



# Wisconsin's Great Lakes Beach Monitoring & Notification Program

## 2013 Beach Season Summary



**Office of the Great Lakes  
Wisconsin Department of Natural Resources  
December 16, 2014**

## **Acknowledgements**

*Cover photos:*

*An evening at Crescent Beach, Manitowoc County WI; photo by Donalea Dinsmore*

*In the Soup, Milwaukee County, WI; photo by Marc Ponto*

Wisconsin's Great Lakes Beach Monitoring & Notification Program is largely funded by a grant provided by the United States Environmental Protection Agency (USEPA) under the authority of the Federal Beaches Environmental Assessment and Coast Health Act (BEACH Act). Two counties received grants from Wisconsin's Coastal Management Program to pilot a two tiered Nowcasting system. These grants included funds for a full season of beach monitoring at targeted beaches. To varying degrees, coastal counties and local communities support beach management activities with staff time to collect samples, post advisories, and report the data to the Beach Health Website. Through partnership with the University of Wisconsin – Oshkosh, various public health agencies use field and laboratory services available at fairly low cost and within a reasonable distance from the coastal beaches. In southeastern Wisconsin, the City of Racine Health Department provides technical and monitoring support to local participants. The energy and vision that these partnerships bring to coastal beach management issues is invaluable.

Adam Mednick's work on Nowcasting has been critical for moving Wisconsin's Beach program forward. GLRI grants to WDNR and USGS provided funds for implementing Nowcasts locally. This collaborative effort enabled tool development (Virtual Beach 3.0 and the Environmental Data Discovery and Transformation Tool) that, when integrated into the Beach Health website, streamlined processes and made the tools accessible and understandable to the local participants. In addition to EPA support for Virtual Beach, the Wisconsin Coastal Management Program funded enhancements within the Beach Health Website to automate data transfer, allowing Nowcasts to be made within minutes.

Sincere thanks go to Julie Kinzelman (City of Racine), Greg Kleinheinz and Kimberly Busse (University of Wisconsin – Oshkosh), and Adam Mednick (WDNR). Without their efforts to work with stakeholders, identify alternative funding, and implement the beach program in spite of funding uncertainties, the level of monitoring done during 2013 would not have been possible. We also recognize the significant efforts by Rhonda Kohlberg at Door County Public Health to reach out to communities and stakeholders in the county, making the case for beach funding locally. The City of Milwaukee partnered with the University of Wisconsin – Milwaukee (Schools of Public Health and Freshwater Science) Water Institute to assure continued operations in our largest metropolitan area. Wisconsin's Coastal Management Program's support for piloting two tiered nowcasting and completing key sanitary surveys funded significant projects in Ozaukee and Sheboygan Counties. WDNR's commitment to addressing impairments in the St. Louis River Area of Concern made it possible for monitoring to continue in Douglas County.

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

### **County participants include:**

Ashland County Health Department  
Bayfield County Health Department  
Brown County Health Department (voluntary)  
City of Milwaukee Health Department  
Door County Health Department  
Douglas County Health Department

Iron County Health Department (voluntary)  
Kenosha County Division of Health  
Kewaunee County Health Department  
Manitowoc County Health Department  
North Shore/Shorewood Health Department  
Ozaukee County Health Department  
City of Racine Health Department  
Sheboygan County Human Services  
City of South Milwaukee Health Department

**Additional assistance provided by:**

University of Wisconsin, Oshkosh – Environmental Research and Innovation Center  
Sampling and Analytical Support for Door, Kewaunee, and Manitowoc Counties and  
Kohler-Andrae State Park as well as Brown, Bayfield and Iron Counties  
Racine Public Health Department  
Sampling and Analytical Support for Kenosha and Racine Counties and South Milwaukee  
Health Department  
Northland College – Sigurd Olson Environmental Institute  
Sampling and Analytical Support for Ashland and Douglas Counties  
United States Environmental Protection Agency – Region 5  
United States Geological Survey – Middleton, Wisconsin  
University of Wisconsin, Madison – State Laboratory of Hygiene  
Wisconsin Dept. of Administration – WI Coastal Management Program

## Summary

The summer of 2013 was the eleventh season of the Wisconsin's Great Lakes Beach Monitoring & Notification Program. The beach program experienced significant changes in the number of beaches covered, frequency of monitoring, and added emphasis on nowcast with adjustments to decision criteria based on its operation.

The United States Environmental Protection Agency (USEPA) awarded the Wisconsin Department of Natural Resources (WDNR) \$212,000 (a 5% reduction from previous years) to implement the federal Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000. WDNR accepted this grant on June 28, 2013, a month into the 2013 beach season. The uncertainties about the availability of funding and its timing necessitated multiple contingency planning efforts and resulted in considerable stress to the program. Existing partners stepped up efforts to seek alternate funding, to identify existing projects with compatible objectives that could also support beach monitoring, and to begin monitoring in advance of contract or assistance agreement awards. Considering the practical constraints involved in allocating grant funds in the year awarded and the limited ability to plan when funding is interrupted, WDNR decided to allocate the 2013 BEACH Act grant over two beach seasons. This gave the local participants more certainty about available grant funding that could be factored into their individual budget planning cycles. Overall, it gave the Beach program necessary flexibility to consider multiple funding sources and their associated constraints. Wisconsin's Beach Program reduced the number of beaches that were funded, adjusted the minimum monitoring requirements, and supported implementation of operational nowcasts wherever feasible.

In 2013, monitoring occurred at a total of 110 beaches, of which 26 locations were monitored voluntarily. Local jurisdictions implemented Nowcasting at 21 beaches, with some health departments using it as the primary tool for posting public notifications and others using it in conjunction with other decision tools. A total of 3,145 samples were collected (compared to 4,936 samples in 2012).

Given the number of adjustments made to the monitoring frequencies and decision tools, straight comparisons of 2013 sample exceedance rates by county with data from previous years can be misleading and is not recommended. A number of beach managers reported that water quality in a given year has been strongly influenced by unusual weather patterns (e.g. drought, excessive heat, prolonged or intense rainfall with flooding) and individual beaches are affected differently. This suggests that trends in water quality are better assessed by beach and over multiple years. The 2013 annual report presents data summaries by county and for individual beaches to demonstrate how the program adjustments affected the overall assessment of beach conditions.

### **Lessons Learned**

BEACH Act funding is a cornerstone for Wisconsin's Great Lakes Beach Program. We cannot assume that funding provided to county and city public health departments will be replaced by local sources given budget constraints and significant competition for public health dollars. Beach management is often the responsibility of Parks Departments who lack the staff to make public health decisions and whose maintenance budgets are also stretched very thin. These departments may not be connected to departments involved in community development, land use planning, and green infrastructure. Eliminating BEACH Act funding places all of the accomplishments of our Beach Program in jeopardy and risks diverting attention from water quality along our coastline. The data are critical to spotlighting problems, without which it's difficult to generate community support to invest in beach restorations.

Early in 2013, it appeared that no Federal funding would be available for BEACH Act grants. The dire funding prospects forced a re-examination of our priorities and operating principles and procedures. Historically, Wisconsin's Beach Program distributed its grant dollars for monitoring in the same year issued, a practice encouraged by EPA. This meant that both the grant and the assistance agreements to the monitoring partners needed to be expedited every year. Disruptions in the funding schedule had significant consequences for our program implementation, adding significant stress to partnership relationships. Budget cuts in several local jurisdictions meant resources were not available to pay existing staff, hire seasonal staff, or cover costs without the certainty of reimbursement. We faced the real possibility that no monitoring would occur at low and medium priority beaches leaving Wisconsin's Lake Superior beaches totally unmonitored. Door County (Rhonda Kohlberg) made an exceptional effort to find local funding as did the cities of Racine and Milwaukee. Thanks to efforts by Dr. Julie Kinzelman (Racine Health Department), Dr. Kleinheinz and Kim Busse (UW-Oshkosh), Adam Mednick (WDNR) and the coastal program (DOA) to leverage existing resources and find alternate funding sources, all tier 1 (high priority) beaches found short-term funding; however, these are one-time resources that will not sustain the program beyond 2014.

Both unseasonably cool weather and funding uncertainties contributed to a delay in beginning monitoring in some locations and miscommunications about which beaches would be monitored in 2013. Additionally, several local jurisdictions were subject to furloughs, interrupting their ability to perform routine job functions. Government shut downs and furloughs may occur into the future and the program needs to incorporate contingencies for monitoring and public notifications, particularly if web sites and data servers need to be shut down temporarily.

To avoid similar circumstances in 2014 and give our local partners budget certainty, Wisconsin's Beach Program adjusted the current grant allocations to cover two seasons with a more conservative monitoring schedule so future grants will be allocated to local participants for the following beach season (e.g. 2014 grant funds are allocated to the 2015 beach season). This provided a cushion for planning so localities could budget and retain staff within their usual cycles and not be disproportionately affected by uncertainties and delays in the Federal budget process or other delays in obtaining funding.

In the face of minimal funding, several local communities were motivated to implement Nowcasting<sup>1</sup> and to rely more heavily on this tool as a primary decision tool, with the monitoring data playing a supporting role in the decisions. Several local public health departments are willing to operate the models but most generally lack the expertise and resources to assume the responsibility for their development and recalibration. They will need continued support to build their confidence in using the tools and the decisions that stem from it.

With a shifting balance between culture-based monitoring methods and real-time methods like qPCR and Nowcast modeling, our traditional methods for assessing the overall water quality and coastal health needs to be re-evaluated. Beaches may have partial day advisories and our data systems need to consider how those circumstances will be reported and how implementing these rapid methods will be considered in decisions about water quality impairments. Traditionally, only the culture-based sample results were considered, however, the shift in emphasis may affect the robustness of the data set for assessing impairment status. During the transition period between methods and advisory procedures, the local cooperators need additional technical support and in some cases, require additional monitoring dollars. Sanitary surveys and the beach-specific physical data are increasingly important for implementing the models as well as identifying and mitigating contaminant sources. Our program needs the ability to respond to short-term (and at

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<sup>1</sup> "Model-based Decision Support using EPA's "Virtual Beach" Software Package <http://www2.epa.gov/exposure-assessment-models/virtual-beach-30-download-page> and USGS' EnDDat Web Data Portal" <http://cida.usgs.gov/enddat>

times, unexpected) resource needs. Future grants need to consider reserving a small allocation to fund for special needs or small projects to support the transition.

Wisconsin's program is decentralized, relying on voluntary county participation in cooperation with WDNR to determine which beaches are monitored. The data generated by the program feeds water quality assessments for inclusion on the 303(d) Impaired Waters List. Program focus needs to shift slightly to assure that monitoring for beaches that are listed as impaired is not abandoned. If the program becomes entirely voluntary, WDNR and EPA will not have any guarantee that beach monitoring data will be reported using the existing databases and transmission mechanisms. Several counties with inland beaches use their own websites and notification mechanisms to communicate water quality status. Without funding, monitoring frequencies, the lists of beaches monitored, and even the public notification procedures will be entirely under local control so there may be significant inconsistencies in level of vigilance along the coastline, similar to that experienced for Wisconsin's inland beaches.

### **General Program Overview**

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."*

Currently, Wisconsin lists 190 coastal beaches along Lake Michigan and Lake Superior. (Sam Myers in Racine and South Shore Rocky in Milwaukee were removed from the original list of 192 coastal beaches.) 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. As a result of sanitary surveys performed in previous years, beach lengths were updated and posted for public comment on Wisconsin DNR's beach website. 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 have changed beach dimensions over time, individual beaches may be improved or restored and beach usage patterns also change, so local beach managers are given an opportunity to re-evaluate their priority classification and update their information annually. 2013 reflects a year of historic low lake levels, exposing lakebed that may have been under water in 2002 when beaches were originally mapped. Phragmites infestations in northeast Wisconsin also affect size and accessibility to several beaches.

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. The assistance agreements and contracts were expanded in 2012 to allow for implementation of Nowcast modeling and to provide an opportunity for jurisdictions with capability to do qPCR to demonstrate their performance at specific beaches and implement more real-time monitoring.

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 and operate nowcast models. 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 - 2013 Program Highlights**

Without the committed group of stakeholders and willingness to adapt to uncertain circumstances, significantly less monitoring would have occurred at Wisconsin's coastal beaches during 2013. EPA Region V's efforts to regularly communicate funding status and expedite Wisconsin's grant award mitigated the effects of the delayed funding and provided our program the ability to make adjustments in a more timely fashion.

In preparation for the 2013 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. Two beaches, Sam Myers in Racine and South Shore Rocky in Milwaukee were 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 strategy for allocating funding placed a priority on support for Wisconsin's Beach Health web application operated by USGS because it both manages the data and provides public notification of beach conditions. Funding for monitoring considered the beach priority (Tier), availability to leverage other funding or partnership arrangements, locations with operational Nowcasts, travel considerations and status on the 303(d) impaired waters list. This meant that low priority (Tier 3) beaches were unfunded unless the beaches were listed as impaired or monitoring was funded locally. Likewise, travel costs associated with monitoring beaches on islands were too costly to be funded. With few exceptions, these beaches are in Tier 3.

Budget reductions and grant timing drove our decision to once again reduce the minimum required sampling frequency at high priority beaches (Tier 1) to twice per week, recognizing that Nowcasts in place at 20 beaches supported public notifications and partners have the latitude to voluntarily increase monitoring at any beaches based on local needs and funding. Medium priority beaches (Tier 2) with Nowcasts received funding for sampling twice per week and beaches listed as impaired on the 303(d) list were prioritized for sampling once per week. 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.

Based on the funding strategy, fewer counties and health departments were supported with BEACH Act funding in 2013 than in past years. Brown and Iron Counties received no BEACH Act funding for 2013 (and 2014) because their beaches were all ranked as low priority (Tier 3) and none were listed on the impaired waters list. Lake Michigan beaches received analytical support for a fourteen week sampling season while Lake Superior beaches (Ashland, Bayfield, Douglas, and Iron counties) operated during a twelve to thirteen week sampling season, attributable to late ice out (mid-May) in Lake Superior. In southeast Wisconsin (from South Milwaukee to the state

line), Racine Public Health Department coordinated monitoring with the local health departments, making it possible to leverage funding and staff resources.

Beach monitoring continued voluntarily at some beaches and was reported using Wisconsin's Beach Health public notification website. WDNR provided alternate funding for two beaches in Douglas County that are listed as impaired waters.

Similar to past years, 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://ww.wibeaches.us>). Decisions to post an advisory were generally triggered by the amount of *E. coli* present as compared to 235 colonies/100 mL threshold recommended by USEPA, results of rapid lab methods (qPCR) or statistical "Nowcast" models. Beach closure decisions were generally based on *E. coli* results of 1000 colonies/100 mL. In some cases, advisories 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.

### **Time Schedule**

The activities described in this report took place during Federal Fiscal Year (FFY) 2013 (October 1, 2012 through September 30, 2013). FFY 2013 encompassed the entire 2013 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. In Lake Superior, ice remained in the lake until very late May. 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 – BEACH Act Grant only**

On June 28, 2013, USEPA awarded Wisconsin a BEACH Act grant of \$212,000, a 5% reduction from previous years. Approximately \$16,135 remained in the 2012 grant which was available for 2013 monitoring needs. USEPA required that 2012 funds be spent before the 2013 BEACH Act grant could be issued. In light of the circumstances surrounding the Federal budget, the timing for the grant award, and the prospect of uncertain funding in 2014, Wisconsin's Beach Program decided to allocate funds to cover two beach seasons (2013 and 2014) to assure some stability and certainty in the program operations. The highest priority for funding was given to maintaining the USGS website, a central tool for notifying the public about beach conditions and to manage data reported to USEPA as required by the grant

Our program partners sought funding from other sources and evaluated available resources to find efficiencies and optimize the monitoring that could be accomplished. Considering available funding and distribution over two beach seasons, low priority beaches were ineligible for funding unless the beach was identified as an impaired water for bacteria. Monitoring for beaches on islands could only be funded by the grant if transportation costs were covered by another means.

Because the grant funds were allocated to cover two beach seasons and some jurisdictions secured alternate funds with their own constraints, aid agreements or contracts contained flexibility to how funding could be divided between the two years. The 2014 season funding is shown for reference.

**Table 1.** Allocation of Beach Act Funds for the 2013 Season

<b>Participating Locations/Counties</b>	<b>2012 Grant</b>	<b>2013 Grant</b>	<b>2014 Allocation</b>
Ashland County		\$6000	\$6000
Bayfield County		\$2000	\$2000
Brown County		\$0	\$0
Door	\$8000	\$32,000	\$40,000
Douglas		\$0*	\$0*
Iron		\$0	\$0
Kenosha		+	+
Kewaunee County++		\$3000	\$3000
Manitowoc County++		\$6000	\$6000
Milwaukee, City of	\$1335		\$10,365
Northshore/Shorewood Combined Health Department,		\$2450	\$2450
Ozaukee County		\$16,000	*
Racine, City of	\$6800	\$4,735	\$22,000
Sheboygan County		\$*	\$10,000
Kohler-Andrae State Park ++		\$2000	\$2000
South Milwaukee, City of		+	+
<b>Total</b>	<b>\$16,135</b>	<b>\$74,185</b>	<b>\$103,815</b>

\*Alternate funding used for monitoring

+Funded through City of Racine allocation

++Funded through agreement with UW-Oshkosh

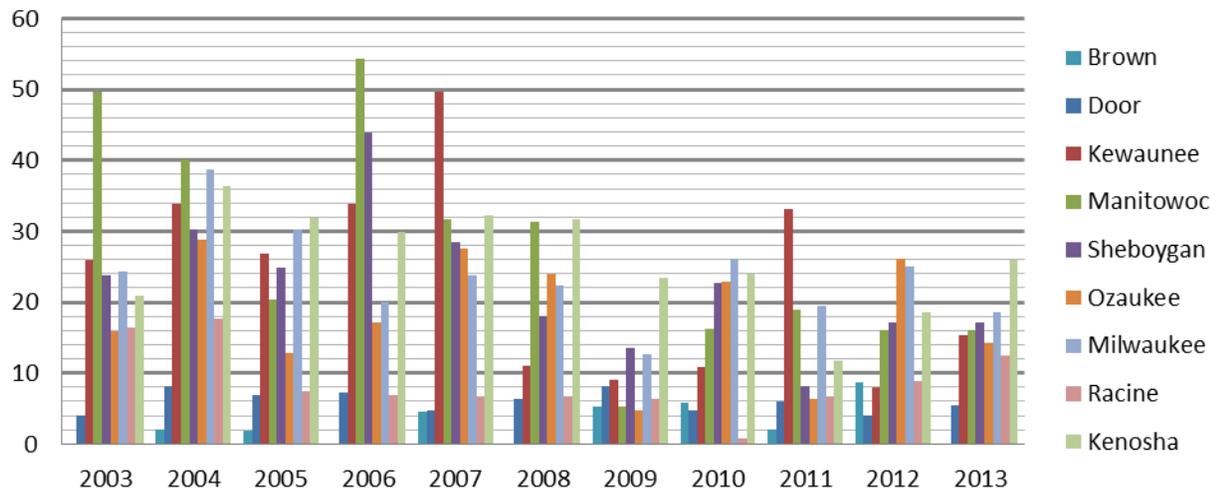
### **Monitoring Summary Results**

In 2013, monitoring occurred at a total of 110 beaches, of which 26 locations monitored voluntarily. Local jurisdictions implemented Nowcasting at 21 beaches, with some health departments using it as the primary tool for posting public notifications and others using it in conjunction with other decision tools. A total of 3145 samples were collected (compared to 4,936 samples in 2012) that were reported on the Beach Health Website (<http://www.wibeaches.us>). At some locations, results reported were composite of multiple locations so the total sample numbers has been adjusted to avoid double counting. Of the samples collected 12.3% exceeded the water quality advisory threshold of 235 CFU/100mL (Table 2). Of those exceedances, 3.1% of all samples collected exceeded the 1,000 CFU/100mL threshold for beach closure. ***At face value the percentage of samples exceeding the advisory threshold was less than 2012; however, these numbers are not truly comparable given the changes in beaches monitored, monitoring frequency adjustments, and nowcast implementation.***

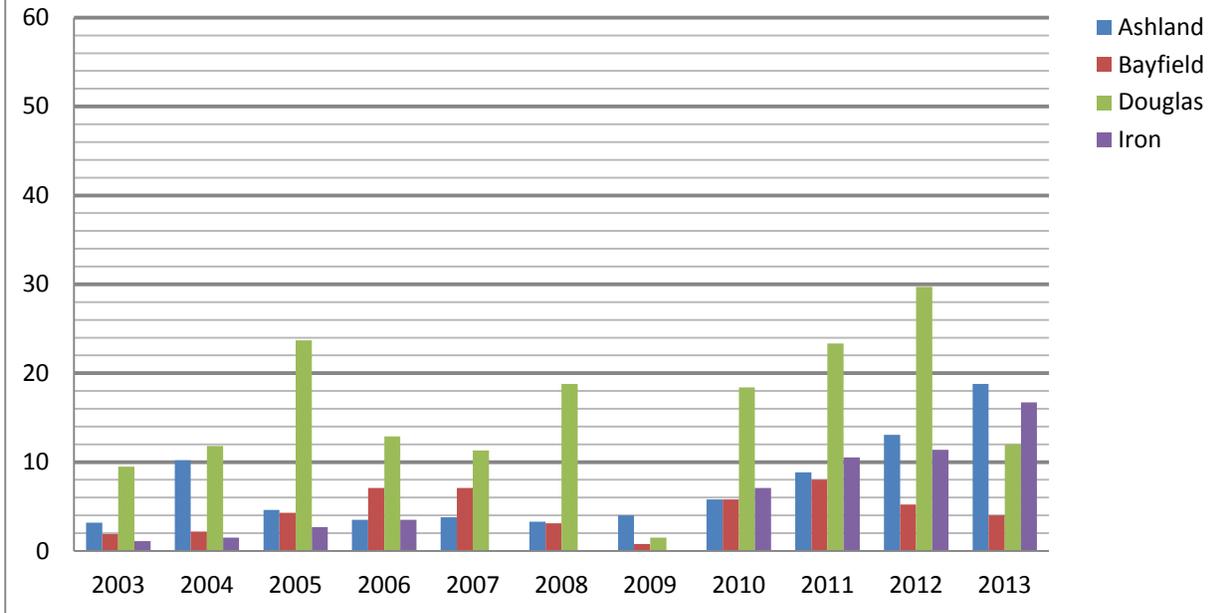
**Table 2.** Annual Sample Percentages that exceed the advisory level of 235 CFU/100mL

<b>County</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Ashland	3.2	10.2	4.6	3.5	3.8	3.3	4	5.8	8.8	13.1	18.8
Bayfield	1.9	2.2	4.3	7.1	7.1	3.1	0.8	5.8	8.0	5.2	4.1
Brown	0	2	1.8	0	4.5	0	5.2	5.9	2.1	8.7	NA
Door	4.1	8.2	6.9	7.3	4.8	6.3	8.1	4.7	6.0	4.1	5.5
Douglas	9.5	11.8	23.7	12.9	11.3	18.8	1.5	18.4	23.3	29.7	12.0
Iron	1.1	1.5	2.7	3.5	0	0	0	7.1	10.5	11.4	16.7
Kenosha	21	36.3	31.9	29.9	32.2	31.7	23.5	24	11.7	18.6	25.9
Kewaunee	26	33.9	26.9	33.9	49.7	11.1	9.1	10.9	33.2	8.1	15.3
Manitowoc	49.6	40.1	20.4	54.4	31.7	31.3	5.3	16.3	18.9	16.1	16.1
Milwaukee	24.3	38.7	30.3	20	23.7	22.4	12.7	26.1	19.4	25.1	18.8
Ozaukee	15.9	28.9	12.9	17.1	27.6	24	4.8	22.9	6.4	26.1	14.3
Racine	16.5	17.6	7.4	6.9	6.7	6.7	6.4	0.7	6.8	8.8	12.5
Sheboygan	23.8	30.2	24.8	43.9	28.5	18.1	13.6	22.7	8.2	17.1	17.1
Percent of all samples	<b>14.6</b>	<b>22.2</b>	<b>15.7</b>	<b>17.5</b>	<b>17.1</b>	<b>14.4</b>	<b>7.3</b>	<b>12.4</b>	<b>11.8</b>	<b>14.4</b>	<b>12.3</b>

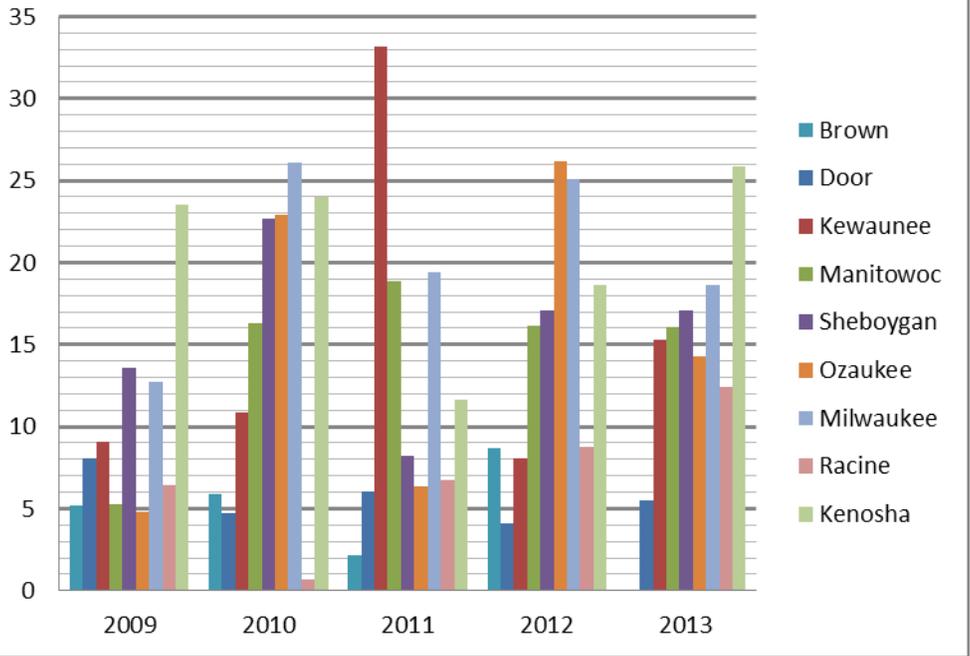
## Lake Michigan Counties 2003 - 2013 Advisory Rates (%) per Year



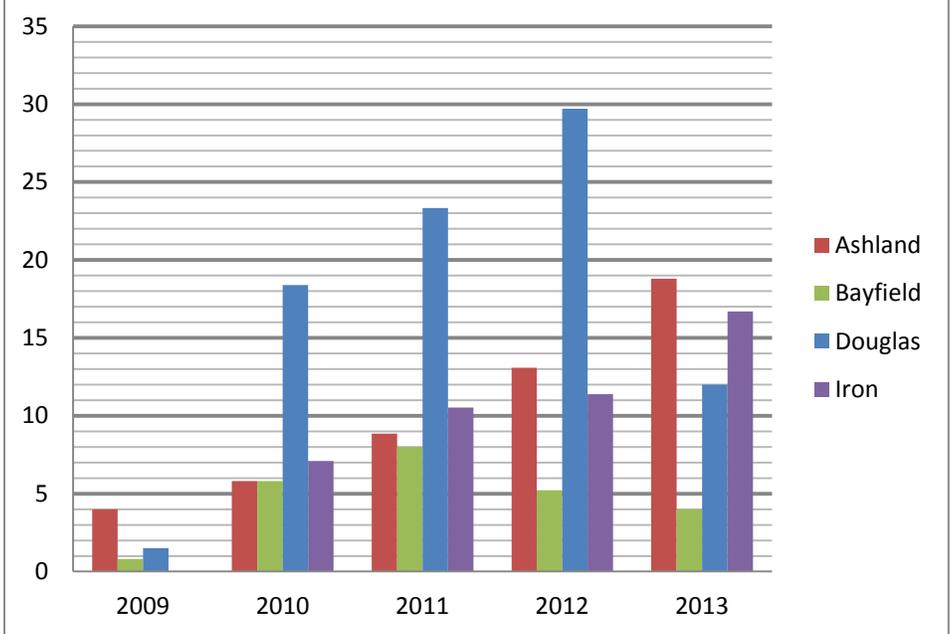
## Lake Superior Counties 2003 - 2013 Advisory Rates (%) per Year



### Lake Michigan Counties 2009 - 2013 Advisory Rates (%) per Year



### Lake Superior Counties 2009 - 2013 Advisory Rates (%) per Year



## **Local Program Status**

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.

Summary data is reported for each monitored beach within a county. The tables provide summary information for the contracted frequency with encoded status information (Nowcast, Voluntary, Alternate funding), total number of samples collected, the number of samples that exceed the E coli advisory threshold of 235 colonies/100 mL in 2013. Summary statistics for the E coli monitoring results were derived from the Wisconsin's Beach Health database. Note that the highlighted line for each county provides summary information for the county, with the first entry identifying the number of monitored beaches rather than the contracted frequency.

### **Lake Superior**

#### ***Ashland County***

In 2013, Ashland County maintained monitoring at four of the seven coastal beaches and implemented nowcasting at Kreher Park and Maslowski beaches. Late ice out in Chequamegon Bay delayed the beginning of the beach season monitoring until the second week in June. Although 39% fewer samples were collected compared with 2012, the county was able to monitor beach water quality five days per week nowcasting. In addition to the Nowcast, the geometric mean of the E coli counts was considered in their decision criteria.

<b>2013 Contract Freq.</b>	<b>2013 Monitored Beaches</b>	<b>Total Samples</b>	<b>#&gt;235</b>	<b>% Exceedances</b>	<b>#&gt;1000</b>	<b>% Closures</b>
2	Bayview Park Beach	31	1	3.2%	0	0.0%
2	Big Bay State Park Beach	14	0	0.0%	0	0.0%
	Big Bay Town Park Beach					
	Casper Road Beach					
2N	Kreher Park Beach	43	9	20.9%	2	4.7%
	La Pointe Memorial Beach					
2N	Maslowski Beaches	40	14	35.0%	2	5.0%
4	<b>Ashland County Total</b>	<b>128</b>	<b>24</b>	<b>18.8%</b>	<b>4</b>	<b>3.1%</b>

#### ***Bayfield County***

Bayfield County received BEACH Act funding for two beaches and voluntarily monitored 15 of the 17 beaches in the county. They used a Nowcast model developed by USGS at Thompson West End Park Beach. This beach received a redesign plan through the UW-Oshkosh GLRI grant.

2013 Contract		Total	%	%		
Freq.	2013 Monitored Beaches	Samples	Exceedances	Closures		
		#>235	#>1000			
V	Bark Bay Beaches	11	0	0.0%	0	0.0%
V	Bono Creek Boat Launch Beach	10	0	0.0%	0	0.0%
V	Broad Street Beach	22	0	0.0%	0	0.0%
V	Herbster Beach	13	1	7.7%	0	0.0%
V	Little Sand Bay Beach	11	0	0.0%	0	0.0%
V	Memorial Beach Bayfield	12	0	0.0%	0	0.0%
V	Memorial Park Beach Washburn	10	0	0.0%	0	0.0%
V	Port Wing Beach East	15	2	13.3%	0	0.0%
V	Port Wing Beach West	13	2	15.4%	0	0.0%
V	Sioux River Beach North	12	0	0.0%	0	0.0%
V	Sioux River Beach South	12	0	0.0%	0	0.0%
V	Siskiwit Bay Beach	13	1	7.7%	1	7.7%
2N	Thompson West End Park Beach	43	3	7.0%	0	0.0%
V	Washburn Marina Beach	12	0	0.0%	0	0.0%
V	Washburn Walking Trail Beach / BAB Beach	13	1	7.7%	0	0.0%
V	Washington Avenue Beach	12	0	0.0%	0	0.0%
V	Wikdal Memorial Boat Launch Beach	11	0	0.0%	0	0.0%
<b>17</b>	<b>Bayfield County Total</b>	<b>244</b>	<b>10</b>	<b>4.1%</b>	<b>1</b>	<b>0.4%</b>

### ***Douglas County***

The two Douglas County beaches that were monitored in 2013 are both listed on the impaired waters list and part of the St. Louis Estuary Area of Concern. BEACH Act funds were insufficient to support all beaches so alternate funding was used to contract with Northland College to conduct the monitoring.

2013 Contract		Total	%	%		
Freq.	2013 Monitored Beaches	Samples	Exceedances	Closures		
		#>235	#>1000			
	Allouez Bay Beach 3					
	Amnicon River Beach					
A - 2	Barker's Island Inner Beach	25	2	8.0%	0	0.0%
	Brule River State Forest Beach 1					
	Brule River State Forest Beach 2					
	Brule River State Forest Beach 3					
	Middle River Beach					
	Wisconsin Point Beach 1					
A - 2	Wisconsin Point Beach 2	25	4	16.0%	1	4.0%
	Wisconsin Point Beach 3					
	Wisconsin Point Beach 4					
	Wisconsin Point Beach 5					
<b>2</b>	<b>Douglas County Totals</b>	<b>50</b>	<b>6</b>	<b>12.0%</b>	<b>1</b>	<b>2.0%</b>

## ***Iron County***

All of the beaches in Iron County were identified as low priority so BEACH Act funding was not used to support the program. UW-Oshkosh worked with the county to implement a voluntary monitoring program at the five county beaches.

<b>2013 Contract Freq.</b>	<b>2013 Monitored Beaches</b>	<b>Total Samples</b>	<b>#&gt;235</b>	<b>% Exceedances</b>	<b>#&gt;1000</b>	<b>% Closures</b>
V	Oronto Bay Beach 1	8	1	12.5%	1	12.5%
V	Oronto Bay Beach 2	8	1	12.5%	1	12.5%
V	Oronto Bay Beach 3	8	1	12.5%	0	0.0%
V	Saxon Harbor Beach East	10	3	30.0%	1	10.0%
V	Saxon Harbor Beach West	8	1	12.5%	1	12.5%
<b>5</b>	<b>Iron County Total</b>	<b>42</b>	<b>7</b>	<b>16.7%</b>	<b>4</b>	<b>9.5%</b>

## **Lake Michigan Counties**

### ***Brown County***

Brown County beaches were all identified as low priority so did not receive BEACH Act funding. Two of the three active beaches were monitored by the University of Wisconsin – Oshkosh. The county is pursuing a redesign of Bay Beach, a location that has been closed to swimming for decades. The location identified Longtail Point is actually a wildlife area that used by boaters for parking and swimming. Communiversity Park Beach is reported to have a number of invasive species (phragmites and zebra mussels) affecting the access and swimming experience.

<b>2013 Contract Freq.</b>	<b>2013 Monitored Beaches</b>	<b>Total Samples</b>	<b>#&gt;235</b>	<b>% Exceedances</b>	<b>#&gt;1000</b>	<b>% Closures</b>
V	Bayshore Park Beach	11	0	0.0%	0	0.0%
	Communiversity Park Beach	0				
V	Longtail Point	7	0	0.0%	0	0.0%
<b>2</b>	<b>Brown County Total</b>	<b>18</b>	<b>0</b>	<b>0.0%</b>	<b>0</b>	<b>0.0%</b>

### ***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 39 public beaches on the peninsula as well as Washington and Rock Islands throughout the summer. The county used a combination of BEACH Act support and local funding to implement their program. This is particularly notable given the transportation costs associated with monitoring the island beaches. Their partnership with the University of Wisconsin – Oshkosh enables their program to function cost-effectively. The county continues to implement redesigns and best management practices at their beaches to reduce the overall advisory rate to the lowest in the state.

2013 Contract Freq.	2013 Monitored Beaches	Total Samples	#>235	% Exceedances	#>1000	% Closures
1	Anclam Park Beach	28	1	3.6%	0	0.0%
2	Baileys Harbor Ridges Park Beach	57	6	10.5%	3	5.3%
V	Clay Banks Beach 2	27	1	3.7%	1	3.7%
2	Egg Harbor Beach	53	1	1.9%	0	0.0%
2	Ellison Bay Town Park Beach	53	0	0.0%	0	0.0%
2	Ephraim Beach	55	4	7.3%	0	0.0%
1	Europe Bay Beach 1	27	1	3.7%	1	3.7%
1	Europe Bay Beach 2	29	3	10.3%	0	0.0%
1	Europe Bay Beach 3	27	1	3.7%	0	0.0%
2	Fish Creek Beach	54	4	7.4%	0	0.0%
V	Gislason Beach	12	0	0.0%	0	0.0%
1	Haines Park Beach	27	0	0.0%	0	0.0%
V	Jackson Harbor Ridges - WI	13	1	7.7%	0	0.0%
1	Lakeside Park Beach	27	0	0.0%	0	0.0%
	Lily Bay Boat Launch Beach					
2	Murphy Park Beach	55	8	14.5%	2	3.6%
2	Newport Bay Beach	53	0	0.0%	0	0.0%
2	Nicolet Beach	53	1	1.9%	0	0.0%
2	Otumba Park Beach	57	8	14.0%	2	3.5%
V	Percy Johnson Memorial Park Beach	12	0	0.0%	0	0.0%
1	Portage Park Beach	27	0	0.0%	0	0.0%
V	Rock Island State Park Beach	12	0	0.0%	0	0.0%
1	Sand Bay Beach 1	28	1	3.6%	1	3.6%
V	Sand Dune Beach	12	0	0.0%	0	0.0%
1	Sandy Bay Town Park Beach	27	0	0.0%	0	0.0%
V	School House Beach	12	0	0.0%	0	0.0%
2	Sister Bay Beach	54	3	5.6%	0	0.0%
1	Sturgeon Bay Ship Canal Nature Preserve	27	2	7.4%	1	3.7%
2	Sunset Park Beach Sturgeon Bay	57	10	17.5%	2	3.5%
V	Whitefish Bay Boat Launch Beach	14	0	0.0%	0	0.0%
2	Whitefish Dunes Beach	52	1	1.9%	1	1.9%
39	Door County Totals	1056	58	5.5%	14	1.3%

### ***Kenosha County***

In 2013, BEACH Act monitoring for Kenosha County beaches was done through an assistance agreement with Racine County. This arrangement enabled the program to leverage other grants and funding sources as well as providing sufficient funding to support summer staff necessary to do the sample collection. Kenosha County has 2 medium priority beaches and 2 low priority beaches each of which is listed as impaired waters, elevating their priority for BEACH Act funds. Two of the beaches had Nowcast models which were not operational but showed good promise for future use in routine decision-making.

2013 Contract Freq.	2013 Monitored Beaches	Total Samples	#>235	% Exceedances	#>1000	% Closures
1	Alford Park Beach	27	6	22.2%	0	0.0%
2N*	Eichelman Beach	42	11	26.2%	4	9.5%
1	Pennoyer Park Beach	32	14	43.8%	8	25.0%
2N*	Simmons Island Beach	37	9	24.3%	3	8.1%
1	Southport Park Beach	24	2	8.3%	1	4.2%
<b>5</b>	<b>Kenosha County Total</b>	<b>162</b>	<b>42</b>	<b>25.9%</b>	<b>16</b>	<b>9.9%</b>

\* Nowcast models developed but not operational

### **Kewaunee County**

Kewaunee County beaches were monitored through an assistance agreement with the University of Wisconsin – Oshkosh. Sampling frequency in 2013 is considerably less than in the previous two years when the sanitary surveys were being conducted. Crescent Beach in Algoma was provided a redesign plan as part of a GLRI grant. Local decision-makers are still evaluating where a restoration project fits within the priorities and budget.

2013 Contract Freq.	2013 Monitored Beaches	Total Samples	#>235	% Exceedances	#>1000	% Closures
2	City Of Kewaunee Beach	14	3	21.4%	3	21.4%
2	Crescent Beach	45	6	13.3%	3	6.7%
<b>2</b>	<b>Kewaunee County Total</b>	<b>59</b>	<b>9</b>	<b>15.3%</b>	<b>6</b>	<b>10.2%</b>

### **Manitowoc County**

Manitowoc County partners with University of Wisconsin – Oshkosh (UW-O) for monitoring the beaches. Several beaches within the county are identified as impaired on the 303(d) list so all but Warm Water Beach were given priority for funding. Considering usage patterns, the county decided not to monitor Fischer Park beach. Maritime Drive boat launch was redesigned to accommodate a swimming beach and is now known as Blue Rail Marina Beach. USGS developed Nowcast models for 4 beaches in Manitowoc county which were operational in 2013. UW-O worked with Manitowoc to assess upstream sources of bacteria through a grant with Coastal Management. Multiple beaches in the county received redesign plans through the GLRI grant to UW-O.

2013 Contract Freq.	2013 Monitored Beaches	Total Samples	#>235	% Exceedances	#>1000	% Closures
2	Blue Rail Marina Beach (aka Maritime Drive Boat Launch)	35	6	17%	0	0%
1	Fischer Park Beach					
2N	Hika Park Bay	35	6	17.1%	2	5.7%
2	Memorial Drive Wayside Beach North	30	6	20.0%	1	3.3%
2	Memorial Drive Wayside Beach South	24	2	8.3%	2	8.3%
2N	Neshotah Beach	52	10	19.2%	3	5.8%
2N*	Point Beach State Forest - Concession Stand Beach	51	3	5.9%	0	0.0%

2*	Point Beach State Forest - Lakeshore Picnic Area Beach	52	4	7.7%	0	0.0%
2*	Point Beach State Forest - Lighthouse Picnic Area Beach	51	6	11.8%	0	0.0%
2N	Red Arrow Park Beach Manitowoc	54	18	33.3%	4	7.4%
2	YMCA Beach	24	5	20.8%	2	8.3%
10	Manitowoc County Totals	408	66	16.2%	14	3.4%

\* Composite sampling considered and approved for Point Beach based on statistical assessment of the water quality data..

### **Milwaukee County**

Multiple government jurisdictions have responsibility for 12 Milwaukee County Great Lakes beaches, monitoring and making public health decisions. The city of Milwaukee partnered with the University of Wisconsin – Milwaukee to monitor Bradford, McKinley and South Shore beach. The northern county beaches are monitored through Northshore Health Department. South Milwaukee beaches were monitored through an arrangement with Racine Public Health. Milwaukee County parks began a project to address contamination at South Shore beach and the adjacent Yacht Club. South Shore Rocky Beach was removed from the beach listing because this area is considered inaccessible for public swimming. Grant Park Beach received a redesign plan through a GLRI grant to Racine Public Health. Funding to implement the redesign remains an issue.

2013 Contract Freq.	2013 Monitored Beaches	Total Samples	#>235	% Exceedances	#>1000	% Closures
2	Atwater Park Beach	26	2	7.7%	1	3.8%
1	Bay View Park Beach	18	0	0.0%	0	0.0%
2N	Bender Beach	31	5	16.1%	3	9.7%
2	Bradford Beach	51	9	17.6%	1	2.0%
2N	Grant Park Beach	42	12	28.6%	4	9.5%
2	Klode Park Beach	27	3	11.1%	0	0.0%
2	McKinley Beach	51	8	15.7%	0	0.0%
2	South Shore Beach	53	20	37.7%	6	11.3%
2	Tietjen Beach / Doctor's Park	25	2	8.0%	1	4.0%
9	Milwaukee County Total	324	61	18.8%	16	4.9%

### **Ozaukee County**

Ozaukee County pursued a grant through Wisconsin Coastal Management to pilot a two tiered nowcast primarily at Upper Lake Park and to perform sanitary surveys at the four beaches at Harrington Beach. Funding from this grant stretched the county dollars allocated from the BEACH Act grant into two seasons and provide additional vigilance at the beaches by operating the models on days when the beach is not monitored. Although models exist for beaches at Harrington Beach State Park, they were not operational because their performance was judged as inadequate.

2013						
Contract Freq.	2013 Monitored Beaches	Total Samples	#>235	% Exceedances	#>1000	% Closures
2N*	Cedar Beach Rd Beach	59	16	27.1%	4	6.8%
2	Concordia University	32	3	9.4%	0	0.0%
2N*	County Road D Boat Launch Beach	53	7	13.2%	1	1.9%
2N*	Harrington State Park Beach North	54	7	13.0%	4	7.4%
2N*	Harrington State Park Beach South	55	11	20.0%	1	1.8%
V	Lion's Den Gorge Nature Preserve	30	2	6.7%	0	0.0%
2N	Upper Lake Park Beach	54	5	9.3%	1	1.9%
7	<b>Ozaukee County Total</b>	<b>337</b>	<b>56</b>	<b>14.3%</b>	<b>12</b>	<b>3.1%</b>

\* Nowcast models were not operational

### **Racine County**

The City of Racine places a high priority on monitoring its beaches and uses rapid methods and uses multiple tools to determine water quality conditions. As a result of a reassessment of beach priorities and accessibility, Two of the six beaches were removed from the list, Sam Myers Park and Michigan Boulevard. Of the remaining five beaches, the two high priority beaches each have multiple monitoring stations, four at North Beach and three at Zoo Beach. Through Dr. Julie Kinzelman's work to develop same-day qPCR methods applicable to E coli, City of Racine Health Department has approval and has implemented these alternate methods for determining beach advisory status. In addition, both North and Zoo beaches had operational Nowcasts during the 2013 that were used in combination with sanitary survey observations and the testing procedures for a weight of evidence approach to determining whether water quality conditions warranted declaring an advisory. The remaining 4 beaches are identified as low priority and were not funded by BEACH Act funds. Through another grant, City of Racine performed a water quality assessment of the Wind Point watershed that involved monitoring at the associated beaches. The monitoring at these beaches was not posted to Wisconsin's Beach Health website. Also notable is that poor access to the coastline and in-water structures at Shoop Park inhibit swimming at this listed beach.

2013						
Contract Freq.	2013 Monitored Beaches	Total Samples	#>235	% Exceedances	#>1000	% Closures
3N	North Beach	69	8	11.6%	1	1.4%
3N	Zoo Beach	67	9	13.4%	5	7.5%
*V-A	Wind Point Lighthouse	13	1	7.7%	0	0%
*V-A	Shoop Park (Wind Point)	13	2	15.4%	0	0%
*V-A	Parkway (North Bay)	12	1	8.3%	0	0%
5	<b>Racine County Total</b>	<b>174</b>	<b>21</b>	<b>12.5%</b>	<b>6</b>	<b>4.4%</b>

\* Wind Point water quality assessment

### **Sheboygan County**

Sheboygan County received both BEACH Act and Wisconsin Coastal Management funding to provide monitoring for 2013 and 2014. The county piloted the two tiered Nowcast system at three

of its beaches with great success. They worked with Blue Harbor resort to provide current beach conditions for their guests, tailoring the message to their nowcast system. The beaches at Kohler-Andrae State Park were monitored through an agreement with University of Wisconsin – Oshkosh. The sanitary survey for the beach at the North Picnic beach identified stormwater runoff as an issue affecting the health of the beach including significant dune and parking lot erosion. Through the GLRI grant, University of Wisconsin – Oshkosh facilitated development of a redesign plan to address this issue.

2013 Contract Freq.	2013 Monitored Beaches	Total Samples	#>235	% Exceedances	#>1000	% Closures
	Amsterdam Beach					
2N	Blue Harbor Beach	30	3	10.0%	2	6.7%
2N	Deland Park Beach	31	1	3.2%	0	0.0%
3N	General King Park Beach	31	4	12.9%	1	3.2%
	KK Road Beach					
3	Kohler Andrae State Park Nature Center Beach	42	6	14.3%	0	0.0%
*	Kohler Andrae State Park North Beach	26	5	19.2%	0	0.0%
*	Kohler Andrae State Park North Picnic Beach	28	9	32.1%	1	3.6%
3	Kohler Andrae State Park South Picnic Beach	28	9	32.1%	1	3.6%
	Van Ess Road Beach					
7	Sheboygan County Total	216	37	17.1%	5	2.3%

\* Initial sampling plan included these beach locations as composite samples with the others at the park. This strategy was revised based on the need to evaluate water quality in more detail.

## **Improvement Opportunities - 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 reduce or eliminate beach advisories and closures. In order to be effective at pollution mitigation, source identification must be a priority. Projects lead by Racine and UW-O and funded through the Great Lakes Restoration Initiative have demonstrated the value of providing this type of information to community decision-makers. Although an increasing number of communities would benefit by identifying the sources of *E. coli* to their beaches, grant conditions for the federal BEACH Act do not allow using funds for this purpose. 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 identification and remediation to the degree possible using all available tools (i.e., Beach Sanitary Surveys, Great Lakes Restoration Initiative funding, etc.). With more stable funding and additional flexibility in use of grant dollars; source identification

initiatives can be more strategic, focusing grant resources based on prioritized needs and severity of water quality impairment.

### **Insufficient Funding for Full Program Implementation**

The 2013 Beach Season required additional cuts in program implementation to provide certainty for monitoring at the highest priority locations and at impaired beaches across the state. Program partners expended exceptional effort to leverage funding from existing sources and optimize presence of Wisconsin's coastal beaches. Most began monitoring in advance of assistance agreements being in place and through their partnerships, performed monitoring and public notification voluntarily. The program has minimal resources to keep beach measurements up-to-date in response to changes in the landscape such as changes in lake levels, presence of invasive species like phragmites, restoration activities and shoreline erosion. Recent sanitary surveys were conducted over a period when Lake Michigan approached historic low levels. With the return to more normal lake levels, updated beach measurements may already be necessary. A number of counties reported changes in coastline access or management of beach areas that involve removing beaches from the list or consolidating beach listings. Non-participating counties have expressed an interest in participating in the program at a time when supplemental funds were necessary to operate a reduced monitoring program. This suggests the need to re-visit the statewide beach list, the supporting locational information. Few coastal beaches have lifeguards routinely so local beach managers rely on subjective assessments to inform assignment to tiers. Additional resources are necessary to support expansion of Nowcasting, maintenance and enhancement of information technology tools to support more real-time notification systems, and at beaches that have implemented restoration or other mitigation efforts, enhanced monitoring to re-establish relationships between water quality and predictive conditions (e.g. water quality response to rainfall or wind). Under more ideal circumstances, the program would be conducting field audit of its monitoring partners to assure consistent implementation of procedures. To date, the program has limited ability to assess the effectiveness of its public notification and communication systems (a repetition of work done during program implementation in 2000). Resources within the BEACH Act are insufficient to cover all of these needs.

### **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. Wisconsin DNR absorbs administrative costs of program operation, placing a priority on supporting local monitoring and the infrastructure necessary to notify the public of beach conditions. Minimum monitoring frequencies were adjusted to assure maximal coverage across the state and assure that beaches identified on the impaired waters list continue to be monitored. Significant efforts were made to stabilize funding and optimize program operation through nowcasting where operational models exist. In the short term, the program worked to optimize and leverage existing resources to cover beach monitoring; however, these added funds are not expected to be available beyond 2014. Communities and the University system continue effective partnerships arrangements to leverage multiple grant sources and stretch available resources; however, funding cuts occurring at all levels of government make it increasingly difficult to find funding for the monitoring, management practices and mitigation activities needed to reduce water quality exceedances that indicate poor swimming conditions. Wisconsin DNR pursued other funding to support Nowcast model development and continue opportunities to balance monitoring effort and meaningful public health notifications. Wisconsin Department of Health provided funding to link data from Wisconsin's beach health website to mobile applications. As illustrated by the 2013 beach season, without secure funding the progress to improve water quality along our coastline and to provide Wisconsin's beach goers with timely notification of potentially unhealthy conditions is in jeopardy. Beyond providing dollars for collecting E coli samples, the BEACH Act grant is critical for maintaining efficient, centralized

information technology resources for reporting data, posting advisories, providing a focal point for public information on the status of our beaches and transmitting the necessary data reporting to EPA.