CONNECTICUT DEPARTMENT OF PUBLIC HEALTH
RECREATION PROGRAM

ANNUAL BEACH GRANT REPORT

2015 Season

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Lighthouse Point Park, New Haven

Keeping Connecticut Healthy
DPH
Connecticut Department of Public Health

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EPA BEACH GRANT # 00A00142

For information about this Annual Report please contact the author:

Stewart Chute PhD, Toxicologist,

Program Coordinator

Connecticut Department of Public Health

410 Capitol Avenue, MS #51REC

P.O. Box 340308

Hartford, CT 06134-0308

voice: (860) 509-7758

fax: (860) 509-7378

email: stewart.chute@ct.gov

This annual report is available at:

www.ct.gov/dph/publicbeaches

TABLE OF CONTENTS

Introduction

The Recreation Program of the Connecticut Department of Public Health (CT DPH) has completed Connecticut's 2015 Annual Report for the US Environmental Protection Agency (US EPA) Beach Grant #00A00142. This report describes the monitoring of regulated marine bathing areas and how the 2011 Quality Assurance Project Plan (QAPP) is being implemented. It also provides information on public notification and water quality monitoring efforts. As part of the Beach Grant work plan, Connecticut provides US EPA with seasonal data for marine recreational water quality monitoring and information on the times and duration of interventions. Much of these data are summarized within this report. Furthermore, it describes how 24 shoreline towns, 19 local health agencies, CT DPH, and Connecticut's Department of Energy and Environmental Protection (CT DEEP) work together to monitor the shoreline marine beaches.

A: Elements of the Beach Monitoring and Notification Program

The Beach Grant includes specific goals for both US EPA and recipient states. The goals for Connecticut are achieved by following a carefully developed work plan. The work plan addresses the twelve (12) specific identified activities described below.

A1: CT DEEP Beach Monitoring. CT DEEP performs weekly or more frequent beach monitoring at 4 coastal state beaches. The coastal State beaches include the following: Sherwood Island State Park, Westport; Silver Sands State Park, Milford; Hammonasett State Park, Madison; and Rocky Neck State Park, East Lyme. Beach sampling will begin the week before Memorial Day and ends prior to Labor Day. This activity proceeds according to the *QAPP*. The beach monitoring that is conducted at the coastal state beaches is partial funded under a Memorandum of Agreement executed with the CT DEEP. This funding is used to hire seasonal personnel who are responsible for the collection of the water samples and the transport of samples to the CT DPH Microbiology Laboratory. In 2015, the CT DPH Laboratory analyzed 292 samples collected at the coastal State Park beaches.

A2: CT DPH Microbiology Laboratory. CT DPH provides indicator bacteria analysis services for beach samples at no cost to CT DEEP and local health agencies. The courier service has regional drop off locations where local officials may transfer beach samples to a courier for delivery of samples to the CT DPH Microbiology Laboratory in Rocky Hill. The DPH Recreation Program partially funds the hiring of seasonal personnel by the CT DPH Microbiology Laboratory, vehicle rental, and the purchase of laboratory supplies associated with the monitoring process. The seasonal employees provide the courier services to local health agencies and perform the laboratory services associated with the analysis of water samples. In 2015, the CT DPH Laboratory analyzed 1522 samples collected at all beaches along the Connecticut coastline. This represents approximately 70% of all 2156 enterococci samples collected on Connecticut marine beaches and sent to US EPA in 2015.

A3: Methods and Quality Control. Sampling design and methods are described in the *QAPP*. The established bacterial indicator for designated marine bathing water in Connecticut is

Enterococci. The benchmark single sample criterion is 104 Colony Forming Units (CFU) or Most Probable Number (MPN)), with a five-sample geometric mean benchmark of 35.

According to Criterion 10 of the National Beach Guidance and Required Performance Criteria for Grants, 2014 Edition, states and tribes receiving beach grants under the CWA section 406 are expected to select a beach notification threshold, i.e.; the Beach Action Value (BAV), that is based on the 75th percentile value of the illness rate in EPA's 2012 Recreational Water Quality Criteria. However, states and tribes have the option to submit a written justification to use an alternative value. The CT DPH has submitted to EPA its justification for maintaining the current threshold values for 2016 instead of the EPA-preferred BAV value. This justification is based on scientific analyses, local water quality data, and monitoring experience (Appendix C).

On November 12, 2015, CT DPH met with CT DEEP to discuss the ongoing efforts of CT DEEP to review its recreational water quality standards relative to the EPA Recreational Water Quality Criteria. CT DEEP is evaluating the EPA recommendations from the 2012 Recreational Water Quality Criteria for the next triennial review process for Water Quality Standards Regulations. CT DEEP will go through the public process, including Legislative review, and adopt a final recommendation into the Water Quality Standard Regulations. The Connecticut Water Quality Standards Regulations are listed within Sections 22a-426-1 to 22a-426-9 of the Regulations of Connecticut State Agencies.

A4: Coastal Recreational Waters List. CT DPH provides US EPA with a list of regulated marine bathing areas and monitoring site locations where data are collected. In 2015 there were 74 beaches on this list; including one newly-opened beach (Pleasure Beach-Bridgeport). This list also includes one dormant beach that is being monitored (Fort Hale-New Haven), and two active beaches that are not being monitored (Middle Beach-Westbrook, Dubois Beach-Stonington).

A5: Local Beach Monitoring and Notification. Local public beaches are monitored by municipal health department officials or regional health district personnel. The monitoring and closure/advisory practices at such coastal beaches are the responsibility of the local health authorities under the guidance of the CT DPH. The Connecticut General Statutes outlines enforcement authority under Chapter 98, Municipal Powers. Section 7-148 states that municipalities have the power to "control and operate" recreation places, public beaches and beach facilities. They also have the power to "regulate and prohibit swimming or bathing in the public or exposed places within the municipality".

A6: Communicating Beach Location, Closure/Advisory, Notification, Potential Pollution Sources, and Monitoring Information. The CT DPH Recreation Program uses an annual US EPA Beach Survey to collect organization, beach contact, location updates, closure, advisory, public notification, and known potential pollution source data for the regulated marine bathing areas under the authority of shoreline towns and CT DEEP. The 2015 Annual Review of Marine Beach Monitoring and Notification Data has been compiled and was distributed to municipalities and CT DEEP on March 31, 2016. These monitoring and survey data are validated, stored electronically in a local Access database developed and maintained by the CT DPH Recreation Program. The data are subsequently reformatted, translated and parsed for upload to US EPA. The monitoring data was compiled and accepted into EPA databases on January 4, 2016, while the notification data was compiled and accepted into EPA databases on February 1, 2016.

Monitoring data for the CT DEEP state park coastal bathing areas are provided to US EPA directly by CT DEEP, in accordance with the Memorandum of Agreement.

A7: Measures that Inform the Public of Potential Risks. Each year prior to the opening of Connecticut's beach season, the CT DEEP and CT DPH collaboratively issue a press release that discusses the state beach monitoring program and informs the public of potential risks associated with swimming in contaminated waters. The CT DPH provides the risk information on the CT DPH Recreation Program Web site (www.ct.gov/dph/publicbeaches). The site contains a listing of all municipal and state park regulated marine bathing areas and their tiered classification. It contains links to local health agencies and CT DEEP for the most up-to-date information about beach status. The site also contains links to beach related topics on US EPA and US Center for Disease Control and Prevention web sites. Communicating the status of state park beaches is accomplished by updating both the CT DEEP web site, and the State Beach "hotline". Updates are accomplished the same day (Monday through Friday) as results are received from the CT DPH laboratory. Notifications procedures for CT municipalities compiled from closure data for years 2003-2015 are shown in Table A1.

Table A1: Public Notification Procedures Listed by current State or municipal agencies. This list includes all current regulating agencies with a history of closing beaches.

Municipal/State Agency	Post at Beach	Post on Web	Via Newspaper	Via Hotline	Close Area	Via Radio	Via TV
Norwalk Health Department	✓	✓	✓	✓			
Old Lyme Health Department	✓	✓	✓				✓
Stamford Health Department	✓	✓	✓	✓	✓	✓	
Stratford Health Department	✓	✓		✓		✓	✓
Bridgeport Health Department			✓		✓	✓	✓
Westbrook Health Department	✓	✓					
West Haven Health Department	✓	✓			✓		
Ledge Light Health District	✓	✓					
Connecticut River Area Health District				✓			
Darien Health Department	✓	✓		✓			
Westport Weston Health District	✓	✓	✓		✓	✓	✓
East Shore District Health Department	✓	✓	✓	✓			
Connecticut Department of Energy & Environmental Protection	✓	✓	✓	✓	✓	✓	✓
Fairfield Health Department	✓	✓	✓	✓	✓	✓	✓
Greenwich Department of Health	✓	✓	✓	✓	✓	✓	
Guilford Health Department				✓			
Milford Health Department	✓	✓	✓	✓		✓	✓
New Haven Health Department					✓		

A8: Coastal Beach Monitoring Meetings with Public Health Officials. CT DPH hosts a spring meeting for coastal Public Health Officials to review the current status of the Beach Grant in Connecticut. Speakers at the meeting have previously included representatives of US EPA Region 1, CT DPH State Laboratory, and the Aquaculture Division of the Department of Agriculture (for shellfish), municipal government officials and CT DPH. The agenda includes a review of protocols for collecting beach closure and advisory information during the bathing season plus guidance/training for collecting and transporting samples. The agenda for the May 14, 2015 meeting is found in Appendix A.

A9: Providing Beach Grant Generated Data upon Request. At various times throughout the year, the CT DPH Recreation Program receives requests from conservation organizations and other interested parties for the notification and monitoring data. The CT DPH Recreation Program assembles data sets and makes them available after a consultation with the Data Coordinator. The DPH Recreation Program responded to two requests for the 2015 data during the period of this grant. The first request was from CT Council on Environmental Quality, and the second was from an NGO (Save the Sound).

A10: US EPA Annual Report. CT DPH prepares and submits an annual Beach Grant report to US EPA Region 1 using a format that was developed jointly between US EPA Region 1 and CT DPH. The annual report includes descriptions of beach data collection and management along with performance criteria and beach data summaries.

A11: Education and Outreach. When CT DPH is invited to explain or review Connecticut's beach monitoring effort, presentations describe the history of beach monitoring in Connecticut, current beach monitoring guidelines, and implementation programs. Connecticut's beach monitoring effort is presented in the annual Environmental Health Training offered at Southern Connecticut State University.

A12: Assorted Office Supplies and Related Equipment. Implementing the Beach Grant generates assorted office supply and related equipment ordering activity. Supplies include paper, color toner cartridges, binders, audio visual and computer equipment ordered to support daily operations and the semi-annual meeting for coastal Public Health officials.

B: CT DPH Staff and Responsibilities

Of the four (4) CT DPH staff positions described on this page, the Beach Grant serves to partially fund the Beach Grant data coordinator position.

The Beach Grant coordinator (Ron Skomro) is responsible for; working cooperatively with the EPA Region 1 Grant Manager (Ann Rodney) in preparing the grant application and budget, work plan development and implementation, grant coordination with CT DEEP and the CT DPH State Laboratory, providing interpretive guidance to shoreline local health departments and CT DEEP for beach closures, and integrating Beach Grant related activities with public health issues in Connecticut.

The Beach Grant data coordinator (Stewart Chute) is responsible for; providing custom beach data sets upon request and analytic/technical assistance to support beach monitoring, preparing Connecticut's annual US EPA Beach Survey used to collect notification and pollution source data, assembling beach monitoring and notification data, organizing and presenting at the shoreline meeting for Public Health Officials, processing and packaging beach data for transmittal to US EPA, writing Connecticut's Annual Report for the US EPA Beach Grant, maintaining/updating the local custom database that CT DPH uses to hold and manage Beach Grant and related data, and participating in biweekly conference calls with EPA technical staff as needed.

The Supervising Microbiologist (Kim Holmes-Talbot) oversees the CT DPH Microbiology Laboratory where marine recreational water samples are tested for Enterococci. Additionally, she hires seasonal staff for the courier sample pick up service and trains them to help perform indicator bacteria testing conducted during the summer. Sample results data are provided by the Laboratory to CT DPH, local health departments and CT DEEP.

The Quality Assurance Program Plan (QAPP) developer (Jeff Curran) was responsible for updating and maintaining the Quality Assurance Project Plan for the Beach Monitoring and Notification Program for Connecticut Coastal Beaches. This required experience in writing and reviewing quality assurance project plans for various types of environmental programs and projects.

C: Performance Criteria and Attainment of Grant Criteria

The Federal Clean Water Act section 406(a) and Section 406(b) authorizes the US Environmental Protection Agency (US EPA) to award grants to implement monitoring and notification programs, but only if the programs meet certain requirements. One of these requirements is that the monitoring and notification programs be consistent with EPA's performance criteria. These performance criteria provide the basis for US EPA's evaluation of Connecticut's 406(b) grant award. The general requirements US EPA's nine performance criteria are summarized in Table C1.

Table C1: Generalized Description of US EPA's Nine Performance Criteria for Grant Recipients.

Category	Performance Criterion	Criterion General Requirements
Evaluation and Classification	1	Develop risk-based beach evaluation and classification plan
Monitoring	2	Develop tiered monitoring plan
	3	Monitoring report submission and delegation
	4	Methods and assessment procedures
Public Notification and Prompt Risk Communication	5	Public notification and risk communication plan
	6	Measures to notify EPA and local governments
	7	Measures to notify the public
	8	Notification report submission and delegation
Public Evaluation	9	Public evaluation of program

CT DPH maintains a beach monitoring and notification program in compliance with the nine performance criteria listed above. In brief, using custom software CT DPH receives, manages, maintains and uses marine beach data supplied to it by the state laboratory, local health departments and CT DEEP. Beach data sets are interrelated and include: a roster of beach managers and regulated marine bathing areas; current geospatial location data for these beaches and their sampling stations; a beach tier list that is updated annually; date and time stamped water quality monitoring results; beach closure and advisory events including extent of beach, duration and cause; and ways the public is notified of beach closures and advisories. CT DPH's custom software is enabled for both incoming and outgoing electronic data interchange and includes utilities to cross check and validate beach data. This monitoring and notification system and its associated database have been used, adapted, and improved since 2003.

The purpose of this Section is to describe CT DPH's beach monitoring and notification program within the context of the nine criteria shown in TableC1. To this end, a brief sequential summary of each criterion is presented below.

C1: Performance Criterion 1: Develop Risk-Based Beach Evaluation & Classification Plan:
The US EPA beach grant requires funds to be prioritized based on water usage and risk to human health. To fulfill this requirement, CT DPH has developed a risk-based beach evaluation and classification procedure for coastal recreational waters. This plan is part of the "Beach Monitoring and Notification Program for Connecticut Coastal Beaches", (Quality Assurance Project Plan - RFA11178, Revision 5.1) approved in August 25, 2011, by the EPA.

C2: Performance Criterion 2: Develop Tiered Monitoring Plan:
The Tiered Monitoring Plan (TMP) addresses monitoring frequency, location and assessment of coastal waters. The TMP is based on the Risk-Based Beach Evaluation and Classification. The TMP is reviewed and revised on an annual basis. The evaluation and classification plan considers factors of beach usage, historical environmental conditions, past test results, and if a beach is listed by CT DEEP as impaired according to Federal 305(b)/303(d) methodology. Coastal beaches are evaluated weekly during the season and classified annually on the potential threat public health visitors might face (Table C2).

Connecticut beaches are ranked in three tiers with a classification scheme as follows:

- Tier I beaches had no more than one closure occurrence during the season.
- Tier II beaches had no more than three closure occurrences during the season.
- Tier III beaches do not meet minimum recommended sampling requirements, or had more than three closure events during the season.

Table C2: 2015 Tier Rank. CT regulated beaches are listed by Town along with rank and change in rank relative to the previous season. Column "Change" denotes the change in Tier Rank relative to the previous (2014) season. "DOWN" indicates the rank improved (e.g.; Tier 2 to Tier 1). "UP" indicates the rank worsened. The equals sign indicates that the rank stayed the same, and "null" means there was no data in 2014.

TOWN	BEACH ID	BEACH NAME	2015 TIER	CHANGE
BRANFORD	CT001209	BRANFORD POINT BEACH	tier 1	=
BRANFORD	CT409818	CLARK AVENUE BEACH	tier 1	=
BRANFORD	CT224775	STONY CREEK BEACH	tier 1	=
BRIDGEPORT	CT404927	SEASIDE PARK BEACH	tier 1	=
BRIDGEPORT	CT901374	PLEASURE BEACH-BRIDGEPORT	tier 1	null
CLINTON	CT104947	TOWN BEACH (CLINTON)	tier 1	=
DARIEN	CT927883	PEAR TREE POINT BEACH	tier 2	=
DARIEN	CT952269	WEED BEACH	tier 2	=
EAST HAVEN	CT091682	EAST HAVEN TOWN BEACH	tier 1	=
EAST LYME	CT103938	HOLE-IN-THE-WALL BEACH	tier 1	=
EAST LYME	CT120292	MCCOOK POINT BEACH	tier 1	=
EAST LYME	CT207829	ROCKY NECK STATE PARK BEACH	tier 1	DOWN
FAIRFIELD	CT306507	JENNINGS BEACH	tier 2	UP
FAIRFIELD	CT080788	PENFIELD BEACH	tier 2	UP
FAIRFIELD	CT634478	SASCO BEACH	tier 2	UP
FAIRFIELD	CT428598	SOUTH PINE CREEK BEACH	tier 2	UP
FAIRFIELD	CT474040	SOUTHPORT BEACH	tier 2	UP
GREENWICH	CT872506	BYRAM BEACH	tier 2	DOWN
GREENWICH	CT096148	GREAT CAPTAIN'S ISLAND BEACH	tier 1	=
GREENWICH	CT486090	GREENWICH POINT BEACH	tier 1	=
GREENWICH	CT101236	ISLAND BEACH	tier 1	=
GROTON	CT705857	EASTERN POINT BEACH	tier 1	=
GROTON	CT434367	ESKER POINT BEACH	tier 1	=
GROTON	CT110195	NOANK DOCK	tier 1	=
GUILFORD	CT303093	JACOBS BEACH (TOWN BEACH)	tier 1	DOWN
MADISON	CT153336	EAST WHARF BEACH	tier 1	=
MADISON	CT964700	HAMMONASSET BEACH STATE PARK BEACH	tier 1	=
MADISON	CT320303	PENT ROAD BEACH	tier 1	=
MADISON	CT386314	SURF CLUB BEACH	tier 1	=
MADISON	CT210340	WEST WHARF BEACH	tier 1	=
MILFORD	CT974464	ANCHOR BEACH (MERWIN POINT) #1	tier 1	=
MILFORD	CT400424	ANCHOR BEACH (MERWIN POINT) #2	tier 1	=
MILFORD	CT910056	GULF BEACH	tier 1	=
MILFORD	CT222176	SILVER SANDS STATE PARK BEACH	tier 2	UP
MILFORD	CT857174	WALNUT BEACH	tier 1	=
MILFORD	CT351834	WOODMONT BEACH	tier 1	=
NEW HAVEN	CT946887	FORT HALE PARK BEACH	tier 1	=
NEW HAVEN	CT760987	LIGHTHOUSE POINT BEACH	tier 1	DOWN
NEW LONDON	CT496693	GREEN HARBOR BEACH	tier 1	=
NEW LONDON	CT407959	OCEAN BEACH PARK	tier 1	=
NORWALK	CT200292	BELL ISLAND BEACH	tier 1	=
NORWALK	CT003939	CALF PASTURE BEACH	tier 1	DOWN
NORWALK	CT010924	HICKORY BLUFF BEACH	tier 1	=
NORWALK	CT023928	MARVIN BEACH	tier 1	=
NORWALK	CT200291	ROWAYTON BEACH	tier 1	=
NORWALK	CT022992	SHADY BEACH	tier 1	DOWN
OLD LYME	CT493837	SOUNDVIEW BEACH	tier 1	=
OLD LYME	CT282823	WHITE SANDS BEACH	tier 1	=
OLD SAYBROOK	CT766006	HARVEY'S BEACH	tier 1	=
OLD SAYBROOK	CT996337	TOWN BEACH (OLD SAYBROOK)	tier 1	=
STAMFORD	CT728213	CUMMINGS BEACH	tier 2	=
STAMFORD	CT085278	EAST (COVE ISLAND) BEACH	tier 2	=
STAMFORD	CT202901	QUIGLEY BEACH	tier 2	=
STAMFORD	CT992639	WEST BEACH	tier 2	DOWN
STONINGTON	CT340493	DUBOIS BEACH	tier 3	=
STRATFORD	CT449733	LONG BEACH (MARNICK'S)	tier 1	DOWN
STRATFORD	CT921236	LONG BEACH (PROPER)	tier 1	DOWN
STRATFORD	CT046814	SHORT BEACH	tier 1	DOWN
WATERFORD	CT079164	PLEASURE BEACH-WATERFORD	tier 1	=
WATERFORD	CT685151	WATERFORD TOWN BEACH	tier 1	=
WEST HAVEN	CT473427	ALTSCHULER BEACH	tier 1	=
WEST HAVEN	CT261657	DAWSON BEACH	tier 1	=
WEST HAVEN	CT555601	MORSE BEACH	tier 1	=
WEST HAVEN	CT143225	OAK STREET A BEACH	tier 1	=
WEST HAVEN	CT816057	OAK STREET B BEACH	tier 1	=
WEST HAVEN	CT914597	ROCK STREET BEACH	tier 1	=
WEST HAVEN	CT597147	SEABLUFF BEACH	tier 1	=
WEST HAVEN	CT112011	SEAVIEW BEACH	tier 1	=
WEST HAVEN	CT128305	SOUTH STREET BEACH	tier 1	=
WESTBROOK	CT221030	MIDDLE BEACH/STANNARD BEACH	tier 3	=
WESTBROOK	CT939211	WESTBROOK TOWN BEACH/WEST BEACH	tier 1	DOWN
WESTPORT	CT730976	BURYING HILL BEACH	tier 1	DOWN
WESTPORT	CT135112	COMPO BEACH	tier 1	DOWN
WESTPORT	CT299970	SHERWOOD ISLAND STATE PARK BEACH	tier 2	UP

C3: Performance Criterion 3: Monitoring Report Submission and Delegation:
The CT DPH beach database is a stand-alone Access database. The module was completed and fully operational in October 2003 and has been constantly improved and adapted to changing needs. The database contains monitoring data on the beaches and information on associated contacts, advisories, pollution sources, and reported illnesses. Beaches are related to monitoring data in the core of the database. The module meets the XML data sharing protocols specified by US EPA. The complete monitoring data set for the 2015 season was submitted to US EPA by February 2016, and is available from their Beacon 2 website (http://watersgeo.epa.gov/beacon2).

C4: Performance Criterion 4: Methods and Assessment Procedures:
All methods for assessing ambient waters and for making decisions concerning the protection of human health at beaches were established in accordance with EPA recommended standard methods. The current QAPP includes sample collection techniques, analytical procedures, and data verification and validation processes. As outlined in the QAPP, coastal waters are analyzed for Enterococci bacteria. While the majority of samples are analyzed at CT DPH's Katherine Kelly Laboratory, some towns use their own State-certified environmental testing laboratories. Each laboratory utilizes analytical methods approved by EPA. In general, results are assessed in comparison to the state standard of 104 CFU/100 ml water and advisories are issued when appropriate. In addition, the director of health will consider 24-hour rainfall data and other local factors when deciding on bathing beach closures.

C5: Performance Criterion 5: Public Notification and Risk Communication Plan:
CT DPH has developed a comprehensive "Beach Closure and Notification" plan. This plan describes how the public will be notified of potential risks associated with water contact activities in coastal recreational waters, and describes the advisory process for issuing, re-sampling and removing advisories. Notification protocols are described within current QAPP. In summary, beach advisories are issued as soon as elevated results are received by CT DEEP staff or local Health Directors. Advisory information is relayed to beach managers who are asked to post signs at beach entrances. The advisory is also listed on the managing authority's telephone hot-line or web site. Once re-sample results are below state standards, the advisory is removed and the public is notified through the same channels as with the posting of the advisory.

C6: Performance Criterion 6: Measures to Notify EPA and Local Governments:
CT DPH has developed a mechanism for prompt notification of the EPA and local governments of the occurrence, nature, location, and pollutants involved when a violation of water quality standards for public beaches occurs. These methods also communicate the extent of exceedance or the likelihood of exceeding applicable state water quality standards for pathogen indicators. CT DPH works closely with 24 municipalities along the Long Island Sound shoreline and their 19 local health departments plus the CT DEEP to support the consistent use of statewide beach monitoring guidelines and beach closure protocol. CT DPH hosts meetings for public health officials to: promote standardized beach monitoring practices; provide updates; to review marine beach tracking data for the state; and provide a forum for US EPA and public health officials to discuss beach issues. The spring 2015 meeting with shoreline public health officials was held on May 14, 2015 at the Savin Rock Conference Center, West Haven, CT. Approximately 13 representatives from the 19 shoreline local health departments/districts attended the meeting. Presentations were given by Dr. Stewart Chute of the CT DPH Recreation

Program, Kimberly Holmes-Talbot of the CT DPH Public Health Laboratory, and Bellucci of the CT DEEP A copy of the meeting agenda is found in Appendix A.

C7: Performance Criterion 7: Measures to Notify the Public:
If it is necessary to close a State Beach, the CT DEEP Project Manager or designee contacts the CT DEEP Parks Division and CT DEEP Communications Office by telephone and email. They take appropriate actions to close state beaches and initiate the public notification process. Communication of closure status at State beaches to the general public is presently accomplished by updating the CT DEEP web site and amending the State Beach "Hotline". Updates are the responsibility of CT DEEP Parks or Office of Communications personnel on the same day significant sample results are received from the CT DPH laboratory. The CT DEEP also issues press releases on the same day the laboratory results are received that are carried by area radio and television stations, and newspapers. Finally, the CT DPH immediately communicates the closure status of any State Beach with appropriate local health officials by telephone or email. A voice-mail message is recorded if direct contact is not made at any point in the above sequence. If the caller does not receive a call back within an hour to acknowledge the voice-mail, subsequent calls are made to alternative staff according to a predetermined sequence until an appropriate person is contacted directly. In addition, CT DEEP maintains a web site for public notification of State beach status (www.**ct.gov/deep**/beachstatus). CT DEEP is also using social media including Facebook and Twitter to provide updated information for selected facilities.

If the local director of health deems it necessary to close a bathing beach, the CT DPH is to be advised of such closure by telephone or fax as soon after the closure as possible but not later than 4-hours. The local health district/department is responsible for the notification of the general public by posting on a local municipality's website and/or via a press release to the local media.

C8: Performance Criterion 8: Notification Report Submission and Delegation:
States are required to report on activities taken to notify the public in the case of water quality standard exceedances, promptly report notification data to the public, and submit annual notification data elements to the US EPA. All beach notification data were entered into CT DPH's Access database before the end of 2015. CT DPH submitted the 2015 notification data to US EPA in January of 2016. This data is available from US EPA's Beacon 2 website (http://watersgeo.epa.gov/beacon2).

C9: Performance Criterion 9: Public Evaluation of the Program:
Public evaluation of the CT DPH beach program is a continual process. The public has been provided with an opportunity to review the list of coastal recreational waters and associated public beaches, the tier designation of coastal public beaches, and yearly reports. All documents are displayed on the CT DPH website (www.ct.gov/dph/publicbeaches), and comments are requested. CT DPH also sends monitoring and notification data to selected public non-governmental organizations and other interested parties upon request.

D: Performance Measures

Connecticut's monitored beaches were safe for swimming 99.5% of the 2015 swim season. Within the 72 monitored beaches, there were 70 closure days and 5 advisory days during the 102 day season. These totals are derived from 50 closure and 4 advisory events. Twenty-six percent of all closures were due to elevated indicator bacteria, while preemptive closures were predominantly due to heavy rainfall. Table D1 shows these results along with other indices. Note that monitoring results include one closed public beach that is being monitored. Also, results do not include monitoring data from two of the 74 tracked beaches because no data was submitted for them. These beaches are Dubois Beach in Stonington, and Middle Beach in Westbrook. According to these town's local health officials, Middle Beach has been designated as private, and Stonington does not provide funds to support a monitoring program.

Table D1: Summary Counts for Key Parameters From the 2015 Marine Beach Season.

Parameter	***Count***
Marine beaches tracked for the US EPA Beach Grant	74
Count of marine beaches monitored weekly during the bathing season	72
Reported marine beach Advisory Events	4
Reported marine beach Advisory Days	5
Reported marine beach Closure Events	50
Reported marine beach Closure Days	70
Total reported marine beach events (closure events and advisory events)	54
Total reported marine beach event days (closure days and advisory days)	75
Tier 1 marine beaches	58
Tier 2 marine beaches	14
Tier 3 marine beaches	2
Reported marine beach closure events due to elevated indicator bacteria	13
Reported marine beach closure events preemptive due to heavy rainfall	37
Reported marine beach recreational water quality monitoring samples	2156
Marine beach recreational water quality monitoring samples that exceeded 104 CFU/100ml	74
Marine beaches with one or more marine recreational water quality samples that exceeded 104 CFU/100ml	30

E: Beach Advisories and Outside Appraisal

CT DPH collects information on notification events from each of the twenty State and municipal agencies charged with monitoring marine beaches. CT DPH generates the survey forms and distributed them in October 2015. Survey forms were returned to CT DPH by the end of November 2015. Information on the survey was reviewed and compiled into a custom database. Notification data was then formatted and initially submitted to US EPA on December 9, 2015. During the 2015 sampling season, 54 coastal notification events were recorded (TableE1). These data have been distributed to outside agencies; including, the National Resources Defense Council and The Connecticut Council for the Environment.

Table E1: Connecticut Beach Advisories for the 2015 Swim Season. Notification data as reported to CT DPH by shoreline local health departments, health districts and CT DEEP. Data set is sorted by Town, Beach Name, and Event Start Date. Under column "REASON", a "Rainfall" closure is preemptive. If the municipal authority does not know the source of elevated bacteria, he/she reports "unknown" under the "SOURCE" column.

TOWN	BEACH NAME	EVENT TYPE	START DATE	DURATION (DAYS)	REASON	SOURCE
BRANFORD	BRANFORD POINT BEACH	Close	6/25/2015	1	Other	Sewage Treatment Works
BRIDGEPORT	SEASIDE PARK BEACH	Close	8/13/2015	5	Elevated bacteria	Unknown
DARIEN	PEAR TREE POINT BEACH	Close	6/1/2015	2	Rainfall	Storm water runoff
DARIEN	PEAR TREE POINT BEACH	Close	8/11/2015	1	Rainfall	Storm water runoff
DARIEN	WEED BEACH	Close	6/1/2015	2	Rainfall	Storm water runoff
DARIEN	WEED BEACH	Close	8/11/2015	1	Rainfall	Storm water runoff
FAIRFIELD	JENNINGS BEACH	Close	6/28/2015	2	Rainfall	Storm water runoff
FAIRFIELD	JENNINGS BEACH	Close	7/16/2015	1	Rainfall	Storm water runoff
FAIRFIELD	PENFIELD BEACH	Close	6/28/2015	2	Rainfall	Storm water runoff
FAIRFIELD	PENFIELD BEACH	Close	7/16/2015	1	Rainfall	Storm water runoff
FAIRFIELD	SASCO BEACH	Close	6/28/2015	2	Rainfall	Storm water runoff
FAIRFIELD	SASCO BEACH	Close	7/16/2015	1	Rainfall	Storm water runoff
FAIRFIELD	SOUTH PINE CREEK BEACH	Close	6/28/2015	2	Rainfall	Storm water runoff
FAIRFIELD	SOUTH PINE CREEK BEACH	Close	7/16/2015	1	Rainfall	Storm water runoff
FAIRFIELD	SOUTHPORT BEACH	Close	6/28/2015	2	Rainfall	Storm water runoff
FAIRFIELD	SOUTHPORT BEACH	Close	7/16/2015	1	Rainfall	Storm water runoff
GREENWICH	BYRAM BEACH	Close	5/26/2015	1	Sewage spill	Sanitary Sewer Overflow
GREENWICH	BYRAM BEACH	Close	6/1/2015	1	Rainfall	Storm water runoff
GREENWICH	BYRAM BEACH	Close	6/21/2015	1	Rainfall	Storm water runoff

Table E1: Connecticut Beach Advisories for the 2015 Swim Season. (Continued)

TOWN	BEACH NAME	EVENT TYPE	START DATE	DURATION (DAYS)	REASON	SOURCE
GREENWICH	GREENWICH POINT BEACH	Close	8/11/2015	1	Rainfall	Storm water runoff
MADISON	HAMMONASSET BEACH STATE PARK BEACH	Close	6/9/2015	1	Elevated bacteria	Wildlife
MILFORD	ANCHOR BEACH (MERWIN POINT) #1	Close	7/2/2015	4	Elevated bacteria	Storm water runoff
MILFORD	SILVER SANDS STATE PARK BEACH	Close	6/2/2015	2	Elevated bacteria	Septic systems
MILFORD	SILVER SANDS STATE PARK BEACH	Close	6/16/2015	1	Elevated bacteria	Wildlife
MILFORD	SILVER SANDS STATE PARK BEACH	Close	6/23/2015	1	Elevated bacteria	Wildlife
NORWALK	BELL ISLAND BEACH	Close	8/11/2015	1	Rainfall	Storm water runoff
NORWALK	CALF PASTURE BEACH	Close	8/11/2015	1	Rainfall	Storm water runoff
NORWALK	HICKORY BLUFF BEACH	Close	8/11/2015	1	Rainfall	Storm water runoff
NORWALK	MARVIN BEACH	Close	8/11/2015	1	Rainfall	Storm water runoff
NORWALK	ROWAYTON BEACH	Close	8/11/2015	1	Rainfall	Storm water runoff
NORWALK	SHADY BEACH	Close	8/11/2015	1	Rainfall	Storm water runoff
OLD SAYBROOK	HARVEY'S BEACH	Close	7/2/2015	1	Elevated bacteria	Storm water runoff
STAMFORD	CUMMINGS BEACH	Close	6/28/2015	1	Rainfall	Unknown
STAMFORD	CUMMINGS BEACH	Close	7/9/2015	1	Rainfall	Unknown
STAMFORD	CUMMINGS BEACH	Close	8/11/2015	1	Rainfall	Unknown
STAMFORD	EAST (COVE ISLAND) BEACH	Close	6/28/2015	1	Rainfall	Unknown
STAMFORD	EAST (COVE ISLAND) BEACH	Close	7/9/2015	1	Rainfall	Unknown
STAMFORD	EAST (COVE ISLAND) BEACH	Close	8/11/2015	1	Rainfall	Unknown
STAMFORD	QUIGLEY BEACH	Close	6/28/2015	1	Rainfall	Unknown
STAMFORD	QUIGLEY BEACH	Close	7/9/2015	1	Rainfall	Unknown
STAMFORD	QUIGLEY BEACH	Close	8/11/2015	1	Rainfall	Unknown
STAMFORD	WEST BEACH	Close	6/28/2015	1	Rainfall	Unknown
STAMFORD	WEST BEACH	Close	7/9/2015	1	Rainfall	Unknown
STAMFORD	WEST BEACH	Close	8/11/2015	1	Rainfall	Unknown
STRATFORD	LONG BEACH (MARNICK'S)	Close	6/15/2015	1	Elevated bacteria	Unknown
STRATFORD	LONG BEACH (MARNICK'S)	Advisory	8/12/2015	1	Rainfall	Unknown
STRATFORD	LONG BEACH (PROPER)	Close	6/15/2015	1	Elevated bacteria	Unknown
STRATFORD	LONG BEACH (PROPER)	Advisory	8/12/2015	1	Rainfall	Unknown
STRATFORD	SHORT BEACH	Advisory	6/1/2015	2	Rainfall	Unknown
STRATFORD	SHORT BEACH	Close	6/15/2015	1	Elevated bacteria	Unknown
STRATFORD	SHORT BEACH	Advisory	8/12/2015	1	Rainfall	Unknown
WEST HAVEN	SEAVIEW BEACH	Close	9/2/2015	5	Elevated bacteria	Unknown
WESTPORT	SHERWOOD ISLAND STATE PARK BEACH	Close	6/2/2015	2	Elevated bacteria	Unknown
WESTPORT	SHERWOOD ISLAND STATE PARK BEACH	Close	6/16/2015	1	Elevated bacteria	Unknown

APPENDIX SECTION

Appendix A: Spring Meeting Agenda.

CONNECTICUT BEACH GRANT MEETING FOR COASTAL HEALTH OFFICIALS

May 14, 2015
Savin Rock Conference Center
6 Rock Street, West Haven, CT
(203) 937-3680
AGENDA

9:00 - 9:15	Stewart Chute, DPH	Welcome
9:15 - 9:45	Kimberly Holmes-Talbot, DPH	The State Laboratory and summer beach monitoring
9:45 - 10:05	Stewart Chute, DPH	Beach Grant annual report
10:05 - 10:20	Break	
10:20 - 10:50	Chris Bellucci, DEEP	CT DEEP and State Park beaches
10:50 - 11:15	Stewart Chute, DPH	A few words about EPA's new criteria
11:15 - 11:30	All	Q & A / Adjourn

Connecticut Department of Public Health, Recreation Program
Stewart Chute, Toxicologist, (860) 509-7758

Appendix B: Thirteen year summary data.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Count of marine beaches tracked for the US EPA Beach Grant	67	67	67	67	66	66	66	66	73	73	73	73	74
Count of marine beaches monitored weekly during the bathing season	65	65	65	63	64	66	65	65	72	72	72	72	72
Count of reported marine beach **Advisory Events**	19	2	7	1	1	1	1	1	16	28	12	3	4
Count of reported marine beach **Advisory Days**	28	7	69	2	1	30	2	3	101	191	52	6	5
Count of reported marine beach **Closure Events**	115	95	86	106	65	66	74	66	152	68	66	65	50
Count of reported marine beach **Closure Days**	179	176	131	222	107	105	106	140	535	107	99	111	70
Count of total marine beach **events** (closure events and advisory events)	134	97	93	107	66	67	75	67	168	96	78	68	54
Count of total marine beach event days (closure days and advisory days)	207	183	200	224	108	135	108	143	636	298	151	117	75
Count of Tier 1 marine beaches[1]	46	43	41	46	54	54	49	52	29	55	57	53	58
Count of Tier 2 marine beaches[1]	6	11	15	8	7	4	10	11	27	12	11	14	14
Count of Tier 3 marine beaches[1]	15	13	11	13	5	8	7	3	17	6	5	6	2

Count of marine beach **closure events** due to elevated indicator bacteria	18	13	15	18	8	13	9	37	49	12	17	18	13
Count of preemptive **closure events** (usually due to heavy rainfall)	89	77	70	81	54	53	65	27	95	56	47	47	37
Number of reported marine beach recreational water quality monitoring samples	966	1086	1129	1385	1682	1636	1962	2213	2051	1953	1806	1787	2156
Number of marine beach recreational water quality monitoring samples that exceeded the US EPA standard of 104 CFU/100ml for marine recreational water	51	62	47	75	89	73	93	261	235	156	112	108	74
Number of marine beaches with one or more marine recreational water quality samples that exceeded the US EPA standard of 104 CFU/100ml for marine recreational water	16	18	14	29	39	28	33	55	58	44	40	30	30

Appendix C: Connecticut Justification to Maintain Its Current Beach Action Values

According to Criterion 10 of the National Beach Guidance and Required Performance Criteria for Grants, 2014 Edition, states and tribes receiving beach grants under the CWA section 406 are expected to select a beach notification threshold, i.e.; the Beach Action Value (BAV), that is based on the 75th percentile value of the illness rate in EPA's 2012 Recreational Water Quality Criteria. However, states and tribes have the option to submit a written justification to use an alternative value. The following written justification explains why the Connecticut Department of Public Health (CT DPH) prefers to use its current threshold values instead of the EPA-preferred BAV value. This justification is based on scientific analyses, local water quality data, and monitoring experience.

I. Marine NEEAR Studies vs. CT Beaches

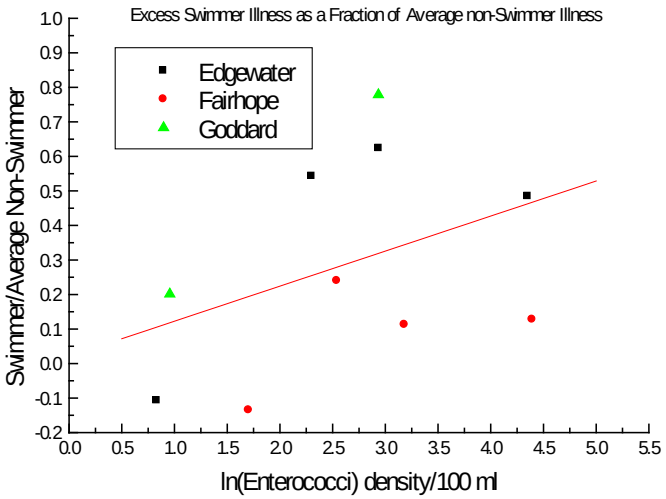
CT DPH questions the significance of the marine beach National Epidemiological and Environmental Assessment of Recreational Water (NEEAR) Study because the correlation between enterococci concentration and swimmer risk is poor. Moreover, in setting the BAV and the Statistical Threshold Value (STV), EPA ignored the uncertainty in this correlation. CT DPH also believes that the marine beaches selected for the NEEAR study are not representative of the vast majority of CT marine beaches.

EPA chose three marine beaches for inclusion in the NEEAR studies. Each of these is/was clearly impacted by sewage from publicly owned treatment works. Two of these beaches are on the Gulf of Mexico, and one is located in Narragansett Bay in a cove with a high population density and poor sewage infrastructure. While CT DPH does not claim that all marine beaches in CT are free of sewage, it does believe that the marine beaches in the NEEAR study have unique problems which leads us to conclude that the ratio of pathogen/indicator is likely to be much higher in these reference beaches relative to normal, and that because this ratio relates to swimmer risk, enterococci is a much less potent indicator of swimmer risk at CT marine beaches.

Furthermore, even within the NEEAR marine beaches, the link between swimmer risk and enterococci concentration is inconsistent. Results of an Analysis of Variance (ANOVA) for Edgewater Beach are significant at the 1:10 level, but the p value for Fairhope is 0.5. Results from the study at Edgewater could not therefore be replicated at Fairhope. Results from Goddard are relatively limited. By design, there are only two levels of exposure and rates for swimmer risk at the high exposure level are less than that for all but the lowest exposure level at Fairhope. We conclude that the NEEAR study does not show a consistent correlation between swimmer risk and enterococci concentration even between these atypical marine beaches. CT DPH concludes that the findings from NEEAR marine beaches should not be extrapolated to CT marine beaches.

As illustrated in Figure 1, The NEEAR study also showed that risk attributable to swimming is a minor fraction of the risk associated with going to the beach and not swimming. (Compare this Figure to Figure 4 in the 2012 criteria document.) Though the regression of the aggregate data is positive, the strength of this correlation is weak, and the results therefore do not appear to have any predictive value. Swimmer risk is therefore inadequately characterized and conclusions are vague.

Figure 1: Results of the three marine NEEAR studies showing the best-fit linear relationship. Dependent variable is excess swimmer-risk rate as a fraction of the average background rate.



The geometric mean (GM) of 35 cfu/100 ml was promulgated in 1986 as a benchmark with an indeterminate but "acceptable" level of swimmer risk and the 2012 document does not offer a more precise characterization. This subjective characterization of risk led the EPA to base other benchmarks (e.g.; BAV, STV, and single sample maximum) on a level of likelihood rather than on a level of risk. That is, the derived criteria estimate the likelihood that a sample may be greater than the GM, while ignoring the uncertainty in the risk characterization. This approach has led to difficulty is communicating swimmer risk to the public because, as the NEEAR studies have shown, it is highly unlikely that the benchmarks derived from likelihood estimates carry any significant additional swimmer risk. CT DPH does not therefore wish to make this confusing situation more difficult for our municipalities by adopting the BAV and STV as they are presented in the 2012 criteria document.

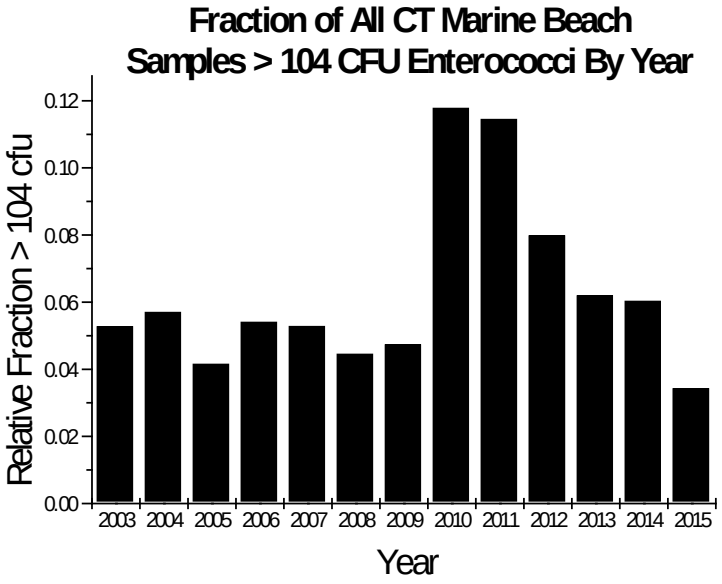
The sole determinant of the change in the 75 and 90 percent likelihood thresholds calculated in the 1986 and the 2012 criteria documents is the change in the uncertainty term (standard deviation) of the sampling distribution. In the 1986 criteria document this standard deviation is 10^0.7. In 2012 however, US EPA based their new criteria on a standard deviation of 10^0.44. The lower standard deviation narrows the probability distribution and thus decreases the threshold values relative to what was outlined in the 1986 document. EPA should thus explain how this lower uncertainty value was derived and why states should adopt it because the 1986 criteria document explicitly told jurisdictions to determine the uncertainty term based on their own analysis (See Table Four, footnote five of the criteria document available at: https://www.regulations.gov/#!documentDetail;D=EPA-HQ-OW-2007-0808-0001.)

CT DPH presently uses the 1986 default value for the standard deviation to derive the threshold of 104 enterococci colonies per 100 milliliters of water. If it were justifiable, CT DPH would alter the uncertainty term in the sampling distribution to customize it for our beaches. However, as is shown above, there is no objective rationale to make a change.

II. Impact of the BAV at CT Marine Beaches

The overall water quality at Connecticut's coastal beaches is quite good. In 2015, 78% of Connecticut marine beaches have a Tier 1 rank, compared to an average of 66% in the years 2003-2006. The average exceedance rate for all samples collected between 2003 and 2015 6.31% +/- 2.61%, and the trend shows a decrease from 2011 to the present (Figure 2). Of the 2015 enterococci samples tested during the 2015 season, 4.3% were greater than 104 cfu, and 5.8% were greater than 70 cfu. The small difference in exceedances suggests that implementation of the BAV could not have more than a negligible impact on protecting human health. With regard to the aforementioned weaknesses in characterizing swimmer risk at Connecticut marine beaches, this intervention appears even less justifiable.

Figure 2: Fraction of all CT Marine Beach Samples exceeding the threshold of 104 cfu/100 ml



The primary purpose of issuing beach advisories is to protect human health. Advisories based on sampling data therefore must be reasonably accurate. Factors such as currents and tides likely affect the accuracy of these advisory forecasts. To evaluate the flux rate in enterococci exceedances, CT DPH examined our 2015 enterococci exceedance results for all beaches and compared these results to results from samples taken soon afterwards. As is typical, when results are above the enterococci threshold a "re-sampling" event is triggered. These resample results, taken 1-3 days later, were extracted from the database and paired with the exceedances that triggered them. Fifty-four comparisons were thus generated. The comparisons are presented in Table 1 for two scenarios; where the threshold is either 104 or 70 cfu enterococci. The results indicate that, regardless of the threshold chosen, the forecasted advisory was correct about nine percent of the time. Evidently, there is much room for improvement in accuracy of advisories. CT DPH believes that this significant error rate negates any putative health benefits of lowering the advisory threshold from 104 to 70 cfu enterococci. Any extra work done as a result of implementing the BAV would therefore constitute an unnecessary administrative burden on our resources.

Table 1: Paired Resampling data for 2015 Exceedances. Exceedances of the 104 cfu enterococci threshold were paired with resample data and the distribution of resample results are shown. Part A shows the distribution assuming a threshold of 104 cfu, and Part B shows the threshold assuming a threshold of 70 cfu. In each part, the percent of resamples below the respective threshold is about 91%. The average time between sample and resampling is 1.6 days.

A

Bin	*# Resample Pairs*	*Cumulative % Below 104 cfu*
Non Detect	34	
<104	16	92.59%
>104	4	

B

Bin	*# Resample Pairs*	*Cumulative % Below 70 cfu*
Non Detect	34	
<70	15	90.74%
>70	5	

A change in CT's recreational criteria would be promulgated within Connecticut's Water Quality Standards. To include the BAV within the Water Quality Standards, CT's Department of Energy and Environmental Protection would need approval from the State Legislature. Legislative action is unlikely without a strong, defensible, demonstrable increase in the protection of public health. Should CT DPH go forward with the BAV we would be putting ourselves in the difficult position of supporting a lower threshold for CT beaches as derived from studies in other States and regions of the US. In light of the aforementioned uncertainties, and the trend shown in Figure 2, its implementation cannot be justified.

The acceptance of the 2012 EPA recommended BAVs would place a significant additional administrative burden on the municipal health departments or health districts that collect and submit bathing area samples at shoreline beaches and the CT DPH Laboratory that analyzes those samples.

III. Summary

CT DPH does not intend to implement the BAV for its coastal waters because EPA has not adequately characterized swimmer risk in its marine NEEAR studies, and because the twelve years of data we have accumulated on beach closures and enterococci concentrations does not support this intervention. Our assessment is summarized as follows:

- CT DPH does not have confidence in the results of the marine beach NEEAR studies because the correlation between enterococci concentration and swimmer risk is poor and the marine beaches selected for the NEEAR study are not representative of the vast majority of CT marine beaches.

- In setting the BAV and STV, EPA did not consider the uncertainty in this correlation (Figure 1). This has led to difficulty is communicating swimmer risk to the public as it is highly unlikely that these

benchmarks are indicative of significant additional swimmer risk. CT DPH does not therefore want to make this confusing situation any worse by implementing the EPA BAV.

- Our analysis of resample data at CT marine beaches indicates that advisories based on an enterococci threshold are largely inaccurate and any putative public health benefits of lowering the advisory threshold from 104 to 70 cfu enterococci are thus negated. Furthermore, the small (1.5%) difference in frequency of exceedances between the 104 and 70 cfu enterococci thresholds suggests that implementation of the BAV could not have more than a negligible impact on protecting human health.

- Implementing the 2012 BAVs would result in significant additional municipal staff and laboratory effort/expense, and would also require legislative action. Legislative action is unlikely without a strong, defensible, demonstrable increase in the protection of public health. Therefore, CT DPH chooses to keep its threshold at 104 enterococci colonies per 100 milliliters of water.

END OF ANNUAL REPORT