Wisconsin's Great Lakes Beach Monitoring & Notification Program

Annual Report
2012 Beach Season

Office of the Great Lakes
Wisconsin Department of Natural Resources

Acknowledgements

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Local participants include:

Ashland County Health Department
Bayfield County Health Department
Brown County Health Department
City of Milwaukee Health Department
Door County Health Department
Douglas County Health Department
Iron County Health Department
Kenosha County Division of Health
Kewaunee County Health Department
Manitowoc County Health Department
North Shore Health Department
Ozaukee County Health Department
City of Racine Health Department
Sheboygan County Human Services
Shorewood/Whitefish Bay Health Department
City of South Milwaukee Health Department

Additional assistance provided by:

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University of Wisconsin, Oshkosh – Department of Biology & Microbiology
Wisconsin Dept. of Administration – WI Coastal Management Program

Thank you to everyone who makes Wisconsin's Great Lakes Beach Monitoring & Notification Program a success!

Cover photo: A Stroll on the Beach, Point Beach State Park, Manitowoc County WI; photo by Merlin E. Horn; .(*or select different photo for use on cover of report)*

Summary

The summer of 2012 was the tenth season of the Wisconsin's Great Lakes Beach Monitoring & Notification Program. This season stands out for several reasons. Record rainfall in June caused historic flooding in the Duluth-Superior area with the first ever recorded algal bloom recorded in July in the Bayfield area. These events accompanied by high surface water temperatures in Lake Superior and drought are likely contributors to an increase in advisories for three counties in the Lake Superior area; Ashland, Douglas, and Iron counties. Many beaches on Lake Michigan saw a decrease in the number of advisories posted during the season; however this was not true in every county.

The United States Environmental Protection Agency (USEPA) awarded Wisconsin Department of Natural Resources (WDNR) $225,000 to implement the federal Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000. Well-established partnerships, efficient and cost-effective operations, and collaborative funding mechanisms meant the State was able to stretch limited program dollars. This ensured monitoring continued at beaches that have been monitored historically, continued financial support was provided to USGS for the Wisconsin Beach Health website, and the Program was able to expand the use of the early warning system, Nowcast, at seven high priority beaches this season. The Nowcast warning system was so successful it won the State Program Innovations Award from the Environmental Council of States. With funding assistance from the Department of Health Services, beach advisory data was made available to *BeachCast,* the mobile application developed by the Great Lakes Commission.

Under the leadership of Dr. Julie Kinzelman, the City of Racine became the first in the nation to be granted permission by U.S. EPA to use Quantitative Polymerase Chain Reaction (qPCR) in lieu of the standard cultured method to analyze for exceedances of the applicable water quality standard. This tool, in conjunction with sanitary survey observations and Nowcasting, minimizes decision errors in declaring beach health advisories and maximizes beach usage by enabling partial day advisories when conditions warrant lifting advisories early.

UW-Oshkosh, City of Racine, and Bay-Lake Regional Planning Commission were awarded grants to conduct beach sanitary surveys at impaired beaches along Wisconsin's Great Lakes coastline. Local communities continue to make progress in addressing sources of pollution to their beaches and several beach restoration projects were funded in 2012 through the Great Lakes Restoration Initiative (GLRI). Door County Land and Water Conservation Department completed several beach restoration projects where implementation of Best Management Practices has improved beach conditions and resulted in lower numbers of beach advisories.

The program continues to suffer from insufficient funding levels to adequately maintain a comprehensive beach program. Of the 192 Great Lakes beaches, only 127 were monitored during the 2012 beach season, with many of these monitored once a week. The Department of Natural Resources provides program coordination without the benefit of a dedicated position. Additional funding was secured through grants and local funding support to help stretch program funds to ensure adequate sampling was performed thus ensuring that visitors to our beaches are properly warned of unsafe beach health conditions.

Similar to past years, 16 health departments representing 13 Lake Michigan and Lake Superior coastal counties accepted BEACH Act funding and collected samples at selected public beaches one to five times per week. Beach *advisories* and/or *closures* were posted using signs placed on the beach property in addition to information being provided on an Internet Web Site (http://www.wibeaches.us). Decisions to post an advisory versus a closure were generally triggered by the amount of *E. coli* present as compared to thresholds recommended by USEPA. In some cases, advisories and/or closures were prompted by rainfall, known or suspected sewage

bypasses, or other factors that have been linked to high *E. coli* counts in the past, as well as the results of rapid lab methods (qPCR) and/or statistical “Nowcast” models.

Based on the monitoring results of the 2012 beach season, the overall percentage of beach samples that exceeded the health advisory threshold was the fourth lowest since beginning BEACH Act monitoring. Additionally, the percentage of total beach samples that exceeded the federal advisory criterion for *E. coli,* 235 Colony Forming Units per 100 mL of water (235 CFU/100mL), was 3% lower than the average of the nine previous beach seasons. Results suggest that ongoing remediation efforts and best management practices implemented at beaches throughout Wisconsin are having a positive effect on water quality at our Great Lakes beaches.

Introduction

The BEACH Act provides funding opportunities for coastal and Great Lakes states, territories, and tribes to develop and conduct beach pathogen monitoring and public notification programs at their coastal beaches. The recipients of BEACH Act grants are required to develop monitoring and notification programs in alignment with grant performance criteria specified by USEPA. The State of Wisconsin has participated in the federal BEACH Act program since its inception through a collaborative effort involving the Wisconsin Department of Natural Resources (WDNR), local health departments, academia, and the United States Geological Survey (USGS) to collect and share information related to water quality of Lake Michigan and Lake Superior public beaches.

The primary goal of Wisconsin's program is to increase visitors' awareness of potential exposure to pathogenic microorganisms while at the beach. *E. coli* is a bacteria species that serves as a pathogenic indicator organism because it is commonly found in the feces of warm-blooded animals. When high levels of *E. coli* are detected, it is likely that fecal matter is present in the water which suggests that humans may be exposed to other harmful pathogens like bacteria, viruses, and protozoans. Potential sources of *E. coli* contamination at Wisconsin beaches include agricultural and urban stormwater runoff and sewage overflows. In addition, localized sources from wildlife and waterfowl feces may contribute to high levels of *E. coli* in both beach sand and water.

The 2012 Beach season was the tenth consecutive summer of Wisconsin's Great Lakes beach monitoring and notification program. The activities described in this report were conducted during Federal Fiscal Year 2012 (October 1, 2011 through September 30, 2012).

Program Overview

In 2002, approximately 55 miles of public beach miles at 192 coastal beaches were identified along Lake Michigan and Lake Superior. The definition of a "beach" for the purpose of the Wisconsin Great Lakes Beach Monitoring & Notification Program implementation is:

"A publicly owned shoreline or land area, not contained in a man-made structure, located on the shore of Lake Michigan or Lake Superior, that is used for swimming, recreational bathing or other water contact recreational activity."

Coastal beaches were geo-located using global positioning system (GPS) equipment and software and geographic information system (GIS) technologies were used to store the data and to create maps for each county that identifies the location of each beach. Information was collected on potential sources of pathogens for each beach, such as: location of stormwater outfalls, waterfowl usage, proximity of wastewater treatment plant outfalls and farms. This information – along with general estimates of swimmer density – was used to rank and classify beaches as "high," "medium," or "low" priority. Beach priority is a major consideration in determining the frequency for monitoring and thus in allocating funding Coastal processes can be expected to change beach dimensions over time and beach usage patterns also change, so local beach managers are given an opportunity to update their information annually. .

In an effort to standardize as much of the statewide program as possible, standard field collection procedures, analytical protocols, reporting, and public notification practices including using consistent advisory signs for beach posting have been formalized in a quality assurance project plan as well as contracts and assistance agreements issued for performing BEACH Act compliance work.

BEACH Act funding supports the Wisconsin Beach Health Website (http://www.wibeaches.us), that is maintained by staff at USGS in partnership with the local health department staff and cooperators who use the site to report beach status and bacteria data. Beach managers also use this site for reporting sanitary survey data associated with their beaches. Through a combination of Great Lakes Restoration Initiative (GLRI) and Wisconsin Coastal Management grants, staff leveraged this centralized data system to capture sanitary survey data, vital data for understanding beach conditions and developing nowcasts. Development continued through 2013 to integrate Environmental Data Discovery and Transformation system (EnDDaT) with Virtual Beach to streamline the process for doing a daily nowcast. USGS also serves as the primary data manager and oversees all data integration needs with USEPA to support the national information exchange goals of the BEACH Act.

Beach Season - 2012

The tenth season of Wisconsin's Great Lakes Beach Monitoring and Notification Program (Program) saw significant advances in public notification through the use of improved technologies. The first, known as Nowcast, is an early warning system that uses statistical models to predict the probability of when beach conditions may exceed water quality guidelines. The system was used at seven high-priority beaches in Wisconsin during the 2012 beach season and Nowcasts are being developed for 20 additional beaches for use in the 2013 season. This tool was so successful in helping local beach managers more effectively manage beach advisories and beach closings that it won the State Program Innovations Award from the Environmental Council of the States.

The second major advancement in improved public notification was EPA's approval to the City of Racine's laboratory to use Quantitative Polymerase Chain Reaction (qPCR) to monitor for the exceedances of the applicable water quality standard at Racine's public beaches. This approval is the first in the nation by USEPA and has

In preparation for the 2012 season, county public health partners were given an opportunity to make adjustments to beach priorities and measurements. As a result, one beach was elevated to a high priority and there was some adjustment in which of the low priority beaches were monitored. One beach was removed from the official beach lists. Data collected as part of the GLRI-funded sanitary surveys was used to adjust beach lengths. These changes were posted on the DNR website and the public was given an opportunity to comment on the changes.

The primary purpose of Wisconsin's Great Lakes Beach Monitoring and Notification Program is to support a consistent statewide Great Lakes beach water quality monitoring and public notification program that reduces beach visitors' risk of exposure to disease-causing microorganisms in water. For 2012 this meant that 112 Great Lakes beaches were monitored at least weekly and all monitoring data was uploaded to the Wisconsin Beach Health Website within 24hrs of collection. The data were used to make beach management decisions and generate beach advisory reports on the Wisconsin Beach Health Website. Additionally, members of the public could sign up to receive daily emails detailing the water quality at their favorite beaches. Assisted by a GLRI grant awarded to Department of Health, USGS was able to make the beach health data available to BeachCast, the mobile application developed by the Great Lakes Commission.

For the 2012 beach season, we continued the thirteen week sampling season for the Lake Superior beaches (Ashland, Bayfield, Douglas, and Iron counties), while all Lake Michigan beaches received analytical support for a fourteen week sampling season. Budgetary constraints forced our decision to reduce the required sampling frequency at high priority beaches from four times a week to three times in 2012. However, all monitoring partners with high priority beaches

were given some additional funding to collect four samples per week at their high priority beaches during critical times, such as holiday weekends or local festivals. Additionally, partners have the latitude to voluntarily increase monitoring at any of the beaches. Several partners fund additional monitoring at their beaches. Federal restrictions on how grant funds could be used prevent local partners from collecting samples for the explicit purpose of identification and control of pollution sources leading to elevated bacteria levels. Any efforts to do so were done independent of the BEACH Act funding.

Time Schedule

The activities described in this report took place during Federal Fiscal Year (FFY) 2012 (October 1, 2011 through September 30, 2012). FFY 2012 encompassed the entire 2012 beach season, which is defined for Wisconsin coastal beaches as Memorial Day Weekend through Labor Day Weekend. However, at some coastal beaches in Wisconsin, swimming may not begin until mid-June due to cold water temperatures. Where weather and swimming history indicate this to be the case, initial sampling associated with these beaches was delayed to coincide with the local swimming season.

Budget

In May of 2012, USEPA awarded Wisconsin a grant in the amount of$225,000. . Due to funding limitations and additional reporting requirements to increase financial accountability, a few changes were made to the contracts provided to local health departments in 2012. The most significant changes were the reduction in high priority beach monitoring and a requirement to provide more detailed reporting of travel and expenses to help better understand program costs. WDNR believes these data will help enable future allocations to be more equitable and reflective of actual costs incurred.

Table 1. Allocation of 2012 Beach Act Monitoring Funds

Monitoring Partner	2012 Allocation
Ashland, Bayfield, Douglas, Iron & Kewaunee Counties (Group Contract)	$45,550
Brown County	$3,364
Door County	$59,640
Kenosha County	$7,495
Manitowoc County	$12,397
Milwaukee, City of	$8,717
Northshore/Shorewood Combined Health Department,	$8,000
Ozaukee County	$17,282
Racine, City of	$8,410
Sheboygan County	$11,210
Shorewood, Village of	$5,079
South Milwaukee, City of	$6,435
2012 Total	**$188,500**

Beach program administration moved into the Office of the Great Lakes beginning in January 2012. To prepare the 2012 Beach Act monitoring budget, WDNR used the invoices from 2011 season to evaluate costs incurred and establish baseline allocations for each partner. These baseline allocations were then adjusted to reflect the 2012 sampling regime modifications and

beach priority changes (Table 1). WDNR placed a high priority on funding monitoring and reporting, allocating grant funds accordingly. All told, 99% of BEACH Act funds received by WDNR were used for either beach monitoring or providing public information on beach conditions (electronic notifications, website and database maintenance) with approximately 84% of BEACH Act funds being used directly for the monitoring of beaches.

Monitoring Summary Results

In 2012, monitoring occurred at a total of 127 beaches generating 4,936 samples that were reported on the Beach Health Website (http://www.wibeaches.us). In the simplest of terms, 14.38% of the discrete samples collected during the beach season exceeded the water quality advisory threshold of 235 CFU/100mL (Table 2). In addition, 4.29% of all samples collected exceeded 1,000 CFU/100mL resulting in mandatory beach closures.

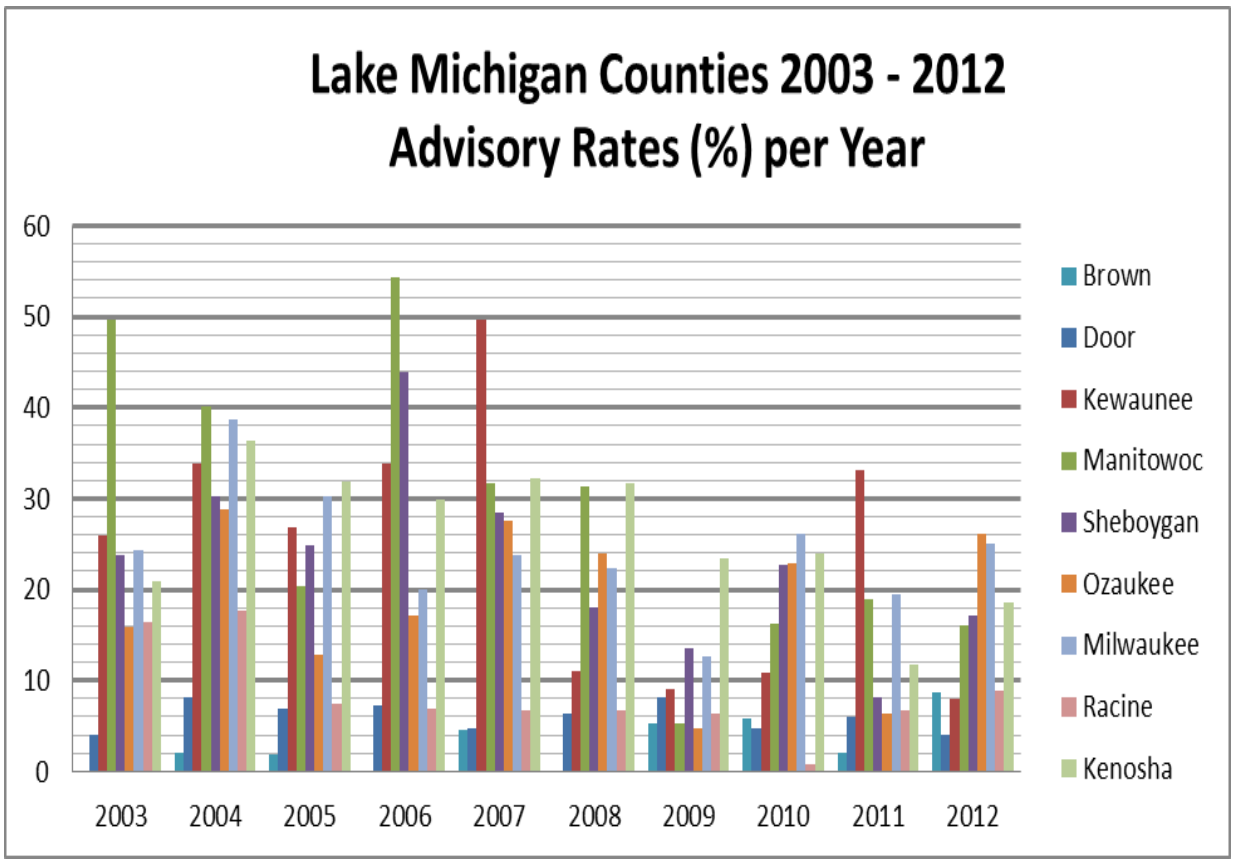
Based on monitoring results, the 2012 beach season had the fourth lowest overall percentage of beach samples that exceeded the health advisory threshold (235 CFU/100mL) since BEACH Act monitoring began in 2003. Compared to 2011, four counties in 2012 saw a decrease in the percent of advisory threshold exceedances and when the 2012 data is compared to the 9-year averages, five counties had lower exceedance rates than their historic average. Four of the five counties that had exceedance rates greater then their historic averages were on Lake Superior, which experienced elevated water temperatures in 2012. It should be noted that during 2012 beaches listed as impaired received additional monitoring in association with the sanitary surveys projects. For medium and low priority beaches, increasing the monitoring may have had a significant effect on the rate of advisories and closures.

Table 2. Annual Sample Percentages that exceed the advisory level of 235 CFU/100mL

County	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Ashland	3.2	10.2	4.6	3.5	3.8	3.3	4	5.8	8.85	13.08
Bayfield	1.9	2.2	4.3	7.1	7.1	3.1	0.8	5.8	8.00	5.21
Brown	0	2	1.8	0	4.5	0	5.2	5.9	2.13	8.70
Door	4.1	8.2	6.9	7.3	4.8	6.3	8.1	4.7	6.03	4.08
Douglas	9.5	11.8	23.7	12.9	11.3	18.8	1.5	18.4	23.34	29.70
Iron	1.1	1.5	2.7	3.5	0	0	0	7.1	10.53	11.39
Kenosha	21	36.3	31.9	29.9	32.2	31.7	23.5	24	11.66	18.63
Kewaunee	26	33.9	26.9	33.9	49.7	11.1	9.1	10.9	33.16	8.06
Manitowoc	49.6	40.1	20.4	54.4	31.7	31.3	5.3	16.3	18.87	16.14
Milwaukee	24.3	38.7	30.3	20	23.7	22.4	12.7	26.1	19.39	25.10
Ozaukee	15.9	28.9	12.9	17.1	27.6	24	4.8	22.9	6.37	26.14
Racine	16.5	17.6	7.4	6.9	6.7	6.7	6.4	0.7	6.75	8.79
Sheboygan	23.8	30.2	24.8	43.9	28.5	18.1	13.6	22.7	8.23	17.08
Percent of all samples	**14.6**	**22.2**	**15.7**	**17.5**	**17.1**	**14.4**	**7.3**	**12.4**	**11.8**	**14.38**

The data collected for 2012 suggests that communities that have invested in implementing BMPs are having success in reducing beach closures and advisories. The results of several years of monitoring and water quality research has led to beach managers throughout Wisconsin adopting best management practices that are improving water quality at Great Lakes beaches throughout the state. At beaches identified as impaired, many received increased monitoring between 2010

and 2012 as part of GLRI-funded sanitary survey projects, supporting the need for more intensive monitoring and investigation to better understand the extent of the impairments. The monitoring data in conjunction with the observations and findings of sanitary surveys are vital for identifying and prioritizing beach restorations as well as understanding the influences on nearshore water quality. Data from the last four years suggests a trend of increasing advisories along the Lake Superior shoreline. More information will be needed to understand the factors influencing this observation.


Lake Michigan Counties 2003 - 2012
Advisory Rates (%) per Year
60
50
40
30
20
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2003
2004
2005
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2007
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Brown
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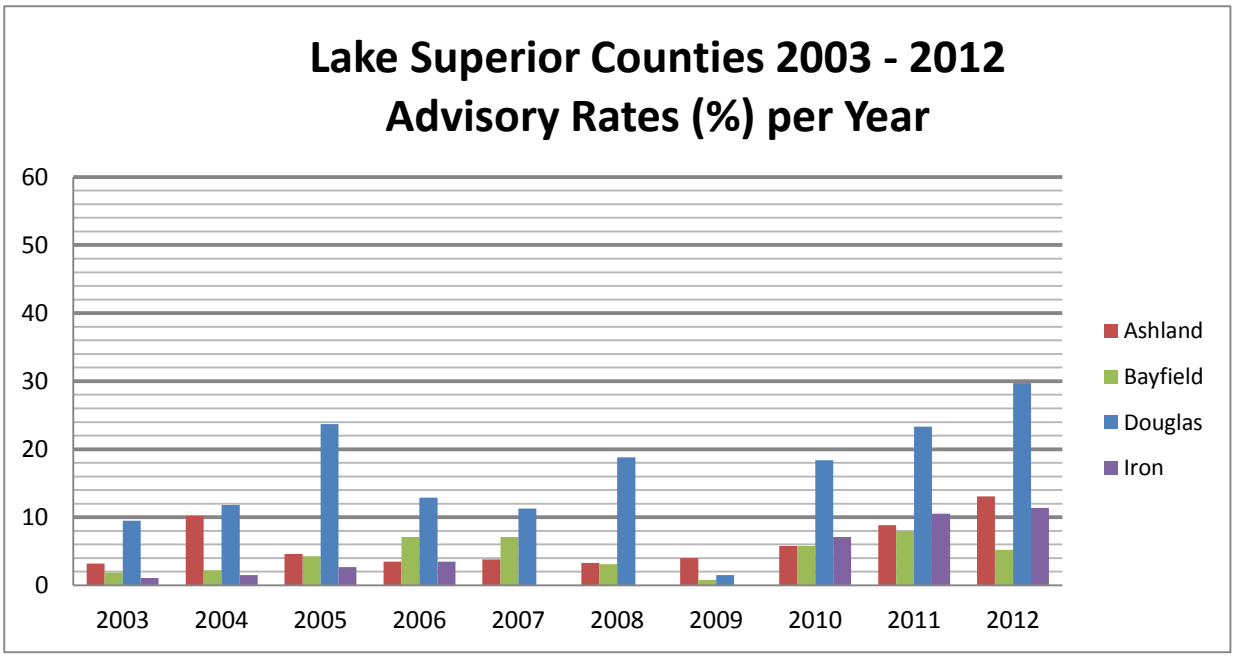
Sheboygan
Ozaukee
Milwaukee
Racine
Kenosha


Lake Superior Counties 2003 - 2012
Advisory Rates (%) per Year
60
50
40
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Ashland
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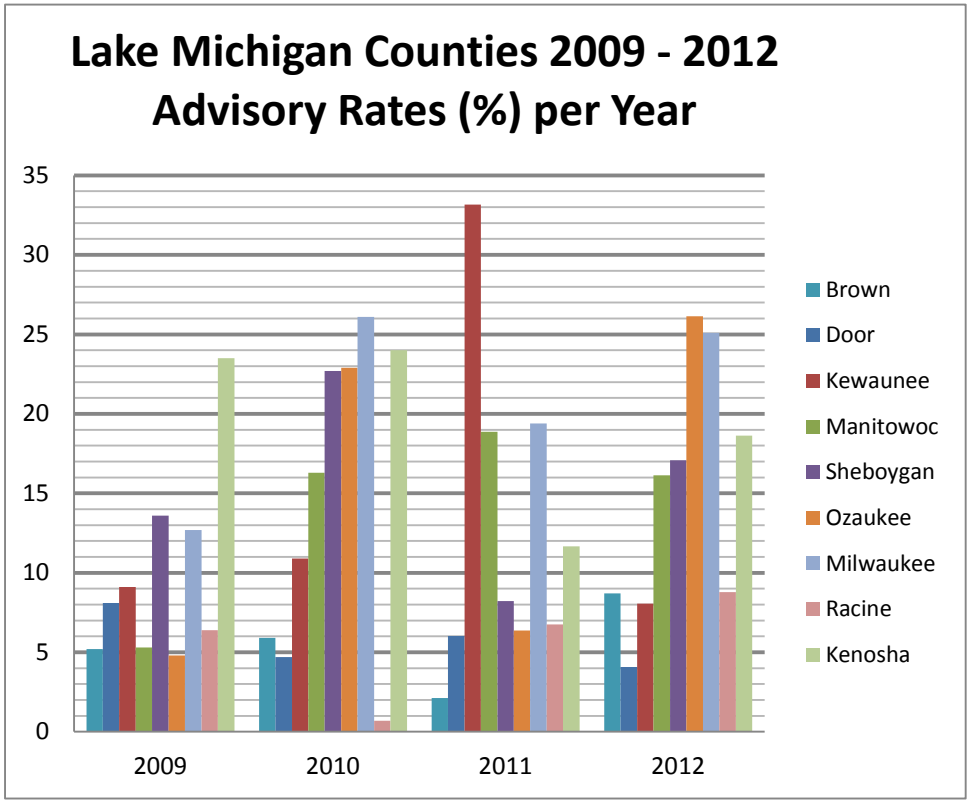
Douglas
Iron


Lake Michigan Counties 2009 - 2012
Advisory Rates (%) per Year
35
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25
20
15
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5
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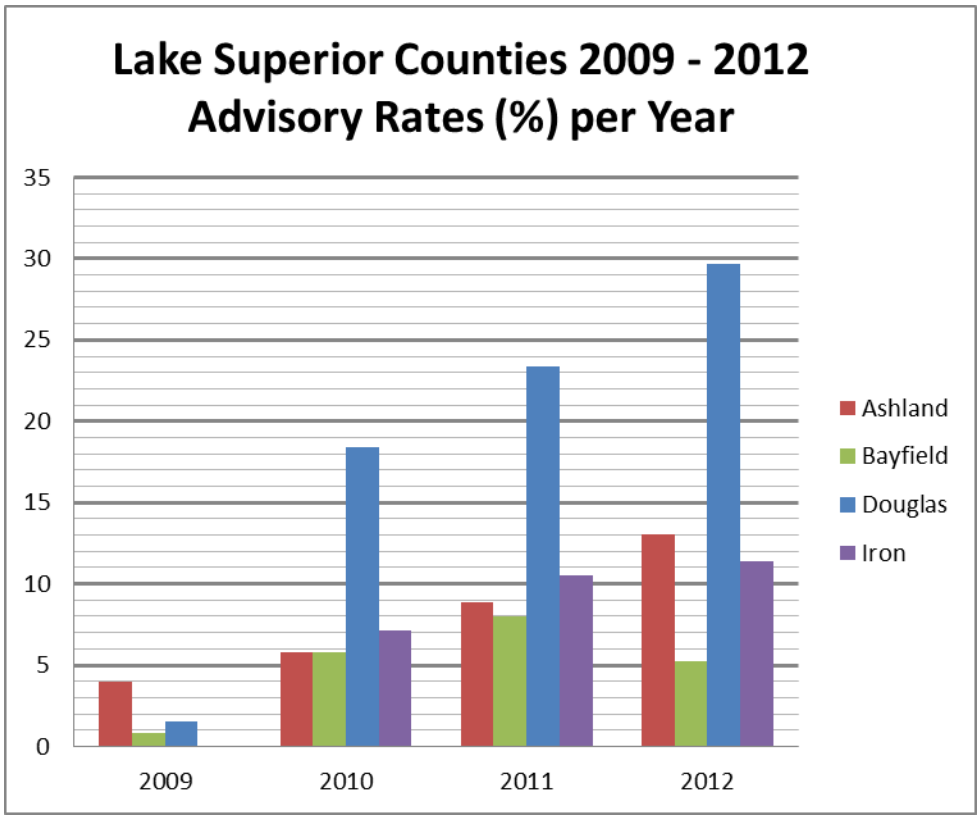
Door
Kewaunee
Manitowoc
Sheboygan
Ozaukee
Milwaukee
Racine
Kenosha


Lake Superior Counties 2009 - 2012
Advisory Rates (%) per Year
35
30
25
20
15
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0
2009
2010
2011
2012
Ashland
Bayfield
Douglas
Iron

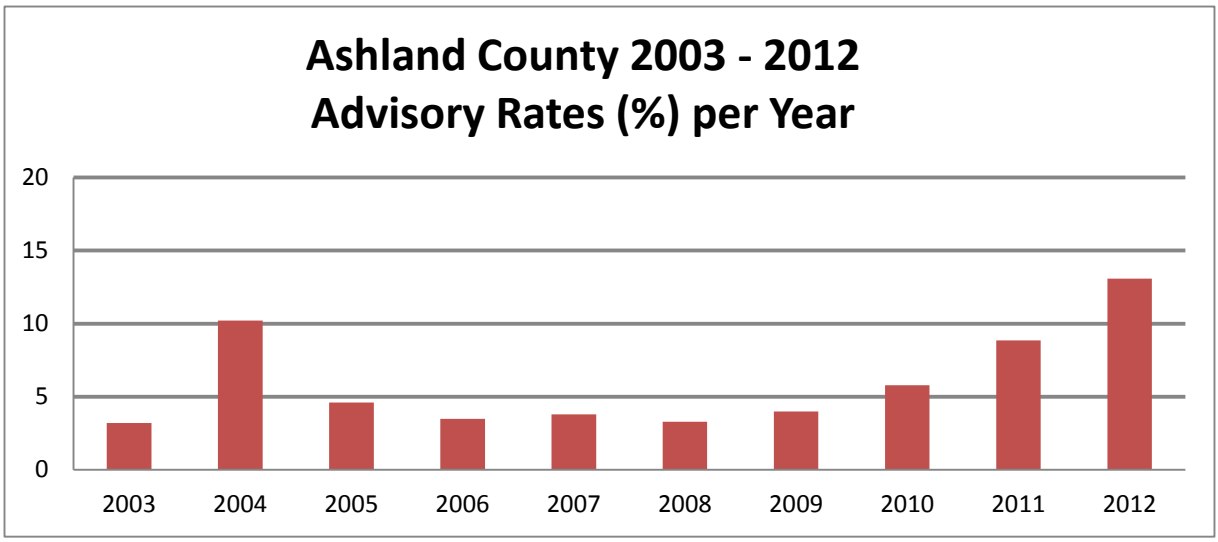
Local Program Status, Research Initiatives, & Successes

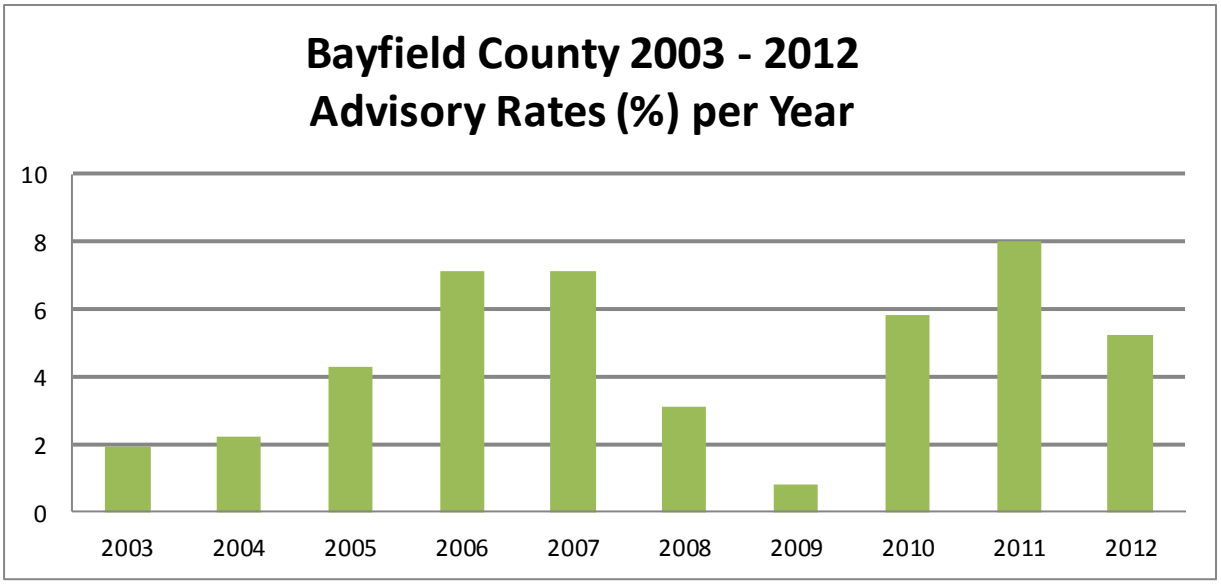
The partners involved in Wisconsin's Great Lakes Beach Monitoring & Notification Program continue to collaborate to increase public awareness about the problems associated with waterborne pathogens along nearshore waters – especially public beaches. In addition to the funding provided by the federal BEACH Act, other local, state, and federal resources have been used to help address some of these problems and increase the use of our public beaches. Some of the notable actions and observations by local partners include:

Ashland, Bayfield, Douglas & Iron Counties
With over 200 miles of Lake Superior coastline that attract many tourists, Ashland, Bayfield, Douglas, and Iron Counties are keenly aware of the importance of clean water and clean beaches. Within these counties, 43 public beaches are monitored at least once per week during the normal Lake Superior beach season (mid-June through mid-September). While BEACH Act funding is helpful, additional resources are needed to supplement local efforts. In particular, partnerships have been built between the counties and Northland College, UW-Oshkosh, and the Lake Superior Alliance to create a comprehensive monitoring and source-tracking program that will help address problems as they are identified. Funding through the Great Lakes Restoration Initiative brought additional resources for more intensive monitoring and implementing selected best management practices (BMPs).

Lake Superior witnessed several record events in 2012 that may have contributed to the increases. In July the first ever recorded algal bloom occurred off the coast near Bayfield, WI possibly fueled by the drought that summer. And in June the Duluth-Superior area received record rainfall causing intensive flash flooding and significant river flooding, sending large amounts of sediment into Lake Superior.

During the 2012 beach season three counties experienced an increase in the number of water quality exceedances while the fourth, Bayfield County, saw a decrease in the number of exceedances. Douglas County leads the state in the number of advisories (29.7%) while Bayfield County is second only to Door in the State with the lowest number of advisories (5.2%). Looking at the historic advisory frequencies, data between 2009 and 2012 displays an overall increasing trend for these Lake Superior beaches that warrants further investigation to identify any attributable causes.




Bayfield County 2003 - 2012
Advisory Rates (%) per Year
10
8
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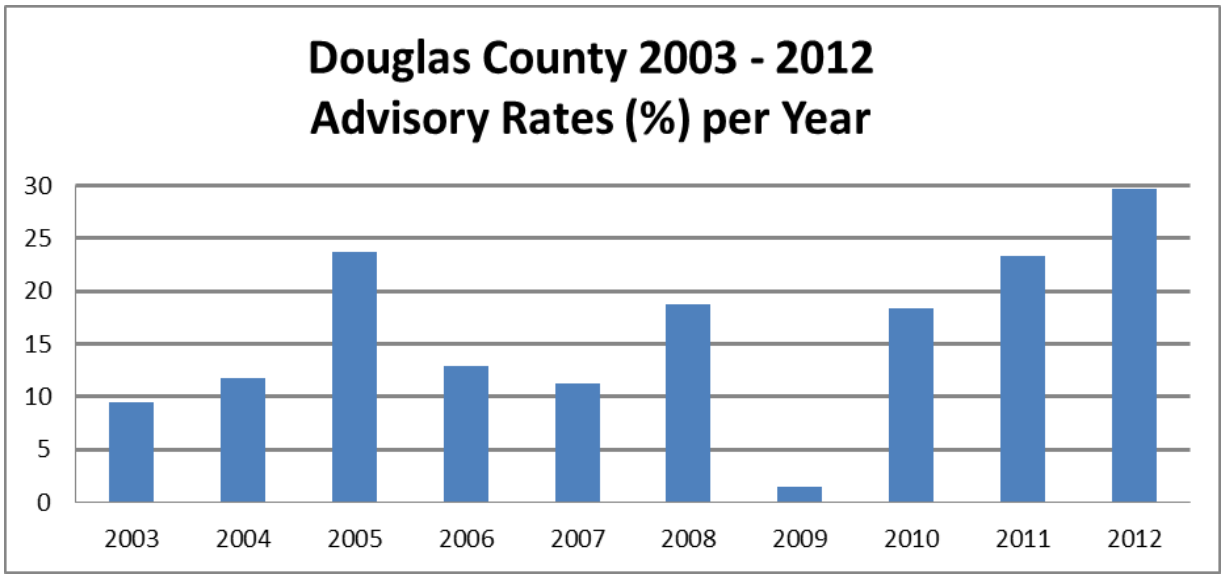
Douglas County 2003 - 2012
Advisory Rates (%) per Year
30
25
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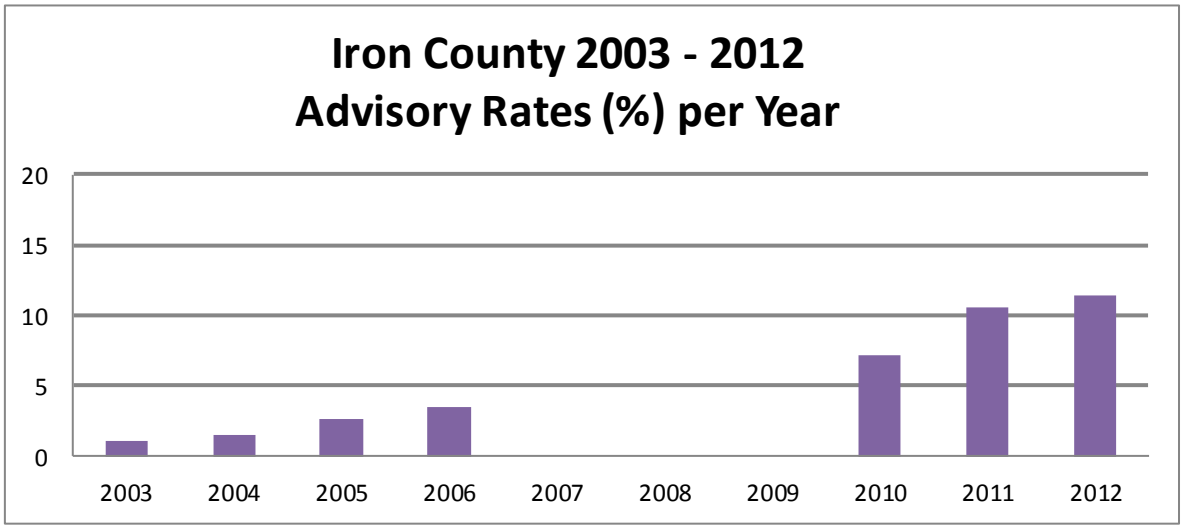
Iron County 2003 - 2012
Advisory Rates (%) per Year
20
15
10
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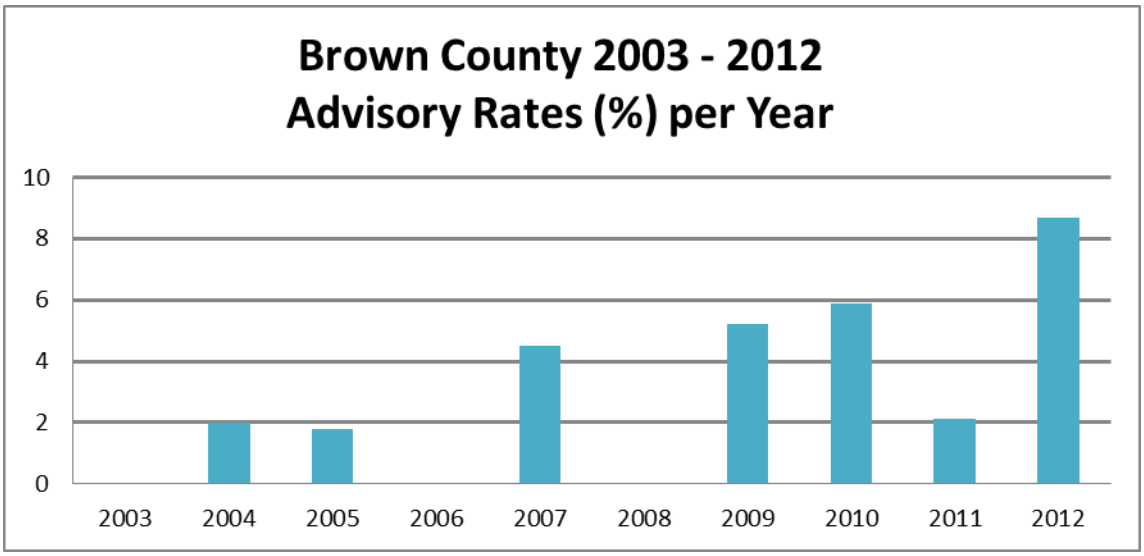
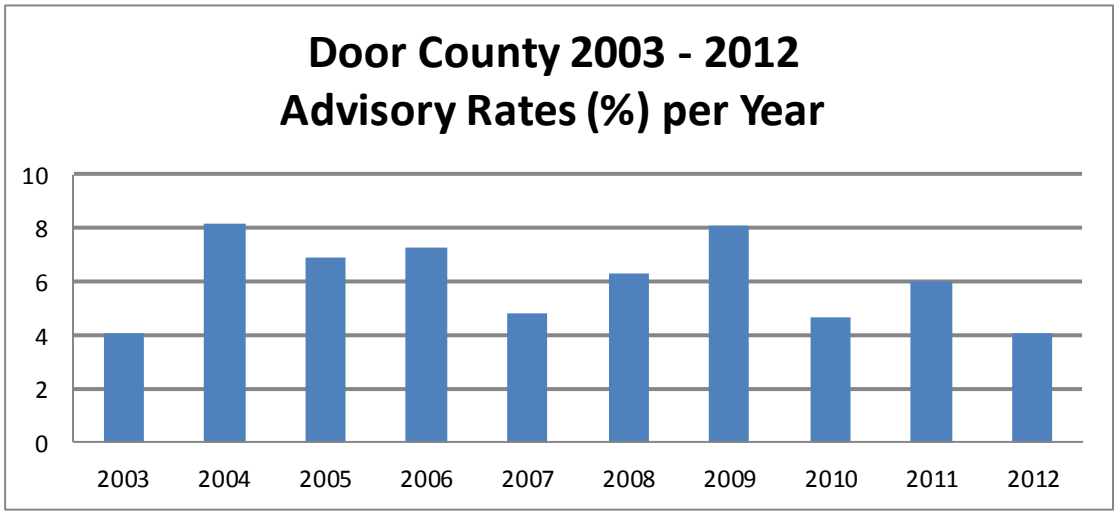
Brown County

The Brown County Health Department monitored three beaches: Bayshore Park Beach, Communiversity Park Beach, and Longtail Point, all of which are identified as low priority beaches. Longtail Point is inaccessible by land, as it is a designated wildlife sanctuary; however, boats congregate off-shore so this area is monitored as a beach. An unusual number of advisories occurred during the 2012 beach season. Historically, advisory frequencies for bacteria contamination are typically below 5%. The city and county officials discussed reopening the long closed Bay Beach in the city of Green Bay. Many of the historic pollution issues at this beach no longer exist and officials would like to see this beach open for public recreation once again.



Door County

Door County has the highest number of coastal beaches in the State, making it one of the most popular summer tourist destinations in Wisconsin. Door County places an emphasis on regular monitoring, testing 31 public beaches on the peninsula as well as Washington and Rock Islands throughout the summer. Priorities for beach monitoring are almost evenly divided between high, medium, and low, with over 1100 samples collected during the 2012 beach season and the lowest advisory rate in the State at 4%.



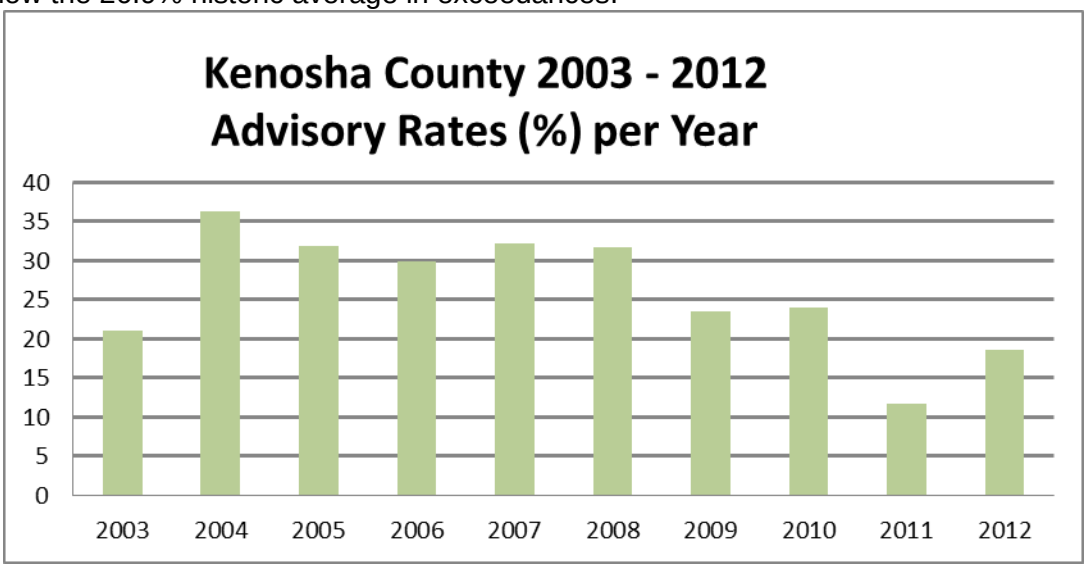
Door County has been very successful in supplementing BEACH Act funding with additional resources, including those provided in partnership with the Door County Public Health

Department, the Door County Soil & Water Conservation Department (DCSWCD), and UW-Oshkosh. Genetic finger printing and antibiotic resistance testing on *E. coli* isolates, rain event and storm water system samples, bird surveys, and spatial distribution surveys of *E. coli* at the beaches have been used to identify possible contamination sources leading to a better understanding of pathogen mitigation opportunities.

Clean water for recreation is critical to the economy of this area – especially since the beach season coincides with the heaviest tourist activity. The Door County Soil and Water Conservation Program embarked on a series of restoration projects in 2009 to implement Best Management Practices to address poor water quality problems at 11 of its beaches. While not all the projects have been fully implemented, their long-term approach to the problem has significantly improved beach health and the aesthetic appeal at many of their beaches. Their success is supported by an intensive monitoring frequency and consistently low percentage of water quality exceedances.

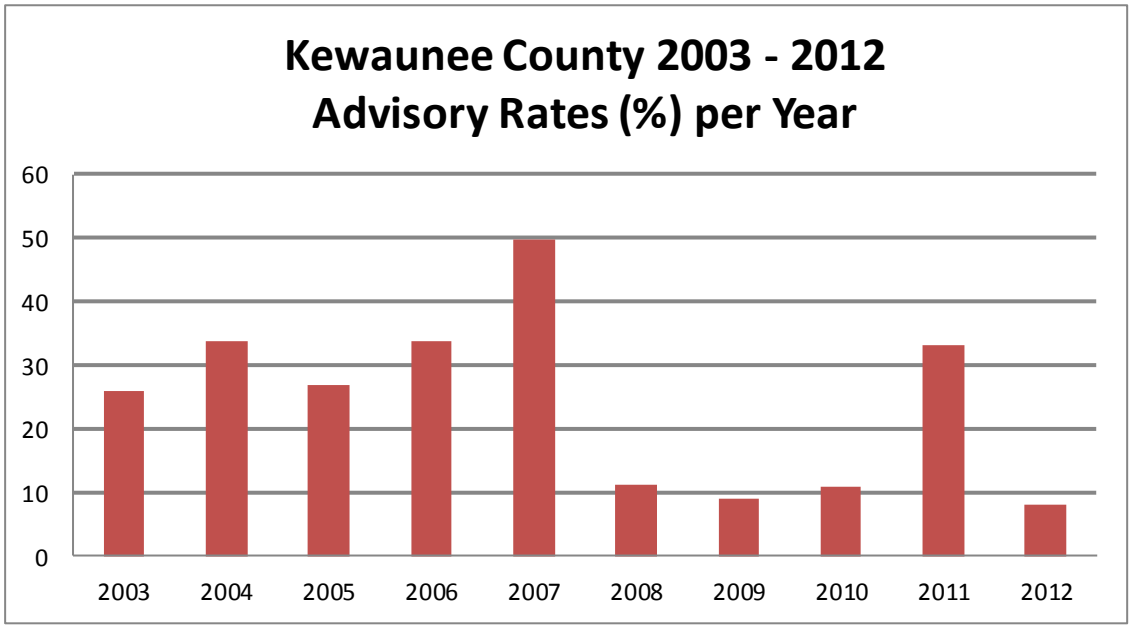
Kenosha County

In 2012, Kenosha County collected 161 samples across five beaches to support BEACH Act monitoring. Kenosha County has 2 medium priority beaches and 2 low priority beaches each of which is listed as impaired waters. The County saw close to a 7% increase in the number of beach samples that exceeded the health advisory threshold when compared to 2011 but is still well below the 26.9% historic average in exceedances.



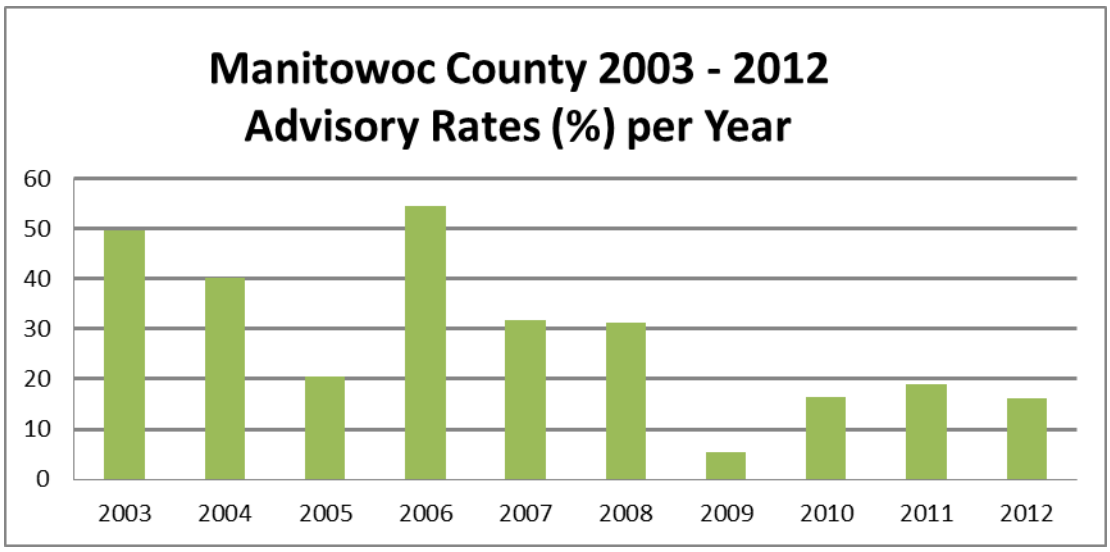
Kewaunee County

Kewaunee County collected 62 samples at two beaches, one medium priority and the other low priority. Both beaches are on the impaired waters list. The data shows the most significant decrease in the number of advisories for water quality exceedances when compared to 2011; however, the advisory rate is similar to that experience between 2008 and 2010. Sampling frequency in 2011 (190 samples) was higher than 2012, likely associated with a sanitary survey at Crescent Beach in Algoma. Sanitary survey results indicate identifiable contaminant sources and the potential for an effective beach restoration project.



Manitowoc County

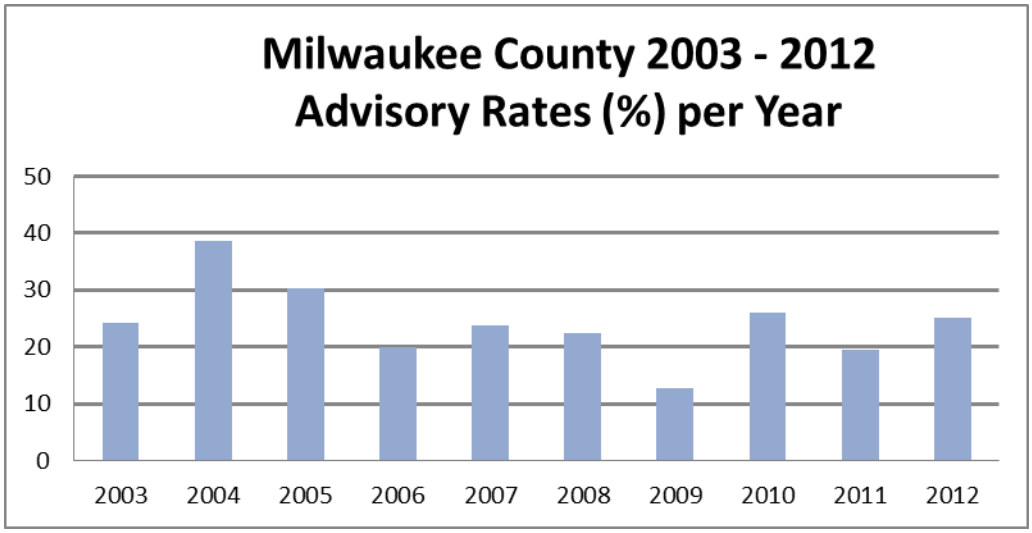
In 2012, Manitowoc County beaches saw 1 2.7% decrease in the number of beach samples that exceeded the health advisory threshold when compared to 2011, with an exceedance rate that is consistent with recent years. The county's historic average is driven by higher advisory rates between 2003 and 2008. For the 2012 beach season, 601 samples were collected along eight coastal beaches (five medium priority and three low priority). All eight beaches are listed as impaired waters and algae are a known contributor to water quality issues as some of these beaches.



Milwaukee County

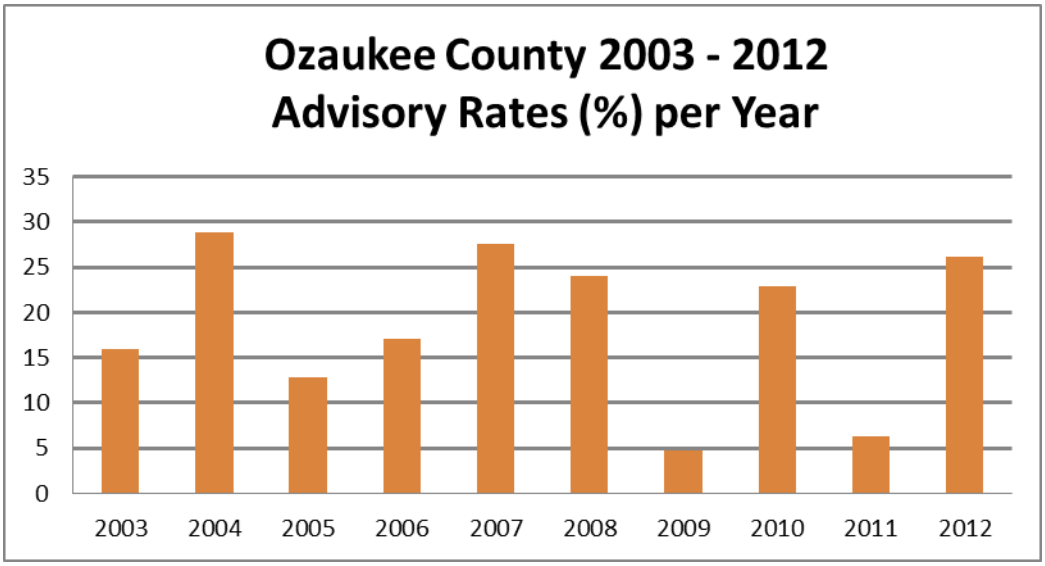
Multiple jurisdictions have responsibility for 12 Milwaukee County Great Lakes beaches, monitoring and making public health decisions at 10 of them. Beach priorities were reassessed for the 2012 season, lowering priorities at two beaches. Bradford Beach has a high priority for monitoring and the remaining beaches are either medium or low priority. Monitoring was discontinued at South Shore Rocky beach, a decision driven by poor access and limiting swimming in that area. Overall, beaches saw a 5.7% increase in the number of beach samples

that exceeded the health advisory threshold when compared to 2011 but the rates are within the historic variation for the county. Aggregate data for the county does not accurately reflect water quality conditions across the county. Looking at individual beaches exceedance rates range from 8 to 49%, with two medium priority beaches, Bender and South Shore showing in excess of 40% of samples as exceedances and bacteria concentrations exceeding 1000 CFU/100 mL resulting in 21 closures at Bender and 7 closures at South Shore. . Beach improvement projects have been installed on several beaches in Milwaukee County, most notably at Bradford Beach for which 10 of 66 samples (15%) exceeded the advisory threshold in 2012.



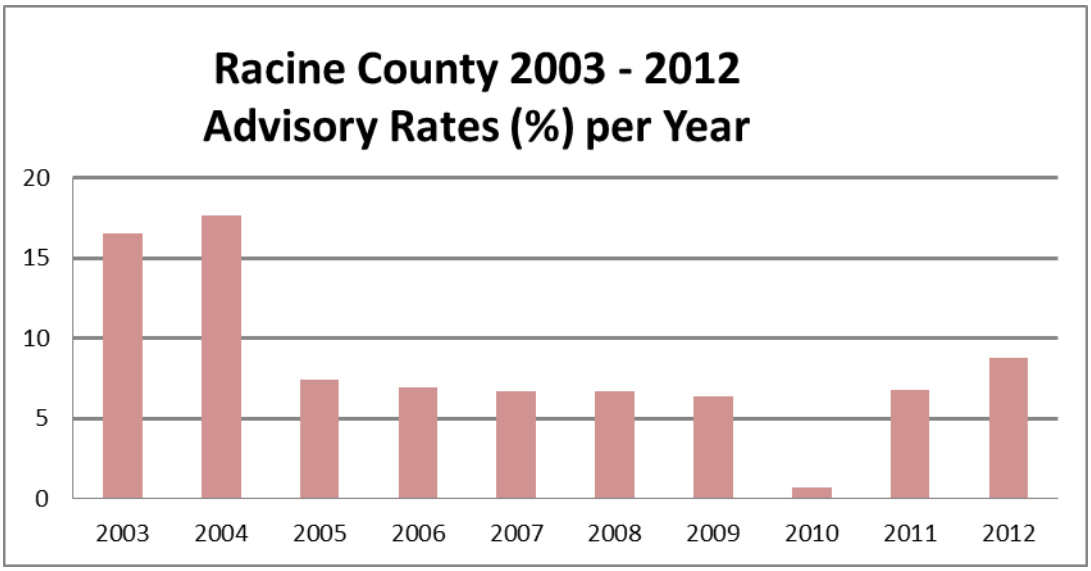
Ozaukee County

Ozaukee County beaches saw a significant increase (19.8%) in the number of beach samples that exceeded the health advisory threshold when compared to 2011 but are within the overall variance seen since monitoring began in 2003. Beaches in this county appeared to be disproportionately affected by the extreme weather conditions experienced in 2012. Of the seven beaches in the county, five are identified as high priority with one medium and one low priority beach. A total of 412 samples were collected during the 2012 beach season and funding was inadequate to pay for re-sample following every exceedance. This became an issue late in the season, when advisories were posted over multiple successive days. Ozaukee County has continued using a predictive model ("Nowcast") for Upper Lake Park Beach. The Nowcast was developed in partnership with the DNR using EPA's "Virtual Beach" modeling software. Ozaukee County's experience during 2012 highlighted the importance of using multiple tools to assess water quality and the need to expedite implementation as a means to optimize the program.



Racine County

The City of Racine places a high priority on monitoring its beaches and uses rapid methods and a weight of evidence approach to determining water quality conditions. As a result of a reassessment of beach priorities, one of the six beaches was removed from the list. Of the remaining five beaches, the two high priority beaches each have multiple monitoring stations, four at North Beach and three at Zoo Beach. The remaining 3 beaches are low priority. A total of 546 compliance samples were collected that were supplemented with nowcasting and qPCR for same-day water quality assessments. Racine experienced an increase of a little over 2% in the number of samples showing advisory-level bacteria concentrations. Given the multiple stations at the two beaches, this represented 8 days during the 2012 season with the majority of the occurrences between July 18 – 25

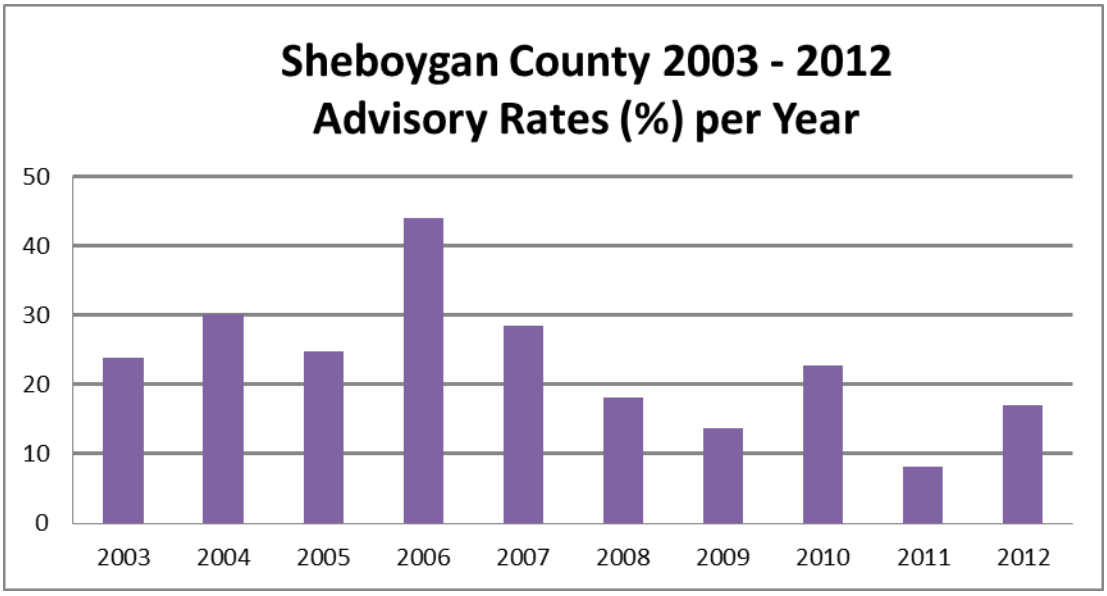


The City of Racine's beach management program leads the state in addressing beach health issues and providing real-time notification of beach advisories. There is a strong emphasis on minimizing decision errors associated with water quality conditions and vigilance to reduce the time beaches had posted advisories. The City was the first in the nation to receive approval from U.S. EPA to use Quantitative Polymerase Chain Reaction (qPCR) analytical method in lieu of the standard culture methods to analyze for an exceedance of the applicable water quality standard,

E.coli, at its beaches. Under the guidance of Dr. Julie Kinzleman, the City developed and tested this method which provides real-time notification of beach health conditions. In addition the City used a Nowcast model (developed with EPA's "Virtual Beach" software) at North Beach. Implementation of the qPCR method and Nowcast along with the traditional monitoring program allows Racine to build upon its previous research. Their forward-thinking efforts at source identification and mitigation serve as a model for the other counties and communities in Wisconsin and the nation.

Sheboygan County

In 2012, Sheboygan County reassessed the priority of its beaches and raised King Beach from medium to high priority. Monitoring occurred at 6 beaches, 5 of which were identified as high priority resulting in 546 samples collected during the beach season. Through the GLRI grant to University of Wisconsin – Oshkosh, sanitary surveys were conducted at two of the beaches, KK Road and Kohler Andrae State Park's north picnic area. Overall, county beaches experienced over an 8% increase in the number of beach advisories compared to 2011 .



Program Deficiencies

Similar to past years, there are a several changes that would be helpful to Wisconsin's efforts to implement a more comprehensive and effective Great Lake Beach Monitoring Program. Two key areas that could use additional support include:

Source Identification & Remediation

After the tenth year of full implementation of the program, the biggest outstanding concern among partners and the public is what is being done to **eliminate** beach advisories and closures. In order to be effective at pollution elimination, **source identification** must be a priority. Although an increasing number of communities would benefit by identifying the sources of *E. coli* to their beaches, the federal BEACH Act does not allow for this. It is unlikely that state funding will be provided for this purpose at the level needed due to constraints on the state budget. Ideally, changes in the federal BEACH Act which have been proposed and debated in the US Congress would be made and funding associated with source identification and remediation would be authorized. Absent those changes, it will be left to local governments and volunteers to engage in effective source identification and remediation to the degree possible using all available tools (i.e., Beach Sanitary Surveys, Great Lakes Restoration Initiative funding, etc.).

Insufficient Funding for Full Program Implementation
The 2012 Beach Season required additional cuts in program implementation to account for increased program costs and reduced federal funding levels. Reductions in the frequency of beach testing were part of the cost savings measures used in 2012. Grant funding was targeted to monitoring activities and operating the Beach Health website (contract with USGS). WDNR used other resources to administer the program. Funding levels did not allow for field audits for quality assurance of sampling procedures. As has been estimated in the past, Wisconsin would achieve full implementation of the required monitoring outlined in the BEACH Act Grant Performance Criteria with an annual budget estimated at nearly $500,000. If no state funding is available and federal funding remains static at approximately $230,000 annually, Wisconsin will continue to implement a program that requires cost-saving measures that may not allow achievement of all of the federal program goals for addressing the problems associated with waterborne pathogens in Great Lakes coastal waters.

Ideas for the 2013 Beach Season

Regardless of program deficiencies, there are ongoing efforts to increase program awareness and advance key program needs for the 2013 Beach Season. It is hoped that some of these efforts will continue to benefit the program as a whole, including, but not limited to:

Increased Coordination
In 2012, considerable efforts were made to increase coordination among – and build new partnerships between – the numerous local, state, federal, academic, and NGO managers, researchers, systems developers, and others working on beach issues in Wisconsin. These efforts culminated in regional "Beach Health" meetings on Lake Superior (Ashland) and Lake Michigan (Racine) attended by over 80 participants in late April/ early May. Sponsored by the Wisconsin Coastal Management Program, the 2-day meetings included presentations, hands-on training on rapid methods and modeling, field visits, and discussions on emerging beach health issues and opportunities. Stakeholders value this type of coordination and would like similar efforts to continue. This will be particularly important for jurisdictions in various stages of implementing nowcasts. .

Predictive Modeling
Efforts continue on the part of multiple researchers in academia and state, federal, and local government to develop, validate, and implement predictive models on a broader scale. As part of these efforts, DNR will continue to provide training and technical assistance to local Nowcast operators and work with EPA and USGS to enhance "Virtual Beach" and other modeling tools. Previous research and operational experience with the Nowcasts in Ozaukee County, City of Racine, and elsewhere in the Great Lakes suggest that the widespread adoption of Nowcast models will result in fewer false exceedances and non-exceedances, as well as fewer overall advisories and closures.

Inland Beaches
Health department officials throughout the state (including non-Great Lakes Coastal agencies) are engaged in a growing dialogue about how to seek program expansion to address pathogen testing and public notification for inland beaches using a program model similar to that used for the Great Lakes beaches.

Volunteer Monitoring
The Alliance for the Great Lakes initiated their Adopt-a-Beach program in southeast Wisconsin last year. This volunteer monitoring effort may provide a cost-effective means to supplement the local beach program resources for source identification and mitigating the trash on the beaches.

They are planning a pilot project to evaluate whether volunteers can collect data of sufficient quality to use in Nowcast modeling.

Conclusion

In spite of a limited budget and an uncertain future for the federal BEACH Act, Wisconsin's Great Lakes Beach Monitoring & Notification Program continues to evolve and provide useful monitoring information for health departments and the public. It is hoped that continued support of this program will heighten awareness of beach health and will provide the resources necessary to increase the knowledge of health professionals allowing for more informed decision making by state and local leaders and less risk to the beach-going public. After ten years of program implementation, the contributing partners believe that the data and experience gained will continue to aid both the public and local and state decision makers in efforts to manage water quality and seek effective solutions to restore and maintain excellence in the quality of all public beaches throughout Wisconsin.