



Illinois Department of Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
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Pat Quinn, Governor
Marc Miller, Director

October 29, 2015

Mr. Chris Korleski
Director – Great Lakes National Program Office
U.S. Environmental Protection Agency
77 West Jackson
Chicago, Illinois 60604

Subject: Removal of the Beach Closings BUI in the Waukegan Harbor AOC

Dear Mr. Korleski,

The purpose of this letter is to request that the U.S. Environmental Protection Agency – Great Lakes National Program Office (USEPA-GLNPO) approve the removal of the Restriction on Recreational Contact-Beach Closings Beneficial Use Impairment in the Waukegan Harbor Area of Concern (AOC). The Beach Closings BUI has been addressed in several ways and should no longer be considered a Beneficial Use Impairment in the AOC.

The Illinois Department of Natural Resources has worked closely with Tammy Mitchell of the Illinois Environmental Protection Agency and the Waukegan Harbor Citizens Advisory Group (CAG) to evaluate the restoration targets, which are consistent with the U.S. Policy Committee's *Delisting Principles and Guidelines* document. The IDNR and IEPA have assessed actions taken towards BUI removal and determined that the Waukegan Harbor AOC has met the restoration criteria for the Beach Closings BUI and that the BUI should be removed from the list of impairments in the Waukegan AOC

Please find enclosed the supporting documentation for the removal of the Beach Closings BUI in Waukegan Harbor AOC, including the proposal to delist this BUI, documentation on public outreach, a recommendation from the Waukegan Harbor CAG, and research on E. coli sources.

We look forward to our continuing partnership with the RAP AOC program and working closely with the U.S. EPA-GLNPO to achieve more delisting targets.

Sincerely,

Todd Main
Illinois Department of Natural Resources,
160 N. La Salle Suite S-700, Chicago, IL 60601.
Phone: (312)814-2751

cc: Tammy Mitchell, IEPA
John Perrecone, USEPA
Bill Bolen, USEPA
Judy Beck, USEPA
Marc Miller, IDNR
John Rogner, IDNR

Waukegan Harbor Area of Concern Remedial Action Plan
Proposed Removal Recommendation for the Restrictions on Recreational Contact
Beneficial Use Impairment (Beach Closings)
September 12, 2011

Purpose

The purpose of this document is to delineate restoration activities and support the recommendation to remove the Restrictions on Recreational Contact (Beach Closings) Beneficial Use Impairment (BUI) in the Waukegan Harbor Area of Concern (AOC).

Overview

The Waukegan Harbor AOC is located on the west shore of Lake Michigan in Waukegan, Illinois. In 1975, PCB contamination was discovered in the Waukegan Harbor as a result of manufacturing activities at Outboard Marine Corporation (OMC). The International Joint Commission (IJC) listed Waukegan Harbor as an AOC in 1981 and identified six BUIs. The Beach Closings BUI was listed as a result of high bacteria levels which subsequent source studies have identified as coming from primarily natural sources: Avian 62%, human 20%, unidentified 13%, and dog and rodent 5%, of contamination.

While the majority of the sewer lines are separated in Lake County, cross connections between storm water and sanitary sewer lines were identified as a potential source for human sewage contamination. The City of Waukegan took remedial actions to correct storm water and sanitary sewer cross-connections that were identified and they continue to monitor and address cross connection issues as they are discovered. Despite the remedial actions beach closures still persisted. The Lake County Health Department (LCHD) conducted bacterial source tracking to determine source contamination and found that 55% of the *E. coli* in beach water samples matched avian (gull) *E. coli*. In 2004, improved beach management efforts by the City of Waukegan led to reduced beach closures. While the identified man made sources of contamination have been corrected, ongoing monitoring has continued to identify avian sources as the primary problem. Gull harassment techniques have been successfully implemented in the past, but the need for a comprehensive solution is required.

The comprehensive solution that has been developed with the participation of the CAG, IDNR, and IEPA has four primary components: 1) Reduction of favorable habitat, 2) Public education, 3) Reduction of potential food sources, 4) Enhanced management and beach grooming.

Geographic Description & AOC Boundary

The Waukegan Harbor AOC is located on the west shore of Lake Michigan in Waukegan, Illinois approximately forty miles north of Chicago. A natural inlet and portions of adjacent wetlands were filled to form the present shape of the harbor. The harbor is surrounded by industrial, commercial, municipal, recreational, open and vacant lands.

In 1981, following the adoption of the AOC, the Illinois Environmental Protection Agency (Illinois EPA), the Waukegan Citizens' Advisory Group (CAG) and the public met and developed what is known as the

Waukegan Expanded Study Area (ESA). The Waukegan ESA was developed to address some of the additional known areas of contamination include potential sources of contamination affecting the Waukegan Harbor nearshore waters of Lake Michigan and to address National Priorities List (NPL) sites that could impact the Waukegan AOC. The ESA is bound by the Dead River in Illinois Beach State Park on the north, the bluff line parallel to Sheridan Road on the west, the south boundary of the former U.S. Steel Property at 22nd St. in North Chicago on the south, and the nearshore waters of Lake Michigan on the east. The study area also includes a portion of the Waukegan River which cuts through the ESA and is a tributary to Lake Michigan with an outlet approximately ¼ mile south of the Waukegan Port District boat launching area. The boundaries of the ESA includes but not restricted to; Johns Manville Corporation, Greiss-Pfleger Tannery, Diamond Scrap Yard, U.S. Steel, Waukegan Tar Pits, Waukegan Paint and Lacquer, North Shore Gas Manufactured Gas Plant sites, Duphar Nutrition and Waukegan Paint and Lacquer. Another tributary located within the Waukegan ESA is the North Ditch tributary, located just north of the OMC property, which drains portions of the study area north of Waukegan Harbor (Final Stage III Report Waukegan Harbor Remedial Action Plan, 1999). The harbor itself, however, has no tributary flow.

The Waukegan Harbor AOC is jointly managed by the Illinois EPA, Illinois Department of Natural Resources (IDNR), the Waukegan CAG.

Area of Concern History

1975 – PCB contamination was discovered in the Waukegan Harbor. The source of the pollutant was later linked to manufacturing activities at OMC where hydraulic fluids containing PCBs were discharged into the AOC (Final Stage III Report Waukegan Harbor Remedial Action Plan, 1999).

1977 – U.S. EPA created guidelines for the dredging of Great Lakes sediments that prohibited open-water disposal of dredged sediments with levels of PCBs greater than 10ppm.

Early 1980's – OMC was listed on the NPL and the Superfund program funded an 20-25 million dollar remediation project of harbor sediment in and around the OMC facility.

1981 – The governments of the United States and Canada listed Waukegan Harbor as an AOC. The IJC identified six BUIs.

1. Restriction on dredging activities;
2. Degradation of benthos;
3. Degradation of phytoplankton and zooplankton populations;
4. Restrictions on fish and wildlife consumption;
5. Loss of fish and wildlife habitat; and,
6. Beach closings.

1990 – The Waukegan CAG was organized to act as a local advisory group to the Illinois EPA and to address environmental concerns in the Waukegan AOC.

1992 & 1993 – The Harbor was dredged in order to remove contaminated sediment. As a part of this sediment remediation project 38,000 cubic yards of sediment containing approximately one million pounds of PCB (95% of the PCB estimated to be in the harbor area) were removed, treated, and

disposed of properly (Remedial Investigation Report OMC Waukegan Harbor Site 2008). Following dredging activities, the removed sediment was stored in containment cells with extraction wells to maintain an inward water flow. The water from this process was treated to remove PCBs prior to its release. The containment cells were operated and maintained by OMC. At this time additional dredging was hampered by lack of an appropriate disposal area as well as high costs.

1997 – The Waukegan Harbor public health advisory against human consumption of fish taken from the harbor was removed based on post clean up monitoring.

1999 – Waukegan Harbor State III Remedial Action Plan (RAP) was submitted to the IJC.

2001 – OMC went bankrupt and the containment cells were operated by the City of Waukegan under an agreement with the Illinois EPA.

Three Waukegan Harbor shippers invested in a dredging project in the harbor to improve navigability.

2002 – The U.S. EPA Region 5 Superfund Division conducted a 5-Year Review of the OMC site to determine the extent to which the 1992 efforts were successful in protecting human health and the environment. Illinois EPA determined at this time that the 50 ppm cleanup level for PCBs may not be protective as PCB levels in harbor-caught fish were still above action levels. PCB remediation levels at other sediment sites were set as low as 0.25 to 1.0 ppm (Remedial Investigation Report OMC Waukegan Harbor Site 2008).

The IJC completed its review of the Waukegan Harbor State 2 and 3 RAP reports. The review concluded that, the Waukegan Harbor AOC continues to possess beneficial use impairments and therefore maintains attributes of an AOC. The Stage 3 RAP submitted to the IJC confirms that restoration of the beneficial uses remains yet to be achieved.

2005 – The sport fish consumption advisory was reviewed based on monitoring data that was collected between 2001 and 2004. The advisory was updated to state that "All sizes of white sucker and sunfish from Waukegan North Harbor of Lake Michigan should be limited to one meal per month because of elevated levels of PCBs."

Beneficial Use Impairments History

The 1987 amendments to the Great Lakes Water Quality Agreement (GLWQA) further defined the BUIs (IJC, 1987). Identified BUIs for the Waukegan Harbor AOC are as follows:

1. Restriction on dredging activities;
2. Degradation of benthos;
3. Degradation of phytoplankton and zooplankton populations;
4. Restrictions on fish and wildlife consumption;
5. Loss of fish and wildlife habitat; and,
6. Beach closings.

The first four BUIs are the results of industrial contamination from the manufacturing activities at OMC where hydraulic fluids containing PCBs were discharged through floor drains at the OMC plant and were released to Waukegan Harbor and to a drainage ditch north of the plant.

The fifth BUI is a result of the urbanized and industrialized nature of the Waukegan Harbor lakefront. The Waukegan Harbor AOC has limited wildlife and fish habitat due to the industrial nature of the man-made harbor.

The sixth BUI, beach closings is primarily the results of high bacteria levels from fecal contamination on the two beaches within the confines of the Waukegan Harbor AOC. The Waukegan North and Waukegan South beaches were receiving fecal contamination from numerous cross connections between storm water and sanitary sewer lines. Additional, contamination occurred as a result of a large colony of gulls that resided nearby.

1988-1997 – The standard for a beach closure was if two consecutive samples had fecal coliform counts greater than 500 counts per 100 ml or total coliform counts greater than 5,000 counts per 100 ml. Based on these guidelines the beaches averaged nine closures per year for Waukegan North Beach and 12 closures per year for Waukegan South Beach (data from 1988 to 2007) (Pfister 2008, personal communication).

Gull harassment began on the two Waukegan Beaches.

1990 – The NSSD conducted a study on the source of fecal contamination. According to study results, the Waukegan River was receiving fecal contamination. Follow-up investigations located the source of this problem which consisted of several cross connections between storm water and sanitary sewer lines. The Illinois EPA requested that the City of Waukegan to correct the cross connections, however follow-up monitoring suggested the problem had not yet been corrected while simultaneously pinpointing several additional problem sewers.

Since 1990, the City of Waukegan has taken remedial actions to correct sanitary sewer overflows and storm water and sanitary sewer cross-connections as they have been discovered (Final Stage III Report Waukegan Harbor Remedial Action Plan 1999). In spite of this on-going program, additional illicit discharges or cross-connections between sanitary and storm sewers have been found in recent years at multiple locations throughout the Waukegan River watershed (Pfister 2008, personal communication).

1997 – Beach closing were much higher than previous years. This increase was attributed to an expanding gull colony that had developed on the OMC property and the surrounding beaches.

1998 – Any single, daily sample exceeding either fecal coliform or *E. coli* standards resulted in a closure. This change in swim ban determination also increased the number of closures (Pfister 2008, personal communication). Additionally, the switch from fecal coliform to *E. coli* as the indicator organism may have also increased the number of closures due to the lower *E. coli* standard.

2000 – Gull harassment ended on Waukegan North and South Beaches. Gull harassment began in 1988 and ended in 2000 as nearly 10,000 gulls were nesting at the Waukegan Coke and Gas Plant site and were associated with elevated bacterial levels at the beaches (Pfister 2008, personal communication). However, when the gull harassment efforts ceased in 2000 elevated fecal coliform concentrations returned shortly thereafter illustrating a possible association. The theory that the gull population was

responsible for the increase in fecal coliform is supported by the presence of beach closures on dry weather days.

The LCHD sampled for fecal streptococci in addition to fecal coliform in the hope of isolating the source of bacterial contamination. The ratio of fecal coliform to fecal streptococci can be used sometimes to estimate the source of contamination although the sampling results from these efforts were inconclusive due to the inherent uncertainty in this comparison method due to variation in survival between the two organisms (Pfister 2008, personal communication).

2002 – *E. coli* became the fecal indicator bacteria utilized from 2002 to date as it is the current U.S. EPA recommended organism for freshwater beaches.

Alternative bacterial source tracking efforts by LCHD in 2002 utilizing ribotyping to determine source contamination, found that 55% of the *E. coli* in beach water samples matched avian (gull) *E. coli* while 7% of the *E. coli* matched the DNA of human/sewage *E. coli*, 4% matched *E. coli* from other mammals, and 34% were unidentified (Pfister 2008, personal correspondence).

2004 – Improved beach management efforts in 2004 by the City of Waukegan (i.e., more frequent removal of garbage to lessen attraction of wildlife to the beach and gull harassment efforts) reduced exceedences from the previous year (Pfister 2008, personal communication).

Beneficial Use Impairment Restoration Targets

The restoration targets developed by the states are described in the “Delisting Targets for the Waukegan Harbor Area of Concern: Final Report” dated October 30, 2008 (ECT, 2008). The BUI removal process described in the “Delisting Targets for the Waukegan Harbor Area of Concern: Final Report”

Restriction on Recreational Contact BUI Restoration Criteria

The restoration criteria for the Restrictions on Recreational Contact BUI in the Waukegan Harbor AOC are as follows:

The IJC Criteria states that the BUI can be delisted “when waters, commonly used for total-body contact or partial body-contact recreation, do not exceed standards, objectives, or guidelines for such use.”

This BUI will be considered for delisting when:

1. All known man made sources of bacterial contamination to the AOC have been controlled or treated to reduce exposures, where feasible.

Actions

1. Continue ongoing bacterial monitoring programs within the AOC and expand as necessary.
2. Conduct annual review of the data collected to determine if sample numbers and/or locations should be increased or decreased.

The Waukegan Citizens Advisory Group has been involved throughout the development of the 2011 comprehensive solution.

- Provided forum for public input at 3 recent CAG meetings: 5/19/11; 6/6/11; 7/21/ 11.
- They participated in a site visit with USEPA, and IDNR on August 10, 2011.
- The public meeting was held on August 18th.
- Meeting attendees did not offer comments on this document.
- The CAG voted to endorse this report and the delisting of the BUI for beach closings at the Waukegan AOC on August 18th, 2011.

Technical Team

The Waukegan Harbor AOC Technical Team is comprised of members of the U.S. EPA GLNPO, Illinois EPA, IDNR, LCHD, and Waukegan CAG.

Summary of Remedial Actions or Source Controls Implemented to Address the BUI

Since the area was designated as an AOC, there have been several changes that affect the status of the Restrictions on Recreational Contact BUI. Among the most notable changes were the repairs of several cross connections between storm water and sanitary sewer lines that led to bacterial contamination in the Waukegan River. These changes are documented in the “Delisting Targets for the Waukegan Harbor Area of Concern: Final Report” (ECT, 2008).

1988-1994 – The NSSD and the LCHD conducted daily sampling from June to August from 1988 to 1994. The City of Waukegan does voluntarily follow and accept the Illinois Department of Public Health (IDPH) Swimming Facility Act even though they are exempt since they are operated by a unit of local government located on Lake Michigan.

1988-1997 – A beach faced closure if two consecutive samples had fecal coliform counts greater than 500 counts per 100 ml or total coliform counts greater than 5,000 counts per 100 ml.

1988-2007 – Based on the guidelines above, the beaches averaged nine closures per year for Waukegan North Beach and 12 closures per year for Waukegan South Beach (data from 1988 to 2007) (Pfister 2008, personal communication).

1990 – An intensive reconnaissance of the area conducted in 1990 by the NSSD found that the Waukegan River was receiving fecal contamination, and further sampling was recommended to locate the source of contamination (NSSD, 1990). Subsequent inspections by the Illinois EPA found stormwater and sanitary sewer cross-connections resulting in pollution discharges to the Waukegan River. The City of Waukegan was requested by Illinois EPA to correct any pollution discharge in a 1991 compliance inquiry letter (Illinois EPA, 1991b).

Follow-up monitoring by Illinois EPA pinpointed additional problem sewers. The Illinois EPA subsequently notified City officials of the problem and the need for repairs pending possible enforcement action (Illinois EPA, 1993). The City of Waukegan has since taken remedial actions to correct a sanitary sewer overflow and storm water and sanitary sewer cross-connections. The City of Waukegan also has a policy of correcting all connections of storm sewers with sanitary sewers when such connections are discovered (Trigg, 1997).

1995-2000 – NSSD no longer assisted with beach monitoring and LCHD monitored the beaches four days per week from Memorial Day to Labor Day, 1995 to 2000.

1997 – Given the fact that coliform problems related to local sewers have largely been eliminated, attention has focused on other sources of bacterial pollution. The LCHD attributes the increase in the number of days Waukegan beaches were closed in 1996 and 1997 to a burgeoning gull colony that has developed on OMC property near the harbor and beaches (Pfister, personal communication, 1997).

The LCHD sampled for fecal streptococci in addition to fecal coliform in the hope of isolating the source of bacterial pollution (Pfister, 1997). (The ratio of fecal coliform to fecal streptococci can be used to roughly determine whether the source of contamination is human or animal in origin). However, sampling results during June, 1997 indicated no trends whatsoever, and the fecal streptococci sampling was therefore discontinued (Pfister, 1997).

2000 – Gull harassment efforts ceased in 2000 elevated fecal coliform concentrations returned shortly thereafter illustrating a possible association. Gull harassment began in 1988 and continue until 2000.

2001-2007 – From Memorial Day to Labor Day, LCHD returned to the seven days per week, daily sampling schedule of the two Waukegan beaches.

2002 – *E. coli* became the fecal indicator bacteria utilized from 2002 to date as it is the current U.S. EPA recommended organism for freshwater beaches. Additionally, the switch from fecal coliform to *E. coli* as the indicator organism may have also increased the number of closures due to the lower *E. coli* standard.

Alternative bacterial source tracking efforts by LCHD in 2002 utilizing ribotyping to determine source contamination, found that 55% of the *E. coli* in beach water samples matched avian (gull) *E. coli* while 7% of the *E. coli* matched the DNA of human/sewage *E. coli*, 4% matched *E. coli* from other mammals, and 34% were unidentified (Pfister 2008, personal correspondence).

2006-2007 – Waukegan South was sampled twice a day, five days per week in August 2006 and throughout the 2007 season during predictive model development (SwimCast). SwimCast measures air and water temperature, wind speed and direction, precipitation, relative humidity, wave height, lake stage, insolation (light energy) and other water quality parameters to help predict when *E. coli* levels are low enough to indicate safe swimming conditions or high enough to call for a swim ban.

2008 – After SwimCast implementation, LCHD returned to sampling four days per week and one weekend per month. Morning and afternoon samples continue to be collected at Waukegan South four days per week.

2011- The Lake County Health Department is participating in a source tracking study being conducted by Dr. Charles Tseng from Purdue-Calumet. They are also conducting a Beach Sanitary Survey collecting additional samples from suspected sources around the beach. For Waukegan, this includes the swale area on the North Beach, the harbor boat launch (in the Yacht Club) and near the mouth of the Waukegan River.

A comprehensive solution for the natural sources (avian) of bacterial contamination has been developed with the participation of the CAG, IDNR, and IEPA. It has four primary components: 1) Reduction of habitat, 2) Public education, 3) Reduction of potential food sources, 4) Enhanced management and beach grooming

- 1) Reduction of habitat: There are approximately 15-18 existing staves that are remnants from old piers on the near shore edge of the swimming beach. The sharp wooden projectiles attract sea gulls and shore birds to gather and perch along this section of the shoreline, and deposit e-coli. They are also a hazard for swimmers and waders.



- 2) Public Education: Signage is needed to educate the public about the importance of the proper disposal of trash and its connection to beach closures as well as advisories on not feeding the gulls. Four to six signs will be placed at key locations for best public viewing similar in style to the recent successful fish consumption signage designed by the local elementary school students.



- 3) Reduction of food source: Open and uncovered trash containers represent a continuing problem as the get turned over by wind or animals and the contents are spread around by

the gulls. The City of Chicago, Philadelphia and others have switched to a closed solar compacting model that minimize animal predation, can be segmented for sorting recyclables from trash and are securely anchored. Placement of the units will be at the pedestrian entry/exits of the beach in sites easily accessible for public refuse removal. The long term end goal will be to remove all of the outdated open trash barrels from the beach proper, and to encourage beach users to carry their trash out to the enhanced new solar powered units located at the pedestrian entry/exit sites by the parking lot and sidewalk areas.



- 4) Enhanced management and beach grooming: Develop a grading plan for implementation spring 2012 to address the low hydric pools in the northern near shore area to reduce the hot spots where the gulls and shore birds inevitably congregate.

Given the ongoing extensive monitoring and bacterial source tracking, to address man made sources of bacterial contamination and the comprehensive solution for naturally occurring sources, the Technical Team has determined that the City of Waukegan has corrected the sources of bacterial contamination and has addressed the rationales and the delisting requirement the for the Beach Closings BUI.

Recommendations

Based upon review of the most recent reports submitted to the U.S. EPA and input from the Technical Team it is agreed that the Beach Closings BUI is not affected/caused by the Waukegan AOC but by other environmental factors. Therefore, we recommend removal of the Restrictions on Recreational Contact “Beach Closings” BUI in Waukegan Harbor.

Acronyms/Glossary

<i>AOC(s)</i>	<i>Area(s) of Concern</i> Geographic area that fails to meet General or Specific Objective of the GLWQA where such failure has caused or is likely to cause impairment of beneficial use or the area's ability to support aquatic life.
<i>BUI</i>	<i>Beneficial Use Impairments</i> Those impairments defined in Annex 2 of the November 1987 – Great Lakes Water Quality Agreement. Impairment to a beneficial use means a change in the chemical, physical, or biological integrity of the Great Lakes System preventing or restricting the use.
<i>CAG</i>	<i>Citizens' Advisory Group</i> <i>CAG or Waukegan CAG is a group comprised of local concerned citizens, industry, government, and other local interest groups that work together to advise agencies of local concerns and goals.</i>
<i>CDF</i>	<i>Confined Disposal Facility</i>
<i>ECT</i>	<i>Environmental Consulting & Technology, Inc.</i>
<i>ESA</i>	<i>Expanded Study Area</i>
<i>GLNPO</i>	<i>Great Lakes National Program Office</i>
<i>GLWQA</i>	<i>Great Lakes Water Quality Agreement</i> An agreement between the United States and Canada signed in 1978 and amended in 1987, which lays out the commitment by the two countries to cooperate in the management of their shared water resources. The Amended 1987 Protocol described, among other things, Lakewide Management Plans, Areas of Concern, and Beneficial Use Impairments.
<i>IDNR</i>	<i>Illinois Department of Natural Resources</i>
<i>IDPH</i>	<i>Illinois Department of Public Health</i>
<i>Illinois EPA</i>	<i>Illinois Environmental Protection Agency</i>
<i>IJC</i>	<i>International Joint Commission</i> Formed by the 1909 Great Lakes Boundary Waters Treaty between the United States and Canada as the independent body overseeing the treaty with Commission appointees from both governments.
<i>LCHD</i>	<i>Lake County Health Department</i>

<i>NPL</i>	<i>National Priorities List</i> The list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories.
<i>NSSD</i>	<i>North Shore Sanitary District</i>
<i>OMC</i>	<i>Outboard Marine Corporation</i>
<i>PCBs</i>	<i>Polychlorinated Biphenyls</i> PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications.
<i>RAP</i>	<i>Remedial Action Plan</i> Plans developed by the states that identify Beneficial Use Impairments and outline the recommended remedial actions to remove the impairments. RAPs set the stage for eventual removal of all of the identified impairments, which will ultimately result in the delisting of AOCs.
<i>U.S. EPA</i>	<i>United States Environmental Protection Agency</i>
<i>Watershed</i>	All of the land area that drains into a particular waterbody.
<i>WWTP</i>	<i>Wastewater Treatment Plant</i>

References

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Great Lakes Water Quality Agreement (GLWQA). 1987. The GLWQA of 1978 is an Agreement with Annexes and Term of Reference, between the United States and Canada signed Ottawa, November 22, 1978, and Phosphorous Load Reduction Supplement signed October 16, 1983, as amended by Protocol November 18, 1987. Office Consolidation IJC United States and Canada.

Illinois EPA. 1991b. Letter to the Mayor and Council, City of Waukegan, Illinois, April 24, 1991 from the Illinois EPA, Maywood, Illinois.

Illinois EPA. 1993. Letter from the Illinois EPA to the Mayor of the City of Waukegan, February 1, 1993.

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International Joint Commission (IJC). United States and Canada. Revised Great Lakes Water Quality Agreement (GLWQA) of 1978 is an Agreement with Annexes and Terms of Reference, between the United States and Canada signed Ottawa, November 22, 1978, and Phosphorous Load Reduction Supplement signed October 16, 1983, as amended by Protocol November 18, 1987. Office Consolidation IJC United States and Canada.

Lake County Health Department Community Health Center. SwimCast Data.
<http://www.lakecountyil.gov/health/want/swimcast.htm>.

North Shore Sanitary District. 1990. North Shore Sanitary District Investigation into the Source of Elevated Coliform Bacteria Counts at Waukegan Beaches. North Shore Sanitary District.

Pfister, M.A. 1997. Letter from the M. Pfister of the Lake County Health Department, Waukegan, Illinois to the Illinois EPA, September 3, 1997.

Pfister, M.A. 1997a. Personal communications with M. Pfister of the Lake County Health Department Environmental Division on April 30, June 2, and September 2, 1997.

Pfister, Mark. Lake County Health Department and Community Health Center, personal communication, 2008.

Trigg, Paula. 1997. Personal communication with Paula Trigg, City of Waukegan, April 24, 1997.

U.S. EPA. Remedial Investigation Report OMC Waukegan Harbor Site 2008.

Waukegan Citizens' Advisory Group. Working Together: Recovery and Delisting of the Waukegan Harbor Area of Concern. April 2011.

Appendix A – Public Meeting Notices



Waukegan Harbor Citizens Advisory Group

55 Barker Place – P.O. Box 297
Waukegan, Illinois 60079

Phone: 847-244-3133 Fax: 847-244-1348

CAG Meeting Notice
Thursday, May 19, 2011
6:00 p.m.

Waukegan Park District
Linec Cottage at Bowen Park-Waukegan, Illinois
1811 North Sheridan (Sheridan at Greenwood - NE corner)
847/360-4720

Featured Topics & Speakers:

OMC Superfund Site
Op Unit 1 – Harbor Dredge Status update
Op Unit 2 – Coke Site Update
Op Unit 4 – OMC Plant #2 Update
Kevin Adler – USEPA

Mouth of Waukegan River

Bowen Park Work Days: CAG In-kind hours
GLRI Grant Progress Report - CAG
USEPA/DNR Operational Grant - CAG

June Meeting – Piping Plover Update- IDNR

Visit the updated CAG web site at:
waukeganharborteam.com

Visit the Lake Barkat Partnership web site at:
www.lakebarkat-nichigan.org

CAG Members

Albert Laboratories
Alexa Noid
Bombardier Recreational Products
Conal Derge, Attorney
City of North Chicago
City of Waukegan
College of Lake County
Commonwealth Edison
Erie R Railway
Green Lakes Sport Fishing Club
Illinois Audubon Society
Integrated Lakes Management
Johns Manville
LaForge Corporation
Lake County Audubon
Lake County Chamber of Commerce
Lake County Department of Planning
Lake County Health Department
Lake County Sustainable Mgt Comm.
Lake Michigan Federation

CAG Members (continued)

Larsen Motors, Inc.
LPR Levine & Piroke
Liberty Prairie Conservancy
Midwest Gyproc
National Gypsum
North Shore Gas
North Shore Sanitary District
Dilwood Marine Corporation
Salmon Unlimited
Steers Club, Illinois Chapter
Luzern Environmental Company
Waukegan Charter Boat Association
Waukegan Mail Stop
Waukegan Lakeland Development Corporation
Waukegan Park District
Waukegan Port District
Waukegan Yacht Club
Concerned Citizens

CAG Associates

Chicago Metropolitan Agency for Planning (CMAP)
Delta Institute
Illinois Citizen Action
Illinois Department of Natural Resources
Illinois Environmental Protection Agency
Illinois-Indiana Sea Grant
Illinois Lake Management Association
Illinois Pollution Control Board
International Joint Commission
Maritime Administration
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U. S. Fish and Wildlife
University of Illinois - Marine Laboratory
Waukegan Public Library



Waukegan Harbor Citizens Advisory Group

55 Harbor Place – P.O. Box 297
Waukegan, Illinois 60079

Phone: 847-244-3133 Fax: 847-244-1348

CAG Meeting Notice

Thursday, June 16, 2011

5:30 p.m. – Bowen Park Watershed Grant tour

6:30 p.m. – Meeting Lilac Cottage

**Waukegan Park District
Lilac Cottage at Bowen Park-Waukegan, Illinois
1911 North Sheridan (Sheridan at Greenwood - NE corner)
847/360-4720**

Featured Topics & Speakers:

5:30 p.m.

**Meet in parking lot behind Lilac Cottage near 3rd base line
See what daylighting looks like first hand – US Fish & Wildlife grant**

**Meeting 6:30 p.m. – note this is ½ hr later than normal to allow tour
GLRI Grant update**

Piping Plover Monitoring – Natalie Dutack

Visit the updated CAG web site at:
waukeganharborcag.com

Visit the Lake Baikal Partnership web site at:
www.baikal-relationship.org

CAG Members

Abbot Laboratories
Akzo Nobel
Bimber's Recreational Products
Carol Dege, Attorney
City of North Chicago
City of Waukegan
College of Lake County
Commonwealth Edison
EJ & E Railway
Great Lakes Sport Fishing Council
Illinois Audubon Society
Integrated Lakes Management
Johns Manville
LaFarge Corporation
Lake County Auditor
Lake County Chapter of Commerce
Lake County Department of Planning
Lake County Health Department
Lake County Stormwater Mgt Center
Lake Michigan Federation

CAG Members (continued)

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LFR Lewis & Fricke
Liberty Prairie Conservancy
Midwest Generation
National Oxygen
North Shore Gas
North Shore Sanitary District
Outboard Marine Corporation
Seimens Unlimited
Sawm Club, Illinois Chapter
Tanner Environmental Company
Waukegan Charter Boat Association
Waukegan Main Street
Waukegan Lubricant Development Corporation
Waukegan Park District
Waukegan Port District
Waukegan Yacht Club
Concerned Citizens

CAG Associates

Chicago Metropolitan Agency for Planning (CMAP)
Delta Institute
Illinois Citizen Action
Illinois Department of Natural Resources
Illinois Environmental Protection Agency
Illinois-Indiana Sea Grant
Illinois Lake Management Association
Illinois Pollution Control Board
International Joint Commission
Maritime Administration
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife
University of Illinois - Marine Extension
Waukegan Public Library



Waukegan Harbor Citizens Advisory Group

55 Harbor Place – P.O. Box 297
Waukegan, Illinois 60079

Phone: 847-244-3133 Fax: 847-244-1348

CAG Meeting Notice
Thursday, July 21, 2011
6:00 p.m. – Meeting Lilac Cottage

Waukegan Park District
Lilac Cottage at Bowen Park-Waukegan, Illinois
1911 North Sheridan (Sheridan at Greenwood - NE corner)
847/360-4720

Featured Topics & Speakers:

Presentation: Chicago Geographic Society
Mapping Opportunities for CAG

Updates:

Good News – Waukegan Harbor project going forward
Good News – North Shore Gas Site status
Not so Good News – 7/11 storm impact on Bowen Park

Remember August 18th – CAG Picnic at Waukegan Port District South Harbor

Visit the updated CAG web site at:

waukeganharborcag.com

Visit the Lake Baikal Partnership web site at:

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U.S. Environmental Protection Agency
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University of Illinois - Marine Extension
Waukegan Public Library

Appendix B. E. coli beach research

E. coli Source Identification on Lake Michigan Beaches in Lake County, Illinois



William J. Soucie, Water Quality Laboratory, Central Lake County Joint Action Water Agency, Lake Bluff, IL 60044 E-Mail: soucie@clejawa.com

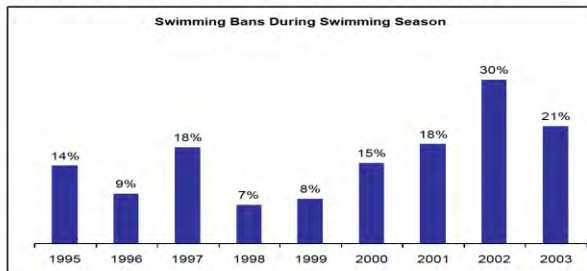


Mark A. Pfister, Lakes Management Unit, Lake County Health Dept., Waukegan, IL 60085 E-Mail: mpfister@co.lake.il.us

Project Goal: Determine the probable sources of *E. coli* in Lake County, Illinois beach water.

Purpose: The number of swimming bans due to high fecal coliform or *E. coli* concentration increased in Lake County from 1998 to 2002. Although the increase coincides with cessation of gull harassment at one beach, other factors are thought to have also contributed to this increase. In 2003, the number of swimming bans decreased. The decrease may be related to better beach management including improved garbage pickup and beach grooming practices. Determining the *E. coli* sources would provide consensus and guidance in ongoing efforts to further minimize swimming bans.

Figure 1. Average days beaches were closed as a percentage of days beaches were tested. Beaches are tested during the swimming season. These data are for the five beaches described here.



Method: In a 2002 study, gull feces and beach water samples were collected at four beaches; North Point Marina Beach, Waukegan Municipal Beach South, Lake Forest Beach, and Rosewood Beach in Highland Park. Samples were collected randomly throughout the study period.

In the 2003 study, gull and mallard feces samples were collected at random throughout the study period. Beach water samples were collected daily, but only those collected in series with samples containing *E. coli* concentrations > 235/100mL were submitted for ribotyping. The 2003 study focused on three beaches, Illinois Beach State Park South, Lake Forest Beach, and Rosewood Beach.

Sanitary sewer samples were collected in both studies by volunteers or Lake County Health Department (LCHD) staff with assistance from North Shore Sanitary District (NSSD) personnel. In 2002, samples were collected from the Cary Avenue Pump Station in Highland Park. In 2003, samples were also collected from the Lake Forest Pump Station near the beach and the Zion Pump Station near the beach.

All water samples were collected in sterile containers by LCHD staff from the same location on each beach. Samples were collected in knee deep water before 8:00 a.m.

Animal feces were collected by LCHD staff or volunteers trained by the LCHD. Only fresh feces from an observed source were collected. Samples were collected during the day.

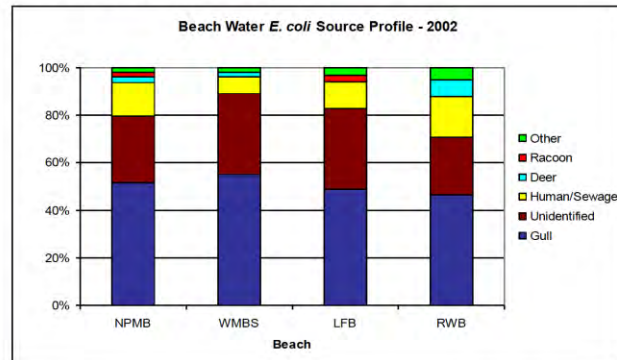
Fecal coliform bacteria from water and sewer samples were initially isolated on mFC agar (incubated at 44.5°C for 24 hours) within 24 hours of collection by Illinois Department of Public Health certified laboratories. Feces samples were typically processed within 72 hours, but five samples were held 15 days prior to analysis. Sewer and feces samples were diluted with phosphate buffered water prior analysis. Beach water total *E. coli* density was determined using Colilert® media in a Quanti-Tray® format. Sealed agar plates containing isolated colonies of interest were sent overnight for further isolation and ribotyping.

In 2002, *E. coli* isolates were submitted to Dr. Charles C. Tseng and W.T. Evert Ting of Purdue University Calumet (PUC) in Hammond, IN. There *E. coli* were ribotyped using an automated RiboPrinter® system. The system uses HindIII restriction enzyme and an RNA probe specific for 5S, 16S, and 23S rRNA genes to produce a chemiluminescent pattern that is digitally processed and stored. A match was defined as a 95% or greater similarity between RNA patterns from unknown samples and known samples in the PUC database. This database contained 815 *E. coli* ribotypes from 10 animal species including the 98 seagulls and 10 human/sewage samples collected for this study.

In 2003, fecal coliform isolates were submitted to Dr. Mansour Samadpour of the University of Washington School of Public Health and Community Medicine in Seattle, WA. Staff at his company, the Institute for Environmental Health (IEH), isolated *E. coli* and then ribotyped the samples. This method uses EcoRI and PvuII restriction enzymes and a cDNA probe for 5S, 16S, and 23S rRNA genes to produce autoradiograms. These were compared against a database containing >90,000 isolates with a match defined as 100% similarity between at least two gene patterns or greater than 95% for all genes.

Results and Discussion: In 2002, samples were collected between August 28 and November 7. Known source samples were collected from seagulls at NPMB (n=16) and WMBS (n=82). Sewage water (n=10) was collected from the NSSD sewer pump station in Highland Park. Beach water samples were collected at NPMB (n=43), WMBS (n=91), LFB (n=40) and RWB (n=41).

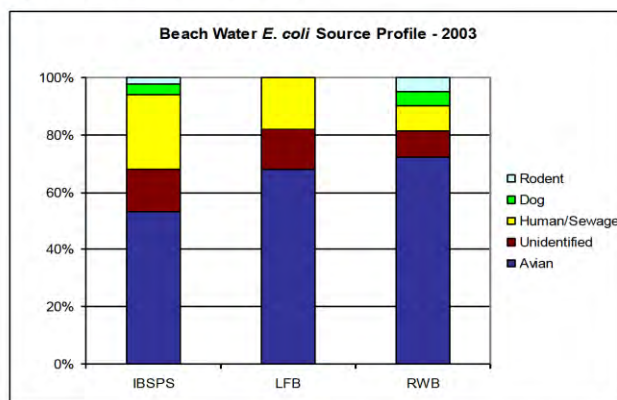
Figure 3. *E. coli* sources in 2002 beach water study.



The importance of fresh ribotype patterns was demonstrated in this study. Only 13% of *E. coli* ribotypes identified in beach water matched the existing ribotype patterns housed in the PUC database. More than 56% of the unknowns matched the new ribotypes identified in the known feces and sewer samples submitted during this study. In total, 51% of the *E. coli* ribotypes isolated from the beach water samples matched gull *E. coli* ribotypes, 11% matched sewage/human, 31% were unidentified, and the remaining 7% matched deer, raccoon, pig, and cow *E. coli* ribotypes.

In the 2003 study, samples were collected from July 8 through August 29. A total of 117 feces and sewer samples were collected at random throughout the period. Known samples were collected from seagulls at IBSPS (n=19), FPB (n=39), and RWB (n=25). Mallard feces were collected at FPB (n=7). Human/sewage samples were collected at NSSD pumping stations (n=27) in Zion, Lake Forest, and Highland Park. Beach water samples submitted for ribotyping included samples from IBSPS (n=11), FPB (n=6), and RWB (n=6).

Figure 4. *E. coli* sources in 2003 beach water study.



This study determined the probable *E. coli* sources when beach water *E. coli* concentrations exceeded 235/100mL. Similar to the 2002 study, avian, human/sewage, and unidentified sources accounted for 62%, 20%, and 13% respectively of the isolated *E. coli*. The remaining 5% of *E. coli* matched dog and rodent sources.

The authors would like to acknowledge the Lake County Illinois Clean Water Testing Review Panel for their guidance and support. We would also like to thank Illinois State Senator Susan Garrett for obtaining project funding.

Poster presentation from 10/21/2003 Great Lakes Beach Association Annual Meeting, Muskegon, MI Revised: 12/4/2003



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

77 WEST JACKSON BOULEVARD

CHICAGO, IL 60604-3590

SEP 28 2011

REPLY TO THE ATTENTION OF:

Mr. Todd Main
Illinois Department of Natural Resources
160 North LaSalle Street
Suite S-700
Chicago, Illinois 60601

Dear Mr. Main:

Thank you for your September 12, 2011 request to remove the "Restriction on Recreational Contact – Beach Closings" Beneficial Use Impairment (BUI) in the Waukegan Area of Concern, Lake County, Waukegan, Illinois. We very much share your desire to restore the health of all of the Great Lakes AOCs and to formally delist them.

Based upon a review of your submittal and the supporting data, the U.S. Environmental Protection Agency hereby approves your BUI removal request. Further, we will notify the International Joint Commission of this significant positive change in the environmental health of the Waukegan Harbor AOC.

We congratulate all of the parties involved in this federal, state, and local partnership. Working together, they have achieved this important environmental improvement which will benefit the Great Lakes, the State of Illinois, and, especially, the people who work and live near the Waukegan Harbor AOC. We look forward to continuing this important and productive relationship with your agency and local coordinating committees as we work together to fully restore the Waukegan Harbor AOC.

If you have further questions, please contact me at (312) 353-4891 or your staff may contact John Perrecone, in EPA's Great Lakes National Program Office at (312) 353-1149.

Sincerely,

A handwritten signature in blue ink, appearing to read "Chris Korleski".

Chris Korleski, Director
Great Lakes National Program Office

cc: Marc Miller, Director, IL DNR
Lisa Bonnett, IEPA, Interim Director
Marcia Wilhite, IEPA, Water Bureau Chief
Tammy Mitchell, IEPA
Dr. Saad Jasim, IJC
Chris Korleski, EPA GLNPO
Wendy Carney, EPA GLNPO
John Perrecone, EPA GLNPO
Bill Bolen, EPA GLNPO