NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
Water Monitoring and Standards
P.O. BOX 409
TRENTON, NEW JERSEY 08625

2016
Work/Quality Assurance Project Plan:

COOPERATIVE COASTAL MONITORING PROGRAM

Prepared By:

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Reviewed By:

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COOPERATIVE COASTAL MONITORING PROGRAM

County Program Coordinator Approvals

Patrick Dillon
CCMP Coordinator
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CCMP Coordinator
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CCMP Coordinator
Monmouth County Health Department

Matthew Csik
CCMP Coordinator
Ocean County Health Department

1.0 Project Name: Cooperative Coastal Monitoring Program (CCMP)

2.0 Requested By: Water Monitoring and Standards, New Jersey Department of Environmental Protection (NJDEP)
Environmental Protection Agency (EPA) Region II as part of the BEACH Act

3.0 Date of Request: April 2016

4.0 Date of Project Initiation: FY16/FY17

5.0 Project Officer: Virginia Loftin
Water Monitoring and Standards

6.0 Quality Assurance Officers:

6.1 Overall: Debra Waller, Office of Quality Assurance

6.2 Laboratory:

6.2.1 J.R. Henderson Labs – Margaret Ellis, Laboratory Director

Ocean County Utilities Authority (OCUA) – Carol S. Conklin, Laboratory Manager and Quality Assurance Officer

Atlantic County Utilities Authority (ACUA) – Michael Gille, Laboratory Supervisor

Cape May County Health Department (CMCHD) – James Neville, Laboratory Supervisor

7.0 Project Description:

7.1 Objective and Scope:

The NJDEP administers the CCMP through the County Environmental Health Act (CEHA), N.J.A.C. 7:18 et seq., to evaluate nearshore coastal water quality. The program provides a consistent format for water quality analyses and their application to coastal zone management strategies and real-time response to public health concerns.

The New Jersey Department of Health (NJDOH) regulates public bathing at recreational sites in the State of New Jersey as per the State Sanitary Code, Chapter IX (Public Recreational Bathing), N.J.A.C. 8:26-1 et seq.

This program will evaluate coastal water quality represented by enterococcus samples collected from designated public recreational bathing sites on the Atlantic coast and estuary shorelines of New Jersey.

7.2 Data Usage:

Water Monitoring and Standards will provide this data to the NJDOH to coordinate required closings and reopenings of public bathing sites as incorporated in Chapter IX (Public Recreational Bathing) of the State Sanitary Code, N.J.A.C. 8:26-1 et seq. If initial enterococcus concentrations exceed the standard of 104 per 100 ml of sample a resample will be collected and a sanitary survey will be performed at the bathing area. If enterococcus concentrations exceed the standard of 104 per 100 ml of sample for two consecutive days the bathing beach will be closed. The beach will reopen when subsequent monitoring indicates that the bacteria concentration is within the standard. When beach closings are necessary the County or Local health agency will post a sign at the beach. If a geometric mean exceedance is triggered, regardless of whether a sample exceeds the bathing standard, a sanitary survey will be performed during the week in which it was triggered.

Counties will submit water monitoring data to NJDEP in electronic format after each sampling event. Water quality information will be reported via e-mail to EPA staff on a daily basis. Annual data will be transferred to EPA's CDX node which can then transfer the data to STORET. Beach conditions, beach closings and the reasons for beach closings will be posted on the NJDEP web page (www.njbeaches.org) each weekday and on weekends if conditions change. That data will also be transmitted to EPA on an annual basis.

The sampling data will be used in initiating pollution source investigations and remedial actions. Enterococcus data may be used by enforcement agencies in NJDEP to guide them to contaminated areas in need of further investigation and remediation. The enterococcus data may be used as background levels for any enforcement actions that require this information, but will not be used as the sole basis for enforcement action. The data will be added to the present CCMP database and the NJDEP GIS.

The annual report will discuss results from the sampling season. If problem areas arise, the State, County and Municipality will coordinate efforts to remediate the situation.

7.3 Monitoring Network Design and Rationale:

There are a total of 185 ocean stations and 31 bay stations in the CCMP. Each station represents a bathing beach where nonpoint sources of pollution may be impacting the water body or an area representative of the water quality of the area. County and local health agencies, in consultation with NJDEP and NJDOH, select the stations before the beginning of each summer season. The locations of the stations are reviewed annually, but remain relatively constant. New stations are added and old stations are deleted when the locations of the recreational beaches are shifted or when pollution sources are discovered and remediated. Though each recreational monitoring station is associated with a recreational beach, not all ocean recreational beaches have a monitoring station. Samples from one recreational beach can be representative of water quality at several adjacent beaches, if there is no break between the beaches and no potential pollution sources such as sewage treatment plant discharges, coastal lake discharges or tidal flows from inlets. Therefore, limited field and laboratory resources need not be consumed by having a monitoring station associated with every recreational beach. However, a beach's proximity to pollution sources can preclude the use of more distant monitoring stations to represent that beach. The beach in question will require its own monitoring station. All bay recreational bathing beaches have monitoring stations.

The Appendix lists the number, municipality and location of each CCMP station. Beaches are generally named for the street where they are situated. All stations have been identified using global positioning system technology and stored on GIS. Samples are collected in approximately the same area each week, generally in front of the lifeguard stands. Each site has a distinct number for easy recognition. Station numbers beginning in "1" are ocean stations and "0" are bay stations. County designations are included in the code (i.e., "AC" for Atlantic County, "OC" for Ocean County.)

7.4 Monitoring Parameters and Frequency of Collection:

The program runs from mid-May through mid-September (the recreational bathing season.) Sampling for the season for all beaches opening on Memorial Day weekend shall commence at least two weeks prior to the official start of the season (Memorial Day) in May so as to identify water quality problems that may have developed over the winter. Sampling at beaches that will open later in the season shall commence two weeks prior to the beach opening date. Weekly sampling will continue until the Tuesday after Labor Day in September or until the beach has closed for the season.

Samples will be collected once per week as recommended by the U.S. Environmental Protection Agency's *National Beach Guidance and Required Performance Criteria for Grants*, preferably on Monday (or Tuesday if Monday is a holiday). Sampling on these specified weekdays will coincide with the period of time immediately after peak usage of and highest stress on the sewage infrastructure.

Each participating health department will be responsible for collecting the samples and will train all samplers in collection methods as stated in NJDEP, Field Sampling Procedures Manual (Chapter 6) Trenton, NJ, 2005; and in Chapter IX (Public Recreational Bathing) of the State Sanitary Code, N.J.A.C. 8:26-1 et seq.

For recreational bathing stations, if the initial enterococcus concentration is above the primary contact standard of 104 cfu per 100 ml of sample, a recreational swimming advisory will be issued and posted at the beach. For beaches with sample results above the primary contact standard, samples will be collected on subsequent days until the concentration decreases to within the standard. In addition, there is bracket sampling of the stations with elevated concentrations in order to evaluate the extent of the problem. Bracketing of the station means sampling to either side of the station at locations that take into consideration potential pollution sources, nearby bathing or monitoring stations or any other impediment to water flow, to determine the extent of the contamination. Initial bracket samples will be collected no more than 50 feet to either side of the primary sample location (north and south or east and west.) If subsequent sampling is necessary, additional bracket samples will be collected at additional 50 foot intervals. If a natural or man-made barrier prevents continuing bracket sampling to one side of the primary station, additional sampling on that side will not be required. The length of primary and bracket sampling in total shall not exceed 300 feet. If contamination is suspected at nearby primary monitoring or bathing beaches, sampling will extend to those beaches. Sanitary surveys as defined in N.J.A.C. 8:26-1.3 are also conducted at the site to determine possible sources of bacterial contamination. Sampling will be performed regardless of weather or tide conditions as long as the sampler determines conditions to be safe and a representative, valid sample can be collected. An exceedance of the 30-day rolling geometric mean will require that a sanitary survey be performed at the bathing beach. All monitoring and sanitary survey data will be entered into the NJDEP Beach Monitoring System.

If the result of the microbiological water quality resample at the primary or bracket station is unsatisfactory, or if the sanitary survey discloses any condition which may present an imminent hazard to public health or safety, the bathing beach shall be closed for bathing. The local health authority shall immediately notify NJDEP of closings of recreational bathing areas that are monitored in the CCMP. If the overall microbiological water quality data indicates that an area exceeds the bathing water microbiological quality standards as a consequence of certain environmental conditions, that bathing area shall be kept closed for a period of time following those environmental conditions as indicated by past sampling data. Further, if environmental conditions, such as heavy rainfall, cause sewage and/or stormwater infrastructure failures such as surcharging manholes, then bathing areas having the potential to be affected shall be closed or sampled at the discretion of the health authority. A bathing beach shall not be opened until the sanitary survey and, if necessary, appropriate sampling shows the microbiological water quality to be acceptable. The local health authority shall immediately notify NJDEP when a bathing beach that is monitored by the CCMP has been reopened.

Enterococcus samples will be analyzed by the methods specified below for each laboratory participating in the program. All samples will be collected in sterile containers and will be preserved on ice in transit to the laboratory as per NJDEP, Field Sampling Procedures Manual (Chapter 2), Trenton, NJ, 2005.

7.5 Parameter Tables:

Atlantic County Utilities Authority for Atlantic County Health Department

Parameter	Enterococcus
# of Samples*	46 per week
Method	EPA Method 1600
Preservative	ice
Holding Time	6 hours

J.R. Henderson Labs for Monmouth County Health Department

Parameter	Enterococcus
# of Samples*	47 per week
Method	EPA Method 1600
Preservative	ice
Holding Time	6 hours

Ocean County Utilities Authority for Ocean County Health Department

Parameter	Enterococcus
# of Samples*	61 per week
Method	EPA Method 1600
Preservative	ice
Holding Time	6 hours

Cape May County Health Department

Parameter	Enterococcus
# of Samples*	62 per week
Method	EPA Method 1600
Preservative	ice
Holding Time	6 hours

*Note: # of Samples is a minimum since additional samples may be collected based on initial results or under special circumstances (i.e., sewer line breaks, STP malfunctions).

Preservation Techniques: Once collected the sample will be cooled to 34° to 39° F (1.1° to 3.9° C) in an ice chest.

8.0 Project Fiscal Information:

NJDEP: Coastal Protection Trust Fund
EPA: BEACH Grant

9.0 Schedule of Tasks and Products:

Activity Date

QA Work Plan Submitted	April 2016
QA Work Plan Approved	April 2016
Sample Collection	May-Sept. FY16/FY17
Sample Analysis	May-Sept. FY16/FY17
QA Review	April 2016
Data Storage	May-Sept. FY16/FY17
Data Summary	November 2016
Final Report	March 2017

10.0 Project Organization and Responsibility:

Project Officer:	Virginia Loftin (NJDEP) 609-984-5599 David Sorensen (MCHD) 732-431-7456 Matthew Csik (OCHD) 732-341-9700 x7471 Patrick Dillon (ACHD) 609-645-5971 x4380 Linda Wilde (CMCHD) 609-465-1212
Sample Analysis:	County Health Department Laboratories
Laboratory QA:	Margaret Ellis (J.R. Henderson Labs), Carol S. Conklin (OCUA), James Neville (CMCHD), Michael Gille (ACUA)
Overall QA:	Debra Waller (NJDEP)

11.0 Data Quality Requirements and Assessments:

11.1 Laboratory:

Detection, precision and accuracy limits and the methods used for all water analyses performed are listed in each laboratory's Standard Operating Procedure (SOP). Each laboratory SOP contains a section entitled Detection, precision and accuracy.

11.2 Data Representativeness:

Water samples will be collected at selected sites throughout four coastal counties: Monmouth, Ocean, Atlantic and Cape May. These samples will:

1) represent general bacterial water quality in the ocean, river and back bays
2) represent the nonpoint source affected areas of coastal water bodies
3) represent bathing-zone water quality

Bracket samples will be collected, when necessary, to show extent of contamination. Bracket samples are taken at either side of a bathing beach at 50-foot intervals in order to and take into consideration pollution sources, nearby bathing or monitoring stations and any other impediments to water flow.

11.3 Data Comparability:

Sampling will be replicated for each station throughout the season. An overall bacteriological assessment will be possible as the same collection techniques and laboratory methods will be followed.

12.0 Water Sampling Procedures:

12.1 Sample Collection:

Samples will be collected directly in the sterile container following procedures set forth in NJDEP, Field Sampling Procedures Manual (Chapter 7, Section F, Bacteriology), Trenton, NJ, 2005; and in Chapter IX (Public Recreational Bathing) of the State Sanitary Code, N.J.A.C. 8:26-1 et seq. (effective September 2009). Samples will be collected in sterile containers in an area with a stabilized water depth between the sampler's lower thighs and chest with the optimum depth being at the sampler's waist. The sample container shall be placed approximately eight to twelve inches below the water surface with the lid and stopper still attached. With the collector's arms extended to the front, the container shall be held near its base and downward at a 45-degree angle. The cap shall be removed and the container filled in one slow sweeping motion (downward or horizontally, not upward.) The mouth of the container shall be kept ahead of the collector's hand and the container recapped while it is still submerged. The cap shall remain submerged during sample collection and care shall be taken not to touch the inner surfaces of the cap. During cold water sampling use of a sampling pole is permitted as long as the sterility of the actual container being used to collect the bacterial sample is not jeopardized creating the potential for false positive Enterococcus data.

Samples shall be refrigerated or kept in an ice chest and held at a maximum of 3.9 degrees Celsius while being transported to the laboratory. Samples shall not be frozen. Samples will be taken to a certified laboratory within six hours of collection for processing. Time and date of sample collection, tidal conditions, air and water temperature, rainfall, winds and other general conditions will be gathered in the field at the time of sampling and from weather forecasts for the site, and will be recorded on field sheets or in field logbooks by the sampler.

Ocean Counties uses NJDEP, Field Sampling Procedures Manual and the New Jersey State Sanitary Code Chapter 9, N.J.A.C. 8:26 Public Recreational Bathing for field Standard Operating Procedures.

12.2 Sample Containers, Preservation, Holding Time:

Water sample containers will be prepared by each laboratory following the routine operational procedures described in the equipment/apparatus section of the laboratory SOP. The holding time for this test shall be 6 hours.

12.3 Sample Identification Forms:

NJDEP, Field Sampling Procedures Manual, Trenton, NJ 2005.

13.0 Sample Custody Procedures:

13.1 Field:

NJDEP, Field Sampling Procedures Manual, Trenton, NJ 2005.

Chain of custody forms are required for this project.

13.2 Laboratory:

Each laboratory SOP contains a section regarding sample collection, receipt and/or preservation. This section details how the samples will be handled in the laboratory.

14.0 Documentation, Data Reduction and Reporting:

All data is submitted via the NJDEP web-based Beach Monitoring System. All raw data will be stored in the Beach Monitoring System.

14.1 Field Data:

NJDEP, Field Sampling Procedures Manual, Trenton, NJ 2005.

14.2 Laboratory:

Each laboratory SOP has a section detailing the submission of data as per the New Jersey Beach Monitoring Solutions User Manual.

15.0 Data Validation:

15.1 Laboratory Data:

The laboratory has responsibility for full validation of report data. Validation of laboratory data occurs within the laboratory in accordance with procedures set forth in each Laboratory Standard Operating Procedures. Additional samples are analyzed when results indicate that further sampling is required, i.e., too numerous to count, sample is contaminated by sand or weeds, confluent growth, etc. Each laboratory manager is responsible for determining whether the data is acceptable.

Laboratories shall report results obtained from the colony counts in the acceptable range of 20-60 colonies per filter whenever possible. If all filters present counts of less than 20 colonies, all colonies that present growth (regardless of colony color) with a blue halo that are $\geq$0.5 mm in diameter are to be used to calculate the final reportable result as a less than (<) value/100mls. If all filters do not contain colonies, then the laboratory will calculate the reportable result by substituting a one (1) in the final calculation multiplied by the dilution factor (or by 100 if a full 100 ml volume was used for the testing for a single dilution), by utilizing the largest filtration volume used for testing if a dilution series is performed in the final calculation.

If all filters contain colony counts greater than 60 and are not too numerous to count the laboratory shall determine the final results based on upper acceptable counting range (60). If a dilution series is utilized, then the laboratory shall use the smallest sample volume used for filtration and divide 60 by that number. If a single

100ml volume was used for testing, then the results would be reported as >60 colonies/100mls, a value that cannot be used to establish compliance with the primary contact standard of 104/100mls standard. A new sample shall be collected and tested with a dilution series when appropriate.

For all other colony count variations, the guidance in Appendix B of Method 1600 should be followed except that actual counts as determined in the laboratory will be used for reporting and final results will not be rounded. Information regarding the data associated with "estimated" reportable results will be retained at the laboratory and will be made available for review when appropriate.

15.2 Field Data:

Each participating health department validates its field data in accordance with:

EPA Data Quality Assessment: A Reviewer's Guide, EPA QA/G-9R (EPA/240/B-06/002, February 2006), and

EPA Data Quality Assessment: Statistical Methods for Practitioners, EPA QA/G-9S (EPA/240/B-06/003, February 2006).

16.0 Performance and Systems Audits:

Laboratory:

Each laboratory SOP has a section that details the requirements for internal performance by the laboratory. Onsite audits, when necessary, shall be conducted in accordance with N.J.A.C. 7:18-2.14(a).

17.0 Corrective Action:

17.1 Field Operations:

Sampling will be postponed if unsafe sampling conditions exist or if representative samples cannot be obtained and will be canceled based on each field sampler's discretion. Sampling will be performed once the conditions are safe and representative samples can be obtained.

All changes in sampling locations, time of sampling, and variations in sampling procedures or protocol will be reported in writing to DEP and annually to EPA.

17.2 Laboratory Operations:

Each laboratory SOP contains a section detailing corrective actions to be followed.

18.0 Reports:

The annual summary report prepared by the Project Officer will include: