



**Northeast Ohio Regional
Sewer District**

Protecting Your Health and Environment

February 26, 2010

Jeff Reynolds
Ohio EPA, Division of Surface Water
Standards & Technical Support Section
50 West Town Street, Suite 700
P.O. Box 1049
Columbus, Ohio 43216-1049

Dear Mr. Reynolds:

Please find enclosed the Level 3 Project Study Plan titled "2010 Lake Erie Bacteriological Sampling of Edgewater, Euclid and Villa Angela Beaches." If you have any questions regarding the content of this study plan, please do not hesitate to contact me. I can be reached by email at Rhoadesj@neorsd.org or phone (216) 641-6000 ext. 2219.

Sincerely,

John W. Rhoades
Supervisor of Environmental Assessment
Water Quality & Industrial Surveillance
Northeast Ohio Regional Sewer District

OHIO EPA - DSW
20:09 MAR - 4 AM 10: 00

Level 3 Project Study Plan

2010 Lake Erie Bacteriological Sampling of Edgewater, Euclid and Villa Angela Beaches

(1) Objective

The purpose of this study is to monitor water quality in Lake Erie at Edgewater, Euclid, and Villa Angela beaches in order to communicate beach conditions to the public and to evaluate water quality standards attainment. Additionally, the study also addresses CSO Minimum Control #9, which requires monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

See location on ATT. A) given 2/20/10 (total)

Microorganisms from urban runoff, combined sewer overflows (CSOs), wildlife, bather shedding, and non-point sources can be a contributing factor to illnesses for individuals utilizing the beaches. The U.S. Environmental Protection Agency has adopted *Escherichia coli* as one of the best indicator organisms at freshwater bathing beaches because its presence has been correlated to other pathogenic microorganisms that can cause illnesses. During this study, *E. coli* densities will be monitored at these three beaches throughout the recreation season. This sampling will be conducted by the NEORSD's Water Quality and Industrial Surveillance (WQIS) department and will occur from May 3, 2010 through October 28, 2010, weather permitting. NEORSD's Analytical Services department will oversee all testing of samples and the daily distribution of results. The data obtained from this sampling will be reported to the Ohio Department of Health (ODH) and may be used for public notification of water quality advisories. WQIS will be responsible for evaluating the results to determine water quality standards attainment.

In addition to water quality sampling at the beaches, water samples will also be collected from Euclid Creek, which, historically, has had bacteriological densities that may be adversely impacting Villa Angela and Euclid Beaches. NEORSD will compare the results to the applicable water quality standards to determine attainment status of Euclid Creek. Additionally, NEORSD will assist the United States Geological Survey (USGS) in research and development of alternative methods for prediction of *E. coli* densities. This will include assisting in the use of the NOWCAST system to predict water quality at Edgewater Beach. The NOWCAST system is a model that has been developed and modified over the past four years. The model uses real-time field conditions to predict water quality.

20:19 MAR -4 AM 10:00

OHIO EPA - DSW

(2) Non-point/Point Sources

Point Sources	Non-point Sources
Publicly Owned Treatment Works	Urban runoff
CSOs	Bathers
Storm sewers	Feces (birds, dogs, wildlife)
Area streams	

CGO minimums
 Control #9?

A map has been provided in Attachment A to show point sources that may be influencing the water quality at each sample location. These sources of pollution, along with the non-point sources listed in the table above, may be negatively impacting the water quality conditions at the beaches. Other factors that may influence water quality and bacteriological densities during the study include precipitation, wind, wave action, sand and beach morphology.

(3) Parameters

What is the date of most current version? Should be included in SOP (and in CDOA) to allow us to confirm we have a copy

Samples collected will be analyzed for *E. coli* densities as outlined by NEORSD's most current Standard Operating Procedure (SOP) for *Determination of E. Coli by Membrane Filtration*. Field parameters to be measured during the study will include pH, water temperature, conductivity and turbidity. In addition, a field assessment of the beach will be conducted. Observations such as number of swimmers and birds, minimum/maximum wave height (or category), average and maximum wind speed and direction, water color, clarity, odor and surface coating, lake surface conditions, and weather conditions will be recorded on a *Beach Sampling Field Data Form* (refer to Attachment B).

(4) Field Collection and Data Assessment Techniques

Individual water samples will be collected from an east and west location at each of the three beaches and Euclid Creek in a 1-liter sterilized polypropylene container.

From June 7, 2010 to August 27, 2010, NEORSD plans to collect samples from Villa Angela and Euclid Beaches and Euclid Creek in an 8-liter sterilized polypropylene container in support of a collaborative research effort with Northeastern Ohio Universities Colleges of Medicine and Pharmacy (NEOUCOM) on rapid microbial detection methods. Of each 8-liter sample, 1 liter will be aliquoted in order for NEORSD Analytical Services to carry out the beach monitoring detailed in this study plan. The remaining 7 liters will be given to NEOUCOM for their research, which is not covered under this study plan. Sample collection at Edgewater Beach will not change during the NEOUCOM sampling. However, this research on rapid microbial detection methods with

may be issues w/ "aliquoting" to other containers. Or they have info to show this won't affect results? Are field blanks collected w/ 8L bottles too? Are those used now & come w/ Certif. of Analysis?

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NEOUCOM is dependent upon funding from the Great Lakes Restoration Initiative. A copy of the proposed sampling plan is available upon request. Should funding not be available, regular bacteriological sampling and field collection with a 1-liter sterilized bacteriological container will continue. One field blank will be collected once a month from a randomly selected beach.

All samples will be collected as grab samples where the total depth of water at each location is approximately three feet. If weather conditions prevent the sampler from wading out to a depth of three feet, a sampling pole will be used to collect the sample and/or wave height will be estimated from the shore. Refer to section 7.5 of Attachment B for an explanation of sample collection during inclement weather. The sample will be taken approximately 6-12 inches below the surface, as stated in the most current *Beach Sampling SOP* (see Attachment B). At the time of collection, field parameters will be measured directly in the lake or creek. Field analyses will include the use of a Hanna HI 98129 meter to measure pH, water temperature and conductivity. If necessary, a YSI-556 MPS Multi-Parameter Water Quality Meter or YSI 600XL Sonde may also be used to measure field parameters. Specifications for these meters are included in Attachment C. Turbidity will be measured for each sample at each beach and Euclid Creek. At Edgewater Beach, turbidity analysis will be conducted in the field using a portable field turbidity meter. The arithmetic average of the turbidity measurements will be used as a variable in the NOWCAST model. Turbidity analysis at Villa Angela and Euclid Beaches and Euclid Creek will be performed in the laboratory.

Notes and observations pertaining to the beach and water conditions will be recorded using the NEORSD *Beach Sampling Field Data Form* included in the most current *Beach Sampling SOP* (see Attachment B). All water samples and field parameters will be collected as specified in the most current NEORSD *Beach Sampling SOP* (see Attachment B), *The Ohio Department of Health, Ohio Bathing Beach Monitoring Program Quality Assurance Project Plan, April 2009*, (effective dates of 9/29/08-9/28/11) and *Manual of Ohio EPA Surveillance Methods and Quality Assurance* (2009). On sampling days during the recreation season, water samples will be collected from an east and west location and will be analyzed separately at the laboratory. Additionally, once a week, a portion of the east and west samples will be combined at the laboratory to serve as an integrated grab sample and analyzed as a single sample. The laboratory will report the arithmetic mean of the east and west sample to the ODH for a daily assessment of bathing water quality. The ODH will use this data to determine whether a beach advisory posting should occur. All sample results, except for those from the arithmetic mean and integrated grab samples, will be compared to the Ohio Water Quality Standards to determine whether any exceedances of the applicable water quality criteria have occurred.

What % does this represent?
How to collect a sample w/ a pole?

What is water?
Also testing on bottles?
What is max container? what happens if recommended frequency when it is
This procedure described? e.g. water source?

Info is attached
A mark instrument of part of method on COA

cont'd problem resolution

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NEORSD will use a predictive model developed by USGS to predict the bacteriological water quality at Edgewater Beach. The model uses water quality variables expected to affect *E. coli* densities including turbidity, wave height, water temperature, and rainfall. Upon entering a combination of these variables, the model calculates the probability that the *E. coli* densities will exceed the bathing water quality criteria. Water quality variables and results from the model are entered onto the NOWCAST Website located at <http://www.ohionowcast.info>.

Research and Source Tracking Work

An integrated grab sample will be obtained by combining aliquots from the samples collected from the east and west sampling locations from each beach. These samples will be combined at the laboratory into a single sample for each beach. The combined east and west samples will be analyzed for *E. coli* by membrane filtration. The results obtained from the integrated grab sample and individual samples (east and west) at Edgewater, Villa Angela and Euclid Beaches will be compared and analyzed statistically to evaluate whether integrated grab samples continue to provide a realistic representation of the water quality. Past data has indicated that an integrated grab sample does provide a realistic representation of water quality, while reducing analytical cost, utilizing culture based methods.

As part of an analytical study by NEORSD, a portion of the east and west grab samples from Edgewater, Villa Angela and Euclid Beaches, will be prepared for Quantitative Polymerase Chain Reaction (qPCR) Monday through Friday. The research work will compare results obtained from the qPCR analysis and the membrane filtration method to determine the correlation between methodologies and determine the viability of the rapid methods.

Additionally, once a week, a portion of the integrated grab samples will also be analyzed using qPCR technology. The qPCR analysis of the integrated grab samples and the east and west grab samples will be compared to determine if a correlation exists between the different sampling types, similar to that seen with the culture based method comparison.

NEORSD will take additional samples at Edgewater Beach in the event of a discharge from CSO 069 (Permit Number 3PA0002069), in accordance with its Emergency Response Plan. CSO 069 (41.487253N/81.744972W) is a storm water outlet for the Northwest Interceptor, located on the western edge of the beach. CSO 069 is located near a highly utilized public recreation area; therefore, such sampling is necessary in the event of a CSO discharge. These samples will be

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collected at three locations on the west side of Edgewater beach near the CSO outfall and at several near shore and far shore locations to determine the impact of the CSO discharge on the water quality at Edgewater Beach. Further sampling locations may be added depending upon environmental conditions. An outline for actions and sampling during a discharge at CSO 069 is located in Emergency Response Plan 2.2.4, Edgewater Overflow. All samples will be collected as specified in the *Manual of Ohio EPA Surveillance Methods and Quality Assurance* (2009). All samples will be analyzed using approved EPA methods as specified by Analytical Services in the most current *Quality Manual SOP*.

(5) Sampling Locations

Two locations at Edgewater, Villa Angela and Euclid Beaches in Cleveland will be sampled for the duration of the study. One sample location is in the east section at each beach and the other is in the west section at each beach. Additional samples will be collected from two locations on Euclid Creek at river miles (RM) 0.55 and 0.14. The following table details the sampling locations. Additional pictures and maps can be found in Attachment B.

Location	Site	Latitude	Longitude	Description	Quadrangle	Purpose
Edgewater Beach	East	N41.4893°	W81.7392°	Eastern half of the beach. In line with the brick stack on the other side of the freeway	Cleveland South	Public notification of water quality conditions at bathing beaches, determination of water quality standards attainment, determination of the impact of point and non-point sources
Edgewater Beach	West	N41.4887°	W81.7404°	Western half of the beach. In line with the large metal pole that is on the other side of the freeway.	Cleveland South	
Villa Angela Beach	East	N41.5851°	W81.5677°	Eastern half of beach mid-distance between the 3 rd and 4 th break walls.	East Cleveland	
Villa Angela Beach	West	N41.5861°	W81.5667°	Western half of beach at the beginning of the 2 nd break wall.	East Cleveland	
Euclid Beach	East	N41.5843°	W81.5686°	Eastern half of beach in line with the East side of the pile of stones on the beach.	East Cleveland	
Euclid Beach	West	N41.5838°	W81.5694	Western half of the beach between the two breakwalls at the second set of stairs from the structure at Euclid Beach	East Cleveland	
Euclid Creek	RM 0.55	N41.5831°	W81.5594°	Downstream of Lakeshore Boulevard.	East Cleveland	
Euclid Creek	RM 0.14	N41.5854°	W81.5641°	Downstream of Wildwood Bridge.	East Cleveland	

(6) Schedule

Beach monitoring is expected to begin on May 3, 2010 and end on October 28, 2010 (Attachment D). From May 3rd through May 13th water samples from the beach sites will be collected four days a week (Monday through Thursday). Beginning May 17th and lasting through September 10th, water quality samples will be collected seven days a week. From September 13th through October 28th water quality sampling will return to four days a week (Monday through Thursday). The two sites on Euclid Creek will be sampled daily, five times a week (Monday through Friday) from May 31st through September 10th. So that sample duplication does not occur at RM 0.55 on Euclid Creek during this study and the “2010 NEORS D Euclid Creek Environmental Monitoring Study” environmental assessment personnel will collect the sample at this site (during the biological field season) and the beach crew will be responsible for collecting the other water quality sample at RM 0.14 on Euclid Creek. Once sampling is finished for the “2010 NEORS D Euclid Creek Environmental Monitoring Study,” the beach crew will resume sampling at RM 0.55 on Euclid Creek. Samples will be collected as scheduled, unless surface water conditions are deemed unsafe. All sampling will be dependent on weather conditions.

(7) QA/QC

Field Collection and Measurements

Water samples will be collected, labeled and immediately placed on ice inside of a sample cooler. Upon completion of a sampling event at the beach or creek, the sample cooler will be stored inside the field truck. The field truck will remain locked at all times when not occupied or visible. Sampling activities, including sample time and condition of surface water sampled, will be entered in a QDC log book and on the *Beach Sampling Field Data Form*. The samples will then be delivered immediately to the NEORS D Analytical Services cooler, after which the door to the cooler will be locked and the samples will be transferred to the custody of Analytical Services. The NEORS D Analytical Services Quality Manual and associated Standard Operating Procedures are on file with Ohio EPA. The Quality Assurance Officer at Analytical Services will send updates, revisions and any information on document control to Ohio EPA as needed.

Laboratory Tests

Detailed quality control procedures are outlined in the laboratory’s analytical SOPs. Quality assurance activities are outlined in the laboratory’s Quality Manual. One duplicate sample will be analyzed per batch on a daily basis for *E.*

coli analysis using the membrane filtration method. Poor duplication indicates the need for additional training and monitoring by an Analytical Services supervisor. Since the test does not allow for re-analysis, results will be accepted based on method performance and the results will be averaged.

All analysts performing the membrane filtration technique go through an extensive hands-on training. Training includes reviewing the SOP, shadowing another analyst, setting up samples and reading plate results under supervision. After training, the analysts will complete a demonstration of capability by performing the test on externally purchased performance standards. Analysts will not be permitted to perform the test until demonstration of capabilities is shown. Monthly analyst variability will be measured by having multiple analysts enumerate the colonies on the same plate. The values obtained from the multiple readings must be within 10% of all of the analyst counts. Failure to meet performance levels of these samples will result in initiation of a corrective action to determine and eliminate any deficiencies.

(8) Work Products

A summary report will be prepared and sent to the ODH by Analytical Services Monday through Friday before 3:00 pm. This report will contain the arithmetic mean of the east and west samples for each beach. A copy of this report is included as Attachment E. A second internal report and the field observation sheets will be sent to personnel from NEORSD and the USGS by Analytical Services Monday through Friday before 4:30 pm. This internal report will contain the data from all samples collected and various parameters analyzed for the previous day. A copy of this report is included as Attachment E. Following the completion of the project, a summary report that includes all the data collected during the study will be prepared by Analytical Services. This summary report, along with the field observation sheets, laboratory bench sheets and chain of custody information, will be sent to the ODH. Additionally, reports summarizing, interpreting, graphically presenting and discussing the bacteriological data and any excursions from water quality standards will be prepared by Analytical Services and WQIS for internal use.

Pictures will be taken during each sampling event by the samplers to document the conditions at the beach. These pictures will be stored electronically and posted on NEORSD's intranet website. Copies of the field observation sheets, daily reports, and pictures will be also stored electronically. Additionally, field observations will also be entered into the Laboratory Information Management Systems (LIMS).

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Results obtained from the east and west locations for Edgewater, Villa Angela and Euclid Beaches will be compared to the integrated results of those locations. The analytical reports will be utilized to validate that integrated grab samples provide a realistic representation of the water quality. This report will be compiled and distributed internally by Analytical Services.

(9) Qualified Data Collectors

Except for the project manager, where necessary, the following noted Level 3 Qualified Data Collectors will be the sample coordinators. The sample coordinators will be responsible for training, scheduling, sampling and data review of field parameters. A checklist of capabilities is included in Attachment F.

Name	QDC Number	Address	Email Address	Phone Number
John Rhoades*	008	4747 E. 49th St., Cuyahoga Heights, OH 44125	rhoadesj@neorsd.org	216-641-6000
Cathy Zamborsky	009	4747 E. 49th St., Cuyahoga Heights, OH 44125	zamborskyc@neorsd.org	216-641-6000
Seth Hothem	010	4747 E. 49th St., Cuyahoga Heights, OH 44125	hothems@neorsd.org	216-641-6000
Kathryn Crestani	011	4747 E. 49th St., Cuyahoga Heights, OH 44125	crestanik@neorsd.org	216-641-6000
Tom Zablontny	018	4747 E. 49th St., Cuyahoga Heights, OH 44125	zablontnyt@neorsd.org	216-641-6000
Ron Maichle	145	4747 E. 49th St., Cuyahoga Heights, OH 44125	maichler@neorsd.org	216-641-6000
Cathy Perciado	045	4747 E. 49 th St., Cuyahoga Heights, OH 44125	perciadoc@neorsd.org	216-641-6000
Benjamin Tedrick	048	4747 E. 49 th St., Cuyahoga Heights, OH 44125	tedrickb@neorsd.org	216-641-6000
Eva Hatvani	180	4747 E. 49 th St., Cuyahoga Heights, OH 44125	hatvanie@neorsd.org	216-641-6000
Francisco Rivera**	262	4747 E. 49 th St., Cuyahoga Heights, OH 44125	riveraf@neorsd.org	216-641-6000

*Project Manager / ** Project Leader

All samplers will receive extensive training. Training consists of videos on safety; review of all the pertinent SOPs; completion of all required demonstrations of capabilities for parameters measured in the field. Training on sampling techniques and field analysis is conducted by having the samplers shadow a QDC at the sites while the techniques are being demonstrated. Proficiency with the techniques will be determined by a QDC while observing sampling being performed and by assessing the sampler's techniques. All samplers must meet and complete all requirements satisfactorily to be permitted to sample. A complete checklist of

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training is provided in Attachment F (*Beach Sampling Training Checklist*). Once samplers have met the outlined criteria, they will be permitted to sample. The sample coordinators will perform monthly audits of the sampling, using a *Beach Sampling Audit Form* (Attachment G), and correct deficiencies through re-training. Re-training will consist of accompaniment to the sampling site, instruction and observation by a QDC until deficiencies are no longer noted.

Official certification letters for the level 3 chemical water quality assessment QDC approvals are included in Attachment H.

The following is a list of persons not qualified as level 3 data collectors who may also be involved in the project. Project leader Francisco Rivera, with assistance from the sample coordinators and Jillian Novak, will provide training on sampling methodology and conduct the monthly audits. The project manager and leader will be responsible for the final review of all reports and data analysis prepared by these individuals prior to completion.

Name	Address	Email Address	Phone Number
Nick Barille	4746 E. 49 th St., Cuyahoga Heights, OH 44125	barillen@neorsd.org	216-641-6000
Joseph Broz	4747 E. 49 th St., Cuyahoga Heights, OH 44125	brozj@neorsd.org	216-641-6000
Tim Dobriansky	4747 E. 49 th St., Cuyahoga Heights, OH 44125	dobrianskyt@neorsd.org	216-641-6000
Kyle Frantz	4748 E. 49 th St., Cuyahoga Heights, OH 44125	frantzk@neorsd.org	216-641-6000
Kristina Granlund	4747 E. 49 th St., Cuyahoga Heights, OH 44125	granlundk@neorsd.org	216-641-6000
Rae Grant	4747 E. 49 th St., Cuyahoga Heights, OH 44125	grantr@neorsd.org	216-641-6000
Eric Hinton	4747 E. 49 th St., Cuyahoga Heights, OH 44125	hintone@neorsd.org	216-641-6000
John Junkin	4748 E. 49 th St., Cuyahoga Heights, OH 44125	junkinj@neorsd.org	216-641-6000
Mark Matteson	4749 E. 49 th St., Cuyahoga Heights, OH 44125	mattesonm@neorsd.org	216-641-6001
Jillian Novak	4747 E. 49 th St., Cuyahoga Heights, OH 44125	novakj@neorsd.org	216-641-6000
Cathy O'Grady	4747 E. 49 th St., Cuyahoga Heights, OH 44125	ogradyc@neorsd.org	216-641-6000
Denise Phillips	4747 E. 49 th St., Cuyahoga Heights, OH 44125	phillipd@neorsd.org	216-641-6000
Kevin Roff	4747 E. 49 th St., Cuyahoga Heights, OH 44125	roffk@neorsd.org	216-641-6000

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Name	Address	Email Address	Phone Number
Frank Schuschu	4747 E. 49 th St., Cuyahoga Heights, OH 44125	schuschuf@neorsd.org	216-641-6000
Wolfram von Kiparski	4747 E. 49 th St., Cuyahoga Heights, OH 44125	vonkiparskiw@neorsd.org	216-641-6000
Summer Co-op	4747 E. 49 th St., Cuyahoga Heights, OH 44125	To Be Determined	216-641-6000
Summer Co-op	4747 E. 49 th St., Cuyahoga Heights, OH 44125	To Be Determined	216-641-6000
Summer Co-op	4747 E. 49 th St., Cuyahoga Heights, OH 44125	To Be Determined	216-641-6000
Summer Co-op	4747 E. 49 th St., Cuyahoga Heights, OH 44125	To Be Determined	216-641-6000
Summer Co-op	4748 E. 49 th St., Cuyahoga Heights, OH 44125	To Be Determined	216-641-6000
Summer Co-op	4749 E. 49 th St., Cuyahoga Heights, OH 44125	To Be Determined	216-641-6000

The following individuals will be responsible for the compilation, approval and distribution of the analytical data to the appropriate internal and external parties.

Name	Address	Email Address	Phone Number
Mark Citriglia*	4747 E. 49 th St., Cuyahoga Heights, OH 44125	citrigliam@neorsd.org	216-641-6000
Kristen Greenwood	4747 E. 49 th St., Cuyahoga Heights, OH 44125	greenwoodk@neorsd.org	216-641-6000
Eva Hatvani*	4747 E. 49 th St., Cuyahoga Heights, OH 44125	hatvanie@neorsd.org	216-641-6000
Laura Quinones	4747 E. 49 th St., Cuyahoga Heights, OH 44125	quinonesl@neorsd.org	216-641-6000
Cheryl Soltis-Muth	4747 E. 49 th St., Cuyahoga Heights, OH 44125	soltismuthc@neorsd.org	216-641-6000
Carol Turner	4747 E. 49 th St., Cuyahoga Heights, OH 44125	turnerc@neorsd.org	216-641-6000

*Analytical Services Project Managers

- (10) Documentation of approval of project manager and other personnel as level 3 qualified data collector is included as Attachment H.
- (11) Contract laboratory contact information
 Not applicable.

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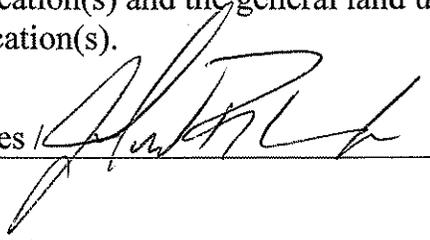
(12) Copy of ODNR collector's permit

Not applicable.

(13) Catalog Statement

A digital photo catalog of all sampling locations will be maintained for 10 years and will include photos of the specific sampling location(s), the riparian zone adjacent to the sampling location(s) and the general land use in the immediate vicinity of the sampling location(s).

Print/Signature: John W. Rhoades



Date: 02/26/10

(14) Voucher Specimen Statement

Not applicable.

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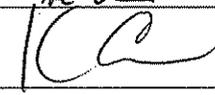
(15) Trespassing Statement

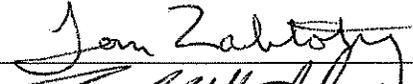
I have not been convicted or pleaded guilty to a Violation of section 2911.21 of the Revised Code (criminal trespass) or a substantially similar municipal ordinance within the previous five years.

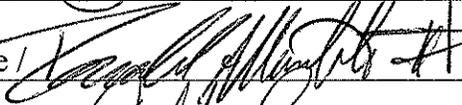
Print/Signature: John W. Rhoades /  Date: 02/26/10

Print/Signature: Cathy Zamborsky /  Date: 2/26/10

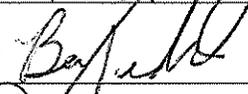
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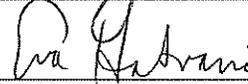
Print/Signature: Kathryn Crestani /  Date: 2/26/2010

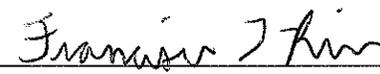
Print/Signature: Tom Zablony /  Date: 2/26/2010

Print/Signature: Ron Maichle /  Date: 02-26-10

Print/Signature: Cathy Perciado /  Date: 2-26-10

Print/Signature: Benjamin Tedrick /  Date: 2/26/10

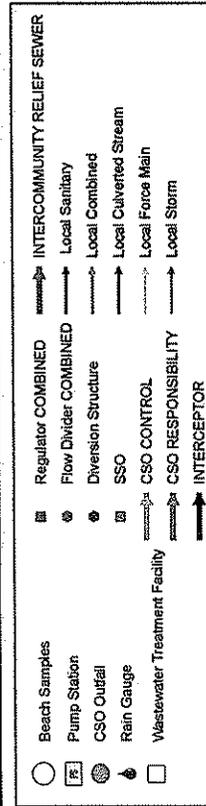
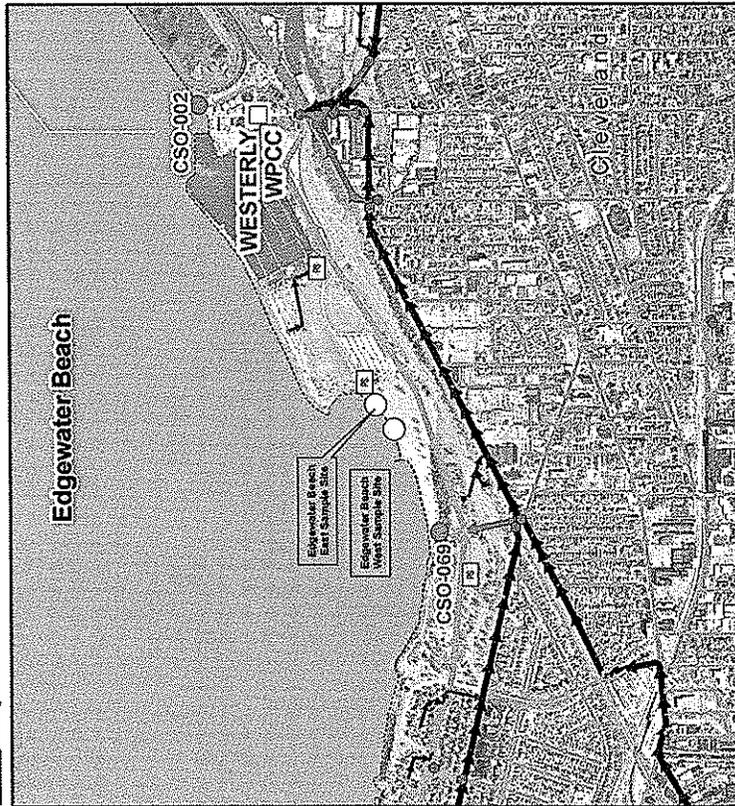
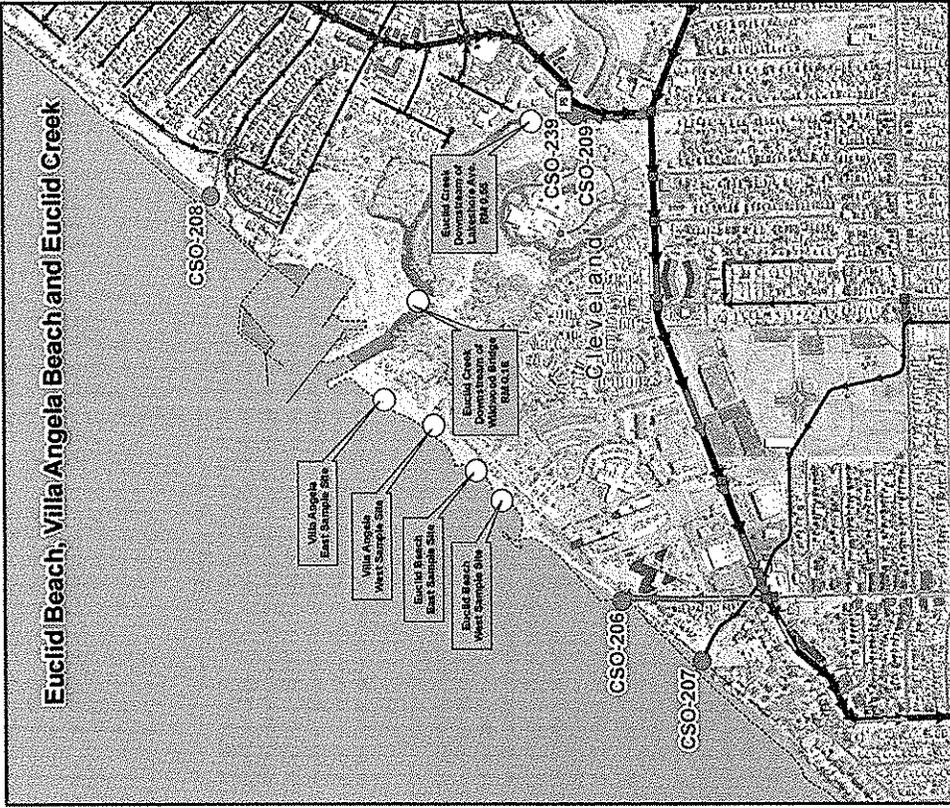
Print/Signature: Eva Hatvani /  Date: 2/26/10

Print/Signature: Francisco Rivera /  Date: 2/26/10

ATTACHMENTS A-H

Attachment A

2010 Lake Erie Beach Monitoring



This map was prepared by the Northeast Ohio Regional Sewer District. The map is for informational purposes only and does not constitute a contract. The map is not to be used for any other purpose. The map is not to be used for any other purpose. The map is not to be used for any other purpose.

Attachment B



**Northeast Ohio Regional
Sewer District**

Protecting Your Health and Environment

**Analytical Services
4747 East 49th. Street
Cuyahoga Hts., OH 44125**

Title

**Beach Sampling
SOP-3004-06**

***Effective Date:* _____**

Approvals

Prepared By: Eva Hatvani

Date:

Reviewed By QA Specialist: Carol Turner

Date:

Approved By Manager: Mark Citriglia

Date:

Property of NEORSD. This is a date sensitive document and may not be current after 2/25/10.

This document is valid only if stamped "Controlled"



**Analytical Services
4747 East 49th. Street
Cuyahoga Hts., OH 44125**

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1. Scope and Application

- 1.1. This SOP describes the procedure for the collection of beach water samples.
- 1.2. Beaches are sampled during the recreational season to monitor levels of bacteria in order to warn the public of a possible risk of exposure to high levels of bacteria.
- 1.3. *E. coli* are commonly associated with sewage contamination resulting from a number of sources including rain events, overflows of sewage systems, warm-blooded animal waste and bird contamination. The presence of the bacteria only indicates that other pathogenic bacteria may be present.
- 1.4. Comparing *E. coli* concentrations to recreational water quality standards initiates possible beach advisories. The standards are based on single sample concentrations of *E. coli* bacteria. The EPA has determined that *E. coli* are one of the best indicator organisms of water quality for freshwater bathing beaches.
- 1.5. The data from beach sampling are sent to the Ohio Department of Health for a daily assessment of bathing water quality. The Ohio Department of Health and the Ohio Department of Natural Resources use this data to determine when postings should be made.

2. Interferences

- 2.1. The use of a sample bottle that is not autoclaved may cause elevated bacteria counts or false positives. Autoclaving kills any residual bacteria that may be present in the bottle.
- 2.2. Do not touch the inside of the bottle or the inside of the cap. This can contaminate the sample.
- 2.3. Sampling at a distance too close to the shoreline may cause elevated bacteria counts or false positives. Avoid sampling near bird feces, sediment, and floating debris and trash.
- 2.4. Avoid disturbing and kicking up bottom material at the sampling station.

we
 recommend
 periodic
 sampling of
 NT bottles
 is that fair
 "Field blank?"

3. Definitions

- 3.1. May – This action, activity or procedural step is neither required nor prohibited.
- 3.2. May not – This action, activity, or procedural step is prohibited.

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- 3.3. Must – This action, activity, or procedural step is required.
- 3.4. Shall – This action, activity, or procedural step is required.
- 3.5. Should - This action, activity or procedural step is suggested but not required.

4. Safety

4.1. Safety Equipment

- 4.1.1. Safety equipment is required while sampling
- 4.1.2. Life Jacket or inflatable Safety Vest
- 4.1.3. Chest Waders
- 4.1.4. Gloves
- 4.1.5. Throw bag with a 50 feet of nylon rope (refer to *Throw Bag SOG*)
- 4.1.6. District Cell phone

4.2. Sampling Safety Procedures

- 4.2.1. While traveling in the District vehicle, all employees should stay in contact with the base station via the mobile radio. Refer to SOP-3003 Vehicle and Mobile Radio Operation for the procedures.
- 4.2.2. A District cell phone has been provided for additional safety. The phone should be charged and turned on while off District premises.
- 4.2.3. Sampling may not occur during a thunderstorm. During times of inclement weather, check with a supervisor or Manager of Water Quality and Industrial Surveillance (WQIS) prior to sampling.
- 4.2.4. If inclement weather occurs while sampling seek safety and call a WQIS supervisor for instructions.
- 4.2.5. Samples will not be taken when wave heights are over 3.5 feet.
- 4.2.6. The sampler MUST put on the chest waders before entering the water.
- 4.2.7. An inflatable life vest is provided for the sampler and must be worn during sampling. The safety vest is for the protection of the sampler.
- 4.2.8. The sampler must wade out to 3-ft. deep water to collect samples. The wave stick is used as a depth indicator. Do not wade out farther than recommended.

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4.2.9. When the water is rough the sampler may use a 12-foot sampling pole to assist with sampling. The sampler should wade out to a safe distance and then extend the sampling pole to obtain a representative sample.

4.2.10. Safety training will be given to all employees sampling.

5. Equipment and Supplies

- 5.1. Sample Bottles – (sterilized 500ml or 1000ml)
- 5.2. Sample Tags and Chain of Custody Sheet
- 5.3. Beach Observation Sheets for each location
- 5.4. Field Meters: Hanna pH EC/TDS, Anemometer
- 5.5. Turbidity Meter or Field Turbidity Meter
- 5.6. Sample Pole, 12 ft./with pull ties and rubber bands
- 5.7. Cooler with Ice
- 5.8. Digital Camera
- 5.9. GPS
- 5.10. Wave Height Stick, marked at inch and foot increments, red tape at 1 ft. mark, yellow tape at 2 ft. mark
- 5.11. Ziploc Bags
- 5.12. Laptop computer with wireless connection for Edgewater Sample Collection
- 5.13. Water quality advisory sign keys
- 5.14. Graduated cylinder, 100 ml plastic
- 5.15. Deionized water bottle, 1 L
- 5.16. Kimwipes
- 5.17. Gloves, plastic nitrile
- 5.18. Hand sanitizer

6. Calibration and Standardization

- 6.1. All field meters must be calibrated daily or verified that the instrument is in calibration by an independent standard.
 - 6.1.1. See SOP 6000 for use and calibration of Hanna pH EC/TDS Meter.

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6.1.2. See SOP 2007 for the calibration of the bench Turbidity meter and field turbidity meter.

6.2. A log of the calibration history is to be maintained to assure that the meter is working properly.

7. Procedure

7.1. Directions to Beaches

7.1.1. Edgewater Beach – (From 4747 E. 49th Street)

- Take E. 49th Street to Harvard Avenue
- Make a right turn at Harvard Avenue
- Make a left onto I-77 N.
- Take I-77 N. to I-90 E.
- Take I-90 E. to Route 2 W.
- Take Route 2 to the Edgewater Park exit.
- Take the exit and follow the signs to the beach area.
- Take the entrance to the bike path on the left and follow it around to the edge of the beach.

7.1.2. Villa Angela Beach/Euclid Beach (From 4747 E. 49th Street)

- Take E. 49th Street to Harvard Avenue
- Make a right turn at Harvard Avenue
- Make a left onto I-77 N.
- Take I-77 N. to I-90 E.
- Take I-90 E. to the Lakeshore exit
- Make a right onto Lakeshore Blvd.
- Follow Lakeshore Blvd. until you see the Euclid Beach entrance sign on the left side of the road.
- Take the entrance to the bike path.
- Go onto the bike path very slowly; Watch out for pedestrians.

7.2. Sampling Locations

7.2.1. Additional Sampling locations may be added as needed.

7.2.2. See attached site diagrams for sampling locations. Appendix A and B.

7.2.3. Edgewater Beach – There are 5 buoys and 3 lifeguard stations at this beach. Count them from left to right.

7.2.3.1. **West Sample** – The West sample is taken in line with the large metal pole that is on the other side of the freeway. This pole is lined up perpendicular to the shoreline.

7.2.3.2. **GPS Location:** 41° 29.320 N 81° 44.422 W

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- 7.2.3.3. **East Sample** –The East sample is taken in line with the brick stack on the other side of the freeway.
- 7.2.3.4. **GPS Location:** 41° 29.357 N 81° 44.350 W
- 7.2.4. Villa Angela Beach – There are 4 stone break walls at this beach. Count them left to right.
- 7.2.4.1. **West Sample** – The West sample is taken at the beginning of the 2nd break wall.
- 7.2.4.2. **GPS Location:** 41° 35.108 N 81° 34.060 W
- 7.2.4.3. **East Sample** – The East sample is taken mid-distance between the 3rd and 4th break walls.
- 7.2.4.4. **GPS Locations:** 41° 35.166 N 81° 33.998 W
- 7.2.5. Euclid Beach – There are 2 stone break walls at this beach.
- 7.2.5.1. **West Sample** – The West sample is taken between the 2 break walls at the second set of stairs from the structure at Euclid Beach.
- 7.2.5.2. **GPS Location:** 41° 35.029 N 81° 34.162 W
- 7.2.5.3. **East Sample** –The East sample is taken inline with the East side of the pile of stones on the beach.
- 7.2.5.4. **GPS Location:** 41° 35.058 N 81° 34.118 W Euclid Creek
- 7.2.6. Euclid Creek - A sample will be taken from two locations on Euclid creek.
- 7.2.6.1. **Euclid Creek** – 0.5 location
- 7.2.6.2. **GPS Location:** 41.5831°N 81.5594°W
- 7.2.6.3. **Euclid Creek** – 30 ft. North of the foot bridge
- 7.2.6.4. **GPS Location:** 41.5854° N 81.5641°W
- 7.3. Field Analysis/Observations – All Sampling Locations
- 7.3.1. Complete all information on the sample tags with permanent marker or pen.
- 7.3.2. Digital pictures are to be taken prior to any sampling to avoid causing any disturbances of the bird activity.
- 7.3.2.1. Pictures of the east, west, central and overall views of the beach are to be taken noting the picture number on the observation sheet. Additional pictures of beach conditions that could impact the outcome of the testing should be taken as well as noted on the field observation form.
- 7.3.3. The sample tag must be completed at the sampling site with the following information:
- Signature
 - Employee ID

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- Start Time (time of sampling)
- Field Parameters (conductivity, pH, temperature (°C), turbidity if measured in the field)

7.3.4. Field observation notes must be entered onto the observations sheets at the sampling site. The form must be filled out completely.

7.3.5. Field parameters must be taken in the water at each sampling location (east and west). Measure pH, conductivity, temperature and turbidity.

7.3.6. The sample collected in the 500 ml or 1 L bottle will be used for microbiological tests at the laboratory.

7.3.7. Once the field analyses have been performed place the sample into a Ziploc bag and place it into the cooler filled with ice.

7.3.8. Record the results from all field analyses.

7.3.9. The samples must remain in the cooler until delivered to the Sample Custodian at Analytical Services.

7.3.10. The field observations sheets are given to the supervisor of the microbiology area for review. See Appendix C for an example of the form.

7.3.11. After review, the field data is entered into Lablynx. The observation sheets are uploaded through Lablynx to the District's intranet page. Please see SOP-1005 LIMS Image and File Upload for Beach.

7.4. Sample Collection

7.4.1. Locate the sampling location by the markers on the beach as indicated in section 7.2.

7.4.2. Take a GPS reading to verify the location, record the coordinates on the field observation sheet.

7.4.3. Wade out to a water depth of at least 3 feet. Use the wave stick to verify the depth. The distance from the shoreline will vary based on the depth of Lake Erie and wave height.

7.4.4. The sampler must remove the cap, invert the sample bottle and plunge the sample bottle 6-12 inches below the surface of the water.

7.4.5. The bottle should be rotated with the opening facing the surface to allow sample to fill the bottle. Make sure to leave headspace in order to provide sufficient space for shaking the sample for analysis.

7.4.6. The sample container should be capped and secured.

7.4.7. Collect the second sample for field analysis by repeating steps 7.5.5 through 7.5.7.

7.4.8. Take the maximum and minimum wave heights before returning to the shoreline by using a measuring stick. This is done by observing the minimum and maximum height of waves for one minute.

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Record the minimum and maximum wave heights on the observation sheet in inches. Perform the following calculation to get the wave height for the model:

Maximum height (in) – minimum height(in) = wave height (in)

Convert inches to feet.

7.4.9. If you are unable to enter the water because of unsafe conditions, estimate the wave height as follows:

(1) 0-2 ft, (2) 1-3 ft, (3) 2-4 ft, (4) 3-6 ft.

7.4.10. Make an observation of water clarity using the wave height stick. The wave height stick is marked with red tape at the one-foot mark and yellow tape at the two foot mark.

7.4.10.1. If you look to see the bottom and can see the bottom, , the water is “clear”.

7.4.10.2. If you can not see the bottom but the first mark which is yellow is clear, the water has “low sediment”.

7.4.10.3. If you can not see the bottom or the first mark which is yellow, but can see the second mark which is red, the water has “medium sediment”.

7.4.10.4. If you can not see the bottom, or the yellow mark or the red mark has “high sediment”.

7.4.11. The bottles are placed in a Ziploc bag and placed into the cooler containing ice.

7.5. Sample Collection During Inclement Weather

7.5.1. Locate the sampling location by the markers on the beach.

7.5.2. Take a GPS reading to verify the location, record the coordinates on the field observation sheet.

7.5.3. A sampling pole must be used to obtain the sample when the wave height is over 3 feet.

7.5.4. Remove the cap and secure the sampling bottle to the pole with at least three rubber bands.

7.5.5. Wade out into the water to a safe depth, at least 1.5 feet. The distance from the shoreline will vary based on the depth of Lake Erie and wave height.

7.5.6. The sample pole should be extended to maximum length and the sample bottle is inverted and plunged below the surface of the water.

7.5.7. Cap and secure the sample and obtain a second sample for field analysis.

7.5.8. Return to the shoreline, tag the samples and place one the sample in a Ziploc bag and into the cooler for microbiological analysis.

7.6. Integrated Grab Sample for Microbiology and Turbidity Samples

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7.6.1. When integrated grab sampling is required, equal portions of each beach site are combined for each beach. For example, the East and West sites of Edgewater are combined or the East and West sites of Villa Angela Beach are combined.

7.6.2. **TURBIDITY Analysis**

7.6.2.1. Prepare the integrated grab sample by combining 50 ml of the East site and 50 ml of the West site in a clean 125 ml disposable bottle.

7.6.3. Do turbidity analysis in field if required. Analyze the sample for turbidity. *See current version of SOP 2007.*

8. Data Handling and Review

- 8.1. The Project Leader will review all tags and beach logs for accuracy and neatness.
- 8.2. The Project Leader will periodically audit the sampling process.
- 8.3. Report any unusual circumstances to the Project Leader or supervisor.
- 8.4. At Edgewater, the analyst must enter the field measurements into Lablynx in the field.
- 8.5. At all other beach sites, the analyst must enter the field measurements in the Lablynx application upon returning to the lab.
- 8.6. If the turbidity is not measured in the field, the turbidity analysis must be completed within 1 hour of returning to EMSC.

9. Additional Information

9.1. NOWCASTING PROTOCOL for EDGEWATER

9.1.1. See Appendix H for Protocol for the Edgewater Model

9.2. Using the Anemometer to Measure Wind Speed

- 9.2.1. Use a digital anemometer.
- 9.2.2. Turn the unit ON by pressing the ON button.
- 9.2.3. Turn the temperature switch to the °C position.
- 9.2.4. Slide the selector switch to the feet/minute setting.
- 9.2.5. Place the anemometer vane probe into the air flow and read the maximum and average wind speed measurement on the display.

NOTE: do not get the probe wet.

9.2.6. Turn the unit off when not using to conserve the battery.

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10. References

- 10.1. USEPA National Beach Guidance and Performance Criteria for Recreational Waters (EPA-823-B-02-004) July 2002, Chapter 4- Beach Monitoring and Assessment.
- 10.2. Website:<http://www.epa.gov/waterscience/beaches/grants/index.html>.
- 10.3. Microbiological Methods for Monitoring the Environment Water and Wastes, EPA-600/8-78-017, December 1978, Cincinnati, OH.
- 10.4. USGS, Nowcasting Protocol for Edgewater, April 29, 2008.
- 10.5. USGS, Nowcast at Huntington and Edgewater quality Assurance/quality Plan 2008, April 29, 2008

11. Revision History

- 11.1. Section 1.4 deleted fecal coliform as a beach standard (E. Hatvani, 5/5/06)
- 11.2. Section 4.3.2 added reference to SOP-3003 (E. Hatvani 5/5/06)
- 11.3. Section 5.0 added equipment:
- 11.4. Section 5.4 added Anemometer, E. Hatvani 5/5/06).
- 11.5. Section 5.10 added Wave Height Stick, E. Hatvani 5/5/06).
- 11.6. Section 7.2.2
- 11.7. Section 7.7.2 added information on analysis, E. Hatvani 5/5/06).
- 11.8. Section 1.3 single sample concentrations of E. coli bacteria (E. Hatvani 6/6/2007)
- 11.9. Section 5.1 Sample Bottles – changed volume and added second bottle type (E. Hatvani 6/6/2007)
- 11.10. Section 5.2 Added Chain of Custody Sheet (E. Hatvani 6/6/2007)
- 11.11. Section 5.11 Added Ziploc Bags (E. Hatvani 6/6/2007)
- 11.12. Section 7.5.1 Complete all information on the sample tags with permanent marker or pen. (E. Hatvani 6/6/2007)
- 11.13. Section 7.5.4 added to use the wave height stick to verify the depth. (E. Hatvani 6/6/2007)
- 11.14. Section 7.5.6. Make sure to leave headspace in order to provide sufficient space for shaking the sample for analysis. (E. Hatvani 6/6/2007)

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- 11.15. Section 7.5.9 Added (E. Hatvani 6/6/2007) Take the maximum and minimum wave heights before returning to the shoreline.
- 11.16. Section 7.5.10 Added the bottles are placed in a Ziploc bag and placed into the cooler containing ice. (E. Hatvani 6/6/2007)
- 11.17. Section 7.7.6 Added Appendix A,B,C, and D. (E. Hatvani 6/6/2007)
- 11.18. Section 7.6.8 Added place the bottle into a Ziploc bag. (E. Hatvani 6/6/2007)
- 11.19. Section 8.4 Revised to state that field observations are entered into LabLynx upon returning to the lab. (E. Hatvani 6/6/2007)
- 11.20. Section 9.1 and 9.2 Corrected to References to USEPA (E.Hatvani6/6/2007).
- 11.21. Moved Previously numbered Section 11.1 to 7.8 Composite Sampling (E. Hatvani 6/6/2007)
- 11.22. Revised Section 7.5.5 to read plunge the sample bottle 6-12 inches below the surface of the water.6-12 inches. (E. Hatvani 12/18/2007)
- 11.23. Revised date of the field observations sheets (Appendix C-F) to 2008 (E. Hatvani 12/18/2007)
- 11.24. Removed Section 4.3. (E. Hatvani 4/23/2008)
- 11.25. Moved 4.3.2 and 4.3.3 to Section 4.1 Safety. (E. Hatvani 4/23/2008)
- 11.26. Revised bottle size to 100 ml disposable plastic bottles. (E. Hatvani 4/23/2008)
- 11.27. Modified 5.5 to include Field Turbidity Meter. (E. Hatvani 4/23/2008)
- 11.28. Modified Section 6 to include calibration of Turbidity and Filed Turbidity meters in SOP 2007. (E. Hatvani 4/23/2008)
- 11.29. Removed 11.1. Euclid Creek Sampling and added it to Section 7.3. Also added the GPS locations. (E. Hatvani 4/23/2008)
- 11.30. Moved Section 7.6 into Section 7.4. (E. Hatvani 4/23/2008)
- 11.31. Revised 7.4.9 to include the calculation for wave height. And convert to feet.(e. Hatvani 4/29/2008)
- 11.32. Added 5.12 Laptop computers with wireless connection for Edgewater Sample Collection. (E. Hatvani 4/29/2008)
- 11.33. Added 9.4 and 9.5 two USGS references for Nowacast Model Protocol. (E. Hatvani 4/29/2008)
- 11.34. Added 5.13 – 5.17 – 100 ml plastic graduated cylinder, deioinzed water bottle, kimwipes, gloves and hand sanitizer. (E. Hatvani 5/28/2008)
- 11.35. Revised 7.6.4.3 to read, “Shake each sample a minimum of 15 times before measuring.”.(E. Hatvani 5/28/2008)
- 11.36. Revised 7.3.11 to include field parameters are to be entered into Lablynx. (E. Hatvani 5/28/2008)
- 11.37. Revised Appendix A to include additional pictures of the sampling sites at Edgewater. (E. Hatvani 5/28/2008)

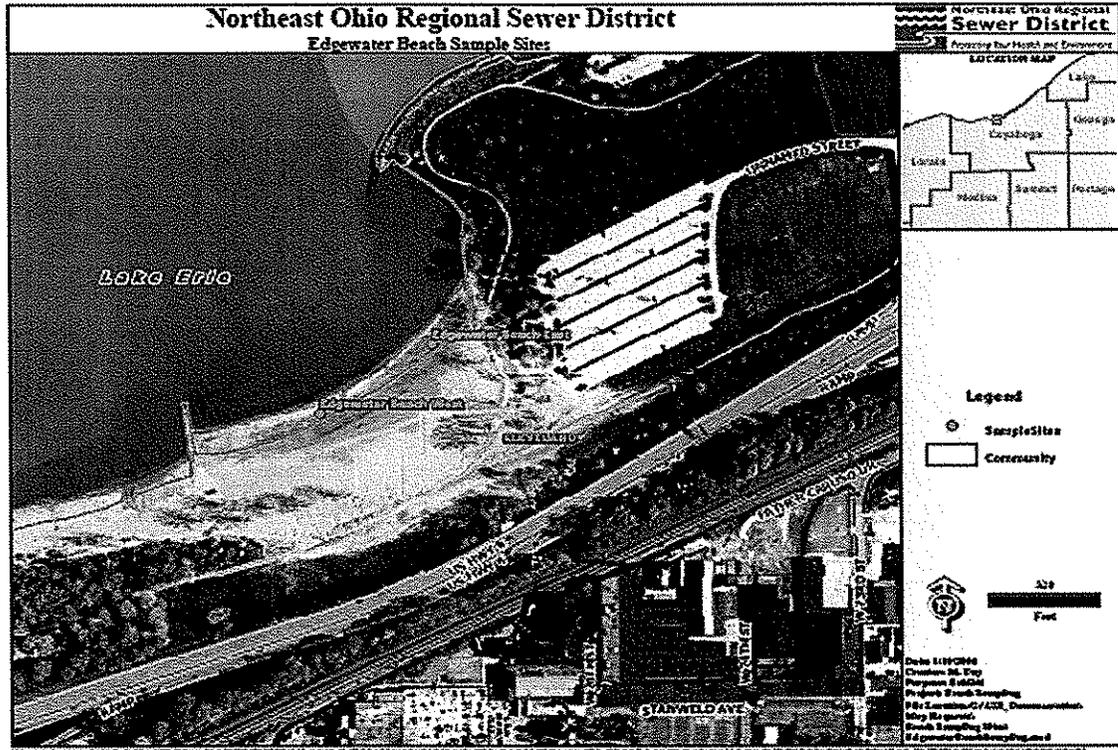
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- 11.38. Revised Appendix B to include additional pictures of the sampling sites at Villa Angela, Euclid and Euclid Creek sites. (E. Hatvani 5/28/2008)
- 11.39. Revised Appendices C-F - Edgewater, Villa Angela, Euclid Beaches and Euclid Creek observation sheets to latest version. (E. Hatvani 6/5/2008).
- 11.40. Removed Sampling Schedule Appendix G. (E. Hatvani 3/3/2009).
- 11.41. Revised 5.10 Wave Height Stick, marked at inch and foot increments. (E. Hatvani 3/3/2009).
- 11.42. Revised 4.2.6 to read, "The wave stick is used as a depth indicator". (E. Hatvani 3/3/2009)
- 11.43. Revised Appendices C, D, E and F. Removed date and forms. Listed them as examples. (E. Hatvani 3/3/2009)
- 11.44. Revised 7.3.10 to read, "See Appendix C, D, E and F for examples of the forms. Use current revisions of FORMS numbered 3154-3157. (E. Hatvani 3/3/2009)
- 11.45. Added to 5.10. added red and yellow tape marking on wave height stick. (E. Hatvani 5/11/2009)
- 11.46. Revised 6.1. 1 SOP number was changed from 7002 to SOP 6000. (E. Hatvani 5/11/2009)
- 11.47. Revised 9.2.4 changed the units on the anemometer from knots to ft/min. (E. Hatvani 5/11/2009)
- 11.48. Changed observation sheet in Appendix C for Edgewater with 2009 beach model criteria. (E. Hatvani 5/11/2009)
- 11.49. Added 7.10.4. This section explains how to determine water clarity based on the visibility of markings on the wave height stick. (E. Hatvani 5/11/2009)
- 11.50. Removed Villa Angela Beach Observation Sheet, Euclid Beach Observation Sheet and Euclid Creek Observation Sheet from Table of Contents (J. Novak 2/17/2010)
- 11.51. Revised Table of Contents to reflect updated page numbers (J. Novak 2/17/2010)
- 11.52. Revised 4.1.5 to read "Throw bag with 50 feet of nylon rope (refer to *Throw Bag SOG*)" (J. Novak 2/17/2010)
- 11.53. Removed "Analytical Services" from 4.2.3. and replaced with "Water Quality and Industrial Surveillance" (J. Novak 2/17/2010)
- 11.54. Removed "Analytical Services" from 4.2.4. and replaced with "Water Quality and Industrial Surveillance" (J. Novak 2/17/2010)
- 11.55. Revised 5.4 to read "Field Meters: Hanna pH EC/TDS, Anemometer" (J. Novak 2/17/2010)
- 11.56. Removed from 7.3.4. "One sheet is used for each location" (J. Novak 2/17/2010)

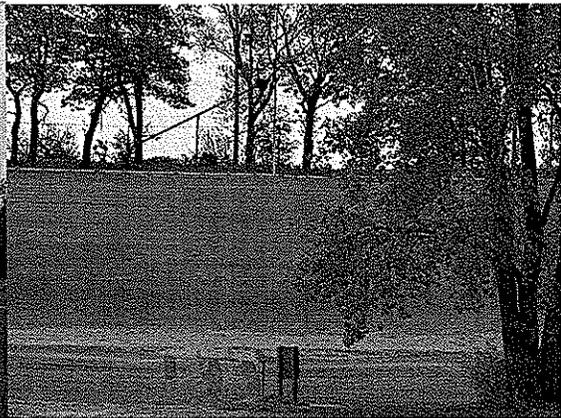
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- 11.57. Revised 7.3.5. to read “Field parameters must be taken in the water at each sampling location (east and west)” (J. Novak 2/17/2010)
- 11.58. Removed 7.6.4. (J. Novak 2/17/2010)
- 11.59. Revised 9.2.2. to read “Turn the unit ON by pressing the ON button” (J. Novak 2/17/2010)
- 11.60. Removed “knots setting” from 9.2.4. and added “feet/minute setting” (J. Novak 2/17/2010)
- 11.61. Revised 9.2.5. to read “Place the anemometer vane probe into the air flow and read the maximum and average wind speed measurement on the display” (J. Novak 2/17/2010)
- 11.62. Added “RM 0.55” to Appendix B, Euclid Creek Sampling Sites (J. Novak 2/17/2010)
- 11.63. Revised Beach Observation Sheet in Appendix C (J. Novak 2/17/2010)
- 11.64. Removed Appendix D, E and F (J. Novak 2/17/2010)
- 11.65. Re-lettered “NOWCASTING Protocol for Edgewater Beach” to Appendix D (J. Novak 2/17/2010)
- 11.66. Removed “Obtain Lake Level Data” from Appendix D, NOWCASTING Protocol for Edgewater Beach (J. Novak 2/17/2010)
- 11.67. Added “Update NEORS D Website” to Appendix D, NOWCASTING Protocol for Edgewater Beach” (J. Novak 2/17/2010)

APPENDIX A – EDGEWATER BEACH SAMPLING SITES

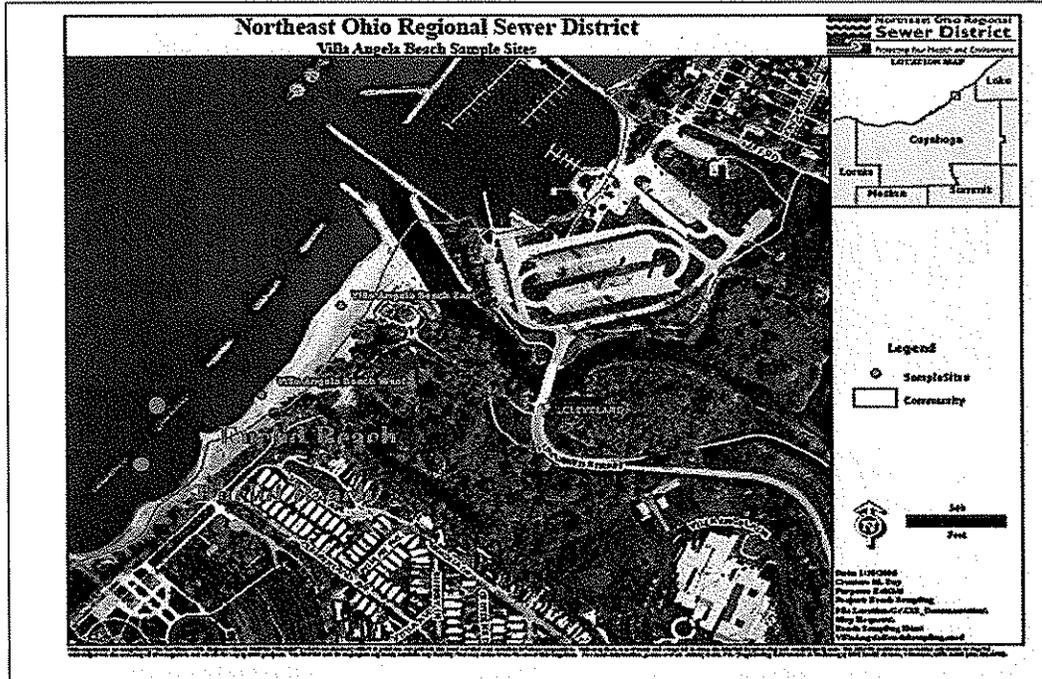


EAST SAMPLE SITE
Brick stack on other side of freeway



WEST SAMPLE SITE
Large metal pole on other side of the freeway

APPENDIX B – VILLA ANGELA AND EUCLID BEACHES SAMPLING SITES



Villa Angela Sample Sites



EAST SAMPLE SITE
Mid-distance between 3rd and 4th
break walls



WEST SAMPLE SITE
Beginning of 2nd break wall

Euclid Beach Sample Sites



EAST SAMPLE SITE
Pile of stones

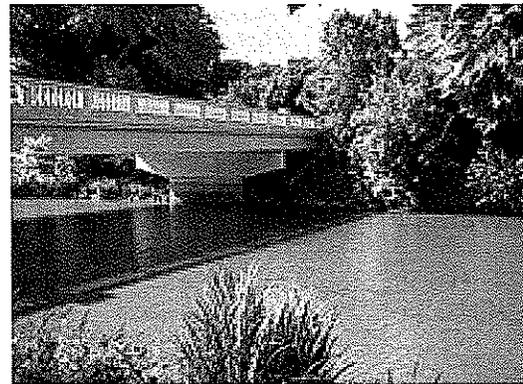


WEST SAMPLE SITE
Midway between 1st and 2nd
breakwalls

EUCLID CREEK SAMPLING SITES



EUCLID CREEK
RM 0.55



EUCLID CREEK BRIDGE
RM 0.14 (30 ft. north of the foot bridge)

APPENDIX C- Beach Observation Sheet

NEORSD Beach Sampling Field Data Form

Location: _____ Date: _____ Collectors: _____
 Weather: Clear Partly Cloudy Overcast Light Rain/Showers Heavy Rain
Steady Rain Heavy Snow Melt Other: _____
 Was this sample taken during or following a wet weather event? **YES / NO**
 Pictures: Overall: _____ Central: _____ West: _____ East: _____
 Water Quality Meters Used: _____ Beach Posted: **YES / NO**
 Time (hrs): _____ Location: _____ Site: _____
 Water-
 Color: Clear Muddy Tea Milky Other: _____
 Clarity: Clear Low Sediment Med Sed. High Sed. Algae Other: _____
 Odor: Normal Petroleum Anaerobic Sewage Chemical Other: _____
 Surface Coating: None Foam Oily Scum Other: _____
 Lake Surface Condition: Calm Ripples Moderate Waves Whitecaps Other: _____
 Field Parameters: Sp. Conductance (µmhos/cm): _____ Temperature (°C): _____
 Turbidity (NTU): 1) _____ 2) _____ Avg. Turbidity: _____ pH (s.u.): _____
 Wind Direction: _____ Wind Speed Max: _____ Average: _____
 Wave Height (inches): Max (+): _____ Min (-): _____ Total: _____
 Other-
 Number of Birds: Geese: _____ Gulls: _____ () _____
 Number of Swimmers: Total: _____
 General Comments: _____

Time (hrs): _____ Location: _____ Site: _____
 Water-
 Color: Clear Muddy Tea Milky Other: _____
 Clarity: Clear Low Sediment Med Sed. High Sed. Algae Other: _____
 Odor: Normal Petroleum Anaerobic Sewage Chemical Other: _____
 Surface Coating: None Foam Oily Scum Other: _____
 Lake Surface Condition: Calm Ripples Moderate Waves Whitecaps Other: _____
 Field Parameters: Sp. Conductance (µmhos/cm): _____ Temperature (°C): _____
 Turbidity (NTU): 1) _____ 2) _____ Avg. Turbidity: _____ pH (s.u.): _____
 Wind Direction: _____ Wind Speed Max: _____ Average: _____
 Wave Height (inches): Max (+): _____ Min (-): _____ Total: _____
 Other-
 Number of Birds: Geese: _____ Gulls: _____ () _____
 Number of Swimmers: Total: _____
 General Comments: _____

Model Parameters:
 Turbidity (NTU): Composite: _____ Composite Avg: _____
 Wave Height (feet): _____ or Backup Category: (1) 0-2 ft (2) 1-3 ft (3) 2-4 ft (4) 3-6 ft
 Radar Rain (in): 24 hrs: _____ 48 hrs: _____ or Backup NWS Rain (in) 24 hrs: _____ 48 hrs: _____
 Predicted E. coli CFU/100ml: Lower: _____ Upper: _____ Probability >235: _____
(Radar Rainfall - May 4-June 3 - ≥ 22%; June 9-Aug 18 - ≥ 27%; Aug 11-Sep 15 - ≥ 32%)
(Lightning Rainfall - May 4-June 3 - ≥ 22%; June 9-Aug 10 - ≥ 24%; Aug 11-Sep 15 - ≥ 35%)
 Beach Posted? **GOOD / POOR**

Modified February 16, 2010

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APPENDIX D - NOWCASTING PROTOCOL FOR EDGEWATER BEACH

NOWCASTING PROTOCOL FOR EDGEWATER BEACH – 2010

1. Collect sample data
 - A. Use Beach Sampling SOP – 3004-06.

2. Set up computer
 - A. Insert Sprint card into laptop.
 - B. Power ON.
 - C. Log on using information on sticker (bottom left of keyboard).
 - i. Make sure **Workstation Only** is checked.
 - D. Connect to internet using Sprint PCS shortcut on laptop desktop.
 - i. Click **GO** when Sprint PCS window says **Connected**.

3. Check Email OR Internet to obtain rainfall data
 - A. Open **Edgewater Beach Folder** on laptop desktop.
 - B. Open GroupWise and login.
 - C. Check for email from radarner@usgs.gov for 24 and 48 hour total rainfall and record onto field sheet.
 - D. Exit email.

If no rainfall email was received from USGS:

- A. Open **Edgewater Beach Folder** on laptop desktop.
 - B. Open NWS Rainfall link.
 - C. For 24 hour data, add up the numbers in the 6 hour column from 8:51AM yesterday to 7:51AM today.
 - D. For 48 hour data, add up the numbers in the 6 hour column from 8:51AM the day **before** yesterday to 7:51AM today.
 - E. Check **backup** box on field sheet.
-
4. Wave Height
 - A. Convert wave height to feet.
 - B. If wave height cannot be determined using measuring stick, estimate wave height and assign category number.
 - i. Check **backup** box on field sheet.

 5. Obtain turbidity data
 - A. Use Turbidity SOP-2007.

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6. Run model

- A. Open **Edgewater Beach Folder** on laptop desktop.
- B. Open **Edgewater Model 2010**.
- C. Enter model parameters from field sheet.
- D. When asked if radar rainfall was used, enter **Y** if USGS email was received or **N** if email was not received and NWS rainfall was used.
- E. Record lower, upper, predicted and probability *E. coli* densities on field sheet.
- F. Based on probability percentage, season and rainfall determine NOWCAST posting and check appropriate box on field sheet.
- G. If problems with model arise, please call John Rhoades at 216-641-6000 ext. 2219.
- H. Close model and proceed to NOWCAST website.

7. NOWCAST

- A. Open **Edgewater Beach Folder** on laptop desktop.
- B. Open NOWCAST website link.
- C. Click on **Edgewater Beach** on right-hand side of page.
- D. Click on **Login** under Data Upload at bottom on page.
- E. Enter in login information:
 - Username: neorsd
 - Password: mark2010
- F. Click **Add Record**.
- G. Enter data
 - i. Use collection time from EAST sample.
 - ii. Enter in field parameters (convert water temperature to °F).
 - iii. *E. coli* is Predicted *E. coli*.
 - iv. Rain at Hopkins= NWS data; Radar Rain= USGS email.
 - v. Enter predicted water quality, probability and advisory.
 - vi. Enter any relevant notes and initials of model runner into the **Notes** section.
 - vii. Click **ADD**.
- H. Review information and click edit/modify if anything needs to be changed.

8. Update NEORSD website

- A. Open **Edgewater Beach Folder** on laptop desktop.
- B. Double-click the NEORSD link.
(http://www.neorsd.org/beach_chk.php)
- C. Enter your NEORSD personal login information.