Marine and Freshwater Beach Testing in Massachusetts

Annual Report: 2010 Season

Massachusetts Department of Public Health
Bureau of Environmental Health
Environmental Toxicology Program
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PART ONE: THE MDPH/BEH BEACHES PROJECT

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I. OVERVIEW

There are over 1,000 public and semi-public bathing beaches in Massachusetts, both freshwater and marine, many of which are used by Massachusetts residents. Depending on weather and a variety of other changing conditions, beach water sometimes contains bacteria at levels that can cause health problems such as sore throat, gastroenteritis, or even meningitis or encephalitis.[1] Therefore, it is critical to ensure that bacteria levels at beaches are monitored, and that such levels are acceptable and within public health standards. In 2010, bacteria levels that exceeded public health standards were detected on 794 different occasions across the state, resulting in temporary beach closures. This represents 5.0% of all samples collected during the 2010 season.

In Massachusetts, bathing beach water quality is regulated by the Massachusetts Department of Public Health (MDPH) under Massachusetts General Law[2] and the Code of Massachusetts Regulations.[3] These require that all public and semi-public bathing beaches (e.g., beaches at camps, campgrounds, hotels, condominiums, country clubs) in the state be monitored for bacterial, and on occasion other environmental contamination during the bathing beach season. The exact dates of a given bathing season vary from beach to beach, and are determined by the operators of each individual beach. Some beaches open as early as Memorial Day, but the majority begin operation when the school year ends in mid-June, and most close for the season during the week of Labor Day.

The vast majority of beach water sampling in Massachusetts is conducted by local boards of health, the Barnstable County Department of Health and the Environment, and the Massachusetts Department of Conservation and Recreation (MDCR). Most marine beach samples are analyzed at laboratories under contract with MDPH's Bureau of Environmental Health (BEH). BEH utilizes both state and federal Environmental Protection Agency (USEPA) funds to support these costs. Most freshwater samples are analyzed at private laboratories hired by beach operators or boards of health, while a small number are analyzed at municipal laboratories.

Bathing water samples that are found to contain levels of bacterial contamination in excess of regulatory standards are termed exceedances. If water samples from a beach are found to be in exceedance of regulatory standards, the beach waters must be closed. When this happens signs must be posted at access points to the beach notifying the public that swimming is unsafe due to bacterial contamination. For marine beaches, the public is also notified via the Beach Water Quality Locator, on the MDPH/BEH website, which is operated in collaboration with local health officials and MDPH contract laboratories.[4] Local health officials and MDPH/BEH contract laboratories collect and analyze the samples and perform a majority of the data entry onto the website. MDPH/BEH is notified of exceedances within

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[1] Cabelli, 1983; USEPA, 1986; Cabelli, 1989; Haile, 1996; Pruss, 1998.

[2] MGL Chapter (C) 111, § Section (S) 5. See Appendix A.

[3] 105 CMR 445.000: Minimum Standards for Bathing Beaches (State Sanitary Code, Chapter VII). See Appendix B.

[4] The address of the MDPH/BEH website can be found on the cover of this report.

24 hours (105 CMR 445.040). Beaches are to remain closed until their bacteria counts decrease to levels below the applicable standard, at which point the postings can be removed and MDPH/BEH is notified of the beach reopening.

II. BACKGROUND

A. Beach Water Quality & Health: The Need for Testing

The health risks associated with both marine and freshwater swimming have been demonstrated in numerous studies. Swimmers may ingest or absorb pathogens (illness-causing microorganisms), and several prospective and retrospective epidemiological studies have demonstrated an increased risk of disease among swimmers relative to non-swimmers in both marine and fresh waters that are polluted with bacteria.[5] One retrospective study found the relative risk of gastrointestinal (GI) illness among swimmers in polluted waters to be one to three times that of non-swimmers.[6]

Swimming in polluted marine water can lead to gastrointestinal symptoms (e.g., nausea, vomiting, diarrhea, abdominal pain), respiratory symptoms (e.g., sore throat, cough, chest cold, runny nose, sneezing), eye and ear symptoms (e.g., irritation, earache, itchiness), dermatological symptoms (e.g., skin rash, pruritis), or constitutional symptoms (e.g., fever, chills). Several studies conducted by the United States Environmental Protection Agency (USEPA) and others have associated gastrointestinal symptoms with swimming in polluted fresh waters as well, and more recent studies have reaffirmed that there is a significant association between swimming in contaminated water and gastrointestinal illness.[7]

Pathogens in beach waters typically have a fecal source, and pathogens associated with human fecal matter (e.g., some strains of *Escherichia coli*) may enter beach waters (both marine and fresh) in a variety of ways. Many of these pathways involve sewage: system failures in human sewage treatment facilities, leaking sewer pipes, combined sewer overflows, illegal sewer hookups, leachate from septic systems, or discharge of sewage by boats. Other sources of pathogens in beach waters include (but are not limited to) rainfall and resulting surface water runoff (washing contaminants such as animal wastes from dogs or farms into beach water). Bathers may also contribute significantly to pathogen concentrations in recreational waters,[8] and swimmer-to-swimmer contamination is another potential source for microbiological contamination. All of these factors contribute to elevations in bacteria which can cause illness among swimmers.

B. Establishment of the MDPH/BEH Beaches Project

Responding to these health concerns, state and federal regulatory agencies have worked together to establish a system to protect the public from exposure to swimming-related pathogens.

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[5] Cabelli et al., 1982; Cabelli, 1983; USEPA, 1986; Cabelli, 1989; Coye and Goldoft,1989; CDC, 1990-2004; Corbett et al., 1993; Haile, 1996; Pruss, 1998.

[6] Pruss, 1998.

[7] Wade et al., 2003; Wade et al., 2006

[8] California, 1997; Gerba, 2000

In 1996, MDPH conducted a state-wide beach survey of all Massachusetts municipalities, thereby establishing an initial inventory of all public marine bathing beaches in the state. Based on information collected from local boards of health, beach managers, and other parties, MDPH compiled a documented inventory which has been updated over time and currently includes over 500 marine and 600 freshwater beaches. The inventory is updated continually to reflect changes in beach names, boundaries, etc.

In 2000, the U.S. Congress enacted the Beaches Environmental Assessment and Coastal Health (BEACH) Act (Appendix C). The BEACH Act, which amends the Federal Water Pollution Control Act (often referred to as the Clean Water Act, or CWA) is intended to improve the quality of the nation's coastal recreational waters. It seeks to reduce the risk of illness to users of these waters through the identification of high-risk beaches, identification and mitigation of sources of pollution, and notification/ risk communication to the public. It also authorizes grants to eligible states to support these objectives.

Also in 2000, the Massachusetts legislature passed An Act Relative to Minimum Standards for Public Bathing Waters, often referred to as the Massachusetts Beaches Act (Appendix D). The Act directed MDPH and local health officials:

(1) to adopt bathing water standards protective of public health to apply to all public and semi-public bathing beaches across the state;
(2) to require regular bacteria testing at all public and semi-public beaches; and
(3) to notify the public when bathing standards are violated.

The Act mandated that all beaches be tested weekly except where MDPH and the local board of health stipulated a greater or lesser frequency for a specific beach. It also mandated MDPH to publish an annual report analyzing statewide bacteria testing results.

Since late 2001, the program has received funding from the USEPA. This funding partially supports MDPH efforts

(1) to develop and maintain an inventory of marine bathing beaches;
(2) to compile and analyze monitoring data; and
(3) to conduct assessments of those beaches identified as high-risk.

With the help of these funds, and building upon such groundwork as the beaches inventory, the web-based reporting system, and mapping layer, MDPH/BEH has established a system of routine beach monitoring oversight that has been in place 2002. The elements of this system are described below.

In 2001, MDPH initiated the development of its web-based system for public notification of marine beach closures and water quality monitoring data. Developed by MDPH in conjunction with Garrison Enterprises, with funding support from the USEPA BEACH grant, the site went online in 2003. It provides a mechanism for marine beach water testing data results to be uploaded into a central database immediately after laboratory analysis is complete. Violations are identified by the system automatically, and this information is made available to the public on the Beach Water Quality Locator, a website that is updated twice

each day. By visiting the Locator, the public can quickly learn which beaches are open or closed and the reason behind any closure. [9]

This system was enhanced in 2006 to more clearly explain and illustrate the sampling results, for example by providing easy viewing of historical monitoring data, and to speed the entry and quality of data by laboratories that use the system. These improvements allow the public to quickly find the locations of all beaches through the use of the new GIS maps and provide for easy viewing of graphical and tabular historical monitoring data.

In 2002, the MDPH/BEH Environmental Toxicology and Community Sanitation programs collaborated and released the first annual beaches report, summarizing beach water sampling and results from the 2001 beach season. Since that time, an annual report has been prepared and publicly released for each subsequent bathing season.

In 2003, MDPH worked with local health officials to gather key information on all Massachusetts marine bathing beaches, then validated that information by performing site visits to each beach and taking in-field GPS readings. With the help of Applied Geographics, Inc., MDPH converted the GPS coordinates into a detailed geographic information system (GIS) layer. For every beach, the GIS layer contains the following information:

- location and specific boundaries of the beach itself
- locations of normal access points and parking lots
- public or semi-public designation (or private, if known)
- sampling location(s) for routine water monitoring
- location at each beach where posting signs will be placed in the event that the beach is closed

All information was validated by MDPH staff.

That year, MDPH/BEH also developed the *Public Health-Based Beach Evaluation, Classification, and Tiered Monitoring Plan.* The plan sets forth a three-tiered system for categorizing every marine beach according to the severity of its pollution. Based on this information, a testing frequency is determined which is tailored to the specific needs of the beach, with greater resources being devoted to testing the most polluted beaches. A full description of this system can be found on page 15.

Also in 2003, MDPH finalized its *Quality Management Plan* (QMP) for all beaches activities under the USEPA BEACH grant, as well as for other activities specific to bathing beach regulations. The QMP described how the program would develop, implement, and determine the effectiveness of, its quality assurance and quality control policies and procedures.

In the same year, MDPH completed its *Quality Assurance Project Plan* (QAPP), which was approved by USEPA. In 2007, the QAPP was revised to reflect changes in the Beaches Project. This update was approved by USEPA and distributed to MDPH/BEH's contract

[9] The Beach Water Quality Locator can be accessed through the main MDPH/BEH website (see cover) and clicking on "Bathing Beaches." It can also be accessed directly at http://mass.digitalhealthdepartment.com/public_21/index.cfm.

laboratories before the 2007 beach season. The QAPP describes quality assurance, quality control, and related steps (including enforcement measures) taken to ensure that the results of the project will meet USEPA's published performance criteria. It also updates details on approved laboratory methods, MDPH/BEH contacts, and website information.

III. BEACH WATER QUALITY MONITORING

A. Sample collection

The water quality samples for most public bathing beaches in Massachusetts are collected by local boards of health; on Cape Cod a number of beaches are sampled by the Barnstable County Department of Health and the Environment. The Massachusetts Department of Conservation and Recreation (MDCR), which operates beaches, performs its own sampling. Samples for semi-public beaches are usually collected by the beach operator, although there are some communities that collect semi-public beach samples in the course of their routine sampling of public beaches.

Sample collection is required to be in compliance with the *Standard Methods for the Examination of Water and Waste Water* of the American Public Health Association or as approved by the USEPA. Sample collectors are to record a variety of field data at the time of sample collection, using the current Beach Sampling Field Data Form developed by MDPH/BEH (Appendix E). The information collected includes:

- Community where beach is located
- Name of beach
- Beach type (marine or freshwater)
- Date of sample collection
- Sample collector
- Sample identification number
- Time of sample collection
- Weather condition at time of sample collection
- Air temperature
- Wind direction
- Time of last high tide (if applicable)
- Number of days since last rainfall
- Bather density (i.e., number of people in the water)
- Water temperature
- Water clarity (i.e., is the sample clear or cloudy/murky?)
- Observations (e.g., trash, sludge deposits, oils, algae, fish die-off, jellyfish, birds)
- Comments

Water samples, with field data form attached, are submitted to a certified laboratory for analysis. The field data are later included with the corresponding laboratory results when they are submitted to MDPH/BEH (see the Reporting section, below).

B. Sample analysis

1. THE MDPH CONTRACT LABORATORY PROGRAM

All beach water samples are required to be analyzed within six hours of collection. The laboratories who perform this analysis are generally hired by either the city or town the

beach is in (most often by its board of health, but sometimes by another municipal department, e.g. recreation) or by the operator of that beach. As mentioned earlier, MDPH/BEH uses state funds and for the 2010 season limited federal funding to contract with a number of laboratories to analyze qualifying communities' public marine beach samples. Since 2003, MDPH/BEH has reimbursed communities over $550,000 for the analysis of over 35,000 marine samples from over 50 communities that have taken part in the contract laboratory program. The contract laboratories were successfully audited by MDPH/BEH staff in 2005 to ensure compliance with the QAPP and Standard Operating Procedures.

2. THE USE OF INDICATORS

In the United States, most swimming-associated diseases are caused by a wide variety of pathogens associated with fecal contamination (Cabelli, 1983). Most of these pathogens are very difficult to measure directly, but water samples that contain them also contain other microorganisms which are easier to measure. These "indicator organisms" provide a reliable indication of the pathogens' presence and quantity. By measuring these other microorganisms, which live in the same microbiologic conditions, follow the same life cycles, and occur at levels proportionate to those of the pathogens, public health officials are able to estimate the level of the pathogens in beach water samples. When the presence of one microorganism is used to indicate the presence of another, it is referred to as an "indicator."

The most accurate indicators of fecal contamination (and thus of risk to swimmers) are specific microorganisms that are predominantly present in human and animal feces, such as *Streptococcus faecalis* or *Clostridium perfringens* (Cabelli, 1983). However, testing for a single indicator species can fail to detect the presence of fecal pathogens if that indicator species does not survive in the natural environment for as long as the fecal pathogens themselves (NAS, 1977). Therefore, it is preferable to test for groups of microorganisms, such as total coliforms, fecal coliforms, or Enterococci, instead (Cabelli, 1983). These analyses are usually easier and faster to perform than those that test for only one indicator species, although a disadvantage of using groups of microorganisms as indicators is that this method can also detect organisms not associated with fecal contamination, thus falsely predicting the presence of fecal contamination (NAS, 1977; Cabelli, 1983; Barrell et al., 2000). However, in the case of Enterococci, results do correlate strongly with swimming-associated illnesses (USEPA, 1986; Pruss, 1998).

3. ENTEROCOCCI

In its *Ambient Water Quality for Bacteria – 1986,* USEPA recommended that Enterococci rather than fecal or total coliforms be used as the indicator species in marine water quality testing. This recommendation was based on studies performed at three locations (New York, NY; Boston, MA; and Lake Pontchartrain, LA) that demonstrated that gastrointestinal symptoms reported by swimmers were strongly correlated with Enterococci levels, but not with levels of total or fecal coliforms (Cabelli,1983). In the late 1990s, rapid laboratory methods became available to allow for the adoption of this indicator. Since 2000, Enterococci has been the required indicator for routine marine beach testing in Massachusetts (105 CMR 445.000). All marine beaches submitting data have used this method since 2004.

The Enterococci method detects the number of bacteria that grow under certain laboratory conditions (USEPA, 1985). It measures the concentration of bacteria from a group of species within the *Streptococcus* genus, some of which (e.g., *Streptococcus faecalis*) are

typically found in human and animal intestines (USEPA, 1985). Although not all of the species detected by this method are associated with fecal contamination (USEPA, 1985), leading to false-positive results, it is prudent, for public health purposes, to treat all exceedances in indicator level as possible public health risks. Moreover, the Enterococci method does not detect as many non-fecal species as older methods do (e.g., fecal or the total coliform), and is therefore more accurate. Having said that, all viruses and some bacterial pathogens are not detected by this method.

4. *E. COLI*

Escherichia coli, usually referred to as *E. coli*, is a species of bacteria that originates in human and animal intestines (USEPA, 1985). Certain strains of this species are enteric (i.e., intestinal) pathogens (NAS, 1977). While both the total and fecal coliform methods can detect *E. coli* as part of a group of organisms, the *E. coli* method tests specifically for the presence or absence of this one particular species. Because *E. coli* originates in human and animal intestines, this method is a very sensitive indicator of fecal contamination for freshwater beaches (USEPA, 1985).

5. LABORATORY METHODS

Enterococci and *E. coli* are currently the preferred indicators for beach water quality testing, and the only ones accepted in Massachusetts. The laboratory methods required for beach water analysis in Massachusetts are those specified in the most recent edition of the American Public Health Association's *Standard Methods for Examination of Water and Waste Water* or as approved by the USEPA.

Currently, the required methods for Enterococcus are either Method 1600: Membrane Filter Test Method for Enterococci in Water, or Enterolert. Method 1600, which was approved and adopted by USEPA in 1997, enables a faster turnaround time for testing of Enterococci, making it practical for local use. Laboratories contracted by MDPH to perform public, marine beach sample analysis are required to utilize the Modified Enterococci Method (Method 1600) or Enterolert as approved by the USEPA and the MDPH/BEH Beach Project QAPP. Both are culture-enzyme-substrate methods, approved and adopted by USEPA in 2003 for testing ambient water (Jagals et al., 2000; Federal Register, 2003).

6. BACTERIAL STANDARDS

Water quality standards are guidance concentrations used by public health officials to make decisions regarding the health risks associated with swimming. These criteria are typically expressed as the concentration of an indicator in the water above which there is an unacceptable risk for adverse health effects in swimmers.

Because the correlation between indicator levels and the levels of the actual pathogens posing health concerns is strong, indicator levels allow public health officials to estimate the health risk related to swimming at a particular beach. But other site-specific factors are taken into consideration to supplement these estimates, such as recent rainfall patterns and the number of people who use the beach.

The concentration of a microorganism in water is usually reported as the number of colony forming units (CFU) of indicators present per 100 milliliters (ml) of water. Massachusetts has specific water quality standards for marine water and freshwater.

<u>Marine</u>

USEPA (1986) used the relationship between the number of cases of swimming-associated disease and the Enterococci concentration in bathing water to establish the criteria for Enterococci in marine waters at 104 CFU per 100 ml for a single sample and 35 CFU per 100 ml for the geometric mean of at least five samples over a 30-day period. These standards were set such that the expected incidence of gastrointestinal illness among swimmers would be the same as it had been for the previous USEPA water quality criteria for fecal coliform (i.e., 19 illnesses per 1,000 swimmers at marine beaches). MDPH/BEH adopted this standard by regulation beginning with the 2000 bathing season.

Freshwater

As indicated in the regulations (105 CMR 445.031) (see Appendix B), the indicator organisms for freshwater bathing beaches are *E. coli* and Enterococcus. This is based on research conducted by USEPA (Dufour, 1984; USEPA, 1986). Each freshwater beach is required to test for one of these two indicators.

For Enterococcus, no sample shall exceed 61 CFU per 100 ml, and the geometric mean of the most recent five Enterococci samples within the same bathing season shall not exceed 33 CFU per 100 ml. For *E. coli*, no sample shall exceed 235 CFU per 100 ml, and the geometric mean of the most recent five *E. coli* samples within the same bathing season shall not exceed 126 CFU per 100 ml. These are the standard criteria established in MDPH/BEH regulations (105 CMR 445.031).

Both the *E. coli* and the Enterococcus standards are based on studies (Dufour, 1984; USEPA, 1986) that showed that levels of *E. coli* and Enterococci correlated strongly with rates of swimmer-associated gastrointestinal disease in freshwaters. The values are set to a level of risk of no more than eight cases of acute gastrointestinal illness per 1,000 swimmers in freshwater beaches.

C. Reporting

The laboratories performing these analyses report their results to the beach operator or board of health that has hired them. Beach operators report their results to the local board of health. Boards of health report them to MDPH/BEH.

For communities having public, marine beaches, the MDPH contract laboratories report the results directly to the MDPH/BEH Beaches Website via a secure Internet connection as soon as they are generated. Data are then displayed on the Beaches website in near real-time for public notification of beach closures and test results. Some boards of health that do not use MDPH/BEH contract laboratories fax their marine sampling results to MDPH/BEH staff who either enter the data onto the beaches website or have other laboratories perform this input for them.

1. THE BEACHES WEBSITE

In 2003, using funding provided as part of the USEPA BEACH Grant, MDPH established a web-based system designed to make up-to-date water quality information on all public, marine beaches available to the public as quickly as possible. This system has two components:

(1) A series of password-protected data-entry pages through which MDPH/BEH contract laboratories enter all water quality data (along with corresponding field data) directly into one centralized database. The laboratories are required under the

MDPH/BEH contract to enter these data as soon as they become available. Local boards of health also have access to this portion of the website to review laboratory and associated field data in order to most efficiently take public health action.

(2) The Beach Water Quality Locator, a public website that allows users to select a beach via a series of interactive maps of the Massachusetts coast to see if it is currently open and to view its most recent test results. Historical data for each beach are available as well.[10]

In 2004, MDPH developed its *Data Submission Plan for Routine Monitoring*, which was then submitted to and approved by USEPA. The procedures outlined in this document are used for data submission under the USEPA BEACH grant, as well as for other activities specific to bathing beach regulations. The Plan is a required document that describes Massachusetts' plan for submitting the beach data it collects from coastal municipalities to USEPA. USEPA then compiles data from all states to develop a national picture of marine bathing water quality.

In 2006, the MDPH beaches website was enhanced through the addition of a GIS layer to display maps of beach locations, provide graphs for both single sample and geometric mean data, and improved reliability and efficiency for data entry. These improvements allow the public to quickly find the locations of all beaches through the use of new GIS maps and to view graphical and tabular historical monitoring data.

2. EXCEEDANCES: BEACH CLOSURES & PUBLIC NOTIFICATION

When a water sample from a beach exceeds bacterial standards (either single sample or geometric mean), Massachusetts law requires that the beach be closed. MDPH/BEH contract laboratories are required to report exceedances of bacterial water quality standards to MDPH/BEH and local boards of health as soon as analyses are completed and results available. Beach operators are required to report exceedances to their local boards of health immediately.

Under Massachusetts law (MGL C 111, § 5S), the local board of health is required to post standard signs at the key access points to a beach immediately after, or within 24 hours of, being notified that the beach did not meet water quality standards. In addition, the board of health is required to notify MDPH/BEH within 24 hours of the exceedance and the closure by faxing both the laboratory results and a standard beach closure form provided to them by MDPH/BEH. The closure form affirms that that the beach waters have been closed and that signs have been put up at to that beach. MDCR is responsible for the closure and posting of its own beaches, in the event of an exceedance.

For public marine beaches, up-to-date closure information can also be accessed on MDPH/BEH's Beach Water Quality Locator website. MDPH contract laboratories enter these results into the Beaches Website as soon as they become available. When the results for a given beach exceed water quality standards for either a single-sample or geometric

[10] The Beach Water Quality Locator can be accessed through the main MDPH/BEH website (see cover) and clicking on "Bathing Beaches." It can also be accessed directly at http://mass.digitalhealthdepartment.com/public_21/index.cfm.

mean, the website automatically generates a notification of that beach's closure. These closure notifications (or "postings") are added to the Beach Water Quality Locator webpage twice each day, at 9:30 AM and 12:30 PM. This means the web-based system allows for public notification that is as near to real-time as possible. Local health officials can view postings shortly before public notification, which gives them an opportunity to place closure signs at the beaches and to prepare for public inquiries that may result, depending on the most recent data. MDPH/BEH staff have provided training to local health officials on how to use the website.

3. DATA MANAGEMENT

Marine data, already entered via the website, are uploaded to USEPA by MDPH/BEH in fulfillment of USEPA reporting requirements under the USEPA BEACH Grant, which mandates that MDPH must electronically report to USEPA all routine marine monitoring sampling data and laboratory results, as well as beach postings, on an annual basis.

The marine data are also kept in an in-house database at MDPH/BEH for analysis and inclusion in this report. Freshwater data (including field data) are entered into the same database.

All data are validated and checked for completeness by MDPH/BEH personnel. Local boards of health and laboratories are contacted directly, as necessary, to resolve questions and discrepancies in the data.

D. Quality Assurance

As previously mentioned, MDPH/BEH's *Quality Assurance Project Plan* was revised in 2007. This document, approved by USEPA, describes the quality assurance/quality control mechanisms MDPH/BEH has developed to ensure that the state's beach monitoring activities and the resulting data meet USEPA's published performance criteria. Copies of the revised QAPP were distributed to all MDPH contract laboratories in 2007. MDPH/BEH uses the same standards for its freshwater monitoring activities.

There are four main parts of the QAPP: project management, data generation and acquisition, assessment and oversight, and data validation and usability. The project management section describes the project's organization, planning, schedule, and performance criteria. The data generation and acquisition section discusses the sampling and analytical methods, chain-of-custody, and instrument/equipment quality control. The section on assessment and oversight outlines the audits and assessments that will be performed to ensure compliance with the QAPP and Standard Operating Procedure (SOP). The final section, data validation and usability, describes the process for reviewing, verifying, and validating data.

E. The Tier System and Frequency of Testing

The Massachusetts and federal beach Acts require that all public and semi-public marine bathing beaches be tested weekly. However, some beaches have a history of severe pollution problems, while others have proven over time to be exceptionally clean. The former require more frequent monitoring, and the latter less frequent monitoring. For a beach that has gone two years without a single violation and where a sanitary survey has been completed to ensure there is a low risk of future violations, weekly testing may result in unnecessarily burdening local health officials' resources that could be more effectively used.

1. THE THREE TIERS

To address this, the USEPA BEACH Grant required the development of a tiered monitoring approach to sampling, and in 2003 MDPH/BEH developed the *Public Health-Based Beach Evaluation, Classification, and Tiered Monitoring Plan*. The purpose of the *Plan* is to facilitate the identification and clean-up of pollution problems, while allowing those beaches with more pristine records to be monitored less often than weekly. The Plan is based on a three-tier system that classifies all beaches according to the severity of their pollution:

> Tier One includes heavily used beaches which have pollution problems. USEPA believes that these beaches should be tested at least twice per week. Because of the ongoing pollution concerns/violations, those beaches are generally sampled more than once a week. There are currently seven Tier One beaches in Massachusetts. All seven are marine beaches and are tested daily.
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> Tier Two includes higher-use beaches with some pollution. These beaches must be tested once per week. The majority of beaches (435 of the 534 marine and 529 of the 535 freshwater beaches) are categorized as Tier Two beaches.
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> Tier Three beaches are those with no known pollution problems. They are required to be tested once every two weeks or sometimes less frequently, as determined by the local board of health and MDPH/BEH through the variance process. There are 92 marine beaches and 6 freshwater beaches currently listed as Tier Three beaches.

Because the frequency of monitoring mandated by both federal and state law is weekly, Tier Two functions as the default, or baseline classification. If monitoring data indicate severe pollution, a beach may be reclassified as Tier One and monitored more frequently. If the data show that a beach has maintained exceptionally clean water quality, it may be reclassified as Tier Three, allowing for less frequent than weekly testing, usually one to two times a month.

2. SANITARY SURVEYS AND VARIANCES

For a beach to upgrade to Tier Three status, its operator must apply to the local board of health for a variance; beaches operated by State agencies must apply to MDPH. Pursuant to Massachusetts regulations (105 CMR 445.100), two requirements must be met for the variance to be issued: (1) the beach must have a proven track record of “clean” sampling; and (2) MDPH/BEH’s Sanitary Survey must be completed for the beach by a registered sanitarian, Certified Health Officer, or Registered Environmental Health Specialist. The Survey is a tool health officials can use to assess the level of pollution at a given beach and to identify all possible sources of contamination (e.g. sewage discharge, stormwater overflows, bird and animal populations). Local health officials must review sanitary surveys before approving variance applications for final approval by MDPH.

F. Forms

The various standardized forms involved in the monitoring process have been periodically updated to reflect changes to the monitoring system or improved based on field experience or feedback from laboratories and local health officials. Electronic versions of these forms can be obtained by clicking the “Publications and Reports” hyperlink on the MDPH/BEH beaches webpage.

IV. HISTORICAL ACTIVITIES

A. Training

MDPH/BEH has held numerous training sessions for local health officials during the life of the BEACH Grant. Topics discussed have included: health concerns related to polluted bathing water, sampling methodology and use of standardized field sampling forms, administration of sanitary surveys, current federal and state regulations, MDPH/BEH's Beaches website and an overview of the GPS survey of marine beaches in Massachusetts. MDPH/BEH trainings have also presented information on identifying actual and/or potential sources of contamination. Additional technical guidance is frequently provided through mailings and personal communications with local health officials. Each year, MDPH/BEH ETP contacts boards of health to discuss any reporting deficiencies and then MDPH updates its internal database based on these conversations.

B. Emergency Response

MDPH/BEH have also provided assistance in investigating potential outbreaks of water-borne parasites and illnesses. In past years, incidents requiring emergency response have included cases of *E. coli* O157:H7, giardiasis, and Vibrio vulnificus infections. These response actions can involve reviewing sampling results and/or medical records, or the preparation of educational materials, often in collaboration with local boards of health, other programs within MDPH/BEH (e.g. Food Protection, Community Sanitation),other MDPH bureaus (e.g. MDPH's Bureau of Infectious Disease Prevention, Response and Services). or other state agencies.

MDPH/BEH has also responded to numerous incidents involving algal blooms whose proximity to bathing beaches posed a potential health risk to swimmers. MDPH/BEH has provided technical support to local health officials in response to algal blooms across the state. Typically, this involves performing a site visit and providing educational materials. In 2007, MDPH/BEH developed a protocol for responding to harmful algae blooms at freshwater bodies. In 2008, MDPH/BEH was one of ten states to be awarded a cooperative agreement from the United States Centers for Disease Control and Prevention to enhance environmental and human illness surveillance related to harmful algae blooms.

V. LIMITATIONS

The ability of MDPH/BEH to provide prompt public notification of beach water quality monitoring results is limited by both the completeness and accuracy of the data reported; the use of indicator organism criteria which, although strongly supported in the recent literature, has some uncertainties; and analytical techniques that require 24 hours to generate results, thereby potentially leaving beach users at risk.

Although data completeness and accuracy are inevitably reliant upon the multiplicity of parties and individuals involved in data collection and reporting, the electronic reporting system and public beaches website have vastly improved the accuracy and quality of marine data submitted. Another stabilizing factor is the nearly 100% compliance Massachusetts has achieved in recent years in the use of Enterococci, the state and federally mandated indicator organism, for testing by public marine beaches reporting routine monitoring results.

The use of proper and consistent sampling procedures is an important step in ensuring the quality of data reported. As a result of training, the use of standardized field sampling forms and the participation of contracted laboratories, consistency in the format and completeness of data reported continues to improve.

In recent years, MDPH/BEH was provided data from approximately 99% of the communities with open freshwater beaches. The amount and quality of data submitted from each community, however, varied greatly. During the beach season, communities often use different monitoring techniques. Therefore, the comprehensiveness of data varies among communities. Currently, with the exception of exceedances, which are required to be reported to the MDPH/BEH within 24 hours, freshwater beach data are normally reported once during the year, after the end of the beach season. As a result, MDPH/BEH ETP personnel can only review the data for proper sample collecting and testing techniques after the sampling season has ended. MDPH/BEH continues to work individually with local boards of health to reduce issues related to quality control and variability by providing guidance and resources as necessary.

Another limitation, related to the specificity of analytical methods, is that the data are indicator-, not pathogen-, specific. As a result, the data only suggest a potential for the presence of pathogens that can cause human disease. The presence or absence of specific pathogens is not directly measured. The use of indicators implies that water meeting the criteria may harbor disease-causing microorganisms and also that water considered unsafe may not carry any disease-causing microorganisms (e.g., Polo et al., 1998; Moore et al., 2001; Prieto et al., 2001; Schindler, 2001). This is an inherent limitation of using indicators as a test of water quality, in Massachusetts and elsewhere. However, it does need to be emphasized that a substantial body of scientific research generally supports the use of these indicators as described earlier in this document (Cabelli, 1983; USEPA, 1986).

The criteria developed for each indicator are set at a specific level of risk of an adverse health effect, in this case gastrointestinal illness, rather than at a no-risk level. The indicator limits recommended by USEPA for Enterococci in marine waters are associated with a risk level of 19 GI illnesses per 1,000 swimmers (USEPA, 1986). Therefore, levels of indicators considered in compliance by the Massachusetts and national requirements do not imply freedom from risk of adverse health effects for the total population at risk.

Using current indicators, it takes 24 hours to receive the results of a bathing beach water sample analysis (Wade et al., 2005). This delay can lead to the exposure of bathers to unsafe bacterial levels, as well as unnecessary closings (Wade et al., 2006) (e.g., beach closed on day of results, but by then the bacterial criteria may not be exceeded). This delay also makes it very difficult for investigators to track the contamination back to its sources, as it may dissipate before an investigation begins (Evaluation of New Methods, SCCWRP).

Development of a reliable rapid testing method continues. This new method would expedite obtaining results in the laboratory, in turn expediting the transmission of results to beach managers. Ideally, beach managers would be able to sample in the morning and receive results that same day, minimizing both exposures and unwarranted closures. A modified method of polymerase chain reaction (PCR), quantitative PCR (qPCR), detects in real time specific DNA sequences that originate from a particular organism, like fecal indicator bacteria such as Enterococcus (Haugland, 2005). QPCR can measure indicator bacteria levels in recreational water samples and give results in two hours or less (Wade et al., 2006). In freshwater studies, a significant correlation was shown between water quality as

measured by qPCR and swimming-related gastroenteritis (Wade et al., 2005). Because the rapid indicator method has been shown to accurately predict health effects in much less time, its use may reduce instances of illness and erroneous beach closings (Wade et al., 2006). In 2010, USEPA analyzed the results from past epidemiologic studies to evaluate the performance of qPCR versus current analytical methods in predicting health risks. The results from these studies, as well as others, will be assessed for possible development of new test methods for recreational waters within the next few years.

Finally, acceptable levels of risk are typically determined by the incidence of GI symptoms among swimmers compared to that for non-swimmers. While research has shown that GI is the most sensitive outcome, it should be noted that pathogens found in marine and freshwater can cause other symptoms, including respiratory, dermatologic, ophthalmologic, and constitutional.

PART TWO: THE 2010 BATHING SEASON

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I. MDPH ACCOMPLISHMENTS

In addition to its routine monitoring activities (outlined earlier), MDPH/BEH performed a variety of more specific activities, unique to the 2010 season.

A. Beaches Website/Data Management

Links to all MDPH/BEH standardized forms were checked and the forms were made available for download via the Publications and Reports hyperlink on the bathing beaches website. These forms included the Beach Permit Form, Field Sampling Form, Posting Fax Form, Posting Sign Form, Surrogate Sampling Point Form, and the Tier III Sanitary Survey Form. Both local communities and laboratories were notified and given newly updated field data forms that made it easier for samplers to record conditions while in the field.

Forms were distributed to local boards of health in 2010

Guidance and training was provided to local boards of health, when necessary, to ensure quality assurance for data entry conducted outside of the contract laboratory program.

The beach program's database was again updated for the 2010 beach season. Beach locations were revised as sampling points were combined at continuous, uninterrupted beaches; non-swim beaches were identified and reassigned; and new swim beaches were identified. New information, such as waterbody information, latitude/longitude information, and potential pollution sources, for nearly 100 freshwater beaches were added to the database to provide greater clarity when analyzing bacterial results and also help identify potential exposure points when potential waterborne public health emergencies occur.

New information such as waterbody and pollution sources has been added to MDPH's database to help ensure quick responses to public health emergencies

B. Trainings

In April 2010, MDPH gave presentations to local health officials at five seminars held by the Massachusetts Health Officers Association (MHOA) and MDPH/BEH Community Sanitation Program at geographically diverse locations across the state. MDPH beaches staff presented information on the new beach regulations and their application in the 2010 beach season. Informational packets were provided containing the beach sampling field data forms, sanitary survey forms, posting forms, and fact sheets. Importantly, time was allocated for health agents to provide feedback and pose any questions they had regarding forms and procedures.

Five trainings for local health officials were conducted prior to the beach season in 2010.

Also, in April 2010, MDPH staff attended a Cape and Islands Health Agents Coalition meeting to discuss aspects of the MDPH's proposed amendments to the bathing beach regulations. MDPH staff also provided technical assistance and forms needed for the 2010 beach season.

In preparation for the 2010 beach season, MDPH staff personally communicated with bathing beach communities while collecting 2009 beach data. Local health officials were reminded of their responsibilities under the

bathing beach regulations and provided with any technical assistance or forms needed. MDPH staff also discussed deficiencies in reporting and updated the internal database based on these conversations. These efforts help enhance reporting, as nearly all communities in the state now report beach testing results on a yearly basis.

C. Quality Assurance

Throughout the beach season MDPH staff conduct numerous inspections at selected beaches identified as having an exceedance to ensure proper signage is present. MDPH staff also assisted local health officials and laboratories in developing their weekly sampling schedules for the 2010 beach season. MDPH helped analyze the locations and logistics with local health officials, and staff standardized field forms with beach names and the weeks when they were to be sampled so that appropriate sampling schedules were maintained (either weekly, bi-weekly or monthly).

MDPH staff conducted numerous site visits to ensure proper public notification of bacterial contamination.

D. Laboratory Program

Since 2003, MDPH/BEH has supported local marine communities for routine monitoring through the services of contract laboratories funded by MDPH. This support continued in 2010. The laboratories funded by MDPH/BEH (Barnstable County Department of Health and Environment Water Quality Testing Laboratory, Town of Chatham Department of Health and Environment Water Quality Laboratory, G & L Laboratories, Inc., New Bedford Health Department Laboratory, and Wampanoag Environmental Laboratory) analyzed over 4,500 marine beach samples from 55 marine beach communities during the 2010 beach season. Five of the six contract laboratories were successfully audited by MDPH/BEH staff in 2010 to ensure compliance with the QAPP and Standard Operating Procedures. The sixth laboratory will be audited prior to the start of the 2011 beach season.

Laboratory contracts were renewed in 2010 and 55 of the 60 marine communities utilized these services.

Laboratories fulfilled their contract requirements by promptly entering sampling data and laboratory results into the MDPH/BEH public notification website as results became available. Beach postings were automatically generated by the website when submitted samples exceeded acceptable water quality standards. Display of these postings on the public pages occurs twice per day, at 9:30 AM and 12:30 PM.

E. Public Health Emergency Response

During the 2010 season, MDPH/BEH also responded to several incidents that posed potential health concerns related to water quality or other conditions at bathing beaches. Algae blooms were reported at 25 lakes and ponds throughout Massachusetts, nine of which had beaches (n=15). MDPH/BEH Beaches Staff involved with algae bloom surveillance staff coordinated the response actions with local health officials to ensure that the public was aware of potential health concerns related to algae blooms. MDPH/BEH HAB staff distributed fact sheets to local boards of health and conducted on-site assessments of the algae bloom at the beaches at these lakes and ponds, and public health issued advisories that affected the operation of 15 beaches where advisories were issued.

In July 2010, BEH was contacted by MDPH's Bureau of Communicable Disease Control (BCDC) regarding a number of cases of *Shigella sonnei* reported among individuals who visited the Mystic River Reservation Shannon Beach Recreational Area in Winchester. This was the same location, where in 2009, shigella cases were linked to poor sanitary conditions at the facilities. Given this history and an apparent reoccurrence of shigella in 2010, BEH beaches staff conducted several site visits to assess the sanitary conditions. MDPH continues to work with MDCR staff to improve the conditions at this facility.

II. MONITORING

A. Results

During the 2010 bathing season, 215 of 229 communities in Massachusetts with public or semi-public, marine or freshwater beaches sent water quality data to MDPH/BEH. Twelve of the fourteen communities that did not submit data, had closed their beaches for the 2010 beach season, and hence no beach water quality data were collected in 2010. These beaches were closed mainly due to lack of use and resources (e.g. staff to maintain and collect samples or money to conduct required sampling). Two communities (Rockland and Topsfield) did have freshwater beaches open in 2010, but did not submit testing data.

99% of communities with open beaches reported data to MDPH in 2009.

In total, MDPH received water quality data collected from 603 marine and 571 freshwater sampling locations at 534 marine and 535 freshwater beaches respectively. Due to the length of some beaches in Massachusetts, multiple sampling locations are necessary to distinguish specific areas of water quality. For the purposes of this report, a sample location is considered a single beach. In total, MDPH/BEH received results for 15,409 water samples from marine and freshwater beaches collected during the 2010 beach season. There are 33 communities that have only marine bathing beaches, 169 communities that have only freshwater beaches, and 27 that have both marine and freshwater bathing beaches within their communities (Table 1).

MDPH received data for 1,100 sampling locations at over 1,000 marine and freshwater beaches in 2010.

1. MARINE BEACHES

During the 2010 bathing season, all of the 60 Massachusetts coastal communities with known public or semi-public marine bathing beaches submitted beach monitoring data to MDPH/BEH. These communities accounted for 603 sampling locations at 534 public or semi-public marine bathing beaches.

There are 60 communities with marine beaches in Massachusetts.

A total of 7,919 water samples were collected from marine public and semi-public beaches and reported to MDPH/BEH during the 2010 bathing beach season (Table 2). Bather density data were collected as part of routine sampling. Massachusetts regulations require samples to be taken within the area of greatest bather density (105 CMR 445.000). GPS surveys of marine beaches completed by MDPH/BEH in 2003 and subsequent observations by MDPH/BEH beach inspectors confirm that samples are being taken within the areas that typically receive the highest use (greatest bather density) such as areas near main entrances and/or areas closest to parking lots. Due to the time needed to collect and analyze samples, a majority of the samples were collected at times when bather density consisted of ten or fewer individuals (Table 3). Most samples were collected before noon, when the bather load is generally low even in high-use areas.

Over 7,900 samples were collected at marine beaches in 2010 to evaluate bacterial water quality.

With the passage of the Massachusetts Beaches Act in 2000, the state adopted the USEPA recommended Enterococci as the standard indicator for

water quality monitoring at marine beaches. Since the institution of the MDPH/BEH contract laboratories and website, boards of health in Massachusetts marine communities have all adopted the use of Enterococci as an indicator organism. Enterococci was the indicator used for all water samples taken at marine beaches in 2010. The use of MDPH/BEH contracted laboratories for analyzing public marine beach water samples has played a major role in achieving uniform compliance with the MDPH/BEH regulation for marine beaches.

100% of the samples collected were analyzed with the mandated indicator method.

Eighty-three percent of the marine beaches were tested daily or weekly (in most cases, the minimum requirement is weekly sampling) (Table 4). Most of the remaining marine beaches were permitted to sample less frequently because of Tier Three status. However, there was one semi-public beach, Leisure Shores in Mattapoisett, which was not tested during the 2010 beach season despite the fact that it was open during the summer bathing season. The Mattapoisett Board of Health is working with the beach operator to ensure they abide by regulatory requirements for frequency of testing and beach operation.

Nearly 100% of all marine beaches were tested as required in 2010.

Local health departments, independent laboratories, the National Park Service, MDCR, and semi-public operators (camps, hotels, and neighborhood associations, etc.) were responsible for collecting the majority of the marine beach water samples. MDPH/BEH contract laboratories performed the majority of analyses for these samples during 2010. Four communities (Boston, Lynn, Revere, and Salisbury) have marine beaches that are solely managed by MDCR and therefore are not eligible for the contract laboratory system. MDCR coordinates with MDPH for laboratory results to be entered onto the beaches website by the laboratories they utilize. The Town of Kingston opted not to use MDPH/BEH contracted laboratories in 2010. Kingston faxed their data to MDPH beach inspectors and these data were subsequently entered directly onto the beaches website for prompt public notification.

The number of marine beach postings in 2010 was 519.

The total number of marine beach postings (i.e., verification to MDPH/BEH that a sign was posted at the beach) received in 2010 was 519 (Table 5). The number of postings was greater than the total number of single sample exceedances (490). This could be due to a variety of factors, such as number of precautionary postings issued due to rainfall. These data are discussed further in the Analysis of Results section. The percentage of exceedances versus total number of samples collected was 6.2% in 2010 (Table 6). Of the 603 public or semi-public marine beach locations, 215 (36%) incurred at least one bacterial exceedance (Table 7).

196 marine beaches had at least one exceedance.

6.2% of all samples collected exceeded the bacterial standard.

Total rainfall amounts in most regions in Massachusetts were lower during the 2010 season compared to 2009 (Tables 8 through 11). The Boston area received 11.59 inches of rain in the 2010 beach season (i.e., June through August) versus 13.36 inches received in 2009. The Cape Cod region (Chatham) received a total of 7.95 inches of rain in the 2010 season, which is more than a third less than the amount received in the 2009 season (13.82 inches).

Total rainfall in Boston was above normal. While in Chatham, the amount of rainfall was below normal.

As part of routine sampling, environmental observations should be recorded on a field data form and reported to MDPH/BEH. Samplers have the option of recording potential sources of pollution, as well as noting when no sources are observed. In 2010, the field forms accompanying 4,338 of the 7,919 marine samples collected (about 55%) included information as to whether potential transient pollution sources had been observed to be present at the sampling location. Of those, 25% recorded the presence of a specific source (e.g. birds, dogs, algae, trash), and 7.5% of those samples exceeded the bacterial standard (Table 12). The field forms for 3,049 samples specifically noted the absence of potential pollution sources. Of those, 4.8% exceeded the bacterial standard. The data suggest that potential bacterial sources at the time of sampling presents a higher risk of bacterial exceedances.

Samples that noted potential pollution sources at the beach at the time of sampling had a slightly higher rate of exceedances compared to beaches were no potential sources were noted.

There were a large number of samples (3,581) where information on pollution sources (or lack thereof) was not completed on field data forms. For these samples, 6.9% exceeded the bacterial standard. MDPH continues to stress the need to record these potential sources on the field data form. Although some communities have improved in this area, most still do not complete the form.

2. FRESHWATER BEACHES

During the 2010 bathing season, 182 of the 196 Massachusetts communities with known public or semi-public freshwater bathing beaches submitted beach monitoring data to MDPH/BEH. Twelve of the 14 communities that did not report freshwater data for 2010 (Brimfield, Brookfield, Dartmouth, Duxbury, Merrimac, New Bedford, Norton, Sheffield, Shirley, Weymouth, Windsor, and Worthington) did not open any freshwater beach in 2010. As mentioned previously, two communities (Rockland and Topsfield) did have freshwater beaches open in 2010, but did not submit testing data. The 182 communities that had open freshwater beaches and submitted data to MDPH contain 571 public or semi-public freshwater bathing beaches and collected a total of 7,490 freshwater samples (Table 2).

7,490 samples were collected at Massachusetts freshwater beaches in 2010.

For bather density (Table 3), the data are similar to those for marine beaches, with a high percentage (82%) indicating low bather density (0-10 bathers on the beach) during sampling. As discussed previously, most samples are collected during non-peak bathing hours, usually between 8 AM and 12 PM. Samples at beaches are often taken in the morning to allow adequate time for delivery to and analysis at the laboratory.

Routine samples are most often collected in the morning to allow time for laboratory delivery.

In 2010, local health officials used the approved indicator organism (either *E. coli* or Enterococci) at 100% of freshwater beaches in Massachusetts, with the majority of beaches using the *E. coli* indicator. Approximately 96% of public and semi-public freshwater beaches in Massachusetts were tested with the minimum required weekly frequency in 2010 (Table 4). Seven freshwater beaches have Tier Three status and sample every other week, as approved by MDPH and the local board of health. Two percent of freshwater beaches (n = 11) either did not sample as required or did not

96% of freshwater beaches were tested weekly.

submit data to MDPH/BEH detailing all sampling conducted for the season. As noted, communities that did not test all their beaches with the required frequency have been contacted to review regulatory requirements. Independent laboratories collected the majority of samples to be analyzed from freshwater beaches. Local health departments and MDCR collected the remainder of the samples.

299 bacterial exceedances were reported in 2010.

The total number of freshwater beach exceedances detected in 2010 was 299 (4.0%) (Table 5). This was an increase from the number of exceedances of the freshwater water quality standards (235 cfu/100 ml *E. coli* and 61 cfu/100 ml Enterococci) in 2009 (222 or 2.9%) (Table 6). These data are discussed further in the Analysis of Results section.

The field forms accompanying 4,921 of the 7,490 freshwater samples collected (66%) included information as to whether potential transient pollution sources had been observed to be present at the sampling location. Of those, 13% (n=952) recorded the presence of specific source (e.g. birds, dogs, algae, trash), and 4.7% of those 952 samples (n=45) exceeded the bacterial standard (Table 12). The field forms for 3,969 samples specifically noted the absence of potential pollution sources. Of those, 2.6% (n=104) exceeded the bacterial standard.

B. Analysis of Results

In 2010, all marine and 99% of freshwater communities with open beaches reported bathing beach water quality data to MDPH/BEH, up from 98% of marine communities and 83% of freshwater communities reporting in 2001. A significant improvement, particularly for marine beaches, is the public notification figures and increased compliance in reporting to MDPH/BEH of any posting within 24 hours. In 2001, MDPH/BEH received postings for approximately 35% of all exceedances at marine bathing beaches. In 2010, MDPH/BEH received the required notification for all but five postings for marine beaches (a total of 519 postings for marine waters or 99%). It should be noted that a posting may not always occur when there is an exceedance. For example, if a beach is already posted because of a prior single sample or geometric mean exceedance and a follow-up sample shows a continued exceedance, an additional posting notification to MDPH/BEH is not required for the follow-up exceedance result. Therefore a single beach posting could cover several exceedances. Additionally, a posting notification is not required if a second sample is taken within 24 hours of the original exceedance and the resample results do not exceed the standard. It should also be noted that local boards of health may preemptively post beaches without a test result showing bacterial exceedance, and instances of this are included in the total number of postings.

Posting notifications were not received by MDPH/BEH for 24 exceedances at freshwater beaches in 2010, which is an improvement over 2009, when

In 2010, 275 exceedances had corresponding posting notifications at freshwater beaches.

there were 54 exceedances without posting notifications. This is the fewest number of exceedances without posting notifications for freshwater beaches since we began tracking this metric in 2007. For freshwater beaches, MDPH receives the majority of freshwater data after October 31 each year (the Massachusetts Beach Act requires submittal of data by October 31). Therefore, MDPH staff are not able to remind local health departments to submit the required posting notifications at the time of the exceedances, which may reduce the number of posting notifications received in a given year. These results highlight the need for continued outreach to health departments of freshwater communities on beach water quality regulatory requirements. Efforts were made by MDPH/BEH staff to obtain posting information by directly contacting communities both during and after the beach season to explain the regulations and by providing standardized reporting forms; both the forms and regulations were made available for download from the MDPH/BEH website. MDPH/BEH will target local health officials in communities with freshwater beaches to provide technical assistance and improve compliance with the posting requirements before the 2011 beach season.

Completeness of the field data forms filled out by samplers has also increased over the years. While there are still areas for improvement, such as actively reporting the presence or absence of environmental pollution sources, Massachusetts local health officials have for the most part adhered to MDPH/BEH's field forms. This can be seen in the wide range of potential sources of pollution noted on the field forms submitted in 2010. Prior to 2003, most noted potential sources of pollution were fairly general (i.e., outflow pipes, wildlife, and boats). Starting in 2004 and continuing in the 2010 bathing beach season, more communities began to document incidents of algae and wrack build-up on beaches and the presence of trash, birds, dogs, waste solids and fish die-offs. These notations become an important factor when the communities or MDPH/BEH need to identify possible reasons for continuously elevated bacterial levels at a particular beach that may increase potential health risks and to develop strategies to reduce these sources.

Environmental pollution sources are being recorded more often.

Observations made by samplers at freshwater beaches may help to explain some contributing factors to elevated indicator levels (Table 12). Of freshwater beaches that had a recorded pollution source, 4.7% exceeded public health standards, compared to 2.6% for those that actively noted an absence of observed sources. For marine beaches, the percentage of exceedances at beaches where a pollution source was noted (7.5%) was also higher than those where none were noted (4.8%). However, it should be noted that, overall, 45% of marine samples and 34% of freshwater samples were accompanied by a field data form that did not include any information on the presence or absence of pollution sources. Notification on the presence or absence of pollution sources is an area that needs improvement in order to help in the formulation of mitigation strategies.

As shown in Table 6, from 2001 through 2010, 4.9% of all marine samples collected exceeded the Enterococcus standard. The rate of marine beach exceedances in 2010 was 6.2% which matches the second highest

percentage since the MDPH/BEH Beaches Project was started in 2001. All marine communities that had at least one exceedance in 2010 appear in Figure 1.

Rainfall amounts during the 2010 beach season (Tables 8 - 11) may partly explain the higher exceedance percentage. The Boston area received 11.59 inches of rain in the 2010 beach season (i.e., June through August) versus 9.65 inches of rain normally received in those months. The rainfall amounts were significantly above normal in August (+71%). The Chatham area (Brewster, Chatham, Dennis, Eastham, Harwich, and Orleans) received above average rainfall for August (+33%).

Although the beach testing results from the 2010 season show the percentage of exceedances at marine beaches was higher than the historical average, the 2010 percentage was nonetheless lower than the percentage from 2009. This is likely in part due to decreased overall rainfall during the 2010 beach season compared to the 2009 beach season. The beaches in the Boston area have a greater proportion of bacterial exceedances than in the rest of the Commonwealth and therefore the above normal rainfall amounts likely increased the high number of exceedances in 2010.

In 2010, the marine beach communities in the Boston area (Boston, Braintree, Lynn, Quincy, Revere, and Winthrop) had 7% of the total number of marine beaches (44 of 603 sampling points), but at these beaches a disproportionate number of bacterial exceedances occurred (147 of the 490 marine exceedances, or 30%). There are several reasons for this higher rate of exceedances versus other regions. First, there are twelve sampling locations at six beaches in this region that are classified as Tier 1 beaches and therefore are sampled on a daily basis. There are more opportunities to capture bacterial exceedances because of the increased monitoring. In 2010, 97 of the 490 bacterial exceedances (20%) occurred at these six beaches. These six Tier 1 beaches are Carson Beach, City Point Beach, Constitution Beach, M Street Beach, and Tenean Beach in Boston and Wollaston Beach in Quincy. No other beaches are sampled on a daily basis.

Second, as noted above, more rainfall occurred in the Boston area compared to the Chatham area and this rainfall could cause more bacterial contamination in urban beach waters because of added runoff. As shown in Figures 3 and 4, when comparing the percentage of samples that exceeded the beach water quality standard to the amount of rainfall in each month there are matching trends for both the Boston and Chatham areas (i.e. higher rainfall corresponds with a higher percentage of exceedances).

Third, due to the implementation of the Tiered Monitoring Plan, for the last several years, MDPH/BEH has been working with local boards of health to reduce sampling at beaches where there is a low risk for bacterial exceedances allowing for more intense focus on higher risk beaches. As specified previously, there are over 90 marine beaches with Tier 3 status which allows reduced sampling. Meanwhile, sampling at beaches with a higher risk of exceedances (Tier 1 and Tier 2) has remained relatively

Exceedance rates were above historical averages for marine beaches in 2010.

consistent. In 2006, 584 of the 602 beaches sampled at least weekly, while in 2010, 500 of the 603 marine beaches were sampled at least weekly. Reduced sampling at low risk beaches has reduced the total number of samples collected in a year, even though more beaches are sampled. Thus, a higher percentage of bacterial exceedances may occur because of this recent shift to reducing sampling at low risk beaches. A complete listing of marine beaches sampled during the 2010 beach season, their exceedances, and postings can be found in Table 13.

As shown in Tables 8 through 11, the amount of rainfall was highly variable in four areas around the state (Amherst, Ashburnham, Boston, and Chatham). As noted previously, the Boston area received above average rainfall for the season. The remaining three locations had below average rainfall and the greatest amount of rainfall for a given month was different for each location. For example, in Amherst, Ashburnham, and Chatham the most rain fell in June, July, and August respectively. It should be noted that these are only four data points for a large geographical area and therefore localized rainfall totals could be different. For the entire beach season, the amount of rainfall was below the levels received in 2009 in all of the areas.

Overall 3.9% of the samples collected at freshwater beaches during 2010 exceeded bacterial standards (Table 6). This percentage of exceedances was consistent with the historical average (4.1%). All communities that experienced at least one freshwater exceedance in 2010 can be seen in Figure 4. A complete listing of freshwater beaches sampled during the 2010 beach season, their exceedances, and postings can be found in Table 14.

Similar to marine beaches, the amount of rainfall and number of exceedances are often correlated at freshwater beaches. Figures 5 – 7 display rainfall information and the percentage of bacterial exceedances for the months of June, July, and August for three areas: Barnstable, Plymouth, and Westfield. The areas surrounding Barnstable, Plymouth, and Westfield were selected because of the availability of rainfall data in close proximity to a significant number of freshwater beaches. These figures show increasing rainfall in July and August resulting in increased numbers of exceedances in the Plymouth and Westfield areas. The number of exceedances in the Barnstable area was low (n=8) in the three month period and therefore trends are more difficult to analyze. Rainfall in June was concentrated in the first two weeks of the month and sampling generally doesn't begin until school is released in mid-June.

Figures 8 and 9 show the historical relationship between exceedances at marine and freshwater beaches and the total amount of rainfall between June and August. For both marine and freshwater beaches, exceedances generally rise and fall with rainfall amounts, with some exceptions. For marine beaches, when rainfall decreased in 2005 and then increased significantly in 2006, the percentage of exceedances remained similar across both years. For freshwater beaches, when rainfall increased in 2009, the percentage of exceedances decreased.

Stormwater runoff associated with wet weather has been shown to be a significant source of sewage contamination at bathing beaches (Cabelli et al, 1982; Cabelli, 1989; Pruss, 1998; Gerba, 2000; Schindler, 2001). Sources of runoff to surface waters include direct runoff from paved surfaces such as roads and boat ramps, runoff channeled through drainpipes, natural and man-made swales, and increased flow of freshwater streams. These sources can carry bacteria present over a wide area directly to a beach. Runoff is positively related to land-use density (houses per unit area) of the area drained (MDEP and MCZM, 1997). Therefore, exceedances are likely to be more numerous at beaches in urban areas (i.e. Boston Harbor) than beaches in rural areas (i.e. Nantucket). As shown in Figures 10 through 15 show that the majority of beaches that had multiple bacterial exceedances were in areas with high population densities. It should be noted that the population data used in these figures is based on year-round populations and many communities along the coast see large increases in population during the summer. Many Massachusetts communities have addressed combined sewer overflows and stormwater runoff problems in response to USEPA's stormwater regulations. Water quality improvements are expected to continue into the future with the assistance of better monitoring and reporting as well as new infrastructure projects.

Stormwater runoff is correlated with land use density.

Table 15 and Figure 16 show that the total number of exceedances statewide is significantly higher within 24 hours of a rain event. These rain data are based on information recorded on the field data form. For marine beaches, all 490 exceedances had corresponding rain event information, while for freshwater beaches rain event data were recorded for 165 of the 295 bacterial exceedances in 2010. Seventy-seven percent of marine beach exceedances and 35% of freshwater exceedances occurred within 24 hours of a rain event. Figure 16 shows the exponential drop-off in the number of exceedances as the time from rainfall increases.

Bacterial exceedances are closely tied to rain events.

The bather load at a particular beach can affect water quality as well because humans are also sources of fecal pollution. The greater the bather density at a beach, the greater the likelihood that human sources are contributing to higher Enterococci levels. However, as in previous years, more than three-quarters of the marine beach samples (88%) and freshwater beach samples (82%) that reported bather density indicated low bather density (0-10 bathers on the beach) during sampling. This can be attributed largely to samples being taken during off-peak hours for swimming. Samples are primarily collected before 12:00 PM so that laboratories can begin the analysis before the close of business and before the six hour holding time expires. Thus, it is difficult to comprehensively evaluate the effect of bather density on beach water quality.

Greater bather use at a beach can increase bacterial levels.

Another potential influence on bacteria levels in bathing waters may be spring tides. These strong tides, which take place year-round, occur when the earth, moon, and sun are in line and the gravitational forces of both the moon and sun contribute to the larger than normal tides. Spring tides occur during full and new moons, and recent attention has been focused on them with respect to water quality and beaches. In a study released by the

Studies have shown spring tides to increase bacterial levels.

Southern California Coastal Water Research Project, a government agency that focuses on marine environmental research, researchers found beaches twice as likely to be out of compliance with water quality standards during spring tides (Boehm, A. B. and S.B. Weisberg, 2005). This study concluded bacteria levels may be higher during spring-ebb tides (receding tides) compared to all other tidal conditions and that Enterococci densities were found at beaches during tidal events with no obvious point source. The study suggested that tidally forced sources of Enterococci may be occurring at beaches. Potential sources for these Enterococci could include beach sands and sediments, decaying plant material, and polluted groundwater. All of these sources are known to harbor fecal indicator bacteria and have the potential to become 'activated' with the mass and momentum of a spring tide (i.e., disturbing bacteria that would have otherwise lain dormant).

Decaying plant material has been shown to incubate bacteria and may release bacteria to the water at high tide.

The decaying plant material, or wrack line, at a beach may also be an incubator for bacteria, potentially increasing bacterial counts even outside spring tides. In addition, it has been suggested that wrack is often the subject of scavenging by wildlife and pets, which may defecate in it, further increasing its contribution to bacterial contamination (Heufelder 1988). Wrack also keeps the soil surfaces it covers in a dark, wet environment, which is conducive to bacterial growth. Researchers have found that survival of fecal coliform and Enterococcus bacteria was far greater in salt water when organic debris (i.e., wrack) were present (Martin and Gruber 2005). Furthermore, they concluded that tidal flushing of wrack during high tide could easily transport elevated bacterial densities into the marine environment, thus potentially degrading the surrounding waters (Martin and Gruber 2005).

Illicit boat waste can be a major source of beach closures.

Other potential sources of bacteria, which are difficult to directly measure through routine beach water sampling, have the ability to influence overall water quality. At marine beaches, illicit discharges of human waste from boats may cause significant degradation of water quality where there is significant boating activity. It is generally believed that the number of illicit discharges from boats is proportional to the difficulty posed in the disposal of the wastewater; therefore there has been significant effort by many coastal communities to increase the number of locations where boat waste can safely be discharged. USEPA is working with state and local officials to designate all marine waters within three miles of the Massachusetts coast as a no-discharge zone and has set up a series of fines for persons who do discharge illegally. In July 2010, Pleasant Bay in Cape Cod became the state's latest no-discharge zone. The designation by the US EPA was requested by the Pleasant Bay Resource Management Alliance, comprising the four towns that share the bay – Orleans, Brewster, Chatham, and Harwich.

Most of the Massachusetts coast line is now a no-discharge zone.

Sediments may also be a bacterial incubator and contribute to higher bacterial results.

Additionally, sediments may act as a sink for fecal indicators at both fresh and marine beaches. These sediments may be disturbed by tides, human activities, or stormwater runoff and potentially increase bacterial contamination.

III. FUTURE PLANS

A. Direct Web-Based Reporting

In 2011, MDPH/BEH contract laboratories, local boards of health, and others will continue to perform data entry to the electronic, web-based public notification website. MDPH/BEH will be working with contract laboratories and other data reporters to ensure that field data are accurately recorded via the web-based reporting system. Important information regarding recent rainfall data and the presence of transient pollution sources will be targeted. As in previous years, a history of postings will be maintained on the website to facilitate analysis of the data. This will provide more accurate recordkeeping so that trends can be analyzed in future annual reports.

B. Training and Community Outreach

In the spring of 2011, MDPH/BEH worked in collaboration with the MDPH/BEH Community Sanitation Program and the Massachusetts Health Officers Association to provide five separate training events for local boards of health in five different regions of the state. These trainings focused on reviewing changes to the beach regulations, including permitting, signage placement, and tiered monitoring, and also provided information on harmful algae blooms. MDPH/BEH will continue to offer sampling training and provide additional technical assistance to freshwater and marine communities where needed. MDPH/BEH will also provide assistance on the use of the MDPH posting form and the field data forms that are required to be completed each time a sample is taken.

MDPH conducted five trainings in the spring of 2011 for local health officials.

C. Sanitary Surveys

MDPH/BEH will continue to facilitate sanitary surveys in support of the Tiered Monitoring Plan and the variance process during 2011. When the Tiered Monitoring Plan is adopted at specific beaches, a “high” priority beach will receive the most frequent water quality sampling and analysis. Such a beach might be one with high bather volume, high frequency or percentage of exceedances, problematic sources of pollution, or a combination of these factors. A “medium” priority beach will be sampled once per week and will still be required to meet water quality standards. Beaches that are tiered “medium” can have any of the factors listed for “high” priority beaches but with less frequency or intensity of any of the three criteria. A “low” priority beach is one that is relatively pristine. Low-priority beaches are eligible for less frequent testing, as infrequently as every 30 days under 105 CMR 445.000, if the local health department receives a testing variance. This categorization will assist MDPH/BEH in working with local health departments in 2010 to conduct sanitary surveys that will support the Tiered Monitoring Plan. Data from the 2009 and 2010 beach seasons will be incorporated into the existing Tiered Monitoring Plan to update the published classifications. These efforts will allow MDPH/BEH and marine communities to focus on determining and alleviating pollution sources at problematic beaches, and also allowing MDPH/BEH to reduce

Additional sanitary surveys will be conducted to further the goals of the Tiered Monitoring Plan in 2011.

unnecessary sampling at low-priority beaches through the variance process. MDPH/BEH will be conducting many sanitary surveys at public marine beaches in support of these efforts.

IV. SUMMARY

This report summarizes beach monitoring and testing data from Massachusetts public and semi-public marine and freshwater bathing beaches in the 2010 season. In total, all 214 communities with operating bathing beaches reported 15,409 water samples collected at over 1,000 beaches. The beach testing results from the 2010 season show lower percentages of exceedances at marine beaches than the 2009 beach season's averages, however the percentage of exceedances remained above historical average. This is likely due to above normal rainfall in the Boston area during the 2010 beach season, where the majority of daily monitored Tier 1 beaches are located. Overall water quality data at freshwater beaches showed the percentage of exceedances in 2010 was consistent with the historical rate. Massachusetts marine communities are nearly in full compliance with the regulations with the exception of some semi-public beaches missing sampling rounds and posting notifications. This illustrates in part the success of the electronic reporting requirement through the MDPH/BEH contract laboratory system for marine beaches. This requirement has also facilitated improved compliance with the regulations by BOHs in other areas besides sample reporting. For example, 100% of the marine beach samples were tested for the correct indicator required by regulation. MDPH/BEH also achieved nearly full compliance with the posting regulation in marine communities. Massachusetts freshwater communities continue to increase their usage of the required field data form, including identifying potential environmental pollution sources.

Over 15,000 samples were collected at 1,000 beaches in 2010.

MDPH/BEH continues to provide training and information to local communities in an effort to improve compliance with the regulations. MDPH/BEH also continues to make improvements to its public notification website to make sure that information is accessible to the public as soon as it becomes available. In addition, MDPH/BEH is continuing to focus efforts on the most vulnerable beaches through its Tiered Monitoring Plan and sanitary surveys.

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TABLES

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Table 1

MA Beaches (2010): All communities grouped by the presence or absence of marine and/or freshwater public and semi-public bathing beaches.

Type of community	#	%
Marine beach only	33	9.4%
Freshwater beach only	169	48.1%
Marine and freshwater beaches	27	7.7%
No beaches	122	34.8%
Total	351	100%

Table 2

MA Beaches (2010): Water quality testing at marine and freshwater public and semi-public bathing beaches, grouped by community, beach, and sample.

	# communities (total) containing	# communities with data providing data for	# tested[2]	# samples collected from
Marine Beaches[1]	60	60	603	7,919
Freshwater Beaches[1]	196	182	571	7,490
		Total:	1,174	15,409

1. For the purposes of this report, a sample location is considered a single beach.

2. Note that this table does not include the number of beaches *not* tested, as data were not compiled to accurately determine this number.

Table 3

MA Beaches (2010): Bather density at marine and freshwater public and semi-public bathing beaches at times when samples were taken.

Marine beaches

Bather Density (# people)	# Samples	%
0-10	6,932	87.5%
10-20	279	3.5%
20-50	100	1.3%
>50	63	0.8%
Not indicated	545	6.9%
Total	7,919	100.0%

Freshwater beaches

Bather Density (# people)	# Samples	%
0-10	6,146	82.1%
10-20	248	3.3%
20-50	130	1.7%
>50	98	1.3%
Not indicated	868	11.6%
Total	7,490	100.0%

Table 4

MA Beaches (2010): Frequency of water quality testing at public and semi-public bathing beaches, grouped by beach and frequency.

Marine Beaches

Test frequency	# Beaches	%
Daily	12	2.0%
Weekly	488	80.9%
Monthly	90	14.9%
Biweekly	11	1.8%
Once	1	0.2%
Not monitored	1	0.2%
Total	603	100.0%

Freshwater Beaches

Test frequency	# Beaches	%
Weekly	549	96.1%
Monthly	1	0.2%
Biweekly	8	1.4%
Twice per week	4	0.7%
One time	3	0.5%
Unknown	6	1.1%
Total	571	100.0%

Table 5

MA Beaches (2010): Number of exceedances and postings at marine and freshwater public and semi-public bathing beaches.

Marine beaches

Exceedances, Total (Enterococcus)	490
Postings, Total[1]	519
Postings, Enterococcus	357
Postings, Geomean	31
Postings, Preemptive Rainfall	74
Postings, Preemptive - Other	57

Freshwater beaches

Exceedances, Total	295
Exceedances, Enterococcus	108
Exceedances, E. Coli	187
Postings, Total[1]	188
Postings, Enterococcus	80
Postings, E. Coli	92
Postings, Preemptive - Rainfall	1
Postings, Preemptive - Other	6
Postings, Algae	9

1. Total postings does not necessarily equal total exceedances because some tests that resulted in exceedances may have occurred while the beach was closed, or beach closings covered multiple parts of a beach that were counted as separate beaches in this report.

Table 6

MA Beaches (2010): Number of samples in which the measured Enterococcus concentration (marine beaches) or Enterococcus or *E. coli* concentration (freshwater beaches) exceeded the respective water quality criterion at public and semi-public bathing beaches.

Year	Marine Beaches			Freshwater Beaches		
	Exceedances[1]	Total Samples Analyzed	%	Exceedances[1]	Total Samples Analyzed	%
2001	444	7200	6.2%	336	5651	5.9%
2002	185	6686	2.8%	264	6473	4.1%
2003	320	7439	4.3%	333	6480	5.1%
2004	337	7873	4.3%	267	7313	3.7%
2005	368	8064	4.6%	286	7148	4.0%
2006	405	8367	4.8%	279	7438	3.8%
2007	253	7693	3.3%	236	7977	3.0%
2008	433	7639	5.7%	325	7834	4.1%
2009	571	8119	7.0%	222	7684	2.9%
2010	490	7919	6.2%	299	7490	4.0%
Average	381	7700	4.9%	285	7149	4.1%

1. For marine beaches, Enterococcus is the indicator species. A sample is said to be in exceedance if the number of colony forming units (CFU) / 100 ml is greater than 104 for a single sample or greater than 35 for the average of 5 samples over a 40-day period. For freshwater beaches, either Enterococcus or *E. coli* can be used as indicator species. For Enterococcus, a sample is said to be in exceedance if the number of CFU / 100 ml is greater than 61 for a single sample or greater than 33 for the average of at least 5 samples over a 40-day period. For *E. coli*, a sample is said to be in exceedance if the number of CFU / 100 ml is greater than 235 for a single sample or greater than 126 for the average of at least 5 samples over a 40-day period.

Table 7

MA Beaches (2010): Number of beaches in which at least one measured Enterococcus concentration (marine beaches) or at least one Enterococcus or *E. coli* concentration (freshwater beaches) exceeded the respective water quality criterion at public bathing beaches.

	# beaches with at least one exceedance	Total # beaches reporting	%
Marine	215	603	35.7%
Freshwater	152	571	26.6%

Table 8

MA Beaches (2001-2010): Rainfall during swimming season - Boston*

Boston

Year	Rainfall	June	July	August	Total
n/a	**Norm for month**	**3.22**	**3.06**	**3.37**	**9.65**
2001	**Total**	4.99	2.13	4.14	11.26
	Dev From Norm	+55%	-30%	+23%	+17%
2002	**Total**	4.78	1.42	2.13	8.33
	Dev From Norm	+48%	-54%	-37%	-14%
2003	**Total**	4.69	2.11	2.89	9.69
	Dev From Norm	+46%	-31%	-14%	<1%
2004	**Total**	1.95	3.87	4.38	10.20
	Dev From Norm	-39%	+26%	+30%	+6%
2005	**Total**	1.46	3.37	2.88	7.71
	Dev From Norm	-55%	+10%	-15%	-20%
2006	**Total**	10.09	3.58	3.20	16.87
	Dev From Norm	+213%	+17%	-5%	+75%
2007	**Total**	2.12	5.26	0.66	8.04
	Dev From Norm	-34%	+72%	-80%	-17%
2008	**Total**	3.46	6.00	4.47	13.93
	Dev From Norm	+7%	+96%	+33%	+44%
2009	**Total**	3.22	6.90	3.24	13.36
	Dev From Norm	0%	+125%	-4%	+38%
2010	**Total**	3.18	2.66	5.75	11.59
	Dev From Norm	-1%	-13%	+71%	+20%

* obtained from the National Weather Service Forecast office, at http://www.erh.noaa.gov/er/box/dailystns.shtml

Table 9

MA Beaches (2001-2010): Rainfall during swimming season - Chatham*

Chatham

Year	Rainfall	June	July	August	Total
n/a	**Norm for month**	**3.44**	**3.38**	**3.33**	**10.15**
2001	**Total**	3.00	3.35	5.36	11.71
	Dev From Norm	-13%	-1%	+61%	+15%
2002	**Total**	2.88	0.48	2.45	5.81
	Dev From Norm	-16%	-86%	-26%	-43%
2003	**Total**	5.07	1.78	3.46	10.31
	Dev From Norm	+47%	-47%	+4%	+2%
2004	**Total**	1.60	2.48	5.49	9.57
	Dev From Norm	-53%	-27%	+65%	-6%
2005	**Total**	1.61	3.37	2.99	7.97
	Dev From Norm	-53%	<1%	-10%	-21%
2006	**Total**	9.49	2.97	2.61	15.07
	Dev From Norm	+176%	-12%	-22%	+48%
2007	**Total**	1.38	2.80	0.35	4.53
	Dev From Norm	-60%	-17%	-89%	-55%
2008	**Total**	1.78	2.85	1.92	6.55
	Dev From Norm	-48%	-16%	-42%	-35%
2009	**Total**	3.55	6.13	4.14	13.82
	Dev From Norm	+3%	+81%	+24%	+36%
2010	**Total**	1.74	1.78	4.43	7.95
	Dev From Norm	-49%	-47%	+33%	-22%

* obtained from the National Weather Service Forecast office, at http://www.erh.noaa.gov/er/box/dailystns.shtml

Table 10

MA Beaches (2002-2010): Rainfall during swimming season - Amherst*

Amherst

Year	Rainfall	June	July	August	Total
n/a	**Norm for month**	**3.81**	**3.95**	**4.1**	**11.86**
2002	**Total**	4.80	2.08	3.41	10.29
	Dev From Norm	+26%	-47%	-17%	-13%
2003	**Total**	5.90	2.69	7.99	16.58
	Dev From Norm	+55%	-32%	+95%	+40%
2004	**Total**	2.91	3.89	3.77	10.57
	Dev From Norm	-24%	-2%	-8%	-11%
2005	**Total**	4.42	2.41	2.81	9.64
	Dev From Norm	+16%	-39%	-31%	-19%
2006	**Total**	6.39	2.83	3.31	12.53
	Dev From Norm	+68%	-28%	-19%	+6%
2007	**Total**	2.59	5.50	1.12	9.21
	Dev From Norm	-32%	+39%	-73%	-22%
2008	**Total**	6.92	8.20	2.37	17.49
	Dev From Norm	+82%	+108%	-42%	+47%
2009	**Total**	5.38	9.03	3.52	17.93
	Dev From Norm	+41%	+129%	-14%	+51%
2010	**Total**	3.69	2.98	2.33	9.00
	Dev From Norm	-3%	-25%	-43%	-24%

* Data obtained from the National Climatic Data Center's
Preliminary Record of Climatological Observations, at
http://cdo.ncdc.noaa.gov/pls/plclimprod/poemain.cdobystn?dataset=DS3220&StnList=190120NNNNN

Table 11

MA Beaches (2002-2010): Rainfall during swimming season - Ashburnham*

Ashburnham

Year	Rainfall	June	July	August	Total
n/a	**Norm for month**	**4.06**	**4.05**	**4.28**	**12.39**
2002	**Total**	4.08	2.50	3.16	9.74
	Dev From Norm	<1%	-38%	-26%	-21%
2003	**Total**	4.46	1.10	5.74	11.30
	Dev From Norm	+10%	-73%	+34%	-9%
2004	**Total**	1.93	2.90	5.15	9.98
	Dev From Norm	-52%	-28%	+20%	-19%
2005	**Total**	4.43	5.07	3.37	12.87
	Dev From Norm	+9%	+25%	-21%	+4%
2006	**Total**	8.54	3.55	4.50	16.59
	Dev From Norm	+110%	-12%	+5%	+34%
2007	**Total**	3.76	6.23	1.32	11.31
	Dev From Norm	-7%	+54%	-69%	-9%
2008	**Total**	4.14	7.80	3.90	15.84
	Dev From Norm	+2%	+93%	-9%	+28%
2009	**Total**	7.20	7.03	3.66	17.89
	Dev From Norm	+77%	+74%	-14%	+44%
2010	**Total**	3.19	4.97	3.43	11.59
	Dev From Norm	-21%	+23%	-20%	-6%

* Data obtained from the National Climatic Data Center's Preliminary Record of Climatological Observations, at http://cdo.ncdc.noaa.gov/pls/plclimprod/poemain.cdobystn?dataset=DS3220&StnList=190190NNNNN

Table 12

MA Beaches (2010): Number of exceedances at public and semi-public beaches which reported environmental sources of pollution.

Pollution Source?[1]	Marine beaches			Freshwater beaches		
	# Excee-dances	# Samples	%	# Excee-dances	# Samples	%
Yes	97	1,289	7.5%	45	952	4.7%
Unknown	247	3,581	6.9%	150	2,569	5.8%
No	146	3,049	4.8%	104	3,969	2.6%
Total	490	7,919	6.2%	299	7,490	4.0%

1 "Yes" indicates that a source was observed; "unknown" means that no information was recorded; "no" indicates that the field forms explicitly record an absence of pollution sources.

Table 13

MA Marine Beaches (2010): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Aquinnah	Lobsterville	Sampling Point	Monthly	4				
Aquinnah	Moshup Beach	Sampling Point	Monthly	4				
Aquinnah	Philbin Beach	Sampling Point	Weekly	14				
Aquinnah	Red Beach	Sampling Point	Monthly	4				
Barnstable	Cotuit Bay Shores Association	Sampling Point	Weekly	12				
Barnstable	Covell's	Sampling Point	Weekly	15				
Barnstable	Craigville	Sampling Point	Weekly	15				
Barnstable	Craigville Beach Club	Sampling Point	Weekly	14				
Barnstable	Crocker's Neck	Sampling Point	Weekly	15	1	198	198	1
Barnstable	Dowses	Sampling Point	Weekly	15				
Barnstable	East (Town) Beach	Sampling Point	Weekly	14	1	250	250	1
Barnstable	Kalmus Ocean	Sampling Point	Weekly	15				
Barnstable	Kalmus Yacht	Sampling Point	Weekly	14				
Barnstable	Kennedy Memorial	Sampling Point	Weekly	13				
Barnstable	Keyes Beach	Sampling Point	Weekly	15				
Barnstable	Loops	Sampling Point	Weekly	13				
Barnstable	Millway	Sampling Point	Weekly	14	2	108	112	1
Barnstable	Oregon	Sampling Point	Weekly	3	1	108	108	1
Barnstable	Oyster Harbors Club	Sampling Point	Weekly	12				
Barnstable	Ropes	Sampling Point	Weekly	2				
Barnstable	Sandy Neck	Sampling Point	Weekly	13				
Barnstable	Seaside Park Improvement Association	Sampling Point	Weekly	12				
Barnstable	Veterans	Sampling Point	Weekly	15				
Barnstable	Wianno Avenue	Sampling Point	Weekly	3	1	108	108	1
Barnstable	Wianno Club (Salt-107 Seaview)	Sampling Point	Weekly	12				
Beverly	Brackenbury	Sampling Point	Weekly	15	3	111	189	2
Beverly	Dane Street	Bathhouse	Weekly	16	4	109	350	2
Beverly	Goat Hill	Sampling Point	Weekly	12				
Beverly	Independence Park	Sampling Point	Weekly	18	6	121	546	3
Beverly	Lynch Park	Sampling Point	Weekly	14	2	122	313	1
Beverly	Mingo	Sampling Point	Weekly	14	2	134	173	2

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Beverly	Obear Park	Sampling Point	Weekly	12				
Beverly	Rice	Sampling Point	Weekly	14	2	262	1270	1
Beverly	Sandy Point	Sampling Point	Weekly	12				
Beverly	West	Sampling Point	Weekly	12				
Beverly	Woodbury	Sampling Point	Weekly	12				
Boston	Carson Beach	at Bathhouse	Daily	84	9	106	1420	15
Boston	Carson Beach	at I St.	Daily	84	7	106	691	15
Boston	City Point Beach	Sampling Point	Daily	82	3	226	420	7
Boston	Constitution	Middle	Daily	82	1	121	121	6
Boston	Constitution	North site	Daily	82	5	108	759	6
Boston	Constitution	Rec Center	Daily	82	2	160	1240	6
Boston	Lovell's Island	Sampling Point	Weekly	11				
Boston	M Street Beach	Sampling Point	Daily	83				5
Boston	Malibu	Sampling Point	Weekly	18	2	135	162	2
Boston	Pleasure Bay	Sampling Point	Weekly	15				
Boston	Savin Hill	Sampling Point	Weekly	16				1
Boston	Spectacle Island	Sampling Point	Weekly	11				
Boston	Tenean	Sampling Point	Daily	83	13	107	11200	20
Bourne	Barlows Landing	Sampling Point	Monthly	4				
Bourne	Briarwood Marine and Science	Sampling Point	Weekly	7				
Bourne	Cataumet Harbor	Sampling Point	Weekly	15	2	116	152	
Bourne	Cedar Point Association	Sampling Point	Weekly	12				
Bourne	Electric Avenue	Sampling Point	Monthly	4				
Bourne	Gray Gables	Sampling Point	Weekly	14				
Bourne	Hideaway Village Association	Sampling Point	Weekly	12				
Bourne	Monument	Sampling Point	Monthly	4				
Bourne	Patiusset Beach	Sampling Point	Weekly	13				
Bourne	Pocasset Beach Improvement Association	Sampling Point	Weekly	12				
Bourne	Sagamore	Sampling Point	Weekly	14				
Bourne	Scraggy Neck Recreation Association	Sampling Point	Weekly	12				
Bourne	Tahanto Associates, Inc.	Sampling Point	Weekly	12				
Bourne	Wings Neck Trust Association (North Beach)	Sampling Point	Weekly	13	1	106	106	1
Bourne	Wings Neck Trust Association (South Beach)	Sampling Point	Weekly	12				

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Braintree	Smith Beach	Sampling Point	Weekly	12	1	1310	1310	1
Brewster	Breakwater Landing	Sampling Point	Weekly	14				
Brewster	Brewster Dunes	Sampling Point	Weekly	12				
Brewster	Cape Cod Sea Camps (Bay)	Sampling Point	Weekly	12				
Brewster	Crosby Landing	Sampling Point	Weekly	14				
Brewster	Ellis Landing	Sampling Point	Weekly	14				
Brewster	Ellis Landing Park Condominiums	Sampling Point	Weekly	12				
Brewster	Halliday Acres	Sampling Point	Weekly	12				
Brewster	Linnell Landing	Sampling Point	Monthly	4				
Brewster	Mants	Sampling Point	Weekly	14				
Brewster	Ocean Edge	Resort	Weekly	12				
Brewster	Ocean Edge	Condos	Weekly	12				
Brewster	Paines Creek	Sampling Point	Weekly	14				
Brewster	Pilgrim Pine Acres	Sampling Point	Weekly	9				
Brewster	Point of Rocks	Sampling Point	Monthly	4				
Brewster	Saints Landing	Sampling Point	Weekly	14				
Brewster	Sea Pines	Sampling Point	Weekly	12				
Brewster	Sunset Beach Association	Sampling Point	Weekly	12				
Chatham	Andrew Harding Lane Beach	Sampling Point	Weekly	12				1
Chatham	Bucks Creek	Sampling Point	Weekly	15	2	192	324	2
Chatham	Chatham Bars Inn	Sampling Point	Weekly	11				
Chatham	Cockle Cove	Sampling Point	Weekly	12				
Chatham	Cockle Cove Creek	at Parking Lot	Weekly	12	7	150	2005	1
Chatham	Cockle Cove Creek	at Ridgevale Bridge	Weekly	12	4	164	1091	1
Chatham	Forest Street Beach	Sampling Point	Weekly	12				
Chatham	Hardings	East parking lot	Weekly	12				
Chatham	Hardings	West parking lot	Weekly	12				
Chatham	Hawthorne	Sampling Point	Weekly	12				
Chatham	Jacknife Harbor	Sampling Point	Weekly	12				
Chatham	Lighthouse	Sampling Point	Weekly	12				1
Chatham	Oyster Pond	Sampling Point	Weekly	12				
Chatham	Pleasant Street	Sampling Point	Weekly	13	1	150	150	1
Chatham	Ridgevale	Sampling Point	Weekly	12				
Chatham	Scatteree Town Landing	Sampling Point	Once	1				1

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Chilmark	Great Rock Bight	Sampling Point	Monthly	4				
Chilmark	Menemsha	Sampling Point	Monthly	4				
Chilmark	Ocean @ Chilmark Pond Preserve	Sampling Point	Monthly	5				
Chilmark	Ocean @ Lucy Vincent Beach	Sampling Point	Weekly	13	3	108	316	2
Chilmark	Ocean @ Squibnocket Beach	Sampling Point	Weekly	15	1	748	748	1
Chilmark	Pond @ Lucy Vincent Beach	Sampling Point	Weekly	17	6	114	582	
Cohasset	Black Rock	Sampling Point	Weekly	13	1	318	318	1
Cohasset	Sandy	Sampling Point	Weekly	15	3	173	591	2
Cohasset	Sandy Cove	Sampling Point	Weekly	13	1	197	197	1
Cohasset	Yacht Club	Sampling Point	Weekly	13	1	305	305	1
Danvers	Sandy Beach	West	Weekly	17	3	228	4640	
Dartmouth	Anthony's	Sampling Point	Weekly	12				
Dartmouth	Apponagansett Town Beach	Sampling Point	Weekly	12				
Dartmouth	Bayview	Sampling Point	Weekly	12				
Dartmouth	Demarest Lloyd	Sampling Point	Weekly	15				
Dartmouth	Hidden Bay	Sampling Point	Weekly	12				
Dartmouth	Jones Town Beach	Sampling Point	Weekly	12				
Dartmouth	Moses Smith Creek	Sampling Point	Weekly	12	2	212	384	2
Dartmouth	Nonquitt	Sampling Point	Weekly	12				
Dartmouth	Oak Hill Shores	Sampling Point	Weekly	12				
Dartmouth	Round Hill	Sampling Point	Biweekly	6				
Dartmouth	Salter's Point East	Sampling Point	Weekly	12				
Dartmouth	Salter's Point South	Sampling Point	Weekly	12				
Dennis	Bayview	Sampling Point	Weekly	13				
Dennis	Chapin Memorial	Sampling Point	Weekly	13				
Dennis	Clipper Lane	Sampling Point	Weekly	14	1	326	326	1
Dennis	Cold Storage	Sampling Point	Weekly	13				
Dennis	Corporation	Sampling Point	Weekly	14				
Dennis	Follins Pond	Sampling Point 2	Weekly	15	2	114	186	2
Dennis	Glendon Road	West	Weekly	13				
Dennis	Haigis	Sampling Point	Weekly	13				
Dennis	Harborview	Sampling Point	Weekly	13				
Dennis	Howes Street	Sampling Point	Weekly	13				
Dennis	Inman Road	Sampling Point	Weekly	13				

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Dennis	Mayflower	Sampling Point	Weekly	14				
Dennis	Raycroft	Sampling Point	Weekly	13				
Dennis	Sea Street (Dennisport)	Dennisport	Weekly	13				
Dennis	Sea Street (East Dennis)	East	Weekly	13				
Dennis	South Village	Sampling Point	Weekly	13				
Dennis	Sullivan (Depot St.)	Sampling Point	Weekly	13				
Dennis	Trotting Park	Sampling Point	Weekly	13				
Dennis	West Dennis	Residential	Weekly	13				
Dennis	West Dennis	West	Weekly	14				
Dennis	West Dennis	West of snack bar	Weekly	14				
Duxbury	Duxbury Beach @ Bath House	Sampling Point	Weekly	14				
Duxbury	Landing Road	Sampling Point	Weekly	16	2	122	295	2
Duxbury	Residents Beach (Duxbury Beach)	Sampling Point	Weekly	14				
Duxbury	Shipyard Lane	Sampling Point	Weekly	15	1	109	109	1
Duxbury	West End	Sampling Point	Weekly	14				
Eastham	Boat Meadow	Sampling Point	Weekly	14				
Eastham	Campground	Sampling Point	Weekly	15	1	400	400	1
Eastham	Coast Guard	Sampling Point 1	Weekly	10				
Eastham	Coast Guard	Sampling Point 2	Weekly	10				
Eastham	Cole Road	Sampling Point	Weekly	15	1	122	122	1
Eastham	Cook's Brook	Sampling Point	Weekly	14				
Eastham	Dyer Prince	Sampling Point	Weekly	14				
Eastham	First Encounter	Beach	Weekly	14				
Eastham	First Encounter	Spit River	Weekly	14				
Eastham	Kingsbury	Sampling Point	Weekly	14				
Eastham	Nauset Light	Sampling Point 1	Weekly	10				
Eastham	Nauset Light	Sampling Point 2	Weekly	10				
Eastham	S. Sunken Meadow	Sampling Point	Weekly	14				
Eastham	Silver Springs Association	Sampling Point	Weekly	12				
Eastham	Thumpertown	Sampling Point	Weekly	15	1	400	400	1
Eastham	Town Cove	Sampling Point	Weekly	14				
Edgartown	Bend in the Road	Sampling Point	Monthly	3				
Edgartown	Chappy Beach Club	Sampling Point	Monthly	2				
Edgartown	Chappy Point Beach	Sampling Point	Monthly	4				

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Edgartown	East Beach (Chappy)	Sampling Point	Monthly	3				
Edgartown	Fuller Street	Sampling Point	Monthly	3				
Edgartown	Joseph Sylvia State Beach	big Bridge	Monthly	3				
Edgartown	Katama Point	Sampling Point	Weekly	10	2	110	254	2
Edgartown	Norton Point Beach	East ocean	Monthly	3				
Edgartown	Ocean @ Edgartown Great Pond	Sampling Point	Monthly	4				
Edgartown	South Beach State Park	east	Monthly	3				
Edgartown	South Beach State Park	middle	Monthly	3				
Edgartown	South Beach State Park	west	Monthly	3				
Edgartown	Wasque Swim Beach	Sampling Point	Monthly	3				
Essex	Clammer's Beach	Sampling Point	Monthly	4				
Essex	Front Beach	Sampling Point	Monthly	4				
Fairhaven	Fort Phoenix	Sampling Point	Weekly	16	1	138	138	2
Fairhaven	Fort Phoenix - Town Beach	Sampling Point	Weekly	12				
Fairhaven	Knollmere	Sampling Point	Weekly	12				
Fairhaven	Manhattan Avenue	Sampling Point	Weekly	13	1	778	778	1
Fairhaven	Raymond Street	Sampling Point	Weekly	12				
Fairhaven	Seaview	Sampling Point	Weekly	12				
Fairhaven	West Island Causeway	Sampling Point	Monthly	3				
Fairhaven	West Island Town Beach	Sampling Point	Monthly	3				
Falmouth	Acapesket Improvement Association	Sampling Point	Weekly	12				
Falmouth	Bikepath Beach (Trunk River)	East	Weekly	15	1	126	126	1
Falmouth	Bikepath Beach (Trunk River)	West	Weekly	14				
Falmouth	Bristol	East	Weekly	15	1	126	126	
Falmouth	Bristol	West	Weekly	14				
Falmouth	Chapoquoit	Sampling Point	Weekly	14				
Falmouth	Chapoquoit Associates - Front Beach	Sampling Point	Weekly	12				
Falmouth	Chapoquoit Associates - Little Beach	Sampling Point	Weekly	12				
Falmouth	Falmouth Associates - 564 Surf Drive	Sampling Point	Weekly	12				
Falmouth	Falmouth Heights	East	Weekly	14				
Falmouth	Falmouth Heights	West	Weekly	14				
Falmouth	Falmouth Yacht Club	Sampling Point	Weekly	12				
Falmouth	Jetty Lane	Sampling Point	Weekly	6				
Falmouth	Little Island Beach Preserve	Sampling Point	Weekly	12				

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Falmouth	Megansett	North	Weekly	14				
Falmouth	Menauhant	East	Weekly	14				
Falmouth	Menauhant	West	Weekly	14				
Falmouth	Mill Road	Sampling Point	Weekly	14				
Falmouth	New Silver (Silver Beach Improvement Association)	Sampling Point	Weekly	12				
Falmouth	Nobska Beach Association	Sampling Point	Weekly	12				
Falmouth	Old Silver 1	Central	Weekly	14				
Falmouth	Old Silver 2	North	Weekly	15				
Falmouth	Old Silver 2	South	Weekly	13				
Falmouth	Old Silver Beach Estates Assoc.	Sampling Point	Weekly	12				
Falmouth	Quisset Beach Association	Sampling Point	Weekly	10				
Falmouth	Racing Beach Association	Whittemore Rd.	Weekly	12				
Falmouth	Saconessett Hills Association	Sampling Point	Weekly	12				
Falmouth	Seacoast Shores Associates, Inc.	Sampling Point	Weekly	12				
Falmouth	Seacrest Resort	Sampling Point	Weekly	12				
Falmouth	Shorewood Beach Association	Beach 1	Weekly	13	5	118	400	4
Falmouth	Sippewissett Highlands Trust	Sampling Point	Weekly	12				
Falmouth	Stoney Beach (MBL)	Sampling Point	Weekly	14				
Falmouth	Surf Drive	Surf Drive 1	Weekly	14				
Falmouth	Surf Drive	Surf Drive East	Weekly	14				
Falmouth	Surf Drive	Surf Drive Pool	Weekly	14				
Falmouth	Tides Hotel	Sampling Point	Weekly	12				
Falmouth	Wild Harbour Estates	Sampling Point	Weekly	12				
Falmouth	Wood Neck Beach	Sampling Point	Weekly	14				
Falmouth	Wood Neck River	Sampling Point	Weekly	15	1	106	106	1
Gloucester	Cressy's	Sampling Point	Monthly	4				1
Gloucester	Good Harbor	Sampling Point	Weekly	17	1	619	619	1
Gloucester	Good Harbor Creek	Sampling Point	Weekly	17	1	652	652	1
Gloucester	Half Moon	Sampling Point	Monthly	4				1
Gloucester	Niles	Sampling Point	Monthly	4				1
Gloucester	Pavillion Beach	Sampling Point	Monthly	4				1
Gloucester	Plum Cove	Sampling Point	Weekly	13	1	763	763	1
Gloucester	Wingearsheek	Sampling Point	Weekly	17	1	1014	1014	1
Harwich	Allen Harbor	Sampling Point	Weekly	12				

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Harwich	Atlantic Avenue	Sampling Point	Monthly	4				
Harwich	Bank Street - Bayview Rd	Sampling Point	Monthly	4				
Harwich	Brooks	Sampling Point	Monthly	4				
Harwich	Earle Road	Sampling Point	Weekly	14	1	148	148	1
Harwich	Grey Neck	Sampling Point	Monthly	4				
Harwich	Merkel Beach (Snow Inn Road)	Sampling Point	Monthly	4				
Harwich	Neel Road	Sampling Point	Monthly	4				
Harwich	Old Mill Point Association	Right of jetty	Weekly	13	1	188	188	1
Harwich	Old Mill Point Association	Strandway	Weekly	12				
Harwich	Pleasant Bay	Sampling Point	Monthly	5	1	106	106	1
Harwich	Pleasant Road	Sampling Point	Monthly	4				
Harwich	Red River	East	Weekly	6	2	122	400	1
Harwich	Red River	Middle	Weekly	14	1	106	106	1
Harwich	Red River	West	Weekly	14	1	108	108	1
Harwich	Seabreeze	Sampling Point	Monthly	4				
Harwich	The Belmont	Sampling Point	Weekly	12				
Harwich	Wah Wah Taysee Road	Sampling Point	Monthly	4				
Harwich	Wequasett Inn Resort	Sampling Point	Weekly	12				
Harwich	Zylpha	Sampling Point	Monthly	4				
Hingham	Belair	Sampling Point	Weekly	11				
Hingham	Kimball	Sampling Point	Weekly	12	1	262	262	1
Hingham	Martin's Cove	Sampling Point	Weekly	10				
Hingham	North	Sampling Point	Weekly	11				
Hingham	Seal Cove	Sampling Point	Weekly	14	2	120	341	4
Hingham	Town Beach	Sampling Point	Weekly	11				
Hingham	Wampatuck	Sampling Point	Weekly	12	1	6020	6020	1
Hingham	Yacht Club	Sampling Point	Weekly	10				
Hull	A Street Bay Side	Sampling Point	Weekly	13	1	241	241	1
Hull	A Street Ocean	Sampling Point	Weekly	12				
Hull	Darcy's	Sampling Point	Weekly	12				
Hull	Edgewater	Sampling Point	Weekly	12				
Hull	Gunrock	Sampling Point	Weekly	12				
Hull	James Ave.	Sampling Point	Weekly	15	1	990	990	2
Hull	Kenberma	Sampling Point	Biweekly	7				

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Hull	Nantasket	Bathhouse	Weekly	15				
Hull	Nantasket	North site	Weekly	15	1	124	124	
Hull	Nantasket	Park St.	Weekly	15				
Hull	Nantasket	Water St.	Weekly	15				
Hull	Newport	Sampling Point	Weekly	12				
Hull	XYZ	Sampling Point	Weekly	12				
Ipswich	Clark	Sampling Point	Weekly	15				
Ipswich	Crane	Head Lifeguard Station	Monthly	5				
Ipswich	Little Neck	Sampling Point	Weekly	15				
Ipswich	Pavillion	greatest batherload	Monthly	5				
Ipswich	Steep Hill	Steep Hill	Weekly	14				
Kingston	Gray's	Sampling Point	Weekly	16	1	160	160	1
Kingston	Rocky Nook	Sampling Point	Weekly	17	2	160	370	1
Lynn	Kings	Kimball Road	Weekly	18	1	113	113	2
Lynn	Kings	Ocean Terrace	Weekly	18	2	122	127	2
Lynn	Kings	Stacy Brook Outlet	Weekly	18	15	106	2300	2
Manchester	Black	Sampling Point	Weekly	16	2	148	173	2
Manchester	Magnolia	Right of Bath & Tennis	Weekly	15				1
Manchester	Magnolia	Sampling Point 1	Weekly	16	1	426	426	1
Manchester	Singing	Right of parking lot	Weekly	15				
Manchester	Singing	Sampling Point 1	Weekly	15				
Manchester	Tuck's Point	Sampling Point	Weekly	15				
Manchester	West Manchester	Sampling Point	Weekly	16	2	145	231	1
Manchester	White	Sampling Point	Weekly	16	1	132	132	1
Marblehead	Crocker Park	Sampling Point	Weekly	13	1	199	199	1
Marblehead	Devereux	Sampling Point	Weekly	12				
Marblehead	Gas House	Sampling Point	Weekly	15	2	504	2400	2
Marblehead	Grace Oliver	Sampling Point	Weekly	15	2	2190	10000	2
Marblehead	Stramski	Sampling Point	Weekly	15	4	109	1220	2
Marblehead	Sunset Road	Sampling Point	Weekly	14	2	148	171	2
Marblehead	Village Street	Sampling Point	Weekly	15	2	109	121	2
Marion	Beverly Yacht	Sampling Point	Weekly	12				
Marion	Converse Point	Sampling Point	Weekly	12				

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Marion	Dexter Lane	Sampling Point	Weekly	12				
Marion	Island Wharf	Sampling Point	Weekly	12				
Marion	Oakdale Avenue	Sampling Point	Weekly	12	1	146	146	1
Marion	Piney Point	Sampling Point	Weekly	12				
Marion	Planting Island	Sampling Point	Weekly	12				
Marion	Silver Shell	North Jetty	Weekly	12				
Marion	Silver Shell	South Jetty	Weekly	12				
Marion	Tabor Academy	Sampling Point 1	Weekly	12				
Marion	Tabor Academy	Sampling Point 2	Weekly	12				
Marshfield	Brant Rock	Sampling Point	Weekly	12				
Marshfield	Fieldston	9th Road	Weekly	14	2	122	173	2
Marshfield	Fieldston	Hartford Rd	Weekly	14	2	148	231	2
Marshfield	Green Harbor	Sampling Point	Weekly	13	1	435	435	1
Marshfield	Rexhame	Sampling Point	Weekly	15				
Mashpee	Callies Beach	Sampling Point	Monthly	4				
Mashpee	Mashpee Neck Road (Town Landing)	Sampling Point	Weekly	15	1	112	112	1
Mashpee	Maushup Village	Sampling Point	Weekly	12				
Mashpee	Popponesset (Beach Road)	Sampling Point	Weekly	12				1
Mashpee	Popponesset (Bluff Ave)	Sampling Point	Weekly	13	1	230	230	
Mashpee	Popponesset (New Seabury Inn)	Sampling Point	Weekly	12				
Mashpee	Seconsett Island Causeway	Sampling Point	Weekly	14				
Mashpee	South Cape Beach	Sampling Point 1	Weekly	15				
Mattapoisett	Antasawomak	Sampling Point 1	Weekly	10	1	170	170	1
Mattapoisett	Antasawomak	Sampling Point 2	Weekly	10				
Mattapoisett	Aucoot	Sampling Point	Weekly	12	1	170	170	1
Mattapoisett	Brant Beach	Sampling Point	Weekly	9				
Mattapoisett	Crescent	Sampling Point	Weekly	10				
Mattapoisett	Harbor Beach North	Sampling Point	Weekly	10	1	240	240	1
Mattapoisett	Harbor Beach South	Sampling Point	Weekly	12	2	150	1300	2
Mattapoisett	Hollywoods	Sampling Point 1	Weekly	10	1	560	560	1
Mattapoisett	Leisure Shores	Sampling Point	Not Monitored	0				1
Mattapoisett	Mattapoisett Shores Association	Sampling Point	Weekly	11	1	230	230	1
Mattapoisett	Ned's Point	Sampling Point	Weekly	11				
Mattapoisett	Peases Point (East)	Sampling Point	Weekly	10				

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Mattapoisett	Peases Point (West)	Sampling Point	Weekly	10				
Mattapoisett	Point Connett	Sampling Point	Weekly	10	1	600	600	1
Mattapoisett	Shining Tides Reservation	Sampling Point	Weekly	11				
Mattapoisett	Town Beach	Sampling Point	Weekly	11	1	568	568	1
Nahant	Black Rock	Sampling Point	Weekly	12	1	161	161	1
Nahant	Canoe	Sampling Point	Weekly	13	1	134	134	1
Nahant	Nahant Beach	Flagpole	Weekly	15				
Nahant	Nahant Beach	N. of bathhouse	Weekly	15				
Nahant	Nahant Beach	Parking section 9	Weekly	15				
Nahant	Nahant Beach	South site	Weekly	15				
Nahant	Short	Sampling Point	Weekly	12				
Nahant	Tudor	Sampling Point	Weekly	15	3	156	318	3
Nantucket	40th Pole 1	Sampling Point	Weekly	13	1	400	400	1
Nantucket	Children's	Sampling Point	Weekly	14	2	400	400	2
Nantucket	Cisco	Sampling Point	Monthly	3				
Nantucket	Cliffside	Sampling Point	Monthly	3				
Nantucket	Cliffside Motel	Sampling Point	Weekly	8				
Nantucket	Dionis	Sampling Point	Weekly	13	1	400	400	1
Nantucket	Jetties	Sampling Point	Weekly	13	1	400	400	1
Nantucket	Madaket	Sampling Point	Monthly	3				
Nantucket	Miacomet	Sampling Point	Monthly	3				
Nantucket	Sconset 1	Sampling Point	Monthly	3				
Nantucket	Sewerbeds	Sampling Point	Monthly	3				
Nantucket	Surfside 1	Sampling Point	Monthly	3				
Nantucket	Surfside 2	Sampling Point	Monthly	3				
Nantucket	Warren's Landing	Sampling Point	Weekly	13				
Nantucket	Washing Pond	Sampling Point	Weekly	13	1	400	400	1
Nantucket	Washington Street	Sampling Point	Weekly	14	2	400	400	2
Nantucket	Wauwinet Bayside	Sampling Point	Weekly	10	1	400	400	1
Nantucket	Wauwinet Oceanside	Sampling Point	Weekly	10	1	400	400	1
New Bedford	400 North	Sampling Point	Weekly	16	1	106	106	3
New Bedford	400 South	Sampling Point	Weekly	16	1	120	120	3
New Bedford	Davy's Locker	Sampling Point	Weekly	16	1	200	200	3
New Bedford	J. Beach	Sampling Point	Weekly	15				2

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
New Bedford	Kids Beach	Sampling Point	Weekly	16	1	212	212	3
New Bedford	O'Tools	Sampling Point	Weekly	18	3	234	806	4
New Bedford	Squid	Sampling Point	Weekly	16	1	252	252	3
New Bedford	Tabor Park South	Sampling Point	Weekly	18	3	148	500	5
New Bedford	Tower 1	Sampling Point	Weekly	18	3	106	500	4
New Bedford	Tower 4	Sampling Point	Weekly	18	3	120	500	4
Newbury	Plum Island	Sampling Point	Monthly	4				
Newburyport	Plum Island	55th street	Weekly	15				
Newburyport	Plum Island	end of island 1	Biweekly	8				
Newburyport	Plum Island	end of island 2	Biweekly	8				
Newburyport	Plum Island	Plum Island Point	Biweekly	8				
Oak Bluffs	Eastville Town Beach - Drawbridge	Sampling Point	Weekly	8	2	112	314	2
Oak Bluffs	Eastville Town Beach - Harbor	Sampling Point	Monthly	5				
Oak Bluffs	Joseph Sylvia State Beach	Little bridge	Monthly	5				
Oak Bluffs	Joseph Sylvia State Beach	Sound	Monthly	5				
Oak Bluffs	Marinelli (Jetty) Beach	Sampling Point	Monthly	5				
Oak Bluffs	Medeiros Cove	Sampling Point	Weekly	8	1	216	216	1
Oak Bluffs	Pay Beach	Inkwell	Weekly	9	2	146	159	2
Oak Bluffs	Pay Beach	Sampling Point	Weekly	8	1	114	114	1
Oak Bluffs	Pecoy Point Preserve Beach	Sampling Point	Weekly	15	4	120	368	1
Orleans	Kent's Point	Sampling Point	Biweekly	7				
Orleans	Little Inn at Pleasant Bay	Sampling Point	Weekly	14	2	156	1780	
Orleans	Meeting House Pond	Sampling Point	Weekly	13				
Orleans	Nauset	Sampling Point	Weekly	14				
Orleans	Paw Wah Pond	Sampling Point	Monthly	4				
Orleans	Pleasant Bay	Sampling Point	Weekly	19	5	106	268	4
Orleans	Priscilla's Landing	Sampling Point	Weekly	6	1	110	110	1
Orleans	Quanset Harbor Club Association	Sampling Point	Weekly	13				
Orleans	Rock Harbor	Sampling Point	Weekly	17	3	254	400	3
Orleans	Skaket Beach	Sampling Point	Biweekly	7				
Orleans	Skaket Beach Condominiums	Sampling Point	Weekly	13				
Orleans	Town Cove	Sampling Point	Weekly	16	2	150	400	2
Plymouth	Plymouth Beach	Sampling Point 1	Weekly	12				
Plymouth	Plymouth Beach	Sampling Point 3	Weekly	12	1	109	109	1

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Plymouth	Plymouth Beach	Sampling Point 5	Weekly	13	1	122	122	1
Plymouth	White Horse	Full Sail	Weekly	13	1	121	121	1
Plymouth	White Horse	Hill Top	Weekly	12	1	131	131	1
Provincetown	29 Commercial Street	Sampling Point	Weekly	16	3	108	180	3
Provincetown	333 Commercial Street	Sampling Point	Weekly	15	2	136	136	2
Provincetown	451 Commerical Street	Sampling Point	Weekly	15	2	108	144	2
Provincetown	593 Commercial Street	Sampling Point	Weekly	13				
Provincetown	637 Commercial Street	Sampling Point	Weekly	13				
Provincetown	Atkins Lane	Sampling Point	Weekly	15	2	136	164	2
Provincetown	Atlantic Avenue	Sampling Point	Weekly	15	2	108	192	2
Provincetown	Court Street	Sampling Point	Weekly	16	3	124	232	3
Provincetown	Herring Cove	Sampling Point 1	Weekly	10				
Provincetown	Johnson Street	Sampling Point	Weekly	16	3	108	128	3
Provincetown	Kendal Lane	Sampling Point	Weekly	13				
Provincetown	Provincetown Inn Rotary	Sampling Point	Weekly	14	1	240	240	1
Provincetown	Race Point	Sampling Point 1	Weekly	10				
Provincetown	Race Point	Sampling Point 2	Weekly	10				
Provincetown	Ryder Street	Sampling Point Left	Weekly	15	2	200	232	2
Provincetown	Ryder Street	Sampling Point Middle	Weekly	15	2	156	192	2
Provincetown	Ryder Street	Sampling Point Right	Weekly	15	2	144	224	2
Provincetown	Town Landing - Breakwater	Sampling Point	Weekly	18	4	112	800	4
Provincetown	Town Landing - Snail Road	Sampling Point	Weekly	14	1	364	364	1
Provincetown	Town Landing West of Coast Guard	Sampling Point	Weekly	14	1	800	800	1
Provincetown	West End Lot	Sampling Point	Weekly	17	4	116	268	3
Provincetown	Winston Ave	Sampling Point	Weekly	18	3	260	800	4
Quincy	Avalon	Sampling Point	Weekly	14	2	350	5490	2
Quincy	Broady (Baker)	Sampling Point	Weekly	15	3	185	637	3
Quincy	Chikatawbot	Sampling Point	Weekly	13	1	677	677	1
Quincy	Delano Ave.	Sampling Point	Weekly	14	2	160	723	2
Quincy	Edgewater	Sampling Point	Weekly	14	2	187	2060	2
Quincy	Germantown Firestation	Sampling Point	Weekly	13	1	189	189	1
Quincy	Heron	Sampling Point	Weekly	14	2	530	1670	2
Quincy	Merrymount	Sampling Point	Weekly	13	1	1370	1370	1

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Quincy	Mound	Sampling Point	Weekly	14	2	122	6015	2
Quincy	Nickerson	Sampling Point	Weekly	14	2	368	1920	2
Quincy	Orchard Street	Sampling Point	Weekly	14	1	233	233	1
Quincy	Parkhurst	Sampling Point	Weekly	15	5	122	695	3
Quincy	Rhoda	Sampling Point	Weekly	15	2	399	1520	1
Quincy	Wollaston	Channing Street	Daily	84	18	109	19900	23
Quincy	Wollaston	Milton Street	Daily	83	17	105	5170	22
Quincy	Wollaston	Rice Road	Daily	83	8	110	538	16
Quincy	Wollaston	Sachem Street	Daily	84	13	107	7700	25
Revere	Revere	at state police	Weekly	15	1	970	970	
Revere	Revere	Oak Island St.	Weekly	15				
Revere	Revere	Point of Pines	Weekly	15				
Revere	Revere	Shirley St.	Weekly	15				
Revere	Short	Sampling Point	Weekly	15				
Rockport	Back	Sampling Point	Monthly	5				
Rockport	Cape Hedge	Sampling Point	Monthly	5				
Rockport	Front Beach	Sampling Point	Monthly	5				
Rockport	Long	Gloucester	Monthly	5				
Rockport	Long	North	Monthly	5				
Rockport	Old Garden	Sampling Point	Monthly	5				
Rockport	Pebble	Sampling Point	Monthly	5				
Salem	Children's Island - Back	Sampling Point	Weekly	9				2
Salem	Children's Island - Dock	Sampling Point	Weekly	9				2
Salem	Children's Island - Wally	Sampling Point	Weekly	9				2
Salem	Collins Cove	Sampling Point	Weekly	13	1	365	365	1
Salem	Dead Horse	Sampling Point	Weekly	12				
Salem	Forest River Point	Sampling Point	Weekly	12				
Salem	Juniper Point	Sampling Point	Weekly	13	1	213	213	1
Salem	Mackey	Sampling Point	Weekly	3				
Salem	Ocean Avenue	Sampling Point	Weekly	14	3	121	173	2
Salem	Osgood	Sampling Point	Weekly	8				
Salem	Pioneer	Sampling Point	Weekly	13	1	132	132	1
Salem	Steps	Sampling Point	Weekly	12				
Salem	Willow Avenue	Sampling Point	Weekly	14	4	169	318	2

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Salem	Willows Pier	Sampling Point	Weekly	12				
Salem	Winter Island (Waikiki)	Sampling Point	Weekly	12				
Salisbury	Salisbury	North Beach	Weekly	15				
Salisbury	Salisbury	Sampling Point	Weekly	15				
Sandwich	East Sandwich	Sampling Point	Weekly	14	1	108	108	1
Sandwich	Scusset	Sampling Point	Weekly	16	1	300	300	1
Sandwich	Torrey Beach Community Association	Sampling Point	Weekly	11	1	174	174	
Sandwich	Town Neck	End of Boardwalk	Weekly	13				
Sandwich	Town Neck	Mill Creek	Weekly	16	3	126	400	3
Sandwich	Town Neck (Horizons)	Sampling Point	Weekly	13				
Scituate	Bassing's (Sailing Club)	Sampling Point	Weekly	13	2	122	199	2
Scituate	Egypt	Sampling Point	Weekly	11				
Scituate	Humarock	Sampling Point	Weekly	11				
Scituate	Minot	Sampling Point	Weekly	11				
Scituate	Peggotty	Sampling Point	Weekly	13	2	121	388	1
Scituate	Sand Hills	Sampling Point	Weekly	11				
Scituate	Scituate Lighthouse	Sampling Point	Weekly	11				
Somerset	Pierce Beach	Sampling Point	Weekly	19	9	108	1918	5
Swampscott	Eisman's	Sampling Point	Weekly	13	1	189	189	1
Swampscott	Fisherman's	Sampling Point	Weekly	15	3	121	4570	3
Swampscott	Kings	Sampling Point	Weekly	14	2	309	790	2
Swampscott	Phillips	Sampling Point	Biweekly	7	1	145	145	1
Swampscott	Preston	Sampling Point	Weekly	13	1	3440	3440	1
Swampscott	Whales	Sampling Point	Weekly	13	1	253	253	1
Swansea	Cedar Cove	Sampling Point	Weekly	9	1	233	233	1
Swansea	Coles River Club off Harbor Rd	Sampling Point	Weekly	12				
Swansea	Leeside	Sampling Point	Weekly	12	2	295	10000	1
Swansea	Sandy Beach	Sampling Point	Weekly	12	1	160	160	1
Swansea	Town Beach	Sampling Point	Weekly	13	2	228	428	2
Tisbury	Hilman's Point	Sampling Point	Monthly	4				
Tisbury	Mink Meadows	Sampling Point	Weekly	11	2	243	360	2
Tisbury	Owen Little Way	Sampling Point	Weekly	17	4	136	484	4
Tisbury	Owen Park	Sampling Point	Monthly	4				
Tisbury	Ramble Trail Preserve Beach	Sampling Point	Weekly	16	5	110	232	4

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Tisbury	Sound @ Wilfred's Pond Preserve	Sampling Point	Monthly	4				
Tisbury	Tashmoo Beach	Sampling Point	Monthly	4				
Tisbury	Tashmoo Cut	Sampling Point	Weekly	15	2	208	468	2
Tisbury	Vineyard Harbor Motel	Sampling Point	Weekly	16	3	142	516	3
Truro	Ballston	Sampling Point	Monthly	4				
Truro	Beach Point Landing	Sampling Point	Weekly	15	1	116	116	1
Truro	Coast Guard Town	Sampling Point	Monthly	4				
Truro	Cold Storage/Pond Village	Sampling Point	Weekly	15	1	148	148	1
Truro	Corn Hill	Sampling Point	Monthly	4				
Truro	Cranberry Hill	Sampling Point	Weekly	13	1	122	122	1
Truro	Crow's Nest (496 Shore Rd)	Sampling Point	Weekly	15	1	400	400	1
Truro	Dune's Colony (648 Shore Rd)	Sampling Point	Weekly	15	1	150	150	1
Truro	Fisher	Sampling Point	Monthly	4				
Truro	Great Hollow	Sampling Point	Monthly	4				
Truro	Head of the Meadow	Sampling Point	Weekly	10				
Truro	Head of the Meadow (Town)	Sampling Point	Monthly	4				
Truro	Longnook	Sampling Point	Monthly	4				
Truro	Noon's Landing	Sampling Point	Weekly	16	2	112	212	2
Truro	Pamet Harbor	Sampling Point	Weekly	15	1	108	108	1
Truro	Ryder	Sampling Point	Monthly	4				
Truro	Sunset Village (379 Shore Rd)	Sampling Point	Weekly	15	1	106	106	1
Wareham	Briarwood	Sampling Point	Weekly	16				
Wareham	East Boulevard	Sampling Point	Weekly	11	2	166	400	2
Wareham	Forbes	Sampling Point	Weekly	17	4	134	400	4
Wareham	Hamilton Beach	Sampling Point	Weekly	16				
Wareham	Indian Mound Beach	Sampling Point	Weekly	17	2	126	264	2
Wareham	Little Harbor	Sampling Point	Weekly	16				
Wareham	North Boulevard	Sampling Point	Weekly	18	3	106	400	2
Wareham	Onset	Sampling Point	Weekly	16				
Wareham	Parkwood	Sampling Point	Weekly	16				
Wareham	Pinehurst	Sampling Point	Weekly	17	1	118	118	1
Wareham	Point Independence	Sampling Point	Weekly	16				
Wareham	Riverside Avenue	Sampling Point	Biweekly	8				
Wareham	Shell Point	Sampling Point	Biweekly	9				

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Wareham	Swift's	Sampling Point	Weekly	16				
Wareham	Swift's Neck	Sampling Point	Weekly	16				
Wellfleet	Burton Baker	Sampling Point	Weekly	13				
Wellfleet	Cahoon Hollow	Sampling Point	Monthly	4				
Wellfleet	Chequesset Yacht and Country Club	Sampling Point	Weekly	12				
Wellfleet	Duck Harbor	Sampling Point	Monthly	4				
Wellfleet	Indian Neck	Sampling Point	Monthly	4				
Wellfleet	Maguires Landing	Sampling Point	Monthly	4				
Wellfleet	Marconi	Sampling Point 1	Weekly	10				
Wellfleet	Marconi	Sampling Point 2	Weekly	10				
Wellfleet	Mayo	Sampling Point	Weekly	14				
Wellfleet	Newcomb Hollow	Sampling Point	Monthly	4				
Wellfleet	Omaha Road	Sampling Point	Monthly	4				
Wellfleet	Powers Landing	Sampling Point	Monthly	4				
Wellfleet	The Gut	Sampling Point	Weekly	14				
Wellfleet	White Crest	Sampling Point	Monthly	4				
West Tisbury	Great Pond @ Long Point	Sampling Point	Weekly	18	9	120	302	6
West Tisbury	Lambert's Cove Beach	North	Weekly	14	1	244	244	1
West Tisbury	Lambert's Cove Beach	South	Weekly	14	1	296	296	1
West Tisbury	Makonikey Roads and Beach Trust	Capawok	Weekly	12	1	134	134	1
West Tisbury	Makonikey Roads and Beach Trust	Naushon	Weekly	11				
West Tisbury	Ocean @ Long Point	Central	Weekly	15	3	184	819	2
West Tisbury	Sepiessa Point	Sampling Point	Weekly	12	4	129	354	4
West Tisbury	Seven Gates Beach	Gray's	Weekly	12	1	194	194	1
West Tisbury	Seven Gates Beach	Saltworks	Weekly	12	1	140	140	1
West Tisbury	Tisbury Great Pond	Sampling Point	Monthly	5				
Westport	Baker's Beach	Sampling Point	Monthly	3				
Westport	C and K Club	Sampling Point	Weekly	12	1	500	500	
Westport	Cherry & Webb	Sampling Point	Monthly	3				
Westport	East Beach	Sampling Point	Monthly	3				
Westport	Elephant Rock	Sampling Point	Weekly	11				
Westport	Horseneck	Sampling Point	Weekly	15	1	500	500	2
Westport	Spindle Rock	Sampling Point	Weekly	11				
Westport	Town Beach	Sampling Point	Weekly	11				

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Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Weymouth	George E. Lane	Sampling Point	Weekly	12	1	135	135	1
Weymouth	Wessagusett (Old Wessagussett)	Sampling Point	Biweekly	6				
Winthrop	Donovans	Sampling Point	Weekly	22	3	142	437	1
Winthrop	Grandview	Sampling Point	Weekly	20				
Winthrop	Halford	Sampling Point	Weekly	20	1	203	203	1
Winthrop	Pico	Sampling Point	Weekly	20				
Winthrop	Winthrop	Sampling Point	Weekly	12				
Winthrop	Yerrill	Sampling Point	Weekly	20				
Yarmouth	Bass River	East	Weekly	14				
Yarmouth	Bass River	West	Weekly	14				
Yarmouth	Baxter Avenue	Sampling Point	Weekly	14				
Yarmouth	Bay Road	Sampling Point	Weekly	14				
Yarmouth	Bayview Street	Sampling Point	Weekly	14				
Yarmouth	Colonial Acres	East	Weekly	14				
Yarmouth	Colonial Acres	West	Weekly	13				
Yarmouth	Columbus Avenue	Sampling Point	Weekly	14				
Yarmouth	Englewood	Sampling Point	Weekly	13				
Yarmouth	Follins Pond	Sampling Point	Weekly	14				
Yarmouth	Gray's Beach	Sampling Point	Weekly	14				
Yarmouth	Malfa Road	Sampling Point	Weekly	13				
Yarmouth	Parkers River East	Sampling Point	Weekly	14				
Yarmouth	Parkers River West	Sampling Point	Weekly	13				
Yarmouth	Seagull (Center)	East front	Weekly	14				
Yarmouth	Seagull (Left)	back	Weekly	13				
Yarmouth	Seagull (Right)	West front	Weekly	14				
Yarmouth	Seaview Ave. Beach	Sampling Point	Weekly	13				
Yarmouth	South Middle	Sampling Point	Weekly	13				
Yarmouth	Thatcher Town Park	Sampling Point	Weekly	14				
Yarmouth	Vernon St.	Sampling Point	Weekly	15				1
Yarmouth	Wilbur Park	Sampling Point	Weekly	13				
Yarmouth	Windmill	Sampling Point	Weekly	13				

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Table 14

MA Freshwater Beaches (2010) Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Testing Frequency	Indicator Type	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Abington	Island Grove Beach	Weekly	E. Coli	11				
Acton	NARA Beach	Weekly	E. Coli	20	2	270	360	2
Agawam	Robinson Pond Beach 1	Weekly	Enterococci	12	1	400	400	1
Amesbury	Camp Bauercrest	Weekly	E. Coli	15				
Amesbury	Glen Devin Condominiums	Weekly	E. Coli	15				
Amesbury	Lake Gardner	Weekly	E. Coli	16	1	2400	2400	1
Amesbury	Sandy Beach (Lake Attitash)	Weekly	E. Coli	15				
Andover	Pomps Pond Station 1	Weekly	E. Coli	9				
Andover	Pomps Pond Station 2	Weekly	E. Coli	9				
Andover	Pomps Pond Station 3	Weekly	E. Coli	9				
Andover	Camp Maude Eaton	Weekly	E. Coli	9				
Andover	Camp Maude Eaton 2	Weekly	E. Coli	9				
Arlington	Arlington Reservoir	Weekly	E. Coli	12	2	368	1460	1
Arlington	Medford Boat Club Lower	Weekly	E. Coli	18	3	300	580	3
Arlington	Medford Boat Club Upper	Weekly	E. Coli	16				
Ashburnham	Camp Collier	Weekly	E. Coli	16				
Ashburnham	Camp Split Rock	Unknown	E. Coli	2				
Ashburnham	Camp Wellville Beach	Unknown	E. Coli	7				
Ashburnham	Camp Winnekeag Pond	Weekly	E. Coli	10				
Ashby	Camp Lapham	Unknown	E. Coli	4				
Ashby	Damon Pond Beach	Weekly	Enterococci	17	2	172	176	1
Ashfield	Ashfield Park Beach	Weekly	E. Coli	16				
Ashland	Camp Winnetaska	Weekly	E. Coli	6				
Ashland	Hopkinton Reservoir-Main Beach	Weekly	Enterococci	16	1	64	64	2
Ashland	Hopkinton Reservoir-Upper Beach	Weekly	Enterococci	15				
Ashland	Warren Conference Center	Unknown	E. Coli	3				
Athol	Ellis Beach	Weekly	E. Coli	17	3	315	602	1
Athol	Silver Lake	Weekly	E. Coli	17				
Auburn	Century Sportsmen	Weekly	E. Coli	15	1	420	420	
Ayer	Ayer Town Beach	Weekly	E. Coli	15				
Ayer	Mirror Lake	Weekly	E. Coli	10				

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Community	Beach Name[1]	Testing Frequency	Indicator Type	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Barnstable	Fair Acres Country Day School	Weekly	E. Coli	10	2	284	336	1
Barnstable	Hamblin Pond	Weekly	E. Coli	14	1	544	544	1
Barnstable	Hathaway Pond	Weekly	E. Coli	13				
Barnstable	Holly Point Assoc.	Weekly	E. Coli	8				
Barnstable	Homestead Homeowner's Association	Weekly	E. Coli	13	1	252	252	1
Barnstable	Joshua's Pond	Weekly	E. Coli	13				
Barnstable	Long Pond (Centerville)	Weekly	E. Coli	2				
Barnstable	Long Pond Farms Association	Weekly	E. Coli	12				
Barnstable	Lovell's Pond	Weekly	E. Coli	13				2
Barnstable	Regency Drive Owners Association	Weekly	E. Coli	12				
Barnstable	Sand Shores Association	Twice per week	E. Coli	26				
Barnstable	Wequaquet Estates	Weekly	E. Coli	12				
Barnstable	Wequaquet Heights Association 118 Conners Rd.	Weekly	E. Coli	12				
Barnstable	Wequaquet Heights Association Jimmy's Beach	Weekly	E. Coli	12				
Barnstable	Wequaquet Lake Town	Weekly	E. Coli	13				
Barnstable	Wequaquet Lake Yacht	Weekly	E. Coli	15	2	332	344	2
Barnstable	Wianno Club (Fresh-Crystal Lake)	Weekly	E. Coli	12				
Becket	Becket Woods Road District - Beach	Weekly	E. Coli	16				
Becket	Becket Woods Road District - Dock	Weekly	E. Coli	16				
Becket	Camp Becket - Iroquois Beach	Weekly	E. Coli	16				
Becket	Camp Becket Main - Beach	Weekly	E. Coli	16				
Becket	Camp Greylock - Jr. Beach	Weekly	E. Coli	9				
Becket	Camp Watitoh Beach	Weekly	E. Coli	9				
Becket	Center Lake Estates Beach	Weekly	E. Coli	16				
Becket	Center Pond Beach	Weekly	E. Coli	16				
Becket	Center Pond Beach	Weekly	Total coliform	8				
Becket	Chimney Corners Camp - Beach	Weekly	E. Coli	16				
Becket	Crystal Pond Homeowners Assoc Beach	Weekly	E. Coli	16				
Becket	Indian Lake Assoc - Beach #1	Weekly	E. Coli	16				
Becket	Indian Lake Assoc - Beach #2	Weekly	E. Coli	16				
Becket	Indian Lake Assoc - Boat Dock	Weekly	E. Coli	16				
Becket	Indian Lake Assoc - Small Pond Beach	Weekly	E. Coli	16				
Becket	Mountain Grove Assoc. Beach	Weekly	E. Coli	16				
Becket	Shawnee Shore Beach	Weekly	E. Coli	16				

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Becket	Sherwood Forest - Excalibur	Biweekly	E. Coli	8				
Becket	Sherwood Forest - Lancelot Beach	Biweekly	E. Coli	8				
Becket	Sherwood Forest - Little Robin Beach	Biweekly	E. Coli	8				
Becket	Sherwood Forest - Robin Hood #1	Biweekly	E. Coli	8				
Becket	Sherwood Forest - Robin Hood #2	Biweekly	E. Coli	8				
Bedford	Springs Brook Park Bathing Beach Slide	Weekly	E. Coli	20				
Bedford	Springs Brook Park Bathing Beach Slide	Weekly	Total Coliform	2				
Bedford	Springs Brook Park Bathing Beach Spray Park	Weekly	E. Coli	12				
Bedford	Springs Brook Park Bathing Beach Spray Park	Weekly	Total Coliform	1				
Belchertown	Belchertown Town Beach (Lake Arcadia)	Weekly	E. Coli	11	1	250	250	1
Bellingham	Silver Lake	Weekly	E. Coli	12				
Billerica	Nutting Lake - Micozzi Beach North	Weekly	E. Coli	13	2	400	400	2
Billerica	Nutting Lake - Micozzi Beach	Weekly	E. Coli	12				
Billerica	Nutting Lake - Micozzi Beach South	Weekly	E. Coli	13	1	380	380	2
Bolton	Bolton Town Beach	Weekly	E. Coli	14				
Bolton	Camp Virginia Beach	Weekly	E. Coli	8				
Bolton	Tom Denny Camp	Weekly	E. Coli	8				
Bourne	Picture Lake	Weekly	E. Coli	14				
Bourne	Queen Sewell Pond	Weekly	E. Coli	14				
Boxford	Camp Rotary	Biweekly	E. Coli	2				
Boxford	Camp Stepping Stone	Weekly	E. Coli	3	1	345	345	
Boxford	Camp Wakanda	Weekly	E. Coli	1				
Boxford	Danvers YMCA Daycamp	Weekly	E. Coli	4				
Boxford	Stiles Pond	Weekly	E. Coli	3				
Braintree	Sunset Lake	Weekly	E. Coli	12				
Brewster	Beechwood	Weekly	E. Coli	12				
Brewster	Blueberry Pond	Weekly	E. Coli	12				
Brewster	Cape Cod Sea Camps (Long Pond)	Weekly	E. Coli	12				
Brewster	Cliff Pond DYS	Weekly	Enterococci	15				
Brewster	Cliff Pond	Weekly	Enterococci	16	1	242	242	1
Brewster	Flax Pond	Weekly	Enterococci	15				
Brewster	Greenland Pond	Weekly	E. Coli	12				
Brewster	Long Pond	Weekly	E. Coli	14				
Brewster	Long Pond at Camp Favorite	Weekly	E. Coli	12				

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Brewster	Robinwood Homeowners Association (Owl Pond)	Weekly	E. Coli	15	3	248	300	2
Brewster	Seymour Pond	Weekly	E. Coli	14				
Brewster	Sheep Pond	Weekly	E. Coli	14				
Brewster	Sheep Pond Beach (Tupelo Rd.)	Weekly	E. Coli	12				
Brewster	Slough Pond Crossroads for Kids	Weekly	E. Coli	12				
Brewster	Slough Pond	Weekly	E. Coli	14				
Brewster	Upper Mill Pond	Weekly	E. Coli	14				
Carver	Cooper's Pond	Weekly	E. Coli	8				
Carver	Crystal Lake	Weekly	E. Coli	8				
Carver	John's Pond	Weekly	E. Coli	16				
Carver	Sampson's Pond	Weekly	E. Coli	16				
Charlemont	Cold River Pool	Weekly	Enterococci	17	2	112	240	2
Charlton	Camp Foskett (YMCA)	Weekly	E. Coli	9				
Charlton	Camp Joslin	Weekly	E. Coli	9				
Chatham	60 White Pond Rd.	Weekly	Enterococci	11				
Chatham	Goose Pond	Weekly	Enterococci	12				
Chatham	Schoolhouse Pond	Weekly	Enterococci	14				
Chatham	White Pond	Weekly	Enterococci	12				
Chelmsford	Baptist Pond Dock	Weekly	E. Coli	10				
Chelmsford	Baptist Pond Ramp	Weekly	E. Coli	10				
Chelmsford	Freeman Lake North	Weekly	E. Coli	12	2	256	260	2
Chelmsford	Freeman Lake South	Weekly	E. Coli	10	2	300	400	2
Chesterfield	Chesterfield Scout Reservation - BSA	Weekly	E. Coli	14				
Chesterfield	Lake Damon Corporation Beach	Weekly	E. Coli	15				
Chicopee	Chicopee Beach	Weekly	Enterococci	16	1	120	120	1
Clarksburg	Mausert Pond - Day use area beach	Weekly	Enterococci	17	1	112	112	1
Concord	Annursnac Hill Assoc.	Weekly	E. Coli	16				
Concord	Silver Hill Assoc	Weekly	E. Coli	16				
Concord	Walden Pond - Main	Weekly	Enterococci	15				1
Concord	Walden Pond - Red Cross	Weekly	Enterococci	1				1
Concord	White Pond Assoc	Weekly	E. Coli	16				
Conway	Conway Swimming Pool	Weekly	E. Coli	10				
Cummington	Shire Village Beach	Weekly	E. Coli	7				
Dennis	Flax Pond	Weekly	E. Coli	13				
Dennis	Princess Beach-Scargo Lake	Weekly	E. Coli	13				

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Dennis	Scargo Lake	Weekly	E. Coli	13				
Douglas	Breezy Picnic Grounds	Weekly	E. Coli	14				
Douglas	Lake Manchaug Camping	Weekly	E. Coli	14				
Douglas	Wallum Lake	Weekly	Enterococci	15				
Douglas	Wallum Lake Terrace	Monthly	E. Coli	4				
Dover	Grossman Beach	Weekly	E. Coli	11				
Dover	Powissett	Weekly	E. Coli	12	1	750	750	
Dracut	Fleur de Lis	Weekly	E. Coli	10				
Dracut	Grove	Weekly	E. Coli	10				
Dracut	Hilltop	Weekly	E. Coli	11	1	250	250	
Dracut	Mascuppic	Weekly	E. Coli	10				
Dracut	Passaconaway	Weekly	E. Coli	10				
Dracut	Richardson	Weekly	E. Coli	7				
Dudley	Merino Pond	Weekly	E. Coli	15				
East Brookfield	Camp Frank A Day	Weekly	E. Coli	10	1	300	300	
East Brookfield	Lake Lashaway	Weekly	E. Coli	13				
Eastham	Great Pond	Weekly	E. Coli	14				
Eastham	Herring Pond	Weekly	E. Coli	14				
Eastham	Long Pond (Depot St.)	Weekly	E. Coli	14				
Eastham	Minister's Pond	Weekly	E. Coli	15	1	288	288	1
Eastham	Nauset Haven Lakeside Condo (Minister)	Weekly	E. Coli	13	1	248	248	1
Eastham	Whispering Pines Condo (Muddy Pond)	Weekly	E. Coli	12				
Eastham	Wiley Park	Weekly	E. Coli	14				
Easton	Town Pool	Weekly	E. Coli	9				
Egremont	Prospect Lake Park	Weekly	E. Coli	16				
Erving	Laurel Lake	Weekly	Enterococci	15				
Essex	Camp Menorah	Weekly	E. Coli	8				
Essex	Centennial Grove	Weekly	E. Coli	16	2	308	687	1
Falmouth	Ashumet Pond	Weekly	E. Coli	13				
Falmouth	Ashumet Valley Holly Sands	Weekly	E. Coli	12				
Falmouth	Cape Cod Camp Resort	Weekly	E. Coli	12				
Falmouth	Coonamessett Pond	Weekly	E. Coli	13				
Falmouth	Grew's Pond	Weekly	E. Coli	14				
Falmouth	Jenkins Pond - Pinecrest	Weekly	E. Coli	12				
Falmouth	Lochstead Association	Weekly	E. Coli	12				
Falmouth	Mares Pond Association	Weekly	E. Coli	12				

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Falmouth	Sand Pointe Shores-Rock Hollow	Weekly	E. Coli	12				
Falmouth	Sand Pointe Shores-White Cap	Weekly	E. Coli	12				
Falmouth	Shady Lane HA-Crooked Pond	Weekly	E. Coli	12				
Falmouth	Water-by Estates Association-Flax Pond	Weekly	E. Coli	12				
Florida	Manice Education Center Beach	Weekly	E. Coli	17	1	484	484	
Framingham	Cochituate Beach	Weekly	E. Coli	10				
Framingham	Learned Beach	Weekly	E. Coli	10				
Framingham	Washakum Beach	Weekly	E. Coli	13	4	920	1600	2
Franklin	Chilson Beach	Weekly	E. Coli	10				1
Freetown	Long Pond AKA Town Beach	Weekly	E. Coli	17	4	280	410	2
Gardner	P.A.C.C.	Once	E. Coli	1				
Gardner	Dunn Pond	Weekly	Enterococci	16	1	70	70	1
Gardner	Lithuanian Outing Assoc.	Weekly	E. Coli	16				
Georgetown	American Legion Park	Weekly	E. Coli	13	1	261	261	1
Georgetown	Camp Leslie	Weekly	E. Coli	10	2	517	2400	1
Georgetown	Lake Shore Drive Beach	Once	E. Coli	1				
Goshen	Camp Holy Cross	Weekly	E. Coli	14				
Goshen	Camp Howe	Weekly	E. Coli	16				
Goshen	Hammond Acres	Weekly	E. Coli	16				
Goshen	Upper Highland Lake - Campers Beach	Weekly	Enterococci	15				
Goshen	Upper Highland Lake - Day use area beach	Weekly	Enterococci	15				
Grafton	Silver Lake Beach	Weekly	E. Coli	12				
Great Barrington	[obsolete] Green River	Weekly	E. Coli	12	1	252	252	1
Great Barrington	Lake Mansfield	Weekly	E. Coli	12				
Greenfield	Greenfield Municipal Bathing Beach	Weekly	E. Coli	14				
Groton	Baby Beach Lost Lake	Weekly	E. Coli	14				
Groton	Groton Town Beach	Weekly	E. Coli	14				
Groton	Grotonwood Camp	Weekly	E. Coli	10				
Halifax	Annawon Drive	Weekly	E. Coli	13				
Halifax	Halifax Beach Association	Weekly	E. Coli	13				2
Halifax	Holmes Street	Weekly	E. Coli	13				
Halifax	Lingan Street	Weekly	E. Coli	13	1	700	700	4
Halifax	Wamsutta (State Boat Ramp)	Weekly	E. Coli	13	1	1600	1600	3
Hanson	Cranberry	Weekly	E. Coli	11				
Hanson	Ocean Ave.	Weekly	E. Coli	11	1	340	340	

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Harvard	Harvard Town Beach	Weekly	E. Coli	11				
Harwich	Aunt Edie's Pond	Weekly	E. Coli	12				
Harwich	Buck's Pond	Weekly	E. Coli	13				
Harwich	Clearwater Drive (Great Sands)	Weekly	E. Coli	13	1	560	560	1
Harwich	Hinkley's Pond	Weekly	E. Coli	13				
Harwich	Long Pond Rte 124	Weekly	E. Coli	14	1	708	708	1
Harwich	Long Pond-Cahoon St.	Weekly	E. Coli	13				
Harwich	Long Pond-Long Pond Drive	Weekly	E. Coli	13				
Harwich	Robbins Pond	Weekly	E. Coli	13				
Harwich	Sand Pond	Weekly	E. Coli	13				
Harwich	Seymour Pond	Weekly	E. Coli	14	1	360	360	1
Harwich	Skinequit Pond	Weekly	E. Coli	13				
Harwich	Vacation Lane (Great Sands)	Weekly	E. Coli	12				
Haverhill	Plug's Pond	Weekly	E. Coli	10				
Heath	Mohawk Estates	Weekly	E. Coli	15				
Hinsdale	Camp Ashmere Beach	Weekly	E. Coli	13				
Hinsdale	Camp Emerson Beach	Weekly	E. Coli	9				
Hinsdale	Camp Emerson Marina	Weekly	E. Coli	9				
Hinsdale	Camp Emerson Marina	Weekly	Total Coliform	9				
Hinsdale	Camp Romaca	Weekly	E. Coli	10				
Hinsdale	Camp Taconic Beach	Weekly	E. Coli	12				
Hinsdale	Dan Duquette Sports Academy	Weekly	E. Coli	11				
Hinsdale	Plunkett Lake Beach	Weekly	E. Coli	16				
Holden	Camp Kinneywood Beach	Weekly	E. Coli	8				
Holden	Eagle Lake	Weekly	E. Coli	12	3	520	630	2
Holland	Hamilton Reservoir - North	Weekly	E. Coli	5				
Holland	Hamilton Reservoir - South	Weekly	E. Coli	5				
Holland	Holland Pond	Weekly	E. Coli	11				
Holliston	Pleasure Point	Weekly	E. Coli	13	1	700	700	1
Holliston	Stoddard	Weekly	E. Coli	13				
Hopkinton	Sandy Beach Left	Weekly	E. Coli	13				1
Hopkinton	Sandy Beach Middle	Weekly	E. Coli	13	1	640	640	1
Hopkinton	Sandy Beach Right	Weekly	E. Coli	13	1	470	470	1
Hubbardston	Comet Pond Beach	Weekly	Enterococci	15				
Hubbardston	Pinecrest Property Owners Assoc.	Biweekly	E. Coli	8				
Hudson	Hudson Centennial Beach	Weekly	E. Coli	11				

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Huntington	Timothy Hill Children's Ranch	Weekly	E. Coli	14				
Ipswich	Hood Pond-boat ramp	Weekly	Enterococci	17	3	150	980	2
Kingston	Camp Mishannock	Weekly	E. Coli	7				
Lakeville	3rd Beach	Weekly	E. Coli	7				
Lakeville	Big Beach	Weekly	E. Coli	9	2	270	1100	3
Lancaster	Camp Lowe Beach	Weekly	E. Coli	10	1	400	400	1
Lancaster	Lancaster Town Beach	Weekly	E. Coli	8				
Lanesborough	Camp Mohawk Beach	Weekly	E. Coli	9				
Lanesborough	Sunrise Beach	Weekly	E. Coli	16				
Lee	Goose Pond at Leisure Lee Rd.	Weekly	E. Coli	15				
Lee	Goose Pond at Leisure Lee Rd.	Weekly	Total coliform	12				
Lee	Lee Town Beach	Weekly	E. Coli	21	3	260	290	
Lee	Lee Town Beach	Weekly	Total coliform	14				
Leicester	Camp Wind-in-the-Pines	Weekly	E. Coli	9				
Lenox	Lenox Town Beach (Laurel Lake)	Weekly	E. Coli	17	2	270	450	
Lenox	Lenox Town Beach (Laurel Lake)	Weekly	Total coliform	12				
Leominster	Ricker's Kindercamp	Weekly	E. Coli	11	1	400	400	1
Lexington	Old Reservoir Swim Area #1	Weekly	Enterococci	14	1	74	74	1
Lexington	Old Reservoir Swim Area #2	Weekly	Enterococci	14	1	72	72	1
Littleton	Littleton Town Beach	Weekly	E. Coli	15				1
Lowell	Merrimac River - Bath House	Weekly	E. Coli	11	1	390	390	1
Ludlow	Haviland Pond	Weekly	E. Coli	14				
Lunenburg	Hickory Hill (Hemlock Drive)	Weekly	E. Coli	11				
Lunenburg	Hickory Hills (Island Rd.)	Weekly	E. Coli	10				
Lunenburg	Lunenburg Town Beach	Weekly	E. Coli	9				
Lunenburg	Shady Point Campground	Weekly	E. Coli	8				
Lynn	Flax Pond - Railing	Weekly	E. Coli	13	7	260	6700	
Lynn	Flax Pond - Railing	Weekly	Total Coliform	12				
Lynn	Flax Pond - Rocks	Weekly	E. Coli	13	8	250	6000	
Lynn	Flax Pond - Rocks	Weekly	Total Coliform	12				
Lynn	Sluice Pond - Briarcliff Lodge	Weekly	E. Coli	13	6	300	1900	
Lynn	Sluice Pond - Briarcliff Lodge	Weekly	Total Coliform	12				
Lynn	Sluice Pond - Four Winds	Weekly	E. Coli	13				
Lynn	Sluice Pond - Four Winds	Weekly	Total Coliform	12				
Marlborough	Memorial - Left	Weekly	E. Coli	7	1	2000	2000	1
Marlborough	Memorial - Right	Weekly	E. Coli	7	1	520	520	1

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Mashpee	Attaquin	Weekly	E. Coli	14				
Mashpee	Camp Farley - Wakeby Pond	Weekly	E. Coli	14				
Mashpee	Fells Pond	Weekly	E. Coli	13	1	452	452	1
Mashpee	John's Pond (Briarwood)	Weekly	E. Coli	12				
Mashpee	John's Pond (North)	Weekly	E. Coli	10				
Mashpee	John's Pond (Public) Back Road	Weekly	E. Coli	14				
Mashpee	John's Pond (Public) Brickyard Road	Weekly	E. Coli	14				
Mashpee	John's Pond (Tim's Beach)	Weekly	E. Coli	12				
Mashpee	Mashpee Shores Assoc.	Weekly	E. Coli	12				
Mashpee	Santuit Pond Bryant's Neck	Weekly	E. Coli	14				
Mashpee	Santuit Pond Town Landing	Weekly	E. Coli	15	1	320	320	1
Mashpee	Santuit Pond Estate Assoc. - Santuit Pond	Weekly	E. Coli	12				
Mashpee	Trustee's of the Reservation (Mashpee Pond)	Weekly	E. Coli	12				
Mashpee	Trustee's of the Reservation (Wakeby Pond)	Weekly	E. Coli	12				
Medfield	Hinkley Left	Weekly	E. Coli	12	2	250	490	1
Medfield	Hinkley Right	Weekly	E. Coli	12	1	440	440	1
Medford	Wrights Pond Deep End	Weekly	E. Coli	10				
Medford	Wrights Pond Shallow End	Weekly	E. Coli	10				
Medway	Choate Pond Left	Weekly	E. Coli	9	2	320	2000	
Medway	Choate Pond Right	Weekly	E. Coli	9	2	240	420	
Mendon	Town Beach	Weekly	E. Coli	17	1	400	400	
Methuen	Forest Lake: Swimming Beach	Weekly	E. Coli	13				
Middleborough	Camp Avoda	Weekly	E. Coli	9				
Middleborough	Camp Yomechas	Weekly	E. Coli	16				
Middleborough	Woods Pond Cabins	Weekly	E. Coli	11				
Middleton	Thunderbridge	Weekly	E. Coli	16				
Milton	Houghton's Pond @ Bathouse	Weekly	Enterococci	16	1	323	323	1
Monterey	Benedict Pond Beach	Weekly	Enterococci	15				
Monterey	Camp Half Moon	Weekly	E. Coli	7				
Monterey	Lake Garfield	Weekly	E. Coli	15				
Monterey	Seven Stones Beach	Weekly	E. Coli	10				
Mt. Washington	Camp Hi Rock - Bear Rock Beach	Weekly	E. Coli	16				
Mt. Washington	Camp Hi Rock - Main Beach	Weekly	E. Coli	16				
Nantucket	Miacomet Pond	Weekly	E. Coli	13	4	248	800	3
Nantucket	Sesachacha Pond	Weekly	E. Coli	12				

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Natick	Camp Arrowhead	Weekly	E. Coli	8				
Natick	Camp Nonesuch	Weekly	E. Coli	12				
Natick	Cochituate Lake-North Beach	Weekly	Enterococci	16	1	120	120	1
Natick	Dug Pond - Diving	Weekly	E. Coli	13	1	1600	1600	1
Natick	Dug Pond - Kiddie	Weekly	E. Coli	12				
New Marlborough	Camp Segowea	Weekly	E. Coli	9				
Newton	Crystal Lake	Weekly	E. Coli	12				
North Adams	Windsor Lake	Weekly	E. Coli	16				
North Andover	Frye Pond Beach	Weekly	Enterococci	17	3	192	415	3
North Andover	Stevens Pond - Right	Weekly	E. Coli	9				
North Attleboro	Falls Pond	Weekly	E. Coli	18	4	250	460	3
North Attleboro	Whitings Pond	Weekly	E. Coli	17	6	260	620	3
North Brookfield	Brooks Pond	Weekly	E. Coli	11				
North Brookfield	Camp Atwater	Weekly	E. Coli	10				
Northbridge	Girl Scout Camp	Weekly	E. Coli	3				
Northampton	Musante Beach	Weekly	E. Coli	9				
Oakham	Lake Dean - Dean Campground	Weekly	E. Coli	16	1	1000	1000	
Oakham	Lake Dean - Pine Acres Campground	Weekly	E. Coli	12				
Orange	Town Beach	Weekly	E. Coli	16				
Orleans	Crystal Lake	Weekly	E. Coli	14				
Orleans	Pilgrim Lake	Weekly	E. Coli	14				
Otis	Camp Bonnie Brae	Weekly	E. Coli	11				
Otis	Camp Overflow Beach	Weekly	E. Coli	16				
Otis	Otis Reservoir Beach	Weekly	Enterococci	15				
Otis	Otis Woodlands Beach	Weekly	E. Coli	16				
Otis	Otis Woodlands Beach	Weekly	Total coliform	16				
Otis	Otis Woodlands Picnic Grove	Weekly	E. Coli	16				
Otis	Otis Woodlands Picnic Grove	Weekly	Total coliform	16				
Otis	Otis Woodlands Weir	Weekly	E. Coli	16				
Otis	Otis Woodlands Weir	Weekly	Total coliform	16				
Oxford	Carbuncle Pond	Weekly	E. Coli	10				
Pembroke	Finn Camp	Weekly	E. Coli	4				
Pembroke	Little Sandy	Weekly	E. Coli	13				
Pembroke	Oldham	Weekly	E. Coli	14	1	460	460	1
Pembroke	Stetson	Weekly	E. Coli	13				

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Peru	Camp Danbee	Weekly	E. Coli	14				
Phillipston	Queen Lake Beach North	Weekly	Enterococci	17	4	133	613	1
Phillipston	Queen Lake Beach South	Weekly	Enterococci	17	2	65	173	1
Pittsfield	Cathedral Camp	Weekly	E. Coli	10				
Pittsfield	CYC Camp St. Michael	Weekly	E. Coli	10				
Pittsfield	CYC Camp St. Michael	Weekly	E. Coli	10				
Pittsfield	Pines Beach	Weekly	E. Coli	16				
Pittsfield	Camp Stevenson/Witawentin	Weekly	E. Coli	10				
Pittsfield	Country Club of Pittsfield	Weekly	E. Coli	14				
Pittsfield	Lakeside Christian Camp	Weekly	E. Coli	14				
Pittsfield	Lulu Pond Beach	Weekly	Enterococci	17	2	224	400	2
Pittsfield	Onota Lake - Controy Pavillion	Weekly	E. Coli	16				
Pittsfield	Onota Lake - Decom Beach	Weekly	E. Coli	16				
Pittsfield	Onota Lake - Public Beach at Burbank Park	Weekly	E. Coli	16				
Pittsfield	Pontoosuc Lake - Decom Beach	Weekly	E. Coli	16				
Plainfield	Plainfield Pond	Weekly	E. Coli	16				
Plymouth	Baird Center (Bloody Pond)	Weekly	E. Coli	12				
Plymouth	Barrett Pond	Weekly	Enterococci	16	1	246	246	1
Plymouth	Blueberry Hill Camp (Curlew Pond)	Weekly	E. Coli	12	1	400	400	
Plymouth	Camp Bournedale - Great Herring Pond	Weekly	E. Coli	5				
Plymouth	Camp Cachalot	Weekly	E. Coli	11				
Plymouth	Camp Clark YMCA - Hyles Pond	Weekly	E. Coli	9	1	400	400	
Plymouth	Camp Massasoit - Elbow Pond	Weekly	E. Coli	12				
Plymouth	Camp Squanto	Weekly	E. Coli	11				
Plymouth	Charge Pond	Weekly	Enterococci	15				
Plymouth	Clear Pond Motel/Village	Unknown	E. Coli	10				
Plymouth	College Pond Day Use	Weekly	Enterococci	16	1	78	78	1
Plymouth	Curlew Pond (DCR)	Weekly	Enterococci	17	3	84	302	2
Plymouth	Ellis Haven - Ellis Pond	Weekly	E. Coli	11				
Plymouth	Fearing Pond 1	Weekly	Enterococci	17	2	86	246	1
Plymouth	Fearing Pond 2	Weekly	Enterococci	17	3	128	500	2
Plymouth	Fresh Pond Left	Weekly	E. Coli	16	5	270	400	2
Plymouth	Fresh Pond Right	Weekly	E. Coli	16	3	350	400	2
Plymouth	Hedges Pond	Weekly	E. Coli	12				
Plymouth	Indian Head Resort	Weekly	E. Coli	12				

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Community	Beach Name[1]	Testing Frequency	Indicator Type	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Plymouth	Morton Park Cove	Weekly	E. Coli	18	2	400	400	2
Plymouth	Morton Park Main	Weekly	E. Coli	18	2	300	380	1
Plymouth	Pinewood Camp - Camphouse Beach	Weekly	E. Coli	12				
Plymouth	Pinewood Camp - Crew Dock	Weekly	E. Coli	12				
Plymouth	Pinewood Camp - Pinecones Beach	Weekly	E. Coli	12				
Plymouth	Pinewood Lodge - Fresh Meadow	Weekly	E. Coli	14				
Plymouth	Plymouth Estates	Once	E. Coli	1				
Plymouth	Sandy Pond Campground	Weekly	E. Coli	9				
Plymouth	Wind-in-the-Pines Camp	Weekly	E. Coli	10				
Randolph	Ponkapoag Pond	Weekly	E. Coli	12				
Richmond	Camp Marion White	Weekly	E. Coli	15				
Richmond	Camp Russell	Weekly	E. Coli	11				
Richmond	Richmond Shores - East	Weekly	E. Coli	16				
Richmond	Richmond Town Beach	Weekly	E. Coli	15				
Rochester	Perry's Camp	Weekly	E. Coli	10				
Rochester	Perry's Camp	Weekly	Enterococci	1				
Rochester	Snipituit Pond	Weekly	E. Coli	10				
Rowe	Rowe Beach - Center	Weekly	E. Coli	17				
Rowe	Rowe Beach - Inlet	Weekly	E. Coli	2				
Rowe	Rowe Beach - Left	Weekly	E. Coli	6				
Rowe	Rowe Beach - Right	Weekly	E. Coli	17				
Royalston	St. Laurent Camp	Weekly	E. Coli	11				
Royalston	St. Laurent Camp	Weekly	Enterococci	11	4	172	880	3
Royalston	Tully Lake Campground	Weekly	E. Coli	14				
Russell	H.A. Moses Beach	Weekly	E. Coli	12				
Rutland	Treasure Valley Scout	Weekly	E. Coli	13				
Rutland	Treasure Valley Scout	Weekly	E. Coli	10				
Rutland	Whitehall Pond Beach	Weekly	Enterococci	16	1	400	400	1
Sandisfield	York Lake Beach	Weekly	Enterococci	15				
Sandwich	Camp Burgess	Weekly	E. Coli	9				
Sandwich	Camp Good News	Weekly	E. Coli	12				
Sandwich	Camp Hayward	Weekly	E. Coli	9				
Sandwich	Camp Lyndon	Weekly	E. Coli	7				
Sandwich	Dunroamin Park & Cottages	Weekly	E. Coli	12				
Sandwich	Hoxie Pond	Weekly	E. Coli	13				
Sandwich	Lakewood Hills Property Owners Assoc.	Weekly	E. Coli	12				

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Community	Beach Name[1]	Testing Frequency	Indicator Type	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Sandwich	Lawrence Pond	Weekly	E. Coli	13				
Sandwich	Peter's Pond Park (boat ramp)	Weekly	E. Coli	13				
Sandwich	Peter's Pond Town Park 1	Weekly	E. Coli	13				
Sandwich	Pimlico Pond	Weekly	E. Coli	13				
Sandwich	Snake Pond	Weekly	E. Coli	13				
Sandwich	Triangle Pond	Weekly	E. Coli	13				
Sandwich	Wakeby Pond	Weekly	E. Coli	13				
Saugus	Pearce Lake @ Breakheart	Weekly	Enterococci	17	3	76	170	2
Saugus	Peckham Pond @ Camp Nihan	Weekly	Enterococci	16	1	631	631	1
Savoy	North Pond Beach	Weekly	Enterococci	16	1	108	108	1
Savoy	South Pond Beach	Weekly	Enterococci	15				
Sharon	Camp Gannett Beach	Weekly	E. Coli	10	1	260	260	1
Sharon	Camp Wonderland Beach	Weekly	E. Coli	10	1	920	920	1
Sharon	Community Center Beach	Twice per week	E. Coli	25	11	260	1000	2
Sharon	Massapoag Yacht Club	Weekly	E. Coli	12				
Sharon	Town Beach Boat Landing	Twice per week	E. Coli	28				
Sharon	Town Beach Swimming Dock	Twice per week	E. Coli	28				
Sherborn	Farm Pond	Weekly	E. Coli	22	3	280	2000	2
Sherborn	Farm Pond	Weekly	Enterococci	6	4	638	6131	
Shrewsbury	Sunset Beach	Weekly	E. Coli	7				
Shutesbury	Lake Wyola	Weekly	Enterococci	15				
Southwick	South Pond Beach - North	Weekly	E. Coli	7				
Spencer	Camp Laurelwood	Weekly	E. Coli	12				
Spencer	Camp Marshall - Thompson	Weekly	E. Coli	12				
Spencer	Luther Hill Park	Weekly	E. Coli	10	1	310	310	1
Springfield	Bass Pond - Left	Weekly	Enterococci	12	7	66	921	3
Springfield	Bass Pond - Right	Weekly	Enterococci	12	6	62	649	3
Springfield	Camp Wilder - Left	Weekly	Enterococci	7				
Springfield	Camp Wilder - Right	Weekly	Enterococci	7				
Springfield	Five Mile Pond - Left	Weekly	Enterococci	12	2	79	162	2
Springfield	Five Mile Pond - Right	Weekly	Enterococci	12	3	130	161	2
Springfield	Knights of Columbus - Left	Weekly	Enterococci	11	1	64	64	1
Springfield	Knights of Columbus - Right	Weekly	Enterococci	11	1	70	70	1
Springfield	Paddle Club - Left	Weekly	Enterococci	12	5	112	238	2

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Community	Beach Name[1]	Testing Frequency	Indicator Type	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Springfield	Paddle Club - Right	Weekly	Enterococci	13	6	75	770	2
Sterling	Lake Waushacum #1	Weekly	E. Coli	11	1	340	340	
Stockbridge	Beachwood Assoc. Inlet	Weekly	E. Coli	1				
Stockbridge	Beachwood Assoc. Inlet	Weekly	Total coliform	1				
Stockbridge	Beachwood Assoc.	Weekly	E. Coli	22				
Stockbridge	Beachwood Assoc.	Weekly	Total coliform	6				
Stockbridge	Berkshire Country Day School	Weekly	E. Coli	13				
Stockbridge	Berkshire Country Day School	Weekly	Total coliform	12				
Stockbridge	Camp Mah-kee-nac	Weekly	E. Coli	16				
Stockbridge	Kripalu Beach	Weekly	E. Coli	31				
Stockbridge	Kripalu Beach	Weekly	Total coliform	11				
Stockbridge	Town Beach (Stockbridge Bowl)	Weekly	E. Coli	15	1	250	250	
Stockbridge	Town Beach (Stockbridge Bowl)	Weekly	Total coliform	11				
Stockbridge	White Pines Condos (Stockbridge Bowl)	Weekly	E. Coli	20				
Stockbridge	White Pines Condos (Stockbridge Bowl)	Weekly	Total coliform	4				
Stoughton	Ames Pond	Weekly	E. Coli	13				
Stow	Lake Boone	Weekly	E. Coli	14	1	1200	1200	1
Sturbridge	Main Beach - Walker Pond Assoc.	Weekly	E. Coli	7				
Sturbridge	Oak Cove - Walker Pond Assoc.	Weekly	E. Coli	7				
Sturbridge	Outdoor World Beach	Weekly	E. Coli	13				
Sturbridge	Streeter Point	Weekly	Enterococci	14	1	400	400	1
Sturbridge	Sturbridge Host Hotel	Weekly	E. Coli	15				
Sturbridge	Sturbridge Recreation - Cedar Pond	Weekly	E. Coli	11	1	360	360	1
Sturbridge	Trail Beach	Unknown	E. Coli	5				
Sturbridge	Wells State Park	Weekly	Enterococci	16	1	400	400	1
Sutton	Camp Blanchard	Weekly	E. Coli	11				
Sutton	Camp Marion	Weekly	E. Coli	10				
Sutton	King's Campground	Unknown	E. Coli	2	1	2000	2000	1
Sutton	Old Holbrook Campground	Weekly	E. Coli	16				
Sutton	Sutton Falls Camp	Weekly	E. Coli	17				
Taunton	Watsons Pond	Weekly	Enterococci	15				
Templeton	Beamans Pond	Weekly	Enterococci	14	1	68	68	
Templeton	Beamans Pond Campground	Weekly	Enterococci	15				
Tolland	Camp Kinderland Beach	Weekly	E. Coli	11				
Tolland	Camp Timbertrails	Weekly	E. Coli	9				
Tolland	Wildwood - Fox Den	Weekly	E. Coli	16				

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Community	Beach Name[1]	Testing Frequency	Indicator Type	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Tolland	Wildwood - Lakeside	Weekly	E. Coli	16				
Tolland	Wildwood - Main Beach	Weekly	E. Coli	16				
Tolland	Wildwood - Meadow	Weekly	E. Coli	16				
Tolland	Wildwood - Otter Pond Beach	Weekly	E. Coli	16				
Townsend	Pearl Hill Pond Beach	Weekly	Enterococci	15				
Tyngsborough	Town Beach	Weekly	E. Coli	11				
Tyringham	Tyringham Park Beach	Weekly	E. Coli	16				
Upton	Kiwanis Beach	Weekly	E. Coli	11				
Uxbridge	Buffumville Lake	Weekly	E. Coli	15				
Uxbridge	Fairwoods	Weekly	E. Coli	16	2	340	620	2
Uxbridge	Pout Pond	Weekly	E. Coli	13	1	390	390	1
Uxbridge	West Hill Park	Weekly	E. Coli	16	1	490	490	
Wales	Lake Land	Weekly	E. Coli	14	1	324	324	
Wales	Sichols	Weekly	E. Coli	15	1	480	480	
Wales	Town Beach	Weekly	E. Coli	14	2	290	552	
Walpole	Sharon Country Day Camp Brook	Weekly	E. Coli	9				
Walpole	Sharon Country Day Camp Pond	Weekly	E. Coli	9				
Wareham	Glen Charlie at Shangri-La	Weekly	E. Coli	16				
Wareham	Wareham Lake Shores	Weekly	E. Coli	8				
Wareham	White Island Association	Weekly	E. Coli	17	1	280	280	
Warren	Comin's Pond	Weekly	E. Coli	14				
Warwick	Moores Pond Beach	Weekly	E. Coli	16				
Wayland	Town Beach Left Buoy (deep)	Weekly	E. Coli	14				
Wayland	Town Beach Left Shallow	Weekly	E. Coli	12				
Wayland	Town Beach Middle	Weekly	E. Coli	13				
Wayland	Town Beach Right Shallow	Weekly	E. Coli	13				
Webster	Beacon Park	Weekly	E. Coli	14				
Webster	Birch Island	Weekly	E. Coli	14				
Webster	Colonial Park	Weekly	E. Coli	14				
Webster	Indian Ranch	Weekly	E. Coli	17				
Webster	Kildeer Island	Weekly	E. Coli	14				
Webster	Lakeside	Weekly	E. Coli	14				
Webster	Memorial Beach #1	Weekly	E. Coli	15				
Webster	Memorial Beach #2	Weekly	E. Coli	15				
Webster	Nipmuc Cove	Weekly	E. Coli	14				
Webster	Treasure Island	Weekly	E. Coli	14				

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Community	Beach Name[1]	Testing Frequency	Indicator Type	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Wellesley	Morses Beach - Shallow	Weekly	E. Coli	14	1	660	660	1
Wellfleet	Duck Pond	Weekly	E. Coli	14				
Wellfleet	Great Pond	Weekly	E. Coli	14				
Wellfleet	Gull Pond	Weekly	E. Coli	14				
Wellfleet	Gull Pond (2)	Weekly	E. Coli	14				
Wellfleet	Higgins Pond	Weekly	E. Coli	14				
Wellfleet	Long Pond	Weekly	E. Coli	14				
Wendell	Ruggles Pond	Weekly	Enterococci	16	1	72	72	1
Wenham	Pleasant Street Pond	Weekly	E. Coli	14	3	479	727	
West Brookfield	Lake Wickabog - Main Beach	Weekly	E. Coli	15	1	640	640	1
West Stockbridge	Card Pond Beach	Weekly	E. Coli	16				
West Stockbridge	Crane Lake Camp	Weekly	E. Coli	11				
West Tisbury	Ice House Pond	Unknown	Enterococci	2	1	64	64	1
West Tisbury	Long Cove (fresh)	Weekly	Enterococci	16	3	66	306	3
West Tisbury	Seth's Pond Beach #1 (Focus)	Weekly	Enterococci	14	1	76	76	1
West Tisbury	Seth's Pond Cove #2	Weekly	Enterococci	14	2	64	168	
Westborough	Lake Chauncy Beach #1	Weekly	E. Coli	9				
Westfield	Kingsley Beach	Weekly	Enterococci	16	1	280	280	1
Westfield	Lamberts Beach	Weekly	Enterococci	15	1	296	296	1
Westford	American Legion	Weekly	E. Coli	14				
Westford	East Boston Camps - Boys Beach	Weekly	E. Coli	17	1	400	400	1
Westford	East Boston Camps - Day Care	Weekly	E. Coli	17	1	400	400	1
Westford	Edwards Town Beach	Weekly	E. Coli	15	1	400	400	1
Westford	Forge Village Beach	Weekly	E. Coli	13				
Westford	Lakeside Meadows	Weekly	E. Coli	16	1	238	238	1
Westford	Marylou's Beach (NIA)	Weekly	E. Coli	14				
Westford	Nashoba Valley Ski Resort: Camp Pond	Weekly	E. Coli	14				
Westford	Nashoba Valley Ski Resort: Function Pond	Weekly	E. Coli	14				
Westford	North Beach (NIA)	Weekly	E. Coli	16	2	400	400	1
Westford	Sandy Beach (NIA)	Weekly	E. Coli	14				
Westford	Summer Village Main Beach	Weekly	E. Coli	15				
Westminster	Crocker Pond	Weekly	E. Coli	16				
Westminster	Crow Hill Pond Beach	Weekly	Enterococci	15				
Weston	River Day Camp	Weekly	E. Coli	11	1	264	264	1

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Community	Beach Name[1]	Testing Frequency	Indicator Type	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Weston	Valley Pond	Weekly	E. Coli	14				
Westport	Sawdy Pond	Weekly	Enterococci	11	3	72	302	3
Westwood	Membership Beach Middle	Weekly	E. Coli	17	2	430	600	1
Westwood	Membership Beach North	Weekly	E. Coli	17				1
Westwood	Membership Beach South	Weekly	E. Coli	17	1	350	350	1
Westwood	North Beach Middle	Weekly	E. Coli	16				
Westwood	North Beach North	Weekly	E. Coli	16				
Westwood	North Beach South	Weekly	E. Coli	16				
Whately	Tri-Town Beach	Weekly	E. Coli	11	1	350	350	1
Wilbraham	Spec Pond Beach	Weekly	E. Coli	10	1	400	400	
Williamstown	Margaret Lindley Park	Biweekly	E. Coli	7				
Wilmington	Baby Beach	Weekly	E. Coli	14				
Wilmington	Town Beach - Center	Weekly	E. Coli	14				
Wilmington	Town Beach - Right	Weekly	E. Coli	14				
Winchendon	Lake Dennison State Park Day Use	Weekly	Enterococci	15				
Winchendon	Lake Dennison State Park North Camp	Weekly	Enterococci	15				
Winchester	Shannon Beach @ Upper Mystic	Weekly	Enterococci	22	7	68	385	3
Winchester	Wedge Pond	Weekly	E. Coli	8				
Worcester	Bell Pond Beach	Weekly	E. Coli	8				
Worcester	Coes Pond Beach (Mill St.)	Weekly	E. Coli	8				
Worcester	Indian Lake Public Beach (Sherburne Ave)	Weekly	E. Coli	8				
Worcester	Indian Lake Shore Park	Weekly	E. Coli	9	1	450	450	1
Worcester	Lake Quinsigamond-Lake Park Beach	Weekly	Enterococci	18	4	64	110	2
Worcester	Lake Quinsigamond-Regatta Point Beach	Weekly	Enterococci	15				
Wrentham	Lake Pearl Park	Weekly	E. Coli	12				
Wrentham	Sweatt Beach	Weekly	E. Coli	16	2	400	420	1
Yarmouth	Big Sandy Pond	Weekly	E. Coli	14	1	660	660	1
Yarmouth	Camp Greenough - Boy Scouts	Weekly	E. Coli	8				
Yarmouth	Dennis Pond	Weekly	E. Coli	15				
Yarmouth	Elijah's Pond, Camp Wingate	Weekly	E. Coli	12				
Yarmouth	Flax Pond	Weekly	E. Coli	14				
Yarmouth	Horse Pond	Weekly	E. Coli	15				
Yarmouth	Horse Pond - Halcyon Condos	Weekly	E. Coli	13				
Yarmouth	Little Sandy Pond	Weekly	E. Coli	15	1	320	320	
Yarmouth	Long Pond - Indian	Weekly	E. Coli	14				
Yarmouth	Long Pond - Lyman	Weekly	E. Coli	15				

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Table 15

MA Beaches (2010) Exceedances reported based on number of days since last rainfall at public and semi-public bathing beaches

Marine beaches

# Days Since Rain	# Exceedances	%
0	375	76.5%
1	36	7.3%
2	16	3.3%
3	15	3.1%
4	13	2.7%
5	16	3.3%
6	0	0.0%
7	4	0.8%
8	3	0.6%
9	2	0.4%
10	2	0.4%
10+	8	1.6%
Total	490	100.0%

Freshwater beaches

# Days Since Rain	# Exceedances	%
0	58	35.2%
1	41	24.8%
2	10	6.1%
3	14	8.5%
4	12	7.3%
5	5	3.0%
6	9	5.5%
7	6	3.6%
8	3	1.8%
9	4	2.4%
10	1	0.6%
10+	2	1.2%
Total	165*	100.0%

* - Out of 295 bacterial exceedances. One hundred thirty exceedances had no corresponding rainfall information.

FIGURES

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Figure 1 - MA Marine Beaches, 2010: Exceedances per Community

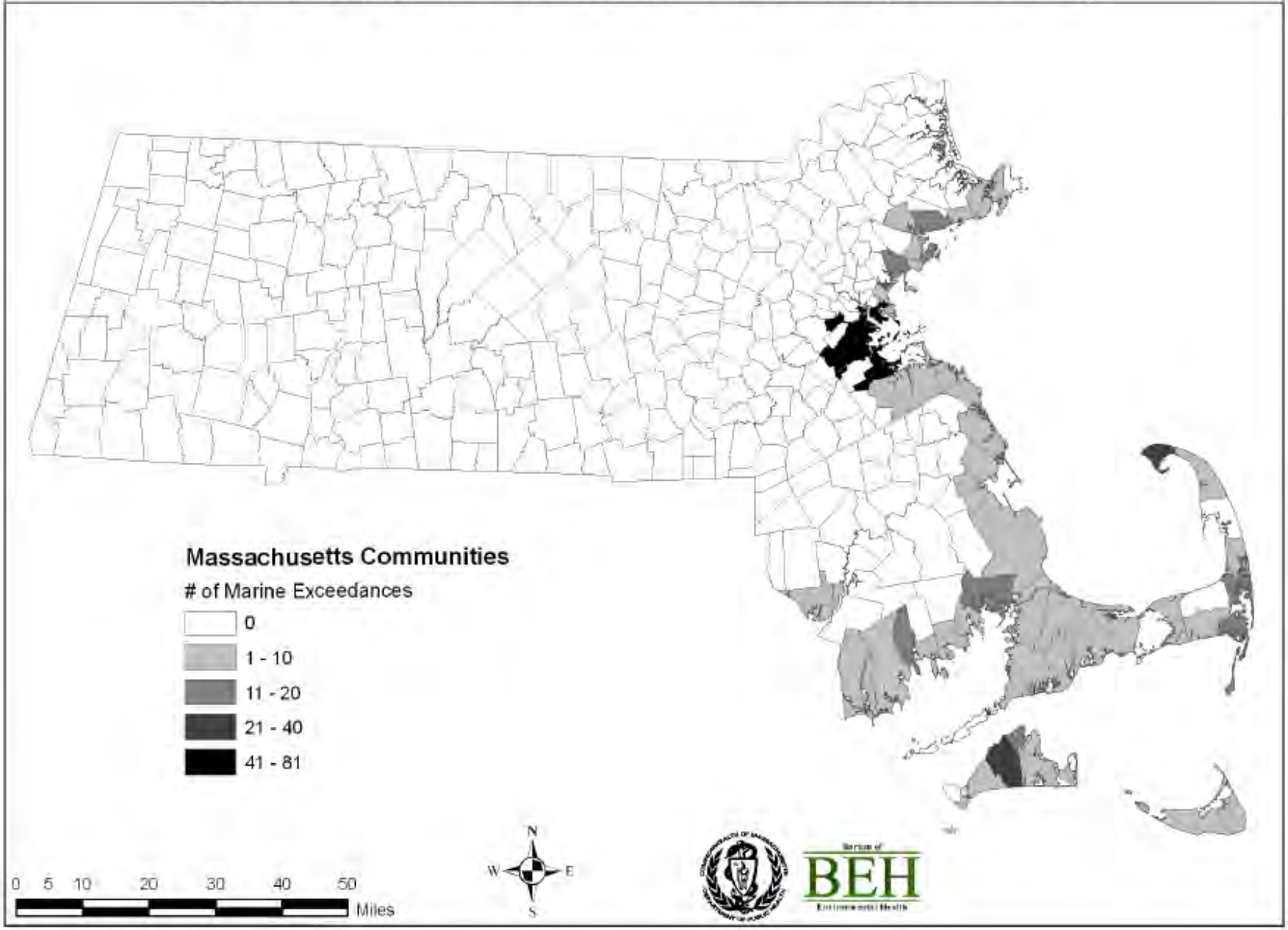


Figure 2 - MA Freshwater Beaches, 2010: Exceedances per Community

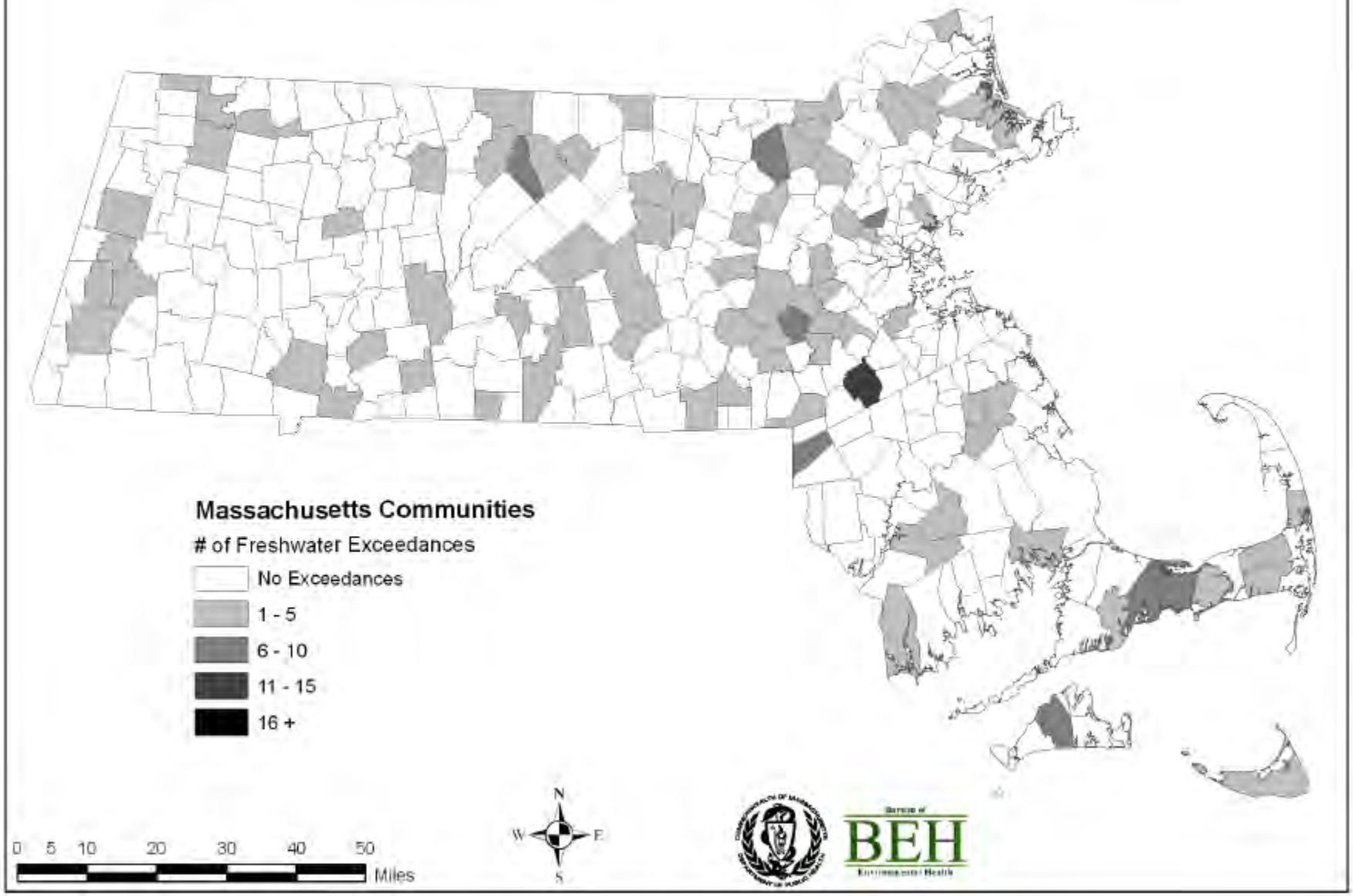


Figure 3

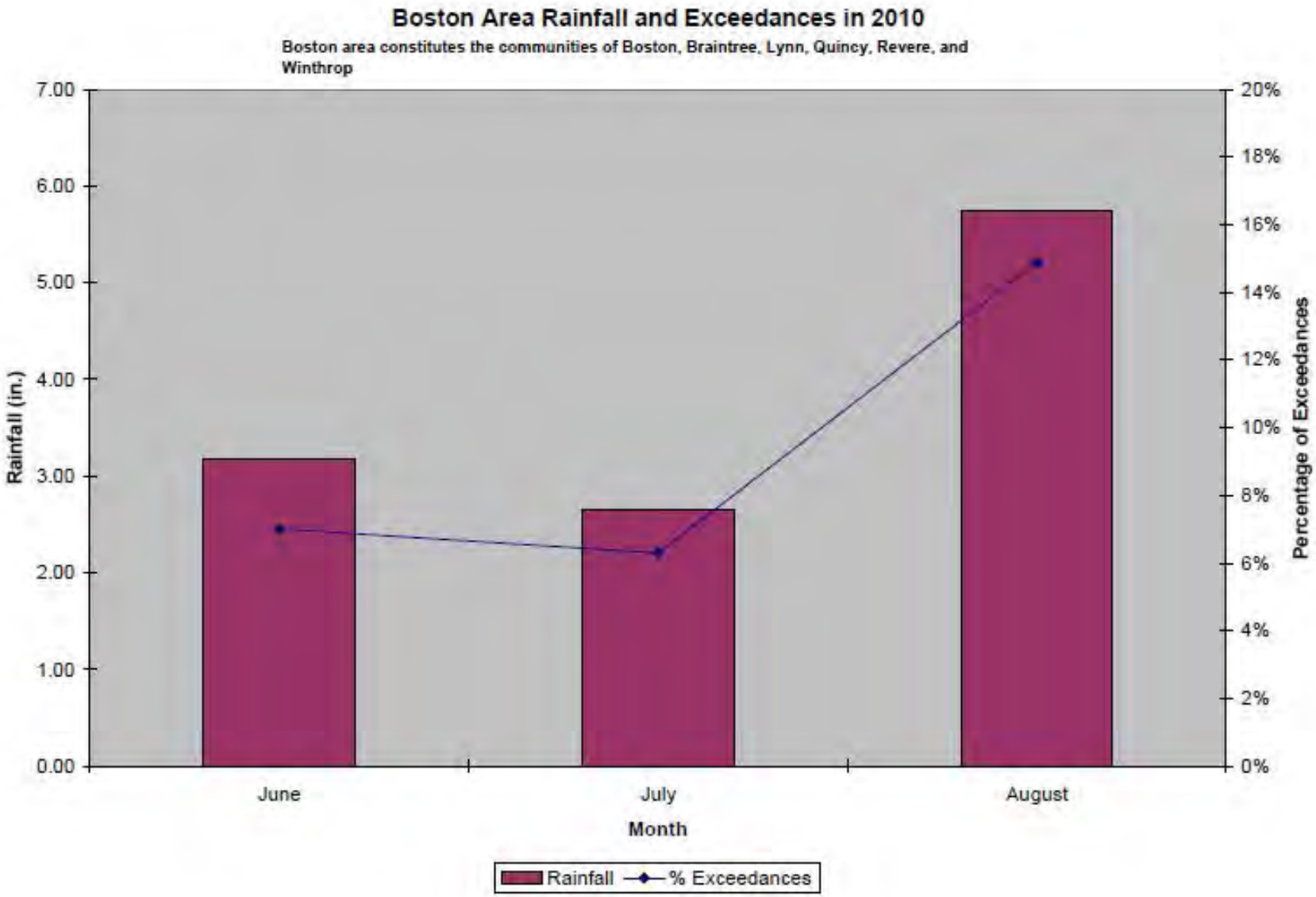

Boston Area Rainfall and Exceedances in 2010
Boston area constitutes the communities of Boston, Braintree, Lynn, Quincy, Revere, and Winthrop
Rainfall (in.)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Percentage of Exceedances
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
June
July
August
Month
Rainfall
% Exceedances

Figure 4

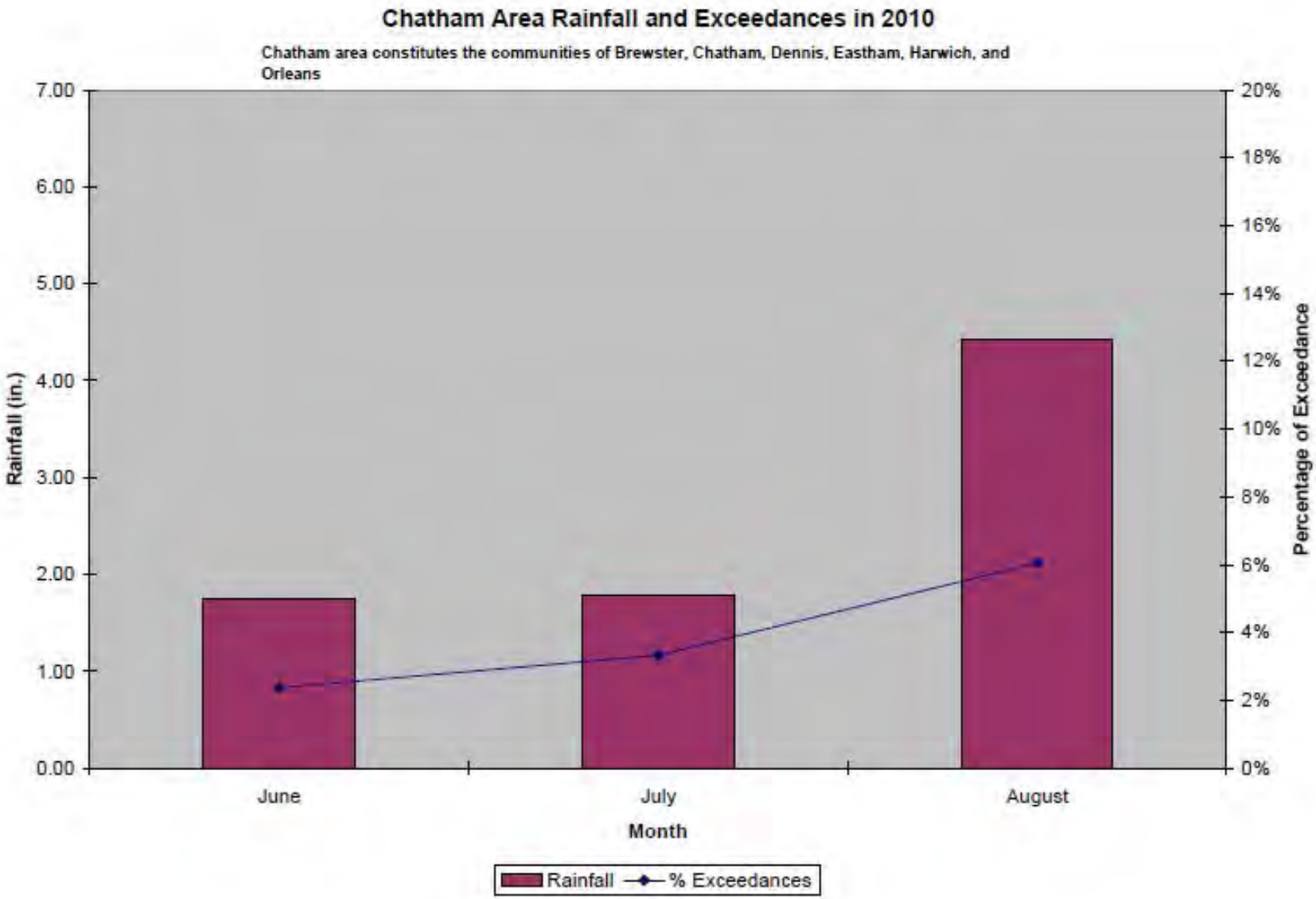

Chatham Area Rainfall and Exceedances in 2010
Chatham area constitutes the communities of Brewster, Chatham, Dennis, Eastham, Harwich, and Orleans
Rainfall (in.)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Percentage of Exceedance
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
June
July
August
Month
Rainfall
% Exceedances

Figure 5

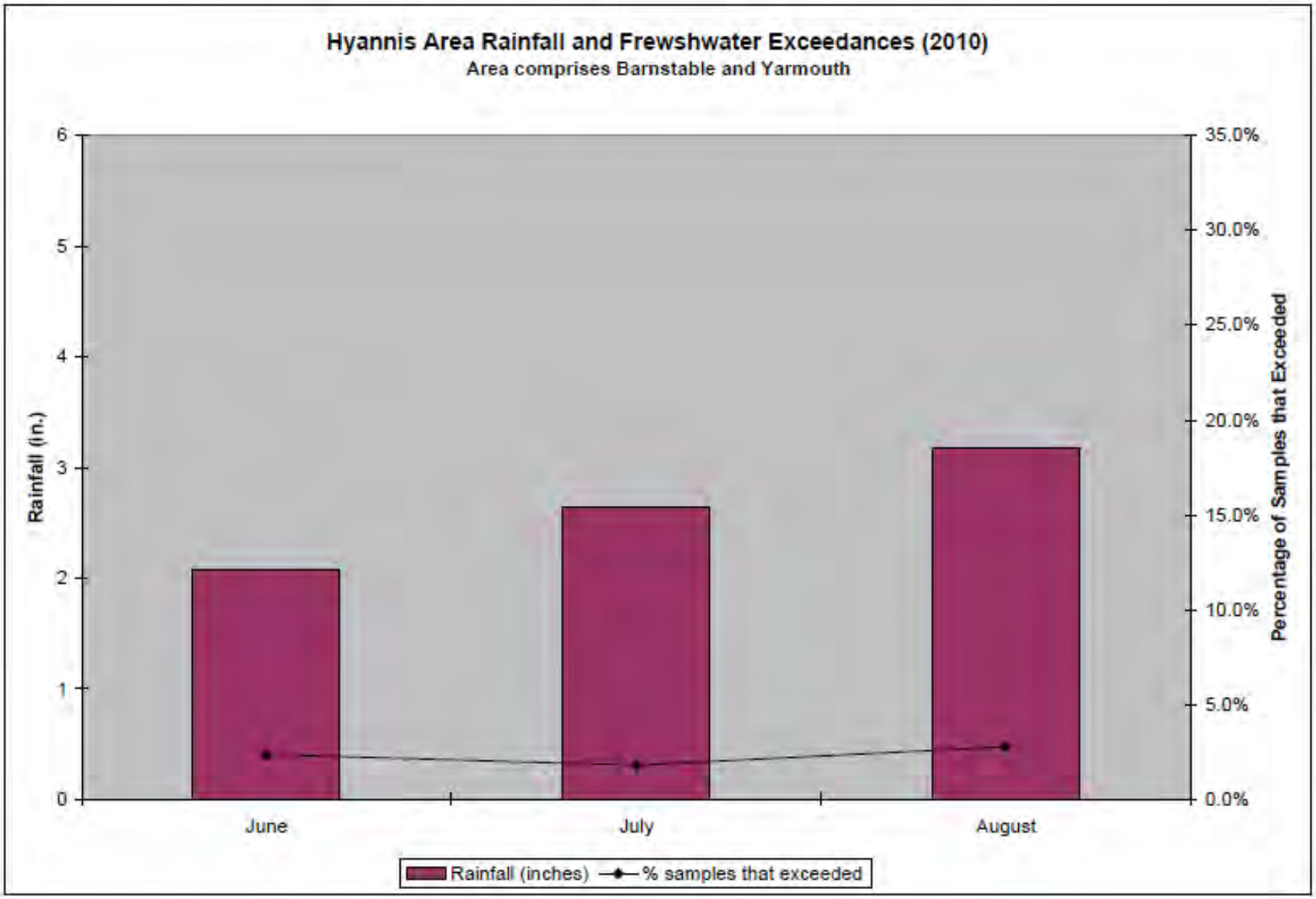

Hyannis Area Rainfall and Frewshwater Exceedances (2010)
Area comprises Barnstable and Yarmouth
Rainfall (in.)
Percentage of Samples that Exceeded
0
1
2
3
4
5
6
0.0%
5.0%
10.0%
15.0%
20.0%
25.0%
30.0%
35.0%
June
July
August
Rainfall (inches)
% samples that exceeded

Figure 6

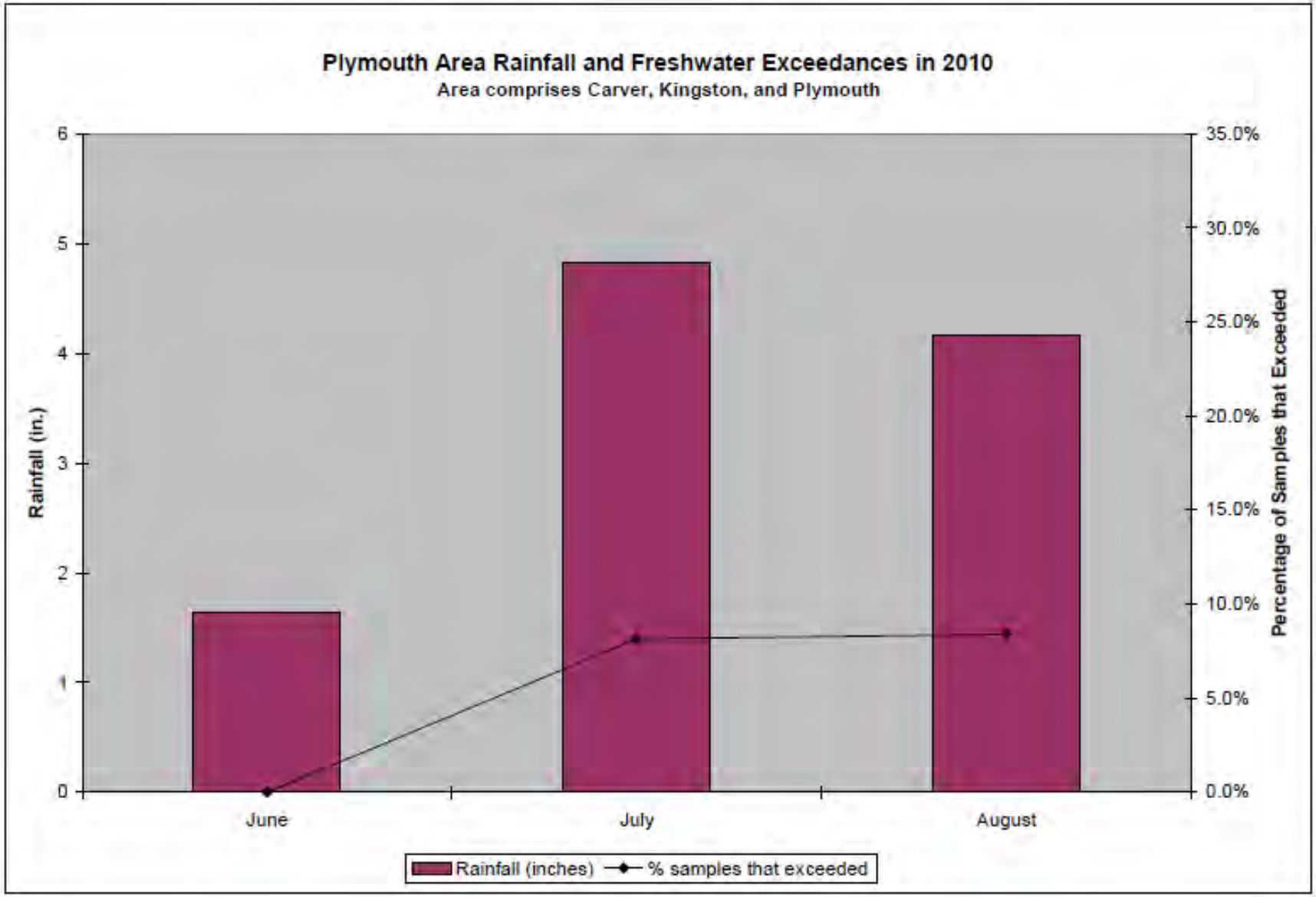

Plymouth Area Rainfall and Freshwater Exceedances in 2010
Area comprises Carver, Kingston, and Plymouth
Rainfall (in.)
Percentage of Samples that Exceeded
0
1
2
3
4
5
6
0.0%
5.0%
10.0%
15.0%
20.0%
25.0%
30.0%
35.0%
June
July
August
Rainfall (inches)
% samples that exceeded

Figure 7

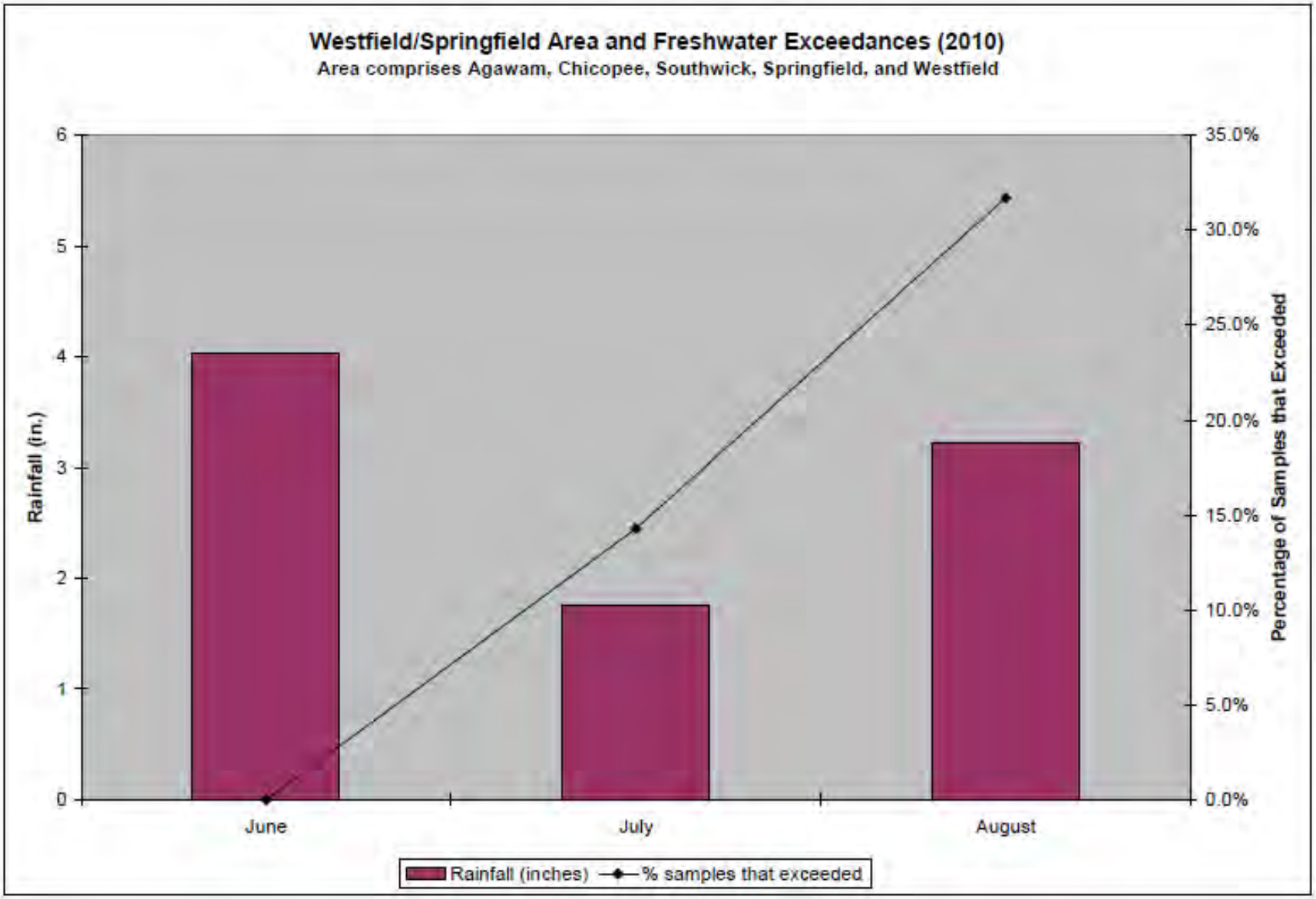

Westfield/Springfield Area and Freshwater Exceedances (2010)
Area comprises Agawam, Chicopee, Southwick, Springfield, and Westfield
Rainfall (in.)
Percentage of Samples that Exceeded
0
1
2
3
4
5
6
0.0%
5.0%
10.0%
15.0%
20.0%
25.0%
30.0%
35.0%
June
July
August
Rainfall (inches)
% samples that exceeded

Figure 8

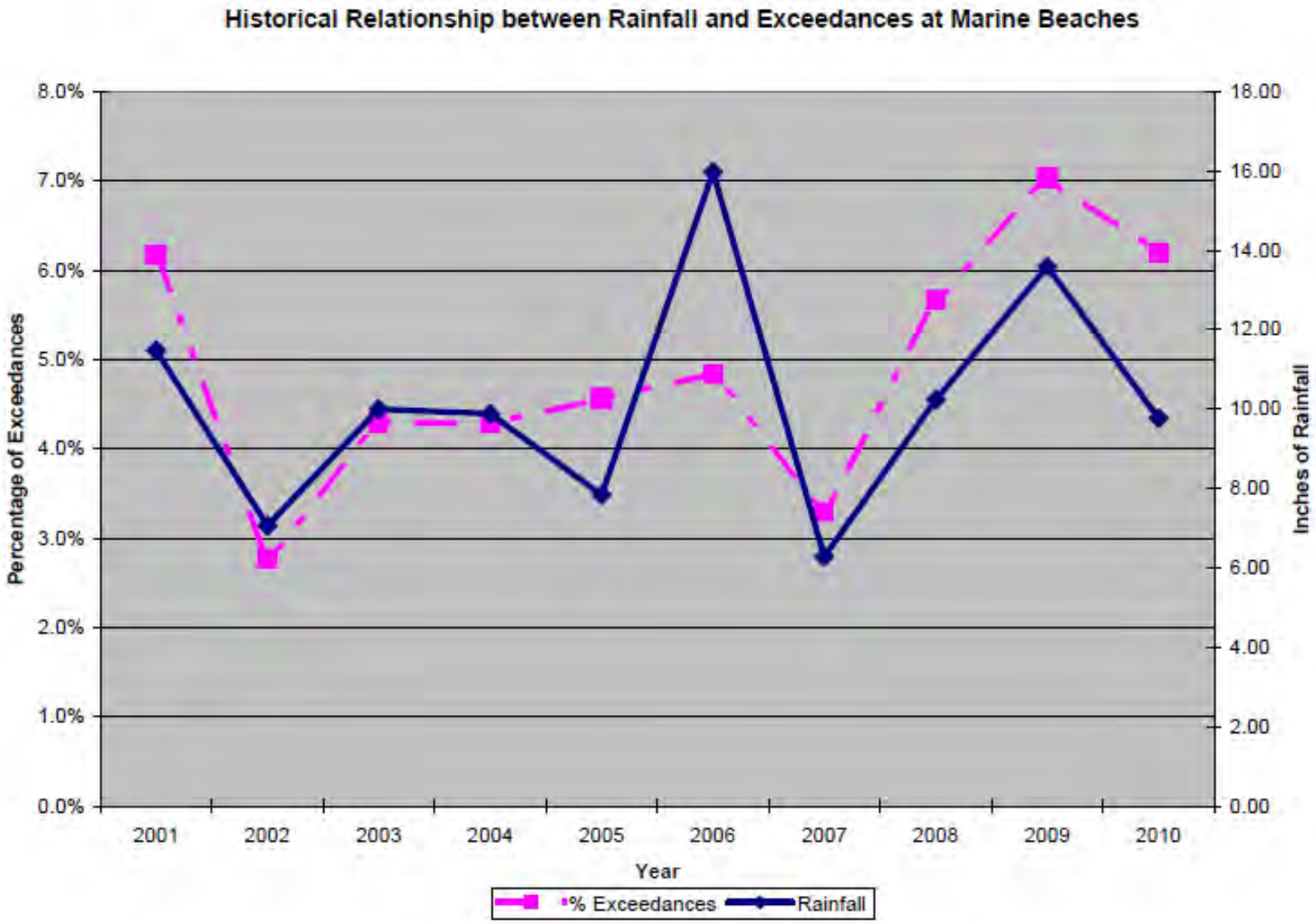
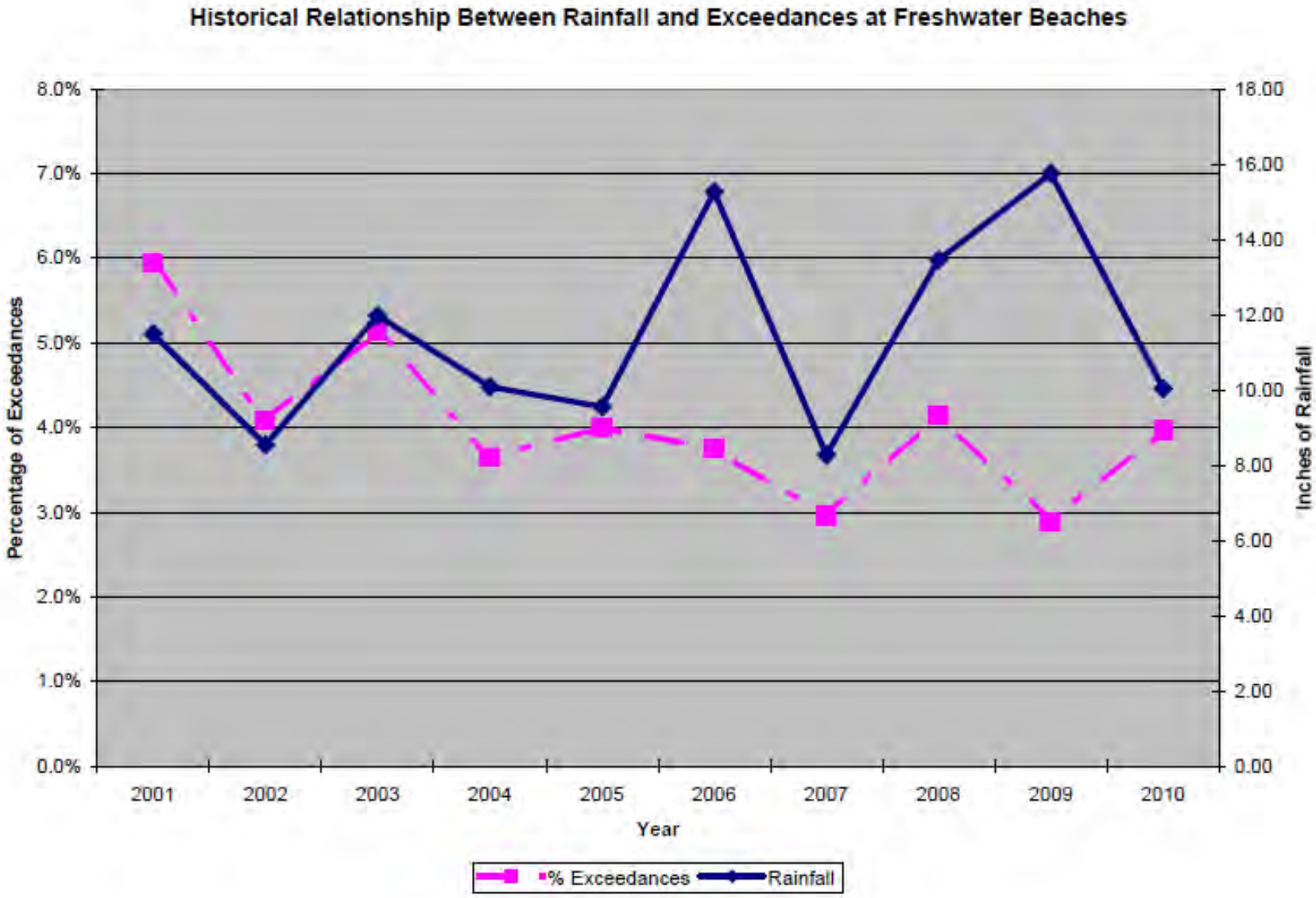
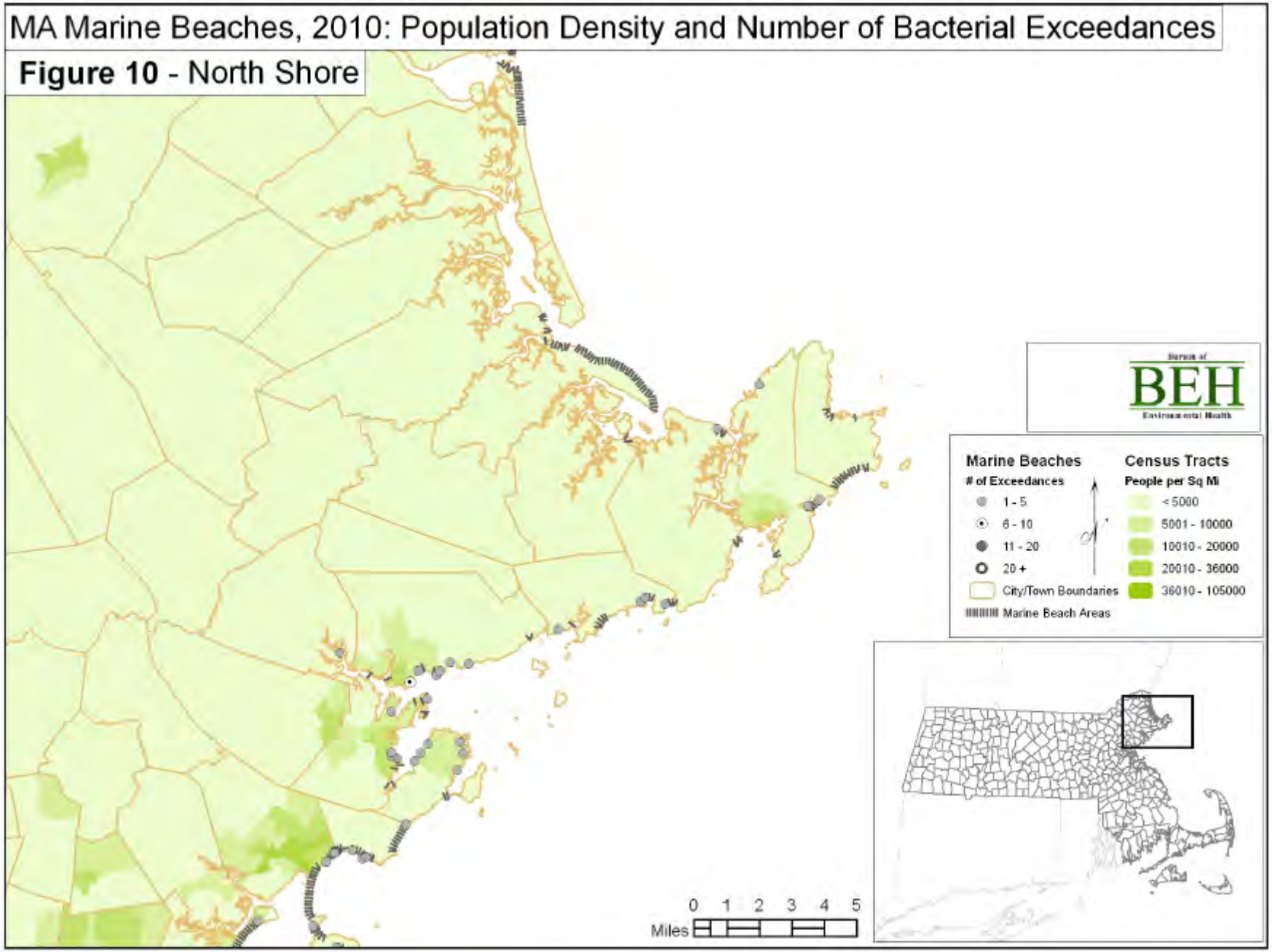
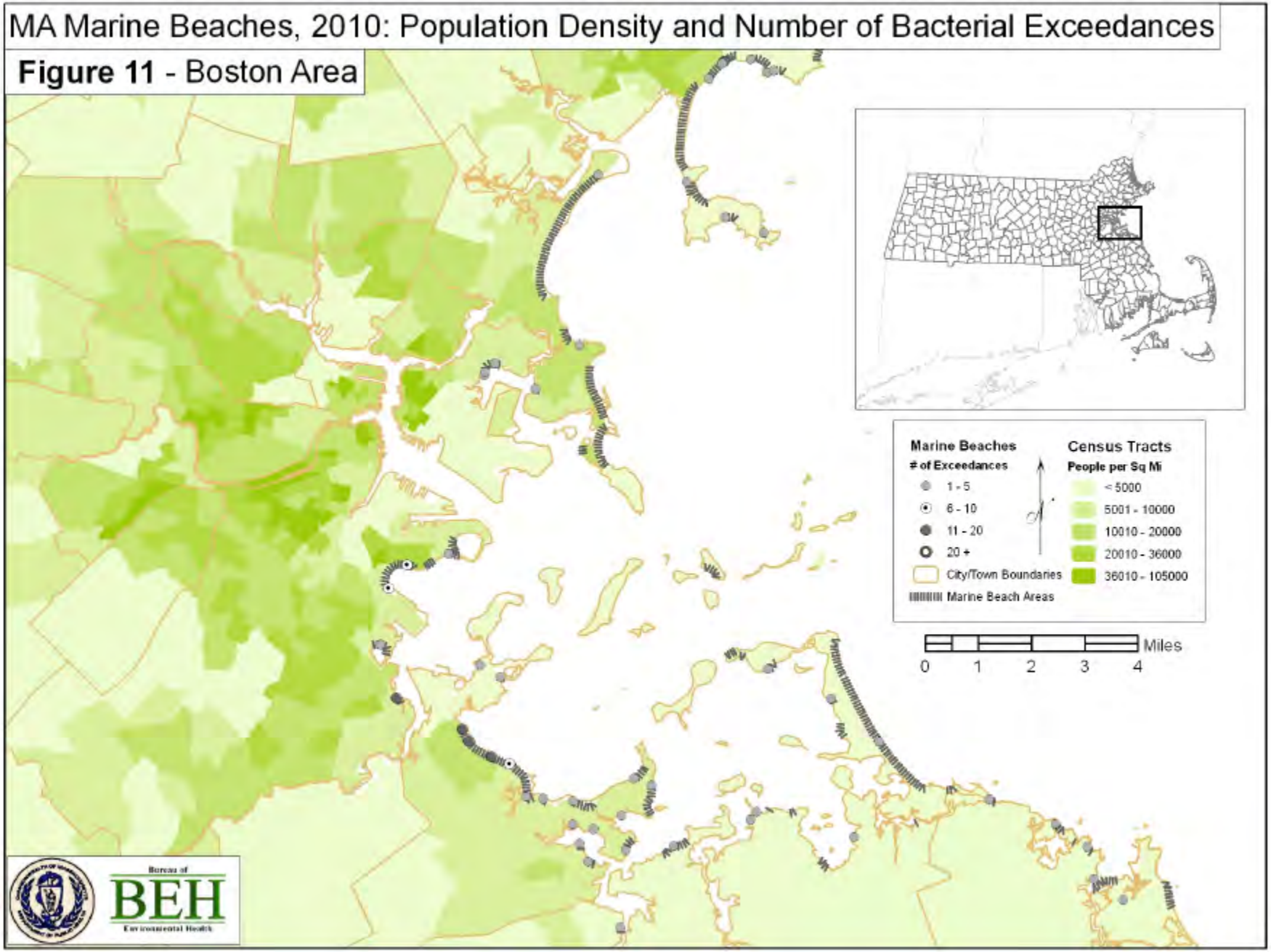

Historical Relationship between Rainfall and Exceedances at Marine Beaches
Percentage of Exceedances
Inches of Rainfall
8.0%
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Year
% Exceedances
Rainfall

Figure 9

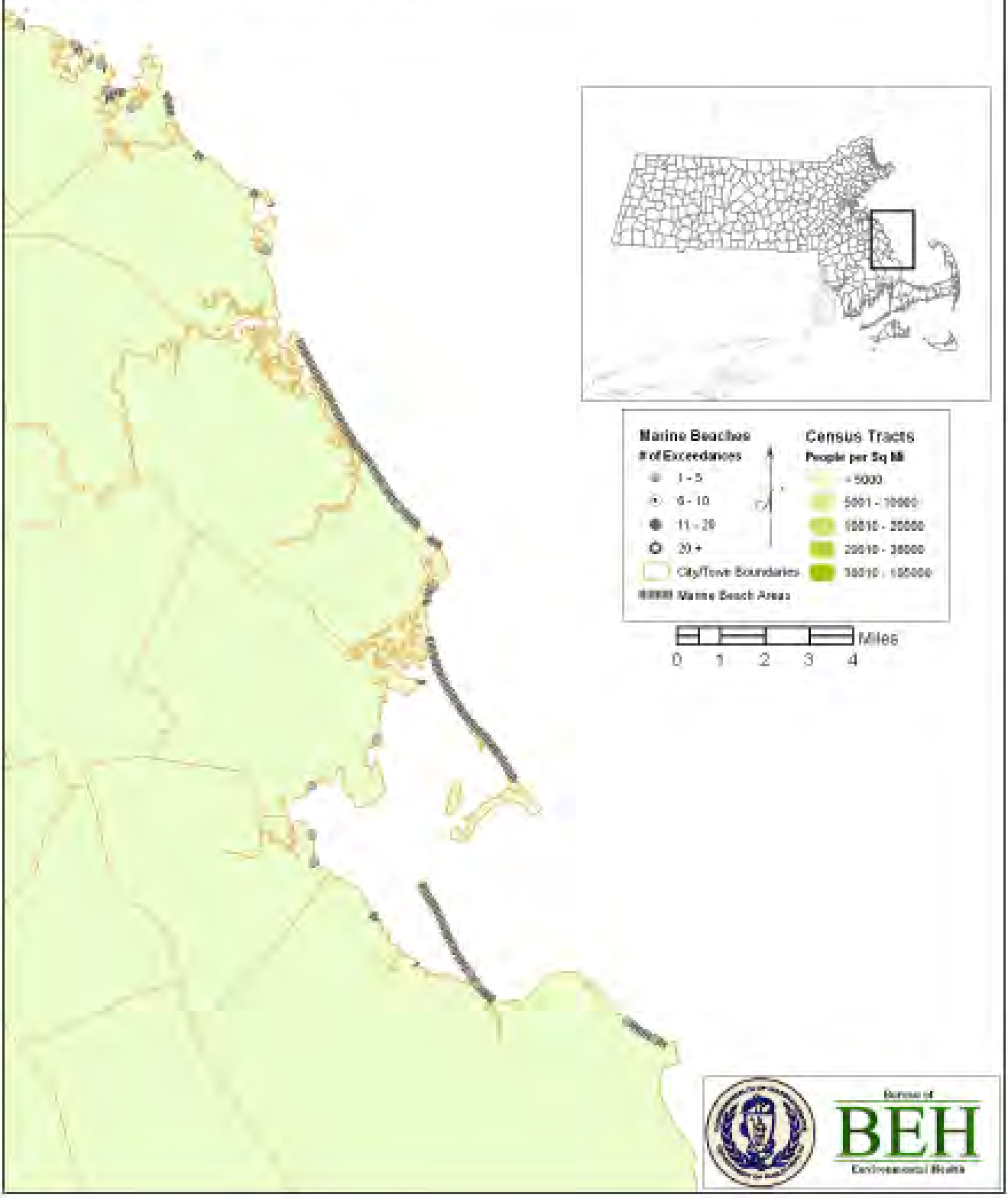

Historical Relationship Between Rainfall and Exceedances at Freshwater Beaches
Percentage of Exceedances
8.0%
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
Inches of Rainfall
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Year
% Exceedances
Rainfall

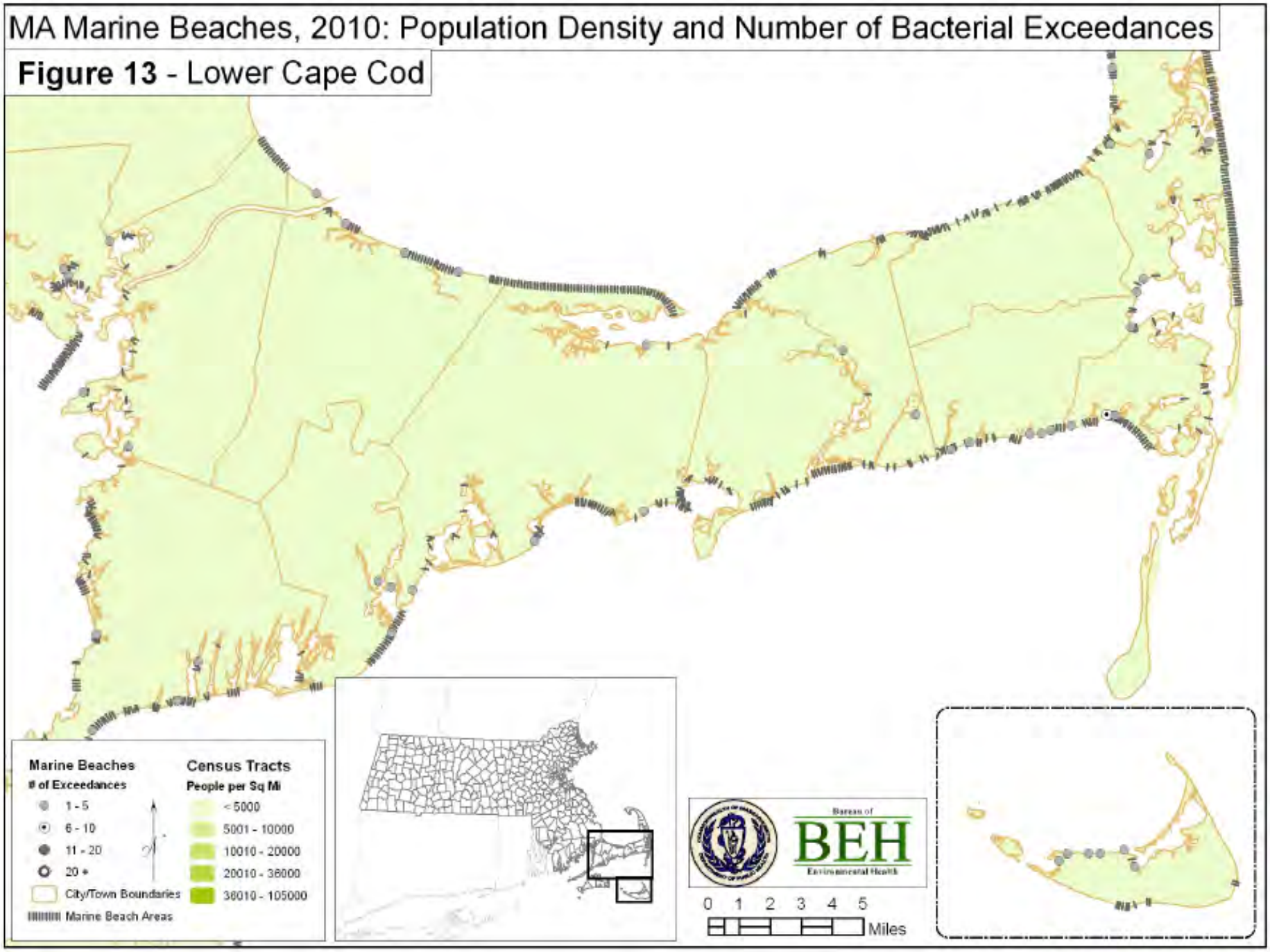

MA Marine Beaches, 2010: Population Density and Number of Bacterial Exceedances
Figure 10 - North Shore
BEH
Marine Beaches
# of Exceedances
1 - 5
6 - 10
11 - 20
20 +
City/Town Boundaries
Marine Beach Areas
Census Tracts
People per Sq Mi
< 5000
5001 - 10000
10010 - 20000
20010 - 36000
36010 - 105000
0 1 2 3 4 5
Miles


MA Marine Beaches, 2010: Population Density and Number of Bacterial Exceedances
Figure 11 - Boston Area
Marine Beaches
# of Exceedances
1 - 5
6 - 10
11 - 20
20 +
City/Town Boundaries
Marine Beach Areas
Census Tracts
People per Sq Mi
< 5000
5001 - 10000
10010 - 20000
20010 - 36000
36010 - 105000
Miles
0 1 2 3 4
Bureau of
BEH
Environmental Health

MA Marine Beaches, 2010: Population Density and Number of Bacterial Exceedances

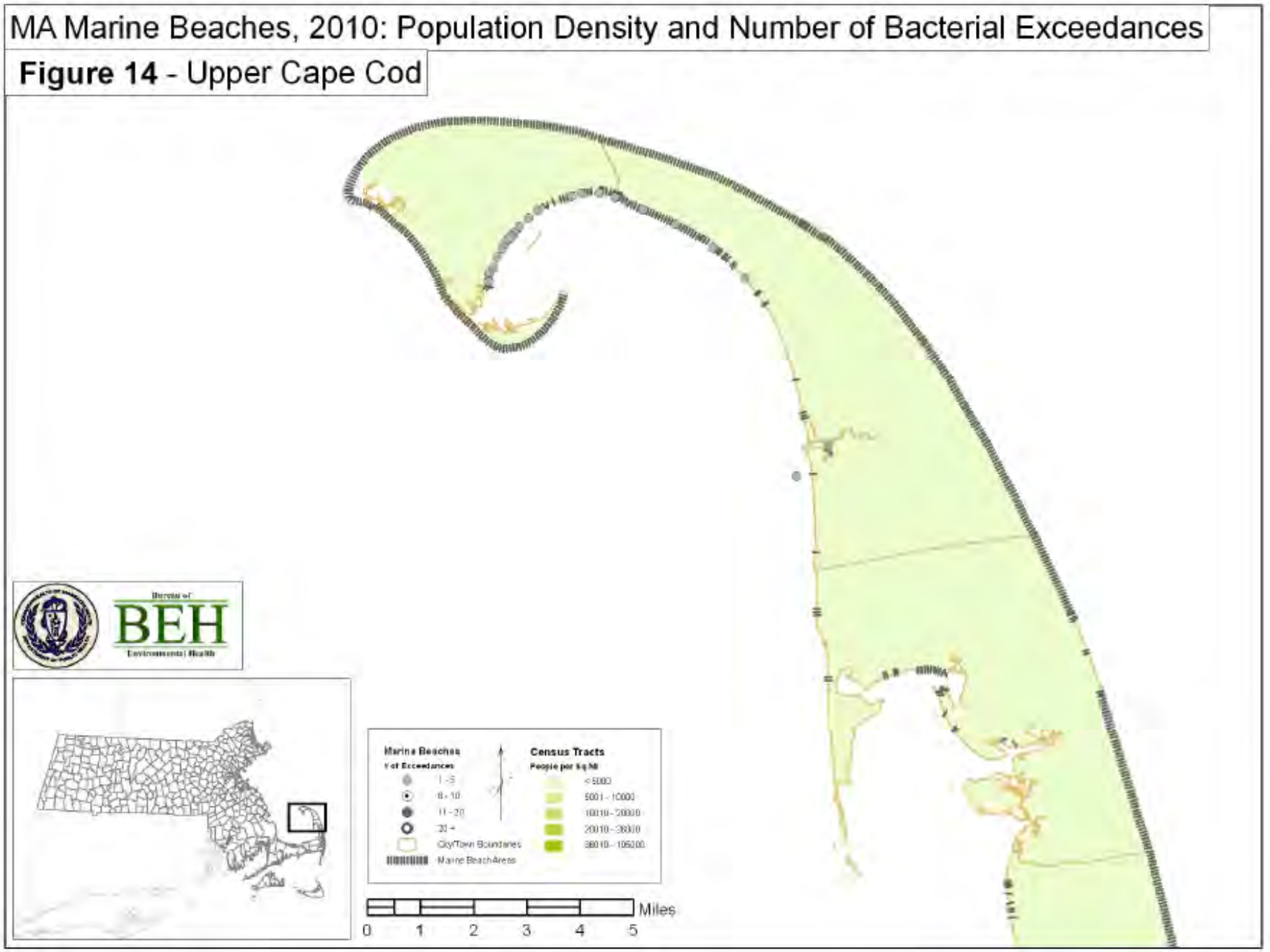
Figure 12 - Plymouth Area




MA Marine Beaches, 2010: Population Density and Number of Bacterial Exceedances
Figure 13 - Lower Cape Cod
Marine Beaches
# of Exceedances
1 - 5
6 - 10
11 - 20
20 +
City/Town Boundaries
Marine Beach Areas
Census Tracts
People per Sq Mi
< 5000
5001 - 10000
10010 - 20000
20010 - 36000
36010 - 105000
Bureau of
BEH
Environmental Health
0 1 2 3 4 5
Miles

MA Marine Beaches, 2010: Population Density and Number of Bacterial Exceedances

Figure 14 - Upper Cape Cod



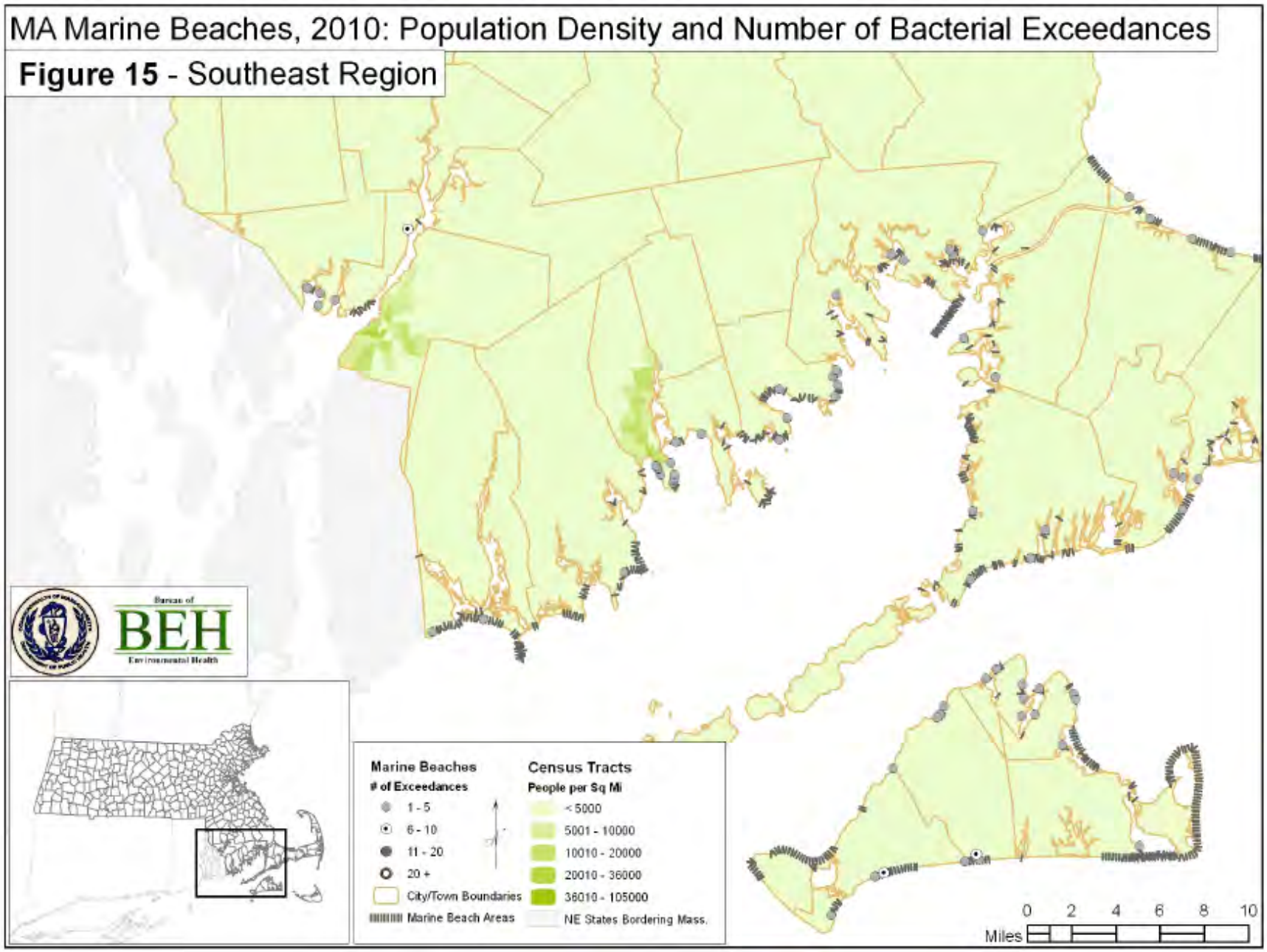
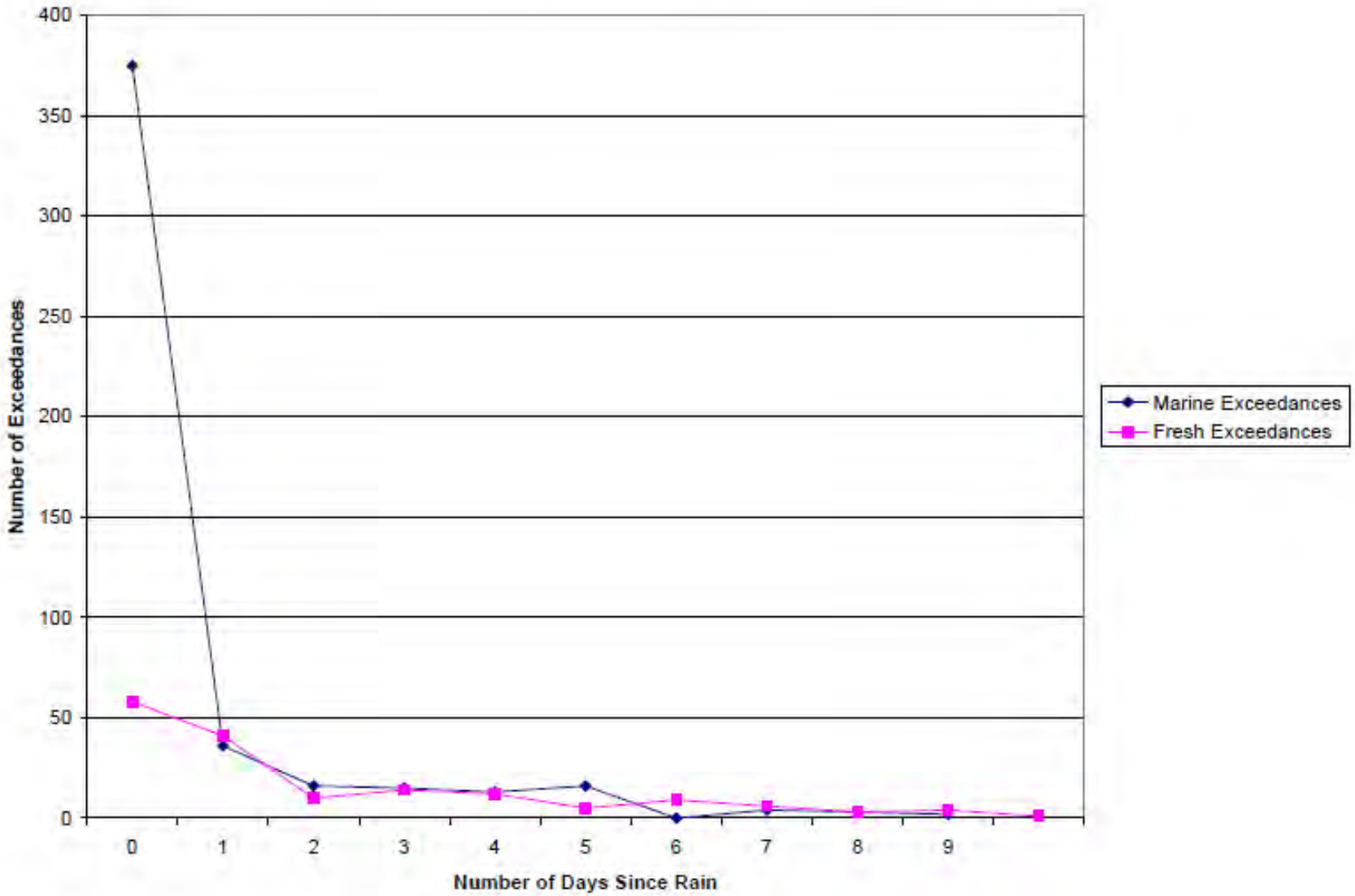

MA Marine Beaches, 2010: Population Density and Number of Bacterial Exceedances
Figure 15 - Southeast Region
Bureau of
BEH
Environmental Health
Marine Beaches
# of Exceedances
1 - 5
6 - 10
11 - 20
20 +
City/Town Boundaries
Marine Beach Areas
Census Tracts
People per Sq Mi
< 5000
5001 - 10000
10010 - 20000
20010 - 36000
36010 - 105000
NE States Bordering Mass.
0 2 4 6 8 10
Miles

Figure 16

MA Beaches (2010): Relationship Between Bacterial Exceedances and Days Since Last Rainfall



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APPENDICES

A. Massachusetts State Regulations

B. General Laws of Massachusetts

C. Massachusetts' Beach Act

D. Federal BEACH Act

E. MDPH Beach Sampling Field Data Form

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APPENDIX

A. GENERAL LAWS OF MASSACHUSETTS

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GENERAL LAWS OF MASSACHUSETTS

PART I.
ADMINISTRATION OF THE GOVERNMENT

TITLE XVI.
PUBLIC HEALTH

CHAPTER 111. PUBLIC HEALTH

DUTIES OF THE DEPARTMENT OF PUBLIC HEALTH

Chapter 111: Section 5S Public bathing waters; minimum sanitation standards; testing, monitoring and analysis; regulations

Section 5S. (a) As used in this section, the following words shall have the following meanings:--

“Bathing water”, fresh or salt water adjacent to any public bathing beach or semi-public bathing beach in the commonwealth.

“Department”, the department of public health.

“Public bathing beach”, a beach open to the general public, whether or not an entry fee is charged, that permits access to bathing waters.

“Semi-public bathing beach”, a bathing beach used in connection with a hotel, motel, trailer park, campground, apartment house, condominium, country club, youth club, school, camp or similar establishment where the primary purpose of the establishment is not the operation of the bathing beach, and where admission to the use of the bathing beach is included in the fee paid for use of the premises. A semi-public bathing beach shall also include a bathing beach operated and maintained solely for the use of members and guests of an organization that maintains such a bathing beach.

(b) The department, in consultation with local health officers, shall establish minimum sanitation standards to protect bathing waters from contamination from the following: (1) sludge deposits and solid refuse; (2) floating solid, grease or scum wastes; (3) oil, hazardous material, and heavy metals; and (4) bacteria, including but not limited to, total coliform, fecal coliform and enterococci bacteria.

(c) Such standards shall establish safe levels of human exposure to such contaminants, and shall further incorporate, at a minimum, the following provisions:--

(1) An officer or an agent of a local board of health shall test, monitor and analyze all bathing waters within its municipality. Every local board of health shall report the results from all testing, monitoring and analysis of bathing waters to the department. The department shall establish such reporting requirements and shall keep public records thereof. The department shall issue an annual report on the state of beach water quality

using data that has been reported to the department. The department shall make such data available to the public upon written request.

(2) The department shall determine at which sites to conduct testing and monitoring of bathing waters. The department shall consider, but not be limited to, the following factors in determining at which sites to conduct testing and monitoring of bathing waters: (i) prior testing results pursuant to this section for such bathing waters; (ii) the number of people who use the bathing beach annually; and (iii) whether the beach is located adjacent to a storm water drain, sewage, industrial and commercial wastewater discharges, or commercial, industrial and agricultural drains.

(d) The department shall determine at what frequency to conduct testing, monitoring and analysis of bathing waters. Testing, monitoring and analysis shall be conducted on at least a weekly basis during the bathing season, and at such times and under such conditions as shall be sufficient to protect public health and safety. The department may grant a variance from the weekly testing requirement for a public or semi-public bathing beach only where there is a documented history of no sources of pollution, both point and non-point, at the bathing beach, or where such pollution sources at the beach have been fully and completely remediated.

(e) The department shall require the posting of conspicuous warning signs to notify the public whenever there is a threat to human health or safety in bathing waters. Signs shall be posted at locations on the beach that are visible to the public in order to inform the public of the nature of the problem and the possibility of a threat to human health and safety. Signs shall be posted immediately after significant rainstorms at bathing beach locations where there has been a chronic history of violations of the department's minimum sanitation standards for bathing beaches after such rainstorms. When an officer or agent of a local board of health discovers a violation of such minimum sanitation standards, the officer or agent shall notify the department immediately, and in no event not later than 24 hours after such discovery. The local board of health shall also post signs immediately, and in no event not later than 24 hours after such a discovery.

(f) A person may request that a local board of health conduct testing, monitoring and analysis of bathing waters when there is a reasonable basis to believe that an alleged violation of such minimum sanitation standards established by this section has occurred. Local boards of health shall promptly review such requests and determine whether any such testing, monitoring and analysis is necessary to ensure the public health and safety in bathing waters.

(g) The owners of semi-public bathing beaches shall be required to pay for the costs of testing, monitoring and analysis of bathing waters adjacent to such semi-public bathing beaches.

(h) Local boards of health may enter into contractual agreements with owners of semi-public bathing beaches where the local board of health conducts testing, monitoring and analysis of such bathing waters.

(i) A municipality or state agency may adopt sanitation standards and testing, monitoring, and analysis requirements for bathing waters within its jurisdiction that are stricter than the

standards adopted by the department. In any case where a municipality or state agency adopts such stricter standards, any warning signs required by this section shall display the results of such stricter standards relative to the standards of the department.

(j) The testing, monitoring and analysis of bathing waters that are under the control of any state agency shall be conducted by that state agency. All such state agencies shall meet the requirements set forth by this section and the regulations promulgated by the department.

(k) The department may, subject to appropriation, award competitive grants to local boards of health in the form of a 50 per cent reimbursement for the testing, monitoring and analysis of bathing waters and to otherwise carry out the provisions of this section and the regulations promulgated there under. The department shall enter into a contractual agreement with a sole provider of testing services to be utilized by any state agency, and which may be utilized by any local board of health, to comply with the provisions of this section.

The department shall also ensure that the provisions of this section and the regulations promulgated there under are implemented in a cost effective manner by encouraging, where possible, regional approaches or other cost effective means of carrying out the purposes of this section.

(l) The department shall enforce the provisions of this section in accordance with the penalty and enforcement provisions of section 127A.

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B. MASSACHUSETTS STATE REGULATIONS

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105 CMR 445.000: MINIMUM STANDARDS FOR BATHING BEACHES (STATE SANITARY CODE, CHAPTER VII)

Section

445.001: Purpose

The purpose of 105 CMR 445.000 is to protect the health, safety and well-being of the users of bathing beaches, to establish acceptable standards for the operation of bathing water and to establish a procedure for informing the public of any bathing water closures.

445.002: Authority

105 CMR 445.000 is adopted under the authority of M.G.L. c. 111, ss. 3,5S and 127A.

445.003: Citation

105 CMR 445.000 shall be known and may be cited as 105 CMR 445.000: Minimum Standards for Bathing Beaches (State Sanitary Code, Chapter VII).

445.004: Scope

These regulations shall apply to all public and semi-public bathing beaches.

445.010: Definitions

The words, terms or phrases listed below, for the purpose of 105 CMR 445.000, shall be defined and interpreted as follows:

Bathing Beach means the land where access to the bathing water is provided. It shall not mean a swimming pool as defined in 105 CMR 435.000: Minimum Standards for Swimming Pools (State Sanitary Code, Chapter V).

Bathing Water means fresh or salt water adjacent to any public bathing beach or semi- public bathing beach at the location where it is used for bathing and swimming purposes.

Board of Health means the appropriate and legally designated health authority of the community, or other legally constituted governmental unit within the Commonwealth having the usual powers and duties of the board of health of a city or town, or its authorized agent or representative.

Department means the Department of Public Health.

Operator means any person who

(a) alone or jointly or severally with others has legal title to a bathing beach whether or not that person has legal title or control of the bathing water; or

(b) has care, charge or control of such bathing beach as agent or lessee of the owner or an independent contractor.

Person means any individual or any partnership, corporation, firm, association or group, or the Commonwealth, or any of its agencies, authorities or departments or any political subdivisions of the Commonwealth, including municipalities or other legal entity.

Public Bathing Beach means any bathing beach open to the general public, whether or not any entry fee is charged, that permits access to bathing waters.

Semi-Public Bathing Beach means any bathing beach that has common access and/or common use by a group or organization, which includes

(a) any bathing beach used in connection with a hotel, motel, a manufactured home park, campground, apartment house, condominium, country club, youth club, school, camp or other similar establishment where the primary purpose of the establishment is not the operation of the bathing beach, and where admission to the use of the bathing beach is included in the fee or consideration paid or given for the primary use of the premises.

(b) any bathing beach used in connection with a neighborhood or residential association

(c) any bathing beach operated solely for the use of members and guests of an organization that maintains such a bathing beach.

Private Bathing Beach means any bathing beach not considered to be a public or semi-public bathing beach.

Sanitary Survey means a written report, conducted by a Massachusetts Registered Sanitary Engineer, Certified Health Officer or Registered Sanitarian, documenting an examination of the bathing water and contiguous land masses for the purpose of identifying actual or potential sources of microbiological or chemical contamination. The sanitary survey shall also include a description of the water circulation associated with the bathing

area, the impact of bather load on the bathing beach area and any natural or artificial physical hazards.

445.020: Operation

No operator shall allow bathing or swimming in bathing water whenever in the opinion of the Board of Health or the Department the bathing water is or may be hazardous or unsafe for bathing or swimming. Bathing and swimming at public and semi-public beaches shall be limited to water areas that meet the requirements of 105 CMR 445.030. Any operator of a public or semi-public bathing beach shall comply with the requirements of 105 CMR 445.000.

(A) After May 15, 2010 no bathing beach shall be operated without a permanent sign posted at the entrance to each parking lot and/or each entrance to the beach. At minimum, the sign must state the dates of operation, the name and telephone number for the beach operator, permit number, and note that the beach is not monitored for bacteria outside of the specified date range.

(B) The bathing beach operator is responsible for providing and maintaining the sign required in 105 CMR 445.020 (A).

445.030: Bathing Water Quality

Bathing or swimming shall not be permitted in any bathing water where the quality of the water does not meet the standards established in 105 CMR 445.030(A), 445.030(B), or 445.030(C), and no bathing or swimming shall be allowed when the bathing water is determined by the Board of Health or the Department to be unfit or so subject to contamination as to constitute a menace to health. Bathing or swimming shall not be permitted in bathing waters when:

(A) Physical Quality.

(1) Sludge deposits, solid refuse, floating waste solids, oils, grease or scum are present; or

(2) There are safety hazards including, but not limited to, fast currents, sharp drop-offs or an unstable bottom in the wading area(s) or lack of water clarity.

(B) Bacteriological Quality.

(1) The results of a sanitary survey or other information indicates that sewage or other hazardous substances may be discharged into the bathing water to a degree considered by the Board of Health or the Department to be of public health significance; or

(2) Epidemiological evidence discloses the prevalence of an infectious disease or other health condition which is considered to be related to the use of the bathing water and is considered by the Board of Health or the Department to be of public health significance; or

(3) The bacteriological quality of the bathing water is unacceptable as determined by laboratory analysis for the appropriate indicator organisms specified in 105 CMR 445.031 and exceeds the standards established therein.

(C) Oil. Hazardous Materials, or Heavy Metals.

(1) Oil, hazardous materials, or heavy metals are present in excess of surface water quality standards or guidelines established by the United

States Environmental Protection Agency or the Massachusetts Department of Environmental Protection.

445.031: Indicator Organisms

(A) For marine water, the indicator organism shall be Enterococci.

(1) No single Enterococci sample shall exceed 104 colonies per 100 ml. and the geometric mean of the most recent five (5) Enterococci levels within the same bathing season shall not exceed 35 colonies per 100 ml.

(B) For fresh water, the indicator organisms shall be *E. coli* or Enterococci.

(1) No single *E. coli* sample shall exceed 235 colonies per 100 ml. and the geometric mean of the most recent five *E. coli* samples within the same bathing season shall not exceed 126 colonies per 100 ml; or

(2) No single Enterococci sample shall exceed 61 colonies per 100 ml. and the geometric mean of the most recent five (5) Enterococci samples within the same bathing season shall not exceed 33 colonies per 100 ml.

445.032 Collection of Bathing Water Samples

(A) Location.

(1) The Board of Health, for public and semi-public bathing beaches that are not operated by the Commonwealth shall approve sampling locations at each bathing beach in its jurisdiction. (2) The Department, for bathing beaches that are operated by the Commonwealth, shall approve sampling locations at each bathing beach in its jurisdiction.

(3) Samples of bathing water shall be taken at locations within areas of greatest bather load.

(4) Additional samples shall also be obtained at any critical location subject to contamination from business developments, dwellings, streams, sewer outfall pipes or other sources.

(5) At locations where there are multiple beach operators within 500 meters of shoreline, the beach operators may designate a single sampling location, known as a surrogate sampling point, which will provide sufficient protection to public health as approved by the local Board of Health. These locations must meet the following criteria:

(a) Bathing beaches must not be physically separated from the surrogate sampling point by natural or man-made formations. These may include:

(I) embayments or peninsulas

(II) streams, rivers, or creeks

(III) jetties or other bounding structures

(IV) stormwater or combined-sewer overflow outfalls

(b) At any time the results of a bacterial test exceed the levels in 105 CMR 445.030, all beach operators using a surrogate sampling point must comply with 445.040.

(c) Each beach operator utilizing a surrogate sampling point will be equally responsible for the costs of testing, monitoring and analysis.

(d) Thirty days prior to the beginning of the beach season, the local Board of Health must notify the Department of the beach operators utilizing a surrogate sampling point, their location, and the location of the surrogate sampling point.

(e) The local Board of Health or the Department may require any or all of the beach operators to discontinue the use of surrogate sampling points at any time the bathing waters are found to be unfit, subject to contamination as to constitute a menace to public health, or do not provide sufficient protection to protect public health.

(B) Sample Collection. Samples shall be obtained in accordance with the procedures recommended by the most recent edition of the Standard Methods for the Examination of Water and Waste Water of the American Public Health Association or as approved by the United States Environmental Protection Agency.

(C) Frequency.

(1) The Board of Health, its agent, or any other authorized person shall collect the bacteriologic samples:

(a) Within the five days immediately preceding the opening of the bathing season; and

(b) At least weekly during the bathing season at a time and day approved by the Board of Health or the Department; and

(c) Prior to reopening a beach after closure due to the presence or suspected presence of any of the conditions specified in 105 CMR 445.030(B).

(2) Testing for oil, hazardous materials, or heavy metals shall only be required if the operator, the Board of Health, or the Department has information indicating possible contamination of the bathing beach or bathing waters from oil, hazardous materials or heavy metals.

(D) Field Data. Physical conditions at the time of sampling shall be noted and recorded on a form provided by the Department.

(E) Personnel. Samples shall be taken by the Board of Health, the Department, their duly authorized representatives or other qualified persons as determined by the Board of Health or the Department.

445.033: Laboratory Analysis and Reporting

(A) Laboratory Analysis. -Laboratory analysis of bathing water as required by 105 CMR 445.000 shall be conducted in accordance with the most recent edition of the Standard Methods for Examination of Water and Waste Water of the American Public Health Association or as approved by the United States Environmental Protection Agency.

(B) Reporting.

(1) Routine Reporting by Operators. Any operator or authorized agent of a public bathing beach, except public bathing beaches operated by the Commonwealth, and any operator or authorized agent of a semi-public bathing beach shall report the certified results of all testing, monitoring and analysis of bathing water to the Board of Health within five (5) days of receipt of the results from the laboratory.

(2) Reporting by Operators of Levels Exceeding the Established Standards. Any operator or authorized agent of a public or semi-public bathing beach shall immediately and in no event later than 12 hours after the results are

validated report to the Board of Health the results of all testing, monitoring and analysis of bathing water found to exceed the standards established in 105 CMR 445.030.

(3) Reporting by the Board of Health. The Board of Health or its authorized agent shall report the results of all testing, monitoring and analysis of bathing water to the Department no later than October 31 of each year.

445.034 Bathing Beaches Operated by the Commonwealth

State agencies that own or operate a bathing beach shall conduct or cause to be conducted all testing, monitoring, and analysis of bathing water at such bathing beach in accordance with these regulations. If the results of such testing, monitoring and analysis are found to exceed the standards established in 105 CMR 445.030, state agencies shall immediately, and in no event later than 12 hours, report the results of such testing, monitoring and analysis to the Department and the Board of Health in the community where the bathing beach is located. All other results shall be reported to the Department no later than October 31 of each year.

445.035: Sampling and Analysis at Semi-Public Beaches

(A) The operators of semi-public bathing beaches shall pay for the costs of testing, monitoring and analysis of bathing waters adjacent to such semi-public bathing beaches.

(B) Operators of semi-public bathing beaches may enter into contractual agreements with the Board of Health to have the testing, monitoring and analysis of bathing water conducted by the Board of Health, the Department or other qualified persons as determined by the Board of Health or the Department.

445.036: Public Request for Testing

Any person may request that the Board of Health, or in the case of a bathing beach operated by the Commonwealth, the state agency or the Department, conduct testing, monitoring, and analysis of public and semi-public bathing waters when there is reasonable basis to believe that an alleged violation of 105 CMR 445.000 has occurred. The Board of Health or the Department, as appropriate, shall promptly review such requests and determine whether any such testing, monitoring, and analysis is necessary to ensure the public health and safety of bathing waters.

445.040: Posting and Reopening Notifications

(A) Posting. Whenever the bathing water quality does not meet the requirements of 105 CMR 445.030, 105 CMR 445.032, or after any significant rainstorm at a bathing beach where there has been a history of violations of the water quality requirements contained in 105 CMR 445.030, the Board of Health, its agent, or any other authorized person shall immediately, and in no event later than 24 hours, notify the Department, and post or cause to be posted, a sign, or signs, at the entrance to each parking lot and each entrance to the beach stating:

WARNING! NO SWIMMING
SWIMMING MAY CAUSE ILLNESS

and a graphic depiction of a swimmer in a red circle with a diagonal hatch mark. The sign shall also contain the reason for the warning, the date of the posting and the name and telephone number of the board of health. For conditions solely related to physical hazards, the word “injury” may be substituted for “illness” in the required notification.

(B) Reopening. Prior to reopening bathing water posted due to a violation or an assumption of a violation of the standards established in 105 CMR 445.030(B), the Board of Health, its agent, or any other authorized person shall verify that the certified results of the laboratory analysis are less than the standard specified in 105 CMR 445.031. Prior to reopening bathing water posted due to a violation or an assumption of a violation of the standards established in 105 CMR 445.030(A) or 105 CMR 445.030(C), the Board of Health, its agent, or any other authorized person shall confirm by analytic testing or other verifiable means that conditions no longer constitute a threat to human health or safety. The operator of any state operated bathing beach shall notify the Department and the Board of Health within 24 hours, or the next business day, of the reopening of the bathing water.

445.100: Variance

(A) The Board of Health may grant a variance from the provisions of 105 CMR 445.000 for any public or semi-public bathing beach not operated by the Commonwealth. The Department may grant a variance for any bathing beach operated by the Commonwealth. In granting a variance, the Board of Health and the Department shall review available epidemiological data and a written sanitary survey of the bathing beach, as provided by the operator. The survey shall include:

(1) All possible sources of contamination, both bacterial and chemical, on the watershed tributary to the bathing beach including the location and volume of:

(a) sewage and industrial wastewater discharges;
(b) storm water overflows;
(c) bird and animal populations; and
(d) commercial and agricultural drainage.

(2) The volume and quality of the diluting water, water depth, water surface area, tides and confluence of tributaries, water currents and prevailing winds.

(B) Any variance granted by the Board of Health shall specify the required bacteriological testing schedule, provided that the frequency of bacteriological testing shall not be less than once prior to the bathing season and at least every 30 days thereafter throughout the duration of the bathing season.

(C) Any variance granted by a Board of Health or the Department shall expire:

(1) at any time as determined by the Board of Health or the Department, but in no instance greater than four years, at which time the operator may apply for an extension, or

(2) at any time the results of bacterial testing exceed the levels specified in 105 CMR 445.031.

(D) No variance from the requirement of weekly testing shall be granted until the applicant provides the Board of Health or the Department with water quality data collected for at least two complete and consecutive bathing seasons.

(E) In granting a variance, the Board of Health or the Department must determine that the enforcement of 105 CMR 445.000 would not serve a significant public health purpose and that the granting of the variance will not conflict with the intent and spirit of these minimum standards. Any variance or other modification authorized to be made by these regulations may be subject to such qualification, revocation, suspension, or other expiration as the Board of Health or the Department expresses in its grant. A variance or other modification authorized to be made by this regulation may otherwise be revoked, modified, or suspended in whole or in part, only after the holder thereof has been notified in writing and has been given the opportunity to be heard.

445.101: Variance to be in Writing

(A) Any variance granted by the Board of Health or the Department shall be in writing. Any denial for a variance shall also be in writing and shall contain a brief statement of the reasons for denial. A copy of each variance shall be conspicuously posted for 30 days following its issuance and shall, while it is in effect, be available to the public at all reasonable hours in the office of the clerk of the community, or in the office of the Board of Health and in the case of a variance by the Department, at the Department.

(B) The Board of Health shall submit to the Department a notice of the intent to grant a variance. The Department shall approve, disapprove, or modify the variance within 45 days from receipt thereof. If the Department fails to comment within 45 days, its approval shall be presumed. No alteration of any requirement in these regulations shall be made under any variance until the Department approves it or 45 days has elapsed without comment, unless the Board of Health certifies in writing to the Department that an emergency exists.

445.300: Permit - Issuance

(A) Permit Required to Operate. After May 28, 2010 no person shall commence the operation of, or continue to operate, a bathing beach unless the operator is the holder of a valid permit issued by the Board of Health or the Department.

(B) Application. By no later than April 26, 2010, any person currently operating a bathing beach desiring to continue operating said beach shall file a written application for a permit with the Board of Health, on forms prepared by the Department and obtained from the Board of Health. Any information as required by the Board of Health and payment of any fee required by local bylaw, ordinance or regulation shall accompany the application.

(C) Permit. Upon receipt of a completed application form and any applicable fee, the Board of Health shall review the information to determine if the beach meets the criteria established in 105 CMR 445.000. If so, the Board of Health shall make a determination within 30 days for existing applicants or 60 days for new applicants whether to issue a permit to the operator or the proposed operator to operate a bathing beach, on a form provided by the Department.

(D) Expiration and Renewal of Permit.

(1) A permit shall expire no later than two years from the date issued.

(2) A bathing beach permit may be renewed by applying at least 30 days prior to the expiration of the permit. Renewal application forms prepared by the Department shall be obtained from the Board of Health.
(3) Upon receipt of a completed renewal application form and any applicable fee, the Board of Health shall issue a renewal permit, provided that the conditions for operation set forth in 105 CMR 445.000 are satisfied. The Board of Health may suspend, revoke, or refuse to renew a permit to an operator who is in repeated non-compliance with 105 CMR 445.000.
(4) If a permit expires while a timely filed application for renewal is pending, the bathing beach shall continue to operate under the expired permit until a new permit is issued or the renewal application is denied.

445.400: General Administration

The provisions of 105 CMR 400.000 shall govern the administration and enforcement of 105 CMR 445.000.

445.500: Severability

In the event that any section of 105 CMR 445.000 is found to be invalid or unconstitutional, the remaining sections shall not be affected and shall remain in full force and effect. To this end, the provisions of this regulation are hereby declared severable.

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C. FEDERAL BEACH ACT

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BEACHES ENVIRONMENTAL ASSESSMENT AND COASTAL HEALTH ACT OF 2000

Public Law 106–284
106th Congress

An Act

Oct. 10, 2000
[H.R. 999]

To amend the Federal Water Pollution Control Act to improve the quality of coastal recreation waters, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Beaches Environmental Assessment and Coastal Health Act of 2000.
Inter-governmental relations.
Public health and safety.
33 USC 1251 note.

SECTION 1. SHORT TITLE.

This Act may be cited as the "Beaches Environmental Assessment and Coastal Health Act of 2000".

SEC. 2. ADOPTION OF COASTAL RECREATION WATER QUALITY CRITERIA AND STANDARDS BY STATES.

Section 303 of the Federal Water Pollution Control Act (33 U.S.C. 1313) is amended by adding at the end the following:

"(i) COASTAL RECREATION WATER QUALITY CRITERIA.—

Deadlines.

"(1) ADOPTION BY STATES.—

"(A) INITIAL CRITERIA AND STANDARDS.—Not later than 42 months after the date of the enactment of this subsection, each State having coastal recreation waters shall adopt and submit to the Administrator water quality criteria and standards for the coastal recreation waters of the State for those pathogens and pathogen indicators for which the Administrator has published criteria under section 304(a).

"(B) NEW OR REVISED CRITERIA AND STANDARDS.—Not later than 36 months after the date of publication by the Administrator of new or revised water quality criteria under section 304(a)(9), each State having coastal recreation waters shall adopt and submit to the Administrator new or revised water quality standards for the coastal recreation waters of the State for all pathogens and pathogen indicators to which the new or revised water quality criteria are applicable.

"(2) FAILURE OF STATES TO ADOPT.—

"(A) IN GENERAL.—If a State fails to adopt water quality criteria and standards in accordance with paragraph (1)(A) that are as protective of human health as the criteria for pathogens and pathogen indicators for coastal recreation waters published by the Administrator, the Administrator shall promptly propose regulations for the State setting forth revised or new water quality standards for pathogens and pathogen indicators described in paragraph (1)(A) for coastal recreation waters of the State.

"(B) EXCEPTION.—If the Administrator proposes regulations for a State described in subparagraph (A) under subsection (c)(4)(B), the Administrator shall publish any revised or new standard under this subsection not later than 42 months after the date of the enactment of this subsection. Publication.

"(3) APPLICABILITY.—Except as expressly provided by this subsection, the requirements and procedures of subsection (c) apply to this subsection, including the requirement in subsection (c)(2)(A) that the criteria protect public health and welfare.".

SEC. 3. REVISIONS TO WATER QUALITY CRITERIA.

(a) STUDIES CONCERNING PATHOGEN INDICATORS IN COASTAL RECREATION WATERS.—Section 104 of the Federal Water Pollution Control Act (33 U.S.C. 1254) is amended by adding at the end the following:

"(v) STUDIES CONCERNING PATHOGEN INDICATORS IN COASTAL RECREATION WATERS.—Not later than 18 months after the date of the enactment of this subsection, after consultation and in cooperation with appropriate Federal, State, tribal, and local officials (including local health officials), the Administrator shall initiate, and, not later than 3 years after the date of the enactment of this subsection, shall complete, in cooperation with the heads of other Federal agencies, studies to provide additional information for use in developing— Deadlines.

"(1) an assessment of potential human health risks resulting from exposure to pathogens in coastal recreation waters, including nongastrointestinal effects;

"(2) appropriate and effective indicators for improving detection in a timely manner in coastal recreation waters of the presence of pathogens that are harmful to human health;

"(3) appropriate, accurate, expeditious, and cost-effective methods (including predictive models) for detecting in a timely manner in coastal recreation waters the presence of pathogens that are harmful to human health; and

"(4) guidance for State applica 104 the criteria for pathogens and pathogen indicators to be published under section 304(a)(9) to account for the diversity of geographic and aquatic conditions.".

(b) REVISED CRITERIA.—Section 304(a) of the Federal Water Pollution Control Act (33 U.S.C. 1314(a)) is amended by adding at the end the following:

"(9) REVISED CRITERIA FOR COASTAL RECREATION WATERS.— Deadlines.

"(A) IN GENERAL.—Not later than 5 years after the date of the enactment of this paragraph, after consultation and in cooperation with appropriate Federal, State, tribal, and local officials (including local health officials), the Administrator shall publish new or revised water quality criteria for pathogens and pathogen indicators (including a revised list of testing methods, as appropriate), based on the results of the studies conducted under section 104(v), for the purpose of protecting human health in coastal recreation waters. Publication.

"(B) REVIEWS.—Not later than the date that is 5 years after the date of publication of water quality criteria under this paragraph, and at least once every 5 years thereafter,

the Administrator shall review and, as necessary, revise the water quality criteria.".

SEC. 4. COASTAL RECREATION WATER QUALITY MONITORING AND NOTIFICATION.

Title IV of the Federal Water Pollution Control Act (33 U.S.C. 1341 et seq.) is amended by adding at the end the following:

33 USC 1346.

"SEC. 406. COASTAL RECREATION WATER QUALITY MONITORING AND NOTIFICATION.

Deadline. Publication.

"(a) MONITORING AND NOTIFICATION.—

"(1) IN GENERAL.—Not later than 18 months after the date of the enactment of this section, after consultation and in cooperation with appropriate Federal, State, tribal, and local officials (including local health officials), and after providing public notice and an opportunity for comment, the Administrator shall publish performance criteria for—

"(A) monitoring and assessment (including specifying available methods for monitoring) of coastal recreation waters adjacent to beaches or similar points of access that are used by the public for attainment of applicable water quality standards for pathogens and pathogen indicators; and

"(B) the prompt notification of the public, local governments, and the Administrator of any exceeding of or likelihood of exceeding applicable water quality standards for coastal recreation waters described in subparagraph (A).

"(2) LEVEL OF PROTECTION.—The performance criteria referred to in paragraph (1) shall provide that the activities described in subparagraphs (A) and (B) of that paragraph shall be carried out as necessary for the protection of public health and safety.

"(b) PROGRAM DEVELOPMENT AND IMPLEMENTATION GRANTS.—

"(1) IN GENERAL.—The Administrator may make grants to States and local governments to develop and implement programs for monitoring and notification for coastal recreation waters adjacent to beaches or similar points of access that are used by the public.

"(2) LIMITATIONS.—

"(A) IN GENERAL.—The Administrator may award a grant to a State or a local government to implement a monitoring and notification program if—

"(i) the program is consistent with the performance criteria published by the Administrator under subsection (a);

"(ii) the State or local government prioritizes the use of grant funds for particular coastal recreation waters based on the use of the water and the risk to human health presented by pathogens or pathogen indicators;

"(iii) the State or local government makes available to the Administrator the factors used to prioritize the use of funds under clause (ii);

"(iv) the State or local government provides a list of discrete areas of coastal recreation waters that are subject to the program for monitoring and notification for which the grant is provided that specifies any coastal recreation waters for which fiscal constraints

will prevent consistency with the performance criteria under subsection (a); and

"(v) the public is provided an opportunity to review the program through a process that provides for public notice and an opportunity for comment.

"(B) GRANTS TO LOCAL GOVERNMENTS.—The Administrator may make a grant to a local government under this subsection for implementation of a monitoring and notification program only if, after the 1-year period beginning on the date of publication of performance criteria under subsection (a)(1), the Administrator determines that the State is not implementing a program that meets the requirements of this subsection, regardless of whether the State has received a grant under this subsection.

"(3) OTHER REQUIREMENTS.—

"(A) REPORT.—A State recipient of a grant under this subsection shall submit to the Administrator, in such format and at such intervals as the Administrator determines to be appropriate, a report that describes—

"(i) data collected as part of the program for monitoring and notification as described in subsection (c); and

"(ii) actions taken to notify the public when water quality standards are exceeded.

"(B) DELEGATION.—A State recipient of a grant under this subsection shall identify each local government to which the State has delegated or intends to delegate responsibility for implementing a monitoring and notification program consistent with the performance criteria published under subsection (a) (including any coastal recreation waters for which the authority to implement a monitoring and notification program would be subject to the delegation).

"(4) FEDERAL SHARE.—

"(A) IN GENERAL.—The Administrator, through grants awarded under this section, may pay up to 100 percent of the costs of developing and implementing a program for monitoring and notification under this subsection.

"(B) NON-FEDERAL SHARE.—The non-Federal share of the costs of developing and implementing a monitoring and notification program may be—

"(i) in an amount not to exceed 50 percent, as determined by the Administrator in consultation with State, tribal, and local government representatives; and

"(ii) provided in cash or in kind.

"(c) CONTENT OF STATE AND LOCAL GOVERNMENT PROGRAMS.—As a condition of receipt of a grant under subsection (b), a State or local government program for monitoring and notification under this section shall identify—

"(1) lists of coastal recreation waters in the State, including coastal recreation waters adjacent to beaches or similar points of access that are used by the public;

"(2) in the case of a State program for monitoring and notification, the process by which the State may delegate to local governments responsibility for implementing the monitoring and notification program;

"(3) the frequency and location of monitoring and assessment of coastal recreation waters based on—

"(A) the periods of recreational use of the waters;

"(B) the nature and extent of use during certain periods;

"(C) the proximity of the waters to known point sources and nonpoint sources of pollution; and

"(D) any effect of storm events on the waters;

"(4)(A) the methods to be used for detecting levels of pathogens and pathogen indicators that are harmful to human health; and

"(B) the assessment procedures for identifying short-term increases in pathogens and pathogen indicators that are harmful to human health in coastal recreation waters (including increases in relation to storm events);

"(5) measures for prompt communication of the occurrence, nature, location, pollutants involved, and extent of any exceeding of, or likelihood of exceeding, applicable water quality standards for pathogens and pathogen indicators to—

"(A) the Administrator, in such form as the Administrator determines to be appropriate; and

"(B) a designated official of a local government having jurisdiction over land adjoining the coastal recreation waters for which the failure to meet applicable standards is identified;

"(6) measures for the posting of signs at beaches or similar points of access, or functionally equivalent communication measures that are sufficient to give notice to the public that the coastal recreation waters are not meeting or are not expected to meet applicable water quality standards for pathogens and pathogen indicators; and

"(7) measures that inform the public of the potential risks associated with water contact activities in the coastal recreation waters that do not meet applicable water quality standards.

Deadline.

"(d) FEDERAL AGENCY PROGRAMS.—Not later than 3 years after the date of the enactment of this section, each Federal agency that has jurisdiction over coastal recreation waters adjacent to beaches or similar points of access that are used by the public shall develop and implement, through a process that provides for public notice and an opportunity for comment, a monitoring and notification program for the coastal recreation waters that—

"(1) protects the public health and safety;

"(2) is consistent with the performance criteria published under subsection (a);

Reports.

"(3) includes a completed report on the information specified in subsection (b)(3)(A), to be submitted to the Administrator; and

"(4) addresses the matters specified in subsection (c) .

Public information.

"(e) DATABASE.—The Administrator shall establish, maintain, and make available to the public by electronic and other means a national coastal recreation water pollution occurrence database that provides—

"(1) the data reported to the Administrator under subsections (b)(3)(A)(i) and (d)(3); and

"(2) other information concerning pathogens and pathogen indicators in coastal recreation waters that—

"(A) is made available to the Administrator by a State or local government, from a coastal water quality monitoring program of the State or local government; and

"(B) the Administrator determines should be included.

"(f) TECHNICAL ASSISTANCE FOR MONITORING FLOATABLE MATERIAL.—The Administrator shall provide technical assistance to States and local governments for the development of assessment and monitoring procedures for floatable material to protect public health and safety in coastal recreation waters.

"(g) LIST OF WATERS.—

"(1) IN GENERAL.—Beginning not later than 18 months after the date of publication of performance criteria under subsection (a), based on information made available to the Administrator, the Administrator shall identify, and maintain a list of, discrete coastal recreation waters adjacent to beaches or similar points of access that are used by the public that— Deadline.

"(A) specifies any waters described in this paragraph that are subject to a monitoring and notification program consistent with the performance criteria established under subsection (a); and

"(B) specifies any waters described in this paragraph for which there is no monitoring and notification program (including waters for which fiscal constraints will prevent the State or the Administrator from performing monitoring and notification consistent with the performance criteria established under subsection (a)).

"(2) AVAILABILITY.—The Administrator shall make the list described in paragraph (1) available to the public through— Public information.

"(A) publication in the Federal Register; and Federal Register, publication.

"(B) electronic media.

"(3) UPDATES.—The Administrator shall update the list described in paragraph (1) periodically as new information becomes available.

"(h) EPA IMPLEMENTATION.—In the case of a State that has no program for monitoring and notification that is consistent with the performance criteria published under subsection (a) after the last day of the 3-year period beginning on the date on which the Administrator lists waters in the State under subsection (g)(1)(B), the Administrator shall conduct a monitoring and notification program for the listed waters based on a priority ranking established by the Administrator using funds appropriated for grants under subsection (i)—

"(1) to conduct monitoring and notification; and

"(2) for related salaries, expenses, and travel.

"(i) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated for making grants under subsection (b), including implementation of monitoring and notification programs by the Administrator under subsection (h), $30,000,000 for each of fiscal years 2001 through 2005.".

SEC. 5. DEFINITIONS.

Section 502 of the Federal Water Pollution Control Act (33 U.S.C. 1362) is amended by adding at the end the following:

"(21) COASTAL RECREATION WATERS.—

"(A) IN GENERAL.—The term 'coastal recreation waters' means—

"(i) the Great Lakes; and

"(ii) marine coastal waters (including coastal estuaries) that are designated under section 303(c) by a State for use for swimming, bathing, surfing, or similar water contact activities.

"(B) EXCLUSIONS.—The term 'coastal recreation waters' does not include—

"(i) inland waters; or

"(ii) waters upstream of the mouth of a river or stream having an unimpaired natural connection with the open sea.

"(22) FLOATABLE MATERIAL.—

"(A) IN GENERAL.—The term 'floatable material' means any foreign matter that may float or remain suspended in the water column.

"(B) INCLUSIONS.—The term 'floatable material' includes—

"(i) plastic;

"(ii) aluminum cans;

"(iii) wood products;

"(iv) bottles; and

"(v) paper products.

"(23) PATHOGEN INDICATOR.—The term 'pathogen indicator' means a substance that indicates the potential for human infectious disease.".

SEC. 6. INDIAN TRIBES.

Section 518(e) of the Federal Water Pollution Control Act (33 U.S.C. 1377(e)) is amended by striking "and 404" and inserting "404, and 406".

33 USC 1375a.

SEC. 7. REPORT.

Deadline.

(a) IN GENERAL.—Not later than 4 years after the date of the enactment of this Act, and every 4 years thereafter, the Administrator of the Environmental Protection Agency shall submit to Congress a report that includes—

(1) recommendations concerning the need for additional water quality criteria for pathogens and pathogen indicators and other actions that should be taken to improve the quality of coastal recreation waters;

(2) an evaluation of Federal, State, and local efforts to implement this Act, including the amendments made by this Act; and

(3) recommendations on improvements to methodologies and techniques for monitoring of coastal recreation waters.

(b) COORDINATION.—The Administrator of the Environmental Protection Agency may coordinate the report under this section with other reporting requirements under the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.).

SEC. 8. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to carry out the provisions of this Act, including the amendments made by this Act, for which amounts are not otherwise specifically authorized to be appropriated, such sums as are necessary for each of fiscal years 2001 through 2005.

Approved October 10, 2000.

LEGISLATIVE HISTORY—H.R. 999 (S. 522):

HOUSE REPORTS: No. 106–98 (Comm. on Transportation and Infrastructure).
SENATE REPORTS: No. 106–366 accompanying S. 522 (Comm. on Environment and Public Works).
CONGRESSIONAL RECORD:
Vol. 145 (1999): Apr. 22, considered and passed House.
Vol. 146 (2000): Sept. 21, considered and passed Senate, amended.
Sept. 26, House concurred in Senate amendment.
WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 36 (2000):
Oct. 10, Presidential statement.

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D. MASSACHUSETTS' BEACH ACT

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Chapter 248 of the Acts of 2000

AN ACT RELATIVE TO MINIMUM STANDARDS FOR PUBLIC BATHING WATERS.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. Chapter 111 of the General Laws is hereby amended by inserting after section 5R the following section:-

Section 5S. (a) As used in this section, the following words shall have the following meanings:-

"Bathing water", fresh or salt water adjacent to any public bathing beach or semi-public bathing beach in the commonwealth.

"Department", the department of public health.

"Public bathing beach", a beach open to the general public, whether or not an entry fee is charged, that permits access to bathing waters.

"Semi-public bathing beach", a bathing beach used in connection with a hotel, motel, trailer park, campground, apartment house, condominium, country club, youth club, school, camp or similar establishment where the primary purpose of the establishment is not the operation of the bathing beach, and where admission to the use of the bathing beach is included in the fee paid for use of the premises. A semi-public bathing beach shall also include a bathing beach operated and maintained solely for the use of members and guests of an organization that maintains such a bathing beach.

(b) The department, in consultation with local health officers, shall establish minimum sanitation standards to protect bathing waters from contamination from the following: (1) sludge deposits and solid refuse; (2) floating solid, grease or scum wastes; (3) oil, hazardous material, and heavy metals; and (4) bacteria, including but not limited to, total coliform, fecal coliform and enterococci bacteria.

(c) Such standards shall establish safe levels of human exposure to such contaminants, and shall further incorporate, at a minimum, the following provisions:-

(1) An officer or an agent of a local board of health shall test, monitor and analyze all bathing waters within its municipality. Every local board of health shall report the results from all testing, monitoring and analysis of bathing waters to the department. The department shall establish such reporting requirements and shall keep public records thereof. The department shall issue an annual report on the state of beach water quality using data that has been reported to the department. The department shall make such data available to the public upon written request.

(2) The department shall determine at which sites to conduct testing and monitoring of bathing waters. The department shall consider, but not be limited to, the following factors in determining at which sites to conduct testing and monitoring of bathing waters: (i) prior testing results pursuant to this section for such bathing waters; (ii) the number of people who use the bathing beach annually; and (iii) whether the beach is located adjacent to a storm water drain, sewage, industrial and commercial wastewater discharges, or commercial, industrial and agricultural drains.

(d) The department shall determine at what frequency to conduct testing, monitoring and analysis of bathing waters. Testing, monitoring and analysis shall be conducted on at least a weekly basis during the bathing season, and at such times and under such conditions as shall be sufficient to protect public health and safety. The department may grant a variance from the weekly testing requirement for a public or semi-public bathing beach only where there is a documented history of no sources of pollution, both point and non-point, at the bathing beach, or where such pollution sources at the beach have been fully and completely remediated.

(e) The department shall require the posting of conspicuous warning signs to notify the public whenever there is a threat to human health or safety in bathing waters. Signs shall be posted at locations on the beach that are visible to the public in order to inform the public of the nature of the problem and the possibility of a threat to human health and safety. Signs shall be posted immediately after significant rainstorms at bathing beach locations where there has been a chronic history of violations of the department's minimum sanitation standards for bathing beaches after such rainstorms. When an officer or agent of a local board of health discovers a violation of such minimum sanitation standards, the officer or agent shall notify the department immediately, and in no event not later than 24 hours after such discovery. The local board of health shall also post signs immediately, and in no event not later than 24 hours after such a discovery.

(f) A person may request that a local board of health conduct testing, monitoring and analysis of bathing waters when there is a reasonable basis to believe that an alleged violation of such minimum sanitation standards established by this section has occurred. Local boards of health shall promptly review such requests and determine whether any such testing, monitoring and analysis is necessary to ensure the public health and safety in bathing waters.

(g) The owners of semi-public bathing beaches shall be required to pay for the costs of testing, monitoring and analysis of bathing waters adjacent to such semi-public bathing beaches.

(h) Local boards of health may enter into contractual agreements with owners of semi-public bathing beaches where the local board of health conducts testing, monitoring and analysis of such bathing waters.

(i) A municipality or state agency may adopt sanitation standards and testing, monitoring, and analysis requirements for bathing waters within its jurisdiction that are stricter than the standards adopted by the department. In any case where a municipality

or state agency adopts such stricter standards, any warning signs required by this section shall display the results of such stricter standards relative to the standards of the department.

(j) The testing, monitoring and analysis of bathing waters that are under the control of any state agency shall be conducted by that state agency. All such state agencies shall meet the requirements set forth by this section and the regulations promulgated by the department.

(k) The department may, subject to appropriation, award competitive grants to local boards of health in the form of a 50 per cent reimbursement for the testing, monitoring and analysis of bathing waters and to otherwise carry out the provisions of this section and the regulations promulgated there under. The department shall enter into a contractual agreement with a sole provider of testing services to be utilized by any state agency, and which may be utilized by any local board of health, to comply with the provisions of this section.
The department shall also ensure that the provisions of this section and the regulations promulgated there under are implemented in a cost effective manner by encouraging, where possible, regional approaches or other cost effective means of carrying out the purposes of this section.

(l) The department shall enforce the provisions of this section in accordance with the penalty and enforcement provisions of section 127A.

SECTION 2. The department of public health shall promulgate the regulations required by section 5S of chapter 111 of the General Laws not later than March 1, 2001.

SECTION 3. The division of local mandates, in the office of the state auditor, through the legislative review program, pursuant to the last paragraph of section 6B of chapter 11 of the General Laws, shall make a comprehensive report on sections 1 and 2 of this act. The report shall determine the financial impact on cities and towns of such sections and shall prepare a preliminary cost study and cost benefit analysis. The report shall be filed with the clerk of the House of Representatives not later than December 1, 2000.

SECTION 4. Sections 1 and 2 of this act shall take effect on February 1, 2001.
Approved August 11, 2000.

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APPENDIX

E. MDPH BEACH SAMPLING DATA FORM

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Beach Sampling Field Data Form

Town/City of Collection: **Date Collected:** **Collected By:**	**Time Delivered to Lab:** **Delivered By:** **Relinquished To:**

Instructions: Collect sample(s) in areas of greatest bather load and at locations subject to contamination at a uniform depth of 3 feet. Collect samples 12 inches below water surface. Do not collect samples within 6 inches of bottom.

Sample ID	**Sample Location** (Note beach and sampling location)	**Marine or Fresh**	**Sample Time**	**Water Clarity**		**Water Temp** (°F)	**Days Since Rain** ('0' if w/in 24 hrs.)	**Bather Density (in water)** (Circle appropriate # range)				**Observations of bathing water**
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	
				Clear	Cloudy/Murky			0-10	11-20	20-50	>50	

Observations: **T=**Trash **WS**=Waste Solids **SD**=Sludge Deposit **O**=Oils **A**=Algae **F**=Fish die-offs **J**=Jellyfish **B**=Birds **D**=Dogs **N**=None

Current Weather Condition: **C**loudy/Overcast **S**unny **R**ainy **F**oggy **W**indy **Air Temp:** ________**°F** **Wind Direction:** _________

Comments: ____

____

____

Please Note: This form MUST be utilized upon collection of samples and filled out in its entirety. For reporting purposes, a copy must be submitted to MDPH with any lab results.