Appendix I

Arsenic bioaccessibility by in vitro gastrointestinal (IVG) extraction Report

The Ohio State University School of Environment and Natural Resources
Soil Environmental Chemistry Laboratory
Analytical Results

Facility

The Soil Environmental Chemistry Laboratory is located at 2021 Coffey Rd., Columbus OH, 43210 in the School of Environment and Natural Resources. The Soil Environmental Chemistry Lab exists to meet the needs of research grants, individuals, companies, state and federal agencies in regard to physical and chemical analysis of soil, water, plant, and other environmental samples. Professor Nick Basta, Director.

Instrumentation

Arsenic (As) analysis was carried out on a Varian Vista-MPX ICP-OES.

Quality Control

Inductively Coupled Plasma (ICP) Detection Limits

Definitions:
Method Detection Limit (MDL): The MDL for each element is calculated on the basis of the analytical method used to prepare and analyze the sample.. For analysis via ICP, the method detection limit is based on the multiple of three times the standard deviation of the signal of 10 blank solutions.

Limit of Quantitation (LOQ): The LOQ is the lowest reportable concentration of an element at which accuracy of ± 20% is demonstrated with a check standard prepared from a certified ICP standard. The LOQ check standard is analyzed at a frequency up to one per 20 samples.

Sample Preparation QA/QC Procedures

Measures:
Laboratory Control Sample: A standard reference material (SRM) or certified reference material (CRM) that goes through the same extraction/preparation procedure as the samples. The analyte composition of the United States Environmental Protection Agency (USEPA) SW-846 Method 3051a laboratory control sample (RTC Corp, CRM059-050) is certified using the same or similar extraction procedure. NIST 2710 is used as a laboratory control sample for the Ohio State University In Vitro Gastrointestinal extraction method (Basta et al., 2007; Rodriguez et al., 1999). However, no certified value exists for in vitro extractions for As.

Preparation Blank: The Preparation Blank is a sample that contains only the reagents used in the extraction procedure. The preparation blank is processed through the same preparation procedures as the samples and therefore gives an indication of any contamination introduced to the sample during the preparation process.

Sample Duplicates: A sample split and prepared by the same procedure in order to evaluate the reproducibility of the preparation method.

QC Limits:

Laboratory Control Sample: ± 20% of the known value or within the 95% prediction interval of the certified value.

Preparation Blank: For elements with blank concentrations above the LOQ, the sample concentration must be ≥ 10x the blank concentration.

Sample Duplicates: The relative percent difference (RPD) must be no more than ±20%. Sample Duplicates not evaluated for elements below the LOQ.

$$RPD = 100 \times \frac{|S - D|}{\text{Avg. } (S,D)}$$

ICP QA/QC Procedures

Measures:

Initial and Continuing calibration verification (ICV and CCV): Performed using standards prepared at two concentrations from a certified check standard (SPEX CertiPrep Group LPC standard 1, Fisher Cat. No. LPC-1-100N). Both solutions are analyzed after calibration but before samples, then alternating every 10 samples thereafter.

Initial and Continuing calibration blank (ICB and CCB): Blank solution analyzed after calibration but before samples and every 10 samples thereafter.

LOQ check standard: Prepared from certified check standard (SPEX CertiPrep Group LPC standard 1, Fisher Cat. No. LPC-1-100N). The LOQ for each element is analyzed at a frequency no greater than every 20 samples.

Linear range verification (LRV): A check standard analyzed for each element concentration that exceed the highest calibration standard by more than 20%. The standard shall be analyzed at any point during the analytical run.

Matrix Spike: A composite sample from samples of similar matrix is spiked with a solution prepared from certified check standard (SPEX CertiPrep Group LPC standard 1, Fisher Cat. No. LPC-1-100N).

Serial Dilution: A composite sample from samples of similar matrix is diluted by a known factor.

QC Limits:

ICV and CCV: ± 10% of the known concentration.

ICB and CCB: Below the MDL.

LOQ check standard: ± 20% of the known concentration.

LRV: ± 10% of the known concentration.

Matrix Spike: ± 25% of the spike concentration.
Serial Dilution: % difference ≤10%. Not evaluated for elements in which the diluted concentration is less than the LOQ.

$$\%Difference = 100 * \frac{(initial - (diluted * DilutionFactor))}{initial}$$

The OSU *in vitro* gastrointestinal Extraction

The OSU IVG is a rapid, inexpensive and reliable screening tool for determining the potential bioavailability (i.e., bioaccessible) of soil contaminants including As (Basta et al., 2007; Rodriguez et al., 1999). The OSU IVG method simulates important parameters of the human GI tract under fasting conditions. The amount of contaminant extracted by the OSU IVG is assumed to be available for absorption across the intestinal membrane (i.e., bioaccessible) and incorporation into systemic circulation (Ruby et al., 1999).

Bioaccessible As results:

Sample	Result	Unit	QC Qualifier
DC-2	5.38	mg/kg	J
OC-15/16	5.06	mg/kg	J
OC-22	8.04	mg/kg	
OC-24/25	2.88	mg/kg	J
DC-11	12.0	mg/kg	
OC-2	6.25	mg/kg	

USEPA 3051a As

USEPA 3051a is a microwave-assisted extraction using aqua regia and HNO_3. This method is more aggressive in dissolving the sample matrix than methods using conventional heating with nitric acid (HNO_3), or alternatively, nitric acid and hydrochloric acid (HCl), according to EPA Methods 200.2 and 3050.

This method is intended to provide a rapid multi-element acid extraction or dissolution prior to analysis. Many types of samples will be dissolved by this method. A few refractory sample matrix compounds, such as quartz, silicates, titanium dioxide, alumina, and other oxides may not be dissolved and in some cases may sequester target analyte elements. These bound elements are considered non-mobile in the environment and are excluded from most aqueous transport mechanisms of pollution.

Analytical Results

3051a As results:

Sample	Result	Unit	QC Qualifier
DC-2	12.8	mg/kg	
OC-15/16	17.0	mg/kg	
OC-22	21.4	mg/kg	
OC-24/25	5.00	mg/kg	

DC-11	39.9	mg/kg	
OC-2	11.9	mg/kg	

Percent Bioaccessible As
% Bioaccessibile As = 100*(Bioaccessible As/3051a As)

%Bioaccessible As Results:

Sample	Result	Unit	QC Qualifier
DC-2	42.0	%	J
OC-15/16	29.8	%	J
OC-22	37.6	%	
OC-24/25	57.6	%	J
DC-11	30.1	%	
OC-2	52.5	%	

QC Measures

Laboratory Control Sample Results:

Sample	Method	Result	Unit	Certified Value	% Recovery
Montana 2710	OSU IVG	184	mg/kg	NA	NA
CRM059-050	3051a	160	mg/kg	149	107

Sample Duplicate Results:

Sample Result	Sample Dup Result	Unit	Method	% Difference
5.38	6.36	mg/kg	OSU IVG	17
21.4	20.1	mg/kg	3051a	6

ICP Matrix Spike:

Sample Result	Sample Spike Result	Spike Concentration	Unit	Matrix/Method	% Recover
0.0417	0.791	0.800	mg/L	OSU IVG	94
0.170	1.01	0.800	mg/L	3051a	105

QC Qualifiers
J- Above the method detection limit (MDL) but below the limit of quantitation (LOQ)

Blank (Blk) **11/9/2010, 1:41:28 PM** **Rack 1, Tube 1**

Label	Replicates Intensity (c/s)								
As 188.980	0.556	0.800	1.35	0.748	2.04	2.56	1.71	4.73	1.76
	0.847								

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.000000	mg/L	1.244	72.8	1.71

Standard 1 (Std) **11/9/2010, 1:48:05 PM** **Rack 1, Tube 2**

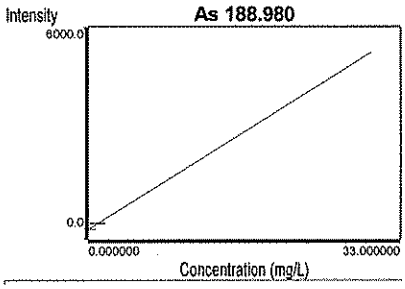
Label	Replicates Intensity (c/s)								
As 188.980	179	177	176	168	178	180	182	191	168
	170								

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	1.00	mg/L	6.930	3.9	177

As 188.980 Calibration (mg/L) **11/9/2010, 1:48:05 PM** **Correlation Coefficient: 1.000000**

Label	Flags	Int. (c/s)	Std Conc.	Calc Conc.	Error	%Error
Blank		1.71	0.000000	0.000000	-	-
Standard 1		177	1.00	1.00	0.000000	0.0

Curve Type: Linear Equation: y = 175.347 x + 1.70953



Blk (Samp) **11/9/2010, 1:54:44 PM** **Rack 1, Tube 3**

Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)								
As 188.980	1.13u	2.07	2.39	1.98	2.03	3.50	1.82	2.78	3.01
	1.09u								

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.00267u	mg/L	0.00440	164.3	2.18	0.00267 mg/L

Blank (Blk) **11/9/2010, 2:03:18 PM** **Rack 1, Tube 1**

Label	Replicates Intensity (c/s)		
As 188.980	1.8062	4.0225	2.5782

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.000000	mg/L	1.125	40.1	2.8023

Standard 1 (Std) **11/9/2010, 2:07:09 PM** **Rack 1, Tube 2**

Label	Replicates Intensity (c/s)		
As 188.980	4.1494	5.3162	5.6890

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.020000	mg/L	0.803	15.9	5.0515

Standard 2 (Std) **11/9/2010, 2:11:00 PM** **Rack 1, Tube 3**

Label	Replicates Intensity (c/s)		
As 188.980	11.470	10.898	9.4869

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.050000	mg/L	1.021	9.6	10.618

Standard 3 (Std) **11/9/2010, 2:14:51 PM** **Rack 1, Tube 4**

Label	Replicates Intensity (c/s)		
As 188.980	18.828	16.346	19.027

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.10000	mg/L	1.494	8.3	18.067

Standard 4 (Std) **11/9/2010, 2:18:42 PM** **Rack 1, Tube 5**

Label	Replicates Intensity (c/s)		
As 188.980	81.833	86.598	84.198

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.50000	mg/L	2.383	2.8	84.209

Standard 5 (Std) **11/9/2010, 2:22:33 PM** **Rack 1, Tube 6**

Label	Replicates Intensity (c/s)		
As 188.980	172.78	175.63	173.39

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	1.0000	mg/L	1.501	0.9	173.93

Standard 6 (Std) **11/9/2010, 2:26:24 PM** **Rack 1, Tube 7**

Label	Replicates Intensity (c/s)		
As 188.980	849.26	924.19	944.52

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	5.0000	mg/L	50.171	5.5	905.99

Standard 7 (Std) **11/9/2010, 2:30:16 PM** **Rack 1, Tube 8**

Label	Replicates Intensity (c/s)		
As 188.980	1889.1e	1942.5e	1938.7e

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	-----e	mg/L	0.000	-	0.000000

Standard 8 (Std) **11/9/2010, 2:34:09 PM** **Rack 1, Tube 9**

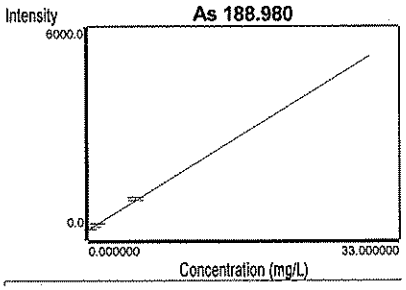
Label	Replicates Intensity (c/s)		
As 188.980	4313.4e	4140.1e	4270.0e

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	-----e	mg/L	0.000	-	0.000000

As 188.980 Calibration (mg/L) **11/9/2010, 2:34:09 PM** **Correlation Coefficient: 0.999926**

Label	Flags	Int. (c/s)	Std Conc.	Calc Conc.	Error	%Error
Blank		2.8023	0.000000	0.005834	-	-
Standard 1		5.0515	0.020000	0.018942	-0.001058	-5.3
Standard 2		10.618	0.050000	0.051385	0.001385	2.8
Standard 3		18.067	0.10000	0.094796	-0.005204	-5.2
Standard 4		84.209	0.50000	0.48026	-0.019738	-3.9
Standard 5		173.93	1.0000	1.0032	0.003159	0.3
Standard 6		905.99	5.0000	5.2695	0.26948	5.4
Standard 7	e	0.000000	-----	-0.010497	-10.010	-100.1
Standard 8	e	0.000000	-----	0.000000	-25.000	-100.0

Curve Type: Linear Equation: y = 171.59 x + 1.80123



Chk 0.04 (Samp) **11/9/2010, 3:03:46 PM** **Rack 1, Tube 10**

Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	10.001	7.7730	9.2747

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.042048	mg/L	0.006622	15.7	9.0163	0.042048 mg/L

Chk 0.40 (Samp) **11/9/2010, 3:07:37 PM** **Rack 1, Tube 11**

Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	69.090	67.233	72.957

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.39605	mg/L	0.017019	4.3	69.760	0.39605 mg/L

Chk 4.0 (Samp) **11/9/2010, 3:11:28 PM** **Rack 1, Tube 12**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	653.71	657.91	660.27

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	3.8201	mg/L	0.019351	0.5	657.30	3.8201 mg/L

Blk (Samp) **11/9/2010, 3:17:46 PM** **Rack 1, Tube 13**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	3.6571	1.5878u	3.2224

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.005951u	mg/L	0.006359	106.8	2.8224	0.005951 mg/L

BlkIVG (Samp) **11/9/2010, 3:21:37 PM** **Rack 1, Tube 14**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	1.9264	3.1668	3.8073

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.006793	mg/L	0.005573	82.0	2.9669	0.006793 mg/L

2710IVG (Samp) **11/9/2010, 3:25:27 PM** **Rack 1, Tube 15**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	209.86	212.86	213.17

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	1.2248	mg/L	0.010659	0.9	211.96	1.2248 mg/L

NERLIVG (Samp) **11/9/2010, 3:29:18 PM** **Rack 1, Tube 16**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	1542.8	1530.7	1526.6

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	8.9258	mg/L	0.049242	0.6	1533.4	8.9258 mg/L

DC-2 A (Samp) **11/9/2010, 3:33:10 PM** **Rack 1, Tube 17**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	7.7585	9.1260	6.9878

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.035878	mg/L	0.006311	17.6	7.9574	0.035878 mg/L

DC-2 B (Samp) **11/9/2010, 3:37:03 PM** **Rack 1, Tube 18**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	7.5660	8.9552	10.720

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.042422	mg/L	0.009212	21.7	9.0803	0.042422 mg/L

OC-15/16 (Samp) **11/9/2010, 3:40:54 PM** **Rack 1, Tube 19**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	6.7282	9.4182	6.6084

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.033707	mg/L	0.009259	27.5	7.5849	0.033707 mg/L

OC-22 (Samp) **11/9/2010, 3:44:46 PM** **Rack 1, Tube 20**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	10.986	12.040	9.9544

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.053572	mg/L	0.006077	11.3	10.994	0.053572 mg/L

OC-24/25 (Samp) **11/9/2010, 3:48:37 PM** **Rack 1, Tube 21**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	5.6545	4.7257	4.8940

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.019175	mg/L	0.002884	15.0	5.0914	0.019175 mg/L

DC-11 (Samp) **11/9/2010, 3:52:28 PM** **Rack 1, Tube 22**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	15.718	14.265	16.648

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.080090	mg/L	0.006999	8.7	15.544	0.080090 mg/L

OC-2 (Samp) **11/9/2010, 3:56:19 PM** **Rack 1, Tube 23**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	9.3020	9.1470	8.3961

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.041652	mg/L	0.002824	6.8	8.9484	0.041652 mg/L

Blk (Samp) **11/9/2010, 4:00:11 PM** **Rack 1, Tube 24**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	2.5359	4.2113	4.1678

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.010706	mg/L	0.005565	52.0	3.6383	0.010706 mg/L

chk 0.4 (Samp) **11/9/2010, 4:04:01 PM** **Rack 1, Tube 25**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	72.898	75.669	75.320

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.42443	mg/L	0.008795	2.1	74.629	0.42443 mg/L

chk 0.04 (Samp) **11/9/2010, 4:07:54 PM** **Rack 1, Tube 26**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	9.5195	9.3742	11.137

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.047841	mg/L	0.005703	11.9	10.010	0.047841 mg/L

Comp (Samp) **11/9/2010, 4:33:03 PM** **Rack 1, Tube 27**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	9.9852	9.0432	7.8350

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.041688	mg/L	0.006281	15.1	8.9545	0.041688 mg/L

Comp spk (Samp) **11/9/2010, 4:36:54 PM** **Rack 1, Tube 28**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	138.40	137.86	136.12

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.79058	mg/L	0.006938	0.9	137.46	0.79058 mg/L

Comp x5 (Samp) **11/9/2010, 4:40:46 PM** **Rack 1, Tube 29**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	4.0733	4.4118	4.1701

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.014087	mg/L	0.001016	7.2	4.2184	0.014087 mg/L

Blank (Blk) **11/10/2010, 2:27:38 PM** **Rack 1, Tube 1**

Label	Replicates Intensity (c/s)								
As 188.980	2.6074	2.7720	1.0795	1.5744	2.8316	1.9621	4.4657	2.8339	2.8909
	2.8402								

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.000000	mg/L	0.915	35.4	2.5858

Standard 1 (Std) **11/10/2010, 2:34:24 PM** **Rack 1, Tube 2**

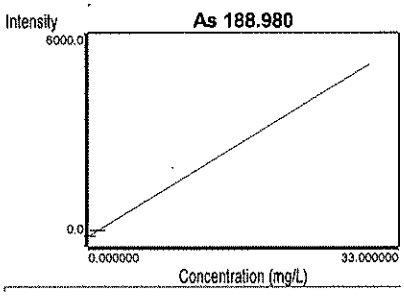
Label	Replicates Intensity (c/s)								
As 188.980	170.86	169.18	171.82	170.68	170.61	175.36	174.42	175.91	172.39
	171.59								

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	1.0000	mg/L	2.234	1.3	172.28

As 188.980 Calibration (mg/L) **11/10/2010, 2:41:08 PM** **Correlation Coefficient: 1.000000**

Label	Flags	Int. (c/s)	Std Conc.	Calc Conc.	Error	%Error
Blank		2.5858	0.000000	0.000000	-	-
Standard 1		172.28	1.0000	1.0000	0.000000	0.0

Curve Type: Linear Equation: y = 169.696 x + 2.58577



Blk (Samp) **11/10/2010, 2:47:53 PM** **Rack 1, Tube 4**

Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)								
As 188.980	3.6768	2.1721u	2.2424u	1.4123u	1.2985u	4.2722	1.3609u	3.0058	0.50563u
	0.71561u								

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	-0.003062u	mg/L	0.007391	241.4	2.0662	-0.003062 mg/L

Blank (Blk) **11/10/2010, 2:52:51 PM** **Rack 1, Tube 1**

Label	Replicates Intensity (c/s)		
As 188.980	5.4443	3.3705	2.0829

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.000000	mg/L	1.696	46.7	3.6326

Standard 1 (Std) **11/10/2010, 2:56:43 PM** **Rack 1, Tube 2**

Label	Replicates Intensity (c/s)		
As 188.980	4.6300e	6.4095e	2.5886e

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	-----e	mg/L	0.000	-	0.000000

Standard 2 (Std) **11/10/2010, 3:00:36 PM** **Rack 1, Tube 3**

Label	Replicates Intensity (c/s)		
As 188.980	11.056	10.479	11.486

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.050000	mg/L	0.505	4.6	11.007

Standard 3 (Std) **11/10/2010, 3:04:29 PM** **Rack 1, Tube 4**

Label	Replicates Intensity (c/s)		
As 188.980	20.304	20.788	18.606

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.10000	mg/L	1.146	5.8	19.900

Standard 4 (Std) **11/10/2010, 3:08:22 PM** **Rack 1, Tube 5**

Label	Replicates Intensity (c/s)		
As 188.980	82.667	83.845	82.853

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	0.50000	mg/L	0.634	0.8	83.122

Standard 5 (Std) **11/10/2010, 3:12:15 PM** **Rack 1, Tube 6**

Label	Replicates Intensity (c/s)		
As 188.980	175.81	176.13	177.48

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	1.0000	mg/L	0.883	0.5	176.47

Standard 6 (Std) **11/10/2010, 3:16:09 PM** **Rack 1, Tube 7**

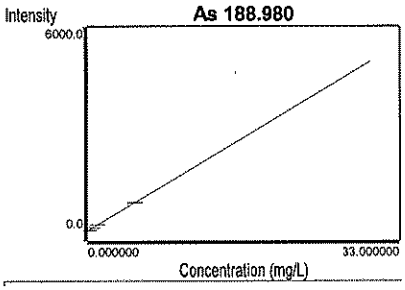
Label	Replicates Intensity (c/s)		
As 188.980	819.22	841.83	839.55

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
As 188.980	5.0000	mg/L	12.450	1.5	833.53

As 188.980 Calibration (mg/L) **11/10/2010, 5:32:25 PM** **Correlation Coefficient: 0.999943**

Label	Flags	Int. (c/s)	Std Conc.	Calc Conc.	Error	%Error
Blank		3.6326	0.000000	-0.001158	-	-
Standard 1	e	0.000000	-----	-0.023024	-0.043024	-215.1
Standard 2		11.007	0.050000	0.043236	-0.006764	-13.5
Standard 3		19.900	0.10000	0.096764	-0.003236	-3.2
Standard 4		83.122	0.50000	0.47734	-0.022661	-4.5
Standard 5		176.47	1.0000	1.0393	0.039275	3.9
Standard 6		833.53	5.0000	4.9945	-0.005456	-0.1

Curve Type: Linear Equation: y = 166.123 x + 3.82485



Chk 0.04 (Samp) **11/10/2010, 3:38:03 PM** **Rack 1, Tube 14**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	10.793	9.5452	9.4581

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.036764	mg/L	0.004496	12.2	9.9322	0.036764 mg/L

Chk 0.40 (Samp) **11/10/2010, 3:41:57 PM** **Rack 1, Tube 15**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	73.131	72.696	71.481

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.41302	mg/L	0.005147	1.2	72.436	0.41302 mg/L

Chk 4.0 (Samp) **11/10/2010, 3:45:50 PM** **Rack 1, Tube 16**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	713.40	711.39	717.52

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	4.2756	mg/L	0.018798	0.4	714.10	4.2756 mg/L

Blk (Samp) **11/10/2010, 3:49:44 PM** **Rack 1, Tube 17**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	2.7697u	2.6615u	3.1630u

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	-0.005780u	mg/L	0.001589	27.5	2.8647	-0.005780 mg/L

CRM059-050-104 (Samp) **11/10/2010, 3:54:37 PM** **Rack 1, Tube 18**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	271.72	269.50	268.01

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	1.6007	mg/L	0.011218	0.7	269.74	1.6007 mg/L

Blk-104 (Samp) **11/10/2010, 4:17:45 PM** **Rack 1, Tube 19**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	2.1848u	3.0508u	1.1706u

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	-0.010170u	mg/L	0.005665	55.7	2.1354	-0.010170 mg/L

ICSA-104 (Samp) **11/10/2010, 4:21:40 PM** **Rack 1, Tube 20**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	5.0621	4.7153	5.5415

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.007714	mg/L	0.002497	32.4	5.1063	0.007714 mg/L

ICSB-104 (Samp) **11/10/2010, 4:25:33 PM** **Rack 1, Tube 21**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	20.521	19.495	17.751

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.092889	mg/L	0.008428	9.1	19.256	0.092889 mg/L

OC-22A (Samp) **11/10/2010, 4:29:25 PM** **Rack 1, Tube 22**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	39.973	38.166	39.842

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.21371	mg/L	0.006062	2.8	39.327	0.21371 mg/L

OC-22B (Samp) **11/10/2010, 4:33:17 PM** **Rack 1, Tube 23**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	35.525	39.089	36.838

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.20061	mg/L	0.010849	5.4	37.151	0.20061 mg/L

OC-15/16 (Samp) **11/10/2010, 4:37:11 PM** **Rack 1, Tube 24**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	32.413	32.002	31.978

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.17039	mg/L	0.001471	0.9	32.131	0.17039 mg/L

OC-24/25 (Samp) **11/10/2010, 4:41:04 PM** **Rack 1, Tube 25**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	13.709	11.083	11.624

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.050046	mg/L	0.008347	16.7	12.139	0.050046 mg/L

DC-11 (Samp) **11/10/2010, 4:44:58 PM** **Rack 1, Tube 26**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	67.903	71.568	70.761

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.39882	mg/L	0.011592	2.9	70.078	0.39882 mg/L

OC-2 (Samp) **11/10/2010, 4:48:52 PM** **Rack 1, Tube 27**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	23.365	24.295	23.036

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.11883	mg/L	0.003928	3.3	23.565	0.11883 mg/L

DC-2 (Samp) **11/10/2010, 4:52:45 PM** **Rack 1, Tube 28**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	24.129	25.146	26.137

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.12830	mg/L	0.006044	4.7	25.138	0.12830 mg/L

Blk (Samp) **11/10/2010, 4:56:37 PM** **Rack 1, Tube 29**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	1.5438u	1.8608u	2.3914u

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	-0.011394u	mg/L	0.002578	22.6	1.9320	-0.011394 mg/L

Chk 0.4 (Samp) **11/10/2010, 5:00:51 PM** **Rack 1, Tube 30**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	72.727	73.777	71.231

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.41387	mg/L	0.007700	1.9	72.578	0.41387 mg/L

BL 0.04 A (Samp) **11/10/2010, 5:04:44 PM** **Rack 1, Tube 31**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	79.512	78.704	79.042

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.45305	mg/L	0.002443	0.5	79.086	0.45305 mg/L

BL 0.04 B (Samp) **11/10/2010, 5:08:36 PM** **Rack 1, Tube 32**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	84.489	84.665	84.515

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.48598	mg/L	0.000573	0.1	84.556	0.48598 mg/L

BL 0.4 (Samp) **11/10/2010, 5:12:29 PM** **Rack 1, Tube 33**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	79.582	81.753	79.882

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.46099	mg/L	0.007080	1.5	80.406	0.46099 mg/L

BL 1.8 (Samp) **11/10/2010, 5:16:22 PM** **Rack 1, Tube 34**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	96.993	94.601	93.824

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.54968	mg/L	0.009942	1.8	95.140	0.54968 mg/L

Hcomp (Samp) **11/10/2010, 5:20:16 PM** **Rack 1, Tube 35**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	31.538	32.657	31.802

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.16960	mg/L	0.003519	2.1	31.999	0.16960 mg/L

Hcomp spk (Samp) **11/10/2010, 5:24:10 PM** **Rack 1, Tube 36**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	172.10	172.21	170.50

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	1.0100	mg/L	0.005752	0.6	171.60	1.0100 mg/L

Hcomp x5 (Samp) **11/10/2010, 5:28:04 PM** **Rack 1, Tube 37**
Weight: 1 Volume: 1 Dilution: 1

Label	Replicates Intensity (c/s)		
As 188.980	8.9125	7.6587	6.5414

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	0.023352	mg/L	0.007141	30.6	7.7042	0.023352 mg/L

USEPA Contract Laboratory Program
Generic Chain of Custody

Reference Case 40638
Client No:
SDG No:

L

Date Shipped:	10/19/2010
Carrier Name:	FedEx
Airbill:	7963 5822 1551
Shipped to:	OSU - School of Environmental & Natural Resources 2021 Coffer Road 210 Kottman Hall Columbus OH 43210

Chain of Custody Record

Sampler Signature: for Matt Beer

	Relinquished By (Date / Time)	Received By (Date / Time)
1	10/19/10 1600	10/22/10 1200
2		
3		
4		

For Lab Use Only

Lab Contract No:
Unit Price:
Transfer To:
Lab Contract No:
Unit Price:

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		FOR LAB USE ONLY Sample Condition On Receipt
DC-11	Sediment/ Matt Beer	L/C	AS Bioavai (21)	(Ice Only) (1)	DC-11	S: 10/18/2010	10:40	
OC-2	Sediment/ Mike Browning	L/G	AS Bioavai (21)	(Ice Only) (1)	OC-2	S: 10/6/2010	11:10	

Shipment for Case Complete?N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Cooler Temperature Upon Receipt:	Chain of Custody Seal Number: 110174-110175
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G		Custody Seal Intact? ___ Shipment Iced? ___

AS Bioavai = As Bioavailability

TR Number: 5-350091276-101910-0006

LABORATORY COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
Send Copy to: Sample Management Office, 15000 Conference Center Dr., Chantilly, VA. 20151-3819 Phone 703/818-4200; Fax 703/818-4602

USEPA Contract Laboratory Program
Generic Chain of Custody

Reference Case 40638
Client No:
SDG No:
L

Date Shipped:	10/21/2010
Carrier Name:	FedEx
Airbill:	7963 6329 0219
Shipped to:	OSU - School of Environmental & Natural Resources 2021 Coffer Road 210 Kottman Hall Columbus OH 43210

Chain of Custody Record

	Relinquished By (Date / Time)	Received By (Date / Time)
1	10/21/10 1600	10/22/10 12:40
2		
3		
4		

Sampler Signature: for Matt Beer

For Lab Use Only

Lab Contract No:
Unit Price:
Transfer To:
Lab Contract No:
Unit Price:

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	FOR LAB USE ONLY Sample Condition On Receipt
DC-2	Sediment/ Matt Beer	L/C	AS Bioavai (21)	(Ice Only) (1)	DC-2	S: 10/19/2010	17:10
OC-15/16	Sediment/ Matt Beer	L/C	AS Bioavai (21)	(Ice Only) (1)	OC-15/16	S: 10/19/2010	14:50
OC-22	Sediment/ Matt Beer	L/C	AS Bioavai (21)	(Ice Only) (1)	OC-22	S: 10/19/2010	10:35
OC-24/25	Sediment/ Matt Beer	L/C	AS Bioavai (21)	(Ice Only) (1)	OC-24/25	S: 10/19/2010	9:25

Shipment for Case Complete?N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Cooler Temperature Upon Receipt:	Chain of Custody Seal Number: 110195-6
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G		Custody Seal Intact? ___ Shipment Iced? ___

AS Bioavai = As Bioavailability

TR Number: 5-350091276-102110-0004

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
Send Copy to: Sample Management Office, 15000 Conference Center Dr., Chantilly, VA. 20151-3819 Phone 703/818-4200; Fax 703/818-4602

LABORATORY COPY

Appendix J

USFWS Fish Tissue Residue Work Plan and DRAFT ENTRIX Memo on Sample Selection for Chemical Analyses

ENTRIX, Inc.
1000 Hart Road, Suite 130
Barrington, IL 60010
(847) 277-2850 | Fax (847) 381-6679
www.entrix.com

Date: October 4, 2010

To: Duck and Otter Creek Industrial Partners

From: Jody Kubitz, Ph.D. and John Matousek, MS, ENTRIX, Inc.

Re: **DRAFT Recommendations for Chemical Analyses of Fish Tissues from Duck and Otter Creek**

On August 24 and 25, 2010 fish samples were collected from Duck and Otter Creeks in Northwest Ohio by the U.S. Fish and Wildlife Service (USFWS). Boat-based electroshocking equipment was used to collect fish from the lacustuarine sections of Duck and Otter Creeks and Hecklinger Pond. Backpack electroshocking equipment and seines were used to collect fish from upstream areas. The USFWS fish collection team was composed of Dave DeVault (project lead), Kevin Tloczynski (asst. project lead), Jeromy Applegate, Jennifer Finfera, and Dave Henry. Sampling support was also provided by John Matousek (ENTRIX) on behalf of the Duck and Otter Creek Industrial Partners (Partners). Fish were collected from three stream reaches of Duck Creek and three reaches of Otter Creek. The coordinates for the stream reaches that were sampled are presented in Table 1.

Table 1. Coordinates for the stream reaches of Duck and Otter Creeks where fish were sampled in August 2010.

Sample reach	Start coordinates	Stop coordinates
Duck Creek A	N 41 41.342, W 083 27.941	N41 41.290, W 083 28.021
Duck Creek D	-	-
Duck Creek E (Hecklinger Pond)	N 41 39.113, W 083 29.833 (launch/landing point)	
Otter Creek A	N 41 41.937, W 083 27.203	N41 41.044, W 083 27.486
Otter Creek C	N 41 39.778, W 083 28.372	N 41 39.663, W 083 28.438
Otter Creek D	N 41 37.748, W 083 29.910	N 41 37.664, W 083 29.924

Twenty-three species of fish were captured in Otter Creek and thirteen species of fish were captured in Duck Creek on August 24 and 25, 2010. Most of the species that were captured were native to the streams of Northwestern Ohio; however, six introduced species were observed (Table 2). Twenty-nine fish tissue samples were collected from Duck Creek; eleven were individual fish and eighteen were composites of several small individuals. Forty-nine fish tissue samples were collected from Otter Creek; seventeen were individual fish and thirty-two were composites. A total of seventy-eight fish tissue samples are available for chemical analysis from Duck and Otter Creek.

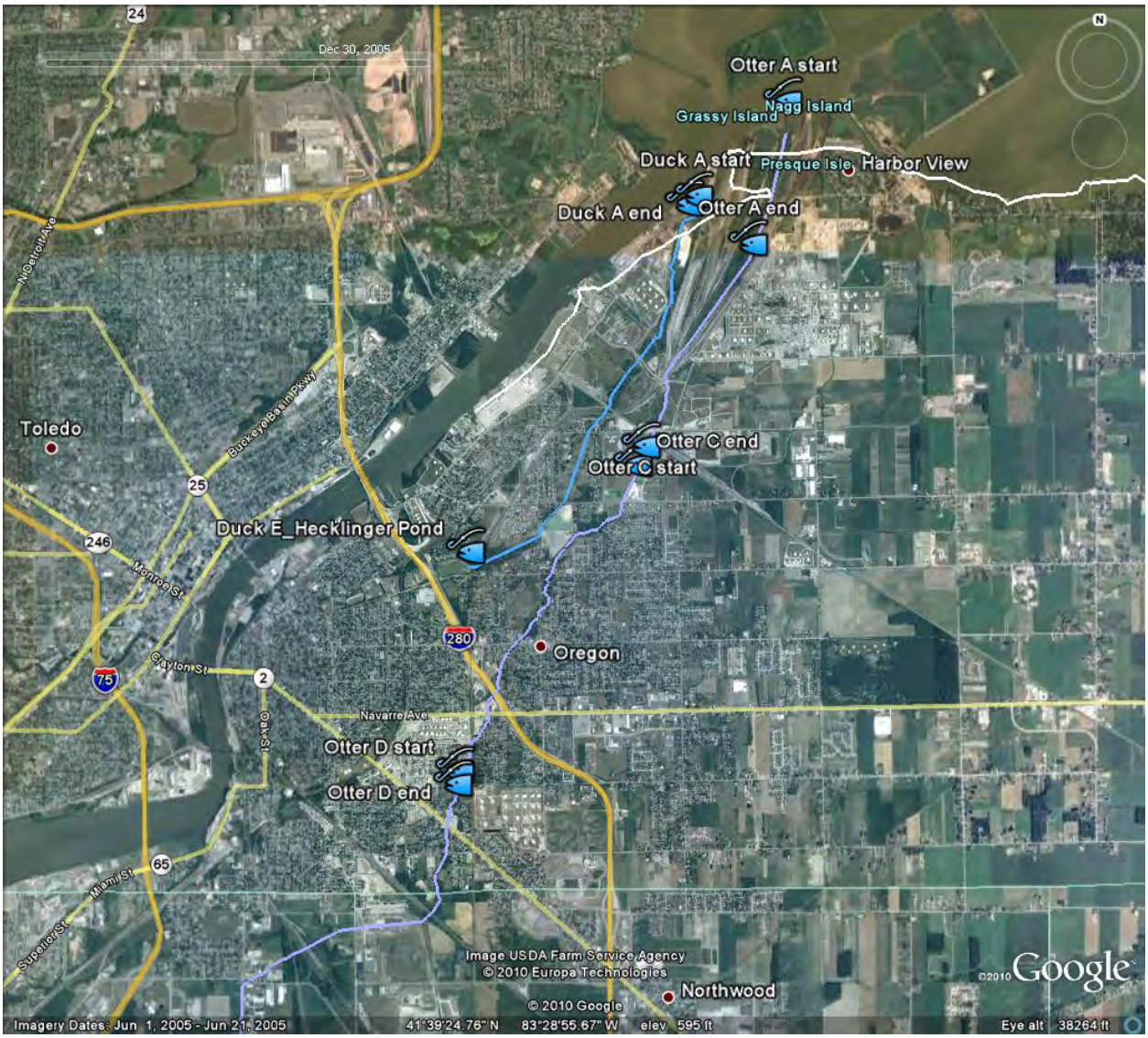


Figure 1. **Aerial photograph of Duck and Otter Creeks with USFWS sample location information. Duck Creek is represented by the blue line; Otter Creek is represented by the lavender line. The white line is the approximate shoreline of the Maumee River and Bay in 1900.**

Table 2. Fish species observed (O) and sampled (S) in Duck and Otter Creeks in August 2010.

Fish Species	Duck Creek	Otter Creek
Largemouth bass	S (n=13)	S (n=6)
Yellow perch	S (n=2)	S (n=5)
Northern pike	-	O
Freshwater drum	S (n=2)	S (n=6)
Emerald shiner	-	O
Brook silverside	O	O
Bluntnose minnow	O	O
Log perch	S (n=1)	S (n=1)
Creek chub	S (n=1)	S (n=7)
Bluegill	S (n=7)	S (n=2)
Pumpkinseed	S (n=3)	S (n=3)
Green sunfish	O	S (n=1)
Bluegill x green sunfish hybrid	-	S (n=1)
Longnose gar	-	O
Channel Catfish	-	S (n=1)
Yellow bullhead	-	S (n=2)
White sucker	O	S (n=4)
Spotted sucker	-	S (n=1)
White perch*	-	O
Golden shiner*	-	S (n=5)
Gizzard shad*	O	O
Common carp*	-	S (n=3)
Goldfish*	-	O
Round goby*	O	-

* These fish species are not believed to be native to Duck and Otter Creek.

Unique sample identification codes were created by USFWS staff in the field using the following convention:

- The first two letters indicate the stream where fish were collected; OC for Otter Creek or DC for Duck Creek;
- The third letter indicates the stream zone (i.e. zones A through Zone E);
- The fourth fifth and sixth letter when present indicate the fish species (e.g. CC = channel catfish, CCH = creek chub, PS = pumpkinseed);
- The number following the species code indicates the sample number for that combination of location and species (i.e. CC3, would be the third channel catfish sample collected from that location);

- The final letter that follows the dash indicates whether the sample was one individual fish (I) or a composite of several individual fish (C); and, in some cases a number was appended after the "C" indicating how many individuals were included in that composite sample.

Total lengths for each fish were recorded; for composite samples the range of lengths of sizes of the individuals that were included was recorded. The total weight of each sample was also recorded; for composites, the combined weight of all fish was recorded. All fish tissue samples where wrapped in aluminum foil, labeled with a loose paper scrap in bag, then and placed in a sealed plastic bag. Chain of custody forms were completed in the field. Bagged fish samples were placed in a cooler with loose "wet" ice (frozen H_2O) for shipment to the USFWS facility.

The *Fish Tissue Collection Work Plan for Duck and Otter Creeks* (USFWS 2010a) was published as a part of the NRDA that will be conducted by the Trustee (USFWS 2010b). The stated purposes of the USFWS fish tissue collection work plan are:

> "*1. Establish exposure of various fish species present in Duck and Otter Creeks to a range of hazardous substances released, or potentially released, by PRPs.*
>
> *2. Begin establishing the pathway by which hazardous substances have reached trust resources.*
>
> *3. Evaluate current fish tissue concentrations of select hazardous substances relative to various regulatory endpoints. Specifically, to determine whether concentrations of a hazardous substance exceed action or tolerance levels established under section 402 of the Food, Drug and Cosmetic Act, 21 U.S.C. 342, in edible portions of organisms [43 CFR § 11.62(f)(1)(ii)] or exceed levels for which an appropriate state health agency has issued directives to limit or ban consumption of such organism [43 CFR § 11.62(f)(1)(iii)].*"

ENTRIX has identified three subsets of samples that can be used to meet the stated USFWS objectives, and to meet the objectives of the Great Lakes Legacy Act (GLLA) data gap investigation.

The first subset of data includes eighteen samples of fish that are either 1) within the general size range that represents common forage sizes for wildlife (< 6 inches or 152 mm) or 2) represent fish species that have a relatively close association with sediments (yellow bullhead, white sucker). These 18 fish are

identified in Table 3 for chemical analysis. These relatively small fish tend to have small home ranges and they tend to have greater site tenacity than larger species that tend to migrate. Consequently, the small fish in Table 3 are suitable for addressing the site-specific relationships between constituents in sediments and fish tissues. The chemical analysis of forage-sized fish can also be used to assess the potential exposure of wildlife to chemical constituents in prey-sized fish, which is consistent with the USFWS objective 2.

Table 3. Recommended whole fish samples to submit for chemical analyses. These samples represent potential ecological and wildlife exposure and can be used to evaluate site-specific bioaccumulation factors.

Species	Duck Creek fish tissue samples	Otter Creek fish tissue samples
Yellow Perch	DCA YP1-C2; DCE YP1-I	OCA YP5-C
Log perch	DCA LP1-C93*	OCA LP1-C*
Creek chub	DCD-CCH1-C*	OCC CCH2-C8*; OCD CCH4-C14
White sucker	-	OCA WS3-C8; OCD WS1-C9
Yellow bullhead	-	OCA-YB1-I
Bluegill	DCA BG1-C4; DCE BLG1-C	OCA BG1-C; OCD BG1-C6
Pumpkinseed	DCA PS1-C2; DCE PS2-C	OCA PS1-C

* These samples are most suitable for fulfilling the objectives of the GLLA data gap investigation.

The second subset of data includes the four fish samples that were identified in the GLLA data gap investigation Quality Assurance Project Plan (Weston 2010). The four proposed samples can be used to evaluate site-specific accumulation of chemical constituents present in the sediments of Duck and Otter Creeks by fish. The four samples that best match the proposed GLLA data gap investigation work plan are identified with asterisks in Table 4. Two are samples of log perch from the "A" reaches of Duck and Otter Creeks, respectively. The other two samples proposed for the GLLA data gap investigation are creek chubs from the upstream reaches of the streams. By selecting the same species for each stream, these samples will minimize interspecies variability in constituent bioaccumulation. ENTRIX recommends that the Partners request split samples from these four samples from the USFWS and conduct the chemical analyses that are proposed in the *Quality Assurance Project Plan: Duck and Otter Creeks 2010 Data Gaps Investigation, Wood and Lucas Counties, Ohio* (Weston 2010). The list of GLLA analytes is included in Table 5.

Table 4. **Recommended whole fish sample splits to submit for the GLLA suite of chemical analyses. These samples represent potential ecological and wildlife exposure and can be used to evaluate site-specific bioaccumulation factors.**

Species	Duck Creek fish tissue samples	Otter Creek fish tissue samples
Log perch	DCA LP1-C93	OCA LP1-C
Creek chub	DCD-CCH1-C	OCC CCH2-C8

Table 5. **Biota tissue sample analysis rationale; excerpted from the GLLA data gap investigation (Weston 2010).**

Analysis	Method	Rationale
Metals	ILM05.4	Some metals in sediments can be accumulated by biota Tissue data can be interpreted based on residue-effects information from the literature to estimate the likelihood of adverse effects on fish and invertebrates. In addition, tissue data could support future evaluations of wildlife and potential human exposures.
PAH_{34}	1734.2	PAHs are organic molecules that can be accumulated and metabolized by aquatic life. Tissue data can be interpreted based on residue-effects information from the literature to estimate the likelihood of adverse effects on fish and invertebrates. In addition, tissue data could support future evaluations of wildlife and potential human exposures.
Aroclors	SOM01.2	PCBs are persistent organic compounds that can biomagnify in aquatic ecosystems. Tissue data can be interpreted based on residue-effects information from the literature to estimate the likelihood of adverse effects on fish and invertebrates. In addition, tissue data could support future evaluations of wildlife and potential human exposures.
Lipid content	Gravimetric	Organic molecules tend to partition into, and can be transferred through the food web with lipids. Lipid content can also be useful for estimating accumulation factors for other species or stream areas.

The third subset of data includes sixteen fish samples that are relevant to USFWS objective 3 regarding constituent concentrations in the consumable tissues of fish. Eight fish from Duck Creek and eight fish from Otter Creek are listed in Table 6. Chemistry data from these samples could be used to refine analyses of human health risks, evaluate whether fish consumption advisories are warranted, and/or evaluate whether the uptake of constituents is greater in large fish than in small fish. The large fish that were collected from the lacustuarine sections of Duck and Otter Creek also represent individuals that may migrate and their tissue concentrations may represent an integrated exposure to the streams where they

were captured plus portions of the Maumee River and Bay. Given the potential migratory behavior of these large fish in Table 6, they are not as well-suited for evaluating the site-specific relationships between constituents in sediments and fish tissues as the small fish in Table 4. This subset also can be used to address the exposure of fish to chemical constituents that have been accumulated from the aquatic environment, which is consistent with the USFWS objective 1.

Table 6. Recommended fish samples to submit as fillet portions for chemical analyses. These samples represent potential human health exposure pathways.

Species	Duck Creek fish tissue samples	Otter Creek fish tissue samples
Yellow Perch	-	OCA YP1-I; OCA YP2-I
Largemouth bass	DCE LMB3-I[a]; DCE LMB4-I[a]; DCE LMB5-I[a]; DCA LMB1-I[b]; DCA LMB2-I[b]; DCA LMB3-I[b]	OCA LMB1-I[b]
Channel catfish	-	OCA CC1-I
Freshwater drum	DCA FD1-I; DCA FD2-I	OCA FD1-I; OCA FD6-I
Common carp	-	OCA CRP1-I; OCA CRP2-I

a The Partners do not have a history of potential discharges to Hecklinger Pond (Duck Creek E), and, therefore views these fish samples as being unrelated to their component of the NRDA case. Consequently, the GLLA list of analytes (Table 5) is recommended for these samples instead of the UFWS (2010a) list of analytes.

b these fish are smaller than the minimum legal size of 14 inches (356 mm) but are the largest individuals of this popular sport fish species available for edible tissue analysis from the lower reaches of the streams.

References

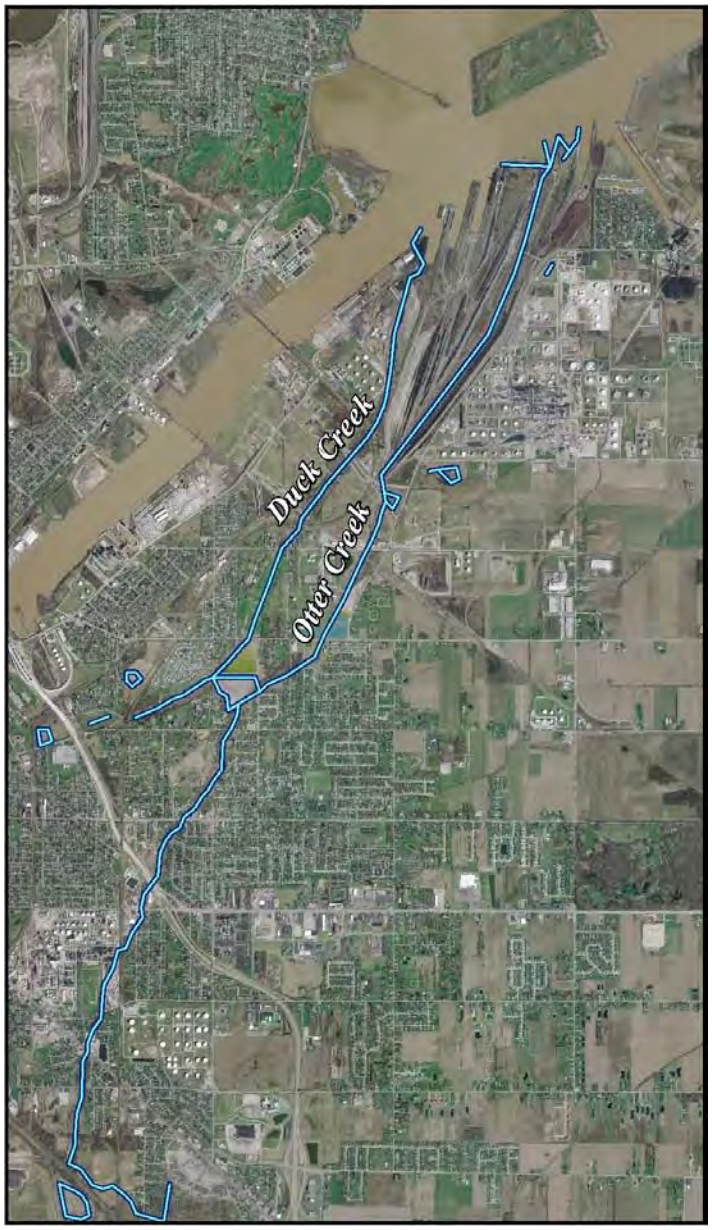
USFWS. 2010a. Duck and Otter Creek, Natural Resource Damage Assessment, Fish Tissue Residue Work Plan. Prepared by U.S. Fish and Wildlife Service, Columbus Ohio Field Office, 4625 Morse Road, Suite 104, Columbus, Ohio July 16, 2010. 5 pp.

USFWS 2010b. Duck and Otter Creek, Natural Resource Damage Assessment Plan. Prepared by U.S. Fish and Wildlife Service, Columbus Ohio Field Office, 4625 Morse Road, Suite 104, Columbus, Ohio August 6, 2010. 40 pp.

Weston 2010. Quality Assurance Project Plan: Duck and Otter Creeks 2010 Data Gaps Investigation, Wood and Lucas Counties, Ohio. Revision 0. prepared by Weston Solutions of Michigan, Inc. in preparation.

Duck & Otter Creeks

Natural Resource Damage Assessment
Fish Tissue Residue Work Plan



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16 July 2010

Fish Tissue Collection Work Plan for Duck and Otter Creeks

The United States Department of the Interior (DOI) represented by the U.S. Fish and Wildlife Service (FWS) (the Trustee) is conducting a natural resource damage assessment (NRDA) to address injuries to natural resources resulting from the release of hazardous substances from several Potentially Responsible Parties (PRPs) to Duck and Otter Creeks in Toledo, Ohio ("Duck and Otter Creeks Assessment Area" or the "Assessment Area"). The Assessment Area as defined in the Duck & Otter Creeks Natural Resource Damage Assessment Plan includes Duck Creek from its upstream terminus downstream four miles to its confluence with the Maumee River, Otter Creek from its upstream terminus seven miles downstream to its confluence with the Maumee Bay, and the entirety of Driftmeyer Ditch and the Duck and Otter Creek watersheds.

Decades of refining and manufacturing activity and improper waste disposal practices have resulted in the release of hazardous substances to both Duck and Otter Creeks and their watersheds, and potentially Driftmeyer Ditch. Hazardous substances have migrated to Duck and Otter Creeks from refineries and other industrial complexes along their banks, as well as through numerous spills and other releases from these facilities. Hazardous substances have potentially injured surface waters, sediments, fish and wildlife in the Duck and Otter Creeks Assessment Area.

The Fish Tissue Collection Work Plan for Duck and Otter Creeks (the "Work Plan" or "Study") is a part of the NRDA that will be conducted by the Trustee [1]. This Work Plan describes fish collection and analysis to be conducted by the FWS in August of 2010. The purposes of this Study are:

1. Establish exposure of various fish species present in Duck and Otter Creeks to a range of hazardous substances released, or potentially released, by PRPs.

2. Begin establishing the pathway by which hazardous substances have reached trust resources.

3. Evaluate current fish tissue concentrations of select hazardous substances relative to various regulatory endpoints. Specifically, to determine whether concentrations of a hazardous substance exceed action or tolerance levels established under section 402 of the Food, Drug and Cosmetic Act, 21 U.S.C. 342, in edible portions of organisms [43 CFR § 11.62(f)(1)(ii)] or exceed levels for which an appropriate state health agency has issued directives to limit or ban consumption of such organism [43 CFR § 11.62(f)(1)(iii)].

The Screening and Baseline Ecological Risk Assessment prepared for Partners for Clean Streams (Tetra Tech EM, 2008) separated Duck and Otter Creeks each into five exposure areas (Duck Creek exposure areas A through E, and Otter Creek exposure areas A through E, collectively referred herein as "Exposure Areas"). For consistency with previous work at the Duck and Otter Creeks Assessment Area, the FWS will attempt to collect and analyze fish within each of these respective Exposure Areas. However, the Trustee recognizes that, based on collection success, it may be necessary to combine samples from one or more Exposure Areas for data analysis.

[1] The Trustee is preparing a comprehensive Natural Resource Damage Assessment Plan (the "Assessment Plan") for the Duck and Otter Creeks Site. The Assessment Plan will be noticed for public comment for a period of thirty (30) days.

A review of available data for the Assessment Area confirms that there are few historical datasets from Duck and Otter Creeks that provide either fish tissue hazardous substance concentrations or fish species community composition and abundance. It is, therefore, not possible to determine what species and numbers will be collected for analysis. However, both streams are Lake Erie tributaries and could be expected to contain fish species assemblages similar to other Lake Erie tributaries. This could include yellow perch (*Perca flavescens*), white bass (*Morone chrysops*), pumpkinseed (*Lepomis gibbosus*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), goldfish (*Carassius auratus*), emerald shiner (*Notropis atherinoides*), gizzard shad (*Dorosoma cepedianum*), carp (*Cyprinus carpio*), brown bullhead (*Ictalurus nebulosus*), yellow bullhead (*Ameirus natalis*), alewife (*Alosa pseudoharangus*), smallmouth bass (*Micropterus dolomieui*), largemouth bass (*Micropterus salmoides*), rainbow smelt (*Osmerus mordax*), Johnny darter (*Etheostoma nigrum*), walleye (*Stizostedion vitreum*), rainbow trout (*Oncorhynchus mykiss*), spottail shiners (*Notropis hudsonius*), stone roller (*Campostoma anomalum*), blunt nose minnow (*Pimephales notatus*), creek chub (*Semotilus atromaculatus*), log perch (*Percina caprodes*), freshwater drum (*Aplodinotus grunniens*), lake sturgeon (*Acipenser fulvescens*), bowfin (*Amia calva*), and white suckers (*Catostomus commersoni).*

Within each Exposure Area, the Trustee will collect all available fish species using boat and/or backpack electro-shocking devices. If necessary, trap nets may also be deployed. The majority of fish will be analyzed as whole body samples. Selected samples of large bass (large and or small mouth) and common carp may be analyzed as skin on fillets for comparison to regulatory endpoints. The upstream and downstream ends of each zone will be recorded using a geographical positioning system.

Most fish will be identified to species, while some, such as minnows or hybrids may be identified to genus. All will be measured for length and weight, individually wrapped in aluminum foil and placed in Ziplock bags. Each fish sample will be labeled with a distinct sample number and stored on ice. Samples will be shipped overnight to the FWS, Columbus, Ohio Field Office the day they are collected. Upon arrival at the Field Office, the samples will be frozen and kept frozen until arrival at the analytical laboratory.

At the analytical laboratory, fish will be homogenized and analyzed for polychlorinated biphenyl congeners, chlorinated pesticides, heavy metals, polycyclic aromatic hydrocarbons and metabolites, and percent lipids (Table 1). Larger fish will be analyzed as individual fish, with small fishes being composited as necessary to achieve the biomass required by the analytical laboratory.

Table 1. Analytical Parameter List

Organochlorines including quantification of the following compounds:

pp'-DDE	alpha BHC	gamma chlordane
pp'-DDD	beta BHC	cis-nonachlor
pp'-DDT	gamma BHC	trans-nonachlor
op'-DDE	dieldrin	endrin
op'-DDD	heptachlor epoxide	mirex
op'-DDT	oxychlordane	toxaphene
HCB	alpha chlordane	PCB – 209 congeners

Aliphatic hydrocarbons including quantification of the following compounds:

n-decane	n-undecane	n-dodecane	n-tridecane
n-tetradecane	n-pentadecane	n-hexadecane	n-heptadecane
n-octadecane	n-nonadecane	n-eicosane	n-heneicosane
n-docosane	n-tricosane	n-tetracosane	n-pentacosane
n-hexacosane	n-heptacosane	n-octacosane	n-nonacosane
n-triacontane	n-hentriacontane	n-dotriacontane	n-tritriacontane
n-tetratriacontane	pristine	phytane	

Aromatic hydrocarbons including quantification of the following compounds:

naphthalene	C1-naphthalenes	C2-naphthalenes
C3-naphthalenes	C4-naphthalenes	biphenyl
acenaphthalene	acenaphthene	fluorene
C1-fluorenes	C2-fluorenes	C3-fluorenes
phenanthrene	anthracene	C1-phenanthrenes
C2-phenanthrenes	C3-phenanthrenes	C4- phenanthrenes
dibenzothiophene	C1-dibenzothiophenes	C2-dibenzothiophenes
C3-dibenzothiophenes	fluoranthene	pyrene
(C1-flouranthenes+C1-pyrenes)	benz(a)anthracene	chrysene
C1-chrysenes	C2-chrysenes	C3-chrysenes
C4-chrysenes	benzo(b)fluoranthene	benzo(k)fluoranthene
benzo(e)pyrene	benzo(a)pyrene	perylene
indeno(1,2,3-cd)pyrene	dibenz(a,h)anthracene	benzo(g,h,i)perylene
2-methylnaphthalene	1-methylnaphthalene	2,6-dimethylnaphthalene
2,3,5-trimethylnaphthalene	1-methylphenanthrene	

Metals:

Arsenic, selenium, mercury, aluminum, boron, barium, beryllium, cadmium, chromium, copper, iron, magnesium, manganese, molybdenum, nickel, lead, strontium, vanadium, and zinc

Standard U.S. Fish and Wildlife Service quality assurance protocols will be followed. See http://www.fws.gov/chemistry/acf_qaqc.html, http://www.fws.gov/chemistry/acf_org_sow.html and http://www.fws.gov/chemistry/acf_inorg_sow.html for details.

Public Review and Comment

The Trustee intends for this Work Plan to communicate the approach for this Study to the public, so that the public can become engaged and comment on, the proposed approach. The Trustee will soon publish and seek public comment on the "Natural Resource Damage Assessment Plan for Duck and Otter Creeks". This will describe the overall assessment process the Trustee intends to follow for Duck and Otter Assessment area. The current Work Plan is being released in advance of the broader "Natural Resource Damage Assessment Plan for Duck and Otter Creeks" to increase efficiency and reduce costs by

coordinating with the "Great Lakes Legacy Act Data Gap Investigation For Duck and Otter Creeks in The Maumee River Area of Concern" being conducted by the U.S. Environmental Protection Agency – Great Lakes National Program Office and several local industry partners.

The Work Plan is available for public review and comment for 30 days, with reasonable extensions granted, if appropriate. The public comment period for this Work Plan begins on the day the notice of availability is published in newspapers in the northwest Ohio area and lasts for 30 calendar days. Comments may be submitted in writing or by email to:

Kevin Tloczynski
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, Ohio 43230
Kevin_Tloczynski@fws.gov

References:

Tetra Tech EM. 2008. Screening and Baseline Ecological Risk Assessment Duck and Otter Creeks, Toledo, Ohio

Appendix K

EPA Data Qualifiers

Ref Columbia Analytical

EPA Data Qualifiers

The following is a list of EPA Data Qualifiers by category. These are used to flag analytes in an analytical report, under the column labeled "Q" for qualifier. A contractor or client may use additional flags as needed, but the definition of such flags must be explicit, not contradict the qualifiers listed below, and be included in the accompanying SDG Narrative, according to EPA instructions. This information is from the EPA Contract Laboratory Program (CLP).

PCB Congeners, Dioxins and Furans

Qualifier (flag)	Definition
U	Indicates compound was analyzed for, but not detected. The "CONCENTRATION" column is left blank in this instance, and an Estimated Detection Limit (EDL) must be calculated based on the signal-to-noise (S/N) ratio, as described in Exhibit D. This calculation takes into account the sample weight/volume extracted, the volume of the most concentrated extract, the injection volume, and dilution of the most concentrated extract prior to analysis.
J	Indicates an estimated value. This flag is used when the mass spectral data indicate the presence of an analyte meeting all the identification criteria in Exhibit D, but the result is less than the Contract Required Quantitation Limit (CRQL), as listed in Exhibit C, but greater than zero.
B	This flag is used when the analyte is found in the associated blank, as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
E	This flag identifies analytes whose concentrations exceed the calibration range of the HRGC/HRMS instrument for that specific analysis. If one or more compounds have a response greater than fullscale, except as noted in Exhibit D, a smaller sample size must be extracted and analyzed according to the specifications in Exhibit D. All such compounds with a response greater than full scale should have the concentration flagged "E" on the Form I for the original analysis. If the dilution causes any compounds identified in the first analysis to be below the calibration range in the second analysis, the results of both analyses shall be reported on separate copies of Form I. The Form I for the diluted sample shall have the"DL" suffix appended to the EPA Sample

	Number.
D	This flag indicates all compounds identified in an analysis at a secondary dilution factor. If a smaller sample size is analyzed, as in the "E" flag above, the "DL" suffix is appended to the EPA Sample Number on the Form I for the diluted sample, and all concentration values reported on that Form I are flagged with the "D" flag. This flag alerts data users that any discrepancies between the concentrations reported may be due to dilution of the sample extract.
H	This flag indicates that the analyte in question was quantitated using peak heights rather than peak areas for both the analyte and its internal standard.
X	Other specific flags may be required to properly define the results. If used, they must be fully described, and such description must be attached to the Sample Data Package and the SDG Narrative. Begin using "X". If more than one flag is needed, use "Y" and "Z" as needed. The laboratory-defined flags are limited to the letters "X", "Y", and "Z".

Inorganics

Qualifier (flag)	Definition
	"C" Concentration qualifier
J	The reported value was obtained from a reading that was less than the CRQL but greater than or equal to the MDL (Method Detection Limit).
U	If the reading was less than the MDL.
	"Q" qualifier
E	The reported value is estimated due to the presence of interference. An explanatory note shall be included under “Comments” on the Cover Page (if the problem applies to all samples), or on the specific Form IA-IN or Form IB-IN (if it is an isolated problem).
N	Spiked sample recovery not within control limits.
*	Duplicate analysis not within control limits.
D	The reported value is from a dilution.
	"M" (Analysis Method) qualifier
P	ICP-AES
MS	ICP-MS
CV	Manual Cold Vapor Atomic Absorption (AA)
AV	Automated Cold Vapor AA
AS	Semi-Automated Spectrophotometric
C	Manual Spectrophotometric

" ":	Where no data have been entered
NR	The analyte is Not Required to be analyzed

Organics

Qualifier (flag)	Definition
U	This flag indicates the compound was analyzed for but not detected. The Contract Required Quantitation Limit (CRQL) shall be adjusted according to the equation listed in Exhibit D. CRQLs are listed in Exhibit C.
J	This flag indicates an estimated value. This flag is used when: 1. estimating a concentration for Tentatively Identified Compounds (TICs) where a 1:1 response is assumed; 2. the mass spectral and Retention Time (RT) data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the adjusted CRQL but greater than zero 3. the RT data indicate the presence of a compound that meets the pesticide and/or Aroclor identification criteria, and the result is less than the adjusted CRQL but greater than zero. For example, if the sample's adjusted CRQL is 5.0 µg/L, but a concentration of 3.0 µg/L is calculated, report it as 3.0J.
N	This flag indicates presumptive evidence of a compound. This flag is only used for TICs, where the identification is based on a mass spectral library search and must be used in combination with the J flag. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, or for an "unknown" (no matches $ 85%), the "N" flag is not used.
P	This flag is used for pesticide and Aroclor target compounds when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P". The "P" flag is not used unless a compound is identified on both columns.
C	This flag applies to pesticide and Aroclor results when the identification has been confirmed by GC/MS. If GC/MS confirmation was attempted but was unsuccessful, do not apply this flag; use a laboratory-defined flag instead (see the X qualifier).
B	This flag is used when the analyte is found in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user to take appropriate action. This flag shall be used for a TIC as well

	as for a positively identified target compound.
E	This flag identifies compounds whose response exceed the response of the highest standard in the initial calibration range of the instrument for that specific analysis. If one or more compounds have a response greater than the response of the highest standard in the initial calibration, the sample or extract shall be diluted and reanalyzed according to the specifications in Exhibit D. Exceptions are also noted in Exhibit D. All such compounds with responses greater than the response of the highest standard in the initial calibration shall have the result flagged with an "E"on Form I for the original analysis. The results of both analyses shall be reported on separate copies of Form I. The Form I for the diluted sample shall have "DL" suffix appended to the Sample Number.
D	If a sample or extract is reanalyzed at a DF greater than 1 (e.g., when the response of an analyte exceeds the response of the highest standard in the initial calibration), the DL suffix is appended to the Sample Number on Form I for the more diluted sample, and all reported concentrations on that Form I are flagged with the "D" flag. This flag alerts data users that any discrepancies between the reported concentrations may be due to dilution of the sample or extract.

Other Abbreviations

symbol	Definition
MDL	Method Detection Limit
DL	Dilution
CRQL	Contract Required Quantitation Limit
TIC	Tentatively Identified Compounds
RT	Retention Time
GC/MS	Gas chromatograph / mass spectrometer

Appendix L

CAS Qualifiers

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition*: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	In accordance with the 2007 EPA Methods Update Rule published in the Federal Register, the holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value that was detected outside the quantitation range.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition*: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition*: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Appendix M

SulTRAC 2007 Data

TABLE 23
SUMMARY OF TOXICITY TESTING –
DUCK CREEK

Exposure Area/ Sample Location	Mean Percent Survival	Mean Percent Survival Statistically Different from Controls	Mean Dry Weight (grams)	Mean Dry Weight Statistically Different from Controls
Control	91.7	NA	1.3304	NA
Duck Creek Exposure Area A				
DC-01	43.3	Yes	NA	NA
DC-03	85	No	1.509	No
DC-05	40	Yes	NA	NA
Duck Creek Exposure Area B				
DC-05	40	Yes	NA	NA
DC-08	45	Yes	NA	NA
Duck Creek Exposure Area C				
DC-08	45	Yes	NA	NA
DC-10	83	No	1.5511	No
Duck Creek Exposure Area D				
DC-10	83	No	1.5511	No
DC-13	90	No	1.336	No
Duck Creek Exposure Area E				
DC-13	90	No	1.336	No
DC-14	86.7	No	1.474	No

Notes:

NA Not applicable

TABLE 24
SUMMARY OF TOXICITY TESTING –
OTTER CREEK

Exposure Area/ Sample Location	Mean Percent Survival	Mean Percent Survival Statistically Different from Controls	Mean Dry Weight (grams)	Mean Dry Weight Statistically Different from Controls
Control	91.7	NA	1.3304	NA
Otter Creek Exposure Area A				
OC-01	60	No	2.3783	No
OC-03	48.3	Yes	NA	NA
OC-05	16.7	Yes	NA	NA
OC-07	16.7	Yes	NA	NA
Otter Creek Exposure Area B				
OC-07	16.7	Yes	NA	NA
OC-11	43.3	Yes	NA	NA
Otter Creek Exposure Area C				
OC-11	43.3	Yes	NA	NA
OC-14	51.7	Yes	NA	NA
Otter Creek Exposure Area D				
OC-19	53.3	Yes	NA	NA
OC-22	30	Yes	NA	NA
Otter Creek Exposure Area E				
OC-22	30	Yes	NA	NA
OC-26	35	Yes	NA	NA

Notes:

NA Not applicable

TABLE B-2
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PESTICIDES
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S01-DC-01 4/02/07	S02-DC-02 4/02/07	S03-DC-03 4/02/07	S04-DC-04 4/02/07	S05-DC-05 4/03/07	S06-DC-06 4/03/07		
Aldrin	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	0.029	NE
Alpha-BHC	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	0.09	NE
Beta-BHC	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	0.32	NE
Gamma-BHC	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	0.44	0.00237
Delta-BHC	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	0.09	NE
Alpha-Chlordane	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	1.6	0.00324
Gamma-Chlordane	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	1.6	0.00324
4,4'-DDD	*0.089*	*0.0721*	*0.0218*	*0.0912*	*0.136*	*0.161*	2.4	0.00488
4,4'-DDE	*0.0473*	*0.0367*	*0.0107*	*0.0417*	*0.0622*	*0.0566*	1.7	0.00316
4,4'-DDT	0.00483 U	0.0102 U	*0.0191*	0.0106 U	0.0104 U	0.00888 U	1.7	0.00416
Dieldrin	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	0.03	0.0019
Endosulfan I	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	370	NE
Endosulfan II	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	370	NE
Endosulfan Sulfate	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	370	NE
Endrin	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	18	0.00222
Endrin Aldehyde	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	18	NE
Endrin Ketone	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	18	NE
Heptachlor	0.00483 U	0.0102 U	0.00392 J	0.0106 U	0.0104 U	0.00888 U	0.11	NE
Heptachlor Epoxide	*0.0109*	*0.00786*	0.00521 U	*0.00907 J*	*0.0147*	0.00888 U	0.053	0.00247
Methoxychlor	0.00483 U	0.0102 U	0.00521 U	0.0106 U	0.0104 U	0.00888 U	310	NE

TABLE B-2
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PESTICIDES
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S07-DC-07 4/02/07	S08-DC-08 4/02/07	S09-DC-09 4/02/07	S10-DC-10 4/0307	S11-DC-11 4/03/07	S12-DC-12 4/03/07		
Aldrin	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	0.029	NE
Alpha-BHC	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	0.09	NE
Beta-BHC	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	0.32	NE
Gamma-BHC	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	0.44	0.00237
Delta-BHC	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	0.09	NE
Alpha-Chlordane	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	1.6	0.00324
Gamma-Chlordane	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	1.6	0.00324
4,4'-DDD	*0.222*	*0.14*	*0.176*	*0.0783*	*0.388 H*	*0.277*	2.4	0.00488
4,4'-DDE	*0.0752*	*0.136*	*0.0727*	*0.061*	*0.201 H*	*0.285*	1.7	0.00316
4,4'-DDT	0.0121 U	*0.0372*	*0.0167*	*0.017*	*0.0502 H*	*0.0248*	1.7	0.00416
Dieldrin	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	0.03	0.0019
Endosulfan I	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	370	NE
Endosulfan II	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	370	NE
Endosulfan Sulfate	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	370	NE
Endrin	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	18	0.00222
Endrin Aldehyde	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	18	NE
Endrin Ketone	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	18	NE
Heptachlor	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	0.11	NE
Heptachlor Epoxide	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	0.053	0.00247
Methoxychlor	0.0121 U	0.0159 U	0.01 U	0.00801 U	0.0121 U, H	0.0224 U	310	0.00141

TABLE B-2
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PESTICIDES
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S13-DC-13 4/04/07	S14-DC-14 4/04/07	S15-DC-15 4/04/07	S16-DC-16 4/02/07	S17-DC-17 4/02/07	S18-DC-18 4/02/07		
Aldrin	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	0.029	NE
Alpha-BHC	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	0.09	NE
Beta-BHC	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	0.32	NE
Gamma-BHC	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	0.44	0.00237
Delta-BHC	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	0.09	NE
Alpha-Chlordane	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	1.6	0.00324
Gamma-Chlordane	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	1.6	0.00324
4,4'-DDD	*0.136*	*0.0707*	*0.00787*	*0.0179*	*0.0198*	*0.0174*	2.4	0.00488
4,4'-DDE	*0.0727*	*0.0175*	*0.00723*	*0.0194*	*0.0199*	*0.019*	1.7	0.00316
4,4'-DDT	*0.0349*	0.00954 U	0.00313 J	0.0112 U	0.0109 U	0.0104 U	1.7	0.00416
Dieldrin	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	0.03	0.0019
Endosulfan I	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	370	NE
Endosulfan II	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	370	NE
Endosulfan Sulfate	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	370	NE
Endrin	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	18	0.00222
Endrin Aldehyde	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	18	NE
Endrin Ketone	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	18	NE
Heptachlor	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	0.11	NE
Heptachlor Epoxide	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	0.053	0.00247
Methoxychlor	0.00616 U	0.00954 U	0.00609 U	0.0112 U	0.0109 U	0.0104 U	310	0.00141

TABLE B-2
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PESTICIDES
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S19-DC-19 4/04/07	S20-OC-01 4/02/07	S21-OC-02 4/02/07	S22-OC-03 4/02/07	S23-OC-04 4/02/07	S24-OC-05 4/02/07		
Aldrin	0.00539 U	0.0541 U, MS, LS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	0.029	NE
Alpha-BHC	0.00539 U	0.0541 U, MS, LS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	0.09	NE
Beta-BHC	0.00539 U	0.0541 U, MS, LS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	0.32	NE
Gamma-BHC	0.00539 U	0.0541 U, MS, LS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	0.44	0.00237
Delta-BHC	0.00539 U	0.0541 U, MS, LS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	0.09	NE
Alpha-Chlordane	0.00539 U	0.0541 U, MS, LS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	1.6	0.00324
Gamma-Chlordane	0.00539 U	0.0541 U, MS, LS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	1.6	0.00324
4,4'-DDD	*0.00764*	*0.0116 M, MS, LC*	*0.0252 LS, LC*	*0.0274 LS, LC*	*0.0152 LS, LC*	*0.0233 LS, LC*	2.4	0.00488
4,4'-DDE	*0.0044 J*	*0.00938 M, MS, LC*	*0.0178 LS, LC*	*0.0174 LS, LC*	*0.0138 LS, LC*	*0.0163 LS, LC*	1.7	0.00316
4,4'-DDT	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	1.7	0.00416
Dieldrin	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	0.03	0.0019
Endosulfan I	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	370	NE
Endosulfan II	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	370	NE
Endosulfan Sulfate	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	370	NE
Endrin	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	18	0.00222
Endrin Aldehyde	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	18	NE
Endrin Ketone	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	18	NE
Heptachlor	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	0.11	NE
Heptachlor Epoxide	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	0.053	0.00247
Methoxychlor	0.00539 U	0.0541 U, M, MS, LC	0.00743 U, LS, LC	0.00958 U, LS, LC	0.00798 U, LS, LC	0.00848 U, LS, LC	310	0.00141

TABLE B-2
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PESTICIDES
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S25-OC-06 4/02/07	S26-OC-07 4/03/07	S27-OC-08 4/03/07	S28-OC-09 4/04/07	S29-OC-10 4/04/07	S30-OC-11 4/03/07		
Aldrin	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	0.029	NE
Alpha-BHC	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	0.09	NE
Beta-BHC	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	0.32	NE
Gamma-BHC	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	0.44	0.00237
Delta-BHC	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	0.09	NE
Alpha-Chlordane	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	1.6	0.00324
Gamma-Chlordane	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	1.6	0.00324
4,4'-DDD	*0.0109 LS, LC*	*0.18 LS, LC*	*0.0157 LS, LC*	*0.0132 LS, LC*	*0.0153 LS, LC*	*0.0158 LS, LC*	2.4	0.00488
4,4'-DDE	*0.00972 LS, LC*	*0.00992 LS, LC*	*0.00843 LS, LC*	*0.00473 LS, LC*	*0.0102 LS, LC*	*0.00971 LS, LC*	1.7	0.00316
4,4'-DDT	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	1.7	0.00416
Dieldrin	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	0.03	0.0019
Endosulfan I	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	370	NE
Endosulfan II	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	370	NE
Endosulfan Sulfate	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	370	NE
Endrin	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	18	0.00222
Endrin Aldehyde	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	18	NE
Endrin Ketone	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	18	NE
Heptachlor	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	0.11	NE
Heptachlor Epoxide	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	0.053	0.00247
Methoxychlor	0.0071 U, LS, LC	0.00695 U, LS, LC	0.006 U, LS, LC	0.00521 U, LS, LC	0.00576 U, LC	0.00766 U, LC	310	0.00141

TABLE B-2
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PESTICIDES
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S31-OC-12 4/03/07	S32-OC-13 4/03/07	S33-OC-14 4/03/07	S34-OC-15 4/03/07	S35-OC-16 4/03/07	S36-OC-17 4/03/07		
Aldrin	0.006 U, LC	0.00487 U, LS, LC	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	0.029	NE
Alpha-BHC	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	0.09	NE
Beta-BHC	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	0.32	NE
Gamma-BHC	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	0.44	0.00237
Delta-BHC	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	0.09	NE
Alpha-Chlordane	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	1.6	0.00324
Gamma-Chlordane	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	1.6	0.00324
4,4'-DDD	*0.0133 LS, LC*	*0.0141 LS*	*0.0125 LS*	*0.011*	0.00538 U	*0.0279*	2.4	0.00488
4,4'-DDE	*0.00608 LS, LC*	*0.00615 LS*	*0.00573 LS*	*0.00439 J*	0.00538 U	*0.0155*	1.7	0.00316
4,4'-DDT	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	1.7	0.00416
Dieldrin	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	0.03	0.0019
Endosulfan I	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	370	NE
Endosulfan II	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	370	NE
Endosulfan Sulfate	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	370	NE
Endrin	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	18	0.00222
Endrin Aldehyde	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	18	NE
Endrin Ketone	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	18	NE
Heptachlor	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	0.11	NE
Heptachlor Epoxide	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	0.053	0.00247
Methoxychlor	0.006 U, LC	0.00487 U, LS	0.00537 U, LS	0.00617 U	0.00538 U	0.00502 U	310	0.00141

TABLE B-2
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PESTICIDES
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S37-OC-18 4/03/07	S38-OC-19 4/03/07	S39-OC-20 4/03/07	S40-OC-21 4/03/07	S41-OC-21A 4/04/07	S42-OC-22 4/03/07		
Aldrin	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	0.029	NE
Alpha-BHC	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	0.09	NE
Beta-BHC	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	0.32	NE
Gamma-BHC	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	0.44	0.00237
Delta-BHC	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	0.09	NE
Alpha-Chlordane	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	1.6	0.00324
Gamma-Chlordane	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	1.6	0.00324
4,4'-DDD	*0.0146*	*0.0101*	*0.0233*	*0.00708 J*	*0.00547*	0.00358	2.4	0.00488
4,4'-DDE	*0.00765*	*0.00666*	*0.0139*	*0.0066 J*	*0.00519 J*	*0.0209*	1.7	0.00316
4,4'-DDT	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	1.7	0.00416
Dieldrin	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	0.03	0.0019
Endosulfan I	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	370	NE
Endosulfan II	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	370	NE
Endosulfan Sulfate	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	370	NE
Endrin	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	18	0.00222
Endrin Aldehyde	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	18	NE
Endrin Ketone	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	18	NE
Heptachlor	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	0.11	NE
Heptachlor Epoxide	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	0.053	0.00247
Methoxychlor	0.00529 U	0.00427 U	0.00447 U, LS	0.00718 U	0.00539 U	0.00485 U	310	0.00141

TABLE B-2
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PESTICIDES
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S43-OC-23 4/03/07	S44-OC-24 4/03/07	S45-OC-25 4/03/07	S46-OC-26 4/03/07	S47-ER-EK-01 4/04/07 (milligrams per liter)	S48-ER-SH-02 4/04/07 (milligrams per liter)		
Aldrin	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0366 U	0.0337 U	0.029	NE
Alpha-BHC	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0366 U	0.0337 U	0.09	NE
Beta-BHC	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0366 U	0.0337 U	0.32	NE
Gamma-BHC	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0336 U	0.0337 U	0.44	0.00237
Delta-BHC	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0336 U	0.0337 U	0.09	NE
Alpha-Chlordane	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0732 U	0.0674 U	1.6	0.00324
Gamma-Chlordane	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0732 U	0.0674 U	1.6	0.00324
4,4'-DDD	0.00485 U	0.00363 J	0.00586 U	0.00529 U	0.0732 U	0.0674 U	2.4	0.00488
4,4'-DDE	0.00485 U	0.00247 J	0.00586 U	0.00237 J	0.0366 U	0.0337 U	1.7	0.00316
4,4'-DDT	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.11 U	0.101 U	1.7	0.00416
Dieldrin	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0366 U	0.0337 U	0.03	0.0019
Endosulfan I	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.07332 U	0.0674 U	370	NE
Endosulfan II	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0366 U	0.0337 U	370	NE
Endosulfan Sulfate	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0732 U	0.0674 U	370	NE
Endrin	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0366 U	0.0337 U	18	0.00222
Endrin Aldehyde	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0366 U	0.0337 U	18	NE
Endrin Ketone	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0732 U	0.0674 U	18	NE
Heptachlor	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0336 U	0.0337 U	0.11	NE
Heptachlor Epoxide	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.0366 U	0.0337 U	0.053	0.00247
Methoxychlor	0.00485 U	0.00462 U	0.00586 U	0.00529 U	0.146 U	0.0135 U	310	0.00141

Notes:

[a] Human health reference limits taken from EPA Region 9 preliminary remediation goals (PRG) for residential soil exposure (EPA 2004c)

[b] Ecological reference limits were provided by EPA GLNPO (MacDonald and others 2000).

H = Estimated value. Holding time exceeded.
J = Estimated value. Greater than detection limit, but less than reporting limit.
LC = Estimated value. Lab control recoveries exceed upper or lower control limits.
LS = Estimated value. Batch quality control for laboratory surrogate exceeds upper or lower control limits.
M = Estimated value. Associated matrix spike/matrix spike duplicate recoveries exceed the upper or lower control limits.
MS = Estimated value. Relative percent difference between matrix spike/matrix spike duplicate exceeded specified criteria.
NE = Not established
U = Analyte not detected at or above reporting limit

Bold values exceed human health reference limits
Italicized values exceed ecological reference limits
All values are expressed in milligrams per kilogram unless otherwise noted

TABLE B-3
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PCBs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S01-DC-01 4/02/07	S02-DC-02 4/02/07	S03-DC-03 4/02/07	S04-DC-04 4/02/07	S05-DC-05 4/03/07	S06-DC-06 4/03/07		
Aroclor 1016	0.145 U	0.306 U	0.156 U	0.317 U	0.312 U	0.266 U	3.90	NE
Aroclor 1221	0.0966 U	0.204 U	0.104 U	0.211 U	0.208 U	0.178 U	3.90	NE
Aroclor 1232	0.0966 U	0.204 U	0.104 U	0.211 U	0.208 U	0.178 U	3.90	NE
Aroclor 1242	0.0966 U	0.204 U	0.104 U	0.211 U	0.208 U	0.178 U	0.22	NE
Aroclor 1248	0.0966 U	0.204 U	0.104 U	0.211 U	0.208 U	0.178 U	0.22	NE
Aroclor 1254	0.193	0.141 J	0.104 U	0.186 J	0.15 J	0.11 J	0.22	NE
Aroclor 1260	**0.295**	0.137 J	0.125 U	0.253 U	0.25 U	0.213 U	0.22	NE
Total PCBs[c]	*0.488*	*0.278*	U	*0.186*	*0.15*	*0.11*	NE	0.0598

TABLE B-3
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PCBs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S07-DC-07 4/02/07	S08-DC-08 4/02/07	S09-DC-09 4/02/07	S10-DC-10 4/0307	S11-DC-11 4/03/07	S12-DC-12 4/03/07		
Aroclor 1016	0.362 U	0.476 U	0.3 U	0.24 U	0.363 U, H	0.673 U	3.90	NE
Aroclor 1221	0.242 U	0.317 U	0.2 U	0.16 U	0.242 U, H	0.449 U	3.90	NE
Aroclor 1232	0.242 U	0.317 U	0.2 U	0.16 U	0.242 U, H	0.449 U	3.90	NE
Aroclor 1242	0.242 U	0.317 U	0.2 U	0.16 U	0.242 U, H	0.449 U	0.22	NE
Aroclor 1248	0.242 U	0.317 U	0.2 U	0.16 U	0.242 U, H	0.449 U	0.22	NE
Aroclor 1254	0.164 J	0.317 U	0.2 U	0.16 U	0.242 U, H	0.449 U	0.22	NE
Aroclor 1260	0.29 U	0.381 U	0.24 U	0.192 U	0.291 U, H	0.538 U	0.22	NE
Total PCBs[c]	*0.164*	U	U	U	U	U	NE	0.0598

TABLE B-3
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PCBs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S13-DC-13 4/04/07	S14-DC-14 4/04/07	S15-DC-15 4/04/07	S16-DC-16 4/02/07	S17-DC-17 4/02/07	S18-DC-18 4/02/07		
Aroclor 1016	0.185 U	0.286 U	0.183 U	0.335 U	0.327 U	0.312 U	3.90	NE
Aroclor 1221	0.123 U	0.191 U	0.122 U	0.223 U	0.218 U	0.208 U	3.90	NE
Aroclor 1232	0.123 U	0.191 U	0.122 U	0.223 U	0.218 U	0.208 U	3.90	NE
Aroclor 1242	0.123 U	0.191 U	0.122 U	0.223 U	0.218 U	0.208 U	0.22	NE
Aroclor 1248	0.123 U	0.191 U	0.122 U	0.223 U	0.218 U	0.208 U	0.22	NE
Aroclor 1254	0.123 U	0.195	0.122 U	**0.259**	**0.231**	**0.235**	0.22	NE
Aroclor 1260	0.148 U	0.145 J	0.146 U	0.268 U	0.262 U	0.249 U	0.22	NE
Total PCBs[c]	U	*0.34*	U	*0.259*	*0.231*	*0.235*	NE	0.0598

TABLE B-3
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PCBs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S19-DC-19 4/04/07	S20-OC-01 4/02/07	S21-OC-02 4/02/07	S22-OC-03 4/02/07	S23-OC-04 4/02/07	S24-OC-05 4/02/07		
Aroclor 1016	0.162 U	0.162 U	0.223 U	0.287 U	0.239 U	0.254 U	3.90	NE
Aroclor 1221	0.108 U	0.108 U	0.149 U	0.192 U	0.16 U	0.17 U	3.90	NE
Aroclor 1232	0.108 U	0.108 U	0.149 U	0.192 U	0.16 U	0.17 U	3.90	NE
Aroclor 1242	0.108 U	0.108 U	0.149 U	0.192 U	0.16 U	0.17 U	0.22	NE
Aroclor 1248	0.108 U	0.108 U	0.149 U	0.192 U	0.16 U	0.17 U	0.22	NE
Aroclor 1254	0.108 U	0.172	**0.484**	**0.468**	**0.458**	**0.332**	0.22	NE
Aroclor 1260	0.129 U	0.13 U	0.178 U	0.23 U	0.192 U	0.204 U	0.22	NE
Total PCBs[c]	U	*0.172*	*0.484*	*0.468*	*0.458*	*0.332*	NE	0.0598

TABLE B-3
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PCBs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S25-OC-06 4/02/07	S26-OC-07 4/03/07	S27-OC-08 4/03/07	S28-OC-09 4/04/07	S29-OC-10 4/04/07	S30-OC-11 4/03/07		
Aroclor 1016	0.213 U	0.209 U	0.18 U	0.156 U	0.173 U	0.23 U	3.90	NE
Aroclor 1221	0.142 U	0.139 U	0.12 U	0.104 U	0.115 U	0.153 U	3.90	NE
Aroclor 1232	0.142 U	0.139 U	0.12 U	0.104 U	0.115 U	0.153 U	3.90	NE
Aroclor 1242	0.142 U	0.139 U	0.12 U	0.104 U	0.115 U	0.153 U	0.22	NE
Aroclor 1248	0.142 U	0.139 U	0.12 U	0.104 U	0.115 U	0.153 U	0.22	NE
Aroclor 1254	**0.403**	**0.242**	0.201	0.0813 J	0.116	**0.247**	0.22	NE
Aroclor 1260	0.17 U	0.167 U	0.144 U	0.125 U	0.138 U	0.184 U	0.22	NE
Total PCBs[c]	*0.403*	*0.242*	*0.201*	*0.0813*	*0.116*	*0.247*	NE	0.0598

TABLE B-3
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PCBs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S31-OC-12 4/03/07	S32-OC-13 4/03/07	S33-OC-14 4/03/07	S34-OC-15 4/03/07	S35-OC-16 4/03/07	S36-OC-17 4/03/07		
Aroclor 1016	0.18 U	0.146 U	0.163 U	0.185 U	0.161 U	0.151 U	3.90	NE
Aroclor 1221	0.12 U	0.0974 U	0.109 U	0.123 U	0.108 U	0.1 U	3.90	NE
Aroclor 1232	0.12 U	0.0974 U	0.109 U	0.123 U	0.108 U	0.1 U	3.90	NE
Aroclor 1242	0.12 U	0.0974 U	0.109 U	0.123 U	0.108 U	0.1 U	0.22	NE
Aroclor 1248	0.12 U	0.0974 U	0.109 U	0.123 U	0.108 U	0.1 U	0.22	NE
Aroclor 1254	0.184	0.188	0.151	0.123 U	**11.3**	**0.524**	0.22	NE
Aroclor 1260	0.144 U	0.117 U	0.13 U	0.148 U	0.129 U	0.121 U	0.22	NE
Total PCBs[c]	*0.184*	*0.188*	*0.151*	U	*11.3*	*0.524*	NE	0.0598

TABLE B-3
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PCBs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S37-OC-18 4/03/07	S38-OC-19 4/03/07	S39-OC-20 4/03/07	S40-OC-21 4/03/07	S41-OC-21A 4/04/07	S42-OC-22 4/03/07		
Aroclor 1016	0.159 U	0.128 U	0.134 U	0.215 U	0.162 U	0.146 U	3.90	NE
Aroclor 1221	0.106 U	0.0855 U	0.0895 U	0.144 U	0.108 U	0.0971 U	3.90	NE
Aroclor 1232	0.106 U	0.0855 U	0.0895 U	0.144 U	0.108 U	0.0971 U	3.90	NE
Aroclor 1242	0.106 U	0.0855 U	0.0895 U	0.144 U	0.108 U	0.0971 U	0.22	NE
Aroclor 1248	0.106 U	0.0855 U	0.0895 U	0.144 U	0.108 U	0.0971 U	0.22	NE
Aroclor 1254	0.179	0.145	**0.257**	0.197	0.166	0.161	0.22	NE
Aroclor 1260	0.127 U	0.103 U	0.107 U	0.172 U	0.129 U	0.116 U	0.22	NE
Total PCBs[c]	*0.179*	*0.145*	*0.257*	*0.197*	*0.166*	*0.161*	NE	0.0598

TABLE B-3
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PCBs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S43-OC-23 4/03/07	S44-OC-24 4/03/07	S45-OC-25 4/03/07	S46-OC-26 4/03/07	S47-ER-EK-01 4/04/07 (micrograms per liter)	S48-ER-SH-02 4/04/07 (micrograms per liter)		
Aroclor 1016	0.145 U	0.138 U	0.176 U	0.159 U	1.22 U	1.12 U	3.90	NE
Aroclor 1221	0.097 U	0.0923 U	0.117 U	0.106 U	1.22 U	1.12 U	3.90	NE
Aroclor 1232	0.097 U	0.0923 U	0.117 U	0.106 U	1.22 U	1.12 U	3.90	NE
Aroclor 1242	0.097 U	0.0923 U	0.117 U	0.106 U	1.22 U	1.12 U	0.22	NE
Aroclor 1248	0.097 U	0.0923 U	0.117 U	0.106 U	1.22 U	1.12 U	0.22	NE
Aroclor 1254	**2.42**	0.0618 J	0.117 U	0.162	1.22 U	1.12 U	0.22	NE
Aroclor 1260	0.116 U	0.111 U	0.141 U	0.127 U	1.22 U	1.12 U	0.22	NE
Total PCBs[c]	*2.42*	*0.0618*	U	*0.162*	U	U	NE	0.0598

Notes:

[a] Human health reference limits taken from EPA Region 9 preliminary remediation goals (PRG) for residential soil exposure

[b] Ecological reference limits were provided by EPA GLNPO

[c] Non-detect results were counted as 0 when calculating total PCBs.

H = Estimated value. Holding time exceeded.
J = Estimated value. Greater than detection limit, but less than reporting limit.
NE = Not established
U = Not detected

Bold values exceed human health reference limits.
Italicized values exceed ecological reference limit for total PCBs
All values are expressed in milligrams per kilogram unless otherwise noted.

TABLE B-4
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PAHs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S01-DC-01 4/02/07	S02-DC-02 4/02/07	S03-DC-03 4/02/07	S04-DC-04 4/02/07	S05-DC-05 4/03/07	S06-DC-06 4/03/07		
Acenaphthene	0.447 U	1.3 U	0.535 U	1.38 U	1.27 U	1.24 U	3,700	NE
Acenaphthylene	0.447 U	1.3 U	0.535 U	1.38 U	1.27 U	1.24 U	3,700	NE
Anthracene	*0.076 J*	1.3 U	*0.112 J*	1.38 U	1.27 U	*0.297 J*	22,000	0.0572
Benzo(a)anthracene	*0.218 J*	*0.517 J*	*0.427 J*	*0.292 J*	*0.31 J*	***1.3***	0.62	0.108
Benzo(a)pyrene	***0.183 J***	***0.449 J***	***0.305 J***	***0.201 J***	***0.201 J***	***1.05 J***	0.062	0.15
Benzo(b)fluoranthene	0.251 J	**0.658 J**	*0.567*	0.416 J	0.407 J	**1.58**	0.62	NE
Benzo(g,h,i)perylene	0.447 R, M, LC	1.3 R, M, LC	0.535 R, M, LC	1.38 R, M, LC	1.27 R, M, LC	1.24 R, M, LC	2,300	NE
Benzo(k)fluoranthene	0.0734 J	0.217 J	0.212 J	1.38 U	0.155 J	0.606 J	6.2	NE
Chrysene	*0.31 J*	*0.828 J*	*0.539*	*0.449 J*	*0.43 J*	*1.56*	62	0.166
Dibenz(a,h)anthracene	***0.0716 J***	***0.149 J***	***0.0707 J***	1.38 U	1.27 U	***0.163 J***	0.062	0.033
Fluoranthene	0.307 J	*0.974 J*	*1.08*	*0.923 J*	*0.771 J*	*2.53*	2,300	0.423
Fluorene	*0.0859 J*	1.3 U	0.0728 J	1.38 U	1.27 U	*0.178 J*	2,700	0.0774
Indeno(1,2,3-cd)pyrene	0.103 J	0.261 J	0.216 J	0.157 J	0.135 J	0.499 J	0.62	NE
Naphthalene	*0.384 J*	*0.694 J*	0.131 J	*0.51 J*	*0.692 J*	*0.655 J*	56	0.176
Phenanthrene	*0.322 J*	*0.833 J*	*0.574*	*0.496 J*	*0.514 J*	*1.38*	22,000	0.204
Pyrene	*0.414 J*	*1.08 J*	*0.86*	*0.761 J*	*0.593 J*	*2.24*	2,300	0.195
Total PAHs[c]	*2.80*	*6.66*	*5.17*	*4.21*	*4.21*	*14.0*	NE	1.61

TABLE B-4
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PAHs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S07-DC-07 4-02-07	S08-DC-08 4-02-07	S09-DC-09 4/02/07	S10-DC-10 4/03/07	S11-DC-11 4/03/07	S12-DC-12 4/03/07		
Acenaphthene	0.23 J	2.25 U	1 U	0.719 U	1.41 U	2.88 U	3,700	NE
Acenaphthylene	1.16 U	2.25 U	1 U	0.719 U	1.41 U	2.88 U	3,700	NE
Anthracene	*0.374 J*	2.25 U	*0.275 J*	*0.214 J*	1.41 U	2.88 U	22,000	0.0572
Benzo(a)anthracene	***1.19***	***0.739 J***	***0.918 J***	***0.635 J***	*0.459 J*	2.88 U	0.62	0.108
Benzo(a)pyrene	***1.05 J***	***0.649 J***	***0.898 J***	***0.586 J***	***0.428 J***	2.88 U	0.062	0.15
Benzo(b)fluoranthene	**1.81**	**1.32 J**	**1.48**	**1.1**	**0.853 J**	0.306 J	0.62	NE
Benzo(g,h,i)perylene	1.16 R, M, LC	2.25 R, M, LC	1 R, M, LC	0.719 R, M, LC	1.41 R, M, LC	2.88 R, M, LC, CV	2,300	NE
Benzo(k)fluoranthene	0.599 J	0.419 J	0.519 J	0.394 J	0.293 J	2.88 U	6.2	NE
Chrysene	*1.53*	*1.1 J*	*1.24*	*0.949*	*0.693 J*	2.88 U	62	0.166
Dibenz(a,h)anthracene	***0.169 J***	2.25 U	***0.136 J***	***0.0907 J***	1.41 U	2.88 U	0.062	0.033
Fluoranthene	*2.81*	*2.6*	*2.76*	*2.23*	*1.41*	*0.473 J*	2,300	0.423
Fluorene	*0.234 J*	2.25 U	*0.136 J*	*0.132 J*	*0.217 J*	2.88 U	2,700	0.0774
Indeno(1,2,3-cd)pyrene	**0.627 J**	0.478 J	0.547 J	0.396 J	0.27 J	2.88 U	0.62	NE
Naphthalene	*0.928 J*	2.25 U	1 U	0.719 U	1.41 U	2.88 U	56	0.176
Phenanthrene	*1.26*	*1.25 J*	*1.15*	*1.1*	*1.55*	2.88 U	22,000	0.204
Pyrene	*2.26*	*1.79 J*	*2*	*1.64*	*1.08 J*	*0.317 J*	2,300	0.195
Total PAHs[c]	*15.07*	*10.3*	*12*	*9.5*	*7.25*	1.096	NE	1.61

TABLE B-4
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PAHs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S13-DC-13 4/04/07	S14-DC-14 4/04/07	S15-DC-15 4/04/07	S16-DC-16 4/02/07	S17-DC-17 4/02/07	S18-DC-18 4/02/07		
Acenaphthene	0.394 J	5.85	0.515 U	1.25 U	1.25 U	1.27 U	3,700	NE
Acenaphthylene	0.859 U	0.816 J	0.515 U	1.25 U	1.25 U	1.27 U	3,700	NE
Anthracene	*1.54*	*32.4*	0.515 U	*0.341 J*	*0.171 J*	1.27 U	22,000	0.0572
Benzo(a)anthracene	***5.3***	***87.2***	0.0712 J	***1.69***	***0.934 J***	***0.894 J***	0.62	0.108
Benzo(a)pyrene	***5.4***	***82.5***	**0.0712 J**	***1.7***	***1.02 J***	***0.894 J***	0.062	0.15
Benzo(b)fluoranthene	**7.65**	**10.7**	0.105 J	**2.75**	**1.68**	**1.47**	0.62	NE
Benzo(g,h,i)perylene	0.859 R, M, LC, CV	2.53 R, M, LC, CV	0.515 R, M, LC, CV	1.25 R, M, LC, CV	1.25 R, M, LC, CV	1.27 R, M, LC, CV	2,300	NE
Benzo(k)fluoranthene	2.63	**38.6**	0.515 U	0.964 J	0.583 J	0.531 J	6.2	NE
Chrysene	*5.1*	***80.9***	0.0898 J	*1.71*	*1.03 J*	*0.901 J*	62	0.166
Dibenz(a,h)anthracene	***0.659 J***	***9.74***	0.515 U	***0.208 J***	1.25 U	1.27 U	0.062	0.033
Fluoranthene	*10.8*	*190*	0.182 J	*4.1*	*2.3*	*2.09*	2,300	0.423
Fluorene	*0.619 J*	*8.72*	0.515 U	1.25 U	1.25 U	1.27 U	2,700	0.0774
Indeno(1,2,3-cd)pyrene	**2.35**	**32.9**	0.515 U	**0.811 J**	0.492 J	0.406 J	0.62	NE
Naphthalene	*0.253 J*	*1.93 J*	0.515 U	1.25 U	1.25 U	1.27 U	56	0.176
Phenanthrene	*4.31*	*68.4*	0.063 J	*1.13 J*	*0.595 J*	*0.584 J*	22,000	0.204
Pyrene	*8.99*	*150*	0.141 J	*2.96*	*1.67*	*1.63*	2,300	0.195
Total PAHs[c]	*56.0*	*801*	0.723	*18.4*	*10.5*	*9.40*	NE	1.61

TABLE B-4
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PAHs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S19-DC-19 4/04/07	S20-OC-01 4/02/07	S21-OC-02 4/02/07	S22-OC-03 4/02/07	S23-OC-04 4/02/07	S24-OC-05 4/02/07		
Acenaphthene	0.578 U	0.646 U	0.744 U	1 U	0.725 U, H	0.785 U, H	3,700	NE
Acenaphthylene	0.578 U	0.646 U	0.744 U	1 U	0.725 U, H	0.785 U, H	3,700	NE
Anthracene	0.578 U	*0.142 J*	*0.336 J*	*0.227 J*	*0.277 J, H*	*0.329 J, H*	22,000	0.0572
Benzo(a)anthracene	*0.147 J*	***0.727***	***1.12***	***0.761 J***	***0.666 J, H***	***0.872 H***	0.62	0.108
Benzo(a)pyrene	**0.11 J**	***0.725***	***1.15***	***0.888 J***	***0.551 J, H***	***1.21 H***	0.062	0.15
Benzo(b)fluoranthene	0.186 J	**1.06**	**2.24**	**1.59**	**0.913 H**	**2.27 H**	0.62	NE
Benzo(g,h,i)perylene	0.578 R, M, LC, CV	0.646 R, M, LC, CV	0.744 R, LC, CV	1 R, M, LC, CV	0.373 R, H, LC	0.83 R, H, LC	2,300	NE
Benzo(k)fluoranthene	0.0717 J	0.202 J	0.472 J	0.442 J	0.297 J, H	0.745 J, H	6.2	NE
Chrysene	0.103 J	*1.92*	*2.5*	*1.77*	*1.31 H*	*1.76 H*	62	0.166
Dibenz(a,h)anthracene	0.578 U	***0.219 J***	***0.146 J***	***0.141 J***	***0.107 J, H***	***0.176 J, H***	0.062	0.033
Fluoranthene	0.25 J	*0.641 J*	*1.86*	*1.92*	*1.39 H*	*2.94 H*	2,300	0.423
Fluorene	0.578 U	*0.125 J*	*0.247 J*	*0.163 J*	*0.225 J, H*	*0.303 J, H*	2,700	0.0774
Indeno(1,2,3-cd)pyrene	0.578 U	0.233 J	0.293 J	0.311 J	0.29 J, H	**0.711 J, H**	0.62	NE
Naphthalene	0.578 U	0.173 J	*0.517 J*	*0.42 J*	*0.562 J, H*	*0.283 J, H*	56	0.176
Phenanthrene	0.0752 J	*0.862*	*1.45*	*1.13*	*1.13 H*	*1.13 H*	22,000	0.204
Pyrene	0.182 J	*1.14*	*2.7*	*2.02*	*1.99 H*	*2.57 H*	2,300	0.195
Total PAHs[c]	1.12	*8.17*	*15.0*	*11.78*	*9.71*	*15.30*	NE	1.61

TABLE B-4
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PAHs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S25-OC-06 4/02/07	S26-OC-07 4/03/07	S27-OC-08 4/03/07	S28-OC-09 4/04/07	S29-OC-10 4/04/07	S30-OC-11 4/03/07		
Acenaphthene	0.628 U, H	0.662 U, H	0.513 U, H	*1.33 H*	0.539 U, H	0.571 U, H	3,700	NE
Acenaphthylene	0.628 U, H	0.662 U, H	0.513 U, H	0.44 U, H	0.539 U, H	0.571 U, H	3,700	NE
Anthracene	*0.151 J, H*	*0.208 J, H*	*0.351 J, H*	*3.8 H*	*0.326 J, H*	*0.344 J, H*	22,000	0.0572
Benzo(a)anthracene	*0.305 J, H*	***0.783 H***	***0.719 H***	***10.9 H***	***1.08 H***	***1.77 H***	0.62	0.108
Benzo(a)pyrene	***0.294 J, H***	***0.865 H***	***0.759 H***	***7.86 H***	***1.29 H***	***2.39 H***	0.062	0.15
Benzo(b)fluoranthene	0.427 J, H	**1.47 H**	**1.09 H**	**14 H**	**2.25 H**	**4.31 H**	0.62	NE
Benzo(g,h,i)perylene	0.148 R, H, LC	0.474 R, H, LC	0.325 R, H, LC	1.92 R, H, LC	0.495 R, H, LC, CV	0.91 R, H, LC, CV	2,300	NE
Benzo(k)fluoranthene	0.151 J, H	0.46 J, H	0.397 J, H	3.63 H	0.8 H	1.38 H	6.2	NE
Chrysene	*0.586 J, H*	*1.24 H*	*1.12 H*	*12.4 H*	*1.84 H*	*3.11 H*	62	0.166
Dibenz(a,h)anthracene	0.628 U, H	***0.124 J, H***	***0.0945 J, H***	***0.951 H***	***0.13 J, H***	***0.238 J, H***	0.062	0.033
Fluoranthene	*0.743 H*	*1.82 H*	*1.55 H*	*18 H*	*3.19 H*	*5.87 H*	2,300	0.423
Fluorene	*0.123 J, H*	*0.142 J, H*	*0.148 J, H*	*1.5 H*	*0.0799 J, H*	*0.146 J, H*	2,700	0.0774
Indeno(1,2,3-cd)pyrene	0.111 J, H	0.396 J, H	0.299 J, H	**2.11 H**	0.509 H, CV	**0.914 J, H, CV**	0.62	NE
Naphthalene	0.162 J, H	0.662 U, H	*0.176 J, H*	*0.311 J, H*	0.539 U, H	0.751 U, H	56	0.176
Phenanthrene	*0.501 J, H*	*0.824 H*	*0.709 H*	*13.1 H*	*2.81 H*	*4.84 H*	22,000	0.204
Pyrene	*1.16 H*	*1.89 H*	*1.93 H*	*17.4 H*	*4.55 H*	*3.82 H*	2,300	0.195
Total PAHs[c]	*4.71*	*10.22*	*9.34*	*107*	*18.9*	*29.13*	NE	1.61

TABLE B-4
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PAHs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S31-OC-12 4/03/07	S32-OC-13 4/03/07	S33-OC-14 4/03/07	S34-OC-15 4/03/07	S35-OC-16 4/03/07	S36-OC-17 4/03/07		
Acenaphthene	0.726 U	0.532 U	0.586 U	0.121 J	0.748	1.15	3,700	NE
Acenaphthylene	0.726 U	0.532 U	0.11 J	0.527 U	0.5 U	0.235 J	3,700	NE
Anthracene	*0.295 J*	*0.291 J*	*0.29 J*	*0.316 J*	*1.34*	*2.6*	22,000	0.0572
Benzo(a)anthracene	***1.26***	***0.891***	***1.43***	***1.26***	***3.49***	***7.13***	0.62	0.108
Benzo(a)pyrene	***1.66***	***0.983***	***1.58***	***1.38***	***2.51***	***7.22***	0.062	0.15
Benzo(b)fluoranthene	**3.76**	**2.15**	**2.52**	**2.44**	**2.86**	**9.52**	0.62	NE
Benzo(g,h,i)perylene	0.726 R, M, LC, CV	0.532 R, M, LC, CV	0.586 R, M, LC, CV	0.527 R, LC	0.441 R, J, LC	2.22 R, LC	2,300	NE
Benzo(k)fluoranthene	1.26	0.695	0.969	0.789	0.788	3.09	6.2	NE
Chrysene	*2.22*	*1.57*	*2.26*	*1.83*	*4.37*	*8.81*	62	0.166
Dibenz(a,h)anthracene	0.726 U, CV	0.532 U, CV	***0.45 J, CV***	***0.191 J***	***0.0892 J***	***1.81***	0.062	0.033
Fluoranthene	*4.61*	*2.69*	*3.46*	*3.14*	*3.34*	*19.1*	2,300	0.423
Fluorene	*0.119 J*	0.532 U	*0.118 J*	*0.156 J*	*0.546*	*1.5*	2,700	0.0774
Indeno(1,2,3-cd)pyrene	0.469 J, CV	0.245 J, CV	**1.73 CV**	**0.787**	**1.28**	**5.58**	0.62	NE
Naphthalene	0.726 U	0.113 J	0.109 J	*0.495 J*	*0.313 J*	*1.45*	56	0.176
Phenanthrene	*1.53*	*0.668*	*1.41*	*1.69*	*1.85*	*13.6*	22,000	0.204
Pyrene	*3.09*	*2.33*	*3.87*	*2.59*	*13*	*17.8*	2,300	0.195
Total PAHs[c]	*20.27*	*12.63*	*20.31*	*17.19*	*37*	*100.6*	NE	1.61

TABLE B-4
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PAHs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S37-OC-18 4/03/07	S38-OC-19 4/03/07	S39-OC-20 4/03/07	S40-OC-21 4/03/07	S41-OC-21A 4/04/07	S42-OC-22 4/03/07		
Acenaphthene	0.643 J	0.18 J	0.723	0.846 U	0.692 U	1.63	3,700	NE
Acenaphthylene	1.08 U	0.416 U	0.203 J	0.846 U	0.692 U	1.25 U	3,700	NE
Anthracene	*2.05*	*0.297 J*	*1.81*	*0.232 J*	*0.123 J*	*4.84*	22,000	0.0572
Benzo(a)anthracene	***3.46***	***1.02***	***6.79***	***1.38***	*0.598 J*	***18.4***	0.62	0.108
Benzo(a)pyrene	***3.27***	***1.13***	***6.95***	***1.84***	***0.773***	***20***	0.062	0.15
Benzo(b)fluoranthene	**4.08**	**1.67**	**9.88**	**2.67**	**1.32**	**24.7**	0.62	NE
Benzo(g,h,i)perylene	0.879 R, J, LC	0.144 R, J, LC	1.04 R, LC	0.648 R, J, LC	0.114 R, J, LC	8.39 R, LC	2,300	NE
Benzo(k)fluoranthene	1.4	0.585	3.08	0.911	0.425 J	**7.88**	6.2	NE
Chrysene	*3.95*	*1.34*	*7.84*	*2.27*	*0.969*	*22.9*	62	0.166
Dibenz(a,h)anthracene	***0.855 J***	***0.174 J***	***1.01***	***0.581 J***	***0.136 J***	***4.53***	0.062	0.033
Fluoranthene	*8.79*	*2.92*	*19.5*	*3.58*	*1.9*	*51.8*	2,300	0.423
Fluorene	*0.859 J*	*0.231 J*	*0.982*	0.846 U	0.692 U	*2.39*	2,700	0.0774
Indeno(1,2,3-cd)pyrene	**2.5**	**0.679**	**3.74**	**1.81**	0.517 J	**17.7**	0.62	NE
Naphthalene	*0.459 J*	*0.824*	*0.288 J*	0.846 U	0.692 U	*0.265 J*	56	0.176
Phenanthrene	*6.93*	*1.67*	*12.4*	*1.34*	*0.645 J*	*26.3*	22,000	0.204
Pyrene	*8.59*	*2.25*	*17.3*	*3.54*	*1.54*	*44.8*	2,300	0.195
Total PAHs[c]	*47.8*	*14.97*	*92.5*	*20.15*	*8.9*	*248*	NE	1.61

TABLE B-4
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - PAHs
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]
	S43-OC-23 4/03/07	S44-OC-24 4/03/07	S45-OC-25 4/03/07	S46-OC-26 4/03/07	S47-ER-EK-01 4/04/07 (micrograms per liter)	S47-ER-SH-02 4/04/07 (micrograms per liter)		
Acenaphthene	0.655 U	0.509 U	0.641 U	0.599 U	5.26 U, H	5.15 U, H	3,700	NE
Acenaphthylene	0.655 U	0.509 U	0.641 U	0.599 U	5.26 U, H	5.15 U, H	3,700	NE
Anthracene	*0.168 J*	*0.109 J*	*0.162 J*	*0.368 J*	5.26 U, H	5.15 U, H	22,000	0.0572
Benzo(a)anthracene	*0.539 J*	*0.375 J*	***0.704***	***1.47***	5.26 U, H	5.15 U, H	0.62	0.108
Benzo(a)pyrene	***0.46 J***	***0.364 J***	***0.672***	***1.62***	5.26 U, H	5.15 U, H	0.062	0.15
Benzo(b)fluoranthene	0.56 J	0.521	**1.09**	**2.64**	5.26 U, H	5.15 U, H	0.62	NE
Benzo(g,h,i)perylene	0.08 R, J, LC	0.125 R, J, LC	0.214 R, J, LC	0.173 R, J, LC	5.26 U, H	5.15 U, H	2,300	NE
Benzo(k)fluoranthene	0.142 J	0.198 J	0.373 J	0.865	5.26 U, H	5.15 U, H	6.2	NE
Chrysene	*1.15*	*0.478 J*	*0.922*	*2.01*	5.26 U, H	5.15 U, H	62	0.166
Dibenz(a,h)anthracene	***0.147 J***	***0.158 J***	***0.254 J***	***0.217 J***	5.26 U, H	5.15 U, H	0.062	0.033
Fluoranthene	*0.982*	*0.869*	*1.52*	*4.97*	5.26 U, H	5.15 U, H	2,300	0.423
Fluorene	*0.113 J*	*0.15 J*	0.641 U	*0.145 J*	5.26 U, H	5.15 U, H	2,700	0.0774
Indeno(1,2,3-cd)pyrene	0.388 J	0.382 J	**0.643**	**0.853**	5.26 U, H	5.15 U, H	0.62	NE
Naphthalene	0.655 U	0.136 J	0.168 J	0.599 U	5.26 U, H	5.15 U, H	56	0.176
Phenanthrene	*0.761*	*0.585*	*0.571 J*	*2.11*	5.26 U, H	5.15 U, H	22,000	0.204
Pyrene	*1.35*	*0.874*	*1.47*	*3.66*	5.26 U, H	5.15 U, H	2,300	0.195
Total PAHs[c]	*6.76*	*5.20*	*8.55*	*20.93*			NE	1.61

Notes:

[a] Human health reference limits taken from EPA Region 9 preliminary remediation goals (PRG) for residential soil exposure

[b] Ecological reference limits were provided by EPA GLNPO

[c] Non-detect results were counted as 0 when calculating total PAHs.

CV = Estimated value. Calibration verification results exceed upper or lower control limits.
H = Estimated value. Holding time exceeded.
J = Estimated value. Greater than detection limit, but less than reporting limit.
LC = Estimated value. Laboratory control recoveries exceed upper or lower control limits.
M = Estimated value. Associated matrix spike/matrix spike duplicate recoveries exceed the upper or lower control limits.
NE = Not established
R = Rejected value
U = Analyte not detected at or above reporting limit.

Bold values exceed human health reference limits
Italicized values exceed ecological reference limits
All values expressed in milligrams per kilogram unless otherwise noted

TABLE B-5
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - RCRA METALS, TOC, AND OIL AND GREASE
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]	OEPA Sediment Reference Values[c]
	S01-DC-01 4/02/07	S02-DC-02 4/02/07	S03-DC-03 4/02/07	S04-DC-04 4/02/07	S05-DC-05 4/03/07	S06-DC-06 4/03/07			
Arsenic	***45.5***	***46.8***	**5.48**	***102***	***132***	***42.2***	0.39	9.79	11
Barium	94.9	439	133	526	469	343	5,400	NE	210
Cadmium	0.83	*5*	0.49	*4.58*	*4.49*	*2.35*	37	0.99	0.96
Chromium	26	*81.9*	15.9	*77.4*	*76.2*	*66*	100,000	43.4	51
Lead	*112*	*292*	*83.6*	***402***	*290*	*240*	400	35.8	47
Mercury	0.05 U,B	*0.19 J*	*0.37*	*0.23*	*0.19*	0.13	23	0.18	0.12
Selenium	2.21 U	5.56	2.45 U	9.6	9.97	6.07	390	NE	1.4
Silver	1.4 U	2.9 U	1.4 U	3.1 U	2.9 U	2.6 U	390	NE	0.43
Total Organic Carbon (%)	8.56 H, LD	11.1 H, LD	4.86 H, LD	7.15 H, LD	12.2 H, LD	6.24 H, LD	NE	NE	NE
Oil & Grease	1,100 J	2,130 J	2,390 J	6,360 U	3,400 J	2,740 J	NE	NE	NE
Percent Solids	76.9	34.2	69.4	32.3	34.1	37.9	NE	NE	NE

TABLE B-5
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - RCRA METALS, TOC, AND OIL AND GREASE
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]	OEPA Sediment Reference Values[c]
	S07-DC-07 4-02-07	S08-DC-08 4-02-07	S09-DC-09 4/02/07	S10-DC-10 4/03/07	S11-DC-11 4/03/07	S12-DC-12 4/03/07			
Arsenic	***72.2***	***65.1***	***41.3***	***29.5***	***140***	***82.3***	0.39	9.79	11
Barium	447	651	324	295	651	2,152	5,400	NE	210
Cadmium	*3.51*	*3.67*	*2.24*	*1.66*	*3.39*	*16.08*	37	0.99	0.96
Chromium	*72.2*	*74.4*	*44.2*	38.6	*65.1*	*190*	100,000	43.4	51
Lead	*309*	*363*	*186*	*173*	*277*	***1,076***	400	35.8	47
Mercury	*0.21 J*	*0.18 J*	*0.21 J*	0.12 J	0.13 J	*6.82*	23	0.18	0.12
Selenium	7.56	7.44 U	4.72 U	3.86 U	7.19	30.4	390	NE	1.4
Silver	*44.7*	4.6 U	2.9 U	2.3 U	3.4 U	*10.8*	390	NE	0.43
Total Organic Carbon (%)	15.8 H, LD	7.48 H, LD	28.7 H, LD	5.93 H, LD	7.33 H, LD	26.7 H, LD	NE	NE	NE
Oil & Grease	7,600 U	4,050 J	3,770 J	4,060 U	4,790 J	13,900 U	NE	NE	NE
Percent Solids	29.1	21.5	33.9	44.0	29.2	15.8	NE	NE	NE

TABLE B-5
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - RCRA METALS, TOC, AND OIL AND GREASE
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]	OEPA Sediment Reference Values[c]
	S13-DC-13 4/04/07	S14-DC-14 4/04/07	S15-DC-15 4/04/07	S16-DC-16 4/02/07	S17-DC-17 4/02/07	S18-DC-18 4/02/07			
Arsenic	***22.9***	***86***	***52.1***	***129***	***125***	***121***	0.39	9.79	11
Barium	159	315	68.4	514	492	455	5,400	NE	210
Cadmium	0.88	*1.23*	0.37	*3.12*	*3.34*	*3.42*	37	0.99	0.96
Chromium	33.5	31.5	21.2	*109*	*121*	*100*	100,000	43.4	51
Lead	*108*	*226*	*78.2*	*354*	*393*	*333*	400	35.8	47
Mercury	0.03 U, B	0.08 J	0.02 U, B	0.11 J	0.12 J	0.11 J	23	0.18	0.12
Selenium	2.82 U	15.5	3.26	18	18.7	16.7	390	NE	1.4
Silver	1.8 U	2.9 U	1.6 U	3.2 U	3.3 U	3 U	390	NE	0.43
Total Organic Carbon (%)	5.09 H, LD	10.5 H, LD	2.96 H, LD	3.33 H, LD	4 H, LD	2.56 H, LD	NE	NE	NE
Oil & Grease	1,340 J	12,600	3,040 U	6,840 U	6,370 U	5,610 U	NE	NE	NE
Percent Solids	56.7	34.9	61.4	31.1	30.5	33.0	NE	NE	NE

TABLE B-5
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - RCRA METALS, TOC, AND OIL AND GREASE
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]	OEPA Sediment Reference Values[c]
	S19-DC-19 4/04/07	S20-OC-01 4/02/07	S21-OC-02 4/02/07	S22-OC-03 4/02/07	S23-OC-04 4/02/07	S24-OC-05 4/02/07			
Arsenic	***54.1***	***12.9***	***32.5***	***43.1***	***29.4***	***35.7***	0.39	9.79	11
Barium	97.1	86.6	346	350	385	286	5,400	NE	210
Cadmium	0.4	0.9	*2.29*	*2.67*	*1.97*	*2.55*	37	0.99	0.96
Chromium	19.1	*56.2*	*177*	*224*	*385*	*162*	100,000	43.4	51
Lead	*68.5*	*89.7*	*260*	*350*	*294*	*333*	400	35.8	47
Mercury	0.04 U, B	0.1 J	*0.3*	*0.28*	*0.35*	*0.25*	23	0.18	0.12
Selenium	4.46	2.43 U	3.46 U	4.31 U	7.24 U	3.81 U	390	NE	1.4
Silver	1.6 U	1.5 U	2.2 U	2.7 U	2.3 U	2.4 U	390	NE	0.43
Total Organic Carbon (%)	2.72 H, LD	1.47 H, LD	7.44 H, LD	5.03 H, LD	4.81 H, LD	6.39 H, LD	NE	NE	NE
Oil & Grease	3,200 U	2,730 U	7,840	6,290	13,100	4,220 J	NE	NE	NE
Percent Solids	62.8	65.8	46.2	37.1	44.2	42.0	NE	NE	NE

TABLE B-5
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - RCRA METALS, TOC, AND OIL AND GREASE
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]	OEPA Sediment Reference Values[c]
	S25-OC-06 4/02/07	S26-OC-07 4/03/07	S27-OC-08 4/03/07	S28-OC-09 4/04/07	S29-OC-10 4/04/07	S30-OC-11 4/03/07			
Arsenic	***26.5***	***38.1***	***27.3***	***22.5***	***39.5***	***52.5***	0.39	9.79	11
Barium	265	220	150	127	189	284	5,400	NE	210
Cadmium	*1.37*	*1.82*	0.87	0.9	*1.51*	*2.6*	37	0.99	0.96
Chromium	*186*	*220*	*121*	*89.8*	*127*	*160*	100,000	43.4	51
Lead	*204*	*321*	*187*	*165*	*206*	*306*	400	35.8	47
Mercury	*0.26*	*0.35*	*0.22*	*0.28*	*0.2*	*0.28*	23	0.18	0.12
Selenium	6.73 U	6.41 U	5.62 U	2.4 U	2.74 U	3.72 U	390	NE	1.4
Silver	2 U	2 U	1.7 U	1.5 U	1.7 U	2.2 U	390	NE	0.43
Total Organic Carbon (%)	4.56 H, LD	7.16 H, LD	2.94 H, LD	2.48 H, LD	10.1 H, LD	5.45 H, LD	NE	NE	NE
Oil & Grease	5,110	3,050 J	2,000 J	3,120 U	1,390 J	2,040 J	NE	NE	NE
Percent Solids	49.0	49.9	58.7	66.8	58.3	45.7	NE	NE	NE

TABLE B-5
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - RCRA METALS, TOC, AND OIL AND GREASE
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]	OEPA Sediment Reference Values[c]
	S31-OC-12 4/03/07	S32-OC-13 4/03/07	S33-OC-14 4/03/07	S34-OC-15 4/03/07	S35-OC-16 4/03/07	S36-OC-17 4/03/07			
Arsenic	***54.1***	***42.1***	***55***	***83.5***	***46.3***	***58.5***	0.39	9.79	11
Barium	192	129	336	301	255	190	5,400	NE	210
Cadmium	*1.69*	*1.3*	*1.77*	*1.65*	*1.12*	*1.68*	37	0.99	0.96
Chromium	*279*	*323*	*153*	*184*	*399*	*237*	100,000	43.4	51
Lead	*262*	*196*	*397*	*267*	*191*	*237*	400	35.8	47
Mercury	*0.2*	0.15	0.11 J	0.14	*0.77*	0.17	23	0.18	0.12
Selenium	3.14	3.65	2.44 U	2.67	5.1 U	3.01	390	NE	1.4
Silver	1.7 U	1.4 U	1.5 U	1.7 U	1.6 U	1.6 U	390	NE	0.43
Total Organic Carbon (%)	5.46 H, LD	3.42 H, LD	2.48 H, LD	4.62 H, LD	4.12 H, LD	4.96 H, LD	NE	NE	NE
Oil & Grease	1,940 J	7,460	3,350	12,500	13,000	3,910	NE	NE	NE
Percent Solids	57.3	71.3	65.5	59.9	62.7	63.2	NE	NE	NE

TABLE B-5
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - RCRA METALS, TOC, AND OIL AND GREASE
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]	OEPA Sediment Reference Values[c]
	S37-OC-18 4/03/07	S38-OC-19 4/03/07	S39-OC-20 4/03/07	S40-OC-21 4/03/07	S41-OC-21A 4/04/07	S42-OC-22 4/03/07			
Arsenic	***35.8***	***34.8***	***47.3***	***65.7***	***56.6***	***17.4***	0.39	9.79	11
Barium	156	94.2	143	318	137	155	5,400	NE	210
Cadmium	*1.06*	0.53	*1.23*	*1.48*	*1.09*	*2.39*	37	0.99	0.96
Chromium	*218*	*76.1*	*103*	*106*	*56.6*	*98.1*	100,000	43.4	51
Lead	*202*	*69.7*	*207*	*206*	*102*	*348*	400	35.8	47
Mercury	*0.25*	0.06 U, B	0.11	0.12 J	0.15	0.08 U, B	23	0.18	0.12
Selenium	2.65 U	2.06 U	2.36 U	3.39 U	2.92 U	5.22 U	390	NE	1.4
Silver	1.6 U	1.3 U	1.5 U	2.1 U	1.8 U	1.6 U	390	NE	0.43
Total Organic Carbon (%)	4.38 H, LD	1.39 H, LD	2.63 H, LD	5.51 H, LD	3.4 H, LD	5.51 H, LD	NE	NE	NE
Oil & Grease	2,470 J	1,550 J	2,740 J	1,720 J	1,750 J	9,120	NE	NE	NE
Percent Solids	64.2	77.5	67.7	47.2	54.8	63.2	NE	NE	NE

TABLE B-5
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - RCRA METALS, TOC, AND OIL AND GREASE
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected						Human Health Reference Limit for Soil[a]	Ecological Reference Limit for Sediment[b]	OEPA Sediment Reference Values[c]
	S43-OC-23 4/03/07	S44-OC-24 4/03/07	S45-OC-25 4/03/07	S46-OC-26 4/03/07	S47-ER-EK-01 4/04/07 (milligrams per liter)	S47-ER-SH-02 4/04/07 (milligrams per liter)			
Arsenic	***51***	**6.67**	***25.8***	***23.8***	0.02 U	0.02 U	0.39	9.79	11
Barium	117	62.4	207	221	0.003 U	0.003 U	5,400	NE	210
Cadmium	0.8	0.51	*1.46*	*1.48*	0.002 U	0.002 U	37	0.99	0.96
Chromium	42.5	28.4	34.4	*44.1*	0.005 U	0.005 U	100,000	43.4	51
Lead	*78.2*	*66.7*	*105*	*144*	0.015 U	0.015 U	400	35.8	47
Mercury	0.12 J	*0.21*	0.08 J	0.07 U,B	5E-04 U	0.0005 U	23	0.18	0.12
Selenium	2.72 U	2.27 U	2.75 U	2.72 U	0.03 U	0.03 U	390	NE	1.4
Silver	1.7 U	1.4 U	1.7 U	1.7 U	0.005 U	0.005 U	390	NE	0.43
Total Organic Carbon (%)	3.07 H, LD	1.85 H, LD	13.2 H, LD	2.61 H, LD	1.9 J	1.4 J	NE	NE	NE
Oil & Grease	4,160	2,900	1,560 J	2,530 J		1.8 U	NE	NE	NE
Percent Solids	58.8	70.5	58.1	58.9	NA	NA	NE	NE	NE

Notes:

[a] Human health reference limits taken from EPA Region 9 preliminary remediation goals (PRG) for residential soil exposure (EPA 2004c).

[b] Ecological reference limits were provided by EPA GLNPO (MacDonald and others 2000).

[c] Statewide or available local ecoregion sediment reference values taken from OEPA Guidance for Conducting Ecological Risk Assessments (OEPA 2003a).

% = Percent
B = Analyte detected in laboratory method blank.
H = Estimated value. Holding time exceeded.
J = Estimated value. Greater than detection limit, but less than reporting limit.
LD = Estimated value. Batch quality control for lab duplicate exceeds upper or lower control limits.
NE = Not established
OEPA = Ohio Environmental Protection Agency
R = Value is rejected
U = Analyte not detected at or above reporting limit.

Bold values exceed ecological and human health reference limits
Italicized values exceed ecological reference limits
All values expressed in milligrams per kilogram unless otherwise noted

TABLE B-6
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - FULL-SCAN PAHs[a]
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected							
	Full Scan	Regularly Reported	Full Scan	Regularly Reported	Full Scan	Regularly Reported	Full Scan	Regularly Reported
	S01-DC-01 4/02/07	S01-DC-01[a] 4/02/07	S03-DC-03 4/02/07	S03-DC-03[a] 4/02/07	S05-DC-05 4/03/07	S05-DC-05[a] 4/03/07	S08-DC-08 4-02-07	S08-DC-08[a] 4-02-07
Acenaphthene	0.041 IS	0.447 U	0.028 J, IS	0.535 U	0.42 IS	1.27 U	0.099 J, IS	2.25 U
Acenaphthylene	0.015 J, IS	0.447 U	0.011 J, IS	0.535 U	0.026 J, IS	1.27 U	0.022 J, IS	2.25 U
Anthracene	0.1 IS	0.076 J	0.15 IS	0.112 J	0.15 IS	1.27 U	0.32 IS	2.25 U
Benzo(a)anthracene	0.45 IS	0.218 J	0.68 IS	0.427 J	0.63 IS	0.31 J	1.3 IS	0.739 J
Benzo(a)pyrene	0.55 IS	0.183 J	0.69 IS	0.305 J	0.61 IS	0.201 J	1.3 IS	0.649 J
Benzo(b)flouranthene	0.57 IS	0.251 J	0.77 IS	0.567	0.81 IS	0.407 J	2.1 IS	1.32 J
Benzo(e)pyrene	0.52 IS	NA	0.47 IS	NA	0.52 IS	NA	1.1 IS	NA
Benzo(g,h,i)perylene	0.54 IS	0.447 R, M, LC	0.55 IS	0.535 R, M, LC	0.49 IS	1.27 R, M, LC	1.2 IS	2.25 R, M, LC
Benzo(k)flouranthene	0.24 IS	0.0734 J	0.64 IS	0.212 J	0.66 IS	0.155 J	1.4 IS	0.419 J
C1-Chrysene	1.2 IS	NA	0.45 IS	NA	0.94 IS	NA	1 IS	NA
C1-Fluorenes	0.15 IS	NA	0.038 J, IS	NA	0.66 IS	NA	0.05 J, IS	NA
C1-Fluoranthenes/pyrene	0.8 IS	NA	0.59 IS	NA	0.61 IS	NA	1 IS	NA
C1-Naphthalenes	0.55 IS	NA	0.09 IS	NA	0.3 IS	NA	0.079 J, IS	NA
C1-Phenanthrenes/anthracenes	0.9 IS	NA	0.39 IS	NA	0.52 IS	NA	0.66 IS	NA
C2-Chrysene	1 IS	NA	0.28 IS	NA	0.74 IS	NA	0.34 IS	NA
C2-Fluorenes	0.28 IS	NA	0.064 IS	NA	0.14 IS	NA	0.052 J, IS	NA
C2-Naphthalenes	1.9 IS	NA	0.35 IS	NA	0.89 IS	NA	0.25 IS	NA
C2-Phenanthrenes/anthracenes	0.79 IS	NA	0.25 IS	NA	0.46 IS	NA	0.29 IS	NA
C3-Chrysene	0.42 IS	NA	0.12 IS	NA	0.51 IS	NA	0.11 J, IS	NA
C3-Fluorenes	0.53 IS	NA	0.12 IS	NA	0.35 IS	NA	0.088 J, IS	NA
C3-Naphthalenes	1.6 IS	NA	0.37 IS	NA	0.74 IS	NA	0.16 IS	NA
C3-Phenanthrenes/anthracenes	0.6 IS	NA	0.18 IS	NA	0.47 IS	NA	0.15 IS	NA
C4-Chrysene	0.17 IS	NA	0.055 IS	NA	0.35 IS	NA	0.048 J, IS	NA
C4-Naphthalenes	1.3 IS	NA	0.25 IS	NA	0.62 IS	NA	0.12 IS	NA
C4-Phenanthrenes/anthracenes	0.24 IS	NA	0.064 IS	NA	0.35 IS	NA	0.049 J, IS	NA
Chrysene	0.67 IS	0.31 J	0.84 IS	0.539	0.83 IS	0.43 J	1.9 IS	1.1 J
Dibenz(a,h)anthracene	0.19 IS	0.0716 J	0.15 IS	0.0707 J	0.15 IS	1.27 U	0.31 IS	2.25 U
Fluoranthene	0.63 IS	0.307 J	2 IS	1.08	1.2 IS	0.771 J	4.4 IS	2.6
Fluorene	0.081 IS	0.0859 J	0.063 IS	0.0728 J	0.71 IS	1.27 U	0.19 IS	2.25 U
Indeno(1,2,3-cd)pyrene	0.28 IS	0.103 J	0.48 IS	0.216 J	0.46 IS	0.135 J	1.1 IS	0.478 J
Naphthalene	0.22 IS	0.384 J	0.067 IS	0.131 J	0.27 IS	0.692 J	0.066 J, IS	2.25 U
Perylene	0.12 IS	NA	0.17 IS	NA	0.17 IS	NA	0.33	NA
Phenanthrene	0.43 IS	0.322 J	0.73 IS	0.574	0.48 IS	0.514 J	1.4	1.25 J
Pyrene	0.82 IS	0.414 J	1.5 IS	0.86	1.1 IS	0.593 J	3.2 IS	1.79 J
TOTAL PAHs[b]	18.9	2.80	14	5.17	18.3	4.21	26	10.3

TABLE B-6
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - FULL-SCAN PAHs[a]
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected							
	Full Scan	Regularly Reported	Full Scan	Regularly Reported	Full Scan	Regularly Reported	Full Scan	Regularly Reported
	S10-DC-10 4/03/07	S10-DC-10[a] 4/03/07	S13-DC-13 4/04/07	S13-DC-13[a] 4/04/07	S14-DC-14 4/04/07	S14-DC-14[a] 4/04/07	S20-OC-01 4/02/07	S20-OC-01[a] 4/02/07
Acenaphthene	0.12 U	0.719 U	0.19 U	0.394 J	10	5.85	0.079 U	0.646 U
Acenaphthylene	0.12 U	0.719 U	0.19 U	0.859 U	9.5 U	0.816 J	0.079 U	0.646 U
Anthracene	0.24	0.214 J	0.59	1.54	57	32.4	0.11	0.142 J
Benzo(a)anthracene	1.1	0.635 J	2.1	5.3	180	87.2	1.3	0.727
Benzo(a)pyrene	1.2	0.586 J	2.1	5.4	140	82.5	1.4	0.725
Benzo(b)flouranthene	1.9	1.1	2.4	7.65	150	10.7	1.8	1.06
Benzo(e)pyrene	0.95	NA	1.2	NA	77	NA	2.1	NA
Benzo(g,h,i)perylene	1	0.719 R, M, LC	1.4	0.859 R, M, LC, CV	76	2.53 R, M, LC, CV	1.4	0.646 R, M, LC, CV
Benzo(k)flouranthene	1.3	0.394 J	2	2.63	130	38.6	0.46	0.202 J
C1-Chrysene	0.76	NA	1	NA	61	NA	4	NA
C1-Fluorenes	0.12 U	NA	0.19 U	NA	9.5 U	NA	0.36	NA
C1-Fluoranthenes/pyrene	0.91	NA	1.4	NA	100	NA	2.9	NA
C1-Naphthalenes	0.12 U	NA	0.19 U	NA	9.5 U	NA	0.2	NA
C1-Phenanthrenes/anthracenes	0.39	NA	0.88	NA	61	NA	2	NA
C2-Chrysene	0.29	NA	0.31	NA	17	NA	3.2	NA
C2-Fluorenes	0.12 U	NA	0.19	NA	9.5 U	NA	0.77	NA
C2-Naphthalenes	0.13	NA	1.3	NA	16	NA	1.7	NA
C2-Phenanthrenes/anthracenes	0.21	NA	0.39	NA	19	NA	2.2	NA
C3-Chrysene	0.12 U	NA	0.19 U	NA	9.5 U	NA	1.4	NA
C3-Fluorenes	0.12 U	NA	0.19	NA	9.5 U	NA	1.6	NA
C3-Naphthalenes	0.12 U	NA	1.5	NA	16	NA	3.6	NA
C3-Phenanthrenes/anthracenes	0.12 U	NA	0.19 U	NA	9.5 U	NA	2	NA
C4-Chrysene	0.12 U	NA	0.19 U	NA	9.5 U	NA	7	NA
C4-Naphthalenes	0.12 U	NA	1.1	NA	12	NA	3.1	NA
C4-Phenanthrenes/anthracenes	0.12 U	NA	0.19 U	NA	9.5 U	NA	1.1	NA
Chrysene	1.5	0.949	2.2	5.1	160	80.9	3	1.92
Dibenz(a,h)anthracene	0.28	0.0907 J	0.31	0.659 J	18	9.74	0.72	0.219 J
Fluoranthene	3.4	2.23	5.3	10.8	440	190	1	0.641 J
Fluorene	0.12 U	0.132 J	0.2	0.619 J	15	8.72	0.13	0.125 J
Indeno(1,2,3-cd)pyrene	1	0.396 J	1.3	2.35	78	32.9	0.76	0.233 J
Naphthalene	0.12 U	0.719 U	0.19 U	0.253 J	9.5 U	1.93 J	0.079 U	0.173 J
Perylene	0.32	NA	0.57	NA	35	NA	0.25	NA
Phenanthrene	0.99	1.1	1.5	4.31	140	68.4	0.71	0.862
Pyrene	2.5	1.64	4	8.99	330	150	2	1.14
TOTAL PAHs[b]	20	9.5	35	56.0	2338	801	54	8.17

TABLE B-6
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - FULL-SCAN PAHs[a]
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected							
	Full Scan	Regularly Reported	Full Scan	Regularly Reported	Full Scan	Regularly Reported	Full Scan	Regularly Reported
	S22-OC-03 4/02/07	S22-OC-03[a] 4/02/07	S24-OC-05 4/02/07	S24-OC-05[a] 4/02/07	S26-OC-07 4/03/07	S26-OC-07[a] 4/03/07	S30-OC-11 4/03/07	S30-OC-11[a] 4/03/07
Acenaphthene	0.079 J	1 U	0.12 U	0.785 U, H	0.14	0.662 U, H	0.19 U	0.571 U, H
Acenaphthylene	0.03 J	1 U	0.12 U	0.785 U, H	0.12 U	0.662 U, H	0.19 U	0.571 U, H
Anthracene	0.23	0.227 J	0.14	0.329 J, H	0.24	0.208 J, H	0.33	0.344 J, H
Benzo(a)anthracene	2.6	0.761 J	1.2	0.872 H	1.8	0.783 H	2	1.77 H
Benzo(a)pyrene	3.2	0.888 J	1.7	1.21 H	1.9	0.865 H	2.6	2.39 H
Benzo(b)flouranthene	3.7	1.59	2.6	2.27 H	1.9	1.47 H	3.8	4.31 H
Benzo(e)pyrene	3.7	NA	1.6	NA	2	NA	2.1	NA
Benzo(g,h,i)perylene	3	1 R, M, LC, CV	1.8	0.83 R, H, LC	1.5	0.474 R, H, LC	2.4	0.91 R, H, LC, CV
Benzo(k)flouranthene	3	0.442 J	2.1	0.745 J, H	1.8	0.46 J, H	2.7	1.38 H
C1-Chrysene	7.8	NA	1.8	NA	6.6	NA	2	NA
C1-Florenes	0.35	NA	0.45	NA	0.45	NA	0.27	NA
C1-Flouran/Pyrenes	7.7	NA	2.2	NA	7.1	NA	3	NA
C1-Naphthalenes	0.39	NA	0.21	NA	0.17	NA	0.19 U	NA
C1-Phenan/Anthracenes	3.1	NA	1.7	NA	3	NA	1.3	NA
C2-Chrysene	9.8	NA	1.8	NA	8.3	NA	1.6	NA
C2-Florenes	1.3	NA	1.4	NA	1.7	NA	0.6	NA
C2-Naphthalenes	1.7	NA	1.7	NA	1.7	NA	0.53	NA
C2-Phenan/Anthracenes	5.8	NA	2.7	NA	7.2	NA	2.5	NA
C3-Chrysene	5.5	NA	1.2	NA	5.2	NA	0.88	NA
C3-Florenes	3.9	NA	2.8	NA	5.1	NA	1.6	NA
C3-Naphthalenes	2.4	NA	3.4	NA	4.3	NA	1.5	NA
C3-Phenan/Anthracenes	8.5	NA	2.9	NA	9.3	NA	3.3	NA
C4-Chrysene	2.1	NA	0.43	NA	2.8	NA	0.46	NA
C4-Naphthalenes	3	NA	4.1	NA	5	NA	1.7	NA
C4-Phenan/Anthracenes	5.6	NA	1.6	NA	5.5	NA	1.9	NA
Chrysene	5.1	1.77	2.1	1.76 H	2.9	1.24 H	3.3	3.11 H
Dibenz(a,h)anthracene	0.72	0.141 J	0.27	0.176 J, H	0.43	0.124 J, H	0.58	0.238 J, H
Flouranthene	4.2	1.92	3.5	2.94 H	3	1.82 H	6.4	5.87 H
Fluorene	0.15	0.163 J	0.2	0.303 J, H	0.2	0.142 J, H	0.19 U	0.146 J, H
Indeno(1,2,3-cd)pyrene	2.3	0.311 J	1.6	0.711 J, H	1.3	0.396 J, H	2.3	0.914 J, H, CV
Naphthalene	0.19	0.42 J	0.12 U	0.283 J, H	0.12 U	0.662 U, H	0.19 U	0.751 U, H
Perylene	0.92	NA	0.42	NA	0.64	NA	0.6	NA
Phenanthrene	1.2	1.13	0.84	1.13 H	0.98	0.824 H	1.7	4.84 H
Pyrene	4.9	2.02	3.3	2.57 H	4	1.89 H	5.3	3.82 H
TOTAL PAHs[b]	108	11.78	53.8	15.30	98	10.22	59	29.13

TABLE B-6
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - FULL-SCAN PAHs[a]
DUCK AND OTTER CREEKS
TOLEDO, OHIO

Parameter	Sample Number and Date Collected							
	Full Scan	Regularly Reported	Full Scan	Regularly Reported	Full Scan	Regularly Reported	Full Scan	Regularly Reported
	S33-OC-14 4/03/07	S33-OC-14[a] 4/03/07	S38-OC-19 4/03/07	S38-OC-19[a] 4/03/07	S42-OC-22 4/03/07	S42-OC-22[a] 4/03/07	S46-OC-26 4/03/07	S46-OC-26[a] 4/03/07
Acenaphthene	0.12 U	0.586 U	0.22	0.18 J	1.5 U	1.63	0.18 U	0.599 U
Acenaphthylene	0.12 U	0.11 J	0.12 U	0.416 U	1.5 U	1.25 U	0.18 U	0.599 U
Anthracene	0.27	0.29 J	0.76	0.297 J	3.8	4.84	0.36	0.368 J
Benzo(a)anthracene	1.6	1.43	2.1	1.02	17	18.4	1.7	1.47
Benzo(a)pyrene	1.8	1.58	2	1.13	19	20	1.7	1.62
Benzo(b)flouranthene	2.7	2.52	2.4	1.67	26	24.7	2.5	2.64
Benzo(e)pyrene	1.5	NA	1.3	NA	13	NA	1.2	NA
Benzo(g,h,i)perylene	1.6	0.586 R, M, LC, CV	1.4	0.144 R, J, LC	15	8.39 R, LC	1.4	0.173 R, J, LC
Benzo(k)flouranthene	2	0.969	1.8	0.585	18	7.88	1.8	0.865
C1-Chrysene	1.3	NA	0.98	NA	7.2	NA	0.75	NA
C1-Florenes	0.12	NA	0.12 U	NA	1.5 U	NA	0.18 U	NA
C1-Flouran/Pyrenes	1.7	NA	1.6	NA	9.9	NA	1	NA
C1-Naphthalenes	0.12 U	NA	0.12 U	NA	1.5 U	NA	0.18 U	NA
C1-Phenan/Anthracenes	0.7	NA	0.85	NA	4.6	NA	0.52	NA
C2-Chrysene	0.82	NA	0.45	NA	2.7	NA	0.29	NA
C2-Florenes	0.29	NA	0.15	NA	1.5 U	NA	0.18 U	NA
C2-Naphthalenes	0.34	NA	0.36	NA	1.5 U	NA	0.18 U	NA
C2-Phenan/Anthracenes	0.74	NA	0.48	NA	1.6	NA	0.2	NA
C3-Chrysene	0.4	NA	0.18	NA	1.5 U	NA	0.18 U	NA
C3-Florenes	0.75	NA	0.38	NA	1.5 U	NA	0.18 U	NA
C3-Naphthalenes	0.59	NA	0.29	NA	1.5 U	NA	0.18 U	NA
C3-Phenan/Anthracenes	1.1	NA	0.54	NA	1.5 U	NA	0.18 U	NA
C4-Chrysene	0.18	NA	0.12 U	NA	1.5 U	NA	0.18 U	NA
C4-Naphthalenes	0.72	NA	0.39	NA	1.5 U	NA	0.18 U	NA
C4-Phenan/Anthracenes	0.62	NA	0.3	NA	1.5 U	NA	0.18 U	NA
Chrysene	2.4	2.26	2.3	1.34	19	22.9	2.1	2.01
Dibenz(a,h)anthracene	0.26	0.45 J, CV	0.34	0.174 J	2.9	4.53	0.32	0.217 J
Flouranthene	4.8	3.46	6	2.92	48	51.8	5.3	4.97
Fluorene	0.12	0.118 J	0.37	0.231 J	1.7	2.39	0.18 U	0.145 J
Indeno(1,2,3-cd)pyrene	1.6	1.73 CV	1.4	0.679	15	17.7	1.4	0.853
Naphthalene	0.12 U	0.109 J	0.12 U	0.824	1.5 U	0.265 J	0.18 U	0.599 U
Perylene	0.47	NA	0.49	NA	4.5	NA	0.42	NA
Phenanthrene	1.4	1.41	3.2	1.67	19	26.3	1.9	2.11
Pyrene	3.7	3.87	4.4	2.25	36	44.8	3.7	3.66
TOTAL PAHs[b]	37	20.31	37	14.97	284	248	29	20.93

Notes:

a EPA Central Regional Laboratory analytical results for 16 regularly reported PAHs (not full-scan) are also presented for comparison purposes. These results are also presented for all sampling locations in Table B-4.

b Non-detect results were counted as 0 when calculating total PAHs.

CV = Estimated value. Calibration verification results exceed upper or lower control limits.
H = Estimated value. Holding time exceeded.
IS = Estimated value. Internal standard recoveries exceed the upper or lower control limits.
J = Estimated value. Greater than detection limit, but less than reporting limit.
LC = Estimated value. Laboratory control recoveries exceed upper or lower control limits.
M = Estimated value. Associated matrix spike/matrix spike duplicate recoveries exceed the upper or lower control limits.
NA = Not analyzed
R = Rejected value
U = Analyte not detected at or above reporting limit.

All values expressed in milligrams per kilogram unless otherwise noted

TABLE B-7
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - AVS/SEM
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Parameter	Sample Number and Date Collected					
	DC-SED-01 4/05/07	DC-SED-03 4/05/07	DC-SED-05 4/05/07	DC-SED-08 4/05/07	DC-SED-10 4/05/07	DC-SED-13 4/05/07
Cadmium	0.0058 B	0.0085 B	0.011	0.0088	0.0049	0.0077
Copper	0.094 B	0.05 B	0.035	0.087	0.074	0.099
Lead	0.08	0.097	0.21	0.14	0.082	0.83
Nickel	0.1 B	0.065 B	0.24 B	0.18 B	0.09 B	0.14 B
Silver	0.012 M, MS	0.011 M, MS	0.023 M, MS	0.039 M, MS	0.019 M, MS	0.014 M, MS
Zinc	1 SD	0.79 SD	2.9 SD	1.7 SD	0.77 SD	0.83 SD
Mercury	0.00018 M	0.00016 M	0.00035 M	0.0006 M	0.00028 M	0.00021 M
Total SEM	1.29198	1.02166	3.41935	2.1554	1.04018	1.92091
Acid Volatile Sulfide	8.7 M	10.3 M	59.3 M	76.4 M	11.3 M	20.3 M
Ratio of SEM*/AVS	0.15	0.097	0.057	0.027	0.088	0.094
Acid Volatile Sulfide (mg/kg)	279	329	1900	2450	361	652

TABLE B-7
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - AVS/SEM
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Parameter	Sample Number and Date Collected					
	DC-SED-14 4/05/07	OC-SED-01 4/05/07	OC-SED-03 4/05/07	OC-SED-05 4/05/07	OC-SED-07 4/05/07	OC-SED-11 4/05/07
Cadmium	0.0038	0.0028 B	0.0071 B	0.0072	0.006	0.0073
Copper	0.025 U	0.23	0.67	0.62	0.33	0.052
Lead	0.14	0.09	0.31	0.31	0.32	0.33
Nickel	0.055 B	0.087 B	0.22 B	0.22 B	0.21 B	0.25 B
Silver	0.019 M, MS	0.013 M, MS	0.02 M, MS	0.019 M, MS	0.019 M, MS	0.019 M, MS
Zinc	0.99 SD	0.76 SD	2.6 SD	2.7 SD	1 SD	2.9 SD
Mercury	0.00029 M	0.00019 M	0.00031 M	0.00029 M	0.00029 M	0.00029 M
Total SEM	1.23309	1.18299	3.82741	3.87649	1.88529	3.55859
Acid Volatile Sulfide	21.9 M	2.5 M	17.6 M	14 M	23.4 M	32.1 M
Ratio of SEM*/AVS	0.055	0.48	0.22	0.28	0.12	0.11
Acid Volatile Sulfide (mg/kg)	702	80.1	565	450	749	1030

TABLE B-7
SUMMARY OF SEDIMENT SAMPLE ANALYTICAL RESULTS - AVS/SEM
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Parameter	Sample Number and Date Collected			
	OC-SED-14 4/05/07	OC-SED-19 4/05/07	OC-SED-22 4/05/07	OC-SED-26 4/05/07
Cadmium	0.006	0.0028	0.0062	0.0043
Copper	0.27	0.18	0.016 U	0.17
Lead	0.36	0.13	0.22	0.17
Nickel	0.24 B	0.11 B	0.12 B	0.22 B
Silver	0.014 M, MS	0.0093 M, MS	0.012 M, MS	0.015 F, MS
Zinc	2.1 SD	1.3 SD	2.6 SD	1.1 F, CV
Mercury	0.0002 M	0.00014 M	0.00018 M	0.00022 F, MS
Total SEM	2.9902	1.73224	2.97438	1.67952
Acid Volatile Sulfide	16.9 M	8.7 M	39 M	7.2 M
Ratio of SEM*/AVS	0.18	0.2	0.074	0.24
Acid Volatile Sulfide (mg/kg)	543	280	1250	231

Notes:

AVS = Acid volatile sulfide
B = Result is less than reporting limit but greater than instrument detection limit.
CV = Estimated value. Calibration verification results exceed upper or lower control limits.
F = Estimated value. Relative Percent Difference of field duplicates/replicates exceeds criteria.
mg/kg = Milligrams per kilogram
M = Estimated value. Associated MS/MSD recoveries exceed the upper or lower control limits.
MS = Estimated value. RPD between MS/MSD exceeded specified criteria.
SD = Estimated value. Serial dilution exceeds specified criteria.
SEM = Simultaneously extracted metals

All results expressed in micromoles per gram unless otherwise noted

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S01-DC-01	Sieve 3/8	25.9	Gravel
S01-DC-01	Sieve 4	11.1	Sand
S01-DC-01	Sieve 10	9.3	Sand
S01-DC-01	Sieve 16	5.7	Sand
S01-DC-01	Sieve 35	11.0	Sand
S01-DC-01	Sieve 50	7.3	Sand
S01-DC-01	Sieve 100	9.0	Sand
S01-DC-01	Sieve 200	1.1	Silt and Clay
S01-DC-01	Pan and Wash through 200 Sieve	19.6	Silt and Clay
S02-DC-02	Sieve 3/8	2.3	Gravel
S02-DC-02	Sieve 4	0.7	Sand
S02-DC-02	Sieve 10	1.2	Sand
S02-DC-02	Sieve 16	0.8	Sand
S02-DC-02	Sieve 35	1.3	Sand
S02-DC-02	Sieve 50	1.7	Sand
S02-DC-02	Sieve 100	3.4	Sand
S02-DC-02	Sieve 200	4.7	Silt and Clay
S02-DC-02	Pan and Wash through 200 Sieve	83.9	Silt and Clay
S03-DC-03	Sieve 3/8	0.0	Gravel
S03-DC-03	Sieve 4	1.5	Sand
S03-DC-03	Sieve 10	8.6	Sand
S03-DC-03	Sieve 16	5.7	Sand
S03-DC-03	Sieve 35	14.6	Sand
S03-DC-03	Sieve 50	12.7	Sand
S03-DC-03	Sieve 100	34.7	Sand
S03-DC-03	Sieve 200	9.8	Silt and Clay
S03-DC-03	Pan and Wash through 200 Sieve	12.4	Silt and Clay
S04-DC-04	Sieve 3/8	0.2	Gravel
S04-DC-04	Sieve 4	0.6	Sand
S04-DC-04	Sieve 10	1.1	Sand
S04-DC-04	Sieve 16	1.1	Sand
S04-DC-04	Sieve 35	1.9	Sand
S04-DC-04	Sieve 50	1.4	Sand
S04-DC-04	Sieve 100	3.4	Sand
S04-DC-04	Sieve 200	1.4	Silt and Clay
S04-DC-04	Pan and Wash through 200 Sieve	88.9	Silt and Clay
S05-DC-05	Sieve 3/8	0.0	Gravel
S05-DC-05	Sieve 4	0.2	Sand
S05-DC-05	Sieve 10	0.9	Sand
S05-DC-05	Sieve 16	0.8	Sand
S05-DC-05	Sieve 35	1.0	Sand
S05-DC-05	Sieve 50	1.2	Sand
S05-DC-05	Sieve 100	1.5	Sand
S05-DC-05	Sieve 200	1.8	Silt and Clay
S05-DC-05	Pan and Wash through 200 Sieve	92.6	Silt and Clay

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S06-DC-06	Sieve 3/8	2.1	Gravel
S06-DC-06	Sieve 4	2.4	Sand
S06-DC-06	Sieve 10	3.3	Sand
S06-DC-06	Sieve 16	2.5	Sand
S06-DC-06	Sieve 35	6.5	Sand
S06-DC-06	Sieve 50	4.6	Sand
S06-DC-06	Sieve 100	9.9	Sand
S06-DC-06	Sieve 200	13.4	Silt and Clay
S06-DC-06	Pan and Wash through 200 Sieve	55.3	Silt and Clay
S07-DC-07	Sieve 3/8	2.6	Gravel
S07-DC-07	Sieve 4	1.4	Sand
S07-DC-07	Sieve 10	2.1	Sand
S07-DC-07	Sieve 16	1.7	Sand
S07-DC-07	Sieve 35	2.5	Sand
S07-DC-07	Sieve 50	2.8	Sand
S07-DC-07	Sieve 100	3.9	Sand
S07-DC-07	Sieve 200	3.5	Silt and Clay
S07-DC-07	Pan and Wash through 200 Sieve	79.5	Silt and Clay
S08-DC-08	Sieve 3/8	0.0	Gravel
S08-DC-08	Sieve 4	0.3	Sand
S08-DC-08	Sieve 10	1.1	Sand
S08-DC-08	Sieve 16	0.9	Sand
S08-DC-08	Sieve 35	-0.8	Sand
S08-DC-08	Sieve 50	1.1	Sand
S08-DC-08	Sieve 100	1.6	Sand
S08-DC-08	Sieve 200	1.3	Silt and Clay
S08-DC-08	Pan and Wash through 200 Sieve	94.5	Silt and Clay
S09-DC-09	Sieve 3/8	0.0	Gravel
S09-DC-09	Sieve 4	2.0	Sand
S09-DC-09	Sieve 10	3.7	Sand
S09-DC-09	Sieve 16	3.1	Sand
S09-DC-09	Sieve 35	5.6	Sand
S09-DC-09	Sieve 50	6.2	Sand
S09-DC-09	Sieve 100	9.2	Sand
S09-DC-09	Sieve 200	10.9	Silt and Clay
S09-DC-09	Pan and Wash through 200 Sieve	59.3	Silt and Clay
S10-DC-10	Sieve 3/8	0.0	Gravel
S10-DC-10	Sieve 4	0.2	Sand
S10-DC-10	Sieve 10	0.7	Sand
S10-DC-10	Sieve 16	0.6	Sand
S10-DC-10	Sieve 35	1.6	Sand
S10-DC-10	Sieve 50	1.1	Sand
S10-DC-10	Sieve 100	2.4	Sand
S10-DC-10	Sieve 200	1.4	Silt and Clay
S10-DC-10	Pan and Wash through 200 Sieve	92.0	Silt and Clay

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S11-DC-11	Sieve 3/8	0.0	Gravel
S11-DC-11	Sieve 4	0.0	Sand
S11-DC-11	Sieve 10	0.2	Sand
S11-DC-11	Sieve 16	0.3	Sand
S11-DC-11	Sieve 35	0.3	Sand
S11-DC-11	Sieve 50	0.3	Sand
S11-DC-11	Sieve 100	0.6	Sand
S11-DC-11	Sieve 200	1.4	Silt and Clay
S11-DC-11	Pan and Wash through 200 Sieve	96.9	Silt and Clay
S12-DC-12	Sieve 3/8	0.1	Gravel
S12-DC-12	Sieve 4	2.1	Sand
S12-DC-12	Sieve 10	4.4	Sand
S12-DC-12	Sieve 16	3.2	Sand
S12-DC-12	Sieve 35	6.1	Sand
S12-DC-12	Sieve 50	3.1	Sand
S12-DC-12	Sieve 100	4.0	Sand
S12-DC-12	Sieve 200	0.3	Silt and Clay
S12-DC-12	Pan and Wash through 200 Sieve	76.7	Silt and Clay
S13-DC-13	Sieve 3/8	9.0	Gravel
S13-DC-13	Sieve 4	6.3	Sand
S13-DC-13	Sieve 10	4.8	Sand
S13-DC-13	Sieve 16	3.1	Sand
S13-DC-13	Sieve 35	4.6	Sand
S13-DC-13	Sieve 50	6.5	Sand
S13-DC-13	Sieve 100	11.1	Sand
S13-DC-13	Sieve 200	14.0	Silt and Clay
S13-DC-13	Pan and Wash through 200 Sieve	40.6	Silt and Clay

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S14-DC-14	Sieve 3/8	4.0	Gravel
S14-DC-14	Sieve 4	12.5	Sand
S14-DC-14	Sieve 10	15.5	Sand
S14-DC-14	Sieve 16	7.2	Sand
S14-DC-14	Sieve 35	13.7	Sand
S14-DC-14	Sieve 50	10.4	Sand
S14-DC-14	Sieve 100	17.8	Sand
S14-DC-14	Sieve 200	3.4	Silt and Clay
S14-DC-14	Pan and Wash through 200 Sieve	15.5	Silt and Clay
S15-DC-15	Sieve 3/8	4.9	Gravel
S15-DC-15	Sieve 4	9.5	Sand
S15-DC-15	Sieve 10	9.1	Sand
S15-DC-15	Sieve 16	5.0	Sand
S15-DC-15	Sieve 35	8.0	Sand
S15-DC-15	Sieve 50	11.0	Sand
S15-DC-15	Sieve 100	14.7	Sand
S15-DC-15	Sieve 200	13.3	Silt and Clay
S15-DC-15	Pan and Wash through 200 Sieve	24.5	Silt and Clay
S16-DC-16	Sieve 3/8	0.1	Gravel
S16-DC-16	Sieve 4	0.0	Sand
S16-DC-16	Sieve 10	0.0	Sand
S16-DC-16	Sieve 16	0.0	Sand
S16-DC-16	Sieve 35	0.1	Sand
S16-DC-16	Sieve 50	0.2	Sand
S16-DC-16	Sieve 100	0.3	Sand
S16-DC-16	Sieve 200	0.0	Silt and Clay
S16-DC-16	Pan and Wash through 200 Sieve	99.4	Silt and Clay
S17-DC-17	Sieve 3/8	0.0	Gravel
S17-DC-17	Sieve 4	0.0	Sand
S17-DC-17	Sieve 10	0.0	Sand
S17-DC-17	Sieve 16	0.0	Sand
S17-DC-17	Sieve 35	0.0	Sand
S17-DC-17	Sieve 50	0.0	Sand
S17-DC-17	Sieve 100	0.1	Sand
S17-DC-17	Sieve 200	0.1	Silt and Clay
S17-DC-17	Pan and Wash through 200 Sieve	99.8	Silt and Clay
S18-DC-18	Sieve 3/8	0.0	Gravel
S18-DC-18	Sieve 4	0.0	Sand
S18-DC-18	Sieve 10	0.0	Sand
S18-DC-18	Sieve 16	0.0	Sand
S18-DC-18	Sieve 35	0.0	Sand
S18-DC-18	Sieve 50	0.0	Sand
S18-DC-18	Sieve 100	0.5	Sand
S18-DC-18	Sieve 200	0.3	Silt and Clay
S18-DC-18	Pan and Wash through 200 Sieve	99.2	Silt and Clay

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S19-DC-19	Sieve 3/8	0.4	Gravel
S19-DC-19	Sieve 4	3.3	Sand
S19-DC-19	Sieve 10	6.9	Sand
S19-DC-19	Sieve 16	4.0	Sand
S19-DC-19	Sieve 35	9.4	Sand
S19-DC-19	Sieve 50	9.1	Sand
S19-DC-19	Sieve 100	17.9	Sand
S19-DC-19	Sieve 200	0.3	Silt and Clay
S19-DC-19	Pan and Wash through 200 Sieve	48.7	Silt and Clay
S20-OC-01	Sieve 3/8	3.4	Gravel
S20-OC-01	Sieve 4	2.3	Sand
S20-OC-01	Sieve 10	1.0	Sand
S20-OC-01	Sieve 16	0.5	Sand
S20-OC-01	Sieve 35	0.0	Sand
S20-OC-01	Sieve 50	2.6	Sand
S20-OC-01	Sieve 100	17.1	Sand
S20-OC-01	Sieve 200	32.6	Silt and Clay
S20-OC-01	Pan and Wash through 200 Sieve	40.5	Silt and Clay
S21-OC-02	Sieve 3/8	0.0	Gravel
S21-OC-02	Sieve 4	0.1	Sand
S21-OC-02	Sieve 10	0.9	Sand
S21-OC-02	Sieve 16	0.5	Sand
S21-OC-02	Sieve 35	0.6	Sand
S21-OC-02	Sieve 50	0.9	Sand
S21-OC-02	Sieve 100	0.6	Sand
S21-OC-02	Sieve 200	0.1	Silt and Clay
S21-OC-02	Pan and Wash through 200 Sieve	96.4	Silt and Clay
S22-OC-03	Sieve 3/8	-0.5	Gravel
S22-OC-03	Sieve 4	0.9	Sand
S22-OC-03	Sieve 10	0.9	Sand
S22-OC-03	Sieve 16	1.1	Sand
S22-OC-03	Sieve 35	3.1	Sand
S22-OC-03	Sieve 50	2.6	Sand
S22-OC-03	Sieve 100	1.7	Sand
S22-OC-03	Sieve 200	8.4	Silt and Clay
S22-OC-03	Pan and Wash through 200 Sieve	81.8	Silt and Clay
S23-OC-04	Sieve 3/8	0.0	Gravel
S23-OC-04	Sieve 4	0.0	Sand
S23-OC-04	Sieve 10	0.1	Sand
S23-OC-04	Sieve 16	0.1	Sand
S23-OC-04	Sieve 35	0.1	Sand
S23-OC-04	Sieve 50	0.1	Sand
S23-OC-04	Sieve 100	0.3	Sand
S23-OC-04	Sieve 200	0.5	Silt and Clay
S23-OC-04	Pan and Wash through 200 Sieve	98.9	Silt and Clay

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S24-OC-05	Sieve 3/8	0.0	Gravel
S24-OC-05	Sieve 4	0.0	Sand
S24-OC-05	Sieve 10	0.1	Sand
S24-OC-05	Sieve 16	0.2	Sand
S24-OC-05	Sieve 35	0.8	Sand
S24-OC-05	Sieve 50	0.5	Sand
S24-OC-05	Sieve 100	0.1	Sand
S24-OC-05	Sieve 200	4.5	Silt and Clay
S24-OC-05	Pan and Wash through 200 Sieve	93.8	Silt and Clay
S25-OC-06	Sieve 3/8	-0.4	Gravel
S25-OC-06	Sieve 4	0.0	Sand
S25-OC-06	Sieve 10	-0.1	Sand
S25-OC-06	Sieve 16	0.2	Sand
S25-OC-06	Sieve 35	0.3	Sand
S25-OC-06	Sieve 50	0.1	Sand
S25-OC-06	Sieve 100	0.3	Sand
S25-OC-06	Sieve 200	2.2	Silt and Clay
S25-OC-06	Pan and Wash through 200 Sieve	97.4	Silt and Clay
S26-OC-07	Sieve 3/8	2.0	Gravel
S26-OC-07	Sieve 4	6.3	Sand
S26-OC-07	Sieve 10	6.0	Sand
S26-OC-07	Sieve 16	4.1	Sand
S26-OC-07	Sieve 35	7.7	Sand
S26-OC-07	Sieve 50	14.9	Sand
S26-OC-07	Sieve 100	14.0	Sand
S26-OC-07	Sieve 200	6.5	Silt and Clay
S26-OC-07	Pan and Wash through 200 Sieve	38.5	Silt and Clay
S27-OC-08	Sieve 3/8	0.0	Gravel
S27-OC-08	Sieve 4	0.7	Sand
S27-OC-08	Sieve 10	2.2	Sand
S27-OC-08	Sieve 16	3.1	Sand
S27-OC-08	Sieve 35	13.9	Sand
S27-OC-08	Sieve 50	11.3	Sand
S27-OC-08	Sieve 100	5.2	Sand
S27-OC-08	Sieve 200	25.5	Silt and Clay
S27-OC-08	Pan and Wash through 200 Sieve	38.1	Silt and Clay
S28-OC-09	Sieve 3/8	0.0	Gravel
S28-OC-09	Sieve 4	1.8	Sand
S28-OC-09	Sieve 10	5.3	Sand
S28-OC-09	Sieve 16	5.5	Sand
S28-OC-09	Sieve 35	9.5	Sand
S28-OC-09	Sieve 50	15.1	Sand
S28-OC-09	Sieve 100	15.3	Sand
S28-OC-09	Sieve 200	11.8	Silt and Clay
S28-OC-09	Pan and Wash through 200 Sieve	35.7	Silt and Clay

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S29-OC-10	Sieve 3/8	0.6	Gravel
S29-OC-10	Sieve 4	5.0	Sand
S29-OC-10	Sieve 10	8.7	Sand
S29-OC-10	Sieve 16	7.5	Sand
S29-OC-10	Sieve 35	13.3	Sand
S29-OC-10	Sieve 50	15.0	Sand
S29-OC-10	Sieve 100	12.7	Sand
S29-OC-10	Sieve 200	9.5	Silt and Clay
S29-OC-10	Pan and Wash through 200 Sieve	27.7	Silt and Clay
S30-OC-11	Sieve 3/8	0.0	Gravel
S30-OC-11	Sieve 4	0.5	Sand
S30-OC-11	Sieve 10	3.4	Sand
S30-OC-11	Sieve 16	3.8	Sand
S30-OC-11	Sieve 35	5.2	Sand
S30-OC-11	Sieve 50	6.1	Sand
S30-OC-11	Sieve 100	15.0	Sand
S30-OC-11	Sieve 200	18.6	Silt and Clay
S30-OC-11	Pan and Wash through 200 Sieve	47.4	Silt and Clay
S31-OC-12	Sieve 3/8	0.0	Gravel
S31-OC-12	Sieve 4	3.0	Sand
S31-OC-12	Sieve 10	4.1	Sand
S31-OC-12	Sieve 16	5.7	Sand
S31-OC-12	Sieve 35	21.6	Sand
S31-OC-12	Sieve 50	12.9	Sand
S31-OC-12	Sieve 100	1.8	Sand
S31-OC-12	Sieve 200	20.4	Silt and Clay
S31-OC-12	Pan and Wash through 200 Sieve	30.5	Silt and Clay
S32-OC-13	Sieve 3/8	0.0	Gravel
S32-OC-13	Sieve 4	0.9	Sand
S32-OC-13	Sieve 10	4.8	Sand
S32-OC-13	Sieve 16	5.7	Sand
S32-OC-13	Sieve 35	17.6	Sand
S32-OC-13	Sieve 50	12.5	Sand
S32-OC-13	Sieve 100	8.9	Sand
S32-OC-13	Sieve 200	19.3	Silt and Clay
S32-OC-13	Pan and Wash through 200 Sieve	30.3	Silt and Clay
S33-OC-14	Sieve 3/8	0.0	Gravel
S33-OC-14	Sieve 4	3.2	Sand
S33-OC-14	Sieve 10	6.6	Sand
S33-OC-14	Sieve 16	5.0	Sand
S33-OC-14	Sieve 35	9.2	Sand
S33-OC-14	Sieve 50	13.7	Sand
S33-OC-14	Sieve 100	15.8	Sand
S33-OC-14	Sieve 200	9.5	Silt and Clay
S33-OC-14	Pan and Wash through 200 Sieve	37.0	Silt and Clay

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S34-OC-15	Sieve 3/8	0.3	Gravel
S34-OC-15	Sieve 4	3.7	Sand
S34-OC-15	Sieve 10	15.1	Sand
S34-OC-15	Sieve 16	11.5	Sand
S34-OC-15	Sieve 35	21.7	Sand
S34-OC-15	Sieve 50	9.0	Sand
S34-OC-15	Sieve 100	0.7	Sand
S34-OC-15	Sieve 200	13.6	Silt and Clay
S34-OC-15	Pan and Wash through 200 Sieve	24.4	Silt and Clay
S35-OC-16	Sieve 3/8	0.0	Gravel
S35-OC-16	Sieve 4	8.5	Sand
S35-OC-16	Sieve 10	11.3	Sand
S35-OC-16	Sieve 16	7.3	Sand
S35-OC-16	Sieve 35	13.8	Sand
S35-OC-16	Sieve 50	10.1	Sand
S35-OC-16	Sieve 100	1.2	Sand
S35-OC-16	Sieve 200	17.9	Silt and Clay
S35-OC-16	Pan and Wash through 200 Sieve	29.9	Silt and Clay
S36-OC-17	Sieve 3/8	1.2	Gravel
S36-OC-17	Sieve 4	1.6	Sand
S36-OC-17	Sieve 10	6.8	Sand
S36-OC-17	Sieve 16	8.2	Sand
S36-OC-17	Sieve 35	19.2	Sand
S36-OC-17	Sieve 50	25.0	Sand
S36-OC-17	Sieve 100	17.4	Sand
S36-OC-17	Sieve 200	7.1	Silt and Clay
S36-OC-17	Pan and Wash through 200 Sieve	13.5	Silt and Clay
S37-OC-18	Sieve 3/8	3.5	Gravel
S37-OC-18	Sieve 4	0.9	Sand
S37-OC-18	Sieve 10	3.0	Sand
S37-OC-18	Sieve 16	1.9	Sand
S37-OC-18	Sieve 35	10.6	Sand
S37-OC-18	Sieve 50	24.4	Sand
S37-OC-18	Sieve 100	4.2	Sand
S37-OC-18	Sieve 200	33.8	Silt and Clay
S37-OC-18	Pan and Wash through 200 Sieve	17.7	Silt and Clay
S38-OC-19	Sieve 3/8	3.0	Gravel
S38-OC-19	Sieve 4	1.9	Sand
S38-OC-19	Sieve 10	11.7	Sand
S38-OC-19	Sieve 16	13.5	Sand
S38-OC-19	Sieve 35	23.4	Sand
S38-OC-19	Sieve 50	12.6	Sand
S38-OC-19	Sieve 100	16.2	Sand
S38-OC-19	Sieve 200	1.9	Silt and Clay
S38-OC-19	Pan and Wash through 200 Sieve	15.8	Silt and Clay

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S39-OC-20	Sieve 3/8	2.4	Gravel
S39-OC-20	Sieve 4	2.1	Sand
S39-OC-20	Sieve 10	9.2	Sand
S39-OC-20	Sieve 16	10.5	Sand
S39-OC-20	Sieve 35	22.8	Sand
S39-OC-20	Sieve 50	13.0	Sand
S39-OC-20	Sieve 100	7.1	Sand
S39-OC-20	Sieve 200	8.9	Silt and Clay
S39-OC-20	Pan and Wash through 200 Sieve	24.0	Silt and Clay
S40-OC-21	Sieve 3/8	0.3	Gravel
S40-OC-21	Sieve 4	2.5	Sand
S40-OC-21	Sieve 10	4.4	Sand
S40-OC-21	Sieve 16	5.9	Sand
S40-OC-21	Sieve 35	12.9	Sand
S40-OC-21	Sieve 50	16.7	Sand
S40-OC-21	Sieve 100	17.5	Sand
S40-OC-21	Sieve 200	15.3	Silt and Clay
S40-OC-21	Pan and Wash through 200 Sieve	24.5	Silt and Clay
S41-OC-21A	Sieve 3/8	0.0	Gravel
S41-OC-21A	Sieve 4	0.5	Sand
S41-OC-21A	Sieve 10	1.5	Sand
S41-OC-21A	Sieve 16	1.7	Sand
S41-OC-21A	Sieve 35	5.1	Sand
S41-OC-21A	Sieve 50	4.5	Sand
S41-OC-21A	Sieve 100	4.8	Sand
S41-OC-21A	Sieve 200	19.8	Silt and Clay
S41-OC-21A	Pan and Wash through 200 Sieve	62.1	Silt and Clay
S42-OC-22	Sieve 3/8	0.0	Gravel
S42-OC-22	Sieve 4	1.6	Sand
S42-OC-22	Sieve 10	7.3	Sand
S42-OC-22	Sieve 16	7.1	Sand
S42-OC-22	Sieve 35	9.4	Sand
S42-OC-22	Sieve 50	12.3	Sand
S42-OC-22	Sieve 100	37.6	Sand
S42-OC-22	Sieve 200	10.0	Silt and Clay
S42-OC-22	Pan and Wash through 200 Sieve	14.7	Silt and Clay
S43-OC-23	Sieve 3/8	16.6	Gravel
S43-OC-23	Sieve 4	5.0	Sand
S43-OC-23	Sieve 10	4.2	Sand
S43-OC-23	Sieve 16	3.7	Sand
S43-OC-23	Sieve 35	10.3	Sand
S43-OC-23	Sieve 50	8.1	Sand
S43-OC-23	Sieve 100	7.6	Sand
S43-OC-23	Sieve 200	16.1	Silt and Clay
S43-OC-23	Pan and Wash through 200 Sieve	28.4	Silt and Clay

TABLE B-8
SEDIMENT GRAIN SIZE ANALYSIS
DUCK AND OTTER CREEKS
TOLEDO AND OREGON, OHIO

Sample Name	Sieve No.	Percent Retained	Soil Classification
S44-OC-24	Sieve 3/8	0.0	Gravel
S44-OC-24	Sieve 4	0.3	Sand
S44-OC-24	Sieve 10	1.1	Sand
S44-OC-24	Sieve 16	1.0	Sand
S44-OC-24	Sieve 35	1.6	Sand
S44-OC-24	Sieve 50	2.6	Sand
S44-OC-24	Sieve 100	13.4	Sand
S44-OC-24	Sieve 200	36.0	Silt and Clay
S44-OC-24	Pan and Wash through 200 Sieve	44.0	Silt and Clay
S45-OC-25	Sieve 3/8	5.7	Gravel
S45-OC-25	Sieve 4	12.8	Sand
S45-OC-25	Sieve 10	12.8	Sand
S45-OC-25	Sieve 16	5.4	Sand
S45-OC-25	Sieve 35	10.5	Sand
S45-OC-25	Sieve 50	8.2	Sand
S45-OC-25	Sieve 100	14.8	Sand
S45-OC-25	Sieve 200	0.5	Silt and Clay
S45-OC-25	Pan and Wash through 200 Sieve	29.3	Silt and Clay
S46-OC-26	Sieve 3/8	0.0	Gravel
S46-OC-26	Sieve 4	0.0	Sand
S46-OC-26	Sieve 10	1.7	Sand
S46-OC-26	Sieve 16	3.6	Sand
S46-OC-26	Sieve 35	8.2	Sand
S46-OC-26	Sieve 50	9.9	Sand
S46-OC-26	Sieve 100	10.5	Sand
S46-OC-26	Sieve 200	10.2	Silt and Clay
S46-OC-26	Pan and Wash through 200 Sieve	55.9	Silt and Clay

Appendix N

Summary of Statistical Test Results

Descriptive Statistics: Friday, February 17, 2012, 7:43:19 PM

Data source: scaled biomass Data 1 in growth data_no Planaria

Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
AD-1 scaled biomass	8	1	1.020	0.350	0.132	0.324
GC-1 scaled biomass	10	0	0.815	0.333	0.105	0.238
DC-3 scaled biomass	8	1	0.897	0.300	0.114	0.278
DC-5 scaled biomass	8	1	0.786	0.127	0.0481	0.118
DC-6/7 scaled biomass	8	0	0.690	0.171	0.0604	0.143
DC-11/12 scaled biomass	8	0	0.542	0.142	0.0502	0.119

Column	Range	Max	Min	Median	25%	75%
AD-1 scaled biomass	1.020	1.549	0.529	1.090	0.677	1.247
GC-1 scaled biomass	1.086	1.278	0.192	0.824	0.576	1.081
DC-3 scaled biomass	0.775	1.176	0.400	1.015	0.568	1.140
DC-5 scaled biomass	0.314	0.954	0.639	0.763	0.674	0.952
DC-6/7 scaled biomass	0.522	1.055	0.533	0.689	0.543	0.746
DC-11/12 scaled biomass	0.421	0.737	0.316	0.504	0.456	0.694

Column	Skewness	Kurtosis	K-S Dist.	K-S Prob.	SWilk W	SWilk Prob
AD-1 scaled biomass	0.0128	-0.613	0.152	0.736	0.979	0.954
GC-1 scaled biomass	-0.391	-0.0974	0.0898	0.802	0.977	0.946
DC-3 scaled biomass	-0.980	-0.605	0.224	0.333	0.863	0.162
DC-5 scaled biomass	0.496	-1.453	0.191	0.537	0.893	0.293
DC-6/7 scaled biomass	1.508	2.868	0.238	0.199	0.829	0.058
DC-11/12 scaled biomass	0.0468	-0.534	0.217	0.309	0.939	0.599

Column	Sum	Sum of Squares
AD-1 scaled biomass	7.137	8.011
GC-1 scaled biomass	8.150	7.639
DC-3 scaled biomass	6.278	6.172
DC-5 scaled biomass	5.499	4.417
DC-6/7 scaled biomass	5.518	4.011
DC-11/12 scaled biomass	4.335	2.491

Descriptive Statistics: Friday, February 17, 2012, 8:16:27 PM

Data source: scaled biomass Data 1 in growth data_no Planaria

Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
OC-4 scaled biomass	8	1	0.0853	0.0317	0.0120	0.0293
OC-5A-01 scaled biomass	8	0	0.196	0.116	0.0411	0.0972
OC-6/7 scaled biomass	8	1	0.877	0.170	0.0641	0.157
OC-9-10 scaled biomass	8	1	0.492	0.125	0.0471	0.115
OC-12/13 scaled biomass	8	1	0.893	0.0793	0.0300	0.0734
OC-16 scaled biomass	7	0	0.841	0.182	0.0687	0.168
OC-22 scaled biomass	8	0	0.855	0.223	0.0790	0.187
OC-24/25 scaled biomass	8	0	0.807	0.318	0.112	0.266

Column	Range	Max	Min	Median	25%	75%
OC-4 scaled biomass	0.0907	0.120	0.0294	0.0912	0.0676	0.118
OC-5A-01 scaled biomass	0.374	0.418	0.0442	0.220	0.0921	0.233
OC-6/7 scaled biomass	0.502	1.137	0.635	0.905	0.688	0.960
OC-9-10 scaled biomass	0.355	0.597	0.242	0.526	0.458	0.596
OC-12/13 scaled biomass	0.224	1.025	0.801	0.865	0.834	0.973
OC-16 scaled biomass	0.562	1.175	0.613	0.831	0.714	0.948
OC-22 scaled biomass	0.674	1.150	0.476	0.836	0.698	1.076
OC-24/25 scaled biomass	1.039	1.239	0.200	0.806	0.653	1.046

Column	Skewness	Kurtosis	K-S Dist.	K-S Prob.	SWilk W	SWilk Prob
OC-4 scaled biomass	-0.753	0.408	0.145	0.757	0.935	0.591
OC-5A-01 scaled biomass	0.680	1.009	0.249	0.152	0.911	0.363
OC-6/7 scaled biomass	-0.130	-0.134	0.231	0.293	0.936	0.602
OC-9-10 scaled biomass	-1.573	2.718	0.249	0.209	0.829	0.079
OC-12/13 scaled biomass	0.789	-0.403	0.213	0.397	0.930	0.547
OC-16 scaled biomass	0.940	1.286	0.203	0.460	0.949	0.717
OC-22 scaled biomass	-0.300	-0.157	0.182	0.534	0.954	0.751
OC-24/25 scaled biomass	-0.745	1.065	0.173	0.594	0.957	0.781

Column	Sum	Sum of Squares
OC-4 scaled biomass	0.597	0.0570
OC-5A-01 scaled biomass	1.569	0.402
OC-6/7 scaled biomass	6.138	5.555
OC-9-10 scaled biomass	3.444	1.788
OC-12/13 scaled biomass	6.254	5.625
OC-16 scaled biomass	5.887	5.149
OC-22 scaled biomass	6.840	6.197
OC-24/25 scaled biomass	6.458	5.922

t-test Friday, February 17, 2012, 7:37:22 PM

Data source: scaled biomass Data 1 in growth data_no Planaria

Normality Test (Shapiro-Wilk) Passed (P = 0.951)

Equal Variance Test: Passed (P = 0.579)

Group Name	N	Missing	Mean	Std Dev	SEM
AD-1 scaled biomass	8	1	1.020	0.350	0.132
GC-1 scaled biomass	10	0	0.815	0.333	0.105

Difference 0.205

t = 1.222 with 15 degrees of freedom.

95 percent two-tailed confidence interval for difference of means: -0.152 to 0.561

Two-tailed P-value = 0.241

The difference in the mean values of the two groups is not great enough to reject the possibility that the difference is due to random sampling variability. There is not a statistically significant difference between the input groups (P = 0.241).

One-tailed P-value = 0.120

The sample mean of group AD-1 scaled biomass does not exceed the sample mean of the group GC-1 scaled biomass by an amount great enough to exclude the possibility that the difference is due to random sampling variability. The hypothesis that the population mean of group GC-1 scaled biomass is greater than or equal to the population mean of group AD-1 scaled biomass cannot be rejected. (P = 0.120).

Power of performed two-tailed test with alpha = 0.050: 0.208

The power of the performed test (0.208) is below the desired power of 0.800.
Less than desired power indicates you are less likely to detect a difference when one actually exists.
Negative results should be interpreted cautiously.

Power of performed one-tailed test with alpha = 0.050: 0.316

The power of the performed test (0.316) is below the desired power of 0.800.
Less than desired power indicates you are less likely to detect a difference when one actually exists.
Negative results should be interpreted cautiously.

One Way Analysis of Variance Friday, February 17, 2012, 7:38:56 PM

Data source: scaled biomass Data 1 in growth data_no Planaria

Normality Test (Shapiro-Wilk) Failed (P < 0.050)

Test execution ended by user request, ANOVA on Ranks begun

Kruskal-Wallis One Way Analysis of Variance on Ranks Friday, February 17, 2012, 7:38:56 PM

Data source: scaled biomass Data 1 in growth data_no Planaria

Group	N	Missing	Median	25%	75%
AD-1 scaled biomass	8	1	1.090	0.677	1.247
GC-1 scaled biomass	10	0	0.824	0.576	1.081
OC-4 scaled biomass	8	1	0.0912	0.0676	0.118
OC-5A-01 scaled biomass	8	0	0.220	0.0921	0.233
OC-6/7 scaled biomass	8	1	0.905	0.688	0.960
OC-9-10 scaled biomass	8	1	0.526	0.458	0.596
OC-12/13 scaled biomass	8	1	0.865	0.834	0.973
OC-16 scaled biomass	7	0	0.831	0.714	0.948
OC-22 scaled biomass	8	0	0.836	0.698	1.076
OC-24/25 scaled biomass	8	0	0.806	0.653	1.046
DC-3 scaled biomass	8	1	1.015	0.568	1.140
DC-5 scaled biomass	8	1	0.763	0.674	0.952
DC-6/7 scaled biomass	8	0	0.689	0.543	0.746
DC-11/12 scaled biomass	8	0	0.504	0.456	0.694

H = 58.920 with 13 degrees of freedom. (P = <0.001)

The differences in the median values among the treatment groups are greater than would be expected by chance; there is a statistically significant difference (P = <0.001)

To isolate the group or groups that differ from the others use a multiple comparison procedure.

All Pairwise Multiple Comparison Procedures (Dunn's Method) :

Comparison	Diff of Ranks	Q	P<0.05
AD-1 scaled b vs OC-4 scaled b	73.500	4.473	Yes
AD-1 scaled b vs OC-5A-01 scal	67.188	4.223	Yes
AD-1 scaled b vs OC-9-10 scale	50.714	3.086	No
AD-1 scaled b vs DC-11/12 scal	45.375	2.852	Do Not Test
AD-1 scaled b vs DC-6/7 scaled	30.000	1.885	Do Not Test
AD-1 scaled b vs DC-5 scaled b	17.714	1.078	Do Not Test
AD-1 scaled b vs GC-1 scaled b	15.000	0.990	Do Not Test
AD-1 scaled b vs OC-24/25 scal	14.375	0.903	Do Not Test
AD-1 scaled b vs OC-16 scaled	12.429	0.756	Do Not Test
AD-1 scaled b vs OC-22 scaled	11.375	0.715	Do Not Test
AD-1 scaled b vs OC-6/7 scaled	7.429	0.452	Do Not Test
AD-1 scaled b vs DC-3 scaled b	6.429	0.391	Do Not Test
AD-1 scaled b vs OC-12/13 scal	4.143	0.252	Do Not Test
OC-12/13 scal vs OC-4 scaled b	69.357	4.221	Yes
OC-12/13 scal vs OC-5A-01 scal	63.045	3.962	Yes

OC-12/13 scal vs OC-9-10 scale	46.571	2.834	Do Not Test
OC-12/13 scal vs DC-11/12 scal	41.232	2.591	Do Not Test
OC-12/13 scal vs DC-6/7 scaled	25.857	1.625	Do Not Test
OC-12/13 scal vs DC-5 scaled b	13.571	0.826	Do Not Test
OC-12/13 scal vs GC-1 scaled b	10.857	0.717	Do Not Test
OC-12/13 scal vs OC-24/25 scal	10.232	0.643	Do Not Test
OC-12/13 scal vs OC-16 scaled	8.286	0.504	Do Not Test
OC-12/13 scal vs OC-22 scaled	7.232	0.455	Do Not Test
OC-12/13 scal vs OC-6/7 scaled	3.286	0.200	Do Not Test
OC-12/13 scal vs DC-3 scaled b	2.286	0.139	Do Not Test
DC-3 scaled b vs OC-4 scaled b	67.071	4.081	Yes
DC-3 scaled b vs OC-5A-01 scal	60.759	3.819	Yes
DC-3 scaled b vs OC-9-10 scale	44.286	2.695	Do Not Test
DC-3 scaled b vs DC-11/12 scal	38.946	2.448	Do Not Test
DC-3 scaled b vs DC-6/7 scaled	23.571	1.481	Do Not Test
DC-3 scaled b vs DC-5 scaled b	11.286	0.687	Do Not Test
DC-3 scaled b vs GC-1 scaled b	8.571	0.566	Do Not Test
DC-3 scaled b vs OC-24/25 scal	7.946	0.499	Do Not Test
DC-3 scaled b vs OC-16 scaled	6.000	0.365	Do Not Test
DC-3 scaled b vs OC-22 scaled	4.946	0.311	Do Not Test
DC-3 scaled b vs OC-6/7 scaled	1.000	0.0609	Do Not Test
OC-6/7 scaled vs OC-4 scaled b	66.071	4.021	Yes
OC-6/7 scaled vs OC-5A-01 scal	59.759	3.756	Yes
OC-6/7 scaled vs OC-9-10 scale	43.286	2.634	Do Not Test
OC-6/7 scaled vs DC-11/12 scal	37.946	2.385	Do Not Test
OC-6/7 scaled vs DC-6/7 scaled	22.571	1.419	Do Not Test
OC-6/7 scaled vs DC-5 scaled b	10.286	0.626	Do Not Test
OC-6/7 scaled vs GC-1 scaled b	7.571	0.500	Do Not Test
OC-6/7 scaled vs OC-24/25 scal	6.946	0.437	Do Not Test
OC-6/7 scaled vs OC-16 scaled	5.000	0.304	Do Not Test
OC-6/7 scaled vs OC-22 scaled	3.946	0.248	Do Not Test
OC-22 scaled vs OC-4 scaled b	62.125	3.904	Yes
OC-22 scaled vs OC-5A-01 scal	55.813	3.631	Yes
OC-22 scaled vs OC-9-10 scale	39.339	2.472	Do Not Test
OC-22 scaled vs DC-11/12 scal	34.000	2.212	Do Not Test
OC-22 scaled vs DC-6/7 scaled	18.625	1.212	Do Not Test
OC-22 scaled vs DC-5 scaled b	6.339	0.398	Do Not Test
OC-22 scaled vs GC-1 scaled b	3.625	0.249	Do Not Test
OC-22 scaled vs OC-24/25 scal	3.000	0.195	Do Not Test
OC-22 scaled vs OC-16 scaled	1.054	0.0662	Do Not Test
OC-16 scaled vs OC-4 scaled b	61.071	3.716	Yes
OC-16 scaled vs OC-5A-01 scal	54.759	3.442	No
OC-16 scaled vs OC-9-10 scale	38.286	2.330	Do Not Test
OC-16 scaled vs DC-11/12 scal	32.946	2.071	Do Not Test
OC-16 scaled vs DC-6/7 scaled	17.571	1.104	Do Not Test
OC-16 scaled vs DC-5 scaled b	5.286	0.322	Do Not Test
OC-16 scaled vs GC-1 scaled b	2.571	0.170	Do Not Test
OC-16 scaled vs OC-24/25 scal	1.946	0.122	Do Not Test
OC-24/25 scal vs OC-4 scaled b	59.125	3.716	Yes
OC-24/25 scal vs OC-5A-01 scal	52.813	3.436	Do Not Test
OC-24/25 scal vs OC-9-10 scale	36.339	2.284	Do Not Test
OC-24/25 scal vs DC-11/12 scal	31.000	2.017	Do Not Test
OC-24/25 scal vs DC-6/7 scaled	15.625	1.016	Do Not Test
OC-24/25 scal vs DC-5 scaled b	3.339	0.210	Do Not Test
OC-24/25 scal vs GC-1 scaled b	0.625	0.0429	Do Not Test
GC-1 scaled b vs OC-4 scaled b	58.500	3.861	Yes

GC-1 scaled b vs OC-5A-01 scal	52.188	3.579	Do Not Test
GC-1 scaled b vs OC-9-10 scale	35.714	2.357	Do Not Test
GC-1 scaled b vs DC-11/12 scal	30.375	2.083	Do Not Test
GC-1 scaled b vs DC-6/7 scaled	15.000	1.029	Do Not Test
GC-1 scaled b vs DC-5 scaled b	2.714	0.179	Do Not Test
DC-5 scaled b vs OC-4 scaled b	55.786	3.395	No
DC-5 scaled b vs OC-5A-01 scal	49.473	3.109	Do Not Test
DC-5 scaled b vs OC-9-10 scale	33.000	2.008	Do Not Test
DC-5 scaled b vs DC-11/12 scal	27.661	1.738	Do Not Test
DC-5 scaled b vs DC-6/7 scaled	12.286	0.772	Do Not Test
DC-6/7 scaled vs OC-4 scaled b	43.500	2.734	Do Not Test
DC-6/7 scaled vs OC-5A-01 scal	37.188	2.419	Do Not Test
DC-6/7 scaled vs OC-9-10 scale	20.714	1.302	Do Not Test
DC-6/7 scaled vs DC-11/12 scal	15.375	1.000	Do Not Test
DC-11/12 scal vs OC-4 scaled b	28.125	1.768	Do Not Test
DC-11/12 scal vs OC-5A-01 scal	21.813	1.419	Do Not Test
DC-11/12 scal vs OC-9-10 scale	5.339	0.336	Do Not Test
OC-9-10 scale vs OC-4 scaled b	22.786	1.387	Do Not Test
OC-9-10 scale vs OC-5A-01 scal	16.473	1.035	Do Not Test
OC-5A-01 scal vs OC-4 scaled b	6.313	0.397	Do Not Test

Note: The multiple comparisons on ranks do not include an adjustment for ties.

Descriptive Statistics: Monday, June 27, 2011, 5:59:19 AM

Data source: taxa richness Data 1 in initial metrics

Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
AD-1	5	0	7.400	1.949	0.872	2.420
GC-1	5	0	8.800	1.924	0.860	2.388
DC-6/7	5	0	7.000	2.345	1.049	2.912
DC-5	5	0	7.600	1.140	0.510	1.416
DC-3	5	0	8.000	2.550	1.140	3.166
OC-24/25	5	0	12.400	2.302	1.030	2.859
OC-22	5	0	6.000	2.345	1.049	2.912
OC-16	5	0	4.800	1.924	0.860	2.388
OC-12/13	5	0	4.600	2.191	0.980	2.720
OC-9/10	5	0	4.600	1.140	0.510	1.416
OC-6/7(2)	5	0	2.200	0.837	0.374	1.039
OC-5A	5	0	4.600	0.548	0.245	0.680
OC-4	5	0	4.200	0.447	0.200	0.555

Column	Range	Max	Min	Median	25%	75%
AD-1	5.000	10.000	5.000	8.000	5.750	8.500
GC-1	5.000	11.000	6.000	9.000	7.500	10.250
DC-6/7	6.000	11.000	5.000	6.000	5.750	8.000
DC-5	3.000	9.000	6.000	8.000	6.750	8.250
DC-3	7.000	12.000	5.000	8.000	6.500	9.000
OC-24/25	5.000	15.000	10.000	13.000	10.000	14.250
OC-22	5.000	9.000	4.000	5.000	4.000	8.250
OC-16	5.000	8.000	3.000	4.000	3.750	5.750
OC-12/13	6.000	8.000	2.000	4.000	3.500	5.750
OC-9/10	3.000	6.000	3.000	5.000	3.750	5.250
OC-6/7(2)	2.000	3.000	1.000	2.000	1.750	3.000
OC-5A	1.000	5.000	4.000	5.000	4.000	5.000
OC-4	1.000	5.000	4.000	4.000	4.000	4.250

Column	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
AD-1	0.0810	-0.817	0.221	0.497	37.000	289.000
GC-1	-0.590	-0.0219	0.141	0.746	44.000	402.000
DC-6/7	1.744	3.322	0.300	0.149	35.000	267.000
DC-5	-0.405	-0.178	0.237	0.414	38.000	294.000
DC-3	0.905	2.000	0.300	0.149	40.000	346.000
OC-24/25	-0.197	-2.716	0.251	0.343	62.000	790.000
OC-22	0.581	-2.628	0.265	0.280	30.000	202.000
OC-16	1.517	2.608	0.261	0.297	24.000	130.000
OC-12/13	0.846	1.745	0.228	0.463	23.000	125.000
OC-9/10	-0.405	-0.178	0.237	0.414	23.000	111.000
OC-6/7(2)	-0.512	-0.612	0.231	0.448	11.000	27.000
OC-5A	-0.609	-3.333	0.367	0.026	23.000	107.000
OC-4	2.236	5.000	0.473	<0.001	21.000	89.000

Descriptive Statistics: Sunday, February 19, 2012, 7:36:52 AM

Data source: %EATData 2 in initial metrics v2.SNB

Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
AD-1	5	0	0.614	0.187	0.0837	0.232
GC-1	5	0	0.000593	0.000963	0.000431	0.00120
DC-3	5	0	0.180	0.120	0.0537	0.149
DC-5	5	0	0.167	0.152	0.0679	0.189
DC-6/7	5	0	0.185	0.158	0.0706	0.196
OC-4	5	0	0.000	0.000	0.000	0.000
OC-5A	5	0	0.000	0.000	0.000	0.000
OC-6/7(2)	5	0	0.000	0.000	0.000	0.000
OC-9/10	5	0	0.0135	0.0228	0.0102	0.0283
OC-12/13	5	0	0.000	0.000	0.000	0.000
OC-16	5	0	0.00294	0.00658	0.00294	0.00817
OC-22	5	0	0.00909	0.0141	0.00631	0.0175
OC-24/25	5	0	0.0293	0.0245	0.0110	0.0305

Column	Range	Max	Min	Median	25%	75%
AD-1	0.476	0.894	0.419	0.631	0.443	0.775
GC-1	0.00221	0.00221	0.000	0.000	0.000	0.00148
DC-3	0.299	0.345	0.0463	0.150	0.0755	0.301
DC-5	0.376	0.396	0.0200	0.148	0.0330	0.309
DC-6/7	0.363	0.375	0.0116	0.130	0.0472	0.351
OC-4	0.000	0.000	0.000	0.000	0.000	0.000
OC-5A	0.000	0.000	0.000	0.000	0.000	0.000
OC-6/7(2)	0.000	0.000	0.000	0.000	0.000	0.000
OC-9/10	0.0526	0.0526	0.000	0.000	0.000	0.0338
OC-12/13	0.000	0.000	0.000	0.000	0.000	0.000
OC-16	0.0147	0.0147	0.000	0.000	0.000	0.00735
OC-22	0.0321	0.0321	0.000	0.000	0.000	0.0227
OC-24/25	0.0594	0.0594	0.000	0.0376	0.00420	0.0502

Column	Skewness	Kurtosis	K-S Dist.	K-S Prob.	SWilk W	SWilk Prob
AD-1	0.746	0.263	0.211	0.548	0.933	0.614
GC-1	1.698	2.585	0.331	0.077	0.737	0.022
DC-3	0.495	-1.176	0.201	0.593	0.961	0.818
DC-5	0.880	0.157	0.186	0.654	0.929	0.587
DC-6/7	0.337	-2.515	0.236	0.419	0.905	0.440
OC-4	0.000	-4.000	0.000	<0.001	0.000	<0.001
OC-5A	0.000	-4.000	0.000	<0.001	0.000	<0.001
OC-6/7(2)	0.000	-4.000	0.000	<0.001	0.000	<0.001
OC-9/10	1.844	3.289	0.323	0.095	0.716	0.014
OC-12/13	0.000	-4.000	0.000	<0.001	0.000	<0.001
OC-16	2.236	5.000	0.473	<0.001	0.552	<0.001
OC-22	1.484	1.502	0.341	0.059	0.758	0.035
OC-24/25	-0.136	-1.895	0.233	0.436	0.931	0.605

Column	Sum	Sum of Squares
AD-1	3.068	2.022
GC-1	0.00297	0.00000547
DC-3	0.902	0.220
DC-5	0.833	0.231
DC-6/7	0.926	0.271

OC-4	0.000	0.000
OC-5A	0.000	0.000
OC-6/7(2)	0.000	0.000
OC-9/10	0.0676	0.00299
OC-12/13	0.000	0.000
OC-16	0.0147	0.000216
OC-22	0.0455	0.00121
OC-24/25	0.146	0.00670

Descriptive Statistics: Sunday, February 19, 2012, 7:43:46 AM

Data source: %OCData 3 in initial metrics v2.SNB

Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
AD-1	5	0	0.236	0.168	0.0752	0.209
GC-1	5	0	0.812	0.120	0.0538	0.149
DC-3	5	0	0.434	0.201	0.0900	0.250
DC-5	5	0	0.739	0.155	0.0693	0.193
DC-6/7	5	0	0.705	0.200	0.0895	0.248
OC-4	5	0	0.773	0.182	0.0814	0.226
OC-5A	5	0	0.908	0.0692	0.0310	0.0859
OC-6/7(2)	5	0	0.954	0.0872	0.0390	0.108
OC-9/10	5	0	0.764	0.125	0.0561	0.156
OC-12/13	5	0	0.713	0.259	0.116	0.322
OC-16	5	0	0.828	0.0738	0.0330	0.0916
OC-22	5	0	0.833	0.109	0.0488	0.135
OC-24/25	5	0	0.191	0.111	0.0496	0.138

Column	Range	Max	Min	Median	25%	75%
AD-1	0.420	0.465	0.0453	0.255	0.0730	0.388
GC-1	0.280	0.935	0.655	0.853	0.686	0.917
DC-3	0.552	0.734	0.183	0.452	0.264	0.595
DC-5	0.344	0.897	0.554	0.820	0.573	0.865
DC-6/7	0.409	0.895	0.486	0.826	0.488	0.861
OC-4	0.467	0.954	0.486	0.806	0.605	0.923
OC-5A	0.176	0.968	0.792	0.939	0.847	0.954
OC-6/7(2)	0.200	1.000	0.800	1.000	0.886	1.000
OC-9/10	0.322	0.947	0.625	0.743	0.655	0.884
OC-12/13	0.668	0.941	0.273	0.815	0.494	0.882
OC-16	0.197	0.930	0.733	0.821	0.764	0.896
OC-22	0.284	0.963	0.679	0.818	0.739	0.935
OC-24/25	0.297	0.356	0.0588	0.204	0.0935	0.282

Column	Skewness	Kurtosis	K-S Dist.	K-S Prob.	SWilk W	SWilk Prob
AD-1	0.277	-1.065	0.189	0.645	0.961	0.816
GC-1	-0.512	-2.163	0.235	0.427	0.912	0.482
DC-3	0.542	1.295	0.258	0.312	0.954	0.767
DC-5	-0.477	-2.830	0.299	0.153	0.852	0.202
DC-6/7	-0.518	-3.173	0.327	0.086	0.781	0.056
OC-4	-1.094	1.094	0.194	0.622	0.931	0.601
OC-5A	-1.640	2.819	0.272	0.249	0.834	0.148
OC-6/7(2)	-2.135	4.599	0.381	0.017	0.641	0.002
OC-9/10	0.661	-0.167	0.167	0.714	0.970	0.878
OC-12/13	-1.708	3.274	0.302	0.144	0.825	0.127
OC-16	0.213	0.107	0.137	0.746	0.996	0.997
OC-22	-0.375	-0.189	0.178	0.684	0.971	0.881
OC-24/25	0.606	0.840	0.241	0.393	0.956	0.780

Column	Sum	Sum of Squares
AD-1	1.178	0.391
GC-1	4.060	3.355
DC-3	2.169	1.103
DC-5	3.696	2.828
DC-6/7	3.524	2.643

OC-4	3.863	3.117
OC-5A	4.541	4.143
OC-6/7(2)	4.772	4.585
OC-9/10	3.820	2.982
OC-12/13	3.566	2.811
OC-16	4.141	3.452
OC-22	4.167	3.520
OC-24/25	0.954	0.231

Descriptive Statistics: Sunday, February 19, 2012, 10:07:58 AM

Data source: Data 1 in habitat benthos

Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
QHEI	14	2	33.125	5.633	1.626	3.579
median tolerant	14	1	0.719	0.251	0.0696	0.152
median sensitive	14	1	0.0844	0.175	0.0486	0.106
median total taxa	14	1	6.231	2.891	0.802	1.747
substrate	14	2	3.000	0.826	0.238	0.525
cover	14	2	8.250	3.793	1.095	2.410
morph	14	2	7.000	1.537	0.444	0.977
banks	14	2	5.292	1.287	0.372	0.818
riffle pool	14	2	5.000	2.558	0.739	1.626
gradient	14	2	4.583	1.505	0.434	0.956

Column	Range	Max	Min	Median	25%	75%
QHEI	19.000	42.000	23.000	33.250	31.375	36.875
median tolerant	0.796	1.000	0.204	0.818	0.598	0.839
median sensitive	0.631	0.631	0.000	0.000	0.000	0.139
median total taxa	11.000	13.000	2.000	5.000	4.000	8.000
substrate	2.000	4.500	2.500	2.500	2.500	3.750
cover	11.000	13.000	2.000	7.000	5.250	12.750
morph	4.000	10.000	6.000	6.000	6.000	8.750
banks	4.000	7.500	3.500	5.750	4.000	6.000
riffle pool	9.000	11.000	2.000	4.000	3.000	6.000
gradient	3.000	6.000	3.000	5.000	3.000	6.000

Column	Skewness	Kurtosis	K-S Dist.	K-S Prob.	SWilk W	SWilk Prob
QHEI	-0.504	0.337	0.206	0.170	0.915	0.247
median tolerant	-1.340	0.640	0.327	<0.001	0.777	0.004
median sensitive	2.913	9.203	0.315	<0.001	0.550	<0.001
median total taxa	0.951	1.183	0.203	0.148	0.917	0.225
substrate	1.308	-0.0929	0.394	<0.001	0.640	<0.001
cover	0.0802	-1.339	0.212	0.139	0.892	0.125
morph	1.081	-0.592	0.409	<0.001	0.681	<0.001
banks	-0.0958	-0.986	0.209	0.155	0.914	0.240
riffle pool	1.251	1.528	0.235	0.065	0.879	0.085
gradient	-0.0956	-2.323	0.327	<0.001	0.694	<0.001

Column	Sum	Sum of Squares
QHEI	397.500	13516.250
median tolerant	9.352	7.484
median sensitive	1.097	0.461
median total taxa	81.000	605.000
substrate	36.000	115.500
cover	99.000	975.000
morph	84.000	614.000
banks	63.500	354.250
riffle pool	60.000	372.000
gradient	55.000	277.000

Spearman Rank Order Correlation Sunday, February 19, 2012, 10:10:20 AM

Data source: Data 1 in habitat benthos

Cell Contents:
Correlation Coefficient
P Value
Number of Samples

	median tolerant	**median sensitive**	**median total taxa**	**substrate**	**cover**
QHEI	0.225 0.470 12	-0.172 0.572 12	-0.0303 0.921 12	0.213 0.484 12	0.737 0.00540 12
median tolerant		-0.479 0.0934 13	-0.397 0.173 13	0.538 0.0663 12	0.255 0.415 12
median sensitive			0.637 0.0180 13	-0.135 0.667 12	-0.0355 0.904 12
median total taxa				0.174 0.572 12	0.0540 0.852 12
substrate					0.410 0.173 12
cover					
morph					
banks					
riffle pool					
gradient					

	morph	**banks**	**riffle pool**	**gradient**
QHEI	0.358 0.243 12	0.298 0.329 12	0.602 0.0359 12	0.0176 0.939 12

median tolerant	0.238 0.442 12	0.464 0.123 12	0.229 0.456 12	-0.401 0.189 12
median sensitive	-0.223 0.470 12	-0.323 0.295 12	-0.486 0.105 12	-0.234 0.442 12
median total taxa	0.159 0.603 12	-0.147 0.635 12	-0.563 0.0547 12	0.0553 0.852 12
substrate	-0.0597 0.834 12	-0.0810 0.783 12	-0.162 0.603 12	-0.313 0.306 12
cover	0.0507 0.869 12	-0.0868 0.783 12	0.318 0.295 12	-0.406 0.181 12
morph		0.345 0.263 12	0.128 0.683 12	0.111 0.716 12
banks			0.292 0.340 12	0.229 0.456 12
riffle pool				0.0715 0.817 12
gradient				

The pair(s) of variables with positive correlation coefficients and P values below 0.050 tend to increase together. For the pairs with negative correlation coefficients and P values below 0.050, one variable tends to decrease while the other increases. For pairs with P values greater than 0.050, there is no significant relationship between the two variables.

Descriptive Statistics: Thursday, March 01, 2012, 4:50:52 PM

Data source: TPH metals TU Data 2 in habitat benthos

Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
survival	27	13	0.783	0.136	0.0362	0.0782
scaled biomass	27	13	0.700	0.275	0.0736	0.159

Column	Range	Max	Min	Median	25%	75%
survival	0.516	0.929	0.413	0.821	0.700	0.882
scaled biomass	0.935	1.020	0.0853	0.811	0.530	0.881

Column	Skewness	Kurtosis	K-S Dist.	K-S Prob.	SWilk W	SWilk Prob
survival	-1.624	3.490	0.159	0.410	0.858	0.028
scaled biomass	-1.329	0.949	0.266	0.008	0.834	0.014

Column	Sum	Sum of Squares
survival	10.963	8.824
scaled biomass	9.796	7.841

Descriptive Statistics: Thursday, March 01, 2012, 4:05:30 PM

Data source: Data 1 in habitat benthos

Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
ammonia	27	13	4.831	3.856	1.030	2.226
PAH 34 SumTU	27	13	2.796	4.873	1.302	2.813

Column	Range	Max	Min	Median	25%	75%
ammonia	12.353	12.700	0.347	4.265	0.921	7.258
PAH 34 SumTU	17.740	18.196	0.456	0.562	0.461	4.302

Column	Skewness	Kurtosis	K-S Dist.	K-S Prob.	SWilk W	SWilk Prob
ammonia	0.689	-0.191	0.137	0.605	0.924	0.255
PAH 34 SumTU	2.797	8.480	0.364	<0.001	0.560	<0.001

Column	Sum	Sum of Squares
ammonia	67.628	519.950
PAH 34 SumTU	39.147	418.131

Spearman Rank Order Correlation Thursday, March 01, 2012, 4:17:56 PM

Data source: TPH metals TU Data 2 in habitat benthos

Cell Contents:
Correlation Coefficient
P Value
Number of Samples

	PAH 34 SumTU	**survival**	**scaled biomass**	**taxa richness**	**sensitive**	**tolerant**
ammonia	-0.368	-0.0728	-0.238	0.0532	0.279	0.179
	0.189	0.797	0.399	0.849	0.404	0.541
	14	14	14	13	10	13
PAH 34 SumTU		-0.271	-0.150	-0.732	-0.433	0.143
		0.340	0.594	0.00373	0.199	0.629
		14	14	13	10	13
survival			0.209	-0.257	0.214	0.0138
			0.463	0.382	0.535	0.949
			14	13	10	13
scaled biomass				0.0615	0.433	-0.220
				0.835	0.199	0.458
				13	10	13
taxa richness					0.506	-0.397
					0.126	0.173
					10	13
sensitive						-0.575
						0.0736
						10
tolerant						

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