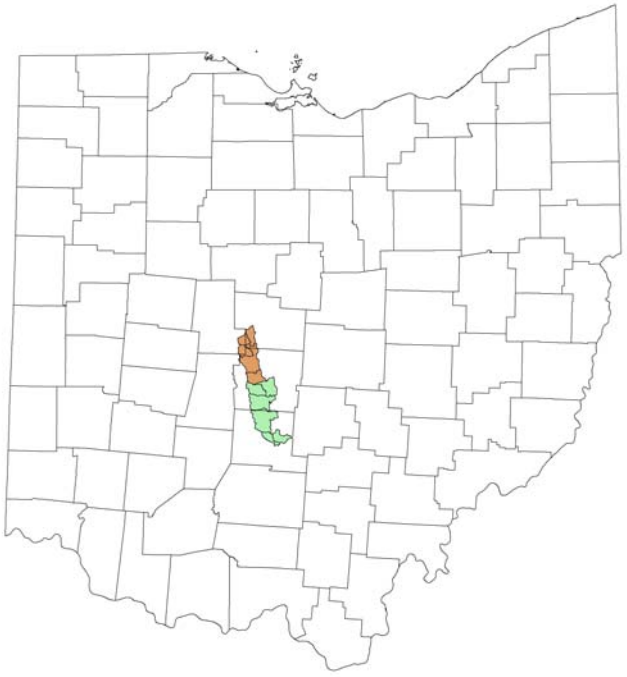
May 2010

Ohio Environmental Protection Agency
Division of Surface Water

2010 Study Plan for the Middle Scioto River Watershed

Hydrologic Unit Codes 0506000107, 0506000112 and 0506000123
Delaware, Franklin, Pickaway, and Union Counties



Ted Strickland, Governor
Lee Fisher, Lt. Governor
Chris Korleski, Director

2010 Study Plan for the Middle Scioto River Watershed

Hydrologic Unit Codes (HUCs)
0506000112 and 0506000123

Delaware, Franklin, Pickaway, and Union Counties, Ohio

Ohio Environmental Protection Agency
Division of Surface Water
Central District Office
50 W. Town Street, Suite 700
Columbus, OH 43215

Ecological Assessment Section
4675 Homer Ohio Lane
Groveport, OH 43125

May 21, 2010

CONTACTS

Ohio EPA Field Staff

- Coordinator/Macroinvertebrates: Angela Dripps 614-836-8798
- Fish/Habitat: Holly Tucker 614-836-8777
- Chemical and Sediment: Paul Vandermeer 614-728-3854 and Jeff Lewis 614-728-3852
- Modeling: Chris Hunt 614-728-2385

Ohio DNR – Wildlife Officers
District One (614-644-3925)

- Delaware: Steve Harvey (614-644-3929 x1225)
- Franklin: Brad Kiger (614-644-3929 x1205)
- Pickaway: Ken Bebout (614-644-3929 x1212)
- Union: Chris Rice (614-644-3929x1213)

Sheriffs

- Delaware: Walter Davis (740-833-2810)
- Franklin: James Karnes (614-462-3360)
- Pickaway: Dwight Radcliff (740-477-6000)

Police Departments

- Columbus: 614-645-4545
- Ashville, Commercial Point, South Bloomfield: 740-474-2176
- Circleville: 740-477-8208
- Dublin: 614-889-1112
- Hilliard: 614-876-7321
- Grove City: 614-277-1710

Hospitals (maps attached at end)

- Riverside Methodist, Columbus: ER: 614-566-5321, Gen: 614-566-5000
- Dublin Methodist Hospital, Dublin: Gen: 614-544-8000
- Grady Memorial, Delaware: ER: 740-368-5179, Gen: 740-369-8711
- Berger Hospital, Circleville: ER: 740-474-2126, Gen: 740-474-2126

INTRODUCTION

During the 2010 field season (July - October) chemical, physical, and biological sampling will be conducted in the Middle Scioto River watershed (HUCs 0506000107, 0506000112 and 0506000123) to assess and characterize water quality conditions.

The Middle Scioto mainstem was last assessed in 1996. In anticipation of the 2010 survey, the Middle Scioto River mainstem was sampled for biological parameters in 2009. The results of this sampling are presented in Table 1. Four sentinel sites on the Scioto River will be sampled in 2010 (Table 3). Two stretches of the Middle Scioto River are impounded by reservoirs: O'Shaugnessy Reservoir from River Miles (RMs) 155.4-148.83 and Griggs Reservoir from RMs 143.78-138.82. These water bodies were sampled in 2009 by Ohio EPA's Inland Lakes Monitoring Program, and are scheduled to be sampled again in 2010.

Most of the tributaries to the Scioto River in these HUC units have never been sampled by Ohio EPA, and therefore will be sampled in 2010 for the first time. Nearly all of the tributaries that are scheduled for sampling in 2010 either have unverified beneficial uses, or are undesignated. These streams are denoted by an asterisk in Table 3. The results of sampling on these streams in 2010 will be used to determine the appropriateness of existing beneficial uses, or to designate beneficial uses altogether.

A few sites will be sampled in the Bokes Creek watershed (HUC 0506000107) to assess historical trends in relation to the effect of agricultural operations.

Sampling Objectives:

- Monitor and assess the chemical, physical and biological integrity of the Middle Scioto River and its tributaries.
- Determine the influences from known and/or potential pollution sources including point source dischargers.
- Assess physical habitat influences on stream biotic integrity.
- Determine recreational use attainment status.
- Verify the appropriateness of existing beneficial uses, and assign uses to undesignated streams.

SAMPLING ACTIVITIES

Chemical/Physical Water and Sediment

Chemical sampling locations within the study area are listed in Table 3. Conventional chemical/physical water quality samples will be collected 5 times at each designated location during the survey. Sediment samples will be collected at 10 locations. Datasondes© will be deployed at 25 locations. Chemical parameters to be tested are listed in Table 5. 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 18 sites on the Scioto River and selected tributaries 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 3. Fish assemblages will be sampled as listed in Table 3. Habitat will be scored using the Qualitative Habitat Evaluation Index (QHEI) at all fish sampling locations.

Fish Tissue
Fish tissue samples will be collected from 9 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).

Drinking water use attainment will also be assessed at the intake to the Dublin Road water plant on the Scioto River. This will be accomplished by obtaining 10 samples of river water at the raw water intake beginning in May and going on through September (approximately two samples each month). Each sample will evaluate standard chemical parameters in addition to a number of pesticides using EPA method 525.

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^2. Qualitative sampling will be conducted in headwater sites with drainages smaller than 20 mi^2. 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^2 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^oC) 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 2008) and delivered to the Ohio EPA lab for analyses. Datasonde© 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 2008) . All samples will be analyzed for *E. coli* bacteria using U.S.EPA approved methods.

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 2008).

Table 1. Aquatic life use attainment status for sampling locations in the Scioto River, 2009. The Index of Biotic Integrity (IBI), Modified Index of Well-being (MIwb), and Invertebrate Community Index (ICI) scores are based on the performance of the biological community. Stream habitat reflects the ability to support a biological community. The Scioto River is located in the Eastern Corn Belt Plains (ECBP) ecoregion. If biological impairment has occurred, the cause(s) and source(s) of the impairment are noted. NA = not applicable. For the Aquatic Life Use Designation, R denotes a recommendation *that differs from the current use designation.*

Sample Location River Mile	Sampling Type	Ecoregion	Aquatic Life Use Designation	Aquatic Life Attainment Status	IBI	MIwb	ICI	Stream [a] Habitat	Aquatic Life Use Impairment Cause/Source
145.5	Boat	ECBP	WWH	**FULL**	52	10.7	38	Excellent	
136.2	Boat	ECBP	WWH	**FULL**	52	10.2	Good	Excellent	
131.8	Boat	ECBP	MWH	**FULL**	34	8.5	10	Fair	MWH use (impounded): ICI does not apply
129.1	Boat	ECBP	WWH	**PARTIAL**	48	11.8	28*	Excellent	Organic enrichment/ CSOs
126.0	Boat	ECBP	WWH	**PARTIAL**	52	11.5	16*	Excellent	Organic enrichment/ CSOs, WWTP
119.9	Boat	ECBP	WWH	**FULL**	50	11.7	36	Excellent	
117.6	Boat	ECBP	WWH	**FULL**	52	11.1	32[ns]	Good	
116.3	Boat	ECBP	EWH-R	**FULL**	52	11.6	44[ns]	Excellent	
109.4	Boat	ECBP	EWH-R	**FULL**	54	11.7	54	Excellent	
105.3	Boat	ECBP	EWH-R	**FULL**	48	11.4	52	Excellent	

BIOCRITERIA			
INDEX	MWH-Impounded	WWH	EWH
IBI: Boat/ Wading	30/ NA	42/ 40	48/ 50
MIwb: Boat/ Wading	6.6/ NA	8.5/ 8.3	9.6/ 9.4
ICI	NA	36	46

[ns] Nonsignificant departure from biocriterion (≤4 IBI or ICI units; ≤0.5 MIwb units).
* Significant departure from biocriterion (>4 IBI or ICI units; >0.5 MIwb units). Poor and very poor results are underlined.
[a] Narrative habitat evaluations are based on QHEI scores as follows: Excellent =75-100, Good = 60-74, Fair = 44-59, Poor = 30-43 and Very Poor <30

Table 2. Facilities regulated by the National Pollution Discharge Elimination System in the Middle Scioto River study area.

Permit #	Facility Name	Station	Type	River Mile	Receiving Stream	Design Flow MGD	Avg. Daily Flow 2009 MGD	County
4IM00106	Advanced Machining Inc	1	Final Outfall	1.2	UT Scioto Big Run (3.33)	0.0015	0.001	Franklin
4IJ00020	Agg Rock Materials Div of WSG	1	Final Outfall	1.95	Scioto Big Run	NA	2.62	Franklin
4IN00027	BP Products North America Inc Columbus	1	Final Outfall	0.3	UT Dry Run	NA	0.02	Franklin
4IN00049	Buckeye Terminals - Columbus East Terminal	1	Final Outfall	3.5	Dry Run	NA	0.01	Franklin
4IN00049	Buckeye Terminals - Columbus East Terminal	2	Final Outfall	3.6	Dry Run	NA	0.01	Franklin
4IN00062	Buckeye Terminals LLC Columbus West Terminal	2	Final Outfall	1.6	NB Dry Run	NA	0.02	Franklin
4IF00011	Capital Resin Corp	2	Final Outfall	1.23	Kian Run (storm sewer)	NA	0.19	Franklin
4IF00011	Capital Resin Corp	3	Final Outfall	1.23	Kian Run (storm sewer)	NA	AH	Franklin
4IF00011	Capital Resin Corp	4	Final Outfall	1.23	Kian Run (storm sewer)	NA	AH	Franklin
4PV00108	Carter's MHP	1	Final Outfall	1.3	UT Scioto Big Run (3.33)	0.01	0.01	Franklin
4IN00048	CITGO Petroleum	1	Final Outfall	4.6	SF Indian Run	NA	AH	Franklin
4IB00000	Columbus & So Ohio Electric Pick Gen Station	1	Final Outfall	116.46	Scioto River	NA	46	Pickaway
4PF00001	Columbus Southerly WWTP	1	Final Outfall	118.4	Scioto River	114	106	Franklin
4PF00001	Columbus Southerly WWTP	7	Final Outfall	118.6	Scioto River	NA	AH	Franklin
4IN00043	Columbus Steel Castings Co	1	Final Outfall	1.1	Kian Run	NA	0.36	Franklin
4IN00043	Columbus Steel Castings Co	2	Final Outfall	0	UT Kian Run (storm sewer)	NA	AH	Franklin
4PB00107	Commercial Point WWTP	1	Final Outfall	115.35	Scioto River	0.43	0.23	Franklin
4PY00006	Country Side MHP	1	Final Outfall	3.01	Hayden Run (storm sewer)	0.018	0.01	Franklin
4IF00010	DeLille Oxygen Co	1	Final Outfall	128.35	Scioto R (storm drain)	NA	AH	Franklin
4IW00030	Dublin Rd WTP	1	Final Outfall	133.4	Scioto R (quarry lake)	NA	3.24	Franklin
4IW00030	Dublin Rd WTP	2	Final Outfall	133.1	Scioto R (pilot area)	NA	1.97	Franklin
4PH00005	Enchanted Acres MHP	1	Final Outfall	124.39	Scioto R (storm drain)	0.1	0.06	Franklin
4PX00042	Foxfire Golf Club	1	Final Outfall	3.65	Peters Run	0.006	AH	Pickaway
4IN00072	Franklin County Sanitary Landfill	3	Final Outfall	3	UT Grant Run	NA	0.29	Franklin
4IN00072	Franklin County Sanitary Landfill	4	Final Outfall	3.3	UT Grant Run	NA	0.5	Franklin
4IN00072	Franklin County Sanitary Landfill	5	Final Outfall	2.4	UT Grant Run	NA	0.03	Franklin
4IN00072	Franklin County Sanitary Landfill	6	Final Outfall	2.5	UT Grant Run	NA	AH	Franklin
4IN00072	Franklin County Sanitary Landfill	7	Final Outfall	3.1	UT Grant Run	NA	AH	Franklin
4IE00006	GFS Chemicals Inc	2	Final Outfall	132.8	Scioto R (storm sewer)	NA	0.005	Franklin
4IE00006	GFS Chemicals Inc	3	Final Outfall	132.8	Scioto R (storm sewer)	NA	AH	Franklin
4IE00006	GFS Chemicals Inc	4	Final Outfall	132.8	Scioto R (storm sewer)	NA	AH	Franklin
4IE00006	GFS Chemicals Inc	5	Final Outfall	132.8	Scioto R (storm sewer)	NA	AH	Franklin

Permit #	Facility Name	Station	Type	River Mile	Receiving Stream	Design Flow MGD	Avg. Daily Flow 2009 MGD	County
4IE00006	GFS Chemicals Inc	6	Final Outfall	132.8	Scioto R (storm sewer)	NA	AH	Franklin
4IE00006	GFS Chemicals Inc	7	Final Outfall	132.8	Scioto R (storm sewer)	NA	0.005	Franklin
4PV00110	Hayden Heights MHP	1	Final Outfall	5.7	Hayden Run	0.04	0.06	Franklin
4PF00000	Jackson Pike WWTP	30	Final Outfall	127.2	Scioto River	NA	AH	Franklin
4PF00000	Jackson Pike WWTP	1	Final Outfall	127.1	Scioto River	68	50	Franklin
4PV00003	Lockbourne Lodge MHP	0	Final Outfall	3.35	UT Scioto R. (114.21)	0.054	0.06	Pickaway
4PK00004	Lower Scioto WRF	1	Final Outfall	153.3	Scioto River	0.2	AH	Delaware
4IN00011	Marathon fka SemMaterials	1	Final Outfall	3.75	Dry Run	NA	AH	Franklin
4IN00020	Marathon Petroleum LLC Columbus Terminal	1	Final Outfall	3.85	Dry Run	NA	0.02	Franklin
4IN00065	Marathon Petroleum LLC Columbus Terminal	1	Final Outfall	1.6	NB Dry Run	NA	0.07	Franklin
4IJ00005	Marble Cliff Limestone Inc	1	Final Outfall	138.2	Scioto River	NA	0.37	Franklin
4IJ00005	Marble Cliff Limestone Inc	2	Final Outfall	137.4	Scioto River	NA	AH	Franklin
4IJ00005	Marble Cliff Limestone Inc	3	Final Outfall	138.3	Scioto River	NA	0.46	Franklin
4PY00003	Meadowbrook MHP	1	Final Outfall	3.35	UT Scioto R (114.21)	0.03	0.02	Pickaway
4IZ00052	North Area WTP	1	Final Outfall	105.2	Scioto River	0.029	AH	Pickaway
4IN00026	Ohio Dept of Youth Scioto Village	1	Final Outfall	151.3	Scioto River	0.2	0.02	Delaware
4PV00011	Ponderosa Mobile Home Est	1	Final Outfall	2.6	UT Scioto R storm (143.6)	0.015	0.0145	Franklin
4IN00085	Rickenbacker International Airport	8	Final Outfall	4.9	UT Scioto (114.21)	NA	AH	Pickaway
4PX00005	Rte 23 Truck Stop	1	Final Outfall	1	Dry Run	0.004	0.004	Pickaway
4PC00101	South Bloomfield WWTP No 2	1	Final Outfall	109.29	Scioto River	0.5	0.18	Pickaway
4IN00056	Sunoco M & T LP Columbus West Terminal	1	Final Outfall	1.15	NB Dry Run	NA	0.01	Franklin
4IN00056	Sunoco M & T LP Columbus West Terminal	2	Final Outfall	1.15	NB Dry Run	NA	0.03	Franklin
4IN00021	Sunoco Partners Marketing & Terminals Columbus	1	Final Outfall	1.7	UT Dry Run	NA	0.01	Franklin
4IN00021	Sunoco Partners Marketing & Terminals Columbus	2	Final Outfall	1.7	UT Dry Run	NA	0.03	Franklin
4IN00057	T Marzetti Allen Division	1	Final Outfall	3.6	Scioto Big Run (storm d.)	NA	0.04	Franklin
4IN00032	TechSouth	2	Final Outfall	129.2	Scito River (storm sewer)	NA	AH	Franklin
4IJ00112	The Olen Corp	2	Final Outfall	121.47	Scioto River	NA	AH	Franklin
4IJ00112	The Olen Corp	3	Final Outfall	120.1	Scioto River	NA	AH	Franklin
4IJ00112	The Olen Corp	1	Final Outfall	122.55	Scioto River	NA	AH	Franklin
4IJ00016	The Shelly Co Columbus Limestone Inc	1	Final Outfall	126.7	Scioto River	NA	AH	Franklin
4IJ00016	The Shelly Co Columbus Limestone Inc	2	Final Outfall	126.85	Scioto River	NA	11.49	Franklin
4IJ00016	The Shelly Co Columbus Limestone Inc	3	Final Outfall	127.6	Scioto River	NA	0.12	Franklin
4IJ00016	The Shelly Co Columbus Limestone Inc	4	Final Outfall	125.5	Scioto River	NA	111	Franklin
4IJ00016	The Shelly Co Columbus Limestone Inc	5	Final Outfall	125.12	Scioto River	NA	29	Franklin
4IJ00016	The Shelly Co Columbus Limestone Inc	6	Final Outfall	125.02	Scioto River	NA	AH	Franklin

Permit #	Facility Name	Station	Type	River Mile	Receiving Stream	Design Flow MGD	Avg. Daily Flow 2009 MGD	County
4PR00012	Tinks Restaurant	1	Final Outfall	0.4	Dry Run (RR ditch)	0.0025	AH	Pickaway
4PX00011	Walker Station	1	Final Outfall	0.3	UT Scioto R (RM 155.0)	0.0036	0.00007	Delaware

NA – not available AH – not reported
Source: Ohio EPA GIS Karta Layer (NPDES Facilities, River Mile Maps), SWIMS

Table 3. Sampling locations, arranged by 12-digit HUC, including sampling parameters and purpose associated with each site.

Storet	Stream	RM[1]	DA[2]	Sampling	Location	Purpose
Large River Assessment Unit 05060001 – Scioto River						
610820	Scioto River	152.00	959.0	T only	O'Shaughnessy Reservoir @ Home Road	Fish Tissue
V03K02	Scioto River	144.60	1009.0	T only	Griggs Reservoir @ SR 161	Fish Tissue
V03P31	Scioto River	140.00	1040.0	T only	Griggs Reservoir @ Fishinger Road	Fish Tissue
600840	Scioto River	n/a	n/a	C, Op	Columbus Public Water intake	Assess public water supply use
V03P33	Scioto River	132.50	1068.0	T only	Ust Olentangy, dst PWS	Fish Tissue
V07P27	Scioto River	130.40	1615.0	T only	Greenlawn Dam pool	Fish Tissue
600860	Scioto River	129.00	1623.0	T only	Dst Greenlawn Dam	Fish Tissue
600870	Scioto River	127.74	1628.0	F2, MT, Cn,D,O,B,S	@ Frank Road	Sentinel
V07W06	Effluent	127.1	--	C only	Columbus Jackson Pike WWTP	Coverage
V07W17	Scioto River	125.50	1636.0	F2, MT, Cn,D,O,B,S	Dst sharp bend/trailer park	Sentinel
V07P29	Scioto River	123.50	1671.0	T only	Dst I-270	Fish Tissue
V07W25	Scioto River	119.10	1700.0	B only	SR 665 @ canoe livery	Longitudinal coverage - bacteria
V07W10	Effluent	118.4	--	C only	Columbus Southerly WWTP	Coverage
600900	Scioto River	115.60	2272.0	T only	Ust. SR 762	Fish Tissue
600910	Scioto River	109.37	2311.0	F2, MT, Cn,D,O,B, S	W of South Bloomfield @ SR 316	Sentinel
V07W43	Scioto River	107.10	2322.0	T only	S. of South Bloomfield, ust Walnut Cr.	Fish Tissue
601340	Scioto River	102.14	2638.0	F2,MT,Cn,D,O,B, S	Ust Circleville@ Commercial Point Rd	Sentinel, Reference
HUC 050600010702 – Brush Run-Bokes Creek						
V02S23	Bokes Creek	27.22	32.0	F2,MT,C	Phelps Road	Historical, ust High-Q egg
V02S22	Bokes Creek	21.29	41.0	F2,MT,C	Yeardsley Road	Historical, ust Powderlick Run
V02K05	Bokes Creek	20.20	45.0	F2,MT,C	Adj SR 31	Historical, dst Powderlick Run
V02K11	Powderlick Run	3.4	1.8	F,M,C	SR 379, ust Daylay #1	Historical
V02K09	Powderlick Run	1.2	3.8	F,M,C	Powderlick Road (lower crossing)	Historical
HUC 050600010702 – Smith Run-Bokes Creek						
V02S21	Bokes Creek	14.73	61.0	F2,MT,C	Taylor-Claiborne Road	Historical, recovery

Storet	Stream	RM[1]	DA[2]	Sampling	Location	Purpose
HUC 050600011201 – Eversole Run						
300965	Eversole Run*	2.20	4.3	F,M,C,D	Concord Road	Coverage, verify ALU
203160	Eversole Run*	1.30	10.5	F,M,C,D,B,O,S	NW Shawnee Hills, dst Cook Rd	Sentinel, verify ALU
HUC 050600011203 – Indian Run						
300963	North Fork Indian Run*	5.20	5.6	F,M,C,D	Hyland Croy Road, adj Dublin Jerome High School	Longitudinal coverage
300964	North Fork Indian Run*	1.80	10.2	F,M,C,B,D	Coffman Road	Assess HUC, verify ALU
300966	South Fork Indian Run*	1.3	6.0	F,M,C,B,D	Dublin Rec Center Entrance Road	Assess HUC, verify ALU
HUC 050600011204 – Hayden Run-Scioto River						
300802	Hayden Run*	0.83	7.0	F,M,C,D,O,B,S	Hayden Run Rd, adj Dexter Falls	Sentinel, verify ALU
HUC 050600011205 – Dry Run-Scioto River						
V03K04	Dry Run	1.40	7.2	F,M,C,B,D,O	Holton Park sewer crossing	Assess HUC
V03P11	Trabue Run*	0.28	5.9	F,M,C,B,D	McKinley Road, old road adj Buckeye Auto Parts, across from Police Academy	Assess HUC, verify ALU
HUC 050600012301 – Scioto Big Run						
300968	Scioto Big Run*	4.40	11.8	F,M,C,D	Big Run Road	Longitudinal coverage
V07K11	Scioto Big Run*	2.90	17.6	F,M,C,D,O,B,S	@ Hardy Parkway	Sentinel
HUC 050600012302 – Kian Run-Scioto River						
300967	Kian Run*	0.45	0.0	F,M,C,B,O,D,S	Castle Road – walk in at end of road	Assign ALU, Cols Steel Castings and Capitol Resins discharges
HUC 050600012303 – Grant Run-Scioto River						
300969	Republican Run	1.38	5.7	F,M,C,B,D	Buckeye Parkway	Assess HUC; SSOs?
300803	Grant Run*	2.00	7.8	F,M,C,D,O,B,S	at Buckeye Parkway	Sentinel, verify ALU
300970	Grant Run*	0.20	14.1	F,M,C,D	5683 Paul Talbot Drive, behind house	Longitudinal coverage
V07P23	Plum Run*	0.72	7.0	F,M,C,D,O,B,S	SW of Shadeville @ SR 665	Sentinel, verify ALU
HUC 050600012304 – Grove Run-Scioto River						
300972	Peter's Run*	1.75	7.2	F,M,C,D	SR 762	Assess HUC, assign ALU
300973	Grove Run*	1.58	5.6	F,M,C,B,D	Gibson Road	Assess HUC, verify ALU
300974	Van Meter Run*	1.00	5.8	F,M,C,D	SR 104	Assess HUC, verify ALU
HUC 050600012305 – Dry Run						
300975	Dry Run*	3.70	4.7	F,M,C,D	Belles Station Road	Longitudinal coverage, verify ALU
300976	Dry Run*	0.50	18.4	F,M,C,B,D	Island Road	Assess HUC, verify ALU

Storet	Stream	RM[1]	DA[2]	Sampling	Location	Purpose
300977	Griffy Run*	1.10	4.9	F,M,C,D	Walnut Creek Pike, New Hope Church	Verify ALU

* - unverified (WWH) or unassigned aquatic life use
[1] – River Mile
[2] – Drainage Area (mi^2)

C – Conventional chemistry
Cn – Conventional chemistry, plus BOD5 and chlorophyll-a
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
S – Sediment
T – Fish tissue
O – Organics
Op – Organics, with method 525pesticides

Type	Number of Sites
Chemistry	31
Bacteria	18
Fish, one pass	23
Fish, two pass	8
Macroinvertebrate, qualitative only	23
Macroinvertebrate, quatitative	8
Datasonde©	25
Sediment	10
Organics	12
Fish tissue	9

Table 4. Sampling locations, arranged alphabetically, with coordinates.

Stream	RM	DA	Location	USGS Quad	County	Latitude	Longitude	HUC 12
Bokes Creek	27.22	32.0	Phelps Road	York Center	Union	40.423100	-83.473300	050600010702
Bokes Creek	21.29	41.0	Yeardsley Road	York Center	Union	40.390800	-83.412500	050600010702
Bokes Creek	20.20	45.0	Adj SR 31	York Center	Union	40.381221	-83.406941	050600010702
Bokes Creek	14.73	61.0	Taylor-Claiborne Road	Magnetic Springs	Union	40.361400	-83.350600	050600010703
Dry Run	1.40	7.2	Holton Park sewer crossing	Southwest Columbus	Franklin	39.961264	-83.068831	050600011205
Dry Run	3.70	4.7	Belles Station Road	Ashville	Pickaway	39.654199	-82.935461	050600012305
Dry Run	0.50	18.4	Island Road	Ashville	Pickaway	39.650378	-82.969248	050600012305
Eversole Run	2.20	4.3	Concord Road	Shawnee Hills	Delaware	40.181431	-83.159839	050600011201
Eversole Run	1.30	10.5	NW Shawnee Hills, dst Cook Rd	Shawnee Hills	Delaware	40.176100	-83.147800	050600011201
Grant Run	2.00	7.8	at Buckeye Parkway	Commercial Point	Franklin	39.836439	-83.045472	050600012303
Grant Run	0.20	14.1	5683 Paul Talbot Drive, behind house	Commercial Point	Franklin	39.843483	-83.021003	050600012303
Griffy Run	1.10	4.9	Walnut Creek Pike, New Hope Church	Ashville	Pickaway	39.641482	-82.932736	050600012305
Grove Run	1.58	5.6	Gibson Road	Darbyville	Pickaway	39.748677	-83.035627	050600012304
Hayden Run	0.83	7.0	Hayden Run Rd, adj Dexter Falls Rd	Northwest Columbus	Franklin	40.065480	-83.122050	050600011204
Kian Run	0.45	0.0	Castle Road – walk in at end of road	Southwest Columbus	Franklin	39.908236	-82.999214	050600012302
NF Indian Run	5.20	5.6	Hyland Croy Road, adj to Dublin Jerome High School	Shawnee Hills	Union	40.132644	-83.179145	050600011203
NF Indian Run	1.80	10.2	Coffman Road	Hilliard	Franklin	40.117828	-83.131925	050600011203
Peter's Run	1.75	7.2	SR 762	Commercial Point	Pickaway	39.771110	-83.015530	050600012304

Stream	RM	DA	Location	USGS Quad	County	Latitude	Longitude	HUC 12
Plum Run	0.72	7.0	SW of Shadeville @ SR 665	Commercial Point	Franklin	39.825300	-83.024141	050600012303
Powderlick Run	3.4	1.8	SR 379, ust Daylay #1	York Center	Union	40.384700	-83.454700	050600010702
Powderlick Run	1.2	3.8	Powderlick Road (lower crossing)	York Center	Union	40.384200	-83.427200	050600010702
Republican Run	1.38	5.7	Buckeye Parkway	Commercial Point	Franklin	39.867688	-83.045377	050600012303
Scioto Big Run	4.40	11.8	Big Run Road	Southwest Columbus	Franklin	39.916146	-83.064130	050600012301
Scioto Big Run	2.90	17.6	@ Hardy Parkway	Southwest Columbus	Franklin	39.911400	-83.041700	050600012301
Scioto River	152.00	959.0	O'Shaughnessy Reservoir @ Home Rd	Shawnee Hills	Delaware	40.196865	-83.139437	050600011202
Scioto River	144.60	1009.0	Griggs Reservoir @ SR 161	Northwest Columbus	Franklin	40.099533	-83.111107	050600011204
Scioto River	140.00	1040.0	Griggs Reservoir @ Fishinger Road	Northwest Columbus	Franklin	40.032588	-83.094994	050600011204
Scioto River	132.50	1068.0	Ust Olentangy, dst PWS	Southwest Columbus	Franklin	39.963570	-83.019415	050600011205
Scioto River	130.40	1615.0	Greenlawn Dam pool	Southwest Columbus	Franklin	39.946788	-83.012733	050600012302
Scioto River	129.00	1623.0	Dst Greenlawn Dam	Southwest Columbus	Franklin	39.933593	-83.002833	050600012302
Scioto River	127.74	1628.0	@ Frank Road	Southwest Columbus	Franklin	39.916700	-83.009700	050600012302
Scioto River	125.50	1636.0	Dst sharp bend/trailer park	Southwest Columbus	Franklin	39.890800	-83.007900	050600012302
Scioto River	123.50	1671.0	Dst I-270	Southwest Columbus	Franklin	39.868172	-83.024561	050600012303
Scioto River	119.10	1700.0	SR 665 @ canoe livery	Commercial Point	Franklin	39.822219	-83.012902	050600012303
Scioto River	115.60	2272.0	Ust. SR 762	Commercial Point	Pickaway	39.778247	-83.007987	050600012304
Scioto River	109.37	2311.0	W of South Bloomfield	Darbyville	Franklin	39.719400	-83.012500	050900012304

Stream	RM	DA	Location	USGS Quad	County	Latitude	Longitude	HUC 12
			@ SR 316					
Scioto River	107.10	2322.0	S. of South Bloomfield, ust Walnut Cr.	Ashville	Pickaway	39.692334	-82.997048	050600012304
Scioto River	102.14	2638.0	Ust Circleville@ Commercial Point Rd	Ashville	Pickaway	39.632800	-82.962483	050600012306
SF Indian Run	0.95	6.0	Dublin Rec Center Entrance Road	Hilliard	Franklin	40.105875	-83.138509	050600011203
Trabue Run	0.28	5.9	McKinley Road, old road adj Buckeye Auto Parts, next to Police Academy	Southwest Columbus	Franklin	39.978260	-83.068970	050600011205
Van Meter Run	1.00	5.8	SR 104	Darbyville	Pickaway	39.69817	-83.008750	050600012304

Table 5. List of chemical/physical water quality parameters to be analyzed/ measured in surface water, from the Middle Scioto River watershed, 2010. Water samples will be collected 5 times Bacteria samples will be collected 5 times from July – October 15, 2009. Select sampling locations will be monitored for dissolved oxygen, pH, temperature, and conductivity using Datasonde© continuous recorders (Table 3).

Parameters	Test Method	Water	Sediment	Fish Tissue
Acidity	USEPA 305.1	X		
Alkalinity	USEPA 310.1	X		
BOD, 5-DAY	SM 5210B	X		
CBOD, 20 day (modeling only)	?	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		
Chloride	USEPA 325.1	X		
COD	USEPA 410.4	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 olnly)	X (OEPA 590.1)
E.coli	USEPA 1103.1/ 640.1	X		
Percent Solids	SM 2540G		X	X

Table 6. Boat access points on the Scioto River, 2009.

Ramp Name	River Mile	River Side	Latitude	Longitude	Type	Locked
I-270 North Bridge	145.5	left	40.1092	-83.1122	Dirt area under bridge	no
Dst. Griggs Dam	138.6	Left	40 00 48.4	83 05 32.4	Good access – OK with watershed office, Columbus	no
I-670 Grandview	134.1	Left	39.96864	83.04364	Good access 50 m upst. I-670 bridge, via Grandview Ave.	no
W. Nationwide/Olentan River	0.3	left	39 58 02	83 01 09	Boat ramp near mouth	no
Greenlawn Ave.	129.6	Right	39 56 23	83 00 02	Bike path access - Columbus	no
Scioto Canoe Livery	119.3	right	39.82463	83.01125	Good access: 871-9852	yes
SR762	115.3	Left	39.7742	-83.0075	Access - ODNR	no
SR 316/S. Bloomfield WWTP	109.0	Left	39.71508	-83.01054	Joe Allen: 740-207-6213; can bulldoze access- needs to be dry for access	no

REFERENCES

Hughes, R. M., D. P. Larsen, and J. M. Omernik. 1986. Regional reference sites: a method for assessing stream pollution. Env. Mgmt. 10(5): 629-635.

Karr, J.R. and D.R. Dudley. 1981. Ecological perspective on water quality goals. Env. Mgmt. 5(1): 55-68.

Ohio Environmental Protection Agency. 2008. Ohio EPA manual of surveillance methods and quality assurance practices, updated edition. Division of Environmental Services, Columbus, Ohio.
http://www.epa.state.oh.us/dsw/documents/Field%20Manual%203-6-06%20revision.pdf

Ohio EPA. 1987a. Biological criteria for the protection of aquatic life: Volume I. The role of biological data in water quality assessment. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio.
http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html

Ohio EPA. 1987b. Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio
http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html

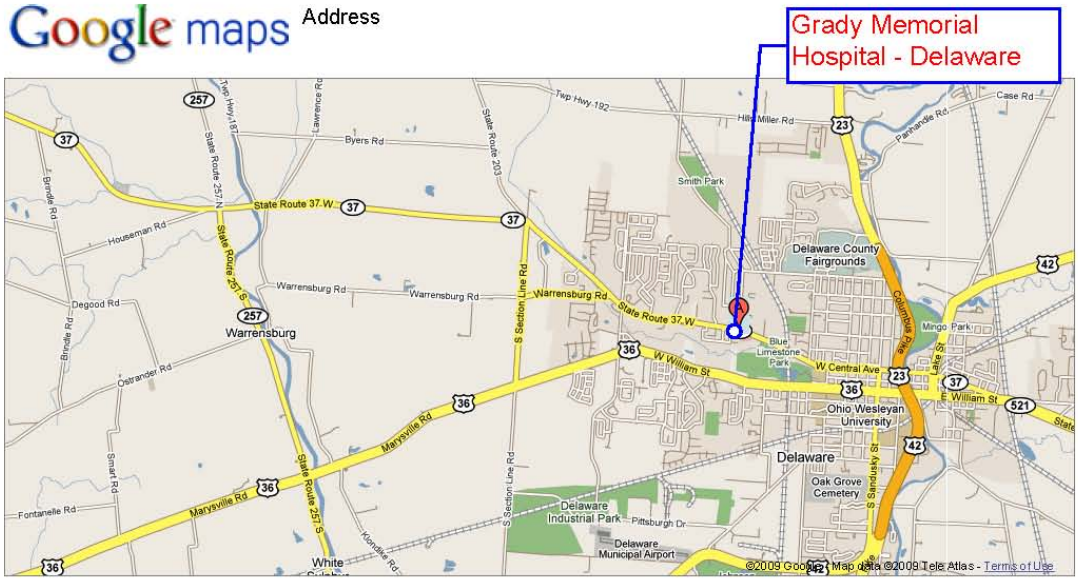
Ohio EPA. 1989a. Addendum to biological criteria for the protection of aquatic life: Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Planning and Assessment, Surface Water Section, Columbus, Ohio.
http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html

Ohio EPA. 1989b. Biological criteria for the protection of aquatic life: Volume III. Standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Division of Water Quality Planning and Assessment, Columbus, Ohio.
http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html

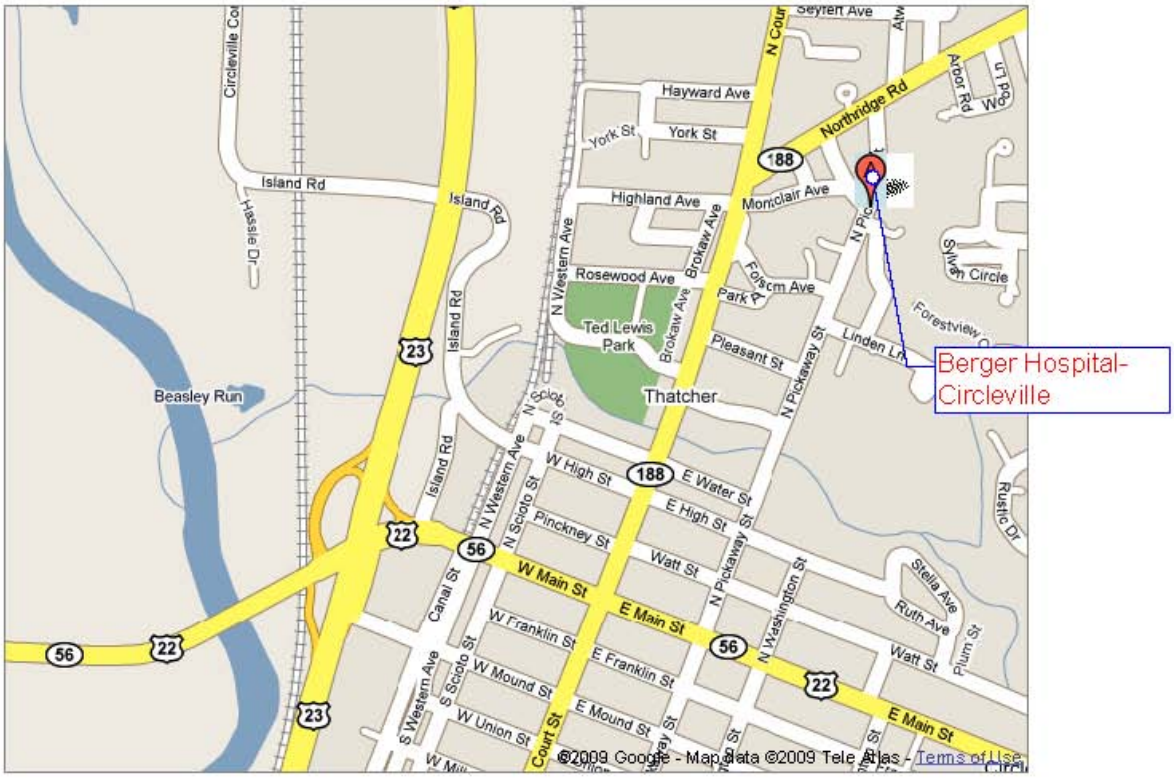
Omernik, J.M. 1987. Ecoregions of the conterminous United States. Ann. Assoc. Amer. Geogr. 77(1): 118-125.

Rankin, E.T. 1989. The qualitative habitat evaluation index (QHEI): rationale, methods, and application. Division of Water Quality Planning and Assessment, Columbus, Ohio.
http://www.epa.state.oh.us/dsw/bioassess/BioCriteriaProtAqLife.html

grady memorial hospital delaware ohio - Google Maps Page 1 of 1

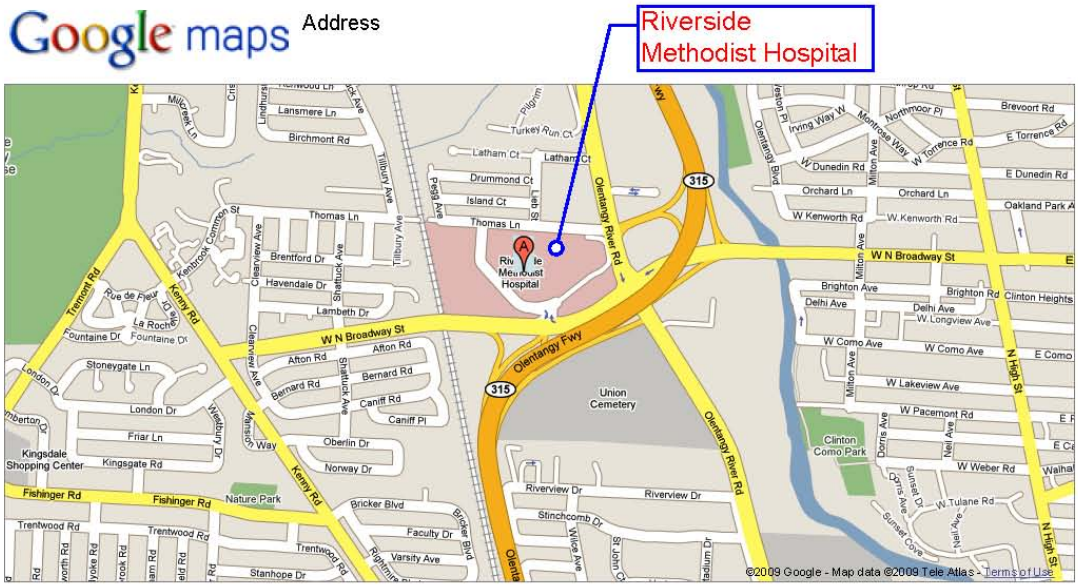


600 north pickway street, circleville, ohio 43113 - Google Maps Page 2 of 2

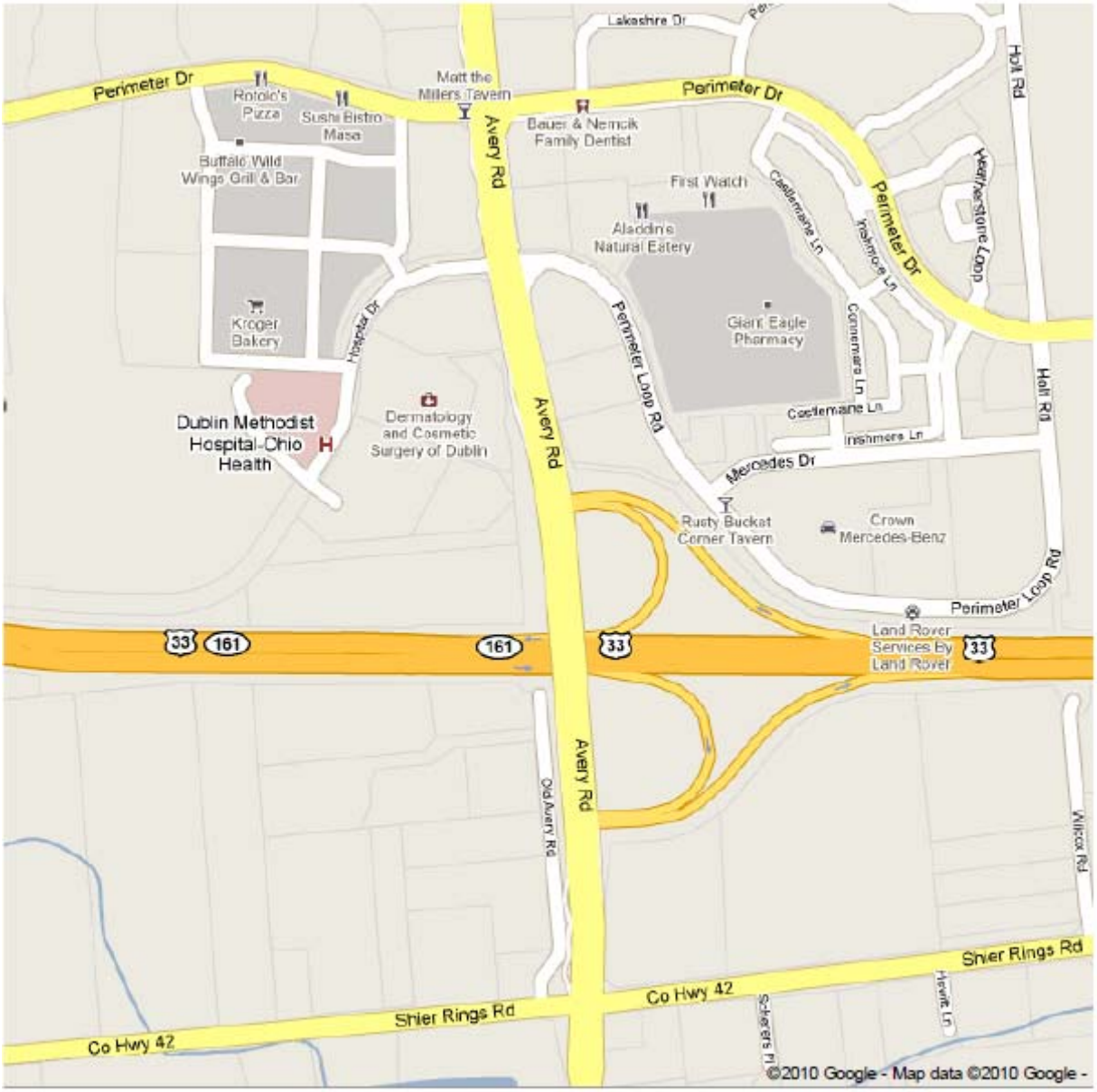


http://maps.google.com/maps?f=q&source=s_q&hl=en&geocode=&q=600+north+pickwa... 6/24/2009

riverside methodist hospital columbus ohio - Google Maps Page 1 of 1



http://maps.google.com/maps?hl=en&q=riverside+methodist+hospital+columbus+ohio&u... 6/24/2009



A. **Dublin Methodist Hospital-Ohio Health**
Dublin Methodist Hospital-Ohio Health, Dublin, Ohio 43016 - (614) 544-8000