

Little Miami River Total Phosphorous Monitoring Level 3 Project Study Plan

Background

In April of 2002, Ohio EPA issued the Final Report for Total Maximum Daily Loads (TMDL) of the Upper Little Miami River watershed in Southwest Ohio. According to this report, leading causes of impairment are nutrient enrichment, low in-stream dissolved oxygen, sedimentation, and habitat degradation. Ohio EPA identified Publicly Owned Treatment Works (POTWs) as major contributors of total phosphorus, while agriculture and urban development were listed as leading sources of sediment.

While Ohio EPA currently does not have statewide numeric criteria for nutrients, potential targets have been identified in a technical report entitled *Association between Nutrients, Habitat, and the Aquatic Biota in Ohio Rivers and Streams* (OEPA, 1999). The total phosphorus target for small rivers is 0.17 mg/l (Eastern Corn Belt Plains Criteria). For the upper Little Miami River, an overall phosphorus reduction basin-wide of 60% is needed from the 0.43 mg/l median concentration observed at the most downstream point. Because phosphorus is currently not codified in Ohio's water quality standards; Ohio EPA maintains a certain degree of flexibility as to how these can be used in a TMDL setting (OEPA, 2002).

During the TMDL process, the watershed's POTWs worked with Ohio EPA to develop an implementation schedule to comply with the phosphorus load reduction goal. The schedule contains provisions for NPDES permitted dischargers to meet wasteload allocations by:

- reducing phosphorus loads discharged at final outfalls;
- implementing Ohio EPA acceptable nonpoint source reduction projects; or,
- combining point and nonpoint source reduction projects (Shamblen, 2006).

In 2003, the Ohio EPA issued renewed NPDES permits to the five largest POTWs in the upper portion of the region operated by the City of Xenia, Montgomery County, and Greene County. Each facility was required to meet a final effluent limit of 1.0 mg/l total phosphorus (30-day average) during the months of May through October within the five-year term of the permit. In addition, the permit for each facility contained a compliance schedule requiring it to meet its share of the waste load allocation by reducing total phosphorus by 60% within 118 months. Smaller dischargers in the basin would be required to meet the 1.0 mg/l limit when their permits were renewed.

These permits contain a provision that the Ohio EPA will evaluate any proposed modification of the TMDL implementation schedule in the event evidence becomes available demonstrating to the Ohio EPA's satisfaction that either:

- biological indices are in full attainment; or
- monitoring data collected at the lower end of the TMDL study area show the May-October median total phosphorus concentration is less

than or equal to the 0.17 mg/l in-stream target of two consecutive years.

In 2004, a group comprised of POTW representatives from Montgomery County, Greene County, and the cities of Xenia and Waynesville began to meet as an offshoot of the initial TMDL stakeholder's group. Their goal was to logically implement measures to protect the integrity of the Little Miami River water quality while considering the economics of these proposed mass-based phosphorus limitations on POTWs and their customers. The financial impacts of these new limitations could potentially cost into the hundreds of millions of dollars for POTWs across the entire watershed due to need to modify process operations and/or construct facility upgrades, and consequently placing a heavy burden on policy makers, facility administrators, and rate payers.

Because the Ohio EPA lacked necessary resources to fund a monitoring program to determine if the river reached either the attainment or in-stream phosphorus goals, the ULMR stakeholders believed it would be in their best interest to implement a program to monitor phosphorus concentrations at the downstream reaches of the ULMR watershed. The main goal of the program is to analyze and monitor the in-stream phosphorus levels in an attempt to eliminate the need for further reductions of phosphorus from PTOW discharges. These mass-based limits are currently scheduled for implementation by 2013 and would reduce effluent discharge concentrations to below 0.5 mg/l TP for most of the facilities in the watershed.

(1) Objective and DQOs

The Upper Little Miami River TMDL set an in-stream target of 0.17 mg/l total phosphorus at a point just before the confluence of the Little Miami River with the Caesars Creek. This study will provide data to determine if this limit is currently being met based on the six month median of the total phosphorus data collected between May 1 and October 31 at the point above Caesars Creek on the Little Miami River.

We expect a total of 24 samples to be collected between May 1 to October 31 with a sampling event to occur once per week. The day and time of sampling will be determined solely by the availability of sampling teams to complete the work but should, in general, be Monday through Friday between the hours of 7:00 a.m. and 5:00 p.m. Sampling will be accomplished independent of flow and, within reason, weather.

PARCC Standards

- a. Precision: the agreement between duplicate samples can be expressed as the Relative Percent Difference.

RPD defined as:

$$\frac{|X_1 - X_d|}{\frac{X_1 + X_d}{2}} \times 100$$

X_1 = sample measurement

X_d = duplicate measurement

Should be $\leq 20\%$ for laboratory duplicates and $\leq 20\%$ for field duplicates.

- b. Accuracy: defined as the closeness of a measurement to the true value. A matrix spike is usually prepared in the laboratory using an actual field sample. An expression of percent recovery would be:

$$\frac{X_{s+1} - X_1}{S_a} \times 100$$

Where, X_{s+1} = spiked sample measurement

X_1 = sample measurement

S_a = true amount added in the spiking procedure

The matrix spike recovery should be $\leq 30\%$.

- c. Representativeness: a qualitative parameter related to how the overall data collection design represents a characteristic of a population.

The sample collection site for this study has been approved and used by OEPA in past work and is considered representative.

All sampling procedures used in this study comply with industry standards and have been reviewed by OEPA. All sampling teams will be trained and monitored by a CDC concerning methods to be used, field preservation techniques and sample handling. Representativeness of this study should be considered acceptable.

- d. Comparability: from a laboratory stand point this refers to the confidence with which data sets obtained from the same set of samples can be considered comparable. Laboratories must run performance evaluation (PE) studies and perform acceptably to be considered comparable to other labs evaluated. Montgomery County Laboratory has successfully completed many PE studies for total P. Comparability for the entire study includes all aspects of sampling as well as laboratory performance.

Sample collecting and handling must be carefully documented and controlled so that others may follow these procedures and achieve similar results. Our study is quite straight forward, well documented and easy to follow. It should have good comparability with other efforts.

- e. Completeness: a measure of whether all the data necessary to meet project objectives has been collected. For this project more data would always be preferable but resources are limited and one sample per week is all that can be accomplished at this time. Considering analytical completeness, sampling completeness and holding time completeness, a 90% goal should be achievable in all cases.

(2) Non-point/Point Sources

No specific non-point and/or point sources were considered, however, all point and non-point sources contributing to the Upper Little Miami system above river mile 51.2 before the confluence with Caesars Creek are represented at site 1. (A schematic showing treatment plants and a table listing permitted wastewater treatment plants in the Upper Little Miami River system may be found in Appendix A.)

(3) Parameters Covered

Parameters to be measured during the study are total phosphorous, dissolved oxygen and temperature. These will be taken at the County Road 30 bridge over the Little Miami River. Water level will be recorded at the Oregonia Road bridge over the Little Miami River.

(4) Field Collection and Data Assessment Techniques

A sample will be grabbed on a weekly basis from the County Road 30 bridge. A river height measurement will be made at the Oregonia Road bridge on the same day as the total phosphorus sample is collected. D.O. and temperature will be measured using portable D.O. equipment such as a YSI 50B or YSI 58 or similar units. D.O. and temperature will be made directly from the bridge using a 30 foot cable and probe. Equipment will be calibrated as per manufacturer requirements.

Operations manuals are available at www.yesi.com. The total phosphorous collection will be made using a disposable plastic sample bottle attached to a nylon line lowered from the bridge. See attached SOP for the manual collection of stream water samples. The river height data will be used by the OEPA to calculate flows and then calculate loadings.

Data assessment may include an analysis of temporal and spatial trends in the collected data as well as comparison to the TMDL limit to determine if any deviation has occurred. The comparison will be made using the median of the total phosphorus data collected between May 1 and October 31.

(5) Sampling Locations

Sampling will occur at two (2) locations:

Site 1: Covered bridge over the Little Miami River on County Road 30. This location is approximately 500m above the confluence of Caesars Creek with Little Miami.

Site 2: Oregonia Road bridge over the Little Miami River (flow gauging only). This location is approximately 5.19 km below the confluence of the Little Miami River and Caesars Creek.

(See Table #1) (See maps and aerial photographs in Appendix A)

Table #1

Location	Latitude GIS	Longitude GIS	River Mile	Description	Quadrangle	Purpose
County Road 30 (aka Middletown Rd.) bridge over the Little Miami River	39.4975	-84.1022	51.2	Approximately 380m upstream of the confluence of Caesars Creek with the Little Miami River	Oregonia	Evaluation of total P contribution from Upper Little Miami
Oregonia Road bridge over the Little Miami River	39.4548	-84.0982	47.67	Approximately 5.19 km downstream of confluence of Caesars Creek with Little Miami River	Oregonia	Flow gauging

(6) **Schedule**

Sampling will occur this year starting in April 2008 and ending November 2008. Grab samples will be collected once per week. The tentative division of labor will be as follows:

Montgomery County: Week 2 & 3 of April; October; Week 1 of November;
City of Xenia: Week 4 of April; May; August; Week 1 & 2 of September; Week 2 of November

Greene County: Week 1 of April; June; July; Week 3 & 4 of September; Week 3 & 4 of November

All teams will sample in April under the observation of a QDC and other team members as available.

Assignments in future years may be different. Because Montgomery County has taken on the role as sole analytical lab they are forgiven one month of field sampling. Sampling will occur regardless of normal weather conditions. Winds of any strength will degrade the accuracy of the river height measurements and must be noted with the river gauging results. Sampling may be postponed when conditions are deemed unsafe by the National Weather Service or when lightning is observed up to ½ hour before sampling is planned.

(7) **QA/QC**

D.O./temperature meters will be calibrated each day that sampling is to occur. Calibration will be done according to the manufacturer's recommendations. Operation manuals for YSI equipment are available at www.ysi.com. All sampling personnel must have a copy of the D.O. meter user manual available to them and be familiar with calibration and operation instructions. Currently the City of Xenia is using a YSI 550 A. Montgomery County is using a YSI 600 XL multi meter. Greene County is using a YSI 50 B. User manuals for these instruments may be found as a PDF file in Appendix B. Any problem will be corrected before river sampling is initiated. Calibration and maintenance activities will be noted in a log. Malfunctioning equipment will not be used to collect data.

Sampling for total phosphorous will be accomplished according to the SOP for manual collection of stream water samples (attached). Laboratory QA/QC is documented in the Montgomery County Laboratory QA/QC plan. Minimum quality assurance field practices will be field duplicates once per month and equipment blanks once every ten samples. The frequency of duplicate collection may be reduced to once every ten samples if duplicates are close. This would be done in consultation with OEPA.

Flow measurement is accomplished using dedicated reel tape measurer with a weight attached. The reel tape is a Keson 50ft model #OTR1050 and has a 340 g weight on the end which is made up of 2"x1/2" bolt and nut with 11 large fender washers. (The tape system, modeling unit 8, is the property of OEPA.) The specific spot on the bridge for measurement has been permanently marked by OEPA. The reel is placed at the mark and the weighted end slowly released until the weight just touches the water. A spotter on the bridge, approximately 25 feet away from the collection point, will help to determine when the weight is just touching the water. When in proper position, record the reading at the point when the tape crosses the bridge girder going down to the river to the nearest 0.01 of a foot. Record the reading. The OEPA modeling division will convert the measurement to flow. If weather conditions are windy accurate flow measurement is not possible. Measurements should be duplicated and the average reported. Duplicate measurements should agree within ± 0.01 feet. During April all sampling teams will perform river level measurements under the close supervision of project QDC(s). All teams must perform the task correctly with acceptable precision before being cleared for May sampling.

(8) Work Products

Following the completion of the project a spreadsheet that presents data collected during the study will be prepared. Reports, summarizing, graphically presenting and discussing the data may also be prepared. The median of the data will be calculated based on the samples collected between May 1 and October 31. This result will be compared to the critical value of 0.17 mg/l total P.

(9) Qualified Data Collectors

The Level 3 Qualified Data Collectors managing this project will be:

Richard A. Schran (QDC number 059)
422 Factory Road
Beavercreek, OH 45434

(937) 562-7152
Email: rschran@co.greene.oh.us

Dave Brewer (QDC number 167)
1802 Spaulding Road
Dayton, OH

(937) 496-7096 cell: 825-6807
Email: BrewerD@mcohio.org

Roger Spence (QDC number 169)
420 Factory Road
Beavercreek, OH 45434

The following is a list of persons not qualified as Level 3 Data Collectors who will be involved in the project. The project manager will provide guidance concerning proper sampling techniques and methods. The manager will also review all reports and data analysis prepared by these individuals prior to the release of the final report.

<u>Greene County</u>	<u>Work Address</u>	<u>Email</u>	<u>Phone</u>
Mike Gummer	422 Factory Rd. Beavercreek, OH	mgummer@co.greene.oh.us	937-562-7150
Mike Kistler	422 Factory Rd. Beavercreek, OH	mkistler@co.greene.oh.us	937-562-7150
Jim Martin	422 Factory Rd. Beavercreek, OH	jmartin@co.greene.oh.us	937-562-7150
Teresa Shinkle	422 Factory Rd. Beavercreek, OH	tshinkle@co.greene.oh.us	937-562-7150
<u>Montgomery County</u>	<u>Work Address</u>	<u>Email</u>	<u>Phone</u>
Ken Linebaugh	1802 Spaulding Rd. Dayton, OH	LinebaughK@mcoho.org	937-496-7070
<u>City of Xenia</u>	<u>Work Address</u>	<u>Email</u>	<u>Phone</u>
Jason Tincu WWT Supervisor	101 N. Detroit St. Xenia, OH	jtincu@ci.xenia.oh.us	937-376-7271
Richard Turner Lab Tech II	101 N. Detroit St. Xenia, OH	WATER@ci.xenia.oh.us	937-376-7271
Carolyn Fankell Lab Tech I	101 N. Detroit St. Xenia, OH	WATER@ci.xenia.oh.us	937-376-7271

Due to the lack of a QDC for each sampling team, extensive training and over site will be provided.

1. All participants will be required to attend a training session where all phases of sample collection and sample handling will be covered. The training will be conducted by project CDCs.
2. All sampling teams will be required to demonstrate proper sample collection and sample handling, in situ, in the month of April. Any deviation will be noted and the procedure will be repeated until performance is satisfactory in the view of the QDC on site.
3. The first sample event of a sampling team's assigned month will be observed by a QDC. Deviations will be noted and corrected. If deviations are noted, a QDC will attend subsequent sampling events until the team performs with no deviations. A QDC will attend at least one more sampling event that month, unannounced, to observe sampling activities. **NOTE:** If a QDC is a member of

Rec'd 7/16/08
by mail
gdc

a sampling team and is with them at all times during sampling activities, then they are exempt from # 3.

(10) Documentation of approval of project manager as Level 3 qualified data collector

(See attached)

(11) Laboratory contact information

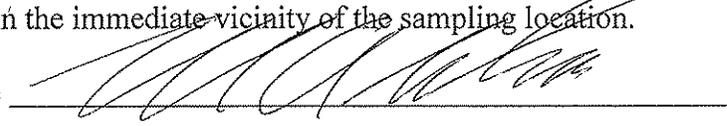
Total Phosphorus analysis is being handled by the Montgomery County Environmental Laboratory, 4257 Dryden Road, Dayton, OH 45439. Telephone number (937) 496-7051. The lab is managed by Jim Davis. Samples for Total Phosphorus analysis should be delivered to the Eastern Regional WWTP at 1802 Spaulding Road, Kettering, OH. At the gate, page an operator to the laboratory and then proceed to the lab area at the north side of the administration building. The operator will co-sign the chain-of-custody, take the sample and place it in the secure laboratory refrigerator. A courier will transport the sample to the Montgomery County Environmental Laboratory. Before leaving obtain a copy of the signed chain-of-custody and maintain in your records. Hours at the Eastern Regional WWTP for sample drop-off are 7:00 a.m. to 6:00 p.m., Monday – Friday.

(12) Copy of ODNR collector's permit (not applicable)

(13) Catalog Statement

I, Richard A. Schran, will be responsible for maintaining a digital photo catalog of all sampling locations for at least ten years including photos of the specific locations, riparian zone adjacent to the sampling location and general land use in the immediate vicinity of the sampling location.

Signature



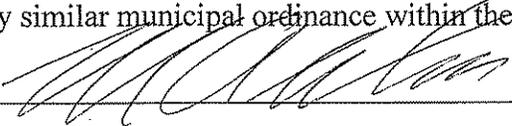
Date:

6-19-08

(14) Voucher Specimen Statement not applicable

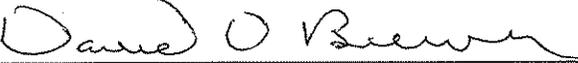
(15) Trespassing Statement

I, Richard A. Schran, 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.

Signature 

Date: 6-19-08

I, David O. Brewer, 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.

Signature 

Date: 6/19/08

I, Roger Spence, 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.

Signature 

Date: 6/19/08



State of Ohio Environmental Protection Agency

OHIO E.P.A.

STREET ADDRESS:

MAILING ADDRESS:

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

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

MAY 14 2008

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

ENTERED DIRECTOR'S JOURNAL

Effective Date: May 14, 2008
Expiration Date: May 13, 2010

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

Roger Spence
Greene County, Sanitary Engineering
1398 Meadow Wood Drive
Fairborn, Ohio 45324

By: [Signature] Date: 5-14-08

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

Dear Roger:

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: 169

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

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www.epa.state.oh.us

MAILING ADDRESS:

OHIO E.P.A.
P.O. Box 1049
Columbus, OH 43216-1049
APR 18 2007

ENTERED DIRECTOR'S JOURNAL

CERTIFIED MAIL

Effective Date: April 16, 2007
Expiration Date: April 15, 2009

Richard Schran
Greene County Sanitary Engineering
422 Factory Road
Beavercreek, Ohio 45434

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

Dear Mr. Schran:

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: 059

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.

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: Dan Jacobs Date: 4-16-07

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





State of Ohio Environmental Protection Agency

OHIO E.P.A.

STREET ADDRESS:

APR -7 2008 MAILING ADDRESS:

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

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www.epa.state.oh.us

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

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

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

David Brewer
Montgomery County Sanitary Engineering
1850 Spaulding Road
Kettering, Ohio 45432-3732

By: [Signature] Date: 4-7-08

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

Dear David:

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: 167

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

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- Figure 2** Table of municipal wastewater treatment plants in the Upper Little Miami River basin
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- File 2** YSI 600 XL user manual
- File 3** YSI 50 B user manual

) electronic &
on internet

Figure 2

UPPER LITTLE MIAMI RIVER WATERSHED TMDLS

Municipal wastewater treatment plants in the upper Little Miami River Basin.

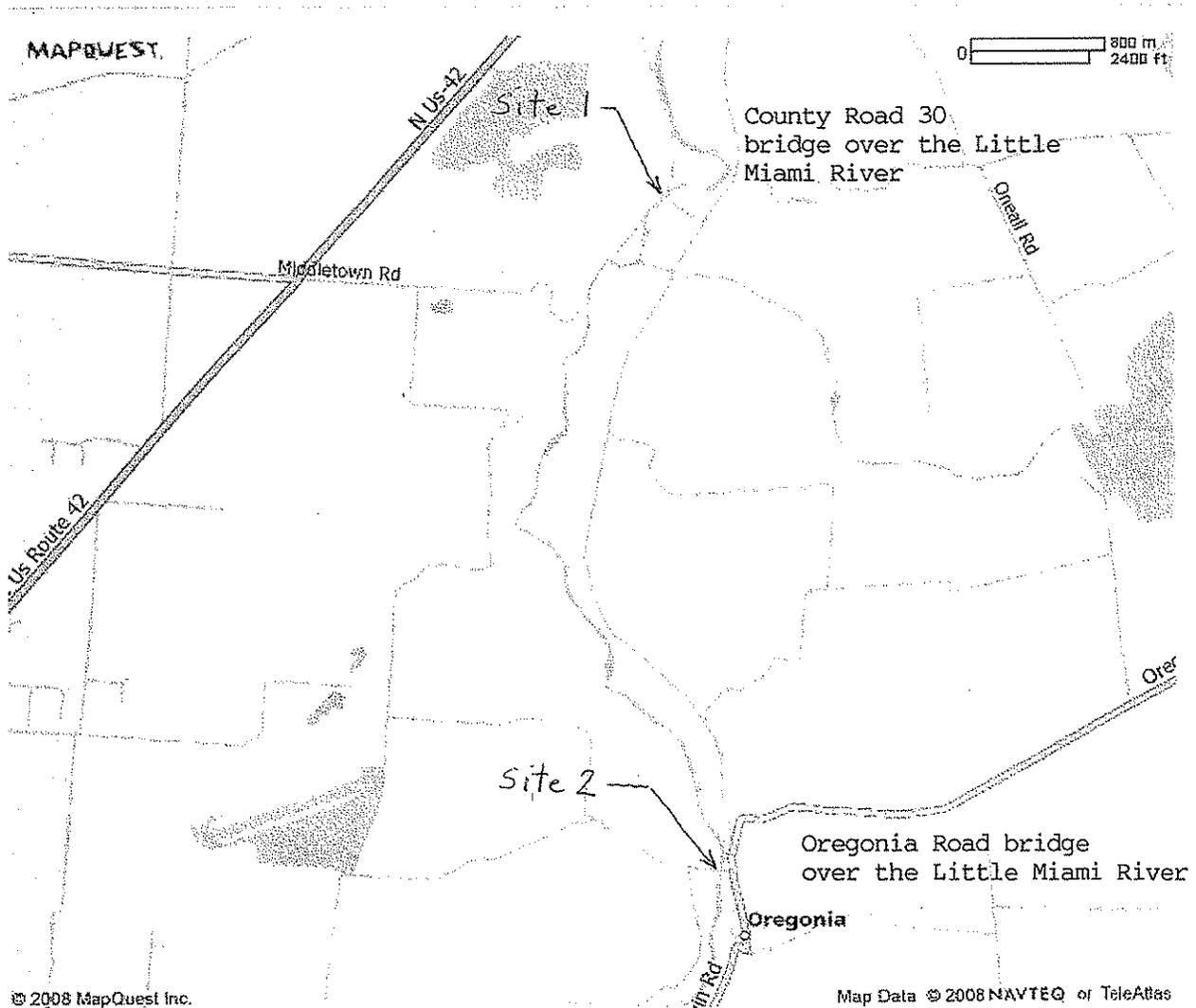
Entity	Receiving Stream (RM of discharge)	Design Flow (MGD)	Annual 1998 Median Flow (MGD)
Village of South Charleston WWTP	Gilroy Ditch (RM 1.40)	0.24	0.2
Greene County Clifton WWTP	Little Miami River (RM 89.10)	0.029	0.017
Village of Yellow Springs WWTP	Yellow Springs Creek (RM 0.43)	0.600	0.8
Greene County Cedarville WWTP	Massie Creek (RM 8.95)	0.56	0.4
City of Xenia-Ford Rd WWTP	Little Miami River (RM 77.03)	3.60	2.7
Greene County Beaver Creek WWTP	Beaver Creek (RM 0.40)	8.50	6.2
Montgomery County Eastern Regional WWTP	Little Beaver Creek (RM 4.58)	13.0	8.4
Greene County Sugar Creek WWTP	Little Miami River (RM 64.43)	4.90	6.2
City of Xenia-Glady Run WWTP	Glady Run (RM 4.93)	4.00	2.1
Village of Waynesville WWTP	Little Miami River (RM 53.79)	0.710	0.4
Jamestown WWTP	South Branch Caesar Creek (RM 9.00)	0.30 (0.90 proposed)	0.2

NA-Not available

Source: TMDL for the Upper Little Miami River, final report
OEPA Division of Surface Water April 2002

MAPQUEST.

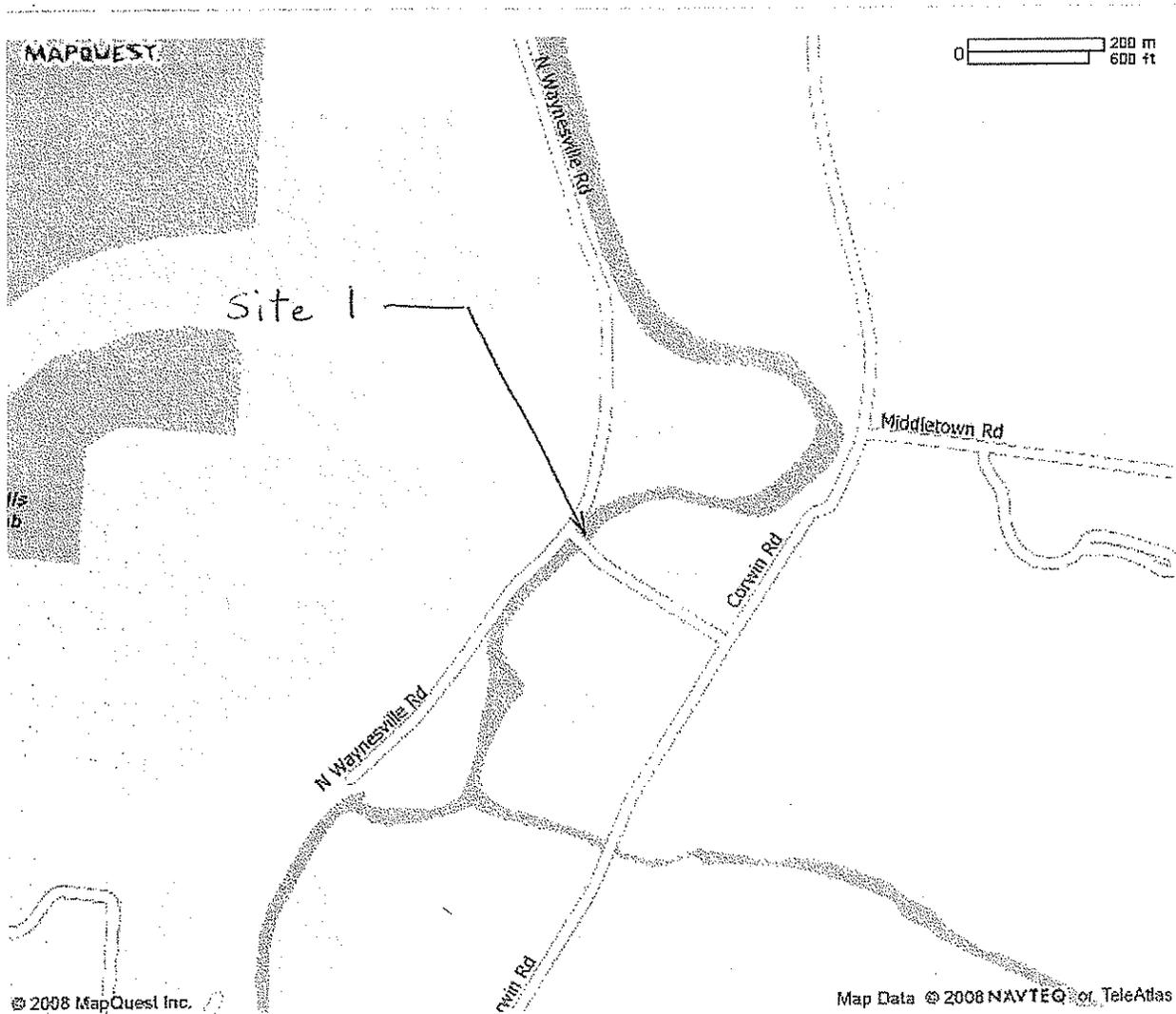
Site 1 and Site 2



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MAPQUEST.

Site 1 County Road 30 (aka Middletown Road)
bridge over the Little Miami River



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Aerial view of Site 1

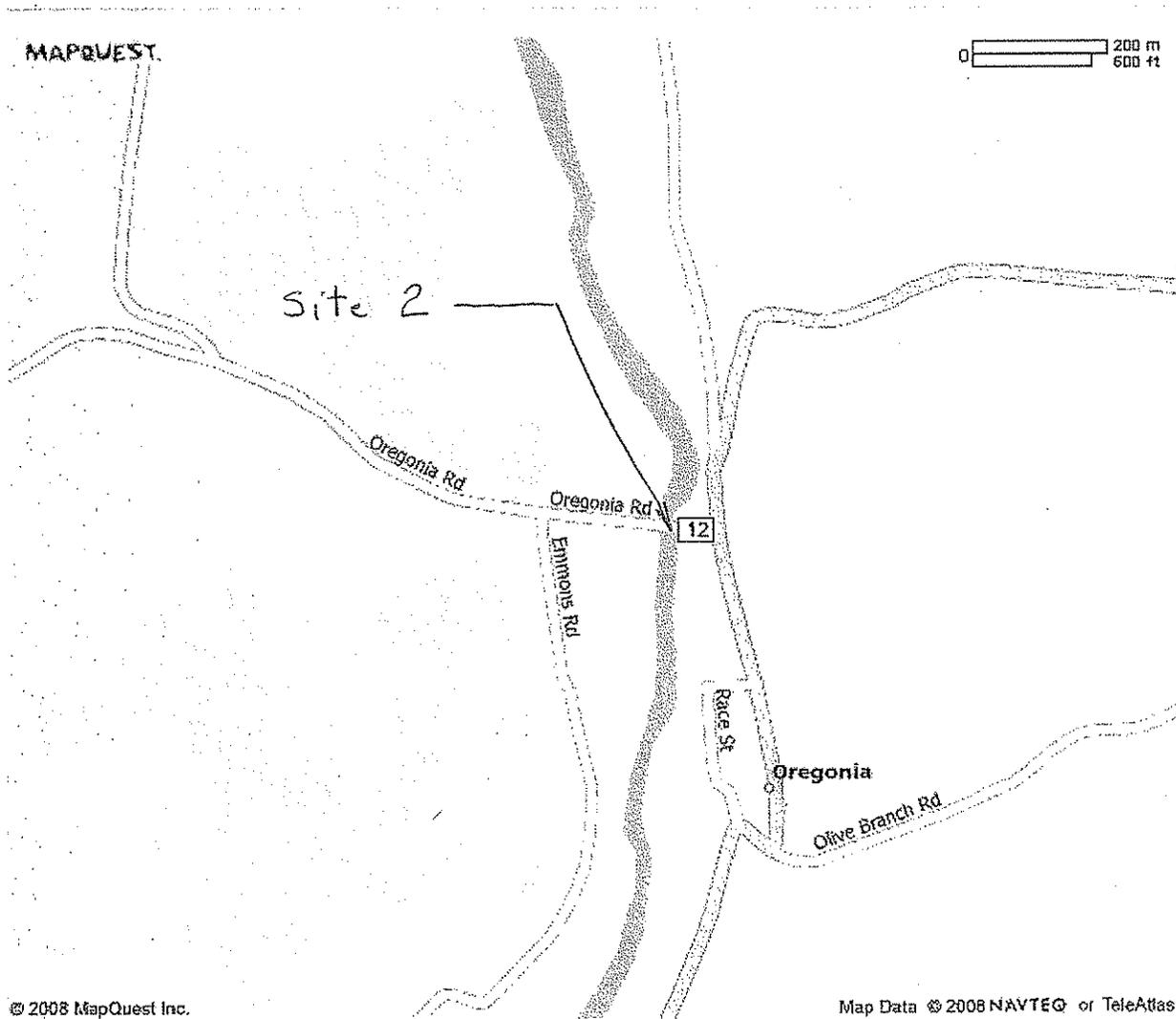
A: Waynesville, OH



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MAPQUEST.

Site 2 Oregonia Road bridge over the Little Miami River



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Aerial view of Site 2

A: Waynesville, OH



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Standard Operating Procedures

For the

Manual Collection of Stream Water Samples

From the County Road 30 Covered Bridge
Over the Little Miami River

AND

River Level Gauging
From the Oregonia Road Bridge
Over the Little Miami River

Total Phosphorus TMDL Multi-jurisdictional Study
R. Schran
(937) 562-7152
Revision Number: 6.11
4 June 2008

Introduction

This document describes the procedures for the collection of water chemistry samples from surface water sites. These methods allow for the collection of grab samples from a bridge. This standard operating procedures document (SOP) has been developed to maintain consistent data collection procedures, and to ensure the quality of the data collected.

1.0 Field Equipment

The following equipment is needed to implement the sampling techniques.

- Field Sampling SOP
- DO meter
- Field Data Sheet with chain of custody
- Permanent Marker (Sharpie)
- WBH (Weighted Bottle Holder): Custom made weighted sample bottle holder with 26 foot nylon line attached. System uses a spring loaded take-up reel to facilitate line control during sample collection. The device can, when needed, hold two (2) disposable bottles for duplicate sample collection.
- Latex or nitrile gloves
- Disposable 250ml sample bottles with preservative added by the analytical laboratory
- Safety glasses with splash shields or full face splash shield
- Rinse water for acid splash clean-up
- Coolers and ice
- Blank Water (reagent grade de-ionized) for field blanks
- Traffic cones
- Safety vests

2.0 Preparation

Before collecting samples, properly fill out the label (date, sampling point, sample ID number, analysis required, collectors name and the name of the collecting entity) using a permanent marker and affix the labels to the bottles. Ideally, the labels are filled out (except for time) and attached to the sample bottles before the sampling even occurs. Alternatively, adhesive labels may be attached to the bottle after sample collection. The sample bottle must be dried with paper towels before the label is attached. The label may be covered with wide plastic tape to protect it from the ice.

Prior to collecting samples, both the coolers and the sample bottles should be visually inspected for presence of any dirt, chemicals, or other contaminants. If a sample bottle has any contaminants present, discard it and replace. The cooler should be wiped down or washed with a mild soap and thoroughly rinsed if any contaminants present. In addition, all sampling equipment must be inspected for proper operation.

When actually collecting the samples latex or nitrile gloves shall be worn and care taken to avoid touching or otherwise contaminating the inner surface of the sample bottles or lids.

3.0 Safety

Traffic management: When collecting samples from a bridge or other location where a vehicle will be stopped in a lane of traffic, safety cones should be used to direct traffic around the vehicle. Sampling activities should be conducted in front of the vehicle so that it protects personnel from on-coming traffic. Vehicle emergency flashers and warning beacon/strobe should be activated. Personnel should wear safety vests to enhance visibility to motorists. Because concentrated sulfuric acid is used to preserve the sample, samplers must wear eye protection. Rinse water should be maintained to wash acid splashes from skin and clothing. Portable eyewash bottles are highly recommended.

4.0 Procedures

Keep all sampling bottles closed until they have been placed in the WBH and are ready to be filled. Collect the sample from the upstream side of bridge. The sample should be collected from the middle window or frame of the bridge. This will be marked. Avoid placing the sampling device in contact with the streambed or bank. Once the sample is collected, sealed, and labeled, the sample bottle should be immediately placed in a cooler and covered with ice.

4.1 Sampling with custom made weighted bottle holder and line (WBH)

Sample Collection

- Don latex or nitrile gloves
- Place a disposable bottle with preservative in the WBH then uncap bottle
- Lower the WBH into the river to obtain a surface grab sample. Take care not to collect or disturb sediment from the river channel bed.
- Pull up the WBH from the river, being careful to avoid any contact with the bridge.
- Cap the sample bottle and remove from WBH. Attach or complete bottle label. The label may then be covered with clear tape to protect it from deterioration in the cooler.
- Place sample bottle in cooler and cover with ice.

At the end of each sampling day, rinse the WBH and first 12" of line three times each with de-ionized water and place under a protective covering.

5.0 Quality Assurance

Quality assurance samples should comprise at least 10 percent of the total number of stream samples collected. Collect duplicates and field blanks once per month.

5.1 Duplicate Samples

Place two disposable sample bottles with preservative in the WBH. Collect the samples as in 4.1 being sure to cap each bottle before removed from the WBH. Complete a chain of custody for each sample. Each sample should be labeled and transported in ice to the laboratory.

5.2 Field Blanks

To collect a field blank, first put on a new pair of gloves, and then fill a disposable sample bottle containing preservative directly from the de-ionized water container provided by the laboratory. Do not use the sampling equipment in the collection of field blanks. Once the field blank is collected, sealed and labeled, the sample bottle should be immediately placed in a cooler and covered with ice.

6.0 River Level Gauging

Flow measurement is accomplished using dedicated reel tape measurer with a weight attached. The reel tape is a Keson 50ft model #OTR1050 and has a 340g weight on the end which is made up of 2"x1/2" bolt and nut with 11 large fender washers. (The tape system, modeling unit 8, is the property of OEPA.) The specific spot on the bridge for measurement has been permanently marked by OEPA. The reel is placed at the mark and the weighted end slowly released until the weight just touches the water. A spotter on the bridge, approximately 25 feet away from the collection point, will help to determine when the weight is just touching the water. When in proper position, record the reading at the point when the tape crosses the bridge girder going down to the river to the nearest 0.01 of a foot. Record the reading. Repeat the measurement and record the reading. Report the average. The OEPA modeling division will convert the measurement to flow. If weather conditions are windy accurate flow measurement is not possible. Measurements should be duplicated and the average reported. Please note the time of the measurement on the Field Data Sheet.

7.0 Chain of Custody Procedures

All samples are to be recorded on a Field Data Sheet with a Chain of Custody section. An example of the field data sheet to be used is provided in Attachment B.

Prior to submitting samples, the special Montgomery County Sample Submission Request form (which also acts as a Chain of Custody) must be filled out. The personnel conducting the sampling should be noted, along with the date and time of sample collection. The temperature, and dissolved oxygen readings observed in the stream at the time of sample collection should be recorded on the Chain of Custody. The Depth to River reading obtained at the Oregonia Road bridge should also be recorded on the Chain of Custody on the provided line. Additional comments may be noted on the lines provided.

Upon submitting the samples to the laboratory, both the courier and a laboratory staff member or other intermediate personnel should compare the sample bottles with the information recorded on the Chain of Custody to assure that all sample bottles are present. When it has been determined that all samples are present and that all information on the Chain of Custody is correct, the Chain of Custody form is to be signed by both the courier relinquishing the samples and the laboratory staff member or other intermediate personnel receiving the samples. The original Chain of Custody shall be kept on file at the laboratory. If possible, a copy of the Chain of Custody should be given to the sampler.

Sample Submission Request
Montgomery County Environmental Laboratory
Sanitary Engineering Department
4257 Dryden Road, Dayton, Ohio 45439
Lab Manager – (937) 496-7051
Laboratory – (937) 496-7053



Report To: Name: <u>Rick Schran</u> Organization: <u>Greene County Sanitary Engineering Department</u>	Sample Log Number: _____ (Lab Use Only)								
Sample Identification: Sample Name/#/ID: <u>Little Miami River @ Co. Road 30</u> Collected By: _____ Collected On: _____ Time: _____ <input checked="" type="checkbox"/> Grab <input type="checkbox"/> Drinking Water <input type="checkbox"/> Wastewater <input type="checkbox"/> Sludge <input checked="" type="checkbox"/> Other <u>Stream</u>	Field Treatment: <input checked="" type="checkbox"/> H ₂ SO ₄ Field Analysis: DO (mg/L) _____ Temp (°C) _____ Depth to River (Feet) _____ (Oregonia Rd bridge over the Little Miami River)								
Lab Analysis <table style="width:100%; border: none;"> <tr> <td style="width:40%; vertical-align: top;"> Wet Chemistry <input type="checkbox"/> Alkalinity <input type="checkbox"/> Alkalinity Stability <input type="checkbox"/> Ammonia as N <input type="checkbox"/> BOD, 5-Day <input type="checkbox"/> cBOD, 5-Day <input type="checkbox"/> Chlorine, Free (Lab) <input type="checkbox"/> Chlorine, Total (Lab) <input type="checkbox"/> Conductivity <input type="checkbox"/> Cyanide, Total <input type="checkbox"/> Cyanide, Free <input type="checkbox"/> Dissolved Oxygen (Lab) <input type="checkbox"/> Fluoride <input type="checkbox"/> Hardness <input type="checkbox"/> Hexavalent Chromium <input type="checkbox"/> Nitrate as N <input type="checkbox"/> Nitrite as N <input type="checkbox"/> Nitrate-Nitrite as N <input type="checkbox"/> Oil and Grease <input type="checkbox"/> Phosphorus, Ortho as PO₄ <input checked="" type="checkbox"/> Phosphorus, Total as P <input type="checkbox"/> pH (Lab) <input type="checkbox"/> Residue, Total (TS) <input type="checkbox"/> Residue, Total Volatile (TVS) <input type="checkbox"/> Residue, Total Nonfilterable (TSS) <input type="checkbox"/> Residue, Total Volatile Nonfilterable (TVSS) <input type="checkbox"/> Residue, Settleable (SS) <input type="checkbox"/> Specific Gravity <input type="checkbox"/> Total Kjeldahl Nitrogen <input type="checkbox"/> Turbidity Bacteriology <input type="checkbox"/> Total Coliform/E. 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