

Lake Management Plan
for
Long Lake

Hubbard County, Minnesota



December 2010

Healthy Lakes & Rivers Partnership Committee

Long Lake Area Association

ACKNOWLEDGEMENT

The Long Lake Area Association involvement with the Healthy Lakes and Rivers Partnership formally began in April, 2010 with two evening training sessions. The training was provided by: Don Hickman, Initiative Foundation, Molly Zins, Minnesota Waters, Shane Foley, Hubbard County Soil and Water Conservation District, Jim Steenerson, Northwest Minnesota Foundation, Doug Kingsley, DNR Area Fisheries Supervisor, and Darrin Hoverson, DNR NW Regional Invasive Species Specialist.

Long Lake developed a Healthy Lakes and Rivers Partnership Committee consisting of representatives from each of the 6 neighborhoods around the lake. These members attended the two training sessions, participated in the Visioning Session, served on two primary focus groups and provided input into the development of our final lake management plan. The members of the committee are:

Bill Anderson	Katy Howe
Jeff Bjorkman	John McKinney
Bill Cowman	Sharon Natzel
Don Haagenson	Al Pfingsten
John Hansell	Larry Roberts
Joyce Hansell	

The Visioning Session, held on July 24, 2010 and facilitated by Don Hickman, Initiative Foundation included 32 LLAA members, one fishing club representative, one County Commissioner and one Long Lake Watershed resident. They are:

David Anderson	Stuart Hamilton	Ralph Notch
Bill Anderson	Phyllis Hansell	Sam Oliver
Jim Blodgett	Jim Hansen	Al Pfingsten
Dante Beretta	Daryl Hirschel	Ken Retzer
Jaimie Beretta	Katy Howe	Larry Roberts
Kirk Brock	Arthur Howe	Jon Sams
Don Carlson	Bruce Johnson	Harry Stock
Bill Cowman	John McKinney	Marlene Stock
Joyce Cowman	Robert Natzel	Frank Zoelle
Robert Eggers	Sharon Natzel	Thomas Waterman
Mary Fuchs		Mary Anne Waterman
Kathy Grell		
Al Grimm		
Marlene Grimm		

Two primary Focus Groups were developed as a result of the input given by residents and others attending the Visioning Session. The two focus groups and their members are:

Water Quality Focus Group

Chairman: Bill Cowman

Members:	Robert Eggers	John McKinney
	Mary Fuchs	Jon Sams
	Katy Howe	Harry Stock
	Bruce Johnson	Tom Waterman

Aquatic Vegetation and AIS Exotic Species Focus Group

Chairman: David Anderson

Members:	Jim Blodgett	Sharon Natzel
	Stuart Hamilton	Sam Oliver
	Phyllis Hansell	Al Pfingsten
	Arthur Howe	Mary Ann Waterman

I would like to personally thank everyone mentioned above for their willingness to attend meetings, discuss ideas, develop priorities and finally to review the final Lake Management Plan and provide suggestions for improvement. We now begin the process of implementing those plans to improve the quality of life in and around Long Lake and its watershed.

Larry L. Roberts
Past President
Long Lake Area Association

Table of Contents

Management Plan for Long Lake

I. Introduction:

Summary of Healthy Lakes & Rivers Partnership Program

Physical Description of your lake or drainage

 Watershed size

 Watershed Hydrology

 Precipitation

 Soils

 Land Use

History of development/impacts on your lake

Organizational history

a) Mission

b) Structure

c) Accomplishments

II. Review of historical and existing conditions for each of nine focus areas:

Water Quality

Fisheries Management Plans

Aquatic vegetation

Wildlife

Exotic Species

Land Use and zoning

Managing water surface use conflicts

Public water access

Organizational Development and Communication

III. Summary/Conclusion

Outcome of Visioning Session

IV. Priorities and Action Plans

Appendices

Appendix I: 1995 Lake Assessment Program website link

Appendix II: DNR Fisheries Management Plan for Long Lake

Glossary

Guide to Common Acronyms and abbreviations

Appendix IIA: DNR Fisheries 2009 Gill Net Survey for Long Lake

Appendix III: Long Lake Strategy Roadmap

Introduction

In April 2010 the Long Lake Association was invited to participate in the Healthy Lakes and Rivers Partnership program along with eight other Lake Associations in Hubbard, Beltrami and Clearwater Counties. Under the coordination of Shane Foley (Hubbard County Soil & Water Conservation District), John Knisley (Clearwater County Soil & Water Conservation District), and Bill Patnaude (Beltrami County Environmental Services) 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 Long Lake Area Association was represented at the Healthy Lakes & Rivers training sessions by: Larry Roberts, Don Haagenon, Jeff Bjorkman, Bill Cowman, Bill Anderson, Sharon Natzel, John McKinney, Katy Howe, Al Pflingsten, John and Joyce Hansell.

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 Long Lake Area Association held this planning session July 24, 2010 facilitated by Don Hickman. Thirty two out of the 35 participants were Long Lake property owners. One participant represented a local fishing club, one was a current county commissioner and one was a candidate for county commissioner. Sixteen percent of the property owners describe themselves as year-round residents. Details of the public input received at this session are provided within this plan. Their input was essential to the completion of this plan.

This document is intended to create a record of historic and existing conditions and influences on Long Lake, and to identify the goals of the Long 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 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 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.

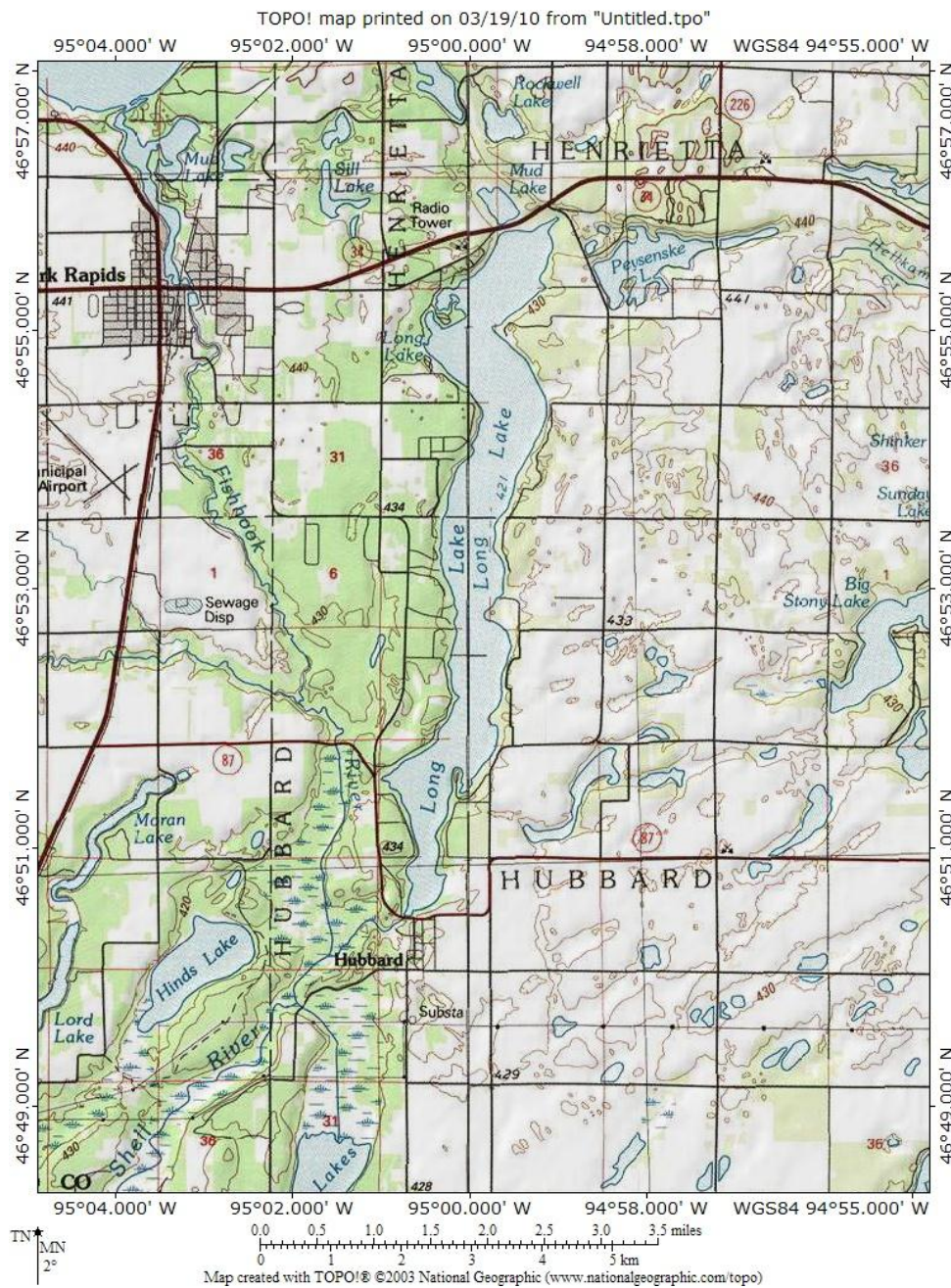
In discussing lake management issues, it is impossible to avoid all scientific or technical terms. We have tried to express our goals, measures of success, and other themes as simply and clearly as possible, but have included a glossary of common limnological terms at the end of the plan to assist the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

Finally, we would like to thank the funders of the Healthy Lakes & Rivers Partnership program for Hubbard, Clearwater and Beltrami Counties, including the Northwest Minnesota Foundation, the McKnight Foundation, the Initiative Foundation and Minnesota Waters.

Physical Characteristics and location of Long Lake

Long Lake (#29-0161) is located in southwestern Hubbard County just southeast of Park Rapids. In 1995 the Minnesota Pollution Control Agency conducted a Lake Assessment Program (LAP) study of Long Lake which is included as Appendix I to this citizen-based Lake Management Plan and is cited frequently as a source of information.

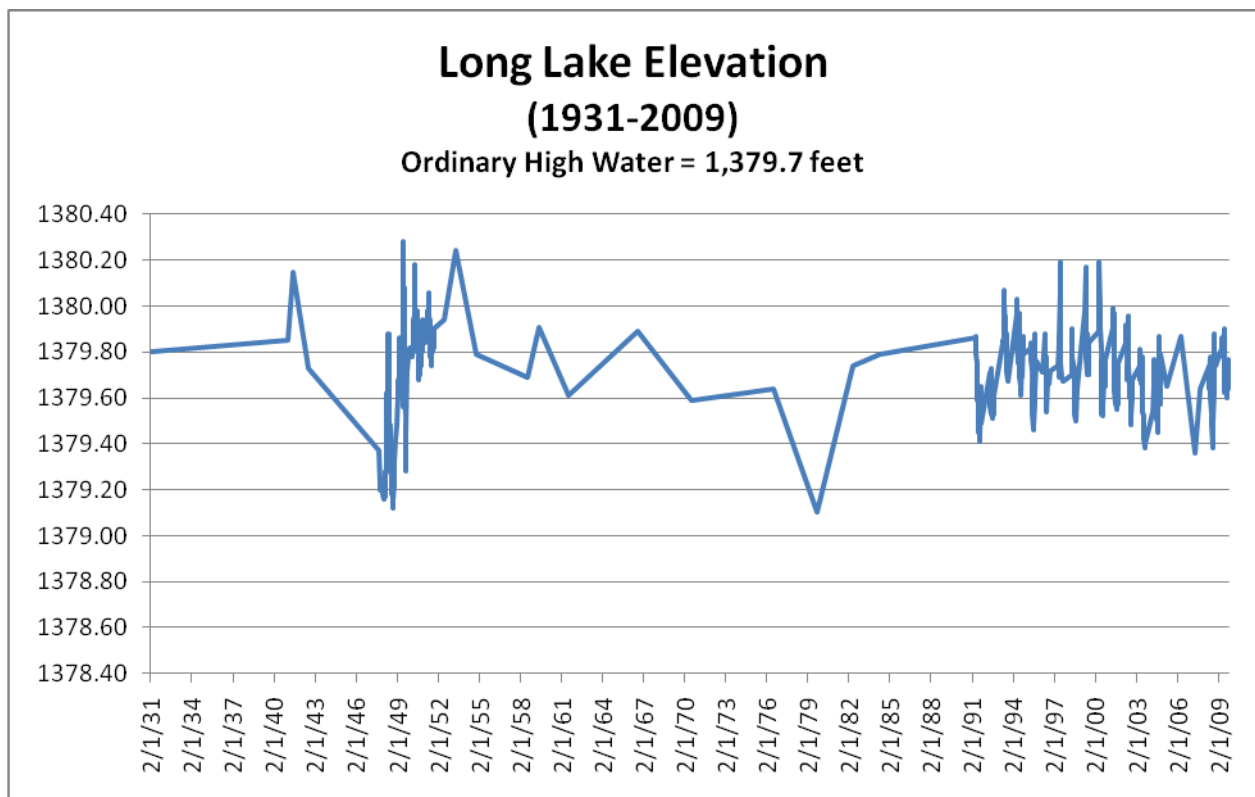
Long Lake has a surface area of 1,926 acres and a maximum depth of 135 feet, placing the lake in the top five percent statewide in terms of size. Approximately 468 acres (23 percent) of lake is within the littoral zone (having a depth of less than 15 feet). Water clarity averaged 13.0 feet in 1995.



Water Level:

The Minnesota Department of Natural Resources, Division of Waters has monitored Long Lake levels in cooperation with volunteer readers since 1931. During the period of record the lake level has varied 1.18 feet based on 757 readings (through October 2009). In general, water levels decline from May through September, with the exception of a slight increase in mid-July in response to several storms.

Highest Recorded (feet/date)	Lowest Recorded (feet/date)	Ordinary High Water (feet)
1,380.28 ft (July 9, 1949)	1,379.1 ft (Sept. 19, 1979)	1,379.7 ft.



Precipitation

In 1995 the Minnesota Pollution Control Agency conducted a Lake Assessment Program (LAP) study of Long Lake and noted that in this part of the state average annual precipitation ranges around 26 inches and evaporation averages around 32 inches.

Soils

The MPCA's 2005 Lake Assessment Program (LAP) report included the following summary of geology within the Long Lake drainage:

Long Lake was formed from ice block basins in outwash plains of the Des Moines Lobe, the most recent glacial lobe. Soils of the watershed consist of the Menahga variety of soil types. These light-colored, droughty, coarse to medium textured forest soils are formed from glacial outwash sand.

Watershed

Land use in the watershed is characterized by cultivated (38 percent of the area) and forested (37 percent) land uses. The proportion of agricultural land is high for lakes in this region of the state. Typically, forested and marsh land uses comprise around 70-90 percent of land uses with the lake watersheds of the Northern Lakes and Forests Eco-region.

The LAP study presented development data tracking the relative density of development and proportion of season vs. permanent structures:

Year	Seasonal	Permanent	Total
1967	244	67	311
1982	163	163	543
1995	357	193	550

The LAP study also concluded that:

“The residential or urban land use around Long Lake is significant in terms of the amount of buildable shoreline per acre of lake surface. Long Lake has a surface area of 1,926 acres and has 17.1 miles of potential shoreline development. In comparison with two other Hubbard County lakes, Kabekona Lake is 2,607 acres and has 8.5 miles of shoreline, and Big Sand Lake is 1,738 areas and has 7.9 miles of shoreline. The significant difference between Long Lake and the other two lakes is due to the long narrow shape of the lake. The high level of urban land use raises the importance of proper zoning and shoreland stewardship on Long Lake.”

Introduction/History of your Lake/River Association

Long Lake's early history including its development as a major recreation lake in Hubbard County began around 1884 when an enterprising businessman dammed up a stream at the south end (next to the town of Hubbard) of a chain of five smaller lakes and created one long lake. The initial earthen dam immediately gave way under the water pressure and eventually a concrete and earthen dam permanently dammed up the waters and created the 9 mile lake that was named Long Lake. Early historical and property records indicate that the west side of the lake just up from the new dam was platted and lots sold by a developer from Des Moines, IA. These early lots were 50-70 wide and eventually became high density lakeside properties.

Resorts began to spring up in the early 1920's and at one time the lake had 29 resorts on its lakeshores. Currently only 5 active resorts and one campground remain. All the rest were sold off as individual cabins/cottages.

The Long Lake Association informally began in the early 1950's when a number of the Des Moines, Iowa property owners would have winter social meetings in Des Moines. The meetings were an informal way to remain in contact with their lake friends over the long winters. In 1954, residents formed the Lake Shore Property Owners Association which continued until 1962.

The Long Lake Association was formed in 1974 as a result of a developer's purchase of the "Wyeth Estate" with the intent of building 300 condominiums and other associated facilities on the west side Long Lake. The first Long Lake Association meeting was held in August, 1974 with a large number of Long Lake residents present. The association hired an attorney and successfully blocked the development plan. As a result, the developer filed bankruptcy and much of the property was sold for development of individual residences. Nine homes took the place of the intended 300 condominiums. The Lake Association held its first annual meeting July 27, 1975.

Since its early beginnings, the Long Lake Association has been directly involved in Long Lake's fishery. For many years the Association rented rearing ponds stocked with walleye fry which were later stocked in Long Lake. The Lake Association continues to be involved in the walleye stocking program with the local DNR Fisheries office. The Lake Association periodically raises funds to stock various size walleye, as determined by DNR, to enhance the fishery. In 2004, LLAA stocked 128 lbs of walleye fingerlings, 2005, 193 lbs of walleye yearlings, 2006, 424 lbs of walleye fingerlings.

After the initial purpose of the lake association was accomplished, the Long Lake Association changed its mission to: "improving the quality of life within our lake community, including the environment, through education and communication." That focus continues today. In 2005, the Board of Directors utilized the services of a Fortune 500 business consultant (Lou Schultz) to create a Strategy Map which incorporates our mission, vision and values into 9 strategic areas of importance. This strategy map is included in Appendix III. All activities in support of the lake association fall within the 9 areas of importance.

Long Lake is generally referred to as being 9 miles long (although various reports show the distance anywhere from 8 to 8.5 miles), covering 1926 acres but generally containing 17.1 miles of shoreline. Plat records indicate that 525 deeded land parcels actually touch the lake. The actual number of homes on the lake at last count appeared to be 475. Long Lake has the highest housing density of any lake in Hubbard County with 30 homes per shoreline mile. There is only a small amount of privately held undeveloped land on the shoreline which could eventually be developed. Variations in house numbers occur when resort cabins are sold off individually or when two older cabins are torn down and replaced by a single home. The majority of the new homes can be occupied year round, thus the number of seasonal cabins is gradually being reduced. Second tier and some third tier development is occurring off the lake, however, those developments only have access to the lake at public access points.

The lake association has created several “restore the shore” and other projects to help homeowners reduce erosion and become better stewards of their property. The lake shore line has numerous areas where erosion has taken place and sediment flows into the lake, thus reducing water clarity. The small number of participants in these programs indicates the lake association needs to do more to convince property owners of the need.

Participation in the lake association varies yearly. The extensive shoreline makes it difficult for residents to meet other residents other than at the annual meeting. If there is not a major issue facing the lake, people tend to only gather with close friends on the lake. Membership currently stands at 225. To improve membership and communication, the Association Board of Directors established 6 neighborhoods around the lake with a board member and alternate elected by residents of each respective neighborhood, plus two At Large members elected by the membership. A website was established (www.longlakeliving.org) to allow members even greater access to the happenings on the lake and links to other important websites.

Neighborhood coffees or other forms of socializing are encouraged to help neighbors meet neighbors. Monthly Zorbaz pizza nights and an annual Christmas holiday dinner hosted by the Long Lake Ladies further provide opportunities for lake residents to get together. For many years the LLAA has held an annual July 4th flotilla on the lake open to all residents. Dock decorating was recently added as part of our 4th of July celebration. LLAA participates in the Adopt-A-Highway program with Hubbard County for County Road 20 bordering the east side of Long Lake. Cleanups are scheduled each spring and fall. A lake shoreline cleanup event is being planned for 2011.

This year the Board of Directors have filed with the IRS to create a non-profit charitable foundation to support a variety of issues. When approved, this will allow members to make tax deductible contributions to the lake foundation.

The LAP study noted that:

A septic system survey was conducted by Gary Johannson of the Hubbard County Environmental Services Office in 1995. The purpose of this survey was to identify those systems that were in non-conformance with the Minnesota Rule Chapter 7080 (On-site Wastewater System Code) so that all systems could be brought into compliance. This information should assist the Association with determining whether more education is needed with respect to design and maintenance of on-site systems and whether assistance from Hubbard County is needed in the areas of education.

The County surveyed 550 lots...and determined that only 15 properties/dwellings had a non-conforming system in need of upgrading. They also estimated that approximately 35 percent (193 residences) of the 550 lots were year-round residences, while approximately

65 percent (357 residences) were seasonal.

A positive aspect of establishment of year round residences is that it generally requires upgrades to any previous existing septic system. As a result, the number of non-conforming septic systems is low.

1. Water Quality

Since 1984, citizen volunteers from Long Lake have participated in the Minnesota Pollution Control Agency's (MPCA) Citizen Lake Monitoring Program (CLMP), recording secchi disc transparency – a measure of water clarity. Harry Stock and Jon Sams, seasonal lake residents have been responsible for these efforts in recent years.

On the MPCA's web-site 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:

<u>TSI Range</u>	<u>Trophic Status</u>	<u>Characteristics</u>
0-40	Oligotrophic	Clean Lake
41-50	Mesotrophic	Temporary algae & aquatic plant problems
50-70	Eutrophic	Persistent algae & aquatic plant problems
Greater than 70	Hyper-eutrophic	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.

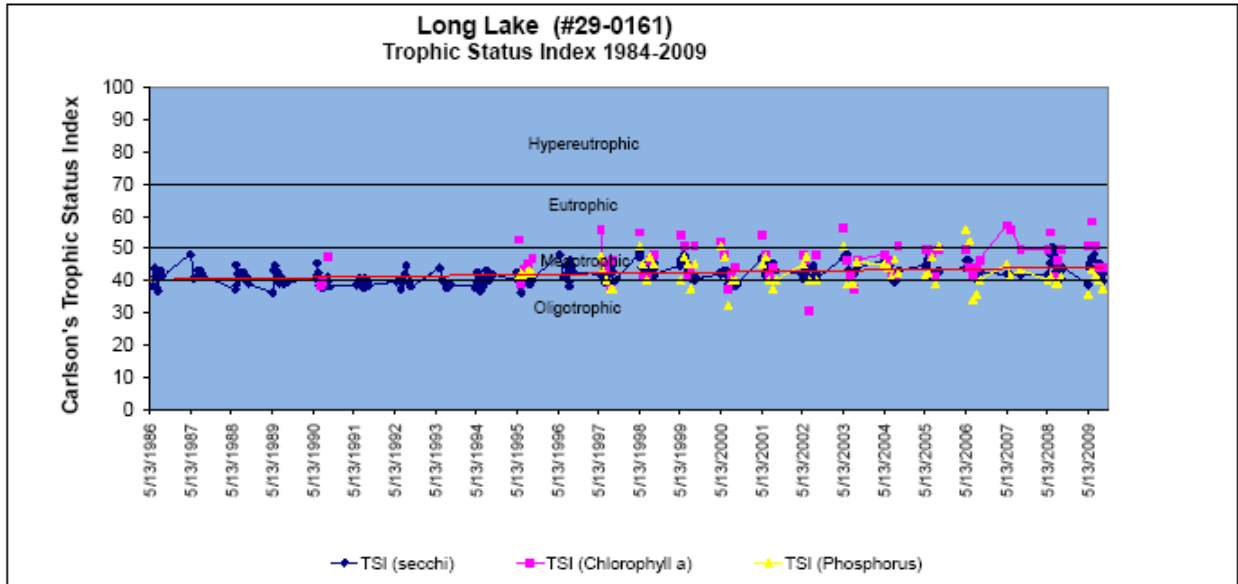
Average TSI Measurements for Long Lake, 1984-2009.

Year	Chlorophyll <i>a</i> (µg/L)	Total Phosphorus (µg/L)	Secchi Depth (feet)	Average TSI
1984	---	---	11.3	42.3
1985	---	---	12.7	40.6
1986	---	---	12.7	40.7
1987	---	---	10.9	42.8
1988	---	---	12.4	41.0
1989	---	---	12.8	40.6
1990	3.2	---	13.4	40.1
1991	---	---	13.8	39.4
1992	---	---	13.2	40.1
1993	---	---	13.5	39.7
1994	---	---	12.9	40.3
1995	5.1	13.8	13.3	40.9
1996	---	---	10.9	43.0
1997	5.8	13.4	11.4	42.5
1998	5.8	18.2	9.6	44.7
1999	6.8	15.2	10.1	44.3
2000	4.8	15.2	12.7	41.1
2001	6.0	14.2	9.8	44.0
2002	3.8	14.6	11.2	42.6
2003	5.8	15.2	9.8	44.3
2004	5.0	15.8	10.7	43.5
2005	6.0	16.6	10.5	43.8
2006	4.6	18.6	10.4	43.8
2007	11.7	15.0	11.5	46.4
2008	6.8	12.0	9.4	45.5
2009	8.2	11.8	10.3	44.1
*2010	4.6	11.2	12.9	44.0

*This years results added to this chart for information purposes only.

These data suggest that water quality in Long Lake routinely exhibits conditions in the mesotrophic range (a score above 40 but below 50). A graph of all TSI data on record is presented on page 11.

In the MPCA's *Report on the Transparency of Minnesota Lakes* (2006 edition), these data were statistically analyzed, and Long Lake was classified as demonstrating a "declining trend" with respect to water clarity.



The graph above shows the long-term trend in Trophic Status Index values the years for which data are available for **Long Lake**. 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 data suggests range within mesotrophic conditions since data were first collected in 1984.

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. The table below is adapted from the MN Pollution Control Agency “Environmental Data Access” database, and compares observed surface water results in Long Lake to common water quality ranges for lakes within the Northern Lakes and Forests Eco-region.

Average Summer Water Quality and Trophic Status Indicators

Parameter	Typical Range: Northern Lakes & Forests Eco-region (25 th -75 th Percentile)	Long Lake (#29-0161)
Total Phosphorus (µg/L)	14-27	14.9 ± 0.6
Chlorophyll a (µg/L) mean	4-10	5.8 ± 3.4
Chlorophyll a (µg/L) maximum	< 15	13.1
Secchi disc (feet)	8-15	10.5 ± 3.9
Total Kjeldahl Nitrogen (mg/L)	0.4 - 0.75	0.39 ± 0.09
Nitrite + Nitrate Nitrogen (mg/L)	<0.01	0.16 ± 0.09
Alkalinity (mg/L)	40 - 140	ND
Color (Pt-Color units)	10 - 35	ND
pH	7.2 - 8.3	8.6 ± 0.14
Chloride (mg/L)	0.6 – 1.2	ND
Total Suspended Solids (mg/L)	< 1 – 2	2.4 ± 0.8
Conductivity (µmhos/cm)	50 - 250	297 ± 33

ND = No data

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. For the Northern Lakes and Forest Eco region phosphorus criteria level of 30 micrograms per liter (µg/L) serves as the upper threshold for full-support for swimmable use.

Phosphorus concentration (µg/L)	Trophic Status Index range	Regulatory Status	Common conditions
30	53 or lower	Full support for swimmable use	
31-35	53-55	Partial-support	Increased frequency of nuisance algal blooms results in high percentage of summer (26-50 percent) perceived as impaired swimming.
35	55 or higher	Non-support	Mild algal 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.

The MPCA uses a summary based on available summer (June through September) data in STORET (STORET is the national water quality data repository developed by the United States Environmental Protection Agency) to calculate achievement in this area. All water quality data collected by MPCA or received from external groups is placed in STORET) collected between 1984 and 2009. The following summary is presented on the MPCA website:

Name	Mean Total Phosphorus (µg/l)	Carlson's Trophic Stratus Index (phosphorus)	MPCA Swimming Criterion ¹
Long Lake	15.0	43	Full Support

Based on the phosphorus data presented above, Long Lake fully supports recreational use and contact.

The 2010 data shows that our Chlorophyll a (4.2 µg/L) measurement still still classifies Long Lake as Mesotrophic. This is the best Chlorophyll a reading we have recorded since 2006. Our water samplers believe this measurement could be even better if Long Lake can reduce run-off from shoreline erosion. Long Lake's total phosphorous measurement (11.2 µg/L) classifies Long Lake as Oligotrophic. This is the best reading we have seen since TP testing started in 1995. Our 2010 secchi depth reading (12.9 ft.) was also the best recorded since 1995.

2. Fisheries:

Status of the Long Lake fishery (as of July 19, 2004) according to the MN Dept. of Natural Resources fisheries summary:

Long Lake is located four miles east of Park Rapids in Hubbard County. Long Lake has a surface area of 1,926 acres and a maximum depth of 135 feet. Long Lake is eight miles long from the north to south end. Long Lake has moderate to heavy home/cabin development for this area and is a very popular lake for fishing and other water recreation. The Minnesota Department of Natural Resources (DNR) has classified Minnesota's lakes into 43 different types based on physical and chemical characteristics. Long Lake is in lake class 22. Other Park Rapids area lakes in this same classification include: Big Sand, Lower Bottle, Kabekona, and Potato.

Long Lake is a popular walleye lake and is known for producing some big fish. Long has a reputation of being a tricky lake to fish, probably due to the clear water and large area of deep water. Good numbers of walleye were sampled (9.2 walleye/gillnet). This is the highest walleye gillnet catch rate for all surveys going back to 1959, and above the current management goal of 6.0 walleye/gillnet. Sampled walleye had an average length and weight of 17.4 inches and 2.1 pounds. Important walleye forage species such as yellow perch and tullibee (cisco) were sampled in good numbers. The abundant walleye population currently found in Long Lake is the result of an aggressive and successful DNR stocking program. Age analysis showed that 91% of the walleye sample (127 of 140 walleye) corresponded to stocked years. Long Lake is stocked with walleye fingerlings during even years.

Northern pike were sampled in moderate numbers (5.0 pike/gillnet), within the range "typical" for this lake class. Sampled northern pike had an average length and weight of 23.6 inches and 3.0 pounds, with fish measured up to 33.3 inches. A good tullibee (cisco) forage base provides the conditions to produce large pike.

Black crappie fishing is popular right after ice-out on the north end of the lake in an area known as "the fill". Black crappie abundance in Long Lake has remained fairly stable, generally at low to moderate levels. Fishing for other panfish species is limited on Long Lake. While bluegill and pumpkinseed numbers are high, average size is poor (5.1 inches). Larger bluegill are present in Long, however, the size of bluegill is limited by very slow growth rates.

Long Lake supports a healthy largemouth bass population, especially in the north and south bays where there is shallower water and good beds of submerged aquatic vegetation which provides excellent habitat. Anglers will find good numbers of bass in the 12-14 inch size range as well as larger fish.

Other species sampled included in moderate abundance and similar to past surveys included white sucker, rock bass, and yellow bullhead. Shorthead redhorse, brown bullhead, and bowfin (dogfish) were sampled in low numbers.

In 2003, the Long Lake Area Association (LLAA) begun discussions with Doug Kingsley, Area Fisheries Manager for DNR about the Lake Association stocking walleyes in the off

years when DNR does not stock. DNR and the LLAA agreed to an off year stocking plan based upon length/size criteria to be determined by DNR. Funds were raised through specific walleye stocking donations and stocking began in 2004 and continued in 2006 and 2008. Fingerlings were purchased through a private vendor who met DNR's criteria.

The 2009 gillnet survey completed by DNR is found in Appendix II. A revised fisheries management plan based on the new survey results has not yet been completed by DNR. The information found below is based on the 2004 gillnet summary.

For Hubbard County the DNR Area Fisheries Manager is Doug Kingsley, MN DNR Fisheries, 301 S Grove Avenue, Park Rapids, MN 56470, Phone: (218) 732-4153, e-mail: doug.kingsley@dnr.state.mn.us. Mr. Kingsley and his colleagues have prepared a fisheries management plan for Long Lake. The long range fisheries goals of the DNR plan for Long Lake are to:

- Maintain or improve the quality of fishing for walleye by attempting to provide a population with a mean catch per effort (CPE) index of at least 6 per gill net lift and a proportional stock density (PSD) index of 30 to 60. Attempt to maintain a relative stock density (RSD) of preferred length (20") walleye of at least 29 and an RSD of memorable length (25") walleye of at least 6.
- Walleye abundance should be balanced with abundance of preferred forage, yellow perch, by attempting to maintain a perch population with an average CPE index of at least 1 per gill net lift.
- Maintain related fish communities
- Protect or enhance desirable aquatic and riparian habitats (water quality, aquatic and riparian vegetation, and shoreline substrate).

The DNR plan also notes the following limiting factors:

Heavy development on Long Lake and within its immediate watershed has resulted in removal of aquatic and riparian vegetation and probably increased contribution of nutrients to the lake. Loss of vegetation and the resulting loss of habitat and degraded water quality could negatively affect fish populations, reduce recreational opportunities, and reduce the aesthetic quality of the lake. The small proportion of shallow, littoral area in Long Lake probably limits production, abundance, growth, condition and sizes of warm water fish species like bluegill, largemouth bass or black crappie. Emergent aquatic vegetation like bulrush is particularly sparse on Long Lake, and can provide spawning habitat for these nesting fish species. Removal of emergent aquatic vegetation will have the greatest negative impacts on these species.

A lack of suitable habitat or other fish populations may limit natural reproduction or recruitment of walleye. Other fish populations may limit survival or recruitment of stocked walleye. Yellow perch are an important source of food for predators like walleye and can often affect survival, growth or condition of either naturally produced or stocked walleye.

Northern pike reproduction and recruitment may be limited by the amount of seasonally flooded vegetation and marsh areas that provide suitable spawning habitat, and by water

levels in inlets to allow pike to reach suitable spawning areas. However, higher recruitment and abundance of pike could lead to more competition for food, poorer growth and smaller fish. The amount of habitat in Long Lake for pike production appears to be adequate. Numbers of pike are generally within the normal range for lakes like Long, and growth and condition are good.

Increased fishing pressure and harvest in recent decades may be affecting abundance, size, or age structure of some game fish populations. Sizes of northern pike in Long Lake are fair, but with only moderate recruitment and good growth, it would seem that sizes of northerns could be better.

The DNR Plan also recommends that, “The extent and composition of aquatic and riparian vegetation could be inventoried using Geographic Positioning System (GPS), Geographic Information Systems (GIS), digital or digitized photography. This information could be used to better monitor changes in habitat, and long term habitat trends.”

The entire DNR Fisheries Management Plan for Long Lake is included as Appendix II of this Lake Management Plan. Appendix IIA contains the 2009 DNR Gill Net Survey for Long Lake. An updated Fisheries Management Plan based on 2009 results has not been completed.

3. Aquatic Vegetation

We take under advisement, the following suggestions by the DNR: 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, curly leaf 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.

The Long Lake Area Association in conjunction with Hubbard COLA, DNR and Hubbard County Soil and Water Conservation District works to ensure Long Lake residents are aware of and encouraged to participate in shoreline restoration projects and other programs which will help preserve our shoreline and waters. The number of participants has been small (to date less than 6 shoreline restoration projects), thus the LLAA needs to continue to educate its members in the positive value of such programs. Brochures are provided at the annual meeting and links to a variety of educational websites are provided on our website. Additional information is distributed via e-mail to members as that information is made available to the LLAA. We are not aware of any active “master gardeners”, landscapers or shoreline restoration experts living on Long Lake, however, there are several in the Park Rapids community and their services are available to lake residents for a fee. Hubbard COLA is developing additional educational programs as part of their Strategy Map. Long Lake will participate in those programs.

4. 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 Minnesota County Biological Survey has not yet been completed the survey for Hubbard County. For more information contact: Carmen Converse, Unit Supervisor, carmen.converse@state.mn.us, tel. (651) 259-5083

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 Long Lake, the DNR Area Wildlife Manager is **Katie Haws**, Nongame Wildlife Specialist, Phone: (218) 308-2641, Email: katie.haws@state.mn.us, 2115 Birchmont Beach Road NE, Bemidji, MN 56601

Long Lake enjoys a wide variety of wildlife near the lake including: loons, herons, ducks, geese, tundra swans, bald eagles, osprey, hawks, muskrats, beaver, fisher martins, fox, porcupine, woodchucks, deer, black bear, wolves, and a large variety of songbirds.

Long Lake has had a Great Blue Heron Rookery located on the west side of the lake for many years. The Rookery was established by Mr. & Mrs. John Wyeth who had purchased 2600 feet of Long Lake shoreline in the early 1930’s. Mrs. Wyeth was a bird enthusiast and included in their estate a request/condition that the Rookery never be disturbed. In the 1970’s a developer cut a road through the Rookery, but the herons have returned every year to nest in the trees. The presence of the Rookery seems to be one reason for the large number of blue heron found on the shoreline of Long Lake every year. DNR Wildlife Manager Katie Haws (see above) advised that the rookery encompasses around 60 acres of timberland, however, the birds do relocate their nests when their tree branches begin falling, thus, they may extend outside of the 60 acre tract.

The DNR has maintained records of the rookery since 1977 when the colony consisted of 150 nests. A 2005 study showed that the colony has been reduced to 20 active nests. Ms. Haws notes that the heron is a transient bird and may move out of the area, but there may also be other reasons for the decline. Predators such as raccoons, hawks, bears, and other animals have been known to take the young from the nest after hatching. The number of great blue heron colonies in Northwest Minnesota is declining. There are currently only two active colonies in Hubbard County; the Long Lake Rookery and a small colony of 6 nests on Benedict Lake on the east side

of the County. There were colonies south of Akeley, and on Kabekona Lake, but those colonies are gone. DNR conducts their surveys in June when the eggs hatch. Since the rookery is on private property the survey is done from the road going past the rookery. The LLAA desires to aid in keeping the Rookery active and will seek a partnership with the current rookery land owner to help with this important wildlife project. Currently, the rookery is kept safe on land posted "No Trespassing" and ditches full of poison ivy. LLAA will also begin keeping a count on the number of great blue herons on the lake during the summer. DNR agrees this will be beneficial to their research and will provide information on the process to utilize. DNR is also providing documents on the history of the Long Lake Rookery and that information will be provided to the membership through the newsletter, website and our Long Lake History book which will contain more detailed information on the rookery.

In addition, the proposed LLAA children's wildlife/nature tours conducted by lake resident Jon Sams will also include information regarding the rookery. The lake association will work to get other lake residents and/or local high school students, 4-H or Scout troops involved to assist Mr. Sams in continuing and hopefully expanding the wildlife/nature tours. Ms. Haws advises that the best time for viewing the great blue heron on the nest is in June during the hatch when the adults are active and the young are making noise.

Long Lake previously participated in an annual loon count for DNR. Several years ago it was believed that the Lake was host to 12-14 pairs of loons. No accurate count has been taken for several years. LLAA hopes to begin counting again in 2011. The presence of such a number of loons truly makes Long Lake a north woods lake. Residents and visitors alike enjoy their presence and hundreds of photos are taken of the loons every year. Loons normally nest in the secluded areas of the lake and seem to have adapted to boaters. During nesting time, residents have observed boats and fishermen getting too close to the loon nests and scaring the loons off. Successful hatching of the loon eggs is jeopardized. There is no signage to warn boaters of the nests and to stay away.

Nearly all the nests are "loon-made" rather than man made. The LLAA wants to build 8-10 loon platforms to install in the nesting areas along with signage to warn boaters to stay away. In several of the nesting areas, especially at the north end, the nests are in the area of bald eagle nests, thus the loon platforms need to have protective covers to keep the eagles from taking the young loons. Cost for completion of the platforms is estimated to be \$125/platform, plus labor.

Long Lake hosts a very healthy and active bald eagle population. Nests can be found in nearly every neighborhood. While the eagles are a problem for the loon population, the presence of bald eagles is an important aspect of north woods life and Long Lake.

Ducks and geese stage in the quiet shallow bay areas of the lake spring and fall. A number of ducklings and goslings are seen on the lake every year. Their proliferation, especially in the shallow sandy areas around swimming areas has resulted in cases of swimmers itch. Geese in particular, are a pest for most property owners when they come up onto the grassy areas to eat and leave behind droppings. Shoreline projects which encourage taller grasses along the shore would help reduce this problem as the geese tend to stay away from tall grass areas where predators can hide. Residents however, are reluctant to allow existing grasses to grow tall or to plant native vegetation and let it grow tall and thus keep out geese. Instead they install a variety of reflective and/or moving objects to scare the geese away. These items do little to enhance the beauty of the shoreline. This is a continuing education issue and the lake association would like

to provide additional information brochures/booklets to the residents to help create better ways to keep the geese in the water.

Muskrats and beaver, while interesting to observe, can be very destructive to the shoreline and trees. Muskrats burrow into the shoreline to create nests. This burrow often fills with water and is eroded away by wave action, thus creating erosion which falls into the lake. The only method of control is to trap the muskrats. Fur prices are so low that there is little interest in trapping muskrats.

Beaver, while not found everywhere on the lake, create problems of their own in the areas where their lodges are found. This is primarily in the north and south ends where shallow bays and bogs exist. The beaver cut down small trees, especially tamarack in the bog areas. They also cut down young trees planted by property owners. Residents generally prefer to leave the beavers alone until they start cutting trees on their property, then they want the critters removed. The only effective way to remove the beaver is by trapping. At the present time, fur prices are so low that it is hardly worth anyone's time to set traps. Residents are allowed to shoot beaver if they are cutting their trees, however, that can be dangerous as bullets are known to ricochet off the water.

To help ensure the future of the wildlife around Long Lake and to educate the youth who either live on the lake or visit the area, one Long Lake resident, a retired teacher (Jon Sams) has been giving nature tours to children for years. Mr. Sams, a seasonal resident has a deep concern for the lake and the surrounding environment. He is concerned that children may not appreciate nor fully understand how the lake and the surrounding environment support wildlife. Mr. Sams uses his training as an educator to show youth this connection. The LLAA has encouraged Mr. Sams to continue this project and would like to expand it further to educate the entire Long Lake community about this issue. The purchase of educational materials and youth certificates for completing the program would help ensure the future of wildlife in this area.

5. Exotic Species/Aquatic Invasive Species

Darrin Hoverson is the NW Regional Invasive Species Specialist for the Department of Natural Resources; 27841 Forest Lane, Park Rapids, MN 56470, 218-699-7293, Darrin.Hoverson@state.mn.us , He can either assist you directly or steer you to the staff that can.

Background

"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 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.

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 water milfoil (*Myriophyllum spicatum*)

Eurasian watermilfoil was accidentally introduced to North America from Europe. Spread westward into inland lakes primarily by boats and also by water birds, 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 creates 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.

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.

Purple loosestrife has been identified at two locations near the north end of Long Lake. Purple loosestrife was probably introduced into the Long Lake shoreline as a result of planting by residents before it was recognized as an invasive species. The Hubbard County Agriculture Department, Greg Hensel, and lake association residents have been monitoring these two locations since 1988. Control/treatment usually consists of cutting off seed heads/flowers and/or digging or pulling the roots of the plants. Approved chemicals have been used at one site and Hubbard County is considering using chemicals on the second site. This is the only known aquatic invasive species in or on Long Lake. Purple loosestrife can crowd out beneficial vegetation such as cattails and other wetland plants.

The LLAA has submitted Requests for Proposal to several companies approved by the MN DNR to complete a point-intercept vegetation survey including the emergent and aquatic vegetation during 2011. RFP's have been returned and are currently being reviewed. Grant funding will be sought to help offset the cost of this project. The LLAA determined it was in our best interests to hire professionals to complete this work. Bid estimates range from \$3,774 to \$10,055, thus grant funding will be necessary to assist in the cost of this project. The LLAA will also assist where possible to help reduce costs. This survey is essential if the LLAA is to be prepared for combating any invasive vegetation that may be brought into the lake in the coming years. It was also noted above in the DNR Fisheries Plan that a vegetation mapping/survey should be completed of all vegetation in the littoral area and all riparian vegetation also as this will help them continue to monitor the fishery.

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.

Curley-leaf pondweed has been found in Hinds Lake, Upper and Lower Twin Lakes just south of the Hubbard, MN (at the south end of Long Lake. In addition, Upper Twin Lake and a portion of

the Straight River which feeds into the north end of Upper Twin have been designated as impaired waters after the discovery of faucet snails in 2009.

While none of these waters allow direct access to Long Lake, the fact that such invasive species are so close to Long Lake demands the Lake Association work diligently to prevent the spread of either species to Long Lake.

To protect Long Lake from the accidental introduction of invasive species into the lake, the LLAA applied for and received a matching grant from the DNR in 2010 to conduct watercraft inspections at the two primary access points to the lake (north access point and south access point). LLAA received funding to cover 280 hours of paid inspection to be completed by two DNR employed interns. LLAA was required to match 50% of the cost. Our share was \$1680. LLAA approached the Township supervisors in both Henrietta and Hubbard Townships with a request that each provide funding in the amount of \$840 to cover the required match. Both townships agreed, to the partnership and that the Lake Association will contribute volunteer hours to the project. Ten volunteers were subsequently trained by DNR, however, several glitches in the certification process delayed volunteers from beginning their inspections until September, 2010. As a result, volunteers were only able to complete 32 hours of watercraft inspections with 18 actual inspections conducted.

The DNR-employed interns completed 232 hours of inspections and completed 358 watercraft inspections from Memorial Day weekend through Labor Day weekend. The same interns also conducted inspections on other Hubbard County lakes. 376 total inspections were completed. The interns worked less than 20 hours per week on Long Lake. We estimate conservatively, that over 400 watercraft were launched on Long Lake during the time the interns and volunteers **were not** conducting inspections. The inspection number does not include the two weeks following walleye opener in May, nor the remaining three weeks of September which are generally very active fishing times. Long Lake appears to be one of the highest use lakes in the area, thus, it is important for LLAA to continue to conduct watercraft inspections on an annual basis. **The south access point had the highest usage of any public access point (1.81 boats per hour) of Hubbard County lakes where watercraft inspections were conducted in 2010.** The final inspection report data indicates that 1-2% of the watercraft entering Long Lake came from zebra mussel infested waters and that 5% of the watercraft launched came from outside Minnesota.

LLAA will again be applying for DNR grant funds to conduct 480 hours of watercraft inspections in 2011. It is anticipated that both Henrietta and Hubbard Townships will again partner with us and the lake association will work to recruit additional volunteers and complete more volunteer inspections throughout the summer. No inspections were completed at any of the other smaller public access points where off road parking is not available. That should be addressed in 2011.

Hubbard COLA has prepared AIS education packs for all resort owners in Hubbard County. LLAA hand delivered these to each active resort and campground on the lake this spring. Cedar Shores Resort and Spruce Hill Campground both regularly inspect boats using their private launch sites and provide information to all guests bringing watercraft to their locations. All resorts were requested to provide the information to their guests. All agreed to do so.

Flowering rush (*Botumus umbellatus*) is a perennial plant from 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.

Land Use and zoning

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. Clearly any local municipal jurisdiction may have additional (and usually more restrictive) standards as well.

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. Long Lake (DNR Lake ID #29-0161) is a Recreational Development (RD) 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 Hubbard 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 Hubbard County the RD management district is established to “manage proposed development reasonable 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. Hubbard 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.”

Hubbard County’s zoning standards for respective lake classifications are:

Standards:	General Development	Recreational Development - Unsewered	Recreational Development - Sewered	Natural Environment
Structure setback from OHW	75 ft	100 ft	100 ft	150 ft
Sewage soil treatment system setback from OHW	150 ft	150 ft	150 ft	150 ft
Maximum Impervious Coverage	25 percent	25 percent	25 percent	25 percent
Structure and ISTS setback from top of bluff	30 ft	30 ft	30 ft	30 ft
Minimum Lot Size: Single				
Riparian Lots	20,000 sq ft	40,000 sq ft	30,000 sq ft	80,000 sq ft
Non-riparian lots	40,000 sq ft	80,000 sq ft	same	120,000 sq ft
Minimum Lot Size: Duplex				
Riparian Lots	40,000 sq ft	80,000 sq ft	60,000 sq ft	120,000 sq ft
Non-riparian lots	80,000 sq ft	120,000 sq ft	same	160,000 sq ft
Minimum Lot Size: Triplex				
Riparian Lots	60,000 sq ft	120,000 sq ft	90,000 sq ft	160,000 sq ft
Non-riparian lots	120,000 sq ft	160,000 sq ft	same	240,000 sq ft
Lot Width – Single				
Riparian Lots	100 ft	150 ft	100 ft	200 ft
Non-riparian lots	100 ft	150 ft	100ft	200 ft
Lot Width-Duplex				
Riparian Lots	180 ft	225 ft	150 ft	300 ft
Non-riparian lots	265 ft	265 ft	150 ft	400 ft
Side Yard Setback	10 ft	10 ft	10 ft	10 ft

Clearly any local municipal jurisdiction may have additional (and usually more restrictive) standards as well.

Most lakes have numerous properties that are “grandfathered,” 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.

Details on shoreland standards and restrictions and answers to “frequently asked questions” regarding best management practices, resources of education or information, and additional assistance are provided through the Hubbard County Planning & Zoning Department. Eric Buitenwerf, Environmental Services Officer, Hubbard County, 301 Court Avenue, Park Rapids, MN 56470-1483, Phone: (218) 732-2356, Fax: (218) 732-7993
Email: ebuitenwerf@co.hubbard.mn.us

The Hubbard County Shoreland Management Ordinance (SMO) was developed by statutory authority from the State of Minnesota. The Legislature “assigned the responsibility for regulating subdivision use and development of shorelands of public waters in order to preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of the shorelands and to provide for the wise use of waters and related resources.” Hubbard County chose to accomplish this through its own SMO. The ordinance covers all aspects of standards set for land use including, setbacks, vegetative buffers, storm water retention/treatment, limitation of density of buildings and impervious surfaces, restrictions on the development of sensitive wetlands, steep slopes or banks, restrictions/prohibition on high risk activities such as fuel storage, extraction of gravel, etc and storage or disposal of hazardous materials and the retention of ice ridges.

The SMO also allows for individuals to request a variance to allow for departure from the SMO for certain conditions. A requirement for a variance is that the individual must show that a “hardship” exists if the variance is not approved. Recent monitoring of the Board of Adjustment (BOA) hearings by the Hubbard Coalition of Lake Associations show that the BOA approves variance requests 50-80% of the time but often ignore the SMO and recommendations by Environmental Services against approval. This process is currently the subject of litigation in the Hubbard County Court.

Residential construction on Long Lake is no different than on any other lake in Hubbard County. The trend is to building year round houses rather than seasonal cabins. As old seasonal cabins are torn down, new, larger year round homes are being built. Some residents have purchased adjoining lots in order to create one larger lot and build a larger home, thus the number of homes and shoreline lots can vary.

Long Lake Watershed includes productive agricultural land and timberland around it, but only a small number of agricultural grounds are shoreline property. Any development of agricultural land within the watershed is generally several hundred yards away from the shoreline. The recent economic downturn and housing market decline has halted nearly all new development around the lake. Remodeling and replacing existing structures is the primary trend now.

LLAA count of residences within the first tier of development on Long Lake is approximately 475 homes. We estimate less than 1% of the older homes to be in need of modernization (sewer,

well, etc.) There are clusters of older homes, mostly seasonal, primarily on the south half of the lake. This was the first area of the lake to be developed and which has the smallest lot sizes. Many of the older homes now have been remodeled or replaced entirely. The exact number cannot be determined without going through 475 Hubbard County property tax records. Lot sizes limit the amount of remodeling available or the size of new additions or new homes. Not many Long Lake properties are listed for sale at any time.

There are five (5) active resorts on the lake plus one large campground. One resort is converting to a community ownership design (but not a planned unit development) with cabins being sold off and owners being assessed fees for community property. At one time there were as many as 29 resorts on the lake. The majority sold off their cabins as individual units over the years.

As mentioned in the history of Long Lake, there was an attempt by a developer in the early 1970's to develop a large section of the west side of the lake. The lake association was formally started and successfully blocked the development in court.

Presently, there is no gas facility available for boaters except for one resort where it is only available to its guests. There is a 9 hole golf course operated by one resort but it is not within the shoreline ordinance jurisdiction.

All residences (except for the less than 1% non-modern), utilize individual septic systems. Resorts and campgrounds utilize centralized septic systems. There are no wastewater treatment facilities within the shoreline management area. A dairy farm at the south end of the lake previously disposed of livestock manure on agricultural fields in close proximity to the lake but the dairy operation ceased many years ago. Farm ground is irrigated by center-pivot irrigation. Potatoes, corn, soybeans and edible beans are all grown within the Long Lake Watershed.

Recent well water testing by residents at the south end of the lake has disclosed higher than normal nitrate levels. All lake residents have been encouraged by LLAA to have their well water tested. High nitrates in City of Park Rapids wells 4 miles west of Long Lake caused the city to shut down one of its wells this year. Agriculture chemicals/fertilizers leaching through the sandy soil in this area are thought to be the main culprit. Center pivot irrigation used by several farmers in the watershed area may also speed up the leaching process. The LLAA will make arrangements for well water testing at our annual meeting and encourage residents to continue testing on their own.

The shoreline around Long Lake is primarily glacial sand composition. It is subject to erosion once the vegetative cover is removed. LLAA has identified more than 10 areas where shoreline erosion is contributing to reduced water clarity. All of these locations have steep banks, most of which are not conducive to the growth of good ground cover. The need exists to map each of these locations and work with the property owners to develop a plan to restore vegetation where possible and utilize rock riprap or other solutions where vegetation will not succeed. The availability of grant funds to cover 50% or more of the cost is important to ensure this project can proceed.

In addition, the north public access point, owned by the State and maintained by DNR is a major pollutant to the lake. The asphalt drive and parking area allows water to flow down the steep parking area directly into the lake. There are no catch basins, no vegetative buffer, nor any other

barriers to break up or slow down the water flow. Boat launching is difficult and potentially dangerous due to the narrow approach and steep back up area. This facility receives very heavy usage during the summer as it is only 4 miles from downtown Park Rapids. The LLAA has been in contact with DNR Trails and Waterways in Bemidji requesting this access point be reconstructed and that they consider installing a handicapped accessible fishing pier over the water as they have done on the south end of the lake. Presently, even though signage is supposed to prohibit fishing from the single dock, people are always fishing from it and creating problems for boaters going in and out of the access area.

DNR has advised that they are looking into expanding the parking area and fixing the access point if they can obtain additional property when County Road 107 is relocated in 2011. The LLAA has offered to help wherever possible. This would be a good area for grant funding to pick up part of the cost of installing a fishing pier and reducing runoff into the lake.

The only designated “park” area around Long Lake is at the south public access point. The “park” has a men’s/ladies permanent brick vault toilet. The doors springs are broken so the doors won’t close, the walls, floors and toilet seats are filthy and there is no hand sanitizer. At times the vaults have been noted to be completely full. There are hook/eye locks on the outside of the doors so someone could be locked inside. It is an unsafe, unsanitary facility. The vault toilets are not handicapped accessible. This is particularly troubling since there is a handicapped accessible fishing pier at the park. There are several picnic tables also in the area and there are trash cans. Members of LLAA who have been at the access point during watercraft inspections have noted that the trash cans are being used. The park is the responsibility of Hubbard County. Besides a concrete ramp, there is a handicap access fishing pier which receives heavy use. The gravel/sand driveway and parking area are subject to major erosion during rainy weather and all the silt runs directly into Long Lake. There is nothing to help break up and/or reduce the flow of rainwater and debris into the lake. Catch basins or some form of rainwater diversion is needed.

There is one established land trust through the Minnesota Land Trust on the west side of the lake. It is approximately 100 acres of timber and was at one time a tree farm. It is located between Chippewa Loop and County Road 6. Students previously assisted in planting trees on the property. The owners have expressed an interest in working with LLAA to maintain the tract.

The Long Lake Area Association President is on the mailing list for notification of Variance requests submitted to the Board of Adjustment by residents within the Shoreland Management Ordinance control. As a general rule, the LLAA does not take a position supporting or opposing such requests unless there is a significant issue which might affect the Lake and its residents. Various lake association members and other residents of the Long Lake shoreline have been present at site visits and variance hearings over the years. Monitoring of activity by the Board of Adjustment is currently being done by Hubbard COLA and its members (which include the Long Lake Area Association). HCOLA represents 30 lake associations in Hubbard County and keeps each lake association informed of new issues that may affect lake residents. LLAA has two representatives on the HCOLA Board plus one member on the Executive Committee of HCOLA. HCOLA also keeps the lake associations aware of educational programs which may be of interest to them, oversees water quality testing for all lakes and helps sponsor the local Children’s Water Festival. HCOLA also monitors legislative issues through Minnesota Waters and other organizations closely aligned with their mission and provides that information to the lake associations. HCOLA represents all lake associations with their participation in the County Water Plan Task Force.

The LLAA encourages its members to be active in local politics and to be aware of what the various boards and committees are doing that affect lake residents. One member of the LLAA is an elected Henrietta Township Board of Supervisors member and another lake resident (non LLAA member) serves as the Henrietta Township Clerk and has recently been elected to serve as a Supervisor. No other lake residents currently serve on any County boards or committees. Other members of the lake association are actively involved in various community groups, civic organizations and committees including, Rotary, Chamber of Commerce, Progress Park Rapids, Hubbard Economic Development, Governor's Fishing Opener Committee and others.

LLAA has been in regular contact with Shane Foley, Hubbard County Soil and Water Conservation District regarding issues on Long Lake. We have met with him to better understand the Long Lake Watershed area and received training from him regarding dissolved oxygen testing with the equipment owned by SWCD. DSO testing will be conducted on a regular basis starting in 2011. SWCD analyzes the data and that information in conjunction with the regular water testing program will assist LLAA and DNR in monitoring the fishery.

Hubbard County does not have a Comprehensive Land Use Plan in place. It relies on existing zoning ordinances including the Shoreland Management Ordinance and building permit requirements for property around Long Lake and in the watershed.

6. 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 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.

Water surface use conflicts periodically occur on Long Lake as on any other lake. Since it is designated as a “recreational lake”, Long Lake can see very heavy boat traffic especially on summer weekends and holidays. July 4th and Labor Day are usually see the heaviest boat usage. The number of personal watercraft (jet skis) on the lake at a given time is generally low. The resorts do not allow guests to bring their own and there are few businesses renting them. Even with the low numbers, they generally receive the most complaints from residents, especially at the annual lake association meeting. The lake association is not aware of any documented damage to any personal property or injuries sustained as a result of on the water conflicts.

Those complaints usually involve neighbors complaining about other neighbors coming too close to their docks/boats or racing back and forth to close to shore and making too much noise. The lake association generally does not get involved in such issues, instead, our position is to advise anyone who has complaints about personal watercraft or other on water concerns about boaters, etc. to contact the Hubbard County Sheriff and ask them to investigate the complaint. The other major complaint is water skiers coming to close to fishing boats. The Sheriff utilizes two different boats and personal watercraft to patrol the lakes in Hubbard County.

The lake association hosts an annual July 4th flotilla with residents decorating their boats and other watercraft and docks and then cruising around the lake. The flotilla requires a permit from the Sheriff and the flotilla is escorted by a reserve water patrol deputy who lives on Long Lake.

The Sheriff’s water patrol frequents Long Lake several times a week and at different hours. The deputy is often seen on the lake near dusk watching for personal watercraft and waterskiing after the designated stop time. In addition, the deputy regularly checks boats for flotation devices and their availability to passengers. They also watch for unsafe boating practices. Warnings generally resolve the issue, however, failure to have flotation devices will result in a citation.

To assist the Sheriff in locating problems on the lake, the LLAA began offering dock sign numbers to its membership in 2009. Residents purchase these signs through the lake association to ensure uniformity. This is a voluntary program which the Hubbard County Sheriff supports. These reflective signs are mounted at the end of a resident’s dock. The signs have the resident’s E-911 street number on them. On Long Lake, there should be no duplicate E-911 numbers, so if a citizen calls 911 regarding a problem on the lake, they only need to give the number listed on the dock sign for the dispatcher to give the deputy an approximate location for the incident. This is especially beneficial if an accident occurs on the water and people on the boat involved or in the water do not know exactly where they are.

Safety and security both on and off the lake are a concern for all Long Lake residents. The Strategy Map developed in 2007 by the lake association includes concerns regarding safety and security for all residents and guests.

7. 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.

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 2004 Minnesota Department of Natural Resources Fisheries Survey, there are four public accesses on Long Lake, as shown below:

Public Access Information

Ownership	Type	Description
Minnesota DNR	Concrete	North Shore Access - West shore of the north end of the lake off Minnesota Highway 34 (T. 140, R. 34, S. 21).
County	Earthen	Nakomis Access - West central shore (T. 139, R. 34, S. 8).
County	Earthen	Norway Bay Access - North shore of southwest point (T. 139, R. 34, S. 17).
County	Concrete	South Shore Access - Southern tip of lake off Highway 87 & County Road 6.

As noted in section 5 above and the chart above, there are four public access points to Long Lake. The two primary public access points are the north public access point managed by DNR and the south public access point managed by Hubbard County.

As noted in section 5, the north public access point is in dismal condition. The asphalt parking lot is degraded to the point that large potholes have been filled with gravel and left unrepaired for several years, DNR signage is faded or missing and what is left is mounted on a post structure that is falling down. The access point is very steep and requires maneuvering around several trees in the parking lot. The design normally requires the tow vehicle to go off the asphalt at some point to properly back down the ramp. The ramp was repaired several years ago and the broken concrete strips were thrown on the side of the access parking and left there.

There was never a restroom available for the spring fishermen who fish the shallow waters of “the fill” for crappie, thus people were urinating on the ground or into the lake. Several years ago DNR began placing a portable outhouse at the access point. On at least one occasion it was tipped over with the contents running into the lake. DNR is maintaining the portable toilet and it is clean, well supplied and is anchored down. It is removed in October by the time the public dock is removed. The volume of activity at the north access point justifies installation of a concrete vault toilet which is handicapped accessible. This could be completed during the reconstruction of the access point by DNR. No trash receptacles are available, so people throw their trash on the ground. In rainy conditions, that trash goes into the lake. The parking area has no catch basin, or erosion control devices, so all the water falling on the asphalt runs directly into the lake, taking with it trash, sand, dirt, oil residue and anything else left on the parking lot.

DNR has indicated they are going to remodel the public access when they obtain the land where County Road 107 intersects with State Highway 34 when the 34 road construction begins in 2011. The lake association wants to partner with DNR in fixing this access point by improving signage, especially as it relates to AIS, loon nesting and watercraft rules. DNR currently will not allow LLAA to post AIS prevention signs purchased from COLA as they are not the same color as DNR’s. LLAA has offered to partner with DNR in the reconstruction of the north access point.

In addition, LLAA would like to see a handicapped accessible pier constructed for people wishing to fish in the area. Currently, people use the DNR floating dock, which directly interferes with boaters and others launching boats and personal watercraft. It is an issue where conflict will eventually occur.

At the south access point, managed by Hubbard County, the park area (see above section 5) needs improvement as well as the signage for AIS and other issues. The LLAA is working to install kiosk type facilities to all signage at the south end and perhaps the north end. Cost is estimated at \$700-800 each. The kiosk is modeled after one installed several years ago at the public access to Little Sand Lake. The lake association would install and maintain the kiosks.

The other two identified public access points are gravel/sand access points owned by Henrietta and Hubbard Townships. They are not properly maintained, there is significant erosion occurring at each site when it rains. There is a small AIS sign at each location and a sign indicating it is a public access point. There is no parking area at either of the locations, so people either park on the side of the road, in the ditch, if there is one, or on resident’s private property, which often results in conflicts as they (the residents) do not want people parking on their grass. The Townships have not expressed any interest in upgrading any these access points. Conflict has developed at several of the access points when residents in second tier housing who do not have direct access to the lake, have installed a dock on the public property to moor their boat. The Sheriff has become involved in at least one of these incidents. The lake association would prefer to see these accesses be closed if the townships are not going to maintain them, but realize that will probably not occur. Both townships have said they will not close the points. The lake association will continue to attempt to partner with the townships on these access points with the hopes of improving them by reducing run-off, installing better signage and monitoring for AIS.

9. Organizational Development and Communication

The Long Lake Area Association Strategy Map was developed with the assistance of Fortune 500 quality consultant, Lou Schultz, a Long Lake resident. The process included a planning session with about 25 lake residents identifying priorities for the lake association to pursue. As a result, 9 separate actions were identified and subcommittees developed to address each issue. At the same time, the Board of Directors of the LLAA determined that the association's by laws needed revision to fit with our newly developed neighborhood concept. Long Lake properties are divided into six neighborhoods with a board member and alternate member elected by the residents of each neighborhood. In addition two at large board members are elected by the entire membership at the annual meeting.

The number one action identified by the Strategy Plan is "Improving Communication." It is difficult for residents to get to know anyone outside of their small neighborhoods unless they have other connections to them. The creation of 6 neighborhoods was designed to improve communications in a broader area while ensuring everyone on the lake had representation and a voice on the board of directors. In addition, the lake association established a website: www.longlakeliving.org. This allows better sharing of information with all residents and persons interested in Long Lake. We also publish a newsletter two times a year to keep our membership informed of lake issues and membership activities. The website has recently been redesigned to allow easier access for the membership including a blog page which will allow even better membership comments and concerns.

The lake association has a continuing effort to encourage all lake property owners to join the LLAA. At present, our membership stands at 225 members, just under 50% of the property owners. Each year membership numbers fluctuate. Renewals are to be made at the annual meeting, however, e-mails and postcards must also be sent to delinquent members to remind them to renew. In addition the Fall newsletter also goes to delinquent members with a box checked reminding them to renew. A membership committee has been working diligently to develop additional strategies to improve membership.

Please refer to Appendix III for additional information regarding the Strategy roadmap, our mission, vision and values.

The visioning process for our lake management plan includes information on benchmarking, goals and deadlines for completing actions relating to our lake management plan. Those will be found in the section: "Summary of visioning/planning session" below.

Summary of Visioning/Planning Session

The visioning session for the Long Lake Area Association was held on July 24, 2010 at the Hubbard Community Center at the south end of Long Lake. Prior to the meeting, letters and postcard notices were sent to all Long Lake residents (both Association members and non-members), along with newspaper, radio and television advertisements. Letters were also sent to all local businesses (sporting goods, boat dealers and boat repair shops, dock installers and sales) and individuals (fishing guides, fishing clubs, local government officials) who are involved in or have an interest in water related activities and protecting our lakes. A total of 35 people came to the session. Two of the attendees were local government officials and 1 was a local fishing club member.

The session was facilitated by Don Hickman, Initiative Foundation. The Long Lake Area Association wishes to thank Don for assisting us with this process. He inspired the participants and encouraged them to think about the issues affecting our lake.

After giving examples in each of the 8 categories below, Don Hickman, instructed the 35 attendees that they each got 2 votes for the 8 categories. We combined aquatic vegetation and exotic species categories.

The 2 areas that received the most votes were Water Quality with 26 votes + 1 absentee and Aquatic Vegetation – AIS Exotic Species with 24 votes.

- 1) Water Quality = 26 votes + 1 absentee
- 2) Fisheries Management Plan = 2 votes
- 3) Aquatic Vegetation & 5) AIS - Exotic Species were combined & received 24 votes.
- 4) Wildlife = 3 votes
- 5) See 3 & 5 combined above....
- 6) Land Use & Zoning = 5 votes
- 7) Managing Water Surface Use Conflicts = 1
- 8) Public Access = 3 votes

Don sought feedback from the parties interested in the other areas. Their comments allowed grouping into our 2 focus areas of Water Quality and Aquatic Vegetation & AIS Exotic Species.

Individuals were asked to gather into the 2 interest areas – 1) Aquatic Vegetation & AIS Exotic Species and 2) Water Quality.

In the end – when the focus groups recapped, the two subgroups essentially identified the same projects that they wished to pursue.

Aquatic Vegetation & AIS Exotic Species Focus Area

Desired Outcomes

The Aquatic Vegetation and AIS Focus Group determined the most important (measurable) "indicators of success" to implement a successful action or activity associated with this focus area are:

1. No AIS
2. Survey Completed (Lake Vegetation Mapping)
3. Continue Prevention Measures
4. Education
 - a. Water Quality
 - b. No Mow to Waters' Edge – Use Path to Lake Concept
 - c. No Phosphorous Fertilizers
 - d. Landscaping for Water Quality
 - e. Healthy Plant Identification
 - f. Aquatic Invasive Species Identification

5. Improved Signage - North and South Public Access
6. Membership Increase

People Involved

To achieve the "Desired Outcomes" the following people or organizations need to be involved:

<u>Person/Organization</u>	<u>Why we need to involve them:</u>
----------------------------	-------------------------------------

- | | |
|---|--|
| <ul style="list-style-type: none"> • DNR - improved signage shows success with DNR & Hubbard County expectations, prevention grants, lake vegetation mapping expectations • Hubbard County Road Service & Environmental Service – improve signage • Resorts – educate guests | |
| <ul style="list-style-type: none"> • Sports Leagues – like Fishing - attend their meetings / activities – attract youth through proactive partnership • Sheriff’s team – personal contact for AIS education • Realtors – new homeowners – membership and education • Service clubs – like Scouts, Rotary, Lions, etc. - spread out the work efforts – seek resources for budget potentially | |

Benchmarks

As we report on this Focus Area at our Annual Meeting in June 2011, these are the achievements we want to point to:

1. Lake Mapping – Vegetation includes talking to DNR, assessing options and what’s best for Long Lake, getting funds with grants
2. Signage installed at Access and ongoing plan for care
3. Membership increased – goals & what is occurring & volunteers are working on it; website and newsletter
4. Attend Sports Club Meeting(s)

Actions

In order to move us towards the spring 2011 achievements, the following actions need to be taken in the next 90 days:	Person/People Responsible:	Resources Needed:	Time line:
<p>We ran out of time for completing Exhibit D at the 7-24-2010 meeting. We will assess the Exhibit E volunteer signup sheet. A meeting may be held in August and the Blog will be Used.</p>			<p>For each of the Desired Outcomes / Benchmarks, members of the subgroups of volunteers who sign up on Exhibit E are to determine what to do for each Outcome / Benchmark and when.</p> <p><i>Don Hickman provided the following examples of action:</i> <i>Lake Vegetation Mapping – initial mapping early in Spring based on DNR guidance – achieve either with trained volunteers or hire contractor.</i></p> <p><i>Access Signage: prototype developed by end of Sept. and identify free posthole digger.</i></p>

Task Force: Aquatic Vegetation and AIS Exotic Species
The Point Person for this Task Force is: Dave Anderson

Members of this Task Force: (Please include address, phone, e-mail if available)	Other persons we need to invite to join this Task Force:
Stu Hamilton	
Phyllis Hansell Membership	
Arthur Howe Signage	
Jim Blodgett Lake Vegetation Survey Sharon Natzel Lake Vegetation Survey	
Sam Oliver Second Round – Resident Education	
Mary Ann Waterman Work on - Compose / Edit - New Resident's Booklet	
Al Pfingsten Improved Signage at Accesses	

Water Quality Focus Group

Desired Outcomes

The Water Quality Focus Group identified the most important (measurable) "indicators of success" to implement a successful action or activity associated with this focus area:

1. Improved water quality monitoring scores
2. Increased shoreland buffer restoration
3. All property owner participation, not just LLAA membership
4. Awareness / education program

People Involved

To achieve the "Desired Outcomes" the following people or organizations need to be involved:

Person/Organization Why we need to involve them:

- LLAA membership
- All lakeshore property owners
- Henrietta / Hubbard Townships
- State and Local Specialist on Shoreland Restoration

Benchmarks

As we report on this Focus Area at our Annual Meeting in June, 2011, these are the achievements we want to point to:

- 1) Improved lake quality monitoring elements i.e. phosphorous, chlorophyll, secci disk
- 2) Increased buffer zone restoration
- 3) Increased partnership with Henrietta and Hubbard Townships
- 4) Developed awareness / education program

Actions

In order to move us towards the spring 2011 achievements, the following actions need to be taken in the next 90 days:	Person/People Responsible:	Resources Needed:	Time line:
Improve Water Clarity (through water	Harry Stock Jon Sams and Membership	Hubbard COLA RMB Labs, Detroit Lakes SWCD, Hubbard County Handheld GPS	Ongoing action. Tests are taken 5x/year – May thru Sept. at specific locations on the lake
Increase Shoreland buffer restoration	Bill Cowman		

Task Force: Water Quality; Point Person: Bill Cowman

<p>Members of this Task Force: (Please include address, phone, e-mail if available)</p>	<p>Other persons we need to invite to join this Task Force:</p>
<p>From the list of persons attending, we will form the task force and this will include Jon Sams who would like to develop the awareness / education program.</p>	
<p>Attending: Tom Waterman, Katy Howe, Harry Stock, Bob Eggers, Bruce Johnson, John McKinney, Mary Fuchs, Bill Cowman</p>	

Prioritized Goals and Action Plan

The final chapter of our lake management plan summarizes the conclusions and priority action we have chosen to work on at this time. Specifically, for each priority action we have done our best to answer (for each goal presented):

- What are the criteria for measuring success (measured as outcomes, not effort)?
- What is our schedule for implementation (What needs to happen in the next 30 days, 60 days, one-year out)?
- Who is responsible for implementation or measurement (name names!)?
- What is the budget for this action/goal?
- Is this an on going action/goal, or a one-time effort? If on-going will we require additional funds for full implementation?

Following this format, the remaining pages identify our top priorities, what our goals for each priority are, and how, who, and when we will implement action for each of these priorities.

Grantee Action Plan and Evaluation Form

Grantee Organization:	Long Lake Area Association
Project Coordinator:	Dave Anderson
Phone/Email:	
Project Title:	Aquatic Vegetation and AIS Exotic Species

Summary of Project (1 or 2 sentences)	Complete vegetation mapping of lake to ensure no AIS present, develop educational programs for shoreline protection, improve signage at access points and increase LLAA membership
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**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)

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

Complete aquatic vegetation mapping of lake.		
Action	By When	Person Responsible
1. Complete aquatic vegetation survey	Fall-2011	Sharon Natzel-
2.		
3.		
4.		
Expected Result: Finished vegetative survey with all vegetation identified		

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 <u>ONLY</u> if grant exceeds \$5,000)		
Objective #1		Initiative Foundation use only
Actual Result (to be completed at end of grant period for final report)		

Grantee Action Plan and Evaluation Form

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

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

Continue and expand AIS/Exotic species prevention and education programs for 2011		
Action	By When	Person Responsible
1. Expand watercraft inspection plan to 480 paid hours and increase volunteer inspections hours to 100.	Begin May walleye opener-conclude Sept. 30, 2011	Jeff Bjorkman and volunteer inspection crew
2. Provide educational opportunities for lake residents and users for appropriate shoreline vegetation, use of lawn chemicals, no mow (Path to Lake Concept) encouragement to members, healthy plant and AIS plant identification training/brochures	Begin-May 2011 & continue monthly thru Sept. 2011	Dave Anderson
3. Representative of LLAA to attend meetings of local fishing clubs using Long Lake during the year. Includes Bass Club, Walleye Club and Fall Fishing Classic.	Starting May 2011-ongoing once year per club	
4.		

Expected Result: Increase the number of watercraft inspected in 2010 (387) to 580. Attend fishing club meetings annually to represent the lake. Develop shoreland stewardship packet with all information available and begin offering seminars in conjunction with Hubbard COLA at various times during the year.

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 #
Mid-point Result
(fill out at mid-point ONLY if grant exceeds \$5,000)

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Grantee Action Plan and Evaluation Form

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

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

Improve lake, AIS and wildlife signage at 4 public access points and develop plan for continuing care/maintenance of signs		
Action	By When	Person Responsible
1. Erect kiosk style sign center at south access point with approval of Hubbard County with maintenance agreement	June 2011	
2. Coordinate with DNR for installation of new signs and sign post system at north public access point following reconstruction of area with maintenance agreement	October 2012	
3. Coordinate with Hubbard County for improved signage at two sand access points with maintenance agreement	October 2012	
4. Develop education program for lake residents regarding AIS-Exotic species to include training sessions, brochures, website information and training of volunteers to identify vegetation.	Start summer 2011-ongoing annually	
Expected Result: New lake info, AIS and wildlife signage installed at all public access points and agreements with Hubbard County and DNR regarding regular maintenance of signs; and development of educational strategy for lake residents and visitors to be aware of exotic species and how to identify them.		

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 # _____
Mid-point Result
(fill out at mid-point ONLY if grant exceeds \$5,000)

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*** Objective # 4 (must be measurable results, not just effort)**

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

Increase lake association membership to 75% of property owners within 2 years.		
Action	By When	Person Responsible
1. Develop new resident's booklet and membership packet	June 2011	
2. Door to door campaign by neighborhood during summer months to tell residents about the lake association and deliver application	September 2012	
3. Start spring meeting to welcome back residents and fall "don't forget the lake" get together.	Start May 2011 ongoing annually	
4. Streamline membership renewal process to reduce annual e-mails, postcards and other forms of notification to renew membership.	Annual meeting 2012	

Expected Result:

Increase total membership of lake association to 70% of actual number of Long Lake property owners by 2013.

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 #
Mid-point Result
 (fill out at mid-point ONLY if grant exceeds \$5,000)

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Grantee Action Plan and Evaluation Form

Grantee Organization:	Long Lake Area Association
Project Coordinator:	Bill Cowman
Phone/Email:	
Project Title:	Long Lake Water Quality Plan

Summary of Project (1 or 2 sentences)	To promote awareness of the importance of maintaining and improving the water quality of Long Lake, guarding against the degrading of this valued recreational asset. Knowledge brings about changes in attitudes and behaviors leading to good stewardship and continued enjoyment by residents and visitors.
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**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)

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

Improve Water Clarity		
Action	By When	Person Responsible
1. Conduct water sampling and secchi disk recordings 5X per year from May through September at designated locations on the lake.	Starts in May, ends Sept.- ongoing every year	Harry Stock And other lake residents
2. Chart water quality results and compare to previous years & identify trends and events which may be responsible for changes.	Ongoing	RMB Labs, Harry Stock
3.		
4.		
Expected Result: Maintain oligotrophic classification		

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
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Grantee Action Plan and Evaluation Form

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

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

Increased shoreland buffer restoration		
Action	By When	Person Responsible
1. Conduct shoreland buffer and restore the shore seminars on Long Lake in cooperation with Hubbard COLA, DNR, SWCD and professionals in the area	ongoing	Bill Cowman With: SWCD DNR and membership
2. Develop shoreland demonstration project on Long Lake with regular observation by members.	ongoing	Bill Cowman SWCD, DNR and membership
3. Distribute literature and resource information to all members on shoreland buffers & restore the shore.	June 2011	Bill Cowman and membership
4. Encourage/promote purchase of plants (trees/shrubs) through "Restore the Shore" program	ongoing	Bill Cowman, membership, HCOLA and SWCD
Completion of 1-3 projects per year.		

Expected Result:

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

Mid-point Result (fill out at mid-point ONLY if grant exceeds \$5,000)

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Grantee Action Plan and Evaluation Form

*** Objective**

3. (must be measurable results, not just effort)

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

Develop and implement a plan to improve all public access points on Long Lake to include signage, surface run-off, restroom facilities, handicap access.		
Action	By When	Person Responsible
1. Develop with Hubbard County plan to upgrade south access point to include new vault toilets (including handicap access), kiosk sign proposal (see AIS plan above), redesigning parking and approach to reduce surface water run-off into lake	2012	Bill Cowman, Stu Hamilton
2. Develop plan with DNR to redesign north access point to include water run-off controls, Better approach to ramp, handicap accessible concrete vault toilets, fishing pier, new lake signage (see AIS above) and trash collection	2013	Bill Cowman, Stu Hamilton
3. Develop with Hubbard County, Henrietta and Hubbard townships plan to reduce water run-off, improve signage and design of two sand public access points	2015	Bill Cowman, Stu Hamilton
4.		

Expected Result:

Development of a strategy plan for each public access location in cooperation with local and state governmental agencies.

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 # _____
Mid-point Result
 (fill out at mid-point ONLY if grant exceeds \$5,000)

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Grantee Action Plan and Evaluation Form

*** Objective #_4_** (must be measurable results, not just effort)

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

Awareness and education program (children and adults).		
Action	By When	Person Responsible
1. Establish ad hoc committee to develop programs dealing with fisheries, wildlife, habitat surround Long Lake	Fall 2010 and ongoing	Jon Sams and membership
2.		
3.		
4.		

Expected Result:

Structured programs in cooperation with LLAA, Park Rapids School District, DNR, SWCD, Extension Service, which will help education children and adults about the Long Lake Watershed area.

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 #_

Mid-point

Result (fill out at mid-point ONLY if grant exceeds \$5,000)

**APPENDIX I:
LAKE ASSESSMENT PROGRAM
1995
LONG LAKE, HUBBARD COUNTY**

This report (48 pages) can be found on the MNPCA website at:
<http://www.pca.state.mn.us/index.php/view-document.html?gid=6632>. The
copy on the website is poor quality. The basic information regarding the
report was mentioned earlier in this plan.

**APPENDIX II:
DNR FISHERIES MANAGEMENT PLAN
FOR
LONG LAKE
2006**

Appendix II

DNR Fisheries Management Plan LAKE MANAGEMENT PLAN

<u>Region</u>	<u>Area</u>	<u>D.O.W. Number</u>	<u>County</u>	<u>D.O.W. Lake Name</u>	<u>Lake Class</u>	<u>Acreage</u>
1	Park Rapids (F11H)	29-0161	Hubbard	Long	22	1,966 plan. 468 littoral

LONG RANGE GOALS:

- Maintain or improve the quality of fishing for walleye by attempting to provide a population with a mean catch per effort (CPE) index of at least 6 per gill net lift and a proportional stock density (PSD) index of 30 to 60. Attempt to maintain a relative stock density (RSD) of preferred length (20") walleye of at least 29 and an RSD of memorable length (25") walleye of at least 6.
- Walleye abundance should be balanced with abundance of preferred forage, yellow perch, by attempting to maintain a perch population with an average CPE index of at least 1 per gill net lift.
- Maintain related fish communities
- Protect or enhance desirable aquatic and riparian habitats (water quality, aquatic and riparian vegetation, and shoreline substrate).

OPERATIONAL PLANS:

- Conduct special sampling, population assessments or lake surveys about every five years (2009, 2014...), or as needed to evaluate management efforts. Special spring electrofishing effort may be included with evaluations to better assess largemouth bass, black crappie or bluegill populations, if feasible within time and staffing constraints. Special fall electrofishing may be conducted if desirable to evaluate natural reproduction or stocking success of walleye, and if feasible.
- Stock walleye fingerlings at an increased rate of 2 pound per littoral acre (935 pounds total) during even numbered years. Adjust stocking rate, frequency, or size of fish if necessary to maintain desirable levels of abundance and size structures of walleye and forage fishes at minimum costs.
- Clean and post the walleye spawning area at the inlet of Long Lake prior to the spring walleye spawning season.
- Monitor winter fishing pressure by conducting aerial fish house counts.
- Provide free and adequate public water access to Long Lake. Work with MDNR, Div. of Trails & Waterways to investigate the feasibility of developing handicapped accessible shore or pier fishing opportunities near the north access site.
- Work with educators, groups, agencies, individuals or news media to provide aquatic education opportunities. Efforts may include presentations, news releases, personal contacts or special projects.
- Provide recommendations on permit applications that will minimize impacts to aquatic resources associated with projects in Long Lake, its tributaries, or its watershed.
- Encourage, support and assist efforts of local, state or federal groups or agencies to improve water quality, and maintain or improve fisheries habitat in Long Lake.

MID RANGE OBJECTIVES:

- Evaluate population characteristics (abundance, size and age structure, and growth) of walleye, yellow perch, northern pike, largemouth bass, black crappie, bluegill, and tullibee. Continue to refine definitions of desirable levels of abundance and size structure for managed fish species.
 - Continue to evaluate the extent of natural reproduction of walleye, and the contribution of stocked walleye. Adjust stocking rates, schedule or size of fish if necessary or desirable to maintain suitable levels of abundance and size structures of walleye and forage fishes at minimum costs.
-

POTENTIAL PLAN:

- Conduct an angler creel and recreational use survey of Long Lake, in conjunction with other area lakes.

SUBTOTAL \$ Costs would be shared with other lakes

- Work with MDNR, Div. of Trails & Waterways to investigate the feasibility of developing handicapped accessible fishing opportunities (shore or pier) near the north access site, and to redirect runoff.

SUBTOTAL \$ Feasibility and costs would have to be determined

- Attempt to estimate stocked walleye fry or fingerling survival and contribution to year class strength by marking stocked walleye with fin clips, tags, or tetracycline, recapturing marked fish during assessments or surveys, and estimating relative proportion of stocked and non-stocked fish.

SUBTOTAL \$ 5,000

- Inventory extent and composition of aquatic and riparian vegetation using Geographic Positioning System (GPS), Geographic Information Systems (GIS), digital or digitized photography. This information could be used to monitor long term habitat trends.

SUBTOTAL \$ Costs would be shared with other area lakes

- Use fee title purchase or easements to protect known spawning areas or other critical habitat.

SUBTOTAL \$ Costs depend on size or extent of projects

The fishery of Long Lake has been managed primarily for walleye with secondary emphasis on northern pike, largemouth bass, or black crappie. Management activities have consisted of: statewide fishing regulations; whitefish and tullibee netting since 1944; closures to dark house spearing in 1949-51; posting of bluegill spawning beds in 1949-54; fish stockings; improvement of angler access; and efforts to protect aquatic habitat.

Records indicate walleye, northern pike, bass, crappies, sunfish, whitefish, and rainbow trout were stocked in Long Lake between 1911 and 1945. From 1946 through 1974 walleye and northern pike were stocked frequently, generally as fry or fingerlings, at various rates. From 1975 through 1989 only walleye fry and fingerlings were stocked, but frequently and at various rates. From 1990 through 2002, walleye fingerlings, yearlings or adults were stocked, usually at a rate of about ¾ pound per littoral acre, and only in alternate, even numbered years to better evaluate the extent of natural reproduction and to improve stocking success.

In 2004, lake management plan amendments recommended increasing the stocking rate to 1 pound of walleye fingerlings per littoral acre (470 pounds) to compensate for a decrease in the reported littoral acreage when the lake was remapped, and to stock an additional ½ pound per littoral acre (235 pounds) if surplus walleye fingerlings were available. A total of 600 pounds of fingerlings were stocked in 2004, including 128 pounds that were purchased from a private supplier by the Long Lake Association. In 2005 the Park Rapids walleye stocking program was reviewed, and it was recommended that the walleye stocking rate in Long Lake be increased further, to 2 pounds per littoral acre (935 pounds), beginning in 2006. The lake association wanted to stock additional fish in 2005. They were permitted to stock an additional 190 pounds of walleye with the stipulation that yearlings (2004 year class) be stocked so as not to confound stocking evaluations.

VARIOUS SURVEYS:

Long Lake was mapped by the CCC in 1941, and the fishery was initially surveyed in 1959. The lake was resurveyed in 1972 and 1978. Population assessments were conducted in 1983, 1988, 1993, 1998 and 2004. The Minnesota Pollution Control Agency (MPCA) conducted a Lake Assessment Program (LAP) study in 1995 to establish baseline water quality data. The Long Lake Association was involved in the Hubbard County Coalition of Lake Associations (COLA) lake water quality monitoring program in 1997-2005, and lake water transparency was recorded through the MPCA Citizen Lake Monitoring Program in 1984-2000, and annually since 2002. The lake is considered mesotrophic based on total phosphorus, chlorophyll-a, and secchi disk measurements. Aerial fish house counts have been conducted annually since 1983 to monitor trends in ice fishing pressure. Counts have ranged from 20 to 72 houses, and averaged 40.

Mean gill net catch rates provide the best index of walleye abundance. Average gill net catch rates of walleye were very stable, and below the interquartile or “normal” range (4.0 to 9.6/gill net) for lakes with similar physical and chemical characteristics, from the initial survey in 1959 to 1978 (Figure 1). From 1983 through 2004 walleye gill net catch rates generally increased with very little fluctuation. The average walleye catch rate was near the high end of the normal

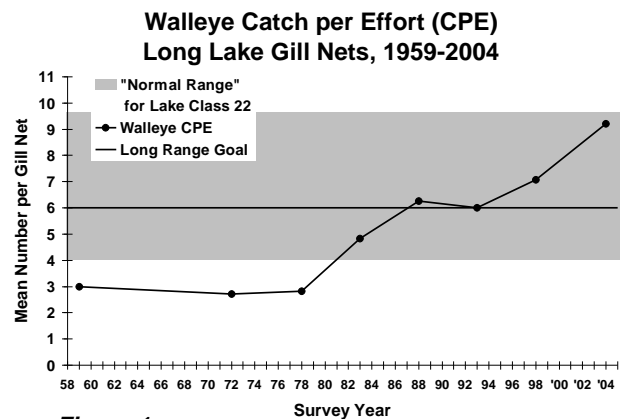
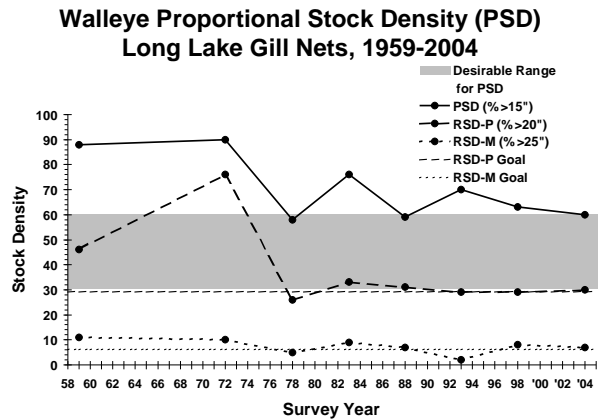


Figure 1

range and the highest ever observed in Long Lake in 2004. The average of catch rates from all Long Lake samples was 4.7 per gill net following the 1998 sample. The Management Plan goal of 6 per gill net was set at that time between that long term average and the third quartile of historic walleye catch rates. The average of all walleye catch rates following the 2004 sample was 5.2 per gill net. Walleye growth rates in 2004 were comparable to those of other similar lakes.

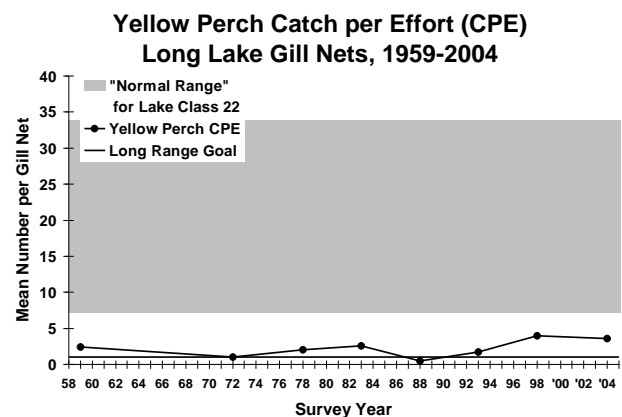
Proportional Stock Density (PSD) is an index of population size structure that measures the proportion of stock sized (10" or larger) walleye that are also a quality size of 15" or larger. Walleye PSD in Long Lake was well above a desirable range of 30 to 60 in 1959 and 1972 samples, but has fluctuated slightly at or just above the desirable range since then (Figure 2). High PSDs are a reflection of a high proportion of large fish and fewer small fish in the sample, probably indicating low recruitment. Low PSDs are due to a high proportion of small fish and relatively few large fish, a less desirable condition for anglers. More desirable mid-range PSDs indicate enough small fish recruiting into the population to provide good fishing in the future, and enough large fish to provide good fishing now.



Relative Stock Densities measure the proportion of stock sized walleye that are also a preferred size of 20 inches or larger (RSD-P or RSD-20), or the proportion that are also a memorable size of 25 inches or larger (RSD-M or RSD-25). The proportion of 20 inch walleye (RSD-P) in Long Lake was quite high in 1959 and 1972 samples. RSD-P decreased, but has still been quite good and remarkably stable since 1978. The proportion of 25 inch walleye (RSD-M) has historically been good and also remarkably stable, ranging from 2 to 11.

It has been difficult to evaluate natural reproduction of walleye and the contribution of stocking, because there have been relatively few samples of the lake's fishery, there were relatively few years that walleye were not stocked in the lake prior to 1990, walleye were often stocked in consecutive years, and different sizes of walleye have been stocked, sometimes in the same year. In general, walleye stockings appear to be contributing substantially to the walleye population in Long Lake. Mean gill net catch rates of year classes of walleye from stocked years appear to be substantially higher than non-stocked years at the same age. However, sample sizes are small so conclusions about the effectiveness of stocking must be viewed cautiously.

Yellow perch abundance in Long Lake has historically been quite low. Average gill net catch rates of yellow perch in Long Lake have ranged from 0.5 to 4.0 per gill net (Figure 3). Average catch rates of perch were the highest ever observed in 1998 and 2004, but were still considerably lower than the inter-quartile range



for similar lakes (7.1 to 33.9/gill net). The long range goal of at least 1 perch per gill net was set near the 25th percentile of historic perch catch rates for Long Lake. Catch rates of perch were below the goal in 1988 and at the goal in 1972. Size structure (PSD) of perch in Long Lake has also historically been low, consistently below the desirable range of 30-60. Only in 1978 and 1998 were any perch sampled that were a preferred size of 10 inches or larger, and there has never been a perch sampled that was a memorable size of 12 inches or larger. Small size and low abundance of yellow perch in Long Lake limit their value as a fishery for anglers. Considering the low abundance of perch in Long Lake, predators like walleye and northern pike are probably also seeking other prey like tullibee. However, perch are still an important source of food, and it is still important to maintain a good perch population to provide adequate forage for the lake's predators.

The abundance of northern pike in Long Lake has fluctuated, usually within the range typically found in similar lakes (3.0 to 7.9/gill net). Only in 1983 and 1998 were average catch rates higher than the normal range. PSD of northerns was very stable from 1959 through 1983, and near the low end of the desirable range of 30 to 60. Pike PSD has generally increased since 1988, and in 2004 was well above the desirable range. The proportions of northern pike that were a preferred size of 28 inches and larger (RSD-P or RSD-28) have historically been low, but increased slightly in 1998 and 2004. The proportions of pike that were a memorable size of 34 inches or larger (RSD-M or RSD-34) have historically been very low. Growth rates of younger pike were fast in 2004, and average in older pike, compared to other similar lakes. Moderate abundance, good growth, and low proportions of large northern pike may be an indication that natural reproduction and recruitment are adequate, but mortality, including angler harvest, may be high.

Largemouth bass have been collected with both gill nets and trap nets during the course of population assessments and lake surveys, but those gears do not do a very good job of sampling bass. Catch rates with both gears have been relatively high. Catch rates fluctuated, but appear to have decreased from 1955 through the late 1970s, then increased since then. The 2004 sampling catch rates of bass were the highest ever for gill nets and second highest ever for trap nets. Population size structure indices of bass have been low, but remarkably stable. PSDs of largemouth bass have consistently been around the low end of the desirable range of 30 to 60. The proportions of preferred size (15" or larger) bass (RSD-P or RSD-15) have ranged from 2 to 6. No memorable size (20" or larger) bass have ever been sampled at Long Lake. Growth rates of bass in 2004 were comparable to other similar lakes. Future population assessments or surveys should include spring electrofishing sampling to better evaluate bass populations, if possible within time and staffing constraints.

Average trap net catch rates probably provide the best index of black crappie abundance. Trap net catch rates of crappie in Long Lake have fluctuated within or below the interquartile range for similar lakes (0.3-1.7/net). The average trap net catch rates haven't shown any apparent trend of either increasing or decreasing over time. However, gill net catch rates appear to have decreased from 1959 to 1972, then increased since then. Proportions of quality size (8" or larger) crappie (PSD) have fluctuated widely, but usually around the desirable range of 30 to 60 and with no apparent trends of either improving or declining. Proportions of preferred size (10" or larger) crappie have also fluctuated, but were generally low, ranging from 0 and 13. The only memorable size (12" or larger) crappie sampled was a single individual in 2004.

Mean trap net catch rates also provide the best index of bluegill abundance. Bluegill trap net catch rates in Long Lake have fluctuated within or above the inter-quartile range for similar lakes (3.7 to 42.9/net) with no apparent trend of increasing or decreasing over time. Size structure (PSD) of bluegills has generally been low, either below or near the low end of the desirable range of 20 to 60. The only bluegill sampled, that was larger than a preferred size of 8" was a single individual in 1959.

Tullibee (cisco) are very high in protein, and can provide another valuable source of forage. The average gill net catch rate of tullibee was above the inter-quartile range for similar lakes in the 1959 sample, declined and was below the normal range in 1976 through 1998 samples, then increased to within the normal range again in 2004. Tullibee netting has been allowed in Long Lake since 1944, but it doesn't appear that many people participate or that it has much effect on the tullibee population.

SOCIAL CONSIDERATIONS:

Long Lake and its fishery are an important feature and recreational attraction for the Park Rapids area and surrounding communities. The lake and its fishery have the potential to contribute substantially to local and state economies. There were 466 homes/cabins reported on Long Lake during a 1993 population assessment. There were 516 homes/cabins counted during a 1998 assessment, amounting to an 11% increase of homes/cabins during that five year period. A total of 518 homes/cabins were observed during the 2004 assessment. That resulted in less than an additional 1% increase over the most recent five year period, and still an 11% increase in homes/cabins over ten years. The number of cabins/homes observed in 2004 results in 30.3 cabins/homes per shoreline mile, which is in the 98th percentile of 96 lakes in the Park Rapids area where shoreline development has been recorded.

PRESENT LIMITING FACTORS:

Heavy development on Long Lake and within its immediate watershed has resulted in removal of aquatic and riparian vegetation and probably increased contribution of nutrients to the lake. Loss of vegetation, and the resulting loss of habitat and degraded water quality could negatively affect fish populations, reduce recreational opportunities, and reduce the aesthetic quality of the lake. The small proportion of shallow, littoral area in Long Lake probably limits production, abundance, growth, condition and sizes of warmwater fish species like bluegill, largemouth bass or black crappie. Emergent aquatic vegetation like bulrush is particularly sparse on Long Lake, and can provide spawning habitat for these nesting fish species. Removal of emergent aquatic vegetation will have the greatest negative impacts on these species.

A lack of suitable habitat or other fish populations may limit natural reproduction or recruitment of walleye. Other fish populations may limit survival or recruitment of stocked walleye. Yellow perch are an important source of food for predators like walleye and can often affect survival, growth or condition of either naturally produced or stocked walleye.

Northern pike reproduction and recruitment may be limited by the amount of seasonally flooded vegetation and marsh areas that provide suitable spawning habitat, and by water levels in inlets to allow pike to reach suitable spawning areas. However, higher recruitment and abundance of pike could lead to more competition for food, poorer growth and smaller fish. The amount of

habitat in Long Lake for pike production appears to be adequate. Numbers of pike are generally within the normal range for lakes like Long, and growth and condition are good.

Increased fishing pressure and harvest in recent decades may be affecting abundance, size, or age structure of some game fish populations. Sizes of northern pike in Long Lake are fair, but with only moderate recruitment and good growth, it would seem that sizes of northerns could be better.

SURVEY NEEDS:

Fisheries surveys or assessments should be conducted at a minimum of about every five years to monitor population trends of managed fish species. If possible with fiscal and staffing constraints, assessment or survey sampling should include spring electrofishing to better evaluate largemouth bass and perhaps crappie and bluegill populations. Special fall electrofishing may be conducted if desirable to evaluate natural reproduction or stocking success of walleye, and if feasible. More frequent sampling may be necessary to determine management needs or better evaluate management efforts. Complete lake surveys should be conducted regularly at Long Lake to provide information about physical and chemical characteristics of the lake and its watershed that can be used to monitor long term habitat trends.

An angler creel and recreational use survey could be considered for Long Lake. A creel survey could provide needed information on fishing pressure, catch, harvest, angler characteristics, and recreational use in the Park Rapids area in general, and Long Lake in particular. A creel survey could include a late winter/early spring period to determine the extent of harvest during the spawning period. Consideration may also be given to marking walleye, northern pike, crappie, bluegill and/or bass in conjunction with an angler creel survey to attempt to estimate exploitation.

The extent and composition of aquatic and riparian vegetation could be inventoried using Geographic Positioning System (GPS), Geographic Information Systems (GIS), digital or digitized photography. This information could be used to better monitor changes in habitat, and long term habitat trends.

A mark and recapture tagging study could be undertaken to estimate stocked walleye fingerling survival and contribution to year class strength. Such a study could be conducted by marking stocked walleye with fin clips, tags or oxytetracycline, recapturing marked fish during special sampling, assessments or surveys, and estimating relative proportion of stocked and nonstocked fish.

LAND ACQUISITION:

Long Lake has two public access sites with concrete ramps and adequate parking. A state owned site is located on the north end of the lake, and a county owned site is located at the south end. There are two other county owned sites with earthen ramps and limited parking. One is located on the north shore of a southwest point (Norway Bay), and the other (Nakomis) is located on the west central shore. There are several other publicly owned easements to the lake, but they do not provide suitable access or parking. MN DNR, Div. of Trails & Waterways has indicated that they may be considering improvements to the north end public access site. Since the north end of Long Lake can provide some very good shore fishing in the early spring, opportunities for including shore or pier fishing for handicapped anglers might be considered. If the north access ramp or parking area is reconstructed, it should be designed to redirect runoff to infiltration areas rather than directly into the lake. Except for the improvements to the north end access site,

public access appears to be adequate for the present. However, additional land acquisition may be considered in the future to satisfy increased recreational demand or to ensure accessibility for shore fishermen, elderly or disabled. Any improvements in access should be weighed with anticipated negative effects of increased use.

Consideration should be given to acquiring property or using cost-share programs to protect identified spawning areas or other critical habitat from development or further degradation, or to improve habitat in those areas. Consideration might also be given to acquiring property or using cost-share programs to protect marginal land and critically eroding areas, or to provide vegetative buffer strips along the lakeshore or tributaries.

HABITAT DEVELOPMENT AND PROTECTION:

Fisheries personnel will continue efforts to inform and educate the public about the value of riparian and aquatic habitats (water quality, vegetation and substrates), and the need to protect or restore them. Efforts of local, state or federal groups, agencies or individuals to maintain or improve water quality or fisheries habitat in Long Lake will continue to be encouraged, supported and assisted. Aquatic plant management and work in protected waters permit applications will be reviewed, and recommendations will be provided to minimize loss or degradation of riparian and aquatic habitats.

In particular, existing or prospective lakeshore property owners should be advised of the benefits of riparian and aquatic vegetation as habitat and shoreline protection. They should be encouraged to maintain existing or restore destroyed vegetation. They should be given options to obtain access to open water or to reasonably use lakeshore property, but still maintain as much vegetation as possible. Fisheries personnel will also work with developers of private land or planning and zoning authorities whenever possible, to provide recommendations and define guidelines for aquatic plant management or protection of sensitive habitat. In cases of erosion, property owners should be advised of options to protect their shorelines. Options may include reshaping, re-vegetation, or as a last resort in severe cases, rip-rap. Recommendations can be provided on a case by case basis.

STOCKING PLANS:

Prior to 2006, walleye fingerlings were being stocked in Long Lake at a recommended rate of 1 pound per littoral acre (470 pounds) and an additional ½ pound per littoral acre (235 pounds) if surplus fish were available. Fingerlings are being stocked in alternate years to better evaluate natural reproduction and to improve chances of stocking success. Walleye stocking rates are being increased at many lakes in response to public demands to increase walleye stocking statewide, because the statewide walleye stocking quota has been increased, and because there appears to be some benefit to stocking walleye fingerlings at higher rates (up to 1 pound per littoral acre per year average or 2 pounds per littoral acre every other year). It is recommended that the walleye fingerling stockings at Long Lake should be increased to 2 pounds per littoral acre (935 pounds total) every other year. If the Lake Association is interested in stocking walleye fingerlings, and if the recommended quota (935 pounds) is not met, the Lake Association should be allowed to purchase and stock appropriate strain walleye fingerlings of the same year class up to the recommended quota.

Recommendations for future changes in walleye stocking schedules, rates, or sizes of fish should be based on results of evaluations. Walleye stocking frequency or rates could be adjusted in an

attempt to further increase abundance of walleye, but only if abundance of yellow perch warrants, if other fish populations are not negatively affected, if growth or condition of walleye are not jeopardized, and if walleye stockings appear to be contributing significantly to the walleye population. Walleye stocking frequency or rates may be decreased if walleye stockings do not appear to be contributing significantly to the walleye population or if other fish populations (particularly yellow perch) are being negatively affected.

EVALUATION PLANS:

Fisheries sampling information will be used to evaluate population characteristics (abundance, relative abundance, size structure, age structure, growth or condition) of walleye, yellow perch, northern pike, black crappie, bluegill, largemouth bass, tullibee, and forage fishes. Fisheries sampling information will also be used to build a more complete database, allow better comparisons of species' population characteristics over time, and might aid with evaluation of community interactions. Results will be used to evaluate and adjust management efforts, including stocking, if necessary to achieve desirable levels of abundance and size structure for managed fish species and forage fishes at minimum costs. Complete lake surveys will provide information about physical and chemical characteristics of the lake and its watershed that can be used to monitor and evaluate long term habitat trends.

If an angler creel survey can be conducted, particular attention should be placed on determining harvest of walleye, northern pike, black crappie, bluegill and bass, and resulting impacts to those populations, particularly during spawning periods or in spawning areas. Results of an angler creel survey should be used to evaluate the potential to improve abundance and size structure of managed fish species (walleye, northern pike, crappie, bluegill or bass) with regulation changes (seasons, bag limits, size limits).

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 assessed,

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 is 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 <i>a</i>	Chlorophyll <i>a</i>
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 <i>a</i>)
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
LMC	League of Minnesota Cities
MAT	Minnesota Association of Townships
MCIT	Minnesota Counties Insurance Trust
MSBA	Minnesota School Board Association
Mid-MnMA	Mid-Minnesota Association of Builders
MnSCU	Minnesota State Colleges and Universities
MW	Minnesota Waters
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

APPENDIX IIA:

**DNR FISHERIES 2009 GILL NET SURVEY
FOR LONG LAKE**

APPENDIX III:

**LONG LAKE AREA ASSOCIATION
2007 STRATEGY MAP**