Marine and Freshwater Beach Testing in Massachusetts

Annual Report: 2013 Season

Massachusetts Department of Public Health
Bureau of Environmental Health
Environmental Toxicology Program
http://www.mass.gov/dph/beaches

June 2014

This page is intentionally left blank.

PART ONE: THE MDPH/BEH BEACHES PROJECT 5
I. Overview 7
II. Background 7
A. Beach Water Quality & Health: The Need for Testing 7
B. Establishment of the MDPH/BEH Beaches Project 8
III. Beach Water Quality Monitoring 9
A. Sample collection 9
B. Sample analysis 9
1. The MDPH contract laboratory program 9
2. The use of indicators 9
3. Enterococci 10
4. *E. coli* 10
5. Laboratory Methods 10
6. Bacterial Standards 10
C. Reporting 11
1. The Beaches Website 12
2. Exceedances: Beach Closures & Public Notification 12
3. Data Management 13
D. Quality Assurance 13
E. The Tier System and Frequency of Testing 13
1. The Three Tiers 14
2. Sanitary Surveys and Variances 14
IV. Limitations 15

PART TWO: THE 2013 BATHING SEASON 17
I. MDPH ACCOMPLISHMENTS 19
A. Beaches Website/Data Management 19
B. Trainings 19
C. Quality Assurance 20
D. Laboratory Program 20
E. Emergency Response 21
II. MONITORING 22
A. Results 22
1. Marine Beaches 22
2. Freshwater Beaches 24
B. Analysis of Results 25
III. FUTURE PLANS 30
A. Direct Web-Based Reporting 30
B. Training and Community Outreach 30
C. Sanitary Surveys 30
D. Amendments to Bathing Beach Regulations 31
IV. SUMMARY 32

ACKNOWLEDGEMENTS 33

REFERENCES 35

TABLES 39

FIGURES 85

APPENDICES 95

This page is intentionally left blank.

PART ONE: THE MDPH/BEH BEACHES PROJECT

This page is intentionally left blank.

I. OVERVIEW

There are over 1,000 public and semi-public bathing beaches in Massachusetts, both freshwater and marine. 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 U.S. Environmental Protection Agency (USEPA) and state regulatory standards. In 2013, 4.9% (n=755) of all samples collected during the bathing season exceeded bacterial standards, resulting in temporary beach closures.

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.

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 come in contact with 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 pathogens (e.g., bacteria and viruses).[4] 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.[5]

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 USEPA and others have also associated gastrointestinal symptoms with swimming in polluted fresh waters, and more recent studies

---

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 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.
5 Pruss, 1998.

have reaffirmed that there is a significant association between swimming in contaminated water and gastrointestinal illness.[6]

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 both marine and fresh beach waters 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,[7] and swimmer-to-swimmer contamination is another potential source for microbial 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.

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 to:

(1) adopt bathing water standards protective of public health to apply to all public and semi-public bathing beaches across the state;

(2) require regular bacteria testing at all public and semi-public beaches; and

(3) 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.

Beginning in 2001, the program has received funding from USEPA. This funding has provided significant support for MDPH efforts to

(1) develop and maintain an inventory of marine bathing beaches;

(2) compile and analyze monitoring data; and

---

6 Wade et al., 2003; Wade et al., 2006
7 California, 1997; Gerba, 2000

(3) 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 since 2002.

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 large 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 *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). 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).

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 the analyses 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. For the 2013 season MDPH/BEH used state funds and 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 $930,000 for the analysis of over 49,000 marine samples from over 50 communities that have taken part in the contract laboratory program.

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."

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. Since 2000, enterococcus 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 enterococcus 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 of the indicator level as possible public health risks. Moreover, the enterococcus 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. However, 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

Enterococcus 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 enterococci are either Method 1600: Membrane Filter Test Method for Enterococcus in Water, or Enterolert. Method 1600, which was approved and adopted by USEPA in 1997, enables a faster turnaround time for testing of enterococcus, making it practical for local use. Laboratories contracted by MDPH to perform public, marine beach sample analysis are required to utilize the Modified Enterococcus 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.

Marine

USEPA (1986) used the relationship between the number of cases of swimming-associated disease and the enterococcus 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 these standards by regulation beginning with the 2000 bathing season, with an exception. The geometric mean standard of 35 cfu/100 ml remains the same, but is calculated using the five most recent non-storm event samples.

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 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 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). The geometric mean is calculated using non-storm event samples.

Both the *E. coli* and the enterococcus standards are based on studies (Dufour, 1984; USEPA, 1986) that showed that levels of *E. coli* and enterococcus 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 then enter the data onto the beaches website.

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.[8]

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 improve reliability and efficiency for data entry. These improvements allow the public to quickly find the locations of all beaches through the use of 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 a bacterial standard (either single sample or geometric mean), Massachusetts law requires that the beach be posted. 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 are 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 posting by faxing both the laboratory results and a standard beach posting form provided by MDPH/BEH. The posting form affirms that the beach waters have been closed and that signs have been put up at that beach. MDCR is responsible for the posting of its own beaches in the event of an exceedance.

For public marine beaches, up-to-date posting information can also be accessed on MDPH/BEH's Beach Water Quality Locator website. MDPH contract laboratories enter

---

8 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.

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 mean, the website automatically generates a notification of that beach's postings. 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 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.

On May 14, 2014, the MDPH Public Health Council approved for promulgation amendments to the bathing beaches regulations (105 CMR 445.000, Minimum Standards for Bathing Beaches). Effective June 6th, 2014, these amendments will define bathing water quality as unacceptable when two samples collected on consecutive days exceed the established water quality standard. This change, consistent with practices in other Northeast states (e.g., Connecticut, New Jersey), stipulates that a posting will not be required until two samples collected on consecutive days show elevated levels of bacteria. For beaches with a history of multi-day elevated bacteria levels (i.e., one or more consecutive exceedances in two or more of the last four beach seasons), postings will continue to be required after a single sample with an elevated bacteria level. A full copy of the amendments and the comments received during the public comment period are available in Appendix E.

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

In 2003, MDPH/BEH 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 laboratories before the 2007 beach season. The QAPP describes quality assurance and quality control mechanisms developed and related steps (including enforcement measures) taken to ensure that the state's beach monitoring activities and the resulting data meet USEPA's published performance criteria. It also updates details on approved laboratory methods, MDPH/BEH contacts, and website information. MDPH/BEH uses the same quality standards for its freshwater monitoring activities.

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 not had a single violation for two consecutive years 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 (e.g., providing increased testing at those beaches which, due to greater pollution, are known to pose a greater health risk to swimmers).

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 (both marine and freshwater) according to the severity of their pollution:

> Tier One includes heavily used beaches which have pollution problems. Because of the ongoing pollution concerns/violations, these beaches are generally sampled more than once a week. There are currently eight Tier One beaches in Massachusetts. All eight are marine beaches and are tested daily.
>
> Tier Two includes higher-use beaches with some pollution. These beaches must be tested once per week. The majority of beaches (417 of the 528 marine and 545 of the 547 freshwater beaches) are categorized as Tier Two beaches.
>
> 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 103 marine beaches and two 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 (at least two full seasons of water quality data with no exceedances); 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.

IV. 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. In addition, the use of indicator organism criteria, although strongly supported in the literature, has some uncertainties. Finally, analytical techniques that require 24 hours to generate results may thereby potentially leave beach users at risk on the day that a sample was collected and leave beaches closed the following day when most beaches will show clean results.

Although data completeness and accuracy are inevitably reliant upon the 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 100% compliance Massachusetts has achieved in the use of enterococcus, the state and federally mandated indicator organism, in testing at public marine beaches reporting routine monitoring results.

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 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 personnel can only review the data for proper sample collection 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. These are inherent limitations of using indicators as a measure 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 an acceptable level of risk of an adverse health effect, in this case gastrointestinal (GI) illness, rather than at a no-risk level. The indicator limits recommended by USEPA for enterococcus 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 absence of 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 (SCCWRP, 2006).

PART TWO: THE 2013 BATHING SEASON

This page is intentionally left blank.

I. MDPH ACCOMPLISHMENTS

In addition to its routine monitoring activities (outlined earlier), MDPH/BEH performed a variety of more specific activities, unique to the 2013 season.

A. Beaches Website/Data Management

The required field data forms were distributed to local boards of health in 2013.

Links to all MDPH/BEH standardized forms were checked and the forms were made available for download via the Forms link in the Publications and Reports section on the bathing beaches website. Both local communities and laboratories were notified and given field data forms that made it easier for samplers to record conditions while in the field.

Guidance and training were 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 2013 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. Throughout the duration of the project, MDPH has continuously been adding new information associated with beaches, such as waterbody information, latitude/longitude coordinates, and potential pollution sources of freshwater beaches.

After the 2013 bathing season ended, extensive enhancements were made to the MDPH beach database to improve alignment with the USEPA reporting schema. Enhancements included the following:

- Analytical methods are now being reported to USEPA.
- The formatting for reporting non-detects has been improved.
- The procedure for assigning USEPA-issued identification numbers to beaches has been better aligned with USEPA specifications. This particular change to meet USEPA requirements resulted in some multiple sample location marine beaches being reported as a single beach vs. multiple beaches. This will be further explored in the discussion of 2013 marine beach results.
- A system for ensuring the reporting of any changes to beach name, coordinates, sampling frequency, or Tier has been implemented.
- The latitudes and longitudes of each beach are now being reported to USEPA.

B. Trainings

Five trainings for local health officials were conducted prior to the beach season in 2013.

In April 2013, 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 staff presented a beach season "checklist" of the five most important tasks that health agents need to complete each beach season, and responded to questions from local health officials in

preparation for the 2013 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.

In preparation for the 2013 beach season, MDPH staff personally communicated with and conducted outreach to bathing beach communities while collecting 2012 beach data. Local health officials were reminded of their responsibilities under the state's 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 conducted numerous inspections at selected beaches identified as having an exceedance to ensure proper signage was present. MDPH staff also assisted local health officials and laboratories in developing their weekly sampling schedules for the 2013 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 (weekly, biweekly 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 2013. In the spring of 2013 a new MDPH Request for Response (RFR) for the contract laboratory program was posted on the Commonwealth Procurement Access and Solicitation System (Comm-PASS) professional services open solicitation section. The laboratories chosen were Barnstable County Department of Health and Environment Water Quality Testing Laboratory, Biomarine, Inc., G&L Laboratories, Inc., New Bedford Health Department Laboratory, and Wampanoag Environmental Laboratory. The Wampanoag Environmental Laboratory was successfully audited in 2013 by MDPH/BEH staff due to personnel changes (i.e., hiring of a new laboratory director). The laboratories funded by MDPH/BEH analyzed over 3,800 marine beach samples from 52 marine beach communities during the 2013 beach season.

Laboratory contracts were awarded in 2013 and 52 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. Emergency Response

Over the Fourth of July holiday weekend, more than 130 people became ill with shigellosis after swimming at Spring Lake in Burrillville, Rhode Island. Shigellosis is an infectious disease caused by the bacteria *Shigella*. Symptoms include diarrhea, fever, and stomach cramps. *Shigella* bacteria are typically transmitted through person to person contact and do not survive long in the environment. The Rhode Island Department of Health believes that fecal contamination of the bathing water at Spring Lake occurred on July 4. Burrillville abuts the Massachusetts towns of Douglas and Uxbridge. People also reported becoming ill after swimming in Wallum Lake in Douglas, which has a public bathing beach managed by DCR. Wallum Lake spans the MA/RI border and is located five miles from Spring Lake. There were seven confirmed cases in Massachusetts residents associated with Wallum Lake. Illness reports were also linked to Webster Lake in Webster (four confirmed cases in MA residents), and Falls Pond in North Attleboro (one confirmed case).

MDPH/BEH beaches staff reviewed sampling data for all three waterbodies and conducted site visits at Wallum Lake and Webster Lake. Falls Pond had been posted as closed due to a bacterial exceedance at the time of the ill bathers' exposure. The beach sampling data for Wallum and Webster lakes showed that there had been no exceedances in the timeframe of concern. There were no issues noted during the site visits. Beaches staff also received calls from ill beachgoers and conducted phone interviews. Beaches staff coordinated with DCR staff, local health departments, and epidemiologists from MDPH's Division of Epidemiology and Immunization. The MDPH epidemiologists worked with state of Rhode Island epidemiologists and the US Centers for Disease Control and Prevention (CDC) to interview and tally the affected beachgoers and track the outbreak. Spring Lake was closed for several days by the Rhode Island Department of Health and the facilities were sanitized. It was determined that Wallum and Webster lakes did not need to be closed. DCR staff increased the cleaning of Wallum Lake facilities. By the end of July no additional exposures were reported.

II. MONITORING

A. Results

During the 2013 bathing season, 223 communities in Massachusetts with public or semi-public, marine or freshwater beaches sent water quality data to MDPH/BEH. In total, MDPH received water quality data collected from 596 marine and 585 freshwater sampling locations at 528 marine and 547 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 15,471 water samples from marine and freshwater beaches collected during the 2013 beach season. Thirty-nine communities reported only marine bathing beach data, 163 communities reported only freshwater beach data, and 21 communities reported both marine and freshwater bathing beach data (Table 1).

223 communities reported data to MDPH in 2013.

MDPH received data for over 1,100 sampling locations at over 1,000 marine and freshwater beaches in 2013.

1. MARINE BEACHES

During the 2013 bathing season, 60 Massachusetts coastal communities with public or semi-public marine bathing beaches submitted beach monitoring data to MDPH/BEH. These communities accounted for 596 sampling locations at 528 public or semi-public marine bathing beaches.

There are 60 communities with marine beaches in Massachusetts.

A total of 8,132 water samples were collected from marine public and semi-public beaches and reported to MDPH/BEH during the 2013 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 8,100 samples were collected at marine beaches in 2013 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. The institution of the MDPH/BEH beaches website and contract laboratory program has helped all boards of health in Massachusetts' marine communities to adopt the use of enterococci as an indicator organism. Enterococcus was the indicator used for all water samples taken at marine beaches in 2013. The use of MDPH/BEH contract laboratories for the analysis of public marine beach water samples has played a major role in achieving uniform compliance with the MDPH/BEH regulations for marine beaches.

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

Eighty two percent of the marine beaches were tested daily or weekly (the minimum requirement is weekly sampling) (Table 4). The remaining marine beaches were permitted to sample less frequently because of Tier Three status.

100% of all marine beaches were tested as required in 2013.

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 2013. 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 towns of Kingston, Sandwich, Tisbury and Winthrop opted not to use MDPH/BEH contracted laboratories in 2013. Each of these towns faxed their data to MDPH beach inspectors and these data were subsequently entered directly onto the beaches website for prompt public notification.

The total number of marine beach postings (i.e., verification to MDPH/BEH that a sign was posted at the beach) received in 2013 was 424. As noted previously in Part Two, Section I.A., following the 2013 season, MDPH/BEH enhanced its beach database reporting to meet USEPA data reporting requirements due in the winter of 2013-2014. USEPA requirements included the use of USEPA-issued beach identification codes and treatment of multiple sample location beaches as a single beach if the operator made posting decisions for the entire beach based on an exceedance at any one location or a subset of locations. For beaches where the operator would close at a single location but not at other locations that tested clean, a unique USEPA-issued identification code would be assigned to each sample location.

As a result of the USEPA reporting requirements, MDPH/BEH reported to USEPA in February 2014 a total of 385 marine postings in 2013 (vs. 424 postings based on previous reporting requirements). The difference is primarily attributed to multiple sample location beaches managed as a single beach now being reported as a single beach posting instead of multiple location postings. For example, at Constitution Beach in East Boston, which has three sampling locations managed collectively, in previous years a three-day closure would have been reported as three separate postings that lasted for a total of nine days (three days each at three sampling locations). The new system would report this as one posting that lasted for three total days (three days at one beach). For comparison purposes, both the new and old methods of calculating the number of postings and posting days are presented in Table 5.

The number of marine beach postings in 2013 was 385.

The number of postings, calculated either way, was less than the total number of single sample exceedances (n=475). This is due primarily to single postings covering multiple exceedances and exceedances occurring prior to a beach's opening. These data are discussed further in the Analysis of Results section. The percentage of exceedances for the total number of

5.8% of all samples collected exceeded the bacterial standard.

samples collected was 5.8% in 2013 (Table 6). Of the 596 public or semi-public marine beach locations, 212 (36%) incurred at least one bacterial exceedance (Table 7).

212 marine beaches had at least one exceedance.

Total rainfall amounts in Massachusetts were much higher during the 2013 season as compared to 2012 (Tables 8 through 11). The Boston area received 15.95 inches of rain in the 2013 beach season (i.e., June through August), which is above both the 10.46 inches of rain normally received in those months and the 11.67 inches received in 2012. The Chatham area (Brewster, Chatham, Dennis, Eastham, Harwich, and Orleans) also received significantly more rainfall during the 2013 beach season than 2012 (12.46 inches in 2013 vs. 4.95 inches in 2012).

Total rainfall was above normal in both Boston and Chatham.

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 2013, the field forms accompanying 4,717 of the 8,132 marine samples collected (about 58%) included information as to whether potential transient pollution sources had been observed at the time of sampling. Of those, 22% recorded the presence of a specific source (e.g. birds, dogs, waste solids, trash), and 7.9% of those samples exceeded the bacterial standard (Table 12). The field forms for 3,662 samples specifically noted the absence of potential pollution sources. Of those, 4.1% exceeded the bacterial standard. The data suggest that potential bacterial sources at the time of sampling present a higher risk of bacterial exceedances.

Samples associated with potential pollution sources at the beach at the time of sampling had a higher rate of exceedances compared to samples for which no potential sources were noted.

There were a large number of samples (3,415) for which information on pollution sources (or lack thereof) was not provided on field data forms. For these samples, 7.1% 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, many still do not complete the form.

2. Freshwater Beaches

During the 2013 bathing season, 184 Massachusetts communities with public or semi-public freshwater bathing beaches submitted beach monitoring data to MDPH/BEH. These communities provided data for 585 public or semi-public freshwater bathing beaches and collected a total of 7,339 freshwater samples (Table 2).

7,339 samples were collected at Massachusetts freshwater beaches in 2013.

For bather density (Table 3), the data are similar to those for marine beaches, with a high percentage (74%) 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 2013, 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. Nearly 97% of public

97% of freshwater beaches were tested weekly.

and semi-public freshwater beaches in Massachusetts were tested with at least the minimum required weekly frequency in 2013 (Table 4). Two freshwater beaches have Tier Three status and sample every other week or once a month**,** as approved by MDPH and the local board of health. Three percent of freshwater beaches (n=16) either did not sample as required or did not 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.

3.8% of bacterial water quality samples exceeded the freshwater standard.

280 freshwater bacterial exceedances were reported in 2013.

The total number of freshwater beach exceedances detected in 2013 was 280 (3.8% of all freshwater samples collected) (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 enterococcus) in 2012 (200 or 2.7%) (Table 6). Of the 585 public or semi-public freshwater beach locations, 139 (24%) incurred at least one bacterial exceedance (Table 7). These data are discussed further in the Analysis of Results section.

The field forms accompanying 3,570 of the 7,339 freshwater samples collected (49%) included information as to whether potential transient pollution sources had been observed to be present at the sampling location. Of those, 24% (n=862) recorded the presence of specific source (e.g. birds, dogs, algae, trash), and 5.7% of those 862 samples (n=49) exceeded the bacterial standard (Table 12). The field forms for 2,708 samples specifically noted the absence of potential pollution sources. Of those, 2.5% (n=68) exceeded the bacterial standard. As with marine beaches, there were a large number of samples (3,769) for which information on pollution sources (or lack thereof) was not provided on field data forms. For these samples, 4.3% exceeded the bacterial standard.

B. Analysis of Results

In 2013, 223 marine and/or freshwater communities reported bathing beach water quality data to MDPH/BEH. In 2013, MDPH/BEH received the required notification for all but 9 of 475 exceedances for marine waters or approximately 98%. 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. It should also be noted that local boards of health may preemptively post beaches without a test result showing a bacterial exceedance, and instances of this are included in the total number of postings.

One hundred sixty eight posting notifications were received by MDPH/BEH for 280 exceedances, a difference of 112. Through researching these 112

exceedances without postings, it was determined that postings were not required for 43 of these exceedances, due to single postings covering multiple exceedances or the exceedances occurring prior to the beach's opening. It was determined that posting notifications were not received for 69 of 280 exceedances at freshwater beaches in 2013, which is an increase over 2012, when there were 27 exceedances without posting notifications. In 2013, posting notifications were received for 75% of exceedances at freshwater beaches, compared to 87% in 2012. This shows a decline in reporting over the previous year. 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. The 69 missing postings 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 are available for download from the MDPH/BEH website.

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 2013. 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 2013 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.

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, 5.7% exceeded public health standards, compared to 2.5% 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 (7.9%) was also higher than those where none were noted (4.1%). However, it should be noted that, overall, 42% of marine samples and 51% 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 2013, from 2.8 to 7.0% of all marine samples collected during the summer bathing seasons exceeded the enterococcus standard, with an overall average of 5.0% exceedance across all seasons. The rate of marine beach exceedances in 2013 was 5.8% which is within the historical range. All marine communities that had at least one exceedance in 2013 appear in Figure 1. A complete listing of marine beaches sampled during the 2013 beach season, their exceedances, and postings can be found in Table 13.

The exceedance rate was above the historical average for marine beaches in 2013.

Rainfall amounts during the 2013 beach season (Tables 8 - 11) may partly explain the higher exceedance percentage. The Boston area received 15.95 inches of rain during the 2013 beach season (i.e., June through August), which is above the 10.46 inches of rain normally received in those months. The Chatham area (Brewster, Chatham, Dennis, Eastham, Harwich, and Orleans) received above average rainfall during the beach season (12.46 inches received in 2013 vs. the 10.15 inches typically received). The beach testing results also show the percentage of exceedances at marine beaches was higher in 2013 than 2012 (5.8% versus 4.3%). Rainfall is a major driver of bacterial exceedances in beach water. The Boston area, which has many urban beaches affected by rainfall, received over four more inches of rain in 2013 vs. 2012. In 2013 the Chatham area received more than double the rainfall received in 2012. Figures 2 and 3 display rainfall information and the percentages of bacterial exceedances for the Boston and Chatham areas during the 2013 bathing season.

From 2001 through 2013, from 2.7 to 5.9% of all freshwater samples collected during the summer bathing seasons exceeded water quality standards, with an overall average exceedance rate of 4.1% across all seasons. The rate of freshwater beach exceedances in 2013 was 3.8% which is within the historical range. All communities that experienced at least one freshwater exceedance in 2013 can be seen in Figure 4. A complete listing of freshwater beaches sampled during the 2013 beach season, their exceedances, and postings can be found in Table 14.

At freshwater beaches, the percentage of exceedances in 2013 was higher than the 2012 exceedance rate (2.7%). 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, during the 2013 bathing season both the Boston and Chatham areas received rainfall above the historical averages. The Amherst area's rainfall during the bathing season was 50% higher than normal and over five inches more than in 2012. The Ashburnham area's rainfall during the bathing season was 33% more than normal and over six inches more than 2012. It should be noted that these are only four data points for a large geographical area and therefore localized rainfall totals could be different.

Figures 5 and 6 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. As

discussed previously and as expected, in 2013 the amount of rainfall increased and the percentage of exceedances increased from 2012.

Bacterial exceedances are closely tied to rain events.

Table 15 and Figure 7 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. In 2013, 312 of the 475 marine exceedances had corresponding rain event information, while for freshwater beaches rain event data were recorded for 157 of the 280 bacterial exceedances. Sixty seven percent of marine beach exceedances and 54% of freshwater exceedances occurred within 24 hours of a rain event in 2013. Figure 7 shows the exponential drop-off in the number of exceedances as the time from rainfall increases.

Greater bather use at a beach can increase bacterial levels.

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 enterococcus levels. However, as in previous years, more than two-thirds of the marine beach samples (80%) and freshwater beach samples (74%) 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.

While the data relative to the impacts of bather density on exceedances are extremely limited, beaches staff did evaluate the data to determine if trends were apparent. For marine samples with a corresponding bather density, exceedance rates did not increase with increasing bather density. The overall rate of exceedances for all marine samples (5.8%) was higher than the rates of exceedance for each bather density grouping (0-10 bathers, 5.7%; 10-20 bathers, 2.8%; 20-50 bathers, 1.0%; >50 bathers, 1.9%). The rate of exceedance for samples that did not have a corresponding bather density was highest of all, at 8.1%. For freshwater samples, the three higher bather density groupings (10-20 bathers, 1.8%, 20-50 bathers, 2%, >50 bathers, 2.6%) all exhibited an exceedance rate lower than both the overall rate for all freshwater samples (3.8%) and the exceedance rate for samples in the lowest bather density grouping (0-10 bathers, 3.2%). As with the marine data, the rate of exceedance for the freshwater samples that did not have a corresponding bather density (6.8%) was again the highest. Thus, at this time the effect of bather density on beach water quality cannot be reported with confidence.

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 enterococcal 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).

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 worked with state and local officials to designate virtually all marine waters within three miles of the Massachusetts coast as a no-discharge zone.

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

Virtually all of the Massachusetts coast line is a no-discharge zone.

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.

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

III. FUTURE PLANS

A. Direct Web-Based Reporting

In 2014, 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

MDPH conducted four trainings in the spring of 2014 for local health officials.

In the spring of 2014, MDPH/BEH worked in collaboration with the MDPH/BEH Community Sanitation Program and the Massachusetts Health Officers Association to provide four separate training events for local boards of health in different regions of the state. These trainings provided a recap of the 2013 bathing beach season. Information was also provided 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.

C. Sanitary Surveys

Additional sanitary surveys will be conducted to further the goals of the Tiered Monitoring Plan in 2014.

MDPH/BEH will continue to facilitate sanitary surveys in support of the Tiered Monitoring Plan and the variance process during 2014. 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 2014 to conduct sanitary surveys that will support the Tiered Monitoring Plan. Data from the 2012 and 2013 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 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.

D. Amendments to Bathing Beach Regulations

MDPH has collected water quality data at approximately 1,000 marine and freshwater beaches for the past 13 years. These data suggest that beaches rarely have two consecutive tests that exceed the relevant USEPA single sample water quality standard (for marine waters, 104 cfu/100 ml enterococci; for fresh waters, 235 cfu/100 ml *E. coli* or 61 cfu/100 ml enterococci). For the majority of beaches, any initial exceedance is transient in nature and not reflected in the confirmatory sample that is processed the next day (i.e., 24 hours after the initial exceedance). Therefore, beach operators (primarily local health agents) have often posted an advisory sign at a beach when the current water quality meets the established standard. Posting advisories in this manner deprives residents of the benefits of swimming and other water-related exercise, creates unnecessary work and costs for the local health agents, and causes economic losses to communities and businesses connected with those beaches. In an effort to address these concerns, MDPH proposed regulatory amendments to the bathing beaches regulations. These amendments were approved by the MDPH Public Health Council on May 14, 2014 and are in effect as of June 6, 2014. An advisory will no longer be required at a beach until two samples collected on consecutive days show elevated bacteria levels. If a retest is not collected on the day following the initial exceedance, then posting would still be required until a sample confirms that the water quality standard is met. For beaches with consecutive exceedances in two or more of the last four beach seasons, postings will continue to be required after each exceedance. Effective June 6th, 2014, the quality of bathing water will be considered unacceptable based on the following evaluation of the bacteriological water quality criteria:

1. Two samples of bathing water, collected on two consecutive days, that both exceed the single sample water quality standard, or one sample of bathing water that exceeds the single sample water quality standard when an additional sample is not collected on the following day; or
2. One sample of bathing water that exceeds the single sample standard at beaches where, in two or more of the last four full beach seasons, samples collected on two consecutive days both exceeded the single sample water quality standard; or
3. Any bathing water sample that exceeds the geomean water quality standard.

Please refer to Appendix E for a further description of the regulatory amendments.

IV. SUMMARY

This report summarizes beach monitoring and testing data from Massachusetts public and semi-public marine and freshwater bathing beaches during the 2013 season. In total, 223 communities with operating bathing beaches reported 15,471 water samples collected at over 1,000 beaches. The beach testing results from the 2013 season show there was a higher percentage of exceedances at marine beaches than the 2012 beach season's rate, most likely due to much higher rainfall in 2013 vs. 2012. Similarly, water quality data at freshwater beaches also showed an increase in the percentage of exceedances in 2013 compared to 2012. Massachusetts marine communities are nearly in full compliance with the regulations with the exception of some 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 boards of health 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 over 1,000 beaches in 2013.

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.

ACKNOWLEDGEMENTS

This study would not have been possible without the efforts, cooperation, and collaboration of the local health departments in Massachusetts (including Barnstable County). MDPH/BEH also received much assistance from many local, regional, and state organizations, including MDCR, in ensuring that bathing beaches are tested and that their data are forwarded to MDPH/BEH in a timely fashion. Finally, we are grateful to USEPA for providing financial support. USEPA BEACH Grant funds have helped support efforts in areas related to public marine beach data reporting and notification, including the public notification website, laboratory analysis of routine monitoring samples, the Flagship Beach project, training, and enforcement activities.

This page is intentionally left blank.

REFERENCES

Barrell RA, Hunter PR, Nichols G, 2000. Microbiological standards for water and their relationship to health risk. Commun Dis Public Health. March, Volume 3, pp. 8-13.

Boehm, A. B. and S.B. Weisberg, 2005. Tidal forcing of enterococci at marine recreational beaches at fortnightly and semi-diurnal frequencies. Environmental Science and Technology, 39(14), pp. 5575-5583.

Beaches Environmental Assessment and Coastal Health Act. Federal Register 2002 21 March, 67 (55) pp. 13140-13143.

Cabelli, VJ, Dufour, A, McCabe, L, and Levin, MA, 1982, Swimming-associated gastroenteritis and water quality, American Journal of Epidemiology, Volume 115 (4) pp. 606-616.

Cabelli, VJ, 1983, Health Effects Criteria for Marine Recreational Waters, USEPA Document Number USEPA-600/1-80-031, Health Effects Research Laboratory, Office of Research and Development, United States Environmental Protection Agency, Research Triangle Park, North Carolina.

Cabelli, VJ, 1989, Swimming-associated illness and recreational water quality criteria, Water Science Technology, Volume 21 (2) pp. 13-21.

California Department of Health Services, 1997. Draft Guidance for Saltwater Recreational Areas: Assessing Microbiological Contamination and Taking Corrective Action.

California Department of Health Services, 1997. Draft Guidance for Freshwater Recreational Areas: Assessing Microbiological Contamination and Taking Corrective Action.

CDC, 1990, Waterborne disease outbreaks, 1986-1988, Morbidity and Mortality Weekly Report, Volume 39 (SS-1), Center for Disease Control and Prevention, pp. 1-13.

CDC, 1991, Waterborne disease outbreaks, 1989-1990, Morbidity and Mortality Weekly Report, Volume 40 (SS-3), Center for Disease Control and Prevention, pp. 1-21.

CDC, 1992, Cercarial dermatitis outbreak at a state park-Delaware, 1991, Morbidity and Mortality Weekly Report, April 10, 1992, Volume 41, Number 14, Center for Disease Control and Prevention, pp. 225-228.

CDC, 1993, Surveillance for waterborne disease outbreaks-United States, 1991-2, Morbidity and Mortality Weekly Report, November 19, 1993, Volume 42 (SS-5), Center for Disease Control and Prevention, pp. 1-22.

CDC, 1996, Surveillance for waterborne disease outbreaks-United States, 1993-4, Morbidity and Mortality Weekly Report, April 12, 1996, Volume 45 (SS-1), Center for Disease Control and Prevention, pp. 1-33.

CDC, 2002, Surveillance for waterborne disease outbreaks-United States, 1999-2000, Morbidity and Mortality Weekly Report, November 22, 2002, Volume 51 (SS-8), Center for Disease Control and Prevention, pp. 1-48.

CDC, 2004, Surveillance for waterborne disease outbreaks-United States, 2001-2002, Morbidity and Mortality Weekly Report, October 22, 2004, Volume 53 (SS-08), Center for Disease Control and Prevention, pp. 1-22.

Corbett, SJ, Rubin, GL, Curry, GK, and Kleinbaum, DG, 1993, The health effects of swimming at Sydney beaches, American Journal of Public Health, Volume 83 (12) pp. 1701-1706.

Coye, MJ, and Goldoft, MG, 1989, Microbiological contamination of the ocean and human health, New Jersey Medicine, Volume 86 (7) pp. 533-538.

Dufour, AP, 1984, Health Effects Criteria for Fresh Recreational Waters, USEPA Document Number USEPA-600/1-84-004. Health Effects Research Laboratory, Office of Research and Development, USEPA, Research Triangle Park, NC.

Evaluation of New, Rapid Microbiological Measurement Methods For Recreational Water Quality. Southern California Coastal Water Research Project. 21 February 2006. <http://www.sccwrp.org/whatsnew/rapid_indicator/water_quality.html>

Federal Register, 2003. Guidelines Establishing Test Procedures for the Analysis of Pollutants; Analytical Methods for Biological Pollutants in Ambient Water. Federal Register 2003 21 July, 68 (139) pp. 43272-43283.

Gerba, Charles P., 2000. Assessment of Enteric Pathogen Shedding by Bathers during Recreational Activity and its Impact on Water Quality. Quantitative Microbiology, March 2000 Volume 2 (1) pp. 55-68.

Haile R, 1996. A Health Effect Study of Swimmers in Santa Monica Bay. Santa Monica Bay Restoration Project, Monterey Park, CA.

Haugland, RA. "Using Today's Data to Close the Beach Today. Quantitative Polymerase Chain Reaction (QPCR) rapid beach closings tool." 2005 US EPA Office of Research and Development Product Expo. 8 February 2005

Jagals, P.; Grabow W.O.K.; Griesel M.; Jagals C.; 2000. Evaluation of Selected Membrane Filtration and Most Probable Number Methods for the Enumeration of Faecal Coliforms, Escheria coli and Enterococci in Environmental Waters. Quantitative Microbiology, June 2000 Volume 2 (2) pp. 129-140.

Massachusetts Department of Environmental Protection (MDEP) and Office of Coastal Zone Management (MCZM). March 1997. Stormwater Management Volume Two: Stormwater Technical Handbook.

Massachusetts Department of Public Health Regulations, 105 CMR § 445.000, Minimum Standards for Bathing Beaches (State Sanitary Code Chapter VII).

Moore JE, Caldwell PS, Millar BC, Murphy PG, 2001. Occurrence of Campylobacter spp. in water in Northern Ireland: implications for public health. Ulster Med J. Nov, Volume 70, pp. 102-7.

NAS, 1977, Drinking Water and Health, Safe Drinking Water Committee, National Academy of Sciences, Washington, D.C., 1977.

Polo, F, Figueras, MJ, Inza, I, Sala, J, Fleisher, JM, Guarro, J, 1998. Relationship between presence of Salmonella and indicators of fecal pollution in aquatic habitats. FEMS Microbiol Lett. March 15, Volume 160, pp. 253-6.

Prieto, MD, Lopez, B, Juanes, JA, Revilla, JA, Llorca, J, Delgado-Rodriguez, M, 2001. Recreation in Coastal Waters: Health Risks Associated with Bathing in Sea Water. Journal of Epidemiology and Community Health, June 2001, Vol. 55, pp. 442-7.

Pruss, A, 1998. Review of epidemiological studies on health effects from exposure to recreational water. International Journal of Epidemiology. Vol. 27, pp. 1-9.

Schindler, PR, 2001. Hygiene of Bathing Waters. Gesundheitswesen. Vol. 63, Suppl. 2, pp. S142-50.

USEPA, 1985. Test Methods for Escherichia coli and Enterococci in Water by the Membrane Filter Procedure, USEPA Document Number USEPA-600/4-85/076, Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio.

USEPA, 1986. Ambient Water Quality Criteria for Bacteria - 1986, USEPA Document Number USEPA-440/5-84-002, Office of Regulations and Standards, Criteria and Standards Division, U.S. Environmental Protection Agency, Washington, DC.

USEPA, 1997. Method 1600: Membrane Filter Test Method for Enterococci in Water. USEPA Document Number USEPA-821-R-97-004, Office of Water, U.S. Environmental Protection Agency, Washington D.C., May 1997.

USEPA, 2007. Criteria Development Plan and Schedule: Recreational Water Quality Criteria. USEPA Document Number USEPA-823-R-08-003, Office of Water, Office of Research and Development, U.S. Environmental Protection Agency, Washington D.C., August 2007.

Wade, TJ, Pai, N, Eisenberg, JNS, Colford, JMJ. Do U.S. Environmental Protection Agency Water Quality Guidelines for Recreational Waters Prevent Gastrointestinal Illness? A Systematic Review and Meta-analysis. Environmental Health Perspectives, June 2003, Vol. 111 (8) pp. 1102-1109.

Wade, TJ, Dufour, AP, Calderon, RL, Beach, MJ, Sams, EA, Brenner, KP. “Protecting Swimmer Health with Same Day Water Quality Monitoring Results for Bathing Beaches.” 2005 Great Lakes Beach Association Conference. Green Bay, WI. 3 November 2005.

Wade, TJ, Calderon, RL, Sams, E, Beach, M, Brenner, KP, Williams, AH, Dufour, AP, 2006. Rapidly Measured Indicators of Recreational Water Quality Are Predictive of Swimming-Associated Gastrointestinal Illness. Environmental Health Perspectives, January 2006, Vol. 114 (1) pp. 24-28.

This page is intentionally left blank.

TABLES

This page is intentionally left blank.

Table 1

MA Beaches (2013): Breakdown of communities reporting water quality data for marine and/or freshwater public and semi-public bathing beaches.

Type of community	#	%
Marine beach only	39	17%
Freshwater beach only	163	73%
Marine and freshwater beaches	21	9%
Total	223	100%

Table 2

MA Beaches (2013): Marine vs. freshwater testing: number of beaches, communities, and samples.

	Beaches tested[1]	**Communities**	**Samples collected**
Marine	596	60	8,132
Freshwater	585	184	7,339
Total:	1,181	223 [2]	15,471

1. Beaches include both public and semi-public bathing beaches. For the purposes of this report, a sample location is considered a single beach. Also, note that this table does not include the number of beaches not tested, as data were not compiled to accurately determine this number.

2. Twenty-one of the 60 communities containing marine beaches are also counted among the 184 communities with freshwater beaches because they contain both types of beach: see Table 1.

Table 3
MA Beaches (2013): 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	6,542	80%
10-20	287	4%
20-50	102	1%
>50	53	1%
Not indicated	1,148	14%
Total	8,132	100%

Freshwater beaches

Bather Density (# people)	# Samples	%
0-10	5,420	74%
10-20	278	4%
20-50	153	2%
>50	38	1%
Not indicated	1,450	20%
Total	7,339	100%

Table 4
MA Beaches (2013): Frequency of water quality testing at public and semi-public bathing beaches, grouped by beach and frequency.

Marine Beaches

Test frequency	# Beaches	%
Daily	18	3%
Weekly	473	79%
Monthly	89	15%
Biweekly	16	3%
Total	596	100%

Freshwater Beaches

Test frequency	# Beaches	%
Weekly	564	96.4%
Twice per week	3	0.5%
Monthly	2	0.3%
Biweekly	1	0.2%
One time	8	1.4%
Two times	3	0.5%
Unknown	4	0.7%
Total	585	100.0%

Table 5

MA Beaches (2013): Number of exceedances and postings at marine and freshwater public and semi-public bathing beaches.

Marine beaches	Old*	New*
Exceedances, Total (Enterococcus)	475	475
Postings, Total[1]	424	385
Postings, Single Sample Exceedance	319	297
Postings, Geomean Exceedances	24	20
Postings, Preemptive - Rainfall	68	55
Postings, Preemptive - Other	11	11
Permanent closures	2	2

**refers to the historical and new methods of calculating the number of postings as described in the text.*

Freshwater beaches	
Exceedances, Total	280
Exceedances, Enterococcus	96
Exceedances, E. coli	184
Postings, Total[1]	168
Postings, Enterococcus	76
Postings, E. coli	75
Postings, Preemptive - Rainfall	0
Postings, Preemptive - Other	11
Postings, Algae	6

Table 6

MA Beaches (2013): 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%
2011	481	8140	5.9%	434	7612	5.7%
2012	343	8006	4.3%	200	7513	2.7%
2013	475	8132	5.8%	280	7339	3.8%
Average	393	7791	5.0%	289	7227	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 geometric mean of the last 5 non-rain samples. 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 geometric mean of the last 5 non-rain samples. 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 geometric mean of the last 5 non-rain samples.

Table 7

MA Beaches (2013): Number of beaches at which at least one enterococcus sample (marine beaches) or at least one enterococcus or *E. coli* sample (freshwater beaches) exceeded the respective water quality criteria.

	# beaches with at least one exceedance	Total # beaches reporting	%	% in previous years				
				2012	2011	2010	2009	2008
Marine	212	596	36%	28%	35%	36%	38%	32%
Freshwater	139	585	24%	18%	38%	27%	20%	27%

Table 8

MA Beaches (2004-2013): Rainfall during swimming season - Boston*

Boston

Year	Rainfall	June	July	August	Total
n/a	**Norm for month**	**3.68**	**3.43**	**3.35**	**10.46**
2004	**Total**	1.95	3.87	4.38	10.20
	Dev From Norm	-47%	+13%	+31%	-2%
2005	**Total**	1.46	3.37	2.88	7.71
	Dev From Norm	-60%	-2%	-14%	-26%
2006	**Total**	10.09	3.58	3.20	16.87
	Dev From Norm	+174%	+4%	-4%	+61%
2007	**Total**	2.12	5.26	0.66	8.04
	Dev From Norm	-42%	+53%	-80%	-23%
2008	**Total**	3.46	6.00	4.47	13.93
	Dev From Norm	-6%	+75%	+33%	+33%
2009	**Total**	3.22	6.90	3.24	13.36
	Dev From Norm	-13%	+101%	-3%	+28%
2010	**Total**	3.18	2.66	5.75	11.59
	Dev From Norm	-14%	-22%	+72%	+11%
2011	**Total**	4.76	2.04	7.74	14.54
	Dev From Norm	+29%	-41%	+131%	+39%
2012	**Total**	4.71	3.88	3.08	11.67
	Dev From Norm	+28%	+13%	-8%	+12%
2013	**Total**	10.50	3.61	1.84	15.95
	Dev From Norm	+185%	+5%	-45%	+52%

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

Table 9

MA Beaches (2004-2013): 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**
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%
2011	**Total**	3.61	3.76	3.51	10.88
	Dev From Norm	+5%	+11%	+5%	+7%
2012	**Total**	1.85	1.30	1.80	4.95
	Dev From Norm	-46%	-62%	-46%	-51%
2013	**Total**	6.94	4.08	1.44	12.46
	Dev From Norm	+102%	+21%	-57%	+23%

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

Table 10

MA Beaches (2004-2013): 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**
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%
2011	**Total**	5.84	1.81	10.05	17.70
	Dev From Norm	+53%	-54%	+145%	+49%
2012	**Total**	4.14	2.45	5.80	12.39
	Dev From Norm	+9%	-38%	+41%	+4%
2013	**Total**	9.44	4.94	3.51	17.89
	Dev From Norm	+148%	+25%	-14%	+51%

* Data obtained from the National Climatic Data Center's Preliminary Record of Climatological Observations, at http://www.ncdc.noaa.gov/IPS/coop/coop.html

Table 11

MA Beaches (2004-2013): 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**
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%
2011	**Total**	5.64	1.55	10.23	17.42
	Dev From Norm	+48%	-61%	+150%	+41%
2012	**Total**	3.75	1.39	5.02	10.16
	Dev From Norm	-8%	-66%	+17%	-18%
2013	**Total**	8.32	3.49	4.70	16.51
	Dev From Norm	+118%	-12%	+15%	+33%

* Data obtained from the National Climatic Data Center's Preliminary Record of Climatological Observations, at http://www.ncdc.noaa.gov/IPS/coop/coop.html

Table 12

MA Beaches (2013): Number of exceedances at public and semi-public beaches which reported environmental sources of pollution.

Pollution Source?[1]	Marine beaches			Freshwater beaches		
	# Exceedances	# Samples	%	# Exceedances	# Samples	%
Yes	83	1,055	7.9%	49	862	5.7%
Unknown	241	3,415	7.1%	163	3,769	4.3%
No	151	3,662	4.1%	68	2,708	2.5%
Total	475	8,132	5.8%	280	7,339	3.8%

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 (2013): 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	3				
Aquinnah	Moshup Beach	Sampling Point	Monthly	4				
Aquinnah	Philbin Beach	Sampling Point	Weekly	8				
Aquinnah	Red Beach	Sampling Point	Monthly	3				
Barnstable	Cotuit Bay Shores Association	Sampling Point	Weekly	14	1	108	108	1
Barnstable	Covell's	Sampling Point	Weekly	15				
Barnstable	Craigville	Sampling Point	Weekly	16	1	194	194	1
Barnstable	Craigville Beach Club	Sampling Point	Weekly	12				
Barnstable	Cross Street	Sampling Point	Weekly	13				
Barnstable	Dowses	Sampling Point	Weekly	15				
Barnstable	Eugenia Fortes	Sampling Point	Weekly	13				
Barnstable	Kalmus Ocean	Sampling Point	Weekly	16	1	158	158	1
Barnstable	Kalmus Yacht	Sampling Point	Weekly	15				
Barnstable	Kennedy Memorial/Veterans Beach	Sampling Point	Weekly	15				
Barnstable	Keyes Beach	Sampling Point	Weekly	15	2	230	400	1
Barnstable	Loops	Sampling Point	Weekly	13				
Barnstable	Millway	Sampling Point	Weekly	15	2	220	400	1
Barnstable	Oyster Harbors Club	Sampling Point	Weekly	13				
Barnstable	Ropes	Sampling Point	Weekly	14	1	198	198	1
Barnstable	Sandy Neck	Sampling Point	Weekly	15				
Barnstable	Seaside Park Improvement Association	Sampling Point	Weekly	13				
Barnstable	Wianno Club (Salt-107 Seaview)	Sampling Point	Weekly	13				
Beverly	Brackenbury	Sampling Point	Weekly	12				
Beverly	Dane Street	Bathhouse	Weekly	14	2	241	677	2
Beverly	Goat Hill	Sampling Point	Weekly	13	1	161	161	1
Beverly	Independence Park	Sampling Point	Weekly	14	2	243	706	2
Beverly	Lynch Park	Sampling Point	Weekly	12				
Beverly	Mingo	Sampling Point	Weekly	18	4	121	336	3
Beverly	Obear Park	Sampling Point	Biweekly	6				
Beverly	Rice's	Sampling Point	Weekly	12				
Beverly	Sandy Point	Sampling Point	Weekly	10	1	109	109	1
Beverly	West	Sampling Point	Biweekly	6				
Beverly	Woodbury	Sampling Point	Weekly	14	2	175	950	1
Boston	Carson Beach	at Bathhouse	Daily	75	1	269	269	3
Boston	Carson Beach	at I St.	Daily	79	1	121	121	3
Boston	City Point Beach	WWII Memorial	Daily	79				1
Boston	Constitution	Middle	Daily	79	2	162	1000	5

Table 13
MA Marine Beaches (2013): 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]
Boston	Constitution	North site	Daily	79	4	158	1500	5
Boston	Constitution	Rec Center	Daily	79	1	1100	1100	5
Boston	Lovell's Island	Sampling Point	Weekly	10				
Boston	M Street Beach	Sampling Point	Daily	78	1	122	122	2
Boston	Malibu	Sampling Point	Weekly	18	4	133	492	3
Boston	Pleasure Bay	Broadway	Daily	79	1	140	140	1
Boston	Pleasure Bay	South Flagpole	Daily	79	1	508	508	1
Boston	Pleasure Bay	Sullivans	Daily	79	8	165	808	1
Boston	Savin Hill	Sampling Point	Weekly	15				
Boston	Spectacle Island	Sampling Point	Weekly	10				
Boston	Tenean	Sampling Point	Daily	81	17	105	2600	24
Bourne	Barlows Landing	Sampling Point	Weekly	13				
Bourne	Cataumet Harbor	Sampling Point	Weekly	15	2	134	400	2
Bourne	Cedar Point Association	Sampling Point	Weekly	13				
Bourne	Electric Avenue	Sampling Point	Monthly	4				
Bourne	Gilder Road Beach	Sampling Point	Monthly	4				
Bourne	Hideaway Village Association	Sampling Point	Weekly	13				
Bourne	Monument	Sampling Point	Monthly	4				
Bourne	Patuisset Beach	Sampling Point	Biweekly	7				
Bourne	Pocasset Beach Improvement Association	Sampling Point	Weekly	13				
Bourne	Sagamore	Sampling Point	Monthly	4				
Bourne	Scraggy Neck Recreation Association	Sampling Point	Weekly	11	1	374	374	1
Bourne	Tahanto Associates, Inc.	Sampling Point	Weekly	13				
Bourne	Wings Neck Trust Association (North Beach)	Sampling Point	Weekly	13				
Bourne	Wings Neck Trust Association (South Beach)	Sampling Point	Weekly	13				
Braintree	Smith Beach	Sampling Point	Weekly	14	5	120	910	4
Brewster	Breakwater Landing	Sampling Point	Weekly	14	1	116	116	
Brewster	Brewster Dunes	Sampling Point	Weekly	13				
Brewster	Cape Cod Sea Camps (Bay)	Sampling Point	Weekly	14	1	120	120	
Brewster	Crosby Landing	Sampling Point	Weekly	13				
Brewster	Ellis Landing	Sampling Point	Weekly	13				
Brewster	Ellis Landing Park Condominiums	Sampling Point	Weekly	13				
Brewster	Halliday Acres	Sampling Point	Weekly	13				
Brewster	Linnell Landing	Sampling Point	Weekly	13				
Brewster	Mants	Sampling Point	Weekly	13				

Table 13
MA Marine Beaches (2013): 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]
Brewster	Ocean Edge	Condos	Weekly	13				
Brewster	Paines Creek	Sampling Point	Weekly	13				
Brewster	Pilgrim Pine Acres	Sampling Point	Weekly	10				
Brewster	Point of Rocks	Sampling Point	Weekly	13				
Brewster	Saints Landing	Sampling Point	Weekly	14	1	252	252	
Brewster	Sea Pines Condominiums	Sampling Point	Weekly	13				
Brewster	Sunset Beach Association	Sampling Point	Weekly	13				
Chatham	Andrew Harding Lane Beach	Sampling Point	Weekly	13				
Chatham	Bucks Creek	Sampling Point	Weekly	20	5	186	400	5
Chatham	Chatham Bars Inn	Sampling Point	Weekly	11				
Chatham	Cockle Cove	Sampling Point	Weekly	13				
Chatham	Cockle Cove Creek at Parking Lot	at Parking Lot	Weekly	13	8	136	400	1
Chatham	Cockle Cove Creek at Ridgevale Bridge	at Ridgevale Bridge	Weekly	15	6	116	400	1
Chatham	Forest Street Beach	Sampling Point	Weekly	13				
Chatham	Hardings East	East parking lot	Weekly	13				
Chatham	Hardings West	West parking lot	Weekly	13				
Chatham	Hawthorne Motel	Sampling Point	Weekly	13				
Chatham	Jacknife Harbor	Sampling Point	Weekly	13				
Chatham	Lighthouse	Sampling Point	Weekly	13				
Chatham	Oyster Pond	Sampling Point	Weekly	13				
Chatham	Pleasant Street	Sampling Point	Weekly	14	1	222	222	1
Chatham	Ridgevale	Sampling Point	Weekly	13				
Chilmark	Great Rock Bight	Sampling Point	Monthly	4				
Chilmark	Menemsha	Sampling Point	Monthly	4				
Chilmark	Ocean @ Chilmark Pond Preserve	Sampling Point	Weekly	13				
Chilmark	Ocean @ Lucy Vincent Beach	Sampling Point	Weekly	17				
Chilmark	Ocean @ Squibnocket Beach	Sampling Point	Weekly	12				
Chilmark	Pond @ Lucy Vincent Beach	Sampling Point	Weekly	23	14	146	2419	8
Cohasset	Black Rock	Sampling Point	Weekly	14	1	183	183	1
Cohasset	Sandy Beach	Sampling Point	Weekly	14	1	10100	10100	1
Danvers	Sandy Beach	West	Weekly	15	2	165	197	2
Dartmouth	Anthony Beach	Sampling Point	Weekly	13	1	500	500	1
Dartmouth	Apponagansett Town Beach	Sampling Point	Weekly	12	1	276	276	1
Dartmouth	Bayview	Sampling Point	Weekly	13	1	500	500	1
Dartmouth	Demarest Lloyd	Sampling Point	Weekly	16	1	294	294	1
Dartmouth	Hidden Bay	Sampling Point	Weekly	13	2	500	500	2
Dartmouth	Jones Town Beach North	North	Biweekly	7				

Table 13
MA Marine Beaches (2013): 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]
Dartmouth	Jones Town Beach South	South	Weekly	11	2	180	500	2
Dartmouth	Moses Smith Creek	Sampling Point	Weekly	13	3	128	500	2
Dartmouth	Nonquitt	Sampling Point	Weekly	13	1	500	500	1
Dartmouth	Oak Hill Shores	Sampling Point	Weekly	12				
Dartmouth	Round Hill	Sampling Point	Weekly	13	1	500	500	1
Dartmouth	Salter's Point East	Sampling Point	Weekly	12				
Dartmouth	Salter's Point South	Sampling Point	Weekly	12				
Dennis	Bayview	Sampling Point	Weekly	14	1	130	130	1
Dennis	Chapin Memorial	Sampling Point	Weekly	15	2	208	326	1
Dennis	Clipper Lane	Sampling Point	Weekly	16	3	110	400	1
Dennis	Cold Storage	Sampling Point	Weekly	14	1	106	106	1
Dennis	Corporation	Sampling Point	Weekly	16	1	156	156	
Dennis	Follins Pond	Sampling Point 2	Weekly	14	1	106	106	
Dennis	Glendon Road - East	East	Weekly	14	1	400	400	1
Dennis	Glendon Road - West	West	Weekly	14	1	200	200	1
Dennis	Haigis	Sampling Point	Weekly	14	1	400	400	1
Dennis	Harborview	Sampling Point	Weekly	16	3	212	400	1
Dennis	Howes Street	Sampling Point	Weekly	14	1	120	120	
Dennis	Inman Road	Sampling Point	Weekly	15	2	148	168	1
Dennis	Mayflower	Sampling Point	Weekly	17	2	112	152	1
Dennis	Raycroft	Sampling Point	Weekly	15	3	184	332	1
Dennis	Sea Street (Dennisport)	Dennisport	Weekly	14	1	170	170	
Dennis	Sea Street (East Dennis)	East	Weekly	14	1	108	108	1
Dennis	South Village	Sampling Point	Weekly	13				
Dennis	Sullivan (Depot St.)	Sampling Point	Weekly	15	2	204	354	1
Dennis	Trotting Park	Sampling Point	Weekly	15	2	170	188	1
Dennis	West Dennis - Residential	Residential	Weekly	18	3	116	400	1
Dennis	West Dennis - West	West	Weekly	15				
Dennis	West Dennis - West of snack bar	West of snack bar	Weekly	17	2	130	166	
Duxbury	Duxbury Beach @ Bath House	Sampling Point	Weekly	12				
Duxbury	Landing Road	Sampling Point	Weekly	12				
Duxbury	Residents Beach (Duxbury Beach)	Sampling Point	Weekly	12				
Duxbury	Shipyard Lane	Sampling Point	Weekly	12				
Duxbury	West End	Sampling Point	Weekly	12				
Eastham	Boat Meadow	Sampling Point	Weekly	13				
Eastham	Campground	Sampling Point	Weekly	14	1	124	124	1
Eastham	Coast Guard (National Seashore)	Sampling Point 1	Weekly	11				
Eastham	Coast Guard (National Seashore)	Sampling Point 2	Weekly	11				

Table 13
MA Marine Beaches (2013): 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]
Eastham	Cole Road	Sampling Point	Weekly	13				
Eastham	Cook's Brook	Sampling Point	Weekly	13				
Eastham	Dyer Prince	Sampling Point	Weekly	13				
Eastham	First Encounter - Spit River	Spit River	Weekly	13				
Eastham	First Encounter Beach	Beach	Weekly	13				
Eastham	Kingsbury	Sampling Point	Weekly	13				
Eastham	Nauset Light (National Seashore)	Sampling Point 1	Weekly	11				
Eastham	Nauset Light (National Seashore)	Sampling Point 2	Weekly	11				
Eastham	S. Sunken Meadow	Sampling Point	Weekly	13				
Eastham	Salt Pond	Sampling Point	Weekly	13				
Eastham	Silver Springs Association	Sampling Point	Weekly	14	1	128	128	
Eastham	Thumpertown	Sampling Point	Weekly	13				
Eastham	Town Cove	Sampling Point	Weekly	14	1	300	300	1
Edgartown	Bend in the Road	Sampling Point	Monthly	3				
Edgartown	Chappy Beach Club	Sampling Point	Monthly	3				
Edgartown	Chappy Point Beach	Sampling Point	Monthly	4				
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	Norton Point East	East ocean	Monthly	3				
Edgartown	Ocean @ Edgartown Great Pond	Sampling Point	Monthly	4				
Edgartown	South Beach State Park - East	East	Monthly	3				
Edgartown	South Beach State Park - Middle	Middle	Monthly	3				
Edgartown	South Beach State Park - West	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	19	4	320	500	4
Fairhaven	Fort Phoenix - Town Beach	Sampling Point	Weekly	11				
Fairhaven	Knollmere	Sampling Point	Weekly	11				
Fairhaven	Manhattan Avenue	Sampling Point	Weekly	17	3	308	500	3
Fairhaven	Sandy Beach (Raymond Street)	Sampling Point	Weekly	12	1	250	250	1
Fairhaven	Seaview	Sampling Point	Weekly	11				
Fairhaven	West Island Causeway	Sampling Point	Weekly	11				
Fairhaven	West Island Town Beach	Sampling Point	Weekly	11				
Falmouth	Acapesket Improvement Association	Sampling Point	Weekly	14	1	270	270	1
Falmouth	Bayshore Homeowners Association	Sampling Point	Weekly	13				
Falmouth	Bikepath Beach (Trunk River) - East	East	Weekly	13				

Table 13
MA Marine Beaches (2013): 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]
Falmouth	Bikepath Beach (Trunk River) - West	West	Weekly	13				
Falmouth	Bowerman Beach Club	Sampling Point	Weekly	13				
Falmouth	Bristol - East	East	Weekly	14	1	138	138	1
Falmouth	Bristol - West	West	Weekly	14	1	160	160	1
Falmouth	Chapoquoit	Sampling Point	Weekly	15	2	120	400	2
Falmouth	Chapoquoit Associates - Front Beach	Sampling Point	Weekly	13				
Falmouth	Chapoquoit Associates - Little Beach	Sampling Point	Weekly	14	1	108	108	1
Falmouth	Falmouth Associates - 564 Surf Drive	Sampling Point	Weekly	12				
Falmouth	Falmouth Heights East	East	Weekly	14	1	174	174	1
Falmouth	Falmouth Heights West	West	Weekly	14	1	260	260	1
Falmouth	Falmouth Yacht Club	Sampling Point	Weekly	13				
Falmouth	Jetty Lane	Sampling Point	Weekly	16	4	136	400	3
Falmouth	Little Island Beach Preserve	Sampling Point	Weekly	15	2	108	138	2
Falmouth	Megansett	Sampling Point	Weekly	13				
Falmouth	Megansett North	North	Weekly	13				
Falmouth	Megansett Yacht Club	Sampling Point	Weekly	13				
Falmouth	Menauhant East	East	Weekly	13				
Falmouth	Menauhant West	West	Weekly	13				
Falmouth	Mill Road	Sampling Point	Weekly	13				
Falmouth	New Silver (Silver Beach Improvement Association)	Sampling Point	Weekly	13	1	162	162	1
Falmouth	Nobska Beach Association	Sampling Point	Weekly	13				
Falmouth	Old Silver (Public) - North	North	Weekly	14	1	400	400	1
Falmouth	Old Silver (Public) - South	South	Weekly	14	1	114	114	1
Falmouth	Old Silver 1 (Residents)	Central	Weekly	13				
Falmouth	Old Silver Beach Estates Assoc.	Sampling Point	Weekly	13				
Falmouth	Quisset Beach Association	Sampling Point	Weekly	11				
Falmouth	Racing Beach Association	Whittemore Rd.	Weekly	11				
Falmouth	Saconessett Hills Association	Sampling Point	Weekly	14	1	400	400	1
Falmouth	Seacoast Shores Associates, Inc.	Sampling Point	Weekly	12	1	136	136	
Falmouth	Seacrest Resort	Sampling Point	Weekly	15	2	160	252	2
Falmouth	Sippewissett Highlands Trust	Sampling Point	Weekly	13				
Falmouth	Stoney Beach (MBL)	Sampling Point	Weekly	13				
Falmouth	Surf Drive - East	Surf Drive East	Weekly	13				
Falmouth	Surf Drive - Pool	Surf Drive Pool	Weekly	14	1	150	150	1
Falmouth	Surf Drive - West	Main (concession) West	Weekly	14	1	128	128	1
Falmouth	Tides Hotel	Sampling Point	Weekly	13				

Table 13
MA Marine Beaches (2013): 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]
Falmouth	Wild Harbour Estates	Sampling Point	Weekly	15	3	108	228	2
Falmouth	Wood Neck Beach	Sampling Point	Weekly	15	2	172	400	2
Falmouth	Wood Neck River	Sampling Point	Weekly	14	1	400	400	1
Gloucester	Cressy's	Sampling Point	Monthly	5				
Gloucester	Good Harbor	Sampling Point	Weekly	17				
Gloucester	Good Harbor Creek	Sampling Point	Weekly	16				
Gloucester	Half Moon	Sampling Point	Monthly	5				
Gloucester	Niles	Sampling Point	Monthly	5				
Gloucester	Pavilion Beach	Sampling Point	Monthly	6				1
Gloucester	Plum Cove	Sampling Point	Weekly	18	1	218	218	1
Gloucester	Wingearsheek	Sampling Point	Weekly	16				
Harwich	Atlantic Avenue	Sampling Point	Monthly	4				
Harwich	Bank Street - Bayview Rd	Sampling Point	Monthly	4				
Harwich	Brooks Road	Sampling Point	Monthly	4				
Harwich	Earle Road	Sampling Point	Weekly	13				
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	Strandway - right of jetty	Weekly	13				
Harwich	Pleasant Bay	Sampling Point	Weekly	13				
Harwich	Pleasant Road	Sampling Point	Monthly	4				
Harwich	Red River East	East	Weekly	13				
Harwich	Red River Middle	Middle	Weekly	13				
Harwich	Red River West	West	Weekly	13				
Harwich	Sea Breeze Avenue	Sampling Point	Monthly	4				
Harwich	Stone Horse Yacht Club	Sampling Point	Weekly	10				
Harwich	The Belmont	Sampling Point	Weekly	13				
Harwich	Wah Wah Taysee Road	Sampling Point	Monthly	4				
Harwich	Wequasett Inn Resort	Sampling Point	Weekly	13				
Harwich	Wychmere Harbor Beach Club	Sampling Point	Weekly	13				
Harwich	Zylpha Road Beach	Sampling Point	Monthly	4				
Hingham	Belair	Sampling Point	Weekly	12	2	249	435	2
Hingham	Kimball	Sampling Point	Weekly	11				
Hingham	Martin's Cove	Sampling point	Weekly	12	1	213	213	1
Hingham	North	Sampling Point	Weekly	12	1	146	146	1
Hingham	Seal Cove	Sampling Point	Weekly	14	4	121	605	3
Hingham	Town Beach	Sampling Point	Weekly	12	1	134	134	1

Table 13
MA Marine Beaches (2013): 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]
Hingham	Wompatuck	Sampling Point	Weekly	11	1	148	148	1
Hingham	Yacht Club	Sampling Point	Weekly	11				
Hull	A Street Bay Side	Sampling Point	Weekly	13	2	800	3130	2
Hull	A Street Ocean	Sampling Point	Weekly	12				
Hull	Darcy's	Sampling Point	Monthly	3				
Hull	Edgewater	Sampling Point	Weekly	13	2	131	187	2
Hull	Gunrock	Sampling Point	Monthly	3				
Hull	James Ave.	Sampling Point	Weekly	12				
Hull	Kenberma	Sampling Point	Biweekly	6				
Hull	Nantasket	Bathhouse	Weekly	15				
Hull	Nantasket	North site	Weekly	15				
Hull	Nantasket	Park St.	Weekly	15				
Hull	Nantasket	Water St.	Weekly	15				
Hull	Newport	Sampling Point	Monthly	3				
Hull	XYZ	Sampling Point	Monthly	3				
Ipswich	Clark	Sampling Point	Weekly	16	1	185	185	1
Ipswich	Crane	Head Lifeguard Station	Monthly	4				
Ipswich	Little Neck	Sampling Point	Weekly	16	1	145	145	1
Ipswich	Pavillion	greatest batherload	Monthly	4				
Ipswich	Steep Hill	Steep Hill	Monthly	4				
Kingston	Gray's	Sampling Point	Weekly	11				
Kingston	Rocky Nook	Sampling Point	Weekly	10				
Lynn	Kings	Eastern Ave	Daily	78	20	132	5480	8
Lynn	Kings	Kimball Road	Daily	77	11	121	24200	8
Lynn	Kings	Pierce Road	Daily	79	10	133	2600	8
Manchester	Black	Sampling Point	Weekly	20	5	122	459	6
Manchester	Magnolia	Right of Bath and Tennis	Weekly	15				
Manchester	Magnolia	Sampling Point 1	Weekly	15				
Manchester	Singing	Right of parking lot	Weekly	15				
Manchester	Singing	Sampling Point 1	Weekly	15				
Manchester	Tuck's Point	Sampling Point	Weekly	17	2	158	216	2
Manchester	West Manchester	Sampling Point	Weekly	18	5	332	1450	3
Manchester	White	Sampling Point	Weekly	15				
Marblehead	Crocker Park	Sampling Point	Weekly	13				
Marblehead	Devereux	Sampling Point	Weekly	13				
Marblehead	Gas House	Sampling Point	Weekly	16	3	110	7560	2
Marblehead	Grace Oliver	Sampling Point	Weekly	17	4	120	1145	3

Table 13
MA Marine Beaches (2013): 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]
Marblehead	Stramski	Sampling Point	Weekly	16	2	201	410	2
Marion	Beverly Yacht	Sampling Point	Weekly	12				
Marion	Converse Point	Sampling Point	Weekly	12				
Marion	Dexter Lane	Sampling Point	Weekly	12				
Marion	Island Wharf	Sampling Point	Biweekly	6				
Marion	Oakdale Avenue	Sampling Point	Weekly	12				
Marion	Piney Point	Sampling Point	Weekly	12				
Marion	Planting Island	Sampling Point	Monthly	3				
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	11				
Marshfield	Fieldston	Hartford Rd (Fieldston)	Weekly	11				
Marshfield	Green Harbor	Sampling Point	Weekly	12	1	390	390	1
Marshfield	Rexhame	Sampling Point	Weekly	15				
Marshfield	Sunrise	9th Road - Foster Ave.	Weekly	11				
Mashpee	Callies Beach	Sampling Point	Monthly	4				
Mashpee	Mashpee Neck Road (Town Landing)	Sampling Point	Weekly	13				
Mashpee	Maushup Village	Sampling Point	Weekly	13				
Mashpee	Popponesset (Beach Road)	Sampling Point	Weekly	13				
Mashpee	Popponesset (Bluff Ave)	Sampling Point	Weekly	13				
Mashpee	Popponesset (New Seabury Inn)	Sampling Point	Weekly	14	1	110	110	1
Mashpee	Seconsett Island Causeway	Sampling Point	Weekly	13				
Mashpee	South Cape Beach	Sampling Point 1	Weekly	15				
Mattapoisett	Antassawomak East	Sampling Point 1	Weekly	11	1	500	500	1
Mattapoisett	Antassawomak West	Sampling Point 2	Weekly	10				
Mattapoisett	Aucoot	Sampling Point	Weekly	12	1	186	186	1
Mattapoisett	Brant Beach	Sampling Point	Weekly	10				
Mattapoisett	Crescent	Sampling Point	Weekly	11	1	140	140	1
Mattapoisett	Harbor Beach 1 (North)	Sampling Point	Weekly	11	1	140	140	1
Mattapoisett	Harbor Beach 2 (South)	Sampling Point	Weekly	11	1	176	176	1
Mattapoisett	Holly Woods 1	Sampling Point 1	Weekly	10				
Mattapoisett	Holly Woods 2	Sampling Point 2	Weekly	10				
Mattapoisett	Leisure Shores	Sampling Point	Weekly	14	4	140	500	3
Mattapoisett	Mattapoisett Shores Association	Sampling Point	Weekly	10				
Mattapoisett	Ned's Point	Sampling Point	Weekly	15	5	136	364	2
Mattapoisett	Peases Point I (East)	Sampling Point	Weekly	10				

Table 13
MA Marine Beaches (2013): 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]
Mattapoisett	Peases Point II (West)	Sampling Point	Weekly	10				
Mattapoisett	Point Connett	Sampling Point	Weekly	10				
Mattapoisett	Shining Tides Reservation	Sampling Point	Weekly	13	2	152	500	2
Mattapoisett	Town Beach	Sampling Point	Weekly	13	2	188	220	2
Nahant	Black Rock	Sampling Point	Weekly	15	1	265	265	1
Nahant	Canoe	Sampling Point	Weekly	18	3	111	340	3
Nahant	Forty Steps Beach	Sampling Point	Weekly	16	1	280	280	1
Nahant	Nahant Beach	Flagpole	Weekly	17	2	124	515	1
Nahant	Nahant Beach	N. of bathhouse	Weekly	17	2	454	700	1
Nahant	Nahant Beach	Parking section 9	Weekly	17	1	562	562	1
Nahant	Nahant Beach	South site	Weekly	17	1	330	330	1
Nahant	Short	Sampling Point	Weekly	15				
Nahant	Tudor	Sampling Point	Weekly	15				
Nantucket	40th Pole	Sampling Point	Weekly	12				
Nantucket	Children's	Sampling Point	Weekly	13	1	216	216	1
Nantucket	Cisco	Sampling Point	Monthly	3				
Nantucket	Cliffside Beach	Sampling Point	Monthly	3				
Nantucket	Cliffside Beach Club	Sampling Point	Weekly	4				
Nantucket	Dionis	Sampling Point	Weekly	12				
Nantucket	Jetties	Sampling Point	Weekly	13	1	280	280	1
Nantucket	Madaket	Sampling Point	Weekly	12				
Nantucket	Miacomet	Sampling Point	Weekly	12				
Nantucket	Sconset	Sampling Point	Monthly	3				
Nantucket	Sewerbeds	Sampling Point	Weekly	12				
Nantucket	Surfside 1	Sampling Point	Monthly	3				
Nantucket	Surfside 2	Sampling Point	Monthly	3				
Nantucket	Warren's Landing	Sampling Point	Weekly	13	1	132	132	
Nantucket	Washing Pond	Sampling Point	Weekly	12				
Nantucket	Washington Street	Sampling Point	Weekly	13	1	118	118	1
Nantucket	Wauwinet Bayside	Sampling Point	Weekly	8				
Nantucket	Wauwinet Oceanside	Sampling Point	Weekly	9	1	140	140	
New Bedford	400 Beach	North	Weekly	15				1
New Bedford	400 Beach	South	Weekly	15				1
New Bedford	Davy's Locker	Sampling Point	Weekly	16	1	162	162	2
New Bedford	J. Beach	Sampling Point	Weekly	15				1
New Bedford	Kids Beach	Sampling Point	Weekly	15				1
New Bedford	O'Tools	Sampling Point	Weekly	15				1
New Bedford	Squid	Sampling Point	Weekly	16	1	500	500	2

Table 13
MA Marine Beaches (2013): 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]
New Bedford	Tabor Park South	Sampling Point	Weekly	15				1
New Bedford	Tower Beach	Tower 1	Weekly	15				1
New Bedford	Tower Beach	Tower 4	Weekly	15				1
Newbury	Plum Island	Sampling Point	Monthly	4				
Newburyport	Plum Island - 55th St.	55th street	Weekly	15				
Newburyport	Plum Island - end of island 1	end of island 1	Weekly	15				
Newburyport	Plum Island - end of island 2	end of island 2	Weekly	15				
Newburyport	Plum Island Point	Plum Island Point	Weekly	15				
Oak Bluffs	Eastville Town Beach - Harbor side	Sampling Point	Monthly	4				
Oak Bluffs	Eastville Town Beach - Lagoon side	Sampling Point	Weekly	12	1	331	331	1
Oak Bluffs	Inkwell Beach	Sampling Point	Weekly	11				
Oak Bluffs	Joseph Sylvia State Beach - Big Bridge	Big Bridge	Monthly	3				
Oak Bluffs	Joseph Sylvia State Beach - Sound	Sound	Monthly	3				
Oak Bluffs	Marinelli (Jetty) Beach	Sampling Point	Monthly	3				
Oak Bluffs	Medeiros Cove (Sailing Camp)	Sampling Point	Weekly	12	1	1050	1050	1
Oak Bluffs	Pay Beach	Sampling Point	Weekly	11				
Orleans	Little Inn at Pleasant Bay	Sampling Point	Weekly	14	1	194	194	
Orleans	Nauset	Sampling Point	Weekly	13				
Orleans	Quanset Harbor Club Association	Sampling Point	Weekly	15	1	366	366	1
Orleans	Skaket Beach	Sampling Point	Weekly	13				
Orleans	Skaket Beach Condominiums	Sampling Point	Weekly	13				
Plymouth	Plymouth Beach - 1	Sampling Point 1	Weekly	12				
Plymouth	Plymouth Beach - 3	Sampling Point 3	Weekly	12				
Plymouth	Plymouth Beach - 5	Sampling Point 5	Weekly	12				
Plymouth	White Horse - Full Sail	Full Sail	Weekly	12				
Plymouth	White Horse - Hill Top	Hill Top	Weekly	12				
Provincetown	333 Commercial Street	Sampling Point	Weekly	13				
Provincetown	451 Commercial Street	Sampling Point	Weekly	15	2	156	324	1
Provincetown	593 Commercial Street	Sampling Point	Weekly	14	1	292	292	1
Provincetown	637 Commercial Street	Sampling Point	Weekly	15	2	160	184	1
Provincetown	Atkins Lane	Sampling Point	Weekly	15	2	160	464	1
Provincetown	Atlantic Avenue	Sampling Point	Weekly	14	1	112	112	1
Provincetown	Court Street	Sampling Point	Weekly	13				
Provincetown	Herring Cove (National Seashore)	Sampling Point 1	Weekly	11				
Provincetown	Herring Cove (National Seashore)	Sampling Point 2	Weekly	11				
Provincetown	Johnson Street	Sampling Point	Weekly	13				
Provincetown	Kendal Lane	Sampling Point	Weekly	13				

Table 13
MA Marine Beaches (2013): 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]
Provincetown	Provincetown Inn East	Sampling Point	Weekly	13				
Provincetown	Provincetown Inn Rotary	Sampling Point	Weekly	13				
Provincetown	Race Point (National Seashore)	Sampling Point 1	Weekly	11				
Provincetown	Race Point (National Seashore)	Sampling Point 2	Weekly	11				
Provincetown	Ryder Street	Sampling Point Left	Weekly	13				
Provincetown	Ryder Street	Sampling Point Middle	Weekly	13				
Provincetown	Ryder Street	Sampling Point Right	Weekly	13				
Provincetown	Town Landing - Breakwater	Sampling Point	Weekly	14	1	376	376	
Provincetown	Town Landing - Snail Road	Sampling Point	Weekly	15	2	144	284	1
Provincetown	Town Landing West of Coast Guard	Sampling Point	Weekly	14	1	132	132	
Provincetown	West End Lot	Sampling Point	Weekly	14	1	116	116	1
Provincetown	Winston Ave	Sampling Point	Weekly	15	2	152	360	1
Quincy	Avalon	Sampling Point	Weekly	14	2	131	2140	2
Quincy	Broady (Baker)	Sampling Point	Weekly	14	3	108	132	2
Quincy	Chikatawbot	Sampling Point	Weekly	14	3	120	1130	2
Quincy	Delano Ave.	Sampling Point	Weekly	17	6	160	317	5
Quincy	Edgewater	Sampling Point	Weekly	12				
Quincy	Germantown Firestation	Sampling Point	Weekly	12				
Quincy	Heron	Sampling Point	Weekly	13	1	450	450	1
Quincy	Merrymount	Sampling Point	Weekly	14	2	110	2720	2
Quincy	Mound	Sampling Point	Weekly	14	2	120	1660	2
Quincy	Nickerson	Sampling Point	Weekly	15	4	134	288	3
Quincy	Orchard Street	Sampling Point	Weekly	13	1	158	158	1
Quincy	Parkhurst	Sampling Point	Weekly	13	1	354	354	1
Quincy	Rhoda	Sampling Point	Weekly	12				
Quincy	Wollaston @ Channing Street	Channing Street	Daily	80	16	110	2600	21
Quincy	Wollaston @ Milton Street	Sampling Point	Daily	81	9	111	2600	15
Quincy	Wollaston @ Rice Road	Sampling Point	Daily	81	5	121	515	13
Quincy	Wollaston @ Sachem Street	Sampling Point	Daily	80	8	129	2470	16
Revere	Revere	at state police	Weekly	16	1	154	154	1
Revere	Revere	Beach St.	Weekly	16	2	135	149	1
Revere	Revere	Carey Circle	Weekly	16	1	323	323	1
Revere	Revere	Oak Island St.	Weekly	16	1	323	323	1
Revere	Short	Sampling Point	Weekly	17	1	177	177	1
Rockport	Back	Sampling Point	Weekly	11	2	206	253	2
Rockport	Cape Hedge	Sampling Point	Monthly	3				
Rockport	Front Beach	Sampling Point	Weekly	10	1	359	359	1
Rockport	Long - Gloucester	Gloucester	Monthly	3				

Table 13
MA Marine Beaches (2013): 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]
Rockport	Long - North	North	Monthly	3				
Rockport	Old Garden	Sampling Point	Monthly	3				
Rockport	Pebble	Sampling Point	Monthly	3				
Salem	Camp Naumkeag	Sampling Point	Weekly	12	1	160	160	1
Salem	Children's Island - Back	Back	Weekly	7				2
Salem	Children's Island - Dock	Dock	Weekly	7				2
Salem	Children's Island - Wally	Wally	Weekly	7				2
Salem	Collins Cove	Sampling Point	Weekly	12				
Salem	Dead Horse	Sampling Point	Biweekly	6				
Salem	Forest River - Pioneer	Sampling Point	Weekly	13	2	259	512	1
Salem	Forest River - Point	Sampling Point	Biweekly	6				
Salem	Juniper Point	Sampling Point	Weekly	13	1	109	109	1
Salem	Ocean Avenue	Sampling Point	Weekly	14	3	187	855	2
Salem	Osgood	Sampling Point	Weekly	11				
Salem	Steps	Sampling Point	Biweekly	6				
Salem	Waikiki Beach (Winter Island)	Sampling Point	Biweekly	6				
Salem	Willow Avenue	Sampling Point	Weekly	13	1	420	420	1
Salem	Willows Pier	Sampling Point	Biweekly	6				
Salisbury	Salisbury Beach	Sampling Point	Weekly	14				
Salisbury	Salisbury Beach North End	Star of the Sea	Weekly	15				
Sandwich	Carltow	Sampling Point	Weekly	13				
Sandwich	East Sandwich	Sampling Point	Weekly	10				
Sandwich	Mill Creek	Sampling Point	Weekly	10				
Sandwich	Scusset	Sampling Point	Weekly	15				
Sandwich	Torrey Beach Community Association	Sampling Point	Weekly	13				
Sandwich	Town Neck (Hemispheres)	Sampling Point	Weekly	10				
Sandwich	Town Neck Beach	End of Boardwalk	Weekly	10				
Scituate	Bassing's (Sailing Club)	Sampling Point	Weekly	15	6	199	2700	1
Scituate	Egypt	Sampling Point	Weekly	13	2	121	450	2
Scituate	Humarock	Sampling Point	Weekly	11	1	810	810	1
Scituate	Minot	Sampling Point	Weekly	12	2	260	420	2
Scituate	Peggotty	Sampling Point	Weekly	14	2	122	730	3
Scituate	Sand Hills	Sampling Point	Weekly	11	1	259	259	
Scituate	Scituate Lighthouse	Sampling Point	Weekly	11	1	311	311	
Somerset	Pierce Beach	Sampling Point	Weekly	14	6	272	9610	2
Swampscott	Eisman's	Sampling Point	Weekly	12				
Swampscott	Fisherman's	Sampling Point	Weekly	13	2	399	605	1
Swampscott	Kings	Sampling Point	Weekly	13	1	443	443	1

Table 13
MA Marine Beaches (2013): 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]
Swampscott	Phillips	Sampling Point	Weekly	12				
Swampscott	Preston	Sampling Point	Weekly	12				
Swampscott	Whales	Sampling Point	Weekly	12	1	120	120	1
Swansea	Cedar Cove Club	Sampling Point	Weekly	6				1
Swansea	Coles River Club off Harbor Rd	Sampling Point	Weekly	12				
Swansea	Sandy Beach	Sampling Point	Weekly	12	1	246	246	1
Swansea	Swansea Town Beach	Sampling Point	Weekly	13	1	323	323	1
Tisbury	Hilman's Point	Sampling Point	Monthly	4				
Tisbury	Mink Meadows	Sampling Point	Weekly	11				
Tisbury	Owen Little Way	Sampling Point	Weekly	12	1	279	279	1
Tisbury	Owen Park	Sampling Point	Monthly	3				
Tisbury	Sound @ Wilfred's Pond Preserve	Sampling Point	Monthly	4				
Tisbury	Tashmoo Beach	Sampling Point	Monthly	3				
Tisbury	Tashmoo Cut	Sampling Point	Weekly	11				
Tisbury	Vineyard Harbor Motel	Sampling Point	Weekly	11				
Truro	Ballston	Sampling Point	Monthly	4				
Truro	Beach Point Landing	Sampling Point	Weekly	13				
Truro	Coast Guard Town	Sampling Point	Monthly	4				
Truro	Cold Storage/Pond Village	Sampling Point	Weekly	13				
Truro	Corn Hill	Sampling Point	Monthly	4				
Truro	Cranberry Hill	Sampling Point	Weekly	10				
Truro	Crow's Nest (496 Shore Rd)	Sampling Point	Weekly	13				
Truro	Dune's Colony (648 Shore Rd)	Sampling Point	Weekly	13				
Truro	Fisher	Sampling Point	Monthly	4				
Truro	Great Hollow	Sampling Point	Monthly	4				
Truro	Head of the Meadow (National Seashore)	Sampling Point 1	Weekly	11				
Truro	Head of the Meadow (National Seashore)	Sampling Point 2	Weekly	11				
Truro	Head of the Meadow (Town)	Sampling Point	Monthly	4				
Truro	Longnook	Sampling Point	Monthly	4				
Truro	Lookout Bluff	Sampling Point	Weekly	13				
Truro	Noon's Landing	Sampling Point	Weekly	13				
Truro	Pamet Harbor	Sampling Point	Weekly	15	2	284	334	1
Truro	Ryder	Sampling Point	Monthly	4				
Truro	Shearwater Association	Shearwater 1	Weekly	10				
Truro	Sunset Village (372 Shore Rd)	Sampling Point	Weekly	13				
Wareham	Briarwood	Sampling Point	Weekly	18	5	114	250	5

Table 13
MA Marine Beaches (2013): 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]
Wareham	East Boulevard	Sampling Point	Weekly	15	1	170	170	1
Wareham	Forbes	Sampling Point	Weekly	16	3	254	292	3
Wareham	Hamilton Beach	Sampling Point	Weekly	16	1	400	400	1
Wareham	Indian Mound Beach	Sampling Point	Weekly	15				
Wareham	Little Harbor	Sampling Point	Weekly	16	1	400	400	1
Wareham	North Boulevard	Sampling Point	Weekly	16	2	188	238	2
Wareham	Onset	Sampling Point	Biweekly	8				
Wareham	Parkwood	Sampling Point	Weekly	15				
Wareham	Pinehurst	Sampling Point	Weekly	15				
Wareham	Point Independence	Sampling Point	Biweekly	8				
Wareham	Riverside Avenue	Sampling Point	Biweekly	8				
Wareham	Shell Point	Sampling Point	Biweekly	8				
Wareham	Swift's	Sampling Point	Weekly	9	1	400	400	1
Wareham	Swift's Neck	Sampling Point	Biweekly	8				
Wellfleet	Burton Baker	Sampling Point	Weekly	13				
Wellfleet	Cahoon Hollow	Sampling Point	Monthly	4				
Wellfleet	Chequesset Yacht and Country Club	Sampling Point	Weekly	10				
Wellfleet	Duck Harbor	Sampling Point	Monthly	4				
Wellfleet	Indian Neck	Sampling Point	Monthly	4				
Wellfleet	Maguire Landing	Sampling Point	Monthly	4				
Wellfleet	Marconi (National Seashore)	Sampling Point 1	Weekly	9				
Wellfleet	Marconi (National Seashore)	Sampling Point 2	Weekly	8				
Wellfleet	Mayo	Sampling Point	Weekly	11	1	110	110	1
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	Monthly	4				
Wellfleet	White Crest	Sampling Point	Monthly	4				
West Tisbury	Capawok Beach	Capawok sampling point	Weekly	9				
West Tisbury	Gray's Beach	Gray's	Weekly	9				
West Tisbury	Lambert's Cove Beach	Sampling Point	Weekly	12				
West Tisbury	Long Point (Ocean)	Central	Weekly	14				
West Tisbury	Naushon Beach	Naushon sampling point	Weekly	9				
West Tisbury	Saltworks Beach	Saltworks	Weekly	9				
West Tisbury	Tisbury Great Pond Beach	Sampling Point	Monthly	4				
Westport	Baker's Beach	Sampling Point	Monthly	3				

Table 13
MA Marine Beaches (2013): 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]
Westport	C and K Club - Howland	Sampling Point	Weekly	12				
Westport	Cherry and Webb	Sampling Point	Monthly	3				
Westport	East Beach	Sampling Point	Monthly	3				
Westport	Elephant Rock Beach Club	Sampling Point	Monthly	3				
Westport	Horseneck	Sampling Point	Weekly	15				
Westport	Spindle Rock	Sampling Point	Monthly	3				
Westport	Town-Yacht	Sampling Point	Monthly	3				
Weymouth	George E. Lane	Sampling Point	Weekly	14	1	305	305	
Weymouth	Wessagusett (Old Wessagussett)	Sampling Point	Weekly	14	1	1790	1790	
Winthrop	Donovans	Sampling Point	Weekly	12	3	130	1340	3
Winthrop	Grandview	Sampling Point	Weekly	12				
Winthrop	Halford	Sampling Point	Weekly	12	1	106	106	1
Winthrop	Pico	Sampling Point	Weekly	12	1	450	450	1
Winthrop	Winthrop	Sampling Point	Weekly	17	1	110	110	1
Winthrop	Yerrill	Sampling Point	Weekly	12				
Yarmouth	Bass River East	East	Weekly	15				
Yarmouth	Bass River West	West	Weekly	15				
Yarmouth	Baxter Avenue	Sampling Point	Weekly	15				
Yarmouth	Bay Road	Sampling Point	Weekly	15				
Yarmouth	Bayview Street	Sampling Point	Weekly	17	2	154	310	1
Yarmouth	Colonial Acres East	East	Weekly	15				
Yarmouth	Colonial Acres West	West	Weekly	15				
Yarmouth	Columbus Avenue	Sampling Point	Weekly	20	3	110	400	3
Yarmouth	Englewood	Sampling Point	Weekly	15				
Yarmouth	Follins Pond	Sampling Point	Weekly	16	1	400	400	1
Yarmouth	Gray's Beach	Sampling Point	Weekly	15				
Yarmouth	Malfa Road	Sampling Point	Weekly	15				
Yarmouth	Ocean Club	Smuggler's Beach	Weekly	2				
Yarmouth	Ocean Mist Hotel	Sampling Point	Weekly	13				
Yarmouth	Parkers River East	Sampling Point	Weekly	16	1	110	110	1
Yarmouth	Parkers River West	Sampling Point	Weekly	15				
Yarmouth	Seagull (Center)	East front	Weekly	16	1	318	318	1
Yarmouth	Seagull (Left)	back	Weekly	13				
Yarmouth	Seagull (Right)	West front	Weekly	15				
Yarmouth	Seaview Ave. Beach	Sampling Point	Weekly	15				
Yarmouth	South Middle	Sampling Point	Weekly	15				
Yarmouth	Thatcher Town Park	Sampling Point	Weekly	15				
Yarmouth	Vernon St.	Sampling Point	Weekly	16	1	400	400	1

Table 13
MA Marine Beaches (2013): 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]
Yarmouth	Wilbur Park	Sampling Point	Weekly	15				
Yarmouth	Windmill	Sampling Point	Weekly	15				

1 - Multiple instances of beaches may occur due to multiple sampling points.
2 - The number of postings could be greater than the number of single sample exceedances due to the presence of geometric mean exceedances or precautionary postings

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Abington	Island Grove Beach	Sampling Point	Weekly	E. coli	12	2	720	1120	
Acton	NARA Beach	Sampling Point	Weekly	E. coli	16	1	242	242	1
Agawam	Robinson Pond Beach 1	Sampling Point	Weekly	Enterococci	14				
Amesbury	Camp Bauercrest	Sampling Point	Weekly	E. coli	15				
Amesbury	Glen Devin Condominiums	Sampling Point	Weekly	E. coli	15	3	517	2420	3
Amesbury	Lake Gardner	Sampling Point	Weekly	E. coli	15				
Amesbury	Sandy Beach (Lake Attitash)	Dam/Bathing area	Weekly	E. coli	15				
Amesbury	Tuxbury RV Resort Lagoon	Sampling Point	Weekly	E. coli	12				
Amherst	Puffers Pond	North	Once	E. coli	1				
Amherst	Puffers Pond	South	Once	E. coli	1				
Andover	Camp Maude Eaton	Sample Site 1; "swim 2 feet"	Weekly	E. coli	10				
Andover	Camp Maude Eaton	Sample Site 2; "swim 4 feet"	Weekly	E. coli	10				
Andover	Pomps Pond	Station 1	Weekly	E. coli	15	1	1600	1600	1
Andover	Pomps Pond	Station 2	Weekly	E. coli	15	2	360	1700	1
Andover	Pomps Pond	Station 3	Weekly	E. coli	15	2	400	720	1
Arlington	Arlington Reservoir	Sampling Point	Weekly	E. coli	13	1	1600	1600	1
Arlington	Medford Boat Club	Lower	Weekly	E. coli	13	4	292	560	4
Arlington	Medford Boat Club	Upper	Weekly	E. coli	14				
Ashburnham	Camp Collier	Sampling Point	Weekly	E. coli	12				
Ashburnham	Camp Split Rock	Sampling Point	Weekly	E. coli	8				
Ashburnham	Camp Winnekeag Pond	Sampling Point	Weekly	E. coli	12				
Ashby	Camp Lapham	Sampling point	Weekly	E. coli	11	1	400	400	1
Ashby	Damon Pond Beach	Sampling Point	Weekly	Enterococci	24	10	64	264	7
Ashfield	Ashfield Park Beach	Sampling Point	Weekly	E. coli	15				
Ashland	Ashland Reservoir-Main Beach	Sampling Point	Weekly	Enterococci	16	2	138	206	2
Ashland	Camp Winnetaska	Sampling Point	Weekly	E. coli	7				
Ashland	Hopkinton Reservoir-Main Beach	Sampling Point	Weekly	Enterococci	17	3	64	280	2
Ashland	Hopkinton Reservoir-Upper Beach	Sampling Point	Weekly	Enterococci	15				
Ashland	Warren Conference Center	Sampling Point	Unknown	E. coli	5	1	270	270	
Athol	Ellis Beach	Sampling Point	Weekly	E. coli	17	2	258	400	2
Athol	Silver Pond Beach	Sampling Point	Weekly	E. coli	16	1	336	336	
Auburn	Century Sportsman's Club	Sampling Point	Weekly	E. coli	15				
Ayer	Ayer Town Beach	Sampling Point	Weekly	E. coli	15				
Ayer	Mirror Lake	Sampling Point	Weekly	E. coli	11				
Barnstable	Fair Acres Country Day School	Sampling Point	Weekly	E. coli	9				
Barnstable	Hamblin Pond	Sampling Point	Weekly	E. coli	13				
Barnstable	Hathaway Pond	Sampling Point	Weekly	E. coli	14	1	308	308	
Barnstable	Holly Point Assoc.	Sampling Point	Weekly	E. coli	13				
Barnstable	Homestead Homeowner's Association	Sampling Point	Weekly	E. coli	13				
Barnstable	Jimmy's Beach (Wequaquet Heights Association)	118 Conners Rd	Weekly	E. coli	13				
Barnstable	Jimmy's Beach (Wequaquet Heights Association)	Jimmy's Beach	Weekly	E. coli	13				
Barnstable	Joshua's Pond	Sampling Point	Weekly	E. coli	13				
Barnstable	Long Pond Farms Association	Sampling Point	Weekly	E. coli	13				
Barnstable	Lovell's Pond	Sampling Point	Weekly	E. coli	13				

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Barnstable	Middle Pond	Sampling Point	Weekly	E. coli	13				
Barnstable	Regency Drive Owners Association	Sampling Point 1	Weekly	E. coli	16	4	252	288	3
Barnstable	Sand Shores Association	Sampling Point	Weekly	E. coli	13				
Barnstable	Wequaquet Estates	Sampling Point	Weekly	E. coli	13				
Barnstable	Wequaquet Lake Town	Sampling Point	Weekly	E. coli	13				
Barnstable	Wianno Club (Fresh-Crystal Lake)	Sampling Point	Weekly	E. coli	13				
Becket	Camp Becket - Iroquois Beach	Sampling Point	Weekly	E. coli	15				
Becket	Camp Becket Main - Beach	Sampling Point	Weekly	E. coli	15				
Becket	Camp Greylock - Jr. Beach	Sampling Point	Weekly	E. coli	11				
Becket	Camp Watitoh Beach	Sampling Point	Weekly	E. coli	13				
Becket	Center Lake Estates Beach	Sampling Point	Weekly	E. coli	8	1	326	326	
Becket	Center Pond Beach	Sampling Point	Weekly	E. coli	7	1	727	727	
Becket	Chimney Corners Camp - Beach	Sampling Point	Weekly	E. coli	15				
Becket	Crystal Pond Homeowners Assoc Beach	Sampling Point	Weekly	E. coli	15	1	1733	1733	
Becket	Indian Lake Assoc - Beach #1	Sampling Point	Weekly	E. coli	15				
Becket	Indian Lake Assoc - Beach #2	Sampling Point	Weekly	E. coli	15				
Becket	Indian Lake Assoc - Boat Dock	Boat Dock	Weekly	E. coli	15				
Becket	Indian Lake Assoc - Small Pond Beach	Sampling Point	Weekly	E. coli	15				
Becket	Mountain Grove Assoc. Beach	Sampling Point	Weekly	E. coli	14	1	281	281	
Becket	Shawnee Shore Beach	Sampling Point	Once	E. coli	1				
Becket	Sherwood Forest - Arrow Beach	Sampling Point	Weekly	E. coli	14				
Becket	Sherwood Forest - Boat Beach	Sampling Point	Weekly	E. coli	15				
Becket	Sherwood Forest - Excalibur	Sampling Point	Weekly	E. coli	15	1	248	248	
Becket	Sherwood Forest - Grass Beach	Sampling Point	Weekly	E. coli	9				
Becket	Sherwood Forest - Lancelot Beach	Sampling Point	Weekly	E. coli	15				
Becket	Sherwood Forest - Little Robin Beach	Little Robin Dam	Weekly	E. coli	6				
Becket	Sherwood Forest - Little Robin Beach	Sampling Point	Weekly	E. coli	15	2	248	548	
Becket	Sherwood Forest - North Beach	Sampling Point	Weekly	E. coli	15				
Becket	Sherwood Forest - Will Scarlett	Sampling Point	Weekly	E. coli	15	1	365	365	
Becket	Sherwood Greens Road District Beach	Sampling Point	Weekly	E. coli	13				
Bedford	Springs Brook Park Bathing Beach	Concession Stand Area	Weekly	E. coli	10				
Bedford	Springs Brook Park Bathing Beach	Dock	Weekly	E. coli	10				
Bedford	Springs Brook Park Bathing Beach	Spray Pond	Weekly	E. coli	10				
Bedford	Springs Brook Park Bathing Beach	Water Slide (used to be Rivulet)	Weekly	E. coli	10				
Belchertown	Belchertown Town Beach (Lake Arcadia)	Sampling Point	Weekly	E. coli	10				
Bellingham	Arcand Park Beach	Sampling Point	Weekly	E. coli	9				
Bellingham	Arcand Park Beach	Sampling Point	Weekly	Enterococci	6	2	80	126	
Bellingham	Silver Lake	Sampling Point	Weekly	E. coli	10	3	400	400	
Bellingham	Silver Lake	Sampling Point	Weekly	Enterococci	8	5	72	188	
Billerica	Nutting Lake - Micozzi Beach	North	Weekly	E. coli	15	1	348	348	2
Billerica	Nutting Lake - Micozzi Beach	South	Weekly	E. coli	15	2	320	344	2
Bolton	Bolton Town Beach	Sampling Point	Weekly	E. coli	15				
Bolton	Camp Resolute	Day Beach AKA Camp 2	Weekly	E. coli	14				
Bolton	Camp Resolute	Main Beach AKA Camp 1	Weekly	E. coli	15	1	400	400	1

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Bolton	Camp Virginia Beach	Sampling Point	Weekly	E. coli	11	2	400	400	2
Bolton	Tom Denney Nature Camp	Sampling Point	Weekly	E. coli	8				
Bourne	Picture Lake	Sampling Point	Weekly	E. coli	14	1	800	800	1
Bourne	Queen Sewell Pond	Sampling Point	Weekly	E. coli	13				1
Boxford	Camp Rotary	Sampling Point	Weekly	E. coli	10				
Boxford	Camp Stepping Stone	Sampling Point	Weekly	E. coli	7				
Boxford	Camp Wakanda	Sampling Point	Weekly	E. coli	13				
Boxford	Danvers YMCA Daycamp	Sampling Point	Weekly	E. coli	8				
Boxford	Stiles Pond	Sampling Point	Weekly	E. coli	14				
Braintree	Sunset Lake	dock	Weekly	E. coli	12				
Brewster	Beechwood Landing/Greenland Pond	Sampling Point	Weekly	E. coli	13				
Brewster	Beechwood Landing/Long Pond	Sampling Point	Weekly	E. coli	13				
Brewster	Blueberry Pond	Sampling Point	Weekly	E. coli	13				
Brewster	Camp Favorite	Sampling Point	Weekly	E. coli	8				
Brewster	Cape Cod Sea Camps (Long Pond)	Sampling Point	Weekly	E. coli	11				
Brewster	Cliff Pond	DYS	Weekly	Enterococci	15				
Brewster	Cliff Pond	Sampling Point	Weekly	Enterococci	16	1	500	500	1
Brewster	Crossroads for Kids Camp	Crossroads for Kids Camp	Weekly	E. coli	11	1	496	496	
Brewster	Flax Pond	Sampling Point	Weekly	Enterococci	15				
Brewster	Long Pond	Sampling Point	Weekly	E. coli	13				
Brewster	Robinwood Homeowners Association (Owl Pond)	Sampling Point	Weekly	E. coli	10				
Brewster	Sheep Pond	Sampling Point	Weekly	E. coli	13				
Brewster	Sheeps Landing	Sampling Point	Weekly	E. coli	13				
Brewster	Slough Pond	Sampling Point	Weekly	E. coli	13				
Brewster	Upper Mill Pond	Sampling Point	Weekly	E. coli	13				
Brimfield	Dean Pond Beach	Sampling Point	Weekly	Enterococci	12	2	74	400	1
Brimfield	Quinebaug Cove Campground	Sampling Point	Unknown	E. coli	4	2	690	2420	
Brimfield	Village Green Family Campground	Sampling Point	Weekly	E. coli	13				
Brookfield	South Pond	Sampling Point	Weekly	E. coli	9				
Carver	Crystal Lake	Sampling Point	Weekly	E. coli	7				
Carver	John's Pond	Sampling Point	Weekly	E. coli	13				
Carver	Sampson's Pond	Sampling Point	Weekly	E. coli	12				
Charlemont	Cold River Pool	Sampling Point	Weekly	Enterococci	5				
Charlton	Buffumville Lake (USACE)	Sampling Point	Weekly	E. coli	16				
Charlton	Camp Foskett (YMCA)	Sampling Point	Weekly	E. coli	11	1	520	520	1
Charlton	Camp Joslin	Sampling Point	Weekly	E. coli	10				
Charlton	Salem Covenant Church Camp	Sampling Point	Weekly	E. coli	14	1	550	550	2
Chatham	Goose Pond	Sampling Point	Weekly	E. coli	13				
Chatham	Schoolhouse Pond	Sampling Point	Weekly	E. coli	13				
Chatham	White Pond	Sampling Point	Weekly	E. coli	13				
Chatham	White Pond @ 60 White Pond Rd.	Sampling Point	Weekly	E. coli	13				
Chelmsford	Freeman Lake	Middle	Weekly	E. coli	11	3	256	320	1
Chelmsford	Hart Pond	Middle	Weekly	E. coli	9				
Chesterfield	Lake Damon Corporation Beach	Sampling Point	Weekly	E. coli	15				
Chicopee	Chicopee Beach	Sampling Point	Weekly	Enterococci	16	1	104	104	1

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Clarksburg	Mausert Pond - Day use area beach	Sampling Point	Weekly	Enterococci	15				
Concord	Annursnac Hill Assoc.	Sampling Point	Weekly	E. coli	16	1	1140	1140	1
Concord	Silver Hill Assoc	Sampling Point	Weekly	E. coli	16	1	256	256	1
Concord	Walden Pond - Main	Sampling Point	Weekly	Enterococci	15				
Concord	Walden Pond - Red Cross	Sampling Point	Weekly	Enterococci	15				
Concord	White Pond Assoc	Sampling Point	Weekly	E. coli	15				
Cummington	Shire Village Beach	Sampling Point	Weekly	E. coli	7				
Dennis	Flax Pond	Sampling Point	Weekly	E. coli	13				
Dennis	Princess Beach-Scargo Lake	Sampling Point	Weekly	E. coli	13				
Dennis	Scargo Lake	Sampling Point	Weekly	E. coli	13				
Douglas	Breezy Picnic Grounds	Sampling Point	Weekly	E. coli	13				
Douglas	Lake Manchaug Camping	Sampling Point	Weekly	E. coli	13				
Douglas	Wallum Lake	Sampling Point	Weekly	Enterococci	16	1	80	80	1
Douglas	Wallum Lake Terrace	Sampling Point	Monthly	E. coli	4				
Dover	Grossman Beach	Sampling Point	Weekly	E. coli	11	1	390	390	
Dover	Powissett	Sampling Point	Weekly	E. coli	11				
Dracut	Fleur de Lis	Sampling Point	Weekly	E. coli	9				
Dracut	Grove	Sampling Point	Weekly	E. coli	9				
Dracut	Hilltop	Sampling Point	Weekly	E. coli	9				
Dracut	Mascuppic	Sampling Point	Weekly	E. coli	9				
Dracut	Passaconaway	Sampling Point	Weekly	E. coli	9				
Dracut	Richardson	Sampling Point	Weekly	E. coli	9				
Dudley	Merino Pond	Sampling Point	Weekly	E. coli	14				
Dunstable	YMCA beach @ Massapoag Pond	Sampling Point	Weekly	E. coli	12				
East Brookfield	Camp Frank A Day	Sampling Point	Weekly	E. coli	7				
East Brookfield	Lake Lashaway	Sampling Point	Weekly	E. coli	12				
Eastham	Great Pond	Sampling Point	Weekly	E. coli	13				
Eastham	Herring Pond	Sampling Point	Weekly	E. coli	13				
Eastham	Jemima Pond	Sampling Point	Weekly	E. coli	13				
Eastham	Long Pond (Depot St.)	Sampling Point	Weekly	E. coli	13				
Eastham	Minister's Pond	Sampling Point	Weekly	E. coli	13				
Eastham	Nauset Haven Lakeside Condo (Minister)	Sampling Point	Weekly	E. coli	13				
Eastham	Whispering Pines Condo (Muddy Pond)	Sampling Point	Weekly	E. coli	10				
Eastham	Wiley Park	Sampling Point	Weekly	E. coli	14	1	244	244	1
Easton	Town Pool	End of 1st dock	Weekly	E. coli	7				
Egremont	Prospect Lake Park	Sampling Point	Weekly	E. coli	16	3	285	2419	
Erving	Laurel Lake	Sampling Point	Weekly	Enterococci	16	1	132	132	1
Essex	Camp Menorah	Sampling Point	Weekly	E. coli	10				
Essex	Centennial Grove	Sampling Point	Weekly	E. coli	14				
Falmouth	Ashumet Valley Holly Sands	Sampling Point	Weekly	E. coli	13				
Falmouth	Cape Cod Camp Resort	Sampling Point	Weekly	E. coli	13				
Falmouth	Coonamessett Pond	Sampling Point	Weekly	E. coli	13				
Falmouth	Grew's Pond	Sampling Point	Weekly	E. coli	13				
Falmouth	Jenkins Pond - Pinecrest	Sampling Point	Weekly	E. coli	13				
Falmouth	Lochstead Association	Sampling Point	Weekly	E. coli	13				
Falmouth	Mares Pond Association	Sampling Point	Weekly	E. coli	13				
Falmouth	Sand Pointe Shores-Rock Hollow	Sampling Point	Weekly	E. coli	13				

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Falmouth	Sand Pointe Shores-White Cap	Sampling Point	Weekly	E. coli	13				
Falmouth	Shady Lane HA-Crooked Pond	Sampling Point	Weekly	E. coli	12				
Falmouth	Water-by Estates Association-Flax Pond	Sampling Point	Weekly	E. coli	11				
Florida	Manice Education Center Beach	Sampling Point	Weekly	E. coli	16	1	435	435	
Framingham	Cochituate Beach	Sampling Point	Weekly	E. coli	10				
Framingham	Learned Beach	Sampling Point	Weekly	E. coli	12	3	320	1300	
Framingham	Washakum Beach	Sampling Point	Weekly	E. coli	12	3	840	1260	2
Franklin	Chilson Beach	Sampling Point	Weekly	E. coli	10	1	310	310	1
Freetown	Cathedral Camp	Sampling point	Weekly	E. coli	11				
Freetown	Long Pond AKA Town Beach	Sampling Point	Weekly	E. coli	15	2	760	2000	
Gardner	Dunn Pond	Sampling Point	Weekly	Enterococci	14				
Gardner	Lithuanian Outing Assoc.	Sampling Point	Weekly	E. coli	16				
Georgetown	American Legion Park	Sampling Point	Weekly	E. coli	10				
Georgetown	Camp Leslie	Sampling Point	Weekly	E. coli	9				
Goshen	Camp Holy Cross	Sampling Point	Weekly	E. coli	10	1	286	286	
Goshen	Camp Howe	Sampling Point	Weekly	E. coli	11	1	420	420	
Goshen	Hammond Acres	Sampling Point	Weekly	E. coli	16	1	340	340	
Goshen	Upper Highland Lake - Campers Beach	Sampling Point	Weekly	Enterococci	15				
Goshen	Upper Highland Lake - Day use area beach	Sampling Point	Weekly	Enterococci	15				
Grafton	Silver Lake Beach	Sampling Point	Weekly	E. coli	11				
Great Barrington	Camp Half Moon	Sampling Point	Weekly	E. coli	11				
Great Barrington	Lake Mansfield	Town beach	Weekly	E. coli	15				
Great Barrington	Seven Stones Beach (KSA)	Sampling Point	Weekly	E. coli	13				
Greenfield	Greenfield Municipal Bathing Beach	Sampling Point	Weekly	E. coli	15	1	428	428	1
Groton	Baby Beach Lost Lake	Sampling Point	Weekly	E. coli	15				
Groton	Groton Town Beach	Sampling Point	Weekly	E. coli	15	1	244	244	1
Groton	Grotonwood Camp	Sampling Point	Weekly	E. coli	10				
Halifax	Annawon Drive	Sampling Point	Weekly	E. coli	12				1
Halifax	Halifax Beach Association	Sampling Point	Weekly	E. coli	12				
Halifax	Holmes Street	Sampling Point	Weekly	E. coli	12				1
Halifax	Lingan Street	Sampling Point	Weekly	E. coli	12				1
Halifax	Twin Lakes Condominiums	Sampling Point	Weekly	E. coli	12				1
Hanson	Cranberry Cove	Sampling Point	Weekly	E. coli	11				
Hanson	Ocean Ave.	Sampling Point	Weekly	E. coli	9	1	400	400	1
Harvard	Camp Green Eyrie	Sampling Point	Weekly	E. coli	14				
Harvard	Harvard Town Beach	Sampling Point	Weekly	E. coli	15				
Harwich	Aunt Edie's Pond	Sandy Shore Way	Weekly	E. coli	13				
Harwich	Buck's Pond	Sampling Point	Weekly	E. coli	14	1	588	588	1
Harwich	Clearwater Drive (Great Sands)	3	Weekly	E. coli	13				
Harwich	Hinkley's Pond	Sampling Point	Weekly	E. coli	13				
Harwich	John Joseph Pond at Lakeside Terrace (Great Sands)	Lakeside Terrace	Weekly	E. coli	13				
Harwich	John Joseph Pond at Vacation Lane (Great Sands)	2	Weekly	E. coli	13				

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Harwich	Long Pond Rte 124	Sampling Point	Weekly	E. coli	13				
Harwich	Long Pond-Cahoon St.	Sampling Point	Weekly	E. coli	13				
Harwich	Long Pond-Long Pond Drive	Sampling Point	Weekly	E. coli	13				
Harwich	Robbins Pond	Sampling Point	Weekly	E. coli	13				
Harwich	Sand Pond	Sampling Point	Weekly	E. coli	13				
Harwich	Seymour Pond	Sampling Point	Weekly	E. coli	13				
Harwich	Skinequit Pond	Sampling Point	Weekly	E. coli	13				
Haverhill	Plugs Pond	Sampling Point	Weekly	E. coli	10				
Heath	Mohawk Estates	Beach	Weekly	E. coli	7				
Hinsdale	Camp Ashmere Beach	Sampling Point	Weekly	E. coli	11				
Hinsdale	Camp Emerson Beach	Sampling Point	Weekly	E. coli	4				
Hinsdale	Camp Romaca	Beach	Weekly	E. coli	11				
Hinsdale	Camp Taconic Beach	Sampling Point	Weekly	E. coli	11				
Holden	Camp Kinneywood Beach	Sampling Point	Weekly	E. coli	11	1	440	440	
Holden	Eagle Lake	Sampling Point	Weekly	E. coli	15	2	360	770	2
Holland	Aqua Riders of Holland	Sampling Point	Weekly	E. coli	6				
Holland	Craig Road Beach	Sampling Point	Weekly	E. coli	16	1	5100	5100	
Holland	Lake Siog Park (USACE)	Sampling Point 2	Weekly	E. coli	14				
Holland	Massaconet Shores	Sampling Point	Weekly	E. coli	15				
Holland	PJ's Beach	Sampling Point	Weekly	E. coli	10	1	2500	2500	
Holliston	Pleasure Point	Sampling Point	Weekly	E. coli	15				
Holliston	Stoddard Park	Sampling Point	Weekly	E. coli	15				
Hopkinton	Sandy Beach	Left	Weekly	E. coli	10				
Hopkinton	Sandy Beach	Middle	Weekly	E. coli	10				
Hopkinton	Sandy Beach	Right	Weekly	E. coli	10				
Hubbardston	Comet Pond Beach	Middle	Weekly	Enterococci	13	1	96	96	1
Hubbardston	Pinecrest Property Owners Assoc.	Sampling Point	Biweekly	E. coli	5				
Hudson	Centennial Beach	Sampling Point	Weekly	E. coli	11				
Huntington	Timothy Hill Children's Ranch	Beach	Weekly	E. coli	9				
Huntington	YMCA Camp Norwich Beach	Sampling Point	Weekly	E. coli	9				
Ipswich	Hood Pond-boat ramp	Sampling Point	Weekly	Enterococci	15				
Kingston	Camp Morning Star	Sampling Point	Weekly	E. coli	6				
Lakeville	Loon Pond	Sampling Point	Once	E. coli	1				
Lakeville	Clear Pond	Sampling Point	Weekly	E. coli	11				
Lancaster	Camp Lowe Beach	Sampling Point	Weekly	E. coli	10				
Lancaster	Lancaster Town Beach	Sampling Point	Weekly	E. coli	10				
Lanesborough	Sunrise Beach	Sampling Point	Weekly	E. coli	14				
Lee	Goose Pond at Leisure Lee Rd.	Sampling Point	Weekly	E. coli	15				
Lee	Inn at Laurel Lake	Sampling Point	Weekly	E. coli	14				
Lee	Lee Town Beach	Sampling Point	Weekly	E. coli	16				
Leicester	Camp Wind-in-the-Pines	Lower beach	Weekly	E. coli	9				
Lenox	Lenox Town Beach (Laurel Lake)	Sampling Point	Weekly	E. coli	15				
Leominster	Ricker's Kindercamp	Sampling Point	Weekly	E. coli	8				
Lexington	Old Reservoir Swim Area #1	Sampling Point	Weekly	Enterococci	15	1	185	185	2
Lexington	Old Reservoir Swim Area #2	Sampling Point	Weekly	Enterococci	15	3	63	990	2
Littleton	Littleton Town Beach	Sampling Point	Weekly	E. coli	15				
Lowell	Merrimac River - Bath House	Sampling Point	Weekly	E. coli	14				

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Ludlow	Haviland Pond	Middle of pond	Weekly	E. coli	14				
Lunenburg	Hickory Hill (Hemlock Drive)	Sampling Point	Weekly	E. coli	15				
Lunenburg	Hickory Hills (Island Rd.)	Sampling Point	Weekly	E. coli	15				
Lunenburg	Lake Whalom	Sampling Point	Weekly	E. coli	15	1	365	365	1
Lunenburg	Lunenburg Town Beach	Sampling Point	Weekly	E. coli	9				
Lunenburg	Shady Point Campground	Sampling Point	Weekly	E. coli	14				
Marlborough	Henry F Collins Beach	Sampling Point	Weekly	E. coli	8				
Marlborough	Intercolonial Club of Marlborough	Sampling Point	Weekly	E. coli	8				
Marlborough	McDonald Beach	Sampling Point	Weekly	E. coli	9				
Marlborough	Memorial Beach	Left	Weekly	E. coli	14				
Marlborough	Memorial Beach	Right	Weekly	E. coli	14				
Marlborough	Richard P. Sharon Beach	Sampling Point	Weekly	E. coli	8				
Marlborough	Roger's Beach	Sampling Point	Weekly	E. coli	9				
Mashpee	Attaquin	Sampling Point	Weekly	E. coli	14	1	800	800	1
Mashpee	Briarwood Beach	Sampling Point	Weekly	E. coli	13				
Mashpee	Camp Farley - Wakeby Pond	Sampling Point	Weekly	E. coli	13				
Mashpee	Fells Pond	Sampling Point	Weekly	E. coli	13				
Mashpee	John's Pond (Fred's Beach)	Tim's Beach	Weekly	E. coli	13				
Mashpee	John's Pond (North)	Sampling Point	Weekly	E. coli	13				
Mashpee	John's Pond (Public)	Back Road	Weekly	E. coli	13				
Mashpee	John's Pond (Public)	Brickyard Road	Weekly	E. coli	13				
Mashpee	Mashpee Shores Assoc.	Sampling Point	Weekly	E. coli	14	1	800	800	1
Mashpee	Santuit Pond	Bryant's Neck	Weekly	E. coli	13				
Mashpee	Santuit Pond	Town Landing	Weekly	E. coli	13				
Mashpee	Santuit Pond Estate Assoc. - Santuit Pond	Sampling Point	Weekly	E. coli	5	1	800	800	
Mashpee	Trustees of the Reservation (Mashpee Pond)	Sampling Point	Weekly	E. coli	13				
Mashpee	Trustees of the Reservation (Wakeby Pond)	Sampling Point	Weekly	E. coli	13				
Medfield	Hinkley	Left	Weekly	E. coli	8	1	770	770	
Medfield	Hinkley	Right	Weekly	E. coli	9	1	810	810	
Medford	Wrights Pond	Deep End	Weekly	E. coli	10	1	260	260	1
Medford	Wrights Pond	Shallow End	Weekly	E. coli	9				1
Medway	Choate Pond	Left (Thayer)	Weekly	E. coli	14	3	240	3115	
Medway	Choate Pond	Right (playground)	Weekly	E. coli	14	5	269	1027	
Mendon	Town Beach	Sampling Point	Weekly	E. coli	10				
Methuen	Forest Lake: Swimming Beach	Sampling Point	Weekly	E. coli	10				1
Middleborough	Camp Avoda	Sampling Point	Weekly	E. coli	8				
Middleborough	Camp Yomechas	Sampling Point	Weekly	E. coli	15				
Middleborough	Woods Pond Cabins	Sampling Point	Weekly	E. coli	10				
Middleton	Thunderbridge	Sampling Point	Weekly	E. coli	16				1
Milton	Houghton's Pond @ Bathhouse	Sampling Point	Weekly	Enterococci	15				
Monterey	Benedict Pond Beach	Sampling Point	Weekly	Enterococci	15				
Monterey	Lake Garfield	Sampling Point	Weekly	E. coli	13				
Nantucket	Miacomet Pond	Sampling Point	Weekly	E. coli	12				
Nantucket	Sesachacha Pond	Sampling Point	Weekly	E. coli	12				
Natick	Camp Arrowhead	Sampling Point	Weekly	E. coli	9	1	324	324	1

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Natick	Camp Nonesuch	Sampling Point	Weekly	E. coli	13	1	328	328	
Natick	Cochituate Lake-North Beach	Sampling Point	Weekly	Enterococci	15				
Natick	Memorial Beach (Dug Pond)	Diving	Weekly	E. coli	11				
Natick	Memorial Beach (Dug Pond)	Kiddie	Weekly	E. coli	11				
New Marlborough	Camp Wa Wa Segowea	Sampling Point	Weekly	E. coli	6				
Newton	Crystal Lake	Sampling Point	Weekly	E. coli	9				
North Adams	Windsor Lake	Sampling Point	Weekly	E. coli	14				
North Andover	Frye Pond Beach	Sampling Point	Weekly	Enterococci	15				
North Andover	Stevens Pond	Sampling Point	Weekly	E. coli	12	6	800	4900	3
North Attleboro	Falls Pond	Sampling Point	Weekly	E. coli	11	4	250	1330	3
North Attleboro	Whitings Pond	Sampling Point	Weekly	E. coli	11	3	820	1900	1
North Brookfield	Brooks Pond	Sampling Point	Weekly	E. coli	10				
North Brookfield	Camp Atwater	Sampling Point	Weekly	E. coli	6				
Northampton	Musante Beach	Sampling Point	Weekly	E. coli	18	1	389	389	
Northbridge	Camp Hickory Hill Girl Scouts Camp	Sampling Point	Weekly	E. coli	4				
Oakham	Lake Dean Dean Campground	Sampling Point	Weekly	E. coli	14				
Oakham	Pine Acres Resort	Sampling Point	Weekly	E. coli	16				
Oakham	Treasure Valley Scout	East	Weekly	E. coli	14				
Oakham	Treasure Valley Scout	West	Weekly	E. coli	12				
Orange	Camp Selah	Sampling Point	Weekly	E. coli	5				
Orange	Town Beach	Beach	Weekly	E. coli	15	1	921	921	1
Orleans	Crystal Lake	Sampling Point	Weekly	E. coli	13				
Orleans	Pilgrim Lake	Sampling Point	Weekly	E. coli	13				
Otis	Camp Bonnie Brae	Sampling Point	Weekly	E. coli	13				
Otis	Camp Nawaka (Larkum Lake)	Sampling Point	Weekly	E. coli	6				
Otis	Otis Reservoir Beach	Sampling Point	Weekly	Enterococci	16	1	400	400	1
Otis	Otis Woodlands Club	Beach	Weekly	E. coli	14	1	261	261	1
Otis	Otis Woodlands Club	Picnic Grove	Weekly	E. coli	1				
Otis	Otis Woodlands Club	Weir	Weekly	E. coli	1				
Oxford	Barton Center	Sampling Point	Weekly	E. coli	11				
Oxford	Carbuncle Pond	Sampling Point	Weekly	E. coli	10				
Pembroke	Little Sandy	Sampling Point	Weekly	E. coli	12				
Pembroke	Oldham	Sampling Point	Weekly	E. coli	12				
Pembroke	Stetson	Sampling Point	Weekly	E. coli	12	1	560	560	
Peru	Camp Danbee	Sampling Point	Weekly	E. coli	15	1	340	340	
Phillipston	Queen Lake Beach	North Beach	Weekly	E. coli	16				
Phillipston	Queen Lake Beach	South Beach	Weekly	E. coli	16				
Pittsfield	Camp Stevenson/Witawentin	Sampling Point	Weekly	E. coli	8				
Pittsfield	Camp Winadu	Sampling Point	Weekly	E. coli	7				
Pittsfield	Country Club of Pittsfield	Sampling Point	Weekly	E. coli	10				
Pittsfield	Lakeside Christian Camp	Sampling Point	Weekly	E. coli	10				
Pittsfield	Lulu Pond Beach	Sampling Point	Weekly	Enterococci	23	9	72	320	5
Pittsfield	Onota Lake - Controy Pavillion	Sampling Point	Weekly	E. coli	15				
Pittsfield	Onota Lake - Decom Beach	Sampling Point	Weekly	E. coli	15				

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Pittsfield	Onota Lake - Public Beach at Burbank Park	Sampling Point	Weekly	E. coli	15				
Pittsfield	Pontoosuc Lake - Decom Beach	Sampling Point	Weekly	E. coli	15				
Pittsfield	The Pines (Pontoosuc Lake)	Sampling Point	Weekly	E. coli	15				
Plainfield	Plainfield Pond	Sampling Point	Weekly	E. coli	4				
Plymouth	Baird Center (Bloody Pond)	Sampling Point	Weekly	E. coli	11				
Plymouth	Barrett Pond	Sampling Point	Weekly	Enterococci	15				
Plymouth	Blueberry Hill Camp (Curlew Pond)	Sampling Point	Weekly	E. coli	14	1	400	400	
Plymouth	Camp Bournedale - Great Herring Pond	Sampling Point	Weekly	E. coli	11				
Plymouth	Camp Cachalot	Sampling Point	Weekly	E. coli	9				
Plymouth	Camp Clark YMCA - Hyles Pond	Sampling Point	Weekly	E. coli	10				
Plymouth	Camp Massasoit - Elbow Pond	Sampling Point	Weekly	E. coli	10				
Plymouth	Camp Norse	Sampling Point	Once	E. coli	1				
Plymouth	Camp Squanto	Sampling Point	Weekly	E. coli	9				
Plymouth	Charge Pond	Sampling Point	Weekly	Enterococci	15				
Plymouth	Clear Pond Condos/Village	Sampling Point	Once	E. coli	1				
Plymouth	College Pond Day Use	Sampling Point	Weekly	Enterococci	15				
Plymouth	Curlew Pond (DCR)	Sampling Point	Weekly	Enterococci	15				
Plymouth	Ellis Haven - Ellis Pond	Sampling Point	Weekly	E. coli	12				
Plymouth	Fearing Pond	Beach 1	Weekly	Enterococci	15				
Plymouth	Fearing Pond	Beach 2	Weekly	Enterococci	15				
Plymouth	Fresh Pond	Left (aka Mid Pond)	Weekly	E. coli	12				
Plymouth	Fresh Pond	Right (aka End Pond)	Weekly	E. coli	12				
Plymouth	Hedges Pond	Sampling Point	Weekly	E. coli	12				
Plymouth	Indian Head Resort	Sampling Point	Weekly	E. coli	10				
Plymouth	Morton Park	Cove (AKA right)	Weekly	E. coli	12				
Plymouth	Morton Park	Main (AKA left)	Weekly	E. coli	12				
Plymouth	Pinewood Camp - Camphouse Beach	Sampling Point	Weekly	E. coli	13				
Plymouth	Pinewood Camp - Crew Dock	Sampling Point	Weekly	E. coli	13				
Plymouth	Pinewood Camp - Round Pond	Sampling Point	Weekly	E. coli	13				
Plymouth	Pinewood Lodge - Pinewood Lake	Sampling Point	Weekly	E. coli	15				
Plymouth	Plymouth Estates	Sampling Point	Once	E. coli	1				
Plymouth	Sandy Pond Campground	Sampling Point	Weekly	E. coli	15				
Plymouth	Wind-in-the-Pines Camp	Sampling Point	Weekly	E. coli	9				
Randolph	Ponkapoag Pond	Sampling Point	Weekly	E. coli	11				
Richmond	Camp Marion White	Sampling Point	Weekly	E. coli	11				
Richmond	Camp Russell	Sampling Point	Weekly	E. coli	14	3	326	2419	
Richmond	Town Beach	Sampling Point	Weekly	E. coli	9				
Rochester	S.P.E.N.A. Beach	Sampling Point	Weekly	Enterococci	12				
Rockland	Hartsuff Park	Sampling Point	Weekly	E. coli	6				
Rowe	Rowe Town Beach at Pelham Park	Center AKA Swimming	Weekly	E. coli	17				
Rowe	Rowe Town Beach at Pelham Park	Inlet	Weekly	E. coli	13	1	326	326	
Rowe	Rowe Town Beach at Pelham Park	Right	Weekly	E. coli	17	1	291	291	
Royalston	St. Laurent Camp	Sampling Point	Weekly	E. coli	15				
Royalston	St. Laurent Camp	Sampling Point	Weekly	Enterococci	15	6	64	852	3
Royalston	Tully Lake Campground (USACE)	Sampling Point	Weekly	E. coli	16				

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Russell	H.A. Moses Beach	Sampling Point	Weekly	E. coli	8				
Rutland	Whitehall Pond Beach	Sampling Point	Weekly	Enterococci	15				
Sandisfield	York Lake Beach	Sampling Point	Weekly	Enterococci	15				
Sandwich	Camp Burgess	Sampling Point	Weekly	E. coli	12				
Sandwich	Camp Good News	Sampling Point	Weekly	E. coli	12				
Sandwich	Camp Hayward	Sampling Point	Weekly	E. coli	12				
Sandwich	Camp Lyndon	Sampling Point	Weekly	E. coli	12				
Sandwich	Dunroamin Park & Cottages	Sampling Point	Weekly	E. coli	13				
Sandwich	Lakefield Farms Trust	Sampling Point	Weekly	E. coli	13				
Sandwich	Lakewood Hills Property Owners Assoc.	Sampling Point	Weekly	E. coli	11				
Sandwich	Lawrence Pond Village	Sampling Point	Weekly	E. coli	13				
Sandwich	Peter's Pond RV Park	Main Beach/Beach Rd	Unknown	E. coli	4				
Sandwich	Peter's Pond RV Park	Small Beach/Cove St	Unknown	E. coli	4				
Sandwich	Peter's Pond Town Park 1	Sampling Point	Weekly	E. coli	9				
Sandwich	Rolling Ridge Homeowners Assoc.-Lawrence Pond	Sampling Point	Weekly	E. coli	14				
Sandwich	Snake Pond	Sampling Point	Weekly	E. coli	9				
Sandwich	South Shore YMCA - Triangle Pond	Sampling Point	Weekly	E. coli	12				
Sandwich	Wakeby Pond	Sampling Point	Weekly	E. coli	9				
Saugus	Peckham Pond @ Camp Nihan	Sampling Point	Weekly	Enterococci	15	1	315	315	1
Saugus	Pierce Lake @ Breakheart	Sampling Point	Weekly	Enterococci	17	2	83	110	2
Savoy	North Pond Beach	Sampling Point	Weekly	Enterococci	15				
Savoy	South Pond Beach	Sampling Point	Weekly	Enterococci	15				
Sharon	Camp Gannett Beach	Sampling Point	Weekly	E. coli	12				
Sharon	Camp Wonderland Beach	Sampling Point	Weekly	E. coli	9				
Sharon	Community Center Beach	Sampling Point	Twice per week	E. coli	26	5	245	1080	3
Sharon	Everwood Day Camp	Sampling Point	Weekly	E. coli	12				
Sharon	Massapoag Yacht Club	Sampling Point	Weekly	E. coli	14				
Sharon	Town Beach	Boat landing & beach	Twice per week	E. coli	31	2	264	264	1
Sharon	Town Beach	Swimming dock	Twice per week	E. coli	30	3	320	1220	2
Sherborn	Farm Pond	Sampling Point	Weekly	E. coli	19	2	345	730	3
Shrewsbury	Sunset Beach	Sampling Point	Weekly	E. coli	10				
Shutesbury	Lake Wyola	Sampling Point	Weekly	Enterococci	16	1	80	80	1
Shutesbury	Lake Wyola Association	East	Twice	E. coli	2				
Shutesbury	Lake Wyola Association	North	Twice	E. coli	2				
Shutesbury	Lake Wyola Association	West	Twice	E. coli	2				
Southwick	South Pond Beach - North	Sampling Point	Weekly	E. coli	16	5	280	1900	4
Spencer	Camp Laurel Wood	Sampling Point	Weekly	E. coli	14				
Spencer	Camp Marshall Beach	Sampling Point	Weekly	E. coli	11				
Spencer	Luther Hill Park	Sampling Point	Weekly	E. coli	11				
Springfield	Bass Pond	Right	Weekly	Enterococci	12	3	101	1119.9	3
Springfield	Camp Wilder	Right	Weekly	Enterococci	7				
Springfield	Five Mile Pond	Right	Weekly	Enterococci	9	1	116	116	1

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Springfield	Paddle Club	Right	Weekly	Enterococci	10	1	62	62	1
Sterling	Lake Waushacum #1	Sampling Point	Weekly	E. coli	11	1	649	649	
Stockbridge	Beachwood Assoc.	Sampling Point	Weekly	E. coli	18				
Stockbridge	Berkshire Country Day School	Sampling Point	Weekly	E. coli	8				
Stockbridge	Camp Mah-kee-nac	Sampling Point	Weekly	E. coli	14				
Stockbridge	Kripalu Beach	Sampling Point	Weekly	E. coli	12				
Stockbridge	Stockbridge Town Beach (Stockbridge Bowl)	Sampling Point	Weekly	E. coli	15				
Stockbridge	Tanglewood	Sampling Point	Weekly	E. coli	8				
Stockbridge	White Pines Condos (Stockbridge Bowl)	Sampling Point	Weekly	E. coli	15				
Stoughton	Ames Pond	Sampling Point	Weekly	E. coli	15	3	310	400	
Stow	Lake Boone	Sampling Point	Weekly	E. coli	13				
Sturbridge	Italian-American Sporting Club	Sampling Point	Weekly	E. coli	17	2	365	>2420	
Sturbridge	Main Beach - Walker Pond Assoc.	Sampling Point	Weekly	E. coli	13				
Sturbridge	Oak Cove - Walker Pond Assoc.	Sampling Point	Weekly	E. coli	15	1	2300	2300	
Sturbridge	Pioneer Pond Beach (Outdoor World)	Sampling Point	Weekly	E. coli	16	1	860	860	
Sturbridge	Sturbridge Host Hotel	Sampling Point	Weekly	E. coli	15				
Sturbridge	Sturbridge Recreation - Cedar Pond	Sampling Point	Weekly	E. coli	11				
Sturbridge	The Trail at Big Alum Lake Association Beach	Sampling Point	Weekly	E. coli	9				
Sturbridge	Wells State Park - Walker Pond Beach	Sampling Point	Weekly	Enterococci	15				
Sturbridge	Yogi Bear Campground	Sampling Point	Weekly	E. coli	17	4	240	727	
Sutton	Camp Blanchard	Sampling Point	Weekly	E. coli	14				
Sutton	King's Campground	Sampling Point	Weekly	E. coli	20				
Sutton	Marions Camp	Sampling Point	Weekly	E. coli	12				
Sutton	Old Holbrook Place	Sampling Point	Weekly	E. coli	15				
Sutton	Sutton Falls Camp	Sampling Point	Weekly	E. coli	19	3	300	350	
Taunton	Watsons Pond	Sampling Point	Weekly	Enterococci	15	1	80	80	1
Templeton	Beamans Pond	Sampling Point	Weekly	Enterococci	15	1	400	400	1
Templeton	Beamans Pond Campground	Sampling Point	Weekly	Enterococci	16	1	400	400	1
Templeton	Pinewood Shores	Sampling Point	Weekly	E. coli	7				
Templeton	Templeton Fish and Game Club	Sampling Point	Weekly	E. coli	16				
Tolland	Camp Kinderland Beach	Sampling Point	Weekly	E. coli	14				
Tolland	Camp Timbertrails	Sampling Point	Weekly	E. coli	13				
Tolland	Twin Brook Camping Area	Sampling Point	Monthly	E. coli	3				
Tolland	Wildwood - Fox Den	Sampling Point	Weekly	E. coli	15				
Tolland	Wildwood - Lakeside	Sampling Point	Weekly	E. coli	15				
Tolland	Wildwood - Main Beach	Sampling Point	Weekly	E. coli	15				
Tolland	Wildwood - Meadow	Sampling Point	Weekly	E. coli	15				
Tolland	Wildwood - Otter Pond Beach	Sampling Point	Weekly	E. coli	15				
Topsfield	Hood's Pond	Sampling Point	Weekly	E. coli	9				
Townsend	Pearl Hill Pond Beach	Sampling Point	Weekly	Enterococci	19	5	76	170	3
Tyngsborough	Berry's Grove Campground	Sampling Point	Weekly	E. coli	14				
Tyngsborough	Town Beach	Sampling Point	Weekly	E. coli	15				
Tyringham	Tyringham Park Beach	Sampling Point	Weekly	E. coli	14	1	548	548	
Upton	Kiwanis Beach	Sampling Point	Weekly	E. coli	13	2	250	390	
Uxbridge	Fairwoods	Sampling Point	Weekly	E. coli	14				

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Uxbridge	Pout Pond	Sampling Point	Weekly	E. coli	6				
Uxbridge	West Hill Park (USACE)	Sampling Point	Weekly	E. coli	19	3	326	770	
Wales	Cordially Colony	Sampling Point	Weekly	E. coli	14				
Wales	Lakeland Beach	Sampling Point	Weekly	E. coli	14				
Wales	Sichols	Sampling Point	Weekly	E. coli	13				
Wales	Wales Town Beach	Sampling Point	Weekly	E. coli	14				
Walpole	Sharon Country Day Camp Brook	Sampling Point	Weekly	E. coli	8				
Walpole	Sharon Country Day Camp Pond	Sampling Point	Weekly	E. coli	8				
Wareham	Shangri-La	Sampling Point	Weekly	E. coli	16	1	800	800	1
Wareham	Wareham Lake Shores	Sampling Point	Weekly	E. coli	15				
Wareham	White Island Association	Sampling Point	Weekly	E. coli	15				
Warren	Comin's Pond	Sampling Point	Weekly	E. coli	15				
Warwick	Moores Pond Beach	Sampling Point	Weekly	E. coli	12				
Wayland	Town Beach	Left Shallow	Weekly	E. coli	15				1
Wayland	Town Beach	Middle	Weekly	E. coli	8				1
Wayland	Town Beach	Right Shallow	Weekly	E. coli	15	1	1420	1420	1
Webster	Beacon Park Condominiums	Sampling Point	Weekly	E. coli	14				
Webster	Birch Island	Sampling Point	Weekly	E. coli	13				
Webster	Colonial Park	Sampling Point	Weekly	E. coli	14				
Webster	Kildeer Island (AKA Sandy Shore)	Sampling Point	Weekly	E. coli	14				
Webster	Lakeside	Sampling Point	Weekly	E. coli	17	1	350	350	
Webster	Memorial Beach #1	Sampling Point	Weekly	E. coli	15				
Webster	Memorial Beach #2	Sampling Point	Weekly	E. coli	15				
Webster	Nipmuc Cove	Sampling Point	Weekly	E. coli	12				
Webster	Treasure Island Condominiums	Sampling Point	Weekly	E. coli	14				
Wellesley	Morses Beach - Shallow	Sampling Point	Weekly	E. coli	16	3	240	520	2
Wellfleet	Duck Pond	Sampling Point	Weekly	E. coli	13				
Wellfleet	Great Pond	Sampling Point	Weekly	E. coli	13				
Wellfleet	Gull Pond	Sampling Point	Weekly	E. coli	13				
Wellfleet	Gull Pond (2)	Sampling Point	Weekly	E. coli	13				
Wellfleet	Higgins Pond	Sampling Point	Weekly	E. coli	13				
Wellfleet	Long Pond	Sampling Point	Weekly	E. coli	13				
Wendell	Ruggles Pond	Sampling Point	Weekly	Enterococci	16	2	62	62	1
Wenham	Gull Pond	Sampling Point	Weekly	E. coli	12				
Wenham	Pleasant Street Pond	Sampling Point	Weekly	E. coli	15				
West Brookfield	Lake Wickabog - Main Beach	Center	Weekly	E. coli	15				
West Stockbridge	Card Pond Beach	Sampling Point	Weekly	E. coli	10				
West Stockbridge	Crane Lake Camp	Sampling Point	Weekly	E. coli	11				
West Tisbury	Ice House Pond	Sampling Point	Weekly	Enterococci	14				
West Tisbury	Long Cove (fresh)	Sampling Point	Weekly	Enterococci	14				
West Tisbury	Seth's Pond	Focus	Weekly	Enterococci	11				
West Tisbury	Seth's Pond	Town Beach	Weekly	Enterococci	23	4	93.2	200.5	2
Westborough	Lake Chauncy Beach #1	Sampling Point	Weekly	E. coli	10	1	440	440	1
Westfield	Kingsley Beach	Sampling Point	Weekly	Enterococci	23	6	92	400	5
Westfield	Lamberts Beach	Sampling Point	Weekly	Enterococci	23	6	100	400	8

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Westford	East Boston Camps - Boys Beach	Sampling Point	Weekly	E. coli	16				
Westford	East Boston Camps - Day Care	Sampling Point	Weekly	E. coli	16				
Westford	East Boston Camps - Girls Beach	Sampling Point	Weekly	E. coli	16				
Westford	Edwards Town Beach	Sampling Point	Weekly	E. coli	10				
Westford	Forge Village Beach	Sampling Point	Weekly	E. coli	10				
Westford	Lakeside Meadows	Sampling Point	Weekly	E. coli	17	2	276	324	1
Westford	Marylou's Beach (NIA)	Sampling Point	Weekly	E. coli	15				
Westford	Nabnassett American Legion	Sampling Point	Weekly	E. coli	15				
Westford	Nashoba Valley Ski Resort: Camp Pond	Sampling Point	Weekly	E. coli	15				
Westford	Nashoba Valley Ski Resort: Function Pond	Sampling Point	Weekly	E. coli	15				
Westford	Noble's Cove Beach	Sampling Point	Weekly	E. coli	15				
Westford	North Beach (NIA)	Sampling Point	Weekly	E. coli	15				
Westford	Sandy Beach (NIA)	Sampling Point	Weekly	E. coli	15				
Westford	Summer Village Main Beach	Sampling Point	Weekly	E. coli	15				
Westminster	Crocker Pond	Sampling Point	Weekly	E. coli	23	1	286	286	1
Westminster	Crow Hill Pond Beach	Sampling Point	Weekly	Enterococci	18	3	72	160	3
Weston	River Day Camp	Sampling Point	Weekly	E. coli	13	1	292	292	
Weston	Valley Pond	Swim Pond	Weekly	E. coli	15				
Westwood	Membership Beach	Middle	Weekly	E. coli	15				
Westwood	Membership Beach	North	Weekly	E. coli	15				
Westwood	Membership Beach	South	Weekly	E. coli	15				
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	Sampling Point	Weekly	E. coli	10				
Wilbraham	Spec Pond Beach	Sampling Point	Weekly	E. coli	14	4	400	1000	2
Williamstown	Margaret Lindley Park	Sampling Point	Weekly	E. coli	10	1	345	345	2
Wilmington	Baby Beach	Sampling Point	Weekly	E. coli	13	1	480	480	
Wilmington	Town Beach	Center	Weekly	E. coli	14				
Wilmington	Town Beach	Right	Once	E. coli	1				
Winchendon	Lake Dennison State Park	Campers Beach	Weekly	Enterococci	16	1	96	96	1
Winchendon	Lake Dennison State Park	Day Use Area	Weekly	Enterococci	15				
Winchester	Shannon Beach @ Upper Mystic	Middle	Weekly	Enterococci	17	3	65	169	3
Winchester	Wedge Pond	Center	Weekly	E. coli	13	3	275	720	2
Winchester	Wedge Pond	North (aka left)	Weekly	E. coli	1				
Winchester	Wedge Pond	South (aka right)	Weekly	E. coli	1				
Worcester	Bell Pond Beach	Sampling Point	Weekly	E. coli	7				
Worcester	Coes Pond Beach (Mill St.)	Sampling Point	Weekly	E. coli	7				
Worcester	Indian Lake Public Beach (Sherburne Ave)	Sampling Point	Weekly	E. coli	7				
Worcester	Indian Lake Shore Park	Sampling Point	Weekly	E. coli	7				
Worcester	Lake Quinsigamond-Regatta Point Beach	Sampling Point	Weekly	Enterococci	22	5	72	400	5
Wrentham	Lake Pearl Park	Beach Center	Weekly	E. coli	11				
Wrentham	Sweatt Beach	Sampling Point	Weekly	E. coli	10				
Yarmouth	Big Sandy Pond	Sampling Point	Weekly	E. coli	13				
Yarmouth	Camp Greenough - Boy Scouts	Sampling Point	Weekly	E. coli	11	2	800	800	1
Yarmouth	Camp Wingate	Sampling Point	Weekly	E. coli	13				
Yarmouth	Dennis Pond	Sampling Point	Weekly	E. coli	15				

Table 14
MA Freshwater Beaches (2013): Water quality data for public and semi-public bathing beaches.

Community	Beach Name[1]	Sample Location	Testing Frequency	Indicator	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Yarmouth	Flax Pond	Sampling Point	Weekly	E. coli	16				
Yarmouth	Halcyon Condos	Sampling Point	Weekly	E. coli	13				
Yarmouth	Horse Pond	Sampling Point	Weekly	E. coli	15				
Yarmouth	Little Sandy Pond	Sampling Point	Weekly	E. coli	15				
Yarmouth	Long Pond - Indian	Sampling Point	Weekly	E. coli	16	1	444	444	1
Yarmouth	Long Pond - Lyman	Sampling Point	Weekly	E. coli	16	1	252	252	1

1 - Multiple instances of beaches may occur due to multiple sampling points.
2 - The number of postings could be greater than the number of single sample exceedances due to the presence of geometric mean exceedances or precautionary postings.

Table 15

MA Beaches (2013): Exceedances reported based on the number of days since last rainfall at public and semi-public bathing beaches.

Marine beaches

# Days Since Rain	# Exceedances	%
0	210	67.3%
1	10	3.2%
2	27	8.7%
3	9	2.9%
4	4	1.3%
5	10	3.2%
6	16	5.1%
7	20	6.4%
8	1	0.3%
9	1	0.3%
10	0	0.0%
10+	4	1.3%
Total	312*	100.0%

* - Out of 475 bacterial exceedances. One hundred sixty three exceedances had no corresponding rainfall information.

Freshwater beaches

# Days Since Rain	# Exceedances	%
0	85	54.1%
1	17	10.8%
2	26	16.6%
3	9	5.7%
4	5	3.2%
5	6	3.8%
6	3	1.9%
7	2	1.3%
8	2	1.3%
9	1	0.6%
10	1	0.6%
10+	0	0.0%
Total	157*	100.0%

* - Out of 280 bacterial exceedances. One hundred twenty three exceedances had no corresponding rainfall information.

FIGURES

This page is intentionally left blank.

Figure 1 - MA Marine Beaches, 2013: Exceedances per Community

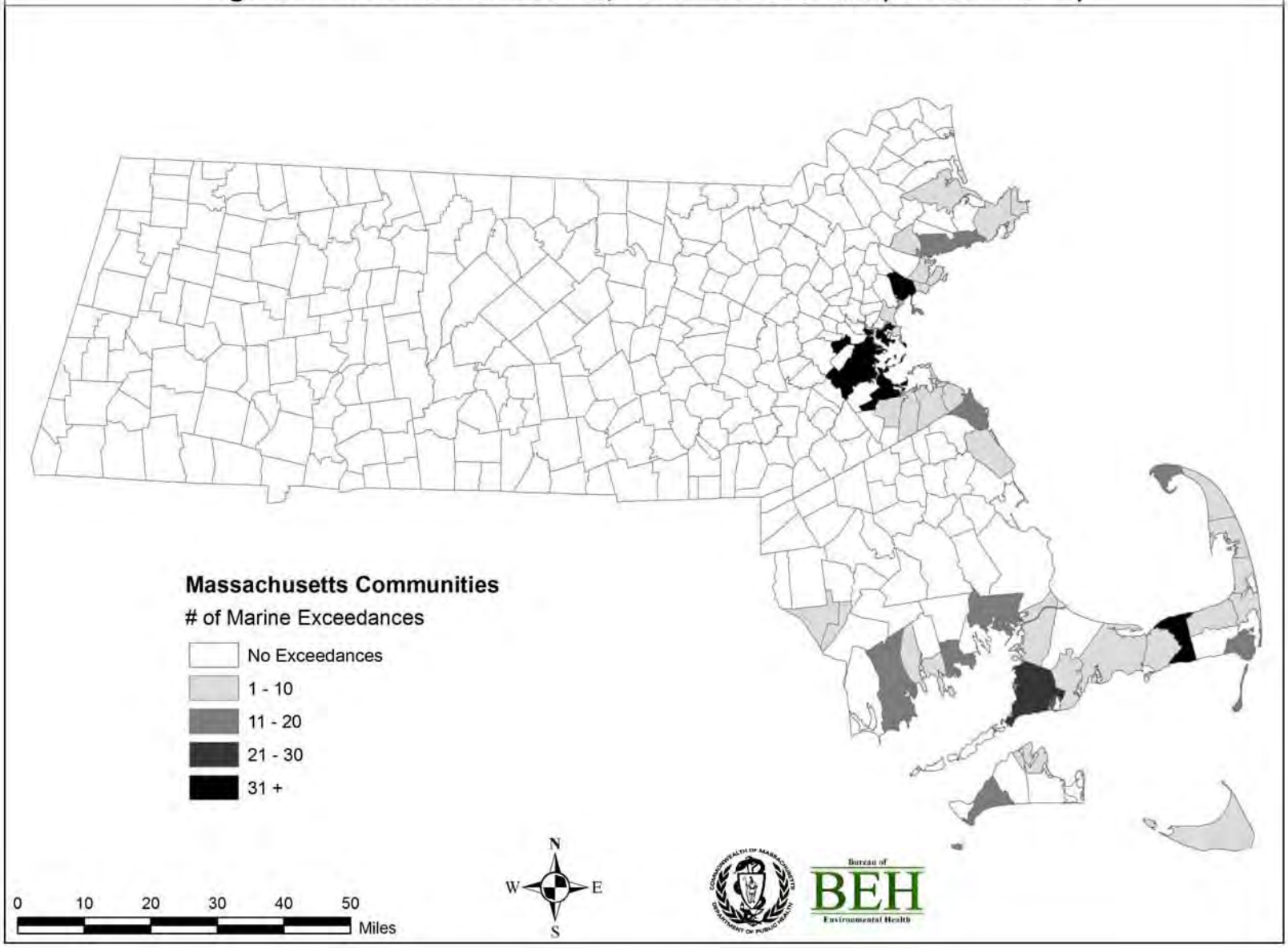


Figure 2 - Rainfall and Marine Exceedances in Boston Area (2013)

Boston area constitutes the communities of Boston, Braintree, Lynn, Quincy, Revere, and Winthrop

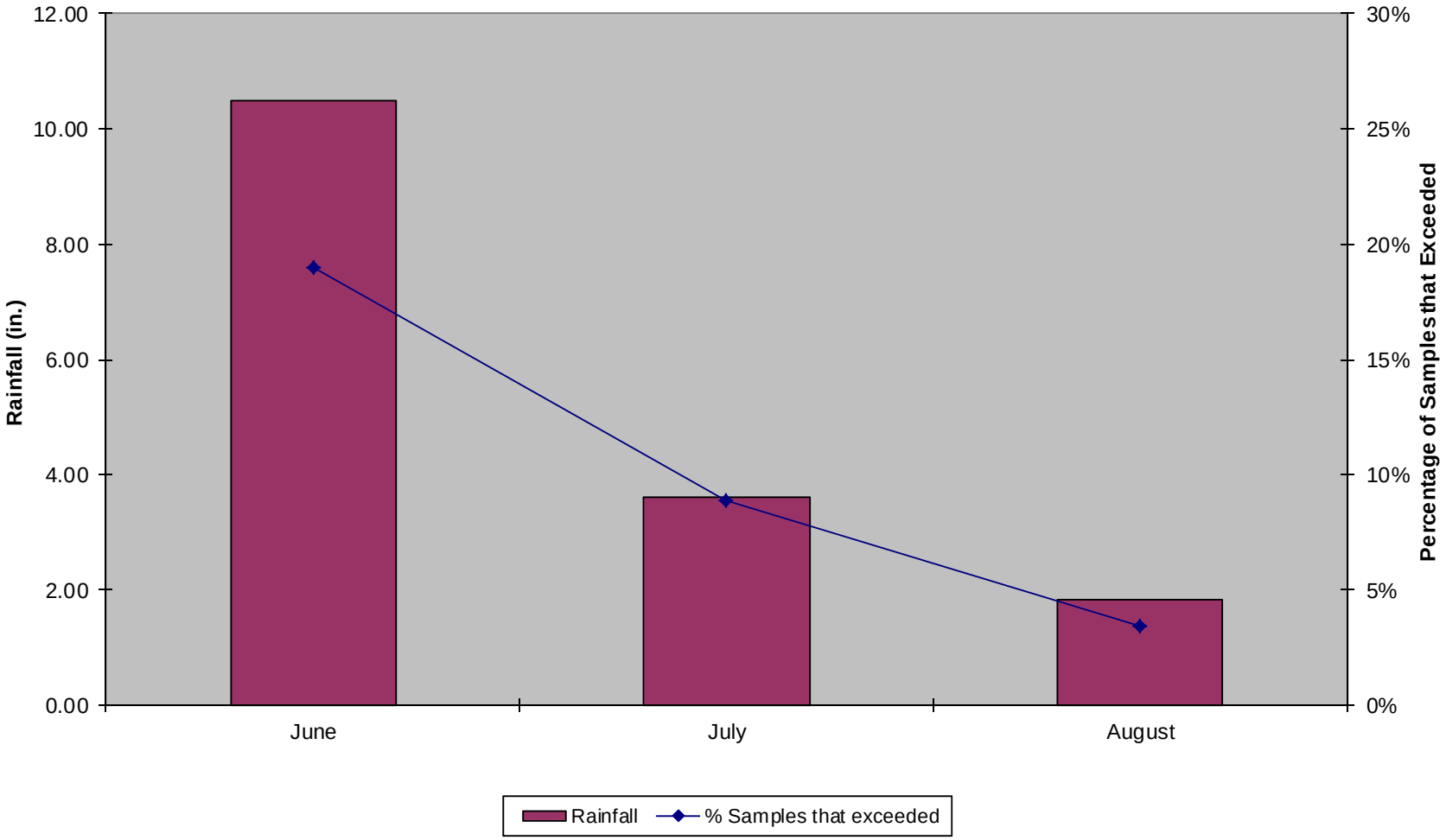


Figure 3 - Rainfall and Marine Exceedances in Chatham Area (2013)

Chatham area constitutes the communities of Brewster, Chatham, Dennis, Eastham, Harwich, and Orleans

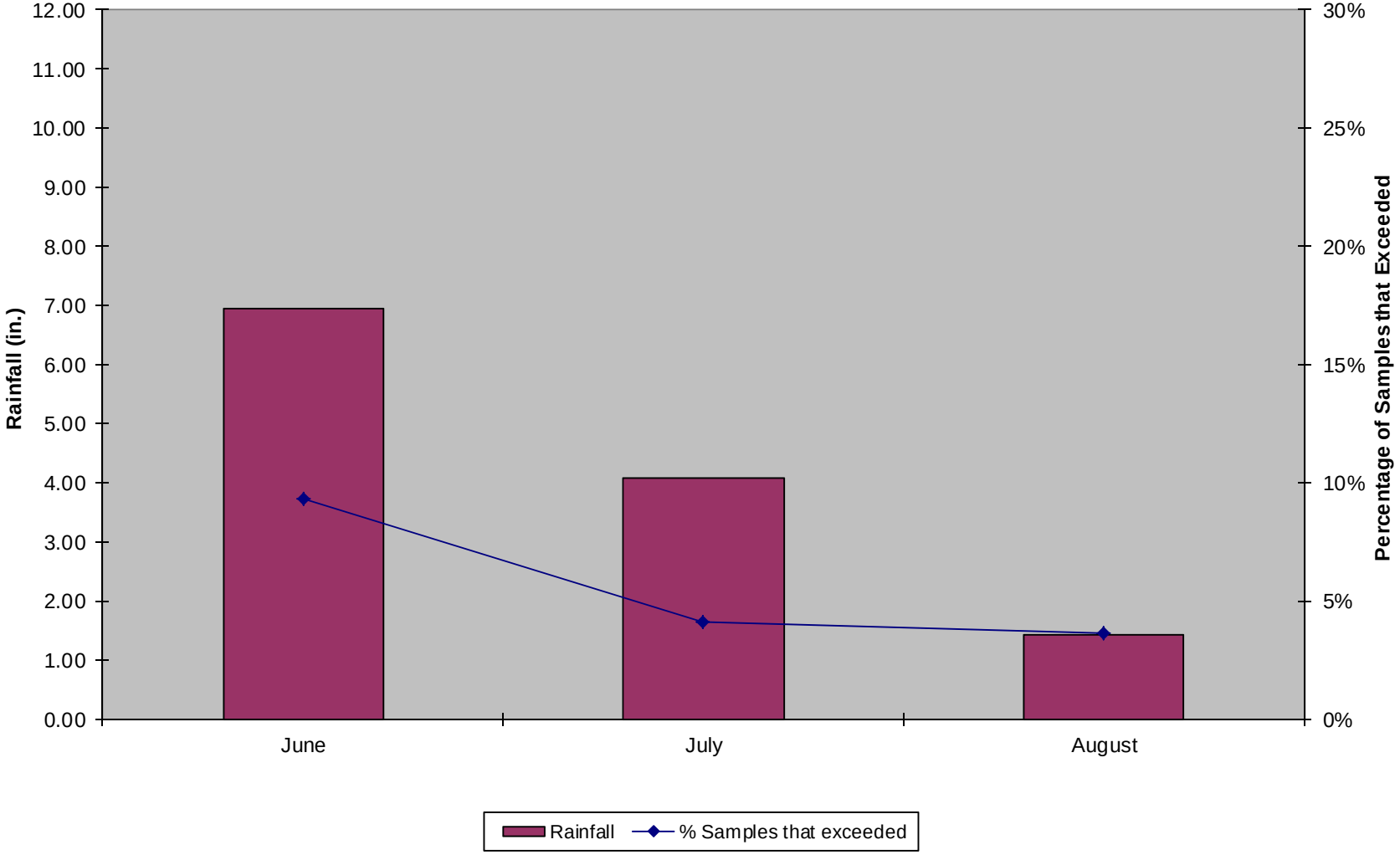


Figure 4 - MA Freshwater Beaches, 2013: Exceedances per Community

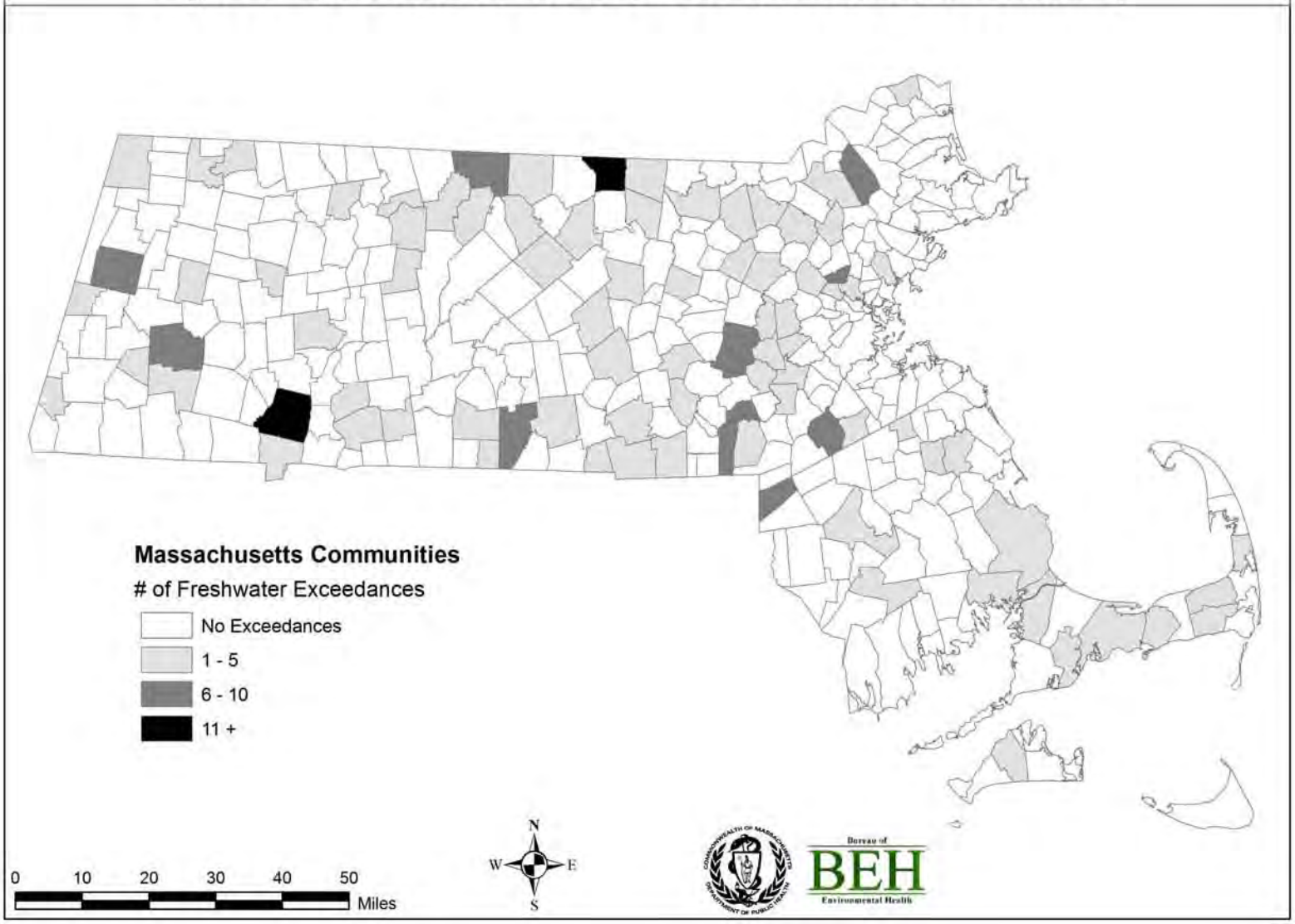


Figure 5

Historical Relationship between Rainfall and Exceedances at Marine Beaches

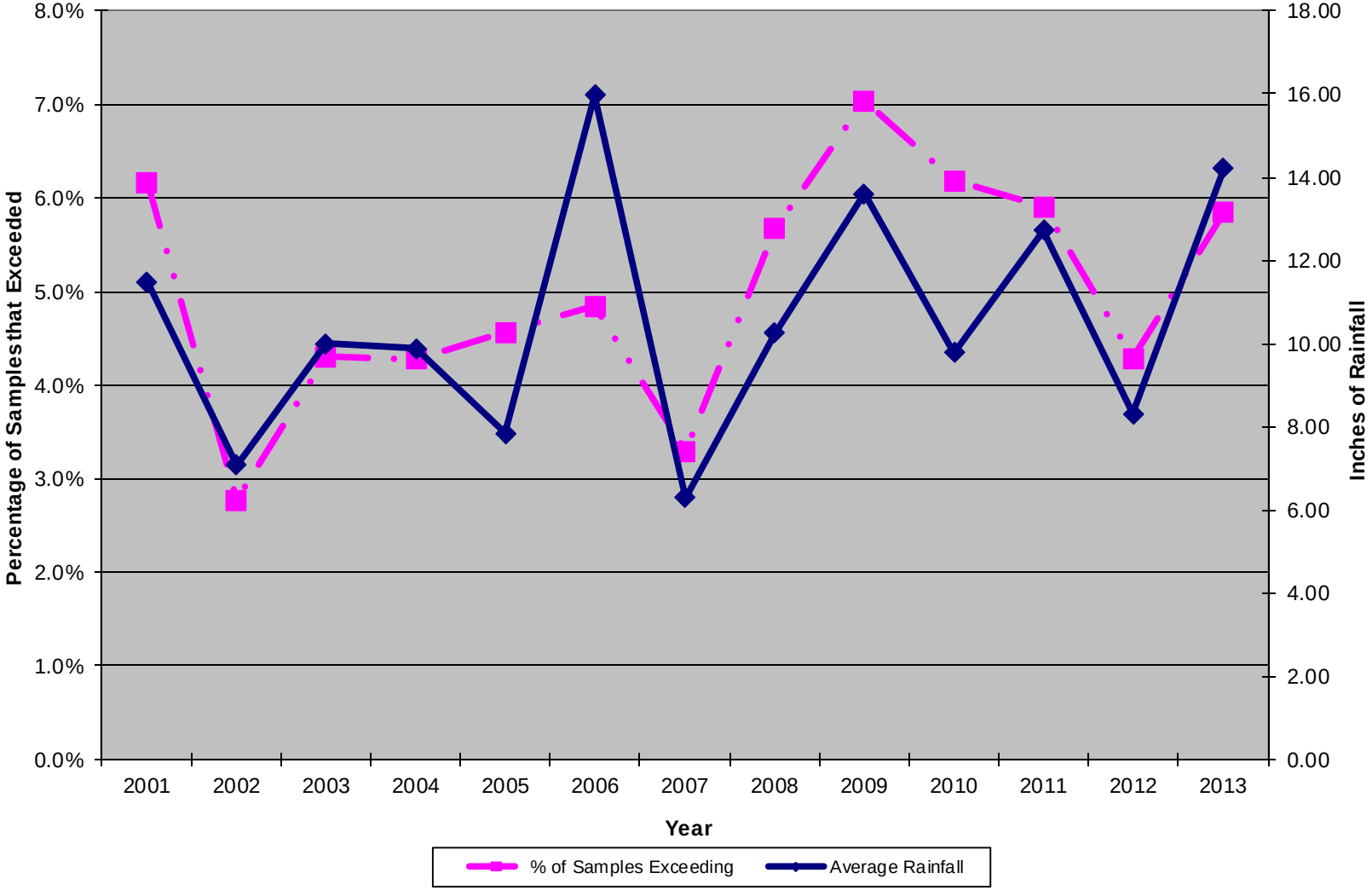


Figure 6
Historical Relationship Between Rainfall and Exceedances at Freshwater Beaches

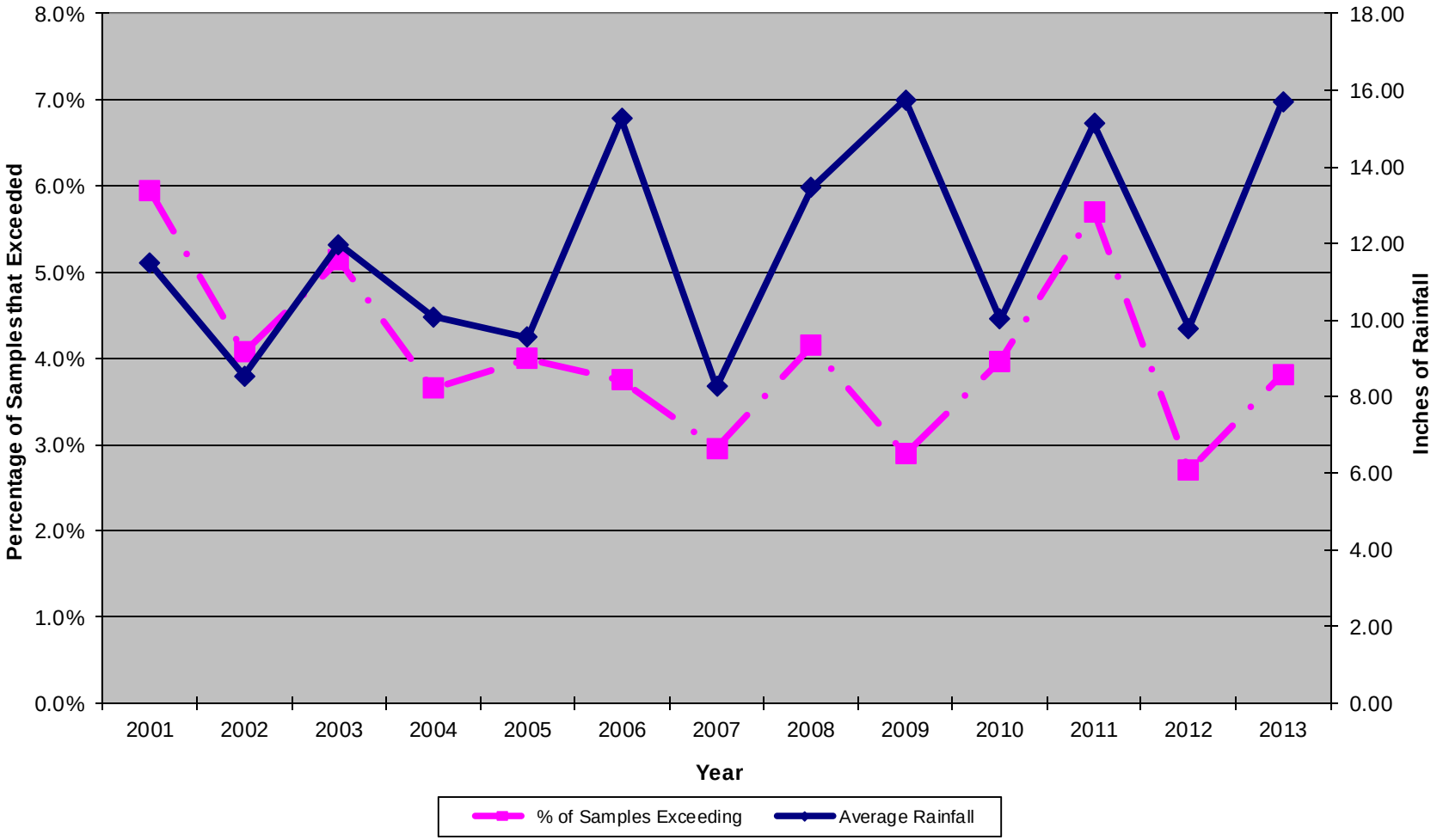
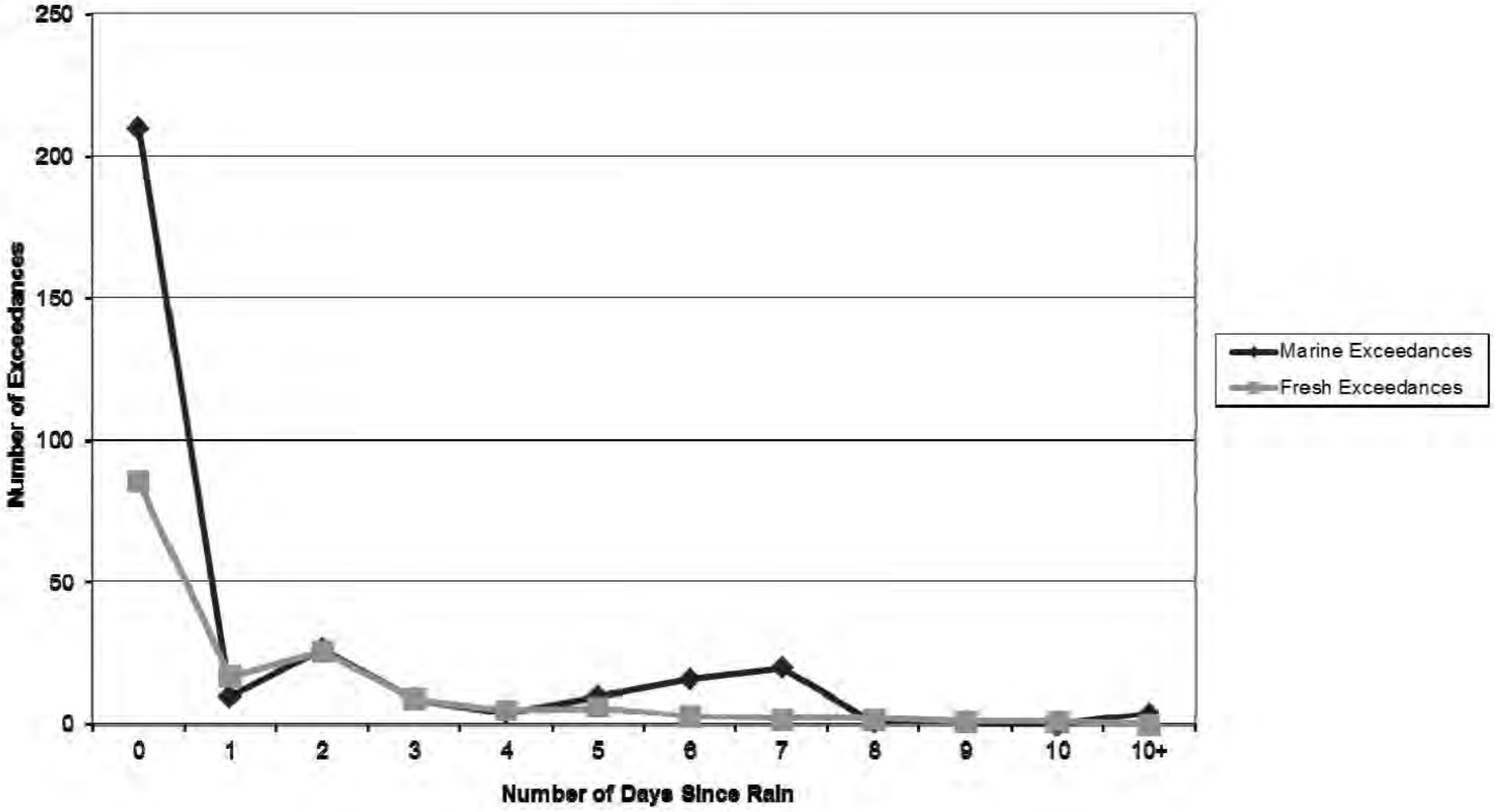


Figure 7
MA Beaches (2013): Relationship Between Bacterial Exceedances and Days Since Last Rainfall



This page is intentionally left blank.

APPENDICES

A. Massachusetts State Regulations
B. General Laws of Massachusetts
C. Massachusetts Beach Act
D. Federal BEACH Act
E. Background Information for Amendments to Bathing Beach Regulations
F. MDPH Beach Sampling Field Data Form

This page is intentionally left blank.

APPENDIX

A. Massachusetts State Regulations

This page is intentionally left blank.

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

Section

445.001: Purpose
445.002: Authority
445.003: Citation
445.004: Scope
445.010: Definitions
445.020: Operation
445.030: Bathing Water Quality
445.031: Indicator Organisms
445.032: Collection of Bathing Water Samples
445.033: Laboratory Analysis and Reporting
445.034: Bathing Beaches Operated by the Commonwealth
445.035: Sampling and Analysis at Semi-Public Beaches
445.036: Public Request for Testing
445.040: Posting and Reopening Notifications
445.100: Variance
445.101: Variance to be in Writing
445.300: Permit Required to Operate
445.400: General Administration
445.500: Severability

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.

This page is intentionally left blank.

APPENDIX

B. General Laws of Massachusetts

This page is intentionally left blank.

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.

This page is intentionally left blank.

APPENDIX

C. Massachusetts Beach Act

This page is intentionally left blank.

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.

This page is intentionally left blank.

APPENDIX

D. Federal Beach Act

This page is intentionally left blank.

PUBLIC LAW 106–284—OCT. 10, 2000

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 application of 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.

○

This page is intentionally left blank.

APPENDIX

E. Background Information for Amendments to the Bathing Beach Regulations

This page is intentionally left blank.

The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health
250 Washington Street, Boston, MA 02108-4619

DEVAL PATRICK
GOVERNOR

JOHN W. POLANOWICZ
SECRETARY

CHERYL BARTLETT, RN
COMMISSIONER

MEMORANDUM

To: Commissioner Bartlett and Members of the Public Health Council

From: Suzanne K. Condon, Associate Commissioner
Director, Bureau of Environmental Health

Date: May 8, 2014

Re: Request for Final Promulgation of Amendments to 105 CMR 445.000: Minimum Standards for Bathing Beaches (State Sanitary Code, Chapter VII)

INTRODUCTION

The purpose of this memorandum is to summarize public comments received and responses to comments regarding proposed amendments to 105 CMR 445.000, *Minimum Standards for Bathing Beaches (State Sanitary Code, Chapter VII)* and to request approval for final promulgation. The proposed amendments will modify the criteria for when bathing water is considered unacceptable based on water quality standards. Department staff briefed the Council on the proposed amendments on April 9, 2014.

BACKGROUND

Under current regulations, bathing water quality is considered unacceptable when one sample exceeds the single sample water quality standard. The proposed amendments would revise this standard as follows:

The bacteriological quality of bathing water will be considered unacceptable based on the following criteria:

4. Two samples of bathing water, collected on two consecutive days, that both exceed the single sample water quality standard, or one sample of bathing water that exceeds the single sample water quality standard when an additional sample is not collected on the following day; or
5. One sample of bathing water that exceeds the single sample standard at beaches where, in two or more of the last four full beach seasons, samples collected on two consecutive days both exceeded the single sample water quality standard; or
6. Any bathing water sample that exceeds the geomean water quality standard.

PUBLIC HEARING AND COMMENT PERIOD

A public hearing was held in Boston on April 28, 2014. Three people attended the hearing and one person provided written comments that he read at the hearing. In all, four sets of written comments were received, including the one at the public hearing. In addition, MDPH/BEH staff were asked by the Public Health Council to evaluate whether there may be a bacterial level at which a Day 1 exceedance at a beach could reliably predict that the Day 2 sample would also be an exceedance. This memo addresses that question as well as other comments.

PUBLIC COMMENTS AND STAFF RESPONSES

A summary of comments received during the public comment period and staff responses to these comments are included as Attachment A. In addition, MDPH/BEH reviewed historical beach water quality data to help address the following question raised by a PHC member at the April 14, 2014, meeting: Based upon a review of historical data, is there a specific Day 1 bacterial level (i.e., a *threshold*) that could be established where a Day 2 exceedance can be reasonably expected?

Staff reviewed over 46,000 water quality samples taken during the three year period of 2011-2013. That review revealed that for the beaches that will not be required to post until two consecutive days of exceedances, approximately 97 percent of all samples (marine and freshwater combined) met water quality standards. At beaches proposed to post after 2 days, second day exceedances represent only 0.2% of the 46,000 samples evaluated.

When evaluating the three years of data to determine if a *threshold* value may exist, above which an initial exceedance is followed by a confirmatory exceedance on the next day, no clear pattern emerged. For example, the maximum value for marine beaches was 10,100 cfu/100 ml. The following day, water sampled at this marine beach was measured at 20 cfu/100 ml. The standard is 104 cfu/100 ml. Three other samples that exceeded 5,000 cfu/100 ml, were correspondingly low (10 or less cfu/100 ml) the following day. Similar results were observed at fresh water beaches.

Most public health officials involved with beach water monitoring believe that weather patterns are generally better predictors of high magnitude bacterial counts. During high magnitude rain events sewage system overflows and runoff from urban areas contribute to increased bacterial counts. An examination of the small amount of data where bacterial levels continued following a Day 1 exceedance supports this position. For example, following 2.8 inches of rainfall around August 27, 2013 in Southeastern Massachusetts, bacterial counts of 500 and 128 cfu/100 ml, on days one and two, respectively, were observed at Moses Smith Creek Beach, Dartmouth, MA. Results for four beaches in New Bedford can be explained by the impacts of Tropical Storm Irene on August 29, 2011.

In these types of cases, local health officials already have the option to pre-emptively close beaches due to such concerns. DPH will work with local public health officials to ensure that consideration of these actions is uniform statewide.

CONCLUSION

Department staff have concluded that the proposed amendments do not warrant further modifications based upon comments received. A copy of the final amended version of these regulations is attached as Attachment B.

Department staff request approval for final promulgation of the amendments. Following PHC approval, the Department will file the amendments with the Secretary of the Commonwealth for publication in the *Massachusetts Register*.

Attachment A

RESPONSE TO COMMENTS

The public comment period for the proposed revisions to 105 CMR 445.000 was held from April 11, 2014, through April 28, 2014. The comments received during the public comment period were as follows:

List of Commenters

The following individuals or organizations submitted written comments:

1. Bruce Berman, Director of Strategy, Communications, and Programs, Save the Harbor/Save the Bay
2. Cynthia A. Coffin, R.S., C.H.O, Health Agent, Bourne
3. Melissa Gates, Northeast Regional Coordinator, Surfrider Foundation
4. Michael J. Hornbrook, Chief Operating Officer, Massachusetts Water Resources Authority

Specific Comments

Comments received as well as a response to specific comments follow:

Comment	**Organization**	**Department Response**
The proposed change will reduce the number of inaccurate postings, but the vast majority of red flags will continue to fly on days when the water is clean. Requiring beach postings based on yesterday's test results is a very imperfect way to manage a beach.	**Save the Harbor/Save the Bay**	We agree that the proposed amendment will significantly reduce the number of inaccurate postings at beaches across the Commonwealth. DPH does not require a flagging system at beaches as a form of notification.
Postings based on site specific criteria (e.g., rainfall, tide) and other predictive tools are more accurate than the current testing methodology.	**Save the Harbor/Save the Bay, Massachusetts Water Resources Authority**	DPH agrees that along with large data sets and recent testing results, modeling of rainfall amounts can be an effective tool. DPH has applied such a system at the annual Charles River swim event in Boston. If the model and/or recent test results suggest elevated bacteria levels, cancellation of the event is recommended. However, given that the amount of data to support modeling is not available for most beaches statewide, most local health officials would not be able to use such a protocol.

Due to the limitations in the current testing methodology, more resources should be invested in sanitary surveys and bacteria source tracking and less in daily testing.	**Massachusetts Water Resources Authority**	Daily testing is not required by DPH regulations. DPH agrees that sanitary surveys and bacteria source tracking are important tools for evaluating bathing water quality.
The proposed regulatory amendment appears to prioritize economic impacts over protection of public health/ leave the public more vulnerable to waterborne illness.	**Surfrider Foundation**	Beaches with known or potential pollution problems will still be required to post after any exceedance. For the beaches that will not be required to post until two consecutive days of exceedances, 97 percent of all samples (marine and freshwater combined) met water quality standards. Additional analyses demonstrated that a second day exceedance was observed in only 0.2% of samples. Most of those beaches were impacted by meteorologic conditions (e.g. rainfall).
DPH should consider changing the basis of the geometric mean calculation, as specified in 105 CMR 445.031, from the 5-most recent samples to all samples from the previous 30 days. The 30-day basis represents more of a long-term trend, especially for beaches sampled daily.	**Massachusetts Water Resources Authority**	DPH will consider modification of the calculation of the geometric mean in future regulatory amendments.

Attachment B

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

Section

445.001: Purpose
445.002: Authority
445.003: Citation
445.004: Scope
445.010: Definitions
445.020: Operation
445.030: Bathing Water Quality
445.031: Indicator Organisms
445.032: Collection of Bathing Water Samples
445.033: Laboratory Analysis and Reporting
445.034: Bathing Beaches Operated by the Commonwealth
445.035: Sampling and Analysis at Semi-Public Beaches
445.036: Public Request for Testing
445.040: Posting and Reopening Notifications
445.100: Variance
445.101: Variance to be in Writing
445.300: Permit Required to Operate
445.400: General Administration
445.500: Severability

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

(d) 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.

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

(f) 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.

(C) 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.

(D) 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.~~ **based on the standards specified in 105 CMR 445.031 and the following criteria:**

(a) two samples of bathing water, collected on two consecutive days, that both exceed the single sample water quality standard, or one sample of bathing water that exceeds the single sample water quality standard when an additional sample is not collected on the following day; or

(b) one sample of bathing water that exceeds the single sample standard at beaches where, in two or more of the last four full beach seasons, samples collected on two consecutive days both exceeded the single sample water quality standard; or

(c) any bathing water sample that exceeds the geomean water quality standard.

(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.

This page is intentionally left blank.

APPENDIX

F. MDPH Beach Sampling Data Form

This page is intentionally left blank.

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.