

### Level 3 Project Study Plan

#### *2011 Lake Erie Bacteriological Sampling of Edgewater, Villa Angela and Euclid 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.

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. Sampling will be conducted by the Northeast Ohio Regional Sewer District's (NEORS) Water Quality and Industrial Surveillance (WQIS) division and will occur from May 2, 2011 through October 31, 2011, weather permitting. NEORS's Analytical Services division 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 will 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 high bacteriological densities that may be adversely impacting Villa Angela and Euclid Beaches. NEORS will compare the results to the applicable water quality standards to determine attainment status of Euclid Creek and what effect, if any, Euclid Creek may be having on Villa Angela and Euclid Beaches.

(2) Non-point/Point Sources

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

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, beach sand and beach morphology.

(3) Parameters

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 following the procedures outlined in NEORSD's *Beach Sampling SOP* (refer to Attachment B). 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* (Attachment C). NEORSD will also analyze the samples for additional chemical parameters including total phosphorus, ortho phosphate, ammonia, chlorophyll *a*, total suspended solids, total dissolved solids, total solids and nitrate+nitrite (Attachment C). Analysis for these chemical parameters will follow the most current NEORSD SOPs.

(4) Field Collection and Data Assessment Techniques

Individual bacteriological samples will be collected from the two Euclid Creek sites and an east and west location at each of the three beaches in a 2-liter sterilized polypropylene container. A 125-milliliter bottle will be used to collect a turbidity sample at each site. Additionally, a 4-liter polyethylene cubitainer, 473-milliliter plastic bottle field preserved with H<sub>2</sub>SO<sub>4</sub> and 250-milliliter amber glass jar field preserved with H<sub>2</sub>SO<sub>4</sub> will be used to collect water samples for chemical analysis from the east sites at Villa Angela and Euclid Beaches, Edgewater Beach and at Euclid Creek River Mile (RM) 0.55.

Field blanks are not required by method 1603 or by the National Environmental Laboratory Accreditation Conference (NELAC) for bacteria analysis. Analytical Services has procedures in place which are required by NELAC to demonstrate that the sample containers are clean and sterile. If the sterility check comes back positive, all equipment is re-cleaned and sterilized. Additionally, bacteriological field duplicates will be aliquoted by Analytical Services from a randomly chosen 2-liter bacteriological sample at a frequency not less than 10% of the total samples collected.

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Duplicate water chemistry samples will be collected at a randomly selected site at a frequency not less than 10% of the total samples collected. Additionally, field blanks will be collected at a frequency not less than 5% of the total samples collected. Field duplicates and blanks will be analyzed for total phosphorus, ammonia, chlorophyll *a*, total suspended solids, total dissolved solids, total solids and nitrate+nitrite.

All sterilized polypropylene 2-liter containers are cleaned with hot soapy water and rinsed with cold water followed by several rinses with de-ionized water. All containers used for microbiological sampling are sterilized prior to use. No container, new or recently cleaned and sterilized, is released for use until one container from the batch is validated for sterility. Additionally, all containers are marked with autoclave tape to verify sterility. The autoclave is validated with a spore test monthly.

All samples will be collected as grab samples where the total depth of water at each location is approximately three feet. Samples will be taken approximately 6-12 inches below the water surface, as stated in Attachment B. At the time of collection, field parameters (pH, conductivity and temperature) will be measured directly in the lake or creek. Field analyses will include the use of the following to measure pH, water temperature and conductivity: Extech EC500 Exstik II pH/Conductivity meter, Hanna HI 98129, YSI-556 MPS Multi-Parameter Water Quality Meter or YSI 600XL Sonde. Specifications for these meters are included in Attachment D. Turbidity will also be measured at each site using the 125-milliliter turbidity surface water sample collected and a portable field turbidity meter, the Hach 2100P Turbidimeter, LaMotte 2020 Turbidity Meter or the Thermo Orion AQ4500 Turbidimeter (see Appendix D for specifications).

If weather conditions prevent the sampler from wading out to a depth of three feet, a sampling pole will be used to collect the 2-liter bacteriological sample and turbidity sample from Lake Erie. Collection of the 4-liter polyethylene cubitainer will involve securing a 473-milliliter plastic container to the sampling pole and transferring the surface water sample collected to the cubitainer. This will be repeated until the cubitainer is filled. Collection of the 473-milliliter plastic bottle will be obtained by securing the bottle to the sampling pole. There will be no collection of the 250-milliliter glass amber jar during inclement weather, because the jar will not adequately secure to the sampling pole and transfer of the sample to the glass jar from a plastic bottle will cause contamination of the sample. If weather conditions do not permit the use of a sampling pole, then no samples will be collected. Refer to section 7.5 of Attachment B for an explanation of sample collection during inclement weather.

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Notes and observations pertaining to the beach and water conditions will be recorded using the NEORSD *Beach Sampling Field Data Form* (see Attachment C). 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 Practices* (2009). On sampling days during the recreation season, bacteriological samples will be collected from an east and west location and will be analyzed separately at the laboratory. Water chemistry samples will be collected from the east site at Villa Angela and Euclid Beaches, Edgewater Beach and at Euclid Creek RM 0.55. All bacteriological sample results will be compared to the State of Ohio Water Quality Standards to determine whether any exceedances of the applicable water quality criteria have occurred.

NEORSD will take additional samples at Edgewater Beach in the event of a discharge from Combined Sewer Overflow (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 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 NEORSD 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 Practices* (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 eastern section of each beach and the other is in the western section of each beach. Additional samples will be collected from two locations on Euclid Creek at RM 0.55 and 0.14. The following table details the sampling locations. Additional pictures and maps can be found in Attachment B (Appendix A and B).

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Location	Site	Latitude	Longitude	Description	Quadrangle	Purpose
Edgewater Beach	East	41.4897°N	81.7392°W	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, and determination of the impact of point and non-point sources.
Edgewater Beach	West	41.4887°N	81.7404°W	Western half of the beach. In line with the large metal pole on the other side of the freeway.	Cleveland South	
Villa Angela Beach	East	41.5862°N	81.5667°W	Eastern half of beach mid-distance between the 3 <sup>rd</sup> and 4 <sup>th</sup> break walls.	East Cleveland	
Villa Angela Beach	West	41.5855°N	81.5674°W	Western half of beach at the beginning of the 2 <sup>nd</sup> break wall.	East Cleveland	
Euclid Beach	East	41.5842°N	81.5687°W	In front of the pile of stones on the east side of the beach.	East Cleveland	
Euclid Beach	West	41.5837°N	81.5695°W	Western half of the beach between the two break walls at the second set of stairs.	East Cleveland	
Euclid Creek	RM 0.55	41.5835°N	81.5595°W	Downstream of Lakeshore Boulevard.	East Cleveland	
Euclid Creek	RM 0.14	41.5853°N	81.5641°W	Downstream of Wildwood Bridge.	East Cleveland	

(6) Schedule

Beach monitoring is expected to begin on May 2, 2011 and end on October 31, 2011 (Attachment E). From May 2<sup>nd</sup> through May 12<sup>th</sup>, bacteriological water samples from the beach sites will be collected four days a week (Monday through Thursday). Beginning May 16<sup>th</sup> and lasting through September 9<sup>th</sup>, bacteriological water quality samples will be collected seven days a week. From September 12<sup>th</sup> through October 31<sup>st</sup>, bacteriological water quality sampling will return to four days a week (Monday through Thursday). Euclid Creek RM 0.14 will be sampled for bacteria five times a week (Monday through Friday) from June 6<sup>th</sup> through September 9<sup>th</sup>. No samples will be collected at Euclid Creek RM 0.14 on July 4<sup>th</sup> and September 5<sup>th</sup> (observed holidays). Euclid Creek RM 0.55 will be sampled for bacteria seven days a week from May 1<sup>st</sup> through September 9<sup>th</sup>.

Chemical water quality samples will be collected daily from May 2<sup>nd</sup> through July 31<sup>st</sup> (except for May 7<sup>th</sup>, 8<sup>th</sup>, 14<sup>th</sup> and 15<sup>th</sup> due to no weekend sampling) at the east site at Villa Angela and Euclid Beaches, Edgewater Beach and at Euclid Creek RM 0.55 to analyze for total phosphorus, ammonia, total suspended solids, total dissolved solids, total solids, chlorophyll *a* and nitrate+nitrite. If a correlation exists between the above mentioned parameters and bacteria, collection and analysis of the parameters will continue beyond July 31<sup>st</sup>. If no correlation exists, then sampling for the chemical parameters will cease. Samples will be collected

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as scheduled, unless surface water conditions are deemed unsafe. All sampling will be dependent on weather conditions.

(7) QA/QC

All 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 log book and on the *Beach Sampling Field Data Form* (Attachment C). The samples will then be delivered immediately to the NEORSD 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 NEORSD Analytical Services Quality Manual and associated SOPs 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.

(8) Work Products

A summary report will be prepared and sent to the ODH by Analytical Services Monday through Friday before 3:00 pm. A second internal report and the field observation sheets will be sent to personnel from NEORSD and the United States Geological Survey (USGS) by Analytical Services Monday through Friday before 4:30 pm. The internal report will contain the data from all samples collected and various parameters analyzed from the previous day. Following the completion of the project, a summary report that includes all the data collected during the study will be prepared by Analytical Services. The 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 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 *Beach Sampling Field Data Form*, daily reports, and pictures will also be stored electronically. Additionally, field observations will also be entered into the Laboratory Information Management System (LIMS).

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(9) Qualified Data Collectors

Except for the project manager, where necessary, the following noted Level 3 Qualified Data Collectors (QDC) certified by Ohio EPA in Chemical Water Quality Assessment will be the sample coordinators (see table below). The sample coordinators will be responsible for training, scheduling, sampling and data review of field parameters.

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
Francisco Rivera**	262	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	riveraf@neorsd.org	216-641-6000
Jillian Novak**	512	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	novakj@neorsd.org	216-641-6000
Kristina Granlund	511	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	granlundk@neorsd.org	216-641-6000
Benjamin Tedrick	048	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	tedrickb@neorsd.org	216-641-6000

\*Project Manager / \*\* Project Leader

All non-QDC samplers will receive training that consists of reviewing all pertinent SOPs and completion of required demonstrations of capabilities for parameters measured in the field. Training on sampling techniques and field analysis will be conducted by having the samplers assist a QDC at the sites while the techniques are being demonstrated. The non-QDC samplers will then get an opportunity to conduct sampling, and the QDC will determine their proficiency with the techniques by observing sampling being performed and assessing the samplers' techniques. All samplers must meet and complete all requirements satisfactorily to be permitted to sample on their own. A complete checklist of training is provided in Attachment F (*Beach Sampling Training Checklist*). Once samplers have met the outlined criteria, they will be permitted to sample without the supervision of a QDC. The sample coordinators will perform monthly audits of the sampling at all three beaches, using a *Beach Sampling Audit Form* (Attachment G), and correct deficiencies through re-training if necessary. Re-

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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 leaders Francisco Rivera and Jillian Novak, with assistance from the sample coordinators, will provide training on sampling methodology and conduct the monthly audits. The project manager and leaders 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
Nicholas Barille	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	barillen@neorsd.org	216-641-6000
Joseph Carbonaro	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	carbonaroj@neorsd.org	216-641-6000
Joseph Broz	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	brozj@neorsd.org	216-641-6000
Tim Dobriansky	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	dobrianskyt@neorsd.org	216-641-6000
Kyle Frantz	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	frantzk@neorsd.org	216-641-6000
Rae Grant	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	grantr@neorsd.org	216-641-6000
Eric Hinton	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	hintone@neorsd.org	216-641-6000
Mark Matteson	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	mattesonm@neorsd.org	216-641-6000
Denise Phillips	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	phillipsd@neorsd.org	216-641-6000
Kevin Roff	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	roffk@neorsd.org	216-641-6000
Frank Schuschu	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	schuschuf@neorsd.org	216-641-6000
Wolfram von Kiparski	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	vonkiparskiw@neorsd.org	216-641-6000
Amy Erzen	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	erzena@neorsd.org	216-641-6000
Summer Co-op	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	To Be Determined	216-641-6000
Summer Co-op	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	To Be Determined	216-641-6000
Summer Co-op	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	To Be Determined	216-641-6000



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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 <sup>th</sup> St., Cuyahoga Heights, OH 44125	citrigliam@neorsd.org	216-641-6000
Kristen Greenwood	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	greenwoodk@neorsd.org	216-641-6000
Laura Quinones	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	quinonesl@neorsd.org	216-641-6000
Cheryl Soltis-Muth	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	soltismuthc@neorsd.org	216-641-6000
Carol Turner	4747 E. 49 <sup>th</sup> St., Cuyahoga Heights, OH 44125	turnerc@neorsd.org	216-641-6000

\*Analytical Services Project Manager

(10) Level 3 QDC documentation

Documentation of approval of project manager and other personnel as Level 3 QDCs is included as Attachment H.

(11) Contract laboratory contact information

Not applicable.

(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: \_\_\_\_\_

(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: \_\_\_\_\_

Print/Signature: Cathy Zamborsky / Date: \_\_\_\_\_

Print/Signature: Seth Hothem / Date: \_\_\_\_\_

Print/Signature: Kathryn Crestani / Date: \_\_\_\_\_

Print/Signature: Tom Zablotny / Date: \_\_\_\_\_

Print/Signature: Ron Maichle / Date: \_\_\_\_\_

Print/Signature: Benjamin Tedrick / Date: \_\_\_\_\_

Print/Signature: Francisco Rivera / Date: \_\_\_\_\_

Print/Signature: Jillian Novak/ Date: \_\_\_\_\_

Print/Signature: Kristina Granlund/ Date: \_\_\_\_\_

Attachment A

# 2011 Lake Erie Beach Monitoring



	Beach Samples		REGULATOR		INTERCOMMUNITY RELIEF SEWER
	Pump Station		COMBINED		Local Sanitary
	CSO Outfall		Flow Divider		Local Combined
	Rain Gauge		Structure		Local Culverted Stream
	Wastewater Treatment Facility		SSO		Local Force Main
			CSO CONTROL		Local Storm
			CSO RESPONSIBILITY		
			INTERCEPTOR		

This map was compiled by the Northeast Ohio Regional Sewer District. It is based on GIS data provided by the City of Cleveland and the City of Euclid. The map does not constitute a warranty of any kind, expressed or implied, for the accuracy or completeness of the information shown. The user assumes all responsibility for the use of this map. The map is not to be used for any other purpose without the express written consent of the Northeast Ohio Regional Sewer District.

## Attachment B





**Northeast Ohio Regional  
Sewer District**

*Protecting Your Health and Environment*

**Water Quality and Industrial Surveillance**

**4747 East 49<sup>th</sup> Street**

**Cuyahoga Hts., OH 44125**

---

Title

**Beach Sampling**

***SOP-EA0013-00***

***Effective Date:*** \_\_\_\_\_

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Approvals

Prepared By: Eva Hatvani/Jillian Novak

Date:

Reviewed By QA Specialist: Carol Turner

Date:

Approved By Manager: Mark Citriglia

Date:

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**This document is valid only if stamped "Controlled"**





**Water Quality and Industrial Surveillance**

**4747 East 49<sup>th</sup> Street**

**Cuyahoga Hts., OH 44125**

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## 1. Scope and Application

- 1.1. This SOP describes the procedure for the collection of bacteriological 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 the effects of increased wave height. The presence of the bacteria only indicates that other pathogenic bacteria may be present.
- 1.4. The EPA has determined that *E. coli* are one of the best indicator organisms of water quality for freshwater bathing beaches.
- 1.5. *E. coli* densities are compared to the Ohio water quality standards to determine recreation use attainment and beach and bathing water advisories. Beach advisories are based on single sample concentrations of *E. coli* bacteria.
- 1.6. 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 beach advisory 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.

## 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. Life jacket or inflatable safety vest
- 4.1.2. Chest waders
- 4.1.3. Gloves, if desired
- 4.1.4. Throw bag with 50 feet of nylon rope (refer to *Throw Bag SOG*)
- 4.1.5. District cell phone

### 4.2. Sampling Safety Procedures

- 4.2.1. While traveling in the District vehicle, all employees should be familiar with the use of 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 chest waders before entering the water.
- 4.2.7. An inflatable life vest is provided for the sampler.
  - 4.2.7.1. Life vest must be worn if wave height is greater than 2 feet.
  - 4.2.7.2. Use of the life vest during all other lake conditions is at the discretion of the sampler.
- 4.2.8. The sampler must wade out to a water depth of 3 feet 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.
- 4.2.11. Additional safety concerns should be brought to the attention of a WQIS Supervisor or Manager.

## 5. Equipment and Supplies

- 5.1. Sample Bottles
  - 5.1.1. 2000 milliliter sterilized bacteriological bottle
  - 5.1.2. 125 milliliter turbidity bottle
- 5.2. Sample tags and chain of custody sheet
- 5.3. Beach Sampling Field Data Forms for each beach and creek
- 5.4. Field Meters
  - 5.4.1. Omegaette PHH-7200,
  - 5.4.2. Hanna pH EC/TDS,
  - 5.4.3. YSI 650 MDS/600XL Sonde, or
  - 5.4.4. YSI 556
- 5.5. Field Turbidity Meter
  - 5.5.1. Hach 2100P Turbidimeter or
  - 5.5.2. LaMotte 2020 Turbidity Meter
- 5.6. Anemometer
- 5.7. Sampling pole (12 feet) with zip ties
- 5.8. Cooler with ice
- 5.9. Digital camera
- 5.10. GPS, if needed
- 5.11. Wave height stick, marked at inch and foot increments
- 5.12. Ziploc bags
- 5.13. Gloves, if desired
- 5.14. Hand sanitizer

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### 5.15. Equipment needed at Edgewater only

5.15.1. Laptop computer with wireless connection

5.15.2. Water quality advisory sign keys (1C1 key)

5.15.3. Edgewater tote

5.15.3.1. Plastic graduated cylinder (100 milliliter)

5.15.3.2. Deionized water bottle (1 liter)

5.15.3.3. Kimwipes

## 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.

6.1.2. See *SOP 2007* for the calibration of the field turbidity meter.

6.1.3. See *SOP-EA010-00* for the use and calibration of the YSI 600XL Sonde and YSI 556

6.1.4. Refer to manufacturer's operations manual for the proper use and calibration of all other meters.

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. 49<sup>th</sup> Street)

- Take E. 49<sup>th</sup> Street to Harvard Avenue.
- Make a right turn at Harvard Avenue.
- Make a left onto I-77 N.
- Take I-77N to I-90E.
- Take I-90E to Route 2W.
- 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/Euclid Creek (From 4747 E. 49<sup>th</sup> Street)

- Take E. 49<sup>th</sup> Street to Harvard Avenue.
- Make a right turn at Harvard Avenue.

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- Make a left onto I-77 N.
- Take I-77N to I-90E.
- Take I-90E to the Lakeshore Boulevard exit.
- Make a right onto Lakeshore Boulevard
- Follow Lakeshore Boulevard until you see the “Euclid Beach” entrance sign on the left. Turn into the premises (Villa Angela Drive)
- Euclid Creek will be on your right hand side as you enter.
  - Take the bike path on the right hand side and park in the grass at the first bend.
  - RM 0.55 sampling location is approximately 330 feet north of the Lakeshore Boulevard bridge.
  - Continue north on the bike path until the path intersects with Villa Angela Drive and continue to take this road until you go over the foot bridge.
  - Take a left into the grass after you pass the foot bridge and park the truck.
  - Walk down to the RM 0.14 sampling location, which is approximately 30 feet north of the bridge.
- Take the entrance to the bike path right before the foot bridge on Villa Angela Drive.
- Go onto the bike path very slowly; watch out for pedestrians.
- Villa Angela is the first beach on your right. Park on the right hand side in the grass by the entrance that leads you down to the beach.
- Euclid Beach is the second beach on your right. Park in the grass near the picnic tables.

## 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 2 buoys and 3 lifeguard stations at this beach. Count them from left to right.
  - 7.2.3.1. **East Sample** –The East sample is taken in line with the brick stack on the other side of the freeway.
  - 7.2.3.2. **East GPS Location:** 41.489694°N 81.739117°W
  - 7.2.3.3. **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.
  - 7.2.3.4. **West GPS Location:** 41.488853°N 81.740519°W

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- 7.2.4. Villa Angela Beach – There are 4 stone break walls at this beach. Count them left to right.
- 7.2.4.1. **East Sample** – The East sample is taken mid-distance between the 3rd and 4th break walls.
- 7.2.4.2. **East GPS Locations:** 41.586242°N 81.566656°W
- 7.2.4.3. **West Sample** – The West sample is taken at the beginning of the 2nd break wall.
- 7.2.4.4. **West GPS Location:** 41.585467°N 81.567369°W
- 7.2.5. Euclid Beach – There are 2 stone break walls at this beach.
- 7.2.5.1. **East Sample** – The East sample is taken in front of the pile of stones on the east side of the beach.
- 7.2.5.2. **East GPS Location:** 41.584244°N 81.568739°W
- 7.2.5.3. **West Sample** – The West sample is taken between the 2 break walls at the second set of stairs from the structure at Euclid Beach.
- 7.2.5.4. **West GPS Location:** 41.583747°N 81.569478°W
- 7.2.6. Euclid Creek - A sample will be taken from two locations on Euclid Creek.
- 7.2.6.1. **Euclid Creek RM 0.55** – Downstream of Lakeshore Boulevard
- 7.2.6.2. **RM 0.55 GPS Location:** 41.583525°N 81.5595°W
- 7.2.6.3. **Euclid Creek RM 0.14** – 30 feet north of the foot bridge
- 7.2.6.4. **RM 0.14 GPS Location:** 41.585294°N 81.564139°W
- 7.3. Field Analysis/Observations – All Sampling Locations
- 7.3.1. Digital pictures are to be taken prior to any sampling to avoid causing any disturbances of the bird activity.
- 7.3.1.1. Pictures of the east, west, central and overall views of the beach are to be taken, noting the picture number on the Beach Sampling Field Data Form. Additional pictures of beach conditions that could impact the outcome of the testing should be taken as well as noted on the Beach Sampling Field Data Form.
- 7.3.2. The sample tag must be completed at the sampling site with the following information:
- Signature
  - Employee ID
  - Start Time (time of sampling)
- 7.3.3. Field observation notes must be entered onto the Beach Sampling Field Data Form at the sampling site. The form must be filled out completely.

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- 7.3.4. Field parameters must be taken in the water at each sampling location (east and west). Measure pH, conductivity, temperature and turbidity.
- 7.3.5. The sample collected in the 2 L bottle will be used for microbiological tests at the laboratory.
- 7.3.6. Once the field analyses have been performed place the sample into a Ziploc bag and place it into the cooler filled with ice.
- 7.3.7. Record the results from all field analyses.
- 7.3.8. The samples must remain in the cooler until delivered to the Sample Custodian at Analytical Services.
- 7.3.9. After review, the field data is entered into Lablynx. The Beach Sampling Field Data Forms (Appendix C) are uploaded through Lablynx to the NEORSO intranet page. 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. If necessary, take a GPS reading to verify the location.
  - 7.4.3. Wade out to a water depth of approximately 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. Repeat steps 7.4.4. through 7.4.6. to obtain turbidity sample.
  - 7.4.8. Take the maximum and minimum wave height before returning to the shoreline by using the wave stick. This is done by observing the minimum and maximum height of waves for one minute. Record the minimum and maximum wave heights, in inches, on the Beach Sampling Field Data Form. Convert inches to feet for use in the Edgewater NOWCAST model and entry into Lablynx. Perform the following calculation to get the wave height for the model:
   
  

$$\text{Maximum height (in)} + \text{minimum height (in)} = \text{wave height (in)}$$
  - 7.4.9. If you are unable to enter the water because of unsafe conditions, estimate the wave height.

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- 7.4.10. Make an observation of water clarity using the wave height stick. The wave height stick is marked with colored tape at the 1-foot mark and at the 2-foot mark.
- 7.4.10.1. Water clarity is “clear” if you can see the bottom sediment.
  - 7.4.10.2. Water clarity is “low” if you can only see the tape at the 1-foot mark, but not the bottom sediment.
  - 7.4.10.3. Water clarity is “medium” if you can only see the tape at the 2-foot mark, but not the 1-foot mark or bottom sediment.
  - 7.4.10.4. Water clarity is “high” if you cannot see either marked tape or bottom sediment.
- 7.4.11. The bottles are placed in a Ziploc bag and placed into the cooler containing ice.
- 7.4.12. Repeat Section 7.4 to collect samples at other site.
- 7.5. Sample Collection During Inclement Weather
- 7.5.1. Locate the sampling location by the markers on the beach.
  - 7.5.2. If necessary, take a GPS reading to verify the location.
  - 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 zip ties.
  - 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.
  - 7.5.8. Repeat steps 7.5.4. through 7.5.7. to obtain turbidity sample.
  - 7.5.9. Return to the shoreline, tag the samples and place the samples in a Ziploc bag and into the cooler.
  - 7.5.10. Fill in Beach Sampling Field Data Form completely and indicate that the sampling pole was used.
- 7.6. Turbidity Analysis
- 7.6.1. Turbidity analysis is to be performed in field for all beach sites. Analyze both the east and west sample for turbidity. *See current version of SOP 2007.*
    - 7.6.1.1. Each beach site is run for turbidity twice and the values are averaged for a final turbidity result.



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## 8. Data Handling and Review

- 8.1. The Project Leader will review all beach observation sheets 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 WQIS Supervisor.
- 8.4. At all beach sites, the sampler must enter the field measurements into Lablynx upon returning to the lab.
- 8.5. If the turbidity is not measured in the field due to meter malfunction, the turbidity analysis must be completed within 1 hour of returning to EMSC (notify Project Leader or WQIS Supervisor if this occurs)

## 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.

## 10. References

- 10.1. USEPA National Beach Guidance and Performance Criteria for Recreational Waters (EPA-823-B-02-004). (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 (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

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## 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)
- 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)

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- 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)
- 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)

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- 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)
- 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)

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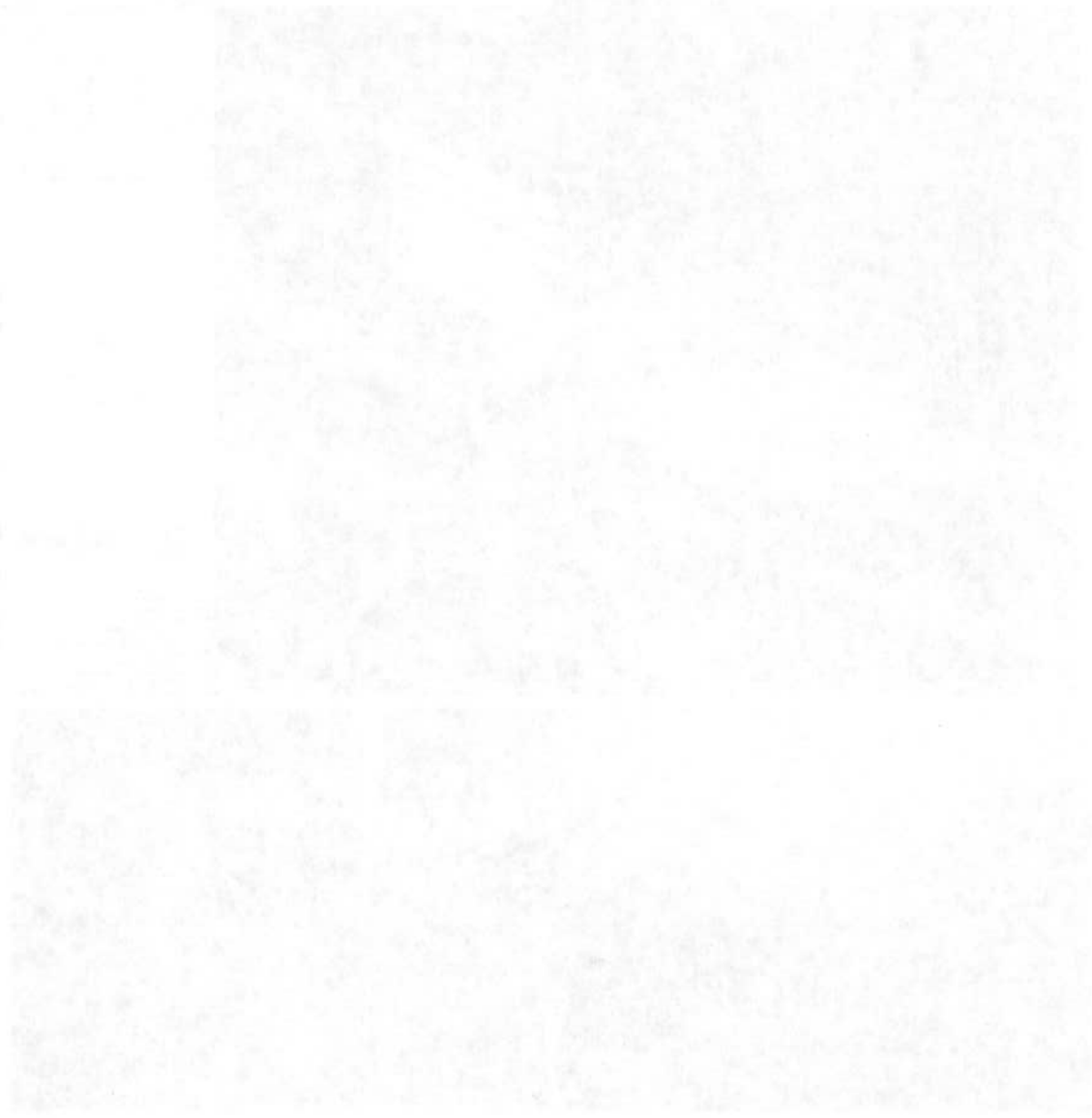
- 11.65. Re-lettered “NOWCASTING Protocol for Edgewater Beach” to Appendix D (J. Novak 2/17/2010)
- 11.66. Removed “Obtain Lake Level Data” from Appendix D, NOWCASTING Protocol for Edgewater Beach (J. Novak 2/17/2010)
- 11.67. Added “Update NEORS D Website” to Appendix D, NOWCASTING Protocol for Edgewater Beach” (J. Novak 2/17/2010)
- 11.68. Added “if desired” to 4.1.4. (J. Novak 12/29/10)
- 11.69. Added 4.2.7.1 and 4.2.7.2. (J. Novak 12/29/10)
- 11.70. Removed “sterilized 500ml or 1000ml bottle” and added 5.1.1. and 5.1.2. (J. Novak 12/29/10)
- 11.71. Added “YSI 600XL Sonde” and “YSI 556” to 5.4. (J. Novak 12/29/10)
- 11.72. Removed “pull ties and rubber bands” from 5.6. and added “zip ties”. (J. Novak 12/29/10)
- 11.73. Added “if needed” to 5.9. (J. Novak 12/29/10)
- 11.74. Removed “sample collection” from 5.12. (J. Novak 12/29/10)
- 11.75. Added “if desired” to 5.17. (J. Novak 12/29/10)
- 11.76. Changed GPS location at all beach sites to decimal degrees. (J. Novak 12/29/10)
- 11.77. “Removed “0.5 location” from 7.2.6.1. and added “RM 0.55”. (J. Novak 12/29/10)
- 11.78. Added “RM 0.14” to 7.2.6.3. (J. Novak 12/29/10)
- 11.79. Removed 7.3.1. and 7.3.10. (J. Novak 12/29/10)
- 11.80. Added “if necessary” to 7.4.2. and 7.5.2. and removed “record the coordinates on the field observation sheet”. (J. Novak 12/29/10)
- 11.81. Replaced “at least” with “approximately” in 7.4.3. (J. Novak 12/29/10)
- 11.82. Added 7.4.8. (J. Novak 12/29/10)
- 11.83. Changed “-“ to “+” in 7.4.9. for wave height calculation. (J. Novak 12/29/10)
- 11.84. Reworded 7.4.11.1.-7.4.11.4. (J. Novak 12/29/10)
- 11.85. Changed 7.6. to “Turbidity Analysis”. (J. Novak 12/29/10)
- 11.86. Removed 7.6.1. (J. Novak 12/29/10)
- 11.87. Added that turbidity is to be done in the field for all beach sites in 7.6. (J. Novak 12/29/10)
- 11.88. Removed “tags and beach logs” in 8.1. and added “beach observation sheets”. (J. Novak 12/29/10)
- 11.89. Added “notify Project Leader or WQIS Supervisor if this occurs” to 8.5. (J. Novak 12/29/10)
- 11.90. Added current beach observation sheet to Appendix C. (J. Novak 12/29/10)
- 11.91. Changed 1.A. to “SOP-EA0013-00” in Appendix D. (J. Novak 12/29/10)

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- 11.92. Added 5.B.: “use the average of the east and west turbidity values” in Appendix D. (J. Novak 12/29/10)
- 11.93. Removed “and rainfall” from 6.F. in Appendix D. (J. Novak 12/29/10)
- 11.94. Removed “field parameters” from 7.3.3. (J. Novak 12/29/10)
- 11.95. Removed 8.4. (J. Novak 12/29/10)
- 11.96. Removed “other” from 8.5. (J. Novak 12/29/10)
- 11.97. Added “*E. coli* densities are compared to the Ohio water quality standards to determine recreation use attainment” to 1.5 (J. Novak 1/18/11).
- 11.98. Added “See *SOP-EA010-00* for the use and calibration of the YSI 600XL Sonde and YSI 556” and “Refer to manufacturer’s operations manual for the proper use and calibration of other meters” to 6.0. (J. Novak 1/18/11)
- 11.99. Added “bacteriological” to 1.1. (J. Novak 1/21/11)
- 11.100. Added Section 1.5. (J. Novak 1/21/11)
- 11.101. Added “the effects of increased” to Section 1.3. (J. Novak 1/21/11)
- 11.102. Added 4.2.11 “Additional safety concerns should be brought to the attention of a WQIS Supervisor or Manager.” (J. Novak 1/21/11)
- 11.103. Added Omegaette PHH-7200 to list of equipment in Section 5. (J. Novak 1/21/11)
- 11.104. Added LaMotte 2020 turbidity meter to list of equipment in Section 5 (J. Novak 1/21/11)
- 11.105. Removed “bench turbidity meter and” from Section 6.1.2. (J. Novak 1/21/11)
- 11.106. Added Section 6.1.4. “Refer to manufacturer’s operations manual for the proper use and calibration of all other meters.” (J. Novak 1/21/11)
- 11.107. Removed “Collect the second sample for field analysis by repeating steps 7.4.1. through 7.4.6. from Section 7. (J. Novak 1/21/11)
- 11.108. Replaced “measuring stick” with “wave stick” in Section 7.4.9. (J. Novak 1/21/11)
- 11.109. Removed wave height categories from Section 7.4.10. (J. Novak 1/21/11)
- 11.110. Added Section 7.4.13. “Repeat Section 7.4 to collect samples at other site.” (J. Novak 1/21/11)
- 11.111. Added Section 7.5.10. “Fill in Beach Sampling Field Data Form completely and indicate that the sampling pole was used.” (J. Novak 1/21/11)
- 11.112. Replaced “analyst” with “sampler” in Section 8.4. (J. Novak 1/21/11)
- 11.113. Added directions to Euclid Creek in Section 7. (J. Novak 1/26/11)
- 11.114. Added “Villa Angela is the first beach on your right. Park on the right hand side in the grass by the entrance that leads you down to the beach.

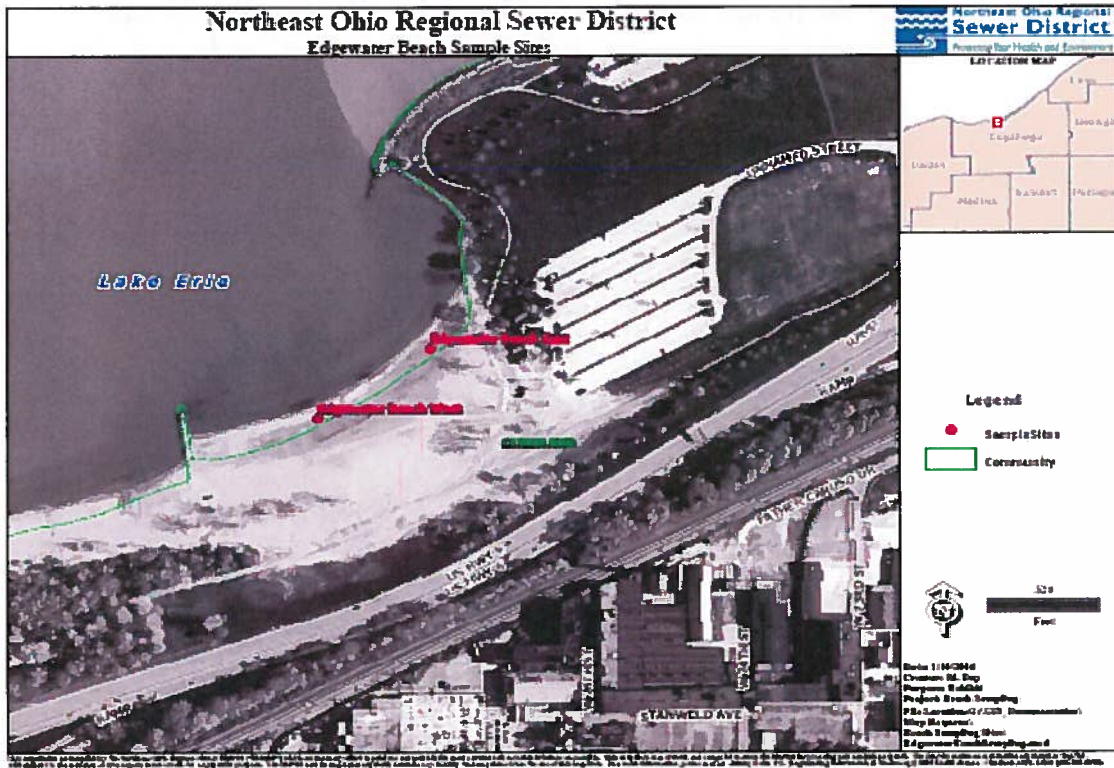
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Euclid Beach is the second beach on your right. Park in the grass near the picnic tables” to Section 7.1.2. (J. Novak 1/26/11)





## APPENDIX A – EDGEWATER BEACH SAMPLING SITES



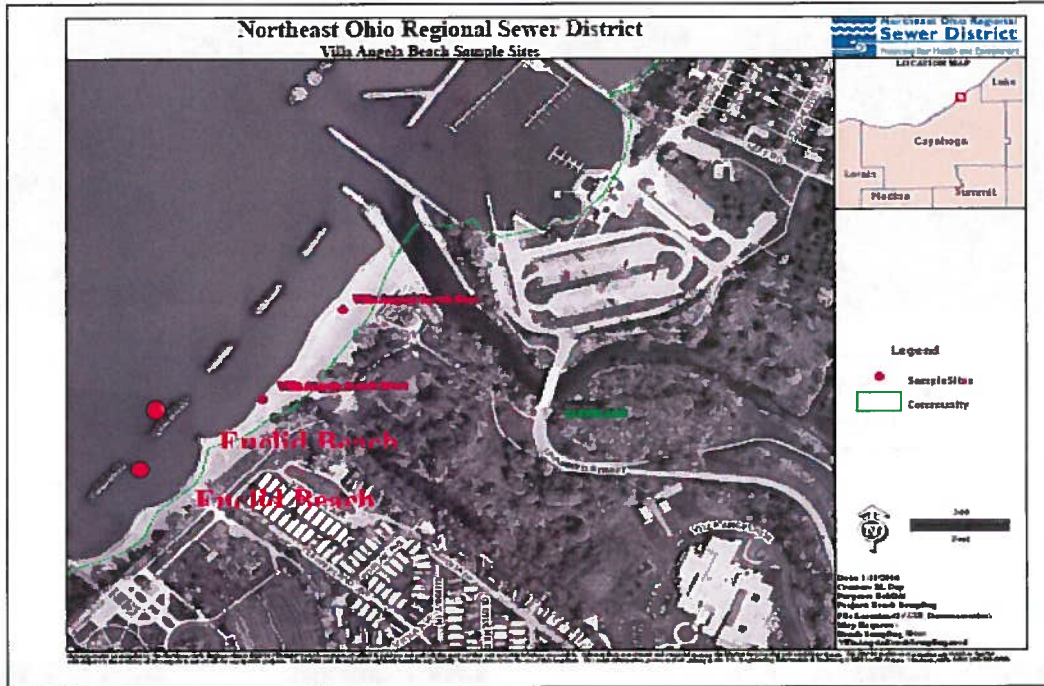
**EAST SAMPLE SITE**  
Brick stack on other side of freeway



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



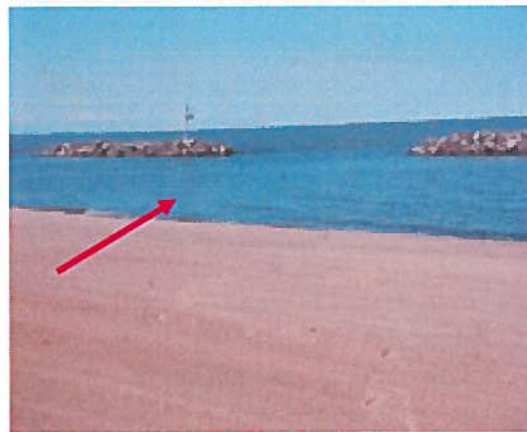
## APPENDIX B – VILLA ANGELA BEACH, EUCLID BEACH, & EUCLID CREEK SAMPLING SITES



### Villa Angela Sample Sites



**EAST SAMPLE SITE**  
Mid-distance between 3<sup>rd</sup> and 4<sup>th</sup>  
break walls



**WEST SAMPLE SITE**  
Beginning of 2<sup>nd</sup> break wall

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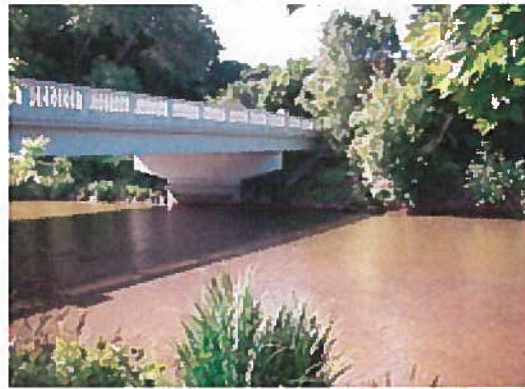
### Euclid Beach Sample Sites



**EAST SAMPLE SITE**  
Pile of stones

**WEST SAMPLE SITE**  
Midway between 1<sup>st</sup> and 2<sup>nd</sup>  
breakwalls

### Euclid Creek Sample Sites



**EUCLID CREEK RM 0.55**  
Downstream of Lakeshore  
Boulevard

**EUCLID CREEK RM 0.14**  
30 feet north of the foot bridge

## APPENDIX C- Beach Observation Sheet

### NEORS D Beach Sampling Field Data Form

Location: \_\_\_\_\_ Date: \_\_\_\_\_ Collectors: \_\_\_\_\_

**Weather:** Clear Partly Cloudy Overcast Light Rain/Showers Heavy Rain  
Steady Rain Heavy Snow Melt Other: \_\_\_\_\_

Wind Direction: \_\_\_\_\_ Wind Speed Max: \_\_\_\_\_ Average: \_\_\_\_\_

Was this sample taken during or following a wet weather event? YES / NO

**Pictures:** Overall: \_\_\_\_\_ Central: \_\_\_\_\_ West: \_\_\_\_\_ East: \_\_\_\_\_

Water Quality Meters Used: \_\_\_\_\_ Total Number of Swimmers: \_\_\_\_\_

Time (hrs): \_\_\_\_\_ 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: \_\_\_\_\_

Algae: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Debris: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Fecal Material: 1. None 2. Sparse 3. Some 4. Some Multiple Areas 5. All Along Shoreline

**Lake Surface Condition:** Calm Ripples Moderate Waves Whitecaps Other: \_\_\_\_\_

**Field Parameters:** Conductivity (µmhos/cm): \_\_\_\_\_ Temperature (°C): \_\_\_\_\_

Turbidity (NTU): 1) \_\_\_\_\_ 2) \_\_\_\_\_ Avg. Turbidity: \_\_\_\_\_ pH (s.u.): \_\_\_\_\_

**Wave Height (Inches):** Max (+): \_\_\_\_\_ Min (-): \_\_\_\_\_ Total: \_\_\_\_\_

Other-  
**Number of Birds:** Geese: \_\_\_\_\_ Gulls: \_\_\_\_\_ Other: \_\_\_\_\_ Total: \_\_\_\_\_

**General Comments:** \_\_\_\_\_

---

Time (hrs): \_\_\_\_\_ 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: \_\_\_\_\_

Algae: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Debris: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Fecal Material: 1. None 2. Sparse 3. Some 4. Some Multiple Areas 5. All Along Shoreline

**Lake Surface Condition:** Calm Ripples Moderate Waves Whitecaps Other: \_\_\_\_\_

**Field Parameters:** Conductivity (µmhos/cm): \_\_\_\_\_ Temperature (°C): \_\_\_\_\_

Turbidity (NTU): 1) \_\_\_\_\_ 2) \_\_\_\_\_ Avg. Turbidity: \_\_\_\_\_ pH (s.u.): \_\_\_\_\_

**Wave Height (Inches):** Max (+): \_\_\_\_\_ Min (-): \_\_\_\_\_ Total: \_\_\_\_\_

Other-  
**Number of Birds:** Geese: \_\_\_\_\_ Gulls: \_\_\_\_\_ Other: \_\_\_\_\_ Total: \_\_\_\_\_

**General Comments:** \_\_\_\_\_

---

**Edgewater Model Parameters:**

Avg. of East & West Turbidity (NTU): \_\_\_\_\_ East Site Temperature (°F): \_\_\_\_\_

Avg. Wave Height (feet): \_\_\_\_\_ or Backup Estimated Average Wave Height: \_\_\_\_\_

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 1-June 15 ≥ 27%; June 16- Aug 10 ≥ 28%; Aug 11-Sep 15 ≥ 31%) NOWCAST: GOOD / POOR

(Heights Rainfall - May 1 - Sep 15 ≥ 30%) BEACH POSTED? GOOD / POOR

Modified May 3, 2010

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## APPENDIX D - NOWCASTING PROTOCOL FOR EDGEWATER BEACH

### NOWCASTING PROTOCOL FOR EDGEWATER BEACH – 2010

1. Collect all beach data
  - A. Use Beach Sampling *SOP—EA0013-00*.
  
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 Beach Sampling Field Data Form.
  - 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 Beach Sampling Field Data Form.
  
4. Wave Height
  - A. Convert wave height to feet.
  - B. If wave height cannot be determined using measuring stick, estimate wave height.
    - i. Check ***backup*** box on Beach Sampling Field Data Form.
  
5. Obtain turbidity data
  - A. Follow the most current Turbidity SOP.

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B. Use the average of east and west turbidity values.

6. Run model

- A. Open **Edgewater Beach Folder** on laptop desktop.
- B. Open **Edgewater Model 2011**.
- C. Enter model parameters from the Beach Sampling Field Data Form.
- 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 the Beach Sampling Field Data Form.
- F. Based on probability percentage and season, 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 of page.
- E. Enter in login information:
  - Username: neorsd
  - Password: mark2011
- F. Click **Add Record**.
- G. Enter data
  - i. Use collection time from the east sample.
  - ii. Enter in field parameters (convert water temperature to °F).
  - iii. Enter the predicted *E. coli* density in the *E. coli* box.
  - 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.



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- B. Double-click the NEORSD link.  
([http://www.neorsd.org/beach\\_chk.php](http://www.neorsd.org/beach_chk.php))
- C. Enter your NEORSD personal login information.
- D. Double-click NEORSD link in the **Edgewater Beach Folder** again.  
([http://www.neorsd.org/beach\\_chk.php](http://www.neorsd.org/beach_chk.php))
- E. Check appropriate water quality box (*Good* or *Poor*) and click **Submit**.
- F. Return to NEORSD homepage to review your submission.

9. Update NOWCAST Information Line (must be done at Edgewater Beach, after NOWCAST website is updated and after NOWCAST prediction for Huntington is posted)

- A. From cell phone
  - i. Call **216-881-6600**.
  - ii. Ask for extension **6890**.
  - iii. Dial **6003** and press #.
  - iv. Enter password **13580** and press #.
  - v. Press **3** to administer a new greeting.
  - vi. Press **3** again to activate a new greeting.
  - vii. Enter one of the numbered options (**1-7**) to change the greeting for the day (see below).
- B. From an EMSC phone
  - i. Press **Audix/Voicemail** button on phone (or dial **6890**).
  - ii. Dial **6003** and press #.
  - iii. Enter password **13580** and press #.
  - iv. Press **3** to administer new greeting.
  - v. Press **3** to activate new greeting.
  - vi. Enter one of the numbered options (**1-7**) to change the greeting for the day (see below).

Option Selection Number	Edgewater Conditions	Huntington Conditions	Message Text (see below)
1	Good	Good	A
2	Good	Poor	B
3	Poor	Good	C
4	Poor	Poor	D
5	Good	Not Available	E
6	Not Available	Not Available	F
7	Record special message for the day		G

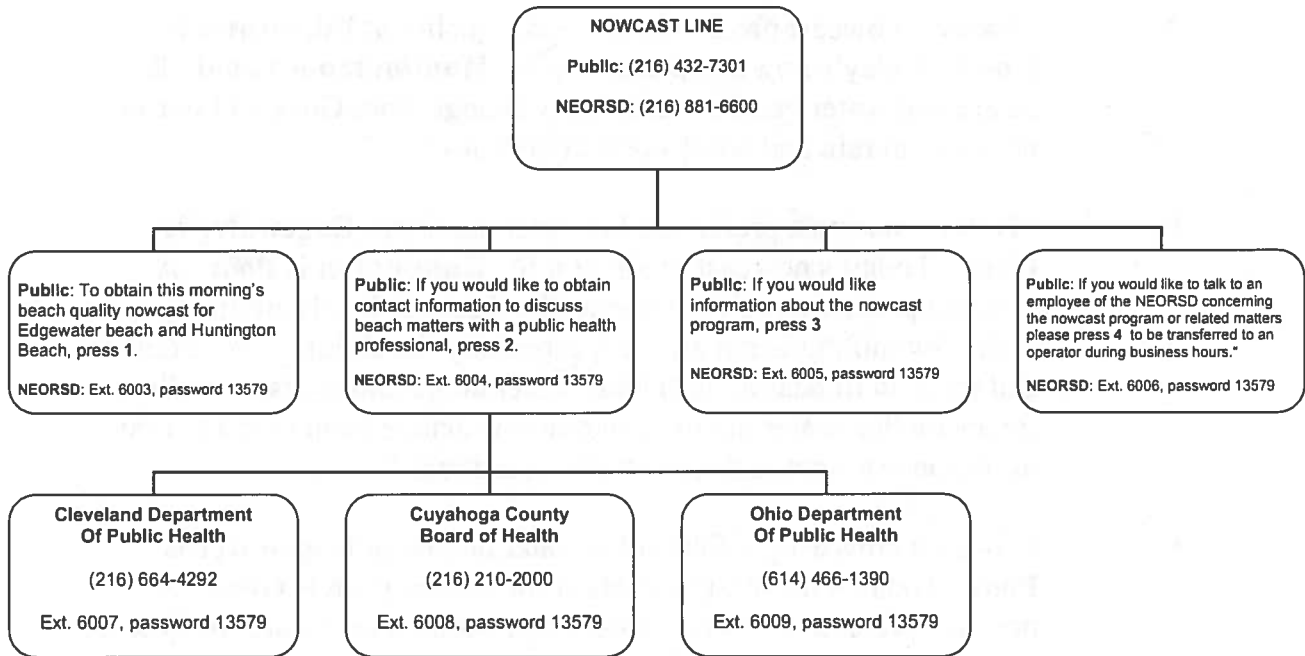
Note: If greeting is same as previous day, message does not need to be updated.

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**Message Text (what caller will hear):**

- A** “Today’s nowcast prediction for water quality at **Edgewater is Good**. Today’s nowcast prediction for **Huntington is Good**. Be aware that water quality can quickly change from Good to Poor in response to rain and wind storm conditions.”
- B** “Today’s nowcast prediction for water quality at **Edgewater is Good**. Today’s nowcast prediction for **Huntington is Poor**. A nowcast prediction of Poor means that bacteria levels are likely to be high. Swimming is not advised, especially for children, the elderly and those in ill health. Full body water contact may result in illness. Be aware that water quality can quickly change from Good to Poor in response to rain and wind storm conditions.”
- C** “Today’s nowcast prediction for water quality at **Edgewater is Poor**. Today’s nowcast prediction for **Huntington is Good**. A nowcast prediction of Poor means that bacteria levels are likely to be high. Swimming is not advised, especially for children, the elderly and those in ill health. Full body water contact may result in illness. Be aware that water quality can quickly change from Good to Poor in response to rain and wind storm conditions.”
- D** “Today’s nowcast prediction for water quality at **Edgewater is Poor**. Today’s nowcast prediction for **Huntington is Poor**. A nowcast prediction of Poor means that bacteria levels are likely to be high. Swimming is not advised, especially for children, the elderly and those in ill health. Full body water contact may result in illness.”
- E** “Today’s nowcast prediction for water quality at **Edgewater is Good**. There is **no prediction available for Huntington Beach**. Be aware that water quality can quickly change from Good to Poor in response to rain and wind storm conditions.”
- F** “Due to technical problems, we are unable to provide nowcast services today.”
- G** This option would allow for the creation (recording) of a special message for unusual circumstances.

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## Attachment C

## NEORSD Edgewater Beach Sampling Field Data Form

Location: \_\_\_\_\_ Date: \_\_\_\_\_ Collectors: \_\_\_\_\_

**Weather:** Clear Partly Cloudy Overcast Light Rain/Showers Heavy Rain  
Steady Rain Heavy Snow Melt Other: \_\_\_\_\_

Wind Direction: \_\_\_\_\_ Wind Speed Max: \_\_\_\_\_ Average: \_\_\_\_\_

Was this sample taken during or following a wet weather event? YES / NO

**Pictures:** Overall: \_\_\_\_\_ Central: \_\_\_\_\_ West: \_\_\_\_\_ East: \_\_\_\_\_

Water Quality Meters Used: \_\_\_\_\_ Total Number of Swimmers: \_\_\_\_\_

Time (hrs): \_\_\_\_\_ 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: \_\_\_\_\_

Algae: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Debris: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Fecal Material: 1. None 2. Sparse 3. Some 4. Some Multiple Areas 5. All Along Shoreline

**Lake Surface Condition:** Calm Ripples Moderate Waves Whitecaps Other: \_\_\_\_\_

**Field Parameters:** Conductivity ( $\mu\text{mhos/cm}$ ): \_\_\_\_\_ Temperature ( $^{\circ}\text{C}$ ): \_\_\_\_\_

Turbidity (NTU): 1) \_\_\_\_\_ 2) \_\_\_\_\_ Avg. Turbidity: \_\_\_\_\_ pH (s.u.): \_\_\_\_\_

**Wave Height (inches):** Max (+): \_\_\_\_\_ Min (-): \_\_\_\_\_ Total: \_\_\_\_\_

**Other-**

**Number of Birds:** Geese: \_\_\_\_\_ Gulls: \_\_\_\_\_ Other: \_\_\_\_\_ Total: \_\_\_\_\_

**General Comments:** \_\_\_\_\_

Sample ID: (Label Here)

Sample ID:

Time (hrs): \_\_\_\_\_ 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: \_\_\_\_\_

Algae: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Debris: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Fecal Material: 1. None 2. Sparse 3. Some 4. Some Multiple Areas 5. All Along Shoreline

**Lake Surface Condition:** Calm Ripples Moderate Waves Whitecaps Other: \_\_\_\_\_

**Field Parameters:** Conductivity ( $\mu\text{mhos/cm}$ ): \_\_\_\_\_ Temperature ( $^{\circ}\text{C}$ ): \_\_\_\_\_

Turbidity (NTU): 1) \_\_\_\_\_ 2) \_\_\_\_\_ Avg. Turbidity: \_\_\_\_\_ pH (s.u.): \_\_\_\_\_

**Wave Height (inches):** Max (+): \_\_\_\_\_ Min (-): \_\_\_\_\_ Total: \_\_\_\_\_

**Other-**

**Number of Birds:** Geese: \_\_\_\_\_ Gulls: \_\_\_\_\_ Other: \_\_\_\_\_ Total: \_\_\_\_\_

**General Comments:** \_\_\_\_\_

Sample ID: (Label Here)

Sample ID:

**Edgewater Model Parameters:**

Avg. of East & West Turbidity (NTU): \_\_\_\_\_ East Site Temperature ( $^{\circ}\text{F}$ ): \_\_\_\_\_

Avg. Wave Height (feet): \_\_\_\_\_ or Backup Estimated Average Wave Height: \_\_\_\_\_

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 1-June 15  $\geq$  27%; June 16-Aug 10  $\geq$  28%; Aug 11-Sep 15  $\geq$  31%)

NOWCAST: GOOD / POOR

(Hopkins Rainfall - May 1-Sep 15  $\geq$  30%)

BEACH POSTED? GOOD / POOR

**NEORS D Villa/Euclid Beach Sampling Field Data Form**

Location: \_\_\_\_\_ Date: \_\_\_\_\_ Collectors: \_\_\_\_\_

**Weather:** Clear Partly Cloudy Overcast Light Rain/Showers Heavy Rain  
Steady Rain Heavy Snow Melt Other: \_\_\_\_\_

Wind Direction: \_\_\_\_\_ Wind Speed Max: \_\_\_\_\_ Average: \_\_\_\_\_

Was this sample taken during or following a wet weather event? YES / NO

**Pictures:** Overall: \_\_\_\_\_ Central: \_\_\_\_\_ West: \_\_\_\_\_ East: \_\_\_\_\_

Water Quality Meters Used: \_\_\_\_\_ Total Number of Swimmers: \_\_\_\_\_

Time (hrs): \_\_\_\_\_ 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: \_\_\_\_\_

Algae: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Debris: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Fecal Material: 1. None 2. Sparse 3. Some 4. Some Multiple Areas 5. All Along Shoreline

**Lake Surface Condition:** Calm Ripples Moderate Waves Whitecaps Other: \_\_\_\_\_

**Field Parameters:** Conductivity ( $\mu$ mhos/cm): \_\_\_\_\_ Temperature ( $^{\circ}$ C): \_\_\_\_\_

Turbidity (NTU): 1) \_\_\_\_\_ 2) \_\_\_\_\_ Avg. Turbidity: \_\_\_\_\_ pH (s.u.): \_\_\_\_\_

**Wave Height (inches):** Max (+): \_\_\_\_\_ Min (-): \_\_\_\_\_ Total: \_\_\_\_\_

**Other-**

**Number of Birds:** Geese: \_\_\_\_\_ Gulls: \_\_\_\_\_ Other: \_\_\_\_\_ Total: \_\_\_\_\_

**Sand Erosion Factor (ft):** \_\_\_\_\_ **Sand Moisture (%H<sub>2</sub>O):** \_\_\_\_\_

**Long Shore Current Velocity (ft/sec):** \_\_\_\_\_ (divide seconds by 32.8ft)

**General Comments:** \_\_\_\_\_

(Label Here)

Sample ID:

(Label Here)

Sample ID:

Time (hrs): \_\_\_\_\_ 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: \_\_\_\_\_

Algae: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Debris: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers

Fecal Material: 1. None 2. Sparse 3. Some 4. Some Multiple Areas 5. All Along Shoreline

**Lake Surface Condition:** Calm Ripples Moderate Waves Whitecaps Other: \_\_\_\_\_

**Field Parameters:** Conductivity ( $\mu$ mhos/cm): \_\_\_\_\_ Temperature ( $^{\circ}$ C): \_\_\_\_\_

Turbidity (NTU): 1) \_\_\_\_\_ 2) \_\_\_\_\_ Avg. Turbidity: \_\_\_\_\_ pH (s.u.): \_\_\_\_\_

**Wave Height (inches):** Max (+): \_\_\_\_\_ Min (-): \_\_\_\_\_ Total: \_\_\_\_\_

**Other-**

**Number of Birds:** Geese: \_\_\_\_\_ Gulls: \_\_\_\_\_ Other: \_\_\_\_\_ Total: \_\_\_\_\_

**Sand Erosion Factor (ft):** \_\_\_\_\_ **Sand Moisture (%H<sub>2</sub>O):** \_\_\_\_\_

**Long Shore Current Velocity (ft/sec):** \_\_\_\_\_ (divide seconds by 32.8ft)

**General Comments:** \_\_\_\_\_

**Additional Comments:** \_\_\_\_\_

## NEORSD Euclid Creek 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:** RM 0.14: \_\_\_\_\_ RM 0.55: \_\_\_\_\_

Water Quality Meters Used: \_\_\_\_\_ Total Number of Swimmers: \_\_\_\_\_

Time (hrs): \_\_\_\_\_ Site: \_\_\_\_\_

Label Here)

**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: \_\_\_\_\_  
 Algae: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers  
 Debris: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers  
 Fecal Material: 1. None 2. Sparse 3. Some 4. Some Multiple Areas 5. All Along Shoreline

**Field Parameters:** Conductivity ( $\mu\text{mhos/cm}$ ): \_\_\_\_\_ Temperature ( $^{\circ}\text{C}$ ): \_\_\_\_\_  
 Turbidity (NTU): 1) \_\_\_\_\_ 2) \_\_\_\_\_ Avg. Turbidity: \_\_\_\_\_ pH (s.u.): \_\_\_\_\_

Sample ID:

**Other-**

**Number of Birds:** Geese: \_\_\_\_\_ Gulls: \_\_\_\_\_ Other: \_\_\_\_\_ Total: \_\_\_\_\_

**General Comments:** \_\_\_\_\_

Time (hrs): \_\_\_\_\_ Site: \_\_\_\_\_

**Water-**

Label Here)

**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: \_\_\_\_\_  
 Algae: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers  
 Debris: 1. None 2. Some 3. Visible Floating 4. Thick Layer 5. Multiple Thick Layers  
 Fecal Material: 1. None 2. Sparse 3. Some 4. Some Multiple Areas 5. All Along Shoreline

**Field Parameters:** Conductivity ( $\mu\text{mhos/cm}$ ): \_\_\_\_\_ Temperature ( $^{\circ}\text{C}$ ): \_\_\_\_\_  
 Turbidity (NTU): 1) \_\_\_\_\_ 2) \_\_\_\_\_ Avg. Turbidity: \_\_\_\_\_ pH (s.u.): \_\_\_\_\_

Sample ID:

**Other-**

**Number of Birds:** Geese: \_\_\_\_\_ Gulls: \_\_\_\_\_ Other: \_\_\_\_\_ Total: \_\_\_\_\_

**General Comments:** \_\_\_\_\_

**Additional Comments:** \_\_\_\_\_

Parameter	Test	Minimum Detection Limit	Practical Quantitation Limit
NH3*	EPA 350.1	0.002 mg/L	0.010 mg/L
NO2 + NO3	EPA 353.2	0.001 mg/L	0.010 mg/L
Ortho-P	EPA 365.1	0.003 mg/L	0.010 mg/L
Total-P	EPA 365.1	0.002 mg/L	0.010 mg/L
Chlorophyll <i>a</i>	EPA 445.0	To be determined	2.0 µg/L
TS	SM 2540 B	0.5 mg/L	1.0 mg/L
TSS	SM 2540 D	0.5 mg/L	1.0 mg/L
TDS	SM 2540 C	0.5 mg/L	1.0 mg/L
<i>E. coli</i>	EPA 9213D	1 colony	
Field Parameter	Test	(Value Reported in)	
pH	SM 4500H-B	s.u.	
Conductivity	SM 2510A	µs/cm	
Temperature	SM 2550B	°C	
Turbidity	EPA 180.1	NTU	

\*NOTE: Listed MDL/PQL is for undistilled samples. When the MUR goes into place, more than likely we will have to distill everything. Distilled MDL = 0.044 mg/L, PQL = 0.100 mg/L



Attachment D

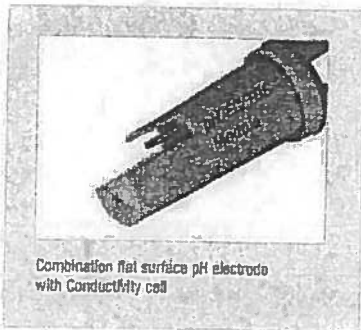


## Waterproof ExStik® II pH/Conductivity Meter

✓ **Combination rugged Flat Surface pH electrode**  
Innovative design with flat surface technology for quick on-the-spot  
pH measurements combined with autoranging high accuracy Conductivity cell

### Features:

- Measures 5 parameters including Conductivity, TDS, Salinity, pH, and Temperature using one electrode
- 9 units of measure: pH,  $\mu\text{S}/\text{cm}$ ,  $\text{mS}/\text{cm}$ , ppm, ppt,  $\text{mg}/\text{L}$ ,  $\text{g}/\text{L}$ ,  $^{\circ}\text{C}$ ,  $^{\circ}\text{F}$
- Analog bargraph indicates trends
- Memory stores up to 25 labeled readings
- Adjustable Conductivity to TDS ratio from 0.4 to 1.0; 0.5 fixed Salinity ratio
- RENEW feature alerts user when electrode needs replacement
- Auto power off and low battery indicator
- Waterproof to IP57
- EC500 meter Includes electrode, protective sensor cap, sample cup with cap, four 3V CR-2032 batteries, and 48" (1.2m) neckstrap.
- Order Conductivity standards and pH buffers separately
- EC510 Kit includes EC500,  $84\mu\text{S}/\text{cm}$ ,  $1413\mu\text{S}/\text{cm}$ ,  $12880\mu\text{S}/\text{cm}$  Conductivity calibration standards, pH buffer pouches (1 each of 4, 7, 10pH plus rinse solution), weighted base, 3 sample cups with caps, and case — \$19 Savings



Combination flat surface pH electrode with Conductivity cell

### Ordering Information:

- EC500 ..... Waterproof ExStik® II pH/Conductivity Meter
- EC510 ..... Waterproof ExStik® II pH/Conductivity Meter Kit
- EC505 ..... Spare ExStik® II pH/Conductivity cell module for EC500
- EC-84-P .....  $84\mu\text{S}$  Conductivity Standard (2 bottles - 1 pint each)
- EC-1413-P .....  $1413\mu\text{S}$  Conductivity Standard (2 bottles - 1 pint each)
- EC-12880-P .....  $12880\mu\text{S}$  Conductivity Standard (2 bottles - 1 pint each)
- PH4-P ..... pH 4 Buffer Solution (2 bottles - 1 pint each)
- PH7-P ..... pH 7 Buffer Solution (2 bottles - 1 pint each)
- PH10-P ..... pH 10 Buffer Solution (2 bottles - 1 pint each)

Specifications	Range	Max. Resolution	Basic Accuracy
Conductivity	0 to $1999\mu\text{S}/\text{cm}$ , 200 to $1999\mu\text{S}/\text{cm}$ , 2.00 to $19.99\text{mS}/\text{cm}$	$0.1\mu\text{S}/\text{cm}$	$\pm 2\% \text{FS}$
TDS/Salinity	0 to $99.9\text{ppm}$ ( $\text{mg}/\text{L}$ ), $100-999\text{ppm}$ ( $\text{mg}/\text{L}$ ) 1.00 to $9.99\text{ppt}$	$0.1\text{ppm}$ ( $\text{mg}/\text{L}$ )	$\pm 2\% \text{FS}$
pH	0.00 to 14.00pH	0.01pH	$\pm 0.01\text{pH}$
Temperature	$23^{\circ}$ to $194^{\circ}\text{F}$ ( $-5^{\circ}$ to $90^{\circ}\text{C}$ )	$0.1^{\circ}\text{F}/^{\circ}\text{C}$	$\pm 1.8^{\circ}\text{F}/1^{\circ}\text{C}$
Waterproof	IP57		
Memory	25 datasets		
Dimensions	1.4 x 7.3 x 1.6" (36 x 186 x 41mm)		
Weight	3.6oz (110g)		





## Products By Category

Chemical Test Kits  
 pH Meters  
 pH/ORP Meters  
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 Conductivity/TDS  
 Digital Refractometers  
 Dissolved Oxygen  
 Multiparameter  
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 Titration Systems  
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 Photometers  
 Turbidity  
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 Titrator

Home > pH/ORP/ISE > pH Testers

1



### HI 98129 Combo pH/EC/TDS/Temperature Tester with Low Range EC

[Click to Buy](#)    [Get a Quote](#)

The HI 98129 Combo waterproof tester offer high accuracy pH, EC/TDS and temperature measurements in a single tester! No more switching between meters for your routine measurements. The waterproof Combo (it even floats) has a large easy-to-read, dual-level LCD and automatic shut-off. pH and EC/TDS readings are automatically compensated for the effects of temperature (ATC). This technologically advanced tester has a replaceable pH electrode cartridge with an extendable cloth junction as well as an EC/TDS graphite electrode that resists contamination by salts and other substances. This gives these meters a greatly extended life. Your tester no longer needs to be thrown away when the pH sensor is exhausted.

The EC/TDS conversion factor is user selectable as is the temperature compensation coefficient (B). Fast, efficient, accurate and portable, the Combo pH, EC/TDS and temperature tester brings you all the features you've asked for and more!

#### Order Information:

HI 98129 is supplied with protective cap, electrode removal tool, batteries and instructions.

Specifications	Accessories	Downloads
Range	pH	0.00 to 14.00 pH
Range	EC	0 to 3999 $\mu$ S/cm
Range	TDS	0 to 2000 ppm
Range	Temperature	0.0 to 60.0°C / 32 to 140.0°F
Resolution	pH	0.01 pH
Resolution	EC	1 $\mu$ S/cm
Resolution	TDS	1 ppm
Resolution	Temperature	0.1°C / 0.1°F
Accuracy	pH	$\pm$ 0.05 pH
Accuracy	EC/TDS	$\pm$ 2% F.S.
Accuracy	Temperature	$\pm$ 0.5°C / $\pm$ 1°F
Temperature Compensation		pH: automatic; EC/TDS: automatic with B adjustable from 0.0 to 2.4% / °C automatic, 1 or 2 points with 2 sets of memorized buffers (pH 4.01 / 7.01 / 10.01 or 4.01 / 6.86 / 9.18)
Calibration	pH	automatic, 1 point
Calibration	EC/TDS	automatic, 1 point
TDS Conversion Factor		adjustable from 0.45 to 1.00
pH Electrode Environment		HI 73127 (replaceable; included) 0 to 50°C (32 to 122°F); RH max 100% 4 x 1.5V / approx. 100 hours of continuous use; auto-off after 8 minutes of non-use
Battery Type / Life		
Dimensions		163 x 40 x 26 mm (6.4 x 1.6 x 1.0")
Weight		100 g (3.5 oz.)

## Product Accessories

Solutions  
 HI 70004P  
 4.01 pH Buffer Solution  
 HI 70006P  
 6.86 pH Buffer Solution  
 25 x 20 mL sachets  
 HI 70007P  
 7.01 pH Buffer Solution  
 25 x 20 mL sachets  
 HI 70009P  
 9.18 pH Buffer Solution  
 25 x 20 mL sachets  
 HI 70010P  
 10.01 pH Buffer Solution  
 25 x 20 mL sachets

## Product Manuals

Manual: Download

## Testimonials

I personally just love the HI98129, I went thru a few competitors meters until I found that one. Just a bit of user end feedback for ya.

~Tom Stark  
 C.E.O. / Owner  
 Hydro Heaven  
 Urban Garden Supply~

## Add Testimonials

## Top Products



HI 98331  
 Soil Test Direct Soil  
 Conductivity and Temperature  
 Tester



HI 504 Series  
 pH/ORP Controller with  
 Tele-Control and Sensor Check



HI 208  
 Educational pH Meter with  
 Built-In Stirrer



Y S I Environmental



*The 556 has multiple language capabilities and graphics!*

Pure  
Data for a  
Healthy  
Planet.®

*A rugged, cost-effective  
multiparameter handheld  
system designed for the field!*

## YSI 556 Multiparameter System

*Versatile, multiparameter handheld instrument*

Rugged and reliable, the YSI 556 MPS (Multiprobe System) combines the versatility of an easy-to-use, easy-to-read handheld unit with all the functionality of a multiparameter system.

- Simultaneously measures dissolved oxygen, pH, conductivity, temperature, and ORP
- Field-replaceable electrodes
- Compatible with Eco Watch® for Windows® data analysis software
- Stores over 49,000 data sets, time and date stamped, interval or manual logging
- Three-year warranty on the instrument; one-year on the probes
- GLP assisting, records calibration data in memory
- Available with 4, 10, and 20-m cable lengths
- IP-67, impact-resistant, waterproof case
- Easy-to-use, screw-on cap DO membranes
- RS-232 interface for PC connection

### Options to Fit Your Applications!

- **Battery Options** - The unit is powered by alkaline batteries or an optional rechargeable battery pack with quick-charge feature.
- **Optional Barometer** - Internal barometer can be user-calibrated and displayed along with other data, used in dissolved oxygen calibrations, and logged to memory for tracking changes in barometric pressure. (Choose 556-02)
- **Optional Flow Cell** - The 5083 flow cell can be used for ground water applications or anytime water is pumped for sampling.
- **Carrying Case** - The instrument comes standard with YSI 5061, a soft-sided carrying case with enough space for the 556, a 20-meter cable, and calibrating supplies. An optional 5080 hard-sided carrying case is also available.
- **Confidence Solution®** - Quality assurance ensured. Quickly check conductivity, pH, and ORP readings with one solution.

[www.YSI.com/556](http://www.YSI.com/556)



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## 5563 MPS Sensor Specifications

<b>Dissolved Oxygen</b> (% saturation)	<b>Sensor Type</b> Range Accuracy Resolution	Steady state polarographic 0 to 500% air saturation 0 to 200% air saturation, $\pm 2\%$ of the reading or $\pm 2\%$ air saturation, whichever is greater; 200 to 500% air saturation, $\pm 6\%$ of the reading 0.1% air saturation
<b>Dissolved Oxygen</b> (mg/L)	<b>Sensor Type</b> Range Accuracy Resolution	Steady state polarographic 0 to 50 mg/L 0 to 20 mg/L, $\pm 2\%$ of the reading or $\pm 0.2$ mg/L, whichever is greater; 20 to 50 mg/L, $\pm 6\%$ of the reading 0.01 mg/L
<b>Temperature</b>	<b>Sensor Type</b> Range Accuracy Resolution	YSI Temperature Precision thermistor -5 to 45°C $\pm 0.15^\circ\text{C}$ 0.1°C
<b>Conductivity</b>	<b>Sensor Type</b> Range Accuracy Resolution	4-electrode cell with autoranging 0 to 200 mS/cm $\pm 0.5\%$ of reading or $\pm 0.001$ mS/cm; whichever is greater (4-meter cable) $\pm 1.0\%$ of reading or $\pm 0.001$ mS/cm; whichever is greater (20-meter cable) 0.001 mS/cm to 0.1 mS/cm (range-dependent)
<b>Salinity</b>	<b>Sensor Type</b> Range Accuracy Resolution	Calculated from conductivity and temperature 0 to 70 ppt $\pm 1.0\%$ of reading or $\pm 0.1$ ppt, whichever is greater 0.01 ppt
<b>pH (optional)</b>	<b>Sensor Type</b> Range Accuracy Resolution	Glass combination electrode 0 to 14 units $\pm 0.2$ units 0.01 units
<b>ORP (optional)</b>	<b>Sensor Type</b> Range Accuracy Resolution	Platinum button -999 to +999 mV $\pm 20$ mV 0.1 mV
<b>Total Dissolved Solids (TDS)</b>	<b>Sensor Type</b> Range Resolution	Calculated from conductivity (variable constant, default 0.65) 0 to 100 g/L 4 digits
<b>Barometer (optional)</b>	<b>Range</b> Accuracy Resolution	500 to 800 mm Hg $\pm 3$ mm Hg within $\pm 10^\circ\text{C}$ temperature range from calibration point 0.1 mm Hg

## YSI 556 Instrument Specifications

Size	13.9 cm width x 22.9 cm length (4.7 in. x 9 in.)
Weight with batteries	2.1 lbs. (916 grams)
Power	4 alkaline C-cells; optional rechargeable pack
Cables	4-, 10-, and 20-m (13.1, 32.8, 65.6 ft.) lengths
Warranty	3-year instrument; 1 year probes and cables
Communication Port	RS-232 Serial
Data Logger	49,000 data sets, date and time stamp, manual or logging, with user-selectable intervals

## 556 Ordering Information (Order all items separately)

556-01	Instrument (with 5061 large, soft-sided carrying case)
556-02	Instrument with barometer option (with 5061 carrying case)
5563-4	4-m cable and DO/temp/conductivity
5563-10	10-m cable and DO/temp/conductivity
5563-20	20-m cable and DO/temp/conductivity
5564	pH Probe for any 5563 cable
5565	pH/ORP Probe for any 5563 cable
6118	Rechargeable battery pack kit (includes battery, adapter, charger)
614	Ultra clamp, C-clamp mount
616	Charger, cigarette lighter
4654	Tripod (small tripod for instrument)
5060	Small carrying case, soft-sided (fits instrument and 4-m cable)
5065	Form-fitted carrier with shoulder strap
5080	Small carrying case, hard-sided (fits instrument, 4-m cable, flow cell, batteries, membrane kit, calibration bottles)
5083	Flow cell
5085	Hands-free harness
5580	Confidence Solution® (insure probe accuracy with a simple field-check for conductivity, pH, and ORP)



The 5080 carrying case with 5563-4 cable, and 5083 flow cell.



## YSI 600XL and 600XLM Sondes

### Measure multiple parameters simultaneously

The YSI 600XL and YSI 600XLM compact sondes measure eleven parameters simultaneously:

Temperature	TDS
Conductivity	pH
Specific Conductance	ORP
Salinity	Depth or Level
Resistivity	Rapid Pulse™ DO (% and mg/L)

### Connect with Data Collection Platforms

Either sonde can easily connect to the YSI 6200 DAS (Data Acquisition System), YSI EcoNet™ or your own data collection platform, via SDI-12 for remote and real-time data acquisition applications.

### Economical Logging System

The YSI 600XLM is an economical logging system for long-term, in situ monitoring and profiling. It will log all parameters at programmable intervals and store 150,000 readings. At one-hour intervals, the instrument will log data for about 75 days utilizing its own power source. The 600XL can also be utilized in the same manner with user-supplied external power.



The YSI 600XL and 600XLM

- Either sonde fits down 2-inch wells
- Horizontal measurements in very shallow waters
- Stirring-independent Rapid Pulse® dissolved oxygen sensor
- Field-replaceable sensors
- Easily connects to data collection platforms
- Available with detachable cables to measure depth up to 200 feet
- Compatible with YSI 650 Multiparameter Display System
- Use with the YSI 5083 flow cell for groundwater applications

Pure  
Data for a  
Healthy  
Planet.®

Economical, multiparameter  
sampling or logging in a  
compact sonde

### Sensor performance verified™

The 6820 V2 and 6920 V2 sondes use sensor technology that was verified through the US EPA's Environmental Technology Verification Program (ETV). For information on which sensors were performance-verified, turn this sheet over and look for the ETV logo.





To order, or for more info,  
contact YSI Environmental.

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www.ysi.com

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inquiry@sontek.com

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## YSI 600XL & 600XLM Sensor Specifications

		Range	Resolution	Accuracy
Dissolved Oxygen % Saturation	ETV 6562 Rapid Pulse™ Sensor*	0 to 300%	0.1%	0 to 200% ±2% of reading or 2% air saturation, whichever is greater; 200 to 300% ±6% of reading
Dissolved Oxygen mg/L	ETV 6562 Rapid Pulse™ Sensor*	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L ± 0.2 mg/L or 2% of reading, whichever is greater; 20 to 50 mg/L ±6% of reading
Conductivity	ETV 6560 Sensor*	0 to 100 mS/cm	0.001 to 0.1 mS/cm (range dependent)	±0.5% of reading + 0.001 mS/cm
Salinity		0 to 70 ppt	0.01 ppt	±1% of reading or 0.1 ppt, whichever is greater
Temperature	ETV 6560 Sensor*	5 to +50°C	0.01°C	±0.15°C
pH	ETV 6561 Sensor*	0 to 14 units	0.01 unit	±0.2 unit
ORP		-999 to +999 mV	0.1 mV	±20 mV
Depth & Level	Medium	0 to 200 ft, 61 m	0.001 ft, 0.001 m	±0.4 ft, ±0.12 m
	Shallow	0 to 30 ft, 9.1 m	0.001 ft, 0.001 m	±0.06 ft, ±0.02 m
	Worked level	0 to 30 ft, 9.1 m	0.001 ft, 0.001 m	±0.01 ft, 0.003 m

\* Report outputs of specific conductance (conductivity corrected to 25°C), resistivity, and total dissolved solids are also provided. These values are automatically calculated from conductivity according to algorithms found in Standard Methods for the Examination of Water and Wastewater (ed 1995).

## YSI 600XL & 600XLM Sonde Specifications

Medium		Fresh, sea or polluted water
Temperature	Operating	-5 to +50°C
	Storage	-10 to +60°C
Communications		RS-422, SDI-12
Software		EcoWatch*
Dimensions	Diameter	1.65 in, 4.19 cm   1.65 in, 4.3 cm
	Length	76 in, 40.6 cm   21.3 in, 54.1 cm
	Weight	1.3 lbs, 0.59 kg   1.5 lbs, 0.69 kg
Power	External	12 V DC
	Internal (600XLM only)	4 AA-size alkaline batteries

YSI model 5083  
flow cell and  
600XL. This is an  
ideal combination  
for groundwater  
applications.







**Hach<sub>2</sub>O** Your formula for water analysis.

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## 2100P IS Portable Turbidimeter

### Specifications

**2100P Portable Turbidimeter Specifications:**

- Ranges:** 0-1000 NTU with automatic decimal point placement or manual range selection of 0-9.99, 0-99.9 and 0-1000 NTU selection.
- Accuracy:** ± 2% of reading plus stray light from 0 to 1000 NTU (stray light: <0.02 NTU)
- Repeatability:** ± 1% of reading or ± 0.01 NTU, whichever is greater
- Resolution:** 0.01 NTU on lowest range
- Sample Required:** 15 mL
- Power Requirement:** Four AA alkaline batteries or optional 120 or 230 Vac battery eliminator.
- Construction:** High-Impact ABS plastic shell
- Dimensions:** 22.2 x 9.5 x 8.9 cm (8.75 x 3.75 x 3.5")
- Shipping Weight:** 3.6 kg (8 lb)
- Warranty:** Two years

Specifications subject to change.

### MAIN PRODUCT PAGE

» [2100P IS Portable Turbidimeter](#)

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## 2020we & 2020wi Portable Turbidity Meters

### The Clear Choice for Turbidity Measurement!

Industry-leading precision, sensitivity, and dependability in one of the most innovative handheld meters available on the market!

- Waterproof to IP67
- Lithium rechargeable battery
- USB port
- 7 languages
- Backlit display
- EPA and ISO versions

**2020we** Complies with USEPA 180.1 Standard

**2020wi** Complies with ISO 7027 Standard



Kit supplied with 0, 1, and 10 NTU standard, sample bottle, 4 sample tubes, USB cable, USB computer/wall adapter, and waterproof carrying case.

#### Order Codes

1970-EPA	<b>2020we Kit:</b> Portable turbidity meter complies with USEPA 180.1 Standard
1970-ISO	<b>2020wi Kit:</b> Portable turbidity meter complies with ISO 7027 Standard

Turbidity Specifications

Meter Features

Order Codes

#### Turbidity Specifications:

Unit of Measure:	2020we: NTU, AU, ASBC, EBC 2020wi: FNU, FAU, ASBC, EBC
Range:*	0-4000 NTU/FNU, 0-10,500 ASBC, 0-150 EBC
Resolution:*	0.01 NTU/FNU 10.00-10.99 0.1 NTU/FNU 11.00-109.9 1 NTU/FNU 110-4000
Accuracy:*	From 0-2.5 NTU the accuracy is ±0.05 NTU From 2.5-100 NTU the accuracy is ±2% From 100 NTU the accuracy is ±3%
Detection Limit:	0.05 NTU/FNU
Range Selection:	Automatic
Reproducibility:*	0.02 NTU/FNU or 1%
Light Source:	Tungsten (EPA) complies with EPA 180.1 Standard 860 LED (ISO) complies with ISO 7027

\*Over 600 NTU/FNU units expressed as AU/FAU

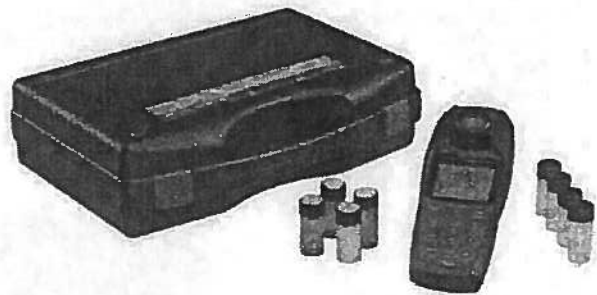
## Water Quality Turbidity Meter

### Orion AQUAfast AQ4500 Turbidimeter

Thermo Electron introduces the Orion AQ4500 Turbidimeter which offers advanced features not available on any other benchtop or portable turbidimeter. The AQ4500 offers a dual source LED which allows readings that comply with both EPA 180.1 and ISO 7027. Turbidity can be read in the range of 0 - 1000 NTU with a choice of units: NTU, FTU, FNU, ASBC, and EBC. In the range of 0 - 40 NTU the AQ4500 offers a ratiometric range which will give EPA, GLI method 2 equivalent numbers. This portable field unit is truly IP67 waterproof with typical battery life of over 1000 hours on one set of batteries and datalog capacity of 100 points which can later be downloaded to a printer or computer. The AQ4500 accepts 24 mm cuvettes and comes with a two year warranty.

#### FEATURES

- Nephelometric and Ratiometric measurements with Autoranging
- Data log capacity of up to 100 data points
- Readings in the range of 0 - 1000 NTU with a choice of units: NTU, FTU, FNU, ASBC, or EBC
- Includes Turbidity Standards kit, rugged carrying case, and replacement cuvettes
- Orion AQ4500 is truly IP67 waterproof to a depth of 3 meters



#### SPECIFICATIONS

Type	Turbidity Meter	Repeatability	± 1% of reading or 0.01 NTU
Principle of Operation	Nephelometric	Response Time	< 8 seconds
Operating Modes	Automatic	Calibration	1, 10, 100, 1000 NTU
Measurement Modes	Automatic	Signal Averaging	Yes
Ranges		Sample Cell Size	24 mm
	NTU 0 - 2000	Sample Size	-12 mL
	Nephelometric 0 - 4000	Display	Custom LED
	EPA 0 - 4000 NTU	RTC	Yes
	ISO - NEPH (7027) 0 - 150 FNU	Input/Output	RS-232 Serial Port
	ISO - ABSB 40 - 4000 FAU	Power	Battery - four AA's (2,500 hours Alkaline, 10,000 lithium)
	IR RATIO 0 - 4000 NTU	Environmental Conditions	
	EBC 0 - 24.5	Operating Temperature	-40° to 140°F (-40° to 60°C)
	ASBC 0 - 236	Humidity	90% RH at 30.0C max
Accuracy	± 2% of reading plus 0.01 NTU (0 - 500 NTU)	Light Source	White, IR
	± 3% of reading (500 - 1000 NTU)	Warranty	2 years
	± 5% of reading (1000 - 2000 NTU)	Weight	8 lbs (3.63 kg)
Resolution	0.01 NTU (0 - 9.99)	Safety Rating	UL, CSA, CE, FCC
	0.1 NTU (10 - 99.9)		
	1 NTU (100 - 1000)		

**CALL GEOTECH TODAY (800) 833-7958**

Geotech Environmental Equipment, Inc.  
 2650 East 40th Avenue • Denver, Colorado 80205  
 (303) 320-4764 • (800) 833-7958 • FAX (303) 322-7242  
[email, sales@geotechenv.com](mailto:sales@geotechenv.com) [website, www.geotechenv.com](http://www.geotechenv.com)



Attachment E

The image shows a large, empty grid of cells, possibly a table or ledger. The grid is composed of approximately 10 columns and 20 rows. The lines are faint and the overall appearance is that of a scanned document with some noise or smudges. There is no data or text within the grid cells.

### 2011 Sampling Schedule

		Edgewater Beach		Villa Angela Beach		Euclid Beach		Euclid Creek	
Day	Date	East	West	East	West	East	West	RM 0.14	RM 0.55
Monday	5/2/2011	O	O	O*	O	O*	O		
Tuesday	5/3/2011	O	O	O*	O	O*	O		
Wednesday	5/4/2011	O	O	O*	O	O*	O		
Thursday	5/5/2011	O	O	O*	O	O*	O		
Friday	5/6/2011								
Saturday	5/7/2011								
Sunday	5/8/2011								
Monday	5/9/2011	O	O	O*	O	O*	O		
Tuesday	5/10/2011	O	O	O*	O	O*	O		
Wednesday	5/11/2011	O	O	O*	O	O*	O		
Thursday	5/12/2011	O	O	O*	O	O*	O		
Friday	5/13/2011								
Saturday	5/14/2011								
Sunday	5/15/2011								
Monday	5/16/2011	O	O	O*	O	O*	O		
Tuesday	5/17/2011	O	O	O*	O	O*	O		
Wednesday	5/18/2011	O	O	O*	O	O*	O		
Thursday	5/19/2011	O	O	O*	O	O*	O		
Friday	5/20/2011	O	O	O*	O	O*	O		
Saturday	5/21/2011	O	O	O*	O	O*	O		
Sunday	5/22/2011	O	O	O*	O	O*	O		
Monday	5/23/2011	O	O	O*	O	O*	O		
Tuesday	5/24/2011	O	O	O*	O	O*	O		
Wednesday	5/25/2011	O	O	O*	O	O*	O		
Thursday	5/26/2011	O	O	O*	O	O*	O		
Friday	5/27/2011	O	O	O*	O	O*	O		
Saturday	5/28/2011	O	O	O*	O	O*	O		
Sunday	5/29/2011	O	O	O*	O	O*	O		
Monday	5/30/2011	O	O	O*	O	O*	O		
Tuesday	5/31/2011	O	O	O*	O	O*	O		
Wednesday	6/1/2011	O	O	O*	O	O*	O		
Thursday	6/2/2011	O	O	O*	O	O*	O		
Friday	6/3/2011	O	O	O*	O	O*	O		
Saturday	6/4/2011	O	O	O*	O	O*	O		
Sunday	6/5/2011	O	O	O*	O	O*	O		
Monday	6/6/2011	O	O	O*	O	O*	O	O	O*
Tuesday	6/7/2011	O	O	O*	O	O*	O	O	O*
Wednesday	6/8/2011	O	O	O*	O	O*	O	O	O*
Thursday	6/9/2011	O	O	O*	O	O*	O	O	O*
Friday	6/10/2011	O	O	O*	O	O*	O	O	O*
Saturday	6/11/2011	O	O	O*	O	O*	O		O*
Sunday	6/12/2011	O	O	O*	O	O*	O		O*
Monday	6/13/2011	O	O	O*	O	O*	O	O	O*
Tuesday	6/14/2011	O	O	O*	O	O*	O	O	O*
Wednesday	6/15/2011	O	O	O*	O	O*	O	O	O*
Thursday	6/16/2011	O	O	O*	O	O*	O	O	O*
Friday	6/17/2011	O	O	O*	O	O*	O	O	O*
Saturday	6/18/2011	O	O	O*	O	O*	O		O*





		Edgewater Beach		Villa Angela Beach		Euclid Beach		Euclid Creek	
Day	Date	East	West	East	West	East	West	RM 0.14	RM 0.55
Tuesday	9/27/2011	O	O	O	O	O	O		
Wednesday	9/28/2011	O	O	O	O	O	O		
Thursday	9/29/2011	O	O	O	O	O	O		
Friday	9/30/2011								
Saturday	10/1/2011								
Sunday	10/2/2011								
Monday	10/3/2011	O	O	O	O	O	O		
Tuesday	10/4/2011	O	O	O	O	O	O		
Wednesday	10/5/2011	O	O	O	O	O	O		
Thursday	10/6/2011	O	O	O	O	O	O		
Friday	10/7/2011								
Saturday	10/8/2011								
Sunday	10/9/2011								
Monday	10/10/2011	O	O	O	O	O	O		
Tuesday	10/11/2011	O	O	O	O	O	O		
Wednesday	10/12/2011	O	O	O	O	O	O		
Thursday	10/13/2011	O	O	O	O	O	O		
Friday	10/14/2011								
Saturday	10/15/2011								
Sunday	10/16/2011								
Monday	10/17/2011	O	O	O	O	O	O		
Tuesday	10/18/2011	O	O	O	O	O	O		
Wednesday	10/19/2011	O	O	O	O	O	O		
Thursday	10/20/2011	O	O	O	O	O	O		
Friday	10/21/2011								
Saturday	10/22/2011								
Sunday	10/23/2011								
Monday	10/24/2011	O	O	O	O	O	O		
Tuesday	10/25/2011	O	O	O	O	O	O		
Wednesday	10/26/2011	O	O	O	O	O	O		
Thursday	10/27/2011	O	O	O	O	O	O		
Friday	10/28/2011								
Saturday	10/29/2011								
Sunday	10/30/2011								
Monday	10/31/2011	O	O	O	O	O	O		

O= Bacteriological Sampling

\* Water Chemistry Sampling

Shading= No Sampling



## Attachment F



# Beach Sampling Training

Signature: \_\_\_\_\_

Supervisor: \_\_\_\_\_

	Yes	No	Initials	Date
<b>Method Review</b>				
1. Review "Beach Sampling" SOP				
2. Review "Vehicle and Mobile Radio Operation" SOP				
3. Review "Procedures for the Calibration, Use and Maintenance... Extech Exstik II EC500 Meter" SOP				
4. Review "Image and File Upload for Beach Project" SOP				
5. Review "NRS Compact Throw Bag Usage" SOP				
<b>Safety Equipment</b>				
1. Life Jacket or inflatable safety vest				
2. Chest Waders				
3. Gloves, if desired				
4. Throw bag				
5. Cell phone				
6. Sampling pole for inclement weather sampling				
<b>Equipment</b>				
1. Can calibrate and use the Exstik II EC500 Meter				
2. Can use digital camera				
3. Can upload images from camera to computer				
4. Can scan beach observation sheets from copier to w:/scans				
5. Can calibrate and use turbidity meter				
6. Can use wind anemometer				
7. Uses wave height stick to measure wave height				
<b>Sampling</b>				
1. Samples at correct East and West sites				
2. Uses proper sample bottles and technique to sample				
3. Uses proper sampling techniques				
4. Can fill out Beach Sampling Field Data Form				
5. Uses cooler with ice				
<b>LabLynx Skills</b>				
1. Can log in field parameters.				
2. Can upload photos to LabLynx.				
3. Can upload field sheets to LabLynx				



Attachment G



# Beach Sampling Audit

Beach/Samplers Audited: \_\_\_\_\_

QDC Auditing: \_\_\_\_\_

Safety Equipment with Field Crew	Yes	No	Initials	D
1. Life Jacket or inflatable safety vest				
2. Chest Waders				
3. Throw bag				
4. Cell phone				
5. Sampling pole for inclement weather sampling				
Sampling Equipment Checklist	Yes	No	Initials	D
1. Field Observation Sheet				
2. Sterile Bacti Bottles				
3. Sample Tags				
4. Bottles for Turbidity Samples				
5. pH/Conductivity/Temp Meter				
6. Wind Aenometer				
7. Wave Height Stick				
8. Camera				
9. Cooler				
10. Ice				
11. Ziploc Bags				
12. Calculator				
13. Laptop - Edgewater Crew Only				
14. Keys for signs- Edgewater Crew Only				
Method Review	Yes	No	Initials	D
1. Samplers Attained Samples at Appropriate Sites				
East				
West				
Creek				
2. Sampled at appropriate depth of 3 ft. using wave height stick to verify.				
3. Samples exhibited proper sampling technique				

a. Uses sterile bottles				
b. Bottle inverted before it enters the water.				
c. Bottle is plunged 6-12 inches below the surface of the water				
d. Bottle rotated with the opening facing the surface.				
e. Headspace left				
f. Bottle capped securely				
g. Second bottle collected for turbidity analysis				
h. Can fill out Beach Observation Sheet				
i. Uses cooler with ice				

<b>Equipment Skills</b>	<b>Yes</b>	<b>No</b>	<b>Initials</b>	<b>D</b>
1. Can calibrate and use the Exstik II EC500 Meter				
3. Can use digital camera				
4. Can upload images from camera to computer				
5. Can scan beach observation sheets from copier to w:/scans				
6. Can use and calibrate turbidity meter				
7. Can use wind anemometer to measure wind speed				
8. Uses wave height stick to measure wave height				

<b>LabLynx Skills</b>	<b>Yes</b>	<b>No</b>	<b>Initials</b>	<b>D</b>
1. Can enter field parameters.				
2. Can upload photos to LabLynx.				
3. Can upload field sheets to LabLynx.				

<b>Edgewater NOWCAST Model</b>	<b>Yes</b>	<b>No</b>	<b>Initials</b>	<b>D</b>
1. Can access email for 24 and 48 hour rainfall				
2. Obtains Hopkins Rainfall from internet				
3. Can plug in appropriate parameters into the model				
4. Can post to the NOWCAST website				
5. Updates NEORSD phone line				
6. Updates NEORSD internet page to reflect forecast				
7. Changes signs at beach to GOOD or POOR as appropriate				

Comments:



## Attachment H



State of Ohio Environmental Protection Agency

OHIO E.P.A.

STREET ADDRESS:

Lazarus Government Center  
50 W. Town St., Suite 700  
Columbus, Ohio 43215

TELE (614) 644-3020 FAX (614) 644-3184  
www.epa.state.oh.us

OCT 29 2010 MAILING ADDRESS:

P.O. Box 1049  
Columbus, OH 43216-1049

ENTERED DIRECTOR'S JOURNAL

**CERTIFIED MAIL**

Effective Date: 10/28/2010  
Expiration Date: 10/27/2012

I certify this to be a true and accurate copy of the  
official documents as filed in the records of the Ohio  
Environmental Protection Agency.

Jillian B Novak  
NEORS  
4747 E. 49th Street  
Cuyahoga Heights, OH 44125

By: [Signature] Date: 10-28-10

Re: Qualified Data Collector Approval, Surface Water Credible Data Program

Dear Jillian:

The Division of Surface Water Credible Data Program has reviewed your Qualified Data Collector (QDC) application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745 4 03, you are approved as a QDC for the following level and specialty:

Level: 3  
Specialty: Chemical Water Quality Assessment -  
QDC number: 00512

Please use this QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date. You may now submit study plans to the Volunteer Monitoring Program.

A renewal application must be submitted in accordance with OAC 3745 4 03(C). As provided in this rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re apply for initial QDC status.

As a reminder, your status is contingent upon the absence of any trespassing violation (within the previous five years) by you or any person sampling under your supervision. Always obtain land owner permission prior to sampling.

Additionally, collection (and retention) of aquatic biological samples (this includes fish, macroinvertebrates, mollusks, and shells) requires a collector's permit from the Ohio

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
Chris Korleski, Director



Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Kevin Boyce", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:  
Environmental Review Appeals Commission, 309 South Fourth Street, Room 222,  
Columbus, OH 43215.

Sincerely,



Chris Korleski,  
Director



State of Ohio Environmental Protection Agency

OHIO E.P.A.

**STREET ADDRESS:**

Lazarus Government Center  
50 W. Town St., Suite 700  
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184  
www.epa.state.oh.us

**MAILING ADDRESS:**

P.O. Box 1049  
Columbus, OH 43216-1049

OCT 28 2010

ENTERED DIRECTOR'S JOURNAL

**CERTIFIED MAIL**

Effective Date: 10/28/2010  
Expiration Date: 10/27/2012

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

Tom Zabloutny  
Northeast Ohio Regional Sewer District  
4747 E 49th Street  
Cuyahoga Heights, OH 44125

By Jon K. Lassiter Date: 10-28-10

Re: Qualified Data Collector Renewal, Surface Water Credible Data Program

Dear Tom:

The Division of Surface Water Credible Data Program has reviewed your Qualified Data Collector (QDC) renewal application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745 4 03, you are approved as a QDC for the following level and specialty:

- Level: 3
- Specialty: Chemical Water Quality Assessment -
- QDC number: 00018

Please use this QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date. You may now submit study plans to the Volunteer Monitoring Program.

A renewal application must be submitted in accordance with OAC 3745 4 03(C). As provided in this rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re apply for initial QDC status.

As a reminder, your status is contingent upon the absence of any trespassing violation (within the previous five years) by you or any person sampling under your supervision. Always obtain land owner permission prior to sampling.

Additionally, collection (and retention) of aquatic biological samples (this includes fish, macroinvertebrates, mollusks, and shells) requires a collector's permit from the Ohio

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
Chris Korleski, Director

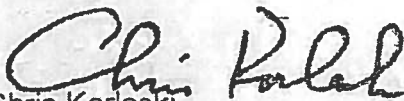




Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Kevin Boyce", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address: Environmental Review Appeals Commission, 309 South Fourth-Street, Room-222, Columbus, OH 43215.

Sincerely,

  
Chris Korleski,  
Director



State of Ohio Environmental Protection Agency

OHIO E.P.A.

STREET ADDRESS:

Lazarus Government Center  
50 W. Town St., Suite 700  
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184  
www.epa.state.oh.us

MAILING ADDRESS:

APR 28 2009 P.O. Box 1049  
Columbus, OH 43216-1049

ENTERED DIRECTOR'S JOURNAL

Effective Date: April 27, 2009  
Expiration Date: April 28, 2011

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

Benjamin Tedrick  
Northeast Ohio Regional Sewer District  
4747 East 49th Street  
Cuyahoga Heights, Ohio 44125

By: Dany Lassiter Date: 4-28-09

Re: Qualified Data Collector Renewal, Surface Water Volunteer Monitoring Program

Dear Benjamin:

The Division of Surface Water Volunteer Monitoring (Credible Data) Program has reviewed your Qualified Data Collector (QDC) renewal application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745-4-03, you are approved as a QDC for the following level and specialty:

QDC Level: 3  
QDC Specialty: Chemical Water Quality Assessment  
QDC number: 048

Please continue to use your QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date.

At that time, another renewal application must be submitted in accordance with OAC 3745-4-03(C). As rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re-apply for initial QDC status.

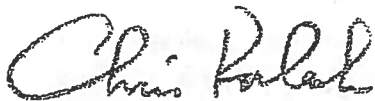
As a reminder, your status is contingent upon the absence of any trespassing violation (within the previous five years) by you or any person sampling under your supervision. Always obtain land owner permission prior to sampling.

Additionally, collection (and retention) of aquatic biological samples (this includes fish, macroinvertebrates, mollusks, and shells) requires a collector's permit from the Ohio Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
Chris Korleski, Director

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of seventy dollars (\$70.00) which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal must be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Commission at the following address: 309 South Fourth Street, Room 222, Columbus, Ohio 43215.

Sincerely,

A handwritten signature in cursive script that reads "Chris Korleski".

Chris Korleski  
Director



State of Ohio Environmental Protection Agency

STREET ADDRESS:

Lazarus Government Center  
50 W. Town St., Suite 700  
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184  
www.epa.state.oh.us

OHIO E.P.A.

SEP 14 2010

MAILING ADDRESS:

P.O. Box 1049  
Columbus, OH 43216-1049

ENTERED DIRECTOR'S OFFICE

CERTIFIED MAIL

Effective Date: 9/14/2010  
Expiration Date: 9/13/2012

I certify this to be a true and accurate copy of the  
official documents as filed in the records of the Ohio  
Environmental Protection Agency.

Seth Hothem  
Northeast Ohio Regional Sewer District  
7815 Dartworth Dr.  
Parma, OH 44129

Date: 9.14.2010

Re: Qualified Data Collector Renewal, Surface Water Credible Data Program

Dear Seth:

The Division of Surface Water Credible Data Program has reviewed your Qualified Data Collector (QDC) renewal application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745 4 03, you are approved as a QDC for the following level and specialty:

Level: 3  
Specialty: Chemical Water Quality Assessment -  
QDC number: 00010

Please use this QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date. You may now submit study plans to the Volunteer Monitoring Program.

A renewal application must be submitted in accordance with OAC 3745 4 03(C). As provided in this rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re apply for initial QDC status.

As a reminder, your status is contingent upon the absence of any trespassing violation (within the previous five years) by you or any person sampling under your supervision. Always obtain land owner permission prior to sampling.

Additionally, collection (and retention) of aquatic biological samples (this includes fish, macroinvertebrates, mollusks, and shells) requires a collector's permit from the Ohio

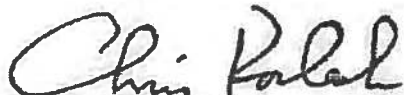
Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
Chris Korleski, Director



Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Kevin Boyce", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:  
Environmental Review Appeals Commission, 309 South Fourth Street, Room 222,  
Columbus, OH 43215.

Sincerely,



Chris Korleski,  
Director



State of Ohio Environmental Protection Agency

OHIO E.P.A.

**STREET ADDRESS:**

Lazarus Government Center  
50 W. Town St., Suite 700  
Columbus, Ohio 43215

TELE (614) 644-3020 FAX (614) 644-3154  
www.epa.ohio.gov

**MAILING ADDRESS:**

JAN 28 2010  
P.O. Box 1049  
Columbus, OH 43216-1049

ENTERED DIRECTOR'S JOURNAL

Effective Date: January 28, 2010  
Expiration Date: January 27, 2012

**CERTIFIED MAIL**

Ronald Maichle  
NEORS  
25970 Elmer Avenue  
Olmsted Falls, Ohio 44138

*Janice Cassidy 1-28-10*

Re: Qualified Data Collector Approval, Surface Water Volunteer Monitoring Program

Dear Ronald:

The Division of Surface Water Volunteer Monitoring (Credible Data) Program has reviewed your Qualified Data Collector (QDC) application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745-4-03, you are approved as a QDC for the following level and specialty:

QDC Level: 3  
QDC Specialty: Chemical Water Quality Assessment  
QDC number: 145

Please use this QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date. You may now submit study plans to the Volunteer Monitoring Program.

A renewal application must be submitted in accordance with OAC 3745-4-03(C). As provided in this rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re-apply for initial QDC status.

As a reminder, your status is contingent upon the absence of any trespassing violation (within the previous five years) by you or any person sampling under your supervision. Always obtain land owner permission prior to sampling.

Additionally, collection (and retention) of aquatic biological samples (this includes fish, macroinvertebrates, mollusks, and shells) requires a collector's permit from the Ohio Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
Chris Karleski, Director



You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Kevin Boyce," which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:

Environmental Review Appeals Commission  
309 South Fourth Street, Room 222  
Columbus, Ohio 43215

Sincerely,



Chris Korleski  
Director



State of Ohio Environmental Protection Agency

**STREET ADDRESS:**

Lazarus Government Center  
50 W. Town St., Suite 700  
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184  
www.epa.state.oh.us

**MAILING ADDRESS:**

P.O. Box 1049  
Columbus, OH 43216-1049

**CERTIFIED MAIL**

Effective Date: 9/3/2010  
Expiration Date: 9/2/2012

91 7108 2133 3937 1502 8197

Catherine Zamborsky  
Northeast Ohio Regional Sewer District  
1749 Royalwood Road  
Broadview Hts, OH 44147

OHIO E.P.A.  
SEP - 3 2010  
FRED DIRECTOR'S JOURNAL

Re: Qualified Data Collector Renewal, Surface Water Credible Data Program

Dear Catherine:

The Division of Surface Water Credible Data Program has reviewed your Qualified Data Collector (QDC) renewal application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745 4 03, you are approved as a QDC for the following level and specialty:

**Level: 3**  
**Specialty: Chemical Water Quality Assessment -**  
**QDC number: 00009**

Please use this QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date. You may now submit study plans to the Volunteer Monitoring Program.

A renewal application must be submitted in accordance with OAC 3745 4 03(C). As provided in this rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re apply for initial QDC status.

As a reminder, your status is contingent upon the absence of any trespassing violation (within the previous five years) by you or any person sampling under your supervision. Always obtain land owner permission prior to sampling.

Additionally, collection (and retention) of aquatic biological samples (this includes fish, macroinvertebrates, mollusks, and shells) requires a collector's permit from the Ohio

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
Chris Koreski, Director

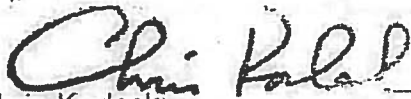




Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Kevin Boyce", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:  
Environmental Review Appeals Commission, 309 South Fourth Street, Room 222,  
Columbus, OH 43215.

Sincerely,



Chris Korleski,  
Director

I certify this to be a true and accurate copy of the  
original documents as filed in the records of the Ohio  
Environmental Protection Agency.

By: Kelly A. Mitchell Date: 9-3-10



State of Ohio Environmental Protection Agency

**STREET ADDRESS:**

Lazarus Government Center  
50 W. Town St., Suite 700  
Columbus, Ohio 43215

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**MAILING ADDRESS:**

P. O. Box 1049  
Columbus, OH 43216-1049

**CERTIFIED MAIL**

Effective Date: 9/3/2010  
Expiration Date: 9/2/2012

Francisco J Rivera  
Northeast Ohio Regional Sewer District  
951 Center Rd.  
Eastlake, OH 44095

Re: Qualified Data Collector Renewal, Surface Water Credible Data Program

Dear Francisco:

The Division of Surface Water Credible Data Program has reviewed your Qualified Data Collector (QDC) renewal application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745 4 03, you are approved as a QDC for the following level and specialty:

**Level: 3**  
**Specialty: Chemical Water Quality Assessment -**  
**QDC number: 00262**

Please use this QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date. You may now submit study plans to the Volunteer Monitoring Program.

A renewal application must be submitted in accordance with OAC 3745 4 03(C). As provided in this rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re apply for initial QDC status.

As a reminder, your status is contingent upon the absence of any trespassing violation (within the previous five years) by you or any person sampling under your supervision. Always obtain land owner permission prior to sampling.

Additionally, collection (and retention) of aquatic biological samples (this includes fish, macroinvertebrates, mollusks, and shells) requires a collector's permit from the Ohio

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
Chris Korleski, Director

OHIO E.P.A.  
SEP - 3 2010  
RECEIVED DIRECTOR'S JOURNAL



OHIO EPA

Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Kevin Boyce", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address: Environmental Review Appeals Commission, 309 South Fourth Street, Room 222, Columbus, OH 43215.

Sincerely,

Chris Korleski,  
Director

I hereby acknowledge receipt of a copy of the  
Ohio EPA's letter to the Director of the Ohio  
Environmental Protection Agency

Neil J. Nibel Date: 9/3/10



State of Ohio Environmental Protection Agency  
Ohio E.P.A.

STREET ADDRESS:

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50 W. Town St., Suite 700  
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184  
www.epa.state.oh.us

SEP 14 2010

MAILING ADDRESS:

P.O. Box 1049  
Columbus, OH 43216-1049

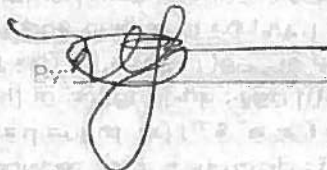
ENTERED DIRECTOR'S JOURNAL

**CERTIFIED MAIL**

Effective Date: 9/14/2010  
Expiration Date: 9/13/2012

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

John W Rhoades  
Northeast Ohio Regional Sewer District  
22370 Blossom Drive  
Rocky River, OH 44116

By:  Date: 9.14.2010

Re: Qualified Data Collector Renewal, Surface Water Credible Data Program

Dear John:

The Division of Surface Water Credible Data Program has reviewed your Qualified Data Collector (QDC) renewal application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745 4 03, you are approved as a QDC for the following level and specialty:

Level: 3  
Specialty: Chemical Water Quality Assessment -  
QDC number: 00008

Please use this QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date. You may now submit study plans to the Volunteer Monitoring Program.

A renewal application must be submitted in accordance with OAC 3745 4 03(C). As provided in this rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re apply for initial QDC status.

As a reminder, your status is contingent upon the absence of any trespassing violation (within the previous five years) by you or any person sampling under your supervision. Always obtain land owner permission prior to sampling.

Additionally, collection (and retention) of aquatic biological samples (this includes fish, macroinvertebrates, mollusks, and shells) requires a collector's permit from the Ohio

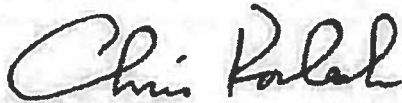
Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
Chris Korleski, Director



Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Kevin Boyce", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:  
Environmental Review Appeals Commission, 309 South Fourth Street, Room 222,  
Columbus, OH 43215.

Sincerely,



Chris Korleski,  
Director





State of Ohio Environmental Protection Agency

OHIO E.P.A.

STREET ADDRESS:

MAILING ADDRESS:

Lazarus Government Center  
50 W. Town St., Suite 700  
Columbus, Ohio 43215

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www.epa.state.oh.us

OCT - 4 2010

P.O. Box 1049  
Columbus, OH 43216-1049

ENTERED DIRECTOR'S JOURNAL

CERTIFIED MAIL

Effective Date: 10/4/2010  
Expiration Date: 10/3/2012

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

Kathryn Crestani  
Northeast Ohio Regional Sewer District  
4075 W. 215th St.  
Fairview Park, OH 44126

By: Tom Cassel Date: 10-4-10

Re: Qualified Data Collector Renewal, Surface Water Credible Data Program

Dear Kathryn:

The Division of Surface Water Credible Data Program has reviewed your Qualified Data Collector (QDC) renewal application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745 4 03, you are approved as a QDC for the following level and specialty:

Level: 3  
Specialty: Chemical Water Quality Assessment -  
QDC number: 00011

Please use this QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date. You may now submit study plans to the Volunteer Monitoring Program.

A renewal application must be submitted in accordance with OAC 3745 4 03(C). As provided in this rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re apply for initial QDC status.

As a reminder, your status is contingent upon the absence of any trespassing violation (within the previous five years) by you or any person sampling under your supervision. Always obtain land owner permission prior to sampling.

Additionally, collection (and retention) of aquatic biological samples (this includes fish, macroinvertebrates, mollusks, and shells) requires a collector's permit from the Ohio

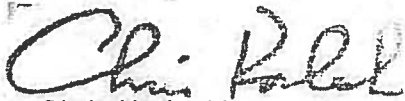
Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
Chris Korleski, Director



Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Kevin Boyce", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:  
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Columbus, OH 43215.

Sincerely,



Chris Korleski,  
Director



State of Ohio Environmental Protection Agency

OHIO E.P.A.

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www.epa.state.oh.us

OCT 28 2010

P.O. Box 1049  
Columbus, OH 43216-1049

ENTERED DIRECTOR'S JOURNAL  
**CERTIFIED MAIL**

Effective Date: 10/28/2010  
Expiration Date: 10/27/2012

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

Kristina L Granlund  
NEORS  
4747 East 49th Street  
Cuyahoga Heights, OH 44125

By: [Signature] Date: 10-28-10

Re: Qualified Data Collector Approval, Surface Water Credible Data Program

Dear Kristina:

The Division of Surface Water Credible Data Program has reviewed your Qualified Data Collector (QDC) application. Pursuant to Ohio Revised Code (ORC) 6111.53 and Ohio Administrative Code (OAC) 3745 4 03, you are approved as a QDC for the following level and specialty:

Level: 3  
Specialty: Chemical Water Quality Assessment -  
QDC number: 00511

Please use this QDC number on all correspondence, study plans, etc. submitted to Ohio EPA.

As noted at the top of this letter, this status is effective as of the date of this letter and expires two years from that date. You may now submit study plans to the Volunteer Monitoring Program.

A renewal application must be submitted in accordance with OAC 3745 4 03(C). As provided in this rule, renewal of status is contingent upon active participation in the Volunteer Monitoring Program at the designated level and specialty. Lack of such participation will prevent you from renewing your status, but you may re apply for initial QDC status.

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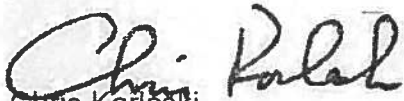
Ohio EPA is an Equal Opportunity Employer



Department of Natural Resources/Division of Wildlife. Obtain this permit prior to collection of any biological samples.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Kevin Boyce", which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address: Environmental Review Appeals Commission, 309 South Fourth Street, Room 222, Columbus, OH 43215.

Sincerely,

  
Chris Korleski,  
Director

