EPA New England Beach Initiative
NEIWPCC Nonpoint Source Annual Meeting
Newport, RI May 22, 2007
New England has a short swimming season and one out of four beaches experiences a closure or an advisory every year.
Beaches closed -- just in time for Labor Day weekend
By JOAO FERREIRA, Standard-Times staff writer

With the busy Labor Day weekend approaching, health officials in at least two SouthCoast communities closed public beaches yesterday due to contamination.

Officials closed beaches in New Bedford and Wareham. The swimming areas could reopen today after new test results become available.

One beach reopens, another closes

By Lois Marchand
Staff Writer

KINGSTON -- The town beach on Greenwood Lake has reopened after a series of water tests showed the troublesome cyanobacteria bloom has been reduced to limits considered safe.

High bacteria level forces beach closing:
Geese droppings, water rise seen as potential causes

By JOE McGEE
The Patriot Ledger

HANSON—A Monponsett Pond beach was closed to swimmers yesterday because of dangerous bacteria levels in the water.

A sign was posted on the Ocean Avenue beach at about 1 p.m. yesterday.

“We did get a hit for E. coli bacteria,” health board member Terence McSweeney said.
EPA’s Clean Beaches Initiative
Protects public health by reducing beach closures with consistent, appropriate monitoring and notification

- Issue Beach Grants
  - Use enterococci to monitor beaches with tiered monitoring plan

- Control storm water
  - Provide technical assistance with surveys
  - Work more closely with communities with chronic closures NEW!

- Track progress among states, and Flagship Beaches

- Promote and improve high quality monitoring and assessment technologies

- Coordinate among federal, state and local health agencies
Using over $1 million annually Federal Beach Act funding, all New England states:

- monitor water quality at beaches *using* enterococci
- assess sources of pathogens (perform sanitary surveys)
- and notify the public of water quality conditions
Municipalities and states have implemented many ways to notify the public of advisories or postings.
With the grants, New England beaches are monitored more extensively than five years ago.
States are required to develop a tiered monitoring plan based on characterizing the beach for pollution sources and use.

- **Geomean of 11**: Sample once weekly.
- **Geomean of 35**: Sample 3 to 6x/week.

Increased monitoring frequency with increase in probability of exceedances.
Why does EPA promote the use of enterococci for marine waters?

- Strong relationship to illnesses based on many epi studies
- Relative risk is greater above the geometric threshold of 35 enterococci per 100 ml

Figure 1. Scatterplot and weighted regression line (weighted by the inverse of the standard error of the natural log relative risk) of natural log relative risks of GI illness from marine water studies as a function of enterococci density.

Source: Wade et al., 2003
New technologies: a common problem – bacteria plumes are transient, and spikes result in next day beach closures

We need a *real-time* method to detect bacteria

Single Sample threshold = 104
New EPA Epi studies indicate a relationship between new rapid (PCR) DNA-based measure of enterococci and swimming associated GI illness rates.

Source: Tim Wade, EPA
Do nonpoint sources cause illness, and what indicators best predict illness?

- Study conducted at several beaches in Mission Bay, San Diego, CA
- Most sources are not human derived
- There was a higher GI illness rate associated with swimming, and related to exposure
- But, no indicator was strongly associated with illnesses

![Excess illnesses per 100 swimmers](chart)

- Excess illnesses per 100 swimmers
- Any water contact
- Water on face
- Swallow water
- All ages
- Children 5 to 12
Control nonpoint and storm water pollution sources that contribute to beach closures -- the major known cause of beach closures is storm water

Eliminate human fecal contamination of storm water -- (illicit discharges) -- part of the 6 minimum controls of the NPDES storm water permit

(source, EPA 2002 national beach watch survey)
We find three typical kinds of problems at coastal beaches:

- CSOs, leaky sewers
- Culvertized streams integrated into the storm water infrastructure, sometimes with contaminated water (Scarborough)
- Contaminated runoff from impervious surfaces discharged directly in pipes with poor treatment
Wollaston Beach, MA good example of connection between storm water and sewer system ("leaky sewers"), shows challenge with controlling sources.
Culvertization of coastal streams is a problem at many New England beaches.
“Urban runoff” from poor management practices, or insufficient treatment.
Conceptual model of influence of spring tides on bacteria in marsh outflow

Environmental growth of enterococci in marsh pools affected by spring tides

- **Enterococci densities in marsh ponds**
  - **restricted**
  - **normal**
  - **Spring tide**

Date

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Thoughts on how indicator bacteria get to a beach from nonpoint sources

**Source of indicator bacteria and pathogens**
- duck pond, seagulls
- cattle from nearby farm
- high concentration of leaking septic systems in sandy soils

**Environmental growth of indicator bacteria**, and possibly pathogens, in sediments of catch basins and marshes, wrack, surf zone sediments

**Riparian zones of streams have been removed**, so the natural ecology is altered -- indicator bacteria and pathogen populations are not as attenuated
Tracking Progress: Across New England, we’re seeing no changes in water quality, with increased monitoring (although reporting has increased)

As reported to EPA by states
Warwick and Middletown/Newport experience most action days at coastal Rhode Island beaches

Percentage of RI Saltwater Beach Closures By Town - 2006 Beach Season

- Warwick: 35%
- Middletown: 17%
- Warwick and Middletown/Newport experience most action days at coastal Rhode Island beaches

Source: RI DOH
Tracking progress is made difficult by the nature of nonpoint source pollution – Beach Action Days in Rhode Island often dependent on amount of rainfall.
Our mantra: use monitoring and assessment information to identify sources of bacteria and correct them
What can regulatory agencies and communities do to reduce discharges of fecal contamination – a short list

Implement BMPs, routinely clean catch basins, eliminate illicit connections

Provide some technical assistance (including workshops) to states and communities and technologies to detect fecal contamination

Provide some pressure -- meet with communities to discuss implementation of MS4 NPDES permits and other tools to identify and remove fecal contamination
Tracking Progress:
The value of monitoring -- remediation of sewer connection to storm water system improved water quality at Warren Town Beach *A Flagship Beach*

- In 2003, some storm water samples exceeded 400,000 enterococci mpn per 100 ml, closed 78 days
- 2004 closed 0 days
- 2005 closed 1 day
- 2006 closed 29 days

Source: RI DOH
Summary of beach issues in New England

- Beaches are increasingly being assessed, monitored and the public notified of risks
- State and communities are using the monitoring results to find and correct problems
- Major problem is integration of storm water into the coastal system
- It is a challenge to identify and remediate nonpoint sources of indicator bacteria

[Link to EPA website] epa.gov/ne/eco/beaches