2006 Study Plan for the 
Scioto Brush Creek Watershed 
(Adams and Scioto Counties, OH)
Monitoring Rationale

Introduction
During the 2006 field season (June thru October) chemical, physical, and biological sampling will be conducted in the Scioto Brush Creek basin to assess and characterize all of the various potential sources of water quality impairment in the watershed. As a Total Maximum Daily Load (TMDL) basin, this survey will incorporate a drainage area stratified systematic study design.

No significant point source discharges are known to exist in the basin. Thus, the sampling effort is structured to characterize non point source impacts including those from unsewered communities and from agricultural or industrial activities. Streams, locations and types of sampling scheduled for the study area are listed in Table 1. Lab effort is detailed in Table 2.

Sampling Objectives:
Evaluate all streams in the basin which drain at least 4 mi² to determine the status of the aquatic community.

Characterize the amount of aquatic resource degradation attributable to various land uses including agricultural or forestry practices and from rural community development.

Investigate the potential for use impairment induced by industrial activities.

Determine any potential recreational impacts from unsewered communities including McDermott, Rarden, Otway, Youngs and Owensville.

Chemical/Physical Water and Sediment Quality
Chemical sampling locations within the study area are listed in Table 1. Conventional chemical/physical water quality samples will be collected six times at locations where drainage areas are ≥ 8 mi². Four samples will be collected at locations where drainage areas are ≈ 4 mi². Half of the samples from these sites will be submitted for mercury concentration analysis. In support of a statewide study to assess nutrient assimilation, dissolved P, water column chlorophyll, and periphyton samples will be collected at seven sites. The sampling protocol for determination of chlorophyll a concentrations requires that these samples be collected between late July and early September following a minimum of two weeks of stable, low-flow conditions. For a given sampling event (either water column chlorophyll or periphyton), one composite sample per site will be split among three filters for later analysis. The dissolved P and water column chlorophyll samples should be collected during the same sampling event.

Nutrient sampling will occur at: Scioto Brush Creek - RM’s 33.55 & 5.82, Rarden Creek - RM 3.86, South Fork Scioto Brush Creek - RM 0.65, Mill Creek - RM 0.79, Rocky Fork - RM 3.52 and Bear Creek RM 3.45.

Bacteriological water samples will be collected six times at locations where drainage areas are ≈
32 mi² or 64 mi² (4 locations), at reference sites (2 locations), and at sentinel sites (3 locations, one of these is also a reference site). Three samples will be collected at locations where drainage areas are ≤ 16 mi² and at Scioto Brush Creek - RM’s 12.15, 3.35 & 0.27. Beyond the drainage area stratified and mainstem selected sites, six additional sites were identified to determine whether there is an excessive presence of water borne pathogens in proximity to specific communities. No aquatic life assessment is requested at these locations: Dry Run - RM 0.43, Jessie Run - RM’s 0.25 & 0.65, Bloody Run - RM’s 0.10 & 0.50 and Reeds Run - RM 0.10.

Organic water samples will be collected once, and sediment metal and organic samples will be collected once at locations where drainage areas are ≥ 32 mi² or 64 mi² (4 locations), at reference sites (2 locations), at sentinel sites (3 locations, one of these is also a reference site), at Dunlap Creek RM - 0.65, and at Jaybird Branch - RM 0.99. Additionally, sediment sampling to assess nutrients (ammonia & total phosphorus), total organic carbon and particle size should occur at all nutrient assessment locations (4 additional locations where metal and organic concentration analysis is not requested).

Datasonde© sampling will be completed by the Modeling Unit. One deployment run is anticipated at all sites where drainage areas are ≥ 32 mi² (10 locations). Datasonde© sampling is also requested at the smaller drainage area reference or nutrient assessment locations (5 additional sites).

The Modeling Unit will calibrate discharge correlated to stream height at the three sentinel sites. These stations will be chemically sampled six times during which stream height will be recorded. Subsequently, loading calculations will be possible for these locations.

**Macroinvertebrate and Fish Assemblages**

Quantitative macroinvertebrate sampling methods and two fish sampling passes will be conducted at all sites where drainage areas are ≥ 32 mi² (9 locations, excludes the mainstem pathogen site Scioto Brush Creek - RM 3.35). Qualitative macroinvertebrate sampling methods and one fish sampling pass will be conducted at all sites where drainage areas are ≥ 4 mi², 8 mi² and 16 mi². (45 locations excluding the pathogen sites: Dry Run - RM 0.43, Jessie Run - RM’s 0.25 & 0.65, Bloody Run - RM’s 0.10 & 0.50 and Reeds Run - RM 0.10.). Habitat assessment will occur at all fish sampling locations.

Collection of fish tissue samples is anticipated at five locations: Scioto Brush Creek - RM’s 26.6, 17.1, 13.4, 9.5 & 0.27.
Quality Assurance / Sampling Methods

Ohio EPA Manuals
All biological, chemical, EPA laboratory, data processing, and data analysis methods and procedures adhere to those specified in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio Environmental Protection Agency 2006), Biological Criteria for the Protection of Aquatic Life, Volumes II - III (Ohio Environmental Protection Agency 1987, 1989a, 1989b), The Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Rankin 1989) for habitat assessment, and Ohio EPA Sediment Sampling Guide and Methodologies (Ohio EPA 2001).

Quality Control Samples
Ten percent of the sediment, water, and bacteria samples will be submitted to the lab as field duplicates. One Datasonde© recorder site will have two instruments placed in the river as field duplicates.

Surface Water
Surface water grab samples will be collected from the upper 12 inches of river water and sampled directly into appropriate containers. Collected water will be 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 2006) and delivered to the Ohio EPA lab for analysis. Datasonde© continuous recorders will be placed at select locations to evaluate diurnal measurements of dissolve oxygen, pH, temperature, and conductivity.

Bacteria
Water samples will be collected directly from the river into sterilized polyethylene containers, cooled to 4°C, and transported to the Ohio EPA lab in Columbus for analysis within 6 hours of sample collection. All samples will be analyzed for fecal coliform and E. coli bacteria using U.S.EPA approved methods (STORET Parameter Codes 31611 and 31633). Samples may be processed in the field using standard incubation methods before delivery to the Ohio EPA lab.

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

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

**Stream Habitat Evaluation**

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

**Use Attainment**

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

Performance expectations for the basic aquatic life uses (Warmwater Habitat [WWH], Exceptional Warmwater Habitat [EWH], and Modified Warmwater Habitat [MWH] were developed using the regional reference site approach (Hughes et al. 1986; Omernik 1988). This fits the practical definition of biological integrity as the biological performance of the natural habitats within a region (Karr and Dudley 1981). Attainment of an aquatic life use is FULL if all three indices (or those available) meet the applicable criteria, PARTIAL if at least one of the indices did not attain and performance did not fall below the fair category, and NON if all indices either fail to attain or any index indicates poor or very poor performance. The results will be compared to WWH biocriteria for the Western Allegheny Plateau ecoregion.

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

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Fish Tissue: Mylynda Shaskus (614) 644-6308

Please notify Brian Alsdorf (614) 836-8770 if there are any changes to this study plan, sampling problems, or additional information.
Table 1. List of sampling locations in the 2006 Scioto Brush Creek study area. Sample type acronyms and number of sites follow:

<table>
<thead>
<tr>
<th>RM</th>
<th>Sample Type</th>
<th>Location / Notes</th>
<th>Mi²</th>
<th>Map#</th>
<th>Lat.-Long.</th>
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<tbody>
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<td><strong>Scioto Brush Creek</strong></td>
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<tr>
<td>38.20</td>
<td>c,b,m,f</td>
<td>Trail from Hackelshin Rd.</td>
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<td>710</td>
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<td>36.01</td>
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<td>c,O,S,b,m,f</td>
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<td>3.86</td>
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<td><strong>Jessie Run</strong></td>
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<td>0.65</td>
<td>c,b</td>
<td>Ust. Rarden, Lane from St. Rt. 772 / Pathogen site</td>
<td>1.7 733 38.9252-83.2401</td>
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<td>0.43</td>
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<td>Near confluence</td>
<td>7.1 733 38.8980-83.2061</td>
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<td><strong>Bloody Run</strong></td>
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<td>0.5</td>
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<td>Ust. Otway, St. Rt. 348 / Pathogen site</td>
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<td><strong>South Fork Scioto Brush Creek</strong></td>
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<td>12.4</td>
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<td>5.88</td>
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<td>Footbridge at Liston Run confluence</td>
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<td>112 752 38.8564-83.1975</td>
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<td><strong>Mill Creek</strong></td>
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<td>2.20</td>
<td>c,b,m,f</td>
<td>Ust. Middle Branch, Adj. St. Rt. 125</td>
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<td>15.9 752 38.7748-83.347</td>
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<td>3.9</td>
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<td>2.17</td>
<td>c,b,m,f</td>
<td>Blue Creek Gravel road, Dst. Glen Run</td>
<td>3.9 767 38.7493-83.3537</td>
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<td>0.1</td>
<td>c,b,m,f</td>
<td>Winterstein Run Blue Creek Rd.</td>
<td>3.2 752 38.7861-83.3201</td>
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<tr>
<td>0.26</td>
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<td>Turkey Run Newman Rd.</td>
<td>4.8 752 38.8204-83.3039</td>
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<td>6.00</td>
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<td>Turkey Creek Jones Rd.</td>
<td>4.2 752 38.8713-83.3638</td>
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<tr>
<td>4.24</td>
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<td>Turkey Creek Gravel lane ust. Dry Fork</td>
<td>7.4 752 38.8640-83.3366</td>
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<tr>
<td>0.40</td>
<td>C,b,m,f</td>
<td>Turkey Creek St. Rt. 781</td>
<td>16.6 752 38.8376-83.2804</td>
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<td>0.18</td>
<td>c,b,m,f</td>
<td>Dry Fork St. Rt. 781</td>
<td>4.2 752 38.8627-83.3263</td>
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<td>1.85</td>
<td>c,b,m,f</td>
<td>Beach Fork Beech Fork Rd. (2nd crossing Ust. confluence)</td>
<td>4.1 752 38.8606-83.2679</td>
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<tr>
<td>8.78</td>
<td>c,b,m,f</td>
<td>Rocky Fork St. Rt. 125</td>
<td>4.7 752 38.7560-83.2656</td>
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<tr>
<td>7.15</td>
<td>C,b,m,f</td>
<td>Rocky Fork Footbridge, Dst. Big Run</td>
<td>8.4 752 38.7771-83.2573</td>
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<tr>
<td>3.52</td>
<td>C,N,s,D,b,m,f</td>
<td>Rocky Fork Gravel lane from Rocky Fork Rd. / Nutrient site</td>
<td>18.0 753 38.8213-83.2383</td>
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<tr>
<td>0.1</td>
<td>c,b,m,f</td>
<td>Spruce Run Rocky Fork Rd.</td>
<td>3.4 753 38.8071-83.247</td>
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<td>5.10</td>
<td>c,b,m,f</td>
<td>Bear Creek Big Spruce Rd., Dst. Left &amp; Right Forks</td>
<td>4.2 753 38.7933-83.1919</td>
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<tr>
<td>3.45</td>
<td>C,N,s,D,b,m,f</td>
<td>Bear Creek Big Spruce Rd., near Alum Rock / Nutrient site</td>
<td>7.9 753 38.8100-83.1771</td>
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<tr>
<td>1.40</td>
<td>C,b,m,f</td>
<td>Saw Pit Run Adj. St. Rt. 73, Dst. Saw Pit Run</td>
<td>17.8 753 38.8251-83.1519</td>
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<td>0.11</td>
<td>c,b,m,f</td>
<td>Saw Pit Run St. Rt. 73</td>
<td>4.9 753 38.8239-83.1501</td>
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<td>1.33</td>
<td>C,b,m,f</td>
<td>McCullough Creek Henly Deemer Rd.</td>
<td>7.4 753 38.8601-83.1494</td>
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<td>0.61</td>
<td>C,b,m,f</td>
<td>McCullough Creek Diehlman Rd.</td>
<td>18.6 753 38.8525-83.1266</td>
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Table 1. continued

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<th>RM</th>
<th>Sample Type</th>
<th>Location</th>
<th>Notes</th>
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<tr>
<td>3.80</td>
<td>c,b,m,f</td>
<td>Adj. St. Rt. 348, Dst. western trib.</td>
<td>4.4 734 38.8916-83.1047</td>
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<td>1.00</td>
<td>C,b,m,f</td>
<td>Ust. Conley Rd.</td>
<td>8.9 754 38.8500-83.1200</td>
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<tr>
<td>1.52</td>
<td>c,b,m,f</td>
<td>Lane ust. Reeds Run</td>
<td>4.0 754 38.8509-83.0424</td>
</tr>
<tr>
<td>0.1</td>
<td>c,b</td>
<td>Dst. Owensville, Duck Run Otway Rd. / Pathogen site</td>
<td>0.9 754 38.8509-83.0395</td>
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</table>

**East Branch McCullough Creek**

**Duck Run**

**Reeds Run**

---

**Sample type acronyms and number of sites:**

- **C**: Conventional water chemistry, 6 passes - 29 sites (174 samples)
- **c**: conventional water chemistry, 4 passes - 32 sites (128 samples)
- **N**: Nutrient assimilation (dissolved P, water column chlorophyll, & periphyton), 1 pass - 7 sites
- **O**: Organic water chemistry, 1 pass - 10 sites (10 samples).
- **S**: Sediment inorganic, organic and metal concentrations, 1 pass - 10 sites (10 samples).
- **s**: sediment inorganic (nutrient) concentrations, 1 pass - 4 sites (4 samples).
- **B**: Bacteriological analysis, 6 passes - 7 sites (42 samples)
- **b**: bacteriological analysis, 3 passes - 54 sites (162 samples)
- **D**: Datasonde (areas of algal activity may require units with stirrers) 1 pass - 15 sites
- **M**: Macroinvertebrates, quantitative, 9 sites (9 samples).
- **m**: macroinvertebrates, qualitative, 45 sites (45 samples).
- **F**: fish, 2 pass, 9 sites (18 samples).
- **f**: fish, 1 pass, 45 sites (45 samples).

**Reference site**: Data from these locations was used to derive ecoregional biological expectations. Generally, a robust sampling effort is conducted at these sites to support future calibration needs (2 sites).

**Nutrient site**: Ohio EPA is evaluating data from these locations toward developing nutrient concentration water quality criteria in correlation with aquatic life use performance (7 sites).

**Sentinel site**: Location where modeling unit will calibrate flow with stage height. Water level will be measured on each chemistry sample pass (3 sites).

**Pathogen site**: These locations were selected to determine whether bacteria concentrations in proximity to populated vicinities comply with recreational use criteria (7 sites).

**Fish Tissue site**: Fish from these locations will be analyzed to provide relative human consumption risk information (5 sites).
Table 2. Ohio EPA chemistry lab sampling effort for the 2006 Scioto Brush Creek study area
(See attached mock lab report forms).

<table>
<thead>
<tr>
<th>Type of sample</th>
<th># DES Parameters</th>
<th># Sites</th>
<th># Passes</th>
<th>Total #</th>
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<tr>
<td><strong>Water Chemistry</strong></td>
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<tr>
<td><strong>Conventional (Inorganic Samples)</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Demand</td>
<td>4</td>
<td>32 / 29</td>
<td>4 / 6</td>
<td>1208</td>
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<tr>
<td>oil &amp; grease</td>
<td>not requested</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutrients</td>
<td>9</td>
<td>32 / 29</td>
<td>4 / 6</td>
<td>2718</td>
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<tr>
<td>dissolved P</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Bacteria</td>
<td>3</td>
<td>54 / 7</td>
<td>3 / 6</td>
<td>612</td>
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<tr>
<td>Metals / Low Level</td>
<td>18</td>
<td>32 / 29</td>
<td>4 / 6</td>
<td>5436</td>
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<tr>
<td>mercury</td>
<td>1</td>
<td>32 / 29</td>
<td>2 / 3</td>
<td>151</td>
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<tr>
<td><strong>Organic Scan</strong></td>
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<td></td>
<td></td>
<td></td>
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<td>Volatiles (VOC)</td>
<td>1 (59 compounds)</td>
<td>10</td>
<td>1</td>
<td>10</td>
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<tr>
<td>Cyanazine / Herbicides</td>
<td>2 (13 compounds)</td>
<td>10</td>
<td>1</td>
<td>20</td>
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<tr>
<td>Semivolatile (BNA)</td>
<td>1 (54 compounds)</td>
<td>10</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>PCBs, Pesticides</td>
<td>4 (27 compounds)</td>
<td>10</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Carbamates</td>
<td>1 (10 compounds)</td>
<td>10</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>1 (1 compound)</td>
<td>10</td>
<td>1</td>
<td>10</td>
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<td><strong>Sediment Chemistry</strong></td>
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<tr>
<td><strong>Conventional (Inorganic Samples)</strong></td>
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<tr>
<td>Demand</td>
<td>3</td>
<td>14</td>
<td>1</td>
<td>42</td>
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<tr>
<td>Nutrients</td>
<td>2</td>
<td>14</td>
<td>1</td>
<td>28</td>
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<tr>
<td>Metals / Low Level</td>
<td>17</td>
<td>10</td>
<td>1</td>
<td>170</td>
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<tr>
<td>mercury</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>10</td>
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<tr>
<td><strong>Organic Scan</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Volatiles (VOC)</td>
<td>1 (64 compounds)</td>
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<td>1</td>
<td>10</td>
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<tr>
<td>Semivolatile (BNA)</td>
<td>1 (86 compounds)</td>
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<td>1</td>
<td>10</td>
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<tr>
<td>PCBs, Pesticides</td>
<td>4 (31 compounds)</td>
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<td>1</td>
<td>40</td>
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<tr>
<td><strong>Chlorophyll A</strong></td>
<td></td>
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<tr>
<td>Fluorometer test</td>
<td>1</td>
<td>7</td>
<td>1</td>
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Table 3. Ohio EPA test methods for the 2006 Scioto Brush Creek study area.

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<tr>
<th>Parameters</th>
<th>Water column field test method</th>
<th>Water column lab test method</th>
<th>Sediment lab test method</th>
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<tr>
<td>Percent Solids</td>
<td></td>
<td>USEPA 160.1</td>
<td>SM 2540G</td>
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<td>BOD, 5-Day</td>
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<td>USEPA 405.1, SM 5210B</td>
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<tr>
<td>Conductivity</td>
<td>Hanna HI9811 meter USEPA 120.1</td>
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<tr>
<td>Particle Size</td>
<td></td>
<td>OEP 160.1</td>
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<tr>
<td>pH</td>
<td>Hanna HI9811 meter</td>
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<td></td>
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<tr>
<td>Solids, Dissolved (TDS)</td>
<td>USEPA 160.1</td>
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<tr>
<td>Solids, Suspended (TSS)</td>
<td>USEPA 160.2</td>
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<tr>
<td>Total Organic Carbon (TOC)</td>
<td>USEPA 305.1</td>
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<td>OEP 335.2</td>
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<tr>
<td>Acidity, Total CaCO3</td>
<td>USEPA 310.1</td>
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<tr>
<td>Alkalinity, Total CaCO3</td>
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<tr>
<td>Chloride, Cl</td>
<td>USEPA 410.4</td>
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<tr>
<td>Nitrite</td>
<td>USEPA 354.1</td>
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<tr>
<td>Ammonia</td>
<td>USEPA 350.1</td>
<td>USEPA 160.1</td>
<td>SM 4500 -NH3 B &amp; E</td>
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<tr>
<td>Nitrate+Nitrite</td>
<td>USEPA 353.1</td>
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<tr>
<td>Phosphorus, Dissolved</td>
<td>USEPA 365.4</td>
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<td>Sulfate</td>
<td>USEPA 375.4</td>
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<tr>
<td>TKN (Total Kjeldahl Nitrogen)</td>
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<tr>
<td>Phosphorus, Total</td>
<td>USEPA 351.2</td>
<td>USEPA 365.4</td>
<td>USEPA 365.4</td>
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<td>E.coli</td>
<td>USEPA 1103.1/ 640.1</td>
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<tr>
<td>Fecal coliform</td>
<td>SM 9222 D/ 610.1</td>
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<tr>
<td>Total Coliform</td>
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<tr>
<td>ICP 1 (Al,Ba,Ca,Cr,Cu,Fe, Mg, Mn, Na, Ni, K, Sr, Zn, Hardness)</td>
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<td>ICP 3 (Al,Ba,Cr,Cu,Fe,Mg,Mn,Na,Ni,K,Sr,Zn,Pb)</td>
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<td>USEPA 200.9, SM 3113B</td>
<td>USEPA 200.9, SM 3113B</td>
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<tr>
<td>GFAA/SIMA 1 (As,Cd,Pb,Se)</td>
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<td>USEPA 200.9, SM 3113B</td>
<td>USEPA 200.9, SM 3113B</td>
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<td>GFAA/SIMA 2 (As, Cd, Se)</td>
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<td>USEPA 7471A</td>
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<td>Dissolved Oxygen</td>
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<td>Temperature</td>
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<td>VOCs</td>
<td>USEPA 525.2</td>
<td>USEPA 525.2</td>
<td>USEPA 8270C</td>
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<td>Cyanazine (Bladex)</td>
<td>USEPA 525.2</td>
<td>USEPA 525.2</td>
<td>USEPA 8270C</td>
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<td>Herbicides (Atrazine, etc.)</td>
<td>USEPA 608</td>
<td>USEPA 8081A, 8082</td>
<td>USEPA 8081A, 8082</td>
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<td>BNA Organics (SVOCs)</td>
<td>USEPA 625</td>
<td>USEPA 8081A, 8082</td>
<td>USEPA 8081A, 8082</td>
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<tr>
<td>Pesticides/ PCBs/ Chlordane</td>
<td>USEPA 531.1</td>
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<td>Carbamates (Sevin)</td>
<td>USEPA 547</td>
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### Scioto Brush Creek TMDL Water Column

**Parameters**

- **Demand**
  - COD
  - BOD
  - NPS
  - Organic NPS
  - Nutrients
    - P
    - K
    - Ca
    - Mg
    - Na
  - Microbiology
    - E. coli
    - Fecal Coliform
    - Fecal Streptococcus
    - MMD-MUG
    - Total Coliform
  - Metals
    - SW846
    - ICP
    - SIMA
    - Low Level
    - Only 2 or 3 samples per site need Hg analysis

**Sample Information**

- **Client (Bill to)**
- **Special Project Identity**
  - Division: DAPC
  - OEPA District: DODW

- **Sample Type**
  - Ambient
  - Complaint
  - Complainco
  - Litigation
  - NPS
  - Survey
  - Raw
  - Plant
  - Distribution: DW only

- **Collection Date**
  - MM/DD/YY: Begin
  - Collection Date: Grab

- **Frequency & Duration of Composite Sample**
  - Field QC (Check one)
    - Field Duplicate
    - Field/Equip/Acid Blank

- **Container Information**
  - Qty.
  - Type
  - Press.
  - Location: County

- **Sample Location**
  - County

**Lab Comments**

- Chlorine, mg/L
- Cond. conduct, mS/m
- % Solids
- Flow, cfs
- Temp, °F
- % Set
- Com.

- Bioassay

### Division of Environmental Services

Inorganic Sample Submission Form

DW Certification #4165

Date Received: MM/DD/YY

Sample Information (INSTRUCTIONS ON BACK)

- **Parameters**
  - **Template**: Scioto Brush Creek TMDL
  - **Water Column**
    - **Demand**
    - **Nutrients**
      - Calcium, Total CaCO₂
      - Alkalinity
      - Total CaCO₃
      - Sodium, Total Na₂SO₄
      - Chloride
      - COD
      - Chromium, Hexavalent (N/P Filter)
      - Cyanide, Free (WaD)
      - Cyanide, Total
      - Fluoride
      - Nitrite
      - Ammonia/Nitrate + Nitrite
      - Phenolics, Total w/man. dist.
      - Phosphorus, Dissolved (Filter)
      - Sulfate
      - TKN / Phosphorous, Total
    - **Microbiology**
      - E. coli
      - Fecal Coliform
      - Fecal Streptococcus
      - MMD-MUG
      - Total Coliform
    - **Metals**
      - SW846
      - ICP
      - SIMA
      - Low Level
    - **Only 2 or 3 samples per site need Hg analysis**

Lab Comments

- Chlorine, mg/L
- Cond. conduct, mS/m
- % Solids
- Flow, cfs
- Temp, °F
- % Set
- Com.

EPA 4705 (1/05)

Remove yellow copy of form for your records prior to submitting form to DES

All Rush Samples require prior approval
**Scioto Brush Creek TMDL**

**Water Column 1**

<table>
<thead>
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<th>Client (Bill to)</th>
</tr>
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<tbody>
<tr>
<td>Special Project Identity</td>
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<table>
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<tr>
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<th>OPEA District (check one)</th>
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<td>OAPC</td>
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<td>CDAGW</td>
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<td>DERR</td>
<td>MEDO</td>
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<tr>
<td>DHVM</td>
<td>NWDO</td>
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<td>DSIVM</td>
<td>SEDO</td>
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<td>Other</td>
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<td>Air Canister</td>
</tr>
<tr>
<td>Complaint</td>
<td>Drinking water</td>
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<tr>
<td>Compliance</td>
<td>Ground water</td>
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<tr>
<td>Litigation</td>
<td>Oil Wipe</td>
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<td>NPS</td>
<td>Sediment</td>
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<tr>
<td>Raw</td>
<td>Soil</td>
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<td>Plant</td>
<td>Surface water</td>
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<td>Distribution</td>
<td>Waste water</td>
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<td>Other</td>
<td>Reagent water</td>
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<td>Composite Begin End</td>
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<tr>
<td>Air Canister</td>
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<tr>
<td>Amber, S2S</td>
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<td>Amber, S2S</td>
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<td>Amber, S1S</td>
</tr>
<tr>
<td>Amber, BNA</td>
</tr>
<tr>
<td>Amber, P/P</td>
</tr>
<tr>
<td>Vial, VOC</td>
</tr>
<tr>
<td>Vial, 504</td>
</tr>
<tr>
<td>Vial, 505</td>
</tr>
<tr>
<td>Jar, Oil Wipe</td>
</tr>
<tr>
<td>Encore Sampler</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collected By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer ID #</td>
</tr>
<tr>
<td>Referred By</td>
</tr>
<tr>
<td>Station ID #</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>County:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field Comments</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Lab Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-Original (DES)</td>
</tr>
<tr>
<td>Green-DES</td>
</tr>
<tr>
<td>Yellow-Reflection Records</td>
</tr>
</tbody>
</table>

Remove yellow copy of form for your records prior to submitting form to DES
### Organic Sample Submission Form

**Scioto Brush Creek TMDL**

**Water Column 2**

#### Sample Information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Solids, Sed only</td>
<td>Drinking Water Analysis</td>
</tr>
<tr>
<td>VOC, 524.2</td>
<td>Drinking Water Analysis</td>
</tr>
<tr>
<td>VOC, 624</td>
<td>Waste Water Analysis</td>
</tr>
<tr>
<td>VOC, 8260</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Cyanazine, 525.2</td>
<td>Drinking Water Analysis</td>
</tr>
<tr>
<td>Hericides, 525.2</td>
<td>Drinking Water Analysis</td>
</tr>
<tr>
<td>BNA, 625</td>
<td>Waste Water Analysis</td>
</tr>
<tr>
<td>BN (PAHs) only, 625</td>
<td>Waste Water Analysis</td>
</tr>
<tr>
<td>Acids (Phenols) only, 625</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>BNA, 8270</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>BN (PAHs) only, 8270</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Acids (Phenols) only, 8270</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>SAS-305</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>SAS-310</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Pesticides, 505</td>
<td>Drinking Water Analysis</td>
</tr>
<tr>
<td>PCBs, 508 (508A)</td>
<td>Drinking Water Analysis</td>
</tr>
<tr>
<td>Chlor dane, 505</td>
<td>Waste Water Analysis</td>
</tr>
<tr>
<td>Toxaphene, 505</td>
<td>Waste Water Analysis</td>
</tr>
<tr>
<td>EDE/DRC, 504</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Acid Herbicides, 515</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Pesticides, 608</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>PCBs, 608</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Chlor dane, 608</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Toxaphene, 608</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Pesticides, 8081</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>PCBs, 8082</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Chlor dane, 8081</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>Toxaphene, 8081</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>PCBs, Oil Wipe</td>
<td>SW846 Analysis</td>
</tr>
<tr>
<td>TO-14A</td>
<td>Air Analysis</td>
</tr>
<tr>
<td>Canister Cleaning, Only</td>
<td>Air Analysis</td>
</tr>
</tbody>
</table>

**Other**

- Glyphosate 547
- Carbamates 531.1

#### Field Comments

- Chlorine, mg/L
- Cond., umhos/cm
- DO, mg/L
- pH, 7.5
- Gage Ht, ft
- % Sat
- Temp., oC
- Conv. Cond., umhos/cm

---

**EPA 47/08 (1/03)**

Remove yellow copy of form for your records prior to submitting form to DES.
### Sample Information

- **Client (Bill to):**
- **Special Project Identity:** Requires prior approval
- **Division:** DACP
- **OEPA District:**
- **Sample Type:** Ambient
- **Matrix:** Air Filter
- **Sample Collection Date:**
  - **Grab:** MM DD YY HH MM
  - **Composite:** Begin End
- **Frequency & Duration of Composite Sample:**
- **Container Information:**
  - **Pres.:** Field Duplicate, Field/Equip/Acid Blank, MSD
  - **Field QC (Check one):**
    - **Collected By:**
- **Customer ID #:**
- **Referred By:**
- **Station ID #:**
- **Sample Location:** County:

### Parameters

#### Template: Scioto Brush Creek Sediment

- **Demand**
  - % Solids, Sed only
  - BOD-20 day
  - BOD-5 day
  - BOD-Ultimate
  - CBOD-20 day
  - CBOD-5 day
  - CBOD-Ultimate
- **Conductivity**
- **Flashpoint**
- **Oil/Grease**
- **Particle Size, Sed only**
- **pH**
- **Solids, Dissill (fill)**
- **Solids, Suspended (fill)**
- **Solids, Total**
- **Solids, Total Volatile**
- **TDC**

#### Nitrogen

- N-Acetate
- Nitrification
- Nitrification/Total N
- Phenolics, Total w/mon dist
- Phosphorus, Dissolved (Fill)
- Sulfate
- TKN / Phosphorous, Total

#### Microbiology

- E. coli
- Fecal Coliform
- Fecal Streptococcus
- MMO-MUG
- Total Coliform

#### Metals

- ICP 1, Water only (Al, Ba, Ca, Cr, Cu, Fe, Mn, Na, Ni, K, Sr, Zn, Hardness)
- ICP 2, Water only (Ca, Mg, Hardness)
- ICP 3, Sediment only (Al, Ba, Ca, Cr, Cu, Fe, Mn, Na, Ni, K, Sr, Zn, Pb)
- ICP 4, SW48 Sed only (Al, Ba, Ca, Cr, Cu, Fe, Mn, Na, Ni, K, Sr, Zn, Y, Cd, Co, Ti, Be, Hardness)
- ICP 5, SW48 Sed only (Al, Ba, Ca, Cr, Cu, Fe, Mn, Na, Ni, K, Sr, Zn, Y, Cd, Co, Ti, Be)
- ICP 6, Air Filters only (Cr, Ni, Pb, Zn, Mn)
- Yenium
- Titanium

#### Metals - Low Level

- SIMA 1, Water only (As, Cd, Pb, Se), L L
- SIMA 2, Sed only (As, Cd, Se), L L
- SIMA 3, Air only (As, Cd), L L
- Arsenic, SW48 only, L L
- Cadmium, SW48 only, L L (Sed only)
- Lead, SW48 only, L L
- Selenium, SW48 only, L L

The following require prior notification to DES before submitting:

- Antimony, L L
- Beryllium, L L (Water, Sed, Air only)
- Cobalt, L L (Water, Sed, Air only)
- Copper, L L (Water only)
- Silver, L L
- Thallium, L L
- Tin, L L
- Mercury

#### Bioassay

#### Field Comments

#### Lab Comments

---

Remove yellow copy of form for your records prior to submitting form to DES

All Rush Samples require prior approval
**Scioto Brush Creek TMDL Sediment**

### Sample Information

<table>
<thead>
<tr>
<th>Client (Bill to)</th>
<th>Special Project Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(project identity requires prior approval)</td>
</tr>
</tbody>
</table>

#### Division (check one)
- DACP
- CDAGW
- DERR
- DHWM
- DSW
- DSWM
- Other

#### OEPA District (check one)
- CO
- CDD
- MED
- NWDO
- SEDO
- SWDO
- Other

#### Sample Type (check one)
- Ambient
- complaint
- compliance
- litigation
- NPS
- survey
- raw
- Plant
- distribution

#### Matrix (check one)
- Air Canister
- Drinking water
- Ground water
- Oil Wipe
- Sediment
- Soil
- Surface water
- Waste water
- Reagent water

#### Collection Date

- **Grab**
  - MM
  - DD
  - Yr
  - HH
  - MM
- **Composite**
  - Begin
  - End

#### Frequency & Duration of Composite Sample:

<table>
<thead>
<tr>
<th>Container Information</th>
<th>Field QC (Check one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qty.</td>
<td>Type</td>
</tr>
<tr>
<td>Air Canister</td>
<td>Amber, S2S</td>
</tr>
<tr>
<td>Amber, S2S</td>
<td>H2O &amp; Na2SO4</td>
</tr>
<tr>
<td>Amber, S1S</td>
<td>H2O &amp; Na2SO4</td>
</tr>
<tr>
<td>Amber, BNA</td>
<td>N/P</td>
</tr>
<tr>
<td>Amber, BNA</td>
<td>Na2SO4</td>
</tr>
<tr>
<td>Amber, P/P</td>
<td>Na2SO4</td>
</tr>
<tr>
<td>Vial, VOC</td>
<td>H2O / Na2SO4</td>
</tr>
<tr>
<td>Vial, VOC</td>
<td></td>
</tr>
<tr>
<td>Vial, 504</td>
<td>Na2SO4</td>
</tr>
<tr>
<td>Vial, 505</td>
<td>Na2SO4</td>
</tr>
<tr>
<td>Jar, Oil Wipe</td>
<td></td>
</tr>
<tr>
<td>Encore Sampler</td>
<td></td>
</tr>
</tbody>
</table>

#### Collected By

- _____

#### Customer ID #

- _____

#### Referred By

- _____

#### Station ID #

- _____

### Sample Location

<table>
<thead>
<tr>
<th>County:</th>
</tr>
</thead>
</table>

### Field Comments

<table>
<thead>
<tr>
<th>Chlorine, mg/l</th>
<th>Conductivity, umho/cm</th>
<th>EC, mS/m</th>
<th>DO, mg/l</th>
<th>Flow, cfs</th>
<th>Gage Ht, ft</th>
<th>pH, su</th>
<th>% Sat</th>
<th>Temp, °C</th>
<th>Conv, Cond, umho/cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS009</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

### Lab Comments

<table>
<thead>
<tr>
<th>White-Original (DES)</th>
<th>Green-DES</th>
<th>Yellow-Field Records</th>
</tr>
</thead>
</table>

---

Remove yellow copy of form for your records prior to submitting form to DES
### Scioto Brush Creek Nutrient Sites

**Water Column**

- **Chlorophyll A, 445**

Only 3 samples per site need Hg analysis.

### Sample Location

- County:

### Sample Information

- **Division**: check one
  - DAPC
  - DDGW
  - DERR
  - DHWM
  - DSW
  - DSWM
  - Other

- **OEPA District**: check one
  - CO
  - CDO
  - NEDO
  - NWDO
  - SEDO
  - SWDO
  - Other

- **Sample Type**: check one
  - Ambient
  - Complaint
  - Complianco
  - Litigation
  - NPS
  - Survey
  - Raw
  - Plant
  - Distribution
  - Other

- **Matrix**: check one
  - Air Filter
  - Drinking water
  - Ground water
  - Sediment
  - Soil
  - Surface water
  - Waste water
  - Reagent Water
  - Other

### Collection Date

- **Grab**
  - MM
  - DD
  - YY
  - HH
  - MM

- **Composite**
  - Begin
  - End

### Frequency & Duration of Composite Sample:

- **Container Information**: check one
  - Field Duplicate
  - Field/Equip/Acid Blank
  - MSD

- **Field QC (Check one)**
  - Collected By
  - Customer ID #

- **Pres.**
  - Jar
  - HgSO4
  - Sed
  - Bacteria

- **Station ID #**

### Sample Data

- **Demand**
  - % Solids, Sed only
  - BOD-20 day
  - BOD-5 day
  - COD
  - CBOD-20 day
  - CBOD-5 day
  - COD
  - Conductivity
  - Flashpoint
  - GOM
  - Part Size, Sed only
  - pH
  - Solids, Diss (fill)
  - Solids, Susp (fill)
  - Solids, Total
  - Volatile
  - TOC

- **Microbiology**
  - E. coli
  - Fecal Coliform
  - Fecal Streptococcus
  - MMO-MUG
  - Total Coliform

- **Nutrients**
  - Acidity, Total CaCO3
  - Alkalinity
  - Bicarbonate
  - Chloride
  - COD
  - Chromium, Hexavalent (N/P fill)
  - Cyanide, Free (WAD)
  - Cyanide, Total
  - Fluoride
  - Nitrite
  - Ammonia/Nitrate + nitrite
  - Phenolics, Total w/man dist.
  - Phosphorus, Dissolved (Fill)
  - Sulfate
  - TKN / Phosphorus, Total

- **Metals**
  - ICP 1, Water only (Al, Ba, Ca, Cr, Cu, Fe, Mq, Mn, Na, Ni, K, Sr, Zn, Hardness)
  - ICP 2, Water only (Ca, Mg, Hardness)
  - ICP 3, Sediment only (Al, Ba, Ca, Cr, Cu, Fe, Mg, Mn, Na, Ni, K, Sr, Zn, Pb)
  - ICP 4, SW846 only (Al, Ba, Ca, Cr, Cu, Fe, Mg, Mn, Na, Ni, K, Sr, Zn, Y, Cd, Co, Ti, Be, Hardness)
  - ICP 5, SW846 SED only (Al, Ba, Ca, Cr, Cu, Fe, Mg, Mn, Na, Ni, K, Sr, Zn, Y, Cd, Co, Ti, Be)
  - ICP 6, Air Filters only (Cr, Ni, Pb, Zn, Mn)
  - Yenadium
  - Titanium

- **Metals- Low Level**
  - SIMA 1, Water only (As, Cd, Pb, Se), L L
  - SIMA 2, Sed only (As, Cd, Se), L L
  - SIMA 3, Air only (As, Cd), L L
  - Arsenic, SW846 only, L L
  - Cadmium, SW846 only, L L (Sed only)
  - Lead, SW846 only, L L
  - Selenium, SW846 only, L L

The following require prior notification to DES before submitting:

- Antimony, L L
- Beryllium, L L, Water, Sed, Air only
- Cobalt, L L, Water, Sed, Air only
- Copper, L L, Water only
- Silver, L L
- Thallium, L L
- Tin, L L
- Mercury

- Only 3 samples per site need Hg analysis

### Field Comments

- Bioassay

### Lab Comments

- Chlorine, mg/L
- Cond, umhos/cm
- DO, mg/L
- Flow, cfs
- Cage Ht, ft
- pH, su
- % Sat
- Temp, °C
- Conc Cond, umhos

**EPA 4101 (1/75)**

**White-Original DES**

**Green-DES**

**Yellow-Field Records**

Remove yellow copy of form for your records prior to submitting form to DES

All Rush Samples require prior approval
Scioto Brush Creek Nutrient Sites
Sediment

Sample Information

Client (Bill to)

Division (check one)  
DAPC  
DDAGW  
DERR  
OHWM  
DSW  
DS/WM  
Other

Sample Type (check one)  
Ambient  
Complaint  
Compliance  
Litigation  
Surface water  
Waste water  
Raw Water  
Plant  
Plant Water  
Other

Matrix (check one)  
Air Filter  
Drinking water  
Ground water  
Sediment  
Soil  
Surface Water  
Reagent Water  
Other

Temporary

Analysis

Template Scioto Brush Creek Nutrient Sites
Sediment

Demand

Nutrients

Acidity, Total CaCO3
Alkalinity, Total CaCO3
Bicarbonate
Chloride
COD
Chromium, Hexavalent (N/P Filter)
Cyanide, Free (WAO)
Cyanide, Total
Fluoride
Nitrate
Ammonia/Nitrate + nitrite
Phosphates, Total w/ man. dist.
Phosphorus, Dissolved (Filter)
Sulfate
TIN / Phosphorous, Total

Microbiology

E. coli
Fecal Coliform
Fecal Streptococcus
MMO-MUG
Total Coliform

Metals

Water only (Al, Ba, Ca, Cr, Cu, Fe, Mn, Na, Ni, K, Sr, Zn, Hardness)
Water only (Ca, Mg, Hardness)
Sediment only (Al, Ba, Ca, Cr, Cu, Fe, Mn, Na, Ni, K, Sr, Zn, Pb)
SWH46 only (Al, Ba, Ca, Cr, Cu, Fe, Mn, Na, Ni, K, Sr, Zn, Y, Cd, Co, Ti, Be, Hardness)
SWH46 SED only (Al, Ba, Ca, Cr, Cu, Fe, Mn, Na, Ni, K, Sr, Zn, Y, Cd, Co, Ti, Be)
SWH46 filters only (Cr, Ni, Pb, Zn, Mn)
Titanium

SIMA

Water only (As, Cd, Pb, Se, L L)
Sed only (As, Cd, Se, L L)
Air only (As, Cd, L L)
Arsenic, SWH46 only, L L
Cadmium, SWH46 only, L L
Lead, SWH46 only, L L
Selenium, SWH46 only, L L

Bioassay

Field Comments

Lab Comments

Chlorine, mg/L  
Conductivity, mS/m  
Flow, cfs  
Sample pH  
% Sat  
Temp, oC  
Con Cond, resistivity

EPA 4109 (1705)  
White-Original (DES)  
Green-DES  
Yellow-Field Records

Remove yellow copy of form for your records prior to submitting form to DES
All Rush Samples require prior approval
c.c. TMDL Study Team Members
J. DeShon
D. Mishne
M. Silagy
M. Smith