Ohio EPA Credible Data Program - Level III Project Study Plan
Biological and Habitat Assessment

2-10-09

Raccoon Creek, Pierce Run Acid Mine Drainage Remediation Project
Ohio University, Voinovich School of Leadership and Public Affairs

Pierce Run is a tributary to Raccoon Creek in Vinton County that is severely impacted from acid mine drainage (AMD). The Pierce Run Acid Mine Drainage Remediation Project was funded by an EPA Section 319(h) Clean Water Act (#07(h) EPA-09) grant with matching funds from ODNR Division of Mineral Resources Management. The grant/project sponsor is the Voinovich School for Leadership and Public Affairs at Ohio University. The proposed timeline for the project is from September of 2007 to December of 2009. The project will entail implementation of an acid mine drainage treatment project consisting of a steel slag leach bed and two wetland enhancement projects to reduce metal sludge into Pierce Run and Raccoon Creek. The objective of the project is to reduce or eliminate acid loading from the Pierce Run tributary into Raccoon Creek. This will potentially improve water quality and biological communities in Raccoon Creek and potentially in the lower section of Pierce Run.

(1) Monitoring Objectives

Pierce Run has been documented as the leading contributor of acid mine drainage to Raccoon Creek, in the middle basin (or Raccoon Creek below Elk Fork to above Little Raccoon Creek 11 digit HUC watershed). The biological monitoring objective of the Pierce Run AMD Remediation project is to document and analyze any changes (i.e. improvement) in aquatic communities as a result of water quality improvement from the project. This includes the mainstem of Pierce Run or in Raccoon Creek downstream of Pierce Run.

(2) Point and Non-point Issues to be Evaluated

The focus of the investigation is acid mine drainage (AMD) pollution, which is considered a non-point source pollutant. The major source of AMD to the Pierce Run basin is the Oreton abandoned underground mine discharge, PR0135. The coordinates of the Oreton AMD discharge are 39 9' 36.629" North and 82 25' 3.411" South. This AMD discharge accounts for approximately 90% of the mine drainage load to Pierce Run. The proposed remediation strategy will address the acid load at the Oreton Seep but is expected to neutralize all acid loads in Pierce Run at the confluence of Pierce Run and Raccoon Creek.

(3) Parameter Coverage

Biological and stream habitat data will be collected in Pierce Run and Raccoon Creek as part of this project.. Fish Community data will be collected to calculate IBI and Miwb metrics. Macroinvertebrate community data will be collected to calculate the Invertebrate Community Index (ICI) or a qualitative (QUAL) ranking. Habitat sampling will consist of completing the Qualitative Habitat Evaluation Index (QHEI).

(4) Field Collection and Data Assessment Techniques

All fish (IBI & Miwb), QHEI, and macroivertebrate (ICI) data will be collected and analyzed using Ohio EPA protocols outlined in Volume II: Users Manual for the Biological Assessment of Ohio's Surface Waters (Ohio EPA 1987, 1989, & 2006) and Volume III: Standardized Biological Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities (Ohio EPA 1987, 1989, 2006). Fish, QHEI, MAIS macroinvertebrate sampling for the mainstem of Pierce Run will be conducted by Ohio University's Voinovich School. MAIS analysis will be performed by the Midwest Biodiversity Institute (MBI). Fish, QHEI, and ICI macroinvertebrate sampling on Raccoon Creek will be performed and analyzed by MBI.

A. Fish Community Assessment

At wading sites (Pierce Run) fish will be collected by Ohio University's Voinovich School using a long-line electrofishing outfit. The electrofisher constitutes a Honda generator modified to produce pulsed direct current (DC), a 100 meter waterproof electrical cord, a net pole wired as an anode, and a cathode attached to the long-line approximately 8 -10 feet from the anode. A 200 meter reach will be sampled, working upstream, with all available stream habitat being sampled. Fish will be collected, identified, weighed, recorded and released. All field data will be recorded on Ohio EPA fish data sheets. A voucher of each species (minimum of two specimens) will be vouched and stored at the Biological Sciences Department at Ohio University. Identifications will be verified by Dr. Matt White at Ohio University. IBI and Miwb (when appropriate) metrics will be calculated using Ohio EPA methods.

At boat sites (Raccoon Creek sites) fish will be collected by MBI using a boat electrofisher. The electrofisher constitutes a Smith-Root electrofisher on a 10 – 14 foot aluminum John boat. A net pole is attached to a cord from the generator for the anode and the boat serves as the cathode. The two person crew has a netter on the front of the boat and a driver in the back. The netter performs the electrofishing and nets stunned fish, which are placed into a live well in the boat. A 500 meter reach of stream will be sampled working downstream. At the end of the reach all fish collected will be identified, weighed, recorded, and released. All field data will be recorded on MBI fish data sheets. A voucher of each species (minimum of two specimens) will be preserved and stored at the MBI laboratory. IBI and Miwb (when appropriate) metrics will be calculated using Ohio EPA methods.

B. Habitat (QHEI) Assessment

A QHEI will also be collected at each fish sampling station, performed by the crew leader who will be a level III qualified data collector. The QHEI sampling will follow the Ohio EPA protocol (Rankin 1989, Ohio EPA 2006). The QHEI is collected in the same reach as the fish sampling. The Ohio EPA QHEI form will be used for all sites. A total score will be calculated by the crew leader and completed QHEI data sheets will be kept with the project file.

C. Macroinvertebrate Assessment

i. Macroinvertebrate collection will be conducted by MBI using Ohio EPA protocol for the Invertebrate Community Index (ICI). Both quantitave and qualitative methods data collection methods are used to calculate the ICI. The quantitative method uses an artificial substrate sampler known as a Hester-Dendy. The Hester-Dendy samplers are composed of 8 hardboard plates with twelve spacers and constitute roughly a one square foot surface area for colonization. Five of these units are affixed to a weight and placed in the stream where they are colonized for 6 weeks from June 15th to September 30th. A qualitative sample is also collected using a dip net and sampling all available habitats at the stream site. Once collected, the samples are preserved and transported to a lab where they are identified to the species level and the ICI metric is calculated. This qualitative sample can be used to assess a narrative score for the stream reach in the case the Hester-Dendy sampler was not able to be collected. An ICI or a qualitative ranking for each stream site will be calculated and reported to the Voinovich School at Ohio University.

(5) Planned Sampling Locations

Table 1 below contains all proposed sampling locations for biological and habitat monitoring related to the Pierce Run AMD Remediation Project.

Table 1: Proposed Monitoring Locations for Biological and Habitat Monitoring

RC Site #	Waterbody	Site Description	River Mile	USGS 7.5 Minute Quadrangle	Latitude	Longitude
PR0140	Pierce Run	Pierce Run, upstream of Oreton Hollow	RM 5.35	McArthur	39 9' 55.425" N	82 25' 8.579" W
PR0130	Pierce Run	Pierce Run, downstream of Oreton Hollow	RM 4.80	McArthur	39 9' 47.433" N	82 24' 37.640" W
PR0113	Pierce Run	Pierce Run @ large truck pull off on south side of SR 160	RM 3.70	McArthur	39 9' 24.068" N	82 24' 0.780" W
PR0060	Pierce Run	Pierce Run @ Mead Rd. crossing, south of SR 160	RM 2.55	McArthur	39 9' 5.134" N	82 23' 18.200" W
PR0020	Pierce Run	Pierce Run @ Radcliff bridge, downstream of wetland	RM 1.67	McArthur	39 8' 27.962" N	82 22' 48.645" W
PR0010	Pierce Run	Pierce Run near mouth, downstream of gas line crossing	RM 0.45	McArthur	39 7' 36.789" N	82 22' 38.576" W
MSPR0085	Raccoon Creek	RC @ SR 160 near Radcliff	RM 63.0	Vales Mills	39 7' 49.614" N	82 22' 19.492" W
MSSR0015	Raccoon Creek	RC adjacent to CR 10	RM 58.6	Mulga	39 7' 13.043" N	82 22' 52.377" W
MSSR0040	Raccoon Creek	RC @ Clarion Rd bridge	RM 58.1	Mulga	39 6' 22.437" N	82 23' 3.069" W
MSSR0300	Raccoon Creek	RC @ SR 124	RM 55.5	Mulga	39 5' 2.129" N	82 23' 28.533" W

Biological and habitat monitoring will be performed at 6 mainstem Pierce Run sites and at four mainstem Raccoon Creek sites to analyze any changes in aquatic communities as a result of water quality improvement from AMD treatment at Oreton Hollow in Pierce Run. Mainstem Pierce Run sites will be monitored for IBI/QHEI and MAIS pre and post construction. IBI/QHEI and ICI at Raccoon Creek mainstem sites will occur in 2009 as post construction data only. Baseline data was collected at these sites in 2005.

(6) Schedule of Planned Sampling

Biological monitoring for the project will entail several components: both pre-construction and post-construction in the mainstem of Pierce Run, and post construction in mainstem Raccoon Creek sites upstream and downstream of Pierce Run. Baseline biological data was collected at Raccoon Creek sites in 2006 and 2007. Monitoring will be conducted between the months of June 15th and October 15th. Table 2 below summarizes the proposed monitoring timeline for 2008 - 2010. Monitoring will not be conducted during project construction activities, which is expected to occur January to July 2009. Monitoring will be adapted to any change in project construction timelines.

Table 2: Proposed Timeline for Biological and Habitat Monitoring

2008

Basin	*Jan.*	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Raccoon Creek Sites												
Pierce Run Sites						IBI	MAIS					

2009

Basin	*Jan.*	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Raccoon Creek Sites												
Pierce Run Sites												

2010

Basin	*Jan.*	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Raccoon Creek Sites						IBI	ICI					
Pierce Run Sites						IBI	MAIS					

The EPA 319 grant may expire before a year of post treatment monitoring is complete but monitoring is planned to continue with support from ODNR Division of Mineral Resources Management.

(7) Quality Assurance and Quality Control Plan

A Quality Assurance Project Plan (QAPP) for the Pierce Run AMD Remediation project has been developed as part of the EPA Section 319 grant. The QAPP covers both chemical and biological sampling QA/QC and was submitted to Ohio EPA Nonpoint Source Program in December of 2007. The document was approved with minor revisions in January of 2008. A final approved QAPP with all signatures was submitted to Ohio EPA on February 6th, 2008.

(8) Anticipated Work Products

Work products that will be submitted to the director for use will include raw biological data (QHEI, ICI, MAIS, ICI field sheets) collected as part of the project. In addition, a data interpretation summary generated for the EPA Section 319 grant will be submitted to the director for review. The summary will include calculated QHEI, ICI, MAIS, and ICI metrics, pre and post data analysis and comparison of stream sites to Ohio EPA standards and criteria.

(9) Data Collectors and Data Verification Procedures

The project manager is Level III Qualified Data Collector for Fish Community Biology, and Stream Habitat Assessment (QHEI) from the Ohio EPA Surface Water Volunteer Monitoring Program, and is responsible for ensuring data accuracy during collection, database entry, and reporting. The Project Manager, Field Assistant, and MBI fish and macroinvertebrate collectors' contact information is listed in Table 3.

Table 3: Biological Data Collectors for Pierce Run AMD Project

Project Manager	Field Assistant	MBI: Macroinvertebrate (ICI)
Ben McCament (QDC 047) Raccoon Creek Watershed Coordinator Ohio University – Voinovich School of Leadership and Public Affairs The Ridges, Building 22 Athens, Ohio 45701 740-597-1473 mccament@ohio.edu	Amy Mackey QDC 146 Mineral Resources Intern ODNR Division of Mineral Resources Management 280 East State Street Athens, Ohio 45701 740-592-3748 amylmackey@gmail.com	Tracy Mormon QDC 161 Macroinvertebrate Taxonomist Midwest Biodiversity Institute 533 Olentangy Street P.O. Box 21561 Columbus, OH 43221-0561 614-899-7293 appbenthos@yahoo.com
MBI: Fish / Habitat (IBI / QHEI)	**Fish Identification/Verification**	
Chris Yoder QDC 234 Research Director Midwest Biodiversity Institute 533 Olentangy Street P.O. Box 21561 Columbus, OH 43221-0561 614-899-7293 yoder@rrohio.com	Dr. Matthew White Associate Professor Ohio University 310 Irvine Hall Ohio University Athens, Ohio 45701 whitem@ohio.edu	

The project manager will be the primary biological data collector for wading sites (6 sites on Pierce Run) and is responsible for collecting fish, QHEI, and MAIS data. MBI, with Chris Yoder as supervisor, will be the primary biological data collector for boat sites (4 sites on Raccoon Creek) and are Level III qualified data collectors. The field assistant, or any other person assisting with data collection, will be trained according to sampling procedures outlined in the QAPP document and data will be verified for accuracy by the project manager. Data entry will be by the project manager or checked for accuracy by the project manager.

Dr. White at Ohio University will be consulted if any species of fish need verification beyond the Project Manager or MBI's judgement. Dr. White will also store vouchers collected from Pierce Run in the vertebrate collection at Ohio University. If Dr. White is needed for fish verification, a report to Ohio EPA will be sent a summary stating which species were in question and the process followed for identification.

(10) Documentation of Level III Certification

The project manager is Level III Qualified Data Collector for Fish Community Biology, and Stream Habitat Assessment (QHEI) from the Ohio EPA Surface Water Volunteer Monitoring Program (QDC 047). Tracy Morman of MBI is QDC 161, Level III for Macroinvertebrates. Chris Yoder of MBI is QDC 234, Level III for Fish and Habitat (QHEI).

(11) Contract Laboratory

All macroinvertebrate identification will be conducted at the MBI Laboratory. Contact information is listed above in Table 5.

(12) Scientific Collector's Permit

A scientific collector's permit has been issued to the project manager and to MBI by the Ohio Department of Natural Resources, Division of Wildlife (Attached).

(13) Digital Photo Catalog

A digital photograph catalog will be maintained for ten (10) years by the Voinovich School. The catalog will contain photographs of sampling locations, areas adjacent to sampling site, land use in the area, and Pierce Run AMD remediation project photos.

I, _____ agree to maintain a digital photograph catalog for 10 years of all project sampling locations for this project. The catalog will document each stream location, adjacent areas, and surrounding land use.

(14) Voucher Specimens

I, _____ agree to provide to the director upon request two voucher specimens of each taxa or species of fish and macroinvertebrate that are collected at sampling locations and keep these voucher materials for at least 10 years at the Biological Sciences Department at Ohio University .

Signature: _____ Date: _____

(15) Statement of No Convictions for Trespassing in the Past Five Years

I, _____ have not been convicted of 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.

Signature: _____ Date: _____

I, _____ have not been convicted of 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.

Signature: _____ Date: _____

I, _____ have not been convicted of 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.

Signature: _____ Date: _____

References

Ohio EPA, 1987. Biological Criteria for the Protection of Aquatic Life. Volume II: Users Manual for Biological Field Assessment of Ohio Surface Waters. State of Ohio Environmental Protection Agency, Columbus, OH.

Ohio EPA, 1989. Addendum to Volume II: Users Manual for Biological Field Assessment of Ohio Surface Waters. State of Ohio Environmental Protection Agency, Columbus, OH. 60 p.

Ohio EPA, 1989. Biological Criteria for the Protection of Aquatic Life. Volume III: Standardized Biological Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities. State of Ohio Environmental Protection Agency, Columbus, OH. 42 p.

Ohio EPA 2006. Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI). Ohio EPA Technical Bulletin EAS/2006-06-01. Ohio Environmental Protection Agency, Division of Surface Water, Groveport, Ohio.

Rankin, 1989. The Qualitative Habitat Evaluation Index [QHEI]: Rationale, Methods, and Application. State of Ohio Environmental Protection Agency, Columbus, OH. 51 p.

DIVISION OF WILDLIFE

Ohio Department of Natural Resources

Division of Wildlife Headquarters
2045 Morse Road, Bldg. G
Columbus, Ohio 43229-6693
1-800-WILDLIFE

Chief, Division of Wildlife **David M Graham**

WILD ANIMAL PERMIT: 09-115

SCIENTIFIC COLLECTION

DATE ISSUED
4/30/2008

BENNY K MCCAMENT
OHIO UNIVERSITY, THE RIDGES, BLDG 22
ATHENS, OH 45701

Others authorized on permit
NO

is hereby granted permission to take, possess, and transport at any time and in any manner specimens of wild animals, subject to the conditions and restrictions listed below or any documents accompanying this permit. This permit, unless revoked earlier by the Chief, Division of Wildlife, is effective from:

4/30/2008 to: 3/15/2009

This permit must be carried while collecting wild animals and be exhibited to any person on demand.

THIS PERMIT IS RESTRICTED AS FOLLOWs:

1. Permittee may collect fish and aquatic macroinvertebrates for survey and inventory purposes.
2. Permittee must contact the Division of Wildlife if undocumented aquatic species are discovered. Contact John Navarro at (614)265-6346 with information.
3. 24 hours prior to collecting, contact must be made with the local wildlife officer or nearest wildlife district office to advise the location and duration of collecting activities.
4. All voucher specimens to be deposited at Ohio University Biological Sciences.
5. Permittee must provide an annual report of collecting activities to the Division of Wildlife. Report shall provide species, quantity and locations of collection.

Locations of Collecting:
VINTON, JACKSON, GALLIA, AND ATHENS COUNTIES

Equipment and method used in collection:
ELECTROFISHING, DIP NETS, AND KICK SEINES

Name and number of each species to be collected:
FISH AND MACROINVERTEBRATES. SPORT FISH OVER SIX INCHES MAY NOT BE RETAINED.

This permit is not valid for collecting migratory birds, their nests, or eggs unless a current permit from the U.S. Fish and Wildlife Service has been obtained.

RESTRICTIVE DOCUMENTS ACCOMPANYING THIS PERMIT? NO

NO ENDANGERED SPECIES MAY BE TAKEN WITHOUT WRITTEN PERMISSION FROM THE CHIEF