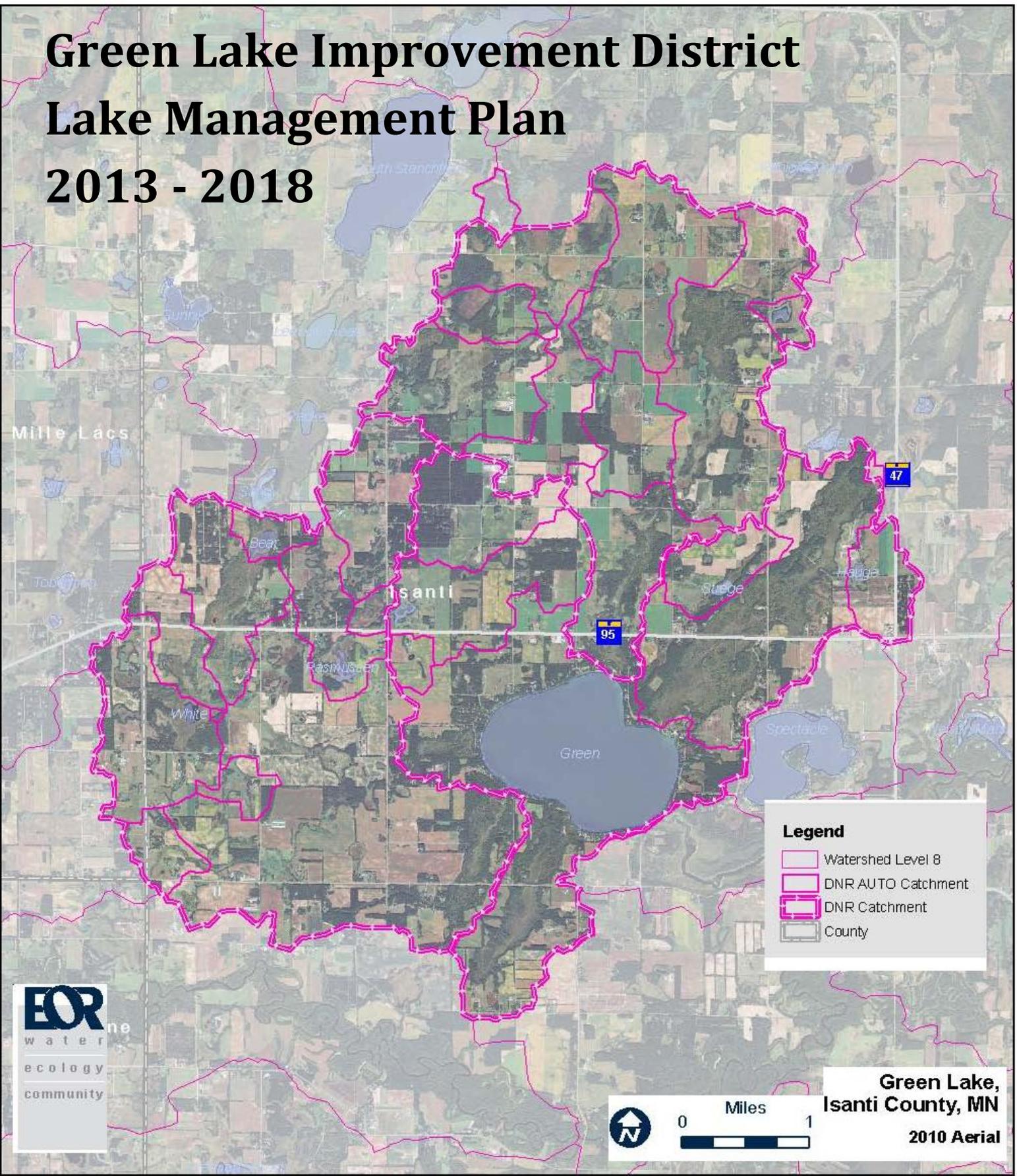


Green Lake Improvement District Lake Management Plan 2013 - 2018

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Legend

- Watershed Level 8
- DNR AUTO Catchment
- DNR Catchment
- County



**Green Lake,
Isanti County, MN**
2010 Aerial



TABLE OF CONTENTS

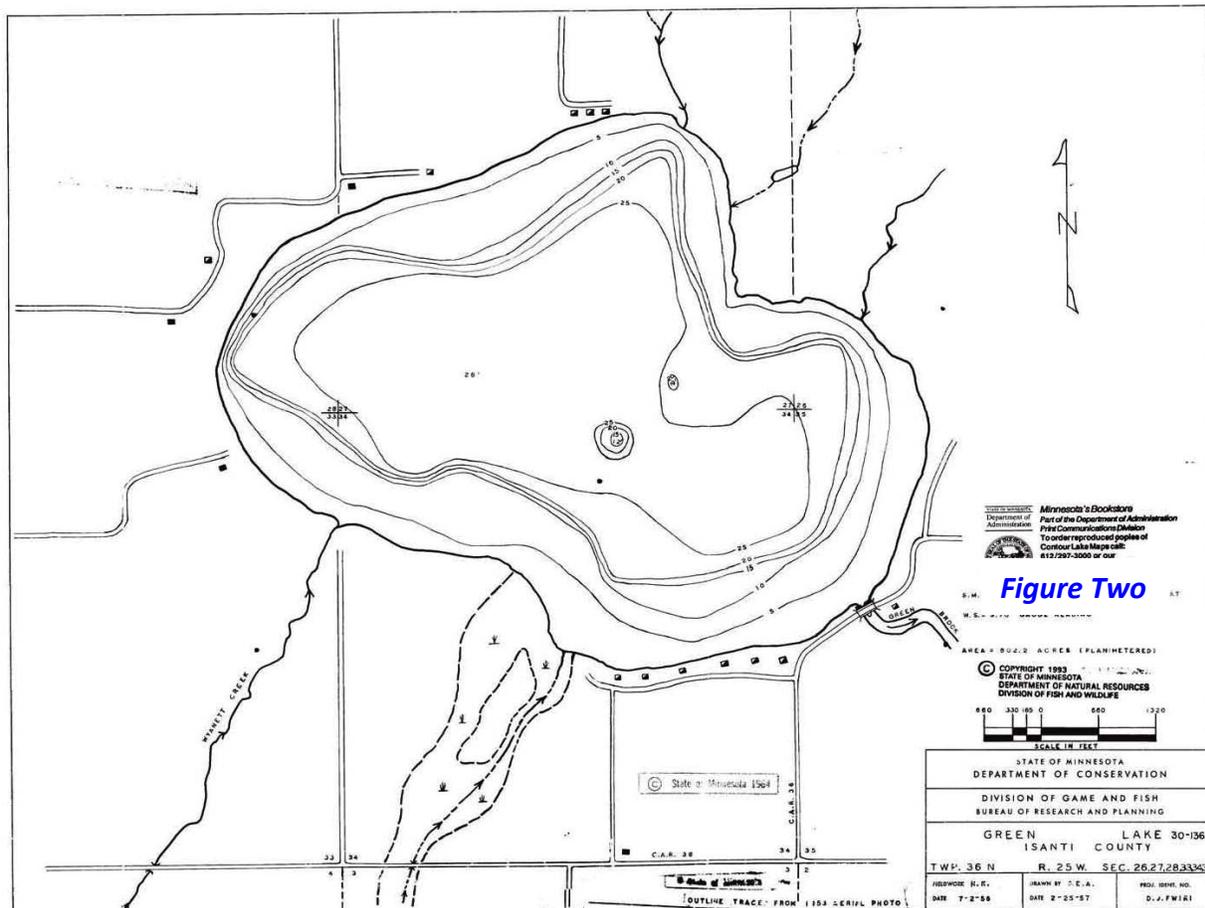
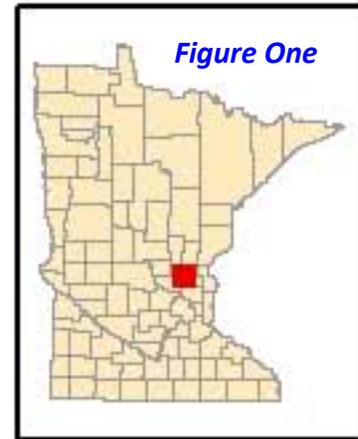
Section		Page
I	EXECUTIVE SUMMARY	1
II	GREEN LAKE	
	• Introduction.....	4
	• History.....	4
	• Physical Characteristics.....	4
	• Water Quality.....	12
	• Fisheries.....	20
	• Aquatic Vegetation.....	20
	• Aquatic Invasive Species.....	21
	• Wildlife.....	22
	• Land Use.....	23
	• Managing Water Surface Use Conflicts.....	26
	• Public Water Access.....	27
	• Wetlands.....	27
III	PUBLIC FEEDBACK AND PERCEPTION	
	• Visioning Session – August 20, 2007.....	30
	• Property Owner’s Survey.....	31
IV	ISSUES, GOALS AND STRATEGIES	
	• Water Quality.....	33
	• Aquatic Invasive Species.....	35
	• Land Use / Zoning.....	36
	• Fisheries.....	36
V	APPENDICES	
	• Appendix 1 – Limnological Terms	

I. EXECUTIVE SUMMARY

Green Lake is a large lake described in **Table One** and is located in Isanti County (**Figure One**). It is the largest of 142 lakes that exist in the County and lies within the Rum River Watershed, which headwaters from Mille Lacs Lake and flows into the Mississippi River at Anoka.

The lake receives water via precipitation, overland flow and inlets as shown in **Figure Two**. The main inlets are Wyanett Creek, North Brook Creek, and three unnamed creeks. The outlet, Green Lake Brook sends and during flooding receives water from the Rum.

Green Lake Statistics	Table One
Lake Number	30-0136
DNR Lake Classification	General Development
Lake Area (acres)	832.87
Littoral Area (acres)	357
Maximum Depth (feet)	28.0
Mean (average) Depth (feet)	16.0
Ordinary High Water Level (OHWL) (feet)	922.6
Miles of Shoreline	4.4
Area of 3 Catchments draining to lake (acres)	15,875
Catchments to Lake Surface ratio	19:1



There are three main catchment areas bordering Green Lake as shown in *Figure Three* on page three. These areas make up the actual Drainage Area of the Lake. County ditch number sixteen and Wyanett ditch both drain into the Lake, providing a direct conduit from the watershed. As shown in *Table Two*, deciduous forest makes up over sixteen percent and cultivated crops make up over forty percent of the land within the drainage area of this lake. Excluding the lake itself, almost fourteen percent of the area is made up of water/wetlands, and over thirteen percent is pasture/hay. There are bluffs along the northeast and southern border

Land Use Within the Drainage Area of Green Lake*		
<small>*Based on National Land Cover Database 2006</small>		<i>Table Two</i>
Land Use	Acres	% of Lakeshed
Developed, Open Space	343.7	2.2
Developed, Low Intensity	377.9	2.4
Developed, Medium Intensity	16.0	0.1
Developed, High Intensity	0.7	0.0
Barren Land	1.6	0.0
Deciduous Forest	2,656.9	16.7
Evergreen Forest	1,050.4	6.6
Mixed Forest	54.5	0.3
Shrub/Scrub	72.7	0.5
Grassland/Herbaceous	524.7	3.3
Pasture/Hay	2,175.0	13.7
Cultivated Crops	6,403.4	40.3
Woody Wetlands	217.4	1.4
Emergent Herbaceous Wetlands	1,127.5	7.1
Open Water	852.6	5.4
Total Acres	15,875.0	100.0

of this lakeshed and hills along sections of shoreline. The land is part of the Anoka Sand Plains and consists mainly of lake sands and outwash deposits, with high to very high probability that the water on the surface will reach the aquifer within “hours to months (very high)” and “weeks to years (high)”.

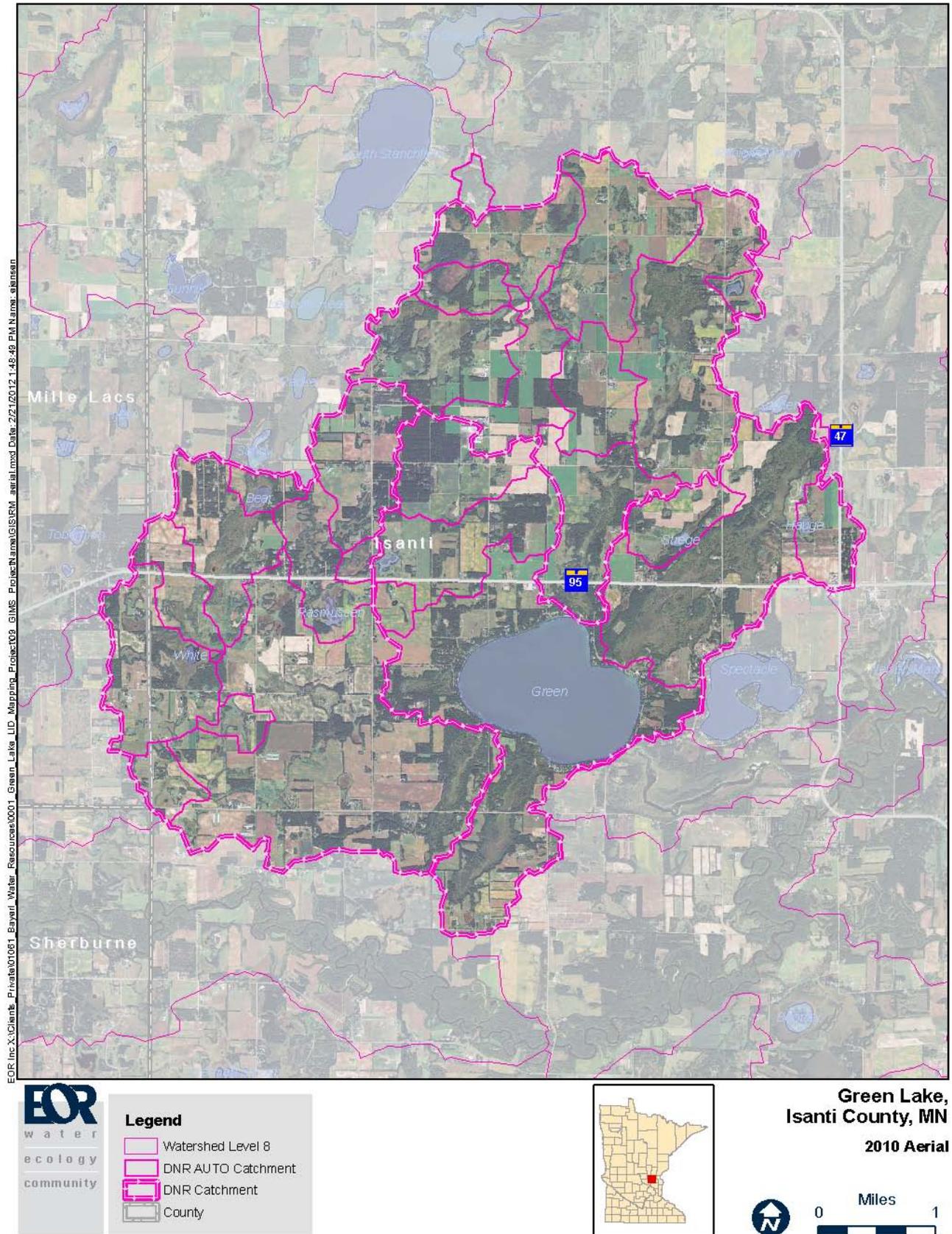
The purpose of this management plan is to document the information available regarding Green Lake in one place and set priorities for accomplishing improvement projects within the catchment boundaries of Green Lake.

To meet these purposes, the Green Lake Improvement District has participated in gathering input from the property owners and other users of the resource to determine concerns and priority issues. Through a survey, a facilitated visioning session and meetings with state and local government, the following priorities were presented, in order of importance: Water Quality, Aquatic Invasive Species (AIS), Land Use and Zoning, and Fisheries.

From the visioning session, strategies were established to manage the problems presented. Chapter Four contains a listing of the actions the Green Lake Improvement District intends to accomplish within the next five to ten years. Education of the residents within the lakeshed and users of the lake is central to all of the listed priority issues.

The Green Lake Management Plan is proposed as a multi-step process that will be reviewed and evolve over time. In addition to organizing its future steps and recruiting volunteers the plan will require funding to accomplish its activities. The Green Lake Improvement District will be working closely with Isanti County Zoning and Isanti Soil and Water Conservation District to investigate funding sources and regulatory changes required to protect our valuable resources. It is meant to be a guide for future lake directors. It can be amended at any time to provide for opportunities and issues unforeseen.

Figure Three – Green Lake Drainage Area



II. GREEN LAKE

Introduction

This document is intended to create a record of historic and existing conditions and influences on Green Lake, and to identify the goals of the Green Lake community. Ultimately it is meant to also help prioritize goals, and guide citizen action and engagement in the priority action areas. Clearly, state agencies and local units of government also have a vital role and responsibility in managing our surface waters and other natural resources, but above all else this Lake Management Plan is intended to be an assessment of what we as citizens can influence, what our desired outcomes are, and how we will participate in shaping our own destiny.

This Lake Management Plan is also intended to be a “living document;” as new or better information becomes available, as we accomplish our goals or discover that alternative strategies are needed it is our intent to update this plan so that it continues to serve as a useful guide to future leaders.

In discussing lake management issues, it is impossible to avoid all scientific or technical terms. We have tried to express our goals, measures of success, and other themes as simply and clearly as possible, but have included a glossary of common limnological terms at the end of the plan to assist the reader. Limnology is the study of lake conditions and behavior.

History and Purpose of the Green Lake Improvement District

Green Lake Improvement District (GLID) was incorporated as a non-profit organization on July 1, 2001. It functions with a nine-member elected board and exists as a local government body under Isanti County. Information is disseminated to lake property owners and the general public via mailings and through the web site: <http://www.greenlakemnid.com/news.php>.

The GLID was initially formed to take over the ownership and operation of a water control structure at the confluence of Green Lake Brook and the Rum River. This mission has since been expanded to include the protection and improvement of Green Lake and its watershed.

Physical Characteristics and location of Green Lake

Green Lake is located in the west-central area of Isanti County and lies within Wyanett Township. It is a shallow lake with forty-three percent of the total acreage fifteen feet or less in depth and a mean depth of sixteen feet. The maximum depth of the lake is twenty-eight feet. The total drainage area of Green Lake is 15,875 acres.

Green Lake is an oval lake totaling almost 833 acres. The shoreline extends 4.4 miles. This amounts to 189 acres of water per mile of shoreline.

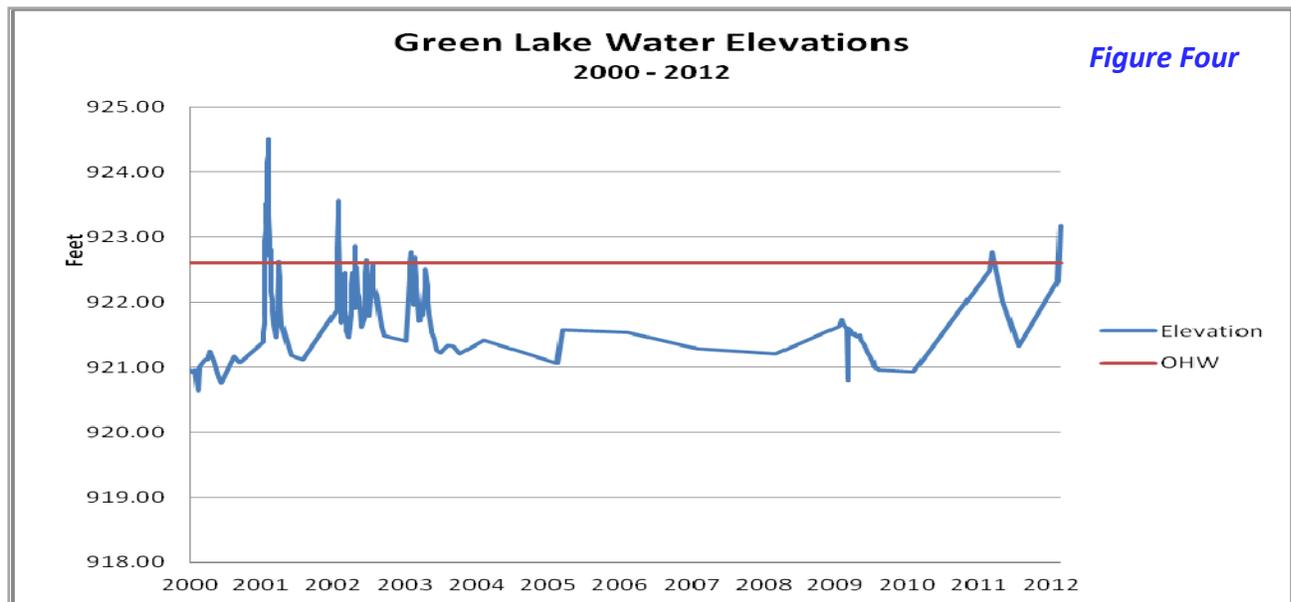
The predominant land uses within the lakeshed are cultivated crops, deciduous forest and pasture or hay. There are 45 separate emergent, herbaceous and woody wetlands. Together, these total almost thirteen percent of the drainage area, not including the lake itself.

The main inlets are Wyanett Creek, North Brook Creek, and three unnamed creeks. The main functioning outlet, Green Lake Brook, lies in section thirty-five of Wyanett Township and consists of a stop log control structure over county road #7 completed in 1936 and a box culvert with timber flap gate three miles downstream at MN Hwy 47. The GLID took over management of these structures in 2001.

Ordinary High Water Level

The Ordinary High Water Level (OHW) of a lake is determined by the Department of Natural Resources (DNR) through the [Minnesota Statutes 103G.005](#), Subd. 14. Ordinary high water level. The OHW is an elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial.

Green Lake levels have been recorded since 1937. The past ten years of recordings are shown in [Figure Four](#), with the highest known reading occurring in May of 2001 at almost two feet above the OHW of 922.6 feet. The lowest recorded level occurred in 1958 at 3 feet below OHW. Fluctuating lake levels can cause bank erosion and loss of vegetation along the shoreline.



Sub-Watersheds

The next several pages will identify the sub-watersheds, their properties, impairments, land uses, and Best Management Practices (BMP) completed within the drainage area. This will provide the tools to identifying issues and assessing needs for implementation strategies.



Catchment #1 – Lakeshed Boundary

The Lakeshed Boundary, shown in *Figure Five* contains Green Lake itself and the immediate lakeshore border. It also contains two large wetland drainage areas. Predominant land use, as shown in *Table Three*, is cultivated crops.

Area: 5,597.3 Acres

Catchment Number:
2107601

Surface Waters:

- Green Lake
- Strege Lake
- Hauge Lake

Areas of Concern:

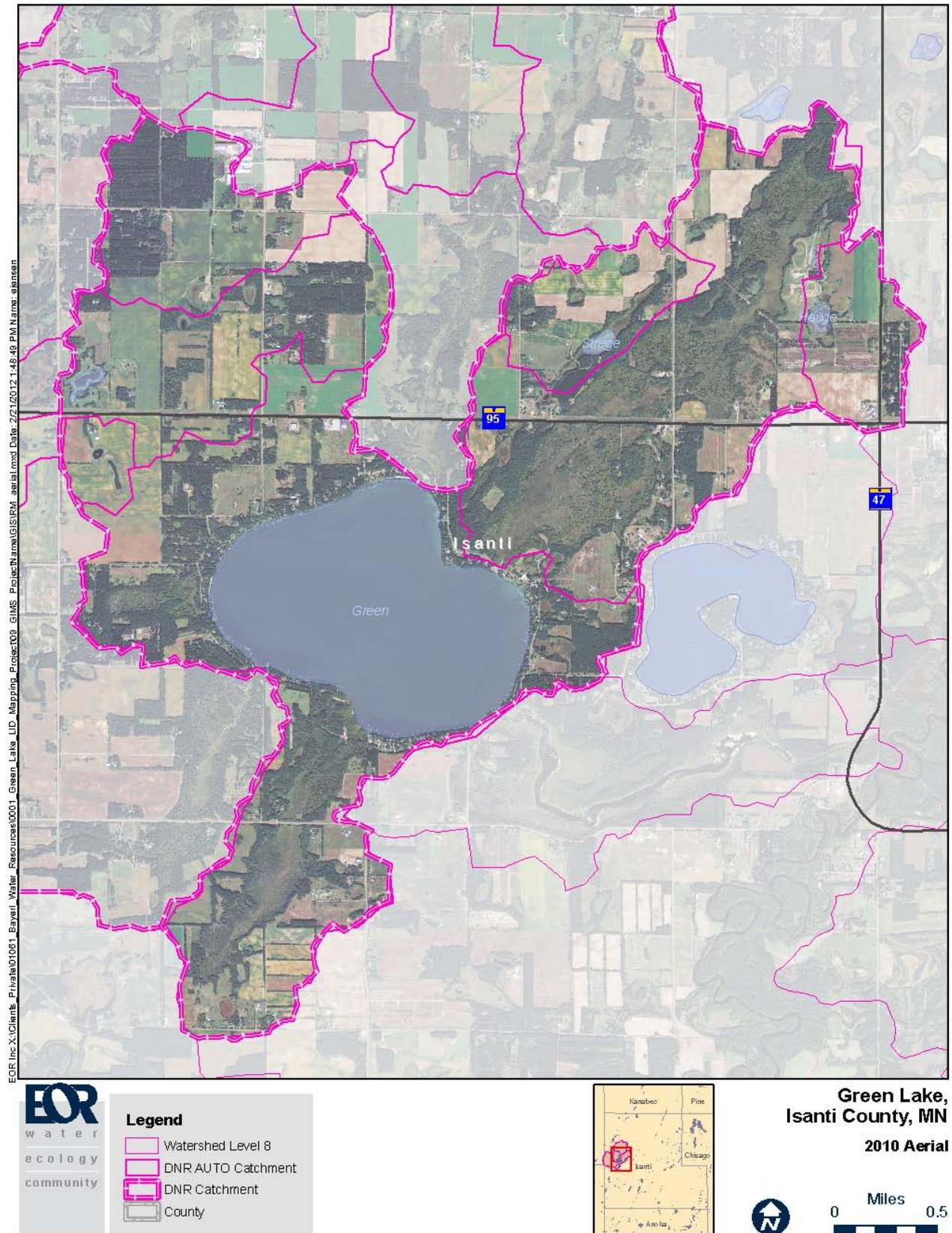
Braitlin Creek to the northeast, Un-named Creek from the south and overland flow from properties located on the lakeshore itself.

Land Use In the Green Lake Lakeshed Area <i>Table Three</i>		
<small>*Based on National Land Cover Database 2006</small>		
Land Use Classification	Acres	Percent
Open Water	822.8	14.7
Developed, Open Space	77.0	1.4
Developed, Low Intensity	151.7	2.7
Developed, Medium Intensity	10.9	0.2
Developed, High Intensity	0.7	0.0
Barren Land		
Deciduous Forest	1,053.9	18.8
Evergreen Forest	460.7	8.2
Mixed Forest	31.0	0.6
Shrub/Scrub	12.0	0.2
Grassland/Herbaceous	167.7	3.0
Pasture/Hay	472.8	8.4
Cultivated Crops	1,847.0	33.0
Woody Wetlands	117.7	2.1
Emergent Herbaceous Wetlands	371.4	6.6
Total	5,597.3	100.0

Suggested Management Practices:

1. Lakescaping projects around the shoreline
2. Agriculture Best Management Practices for Cropland
3. Sub-surface sewage treatment system compliance.

Figure Five – Green Lake Immediate Lakeshed Boundary





Catchment #2 – Wyanett Creek

Wyanett Creek Catchment area, shown in *Figure Six* contains Wyanett Ditch and two branches. It drains over 5,000 acres to the west of Green Lake. Predominant land use, as shown in *Table Four*, is cultivated crops.

Area: 5,502 Acres

Catchment Number:
2103700

Surface Waters:

- White Lake
- Bear Lake
- Rasmussen Lake

Areas of Concern:

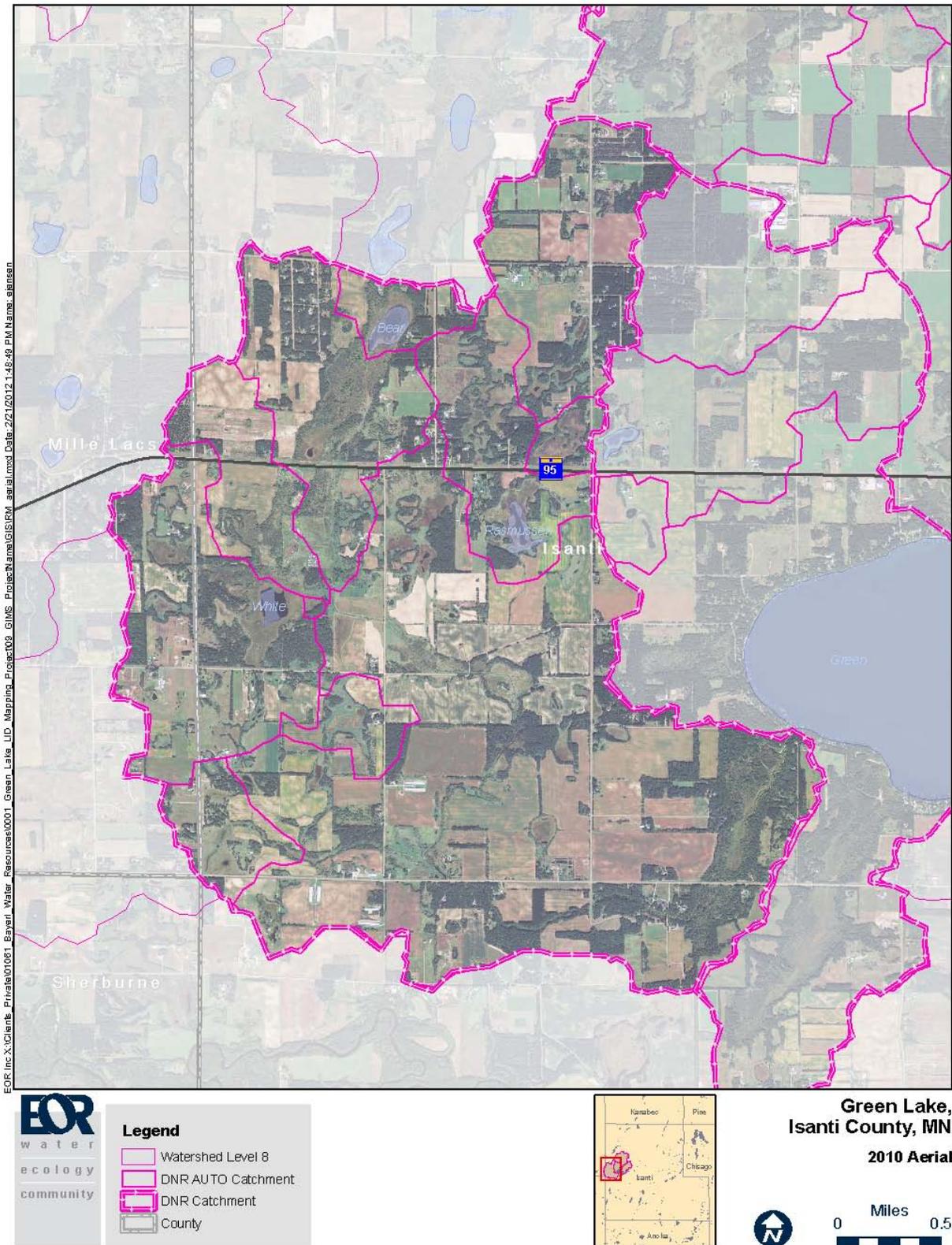
Quality of county ditch system vegetative buffers, quality and quantity of water from the land through the ditch.

Land Use Within Wyanett Creek Catchment <i>Table Four</i>		
<small>*Based on National Land Cover Database 2006</small>		
Land Use Classification	Acres	Percent
Open Water	24.0	0.4
Developed, Open Space	131.3	2.4
Developed, Low Intensity	164.8	3.0
Developed, Medium Intensity	1.1	0.0
Developed, High Intensity		
Barren Land		
Deciduous Forest	823.0	15.0
Evergreen Forest	420.9	7.6
Mixed Forest	17.6	0.3
Shrub/Scrub	55.7	1.0
Grassland/Herbaceous	196.6	3.6
Pasture/Hay	733.1	13.3
Cultivated Crops	2,506.2	45.6
Woody Wetlands	47.8	0.9
Emergent Herbaceous Wetlands	379.9	6.9
Total	5,502.0	100.0

Suggested Management Practices:

1. Buffers along the ditch system
2. Complete stormwater assessment to identify practices needed
3. Ag Best Management Practices for feedlots

Figure Six – Wyanett Creek Catchment Boundary





Catchment #3 – North Brook

North Brook Catchment area, shown in *Figure Seven* is Isanti County Ditch Number Sixteen and four branches. It drains close to 5,000 acres from the north of Green Lake. Predominant land use, as shown in *Table Five*, is cultivated crops.

Area: 4,775.7 Acres

Catchment Number:
2107500

Surface Waters:

Areas of Concern:

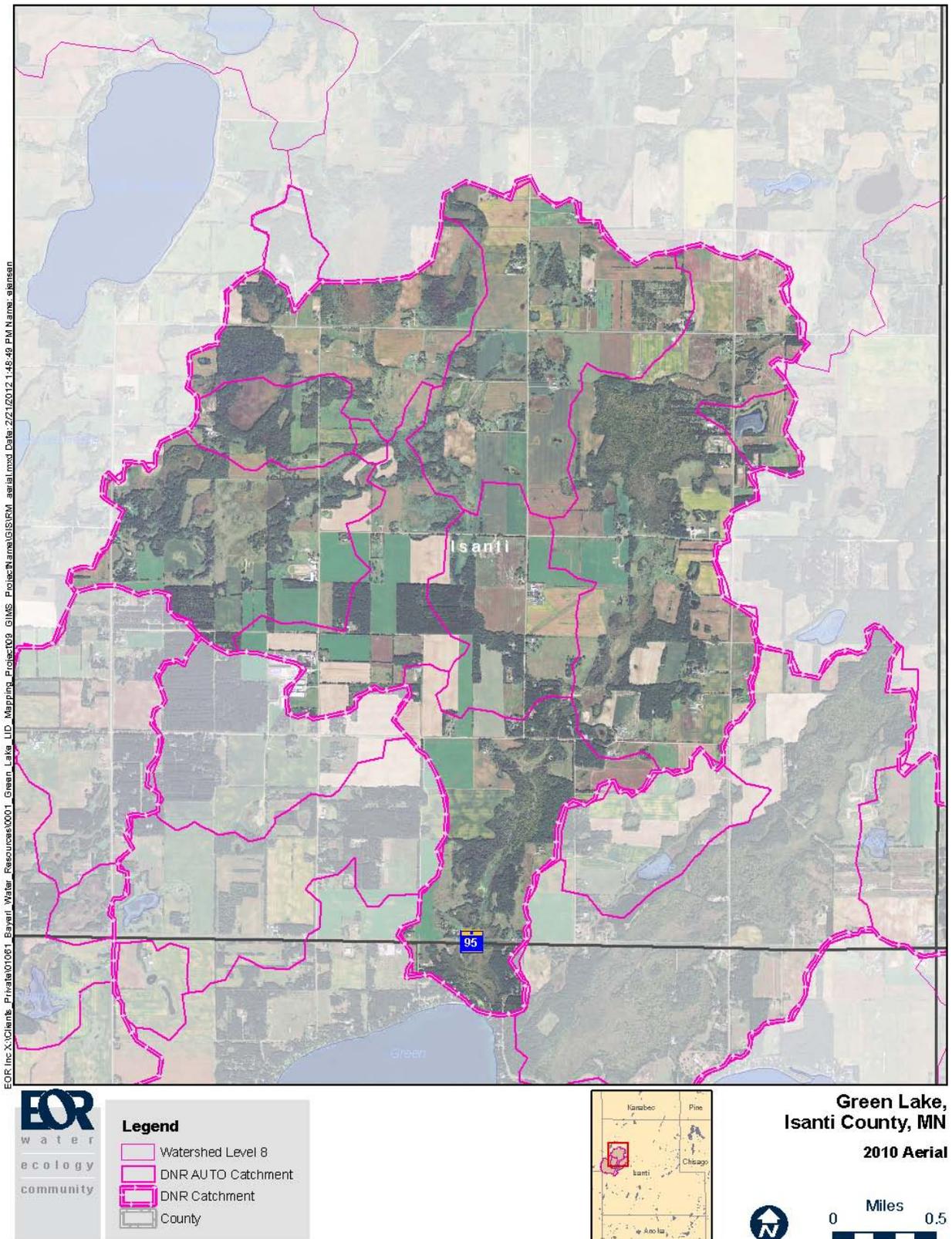
Quality of county ditch system vegetative buffers, quality and quantity of water from the land through the ditch.

Land Use Within North Brook Catchment <i>Table Five</i>		
<small>*Based on National Land Cover Database 2006</small>		
Land Use Classification	Acres	Percent
Open Water	5.8	0.1
Developed, Open Space	135.4	2.8
Developed, Low Intensity	61.4	1.3
Developed, Medium Intensity	4.0	0.1
Developed, High Intensity		
Barren Land	1.6	0.0
Deciduous Forest	780.0	16.3
Evergreen Forest	168.8	3.5
Mixed Forest	5.9	0.1
Shrub/Scrub	5.0	0.1
Grassland/Herbaceous	160.4	3.4
Pasture/Hay	969.1	20.3
Cultivated Crops	2050.2	42.9
Woody Wetlands	51.9	1.1
Emergent Herbaceous Wetlands	376.2	7.9
Total	4,775.7	100.0

Suggested Management Practices:

1. Buffers along the ditch system
2. Complete stormwater assessment to identify practices needed
3. Ag Best Management Practices for cropland

Figure Seven – North Brook Catchment Boundary

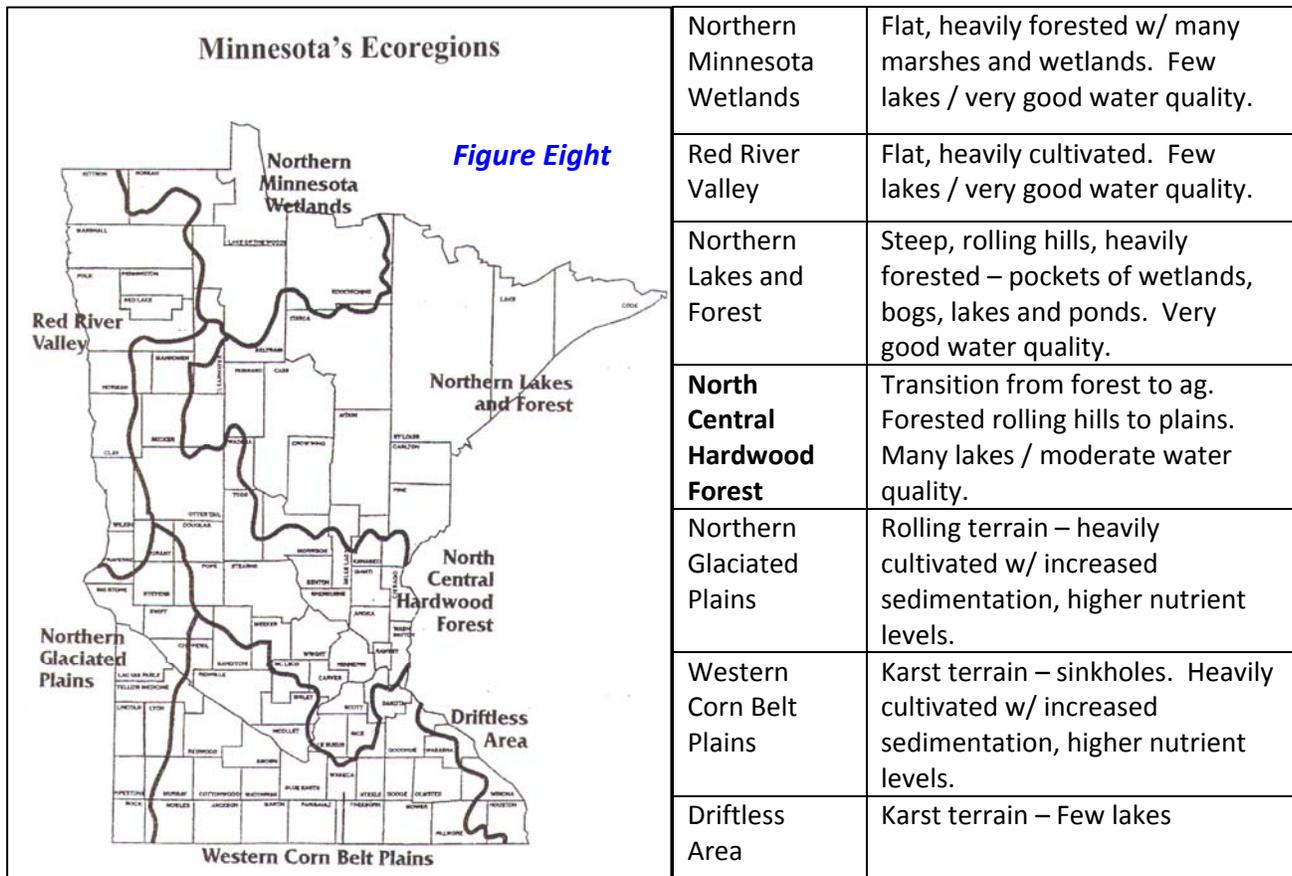


Water Quality

Green Lake has been monitored since 1988 and has been the recipient of numerous studies that are available on the GLID website at: <http://www.greenlakemnid.com/news.php>. Included are:

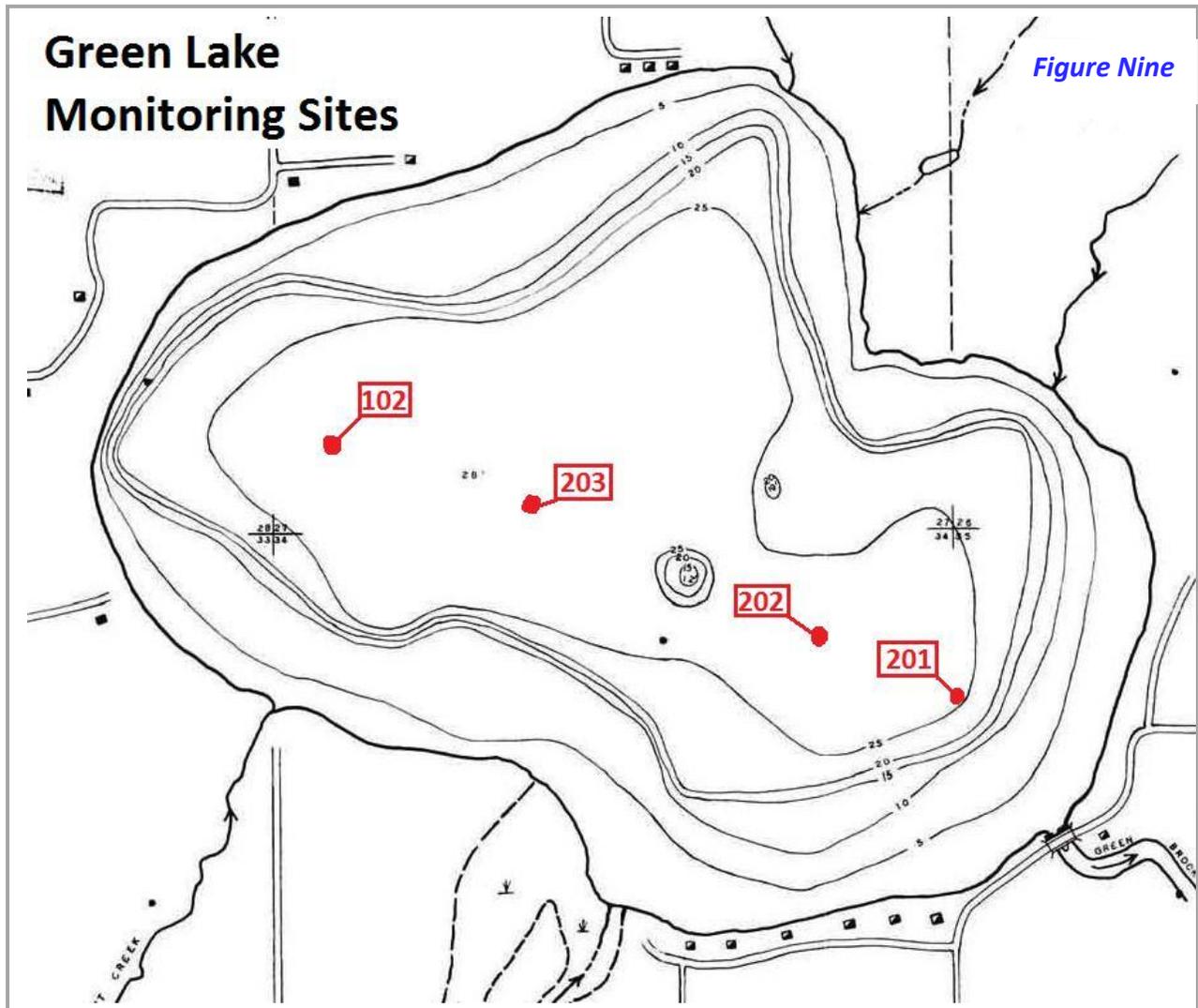
1. 1991 Lake Assessment Program (LAP) survey of the lake was completed by the Minnesota Pollution Control Agency (MPCA), characterizing physical, chemical and biological conditions and influences of the lake.
2. 1995 Green Lake Diagnostic – Feasibility Study
3. 1999 Reference Lake and Trend Monitoring Summary, MPCA
4. 2005 Green Lake Improvement District Water Quality Monitoring Plan

These surveys, along with the volunteer monitoring program on the lake, present enough data to discern trends in water quality. Green Lake is located within the North Central Hardwood Forest Ecoregion. **Figure Eight** contains a map depicting all state ecoregion boundaries and facts about the differing terrains and lake types.



Citizen volunteers have been monitoring the Secchi Transparency in sites 205 and 211 during the months of June through September since 1991. **Figure Nine** is a topographic map of the lake with the sample sites marked. Annual averages are shown in the following pages but complete data can be obtained at: <http://www.dnr.state.mn.us/lakefind/index.html>. The Secchi reading is a measure of clarity of the water. A white disk is lowered into the lake and a measurement is taken at the depth right before visibility is lost.

In addition to the Citizen Lake Monitoring Program, the GLID has participated in a water quality-monitoring program 2004 through 2012.

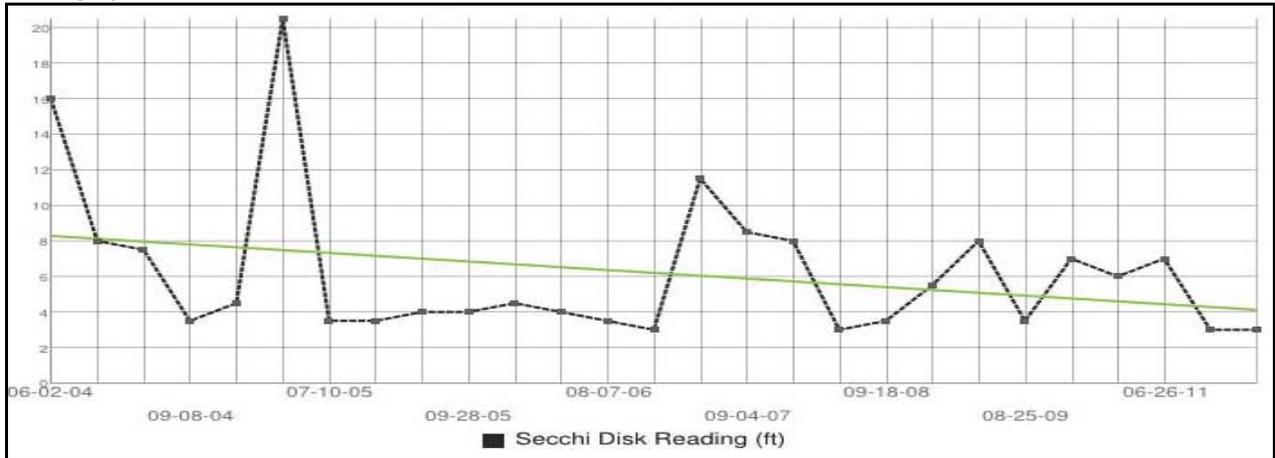


Some sample sites have been monitored for a long time. Site number 202 has been monitored for secchi from 1988-1994 and then from 2004-2012. From 1997-2000, secchi monitoring was continued on site number 203, and during studies (1988, 1989, 1991, and 1998) site 102 was monitored.

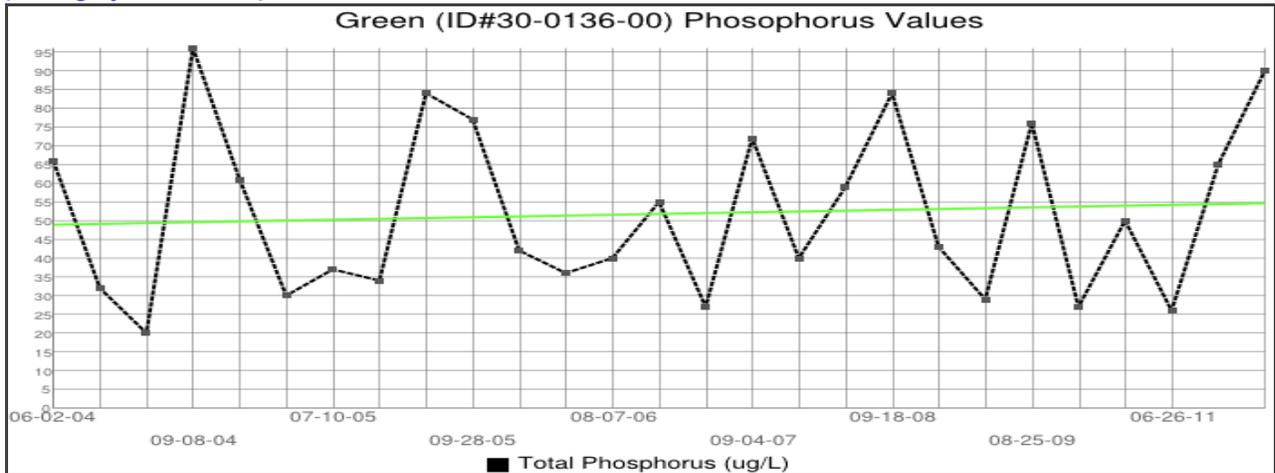
In 2004, Total Phosphorus and Cl-a monitoring were added to site 202. In [Figure Ten](#), three graphs present the three parameters – secchi, t.phos, and cl-a from 2004 through 2011. Note the relationship between them. When phosphorus levels increase, so do chlorophyll-a and consequently the secchi levels decrease in clarity. There is a cause/effect relationship. It is important to manage the lake to decrease phosphorus and other nutrient inputs in the lake to prevent further degradation. Algae blooms will become increasingly common if land use practices do not change to decrease the input of nutrients.

Secchi Averages 2004 – 2011 Site #202
(No Significant Trend)

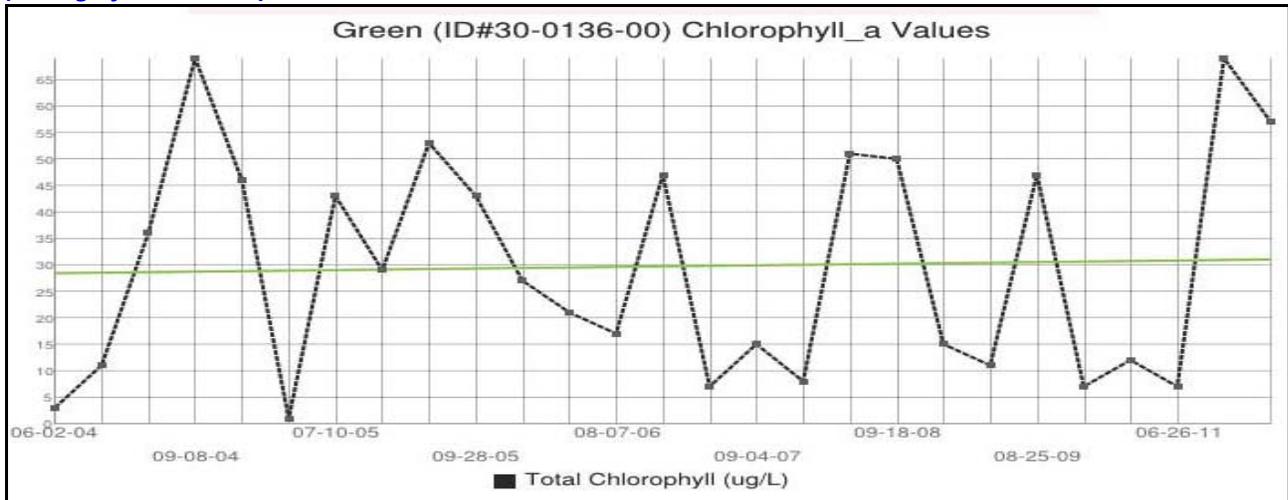
Figure Ten



Green Lake Site 202 Total Phosphorus Trend Analysis 2004 – 2011 by: RMB Laboratories
(No Significant Trend)



Green Lake Site 202 Chlorophyll-a Trend Analysis 2004 – 2011 by: RMB Laboratories
(No Significant Trend)



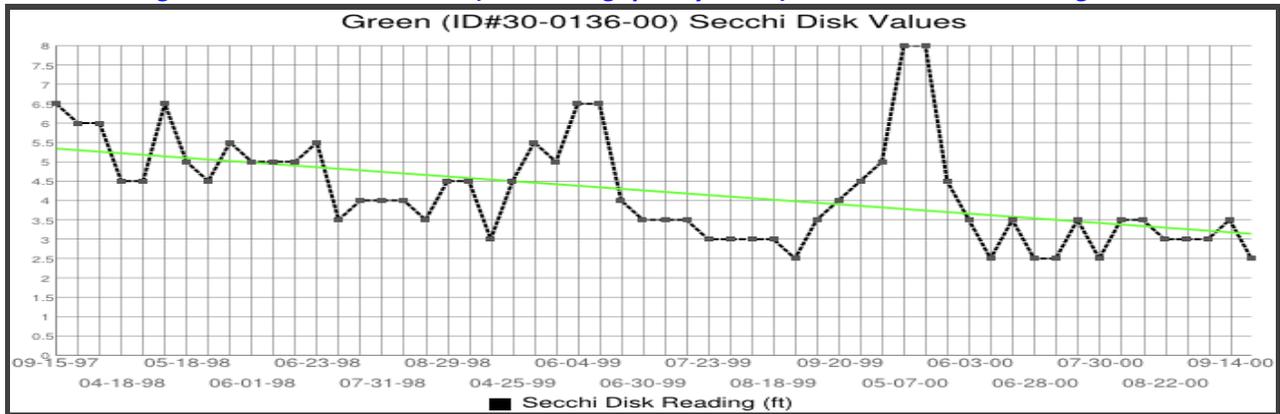
On site number 202, [Table Six](#) shows annual summer means for total phosphorus and chlorophyll-a. While the numbers vary from year to year, the average mean for the sum of the years is outside the typical range for the North Central Hardwood Forest Ecoregion. Green Lake was listed in 2008 by the Minnesota Pollution Control Agency as impaired for nutrients. This impairment will be addressed with the Rum River Watershed Assessment in 2014.

Sample Site #202 - TSI Averages - 2004 through 2011		<i>Table Six</i>
<small>*RMB Lab note: prior to 2011, the reporting limit for total phosphorus was 5 ug/L. Starting in 2011, the reporting limit is 3 ug/L.</small>		
Average Mean of data 2004 - 2011	51.8	29.7
	TP ug/L	ChlA ug/L
2004 Summer Mean	55	33
2005 Summer Mean	52.4	33.8
2006 Summer Mean	43.3	28
2007 Summer Mean	49.5	11
2008 Summer Mean	61	36.3
2009 Summer Mean	49.3	24.3
2010 Summer Mean	38.5	9.5
2011 Summer Mean	60.3	44.3

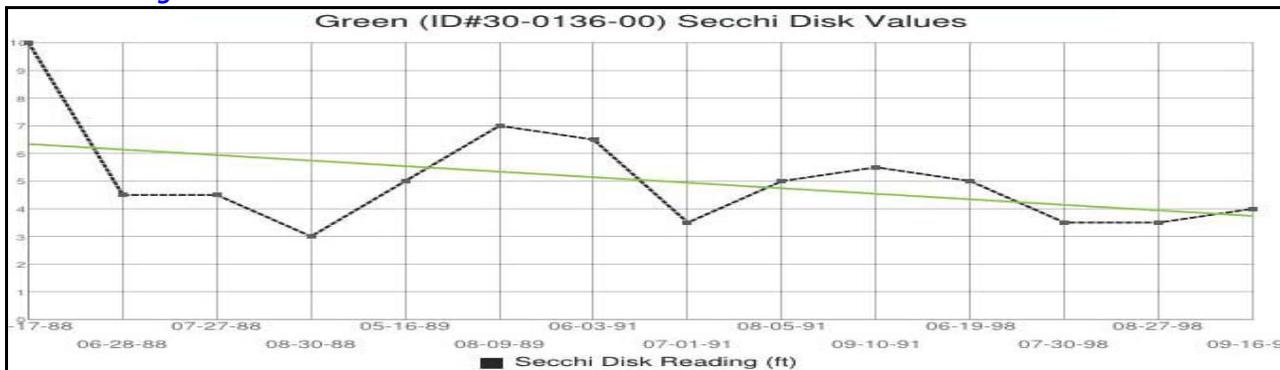
While sites numbers 102 and 203 ([Figure Eleven](#)) have limited data, it is important to look at these values and continue monitoring to establish trends. It is a valuable tool to help determine the areas of the lake that are contributing nutrients so that management strategies can be prioritized by area of the lake.

Secchi Averages 1997 – 2000 Site #203 (Decreasing quality trend)

Figure Eleven



Secchi Averages 1988 – 1998 Site #102



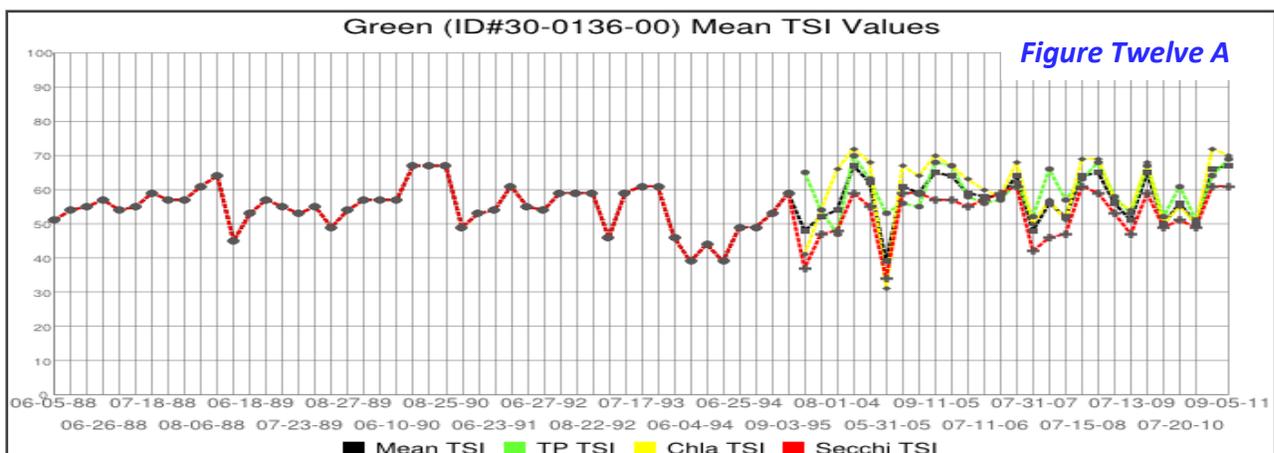
Management practices like upgrading Sub-surface Sewage Treatment Systems, repairing any known areas of erosion on the shoreline and within the drainage area (lakeshed) where the soil is being carried into the lake during a rain event, and allowing lake sediments to remain undisturbed are important to maintaining and improving the water quality of Green Lake. Isanti County has an SSTS inspection program. Green Lake residents were sent a survey in the early 1990s and received a 63% response rate.

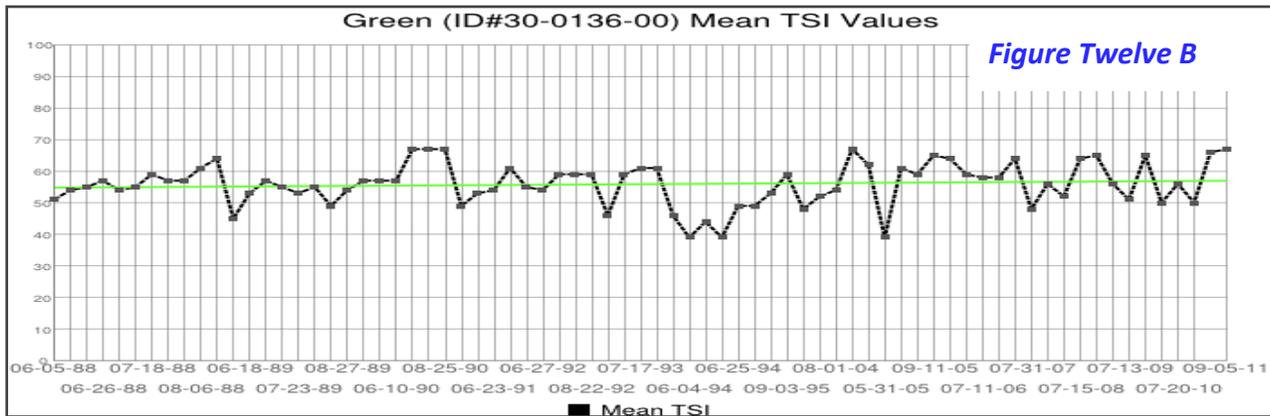
Continued monitoring will be the evaluation tool to determine the positive or negative impacts of how we use the land. Additional management practices to protect water quality include using phosphorus-free fertilizer, pumping septic tanks every two years, locating fire pits where the runoff from the pit cannot enter the lake, maintaining an uncut buffer strip of deep rooted vegetation between the lawn and the lake, by limiting the impervious area on lake property and by protecting both the emergent and sub-emergent vegetation growing around the lake.

Parameters measured through the monitoring program include Total Phosphorus, Chlorophyll-a, and Secchi. Phosphorus is a nutrient that feeds algae in lakes within this ecoregion. Phosphorus comes from many sources including rain, fertilizer, and it is carried by soil in runoff. Chlorophyll-a is the “green” in the plants in the lake. It is tested to measure the impact Phosphorus is having on the algal / plant growth in the lake. It has been said that one pound of Phosphorus can produce 500 pounds of aquatic vegetation. There is a correlation between the amount of Chlorophyll-a and Phosphorus in the water and the ability to see through the water column.

Carlson’s Trophic State Index (TSI)

TSI or Trophic State Index is a standard measure or means for calculating the trophic status or productivity of a lake. This is a measure of a lake’s fertility. TSI uses three measurements combined together to get an average value. The measurements are: Transparency or Secchi Disk reading (water clarity), the amount of Total Phosphorus (a major contributing nutrient), and Chlorophyll A (a measure of the amount of algae in the water). An important relationship exists between these three parameters. INCREASED PHOSPHORUS = INCREASED CHLOROPHYLL = DECREASED SECCHI DISK. TSI is based on the interrelationships of these measurements or parameters. If the index values agree fairly well for your lake, it may be safe to assume that given data for one of the parameters, e.g., Secchi transparency, you should be able to estimate the others and ultimately, be able to track changes in trophic status over time. The data from this sampling period has been further analyzed, as shown in *Figure Twelve A-C*, to present the Trophic Status of the Lake.





The Trophic Status of Green Lake is based on “Carlson’s Trophic State Index” or TSI as shown in [Figure Thirteen](#). This index uses information about Total Phosphorus, Chlorophyll-a, and Secchi to determine the quality of the lake. It is important to note a correlation between the sampled parameters:

“Increased phosphorus = increased chlorophyll = decreased Secchi disk depth”.

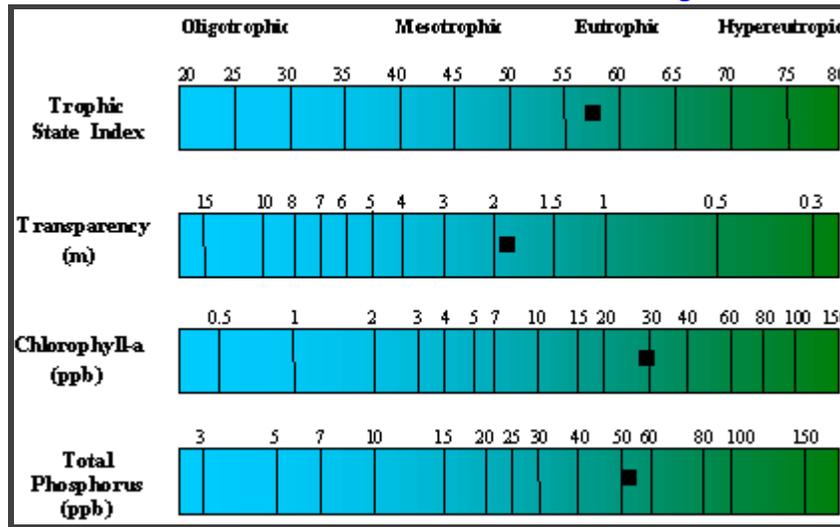
TSI averages are between 47 and 49, indicating the lakes are on the high end of Mesotrophic or

Individual Lake Data Summary							
Lake: Green	Lake MN ID#: 30-0136-00				Figure Twelve C		
Sample Site #202 - TSI Averages - 2004 through 2011							
<small>*RMB Lab note: prior to 2011, the reporting limit for total phosphorus was 5 ug/L. Starting in 2011, the reporting limit is 3 ug/L.</small>							
Average Mean of data 2004 - 2011	51.8	29.7	6.2	59.7	60	52.9	57.6
	TP ug/L	ChlA ug/L	Secchi Ft	TSI Phos	TSI ChlA	TSI Secchi Ft	TSI Avg
2004 Summer Mean	55	33	7.9	59.8	60.2	49.2	56.6
2005 Summer Mean	52.4	33.8	7.1	59.8	59.8	53.2	57.6
2006 Summer Mean	43.3	28	3.8	58.3	62.3	58	59.8
2007 Summer Mean	49.5	11	10	59	53.5	44	52
2008 Summer Mean	61	36.3	4.8	62.7	63	55.7	60.3
2009 Summer Mean	49.3	24.3	5.7	59.3	59.7	53	57.3
2010 Summer Mean	38.5	9.5	6.5	56.5	52.5	50	53
2011 Summer Mean	60.3	44.3	4.3	61.3	64	57	61

the low end of Eutrophic. This graph can be used to check all three parameters for TSI.

The Trophic State of a lake is a useful tool for goal setting. **Eutrophic Lakes** (TSI usually between 45 and 65) are typically very murky green and warm during the summer. They tend to have muddy or silty shorelines and are typically shallow and have bowl shaped basins. These lakes tend to be alkaline (have hard water) and have high levels of nutrients that cause eutrophication. These lakes usually have very extensive growth of macrophytes (aquatic plants). They have extensive algal growth and typically experience algal blooms in the summer. Sometimes these lakes will experience winter fish kills. Warm water fish and rough fish predominate.

Figure Thirteen

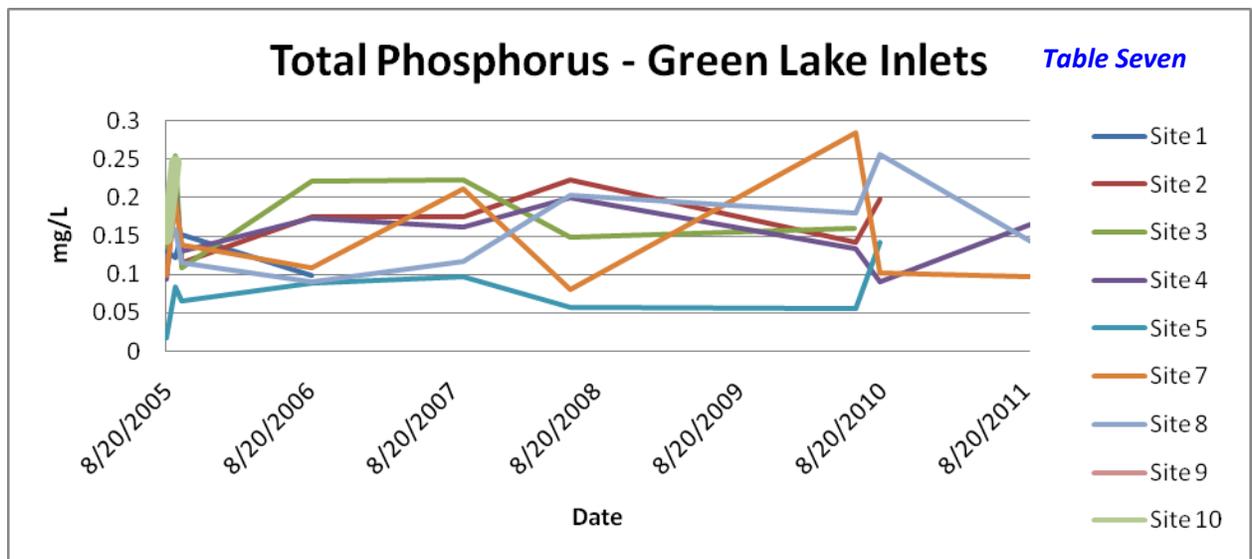
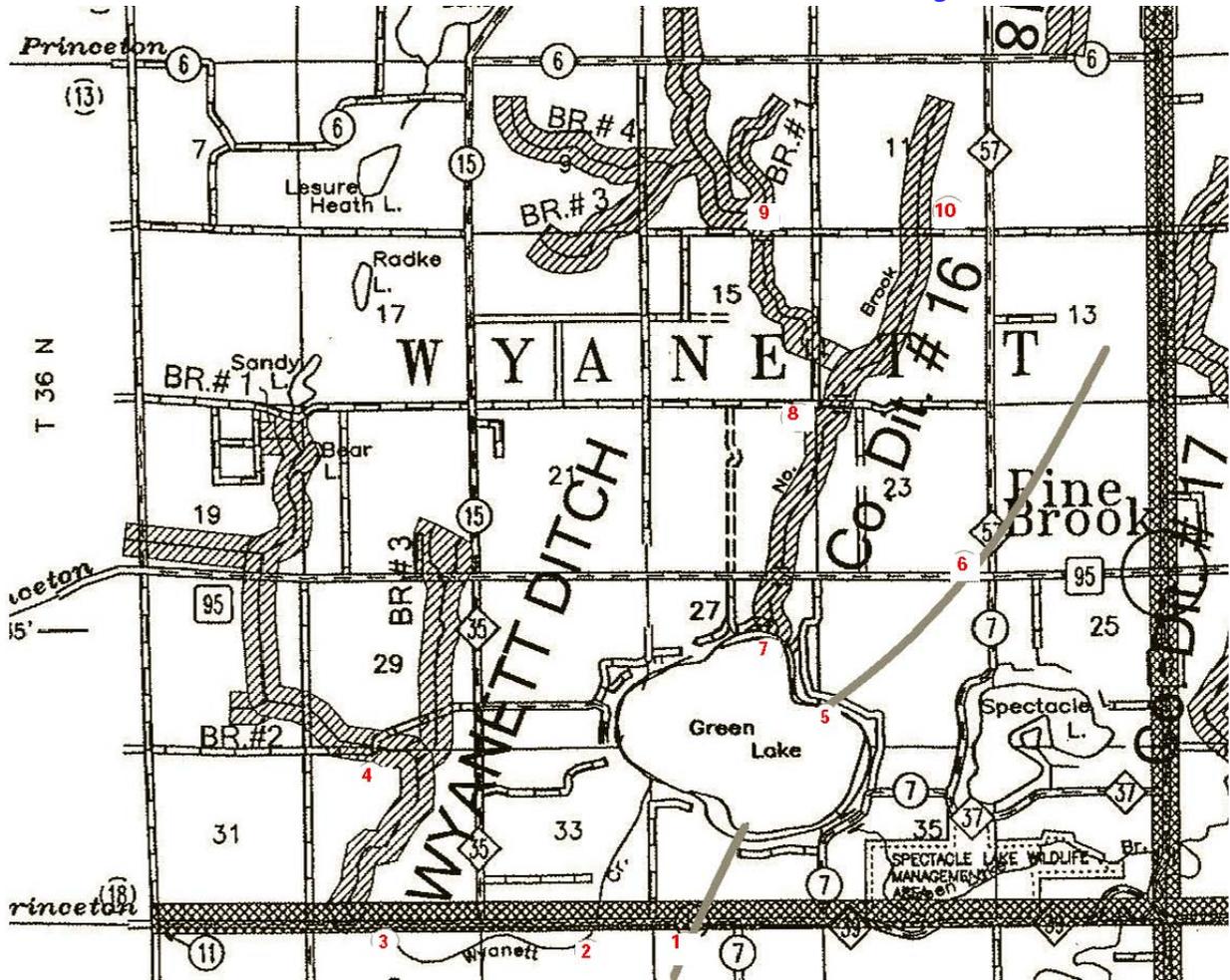


It is important to look carefully at this information as far as protecting and improving Green Lake. The lake can only assimilate nutrient load to a certain degree. When this “tipping point” is reached, the lake will experience severe changes in the areas of clarity and nuisance algal blooms. The TSI averages of 47 to 49 can fit into the higher end of Mesotrophic and / or the lower end of Eutrophic. As you can see by the explanations above, there is a striking difference in the quality and the use / enjoyment of a lake when it tips into the Eutrophic state.

Inlet Monitoring:

The GLID has started a monitoring program in 2010 that monitors the waters flowing into Green Lake from throughout the drainage area. Preliminary total phosphorus data as shown in [Figure Fourteen](#) shows the inlet and outlet monitoring sites. Data from these sites is shown in [Table Seven](#) and from this data there are areas of concern but more information will be needed to determine inputs. A comprehensive monitoring plan on multiple dates during the year with rain events and regular dry events would help develop a more accurate picture of the influence of these inlets. A stormwater assessment targeting runoff into the lake will help utilize this data.

Figure Fourteen



Fisheries:

Current Fisheries management includes annual stocking of 360 pounds of walleye fingerlings. The DNR completed a fish survey on Green Lake in August of 2012. The complete survey can be found at: <http://www.dnr.state.mn.us/lakefind/showreport.html?downum=30013600> and on the GLID website at: <http://www.greenlakemnid.com/news.php>. The status of the Green Lake Fishery (as of 09/10/2007) according to the MN Dept. of Natural Resources fisheries division is summarized in **Table Eight** as followed:

Green Lake Fisheries Population Assessment - 2007 and 2012						Table Eight			
Species	Numbers found		Sample Method	Length - Inches		Mean Length Inches		Mean Weight Lbs.	
	2007	2012		2007	2012	2007	2012	2007	2012
Walleye	4.2	6.75	gill net	12.6-27.5	13-27.4		20.7	2.8	3.14
Northern pike	4.7	4.25	gill net					3.2	3.83
Yellow perch	4.6	19	gill net			<6.5	6.8		
Black crappie	20.6	16.75	gill net	4.7-10.7	3.1-11.4		8.1	0.4	
Bluegill	5.8	6.71	trap net		3.5-7.7	5.2		0.1	0.15
Largemouth bass	40	50.1	electrofishing per hour	6.5-19.7	5.8-19		11.8		

Other: Bowfin (dogfish), black and yellow bullhead – normal abundance
 White Sucker – high abundance Greater Redhorse Sucker noted
 Pumpkinseed Sunfish and Common Carp – low numbers

According to the DNR Fisheries, fish sampling also included near shore sampling by seining and backpack electrofishing to calculate a fish-based Index of Biotic Integrity (IBI). This method determines a numerical score based on species of fish present, types of fish, tolerance of species to degradation, etc. and is being done in conjunction with the MPCA Rum River Watershed sampling. A vegetation IBI will also be calculated. These will provide a better understanding of how Green Lake compares with other area lakes, and provides a baseline for future assessments. The Isanti County the Area Fisheries Supervisor is: Roger A. Hugill, 306 Power Ave. N, P.O. Box 398, Hinckley, MN 55037. Phone: 320-384-7721, email: roger.hugill@state.mn.us.

According to the 2007 Minnesota Department of Natural Resources Fisheries Survey, there is one DNR-owned public access on Green Lake located off State Hwy 95 along the northeast shoreline. It features a concrete apron.

Aquatic Vegetation

Areas of aquatic vegetation have been mapped by the DNR in 2005 and again in 2012. The 2005 vegetation map is shown in **Figure Fifteen** and summarized as follows:

“An aquatic vegetation survey of Green Lake (30-0136-00), Isanti County, Minnesota, was conducted on June 14-15, 2005. Submerged plants were found distributed throughout the lake basin to a maximum depth of fifteen feet, although most vegetation was restricted to water depths less than ten feet. Within the zone from shore to 15 feet, 83 percent of the sites contained vegetation. The aquatic plant community was primarily composed of species tolerant of low water clarity. Eleven native species were found and the most common were bushy pondweed, (*Najas* sp.) (found in 53 percent of the sample sites) and Canada waterweed (23

percent). All other native plant species were found in less than 10 percent of the sample sites. The non-native species, Eurasian watermilfoil (*Myriophyllum spicatum*) was the second most frequent species found, occurring in 34 percent of the sample sites. Another non-native species, curly-leaf pondweed (*Potamogeton crispus*) was found in only four percent of the sites.” (D.Perleberg, 2006) The full survey can be found at: <http://www.greenlakemnid.com/news.php>. The aquatic vegetation survey can also be found on the DNR website at: http://files.dnr.state.mn.us/natural_resources/water/lakes/vegetation_reports/30013600.pdf

Due to the shallowness of the near shore areas, there is abundant submerged aquatic vegetation located around the shoreline of Green Lake. This vegetation provides habitat for waterfowl, fish, and small aquatic mammals such as muskrats.

Buffers along the shoreline, including upland vegetation, are important as habitat and more important for filtering out nutrients before they enter the lake. Woody debris such as trees growing at the water’s edge, fallen branches, etc. should be maintained as a component of a natural shoreline. Macroinvertebrates such as mayflies require a safe place to hatch, providing food for fish, thus providing a “food chain” that exists in a healthy ecosystem.

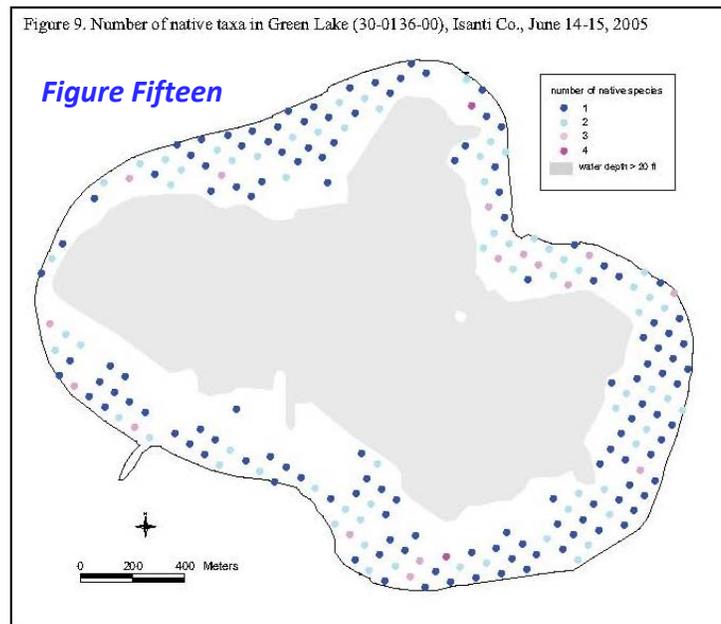
This vegetation includes cattails, hardstem bulrush, arrowhead, and a variety of sedges. This “good” vegetation is crucial to a healthy lake system. They also solidify the shoreline, decreasing the likelihood of erosion. This is nature’s way of stabilizing the banks surrounding the lake. Preservation and restoration of these upland buffers is important to improving the water quality of Green Lake.

A permit is needed for the following: removal of emergent vegetation, removal of floating leaf vegetation other than a 15-foot wide channel to open water, use of herbicides or devices such as weed rollers, or removal of submerged vegetation by hand pulling and cutting in an area greater than 2,500 square feet (50 x 50). Full regulations can be found on the DNR website at: <http://www.dnr.state.mn.us/shorelandmgmt/apg/regulations.html>. Property owners should contact the DNR regarding removal of any aquatic vegetation.

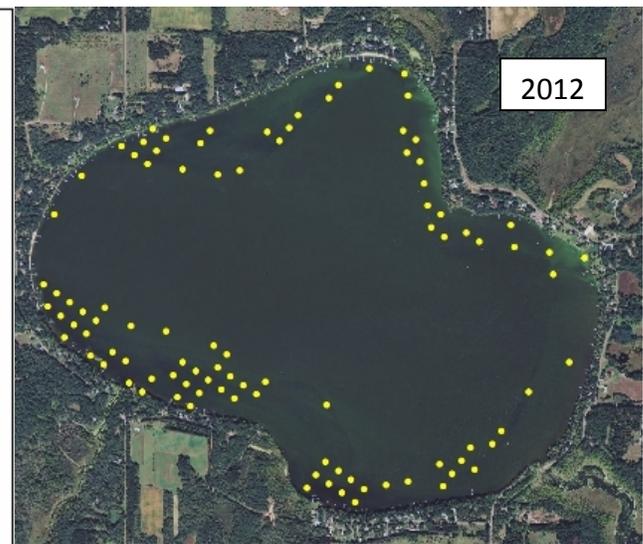
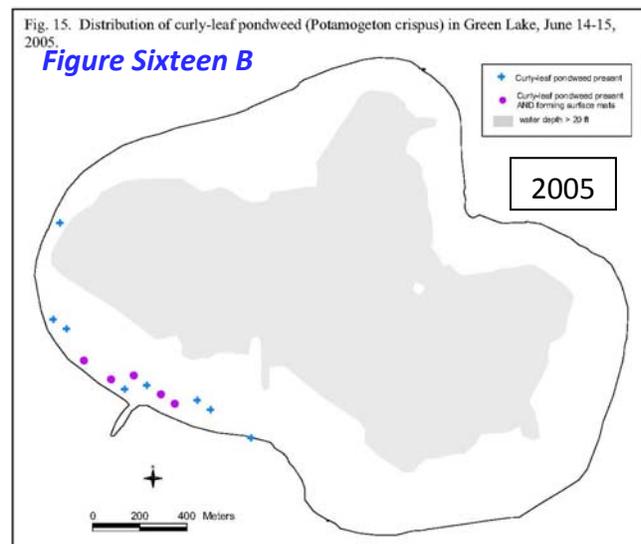
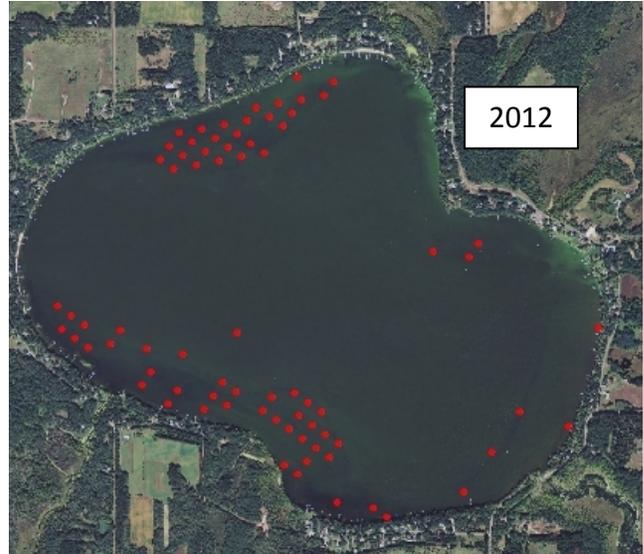
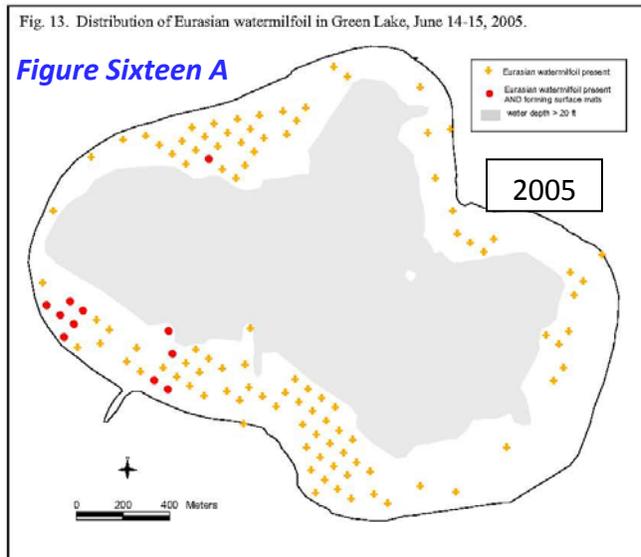
Aquatic Invasive Species (AIS)

Eurasian watermilfoil was first documented in Green Lake in 2000. In the 2005 DNR survey, it was found to depths of 15 feet but was most abundant in depths of 8 feet and less. This species requires less light than the native Northern watermilfoil so it can out compete in the lower water clarity conditions of Green Lake. Surveys completed in 2005 and 2012 (*Figure Sixteen A*) show a slight decrease in area during that time. Green lake has used harvesting the floating mats in the past, but currently use chemical treatment by individual homeowners as needed. Curley-leaf pondweed was found in the lake as far back as 1971.

Green Lake (30-0136-00) Isanti Co. 2005 Vegetation Survey



Curley leaf pondweed showed an increase from 4% in 2005 to 34% in 2012, according to the preliminary results of a survey conducted this summer. As noted in *Figure Sixteen B* it is present in almost all shoreline areas around the littoral zone of the lake. Treatment is by individual property owners on the lake with the GLID prepared to do whole lake treatment if necessary.



2005 Survey by DNR Ecological Services, Brainerd, MN and 2012 Survey (preliminary) completed by DNR Fisheries, Hinckley, MN

Many factors can affect the quantity of aquatic species from year to year. Curley leaf pondweed can grow under the ice in the winter time. In years with less snow cover on the ice and/or shorter seasons, this species has been more abundant. Early spring and longer growing seasons can affect all aquatic plant species. Another factor is the amount of property owners that used chemical treatment year-to-year. Finally, clarity of the water affects species and abundance of growth, more light penetration to deeper areas would promote native species growth.

Wildlife

The most important wildlife habitat begins at the shoreline. The more natural the shoreline, with trees, shrubs and herbaceous vegetation, the more likely that wildlife will be there. Just as important is the shallow water zone close to shore. Cattail, bulrush, and sedges along the

shoreline provide both feeding and nesting areas for wildlife. Loons, black terns and red-necked grebes are important Minnesota birds that are particularly affected by destruction of this vegetation. Underwater vegetation is also important to wildlife for many portions of their life cycle, including breeding and rearing of their young. Various species of geese, duck, egrets, blue herons, gulls, pelicans and cormorants are common on the lake. Mammals noted include mink, beaver, and muskrat where habitat makes it possible.

The primary agency charged with the management of Minnesota’s wildlife is the Department of Natural Resources, Division of Fish and Wildlife, Wildlife Section. For Green Lake, the Area Wildlife Manager is Dave Pauly, 800 Oak Savanna Ln SW, Cambridge, 55008, Phone: 763-689-7100 x 228, email: david.pauly@state.mn.us.

Land Use

The lakeshed of Green Lake is described as the area of land surrounding the lake that empties into the Lake by overland flow. Land use in this plan is from the National Land Cover Database, created in 2001. A full definition of the land use categories can be found in the [Appendix](#) of this document.

The water quality of a lake or river is ultimately a reflection of the land uses within its watershed. The watershed of Green Lake covers about 15,875 acres and includes the following lakes: Bear, White, Rasmussen, Strege and Hauge. The lakeshed includes all the surrounding land that drains directly into Green Lake. This area encompasses 5,597 acres, including the area for the lake itself. Land use in the various catchments of Green Lake is shown in [Table Eight and Figure Seventeen](#).

Land Use Within the Catchment areas of Green Lake*						
	2103700 Wyanett Creek		2107500 North Brook		2107601 Lakeshed	
Catchment	Acres	% of Lakeshed	Acres	% of Lakeshed	Acres	% of Lakeshed
Developed, Open Space	131.3	2.4	135.4	2.8	77.0	1.4
Developed, Low Intensity	164.8	3.0	61.4	1.3	151.7	2.7
Developed, Medium Intensity	1.1	0.0	4.0	0.1	10.9	0.2
Developed, High Intensity					0.7	0.0
Barren Land			1.6	0.0		
Deciduous Forest	823.0	15.0	780.0	16.3	1053.9	18.8
Evergreen Forest	420.9	7.6	168.8	3.5	460.7	8.2
Mixed Forest	17.6	0.3	5.9	0.1	31.0	0.6
Shrub/Scrub	55.7	1.0	5.0	0.1	12.0	0.2
Grassland/Herbaceous	196.6	3.6	160.4	3.4	167.7	3.0
Pasture/Hay	733.1	13.3	969.1	20.3	472.8	8.4
Cultivated Crops	2506.2	45.6	2050.2	42.9	1847.0	33.0
Woody Wetlands	47.8	0.9	51.9	1.1	117.7	2.1
Emergent Herbaceous Wetlands	379.9	6.9	376.2	7.9	371.4	6.6
Open Water	24.0	0.4	5.8	0.1	822.8	14.7
Total Acres	5502.0	100.0	4775.7	100.0	5597.3	100.0

Deciduous forest, pastured land and hay cropland dominate the land use in the area. Residential development occurs mainly around the lake, within the shoreland boundary. While the specific impacts to a lake from various land uses vary as a function of local soils, topography, vegetation, precipitation, and other factors, it is ultimately the land uses which citizens have the most control over through prudent zoning. Local controls can include:

- establishment of appropriate setbacks and vegetative buffers;
- requirement of adequate stormwater retention and treatment;
- limitation of the density of buildings and other impervious surfaces;
- restrictions on the development of sensitive lands like wetlands, those with steep slopes, or areas which cannot support on-site wastewater treatment;
- prohibition or establishment of conditions on higher risk activities like commercial fuel storage, extraction of gravel or other minerals, and storage or disposal of hazardous materials, and:
- retention of ice ridges.

Within the cultivated land category, seven registered feedlots are located. Programs for best management practices are available through the Natural Resources Conservation Service (NRCS) and the SWCD.

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.

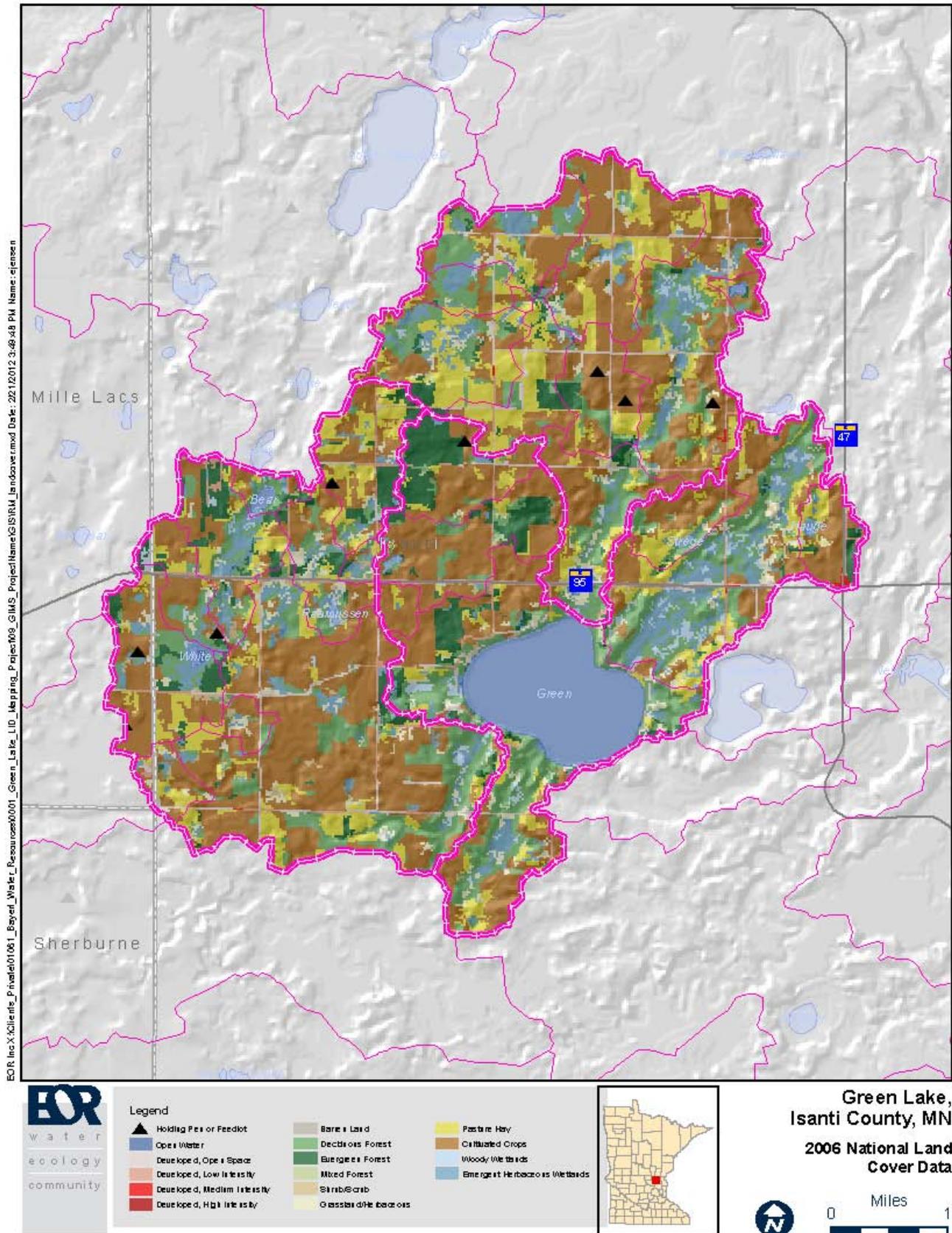
Green Lake (DNR Lake ID#30-0136-00) is a General Development Lake. The Minnesota Department of Natural Resources provides the following explanation of the General Development classification:

General Development Lakes usually have more than 225 acres of water per mile of shoreline and 25 dwellings per mile of shoreline, and are more than 15 feet deep. Green Lake has over 189 acres per mile of shoreline and 40 dwellings per mile. It has a maximum depth of 28 feet. This is why it is designated a General Development lake.

The Shoreland Area is the area within 1000 feet of a lake or 300 feet of a stream or waterway. This is the area regulated in the Shoreland Section of the Zoning Ordinance in Isanti County. A revised Zoning Ordinance has been adopted in 2011.

Isanti County has a web-site, which offers helpful contact information regarding planning and zoning matters: <http://www.co.isanti.mn.us/zoning/zonorddiv/2011zoningordinancesections.pdf>. On any shoreland the permissible density and setbacks for virtually all new use are determined by the lake or river classification standards established by the Department of Natural Resources.

Impervious Surface Coverage: Twenty-five percent is the maximum amount of land that may be covered by surfaces that repel water. (This includes buildings, sidewalks, decks, landscaping, driveways (gravel or otherwise), etc.)



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Alterations of vegetation and topography will be regulated to prevent erosion into public waters, fix nutrients, preserve shoreland aesthetics, preserve historic values, prevent bank slumping, and protect fish and wildlife habitat.

- Erosion control methods must be used as needed to prevent erosion into public waters.
- Use of a fertilizer containing phosphorus is prohibited except for agriculture greater than 300-foot landward of the OHWL.
- Any use of herbicides, pesticides and/or fertilizer must be used in a way to minimize impact on the lake.
- A Grade / Fill permit is needed to move any earth within the shore or bluff impact zone or any wetland. Movement of more than ten cubic yards of material on steep slopes or within the shore or bluff impact zones or the movement of more than fifty cubic yards of material outside of steep slope and shore and bluff impact zones will require a Grade / Fill permit.

Managing water surface use conflicts

The goal of lake management is to ensure that the lake can continue to provide the benefits that attract homeowners and users. However, conflicts among uses arise almost invariably. Successful resolution of conflicts lies in the ability of the users to work collaboratively to arrive at acceptable compromises.

The primary agency responsible for managing surface water use conflicts is the Minnesota Department of Natural Resources, Bureau of Information and Education. The Boat and Water Safety Section within the Bureau oversees surface water use and is in charge of administering the Water Surface Use Management (WSUM) program. The goal of this program is to enhance the recreation use, safety and enjoyment of the water surfaces in Minnesota and to preserve these water resources in a way that reflects the state's concern for the protection of its natural resources.

Within this context, any governmental unit may formulate, amend or delete controls for water surface use by adopting an ordinance. Submit the ordinance for approval by the MDNR Boat and Water Safety Coordinator by calling 1 (800) 766-6000 or (651) 296-3336. To gain approval the ordinance must:

- Where practical and feasible accommodate all compatible recreational uses;
- Minimize adverse impacts on natural resources
- Minimize conflicts between users in a way that provides for maximum use, safety and enjoyment, and
- Conform to the standards set in WSUM Rules.

With increasing boat traffic on lakes, safety is becoming more of a concern. According to the survey the number of boats on the lake is a concern.

From a practical standpoint, any community considering this action should also consult with their local law enforcement agency (that will largely enforce the local ordinance) to ensure that any restrictions can be effectively enforced.

An alternative or complementary approach is to encourage education and a "community standard" of acceptable behavior. Annual distribution of state standards for hours of operation, setbacks from shorelands, loon nests, swimming areas, and other hazards or sensitive areas helps create "peer pressure" to minimize the types of behavior that tend to lead to the most conflicts.

Public water access

Research has shown that Minnesotans rely heavily upon public access sites to access lakes and rivers. A 1988 boater survey conducted by the University of Minnesota showed that three-fourths of the state’s boat owners launch a boat at a public water access site at least once a year. In addition, over 80 percent of boat owners report using public water access sites for recreation activities other than boating.

The primary agency responsible for public water accesses in Minnesota is the Minnesota Department of Natural Resources, Trails and Waterways Unit. They are responsible for the acquisition, development and management of public water access sites. The DNR either manages them as individual units or enters into cooperative agreements with county, state, and federal agencies, as well as local units of government such as townships and municipalities. The DNR’s efforts to establish and manage public water access sites are guided by Minnesota Statutes and established written DNR policy. The goal of the public water access program is free and adequate public access to all of Minnesota’s lake and river resources consistent with recreational demand and resource capabilities to provide recreation opportunities.

According to the 2007 Minnesota Department of Natural Resources Fisheries Survey, there is one township owned public access on Green Lake located off of State Highway 95 along the north shoreline, featuring a concrete apron.

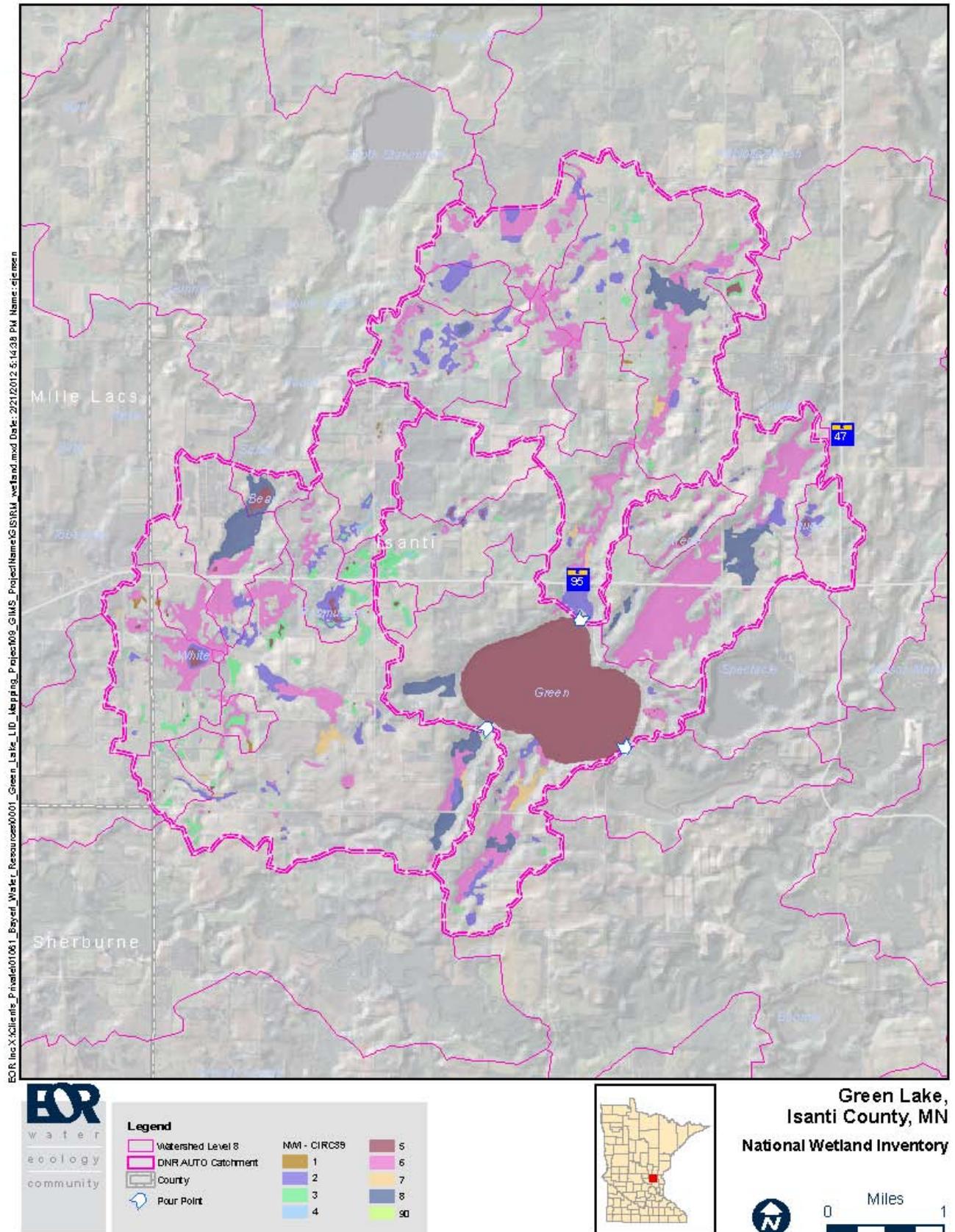
Wetlands

There are 3,346.2 acres of wetland within the catchments of Green Lake as shown in [Table Eight and Figure Eighteen](#). These wetlands provide a value to the lake by providing a place to let nutrients settle out before the water runs into the lake. It also could prevent runoff from entering the lake at all by containing the stormwater and the nutrients.

Wetlands within the Catchment of Green Lake					<i>Table Eight</i>
Wetland Type	Acres 2103700	Acres 2107500	Acres 2107601	Total Acres	Description
1	7.9	4.6		12.5	Seasonally Flooded Basins or Floodplains
2	151.8	189.0	81.1	421.9	Wet Meadows
3	129.1	44.1	40.5	213.7	Shallow Marshes
4	10.0	4.3	3.4	17.7	Deep Marshes
5	37.1	9.6	834.8	881.5	Open Water Wetlands
6	397.2	455.4	525.5	1378.1	Shrub Swamps
7	26.8	17.4	22.0	66.2	Wooded Swamps
8	144.4	72.9	134.9	352.2	Bogs
90	1.8		0.6	2.4	Riverine Systems
Total	906.1	797.3	1,642.8	3,346.2	

Wetlands are protected by the Wetlands Conservation Act. Often developments require wetlands to be filled for building of roads and buildings. Incentive programs through the Soil and Water Conservation District can help farmers keep their wetlands and still get a payment for the land through Conservation Reserve (CRP) Programs.

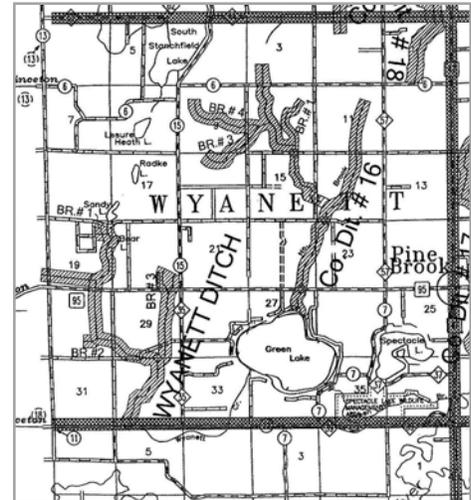
Figure Eighteen



There are 314.6 acres enrolled in the CRP program for 10-year easements in this drainage area. Another 75 acres have been enrolled in Pheasants Forever contracts. These areas provide habitat for wildlife in addition to the benefit to the Lake.

Figure Nineteen

Buffers along the wetlands categorized as “shrub swamps” that lie close to the inlet of Green Lake and are part of the ditch system (**Figure Nineteen**) could help detain sediment. Removal of the sediment that builds up over time becomes a management issue that requires ditch authority permissions. The Isanti County Board of Commissioners is the ditch authority for the county ditches. Any cleanout and/or alteration must go through them with adjacent properties assessed for the costs.



III. PUBLIC FEEDBACK AND PERCEPTION

Process: The Green Lake Improvement District (GLID) process of prioritization has included the following actions:

- **April/May 2012:** The Green Lake Improvement District Survey was mailed to 177 owners of property on the lake. A response was received from about 23 percent of the property owners surveyed.
- **June 23, 2012:** A Visioning Session was held in Princeton at the Wyanett Township Hall. It was attended by 22 concerned citizens. A consensus of priority concerns was reached at this meeting.
- **October 15, 2012:** A draft of the Lake Management Plan was presented to the Green Lake Improvement District board for feedback / approval.
- **July 2013:** Progress of The Lake Management Plan is presented at the GLID annual meeting.

Outcomes:

Planning/Visioning Session:

Through a facilitated process, the following list of priorities and feedback were determined during the Green Lake Improvement District Planning/Visioning Session held June 23, 2012:

1. **Water Quality** – Water Quality was overwhelmingly the highest priority of the participants. Comments included:
 - You can't swim in the lake now.
 - We should leave it better for the next generation.
 - Create a natural, healthy balance.
 - The lake should be clean for recreational use.
 - You should be able to swim, ski and fish in the lake.
2. **Aquatic Invasive Species (AIS)** –The second strongest concern, AIS, comments included:
 - Invasive species affects water quality.
 - AIS increases nutrient loading to the lake.
 - Most AIS, if untreated, become a monoculture in the lake, crowding out the good vegetation.
 - Water quality is driven by habitat.
3. **Land Use and Zoning** – Important for future development potential, this was a high concern:
 - This affects water quality.
 - Land use and zoning drives everything as far as allowing feedlot expansions.
 - Need watershed-wide zoning – need local government participation.
 - We need to protect the undeveloped shoreline.
4. **Fisheries** – Important for all water users:
 - Fishing is an important part of the use of Green Lake.
 - There is a natural aging process going on in the lake.
 - Fishing habitat drives water quality.

Property Owner's Survey:

The Green Lake Improvement District Property Owners Survey was mailed to 177 owners of property on the lake. A response was received from about 23 percent of the property owners surveyed. Representative responses were received from all sections of the lake. Sixty-seven percent were permanent residents. The respondents felt the greatest effect on water quality is aquatic vegetation and algae, followed by runoff. Concern was expressed regarding fertilizer, phosphorus, creeks, septic systems, milfoil, geese and the gate on Hwy 47. Emergent vegetation, algae and surface runoff are seen as a problem in 40-50 percent.

Major issues identified include:

- Weeds
- Algae
- Carp
- Over-use of boats
- Water craft/snow mobiles
- Beach alteration
- Geese
- Farm runoff
- Spear fishing
- Winter overharvesting of fish
- Zebra mussels coming
- Access

Suggested Phosphorus reduction strategies:

- Watershed buffers
- Chemical treatment
- Holding ponds
- Keep out organic matter
- Reduce fertilizer runoff
- Eliminate phosphorus fertilizers
- Review septic systems
- Don't feed the ducks
- Buffer zones and rain gardens

Comments about the lake: people seem to be in agreement that the lake is showing degradation of water quality. There is concern regarding the cost and feasibility of cleaning it up. Focus on the creeks coming into the lake and the outlet structure being too low were issues that came up.

Results of the survey are available on the GLID Website at:

<http://www.greenlakemnid.com/news.php>

IV. ISSUES, GOALS AND STRATEGIES

The Green Lake Improvement District (GLID) hosted a planning/visioning session on June 23, 2012 to find out citizen concerns. This meeting was attended by twenty-two people and resulted in the development of the following priority issues:

- | |
|--|
| <p><i>Water Quality</i>
 <i>Aquatic Invasive Species</i>
 <i>Land Use and Zoning</i>
 <i>Fisheries</i></p> |
|--|

The development of the **goals** within this chapter defines broad directions that GLID residents who participated in the public forum of the planning process wish to pursue to protect their resources. **Objectives** are the outcomes used for measuring success. **Action Strategies** items describe specific measures that the GLID will implement, with assistance from appropriate local, state and federal agencies, to achieve the goals and objectives. Goals may have one or more objectives.



The goals, objectives and action items listed provide guidance for day-to-day operations of the GLID. This document provides assistance in annual budgeting and grant writing decisions.

The core of this Lake Management Plan is the identification and implementation of effective strategies that will assist in the management of water quality and quantity within the Green Lake lakeshed and catchment boundaries. The following Management Strategies have been identified and will be implemented as funding becomes available over the next ten years (2013 - 2022). The GLID will pursue funding options through grant writing and support of available programs.

Key

AIS	Aquatic Invasive Species
EQIP	Environmental Quality Incentives Program
NRCS	Natural Resources Conservation Services
DNR	Minnesota Department of Natural Resources
PICKM	Pine, Isanti, Chisago, Kanabec, Mille Lacs counties alliance
GLID	Green Lake Improvement District
IZ	Isanti County Zoning
LWMP	Local Water Management Plan
MN ext	University of Minnesota Extension Service
MPCA	Minnesota Pollution Control Agency
SSTS	Sub-surface Sewage Treatment System
SWCD	Isanti County Soil and Water Conservation District
TMDL	Total Maximum Daily Load

PRIORITY ISSUE #1: WATER QUALITY				
WATER QUALITY GOAL: WATER QUALITY TRENDS WILL BE MAINTAINED OR SHOW IMPROVEMENT OVER THE NEXT TEN YEARS.				
Objective 1. Maintain intact shoreline buffers and re-vegetate areas of known erosion into Green Lake.				
	Management Strategy	Proposed Time Frame	Partners	Estimated Cost
1	Produce visual data of the shoreline of Green Lake by videotaping or producing low flying photos to determine extent of vegetation degradation and prioritize by need for restoration.	Summer 2013	GLID, DNR, SWCD	32 hours Volunteer time + boat/camera use - \$1,000
2	Work with the Isanti County Local Water Management Plan to fund and restore native vegetation to eroded and mowed sites.	Ongoing	LWMP, SWCD, DNR, GLID, Property owner	Volunteer and staff time - \$500
3	Provide information on workshops for design and management of rain gardens to prevent overland runoff into the lake and benefits of “no-mow” on shorelines. Encourage attendance by lakeshore property owners.	Annually in newsletter and workshop in 2013	PICKM, SWCD, DNR	\$100 annually plus up to \$120 for workshop
4	Inventory inlets to the lake and follow them upstream to determine any sources of pollutants to the lake within the lakeshed boundary utilizing aerial photography.	2013-2014	GLID, SWCD, NRCS	Volunteer time – 40 hours (\$900)
5	Set up non-profit status and Investigate possible funding for acquisition of sensitive lands surrounding Green Lake and its tributaries.	2013	DNR, SWCD, GLID	Unknown
6	Explore feasibility of offering incentives for a voluntary one-rod buffer along the ditch system. Consider additional incentives from the GLID.	2014	SWCD, NRCS, MPCA	Up to \$500 per mile of buffer
7	Work with the NRCS to explore feasibility of water retention on North Brook near Highway 5 and areas upstream on Wyanett Creek to decrease sediment and nutrient load from stormwater runoff. Utilize EQIP funds.	2013-2015	NRCS, SWCD, GLID	\$45,000
8	Work with Landowners, Isanti County Zoning and PICKM to provide “shovel ready” projects such as rain gardens and/or shoreline re-vegetation projects for prevention of stormwater runoff within the drainage area of Green Lake.	By June of 2013 for 2014 grant cycle	GLID, PICKM, IZ	Up to \$3,000 plus in-kind time

Objective 2. The Trophic State Index of Green Lake overall will show positive trend (lower numbers) in 2022.				
9	Continue monitoring in-lake site #202 for Cl-a, TPhos and Secchi to develop trends and monitor improvements.	Ongoing	LWMP, MPCA	\$190/year
10	Work with the MPCA and LWMP to assess the data from past monitoring and place on website for members to view.	Annually	GLID, MPCA, LWMP	Volunteer time - \$200
11	Work with MPCA and DNR to determine detailed monitoring plan, including inlet and outlet monitoring and in-lake program to monitor for trends in water quality.	Ongoing	GLID, RMB labs, DNR, MPCA	\$500 annually
12	Work with Anoka County SWCD to determine a stormwater assessment for the catchments of Green Lake	2013-2014	GLID, Anoka SWCD, MPCA, IZ	\$7,000 - \$17,000
13	Provide suggested management practices funding for stormwater assessment recommendations.	2014-2015	GLID, Anoka SWCD, MPCA, IZ, BWSR	\$20,000 per year x 2 (matching funds)
14	Work with the MPCA to determine appropriate management practices and load reductions within the catchment area of Green Lake – apply for grant funding for implementation.	2013-2015	GLID, MPCA, NRCS, SWCD	Volunteer time - \$1,200
15	Investigate internal load to Green Lake through sediment core sampling as part of the TMDL process	2015-2016	GLID, MPCA	\$1,000
Objective 3. Manage Sub-surface Sewage Treatment Systems within the drainage area of Green Lake.				
16	Provide information to property owners on the proper care and maintenance of an SSTS.	2013	IZ, Extension	\$500
17	Utilize property files in Isanti County Zoning to determine dates of installation, inspection and upgrades on all lakeshore properties.	2013	IZ, GLID	\$ 1,000
18	Work with Isanti Zoning to ensure full septic compliance within the lakeshore of Green Lake.	2013-2015	SWCD, IZ	Volunteer time - \$200
19	Explore grants and low-interest loans for upgrade of failing systems. Investigate feasibility of clustered systems.	On-going	IZ, SWCD, MPCA	Volunteer time - \$200

PRIORITY ISSUE #2: AQUATIC INVASIVE SPECIES (AIS)				
AIS GOAL: PREVENT INTRODUCTION OF AIS INTO GREEN LAKE THROUGH EDUCATION, MONITORING AND ENFORCEMENT.				
Objective 1. The property owners and boaters using the accesses of Green Lake will understand the urgency of AIS prevention and will have the tools to ensure they are not introducing any to the lake.				
20	GLID will have an active AIS committee, keeping current with new regulations and programs being made available by the DNR, applying for funding to promote programs identified in this plan.	On-going	LWMP, DNR	Volunteer time
21	AIS information will be made available in each newsletter and on the GLID website.	Ongoing	GLID, DNR	\$150 annually
22	Provide speaker at the GLID annual meeting on an as-needed basis based on changes in lake and/or regulations.	2013-as needed	GLID	\$150
23	Maintain signage at access educating boaters entering about AIS.	Ongoing	GLID	Volunteer plus \$500
24	Hand out educational information at the access during the fishing opener each season.	Ongoing	GLID, DNR,	Volunteer plus \$100 annually
25	Support GLID board members in attending informational workshops to stay abreast of new developments.	Ongoing	GLID, DNR,	\$375 annually
26	Apply for Prevention Grants through the DNR AIS program for signage and watercraft inspections at the access.	2013 – ongoing	GLID, DNR	\$1,200 annually
Objective 2. GLID will manage the AIS present in Green Lake.				
27	Complete a current emergent and submergent vegetation survey in and around Green Lake.	2012-2013	DNR	Completed
28	Work with DNR to develop a management plan to protect and/or restore vegetation based on the survey completed in 2012.	2013 – 2014	GLID, DNR, SWCD	Volunteer time
29	Work with the DNR to control Curley leaf pondweed and Eurasian milfoil through chemical treatment. Apply for annual grant to assist with funding.	2013-ongoing	GLID, DNR	\$150 to \$700/acre annually

PRIORITY ISSUE #3: LAND MANAGEMENT / ZONING

LAND USE MANAGEMENT GOAL: PROTECT DESIGNATED SENSITIVE AREAS OF THE GREEN LAKE LAKESHED THROUGH THE DEVELOPMENT AND USE OF BETTER TOOLS FOR LAND USE.

Objective 1. The property owners and users of Green Lake will understand the potential impacts of their land use and boating activities on the lake.

30	Work with DNR and the Soil and Water Conservation District to identify and preserve the sensitive areas of Green Lake.	Ongoing	DNR, SWCD	Volunteer time - \$200
31	Establish non-profit status to assist with fundraising efforts. Investigate opportunities such as pull-tabs for lake projects and/or land acquisition.	2013	IF, SWCD	Volunteer time - \$300
32	Work with LWMP to develop an intensive education program for all property owners within the lakeshed of Green Lake to learn about the potential impact of their land use activities on the lake. Develop a mailing list and send a newsletter with the website listed.	2014	LWMP, GLID	Volunteer time, \$100 annually
33	Provide promotional items to promote the website, signage for public access lot, brochures outlining invasive species and other promotional materials to distribute in the lakeshed.	Ongoing	GLID	\$350 annually
34	Provide information to property owners on the benefits of native vegetation to the water quality of the lake and for wildlife habitat.	Annually in newsletter	GLID, DNR	\$100 annually
35	Educate the Green Lake property owners on the impacts of alterations of the natural shoreline area and the effects of boat motors on aquatic vegetation through newsletter articles.	Annually website / newsletter	GLID, DNR	\$150 annually
36	Pursue surface water zoning in areas identified as sensitive to shoreline erosion and/or habitat destruction.	Annually	DNR, GLID	Volunteer time - \$200

PRIORITY ISSUE #4: FISHERIES

FISHERIES GOAL: PROVIDE EDUCATION AND INCENTIVES TO PROTECT AND IMPROVE THE FISHERIES HABITAT.

Objective 1. The GLID will work with the DNR to preserve the habitat and support the fishery of the lake for appropriate game fish.

37	Work closely with the DNR on projects that support fish habitat.	2013-on-going	GLID, DNR	Volunteer time
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