

Minnesota Lake Superior Beach Monitoring and Notification Program Annual Report

Prepared for the Minnesota Pollution Control Agency and the United
States Environmental Protection Agency

Beach Season 2011

Federal Fiscal Year 2010

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Introduction

Both tourists and locals see Minnesota's Lake Superior shore as one of the region's main attractions. Kayaking, swimming, surfing or hunting for agates are all popular activities on these beaches. Not surprisingly, water quality plays a large part in visitor satisfaction. The Minnesota Lake Superior Beach Program monitors beaches for high levels of *E. coli* and notifies users of water conditions as often as twice a week. When beaches are found to have high bacteria levels, they are posted with "Health Advisory: Water Contact Not Recommended" signs. High levels of bacteria occur because of waterfowl, sewage overflows, pet waste, storm water run-off and other kinds of pollution.

The Beaches Environmental Assessment and Coastal Health (BEACH) Act, passed in October of 2000, required states that border coastal recreation waters to adopt new or revised water quality standards by April 10, 2004, for pathogens and pathogen indicators for which EPA has published criteria. The BEACH Act amended the Clean Water Act to add section 406. This section authorizes EPA to award grants to states and tribes to implement a program to monitor public coastal recreation waters for pathogen indicators. States and tribes are also authorized to notify the public if applicable water quality standards for pathogens and pathogen indicators are exceeded.

In 2010 Minnesota was awarded \$206,000 for continued implementation of the beach monitoring and notification program. The purpose of this project is the monitoring of selected beaches along the Great Lakes, prompt notification to the public whenever bacteria levels exceeds EPA's established standards, and investigate alternative methods for public notification. This information is used to investigate long-term trends in water quality and to establish a beach monitoring and public notification plan that will assist communities along the lake shore to improve their ability to monitor and notify beach users of risks associated with high bacteria levels.

Program Overview

From May through September, the Minnesota Department of Health monitors 39 public beaches for the presence of *E. coli* bacteria. An advisory is triggered when samples exceed 235 *E. coli* colonies per 100 milliliters of water in a single sample or 126 *E. coli* colonies in a five-sample geometric mean within a 30-day period. Public notification of an advisory event includes posting of signs at the affected beaches, emailing the beach list-serv, and an update of the program hotline and website. This section details how Minnesota's Beach program was set up and continues to be implemented.

In 2001, this project brought together a Beach Team of state and local-level environmental and public health officials, local health officials, and other interested parties to design a beach monitoring and notification program. Approximately 58 miles

of public beach miles and a total of 79 coastal beaches were identified along the Lake Superior Shore (Appendices A & B). The definition of “beach” for the purpose of Minnesota BEACH Act implementation is:

“A publicly owned shoreline or land area, located on the shore of Lake Superior, that is used for swimming or other water contact recreational activity.”

The coastal beaches were geo-located using GPS technologies and maps were created for all beaches. Additional GIS data layers were added to include the location of all wastewater treatment outfalls along with their proximity to the beaches. Supplementary information was collected for each beach for evaluation: the potential for impacts from storm water runoff, bather and waterfowl loads, and the location of outfalls and farms. This information was used to classify beaches as “high,” “medium,” or “low” priority. Beaches classified as “high” priority were monitored twice a week, beaches classified as “medium” priority were monitored once a week and “low” priority beaches were not monitored.

A standard sampling protocol was developed and standard advisory signs were designed based on feedback from Beach Team members and public meetings held in coastal communities (Appendices C). In 2011, the beach advisory sign was slightly modified to reflect the program’s new home at MDH. Changes included a replacement of the MPCA logo with the MDH logo, a removal of the names of county health departments, and a change from saying “Water Contact Not Recommended At This Time” to saying “Health Advisory: Water Contact Not Recommended At This Time.”

The Beach Program website was designed to include information on all public beaches monitored under the BEACH Act program. This site also provides information on beach health advisories, logistics, amenities, monitoring data, a data visualization tool, and local weather. The website management is contracted through the Natural Resources Research Institute, a research facility of the University of Minnesota Duluth (UMD).

Goals and Objectives

The purpose of this project in 2011 was to reduce beach user’s risk of exposure to disease-causing microorganisms in water. Select beaches along Lake Superior were monitored in accordance with BEACH Act requirements with prompt notification to the public whenever bacterial levels exceeded EPA’s established standards.

Program staff continued to provide opportunity for public comment and evaluation of beach monitoring program via emails, phone calls, public meetings, festivals and other events. Signs, the beach program’s webpage (www.MNBeaches.org), beach program’s hot line (218-725-7724), e-mail alerts, and news releases to the media were utilized to alert the public to the health advisories. Interested parties and managers of beach sites

are also called when a health advisory is posted and again when the advisory is removed.

Time Schedule

The activities described in this report took place during Federal Fiscal Year 2010 (October 1, 2010 – September 30, 2011). This period encompasses the 2011 beach season, which is defined for Minnesota coastal beaches as a week before Memorial Day Weekend through a week after Labor Day Weekend. At some coastal beaches in Minnesota, swimming may not begin until mid-June due to colder water temperatures, but water recreationalist such as kayakers, surfers and sail-borders are in the water all year if conditions are suitable. Because of these recreationalists and University of Minnesota Duluth Outdoor Recreation classes held in Lake Superior during the typical swimming season, selected sites are monitored once a week starting in May until the end of September. This report describes activities before, during and after the monitoring season, i.e. preparation, implementation and evaluation of the beach season. In 2011, monitoring began May 24th, and ended September 28th.

The Key Partners, Cooperators and Staff

The Minnesota Lake Superior Beach Monitoring Project is staffed by the MDH with the following positions:

Infectious Disease Epidemiology, Prevention and Control Division

DirectorKristen Ehresmann
Environmental Health Division DirectorLinda Bruemmer
Epidemiologist, SeniorAmy Westbrook
Planner Principle State.....Lynne Markus
Quality Assurance Coordinator.....Lonna Wolfsteller
Public Health Sanitarian.....Cindy Hakala
Program Assistant.....Austin Lesmeister

The Beach Monitoring Project receives technical advice and review via a technical committee with the following membership:

Beach Team:

Cook County Soil and Water Conservation District.....Ilena Berg
Cook County Soil and Water Conservation District.....Kerrie Fabius
Lake County Health Department.....Michelle Backes-Fogelberg
St. Louis County Health Department.....Guy Peterson
MN Department of Natural Resources (DNR),
Lake Superior Coastal Program.....Lisa Angelos
Western Lake Superior Sanitary District (WLSSD),
Manager Environmental ServicesJoe Mayasich
Information OfficerKaren Anderson
City of Duluth
Stormwater UtilityChris Kleist
Parks and RecreationCarl Seehus
University of Minnesota Duluth (UMD),
Department of Biology.....Randall Hicks
Natural Resources Research Institute (NRRI)Rich Axler
Natural Resources Research Institute (NRRI).....Norman Will
Natural Resources Research Institute (NRRI).....George Host
Minnesota Sea Grant College Program.....Jesse Schomberg
Park Point Community ClubKinnan Stauber
Duluth Boat ClubKeith Stauber
Clean Water ActionRosie Loeffler-Kemp
U.S. Forest Service.....Marty Rye
Minnesota Pollution Control Agency (MPCA),
Lake Superior Basin ProgramBrian Fredrickson
Water Quality Monitoring.....Jesse Anderson
Lake Superior Basin Initiative CoordinatorMarc Hershfield
Information OfficerAnne Moore

Budget Summary – Expenditures

2010-2011 Grant

A total of \$193,111.00 was transferred from the MPCA to the MDH in March of 2011. Including contracts and staff time, a total of \$87,397.09 was spent on the program. In the process of switching agencies, the program timeframe was compressed and this resulted in less funds being used than were available. The remaining funds were returned to the MPCA in the fall of 2011.

Contracts:

Cook County, 11 beaches	\$5,000
NRRI (U of MN)	\$5,000
Era Laboratories	\$20,000

2011-2012 Grant

The budget for the next beach grant cycle is projected to be \$208,000.00.

Work Completed in 2011

In 2011, the beach program was transferred from the Minnesota Pollution Control Agency to the Minnesota Department of Health. In February of 2011, the Beach Program Coordinator, Amy Westbrook, set up the program within MDH with help from the MPCA former Beach Program staff, MDH staff and Beach Team members. Major tasks completed during this time included writing a Quality Assurance Project Plan (QAPP), a Work Plan specific to MDH for the 2011 beach season, and writing a Beach Program grant proposal for the next grant cycle (2011-2012). Other work done in the first part of 2011 included completing contracts with the Cook County Soil and Water Conservation District for sample collection, Era Laboratory for sample analysis, and the University of Minnesota for website management and data processing.

In May, MDH hired a Public Health Sanitarian and a Program Assistant to help with field work, data collection and day-to-day operation of the program. These staff members maintained the database in compliance with EPA BEACH Act Data Element requirements. On May 24th the first samples were taken at Tier 1 beaches, and by June 8th, monitoring was in progress at all 37 beaches. On July 1st, the state government shutdown and did not resume normal operations until July 21th. Due to the timing of the shutdown within the normal sampling schedule, sampling was suspended from June 29th to July 25th. The last sampling date of the season was September 29th.

Program Results:

- 37 sites monitored once a week, May – September, for *E. coli*
- 9 of the sites were monitored twice a week
- 22 beaches had no health advisories
- 10 beaches had one health advisory
- 5 beaches had 2 or more health advisories
- One of the beaches (Hearding Island Canal Beach) was under advisory from July 29th – until September 29th when monitoring ceased.

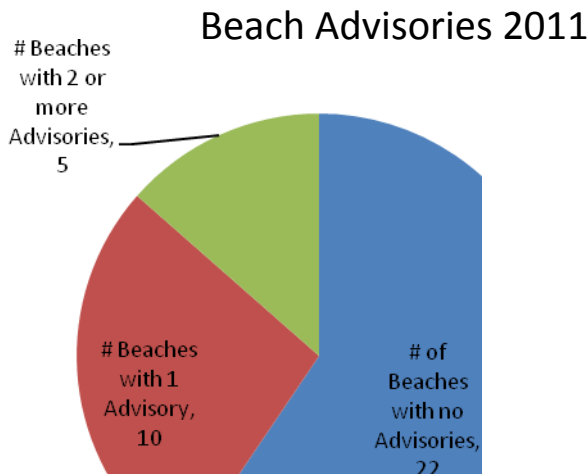


Figure 1) Of the 37 beaches monitored, 59% had no advisories posted, 27% had one posted, and 14% had 2 or more advisories posted (some had as many as 5 advisories during the 2011 beach season).

Superior beaches were free of elevated bacteria advisories in 2011. Ten beaches had one advisory and only contributed to a total of 39 beach advisory days, meaning that 133 advisory days occurred at only 5 Lake Superior beaches (all of which had multiple advisories). The greatest number of advisory days occurred at Park Point Hearing Island Canal Beach.

Shown in **Figure 2**, the greatest area of concern for Lake Superior beaches is near Duluth, where runoff and sources of *E. coli* are greatest. The second column in each subset of the chart represents the number of samples that exceeded state standards for water quality. When divided by the first column in each subset, this represents the percentage of samples that exceeded state standards. Again, this percentage is considerably higher for the urban area located in the city of Duluth than anywhere else

E. coli monitoring at Minnesota’s Lake Superior Beaches in 2011 revealed a change in advisories issued both by beach and duration from years prior. Some beaches that had no advisories posted in 2009, had advisories in 2011 while some that had advisories in 2009, were not posted at all in 2011. These changes are likely due to changing environmental factors including currents, sediment deposition, precipitation and wildlife populations, as well as human factors such as new sewer outfalls, changes in sewer flow, and resolution of past problems.

While the location and duration of advisories has changed, only 5 of the 37 monitored beaches were posted twice or more during the summer. Shown in **Figure 1**, 59% (22) of Minnesota’s Lake

on Lake Superior. Surprisingly, more advisories and more advisory days were noted for rural areas than urban areas on the North Shore, outside of Duluth. It is likely that these few advisory issuances were due to independent causes and their distribution between rural and urban environments is not significant simply because of the greater number of rural sites.

Regional Breakdown of Monitoring

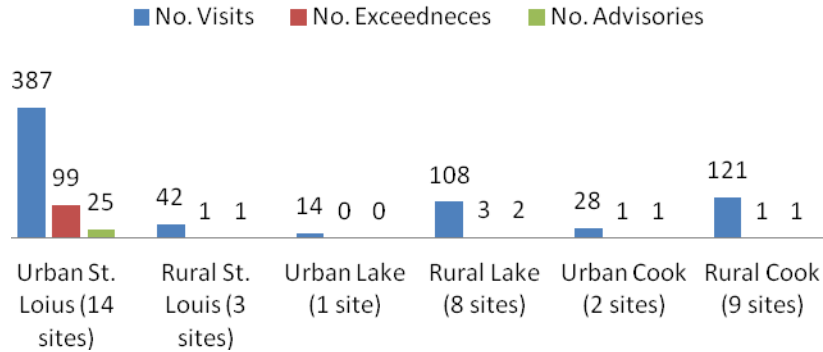


Figure 2

St. Louis County Beaches

A 68 day long advisory posting starting July 25th, ended the season at Hearing Island. This long lasting advisory raised a flag at MDH, and hopefully will be the subject of further investigation. **Figure 3** (next page) shows the number of postings as well as total number of advisory days in 2011 for St. Louis County beaches. Listed from south to north (left to right), the data are skewed towards the southernmost beaches, most of which are located in the Duluth-Superior harbor. Of the 26 advisories posted in St. Louis County, 14 of these were located at harbor beaches and represent 141 of the 172 total advisory days. The water in the harbor has many sources of contamination because of the urban location and a relatively small volume of water (when compared to Lake Superior) with which pollutants can be diluted. This is a primary area of concern for the MN Beaches Program staff. Some of these beaches are being targeted for modeling which may help identify sources of contamination. Although this data is quite different from those in 2009, annual variation in E. coli populations and thus beach advisories is not uncommon due to changing human and environmental factors, which should be tracked closely by the MN Beaches Program.

St. Louis County Beach Advisories

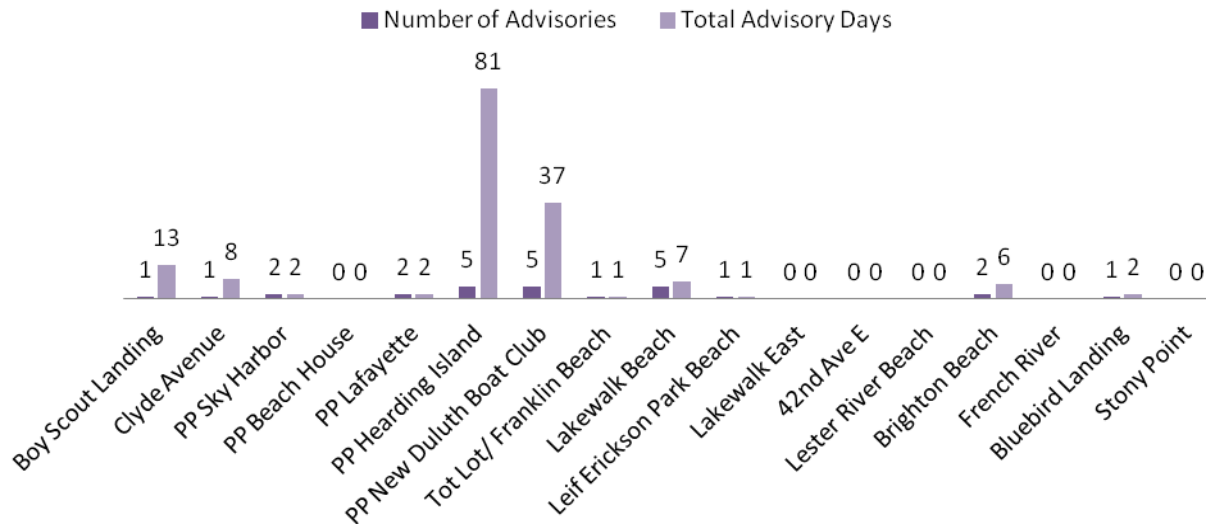


Figure 3) An unusually high number of advisory days are shown above at two adjacent, harbor-side beaches. Hearinging Island and New Duluth Boat Club will be tracked closely with past and future conditions.

Adjacent to Park Point Hearinging Island, New Duluth Boat Club beach saw the second highest number of advisory days at 37 with a total of 5 advisories. (An advisory day is the number of days a beach is posted as “Water Contact Not Recommended”). It is possible that a source population exists at Hearinging Island that drifted downstream only to be deposited at New Duluth Boat Club. If this is true, then both beach problems could be addressed by simply investigating one. A sanitary survey of the area should be planned, preferably before the next beach season.

Lake and Cook County Beaches

Beaches located on the North Shore of Lake Superior had a limited number of health advisories in the 2011 season. Lake and Cook Counties each experienced two independent advisory postings. The Cook County advisories took place at Grand Marais Downtown Beach and Schroeder Town Park Beach from August 8th through 10th. The Lake County advisories took place at Twin Points Landing from June 21st through 27th, and at Tettegouche State Park, at the mouth of the Baptism River, from August 29th through 31st. In the case of Grand Marais Downtown, Schroeder Town Park, and Tettegouche State Park beaches, lab results were not available until late afternoon and there was no re-sampling until following day. It is possible that these events would have only lasted one day, if lab results were available sooner, and re-sampling was done immediately thereafter. These short-duration, sporadic advisories posted along the North Shore each year are not uncommon but will be monitored to see if long-term trends develop. Although no specific cause has been linked to the elevated bacteria levels at Twin Points Landing, meteorological conditions likely played a role in

the 6 day long posting. Approximately 2.25 inches of rain fell two days before sampling with continued precipitation the day of sampling, and during the advisory period. The precipitation was accompanied by high winds and wave action which may also have played a role in elevating bacterial populations.

Notification

- Email alert to media and other interested parties when health advisories posted or removed. There are 166 participants in these alerts as of September 29th, 2011.
- “Water Contact Not Recommended” advisory signs placed on beach
- “Water Contact Not Recommended” advisory posted on Beach Program website (www.MNBeaches.org)
- Update local beach hotline with recorded message (218-725-7724)

Education and Outreach Activities

- One presentation/Q&A at Park Point Community Club meeting
- Two television interviews with Fox Channel 21 News at Harding Island Beach
- Two newspaper articles in the Duluth News Tribune
- Three radio pieces on Minnesota Public Radio
- Seven internet articles including the Northland News Center, MPR, CNN and MSNBC
- Planned one outreach table at an event that took place during the state government shutdown.
- Corresponded with Jesse Schomberg and Minnesota Sea Grant to participate in a survey they are developing for water recreationalists in the Duluth area.

Staff Continuing Education

As newcomers to the beach program, MDH District staff (Beach Program Coordinator, Public Health Sanitarian, and Program Assistant) took advantage of learning opportunities and attended several conferences and workshops in 2011. These included the “EPA Stakeholder Meeting on New or Revised recreational Water Quality Criteria” in New Orleans in June, the “Planning for Climate Impacts in the Western Lake Superior Region” workshop in Duluth in September, and the “State of Lake Michigan – Great Lakes Basin Association (SOLM – GLBA) Conference” in Michigan City, Indiana in September.

Challenges

In 2011, several challenges faced the Beach Program. The two biggest were: 1) the transition from its location at the Minnesota Pollution Control Agency (MPCA) to the Minnesota Department of Health (MDH) and 2) a state government shutdown that lasted for almost three weeks in July. Monitoring ceased on June 29th and resumed July 25th, due to the shutdown.

Two beaches were not monitored in 2011: Agate Bay Beach (16-0001-B039) and Knife River Marina Beach (16-0001-B035). Agate Bay was not monitored due to major construction being performed all around the site. Since the area was restricted to all but the construction crew, beach program staff determined it was neither safe nor necessary to monitor this site for 2011. Construction will likely be completed by 2012 and monitoring will resume next summer.

Knife River Marina Beach was not monitored because it is owned by the County of Lake. The Lake County Board of Commissioners chose not to partner with the beach program for the 2011 monitoring season.

Success Stories and Concurrent Research Projects

University of Minnesota researchers Mike Sadowsky and Randall Hicks have graduate students researching near shore bacteria communities in the Duluth area and St. Louis River estuary. One of these projects is titled:

- Winfried Ksoll. In progress. Naturalization of *Escherichia coli* in the Sediments of Lake Superior and Factors Affecting their Survival Therein.

MDH beach staff will use this research to help them explain recurring beach advisories.

Minnesota Sea Grant is developing a beach-goer survey that will give the Beach Program more information about beach user needs once the results are back.

Program Deficiencies

It is a challenge to continue monitoring *E. coli* levels without being able to track the sources of the bacteria or implement best management practices once the sources of bacteria are known.

Now that MDH has assumed leadership of the program, staff need to establish effective and dynamic partnerships with other agency and community stakeholders.

2012 Beach Season (FFY 2011) Scope of Work

The overall objective of this Program is to continue to implement a comprehensive beach monitoring and public notification plan for Lake Superior beaches. The 154 miles of Lake Superior's Minnesota shoreline include 79 coastal recreational water access points, 39 of which will be monitored one or more times a week. More sites are being investigated to add to the monitoring and notification plan.

The MPCA developed and MDH continues to use a Microsoft Access database to store field, notification, and lab data. Notification data are manually entered by MDH staff. Lab data are submitted by Era Labs via e-mail in an Excel spreadsheet and transferred into the Beaches database. Current beach status information is available via www.MNBeaches.org. All beach data are available by request.

Monitoring data will be submitted annually to MPCA's ambient water quality application (EQuIS) which will interface to EPA via an XML Node. Notification data will be submitted annually to EPA via CDX.

Signs, the MDH Beach webpage (www.MNBeaches.org), beach hot line (218-725-7724), e-mail alerts, and direct e-mails to the media and other stakeholders will be utilized to alert the public to the hazards. Interested parties and managers of sites are also called when an advisory is posted and again when an advisory is removed.

Beach program staff will continue to take comments at public meetings and through other media such as phone and email.

Beach staff will help organize and participate in 2012 Beach Sweep trash pick-up in the Duluth area with the Beach Team members. Beach staff will also work with partners up the shore to recruit new Beach Sweep participants and new locations.

Beach staff will continue to work with Minnesota Sea Grant to develop and implement a beach-goer survey that will follow up on surveys started in 2006. Results from this survey will be used to improve beach program communication efforts.

If additional funds are available:

Beach staff will implement sanitary surveys on some of the more problematic Tier 1 beaches. The Lakewalk Beach and New Duluth Boat Club Beach had sanitary surveys done on them in 2007, these sanitary surveys, if funded, will follow-up on those results as well as provide information on additional beaches.

Beach staff have attended *Virtual Beach* trainings and will begin to build models during the winter of 2012. If models are sufficiently robust, we will begin using *Virtual Beach* as an exceedence predictor tool in the 2012 monitoring season. With additional funding, beach staff will purchase monitoring tools to add to the accuracy of these models.

Citizens will be encouraged to participate in the 2012 Beach Sweep with small thank you gifts - Beach Sweep bags, beach balls, sand pails and shovels, etc.

Source tracking of *E. coli* will be a priority at the most problematic beaches if funding is available for it in 2012. Based on the results of this analysis, staff will write up recommendations for implementation of best practices to improve beach health. These recommendations would be shared with the Beach Team and local resource managers.

Permanent beach signs are a goal of beach program staff. Such signs are necessary to alert beachgoers that beaches are monitored. Staff will work with the city of Duluth to pilot such a project in the most populated area first, if funding is available.

Beach staff would like to purchase a SMART Board for increased interaction during staff and Beach Team meetings, as well as public forums. With a SMART Board, staff could integrate multiple types of data, including GIS and biological, in presentations and meetings.

Appendix A – Beach List and Priority

Tier 1

Beach	STORET	Location
Park Point Beach House	16-0001-B003	St. Louis County
Park Point Harbor Parking Lot/ Sky Harbor Airport Area	16-0001-B004	St. Louis County
Park Pt Lafayette Community Center	16-0001-B005	St. Louis County
Park Point 20 th Street/Hearling Island Canal Beach	16-0001-B037	St. Louis County
New Duluth Boat Club Boat Landing	16-0001-B007	St. Louis County
Tot Lot/13 th Street South	16-0001-B006	St. Louis County
Lakewalk Beach	16-0001-B008	St. Louis County
Brighton Beach	16-0001-B012	St. Louis County

Tier 2

Beach	STORET	Location
Boy Scout Landing	16-0001-B001	St. Louis County
Clyde Ave – West Duluth	16-0001-B002	St. Louis County
Leif Erickson Park	16-0001-B009	St. Louis County
Lakewalk East/16 th Avenue East	16-0001-B038	St. Louis County
42 nd Avenue East	16-0001-B010	St. Louis County
Lester River	16-0001-B011	St. Louis County
French River	16-0001-B013	St. Louis County
Bluebird Landing	16-0001-B014	St. Louis County
Stony Point	16-0001-B015	St. Louis County
Knife River Marina Beach	16-0001-B035	Lake County
Agate Bay	16-0001-B039	Lake County
Burlington Bay	16-0001-B016	Lake County
Flood Bay	16-0001-B017	Lake County
Stewart River Beach	16-0001-B018	Lake County
Gooseberry Falls State Park	16-0001-B019	Lake County
Twin Points Public Access	16-0001-B020	Lake County
Split Rock River	16-0001-B021	Lake County
Split Rock Lighthouse State Park	16-0001-B022	Lake County
Silver Bay Marina	16-0001-B023	Lake County
Tettegouche State Park	16-0001-B024	Lake County
Sugar Loaf Cove	16-0001-B025	Cook County

Schroeder Town Park	16-0001-B026	Cook County
Temperance River State Park	16-0001-B027	Cook County
Cutface Creek Wayside Rest	16-0001-B028	Cook County
Grand Marais Campground	16-0001-B029	Cook County
Grand Marais Downtown	16-0001-B030	Cook County
Old Shore Road Beach Area	16-0001-B031	Cook County
Durfee Creek Area	16-0001-B032	Cook County
Kadunce Creek Outpost Motel Area	16-0001-B033	Cook County
Paradise Beach	16-0001-B034	Cook County
Chicago Bay Beach	16-0001-B078	Cook County

Tier 3

Beach	STORET	Location
Morgan Park Beach	16-0001-B040	St. Louis County
Smithville Park Beach	16-0001-B041	St. Louis County
Indian Point Campground Beach	16-0001-B042	St. Louis County
Waterfront Trail/Riverside Beach	16-0001-B043	St. Louis County
Waterfront Trail/Radio Towers Beach	16-0001-B044	St. Louis County
Waterfront Trail/Interlake Beach	16-0001-B045	St. Louis County
Blatnik Fishing Pier Beach	16-0001-B046	St. Louis County
Bayfront Park Beach	16-0001-B047	St. Louis County
Park Point Southworth Marsh	16-0001-B036	St. Louis County
Minnesota Point Harbor Beach	16-0001-B048	St. Louis County
Lakewalk East/26th Avenue East Beach	16-0001-B049	St. Louis County
Glensheen Cemetary Beach	16-0001-B050	St. Louis County
North Shore Drive Wayside Rest/72nd Avenue East Beach	16-0001-B051	St. Louis County
Lakewood Pump Station Beach	16-0001-B052	St. Louis County
North Shore Drive Wayside Rest/Cant Road Beach	16-0001-B053	St. Louis County
McQuade Road Safe Harbor Beach	16-0001-B054	St. Louis County
Stony Point Wayside Rest Beach	16-0001-B055	St. Louis County
Two Harbors City Park Beach	16-0001-B056	Lake
Silver Creek Beach	16-0001-B057	Lake
Silver Cliff Beach	16-0001-B058	Lake
Split Rock Lighthouse State Park/Split Rock	16-0001-B059	Lake

Point Beach		
Split Rock Lighthouse State Park/Crazy Bay Beach	16-0001-B060	Lake
Split Rock Lighthouse State Park/Corundum Point Beach	16-0001-B061	Lake
Split Rock Lighthouse State Park/Gold Rock Point Beach	16-0001-B062	Lake
Blueberry Hill Beach	16-0001-B063	Lake
Palisade Beach	16-0001-B064	Lake
Tettegouche State Park/Baptism River Beach	16-0001-B065	Lake
Tettegouche State Park/Crystal Bay Beach	16-0001-B066	Lake
Manitou River Beach	16-0001-B067	Lake
Temperance River State Park East Beach	16-0001-B068	Cook
Ray Berglund Wayside Rest Beach	16-0001-B069	Cook
Cascade State Park West Beach	16-0001-B070	Cook
Cascade State Park Campground Beach	16-0001-B071	Cook
Butterwort Cliffs Beach	16-0001-B072	Cook
Croftville Beach	16-0001-B073	Cook
Red Cliff Beach	16-0001-B074	Cook
Coville Creek Beach	16-0001-B075	Cook
Judge C.R. Magney State Park West Beach	16-0001-B076	Cook
Judge C.R. Magney State Park East Beach	16-0001-B077	Cook
Chicago Bay Boat Launch Beach	16-0001-B078	Cook
Horseshoe Bay Boat Launch Beach	16-0001-B079	Cook

Appendix B – Beach Miles

Monitored Minnesota Lake Superior Beaches

County	No. of Beaches	Total Beach Miles	Total Beach Feet	Total Beach Meters
Cook Monitored	11	11.41	60,219	18,355
Lake Monitored	11	6.73	35,509	10,823
St. Louis Monitored	17	12.13	64,040	19,519
Total	39 Beaches	30.27 miles	159,768 feet	48,697 meters

All Minnesota Lake Superior Beaches

County	No. of Beaches	Total Beach Miles	Total Beach Feet	Total Beach Meters
Cook All	22	21.67	114,429	34,878
Lake All	23	16.05	84,744	25,830
St. Louis All	34	20.02	105,677	32,210
Total	79 Beaches	57.74 miles	304,850 feet	92,918 meters

Appendix C – Tiered Monitoring, Sampling and Analysis Plans

Tiered Monitoring Plan

Tier 1 beaches are those that receive the most use by the public for swimming, bathing, surfing, kayaking, or similar water contact activities and/or have the highest potential risk of pathogen pollution within the immediate area. These beaches are sampled a minimum of twice a week on Mondays and Wednesdays.

Tier 2 coastal recreational water sites usually receive moderate use by the public for water contact recreational purposes and have fewer source of pathogen pollution in the area. These beaches are sampled a minimum of once a week on Mondays.

Tier 3 sites typically receive sporadic use, have limited access, and few if any potential sources of pollution in the area. These sites are not sampled.

Sampling Protocol

To assure consistency in collecting samples for analysis, the following procedures will be used:

1. Specific sites will be designated for collecting samples during the bathing season. Samples will be collected exclusively at these sites for the duration of the sampling period.
2. Sample bottles will be prepared and provided by the laboratory charged with conducting bacteria analyses.

General Rules of Sampling

1. Take extreme care to avoid contamination the sample and sample container.
 - Do not remove bottle covering and closure until just prior to obtaining each sample.
 - Do not touch the inside of the sample container.
 - Do not rinse the sample container.
 - Do not put caps on the ground while sampling.
 - Do not transport the samples with other environmental samples.
2. Adhering to sample preservation and holding time limits is critical to the production of valid data.
 - Samples should be labeled and iced or refrigerated at 1 - 4 degrees C immediately after collection and during transit to the lab.
 - Care should be taken to ensure that sample bottles are not totally immersed in water during transit or storage.
 - Samples should arrive in the lab no later than 6 hours after collection. Whenever possible samples should arrive at the lab on the day of collection; preferably before 3 p.m.
3. The sampler will complete the laboratory data form noting time, date, and location of sample collection, current weather conditions (including wind direction and velocity), water temperature, clarity, wave height and any abnormal water conditions.

Sampling Method

- Label the bottle.

- Carefully move to the first sampling location. Water should be approximately knee deep. While wading slowly in the water, try to avoid kicking up bottom sediment at the sampling site.
- Open a sampling bottle and grasp it at the base with one hand and plunge the bottle mouth downward into the water to avoid introducing surface scum.
- The sampling depth should be approximately 6 to 12 inches below the surface of the water.
- Position the mouth of the bottle into the current away from your hand. If the water body is static, an artificial current can be created by moving the bottle horizontally with the direction of the bottle pointed away from you.
- Tip the bottle slightly upward to allow air to exit and the bottle to fill.
- Make sure the bottle is completely filled before removing it from the water.
- Remove the bottle from the water body and pour out a small portion to allow an air space of 2 cm for proper mixing of the sample before analyses.
- Tightly close the cap.
- Store sample in a cooler immediately.

The laboratory provides a Chain-of-Custody record for each sample collected and analyzed. In keeping with laboratory requirements (Standard Methods), all samples must be sealed, chilled, and transported from the sample point to the laboratory for analysis within six hours after sampling. Sample collectors have exclusive custody of any sample from the time of collection until the sample is deposited with the laboratory. The laboratory assumes custody of each sample it receives and is responsible for forwarding all sample analysis results to the Project Manager within twenty-four hours to forty-eight hours of receiving the sample.

Analytical Methods

All analyses shall be performed in laboratories certified by the Minnesota Department of Health for microbiological analysis of *E. coli* in water.

Appendix D – Public Notification and Risk Communication Plan

The public notification and risk communication plan is to address all health advisories for “water contact not recommended” at Minnesota’s Lake Superior beaches. The plan is to provide the public with accurate and timely information regarding beach water quality, risks associated with water contact, and suggestions on how the public can assist in the protection and improvement of beach water quality.

A. Public notification and risk communication plan

1. Identify measures to notify EPA and local governments when indicator bacteria levels exceed a water quality standard.
 - a) The single sample maximum shall not exceed 235 cfu/100mL for *E. coli*
 - b) The geometric mean of 5 most recent samples collected during a 30 day period shall not exceed 126 cfu/100mL for *E. coli*
 - c) The Minnesota Lake Superior Beach Monitoring and Notification Program issues beach advisories when indicator bacteria levels exceed the above standards.
2. Identify measures to notify the public when indicator bacteria levels exceed a water quality standard.

Signs, the MDH Beach webpage (www.MNBeaches.org), email alerts to participants and media, local phone hotline message, and news releases to the media will be utilized to alert the public to the health advisories. Interested parties and managers of sites are also called when an advisory is posted and again when the advisory is removed.

3. Identify notification report submission and delegation process.

Currently, one of the three counties has staff that work directly on the monitoring and notification program. When indicator bacteria levels exceed a water quality standard the county staff are notified, the county staff post the sign, an email alert is generated by beach program staff and sent to interested participants and media, and appropriate parties are notified with a phone call. Because the program is coordinated through the MDH office, including lab facilities and the notification process, there is no need for notification report submission to the MDH from the county health departments.

B. Measures to notify EPA and local governments

1. Identify measures to notify EPA when a state water quality standard is exceeded.

The EPA will be notified in the annual report of exceedances of state water quality standards.

The EPA can be notified on a more timely fashion, if they so choose.

2. For states, identify measures to notify local governments when a water quality standard is exceeded.

Minnesota has a small number of local governments to work with on the North Shore of Lake Superior. There are 3 counties, 7 cities/towns, and 7 state parks. The MDH will send out email notification with a follow-up phone call to make sure the information was received and the proper action taken.

3. States, tribes, and local governments must notify EPA annually of exceedances of water quality standards and actions taken to notify the public.

The EPA will be notified in the annual report of exceedances of state water quality standards in the annual report. The EPA can be notified on a more timely fashion, if they so choose.

4. States only must notify local governments promptly of exceedances of water quality standards and actions taken to notify the public.

When there is an exceedance of the bacteria standard the county is notified with a phone call and asked to post the sign, the public is notified through the media via a news release and posting on the webpage, and interested parties such as state park managers receive a phone call. We are using the same process for removal of an advisory.

C. Measures to notify the public

1. Identify measures to notify the public when a water quality standard has been exceeded.

A central aim of the Beach Team is to produce a comprehensive communication plan to inform the public of beach water health risks and water quality issues in general. Several products were developed for previous beach seasons in Minnesota and will be updated for the 2006 season.

Websites

The Beach Act staff has developed and continues to enhance several Internet outlets to post updated beach water quality information. The MPCA website (www.MNBeaches.org) features a page about beach water quality and public health and the BEACH Act. Other webpages to have links to our webpage include: MN Department of Health, MN Planning, Duluth Streams (www.lakesuperiorstreams.org), MN DNR State Parks, WLSSD, and North Shore Water Trail.

Brochures

The Team has an informational brochure to distribute to the public. "Business" cards with website and program information have been developed and distributed. A series of fact sheets are also being developed with the FAQ already completed.

Signs

The Team has developed standard beach advisory signs. The signs clearly show when risk is present using both words and a "no-swim" icon. The sign presents information about causes of water contamination and shows how to contact authorities for more information.

Media partnering

The Team will continue working to partner with local mass media outlets to communicate beach health risk information to the public. This includes newspapers, radio and television. Program staff have done a number of interviews with local television stations, a number of radio stations, and the local newspaper.

Other Outlets

The staff will be working to make presentations at appropriate public meetings such as the Park Point Community Club, North Shore Water Trail Board, County and Township Boards, and other appropriate groups. Other outlets could include articles in the Minnesota Volunteer, Lake Superior Magazine, a booth at the annual Boat Show, and participation in the RiverQuest.

Hotline

A local hotline (218-725-7724) which has a recorded message with updated beach advisories was started in the late summer of 2004 and will continue into the future.

2. Immediately issue a public notification or resample for bacterial exceedance of a water quality standard.

When bacteria samples are exceeded the public is notified with news releases, webpage updates, emails, and phone calls. The site is resampled, as soon as possible (Monday through Thursday sampling only because of availability of the lab), and daily sampling continues until the site is back below the water quality standards.

3. Promptly notify the public of a water quality standard exceedance when there is no reason to doubt the accuracy of the sample.

The "all clear" is issued through the same steps as the advisory. Signs are removed, a news release goes out, and appropriate phone calls are made.

4. Post a sign or functional equivalent when a water quality standard is exceeded.

Advisory signs are posted on large portable orange and white hazard signs with reflective material. They are placed on the high traffic areas of the beach.

D. Notification report submission and delegation

1. State, tribes, and local governments must notify EPA and in the case of states, local governments must be notified annually of notification plan changes and any delegation of responsibilities.

The Lake Superior Beach Monitoring database is being designed to generate a variety of summary reports from a variety of categories. The following summary reports will be submitted to EPA on an annual basis:

- a. Steps utilized for public notification of advisories
 - b. Beach descriptive data
 - c. Beach programmatic data
 - d. Station and method identification data
 - e. Beach advisory data
2. States, tribes, and local governments, as delegated, must:

There are no delegated local governments at this time. All local governments participate and coordinate through the MDH Duluth office.