

## Subgoal 3

### Can we swim in the water?

#### Status

Some Lake Michigan beaches experience episodic beach closures because of elevated levels of *E. coli* bacteria. This may be due to stormwater runoff, sewer overflows or even waterfowl droppings. Recent studies show other factors like geography, water depth, weather, beach grooming practices and nearby animal populations contribute to beach closures. As a result, the current status of the goal is mixed.

#### Indicators (State of the Lakes Ecosystem Indicators by Number)

- 3516 - Household Stormwater Recycling
- 4200 - Beach Advisories, Postings and Closures
- 6063 - Municipal Wastewater Treatment
- 7028 - Sustainable Agricultural Practices

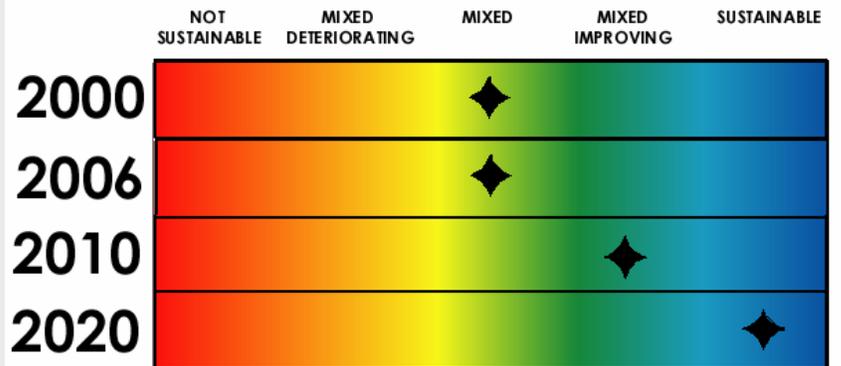
#### Challenges

- Maintain and not overtax the wastewater control infrastructure
- Build a real-time beach monitoring and reporting system
- Continue research and development on testing systems and beach grooming
- Implement actions outlined in the Great Lakes Regional Collaboration's Coastal Health Strategy

#### Next Steps

- Help coordinate outreach materials development
- Continue support of Great Lakes Beach Association conferences
- Report on the latest beach research
- Report on research on beach grooming, pathogen tests, and cladophora bloom causes in the LaMP and at the State of Lake Michigan Conference

#### Lake Michigan Target Dates for Sustainability



## Background

Lake Michigan contains the world's largest collection of freshwater sand dunes and associated beaches, particularly along its eastern shore. Of a total of 3,100 coastal acres, 1,200 acres are publicly owned and available for use, while an additional 1,200 privately owned acres has significant potential for public use. It is important to note that most shoreline areas along Lake Michigan support swimming and secondary contact recreation.

Beach advisories or closures resulting from high pathogen loads have a negative effect on the lake's significant tourism industry. To improve water quality testing at the beach and to help beach managers better inform the public when there are water quality problems, Congress passed the Beaches Environmental Assessment and Coastal Health (BEACH) Act on October 10, 2000.

The BEACH Act requires adoption of consistent bacterial standards at coastal waters nationwide, research on new pathogens and pathogen indicators, and publication of new or revised water quality criteria for pathogens within five years. The BEACH Act also authorizes USEPA to award grants to eligible states, tribes, and territories to develop and implement a program at coastal and Great Lakes



## Great Lakes Regional Collaboration Action Items

### Coastal Health

The **near shore waters and the coastal areas** are the region's largest source of drinking water and experience a variety of recreational activities. To minimize the risk to human health resulting from contact with near shore waters, actions needed include:

- major improvements in wet weather discharge controls from combined and sanitary sewers;
- identify and control releases from indirect sources of contamination;
- implement a "risk-based approach" to manage recreational water;
- protect sources of drinking water; and
- improve the drinking water infrastructure and support source water protection.

## NEEAR Water Study Helps Set New Beach Alert Standards

The National Epidemiological and Environmental Assessment of Recreational (NEEAR) Water Study is a multi-year research project evaluating the health effects of persons using recreational waters for swimming, boating, diving, surfing, and other activities. The objectives of the NEEAR Water Study are to (1) evaluate the water quality at two to three beaches per year for three years concurrently with a health study, (2) obtain and evaluate a new set of health and water quality data for the new rapid, state-of-the-art methods, and (3) develop new federal guidelines and limits for water quality indicators of fecal contamination (USEPA Office of Water) so that beach managers and public health officials can alert the public about the potential health hazards before exposure to unsafe water can occur.

The study released its results in September 2005. It found significant trends between increased gastrointestinal illness (GI) and *Enterococcus* at Lake Michigan and Lake Erie beaches. The study observed a positive trend for *Bacteroides* at the Lake Erie beach, but no trend was observed at the Lake Michigan beach. *Enterococcus* samples collected at 8:00 a.m. were predictive of GI illness that day. The association between *Enterococcus* and illness strengthened as time spent swimming in the water increased. It is the first study to show that water quality measured by rapid methods can predict swimming-associated health effects.

More information is available at: [www.epa.gov/nheerl/near/](http://www.epa.gov/nheerl/near/)

beaches, and to notify the public when bacteria levels are exceeded.

## Progress on Developing and Implementing Beach Monitoring and Notification Plans

Since passage of the BEACH Act, approximately \$7.8 million in BEACH grants have been issued to Great Lakes states to implement beach programs, which has resulted in a significant increase in the number of monitoring and notification programs at Great Lakes beaches. All of the Lake Michigan states have beach monitoring and public notification programs in place at most of their coastal beaches and at all of their high priority or frequently used coastal beaches. Following are beach program summaries for Illinois, Indiana, Michigan, and Wisconsin.

### Illinois

The Illinois Department of Public Health (IDPH), which licenses bathing beaches in Illinois, has received \$983,348 in BEACH Act grants since 2001. Illinois' Lake Michigan beaches are monitored five to seven days a week during the swimming season. IDPH is also working with the Lake County Health Department

(LCHD) to validate and implement predictive models to augment the beach water quality monitoring conducted at several Lake Michigan beaches. Because health warnings are generally based on *E. coli* concentrations from samples taken the previous day, predictive models based on continuously measured hydro-meteorological variables provide an excellent alternative to monitoring. In the summer of 2004, predictive modeling equipment was installed by the LCHD to predict *E. coli* levels at two Lake Michigan beaches: Illinois Beach State Park-South Beach (IBSP) in Zion, IL, and Forest Park Beach (FP) in Lake Forest, IL. The models, which measure wind speed/direction, sunlight, rainfall, air/water temperature, humidity, wave height, dissolved solids, clarity, and other variables, accurately predicted whether *E. coli* concentrations were above or below the 235-cfu/100 ml threshold for full body contact 85% of the time during the 2004 swimming season. Utilizing the predictive models created in 2004, SwimCast was 89% accurate at IBSP beach and 95% accurate at FP beach when used in 2005. This project was partially funded through IDPH's BEACH Act grant.

IDPH continues to develop and distribute educational resources to the public of the potential risks associated with water contact activities when the water quality standards are not met. An educational

## Cladophora Alga

*Cladophora* is a branching, green filamentous alga found naturally along the coastline of most of the Great Lakes. Research in the 1960's and 70's linked *Cladophora* blooms to high phosphorus levels in the water, mainly as a result of human activities such as fertilizing lawns, poorly maintained septic systems, inadequate sewage treatment, agricultural runoff and detergents containing phosphorus. Due to tighter restrictions, phosphorus levels declined during the 1970's and *Cladophora* blooms were largely absent in the 1980's and 90's.

There has been a recent resurgence of macroalgae, predominantly *Cladophora*, along the coast of Lake Michigan and other Great Lakes. These algae blooms lead to unsightly and foul-smelling beaches and have negative economic consequences as a result of the lowered beach use. In addition, *Cladophora* blooms result in reduced quality of drinking water and decreased property values. Reasons for the current resurgence are unknown. Possible causes include increased nutrient inputs, increased water clarity, increased water temperature and changing lake level. While there have been some efforts to remove *Cladophora* from beaches, ultimately the solution to the *Cladophora* problem requires the identification of the factors promoting *Cladophora* growth in the lake, and if possible the mitigation of those factors.

It is unknown if there are increased nutrient concentrations entering the lake via streams and rivers or if zebra mussels redistribute existing nutrients from the phytoplankton they consume to the *Cladophora*. Both may be happening. Work on the Milwaukee River indicates that input of the nutrient most likely to foster *Cladophora* growth, phosphorus, has increased in recent years. (Source: Great Lakes Water Institute, University of Wisconsin-Milwaukee)

For more information on cladophora, see chapter 8 and [www.uwm.edu/Dept/GLWI/cladophora](http://www.uwm.edu/Dept/GLWI/cladophora).



## The Lake Michigan Toolbox Lake Michigan States' Beach Program Web Pages

### Illinois

- Illinois Beach Monitoring Home page [www.idph.state.il.us/envhealth/beachhome.htm](http://www.idph.state.il.us/envhealth/beachhome.htm)
- Chicago Park District's Swim Report [www.chicagoparkdistrict.com/index.cfm/fuseaction/swim\\_report.home.cfm](http://www.chicagoparkdistrict.com/index.cfm/fuseaction/swim_report.home.cfm)
- Northern Illinois Lake Michigan beach notification Web site (Lake County Health Department, Wilmette Park District, Winnetka beaches and the City of Evanston). [www.earth911.org/waterquality/default.asp?cluster=17](http://www.earth911.org/waterquality/default.asp?cluster=17)

### Indiana

- Indiana Department of Environmental Management Beach Home page. [www.in.gov/idem/beaches](http://www.in.gov/idem/beaches)
- IDEM beach water quality notification Web site [www.earth911.org/waterquality](http://www.earth911.org/waterquality)

### Michigan

- Michigan Beach Monitoring home page [www.michigan.gov/deq/1,1607,7-135-3313\\_3686\\_3730---C1,00.html](http://www.michigan.gov/deq/1,1607,7-135-3313_3686_3730---C1,00.html)
- Michigan Department of Environmental Quality – Office of the Great Lakes [www.michigan.gov/deq/1,1607,7-135-3313\\_3677---,00.html](http://www.michigan.gov/deq/1,1607,7-135-3313_3677---,00.html)
- Michigan Sea Grant
- [www.miseagrant.umich.edu/](http://www.miseagrant.umich.edu/)

### Wisconsin

- Wisconsin Beach Health Web site [www.wibeaches.us](http://www.wibeaches.us)
- Wisconsin Sea Grant [www.seagrant.wisc.edu/](http://www.seagrant.wisc.edu/)
- The Door County Beach Contamination Source Identification Interim Report <http://map.co.door.wi.us/swcd/BeachInterimReport.pdf#search='door%20county%20beach%20contamination'>
- Milwaukee Metropolitan Sewerage District. 2003. Deep Tunnel Fact Sheet. [www.mmsd.com/tunnelfactsheet.html](http://www.mmsd.com/tunnelfactsheet.html)
- Water Quality Research [www.cityofracine.org](http://www.cityofracine.org)

beach pamphlet titled, "Why is the beach closed?" was developed and distributed to beach patrons. IDPH also provides beach water quality and program information to beachgoers through signs and Web sites. *Don't Feed the Waterfowl* signs have been posted at several Lake Michigan beaches to discourage visitors from feeding birds, which have the potential to contribute significant fecal loads to beach water.

### Indiana

The Indiana Department of Environmental Management (IDEM) administers the Beach Monitoring and Notification Program at Indiana's Lake Michigan beaches. IDEM has received \$823,753 in BEACH Act grants since 2001.

The beach program is operated in conjunction with the Lake County Parks and Recreation Department, the Hammond Health Department, the East Chicago Department of Public and Environmental Health, the East Chicago Department of Public and Environmental Health, the Gary Sanitary District, the Town of Ogden Dunes, the Town of Dune Acres, and the LaPorte County Health Department.

Indiana has approximately 23 miles of beaches located along the Lake Michigan shoreline, including the Indiana Dunes National Lakeshore, which has 9 beaches, and the Indiana Dunes State Park, with 2 main sections of beaches, along with 14 other county and city beaches. Prior to the BEACH Act, *E. coli* monitoring occurred only one day per week at Indiana's Lake Michigan beaches. Since receiving funding, Indiana has been able to increase the sampling frequency to five/seven days per week at most of its Lake Michigan beaches.

IDEM has also used BEACH Act grant funds to keep the public informed. Beach managers notify the public of elevated bacteria levels by posting beach advisory or closure signs in English, Spanish and Polish. IDEM hired a contractor to install 25 kiosks at several coastal beaches which provide beachgoers with up-to-date information regarding the status of beach waters as well as additional information about the possible sources and causes of *E. coli* contamination. Recommendations are also provided as to how beachgoers and watercraft operators can reduce the likelihood of causing an *E. coli* release. IDEM hopes to implement a pilot project designed to provide real-time information regarding CSO discharge events to the local beach managers and

the public. This project will be linked to Indiana's Beach Program Web site ([www.in.gov/idem/beaches](http://www.in.gov/idem/beaches)).

### Current projects

#### **Source identification near Burns Ditch, Indiana.**

Several organizations have collaborated to identify sources of contamination at beaches near Burns Ditch, Indiana. There are 13 beaches in Porter County and Lake County, Indiana, west of the Burns Ditch outfall (a major point source of pollution), that are subject to beach closures due to high counts of *E. coli*. IDEM participated in a model project collaborating with USGS, NOAA, the City of Gary Sanitary District, the National Park Service, and local health departments, to characterize the movement of *E. coli* from Burns Ditch and to better understand the relative effect of bacteria contamination on beach waters. They studied the relationship between *E. coli* counts in Burns Ditch and beaches to the west, and hydro-meteorological factors, and this information was used to develop a predictive model for high *E. coli* counts at these beaches.

IDEM has used BEACH Act grant dollars to fund the installation of two predictive models at two Lake Michigan beaches with the goal of increasing the efficiency of the monitoring activities along Indiana's Lake Michigan shoreline. During the 2006 beach season, IDEM will implement project SAFE at the beaches west of Burns Ditch (Portage Beach, Ogden Dunes, West Beach, Wells Street Beach, Marquette Beaches, and Lake Street Beach). IDEM will also fund the second year of predictive model development at Buffington Harbor Beach (Gary) and Jeorse Park Beach (East Chicago). A partnership between IDEM and the City of Gary, made the above predictive modeling efforts possible. The third project developed by IDEM was a beach health brochure.

### Michigan

The Michigan Department of Environmental Quality (MDEQ) has received a total of \$1,084,966 in BEACH Act funding since 2002 to support monitoring programs for 431 public beaches in 41 counties along the state's 3,200 miles of Great Lakes shoreline. Along Lake Michigan:

- There are 202 public beaches on Lake Michigan in 17 counties (451 total public beaches on all of



## The Lake Michigan Toolbox Beach Health Resources

### Federal Government Resources

Assessing and Monitoring Floatable Debris.

[www.epa.gov/owow/oceans/debris/floatingdebris/](http://www.epa.gov/owow/oceans/debris/floatingdebris/)

BEACH Watch. [www.epa.gov/waterscience/beaches/](http://www.epa.gov/waterscience/beaches/)

BEACON – Beach Advisory On-line Notification

[www.epa.gov/waterscience/beacon/](http://www.epa.gov/waterscience/beacon/)

Great Lakes Monitoring – The Swimmability Index

[www.epa.gov/glnpo/glindicators/water/beachb.html](http://www.epa.gov/glnpo/glindicators/water/beachb.html)

National Beach Guidance and Required Performance

Criteria for Grants [www.epa.gov/waterscience/beaches/grants/guidance/index.html](http://www.epa.gov/waterscience/beaches/grants/guidance/index.html)

National Pollutant Discharge Elimination System (NPDES)

[http://cfpub1.epa.gov/npdes/home.cfm?program\\_id=5](http://cfpub1.epa.gov/npdes/home.cfm?program_id=5)

USEPA Report to Congress on Impacts and Control of

CSOs and SSOs [http://cfpub.epa.gov/npdes/cso/cpolicy\\_report2004.cfm](http://cfpub.epa.gov/npdes/cso/cpolicy_report2004.cfm)

USEPA Report to Congress on Implementation and Enforcement of the CSO Control Policy

[http://cfpub.epa.gov/npdes/cso/cpolicy\\_report.cfm?program\\_id=5](http://cfpub.epa.gov/npdes/cso/cpolicy_report.cfm?program_id=5)

Centers for Disease Control - Healthy Swimming

[www.cdc.gov/healthyswimming/](http://www.cdc.gov/healthyswimming/)

### Non-Governmental Resources

Beaches in the Great Lakes Region

[www.great-lakes.net/tourism/rec/beach.html#new](http://www.great-lakes.net/tourism/rec/beach.html#new)

Council of Great Lakes Research Managers – Great

Lakes-St. Lawrence Research Inventory  
<http://ri.ijc.org>

Great Lakes Beach Association

[www.great-lakes.net/glba/](http://www.great-lakes.net/glba/)

Great Lakes Beach Association Annual Proceedings, Green Bay, WI, November, 2005.

[www.great-lakes.net/glba/2005conference.html](http://www.great-lakes.net/glba/2005conference.html)

Great Lakes BeachCast – Great Lakes Beach Information (many links from this site)

[www.great-lakes.net/beachcast/nr\\_moreinfo.html](http://www.great-lakes.net/beachcast/nr_moreinfo.html)

### Phytoremediation Project in Racine, WI

The City of Racine Departments of Health, Public Works, and Parks, Recreation and Cultural Services, along with several volunteers collaborated on a project to reduce bacterial contamination at North and Zoo Beaches in Racine, Wisconsin. An existing storm water outfall was re-engineered to reduce the impact of bacterial contamination on surface water. In addition to locating the outfall to a point more distant from the shoreline, the re-designed outfall incorporated primary treatment structures for the removal of solid wastes and secondary treatment cells, a series of nine infiltration beds vegetated with indigenous wetland plants.

The goal of the project is to improve water quality, reduce beach closings, and increase protection of public health while enhancing the coastal ecosystem. Other volunteer efforts, while not directly related to the installation of wetland plants, are providing an additional educational component to storm water management in this community. Members of Keep our Beaches Open have undertaken an initiative to mark storm drains in a collaborative effort with local government to improve surface water quality.

### Source Identification in Door County, WI

The Door County Public Health Department is responsible for monitoring 28 public beaches in Door County, which are frequented by many tourists during the summer season. The Door County Soil and Water Conservation Department (SWCD) is responsible for identifying the sources of beach contamination at these beaches. In 2003, SWCD began source identification work by mapping the watersheds and surface water conveyance systems (storm drains/pipes, streams) in close proximity to the monitored beaches; determining the physical characteristics of the beaches (slope, % impervious surfaces, substrate, runoff potential), and collecting ambient beach factors at the time of the water sampling (number of birds, weather, wind direction, wave height, and water/air temperatures). SWCD acquired funding to pay samplers and analysts to monitor *E. coli* concentrations at selected beaches, near outfalls, and after rain events. In 2003 and 2004, data were collected at all 28 beaches along both sides of the peninsula, at Washington Island, within Sturgeon Bay, and at three inland lakes. Further analyses of these data are being completed, and will include recommendations for changes to the current monitoring protocols, additional data collection, and recommendations on beach management and planning to reduce non-point pollution and storm water runoff on the beaches. Additional data will be collected in 2006 to strengthen the management recommendations and non point pollution reduction strategies at Door County beaches.

Lake Michigan (Illinois-69, Wisconsin-145, Indiana-30)

- 6 beaches in 4 counties reported 43 closure days due to water quality standards exceedances in 2005
- An estimated \$131,113.00 (est. 47% of 2005 BEACH Act grant funds) was distributed to monitor 95 beaches located in 16 Michigan counties on Lake Michigan

The monitoring of beaches in Michigan is voluntary and is conducted by the local health departments, which are required to notify various entities of the test results within 36 hours, and may petition the Circuit Court for an injunction ordering the owners of a beach to close the beach. The MDEQ provides Clean Michigan Initiative-Clean Water Fund (CMI-CWF) and BEACH Act grants to the local health departments to aid in the implementation or enhancement of their beach monitoring programs. The CMI-CWF and BEACH Act grants are designed to fund proposals that determine and report levels of *E. coli* in the swimming areas of public beaches. The objectives of MDEQ's beach program are to:

- Assist local health departments to implement and strengthen beach monitoring programs.
- Determine whether waters of the state are safe for total body contact recreation.
- Create and maintain a statewide database.
- Compile data to determine overall water quality.
- Evaluate the effectiveness of MDEQ programs in attaining water quality standards for pathogen indicators.

Local health departments request an average of \$380,000 in BEACH Act funds per year from the MDEQ for local beach monitoring programs for 212 high-priority beaches. Since passage of the BEACH Act, there has been a dramatic increase in the number of monitoring and notification programs at coastal beaches in Michigan. In 2003, the number of Great Lakes beaches in Michigan that were monitored at least once a week more than doubled to 187 from 83 in 2002.

Local health departments provide beach monitoring program information to the public via press releases, brochures, beach signs, beach seminars, and Internet access.

The Michigan Beach Monitoring Web site

## CSOs in the Lake Michigan Basin

There are currently 30 CSO communities with 347 CSO outfalls that discharge within the Lake Michigan basin. Eighteen of the Lake Michigan CSO communities are in Indiana, 11 are in Michigan, and one is in Wisconsin.

In the Lake Michigan basin, EPA found:

- In Indiana, all 18 CSO permittees in the Lake Michigan basin discharge in the vicinity of 303(d)-impaired waters. Thirteen of these permittees discharge to waters where pathogens (*E. coli*) and/or siltation were cited as reasons or causes of impairment.
- In Michigan, 10 of the 11 CSO communities discharge to 303(d)-impaired waters. The waters in close proximity to the CSO community of Norway have not been assessed. Three CSO permittees in Michigan (Manistee, Niles, and St. Joseph CSO) discharge to 303(d)-listed waters that specifically cite "CSO pathogen (Rule 100)" as a source of impairment. In addition, three CSO permittees (East Lansing, Lansing, and Crystal Falls CSO) discharge to waterbodies where pathogens or pathogens and dissolved oxygen are cited as reasons or causes of impairment.
- In Wisconsin, the Milwaukee Metropolitan Sewerage District (MMSD) operates the only combined sewer system (CSS) in the Lake Michigan basin. MMSD's CSOs discharge to, or in close proximity to, 303(d)-impaired waters where pathogens and/or dissolved oxygen have been cited as reasons or causes of impairment.

The proximity of a CSO outfall to an impaired water segment does not in and of itself demonstrate that the CSO is the cause of the impairment. EPA believes the association between CSO location and impaired waters is due to a number of factors in addition to CSO discharges. For example, CSOs are generally located in urban areas where waterbodies also receive relatively high volumes of storm water and other pollutant loads. Nevertheless, the strong correlation between CSO location and impaired waters does suggest that CSOs should be considered as a potential source of pollution when developing a total daily maximum load (TMDL) for an impaired waterbody.



Source: USEPA

([www.deq.state.mi.us/beach](http://www.deq.state.mi.us/beach)) immediately provides current and historical results for *E. coli* and beach closings/ advisories as they are reported from health departments for all public beaches in Michigan. All public beaches are required to post a sign indicating whether the beach is monitored and where the results can be found.

All beach monitoring data are reported to and evaluated by the MDEQ. The MDEQ incorporates beach monitoring data into other water pollution

prevention programs to encourage strategic improvements in water quality. Michigan's Beach Monitoring web site immediately provides current and historical test results for *E. coli* and beach closings/ advisories as they are reported from health departments for all public beaches in Michigan. All public beaches are required to post a sign indicating whether the beach is monitored and where the results can be found.



Beach access signs around Lake Huron provide a consistent message for the public. There are similar efforts to develop consistent signage underway around Lake Michigan.

### Michigan to Clean Up the Galien River

The Galien River, which flows into Lake Michigan at New Buffalo in southwestern Michigan, is facing bacterial contamination, agricultural pollution, and the debris that chokes stretches of the river.

The watershed is primarily agricultural, pastoral, or forest. Bacterial contamination from sewage makes the river unsafe for swimming and other recreational activities, such as boating and fishing. Sediment from farming flows into the river and high concentrations of nutrients and fertilizer that encourage algae growth that reduces oxygen levels and harms fish populations.

Governmental agencies, conservation groups, and individuals joined together to develop a watershed plan and have begun carrying out the recommendations. Michigan DEQ has given a three year grant for \$590,312 to Chikaming Open Lands. The group will provide \$450,720 in matching funds for a total of \$1.04 million. The money will be used to contact 200 landowners to discuss conservation easements. Funding will also be used to improve 39 road crossings and reduce erosion.

### Wisconsin

The Wisconsin Department of Natural Resources (WDNR) operates Wisconsin's Beach Program. WDNR issues grants to communities along Lake Michigan and Lake Superior to monitor beach water for elevated bacteria levels. Since 2001, WDNR has received \$907,196 in BEACH Act grants to develop and implement monitoring and notification programs at these Great Lakes beaches. Passage of the BEACH Act has enabled WDNR to substantially increase the number of coastal beaches it monitors from six to 112.

To design its beach program, WDNR formed a workgroup comprised of state and local environmental and public health officials and community groups. Using GPS technologies, 192 beaches were identified along Lake Michigan and Lake Superior. Maps of the beaches can be found at [www.dnr.wi.gov/org/water/wm/wqs/beaches/state-map.htm](http://www.dnr.wi.gov/org/water/wm/wqs/beaches/state-map.htm). Additional GPS data layers were added to include the location of all wastewater treatment plant outfalls along with their proximity to the beaches. Additional information was collected for each beach evaluating the potential for impacts from storm water runoff, bather and waterfowl loads, and the location of outfalls and farms. This information was used to rank and classify beaches as high, medium or low priority. These rankings indicate how often the beaches should be monitored to ensure that water quality conditions are safe for swimming.

Wisconsin's beach program workgroup also developed public notification and risk communication measures so water quality monitoring information is made available to the public in order for beach visitors to make informed choices. These measures included development of signs at beaches to give notice to the public that the coastal recreational waters are not meeting, or are not expected to meet, water quality standards. These signs, which are in English, Spanish and Hmong, were designed based on feedback from a beach user survey and public meetings held around the state.

Other public notification and outreach products developed by the workgroup include an automatic e-mail service to which the public can subscribe to receive daily updates on beach conditions; a statewide informational brochure, approximately

100,000 copies of which were distributed at local beaches, parks, and health departments; a Beach Health Web page ([www.wibeaches.us](http://www.wibeaches.us)) for reporting up-to-date conditions at all coastal beaches; and an internal web site for local health departments to report their daily advisory and monitoring data in the format required for USEPA reporting at the end of the beach season.

### Public Communication

Because it has been shown that people who engage in recreational water sports have a higher incidence of symptomatic illnesses, it has become increasingly more important to make the public aware of the potential health hazards that are associated with recreational waters. Recent progress has been made on the national and local levels to provide the public with useful tools that can provide needed information regarding the use of recreational waters. At the national level, the following public communication tools are available:

#### BEACH Watch

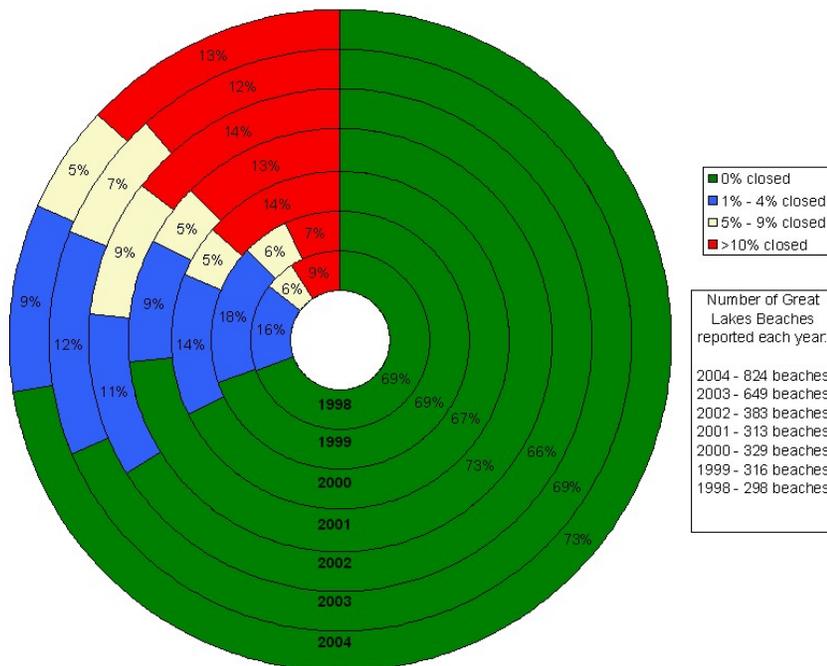
This website contains information about USEPA's BEACH Program, including grants, USEPA's reference and technical documents including USEPA's *Before*

*You Go to the Beach* brochure, upcoming meetings and events, conference proceedings, links to local beach programs, and provides access to BEACON (Beach Advisory and Closing On-line Notification), USEPA's national beach water quality database. [www.epa.gov/OST/beaches](http://www.epa.gov/OST/beaches).

### Annual Great Lakes Beach Association (GLBA) Conference

In February 2001, USEPA, the Lake Michigan LaMP, and the City of Chicago sponsored the Great Lakes Beach Conference to share information on the science and technology of beach monitoring as well as research on exposure, health effects, and water quality indicators. More than 250 environmental and public health officials, beach managers, and regulators attended the 3-day conference. The conclusions of the conference saw the formation of the Great Lakes Recreation Association whose list serve and annual meetings provide quick sharing of research findings. The GLBA is comprised of members from U.S. states, Environment Canada, local environmental and public health agencies, and several universities and NGOs. The GLBA's mission is the pursuit of healthy beach water conditions in the Great Lakes area. Since 2001, the GLBA has held beach conferences annually to bring together beach

Proportion of U.S. Great Lakes Beaches with Beach Advisories for the 1998-2004 Bathing Seasons



### Proportion of all Great Lakes beaches with beach advisories.

In 2004, 69 of the 107 beaches in the Great Lakes basin that were closed more than 10 % of the swimming season (June, July, and August) were located in the Lake Michigan basin (almost 65%).

Number of Great Lakes Beaches reported each year:  
 2004 - 824 beaches  
 2003 - 649 beaches  
 2002 - 383 beaches  
 2001 - 313 beaches  
 2000 - 329 beaches  
 1999 - 316 beaches  
 1998 - 298 beaches

Source: USEPA David Rockwell presentation, November 2005, Great Lakes Beach Association Annual Meeting at the State of the Lake Michigan Conference, Green Bay, Wisconsin

## Proposed Policy on Peak Wet Weather Discharges from Municipal Sewage Treatment Facilities

EPA proposed for public comment a new policy for addressing very high or "peak" flow events at municipal wastewater treatment plants that are a result of significant storm events. The policy follows the joint recommendations of the Natural Resources Defense Council (NRDC) and the National Association of Clean Water Agencies (NACWA). The proposed policy describes limited circumstances when certain management techniques may be used by the operator of a municipal wastewater treatment facility to address very high flows that result from storm events. The policy also indicates how the management of peak flows must be documented in National Pollutant Discharge Elimination System (NPDES) permits.

Aging sewer line infrastructure in many communities allows rain and snow melt to enter sanitary sewer systems. During significant storm events, these high volumes can overwhelm certain parts of the wastewater treatment process and may cause damage or failure of the system. Operators of wastewater treatment plants must manage these high flows to both ensure the continued operation of the treatment process and to prevent backups and overflows of raw wastewater in basements or on city streets. The proposed policy encourages municipalities to make investments in ongoing maintenance and capital improvements to improve their system's long-term performance.

The policy outlines the limited circumstances when these management techniques can be used and how they must be documented in NPDES permits. The policy also stipulates that all NPDES permit limits must be met at all times. The policy encourages further public participation via the National Pollution Discharge Elimination System (NPDES) permit process, and provides for public notification when certain management techniques are used.

The proposed Peak Wet Weather policy is substantially different from the November 2003 proposed "blending" policy. It requires that discharges must still meet all the requirements of NPDES permits and that operators demonstrate that all feasible measures are used to minimize wet weather problems. It also prohibits the use of these peak flow management techniques in systems where high peak flows are due to poor system maintenance or a lack of investment in upgrades to improve treatment capacity. The policy is designed to provide greater national consistency while still incorporating flexibility to recognize site-specific issues.

The comment period ended January 23, 2006. More information on the proposed policy and its follow-up can be found at: [http://cfpub.epa.gov/npdes/wetweather.cfm?program\\_id=0](http://cfpub.epa.gov/npdes/wetweather.cfm?program_id=0).

managers, scientists, and agency officials to exchange information on improving recreational water quality. The next conference is planned for October 2-4, 2006, in Niagara Falls, New York, in conjunction with USEPA's National Beach Conference. [www.great-lakes.net/glba/](http://www.great-lakes.net/glba/)

### BEACHNET

An email discussion list that seeks to facilitate communication among people interested in the improvement of recreational beach water quality in the Great Lakes basin. The listserv is sponsored by the GLBA and is hosted by the Great Lakes Information Network (GLIN). Both the GLBA and the listserv are open to anyone interested in improving beach water quality, understanding bacterial contamination, developing better ways to detect and monitor pollution, or monitoring and assuring beach visitors' health. There are currently several hundred subscribers to BEACHNET. [www.great-lakes.net/glba](http://www.great-lakes.net/glba).

### BeachCast

This website provides Great Lakes beach goers with access to information on Great Lakes beach conditions, including health advisories, water temperature, wave heights, monitoring data, and more. BeachCast is a service of the Great Lakes Commission and its GLIN. [www.glc.org/announce/03/07beachcast.html](http://www.glc.org/announce/03/07beachcast.html)

### Adoption of Bacteria Criteria that meet National Standards

One of the provisions of the BEACH Act required coastal and Great Lakes states to adopt for their coastal recreation waters, by April 10, 2004, water quality criteria for pathogens or pathogen indicators as protective as USEPA's 1986 water quality criteria for bacteria. The BEACH Act further directed USEPA to propose and promulgate such standards for states that did not do so.



### The Lake Michigan Toolbox Great Lakes Beach Association

The Great Lakes Beach Association (GLBA) plays an important role in providing a forum for beach managers, researchers, concurrent meeting with the Lake Michigan State of the Lake conference,

More information is available at:

[www.great-lakes.net/glba/](http://www.great-lakes.net/glba/)

USEPA worked collaboratively with all the states and territories that contain coastal recreation waters to identify their existing water quality standards, review them for consistency with the BEACH Act requirements, and determine what steps were needed to meet the BEACH Act requirements. On November 16, 2004, USEPA

published in the Federal Register a final rule that promulgated water quality standards for states and territories that had not yet adopted water quality criteria for bacteria that were as protective of human health as USEPA's 1986 bacteria criteria. Information about the promulgation can be found online at: [www.epa.gov/waterscience/beaches/bacteria-rule.htm](http://www.epa.gov/waterscience/beaches/bacteria-rule.htm)

### Next Steps

- Help coordinate outreach materials development
- Continue support of Great Lakes Beach Association conferences
- Report on the latest beach research
- Report on research on beach grooming, pathogen tests, and cladophora bloom causes in the LaMP at the State of Lake Michigan Conference

## Great Lakes Regional Collaboration Goals and Recommendations Relevant to the Lake Michigan LaMP Subgoal 3



### Coastal Health Beach Related Goals and Recommendations

**Goal:** By 2020, or sooner where possible, eliminate inputs of untreated or inadequately treated human and industrial waste to Great Lakes basin waters from municipal wastewater treatment systems and on-site disposal systems.

#### Interim Milestones:

- By 2006, EPA and the Great Lakes States will actively enforce NPDES authority to ensure pretreatment programs are properly implemented;
  - By 2007, U.S. EPA and the Great Lakes States will undertake a thorough review of their ongoing wet weather control programs to identify and correct deficiencies, including adequate staffing and funding, to ensure that programs are achieving the requirements of the Clean Water Act (CWA), including anti-degradation;
  - By 2007, watershed planning and applications of best management practices to promote infiltration and reduce impervious cover shall be components of wet weather management implemented by local governments;
  - By 2007, Congress should fully fund the Clean Water State Revolving Fund;
  - By 2008, U.S. EPA, in cooperation with Great Lakes States, will promulgate rules governing the disbursement of new wet weather management grant funds;
  - By 2009, Congress will appropriate grant funds for a wet weather control program;
  - By 2009, local governments shall develop ordinances to ensure proper construction, siting, and maintenance of on-site disposal systems, including conducting inspections at the time of property transfer;
  - By 2010, or as soon as possible, all municipalities with wet weather overflows in the Great Lakes basin will have adopted and begun to implement comprehensive storm water control programs with the objective of meeting all appropriate state and federal regulations; and
- For communities with wet weather problems that have not proceeded with required planning and implementation by 2010, the States or U.S. EPA will apply necessary enforcement actions (administrative order or judicial action) to require correction of the problems by a date certain with appropriate penalties.

**Goal:** Achieve a 90-95 percent reduction in bacterial, algal, and chemical contamination at all local beaches. Steps to achieve this include: identify indirect pollution sources capable of adversely impacting Great Lakes coastal health; educate communities regarding their environmental impact; and remediate all potential indirect pollution sources through identification, estimation of relative contribution (based on historical data and sanitary inspection), and remediation of these sources. This will result in 90-95 percent of all Great Lakes public bathing beaches being classified as having "good" water quality.

#### Interim Milestones:

- By 2005, the BEACH Act will be fully funded to continue routine compliance monitoring of coastal waters;
- By 2006, real-time testing methodologies will be evaluated and trialed at Great Lakes beaches;
- By 2006, coastal states will have complied with the BEACH Act requirements for public notification;
- By 2006, a standardized sanitary survey form will be drafted;
- By 2007, standardized sanitary surveys will be trialed at select coastal communities;
- By 2008, states will add to their existing water quality monitoring programs a standardized tool for conducting sanitary surveys that will identify sources of contamination at the local level in those instances when bacterial indicator levels exceed published standards;
- By 2009, real-time test methodologies will supplant existing test methods (which take in excess of 18 hours before results become available) under the BEACH Act of 2000; and
- By 2010, regional predictive models will be

available using local data and forecasts of water mass movements derived from the Great Lakes Observation System.

**Goal:** At the local level, individual contamination events will occur no more than five percent of available days per bathing season, sources of these contamination events will be identified through standardized sanitary surveys, and remediation measures will be in place to address these events.

Interim Milestones:

- By 2007, coastal communities will have an education and outreach program in place for K-12, college, the general public, and coastal decision-makers, with assistance of the Great Lakes Sea Grant Network;
- By 2008, enforceable city ordinances will be in place that call for the placement of signs regarding the health risk associated with bather shedding, provision of adequate sanitary facilities for bathers, availability and importance of proper boater waste disposal, and prohibition of practices that attract nuisance wildlife to which fines are attached for violations;
- By 2008, use sanitary surveys to identify 90 to 95% of all indirect pollutant sources resulting in beach closures;
- By 2009, begin to control, manage, and/or remediate pollutant sources identified through sanitary surveys; and
- By 2020, nutrient loading will have decreased as evidenced by a decrease in nuisance algal blooms and ambient water concentrations of nitrogen and phosphorous in coastal areas.

## Recommendations

- Eliminate to the extent provided by existing regulation inputs of untreated or inadequately treated human and industrial waste to Great Lakes basin waters through implementation of wet weather programs, including improvements to wastewater treatment systems.
- Identify indirect pollution sources capable of adversely impacting Great Lakes coastal health and, upon identification, promulgate and enforce regulations, provide public education, promote research, and initiate remediation to reduce the impact of these sources.
- Standardize, test, and implement a risk-based approach to manage recreational water.
- Protect drinking source water quality.
- Use the Drinking Water State Revolving Fund to improve drinking water infrastructure and support source water protection.



Sand Dunes with vegetation  
Indiana Dunes National Lakeshore Lake Michigan  
National Park Service, Indiana Dunes National Lakeshore

### **Constructed Wetlands Could Help Beach Health**

Wetlands and marshes help to clean water naturally before the water makes its way to its lakes and streams. Wetlands that are not ditched or filled in by developers provide this filtering to water. Ditches short-circuit the water from the treatment benefits of being spread out over large areas where the proper conditions of light, plants, and soil filtering take out some unwanted contaminants such as *E. coli*.

A man-made one-acre wetland is under construction at the Indiana Dunes State Park in the Dunes Creek watershed to help filter runoff before it gets to the beach on Lake Michigan. The constructed wetland will give scientists insights into the dynamics of how wetlands work and may serve as a prototype for building additional wetlands.