Marine and Freshwater Beach Testing in Massachusetts

Annual Report: 2015 Season

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PART ONE: THE MDPH/BEH BEACHES PROJECT

I. OVERVIEW

There are over 1,000 marine and freshwater public and semi-public bathing beaches in Massachusetts. Depending on weather and a variety of other changing conditions, beach water can sometimes contain bacteria at levels that create health impacts such as sore throat, gastroenteritis, or even meningitis or encephalitis.[1] Therefore, it is critical to monitor bacteria levels at beaches and ensure levels are acceptable within U.S. Environmental Protection Agency (USEPA) and state regulatory standards. In 2015, 4.5% (n=720) of all samples collected during the bathing season exceeded bacterial standards, resulting in temporary beach closures in some cases.

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 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 open as early as Memorial Day, but the majority of beaches 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

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1 Cabelli, 1983; USEPA, 1986; Cabelli, 1989; Haile, 1996; Pruss, 1998.
2 MGL Chapter (C) 111, § Section (S) 5. See Appendix B.
3 105 CMR 445.000: Minimum Standards for Bathing Beaches (State Sanitary Code, Chapter VII). See Appendix A.
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

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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

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 2015 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 $1,100,000 for the analysis of approximately 57,000 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, either Method 1600: Membrane Filter Test Method for Enterococcus in Water or Enterolert. Method 1600, which was approved and adopted by USEPA in 1997, enable 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 with 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 send 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. In 2014, revisions to the website posting mechanism were made such that for a majority of beaches a posting will display only after two consecutive exceedances have occurred.

2. EXCEEDANCES: BEACH CLOSURES & PUBLIC NOTIFICATION

When a water sample from a beach exceeds a bacterial standard (either one or two consecutive single sample violations or a geometric mean violation), 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 posting by submitting the 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.

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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.

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 these results into the Beaches Website as soon as they become available. When the results for a given beach exceed water quality standards, 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.

In 2014, the MDPH Public Health Council approved for promulgation amendments to the bathing beaches regulations (105 CMR 445.000, Minimum Standards for Bathing Beaches). These amendments 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 instances of consecutive exceedances in at least two of the last four beach seasons), postings continue to be required after a single exceedance. These amendments are discussed in greater detail in Part Two, Section I.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 for which 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 five Tier One beaches in Massachusetts. All five 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 (424 of the 529 marine and 542 of the 544 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 100 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 form 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 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 2015 BATHING SEASON

I. MDPH ACCOMPLISHMENTS

In addition to its routine monitoring activities (outlined earlier), MDPH/BEH performed a variety of more specific activities, unique to the 2015 season.

A. Beaches Website/Data Management

The beaches website was maintained and improved as needed to provide the public with the most up-to-date information as well as to present the data in an easy to use format. 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.

*The required field data forms were distributed to local boards of health in **2015**.*

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 2015 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 2015 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

In April 2015, MDPH gave presentations to local health officials at four 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 review of 2014 beach

Four trainings for local health officials were conducted prior to the beach season in 2015.

data and regulatory amendments (see Part Two, Section I.E). Staff also responded to questions from local health officials in preparation for the 2015 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 2015 beach season, MDPH staff personally communicated with and conducted outreach to bathing beach communities while collecting 2014 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 being posted to ensure proper signage was present. MDPH staff also assisted local health officials and laboratories in developing their weekly sampling schedules for the 2015 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 2015. The laboratories are 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 laboratories funded by MDPH/BEH analyzed 4,023 marine beach samples from 54 marine beach communities during the 2015 beach season.

54 of the 60 marine communities utilized the contract laboratory 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. 2014 Amendments to Bathing Beach Regulations

MDPH has collected water quality data at approximately 1,000 marine and freshwater beaches for the past 15 years. An analysis of historical data which was conducted after the 2013 beach season suggested 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 in April 2014. These amendments were approved by the MDPH Public Health Council on May 14, 2014 and went into effect on June 6, 2014. At the majority of beaches, an advisory is no longer required 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 is still 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 continue to be required after each exceedance. Thus, under the regulatory amendments, the quality of bathing water is 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 A for a copy of the current regulations and Appendix E for a further description of the regulatory amendments.

F. Emergency Response

MDPH/BEH has provided assistance in investigating potential outbreaks of water-borne parasites and illnesses. In past years, incidents requiring emergency response have included occurrences of *E. coli* O157:H7, giardiasis, shigellosis, and *Vibrio vulnificus* infection. These response actions can involve reviewing sampling results and/or medical records, or the preparation of educational materials, often in collaboration with local

boards of health, other programs within MDPH/BEH (e.g., Food Protection, Community Sanitation), other MDPH bureaus (e.g., MDPH's Bureau of Infectious Disease), or other state agencies.

MDPH/BEH has also responded to numerous occurrences of algal blooms across the state, many of which posed a potential health risk to swimmers due to their proximity to bathing beaches. In 2007, MDPH/BEH developed a protocol for responding to harmful algae blooms at freshwater bodies. Typically, this involves performing a site visit and providing technical support and educational materials to local health officials. During the 2015 season, MDPH/BEH issued 20 algae bloom advisories for lakes, ponds, and rivers throughout Massachusetts, 6 of which had beaches. In total, 7 beaches were affected by these advisories.

II. MONITORING

A. Results

During the 2015 bathing season, 220 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 587 marine and 590 freshwater sampling locations at 529 marine and 544 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 15,932 water samples from marine and freshwater beaches collected during the 2015 beach season. Thirty-nine communities reported only marine bathing beach data, 160 communities reported only freshwater beach data, and 21 communities reported both marine and freshwater bathing beach data (Table 1).

220 communities reported data to MDPH in 2015.

MDPH received data for over 1,100 sampling locations at over 1,000 marine and freshwater beaches in 2015.

1. MARINE BEACHES

During the 2015 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 587 sampling locations at 529 public or semi-public marine bathing beaches.

There are 60 communities with marine beaches in Massachusetts.

A total of 8,050 water samples were collected from marine public and semi-public beaches and reported to MDPH/BEH during the 2015 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.

A total of 8,050 samples were collected at marine beaches in 2015 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 2015. 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 three 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.

Nearly 100% of marine beaches were tested as required in 2015.

Local health departments, independent laboratories, the National Park Service, MDCR, and semi-public operators (camps, hotels, 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 2015. 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 and Sandwich opted not to use MDPH/BEH contracted laboratories in 2015. 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 2015 was 240 (Table 5). 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 was assigned to each sample location.

As a result of the USEPA reporting requirements, MDPH/BEH reported to USEPA in February 2016 a total of 240 marine postings in 2015 (vs. 289 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).

The number of marine beach postings in 2015 was 240.

The number of postings is less than the total number of single sample exceedances (n=390). A single posting may cover multiple exceedances and exceedances occurring prior to a beach's opening might not be posted. However, the primary reason is the regulatory amendments that were promulgated in 2014: at the majority of beaches, a single sample exceedance does not require posting if a resample collected on the day following the initial exceedance meets water quality standards. These data

4.8% of all samples collected exceeded the bacterial standard.

are discussed further in the Analysis of Results section. The percentage of exceedances for the total number of samples collected was 4.8% in 2015 (Table 6). Of the 587 public or semi-public marine beach locations, 154 (26%) incurred at least one bacterial exceedance (Table 7).

154 marine beaches had at least one exceedance.

Total rainfall amounts in Massachusetts were slightly elevated for the months of June and August during the 2015 season as compared to 2014 (Tables 8 through 11). The Boston area received 9.29 inches of rain during the 2015 beach season (i.e., June through August), which is below the 10.46 inches of rain normally received in those months and more than the 8.94 inches received in 2014. The Chatham area (Brewster, Chatham, Dennis, Eastham, Harwich, and Orleans) received slightly elevated rainfall totals during the 2015 beach season than 2014 (10.36 inches vs. 9.72 inches respectively).

Total rainfall was slightly below normal in Boston and slightly above normal in 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 2015, the field forms accompanying 4,389 of the 8,050 marine samples collected (about 55%) included information as to whether potential transient pollution sources had been observed at the time of sampling. Of those 1,132 samples, 26% recorded the presence of a specific source (e.g. birds, dogs, waste solids, trash), and 7% of those samples exceeded the bacterial standard (Table 12). The field forms for 3,257 samples specifically noted the absence of potential pollution sources. Of those, 2% 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 (3,661) for which information on pollution source (or lack thereof) was not provided on field data forms. For these samples, 6.7% 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 2015 bathing season, 181 Massachusetts communities with public or semi-public freshwater bathing beaches submitted beach monitoring data to MDPH/BEH. These communities provided data for 590 public or semi-public freshwater bathing beaches and collected a total of 7,882 freshwater samples (Table 2).

A total of 7,882 samples were collected at Massachusetts freshwater beaches in 2015.

For bather density (Table 3), the data are similar to those for marine beaches, with a high percentage (85%) 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 2015, 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. Over 98% of public and semi-public freshwater beaches in Massachusetts were tested with at least the minimum required weekly frequency in 2015 (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. Less than two percent of freshwater beaches (n=9) either did not sample as required or did not submit data to MDPH/BEH detailing all sampling conducted for the season. In addition, there were 2 beaches in 2 towns that did not submit any data to the local board of health and/or MDPH and are considered to be out of compliance for the 2015 bathing season. These are not included in the tally of 590 freshwater beaches. 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.

Nearly 98% of freshwater beaches were tested at least weekly.

The total number of freshwater beach exceedances detected in 2015 was 330 (4.2% of all freshwater samples collected) (Table 5). This was an increase from the number of exceedances of the fresh water quality standards (235 cfu/100 ml *E. coli* and 61 cfu/100 ml enterococcus) in 2014 (196 or 2.7%) (Table 6). Of the 590 public or semi-public freshwater beach locations, 158 (27%) incurred at least one bacterial exceedance (Table 7). These data are discussed further in the Analysis of Results section.

4.2% of bacterial water quality samples exceeded the freshwater standard.

330 freshwater bacterial exceedances were reported in 2015.

The field forms accompanying 3,495 of the 7,882 freshwater samples collected (44%) included information as to whether potential transient pollution sources had been observed to be present at the sampling location. Of those 3,495 samples, 20% (n=689) recorded the presence of specific source (e.g. birds, dogs, algae, trash), and 9.3% of those 689 samples (n=64) exceeded the bacterial standard (Table 12). The field forms for 2,806 samples specifically noted the absence of potential pollution sources. Of those, 2.3% (n=65) exceeded the bacterial standard. As with marine beaches, there were a large number of samples (4,387) for which information on pollution sources (or lack thereof) was not provided on field data forms. For these samples, 4.6% exceeded the bacterial standard.

B. Analysis of Results

In 2015, 220 marine and/or freshwater communities reported bathing beach water quality data to MDPH/BEH. MDPH/BEH received the required posting notification (or confirmed that posting was not necessary) for all but 5 of 390 single sample marine exceedances or approximately 99%. It should be noted that not all exceedances require posting. 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. Therefore a single beach posting could cover several exceedances. Local boards of health may preemptively post beaches without a bacterial exceedance and these instances are included in the total number of postings. It should also be noted that, due to regulatory amendments that were promulgated in 2014, the majority of beaches are no longer required to post after a single exceedance if a next day resample shows acceptable water quality. As a result, there were 150 occasions when postings were not necessary. The amendments had a significant impact in reducing the number of postings in 2015.

At freshwater beaches, there were 330 single sample bacterial exceedances in 2015. MDPH/BEH received posting notification (or confirmed that posting was not necessary) for all but 44 of these exceedances. This is slightly more than 2014, when there were 38 exceedances without posting notifications. Posting notifications were received/not required for 87% of exceedances at freshwater beaches in 2015, compared to 81% in 2014. Similar to marine beaches, there was also a reduction in freshwater beach postings as there were 76 occasions when postings were not necessary under the regulatory amendments.

MDPH receives the majority of the 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 44 exceedances that required postings but were missing them highlight the need for continued outreach to health departments of freshwater communities on beach water quality regulatory requirements, in particular the recent amendments. Missed postings for 5 of these 44 exceedances appear to have resulted from a misunderstanding of the revised regulations. Efforts were made by MDPH/BEH staff to obtain posting information by 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 2015. 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 2015 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, 9.3% exceeded public health standards, compared to 2.3% 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%) was also higher than those where none were noted (2%). However, 45% of marine samples and 56% 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 2015, 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 2015 was 4.8% which is within the historical range. All marine communities that had at least one exceedance in 2015 appear in Figure 1. A complete listing of marine beaches sampled during the 2015 beach season, their exceedances, and postings can be found in Table 13.

The exceedance rate was within the historical average for marine beaches in 2015.

Total rainfall amounts for the marine regions during the 2015 beach season (Tables 8 - 9) coincide with their historic total, with Boston and Chatham receiving near average levels of total rainfall. The Boston region received 9.29 inches of rain during beach season (i.e., June through August), which is slightly below the 10.46 inches of rain normally received in those months. The Chatham region received slightly above average rainfall during the beach season (10.36 inches received in 2015 vs. the 10.15 inches typically received). Similar rainfall totals vs. the historic average may help explain the similar exceedance rate vs. the historical average as rainfall is often a major driver of bacterial exceedances in beach water. Given that the Boston and Chatham regions received similar inches of rain in 2015 as in 2014, a comparable exceedance rate would be expected and was observed: 4.8% vs. 4.4%. Figures 2 and 3 display rainfall information and the percentages of bacterial exceedances for the Boston and Chatham areas during the 2015 bathing season.

From 2001 through 2015, 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 3.9% across all seasons. The rate of freshwater beach exceedances in 2015 was 4.2% which is slightly higher than the historical average. All communities that experienced at least one freshwater exceedance in 2015 can be seen in Figure 4. A complete listing of freshwater beaches sampled during the 2015 beach season, their exceedances, and postings can be found in Table 14.

At freshwater beaches, the percentage of exceedances in 2015 was higher than the 2014 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 2015 bathing season both the Boston and Chatham areas received rainfall totals near the historical averages. The Amherst area's rainfall during the bathing season was 39% higher than normal and over two inches more than in 2014. The Ashburnham area's rainfall during the bathing season was approximately equal to the normal amount. 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 2015 the amount of rainfall and the percentage of exceedances was consistent with 2014.

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 2015, 234 of the 390 marine exceedances had corresponding rain event information, while for freshwater beaches rain event data were recorded for 285 of the 330 bacterial exceedances. Sixty four percent of marine beach exceedances and 38% of freshwater exceedances occurred within 24 hours of a rain event in 2015. 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 three-fourths of the marine beach samples (83%) and freshwater beach samples (85%) that reported bather density indicated low bather density (0-10 bathers on the beach) during sampling (Table 3). 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 showed an increase when the bather density reached 50 bathers or greater (Table 16). The overall rate of exceedances for all marine samples (4.8%) was higher than the rates of exceedance for the three lowest bather density groupings (0-10, 10-20, and 20-50 bathers) and lower than the rate of exceedance for samples that did not have a corresponding bather density. The rate of exceedance for samples with a corresponding bather density of >50 bathers was highest of all, at 19%. For freshwater samples, the exceedance rates also showed an increase when the bather density reached 50 bathers or greater (Table 16). The overall rate for all freshwater samples (4.2%) was similar to the lowest bather density grouping and slightly higher than the rate of exceedance for samples that did not

have a corresponding bather density. The highest exceedance rate was again found in the bather density grouping of >50 bathers (18.3%). As with the marine data, the rate of exceedance for the freshwater samples was highest when the bather density reached 50+ bathers. Therefore, bather density appeared to have an effect on beach water quality in 2015.

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).

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

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 in areas 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.

FUTURE PLANS

A. Direct Web-Based Reporting

In 2016, 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 2016 for local health officials.

In the spring of 2016, 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 information on beaches and 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

MDPH/BEH will continue to facilitate sanitary surveys in support of the Tiered Monitoring Plan and the variance process during 2016. 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 2016 to conduct sanitary surveys that will support the Tiered Monitoring Plan. Data from the 2014 and 2015 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. USEPA Recreational Water Quality Criteria

In 2012, USEPA published updated recreational water quality criteria (RWQC). The criteria consist of two elements: a geometric mean (geomean) and a statistical threshold value (STV). The geomean and the STV represent the 50th and 90th percentile, respectively, of a water quality distribution determined through USEPA epidemiological studies. Within the criteria, USEPA also included two supplemental values, called Beach Action Values (BAVs), which represent the 75th percentile of the water quality distribution. USEPA described BAVs as optional values that states could use when informing the public about unsafe water quality.

In 2014, USEPA published the National Beach Guidance and Required Performance Criteria for Grants, 2014 Edition (Guidance). The document describes required performance criteria for states that receive USEPA BEACH Act grant funding, which MDPH has received since 2001. One of the performance criteria requires that states identify and use Beach Notification Thresholds (BNTs). USEPA defined a BNT as a water quality value that is used to "trigger" a beach closure notification. The RWQC includes two USEPA derived sets of BNTs- the BAVs. If a state chooses to use BNTs other than the BAVs, USEPA requires that the state "submit a written justification to USEPA based in science, local water quality data, or monitoring experience" (USEPA 2014).

MDPH conducted several analyses of local water quality data to determine the most appropriate BNTs for public health protection in Massachusetts,. In general, these efforts were focused on comparing the BAVs listed in the 2014 Guidance, to the BNTs currently being used in Massachusetts (i.e., single sample maximums or geometric means described in the 1986 USEPA Recreational Water Quality Criteria). Based on a comprehensive analysis that considered 5 years of local water quality data, MDPH analyses suggest that there when applying either set of standards to protect public health, there is no difference between the two. Based on a rigorous analysis of empirical data from over 1,000 beaches, the current BNTs appear to be as health protective as the USEPA BAVs described in the 2014 Guidance. Absent of a compelling reason to change the existing beach water quality criteria, MDPH will continue to use the 1986 Recreational Water Quality Criteria as BNTs when making beach closure notifications.

III. SUMMARY

This report summarizes beach monitoring and testing data from Massachusetts public and semi-public marine and freshwater bathing beaches during the 2015 season. In total, 220 communities with operating bathing beaches reported 15,932 water samples collected at over 1,000 beaches. Beach results from the 2015 season show a comparable marine exceedance rate as the 2014 beach season, while water quality data at freshwater beaches showed an increase in the percentage of exceedances in 2015 compared to 2014. Massachusetts marine communities are nearly

Nearly 15,000 samples were collected at over 1,000 beaches in 2015.

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.

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. Finally, the regulatory amendments reduced the number of posting days in 2015 and allowed for greater public access to bathing beaches during days of acceptable water quality.

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TABLES

Table 1

MA Beaches (2015): 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	18%
Freshwater beach only	160	73%
Marine and freshwater beaches	21	9%
Total	220	100%

Table 2

MA Beaches (2015): Marine vs. freshwater testing: number of beaches, communities, and samples.

	Beaches tested[1]	Communities	Samples collected
Marine	587	60	8,050
Freshwater	590	181	7,882
Total:	1,177	220 [2]	15,932

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 181 communities with freshwater beaches because they contain both types of beach: see Table 1.

Table 3
MA Beaches (2015): 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	6,664	83%
10-20	304	4%
20-50	129	2%
>50	78	1%
Not indicated	875	11%
Total	8,050	100%

Freshwater beaches

Bather Density (# people)	# Samples	%
0-10	6,679	85%
10-20	273	3%
20-50	102	1%
>50	60	1%
Not indicated	768	10%
Total	7,882	100%

Table 4
MA Beaches (2015): Frequency of water quality testing at public and semi-public bathing beaches, grouped by beach and frequency.

Marine Beaches

Test frequency	# Beaches	%
Daily	12	2%
Weekly	473	81%
Monthly	96	16%
Biweekly	6	1%
Total	587	100%

Freshwater Beaches

Test frequency	# Beaches	%
Weekly	579	98.1%
Twice per week	2	0.3%
Monthly	1	0.2%
Biweekly	1	0.2%
One time	4	0.7%
Two times	1	0.2%
Three times	2	0.3%
Total	590	100.0%

Table 5

MA Beaches (2015): Number of exceedances and postings at marine and freshwater public and semi-public bathing beaches.

Marine beaches

Exceedances, Total (Enterococcus)	390
Postings, Total[1]	240
Postings, Single Sample Exceedance	154
Postings, Geomean Exceedances	30
Postings, Preemptive - Rainfall	48
Postings, Preemptive - Other	7
Permanent Closures	1

Freshwater beaches

Exceedances, Total	330
Exceedances, Enterococcus	127
Exceedances, E. Coli	203
Postings, Total[1]	167
Postings, Enterococcus	89
Postings, E. Coli	63
Postings, Preemptive - Rainfall	1
Postings, Preemptive - Other	1
Postings, Algae	13

1. Total postings does not necessarily equal total exceedances. Some exceedances may have occurred while the beach was already posted. **In addition, many beaches are no longer required to post after an initial exceedance if a next day resample shows acceptable water quality.**

Table 6

MA Beaches (2015): 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%
2014	329	7516	4.4%	196	7358	2.7%
2015	390	8,050	4.8%	330	7882	4.2%
Average	388	7790	5.0%	286	7279	3.9%

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 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 *E. coli*, a sample is said to be in exceedance if the number of CFU / 100 ml is greater than 235.

Table 7

MA Beaches (2015): 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				
				2014	2013	2012	2011	2010
Marine	154	587	26%	26%	36%	28%	35%	36%
Freshwater	158	590	27%	24%	18%	38%	27%	20%

Table 8

MA Beaches (2004-2015): 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%
2014	**Total**	2.62	4.57	1.75	8.94
	Dev From Norm	-29%	+33%	-48%	-15%
2015	**Total**	5.01	2.09	2.19	9.29
	Dev From Norm	+36%	-39%	-35%	-11%

* obtained from the National Weather Service Forecast office, at

http://w2.weather.gov/climate/xmacis.php?wfo=box

Table 9

MA Beaches (2004-2015): 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%
2014	**Total**	2.75	3.72	3.25	9.72
	Dev From Norm	-20%	+10%	-2%	-4%
2015	**Total**	2.76	2.39	5.21	10.36
	Dev From Norm	-20%	-29%	+56%	+2%

* obtained from the National Weather Service Forecast office, at http://w2.weather.gov/climate/xmacis.php?wfo=box

Table 10

MA Beaches (2004-2015): 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%
2014	**Total**	2.83	6.94	4.65	14.42
	Dev From Norm	-26%	+76%	+13%	+22%
2015	**Total**	8.10	4.02	4.37	16.49
	Dev From Norm	+113%	+2%	+7%	+39%

* 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 (2004-2015): 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%
2014	**Total**	1.88	7.77	2.71	12.36
	Dev From Norm	-51%	+97%	-34%	0%
2015	**Total**	6.99	3.03	1.88	11.90
	Dev From Norm	+83%	-23%	-54%	-4%

* 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 (2015): 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	79	1,132	7.0%	64	689	9.3%
Unknown	245	3,661	6.7%	201	4,387	4.6%
No	66	3,257	2.0%	65	2,806	2.3%
Total	390	8,050	4.8%	330	7,882	4.2%

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 (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Aquinnah	Lobsterville	Sampling Point	Monthly	4				
Aquinnah	Moshup Beach	Sampling Point	Monthly	4				
Aquinnah	Philbin Beach	Sampling Point	Monthly	4				
Aquinnah	Red Beach	Sampling Point	Monthly	4				
Barnstable	Barnstable Yacht Club	Sampling Point	Weekly	13				
Barnstable	Cotuit Bay Shores Association	Sampling Point	Weekly	13				
Barnstable	Covell's	Sampling Point	Weekly	16				
Barnstable	Craigville	Sampling Point	Weekly	16				
Barnstable	Craigville Beach Club	Sampling Point	Weekly	14				
Barnstable	Cross Street	Sampling Point	Weekly	13				
Barnstable	Dowses	Sampling Point	Weekly	16				
Barnstable	Eugenia Fortes	Sampling Point	Weekly	15	2	110	228	
Barnstable	Hyannis Yacht Club	Sampling Point	Weekly	13				
Barnstable	Kalmus Ocean	Sampling Point	Weekly	16				
Barnstable	Kalmus Yacht	Sampling Point	Weekly	13				
Barnstable	Kennedy Memorial/Veterans Beach	Sampling Point	Weekly	16				
Barnstable	Keyes Beach	Sampling Point	Weekly	18	2	194	340	
Barnstable	Loops	Sampling Point	Weekly	13				
Barnstable	Millway	Sampling Point	Weekly	13				
Barnstable	Oyster Harbors Club	Sampling Point	Weekly	14				
Barnstable	Ropes	Sampling Point	Weekly	14	1	150	150	1
Barnstable	Sandy Neck	Sampling Point	Weekly	16				
Barnstable	Seaside Park Improvement Association	Sampling Point	Weekly	14				
Barnstable	Wianno Club (Salt-107 Seaview)	Sampling Point	Weekly	14				
Beverly	Brackenbury	Sampling Point	Weekly	13	1	187	187	

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Beverly	Dane Street	Bathhouse	Weekly	18	3	158	199	2
Beverly	Goat Hill	Sampling Point	Weekly	13	1	187	187	
Beverly	Independence Park	Sampling Point	Weekly	17	3	189	213	1
Beverly	Lynch Park	Sampling Point	Weekly	12				
Beverly	Mingo	Sampling Point	Weekly	12				
Beverly	Obear Park	Sampling Point	Weekly	13	1	213	213	
Beverly	Rice's	Sampling Point	Weekly	12				
Beverly	Sandy Point	Sampling Point	Weekly	12				
Beverly	West	Sampling Point	Weekly	12				
Beverly	Woodbury	Sampling Point	Weekly	17	3	135	305	3
Boston	Carson Beach (DCR)	at Bathhouse	Weekly	17				
Boston	Carson Beach (DCR)	at I St.	Weekly	17	1	111	111	
Boston	City Point Beach (DCR)	WWII Memorial	Weekly	16				
Boston	Constitution (DCR)	Middle	Daily	90	10	109	2282	11
Boston	Constitution (DCR)	North site	Daily	90	9	129	906	11
Boston	Constitution (DCR)	Rec Center	Daily	90	10	121	2310	11
Boston	Lovell's Island (DCR)	Sampling Point	Weekly	10				
Boston	M Street Beach (DCR)	Sampling Point	Weekly	16				
Boston	Malibu (DCR)	Sampling Point	Daily	90	12	109	2760	7
Boston	Pleasure Bay (DCR)	Broadway	Weekly	16				
Boston	Pleasure Bay (DCR)	Castle Island Playground	Weekly	16				
Boston	Pleasure Bay (DCR)	South Flagpole	Weekly	16				
Boston	Savin Hill (DCR)	Sampling Point	Weekly	17	1	2600	2600	1
Boston	Spectacle Island (DCR)	Sampling Point	Weekly	10				
Boston	Tenean (DCR)	Sampling Point	Daily	91	26	108	712	27

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Bourne	Barlows Landing	Sampling Point	Weekly	14				
Bourne	Cataumet Harbor	Sampling Point	Weekly	16	2	116	150	
Bourne	Cedar Point Association	Sampling Point	Weekly	15	1	140	140	
Bourne	Electric Avenue	Sampling Point	Monthly	4				
Bourne	Gilder Road Beach	Sampling Point	Monthly	4				
Bourne	Hideaway Village Association	Sampling Point	Weekly	14				
Bourne	Monument	Sampling Point	Monthly	4				
Bourne	Patuisset Beach	Sampling Point	Weekly	13	1	108	108	
Bourne	Pocasset Beach Improvement Association	Sampling Point	Weekly	12				
Bourne	Sagamore	Sampling Point	Monthly	4				
Bourne	Scraggy Neck Recreation Association	Sampling Point	Weekly	9				
Bourne	Tahanto Associates, Inc.	Sampling Point	Weekly	13				
Bourne	Wings Neck Trust Association (North Beach)	Sampling Point	Weekly	15	1	582	582	
Bourne	Wings Neck Trust Association (South Beach)	Sampling Point	Weekly	14				
Braintree	Smith Beach	Dock	Weekly	14	2	171	538	3
Brewster	Breakwater Landing	Sampling Point	Weekly	16				
Brewster	Brewster Dunes	Sampling Point	Weekly	13				
Brewster	Cape Cod Sea Camps (Bay)	Sampling Point	Weekly	13				
Brewster	Crosby Landing	Sampling Point	Weekly	17	1	400	400	1
Brewster	Ellis Landing	Sampling Point	Weekly	16				
Brewster	Ellis Landing Park Condominiums	Sampling Point	Weekly	15	1	400	400	
Brewster	Halliday Acres	Sampling Point	Weekly	10				
Brewster	Linnell Landing	Sampling Point	Weekly	17	1	400	400	
Brewster	Mants	Sampling Point	Weekly	16				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Brewster	Ocean Edge	Condos	Weekly	15	1	246	246	
Brewster	Paines Creek	Sampling Point	Weekly	16				
Brewster	Pilgrim Pine Acres	Sampling Point	Weekly	10				
Brewster	Point of Rocks	Sampling Point	Weekly	17	1	106	106	
Brewster	Saints Landing	Sampling Point	Weekly	16				
Brewster	Sea Pines Condominiums	Sampling Point	Weekly	14				
Brewster	Sunset Beach Association	Sampling Point	Weekly	9				
Chatham	Andrew Harding Lane Beach	Sampling Point	Weekly	12				
Chatham	Bucks Creek	Sampling Point	Weekly	14	3	122	400	2
Chatham	Chatham Bars Inn	Sampling Point	Weekly	12				
Chatham	Cockle Cove	Sampling Point	Weekly	12				
Chatham	Forest Street Beach	Sampling Point	Weekly	13	1	110	110	
Chatham	Hardings East	East parking lot	Weekly	12				
Chatham	Hardings West	West parking lot	Weekly	12				
Chatham	Hawthorne Motel	Sampling Point	Weekly	12				
Chatham	Jacknife Harbor	Sampling Point	Weekly	12				
Chatham	Lighthouse	Sampling Point	Weekly	12				
Chatham	Oyster Pond	Sampling Point	Weekly	12				
Chatham	Pleasant Street	Sampling Point	Weekly	14	2	106	110	
Chatham	Ridgevale	Sampling Point	Weekly	12				
Chilmark	Great Rock Bight	Sampling Point	Weekly	11	1	213	213	1
Chilmark	Menemsha	Sampling Point	Monthly	3				
Chilmark	Ocean @ Chilmark Pond Preserve	Sampling Point	Monthly	7				
Chilmark	Ocean @ Lucy Vincent Beach	Sampling Point	Monthly	5				
Chilmark	Ocean @ Squibnocket Beach	Sampling Point	Monthly	4				
Cohasset	Black Rock	Sampling Point	Weekly	14	1	350	350	

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Cohasset	Sandy Beach	Sampling Point - Cohasset	Weekly	14				
Danvers	Sandy Beach	West - Danvers	Weekly	19	2	359	364	1
Dartmouth	Anthony Beach	Sampling Point	Weekly	12				
Dartmouth	Apponagansett Town Beach	Sampling Point	Weekly	12	1	268	268	1
Dartmouth	Bayview	Sampling Point	Weekly	13	1	284	284	1
Dartmouth	Demarest Lloyd (DCR)	Sampling Point	Weekly	17	1	142	142	
Dartmouth	Hidden Bay	Sampling Point	Weekly	12	1	500	500	1
Dartmouth	Jones Town Beach North	North	Biweekly	6				
Dartmouth	Jones Town Beach South	South	Weekly	13	1	500	500	
Dartmouth	Moses Smith Creek	Sampling Point	Weekly	13	1	500	500	
Dartmouth	Nonquitt	Sampling Point	Weekly	12				
Dartmouth	Oak Hill Shores	Sampling Point	Weekly	12				
Dartmouth	Round Hill	Sampling Point	Weekly	12				
Dartmouth	Salter's Point East	Sampling Point	Weekly	12				
Dartmouth	Salter's Point South	Sampling Point	Weekly	12				
Dennis	Bayview	Sampling Point	Weekly	15	1	166	166	
Dennis	Chapin Memorial	Sampling Point	Weekly	14				
Dennis	Clipper Lane	Sampling Point	Weekly	15	1	400	400	1
Dennis	Cold Storage	Sampling Point	Weekly	16	2	238	306	1
Dennis	Corporation	Sampling Point	Weekly	16				
Dennis	Follins Pond	Sampling Point 2	Weekly	16	2	112	394	
Dennis	Glendon Road - East	Sampling Point	Weekly	14				
Dennis	Glendon Road - West	Sampling Point	Weekly	14				
Dennis	Haigis	Sampling Point	Weekly	14				
Dennis	Harborview	Sampling Point	Weekly	14				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Dennis	Howes Street	Sampling Point	Weekly	14				
Dennis	Inman Road	Sampling Point	Weekly	14				
Dennis	Mayflower	Sampling Point	Weekly	16				
Dennis	Raycroft	Sampling Point	Weekly	14				
Dennis	Sea Street (Dennisport)	Dennisport	Weekly	14				
Dennis	Sea Street (East Dennis)	East	Weekly	14				
Dennis	South Village	Sampling Point	Weekly	14				
Dennis	Sullivan (Depot St.)	Sampling Point	Weekly	14				
Dennis	Trotting Park	Sampling Point	Weekly	14				
Dennis	West Dennis - Residential	Residential	Weekly	16				
Dennis	West Dennis - West	West	Weekly	16				
Dennis	West Dennis - West of snack bar	West of snack bar	Weekly	16				
Duxbury	Duxbury Beach @ Bath House	Sampling Point	Weekly	15				
Duxbury	Landing Road	Sampling Point	Weekly	20	3	146	1400	3
Duxbury	Residents Beach (Duxbury Beach)	Sampling Point	Weekly	15				
Duxbury	Shipyard Lane	Sampling Point	Weekly	15				
Duxbury	West End	Sampling Point	Weekly	15				
Eastham	Boat Meadow	Sampling Point	Weekly	14				
Eastham	Campground	Sampling Point	Weekly	15	1	140	140	
Eastham	Coast Guard (National Seashore)	Sampling Point 1	Weekly	11				
Eastham	Cole Road	Sampling Point	Weekly	14				
Eastham	Cook's Brook	Sampling Point	Weekly	14				
Eastham	Dyer Prince	Sampling Point	Weekly	14				
Eastham	First Encounter - Spit River	Spit River	Weekly	14				
Eastham	First Encounter Beach	Beach	Weekly	14				
Eastham	Kingsbury	Sampling Point	Weekly	14				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Eastham	Nauset Light (National Seashore)	Sampling Point 1	Weekly	11				
Eastham	S. Sunken Meadow	Sampling Point	Weekly	14				
Eastham	Salt Pond	Sampling Point	Weekly	15	1	136	136	1
Eastham	Silver Springs Association	Sampling Point	Weekly	14				
Eastham	Thumpertown	Sampling Point	Weekly	15	1	304	304	
Eastham	Town Cove	Sampling Point	Weekly	14				
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	5				
Essex	Front Beach	Sampling Point	Monthly	5				
Fairhaven	Fort Phoenix - Town Beach	Sampling Point	Weekly	12				
Fairhaven	Fort Phoenix (DCR)	Sampling Point	Weekly	17	1	188	188	
Fairhaven	Knollmere	Sampling Point	Weekly	12	1	206	206	
Fairhaven	Manhattan Avenue	Sampling Point	Weekly	13	1	182	182	
Fairhaven	Sandy Beach (Raymond Street)	Sampling Point	Weekly	13	1	340	340	
Fairhaven	Seaview	Sampling Point	Weekly	12				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Fairhaven	West Island Causeway	Sampling Point	Weekly	12				
Fairhaven	West Island Town Beach	Sampling Point	Weekly	12				
Falmouth	Acapesket Improvement Association	Sampling Point	Weekly	14				
Falmouth	Bayshore Homeowners Association	Sampling Point	Weekly	14				
Falmouth	Bikepath Beach (Trunk River) - East	East	Weekly	14				
Falmouth	Bikepath Beach (Trunk River) - West	West	Weekly	14				
Falmouth	Bowerman Beach Club	Sampling Point	Weekly	14				
Falmouth	Bristol - East	East	Weekly	14				
Falmouth	Bristol - West	West	Weekly	14				
Falmouth	Chapoquoit	Sampling Point	Weekly	14				
Falmouth	Chapoquoit Associates - Front Beach	Sampling Point	Weekly	14				
Falmouth	Chapoquoit Associates - Little Beach	Sampling Point	Weekly	14				
Falmouth	Falmouth Associates - 564 Surf Drive	Sampling Point	Weekly	14				
Falmouth	Falmouth Heights East	East	Weekly	14				
Falmouth	Falmouth Heights West	West	Weekly	14				
Falmouth	Falmouth Yacht Club	Sampling Point	Weekly	12				
Falmouth	Jetty Lane	Sampling Point	Weekly	12				
Falmouth	Little Island Beach Preserve	Sampling Point	Weekly	11				
Falmouth	Megansett	Sampling Point	Weekly	14				
Falmouth	Megansett Yacht Club	Sampling Point	Weekly	13				
Falmouth	Menauhant East	East	Weekly	14				
Falmouth	Menauhant West	West	Weekly	14				
Falmouth	Mill Road	Sampling Point	Weekly	14				
Falmouth	New Silver (Silver Beach Improvement Association)	Sampling Point	Weekly	12				
Falmouth	Nobska Beach Association	Sampling Point	Weekly	14				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Falmouth	Old Silver (Public) - North	North	Weekly	14				
Falmouth	Old Silver (Public) - South	South	Weekly	15	1	156	156	
Falmouth	Old Silver 1 (Residents)	Central	Weekly	14				
Falmouth	Old Silver Beach Estates Assoc.	Sampling Point	Weekly	12				
Falmouth	Quisset Beach Association	Sampling Point	Weekly	12				
Falmouth	Racing Beach Association	Whittemore Rd.	Weekly	12				
Falmouth	Saconessett Hills Association	Sampling Point	Weekly	14				
Falmouth	Seacoast Shores Associates, Inc.	Sampling Point	Weekly	11				
Falmouth	Seacrest Resort	Sampling Point	Weekly	14				
Falmouth	Sippewissett Highlands Trust	Sampling Point	Weekly	14				
Falmouth	Stoney Beach (MBL)	Sampling Point	Weekly	14				
Falmouth	Surf Drive - East	Surf Drive East	Weekly	14				
Falmouth	Surf Drive - Pool	Surf Drive Pool	Weekly	14				
Falmouth	Surf Drive - West	Main (concession) West	Weekly	14				
Falmouth	Tides Hotel	Sampling Point	Weekly	14				
Falmouth	Wild Harbour Estates	Sampling Point	Weekly	14				
Falmouth	Wood Neck Beach	Sampling Point	Weekly	14				
Falmouth	Wood Neck River	Sampling Point	Weekly	14				
Gloucester	Cressy's	Sampling Point	Monthly	5				
Gloucester	Good Harbor	Sampling Point	Weekly	17				
Gloucester	Good Harbor Creek	Sampling Point	Weekly	17				
Gloucester	Half Moon	Sampling Point	Monthly	5				
Gloucester	Niles	Sampling Point	Monthly	5				
Gloucester	Pavilion Beach	Sampling Point	Monthly	5				
Gloucester	Plum Cove	Sampling Point	Weekly	17				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Gloucester	Wingearsheek	Sampling Point	Weekly	17				
Harwich	Atlantic Avenue	Sampling Point	Weekly	9	1	136	136	
Harwich	Bank Street - Bayview Rd	Sampling Point	Monthly	4				
Harwich	Brooks Road	Sampling Point	Monthly	4				
Harwich	Earle Road	Sampling Point	Monthly	4				
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	14	1	170	170	
Harwich	Pleasant Bay	Sampling Point	Monthly	5				
Harwich	Pleasant Road	Sampling Point	Monthly	4				
Harwich	Red River East	East	Monthly	4				
Harwich	Red River Middle	Middle	Weekly	14				
Harwich	Red River West	West	Monthly	4				
Harwich	Sea Breeze Avenue	Sampling Point	Monthly	4				
Harwich	Stone Horse Yacht Club	Sampling Point	Weekly	12	1	400	400	
Harwich	The Belmont	Sampling Point	Weekly	14				
Harwich	Wah Wah Taysee Road	Sampling Point	Monthly	4				
Harwich	Wequasett Inn Resort	Sampling Point	Weekly	14				
Harwich	Wychmere Harbor Beach Club	Sampling Point	Weekly	14				
Harwich	Zylpha Road Beach	Sampling Point	Monthly	4				
Hingham	Belair	Sampling Point	Weekly	11	1	211	211	1
Hingham	Hingham Town Beach	Sampling Point	Weekly	12	2	142	301	1
Hingham	Kimball	Sampling Point	Weekly	11	1	754	754	1
Hingham	Martin's Cove	Sampling point	Weekly	11	1	331	331	1

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Hingham	North	Sampling Point	Weekly	10				
Hingham	Seal Cove	Sampling Point	Weekly	11	3	130	233	1
Hingham	Wompatuck	Sampling Point	Weekly	11	1	134	134	1
Hingham	Yacht Club	Sampling Point	Weekly	11	1	269	269	1
Hull	A Street Bay Side	Sampling Point	Weekly	12				
Hull	A Street Ocean	Sampling Point	Weekly	12				
Hull	Darcy's	Sampling Point	Weekly	12				
Hull	Edgewater	Sampling Point	Weekly	12				
Hull	Gunrock	Sampling Point	Monthly	3				
Hull	James Ave.	Sampling Point	Monthly	3				
Hull	Kenberma	Sampling Point	Biweekly	6				
Hull	Nantasket (DCR)	Bathhouse	Weekly	16				
Hull	Nantasket (DCR)	North site	Weekly	16				
Hull	Nantasket (DCR)	Park St.	Weekly	16				
Hull	Nantasket (DCR)	Water St.	Weekly	16				
Hull	Newport	Sampling Point	Monthly	3				
Hull	Peddocks Island (DCR)	Sampling Point	Weekly	10				
Hull	XYZ	Sampling Point	Monthly	3				
Ipswich	Clark	Sampling Point	Weekly	16				
Ipswich	Crane	Head Lifeguard Station	Monthly	4				
Ipswich	Little Neck	Sampling Point	Weekly	16				
Ipswich	Pavillion	greatest batherload	Monthly	4				
Ipswich	Steep Hill	Steep Hill	Monthly	4				
Kingston	Gray's	Sampling Point	Weekly	13	1	160	160	1
Kingston	Rocky Nook	Sampling Point	Weekly	13	1	160	160	1

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Lynn	Kings (DCR)	Eastern Ave	Daily	90	27	109	19900	12
Lynn	Kings (DCR)	Kimball Road	Daily	90	23	106	24200	12
Lynn	Kings (DCR)	Pierce Road	Daily	90	16	135	24200	12
Manchester	Black	Sampling Point	Weekly	16				
Manchester	Magnolia	Right of Bath and Tennis	Weekly	16				
Manchester	Magnolia	Sampling Point 1	Weekly	16				
Manchester	Singing	Right of parking lot	Weekly	16				
Manchester	Singing	Sampling Point 1	Weekly	16				
Manchester	Tuck's Point	Sampling Point	Weekly	16				
Manchester	West Manchester	Sampling Point	Weekly	18	2	213	253	2
Manchester	White	Sampling Point	Weekly	16				
Marblehead	Crocker Park	Sampling Point	Weekly	12				
Marblehead	Devereux	Sampling Point	Weekly	12				
Marblehead	Gas House	Sampling Point	Weekly	13	1	110	110	
Marblehead	Grace Oliver	Sampling Point	Weekly	13	1	3040	3040	
Marion	Beverly Yacht	Sampling Point	Weekly	13				
Marion	Converse Point	Sampling Point	Weekly	13				
Marion	Dexter Lane	Sampling Point	Weekly	14	1	352	352	
Marion	Island Wharf	Sampling Point	Weekly	13				
Marion	Oakdale Avenue	Sampling Point	Weekly	13				
Marion	Piney Point	Sampling Point	Weekly	14	1	312	312	
Marion	Planting Island	Sampling Point	Monthly	4				
Marion	Silver Shell	North Jetty	Weekly	13				
Marion	Silver Shell	South Jetty	Weekly	13				
Marion	Tabor Academy	Sampling Point 1	Weekly	13				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Marion	Tabor Academy	Sampling Point 2	Weekly	13				
Marshfield	Brant Rock	Sampling Point	Weekly	12				
Marshfield	Fieldston	Hartford Rd (Fieldston)	Weekly	12				
Marshfield	Green Harbor	Sampling Point	Weekly	12				
Marshfield	Rexhame	Sampling Point	Weekly	16				
Marshfield	Sunrise	9th Road - Foster Ave.	Weekly	12				
Mashpee	Callies Beach	Sampling Point	Monthly	4				
Mashpee	Mashpee Neck Road (Town Landing)	Sampling Point	Weekly	14				
Mashpee	Maushup Village	Sampling Point	Weekly	14				
Mashpee	Popponesset (Beach Road)	Sampling Point	Weekly	17	3	120	400	1
Mashpee	Popponesset (Bluff Ave)	Sampling Point	Weekly	15	1	400	400	
Mashpee	Popponesset (New Seabury Inn)	Sampling Point	Weekly	15	1	132	132	
Mashpee	Seconsett Island Causeway	Sampling Point	Monthly	4				
Mashpee	South Cape Beach (DCR)	Sampling Point 1	Weekly	17	1	150	150	
Mattapoisett	Antassawomak East	Sampling Point 1	Weekly	10				
Mattapoisett	Antassawomak West	Sampling Point 2	Weekly	10				
Mattapoisett	Aucoot	Sampling Point	Weekly	13				
Mattapoisett	Brant Beach	Sampling Point	Weekly	10				
Mattapoisett	Crescent	Sampling Point	Weekly	10				
Mattapoisett	Harbor Beach 1 (North)	Sampling Point	Weekly	10				
Mattapoisett	Harbor Beach 2 (South)	Sampling Point	Weekly	10				
Mattapoisett	Holly Woods 1	Sampling Point	Weekly	10				
Mattapoisett	Holly Woods 2	Sampling Point	Weekly	10				
Mattapoisett	Leisure Shores	Sampling Point	Weekly	10				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Mattapoisett	Mattapoisett Shores Association	Sampling Point	Weekly	11	1	196	196	
Mattapoisett	Mattapoisett Town Beach	Sampling Point	Weekly	15	2	124	306	1
Mattapoisett	Ned's Point	Sampling Point	Weekly	13				
Mattapoisett	Peases Point I (East)	Sampling Point	Weekly	10				
Mattapoisett	Peases Point II (West)	Sampling Point	Weekly	10				
Mattapoisett	Point Connett	Sampling Point	Weekly	10				
Mattapoisett	Shining Tides Reservation	Sampling Point	Weekly	16	2	154	236	2
Nahant	Black Rock	Sampling Point	Weekly	16	2	130	364	2
Nahant	Canoe	Sampling Point	Weekly	15				
Nahant	Forty Steps Beach	Sampling Point	Weekly	15				
Nahant	Nahant Beach (DCR)	Flagpole	Weekly	16				
Nahant	Nahant Beach (DCR)	N. of bathhouse	Weekly	16	1	223	223	
Nahant	Nahant Beach (DCR)	Parking section 9	Weekly	16				
Nahant	Nahant Beach (DCR)	South site	Weekly	16				
Nahant	Short	Sampling Point	Weekly	15				
Nahant	Tudor	Sampling Point	Weekly	16	1	226	226	1
Nantucket	40th Pole	Sampling Point	Weekly	11				
Nantucket	Children's	Sampling Point	Weekly	13	1	140	140	
Nantucket	Cisco	Sampling Point	Monthly	3				
Nantucket	Cliffside Beach	Sampling Point	Monthly	3				
Nantucket	Cliffside Beach Club	Sampling Point	Weekly	12	1	410	410	
Nantucket	Dionis	Sampling Point	Weekly	11				
Nantucket	Jetties	Sampling Point	Weekly	12				
Nantucket	Madaket	Sampling Point	Weekly	11				
Nantucket	Miacomet	Sampling Point	Weekly	11				
Nantucket	Sconset	Sampling Point	Monthly	3				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Nantucket	Sewerbeds	Sampling Point	Weekly	11				
Nantucket	Surfside 1	Sampling Point	Weekly	10	1	190	190	
Nantucket	Surfside 2	Sampling Point	Monthly	3				
Nantucket	Washing Pond	Sampling Point	Weekly	11				
Nantucket	Washington Street	Sampling Point	Weekly	11				
Nantucket	Wauwinet Bayside	Sampling Point	Weekly	11				
Nantucket	Wauwinet Oceanside	Sampling Point	Weekly	11				
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	232	232	2
New Bedford	J. Beach	Sampling Point	Weekly	16	1	118	118	2
New Bedford	Kids Beach	Sampling Point	Weekly	16	1	132	132	2
New Bedford	O'Tools	Sampling Point	Weekly	17	2	184	210	3
New Bedford	Squid	Sampling Point	Weekly	17	2	148	500	3
New Bedford	Tabor Park South	Sampling Point	Weekly	15				1
New Bedford	Tower Beach	Tower 1	Weekly	16	1	500	500	2
New Bedford	Tower Beach	Tower 4	Weekly	16	1	500	500	2
Newbury	Plum Island	Sampling Point	Monthly	4				
Newburyport	Plum Island - 55th St.	55th street	Weekly	16				
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	16				1
Newburyport	Plum Island Point	Plum Island Point	Weekly	16				
Oak Bluffs	Eastville Town Beach - Harbor side	Sampling Point	Monthly	3				
Oak Bluffs	Eastville Town Beach - Lagoon side	Sampling Point	Weekly	11				
Oak Bluffs	Inkwell Beach	Sampling Point	Weekly	11				
Oak Bluffs	Joseph Sylvia State Beach - Big	Big Bridge	Monthly	3				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
	Bridge							
Oak Bluffs	Joseph Sylvia State Beach - Sound	Sound	Monthly	3				
Oak Bluffs	Marinelli (Jetty) Beach	Sampling Point	Weekly	11				
Oak Bluffs	Medeiros Cove (Sailing Camp)	Sampling Point	Weekly	11				
Oak Bluffs	Pay Beach	Sampling Point	Weekly	11				
Orleans	Little Inn at Pleasant Bay	Sampling Point	Weekly	9				
Orleans	Meeting House Pond	Sampling Point	Weekly	14				
Orleans	Nauset	Sampling Point	Weekly	17	1	150	150	
Orleans	Quanset Harbor Club Association	Sampling Point	Weekly	10				
Orleans	Skaket Beach	Sampling Point	Weekly	17	1	242	242	
Orleans	Skaket Beach Condominiums	Sampling Point	Weekly	13	1	288	288	
Plymouth	Plymouth Beach - 1	Sampling Point 1	Weekly	16				
Plymouth	Plymouth Beach - 3	Sampling Point 3	Weekly	16				
Plymouth	Plymouth Beach - 5	Sampling Point 5	Weekly	16				
Plymouth	White Horse - Full Sail	Full Sail	Weekly	16	1	213	213	
Plymouth	White Horse - Hill Top	Hill Top	Weekly	17	1	146	146	1
Provincetown	333 Commercial Street	Sampling Point	Weekly	14				
Provincetown	451 Commercial Street	Sampling Point	Weekly	14				
Provincetown	593 Commercial Street	Sampling Point	Weekly	14				
Provincetown	637 Commercial Street	Sampling Point	Weekly	14				
Provincetown	Atkins Lane	Sampling Point	Weekly	14				
Provincetown	Atlantic Avenue	Sampling Point	Weekly	14				
Provincetown	Court Street	Sampling Point	Weekly	14				
Provincetown	Herring Cove (National Seashore)	Sampling Point 1	Weekly	11				
Provincetown	Johnson Street	Sampling Point	Weekly	14				
Provincetown	Kendal Lane	Sampling Point	Weekly	14				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public 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	15	1	312	312	
Provincetown	Provincetown Inn Rotary	Sampling Point	Monthly	4				
Provincetown	Race Point (National Seashore)	Sampling Point 1	Weekly	11				
Provincetown	Ryder Street	Sampling Point Middle	Weekly	14				
Provincetown	Town Landing - Breakwater	Sampling Point	Weekly	17	3	108	628	1
Provincetown	Town Landing - Snail Road	Sampling Point	Weekly	16	2	168	676	1
Provincetown	Town Landing West of Coast Guard	Sampling Point	Weekly	14				
Provincetown	West End Lot	Sampling Point	Weekly	14				
Provincetown	Winston Ave	Sampling Point	Weekly	15	1	672	672	1
Quincy	Avalon	Sampling Point	Weekly	12				
Quincy	Broady (Baker)	Sampling Point	Weekly	14	3	512	4360	1
Quincy	Chikatawbot	Sampling Point	Weekly	12				
Quincy	Delano Ave.	Sampling Point	Weekly	13	1	121	121	1
Quincy	Edgewater	Sampling Point	Weekly	12				
Quincy	Germantown Firestation	Sampling Point	Weekly	14	3	399	3970	1
Quincy	Heron	Sampling Point	Weekly	12				
Quincy	Merrymount	Sampling Point	Weekly	12				
Quincy	Mound	Sampling Point	Weekly	12				
Quincy	Nickerson	Sampling Point	Weekly	12				
Quincy	Orchard Street	Sampling Point	Weekly	12				
Quincy	Parkhurst	Sampling Point	Weekly	12				
Quincy	Rhoda	Sampling Point	Weekly	15	2	243	4790	1
Quincy	Wollaston @ Channing Street (DCR)	Channing Street	Daily	90	13	109	5172	19
Quincy	Wollaston @ Milton Street (DCR)	Sampling Point	Daily	90	18	105	4106	22
Quincy	Wollaston @ Rice Road (DCR)	Sampling Point	Daily	90	8	134	11200	20

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Quincy	Wollaston @ Sachem Street (DCR)	Sampling Point	Daily	90	12	106	2760	19
Revere	Revere (DCR)	at state police	Weekly	18				
Revere	Revere (DCR)	Beach St.	Weekly	18	1	269	269	
Revere	Revere (DCR)	Carey Circle	Weekly	18	2	114	119	
Revere	Revere (DCR)	Oak Island St.	Weekly	18	3	113	346	
Revere	Short (DCR)	Sampling Point	Weekly	19	3	117	546	1
Rockport	Back	Sampling Point	Weekly	12				
Rockport	Cape Hedge	Sampling Point	Monthly	3				
Rockport	Front Beach	Sampling Point	Weekly	12				
Rockport	Long - Gloucester	Gloucester	Weekly	12				
Rockport	Long - North	North	Weekly	12				
Rockport	Old Garden	Sampling Point	Monthly	3				
Rockport	Pebble	Sampling Point	Monthly	3				
Salem	Camp Naumkeag	Sampling Point	Weekly	13				
Salem	Children's Island - Back	Back	Weekly	9	2	146	259	2
Salem	Children's Island - Dock	Dock	Weekly	8				
Salem	Children's Island - Wally	Wally	Weekly	9				
Salem	Collins Cove	Sampling Point	Weekly	13				
Salem	Dead Horse	Sampling Point	Biweekly	7				
Salem	Forest River - Pioneer	Sampling Point	Weekly	13				
Salem	Forest River - Point	Sampling Point	Biweekly	7				
Salem	Juniper Point	Sampling Point	Weekly	14	1	233	233	
Salem	Ocean Avenue	Sampling Point	Weekly	13	1	216	216	1
Salem	Osgood	Sampling Point	Weekly	9				1
Salem	Steps	Sampling Point	Biweekly	7				
Salem	Waikiki Beach (Winter Island)	Sampling Point	Biweekly	7				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Salem	Willow Avenue	Sampling Point	Weekly	14	2	110	173	1
Salem	Willows Pier	Sampling Point	Weekly	13	1	132	132	1
Salisbury	Salisbury Beach (DCR)	Sampling Point	Weekly	16				
Salisbury	Salisbury Beach North End (DCR)	Star of the Sea	Weekly	17	1	340	340	
Sandwich	Carleton Shores	Sampling Point	Weekly	13				
Sandwich	East Sandwich	Sampling Point	Weekly	11				
Sandwich	Mill Creek	Sampling Point	Weekly	11				
Sandwich	Scusset (DCR)	Sampling Point	Weekly	16				
Sandwich	Torrey Beach Community Association	Sampling Point	Weekly	9				
Sandwich	Town Neck (Hemispheres)	Sampling Point	Weekly	11				
Sandwich	Town Neck Beach	End of Boardwalk	Weekly	11				
Scituate	Bassings Beach	Sampling Point	Weekly	14	1	733	733	
Scituate	Egypt	Sampling Point	Weekly	13	1	134	134	1
Scituate	Humarock	Sampling Point	Weekly	12				
Scituate	Minot	Sampling Point	Weekly	13	1	134	134	1
Scituate	Peggotty	Sampling Point	Weekly	17	2	554	3130	3
Scituate	Sand Hills	Sampling Point	Weekly	12				
Scituate	Scituate Lighthouse	Sampling Point	Weekly	15	3	120	1439	3
Somerset	Pierce Beach	Sampling Point	Weekly	14	3	309	10000	1
Swampscott	Eisman's	Sampling Point	Weekly	13	1	2190	2190	
Swampscott	Fisherman's	Sampling Point	Weekly	14	2	199	373	
Swampscott	Kings	Sampling Point	Weekly	13	1	209	209	
Swampscott	Phillips	Sampling Point	Weekly	12				
Swampscott	Preston	Sampling Point	Weekly	13	1	187	187	
Swampscott	Whales	Sampling Point	Weekly	13	1	1010	1010	
Swansea	Cedar Cove Club	Sampling Point	Weekly	12				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Swansea	Coles River Club off Harbor Rd	Sampling Point	Weekly	12				
Swansea	Leeside	Sampling Point	Weekly	12	2	155	158	1
Swansea	Sandy Beach	Sampling Point - Swansea	Weekly	13	1	135	135	1
Swansea	Swansea Town Beach	Sampling Point	Weekly	13	1	238	238	1
Tisbury	Hilman's Point	Sampling Point	Monthly	4				
Tisbury	Mink Meadows	Sampling Point	Weekly	12				
Tisbury	Owen Little Way	Sampling Point	Weekly	22	6	110	314	4
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	13	1	2000	2000	
Tisbury	Vineyard Harbor Motel	Sampling Point	Weekly	12				
Truro	Ballston	Sampling Point	Monthly	4				
Truro	Beach Point Landing	Sampling Point	Weekly	14				
Truro	Coast Guard Town	Sampling Point	Monthly	4				
Truro	Cold Storage/Pond Village	Sampling Point	Monthly	4				
Truro	Corn Hill	Sampling Point	Monthly	4				
Truro	Cranberry Hill	Sampling Point	Weekly	14				
Truro	Crow's Nest (496 Shore Rd)	Sampling Point	Weekly	14				
Truro	Dune's Colony (648 Shore Rd)	Sampling Point	Weekly	14				
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 (Town)	Sampling Point	Monthly	4				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Truro	Longnook	Sampling Point	Monthly	4				
Truro	Lookout Bluff	Sampling Point	Weekly	14				
Truro	Noon's Landing	Sampling Point	Weekly	14				
Truro	Pamet Harbor	Sampling Point	Weekly	14				
Truro	Ryder	Sampling Point	Monthly	4				
Truro	Shearwater Association	Shearwater 1	Weekly	14				
Truro	Sunset Village (372 Shore Rd)	Sampling Point	Weekly	14				
Wareham	Briarwood	Sampling Point	Weekly	17	2	148	152	2
Wareham	East Boulevard	Sampling Point	Weekly	16				
Wareham	Forbes	Sampling Point	Weekly	17	1	254	254	
Wareham	Hamilton Beach	Sampling Point	Weekly	17	1	260	260	
Wareham	Indian Mound Beach	Sampling Point	Weekly	17	1	400	400	
Wareham	Little Harbor	Sampling Point	Weekly	16				
Wareham	North Boulevard	Sampling Point	Weekly	17	1	400	400	
Wareham	Onset	Sampling Point	Weekly	16				
Wareham	Parkwood	Sampling Point	Weekly	17	1	238	238	
Wareham	Pinehurst	Sampling Point	Weekly	16				
Wareham	Point Independence	Sampling Point	Weekly	12	1	308	308	
Wareham	Riverside Avenue	Sampling Point	Weekly	16				
Wareham	Shell Point	Sampling Point	Weekly	16				
Wareham	Standish Shores	Sampling Point	Weekly	10				
Wareham	Swift's	Sampling Point	Weekly	17	2	122	400	1
Wareham	Swift's Neck	Sampling Point	Weekly	17	2	112	170	1
Wellfleet	Burton Baker	Sampling Point	Weekly	14				
Wellfleet	Cahoon Hollow	Sampling Point	Monthly	4				
Wellfleet	Chequesset Yacht and Country Club	Sampling Point	Weekly	12				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
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	11				
Wellfleet	Mayo	Sampling Point	Weekly	14				
Wellfleet	Newcomb Hollow	Sampling Point	Monthly	4				
Wellfleet	Omaha Road	Sampling Point	Monthly	4				
Wellfleet	Powers Landing	Sampling Point	Monthly	4				
Wellfleet	The Gut	Sampling Point	Monthly	4				
Wellfleet	White Crest	Sampling Point	Monthly	4				
West Tisbury	Capawok Beach	Capawok sampling point	Weekly	10				
West Tisbury	Gray's Beach	Grays	Weekly	10				
West Tisbury	Lambert's Cove Beach	Sampling Point	Weekly	13				
West Tisbury	Long Point (Ocean)	Central	Monthly	4				
West Tisbury	Naushon Beach	Naushon sampling point	Weekly	11				
West Tisbury	Saltworks Beach	Saltworks	Weekly	10				
West Tisbury	Tisbury Great Pond Beach	Sampling Point	Monthly	4				
Westport	Baker's Beach	Sampling Point	Monthly	3				
Westport	C and K Club - Howland	Sampling Point	Monthly	3				
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 (DCR)	Sampling Point	Weekly	16				
Westport	Spindle Rock	Sampling Point	Monthly	3				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Westport	Town-Yacht	Sampling Point	Monthly	3				
Weymouth	George E. Lane	Sampling Point	Weekly	12				
Weymouth	Wessagusett (Old Wessagussett)	Sampling Point	Weekly	12				
Winthrop	Donovans	Sampling Point	Weekly	22	8	122	4160	4
Winthrop	Grandview	Sampling Point	Weekly	20	3	121	8704	1
Winthrop	Halford	Sampling Point	Weekly	20				
Winthrop	Pico	Sampling Point	Weekly	23	3	175	1130	2
Winthrop	Winthrop (DCR)	Sampling Point	Weekly	16				
Winthrop	Yerrill	Sampling Point	Weekly	20	1	221	221	
Yarmouth	Bass River East	East	Weekly	16				
Yarmouth	Bass River West	West	Weekly	16				
Yarmouth	Baxter Avenue	Sampling Point	Weekly	16				
Yarmouth	Bay Road	Sampling Point	Weekly	16				
Yarmouth	Bayview Street	Sampling Point	Weekly	16				
Yarmouth	Colonial Acres East	East	Weekly	16				
Yarmouth	Colonial Acres West	West	Weekly	16				
Yarmouth	Columbus Avenue	Sampling Point	Weekly	16				
Yarmouth	Englewood	Sampling Point	Weekly	16				
Yarmouth	Follins Pond	Sampling Point	Weekly	16				
Yarmouth	Gray's Beach	Sampling Point	Weekly	16				
Yarmouth	Malfa Road	Sampling Point	Weekly	16				
Yarmouth	Ocean Mist Hotel	Sampling Point	Weekly	14				
Yarmouth	Parkers River East	Sampling Point	Weekly	16				
Yarmouth	Parkers River West	Sampling Point	Weekly	16				
Yarmouth	Seagull (Center)	East front	Weekly	16				
Yarmouth	Seagull (Left)	back	Weekly	16				

Table 13
MA Marine Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Yarmouth	Seagull (Right)	West front	Weekly	16				
Yarmouth	Seaview Ave. Beach	Sampling Point	Weekly	16				
Yarmouth	South Middle	Sampling Point	Weekly	16				
Yarmouth	Thatcher Town Park	Sampling Point	Weekly	16				
Yarmouth	Vernon St.	Sampling Point	Weekly	17	1	292	292	
Yarmouth	Wilbur Park	Sampling Point	Weekly	16				
Yarmouth	Windmill	Sampling Point	Weekly	16				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Abington	Island Grove Beach	Sampling Point	Weekly	9				
Acton	NARA Beach	Sampling Point	Weekly	19	3	268	400	1
Agawam	Robinson Pond Beach 1 (DCR)	Sampling Point	Weekly	18	3	123	176	2
Amesbury	Camp Bauercrest	Sampling Point	Weekly	10				
Amesbury	Glen Devin Condominiums	Sampling Point	Weekly	11	2	345	387	2
Amesbury	Lake Attitash - A.L.S.I.A.	Dam/Bathing area	Weekly	12	1	461	461	1
Amesbury	Lake Gardner	Sampling Point	Weekly	12	1	308	308	1
Amesbury	Tuxbury RV Resort Lagoon	Sampling Point	Weekly	18				
Amherst	Puffers Pond (AKA Factory Hollow Pond)	North	Three times	3				
Amherst	Puffers Pond (AKA Factory Hollow Pond)	South	Three times	3				
Andover	Camp Maude Eaton	Sample Site 1 - swim 2 feet	Weekly	12				
Andover	Camp Maude Eaton	Sample Site 2 - swim 4 feet	Weekly	12				
Andover	Pomps Pond	Station 1	Weekly	13				
Andover	Pomps Pond	Station 2	Weekly	13				
Andover	Pomps Pond	Station 3	Weekly	13	1	280	280	
Arlington	Arlington Reservoir	Sampling Point	Weekly	13				
Arlington	Medford Boat Club	Lower	Weekly	17				
Arlington	Medford Boat Club	Upper	Weekly	17				
Ashburnham	Camp Split Rock	Sampling Point	Two times	2				
Ashburnham	Camp Wellville Beach	Sampling Point	Weekly	7				
Ashburnham	Camp Winnekeag Pond	Sampling Point	Weekly	16				
Ashby	Camp Lapham	Sampling point	Weekly	8				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Ashby	Damon Pond Beach (DCR)	Sampling Point	Weekly	25	8	68	870	7
Ashland	Ashland Reservoir-Main Beach (DCR)	Sampling Point	Weekly	12				
Ashland	Hopkinton Reservoir-Main Beach (DCR)	Sampling Point	Weekly	18	2	99	99	2
Ashland	Hopkinton Reservoir-Upper Beach (DCR)	Sampling Point	Weekly	16				
Ashland	Warren Conference Center	Sampling Point	Weekly	13				
Athol	Ellis Beach	Sampling Point	Weekly	12				
Athol	Silver Pond Beach	Sampling Point	Weekly	15	3	256	400	2
Auburn	Century Sportsman's Club	Sampling Point	Weekly	14	1	980	980	
Ayer	Ayer Town Beach	Sampling Point	Weekly	16				
Ayer	Mirror Lake	Sampling Point	Weekly	10				
Barnstable	Fair Acres Country Day School	Sampling Point	Weekly	13	3	800	800	
Barnstable	Hamblin Pond	Sampling Point	Weekly	13				
Barnstable	Hathaway Pond	Sampling Point	Weekly	13				
Barnstable	Holly Point Assoc.	Sampling Point	Weekly	14				
Barnstable	Homestead Homeowner's Association	Sampling Point	Weekly	17	4	272	800	1
Barnstable	Jimmy's Beach (Wequaquet Heights Association)	118 Conners Rd	Weekly	14				
Barnstable	Jimmy's Beach (Wequaquet Heights Association)	Jimmys Beach	Weekly	14				
Barnstable	Joshua's Pond	Sampling Point	Weekly	13				
Barnstable	Long Pond Farms Association	Sampling Point	Weekly	13				
Barnstable	Lovell's Pond	Sampling Point	Weekly	13				
Barnstable	Middle Pond	Sampling Point	Weekly	13				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Barnstable	Regency Drive Owners Association	Sampling Point 1	Weekly	16	5	360	800	5
Barnstable	Sand Shores Association	Sampling Point	Weekly	14				
Barnstable	Wequaquet Estates	Sampling Point	Weekly	13				
Barnstable	Wequaquet Lake Town	Sampling Point	Weekly	17	4	312	800	1
Barnstable	Wianno Club (Fresh-Crystal Lake)	Sampling Point	Weekly	14				
Becket	Becket Woods Road District - Beach	Sampling Point	Weekly	19	2	365.4	517.2	
Becket	Berkshire Lake Estates	Sampling Point	Weekly	16				
Becket	Camp Becket - Iroquois Beach	Sampling Point	Weekly	12				
Becket	Camp Becket - Main Beach	Sampling Point	Weekly	12				
Becket	Camp Greylock - Jr. Beach	Sampling Point	Weekly	10				
Becket	Camp Watitoh Beach	Sampling Point	Weekly	10				
Becket	Center Lake Estates Beach	Sampling Point	Weekly	16				
Becket	Center Pond Beach	Sampling Point	Weekly	12				
Becket	Chimney Corners Camp - Beach	Sampling Point	Weekly	12	1	344.8	344.8	
Becket	Crystal Pond Homeowners Assoc Beach	Sampling Point	Weekly	14	1	816.5	816.5	
Becket	Indian Lake Assoc - Boulder Beach	Sampling Point	Weekly	16	1	387.3	387.3	
Becket	Indian Lake Assoc - Dam Beach	Boat Dock	Weekly	16				
Becket	Indian Lake Assoc - Forest Beach	Sampling Point	Weekly	17	1	980.4	980.4	
Becket	Indian Lake Assoc - Niskayuna Beach	Sampling Point	Weekly	15				
Becket	Mountain Grove Assoc. Beach	Sampling Point	Weekly	7				
Becket	Sherwood Forest - Arrow Beach	Sampling Point	Weekly	16				
Becket	Sherwood Forest - Boat Beach	Sampling Point	Weekly	16	1	648.8	648.8	
Becket	Sherwood Forest - Excalibur	Sampling Point	Weekly	17	1	325.5	325.5	
Becket	Sherwood Forest - Fireside Beach	Sampling Point	Weekly	17	1	689.3	689.3	

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
	(Little Robin dam)							
Becket	Sherwood Forest - Grassy Beach	Sampling Point	Weekly	17	1	613.1	613.1	
Becket	Sherwood Forest - Lancelot Beach	Sampling Point 1	Weekly	16				
Becket	Sherwood Forest - North Beach	Sampling Point	Weekly	16	3	260.3	1986.3	
Becket	Sherwood Forest - Will Scarlett	Sampling Point	Weekly	16				
Becket	Sherwood Greens Road District Beach	Sampling Point	Weekly	16				
Bedford	Springs Brook Park Bathing Beach	Concession Stand Area	Weekly	12				
Bedford	Springs Brook Park Bathing Beach	Dock	Weekly	12				
Bedford	Springs Brook Park Bathing Beach	spray pnd (was SP & Concess; b4 that, Pad)	Weekly	12				
Bedford	Springs Brook Park Bathing Beach	water slide (used to be Rivulet)	Weekly	12				
Belchertown	Belchertown Town Beach (Lake Arcadia)	Sampling Point	Weekly	12	2	370	500	1
Bellingham	Arcand Park Beach	Sampling Point	Weekly	14				
Bellingham	Silver Lake	Sampling Point	Weekly	14				
Billerica	Nutting Lake - Micozzi Beach	North	Weekly	12				
Billerica	Nutting Lake - Micozzi Beach	South	Weekly	12	1	276	276	
Bolton	Bolton Town Beach	Sampling Point	Weekly	16				
Bolton	Camp Resolute	Day Beach AKA Camp 2	Weekly	16				
Bolton	Camp Resolute	Main Beach AKA Camp 1	Weekly	16				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Bolton	Tom Denney Nature Camp	Sampling Point	Weekly	7				
Bourne	Picture Lake (Flax Pond)	Sampling Point	Weekly	14				
Bourne	Queen Sewell Pond	Sampling Point	Weekly	14				
Boxford	Camp Rotary	Sampling Point	Weekly	10				
Boxford	Camp Stepping Stone	Sampling Point	Weekly	7				
Boxford	Camp Wakanda	Sampling Point	Weekly	12				
Boxford	Danvers YMCA Daycamp	Sampling Point	Weekly	9				
Boxford	Stiles Pond Beach	Sampling Point	Weekly	16				
Braintree	Sunset Lake	dock	Weekly	14	1	720	720	1
Brewster	Beechwood Landing/Greenland Pond	Sampling Point	Weekly	14				
Brewster	Beechwood Landing/Long Pond	Sampling Point	Weekly	14				
Brewster	Blueberry Pond	Sampling Point	Weekly	14				
Brewster	Camp Favorite	Sampling Point	Weekly	10				
Brewster	Cape Cod Sea Camps (Long Pond)	Sampling Point	Weekly	10				
Brewster	Cliff Pond (DCR)	DYS	Weekly	17	1	160	160	1
Brewster	Cliff Pond (DCR)	Sampling Point	Weekly	16				
Brewster	Crossroads for Kids Camp (Camp Mitton)	Crossroads for Kids Camp	Weekly	11	1	440	440	
Brewster	Flax Pond (DCR)	Sampling Point	Weekly	16				
Brewster	Long Pond	Sampling Point	Weekly	16				
Brewster	Robinwood Homeowners Association (Owl Pond)	Sampling Point	Weekly	13				
Brewster	Sheep Pond Beach	Sampling Point	Weekly	13				
Brewster	Sheep Pond Landing	Sampling Point	Weekly	16				
Brewster	Slough Pond	Sampling Point	Weekly	16				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Brewster	Upper Mill Pond	Sampling Point	Weekly	16				
Brimfield	Dean Pond Beach (DCR)	Sampling Point	Weekly	12				
Brimfield	Village Green Family Campground	Sampling Point	Weekly	19	2	350	500	1
Brookfield	South Pond	Sampling Point	Weekly	8				
Carver	Crystal Lake	Sampling Point	Weekly	8				
Carver	John's Pond	Sampling Point	Weekly	16				
Carver	Sampson's Pond	Sampling Point	Weekly	15				
Charlemont	Cold River Pool (DCR)	Sampling Point	Weekly	23	12	63	548	7
Charlton	Buffumville Lake (USACE)	Sampling Point	Weekly	18				
Charlton	Camp Foskett (YMCA)	Sampling Point	Weekly	8	1	390	390	1
Charlton	Camp Joslin	Sampling Point	Weekly	12				
Charlton	Salem Covenant Church Camp	Sampling Point	Weekly	12	1	410	410	
Chatham	Goose Pond	Sampling Point	Weekly	12				
Chatham	Schoolhouse Pond	Sampling Point	Weekly	12				
Chatham	White Pond	Sampling Point	Weekly	12				
Chatham	White Pond @ 60 White Pond Rd.	Sampling Point	Weekly	12				
Chelmsford	Freeman Lake	Middle	Weekly	11	3	360	640	1
Chelmsford	Hart Pond	Middle	Weekly	9				
Chesterfield	Chesterfield Scout Reservation - BSA	Sampling Point	Weekly	6				
Chesterfield	Damon Pond Association Beach	Sampling Point	Weekly	16				
Chicopee	Chicopee Beach (DCR)	Sampling Point	Weekly	19	3	65	411	3
Concord	Annursnac Hill Assoc.	Sampling Point	Weekly	16				
Concord	Silver Hill Assoc	Sampling Point	Weekly	17	1	268	268	1
Concord	Walden Pond - Main (DCR)	Sampling Point	Weekly	19	2	210	960	2
Concord	Walden Pond - Red Cross (DCR)	East	Weekly	18	2	130	690	3
Concord	Walden Pond - Red Cross (DCR)	West	Weekly	18	2	100	440	2

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Concord	White Pond Assoc	Sampling Point	Weekly	16	1	1060	1060	2
Conway	Conway Swimming Pool	Sampling Point	Weekly	14				
Dennis	Flax Pond (Yarmouth/Dennis)	Sampling Point	Weekly	14				
Dennis	Princess Beach-Scargo Lake	Sampling Point	Weekly	14				
Dennis	Scargo Lake	Sampling Point	Weekly	14				
Douglas	Breezy Picnic Grounds	Sampling Point	Weekly	13				
Douglas	Lake Manchaug Camping	Sampling Point	Weekly	16				
Douglas	Wallum Lake (DCR)	Sampling Point	Weekly	16				
Douglas	Wallum Lake Terrace	Sampling Point	Monthly	4				
Dover	Grossman Beach	Sampling Point	Weekly	11				
Dover	Powissett	Sampling Point	Weekly	11				
Dracut	Fleur de Lis	Sampling Point	Weekly	8				
Dracut	Grove	Sampling Point	Weekly	8				
Dracut	Hilltop	Sampling Point	Weekly	8				
Dracut	Mascuppic	Sampling Point	Weekly	8				
Dracut	Passaconaway	Sampling Point	Weekly	8				
Dracut	Richardson	Sampling Point	Weekly	9	1	252	252	
Dudley	Merino Pond	Sampling Point	Weekly	14				
Dunstable	YMCA beach @ Massapoag Pond	Sampling Point	Weekly	6				
East Brookfield	Camp Frank A Day	Sampling Point	Weekly	13				
East Brookfield	Lake Lashaway	Sampling Point	Weekly	13	2	250	1700	
Eastham	Great Pond	Sampling Point	Weekly	14				
Eastham	Herring Pond	Sampling Point	Weekly	14				
Eastham	Jemima Pond	Sampling Point	Weekly	14				
Eastham	Minister's Pond	Sampling Point	Weekly	15	1	260	260	
Eastham	Nauset Haven Lakeside Condo	Sampling Point	Weekly	14	1	240	240	

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
	(Minister)							
Eastham	Whispering Pines Condo (Muddy Pond AKA Mill Pond)	Sampling Point	Weekly	10				
Eastham	Wiley Park	Sampling Point	Weekly	14				
Easton	Town Pool	End of 1st dock	Weekly	10				
Egremont	Prospect Lake Park	Sampling Point	Weekly	14				
Erving	Laurel Lake (DCR)	Sampling Point	Weekly	16				
Essex	Camp Menorah	Sampling Point	Weekly	9				
Essex	Centennial Grove	Sampling Point	Weekly	16				
Falmouth	Ashumet Valley Holly Sands	Sampling Point	Weekly	14				
Falmouth	Cape Cod Camp Resort	Sampling Point	Weekly	14				
Falmouth	Coonamessett Pond	Sampling Point	Weekly	14				
Falmouth	Grew's Pond	Sampling Point	Weekly	14				
Falmouth	Jenkins Pond - Pinecrest	Sampling Point	Weekly	14				
Falmouth	Lochstead Association	Sampling Point	Weekly	14				
Falmouth	Mares Pond Association	Sampling Point	Weekly	14				
Falmouth	Sand Pointe Shores-Rock Hollow	Sampling Point	Weekly	14				
Falmouth	Sand Pointe Shores-White Cap	Sampling Point	Weekly	14				
Falmouth	Shady Lane HA-Crooked Pond	Sampling Point	Weekly	13				
Falmouth	Water-by Estates Association-Flax Pond	Sampling Point	Weekly	14				
Florida	Manice Education Center Beach	Sampling Point	Weekly	10				
Framingham	Cochituate Beach	Sampling Point	Weekly	10				
Framingham	Learned Beach	Sampling Point	Weekly	11	1	272	272	1
Framingham	Washakum Beach	Sampling Point	Weekly	11	2	360	1600	
Franklin	Chilson Beach	Sampling Point	Weekly	8				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Freetown	Cathedral Camp	Sampling point	Weekly	8				
Freetown	Long Pond AKA Town Beach	Sampling Point	Weekly	17	2	630	990	1
Gardner	Dunn Pond (DCR)	Sampling Point	Weekly	19	3	77	130	3
Gardner	Lithuanian Outing Assoc.	Sampling Point	Weekly	16				
Georgetown	American Legion Park	Sampling Point	Weekly	10				
Georgetown	Camp Leslie	Sampling Point	Weekly	8				
Goshen	Camp Holy Cross	Sampling Point	Weekly	10				
Goshen	Camp Howe	Sampling Point	Weekly	9				
Goshen	Hammond Acres	Sampling Point	Weekly	11				
Goshen	Upper Highland Lake - Campers Beach (DCR)	Sampling Point	Weekly	16				
Goshen	Upper Highland Lake - Day use area beach (DCR)	Sampling Point	Weekly	17	1	71	71	
Grafton	Silver Lake Beach	Sampling Point	Weekly	11				
Great Barrington	Eisner Camp	Sampling Point	Weekly	11	1	365.4	365.4	1
Great Barrington	Lake Mansfield	Town beach	Weekly	12				
Great Barrington	Seven Stones Beach (KSA)	Sampling Point	Weekly	11				
Greenfield	Greenfield Municipal Bathing Beach	Sampling Point	Weekly	20	2	288	410	
Groton	Baby Beach Lost Lake	Sampling Point	Weekly	15				
Groton	Groton Town Beach (Sargisson Beach)	Sampling Point	Weekly	18	1	256	256	1
Groton	Grotonwood Camp	Sampling Point	Weekly	8				
Halifax	Annawon Drive	Sampling Point	Weekly	16				
Halifax	Halifax Beach Association	Sampling Point	Weekly	6				3
Halifax	Holmes Street	Sampling Point	Weekly	15				
Halifax	Lingan Street	Sampling Point	Weekly	5				3

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Halifax	Twin Lakes Condominiums	Sampling Point	Weekly	16				
Hanson	Cranberry Cove (aka Camp Kiwanee)	Sampling Point	Weekly	11	1	240	240	
Hanson	Ocean Ave.	Sampling Point	Weekly	13				1
Harvard	Camp Green Eyrie	Sampling Point	Weekly	15				
Harvard	Harvard Town Beach	Sampling Point	Weekly	12				
Harwich	Aunt Edie's Pond	Sandy Shore Way	Weekly	14				
Harwich	Buck's Pond	Sampling Point	Weekly	14				
Harwich	Clearwater Drive (Great Sands)	3	Weekly	15	1	404	404	
Harwich	Hinkley's Pond	Sampling Point	Weekly	14				
Harwich	John Joseph Pond at Lakeside Terrace (Great Sands)	Lakeside Terrace	Weekly	11				
Harwich	John Joseph Pond at Vacation Lane (Great Sands)	2	Weekly	14				
Harwich	Long Pond Rte 124	Sampling Point	Weekly	14				
Harwich	Long Pond-Cahoon St.	Sampling Point	Weekly	14				
Harwich	Long Pond-Long Pond Drive	Sampling Point	Weekly	14				
Harwich	Robbins Pond	Sampling Point	Weekly	14				
Harwich	Sand Pond	Sampling Point	Weekly	14				
Harwich	Seymour Pond	Sampling Point	Weekly	14				
Harwich	Skinequit Pond	Sampling Point	Weekly	14				
Haverhill	Plugs Pond	Sampling Point	Weekly	11				
Heath	Mohawk Estates	Beach	Weekly	10				
Hinsdale	Camp Ashmere Beach	Sampling Point	Weekly	11				
Hinsdale	Camp Emerson Beach (Fernwood Reservoir)	Sampling Point	Weekly	5				
Hinsdale	Camp Emerson Marina	Sampling Point	Weekly	4				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Hinsdale	Camp Romaca	Beach	Weekly	8				
Hinsdale	Camp Taconic Beach	Sampling Point	Weekly	10	1	517.2	517.2	
Hinsdale	Dan Duquette Sports Academy	Sampling Point	Weekly	9	1	344.1	344.1	
Holden	Camp Kinneywood Beach	Sampling Point	Weekly	8	1	330	330	
Holden	Eagle Lake	Sampling Point	Weekly	13	1	490	490	
Holland	Collette Drive Beach	Sampling Point	Weekly	18	2	390	730	
Holland	Craig Road Beach	Sampling Point	Weekly	16				
Holland	Holland Pond North	Sampling Point	Weekly	7				
Holland	Lake Siog Park (USACE)	Sampling Point	Weekly	13				1
Holland	Massaconet Shores	Sampling Point	Weekly	18	2	290	770	
Holliston	Pleasure Point	Sampling Point	Weekly	13				
Holliston	Stoddard Park	Sampling Point	Weekly	14				
Hopkinton	Sandy Beach	Left	Weekly	9				
Hopkinton	Sandy Beach	Middle	Weekly	9				
Hopkinton	Sandy Beach	Right	Weekly	9				
Hubbardston	Comet Pond Beach (DCR)	Middle	Weekly	14	1	1100	1100	1
Hubbardston	Pinecrest Property Owners Assoc.	Sampling Point	Biweekly	3				
Hubbardston	Pinecrest Property Owners Assoc.	Sampling Point	Biweekly	2	1	120	120	
Hudson	Centennial Beach	Sampling Point	Weekly	16	1	1011	1011	1
Huntington	Timothy Hill Christian Camp	Beach	Once	1				
Huntington	YMCA Camp Norwich Beach	Sampling Point	Once	1				
Ipswich	Hood Pond-boat ramp	Sampling Point	Weekly	16				
Kingston	Camp Morning Star	Sampling Point	Weekly	9				
Lakeville	Clear Pond	Sampling Point	Weekly	11				
Lakeville	Loon Pond	Sampling Point	Once	1				
Lancaster	Camp Lowe Beach	Sampling Point	Weekly	12				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Lancaster	JCC Family Camp	Sampling Point	Weekly	10				
Lancaster	Lancaster Town Beach	Sampling Point	Weekly	9				
Lanesborough	Sunrise Beach	Sampling Point	Weekly	14	1	770	770	
Lee	Goose Pond at Leisure Lee Rd.	Sampling Point	Weekly	16				
Lee	Lee Town Beach	Sampling Point	Weekly	13				
Leicester	Camp Wind-in-the-Pines	Lower beach	Weekly	11				
Leicester	Camp Wind-in-the-Pines	Upper beach	Weekly	10				
Lenox	Lenox Town Beach (Laurel Lake)	Sampling Point	Weekly	15				
Leominster	Ricker's Kindercamp	Sampling Point	Weekly	9				
Lexington	Old Reservoir Swim Area #1	Sampling Point	Weekly	11	1	256	256	
Lexington	Old Reservoir Swim Area #2	Sampling Point	Weekly	11	1	256	256	
Littleton	Littleton Town Beach	Sampling Point	Weekly	16	1	400	400	1
Lowell	Merrimac River - Bath House	Sampling Point	Weekly	15	5	260	10000	1
Ludlow	Haviland Pond	Middle of pond	Weekly	15				
Lunenburg	Hickory Hills (Brookview)	Sampling Point	Weekly	16				
Lunenburg	Hickory Hills (Hemlock Drive)	Sampling Point	Weekly	16				
Lunenburg	Hickory Hills (Island Rd.)	Sampling Point	Weekly	16				
Lunenburg	Lake Whalom	Sampling Point	Weekly	16				
Lunenburg	Lunenburg Town Beach	Sampling Point	Weekly	9				
Lunenburg	Shady Point Campground	Sampling Point	Weekly	18	2	400	400	1
Marlborough	Henry F Collins Beach	Sampling Point	Weekly	12				
Marlborough	Intercolonial Club of Marlborough	Sampling Point	Weekly	12				
Marlborough	McDonald Beach	Sampling Point	Weekly	12				
Marlborough	Memorial Beach	[obsolete] Left (Marl.)	Weekly	6	1	269	269	1
Marlborough	Memorial Beach	[obsolete] Right	Weekly	6	1	1054	1054	1

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
		(Marl.)						
Marlborough	Memorial Beach	Middle (Marl.)	Weekly	10				
Marlborough	Richard P. Sharon Beach	Sampling Point	Weekly	12				
Marlborough	Roger's Beach	Sampling Point	Weekly	12	1	933	933	1
Mashpee	Attaquin	Sampling Point	Weekly	14				
Mashpee	Briarwood Beach	Sampling Point	Weekly	14				
Mashpee	Camp Farley - Wakeby Pond	Sampling Point	Weekly	14				
Mashpee	Fells Pond (AKA Jim Pond)	Sampling Point	Weekly	12				
Mashpee	John's Pond (Fred's Beach)	Tims Beach	Weekly	10	1	720	720	
Mashpee	John's Pond (North)	Sampling Point	Weekly	14				
Mashpee	John's Pond (Public)	Back Road	Weekly	14				
Mashpee	John's Pond (Public)	Brickyard Road	Weekly	14				
Mashpee	Mashpee Shores Assoc.	Sampling Point	Weekly	11				
Mashpee	Santuit Pond	Bryants Neck	Weekly	14				
Mashpee	Santuit Pond	Town Landing	Weekly	14				
Mashpee	Santuit Pond Estate Assoc. - Santuit Pond	Sampling Point	Weekly	14				
Mashpee	Trustees of the Reservation (Mashpee Pond)	Sampling Point	Weekly	14				
Mashpee	Trustees of the Reservation (Wakeby Pond)	Sampling Point	Weekly	14				
Medfield	Hinkley	Left	Weekly	12				
Medfield	Hinkley	Right	Weekly	12				
Medford	Wrights Pond	Deep End	Weekly	9				
Medford	Wrights Pond	Shallow End	Weekly	10	1	256	256	
Mendon	Mendon Town Beach	Sampling Point	Weekly	15	4	340	1300	

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Methuen	Forest Lake: Swimming Beach	Sampling Point	Weekly	11				
Middleborough	Camp Avoda	Sampling Point	Weekly	8				
Middleborough	Camp Yomechas	Sampling Point	Weekly	16				
Middleborough	Woods Pond Cabins	Sampling Point	Weekly	10				
Middleton	Thunderbridge	Sampling Point	Weekly	17	2	380	720	1
Milton	Houghton's Pond @ Bathhouse (DCR)	Sampling Point	Weekly	16				
Monterey	Benedict Pond Beach (DCR)	Sampling Point	Weekly	16				
Monterey	Camp Half Moon	Sampling Point	Weekly	9				
Monterey	Lake Garfield	Sampling Point	Weekly	13	1	648.8	648.8	
Mt. Washington	Camp Hi Rock - Bear Rock Beach	Sampling Point	Weekly	14				
Mt. Washington	Camp Hi Rock - Main Beach	Sampling Point	Weekly	14				
Nantucket	Miacomet Pond	Sampling Point	Weekly	12	1	476	476	
Nantucket	Sesachacha Pond	Sampling Point	Weekly	11				
Natick	Camp Arrowhead	Sampling Point	Weekly	9				
Natick	Camp Nonesuch	Sampling Point	Weekly	12	1	276	276	1
Natick	Cochituate Lake-North Beach (DCR)	Sampling Point	Weekly	16				
Natick	Memorial Beach (Dug Pond)	Diving	Weekly	12	1	680	680	1
Natick	Memorial Beach (Dug Pond)	Wading	Weekly	11				
New Marlborough	Camp Wa Wa Segowea	Sampling Point	Weekly	11				
Newton	Crystal Lake	Sampling Point	Weekly	12				
North Adams	Windsor Lake	Sampling Point	Weekly	25	3	365	461	1
North Andover	Frye Pond Beach (DCR)	Sampling Point	Weekly	16				
North Andover	Stevens Pond	Sampling Point	Weekly	11	1	250	250	
North	Falls Pond	Sampling Point	Weekly	10	2	340	690	1

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Attleborough								
North Attleborough	Whitings Pond	Sampling Point	Weekly	11	8	350	2700	2
North Brookfield	Brooks Pond	Sampling Point	Weekly	11				
North Brookfield	Camp Atwater	Sampling Point	Weekly	5				
Northampton	Musante Beach	Sampling Point	Weekly	17	1	392	392	1
Oakham	Lake Dean Dean Campground	Sampling Point	Weekly	16	1	500	500	
Oakham	Pine Acres Resort	Sampling Point	Weekly	14				
Oakham	Treasure Valley Scout	East	Weekly	8				
Oakham	Treasure Valley Scout	West	Weekly	8				
Orange	Camp Selah	Sampling Point	Weekly	4				
Orange	Orange Town Beach	Beach	Weekly	10				
Orleans	Crystal Lake	Sampling Point	Weekly	16				
Orleans	Pilgrim Lake	Sampling Point	Weekly	16				
Otis	Berkshire Sports Academy	Sampling Point	Weekly	10				
Otis	Camp Bonnie Brae	Sampling Point	Weekly	13				
Otis	Otis Reservoir Beach (DCR)	Sampling Point	Weekly	16				
Otis	Otis Town Beach	Sampling Point	Weekly	16	1	2050	2050	1
Otis	Otis Woodlands Club	Beach	Weekly	16	2	272.3	304.4	
Otis	Otis Woodlands Club	Picnic Grove	Weekly	16	2	387.3	461.1	
Otis	Otis Woodlands Club	Weir	Weekly	16	2	344.8	613.1	
Oxford	Barton Center	Sampling Point	Weekly	9				
Oxford	Carbuncle Pond	Sampling Point	Weekly	12	2	260	650	
Pembroke	Camp Pembroke	Sampling Point	Weekly	5				
Pembroke	Furnace Colony	Sampling Point	Weekly	14	1	1600	1600	1
Pembroke	Little Sandy	Sampling Point	Weekly	14				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Pembroke	Oldham	Sampling Point	Weekly	14				
Pembroke	Stetson	Sampling Point	Weekly	14				
Peru	Camp Danbee	Sampling Point	Weekly	14	1	385	385	
Phillipston	Queen Lake Beach	North Beach	Weekly	17				
Phillipston	Queen Lake Beach	South Beach	Weekly	17				
Pittsfield	Camp Stevenson/Witawentin	Sampling Point	Weekly	8				
Pittsfield	Camp Winadu	Sampling Point	Weekly	10				
Pittsfield	Country Club of Pittsfield	Sampling Point	Weekly	16				
Pittsfield	Lakeside Christian Camp	Sampling Point	Weekly	11				
Pittsfield	Lulu Pond Beach (DCR)	Sampling Point	Weekly	21	5	74	1733	5
Pittsfield	Onota Lake - Controy Pavillion	Sampling Point	Weekly	16				
Pittsfield	Onota Lake - Decom Beach	Sampling Point	Weekly	16	1	400	400	
Pittsfield	Onota Lake - Public Beach at Burbank Park	Sampling Point	Weekly	16				
Pittsfield	Pontoosuc Lake - Decom Beach	Public Beach	Weekly	17				
Pittsfield	South Pond Farm	Sampling Point	Weekly	15				
Pittsfield	The Pines	Pines	Weekly	16				
Plainfield	Plainfield /Pond	Sampling Point	Weekly	16				
Plymouth	Baird Center (Bloody Pond)	Sampling Point	Weekly	12				
Plymouth	Barrett Pond (DCR)	Sampling Point	Weekly	16				
Plymouth	Blueberry Hill Camp (Curlew Pond)	Sampling Point	Weekly	12				
Plymouth	Camp Bournedale - Great Herring Pond	Sampling Point	Weekly	5				
Plymouth	Camp Cachalot	Sampling Point	Weekly	9				
Plymouth	Camp Clark YMCA - Hyles Pond	Sampling Point	Weekly	12				
Plymouth	Camp Norse	Sampling Point	Weekly	10				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Plymouth	Camp Squanto	Sampling Point	Weekly	9				
Plymouth	Charge Pond (DCR)	Sampling Point	Weekly	17	1	180	180	1
Plymouth	Clear Pond Condos/Village	Sampling Point	Weekly	9				
Plymouth	College Pond Day Use (DCR)	Sampling Point	Weekly	18	2	110	680	1
Plymouth	Curlew Pond (DCR)	Sampling Point	Weekly	17	1	220	220	1
Plymouth	Ellis Haven	Sampling Point	Weekly	12				
Plymouth	Fearing Pond (DCR)	Beach 1	Weekly	16				
Plymouth	Fearing Pond (DCR)	Beach 2	Weekly	17	1	170	170	1
Plymouth	Fresh Pond	Left (aka Mid Pond)	Weekly	12				
Plymouth	Fresh Pond	Right (aka End Pond)	Weekly	12				
Plymouth	Hedges Pond	Sampling Point	Weekly	14				
Plymouth	Indian Head Resort	Sampling Point	Weekly	12				1
Plymouth	Morton Park	Cove (Satellite 2)	Weekly	14				
Plymouth	Morton Park	Left (Satellite 1)	Weekly	14				
Plymouth	Morton Park	Main (right)	Weekly	14				
Plymouth	Pinewood Camp - Crew Dock	Sampling Point	Weekly	12				
Plymouth	Pinewood Camp - Main Dock	Sampling Point	Weekly	12				
Plymouth	Pinewood Camp - Round Pond	Sampling Point	Weekly	12				
Plymouth	Pinewood Lodge Campground	Sampling Point	Weekly	14				
Plymouth	Plymouth Estates	Sampling Point	Once	1				
Plymouth	Sandy Pond Campground	Sampling Point	Weekly	14				
Plymouth	Wind-in-the-Pines Camp	Sampling Point	Weekly	8				
Randolph	Ponkapoag Pond	Sampling Point	Weekly	12				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Richmond	Camp Russell	Sampling Point	Weekly	13				
Richmond	Richmond Shores - East	Sampling Point	Weekly	13				
Richmond	Richmond Town Beach	Sampling Point	Weekly	13				
Rochester	S.P.E.N.A. Beach	Sampling Point	Weekly	13	1	304	304	1
Rockland	Hartsuff Park	Sampling Point	Weekly	7				
Rowe	Rowe Town Beach at Pelham Park	Center AKA Swimming	Weekly	15				
Rowe	Rowe Town Beach at Pelham Park	Right	Weekly	15				
Royalston	St. Laurent Camp	Sampling Point	Weekly	16	1	504	504	
Royalston	St. Laurent Camp	Sampling Point	Weekly	16	4	124	644	4
Royalston	Tully Lake Campground (USACE)	Sampling Point	Weekly	12				2
Russell	H.A. Moses Beach (Scout Reservation)	Sampling Point	Weekly	12				
Rutland	Whitehall Pond Beach (DCR)	Sampling Point	Weekly	16				
Sandisfield	York Lake Beach (DCR)	Sampling Point	Weekly	18	2	67	111	2
Sandwich	Camp Burgess	Sampling Point	Weekly	9				
Sandwich	Camp Good News	Sampling Point	Weekly	9				
Sandwich	Camp Hayward	Sampling Point	Weekly	9				
Sandwich	Camp Lyndon	Sampling Point	Weekly	8				
Sandwich	Dunroamin Park & Cottages	Sampling Point	Weekly	14				
Sandwich	Lakefield Farms Trust	Sampling Point	Weekly	11				
Sandwich	Lakewood Hills Property Owners Assoc.	Sampling Point	Weekly	12				
Sandwich	Lawrence Pond Village	Sampling Point	Weekly	17	3	456	800	1
Sandwich	Peter's Pond RV Park	Main Beach/Beach Rd	Weekly	11				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Sandwich	Peter's Pond RV Park	Small Beach/Cove St	Weekly	13	2	800	800	1
Sandwich	Peter's Pond Town Park 1	Sampling Point	Weekly	12	1	400	400	
Sandwich	Rolling Ridge Homeowners Assoc.-Lawrence Pond	Sampling Point	Weekly	15	1	656	656	1
Sandwich	Snake Pond	Sampling Point	Weekly	12	1	400	400	
Sandwich	South Shore YMCA - Triangle Pond	Sampling Point	Weekly	9				
Sandwich	Wakeby Pond	Sampling Point	Weekly	12	1	400	400	
Saugus	Pearce Lake @ Breakheart (DCR)	Sampling Point	Weekly	16	1	70	70	1
Saugus	Peckham Pond @ Camp Nihan (DCR)	Sampling Point	Weekly	19	2	75	423	3
Savoy	North Pond Beach (DCR)	Sampling Point	Weekly	18	2	68	224	2
Sharon	Camp Gannett Beach	Sampling Point	Weekly	10				
Sharon	Camp Wonderland Beach	Sampling Point	Weekly	9				
Sharon	Community Center Beach	Sampling Point	Twice per week	20	1	1600	1600	1
Sharon	Everwood Day Camp	Sampling Point	Weekly	10	1	960	960	
Sharon	Massapoag Yacht Club	Sampling Point	Weekly	15				
Sharon	Sharon Town Beach	Central	Weekly	11				
Sharon	Sharon Town Beach	Swimming dock	Twice per week	20	1	580	580	
Sherborn	Farm Pond	Sampling Point	Weekly	17				
Shrewsbury	Sunset Beach	Sampling Point	Weekly	11				
Shutesbury	Lake Wyola (DCR)	Sampling Point	Weekly	18	2	110	130	2
Shutesbury	Lake Wyola Association	East	Weekly	15				
Shutesbury	Lake Wyola Association	North	Weekly	15				
Shutesbury	Lake Wyola Association	West	Weekly	15				
Southwick	South Pond Beach - North	Sampling Point	Weekly	10	1	410	410	1

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Spencer	Camp Laurel Wood	Sampling Point	Weekly	15				
Spencer	Camp Marshall Beach	Sampling Point	Weekly	14				
Springfield	Bass Pond	Sampling Point	Weekly	10				
Springfield	Camp Wilder	Sampling Point	Weekly	10				
Springfield	Five Mile Pond	Sampling Point	Weekly	10				
Springfield	Paddle Club	Sampling Point	Weekly	9				
Sterling	Lake Waushacum #1	Sampling Point	Weekly	10				
Stockbridge	Beachwood Assoc.	Sampling Point	Weekly	16				
Stockbridge	Berkshire Count ry Day School/Eden Hill Sports Day Camp	Sampling Point	Weekly	11				
Stockbridge	Camp Mah-kee-nac	Sampling Point	Weekly	12				
Stockbridge	Kripalu Beach	Sampling Point	Weekly	15				
Stockbridge	Stockbridge Town Beach (Stockbridge Bowl)	Sampling Point	Weekly	16				
Stockbridge	Tanglewood	Sampling Point	Weekly	11				
Stockbridge	White Pines Condos (Stockbridge Bowl)	Sampling Point	Weekly	16				
Stoughton	Ames Pond	Sampling Point	Weekly	9				
Stow	Lake Boone	Sampling Point	Weekly	8				
Sturbridge	Italian-American Sporting Club	Sampling Point	Weekly	15				
Sturbridge	Main Beach - Walker Pond Assoc.	Sampling Point	Weekly	16				
Sturbridge	Oak Cove - Walker Pond Assoc.	Sampling Point	Weekly	16				
Sturbridge	Pioneer Pond Beach (Outdoor World)	Sampling Point	Weekly	17				
Sturbridge	Sturbridge Host Hotel	Sampling Point	Weekly	17				
Sturbridge	Sturbridge Recreation - Cedar Pond	Sampling Point	Weekly	9				
Sturbridge	The Trail at Big Alum Lake	Sampling Point	Weekly	10				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
	Association Beach							
Sturbridge	Wells State Park - Walker Pond Beach (DCR)	Sampling Point	Weekly	16				
Sturbridge	Yogi Bear Campground	Sampling Point	Weekly	20	6	280	2420	1
Sutton	Camp Blanchard	Sampling Point	Weekly	12				
Sutton	King's Campground	Sampling Point	Weekly	19				
Sutton	Marions Camp	Sampling Point	Weekly	13				
Sutton	Old Holbrook Place	Sampling Point	Weekly	16				
Sutton	Sutton Falls Camp	Sampling Point	Weekly	20	2	490	1400	
Taunton	Watsons Pond (DCR)	Sampling Point	Weekly	27	8	72	500	7
Templeton	Beamans Pond (DCR)	Sampling Point	Weekly	28	12	68	1100	4
Templeton	Beamans Pond Campground (DCR)	Sampling Point	Weekly	27	11	71	690	3
Templeton	Templeton Fish and Game Club	Sampling Point	Weekly	16				
Tolland	Camp Kinderland Beach	Sampling Point	Weekly	13				
Tolland	Camp Timbertrails	Sampling Point	Weekly	13				
Tolland	Tunxis Club	Sampling Point	Weekly	16				
Tolland	Wildwood - Fox Den	Sampling Point	Weekly	16				
Tolland	Wildwood - Lakeside	Sampling Point	Weekly	16				
Tolland	Wildwood - Main Beach	Sampling Point	Weekly	16				
Tolland	Wildwood - Meadow	Sampling Point	Weekly	16				
Tolland	Wildwood - Otter Pond Beach	Sampling Point	Weekly	17	1	517.2	517.2	
Topsfield	Hood's Pond	Sampling Point	Weekly	10				
Townsend	Pearl Hill Pond Beach (DCR)	Sampling Point	Weekly	23	9	67	690	5
Tyngsborough	Berry's Grove Campground	Sampling Point	Weekly	10				
Tyngsborough	Tyngsborough Town Beach	Sampling Point	Weekly	14	3	310	496	
Tyringham	Tyringham Park Beach	Sampling Point	Weekly	14	1	400	400	1

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Upton	Kiwanis Beach	Sampling Point	Weekly	10				
Uxbridge	Fairwoods	Sampling Point	Weekly	16	1	650	650	1
Uxbridge	Pout Pond	Sampling Point	Weekly	15				
Uxbridge	West Hill Park (USACE)	Sampling Point	Weekly	20	2	345	1733	1
Wales	Cordially Colony	Sampling Point	Weekly	16				
Wales	Lakeland Beach	Sampling Point	Weekly	16				
Wales	Sichols	Sampling Point	Weekly	16	1	530	530	1
Wales	Wales Town Beach	Sampling Point	Weekly	16				
Ware	East Beach - Beaver Lake	Sampling Point	Weekly	16				
Ware	South Beach - Beaver Lake	Sampling Point	Weekly	16				
Ware	West Beach - Beaver Lake	Sampling Point	Weekly	17	1	400	400	
Wareham	Blackmore Pond	Sampling Point	Weekly	11	1	800	800	
Wareham	Maple Park Campground	Sampling Point I	Weekly	17				
Wareham	Maple Park Campground	Sampling Point II	Weekly	17				
Wareham	Shangri-La	Sampling Point	Weekly	17	1	744	744	
Wareham	Wareham Lake Shores	Sampling Point	Weekly	18	3	280	800	1
Wareham	White Island Association	Sampling Point	Weekly	16				
Warren	Comin's Pond	Sampling Point	Weekly	15				
Warwick	Moores Pond Beach	Sampling Point	Weekly	17				
Wayland	Wayland Town Beach	Left Shallow	Weekly	13				
Wayland	Wayland Town Beach	Right Shallow	Weekly	13				
Webster	Beacon Park Condominiums	Sampling Point	Weekly	14				
Webster	Birch Island	Sampling Point	Weekly	14				
Webster	Colonial Park	Sampling Point	Weekly	14				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Webster	Indian Ranch	Sampling Point	Weekly	17				
Webster	Kildeer Island (AKA Sandy Shore)	Sampling Point	Weekly	14				
Webster	Lakeside	Sampling Point	Weekly	14	1	320	320	
Webster	Memorial Beach	Sampling Point 1	Weekly	14				
Webster	Memorial Beach	Sampling Point 2	Weekly	14				
Webster	Nipmuc Cove	Sampling Point	Weekly	14				
Webster	Treasure Island Condominiums	Sampling Point	Weekly	14				
Wellesley	Morses Beach - Shallow	Sampling Point	Weekly	12	1	324	324	
Wellfleet	Duck Pond	Sampling Point	Weekly	14				
Wellfleet	Great Pond	Sampling Point	Weekly	14				
Wellfleet	Gull Pond - Gull Pond Landing	Sampling Point	Weekly	14				
Wellfleet	Gull Pond (2) - Steele Rd.	Sampling Point	Weekly	14				
Wellfleet	Higgins Pond	Sampling Point	Weekly	14				
Wellfleet	Long Pond	Sampling Point	Weekly	14				
Wendell	Ruggles Pond (DCR)	Sampling Point	Weekly	16				
Wenham	Gull Pond	Sampling Point	Weekly	12				
Wenham	Pleasant Street Pond (Pleasant Pond Beach)	Sampling Point	Weekly	16				
West Brookfield	Lake Wickabog - Main Beach	Center	Weekly	16				
West Stockbridge	Card Pond Beach	Sampling Point	Weekly	7				
West Stockbridge	Crane Lake Camp	Sampling Point	Weekly	5				
West Tisbury	Ice House Pond	Sampling Point	Weekly	16	1	74.4	74.4	
West Tisbury	Long Cove (fresh)	Sampling Point	Weekly	13				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
West Tisbury	Seth's Pond	Focus	Weekly	13				
West Tisbury	Seth's Pond	Town Beach	Weekly	19	3	61.6	103.6	
Westborough	Lake Chauncy Beach #1	Sampling Point	Weekly	10				
Westfield	Kingsley Beach (DCR)	Sampling Point	Weekly	21	8	64	400	4
Westfield	Lamberts Beach (DCR)	Sampling Point	Weekly	19	4	90	400	3
Westford	East Boston Camps - Boys Beach	Sampling Point	Weekly	17				
Westford	East Boston Camps - Day Care	Sampling Point	Weekly	16				
Westford	East Boston Camps - Girls Beach	Sampling Point	Weekly	15				
Westford	Edwards Town Beach	Sampling Point	Weekly	15	1	302	302	
Westford	Forge Village Beach	Sampling Point	Weekly	12				
Westford	Lakeside Meadows	Sampling Point	Weekly	16				
Westford	Marylou's Beach (NIA)	Sampling Point	Weekly	16				
Westford	Nabnassett American Legion	Sampling Point	Weekly	16				
Westford	Noble's Cove Beach	Sampling Point	Weekly	17	1	328	328	
Westford	North Beach (NIA)	Sampling Point	Weekly	16				
Westford	NVSR: Camp Pond	Sampling Point	Weekly	9				
Westford	NVSR: Function Pond	Sampling Point	Weekly	16				
Westford	Sandy Beach (NIA)	Sampling Point	Weekly	17	1	400	400	
Westford	Summer Village Main Beach	Sampling Point	Weekly	16				
Westminster	Camp Pineshore Bible Camp	End of dock	Weekly	4				
Westminster	Crocker Pond	Sampling Point	Weekly	23	1	400	400	1
Westminster	Crow Hill Pond Beach (DCR)	Sampling Point	Weekly	16				
Weston	River Day Camp	Sampling Point	Weekly	13	1	284	284	1
Weston	Valley Pond	Swim Pond	Weekly	16				
Westwood	Membership Beach	Middle	Weekly	16				
Westwood	Membership Beach	North	Weekly	16				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Westwood	Membership Beach	South	Weekly	15				
Westwood	North Beach	Middle	Weekly	15				
Westwood	North Beach	North	Weekly	15				
Westwood	North Beach	South	Weekly	15				
Whately	Tri-Town Beach	Sampling Point	Weekly	12	2	500	1000	1
Wilbraham	Spec Pond Beach	Sampling Point	Weekly	10				
Williamstown	Margaret Lindley Park	Sampling Point	Weekly	18	2	238.2	307.6	2
Wilmington	Wilmington Town Beach	Center	Weekly	10				
Wilmington	Wilmington Town Beach	Right	Weekly	10				
Winchendon	Lake Dennison State Park (DCR)	Campers Beach	Weekly	16				
Winchendon	Lake Dennison State Park (DCR)	Day Use Area	Weekly	18	2	64	100	1
Winchester	Shannon Beach @ Upper Mystic (DCR)	Middle	Weekly	20	3	70	246	4
Winchester	Wedge Pond	Center	Weekly	14	3	340	600	3
Worcester	Bell Pond Beach	Sampling Point	Weekly	8	1	348	348	
Worcester	Coes Pond Beach (Mill St.)	Sampling Point	Weekly	9	2	408	460	
Worcester	Indian Lake Public Beach (Sherburne Ave)	Sampling Point	Weekly	8	1	320	320	
Worcester	Lake Quinsigamond-Lake Park Beach (DCR)	Sampling Point	Weekly	17				
Worcester	Lake Quinsigamond-Regatta Point Beach (DCR)	Sampling Point	Weekly	17	1	120	120	1
Worcester	Shore Park	Sampling Point	Weekly	8	1	488	488	
Worcester	Smith Pond	Sampling Point	Weekly	12	1	410	410	
Wrentham	Lake Pearl Restaurant	Beach Center	Weekly	16	1	470	470	1
Wrentham	Sweatt Beach	Sampling Point	Weekly	14	1	260	260	1
Yarmouth	Big Sandy Pond	Sampling Point	Weekly	13				

Table 14
MA Freshwater Beaches (2015): Water quality data for public and semi-public beaches

Community	Beach Name[1]	Sample Location	Testing Frequency	# Tests	# Single Sample Exceedances	Minimum Exceedance	Maximum Exceedance	# Postings[2]
Yarmouth	Camp Greenough - Boy Scouts	Sampling Point	Weekly	6				
Yarmouth	Camp Wingate	Sampling Point	Weekly	14				
Yarmouth	Dennis Pond	Sampling Point	Weekly	16				
Yarmouth	Flax Pond (Yarmouth/Dennis)	Sampling Point	Weekly	16				
Yarmouth	Halcyon Condos	Sampling Point	Weekly	14				
Yarmouth	Horse Pond	Sampling Point	Weekly	24	10	236	800	3
Yarmouth	Little Sandy Pond	Sampling Point	Weekly	16				
Yarmouth	Long Pond - Indian	Sampling Point	Weekly	16				
Yarmouth	Long Pond - Lyman	Sampling Point	Weekly	16				

Table 15
MA Beaches (2015): 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	234	63.6%
1	37	10.1%
2	23	6.3%
3	26	7.1%
4	11	3.0%
5	7	1.9%
6	14	3.8%
7	6	1.6%
8	2	0.5%
9	2	0.5%
10	5	1.4%
10+	1	0.3%
Total	368*	100.0%

*Out of 390 bacterial exceedances. Twenty two exceedances had no corresponding rainfall information.

Freshwater beaches

# Days Since Rain	# Exceedances	%
0	124	86.7%
1	55	38.5%
2	40	28.0%
3	23	16.1%
4	13	9.1%
5	9	6.3%
6	6	4.2%
7	4	2.8%
8	3	2.1%
9	2	1.4%
10	2	1.4%
10+	4	2.8%
Total	285*	199.3%

*Out of 330 bacterial exceedances. Forty five exceedances had no corresponding rainfall information.

Table 16
MA Beaches (2015): Exceedances grouped by bather density at the time of sample collection at public and semi-public bathing beaches.

Marine beaches

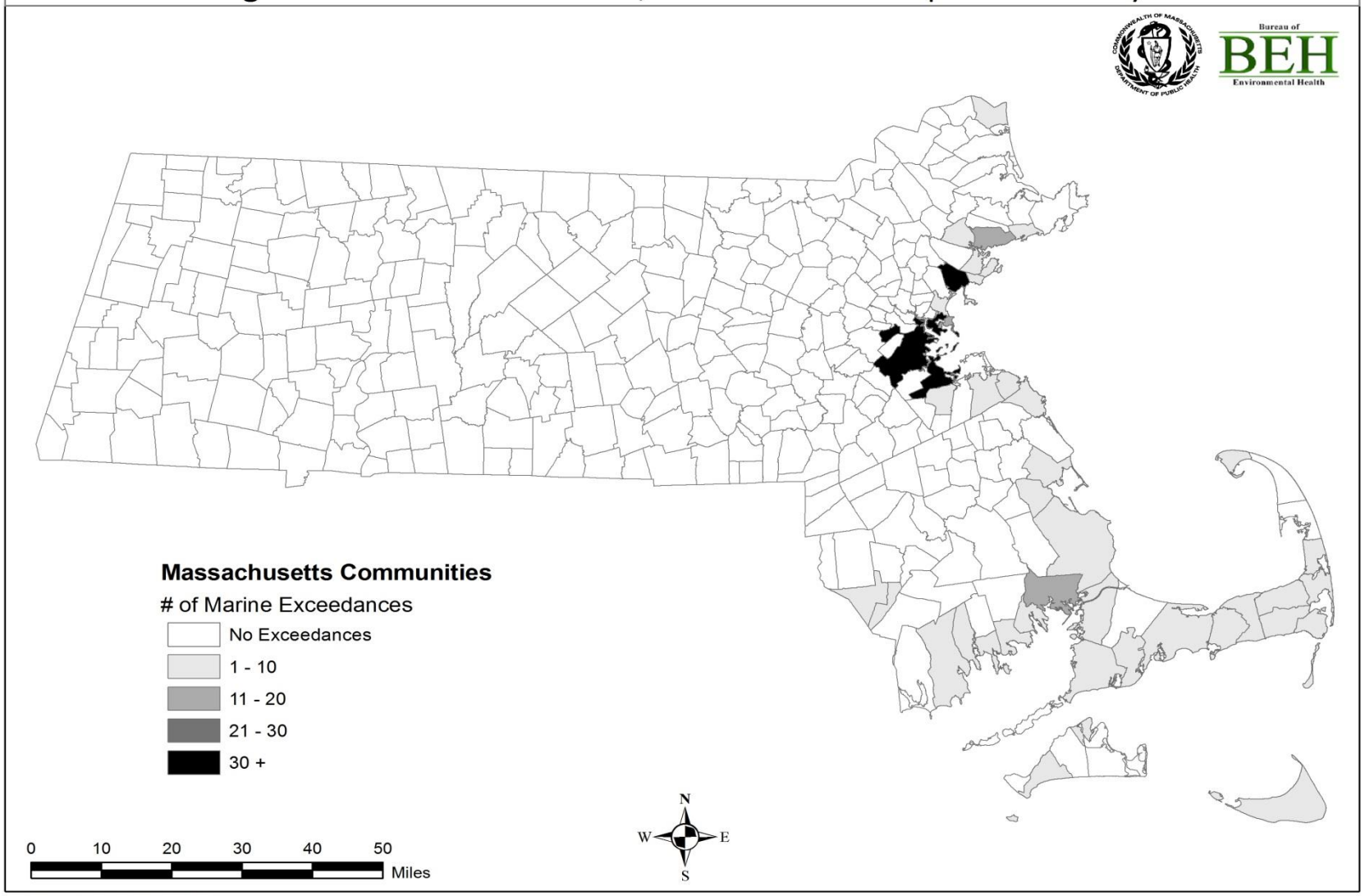
Bather Density (# people)	# Samples	# Exceedances	%
0-10	6,664	216	3.2%
10-20	304	2	0.7%
20-50	129	3	2.3%
>50	78	3	3.8%
Not indicated	875	166	19.0%
Total	8,050	390	4.8%

Freshwater beaches

Bather Density (# people)	# Samples	# Exceedances	%
0-10	6,679	264	4.0%
10-20	273	16	5.9%
20-50	102	9	8.8%
>50	60	11	18.3%
Not indicated	768	30	3.9%
Total	7,882	330	4.2%

FIGURES

Figure 1 - MA Marine Beaches, 2015: Exceedances per Community



Map created by BEH-GIS, MDPH

Figure 2 - Rainfall and Marine Exceedances in Boston Area (2015)

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

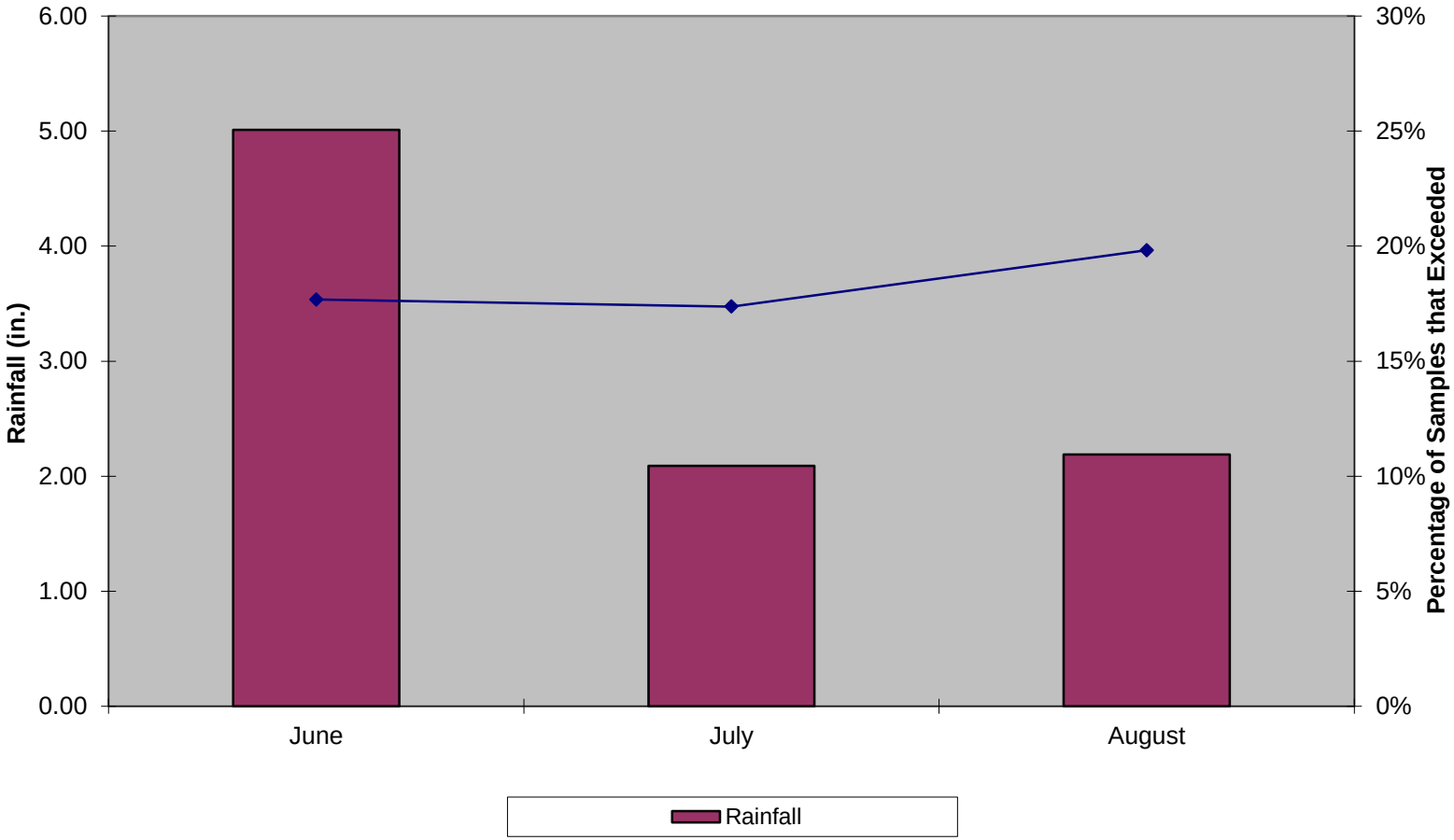


Figure 3 - Rainfall and Marine Exceedances in Chatham Area (2015)

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

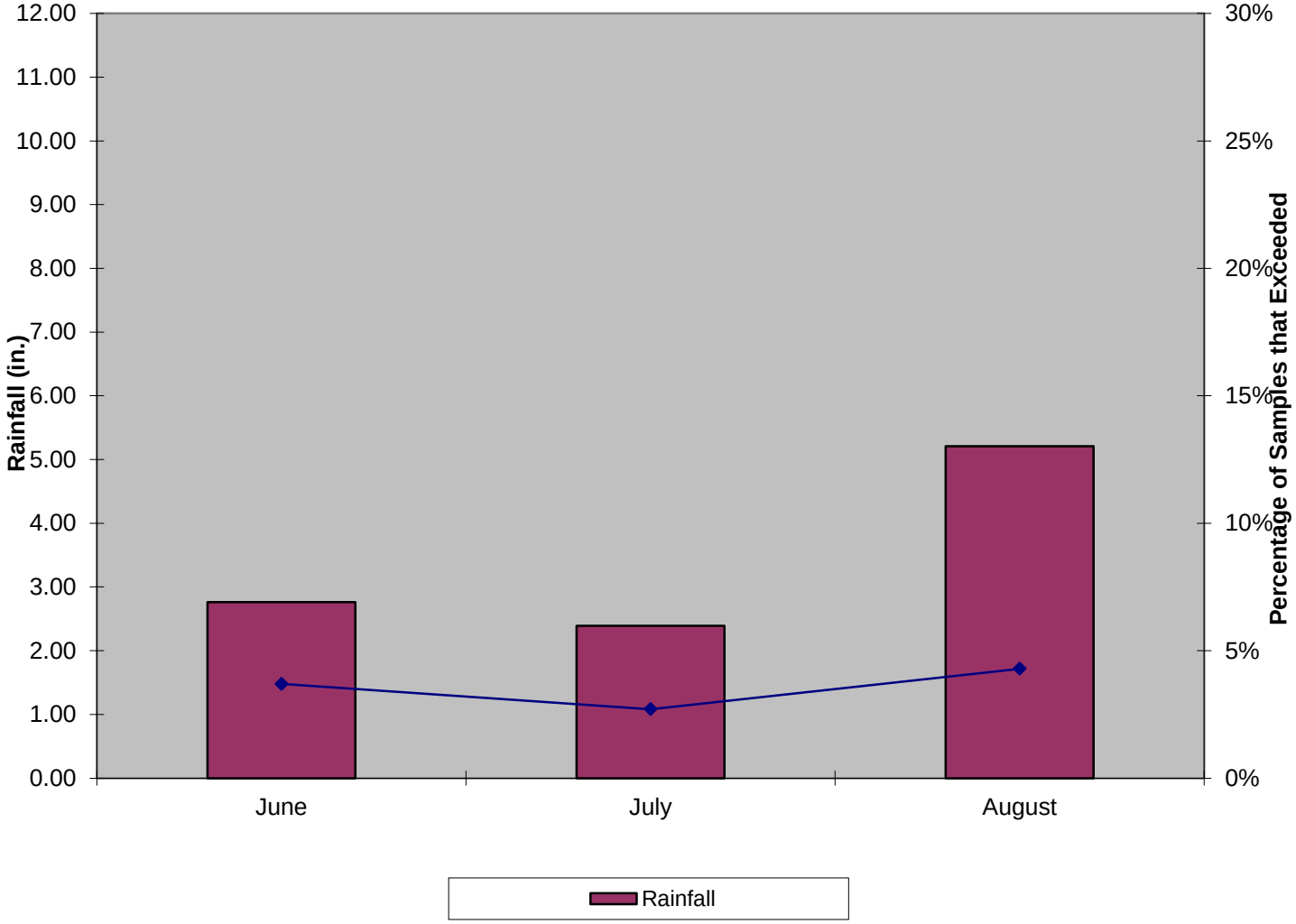
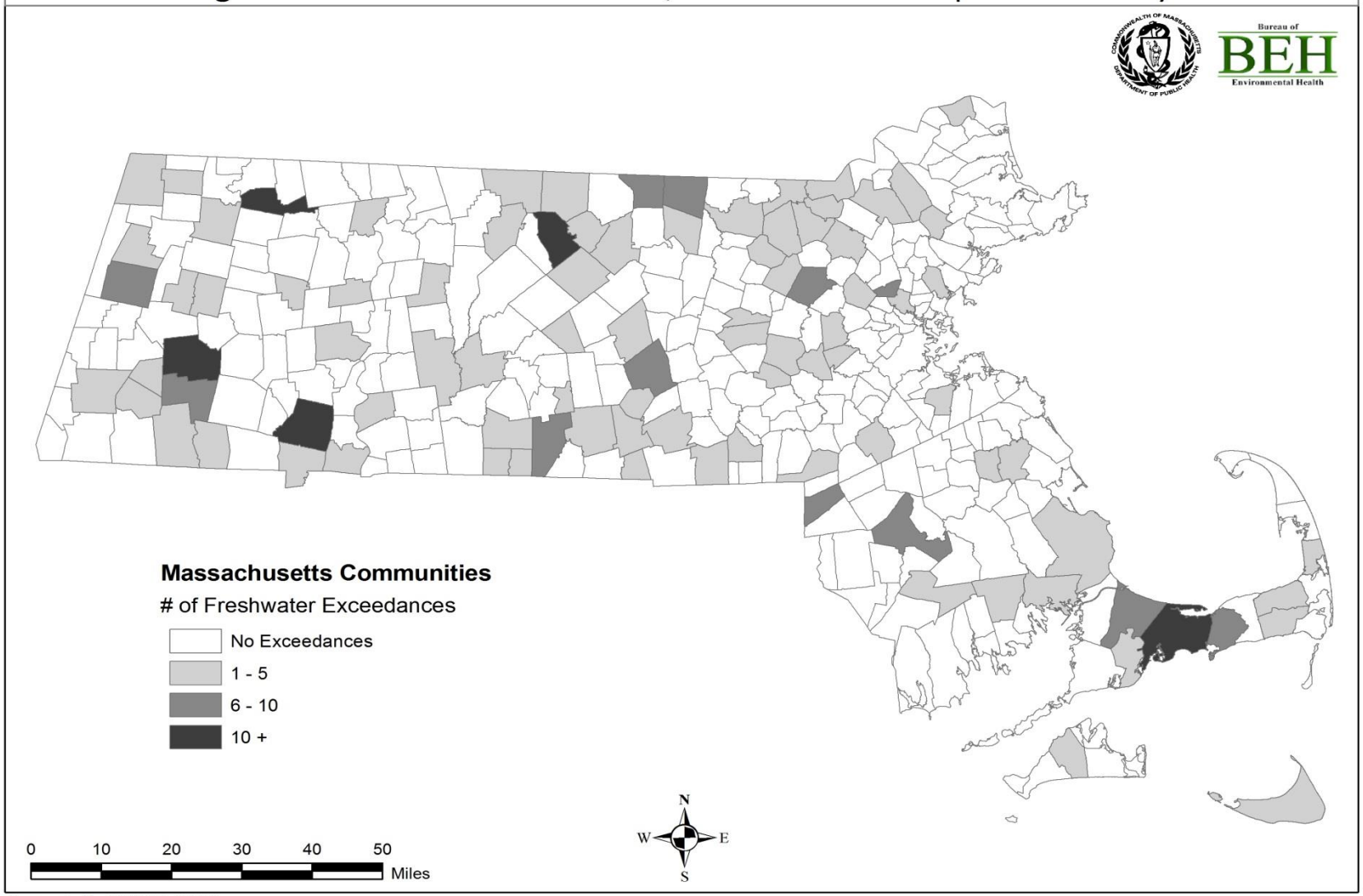


Figure 4 - MA Freshwater Beaches, 2015: Exceedances per Community



Map created by BEH-GIS, MDPH

Figure 5

Historical Relationship between Rainfall and Exceedances at Marine Beaches

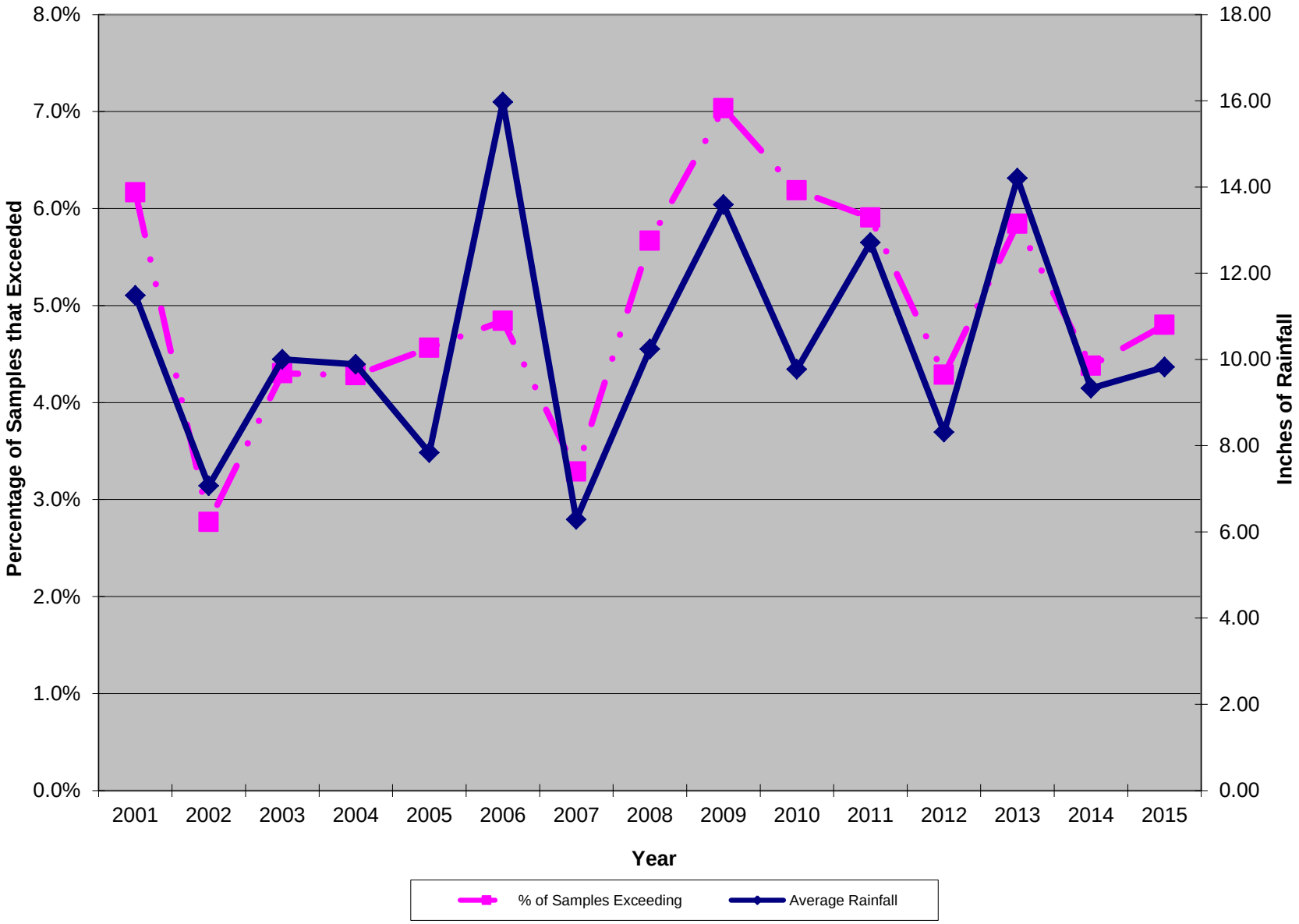


Figure 6

Historical Relationship Between Rainfall and Exceedances at Freshwater Beaches

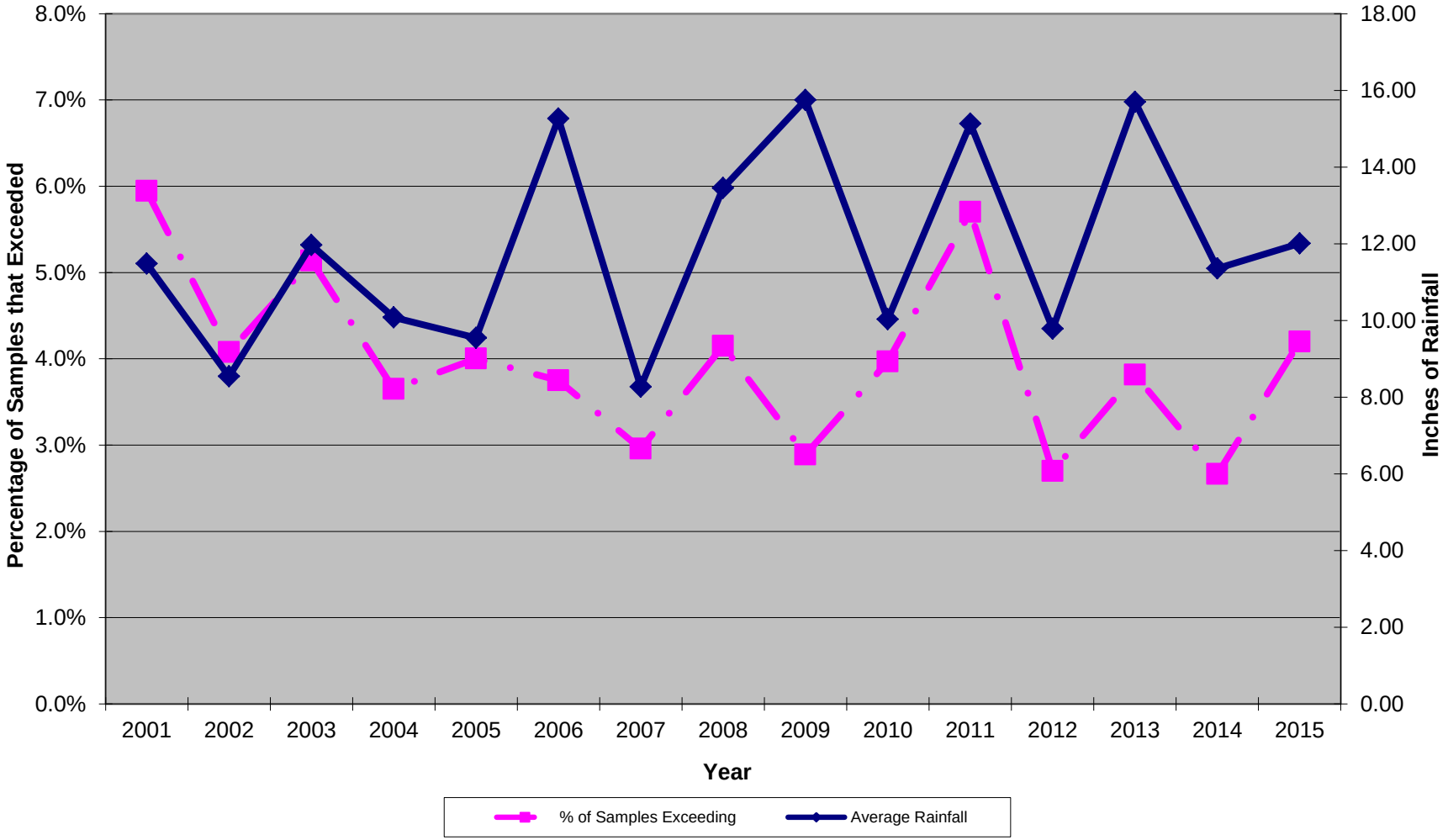
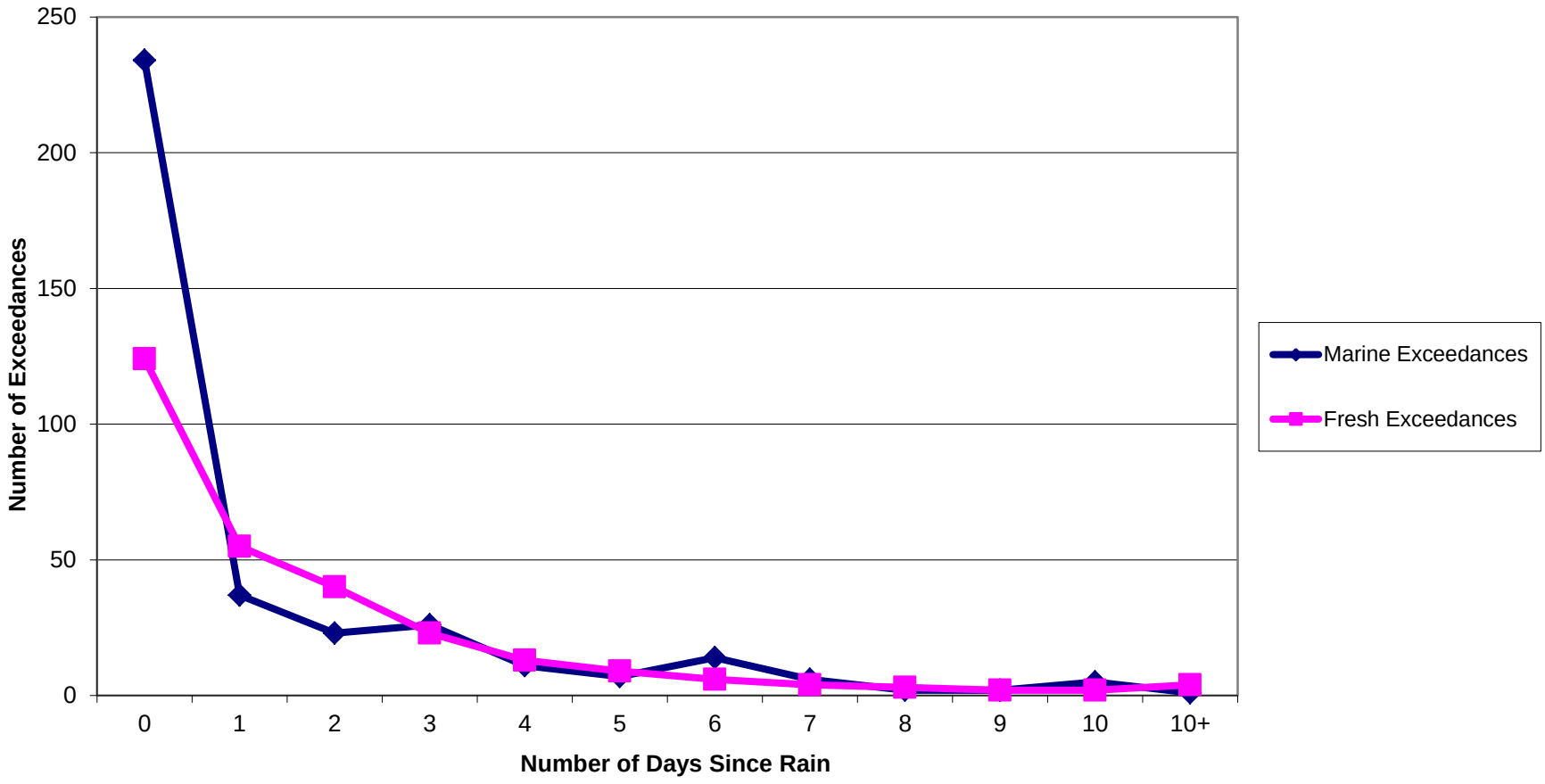


Figure 7
MA Beaches (2015): Relationship Between Bacterial Exceedances and Days Since Last Rainfall



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APPENDICES

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

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APPENDIX

A. Massachusetts State Regulations

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

Section

445.001: Purpose
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 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.

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APPENDIX

B. General Laws of Massachusetts

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GENERAL LAWS OF MASSACHUSETTS
PART I.
ADMINISTRATION OF THE GOVERNMENT

TITLE XVI.
PUBLIC HEALTH

CHAPTER 111. PUBLIC HEALTH

DUTIES OF THE DEPARTMENT OF PUBLIC HEALTH
Chapter 111: Section 5S Public bathing waters; minimum sanitation standards; testing, monitoring and analysis; regulations

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

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

“Department”, the department of public health.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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APPENDIX

C. Massachusetts Beach Act

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Chapter 248 of the Acts of 2000

AN ACT RELATIVE TO MINIMUM STANDARDS FOR PUBLIC BATHING WATERS.

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

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

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

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

"Department", the department of public health.

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

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

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

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

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

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

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

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

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

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

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

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

section shall display the results of such stricter standards relative to the standards of the department.

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

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

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

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

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

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

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APPENDIX

D. Federal Beach Act

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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.

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APPENDIX

E. Background Information for Amendments to the Bathing Beach Regulations

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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:

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.

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.

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.

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APPENDIX

F. MDPH Beach Sampling Data Form

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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.