

## Level 3 Project Study Plan

### *2010 Cuyahoga River Environmental Monitoring*

#### (1) Objectives

The lower Cuyahoga River has been designated as one of 42 Great Lakes Areas of Concern (AOC) by the International Joint Commission. Past monitoring indicated impairment of aquatic biota in the river and was the basis of a Total Maximum Daily Load (TMDL) for the Lower Cuyahoga River. The causes of impairment to the river were classified as organic enrichment, toxicity, low dissolved oxygen, nutrients and flow alteration (Ohio EPA, 2003)<sup>1</sup>. Recent monitoring by the Northeast Ohio Regional Sewer District and the Ohio EPA, however, has shown recovery in some reaches of the river. The purposes of this study, therefore, are to determine the attainment status of the river in relation to point and nonpoint sources of pollution and measure the magnitude of some potential causes of impairment.

During the course of the study, fish communities, benthic macroinvertebrate communities, habitat and water chemistry in the Cuyahoga River between River Mile (RM) 16.20 and RM 7.00 will be surveyed. The results from these surveys will be used to characterize of the overall fish and macroinvertebrate community health in the river. Fish and macroinvertebrate community health will be evaluated through the use of Ohio EPA's Index of Biotic Integrity (IBI), Modified Index of Well-Being (MIwb), and Invertebrate Community Index (ICI). An examination of the individual metrics that comprise these indices will be used in conjunction with water quality data, the NEORSD Macroinvertebrate Field Sheet, and Qualitative Habitat Evaluation Index (QHEI) results in order to identify impacts to the communities. Results will also be compared to historic data to show temporal as well as spatial trends.

In addition, chlorophyll *a* levels in the river will be measured at four locations in the vicinity of Southerly Wastewater Treatment Center (WWTC) to determine any impacts from nutrients in the effluent on algal production. Data sondes will be installed in the river as part of this sampling to provide a more comprehensive understanding of the relationship among algal production, nutrient levels, and dissolved oxygen diel swings in the river.

Finally, the fish community in the Cuyahoga River navigation channel at RMs 5.90, 2.75, and 0.20 will be monitored in support of two grants related to habitat restoration that have already been funded or may be funded as part of the Great Lakes Restoration Initiative (GLRI). One of these grants is the *Cuyahoga River Larval Fish Study* funded by the U.S. Army Corps of Engineers that is being implemented by the Cuyahoga County Planning Commission. The second is a

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<sup>1</sup> See Appendix I for a list of all references.

pending proposal for the GLRI from the Cuyahoga County Engineer's Office titled *Cuyahoga AOC Urban Riparian Habitat Restoration*.

(2) Point/Nonpoint Sources

Point Sources	Nonpoint Sources
Tinkers Creek (RM 16.36)	Urban runoff
Mill Creek (RM 11.49)	Landfills
West Creek (RM 11.05)	Spills
Southerly WWTC (RM 10.57)	Agriculture
Ohio Canal (RM 8.78)	
Big Creek (RM 7.20)	
Combined Sewer Overflows	
Storm Sewer Outfalls	

A map has been provided in Appendix A to show point sources that may be influencing the water quality at each sample location. Other point sources (upstream of RM 16.20) include the Akron Wastewater Treatment Plant (RM 37.45), Combined Sewer Overflows in Akron, and numerous tributaries to the Cuyahoga River (see *Total Maximum Daily Loads for the Lower Cuyahoga River* [Ohio EPA, 2003] for a complete list of tributaries and their locations). These sources, along with the nonpoint sources listed in the table above, may be impacting the health of the fish and benthic macroinvertebrate communities in the Cuyahoga River or may lead to changes in algal and macrophyte production.

(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 EPA Fish Data Sheet will be completed during each assessment. Quantitative fish sampling is expected to be conducted at all locations, unless boat navigation is impeded by unforeseen manmade or natural barriers.

Cuyahoga River flow will be recorded for all locations during each electrofishing pass utilizing data from the United States Geological Survey (USGS) gage station in Independence, Ohio (Station ID # 04208000).

Macroinvertebrate community assemblages will be collected from each location between RMs 16.20 and 7.00 and transferred to AMT (Ravenna, Ohio)<sup>2</sup> for

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<sup>2</sup> The Northeast Ohio Regional Sewer District Board of Trustees has approved the District to enter into a contract with AMT, however at the time of this writing the contract has not been fully executed. An amended study plan will be submitted if the District is unable to enter into a contract with AMT and must contract this service with another vendor.

identification and enumeration. AMT 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* (1987b).

The NEORSD Macroinvertebrate Field Sheet (Appendix B) 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 from RMs 16.20 to 7.00 unless otherwise noted in Section 5. Water chemistry samples will be analyzed by NEORSD's Analytical Services. Appendix C lists the parameters to be tested along with the detection limits and practical quantitation limits. Field measurements for dissolved oxygen, pH, temperature, and conductivity will also be performed. A Surface Water Condition Sampling Field Data Form will be completed at each site during each sampling event (Appendix D).

Benthic and water column chlorophyll *a* samples will be collected at RMs 16.20, 10.75, 10.10, and 7.00. The chemical and physical water quality parameters to be measured in conjunction with the chlorophyll *a* samples include total phosphorus, dissolved reactive phosphorus, nitrate+nitrite, alkalinity, turbidity and suspended solids. In addition, YSI data sondes will be installed at these locations to more frequently monitor dissolved oxygen, temperature, conductivity, and pH.

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

Field collections for fish will be conducted with either a 14-foot Alweld commercial boat or 17-foot Coffelt electrofishing boat, both equipped with a Smith-Root 5.0 GPP Electrofisher. Boat electrofishing will consist of shocking all habitat types within a sampling zone, which is 0.5 kilometers in length, while moving from upstream to downstream. The stunned fish will be collected and put in an on-board live well for later processing. Each boat sampling zone will be electroshocked two or three times during the field season (June 15 - October 15).

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 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 37 percent formaldehyde 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 five replicates of a modified Hester-Dendy multi-plate artificial substrate sampler (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. and for the purposes of providing a replicate sample. Qualitative sampling will be conducted using a D-frame dip net when HD samplers are retrieved. The NEORSD Macroinvertebrate Field Sheet will be completed during each HD retrieval. For the purpose of maintaining her status as a Level 3 QDC for Benthic Macroinvertebrate Biology, Tiffany Moore of AMT will collect a qualitative sampling at one of the sites. Ronald Maichle of NEORSD, a Level 3 QDC for Benthic Macroinvertebrate Biology, will identify the specimens in the replicate sample 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* (1987b). Any midges that are identified by Ronald Maichle will be verified by another Level 3 QDC for Benthic Macroinvertebrate Biology. Voucher specimens will be collected as described in section (14). All other macroinvertebrate community assemblages will be shipped to AMT for identification and enumeration. AMT 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* (1987b). 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, MIwb and ICI, can be found in Ohio EPA's *Biological Criteria for the Protection of Aquatic Life, Volumes II* (1987a) and *III* (1987b).

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.

Water chemistry sampling will occur across a variety of flow conditions. Techniques used for water chemistry sampling and chemical analyses will follow the *Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices* (2009a). 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 randomly selected sites, 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, conductivity and pH; and when necessary, a Hanna HI 98129 meter to measure pH. Specifications for these meters have been included in Appendix E.

Benthic and water column chlorophyll *a* samples will be collected at least three times under low-flow conditions. Sampling methods will follow those detailed in the NEORSD *Chlorophyll a Sampling and Field Filtering Standard Operating Guideline*. A Chlorophyll *a* Sampling Field Sheet will be completed for each site. Water chemistry grab samples will be collected at the same time using the methods discussed previously and will be analyzed for nutrients, turbidity, alkalinity and suspended solids. In addition, at least 24-hours prior to each chlorophyll *a* sampling event, YSI 6600 EDS data sondes will be deployed at the four locations in the Cuyahoga River. Each data sonde will record, at fifteen-minute intervals, dissolved oxygen concentration, pH, temperature, and conductivity from the time the data sonde is deployed until the time it is retrieved. These data sondes will be placed in the stream by inserting each one into a 4.5-

inch PVC pipe with holes drilled into the sides of the lower third of the pipe to allow water to pass through it. The data sondes will remain in the river at least 24-hours following collection of the chlorophyll *a* samples.

Where possible, data assessment will include an analysis of temporal and spatial trends in the collected data. Species assemblages and individual metrics will be analyzed. Graphs that show current and historic QHEI, IBI, MIwb 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. It will also be used to determine any relationships among individual parameters and chlorophyll *a* concentrations. 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 electrofishing and macroinvertebrate sample locations, listed from upstream to downstream on the Cuyahoga River, will be surveyed during the 2010 field season. HD and water chemistry collection sites are located near the mid point of each electrofishing zone, indicated by river mile, unless otherwise noted. GPS coordinates are recorded at the downstream end of each electrofishing zone.

Location	Latitude	Longitude	River Mile	Description	Quadrangle	Purpose
Downstream of Tinkers Creek	N41.3678°	W81.6139°	16.20	Downstream of the confluence with Tinkers Creek near Old Riverview Road	Northfield	Background data for fish, habitat, macroinvertebrates, and chlorophyll <i>a</i>
Upstream of Mill Creek	N41.4123° N41.4101°	W81.6364° W81.6346°	12.10 <sup>3</sup> 11.95	Upstream of the confluence with Mill Creek (I-480)	Cleveland South	Evaluate Mill Creek discharge on fish, habitat and macroinvertebrates
Downstream of Mill Creek	N41.4179°	W81.6446°	11.30	Downstream of the confluence with Mill Creek	Cleveland South	Evaluate Mill and West Creek discharges on fish, habitat and macroinvertebrates
Upstream of Southerly WWTC	N41.4196°	W81.6547°	10.75	Upstream of Southerly WWTC effluent discharge	Cleveland South	Evaluate West Creek and Southerly WWTC discharges on fish, habitat and macroinvertebrates,

<sup>3</sup> HD and Water Chemistry Collection Site

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Location	Latitude	Longitude	River Mile	Description	Quadrangle	Purpose
						and Southerly WWTC discharge on chlorophyll <i>a</i> levels.
Downstream of Southerly WWTC	N41.4242°	W81.6638°	10.10	Downstream of Southerly WWTC effluent discharge	Cleveland South	Evaluate Southerly WWTC discharge on fish, habitat, macroinvertebrates, and chlorophyll <i>a</i> levels.
Upstream of Big Creek	N41.4381°	W81.6680°	8.60	Upstream of the confluence with Big Creek	Cleveland South	Evaluate Big Creek discharge on fish, habitat and macroinvertebrates
Downstream of Big Creek	N41.4497°	W81.6815°	7.00	Downstream of the confluence with Big Creek/ Upstream of habitat restoration project	Cleveland South	Evaluate Big Creek discharge on fish, habitat and macroinvertebrates; Southerly WWTC discharge on chlorophyll <i>a</i> levels; and effectiveness of habitat restoration in navigation channel on fish.
Head of Navigation Channel	N41.4619°	W81.6816°	5.90	Head of navigation channel/Upstream of artificial habitat near ArcelorMittal	Cleveland South	Evaluate effectiveness of habitat restoration in navigation channel on fish.
Abandoned Marina (formerly Scaravelli's)	N41.4881°	W81.6938°	2.75	Mid-navigation channel/Proposed site of GLRI habitat restoration project	Cleveland South	Evaluate effectiveness of habitat restoration in navigation channel on fish.
Cuyahoga River Mouth	N41.5008°	W81.7098°	0.20	Near mouth of river in navigation channel	Cleveland North	Evaluate effectiveness of habitat restoration in navigation channel on fish.

(6) Schedule

Two to three electrofishing surveys will be conducted between June 15 and October 15, 2010, at all locations. Additional qualitative surveys may be conducted at RM 7.00 in April and May of 2010 to determine which species are staging to spawn upstream of the proposed habitat restoration. Surveys will be conducted at least three to four weeks apart. Specific dates have not been

scheduled. River flow and weather conditions will be assessed weekly to determine when each electrofishing pass will be conducted.

Artificial substrate samplers will be installed on the Cuyahoga River once, between June 15 and August 19, 2010, and retrieved six weeks later. Specific dates have not been scheduled. River flow and weather conditions will be assessed weekly to determine when the HD sampler installations and retrievals will be conducted.

QHEI habitat evaluations will be conducted one time between June 15 and October 15, 2010. These evaluations will be conducted around the same time as one of the electrofishing surveys.

Water chemistry samples will be collected a minimum of three times between June 15 and October 15, 2010.

Benthic and water column chlorophyll *a* samples will be collected a minimum of three times between June 15 and October 15, 2010. YSI data sondes will be installed during the same times that these samples are collected.

(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* (1987a) and *III* (1987b) 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 collect data. Proper steps will be taken to correct any problems as soon as possible, whether by repairing in the field, at the NEORSD Environmental & Maintenance Services Center, 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 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, except for the replicate sample, will be collected and shipped to AMT for identification and enumeration. AMT 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* (1987b). The AMT QA/QC manual is attached (Appendix F). All macroinvertebrate specimens will be returned to NEORSD by AMT. At least two voucher specimens of each species, when available, will be separated into individual vials and kept 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 the Environmental & Maintenance Services Center for a period not less than ten years.

Water samples obtained for chemical analyses will be collected, preserved (see Section 4), 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 field log book and on the Surface Water Condition Sampling Field Data Form. The samples will then be delivered immediately to the NEORSD Analytical Services cooler, after which the door to the cooler will be locked, and the samples will be transferred to the custody of Analytical Services. The NEORSD Analytical Services Quality Manual and associated Standard Operating Procedures are on file with Ohio EPA. The Quality Assurance Officer at Analytical Service will send updates, revisions and any information on document control to Ohio EPA as needed.

For benthic and water column chlorophyll *a*, three filtrations will be performed for each sample. Each filtration will be submitted as a separate sample. A field filtration blank will be submitted for every 20 samples.

Calibration of data sondes will be done according to the YSI Environmental Operations Manual. The conductivity will be calibrated first using a 1.413 mS/cm standard. Second, the pH will be calibrated using two different buffers (7 and 10 s.u.). The DO membrane will be replaced, at a minimum, every other time the sondes are calibrated. The DO will be calibrated last. The acceptable error in the DO calibration will be 0.2 mg/L.

Each data sonde will have a separate calibration and maintenance logbook. As the appropriate calibration procedures are completed, the results will be recorded in the logbook along with the name of the person performing the calibration and the

date. If difficulty is encountered in calibrating an instrument, or if the instrument will not hold calibration, this information will also be recorded.

Malfunctioning equipment will not be used to collect data. Proper steps will be taken to correct any problems as soon as possible, whether by repairing the sonde in the field or at the Environmental & Maintenance Services Center or by sending it to the supplier or an appropriate service company. All equipment maintenance will be recorded in the logbook.

Once the sondes are removed from the river, the accuracy of the data that has been collected will be checked by comparing readings taken by the sondes to known standards. If the measurements taken at this time meet quality control goals, all of the data collected since the last calibration will be considered accurate. The acceptable differences for pH and conductivity will be  $\pm 0.3$  with pH 7 buffer and  $\pm 10\%$  of the conductivity standard, respectively (EPA New England- Region 1, 2005). The acceptable difference for DO will be  $\pm 0.2$  mg/L. If the measurements do not meet quality control goals, best professional judgment will be used to decide if any of the data collected during that period may still be accurate. For example, the data collected from the four locations may be plotted on the same graph, and if it appears that the data points are following similar trends, they may be considered accurate. If any data that do not meet quality control goals are used, a rationale for their inclusion will be provided when the data are submitted.

(8) Work Products

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

(9) Qualified Data Collectors

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

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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
<sup>3,6</sup> 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>2</sup> Tom Zablotny	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	zablotnyt@neorsd.org	216-641-6000	QDC - 018 CWQA/FCB/SHA
<sup>4</sup> Ron Maichle	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	maichler@neorsd.org	216-641-6000	QDC - 145 CWQA/SHA/BMB
Francisco Rivera	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	riveraf@neorsd.org	216-641-6000	QDC - 262 CWQA
<sup>5</sup> Tiffany Moore	AMT 8927 Weaver Road Ravenna, Ohio 44266	tiffany@digitaldesignmedia.com	847-945-8010	QDC - 017 BMB
<sup>1</sup> Lead Project Manager		<sup>4</sup> Benthic Macroinvertebrate Biology (BMB) Project Manager		
<sup>2</sup> Fish Community Biology (FCB) Project Manager		<sup>5</sup> Benthic Macroinvertebrate Identification		
<sup>3</sup> Stream Habitat Assessment (SHA) Project Manager		<sup>6</sup> Chemical Water Quality Assessment (CWQA) Project Manager		

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

Name	Address	Email Address	Phone Number
Nick Barille	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	barillen@neorsd.org	216-641-6000
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
Kyle Frantz	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	frantzk@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
John Junkin	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	junkinj@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
Kevin Roff	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	roffk@neorsd.org	216-641-6000

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Name	Address	Email Address	Phone Number
Frank Schuschu	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	schuschuf@neorsd.org	216-641-6000
Wolfram von Kiparski	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	vonkiparskiw@neorsd.org	216-641-6000
Mark Matteson	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	mattesonm@neorsd.org	216-641-6000
Summer Co-op #2	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	To Be Determined	216-641-6000
Summer Co-op #3	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	To Be Determined	216-641-6000
Summer Co-op #4	4747 East 49 <sup>th</sup> Street Cuyahoga Hts., Ohio 44125	To Be Determined	216-641-6000

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

See attached (Appendix G).

- (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.

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 AMT. 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* (1987b).

Tiffany Moore, Benthic Specialist (QDC# 017)  
 8927 Weaver Road  
 Ravenna, OH 44266  
[tiffany@digitaldesignmedia.com](mailto:tiffany@digitaldesignmedia.com)  
 330-626-2310

- (12) Copy of ODNR collector's permit

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

(13) Catalog Statement

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

Print/Signature: John W. Rhoades / Date: \_\_\_\_\_

(14) Voucher Specimen Statement

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: \_\_\_\_\_

(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.

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Print/Signature: John W. Rhoades / Date: \_\_\_\_\_

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

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

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

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

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

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

## Appendix A