

June 2011



Environmental  
Protection Agency

Division of Surface Water

## 2011 Study Plan for the Upper Little Miami River

Hydrologic Unit Codes 05090202  
01,02,03,04,05

Clark, Clinton, Greene, Montgomery, and  
Warren Counties



John R. Kasich, Governor  
Mary Taylor, Lt. Governor  
Scott J. Nally, Director

# **2011 Study Plan for the Upper Little Miami River**

## **Hydrologic Unit Codes (HUCs)**

**05090202 01,02,03,04,05**

**Clark, Clinton, Greene, Montgomery and Warren Counties, Ohio**

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June 2, 2011

## CONTACTS

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### Ohio DNR – Wildlife Officers

#### District 5 – 937-372-9261

- Clark: Byron Rice 937-372-5639 X5212
- Clinton: Matthew Roberts 937-372-5639 X5206
- Greene: Matthew Hunt 937-372-5639 X5204
- Montgomery: Trent Weaver 937-372-5639 X5211
- Warren: Rick Rodgers 937-372-5639 X5216

### Sheriffs (emergencies dial 911)

- Clark: 937-521-2050
- Clinton: 937-382-1611
- Greene: 937-376-5111
- Montgomery: 937-225-4357
- Warren: 513-695-1280

### Police Departments (emergencies dial 911)

- Beavercreek: 937-426-1225
- Bellbrook: 937-848-8484
- Waynesville: 513-897-8010
- Jamestown: 937-675-4111
- Xenia: 937-376-7204
- Yellow Springs: 937-767-7206
- South Charleston: 937-462-8822
- Cedarville: 937-766-2881
- Harveysburg: 513-897-9926

### Hospitals (maps attached at end)

- Springfield Regional Medical Center: 2615 E. High Street, Springfield, OH 45505 937-325-0531
- Greene Memorial Hospital: 1141 N. Monroe Drive, Xenia, OH 45385 937-352-2000
- Miami Valley Hospital South: 2400 Miami Valley Drive, Centerville, OH 45459 937-438-2400
- Kettering Medical Center: 3535 Southern Boulevard, Kettering, OH 45429 937-298-4331

## INTRODUCTION

During the 2011 field season (July through October) chemical, physical, and biological sampling will be conducted in the upper Little Miami River watershed to assess and characterize water quality conditions. The upper Little Miami River watershed is located in southwestern Ohio and includes streams in Clark, Clinton, Greene, Montgomery and Warren counties (Figure 1). This study will cover the Little Miami River mainstem from the headwaters downstream to the confluence with Caesar Creek, and includes the 10-digit Hydrologic Unit Codes (HUCs) 0509020201, 0509020202, 0509020203, 0509020204, and 0509020205. Extensive sampling has been conducted by Ohio EPA in this watershed, with the most recent comprehensive survey taking place in 1998. Due to a combination of intense agricultural land use and the existence of numerous wastewater dischargers in the watershed, the upper Little Miami River watershed is prone to the effects of both nutrient and organic over-enrichment. These effects were evident in the 1998 biological and water quality survey via widespread biological partial and non-attainment (Ohio EPA 2000).



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However, in 2007, the Ohio EPA Biological and Water Quality Study of the Lower Little Miami River report (Ohio EPA 2009) suggested that conditions in the upper watershed had improved. Selected sites on the upper Little Miami River that were previously in biological partial or non-attainment in 1998 were fully meeting the prescribed biological criteria in 2007. Further, the lower Little Miami River mainstem that achieved less than 50% full attainment in 1998 was in 95% full attainment in 2007. Clearly, many changes had transpired in the watershed since 1998, of which were the increased plant capacities and phosphorus removal at five major wastewater treatment facilities in the upper watershed. One objective of the 2011 survey is to further characterize the changes in water quality due to changes in wastewater treatment at these noted facilities.

In addition to the above, specific objectives of the survey are:

- Establish the present biological conditions in the upper Little Miami River watershed by evaluating fish and macroinvertebrate communities;
- Identify the relative levels of organic, inorganic, and nutrient parameters in surface water;
- Evaluate influences from both NPDES discharges and non-point sources;
- Assess physical habitat influences on stream biotic integrity;
- Determine recreation water quality;
- Determine beneficial use attainment status and recommend changes if appropriate, and
- Collect fish samples for the Ohio Sport Fish Tissue Monitoring Program (used to assess chemical contaminant levels in fish).

A State and National Scenic River located in the Eastern Corn Belt Plains (ECBP) ecoregion, the Little Miami River mainstem is assigned the Exceptional Warmwater Habitat aquatic life use throughout its length, except for the reach upstream from the North Fork Little Miami River (RM 91.64), where it is designated Warmwater Habitat (WWH). Major tributaries to be sampled include Massies Creek, Beaver Creek, Caesar Creek (including Anderson Fork), and Sugar Creek. Land use is heavily agricultural throughout most of the watershed, with heavy urban development concentrated in the central and western portions of the basin (Figure 2).

Point source dischargers are fairly numerous in the watershed and are listed with outfall coordinates in Table 1. Stream samples arranged by 12-digit HUC, including sample type, aquatic life use, and purpose are listed in Table 2 and represented graphically in Figure 3. Sample locations with coordinates are listed in Table 3.

## Upper Little Miami River Watershed Land Use

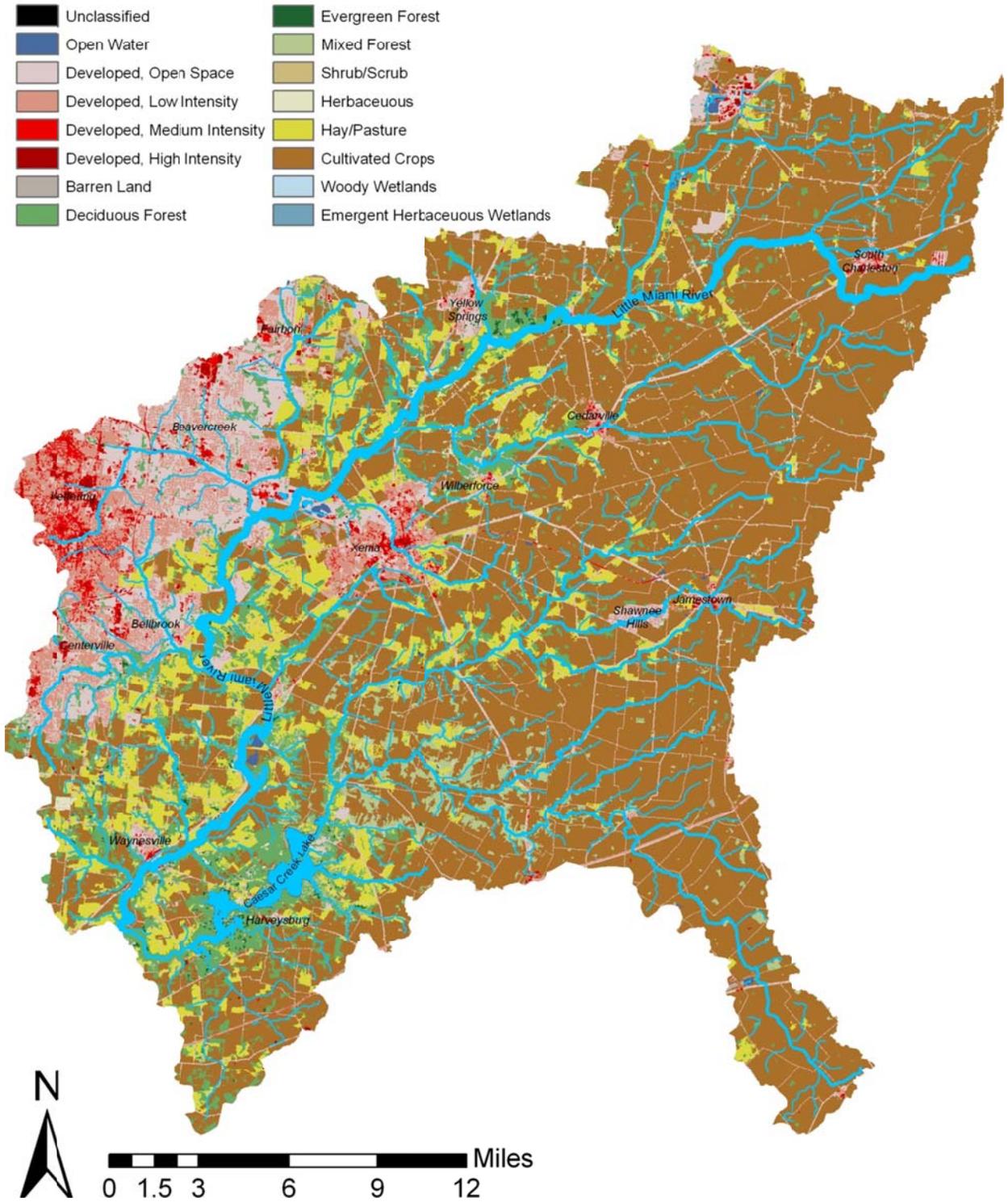


Figure 2. Land use in the upper Little Miami watershed (NLCD 2006).

## SAMPLING ACTIVITIES

### Chemical/Physical Water Sampling

Chemical sampling locations within the study area are listed in Tables 2 and 3. Conventional chemical/physical water quality samples will be collected 5 times at each designated location during the survey. Datasondes® will be deployed at 34 locations. Chemical parameters to be tested are listed in Table 4. Surface water sampling will occur across a variety of flow conditions, from lower flows to moderate and higher flows.

### Bacteriological Sampling

Water samples will be collected at 54 sites for bacteriological analyses to determine the attainment status of the Primary Contact recreational use. Testing will include *Escherichia coli* (*E. coli*) bacteria. Each site will be sampled at least 5 times, with sentinel sites being sampled more often.

### Macroinvertebrate and Fish Assemblages

Macroinvertebrate sampling methods will be used as listed in Table 2. Fish assemblages will be sampled as listed in Table 2. Habitat will be scored using the Qualitative Habitat Evaluation Index (QHEI) at all fish sampling locations, and at select streams as indicated in Table 2.

### Fish Tissue

Fish tissue samples will be collected from 4 locations as part of the Ohio Fish Tissue Consumption Monitoring Program. Fillet samples of edible size sport fish will be tested for organochlorinated pesticides, PCBs, mercury, lead, cadmium, arsenic, and selenium. Results will be used in the Ohio Sport Fish Consumption Advisory Program.

## QUALITY ASSURANCE/SAMPLING METHODS

### Ohio EPA Manuals

All biological, chemical, EPA laboratory, data processing, and data analysis methods and procedures adhere to those specified in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio EPA 2008), Biological Criteria for the Protection of Aquatic Life, Volumes II - III (Ohio Environmental Protection Agency 1987, 1989a, 1989b), and The Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Rankin 1989) for habitat assessment.

### Use Attainment

Attainment/non-attainment of aquatic life uses will be determined by using biological criteria codified in Ohio Administrative Code (OAC) 3745-1-07, Table 7-17. Numerical biological criteria are based on multimetric biological indices including the Index of Biotic Integrity (IBI) and modified Index of Well-Being (MIwb), indices measuring the response of the fish community, and the Invertebrate Community Index (ICI), which indicates the response of the macroinvertebrate community.

Performance expectations for the basic aquatic life uses (Warmwater Habitat [WWH], Exceptional Warmwater Habitat [EWH], and Modified Warmwater Habitat [MWH] were developed using the regional reference site approach (Hughes et al. 1986; Omernik 1987). This fits the practical definition of biological integrity as the biological performance of the natural habitats within a region (Karr and Dudley 1981). Attainment of an aquatic life use is FULL if all three indices (or those available) meet the applicable criteria, PARTIAL if at least one of the indices did not attain and performance did not fall below the fair category, and NON if all indices either fail to attain or any index indicates poor or very poor performance. The results will be compared to WWH biocriteria for the Eastern Corn Belt Plains ecoregion.

Recreational use attainment will be determined using *E. coli* bacteria. *E. coli* is an indicator organism for the potential presence of pathogens in surface water resulting from the presence of untreated human or animal wastes, and is the basis for recreational use water quality criteria in Rule 3745-1-07 of the Ohio Administrative Code (OAC).

### **Stream Habitat Evaluation**

Physical habitat is evaluated using the Qualitative Habitat Evaluation Index (QHEI) developed by the Ohio EPA for streams and rivers in Ohio (Rankin 1989). Various attributes of the available habitat are scored based on their overall importance to the establishment of viable, diverse aquatic faunas. Evaluations of type and quality of substrate, amount of instream cover, channel morphology, extent of riparian canopy, pool and riffle development and quality, and stream gradient are among the metrics used to evaluate the characteristics of a stream segment, not just the characteristics of a single sampling site. As such, individual sites may have much poorer physical habitat due to a localized disturbance yet still support aquatic communities closely resembling those sampled at adjacent sites with better habitat, provided water quality conditions are similar. QHEI scores from hundreds of segments around the state have indicated that values higher than 60 were generally conducive to the establishment of warmwater faunas while those which scored in excess of 75-80 often typify habitat conditions which have the ability to support exceptional faunas.

### **Biological Community Assessment**

Macroinvertebrates will be collected from artificial substrates and from the natural habitats. Quantitative sampling will be conducted at reference sites and at sites with drainage areas in excess of 20 mi<sup>2</sup>. Qualitative sampling will be conducted in headwater sites with drainages smaller than 20 mi<sup>2</sup>. The artificial substrate collection provides quantitative data and consists of a composite sample of 5 modified Hester-Dendy (HD) multiple-plate samplers colonized for six weeks. At the time of the artificial substrate collection, a qualitative multihabitat composite sample is also collected. This sampling effort consists of an inventory of all observed macroinvertebrate taxa from the natural habitats at each site with no attempt to quantify populations other than notations on the predominance of specific taxa or taxa groups within major macrohabitat types (e.g., riffle, run, pool, margin). Fish will be sampled at each sampling location with pulsed DC current. Two passes will be conducted at sites larger than 20 mi<sup>2</sup> and at reference sites. Detailed biological sampling protocols are documented in the Ohio EPA manual Biological Criteria for the Protection of Aquatic Life, Volume III (1989).

### **Fish Tissue**

Tissue fillet samples will be collected from fish of edible size, and species preferred for analysis may include spotted bass, largemouth bass, smallmouth bass, flathead catfish, walleye, saugeye, white bass, common carp, freshwater drum, and channel catfish. When possible, composite samples (by species) will be collected using a minimum of three fish and a minimum of 150 grams of material. At each sampling location, an attempt will be made to collect five fish species for fillet tissue analysis. Fish will be sampled using electrofishing boat methods at the reservoir and wading method at the remainder sites. Sampling locations are listed in Table 3.

Fish used for tissue analysis will be filleted in the field using decontaminated stainless steel fillet knives. Filleted samples will be wrapped in aluminum foil, placed in a sealed plastic bag, and placed on dry ice. Sampling and decontamination protocols will follow those listed in the Ohio EPA Fish Collection Guidance Manual (2004). Fish tissue samples will be stored in chest freezers at the Ohio EPA Groveport Field Facility prior to delivery to DES.

### **Sediment**

Fine grained multi-incremental sediment samples will be collected in the upper 4 inches of bottom material using either decontaminated stainless steel scoops or Ekman dredges. Collected sediment will be placed into appropriate containers, placed on ice (to maintain 4°C) and shipped to the Ohio EPA lab. Sampling and decontamination protocols will follow those listed in the Ohio EPA Sediment Sampling Guide and Methodologies, November, 2001.

### **Surface Water**

Surface water grab samples will be collected and preserved using appropriate methods, as outlined in Parts II and III of the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio EPA 2009) and delivered to the Ohio EPA lab for analyses. Datasonde<sup>®</sup> continuous recorders

will be placed at select locations to evaluate diurnal measurements of dissolved oxygen, pH, temperature, and conductivity.

**Bacteria**

Water samples for bacterial analysis will be collected and preserved in accordance with the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio EPA 2009) . All samples will be analyzed for *E. coli* bacteria using U.S.EPA approved methods.

**Sentinel Sites**

To aid in the development of a TMDL model(s), sentinel sites have been established at 15 locations (Table 2). At each sentinel site, samples are collected monthly prior to the more encompassing survey that starts on June 15th. The purpose of the sentinel sites is to establish a baseline of water chemistry values under varying flow conditions. Stream stage is to be measured to the nearest hundredth of a foot as given by the water line against a designated bridge piling or abutment. Sampling events at sentinel sites should cover the range of stream flow from the 10th to 90th percentiles.

**Field Quality Control Samples**

Ten percent of the water and bacteria samples will be submitted to the lab as field duplicates. One Datasonde© recorder site will have two instruments placed in the river as field duplicates. Field blanks will occur at a minimum of 5 percent of the water samples. Field instruments will be calibrated daily, using manufacturer guidelines and requirements noted in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio EPA 2009).

**Inland Lakes Monitoring**

Caesar Creek Lake will be sampled and assessed at locations to be determined during 2011. The protocols for inland lakes monitoring are outlined in the Ohio EPA Inland Lakes Sampling Procedure Manual, which can be accessed online at [http://www.epa.state.oh.us/dsw/inland\\_lakes/index.aspx](http://www.epa.state.oh.us/dsw/inland_lakes/index.aspx).

Table 1. Facilities regulated by the National Pollution Discharge Elimination System (NPDES) in the upper Little Miami River study area. Facilities shaded in gray will have their effluent monitored as indicated in Table 2. River miles and coordinates represent final outfalls.

Permit #	Permit Name	Design flow (GD)	Receiving Stream	River Mile	Latitude	Longitude
1IK00001	Ohio Feedlot	n/a	Little Miami River	106.49 106.70 106.75 106.80	39.821388 39.821388 39.821388 39.821111	-83.596944 -83.593055 -83.591944 -83.590555
1IN00288	Garick Corp. Paygro Div	400,000	Little Miami River	106.27	39.820555	-83.600000
1PB00028	South Charleston WWTP	240,000	Gilroy Ditch	1.4	39.82920	-83.64448
1IJ00057	Shelly Materials - Springfield	1,080,000	Furray-Gray stream	1.0	39.899865	-83.741978
1PT00120	Reid Primary Middle School	12,000	Unnamed tributary to North Fork Little Miami River	n/a	39.913911	-83.741973
1IN00095	Morris Bean & Co Yellow Springs Plant	35,600	Unnamed tributary to the Little Miami River	84.15	39.773339	-83.889010
1IN00266	Morris Bean & Co Yellow Springs Plant	n/a	Unnamed tributary to the Little Miami River	84.15	39.773339	-83.889010
1PA00023	Clifton WWTP	29,000	Little Miami River	89.1	39.793330	-83.824839
1PC00013	Yellow Springs WWTP	600,000	Yellow Springs Creek	0.4	39.79042	-83.87951
1IK00007	Eastwood Dairy LLC	n/a	Unnamed trib to North Fork Massies Creek (RM 5.85)	2.55	39.785555	-83.688611
1IJ00022	Martin Marietta Aggregates Cedarville Limestone Plt	1,690,000	South Fork Massies Creek	1.05	39.738740	-83.786083
1IY00020	Central State University WTP	n/a	Unnamed trib to Massies Creek (RM 4.6)	0.20	39.720560	-83.877220
1IY00023	Cedarville University WTP	7,500	Unnamed tributary to Massies Creek (~RM 8.61)	n/a	39.720560	-83.877220
1IY00220	Xenia WTP	39,370	Massies Creek	0.15	39.735829	-83.937780
1PB00006	Cedarville WWTP	560,000	Massies Creek	8.9	39.73966	-83.81807
1IN00029	Tenneco Automotive Operating Co Inc	585,964	Unnamed tributary to Little Beaver Creek (RM 6.1)	0.62 0.67 0.85 0.90 0.55	39.708055 39.708055 39.708333 39.708333 39.708055	-84.127222 -84.128055 -84.131388 -84.132222 -84.126111
1PL00001	Montgomery Co. Eastern Regional Water Reclamation Facility	1,300,000	Little Beaver Creek	4.6	39.72463	-84.10384
1IN00189	Unison Industries LLC Plant 1	345,750	Beaver Creek	1.23	39.7111100 001239	-84.026670

Permit #	Permit Name	Design flow (GD)	Receiving Stream	River Mile	Latitude	Longitude
1PK00003	Beavercreek WRRF	8,500,000	Beaver Creek	0.4	39.69930	-84.02828
11J00035	Martin Marietta - Xenia Gravel	1,880,000	Unnamed tributary to Little Miami River (RM 74.0)	0.82	39.698869	-83.992969
1IN00140	Unison Industries LLC Plant 2	216,000	Little Miami River	~73.16	39.698700	-84.019350
1PD00015	Xenia Ford Road WWTP	3,600,000	Little Miami River	77.0	39.71620	-83.97023
11J00059	Martin Marietta Materials - Clinton Co Limestone	n/a	Drainage ditch to Anderson Fork (RM 19.00)	0.20	39.510146	-83.748428
1PT00085	East Clinton High School	10,000	Trib to trib of Anderson Fork (RM 27.82/0.68)	0.27	39.419210	-83.651870
11J00040	Melvin Stone Co	n/a	Anderson Fork	23.48	39.476389	-83.703329
11J00055	Melvin Stone Co LLC	n/a	Unnamed tributary to Grassy Run (RM 1.55)	1.26	39.560490	-83.736139
1PX00054	Budget Inn	24,800	Unnamed tributary to Anderson Fork (RM 9.26)	1.99	39.523999	-83.849189
1PZ00019	Pilot Travel Centers LLC No 016	5,500	Unnamed tributary to Anderson Fork (RM 9.26)	2.00	39.523869	-83.846790
1PZ00041	McDonalds Restaurant	9,999	Unnamed tributary to Anderson Fork (RM 9.26)	2.00	39.523970	-83.848839
1PZ00113	Roberts Development Commerce Park WWTP	500,000	Anderson Fork	9.68	39.544304	-83.846082
1PB00015	Jamestown STP	900,000	South Branch Caesar Creek	9.0	39.65644	-83.73786
1PD00016	Glady Run WWTP	4,000,000	Glady Run	4.9	39.65955	-83.96499
11Y00153	Spring Valley Waterworks	7,500	Unnamed tributary to Little Miami River (RM 63.30)	0.51	39.612490	-84.009929
1PB00032	Waynesville WWTP	710,000	Little Miami River	53.8	39.52448	-84.08939
1PK00014	Sugarcreek WRF	9,900,000	Little Miami River	64.4	39.61588	-84.02914
1PV00113	Wayne Mobile Inc	20,000	Little Miami River	54.42	39.509722	-84.101944
1PV00114	Caesar Lake MHP	15,000	Unnamed tributary to Little Miami River (RM 59.13)	0.30	39.562730	-84.016120



Table 2. Sampling locations, arranged by 12-digit HUC, including sampling parameters and purpose associated with each site. **All** Little Miami River mainstem sites are to be sampled for **both** benthic (rock) and sestonic (water column) chlorophyll-a. Remaining sites marked 'chl' are to be sampled for benthic chlorophyll only. Sentinel sites are shaded.

Map #	Station	Stream	Location	River Mile	Drain. Area	ALU	Sampling	Purpose
<b>HUC 05050202 01 01 - Headwaters Little Miami River</b>								
1	M01W62	Little Miami River	Ust Paygro and ust Huntington Road	106.95	1.40	WWH	C,B,chl <u>only</u>	Ust Paygro & Ohio Feedlot - CHEM ONLY
2	M01S27	Little Miami River	@ SR 41 SE of South Charleston	104.88	4.60	WWH	C,F,M,chl,B	Dst Paygro & Ohio Feedlot
3	M01W64	Little Miami River	@ Jamestown Road	103.13	6.40	WWH	C,F,M,D,chl	Non-attainment in 1998; wide D.O. swings; dst Paygro; dst sludge fields
4	M01W08	Gilroy Ditch	South Charleston WWTP effluent	1.40	-		C,B	Effluent
5	M01W09	Gilroy Ditch	Near ford, 0.9 mi dst South Charleston WWTP	0.50	7.50	WWH	C,F,M,B	Dst South Charleston WWTP
6	200567	Lisbon Fork	N of South Charleston @ SR 41	2.80	7.00	WWH	C,F,M	Status and Trends
<b>HUC 05090101 01 02 - North Fork Little Miami River</b>								
7	200564	North Fork Little Miami River	At Thorps @ SR 41	9.10	11.50	WWH	C,F,M	Status and Trends
8	M01P04	North Fork Little Miami River	@ North River Road	0.37	35.80	WWH	C,F2,MT,B	Status and Trends
9	200562	Tributary to North Fork Little Miami River (5.60)	S of Springfield @ Crabill Road	0.80	7.40	WWH <sup>+</sup>	C,F,M	Status and Trends
<b>HUC 05090202 01 03 - Buffenbarger Cemetery-Little Miami River</b>								
10	M01P02	Little Miami River	@ Dolly Varden Road near South Charleston	98.98	33.00	WWH	C,F2,MT,D,chl B	<b>Sentinel</b> ; Non-attainment in 1998; wide D.O. swings; dst South Charleston WWTP; dst sludge fields;
11	M01P06	Little Miami River	@ Pitchin Road near Clifton	92.27	53.00	WWH	C,F2,MT,D,chl, B	Non-attainment in 1998; wide D.O.; sludge fields
12	200565	Tributary to Little Miami River (96.26)	SE of Pitchin @ Buffenbarger Road	0.60	6.00	WWH <sup>+</sup>	C,F,M	Status and Trends
<b>HUC 05090202 01 04 - Yellow Springs Creek-Little Miami River</b>								
13	M01W67	Little Miami River	Ust sharp bend, adj N. River Road, ½ mile E of SR 72	89.77	94.00	EWH	C,F2,MT,chl	Non-attainment in 1998

Map #	Station	Stream	Location	River Mile	Drain. Area	ALU	Sampling	Purpose
14	M01P12	Little Miami River	@ Grinnel Road near Yellow Springs	85.38	104.00	EWH	C,F2,MT,chl, B	Non-attainment in 1998
15	M01S09	Little Miami River	Dst Yellow Springs WWTP @ Jacoby Road	83.14	118.00	EWH	C,F2,MT,D,chl, T	Non-attainment in 1998
16	600570	Little Miami River	@ US 68	80.63	129.00	EWH	C5,F2,MT,D,chl, B	<b>Sentinel</b>
17	M01W79	Conner Branch	@ US 68 near mouth	0.17	2.30	CWH	C,F,M	Status and Trends
18	M01W78	Jacoby Branch	@ US 68 SW of Yellow Springs	0.50	5.10	EWH	C,F,M	Status and Trends
19	M01W13	Yellow Springs Creek	Yellow Springs WWTP effluent	0.43	-	-	C,B	Effluent
20	M01P09	Yellow Springs Creek	@ Grinnel Road near mouth	0.10	11.30	EWH	C,F,M,B	Dst Yellow Springs WWTP
<b>HUC 05090202 02 01 - North Fork Massies Creek</b>								
21	300611	North Fork Massies Creek	S. of Selma at power lines	6.90	14.10	WWH	C,F,M	319 evaluation
22	200555	North Fork Massies Creek	Near Selma @ Old Route 42	5.90	18.60	WWH	C,F,M,B	Dst Wildman project; ust trib
23	301220	North Fork Massies Creek	@ US 42, Dst tributary	5.73	17.90	WWH	C,F,M,D,chl,B	<b>Sentinel</b> ; dst Eastwood Dairy; Unsewered
24	200554	North Fork Massies Creek	NE of Cedarville @ McMillan Road	2.80	20.90	WWH	C,F2,MT	Habitat restoration
<b>HUC 05090202 02 02 - South Fork Massies Creek</b>								
25	M01P19	South Fork Massies Creek	@ Weimer Road near Cedarville	2.15	17.10	WWH	C,F,M,D,chl	Status and Trends; dst sludge fields
26	M01P20	South Fork Massies Creek	@ RR at Cedarville	0.14	19.90	WWH	C,F,M,B	Ust Cedarville WWTP
<b>HUC 05090202 02 03 - Massies Creek</b>								
27	M01W19	Massies Creek	Cedarville WWTP final effluent	8.98	-	-	C,B	Effluent
28	M01S11	Massies Creek	@ Tarbox Cemetery Road dst Cedarville	7.70	55.00	WWH	C,F2,MT,D,chl, T,B	Dst Cedarville WWTP
29	M01P17	Massies Creek	@ Wilberforce-Clifton Road NR Wilberforce	4.38	63.20	WWH	C,F2,MT,D,chl, B	<b>Sentinel</b>
30	M01W83	Massies Creek	@ Fawcett Drive N of Xenia	1.20	73.00	WWH	C,F2,MT,D,chl, T,B	Status and Trends/Dst Cedarville WWTP
31	M01W87	Clark Run	@ Stevenson Road NW of Wilberforce	0.44	6.20	EWH	C,F,M	Status and Trends
32	M01S13	Oldtown Creek	@ Mouth near US 68	0.4	10.55	WWH	C,F,M	Status and Trends

Map #	Station	Stream	Location	River Mile	Drain. Area	ALU	Sampling	Purpose
<b>HUC 05090202 02 04 - Little Beaver Creek</b>								
33	M01W01	Little Beaver Creek	Ust Montgomery Co Eastern Regional WWTP	4.76	10.00	WWH	C,F,M,D,chl,B	Ust Montgomery County Eastern Regional
34	M01S05	Little Beaver Creek	Eastern Regional WWTP final effluent	4.75	-	-	C,B	Effluent
35	M01S44	Little Beaver Creek	Ust Grange Hall Rd near Dayton	3.54	16.50	WWH	C,F,M,D,chl,B	Dst Montgomery County Eastern Regional
36	M01W06	Little Beaver Creek	@ Valleywood	2.83	17.10	WWH	C,F,M	Dst. Lammars Barrel and Chem
37	600630	Little Beaver Creek	@ Factory Road near Alpha	0.05	26.40	WWH	C,F2,MT,D,chl,B	<b>Sentinel</b> ; Dst Montgomery County Eastern Regional/Landfill
<b>HUC 05090202 02 05 - Beaver Creek</b>								
38	M01S53	Beaver Creek	@ Fairgrounds Road N of Alpha	3.86	14.80	WWH	C,F,M	Trends/Development
39	M01S37	Beaver Creek	@ Dayton-Xenia Road	1.57	20.90	WWH	C,F2,MT,D,chl,B	<b>Sentinel</b> ; Ust Little Beaver Creek
40	M01W56	Beaver Creek	@ US 35 dst Little Beaver Creek	1.04	48.10	WWH	C,F2,MT,D,chl	Dst Little Beaver Creek
41	M01W33	Beaver Creek	Beavercreek WWTP final effluent	0.4	-	-	C,B	Effluent
42	M01S35	Beaver Creek	Adj Factory Road dst Beaver Creek WWTP	0.20	49.40	WWH	C,F2,MT,D,chl,B	Dst Beaver Creek WWTP
<b>HUC 05090202 02 06 - Shawnee Creek-Little Miami River</b>								
43	M01S25	Little Miami River	NW Xenia @ Fairgrounds Road	77.70	217.00	EWB	C5,F2,MT,D,chl,B	Upstream WWTPs
44	M01W22	Little Miami River	Xenia Ford Rd WWTP final effluent	77.03	-	-	C,B	Effluent
45	M01W30	Little Miami River	@ Trebein Road	75.38	238.00	EWB	C5,F2,MT,D,chl,B	<b>Sentinel</b> ; Dst Xenia Ford WWTP
46	M01W32	Little Miami River	0.42 mi ust Beaver Creek at Alpha	73.16	241.00	EWB	C5,F2,MT,D,chl	Dst Xenia Ford, Ust confluence with Beaver Creek
47	M01W84	Ludlow Creek	@ Hilltop Road NW Of Xenia	0.25	6.90	WWH	C,F,M	Status and Trends
48	M01P23	Shawnee Creek	@ Hawkins Road near Xenia	0.65	11.60	WWH	C,F,M,B	Status and Trends
<b>HUC 05090202 03 01 - Headwaters Anderson Fork</b>								
49	M02S12	Anderson Fork	@ Haley Road SE of Port William	18.80	30.00	WWH	C,F2,MT,D,chl,B	Impaired in 1998
50	200478	Grassy Run	@ Sabina Road	0.05	8.44	WWH*	C,F,M	Status and Trends

Map #	Station	Stream	Location	River Mile	Drain. Area	ALU	Sampling	Purpose
<b>HUC 05090202 03 02 - Painters Run-Anderson Fork</b>								
51	M02S02	Anderson Fork	@ Port William Road W of Port William	13.87	50.00	WWH	C,F2,MT,B	Status and Trends
52	301480	Anderson Fork	@ McKay Road	7.90	60.32	EWH	C,F2,MT,B	Dst unnamed trib with discharge
53	200476	Grog Run	S of Paintersville @ Bone Road	0.90	8.30	WWH*	C,F,M	Status and Trends
54	M02P03	Painters Run	@ Eleazer Road near Paintersville	0.43	12.80	WWH	C,F,M,B	Status and Trends
55	301481	Tributary to Anderson Fork (9.26)	@ US 68 (dst crossing)	0.20	1.77	--	C <u>only</u>	CHEM ONLY assessment of trib
<b>HUC 05090202 03 03 - Mouth Anderson Fork</b>								
56	M02S01	Anderson Fork	@ Old Winchester Trail	4.90	78.00	EWH	C5,F2,MT,D,chl, B	<b>Sentinel</b> ; Status and Trends
57	M02P12	Anderson Fork	@ Engle Mill Road	3.27	88.00	EWH	C,F2,MT,T	Status and Trends
<b>HUC 05090202 04 01 - North Branch Caesar Creek</b>								
58	M02S16	North Branch Caesar Creek	@ Junkin Road N of Shawnee Hills	6.67	7.00	WWH	C,F,M	Status and Trends
59	M02S15	North Branch Caesar Creek	@ Jasper Road W of Shawnee Hills	1.23	25.70	WWH	C,F2,MT,B	Status and Trends
<b>HUC 05090202 04 02 - Upper Caesar Creek</b>								
60	301482	Caesar Creek	@ US 35 W of Jamestown	30.76	8.89	WWH	C <u>only</u>	Ust Lake Shawnee
61	M02S08	Caesar Creek	@ Paintersville Road at New Jasper	26.50	12.90	WWH	C,F,M,B	Status and Trends; dst Lake Shawnee
<b>HUC 05090202 04 03 - South Branch Caesar Creek</b>								
62	301439	South Branch Caesar Creek	Jamestown WWTP final effluent	9.00	-	-	C,B	Effluent
63	M02S14	South Branch Caesar Creek	@ Cemetery Road dst Jamestown	8.23	6.50	WWH	C,F,M,B	Dst Jamestown STP
64	M02S13	South Branch Caesar Creek	@ Hoop Road	2.10	17.00	EWH	C,F,M,D,chl,B	<b>Sentinel</b> ; Status and Trends
<b>HUC 05090202 04 04 - Middle Caesar Creek</b>								
65	M02S07	Caesar Creek	@ Stone Road SE of Xenia	23.10	64.60	EWH	C,F2,MT	Status and Trends
66	M02P13	Caesar Creek	@ Paintersville Road	16.52	88.00	EWH	C,F2,MT,T,B	<b>Sentinel</b> ; Status and Trends

Map #	Station	Stream	Location	River Mile	Drain. Area	ALU	Sampling	Purpose
<b>HUC 05090202 04 05 – Flat Fork</b>								
67	M02P07	Flat Fork	Oregonia Rd	1.70	15.80	WWH	C,F,M,B	Assessment
<b>HUC 05090202 04 06 - Lower Caesar Creek</b>								
68	600550	Caesar Creek	@ Corwin Road near Oregonia	0.15	242.00	EWH	C,F2,MT,D,chl, B	<b>Sentinel</b>
69	M02S11	Buck Run	@ SR 380 S of New Burlington	1.18	8.50	WWH	C,F,M	Status and Trends
70	200537	Jonah's Run	@ Harlan-Carroll Road	2.10	4.10	WWH	C,F,M	Status and Trends
71	M02P08	Turkey Run	@ Brimstone Mills Road	1.50	3.60	WWH*	C,F,M	ALU assessment; antideg re-category
<b>HUC 05090202 05 01 - Sugar Creek</b>								
72	M01S51	Little Sugar Creek	Adj Maple Street at Bellbrook	0.45	12.30	WWH	C,F,M	Status and Trends
73	M01S22	Sugar Creek	@ Wilmington Pike near Centerville	4.11	16.50	WWH	C,F,M	Status and Trends
74	M01P26	Sugar Creek	@ Penewit Road near Spring Valley	0.40	33.20	WWH	C,F2,MT,B	Status and Trends
<b>HUC 05090202 05 02 - Bellbrook-Little Miami River</b>								
75	M01P13	Little Miami River	@ Indian Ripple Road near Kettering	72.30	295.00	EWH	C5,F2,MT,D,chl, B	Dst Beaver Creek
76	610550	Little Miami River	@ Upper Bellbrook Road near Bellbrook	69.84	302.00	EWH	C5,F2,MT,D,chl	Dst Beaver Creek; start of partial attainment in 1998
77	M01W39	Little Miami River	@ Washington Mills Road	68.54	307.00	EWH	C5,F2,MT,D,chl, B	<b>Sentinel</b> ; Dst Beaver Creek
<b>HUC 05090202 05 03 - Gladly Run</b>								
78	M01W44	Gladly Run	Gladly Run WWTP final effluent	4.93	-	-	C,B	Effluent
79	M01P16	Gladly Run	@ Hedges Road near Xenia	4.08	6.90	WWH	C,F,M,B	Dst Xenia Gladly Run WWTP
80	M01W60	Gladly Run	@ Schnebly Road, south crossing	1.10	12.40	WWH	F,M	Dst Xenia Gladly Run WWTP; biology only, chemistry at RM 0.54
81	M01P15	Gladly Run	@ SR 725 near Spring Valley	0.54	12.70	WWH	C,D,chl,B	<b>Sentinel</b> ; biology at RM 1.1
<b>HUC 05090202 05 04 - Newman Run-Little Miami River</b>								
82	M01W74	Little Miami River	Ust Greene Co.-Sugar Creek WWTP	65.25	344.00	EWH	C5,F2,MT,D,chl, B	Ust Greene County/Sugar Creek WWTP
83	M01W41	Little Miami River	Sugarcreek WWTP final effluent	64.43	-	-	C,B	Effluent

Map #	Station	Stream	Location	River Mile	Drain. Area	ALU	Sampling	Purpose
84	M01S30	Little Miami River	Dst Greene Co.-Sugar Creek WWTP	64.28	345.00	EWH	C5,F2,MT,D,chl	Dst Greene County/Sugar Creek WWTP
85	M01W45	Little Miami River	@ Spring Valley Roadside Park	63.28	361.00	EWH	C5,F2,MT,D,chl, B	Dst Greene County/Sugar Creek WWTP & Glady Run
86	600600	Little Miami River	@ Roxanna-N. Burlington Rd at USGS gage	60.84	367.00	EWH	C5,F2,MT,D,chl, B	<b>Sentinel</b> ; Dst Greene County/Sugar Creek WWTP & Glady Run
87	M01W75	Little Miami River	Just dst Sandy Run, ¼ mi SW Spring Valley Lake	58.30	378.00	EWH	C5,F2,MT,D,chl	Adj sludge fields, Dst Caesar Lake MHP
88	M01P29	Little Miami River	SR 73	53.84	398.00	EWH	C5,F2,MT,D,chl	Ust Waynesville WWTP
89	M01W54	Little Miami River	Waynesville WWTP final effluent	53.79	-	-	C,B	Effluent
90	M01S29	Little Miami River	Adj Corwin Rd, Dst Waynesville WWTP, upstream Newman Run	53.2	402.00	EWH	C5,F2,MT,D,chl, B	Dst Waynesville WWTP
91	M01W55	Little Miami River	S of Waynesville; 0.1 miles ust Middletown Road	51.65	413.00	EWH	C5,F2,MT,D,chl, B	<b>Sentinel</b> ; Dst Waynesville WWTP
92	M01P30	Mill Run	@ US 42 near Waynesville	0.59	8.50	WWH	C,F,M	Status and Trends
93	M01P31	Newman Run	@ US 42 near Waynesville	0.27	9.80	EWH	C,F,M	Status and Trends; sludge fields in upper watershed

\* - unverified aquatic life use  
 + - unassigned aquatic life use

C – Conventional chemistry C5 – Conventional chemistry with BOD5 F – Fish, one pass F2 – Fish, two pass M – Macroinvertebrate, qualitative only MT – Macroinvertebrate, quantitative B – Bacteria D – Datasonde© (continuous recorder sampler for D.O., pH, temperature, and conductivity) T – Fish tissue Chl – chlorophyll-a
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Type	Number of Sites
Chemistry	92
Bacteria	54
Fish, one pass	40
Fish, two pass	39
Macroinvertebrate, qualitative only	40
Macroinvertebrate, quantitative	39
Datasonde©	34
Fish tissue	4
Chlorophyll-a/ benthic	38
Chlorophyll-a/sestonic	23

Table 3. Sampling locations, arranged alphabetically, with coordinates.

Station	Name	River Mile	Drain. Area	Latitude	Longitude	HUC 12	County	USGS Quad
M02S12	Anderson Fork @ Haley Rd SE of Port William	18.80	30.00	39.516100	-83.752200	050902020301	Clinton	Port William
M02S02	Anderson Fork @ Port William Rd W of Port William	13.87	50.00	39.553300	-83.795800	050902020302	Clinton	Port William
301480	Anderson Fork @ McKay Road	7.90	60.32	39.554316	-83.865006	050902020302	Clinton	Port William
M02S01	Anderson Fork @ Old Winchester Trail	4.90	78.00	39.566400	-83.902800	050902020303	Greene	New Burlington
M02P12	Anderson Fork @ Engle Mill Rd	3.27	88.00	39.581700	-83.922200	050902020303	Greene	New Burlington
M01S53	Beaver Creek @ Fairgrounds Rd N of Alpha	3.86	14.80	39.738197	-84.010693	050902020205	Greene	Bellbrook
M01S37	Beaver Creek @ Dayton-Xenia Rd	1.57	20.90	39.713900	-84.021100	050902020205	Greene	Bellbrook
M01W56	Beaver Creek @ US 35 dst Little Beaver Creek	1.04	48.10	39.708700	-84.028100	050902020205	Greene	Bellbrook
M01W33	Beaver Creek @ Beaver Creek WWTP	0.40	0.00	39.700373	-84.027724	050902020205	Greene	Bellbrook
M01S35	Beaver Creek adj Factory Rd dst Beaver Creek WWTP	0.20	49.40	39.698100	-84.026900	050902020205	Greene	Bellbrook
M02S11	Buck Run @ SR 380 S of New Burlington	1.18	8.50	39.545600	-83.958600	050902020406	Clinton	New Burlington
301482	Caesar Creek @ US 35 W of Jamestown	30.76	0.00	39.662854	-83.754318	050902020402	Greene	Cedarville
M02S08	Caesar Creek @ Paintersville Rd at New Jasper	26.50	12.90	39.642500	-83.819700	050902020402	Greene	Cedarville
M02S07	Caesar Creek @ Stone Rd SE of Xenia	23.10	64.60	39.633100	-83.869700	050902020404	Greene	Cedarville
M02P13	Caesar Creek @ Paintersville Road	16.52	88.00	39.599200	-83.964700	050902020404	Greene	New Burlington
600550	Caesar Creek @ Corwin Rd near Oregonia	0.15	242.00	39.492824	-84.101794	050902020406	Warren	Oregonia
M01W87	Clark Run @ Stevenson Rd	0.44	6.20	39.740800	-83.893900	050902020203	Greene	Xenia
M01W79	Conner Branch @ US 68 near mouth	0.17	2.30	39.755000	-83.926700	050902020104	Greene	Yellow Springs
M02P07	Flat Fork @ Oregonia Road	1.70	15.80	39.473937	-84.045966	050902020405	Warren	Oregonia

Station	Name	River Mile	Drain. Area	Latitude	Longitude	HUC 12	County	USGS Quad
M01W08	Gilroy Ditch @ South Charleston WWTP effluent	1.40	0.00	39.829301	-83.644333	050502020101	Clark	South Charleston
M01W09	Gilroy Ditch near ford, 0.9 MI dst South Charleston WWTP	0.50	7.50	39.830208	-83.658161	050902020101	Clark	South Charleston
M01W44	Glady Run @ Glady Run WWTP	4.93	0.00	39.658148	-83.964810	050902020503	Greene	Xenia
M01P16	Glady Run @ Hedges Rd near Xenia	4.08	6.90	39.650000	-83.975600	050902020503	Greene	Xenia
M01W60	Glady Run @ Schnebly Rd, south crossing	1.10	12.40	39.623300	-84.005600	050902020503	Greene	Waynesville
M01P15	Glady Run @ SR 725 near Spring Valley	0.54	12.70	39.617156	-84.010139	050902020503	Greene	Waynesville
200478	Grassy Run @ Sabina Road	0.05	8.44	39.542249	-83.779506	050902020301	Clinton	Port William
200476	Grog Run south of Paintersville at Bone Rd	0.90	8.30	39.563900	-83.823600	050902020302	Greene	Port William
M01W78	Jacoby Branch @ US 68 southwest of Yellow Springs	0.50	5.10	39.767500	-83.915800	050902020104	Greene	Yellow Springs
200537	Jonahs Run near Harveysburg @ Harlan-Carrol Rd	2.10	4.10	39.496400	-84.014200	050902020406	Warren	Oregonia
M01S51	Little Sugar Creek adj Maple Street at Bellbrook	0.45	12.30	39.635000	-84.075300	050902020501	Greene	Bellbrook
200567	Lisbon Fork north of S. Charleston @ SR 41	2.80	7.00	39.855300	-83.635000	050902020101	Clark	South Charleston
M01W01	Little Beaver Creek ust Montgomery Co. Eastern Regional WWTP	4.76	10.00	39.724546	-84.103634	050902020204	Montgomery	Bellbrook
M01S05	Little Beaver Creek @ Eastern Regional WWTP effluent	4.75	0.00	39.725014	-84.103645	050902020204	Montgomery	Bellbrook
M01S44	Little Beaver Creek ust Grange Hall Rd near Dayton	3.54	16.50	39.726900	-84.085600	050902020204	Greene	Bellbrook
M01W06	Little Beaver Creek @ Valleywood	2.83	17.10	39.726580	-84.072577	050902020204	Greene	Bellbrook
600630	Little Beaver Creek @ Factory Rd near Alpha	0.05	26.40	39.710075	-84.028901	050902020204	Greene	Bellbrook
M01W62	Little Miami River ust Paygro & ust Hintington Rd	106.95	1.40	39.820755	-83.590255	050902020101	Clark	Florence
M01S27	Little Miami River @ SR 41 SE of S. Charleston	104.88	4.60	39.811305	-83.620997	050902020101	Clark	Florence
M01W64	Little Miami River @ Jamestown Rd	103.13	6.40	39.805000	-83.647200	050902020101	Clark	South Charleston

Station	Name	River Mile	Drain. Area	Latitude	Longitude	HUC 12	County	USGS Quad
M01P02	Little Miami River @ Dolly Varden Rd near South Charleston	98.98	33.00	39.832500	-83.694400	050902020103	Clark	South Charleston
M01P06	Little Miami River @ Pitchin Rd near Clifton	92.27	53.00	39.805600	-83.781100	050902020103	Clark	Clifton
M01W67	Little Miami River ust sharp bend, adj N. River Rd, 1/2 mi E of SR 72	89.77	94.00	39.795124	-83.814646	050902020104	Greene	Clifton
M01P12	Little Miami River @ Grinnel Rd near Yellow Springs	85.38	104.00	39.782500	-83.875600	050902020104	Greene	Yellow Springs
M01S09	Little Miami River dst Yellow Springs WWTP @ Jacoby Rd	83.14	118.00	39.764200	-83.901700	050902020104	Greene	Yellow Springs
600570	Little Miami River @ US 68	80.63	129.00	39.747738	-83.931180	050902020104	Greene	Xenia
M01S25	Little Miami River NW of Xenia at Fairgrounds Rd	77.70	217.00	39.724200	-83.963900	050902020206	Greene	Xenia
M01W22	Little Miami River @ Xenia Ford WWTP Effluent	77.03	0.00	39.716341	-83.969821	050902020206	Greene	Xenia
M01W30	Little Miami River @ Trebein Rd	75.38	238.00	39.707663	-83.991326	050902020206	Greene	Xenia
M01W32	Little Miami River 0.42 mi ust Beaver Creek at Alpha	73.16	241.00	39.698600	-84.019400	050902020206	Greene	Bellbrook
M01P13	Little Miami River @ Indian Ripple Rd near Kettering	72.30	295.00	39.691400	-84.028600	050902020502	Greene	Bellbrook
610550	Little Miami River @ Upper Bellbrook Rd near Bellbrook	69.84	302.00	39.661800	-84.040400	050902020502	Greene	Bellbrook
M01W39	Little Miami River @ Washington Mills Rd	68.54	307.00	39.645000	-84.043000	050902020502	Greene	Bellbrook
M01W74	Little Miami River ust Greene Co Sugarcreek WWTP	65.25	344.00	39.617800	-84.043900	050902020504	Greene	Waynesville
M01W41	Little Miami River @ Sugarcreek WWTP effluent	64.43	0.00	39.615673	-84.028600	050902020504	Greene	Waynesville
M01S30	Little Miami River dst Greene County Sugar Creek WWTP	64.28	345.00	39.615800	-84.026700	050902020504	Greene	Waynesville
M01W45	Little Miami River @ Spring Valley roadside park	63.28	361.00	39.605425	-84.014169	050902020504	Greene	Waynesville
600600	Little Miami River @ Roxanna -N. Burlington Rd at USGS gage	60.84	367.00	39.583300	-84.030300	050902020504	Greene	Waynesville
M01W75	Little Miami River just dst Sandy Run, 3/4mil SW Spring Valley Lake	58.30	378.00	39.555000	-84.031100	050902020504	Warren	Waynesville
M01P29	Little Miami River @ SR 73	53.84	398.00	39.524969	-84.087822	050902020504	Warren	Waynesville

Station	Name	River Mile	Drain. Area	Latitude	Longitude	HUC 12	County	USGS Quad
M01W54	Little Miami River @ Waynesville WWTP effluent	53.79	0.00	39.524415	-84.089089	050902020504	Warren	Waynesville
M01S29	Little Miami River Adj Corwin Rd, Dst Waynesville WWTP, Ust Newman Run	53.20	402.00	39.523816	-84.090621	050902020504	Warren	Waynesville
M01W55	Little Miami River S of Waynesville, 0.1 mi ust Middletown Road	51.65	413.00	39.498300	-84.100700	050902020504	Warren	Oregonia
M01W84	Ludlow Creek @ Hilltop Rd NW of Xenia	0.25	6.90	39.715000	-83.975600	050902020206	Greene	Xenia
M01W19	Massies Creek @ Cedarville WWTP effluent	8.98	0.00	39.739026	-83.817436	050902020203	Greene	Cedarville
M01S11	Massies Creek @ Tarbox-Cemetery Rd dst Cedarville	7.70	55.00	39.737200	-83.838900	050902020203	Greene	Cedarville
M01P17	Massies Creek @ Wilberforce-Clifton Rd near Wilberforce	4.38	63.20	39.722632	-83.882366	050902020203	Greene	Xenia
M01W83	Massies Creek @ Fawceet Dr N of Xenia	1.20	73.00	39.740000	-83.920300	050902020203	Greene	Xenia
M01P30	Mill Run @ US 42 near Waynesville	0.59	8.50	39.541700	-84.064400	050902020504	Warren	Waynesville
M02S16	North Branch Caesar Creek @ Junkin Rd N of Shawnee Hills	6.67	7.00	39.680800	-83.772200	050902020401	Greene	Cedarville
M02S15	North Branch Caesar Creek @ Jasper Rd W of Shawnee Hills	1.23	25.70	39.657800	-83.829200	050902020401	Greene	Cedarville
200564	North Fork Little Miami River at Thorps @ SR 41	9.10	11.50	39.881400	-83.708100	050902020102	Clark	New Moorefield
M01P04	North Fork Little Miami River @ N. River Road	0.37	35.80	39.807886	-83.790549	050902020102	Clark	Clifton
300611	North Fork Massies Creek south of Selma @ power lines	6.90	14.10	39.772515	-83.710606	050902020201	Greene	South Charleston
200555	North Fork Massies Creek near Selma @ Old Route 42	5.90	18.60	39.781425	-83.725020	050902020201	Greene	South Charleston
301220	North Fork Massies Creek @ US 42	5.73	17.90	39.781496	-83.727932	050902020201	Clark	South Charleston
200554	North Fork Massies Creek NE of Cedarville @ McMillan Rd	2.80	20.90	39.770000	-83.770300	050902020201	Greene	Clifton
M01P31	Newman Run @ US 42 near Waynesville	0.27	9.80	39.517800	-84.098100	050902020504	Warren	Waynesville
M01S13	Oldtown Creek @ mouth near US 68	0.10	10.55	39.735514	-83.934250	050902020203	Greene	Xenia

Station	Name	River Mile	Drain. Area	Latitude	Longitude	HUC 12	County	USGS Quad
M02P03	Painters Run @ Eleazer Rd near Paintersville	0.43	12.80	39.564200	-83.878600	050902020302	Greene	New Burlington
M01P19	South Fork Massies Creek @ Weimer Road near Cedarville	2.15	17.10	39.738100	-83.765300	050902020202	Greene	Cedarville
M01P20	South Fork Massies Creek @ RR at Cedarville	0.14	19.90	39.742200	-83.801100	050902020202	Greene	Cedarville
M01P23	Shawnee Creek @ Hawkins Rd near Xenia	0.65	11.60	39.703600	-83.966400	050902020206	Greene	Xenia
301439	South Branch Caesar Creek @ Jamestown WWTP effluent	9.00	0.00	39.656651	-83.738530	050902020403	Greene	Jamestown
M02S14	South Branch Caesar Creek @ Cemetery Rd dst Jamestown	8.23	6.50	39.648100	-83.747500	050902020403	Greene	Jamestown
M02S13	South Branch Caesar Creek @ Hoop Road	2.10	17.00	39.630000	-83.834400	050902020403	Greene	Cedarville
M01S22	Sugar Creek @ Wilmington Pike near Centerville	4.11	16.50	39.627500	-84.108100	050902020501	Greene	Bellbrook
M01P26	Sugar Creek @ Penewit Rd near Spring Valley	0.40	33.20	39.620800	-84.057200	050902020501	Greene	Waynesville
301481	Trib to Anderson Fork (RM 9.26) @ US 68 (dst crossing)	0.20	1.77	39.541675	-83.849881	050902020302	Clinton	Port William
200565	Trib to Little Miami River (RM 96.26) SE of Pitchin @ Buffenbarger Rd	0.60	6.00	39.831700	-83.734200	050902020103	Clark	South Charleston
200562	Trib to North Fork Little Miami River (RM 5.60) S. of Springfield @ Crabill Rd	0.80	7.40	39.876400	-83.757500	050902020102	Clark	Springfield
M02P08	Turkey Run @ Brimstone Mills Road	1.50	3.80	39.520793	-83.963908	050902020406	Clinton	New Burlington
M01W13	Yellow Springs Creek @ Yellow Springs WWTP effluent	0.43	0.00	39.790368	-83.879261	050902020104	Greene	Yellow Springs
M01P09	Yellow Springs Creek @ Grinnel Rd near mouth	0.10	11.30	39.786100	-83.877800	050902020104	Greene	Yellow Springs

*Table 4. List of chemical/physical water quality parameters to be analyzed/ measured in surface water, from the upper Little Miami River watershed, 2011. Water samples will be collected 5 times (metals 5 times). Bacteria samples will be collected 5 times from July – October 15, 2011. Select sampling locations will be monitored for dissolved oxygen, pH, temperature, and conductivity using Datasonde© continuous recorders (Table 2).*

Parameters	Test Method	Water	Sediment	Fish Tissue
CBOD, 20 day	Ohio EPA 310.2	X		
BOD, 5-day	Standard Methods, 5210 B	X		
SOLIDS, DISSOLVED (TDS)	USEPA 160.1	X		
SOLIDS, SUSPENDED (TSS)	USEPA 160.2	X		
AMMONIA	USEPA 350.1	X		
TKN	USEPA 351.2	X		
NITRATE-NITRITE	USEPA 353.1	X		
Nitrite	USEPA 354.1	X		
Orthophosphate	USEPA 365.1	X		
Chloride	USEPA 325.1	X		
Chlorophyll-a	USEPA 445.0	X		
Alkalinity – Carbonate-Bicarbonate	USEPA 310.1/SM 2320B			
COD	Standard Methods, 5220 D	X		
TOTAL PHOSPHORUS	USEPA 365.4	X		
ICP 1 (Al,Ba,Ca, Fe, Mg, Mn, Na, Ni, K, Sr, Zn, Hardness)	USEPA 200.7	X		
ICP 3 (Al,Ba,Ca,Fe,Mg,Mn,Na,K,Sr,Zn)	USEPA 200.7		X	
ICPMS 1 (As,Cd,Cr,Cu,Ni,Pb,Se)	USEPA 200.9, SM 3113B	X		X
ICPMS 2 (As,Cd,Cr,Cu,Ni,Pb,Se)	USEPA 200.9, SM 3113B		X	
MERCURY, TOTAL	USEPA 245.1,7470A,7471A	X	X	X (245.1)
pH – grab	YSI 556MPS meter	X – field		
Conductivity – grab	YSI 556MPS meter/ USEPA 120.1	X – field / lab		
Dissolved Oxygen – grab	YSI 556MPS meter	X – field		
Temperature – grab	YSI 556MPS meter	X – field		
VOCs	USEPA 624/USEPA 8260	X	X	
Herbicides, Glyphosate	USEPA 525.2, 547	X		
SVOCs (BNAS)	USEPA 625/ USEPA 8270C	X	X	
Pesticides/PCBs/ Chlordane	USEPA 608/ USEPA 8081A, 8082	X (PCBs only)	X (PCBs only)	X (OEPA 590.1)
E.coli	USEPA 1103.1/ 640.1	X		
Percent Solids	SM 2540G		X	X

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