LAKE MANAGEMENT PLAN STAR LAKE

Dent, MN
2011 – 2012

I. Introduction:

Star Lake is a 4,721 acre moderately fertile lake located in- north central Otter Tail County approximately four miles west of Dent, MN. Star Lake is connected to Dead and Round Lakes via un-navigable streams. The immediate watershed is composed primarily of agricultural land interspersed with- hardwood woodlots. Extensive marsh areas are located in the south arm and the west arm of the lake. Stands of hard-stem-bulrush, wild rice, and common cattail are scattered along the shoreline of the entire lake; however, the largest stands are located in the south arm and the west arm. The maximum depth is 96 feet; however, 59% of the lake is less than 15 feet in depth. Star lake is classified as a general development lake.

II. Planning Process

Vision: Star Lake is a remarkable gift of created beauty and natural resource. The Star Lake Property Owners Association and its Board of Directors Are dedicated to its protection and enhancement for all citizens who wish to enjoy its benefits in this generation and for generations to come.

Mission: The Star Lake Property Owners Association and its Board of Directors are committed to preserving this natural resource to include but not be limited to:

- its excellent water quality
- its bountiful fishery
- its natural wildlife haven
- its orderly and proper development

A. Star Lake Property Owner's Association Board of Directors (2009-2010:

Arlette Preston	President
Dave Kaser	1st Vice President
Carolyn Herron	2nd Vice President
Tim Lindgren	Secretary
Stu Peterson	Treasurer
Noah Riley	Director
Duane Salberg	Director
Mike Cribb	Director
Jim Ebert	Director

B. Committees/Functions/Focus Areas for 2010-2011

Adopt *a* Highway: (Noah Riley, Chair) *spring and* fail clean *up of Co. #41* Right-Of-Way from St. Hwy 108 to 390th Street. Coordination with County on Adopt - A-Highway program.

Annual Meeting and Picnic*:* (Dave Kaser, Chair) Recommend annual meeting date, location, menu, and logistics. Back up location in case of rain. Coordination with meal caterer. General oversight of "Annual Meeting Checklist".

Audit Committee: Annually review the financial records of the Association and report results to the board of directors and membership (comprised of non-board members)

Communications: Correspondence/Newsletters/meeting notices to membership. Solicitation letters to non-members. Mailing list maintenance. SLPOA web site administration.

Finance/Treasure: Development of annual budget recommendations. Monitoring and reporting of revenue and expense trends. Maintain record of current paid members (voting and associate) and coordinate with secretary on membership mailing list.

Fisheries Management Coordination with DNR on all *Issues relating to Star Lake* fishery including *stocking,* public *Access habitat, vegetation,* regulatory *enforcement, etc.* Similar coordination with other state agencies or county departments having authority over resources affecting fish and wildlife habitat. Coordinate with DNR on plans to improve public access.

Lake Protection & Preservation:

1) To gather information and assist in maintaining working relationships with public officials and policy makers for the SLPOA and the Board to effect long term policies to benefit the membership of SLPOA;

2) To identify and take advantage of resources available to protect and preserve the high quality of Star Lake;

3) To provide ongoing communications *back to membership* regarding OTC Land and Resource and state DNR actions/programs affecting Star Lake.

Membership Development Develop and implement strategies to attract new members (and retain existing members) to the SLPOA.

Nominating Committee: Seek nominees for board of director elections, place names in nomination and serve as election committee at the annual meeting. (comprised of non-board members)

Water Safety:(Duane Salberg, Chair) Marker buoy maintenance and placement under license from the OTC Sheriffs Dept. Primary contact with Sheriff's department, DNR, and other authorities on other lake safety issues.

Water Quality / Testing / Aquatic Invasive Species (AIS) Control / Lake Management Plan: (Carolyn Herron, Chair) Conduct lake water testing at site 201 monthly, from May Through September, as part of the COLA water quality monitoring program. Deliver samples to RMB Lab in Detroit Lakes for analysis, with results posted on the lab website at www.rmbel.info.

Conduct periodic Secchi disc readings at sites 201 & 205 (Carolyn Herron), Site 202 (Arlette Preston) and site 206 (Mary Kay Nielsen); aim for 10 – 15 readings through the summer. This is done as part of the Citizen Lake Monitoring Program through the Minnesota Pollution Control Agency (MPCA), and results are mailed to them in the Fall, for inclusion in a PCA nationwide lake testing data base (STORET). See Addendum # A for the MPCA summary of secchi clarity data.

Report the results of both of these testing programs to the SLPOA Board of Directors at their monthly meeting, and to the SLPOA membership at the annual meeting in June.

Direct " Weed Watcher" team to scout their designated portion of lakeshore in May and June for Curly Leaf Pondweed, and in July and August for Eurasian Watermilfoil. Provide team members with vegetation identification material to assist them in their search; any suspicious vegatation will be brought to Minnesota DNR Invasive Species Specialist, Nathan Olson in Fergus Falls (1-218-739-7576 Ext. 259) for identification.

Lake Management Plan: Update LMP (along with other SLPOA Board members' input) with this year's focus areas, current water monitoring results, and most recent fisheries report. Add new information describing our plan to monitor for Aquatic Invasive Species (AIS), and what our likely strategy will be should we discover an AIS in Star Lake.

A. Star Lake Watershed and Comparisons to Regional Patterns

1. A Lake Assessment Program (LAP) was completed by the Minnesota Pollution Control Agency (MPCA) in 2000. In this document, the MPCA has gathered and summarized information about Star Lake from the Minnesota Dept. of Fisheries, from the MPCA Citizen Lake Monitoring Program (CLMP) Secchi disc readings taken on Star Lake over the years, and from records of rainfall and water level fluctuations on Star over the years. For the LAP, the MPCA also gathered and analyzed water samples over the summer of 2000, to learn the concentrations of phosphorus and algae present.

Following are the Introduction, Background Data, and Summary of Recommendations that the MPCA presented to the Star Lake Board in the year 2000. **A lake receiving a LAP report such as this is then free to review these recommendations and make decisions about which ones they feel are important to work toward.** (See the complete LAP report in Appendix __)

Lake Assessment Program: 2000 – INTRODUCTION

Star Lake was sampled by the Minnesota Pollution Control Agency (MPCA during the summer of 2000 as part of the Lake Assessment Program (LAP) This program is designed to assist lake association or municipalities in the collection and analysis of baseline water quality data in order to assess the trophic status of their lakes. The general work plan for LAP includes Association participation in the Citizen Lake-Monitoring Program (CLMP), cooperative examination of land use and drainage patterns in the watershed of the lake, and an assessment of the data by MPCA staff.

Star Lake was sampled on three occasions during the spring and summer of 2000 by Mike Vavricka form the MPCA. The Star Lake Association participated in the CLMP for 2000. Land-use information for the lake's watershed was assembled from previous work done in the watershed. The septic survey and follow up work was conducted by the Otter Tail County Land and Resource Management staff.

This study was conducted at the request of the Association, whose members are interested in identifying sources of pollution to the lake, characterizing the quality of the lake, and developing a program to assist in lake management. A few years of data was available for Star Lake from CLMP. Historical data provides a basis for assessing year to year fluctuations in the quality of Star Lake.

B. Lake Monitoring History

Star lake has lake-monitoring data since May of 1996. Star Lake participates both in the volunteer lake monitoring program of Minnesota PCA and in water quality testing through the Ottertail Coalition of Lake Association (COLA) and the RMB Lab in Detroit Lakes.

1. Sampling procedure:

a. The volunteer lake monitoring program through PCA utilizes the Secchi. Disc measurement process for lake water clarity. A white metal disc, eight *inches in* diameter *is* lowered *into the water at the specific test sites until it can* no longer be seen with a naked eye. The depth is noted and cataloged. This process is repeated weekly. In addition to the depth data, observations are made concerning the weather, wave action, and recreation suitability of the lake and time of day. All measurements are to be taken between 10am and 2pm. At years end, all data is sent to the state PCA office where it is processed and printed *in an* annual report *which includes* all lakes *in the* volunteer monitoring program.

b. Once a month for the five months beginning May through September, a water sample is drawn from a specific site on Star Lake (Site 201 labeled by the Minnesota Pollution Control Agency (MPCA) for the Citizen Lake Monitoring Program (CLMP)), utilizing a standardized procedure. The first sample is mixed with sulfuric acid and the second is left as it is drawn. The acid mixed sample is used to test for levels of Total Phosphorus (TP) and the other is tested for levels of Chlorophyll-a (ChlA). In addition, a secchi disc reading is taken, by lowering a white metal disc into the water until it disappears. Test results are factored into a scale known as a Tropic State Index (TSI), a number from 0-100. The lower the TSI, the better the lake chemistry and the healthier the lake. These data are compiled on the web site of the R M B Lab (www.rmbel.info).

2. Sampling sites.

Four sites are identified as Secchi disc testing sites and one of these is used for taking the water sample for testing once a month. The following sites are used (see map of test sites in appendix):

a. Site 201 is located in the middle of the lake, roughly 113 of the way west of the large island toward Camp Aquila in approximately 85 feet of water. This is the site used for both Secchi readings and for taking the monthly water sample.

b. Site 204 is located SE of the big island in 73' of water. This site is used for Secchi readings only.

c. Site 202 is located in the west arm, in the middle of the lake due south of Frank's Resort in 85' of water. This site is used for the Secchi reading only.

d. Site 205 is located in the north arm, northeast of the galaxy Resort in 96' of water. This site is used for the Secchi reading only.

e. Additional sites are sampled should there appear to be a water quality issue that needs addressing.

3. Sampling data and results –

Star56-0385-00

Print Report Return to Report Search

MN Lake ID:	56-0385-00
County:	Otter Tail
Ecoregion:	Northern Central Hardwood Forests
Major Drainage Basin:	Red River
Latitude/Longitude:	46.52083333 / -95.81277778
Water Body Type:	Public Waters
Monitored Sites (Primary):	201
Monitored Sites (Secondary):	N/A

Physical Characteristics

Surface area (acres):	4721
Littoral area (acres):	2813
% Littoral area:	59%
Max depth (ft):	94 (m): 28.7
Mean depth (ft):	N/A(m): N/A
Watershed size (acres):	N/A

[View MPCA CLMP Historical Secchi Data]

[Search for County Monthly Precipitation Data]

[Search for latest MPCA Assessment Report]

[View MN DNR Fisheries Report]

[View MN DNR Lake Level Report]

Water Quality Characteristics - Historical Means

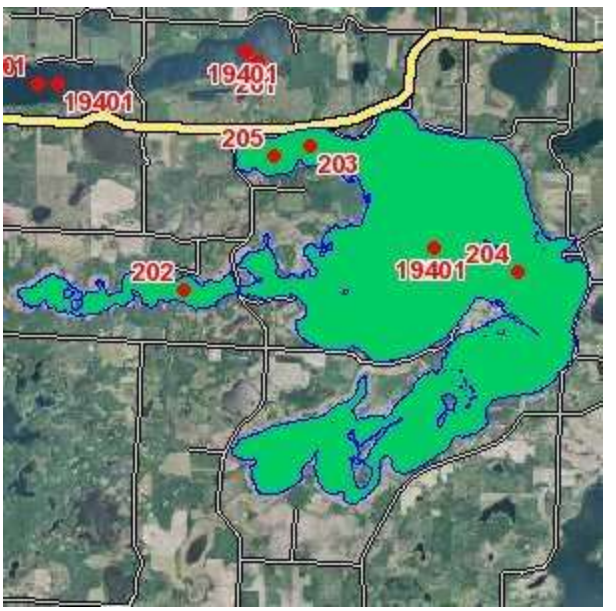
Years monitored: 1996-1998, 2002-2010

(Data from RMB monitoring database only)

Parameters	Primary Site 201
Total Phosphorus Mean:	17.9
Total Phosphorus Min:	10
Total Phosphorus Max:	28
Number of Observations:	54
Chlorophyll-a Mean:	5.7
Chlorophyll-a Min:	1
Chlorophyll-a Max:	12
Number of Observations:	54
Secchi Depth Mean:	13.2
Secchi Depth Min:	6.5
Secchi Depth Max:	24
Number of Observations:	54

Trophic State Index Mean (Primary Site): 44.1

Trophic State: Mesotrophic



Long-term Trends

(Primary site only. For detecting trends, a minimum of 8-10 years of data with 4 or more readings per season are recommended. Minimum confidence accepted by the MPCA is 90%)

Total Phosphorus:	Decreasing, which indicates improving water quality (95% confidence).
Chlorophyll-a:	No Trend
Secchi Depth:	Increasing, which indicates improving water quality (95% confidence).
Trophic State Index:	No Trend

Ecoregion Comparisons

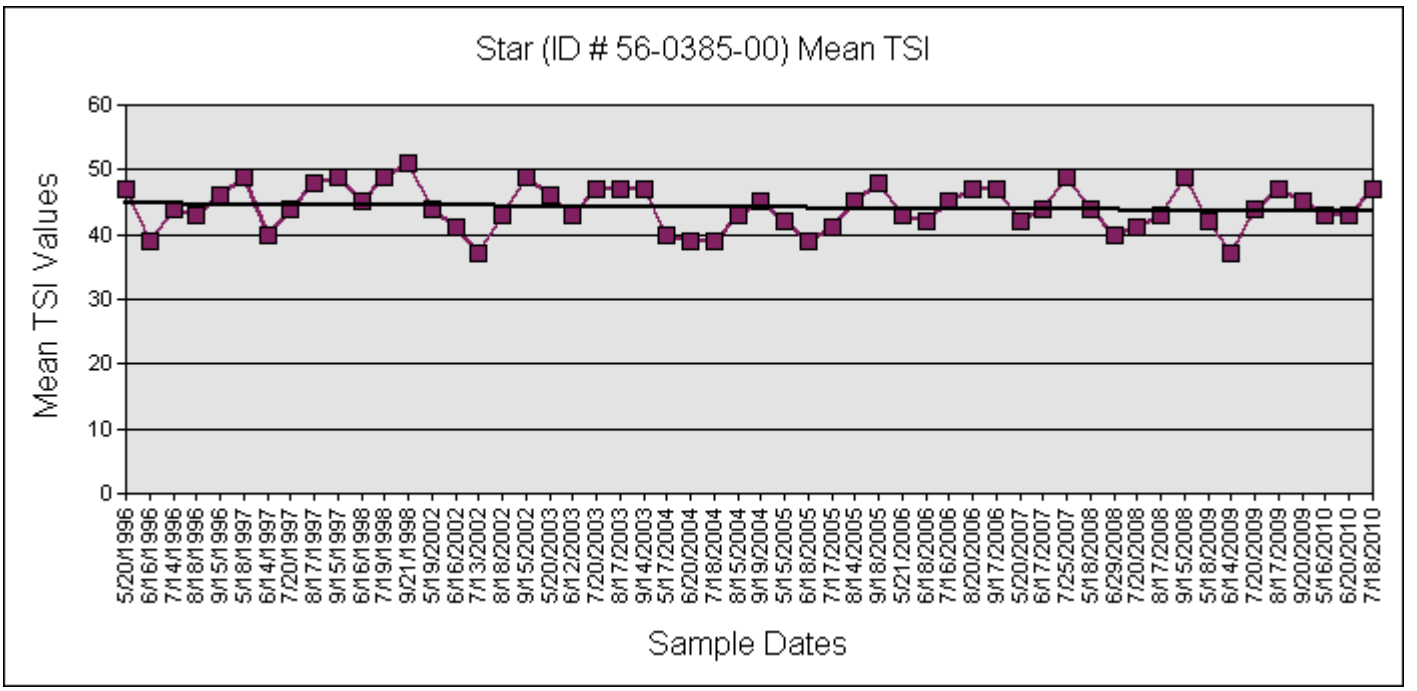
(Primary site only. Comparisons are based on interquartile range, 25th - 75th percentile, for ecoregion reference lakes)

Total Phosphorus:	Below Expected Range
Chlorophyll-a:	Within Expected Range
Secchi Depth:	Above Expected Range

Trend Analysis Report

County	MN Lake ID	Lake	Site	Data Evaluated	Date Range	Data Source
Otter Tail	56-0385-00	Star	201 (Primary)	Mean TSI	05-01-1996 - 07-31-2010	RMB Lab

No Significant Trend Exists



Mann-Kendall Statistic for Trend Significance

Sample Count (n) = 54

Mann-Kendall Statistic = -96

Z = 0.708738167570273

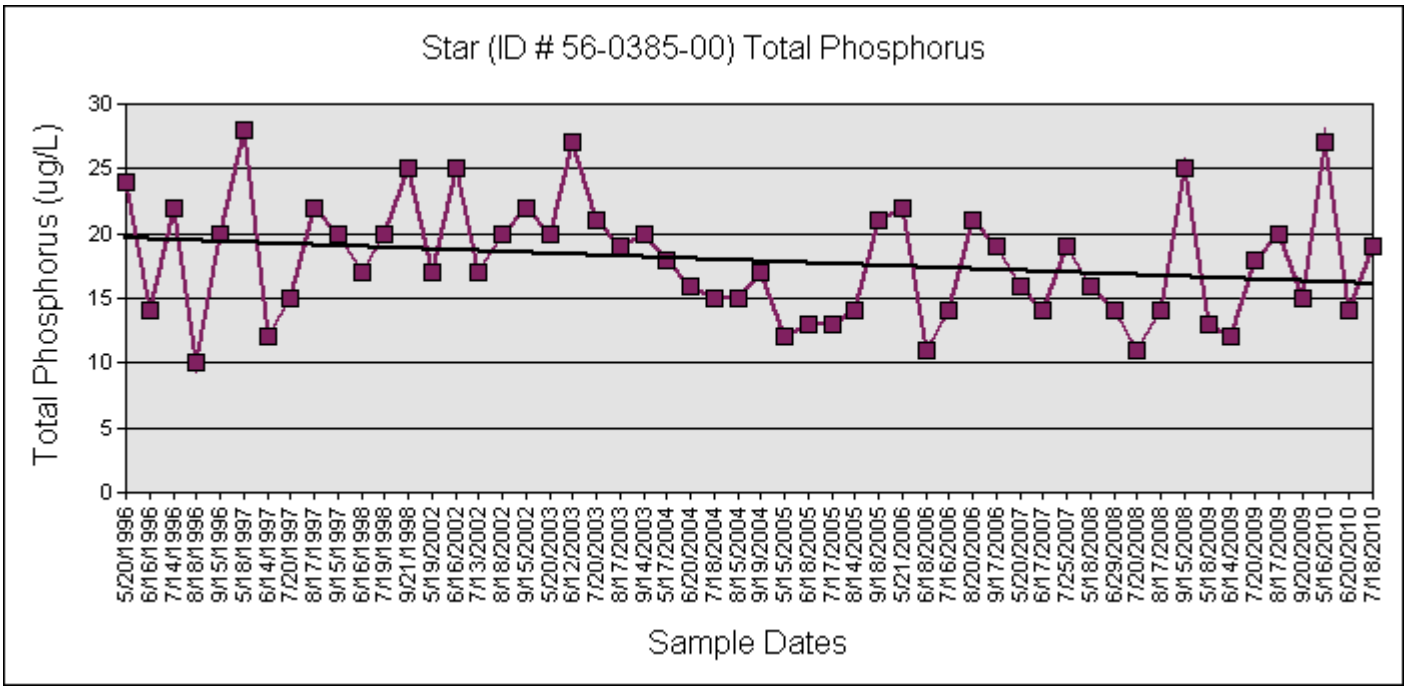
Probability of True Trend	Probability of Type 1 Error (alpha)	Z Critical
99.9%	0.001	3.27
99%	0.01	2.575
95%	0.05	1.96
*90%	0.1	1.645

80%	0.2	1.29
* Minimum probability used by the MPCA		

Trend Analysis Report

County	MN Lake ID	Lake	Site	Data Evaluated	Date Range	Data Source
Otter Tail	56-0385-00	Star	201 (Primary)	Total Phosphorus	05-01-1996 - 07-31-2010	RMB Lab

The probability that a true significant trend exists is 95%
Total Phosphorus is decreasing, which indicates improving water quality.



Mann-Kendall Statistic for Trend Significance

Sample Count (n) = 54

Mann-Kendall Statistic = -275

Z = 2.04415008330795

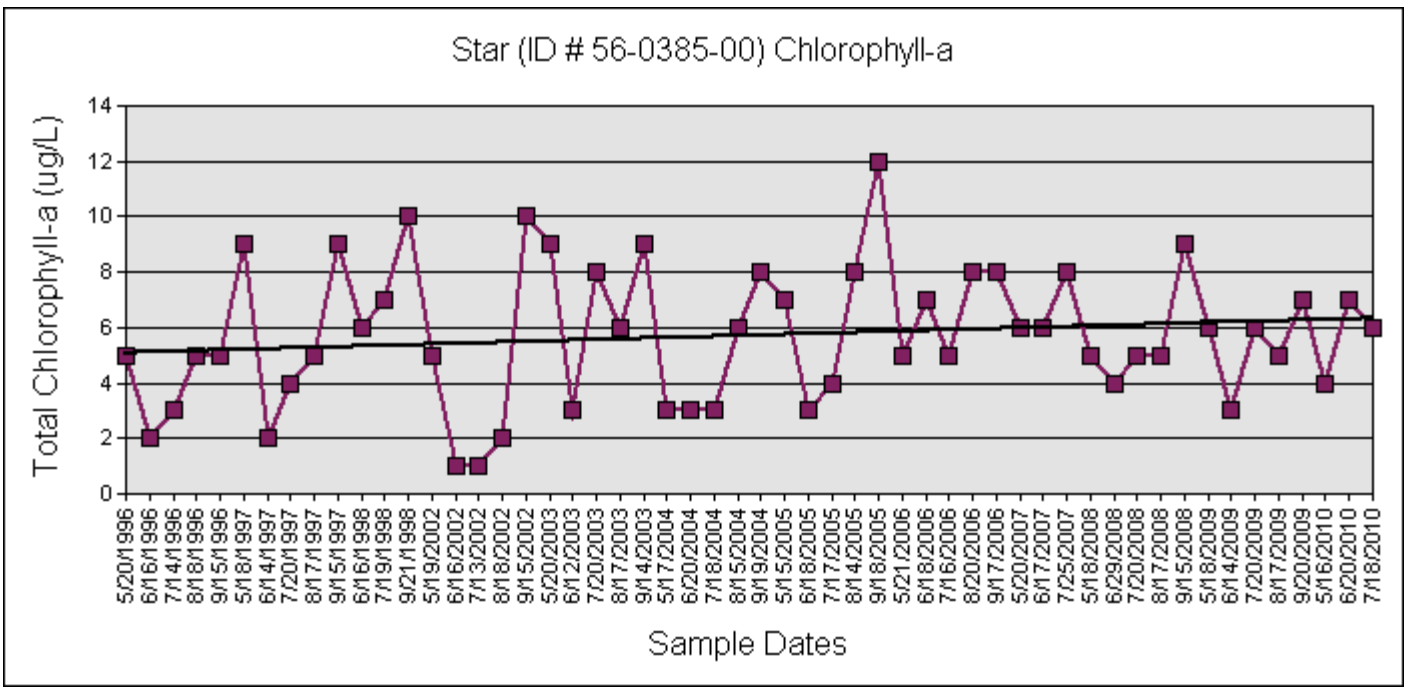
Probability of True Trend	Probability of Type 1 Error (alpha)	Z Critical
99.9%	0.001	3.27
99%	0.01	2.575
95%	0.05	1.96
*90%	0.1	1.645
80%	0.2	1.29

* Minimum probability used by the MPCA

Trend Analysis Report

County	MN Lake ID	Lake	Site	Data Evaluated	Date Range	Data Source
Otter Tail	56-0385-00	Star	201 (Primary)	Chlorophyll-a	05-01-1996 - 07-31-2010	RMB Lab

No Significant Trend Exists



Mann-Kendall Statistic for Trend Significance

Sample Count (n) = 54

Mann-Kendall Statistic = 147

Z = 1.08921865752905

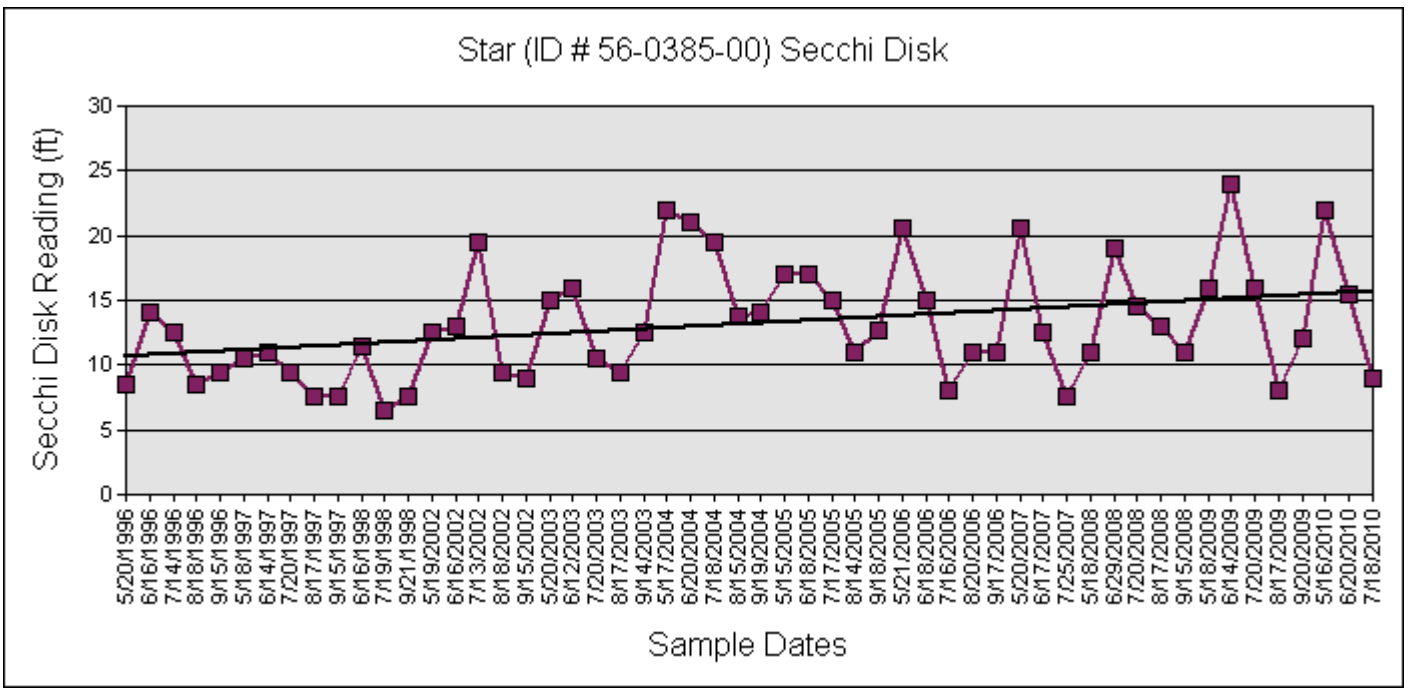
Probability of True Trend	Probability of Type 1 Error (alpha)	Z Critical
99.9%	0.001	3.27
99%	0.01	2.575
95%	0.05	1.96
*90%	0.1	1.645

80%	0.2	1.29
* Minimum probability used by the MPCA		

Trend Analysis Report

County	MN Lake ID	Lake	Site	Data Evaluated	Date Range	Data Source
Otter Tail	56-0385-00	Star	201 (Primary)	Secchi Disk	05-01-1996 - 07-31-2010	RMB Lab

The probability that a true significant trend exists is 95%
Secchi Disk is increasing, which indicates improving water quality.



Mann-Kendall Statistic for Trend Significance

Sample Count (n) = 54

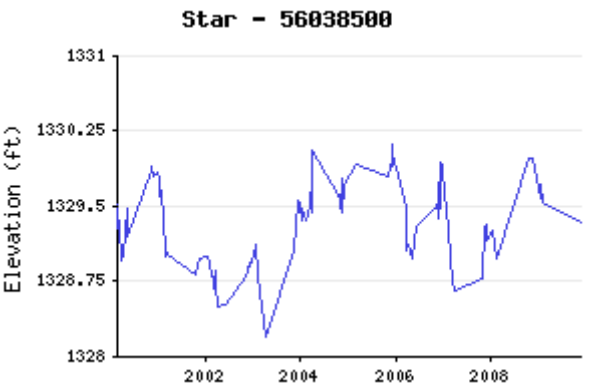
Mann-Kendall Statistic = 330

Z = 2.45447218032231

Probability of True Trend	Probability of Type 1 Error (alpha)	Z Critical
99.9%	0.001	3.27
99%	0.01	2.575
95%	0.05	1.96

*90%	0.1	1.645
80%	0.2	1.29
* Minimum probability used by the MPCA		

Lake water level report



Last 10 years of data, click to enlarge.

Lake name: Star ***County: Otter Tail***

Water Level Data

Period of record: 10/04/1956 to 05/05/2010
# of readings: 584
Highest recorded: 1330.99 ft (07/28/1993)
Highest known: 1331.2 ft
Lowest recorded: 1327.2 ft (10/04/1956)
Recorded range: 3.79 ft
Last reading: 1329.34 ft (05/05/2010)
Ordinary High Water Level (OHW) elevation: 1329.5 ft
Datum: NGVD 29 (ft)

Download lake level data as: [dBase] [ASCII] (If you have trouble try right clicking on the appropriate link and choosing the "Save ... As" option.)

Benchmarks

Elevation: 1334.79 ft Date Set: 11/01/1988
Datum: NGVD 29 (ft)

Benchmark Location		
Township: 135	Range: 41	Section: 9

Description: Double 60d spks in the E face of the N pile cap at CR 41 bridge.

Elevation: 1335.23 ft Date Set: 10/10/1988
Datum: NGVD 29 (ft)

Benchmark Location		
Township: 135	Range: 41	Section: 9

Description: 60d spike in the northeasterly most piling on the east side of the C.R. 41 Bridge.

Elevation: 1332.45 ft Date Set: 11/01/1988
Datum: NGVD 29 (ft)

Benchmark Location		
Township: 135	Range: 40	Section: 18

Description: Railroad spk in 1.1' cottonwood near Star Lake on east, southeast shore at bend in N-S rd.

4.) Lake Information Report – (DNR Fisheries Report)

Nearest Town: Dent
Primary County: Otter Tail
Survey Date: 07/13/2009
Inventory Number: 56038500

Purchase a walleye stamp. Your voluntary contribution will be used to support walleye stocking.

Public Access Information

Ownership	Type	Description
DNR	Concrete	
DNR	Concrete	

Fishing Regulations:

Special and/or Experimental Fishing Regulations exist on this lake. Please refer to our online Minnesota Fishing Regulations.

Fish Health:

Disease: Viral Hemorrhagic Septicemia (VHS) **Date Tested:** 4/27/2010 **Result:** Negative

Source: UMN

Lake Characteristics

Lake Area (acres): 4453.91
Littoral Area (acres): 2813
Maximum Depth (ft): 94
Water Clarity (ft): 8.1 (5.2-10)

Dominant Bottom Substrate: N/A
Abundance of Aquatic Plants: N/A
Maximum Depth of Plant Growth (ft): N/A

Fish Sampled for the 2009 Survey Year

Species	Gear Used	Number of fish per net		Average Fish Weight (lbs)	Normal Range (lbs)
		Caught	Normal Range		
Black Bullhead	Gill net	0.60	0.5 - 4.1	1.21	0.6 - 1.0
Black Crappie	Trap net	0.79	0.3 - 1.7	0.67	0.3 - 0.6
	Gill net	0.60	0.2 - 1.1	0.59	0.2 - 0.5
Bluegill	Trap net	10.14	3.7 - 42.9	0.36	0.1 - 0.2
	Gill net	4.20	N/A	0.47	N/A
Bowfin (dogfish)	Trap net	0.93	0.3 - 1.1	5.30	3.9 - 5.1
	Gill net	0.47	0.1 - 0.2	4.14	3.0 - 5.2
Brown Bullhead	Trap net	1.14	0.3 - 1.7	1.14	0.7 - 1.1
	Gill net	5.33	0.3 - 1.6	1.21	0.7 - 1.2
Hybrid Sunfish	Trap net	0.50	N/A	0.42	N/A
Largemouth Bass	Trap net	0.14	0.4 - 1.4	2.94	0.3 - 0.7
	Gill net	0.53	0.3 - 1.2	1.36	0.6 - 1.0
Northern Pike	Trap net	0.64	N/A	1.43	N/A
	Gill net	7.47	3.0 - 7.9	1.43	1.7 - 2.8
Pumpkinseed	Trap net	1.00	1.6 - 6.9	0.29	0.1 - 0.3
	Gill net	2.20	N/A	0.29	N/A
Rock Bass	Trap net	3.36	0.7 - 3.3	0.37	0.2 - 0.5
	Gill net	6.40	1.0 - 6.6	0.50	0.3 - 0.5
Walleye	Trap net	0.50	0.3 - 0.9	1.31	1.0 - 2.2
	Gill net	8.40	4.0 - 9.6	0.93	1.1 - 1.9
White Sucker	Trap net	0.07	0.2 - 0.8	2.32	1.4 - 2.7
	Gill net	1.33	1.0 - 3.5	2.25	1.5 - 2.3
Yellow Bullhead	Trap net	3.71	0.9 - 4.8	0.93	0.7 - 1.0
	Gill net	2.60	0.6 - 6.4	0.92	0.6 - 0.9
Yellow Perch	Trap net	0.21	0.7 - 3.7	0.12	0.1 - 0.2

	Gill net	8.47	7.1 - 33.9	0.12	0.1 - 0.2

Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.

Length of Selected Species (Trap net, Gillnet) Sampled for the 2009 Survey Year

Species	Number of fish caught in each category (inches)								
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total
black bullhead	0	0	3	6	0	0	0	0	9
black crappie	0	2	17	1	0	0	0	0	20
bluegill	13	172	14	0	0	0	0	0	205
bowfin (dogfish)	0	0	0	0	1	7	12	0	20
brown bullhead	0	0	3	93	0	0	0	0	96
hybrid sunfish	1	6	0	0	0	0	0	0	7
largemouth bass	0	0	1	6	3	0	0	0	10
northern pike	0	0	1	6	81	28	2	3	121
pumpkinseed	6	41	0	0	0	0	0	0	47
rock bass	18	81	40	0	0	0	0	0	143
walleye	0	2	23	78	27	2	1	0	133
white sucker	0	0	3	1	15	2	0	0	21
yellow bullhead	0	0	46	45	0	0	0	0	91
yellow perch	61	67	0	0	0	0	0	0	130

Fish Stocking Activity

Fish Stocked by Species for the Last Ten Years

Year	Species	Size	Number	Pounds
2008	Walleye	fry	2,813,000	24.2
2006	Walleye	fry	2,812,000	22.5
2004	Walleye	fry	2,813,000	22.7
2002	Walleye	fry	2,813,000	23.1
2000	Walleye	fry	2,813,000	28.1

Privately Stocked Fish

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

Stocking Fish Sizes

Fry - Newly hatched fish that are ready to be stocked usually called "swim-ups". Walleye fry are 1/3 of an inch or around 8 mm.

Fingerling - Fingerlings are one to six months old and can range from a size of one to twelve inches depending on the species. Walleye fingerlings range from three to eight inches each fall.

Yearling - Yearling fish are at least one year old. A one-year-old fish can range from three to twenty inches depending on the species. Walleye yearlings average from six to twelve inches.

Adult - Adult fish are fish that have reached maturity. Depending on the species, maturity can be reached at two years of age. Walleye reach maturity between the ages of four and six years.

Fish Consumption Guidelines

These fish consumption guidelines help people make choices about which fish to eat and how often. Following the guidelines enables people to reduce their exposure to contaminants while still enjoying the many benefits from fish.

Pregnant Women, Women who may become pregnant and Children under age 15

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
STAR Otter Tail Co., 56038500	Bluegill Sunfish		All sizes			Mercury
	Carp	All sizes				
	Crappie		All sizes			Mercury
	Largemouth Bass		All sizes			Mercury
	Northern Pike		All sizes			Mercury
	Rock Bass		All sizes			Mercury
	Walleye		All sizes			Mercury
	White Sucker	All sizes				
	Yellow Perch		All sizes			Mercury

General Population

LAKE NAME County, DOWID	Species	Meal Advice				Contaminants
		Unrestricted	1 meal/week	1 meal/month	Do not eat	
STAR Otter Tail Co., 56038500	Bluegill Sunfish	All sizes				
	Carp	All sizes				

	Crappie	All sizes				
	Largemouth Bass		All sizes			Mercury
	Northern Pike		All sizes			Mercury

4.

Status of the Fishery (as of 07/13/2009)

Star Lake is a 4,721-acre mesotropic (moderately fertile) lake located in north-central Otter Tail County approximately four miles west of Dent, MN. Star Lake is connected to Dead and Round Lakes via non-navigable streams. The immediate watershed is composed primarily of agricultural land interspersed with hardwood woodlots. Extensive marsh areas are located in the south bay and the west arm of the lake. The maximum depth is 94 feet; however, 59% of the lake is 15 feet or less in depth. The secchi disk reading during the 2009 lake survey was 9.1 feet. Previous secchi disk readings have ranged from 5.8 to 14.0 feet. Development is scattered around the entire shoreline of Star Lake. A total of 317 homes/cabins and seven resorts were counted during the 2000 lake survey. DNR owned public water accesses are located along the north and east shorelines. Stands of hardstem bulrush, wild rice, and common cattail are scattered along the shoreline of the entire lake; however, the largest stands are located in the south bay and the west arm. Emergent aquatic plants provide valuable fish and wildlife habitat, and are critical for maintaining good water quality. They protect shorelines and lake bottoms, and can actually absorb and break down polluting chemicals. Emergent plants provide spawning areas for fish such as northern pike, largemouth bass, and panfish. They also serve as important nursery areas for all species of fish. Because of their ecological value, emergent plants may not be removed without a DNR permit. To maintain the excellent water quality and angling that this lake has to offer, it is imperative to preserve the quality of the aquatic habitat. Star Lake is a popular angling lake during both the open water and ice fishing seasons. The lake has a reputation as one of the best all-around fishing lakes in Otter Tail County. Northern pike, largemouth bass, walleye, and bluegill are the dominant game fish species. The prolificacy of these species can be attributed to the abundance of suitable spawning habitat that is available. The northern pike test-net catch rate was equivalent to the upper limit of the expected range for similar lakes. Age and length data from recent surveys indicate that pike reproduction is consistently good. Northern pike ranged in length from 11.9 to 30.6 inches with a mean length and weight of 19.1 inches and 1.4 pounds. Pike reach an average length of 20.1 inches at four years of age. The bluegill test-net catch rate was within the expected range for similar lakes. Bluegill catch rates have remained stable over the recent series of surveys. Bluegill size structure is excellent with 83% of the sample 7.0 inches or greater in length. Bluegill reach an average length of 7.8 inches at six years of age. A special regulation (sunfish daily bag limit of 10) was implemented in 2005 in an attempt to preserve the quality bluegill population. The walleye test-net catch rate was within the expected range for similar lakes. The long-term trend has been an increase in walleye catch rates. Walleye ranged in length from 7.5 to 26.8 inches with an average length and weight of 13.7 inches and 1.0 pound. The 2006 year class is very strong and should provide good walleye angling for several years. Walleye reach an average length of 15.5 inches at four years of age. Anglers can maintain the quality of angling by practicing selective harvest. Selective harvest encourages the release of medium to large size fish while allowing the harvest of more abundant smaller fish for table fare.

Releasing the medium to large fish will ensure that the lake has enough spawning age fish on an annual basis and will provide anglers with more opportunities to catch large fish in the future. ?

For more information on this lake, contact:

Area Fisheries Supervisor
1509 1st Ave N
Fergus Falls, MN 56537
Phone: (218) 739-7576
E-Mail: FergusFalls.Fisheries@state.mn.us

Lake maps can be obtained from:

Minnesota Bookstore
660 Olive Street
St. Paul, MN 55155
(651) 297-3000 or (800) 657-3757
To order; use B0231 for the map-id.

For general DNR Information, contact:

DNR Information Center
500 Lafayette Road
St. Paul, MN 55155-4040
TDD: (651) 296-6157 or (888) MINNDNR
Internet: www.dnr.state.mn.us
E-Mail: info.dnr@state.mn.us

Turn in Poachers (TIP):

Toll-free: (800) 652-9093

IV. Lake Management Focus Areas

A. Water Quality

B. Fisheries – Star Lake is on a Three (3) year survey rotation. The 2006, 2007 and 2008 complete survey was presented to the SLPOA at the Annual Meeting on June 13, 2009. This standard Lake Survey Report Listed:

1.) Northern Pike exceeding the range for similar lakes.
2) Blue Gill rate was within the expected range for similar lakes.
3) Walleye abundance is at or above DNR management goals.

* Local fishery staff has not seen any invasive plant species in Star Lake in the

areas tested for Fish populations.

* 2.8 million Walleye Frye is stocked in Star Lake Bi-annually.
* The next Three (3) year survey begins in July 2009.

At the SLPOA Annual meeting on June 12, 2010, Arlen Schalekamp, local DNR Fishery Supervisor, evaluated the Star Lake fishery survey completed in July, 2009.

1.) Northern Pike numbers are down slightly – to be monitored.
2.) Blue Gill numbers are strong and the mean size is increasing; approaching 8 inches.
3.) Walleye numbers are strong.

A Draft Version of the 2009 standard lake survey was presented to the membership. A completed report will be available to our membership in 2011.

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C. Aquatic Vegetation – As noted earlier in 2005 the SLPOA a watershed map showing Emergent, Aquatic and Vegetation types around the lake shore. In the future we can likely have the GIS department resurvey our vegetation to

look for any changes.

D. Wildlife

Wildlife resources in and around Star Lake are an important component of the ecological system, as well as an important aspect for the enjoyment of the lake environment. The most important wildlife habitat begins at the shoreline. The more natural the shoreline, with trees, shrubs and herbaceous vegetation, the more likely that wildlife will be there. Just as important is the shallow water zone close to shore. Cattail, bulrush and wild rice along the shoreline provide both feeding and nesting areas for wildlife. Loons, black terns and red-necked grebes are important Minnesota birds that are particularly affected by destruction of this vegetation. Underwater vegetation is also important to wildlife for many portions of their life cycle, including breeding and rearing of their young. The primary agency charged with the management of Minnesota's wildlife is the Department of Natural Resources, Division of Fish and Wildlife, Wildlife Section.

Actions to consider:

1. Establishing no wake zones or seasonal sanctuaries will help to control disturbances to nesting wildlife in critical areas.
2. Adding artificial nesting structures for loons and houses for other species will help to preserve the lake's wildlife resource.
3. Work to preserve areas by entering into landowner agreements or conservation easements with landowners in the watershed.
4. Explore the possibility of helping the state acquire land for Aquatic Management Areas or Wildlife Management Areas.

Obviously, there are way too many species to begin to list all the wildlife inhabitants around Star Lake, but below is a list of those which have been identified as important to monitor and/or control.

1. Loons: The MN Loon Monitoring Program has been surveying the loon population since 1994. The group of volunteers has completed annual surveys in 6 counties in MN, including Otter Tail with the purpose of detecting changes in the health of the lake habitats and changes in the loon population. The most recent reported survey from 2008 showed the loon population in the 6 counties surveyed as stable over the past 15y.
2. Bald Eagles: In 2005, two statewide bald eagle surveys were conducted in cooperation with the US Fish and Wildlife Service to determine whether to remove the bald eagle from the endangered species list. As a result of surveys in MN and other states, the bald eagle was moved from endangered to threatened.
3. Woodchucks: Woodchucks can become a nuisance when their feeding and burrowing habits conflict with human interests. They feed on a variety of vegetables, grasses and legumes. Are an unprotected species.
4. Beavers: Beavers provide many positive environmental values but can also cause property damage. They are abundant in MN. MN DNR provides information on damage prevention and removal methods on their website www.dnr.state.mn.us.

5. Bears: Black bears have been sighted in the Star Lake area. Otter Tail County is on the very edge of what is considered their primary habitat. Prior to 1984, black bears were viewed as varmints and were shot on sight. Since 1984, however, the MN DNR has placed restrictions on hunting and so the population in the state for black bears has steadily increased to 20,000 today. MN DNR has the responsibility to reduce conflicts between bears and people. The best way to avoid bears is to not attract them in the first place. Most bears are wary of people and will usually leave when encountered. See MN DNR website for further information: http://www.dnr.state.mn.us/livingwith_wildlife/bears; http://www.dnr.state.mn.us/snapshots/mammals/blackbear.html; http://www.associatedcontent.com/article/206531/black_bears_in_minnesota_what_you_should.html?cat=14

6. Coyotes: The coyote is MN most prevalent large predator. According to MN DNR, "densities vary from one coyote every 3 miles during high population years to one every 5-6 miles in low population years". Coyotes can be harvested by hunting or trapping (4000 are harvested every year). http://www.dnr.state.mn.us/snapshots/mammals/coyote.html

MN DNR's list of nuisance animals includes: bats, bears, beavers, coyotes, crows, deer, geese rabbits, raccoons, sandhill cranes, snakes, turkeys, woodchucks, and woodpeckers. To take a nuisance animal, consult the DNR website for regulations and reporting requirements: http://www.dnr.state.mn.us/livingwith_wildlife/taking.html

E. Aquatic Invasive Species (AIS)

F. Land Use/Zoning -

In the next 5 years, the SLPOA will:

1) Continue to educate property owners around the lake regarding septic systems, lawn maintenance and shoreline protection. Increase awareness about possible nutrient sources such as wetland removal, agricultural runoff, septic systems, lawn fertilizer, and the effects of ditching and draining of wetlands. Assistance with this will be sought from staff with MPCA, MN Dept of Natural Resources, MN Extension Service, Otter Tail County Soil and Water Conservation District and County Land and Resource Mgt Office.
    a. A septic system survey was conducted in 2000 (see appendix ___). The noncompliant systems were reportedly brought up to code.
    b. Encourage and support the appropriate agencies to monitor the pumping activities of the septic systems to ensure proper maintenance is occurring.
2) Encourage and support the appropriate agencies to monitor new development in the total watershed for impact on drainage patterns (i.e. removal of wetlands, new wetland discharges into the lake, or major alterations in lake

use). Further development in the immediate watershed of the lake should occur in a manner that minimizes water quality impacts on the lake.

3) Monitor state, county and local actions which address land management activities affecting Star Lake property owners. Communicate back as appropriate. Seek representation and actively participate in such processes as determined by the board or membership.
4) Investigate best management practices for land management activities. Seek out technical assistance through local agencies (SWCD).
    a. Continue to work with Otter Tail SWCD to assist individual property owners in addressing shoreline management issues.
5) Inventory landscape features that influence the lake's water quality:
    a. Wetlands (National Wetlands Inventory Map at Natural Resources Conservation Service Office)
    b. Bluffs and steep slopes (USGS maps County Land & Resource Dept)
    c. Shallow groundwater or bedrock
    d. Soils (County Soil Survey)
    e. Important habitat areas (MN DNR)
    f. Cultural & historic sites (MN Historical Society)
    g. Public accesses, highways adjacent to the lake

7. Managing Surface Water Conflicts - Look up any information on this. Accidents, harassing animals,

8. Water Accesses – Add in 108 Access information and maps

V. References/Resources

VI. Conclusions

Appendix Septic System Survey Summary

TO: Directors
FROM: Sam Jones
DATE: August 10, 2000
RE: Summary of Discussion with George }Iausske, Inspector, Land and Resource Management

In a telephone conversation with George Hausske, Inspector for Land and Resource Management, he made the following comments regarding the septic systems on Star Lake:

- The inspection of septic systems is now completed;
- 429 parcels of land were visited;
- 74 of the parcels were vacant land;
- 355 septic systems were inspected;
- 69 septic systems were not in compliance .a 19.4% failure rate .somewhat lower than the average of 25% ;
- The lower rate for Star Lake was attributed to the fact that the systems along Camp Joy road were inspected and brought up to compliance in the 1980's;
- The Camp Joy road systems were also inspected with this go around;
- Two straight pipe systems (sewage being discharged directly on the ground) were discovered in the course of the inspections.

Septic System Survey Results

A septic system survey has been completed by the Otter Tail County Land and Resource Management Office. The purpose of this survey was to identify those systems that were in non-conformance with Minnesota Rule Chapter 7080 (Onsite Wastewater System Code) so that all systems could be brought into compliance. Of the 355 septic systems that were inspected, there was a 19.4% failure rate. This was reported as being lower than the average failure rate of 25% for this type of a survey. A summary of the septic system survey can be found in the appendix.

Minnesota Extension Service recommends pumping every one to three years for a 1,000 gallon tank serving a thee bedroom house and four occupants (assumes year-round use). The importance of septic system maintenance to Star Lake should be emphasized to all lake residents. The Association is encouraged to look into developing a program which encourages or arranges for the periodic pumping of septic tanks. The Association should inform its membership that poor septic system maintenance can lead to the contamination of shallow wells.

Lakeshore residents are encouraged to locate on their property an alternative-drain field site. This site should be picked with the necessary setbacks in mind and should be protected for the time when it will be needed in the future when the existing drain field begins to fail. This is especially crucial for small lots where there may only be one good alternative drain field site available. Drain fields typically have a design lifetime of 20 to 30 years. Keep in mind that proper maintenance of the septic tank (regular pumping), protecting the drain field from

compaction (keep vehicles and other heavy objects off), and water conservation in the home will all help to extend the useful lifetime of the drain field.