Northeast Ohio Regional Sewer District
Protecting Your Health and Environment

OHIO EPA - DSW
2009 MAR 12 AM 6:35

March 6, 2009

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

Dear Mr. Reynolds:

Please find enclosed the Level 3 Project Study Plan titled "2009 Benthic Macroinvertebrate Sampling Upstream of NEORSD CSO Areas". If you have any questions regarding the content of this study plan, please do not hesitate to contact me. I can be reached by email at rhoadesj@neorsd.org or phone (216) 641-6000 ext. 2219.

Sincerely,

John W. Rhoades
Supervisor of Environmental Assessment
Northeast Ohio Regional Sewer District

4747 E. 49th St. | Cuyahoga Heights, OH 44125 | P: (216) 641-6000 | F: (216) 641-8118

Level 3 Project Study Plan

2009 Benthic Macroinvertebrate Sampling Upstream of NEORSD CSO Areas

(1) Objective

The objective of this study is to conduct benthic macroinvertebrate and water quality sampling upstream from areas of Northeast Ohio Regional Sewer District (NEORSD)-owned combined sewer overflows (CSOs). The resulting upstream data will be compared with the benthic macroinvertebrate data obtained from these streams, downstream of the NEORSD CSO areas (required by Ohio EPA NPDES Permit No. 3PA00002*FD) to determine the extent to which downstream macroinvertebrate communities may be impacted by CSOs or other environmental factors. This sampling will be conducted by the NEORSD's Water Quality and Industrial Surveillance department (WQIS) and will occur from June 15 through September 30, 2009, as required in the OEPA *Biological Criteria for the Protection of Aquatic Life Volume III* (1987, updated September 30, 1989; November 8, 2006; and August 26, 2008).

Sample sites for this study are located on Big Creek, Doan Brook, Euclid Creek and Mill Creek, all of which are surface waters within the NEORSD service area. Quantitative and qualitative benthic macroinvertebrate sampling will be conducted at each sample site. The benthic macroinvertebrate results will be compiled and used to calculate an Invertebrate Community Index (ICI) score for each site. Species assemblages and individual metrics will be analyzed. Water sampling data will be evaluated to determine the presence and/or absence of excursions from water quality criteria. An examination of the individual metrics that comprise the ICI will be used in conjunction with water quality data, the Ohio EPA Macroinvertebrate Field Sheet, and Qualitative Habitat Evaluation Index (QHEI) results in order to identify impacts to the communities. Results will also be compared to historic data to show temporal as well as spatial trends.

In addition to the above sampling, NEORSD will attempt to conduct fish community sampling at each of the sample sites on Big Creek, Doan Brook, Euclid Creek and Mill Creek. This sampling will be dependent upon weather and stream conditions, as well as availability of NEORSD personnel. If the sampling is conducted, fish community health will be evaluated through the use of Ohio EPA indices [Index of Biological Integrity (IBI) and the Modified-Index of Well-Being (MIwb), where applicable]. An examination of the individual metrics that comprise the IBI will be used in conjunction with water quality data and QHEI results in order to identify impacts to the fish community.

(2) Nonpoint/Point Sources

Point Sources	Nonpoint Sources
CSO(s) outside of NEORSD service area	Urban Runoff
Storm Sewer Outfalls	Landfill Leachate
Upstream tributaries	Spills
Home Sewage Treatment Systems	Agriculture
	Golf Course Runoff

A map has been provided in Appendix A to show point sources that may be influencing the water quality at each sample location. These sources of pollution, along with the nonpoint sources listed in the table above, may be impacting the health of the fish and benthic macroinvertebrate communities and will need to be taken into account when evaluating impacts resulting from NEORSD CSOs. Other factors that may influence ecological conditions during the study include periods of drought and periods of heavy precipitation.

(3) Parameters Covered

Macroinvertebrate quantitative and qualitative samples will be collected and shipped to EA Engineering, Science and Technology[1] for identification and enumeration. EA Engineering, Science and Technology will identify the specimens to the lowest practical taxonomic level and whenever possible, to the level of taxonomy recommended in Ohio EPA's *Biological Criteria for the Protection of Aquatic Life, Volume III* (1987, updated September 30, 1989 and November 8, 2006).

The purpose of the study is not intended to determine full biological attainment of the designated use of each water body, but simply to determine the impacts that CSOs have on the macroinvertebrate community. This is consistent with Ohio EPA permit #3PA00002*FD, which does not require the collection of fish where macroinvertebrates are collected. However, an effort will be made to conduct fish community sampling at each of the sample sites for informational purposes. If NEORSD personnel availability does not allow for the completion of all sampling, the sites on Mill Creek and Euclid Creek will take priority over those on Big Creek and Doan Brook. This will be true for all the types of sampling detailed in this study plan.

[1] It is anticipated that EA Engineering, Science and Technology will be contracted to complete all macroinvertebrate identification. However, awarding of the contract is dependent upon approval by the Northeast Ohio Regional Sewer District Board of Trustees, which, to date, has not occurred. An amended study plan will be submitted if someone else is awarded the contract.

The Ohio EPA Macroinvertebrate Field Sheet will be completed at each site during the quantitative sampler retrieval. In addition, stream habitat will be measured by scoring components of the QHEI at all locations, including the substrate, instream cover, channel morphology, riparian zone and bank erosion, pool/glide and riffle/run quality and gradient.

Water chemistry sampling will be conducted at each sampling site. Sampling frequency is discussed below in section (6). Appendix B lists the parameters to be tested. Field measurements for dissolved oxygen, pH, temperature, specific conductance and stream velocity will also be performed. A water quality observation checklist will be completed at each site during each sampling event (Appendix C).

Fish specimens will be identified to species level, weighed (where applicable), counted and examined for the presence of external anomalies including DELTs (deformities, eroded fins, lesions and tumors). An Ohio Environmental Protection Agency Fish Data Sheet will be completed during each assessment.

(4) Field Collection and Data Assessment Techniques

Macroinvertebrate sampling will be conducted using quantitative and qualitative sampling techniques at the locations identified in section 5. Quantitative sampling will include installation of a five Hester-Dendy multi-plate artificial substrate sampler assemblage (HD) that is colonized for a six-week period. Multiple HD samplers may be installed at one or all of the locations in case samplers are lost due to vandalism, burial, etc. Qualitative sampling will be conducted using a D-frame dip net when HD samplers are retrieved. The Ohio EPA Macroinvertebrate Field Sheet will be completed during HD retrieval. Macroinvertebrate community assemblages will be collected and shipped to EA Engineering, Science and Technology for identification and enumeration. EA Engineering, Science and Technology will identify specimens to the lowest practical taxonomic level and when the condition of the specimen allows, to the level of taxonomy recommended in Ohio EPA's *Biological Criteria for the Protection of Aquatic Life, Volume III* (1987, updated September 30, 1989; November 8, 2006; and August 26, 2008). Voucher specimens will be collected as described in section (14). Stream flow will be measured with a Marsh-McBirney FloMate Model 2000 Portable Flow Meter, which measures flow in feet per second, when the HD samplers are installed and retrieved.

Contingent on weather and stream conditions, as well as availability of NEORSD personnel, field collections for fish will be attempted at as many of the locations as possible. The potential locations are listed in the tables in section 5. Sampling will be conducted using longline electrofishing techniques and will consist of

shocking all habitat types within a sampling zone, while moving from downstream to upstream. The sampling zone for headwater sites (Big Creek at river miles (RMs) 4.70 and 4.40, Doan Brook at RMs 1.40, 6.70, and 0.70, and Mill Creek at RMs 8.30 and 0.12) will be 0.15 km long. The sampling zone for wading sites (Big Creek at RM 0.15 and Euclid Creek at RMs 2.70, 1.65, and 0.55) will be 0.2 km long. The stunned fish will be collected and placed into a live well for later identification.

If surveys are conducted, fish will be identified to species level, weighed (where applicable), counted, and examined for the presence of external anomalies including DELTs. Fish easily identified (those commonly collected by NEORSD from year to year) will be returned to the site from which they are collected. Subsamples of difficult to identify species will be brought back to the laboratory for verification by NEORSD Level 3 Fish Qualified Data Collectors (QDC) and, if necessary, sent to The Ohio State University College Museum of Biological Diversity for verification by the Curator and/or Associate Curator of Fish. Voucher specimens will be collected as described in section (14). Endangered species and those too large for preservation will not be collected as voucher specimens, but will instead be photographed. Photographed vouchers will include features that permit definitive identification of the particular species.

Fish will be preserved in 10 percent formalin in the field, soaked in tap water for 24 to 48 hours after 5 to 7 days, then transferred to solutions of 30 and 50 percent ethanol for 5 to 7 days each and, finally, to 70 percent ethanol for long-term storage. Specimens larger than six inches will be slit along the right side and then soaked in formalin for approximately 10 to 14 days before being transferred to water and solutions of 30, 50 and 70 percent ethanol. Label information will include location (description and coordinates), date, time, collectors' names and sample identification code for each specimen collected.

A detailed description of the sampling and analysis methods utilized in the macroinvertebrate and fish surveys, including calculations of the ICI, IBI, and MIwb can be found in Ohio EPA's *Biological Criteria for the Protection of Aquatic Life, Volumes II* (1987, updated January 1, 1988; November 8, 2006; and August 26, 2008) and *III* (1987, updated September 30, 1989; November 8, 2006; and August 26, 2008).

Water chemistry sampling will be completed at all locations and will occur across a variety of flow conditions. Techniques used for water chemistry sampling and chemical analyses will follow the *Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices* (2009). Chemical water quality samples from each site will be collected with one 4-liter disposable polyethylene cubitainer with disposable polypropylene lid and two 473 mL plastic bottles. All water quality

samples will be collected as grab samples. One duplicate sample and one field blank will be collected at a randomly selected site, at the frequency not less than 10% of the total samples collected, for this study plan. The acceptable relative percent difference (RPD) for field duplicate samples will be ≤30 percent; results outside this range will trigger further evaluation and investigation into causes for disparities. RPD values above 30 percent, with results less then ten times the practical quantitation limit, will be reviewed on a case-by-case basis to determine if there is any merit for further investigation. Acid preservation of the samples, as specified in the NEORSD laboratory's standard operating procedure for each parameter, will occur in the field. Appendix B lists the analytical method, method detection limit and practical quantitation limit for each parameter analyzed. Field analyses include the use of either a YSI-556 MPS Multi-Parameter Water Quality Meter or YSI 600XL sonde to measure dissolved oxygen, water temperature, specific conductivity and pH; and when necessary, a Hanna HI 98129 meter to measure pH. Specifications for these meters have been included in Appendix D.

The QHEI, as described in Ohio EPA's, *Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI)* (2006) will be used to assess aquatic habitat conditions at each sample location.

(5) Sampling Locations

Stream	Latitude	Longitude	River Mile	Description	Quadrangle	Purpose
Big Creek	N41.4460°	W81.7540°	4.40	Memphis MetroPark	Lakewood	Evaluate macroinvertebrates and habitat upstream of CSOs
Big Creek	N41.4230°	W81.8019°	4.70	West 150th Street	Lakewood	Evaluate macroinvertebrates and habitat upstream of CSOs
Doan Brook	N41.4838°	W81.5643°	6.70	Upstream of Lee Road	Shaker Heights	Evaluate macroinvertebrates and habitat upstream of CSOs
Doan Brook	N41.4739°	W81.5593°	1.40	US Attleboro Road	Shaker Heights	Evaluate macroinvertebrates and habitat upstream of CSOs
Euclid Creek	N41.5658°	W81.5358°	2.70	Upstream of Highland Road	East Cleveland	Evaluate macroinvertebrates and habitat upstream of CSOs
Euclid Creek	N41.5738°	W81.5470°	1.65	Upstream of St. Clair Avenue	East Cleveland	Evaluate macroinvertebrates and habitat upstream of CSOs
Mill Creek	N41.4305°	W81.5442°	8.30	Upstream of South Miles Road	Shaker Heights	Evaluate macroinvertebrates and habitat upstream of CSOs

Downstream of CSO Permit-Required Sampling Locations*

Site Location	Latitude	Longitude	River Mile	Description	Quadrangle	Purpose
Big Creek	N41.4460°	W81.6865°	0.15	Downstream of Jennings Road	Cleveland South	Ohio EPA Permit No. 3PA00002*FD
Doan Brook	N41.5330°	W81.6296°	0.75	Downstream of St. Clair Avenue	Cleveland North	Ohio EPA Permit No. 3PA00002*FD
Euclid Creek	N41.5833°	W81.5594°	0.55	Downstream of Lakeshore Avenue	East Cleveland	Ohio EPA Permit No. 3PA00002*FD
Mill Creek	N41.4178°	W81.6387°	0.12	Upstream of Canal Road	Cleveland South	Ohio EPA Permit No. 3PA00002*FD

* These locations will be sampled according to Ohio EPA Permit No. 3PA00002*FD and are included here for comparison purposes only.

The purpose of sampling at each location is to compare the macroinvertebrate communities and water quality data from the upstream sampling sites to those from the respective sampling sites located downstream from areas of NEORSD-owned CSOs. Data generated will be used to evaluate the extent to which NEORSD CSOs or other environmental factors may be impacting the downstream macroinvertebrate community. Comparisons between water quality and biological community health will only be made if at least three water quality samples have been collected from a particular site.

(6) Schedule

Artificial substrate samplers will be installed on these streams at all of the sites between June 15 and August 15, 2009, and retrieved six weeks later. Specific dates have not been scheduled. River flow and weather conditions will be assessed weekly to determine when the HD sampler installations and retrievals will be conducted.

If possible, one to two electrofishing surveys will be conducted between June 15 and October 15, 2009. Each survey would be conducted at least four to five weeks apart. Specific dates have not been scheduled. Stream and weather conditions, as well as availability of NEORSD personnel, will be assessed weekly to determine when each electrofishing pass will be conducted.

Water samples will be collected approximately every eight days throughout the macroinvertebrate colonization period, unless surface water conditions are deemed unsafe.

QHEI habitat evaluations will be conducted one time between June 15 and October 15, 2009. These evaluations will be collected around the same time as one of the electrofishing surveys.

(7) QA/QC

Quality assurance and quality control of sampling and analysis methods for habitat, fish, and macroinvertebrate evaluations will follow Ohio EPA's *Biological Criteria for the Protection of Aquatic Life, Volumes II* (1987, updated January 1, 1988; November 8, 2006; and August 26, 2008) and *III* (1987, updated September 30, 1989; November 8, 2006; and August 26, 2008) and *Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI)* (2006).

Macroinvertebrate community assemblages will be collected and shipped to EA Engineering, Science and Technology for identification and enumeration. EA Engineering, Science and Technology will identify specimens to the lowest practical taxonomic level and when the condition of the specimen allows, to the level of taxonomy recommended in Ohio EPA's *Biological Criteria for the Protection of Aquatic Life, Volume III* (1987, updated September 30, 1989; November 8, 2006; and August 26, 2008). The EA Engineering, Science and Technology QA/QC manual is attached (Appendix E). All macroinvertebrate specimens will be returned to NEORSD by EA Engineering, Science and Technology. Voucher specimens for each site will be separated into individual vials and collected as described in section (14). The remaining specimens for each site will be returned in a single container labeled with the site number and method and date of collection. All specimens and accompanying chain-of-custody documentation will be retained by NEORSD and stored at the Environmental & Maintenance Services Center (EMSC) for a period not less than ten years.

Electrofishing equipment will be used according to the guidelines listed in the operation and maintenance manual provided by Smith-Root, Inc. Malfunctioning equipment will not be used to conduct surveys. Proper steps will be taken to correct the problem as soon as possible, whether by repairing in the field or at the NEORSD EMSC or by contacting the supplier or an appropriate service company.

Subsamples of difficult to identify fish species will be brought back to the laboratory for verification by NEORSD Level 3 Fish QDCs, and if necessary, sent to The Ohio State University Museum of Biological Diversity for verification by the Curator and/or Associate Curator of Fish. Voucher specimens will be collected as described in section (14). Endangered species and those too large for preservation will not be collected as voucher specimens, but will instead be photographed. Photographed vouchers will include features that will permit definitive identification of the particular species.

Water samples obtained for chemical analyses will be collected, labeled and then placed on ice inside the field truck. The field truck will remain locked at all times

when not occupied/visible. Sampling activities, including sample time and condition of surface water sampled, will be entered in a QDC log book and on the Surface Water Condition Sampling Field Data Form. 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 Standard Operating Procedures are on file with Ohio EPA. The Quality Assurance Officer at Analytical Service will send updates, revisions and any information on document control to Ohio EPA as needed.

(8) Work Products

Within one year of completion of the project, fish data (species, numbers, weights, pollution tolerances, the incidence of DELT anomalies, IBI and MIwb scores), macroinvertebrate data (types and numbers of macroinvertebrates collected and ICI scores), habitat data (QHEI raw data and scores) and water chemistry results will be submitted to the Ohio EPA. Additionally, reports summarizing, interpreting, graphically presenting and discussing the IBI, MIwb, ICI and QHEI scores and any excursions from water quality standards will be prepared for internal use.

(9) Qualified Data Collectors

The following Level 3 Qualified Data Collectors (QDC) will be involved with this study:

Name	Address	Email Address	Phone Number	QDC Specialty(s)
[1]John W. Rhoades	4747 East 49th Street Cuyahoga Hts., Ohio 44125	rhoadesj@neorsd.org	216-641-6000	QDC - 008 CWQA/FCB/SHA/ BMB
Cathy Zamborsky	4747 East 49th Street Cuyahoga Hts., Ohio 44125	zamborskyc@neorsd.org	216-641-6000	QDC - 009 CWQA/SHA
[2,3]Seth Hothem	4747 East 49th Street Cuyahoga Hts., Ohio 44125	hothems@neorsd.org	216-641-6000	QDC - 010 CWQA/FCB/SHA
Kathryn Crestani	4747 East 49th Street Cuyahoga Hts., Ohio 44125	crestanik@neorsd.org	216-641-6000	QDC - 011 CWQA/SHA
Tom Zablotny	4747 East 49th Street Cuyahoga Hts., Ohio 44125	zablotnyt@neorsd.org	216-641-6000	QDC - 018 CWQA/FCB/SHA
[4]Ron Maichle	4747 East 49th Street Cuyahoga Hts., Ohio 44125	maichler@neorsd.org	216-641-6000	QDC - 145 CWQA/SHA/BMB
[6]Francisco Rivera	4747 East 49th Street Cuyahoga Hts., Ohio 44125	riveraf@neorsd.org	216-641-6000	QDC - 262 CWQA
[5]Marty Sneen	EA Engineering, Science and Technology 444 Lake Cook Road, Suite #18 Deerfield, IL 60015	msneen@eaest.com	847-945-8010	QDC - 026 BMB

[1]Lead Project Manager
[2]Fish Community Biology (FCB) Project Manager
[3]Stream Habitat Assessment (SHA) Project Manager
[4]Benthic Macroinvertebrate Biology (BMB) Project Manager
[5]Benthic Macroinvertebrate Identification
[6]Chemical Water Quality Assessment (CWQA) Project Manager

The following is a list of persons not qualified as QDCs who may be involved in the project. Prior to the start of sampling, the project managers will explain to each individual the proper methods for sampling. Sampling will only be completed under the direct observation of a QDC. The lead project manager will be responsible for reviewing all reports and data analysis prepared by qualified personnel prior to completion.

Name	Address	Email Address	Phone Number
Joseph Broz	4747 East 49th Street Cuyahoga Hts., Ohio 44125	brozj@neorsd.org	216-641-6000
Tim Dobriansky	4747 East 49th Street Cuyahoga Hts., Ohio 44125	dobrianskyt@neorsd.org	216-641-6000
Kristina Granlund	4747 East 49th Street Cuyahoga Hts., Ohio 44125	granlundk@neorsd.org	216-641-6000
Rae Grant	4747 East 49th Street Cuyahoga Hts., Ohio 44125	grantr@neorsd.org	216-641-6000
Eric Hinton	4747 East 49th Street Cuyahoga Hts., Ohio 44125	hintone@neorsd.org	216-641-6000
Jillian Novak	4747 East 49th Street Cuyahoga Hts., Ohio 44125	novakj@neorsd.org	216-641-6000
Cathy O'Grady	4747 East 49th Street Cuyahoga Hts., Ohio 44125	ogradyc@neorsd.org	216-641-6000
Mike Pavlik	4747 East 49th Street Cuyahoga Hts., Ohio 44125	pavlikm@neorsd.org	216-641-6000
Kevin Roff	4747 East 49th Street Cuyahoga Hts., Ohio 44125	roffk@neorsd.org	216-641-6000
Frank Schuschu	4747 East 49th Street Cuyahoga Hts., Ohio 44125	schuschuf@neorsd.org	216-641-6000
Elizabeth Toot-Levy	4747 East 49th Street Cuyahoga Hts., Ohio 44125	toot-levye@neorsd.org	216-641-6000
Wolfram von Kiparski	4747 East 49th Street Cuyahoga Hts., Ohio 44125	vonkiparskiw@neorsd.org	216-641-6000
Summer Co-op	4747 East 49th Street Cuyahoga Hts., Ohio 44125	To Be Determined	216-641-6000
Summer Co-op	4747 East 49th Street Cuyahoga Hts., Ohio 44125	To Be Determined	216-641-6000
Summer Co-op	4747 East 49th Street Cuyahoga Hts., Ohio 44125	To Be Determined	216-641-6000

(10) Documentation of approval of project manager and other personnel as level 3 qualified data collectors

See attached (Appendix F).

(11) Contract laboratory contact information

Identification of macroinvertebrates will be completed by EA Engineering, Science and Technology. Benthic macroinvertebrates will be identified to the lowest practical level as recommended in Ohio EPA's *Biological Criteria for the Protection of Aquatic Life, Volume III* (1987, updated September 30, 1989, November 8, 2006, and August 26, 2008).

Marty Sneen, Benthic Specialist (QDC# 026)
EA Engineering, Science and Technology
444 Lake Cook Road Suite #18
Deerfield, IL 60015
847-945-8010 ext. 108 / msneen@eaest.com

Any fish that is not positively identified in the field or NEORSD laboratory will be sent to The Ohio State University Museum of Biological Diversity for verification by the Curator of Fish. Fish will be identified to the species level.

Dr. Ted Cavender, Curator of Fish / Mr. Marc Kibbey, Associate Curator of Fish
1315 Kinnear Road, Columbus, Ohio 43212
cavender.1@osu.edu / kibbey.3@osu.edu
614-292-7873

(12) ODNR collectors' permit

To be submitted electronically when issued to NEORSD by ODNR.

(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 / [signature] Date: 03/06/09

(14) Voucher Specimen Statement

NEORSD will maintain a benthic macroinvertebrate or fish voucher collection which includes two specimens of each species or taxa collected during the course of biological sampling from any stream within the NEORSD's service area. When benthic macroinvertebrate specimens from other surface waters are collected within the same year and identified by the same QDC, one voucher collection will be created to represent the specimens collected from those streams. When fish

specimens from multiple surface waters are collected within the same year, a single voucher collection will be created to represent the specimens collected from those streams. A separate collection for each sampling event will not be maintained.

NEORSD will provide specimen vouchers to the Director upon request. This collection will be stored at the NEORSD laboratory in the Environmental and Maintenance Services Center.

Print/Signature: John W. Rhoades / Date: 03/06/09

(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: 03/06/09

Print/Signature: Cathy Zamborsky / Date: 3/9/09

Print/Signature: Seth Hothem / Date: 3/6/09

Print/Signature: Kathryn Crestani / Date: 3/6/09

Print/Signature: Tom Zablotny / Date: 3-6-09

Print/Signature: Ron Maichle / Date: 03-06-09

Print/Signature: Francisco Rivera / Date: 3/6/09

Appendix A

Mill Creek

Euclid Creek

Big Creek

Doan Brook

Northeast Ohio Regional Sewer District
Protecting Your Health and Environment

Overview Map

Lake
Lake Erie
Geauga
Cuyahoga
Lorain
Medina
Summit
Portage

Benthic Mancroinvertebrate Sampling Upstream and Downstream of NEORSD CSO Area

- Fish, Macroinvertebrate, Habitat, and Water Sample Site
- CSO Outfalls
- Automated Regulators
- Manual Control Device
- Hydro Brake
- Regulator
- Wastewater Treatment Facility
- WQIS Industries
- Flow Monitor
- Level Monitor
- Remote Level Monitor
- Rain Gauges
- Stream
- Interceptor Sewer
- (ICRS) Intercommunity Relief Sewer
- CSO Control Sewer
- CSO Responsibility Sewer
- Local Combined Sewer
- Local Sanitary Sewer
- Local Storm Sewer
- Local Culverted Stream
- Local Force Main
- Community Boundary

N

1"= Unknown

Not to Scale

Mill Creek

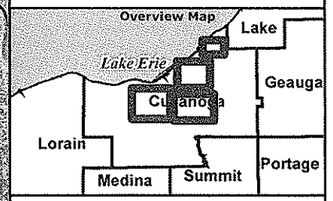
Euclid Creek

Big Creek

Doan Brook

Northeast Ohio Regional Sewer District

Protecting Your Health and Environment



Benthic Mancroinvertebrate Sampling Upstream and Downstream of NEORSD CSO Area

- Fish, Macroinvertebrate, Habitat, and Water Sample Site
- CSO Outfalls
- Automated Regulators
- Manual Control Device
- Hydro Brake
- Regulator
- Wastewater Treatment Facility
- WQIS Industries
- Flow Monitor
- Level Monitor
- Remote Level Monitor
- Rain Gauges
- Stream
- Interceptor Sewer
- (ICRS) Intercommunity Relief Sewer
- CSO Control Sewer
- CSO Responsibility Sewer
- Local Combined Sewer
- Local Sanitary Sewer
- Local Storm Sewer
- Local Culverted Stream
- Local Force Main
- Community Boundary

N

1"= Unknown

Not to Scale

Appendix B

Parameter	Test	Minimum Detection Limit	Practical Quantitation Limit
Alkalinity	EPA 310.2	3.3 mg/L	10 mg/L
COD	EPA 410.4	5 mg/L	10 mg/L
Hex Chrome	SM 3500 Cr D. *	1 ug/L	10 ug/L
Mercury	EPA 245.1	0.005 ug/L	0.050 ug/L
NH3	EPA 350.1	0.004 mg/L	0.010 mg/L
NO2 + NO3	EPA 353.2	0.003 mg/L	0.010 mg/L
NO2	SM 4500-NO_2^- B. *	0.002 mg/L	0.010 mg/L
NO3	EPA 353.2	0.003 mg/L	0.010 mg/L
Soluble-P	EPA 365.2	0.002 mg/L	0.010 mg/L
Total-P	EPA 365.2	0.001 mg/L	0.010 mg/L
BOD	EPA 405.1 (5 Day)	2 mg/L	
Ag	EPA 200.7	0.12 µg/L	1.00 µg/L
Al	EPA 200.7	3.0 µg/L	10.0 µg/L
As	EPA 200.7	0.38 µg/L	2.00 µg/L
Be	EPA 200.7	0.12 µg/L	1.00 µg/L
Ca	EPA 200.7	14 µg/L	275 µg/L
Hardness (calc.)	SM 2340 B *	CaCO3 mg/L =(2.497*Ca mg/L)+(4.118*Mg mg/L)	
Cd	EPA 200.7	0.15 ug/L	1.00 µg/L
Co	EPA 200.7	0.12 ug/L	1.00 µg/L
Cr	EPA 200.7	0.51 ug/L	1.00 µg/L
Cu	EPA 200.7	0.17 ug/L	1.00 µg/L
Fe	EPA 200.7	1.5 ug/L	1.00 µg/L
K	EPA 200.7	30 ug/L	275 µg/L
Mg	EPA 200.7	5 ug/L	150 µg/L
Mn	EPA 200.7	0.17 ug/L	1.00 µg/L
Mo	EPA 200.7	0.18 ug/L	2.00 µg/L
Na	EPA 200.7	23 ug/L	275 µg/L
Ni	EPA 200.7	0.22 ug/L	2.00 µg/L
Pb	EPA 200.7	0.28 ug/L	3.00 ug/L
Sb	EPA 200.7	0.43 ug/L	5.00 ug/L
Se	EPA 200.7	0.86 ug/L	5.00 ug/L
Sn	EPA 200.7	4.6 ug/L	25.0 ug/L
Total Metals	EPA 200.7	µg/L =(Cr µg/L)+(Cu µg/L)+(Ni µg/L)+(Zn µg/L)	
Ti	EPA 200.7	0.64 ug/L	2.00 ug/L
Tl	EPA 200.7	1.1 ug/L	5.0 ug/L
V	EPA 200.7	0.24 ug/L	1.00 ug/L
Zn	EPA 200.7	0.8 ug/L	10.0 ug/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
Turbidity	EPA 180.1	0.1 NTU	0.2 NTU
pH	SM 4500H-B *	(value reported in standard units)	

Field Parameter	Test	(Value Reported in)
pH	EPA 150.1	s.u.
Specific Conductivity	SM 2510 A *	µs/cm
Dissolved Oxygen	SM 4500-0 G *	mg/L
Temperature	EPA 170.1	°C
Flow at Hester-Dendy		fps

* Standard Methods for the Examination of Water and Wastewater, 19th Edition

Appendix C

NEORSD Surface Water Condition Sampling Field Data Form

Stream: _____ Collectors: _____

Date: _____ Cuyahoga River Daily Mean Discharge*: _____ ft³/sec

Was this sample taken during or following a wet weather event? YES / NO
If yes, when and how much rain occurred? _____

Water Quality Meters Used: _____

Time: _____ Site Location (RM): _____

Flow: Low Normal High Other: _____

HD Status: OK Buried Out of Water H-D was Reset

Unknown (river to high) Missing Not Installed Flow: _____ fps

Clarity: Clear Murky Turbid Other: _____

Color: None Green Brown Other: _____

Field Parameters: Dissolved Oxygen (mg/L): _____ Temperature (°C): _____

Specific Conductance (µmhos/cm): _____ pH (s.u.): _____

General Comments: _____

Sample ID: (Label Here)

Field Blank Site / Sample Duplicate Site

Time: _____ Site Location (RM): _____

Flow: Low Normal High Other: _____

HD Status: OK Buried Out of Water H-D was Reset

Unknown (river to high) Missing Not Installed Flow: _____ fps

Clarity: Clear Murky Turbid Other: _____

Color: None Green Brown Other: _____

Field Parameters: Dissolved Oxygen (mg/L): _____ Temperature (°C): _____

Specific Conductance (µmhos/cm): _____ pH (s.u.): _____

General Comments: _____

Sample ID: (Label Here)

Field Blank Site / Sample Duplicate Site

*USGS 04208000 @ Independence, OH

Modified November 06, 2008

NEORSD Surface Water Condition Sampling Field Data Form

Stream: _____ Collectors: _____

Date: _____ Cuyahoga River Daily Mean Discharge*: _____ ft^3/sec

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

If yes, when and how much rain occurred? _____

Water Quality Meters Used: _____

Time: _____ Site Location (RM): _____

Flow: Low Normal High Other: _____

HD Status: OK Buried Out of Water H-D was Reset

Unknown (river to high) Missing Not Installed Flow: _____ fps

Clarity: Clear Murky Turbid Other: _____

Color: None Green Brown Other: _____

Field Parameters: Dissolved Oxygen (mg/L): _____ Temperature (°C): _____

Specific Conductance (µmhos/cm): _____ pH (s.u.): _____

General Comments: _____

_____

Field Blank Site / Sample Duplicate Site

(Label Here)

Sample ID:

Time: _____ Site Location (RM): _____

Flow: Low Normal High Other: _____

HD Status: OK Buried Out of Water H-D was Reset

Unknown (river to high) Missing Not Installed Flow: _____ fps

Clarity: Clear Murky Turbid Other: _____

Color: None Green Brown Other: _____

Field Parameters: Dissolved Oxygen (mg/L): _____ Temperature (°C): _____

Specific Conductance (µmhos/cm): _____ pH (s.u.): _____

General Comments: _____

_____

Field Blank Site / Sample Duplicate Site

(Label Here)

Sample ID:

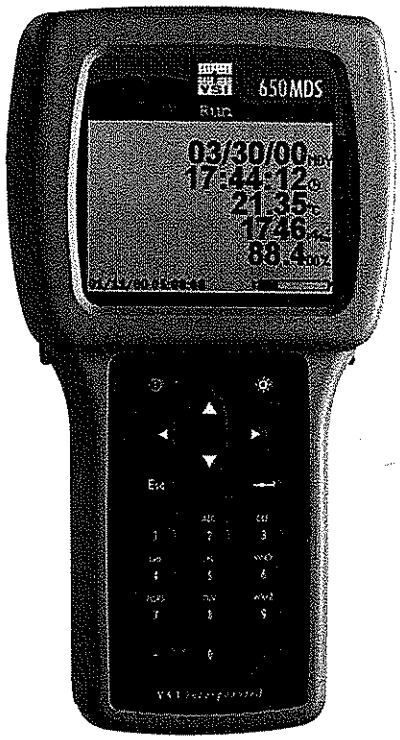
*USGS 04208000 @ Independence, OH

Modified November 06, 2008

Appendix D

YSI 650 Multiparameter Display System

Rugged and Reliable Display and Data Logging System



The YSI 650 Multiparameter Display System

Easily log real-time data, calibrate YSI 6-Series sondes, set up sondes for deployment, and upload data to a PC with the feature-packed YSI 650MDS (Multiparameter Display System). Designed for reliable field use, this versatile display and data logger features a waterproof IP-67, impact-resistant case.

- **Compatible with EcoWatch® for Windows® data analysis software**
- **User-upgradable software from YSI's website**
- **Menu-driven, easy-to-use interface**
- **Multiple language capabilities**
- **Graphing feature**
- **Three-year warranty**

Feature-Packed Performance

Battery Life

With the standard alkaline battery configuration of 4 C-cells, the YSI 650 will power itself and a YSI 6600 sonde continuously for approximately 30 hours. Or, choose the rechargeable battery pack option with quick-charge feature.

Optional Barometer

Temperature-compensated barometer readings are displayed and can be used in dissolved oxygen calibration. Measurements can be logged to memory for tracking changes in barometric pressure.

Optional GPS Interface

Designed to NMEA protocol, the YSI 650 MDS will display and log real-time GPS readings with a user supplied GPS interfaced with YSI 6-Series sondes.

Memory Options

Standard memory with 150 data sets, or a high-memory option (1.5 MB) with more than 50,000 data sets; both options with time and date stamp.

Pure Data for a Healthy Planet.®

A powerful logging display for your data collection processes

The 650MDS can be used with YSI sondes for spot sampling as well as short-term data logging.

Supply a GPS with NMEA 0183 protocol, connect with the YSI 6115 kit, and collect GPS data along with water quality data.

Upload data from the 650 to EcoWatch® for instant data viewing.

www.ysi.com

14.1 Sensor Specifications

Dissolved Oxygen		
Sensor Type		Steady state polarographic
Range:	*% air sat'n*	▪ 0 to 500% air saturation
	mg/L	▪ 0 to 50 mg/L
Accuracy:	*% air sat'n*	▪ 0 to 200% air saturation: ±2% of the reading or 2% air saturation; whichever is greater ▪ 200 to 500% air saturation: ±6% of the reading
	mg/L	▪ 0 to 20 mg/L: ±2% of the reading or 0.2 mg/L; whichever is greater ▪ 20 to 50 mg/L: ±6% of the reading
Resolution:	*% air sat'n*	▪ 0.1% air saturation
	mg/L	▪ 0.01 mg/L
Temperature		
Sensor Type:		YSI Precision™ thermistor
Range:		-5 to 45°C
Accuracy:		±0.15°C
Resolution:		0.01°C
Conductivity		
Sensor Type:		4-electrode cell with auto-ranging
Range:		0 to 200 mS/cm
Accuracy:		±0.5% of reading or ±0.001 mS/cm; whichever is greater–4 meter cable ±1.0% of reading or ±0.001 mS/cm; whichever is greater–20 meter cable
Resolution:		0.001 mS/cm to 0.1 mS/cm (range-dependent)
Salinity		
Sensor Type:		Calculated from conductivity and temperature
Range:		0 to 70 ppt
Accuracy:		±1.0% of reading or 0.1 ppt; whichever is greater
Resolution:		0.01 ppt

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.

The YSI 600XL and 600XLM

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.

- 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.

ETV

YSI 650MDS Specifications

Temperature	Operating	-10 to +60°C for visible display
	Storage	-20 to +70°C
Waterproof Rating		IP-67 for both the standard alkaline battery configuration and for the rechargeable battery pack option
Connector		MS-8; meets IP-67 specification
Dimensions	Width	4.7 in, 11.9 cm
	Length	9 in, 22.9 cm
	Weight with batteries	2.1 lbs, 0.91 kg
Display		VGA; LCD with 320 by 240 pixels with backlight
Power	Standard	4 alkaline C-cells with detachable battery cover
	Optional	Ni metal hydride battery pack with attached battery cover and 110/220 volt charging system
Communications		RS-232 to all sondes, for data transfer to PC, and for software updates
Optional GPS		NMEA 0183; requires user-supplied GPS and YSI 6115 Y-cable
Backlight		4 LEDs illuminating LCD; user-selectable
Keypad		20 keys, including instrument on/off, backlight on/off, enter, esc, 10 number/letter entry keys, 2 vertical arrow keys, 2 horizontal arrow keys, period key, and minus key
Warranty		3 years

Ordering Information

650-01	Instrument, standard memory
650-02	Instrument, high memory
650-03	Instrument, standard memory, barometer
650-04	Instrument, high memory, barometer
6113	Rechargeable battery pack kit with 110 volt charger and adapter cable
616	Charger, cigarette lighter
4654	Tripod
614	Ultra clamp, C-clamp mount
5081	Carrying case, hard-sided
5085	Hands-free harness
5065	Form-fitted carrying case
6115	Y-cable for interface with user-supplied GPS system

The 650MDS can interface with any YSI sonde for
- *spot sampling*
- *short-term studies*
- *surface and ground water monitoring*
- *water level monitoring*

Packaged together, the 600QS system includes a 600R conductivity sonde, 650MDS, field cable, and additional sensor options such as pH, dissolved oxygen, ORP, and vented level.

To order, or for more information, contact YSI

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800 897 4151 (US)

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Who's Minding the Planet?

HI 98129

Combo pH/EC/TDS/Temperature Tester with Low Range EC

Description

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 (ß). Fast, efficient, accurate and portable, the Combo pH, EC/TDS and temperature tester brings you all the features you've asked for and more!

Specifications

Range	pH	0.00 to 14.00 pH
Range	EC	0 to 3999 µS/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 µS/cm
Resolution	TDS	1 ppm
Resolution	Temperature	0.1°C / 0.1°F
Accuracy	pH	±0.05 pH
Accuracy	EC/TDS	±2% F.S.
Accuracy	Temperature	±0.5°C / ±1°F
Temperature Compensation		pH: automatic; EC/TDS: automatic with ß adjustable from 0.0 to 2.4% / °C
Calibration	pH	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	EC/TDS	automatic, 1 point
TDS Conversion Factor		adjustable from 0.45 to 1.00
pH Electrode		HI 73127 (replaceable; included)
Environment		0 to 50°C (32 to 122°F); RH max 100%
Battery Type / Life		4 x 1.5V / approx. 100 hours of continuous use; auto-off after 8 minutes of non-use
Dimensions		163 x 40 x 26 mm (6.4 x 1.6 x 1.0")
Weight		100 g (3.5 oz.)

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

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*Sensors with listed with the ETV logo were submitted to the ETV program on the YSI 6600EDS. Information on the performance characteristics of YSI water quality sensors can be found at www.epa.gov/etv, or call YSI at 800.897.1151 for the ETV verification report. Use of the ETV name or logo does not imply approval or certification of this product nor does it make any explicit or implied warranties or guarantees as to product performance.

YSI incorporated
Who's Minding the Planet?

YSI 600XL & 600XLM Sensor Specifications

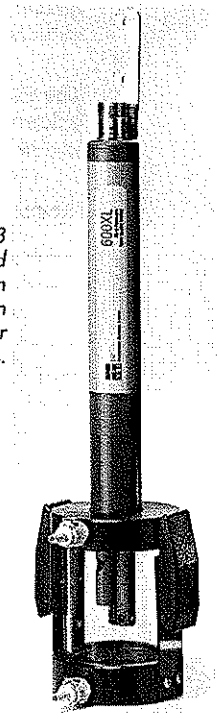
	Range	Resolution	Accuracy
Dissolved Oxygen % Saturation ETV 6562 Rapid Pulse™ Sensor*	0 to 500%	0.1%	0 to 200%: ±2% of reading or 2% air saturation, whichever is greater; 200 to 500%: ±6% of reading
Dissolved Oxygen mg/L ETV 6562 Rapid Pulse™ Sensor*	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ± 0.2 mg/L or 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
Vented 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 1989).

YSI 600XL & 600XLM Sonde Specifications

Medium		Fresh, sea or polluted water
Temperature	Operating	-5 to +50°C
	Storage	-10 to +60°C
Communications		RS-232, SDI-12
Software		EcoWatch*
Dimensions 600XL | 600XLM	Diameter	1.65 in, 4.19 cm | 1.65 in, 4.9 cm
	Length	16 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.



Appendix E

EA Engineering, Science and Technology

444 Lake Cook Rd., Suite 18
Deerfield, IL 60015
Telephone: 847-945-8010
Fax: 847-945-0296

03 February 2009

Mr. John Rhoades
North East Ohio Regional Sewer District
Environmental & Maintenance Services Center
4747 East 49th St.
Cuyahoga Heights, OH 44125-1011

Dear John:

This letter serves as my acknowledgement that I am responsible for the following during the 2009 monitoring period:

1) Benthic macroinvertebrate identifications and benthic macroinvertebrate voucher collection development for all benthic macroinvertebrate samples collected as per the 2009 Benthic Macroinvertebrate Sampling Upstream of NEORSD CSO Areas study plan.
2) Benthic macroinvertebrate identifications and benthic macroinvertebrate voucher collection development and for all benthic macroinvertebrate samples collected as per the 2009 Cuyahoga River Electrofishing & Benthic Macroinvertebrate Surveys study plan. If necessary to maintain my L3 QDC certification, I will collect a HD and qualitative sample from at least one of the Cuyahoga River sampling sites.
3) Benthic macroinvertebrate identifications and benthic macroinvertebrate voucher collection development for all benthic macroinvertebrate samples collected as per the 2009 Dugway Brook East Interceptor Relief Sewer Alignment Baseline Study
4) Benthic macroinvertebrate identifications and benthic macroinvertebrate voucher collection development for all benthic macroinvertebrate samples collected as per the 2009 Euclid Creek, East Branch Restoration Baseline Study
5) Benthic macroinvertebrate identifications and benthic macroinvertebrate voucher collection development for all benthic macroinvertebrate samples collected as per the 2009 Mill Creek Highland Park Golf Course Stream Restoration Baseline Study
6) Benthic macroinvertebrate identifications and benthic macroinvertebrate voucher collection development for all benthic macroinvertebrate samples collected as per the 2009 Creekside WWTP Decommissioning Baseline Study

In addition, I acknowledge that Level 3 QDC Certification by Ohio EPA is required to perform these tasks and that I am responsible for maintaining my Level 3 QDC Certification during the term of these studies.

Sincerely,

Martin E. Sneen
Benthic Taxonomist/EA Project Manager

Standard Operating Procedures

Laboratory Processing of Benthic Samples

Upon arrival at the laboratory, the Hester-Dendy (H-D) and qualitative samples were logged in and accounted for. Prior to sorting and identification, each sample was rinsed on a No. 60 (0.250 mm openings) U.S. Standard Testing Sieve to remove the preservative and the H-D plates were scraped to remove the organisms. Sorting of each H-D sample was conducted in a white enamel pan first under a magnifier lamp and finally under a compound dissecting scope. If necessary, a Folsum sample splitter was used to subsample the H-Ds until a more manageable number of organisms was achieved. Prior to splitting, the sample was pre-picked to remove any large and/or rare taxa. In all a minimum of 250 organisms were removed from the fractionated samples. Organisms were sorted to higher taxonomic levels (generally Class or Order level) and preserved separately in labeled vials containing 70% ethyl alcohol. To assure a consistent level of quality and sorting efficiency, senior EA personnel checked all samples. The qualitative samples contained very little detrital matter and therefore were simply rinsed prior to identification.

Macroinvertebrate identifications were made to the lowest practical taxonomic level using the most current literature available (see attached list of taxonomic literature). Whenever possible, the level of identifications followed those recommended by Ohio EPA (2006). Chironomidae larvae were cleared in warm 10% potassium hydroxide and mounted in CMC-10 prior to identification. Approximately 100 chironomids from any single sample were mounted for identification. For all sample types, specimens were enumerated, coded and recorded on a standard laboratory bench sheet for data processing.

Data Analyses

The Invertebrate Community Index (ICI) was used as the principal measure of overall macroinvertebrate community condition. Developed by the Ohio EPA, the ICI is a modification of the Index of Biotic Integrity for fish (Ohio EPA 1987). The ICI consists of ten individually scored structural community metrics:

1. Total number of taxa
2. Total number of mayfly taxa
3. Total number of caddisfly taxa
4. Total number of dipteran taxa
5. Percent mayflies
6. Percent caddisflies
7. Percent Tanytarsini midges
8. Percent other dipterans and non-insects
9. Percent tolerant organisms
10. Total number of qualitative EPT taxa.

Scoring criteria for all ten metrics is dependent upon drainage area. The scoring of an individual sample was based on the relevant attributes of that sample compared to equivalent data from 232 reference sites throughout Ohio. Metric scores range from six points for values comparable to exceptional community structure to zero points for values that deviate strongly from the expected range of values based on scoring criteria established by Ohio EPA (1989a). The sum of the individual metric scores resulted in the ICI score for that particular location.

For H-D samples with a total count of less than 50 organisms, low-end scoring is used. For low-

end scoring, the proportional ICI metrics five through nine automatically default to a score of zero. This prevents metric scores from being biased due to meaningless proportions of few individuals and taxa (OEPA 2006).

Calculation of the ICI was conducted using a computer program written for the software SAS® by EA in 1994. This program is continuously tested and updated to ensure its accuracy.

The only other statistical comparison used was the relative abundance (or percent composition) of individual taxa from each site and sample type. Relative abundance was calculated for both sample types as:

$$\text{Rel. Abund.}(\%) = 100 \times \frac{\text{\# Individuals of a Taxa}}{\text{Total \# of Individuals in Sample}}$$

All sample processing and data analysis were completed by permanent and full-time EA Engineering, Science, & Technology, Inc. staff working in our Deerfield, Illinois office and laboratory. Specific staff members that worked on this project and relevant years of experience are listed below by task:

Task	EA Personnel	Years of Experience
Login, Sorting, Mounting	Conrad Zack	3
Identification	Marty Sneen	20
Data Analysis	Joe Vondruska	25
	Marty Sneen	20

Selected Ohio EPA Reporting Requirements

Item 12-Taxonomic literature

Although EA's taxonomic library contains substantially more references than are listed here, the following list only includes taxonomic literature used to identify the benthos in samples from Big Creek, Doan Brook, Euclid Creek, Mill Creek, and the Cuyahoga River.

Bednarik, A.F. and W.P. McCafferty. 1979. Biosystematic revision of the genus Stenonema (Ephemeroptera: Heptageniidae). Canadian Bulletins of Fisheries and Aquatic Sciences 201:1-73.

Bode, R.W. 1983. Larvae of North American Eukiefferiella and Tvetenia (Diptera: Chironomidae). New York State Museum Bulletin 452:1-40.

Bolton, M.J. 2007. Ohio EPA supplemental keys to the larval Chironominae (Diptera) of Ohio and Ohio Chironomidae checklist. Ohio EPA, Division of Surface Water, Ecological Assessment Section, Columbus, Ohio.

Brown, H.P. 1976. Aquatic dryopoid beetles (Coleoptera) of the United States. Water

Pollution Control Series 18050 ELDO4/72. 2nd edition. U.S. Environmental Protection Agency, Cincinnati, OH.

Burch, J.B. 1982. Freshwater snails (Mollusca: Gastropoda) of North America. EPA-600/3-82-026. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, OH.

Epler, J.H. 1987. Revision of the Nearctic Dicrotendipes Kieffer, 1913 (Diptera: Chironomidae). Evolutionary Monographs No. 9:1-102.

_____. 1995. Identification manual for the larval Chironomidae (Diptera) of Florida. Florida DEP, Division of Water Facilities, Tallahassee, FL.

_____. 2001. Identification manual for the larval Chironomidae (Diptera) of North and South Carolina. North Carolina DENR, Division of Water Quality, Raleigh, NC.

Grodhaus, G. 1987. Endochironomus Kieffer, Tribelos Townes, Synendotendipes new genus, and Endotribelos new genus (Diptera: Chironomidae) of the Nearctic region. Journal of the Kansas Entomological Society 60(2):167-247.

Jezerinac, R.F., G.W. Stocker, and D.C. Tarter. 1995. The crayfishes (Decapoda: Cambaridae) of West Virginia. Bulletin of the Ohio Biological Survey 10(1):1-193.

Larson, D.J., Y. Alarie, and R.E. Roughley. 2000. Predaceous Diving Beetles (Coleoptera: Dytiscidae) of the Nearctic Region: with emphasis on the fauna of Canada and Alaska. NRC Research Press, Ottawa, Canada.

Klemm, D.J. 1985. Guide to the freshwater Annelida (Polychaeta, naidid, and tubificid Oligochaeta, and Hirudinea) of North America. Kendall/Hunt Publishing Co., Dubuque, IA.

Maschwitz, D.E. and E.F. Cook. 2000. Revision of the Nearctic species of the genus *Polypedilum* Kiefer (Diptera:Chironomidae) in the subgenera *P. (Polypedilum)* Kieffer and *P. (Uresipedilum)* Oyewo and Saether. Bulletin of the Ohio Biological Survey. New Series 12(3): 1-135.

McCafferty, W.P. and R.D. Waltz. 1990. Revisionary synopsis of the Baetidae (Ephemeroptera) of North and Middle America. Transactions of the American Entomological Society 116(4):769-799.

Merritt, R.W., K.W. Cummins, and M.B. Berg, eds. 2007. An introduction to the aquatic insects of North America. 4th edition. Kendall/Hunt Publishing Co., Dubuque, IA.

Morihara, D.K. and W.P. McCafferty. 1979. The Baetis larvae of North America (Ephemeroptera: Baetidae). Transactions of the American Entomological Society 105:139-221.

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Item 13-Voucher Collection

A voucher collection was developed containing two good specimens (when available) of each taxon identified from the samples. This voucher collection along with all sample specimens will be returned to NEORSD upon completion of all the sample analysis.

Outside expert specimen verification was not necessary for identification of these specimens. EA maintains a sizable macroinvertebrate voucher collection with over 1800 specimens representing over 700 taxa used for verification. If this taxonomic library proved to be insufficient, every reasonable attempt would be made to have the specimen(s) identified or verified by a noted authority.

Item 16-Chironomidae Identification

Chironomidae larvae were cleared in warm 10% potassium hydroxide and mounted in CMC-10 prior to identification. Generally, up to 100 chironomids from any single sample are mounted

for identification. Species level identifications generally follow those suggested by Ohio EPA.

Item 17-Copies of Raw Data

Copies of the laboratory bench sheets are appended to the hard copy of this document.

Item 18-ICI Calculation

The Invertebrate Community Index (ICI) was used as the principal measure of overall macroinvertebrate community condition. Developed by the Ohio EPA, the ICI is a modification of the Index of Biotic Integrity for fish (Ohio EPA 1987). The ICI consists of ten individually scored structural community metrics:

1. Total number of taxa
2. Total number of mayfly taxa
5. Percent mayflies
6. Percent caddisflies
7. Percent Tanytarsini midges
3. Total number of caddisfly taxa
4. Total number of dipteran taxa
8. Percent other dipterans and non-insects
9. Percent tolerant organisms
10. Total number of qualitative EPT taxa.

Scoring criteria for all ten metrics is dependent upon drainage area. The scoring of an individual sample was based on the relevant attributes of that sample compared to equivalent data from at least 232 plus reference sites throughout Ohio. Metric scores range from six points for values comparable to exceptional community structure to zero points for values that deviate strongly from the expected range of values based on scoring criteria established by Ohio EPA (1989a). The sum of the individual metric scores resulted in the ICI score for that particular location.

Calculation of the ICI was conducted using a computer program written for the software SAS® by EA in 1994. This program is continuously tested and updated to ensure its accuracy.

Item 20-Statistical Analyses

The only other statistical comparison used was the relative abundance (or percent composition) of individual taxa per site and sample type. Relative abundance was calculated for both sample types as:

$$\text{Rel. Abund.} = \frac{\text{\# Individuals of a Taxa}}{\text{Total \# of Individuals in Sample}}$$

Item 21-Results

Complete results are appended to the hard copy of this document.

Item 25-Electronically Formatted Data

For convenience, the data and text are provided in electronic format as Word 2003® files via email and on the enclosed CD-RW.

Appendix F

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

OHIO E.P.A.
AUG 22 2008
EXECUTIVE DIRECTOR'S OFFICE

Effective Date: August 22, 2008
Expiration Date: August 21, 2010

CERTIFIED MAIL

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.

By: _____ Date: 8/22/08

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

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

Dear John:

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: **008**

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.

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State of Ohio Environmental Protection Agency

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By: _____ Date: 8/22/08

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

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

Dear John:

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: Fish Community Biology/QHEI
QDC number: **008**

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.

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OHIO E.P.A.
NOV - 4

Effective Date: November 4, 2008
Expiration Date: November 3, 2010

CERTIFIED MAIL

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.

By: _____ Date: 11-4-08

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

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

Dear John:

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: Benthic Macroinvertebrate Biology (Collection and Data Evaluation)
QDC number: **008**

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.

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Effective Date: August 15, 2008
Expiration Date: August 14, 2010

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.

By: Jennifer Lassiter Date: 8-15-08

CERTIFIED MAIL

Catherine M. Zamborsky
Northeast Ohio Regional Sewer District
1749 Royalwood Road
Broadview Heights, Ohio 44147

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

Dear Catherine:

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: **009**

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.

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By: Dorothy Lassiter Date: 8-15-08

CERTIFIED MAIL

Catherine M. Zamborsky
Northeast Ohio Regional Sewer District
1749 Royalwood Road
Broadview Heights, Ohio 44147

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

Dear Catherine:

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: Stream Habitat Assessment (QHEI)
QDC number: **009**

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.

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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.

By: [signature] Date: 8-15-08

Seth Hothem
Northeast Ohio Regional Sewer District
7815 Dartworth Drive
Parma, Ohio 44129

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

Dear Seth:

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: **010**

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.

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By: _____ Date: 8-15-08

CERTIFIED MAIL

Seth Hothem
Northeast Ohio Regional Sewer District
7815 Dartworth Drive
Parma, Ohio 44129

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

Dear Seth:

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: Fish Community Biology & Stream Habitat Assessment
QDC number: **010**

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.

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Effective Date: August 15, 2008
Expiration Date: August 14, 2010

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.

CERTIFIED MAIL

By: [signature] Date: 8-15-08

Kathryn Crestani
Northeast Ohio Regional Sewer District
4075 West 215 Street Fairview
Park, Ohio 44126

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

Dear Kathryn:

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: **011**

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.

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Expiration Date: August 14, 2010

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.

Date: 8-15-08

CERTIFIED MAIL

Kathryn Crestani
Northeast Ohio Regional Sewer District
4075 West 215 Street
Fairview Park, Ohio 44126

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

Dear Kathryn:

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: Stream Habitat Assessment (QHEI)
QDC number: **011**

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.

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OHIO E.P.A.
AUG 15 2008
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CERTIFIED MAIL

Effective Date: August 15, 2008
Expiration Date: August 14, 2010

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

By: [signature] Date: 8-15-08

Tom Zablotny
Northeast Ohio Regional Sewer District
1660 Melody Lane
Medina, Ohio 44356

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

Dear Tom:

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: 018

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.

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Columbus, OH 43216-1049

OHIO E.P.A.
AUG 15 2008
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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.

By: _____ Date: 8-15-08

CERTIFIED MAIL

Effective Date: August 15, 2008
Expiration Date: August 14, 2010

Tom Zablotny
Northeast Ohio Regional Sewer District
1660 Melody Lane
Medina, Ohio 44356

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

Dear Tom:

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: Fish Community Biology
QDC number: **018**

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.

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OHIO E.P.A.
JAN - 7 2008
ENTERED DIRECTOR'S JOURNAL

Effective Date: January 7, 2008
Expiration Date: January 6, 2010

CERTIFIED MAIL

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.

By: _____ Date: 1-7-08

Ronald Maichle
Northeast Ohio Regional Sewer District
7716 Oakhill Road #E
North Royalton, Ohio 44133

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.

OhioEPA
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

OHIO E.P.A.
NOV - 4 2008

Effective Date: November 4, 2008
Expiration Date: November 3, 2010

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.

By: [signature] Date: 11-4-08

CERTIFIED MAIL

Ronald Maichle
Northeast Ohio Regional Sewer District
25970 Elmer Avenue
Olmsted Falls, Ohio 44138

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: Stream Habitat Assessment (QHEI)
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.

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

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.

Effective Date: March 3, 2009
Expiration Date: March 2, 201

CERTIFIED MAIL

Ronald Maichle
Northeast Ohio Regional Sewer District
25970 Elmer Avenue
Olmsted Falls, Ohio 44138

Date: 3.3.09

OHIO E.P.A.
MAR - 3 2009
DIRECTOR'S JOURNAL

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: Benthic Macroinvertebrate Biology
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.

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Columbus, OH 43216-1049

OHIO E.P.A.

Effective Date: November 4, 2008
Expiration Date: November 3, 2010

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.

By: [signature] Date: 11-4-08

CERTIFIED MAIL

Francisco Rivera
Northeast Ohio Regional Sewer District
951 Center Road
Eastlake, Ohio 44095

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

Dear Francisco:

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: **262**

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.

Appendix G

To be submitted electronically when issued to NEORSD by ODNR.