Lake Management Plan

for

Lake Jennie

Meeker County, USA
October, 2014

Lake Jennie Improvement Association
Lake Management Plan

Meeker County, Minnesota

October, 2014

Healthy Lakes & Rivers Partnership Committee

Authored by:
Lake Jennie Improvement Association

Cover photo: Aerial View of Lake Jennie from the East.

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INTRODUCTION

A. Summary of Healthy Lakes and Rivers Partnership Program

In May 2012 the Lake Jennie Improvement Association was invited to participate in the Initiative Foundation's Healthy Lakes and Rivers Partnership program along with six other Lake Associations in Meeker County. Under the coordination of Cheryl Glaeser (Southwest Minnesota Initiative Foundation) and with strong support from Joe Norman (Meeker County Soil and Water Conservation District), Warren Formo (Minnesota Agriculture and Water Resource Center), and Dan Nadeau (Crow Wing Organization for Water), representatives attended two days of training on strategic planning, communication, and nonprofit group leadership.

Representatives of many state and local agencies, as well as nonprofit organizations also attended the training sessions in order to offer their assistance to each group in developing a strategic Lake Management Plan. The Lake Jennie Improvement Association was represented at the Healthy Lakes & Rivers training sessions by: Scott Lahr, Mark Theis, Tom Gallett, Spencer Lahr, and Brad Lahr.

Following the training sessions, each Lake Association held an inclusive community planning/visioning session designed to identify key community concerns, assets, opportunities, and priorities. The Lake Jennie Improvement Association held this planning session on June 30th 2012. Approximately 60 people were in attendance, with about 60 percent of the participants describing themselves as year round residents. Details of the public input received at this session are provided within this plan.

This document is intended to create a record of historic and existing conditions and influences on Lake Jennie, and to identify the goals of the Jennie 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 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 discovered 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 state of lake conditions and behavior.

Finally, we would like to thank the funders of the Healthy Lakes & Rivers Partnership program for Meeker County, including the Southwest Initiative Foundation and the McKnight Foundation.

What is a Lake?

A lake is a body of water, but it is also much more. A lake is an ecosystem, a biological community of interaction among animals, plants, and microorganisms, as well as the physical and chemical environment in which they live. Lakes are interconnected with other water resources. Lakes receive much of their water from streams and ground water. Wetlands adjacent to the lakes, or connected to lakes by streams, often serve as spawning grounds for fish and habitat for diverse species of plants and animals. Protection of all of these natural resources as a whole is vital to the protection of lakes. A complex interdependence has evolved among the organisms in a lake community. If one part of the ecosystem is disturbed, it affects other parts. A road, a housing development, a drainage project, a forest fire, acid rain, or other such changes in the watershed can alter the delicate balance of the lake ecosystem. Well-balanced lake ecosystems, however, do change from season to season and from year to year. Short-term events, such as an unusual or excessive algal bloom, may not necessarily signal a long-term problem. On the other hand, changes in land use in the watershed may not immediately have a visible effect on the lake. For example, it may take a decade or more for changes in agricultural practices or urbanization to result in weed problems or fish kills.1

1 Guide to Lake Protection and Management, Freshwater Society

What is a Watershed?

Water quality is the face of a watershed. Look into it and it will tell you a story. The story might be uplifting, discouraging, or somewhere in between. Look into the water and it will tell you about the neighboring land and whether that land has been a friend or a foe.
Critical to any lake ecosystem is the lake's watershed, the surrounding land area that drains into that particular lake. Watersheds are defined by topography in which the high areas drain to the low areas. Water runs into a lake through direct runoff from the land, through a stream or ditch, or through a culvert or agricultural drain tile. In a more developed area, there may be multiple culverts that outlet to a lake. Healthy watersheds capture, store, and safely release precipitation. They provide long-term solutions to flood prevention, places to hunt and fish, clean water, productive agriculture, and economically vibrant communities.

How Do Lakes Work?

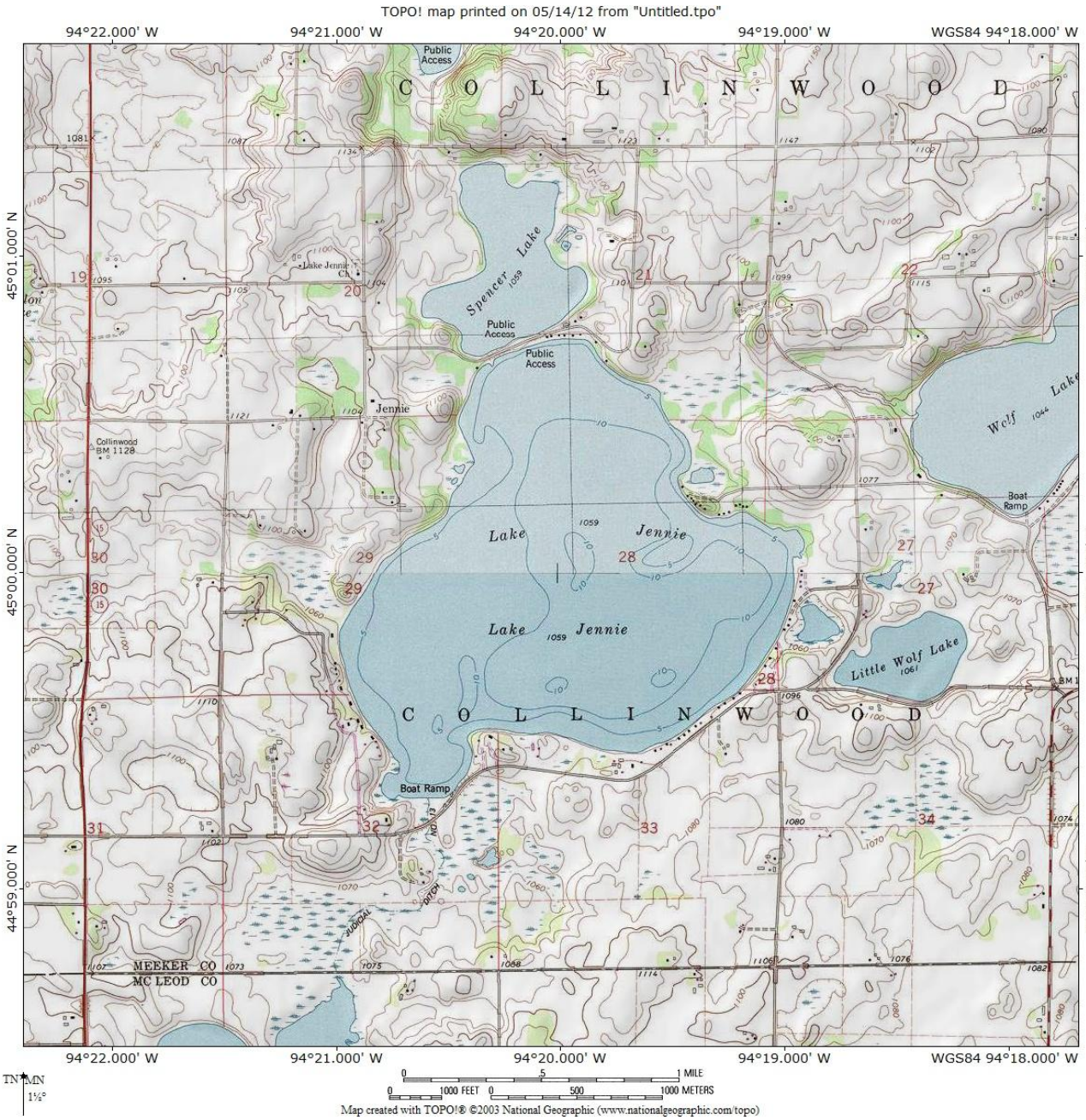
A necessary prerequisite for deciding how to protect a lake is developing a basic understanding of the physical, biological, and chemical properties of a lake. These properties – such as light, temperature, wind, precipitation, and nutrients – affect plants, animals, and the lake itself.1

B. Physical Characteristics and Location of Lake Jennie

Lake Jennie (DNR ID# 47-0015) is located in Meeker County, 5 miles southwest of the City of Dassel. The lake surface area is approximately 1,064 acres, of which 1,056 acres (99 percent) is in the littoral zone (the area where depth is 15 feet or less). The maximum depth is 15 feet.

The Minnesota Pollution Control Agency completed a Lake Assessment Program (LAP) study of Lake Jennie in 1996, and noted that the lake is in the upper two percent of lakes in the state in terms of size. Lake Jennie's watershed is large at about 17 mi^2 including the lake's surface area.

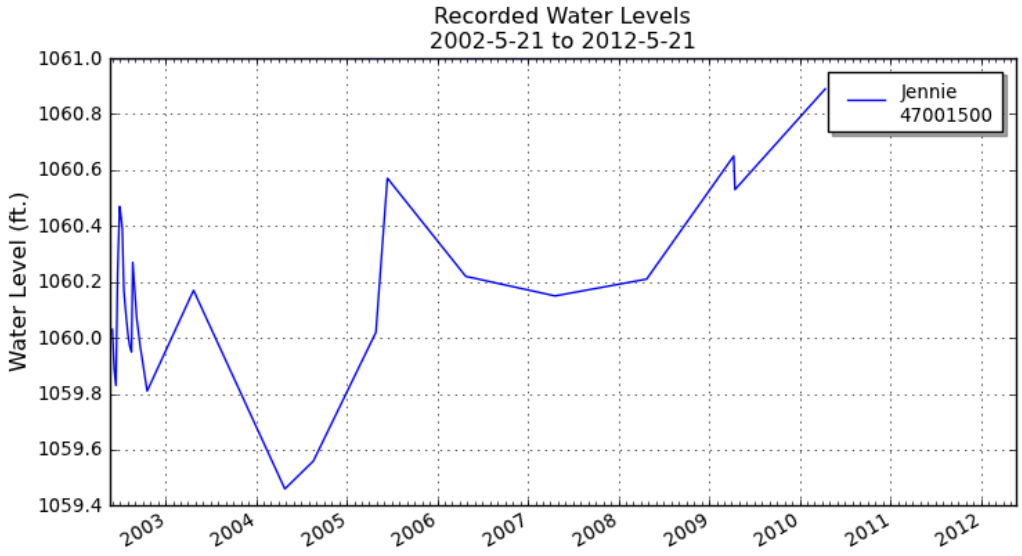
The entire LAP study link is located as Appendix I.



Water Level

The DNR Division of Waters has historic water level data for Lake Jennie. Lake level has varied 9.04 feet based on 265 readings (between December 20, 1940 and April 13, 2010).

Highest Recorded (feet/date)	Lowest Recorded (feet/date)	Ordinary High Water (feet)
1,061.2 ft. (April 28, 1993)	1,052.16 ft. (December 20, 1940)	1,061 ft.



Lake Jennie Watershed Description

According to the 1996 LAP (MPCA Lake Assessment Project) study, Lake Jennie is in the upper 2% of lakes in the state in terms of size. Lake Jennie's watershed is large, at about 9,052 acres in size, including the Lake's surface area.

The Lake Jennie Watershed (HUC 12 no. 47001500), or drainage basin, is shown in figures 2A-2D. In total, there are five known inlets into the lake and one outlet as shown in figure 2C. Inlet 1 and 2 on the south bay area of the lake, originate from Lake Todd, through a series of marshes and cropland with a local feedlot. These inlets are part of the natural North Crow River Watershed. Inlet 3, on the western side, flows from farming cropland into a marsh, and into the lake. Inlet 4 on the north side of the lake, collects overflow from Spencer Lake into Lake Jennie, during times of high water. Inlet 5, on the East shore of Jennie, flows from Little Wolf Lake through a large marsh area and into Lake Jennie during times of high water. Inlet 6 is a drainage ditch that comes through a culvert under the highway, directly out of cropland to the east.

The outlet is located on the Northeast side, flows from Lake Jennie through a marsh and via creek into Wolf Lake to the Northeast.

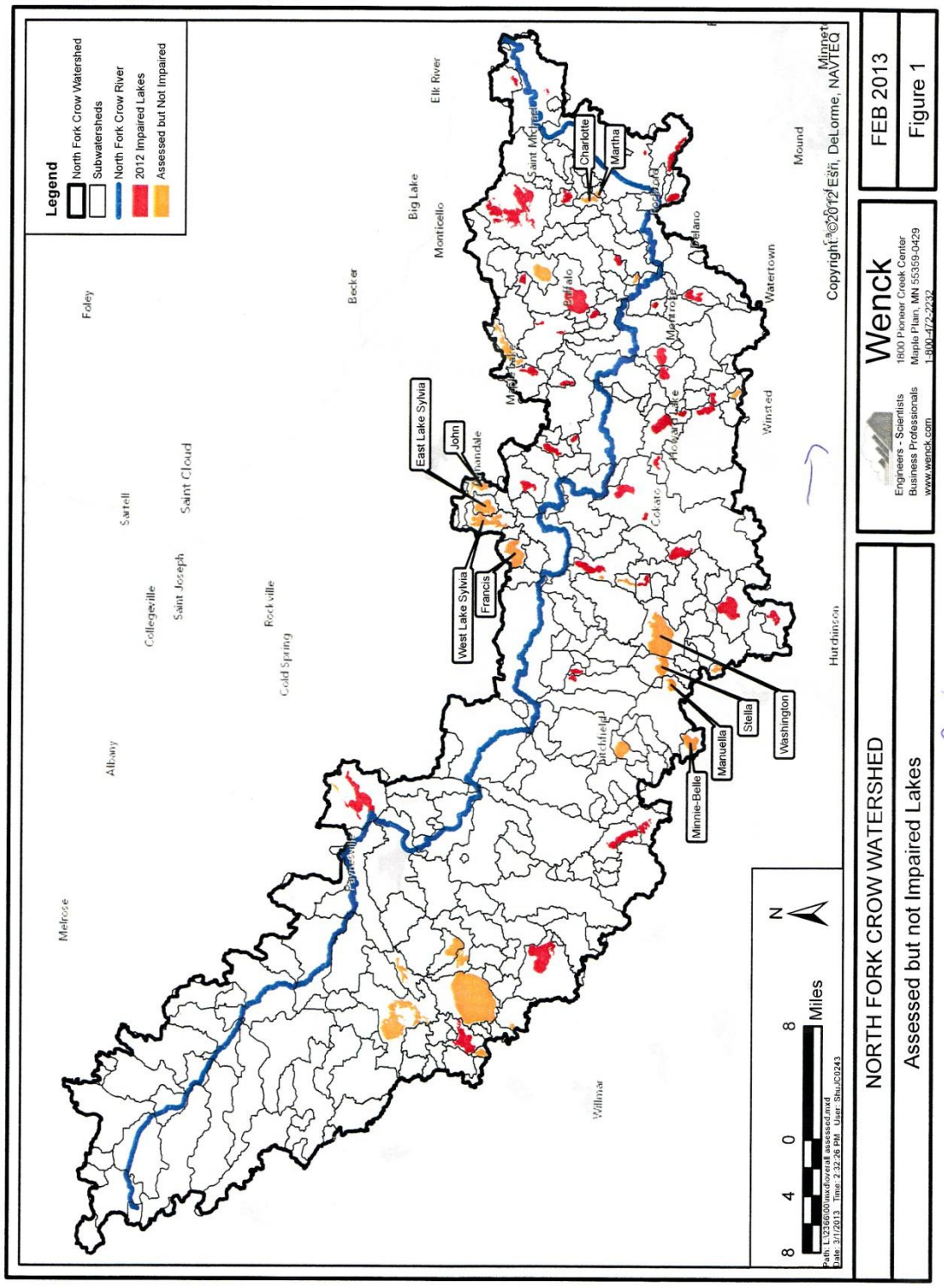
Inserted in the next pages are:

2A North Fork Crow Watershed

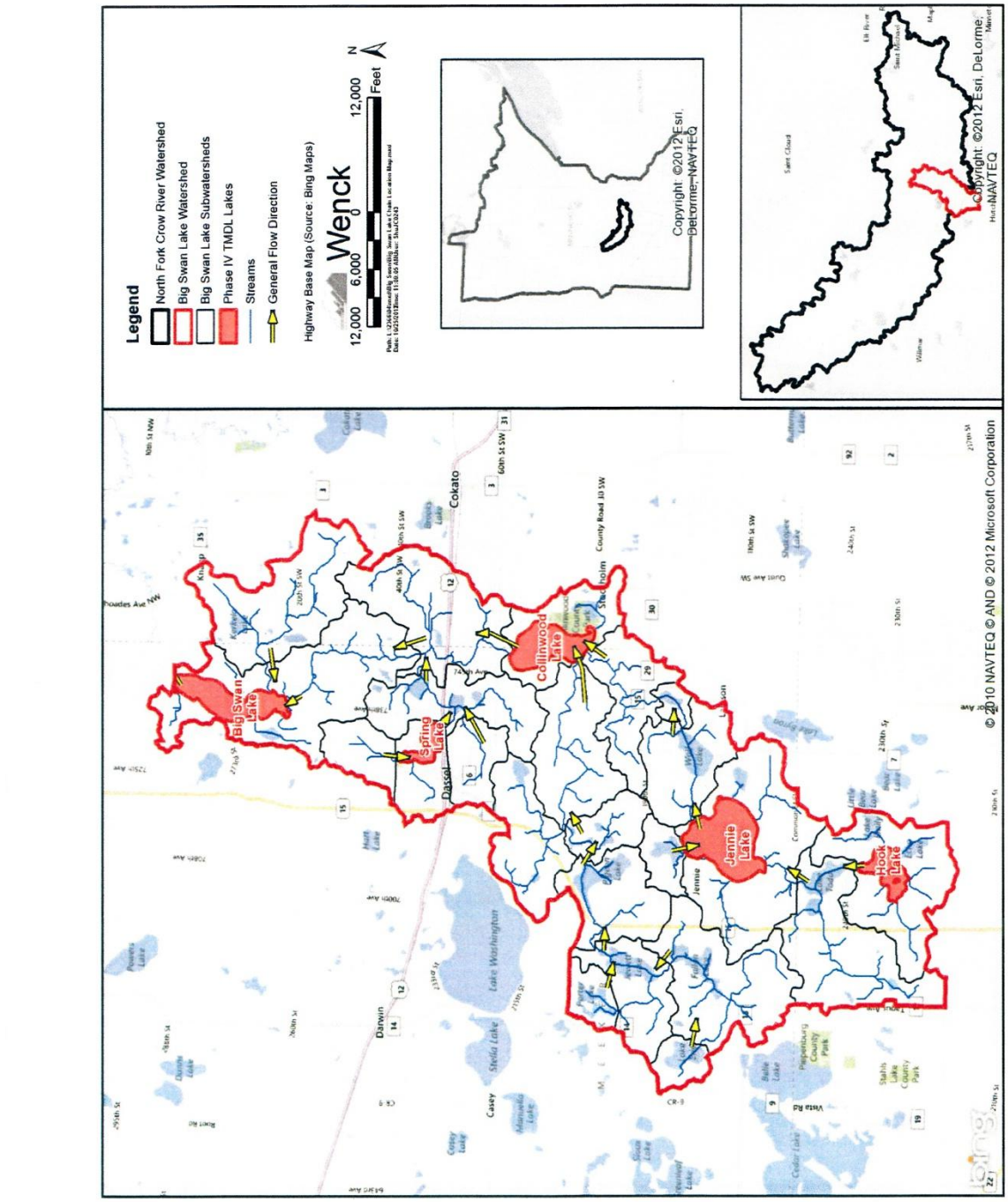
2B Local Lake Jennie Watershed

2C Inlets and Outlets of Lake Jennie

2D Lake Jennie Flowage

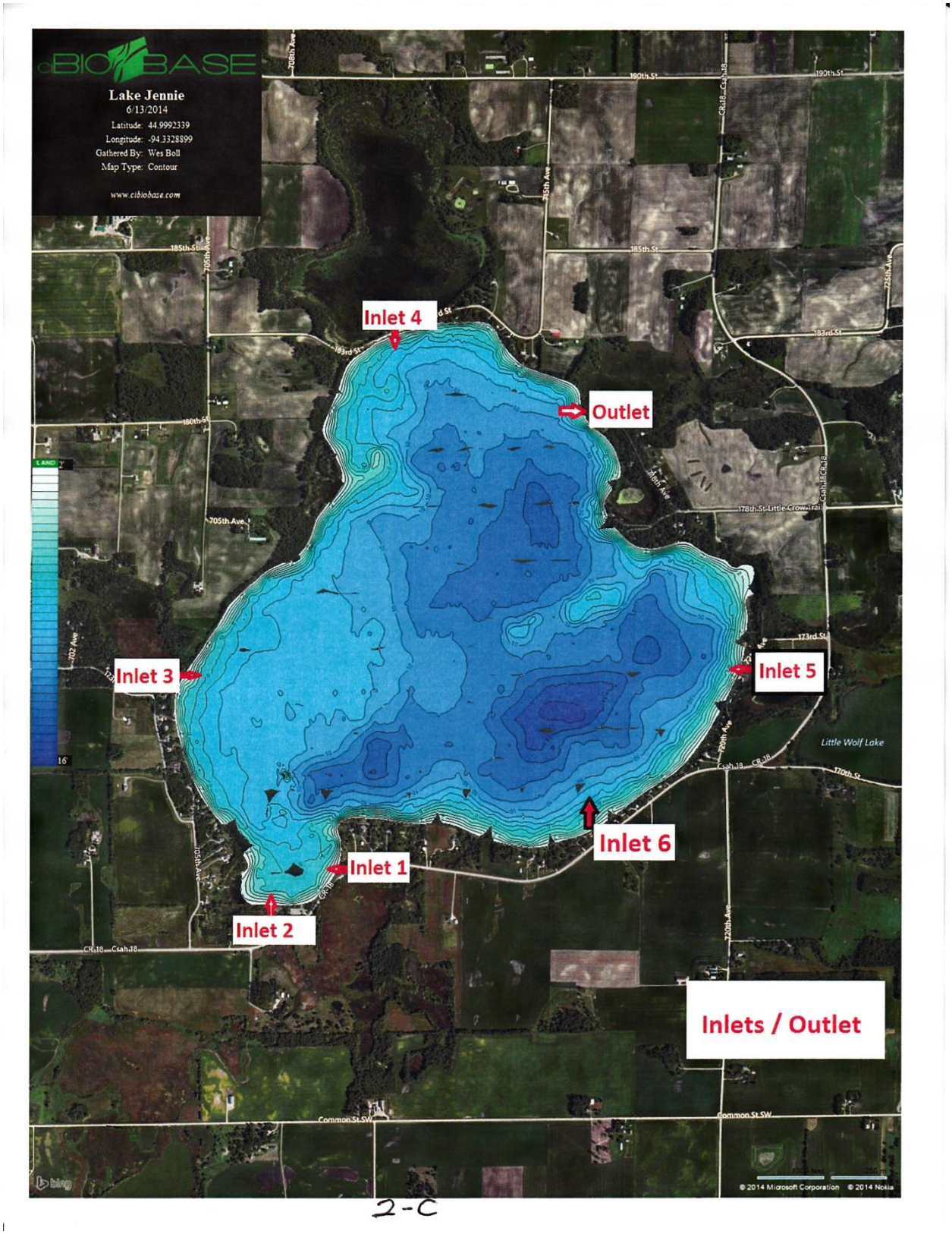


2A North Fork Crow Watershed



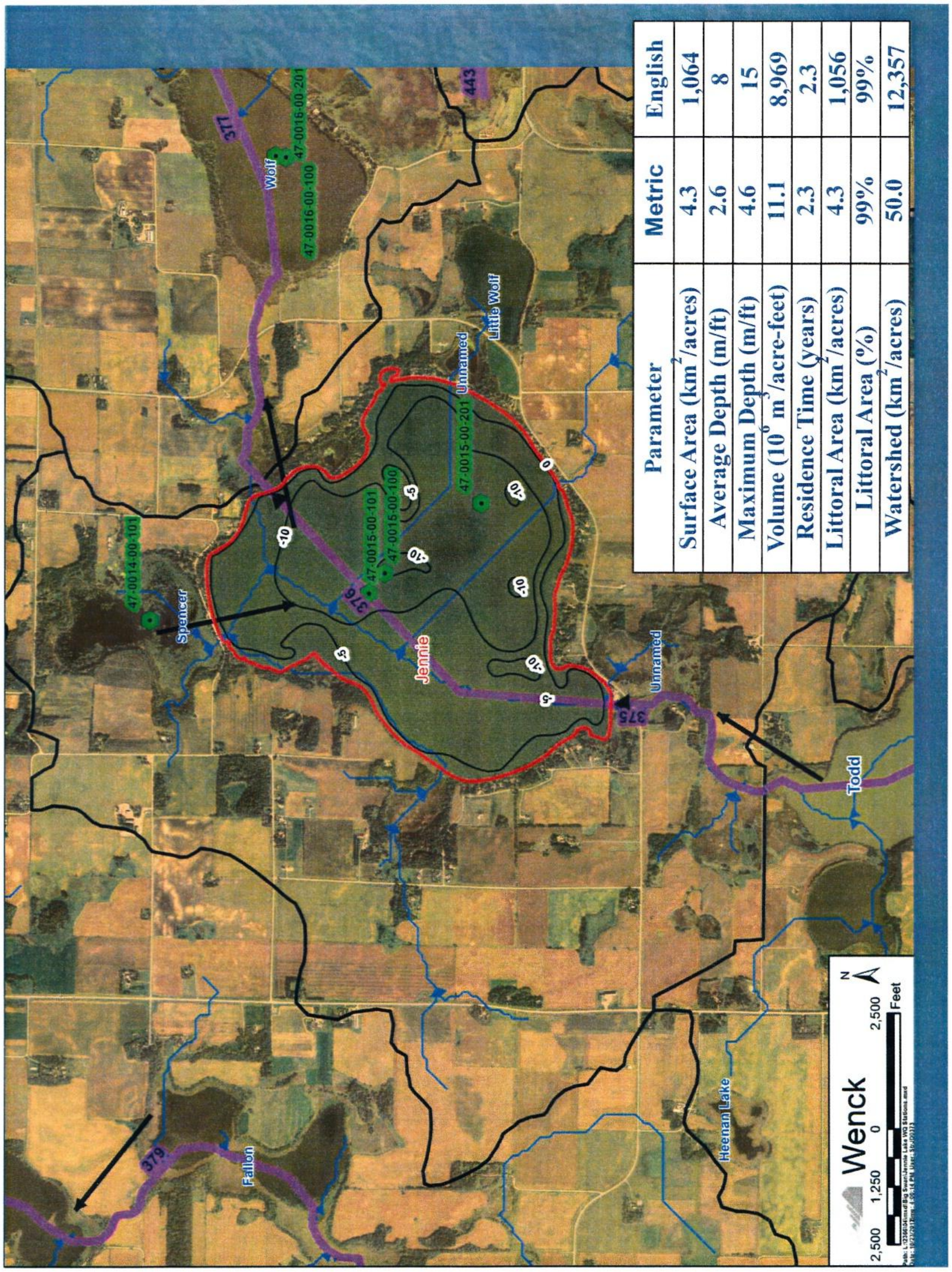
2-B

2B Local Lake Jennie Watershed



2-C

2C Inlets and Outlets of Lake Jennie



2D Lake Jennie Flowage

Land Use

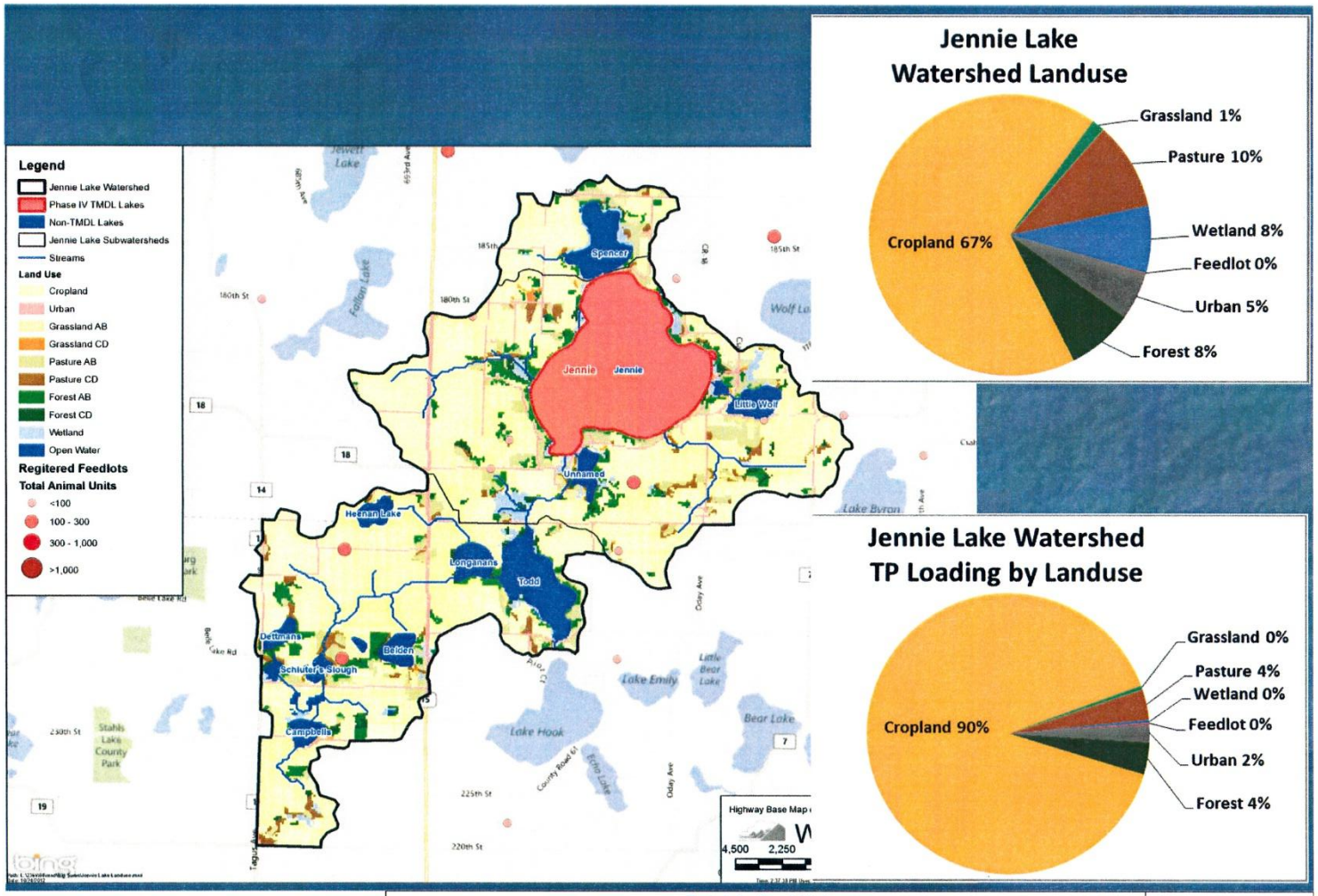
The following statistics compare estimated relative percent of land use within the watershed, based on data from the MPCA LAP report (1996) and MPCA National Lake Assessment Project (2000) reports. It compares the data to typical ranges within the North Central Hardwood Forests Eco-region.

Year	Forest	Water and Marsh	Pasture and Open	Cultivated	Urban
1996	4	23	6	66	1
2000	7	29	3	54	8
NCHF	6-25	14-30	11-25	22-50	2-9

The bulk of the land surrounding Lake Jennie is cropland. There is some pastureland to the northeast and southeast and west, with some forest area to the west buffering the bulk of the cropland to that side. See Figure 3 on the next page which shows the watershed land use around the Lake Jennie watershed basin.

Soils

According to the MPCA, Lake Jennie falls at the edge of the Central Hardwood Forest and the Western Cornbelt Prairie ecoregions. The soils in these areas combine to provide sandy hardwood forest with more fertile agriculturally significant ones. The rich soils and prairie areas usually result in shallower lakes with denser phosphorous and algae concentrations, and with the influence of agricultural activity in the Cornbelt, resulting in some decrease in water quality and clarity from the more northern lakes.

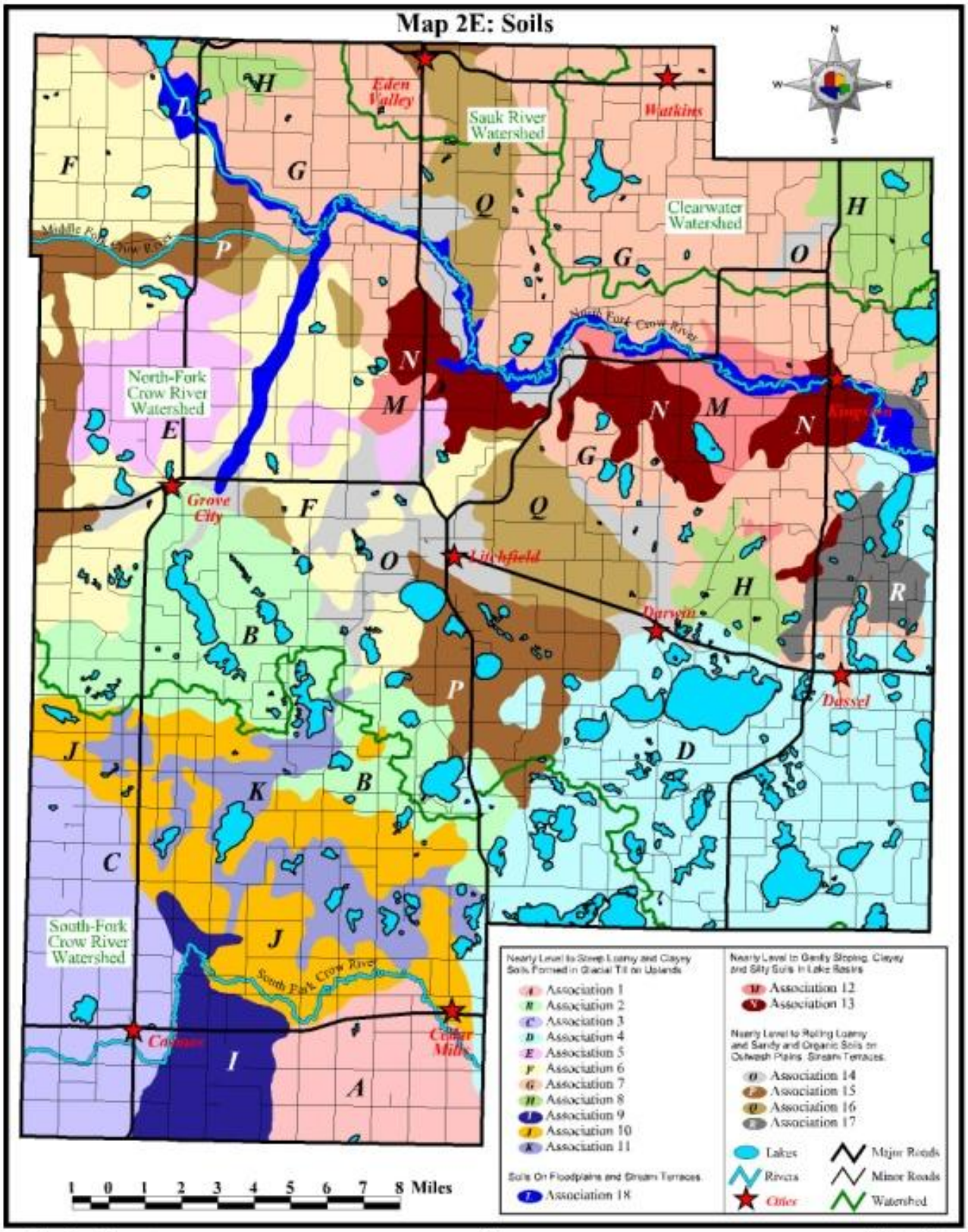


Watershed	Area (acres)	ReachID	Total Animal Units								Total P production (lbs/yr)
			Dairy Cows	Beef Cows	Swine	Horses	Sheep	Chickens	Turkeys	Other	
Jennie South	3,435	375	567	293	47	14	3	0	0	4	59,429
Jennie Direct	5,573	376	83	238	0	10	0	0	0	0	22,425

Figure 3

Figure 3

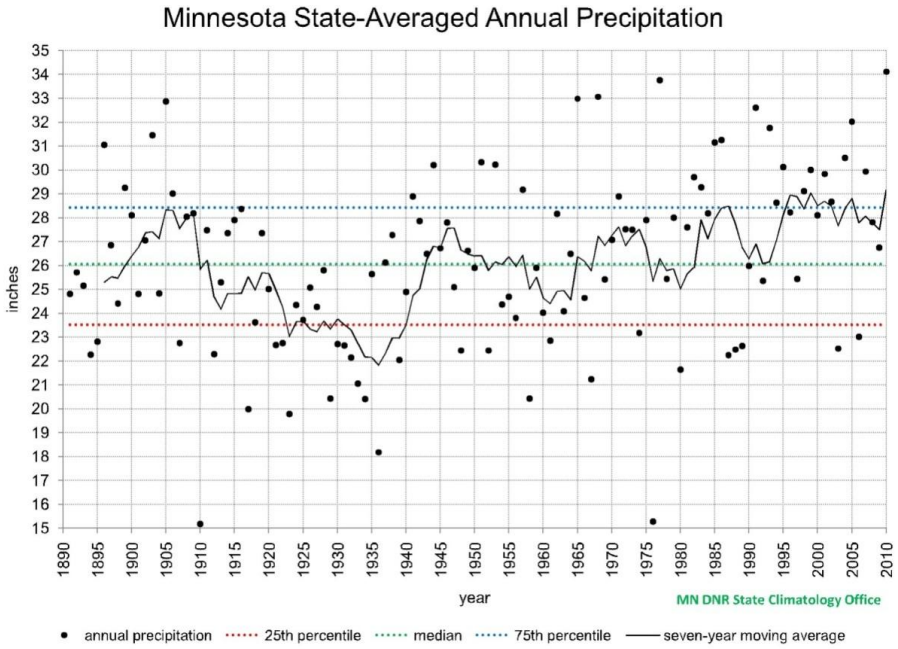
The following map (2E below) indicates the soil types surrounding Lake Jennie.



Precipitation

Based on the state climatology records, precipitation averages 26-28 inches annually in this part of the state. Evaporation typically exceeds precipitation and averages about 37 inches per year. Run-off averages about 4-5.2 inches with a one in ten year low values of .08 to 1.2 inches, and high values of 5.9 to 7.9 inches. Springtime ice-out on Lake Jennie has usually occurred by April 12th with the ice-over average around December 3rd.

Precipitation over much of Meeker County during the 1990's and 2000's has followed a pattern of increasing wetness. In terms of cumulative departure from normal, many regions of the state exceeded the historical average by more than 30 inches during the period from January 1, 1991, through August 16, 1999. This prolonged pattern of increased moisture has also coincided with a general increase in the frequency and timing of intense storm events.



Watershed Management and Lake Protection Strategies

Watershed management and lake protection strategies primarily involve the implementation of key best management practices (BMPs), administration of planning and zoning regulations, education and stewardship, and a monitoring program. In agricultural portions of the Lake Jennie watershed, BMPs are important for reducing or preventing polluted runoff from nonpoint sources from entering the lake. These BMPs may include conservation tillage, crop rotations, manure management, grassed waterways, buffer strips, fencing, fertilizer and pesticide management, and animal feedlot runoff controls.

In developed areas of the Lake Jennie watershed, BMPs are directed at controlling runoff from impervious and semi-impervious surfaces, such as roads, driveways, and rooftops that can contribute leaves, oils, sediment, and nutrients to the lake. BMPs may include residential rain gardens, shoreline buffers, proper leave disposal, fertilizer management, and septic tank (ISTS) surveys.

Education and information about water use, preventive strategies for aquatic invasive species and protection of water quality.

C. History and Development/Impacts on Lake Jennie

History and development of Lake Jennie

The following article is from the Lake Jennie website (LakeJennie.com).

Lake Jennie, at the turn of the 19th Century, was a bustling community of farmers and city dwellers, day picnickers and vacationers, who flocked to the lake for its sandy beaches, serene waters, joyful resorts and coveted Walleye fishing.

The area surrounding Lake Jennie was settled by New Englanders in the mid-1800's who named the area New Virginia, followed by southerners after the Civil War. Canadian settlers changed the name to Collingwood in 1866 and it later became known as Collinwood Township (the "g" was dropped). Around this same time, the advent of the railway developed by the Saint Paul and Pacific Railroad 1brought greater economic vibrancy to the area, giving birth to the town of Dassel.

Tucked in between the growing town of Dassel and nearby Hutchinson, the community around Lake Jennie began to come alive. According to Julie Lindquist, a local resident and historian at the Dassel Area Historical Society, during the late 1880's the community was made up of three distinct ethnic groups – the Swedes on the south side, the Irish along the north and west and natives along the east.

Swedish immigrants who had broken away from the Lutheran Church established Lake Jennie Mission Covenant Church in 1886, which was also home to the Swedish schoolhouse. The natives developed School District 49 of Lake Jennie along with the Lake Jennie Methodist Church located on the south side of the lake.

On the north end of the lake, the Bonniwell family operated a gristmill and feed store and nearby, the first Lake Jennie post office was established. Other businesses around the lake included a creamery and gristmill owned by Otto Olson2 on the west side near the Brodeen farm and a grocery store owned by Leena3 and Frank Chatterdon.

Farmland surrounded Lake Jennie – the McGowan farm on the northeast end, the Coomer farm on the east, Servin farm on the south point, and Broodeen and Harrington farms on the west. Then, around 1910, Lou Merrill, a land surveyor from Hutchinson, developed the first cabins along Lake Jennie's east side on Eagle Point. Skip Quade, whose family owns land in this area that his parents purchased from its original owners, recalls that some of the first property-owners on Eagle Pont included Jon Lindenberg, Ruth Merrill and the Linder family.

As Eagle Point developed, entrepreneurial farmers opened resorts on their land and welcomed vacationers, sparking some of the most active decades of Lake Jennie's history. Coomer's resort, which boasted a water slide, was located on what was known as Sand Point and the Servin resort was located

on the south side near Provincer's Pont. Vacationers from neighboring towns and as far away as Chicago frequented Lake Jennie during this time. "One of Chicago's baseball teams celebrated their World Series victory at Coomer's," says Quade who adds, "I remember seeing each of their names carved into the walls of the main lodge."

The Servin resort was owned and operated by Olga Regal's grandparents who settled n the area in 1912. Olga, who still lives in the Dassel area, explains that the resort was made up of a few cabins and a little store. Her grandfather, she adds, lived up the hill and there was a second house where the resort helper lived. "People came year after year for the Walleye," Regal reminisces, "We would go boating and swimming…I didn't even have a bathing suit, and swam in my dress, if you can believe that!"

Lynette Johnson, a descendent of the McGowan family who farmed the land to the east of Lake Jennie explains that her Uncle, Jo Anders, opened the Happy Hollow on what is now the wooded area on the far east side of the lake. The Happy Hollow, according to Johnson, operated as a dance hall in the 1920's.

Regal recalls that the Servin's also made room for a dance hall on their resort by removing some of the partitions between unused cabins. "I remember all the people dancing the waltzes," she says.

The cheerful, energetic times of the 20's came to a close with The Great Depression and the drought-stricken 1930's. During the Dust Bowl Days, Lake Jennie went dry. Quade explains that with the water gone, "You could see an island near the middle of the lake…we could walk from Eagle Point out into the lake to duck hunt." With no water in the lake to enjoy, the resorts closed down and visitors stopped coming. Even as it began to come back, trees grew into the lake emitting oxygen and it suffered from winterkill and was re-stocked with fish in the mid 1950's. Slowly, the lake began to improve, and re-establish itself with fish and plant life and has once again become a prime fishing location.

During the second half of the 20 th century, the Lake Jennie community continued to grow and evolve. The buildings that once served as dance halls and resort cabins succumbed to age and some of the larger plats of land were subdivided and sold to new owners. While several of the original cabins still stand along Eagle Point, new housing developments formed along Highway 18 which was moved back away from the lake in the 1980's to make room for additional homes.

Now, 100 years after the first development began on Lake Jennie, one might argue that the community on the lake is not much different form its early inhabitants – some farmers, some residents, some seasonal owners from nearby towns of Hutchinson, Dassel, Cokato and the Twin Cities – all who still come to enjoy the serene waters and a triumphant walleye catch.

History and Purpose of the Lake Jennie Improvement Association

The Lake Jennie Improvement Corporation was formed in 1988 by a group of concerned shoreline owners of Lake Jennie. The name was changed to the Lake Jennie Improvement Association and registered with the state of Minnesota as a non-profit in 2009. The articles were again amended in 2014 to redefine the purpose of the Association as one of a charitable and educational association, in line with the application for exemption through the federal IRS code 501(c)3.

Purpose of Lake Jennie Improvement association is:

- To influence and to assist and educate stakeholders on any possible discussion, decisions, issues, concerns and conditions that may affect or pertain to properties along Lake Jennie (of Meeker County, Minnesota) or the community and properties surrounding the lake proper.

- To coordinate efforts designed to stabilize and improve 1) lake quality and the immediate surrounding environment, and 2) the recreational experience for those using the lake.

II. REVIEW OF HISTORICAL AND EXISTING CONDITIONS FOR FOCUS AREAS

Water Quality

Since 1981, citizen volunteers from Lake Jennie have participated in the Minnesota Pollution Control Agency's (MPCA) Citizen Lake Monitoring Program (CLMP), recording secchi disc transparency – a measure of water clarity.

The MPCA has participated in two additional studies of water quality, the 1996 Lake Assessment Program and the 2007 National Lake Assessment Project .

On the MPCA's website link, "Lake Water Quality Database," additional water chemistry data is reported. The MPCA's "Environmental Database Access" system also provides additional water chemistry data which includes total phosphorus concentrations, as well as other data.

One application of secchi disc transparency data is to convert the clarity measurements into a Carlson Trophic Status Index (TSI) score. The Carlson Trophic Status Index (TSI) is a tool used to summarize several measurements of water quality into one index value, which can be used to compare a lake to other lakes, or to historic/future data as a measure of degradation or improvement. In many ways, the index can be viewed as a measure of the potential for algal productivity. Since most people value lakes with low algae productivity, the lower the TSI value the healthier the lake. Specifically:

TSI Range	Trophic Status	Characteristics
0-40	Oligotrophic	Clean Lake
41-50	Mesotrophic	Temporary algae & aquatic plant problems
50-70	Eutrophic	Persistent algae & aquatic plant problems
Greater than 70	Hypereutrophic	Extreme algae & aquatic plant problems

Based on the data provided on the MPCA website, an average concentration (or depth) for the key TSI parameters can be determined, and the associated TSI score calculated.

These data suggest that water quality of Lake Jennie have routinely exhibited "eutrophic" conditions (a TSI score below 70 but above 50) during the period of record.

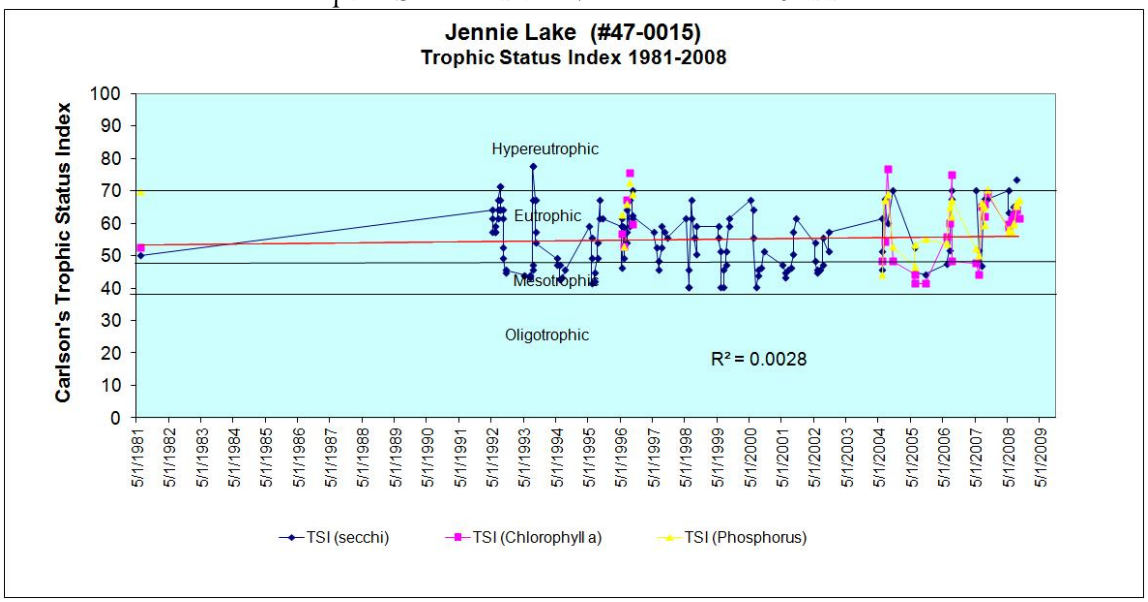
A second method of assessing water quality and determining whether your water body is the "best that it can be" is to compare it to other lakes of similar morphology, geology, and land uses. Listed below are ranges of common measures of water quality based on many years and locations of water quality. The tables below are adapted from the MN Pollution Control

Agency "Environmental Data Access" database, and compare observe results for Lake Jennie to common water quality ranges for lakes within the North Central Hardwood Forests Eco-region.

Average TSI Measurements of Lake Jennie, 1981-2008

Year	Chlorophyll *a* (µg/L)	Total Phosphorus (µg/L)	Secchi Depth (feet)	Average TSI
1981	9.2	94.0	6.6	57.4
1992			3.7	60.1
1993			6.3	54.7
1994			8.9	45.8
1995			6.2	53.1
1996	36.1	72.4	3.8	60.6
1997			5.4	53.4
1998			6.4	53.4
1999			6.9	51.1
2000			6.9	51.7
2001			7.4	49.4
2002			6.9	49.9
2004	33.3	53.3	4.1	57.8
2005	3.3	27.7	8.3	47.0
2006	32.3	58.0	4.3	60.2
2007	25.9	56.5	3.7	60.3
2008	24.0	34.8	2.1	62.8

Trophic Status Index Values for Lake Jennie



The figure above shows the long-term trends in Trophic Status Index values for Lake Jennie for the years for which data are available. The variation observed within a single year reflects naturally occurring impacts of temperature, precipitation and water level; the important 'take home message" of this graph is that the trophic status index values vary within the eutrophic range since data were first collected in 1981.

The tables below are adapted from the MN Pollution Control Agency and show common water quality ranges for lakes within the North Central Hardwood Forest Eco-region. The range of data presented for Lake Jennie were calculated from all surface water data recorded within the MPCA's Environmental Data Access (EDA) database, 1981-2008.

Average Summer Water Quality

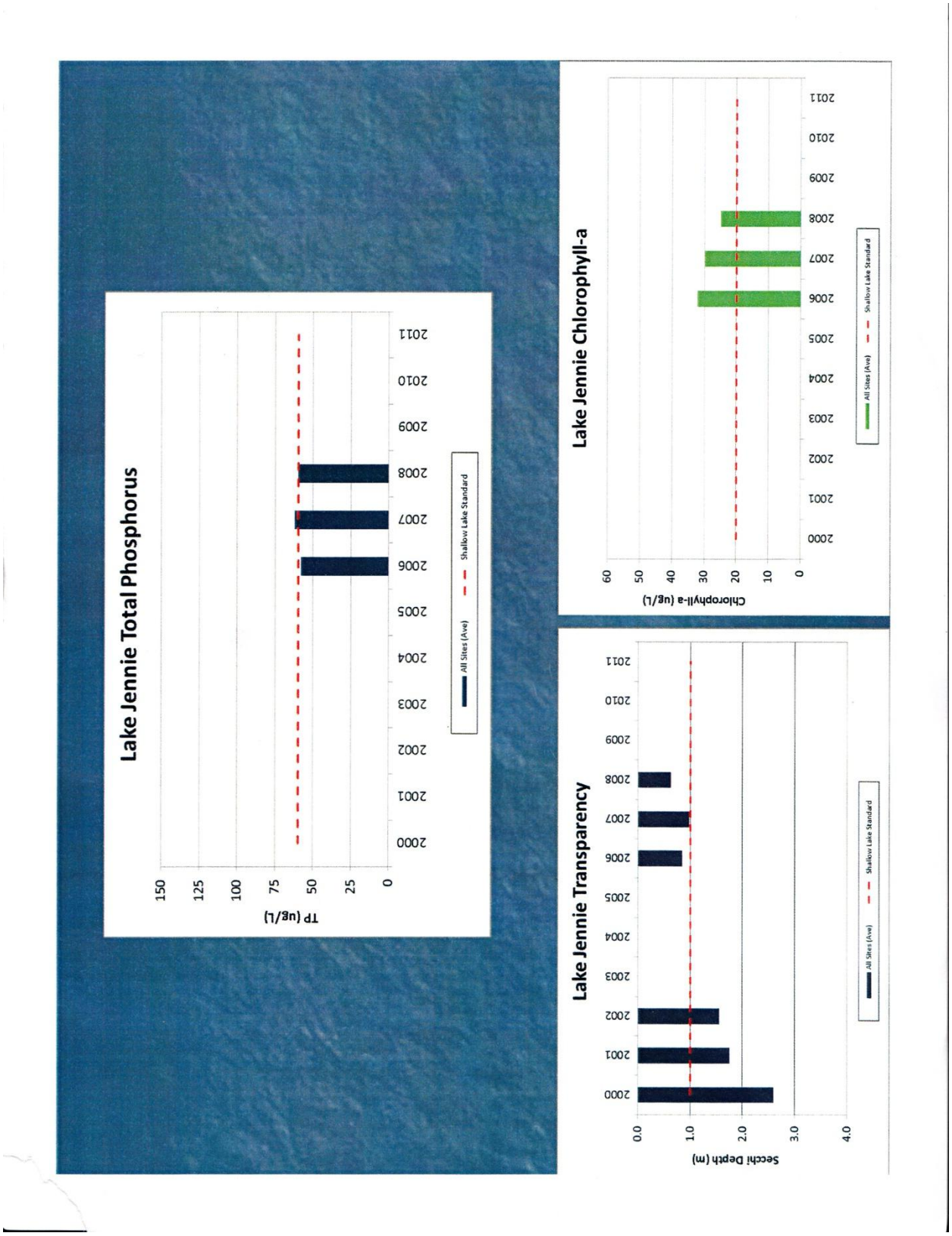
Parameter	Typical Range: North Central Hardwood Forest Eco-region (25^{th}-75^{th} Percentile)	Average & Standard Deviation for Lake Jennie
Total Phosphorus (µg/L)	23 – 50	56.8 ± 26.3
Chlorophyll *a* (µg/L) mean	5 – 22	26.1 ± 27.31
Chlorophyll *a* (µg/L) maximum	7 – 37	110
Secchi disc (feet)	4.9 – 10.5	5.5 ± 3.2
Total Kjeldahl Nitrogen (mg/L)	< 0.60 – 1.2	1.6 ± 0.3
Nitrite + Nitrate Nitrogen (mg/L)	<0.01	0.17 ± 0.07
Alkalinity (mg/L)	75 – 150	147 ± 7
Color (Pt-Color units)	10 – 35	12.2 ± 7.3
pH	8.6 – 8.8	8.5 ± 0.6
Chloride (mg/L)	4 + 10	24.6 ± 2.9
Total Suspended Solids (mg/L)	1 – 2	14.1 ± 6.6
Conductivity (µmhos/cm)	300 – 400	379 ± 75

A third application of these data is to compare phosphorus concentrations to the Minnesota Pollution Control Agency water quality criterion for swimming and other recreational contact. The North Central Hardwood Forests Eco-region phosphorus criteria level of 40 micrograms per liter (µg/L) serves as the upper threshold for full-support for swimmable use. This concentration corresponds to Carlson's TSI values of 57 or lower. The upper threshold for partial support of aquatic recreational use is 59 Carlson's TSI units.

For the North Central Hardwood Forests Eco-region, summer-mean total phosphorus concentrations above 45 µg/L were associated with nonsupport of aquatic recreational use. At concentrations above 45 µg/L mild blooms occur over 80 percent of the summer, nuisance blooms about 40 percent of the summer, and severe nuisance blooms about 15 percent of the summer.

Phosphorus concentrations above criteria levels would result in greater frequencies of nuisance algal blooms and increased frequencies of "impaired swimming."

Name	Mean Total Phosphorus (µg/l)	Carlson's Trophic Stratus Index (Phosphorus)	MPCA Aquatic Recreation Criteria
Lake Jennie	56.4	62.3	Not Supporting



Based on the phosphorus concentration presented above, Lake Jennie would be considered in "not supporting" recreational use and contact and is an "impaired lake" by definition.

MPCA Definitions: Assessing and Listing Impaired Waters

Designated use: aquatic recreation

Pollutant or stressor: Nutrient/Eutrophication Biological Indicators

Lake Jennie was added to the list of "impaired lakes" in 2010, and continues to be observed by MPCA.

The assessment of Minnesota's rivers, streams and lakes is tied to the goals of the 1972 Clean Water Act (CWA) for restoring and protecting the ecological integrity of America's waters. One CWA strategy used to meet these goals is identifying, listing and restoring "impaired waters." The CWA requires states to:

- assign designated uses to waters and develop standards to protect those uses
- monitor and assess their waters
- list waters that do not meet standards
- identify pollutant sources and reductions needed to achieve standards
- develop a plan to implement restoration activities

What are impaired waters?

The CWA requires states to adopt water quality standards to protect waters from pollution. These standards define how much of a water quality parameter can be in a water and still allow it to meet designated uses, such as drinking water, fishing, swimming, irrigation or industrial purposes. "Impaired waters" are those waters that do not meet water quality standards for one or more water quality parameters, thus, they are "impaired" or not supporting their designated uses. Section 303(d) of the CWA requires states to assess all of their waters and publish a list of impaired waters (list) every two years. Assessing Minnesota's waters and developing the list involves a rigorous process that takes more than two years to accomplish. How impaired are waters identified and listed? The assessment and listing process involves dozens of Minnesota Pollution Control Agency (MPCA) staff, other state agencies and local partners. The goal of this effort is to use the best data and best science to assess the condition of Minnesota's surface water. The process requires a high level of planning and cooperation among MPCA staff and partners.

> Background
> Water quality standards are fundamental tools that help protect Minnesota's abundant and valuable water resources from pollution. "Beneficial uses" are the uses that water resources and their associated aquatic communities provide. Under the federal Clean Water Act, states are required to monitor and assess their waters to determine if they meet water quality standards and thereby support the beneficial uses they are intended to provide. Waters that do not meet their designated uses because of water quality standard violations are impaired. States are then required to develop a list of impaired waters that require TMDL studies, and to submit an updated list to the U.S. Environmental Protection Agency every even-numbered year for approval.
>
> Proposed 2014 Impaired Waters List
> Updated every two years, Impaired Waters List consists three major components: the 303(d) (TMDL) List, the Inventory of Impaired Waters, and an "Appendix A" (waterbodies part of theStatewide Mercury TMDL). The TMDL List contains impairments that require Total Maximum Daily Load (TMDL) "cleanup" studies. The

Inventory waters includes impairments in need of TMDLs, those with completed TMDLs that have not yet been restored, "non-pollutant" impairments, and impairments due to natural sources. Appendix A is a list of mercury impairments, mainly for fish tissue concentration exceedences but also for water column mercury concentration exceedences.

Fisheries Management Plan

Status of the **Lake Jennie**, according to the MN Dept. of Natural Resources fisheries summary (June 21, 2007):

A resurvey was conducted at Jennie Lake in 2007. Jennie is primarily managed for northern pike and walleye.

Agriculture row crops dominated the Jennie Lake watershed. Approximately 50% of the shoreline was developed with residential homes. A total of 22 aquatic plants were sampled. Bushy pondweed, coontail, filamentous algae, muskgrass, and northern watermilfoil were all classified as common, while all others were ranked as being rare. Curly-leaf pondweed was abundant during spring and early summer, but not in late August when plant sampling occurred. For shoalwater substrates, sand was abundant, gravel and silt were common, and all others were considered rare. The secchi disk reading was 6.4 feet on 6/21/07. Shoreland owners are encouraged to protect emergent vegetation at Jennie Lake. Emergent plants provide food and shelter for many fish and wildlife species, improve water clarity, reduce shoreline erosion, and improve aesthetics.

A total of 40 walleye were gill netted for a catch rate of 3.3/net, which indicated that numbers were low to fair. The 2003 catch rate was 5.7/net. The 2007 catch rate was tied with 1991 catch rate for the lowest on record at Jennie Lake. In 2007, gill netted walleye were 10.6-28.5 inches long averaging 23.0 inches. Only two of the walleye that were gill netted were under 21 inches. Walleye were 2-11 years old with 5 year-classes present. Approximately 70% of the sample was 10 years old or older. The 1996 and 1997 year-classes continued to dominate the shrinking fishery. The latest stocking regime (1,000 fry/littoral acre two-out-of-three years) began in 1995. Gill net catch rates in 2000, 2003, and 2007 ranged from 3.3-11.5/net, averaging 6.8/net. In 2007, approximately 55% of the gill net sample came from non-stocked years, but missing year-classes from 2000-2005 indicated that natural year-classes were not being produced consistently. Growth was fast.

A total of 76 northern pike were gill netted for a catch rate of 6.3/net, which indicated that numbers were moderate. The 2003 catch rate was 10.8/net. Northern pike catch rates have been decreasing since the 2000 assessment. In 2007, gill netted northern pike were 15.7-35.7 inches long averaging 23.5 inches. Trap nets sampled northern pike up to 36.8 inches in length. Northern pike were 1-5 years old with 5 year-classes present. Growth was fast.

A total of 89 yellow perch were gill netted for a catch rate of 7.4/net, which indicated that fair numbers were present. The 2003 catch rate was 47.3/net. In 2007, gill netted yellow perch were 5.3-8.3 inches long averaging 6.1 inches. Yellow perch were 1-5 years old with 5 year-classes present.

A total of 17 carp were gill netted for a catch rate of 1.4/net, which indicated that fair numbers were present. The catch rate in 2003 was 5.9/net. In 2007, gill netted carp were 18.0-27.1 inches long averaging 23.7 inches. Trap nets did not sample any carp.

A total of 13 black crappie were trap netted for a catch rate of 1.1/net, which indicated that numbers were low. The catch rate in 1996 was 0.0/net. High to moderate numbers of black crappie have not been sampled since the early 1990's. In 2007, trap netted black crappie were 4.0-7.4 inches long averaging 5.1 inches. Black crappie were 1-3 years old with 3 year-classes present. Growth was slow. Gill nets also sampled low numbers (2.6/net) of small fish, with a maximum length of 7.4 inches.

A total of 337 bluegill were trap netted for a catch rate of 28.1/net, which indicated that high numbers of fish were present for this type of lake. The catch rate in 1996 was similar at 23.6/net. Trap netted bluegill were 0.7-10.6 inches long averaging 4.6 inches, but only 1% of the sample was 7 inches or longer. Bluegill were 1-7 years old with 6 year-classes present. Growth was moderate.

A total of 46 black bullhead were trap netted for a catch rate of 3.8/net, which indicated that numbers were low. The catch rate in 1996 was similar at 5.7/net. In 2007, trap netted black bullhead were 4.3-14.9 inches long averaging 7.1 inches. The 2007 gill net catch rate was also low (5.9/net).

A total of 12 largemouth bass were collected during spring night-time electrofishing for a catch rate of 7.2/hour. The 2007 catch rate was the second lowest on record at Jennie Lake. A similar assessment conducted in 2003 produced a catch rate of 16.2/hour. Catch rates have been declining since the 1996 assessment. Catch rates from 1991-2007 ranged from 1.8-41.1/hour averaging 19.1/hr. In 2007, electrofished largemouth bass were 8.9-18.1 inches long averaging 14.1 inches. Largemouth bass were 1-6 years old with 4 year-classes present.

A total of 11 varieties of fish were sampled during shoreline seining. Young-of-the-year were collected for black crappie (12), bluegill (217), green sunfish (9), hybrid sunfish (27), largemouth bass (137), pumpkinseed (3), walleye (1) and yellow perch (483).

For Lake Jennie, Lee J. Sundmark is the Supervisor, Division of Fish and Wildlife Section of Fisheries, Hutchinson Fisheries Management Area, 20596 State Highway 7 Hutchinson, MN 55350, Phone: (320) 234-2550 Extension 223, email: Lee.sundmark@state.mn.us.

Mr. Sundmark and his colleagues routinely prepare a fisheries management plan (Appendix III) for Lake Jennie which is attached as an appendix to this citizen-based Lake Management Plan. The 2008 fisheries long range goal of the DNR plan is to:

> "Provide angling opportunities for northern pike, walleye, black crappie, bluegill, and largemouth bass. To improve water quality, protect and restore shoreland habitat, and sustain submergent and emergent aquatic plant density and diversity.

The DNR Fisheries Management Plan also notes the following limiting factors:

> "Curlyleaf pondweed, a naturalized exotic, likely suppresses native aquatic plant density and diversity. Dense curled-leaf pondweed stands restrict recreational boating and

angling use, especially at the south public access and southwest bay. Curled-leaf pondweed senescence in July leads to frequent intense algal blooms.

Partial winterkills were common in the 1940's. Historical records (incomplete) indicate Jennie was opened for liberalized fishing in 1943, 1944, 1945, 1946, 1948, 1956, 1957, 1959, and 1960. Partial winterkill was documented in 1945 and 1947-48. Winterkill has not been a problem since 1948."

Lake Jennie Board and association membership supports strong fisheries.

Stocking report

Fish **Stocked** by Species for the Last Ten Years

Year	Species	Size	Number	Pounds
2012	Walleye	yearlings	5,816	1,454.0
	Walleye	fry	1,056,650	10.6
2010	Walleye	fry	1,057,492	10.3
2008	Walleye	fry	1,057,140	10.4
	Walleye	fingerlings	15,616	945.0
2007	Walleye	fry	1,057,197	10.0
2005	Walleye	fry	1,053,381	10.3
2004	Walleye	fry	1,056,000	8.9

Privately Stocked Fish
* indicates privately stocked fish. Private stocking includes fish purchased by the DNR for stocking and fish purchased and stocked by private citizens and sporting groups.

Stocking Fish Sizes
Fry - Newly hatched fish that are ready to be stocked usually called "swim-ups". Walleye fry are 1/3 of an inch or around 8 mm.
Fingerling - Fingerlings are one to six months old and can range from a size of one to twelve inches depending on the species. Walleye fingerlings range from three to eight inches each fall.
Yearling - Yearling fish are at least one year old. A one-year-old fish can range from three to twenty inches depending on the species. Walleye yearlings average from six to twelve inches.
Adult - Adult fish are fish that have reached maturity. Depending on the species, maturity can be reached at two years of age. Walleye reach maturity between the ages of four and six years.

Aquatic Vegetation

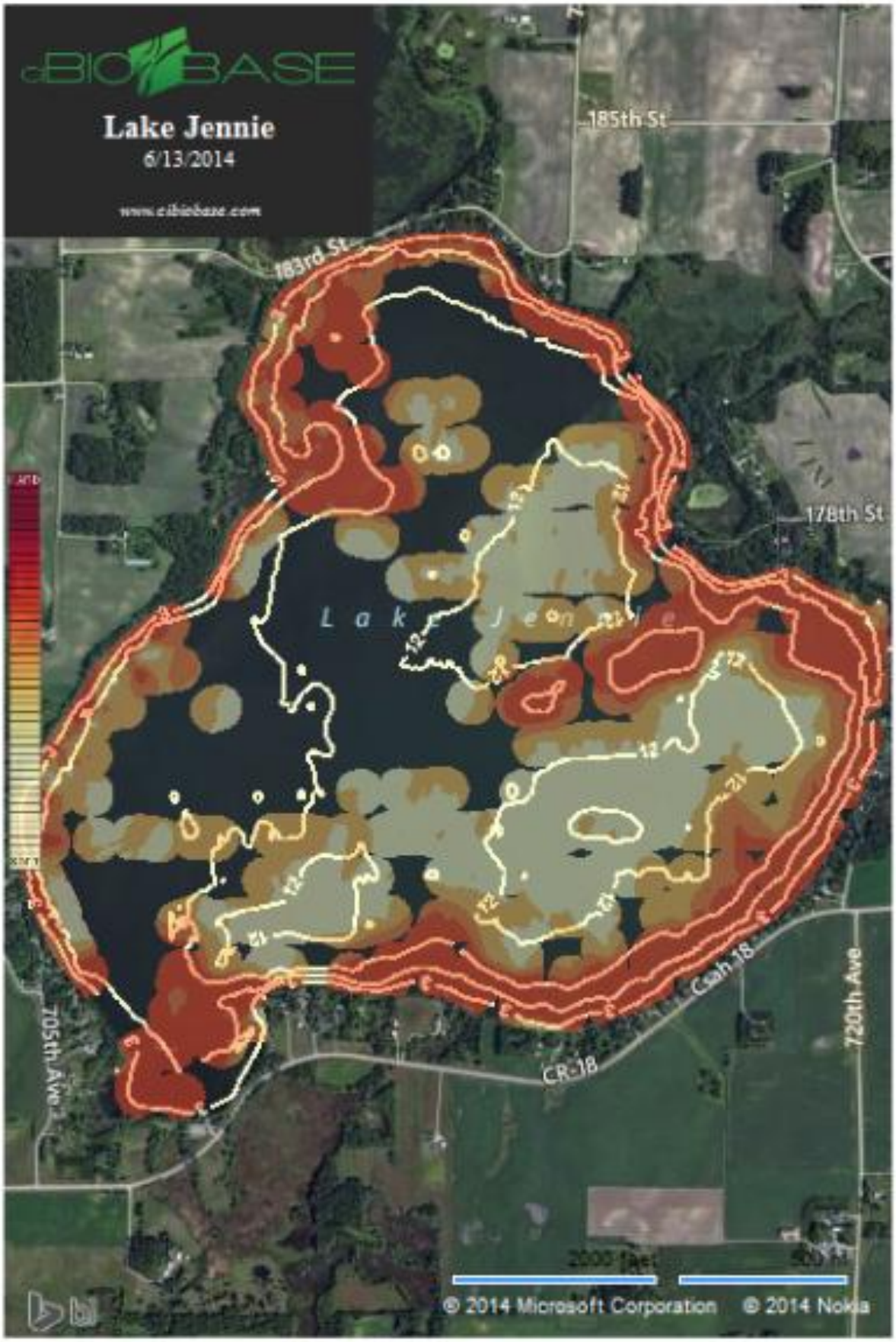
In all your discussions, distinguish between beneficial vegetation (wildlife or fish habitat, vegetative buffer zones, native species) and nuisance (impediments to recreation) or exotic/invasive (biological "threats" such as Eurasian milfoil, purple loosestrife, curlyleaf pondweed). It is also important to remember that control of the nuisance kind of vegetation may have adverse impacts on the fishery/wildlife end of things; it is very hard to please everyone. By Minnesota Rule, aesthetics ***are not*** part of the definition of nuisances. Recreational impairment is the standard used to define nuisance conditions related to aquatic plants.

In 2014, the Lake Jennie Improvement Association board contracted for a vegetation survey to be completed with two passes; one in spring and late summer. The following graphics represent the findings.

Preliminary data showed that curly leaf pondweed was very abundant in the lake and was found at 197 of 252 survey points. However, multiple native species were also observed during the survey.

The following three pages show the data from the processing of the sonar data that was logged while surveying the lake during the springtime survey:

- **Bottom Composition_6132014** shows the bottom hardness of the lake. The darker brown areas are hard bottom (rock, gravel, sand) while the lighter colors demonstrate that silt or muck sediments are present. This information will be remapped during August as the density of curly leaf pondweed affected some of the data readings in portions of the lake.
- **Depth Contours_6132014** shows the 1 foot contours of the lake from the logged sonar data.
- **Vegetation Biovolume_6132014** shows the density of vegetation in the lake on June 13, 2014. The red areas have very dense vegetation (nearly 100% biovolume) while the blue or green areas have less dense vegetation. For the most part, the red areas demonstrate the extent of curly leaf pondweed.
- **Vegetation Biovolume_8222014** shows the density of vegetation on August 22, 2014. At this point the curly leaf pond weed has fallen, and the lake central is fairly clear of problem. The outer circle of the lake and the south bay are clearly infested. This view offers opportunities to locate the primary areas of concern and some possible conclusions for the influx of phosphorous in the lake.


cBIOBASE
Lake Jennie
6/13/2014
www.cibiobase.com
185th St
183rd St
178th St
Lake Jennie
CR-18
705th Ave
720th Ave
2000 feet
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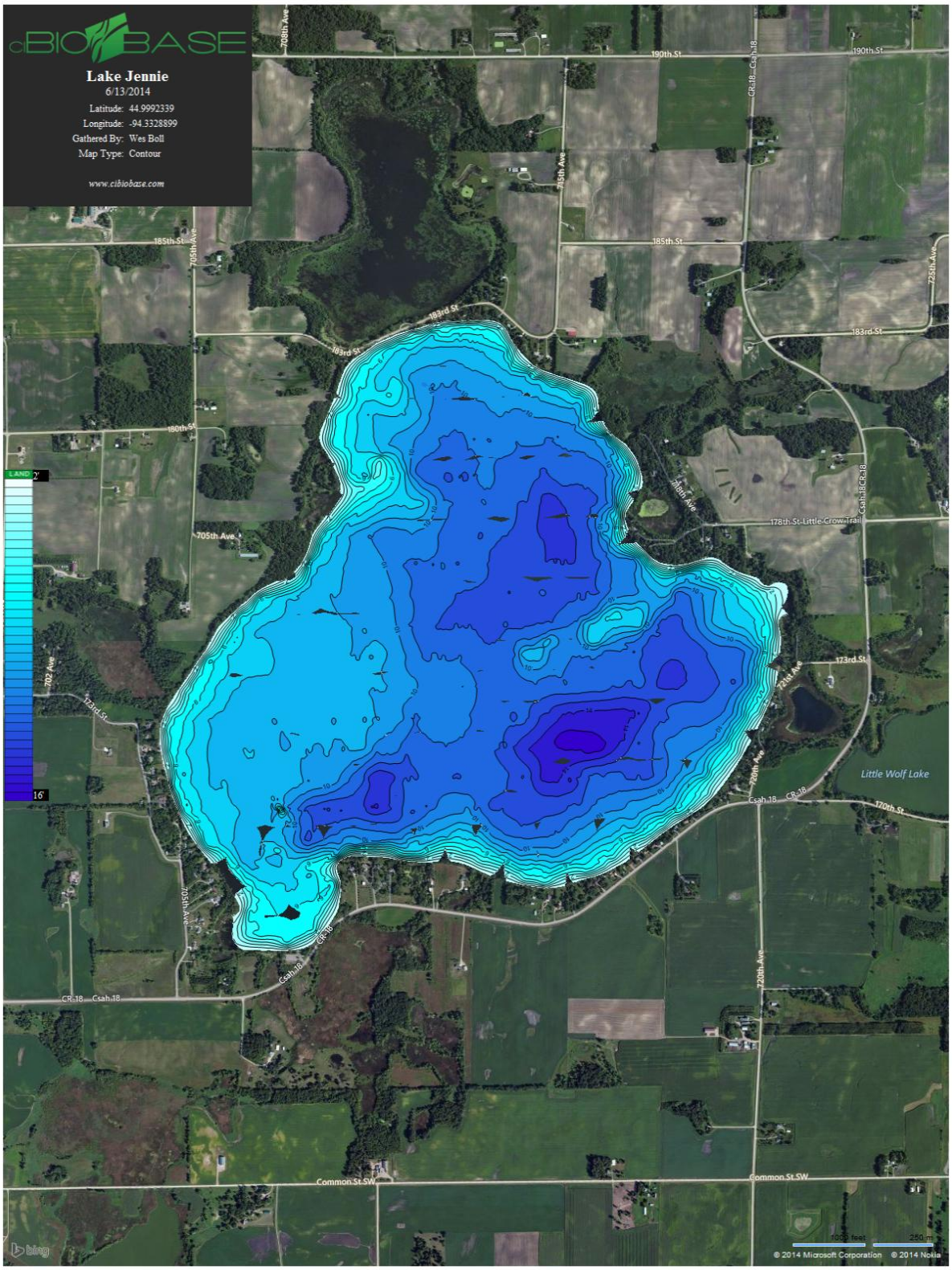
cBIOBASE
Lake Jennie
6/13/2014
Latitude: 44.9992339
Longitude: -94.3328899
Gathered By: Wes Boll
Map Type: Contour
www.cibiobase.com
LAND
16'
Little Wolf Lake
190th St
185th St
183rd St
180th St
178th St-Little Crow Trail
173rd St
170th St
705th Ave
708th Ave
715th Ave
725th Ave
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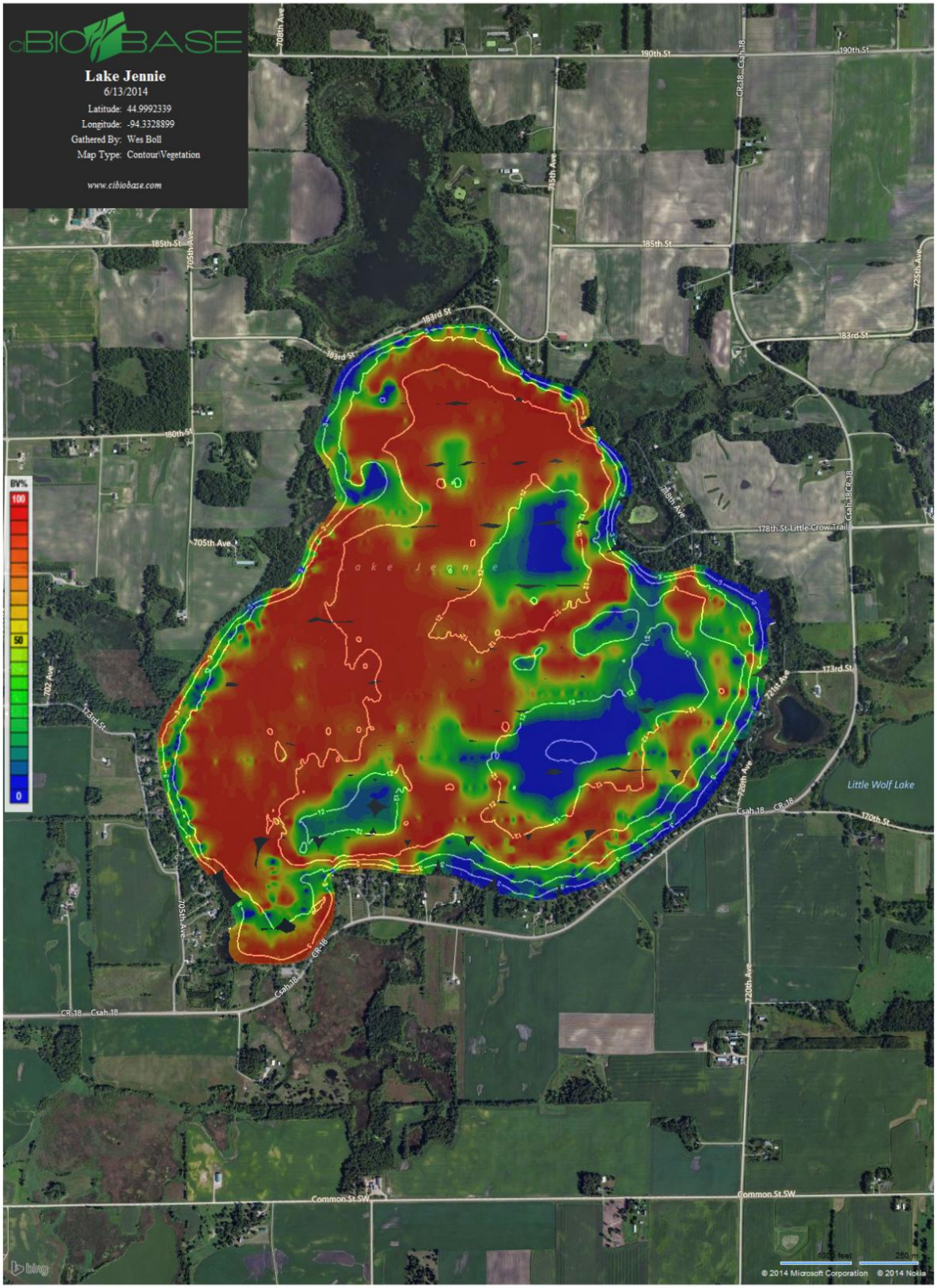
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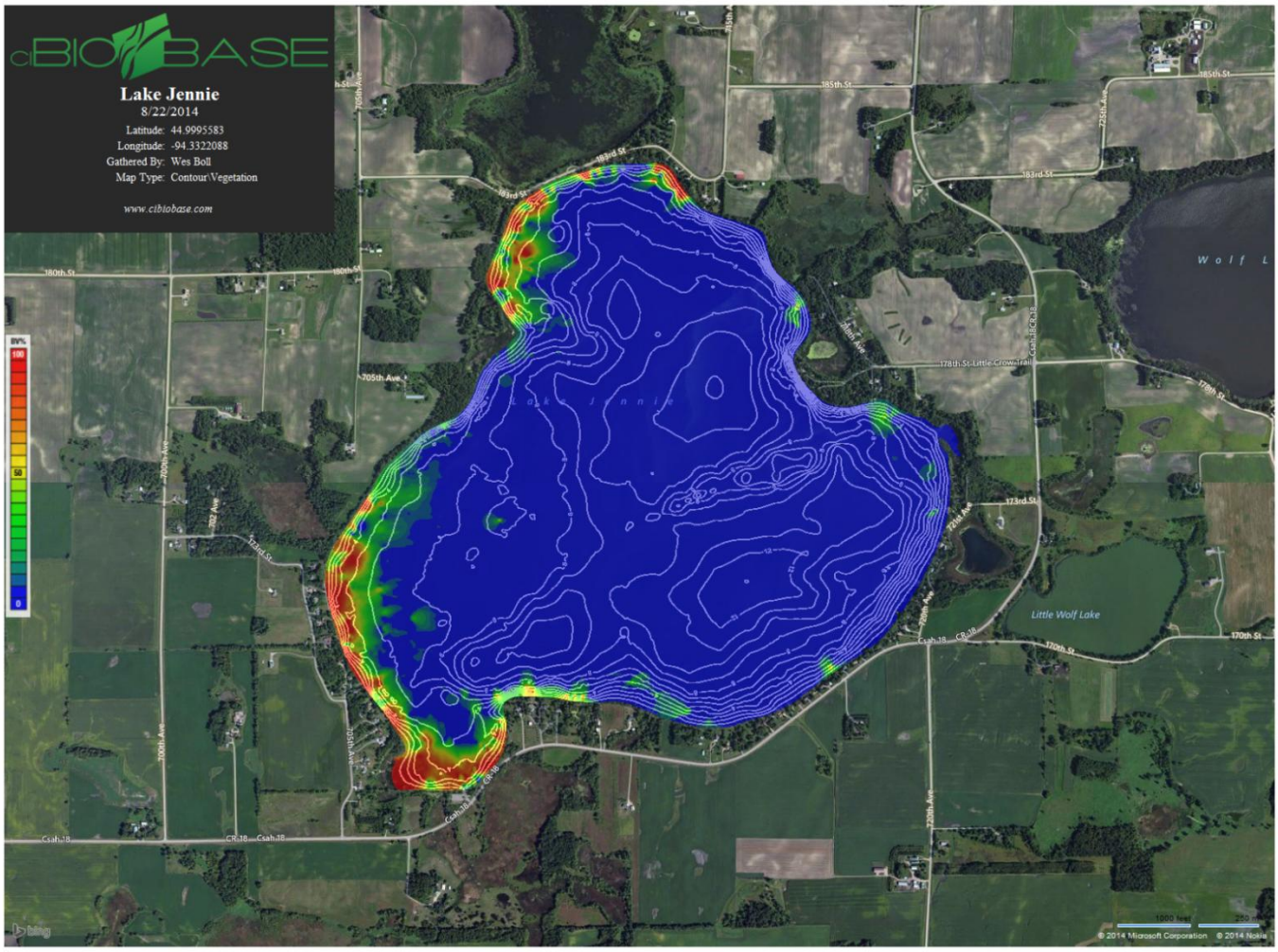

The Lake Jennie Improvement Association has partnered with the C.R.O.W. and Meeker County Association of Lakes to complete various lakescaping projects on Lake Jennie. These projects have been funded through grants. Private lakeshore properties that are deemed sensitive to erosion or lack an adequate vegetative buffer are pinpointed. With the property owner's permission, volunteers plant native plants along the lakeshore to reduce erosion and to help slow runoff.

List of lakescaping projects completed:

- Hedin 2007
- Gersdorf 2010
- Woeffel 2010
- Tews 2011
- Bruce Peterson 2011

Native plant species provide a habitat structure for fish, invertebrates, and other aquatic wildlife, and are preserved and valued in the lake. However, excessive curly pond leaf and algae prevent recreational activities on the lake. Aquatic wildlife are also affected by the curly leaf and excessive algae. Managing the excessive vegetation/algae is a major concern of shoreline owners and visiting lake users—and addressing these problems is being demanded by lake users.

Figures on pages 26-28 represent the recent survey results for Lake Jennie – performed by Wes Boll, Environmental Scientist, Associate at Wenck and Associates, Maple Plain, Minnesota. The initial survey taken June of 2014, with a follow up due near October of 2014. These results indicate problem areas in the lake and have contributed to the formation of lake projects and priorities.

Wildlife

The "Blue Book," *Developing a Lake Management Plan* notes that:

> "Minnesota's lakes are home to many species of wildlife. From our famous loons and bald eagles to muskrats, otters, and frogs, wildlife is an important part of our relationship with lakes. In fact, Minnesota's abundant wildlife can be attributed largely to our wealth of surface water. From small marshes to large lakes, these waters are essential to the survival of 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 wild rice 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.

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 Lake Jennie, the DNR Area Wildlife Manager is LeRoy Dahlke, 398 Sibley State Park Road NE, New London, MN 56273, (320) 354-2154.

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Jaime Edwards, Nongame Wildlife Specialist
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2300 Silver Creek Road NE
Rochester, MN 55906

The Lake Jennie Improvement Association is currently working with local lake associations representing Lake Washington and Collinwood Lake, the DNR, the University of Minnesota, the U.S. Fish and Wildlife Service, and local politicians to develop a strategy to understand how the cormorant and pelican rookery on Pigeon Lake impacts local fisheries. The rookery is the largest in the state of Minnesota and it sits two miles from Lake Jennie.

The lake community enjoys many species of waterfowl and other birds including nesting pairs of loons, bald eagles, Canadian geese, and blue herons. Other visitors to the lake include pelicans, seagulls, terns, coots and other ducks, as well as land birds such as wild turkeys, orioles, hummingbirds, bluebirds, robins and others.

Many other wildlife animals have been observed in and around the lake, including deer, snapping and painted turtles, muskrats. Cormorants continue to be identified as a major problem by the fisheries management, as well as threatening the environment surrounding the lake.

Exotic Species

"Exotic" species -- organisms introduced into habitats where they are not native -- are severe world-wide agents of habitat alternation and degradation. A major cause of biological diversity loss throughout the world, they are considered "biological pollutants."

Introducing species accidentally or intentionally, from one habitat into another, is risky business. Freed from the predators, parasites, pathogens, and competitors that have kept their numbers in check, species introduced into new habitats often overrun their new home and crowd out native species. In the presence of enough food and favorable environment, their numbers will explode. Once established, exotics rarely can be eliminated. Most species introductions are the work of humans. Some introductions, such as carp and purple loosestrife, are intentional and do unexpected damage. But many exotic introductions are accidental. The species are carried in on animals, vehicles, ships, commercial goods, produce, and even clothing. Some exotic introductions are ecologically harmless and some are beneficial. But other exotic introductions are harmful to recreation and ecosystems. They have been caused the extinction of native species -- especially those of confined habitats such as islands and aquatic ecosystems.

The recent development of fast ocean freighters has greatly increased the risk of new exotics in the Great Lakes region. Ships take on ballast water in Europe for stability during the ocean crossing. This water is pumped out when the ships pick up their loads in Great Lakes ports. Because the ships make the crossing so much faster now, and harbors are often less polluted, more exotic species are likely to survive the journey and thrive in the new waters.Page 27 of 43 Many of the plants and animals described in this guide arrived in the Great Lakes this way. But they are now being spread throughout the continent's interior in and on boats and other recreational watercraft and equipment. This guide is designed to help water recreationalists recognize these exotics and help stop their further spread.

Eurasian Watermilfoil (Myriophyllum spicatum)
Eurasian watermilfoil was accidentally introduced to North America from Europe. Spread westward into inland lakes primarily by boats and also by waterbirds, it reached Midwestern states between the 1950s and 1980s.

In nutrient-rich lakes it can form thick underwater stands of tangled stems and vast mats of vegetation at the water's surface. In shallow areas the plant can interfere with water recreation such as boating, fishing, and swimming. The plant's floating canopy can also crowd out important native water plants.

A key factor in the plant's success is its ability to reproduce through stem fragmentation and runners. A single segment of stem and leaves can take root and form a new colony. Fragments clinging to boats and trailers can spread the plant from lake to lake. The mechanical clearing of aquatic plants for beaches, docks, and landings creates thousands of new stem fragments. Removing native vegetation crates perfect habitat for invading Eurasian watermilfoil. Eurasian watermilfoil has difficulty becoming established in lakes with well-established populations of native plants. In some lakes the plant appears to coexist with native flora and has little impact on fish and other aquatic animals.

Likely means of spread: Milfoil may become entangled in boat propellers, or may attach to keels and rudders of sailboats. Stems can become lodged among any watercraft apparatus or sports equipment that moves through the water, especially boat trailers.

Purple Loosestrife (Lythrum salicaria)
Purple loosestrife is a wetland plant from Europe and Asia. It was introduced into the East Coast of North America in the 1800s. First spreading along roads, canals, and drainage ditches, then later distributed as an ornamental, this exotic plant is in 40 states and all Canadian border provinces.

Purple loosestrife invades marshes and lakeshores, replacing cattails and other wetland plants. The plant can form dense, impenetrable stands which are unsuitable as cover, food, or nesting sites for a wide range of native wetland animals including ducks, geese, rails, bitterns, muskrats, frogs, toads, and turtles. Many are rare and endangered wetland plants and animals and are also at risk.

Purple loosestrife thrives on disturbed, moist soils, often invading after some type of construction activity. Eradicating an established stand is difficult because of an enormous number of seeds in the soil. One adult plant can disperse 2 million seeds annually. The plant is able to re-sprout from roots and broken stems that fall to the ground or into the water.
A major reason for purple loosestrife's expansion is a lack of effective predators in North America. Several European insects that only attack purple loosestrife are being tested as a possible long-term biological control of purple loosestrife in North America.Page 28 of 43
Likely means of spread: Seeds escape from gardens and nurseries into wetlands, lakes, and rivers. Once in aquatic system, moving water and wetland animals easily spreads the seeds.

Other Midwestern Aquatic Exotics

Curly-leaf pondweed (Potamogeton crispus) is an exotic plant that forms surface mats that interfere with aquatic recreation. The plant usually drops to the lake bottom by early July.
Curly-leaf pondweed was the most severe nuisance aquatic plant in the Midwest until Eurasian watermilfoil appeared. It was accidentally introduced along with the common carp.

Flowering rush (Botumus umbellatus) is a perennial plant form Europe and Asia that was introduced in the Midwest as an ornamental plant. It grows in shallow areas of lakes as an emergent, and as a submersed form in water up to 10 feet deep. Its dense stands crowd out native species like bulrush. The emergent form has pink, umbellate-shaped flowers, and is 3 feet tall with triangular-shaped stems.

Round goby (Neogobius melanostomus) is a bottom-dwelling fish, native to Eastern Europe that entered the eastern Great Lakes in ballast water. They can spawn several times per year, grow to about 10 inches, are aggressive, and compete with native bottom-dwellers like sculpins and log perch. They are expected to be harmful to Great Lakes and inland fisheries.

Rusty crayfish (Orconectes rusticus) are native to streams in the Ohio, Kentucky, and Tennessee region. Spread by anglers who use them as bait, rusty crayfish are prolific and can severely reduce lake and stream vegetation, depriving native fish and their prey of cover and food. They also reduce native crayfish populations.

White perch (Morone americana) are native to Atlantic coastal regions and invaded the Great Lakes through the Erie and Welland canals. Prolific competitors of native fish species, white perch have the potential to cause declines of Great Lakes walleye populations.

For Lake Jennie, Nick Brown is the Invasive Species Specialist, DNR Division of Ecological & Water Resources, 20596 State Highway 7, Hutchinson, MN 55350, Phone: (320) 234-2550 Extension 238, email: nicholas.brown@state.mn.us.

Lake Jennie is in the process of surveying for exotic aquatic plants, and as of this writing, has identified curly pond leaf as a major problem in the lake (See figure 5D), but there has not been other exotic/invasive species such as Eurasion milfoil or zebra mussels have identified. However, some neighboring lakes have been identified with some instances of eurasion milfoil and have management practices in place.

Long term plans for the Lake Association include goals for reducing the curly pond leaf, and for providing protective/preventive measures to ensure that Lake Jennie remain free from other exotic/invasive species. (See prioritized goals and action plan starting on page 42.

Land Use/Zoning

The Meeker County Planning and Zoning department manages the creation and application of size and use restrictions imposed upon land owners in the county in accordance with the Meeker County Zoning Ordinance. This is the department that issues land use permits, Sewer Permits, Applications for Variance-as they apply to setbacks, Conditional Use Permits and Applications for Rezoning. This department also controls and enforces all rules and regulations pertaining to Feedlots and the Shoreland District.

The Planning and Zoning department works closely with the Minnesota Department of Natural Resources (DNR) and the Soil Conservation Services as it relates to the wetland program.

It is crucial that any resident planning construction, building, or land alteration projects within Meeker County consult the Planning and Zoning department regarding any rules, regulations, and/or necessary permits prior to starting the project.

The water quality of a lake or river is ultimately a reflection of the land uses within its watershed. 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

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.

On any shoreland the permissible density and setbacks for virtually all new uses are determined by the lake or river classification standards established by the Department of Natural Resources. **Lake Jennie (#47-0015) is classified by Meeker County as a Recreational Development Lake**.

Natural Environment lakes are generally small, often shallow lakes with limited capacities for assimilating the impacts of development and recreational use. They often have adjacent lands with substantial constraints for development such as high water tables, exposed bedrock, and unsuitable soils. These lakes, particularly in rural areas, usually do not have much existing development or recreational use. In Meeker County, an NE management district is "established to preserve and enhance high quality waters by protecting them from pollution and to protect shorelands of waters which are unsuitable for development; to maintain a low density of development; and to maintain high standards of quality for permitted development."

Recreational Development lakes are generally medium-sized lakes of varying depths and shapes with a variety of landform, soil, and ground water situations on the lands around them. They often are characterized by moderate levels of recreational use and existing development. Development consists mainly of seasonal and year-round residences and recreationally-oriented commercial uses. Many of these lakes have capacities for accommodating additional development and use. In Meeker County the RD management district is established to "managed proposed development treasonable consistent with existing development and use; to provide for the beneficial use of public waters by the general public, as well as the riparian owners; to provide for multiplicity of lake uses; and to protect areas unsuitable for residential and commercial uses from development."

General Development lakes are generally large, deep lakes or lakes of varying sizes and depths with high levels and mixes of existing development. These lakes often are extensively used for recreation and, except for the very large lakes, are heavily developed around the shore. Second and third tiers of development are fairly common. The larger examples in this class can accommodate additional development and use. Meeker County's Shoreland Ordinance notes that "the GD management district is established to provide minimum regulations in areas presently developed as high density, multiple use areas; and to provide guidance for future growth of commercial and industrial establishments which require locations on protected waters."

Meeker County the zoning standards associated with each water body class are:

Sewered Lakes					
Lake Class	Lakeshore			Non-Lakeshore	
	Lot Width (feet)	Lot Area (ft^2)	Structure setback (feet)	Lot Width (feet)	Lot Area (ft^2)
Natural Sensitive	300	130,000	200	300	130,000
Natural Environmental	125	40,000	150	125	20,000
Recreational Development	75	20,000	75	75	15,000
General Development	75	15,000	50	75	10,000
Unsewered Lakes					
Lake Class	Lakeshore			Non-Lakeshore	
	Lot Width (feet)	Lot Area (ft^2)	Structure setback (feet)	Lot Width (feet)	Lot Area (ft^2)
Natural Sensitive	300	130,000	200	300	130,000
Natural Environmental	200	80,000	150	200	80,000
Recreational Development	150	50,000	100	150	50,000

General Development	125	25,000	75	150	50,000
Rivers					
River Class	River Shoreland				
	Lot Width (feet)	Structure Setback (feet)		Sewage Setback (feet)	
Remote	300	200		150	
Forested/Transition	200	150		100	
Agricultural/ Urban & Tributary	150	50/100*		75	

- Sewered/Unsewered

Note: setbacks are measured from the Ordinary High Water Level

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, or are destroyed by natural, accidental causes or in association with significant renovation.

Additional questions may be directed to: Kristin Cote, Director, Planning & Zoning
Phone: 320-693-5290, **Email:** kristin.cote@co.meeker.mn.us
Location: 325 Sibley Avenue North, Courthouse Level 3 (street level), Litchfield, MN 55355

Contact list for questions regarding zoning and land use
Meeker County Water Plan Task Force Members
Kristen Cote ~ Meeker County Planning & Zoning
Ron Kutzke ~ Meeker County Board of Commissioners
Kim Hemple ~ Meeker County Association of Lakes
Dana Leibfried ~ Meeker County Soil & Water Conservation District
Dale Johnson ~ Natural Resource Conservation Service
Dan Fitterer ~ Meeker County Feedlot & Agricultural Interests
Wesley Nelson ~ Meeker County Planning Commission
Matthew Johnson ~ Mid-Minnesota Development Commission

Wetlands Conservation Act *– Meeker County supports for zoning issues*:

In 1991, the Minnesota Legislature passed Chapter 354, the Wetlands Conservation Act (WCA), which created a statewide "no-net loss" policy for wetlands. The law requires anyone proposing to drain or fill a wetland to first try to avoid disturbing the wetland; second, try to minimize any impact on the wetland; and, finally, replace any lost wetland acres, functions and values. Certain wetland activities are exempt from the act, allowing projects with minimal impact or projects located on land where certain pre-established land uses are present to proceed without regulation. The MeekerCounty Environmental Services Office implements the act locally. The Minnesota Board of Water and Soil Resources (BWSR) administers WCA statewide.

The WCA recognizes a number of wetland benefits deemed important, including: Water quality, including filtering pollutants out of surface water and groundwater, using nutrients that would otherwise pollute public waters, trapping sediments, protecting shoreline, and recharging groundwater supplies; Floodwater and storm water retention, including reducing the potential for flooding in the watershed; Public recreation and education, including hunting and fishing areas, wildlife viewing areas, and nature areas; Commercial benefits, including wild rice and cranberry growing areas and aquaculture areas; Fish and wildlife benefits; and Low-flow augmentation during times of drought.

What are the Risks Involved with Wetlands/Water Retention?

There are numerous water quality and quantity concerns directly related to wetlands and/or water retention issues. Their main water quantity value stems from the increasingly important water management philosophy of allowing water to be absorbed into the ground where it falls. Not only does this avoid overloading ditch systems and streams, thereby reducing erosion and flooding issues, they also provide an extremely value source of groundwater recharge. From a water quality perspective, wetlands provide a natural basin for storm water management, acting as high effective filters. The vegetation found in wetlands help to remove phosphorous. This helps to minimize the unwanted growth of aquatic weeds and algae, which end up using the oxygen that plants and animals need to survive. Meeker County Water Plan (2013-2023).

Where are Wetland/Water Retention concerns in Meeker County?

Today, due in part to regulations such as the WCA, the loss of wetlands has been greatly reduced. The State's Protected Waters Inventory, the Federal Swampbuster Act, and Section 404 of the Clean Water Act also largely contribute to protecting wetland resources. In addition, conservation programs, such as the Wetland Reserve Program and Reinvest in Minnesota Program, actually provide landowners an opportunity to restore previously drained wetlands along with preserving existing wetlands. These programs and others like them should continue to be promoted to landowners within Meeker County. Wetland restorations should also be targeted in conjunction with drainage ditch system improvements to assist with flood mitigation, water retention, and storm water management benefits.

What actions are needed to properly address Wetlands/Water Retention issues in Meeker County?

The Meeker County Planning and Zoning Office and the Soil and Water Conservation District implements WCA locally. The Minnesota Board of Water and Soil Resources (BWSR) administers the WCA's statewide. The Meeker County Water Plan Task Force identified a number of Action Steps that will assist with both wetland protection and water retention This includes working with the various Water Plan Stakeholders to explore options to restore wetlands with voluntary landowners. In addition, the County will examine opportunities to abandon or relocate public drainage systems in conjunction with wetland restorations. The County is also committed to providing education and technical assistance on the importance to protecting wetlands, and assisting with finding which conservation programs may best fit each opportunity. Rob Sip from the Minnesota Department of Agriculture summarizes the issues best: "Properly locating wetlands and water storage or retention projects can be a strategic component of overall efforts to manage nutrients, sediments, and water quantity issues" (April 20, 2012).

The County's Soil and Water Conservation District and watershed organizations are also committed to working with landowners on wetland provisions and Best Management Practices.

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.

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 shore lands, 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.

Based on the Lake Jennie annual meeting in June, 2012, there were no concerns or conflicts noted by the membership.

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 pubic 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 Minnesota Department of Natural Resources Fisheries Survey, there are two public accesses on Lake Jennie.

Ownership	Type	Description
DNR	Concrete	A small access
DNR	Concrete	A paved access with two ramps in the southwest corner of the lake.

There is a fishing pier at the south public access and an aquatic management area on the south shore along CSAH 18.

Members of the LJIA volunteer to inspect watercraft entering and exiting Lake Jennie for aquatic invasive species, mostly during higher traffic times like holiday weekends and just after the fishing opener.

On the south landing, the Lake Jennie Improvement Association provides a security light 12 months of the year, and cooperates with the DNR to provide toilet facilities for the summer months, and pays privately for an additional 3 months to accommodate early and late season lake use. The Association also works with the DNR to keep the south landing more accessible by clearing weeds from the access. There is educational and informational signage located on a bulletin board near the access referring to exotic/invasive identification as well as native plants and fish that can be found in the lake.

III. SUMMARY AND CONCLUSION

Organizational Development

Board Class of 2014-2015
The Lake Jennie Board consists of nine (9) members. Each member of the board comes with various experiences, skills and abilities that contribute to the perspective and work of the board. There is an executive committee that includes a president, vice president, treasurer, and secretary. The board meets typically meets once each month, with the exception of November and December, and on an ad hoc basis.

Communication
The Lake Jennie Improvement Association usually meets 10 months of the year. All meetings are open to members and non-members; but the board announces and holds more formal open meetings quarterly in January, April, June, and September. Communication with membership is accomplished via semi-annual newsletters, mailings, through the Lakejennie.org website, and more recently, via a Lake Jennie Improvement Association Facebook page.

Membership
There are approximately 100 properties around the Lake Jennie shoreline. Several of these properties are owned by an adjacent property, and results in a total potential membership of about 90 members. Currently, the Association claims approximately 60 active members, but has a goal of reaching 100% participation in the next few years.

Goal Setting

The board is working on setting a process for approaching goals. Using the four key areas identified at the Visioning/Planning session, work has been done to investigate and develop goals and projects. Recently, there have been work groups that have tackled individual projects. Some of these projects are fundraising, the lake plan workgroup, a federal 501(c)3 workgroup, and developing teams to investigate and implement action toward accomplishing the goals discussed in the Lake Plan, and as identified in the Action Plan section of the Lake Plan document.

Summary of Visioning/Planning Session

In June of 2012, the Lake Jennie Improvement Association hosted the annual meeting of membership and invited members to participate in a Visioning/Planning session. The LJIA Board used this time to gather input from the attending membership. There were about 60 people on hand to discuss current issues and priorities for work around lake quality improvement. The group identified four key issues and broke into interest groups to discuss desired outcomes, benefits, benchmark indicators and suggested actions. Each break-out group identified contacts and one or two members took the lead on following up on their respective issue. On the next two pages is a summary of the work done at this meeting.

The four key areas identified were 1) water quality, 2) fisheries management, 3) aquatic vegetation—both native and invasive, and 4) exotic species and pests. Water quality received the most concern, as it affects and is affected by the other identified issues. The following pages represent the goals and describes benchmarks and outcomes of work identified toward each goal.

Lake Jennie Association Membership Input on Lake Management Plan June 23, 2012

Identified Issue	Desired Outcome(s)	Benefits	Indicators /Benchmarks	Actions	Contacts	Who will follow up?
Water Quality	• Less Phosphorous (<= 50mg/ltr) • Less algae blooms • Less pondweed • Improved water clarity	Overall better lake experience for all	• Reduction in suspended and sedimented phosporous • Less algae blooms • Less pondweed • Clearer water	• Get data for phosphorous levels • Make connections with other interested or involved people or organization • Formulate projects based on data and connections	• Tim Benoit, Co Commissioner • CROW – local watershed district • DNR – hydrologists, fisheries • AW Research – for water sampling/testing • Local Farmer Association(s)	Karen Nagel Garry Bennett (DNR Hydrologist) Scott Lahr
Fish Manage-ment	• Control cormorants and pelicans • Overabund-ance of northern pike (predators) • Pan fish reproduction and management • Lake Association to match DNR stock of panfish	A variety of people would benefit: fishing residents and community recreational users, baitshops, boat and supply sales, and increased property values	• Fishing contests resume on lake (Monday League) • DNR test samples meet area lakes averages • Lakeshore owners, public access and pier well used • More ice fishing	• Observed improved control over cormorant/pelica n populations • Political Advocacy • A 5-year fish management plan is in place following the results of this summers' DNR testing • A fundraising program for panfish stocking plan • Enhance website	• DNR Fisheries (Hutch fishery) • Local and State Politicians • Commercial Fishermen • Other lake associations for stocking • Lake Jennie Assn to support stocking efforts	Randy Nass, Bob Lindee, Clint K. Mary Nass Dick Nesvold, Kevin Thorud
Aquatic Veg. "desired" vegetation	• More buffer planting • More lake plants (bulrushes, etc.) • No cormorant nesting areas • Walleye spawning plants	Improved fish habitats = more fish; Improved water quality/ clarity; Better for residents and visitors; More visually appealing	• Phosphorou s levels improved • Fish abundance	• Getting information on best plants for fish habitats and buffer plants • Less exotic weeds • More walleye	• DNR – Vegetation Mgmt • Fisheries • Crow River Watershed	Clint Clint
Exotic Species	More proactive measures: • improved signage at landing • monitoring access • educate public • boat inspection training • manage curly leaf	Make lake more useable; control curly leaf. Benefits both owners and community users. Controlling exotics encourages native species. Better access for fishermen.	• No new exotic species introduced • Controlled curly lef • Improved usability of lake for recreation and fishing	• Signage for access • Make connections and get information regarding several areas of concern for exotic species	• DNR for signs, boat inspection training, aquatic vegetation survey • DNR Hydrologist to understand the transfer between lakes and upstream • (monitor/filter the inlets) • Introduce buffers for phosphorous inflow • Cormorant mgmt investigation	Randy, BOD Bob Peterson

Summary of the Lake Jennie Improvement Board Visioning/Planning Session

The current board met in October of 2014 for a strategic planning session to write the first projects into the plan. These include developing projects around the areas defined by membership at the 2012 annual meeting.

Water quality – this is a complicated issue. The priorities defined by the board are dealing first with the problem areas as highlighted by the vegetation survey. We will investigate preventive type strategies prior to treatment strategies. It is clear that the south bay and the western shoreline exhibits problems and it's up to the board, working with the DNR and other agencies, to determine how we can best stop the flow of phosphorous rich runoff into the lake.

Fisheries – fishing continues to be a key area for requesting improvement. We have to investigate ways to improve habitat, request more numbers and varieties of stocked fish, and work with other lake associations and other agencies to reduce the effect that the cormorant population has on the stocking program (some might say it's a cormorant feeding program!)

Aquatic Vegetation – clearly the curly leaf is a problem in early to mid summer and treating it is a priority. We do however, have to focus on ways to prevent the high phosphorous runoffs that are contributing to the overgrowth. We also have to insure that native species of vegetation are maintained in adequate numbers to provide habitat for fish and adequate oxygen supplies.

Exotic Species – at this time, Lake Jennie is free from the ravages of any exotic species. We would like to keep it that way, and we are investigating low cost but highly effective ways of keeping these out of the lake.

Below are the Grant Action Plans as identified at the October, 2014 Strategic Planning Session of the Lake Jennie Improvement Association.

Grantee Action Plan and Evaluation Form

Grantee Organization:	MCAL
Project Coordinator:	
Phone/Email:	
Project Title:	

Summary of Project (1 or 2 sentences)	To contract with a consultant(s) with special training in lake management and improvement projects. The consult will help the Lake Jennie Improvement Association to develop priorities and projects to work toward improving the lake and lake experience to the point of being a non-impaired lake as defined by the MPCA.

*Note: At least one objective should answer the question, "So What?" What difference will your project make in your community, in changed lives, in new skills, knowledge, behaviors, or attitudes? Can you measure that change?

***Objective #1** (must be measurable results, not just effort)

To determine to contract with an appropriate consultant/organization knowledgeable in lake management/improvement strategies.

Action Plan- What steps need to be done to achieve this objective**:**

Action	By When	Person Responsible
1. Contact appropriate organizations and individuals for bids for the consult.		
2. Meet with chosen consultant during a special meeting of the board to express the interests of the membership and board priorities, and expected outcome of an improving the lake and lake experience.		
3. Establish priorities, shovel ready projects and long term solutions for preventive and treatment options. Determine potential costs and investigate grant or funding options for completing various projects.		
4.		

Expected Result:	That the board will have a complete picture of the problem and potential solutions for preventive activities as well as treatment options. This consult will result in a work plan for lake improvement activities; obtaining grants or funding; or acquiring volunteers to assist with smaller projects.

Results: *Please note: the remaining questions are to be filled out at mid term (if grant exceeds $5,000) and at end of grant period for evaluation purposes.

Objective #1 Mid-point Result (fill out at mid-point ONLY if grant exceeds $5,000)		
Objective #1 Actual Result (to be completed at end of grant period for final report)		Initiative Foundation use only

Appendix I

November 2010 Lake Assessment Program Study
Minnesota Pollution Control Agency

http://www.pca.state.mn.us/index.php/view-document.html?gid=15458

Appendix II

June 2012 DNR Fisheries Management Plan

http://www.dnr.state.mn.us/lakefind/showreport.html?downum=47001500

Glossary

Aerobic: Aquatic life or chemical processes that require the presence of oxygen.

Algal bloom: An unusual or excessive abundance of algae.

Alkalinity: Capacity of a lake to neutralize acid.

Anoxic: The absence of oxygen in a water column or lake; can occur near the bottom of eutrophic lakes in the summer or under the ice in the winter.

Benthic: The bottom zone of a lake, or bottom-dwelling life forms.

Best Management Practices: A practice determined by a state agency or other authority as the most effective, practicable means of preventing or reducing pollution.

Bioaccumulation: Build-up of toxic substances in fish (or other living organism) flesh. Toxic effects may be passed on to humans eating the fish.

Biological Oxygen Demand: The amount of oxygen required by aerobic microorganisms to decompose the organic matter in sample of water. Used as a measure of the degree of water pollution.

Buffer Zone: Undisturbed vegetation that can serve as to slow down and/or retain surface water runoff, and assimilate nutrients.

Chlorophyll *a*: The green pigment in plants that is essential to photosynthesis.

Clean Water Partnership (CWP) Program: A program created by the legislature in 1990 to protect and improve ground water and surface water in Minnesota by providing financial and technical assistance to local units of government interested in controlling nonpoint source pollution.

Conservation Easement: A perpetual conservation easement is a legally binding condition placed on a deed to restrict the types of development that can occur on the subject property.

Cultural eutrophication: Accelerated "aging" of a lake as a result of human activities.

Epilimnion: Deeper lakes form three distinct layers of water during summertime weather. The epilimnion is the upper layer and is characterized by warmer and lighter water.

Eutrophication: The aging process by which lakes are fertilized with nutrients.

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

Exotic Species: Any non-native species that can cause displacement of or otherwise threaten native communities.

Fall Turnover: In the autumn as surface water loses temperature they are "turned under" (sink to lower depths) by winds and changes in water density until the lake has a relatively uniform distribution of temperature.

Feedlot: A lot or building or a group of lots or buildings used for the confined feeding, breeding or holding of animals. This definition includes areas specifically designed for confinement in which manure may accumulate or any area where the concentration of animals is such that a vegetative cover cannot be maintained. Lots used to feed and raise poultry are considered to be feedlots. Pastures are not animal feedlots.

Groundwater: water found beneath the soil surface (literally between the soil particles); groundwater is often a primary source of recharge to lakes.

Hardwater: Describes a lake with relatively high levels of dissolved minerals such as calcium and magnesium.

Hypolimnion: The bottom layer of lake water during the summer months. The water in the hypolimnion is denser and much colder than the water in the upper two layers.

Impervious Surface: Pavement, asphalt, roofing materials or other surfaces through which water cannot drain. The presence of impervious surfaces can increase the rates and speed of runoff from an area, and prevents groundwater recharge.

Internal Loading: Nutrients or pollutants entering a body of water from its sediments.

Lake Management: The process of study, assessment of problems, and decisions affecting the maintenance of lakes as thriving ecosystems.

Littoral zone: The shallow areas (less than 15 feet in depth) around a lake's shoreline, usually dominated by aquatic plants. These plants produce oxygen and provide food, shelter and reproduction areas for fish & animal life.

Local Unit of Government: A unit of government at the township, city or county level.

Mesotrophic Lake: A lake that is midway in nutrient concentrations (between a eutrophic and oligotrophic lake). Characterized by periodic problems with algae blooms or problem aquatic vegetation.

Native Species: An animal or plant species that is naturally present and reproducing.

Nonpoint source: Polluted runoff – nutrients or pollution sources not discharged from a single point. Common examples include runoff from feedlots, fertilized lawns, and agricultural fields.

Nutrient: A substance that provides food or nourishment, such as usable proteins, vitamins, minerals or carbohydrates. Fertilizers, particularly phosphorus and nitrogen, are the most common nutrients that contribute to lake eutrophication and nonpoint source pollution.

Oligotrophic Lake: A relatively nutrient-poor lake, characterized by outstanding water clarity and high levels of oxygen in the deeper waters.

Nutrient: A substance that provides food or nourishment, such as usable proteins, vitamins, minerals or carbohydrates. Fertilizers, particularly phosphorus and nitrogen, are the most common nutrients that contribute to lake eutrophication and non-point source pollution.

pH: The scale by which the relative acidity or basic nature of waters are accessed,

Photosynthesis: The process by which green plants produce oxygen from sunlight, water and carbon dioxide.

Phytoplankton: Algae – the base of the lake's food chain, it also produces oxygen.

Point Sources: Specific sources of nutrient or pollution discharge to a water body, i.e., a stormwater discharge pipe.

Riparian: The natural ecosystem or community associated with river or lake shoreline.

Secchi Disc: A device measuring the depth of light penetration in water.

Sedimentation: The addition of soils to lakes, which can accelerate the "aging" process by destroying fisheries habitat, introducing soil-bound nutrients, and filling in the lake.

Spring turnover: After ice melts in the spring, warming surface water sinks to mix with deeper, colder water. At this time of year all water is the same temperature.

Thermocline: During summertime deeper lakes stratify by temperature to form three discrete layers; the middle layer of lake water in known as the thermocline.

Trophic Status: The level of growth or productivity of a lake as measured by phosphorus, content, algae abundance, and depth of light penetration.

Watershed: The surrounding land area that drains into a lake, river, or river system.

Zooplankton: Microscopic animals.

Common Biological or Chemical Abbreviations

BOD	Biological Oxygen Demand
°C	degree(s) Celsius
cfs	cubic feet per second (a common measure of rate of flow)
cfu	colony forming units (a common measure of bacterial concentrations)
chl *a*	Chlorophyll *a*
cm	centimeter
COD	Chemical Oxygen Demand
Cond	conductivity
DO	dissolved oxygen
FC	fecal coliform (bacteria)
ft	feet
IR	infrared
l	liter
m	meter
mg	milligram
ml	milliliter
NH_3-N	nitrogen as ammonia
NO_2-NO_3	nitrate-nitrogen
NTU	Nephelometric Turbidity Units, standard measure of turbidity
OP	Ortho-phosphorus
ppb	parts per billion
ppm	parts per million
SD	Standard Deviation (statistical variance)
TDS	total dissolved solids
TN	total nitrogen
TP	total phosphorus
TSI	trophic status index
TSI (C)	trophic status index (based on chlorophyll *a*)
TSI (P)	trophic status index (based on total phosphorus)
TSI (S)	trophic status index (based on secchi disc transparency)
TSS	total suspended solids
µg/l	micrograms per liter
µmhos/cm	micromhos per centimeter, the standard measure of conductivity
UV	Ultraviolet

Guide to common acronyms

State and Federal Agencies

BWSR	Board of Soil & Water
COE	U.S. Army Corps of Engineers
CRP	Conservation Reserve Program - A federal government conservation program
DNR	Department of Natural Resources
DOJ	United States Department of Justice
DOT	Department of Transportation
DTED	Department of Trade and Economic Development
EPA	U.S. Environmental Protection Agency
EQB	MN Environmental Quality Board
LCCMR	Legislative-Citizen Commission on Minnesota Resources
MDH	Minnesota Department of Health
MPCA	Minnesota Pollution Control Agency
OEA	MN Office of Environmental Assistance
OSHA	Occupational Safety and Health Administration
RIM	Reinvest In Minnesota - a State of Minnesota Conservation Program
SCS	Soil Conservation Service
SWCD	Soil & Water Conservation District
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USFWS	United States Fish & Wildlife Service

Regional, watershed, community development, trade and advocacy groups

AMC	Association of Minnesota Counties
APA	American Planning Association
COLA	Coalition of Lake Associations
IF	Initiative Foundation
LARA	Meeker County Lakes & Rivers Alliance
LMC	League of Minnesota Cities
MAT	Minnesota Association of Townships
MLA	Minnesota Lakes Association
MSBA	Minnesota School Board Association
MCIT	Minnesota Counties Insurance Trust
Mid-MnMA	Mid-Minnesota Association of Builders
MLA	Minnesota Lakes Association
MnSCU	Minnesota State Colleges and Universities
RCM	Rivers Council of Minnesota
TIF	Tax Increment Financing

Codes and Regulations

110B	The Minnesota law that regulates non-metro county water plans
ADA	American Disabilities Act
B & B	Bed and Breakfast
BOA	Board of Adjustment
Chapter 70/80	Individual Sewage Treatment Standards
CIC Plat	Common Interest Community Plat
Class V	Class Five "Injection" well; any well which receives discharge
CSAH	County State Aid Highway
CUP	Conditional Use Permit
CWA	Clean Water Act
EAW	Environmental Assessment Worksheet
EIS	Environmental Impact Statement
EOA	Equal Opportunity Act
FOIA	Freedom of Information Act
GD	General Development (lake)
GLAR	Greater Lakes Area Association of Realtors
IAQ	Indoor Air Quality
ISTS	Individual Sewage Treatment System
LMP	Lake Management Plan
LQG	Large Quantity Generator (of hazardous waste)
MAP	Minnesota Assistance Program
OHW	Ordinary High Water
PUD	Planned Unit Development
RD	Recreational Development (lake)
ROD	Record of Decision
ROW	Right-of-Way
SBC	State Building Code
SDWA	Safe Drinking Water Act
SF	Square feet
SIZ	Shoreland Impact Zone
SQG	Small Quantity Generator (of hazardous waste)
SWMP	Stormwater Management Plan
UBC	Universal Building Code