

March 6, 2009

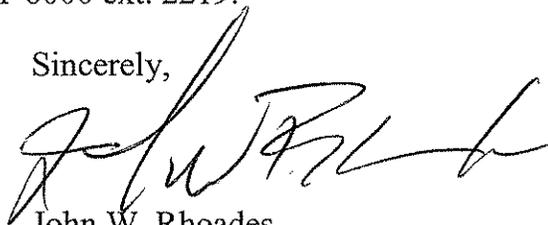
Jeff Reynolds  
Ohio EPA, Division of Surface Water  
Standards & Technical Support Section  
50 West Town Street, Suite 700  
P.O. Box 1049  
Columbus, Ohio 43216-1049

OHIO EPA - USW  
2009 MAR 12 AM 6:33

Dear Mr. Reynolds:

Please find enclosed the Level 3 Project Study Plan titled, "2009 Mill Creek Highland Park Golf Course Stream Restoration." 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](mailto:rhoadesj@neorsd.org) or phone (216) 641-6000 ext. 2219.

Sincerely,



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

## Level 3 Project Study Plan

### *2009 Mill Creek Highland Park Golf Course Stream Restoration*

#### (1) Objectives

Starting in the fall of 2009, a restoration project is planned to begin on Mill Creek through Highland Park Golf Course in Cuyahoga County. Work on the open mile stretch of creek through the golf course has not yet been finalized. However, the Northeast Ohio Regional Sewer District (NEORS) intends to conduct water chemistry sampling, biological evaluation and habitat assessments prior to the beginning of the restoration work.

The purpose of this study is to assess habitat conditions and fish community along with macroinvertebrate community health in Mill Creek prior to restoration activities in order to establish a baseline for future monitoring. The results obtained from this assessment will be evaluated using the Ohio Environmental Protection Agency's Qualitative Habitat Evaluation Index (QHEI), Index of Biotic Integrity (IBI), and Invertebrate Community Index (ICI). An examination of the individual metrics that comprise these indices, along with field sheets, will also be used in subsequent years to determine the degree of improvement resulting from the restoration improvements. Water quality sampling will also be conducted during assessment activities. The results of water quality sample analyses will be compared to Ohio Water Quality Standards.

#### (2) Nonpoint/Point Sources

Point Sources	Nonpoint Sources
Storm Sewer Outfalls	Urban runoff
	Spills
	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 in Mill Creek and will need to be taken into account when evaluating changes to these communities following restoration activities.

#### (3) Parameters Covered

Fish specimens will be identified to species level, weighed, counted and examined for the presence of external anomalies including DELTs (deformities, eroded fins, lesions and tumors). An Ohio Environmental Protection Agency (Ohio EPA) Fish

Data Sheet will be completed during each assessment. Quantitative fish sampling will be conducted at all locations.

Macroinvertebrate community assemblages will be collected from each location and shipped to EA Engineering, Science and Technology<sup>1</sup> 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; November 8, 2006; and August 26, 2008).

The Ohio EPA Macroinvertebrate Field Sheet will be completed at each site during 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 samples will be collected at each electrofishing/macroinvertebrate site unless otherwise noted in Section 5. Appendix B lists the parameters to be tested along with the detection limits and practical quantitation limits. Field measurements for dissolved oxygen, pH, temperature, and specific conductance will also be performed. A Surface Water Condition Sampling Field Data Form will be completed at each site during each sampling event (Appendix C).

#### (4) Field Collection and Data Assessment Techniques

Field collections for fish will be conducted at sites in the upstream and downstream sections undergoing restoration (see Table in Section 5). Sampling will be conducted using longline electrofishing techniques and will consist of shocking all habitat types within a sampling zone, which is 0.15 kilometers in length, while moving from downstream to upstream. The stunned fish will be collected and placed into a live well for processing.

Fish will be identified to species level, weighed, counted, and examined for the presence of external anomalies including DELTs. Fish easily identified (commonly collected 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

---

<sup>1</sup> 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.

Collectors (QDC) 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 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.

Macroinvertebrate sampling will be conducted using quantitative and qualitative sampling techniques. Quantitative sampling will include installation of a five modified Hester-Dendy multi-plate artificial substrate sampler assemblage (HD) that is colonized for a six-week period. Multiple HD samplers will 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 the HD retrieval. Voucher specimens will be collected as described in section (14). All macroinvertebrate community assemblages will be sent to a Level 3 QDC for identification and enumeration. The Level 3 QDC 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.

A detailed description of the sampling and analysis methods utilized in the fish community and macroinvertebrate surveys, including calculations of the IBI and ICI 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 both sites. Techniques used for water quality 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  $\leq 30$  percent; results outside this range will trigger further evaluation and investigation into causes for disparities. RPD values above 30 percent, with results less than 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 by Level 3 QDCs.

Where possible, data assessment will include an analysis of spatial trends in the collected data. Species assemblages and individual metrics will be analyzed. Graphs that show current QHEI, IBI, and ICI scores and how these scores compare to attainment status of biocriteria will be prepared. Water chemistry data collected will be compared to Ohio Water Quality Standards to determine whether any excursions from the applicable water quality criteria have occurred. Comparisons between water quality and biological community health will only be made if at least three water quality samples have been collected from that site.

#### (5) Sampling Locations

The following chemistry, habitat, electrofishing and macroinvertebrate sample locations, listed from downstream to upstream on Mill Creek, will be surveyed during the 2009 field season. HD and water chemistry collection sites are located within each electrofishing zone, indicated by River Mile, unless otherwise noted. GPS coordinates are recorded at the downstream end of each electrofishing zone.

2009 Mill Creek Highland Heights Golf Course Restoration  
 March 6, 2009

River Mile	Latitude	Longitude	Description	Quadrangle	Purpose
11.52	41.4518°N	81.5255°W	Upstream Section of Restoration	Shaker Heights	Evaluate chemistry, habitat, fish, & macroinvertebrates prior to restoration actives
10.70	41.4621°N	81.5214°W	Downstream Section of Restoration	Shaker Heights	Evaluate chemistry, habitat, fish, & macroinvertebrates prior to restoration actives

(6) Schedule

Initial biological, habitat, and water chemistry data collection will occur in the 2009 sampling season, to establish baseline conditions.

At least one electrofishing survey will be conducted in 2009 at the indicated sites, between June 15 and October 15. If multiple surveys are conducted then, each survey will be conducted at least four to five weeks apart. Specific dates have not been scheduled. Stream flow and weather conditions will be assessed weekly to determine when each electrofishing pass will be conducted.

Artificial substrate samplers will be installed on Mill Creek once, between June 15 and July 15, 2009, at both sites and retrieved six weeks later. During retrieval of the HD, a qualitative sample will also be obtained. Specific dates have not been scheduled. Stream flow and weather conditions will be assessed weekly to determine when the HD installations and retrievals will be conducted.

Water quality samples will be collected a minimum of three times between June 15 and October 15, 2009.

QHEI habitat evaluations will be conducted one time in 2009 between June 15 and October 15. These evaluations will be conducted 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).*

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 Environmental & Maintenance Services Center (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 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.

All 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 in 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 maintained as described in section (14). The remaining specimens for each site will be returned in a single container labeled with the site number and collection method and date. All specimens and accompanying chain-of-custody documentation will be retained by NEORSD and stored at EMSC for a period not less than ten years.

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

2009 Mill Creek Highland Heights Golf Course Restoration  
 March 6, 2009

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 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, ICI and QHEI scores in relation to restoration activities and 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)
<sup>1</sup> John W. Rhoades	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	rhoadesj@neorsd.org	216-641-6000	QDC - 008 CWQA /FCB/SHA/BMB
Cathy Zamborsky	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	zamborskyc@neorsd.org	216-641-6000	QDC - 009 CWQA/SHA
Seth Hothem	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	hothems@neorsd.org	216-641-6000	QDC - 010 CWQA/FCB/SHA
Kathryn Crestani	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	crestanik@neorsd.org	216-641-6000	QDC - 011 CWQA/SHA
<sup>5</sup> Tom Zablontny	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	zablontnyt@neorsd.org	216-641-6000	QDC - 018 CWQA/FCB/SHA
<sup>2,3,6</sup> Ron Maichle	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	maichler@neorsd.org	216-641-6000	QDC - 145 CWQA/SHA
Francisco Rivera	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	riveraf@neorsd.org	216-641-6000	QDC - 262 CWQA
<sup>4</sup> 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
<sup>1</sup> Lead Project Manager		<sup>4</sup> Benthic Macroinvertebrate Identification		
<sup>2</sup> Stream Habitat Assessment (SHA) Project Manager		<sup>5</sup> Fish Community Biology (FCB) Project Manager		
<sup>3</sup> Benthic Macroinvertebrate Biology (BMB) Project Manager		<sup>6</sup> Chemical Water Quality Assessment (CWQA) Project Manager		

The following is a list of persons not qualified as a QDC who may be involved in the project. Prior to the start of sampling, the project manager 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.

2009 Mill Creek Highland Heights Golf Course Restoration  
 March 6, 2009

Name	Address	Email Address	Phone Number
Joseph Broz	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	brozj@neorsd.org	216-641-6000
Tim Dobriansky	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	dobrianskyt@neorsd.org	216-641-6000
Kristina Granlund	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	granlundk@neorsd.org	216-641-6000
Rae Grant	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	grantr@neorsd.org	216-641-6000
Eric Hinton	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	hintone@neorsd.org	216-641-6000
Jillian Novak	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	novakj@neorsd.org	216-641-6000
Cathy O'Grady	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	ogradyc@neorsd.org	216-641-6000
Mike Pavlik	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	pavlikm@neorsd.org	216-641-6000
Kevin Roff	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	roffk@neorsd.org	216-641-6000
Frank Schuschu	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	schuschuf@neorsd.org	216-641-6000
Elizabeth Toot-Levy	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	toot-levye@neorsd.org	216-641-6000
Wolfram vonKiparski	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	vonkiparskiw@neorsd.org	216-641-6000
Summer Co-op	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	To Be Determined	216-641-6000
Summer Co-op	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	To Be Determined	216-641-6000
Summer Co-op	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	To Be Determined	216-641-6000
Mark Link	3900 Euclid Avenue Cleveland, OH 44115	linkm@neorsd.org	216-881-6600

- (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

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 and/or Associate Curator of Fish. Fish will be identified to the species level.

2009 Mill Creek Highland Heights Golf Course Restoration  
March 6, 2009

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

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  
[msneen@eaest.com](mailto:msneen@eaest.com)  
847-945-8010 ext. 108

(12) Copy of ODNR collector's permit

To be submitted electronically when issued to NEORSD by ODNR (Appendix G).

(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:

03/06/09

(14) Voucher Specimen Statement

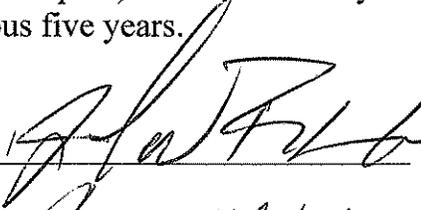
NEORSD will maintain a benthic macroinvertebrate and fish voucher collection which includes two specimens, or appropriate photo vouchers, of each species or taxa collected during the course of biological sampling from any stream within the NEORSD's service area. When benthic macroinvertebrates from multiple 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, one voucher collection will be created to represent the specimens collected from those streams. A separate collection for each sampling event will not be maintained.

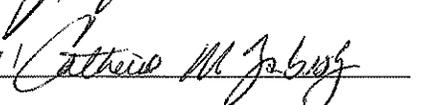
NEORSD will provide specimens or photo vouchers to the Director upon request. This collection will be stored at the NEORSD laboratory in the Environmental and Maintenance Services Center.

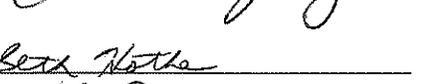
Print/Signature: John W. Rhoades /  Date: 03/06/09

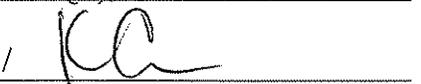
(15) Trespassing Statement

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

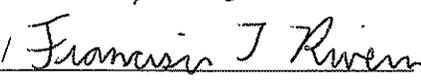
Print/Signature: Cathy Zamborsky /  Date: 3/9/09

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

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

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

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

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

## Appendix A

Overview Map



**2009 Mill Creek, Highland Park Golf Course Stream Restoration**

- Fish Sample Site
- CSO Outfalls
- Automated Regulators
- Manual Control Device
- Hydro Brake
- Regulator
- Flow Monitor
- Level Monitor
- Remote Level Monitor
- Rain Gauges
- Stream
- NEORSD Interceptor Sewer
- NEORSD Intercommunity Relief Sewer
- NEORSD CSO Control Sewer
- NEORSD CSO Responsibility Sewer
- Local Combined Sewer
- Local Sanitary Sewer
- Local Storm Sewer
- Local Culverted Stream
- Local Force Main
- Community Boundary



Date: February, 2009  
Sources: Orthophotos, Street Centerline (2006), Cuyahoga County GIS; Streams(2005), SSURGO; Environmental Assessment Zones (2009), Collection System, NEORSD GIS;



This map/data was compiled by the Northeast Ohio Regional Sewer District ("District") which makes every effort to produce and publish the most current and accurate information possible. This map/data was created and compiled to serve the District for planning and analysis purposes. The District makes no warranties, expressed or implied, with respect to the accuracy of this map/data and its use for any specific purpose. The District and its employees expressly disclaim any liability that may result from the use of this map/data. For more information, please contact: Jeffrey Duke, P.E. (Engineering Information & Technology) 3900 Euclid Avenue, Cleveland, Ohio 44115 (216-881-6600).

## 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 <sub>2</sub> <sup>-</sup> 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 *	CaCO <sub>3</sub> 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)	
<b>Field Parameter</b>			
	<b>Test</b>	<b>(Value Reported in)</b>	
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, 19<sup>th</sup> Edition

## Appendix C

**NEORSD Surface Water Condition Sampling Field Data Form**

Stream: \_\_\_\_\_ Collectors: \_\_\_\_\_

Date: \_\_\_\_\_ Cuyahoga River Daily Mean Discharge\*: \_\_\_\_\_ ft<sup>3</sup>/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

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:

(Label Here)

Sample ID:

**NEORSD Surface Water Condition Sampling Field Data Form**

Stream: \_\_\_\_\_ Collectors: \_\_\_\_\_

Date: \_\_\_\_\_ Cuyahoga River Daily Mean Discharge\*: \_\_\_\_\_ ft<sup>3</sup>/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

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)

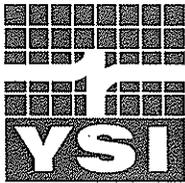
Sample ID:

(Label Here)

Sample ID:

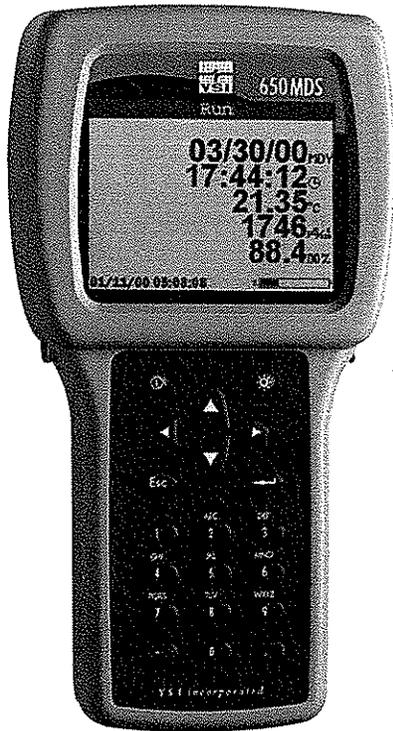
## Appendix D





## 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.

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

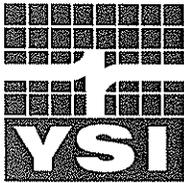
*Supply a GPS with NMEA 0183 protocol, connect with the YSI 6115 kit, and collect GPS data along with water quality data.*

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



Pure  
Data for a  
Healthy  
Planet.®

*A powerful logging display for your data collection processes*



To order, or for more information, contact YSI  
 +1 937 767 7241  
 800 897 4151 (US)  
 www.ysi.com

YSI Environmental  
 +1 937 767 7241  
 Fax +1 937 767 9353  
 environmental@ysi.com

YSI Integrated Systems & Services  
 +1 508 748 0366  
 Fax +1 508 748 2543  
 systems@ysi.com

SonTek/YSI  
 +1 858 546 8327  
 Fax +1 858 546 8150  
 inquiry@sontek.com

YSI Gulf Coast  
 +1 225 753 2650  
 Fax +1 225 753 8669  
 environmental@ysi.com

YSI Hydrodata (UK)  
 +44 1462 673 581  
 Fax +44 1462 673 582  
 europe@ysi.com

YSI Middle East (Bahrain)  
 +973 1753 6222  
 Fax +973 1753 6333  
 halsalem@ysi.com

YSI (Hong Kong) Limited  
 +852 2891 8154  
 Fax +852 2834 0034  
 hongkong@ysi.com

YSI (China) Limited  
 +86 10 5203 9675  
 Fax +86 10 5203 9679  
 beijing@ysi-china.com

YSI Nanotech (Japan)  
 +81 44 222 0009  
 Fax +81 44 221 1102  
 nanotech@ysi.com

ISO 9001  
 ISO 14001

Yellow Springs, Ohio Facility

EcoWatch, Pure Data for a Healthy Planet and Who's Minding the Planet? are registered trademarks of YSI Incorporated. Windows is a registered trademark of the Microsoft Corporation.

©2007 YSI Incorporated  
 Printed in USA 0707 E11-03



YSI Incorporated  
 Who's Minding  
 the Planet?

## 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

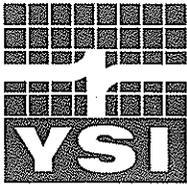
650-01	Instrument, standard memory
650-02	Instrument, high memory
650-03	Instrument, standard memory, barometer
650-04	Instrument, high memory, barometer
6113	Rechargeable battery pack kit with 110 volt charger and adapter cable
616	Charger, cigarette lighter
4654	Tripod
614	Ultra clamp, C-clamp mount
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.

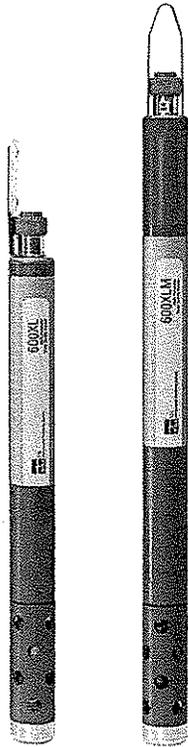


## YSI 600XL and 600XLM Sondes

### 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)



The YSI 600XL and 600XLM

### 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.

- 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

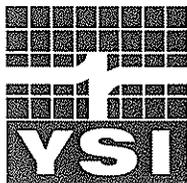
Pure  
Data for a  
Healthy  
Planet.®

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.

+1 937 767 7241  
800 897 4151 (US)  
www.ysi.com

YSI Environmental  
+1 937 767 7241  
Fax +1 937 767 9353  
environmental@ysi.com

Endeco/YSI  
+1 508 748 0366  
Fax +1 508 748 2543  
systems@ysi.com

SonTek/YSI  
+1 858 546 8327  
Fax +1 858 546 8150  
inquiry@sontek.com

YSI Gulf Coast  
+1 225 753 2650  
Fax +1 225 753 8669  
environmental@ysi.com

YSI Hydrodata (UK)  
+44 1462 673 581  
Fax +44 1462 673 582  
europe@ysi.com

YSI Middle East (Bahrain)  
+973 1753 6222  
Fax +973 1753 6333  
halsalem@ysi.com

YSI (Hong Kong) Limited  
+852 2891 8154  
Fax +852 2834 0034  
hongkong@ysi.com

YSI (China) Limited  
+86 10 5203 9675  
Fax +86 10 5203 9679  
beijing@ysi-china.com

YSI Nanotech (Japan)  
+81 44 222 0009  
Fax +81 44 221 1102  
nanotech@ysi.com

ISO 9001  
ISO 14001

Yellow Springs, Ohio Facility

ROX and Rapid Pulse are trademarks and  
EcoWatch, Pure Data for a Healthy Planet  
and Who's Minding the Planet? are registered  
trademarks of YSI Incorporated.

©2007 YSI Incorporated  
Printed in USA 0107 E55-01



\*Sensors with the ETV logo were submitted to the ITV  
program on the YSI 6000EDS. Information on the performance  
characteristics of YSI water quality sensors can be found at www.  
ysi.com/etv, or call YSI at 800.897.4151 for the ITV 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

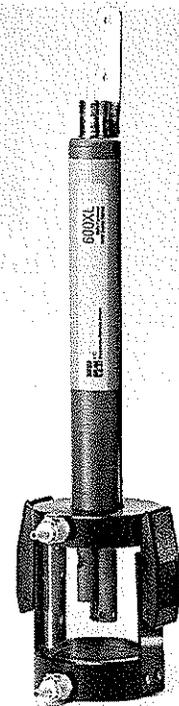
	Range	Resolution	Accuracy
Dissolved Oxygen % Saturation 6562 Rapid Pulse™ Sensor* ETV ✓	0 to 500%	0.1%	0 to 200%: ±2% of reading or 2% air saturation, whichever is greater; 200 to 500%: ±6% of reading
Dissolved Oxygen mg/L 6562 Rapid Pulse™ Sensor* ETV ✓	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ± 0.2 mg/L or 2% of reading, whichever is greater; 20 to 50 mg/L: ±6% of reading
Conductivity* 6560 Sensor* ETV ✓	0 to 100 mS/cm	0.001 to 0.1 mS/cm (range dependent)	±0.5% of reading + 0.001 mS/cm
Solinity	0 to 70 ppt	0.01 ppt	±1% of reading or 0.1 ppt, whichever is greater
Temperature 6560 Sensor* ETV ✓	-5 to +50°C	0.01°C	±0.15°C
pH 6561 Sensor* ETV ✓	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	±0.4 ft, ±0.12 m
	Shallow	0 to 30 ft, 9.1 m	±0.06 ft, ±0.02 m
	Vented Level	0 to 30 ft, 9.1 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

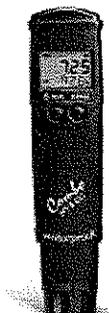
Medium		Fresh, sea or polluted water
Temperature	Operating	-5 to +50°C
	Storage	-10 to +60°C
Communications		RS-232, SDI-12
Software		EcoWatch*
Dimensions 600XL   600XLM	Diameter	1.65 in, 4.19 cm   1.65 in, 4.9 cm
	Length	16 in, 40.6 cm   21.3 in, 54.1 cm
	Weight	1.3 lbs, 0.59 kg   1.5 lbs, 0.69 kg
Power	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.



# 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 ( $\beta$ ). 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 $\mu\text{S}/\text{cm}$
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 $\mu\text{S}/\text{cm}$
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	$\pm 0.5^\circ\text{C}$ / $\pm 1^\circ\text{F}$
Temperature Compensation		pH: automatic; EC/TDS: automatic with $\beta$ 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.)

## Appendix E

## **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 Folsom 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:

<u>Task</u>	<u>EA Personnel</u>	<u>Years of Experience</u>
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, nauidid, 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 Kieffer (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.

- Needham, J.G., M.J. Westfall, Jr., and M.L. May. 2000. Dragonflies of North America (Revised Edition). Scientific Publishers, Gainesville, Florida.
- Roback, S.S. 1985. The immature chironomids of the eastern United States VI. Pentaneurini-genus Ablabesmyia. Proceedings of The Academy of Natural Sciences of Philadelphia 137(2):153-212.
- Saether, O.A. 1977. Taxonomic studies on Chironomidae: Nanocladius, Pseudochironomus, and the Harnischia complex. Bulletin of the Fisheries Research Board of Canada 196:1-143.
- Simpson, K.W. and R.W. Bode. 1980. Common larvae of the Chironomidae (Diptera) from New York State streams and rivers with particular reference to the fauna of artificial substrates. New York State Museum Bulletin 439:1-105.
- Smith, D.G. 2001. Pennak's Freshwater Invertebrates of the United States: Porifera to Crustacea, Fourth Edition. John Wiley & Sons, New York, NY.
- Westfall, M.J., Jr. and M.L. May. 1996. Damselflies of North America. Scientific Publishers, Gainesville, Florida.
- Wiederholm, T., ed. 1983. Chironomidae of the Holarctic region. Keys and diagnoses. Part 1. Larvae. Entomologica Scandinavica Supplement 19:1-457.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). 2nd edition. University of Toronto Press, Toronto, Canada.

#### 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        | 3. Total number of caddisfly taxa          |
| 2. Total number of mayfly taxa | 4. Total number of dipteran taxa           |
| 5. Percent mayflies            | 8. Percent other dipterans and non-insects |
| 6. Percent caddisflies         | 9. Percent tolerant organisms              |
| 7. Percent Tanytarsini midges  | 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<sup>®</sup> files via email and on the enclosed CD-RW.

## Appendix F



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

~~AUG 22 2008~~

**MAILING ADDRESS:**

ENTERED DIRECTOR'S OFFICE  
P.O. Box 1049  
Columbus, OH 43216-1049

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.

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

By: [Signature] Date: 8/22/08

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.

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
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

AUG 22 2008

MAILING ADDRESS:

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

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

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

**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: *M. A. Shapiro* Date: 8/22/08

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.

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
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

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

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

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

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

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.

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
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

~~AUG 15 2008~~

**MAILING ADDRESS:**

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

ENTERED DIRECTOR'S JOURNAL

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

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

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

By Janice Cassader Date: 8-15-08

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.

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
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:**

AUG 15 2008

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

ENTERED DIRECTOR'S JOURNAL

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**

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

By: Don Lassiter Date: 8-15-08

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.

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



State of Ohio Environmental Protection Agency

OHIO E.P.A.

STREET ADDRESS:

AUG 15 2008 MAILING 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

ENTERED DIRECT TO COLUMBUS, OH  
P.O. Box 1049  
Columbus, OH 43216-1049

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

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

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

By: Janice Lassiter Date: 8-15-08

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.

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



State of Ohio Environmental Protection Agency

OHIO E.P.A.

MAILING ADDRESS:

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

AUG 15 2008  
Box 1049  
Columbus, OH 43216-1049

ENTERED DIRECTOR'S JOURNAL

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

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

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

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

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.

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

Ohio EPA is an Equal Opportunity Employer



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

AUG 15 2008

MAILING ADDRESS:

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

ENTERED DIRECTOR'S JOURNAL

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

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

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

By Steve Lassiter Date: 8-15-08

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.

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

Ohio EPA is an Equal Opportunity Employer



State of Ohio Environmental Protection Agency

OHIO E.P.A.

STREET ADDRESS:

AUG 15 2008

MAILING 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

ENTERED DIRECTOR'S OFFICE  
P.O. Box 1049  
Columbus, OH 43216-1049

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**

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

*John Lassiter* Date: 8-15-08

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.

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



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:

AUG 15 2008

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

ENTERED DIRECTOR'S JOURNAL

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

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

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

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

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 a 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

Ohio EPA is an Equal Opportunity Employer



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:**

AUG 15 2008

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

INTENDED DIRECTOR'S JOURNAL

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**

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

By: Tom Zabloutny Date: 8-15-08

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.

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



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

JAN - 7 2008 MAILING ADDRESS:

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

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

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

By: [Signature] Date: 1-7-08

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 Korleski, Director

Ohio EPA is an Equal Opportunity Employer



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

NOV - 1, 2008 MAILING ADDRESS:

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

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. **CERTIFIED MAIL**

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

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

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.

Ted Strickland, Governor  
Lee Fisher, Lieutenant Governor  
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

I certify this to be a true and accurate copy of the  
Effective Date: March 3, 2009 official documents as filed in the records of the Ohio  
Expiration Date: March 2, 2011 Environmental Protection Agency.

**CERTIFIED MAIL**

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

Date: 3.3.09

OHIO EPA  
MAR - 3 2009  
FIELD OPERATIONS SECTION

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.

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

Ohio EPA is an Equal Opportunity Employer



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

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. **CERTIFIED MAIL**

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

By: Don J. Lassiter Date: 11-4-08

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.

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



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 NEORSO 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

Mr. John Rhoades  
NEORSD

03 February 2009  
Page 2

---

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,

A handwritten signature in cursive script, appearing to read "Martin E. Sneen".

Martin E. Sneen  
Benthic Taxonomist/EA Project Manager

Appendix G

*To be submitted electronically when issued to NEORS by ODN.*