



## DELAWARE

### 5th in Beachwater Quality

3% of samples exceeded national standards in 2010

Polluted urban and suburban runoff is a major threat to water quality at the nation's coastal beaches. Runoff from storms and irrigation carries pollution from parking lots, yards, and streets directly to waterways. In some parts of the country, stormwater routinely causes overflows from sewage systems. Innovative solutions known as green infrastructure enable communities to naturally absorb or use runoff before it causes problems. The U.S. Environmental Protection Agency is modernizing its national rules for sources of runoff pollution and should develop strong, green infrastructure-based requirements.

Delaware has about 25 miles of Delaware Bay coastline, 26 miles of Atlantic Ocean coastline, and 115 miles of inland bay shoreline. The state's marine beachwater monitoring program is administered by the Delaware Department of Natural Resources and Environmental Control (DNREC).

Construction of additional sewage treatment capacity in Delaware's inland bay watersheds and the subsequent elimination of tens of thousands of septic tanks and other sources of sewage contamination are expected to result in water quality improvement in the inland bays. Bacteria levels should continue to fall with the implementation of stormwater runoff measures outlined in the Inland Bays Pollution Control Strategy, which emphasizes green infrastructure techniques that allow runoff to percolate into the soil instead of channeling it to surface waters. The pollution control strategy was created to meet watershed cleanup requirements for nitrogen and phosphorus, but many of the provisions will reduce bacterial discharges in runoff to the inland bays as well. For example, the strategy requires that buffer zones be established around wetlands as well as tidal and nontidal waters in the inland bay watersheds. The strategy also allows the preservation or establishment of natural features like forest stands and encourages the use of rain gardens, natural landscaping, and constructed wetlands for management of stormwater.<sup>3</sup>

To identify and reduce sources of pollution at Delaware's lifeguarded beaches, the recreational water program has initiated a beach shoreline survey program.<sup>1</sup> As a result of these surveys, park staff and shop owners have been educated about the need to locate garbage receptacles away from storm drains, and residents' complaints about malfunctioning septic systems have been addressed. Delaware's Recreational Water Program has been providing support and funding for research into rapid methods of analysis of marine and inland bay waters for the presence of pathogenic and pathogen-like Epsilonproteobacteria. Pathogenic members of this group include *Helicobacter pylori* and *Campylobacter jejuni*, both of which are associated with human gastric disease and gastroenteritis. The correlation between results of this research and fecal indicator values is being studied. The goal is to be able to quickly identify harmful bacteria and improve the safety of recreational waters.<sup>1</sup> Additional research was funded to investigate the role of bacteria regrowth in near-shore sediments and the way this regrowth contributes to indicator bacterial levels in the water column. The results of this research, which was conducted in a partnership with Maryland, will help to determine actual and potential pollution sources at beaches that have the highest rate of water quality exceedences.<sup>2</sup>

#### KEY FINDINGS IN DELAWARE

##### Beachwater Contamination

(% of samples exceeding state standards in 2010)

- Delaware Seashore State Park, Tower Road Bayside in Sussex County (41%)
- Broadkill Beach in Sussex County (18%)
- Slaughter Beach in Sussex County (7%)

##### Reported Sources of Beachwater Contamination Statewide (number of closing/advisory days)

- 44 (51%) unknown sources of contamination
- 42 (49%) stormwater runoff

## Monitoring Results

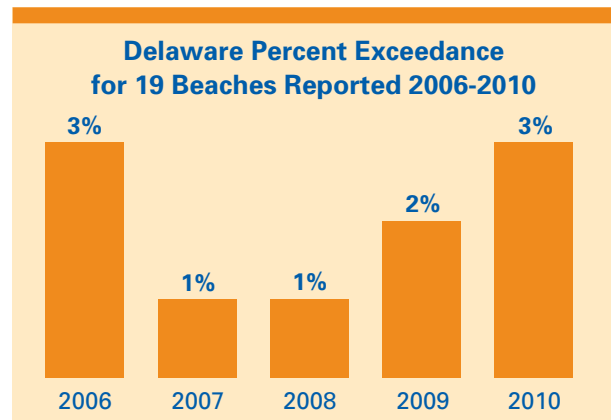
In 2010, Delaware reported 24 coastal beaches, all in Sussex County. Five beaches (21%) were monitored twice a week and 19 (79%) were monitored once a week. For this section of the report, NRDC looked at the percent of monitoring samples that exceeded the state's daily maximum bacterial standards (all reported samples were used to calculate the 2010 percent exceedance rates, including duplicate samples and samples taken outside the official beach season, if any). In 2010, 3% of all reported beach monitoring samples exceeded the state's daily maximum bacterial standards. Five beaches reported samples that exceeded the standard in 2010. The percent exceedances at these beaches were Delaware Seashore State Park, Tower Road Bayside (41%), Broadkill Beach (18%), Slaughter Beach (7%), Prime Hook Beach (6%), and Bethany Beach (3%).

**Sampling Practices:** In 2010, the monitoring season extended from May 3 to September 27.<sup>1</sup> The state's Floatables and Debris Program has a vessel in the water year-round in all weather to monitor oil spills, harmful algae blooms, sewage treatment discharges, nutrient runoff, and industrial discharges.<sup>1</sup>

The DNREC determines sampling practices, locations, standards, and notification protocols and procedures throughout the state.<sup>2</sup> Samples are taken in knee-deep water.<sup>1</sup> Delaware concentrates its monitoring efforts on high-use beaches where water-contact recreation is the dominant activity. All Atlantic coastal beaches are predominantly swimming beaches that are lifeguarded during the monitored beach season and are classified as Tier 1 beaches. Lowest priority is given to beaches that are boat launches or where users have minimal contact with the water.

Once an advisory or closing is issued, resampling to confirm the exceedance is conducted immediately, and the beach is monitored more frequently until the advisory can be lifted.<sup>4</sup> States that monitor more frequently after an exceedance is found will tend to have higher percent exceedance rates and lower total closing/advisory days than they would if their sampling frequency did not increase after an exceedance was found.

The DNREC samples water and/or shellfish for toxins and harmful algal bloom species (*Karenia brevis* and *K. papilionacea*) and issues harmful algal bloom swimming advisories at freshwater beaches.<sup>2</sup>



## Closings and Advisories

Because of concerns about water quality, there is a permanent caution regarding swimming in Rehoboth Bay, Indian River Bay, and Little Assawoman Bay. This permanent advisory includes Tower Road Bayside in Rehoboth Bay and Holts Landing Beach in Indian River Bay. Contaminants in these bays come from many sources in the watershed, including failing septic systems, farm and lawn fertilizers, and runoff from poultry operations. In addition, the sewage treatment plants in Lewes and Rehoboth discharge treated effluent into the Lewes and Rehoboth Canal, which feeds into the bays. Poor flushing of the shallow waters in these bays allows pollutants to linger; it takes more than two months for water to move out of the inland bays.<sup>2</sup> Signs are posted at popular access points around Rehoboth Bay, Indian River Bay, and Little Assawoman Bay to warn the public of the risks associated with swimming in these bodies of water, particularly after a heavy rain.<sup>1</sup>

Total closing/advisory days for 21 events lasting six consecutive weeks or less decreased 9% to 86 days in 2010, from 94 days in 2009. For prior years, there were 11 days in 2008, 10 days in 2007, 0 days in 2006, and 0 days in 2005. In addition, there were no extended or permanent events in 2010; there was 1 permanent event (680 days) in 2009. Extended events are those in effect more than six weeks but not more than 13 consecutive weeks; permanent events are in effect for more than 13 consecutive weeks. For the 21 events lasting six consecutive weeks or less, 67% (58) of closing/advisory days in 2010 were due to monitoring that revealed elevated bacteria levels, and 33% (28) were preemptive (i.e., ordered without waiting for monitoring results) due to heavy rainfall.

**Standards and Procedures:** Delaware standards for marine beachwater quality are an enterococcus single-sample maximum of 104 cfu/100 ml and a geometric mean of 35 cfu/100 ml. DNA analyses to track the source of bacteria at Slaughter Beach and Prime Hook Beach have shown that nonhuman sources contribute to indicator bacteria counts at these beaches. Monitoring results at these beaches are adjusted downward to account for nonhuman sources at these beaches before the water quality standard is applied. (Monitoring data are reported before this adjustment is made.) For Slaughter Beach, the correction factor is 0.49 multiplied by the raw count. This was calculated on the basis of a microbial source tracking study at this beach that found that 77% of fecal bacteria came from wildlife sources, with a 26% margin of error. At Prime Hook, microbial source tracking found that 70% of fecal bacteria came from wildlife, with a 24% margin of error, resulting in a correction factor of 0.54 for this beach.<sup>5</sup>

State policy is to issue advisories when fecal bacteria counts exceed either the single-sample or geometric-mean standard.<sup>1</sup> There are limited overriding factors, such as leaking sampling containers and excessive sediment in samples, which can be taken into account before issuing an advisory when a sample exceeds standards, but these are rare exceptions. Circumstances that would trigger an imminent health threat result in a closing rather than an advisory.

Delaware has a standard for issuing preemptive rainfall advisories. For marine waters, the DNREC has determined that 3.5 inches of rainfall within 24 hours or three inches within 12 hours may trigger a closing.<sup>2</sup> Preemptive closings are issued in the case of a known sewage spill.<sup>2</sup>

<b>Delaware 2010 Monitoring Results and Closing or Advisory Days</b>					
<b>Beach</b>	<b>Tier</b>	<b>Assigned Monitoring Frequency</b>	<b>Total Samples</b>	<b>% of Samples Exceeding State Standards</b>	<b>Closing or Advisory Days</b>
<b>Sussex County</b>					
Atlantic Beach Near Gordons Pond	1	1/wk	15	0%	0
Bethany Beach	2	2/wk	34	3%	0
Broadkill Beach	2	1/wk	17	18%	18
Cape Henlopen Beach	1	1/wk	32	0%	0
Cape Henlopen State Park–Herring Point	2	2/wk	10	0%	0
Delaware Seashore State Park, Tower Road Bayside	2	1/wk	17	41%	58
Delaware Seashore State Park, Tower Road Ocean Site	1	1/wk	15	0%	0
Delaware/Maryland Line Beach	2	1/wk	30	0%	0
Dewey Beach	1	2/wk	36	0%	0
Fenwick Island–Town	1	1/wk	0	NA	0
Fenwick Island State Park Beach	2	2/wk	21	0%	0
Holts Landing Beach	2	1/wk	3	0%	0
Lewes Beach	no data	1/wk	8	0%	0
Lewes Beach North	1	1/wk	13	0%	0
Lewes Beach South	1	1/wk	14	0%	0
North Indian River Inlet Beach, Delaware Seashore State Park	1	1/wk	15	0%	0
Prime Hook Beach	2	1/wk	17	6%	0
Rehoboth–Delaware Ave	1	1/wk	4	0%	0
Rehoboth–Queen St Beach	1	1/wk	16	0%	0
Rehoboth–Rehoboth Ave Beach	1	2/wk	34	0%	0

Beach	Tier	Assigned Monitoring Frequency	Total Samples	% of Samples Exceeding State Standards	Closing or Advisory Days
<b>Sussex County</b>					
Rehoboth–Virginia Ave Beach	1	1/wk	16	0%	0
Slaughter Beach	2	1/wk	15	7%	10
South Bethany Beach	1	1/wk	19	0%	0
South Indian River Inlet Beach	1	1/wk	0	NA	0

## NOTES

- 1 Delaware Department of Natural Resources and Environmental Control. 2010 Recreational Water Year-End Report. Not dated.
- 2 Debbie Rouse, Delaware Department of Natural Resources and Environmental Control, personal communication, March 2011.
- 3 Delaware Department of Natural Resources and Environmental Control. Inland Bays Pollution Control Strategy. May 2008.
- 4 Delaware Department of Natural Resources and Environmental Control. 2008 Recreational Water Year-End Report. Not dated.
- 5 Michael Bott, Delaware Department of Natural Resources and Environmental Control, personal communication, July 2009.

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*Testing the Waters 2011 reflects data as of June 27, 2011.*