State of Ohio
Environmental Protection Agency

Division of Surface Water

Biological and Water Quality Study of the Little Scioto River

Marion County, Ohio

January 18, 2008

Ted Strickland, Governor
Chris Korleski, Director

Biological and Water Quality Study

Little Scioto River

2007

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SUMMARY

A total of 7.5 miles of the lower Little Scioto River were biologically assessed by the Ohio EPA during 2007. Based on the performance of the biological communities, 4.6 miles of the Little Scioto River were in partial attainment of designated aquatic life uses, and 2.9 miles were not attaining (Table 1). The partial attainment at the upstream, background location was associated with extensive siltation of the river bottom. Partial attainment at the recently dredged section (downstream Holland Road) of the Little Scioto River was associated with poor river habitat and wastewater discharges from the Holland Road combined sewer overflow pipe. PAH metabolites measured in white sucker and common carp confirmed heavy exposure to PAH contaminants at sites with elevated sediment PAHs. The urbanized condition of the Little Scioto River within the study segment (municipal wastewater discharge and combined sewer overflows), and elevated sediment contaminants contributed to the impaired biological communities present from SR 95 downstream to SR 739. Biological communities have shown substantial improvement in the lower 6 miles of the Little Scioto River over the last 20 years.

RECOMMENDATIONS

The aquatic life use designations of Modified Warmwater Habitat and Warmwater Habitat for the Little Scioto River have been confirmed in previous Ohio EPA biological and water quality studies. This study verified continued WWH and MWH performance for the Little Scioto River for upstream from RM 9.0, and the lower nine miles of river, respectively.

A contact advisory (do not wade or swim) is currently issued for the Little Scioto River from Holland Road (RM 6.6) to State Route 739 (RM 2.7), due to PAH contamination in the sediment. The contact advisory should be maintained from RM 2.7 up to RM 6.0 (upstream from State Route 95). The contact advisory for the RM 6.6 – 6.0 segment should be removed. This section of the Little Scioto River was dredged, and contaminated sediments removed in 2002 and 2006.

Physical habitat conditions and pool depths verified that the Primary Contact Recreation use is appropriate for the Little Scioto River.

FOREWORD

What is a Biological and Water Quality Survey?

A biological and water quality survey, or "biosurvey," is an interdisciplinary monitoring effort coordinated on a waterbody specific or watershed scale. This effort may involve a relatively simple setting focusing on one or two small streams, one or two principal stressors, and a handful of sampling sites or a much more complex effort including entire drainage basins, multiple and overlapping stressors, and tens of sites. Each year Ohio EPA conducts biosurveys in 4-5 watersheds study areas with an aggregate total of 250-300 sampling sites.

The Ohio EPA employs biological, chemical, and physical monitoring and assessment techniques in biosurveys in order to meet three major objectives: 1) determine the extent to which use designations assigned in the Ohio Water Quality Standards (WQS) are either attained or not attained; 2) determine if use designations assigned to a given water body are appropriate and attainable; and 3) determine if any changes in key ambient biological, chemical, or physical indicators have taken place over time, particularly before and after the implementation of point source pollution controls or best management practices. The data gathered by a biosurvey is processed, evaluated, and synthesized in a biological and water quality report. Each biological and water quality study contains a summary of major findings and recommendations for revisions to WQS, future monitoring needs, or other actions which may be needed to resolve existing impairment of designated uses. While the principal focus of a biosurvey is on the status of aquatic life uses, the status of other uses such as recreation and water supply, as well as human health concerns, are also addressed.

The findings and conclusions of a biological and water quality study may factor into regulatory actions taken by Ohio EPA (*e.g.,* NPDES permits, Director's Orders, the Ohio Water Quality Standards [OAC 3745-1], Water Quality Permit Support Documents [WQPSDs]), and are eventually incorporated into State Water Quality Management Plans, the Ohio Nonpoint Source Assessment, and the biennial Integrated Water Quality Monitoring and Assessment Report (305[b] and 303[d]).

Hierarchy of Indicators

A carefully conceived ambient monitoring approach, using cost-effective indicators consisting of ecological, chemical, and toxicological measures, can ensure that all relevant pollution sources are judged objectively on the basis of environmental results. Ohio EPA relies on a tiered approach in attempting to link the results of administrative activities with true environmental measures. This integrated approach includes a hierarchical continuum from administrative to true environmental indicators (Figure 1). The six "levels" of indicators include: 1) actions taken by regulatory agencies (permitting, enforcement, grants); 2) responses by the regulated community (treatment works, pollution prevention); 3) changes in discharged quantities (pollutant loadings); 4) changes in ambient conditions (water quality, habitat); 5) changes in uptake and/or assimilation (tissue contamination, biomarkers, wasteload allocation); and, 6) changes in health, ecology, or other effects (ecological condition, pathogens). In this process the results of administrative activities (levels 1 and 2) can be linked to efforts to improve water quality (levels 3, 4, and 5) which should translate into the environmental "results" (level 6). Thus, the aggregate effect of billions of dollars spent on water pollution control since the early 1970s can now be determined with quantifiable measures of environmental condition. Superimposed on this hierarchy is the concept of stressor, exposure, and response indicators. *Stressor* indicators generally include activities which have the potential to degrade the aquatic environment such as pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. *Exposure* indicators are those which measure the effects of stressors and can include whole effluent toxicity tests, tissue residues, and biomarkers, each of which provides evidence of biological exposure to a stressor or bioaccumulative agent. *Response* indicators are generally composite measures of the cumulative effects of stress and exposure and include the more direct measures of community and population response that are represented here by the biological indices which comprise Ohio's biological criteria. Other response indicators could include target assemblages, *i.e.,* rare, threatened, endangered, special status, and

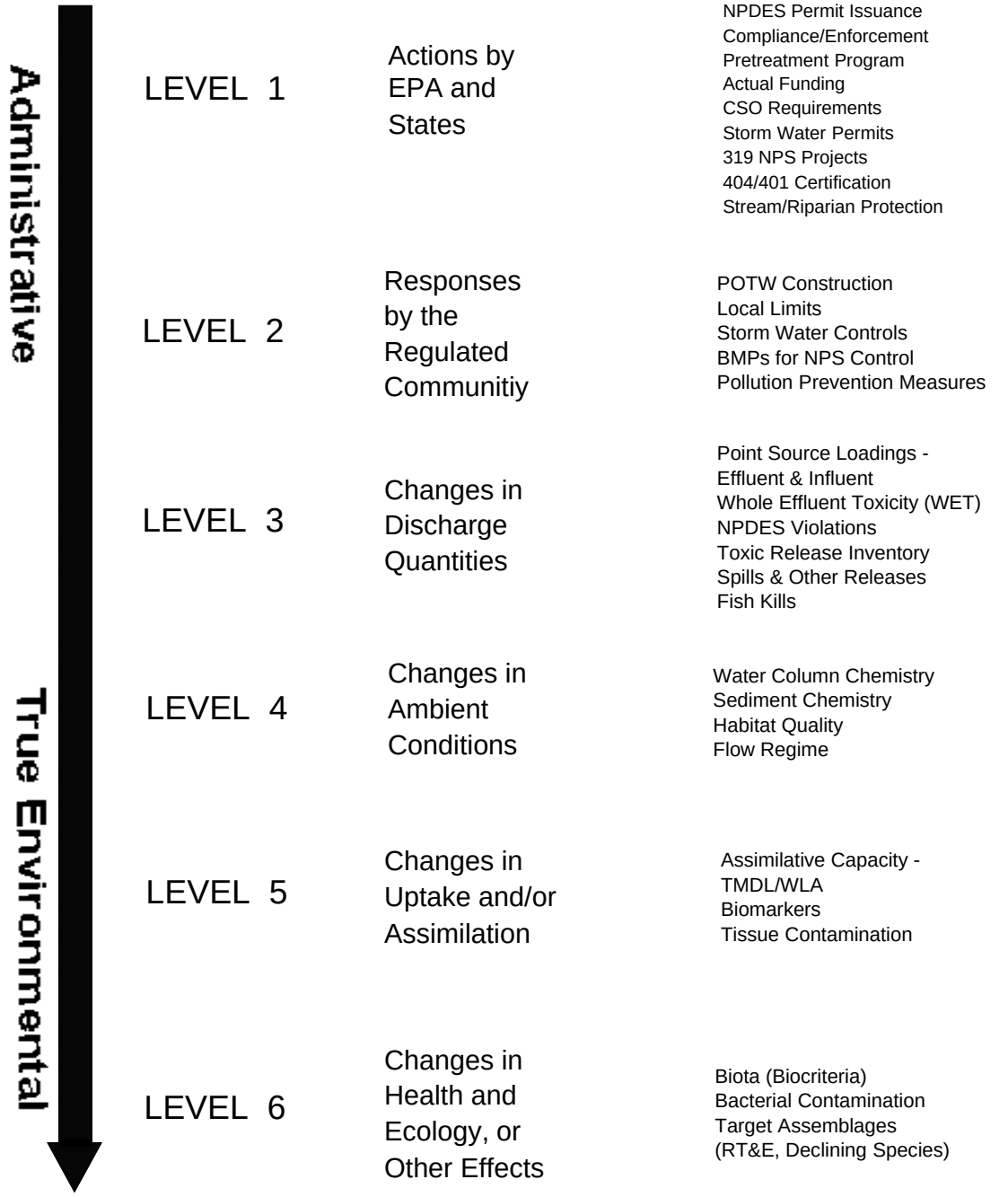

Figure 1. Hierarchy of administrative and environmental indicators which can be used for water quality management activities such as monitoring and assessment, reporting, and the evaluation of overall program effectiveness. This is patterned after a model developed by the U.S. EPA.

declining species or bacterial levels which serve as surrogates for the recreation uses. These indicators represent the essential technical elements for watershed-based management approaches. The key, however, is to use the different indicators *within* the roles which are most appropriate for each.

Describing the causes and sources associated with observed impairments revealed by the biological criteria and linking this with pollution sources involves an interpretation of multiple lines of evidence including water chemistry data, sediment data, habitat data, effluent data, biomonitoring results, land use data, and biological response signatures within the biological data itself. Thus the assignment of principal causes and sources of impairment represents the association of impairments (defined by response indicators) with stressor and exposure indicators. The principal reporting venue for this process on a watershed or subbasin scale is a biological and water quality report. These reports then provide the foundation for aggregated assessments such as the Integrated Water Quality Monitoring and Assessment Report (305[b] and 303[d]), the Ohio Nonpoint Source Assessment, and other technical bulletins.

Ohio Water Quality Standards: Designated Aquatic Life Use

The Ohio Water Quality Standards (WQS; Ohio Administrative Code 3745-1) consist of designated uses and chemical, physical, and biological criteria designed to represent measurable properties of the environment that are consistent with the goals specified by each use designation. Use designations consist of two broad groups, aquatic life and non-aquatic life uses. In applications of the Ohio WQS to the management of water resource issues in Ohio's rivers and streams, the aquatic life use criteria frequently result in the most stringent protection and restoration requirements, hence their emphasis in biological and water quality reports. Also, an emphasis on protecting for aquatic life generally results in water quality suitable for all uses. The five different aquatic life uses currently defined in the Ohio WQS are described as follows:

1) *Warmwater Habitat (WWH)* - this use designation defines the "typical" warmwater assemblage of aquatic organisms for Ohio rivers and streams; *this use represents the principal restoration target for the majority of water resource management efforts in Ohio.*

2) *Exceptional Warmwater Habitat (EWH)* - this use designation is reserved for waters which support "unusual and exceptional" assemblages of aquatic organisms which are characterized by a high diversity of species, particularly those which are highly intolerant and/or rare, threatened, endangered, or special status (*i.e.,* declining species); *this designation represents a protection goal for water resource management efforts dealing with Ohio's best water resources.*

3) *Coldwater Habitat (CWH)* - this use is intended for waters which support assemblages of cold water organisms and/or those which are stocked with salmonids with the intent of providing a put-and-take fishery on a year round basis which is further sanctioned by the Ohio DNR, Division of Wildlife; this use should not be confused with the Seasonal Salmonid Habitat (SSH) use which applies to the Lake Erie tributaries which support periodic "runs" of salmonids during the spring, summer, and/or fall.

4) *Modified Warmwater Habitat (MWH)* - this use applies to streams and rivers which have been subjected to extensive, maintained, and essentially permanent hydromodifications such that the biocriteria for the WWH use are not attainable *and where the activities have been sanctioned by state or federal law;* the representative aquatic assemblages are generally composed of species which are tolerant to low dissolved oxygen, silt, nutrient enrichment, and poor quality habitat.

5) *Limited Resource Water (LRW)* - this use applies to small streams (usually <3 mi^2 drainage area) and other water courses which have been irretrievably altered to the extent that no appreciable assemblage of aquatic life can be supported; such waterways generally include small streams in extensively urbanized areas, those which lie in watersheds with extensive drainage modifications, those which completely lack water on a recurring annual basis (*i.e.,* true ephemeral streams), or other irretrievably altered waterways.

Chemical, physical, and/or biological criteria are generally assigned to each use designation in accordance with the broad goals defined by each. As such the system of use designations employed in the Ohio WQS constitutes a "tiered" approach in that varying and graduated levels of protection are provided by each. This hierarchy is especially apparent for parameters such as dissolved oxygen, ammonia-nitrogen, temperature, and the biological criteria. For other parameters such as heavy metals,

the technology to construct an equally graduated set of criteria has been lacking, thus the same water quality criteria may apply to two or three different use designations.

Ohio Water Quality Standards: Non-Aquatic Life Uses

In addition to assessing the appropriateness and status of aquatic life uses, each biological and water quality survey also addresses non-aquatic life uses such as recreation, water supply, and human health concerns as appropriate. The recreation uses most applicable to rivers and streams are the Primary Contact Recreation (PCR) and Secondary Contact Recreation (SCR) uses. The criterion for designating the PCR use can be having a water depth of at least one meter over an area of at least 100 square feet or, lacking this, where frequent human contact is a reasonable expectation. If a water body does not meet either criterion, the SCR use applies. The attainment status of PCR and SCR is determined using bacterial indicators (*e.g.,* fecal coliform, *E. coli)* and the criteria for each are specified in the Ohio WQS.

Attainment of recreation uses are evaluated based on monitored bacteria levels. The Ohio Water Quality Standards state that all waters should be free from any public health nuisance associated with raw or poorly treated sewage (Administrative Code 3745-1-04, Part F). Additional criteria (Administrative Code 3745-1-07) apply to waters that are designated as suitable for full body contact such as swimming (PCR- primary contact recreation) or for partial body contact such as wading (SCR- secondary contact recreation). These standards were developed to protect human health, because even though fecal coliform bacteria are relatively harmless in most cases, their presence indicates that the water has been contaminated with fecal matter.

Water supply uses include Public Water Supply (PWS), Agricultural Water Supply (AWS), and Industrial Water Supply (IWS). Public Water Supplies are simply defined as segments within 500 yards of a potable water supply or food processing industry intake. The AWS and IWS use designations generally apply to all waters unless it can be clearly shown that they are not applicable. An example of this would be an urban area where livestock watering or pasturing does not take place, thus the AWS use would not apply. Chemical criteria are specified in the Ohio WQS for each use and attainment status is based primarily on chemical-specific indicators. Human health concerns are additionally addressed with fish tissue data, but any consumption advisories are issued by the Ohio Department of Health.

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INTRODUCTION

The lower 9.5 miles of the Little Scioto River were assessed during 2007, evaluating biological, sediment, and surface water resources. Additionally, surface water samples were collected from several locations in North Rockswale Ditch, Rockswale Ditch, and the Scioto River. This study was undertaken to assess water resource conditions in the Little Scioto River upstream, adjacent, and downstream from the historic sediment PAH contaminated section.

Specific objectives of the evaluation were to:

- Establish biological conditions in the Little Scioto River by evaluating fish and macroinvertebrate communities,
- Evaluate surficial sediment and surface water chemical quality at stations in the Little Scioto River and at several tributary locations, and
- Determine the aquatic life use attainment status of the Little Scioto River with regard to the Modified Warmwater Habitat (MWH) or Warmwater Habitat (WWH) aquatic life use designations codified in the Ohio Water Quality Standards.

The Little Scioto River is located in the Eastern Corn Belt Plains (ECBP) ecoregion. The Little Scioto River is currently assigned the Warmwater Habitat (WWH) aquatic life use designation upstream from RM 9.0, and Modified Warmwater Habitat (MWH) from RM 9.0 to the mouth.

Aquatic life use attainment conditions are presented in Table 1, and sampling locations are detailed in Table 2 and graphically presented in Figure 2.

Table 1. Aquatic life use attainment status for sampling locations in the Little Scioto River, 2007. 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. The Qualitative Habitat Evaluation Index (QHEI) is a measure of the ability of the physical habitat to support a biological community. Stream sites are located in the Eastern Corn Belt Plains (ECBP) ecoregion. In the Ohio Water Quality Standards, the Little Scioto River is designated Modified Warmwater Habitat (MWH) from river mile 9.0 to the mouth, and Warmwater Habitat (WWH) for the remaining segment. If biological impairment has occurred, the cause(s) and source(s) of the impairment are noted.

Sample Site River Mile	Attainment Status	IBI	MIwb	ICI	QHEI	Location	Cause	Source
9.2	PARTIAL	32*	7.4*	46	66.5	Hillman Ford Road	Siltation	Nonpoint
6.5	PARTIAL	25	7.6	10*	34.0	Dst. Holland Road	Low flow, contamination	Channelization, Poor substrate, CSOs
5.7	PARTIAL	25	6.6	18*	48.0	State Route 95	Contamination	Sediments, CSOs, WWTP
4.4	NON	20*	5.7*	14*	45.0	Keener Road	Contamination	Sediments, CSOs, WWTP
2.7	NON	16*	5.2*	10*	45.0	State Route 739	Contamination	Sediments, CSOs, WWTP

Ecoregion Biocriteria: Eastern Corn Belt Plains (ECBP) (OAC 3745-1-07, Table 7-15)		
INDEX - Site Type	MWH	WWH
IBI: Wading	24	40
IBI: Boat	24	42
MIwb: Wading	6.2	8.3
MIwb: Boat	5.8	8.5
ICI	22	36

* Significant departure from ecoregion biocriterion; poor and very poor results are underlined.
ns Nonsignificant departure from biocriterion (≤4 IBI or ICI units; ≤0.5 MIwb units).

Table 2. Sampling locations in the Little Scioto River study area, 2007. Type of sampling included fish community (F), macroinvertebrate community (M), surface water (W), and sediment (S).

Stream/ River Mile	Type of Sampling	Latitude	Longitude	Landmark
Little Scioto River				
9.2	F,M,S	40° 37' 38"	83° 10' 21"	Hillman Ford Road
7.9	W	40° 36' 40"	83° 11' 00"	State Route 309
7.1	W	40° 36' 02"	83° 10' 59"	@ old bridge, upstream waterworks plant
6.5	F,M,S	40° 35' 32"	83° 11' 02"	Downstream Holland Road, upstream Marion WWTP
5.7	F,M,S	40° 35' 07"	83° 11' 36"	State Route 95
4.4	F,M,W,S	40° 34' 18"	83° 12' 14"	Keener Road
2.8	W	40° 33' 26"	83° 11' 10"	Downstream from confluence with Rockswale Ditch
2.7	F,M, S	40° 33' 17"	83° 11' 08"	State Route 739
2.0	W	40° 32' 50"	83° 11' 24"	State Route 203
1.4	W	40° 32' 27"	83° 11' 57"	At old oxbow
Scioto River				
178.0	W	40° 31' 44"	83° 12' 43"	Downstream State Route 739
177.5	W	40° 31' 27"	83° 12' 23"	Upstream from confluence with Little Scioto River
175.6	W	40° 30' 02"	83° 11' 47"	Bend in river
North Rockswale Ditch				
1.4	W	40° 36' 19"	83° 10' 15"	State Route 309
1.1	W	40° 36' 01"	83° 10' 15"	@ old road
Rockswale Ditch				
2.2	W	40° 35' 08"	83° 10' 21"	State Route 95
1.1	W	40° 34' 17"	83° 10' 44"	Keener Road

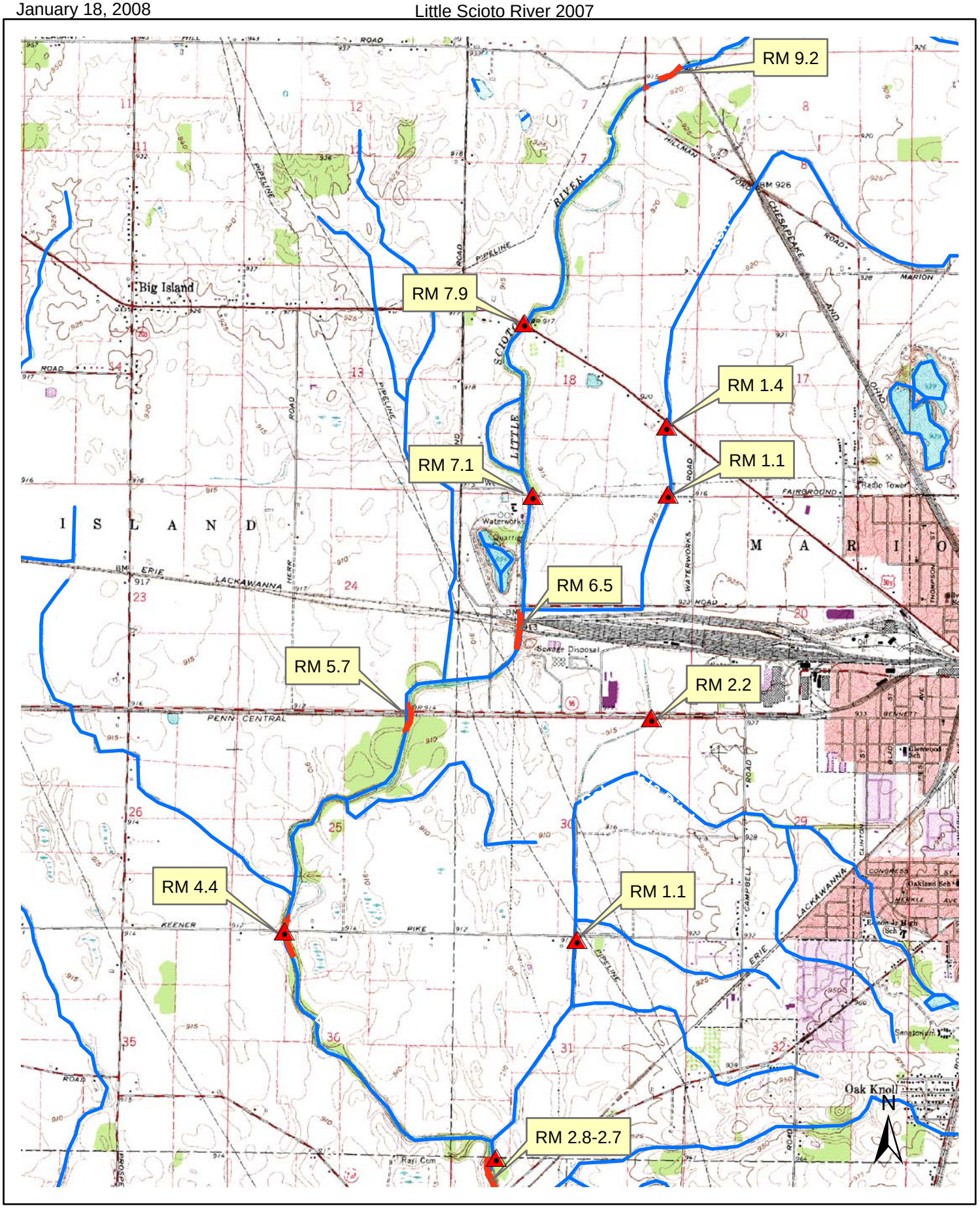
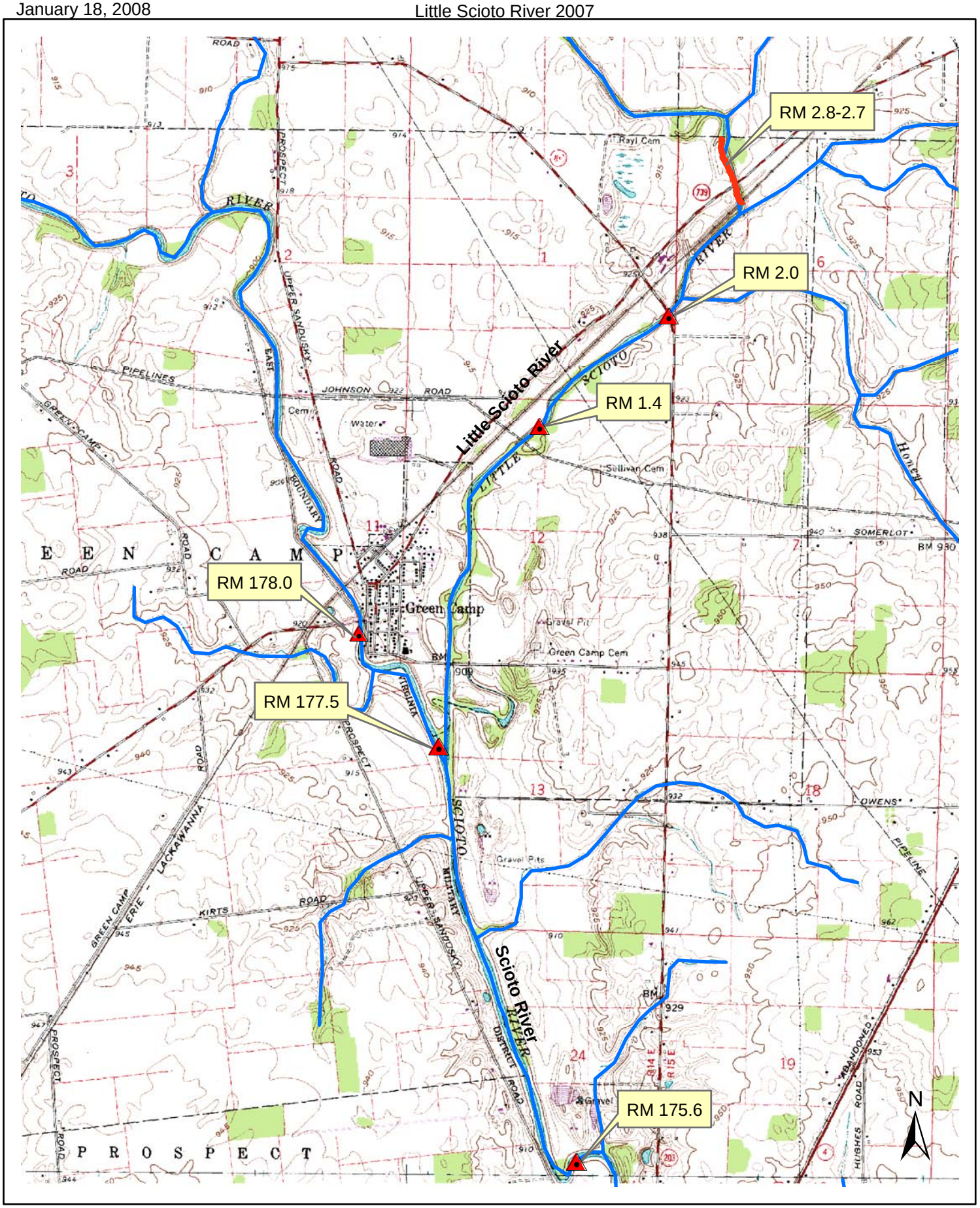


Figure 2a: Little Scioto River study area sampling locations, 2007.



Legend

- Biological Sample Locations
- Surface Water Chemistry

Figure 2b: Little Scioto River study area sampling locations, 2007.

METHODS

All chemical, physical, and biological field, 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 Environmental Protection Agency 2006d), Biological Criteria for the Protection of Aquatic Life, Volumes II - III (Ohio Environmental Protection Agency 1987b, 1989a, 1989b, 2006a, 2006b), The Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Rankin 1989), Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (Ohio EPA 2006c), and Ohio EPA Sediment Sampling Guide and Methodologies (Ohio EPA 2001a).

Determining Use Attainment

Use attainment status is a term describing the degree to which environmental indicators are either above or below criteria specified by the Ohio Water Quality Standards (WQS; Ohio Administrative Code 3745-1). Assessing aquatic use attainment status involves a primary reliance on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-15). These are confined to ambient assessments and apply to rivers and streams outside of mixing zones. 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. Three attainment status results are possible at each sampling location - full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails to meet the biocriteria. Non-attainment means that none of the applicable indices meet the biocriteria or one of the organism groups reflects poor or very poor performance. An aquatic life use attainment table (Table 1) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (*i.e.,* full, partial, or non-attainment), the Qualitative Habitat Evaluation Index (QHEI), and a sampling location description. Biological results were compared to WWH or MWH biocriteria. The Little Scioto River is currently listed as a WWH stream upstream from RM 9.0, and MWH from RM 9.0 to 0.0 in the Ohio Water Quality Standards.

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, 1995; Ohio EPA 2006c). 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 often typify habitat conditions which have the ability to support exceptional faunas.

Sediment and Surface Water Assessment

Fine grain sediment samples were collected multi-incrementally in the upper four inches of bottom material at each biological location using decontaminated stainless steel scoops. At each location, between 15 and 20 scoops of fine grained material over a 200 - 300 meter section of river were collected. Sediment incremental samples were mixed in stainless steel pans (VOC sample jars were filled prior to mixing), transferred into glass jars with teflon lined lids, placed on ice (to maintain 4^{o}C) in a cooler, and shipped to a USEPA CLP lab. Sediment data are reported on a dry weight basis. Decontamination of sediment sampling equipment followed the procedures outlined in the Ohio EPA sediment sampling guidance manual (Ohio EPA 2001a). Surface water samples were collected directly into appropriate containers, preserved and delivered to a USEPA CLP lab. Surface water samples were collected once from each location from the upper 12 inches of water. Collected water was 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 2006d). Surface water samples were evaluated using comparisons to Ohio Water Quality Standards criteria, reference conditions, or published literature. Sediment evaluations were conducted using guidelines established in MacDonald *et al.* (2000), along with a comparison of metals results to Ohio Sediment Reference Values (Ohio EPA 2003b).

Macroinvertebrate Community Assessment

Macroinvertebrates were collected from artificial substrates and from the natural habitats at all five river sites. The artificial substrate collection provided quantitative data and consisted of a composite sample of five modified Hester-Dendy multiple-plate samplers colonized for six weeks. At the time of the artificial substrate collection, a qualitative multihabitat composite sample was also collected. This sampling effort consisted 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). Detailed discussion of macroinvertebrate field and laboratory procedures is contained in Biological Criteria for the Protection of Aquatic Life: Volume III, Standardized Biological Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities (Ohio EPA 1989a, 2006b).

Fish Community Assessment

Fish were sampled twice at each fish site using pulsed DC wading or boat electrofishing methods. Fish were processed in the field, and included identifying each individual to species, counting, weighing, and recording any external abnormalities. Discussion of the fish community assessment methodology used in this report is contained in Biological Criteria for the Protection of Aquatic Life: Volume III, Standardized Biological Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities (Ohio EPA 1989a, 2006b).

Field Instrument Calibration

Field instruments are calibrated using manufacturer recommended procedures along with procedures noted in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (2006d) and Biological Criteria for the Protection of Aquatic Life, Volume III (1989b). Laser rangefinders, used to measure sampling distance, were calibrated once at the Groveport Field Facility prior to summer field sampling activities. Fish weighing scales were checked against certified weights once per month during the field season.

Causal Associations

Using the results, conclusions, and recommendations of this report requires an understanding of the methodology used to determine the use attainment status and assigning probable causes and sources of impairment. The identification of impairment in rivers and streams is straightforward - the numerical biological criteria are used to judge aquatic life use attainment and impairment (partial and non-attainment). The rationale for using the biological criteria, within a weight of evidence framework, has been extensively discussed elsewhere (Karr *et al.* 1986; Karr 1991; Ohio EPA 1987a,b; Yoder 1989; Miner and Borton 1991; Yoder 1991; Yoder 1995). Describing the causes and sources associated with observed impairments relies on an interpretation of multiple lines of evidence including water chemistry data, sediment data, habitat data, effluent data, land use data, and biological results (Yoder and Rankin 1995). Thus the assignment of principal causes and sources of impairment in this report represent the association of impairments (based on response indicators) with stressor and exposure indicators. The reliability of the identification of probable causes and sources is increased where many such prior associations have been identified, or have been experimentally or statistically linked together. The ultimate measure of success in water resource management is the restoration of lost or damaged ecosystem attributes including aquatic community structure and function. While there have been criticisms of misapplying the metaphor of ecosystem “health” compared to human patient “health” (Suter 1993), in this document we are referring to the process for evaluating biological integrity and causes or sources associated with observed impairments, not whether human health and ecosystem health are analogous concepts.

RESULTS

Surface Water Quality

Chemical analyses were conducted on surface water samples collected on October 29, 30, 31 and November 1, 2007 from 13 locations in the study area (Table 3, Appendix Table 1). Surface water samples were analyzed for total analyte list inorganics (metals), PCBs, volatile organic compounds, semivolatile organic compounds, and organochlorinated pesticides. Parameters which were in exceedence of Ohio WQS criteria are reported in Table 3.

Concentrations of PCBs tested in stream waters were reported as not detected. Excluding several low acetone values (a common lab contaminant), volatile organic compounds were all reported as not detected. Semivolatile organic compounds, excluding bis-2 ethylhexyl phthalate, were all reported as not detected. The detected bis-2 ethylhexyl phthalate measurements were below water quality criteria. Organochlorinated pesticides were tested in all water samples collected; all results were reported as not detected.

Metals concentrations were generally very low, with half of the tested parameters less than lab detection limits. Nearly all parameters with measurable concentrations were below applicable Ohio WQS aquatic life and human health criteria. Exceptions included elevated mercury in the Little Scioto River downstream from the Marion WWTP and landfill, and in background samples from the Scioto River and North Rockswale Ditch. All of the mercury measurements detected exceeded the human health nondrinking water quality criterion – none exceeded the aquatic life water quality criterion. Selenium was reported detected at two locations in the study area; in the Little Scioto River at RM 2.8 and in a background sample from the Scioto River. Both measurements were estimated values, and do not appear to be associated with elevated levels of selenium in sediment or point source contributions.

Table 3. Exceedences of Ohio Water Quality Standards criteria (OAC3745-1) for chemical/physical parameters measured in the Little Scioto River study area, 2007.

Stream River Mile	Parameter (value – ug/l)
Little Scioto River	
RM 7.9	None
RM 7.1	None
RM 4.4	Mercury (0.11J [a], 0.55[a])
RM 2.8	Mercury (0.36 [a]), Selenium (12.8J[b])
RM 2.0	None
RM 1.4	Mercury (0.23 [a])
Scioto River	
RM 178.0	Mercury (0.092 [a]), Selenium (11.1J[b])
RM 177.5	None
RM 175.6	None
North Rockswale Ditch	
RM 1.4	Mercury (0.091J [a])
RM 1.1	None
Rockswale Ditch	
RM 2.2	None
RM 1.1	None

[a] Exceedence of the Human Health nondrinking criterion.
[B] Exceedence of the aquatic life Outside Mixing Zone Average water quality criterion.

Nutrients, ammonia-N, dissolved oxygen and bacteriological parameters were not tested as part of this evaluation. Excluding the typical wastewater chemical parameters noted above, good chemical water quality was evident in all streams monitored.

Sediment Quality

Surficial sediment samples were collected at five locations in the Little Scioto River by the Ohio EPA on July 30 and 31, 2007. Sampling locations were co-located with biological sampling sites. Samples were analyzed for total analyte list inorganics (metals), volatile organic compounds, semivolatile organic compounds, organochlorinated pesticides, and PCBs. Specific chemical parameters tested and results are listed in Appendix Table 2. Sediment data were evaluated using guidelines established in *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems* (MacDonald *et.al*. 2000), and *Ohio Specific Sediment Reference Values (SRVs)* for metals (Ohio EPA 2003). The consensus-based sediment guidelines define two levels of ecotoxic effects. A *Threshold Effect Concentration* (TEC) is a level of sediment chemical quality below which harmful effects are unlikely to be observed. A *Probable Effect Concentration* (PEC) indicates a level above which harmful effects are likely to be observed.

Sediment samples were conservatively sampled by focusing on depositional areas of fine grain material (silts and clays). These areas typically are represented by higher contaminant levels, compared to coarse sands and gravels. Fine grained depositional areas were uncommon at RM 9.2, and very common in the channel modified, low gradient segment from RM 9.0 to the mouth.

Chemical parameters measured above ecological screening guidelines are presented in Table 4. At the background location (RM 9.2), chemical compounds in the sediment were within acceptable ecological levels. All four sampling locations in the channel modified section of the Little Scioto River exhibited some degree of elevated sediment chemical levels. The area most recently dredged where contaminated sediments were removed (RM 6.5) exhibited minimally elevated levels of three metal parameters. Overall sediment conditions at RM 6.5 were considered good. Further downstream sampling sites (RMs 5.7 – 2.7) had sediment levels exceeding the PEC for PAHs or metals. Extremely high PAH levels were recorded in the Little Scioto River at RM 5.7 (State Route 95). Overall sediment conditions in the Little Scioto River from RM 5.9 to RM 2.5 suggest contamination levels likely to cause harmful effects to river biology.

Table 4. Chemical parameters measured above screening levels in sediment samples collected by Ohio EPA from surficial sediments in the Little Scioto River, July, 2007. Contamination levels were determined for parameters using consensus-based sediment quality guidelines (MacDonald, et.al. 2000). Sediment reference values are listed in the Ohio EPA Ecological Risk Assessment Guidance (2003). Shaded numbers indicate values above the following: Threshold Effect Concentration -TEC (yellow), Probable Effect Concentration – PEC (red) and Sediment Reference Value (orange). Sampling locations are indicated by river mile (RM).

Parameter	RM 9.2	RM 6.5	RM 5.7	RM 4.4	RM 2.7
Total PAHs (ug/kg)	205	239	214,710	32,895	3,440
Anthracene (ug/kg)	<260	<250	32,000	1,500	<350
Benz(a)anthracene (ug/kg)	<260	<250	11,000	2,800	200
Benzo(a)pyrene (ug/kg)	<260	<250	16,000	4,300	450
Chrysene (ug/kg)	<260	77	20,000	5,800	430
Dibenz(a,h)anthracene (ug/kg)	<260	<250	390	190	<350
Fluoranthene (ug/kg)	<260	<250	40,000	2,200	200
Fluorene (ug/kg)	<260	<250	4,400	140	<350
Naphthalene (ug/kg)	120	81	670	210	160
Phenanthrene (ug/kg)	<260	<250	22,000	400	<350
Pyrene (ug/kg)	<260	<250	19,000	1,700	210
Arsenic (mg/kg)	3.8	10.2	7.0	8.2	8.7
Cadmium (mg/kg)	<0.71	1.6	2.4	2.5	5.4
Chromium (mg/kg)	5.3	32.1	60.2	48.3	120
Copper (mg/kg)	10.8	36.3	70.0	53.8	86.2
Lead (mg/kg)	8.4 J	32.0	81.2	54.0	111
Mercury (mg/kg)	<0.036	<0.064	0.14	0.12	0.13
Nickel (mg/kg)	10.8	23.9	24.3	29.2	49.9
Silver (mg/kg)	0.79	1.9	2.2	2.8	3.9
Zinc (mg/kg)	36.5	95.0	175	180	405

Stream Physical Habitat

Physical habitat was evaluated in the Little Scioto River at each fish sampling location. Physical habitat was assessed using the Qualitative Habitat Evaluation Index (QHEI); scores are detailed in Table 5.

Natural stream habitat conditions were documented in the Little Scioto River at one location - RM 9.2. Stream morphology consisted of pool, riffle, and run areas with bottom substrates predominated by cobble and gravel. The QHEI score at RM 9.2 was 66.5, reflective of good stream habitat and adequate for supporting Warmwater Habitat biological communities.

Physical habitat in the Little Scioto River within the lower nine miles consisted almost entirely of pool and glide areas. This section of the Little Scioto River was extensively modified in the early 1900s. Additional modification occurred in 2002 and 2006 between RM 6.8 and RM 6.0, as part of the contaminated sediment remediation work. Bottom substrates were predominated by sand and detritus in the lower six miles of river, and were extensively embedded with silts and clays. The recently modified river section (RMs 6.0 to 6.8) had very little instream cover, and the bottom was largely composed of hard clay. This section of river was backfilled with clean clay to the approximate bottom elevation started with before remediation dredging. On average, 2-3 feet of clay material was backfilled and compacted in the bed of the river upon completion of sediment removal. QHEI scores in the channel modified segment of the Little Scioto River ranged between 34.0 and 48.0, indicative of poor to fair conditions.

As noted in previous Ohio EPA studies, below the surface layer of silts, the bottom and banks of the Little Scioto River between RMs 6.0 and 2.5 are saturated with a black material with a coal tar odor. Disturbance of the bottom sediments releases an oily substance which creates an extensive oil sheen on the surface of the water.

Table 5. Qualitative Habitat Evaluation Index (QHEI) scores and physical attributes for fish sampling sites on the Little Scioto River, 2007.

			MWH Attributes																																		
			WWH Attributes											*High Influence*						*Moderate Influence*																		
Key QHEI Components			No Channelization or Recovered	Boulder/Cobble/Gravel Substrates	Silt Free Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max. Depth >40 cm	Low-Normal Riffle Embeddedness	**Total WWH Attributes**	Channelized or No Recovery	Silt/Muck Substrates	No Sinuosity	Sparse/ No Cover	Max. Depth <40 cm (WD,HW sites)	**Total High Influence Attributes**	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1-2 Cover Types	Intermittent & Poor Pools	No Fast Current	High/Mod. Overall Embeddedness	High/Mod. Riffle Embeddedness	No Riffle	**Total Moderate Influence Attributes**	**(MWH H.I.+1)/ (WWH+1) Ratio**	**(MWH M.I.+1)/ (WWH+1) Ratio**
River Mile	QHEI	Gradient (ft/mile)																																			
Little Scioto River Year: 2007																																					
9.2	**66.5**	2.87	■	■		■	■	■			■		6				◆		1		●			●	●			●	●	●		6	0.29	1.14
6.5	**34.0**	1.54									■		1	◆			◆		2		●		●	●	●			●	●		●	7	1.50	5.00
5.7	**48.0**	1.54					■	■			■		3				◆		1	●	●			●	●			●	●	●		7	0.50	2.25
4.4	**45.0**	0.34						■			■		2						0	●	●			●	●			●	●		●	7	0.33	2.67
2.7	**45.0**	0.34						■			■		2				◆		1	●	●			●	●			●	●		●	7	0.67	3.00

Fish Community

A total of 1,699 fish representing 35 species were collected from the Little Scioto River between July and September, 2007. Relative numbers and species collected per location are presented in Appendix Table 3 and IBI metrics are presented in Appendix Table 4. Sampling locations were evaluated using either Modified Warmwater Habitat or Warmwater Habitat biocriteria.

Table 6. Average IBI and MIwb scores, and percent DELT anomalies for the natural (RM 9.2) and contaminated channel modified (RM 6.6 -0.0) areas of the Little Scioto River for 2007, 1992, and 1987.

IBI			
	2007	1992	1987
RM 9.2	32	33	33
Channel Modified	21.5	18.7	13.2
MIwb			
	2007	1992	1987
RM 9.2	7.4	7.2	7.9
Channel Modified	6.3	4.5	2.5
DELT Anomalies			
RM 9.2	0.5%	0.1%	0.1%
Channel Modified	4.1%	14.5%	17.5%

The most upstream fish sampling site (RM 9.2) was represented by natural channel conditions, although there was a moderate to heavy layer of silt covering the river bottom. The excessive silt conditions contributed to the fish community not achieving the WWH biocriterion. The IBI and MIwb scores, 32 and 7.4, respectively, were within the fair range of environmental quality (Table 7).

Reduced habitat quality occurred in the Little Scioto River between RMs 6.5 and 2.7. This area of the Little Scioto River is designated MWH due to past channel modification activities. Recently, the section of river from RM 6.8 to RM 6.0 was dredged to the hardpan layer to remove highly contaminated sediments. Because habitat diversity is lower in the MWH segment, fish community quality is not expected to compare to the upstream WWH section; therefore, the biological criteria expectations are not as high. Sampling results from RMs 6.5 and 5.7 were fully achieving the MWH biocriteria. Impairment of the fish communities was documented at RMs 4.4 and 2.7, where both IBI and MIwb scores were in the poor range, and below biocriteria values.

Historical trends in fish community results, represented by average IBI and MIwb scores, and DELT anomalies, are presented in Table 6. Substantial improvement in fish communities in the historically contaminated sediment section of the Little Scioto River occurred from 1987 to 2007. Improvement occurred in both IBI and MIwb scores; IBI values improved 8.3 points between 1987 and 2007 and MIwb values improved 3.8 points. Translated into narrative quality, fish communities improved from very poor in 1987 to poor/fair in 2007. A substantial improvement in DELT anomaly occurrence corresponded with the improved fish communities between 1987 and 2007. Overall, fish communities of the lower Little Scioto River have improved over the last 20 years of monitoring.

Table 7. Fish community summaries based on pulsed D.C. electrofishing sampling conducted by Ohio EPA in the Little Scioto River from July and September, 2007. Relative numbers and weight are per 0.3 km for wading sites and 1.0 km for boat sites. The applicable aquatic life use designation is WWH for RM 9.2 and MWH for all other sites.

Stream River Mile	Sampling Method	Species (Mean)	Species (Total)	Relative Number	Relative Weight (kg)	QHEI	Modified Index of Well-Being	Index of Biotic Integrity	Narrative Evaluation
Little Scioto River									
9.2	Wading	22.5	27	428	23.5	66.5	7.4*	32*	Fair
6.5	Boat	14.5	17	473	76.2	34.0	7.6	25	Fair/Poor
5.7	Boat	15.0	18	477	75.2	48.0	6.6	25	Fair/Poor
4.4	Boat	10.5	13	317	41.2	45.0	5.7*	20*	Poor
2.7	Boat	10.0	13	275	63.4	45.0	5.2*	16*	Poor

Ecoregion Biocriteria: Eastern Corn Belt Plains (ECBP)		
INDEX - Site Type	MWH[a]	WWH
IBI: Wading	24	40
IBI: Boat	24	42
MIwb: Wading	6.2	8.3
MIwb: Boat	5.8	8.5

* Significant departure from ecoregion biocriterion; poor and very poor results are underlined.
[a] Biocriteria scores for channel modified sites.

Macroinvertebrate Community

The macroinvertebrate communities at five Little Scioto River sites were sampled in 2007 using qualitative (multi-habitat composite) and quantitative (artificial substrate) sampling protocols. Results are summarized in Table 9. The ICI metrics with the associated scores, and the raw data are attached as Appendix Tables 5 and 6.

Table 8. Average ICI scores for the natural (RM 9.2) and contaminated channel modified (RM 6.5-2.1) areas of the Little Scioto River for 2007, 1992, and 1987.

ICI			
	2007	1992	1987
RM 9.2	46	38	40
Channel Modified	13.0	10.5	10.5

The macroinvertebrate community from the RM 9.2 sampling location was evaluated as exceptional (ICI=46) and met the designated WWH biocriterion (ICI=36). Good instream physical habitat consisting of pool, riffle, and run habitats with gravel and cobble substrates contributed to the good condition of the macroinvertebrate community at the RM 9.2 sampling location. Downstream from RM 9.0 the designated use for the Little Scioto River is Modified Warmwater Habitat (MWH) due to past channel modification. The ICI biocriterion for attainment of the MWH use is 22. None of the macroinvertebrate communities sampled in the MWH portion of the Little Scioto River met the designated use. The macroinvertebrate communities from RMs 6.5 and 2.7 were evaluated as poor with an ICI of 10. Poor instream habitat with only pool habitat, an absence of measurable current velocities, and bottom substrates limited to clay and silt all contributed to the poor condition of the macroinvertebrate community. The macroinvertebrate communities from the RMs 5.7 and 4.4 sampling locations were evaluated as fair with ICI scores of 18 and 14, respectively, which were in the low end of the fair ICI range of 14-30. These sites were marginally better than the poor sites (RMs 6.5 and 2.7) primarily due to the presence of glide habitats with measurable current velocities and more instream cover.

The 2007 macroinvertebrate sampling indicated some improvement from 1992 and 1987 survey results (Table 8). In 2007, the average ICI from RMs 6.5-2.7 was 13. In both 1992 and 1987, the average ICI from RMs 6.5-2.1 was 10.5. The upstream sampling location (RM 9.2) was evaluated as good in 1992 and 1987 with ICI scores of 38 and 40, respectively.

Table 9. Summary of macroinvertebrate data collected from artificial substrates (quantitative sampling) and natural substrates (qualitative sampling) in the Little Scioto River, 2007.

Stream/ River Mile	Density Number/ft^2	Total Taxa	Quantitative Taxa	Qualitative Taxa	Qualitative EPT[a]	ICI	Evaluation
Little Scioto River							
9.2	500	48	37	32	11	46	Exceptional
6.5	124	32	24	15	2	10*	Poor
5.7	548	49	35	28	3	18*	Fair
4.4	497	35	18	25	0	14*	Fair
2.7	382	21	14	15	0	10*	Poor

Ecoregion Biocriteria: Eastern Corn Belt Plains (ECBP) (Ohio Administrative Code 3745-1-07, Table 7-15)		
INDEX	MWH	WWH
ICI	22	36

[a] EPT=total Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) taxa richness, a measure of pollution sensitive organisms.
* Significant departure from ecoregion biocriterion; poor and very poor results are underlined.
[ns] Nonsignificant departure from biocriterion (≤4 ICI units).

Fish **Bile Metabolites**

Bile was collected from white sucker and common carp at five locations in the Little Scioto River during 2007. A minimum of 10 fish of each species were collected from each sampling location. Bile was extracted from fish gall bladders, placed in plastic vials, and stored and shipped to a contract lab in liquid nitrogen dry shippers. Samples were analyzed for naphthalene and benzo(a)pyrene metabolites using HPLC-fluorescence methodology. Method specifications are detailed in standard operating procedure SOP 0302, Rev. 2 at GERG (Geochemical and Environmental Research Group, College of Geosciences, Texas A&M University). Total protein analysis (used to normalize the metabolite data) was performed on each sample using standard operating procedure SOP 0701, Rev. 1 at GERG. Sampling locations were identified by river mile, and chosen based on reference condition, remediation section, and areas of historical sediment contamination (Table 10).

Table 10. Little Scioto River bile sampling locations.

River Mile (Landmark)	Sampling Designation
9.2 (Hillman Ford Rd.)	Background/reference
6.5 (Dst. Holland Rd.)	Sediment remediation/ removal
5.7 (State Route 95)	Historical sediment contamination
4.4 (Keener Road)	Historical sediment contamination
2.7 (State Route 739)	Historical sediment contamination

Results of the fish bile metabolite tests are presented in Figures 3-6. Included in each figure is a range of values identified as reference conditions based on research conducted by USEPA (Cormier et.al. 2000, Lin et.al. 1996). These reference levels were established from Ohio EPA biological reference sites, as well as, from REMAP sites sampled in Ohio. An adjustment to the reference levels for both species of fish and both types of metabolites was performed – this was necessary to reflect differences between test methodology from 1990s samples (fixed wavelength fluorescence – FF) and the 2007 study (HPLC fluorescence). The reference ranges noted in each figure are used as *'guidance'* in interpreting results.

An evaluation of the fish bile metabolite results from 2007 indicated the following conclusions:

1) The reference site at RM 9.2 was within statewide reference levels for both types of metabolites and both fish species.

2) Although metabolite levels were elevated above reference conditions in the sediment remediation zone of the Little Scioto River (RM 6.5), the median levels for both species were substantially below sites with sediment contamination. The fish collected from RM 6.5 may have reflected some exposure to contaminated sediments that are within a half-mile of the sampling site.

3) Median levels for naphthalene and benzo(a)pyrene metabolites for both white suckers and common carp at the three sites within historical (and present) sediment contamination (RMs 5.7, 4.4, and 2.7) are highly elevated above background and reference conditions. These levels confirm heavy exposure to PAH contaminants.

4) Surficial sediment concentrations of total PAHs, naphthalene, and benzo(a)pyrene noted in Figure 7 revealed low levels at the reference and remediated sites, and highly elevated levels at the historic contaminated sites. and,

5) Sediment remediation activities at RM 6.5 have resulted in lowering the PAH exposure to benthic fish, however, exposure levels have not been reduced to background/reference levels. This could result from fish movements into nearby contaminated areas.

Fish Bile Metabolite Figures

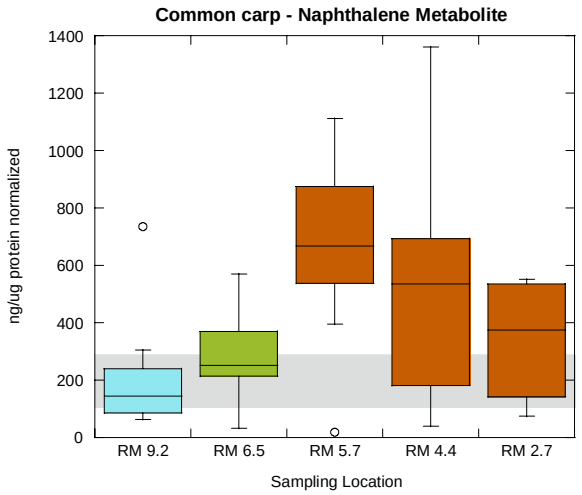


Figure 3. Bile metabolite results for common carp - naphthalene metabolite, 2007.

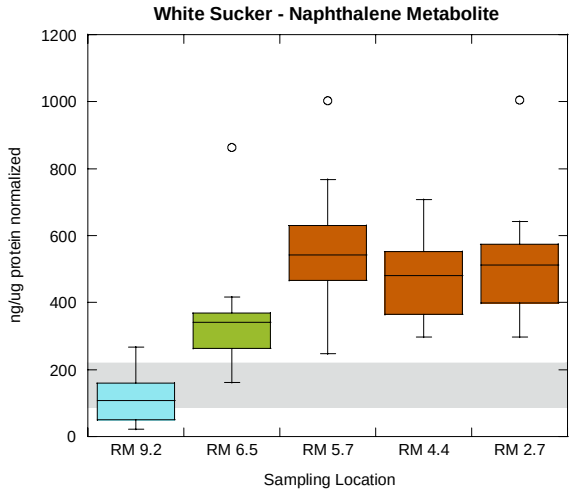


Figure 4. Bile metabolite results for white sucker - naphthalene metabolite, 2007.

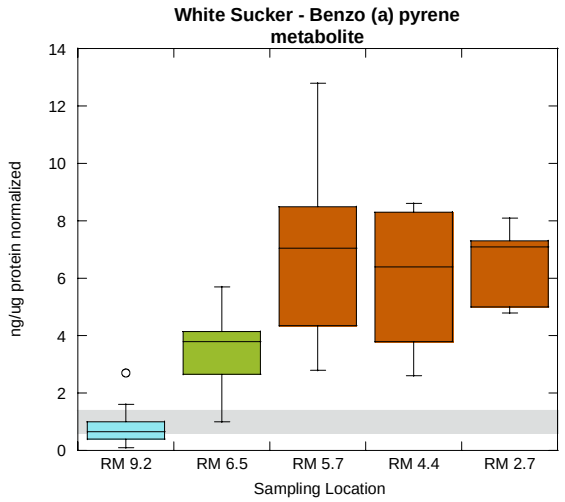


Figure 5. Bile metabolite results for white sucker - benzo(a)pyrene metabolite, 2007.

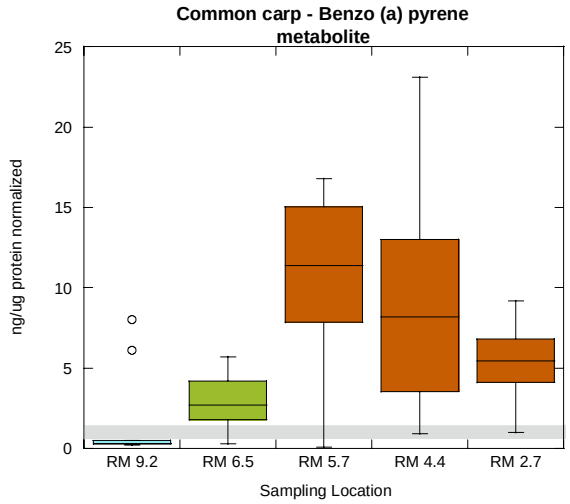
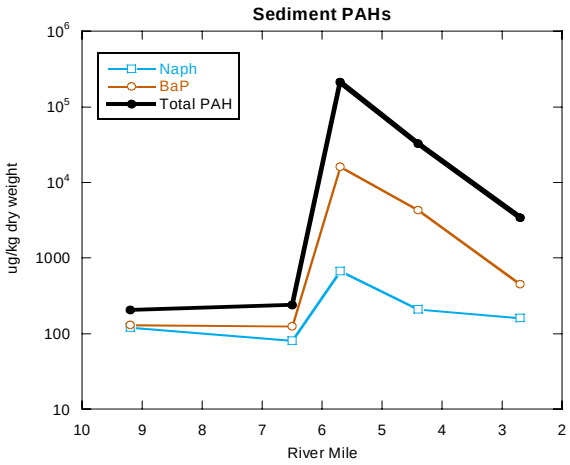


Figure 6. Bile metabolite results for common carp - benzo(a)pyrene metabolite, 2007.

Surficial Sediment

Figure 7. Sediment PAH levels in the Little Scioto River, 2007.



NOTICE TO USERS

Ohio EPA incorporated biological criteria into the Ohio Water Quality Standards (WQS; Ohio Administrative Code 3745-1) regulations in February 1990 (effective May 1990). These criteria consist of numeric values for the Index of Biotic Integrity (IBI) and Modified Index of Well-Being (MIwb), both of which are based on fish assemblage data, and the Invertebrate Community Index (ICI), which is based on macroinvertebrate assemblage data. Criteria for each index are specified for each of Ohio's five ecoregions (as described by Omernik 1987), and are further organized by organism group, index, site type, and aquatic life use designation. These criteria, along with the existing chemical and whole effluent toxicity evaluation methods and criteria, figure prominently in the monitoring and assessment of Ohio's surface water resources.

The following documents support the use of biological criteria by outlining the rationale for using biological information, the methods by which the biocriteria were derived and calculated, the field methods by which sampling must be conducted, and the process for evaluating results:

Ohio Environmental Protection Agency. 1987a. Biological criteria for the protection of aquatic life: Volume I. The role of biological data in water quality assessment. Div. Water Qual. Monit. & Assess., Surface Water Section, Columbus, Ohio.

Ohio Environmental Protection Agency. 1987b. Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Div. Water Qual. Monit. & Assess., Surface Water Section, Columbus, Ohio.

Ohio Environmental Protection Agency. 1989b. Addendum to Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Div. Water Qual. Plan. & Assess., Ecol. Assess. Sect., Columbus, Ohio.

Ohio Environmental Protection Agency. 1989c. Biological criteria for the protection of aquatic life: Volume III. Standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Div. Water Quality Plan. & Assess., Ecol. Assess. Sect., Columbus, Ohio.

Ohio Environmental Protection Agency. 1990. The use of biological criteria in the Ohio EPA surface water monitoring and assessment program. Div. Water Qual. Plan. & Assess., Ecol. Assess. Sect., Columbus, Ohio.

Ohio Environmental Protection Agency. 2006a. 2006 updates to Biological Criteria for the Protection of Aquatic Life: Volume II and Volume II Addendum. Users manual for biological field assessment of Ohio surface waters. Div. of Surface Water, Ecol. Assess. Sect., Columbus, Ohio.

Ohio Environmental Protection Agency. 2006b. 2006 updates to Biological Criteria for the Protection of Aquatic Life: Volume III. Standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Div. of Surface Water, Ecol. Assess. Sect., Columbus, Ohio.

Ohio Environmental Protection Agency. 2006c. Methods for assessing habitat in flowing waters: Using the Qualitative Habitat Evaluation Index (QHEI). Ohio EPA Tech. Bull. EAS/2006-06-1. Div. of Surface Water, Ecol. Assess. Sect., Columbus, Ohio.

Rankin, E.T. 1989. The qualitative habitat evaluation index (QHEI): rationale, methods, and application. Div. Water Qual. Plan. & Assess., Ecol. Assess. Sect., Columbus, Ohio.

In addition to the preceding guidance documents, the following publications by the Ohio EPA should also be consulted as they present supplemental information and analyses used by the Ohio EPA to implement the biological criteria.

DeShon, J.D. 1995. Development and application of the invertebrate community index (ICI), pp. 217-243. in W.S. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Risk-based Planning and Decision Making. Lewis Publishers, Boca Raton, FL.

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Yoder, C.O. 1995. Policy issues and management applications for biological criteria, pp. 327-344. in W. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making. Lewis Publishers, Boca Raton, FL.

Yoder, C.O. and E.T. Rankin. 1995. The role of biological criteria in water quality monitoring, assessment, and regulation. Environmental Regulation in Ohio: How to Cope With the Regulatory Jungle. Inst. of Business Law, Santa Monica, CA. 54 pp.

Yoder, C.O. and M.A. Smith. 1999. Using fish assemblages in a State biological assessment and criteria program: essential concepts and considerations, pp. 17-63. in T. Simon (ed.). Assessing the Sustainability and Biological Integrity of Water Resources Using Fish Communities. CRC Press, Boca Raton, FL.

These documents and this report may be obtained by writing to:

Ohio EPA, Division of Surface Water
Ecological Assessment Section
4675 Homer Ohio Lane
Groveport, Ohio 43125
(614) 836-8786

or

www.epa.state.oh.us/dsw/formspubs.html

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Appendix Table 1. Results for surface water samples collected by the Ohio EPA from the Little Scioto River study area, 2007.

Waterbody:	Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.	
River Mile:	RM 7.9		RM 7.1		RM 4.4		RM 4.4 (DUPL)		RM 2.8	
Sample Number :	E1904		E1905		E1906		E1918		E1907	
Sampling Location:	State Route 309		At Old Bridge		Keener Road		Dst. SR 739		Dst. Rockswale	
Date Sampled :	10/29/2007		10/29/2007		10/29/2007		10/29/2007		10/30/2007	
Volatile Compound (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Vinyl chloride	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ	5.0	U
Bromomethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Trichlorofluoromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Dichloroethene	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ	5.0	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acetone	**3.1**	**J**	10	U	10	U	**4.6**	**J**	10	U
Carbon disulfide	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methyl acetate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methylene chloride	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
trans-1,2-Dichloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methyl tert-butyl ether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Dichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
cis-1,2-Dichloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Butanone	10	U	10	U	10	U	10	U	10	U
Bromochloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloroform	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1,1-Trichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Cyclohexane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon tetrachloride	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,4-Dioxane	100	U	100	U	100	U	100	U	100	U
Trichloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methylcyclohexane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloropropane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromodichloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
cis-1,3-Dichloropropene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U
Toluene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
trans-1,3-Dichloropropene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1,2-Trichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Tetrachloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dibromoethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Ethylbenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
o-Xylene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
m,p-Xylene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Styrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromoform	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Isopropylbenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1,2,2-Tetrachloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,3-Dichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,4-Dichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dibromo-3-chloropropane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4-Trichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,3-Trichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Appendix Table 1. Continued.

Waterbody:	Little Scioto R.		Little Scioto R.		N. Rockswale D.		N. Rockswale D.		Scioto R.	
River Mile:	RM 2.0		RM 1.4		RM 1.4		RM 1.1		RM 178.0	
Sample Number :	E1908		E1909		E1912		E1913		E1918	
Sampling Location:	State Route 203		At old oxbox		State Route 309		At old road		Dst. SR 739	
Date Sampled :	10/31/2007		11/1/2007		10/29/2007		10/29/2007		10/30/2007	
Volatile Compound (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Vinyl chloride	5.0	U	5.0	U	5.0	UJ	5.0	UJ	5.0	UJ
Bromomethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Trichlorofluoromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Dichloroethene	5.0	U	5.0	U	5.0	UJ	5.0	UJ	5.0	UJ
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acetone	10	U	10	U	**2.6**	**J**	10	U	**4.3**	**J**
Carbon disulfide	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methyl acetate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methylene chloride	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
trans-1,2-Dichloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methyl tert-butyl ether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Dichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
cis-1,2-Dichloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Butanone	10	U	10	U	10	U	10	U	10	U
Bromochloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chloroform	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1,1-Trichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Cyclohexane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbon tetrachloride	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,4-Dioxane	100	U	100	U	100	U	100	U	100	U
Trichloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Methylcyclohexane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloropropane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromodichloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
cis-1,3-Dichloropropene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U
Toluene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
trans-1,3-Dichloropropene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1,2-Trichloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Tetrachloroethene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dibromoethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Ethylbenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
o-Xylene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
m,p-Xylene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Styrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bromoform	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Isopropylbenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1,2,2-Tetrachloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,3-Dichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,4-Dichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dibromo-3-chloropropane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4-Trichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,3-Trichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Appendix Table 1. Continued.

Waterbody:	Scioto R.		Scioto R.		Rockswale Ditch		Rockswale Ditch	
River Mile:	RM 177.5		RM 175.6		RM 1.4		RM 1.1	
Sample Number :	E1919		E1920		E1924		E1925	
Sampling Location:	Ust. L. Scioto R.		At big bend		State Route 95		Keener Road	
Date Sampled :	10/30/2007		10/30/2007		10/30/2007		10/29/2007	
Volatile Compound (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	5.0	U	5.0	U	5.0	U	5.0	U
Chloromethane	5.0	U	5.0	U	5.0	U	5.0	U
Vinyl chloride	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ
Bromomethane	5.0	U	5.0	U	5.0	U	5.0	U
Chloroethane	5.0	U	5.0	U	5.0	U	5.0	U
Trichlorofluoromethane	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Dichloroethene	5.0	UJ	5.0	UJ	5.0	UJ	5.0	UJ
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U	5.0	U	5.0	U	5.0	U
Acetone	**4.0**	**J**	**3.7**	**J**	10	U	**90**	
Carbon disulfide	5.0	U	5.0	U	5.0	U	5.0	U
Methyl acetate	5.0	U	5.0	U	5.0	U	5.0	U
Methylene chloride	5.0	U	5.0	U	5.0	U	5.0	U
trans-1,2-Dichloroethene	5.0	U	5.0	U	5.0	U	5.0	U
Methyl tert-butyl ether	5.0	U	5.0	U	5.0	U	5.0	U
1,1-Dichloroethane	5.0	U	5.0	U	5.0	U	5.0	U
cis-1,2-Dichloroethene	5.0	U	5.0	U	**4.0**	**J**	5.0	U
2-Butanone	10	U	10	U	10	U	10	U
Bromochloromethane	5.0	U	5.0	U	5.0	U	5.0	U
Chloroform	5.0	U	5.0	U	5.0	U	5.0	U
1,1,1-Trichloroethane	5.0	U	5.0	U	5.0	U	5.0	U
Cyclohexane	5.0	U	5.0	U	5.0	U	5.0	U
Carbon tetrachloride	5.0	U	5.0	U	5.0	U	5.0	U
Benzene	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloroethane	5.0	U	5.0	U	5.0	U	5.0	U
1,4-Dioxane	100	U	100	U	100	U	100	U
Trichloroethene	5.0	U	5.0	U	5.0	U	5.0	U
Methylcyclohexane	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichloropropane	5.0	U	5.0	U	5.0	U	5.0	U
Bromodichloromethane	5.0	U	5.0	U	5.0	U	5.0	U
cis-1,3-Dichloropropene	5.0	U	5.0	U	5.0	U	5.0	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U
Toluene	5.0	U	5.0	U	5.0	U	5.0	U
trans-1,3-Dichloropropene	5.0	U	5.0	U	5.0	U	5.0	U
1,1,2-Trichloroethane	5.0	U	5.0	U	5.0	U	5.0	U
Tetrachloroethene	5.0	U	5.0	U	5.0	U	5.0	U
2-Hexanone	10	U	10	U	10	U	10	U
Dibromochloromethane	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dibromoethane	5.0	U	5.0	U	5.0	U	5.0	U
Chlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U
Ethylbenzene	5.0	U	5.0	U	5.0	U	5.0	U
o-Xylene	5.0	U	5.0	U	5.0	U	5.0	U
m,p-Xylene	5.0	U	5.0	U	5.0	U	5.0	U
Styrene	5.0	U	5.0	U	5.0	U	5.0	U
Bromoform	5.0	U	5.0	U	5.0	U	5.0	U
Isopropylbenzene	5.0	U	5.0	U	5.0	U	5.0	U
1,1,2,2-Tetrachloroethane	5.0	U	5.0	U	5.0	U	5.0	U
1,3-Dichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U
1,4-Dichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U
1,2-Dibromo-3-chloropropane	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4-Trichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U
1,2,3-Trichlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U

Appendix Table 1. Continued.

Waterbody:	Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.	
River Mile:	RM 7.9		RM 7.1		RM 4.4		RM 4.4 (DUPL)		RM 2.8	
Sample Number :	E1904		E1905		E1906		E1918		E1907	
Sampling Location:	State Route 309		At Old Bridge		Keener Road		Dst. SR 739		Dst. Rockswale	
Date Sampled :	10/29/2007		10/29/2007		10/29/2007		10/29/2007		10/30/2007	
Semivolatile Compound (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Benzaldehyde	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Phenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Bis(2-chloroethyl)ether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2-Chlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2,2'-Oxybis(1-chloropropane)	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Acetophenone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
4-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
N-Nitroso-di-n-propylamine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Hexachloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Nitrobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Isophorone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2-Nitrophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2,4-Dimethylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Bis(2-chloroethoxy)methane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2,4-Dichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Naphthalene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
4-Chloroaniline	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Hexachlorobutadiene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Caprolactam	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
4-Chloro-3-methylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2-Methylnaphthalene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Hexachlorocyclopentadiene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2,4,6-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2,4,5-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
1,1'-Biphenyl	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2-Chloronaphthalene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2-Nitroaniline	10	U	10	U	10	U	10	U	10	UJ
Dimethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2,6-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Acenaphthylene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
3-Nitroaniline	10	U	10	U	10	U	10	U	10	UJ
Acenaphthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2,4-Dinitrophenol	10	U	10	U	10	U	10	UJ	10	UJ
4-Nitrophenol	10	U	10	U	10	U	10	U	10	UJ
Dibenzofuran	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2,4-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Diethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Fluorene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
4-Chlorophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
4-Nitroaniline	10	U	10	U	10	U	10	U	10	UJ
4,6-Dinitro-2-methylphenol	10	U	10	U	10	U	10	U	10	UJ
N-Nitrosodiphenylamine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
1,2,4,5-Tetrachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
4-Bromophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Hexachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Atrazine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Pentachlorophenol	10	U	10	U	10	U	10	R	10	R
Phenanthrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Anthracene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Carbazole	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Di-n-butylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ

Appendix Table 1. Continued.

Waterbody:	Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.	
River Mile:	RM 7.9		RM 7.1		RM 4.4		RM 4.4 (DUPL)		RM 2.8	
Sample Number :	E1904		E1905		E1906		E1918		E1907	
Sampling Location:	State Route 309		At Old Bridge		Keener Road		Dst. SR 739		Dst. Rockswale	
Date Sampled :	10/29/2007		10/29/2007		10/29/2007		10/29/2007		10/30/2007	
Semivolatile Compound (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Pyrene	5.0	UJ	5.0	UJ	5.0	UJ	5.0	U	5.0	UJ
Butylbenzylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
3,3'-Dichlorobenzidine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Benzo(a)anthracene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Chrysene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Bis(2-ethylhexyl)phthalate	5.0	U	5.0	U	5.0	U	5.0	U	**0.52**	**J**
Di-n-octylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Benzo(b)fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Benzo(k)fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Benzo(a)pyrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Indeno(1,2,3-cd)pyrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Dibenzo(a,h)anthracene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
Benzo(g,h,i)perylene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ
2,3,4,6-Tetrachlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	UJ

Appendix Table 1. Continued.

Waterbody:	Little Scioto R.		Little Scioto R.		N. Rockswale D.		N. Rockswale D.		Scioto R.	
River Mile:	RM 2.0		RM 1.4		RM 1.4		RM 1.1		RM 178.0	
Sample Number :	E1908		E1909		E1912		E1913		E1918	
Sampling Location:	State Route 203		At old oxbox		State Route 309		At old road		Dst. SR 739	
Date Sampled :	10/31/2007		11/1/2007		10/29/2007		10/29/2007		10/30/2007	
Semivolatile Compound (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Benzaldehyde	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Phenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-chloroethyl)ether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Chlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,2'-Oxybis(1-chloropropane)	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acetophenone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
N-Nitroso-di-n-propylamine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachloroethane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Isophorone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitrophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-chloroethoxy)methane	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloroaniline	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobutadiene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Caprolactam	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloro-3-methylphenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylnaphthalene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorocyclopentadiene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,6-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,1'-Biphenyl	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Chloronaphthalene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline	10	U	10	U	10	U	10	U	10	U
Dimethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3-Nitroaniline	10	U	10	U	10	U	10	U	10	U
Acenaphthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrophenol	10	UJ	10	UJ	10	UJ	10	UJ	10	UJ
4-Nitrophenol	10	U	10	U	10	U	10	U	10	U
Dibenzofuran	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Diethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluorene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline	10	U	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Atrazine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pentachlorophenol	10	R	10	R	10	R	10	R	10	R
Phenanthrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Anthracene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Carbazole	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Appendix Table 1. Continued.

Waterbody:	Little Scioto R.		Little Scioto R.		N. Rockswale D.		N. Rockswale D.		Scioto R.	
River Mile:	RM 2.0		RM 1.4		RM 1.4		RM 1.1		RM 178.0	
Sample Number :	E1908		E1909		E1912		E1913		E1918	
Sampling Location:	State Route 203		At old oxbox		State Route 309		At old road		Dst. SR 739	
Date Sampled :	10/31/2007		11/1/2007		10/29/2007		10/29/2007		10/30/2007	
Semivolatile Compound (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Di-n-butylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Pyrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Butylbenzylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
3,3'-Dichlorobenzidine	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)anthracene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Chrysene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-ethylhexyl)phthalate	5.0	U	**0.51**	**J**	5.0	U	5.0	U	5.0	U
Di-n-octylphthalate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(b)fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(k)fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(a)pyrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Indeno(1,2,3-cd)pyrene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Dibenzo(a,h)anthracene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(g,h,i)perylene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2,3,4,6-Tetrachlorophenol	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Appendix Table 1. Continued.

Waterbody:	Scioto R.		Scioto R.		Rockswale Ditch		Rockswale Ditch	
River Mile:	RM 177.5		RM 175.6		RM 1.4		RM 1.1	
Sample Number :	E1919		E1920		E1924		E1925	
Sampling Location:	Ust. L. Scioto R.		At big bend		State Route 95		Keener Road	
Date Sampled :	10/30/2007		10/30/2007		10/30/2007		10/29/2007	
Semivolatile Compound (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Benzaldehyde	5.0	U	5.0	U	5.0	UJ	5.0	U
Phenol	5.0	U	5.0	U	5.0	UJ	5.0	U
Bis(2-chloroethyl)ether	5.0	U	5.0	U	5.0	U	5.0	U
2-Chlorophenol	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylphenol	5.0	U	5.0	U	5.0	UJ	5.0	U
2,2'-Oxybis(1-chloropropane)	5.0	U	5.0	U	5.0	U	5.0	U
Acetophenone	5.0	U	5.0	U	5.0	U	5.0	U
4-Methylphenol	5.0	U	5.0	U	5.0	UJ	5.0	U
N-Nitroso-di-n-propylamine	5.0	U	5.0	U	5.0	U	5.0	U
Hexachloroethane	5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene	5.0	U	5.0	U	5.0	U	5.0	U
Isophorone	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitrophenol	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol	5.0	U	5.0	U	5.0	UJ	5.0	U
Bis(2-chloroethoxy)methane	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloroaniline	5.0	U	5.0	U	5.0	UJ	5.0	UJ
Hexachlorobutadiene	5.0	U	5.0	U	5.0	U	5.0	U
Caprolactam	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloro-3-methylphenol	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylnaphthalene	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorocyclopentadiene	5.0	U	5.0	U	5.0	UJ	5.0	UJ
2,4,6-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U
1,1'-Biphenyl	5.0	U	5.0	U	5.0	U	5.0	U
2-Chloronaphthalene	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline	10	U	10	U	10	U	10	U
Dimethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene	5.0	U	5.0	U	5.0	U	5.0	U
3-Nitroaniline	10	U	10	U	10	U	10	U
Acenaphthene	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrophenol	10	UJ	10	UJ	10	UJ	10	UJ
4-Nitrophenol	10	U	10	U	10	U	10	U
Dibenzofuran	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U
Diethylphthalate	5.0	U	5.0	U	5.0	U	**0.80**	**J**
Fluorene	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene	5.0	U	5.0	U	5.0	UJ	5.0	U
Atrazine	5.0	U	5.0	U	5.0	UJ	5.0	U
Pentachlorophenol	10	R	10	R	10	R	10	R
Phenanthrene	5.0	U	5.0	U	5.0	UJ	5.0	U
Anthracene	5.0	U	5.0	U	5.0	UJ	5.0	U
Carbazole	5.0	U	5.0	U	5.0	U	5.0	U
Di-n-butylphthalate	5.0	U	5.0	U	5.0	U	5.0	U

Appendix Table 1. Continued.

Waterbody:	Scioto R.		Scioto R.		Rockswale Ditch		Rockswale Ditch	
River Mile:	RM 177.5		RM 175.6		RM 1.4		RM 1.1	
Sample Number :	E1919		E1920		E1924		E1925	
Sampling Location:	Ust. L. Scioto R.		At big bend		State Route 95		Keener Road	
Date Sampled :	10/30/2007		10/30/2007		10/30/2007		10/29/2007	
Semivolatile Compound (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Fluoranthene	5.0	U	5.0	U	5.0	U	5.0	U
Pyrene	5.0	U	5.0	U	5.0	U	5.0	U
Butylbenzylphthalate	5.0	U	5.0	U	5.0	U	5.0	U
3,3'-Dichlorobenzidine	5.0	U	5.0	U	5.0	UJ	5.0	UJ
Benzo(a)anthracene	5.0	U	5.0	U	5.0	U	5.0	U
Chrysene	5.0	U	5.0	U	5.0	U	5.0	U
Bis(2-ethylhexyl)phthalate	5.0	U	5.0	U	5.0	U	5.0	U
Di-n-octylphthalate	5.0	U	5.0	U	5.0	U	5.0	U
Benzo(b)fluoranthene	5.0	U	5.0	U	5.0	UJ	5.0	UJ
Benzo(k)fluoranthene	5.0	U	5.0	U	5.0	UJ	5.0	UJ
Benzo(a)pyrene	5.0	U	5.0	U	5.0	UJ	5.0	UJ
Indeno(1,2,3-cd)pyrene	5.0	U	5.0	U	5.0	UJ	5.0	UJ
Dibenzo(a,h)anthracene	5.0	U	5.0	U	5.0	UJ	5.0	UJ
Benzo(g,h,i)perylene	5.0	U	5.0	U	5.0	UJ	5.0	UJ
2,3,4,6-Tetrachlorophenol	5.0	U	5.0	U	5.0	U	5.0	U

Appendix Table 1. Continued.

Waterbody:	Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.	
River Mile:	RM 7.9		RM 7.1		RM 4.4		RM 4.4 (DUPL)		RM 2.8		RM 2.0		RM 1.4	
Sample Number :	E1904		E1905		E1906		E1937		E1907		E1908		E1909	
Sampling Location:	State Route 309		At Old Bridge		Keener Road		Dst. SR 739		Dst. Rockswale		State Route 203		At old oxbox	
Date Sampled :	10/29/2007		10/29/2007		10/29/2007		10/29/2007		10/30/2007		10/31/2007		11/1/2007	
Pesticides (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
beta-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
delta-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
gamma-BHC (Lindane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Heptachlor	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Aldrin	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Heptachlor epoxide	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Endosulfan I	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Dieldrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Endrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Endosulfan II	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDD	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Endosulfan sulfate	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDT	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Methoxychlor	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Endrin ketone	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Endrin aldehyde	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
alpha-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
gamma-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Toxaphene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Waterbody:	N. Rockswale D.		N. Rockswale D.		Scioto R.		Scioto R.		Scioto R.		Rockswale Ditch		Rockswale Ditch	
River Mile:	RM 1.4		RM 1.1		RM 178.0		RM 177.5		RM 175.6		RM 1.4		RM 1.1	
Sample Number :	E1912		E1913		E1918		E1919		E1920		E1924		E1925	
Sampling Location:	State Route 309		At old road		Dst. SR 739		Ust. L. Scioto R		At big bend		State Route 95		Keener Road	
Date Sampled :	10/29/2007		10/29/2007		10/30/2007		10/30/2007		10/30/2007		10/30/2007		10/29/2007	
Pesticides (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
beta-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
delta-BHC	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
gamma-BHC (Lindane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Heptachlor	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Aldrin	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Heptachlor epoxide	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Endosulfan I	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Dieldrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDE	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Endrin	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Endosulfan II	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDD	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Endosulfan sulfate	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
4,4'-DDT	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Methoxychlor	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Endrin ketone	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
Endrin aldehyde	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
alpha-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
gamma-Chlordane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.027	U	0.050	U
Toxaphene	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Appendix Table 1. Continued.

Waterbody:	Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.	
River Mile:	RM 7.9		RM 7.1		RM 2.0		RM 1.4	
Sample Number :	E1904		E1905		E1908		E1909	
Sampling Location:	State Route 309		At Old Bridge		State Route 203		At old oxbox	
Date Sampled :	10/29/2007		10/29/2007		10/31/2007		11/1/2007	
PCBs (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Aroclor-1016	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1221	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1232	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1242	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1248	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1254	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1260	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1262	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1268	1.0	U	1.0	U	1.0	U	1.0	U

Waterbody:	N. Rockswale D.		Scioto R.		Scioto R.		Rockswale Ditch	
River Mile:	RM 1.4		RM 177.5		RM 175.6		RM 1.4	
Sample Number :	E1912		E1919		E1920		E1924	
Sampling Location:	State Route 309		Ust. L. Scioto R.		At big bend		State Route 95	
Date Sampled :	10/29/2007		10/30/2007		10/30/2007		10/30/2007	
PCBs (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Aroclor-1016	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1221	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1232	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1242	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1248	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1254	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1260	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1262	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1268	1.0	U	1.0	U	1.0	U	1.0	U

Appendix Table 1. Continued.

Waterbody:	Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.		Little Scioto R.	
River Mile:	RM 7.9		RM 7.1		RM 4.4		RM 4.4 (DUPL)		RM 2.8	
Sample Number :	ME1904		ME1905		ME1906		ME1937		ME1907	
Sampling Location:	State Route 309		At Old Bridge		Keener Road		Dst. SR 739		Dst. Rockswale	
Date Sampled :	10/29/2007		10/29/2007		10/29/2007		10/29/2007		10/30/2007	
ANALYTE (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	**263**		**218**		**288**		**98.0**	**J**	**83.0**	**J**
ANTIMONY	60.0	U	60.0	U	60.0	U	60.0	U	60.0	U
ARSENIC	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
BARIUM	**55.2**	**J**	**60.5**	**J**	**45.6**	**J**	**41.6**	**J**	**42.3**	**J**
BERYLLIUM	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
CADMIUM	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
CALCIUM	**88900**		**91100**		**87800**		**82000**		**83300**	
CHROMIUM	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
COBALT	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U
COPPER	**1.8**	**J**	**2.0**	**J**	**3.3**	**J**	**1.3**		**1.4**	**J**
IRON	**451**		**428**		**560**		**218**		**240**	
LEAD	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
MAGNESIUM	**23800**		**24300**		**25100**		**23300**		**25200**	
MANGANESE	**30.5**		**33.5**		**45.8**		**37.4**		**38.0**	
MERCURY	0.20	U	0.20	U	**0.11**	**J**	**0.55**		**0.36**	
NICKEL	1.5	UJ	1.4	UJ	3.8	UJ	**4.0**	**J**	**4.0**	**J**
POTASSIUM	2990	UJ	3150	UJ	**12800**		**11900**		**14600**	
SELENIUM	35.0	U	35.0	U	35.0	U	35.0	U	**12.8**	**J**
SILVER	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
SODIUM	**14400**		**14000**		**63200**		**58600**		**56300**	
THALLIUM	**3.8**		**5.4**	**J**	**5.7**	**J**	25.0	U	**3.6**	
VANADIUM	**0.80**		**0.72**		**1.5**	**J**	**0.51**		**1.1**	
ZINC	**2.7**	**J**	**5.9**	**J**	**18.1**	**J**	**14.8**	**J**	**13.5**	**J**
CYANIDE	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U

Waterbody:	Little Scioto R.		Little Scioto R.		N. Rockswale D.		N. Rockswale D.		Scioto R.	
River Mile:	RM 2.0		RM 1.4		RM 1.4		RM 1.1		RM 178.0	
Sample Number :	E1908		ME1909		ME1912		ME1913		ME1918	
Sampling Location:	State Route 203		At old oxbox		State Route 309		At old road		Dst. SR 739	
Date Sampled :	10/31/2007		11/1/2007		10/29/2007		10/29/2007		10/30/2007	
ANALYTE (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	**90.2**	**J**	**170**	**J**	**142**	**J**	**171**	**J**	**368**	
ANTIMONY	60.0	U	60.0	U	60.0	U	60.0	U	60.0	U
ARSENIC	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
BARIUM	**44.2**	**J**	**47.5**	**J**	**44.1**	**J**	**46.7**	**J**	**68.1**	**J**
BERYLLIUM	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
CADMIUM	0.14	U	5.0	U	5.0	U	5.0	U	5.0	U
CALCIUM	**85800**		**86000**		**72600**		**79700**		**124000**	
CHROMIUM	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
COBALT	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U
COPPER	**1.5**	**J**	**1.9**	**J**	**1.5**	**J**	25.0	U	**3.6**	**J**
IRON	**275**		**451**		**293**		**329**		**621**	
LEAD	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
MAGNESIUM	**26100**		**26300**		**28200**		**28800**		**34300**	
MANGANESE	**40.1**		**53.3**		**27.4**		**24.6**		**50.7**	
MERCURY	0.20	U	**0.23**		**0.091**	**J**	0.20	U	**0.092**	**J**
NICKEL	**4.0**	**J**	**5.8**	**J**	1.0	UJ	1.8	UJ	**3.9**	**J**
POTASSIUM	**13700**		**18900**		3320	UJ	3380	UJ	**5860**	
SELENIUM	35.0	U	35.0	U	35.0	U	35.0	U	**11.1**	**J**
SILVER	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
SODIUM	**55400**		**70300**		**15400**		**18900**		**19700**	
THALLIUM	25.0	U	25.0	U	25.0	U	**5.1**	**J**	**4.0**	
VANADIUM	**0.65**		**1.1**		50.0	U	50.0	U	**1.3**	**J**
ZINC	**12.5**	**J**	**16.0**	**J**	**7.0**	**J**	**6.6**	**J**	**4.4**	**J**
CYANIDE	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U

Appendix Table 1. Continued.

Waterbody:	Scioto R.		Scioto R.		Rockswale Ditch		Rockswale Ditch	
River Mile:	RM 177.5		RM 175.6		RM 1.4		RM 1.1	
Sample Number :	E1919		ME1920		ME1924		ME1925	
Sampling Location:	Ust. L. Scioto R.		At big bend		State Route 95		Keener Road	
Date Sampled :	10/30/2007		10/30/2007		10/30/2007		10/29/2007	
ANALYTE (ug/l)	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	**358**		**243**		**124**	**J**	**109**	**J**
ANTIMONY	60.0	U	60.0	U	60.0	U	60.0	U
ARSENIC	10.0	U	10.0	U	10.0	U	10.0	U
BARIUM	**72.2**	**J**	**64.0**	**J**	**85.9**	**J**	**62.5**	**J**
BERYLLIUM	5.0	U	5.0	U	5.0	U	5.0	U
CADMIUM	5.0	U	5.0	U	5.0	U	5.0	U
CALCIUM	**130000**		**115000**		**109000**		**93700**	
CHROMIUM	10.0	U	10.0	U	10.0	U	10.0	U
COBALT	50.0	U	50.0	U	50.0	U	50.0	U
COPPER	**2.7**	**J**	**2.7**	**J**	**3.6**	**J**	**2.5**	**J**
IRON	**618**		**467**		**749**		**431**	
LEAD	10.0	U	10.0	U	10.0	U	10.0	U
MAGNESIUM	**36200**		**32200**		**34500**		**27900**	
MANGANESE	**53.5**		**49.5**		**37.7**		**65.9**	
MERCURY	0.20	U	0.20	U	0.20	U	0.20	U
NICKEL	**3.9**	**J**	**4.3**	**J**	**1.8**	**J**	**2.7**	**J**
POTASSIUM	**6200**		**7670**		4460	UJ	**5110**	
SELENIUM	35.0	U	35.0	U	35.0	U	35.0	U
SILVER	10.0	U	10.0	U	10.0	U	10.0	U
SODIUM	**21200**		**29500**		**87900**		**45400**	
THALLIUM	25.0	U	5.0	UJ	25.0	U	**3.5**	
VANADIUM	**1.7**	**J**	**1.4**	**J**	**0.62**		**0.95**	
ZINC	**3.5**	**J**	**7.5**	**J**	**71.4**		**17.4**	**J**
CYANIDE	10.0	U	10.0	U	10.0	U	10.0	U

J - The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
R - The data are unusable.
U - The analyte was analyzed for, but was not detected above the reporte sample quantitation limit.
UJ - The analyte was not detected above the reported sample quantitation limit.

Appendix Table 2. Results for surficial sediment samples collected by the Ohio EPA from the Little Scioto River, 2007.

Sample Number :	E1877	E1878	E1881	E1879	E1880
Sampling Location :	Hillman-Ford Rd.	Holland Road	State Route 95	Keener Road	State Route 739
River Mile	RM 9.2	RM 6.5	RM 5.7	RM 4.4	RM 2.7
Date Sampled :	7/30/2007	7/30/2007	7/31/2007	7/31/2007	7/31/2007
%Moisture :	36	34	44	47	51
Dilution Factor :	1.0	1.0	1.0	1.0	1.0
Volatile Compound (ug/kg)					
Dichlorodifluoromethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Chloromethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Bromomethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Chloroethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Trichlorofluoromethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Acetone	9.9 U	15 U	**12 J**	**18 J**	**21 J**
Carbon disulfide	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Methyl acetate	5.0 U	7.6 U	5.0 U	**5.0**	**7.6**
Methylene chloride	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Methyl tert-Butyl ether	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
2-Butanone	9.9 U	15 U	10 U	9.9 U	10 U
Bromochloromethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Chloroform	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Cyclohexane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Carbon Tetrachloride	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Benzene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,4-Dioxane	99 R	150 R	100 R	99 R	100 R
Trichloroethene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Methylcyclohexane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone	9.9 U	15 U	10 U	9.9 U	10 U
Toluene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
2-Hexanone	9.9 U	15 U	10 U	9.9 U	10 U
Dibromochloromethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
o-Xylene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
m,p-Xylene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Styrene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
Bromoform	5.0 U	7.6 R	5.0 R	5.0 R	5.0 R
Isopropylbenzene	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	5.0 U	7.6 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	5.0 U	7.6 R	5.0 R	5.0 R	5.0 R
1,4-Dichlorobenzene	5.0 U	7.6 R	5.0 R	5.0 R	5.0 R
1,2-Dichlorobenzene	5.0 U	7.6 R	5.0 R	5.0 R	5.0 R
1,2-Dibromo-3-chloropropane	5.0 U	7.6 R	5.0 R	5.0 R	5.0 R
1,2,4-Trichlorobenzene	5.0 U	7.6 R	5.0 R	5.0 R	5.0 R
1,2,3-Trichlorobenzene	5.0 U	7.6 R	5.0 R	5.0 R	5.0 R

Appendix Table 2. Continued.

Sample Number :	E1877	E1878	E1881	E1879	E1880
Sampling Location :	Hillman-Ford Rd.	Holland Road	State Route 95	Keener Road	State Route 739
River Mile	RM 9.2	RM 6.5	RM 5.7	RM 4.4	RM 2.7
Date Sampled :	7/30/2007	7/30/2007	7/31/2007	7/31/2007	7/31/2007
Dilution Factor :	1.0	1.0	1.0	1.0	1.0
Semi-Volatile Compound (ug/kg)					
Benzaldehyde	260 U	250 U	300 U	320 U	350 U
Phenol	260 U	250 U	300 U	320 U	350 U
Bis(2-chloroethyl)ether	260 U	250 U	300 U	320 U	350 U
2-Chlorophenol	260 U	250 U	300 U	320 U	350 U
2-Methylphenol	260 U	250 U	300 U	320 U	350 U
2,2'-Oxybis(1-chloropropane)	260 U	250 U	300 U	320 U	350 U
Acetophenone	260 U	250 U	300 U	320 U	350 U
4-Methylphenol	260 U	250 U	300 U	320 U	350 U
N-Nitroso-di-n-propylamine	260 U	250 U	300 U	320 U	350 U
Hexachloroethane	260 U	250 U	300 U	320 U	350 U
Nitrobenzene	260 U	250 U	300 U	320 U	350 U
Isophorone	260 U	250 U	300 U	320 U	350 U
2-Nitrophenol	260 U	250 U	300 U	320 U	350 U
2,4-Dimethylphenol	260 U	250 U	300 U	320 U	350 U
Bis(2-chloroethoxy)methane	260 U	250 U	300 U	320 U	350 U
2,4-Dichlorophenol	260 U	250 U	300 U	320 U	350 U
Naphthalene	**120 J**	**81 J**	**670**	**210 J**	**160 J**
4-Chloroaniline	260 U	250 U	300 U	320 U	350 U
Hexachlorobutadiene	260 U	250 U	300 U	320 U	350 U
Caprolactam	260 U	250 U	300 U	320 U	350 U
4-Chloro-3-methylphenol	260 U	250 U	300 U	320 U	350 U
2-Methylnaphthalene	**85 J**	250 U	**280 J**	**120 J**	**100 J**
Hexachlorocyclopentadiene	260 U	250 U	300 U	320 U	350 U
2,4,6-Trichlorophenol	260 U	250 U	300 U	320 U	350 U
2,4,5-Trichlorophenol	260 U	250 U	300 U	320 U	350 U
1,1'-Biphenyl	260 U	250 U	300 U	320 U	350 U
2-Chloronaphthalene	260 U	250 U	300 U	320 U	350 U
2-Nitroaniline	510 U	490 U	590 U	620 U	670 U
Dimethylphthalate	260 U	250 U	300 U	320 U	350 U
2,6-Dinitrotoluene	260 U	250 U	300 U	320 U	350 U
Acenaphthylene	260 U	250 U	**640**	**240 J**	350 U
3-Nitroaniline	510 U	490 U	590 U	620 U	670 U
Acenaphthene	260 U	250 U	**2900**	**95 J**	350 U
2,4-Dinitrophenol	510 U	490 U	590 U	620 U	670 U
4-Nitrophenol	510 U	490 U	590 U	620 U	670 U
Dibenzofuran	260 U	250 U	**1700**	320 U	350 U
2,4-Dinitrotoluene	260 U	250 U	300 U	320 U	350 U
Diethylphthalate	260 U	250 U	300 U	320 U	350 U
Fluorene	260 U	250 U	**4400**	**140 J**	350 U
4-Chlorophenyl-phenylether	260 U	250 U	300 U	320 U	350 U
4-Nitroaniline	510 U	490 U	590 U	620 U	670 U
4,6-Dinitro-2-methylphenol	510 U	490 U	590 U	620 U	670 U
N-Nitrosodiphenylamine	260 U	250 U	300 U	320 U	350 U
1,2,4,5-Tetrachlorobenzene	260 U	250 U	300 U	320 U	350 U
4-Bromophenyl-phenylether	260 U	250 U	300 U	320 U	350 U
Hexachlorobenzene	260 U	250 U	300 U	320 U	350 U
Atrazine	260 U	250 U	300 U	320 U	350 U
Pentachlorophenol	510 U	490 U	590 U	620 U	670 U
Phenanthrene	260 U	250 U	**22000**	**400**	350 U
Anthracene	260 U	250 U	**32000**	**1500**	350 U
Carbazole	260 U	250 U	**830**	320 U	350 U
Di-n-butylphthalate	260 U	250 U	300 U	320 U	350 U
Fluoranthene	260 U	250 U	**40000**	**2200**	**200 J**

Appendix Table 2. Continued.

Sample Number :	E1877	E1878	E1881	E1879	E1880
Sampling Location :	Hillman-Ford Rd.	Holland Road	State Route 95	Keener Road	State Route 739
River Mile	RM 9.2	RM 6.5	RM 5.7	RM 4.4	RM 2.7
Date Sampled :	7/30/2007	7/30/2007	7/31/2007	7/31/2007	7/31/2007
Dilution Factor :	1.0	1.0	1.0	1.0	1.0
Semi-Volatile Compound (ug/kg)					
Pyrene	260 U	250 U	**19000**	**1700**	**210 J**
Butylbenzylphthalate	260 U	250 U	300 U	320 U	350 U
3,3'-Dichlorobenzidine	260 U	250 U	300 U	320 U	350 U
Benzo(a)anthracene	260 U	250 U	**11000**	**2800**	**200 J**
Chrysene	260 U	**77 J**	**20000 J**	**5800**	**430 J**
Bis(2-ethylhexyl)phthalate	**130 J**	250 U	300 U	320 U	**120 J**
Di-n-octylphthalate	260 U	250 U	300 U	320 U	350 U
Benzo(b)fluoranthene	260 U	250 U	**27000**	**6100**	**570**
Benzo(k)fluoranthene	260 U	**81 J**	**6300**	**1900**	**190 J**
Benzo(a)pyrene	260 U	250 U	**16000**	**4300**	**450**
Indeno(1,2,3-cd)pyrene	260 U	250 U	**4700**	**2400**	**390**
Dibenzo(a,h)anthracene	260 U	250 U	**390**	**190 J**	350 U
Benzo(g,h,i)perylene	260 U	250 U	**4900**	**2800**	**540**
2,3,4,6-Tetrachlorophenol	260 U	250 U	300 U	320 U	350 U
Pesticides (ug/kg)					
ALPHA-BHC	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
BETA-BHC	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
DELTA-BHC	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
GAMMA-BHC (LINDANE)	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
HEPTACHLOR	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
ALDRIN	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
HEPTACHLOR EPOXIDE	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
ENDOSULFAN I	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
DIELDRIN	5.1 U	5.0 U	5.9 U	6.2 U	6.7 U
4,4'-DDE	5.1 U	5.0 U	5.9 U	6.2 U	6.7 U
ENDRIN	5.1 U	5.0 U	5.9 U	6.2 U	6.7 U
ENDOSULFAN II	5.1 U	5.0 U	5.9 U	6.2 U	6.7 U
4,4'-DDD	5.1 U	5.0 U	5.9 U	6.2 U	6.7 U
ENDOSULFAN SULFATE	5.1 U	5.0 U	5.9 U	6.2 U	6.7 U
4,4'-DDT	5.1 U	5.0 U	5.9 U	6.2 U	6.7 U
METHOXYCHLOR	26 U	26 U	30 U	32 U	34 U
ENDRIN KETONE	5.1 U	5.0 U	5.9 U	6.2 U	6.7 U
ENDRIN ALDEHYDE	5.1 U	5.0 U	5.9 U	6.2 U	6.7 U
ALPHA-CHLORDANE	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
GAMMA-CHLORDANE	2.6 U	2.6 U	3.0 U	3.2 U	3.4 U
TOXAPHENE	260 U	260 U	300 U	320 U	340 U
PCBs (ug/kg)					
Aroclor-1016	51 U	50 U	59 U	62 U	67 U
Aroclor-1221	51 U	50 U	59 U	62 U	67 U
Aroclor-1232	51 U	50 U	59 U	62 U	67 U
Aroclor-1242	51 U	50 U	59 U	62 U	67 U
Aroclor-1248	51 U	50 U	59 U	62 U	67 U
Aroclor-1254	51 U	50 U	59 U	62 U	67 U
Aroclor-1260	51 U	50 U	59 U	62 U	67 U
Aroclor-1262	51 U	50 U	59 U	62 U	67 U
Aroclor-1268	51 U	50 U	59 U	62 U	67 U

Appendix Table 2. Continued.

Sample Number :	ME1877	ME1878	ME1881	ME1879	ME1880
Sampling Location :	Hillman-Ford Rd.	Holland Road	State Route 95	Keener Road	State Route 739
River Mile	RM 9.2	RM 6.5	RM 5.7	RM 4.4	RM 2.7
Date Sampled :	7/30/2007	7/30/2007	7/31/2007	7/31/2007	7/31/2007
Dilution Factor :	1.0	1.0	1.0	1.0	1.0
TAL Metals (mg/kg)					
Percent Solids	54.6	65.1	48.5	46.0	60.3
ALUMINUM	**3650 J**	**7790 J**	**5950 J**	**9600 J**	**9690 J**
ANTIMONY	11.0 UJ	**0.58 J**	**0.80 J**	**0.83 J**	**0.96 J**
ARSENIC	**3.8**	**10.2**	**7.0**	**8.2**	**8.7**
BARIUM	**45.8**	**77.8**	**92.4**	**108**	**140**
BERYLLIUM	**0.18 J**	**0.43 J**	**0.42 J**	**0.54 J**	**0.53 J**
CADMIUM	0.71 UJ	**1.6**	**2.4**	**2.5**	**5.4**
CALCIUM	**12000 J**	**30700 J**	**30900 J**	**27300 J**	**33200 J**
CHROMIUM	**5.3**	**32.1**	**60.2**	**48.3**	**120**
COBALT	3.8 UJ	**8.2**	7.8 UJ	8.6 UJ	9.1 UJ
COPPER	**10.8**	**36.3**	**70.0**	**53.8**	**86.2**
IRON	**8490 J**	**19300 J**	**15400 J**	**21700 J**	**23100 J**
LEAD	**8.4 J**	**32.0 J**	**81.2 J**	**54.0 J**	**111 J**
MAGNESIUM	**3660 J**	**8040 J**	**8580 J**	**9360 J**	**11400 J**
MANGANESE	**112 J**	**329 J**	**213 J**	**256 J**	**269 J**
MERCURY	0.036 UJ	0.064 UJ	**0.14**	**0.12**	**0.13**
NICKEL	**10.8**	**23.9**	**24.3**	**29.2**	**49.9**
POTASSIUM	**497 J**	**1130**	**912**	**1660**	**1500**
SELENIUM	**0.99 J**	**1.6 J**	**1.5 J**	**1.9 J**	**2.1 J**
SILVER	**0.79 J**	**1.9**	**2.2**	**2.8**	**3.9**
SODIUM	102 UJ	175 UJ	243 UJ	324 UJ	319 UJ
THALLIUM	**0.63 J**	**1.5 J**	**1.2 J**	**1.6 J**	**1.5 J**
VANADIUM	**8.3 J**	**17.3**	**13.8**	**19.4**	**19.9**
ZINC	**36.5 J**	**95.0 J**	**175 J**	**180 J**	**405 J**
CYANIDE	4.6 UJ	3.8 UJ	4.1 UJ	5.2 UJ	5.4 UJ

J - The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.

R - The data are unusable.

U - The analyte was analyzed for, but was not detected above the reporte sample quantitation limit.

UJ - The analyte was not detected above the reported sample quantitation limit. However the quantitation limit is approximate and may or may not represent the action limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Appendix Table 3. Ohio EPA fish results from the Little Scioto River, 2007.

River Code: **02-158**	Stream: **Little Scioto River**	Sample Date: **2007**
River Mile: **9.20**	Location: Hillman Ford Rd.	Date Range: 07/30/2007
Time Fished: 4886 sec	Drainage: 72.5 sq mi	Thru: 09/27/2007
Dist Fished: 0.44 km	Basin: Scioto River No of Passes: 2	Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Gizzard Shad		O	M		9	6.14	1.43	0.35	1.50	57.22
Redfin Pickerel		P	M	P	12	8.18	1.91	0.23	0.97	27.75
Silver Redhorse	R	I	S	M	2	1.36	0.32	2.71	11.55	1,987.50
Northern Hog Sucker	R	I	S	M	9	6.14	1.43	0.69	2.95	112.89
White Sucker	W	O	S	T	89	60.68	14.17	1.81	7.72	29.85
Spotted Sucker	R	I	S		2	1.36	0.32	0.01	0.03	6.00
Common Carp	G	O	M	T	12	8.18	1.91	13.38	56.99	1,634.79
Goldfish	G	O	M	T	2	1.36	0.32	0.09	0.36	62.50
Creek Chub	N	G	N	T	23	15.68	3.66	0.52	2.21	33.13
Redfin Shiner	N	I	N		7	4.77	1.11	0.02	0.07	3.29
Bluntnose Minnow	N	O	C	T	217	147.95	34.55	0.39	1.65	2.61
Central Stoneroller	N	H	N		7	4.77	1.11	0.02	0.09	4.57
Yellow Bullhead		I	C	T	1	0.68	0.16	0.18	0.76	260.00
Black Bullhead		I	C	P	11	7.50	1.75	0.35	1.48	46.36
Brindled Madtom		I	C	I	8	5.45	1.27	0.09	0.39	16.75
Tadpole Madtom		I	C		5	3.41	0.80	0.05	0.20	13.40
Blackstripe Topminnow		I	M		1	0.68	0.16	0.00	0.01	2.00
White Crappie	S	I	C		7	4.77	1.11	0.20	0.86	42.29
Rock Bass	S	C	C		15	10.23	2.39	1.12	4.75	109.00
Largemouth Bass	F	C	C		3	2.05	0.48	0.07	0.29	33.67
Green Sunfish	S	I	C	T	20	13.64	3.18	0.35	1.49	25.71
Longear Sunfish	S	I	C	M	52	35.45	8.28	0.57	2.41	15.97
Blackside Darter	D	I	S		2	1.36	0.32	0.01	0.05	8.50
Logperch	D	I	S	M	10	6.82	1.59	0.11	0.46	15.80
Johnny Darter	D	I	C		76	51.82	12.10	0.08	0.33	1.48
Greenside Darter	D	I	S	M	11	7.50	1.75	0.06	0.27	8.45
Fantail Darter	D	I	C		15	10.23	2.39	0.04	0.16	3.73
	Mile Total				628	428.18		23.47		
	Number of Species				27					
	Number of Hybrids				0					

River Code: **02-158**	Stream: **Little Scioto River**	Sample Date: **2007**
River Mile: **6.50**	Location: upst. Holland Rd.	Date Range: 07/30/2007
Time Fished: 3093 sec	Drainage: 86.0 sq mi	Thru: 09/28/2007
Dist Fished: 0.64 km	Basin: Scioto River No of Passes: 2	Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Gizzard Shad		O	M		37	57.81	12.21	5.54	7.27	95.84
Redfin Pickerel		P	M	P	3	4.69	0.99	0.24	0.32	51.67
Golden Redhorse	R	I	S	M	1	1.56	0.33	0.09	0.12	58.00
White Sucker	W	O	S	T	115	179.69	37.95	28.05	36.83	156.12
Spotted Sucker	R	I	S		8	12.50	2.64	5.96	7.83	477.13
Common Carp	G	O	M	T	13	20.31	4.29	24.60	32.29	1,210.85
Goldfish	G	O	M	T	10	15.63	3.30	1.07	1.40	68.40
Golden Shiner	N	I	M	T	8	12.50	2.64	0.30	0.39	23.75
Creek Chub	N	G	N	T	1	1.56	0.33	0.10	0.13	61.00
Yellow Bullhead		I	C	T	2	3.13	0.66	0.85	1.11	270.50
Brown Bullhead		I	C	T	1	1.56	0.33	0.16	0.21	102.00
Black Bullhead		I	C	P	61	95.31	20.13	4.49	5.90	47.13
White Crappie	S	I	C		16	25.00	5.28	1.22	1.60	48.69
Black Crappie	S	I	C		1	1.56	0.33	0.06	0.07	36.00
Largemouth Bass	F	C	C		5	7.81	1.65	2.49	3.27	318.40
Green Sunfish	S	I	C	T	15	23.44	4.95	0.64	0.84	27.40
Bluegill Sunfish	S	I	C	P	6	9.38	1.98	0.33	0.43	35.00
Mile Total					303	473.44		76.18		
Number of Species					17					
Number of Hybrids					0					

River Code: **02-158**	Stream: **Little Scioto River**	Sample Date: **2007**
River Mile: **5.70**	Location: St. Rt. 95	Date Range: 07/31/2007
Time Fished: 3382 sec	Drainage: 89.0 sq mi	Thru: 09/28/2007
Dist Fished: 0.68 km	Basin: Scioto River No of Passes: 2	Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Redfin Pickerel		P	M	P	8	11.60	2.43	0.41	0.55	35.13
Northern Hog Sucker	R	I	S	M	1	1.43	0.30	0.12	0.16	82.00
White Sucker	W	O	S	T	105	153.81	32.22	14.50	19.27	94.10
Spotted Sucker	R	I	S		5	7.23	1.51	1.77	2.36	244.60
Common Carp	G	O	M	T	45	66.02	13.83	48.56	64.52	735.11
Goldfish	G	O	M	T	11	16.41	3.44	0.88	1.17	53.45
Golden Shiner	N	I	M	T	9	13.38	2.80	0.21	0.28	15.78
Creek Chub	N	G	N	T	6	8.75	1.83	0.32	0.43	36.50
Bluntnose Minnow	N	O	C	T	1	1.52	0.32	0.01	0.01	6.00
Channel Catfish	F		C		1	1.43	0.30	1.79	2.37	1,250.00
Yellow Bullhead		I	C	T	1	1.52	0.32	0.07	0.10	49.00
Black Bullhead		I	C	P	56	80.95	16.96	3.33	4.43	41.16
White Crappie	S	I	C		5	7.23	1.51	0.36	0.48	49.40
Rock Bass	S	C	C		1	1.52	0.32	0.09	0.12	58.00
Largemouth Bass	F	C	C		6	9.00	1.89	1.00	1.33	110.17
Green Sunfish	S	I	C	T	55	80.65	16.90	1.39	1.84	17.29
Bluegill Sunfish	S	I	C	P	7	10.52	2.20	0.38	0.50	36.14
Longear Sunfish	S	I	C	M	1	1.43	0.30	0.02	0.03	17.00
Green Sf X Bluegill Sf					2	2.94	0.62	0.05	0.07	17.00
	Mile Total				326	477.32		75.26		
	Number of Species				18					
	Number of Hybrids				1					

River Code: **02-158**	Stream: **Little Scioto River**	Sample Date: **2007**
River Mile: **4.40**	Location: Keener Pike	Date Range: 07/31/2007
Time Fished: 3521 sec	Drainage: 95.0 sq mi	Thru: 09/27/2007
Dist Fished: 0.70 km	Basin: Scioto River No of Passes: 2	Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Redfin Pickerel		P	M	P	3	4.29	1.35	0.27	0.64	62.00
White Sucker	W	O	S	T	128	182.86	57.66	17.58	42.69	96.13
Spotted Sucker	R	I	S		11	15.71	4.95	4.66	11.32	296.55
Common Carp	G	O	M	T	25	35.71	11.26	15.50	37.64	434.00
Goldfish	G	O	M	T	2	2.86	0.90	0.36	0.88	126.50
Golden Shiner	N	I	M	T	4	5.71	1.80	0.08	0.20	14.50
Creek Chub	N	G	N	T	11	15.71	4.95	0.60	1.45	38.09
Redfin Shiner	N	I	N		2	2.86	0.90	0.01	0.01	2.00
Spotfin Shiner	N	I	M		1	1.43	0.45	0.00	0.01	2.00
Bluntnose Minnow	N	O	C	T	4	5.71	1.80	0.02	0.06	4.00
Black Bullhead		I	C	P	22	31.43	9.91	1.80	4.37	57.32
Green Sunfish	S	I	C	T	8	11.43	3.60	0.23	0.56	20.13
Bluegill Sunfish	S	I	C	P	1	1.43	0.45	0.07	0.17	48.00
Mile Total					222	317.14		41.18		
Number of Species					13					
Number of Hybrids					0					

River Code: **02-158**	Stream: **Little Scioto River**	Sample Date: **2007**
River Mile: **2.70**	Location: dst. Rockswale Ditch	Date Range: 07/31/2007
Time Fished: 3661 sec	Drainage: 103.0 sq mi	Thru: 09/27/2007
Dist Fished: 0.80 km	Basin: Scioto River No of Passes: 2	Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Redfin Pickerel		P	M	P	10	12.50	4.55	0.46	0.72	36.50
Northern Pike	F	P	M		1	1.25	0.45	1.19	1.87	950.00
White Sucker	W	O	S	T	95	118.75	43.18	10.34	16.31	87.05
Spotted Sucker	R	I	S		4	5.00	1.82	1.68	2.65	336.00
Common Carp	G	O	M	T	61	76.25	27.73	46.40	73.22	608.47
Goldfish	G	O	M	T	3	3.75	1.36	0.50	0.79	133.67
Golden Shiner	N	I	M	T	3	3.75	1.36	0.10	0.15	25.67
Bluntnose Minnow	N	O	C	T	1	1.25	0.45	0.00	0.01	3.00
Common Carp X Goldfish	G	O		T	1	1.25	0.45	0.48	0.75	382.00
Black Bullhead		I	C	P	24	30.00	10.91	1.77	2.79	58.92
Largemouth Bass	F	C	C		1	1.25	0.45	0.12	0.19	97.00
Green Sunfish	S	I	C	T	14	17.50	6.36	0.21	0.33	12.06
Bluegill Sunfish	S	I	C	P	1	1.25	0.45	0.10	0.16	81.00
Longear Sunfish	S	I	C	M	1	1.25	0.45	0.03	0.04	20.00
Mile Total					220	275.00		63.36		
Number of Species					13					
Number of Hybrids					1					

Appendix Table 4. Index of Biotic Integrity (IBI) metrics and scores for sites sampled in the Little Scioto River, 2007.

River Mile	Type	Date	Drainage area (sq mi)	Number of: Total species	Number of: Sunfish species	Number of: Sucker species	Number of: Intolerant species	Percent of Individuals: Rnd-bodied suckers	Percent of Individuals: Simple Lithophils	Percent of Individuals: Tolerant fishes	Percent of Individuals: Omni-vores	Percent of Individuals: Top carnivores	Percent of Individuals: Insect-ivores	DELT anomalies	Rel.No. minus tolerants /(1.0 km)	IBI	Modified Iwb
Little Scioto River - (02-158)																	
Year: 2007																	
6.50	A	07/30/2007	86	12(3)	4(5)	3(3)	0(1)	4(1)	43(3)	51(1)	67(1)	4(1)	29(3)	5.2(1)	241(3)	26	8.0
6.50	A	09/28/2007	86	13(3)	3(3)	2(1)	0(1)	1(1)	39(3)	59(1)	48(1)	1(1)	50(3)	0.0(5)	191(1)	24	7.2
5.70	A	07/31/2007	89	13(3)	4(5)	3(3)	0(1)	3(1)	34(3)	66(1)	46(1)	4(1)	47(3)	6.3(1)	186(1)	24	7.0
5.70	A	09/28/2007	89	13(3)	4(5)	2(1)	0(1)	1(1)	34(3)	79(1)	54(1)	6(3)	37(3)	2.0(3)	85(1)	26	6.2
4.40	A	07/31/2007	95	9(1)	2(3)	2(1)	0(1)	3(1)	61(5)	79(1)	67(1)	2(1)	28(3)	0.0(5)	63(1)	24	5.8
4.40	A	09/27/2007	95	9(1)	1(1)	2(1)	0(1)	7(1)	64(5)	85(1)	76(1)	1(1)	17(1)	5.5(1)	51(1)	16	5.6
2.70	A	07/31/2007	103	8(1)	1(1)	2(1)	0(1)	2(1)	43(3)	78(1)	70(1)	9(3)	20(1)	4.8(1)	68(1)	16	5.6
2.70	A	09/27/2007	103	9(1)	3(3)	2(1)	0(1)	1(1)	48(3)	85(1)	77(1)	1(1)	22(1)	9.5(1)	38(1)	16	4.8

♦ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

Appendix Table 4. Index of Biotic Integrity (IBI) metrics and scores for sites sampled in the Little Scioto River, 2007.

River Mile	Type	Date	Drainage area (sq mi)	Number of: Total species	Sunfish species	Sucker species	Intolerant species	Darter species	Percent of Individuals: Simple Lithophils	Tolerant fishes	Omni-vores	Top carnivores	Insect-ivores	DELT anomalies	Rel.No. minus tolerants /(0.3km)	IBI	Modified Iwb
Little Scioto River - (02158)																	
Year: 2007																	
9.20	D	07/30/2007	72	22(5)	4(5)	3(3)	1(1)	5(5)	25(3)	59(1)	54(1)	4.6(3)	38(3)	0.0(5)	181(1)	36	7.7
9.20	D	09/27/2007	72	20(3)	4(5)	3(3)	1(1)	4(3)	14(1)	56(1)	51(1)	5.0(3)	38(3)	1.0(3)	179(1)	28	7.1

na - Qualitative data, Modified Iwb not applicable.

♦ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

Appendix Table 5. Ohio EPA macroinvertebrate results from the Little Scioto River, 2007.

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Site: Little Scioto River
Hillman Ford Rd.

Collection Date: 09/04/2007 River Code: 02-158 RM: 9.20

Taxa Code	Taxa	Quant/Qual
00401	*Spongillidae*	+
01200	*Cordylophora lacustris*	1
01320	*Hydra sp*	9
01801	*Turbellaria*	78 +
03600	*Oligochaeta*	24 +
06201	*Hyalella azteca*	+
08250	*Orconectes (Procericambarus) rusticus*	+
08601	*Hydrachnidia*	+
11020	*Acerpenna pygmaea*	11 +
11120	*Baetis flavistriga*	14 +
11130	*Baetis intercalaris*	565 +
12200	*Isonychia sp*	26
13000	*Leucrocuta sp*	1 +
13400	*Stenacron sp*	268 +
13561	*Maccaffertium pulchellum*	39 +
17200	*Caenis sp*	1
21200	*Calopteryx sp*	+
21300	*Hetaerina sp*	+
22001	*Coenagrionidae*	+
22300	*Argia sp*	10 +
47600	*Sialis sp*	+
50315	*Chimarra obscura*	459 +
52200	*Cheumatopsyche sp*	474 +
52430	*Ceratopsyche morosa group*	29 +
52530	*Hydropsyche depravata group*	70 +
57400	*Neophylax sp*	+
59970	*Petrophila sp*	+
68075	*Psephenus herricki*	1 +
68601	*Ancyronyx variegata*	3
68901	*Macronychus glabratus*	182 +
69400	*Stenelmis sp*	21 +
74100	*Simulium sp*	4
77500	*Conchapelopia sp*	23 +
78350	*Meropelopia sp*	2
78450	*Nilotanypus fimbriatus*	2
80360	*Corynoneura "celeripes" (sensu Simpson & Bode, 1980)*	4
80370	*Corynoneura lobata*	32
81231	*Nanocladius (N.) crassicornus or N. (N.) "rectinervis"*	2
81825	*Rheocricotopus (Psilocricotopus) robacki*	2
84450	*Polypedilum (Uresipedilum) flavum*	75 +
84460	*Polypedilum (P.) fallax group*	3
84470	*Polypedilum (P.) illinoense*	+
85625	*Rheotanytarsus sp*	45 +
85821	*Tanytarsus glabrescens group sp 7*	9
87540	*Hemerodromia sp*	1
93900	*Elimia sp*	4 +
95100	*Physella sp*	4
98600	*Sphaerium sp*	2 +

No. Quantitative Taxa: 37 Total Taxa: 48
No. Qualitative Taxa: 32 ICI: **46**
Number of Organisms: 2500 Qual EPT: 11

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Site: Little Scioto River
dst. Holland Rd.

Collection Date: 09/04/2007 River Code: 02-158 RM: 6.50

Taxa Code	Taxa	Quant/Qual		Taxa Code	Taxa	Quant/Qual
01320	*Hydra sp*	3				
01801	*Turbellaria*	1	+			
03600	*Oligochaeta*	512	+			
04664	*Helobdella stagnalis*	5				
04666	*Helobdella triserialis*	3				
04686	*Placobdella papillifera*	1				
04935	*Erpobdella punctata punctata*	1				
08601	*Hydrachnidia*	1				
11200	*Callibaetis sp*		+			
22001	*Coenagrionidae*		+			
45100	*Palmacorixa sp*		+			
51206	*Cyrnellus fraternus*		+			
51400	*Nyctiophylax sp*	1				
65800	*Berosus sp*		+			
68601	*Ancyronyx variegata*	1				
68708	*Dubiraphia vittata group*	1	+			
77001	*Tanypodinae*	1				
78655	*Procladius (Holotanypus) sp*		+			
82700	*Chironomus sp*	5				
82820	*Cryptochironomus sp*		+			
83002	*Dicrotendipes modestus*	45	+			
83040	*Dicrotendipes neomodestus*	1				
83045	*Dicrotendipes nervosus*	2				
83051	*Dicrotendipes simpsoni*		+			
83300	*Glyptotendipes (G.) sp*	5	+			
84540	*Polypedilum (Tripodura) scalaenum group*	22	+			
84790	*Tribelos fuscicorne*	3	+			
84800	*Tribelos jucundum*	3				
85500	*Paratanytarsus sp*	1				
85625	*Rheotanytarsus sp*	1				
95100	*Physella sp*	1				
96120	*Menetus (Micromenetus) dilatatus*	1				

No. Quantitative Taxa: 24 Total Taxa: 32
No. Qualitative Taxa: 15 ICI: **10**
Number of Organisms: 621 Qual EPT: 2

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Site: Little Scioto River
St. Rt. 95

Collection Date: 09/04/2007 River Code: 02-158 RM: 5.70

Taxa Code	Taxa	Quant/Qual
00401	*Spongillidae*	+
01320	*Hydra sp*	728 +
01801	*Turbellaria*	54 +
03360	*Plumatella sp*	+
03600	*Oligochaeta*	631 +
04666	*Helobdella triserialis*	23
06700	*Crangonyx sp*	+
08200	*Orconectes sp*	+
11130	*Baetis intercalaris*	1 +
13400	*Stenacron sp*	31
17200	*Caenis sp*	4
22001	*Coenagrionidae*	18 +
22300	*Argia sp*	63 +
27500	*Somatochlora sp*	+
45400	*Trichocorixa sp*	+
47600	*Sialis sp*	+
52200	*Cheumatopsyche sp*	49 +
52430	*Ceratopsyche morosa group*	+
68601	*Ancyronyx variegata*	2
68700	*Dubiraphia sp*	1
69400	*Stenelmis sp*	1
74501	*Ceratopogonidae*	+
74650	*Atrichopogon sp*	+
77120	*Ablabesmyia mallochi*	12
77130	*Ablabesmyia rhamphe group*	85
77500	*Conchapelopia sp*	12
80370	*Corynoneura lobata*	8
80510	*Cricotopus (Isocladius) sylvestris group*	12
81200	*Nanocladius sp*	35
82121	*Thienemanniella lobapodema*	4
82730	*Chironomus (C.) decorus group*	47 +
83002	*Dicrotendipes modestus*	484 +
83040	*Dicrotendipes neomodestus*	73 +
83300	*Glyptotendipes (G.) sp*	12
83840	*Microtendipes pedellus group*	12
84450	*Polypedilum (Uresipedilum) flavum*	24 +
84470	*Polypedilum (P.) illinoense*	73 +
84520	*Polypedilum (Tripodura) halterale group*	+
84540	*Polypedilum (Tripodura) scalaenum group*	121 +
84790	*Tribelos fuscicorne*	12 +
85500	*Paratanytarsus sp*	+
85625	*Rheotanytarsus sp*	12
85821	*Tanytarsus glabrescens group sp 7*	24
94400	*Fossaria sp*	+
95100	*Physella sp*	+
95501	*Planorbidae*	4
96900	*Ferrissia sp*	48
97601	*Corbicula fluminea*	1
98600	*Sphaerium sp*	20

No. Quantitative Taxa: 35 Total Taxa: 49
No. Qualitative Taxa: 28 ICI: **18**
Number of Organisms: 2741 Qual EPT: 3

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Site: Little Scioto River
Keener Pike

Collection Date: 09/04/2007 River Code: 02-158 RM: 4.40

Taxa Code	Taxa	Quant/Qual
00401	*Spongillidae*	+
01320	*Hydra sp*	99
01801	*Turbellaria*	47 +
03600	*Oligochaeta*	64 +
04666	*Helobdella triserialis*	+
04682	*Placobdella montifera*	+
04935	*Erpobdella punctata punctata*	2
06201	*Hyalella azteca*	+
06700	*Crangonyx sp*	18 +
11130	*Baetis intercalaris*	9
13400	*Stenacron sp*	14
22001	*Coenagrionidae*	+
22300	*Argia sp*	5 +
23700	*Anax sp*	+
23909	*Boyeria vinosa*	+
45400	*Trichocorixa sp*	+
60900	*Peltodytes sp*	+
68601	*Ancyronyx variegata*	1
68708	*Dubiraphia vittata group*	+
77130	*Ablabesmyia rhamphe group*	137 +
77470	*Coelotanypus sp*	+
78655	*Procladius (Holotanypus) sp*	+
80370	*Corynoneura lobata*	4
82730	*Chironomus (C.) decorus group*	+
83002	*Dicrotendipes modestus*	1431 +
83040	*Dicrotendipes neomodestus*	20
83410	*Harnischia curtilamellata*	+
84470	*Polypedilum (P.) illinoense*	+
84520	*Polypedilum (Tripodura) halterale group*	+
84540	*Polypedilum (Tripodura) scalaenum group*	451 +
84790	*Tribelos fuscicorne*	118 +
85821	*Tanytarsus glabrescens group sp 7*	20
96120	*Menetus (Micromenetus) dilatatus*	11
96900	*Ferrissia sp*	34
97601	*Corbicula fluminea*	+

Taxa Code	Taxa	Quant/Qual

No. Quantitative Taxa: 18 Total Taxa: 35
No. Qualitative Taxa: 25 ICI: **14**
Number of Organisms: 2485 Qual EPT: 0

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Site: Little Scioto River
dst. Rockswale Ditch

Collection Date: 09/04/2007 River Code: 02-158 RM: 2.70

Taxa Code	Taxa	Quant/Qual		Taxa Code	Taxa	Quant/Qual
00800	*Spongilla sp*		+			
01320	*Hydra sp*	9				
01801	*Turbellaria*	42	+			
03600	*Oligochaeta*	106	+			
04666	*Helobdella triserialis*	1	+			
04682	*Placobdella montifera*		+			
06700	*Crangonyx sp*		+			
22001	*Coenagrionidae*		+			
22300	*Argia sp*	3	+			
27307	*Epitheca (Epicordulia) princeps*		+			
68708	*Dubiraphia vittata group*		+			
77130	*Ablabesmyia rhamphe group*	61	+			
78655	*Procladius (Holotanypus) sp*		+			
82730	*Chironomus (C.) decorus group*	76				
83002	*Dicrotendipes modestus*	973	+			
83040	*Dicrotendipes neomodestus*	15				
84520	*Polypedilum (Tripodura) halterale group*	15				
84540	*Polypedilum (Tripodura) scalaenum group*	486	+			
84790	*Tribelos fuscicorne*	61	+			
85821	*Tanytarsus glabrescens group sp 7*	61				
95100	*Physella sp*	1				

No. Quantitative Taxa: 14 Total Taxa: 21
No. Qualitative Taxa: 15 ICI: **10**
Number of Organisms: 1910 Qual EPT: 0

Appendix Table 6. Invertebrate Community Index (ICI) metrics and scores for sites sampled in the Little Scioto River, 2007.

River Mile	Drainage Area (sq mi)	Number of				Percent:					Qual. EPT	Eco-region	ICI
		Total Taxa	Mayfly Taxa	Caddisfly Taxa	Dipteran Taxa	Mayflies	Caddis-flies	Tany-tarsini	Other Dipt/NI	Tolerant Organisms			
Little Scioto River (02-158)													
Year: 2007													
9.20	72.5	37(4)	8(4)	4(6)	13(2)	37.0(6)	41.3(6)	2.2(2)	10.9(6)	1.2(6)	11(4)	5	46
6.50	86.0	24(2)	0(0)	1(2)	11(2)	0.0(0)	0.2(2)	0.3(2)	99.2(0)	82.6(0)	2(0)	5	10
5.70	89.0	35(4)	3(2)	1(2)	18(4)	1.3(2)	1.8(2)	1.3(2)	92.5(0)	29.6(0)	3(0)	5	18
4.40	95.0	18(2)	2(0)	0(0)	7(2)	0.9(2)	0.0(0)	0.8(2)	98.0(0)	3.9(6)	0(0)	5	14
2.70	103.0	14(2)	0(0)	0(0)	8(2)	0.0(0)	0.0(0)	3.2(2)	96.6(0)	9.6(4)	0(0)	5	10