State of Ohio
Environmental Protection Agency

Division of Surface Water

Biological and Water Quality Study of the Portsmouth Gaseous Diffusion Plant Streams

Pike County

November 17, 2006

Bob Taft, Governor
Joseph P. Koncelik, Director

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Little Beaver Creek
Big Beaver Creek
Big Run
West Ditch
Scioto River

2005

Pike County, Ohio
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State of Ohio Environmental Protection Agency
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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.

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

Since the publication of the preceding guidance documents, the following new publications by the Ohio EPA have become available. These publications should also be consulted as they represent the latest 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.

Rankin, E. T. 1995. The use of habitat assessments in water resource management programs, pp. 181-208. 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. Biological criteria program development and implementation in Ohio, pp. 109-144. 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. Biological response signatures and the area of degradation value: new tools for interpreting multimetric data, pp. 263-286. 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. 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) 836-8777

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

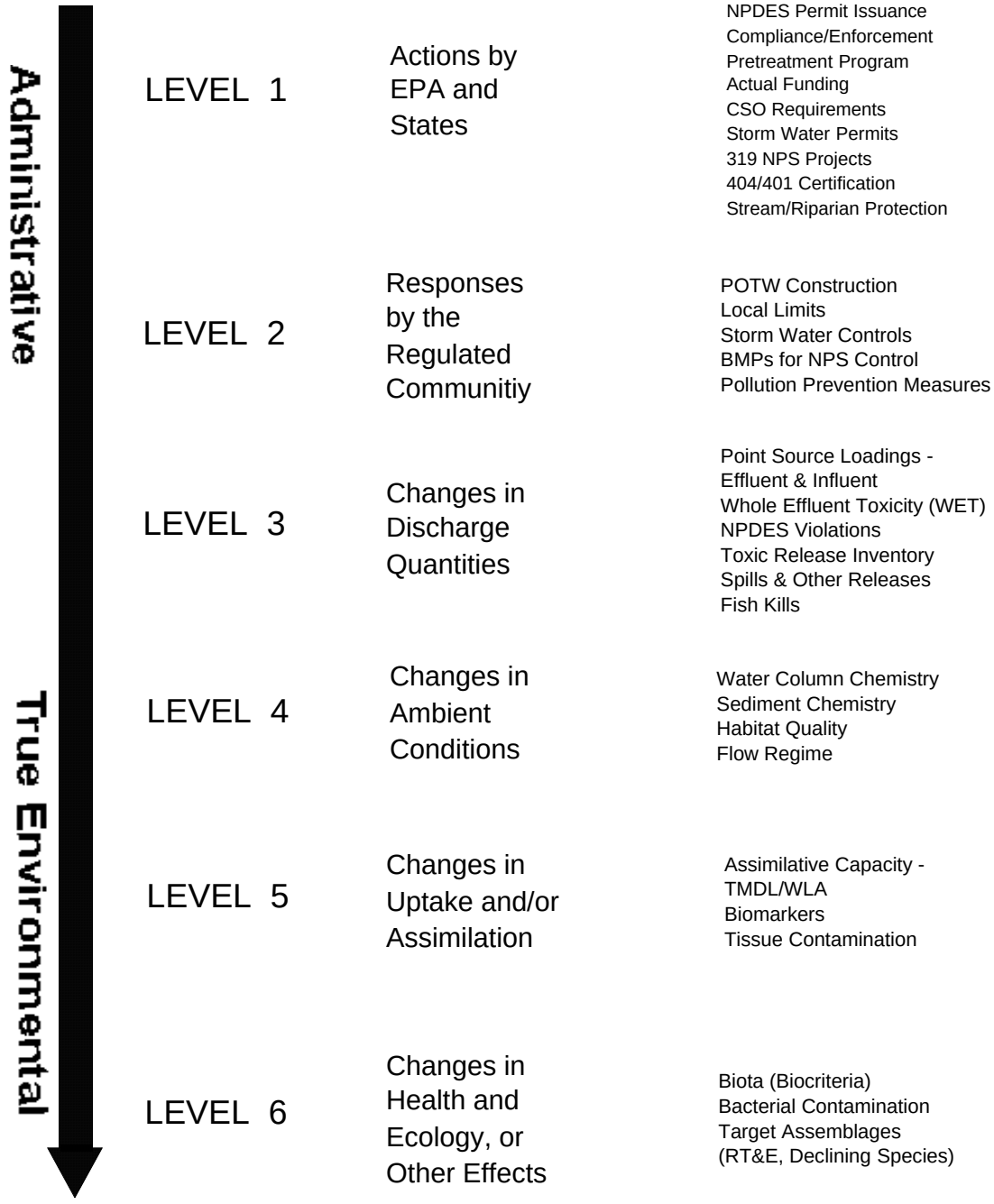

Figure 3. Hierarchy of administrative and environmental indicators which can be used for water quality management activities such as monitoring and assessment, reporting, and the evaluation of overall program effectiveness. This is patterned after a model developed by the U.S. EPA.

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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Report preparation and analysis: David Altfater, Mike Gray
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INTRODUCTION

The Portsmouth Gaseous Diffusion Plant (PORTS), located near Piketon, Ohio, began operations in 1954 as part of a U.S. government expansion program for the production of highly enriched uranium to fuel military reactors (U.S. Navy) and nuclear weapons production. Later, the facility took on a different mission: the production of low-enriched uranium to fuel commercial nuclear power plants. The plant is owned by the U.S. Department of Energy (USDOE) and leased and operated by the United States Enrichment Corporation (USEC). The plant is located on 3,714 acres. Production for the U.S. Navy ceased in 1991. USEC took over operations from Martin Marietta in 1993. The operation was privatized in 1998. In May 2001, USEC ceased uranium enrichment operations at PORTS, and consolidated operations at their Paducah facility. Today, the USEC mission at the PORTS facility is three-fold:

- Perform external contract work, including cold-standby, uranium deposit removal and winterization services,
- Provide operational and administrative support functions, and
- Decontaminate uranium feed material for DOE.

USEC has oversight of eight direct discharges to surface waters on or surrounding the PORTS property, including four discharges to Little Beaver Creek (outfalls 001, 005, 009, and 011), two discharges to the Scioto River (outfalls 003 and 004), one discharge to Big Run (outfall 002), and one discharge to West Ditch (outfall 010). The U.S. Department of Energy has three direct discharges to surface waters (outfalls 012, 013, and 015) and these are all related to remedial activities being carried out at PORTS. Discharge locations are noted in figure 2.

During 2005, Ohio EPA conducted a water resource assessment of streams on and surrounding the PORTS property. Included in this assessment was the biological condition of area streams, including Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River. Additionally, the survey involved collecting surface water, sediment, and fish tissue samples to assess chemical and radiological quality of the water resources. A total of 16 stations were sampled in the five streams.

Specific objectives of the evaluation were to:

- establish the present biological conditions in Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River in the vicinity of the PORTS facility by evaluating fish and macroinvertebrate communities,
- identify the relative levels of organic, inorganic, and radiological parameters in the sediments, surface water, and fish of the above referenced streams,
- evaluate influences from PORTS outfalls to streams,
- determine the attainment status of the Warmwater Habitat aquatic life use designation for area streams, and
- compare present results with historical conditions, particularly 1997.

The PORTS facility and surrounding waterbodies are located in the Western Allegheny Plateau (WAP) ecoregion. Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River are currently assigned the Warmwater Habitat (WWH) aquatic life used designation in the Ohio Water Quality Standards (WQS).

SUMMARY

Little Beaver Creek

Little Beaver Creek was assessed at five locations along a 3.3 mile length of stream. Within this segment, the lower 2.8 miles was fully attaining the Warmwater Habitat aquatic life biocriteria. The lower 1.9 miles were characteristic of exceptional biological quality. The background sampling location, located upstream from the PORTS 001 and 015 outfalls (X-230J-7 East Holding Pond and X-624 Groundwater Treatment), was not attaining the WWH biocriteria. This area of stream is typically characterized by shallow isolated pools during the summer/fall low flow time of year. This intermittent flow condition was the principal factor in the failure to achieve the WWH biocriteria. Improved biological conditions were observed at RM 3.1, a site located immediately downstream from the 001 and 015 outfalls. Although biological conditions were only partially attaining the WWH biocriteria at RM 3.1, substantial improvement did occur from the upstream background location. The contribution of over 1.5 million gallons per day (MGD) of flow into Little Beaver Creek from the 001 and 015 discharges has improved biological diversity in Little Beaver Creek. An evaluation of surface water chemical results revealed copper exceedances of the Ohio WQS criterion at two locations downstream from the 001, 011, and 015 outfalls. These exceedances were largely a result of the low hardness values reported in Little Beaver Creek. Radiological results in surface water documented elevated technetium^{99} in Little Beaver Creek compared with project background levels; however, these values were all far below ecological screening benchmarks. Overall radiological results in Little Beaver Creek surface water indicate that dose amounts were within acceptable levels for protection of aquatic biological communities. Elevated PAHs in sediments were recorded at two sites in Little Beaver Creek, RMs 2.4 and 1.4. These conditions did not affect biological communities, as these sites were fully attaining biological criteria. It should be noted that fine grained sediment material, which is typically collected for testing, was nearly absent in Little Beaver Creek. Thus, sediment chemical concentrations in Little Beaver Creek are not a true reflection of the entire stream bottom, and the potential exposure to aquatic organisms. Sediment radiological results revealed elevated levels of technetium^{99}, total uranium, and isotope uranium in Little Beaver Creek. Results for technetium^{99} and isotope uranium were below ecological screening levels. Trends in sediment technetium^{99} levels show a substantial decline from 1992 to 2005 in Little Beaver Creek. An evaluation of effluent discharges to Little Beaver Creek documented low levels of contaminants, both radiological and non-radiological. Both whole body and fillet samples of fish were tested from Little Beaver Creek. Radiological levels were not substantially elevated in Little Beaver Creek fish. Elevated total PCBs were noted in Little Beaver Creek fish tissue samples both on and off the PORTS facility. Two fish fillet samples exceeded the Ohio Consumption Advisory level of one meal per week. Three whole body tissue samples exceeded WQS criterion for protection against adverse reproductive effects on wildlife.

Big Beaver Creek

Biological communities were assessed at four locations (RMs 5.6, 2.3, 1.8, and 1.3) in Big Beaver Creek, two upstream and two downstream from the Little Beaver Creek confluence. Three of the four sites were fully attaining the Warmwater Habitat aquatic life biocriteria. The fourth site was partially attaining the WWH biocriteria – this site was located upstream from Little Beaver Creek and lacked a riffle area and flows were interstitial. Natural conditions (interstitial flows) caused the macroinvertebrate community to only attain fair quality. PORTS effluent water discharged via Little Beaver Creek improves flow conditions in Big Beaver Creek. Surface water chemical and radiological results from Big Beaver Creek were indicative of good water quality. No exceedances of WQS criteria were noted, and radiological measurements were below project background values and ecological screening benchmarks. Sediment test results revealed low levels of metals, organic, and radiological parameters at all four sites. Whole body fish tissue results did reveal an increase in total PCB levels downstream from the confluence of Little Beaver Creek; however, all samples were below the Ohio WQS criterion for protection against adverse reproductive effects on wildlife.

Big Run

Biological communities were assessed at three locations (RMs 4.8, 4.3, and 4.0) in Big Run. The most upstream sampling location (RM 4.8) was in non-attainment of the Warmwater Habitat aquatic life biocriteria. The sampling site at the PORTS property boundary (RM 4.3) was in partial attainment of the

WWH biocriteria, and the most downstream location (one mile downstream from the source of Big Run) was fully attaining the WWH aquatic life biocriteria. Fish communities at all three sites were fully achieving the biocriteria, while macroinvertebrate communities at the two most upstream stations were indicative of poor and fair quality, respectively. The poor and fair macroinvertebrate community was reflective of organic enrichment impairment. These sites were located immediately downstream from the PORTS 002 outfall impoundment (X-230K South Holding Pond), which contributes 100 percent of the stream flow during summer/fall low flow conditions. Although the pond discharge is not monitored for nutrients or ammonia, visual observations during biological sampling at RM 4.8 noted that the stream bottom was covered with a black slime film and pools had deposits of a black sludge-like material. Surface water chemical results were characteristic of good water quality. Although ammonia-N was not measured in Big Run during this study, compliance sampling by Ohio EPA during October, 2005 recorded low ammonia-N, nutrients, and bacteriological results at the 002 outfall area (Appendix Table 21). Effluent data for outfall 002 were generally within acceptable water quality levels; however, two chemicals (thallium and silver) did exceed permit limits and Ohio WQS criteria. Surface water test results for radiological parameters indicated that dose amounts were within acceptable levels for protection of aquatic biological communities. Sediment test results indicated low levels of metals and most organic chemicals; total PCBs were slightly elevated at the most upstream sampling location. Radiological results from sediment samples indicated that uranium isotopes (234, 235, 238) were elevated compared with project background levels, however, results were below ecological screening benchmarks. Additionally, gross alpha and total uranium were elevated in Big Run sediments compared to background levels, but these elevated values did not contribute to the biological impairment noted in Big Run. Fish tissue monitoring for whole body samples from Big Run revealed low or undetectable radiological parameters. Fish fillet samples were not collected from Big Run, which lacked fish species of edible size. Elevated PCBs were recorded in all whole body fish samples (110 -180 ug/kg), however, concentrations were below the Ohio WQS criterion for protection against adverse reproductive effects on wildlife.

West Ditch

West Ditch was evaluated at one site, located at the PORTS site boundary. Biological communities at this location were partially attaining the Warmwater Habitat biocriteria. Although the fish community was reflective of good water quality and achieving the WWH biocriterion, the macroinvertebrate community was in the fair range. Measurement of surface water quality revealed one exceedance of the Ohio WQS aquatic life criterion for lead. The lead exceedance was largely driven by low hardness conditions in West Ditch (the lead criterion is adjustable to hardness conditions). Aside from the one lead exceedance, all other surface water measurements in West Ditch were characteristic of good water quality. Radiological parameters measured in stream water were all far below screening benchmark dose rates and below project background levels. Surface water test results for radiological parameters indicated that dose amounts were within acceptable levels for protection of aquatic biological communities. Sediment metals and most radiologicals were below ecological benchmarks or project background levels. Total uranium and PAH compounds were slightly elevated above background levels and screening benchmarks. These elevated levels in sediment were not considered significant to the condition of the biological communities. Overall biological quality in West Ditch has improved since the last sampling in 1992. Two effluent discharges from the PORTS facility occur in the headwaters of West Ditch. Combined, they contribute a median flow of 0.368 MGD to West Ditch, and contribute a majority of the flow in the upper section of the stream. Radiological parameters were at low or non-detected levels in the effluent discharges to West Ditch; however, total residual chlorine concentrations were at levels exceeding the Ohio WQS criterion. These chlorine levels would be expected to dissipate to undetectable levels at the PORTS boundary line located 0.7 miles downstream. Fish tissue monitoring for whole body samples from West Ditch revealed low or undetectable radiological parameters which were below project background levels. Fish fillet samples were not collected from West Ditch, which lacked fish species of edible size. Elevated PCBs were recorded in West Ditch whole body fish samples (270 and 380 ug/kg), however, concentrations were below the Ohio WQS criterion for protection against adverse reproductive effects on wildlife.

Scioto River

Biological communities in the Scioto River were fully attaining the Warmwater Habitat biocriteria, with conditions reflective of very good to exceptional quality. Surface water chemical quality was good, with

no exceedances of Ohio WQS criteria. Elevated pH values were noted in the Scioto River, but these did not negatively influence the river biology. Radiological parameters measured in river water were all far below screening benchmark dose rates and below project background levels. Surface water test results for radiological parameters indicated that dose amounts were within acceptable levels for protection of aquatic biological communities. Sediment test results indicated low levels of metals and most organic chemicals; total PCBs were slightly elevated at each Scioto River sampling location. Sediment radiological results for the Scioto River were far below ecological benchmarks, or at or below project background levels. Two PORTS effluent outfalls discharge directly to the Scioto River. The median volume of these two discharges is 1.1 million gallons per day, comprising less than one percent of the river flow under summer/fall low flow conditions. The highest technetium^{99} and total uranium concentrations in PORTS outfalls were reported in one of the Scioto River outfalls; however, these elevated effluent radiological levels would be diluted to low levels in the Scioto River mainstem. Fish tissue monitoring for whole body samples and fillet samples from the Scioto River revealed low or undetected radiological parameters which were below project background levels. Elevated total PCBs were noted in Scioto River fish tissue samples both upstream and downstream from the PORTS facility. One fish tissue sample, collected at RM 24.6, exceeded the Ohio WQS criterion for protection against adverse reproductive effects on wildlife.

CONCLUSIONS

Biological communities in the streams on and draining the PORTS facility were generally meeting Ohio's biological criteria for the protection of aquatic life. Three stream sites not meeting their aquatic life use were associated with natural conditions (i.e. lack of adequate surface water flow). Two stream sites on Big Run, not fully attaining Ohio's biological criteria, were associated with organically enriched water quality. One stream site (West Ditch) was partially impaired, due to unknown causes. Radiological parameters measured during this study were not a contributing factor to biological impairment. Radiologicals were measured at low dose rates, and were within acceptable levels for protection of aquatic biological communities. Although some sediment samples revealed elevated non-radiological chemicals in Little Beaver Creek and West Ditch, the lack of widespread fine-grained bottom substrates lessened contamination concerns. Biological communities have shown improvement over the last 12 years in all five streams. Elevated total PCB concentrations in fish tissue samples was noted in all five streams sampled, with considerable levels documented in Little Beaver Creek and the Scioto River. Three whole body fish samples from Little Beaver Creek exceeded the Ohio WQS criteria for protection against adverse reproductive effects on wildlife.

RECOMMENDATIONS

The current Warmwater Habitat aquatic life use designation should be maintained for Little Beaver Creek, Big Beaver Creek, Big Run, and West Ditch. The Scioto River shows the potential to attain the Exceptional Warmwater Habitat use designation, and should be further investigated when a more complete longitudinal study of the lower Scioto River is accomplished. Non-aquatic life uses of Agricultural Water Supply, Industrial Water Supply, and Primary Contact Recreation should be retained.

An evaluation of the source or sources of PCBs to the PORTS area streams should be conducted. Presently, there are unacceptable levels of PCBs in fish tissue collected from Little Beaver Creek.

Confirmatory sampling of thallium and silver levels in the PORTS 002 outfall (X-230K South Holding Pond) should be conducted. These two parameters have had exceedances of permit limits and, because this discharge comprises a significant amount of the flow in Big Run, can have an influence on stream quality.

West Ditch should be further analyzed to assess the unknown cause of partial attainment of the Warmwater Habitat aquatic life use designation.

Table 1. Aquatic life use attainment status for stations sampled in the PORTS project area, based on data collected July – October, 2005. 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. All streams are located in the Western Alleghany Plateau (WAP) ecoregion.

River Mile Sample Site Fish/Macroinvertebrate	Attainment Status	IBI	MIwb	ICI[a]	QHEI	Comments
Little Beaver Creek *(WWH)*						
3.3/ 3.3	NON	39*	NA	P*	61.0	Intermittent flow – very shallow pools
3.1/ 3.1	PARTIAL	52	NA	18*	79.0	
2.4/ 2.4	FULL	51	NA	34[ns]	76.5	
1.4/ 1.4	FULL	56	NA	46	77.5	Exceptional conditions
0.1/ 0/1	FULL	55	NA	48	82.0	Exceptional conditions
Big Beaver Creek *(WWH)*						
5.6/ 5.6	FULL	50	9.2	38	81.5	
2.3/ 2.3	PARTIAL	49	8.4	F*	63.0	Interstitial flow – no riffle
1.8/ 1.8	FULL	46	9.6	38	73.0	
1.3/ 1.3	FULL	47	9.5	42	74.0	
Big Run *(WWH)*						
4.8/ 4.8	NON	42[ns]	NA	8*	57.0	
4.3/ 4.3	PARTIAL	43[ns]	NA	30*	60.5	
4.0/ 4.0	FULL	45	NA	36	55.5	
West Ditch *(WWH)*						
1.2/ 1.2	PARTIAL	44	NA	28*	69.0	
Scioto River *(WWH)*						
29.0/ 29.0	FULL	48	9.8	50	79.0	Exceptional conditions
27.0/ 27.0	FULL	50	9.9	42	78.0	Exceptional/ Very Good
24.6/ 24.6	FULL	48	9.7	50	77.5	Exceptional conditions

Ecoregion Biocriteria: Western Alleghany Plateau (WAP)

INDEX - Site Type	WWH	EWH
IBI: Headwater - Wading/Boat	44/ 40	50/ 48
MIwb: Wading/ Boat	8.4/ 8.6	9.4/ 9.6
ICI	36	46

* 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).
a Narrative evaluation used in lieu of ICI (E=Exceptional; G=Good; MG=Marginally Good; F=Fair; P=Poor).
N/A Not Applicable. The MIwb is not applicable at headwater sites.

Table 2. Sampling locations at the PORTS water quality project, 2005. Type of sampling included fish community (F), macroinvertebrate community (M), sediment (S), surface water (W), fish tissue (T), and Datasonde© continuous water quality recorder (D).

Stream/ River Mile	Type of Sampling	Latitude	Longitude	Landmark
Little Beaver Creek				
3.3	F,M,S,W,T	39°00'53.4"	82°59'01.6"	Upstream X-230-J7 discharge, background
3.1	F,M,S,W,T	39°01'07.2"	82°59'06.2"	Downstream X-230-J7 discharge
2.4	F,M,S,W,T	39°01'36.1"	82°59'21.3"	Downstream Fog Road crossing
1.4	F,M,S,W,T	39°01'52.2"	83°00'18.6"	Downstream railroad culverts, dst. X-230L
0.1	F,M,S,W,T,D	39°01'57.5"	83°00'31.5"	Near mouth @ Wakefield Mound Road
Big Beaver Creek				
5.6	F,M,S,W,T	39°03'34.2"	82°59'55.1"	Shyville Road
2.3	F,M,S,W,T	39°02'02.4"	83°01'35.8"	Upstream Little Beaver Creek @ railroad bridge
1.8	F,M,S,W,T	39°01'50.2"	83°01'50.2"	Downstream Little Beaver Creek @ Valley Materials gravel
1.3	F,M,S,W,T,D	39°01'31.5"	83°02'10.1"	Old farm ford behind Diaz construction company
Big Run				
4.8	F,M,S,W,T	38°59'56.7"	82°59'56.5"	Downstream X-230-K pond discharge, dst. Hewes St.
4.3	F,M,S,W,T	38°59'34.8"	82°59'52.4"	@ Wilber property, near PORTS property line
4.0	F,M,S,W,T,D	38°59'17.6"	82°59'47.0"	Wakefield Road
West Ditch				
1.2	F,M,S,W,T,D	39°00'29.3"	83°01'23.8"	Wakefield Mound Road
Scioto River				
30.0	S,W	39°02'46.3"	83°03'02.4"	State Route 124
29.0	F,M,T	39°02'05.2"	83°02'43.3"	Downstream SR 124, upstream Big Beaver Cr. confluence
27.0	F,M,S,W,T	39°00'40.8"	83°03'07.5"	Downstream Big Beaver Creek, upstream PORTS outfalls
24.6	F,M,T	38°59'25.3"	83°02'02.7"	Downstream PORTS outfalls 003 and 004 discharges
23.4	S,W,D	38°58'35.6"	83°02'35.4"	Downstream PORTS outfalls 003 and 004 discharges

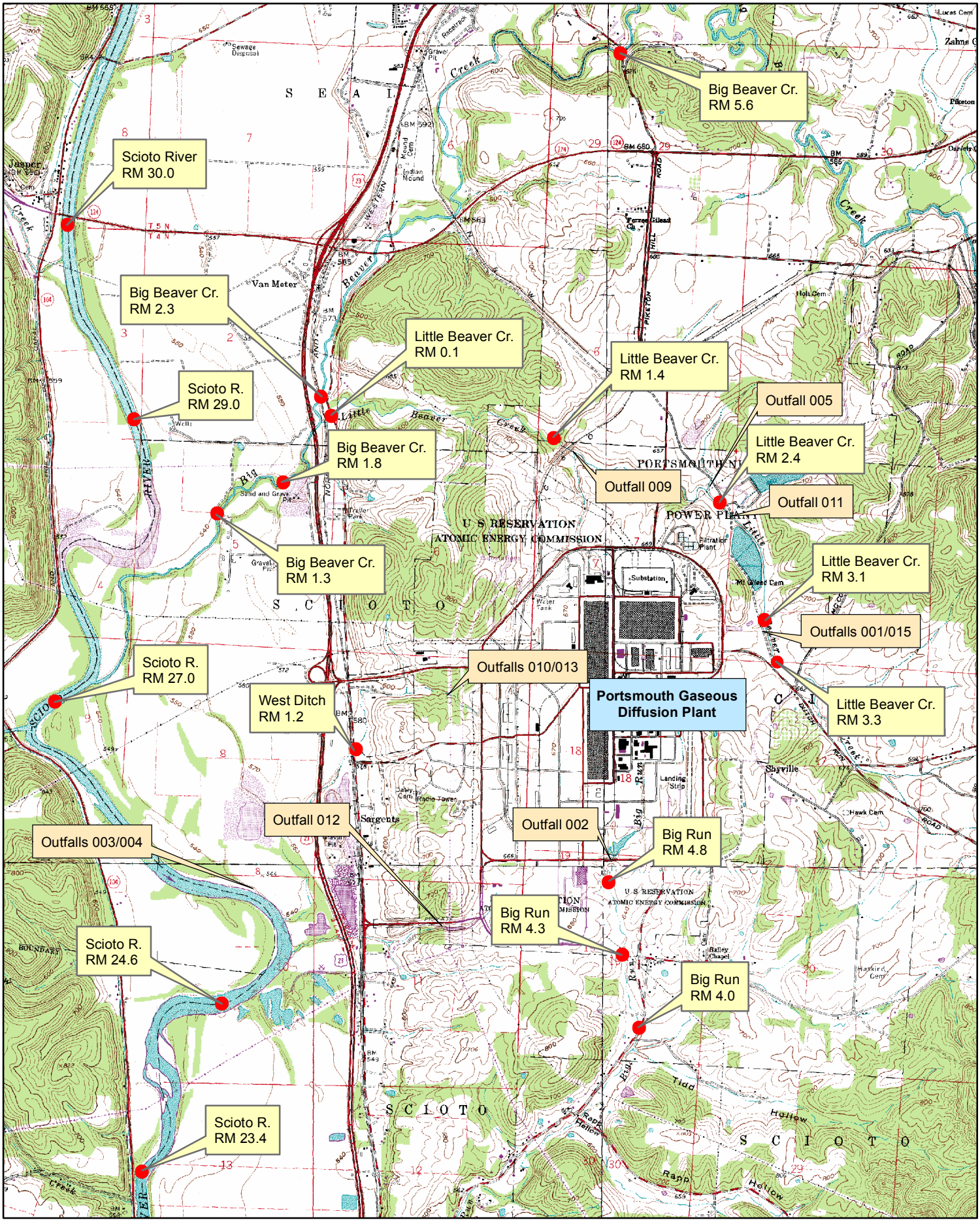


Figure 2 Water quality study sampling locations and effluent discharge points.
Portsmouth Uranium Enrichment Plant project area, 2005. Sampling points are located by river mile (RM).

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 2003a), Manual of Laboratory Operating Procedures, Volumes I-IV (Ohio EPA 2002), Biological Criteria for the Protection of Aquatic Life, Volumes II-III (Ohio Environmental Protection Agency 1987b, 1989a, 1989b) including errata updates, The Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Rankin 1989) for habitat assessment, Ohio EPA Sediment Sampling Guide and Methodologies (Ohio EPA 2001), and Ohio EPA Fish Collection Manual (Ohio EPA 2005).

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), the Qualitative Habitat Evaluation Index (QHEI), and a sampling location description. All biological results were compared to WWH biocriteria for the Western Allegheny Plateau ecoregion.

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

Sediment and Surface Water Assessment

Fine grain sediment samples were collected multi-incrementally in the upper four inches of bottom material at each location using decontaminated stainless steel scoops. Decontamination of sediment sampling equipment followed the procedures outlined in the Ohio EPA sediment sampling guidance manual (Ohio EPA 2001). Sediment incremental samples were homogenized in stainless steel pans, transferred into glass jars with teflon lined lids, placed on ice (to maintain 4^{o}C) in a cooler, and shipped to Ohio EPA Office of Federal Facilities Oversight (OFFO) contract labs (Eberline and GPL). Sediment data is reported on a dry weight basis. Surface water samples were collected directly into appropriate containers, preserved and delivered to Ohio EPA OFFO contract labs. Surface water samples were collected twice 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 2003a) or specified by the OFFO contract labs.

diurnal measurements of dissolved oxygen, pH, temperature, and conductivity. 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) and USEPA Region 5 Ecological Screening Levels - ESLs (2003), 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 14 of 16 PORTS stream 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). Due to marginal flow conditions, two sites were collected using only qualitative sampling. 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), including errata updates.

Fish Community Assessment

Fish were sampled twice at each site using pulsed DC electrofishing methods. The Scioto River was sampled using the boat electrofishing method, with sampling distances of 500 - 560 meters. All other sites were sampled using the wading method, and sampling distances varied between 100 and 200 meters. Fish were processed in the field, and included identifying each individual to species, counting, weighing (Scioto River and Big Beaver Creek sites only), 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).

Fish Tissue

Tissue fillet samples were collected from fish of edible size, and species collected for analysis included spotted bass, quillback carpsucker, common carp, freshwater drum, and channel catfish. When possible, composite samples (by species) were collected using a minimum of three fish and a minimum of 150 grams of material. At each sampling location, an attempt was made to collect two fish species for fillet tissue analysis. Fish were sampled using electrofishing wading or boat methods. Sampling locations are listed in Table 2.

Whole body fish samples were collected using adult fish of a size consumed by piscivorous birds and mammals. Species collected for analysis included longear sunfish, yellow bullhead, rockbass, green sunfish, northern hog sucker, spotted bass, bluegill, golden redhorse, white bass, smallmouth redhorse, and creek chub. Composite samples (by species) were collected using a minimum of three fish and at least 150 grams of material. At each sampling location, an attempt was made to collect two fish species for whole body analysis. Fish were sampled using electrofishing wading or boat methods. Because of the lack of adequate weight of whole body fish at some locations, several species of fish were composited together.

Fish samples used for fillet analysis were filleted in the field using decontaminated stainless steel fillet knives. Filleted samples were wrapped in aluminum foil, placed in a sealed plastic bag, and placed on dry ice. Whole body fish samples were wrapped in aluminum foil, placed in a sealed plastic bag, and placed on dry ice. Sampling and decontamination protocols followed those listed in the Ohio EPA Fish Collection Manual (2005); however, it is not necessary to clean aluminum foil which was used directly from the roll. Fish tissue samples were shipped to the OFFO contract labs, Eberline and GPL.

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 (2003a) and Biological Criteria for the Protection of Aquatic Life, Volume III (1989b). pH, conductivity, and dissolved

oxygen meters were calibrated daily before the start of field work. Datasonde© recorders were calibrated at the Ohio EPA Groveport Field Facility before placement in the field. 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 week during the field season. Calibration of pH, conductivity, dissolved oxygen, fish weighing scales, and laser rangefinders were recorded in a logbook maintained by Ohio EPA, Ecological Assessment Section.

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 August 29 and October 17, 2005 from 16 locations in PORTS area streams (Table 3, Appendix Tables 1 - 5). Surface water samples were analyzed for total analyte list inorganics (metals), total fluoride, total phosphorus, PCBs, volatile organic compounds, semivolatile organic compounds, and eleven radiological parameters. Parameters which were in exceedance of Ohio WQS criteria are reported in Table 3. DataSonde© water quality recorders were placed in each stream to monitor hourly levels of dissolved oxygen, pH, temperature, and conductivity. Measurements were conducted from September 6-9, 2005.

Organic chemicals, including PCBs, volatile organic compounds, and semivolatile organic compounds were measured at one location in each of the following streams: Little Beaver Creek (RM 1.4), Big Run (RM 4.3), and West Ditch (RM 1.2). These sampling locations were at or near the PORTS facility boundary. Analyses of PCBs and volatile organic compounds were all reported as not detected (Appendix Table 3). Aside from the chemical bis(2-ethylhexyl) phthalate, all analyses for semivolatile organic compounds were reported as not detected. Bis(2-ethylhexyl) phthalate is a common lab contaminant (Ohio EPA 2004) and the detected bis-2 surface water results are suspect.

Table 3. Exceedences of Ohio Water Quality Standards criteria (OAC3745-1) for chemical/physical parameters measured in the Scioto River, Big Beaver Creek, Little Beaver Creek, Big Run, and West Ditch, 2005.

Stream/River Mile	Parameter (value – ug/l)
Little Beaver Creek	
RM 3.3	None
RM 3.1	Copper (8.8J*)
RM 2.4	Copper (7.4J*)
RM 1.4	None
RM 0.1	None
Big Beaver Creek	
RM 5.6	None
RM 2.3	None
RM 1.8	None
RM 1.3	None
Big Run	
RM 4.8	None
RM 4.3	Bis(2-ethyhexyl) phthalate (29*)
RM 4.0	None
West Ditch	
RM 1.2	Lead (8.2J*)
Scioto River	
RM 29.0	None
RM 27.0	None
RM 23.4	None

* Exceedance of the aquatic life Outside Mixing Zone Average water quality criterion.
J Analyte positively identified, but is below the instrument reporting limit.

Total analyte list (TAL) metals were measured at 16 stream locations, with 23 parameters tested (Appendix Tables 1 and 2). Two copper values and one lead value exceeded the Ohio WQS aquatic life outside mixing zone average criteria. The two copper exceedances occurred in Little Beaver Creek downstream from the 001 effluent discharge and the lead exceedance occurred in West Ditch (Table 3). All three values were reported as estimated concentrations, since values were reported below the instrument reporting limit. In addition, the exceedances for both copper and lead were largely driven by the very low hardness (<100 mg/l) conditions recorded in both streams at the time of sampling. Aside from the above three exceedances, metals concentrations were very low at all stream sampling locations, with nearly half of the tested parameters less than lab detection limits. Metal parameters (excluding the above noted measurements) with detectable concentrations were below applicable Ohio WQS aquatic life criteria.

Fluoride–T was measured at each biological sampling location and phosphorus-T was measured at all sampling locations, excluding the Scioto River. Results for these two parameters are graphically presented in Figures 3 and 4. Neither parameter have aquatic life criteria listed in the Ohio WQS.

However, the Ohio WQS specify that total phosphorus shall be limited to the extent necessary to prevent nuisance growths of algae, weeds, and slimes that result in a violation of the water quality criteria set forth in paragraph (E) of rule 3745-1-04 of the Administrative Code. In addition, Ohio EPA have suggested phosphorus criteria of 0.10 mg/l for wadeable size streams (Ohio EPA 1999). Review of the fluoride stream data indicate no difference in background sites compared to sites located downstream from PORTS effluent discharges or sites receiving runoff from the PORTS facility. Total phosphorus concentrations at background sites were characteristic of regional reference conditions and below the suggested 0.10 mg/l phosphorus criteria. Of the 24 non-background samples noted in Figure 4, 20 were below the 0.10 mg/l suggested criteria and also within regional reference levels. Overall, phosphorus and fluoride levels were considered reflective of good water quality.

DataSonde© hourly monitoring results for dissolved oxygen, pH, and conductivity at five streams assessed in the study area are presented in Figures 5, 6, and 7. Stream flows were reflective of lower flow conditions typical for the fall. Dissolved oxygen measurements were indicative of good water quality, with all values above average WWH (5.0 mg/l) and EWH (6.0 mg/l) water quality criteria. Diurnal swings in D.O. were most pronounced in the Scioto River. Specific conductance hourly measurements (Figure 6) revealed a wide disparity between several streams. Levels in Little Beaver Creek, Big Beaver Creek, and West Ditch were low, and reflected the low level of ionic salts in the water column. Conductivity levels of these three waterbodies were within ecoregional reference conditions for headwater and wadeable streams (0.375-0.574 mS/cm). Higher conductivity levels in Big Run and the Scioto River were within normal stream levels. Monitoring of pH levels in the PORTS area streams revealed Little Beaver Creek, Big Beaver Creek, Big Run, and West Ditch within acceptable water quality conditions. All pH values recorded in the Scioto River (at RM 23.4) were above the upper range of the pH water quality criteria. These values did not appear to have a negative influence on stream biota. Fish and macroinvertebrate communities in the Scioto River were at very good to exceptional conditions.

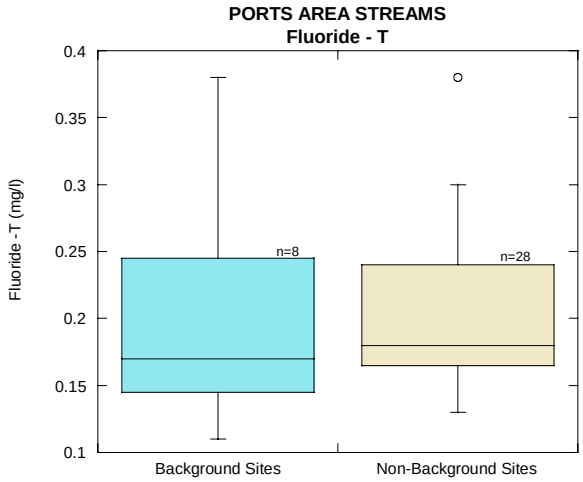


Figure 3. Box plots of total fluoride concentrations in surface water samples collected from Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River, 2005.

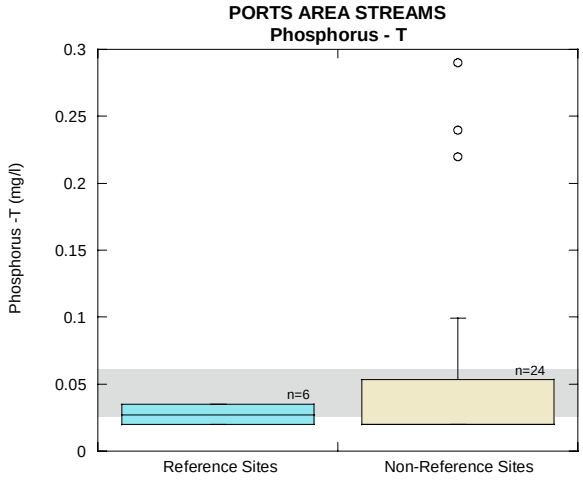


Figure 4. Box plots of total phosphorus concentrations in surface water samples collected from Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River, 2005. Shading represents the median and 75th percentile of reference sites in the WAP ecoregion for wadeable streams.

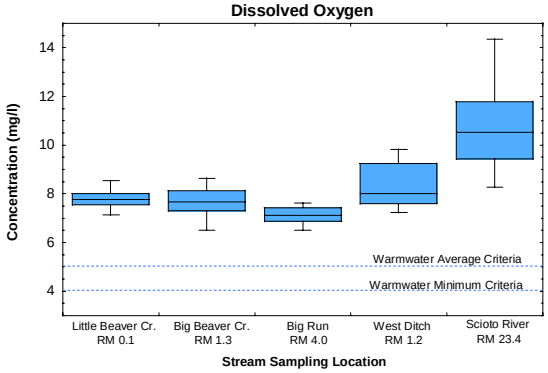


Figure 5. Box plots of hourly dissolved oxygen measurements from PORTS area streams, collected September 6-9, 2005. Aquatic life Warmwater Habitat water quality criteria are noted.

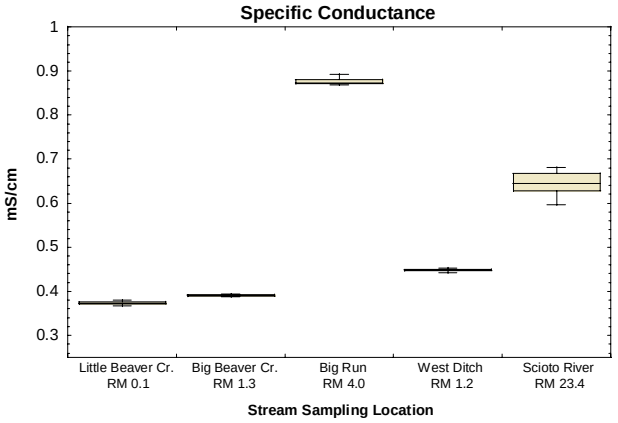


Figure 6. Box plots of hourly conductivity measurements from PORTS area streams, collected September 6-9, 2005.

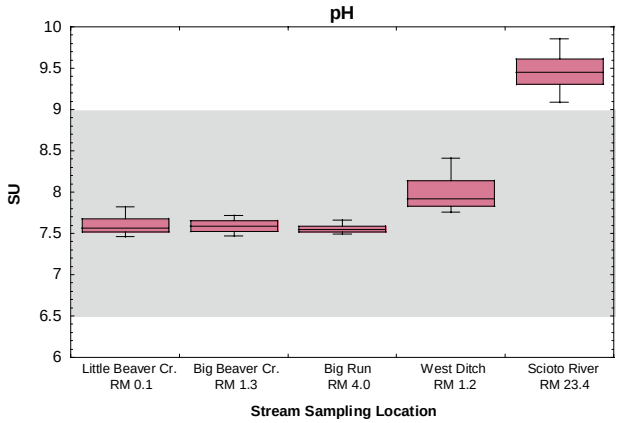


Figure 7. Box plots of hourly pH measurements from PORTS area streams, collected September 6-9, 2005. The shaded area represents the Ohio water quality criteria for the protection of aquatic life.

Radiological parameters were measured in surface water collected from Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River (Appendix Tables 4 and 5). The recommended acceptable dose rate to natural populations of aquatic biota is 1 rad/ day (NCRP 1991). Blaylock et. al. (1993) provide formulas and exposure factors for estimating the dose rates to representative aquatic organisms. Those formulas were used to calculate water and sediment concentrations that result in a total dose rate of 1 rad/ day to fish for selected radionuclides (USDOE 1998). These radiological benchmarks were intended for use at the U.S. Department of Energy's (DOE's) Oak Ridge Reservation and at the Portsmouth and Paducah gaseous diffusion plants as screening values only, to show the nature and extent of contamination and identify the need for additional site-specific investigation. Table 4 lists benchmark screening values (USDOE 1998) along with background concentrations for eight radiological parameters. Each radionuclide measured was screened against the benchmark by calculating a hazard quotient (HQ). The dose rate from an individual radionuclide exceeds the acceptable dose rate limit if the HQ is >1. The radiological benchmarks are normalized in an attempt to account for the biological effectiveness of the different types of radiation. This allows for the calculation of a surface water hazard index (HI), which is the sum of the HQs for the individual radionuclides in the surface water. The surface water HI is a measure of the total dose rate to the organism from surface water exposure.

Table 4. Comparison of maximum concentrations (pCi/l) of selected radiologicals to water screening benchmarks, by waterbody. Hazard quotient (HQ) is the radiological value divided by the benchmark value. The hazard index (HI) is the sum of the hazard quotients.

			Little Beaver Creek		Big Beaver Creek		Big Run		West Ditch		Scioto River	
Parameter	**Back-ground**	**Bench-mark**	**Max. Value**	**HQ**	**Max. Value**	**HQ**	**Max. Value**	**HQ**	**Max. Value**	**HQ**	**Max. Value**	**HQ**
Technetium-99	23.3	1.94e+06	38	1.9e-05	22.2	1.1e-05	25.3	1.3e-05	22	1.1e-05	20.1	1.0e-05
Uranium-234	0.99	4.37e+03	1.21	2.8e-04	0.311	7.1e-05	0.838	1.9e-04	0.824	1.9e-04	0.729	1.7e-04
Uranium-235	0.072	4.37e+03	0.108	2.5e-05	0.0355	8.1e-06	0.0913	2.1e-05	0.0788	1.8e-05	0.0744	1.7e-05
Uranium-238	0.863	4.55e+03	0.286	6.3e-05	0.176	3.9e-05	0.267	5.9e-05	0.441	9.7e-05	0.455	1.0e-04
Plutonium-238	<0.047	1.17e+03	<0.036	3.1e-05	<0.047	4.0e-05	<1.4	1.2e-03	<0.062	5.3e-05	<0.042	3.6e-05
Plutonium-239	<0.045	1.25e+03	<0.026	2.1e-05	<0.037	3.0e-05	<1.22	9.8e-04	<0.07	5.6e-05	<0.046	3.7e-05
Americium-241	<0.025	1.17e+03	<0.025	2.1e-05	<0.026	2.2e-05	<0.028	2.4e-05	<0.022	1.9e-05	<0.028	2.4e-05
Neptunium-237	<0.190	1.34e+03	<0.151	1.1e-04	<0.19	1.4e-04	0.0756	5.6e-05	<0.105	7.8e-05	0.0436	3.2e-05
		Surface Water HI		**5.7e-04**		**4.3e-04**		**2.4e-03**		**5.2e-04**		**4.3e-04**

Results of Ohio EPA surface water radiological testing during 2005 indicated low dose rates in comparison to benchmark screening values. All radiological parameters measured were orders of magnitude below the benchmarks for all five streams sampled. Comparison of stream radiologicals to background levels (Table 4) indicated similar results for nearly all parameters, except technetium^{99} and uranium^{234} in Little Beaver Creek. These two parameters were slightly above background during one of the two sampling events, but still far below ecological screening levels. Total uranium concentrations were all below the chronic toxicity benchmark value of 2.6 ug/l (Suter and Tsao 1996).

Gross alpha, gross beta, and total uranium measurements in surface water are presented in Figures 8, 9, and 10. Results for these constituents revealed similar or better results from all five streams when compared to background values.

Surface water test results for radiological parameters indicate that dose amounts were within acceptable levels for protection of aquatic biological communities.

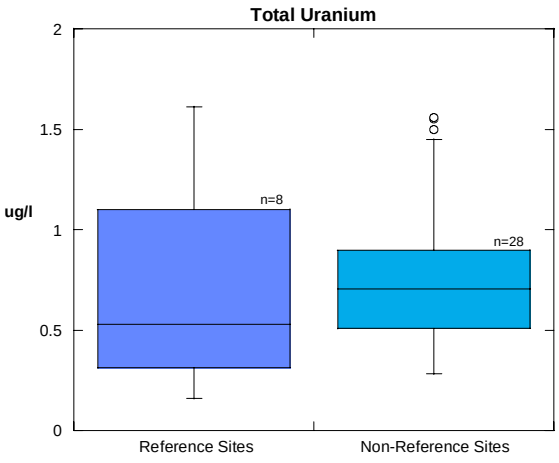


Figure 10. Box plots of total uranium concentrations in surface water samples collected from Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River, 2005.

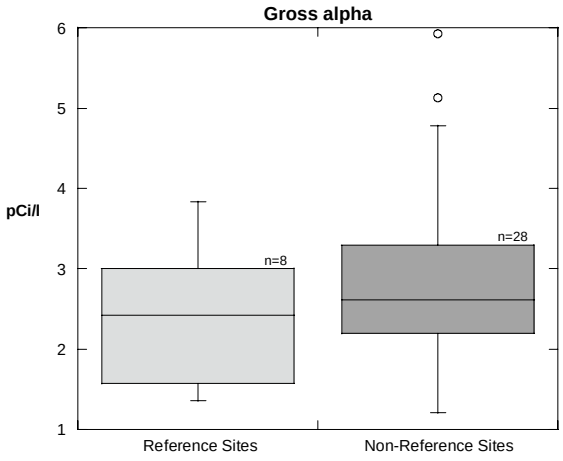


Figure 8. Box plots of gross alpha concentrations in surface water samples collected from Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River, 2005.

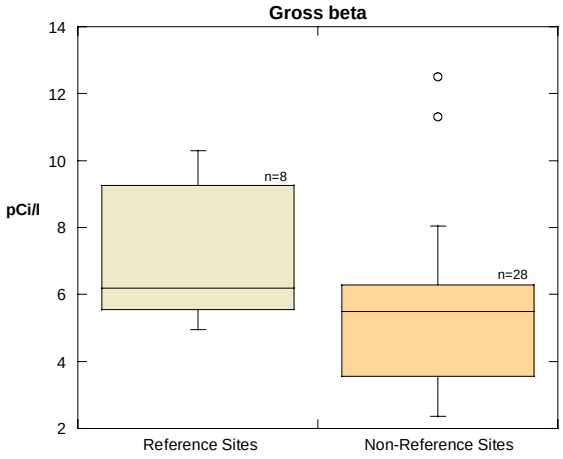


Figure 9. Box plots of gross beta concentrations in surface water samples collected from Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River, 2005.

Sediment Quality

Sediment samples were collected at 15 locations in PORTS area streams by the Ohio EPA in November, 2005. Sampling locations were co-located at biological sampling sites, with one location (Little Beaver Creek – RM 3.3) not sampled for sediment due to a lack of fine grained or sandy material. Intermittent stream flow conditions occurred at RM 3.3 during November, with small isolated pools of water overlying bedrock. All stream sampling locations are indicated by river mile in Figure 2. Samples were analyzed for volatile organic compounds (three locations only), semivolatile organic compounds, PCBs, total analyte list inorganics, and radiologicals. Specific chemical parameters tested and results are listed in Appendix Tables 6-10. Sediment data were evaluated using guidelines established in *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems* (MacDonald *et.al*. 2000), *Ohio Specific Sediment Reference Values (SRVs)* for metals (Ohio EPA 2003b), and *Radiological Benchmarks for Screening Contaminants of Potential Concern for Effects on Aquatic Biota at Oak Ridge National Laboratory, Oak Ridge, Tennessee* (USDOE 1998). 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. The USDOE sediment radiological benchmarks are used to calculate sediment concentrations that result in a total dose rate of 1 rad d-1 to fish for selected radionuclides (USDOE 1998).

Sediment samples were conservatively sampled by focusing on depositional areas of fine grain material. These areas typically are represented by higher contaminant levels, compared to sands and gravels. All sediment sampling sites were represented by only minor amounts of fine grained material, with many of the sites comprised of less than 5 percent acceptable material for testing. In particular, Little Beaver Creek sites were almost devoid of fine grain material, making it difficult to meet lab volume requirements for the tests performed.

Volatile organic compounds (VOCs) were measured at three stream locations (Little Beaver Creek, Big Run, West Ditch) near PORTS property lines. All VOC results were reported not detected at or above the laboratory detection limit. Total fluoride was measured at all stream locations where sediment was collected. Total fluoride was not detected in any sediment samples. Fluoride detection levels ranged between 1.2 and 2.0 mg/kg.

Detectable levels of metals, semivolatile organic compounds, and PCBs are presented in Table 5. Four metal parameters (cadmium, chromium, cobalt, copper) were noted at levels above either Ohio SRVs or TECs, but far below PEC values. Five additional metal parameters (arsenic, beryllium, nickel, vanadium, and zinc) reported detectable concentrations above ecological screening levels. However, reported concentrations of these parameters were questionable, based on lab qualified data. Qualifications included estimated values due to possible presence of interference, spiked sample recovery not within control limits, and duplicate analysis was not within control limits.

PCBs were documented in sediment samples collected from Little Beaver Creek, Big Run, West Ditch, and the Scioto River at all sampling locations (Table 5). Sampling results from Big Beaver Creek noted no detected PCBs upstream from Little Beaver Creek, and minor levels downstream from the confluence. Using ecological screening benchmarks, elevated PCBs were reported in Little Beaver Creek at RMs 2.4 and 1.4, Big Run at RM 4.8, and the Scioto River at all three sampling locations. All PCB concentrations were below Probable Effect Concentrations.

Semivolatile organic compounds were measured in sediments collected from all 15 sampling locations. Of these parameters, nine polycyclic aromatic hydrocarbons (PAHs) were measured at levels exceeding TEC or PEC benchmarks (Table 5). Highest PAH levels were reported in Little Beaver Creek and West Ditch. Five PAH compounds were above PEC guidelines in Little Beaver Creek, and the highest total PAH levels were reported at RMs 2.4 and 1.4. PAH concentrations in Big Beaver Creek, Big Run, and the Scioto River were within acceptable ecological levels.

Table 5. Select chemical compounds detected in sediment samples collected by Ohio EPA from Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River, November, 2005. Shaded numbers indicate values above the following: Ohio Sediment Reference Values (green), Threshold Effect Concentration - TEC (blue), and Probable Effect Concentration - PEC (red). Sampling locations are indicated by river mile (RM).

	Little Beaver Creek					Big Beaver Creek			
Parameter	**RM 3.3**	**RM 3.1**	**RM 2.4**	**RM 1.4**	**RM 0.1**	**RM 5.6**	**RM 2.3**	**RM 2.3** Duplicate	**RM 1.8**
Cadmium	NA	<0.025	0.85	0.53J	0.62	0.1J	0.15J	0.18J	0.23J
Chromium	NA	27.5	48.8	29.8	21.4	9.6	11.4	10.7	11.9
Cobalt	NA	18.2	23.4	17.2	16	9.3	9.4	9.6	9.5
Copper	NA	27.7	34.4	20.2	18.3	8.1	10.2	10.1	12.4
PCB – Total	NA	31	140	230	38	<27	<25	<26	17J
Anthracene	NA	85J	470J	570	140J	<550	<510	<510	<470
Benzo(a)anthracene	NA	250J	1300	1600	290J	<550	<510	<510	56J
Benzo(a)pyrene	NA	200J	960	1000	200J	<550	<510	<510	37J
Chrysene	NA	260J	1200	1300	250J	<550	<510	<510	49J
Dibenz(a,h)anthracene	NA	<600	<600	180J	<580	<550	<510	<510	<470
Fluoranthene	NA	620	3500	3300	620	<550	77J	<510	120J
Fluorene	NA	42J	250J	300J	56J	<550	<510	<510	<470
Phenanthrene	NA	420J	2900	2900	590	<550	<510	<510	74J
Pyrene	NA	520J	2300	2400	530J	<550	<510	<510	88J
Total PAHs	NA	2887	15,864	17,230	3188	<550	77J	<510	499J

	Big Beaver Creek	Big Run			West Ditch		Scioto River		
	RM 1.3	**RM 4.8**	**RM 4.3**	**RM4.0**	**RM 1.2**	**RM 1.2 Duplicate**	**RM 30.0**	**RM 27.0**	**RM 23.4**
Cadmium	0.26J	0.13J	<0.024	0.027J	0.14J	0.088J	0.34J	0.39J	0.23J
Chromium	12.1	21.2	23.1	20.5	13.5	16	12.4	10.3	9.2
Cobalt	10.2	20.6	25.7	18	9	9.6	7.3	7.5	6.1
Copper	11.7	30.3	17.8	15.2	15.6	16.4	18.2	15	12.4
PCB – Total	<28	200	33	44	37	32	68	330	187
Anthracene	<550	<720	<530	<590	100J	280J	99J	<510	<510
Benzo(a)anthracene	110J	<720	<530	<590	330J	690	110J	73J	52J
Benzo(a)pyrene	73J	<720	<530	<590	290J	620	130J	<510	66J
Chrysene	81J	<720	<530	<590	290J	770	140J	88J	59J
Dibenz(a,h)anthracene	<550	<720	<530	<590	<530	75J	<600	<510	<510
Fluoranthene	220J	<720	<530	<590	810	2000	250J	160J	120J
Fluorene	<550	<720	<530	<590	48J	160J	<600	<510	<510
Phenanthrene	160J	<720	<530	<590	580	1600	97J	63J	<510
Pyrene	150J	<720	<530	<590	650	1500	190J	130J	97J
Total PAHs	922J	<720	<530	<590	3914	9675	1386J	664J	524J

J – The analyte was positively identified, but the quantification was below the reporting limit.
< - Not detected at or above the reporting limit (RL value reported with the less than symbol).

Eleven radiological parameters were tested in sediment samples collected from PORTS area streams. Gross alpha, gross beta, technetium^{99}, total uranium, and uranium isotopes 234, 235, and 238 were measured at all sediment collection sites. Plutonium isotopes 238 and 239, americium^{241}, and neptunium^{237} were measured at background/reference sites and at PORTS streams near boundary areas. Maximum radiological concentrations, background levels, and ecological screening values are presented in Table 6. Plutonium$^{238 \text{ and } 239}$, americium^{241}, and neptunium^{237} measurements were below background and benchmark sediment concentrations, with all values below lab reporting limits. Uranium isotopes 234, 235, and 238 were elevated above background levels in Little Beaver Creek and Big Run, with values two to seven times above background. However, these elevated uranium isotope concentrations were far below ecological benchmarks (Table 6). Technetium^{99} measurements in Little Beaver Creek were elevated above background levels, with the highest concentration 14 times above background

Table 6. Comparison of maximum concentrations (pCi/g) of selected radiologicals to sediment screening benchmarks, by waterbody. Hazard quotient (HQ) is the radiological value divided by the benchmark value. The hazard index (HI) is the sum of the hazard quotients.

			Little Beaver Creek		Big Beaver Creek		Big Run		West Ditch		Scioto River	
Parameter	**Back-ground**	**Bench-mark**	**Max. Value**	**HQ**	**Max. Value**	**HQ**	**Max. Value**	**HQ**	**Max. Value**	**HQ**	**Max. Value**	**HQ**
Technetium-99	0.44	9.69e+03	6.35	6.5e-04	0.812	8.4e-05	0.507	5.2e-05	0.290	3.0e-05	<0.351	3.6e-05
Uranium-234	1.44	1.00e+08	10.8	1.1e-07	1.65	1.6e-08	7.31	7.3e-08	1.38	1.4e-08	0.895	8.9 e-09
Uranium-235	0.058	2.96e+05	0.516	1.7e-06	0.0495	1.7e-07	0.204	6.9e-07	0.0334	1.1e-07	0.0422	1.4e-07
Uranium-238	0.98	1.75e+06	3.5	2.0e-06	1.06	6.1e-07	2.74	1.6e-06	1.16	6.6e-07	0.872	5.0e-07
Plutonium-238	<0.0618	9.59e+07	<0.0341	3.5e-10	<0.062	6.5e-10	<0.046	4.8e-10	<0.039	4.1e-10	<0.057	5.9e-10
Plutonium-239	<0.0513	1.25e+05	<0.029	2.3e-07	<0.051	4.1e-07	<0.043	3.4e-07	<0.058	4.6e-07	<0.048	3.8e-07
Americium-241	<0.0525	1.67e+06	<0.044	2.6e-08	<0.053	3.2e-08	<0.028	1.7e-08	<0.050	3.0e-08	<0.048	2.9e-08
Neptunium-237	<0.0767	2.23e+05	<0.095	4.3e-07	<0.024	1.1e-07	<0.092	4.1e-07	<0.108	4.8e-07	<0.077	3.4e-07
		Sediment HI		**6.5e-04**		**8.4e-05**		**5.2e-05**		**3.0e-05**		**3.6e-05**

Table 7. Maximum and average (in parentheses) concentrations of gross alpha, gross beta, and total uranium in sediment collected in PORTS area streams, 2005. Stream values exclude background sample sites. Background values are based on 2005 data.

Parameter	Background	Little Beaver Creek	Big Beaver Creek	Big Run	West Ditch	Scioto River
Gross Alpha	22.6	44.1 (32.1)	23.2 (22.2)	48.9 (32.8)	24.2 (23.1)	17.5 (16.6)
Gross Beta	20.4	31.5 (26.1)	22.3 (22.0)	25.5 (20.2)	21.3 (20.7)	20.4 (18.7)
Total Uranium	23.2	75.3 (52.0)	27.7 (27.0)	75.5 (52.0)	34.4 (31.6)	23.4 (21.1)

reference conditions. As noted with the uranium isotopes, technetium^{99} concentrations in Little Beaver Creek and the other PORTS area streams were far below ecological benchmarks. Ecological screening benchmarks are not available for gross alpha, gross beta, and total uranium in sediment. Maximum and average concentrations of these three parameters by stream are presented in Table 7. Sediment levels for gross alpha, gross beta, and total uranium were compared to site

background concentrations. Results of this comparison revealed that Big Beaver Creek, West Ditch, and the Scioto River were generally comparable to background levels. Elevated levels of these three parameters were observed in Little Beaver Creek and Big Run.

Trends in technetium^{99}, gross alpha, and gross beta between 1992, 1997, and 2005 are depicted in Figure 11. All three parameters revealed a substantial decline between 1992 and 1997 in Little Beaver Creek sediments. Technetium^{99} continued to decline in 2005, with a stream average of 3.7 pCi/g. Gross alpha and gross beta measurements in Little Beaver Creek during 2005 were above 1997 levels. Average gross alpha levels during 2005 were 1.8 times higher than background conditions. Gross beta levels during 2005 were comparable to background conditions.

A comparison of total uranium levels from 1992 and 1997, with 2005 results was not practical due to a discrepancy in background concentrations. The average background level of total uranium during 1992 and 1997 was 2.2 ug/g. Results from 2005 revealed a background total uranium level of 23.2 ug/g, an order of magnitude higher. These results suggest lab errors during one or both of the time periods sampled.

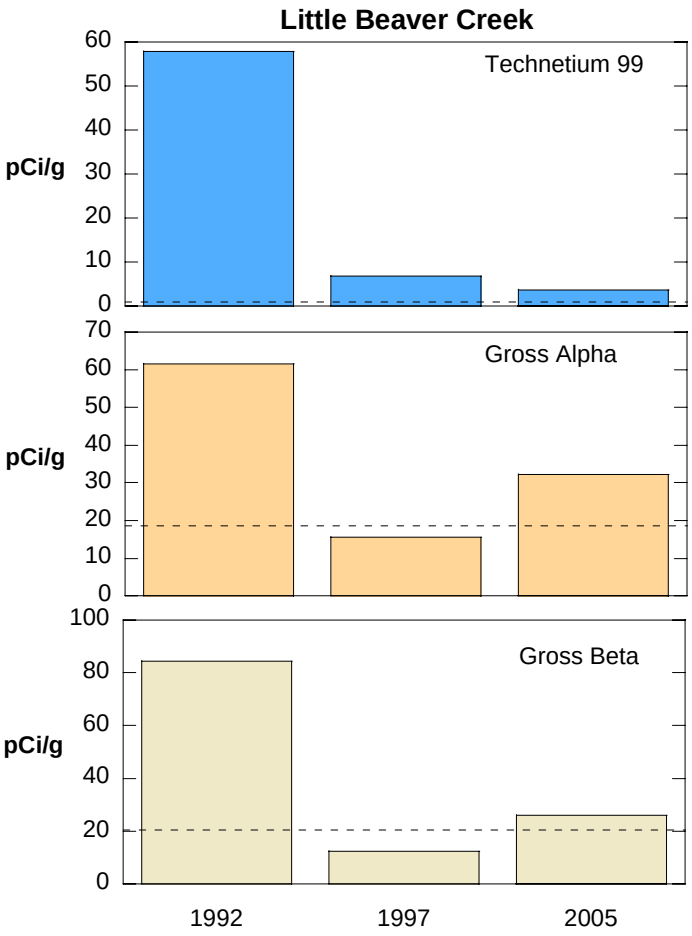


Figure 11. Average concentrations of technetium-99, gross alpha, and gross beta in sediment samples collected from Little Beaver Creek, 1992, 1997, and 2005. Average values excluded the background station on Little Beaver Creek. Background levels are represented by a dashed line.

Effluent Discharges

The Portsmouth Gaseous Diffusion Plant has two *National Pollution Discharge Elimination System* (NPDES) permits for discharging effluent into waterbodies on and adjacent to the facility. The permit numbers, outfall locations, median flows, and receiving streams are listed in Table 8. Numerous internal monitoring points are identified in each permit, but will not be reviewed. Monitoring results for each outfall to a waterbody are detailed in Tables 9 and 10, reporting data from 2000-2005.

Table 8. Portsmouth Gaseous Diffusion Plant permitted effluent discharge locations, 2005. Median discharge flows are based on data reported from 2000 – 2005. MGD= million gallons per day.

Permitted Outfall Number	Waterbody	River Mile Discharge	Median Discharge Flow (MGD)	PORTS Common Name
0IO00000 – 015	Little Beaver Creek	3.14	0.009	X-624 Groundwater Treatment
0IS00023 – 001	Little Beaver Creek	3.14	1.569	X-230J-7 East Holding Pond
0IS00023 – 011	Little Beaver Creek	2.53	0.029	X-230J-6 Northeast Holding Pond
0IS00023 – 005	Little Beaver Creek	2.36	2.394 0.0 (2005)	X-611B Lime Sludge Lagoon
0IS00023 – 009	Little Beaver Creek	1.51	0.291	X-230L North Holding Pond
0IS00023 – 002	Big Run	4.85	0.393	X-230K South Holding Pond
0IO00000 – 013	West Ditch	2.00	0.096	X-2230N West Holding Pond
0IS00023 – 010	West Ditch	1.98	0.272	X-230J-5 North West Holding Pond
0IS00023 – 003	Scioto River	25.38	0.273	X-6619 Sewage Treatment Plant
0IS00023 – 004	Scioto River	25.38	0.831	X-616 Treatment
0IO00000 – 012	Piketon DOE Trib.	0.85	0.091	X-2230M Southwest Holding Pond

Little Beaver Creek receives effluent discharges from five permitted outfalls. These combined outfalls contribute 1.9 million gallons per day (MGD) of flow to Little Beaver Creek, and comprise a large majority of stream flow during summer/fall low flow conditions. As has occurred historically, the X-230J-7 East Holding Pond discharge is the largest volume discharge to Little Beaver Creek. Intermittent stream flow conditions were noted in Little Beaver Creek upstream from this discharge during the fall 2005 sampling. An evaluation of the five effluent discharges to Little Beaver Creek (Table 9) documented low levels of monitored and permitted chemical parameters (non-radiological), with values below associated stream water quality chemical criteria. Radiological parameters were measured at all outfall locations, and summarized results are presented in Table 10. A comparison of technetium^{99} and total uranium between the eleven outfalls is presented in Figures 12 and 13. Transuranic isotopes were not detected in any of the outfall discharges to Little Beaver Creek. Technetium^{99} was reported at low or undetected levels at all outfall discharges to Little Beaver Creek (elevated technetium^{99} concentrations reported in outfall 015 were recorded prior to 2004). Total uranium was measured at low or undetectable levels at four of the five outfalls to Little Beaver Creek, with values near or below stream background levels and below the chronic toxicity benchmark value of 2.6 ug/l (Suter and Tsao 1996). Elevated total uranium concentrations were reported in outfall 009 (50th percentile: 6.11 ug/l), however, this discharge comprises less than 20 percent of the flow of the combined outfalls to Little Beaver Creek.

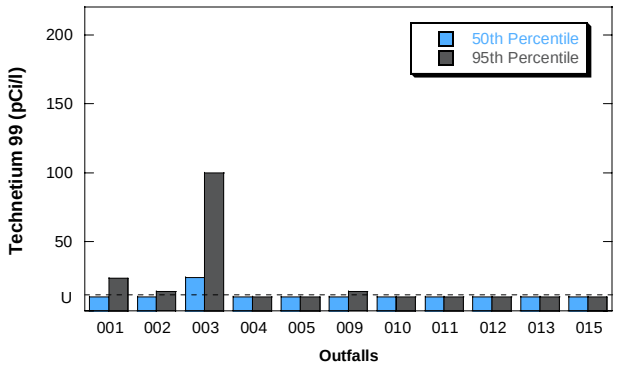


Figure 12. Technetium 99 concentrations from monitored effluent samples collected from eleven outfall locations at the PORTS facility, 2000 - 2005. U = undetected.

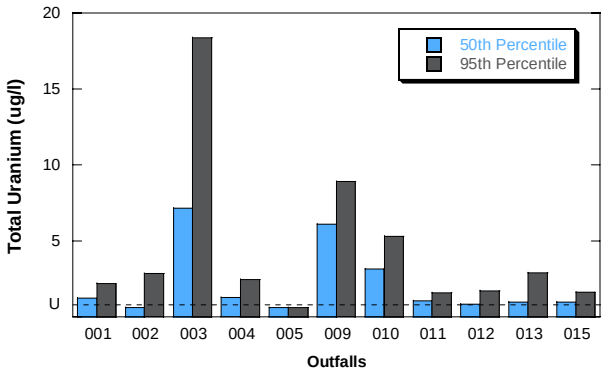


Figure 13. Total uranium concentrations from monitored effluent samples collected from eleven outfall locations at the PORTS facility, 2000 - 2005. U = undetected.

Big Run receives one effluent discharge (outfall 002) at the headwaters of the stream via the South Holding Pond. This discharge contributes a median flow of 0.393 MGD, and comprises nearly the entire flow within the upper one mile of stream. Monitored parameters (Table 9) were generally within acceptable levels, although elevated levels of thallium (95th percentile: 35.2 ug/l) and silver (95th percentile: 14.5 ug/l) were reported in the effluent. These values exceed the average stream aquatic life water quality criteria for silver (1.3 ug/l) and thallium (17 ug/l). Transuranic isotopes were not detected in any of the outfall discharges to Big Run. Technetium^{99} was reported at low or undetected levels (50th percentile: undetected; 95th percentile: 14 pCi/l) from outfall 002 to Big Run. Total uranium was measured at low or undetectable levels in outfall 002, with values near or below stream background levels and near or below the chronic toxicity benchmark value of 2.6 ug/l.

West Ditch receives effluent at the headwaters of the stream via the West Holding Pond (outfall 013) and Northwest Holding Pond (outfall 010). Combined, these two outfalls contribute a median flow of 0.368 MGD and contribute a majority of the flow to the upper section of West Ditch. Monitored chemical parameters, excluding total residual chlorine, were discharged at ecologically acceptable levels. Total residual chlorine levels were reported at elevated levels, with median and 95th percentile values of 0.12 mg/l and 0.34 mg/l, respectively. These levels were above the maximum stream water quality criteria of 0.019 mg/l, and above the mixing zone maximum value of 0.038 mg/l. Chlorine levels would be expected to dissipate to non-detectable levels from the discharge point at outfall 013 to the biological sampling location, located approximately 0.7 miles downstream. Transuranic isotopes and technetium^{99} were not detected in any of the outfall discharges to West Ditch. Slightly elevated total uranium levels were reported in outfall 010, with median and 95th percentile values of 3.15 ug/l and 5.32 ug/l, respectively. Outfall 010 provides the majority of flow to the upper West Ditch.

The Scioto River receives two direct discharges of wastewater from the Portsmouth Gaseous Diffusion Plant (outfalls 003 and 004). These two outfalls contribute a median effluent flow of 1.1 MGD to the Scioto River, comprising less than one percent of the river flow under low flow conditions. Based upon PORTS reported effluent quality, chemical parameters measured in outfalls 003 and 004 were at acceptable water quality levels. Transuranic isotopes were not detected in either outfall discharge to the Scioto River. The highest technetium^{99} and total uranium concentrations from PORTS outfalls were reported from outfall 003, with 95th percentile values for technetium^{99} and total uranium of 216.2 pCi/l and 18.4 ug/l, respectively (Figures 12 and 13, Table 10). These elevated radiological concentrations would be diluted to low levels in the Scioto River. Outfall 003 comprises less than 0.2 percent of the river flow during summer/fall low flow conditions.

The Piketon DOE Tributary receives a minor amount of flow (median = 0.091 MGD) from outfall 012. Monitored chemical parameters, excluding total residual chlorine, were discharged at ecologically acceptable levels. Total residual chlorine levels were reported at elevated levels, with median and 95th percentile values of 0.095 mg/l and 0.29 mg/l, respectively. These levels were above the maximum stream water quality criteria of 0.019 mg/l, and above the mixing zone maximum value of 0.038 mg/l. Transuranic isotopes and technetium^{99} were not detected in the outfall discharge (012) to Piketon DOE Tributary. Total uranium was measured at low or undetectable levels in outfall 012, with values below stream background levels and the chronic toxicity benchmark value of 2.6 ug/l.

Table 9. Concentrations of monitored conventional chemicals in effluent discharged from the PORTS facility, 2000-2005. MDL = below lab method detection limit.

Outfall/ Parameter	50th Percentile	95th Percentile	Permit Limit -30 Day Avg.-	Permit Limit -Maximum-
0IO00000-015 (Little Beaver Creek)				
Trichloroethylene (ug/l)	MDL	2.9	10	10
PCBs – T (ug/l)	MDL	MDL	Monitoring	Monitoring
0IS00023-001 (Little Beaver Creek)				
pH (S.U.)	7.82	8.29	6.5 minimum	9.0
TSS (mg/l)	MDL	10.8	20	45
Fluoride –T (mg/l)	0.2	0.36	Monitoring	Monitoring
Arsenic – T (ug/l)	MDL	20.8	Monitoring	Monitoring
Nickel – T (ug/l)	5.1	9.9	-	-
Zinc – T (ug/l)	23.5	56.7	Monitoring	Monitoring
Copper – T (ug/l)	6.4	13.5	-	-
Manganese – T (ug/l)	13.1	22.1	-	-
Chlorine – TR (mg/l)	MDL	MDL	Monitoring	Monitoring
0IS00023-011 (Little Beaver Creek)				
pH (S.U.)	7.62	8.26	6.5 minimum	9.0
TSS (mg/l)	MDL	10.8	30	45
Fluoride –T (mg/l)	0.3	0.4	Monitoring	Monitoring
Zinc – T (ug/l)	35.5	124.5	Monitoring	Monitoring
Copper – T (ug/l)	4	10.9	Monitoring	Monitoring
0IS00023-005 (Little Beaver Creek)				
pH (S.U.)	8.9	9.5	6.5 minimum	10.0
TSS (mg/l)	3.4	7.2	10	15
PCBs – T (ug/l)	MDL	MDL	-	-
0IS00023-009 (Little Beaver Creek)				
pH (S.U.)	7.74	8.25	6.5 minimum	9.0
TSS (mg/l)	4.8	22.0	30	45
Fluoride –T (mg/l)	0.3	0.4	Monitoring	Monitoring
Zinc – T (ug/l)	24	62.3	Monitoring	Monitoring
Manganese – T (ug/l)	102	184	-	-
0IS00023-002 (Big Run)				
pH (S.U.)	7.82	8.57	6.5 minimum	9.0
TSS (mg/l)	10	23.3	20	45
Fluoride –T (mg/l)	0.2	0.46	Monitoring	Monitoring
Thallium – T (ug/l)	MDL	35.2	6.3	79
Silver – T (ug/l)	MDL	14.5	1.3	11
Manganese – T (ug/l)	153	482	-	-
Mercury –T (ug/l)	MDL	0.0088	0.012	1.7

Table 9. Continued.

Outfall/ Parameter	50th Percentile	95th Percentile	Permit Limit -30 Day Avg.-	Permit Limit -Maximum-
0IO00000-013 (West Ditch)				
pH (S.U.)	8.09	8.56	6.5 minimum	9.0
TSS (mg/l)	MDL	10.8	30	45
Phosphorus-T (mg/l)[a]	MDL	0.05	-	-
Hexavalent Chromium (ug/l) [a]	MDL	MDL	-	-
Chromium – T (ug/l) [a]	MDL	7.6	-	-
PCBs – T (ug/l)	MDL	MDL	Monitoring	Monitoring
Chlorine – TR (mg/l)	0.12	0.34	Monitoring	Monitoring
0IS00023-010 (West Ditch)				
pH (S.U.)	7.63	8.22	6.5 minimum	9.0
TSS (mg/l)	3.2	21.8	30	45
Zinc – T (ug/l)	27.9	62.4	Monitoring	Monitoring
Manganese – T (ug/l)	64.2	132	-	-
0IS00023-003 (Scioto River)				
pH (S.U.)	7.46	7.82	6.5 minimum	9.0
TSS (mg/l)	MDL	2.2	12	18
Ammonia-N (mg/l)	MDL	0.6	Monitoring	Monitoring
Nitrate-Nitrite, N (mg/l)	5.4	7.6	Monitoring	Monitoring
Silver –T (ug/l)	MDL	13.8	Monitoring	Monitoring
Zinc – T (ug/l)	26.4	50.3	Monitoring	Monitoring
Copper – T (ug/l)	26.4	56.3	Monitoring	Monitoring
Chlorine –TR (mg/l)	MDL	MDL	-	0.038
0IS00023-004 (Scioto River)				
pH (S.U.)	7.34	7.64	6.5 minimum	9.0
TSS (mg/l)	MDL	7.2	18	27
Zinc – T (ug/l)	28.3	54.1	Monitoring	Monitoring
Copper – T (ug/l)	9.9	24.1	Monitoring	Monitoring
TDS (mg/l)	306	2974	3500	4000
0IO00000-012 (Piketon DOE Tributary)				
pH (S.U.)	7.94	8.4	6.5 minimum	9.0
TSS (mg/l)	4.0	8.8	30	45
Phosphorus-T (mg/l)[a]	0.03	0.072	-	-
Iron – T (ug/l)[b]	630	9204	Monitoring	Monitoring
Hexavalent Chromium (ug/l) [a]	MDL	MDL	-	-
Chromium – T (ug/l) [a]	MDL	7	-	-
Trichloroethylene (ug/l)	MDL	0.27	Monitoring	Monitoring
PCBs – T (ug/l)	MDL	MDL	Monitoring	Monitoring
Chlorine – TR (mg/l)	0.095	0.29	Monitoring	Monitoring

[a] – data reported for 2000 – 2002.
[b] – data reported for 2002 – 2005.

Table 10. Concentrations of monitored radiological parameters in effluent discharged from the PORTS facility, 2000-2005. U = undetected.

Outfall/ Parameter	50th Percentile	95th Percentile
0IO00000-015 (Little Beaver Creek)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	3.58[a]	117.2[a]
Uranium –Total (ug/l)	0.972	1.635
Uranium 233/234 (pCi/l)	1.069	2.029
Uranium 235 (pCi/l)	U	U
Uranium 236 (pCi/l)	U	U
Uranium 238 (pCi/l)	0.339	0.552
0IS00023-001 (Little Beaver Creek)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	U	23.9
Uranium –Total (ug/l)	U	2.18
0IS00023-011 (Little Beaver Creek)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	U	U
Uranium –Total (ug/l)	1.04	1.57
0IS00023-005 (Little Beaver Creek)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	U	U
Uranium –Total (ug/l)	U	U
0IS00023-009 (Little Beaver Creek)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	U	14
Uranium –Total (ug/l)	6.11	8.90
0IS00023-002 (Big Run)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	U	14
Uranium –Total (ug/l)	1.23	2.86

Table 10. Continued.

Outfall/ Parameter	50th Percentile	95th Percentile
0IO00000-013 (West Ditch)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	U	U
Uranium –Total (ug/l)	0.987	2.895
Uranium 233/234 (pCi/l)	0.608	2.570
Uranium 235 (pCi/l)	U	U
Uranium 236 (pCi/l)	U	U
Uranium 238 (pCi/l)	0.326	0.992
0IS00023-010 (West Ditch)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	U	U
Uranium –Total (ug/l)	3.15	5.32
0IS00023-003 (Scioto River)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	24	216.2
Uranium –Total (ug/l)	7.17	18.4
0IS00023-004 (Scioto River)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	U	U
Uranium –Total (ug/l)	1.26	2.48
0IO00000-012 (Piketon DOE Tributary)		
Americium 241 (pCi/l)	U	U
Neptunium 237 (pCi/l)	U	U
Plutonium 238 (pCi/l)	U	U
Plutonium 239/240 (pCi/l)	U	U
Technetium 99 (pCi/l)	U	U
Uranium –Total (ug/l)	0.834	1.7
Uranium 233/234 (pCi/l)	0.456	0.785
Uranium 235 (pCi/l)	U	U
Uranium 236 (pCi/l)	U	U
Uranium 238 (pCi/l)	0.308	0.56

[a] – values reported for 2004 and 2005 were reported as undetected, excluding one value of 3.4 pCi/l.

Stream Physical Habitat

Physical habitat was evaluated in Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River at each biological sampling location. Physical habitat was assessed using the Qualitative Habitat Evaluation Index (QHEI). QHEI scores are detailed in Table 11.

Little Beaver Creek is a small, high gradient, natural channel stream which is effluent dominated by outfall 001 (X-230-J7 holding pond) during summer/fall low flow periods. Bottom substrates were predominated by slab boulders and bedrock in the upper reach, and gravel and sand in the lower section. During part of the 2005 survey, Little Beaver Creek upstream from outfall 001 was composed of isolated pools with no observable stream flow. These intermittent flow conditions were also recorded during the 1997, 1993, and 1992 biological surveys. QHEI scores for Little Beaver Creek within the study area ranged from 61.0 to 82.0, with a mean value of 75.2. These scores are indicative of good to excellent stream and riparian habitat and reflect conditions which are capable of supporting Warmwater Habitat stream fish communities.

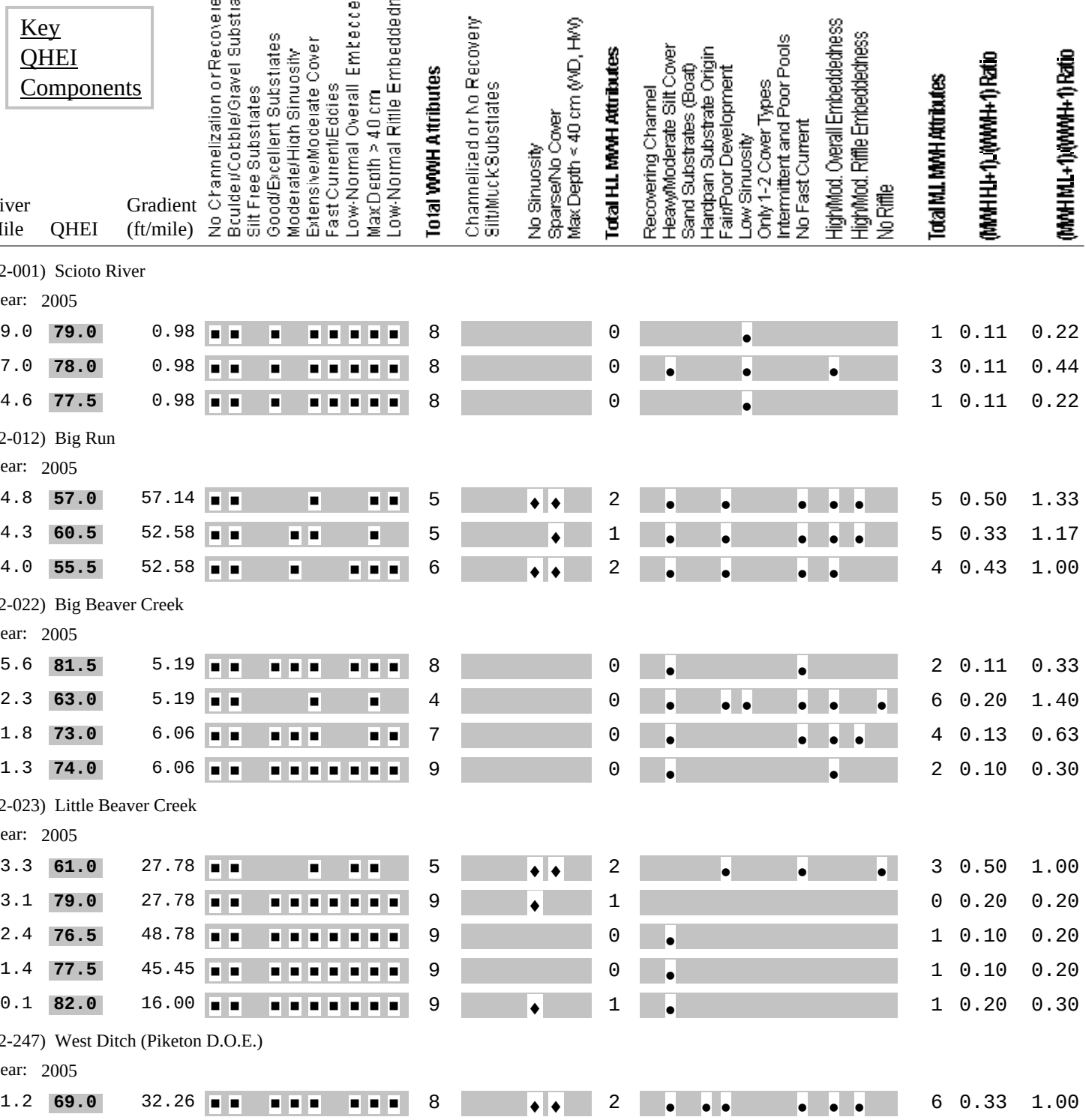
Big Beaver Creek within the study area (lower six miles) was predominated by substrates of sand and gravel. At RM 5.6, hardpan and bedrock were also prevalent. During the 2005 sampling (similar to 1997 and 1992), Big Beaver Creek was intermittent upstream from Little Beaver Creek (confluence at RM 2.2) to at least RM 4.0. Stream flow was observed at RM 5.6 and further upstream. The intermittent flow conditions in this section of Big Beaver Creek results from the stream channel entering the glacial outwash deposits of the abandoned Newark River Valley. The stream flow in this section of Big Beaver Creek becomes interstitial during low stream flow periods. QHEI scores for Big Beaver Creek ranged from 63.0 to 81.5, with a mean value of 72.9. The QHEI scores are adequate for supporting Warmwater Habitat biological communities, being reflective of good to excellent habitat.

Big Run's physical habitat was evaluated between RMs 4.0 and 4.8. The bottom substrates were predominated by gravel, sand, and cobble in an unmodified channel. From the 002 outfall location (X-230-K South Holding Pond) to RM 4.8, Big Run has been modified, and the channel lined with quarried rock. The biological sampling locations were represented by natural channel conditions, but instream cover was sparse. Sludge deposits were observed on the bottom in pool areas at RM 4.8. QHEI scores ranged from 55.5 to 60.5 (mean = 57.7), reflective of the small stream size, poorly developed riffles, and shallow pools. QHEI scores were indicative of marginal Warmwater Habitat quality.

Physical habitat of West Ditch was evaluated at RM 1.2. Substrates were predominated by gravel and sand in a natural channel. The sampling zone was represented by extensive riffle/run areas and several deep pools. The QHEI score of 71 was indicative of good stream habitat and adequate for supporting Warmwater Habitat biological communities.

The Scioto River within the study area (RMs 29.0 to 24.6) was predominated by substrates of gravel and cobble, and moderate amounts of instream cover. A variety of well developed pool, run, and riffle areas were noted at each sampling location, and silt loads and substrate embeddedness were considered normal. QHEI scores for the Scioto River ranged from 77.5 to 79.0, with a mean value of 78.2. These scores are indicative of excellent river habitat, and are adequate for supporting Exceptional Warmwater Habitat biological communities.

Table 11. Qualitative Habitat Evaluation Index (QHEI) scores including modified and warmwater habitat characteristics for Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River, 2005.



River Mile	QHEI	Gradient (ft/mile)	Total WWH Attributes	Total HL MWH Attributes	Total ML MWH Attributes	(MWH HL+1)/(WWH+1) Ratio	(MWH ML+1)/(WWH+1) Ratio
(02-001) Scioto River							
Year: 2005							
29.0	**79.0**	0.98	8	0	1	0.11	0.22
27.0	**78.0**	0.98	8	0	3	0.11	0.44
24.6	**77.5**	0.98	8	0	1	0.11	0.22
(02-012) Big Run							
Year: 2005							
4.8	**57.0**	57.14	5	2	5	0.50	1.33
4.3	**60.5**	52.58	5	1	5	0.33	1.17
4.0	**55.5**	52.58	6	2	4	0.43	1.00
(02-022) Big Beaver Creek							
Year: 2005							
5.6	**81.5**	5.19	8	0	2	0.11	0.33
2.3	**63.0**	5.19	4	0	6	0.20	1.40
1.8	**73.0**	6.06	7	0	4	0.13	0.63
1.3	**74.0**	6.06	9	0	2	0.10	0.30
(02-023) Little Beaver Creek							
Year: 2005							
3.3	**61.0**	27.78	5	2	3	0.50	1.00
3.1	**79.0**	27.78	9	1	0	0.20	0.20
2.4	**76.5**	48.78	9	0	1	0.10	0.20
1.4	**77.5**	45.45	9	0	1	0.10	0.20
0.1	**82.0**	16.00	9	1	1	0.20	0.30
(02-247) West Ditch (Piketon D.O.E.)							
Year: 2005							
1.2	**69.0**	32.26	8	2	6	0.33	1.00

Fish Community

A total of 24,896 fish representing 70 species were collected from Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River between July and September, 2005. Relative numbers and species collected per location are presented in Appendix Table 14 and IBI metrics are presented in Appendix Table 13. Sampling locations were evaluated using Warmwater Habitat biocriteria.

Little Beaver Creek fish communities were all within the exceptional range, excluding the most upstream sampling location at RM 3.3. Shallow isolated pools at RM 3.3, upstream from the 001 outfall, were common during the survey period of July – September, 2005. The IBI score of 39 at RM 3.3 was in the fair range (although nearly meeting the non-significant departure criterion of 40). The low flow condition in Little Beaver Creek upstream from the 001 outfall (X-230-J7 discharge) was the principal factor in the failure to achieve the WWH biocriterion. The IBI scores at the four sites downstream from outfall 001 ranged between 51 and 56, meeting the WWH and EWH biocriteria. The discharge of effluent from the PORTS outfalls did not have a negative impact on the ecological condition of the fish communities of Little Beaver Creek.

Big Beaver Creek fish communities at all four sampling locations achieved the WWH biocriterion. IBI scores ranged from 46 to 50, and MIwb scores ranged from 8.4 to 9.6, all within the good to exceptional range. The PORTS facility did not have a negative impact on the ecological condition of the fish communities of Big Beaver Creek.

Big Run fish communities were assessed at three locations directly downstream from the 002 outfall (X-230K South Holding Pond). All three locations (RMs 4.8, 4.3, and 4.0) achieved the WWH biocriterion. IBI scores ranged from 42 to 45, indicative of marginally good to good quality. The 002 outfall did not have a negative impact on the ecological condition of the fish communities of Big Run.

The fish community of West Ditch was assessed at RM 1.2, approximately 0.7 miles downstream from outfalls 010 (X-230J-5 North West Holding Pond) and 013 (X-2230N West Holding Pond). The IBI score of 44 was in the good range, and achieved the WWH biocriterion. Outfalls 010 and 013 did not have a negative impact on the ecological condition of the fish communities of West Ditch at RM 1.2.

The Scioto River fish communities were assessed at three locations: upstream from Big Beaver Creek (RM 29.0), downstream from Big Beaver Creek and upstream from outfalls 003 and 004 (RM 27.0), and downstream from outfalls 003 and 004 (RM 24.6). All three sampling locations achieved the WWH biocriterion. In fact, all three locations had fish communities reflective of exceptional quality, with IBI scores of 48 to 50 and MIwb scores of 9.7 to 9.9. Outfalls 003 and 004, and potential sources of pollution from PORTS via Little Beaver Creek and Big Beaver Creek, did not have a negative impact on the ecological condition of the fish communities of the Scioto River.

Endangered, threatened, and special interest fish species collected during this survey included blue sucker, shovelnose sturgeon, river redhorse, and tippecanoe darter. Fish species collected which are intolerant of water pollution included mooneye, blue sucker, black redhorse, river redhorse, bigeye chub, silver shiner, rosyface shiner, mimic shiner, stonecat madtom, slenderhead darter, tippecanoe darter, and banded darter.

Historical trends in fish community results, represented by average IBI and MIwb scores per waterbody, are presented in Figures 14 and 15.

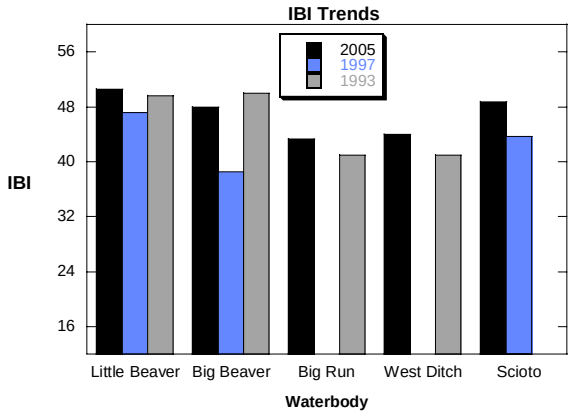


Figure 14. Trends in average IBI scores by waterbody in the PORTS project area, 2005, 1997, and 1993/1992.

Little Beaver Creek, Big Run, West Ditch and the Scioto River fish communities were at their best ecological condition during 2005. Big Beaver Creek fish communities were at or near their best condition during 2005. Overall, fish communities within the study area have improved over the last 12 years of monitoring.

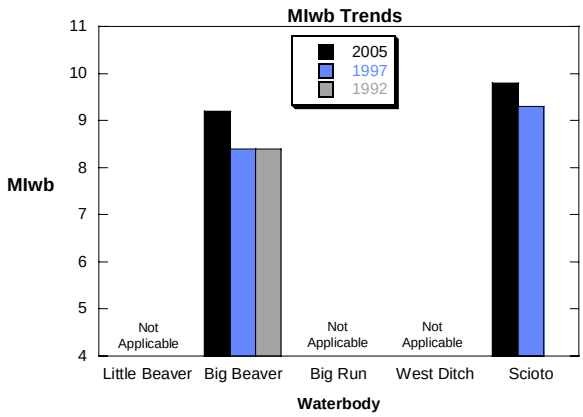


Figure 15. Trends in average MIwb scores by waterbody in the PORTS project area, 2005, 1997, and 1993/1992. The MIwb is not applicable at stream sites with less than 20 square mile drainages.

Table 12. Fish community summaries based on pulsed D.C. electrofishing sampling conducted by Ohio EPA in Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River from July – September, 2005. 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.

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 Beaver Creek									
3.3	Wading	9.5	11	350	NA	61.0	NA	39*	Fair
3.1	Wading	13.0	14	2111	NA	79.0	NA	52	Exceptional
2.4	Wading	14.0	16	1464	NA	76.5	NA	51	Exceptional
1.4	Wading	21.0	25	2168	NA	77.5	NA	56	Exceptional
0.1	Wading	25.5	31	2164	NA	82.0	NA	55	Exceptional
Big Beaver Creek									
5.6	Wading	24.5	30	860	8.08	81.5	9.2	50	Very Good/Exceptional
2.3	Wading	27.0	32	400	8.52	63.0	8.4	49	Good/Very Good
1.8	Wading	34.5	42	2938	15.00	73.0	9.6	46	Very Good/Exceptional
1.3	Wading	36.5	44	2702	23.19	74.0	9.5	47	Very Good/Exceptional
Big Run									
4.8	Wading	6.5	8	1194	NA	57.0	NA	42 ns	Marginally Good
4.3	Wading	7.0	7	1005	NA	60.5	NA	43 ns	Marginally Good
4.0	Wading	7.5	8	1686	NA	55.5	NA	45	Good
West Ditch									
1.2	Wading	8.5	9	2264	NA	69.0	NA	44	Good
Scioto River									
29.0	Boat	29.5	38	576	106.37	79.0	9.8	48	Exceptional
27.0	Boat	32.5	42	831	119.15	78.0	9.9	50	Exceptional
24.6	Boat	26.0	34	410	139.61	77.5	9.7	48	Exceptional

Ecoregion Biocriteria: Western Alleghany Plateau (WAP)

INDEX - Site Type	WWH	EWH
IBI: Headwater - Wading/Boat	44/ 40	50/ 48
MIwb: Wading/ Boat	8.4/ 8.6	9.4/ 9.6

* Significant departure from ecoregion biocriterion; poor and very poor results are underlined.
ns Nonsignificant departure from biocriterion (≤4 IBI units; ≤0.5 MIwb units).
N/A Not Applicable. The Modified Index of Well-Being is not applicable at headwater sites.

Macroinvertebrate Community

The macroinvertebrate communities from Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch and the Scioto River were sampled in 2005. Qualitative samples were collected from all sampling locations. Quantitative samples were collected from all but two of the sampling locations. The Little Beaver Creek site at river mile 3.3 and Big Beaver Creek at river mile 2.3 had insufficient flow conditions to use the Hester Dendy artificial substrate samplers. A summary of the macroinvertebrate data are presented in Table 13. The ICI metrics and the raw data are presented in Appendix Tables 17 and 18.

The Little Beaver Creek macroinvertebrate communities ranged from poor at the most upstream sampling location to exceptional at the two most downstream locations. The poor condition of the macroinvertebrate community at the upstream location (RM 3.3) was caused by the low flow condition upstream from the 001 outfall. The first sampling location downstream from the 001 outfall (RM 3.1) had a ICI score of 18 which is in the fair range. The next sampling location at RM 2.4 had an ICI score of 34 which is marginally good and a nonsignificant departure from the WWH biocriterion. The two most downstream sites at RMs 1.4 and 0.1 had ICI scores of 46 and 48, respectively, which met the EWH biocriterion. The PORTS 001 outfall did not have a negative effect on the macroinvertebrate community in Little Beaver Creek. A comparison of the 2005 sampling results to data from 1997 and 1992 indicate comparable results for the downstream sampling locations in 1997 while the macroinvertebrate community from upstream sampling locations in 2005 were better than 1997 results.

In Big Beaver Creek, the macroinvertebrate community was good to very good at the three sampling locations where quantitative samples were collected in 2005. The ICI scores were 38, 38, and 42 for the RMs 5.6, 1.8 and 1.3 sampling locations with attainment of the WWH biocriterion. At RM 2.3, a qualitative sample indicative of a fair macroinvertebrate community and nonattainment of the WWH biocriterion was collected. Stream conditions at the RM 2.3 site consisted of deep pools with no riffle or run habitat. The fair condition of the macroinvertebrate appeared to be caused by poor macroinvertebrate habitat conditions. The PORTS facility did not have a negative impact on the macroinvertebrate community in Big Beaver Creek. The 2005 sampling results were similar to 1997 and 1992 results.

In Big Run, the macroinvertebrate community was evaluated as poor at RM 4.8, fair at RM 4.3, and good at RM 4.0 with ICI scores of 8, 30, and 36, respectively. The macroinvertebrate community at the RM 4.8 site was dominated by flatworms, segmented worms, hydrozoans (Hydra), and midges (Glyptotendipes), which indicate that the cause of impairment may be due to organic enrichment. The near absence of pollution sensitive EPT taxa may indicate low dissolved oxygen levels. The RM 4.8 sampling location was downstream from the overflow from the South Holding Pond. The macroinvertebrate community improved to fair at the RM 4.3 sampling location. Improvement continued at the RM 4.0 sampling location with the macroinvertebrate community attaining the WWH biocriterion. Limited data is available for historical trend analysis in Big Run. In 1992 the macroinvertebrate community was evaluated as marginally good with an ICI of 34 which was similar to the 2005 results.

The macroinvertebrate community in West Ditch was evaluated as fair with an ICI of 28 at the RM 1.2 sampling location. The macroinvertebrate community did not attain the WWH biocriterion. In 1992 this site had an ICI score of 18.

The macroinvertebrate communities at three sampling locations in the Scioto River were assessed in 2005. The RM 29.0 site was evaluated as exceptional with an ICI score of 50 which achieved the WWH biocriterion. The RM 27.0 site with an ICI score of 42 attained the WWH biocriterion and was evaluated as very good. The RM 24.6 site also met the WWH biocriterion with an ICI score of 50. The PORTS facility did not appear to have an impact on the macroinvertebrate community in the Scioto River. Historical data from 1985 and 1997 for sites in the vicinity of the 2005 sampling locations had ICI scores similar to the 2005 results.

Table 13. Summary of macroinvertebrate data collected from artificial substrates (quantitative sampling) and natural substrates (qualitative sampling) in PORTS area streams, 2005.

Stream/ River Mile	Density Number/ft^2	Total Taxa	Quantitative Taxa	Qualitative Taxa	Qualitative EPT[a]	ICI	Evaluation
Little Beaver Creek							
3.3	-	-	-	13	1	-	Poor[b]
3.1	169	26	16	11	1	18*	Fair
2.4	137	39	24	28	12	34 [ns]	Marginally Good
1.4	196	51	39	26	6	46	Exceptional
0.1	103	42	28	26	7	48	Exceptional
Big Beaver Creek							
5.6	546	73	45	54	11	38	Good
2.3	-	-	-	28	4	-	Fair[b]
1.8	79	54	34	35	14	38	Good
1.3	200	57	45	28	11	42	Very Good
Big Run							
4.8	1448	18	12	10	0	8*	Poor
4.3	489	34	26	20	6	30*	Fair
4.0	342	43	26	26	5	36	Good
West Ditch							
1.2	77	37	27	20	6	28*	Fair
Scioto River							
29.0	1533	52	34	30	10	50	Exceptional
27.0	3965	47	30	37	14	42	Very Good
24.6	1987	47	36	32	12	50	Exceptional

Ecoregion Biocriteria: Western Allegheny Plateau (WAP) (Ohio Administrative Code 3745-1-07, Table 7-15)		
INDEX	WWH	EWH
ICI	36	46

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

Fish Tissue

Whole body samples from 11 fish species and fillet samples of four fish species were collected from the five PORTS area streams and tested for arsenic, cadmium, lead, mercury, selenium, PCBs, gross alpha, gross beta, total uranium, strontium^{90}, potassium^{40}, and technetium^{99}. Results are reported in Appendix Tables 11, 15, and 16. Due to laboratory quality control problems (see Appendix 19) for 16 fish samples collected in 2005, additional tissue samples were collected during June, 2006 and retested for gross alpha, gross beta, and technetium^{99}. Results of these tests are summarized below.

Summarized radiological results from fish tissue samples collected in 2005 and 2006 from PORTS area streams are reported in Table 14. Total uranium was detected in only one fish sample (Big Beaver Creek, RM 1.8), and the result was below the site background value. Potassium^{40} was detected in 23 of 27 samples, but all results were below background levels. All but one strontium^{90} value were below background levels; this one value was marginally above background. Excluding one gross alpha value, all tissue results were below laboratory detection limits. The one detected gross alpha value was below background. Fish tissue measurements for gross beta revealed five samples (all from 2006 samples) slightly above the background level of 3.56 pCi/g. These slightly elevated levels were not correlated with technetium^{99} values. Six technetium^{99} fish tissue samples were measured above background levels, with three samples located from Little Beaver Creek in the lower 2.4 miles, two samples from Big Beaver Creek downstream from Little Beaver Creek, and one sample from Big Run. The technetium^{99} sample from Big Run at RM 4.3 were estimated as an “upper limit" of activity since the matrix spike recovery for these samples was less than the quality control acceptance criteria of 30% (see Appendix 20).

*Table 14. Fish tissue radiological sampling results from PORTS area streams which were reported above background levels, 2005 and 2006. * - result less than the background value.*

	Gross alpha (pCi/g)	Gross beta (pCi/g)	Technetium^{99} (pCi/g)	T – Uranium (ug/g)	Strontium^{90} (pCi/g)	Potassium^{40} (pCi/g)
Background	0.52	3.56	0.44	<0.625	0.187	200.1
***Stream*/ RM**						
Little Beaver Creek						
2.4 (green sunfish)	*	*	0.609	*	0.189J	*
1.4 (green sunfish)	*	4.52J	*	-	-	-
1.4 (spotted bass)	*	4.73J	*	-	-	-
1.4 (rockbass, longear sunfish, green sunfish)	*	*	1.21	*	*	*
0.1 (spotted bass)	*	5.10J	1.37	-	-	-
Big Beaver Creek						
1.8 (spotted bass)	*	*	0.461	*	*	*
1.3 (quillback carpsucker)	*	*	1.54	*	*	*
1.3 (freshwater drum)	*	4.73J	*	-	-	-
Big Run						
4.3 (green sunfish)	*	4.43J	0.545J	-	-	-

PCBs and five metal parameters were tested in fillet and whole body fish samples from the five PORTS area streams, with results summarized in Tables 15 and 16. Fish fillet samples from two locations in Little Beaver Creek (RMs 1.4 and 0.1), one location in Big Beaver Creek (RM 1.3), and three locations in the Scioto River exceeded the Ohio Fish Consumption Advisory restriction level of one meal per week. This level is the least restrictive of the consumption advisory levels (Appendix Table 22). Mercury levels were elevated in all fillet samples collected, characteristic of the ubiquitous nature of this chemical in the environment. Cadmium and selenium were reported in fish fillets at levels below background conditions. Arsenic and lead were measured in fillet samples above consumption advisory levels in a number of

samples, both at on-site locations and at background sites. All of the reported arsenic and lead concentrations in fillet samples were estimated values (J values), and results were marginally above the unrestricted consumption level.

Table 15. Total PCBs, mercury, arsenic, and lead results from PORTS streams fish tissue fillets which were reported above Ohio Sport Fish Consumption Advisory one meal per week levels (see Appendix Table 19).

Stream-RM	Fish Species	Total PCBs (ug/kg)	T-Mercury (mg/kg)	T-Arsenic (mg/kg)	T-Lead (mg/kg)
Little Beaver Creek- 1.4	spotted bass	65	0.12	0.26J	0.087J
Little Beaver Creek- 0.1	spotted bass	67	0.077	0.24J	0.097J
Big Beaver Creek- 5.6	spotted bass	*	0.3[a]	*	*
Big Beaver Creek- 2.3	common carp	*	0.075	0.17J	0.12J
Big Beaver Creek- 2.3	spotted bass	*	0.31[a]	0.22J	*
Big Beaver Creek- 1.8	spotted bass	*	0.094	0.26J	0.1J
Big Beaver Creek- 1.8	quillback	*	0.12	*	*
Big Beaver Creek-1.3	spotted bass	81	0.076	0.25J	*
Big Beaver Creek-1.3	quillback	*	0.12	*	*
Scioto River-29.0	freshwater drum	*	0.061	0.31J	*
Scioto River-29.0	channel catfish	94	0.067	0.2J	*
Scioto River-27.0	channel catfish	153	0.058	0.21J	*
Scioto River- 27.0	freshwater drum	*	0.24[a]	0.28J	0.093J
Scioto River- 24.6	channel catfish	92	0.066	*	*
Scioto River- 24.6	freshwater drum	*	0.16	0.19J	*

[a] – above one meal per month advisory level.

Table 16. PORTS streams whole body fish tissue results reported above total PCB guidelines for the protection of wildlife.

Stream	River Mile	Fish Species	Total PCBs (ug/kg)
Little Beaver Creek	2.4	green sunfish	710[a]
Little Beaver Creek	2.4	yellow bullhead	1400[a]
Little Beaver Creek	1.4	rockbass, green sunfish, longear sunfish	1400[a]
Scioto River	24.6	smallmouth redhorse	800[a]

[a] – Exceeds the Ohio Water Quality Standard to protect against adverse reproductive effects on wildlife (OAC 3745-1-34-C): any whole sample of any representative aquatic organisms shall not exceed 640 ug/kg (wet weight).

PCB levels in whole body fish samples are reported in Appendix Table 11 and summarized in Table 16 and Figure 16. Three whole body samples from on-site PORTS locations in Little Beaver Creek exceeded Ohio Water Quality criteria for the protection of wildlife (Table 16). Fish species with high levels of total PCBs included green sunfish, yellow bullhead, rockbass, and longear sunfish. One fish sample (smallmouth redhorse) from the Scioto River downstream from the PORTS 003 and 004 outfalls exceeded Ohio Water Quality Standards criterion. Average PCB concentrations in whole body fish

samples are presented in Figure 16. Results were summarized by stream, with Big Beaver Creek divided into two sections (upstream and downstream from the Little Beaver Creek confluence) and the Scioto River divided upstream and downstream from the Big Beaver Creek confluence. Average results revealed the highest concentrations in Little Beaver Creek. Additionally, slightly elevated PCBs were observed in Big Run, West Ditch, Big Beaver Creek downstream from Little Beaver Creek, and in the Scioto River downstream from Big Beaver Creek. Upstream sources of PCBs are reflected in the elevated levels in the Scioto River upstream from Big Beaver Creek.

Metal parameters reported for fish fillet samples had similar results for whole body samples (Appendix Table 11).

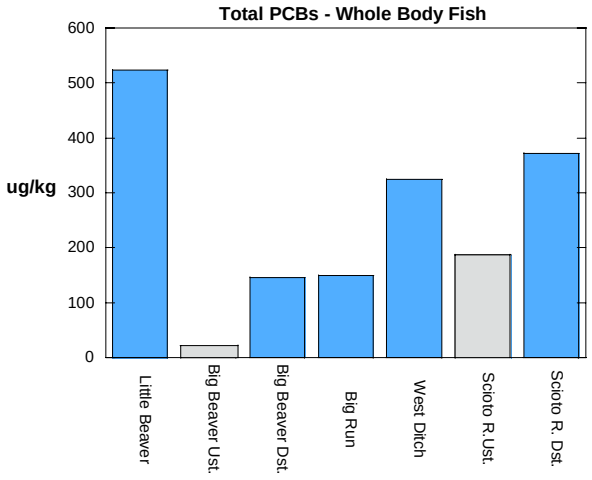


Figure 16. Average total PCB values for whole body fish tissue samples collected by waterbody in the PORTS project area, 2005. Upstream Big Beaver Creek and Scioto River plots are sites outside of PORTS influence.

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Appendix Table 1. Chemical surface water sampling results (metals, fluoride, phosphorus) from streams sampled in the USEC/PORTS project area, August 29, 2005.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek
River Mile	**3.3**	**3.1**	**2.4**	**1.4**	**1.4**	**0.1**	**5.6**	**2.3**	**1.8**
Date Sampled	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005
Time Sampled	10:35 AM	11:00 AM	1:10 PM	1:30 PM	1:30 PM	2:10 PM	3:50 PM	3:50 PM	3:05 PM
					Duplicate				
TAL Metals (ug/l)									
Aluminum	3440 N	187 JN	207 N	464 N	387 N	726 N	<25.4 N	290 N	1340 N
Antimony	<2.5	2.6 J	3.8 J	3.4 J	<2.5	<2.5	<2.5	<2.5	5.3 J
Arsenic	2.5 J	<2.4	<2.4	<2.4	<2.4	<2.4	3.3 J	<2.4	<2.4
Barium	69	8.5	9.3	15.4	15.1	24.1	44	38.5	29.4
Beryllium	0.25 J	0.16 J	0.12 J	<0.042	0.15 J	<0.042	0.18 J	0.12 J	0.13 J
Cadmium	<0.17	<0.17	<0.17	<0.17	0.28 J	0.2 J	<0.17	<0.17	<0.17
Calcium	20300	11500	11600	14500	14700	18200	32600	21400	19500
Chromium	2.1 J	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	3.1 J
Cobalt	1.5 J	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72
Copper	4.7 J	8.8 J	7.4 J	5.8 J	5.5 J	6.3 J	<1.4	2.4 J	4.5 J
Iron	3760	281	329	557	565	820	158	338	1410
Lead	4.7 J	<2.1	2.3 J	<2.1	<2.1	2.1 J	<2.1	<2.1	2.2 J
Magnesium	17500	8100	8510	11400	11400	15000	21800	19600	16300
Manganese	381	20	49.9	30.7	31.1	34	307	74.8	63.2
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	4 J	<0.87	2 J	<0.87	1.9 J	1.5 J	<0.87	<0.87	1.9 J
Potassium	6580	2000	1820	2530	2590	3270	5890	3490	3420
Selenium	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
Silver	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71
Sodium	15000	7980	7800	10900	10700	14700	20000	17400	14800
Thallium	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8
Vanadium	8.4 J	1.2 J	0.88 J	1.9 J	1.3 J	1.9 J	0.61 J	2.1 J	5.1 J
Zinc	15.8 J	44.8	30.3	16 J	17 J	14.8 J	3.5 J	6 J	18.5 J
Inorganic & Nutrient Analytes (mg/l)									
Fluoride-T	0.11	0.13	0.14	0.16	0.15	0.18	0.17	0.19	0.18
Phosphorus -T	0.035	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.035	0.24

Appendix Table 1. Continued.

Stream	Big Beaver Creek	Big Run	Big Run	Big Run	Big Run	West Ditch	Scioto River	Scioto River	Scioto River
River Mile	1.3	4.8	4.3	4.3	4.0	1.2	30.0	27.0	23.4
Date Sampled	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005
Time Sampled	2:45 PM	12:25 PM	12:05 PM	12:05 PM	11:40 PM	3:20 PM	4:10 PM	4:35 PM	5:00 PM
				Duplicate					
TAL Metals (ug/l)									
Aluminum	1400 N	139 JN	111 JN	63.4 JN	111 JN	3400 N	321 N	303 N	336 N
Antimony	<2.5	<2.5	2.5 J	<2.5	<2.5	6.3 J	3 J	4.4 J	2.5 J
Arsenic	<2.4	12.1	9 J	9.2 J	6.9 J	2.8 J	<2.4	<2.4	2.5 J
Barium	34.4	22.5	23.8	23.6	25.4	35.7	86.4	89.4	88.5
Beryllium	<0.042	<0.042	0.089 J	0.12 J	0.16 J	<0.042	<0.042	<0.042	<0.042
Cadmium	0.17 J	<0.17	<0.17	<0.17	<0.17	0.22 J	<0.17	<0.17	<0.17
Calcium	20200	28100	29100	28900	29100	21700	74300	72600	75000
Chromium	1.8 J	<0.45	<0.45	<0.45	<0.45	1.9 J	<0.45	<0.45	<0.45
Cobalt	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72
Copper	5.5 J	3.5 J	2.5 J	1.8 J	2.4 J	7.5 J	3.6 J	3.4 J	3.4 J
Iron	1730	291	275	274	249	3500	368	344	391
Lead	3.1 J	<2.1	<2.1	<2.1	<2.1	8.2 J	<2.1	<2.1	<2.1
Magnesium	16400	23900	23900	23800	23600	10100	25600	25100	25900
Manganese	99	68.6	81.3	79.8	93.5	44.1	74	78.7	81.6
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	3.3 J	<0.87	<0.87	<0.87	<0.87	1.3 J	<0.87	<0.87	1.1 J
Potassium	3640	4430	4210	4230	4190	2930	5550	5420	5720
Selenium	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
Silver	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71
Sodium	15100	125000	122000	122000	120000	13800	55600	55800	56800
Thallium	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8
Vanadium	4.9 J	1.7 J	1.4 J	0.91 J	0.93 J	5.7 J	1.7 J	1.8 J	2.1 J
Zinc	17.5 J	7.1 J	9.7 J	11.2 J	8.4 J	30.3	7.5 J	8 J	8.1 J
Inorganic & Nutrient Analytes (mg/l)									
Fluoride-T	0.19	0.24	0.24	0.24	0.24	0.15	0.38	0.38	0.38
Phosphorus -T	<0.02	0.032	<0.02	<0.02	0.05	0.04	NA	NA	NA

J - The analyte was positively identified, but the quantitation was below the reporting limit.

< - Not detected at or above the method detection limit (MDL) or the instrument detection limit (IDL) (MDL/IDL value reported with the less than symbol).

NA - Not analyzed.

Appendix Table 2. Chemical surface water sampling results (metals, fluoride, phosphorus) from streams sampled in the USEC/PORTS project area, October 17, 2005.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek
River Mile	**3.3**	**3.1**	**2.4**	**1.4**	**1.4**	**0.1**	**5.6**	**2.3**	**1.8**
Date Sampled	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005
Time Sampled	11:20 AM	11:40 AM	4:30 PM	5:00 PM	5:00 PM	1:40 PM	2:55 PM	2:35 PM	2:15 PM
					Duplicate				
TAL Metals (ug/l)									
Aluminum	65 J	93.4 J	28.6 J	42.2 J	41.7 J	33.4 J	88.7 J	161 J	133 J
Antimony	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1
Arsenic	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3
Barium	71.4	11.3	11.6	13.8	13.5	19.5	69.7	33.8	22.7
Beryllium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23
Calcium	31200	17400	17900	19600	19300	21700	31400	21800	21900
Chromium	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Cobalt	1.3 J	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Copper	<1.9	3.6 J	2.3 J	2.2 J	<1.9	<1.9	<1.9	<1.9	2.1 J
Iron	423	148 J	84.4 J	70.2 J	63.1 J	50.8 J	218	202	165
Lead	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
Magnesium	26800	18600	18700	19200	19000	19800	20000	19400	19900
Manganese	1660	18.8	22.2	12.4	12	11.4	555	57	25.4
Mercury	<0.062	<0.062	<0.062	<0.062	<0.062	<0.062	<0.062	<0.062	<0.062
Nickel	1.4 J	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4
Potassium	9640	3310	3420	3310	3360	3350	5690	3740	3370
Selenium	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3
Silver	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69
Sodium	25300	24300	24700	24800	24400	24400	20400	22900	24300
Thallium	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1
Vanadium	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Zinc	6.4 J	13.2 J	8.5 J	6.1 J	5.6 J	4.6 J	5.8 J	4.5 J	6.9 J
Inorganic & Nutrient Analytes (mg/l)									
Fluoride-T	0.14	0.17	0.17	0.17	0.17	0.17	0.15	0.17	0.16
Phosphorus -T	0.034	<0.02	<0.02	<0.02	<0.02	0.22	<0.02	<0.02	0.022

Appendix Table 2. Continued.

Stream	Big Beaver Creek	Big Run	Big Run	Big Run	Big Run	West Ditch	Scioto River	Scioto River	Scioto River
River Mile	1.3	4.8	4.3	4.3	4.0	1.2	30.0	27.0	23.4
Date Sampled	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005
Time Sampled	1:50 PM	12:00 PM	12:15 PM	12:15 PM	12:45 PM	1:10 PM	3:20 PM	3:45 PM	4:05 PM
				Duplicate					
TAL Metals (ug/l)									
Aluminum	80.9 J	66.1 J	33.3 J	34.6 J	87.8 J	1840	466	432	509
Antimony	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1
Arsenic	<7.3	7.4 J	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3
Barium	25.1	25.9	24.4	24.1	25.4	41.1	72.5	70.7	73.7
Beryllium	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23
Calcium	22300	28300	28800	28600	29300	28700	64800	64200	66500
Chromium	<1.2	<1.2	<1.2	<1.2	<1.2	2.9 J	1.2 J	<1.2	1.4 J
Cobalt	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Copper	<1.9	<1.9	2.2 J	1.9 J	<1.9	3.9 J	3.5 J	3.3 J	4.1 J
Iron	151	534	136 J	133 J	195	2460	628	617	688
Lead	<2.2	<2.2	<2.2	<2.2	<2.2	3 J	<2.2	2.4 J	<2.2
Magnesium	19300	25400	25600	25400	25800	20900	23300	23100	23700
Manganese	50.2	167	61.1	59.1	63.9	167	44.2	46	50
Mercury	<0.062	<0.062	<0.062	0.069 J	<0.062	<0.062	<0.062	<0.062	<0.062
Nickel	<1.4	<1.4	<1.4	<1.4	<1.4	2 J	1.4 J	1.7 J	1.8 J
Potassium	3370	4450	4580	4510	4590	3480	6090	6320	6360
Selenium	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3
Silver	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69
Sodium	23800	146000	147000	145000	145000	29000	38900	38800	40300
Thallium	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1
Vanadium	<1.5	<1.5	<1.5	<1.5	<1.5	4.6 J	<1.5	<1.5	1.9 J
Zinc	4.1 J	6.1 J	8.9 J	9.6 J	7.1 J	27.6	9.9 J	11.7 J	13.1 J
Inorganic & Nutrient Analytes (mg/l)									
Fluoride-T	0.17	0.21	0.19	0.21	0.21	0.14	0.3	0.28	0.3
Phosphorus -T	<0.02	0.099	0.057	0.064	0.042	0.29	NA	NA	NA

J - The analyte was positively identified, but the quantitation was below the reporting limit.

< - Not detected at or above the method detection limit (MDL) or the instrument detection limit (IDL) (MDL/IDL value reported with the less than symbol).

NA - Not analyzed.

Appendix Table 3. Chemical surface water sampling results (organics) from streams sampled in the USEC/PORTS project area, August and October, 2005.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Run	Big Run	West Ditch	West Ditch
River Mile	1.4	1.4	1.4	4.3	4.3	1.2	1.2
Date Sampled	8/29/2005	8/29/2005	10/17/2005	8/29/2005	10/17/2005	8/29/2005	10/17/2005
Time Sampled	1:30 PM	1:30 PM	5:00 PM	11:55 PM	12:15 PM	3:20 PM	1:10 PM
		Duplicate					
PCBs (ug/l)							
PCB-1016	<0.52	<0.52	<0.52	<0.51	<0.52	<0.52	<0.51
PCB-1221	<0.52	<0.52	<0.52	<0.51	<0.52	<0.52	<0.51
PCB-1232	<0.52	<0.52	<0.52	<0.51	<0.52	<0.52	<0.51
PCB-1242	<0.52	<0.52	<0.52	<0.51	<0.52	<0.52	<0.51
PCB-1248	<0.52	<0.52	<0.52	<0.51	<0.52	<0.52	<0.51
PCB-1254	<0.52	<0.52	<0.52	<0.51	<0.52	<0.52	<0.51
PCB-1260	<0.52	<0.52	<0.52	<0.51	<0.52	<0.52	<0.51
Volatile Organic Compounds (ug/l)							
1,1,1-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	<5	<5	<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	<5	<5	<5	<5	<5	<5	<5
1,2-Dibromo-3-Chloropropane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5	<5	<5	<5
1,4-Dichlorobenzene	<5	<5	<5	<5	<5	<5	<5
2-Butanone	<10	<10	<10	<10	<10	<10	<10
2-Hexanone	<10	<10	<10	<10	<10	<10	<10
4-Methyl-2-Pentanone	<10	<10	<10	<10	<10	<10	<10
Acetone	<10	<10	<10	<10	<10	<10	<10
Benzene	<5	<5	<5	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5	<5	<5	<5
Bromomethane	<10	<10	<10	<10	<10	<10	<10
Carbon Disulfide	<5	<5	<5	<5	<5	<5	<5

Appendix Table 3. Continued.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Run	Big Run	West Ditch	West Ditch
River Mile	1.4	1.4	1.4	4.3	4.3	1.2	1.2
Date Sampled	8/29/2005	8/29/2005	10/17/2005	8/29/2005	10/17/2005	8/29/2005	10/17/2005
Time Sampled	1:30 PM	1:30 PM	5:00 PM	11:55 PM	12:15 PM	3:20 PM	1:10 PM
Volatile Organic Compounds (ug/l)		Duplicate					
Carbon Tetrachloride	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5
Chloroethane	<10	<10	<10	<10	<10	<10	<10
Chloroform	<5	<5	<5	<5	<5	<5	<5
Chloromethane	<10	<10	<10	<10	<10	<10	<10
cis-1,2-Dichloroethene	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Cyclohexane	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	<5	<5	<5	<5	<5	<5	<5
Dichlorodifluoromethane	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5
Ethylene Dibromide	<5	<5	<5	<5	<5	<5	<5
Freon 113	<5	<5	<5	<5	<5	<5	<5
Isopropylbenzene	<5	<5	<5	<5	<5	<5	<5
Methyl Acetate	<5	<5	<5	<5	<5	<5	<5
Methylcyclohexane	<5	<5	<5	<5	<5	<5	<5
Methylene Chloride	<10	<10	<10	<10	<10	<10	<10
Styrene	<5	<5	<5	<5	<5	<5	<5
tert-butyl methyl ether	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5	<5	<5
trans-1,2-dichloroethene	<5	<5	<5	<5	<5	<5	<5
trans-1,3-dichloropropene	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	<5	<5	<5	<5	<5	<5	<5
Trichlorofluoromethane	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	<10	<10	<10	<10	<10	<10	<10
Xylenes, Total	<5	<5	<5	<5	<5	<5	<5
Semivolatile Organic Compounds (ug/l)							
1,1- Biphenyl	<10	<10	<10	<10	<10	<10	<10
2,2-Oxybis(1-Chloropropane)	<10	<10	<10	<10	<10	<10	<10
2,4,5-Trichlorophenol	<10	<10	<10	<10	<10	<10	<10

Appendix Table 3. Continued.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Run	Big Run	West Ditch	West Ditch
River Mile	1.4	1.4	1.4	4.3	4.3	1.2	1.2
Date Sampled	8/29/2005	8/29/2005	10/17/2005	8/29/2005	10/17/2005	8/29/2005	10/17/2005
Time Sampled	1:30 PM	1:30 PM	5:00 PM	11:55 PM	12:15 PM	3:20 PM	1:10 PM
Semivolatile Organic Compounds (ug/l)		Duplicate					
2,4,6-Trichlorophenol	<10	<10	<10	<10	<10	<10	<10
2,4-Dichlorophenol	<10	<10	<10	<10	<10	<10	<10
2,4-Dimethylphenol	<10	<10	<10	<10	<10	<10	<10
2,4-Dinitrophenol	<21	<21	<21	<21	<21	<21	<21
2,4-Dinitrotoluene	<10	<10	<10	<10	<10	<10	<10
2,6-Dinitrotoluene	<10	<10	<10	<10	<10	<10	<10
2-Chloronaphthalene	<10	<10	<10	<10	<10	<10	<10
2-Chlorophenol	<10	<10	<10	<10	<10	<10	<10
2-Methylnaphthalene	<10	<10	<10	<10	<10	<10	<10
2-methylphenol	<10	<10	<10	<10	<10	<10	<10
2-Nitroaniline	<10	<10	<10	<10	<10	<10	<10
2-Nitrophenol	<10	<10	<10	<10	<10	<10	<10
3,3-Dichlorobenzidine	<21	<21	<21	<21	<21	<21	<21
3-Nitroaniline	<10	<10	<10	<10	<10	<10	<10
4,6-dinitro-2-methyl phenol	<21	<21	<21	<21	<21	<21	<21
4-Bromophenyl-phenylether	<10	<10	<10	<10	<10	<10	<10
4-chloro-3-methylphenol	<10	<10	<10	<10	<10	<10	<10
4-Chloroaniline	<10	<10	<10	<10	<10	<10	<10
4-Chlorophenyl Phenyl Ether	<10	<10	<10	<10	<10	<10	<10
4-methylphenol	<10	<10	<10	<10	<10	<10	<10
4-Nitroaniline	<10	<10	<10	<10	<10	<10	<10
4-Nitrophenol	<21	<21	<21	<21	<21	<21	<21
Acenaphthene	<10	<10	<10	<10	<10	<10	<10
Acenaphthylene	<10	<10	<10	<10	<10	<10	<10
Acetophenone	<10	<10	<10	<10	<10	<10	<10
Anthracene	<10	<10	<10	<10	<10	<10	<10
Atrazine	<10	<10	<10	<10	<10	<10	<10
Benzaldehyde	<10	<10	<10	<10	<10	<10	<10
Benzo(a)anthracene	<10	<10	<10	<10	<10	<10	<10
Benzo(a)pyrene	<10	<10	<10	<10	<10	<10	<10
Benzo(b)fluoranthene	<10	<10	<10	<10	<10	<10	<10
Benzo(g,h,i)perylene	<10	<10	<10	<10	<10	<10	<10

Appendix Table 3. Continued.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Run	Big Run	West Ditch	West Ditch
River Mile	1.4	1.4	1.4	4.3	4.3	1.2	1.2
Date Sampled	8/29/2005	8/29/2005	10/17/2005	8/29/2005	10/17/2005	8/29/2005	10/17/2005
Time Sampled	1:30 PM	1:30 PM	5:00 PM	11:55 PM	12:15 PM	3:20 PM	1:10 PM
Semivolatile Organic Compounds (ug/l)		Duplicate					
Benzo(k)fluoranthene	<10	<10	<10	<10	<10	<10	<10
Benzyl Butyl Phthalate	<10	<10	<10	<10	<10	<10	<10
bis(2-chloroethoxy) methane	<10	<10	<10	<10	<10	<10	<10
bis(2-chloroethyl) ether	<10	<10	<10	<10	<10	<10	<10
bis(2-ethylhexyl) phthalate	<10	<10	**2.2 J**	<10	**29**	**2.3 J**	**2.9 J**
Caprolactam	<10	<10	<10	<10	<10	<10	<10
Carbazole	<10	<10	<10	<10	<10	<10	<10
Chrysene	<10	<10	<10	<10	<10	<10	<10
Dibenz(a,h)Anthracene	<10	<10	<10	<10	<10	<10	<10
Dibenzofuran	<10	<10	<10	<10	<10	<10	<10
Diethyl Phthalate	<10	<10	<10	<10	<10	<10	<10
Dimethyl Phthalate	<10	<10	<10	<10	<10	<10	<10
di-n-Butyl Phthalate	<10	<10	<10	<10	<10	<10	<10
di-n-Octyl Phthalate	<10	<10	<10	<10	<10	<10	<10
Fluoranthene	<10	<10	<10	<10	<10	<10	<10
Fluorene	<10	<10	<10	<10	<10	<10	<10
Hexachlorobenzene	<10	<10	<10	<10	<10	<10	<10
Hexachlorobutadiene	<10	<10	<10	<10	<10	<10	<10
Hexachlorocyclopentadiene	<10	<10	<10	<10	<10	<10	<10
Hexachloroethane	<10	<10	<10	<10	<10	<10	<10
Indeno(1,2,3-c,d)Pyrene	<10	<10	<10	<10	<10	<10	<10
Isophorone	<10	<10	<10	<10	<10	<10	<10
Naphthalene	<10	<10	<10	<10	<10	<10	<10
Nitrobenzene	<10	<10	<10	<10	<10	<10	<10
n-Nitrosodi-n-Propylamine	<10	<10	<10	<10	<10	<10	<10
n-Nitrosodiphenylamine	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	<21	<21	<21	<21	<21	<21	<21
Phenanthrene	<10	<10	<10	<10	<10	<10	<10
Phenol	<10	<10	<10	<10	<10	<10	<10
Pyrene	<10	<10	<10	<10	<10	<10	<10

J - The analyte was positively identified, but the quantitation was below the reporting limit but greater than the MDL.

< - Not detected at or above the method detection limit (MDL).

Appendix Table 4. Chemical surface water sampling results (radiologicals) from streams sampled in the USEC/PORTS project area, August 29, 2005.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek
River Mile	**3.3**	**3.1**	**2.4**	**1.4**	**1.4**	**0.1**	**5.6**	**2.3**	**1.8**
Date Sampled	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005
Time Sampled	10:35 AM	11:00 AM	1:10 PM	1:30 PM	1:30 PM	2:10 PM	3:50 PM	2:25 PM	3:05 PM
Radiologicals					Duplicate				
Gross alpha (pCi/l)	3.83 J	3.45 J	2.42 J	2.43 J	2.87 J	2.85 J	2.48 J	3.23 J	3.30 J
Gross beta (pCi/l)	9.27 J	12.5	11.3 J	5.94 J	5.76 J	6.73 J	9.24 J	5.40 J	6.27 J
Technetium-99(pCi/l)	22.1	38	34	34	16 J	21.3 J	<14.7	17.6 J	16.1 J
Total Uranium (ug/l)	0.164	0.44	0.415	0.549	0.536	0.845	0.464	0.688	0.858
Uranium-234 (pCi/l)	NA	NA	NA	0.757	0.628	NA	0.311	NA	NA
Uranium-235 (pCi/l)	NA	NA	NA	0.0512 J	0.0323 J	NA	0.0355 J	NA	NA
Uranium-238 (pCi/l)	NA	NA	NA	0.242	0.178	NA	0.176	NA	NA
Plutonium-238 (pCi/l)	NA	NA	NA	<0.0357	<0.0192	NA	<0.0316	NA	NA
Plutonium-239 (pCi/l)	NA	NA	NA	<0.0255	<0.0209	NA	<0.0316	NA	NA
Americium-241 (pCi/l)	NA	NA	NA	<0.016	<0.024	NA	<0.0256	NA	NA
Neptunium-237 (pCi/l)	NA	NA	NA	<0.131	<0.147	NA	<0.112	NA	NA

Stream	Big Beaver Creek	Big Run	Big Run	Big Run	Big Run	West Ditch	Scioto River	Scioto River	Scioto River
River Mile	**1.3**	**4.8**	**4.3**	**4.3**	**4.0**	**1.2**	**30.0**	**27.0**	**23.4**
Date Sampled	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005	8/29/2005
Time Sampled	2:45 PM	12:25 PM	11:55 PM	11:55 PM	11:40 PM	3:20 PM	4:10 PM	4:35 PM	5:00 PM
Radiologicals				Duplicate					
Gross alpha (pCi/l)	2.51 J	<2.24	3.21 J	<1.95	2.59 J	5.93 J	<2.36	<5.13	2.36 J
Gross beta (pCi/l)	6.76 J	<2.75	2.9 J	4.19 J	3.40 J	6.31 J	6.38 J	<5.86	5.95 J
Technetium-99(pCi/l)	22.2	25.3	19.4 J	14.0 J	20.8 J	22.0 J	17.0 J	20.1 J	20.1 J
Total Uranium (ug/l)	0.874	0.712	0.697	0.674	0.669	0.621	1.51	1.45	1.5
Uranium-234 (pCi/l)	NA	NA	0.838	NA	NA	0.581	0.729	NA	NA
Uranium-235 (pCi/l)	NA	NA	0.0534 J	NA	NA	0.0253 J	0.0278 J	NA	NA
Uranium-238 (pCi/l)	NA	NA	0.267	NA	NA	0.334	0.455	NA	NA
Plutonium-238 (pCi/l)	NA	NA	<0.0357	NA	NA	<0.0272	<0.0415	NA	<0.0288
Plutonium-239 (pCi/l)	NA	NA	<0.039	NA	NA	<0.0296	<0.0455	NA	<0.0314
Americium-241 (pCi/l)	NA	NA	<0.0242	NA	NA	<0.0217	<0.0251	NA	<0.0285
Neptunium-237 (pCi/l)	NA	NA	0.0756 J	NA	NA	<0.105	<0.0982	NA	0.0436 J

J - The analyte was positively identified, but the quantitation was below the reporting limit.

< - Not detected at or above the method detection limit (MDL) or the instrument detection limit (IDL) (MDL/IDL value reported with the less than symbol).

NA - Not analyzed.

Appendix Table 5. Chemical surface water sampling results (radiologicals) from streams sampled in the USEC/PORTS project area, October 17, 2005.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek
River Mile	**3.3**	**3.1**	**2.4**	**1.4**	**1.4**	**0.1**	**5.6**	**2.3**	**1.8**
Date Sampled	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005
Time Sampled	11:20 AM	11:40 AM	4:30 PM	5:00 PM	5:00 PM	1:40 PM	2:55 PM	2:35 PM	2:15 PM
Radiologicals					Duplicate				
Gross alpha (pCi/l)	<1.70	1.21 J	<1.55	1.88 J	1.84 J	2.64 J	<1.36	1.44 J	2.43 J
Gross beta (pCi/l)	10.3 J	2.64 J	2.92 J	3.69 J	3.78 J	5.44 J	5.98 J	4.95 J	4.14 J
Technetium-99(pCi/l)	<15.9	<11.8	<11.8	<12.2	11.9 J	<11.4	<14.5	12.1 J	<11.5
Total Uranium (ug/l)	<0.161	0.284	0.333	0.843	0.841	0.922	0.506	0.551	0.963
Uranium-234 (pCi/l)	NA	NA	NA	1.21	NA	NA	0.247	NA	NA
Uranium-235 (pCi/l)	NA	NA	NA	0.108	NA	NA	<0.0404	NA	NA
Uranium-238 (pCi/l)	NA	NA	NA	0.286	NA	NA	0.174	NA	NA
Plutonium-238 (pCi/l)	NA	NA	NA	<0.047	NA	NA	<0.0470	NA	NA
Plutonium-239 (pCi/l)	NA	NA	NA	<0.0504	NA	NA	<0.0369	NA	NA
Americium-241 (pCi/l)	NA	NA	NA	<0.0247	NA	NA	<0.0241	NA	NA
Neptunium-237 (pCi/l)	NA	NA	NA	<0.151	NA	NA	<0.190	NA	NA

Stream	Big Beaver Creek	Big Run	Big Run	Big Run	Big Run	West Ditch	Scioto River	Scioto River	Scioto River
River Mile	**1.3**	**4.8**	**4.3**	**4.3**	**4.0**	**1.2**	**30.0**	**27.0**	**23.4**
Date Sampled	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005	10/17/2005
Time Sampled	1:50 PM	12:00 PM	12:15 PM	12:15 PM	12:45 PM	1:10 PM	3:20 PM	3:45 PM	4:05 PM
Radiologicals				Duplicate					
Gross alpha (pCi/l)	2.68 J	<2.81	<3.72	<3.29	<4.13	<2.16	<2.77	4.78 J	<1.81
Gross beta (pCi/l)	5.12 J	5.70 J	5.55 J	5.18 J	3.43 J	<2.36	5.70 J	7.06 J	8.04 J
Technetium-99(pCi/l)	<12.7	<15.8	<12.4	<15.0	<13.6	<15.7	<19.6	<12.3	<15.5
Total Uranium (ug/l)	0.851	0.514	0.479	0.454	0.504	1.36	1.61	1.55	1.56
Uranium-234 (pCi/l)	NA	NA	0.429	NA	NA	0.824	0.521	NA	0.648
Uranium-235 (pCi/l)	NA	NA	0.0913 J	NA	NA	0.0788 J	0.0744 J	NA	<0.0429
Uranium-238 (pCi/l)	NA	NA	0.163	NA	NA	0.441	0.449	NA	0.386
Plutonium-238 (pCi/l)	NA	NA	<1.4	NA	NA	<0.0621	<0.0374	NA	<0.0328
Plutonium-239 (pCi/l)	NA	NA	<1.22	NA	NA	<0.070	<0.0332	NA	<0.0353
Americium-241 (pCi/l)	NA	NA	<0.0282	NA	NA	<0.0217	<0.0256	NA	<0.0254
Neptunium-237 (pCi/l)	NA	NA	<0.139	NA	NA	<0.0857	<0.158	NA	<0.0916

J - The analyte was positively identified, but the quantitation was below the reporting limit.

< - Not detected at or above the method detection limit (MDL) or the instrument detection limit (IDL) (MDL/IDL value reported with the less than symbol).

NA - Not analyzed.

Appendix Table 6. Sediment sampling results (metals, fluoride) from streams sampled in the USEC/PORTS project area, November, 2005.

Stream	**Little Beaver Creek**	**Little Beaver Creek**	**Little Beaver Creek**	**Little Beaver Creek**	**Little Beaver Creek**	**Big Beaver Creek**	**Big Beaver Creek**	**Big Beaver Creek**	**Big Beaver Creek**
River Mile	**3.3**	**3.1**	**2.4**	**1.4**	**0.1**	**5.6**	**2.3**	**2.3**	**1.8**
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/2/2005	11/2/2005	11/2/2005
Time Sampled	NA	3:45 PM	2:55 PM	2:15 PM	11:30 AM	12:25 PM	12:10 PM	12:10 PM	1:30 PM
								Duplicate	
TAL Metals (mg/kg)									
Aluminum	NO SEDIMENT	8250	10200	8590	8010	5120	7650	7160	6830
Antimony		1.4 JN	1.3 JN	1.3 JN	0.73 JN	0.56 JN	0.47 JN	0.29 JN	0.57 JN
Arsenic		33.3 N*	24.9 N*	20.1 N*	17.4 N*	10.4	6.7 N*	7.3 N*	9.1 N*
Barium		48.9	67.7	69.7	77.3	49.6	60	55.9	50.8
Beryllium		1 E	1.1 E	0.84 E	0.9 E	0.5 E	0.52 E	0.52 E	0.53 E
Cadmium		<0.025	0.85	0.53 J	0.62	0.1 J	0.15 J	0.18 J	0.23 J
Calcium		2040 *	2040 *	5570 *	4240 *	2330	4190 *	4040 *	15000 *
Chromium		27.5	48.8	29.8	21.4	9.6	11.4	10.7	11.9
Cobalt		18.2	23.4	17.2	16	9.3	9.4	9.6	9.5
Copper		27.7	34.4	20.2	18.3	8.1	10.2	10.1	12.4
Iron		42500	34800	29300	37700	16700	14200	14500	15800
Lead		25	23.4	19.1	15.4	13.2	10.1	10.2	11
Magnesium		1640 *	2050 *	3070 *	3110 *	1740	3120 *	2930 *	6770 *
Manganese		623	646	618	674	282	294	287	347
Mercury		0.045 J	0.064	0.055	0.037 J	0.02 J	0.019 J	0.02 J	0.027 J
Nickel		20.4 E	51.3 E	37 E	40.4 E	14.8	18.1 E	18.5 E	19.8 E
Potassium		974 N	1560 N	1020 N	1160 N	767 N	1060 N	986 N	1000 N
Selenium		<0.52	0.73 J	<0.45	<0.49	<0.46	<0.44	<0.42	<0.44
Silver		<0.052	<0.062	<0.045	<0.049	<0.046	<0.044	<0.042	<0.044
Sodium		141 J	166 J	114 J	144 J	90.6 J	103 J	110 J	111 J
Thallium		<0.63	<0.75	<0.54	<0.59	<0.56	<0.53	<0.51	<0.53
Vanadium		51.5 N	58.8 N	40.9 N	35.2 N	19.8 N	23.6 N	22.3 N	23 N
Zinc		138 E	296 E	165 E	141 E	47.1	54.8 E	55.2 E	67.2 E
Other)									
Fluoride-T (mg/kg)		<1.6	<2	<1.5	<1.5	<1.5	<1.4	<1.4	<1.2
Percent Solids		55	49	66	58	61	65	65	70

Appendix Table 6. Continued.

Stream	Big Beaver Creek	Big Run	Big Run	Big Run	West Ditch	West Ditch	Scioto River	Scioto River	Scioto River
River Mile	**1.3**	**4.8**	**4.3**	**4.0**	**1.2**	**1.2**	**30.0**	**27.0**	**23.4**
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/28/2005	11/28/2005
Time Sampled	1:05 PM	4:35 PM	9:00 AM	9:45 AM	10:30 AM	10:30 AM	11:45 AM	11:15 AM	10:20 AM
TAL Metals (mg/kg)						Duplicate			
Aluminum	7210	11200	8650	8130	8410	8850	6870	6260	4970
Antimony	0.75 JN	1.3 JN	1.5 JN	1.1 JN	0.78 JN	0.83 JN	0.76 JN	0.77 JN	0.75 JN
Arsenic	9 N*	30.1 N*	42.3 N*	25.5 N*	9.9 N*	11.2 N*	9.3	9.7	8
Barium	57.1	62.4	66.9	49	50.9	53	74.7	65.8	49.8
Beryllium	0.53 E	1.2 E	1.1 E	1 E	0.53 E	0.57 E	0.49 E	0.45 E	0.37 E
Cadmium	0.26 J	0.13 J	<0.024	0.027 J	0.14 J	0.088 J	0.34 J	0.39 J	0.23 J
Calcium	10500 *	5670 *	5160 *	1910 *	3850 *	3980 *	38000	34400	40400
Chromium	12.1	21.2	23.1	20.5	13.5	16	12.4	10.3	9.2
Cobalt	10.2	20.6	25.7	18	9	9.6	7.3	7.5	6.1
Copper	11.7	30.3	17.8	15.2	15.6	16.4	18.2	15	12.4
Iron	16700	29900	40100	29500	17700	19400	17400	15800	14100
Lead	10.2	20.8	24.2	19.7	13.2	14.9	21.9	17.7	23.9
Magnesium	5130 *	3410 *	2840 *	1500 *	2950 *	3070 *	13500	12100	13500
Manganese	506	553	1770 D	566	300	320	474	468	371
Mercury	0.017 J	0.031 J	0.026 J	0.029 J	0.019 J	0.018 J	0.049 J	0.097	0.024 J
Nickel	20.6 E	26.3 E	24.9 E	24.2 E	18 E	19.2 E	18.9	18.5	15.2
Potassium	1020 N	1060 N	807 N	724 N	986 N	1030 N	1190 N	992 N	881 N
Selenium	<0.44	1.2 J	0.84 J	<0.49	<0.46	<0.47	<0.54	<0.45	<0.39
Silver	<0.044	<0.06	<0.049	<0.049	<0.046	<0.047	<0.054	<0.045	<0.039
Sodium	102 J	361	279	268	113 J	127 J	142 J	107 J	107 J
Thallium	<0.54	<0.73	<3 D	<0.59	<0.56	<0.57	<0.66	<0.54	<0.48
Vanadium	23.2 N	42 N	49.4 N	38.3 N	25.4 N	28.1 N	19.5 N	17.6 N	16.4 N
Zinc	68 E	185 E	172 E	102 E	123 E	129 E	93.5	74.8	62.7
Other)									
Fluoride-T (mg/kg)	<1.5	<2	<1.4	<1.6	<1.3	<1.5	<1.7	<1.3	<1.5
Percent Solids	60	46	62	57	63	60	56	65	65

J - The analyte was positively identified, but the quantitation was below the reporting limit.

< - Not detected at or above the method detection limit (MDL) or the instrument detection limit (IDL) (MDL/IDL value reported with the less than symbol).

D - Indicates the analyte was reported from a diluted analysis.

E - Indicates that the reported value is estimated because of the possible presence of interference.

N- Spiked sample recovery not within control limits.

* - Duplicate analysis not within control limits.

Appendix Table 7. Sediment sampling results (volatile organics) from streams sampled in the USEC/PORTS project area, November 2, 2005.

Stream	Little Beaver Creek	Big Run	West Ditch	West Ditch
River Mile	**1.4**	**4.3**	**1.2**	**1.2**
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005
Time Sampled	2:15 PM	9:00 AM	10:30 AM	10:30 AM
Volatile Organic Compounds (ug/kg)				Duplicate
1,1,1-Trichloroethane	<7.6	<8	<7.9	<8.3
1,1,2,2-Tetrachloroethane	<7.6	<8	<7.9	<8.3
1,1,2-Trichloroethane	<7.6	<8	<7.9	<8.3
1,1-Dichloroethane	<7.6	<8	<7.9	<8.3
1,1-Dichloroethene	<7.6	<8	<7.9	<8.3
1,2,4-Trichlorobenzene	<7.6	<8	<7.9	<8.3
1,2-Dibromo-3-Chloropropane	<7.6	<8	<7.9	<8.3
1,2-Dichlorobenzene	<7.6	<8	<7.9	<8.3
1,2-Dichloroethane	<7.6	<8	<7.9	<8.3
1,2-Dichloropropane	<7.6	<8	<7.9	<8.3
1,3-Dichlorobenzene	<7.6	<8	<7.9	<8.3
1,4-Dichlorobenzene	<7.6	<8	<7.9	<8.3
2-Butanone	<15	<16	<16	<17
2-Hexanone	<15	<16	<16	<17
4-Methyl-2-Pentanone	<15	<16	<16	<17
Acetone	<15	<16	<16	<17
Benzene	<7.6	<8	<7.9	<8.3
Bromodichloromethane	<7.6	<8	<7.9	<8.3
Bromoform	<7.6	<8	<7.9	<8.3
Bromomethane	<15	<16	<16	<17
Carbon Disulfide	<7.6	<8	<7.9	<8.3
Carbon Tetrachloride	<7.6	<8	<7.9	<8.3
Chlorobenzene	<7.6	<8	<7.9	<8.3
Chloroethane	<15	<16	<16	<17
Chloroform	<7.6	<8	<7.9	<8.3
Chloromethane	<15	<16	<16	<17
cis-1,2-Dichloroethene	<7.6	<8	<7.9	<8.3
cis-1,3-Dichloropropene	<7.6	<8	<7.9	<8.3
Cyclohexane	<7.6	<8	<7.9	<8.3
Dibromochloromethane	<7.6	<8	<7.9	<8.3
Dichlorodifluoromethane	<7.6	<8	<7.9	<8.3
Ethylbenzene	<7.6	<8	<7.9	<8.3
Ethylene Dibromide	<7.6	<8	<7.9	<8.3
Freon 113	<7.6	<8	<7.9	<8.3
Isopropylbenzene	<7.6	<8	<7.9	<8.3
Methyl Acetate	<7.6	<8	<7.9	<8.3
Methylcyclohexane	<7.6	<8	<7.9	<8.3
Methylene Chloride	<15	<16	<16	<17
Styrene	<7.6	<8	<7.9	<8.3
tert-butyl methyl ether	<7.6	<8	<7.9	<8.3
Tetrachloroethylene	<7.6	<8	<7.9	<8.3
Toluene	<7.6	<8	<7.9	<8.3
trans-1,2-dichloroethene	<7.6	<8	<7.9	<8.3
trans-1,3-dichloropropene	<7.6	<8	<7.9	<8.3
Trichloroethene	<7.6	<8	<7.9	<8.3
Trichlorofluoromethane	<7.6	<8	<7.9	<8.3
Vinyl Chloride	<15	<16	<16	<17
Xylenes, Total	<7.6	<8	<7.9	<8.3

< - Not detected at or above the method detection limit (MDL value reported with the less than symbol).

Appendix Table 8. Sediment sampling results for semivolatile organic compounds from streams sampled in the USEC/PORTS project area, November, 2005.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek
River Mile	3.3	3.1	2.4	1.4	0.1	5.6	2.3	2.3	1.8
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/2/2005	11/2/2005	11/2/2005
Time Sampled	NA	3:45 PM	2:55 PM	2:15 PM	11:30 AM	12:25 PM	12:10 PM	12:10 PM	1:30 PM
								Duplicate	
Semivolatile Organic Compounds (ug/kg)									
1,1- Biphenyl	NO	<600	<680	<510	<580	<550	<510	<510	<470
2,2-Oxybis(1-Chloropropane)	SEDIMENT	<600	<680	<510	<580	<550	<510	<510	<470
2,4,5-Trichlorophenol		<600	<680	<510	<580	<550	<510	<510	<470
2,4,6-Trichlorophenol		<600	<680	<510	<580	<550	<510	<510	<470
2,4-Dichlorophenol		<600	<680	<510	<580	<550	<510	<510	<470
2,4-Dimethylphenol		<600	<680	<510	<580	<550	<510	<510	<470
2,4-Dinitrophenol		<1200	<1400	<1000	<1200	<1100	<1000	<1000	<950
2,4-Dinitrotoluene		<600	<680	<510	<580	<550	<510	<510	<470
2,6-Dinitrotoluene		<600	<680	<510	<580	<550	<510	<510	<470
2-Chloronaphthalene		<600	<680	<510	<580	<550	<510	<510	<470
2-Chlorophenol		<600	<680	<510	<580	<550	<510	<510	<470
2-Methylnaphthalene		<600	<680	70 J	<580	<550	<510	<510	<470
2-methylphenol		<600	<680	<510	<580	<550	<510	<510	<470
2-Nitroaniline		<600	<680	<510	<580	<550	<510	<510	<470
2-Nitrophenol		<600	<680	<510	<580	<550	<510	<510	<470
3,3-Dichlorobenzidine		<1200	<1400	<1000	<1200	<1100	<1000	<1000	<950
3-Nitroaniline		<600	<680	<510	<580	<550	<510	<510	<470
4,6-dinitro-2-methyl phenol		<1200	<1400	<1000	<1200	<1100	<1000	<1000	<950
4-Bromophenyl-phenylether		<600	<680	<510	<580	<550	<510	<510	<470
4-chloro-3-methylphenol		<600	<680	<510	<580	<550	<510	<510	<470
4-Chloroaniline		<600	<680	<510	<580	<550	<510	<510	<470
4-Chlorophenyl Phenyl Ether		<600	<680	<510	<580	<550	<510	<510	<470
4-methylphenol		<600	<680	<510	<580	<550	<510	<510	<470
4-Nitroaniline		<600	<680	<510	<580	<550	<510	<510	<470
4-Nitrophenol		<1200	<1400	<1000	<1200	<1100	<1000	<1000	<950
Acenaphthene		<600	260 J	340 J	65 J	<550	<510	<510	<470
Acenaphthylene		<600	<680	<510	<580	<550	<510	<510	<470
Acetophenone		<600	<680	<510	<580	<550	<510	<510	<470
Anthracene		85 J	470 J	570	140 J	<550	<510	<510	<470
Atrazine		<600	<680	<510	<580	<550	<510	<510	<470
Benzaldehyde		<600	<680	<510	<580	<550	<510	<510	<470
Benzo(a)anthracene		250 J	1300	1600	290 J	<550	<510	<510	56 J

Appendix Table 8. Continued.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek
River Mile	3.3	3.1	2.4	1.4	0.1	5.6	2.3	2.3	1.8
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/2/2005	11/2/2005	11/2/2005
Time Sampled	NA	3:45 PM	2:55 PM	2:15 PM	11:30 AM	12:25 PM	12:10 PM	12:10 PM	1:30 PM
Semivolatile Organic Compounds (ug/kg)								Duplicate	
Benzo(a)pyrene	NO	200 J	960	1000	200 J	<550	<510	<510	37 J
Benzo(b)fluoranthene	SEDIMENT	260 J	1300	1300	280 J	<550	<510	<510	51 J
Benzo(g,h,i)perylene		110 J	410 J	540	<580	<550	<510	<510	<470
Benzo(k)fluoranthene		120 J	350 J	550	76 J	<550	<510	<510	24 J
Benzyl Butyl Phthalate		<600	<680	<510	<580	<550	<510	<510	<470
bis(2-chloroethoxy) methane		<600	<680	<510	<580	<550	<510	<510	<470
bis(2-chloroethyl) ether		<600	<680	<510	<580	<550	<510	<510	<470
bis(2-ethylhexyl) phthalate		<600	<680	<510	<580	<550	<510	<510	<470
Caprolactam		<600	<680	<510	<580	<550	<510	<510	<470
Carbazole		<600	420 J	440 J	<580	<550	<510	<510	<470
Chrysene		260 J	1200	1300	250 J	<550	<510	<510	49 J
Dibenz(a,h)Anthracene		<600	<680	180 J	<580	<550	<510	<510	<470
Dibenzofuran		<600	170	210 J	<580	<550	<510	<510	<470
Diethyl Phthalate		<600	<680	<510	<580	<550	<510	<510	<470
Dimethyl Phthalate		<600	<680	<510	<580	<550	<510	<510	<470
di-n-Butyl Phthalate		<600	<680	<510	<580	<550	<510	<510	<470
di-n-Octyl Phthalate		<600	<680	<510	<580	<550	<510	<510	<470
Fluoranthene		620	3500	3300	620	<550	77 J	<510	120 J
Fluorene		42 J	250 J	300 J	56 J	<550	<510	<510	<470
Hexachlorobenzene		<600	<680	<510	<580	<550	<510	<510	<470
Hexachlorobutadiene		<600	<680	<510	<580	<550	<510	<510	<470
Hexachlorocyclopentadiene		<600	<680	<510	<580	<550	<510	<510	<470
Hexachloroethane		<600	<680	<510	<580	<550	<510	<510	<470
Indeno(1,2,3-c,d)Pyrene		<600	420 J	520	91 J	<550	<510	<510	<470
Isophorone		<600	<680	<510	<580	<550	<510	<510	<470
Naphthalene		<600	74 J	150 J	<580	<550	<510	<510	<470
Nitrobenzene		<600	<680	<510	<580	<550	<510	<510	<470
n-Nitrosodi-n-Propylamine		<600	<680	<510	<580	<550	<510	<510	<470
n-Nitrosodiphenylamine		<600	<680	<510	<580	<550	<510	<510	<470
Pentachlorophenol		<1200	<1400	<1000	<1200	<1100	<1000	<1000	<950
Phenanthrene		420 J	2900	2900	590	<550	<510	<510	74 J
Phenol		<600	<680	<510	<580	<550	<510	<510	<470
Pyrene		520 J	2300	2400	530 J	<550	<510	<510	88 J

Appendix Table 8. Continued.

Stream	Big Beaver Creek	Big Run	Big Run	Big Run	West Ditch	West Ditch	Scioto River	Scioto River	Scioto River
River Mile	1.3	4.8	4.3	4.0	1.2	1.2	30.0	27.0	23.4
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/28/2005	11/28/2005
Time Sampled	1:05 PM	4:35 PM	9:00 AM	9:45 AM	10:30 AM	10:30 AM	11:45 AM	11:15 AM	10:20 AM
Semivolatile Organic Compounds (ug/kg)						Duplicate			
1,1- Biphenyl	<550	<720	<530	<590	<530	<550	<600	<510	<510
2,2-Oxybis(1-Chloropropane)	<550	<720	<530	<590	<530	<550	<600	<510	<510
2,4,5-Trichlorophenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
2,4,6-Trichlorophenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
2,4-Dichlorophenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
2,4-Dimethylphenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
2,4-Dinitrophenol	<1100	<1400	<1100	<1200	<1100	<1100	<1200	<1000	<1000
2,4-Dinitrotoluene	<550	<720	<530	<590	<530	<550	<600	<510	<510
2,6-Dinitrotoluene	<550	<720	<530	<590	<530	<550	<600	<510	<510
2-Chloronaphthalene	<550	<720	<530	<590	<530	<550	<600	<510	<510
2-Chlorophenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
2-Methylnaphthalene	<550	<720	<530	<590	<530	<550	<600	<510	<510
2-methylphenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
2-Nitroaniline	<550	<720	<530	<590	<530	<550	<600	<510	<510
2-Nitrophenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
3,3-Dichlorobenzidine	<1100	<1400	<1100	<1200	<1100	<1100	<1200	<1000	<1000
3-Nitroaniline	<550	<720	<530	<590	<530	<550	<600	<510	<510
4,6-dinitro-2-methyl phenol	<1100	<1400	<1100	<1200	<1100	<1100	<1200	<1000	<1000
4-Bromophenyl-phenylether	<550	<720	<530	<590	<530	<550	<600	<510	<510
4-chloro-3-methylphenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
4-Chloroaniline	<550	<720	<530	<590	<530	<550	<600	<510	<510
4-Chlorophenyl Phenyl Ether	<550	<720	<530	<590	<530	<550	<600	<510	<510
4-methylphenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
4-Nitroaniline	<550	<720	<530	<590	<530	<550	<600	<510	<510
4-Nitrophenol	<1100	<1400	<1100	<1200	<1100	<1100	<1200	<1000	<1000
Acenaphthene	<550	<720	<530	<590	56 J	160 J	<600	<510	<510
Acenaphthylene	<550	<720	<530	<590	<530	<550	<600	<510	<510
Acetophenone	<550	<720	<530	<590	<530	<550	<600	<510	<510
Anthracene	<550	<720	<530	<590	100 J	280 J	99 J	<510	<510
Atrazine	<550	<720	<530	<590	<530	<550	<600	<510	<510
Benzaldehyde	<550	<720	<530	<590	<530	<550	<600	<510	<510
Benzo(a)anthracene	110 J	<720	<530	<590	330 J	690	110 J	73 J	52 J
Benzo(a)pyrene	73 J	<720	<530	<590	290 J	620	130 J	<510	66 J

Appendix Table 8. Continued.

Stream	Big Beaver Creek	Big Run	Big Run	Big Run	West Ditch	West Ditch	Scioto River	Scioto River	Scioto River
River Mile	1.3	4.8	4.3	4.0	1.2	1.2	30.0	27.0	23.4
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/28/2005	11/28/2005
Time Sampled	1:05 PM	4:35 PM	9:00 AM	9:45 AM	10:30 AM	10:30 AM	11:45 AM	11:15 AM	10:20 AM
Semivolatile Organic Compounds (ug/kg)						Duplicate			
Benzo(b)fluoranthene	89 J	<720	<530	<590	490 J	820	280 J	150 J	130 J
Benzo(g,h,i)perylene	<550	<720	<530	<590	140 J	300 J	<600	<510	<510
Benzo(k)fluoranthene	39 J	<720	<530	<590	<530	280 J	<600	<510	<510
Benzyl Butyl Phthalate	<550	<720	<530	<590	<530	<550	<600	<510	<510
bis(2-chloroethoxy) methane	<550	<720	<530	<590	<530	<550	<600	<510	<510
bis(2-chloroethyl) ether	<550	<720	<530	<590	<530	<550	<600	<510	<510
bis(2-ethylhexyl) phthalate	<550	550 J	<530	<590	<530	460 J	200 J	110 J	85 J
Caprolactam	<550	<720	<530	<590	<530	<550	<600	<510	<510
Carbazole	<550	<720	<530	<590	<530	220 J	<600	<510	<510
Chrysene	81 J	<720	<530	<590	290 J	770	140 J	88 J	59 J
Dibenz(a,h)Anthracene	<550	<720	<530	<590	<530	75 J	<600	<510	<510
Dibenzofuran	<550	<720	<530	<590	<530	120 J	<600	<510	<510
Diethyl Phthalate	<550	<720	<530	<590	<530	<550	<600	<510	<510
Dimethyl Phthalate	<550	<720	<530	<590	<530	<550	<600	<510	<510
di-n-Butyl Phthalate	<550	<720	<530	<590	<530	<550	<600	<510	<510
di-n-Octyl Phthalate	<550	<720	<530	<590	<530	<550	<600	<510	<510
Fluoranthene	220 J	<720	<530	<590	810	2000	250 J	160 J	120 J
Fluorene	<550	<720	<530	<590	48 J	160 J	<600	<510	<510
Hexachlorobenzene	<550	<720	<530	<590	<530	<550	<600	<510	<510
Hexachlorobutadiene	<550	<720	<530	<590	<530	<550	<600	<510	<510
Hexachlorocyclopentadiene	<550	<720	<530	<590	<530	<550	<600	<510	<510
Hexachloroethane	<550	<720	<530	<590	<530	<550	<600	<510	<510
Indeno(1,2,3-c,d)Pyrene	<550	<720	<530	<590	130 J	300 J	90 J	<510	<510
Isophorone	<550	<720	<530	<590	<530	<550	<600	<510	<510
Naphthalene	<550	<720	<530	<590	<530	<550	<600	<510	<510
Nitrobenzene	<550	<720	<530	<590	<530	<550	<600	<510	<510
n-Nitrosodi-n-Propylamine	<550	<720	<530	<590	<530	<550	<600	<510	<510
n-Nitrosodiphenylamine	<550	<720	<530	<590	<530	<550	<600	<510	<510
Pentachlorophenol	<1100	<1400	<1100	<1200	<1100	<1100	<1200	<1000	<1000
Phenanthrene	160 J	<720	<530	<590	580	1600	97 J	63 J	<510
Phenol	<550	<720	<530	<590	<530	<550	<600	<510	<510
Pyrene	150 J	<720	<530	<590	650	1500	190 J	130 J	97 J

J - The analyte was positively identified: the quantitation was below the reporting limit and above the method detection limit.

< - Not detected at or above the reporting limit (RL value reported with the less than symbol).

Appendix Table 9. Sediment sampling results for PCBs from streams sampled in the USEC/PORTS project area, November, 2005.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek
River Mile	**3.3**	**3.1**	**2.4**	**1.4**	**0.1**	**5.6**	**2.3**	**2.3**	**1.8**
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/2/2005	11/2/2005	11/2/2005
Time Sampled	NA	3:45 PM	2:55 PM	2:15 PM	11:30 AM	12:25 PM	12:10 PM	12:10 PM	1:30 PM
								Duplicate	
PCBs (ug/kg)									
PCB-1016	NO SEDIMENT	<30	<34	<25	<29	<27	<25	<26	<24
PCB-1221		<30	<34	<25	<29	<27	<25	<26	<24
PCB-1232		<30	<34	<25	<29	<27	<25	<26	<24
PCB-1242		<30	<34	<25	<29	<27	<25	<26	<24
PCB-1248		<30	<34	<25	<29	<27	<25	<26	<24
PCB-1254		<30	<34	<25	<29	<27	<25	<26	<24
PCB-1260		31 P	140	230	38	<27	<25	<26	17 JP

Stream	Big Beaver Creek	Big Run	Big Run	Big Run	West Ditch	West Ditch	Scioto River	Scioto River	Scioto River
River Mile	**1.3**	**4.8**	**4.3**	**4.0**	**1.2**	**1.2**	**30.0**	**27.0**	**23.4**
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/28/2005	11/28/2005
Time Sampled	1:05 PM	4:35 PM	9:00 AM	9:45 AM	10:30 AM	10:30 AM	11:45 AM	11:15 AM	10:20 AM
						Duplicate			
PCBs (ug/kg)									
PCB-1016	<28	<36	<27	<29	<26	<28	<30	<26	<26
PCB-1221	<28	<36	<27	<29	<26	<28	<30	<26	<26
PCB-1232	<28	<36	<27	<29	<26	<28	<30	<26	<26
PCB-1242	<28	<36	<27	<29	<26	<28	<30	190	110
PCB-1248	<28	<36	<27	<29	<26	<28	68 P	140	77
PCB-1254	<28	<36	<27	<29	<26	<28	<30	<26	<26
PCB-1260	<28	200	33	44	37	32	<30	<26	<26

J - The analyte was positively identified, but the quantitation was below the reporting limit.

< - Not detected at or above the method detection limit (MDL) or the instrument detection limit (IDL) (MDL/IDL value reported with the less than symbol).

P - Indicates that there is greater than 25% difference for detected Arochlor results between the two GC columns.

Appendix Table 10. Sediment sampling results (radiologicals) from streams sampled in the USEC/PORTS project area, November, 2005. Results are reported on a dry weight basis.

Stream	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Little Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek	Big Beaver Creek
River Mile	**3.3**	**3.1**	**2.4**	**1.4**	**0.1**	**5.6**	**2.3**	**2.3**	**1.8**
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/2/2005	11/2/2005	11/2/2005
Time Sampled	NA	3:45 PM	2:55 PM	2:15 PM	11:30 AM	12:25 PM	12:10 PM	12:10 PM	1:30 PM
Radiologicals	NO							Duplicate	
Gross alpha (pCi/g)	SEDIMENT	20.1	44.1	36.6	27.8	24.2	28	18.9	23.2
Gross beta (pCi/g)		18.4	30	24.3	31.5	18.7	20.1	20.5	21.7
Technetium-99 (pCi/g)		1.73 J	2.49	4.12	6.35	<0.406	0.243 J	<0.270	0.802 J
Total Uranium (ug/g)		31.8	75.3	54.6	46.3	21.3	27.2	24.7	26.3
Uranium-234 (pCi/g)		4	10.8	5.42	4.97	0.727	1.08	1.11	1.65
Uranium-235 (pCi/g)		0.078 J	0.516	0.167	0.219	<0.020	0.0495 J	0.0438 J	0.024 J
Uranium-238 (pCi/g)		1.27	3.5	2.07	1.6	0.727	0.884	0.838	1
Plutonium-238 (pCi/g)		NA	NA	<0.0341	NA	<0.0618	NA	NA	NA
Plutonium-239 (pCi/g)		NA	NA	<0.0292	NA	<0.0513	NA	NA	NA
Americium-241 (pCi/g)		NA	NA	<0.0438	NA	<0.0525	NA	NA	NA
Neptunium-237 (pCi/g)		NA	NA	<0.095	NA	<0.0245	NA	NA	NA

Stream	Big Beaver Creek	Big Run	Big Run	Big Run	West Ditch	West Ditch	Scioto River	Scioto River	Scioto River
River Mile	**1.3**	**4.8**	**4.3**	**4.0**	**1.2**	**1.2**	**30.0**	**27.0**	**23.4**
Date Sampled	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/2/2005	11/28/2005	11/28/2005	11/28/2005
Time Sampled	1:05 PM	4:35 PM	9:00 AM	9:45 AM	10:30 AM	10:30 AM	11:45 AM	11:15 AM	10:20 AM
Radiologicals						Duplicate			
Gross alpha (pCi/g)	21.2	48.9	20.8	28.6	21.9	24.2	20	17.5	15.7
Gross beta (pCi/g)	22.3	25.5	16.4	18.8	20.1	21.3	22.2	20.4	16.9
Technetium-99 (pCi/g)	0.812 J	0.507 J	<0.414	<0.413	0.290 J	<0.234	<0.309	<0.351	<0.32
Total Uranium (ug/g)	27.7	75.5	44.3	36.3	34.4	28.7	22.5	23.4	18.7
Uranium-234 (pCi/g)	1.34	7.31	2.69	2.84	1.27	1.38	0.895	0.872	0.626
Uranium-235 (pCi/g)	<0.0243	0.204	0.0808 J	0.0888 J	0.0288 J	0.0334 J	0.0422 J	0.0291 J	0.0365 J
Uranium-238 (pCi/g)	1.06	2.74	1.51	1.71	1.16	1.02	0.872	0.854	0.619
Plutonium-238 (pCi/g)	NA	NA	<0.0457	NA	<0.0384	<0.0391	<0.0567	NA	<0.0411
Plutonium-239 (pCi/g)	NA	NA	<0.0428	NA	<0.0495	<0.0581	<0.0478	NA	<0.0317
Americium-241 (pCi/g)	NA	NA	<0.0283	NA	<0.0342	<0.0498	<0.0482	NA	<0.0362
Neptunium-237 (pCi/g)	NA	NA	<0.0922	NA	<0.104	<0.108	<0.0767	NA	<0.0595

J - The analyte was positively identified, but the quantitation was below the reporting limit.

< - Not detected at or above the method detection limit (MDL) or the instrument detection limit (IDL) (MDL/IDL value reported with the less than symbol).

NA - Not analyzed.

Appendix Table 11. Fish tissue analytical results from streams sampled in the USEC/PORTS project, September, 2005. Values are reported on a wet weight basis.

Stream	**L. Beaver Cr.**	**L. Beaver Cr.**	**L. Beaver Cr.**	**L. Beaver Cr.**	**L. Beaver Cr.**	**L. Beaver Cr.**	**L. Beaver Cr.**	**L. Beaver Cr.**	**L. Beaver Cr.**
River Mile	**3.3**	**3.3**	**3.1**	**3.1**	**2.4**	**2.4**	**2.4**	**1.4**	**1.4**
Fish Species	green sunfish	creek chub	creek chub	green sunfish	green sunfish	creek chub	yellow bullhead	spotted bass	creek chub
Sample Type	WBC	WBC	WBC	WBC	WBC	WBC	WBC	SOFC	WBC
Sample Number (s)	FT47	FT46/ FT48	FT35/ FT73	FT43/ FT75	FT38/ FT61	FT27/ FT69	FT40/ FT65	FT6/ FT81	FT3/ FT84
Date Sampled	9/6/2005	9/6/2005	9/6/2005	9/6/2005	9/6/2005	9/6/2005	9/6/2005	9/7/2005	9/7/2005
Percent Lipids	1.6	0.77	0.45	0.55	2.2	0.55	2.9	0.16	0.58
Metals (mg/kg)									
Mercury	0.092	0.066	0.047	0.069	0.038	0.052	0.11	0.12	0.041
Arsenic	0.24 J	0.096 J	<0.086	0.2 J	0.26 J	0.13 J	0.18 J	0.26 J	0.15 J
Cadmium	<0.01	0.013 J	0.021 J	<0.011	0.056 J	0.083 J	0.046 J	<0.011	0.061 J
Lead	0.095 J	0.075 J	0.072 J	0.053 J	0.095 J	0.064 J	0.093 J	0.087 J	0.069 J
Selenium	0.58 J	0.55 J	0.45 J	0.65 J	0.71 J	0.52 J	0.68 J	0.74 J	0.65 J
PCBs (ug/kg)									
PCB-1016	<17	<17	<17	<17	<50	<33	<83	<17	<33
PCB-1221	<17	<17	<17	<17	<50	<33	<83	<17	<33
PCB-1232	<17	<17	<17	<17	<50	<33	<83	<17	<33
PCB-1242	<17	<17	<17	<17	<50	<33	<83	<17	<33
PCB-1248	<17	<17	<17	<17	<50	<33	<83	<17	<33
PCB-1254	<17	<17	<17	<17	<50	<33	<83	<17	<33
PCB-1260	290	40 P	200	300	710	460	1400	65	420
Radiologicals									
Gross alpha (pCi/g)	NA	<0.0265	<0.0219	<0.0238	<0.0153	<0.0198	<0.00588	*	*
Gross beta (pCi/g)	NA	0.203 J	0.166 J	0.139 J	0.0869 J	0.165 J	0.104 J	*	*
Technetium ^{99} (pCi/g)	NA	0.407	0.261 J	0.344	0.609	<0.246	<0.256	*	*
Uranium-T (ug/g)	NA	<0.00951	<0.0482	<0.0598	<0.0483	<1.18	<0.0641	<0.0122	<0.367
Strontium ^{90} (pCi/g)	NA	0.114 J	0.0486 J	0.0987 J	0.189 J	0.0374 J	0.0377 J	0.00985 J	0.045 J
Potassium ^{40} (pCi/g)	NA	55.9	86.9	<43.7	46.7	98.6	<37.3	83.4	<60.4

Appendix Table 11. Continued.

Stream	L. Beaver Cr.	L. Beaver Cr.	L. Beaver Cr.	L. Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.
River Mile	1.4	0.1	0.1	0.1	5.6	5.6	5.6	5.6	2.3
Fish Species	rockbass, green sf, longear sf	rockbass, green sf, longear sf	spotted bass	hog sucker	spotted bass	longear sunfish	green sf, rockbass	hog sucker	common carp
Sample Type	WBC	WBC	SOFC	WBC	SOFC	WBC	WBC	WBC	SFF
Sample Number (s)	FT45/ FT50	FT18/ FT67	FT44/ FT77	FT31/ FT64	FT32/ FT79	FT24/ FT66	FT34/ FT59	FT36/ FT76	FT39/ FT74
Date Sampled	9/7/2005	9/7/2005	9/7/2005	9/7/2005	9/8/2005	9/8/2005	9/8/2005	9/8/2005	9/7/2005
Percent Lipids	1.7	1.4	0.61	0.26	0.11	2.3	5.5	1.9	2.1
Metals (mg/kg)									
Mercury	0.051	0.035	0.077	0.03	0.3	0.048	0.054	0.024	0.075
Arsenic	0.16 J	0.23 J	0.24 J	0.22 J	0.097 J	0.17 J	0.17 J	0.23 J	0.17 J
Cadmium	0.061 J	0.036 J	<0.01	0.097 J	<0.011	<0.011	0.015 J	<0.012	<0.011
Lead	0.05 J	0.062 J	0.097 J	0.075 J	<0.047	0.062 J	0.075 J	0.068 J	0.12 J
Selenium	0.67 J	0.77	0.67 J	0.67 J	0.38 J	0.73 J	0.64 J	0.55 J	0.58 J
PCBs (ug/kg)									
PCB-1016	<83	<33	<17	<17	<17	<17	<17	<17	<17
PCB-1221	<83	<33	<17	<17	<17	<17	<17	<17	<17
PCB-1232	<83	<33	<17	<17	<17	<17	<17	<17	<17
PCB-1242	<83	<33	<17	<17	<17	<17	<17	<17	<17
PCB-1248	<83	<33	<17	<17	<17	<17	<17	<17	<17
PCB-1254	<83	<33	<17	<17	<17	<17	<17	<17	<17
PCB-1260	1400	380	67	150	<17	<17	<17	<17	29 P
Radiologicals									
Gross alpha (pCi/g)	<0.0174	<0.0236	*	<0.00846	*	<0.0224	<0.0161	*	<0.0164
Gross beta (pCi/g)	0.133 J	0.118 J	*	0.0589 J	*	0.0905 J	0.0624 J	*	0.145 J
Technetium ^{99} (pCi/g)	1.21	<0.266	*	0.424	*	<0.249	0.525	*	0.348
Uranium-T (ug/g)	<0.074	<0.0747	<0.187	<0.0299	<0.0115	<0.0547	<0.00324	<0.562	<0.00503
Strontium ^{90} (pCi/g)	0.114 J	0.0965 J	0.0207 J	0.0679 J	<0.00522	0.0808 J	<0.0072	0.175 J	0.0095 J
Potassium ^{40} (pCi/g)	59.3	<37.9	127	37.4	138	45.4	106	47.8	110

Appendix Table 11. Continued.

Stream	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.	Big Beaver Cr.
River Mile	2.3	2.3	1.8	1.8	1.8	1.8	1.3	1.3	1.3
Fish Species	rockbass, green sf, longear sf, bluegill	spotted bass	spotted bass	golden redhorse	quillback	bluegill	spotted bass	quillback	longear sunfish, spotted bass
Sample Type	WBC	SOF	SOFC	WB	SOFC	WBC	SOF	SOF	WBC
Sample Number (s)	FT42/ FT72	FT30/ FT49	FT33/ FT56	FT41/ FT58	FT29/ FT60	FT20/ FT68	FT19/ FT80	FT22/ FT63	FT28/ FT54
Date Sampled	9/7/2005	9/7/2005	9/8/2005	9/8/2005	9/8/2005	9/8/2005	9/8/2005	9/8/2005	9/8/2005
Percent Lipids	1.2	0.13	0.22	1.1	0.17	3.9	0.61	0.014	0.21
Metals (mg/kg)									
Mercury	0.056	0.31	0.094	0.069	0.12	0.036	0.076	0.12	0.044
Arsenic	0.14 J	0.22 J	0.26 J	0.29 J	<0.081	0.27 J	0.25 J	0.1 J	0.1 J
Cadmium	<0.011	<0.01	<0.011	0.012 J	<0.011	<0.011	<0.011	<0.011	<0.011
Lead	0.093 J	0.079 J	0.1 J	0.11 J	0.067 J	0.12 J	0.071 J	0.066 J	<0.047
Selenium	0.58 J	0.49 J	0.47 J	0.69 J	0.58 J	0.55 J	0.48 J	0.59 J	0.64 J
PCBs (ug/kg)									
PCB-1016	<17	<17	<17	<17	<17	<17	<18	<17	<17
PCB-1221	<17	<17	<17	<17	<17	<17	<18	<17	<17
PCB-1232	<17	<17	<17	<17	<17	<17	<18	<17	<17
PCB-1242	<17	<17	<17	<17	<17	<17	<18	<17	<17
PCB-1248	<17	<17	<17	<17	<17	100	41 P	<17	100
PCB-1254	<17	<17	<17	<17	<17	<17	<18	<17	<17
PCB-1260	34 P	<17	<17	100 P	28 P	65 P	40 P	22 P	73 P
Radiologicals									
Gross alpha (pCi/g)	<0.0184	<0.0394	<0.0245	0.03 J	<0.0107	<0.00962	*	<0.249	<0.0201
Gross beta (pCi/g)	0.0938 J	0.373 J	0.35 J	0.113 J	0.0681 J	0.0454 J	*	2.76 J	0.113 J
Technetium ^{99} (pCi/g)	<0.269	0.381	0.461	0.356	0.338	0.28 J	*	1.54	0.351
Uranium-T (ug/g)	<0.599	<0.0158	<0.0067	0.0134	<0.00414	<0.0369	<0.0484	<0.0415	<0.00568
Strontium ^{90} (pCi/g)	0.108 J	0.0178 J	0.0126 J	0.118 J	0.0968 J	0.0307 J	<0.0116	<0.0235	0.0543 J
Potassium ^{40} (pCi/g)	48.1	94.9	117	<35.9	28.7	37.3	159	<221	36.2

Appendix Table 11. Continued.

Stream	Big Run	Big Run	Big Run	Big Run	Big Run	Big Run	West Ditch	West Ditch	Scioto River
River Mile	**4.8**	**4.8**	**4.3**	**4.3**	**4.0**	**4.0**	**1.2**	**1.2**	**29.0**
Fish Species	creek chub	green sunfish	creek chub	green sunfish	creek chub	green sunfish	creek chub	longear sunfish	freshwater drum
Sample Type	WBC	WBC	WBC	WBC	WBC	WBC	WBC	WBC	SOFC
Sample Number (s)	FT23/ FT57	FT25	FT26/ FT70	FT14/ FT78	FT21/ FT71	FT9	FT37/ FT62	FT10/ FT55	FT13/ FT90
Date Sampled	9/7/2005	9/7/2005	9/15/2005	9/15/2005	9/8/2005	9/8/2005	9/7/2005	9/7/2005	9/9/2005
Percent Lipids	0.39	1.9	0.59	1.2	1.2	1.6	0.84	0.26	0.51
Metals (mg/kg)									
Mercury	0.031	0.025	0.049	0.035	0.039	0.065	0.038	0.051	0.061
Arsenic	0.74	0.98	0.16 J	0.27 J	0.21 J	0.32 J	0.15 J	0.28 J	0.31 J
Cadmium	<0.011	<0.011	0.017 J	<0.011	0.012 J	<0.011	<0.011	<0.01	<0.011
Lead	0.057 J	<0.049	0.055 J	0.079 J	0.079 J	0.067 J	0.095 J	0.075 J	0.073 J
Selenium	1.1	1.3	0.84	1.2	0.72 J	0.83	0.58 J	0.71	0.61 J
PCBs (ug/kg)									
PCB-1016	<17	<17	<17	<17	<17	<17	<26	<17	<17
PCB-1221	<17	<17	<17	<17	<17	<17	<26	<17	<17
PCB-1232	<17	<17	<17	<17	<17	<17	<26	<17	<17
PCB-1242	<17	<17	<17	<17	<17	<17	<26	<17	<17
PCB-1248	<17	<17	<17	<17	<17	<17	<26	<17	34 P
PCB-1254	<17	<17	<17	<17	<17	<17	<26	<17	<17
PCB-1260	110 P	140 P	160	110 P	180	200 P	380	270	<17
Radiologicals									
Gross alpha (pCi/g)	<0.0237	NA	<0.0252	*	<0.0223	NA	<0.029	<0.0245	*
Gross beta (pCi/g)	0.15 J	NA	0.211 J	*	0.141 J	NA	0.171 J	0.133 J	*
Technetium ^{99} (pCi/g)	0.37	NA	<0.244	*	<0.238	NA	<0.235	0.25 J	*
Uranium-T (ug/g)	<0.0608	NA	<1.35	<0.511	<0.0622	NA	<0.0758	<0.0695	<0.0112
Strontium ^{90} (pCi/g)	0.0586 J	NA	0.0481 J	0.101 J	0.0308 J	NA	0.0661 J	0.0971 J	<0.00496
Potassium ^{40} (pCi/g)	49.7	NA	105	<62.5	89.3	NA	63.4	41.1	61

Appendix Table 11. Continued.

Stream	**Scioto River**	**Scioto River**	**Scioto River**	**Scioto River**	**Scioto River**	**Scioto River**	**Scioto River**	**Scioto River**	**Scioto River**
River Mile	**29.0**	**29.0**	**29.0**	**27.0**	**27.0**	**27.0**	**27.0**	**24.6**	**24.6**
Fish Species	channel catfish	white bass	golden redhorse	channel catfish	freshwater drum	white bass	golden redhorse	channel catfish	freshwater drum
Sample Type	SFFC	WBC	WB	SFFC	SOFC	WBC	WB	SFF	SOFC
Sample Number (s)	FT15/ FT52	FT2/ FT85	FT12/ FT53	FT4/ FT88	FT7/ FT91	FT17/ FT86	FT5/ FT82	FT8/ FT83	FT11/ FT51
Date Sampled	9/9/2005	9/9/2005	9/9/2005	9/9/2005	9/9/2005	9/9/2005	9/9/2005	9/9/2005	9/9/2005
Percent Lipids	0.86	2.2	2.5	2	0.74	1.8	3.3	1	0.28
Metals (mg/kg)									
Mercury	0.067	0.049	0.047	0.058	0.24	0.058	0.023	0.066	0.16
Arsenic	0.2 J	0.25 J	0.28 J	0.21J	0.28 J	0.21 J	0.26 J	0.14 J	0.19 J
Cadmium	0.015 J	<0.011	0.034 J	<0.011	<0.011	<0.011	<0.011	<0.012	<0.012
Lead	0.085 J	0.073 J	0.093 J	0.084 J	0.093 J	0.052 J	0.11 J	0.078 J	0.067 J
Selenium	0.43 J	0.69 J	0.66 J	0.45 J	0.66 J	0.65 J	0.55 J	0.52 J	0.64 J
PCBs (ug/kg)									
PCB-1016	<17	<17	<17	<17	<17	<17	<17	<17	<17
PCB-1221	<17	<17	<17	<17	<17	<17	<17	<17	<17
PCB-1232	<17	<17	<17	<17	<17	<17	<17	<17	<17
PCB-1242	<17	<17	<17	<17	<17	<17	<17	<17	<17
PCB-1248	61	160	100	100	34	160	100	58	43 P
PCB-1254	<17	<17	<17	<17	<17	<17	<17	<17	<17
PCB-1260	33 P	58 P	56 P	53 P	<17	64 P	33 P	34 P	<17
Radiologicals									
Gross alpha (pCi/g)	<0.00928	*	<0.00588	*	*	*	*	*	<0.0116
Gross beta (pCi/g)	0.381 J	*	0.0196 J	*	*	*	*	*	0.13 J
Technetium ^{99} (pCi/g)	0.821	*	0.38	*	*	*	*	*	0.321
Uranium-T (ug/g)	<0.00598	<0.452	<0.00241	<0.0122	<0.00861	<0.0459	<0.615	<0.012	<0.00301
Strontium ^{90} (pCi/g)	0.0169 J	0.025 J	0.0785 J	<0.00533	<0.00985	<0.0194	0.0781 J	<0.00541	0.0131 J
Potassium ^{40} (pCi/g)	137	32.9	20.7	101	28.7	<37.7	7.6 J	136	94.5

Appendix Table 11. Continued.

Stream	Scioto River	Scioto River
River Mile	**24.6**	**24.6**
Fish Species	white bass	smallmouth redhorse
Sample Type	WBC	WB
Sample Number (s)	FT16/ FT89	FT1/ FT87
Date Sampled	9/9/2005	9/9/2005
Percent Lipids	2.1	13
Metals (mg/kg)		
Mercury	0.031	0.07
Arsenic	0.38 J	0.38 J
Cadmium	<0.011	<0.011
Lead	0.056 J	0.12 J
Selenium	0.75	0.73
PCBs (ug/kg)		
PCB-1016	<17	<50
PCB-1221	<17	<50
PCB-1232	<17	<50
PCB-1242	<17	<50
PCB-1248	200	480 P
PCB-1254	<17	<50
PCB-1260	130 P	320
Radiologicals		
Gross alpha (pCi/g)	*	*
Gross beta (pCi/g)	*	*
Technetium ^{99} (pCi/g)	*	*
Uranium-T (ug/g)	<0.0479	<0.475
Strontium ^{90} (pCi/g)	0.0291 J	0.0326 J
Potassium ^{40} (pCi/g)	33.6	4.72 J

J - The analyte was positively identified, but the quantitation was below the reporting limit.

< - Not detected at or above the reporting limit (MDL value reported with the less than symbol).

P - Indicates that there is greater than 25% difference for detected pesticide/Arochlor results between the two GC columns.

WBC= whole body composite; WB= whole body; SOFC= skin on fillet composite; SOF=skin on fillet; SFF=skin off fillet; SFFC=skin off fillet composite

*- Results did not meet laboratory quality control criteria, therefore the data is unusable.

Appendix Table 12. Hourly stream measurements of dissolved oxygen, pH, temperature, and conductivity at five stream locations in the PORTS project area using Datasonde© continuous recorders, September 6-9, 2005.

SCIOTO RIVER DOWNSTREAM PORTS OUTFALLS - RM 23.4

Date	Time	Temp.	pH	Spec.Conduct.	DO%	D.O.
MMDDYY	HHMM	°C	SU	mS/cm	Saturation	mg/l
90605	12:00	23.38	9.15	0.596	111.6	9.28
90605	13:00	23.66	9.24	0.598	117.4	9.72
90605	14:00	23.99	9.32	0.6	124	10.2
90605	15:00	24.14	9.4	0.6	127.6	10.47
90605	16:00	24.32	9.45	0.602	133.6	10.92
90605	17:00	24.42	9.57	0.604	137.9	11.25
90605	18:00	24.46	9.64	0.605	139.5	11.37
90605	19:00	24.41	9.61	0.607	139.1	11.35
90605	20:00	24.31	9.63	0.609	134.8	11.02
90605	21:00	24.14	9.5	0.612	129.2	10.6
90605	22:00	23.98	9.47	0.614	125.9	10.35
90605	23:00	23.82	9.43	0.617	123.1	10.15
90705	0:00	23.66	9.39	0.619	119.5	9.88
90705	1:00	23.51	9.36	0.62	116.6	9.67
90705	2:00	23.36	9.33	0.622	113.5	9.45
90705	3:00	23.21	9.29	0.623	110.7	9.24
90705	4:00	23.14	9.24	0.625	108.1	9.03
90705	5:00	23.07	9.21	0.626	105.5	8.83
90705	6:00	22.96	9.16	0.627	102.6	8.6
90705	7:00	22.85	9.15	0.628	99.9	8.39
90705	8:00	22.75	9.1	0.629	98.3	8.28
90705	9:00	22.68	9.09	0.63	98.6	8.31
90705	10:00	22.76	9.11	0.63	103.2	8.69
90705	11:00	23.03	9.19	0.63	110.8	9.28
90705	12:00	23.32	9.27	0.63	118.6	9.88
90705	13:00	23.74	9.36	0.63	125.8	10.4
90705	14:00	24.06	9.4	0.63	133.2	10.94
90705	15:00	24.3	9.46	0.63	139.1	11.38
90705	16:00	24.46	9.58	0.63	144.5	11.78
90705	17:00	24.59	9.59	0.63	149.7	12.17
90705	18:00	24.6	9.68	0.63	153.3	12.46
90705	19:00	24.55	9.67	0.632	151.1	12.29
90705	20:00	24.47	9.65	0.633	147.5	12.02
90705	21:00	24.34	9.6	0.635	142	11.6
90705	22:00	24.18	9.58	0.637	136.3	11.17
90705	23:00	23.99	9.52	0.639	131.9	10.85
90805	0:00	23.8	9.49	0.641	128.6	10.61
90805	1:00	23.58	9.45	0.642	124.4	10.31
90805	2:00	23.36	9.4	0.644	120.4	10.02
90805	3:00	23.19	9.35	0.646	116.6	9.74
90805	4:00	23.04	9.31	0.648	113.5	9.5
90805	5:00	22.94	9.3	0.65	110.8	9.29
90805	6:00	22.82	9.24	0.652	107.7	9.05
90805	7:00	22.71	9.21	0.654	105	8.85
90805	8:00	22.62	9.18	0.655	102.6	8.66
90805	9:00	22.59	9.2	0.657	104.1	8.79
90805	10:00	22.7	9.28	0.657	109.9	9.26
90805	11:00	22.97	9.35	0.657	119.6	10.03
90805	12:00	23.32	9.46	0.658	129.1	10.75
90805	13:00	23.7	9.56	0.658	138.3	11.44
90805	14:00	24.01	9.61	0.658	146.5	12.04
90805	15:00	24.26	9.67	0.659	154.1	12.61
90805	16:00	24.39	9.75	0.659	159.6	13.02
90805	17:00	24.47	9.79	0.659	166.5	13.56
90805	18:00	24.45	9.82	0.659	166.7	13.59
90805	19:00	24.4	9.78	0.66	164.6	13.43
90805	20:00	24.34	9.78	0.663	158.5	12.95
90805	21:00	24.3	9.73	0.665	153.6	12.55
90805	22:00	24.22	9.69	0.667	148	12.11
90805	23:00	24.13	9.67	0.668	144	11.81
90905	0:00	24.01	9.63	0.67	140.5	11.55
90905	1:00	23.86	9.6	0.671	136.9	11.28
90905	2:00	23.69	9.56	0.673	131.7	10.89
90905	3:00	23.5	9.52	0.675	127.5	10.58
90905	4:00	23.34	9.46	0.677	122.8	10.22
90905	5:00	23.22	9.41	0.678	118.4	9.88
90905	6:00	23.1	9.36	0.679	115.5	9.66
90905	7:00	22.99	9.34	0.68	112.2	9.4
90905	8:00	22.91	9.3	0.681	109.9	9.22
90905	9:00	22.93	9.33	0.681	112.2	9.41
90905	10:00	23.05	9.38	0.68	118.8	9.94
90905	11:00	23.1	9.43	0.68	122.2	10.22
90905	12:00	23.38	9.52	0.679	131.3	10.92
90905	13:00	23.78	9.6	0.678	144.1	11.9
90905	14:00	24.11	9.67	0.675	154.2	12.65
90905	15:00	24.44	9.74	0.675	163.9	13.36
90905	16:00	24.59	9.77	0.674	171.1	13.91
90905	17:00	24.69	9.86	0.673	176.7	14.34

Appendix Table 12. Continued.

BIG BEAVER CREEK @ OLD FARM FORD - RM 1.3

Date	Time	Temp.	pH	Spec.Conduct.	DO%	D.O.
MMDDYY	HHMM	°C	SU	mS/cm	Saturation	mg/l
90605	12:00	19.85	7.56	0.388	88.4	7.88
90605	13:00	20.13	7.56	0.389	90.3	8.01
90605	14:00	20.78	7.58	0.389	94.1	8.24
90605	15:00	21.39	7.63	0.39	97.4	8.42
90605	16:00	21.71	7.69	0.39	100.2	8.61
90605	17:00	21.96	7.7	0.391	101.2	8.65
90605	18:00	21.91	7.7	0.391	100.5	8.61
90605	19:00	21.7	7.7	0.391	98.9	8.51
90605	20:00	21.29	7.69	0.391	97.1	8.42
90605	21:00	20.99	7.68	0.391	95.2	8.3
90605	22:00	20.76	7.65	0.391	93.5	8.19
90605	23:00	20.57	7.62	0.391	92	8.08
90705	0:00	20.4	7.6	0.39	90.3	7.96
90705	1:00	20.23	7.59	0.391	89.3	7.9
90705	2:00	20.06	7.59	0.39	88.1	7.82
90705	3:00	19.9	7.54	0.39	86.3	7.69
90705	4:00	19.73	7.53	0.39	85.7	7.66
90705	5:00	19.59	7.52	0.39	84.3	7.55
90705	6:00	19.45	7.52	0.39	82.8	7.44
90705	7:00	19.32	7.49	0.39	81.3	7.33
90705	8:00	19.19	7.49	0.39	81.3	7.35
90705	9:00	19.16	7.48	0.39	82.6	7.46
90705	10:00	19.32	7.51	0.39	84.4	7.61
90705	11:00	19.57	7.52	0.391	85.7	7.68
90705	12:00	19.94	7.54	0.391	87.3	7.77
90705	13:00	20.22	7.55	0.391	89.6	7.93
90705	14:00	20.73	7.59	0.391	92.5	8.11
90705	15:00	21.33	7.64	0.392	95.2	8.24
90705	16:00	21.79	7.68	0.392	97.9	8.4
90705	17:00	21.86	7.69	0.392	98.7	8.46
90705	18:00	21.92	7.68	0.392	98.7	8.45
90705	19:00	21.71	7.68	0.392	97.4	8.37
90705	20:00	21.23	7.7	0.392	89.5	7.77
90705	21:00	20.94	7.68	0.391	87.8	7.66
90705	22:00	20.74	7.65	0.391	87.6	7.67
90705	23:00	20.56	7.63	0.391	86.6	7.62
90805	0:00	20.37	7.61	0.39	82.2	7.25
90805	1:00	20.19	7.59	0.39	80.2	7.1
90805	2:00	20.01	7.57	0.39	79.7	7.08
90805	3:00	19.86	7.55	0.39	80.6	7.18
90805	4:00	19.7	7.54	0.389	79.1	7.07
90805	5:00	19.52	7.51	0.389	77.4	6.95
90805	6:00	19.35	7.49	0.389	77.1	6.95
90805	7:00	19.16	7.47	0.389	72	6.5
90805	8:00	19	7.48	0.389	73.2	6.64
90805	9:00	18.98	7.5	0.389	75.9	6.89
90805	10:00	19.08	7.53	0.39	77.3	7
90805	11:00	19.32	7.55	0.39	79.5	7.17
90805	12:00	19.71	7.52	0.39	81.5	7.28
90805	13:00	20.04	7.49	0.391	81.6	7.25
90805	14:00	20.6	7.58	0.392	83.4	7.33
90805	15:00	21.16	7.64	0.392	88.9	7.72
90805	16:00	21.55	7.63	0.393	92.4	7.97
90805	17:00	21.64	7.64	0.393	94.5	8.14
90805	18:00	21.5	7.7	0.393	97.2	8.39
90805	19:00	21.24	7.72	0.393	96.2	8.34
90805	20:00	20.92	7.71	0.394	94.3	8.23
90805	21:00	20.71	7.69	0.393	91.7	8.04
90805	22:00	20.58	7.68	0.393	90.4	7.94
90805	23:00	20.45	7.66	0.393	87.3	7.69
90905	0:00	20.32	7.64	0.393	88.1	7.78
90905	1:00	20.19	7.62	0.393	86.7	7.67
90905	2:00	20.07	7.6	0.393	85.5	7.59
90905	3:00	19.95	7.58	0.392	84	7.47
90905	4:00	19.87	7.57	0.392	83.1	7.41
90905	5:00	19.8	7.56	0.392	81.2	7.25
90905	6:00	19.65	7.54	0.392	79.1	7.08
90905	7:00	19.54	7.51	0.391	80.2	7.19
90905	8:00	19.46	7.5	0.392	80	7.19
90905	9:00	19.5	7.51	0.392	81.8	7.34
90905	10:00	19.6	7.51	0.392	81.7	7.32

Appendix Table 12. Continued.

LITTLE BEAVER CREEK @ WAKEFIELD MOUND RD. - RM 0.1

Date	Time	Temp.	pH	Spec.Conduct.	DO%	D.O.
MMDDYY	HHMM	^{o}C	SU	mS/cm	Saturation	mg/l
90605	13:00	19.93	7.59	0.369	96	8.55
90605	14:00	20.63	7.67	0.369	97.1	8.53
90605	15:00	21.28	7.71	0.369	97.9	8.49
90605	16:00	21.78	7.73	0.37	97.1	8.34
90605	17:00	22.16	7.73	0.371	95.1	8.1
90605	18:00	22.32	7.69	0.37	93.7	7.96
90605	19:00	22.26	7.65	0.372	92.3	7.85
90605	20:00	22.02	7.6	0.371	89.9	7.68
90605	21:00	21.66	7.56	0.372	89.1	7.66
90605	22:00	21.29	7.54	0.371	88.4	7.66
90605	23:00	20.93	7.51	0.369	86.7	7.57
90705	0:00	20.59	7.5	0.369	87.4	7.68
90705	1:00	20.27	7.49	0.368	85.4	7.55
90705	2:00	19.98	7.48	0.368	87.4	7.77
90705	3:00	19.7	7.48	0.368	86.7	7.76
90705	4:00	19.44	7.46	0.368	85.8	7.71
90705	5:00	19.22	7.47	0.367	86.2	7.78
90705	6:00	19.01	7.46	0.367	86.4	7.83
90705	7:00	18.81	7.46	0.368	86.5	7.88
90705	8:00	18.63	7.47	0.369	86.8	7.93
90705	9:00	18.51	7.49	0.369	87.6	8.02
90705	10:00	18.5	7.52	0.37	89.3	8.18
90705	11:00	18.76	7.55	0.371	89.6	8.16
90705	12:00	19.33	7.61	0.371	91.6	8.25
90705	13:00	19.92	7.65	0.373	92.6	8.25
90705	14:00	20.6	7.71	0.373	94.6	8.31
90705	15:00	21.21	7.74	0.374	94.5	8.2
90705	16:00	21.7	7.76	0.373	93.6	8.05
90705	17:00	22.16	7.76	0.373	92.4	7.87
90705	18:00	22.25	7.73	0.377	92.5	7.87
90705	19:00	22.09	7.68	0.378	88.6	7.56
90705	20:00	21.76	7.64	0.378	88	7.56
90705	21:00	21.37	7.6	0.375	86.8	7.51
90705	22:00	21	7.57	0.374	86.1	7.5
90705	23:00	20.66	7.55	0.373	84.9	7.45
90805	0:00	20.34	7.54	0.373	85.4	7.54
90805	1:00	20.03	7.53	0.373	85.3	7.57
90805	2:00	19.71	7.52	0.372	84	7.51
90805	3:00	19.4	7.52	0.371	85.9	7.73
90805	4:00	19.08	7.51	0.371	83.9	7.59
90805	5:00	18.78	7.51	0.371	84.8	7.73
90805	6:00	18.49	7.52	0.371	85.1	7.79
90805	7:00	18.22	7.51	0.371	85.5	7.88
90805	8:00	17.99	7.52	0.372	85.1	7.88
90805	9:00	17.85	7.54	0.372	85.2	7.91
90805	10:00	17.87	7.56	0.372	85.9	7.97
90805	11:00	18.21	7.61	0.373	88.7	8.17
90805	12:00	18.83	7.67	0.373	90.7	8.26
90805	13:00	19.44	7.72	0.373	91	8.18
90805	14:00	20.16	7.78	0.374	92.3	8.18
90805	15:00	20.78	7.8	0.375	91.4	8
90805	16:00	21.28	7.82	0.376	91.1	7.9
90805	17:00	21.67	7.82	0.376	90.5	7.79
90805	18:00	21.89	7.8	0.376	88.7	7.6
90805	19:00	21.9	7.77	0.376	86.8	7.44
90805	20:00	21.73	7.71	0.377	85.4	7.34
90805	21:00	21.44	7.66	0.379	84	7.25
90805	22:00	21.12	7.64	0.38	82.2	7.15
90805	23:00	20.81	7.61	0.379	83.7	7.32
90905	0:00	20.54	7.59	0.378	82.8	7.29
90905	1:00	20.3	7.57	0.376	81.6	7.22
90905	2:00	20.07	7.56	0.376	82.1	7.29
90905	3:00	19.86	7.55	0.375	83.2	7.42
90905	4:00	19.69	7.54	0.375	83	7.43
90905	5:00	19.6	7.54	0.376	83.4	7.47
90905	6:00	19.52	7.54	0.377	82.5	7.41
90905	7:00	19.4	7.54	0.376	84	7.56
90905	8:00	19.26	7.55	0.378	83.7	7.56
90905	9:00	19.18	7.56	0.378	84.4	7.62
90905	10:00	19.29	7.61	0.379	86.1	7.76

Appendix Table 12. Continued.

BIG RUN @ WAKEFIELD RD. - RM 4.0

Date	Time	Temp.	pH	Spec.Conduct.	DO%	D.O.
MMDDYY	HHMM	°C	SU	mS/cm	Saturation	mg/l
90605	11:00	21.08	7.49	0.869	87.1	7.56
90605	12:00	21.96	7.57	0.869	88.1	7.53
90605	13:00	22.74	7.59	0.87	88.3	7.43
90605	14:00	23.46	7.61	0.872	88.3	7.33
90605	15:00	23.85	7.59	0.874	87.4	7.2
90605	16:00	24.06	7.57	0.875	86.3	7.08
90605	17:00	24.06	7.55	0.875	83.8	6.88
90605	18:00	24.07	7.53	0.875	83.2	6.82
90605	19:00	23.94	7.52	0.874	82.5	6.79
90605	20:00	23.56	7.51	0.873	82.1	6.8
90605	21:00	23.04	7.5	0.873	81.5	6.82
90605	22:00	22.53	7.5	0.873	82	6.93
90605	23:00	22.06	7.51	0.873	82.6	7.04
90705	0:00	21.64	7.52	0.873	82.7	7.11
90705	1:00	21.28	7.52	0.873	82.6	7.15
90705	2:00	20.93	7.53	0.873	83.3	7.26
90705	3:00	20.62	7.54	0.873	82.9	7.27
90705	4:00	20.39	7.55	0.873	83.4	7.34
90705	5:00	20.13	7.55	0.872	83.9	7.42
90705	6:00	19.88	7.55	0.872	83.8	7.46
90705	7:00	19.71	7.56	0.872	84.3	7.52
90705	8:00	19.69	7.58	0.871	84.4	7.54
90705	9:00	19.76	7.59	0.871	84.8	7.56
90705	10:00	20.13	7.6	0.871	85.6	7.58
90705	11:00	20.78	7.62	0.871	85.9	7.51
90705	12:00	21.7	7.63	0.87	87.2	7.49
90705	13:00	22.54	7.64	0.87	87.4	7.38
90705	14:00	23.27	7.64	0.871	87.4	7.28
90705	15:00	23.68	7.62	0.872	85.5	7.06
90705	16:00	23.94	7.6	0.872	84.6	6.96
90705	17:00	23.94	7.57	0.872	82.6	6.79
90705	18:00	23.97	7.55	0.873	80.8	6.64
90705	19:00	23.83	7.52	0.873	80.1	6.6
90705	20:00	23.33	7.49	0.872	78.8	6.55
90705	21:00	22.74	7.49	0.871	79.3	6.67
90705	22:00	22.16	7.5	0.871	81.2	6.91
90705	23:00	21.62	7.51	0.87	81	6.97
90805	0:00	21.15	7.52	0.87	82.1	7.12
90805	1:00	20.75	7.53	0.87	82.3	7.2
90805	2:00	20.37	7.54	0.871	82.5	7.27
90805	3:00	20.01	7.55	0.87	83	7.36
90805	4:00	19.7	7.56	0.87	83.9	7.49
90805	5:00	19.45	7.56	0.87	83.2	7.46
90805	6:00	19.2	7.57	0.87	83.1	7.5
90805	7:00	19.02	7.57	0.87	82.7	7.49
90805	8:00	18.99	7.58	0.871	84.1	7.62
90805	9:00	19.08	7.6	0.871	83.2	7.52
90805	10:00	19.55	7.62	0.873	84.6	7.58
90805	11:00	20.32	7.63	0.876	83.4	7.35
90805	12:00	21.3	7.65	0.878	86.5	7.48
90805	13:00	22.17	7.66	0.878	86.5	7.35
90805	14:00	22.93	7.66	0.879	85.7	7.19
90805	15:00	23.35	7.64	0.88	86	7.15
90805	16:00	23.63	7.62	0.882	83.3	6.89
90805	17:00	23.68	7.59	0.883	82	6.78
90805	18:00	23.79	7.56	0.884	81.5	6.72
90805	19:00	23.69	7.54	0.884	80.3	6.64
90805	20:00	23.31	7.51	0.883	78.3	6.52
90805	21:00	22.78	7.51	0.883	78.3	6.58
90805	22:00	22.28	7.5	0.883	78.4	6.65
90805	23:00	21.84	7.51	0.883	79	6.76
90905	0:00	21.44	7.51	0.883	77.9	6.72
90905	1:00	21.1	7.51	0.884	79	6.86
90905	2:00	20.82	7.52	0.886	79.7	6.96
90905	3:00	20.59	7.52	0.889	79	6.92
90905	4:00	20.47	7.53	0.888	80.7	7.09
90905	5:00	20.53	7.54	0.889	78.7	6.91
90905	6:00	20.51	7.53	0.889	78.7	6.91
90905	7:00	20.4	7.53	0.889	79	6.95
90905	8:00	20.31	7.53	0.891	78.7	6.94
90905	9:00	20.44	7.55	0.893	79.2	6.96

Appendix Table 12. Continued.

WEST DITCH @ WAKEFIELD MOUND RD. - RM 1.2

Date	Time	Temp.	pH	Spec.Conduct.	DO%	D.O.
MMDDYY	HHMM	°C	SU	mS/cm	Saturation	mg/l
90605	12:00	18.15	7.88	0.451	102.1	9.42
90605	13:00	18.84	8.03	0.45	105.7	9.62
90605	14:00	19.94	8.13	0.45	110.5	9.83
90605	15:00	20.79	8.14	0.45	111.5	9.76
90605	16:00	21.43	8.15	0.448	111.8	9.66
90605	17:00	22.46	8.38	0.449	113.9	9.65
90605	18:00	22.38	8.34	0.448	109.6	9.3
90605	19:00	22.16	8.35	0.449	104.1	8.87
90605	20:00	21.88	8.3	0.449	97.7	8.36
90605	21:00	21.47	8.21	0.45	91.6	7.91
90605	22:00	20.85	8.08	0.45	87.2	7.62
90605	23:00	20.24	7.96	0.45	84.2	7.44
90705	0:00	19.64	7.88	0.451	83.5	7.48
90705	1:00	19.08	7.83	0.45	82.6	7.47
90705	2:00	18.58	7.81	0.451	82.6	7.56
90705	3:00	18.11	7.8	0.451	82.8	7.64
90705	4:00	17.73	7.8	0.451	83.6	7.78
90705	5:00	17.36	7.8	0.45	84	7.88
90705	6:00	17.09	7.81	0.45	84.2	7.94
90705	7:00	16.91	7.81	0.45	84.6	8.01
90705	8:00	16.8	7.8	0.449	85	8.07
90705	9:00	16.78	7.82	0.449	85.9	8.15
90705	10:00	16.96	7.87	0.448	90.3	8.53
90705	11:00	17.42	7.92	0.448	95.3	8.92
90705	12:00	18.04	7.97	0.448	99.6	9.21
90705	13:00	18.68	8.03	0.448	103.6	9.46
90705	14:00	19.31	8.05	0.448	106.6	9.6
90705	15:00	20.13	8.09	0.448	108.1	9.58
90705	16:00	21.53	8.23	0.446	109.7	9.45
90705	17:00	22.41	8.36	0.446	110.5	9.37
90705	18:00	22.52	8.37	0.446	104.9	8.88
90705	19:00	22.26	8.31	0.446	99	8.42
90705	20:00	21.83	8.24	0.447	93.5	8.01
90705	21:00	21.2	8.13	0.448	89.4	7.76
90705	22:00	20.48	8	0.447	85.3	7.51
90705	23:00	19.82	7.92	0.448	83.2	7.42
90805	0:00	19.18	7.87	0.446	82.4	7.45
90805	1:00	18.63	7.84	0.445	81.7	7.46
90805	2:00	18.1	7.83	0.444	80.8	7.46
90805	3:00	17.62	7.83	0.443	81.9	7.64
90805	4:00	17.33	7.83	0.442	82.1	7.7
90805	5:00	17.18	7.83	0.443	83	7.81
90805	6:00	17.02	7.83	0.443	83.8	7.92
90805	7:00	16.82	7.83	0.444	84.5	8.01
90805	8:00	16.65	7.84	0.445	84.7	8.06
90805	9:00	16.64	7.85	0.445	86.4	8.23
90805	10:00	16.84	7.9	0.445	91.4	8.66
90805	11:00	17.29	7.96	0.446	95.7	8.99
90805	12:00	17.87	8.01	0.446	100.1	9.28
90805	13:00	18.57	8.07	0.446	103.4	9.46
90805	14:00	19.27	8.12	0.446	107.7	9.71
90805	15:00	19.76	8.14	0.446	109.1	9.74
90805	16:00	20.18	8.14	0.446	108.9	9.65
90805	17:00	21.1	8.2	0.446	109.4	9.52
90805	18:00	21.96	8.31	0.446	107.6	9.21
90805	19:00	22.07	8.41	0.446	104.3	8.9
90805	20:00	21.75	8.32	0.447	98	8.42
90805	21:00	21.35	8.25	0.448	91.7	7.94
90805	22:00	20.88	8.14	0.449	86.7	7.57
90805	23:00	20.37	8	0.449	82.5	7.28
90905	0:00	19.89	7.91	0.45	81.2	7.23
90905	1:00	19.44	7.84	0.451	80.7	7.25
90905	2:00	19.01	7.8	0.452	80	7.25
90905	3:00	18.63	7.78	0.452	80.5	7.36
90905	4:00	18.36	7.77	0.453	81.2	7.46
90905	5:00	18.23	7.77	0.453	82.4	7.59
90905	6:00	18.08	7.77	0.453	82.1	7.58
90905	7:00	17.83	7.77	0.452	83	7.71
90905	8:00	17.65	7.76	0.452	83.5	7.79
90905	9:00	17.71	7.8	0.452	85.1	7.92
90905	10:00	18.04	7.84	0.452	89.9	8.31

Appendix Table 13. Fish Index of Biotic Integrity (IBI) and Modified Index of Well-being (MIwb) results for the PORTS area streams, 2005.

River Mile	Type	Date	Drainage area (sq mi)	Number of: Total species	Minnow species	Headwater species	Sensitive species	Darter & Sculpin species	Simple Lithophils	Percent of Individuals: Tolerant fishes	Omni-vores	Pioneering fishes	Insect-ivores	DELT anomalies	Rel.No. minus tolerants /(0.3km)	IBI
Big Run - (02-012)																
Year: 2005																
4.80	E	07/26/2005	0.5	6(3)	4(5)	1(1)	0(1)	0(1)	1(3)	22(5)	0(5)	23(5)	4(1)	0.2(5)	1283(5)	40
4.80	E	09/07/2005	0.5	7(5)	4(5)	1(1)	0(1)	1(3)	3(5)	39(3)	1(5)	49(3)	17(3)	0.0(5)	460(5)	44
4.30	E	07/28/2005	0.9	7(5)	4(5)	1(1)	0(1)	1(3)	3(5)	36(3)	2(5)	40(3)	8(1)	0.0(5)	580(5)	42
4.30	E	09/15/2005	0.9	7(5)	4(5)	1(1)	0(1)	1(3)	3(5)	46(3)	3(5)	51(3)	15(3)	0.0(5)	598(5)	44
4.00	E	07/26/2005	1.0	8(5)	4(5)	1(1)	0(1)	1(3)	3(5)	23(5)	0(5)	36(3)	13(3)	0.0(5)	1442(5)	46
4.00	E	09/08/2005	1.0	7(5)	4(5)	1(1)	0(1)	1(3)	3(5)	39(3)	1(5)	49(3)	10(3)	0.0(5)	906(5)	44
Little Beaver Creek - (02-023)																
Year: 2005																
3.30	E	07/25/2005	2.5	10(5)	4(3)	1(1)	0(1)	3(5)	3(3)	55(3)	8(5)	92(1)	44(5)	0.0(5)	162(3)	40
3.30	E	09/06/2005	2.5	9(3)	5(5)	1(1)	0(1)	2(3)	4(5)	65(1)	5(5)	83(1)	29(5)	0.0(5)	118(3)	38
3.10	E	07/25/2005	3.0	13(5)	5(5)	2(3)	2(3)	4(5)	6(5)	36(3)	7(5)	37(3)	36(5)	0.0(5)	1436(5)	52
3.10	E	09/06/2005	3.0	13(5)	5(5)	2(3)	3(3)	4(5)	6(5)	40(3)	8(5)	42(3)	33(5)	0.0(5)	1186(5)	52
2.40	E	07/25/2005	4.0	16(5)	6(5)	1(1)	4(5)	5(5)	7(5)	30(5)	4(5)	37(3)	44(5)	0.0(5)	1008(5)	54
2.40	E	09/06/2005	4.0	12(5)	4(3)	0(1)	2(3)	3(5)	5(5)	48(3)	7(5)	52(3)	42(5)	0.0(5)	764(5)	48
1.40	E	07/25/2005	4.7	20(5)	7(5)	1(1)	5(5)	5(5)	6(5)	12(5)	5(5)	14(5)	52(5)	0.0(5)	1948(5)	56
1.40	E	09/07/2005	4.7	22(5)	9(5)	1(1)	7(5)	6(5)	10(5)	18(5)	6(5)	20(5)	60(5)	0.0(5)	1744(5)	56
0.10	E	07/26/2005	6.3	23(5)	9(5)	1(1)	8(5)	6(5)	9(5)	8(5)	5(5)	10(5)	42(5)	0.0(5)	1656(5)	56
0.10	E	09/07/2005	6.3	28(5)	12(5)	1(1)	*(5)	7(5)	12(5)	12(5)	9(5)	14(5)	36(3)	0.0(5)	2210(5)	54
West Ditch (Piketon - (02-247)																
Year: 2005																
1.20	E	07/26/2005	1.1	9(5)	6(5)	2(3)	1(3)	0(1)	4(5)	27(5)	12(3)	16(5)	2(1)	0.0(5)	1870(5)	46
1.20	E	09/07/2005	1.1	8(5)	6(5)	2(3)	1(3)	0(1)	4(5)	37(3)	15(1)	28(5)	2(1)	0.0(5)	1238(5)	42

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

Appendix Table 13. Continued.

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
Big Beaver Creek - (02022)																	
Year: 2005																	
5.60	E	07/27/2005	59	23(5)	4(5)	4(5)	2(1)	6(5)	31(3)	7(5)	5(5)	5.2(5)	78(5)	0.0(5)	483(3)	52	9.0
5.60	E	09/08/2005	59	26(5)	3(3)	2(3)	1(1)	7(5)	31(3)	14(5)	15(5)	3.9(3)	68(5)	0.0(5)	1031(5)	48	9.4
2.30	E	07/27/2005	62	26(5)	5(5)	3(3)	1(1)	6(5)	41(5)	13(5)	10(5)	7.5(5)	79(5)	0.0(5)	210(3)	52	8.5
2.30	E	09/07/2005	62	26(5)	4(5)	2(3)	1(1)	7(5)	35(3)	24(5)	31(3)	2.4(3)	60(5)	0.0(5)	429(3)	46	8.4
1.80	E	07/27/2005	68	38(5)	4(5)	3(3)	6(5)	9(5)	16(1)	9(5)	8(5)	0.5(1)	33(3)	0.0(5)	2427(5)	48	9.3
1.80	E	09/08/2005	68	30(5)	4(5)	4(5)	1(1)	6(5)	16(1)	21(5)	23(3)	0.9(1)	32(3)	0.0(5)	2538(5)	44	9.9
1.30	E	07/27/2005	69	36(5)	5(5)	5(5)	4(3)	5(5)	15(1)	11(5)	13(5)	1.3(3)	37(3)	0.3(3)	1794(5)	48	9.3
1.30	E	09/08/2005	69	34(5)	4(5)	3(3)	2(1)	8(5)	20(3)	16(5)	17(5)	0.8(1)	36(3)	0.0(5)	2838(5)	46	9.7

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 13. Continued.

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
Scioto River - (02-001)																	
Year: 2005																	
29.00	A	07/28/2005	5864	27(5)	1(1)	6(5)	3(3)	1(1)	24(3)	5(5)	9(5)	4(1)	63(5)	1.1(3)	468(5)	42	9.6
29.00	A	09/09/2005	5864	31(5)	2(3)	6(5)	4(5)	4(1)	48(5)	1(5)	9(5)	14(5)	62(5)	0.3(5)	652(5)	54	10.1
27.00	A	07/28/2005	5936	30(5)	1(1)	5(3)	5(5)	2(1)	68(5)	3(5)	7(5)	6(3)	83(5)	0.0(5)	584(5)	48	8.8
27.00	A	09/09/2005	5936	33(5)	1(1)	9(5)	4(5)	4(1)	39(5)	2(5)	10(5)	17(5)	57(5)	0.0(5)	1042(5)	52	11.0
24.60	A	07/28/2005	6085	21(5)	2(3)	5(3)	2(3)	5(1)	23(3)	5(5)	9(5)	10(3)	72(5)	0.0(5)	227(3)	44	9.2
24.60	A	09/09/2005	6085	29(5)	2(3)	6(5)	3(3)	3(1)	40(5)	2(5)	8(5)	14(5)	58(5)	0.0(5)	567(5)	52	10.2

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

Appendix Table 14. Ohio EPA fish results from the PORTS area streams, 2005. Relative numbers are per 1.0 kilometer for Scioto River samples, and 0.3 kilometer for all other streams.

River Code: **02-001**	Stream: **Scioto River**	Sample Date: **2005**
River Mile: **29.00**	Location:	Date Range: 07/28/2005
Time Fished: 4389 sec	Drainage: 5864.0 sq mi	Thru: 09/09/2005
Dist Fished: 1.12 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
Shovelnose Sturgeon [E]		I	S		1	0.89	0.16	1.07	1.01	1,200.00
Longnose Gar		P	M		3	2.68	0.47	2.17	2.04	811.67
Mooneye		I	M	R	4	3.57	0.62	0.06	0.05	15.50
Skipjack Herring		P	M		10	8.93	1.55	0.13	0.12	14.00
Gizzard Shad		O	M		10	8.93	1.55	1.50	1.41	168.44
Blue Sucker [E]	R	I	S	R	1	0.89	0.16	2.14	2.01	2,400.00
Black Buffalo	C	I	M		2	1.79	0.31	3.55	3.34	1,987.50
Smallmouth Buffalo	C	I	M		32	28.57	4.96	55.78	52.44	1,952.34
Quillback Carpsucker	C	O	M		1	0.89	0.16	1.09	1.03	1,225.00
River Carpsucker	C	O	M		16	14.29	2.48	11.78	11.08	824.75
Silver Redhorse	R	I	S	M	2	1.79	0.31	2.14	2.01	1,200.00
Golden Redhorse	R	I	S	M	3	2.68	0.47	1.99	1.87	743.67
Northern Hog Sucker	R	I	S	M	7	6.25	1.09	0.77	0.72	123.00
Smallmouth Redhorse	R	I	S	M	5	4.46	0.78	2.62	2.46	586.40
Common Carp	G	O	M	T	1	0.89	0.16	2.63	2.48	2,950.00
Gravel Chub	N	I	S	M	71	63.39	11.01	0.28	0.26	4.44
Suckermouth Minnow	N	I	S		46	41.07	7.13	0.28	0.27	6.92
Emerald Shiner	N	I	S		96	85.71	14.88	0.15	0.14	1.74
Rosyface Shiner	N	I	S	I	1	0.89	0.16	0.00	0.00	2.00
Steelcolor Shiner	N	I	M	P	1	0.89	0.16	0.01	0.01	9.00
Spotfin Shiner	N	I	M		34	30.36	5.27	0.16	0.15	5.21
Sand Shiner	N	I	M	M	78	69.64	12.09	0.11	0.10	1.60
Mimic Shiner	N	I	M	I	4	3.57	0.62	0.01	0.01	2.25
Bullhead Minnow	N	O	C		12	10.71	1.86	0.03	0.02	2.50
Bluntnose Minnow	N	O	C	T	17	15.18	2.64	0.03	0.03	1.88
Central Stoneroller	N	H	N		53	47.32	8.22	0.17	0.16	3.55
Channel Catfish	F		C		10	8.93	1.55	5.40	5.08	605.10
Stonecat Madtom		I	C	I	2	1.79	0.31	0.00	0.00	2.00
White Bass	F	P	M		37	33.04	5.74	1.04	0.98	31.49
White Crappie	S	I	C		2	1.79	0.31	0.36	0.33	199.00
Spotted Bass	F	C	C		6	5.36	0.93	0.67	0.63	124.33
Longear Sunfish	S	I	C	M	1	0.89	0.16	0.00	0.00	4.00
Sauger	F	P	S		1	0.89	0.16	0.02	0.02	20.00
Dusky Darter	D	I	S	M	2	1.79	0.31	0.01	0.01	4.00
Slenderhead Darter	D	I	S	R	1	0.89	0.16	0.01	0.01	8.00
Logperch	D	I	S	M	4	3.57	0.62	0.07	0.07	20.50
Greenside Darter	D	I	S	M	3	2.68	0.47	0.01	0.01	5.00
Sauger X Walleye	E	P			3	2.68	0.47	0.13	0.12	48.67
Freshwater Drum			M	P	62	55.36	9.61	7.99	7.51	144.29
	Mile Total				645	575.89		106.37		
	Number of Species				38					
	Number of Hybrids				1					

River Code: **02-001**	Stream: **Scioto River**	Sample Date: **2005**
River Mile: **27.00**	Location:	Date Range: 07/28/2005
Time Fished: 4517 sec	Drainage: 5936.0 sq mi	Thru: 09/09/2005
Dist Fished: 1.00 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
Silver Lamprey		P	N		1	1.00	0.12	0.02	0.02	20.00
Longnose Gar		P	M		1	1.00	0.12	0.53	0.44	525.00
Mooneye		I	M	R	4	4.00	0.48	0.08	0.07	20.50
Skipjack Herring		P	M		10	10.00	1.20	0.16	0.13	15.70
Gizzard Shad		O	M		9	9.00	1.08	0.16	0.13	17.78
Black Buffalo	C	I	M		4	4.00	0.48	7.10	5.96	1,775.00
Smallmouth Buffalo	C	I	M		23	23.00	2.77	47.35	39.74	2,058.70
Quillback Carpsucker	C	O	M		1	1.00	0.12	1.20	1.01	1,200.00
River Carpsucker	C	O	M		11	11.00	1.32	8.90	7.47	809.09
Highfin Carpsucker	C	O	M		1	1.00	0.12	0.69	0.58	690.00
Silver Redhorse	R	I	S	M	3	3.00	0.36	1.02	0.85	338.33
Black Redhorse	R	I	S	I	1	1.00	0.12	0.05	0.04	47.00
Golden Redhorse	R	I	S	M	3	3.00	0.36	1.21	1.02	403.33
River Redhorse [S]	R	I	S	I	1	1.00	0.12	2.85	2.39	2,850.00
Northern Hog Sucker	R	I	S	M	3	3.00	0.36	0.05	0.04	15.00
Smallmouth Redhorse	R	I	S	M	13	13.00	1.56	2.05	1.72	157.31
Common Carp	G	O	M	T	5	5.00	0.60	12.83	10.76	2,565.00
Gravel Chub	N	I	S	M	85	85.00	10.23	0.36	0.30	4.24
Suckermouth Minnow	N	I	S		87	87.00	10.47	0.61	0.51	6.95
Emerald Shiner	N	I	S		190	190.00	22.86	0.20	0.17	1.07
Steelcolor Shiner	N	I	M	P	13	13.00	1.56	0.12	0.10	9.46
Spotfin Shiner	N	I	M		22	22.00	2.65	0.10	0.08	4.44
Sand Shiner	N	I	M	M	61	61.00	7.34	0.13	0.11	2.12
Mimic Shiner	N	I	M	I	3	3.00	0.36	0.01	0.01	3.67
Bullhead Minnow	N	O	C		35	35.00	4.21	0.08	0.07	2.33
Bluntnose Minnow	N	O	C	T	13	13.00	1.56	0.04	0.03	2.85
Central Stoneroller	N	H	N		25	25.00	3.01	0.19	0.16	7.46
Channel Catfish	F		C		13	13.00	1.56	7.19	6.03	553.08
Flathead Catfish	F	P	C		4	4.00	0.48	3.45	2.90	862.50
Stonecat Madtom		I	C	I	2	2.00	0.24	0.04	0.03	19.00
White Bass	F	P	M		49	49.00	5.90	2.77	2.33	56.62
Smallmouth Bass	F	C	C	M	4	4.00	0.48	0.97	0.82	243.00
Spotted Bass	F	C	C		26	26.00	3.13	2.23	1.87	85.81
Longear Sunfish	S	I	C	M	9	9.00	1.08	0.12	0.10	12.89
Sauger	F	P	S		1	1.00	0.12	0.14	0.11	135.00
Slenderhead Darter	D	I	S	R	1	1.00	0.12	0.00	0.00	3.00
Logperch	D	I	S	M	14	14.00	1.68	0.23	0.19	16.57
Greenside Darter	D	I	S	M	5	5.00	0.60	0.01	0.01	2.60
Banded Darter	D	I	S	I	1	1.00	0.12	0.00	0.00	2.00
Tippecanoe Darter [T]	D	I	S	R	2	2.00	0.24	0.00	0.00	1.50
Rainbow Darter	D	I	S	M	1	1.00	0.12	0.00	0.00	1.00
Sauger X Walleye	E	P			9	9.00	1.08	1.07	0.90	118.67
Freshwater Drum			M	P	62	62.00	7.46	12.86	10.80	207.49
	Mile Total				831	831.00		119.15		
	Number of Species				42					
	Number of Hybrids				1					

River Code: **02-001**	Stream: **Scioto River**	Sample Date: **2005**
River Mile: **24.60**	Location:	Date Range: 07/28/2005
Time Fished: 4503 sec	Drainage: 6085.0 sq mi	Thru: 09/09/2005
Dist Fished: 1.10 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
Longnose Gar		P	M		3	2.73	0.67	3.48	2.49	1,275.00
Mooneye		I	M	R	1	0.91	0.22	0.02	0.02	25.00
Skipjack Herring		P	M		2	1.82	0.44	0.05	0.03	25.00
Gizzard Shad		O	M		3	2.73	0.67	0.46	0.33	169.33
Blue Sucker [E]	R	I	S	R	4	3.64	0.89	15.27	10.94	4,200.00
Black Buffalo	C	I	M		3	2.73	0.67	6.86	4.92	2,516.67
Smallmouth Buffalo	C	I	M		27	24.55	5.99	50.18	35.94	2,044.44
River Carpsucker	C	O	M		3	2.73	0.67	0.08	0.06	30.00
Silver Redhorse	R	I	S	M	2	1.82	0.44	1.16	0.83	640.00
Golden Redhorse	R	I	S	M	1	0.91	0.22	0.59	0.42	650.00
Smallmouth Redhorse	R	I	S	M	8	7.27	1.77	5.26	3.77	723.13
Common Carp	G	O	M	T	10	9.09	2.22	28.59	20.48	3,145.00
Gravel Chub	N	I	S	M	59	53.64	13.08	0.19	0.14	3.57
Suckermouth Minnow	N	I	S		18	16.36	3.99	0.11	0.08	6.47
Emerald Shiner	N	I	S		63	57.27	13.97	0.10	0.07	1.76
Steelcolor Shiner	N	I	M	P	1	0.91	0.22	0.01	0.01	8.00
Spotfin Shiner	N	I	M		26	23.64	5.77	0.12	0.09	5.20
Sand Shiner	N	I	M	M	54	49.09	11.97	0.07	0.05	1.52
Mimic Shiner	N	I	M	I	2	1.82	0.44	0.00	0.00	2.00
Bullhead Minnow	N	O	C		19	17.27	4.21	0.03	0.02	2.00
Bluntnose Minnow	N	O	C	T	3	2.73	0.67	0.01	0.00	2.00
Central Stoneroller	N	H	N		8	7.27	1.77	0.04	0.03	5.13
Channel Catfish	F		C		5	4.55	1.11	3.85	2.76	847.40
Flathead Catfish	F	P	C		2	1.82	0.44	5.46	3.91	3,005.00
Stonecat Madtom		I	C	I	2	1.82	0.44	0.01	0.00	3.00
White Bass	F	P	M		38	34.55	8.43	1.40	1.00	40.50
White Crappie	S	I	C		1	0.91	0.22	0.08	0.05	84.00
Rock Bass	S	C	C		1	0.91	0.22	0.04	0.03	40.00
Spotted Bass	F	C	C		7	6.36	1.55	0.31	0.22	48.00
Green Sunfish	S	I	C	T	1	0.91	0.22	0.01	0.01	13.00
Longear Sunfish	S	I	C	M	5	4.55	1.11	0.03	0.02	6.60
Dusky Darter	D	I	S	M	2	1.82	0.44	0.02	0.01	10.00
Logperch	D	I	S	M	1	0.91	0.22	0.03	0.02	30.00
Sauger X Walleye	E	P			4	3.64	0.89	0.18	0.13	49.75
Freshwater Drum			M	P	62	56.36	13.75	15.52	11.12	275.40
	Mile Total				451	410.00		139.62		
	Number of Species				34					
	Number of Hybrids				1					

River Code: **02-012**	Stream: **Big Run**	Sample Date: **2005**
River Mile: **4.80**	Location: dst. Piketon D.O.E.	Date Range: 07/26/2005
Time Fished: 3360 sec	Drainage: 0.5 sq mi	Thru: 09/07/2005
Dist Fished: 0.20 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	4	5.00	0.42			
Creek Chub	N	G	N	T	190	295.63	24.75			
South. Redbelly Dace	N	H	S		20	31.25	2.62			
Silverjaw Minnow	N	I	M		38	51.25	4.29			
Central Stoneroller	N	H	N		457	770.00	64.47			
Green Sunfish	S	I	C	T	17	22.50	1.88			
Bluegill Sunfish	S	I	C	P	8	15.00	1.26			
Orangethroat Darter	D	I	S		3	3.75	0.31			
Mile Total					737	1,194.38				
Number of Species					8					
Number of Hybrids					0					

River Code: **02-012**	Stream: **Big Run**	Sample Date: **2005**
River Mile: **4.30**	Location:	Date Range: 07/28/2005
Time Fished: 4620 sec	Drainage: 0.9 sq mi	Thru: 09/15/2005
Dist Fished: 0.30 km	Basin: Scioto River	No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	26	26.00	2.59			
Creek Chub	N	G	N	T	345	345.00	34.33			
South. Redbelly Dace	N	H	S		75	75.00	7.46			
Silverjaw Minnow	N	I	M		28	28.00	2.79			
Central Stoneroller	N	H	N		441	441.00	43.88			
Green Sunfish	S	I	C	T	45	45.00	4.48			
Orangethroat Darter	D	I	S		45	45.00	4.48			
Mile Total					1,005	1,005.00				
Number of Species					7					
Number of Hybrids					0					

River Code: **02-012**	Stream: **Big Run**	Sample Date: **2005**
River Mile: **4.00**	Location:	Date Range: 07/26/2005
Time Fished: 4920 sec	Drainage: 1.0 sq mi	Thru: 09/08/2005
Dist Fished: 0.30 km	Basin: Scioto River	No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	6	6.00	0.36			
Creek Chub	N	G	N	T	497	497.00	29.48			
South. Redbelly Dace	N	H	S		132	132.00	7.83			
Silverjaw Minnow	N	I	M		60	60.00	3.56			
Central Stoneroller	N	H	N		851	851.00	50.47			
Green Sunfish	S	I	C	T	9	9.00	0.53			
Bluegill Sunfish	S	I	C	P	1	1.00	0.06			
Orangethroat Darter	D	I	S		130	130.00	7.71			
Mile Total					1,686	1,686.00				
Number of Species					8					
Number of Hybrids					0					

River Code: **02-022**	Stream: **Big Beaver Creek**	Sample Date: **2005**
River Mile: **5.60**	Location:	Date Range: 07/27/2005
Time Fished: 6780 sec	Drainage: 59.0 sq mi	Thru: 09/08/2005
Dist Fished: 0.40 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Black Redhorse	R	I	S	I	2	1.50	0.17	0.42	5.16	278.00
Golden Redhorse	R	I	S	M	9	6.75	0.79	0.56	6.97	83.33
Northern Hog Sucker	R	I	S	M	11	8.25	0.96	0.19	2.32	22.73
Spotted Sucker	R	I	S		1	0.75	0.09	0.02	0.20	22.00
Creek Chub	N	G	N	T	9	6.75	0.79	0.15	1.82	21.78
Emerald Shiner	N	I	S		143	107.25	12.48	0.09	1.11	0.83
Redfin Shiner	N	I	N		6	4.50	0.52	0.02	0.24	4.17
Striped Shiner	N	I	S		20	15.00	1.75	0.14	1.72	9.25
Steelcolor Shiner	N	I	M	P	1	0.75	0.09	0.01	0.09	10.00
Spotfin Shiner	N	I	M		120	90.00	10.47	0.13	1.60	1.44
Sand Shiner	N	I	M	M	113	84.75	9.86	0.09	1.13	1.08
Silverjaw Minnow	N	I	M		9	6.75	0.79	0.01	0.11	1.33
Bullhead Minnow	N	O	C		26	19.50	2.27	0.03	0.43	1.77
Bluntnose Minnow	N	O	C	T	112	84.00	9.77	0.21	2.56	2.46
Central Stoneroller	N	H	N		137	102.75	11.95	0.64	7.86	6.18
Blackstripe Topminnow		I	M		1	0.75	0.09	0.00	0.01	1.00
Trout-perch		I	M		2	1.50	0.17	0.01	0.09	5.00
Brook Silverside		I	M	M	9	6.75	0.79	0.02	0.20	2.33
Rock Bass	S	C	C		12	9.00	1.05	0.54	6.72	60.33
Spotted Bass	F	C	C		37	27.75	3.23	2.60	32.14	93.53
Green Sunfish	S	I	C	T	16	12.00	1.40	0.56	6.98	46.94
Bluegill Sunfish	S	I	C	P	1	0.75	0.09	0.02	0.19	20.00
Longear Sunfish	S	I	C	M	65	48.75	5.67	1.14	14.05	23.28
Blackside Darter	D	I	S		9	6.75	0.79	0.01	0.11	1.33
Logperch	D	I	S	M	37	27.75	3.23	0.19	2.33	6.78
Johnny Darter	D	I	C		33	24.75	2.88	0.02	0.28	0.91
Greenside Darter	D	I	S	M	68	51.00	5.93	0.13	1.63	2.58
Banded Darter	D	I	S	I	39	29.25	3.40	0.04	0.48	1.33
Rainbow Darter	D	I	S	M	15	11.25	1.31	0.02	0.29	2.07
Fantail Darter	D	I	C		83	62.25	7.24	0.10	1.19	1.55
	Mile Total				1,146	859.50		8.08		
	Number of Species				30					
	Number of Hybrids				0					

River Code: **02-022**	Stream: **Big Beaver Creek**	Sample Date: **2005**
River Mile: **2.30**	Location: upst. L. Beaver Creek, at RR	Date Range: 07/27/2005
Time Fished: 6240 sec	Drainage: 62.0 sq mi	Thru: 09/07/2005
Dist Fished: 0.40 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Longnose Gar		P	M		3	2.25	0.56	0.03	0.30	11.33
Gizzard Shad		O	M		12	9.00	2.25	1.37	16.09	152.08
Quillback Carpsucker	C	O	M		3	2.25	0.56	0.92	10.83	409.67
Golden Redhorse	R	I	S	M	7	5.25	1.31	0.14	1.69	27.29
White Sucker	W	O	S	T	1	0.75	0.19	0.18	2.16	245.00
Common Carp	G	O	M	T	2	1.50	0.37	2.46	28.87	1,637.50
Emerald Shiner	N	I	S		52	39.00	9.74	0.04	0.51	1.12
Striped Shiner	N	I	S		109	81.75	20.41	0.10	1.13	1.17
Spotfin Shiner	N	I	M		11	8.25	2.06	0.01	0.17	1.73
Bullhead Minnow	N	O	C		26	19.50	4.87	0.02	0.28	1.20
Bluntnose Minnow	N	O	C	T	87	65.25	16.29	0.09	1.00	1.30
Central Stoneroller	N	H	N		27	20.25	5.06	0.04	0.44	1.85
Channel Catfish	F		C		2	1.50	0.37	0.96	11.32	642.00
Blackstripe Topminnow		I	M		4	3.00	0.75	0.00	0.05	1.50
Trout-perch		I	M		2	1.50	0.37	0.00	0.04	2.00
Brook Silverside		I	M	M	28	21.00	5.24	0.02	0.18	0.74
White Crappie	S	I	C		1	0.75	0.19	0.09	1.05	119.00
Rock Bass	S	C	C		4	3.00	0.75	0.18	2.14	60.50
Smallmouth Bass	F	C	C	M	3	2.25	0.56	0.31	3.61	136.67
Spotted Bass	F	C	C		9	6.75	1.69	0.13	1.53	19.22
Green Sunfish	S	I	C	T	18	13.50	3.37	0.30	3.48	21.94
Bluegill Sunfish	S	I	C	P	24	18.00	4.49	0.16	1.88	8.88
Longear Sunfish	S	I	C	M	42	31.50	7.87	0.56	6.56	17.71
Sauger	F	P	S		2	1.50	0.37	0.22	2.55	144.50
Dusky Darter	D	I	S	M	1	0.75	0.19	0.00	0.02	2.00
Logperch	D	I	S	M	11	8.25	2.06	0.04	0.51	5.18
Johnny Darter	D	I	C		17	12.75	3.18	0.01	0.15	1.00
Greenside Darter	D	I	S	M	5	3.75	0.94	0.01	0.17	3.80
Banded Darter	D	I	S	I	2	1.50	0.37	0.00	0.02	1.00
Rainbow Darter	D	I	S	M	8	6.00	1.50	0.01	0.10	1.38
Fantail Darter	D	I	C		8	6.00	1.50	0.02	0.23	3.25
Freshwater Drum			M	P	3	2.25	0.56	0.09	1.02	38.33
	Mile Total				534	400.50		8.51		
	Number of Species				32					
	Number of Hybrids				0					

River Code: **02-022**	Stream: **Big Beaver Creek**	Sample Date: **2005**
River Mile: **1.80**	Location: dst. L. Beaver Creek	Date Range: 07/27/2005
Time Fished: 6600 sec	Drainage: 69.0 sq mi	Thru: 09/08/2005
Dist Fished: 0.40 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Longnose Gar		P	M		3	2.25	0.08	0.64	4.24	282.33
Gizzard Shad		O	M		11	8.25	0.28	1.54	10.24	186.09
Quillback Carpsucker	C	O	M		11	8.25	0.28	3.91	26.08	474.09
Golden Redhorse	R	I	S	M	7	5.25	0.18	0.53	3.53	100.71
Northern Hog Sucker	R	I	S	M	3	2.25	0.08	0.42	2.79	185.67
White Sucker	W	O	S	T	3	2.25	0.08	0.04	0.29	19.00
Blacknose Dace	N	G	S	T	1	0.75	0.03	0.00	0.01	2.00
Creek Chub	N	G	N	T	65	48.75	1.66	0.09	0.58	1.77
Suckermouth Minnow	N	I	S		72	54.00	1.84	0.13	0.88	2.44
Emerald Shiner	N	I	S		184	138.00	4.70	0.15	1.01	1.09
Silver Shiner	N	I	S	I	1	0.75	0.03	0.00	0.01	2.00
Rosyface Shiner	N	I	S	I	3	2.25	0.08	0.01	0.04	2.33
Striped Shiner	N	I	S		268	201.00	6.84	0.33	2.21	1.65
Steelcolor Shiner	N	I	M	P	1	0.75	0.03	0.01	0.04	8.00
Spotfin Shiner	N	I	M		192	144.00	4.90	0.38	2.56	2.66
Sand Shiner	N	I	M	M	253	189.75	6.46	0.25	1.64	1.30
Mimic Shiner	N	I	M	I	2	1.50	0.05	0.00	0.02	2.00
Silverjaw Minnow	N	I	M		33	24.75	0.84	0.05	0.36	2.18
Bullhead Minnow	N	O	C		85	63.75	2.17	0.08	0.52	1.22
Bluntnose Minnow	N	O	C	T	526	394.50	13.43	0.46	3.09	1.17
Central Stoneroller	N	H	N		1,906	1,429.50	48.65	2.26	15.10	1.58
Channel Catfish	F		C		2	1.50	0.05	0.15	1.01	101.00
Stonecat Madtom		I	C	I	1	0.75	0.03	0.00	0.02	3.00
Blackstripe Topminnow		I	M		1	0.75	0.03	0.00	0.01	2.00
Western Mosquitofish	E	I	N		8	6.00	0.20	0.00	0.03	0.75
Trout-perch		I	M		2	1.50	0.05	0.01	0.04	4.00
Rock Bass	S	C	C		2	1.50	0.05	0.02	0.14	14.00
Smallmouth Bass	F	C	C	M	3	2.25	0.08	0.62	4.11	273.67
Spotted Bass	F	C	C		20	15.00	0.51	1.11	7.41	74.07
Green Sunfish	S	I	C	T	13	9.75	0.33	0.14	0.92	14.08
Bluegill Sunfish	S	I	C	P	18	13.50	0.46	0.72	4.82	53.54
Longear Sunfish	S	I	C	M	60	45.00	1.53	0.68	4.56	15.19
Sauger	F	P	S		1	0.75	0.03	0.10	0.67	133.00
Dusky Darter	D	I	S	M	3	2.25	0.08	0.01	0.05	3.33
Blackside Darter	D	I	S		1	0.75	0.03	0.00	0.01	2.00
Slenderhead Darter	D	I	S	R	1	0.75	0.03	0.00	0.01	2.00
Logperch	D	I	S	M	4	3.00	0.10	0.03	0.20	10.00
Johnny Darter	D	I	C		62	46.50	1.58	0.06	0.37	1.20
Greenside Darter	D	I	S	M	34	25.50	0.87	0.03	0.21	1.22
Banded Darter	D	I	S	I	6	4.50	0.15	0.01	0.04	1.33
Rainbow Darter	D	I	S	M	45	33.75	1.15	0.03	0.18	0.81
Fantail Darter	D	I	C		1	0.75	0.03	0.00	0.01	2.00
	Mile Total				3,918	2,938.50		15.00		
	Number of Species				42					
	Number of Hybrids				0					

River Code: **02-022**	Stream: **Big Beaver Creek**	Sample Date: **2005**
River Mile: **1.30**	Location: dirt road, dst. L. Beaver Crk.	Date Range: 07/27/2005
Time Fished: 7680 sec	Drainage: 69.0 sq mi	Thru: 09/08/2005
Dist Fished: 0.38 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

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		19	15.00	0.56	1.45	6.26	96.74
Grass Pickerel		P	M	P	1	0.79	0.03	0.04	0.16	47.00
Quillback Carpsucker	C	O	M		31	24.47	0.91	11.33	48.86	462.86
Black Redhorse	R	I	S	I	1	0.79	0.03	0.02	0.07	20.00
Golden Redhorse	R	I	S	M	3	2.37	0.09	0.06	0.25	24.00
Northern Hog Sucker	R	I	S	M	2	1.58	0.06	0.07	0.32	46.50
Smallmouth Redhorse	R	I	S	M	2	1.58	0.06	0.04	0.19	28.00
Common Carp	G	O	M	T	2	1.58	0.06	0.10	0.42	62.50
Blacknose Dace	N	G	S	T	2	1.58	0.06	0.00	0.01	2.00
Creek Chub	N	G	N	T	66	52.11	1.93	0.13	0.56	2.48
Suckermouth Minnow	N	I	S		87	68.68	2.54	0.31	1.33	4.47
Emerald Shiner	N	I	S		292	230.53	8.53	0.37	1.62	1.63
Rosyface Shiner	N	I	S	I	8	6.32	0.23	0.02	0.07	2.50
Striped Shiner	N	I	S		53	41.84	1.55	0.13	0.56	3.09
Steelcolor Shiner	N	I	M	P	2	1.58	0.06	0.01	0.06	9.00
Spotfin Shiner	N	I	M		130	102.63	3.80	0.31	1.32	2.99
Sand Shiner	N	I	M	M	208	164.21	6.08	0.23	0.99	1.39
Silverjaw Minnow	N	I	M		2	1.58	0.06	0.00	0.01	2.00
Bullhead Minnow	N	O	C		67	52.90	1.96	0.07	0.29	1.27
Bluntnose Minnow	N	O	C	T	410	323.68	11.98	0.57	2.46	1.76
Central Stoneroller	N	H	N		1,532	1,209.47	44.77	2.09	9.03	1.73
Channel Catfish	F		C		15	11.84	0.44	0.80	3.46	67.80
Flathead Catfish	F	P	C		1	0.79	0.03	1.42	6.13	1,800.00
Stonecat Madtom		I	C	I	14	11.05	0.41	0.04	0.15	3.14
Blackstripe Topminnow		I	M		2	1.58	0.06	0.00	0.02	2.50
Western Mosquitofish	E	I	N		6	4.74	0.18	0.01	0.04	1.83
Trout-perch		I	M		18	14.21	0.53	0.03	0.12	1.94
Brook Silverside		I	M	M	1	0.79	0.03	0.00	0.00	1.00
White Crappie	S	I	C		2	1.58	0.06	0.11	0.49	71.50
Rock Bass	S	C	C		3	2.37	0.09	0.04	0.15	15.00
Smallmouth Bass	F	C	C	M	2	1.58	0.06	0.12	0.53	78.50
Spotted Bass	F	C	C		25	19.74	0.73	1.14	4.91	57.71
Green Sunfish	S	I	C	T	9	7.11	0.26	0.09	0.38	12.56
Bluegill Sunfish	S	I	C	P	26	20.53	0.76	0.25	1.07	12.02
Longear Sunfish	S	I	C	M	146	115.26	4.27	1.27	5.49	11.04
Dusky Darter	D	I	S	M	3	2.37	0.09	0.02	0.07	6.67
Blackside Darter	D	I	S		2	1.58	0.06	0.01	0.03	4.00
Logperch	D	I	S	M	2	1.58	0.06	0.01	0.03	4.00
Johnny Darter	D	I	C		49	38.68	1.43	0.04	0.18	1.08
Greenside Darter	D	I	S	M	39	30.79	1.14	0.05	0.22	1.62
Banded Darter	D	I	S	I	3	2.37	0.09	0.00	0.01	1.33
Rainbow Darter	D	I	S	M	129	101.84	3.77	0.08	0.35	0.79
Fantail Darter	D	I	C		2	1.58	0.06	0.00	0.01	1.50
Freshwater Drum			M	P	3	2.37	0.09	0.31	1.35	132.00
Mile Total					3,422	2,701.58		23.19		
Number of Species					44					
Number of Hybrids					0					

River Code: **02-023**	Stream: **Little Beaver Creek**	Sample Date: **2005**
River Mile: **3.30**	Location:	Date Range: 07/25/2005
Time Fished: 2580 sec	Drainage: 2.5 sq mi	Thru: 09/06/2005
Dist Fished: 0.30 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	2	2.00	0.57			
Creek Chub	N	G	N	T	174	174.00	49.71			
South. Redbelly Dace	N	H	S		14	14.00	4.00			
Striped Shiner	N	I	S		11	11.00	3.14			
Bluntnose Minnow	N	O	C	T	21	21.00	6.00			
Central Stoneroller	N	H	N		10	10.00	2.86			
Green Sunfish	S	I	C	T	13	13.00	3.71			
Bluegill Sunfish	S	I	C	P	3	3.00	0.86			
Johnny Darter	D	I	C		14	14.00	4.00			
Orangethroat Darter	D	I	S		86	86.00	24.57			
Fantail Darter	D	I	C		2	2.00	0.57			
Mile Total					350	350.00				
Number of Species					11					
Number of Hybrids					0					

River Code: **02-023**	Stream: **Little Beaver Creek**	Sample Date: **2005**
River Mile: **3.10**	Location:	Date Range: 07/25/2005
Time Fished: 5040 sec	Drainage: 3.0 sq mi	Thru: 09/06/2005
Dist Fished: 0.30 km	Basin: Scioto River	No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	6	6.00	0.28			
White Sucker	W	O	S	T	80	80.00	3.79			
Creek Chub	N	G	N	T	395	395.00	18.71			
South. Redbelly Dace	N	H	S		360	360.00	17.05			
Striped Shiner	N	I	S		318	318.00	15.06			
Bluntnose Minnow	N	O	C	T	72	72.00	3.41			
Central Stoneroller	N	H	N		476	476.00	22.55			
Green Sunfish	S	I	C	T	253	253.00	11.98			
Bluegill Sunfish	S	I	C	P	2	2.00	0.09			
Longear Sunfish	S	I	C	M	1	1.00	0.05			
Johnny Darter	D	I	C		21	21.00	0.99			
Rainbow Darter	D	I	S	M	34	34.00	1.61			
Orangethroat Darter	D	I	S		84	84.00	3.98			
Fantail Darter	D	I	C		9	9.00	0.43			
	Mile Total				2,111	2,111.00				
	Number of Species				14					
	Number of Hybrids				0					

River Code: **02-023**	Stream: **Little Beaver Creek**	Sample Date: **2005**
River Mile: **2.40**	Location:	Date Range: 07/25/2005
Time Fished: 6240 sec	Drainage: 4.0 sq mi	Thru: 09/06/2005
Dist Fished: 0.30 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	26	26.00	1.78			
White Sucker	W	O	S	T	36	36.00	2.46			
Bigeye Chub	N	I	S	I	1	1.00	0.07			
Creek Chub	N	G	N	T	228	228.00	15.57			
Striped Shiner	N	I	S		111	111.00	7.58			
Spotfin Shiner	N	I	M		2	2.00	0.14			
Bluntnose Minnow	N	O	C	T	39	39.00	2.66			
Central Stoneroller	N	H	N		534	534.00	36.48			
Yellow Bullhead		I	C	T	14	14.00	0.96			
Green Sunfish	S	I	C	T	261	261.00	17.83			
Bluegill Sunfish	S	I	C	P	17	17.00	1.16			
Johnny Darter	D	I	C		61	61.00	4.17			
Greenside Darter	D	I	S	M	1	1.00	0.07			
Rainbow Darter	D	I	S	M	69	69.00	4.71			
Orangethroat Darter	D	I	S		60	60.00	4.10			
Fantail Darter	D	I	C		4	4.00	0.27			
	Mile Total				1,464	1,464.00				
	Number of Species				16					
	Number of Hybrids				0					

River Code: **02-023**	Stream: **Little Beaver Creek**	Sample Date: **2005**
River Mile: **1.40**	Location:	Date Range: 07/25/2005
Time Fished: 5760 sec	Drainage: 4.7 sq mi	Thru: 09/07/2005
Dist Fished: 0.30 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	62	62.00	2.86			
White Sucker	W	O	S	T	13	13.00	0.60			
Bigeye Chub	N	I	S	I	1	1.00	0.05			
Creek Chub	N	G	N	T	80	80.00	3.69			
Emerald Shiner	N	I	S		16	16.00	0.74			
Rosyface Shiner	N	I	S	I	1	1.00	0.05			
Striped Shiner	N	I	S		281	281.00	12.96			
Spotfin Shiner	N	I	M		182	182.00	8.39			
Sand Shiner	N	I	M	M	6	6.00	0.28			
Silverjaw Minnow	N	I	M		30	30.00	1.38			
Bluntnose Minnow	N	O	C	T	99	99.00	4.57			
Central Stoneroller	N	H	N		747	747.00	34.46			
Yellow Bullhead		I	C	T	2	2.00	0.09			
Rock Bass	S	C	C		11	11.00	0.51			
Spotted Bass	F	C	C		8	8.00	0.37			
Green Sunfish	S	I	C	T	128	128.00	5.90			
Bluegill Sunfish	S	I	C	P	28	28.00	1.29			
Longear Sunfish	S	I	C	M	31	31.00	1.43			
Blackside Darter	D	I	S		2	2.00	0.09			
Logperch	D	I	S	M	1	1.00	0.05			
Johnny Darter	D	I	C		12	12.00	0.55			
Greenside Darter	D	I	S	M	69	69.00	3.18			
Rainbow Darter	D	I	S	M	318	318.00	14.67			
Orangethroat Darter	D	I	S		11	11.00	0.51			
Fantail Darter	D	I	C		29	29.00	1.34			
	Mile Total				2,168	2,168.00				
	Number of Species				25					
	Number of Hybrids				0					

River Code: **02-023**	Stream: **Little Beaver Creek**	Sample Date: **2005**
River Mile: **0.10**	Location: Co. Rd. 86	Date Range: 07/26/2005
Time Fished: 5580 sec	Drainage: 6.3 sq mi	Thru: 09/07/2005
Dist Fished: 0.30 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

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		1	1.00	0.05			
Golden Redhorse	R	I	S	M	1	1.00	0.05			
Northern Hog Sucker	R	I	S	M	38	38.00	1.76			
White Sucker	W	O	S	T	6	6.00	0.28			
Creek Chub	N	G	N	T	38	38.00	1.76			
Suckermouth Minnow	N	I	S		15	15.00	0.69			
Emerald Shiner	N	I	S		56	56.00	2.59			
Rosyface Shiner	N	I	S	I	40	40.00	1.85			
Striped Shiner	N	I	S		125	125.00	5.78			
Steelcolor Shiner	N	I	M	P	4	4.00	0.18			
Spotfin Shiner	N	I	M		114	114.00	5.27			
Sand Shiner	N	I	M	M	107	107.00	4.94			
Silverjaw Minnow	N	I	M		23	23.00	1.06			
Bullhead Minnow	N	O	C		12	12.00	0.55			
Bluntnose Minnow	N	O	C	T	144	144.00	6.65			
Central Stoneroller	N	H	N		1,108	1,108.00	51.20			
Stonecat Madtom		I	C	I	1	1.00	0.05			
Rock Bass	S	C	C		7	7.00	0.32			
Smallmouth Bass	F	C	C	M	1	1.00	0.05			
Spotted Bass	F	C	C		12	12.00	0.55			
Green Sunfish	S	I	C	T	43	43.00	1.99			
Bluegill Sunfish	S	I	C	P	4	4.00	0.18			
Longear Sunfish	S	I	C	M	8	8.00	0.37			
Blackside Darter	D	I	S		1	1.00	0.05			
Logperch	D	I	S	M	7	7.00	0.32			
Johnny Darter	D	I	C		16	16.00	0.74			
Greenside Darter	D	I	S	M	23	23.00	1.06			
Banded Darter	D	I	S	I	8	8.00	0.37			
Rainbow Darter	D	I	S	M	183	183.00	8.46			
Orangethroat Darter	D	I	S		1	1.00	0.05			
Fantail Darter	D	I	C		17	17.00	0.79			
	Mile Total				2,164	2,164.00				
	Number of Species				31					
	Number of Hybrids				0					

River Code: **02-247**	Stream: **West Ditch (Piketon D.O.E.)**	Sample Date: **2005**
River Mile: **1.20**	Location: Co. Rd. 86	Date Range: 07/26/2005
Time Fished: 4620 sec	Drainage: 1.1 sq mi	Thru: 09/07/2005
Dist Fished: 0.30 km	Basin: Scioto River No of Passes: 2	Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	134	134.00	5.92			
Blacknose Dace	N	G	S	T	97	97.00	4.28			
Creek Chub	N	G	N	T	310	310.00	13.69			
South. Redbelly Dace	N	H	S		1,173	1,173.00	51.81			
Striped Shiner	N	I	S		6	6.00	0.27			
Bluntnose Minnow	N	O	C	T	168	168.00	7.42			
Central Stoneroller	N	H	N		333	333.00	14.71			
Green Sunfish	S	I	C	T	1	1.00	0.04			
Longear Sunfish	S	I	C	M	42	42.00	1.86			
Mile Total					2,264	2,264.00				
Number of Species					9					
Number of Hybrids					0					

Appendix Table 15. Fish tissue sample information for the USEC/PORTS project area streams, 2005 and 2006 (blue).

Stream River Mile	Sample Number	Fish Species	Sample Type	Individual Fish Measurements Total Length (mm)/ Weight (grams)
Little Beaver Creek				
3.3	FT47	green sunfish	WBC	115/32, 90/15, 88/10, 88/10
3.3	FT46	creek chub	WBC	125-90/10@95 grams
3.3	FT48	creek chub	WBC	181/71, 157/47, 125-90/10@95
3.1	FT35	creek chub	WBC	180/56, 192/83, 161/51
3.1	FT73	creek chub	WBC	195/86, 189/84, 150/50, 157/50, 157/47, 155/47
3.1	FT43	green sunfish	WBC	160/96, 139/61, 125/45
3.1	FT75	green sunfish	WBC	137/58, 119/40, 122/45, 112/48, 115/40, 109/35, 104/30, 107/31, 107/31
2.4	FT27	creek chub	WBC	217/103, 154/47, 144/33
2.4	FT69	creek chub	WBC	214/100, 196/81, 128/24, 125/20, 126/23, 119/19
2.4	FT38	green sunfish	WBC	148/60, 140/54, 126/39
2.4	FT61	green sunfish	WBC	153/71, 136/44, 123/33, 118/26, 123/30, 113/22, 112/23, 105/21, 106/20
2.4	FT40	yellow bullhead	WB	234/223
2.4	FT65	yellow bullhead	WBC	148/51, 222/208
1.4	FT3	creek chub	WBC	213/102, 128/24, 114/18
1.4	FT84	creek chub	WBC	229/124, 123/20, 112/17, 105/17, 116/18, 110/17
1.4	FT6 & FT81	spotted bass	SOFC	310/417, 319/412, 320/380
1.4	FT45	rockbass, green sunfish, longear SF	WBC	RB (183/110), GS (112/26), LS (115/33)
1.4	FT50	rockbass, green sunfish, longear SF	WBC	RB (167/76), GS (130/39, 115/24, 110/24, 106/22, 102/20), LS (105/23)
1.4	FT100	spotted bass	SOFC	301/308, 302/321, 276/288
1.4	FT102	green sunfish	WBC	162/85, 137/50, 119/31
0.1	FT44 & FT77	spotted bass	SOFC	258/225, 208/127, 196/93
0.1	FT31	hog sucker	WBC	136/27, 152/35, 143/29
0.1	FT64	hog sucker	WBC	318/364, 175/56
0.1	FT18	rockbass, green sunfish, longear SF	WBC	RB (127/39), GS (82/13), LS (90/15)
0.1	FT67	rockbass, green sunfish, longear SF, spotted bass	WBC	RB (173/101, 136/50), GS (105/23), LS (88/17), SB (139/30)
0.1	FT105	spotted bass	SOFC	272/276, 236/193
Big Beaver Creek				
5.6	FT36	hog sucker	WBC	131/30, 126/26
5.6	FT76	hog sucker	WBC	269/205, 159/45, 158/40
5.6	FT24	longear sunfish	WBC	109/29, 107/27, 102/30, 97/21
5.6	FT66	longear sunfish	WBC	141/60, 119/40, 120/50, 115/39, 117/26, 117/35, 100/24, 98/22
5.6	FT32 & FT79	spotted bass	SOFC	342/562, 283/298, 293/324, 242/171, 236/163, 233/155
5.6	FT34	rockbass, green sunfish	WBC	RB (138/34), GS (117/30, 98/22)
5.6	FT59	rockbass, green sunfish	WBC	RB (192/120), GS (149/59, 137/49, 107/22, 162/76)
5.6	FT103	spotted bass	SOF	308/368
5.6	FT104	hog sucker	WBC	184/67, 166/57, 193/78, 161/47, 174/63
2.3	FT30 & FT49	spotted bass	SOF	347/500
2.3	FT39 & FT74	common carp	SFF	523/1875
2.3	FT42	bluegill, green sunfish, longear SF	WBC	BG (108/20), GS (118/28), LS (121/37)
2.3	FT72	rockbass, green sunfish, longear SF	WBC	RB (170/84), GS (100/17, 97/16), LS (117/35, 122/41, 100/21, 95/20)
1.8	FT20	bluegill	WBC	127/44, 114/25
1.8	FT68	bluegill	WBC	162/91, 183/140, 166/104
1.8	FT41	golden redhorse	WB	257/165
1.8	FT58	golden redhorse	WB	271/195
1.8	FT 29 & FT60	quillback carpsucker	SOFC	351/510, 358/481, 343/455, 358/500, 357/445, 381/561
1.8	FT33 & FT56	spotted bass	SOFC	284/307, 258/250
1.3	FT28	longear sunfish, spotted bass	WBC	LS (110/23, 85/10, 107/20), SB (118/20, 136/27)
1.3	FT54	longear sunfish, spotted bass	WBC	LS (122/36, 105/34, 96/17, 116/35, 97/21, 88/12), SB (179/80, 116/20)
1.3	FT22 & FT63	quillback carpsucker	SOF	322/360
1.3	FT19 & FT80	spotted bass	SOF	272/300
1.3	FT107	freshwater drum	SOF	404/701
Big Run				
4.8	FT23	creek chub	WBC	123/16, 112/13, 124/19, 130/17
4.8	FT57	creek chub	WBC	121/16, 119/16, 119/16, 110/13, 135/22, 118/15, 117/13, 110-90/10@99
4.8	FT25	green sunfish	WBC	97/15, 103/17, 83/8, 83/7
4.3	FT26	creek chub	WBC	180/58, 180/55, 155/35
4.3	FT70	creek chub	WBC	133/20, 147/38, 138/22, 150/22, 155/30, 152/30, 153/32, 165/34

Appendix Table 15. Continued.

Stream River Mile	Sample Number	Fish Species	Sample Type	Individual Fish Measurements Total Length (mm)/ Weight (grams)
Big Run				
4.3	FT14	green sunfish	WBC	102/15, 104/14, 107/15, 92/10, 93/10
4.3	FT78	green sunfish	WBC	168/65, 140/38, 145/42, 102/18, 104/18, 108/18, 105/13
4.3	FT109	green sunfish	WBC	136/50, 80/12, 89/16, 95/18, 82/12
4.0	FT9	green sunfish	WBC	138/39, 109/24
4.0	FT21	creek chub	WBC	142/33, 151/39, 130/24, 139/28
4.0	FT71	creek chub	WBC	146/36, 152/40, 138/32, 124/25, 122/22, 133/28, 122/22, 126/24, 133/25, 126/24
West Ditch				
1.2	FT37	creek chub	WBC	199/93, 169/49, 153/47
1.2	FT62	creek chub	WBC	192/87, 145/32, 141/33, 137/31, 130/24, 135/23, 115/20
1.2	FT10	longear sunfish	WBC	136/51, 137/55, 103/23
1.2	FT55	longear sunfish	WBC	133/62, 116/44, 110/31, 105/22, 104/22, 100/22, 87/13
Scioto River				
29.0	FT12	golden redhorse	WB	352/456
29.0	FT53	golden redhorse	WB	360/552
29.0	FT2	white bass	WBC	142/48, 136/40
29.0	FT85	white bass	WBC	177/63, 152/48, 168/63, 138/30, 123/20
29.0	FT15 & FT52	channel catfish	SFFC	385/395, 468/833, 446/642
29.0	FT13 & FT90	freshwater drum	SOFC	303/338, 352/510, 309/341, 392/741, 310/340
29.0	FT110	freshwater drum	SOFC	292/320, 313/342, 302/319, 300/297, 313/367, 298/280
29.0	FT111	white bass	WBC	231/147, 200/85, 178/60, 163/50
27.0	FT5	golden redhorse	WB	202/94
27.0	FT82	golden redhorse	WB	452/1069
27.0	FT17	white bass	WBC	147/50, 144/33, 151/38
27.0	FT86	white bass	WBC	177/81, 164/50, 177/80, 167/62
27.0	FT4 & FT88	channel catfish	SFFC	553/1445, 497/923, 405/518
27.0	FT7 & FT91	freshwater drum	SOFC	481/1520, 461/1319
27.0	FT112	freshwater drum	SOFC	442/1010, 410/848, 404/840, 445/1010
27.0	FT113	channel catfish	SFFC	491/1025, 500/1325, 512/1250
27.0	FT114	smallmouth redhorse	WBC	435/820, 310/308
27.0	FT115	white bass	WBC	249/147, 166/51
24.6	FT1	smallmouth redhorse	WB	392/692
24.6	FT87	smallmouth redhorse	WB	440/1030
24.6	FT16	white bass	WBC	171/61, 121/58
24.6	FT89	white bass	WBC	172/70, 160/50, 153/40, 173/62, 162/49, 152/39
24.6	FT11 & FT51	freshwater drum	SOFC	510/1775, 488/1450
24.6	FT8 & FT83	channel catfish	SFF	516/998
24.6	FT116	golden redhorse	WB	303/312
24.6	FT117	white bass	WBC	244/152, 170/55
24.6	FT118	channel catfish	SFF	617/2225

WBC: Whole Body Composite, WB: Whole Body, SOFC: Skin On Fillet Composite, SOF: Skin On Fillet, SFFC: Skin Off Fillet Composite, SFF: Skin Off Fillet

Appendix Table 16. Fish tissue analytical results from streams sampled in the USEC/PORTS project, June, 2006. Values are reported on a wet weight basis.

Stream	River Mile	Fish Species	Sample Type	Sample Number	Date Sampled	Results		
						Gross alpha (pCi/g)	Gross beta (pCi/g)	Technetium ^{99} (pCi/g)
Little Beaver Creek	1.4	spotted bass	SOFC	FT100	6/19/2006	<0.437	4.73J	0.298J
Little Beaver Creek	1.4	green sunfish	WBC	FT102	6/19/2006	<0.727	4.52J	<0.333*
Little Beaver Creek	0.1	spotted bass	SOFC	FT105	6/19/2006	<0.438	5.10J	1.37
Big Beaver Creek	5.6	spotted bass	SOFC	FT103	6/19/2006	<0.817	5.25J	2.98*
Big Beaver Creek	5.6	hog sucker	WBC	FT104	6/19/2006	<0.215	1.70J	<0.339
Big Beaver Creek	1.3	freshwater drum	SOF	FT107	6/19/2006	<0.657	4.73J	<0.237
Big Run	4.3	green sunfish	WBC	FT109	6/19/2006	<2.38	4.43J	0.545*
Scioto River	29.0	freshwater drum	SOFC	FT110	6/21/2006	<0.223	2.71J	<0.244
Scioto River	29.0	white bass	WBC	FT111	6/21/2006	<0.286	1.26J	<0.202
Scioto River	27.0	freshwater drum	SOFC	FT112	6/21/2006	<0.0962	0.427J	0.257J
Scioto River	27.0	channel catfish	SFFC	FT113	6/21/2006	<0.115	1.15J	<0.217
Scioto River	27.0	smallmouth redhorse	WBC	FT114	6/21/2006	0.064J	0.401J	<0.182
Scioto River	27.0	white bass	WBC	FT115	6/21/2006	<0.604	3.26J	<0.242
Scioto River	24.6	golden redhorse	WB	FT116	6/21/2006	<0.397	<0.641	0.258J
Scioto River	24.6	white bass	WBC	FT117	6/21/2006	<0.512	1.92J	0.233J
Scioto River	24.6	channel catfish	SFF	FT118	6/21/2006	<0.184	1.84J	<0.384

J - The analyte was positively identified, but the quantitation was below the reporting limit.

* - The result is an estimate only and is an "upper limit" of activity. This 'estimate only' designation is due to matrix spike recoveries that were less than the quality control acceptance criteria of 30%.

< - Not detected at or above the reporting limit (MDL value reported with the less than symbol).

WBC= whole body composite; WB= whole body; SOFC= skin on fillet composite; SOF=skin on fillet; SFF=skin off fillet; SFFC=skin off fillet composite

Appendix Table 17. Invertebrate Community Index (ICI) metrics and scores for Little Beaver Creek, Big Beaver Creek, Big Run, West Ditch, and the Scioto River, 2005. Page A54

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			
Scioto River (02-001)													
Year: 2005													
29.00	5864	34(6)	9(6)	10(6)	11(6)	16.6(6)	38.9(4)	10.0(6)	34.5(0)	0.6(6)	10(4)	4	50
27.00	5936	30(4)	8(6)	7(4)	10(6)	9.9(4)	19.8(2)	9.9(6)	60.4(0)	1.6(4)	14(6)	4	42
24.60	6085	36(6)	8(6)	10(6)	11(6)	22.2(6)	25.0(4)	12.8(6)	39.9(0)	0.6(6)	12(4)	4	50
Big Run (02-012)													
Year: 2005													
4.80	0.5	12(0)	1(0)	0(0)	8(2)	0.1(2)	0.0(0)	0.4(2)	99.5(0)	22.4(2)	0(0)	4	8
4.30	0.9	26(4)	0(0)	3(6)	17(4)	0.0(0)	13.6(6)	6.1(2)	72.8(0)	2.6(6)	6(2)	4	30
4.00	1.0	27(4)	1(0)	1(4)	17(4)	0.6(2)	0.9(4)	47.8(6)	44.1(4)	8.7(6)	5(2)	4	36
Big Beaver Creek (02-022)													
Year: 2005													
5.60	59.0	45(6)	5(2)	4(6)	17(4)	4.7(2)	3.8(2)	44.6(6)	46.1(2)	7.6(4)	11(4)	4	38
1.80	69.0	34(4)	7(4)	4(6)	17(4)	27.3(4)	3.3(2)	6.6(2)	61.5(2)	10.6(4)	14(6)	4	38
1.30	69.0	45(6)	9(6)	7(6)	20(6)	47.1(6)	1.8(2)	10.6(2)	37.9(4)	21.5(0)	11(4)	4	42
Little Beaver Creek (02-023)													
Year: 2005													
3.10	3.0	16(2)	1(0)	1(4)	13(2)	0.1(2)	12.9(6)	0.2(2)	86.8(0)	56.1(0)	1(0)	4	18
2.40	4.0	24(2)	5(4)	3(6)	11(2)	7.2(2)	5.4(6)	17.4(4)	69.2(0)	25.7(2)	12(6)	4	34
1.40	4.7	39(6)	7(6)	3(6)	19(4)	27.1(6)	10.9(6)	12.8(4)	47.8(2)	15.8(4)	6(2)	4	46
0.10	6.3	28(4)	7(6)	3(6)	13(2)	64.1(6)	2.5(6)	5.6(2)	25.6(6)	7.4(6)	7(4)	4	48
West Ditch (Piketon D.O.E.) (02-247)													
Year: 2005													
1.20	1.1	27(4)	5(4)	0(0)	13(2)	44.5(6)	0.0(0)	12.5(4)	41.1(4)	26.3(2)	6(2)	4	28

Appendix Table 18. Ohio EPA macroinvertebrate results from the PORTS area streams, 2005.

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/09/2005 River Code: 02-001 RM: 29.00 Site: Scioto River

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	17
03360	*Plumatella sp*	2
03600	*Oligochaeta*	48 +
04750	*Myzobdella lugubris*	+
05800	*Caecidotea sp*	+
06700	*Crangonyx sp*	+
11123	*Pseudocloeon dardanum*	+
11130	*Baetis intercalaris*	371 +
11670	*Procloeon viridoculare*	+
12200	*Isonychia sp*	46
13400	*Stenacron sp*	3
13510	*Maccaffertium exiguum*	114
13550	*Maccaffertium mexicanum integrum*	75
13561	*Maccaffertium pulchellum*	119
13570	*Maccaffertium terminatum*	146 +
16700	*Tricorythodes sp*	86 +
17200	*Caenis sp*	309 +
18100	*Anthopotamus sp*	+
22300	*Argia sp*	+
24710	*Dromogomphus spinosus*	+
44501	*Corixidae*	+
48410	*Corydalus cornutus*	1
51206	*Cyrnellus fraternus*	19
52200	*Cheumatopsyche sp*	243
52510	*Hydropsyche aerata*	26
52520	*Hydropsyche bidens*	55
52560	*Hydropsyche orris*	359
52570	*Hydropsyche simulans*	234
52580	*Hydropsyche valanis*	28
52801	*Potamyia flava*	2014 +
53800	*Hydroptila sp*	1 +
59100	*Ceraclea sp*	2
59400	*Nectopsyche sp*	+
69400	*Stenelmis sp*	+
74100	*Simulium sp*	99 +
74501	*Ceratopogonidae*	+
77120	*Ablabesmyia mallochi*	+
77470	*Coelotanypus sp*	+
77750	*Hayesomyia senata or Thienemannimyia norena*	231 +
80360	*Corynoneura "celeripes" (sensu Simpson & Bode, 1980)*	16
82130	*Thienemanniella similis*	38
82730	*Chironomus (C.) decorus group*	+
82820	*Cryptochironomus sp*	+
83040	*Dicrotendipes neomodestus*	+
83300	*Glyptotendipes (G.) sp*	847 +
83310	*Glyptotendipes (Trichotendipes) amplus*	38
84060	*Parachironomus pectinatellae*	38
84450	*Polypedilum (Uresipedilum) flavum*	1001 +
84520	*Polypedilum (Tripodura) halterale group*	+
84540	*Polypedilum (Tripodura) scalaenum group*	77 +
85625	*Rheotanytarsus sp*	770
87540	*Hemerodromia sp*	192

No. Quantitative Taxa: 34 Total Taxa: 52
No. Qualitative Taxa: 30 ICI: **50**
Number of Organisms: 7665 Qual EPT: 10

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/09/2005 River Code: 02-001 RM: 27.00 Site: Scioto River

Taxa Code	Taxa	Quant/Qual
03360	*Plumatella sp*	6 +
03451	*Urnatella gracilis*	64
03600	*Oligochaeta*	224 +
11121	*Pseudocloeon sp*	+
11130	*Baetis intercalaris*	262 +
12200	*Isonychia sp*	33
13000	*Leucrocuta sp*	+
13510	*Maccaffertium exiguum*	59 +
13550	*Maccaffertium mexicanum integrum*	49
13561	*Maccaffertium pulchellum*	144
13570	*Maccaffertium terminatum*	220 +
16700	*Tricorythodes sp*	292 +
17200	*Caenis sp*	903 +
22300	*Argia sp*	+
45400	*Trichocorixa sp*	+
48410	*Corydalus cornutus*	2
51206	*Cyrnellus fraternus*	169 +
52200	*Cheumatopsyche sp*	185 +
52520	*Hydropsyche bidens*	178 +
52560	*Hydropsyche orris*	1667 +
52570	*Hydropsyche simulans*	209 +
52801	*Potamyia flava*	1487 +
53800	*Hydroptila sp*	39
59400	*Nectopsyche sp*	+
63900	*Laccophilus sp*	+
67800	*Tropisternus sp*	+
68901	*Macronychus glabratus*	1
69400	*Stenelmis sp*	+
74100	*Simulium sp*	32 +
77750	*Hayesomyia senata or Thienemannimyia norena*	840 +
78655	*Procladius (Holotanypus) sp*	+
78750	*Rheopelopia paramaculipennis*	+
80410	*Cricotopus (C.) sp*	+
80510	*Cricotopus (Isocladius) sylvestris group*	93
81231	*Nanocladius (N.) crassicornus or N. (N.) "rectinervis"*	93 +
83040	*Dicrotendipes neomodestus*	187
83300	*Glyptotendipes (G.) sp*	9802 +
83310	*Glyptotendipes (Trichotendipes) amplus*	187
84100	*Paracladopelma sp*	+
84450	*Polypedilum (Uresipedilum) flavum*	373 +
84520	*Polypedilum (Tripodura) halterale group*	+
84540	*Polypedilum (Tripodura) scalaenum group*	+
85625	*Rheotanytarsus sp*	1960 +
85800	*Tanytarsus sp*	+
87540	*Hemerodromia sp*	65 +
95100	*Physella sp*	+
97601	*Corbicula fluminea*	+

No. Quantitative Taxa: 30 Total Taxa: 47
No. Qualitative Taxa: 37 ICI: **42**
Number of Organisms: 19825 Qual EPT: 14

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/09/2005 River Code: 02-001 RM: 24.60 Site: Scioto River

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	+
03121	*Paludicella articulata*	1
03360	*Plumatella sp*	3 +
03600	*Oligochaeta*	48
11130	*Baetis intercalaris*	184 +
12200	*Isonychia sp*	2 +
13510	*Maccaffertium exiguum*	88 +
13550	*Maccaffertium mexicanum integrum*	38
13561	*Maccaffertium pulchellum*	115
13570	*Maccaffertium terminatum*	186 +
16700	*Tricorythodes sp*	242 +
17200	*Caenis sp*	1350 +
22300	*Argia sp*	1 +
43300	*Ranatra sp*	+
48410	*Corydalus cornutus*	1
51206	*Cyrnellus fraternus*	3
52200	*Cheumatopsyche sp*	153 +
52520	*Hydropsyche bidens*	49 +
52560	*Hydropsyche orris*	296 +
52570	*Hydropsyche simulans*	75 +
52580	*Hydropsyche valanis*	3
52801	*Potamyia flava*	1818 +
53800	*Hydroptila sp*	73
59100	*Ceraclea sp*	17 +
59400	*Nectopsyche sp*	1
69400	*Stenelmis sp*	3
70800	*Erioptera sp*	+
74100	*Simulium sp*	32 +
77120	*Ablabesmyia mallochi*	+
77750	*Hayesomyia senata or Thienemannimyia norena*	829
80360	*Corynoneura "celeripes" (sensu Simpson & Bode, 1980)*	32 +
80410	*Cricotopus (C.) sp*	+
81231	*Nanocladius (N.) crassicornus or N. (N.) "rectinervis"*	128
82130	*Thienemanniella similis*	+
82820	*Cryptochironomus sp*	+
83003	*Dicrotendipes fumidus*	64
83300	*Glyptotendipes (G.) sp*	1467 +
83310	*Glyptotendipes (Trichotendipes) amplus*	64
84450	*Polypedilum (Uresipedilum) flavum*	1212 +
84520	*Polypedilum (Tripodura) halterale group*	+
84540	*Polypedilum (Tripodura) scalaenum group*	64 +
84612	*Saetheria tylus*	+
84960	*Pseudochironomus sp*	+
85230	*Cladotanytarsus mancus group*	+
85625	*Rheotanytarsus sp*	1276
87540	*Hemerodromia sp*	2 +
95100	*Physella sp*	16 +

No. Quantitative Taxa: 36 Total Taxa: 47
No. Qualitative Taxa: 32 ICI: **50**
Number of Organisms: 9936 Qual EPT: 12

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/07/2005 River Code: 02-012 RM: 4.80 Site: Big Run dst. Piketon D.O.E.

Taxa Code	Taxa	Quant/Qual		Taxa Code	Taxa	Quant/Qual
01320	*Hydra sp*	1291				
01801	*Turbellaria*	3201	+			
03600	*Oligochaeta*	1561	+			
07800	*Cambarus sp*		+			
12501	*Heptageniidae*	8				
62100	*Celina sp*		+			
70000	*Diptera*	1				
71900	*Tipula sp*		+			
74501	*Ceratopogonidae*	16				
77355	*Clinotanypus pinguis*		+			
77500	*Conchapelopia sp*	15				
78401	*Natarsia species A (sensu Roback, 1978)*		+			
82820	*Cryptochironomus sp*	15				
83051	*Dicrotendipes simpsoni*	59				
83300	*Glyptotendipes (G.) sp*	208	+			
84450	*Polypedilum (Uresipedilum) flavum*	833	+			
84540	*Polypedilum (Tripodura) scalaenum group*		+			
85625	*Rheotanytarsus sp*	30				

No. Quantitative Taxa: 12 Total Taxa: 18
No. Qualitative Taxa: 10 ICI: **8**
Number of Organisms: 7238 Qual EPT: 0

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/07/2005 River Code: 02-012 RM: 4.30 Site: Big Run

Taxa Code	Taxa	Quant/Qual		Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	277	+			
03600	*Oligochaeta*	38	+			
08260	*Orconectes (Crokerinus) sanbornii sanbornii*		+			
11120	*Baetis flavistriga*		+			
11130	*Baetis intercalaris*		+			
13521	*Stenonema femoratum*		+			
21200	*Calopteryx sp*	6	+			
22300	*Argia sp*	2	+			
50301	*Chimarra aterrima*		+			
52200	*Cheumatopsyche sp*	233	+			
52530	*Hydropsyche depravata group*	16	+			
59570	*Oecetis nocturna*	16				
68130	*Helichus sp*		+			
68700	*Dubiraphia sp*	41	+			
69400	*Stenelmis sp*	99	+			
74501	*Ceratopogonidae*	4				
74650	*Atrichopogon sp*	1				
77500	*Conchapelopia sp*	27				
77800	*Helopelopia sp*	80	+			
78401	*Natarsia species A (sensu Roback, 1978)*		+			
78450	*Nilotanypus fimbriatus*	93				
80360	*Corynoneura "celeripes" (sensu Simpson & Bode, 1980)*	36				
82141	*Thienemanniella xena*	4				
82820	*Cryptochironomus sp*	13				
84210	*Paratendipes albimanus or P. duplicatus*	40				
84300	*Phaenopsectra obediens group*	13				
84450	*Polypedilum (Uresipedilum) flavum*	583	+			
84470	*Polypedilum (P.) illinoense*	13	+			
84540	*Polypedilum (Tripodura) scalaenum group*	199				
85500	*Paratanytarsus sp*	13				
85625	*Rheotanytarsus sp*	66				
85800	*Tanytarsus sp*		+			
85821	*Tanytarsus glabrescens group sp 7*	40				
86100	*Chrysops sp*	2	+			

No. Quantitative Taxa: 26 Total Taxa: 34
No. Qualitative Taxa: 20 ICI: **30**
Number of Organisms: 1955 Qual EPT: 6

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/08/2005 River Code: 02-012 RM: 4.00 Site: Big Run

Taxa Code	Taxa	Quant/Qual	
01801	*Turbellaria*	32	+
03600	*Oligochaeta*	102	
11120	*Baetis flavistriga*		+
11130	*Baetis intercalaris*	10	+
21200	*Calopteryx sp*	1	+
21300	*Hetaerina sp*		+
22300	*Argia sp*		+
23909	*Boyeria vinosa*	2	+
44501	*Corixidae*		+
50301	*Chimarra aterrima*		+
52200	*Cheumatopsyche sp*	16	+
59001	*Leptoceridae*		+
68075	*Psephenus herricki*		+
68130	*Helichus sp*		+
68708	*Dubiraphia vittata group*	1	
68901	*Macronychus glabratus*	110	
69400	*Stenelmis sp*		+
77355	*Clinotanypus pinguis*		+
77500	*Conchapelopia sp*	40	+
77800	*Helopelopia sp*	27	
78401	*Natarsia species A (sensu Roback, 1978)*		+
78450	*Nilotanypus fimbriatus*	67	
78655	*Procladius (Holotanypus) sp*		+
80351	*Corynoneura n.sp 1*	4	+
80360	*Corynoneura "celeripes" (sensu Simpson & Bode, 1980)*	16	
80370	*Corynoneura lobata*	156	
82141	*Thienemanniella xena*	8	
83840	*Microtendipes pedellus group*	27	
84210	*Paratendipes albimanus or P. duplicatus*		+
84300	*Phaenopsectra obediens group*		+
84450	*Polypedilum (Uresipedilum) flavum*	214	+
84460	*Polypedilum (P.) fallax group*	13	
84470	*Polypedilum (P.) illinoense*	13	
84475	*Polypedilum (P.) ophioides*	13	
84540	*Polypedilum (Tripodura) scalaenum group*		+
85500	*Paratanytarsus sp*	67	
85625	*Rheotanytarsus sp*	201	+
85800	*Tanytarsus sp*	94	+
85821	*Tanytarsus glabrescens group sp 7*	455	
87501	*Empididae*	2	
95100	*Physella sp*	8	
96900	*Ferrissia sp*	12	
98200	*Pisidium sp*		+

Taxa Code	Taxa	Quant/Qual

No. Quantitative Taxa: 27 Total Taxa: 43
No. Qualitative Taxa: 26 ICI: **36**
Number of Organisms: 1711 Qual EPT: 5

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/08/2005 River Code: 02-022 RM: 5.60 Site: Big Beaver Creek

Taxa Code	Taxa	Quant/Qual	
00653	*Eunapius fragilis*		+
01320	*Hydra sp*	10	
01801	*Turbellaria*	4	+
03600	*Oligochaeta*	185	+
06201	*Hyalella azteca*	156	+
07800	*Cambarus sp*	1	
08260	*Orconectes (Crokerinus) sanbornii sanbornii*		+
08601	*Hydrachnidia*	8	
11200	*Callibaetis sp*		+
11250	*Centroptilum sp (w/o hindwing pads)*		+
11651	*Procloeon sp (w/o hindwing pads)*	2	
11670	*Procloeon viridoculare*		+
13400	*Stenacron sp*	2	+
13510	*Maccaffertium exiguum*	2	
13590	*Maccaffertium vicarium*	39	+
17200	*Caenis sp*	83	+
22001	*Coenagrionidae*		+
22300	*Argia sp*		+
23909	*Boyeria vinosa*		+
24710	*Dromogomphus spinosus*		+
26705	*Macromia illinoiensis*		+
27406	*Neurocordulia obsoleta*		+
34130	*Acroneuria frisoni*	3	+
43300	*Ranatra sp*		+
47600	*Sialis sp*		+
48410	*Corydalus cornutus*	1	+
48620	*Nigronia serricornis*	1	+
50315	*Chimarra obscura*		+
50804	*Lype diversa*	8	
52200	*Cheumatopsyche sp*	7	+
53800	*Hydroptila sp*	53	
59120	*Ceraclea flava complex*		+
59580	*Oecetis persimilis*	36	+
60900	*Peltodytes sp*		+
65800	*Berosus sp*	1	
68130	*Helichus sp*		+
68601	*Ancyronyx variegata*	1	+
68708	*Dubiraphia vittata group*		+
68901	*Macronychus glabratus*	5	+
69400	*Stenelmis sp*	11	+
74501	*Ceratopogonidae*	8	+
77120	*Ablabesmyia mallochi*	21	+
77500	*Conchapelopia sp*	82	+
77750	*Hayesomyia senata or Thienemannimyia norena*		+
77800	*Helopelopia sp*	21	
78655	*Procladius (Holotanypus) sp*		+
80410	*Cricotopus (C.) sp*	21	
80427	*Cricotopus (C.) politus*	41	+
82121	*Thienemanniella lobapodema*	8	
82885	*Cryptotendipes pseudotener*		+
83002	*Dicrotendipes modestus*		+
83040	*Dicrotendipes neomodestus*	516	+
83158	*Endochironomus nigricans*	41	+
83300	*Glyptotendipes (G.) sp*	21	
83840	*Microtendipes pedellus group*		+
84000	*Parachironomus sp*	21	
84210	*Paratendipes albimanus or P. duplicatus*		+
84315	*Phaenopsectra flavipes*		+
84450	*Polypedilum (Uresipedilum) flavum*	62	+
85500	*Paratanytarsus sp*	41	
85625	*Rheotanytarsus sp*	103	
85800	*Tanytarsus sp*	268	+
85802	*Tanytarsus curticornis*	21	
85821	*Tanytarsus glabrescens group sp 7*	784	+
87540	*Hemerodromia sp*		+
93200	*Hydrobiidae*	2	+
94400	*Fossaria sp*	1	
95100	*Physella sp*	14	+
96002	*Helisoma anceps anceps*	4	+
96120	*Menetus (Micromenetus) dilatatus*	1	
96900	*Ferrissia sp*	9	
97601	*Corbicula fluminea*		+
98600	*Sphaerium sp*		+

No. Quantitative Taxa: 45 Total Taxa: 73
No. Qualitative Taxa: 54 ICI: **38**
Number of Organisms: 2730 Qual EPT: 11

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/07/2005 River Code: 02-022 RM: 2.30 Site: Big Beaver Creek upst. L. Beaver Creek, at RR

Taxa Code	Taxa	Quant/Qual
03121	*Paludicella articulata*	+
06201	*Hyalella azteca*	+
08601	*Hydrachnidia*	+
13400	*Stenacron sp*	+
13521	*Stenonema femoratum*	+
17200	*Caenis sp*	+
21200	*Calopteryx sp*	+
22001	*Coenagrionidae*	+
22300	*Argia sp*	+
23909	*Boyeria vinosa*	+
27400	*Neurocordulia sp*	+
43300	*Ranatra sp*	+
59110	*Ceraclea ancylus*	+
60300	*Dineutus sp*	+
60350	*Gyretes sp*	+
68130	*Helichus sp*	+
68601	*Ancyronyx variegata*	+
68708	*Dubiraphia vittata group*	+
68901	*Macronychus glabratus*	+
69400	*Stenelmis sp*	+
77120	*Ablabesmyia mallochi*	+
77140	*Ablabesmyia peleensis*	+
78100	*Labrundinia sp*	+
83310	*Glyptotendipes (Trichotendipes) amplus*	+
84888	*Xenochironomus xenolabis*	+
85821	*Tanytarsus glabrescens group sp 7*	+
96002	*Helisoma anceps anceps*	+
96120	*Menetus (Micromenetus) dilatatus*	+

Taxa Code	Taxa	Quant/Qual

No. Quantitative Taxa: 0 Total Taxa: 28
No. Qualitative Taxa: 28 ICI:
Number of Organisms: 0 Qual EPT: 4

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/08/2005 River Code: 02-022 RM: 1.80 Site: Big Beaver Creek dst. L. Beaver Creek

Taxa Code	Taxa	Quant/Qual	
01801	*Turbellaria*		+
03600	*Oligochaeta*	3	+
08260	*Orconectes (Crokerinus) sanbornii sanbornii*		+
11130	*Baetis intercalaris*	29	+
11250	*Centroptilum sp (w/o hindwing pads)*		+
12200	*Isonychia sp*	3	+
13000	*Leucrocuta sp*	6	
13100	*Nixe sp*	6	
13400	*Stenacron sp*	18	+
13510	*Maccaffertium exiguum*		+
13561	*Maccaffertium pulchellum*		+
13590	*Maccaffertium vicarium*	24	+
14950	*Leptophlebia sp or Paraleptophlebia sp*		+
16700	*Tricorythodes sp*		+
17200	*Caenis sp*	22	+
22001	*Coenagrionidae*	1	+
22300	*Argia sp*		+
23909	*Boyeria vinosa*		+
26700	*Macromia sp*		+
48410	*Corydalus cornutus*		+
50315	*Chimarra obscura*	1	+
52430	*Ceratopsyche morosa group*	2	+
52530	*Hydropsyche depravata group*	9	+
53501	*Hydroptilidae*	1	
59500	*Oecetis sp*		+
65800	*Berosus sp*	2	
68130	*Helichus sp*		+
68201	*Scirtidae*		+
68601	*Ancyronyx variegata*		+
68708	*Dubiraphia vittata group*		+
68901	*Macronychus glabratus*	2	+
71100	*Hexatoma sp*		+
77120	*Ablabesmyia mallochi*		+
77500	*Conchapelopia sp*	9	
78450	*Nilotanypus fimbriatus*	3	
80360	*Corynoneura "celeripes" (sensu Simpson & Bode, 1980)*	3	
80370	*Corynoneura lobata*	71	
81200	*Nanocladius sp*	3	
81825	*Rheocricotopus (Psilocricotopus) robacki*	37	+
82121	*Thienemanniella lobapodema*	11	
82141	*Thienemanniella xena*	18	
82730	*Chironomus (C.) decorus group*	3	
83003	*Dicrotendipes fumidus*	34	
84210	*Paratendipes albimanus or P. duplicatus*	9	
84450	*Polypedilum (Uresipedilum) flavum*		+
84460	*Polypedilum (P.) fallax group*	3	+
84470	*Polypedilum (P.) illinoense*	11	+
84540	*Polypedilum (Tripodura) scalaenum group*	3	
85625	*Rheotanytarsus sp*	6	
85800	*Tanytarsus sp*	3	
85821	*Tanytarsus glabrescens group sp 7*	17	
95100	*Physella sp*	21	+
96900	*Ferrissia sp*	1	
97601	*Corbicula fluminea*		+

No. Quantitative Taxa: 34 Total Taxa: 54
No. Qualitative Taxa: 35 ICI: **38**
Number of Organisms: 395 Qual EPT: 14

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/08/2005 River Code: 02-022 RM: 1.30 Site: Big Beaver Creek dirt road, dst. L. Beaver Crk.

Taxa Code	Taxa	Quant/Qual	
01801	*Turbellaria*	8	
03600	*Oligochaeta*	33	+
08260	*Orconectes (Crokerinus) sanbornii sanbornii*		+
11130	*Baetis intercalaris*	3	+
11250	*Centroptilum sp (w/o hindwing pads)*		+
12200	*Isonychia sp*	6	+
13400	*Stenacron sp*	225	+
13510	*Maccaffertium exiguum*	39	+
13521	*Stenonema femoratum*	3	
13561	*Maccaffertium pulchellum*	83	
13590	*Maccaffertium vicarium*	45	+
16700	*Tricorythodes sp*	3	
17200	*Caenis sp*	64	+
21200	*Calopteryx sp*		+
22300	*Argia sp*	4	+
23804	*Basiaeschna janata*		+
23909	*Boyeria vinosa*		+
25010	*Hagenius brevistylus*		+
26700	*Macromia sp*		+
34130	*Acroneuria frisoni*	1	
44300	*Pelocoris sp*		+
47600	*Sialis sp*		+
50315	*Chimarra obscura*	1	+
50804	*Lype diversa*	1	
51300	*Neureclipsis sp*	2	
52200	*Cheumatopsyche sp*	6	+
52430	*Ceratopsyche morosa group*	4	+
52530	*Hydropsyche depravata group*		+
53501	*Hydroptilidae*	2	
59500	*Oecetis sp*	2	
68130	*Helichus sp*		+
68601	*Ancyronyx variegata*	1	
68708	*Dubiraphia vittata group*	1	+
68901	*Macronychus glabratus*	18	+
74501	*Ceratopogonidae*	1	
77500	*Conchapelopia sp*	10	
77750	*Hayesomyia senata or Thienemannimyia norena*	4	
77800	*Helopelopia sp*	2	
80370	*Corynoneura lobata*	93	
80410	*Cricotopus (C.) sp*	2	
81240	*Nanocladius (N.) distinctus*	2	
81825	*Rheocricotopus (Psilocricotopus) robacki*	6	
82121	*Thienemanniella lobapodema*	10	
83040	*Dicrotendipes neomodestus*	10	
84210	*Paratendipes albimanus or P. duplicatus*	2	
84460	*Polypedilum (P.) fallax group*	27	
84540	*Polypedilum (Tripodura) scalaenum group*	2	
84750	*Stictochironomus sp*		+
85230	*Cladotanytarsus mancus group*	2	
85265	*Cladotanytarsus vanderwulpi group Type 5*	2	
85625	*Rheotanytarsus sp*	29	+
85800	*Tanytarsus sp*	40	+
85815	*Tanytarsus glabrescens group sp 1*	2	
85821	*Tanytarsus glabrescens group sp 7*	31	
87540	*Hemerodromia sp*	14	
95100	*Physella sp*	33	
96900	*Ferrissia sp*	120	+

No. Quantitative Taxa: 45 Total Taxa: 57
No. Qualitative Taxa: 28 ICI: **42**
Number of Organisms: 999 Qual EPT: 11

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/06/2005 River Code: 02-023 RM: 3.30 Site: Little Beaver Creek

Taxa Code	Taxa	Quant/Qual
03600	*Oligochaeta*	+
05900	*Lirceus sp*	+
07801	*Cambarus (C.) sp*	+
08200	*Orconectes sp*	+
17200	*Caenis sp*	+
28001	*Libellulidae*	+
67700	*Paracymus sp*	+
72700	*Anopheles sp*	+
78401	*Natarsia species A (sensu Roback, 1978)*	+
82700	*Chironomus sp*	+
84210	*Paratendipes albimanus or P. duplicatus*	+
84750	*Stictochironomus sp*	+
95100	*Physella sp*	+

Taxa Code	Taxa	Quant/Qual

No. Quantitative Taxa: 0 Total Taxa: 13
No. Qualitative Taxa: 13 ICI:
Number of Organisms: 0 Qual EPT: 1

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/06/2005 River Code: 02-023 RM: 3.10 Site: Little Beaver Creek

Taxa Code	Taxa	Quant/Qual
03600	*Oligochaeta*	437
08200	*Orconectes sp*	+
11120	*Baetis flavistriga*	1
21200	*Calopteryx sp*	+
22001	*Coenagrionidae*	+
22300	*Argia sp*	+
24700	*Dromogomphus sp*	+
25510	*Stylogomphus albistylus*	+
26700	*Macromia sp*	+
52530	*Hydropsyche depravata group*	109 +
71900	*Tipula sp*	+
74501	*Ceratopogonidae*	1
77500	*Conchapelopia sp*	20
77750	*Hayesomyia senata or Thienemannimyia norena*	2
77800	*Helopelopia sp*	77
78655	*Procladius (Holotanypus) sp*	+
79085	*Telopelopia okoboji*	2
80370	*Corynoneura lobata*	4
80410	*Cricotopus (C.) sp*	41
80420	*Cricotopus (C.) bicinctus*	28
80430	*Cricotopus (C.) tremulus group*	108
84460	*Polypedilum (P.) fallax group*	4
84470	*Polypedilum (P.) illinoense*	6
85625	*Rheotanytarsus sp*	2
87540	*Hemerodromia sp*	5
94400	*Fossaria sp*	+

Taxa Code	Taxa	Quant/Qual

No. Quantitative Taxa: 16 Total Taxa: 26
No. Qualitative Taxa: 11 ICI: **18**
Number of Organisms: 847 Qual EPT: 1

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/06/2005 River Code: 02-023 RM: 2.40 Site: Little Beaver Creek

Taxa Code	Taxa	Quant/Qual		Taxa Code	Taxa	Quant/Qual
03600	*Oligochaeta*	90	+			
08260	*Orconectes (Crokerinus) sanbornii sanbornii*		+			
11120	*Baetis flavistriga*	8	+			
11130	*Baetis intercalaris*		+			
11250	*Centroptilum sp (w/o hindwing pads)*		+			
11651	*Procloeon sp (w/o hindwing pads)*		+			
12200	*Isonychia sp*		+			
13400	*Stenacron sp*		+			
13521	*Stenonema femoratum*	3	+			
13590	*Maccaffertium vicarium*	19	+			
15501	*Ephemerellidae*	2				
17200	*Caenis sp*	17	+			
21200	*Calopteryx sp*		+			
22300	*Argia sp*	3	+			
23909	*Boyeria vinosa*		+			
24710	*Dromogomphus spinosus*		+			
25510	*Stylogomphus albistylus*		+			
26700	*Macromia sp*		+			
48410	*Corydalus cornutus*	2	+			
48620	*Nigronia serricornis*	1	+			
52200	*Cheumatopsyche sp*	5	+			
52430	*Ceratopsyche morosa group*	10	+			
52530	*Hydropsyche depravata group*	22	+			
71900	*Tipula sp*		+			
74501	*Ceratopogonidae*		+			
77500	*Conchapelopia sp*	116	+			
77750	*Hayesomyia senata or Thienemannimyia norena*	3				
77800	*Helopelopia sp*	147				
78140	*Labrundinia pilosella*	7				
78450	*Nilotanypus fimbriatus*	7				
78655	*Procladius (Holotanypus) sp*		+			
80410	*Cricotopus (C.) sp*	3				
81825	*Rheocricotopus (Psilocricotopus) robacki*	14				
84460	*Polypedilum (P.) fallax group*	3				
84470	*Polypedilum (P.) illinoense*	7	+			
85800	*Tanytarsus sp*	92				
85821	*Tanytarsus glabrescens group sp 7*	27				
95100	*Physella sp*		+			
96900	*Ferrissia sp*	76				

No. Quantitative Taxa: 24 Total Taxa: 39
No. Qualitative Taxa: 28 ICI: **34**
Number of Organisms: 684 Qual EPT: 12

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/07/2005 River Code: 02-023 RM: 1.40 Site: Little Beaver Creek

Taxa Code	Taxa	Quant/Qual
01900	*Nemertea*	20 +
03600	*Oligochaeta*	111 +
08200	*Orconectes sp*	+
11120	*Baetis flavistriga*	6
11130	*Baetis intercalaris*	4 +
12200	*Isonychia sp*	32 +
13400	*Stenacron sp*	23 +
13590	*Maccaffertium vicarium*	46 +
15501	*Ephemerellidae*	4
17200	*Caenis sp*	151 +
21200	*Calopteryx sp*	+
22300	*Argia sp*	1 +
23909	*Boyeria vinosa*	+
25510	*Stylogomphus albistylus*	+
34130	*Acroneuria frisoni*	1
48410	*Corydalus cornutus*	1 +
48620	*Nigronia serricornis*	2 +
50804	*Lype diversa*	102
52200	*Cheumatopsyche sp*	4
52430	*Ceratopsyche morosa group*	1 +
60300	*Dineutus sp*	+
60900	*Peltodytes sp*	+
68075	*Psephenus herricki*	1 +
68130	*Helichus sp*	+
68700	*Dubiraphia sp*	4
68901	*Macronychus glabratus*	4
74501	*Ceratopogonidae*	4
77500	*Conchapelopia sp*	93
77800	*Helopelopia sp*	76
78140	*Labrundinia pilosella*	4
78401	*Natarsia species A (sensu Roback, 1978)*	+
78655	*Procladius (Holotanypus) sp*	+
80370	*Corynoneura lobata*	6
81200	*Nanocladius sp*	4
81460	*Orthocladius (O.) sp*	18
81650	*Parametriocnemus sp*	4
81825	*Rheocricotopus (Psilocricotopus) robacki*	31
82730	*Chironomus (C.) decorus group*	+
83040	*Dicrotendipes neomodestus*	13
83300	*Glyptotendipes (G.) sp*	4
84210	*Paratendipes albimanus or P. duplicatus*	+
84450	*Polypedilum (Uresipedilum) flavum*	18
84460	*Polypedilum (P.) fallax group*	27
84470	*Polypedilum (P.) illinoense*	4
84540	*Polypedilum (Tripodura) scalaenum group*	18
85500	*Paratanytarsus sp*	27
85625	*Rheotanytarsus sp*	9 +
85800	*Tanytarsus sp*	22
85821	*Tanytarsus glabrescens group sp 7*	67
96900	*Ferrissia sp*	13 +
98200	*Pisidium sp*	+

No. Quantitative Taxa: 39 Total Taxa: 51
No. Qualitative Taxa: 26 ICI: **46**
Number of Organisms: 980 Qual EPT: 6

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/07/2005 River Code: 02-023 RM: 0.10 Site: Little Beaver Creek Co. Rd. 86

Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	1
03600	*Oligochaeta*	+
08200	*Orconectes sp*	+
11130	*Baetis intercalaris*	5 +
11400	*Centroptilum sp or Procloeon sp (formerly in Cloeon)*	2
12200	*Isonychia sp*	12 +
13400	*Stenacron sp*	135 +
13521	*Stenonema femoratum*	82 +
13590	*Maccaffertium vicarium*	75 +
17200	*Caenis sp*	19 +
21200	*Calopteryx sp*	+
22300	*Argia sp*	+
23909	*Boyeria vinosa*	+
24501	*Gomphidae*	1 +
27500	*Somatochlora sp*	+
48620	*Nigronia serricornis*	+
50315	*Chimarra obscura*	+
50804	*Lype diversa*	7
52430	*Ceratopsyche morosa group*	4
59500	*Oecetis sp*	2
68075	*Psephenus herricki*	+
68700	*Dubiraphia sp*	1 +
68901	*Macronychus glabratus*	9 +
69400	*Stenelmis sp*	+
74501	*Ceratopogonidae*	1
77500	*Conchapelopia sp*	7
77800	*Helopelopia sp*	2
78655	*Procladius (Holotanypus) sp*	+
80370	*Corynoneura lobata*	68
81825	*Rheocricotopus (Psilocricotopus) robacki*	2
82121	*Thienemanniella lobapodema*	7
82141	*Thienemanniella xena*	2
84155	*Paralauterborniella nigrohalteralis*	+
84210	*Paratendipes albimanus or P. duplicatus*	2 +
84450	*Polypedilum (Uresipedilum) flavum*	2
84460	*Polypedilum (P.) fallax group*	23
84750	*Stictochironomus sp*	+
85625	*Rheotanytarsus sp*	12
85800	*Tanytarsus sp*	3 +
85821	*Tanytarsus glabrescens group sp 7*	14
86100	*Chrysops sp*	+
96900	*Ferrissia sp*	15 +

Taxa Code	Taxa	Quant/Qual

No. Quantitative Taxa: 28 Total Taxa: 42
No. Qualitative Taxa: 26 ICI: **48**
Number of Organisms: 515 Qual EPT: 7

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/06/2005 River Code: 02-247 RM: 1.20 Site: West Ditch (Piketon D.O.E.) Co. Rd. 86

Taxa Code	Taxa	Quant/Qual		Taxa Code	Taxa	Quant/Qual
01801	*Turbellaria*	1				
03600	*Oligochaeta*	76				
08200	*Orconectes sp*		+			
11120	*Baetis flavistriga*	2				
11250	*Centroptilum sp (w/o hindwing pads)*	6	+			
13521	*Stenonema femoratum*	58	+			
14950	*Leptophlebia sp or Paraleptophlebia sp*	1				
17200	*Caenis sp*	104	+			
21200	*Calopteryx sp*	2	+			
22001	*Coenagrionidae*		+			
22300	*Argia sp*	1	+			
23909	*Boyeria vinosa*		+			
24501	*Gomphidae*		+			
50301	*Chimarra aterrima*		+			
50315	*Chimarra obscura*		+			
52200	*Cheumatopsyche sp*		+			
68075	*Psephenus herricki*	2	+			
68700	*Dubiraphia sp*	1				
68901	*Macronychus glabratus*	1	+			
69400	*Stenelmis sp*		+			
71900	*Tipula sp*	1				
77120	*Ablabesmyia mallochi*	1	+			
77500	*Conchapelopia sp*	14				
77800	*Helopelopia sp*	1	+			
78200	*Larsia sp*	2				
78401	*Natarsia species A (sensu Roback, 1978)*		+			
80370	*Corynoneura lobata*	4				
83040	*Dicrotendipes neomodestus*	8				
84210	*Paratendipes albimanus or P. duplicatus*	17	+			
84315	*Phaenopsectra flavipes*		+			
84460	*Polypedilum (P.) fallax group*	21				
84540	*Polypedilum (Tripodura) scalaenum group*	8				
85500	*Paratanytarsus sp*	18				
85800	*Tanytarsus sp*	9				
85821	*Tanytarsus glabrescens group sp 7*	21				
95100	*Physella sp*	1				
96900	*Ferrissia sp*	3				

No. Quantitative Taxa: 27 Total Taxa: 37
No. Qualitative Taxa: 20 ICI: **28**
Number of Organisms: 384 Qual EPT: 6

Appendix 19

Letter from Eberline Laboratory concerning the usability of technetium^{99} results for 16 fish tissue samples (2 pages – A73 and A74)

EBERLINE
SERVICES

February 3, 2006

Ms. Donna Bohannon
Ohio EPA
Office of Federal Facilities Oversight
401 E. Fifth St.
Dayton, OH 45402

Subject: Non-Usability of Technetium 99 and Gross Alpha Data from Sample Delivery Group 05-09032

Dear Ms. Bohannon,

As a follow-up to the final data package for sample delivery group 05-09032 issued January 11, 2006, I recommend that your office not use the results for Technetium-99 and gross alpha. This recommendation is made due to the fact that some or all of the quality control parameters for these methods failed acceptance criteria.

Briefly, the method for Technetium-99 is as follows: Technetium-99 was separated from the tissue samples using TEVA resin prior to liquid scintillation counting. After removal of the pertechnetate ion, TcO_4^-, with TEVA resin, Tc-99 was measured by liquid scintillation counting by adding the resin directly to the liquid scintillation cocktail. Each sample was analyzed with and without a Tc-99 spike to determine chemical recovery. All radionuclides that undergo beta emission or quench the liquid scintillation counting were effectively removed using the TEVA resin. Any organic matter present in the sample could interfere by quenching during the counting. An EiChrom pre-filter column was used to remove organics from the samples. The accuracy was measured by how close the laboratory control sample result was to the *true* or expected value of our standard. In the case of the technetium, the result was at the low end of the acceptable range. Replicating one of the samples in the batch and comparing that result with the original sample result and determining the degree of agreement between those two measurements measured the precision of the method. This normalized difference or relative error ratio (RER) is assigned a vaule of less than or equal to three if the measurements are in agreement. The RER for this batch was 4.46, outside the acceptance range. Finally several of the samples, as was stated in the Case Narrative, had little or no chemical recovery. Due to the failure of these critical quality factors, the technetium data should not be used. A reanalysis of technetium-99 was not possible due to insufficient aliquots.

For the gross alpha method, the results should not be used due to the replicate sample's disagreement with the original. In this case, the RER result was 4.47, again outside the acceptance range.

Analytical Se
7021 Pan American Freew
Albuquerque, New Mexico 87109
(505) 345-3461 Fax (505) 761
Toll Free (866) RAD-LABS (723-

Eberline Services realizes the critical nature of the data and would like to offer a reanalysis for these two parameters free of charge. Since the gross beta is analyzed simultaneously with the gross alpha, we will include that parameter in the reanalysis at no charge.

We sincerely apologize for any inconvenience this has caused. Please contact me directly at 505-761-5414 with any further questions or concerns.

Sincerely,

Karen S. Schoendaller
Laboratory Manager

Appendix 20

Email letter (page A76) from Eberline Services concerning qualification of fish tissue results from three samples collected in 2006

From: Maria Galanti
To: Altfater, Dave; Stewart, Melody; Wells, Steve
Date: 10/16/2006 3:09:08 PM
Subject: Fwd: Re: Tc99 in Fish

FYI

>>> <kschoendaller@eberlineservices.com> 10/16/06 2:54 PM >>>

Maria,
Per our telephone conversation of today, I would like to further clarify the data for the three samples in SDG 06-06033 that had low matrix spike recoveries. As we discussed, the results are an "upper limit" of activity. The results should be used as "estimated only" activities since the matrix spike recoveries were less than the quality control acceptance criteria of 30%. If you have further questions, please feel free to contact myself or Tony Toth. Thank you.

Regards,

Karen S. Schoendaller
Lab Manager
Eberline Services
7021 Pan American Freeway NE
Albuquerque, NM 87109
kschoendaller@eberlineservices.com
(505) 345-3461 x110 Fax (505) 761-5416

"Maria Galanti" <maria.galanti@epa.state.oh.us>
10/16/2006 11:49 AM To
<kschoendaller@eberlineservices.com> cc
"Timothy Christman" <Timothy.Christman@epa.state.oh.us> Subject
Re: Tc99 in Fish

I have a conference call with US EPA at 2:00 my time. I am hoping to be off the phone by the time you call again. I am hoping we can get this issue resolved within a few minutes.

>>> <kschoendaller@eberlineservices.com> 10/16/06 1:43 PM >>>

Hi Maria,
We called at 1130am our time....we will call again at 1230 our time...and keep trying until we reach you. Please accept our apologies for our lousy phone system....talk with you soon.

Karen

Regards,

Karen S. Schoendaller
Lab Manager
Eberline Services
7021 Pan American Freeway NE
Albuquerque, NM 87109

Appendix Table 21. Ohio EPA surface water lab results (page A78) from a grab sample collected in Big Run, October, 2005.

OhioEPA Division of Environmental Services

Laboratory Inorganic Analysis Data Report

Sample	79743				
Date Received	10/18/2005 3:19 PM	**Matrix**	WW	**Collected by**	MONTGOMERY, JOANN
	Begin	**End**		**Sample Type**	COMPLIANCE
Date Collected		10/18/2005 12:35 PM		**Station ID**	
Program	SEDO-DSW			**Customer ID**	JWM1018
Client	DSW_C			**External ID**	
Location	BIG RUN @ OUTFALL 002				

Analysis	Parameter	Storet	Result	RL	Units	Date	Qualifier
TOC	TOC	P680	6.8	2	mg/L	10/28/2005	
E.coli	E.coli	P31648	10	10	#/100ml	10/18/2005	JL
Fecal Coliform	Fecal Coliform	P31616	30	10	#/100ml	10/18/2005	JL
Ammonia	Ammonia	P610	<0.050	0.05	mg/L	10/26/2005	
COD	COD	P340	23	10	mg/L	10/21/2005	
Nitrate	Nitrate+nitrite	P630	<0.10	0.1	mg/L	10/26/2005	
TKN	TKN	P625	0.92	0.2	mg/L	10/25/2005	
TP	Total Phosphorus	P665	0.075	0.01	mg/L	10/25/2005	

Field Comments

Lab Comments

QC / Sample Comments

Approved By SLR **On** 11-17-05

Definition Of Qualifiers is attached when required

Appendix Table 22. Fish fillet contaminant levels of concern used by the Ohio EPA in the Ohio Fish Consumption Advisory Program.

Chemical (RfD ug/kg/day)	Unrestricted	1/week	1/month	6/year	Do Not Eat
Aldrin (0.03)	<0.030	0.131	0.568	1.135	>1.135
Total Arsenic (0.3)	<0.150	0.656	2.838	5.676	>5.676
Total Cadmium (1.0)	<0.500	2.188	9.459	18.91	>18.919
Total Chlordane (0.5)	<0.500	2.188	9.459	18.919	>18.919
Total DDT (0.5)	<0.500	2.188	9.459	18.919	>18.919
Dieldrin (0.05)	<0.050	0.220	1.000	1.999	>1.999
Endosulfan (6.0)	<6.000	26.250	131.514	227.027	>227.027
Endrin (0.30)	<0.300	1.313	5.676	11.351	>11.351
Heptachlor (0.5)	<0.500	2.188	9.459	18.919	>18.919
Heptachlor Epoxide (0.013)	<0.013	0.057	0.246	0.492	>0.492
Hexachlorobenzene (0.8) **	<0.800	3.500	15.135	30.270	>30.270
Total Lead (6.0)	<0.086	0.375	1.622	3.243	>3.243
Lindane (6.0)	<0.3	1.313	5.676	11.315	>11.315
Methoxychlor (5.0)	<5.000	21.875	94.545	189.189	>189.189
Mirex (0.2)	<0.200	0.875	3.784	7.568	>7.568
Methylmercury (0.1)	<0.050	0.220	1.000	1.999	>1.999
Total PCBs (0.05) HPV **	<0.050	0.220	1.000	1.999	>1.999
Total SAS 305 (50.0) **	<50,000	218,750	945,946	1,891,892	>1,891,892
Total SAS 310 (28.6) **	<28,600	125,125	541,081	1,082,162	>1,082,162
Total Selenium (5.0)	<2.500	10.938	47.927	94.545	>94.545
Toxaphene (0.25)	<0.250	1.094	4.730	9.459	>9.45

* Concentrations are reported in mg/kg (ppm) raw fish fillet wet weight. Meal consumption rates are: No restrictions (225 meals/year); One meal/week (52 meals/year); One meal/month (12 meals/year); 6 meals/year; and Do not eat. All metals results are reported as Total metals, including Mercury. Total PCBs are reported as the sum of Arochlors 1016, 1221, 1232, 1242, 1248, 1254 and 1260; Total Chlordane is reported as the sum of Alpha-Chlordane, Gamma-Chlordane, Oxychlordane, cis-Nonachlor and trans-Nonachlor; Total DDT is reported as the sum of DDT and Metabolites (DDE and DDD).

** HPV = Health Protection Value; HCB = hexachlorobenzene; Total SAS 305 is a chemical mixture of the following alkylated biphenyls: o-isopropyl-1,1-diphenylethane, m-isopropyl-1,1-diphenylethane, p-isopropyl-1,1-diphenylethane and p-isopropyl-1,2-diphenylethane; Total SAS 310 is a chemical mixture of the following alkylated biphenyls: o-sec Butyl diphenylmethane, m-sec Butyl diphenylmethane, p-sec Butyl diphenylmethane, o-sec Butyl 1,1-diphenyl-ethane, m-sec Butyl 1,1-diphenylethane, p-sec Butyl 1,1-diphenylethane, o-sec Butyl 1,2-diphenylethane, m-sec Butyl 1,2-diphenylethane, and p-sec Butyl 1,2-diphenylethane.