Appendixes 1–2

Appendix 1. Water-Quality Analyses and Quality-Control Tests

Appendix 2. Sample Analysis

Appendix 1. Water-Quality Analyses and Quality-Control Results

Table 1–1. Field parameters from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; ºC, degrees Celsius; mm Hg, millimeters of mercury; —, not measured; <, less than; WTP, water-treatment plant; DS, downstream; CW, collector well; F, finished water; I, intake]

Site name	Date of sample collection	Time	Discharge (ft^3/s)	Water temperature (ºC)	Air temperature (ºC)	Specific conductance, field (µS/cm)	pH, (standard units)	Dissolved oxygen (mg/L)	Barometric pressure (mm of Hg)
Scioto River near Prospect	12/082005	1030	203	0.2	-4.0	837	8.08	14.2	746
	05/23/2006	1140	340	15.29	20	699	7.87	8.3	744
	08/23/2006	1145	44	23.5	23.6	788	7.97	10.1	742
	10/18/2006	1200	1910	12.07	14	340	7.53	6.45	739
Dublin Road WTP, F	12/07/2005	1035	—	—	—	483	8.05	—	—
	05/24/2006	0935	—	—	—	596	7.85	—	—
	08/22/2006	1325	—	—	—	506	7.97	—	—
	10/24/2006	1005	—	—	—	396	7.73	—	—
Dublin Road WTP, I	12/07/2005	1040	—	—	—	—	—	—	—
	05/24/2006	0945	—	—	—	658	7.74	—	—
	08/22/2006	1320	—	—	—	536	7.7	—	—
	10/24/2006	1000	—	—	—	423	7.82	—	—
Mill Creek below Marysville	12/08/2005	1215	15.7	0	-2	702	8.35	15.9	746
	05/22/2006	1200	21.8	14.9	16	669	8.23	7.1	740
	08/23/2006	1000	0	20.6	23.5	1011	7.71	7.3	742
	10/19/2006	1015	126	14	13.2	498	7.8	8.74	733
Powder Lick Run near Summersville	05/22/2006	1000	0.26	13.1	13	982	7.83	7.77	740
	08/22/2006	1015	0	18.8	24.9	1476	7.44	5.61	742
	10/18/2006	0930	11.4	12.4	11.5	407	7.7	7.55	735

Table 1–1. Field parameters from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; ºC, degrees Celsius; mm Hg, millimeters of mercury; —, not measured; <, less than; WTP, water-treatment plant; DS, downstream; CW, collector well; F, finished water; I, intake]

Site name	Date of sample collection	Time	Discharge (ft³/s)	Water temperature (ºC)	Air temperature (ºC)	Specific conductance, field (µS/cm)	pH, (standard units)	Dissolved oxygen (mg/L)	Barometric pressure (mm of Hg)
Hap Cremean WTP, I	12/07/2005	1120	—	—	—	384	8.1	—	—
	05/24/2006	1010	—	—	—	410	7.89	—	—
	10/24/2006	1035	—	—	—	379	8.33	—	—
Hap Cremean WTP, F	12/07/2005	1115	—	—	—	340	8.14	—	—
	05/24/2006	1015	—	—	—	322	7.38	—	—
	10/24/2006	1040	—	—	—	329	8.11	—	—
Scioto River DS from CW-104	12/06/2005	1130	1840	7.3	-3.0	671	8.1	—	745
	05/23/2006	1400	1370	17.1	23	706	8.2	10.2	752
	10/19/2006	1315	7460	13.82	16	608	7.87	9.93	740
Big Walnut Creek at Sunbury	12/08/2005	0915	25	0	-9.0	701	8.27	15.8	746
	05/23/2006	1000	49	12.3	14	529	8.22	10.61	744
	10/18/2006	1330	447	13.11	17.5	363	7.75	9.98	739
Columbus Well Field CW-101	12/06/2005	1055	—	—	—	781	7.5	—	—
	05/25/2006	1010	—	—	—	829	7.3	—	—
Parsons Avenue WTP, I	12/06/2005	1020	—	—	—	867	7.24	—	—
	05/25/2006	0940	—	—	—	861	7.09	—	—
	10/23/2006	1310	—	—	—	882	7.5	—	—
Parsons Avenue WTP, F	12/06/2005	1015	—	—	—	560	7.8	—	—
	05/23/2006	0945	—	—	—	554	7.46	—	—
	10/23/2006	1315	—	—	—	536	7.7	—	—

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Lincomycin	Carbadox	Trimethoprim	Ormetoprim	Tetracycline	Anhydro-tetracycline	Epi-tetracycline
Scioto River near Prospect	12/08/2005	1030	<0.005	<0.005	**0.012**	<0.005	<0.010	<0.010	<0.010
	05/23/2006	1140	<0.005	<0.005	**0.006**	<0.005	<0.010	<0.010	<0.010
	08/23/2006	1145	<0.005	<0.005	**0.006**	<0.005	<0.010	<0.010	<0.010
	10/18/2006	1200	**0.018**	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Dublin Road WTP, F	12/07/2005	1035	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	05/24/2006	0935	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	08/22/2006	1325	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	10/24/2006	1005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Dublin Road WTP, I	12/07/2005	1040	**0.007**	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	05/24/2006	0945	**0.006**	<0.005	**0.021**	<0.005	<0.010	<0.010	<0.010
	08/22/2006	1320	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	10/24/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Mill Creek below Marysville	12/08/2005	1215	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	05/22/2006	1200	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	08/23/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	10/19/2006	1015	**0.010**	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Powder Lick Run near Summersville	05/22/2006	1000	**0.005**	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	08/22/2006	1015	**0.008**	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	10/18/2006	0930	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Lincomycin	Carbadox	Trimethoprim	Ormetoprim	Tetracycline	Anhydro-tetracycline	Epi-tetracycline
Hap Cremean WTP, I	12/07/2005	1120	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	05/24/2006	1010	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	10/24/2006	1035	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Hap Cremean WTP, F	12/07/2005	1115	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	05/24/2006	1015	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	10/24/2006	1040	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Scioto River DS from CW-104	12/06/2005	1130	<0.005	<0.005	**0.027**	<0.005	<0.010	<0.010	<0.010
	05/23/2006	1400	<0.005	<0.005	**0.027**	<0.005	<0.010	<0.010	<0.010
	10/19/2006	1315	<0.005	<0.005	**0.008**	<0.005	<0.010	<0.010	<0.010
Big Walnut Creek at Sunbury	12/08/2005	0915	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	05/23/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	10/18/2006	1330	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Columbus Well Field CW-101	12/06/2005	1055	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	05/25/2006	1010	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Parsons Avenue WTP, I	12/06/2005	1020	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	05/25/2006	0940	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	10/23/2006	1310	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Parsons Avenue WTP, F	12/06/2005	1015	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	05/25/2006	0945	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
	10/23/2006	1315	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Epi-anhydro-tetracycline	Chloro-tetracycline	Anhydro-chloro-tetracycline	Epi-anhydro-chloro-tetracycline	Epichloro-tetracycline	Isochloro-tetracycline	Epi-isochloro-tetracycline
Scioto River near Prospect	12/08/2005	1030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	1140	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/23/2006	1145	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/18/2006	1200	<0.010	<0.010	<0.010	<0.010	<0.010	**0.037**	<0.010
Dublin Road WTP, F	12/07/2005	1035	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	0935	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/22/2006	1325	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1005	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dublin Road WTP, I	12/07/2005	1040	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	0945	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/22/2006	1320	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Mill Creek below Marysville	12/08/2005	1215	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/22/2006	1200	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/23/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/19/2006	1015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Powder Lick Run near Summersville	05/22/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/22/2006	1015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/18/2006	0930	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Epi-anhydro-tetracycline	Chloro-tetracycline	Anhydro-chloro-tetracycline	Epi-anhydro-chloro-tetracycline	Epichloro-tetracycline	Isochloro-tetracycline	Epi-isochloro-tetracycline
Hap Cremean WTP, I	12/07/2005	1120	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	1010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1035	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Hap Cremean WTP, F	12/07/2005	1115	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	1015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1040	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Scioto River DS from CW-104	12/06/2005	1130	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	1400	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/19/2006	1315	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Big Walnut Creek at Sunbury	12/08/2005	0915	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/18/2006	1330	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Columbus Well Field CW-101	12/06/2005	1055	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/25/2006	1010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Parsons Avenue WTP, I	12/06/2005	1020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/25/2006	0940	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/23/2006	1310	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Parsons Avenue WTP, F	12/06/2005	1015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/25/2006	0945	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/23/2006	1315	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Deme-clocycline	Oxy-tetracycline	Alpha apoxy-tetracycline	Beta apoxy-tetracycline	Epioxy-tetracycline	Minocycline	Doxycycline
Scioto River near Prospect	12/08/2005	1030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	1140	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/23/2006	1145	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/18/2006	1200	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dublin Road WTP, F	12/07/2005	1035	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	0935	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/22/2006	1325	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1005	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dublin Road WTP, I	12/07/2005	1040	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	0945	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/22/2006	1320	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Mill Creek below Marysville	12/08/2005	1215	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/22/2006	1200	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/23/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/19/2006	1015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Powder Lick Run near Summersville	05/22/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/22/2006	1015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/18/2006	0930	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Deme-clocycline	Oxy-tetracycline	Alpha apoxy-tetracycline	Beta apoxy-tetracycline	Epioxy-tetracycline	Minocycline	Doxycycline
Hap Cremean WTP, I	12/07/2005	1120	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	1010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1035	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Hap Cremean WTP, F	12/07/2005	1115	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	1015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1040	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Scioto River DS from CW-104	12/06/2005	1130	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	1400	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/19/2006	1315	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Big Walnut Creek at Sunbury	12/08/2005	0915	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/18/2006	1330	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Columbus Well Field CW-101	12/08/2005	1055	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/25/2006	1010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Parsons Avenue WTP, I	12/06/2005	1020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/25/2006	0940	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/23/2006	1310	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Parsons Avenue WTP, F	12/06/2005	1120	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/25/2006	1010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/23/2006	1315	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Sulfathiazole	Sulfa-merazine	Sulfa-methazine	Sulfa-methoxazole	Sulfa-chlor-pyradazine	Sulfa-dimethoxine	Sulfadiazine
Scioto River near Prospect	12/08/2005	1030	<0.005	<0.005	<0.005	**0.050**	<0.005	<0.005	<0.005
	05/23/2006	1140	<0.005	<0.005	<0.005	**0.024**	<0.005	<0.005	<0.005
	08/23/2006	1145	<0.005	<0.005	<0.005	**0.140**	<0.005	<0.005	<0.005
	10/18/2006	1200	<0.005	<0.005	<0.005	**0.013**	<0.005	<0.005	<0.005
Dublin Road WTP, F	12/07/2005	1035	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	0935	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/22/2006	1325	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dublin Road WTP, I	12/07/2005	1040	<0.005	<0.005	**0.006**	**0.022**	<0.005	<0.005	<0.005
	05/24/2006	0945	<0.005	<0.005	<0.005	**0.031**	<0.005	<0.005	<0.005
	08/22/2006	1320	<0.005	<0.005	<0.005	**0.017**	<0.005	<0.005	<0.005
	10/24/2006	1000	<0.005	<0.005	<0.005	**0.012**	<0.005	<0.005	<0.005
Mill Creek below Marysville	12/08/2005	1215	<0.005	<0.005	<0.005	**0.010**	<0.005	<0.005	<0.005
	05/22/2006	1200	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/23/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/19/2006	1015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Powder Lick Run near Summersville	05/22/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/22/2006	1015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/18/2006	0930	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Sulfathiazole	Sulfa-merazine	Sulfa-methazine	Sulfa-methoxazole	Sulfa-chlor-pyradazine	Sulfa-dimethoxine	Sulfadiazine
Hap Cremean WTP, I	12/07/2005	1120	<0.005	<0.005	<0.005	**0.008**	<0.005	<0.005	<0.005
	05/24/2006	1010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1035	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hap Cremean WTP, F	12/07/2005	1030	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	1140	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1200	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Scioto River DS from CW-104	12/06/2005	1130	<0.005	<0.005	<0.005	**0.088**	<0.005	<0.005	<0.005
	05/23/2006	1400	<0.005	<0.005	<0.005	**0.052**	<0.005	<0.005	<0.005
	10/19/2006	1315	<0.005	<0.005	<0.005	**0.074**	<0.005	<0.005	<0.005
Big Walnut Creek at Sunbury	12/08/2005	0915	<0.005	<0.005	<0.005	**0.016**	<0.005	<0.005	<0.005
	05/23/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/18/2006	1330	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Columbus Well Field CW-101	12/06/2005	1055	<0.005	<0.005	<0.005	**0.006**	<0.005	<0.005	<0.005
	05/25/2006	1010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Parsons Avenue WTP, I	12/06/2005	1020	<0.005	<0.005	<0.005	**0.005**	<0.005	<0.005	<0.005
	05/23/2006	0940	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/25/2006	1310	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Parsons Avenue WTP, F	12/06/2005	1015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/25/2006	0945	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/23/2006	1315	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Norfloxacin	Ciprofloxacin	Clinafloxacin	Flumequine	Lomefloxacin	Ofloxacin	Oxolinic Acid
Scioto River near Prospect	12/08/2005	1030	<0.005	**0.006**	<0.005	<0.005	<0.005	**0.01**	<0.005
	05/23/2006	1140	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/23/2006	1145	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/18/2006	1200	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dublin Road WTP, F	12/07/2005	1035	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	0935	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/22/2006	1325	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dublin Road WTP, I	12/07/2005	1040	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	0945	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/22/2006	1320	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mill Creek below Marysville	12/08/2005	1215	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/22/2006	1200	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/23/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/19/2006	1015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Powder Lick Run near Summersville	05/22/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/22/2006	1015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/18/2006	0930	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Norfloxacin	Ciprofloxacin	Clinafloxacin	Flumequine	Lomefloxacin	Ofloxacin	Oxolinic Acid
Hap Cremean WTP, I	12/07/2005	1120	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	1010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1035	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hap Cremean WTP, F	12/07/2005	1030	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	1140	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1200	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Scioto River DS from CW-104	12/06/2005	1130	<0.005	**0.009**	<0.005	<0.005	<0.005	**0.013**	<0.005
	05/23/2006	1400	<0.005	<0.005	<0.005	<0.005	<0.005	**0.009**	<0.005
	10/19/2006	1315	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Big Walnut Creek at Sunbury	12/08/2005	0915	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/23/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/18/2006	1330	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Columbus Well Field CW-101	12/06/2005	1055	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/25/2006	1010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Parsons Avenue WTP, I	12/06/2005	1020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/23/2006	0940	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/25/2006	1310	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Parsons Avenue WTP, F	12/06/2005	1015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/25/2006	0945	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/23/2006	1315	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Sarafloxacin	Azithromycin	Tylosin	Virginia-mycin	Erythromycin-H_2O	Erythromycin	Roxithro-mycin
Scioto River near Prospect	12/08/2005	1030	<0.005	**0.011**	<0.005	<0.005	**0.014**	**0.015**	<0.005
	05/23/2006	1140	<0.005	<0.005	<0.005	<0.005	<0.005	**0.007**	<0.005
	08/23/2006	1145	<0.005	<0.005	<0.005	<0.005	**0.013**	**0.022**	<0.005
	10/18/2006	1200	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dublin Road WTP, F	12/07/2005	1035	<0.005	**0.025**	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	0935	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/22/2006	1325	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dublin Road WTP, I	12/07/2005	1040	<0.005	**0.031**	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	0945	<0.005	<0.005	<0.005	<0.005	**0.017**	**0.010**	**0.009**
	08/22/2006	1320	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mill Creek below Marysville	12/08/2005	1215	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/22/2006	1200	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/23/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/19/2006	1015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Powder Lick Run near Summersville	05/22/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	08/22/2006	1015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/18/2006	0930	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Sarafloxacin	Azithromycin	Tylosin	Virginia-mycin	Erythromycin-H_2O	Erythromycin	Roxithro-mycin
Hap Cremean WTP, I	12/07/2005	1120	<0.005	**0.005**	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	1010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1035	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hap Cremean WTP, F	12/07/2005	1030	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	05/24/2006	1140	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/24/2006	1200	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Scioto River DS from CW-104	12/06/2005	1130	<0.005	**0.036**	<0.005	<0.005	**0.021**	**0.019**	<0.005
	05/23/2006	1400	<0.005	<0.005	<0.005	<0.005	**0.026**	**0.046**	<0.005
	10/19/2006	1315	<0.005	<0.005	<0.005	<0.005	**0.007**	**0.008**	<0.005
Big Walnut Creek at Sunbury	12/08/2005	0915	<0.005	**0.008**	<0.005	<0.005	<0.005	<0.005	<0.005
	05/23/2006	1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/18/2006	1330	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Columbus Well Field CW-101	12/06/2005	1055	<0.005	**0.048**	<0.005	<0.005	<0.005	<0.005	<0.005
	05/25/2006	1010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Parsons Avenue WTP, I	12/06/2005	1020	<0.005	**0.043**	<0.005	<0.005	<0.005	<0.005	<0.005
	05/23/2006	0940	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/25/2006	1310	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Parsons Avenue WTP, F	12/06/2005	1015	<0.005	**0.080**	**0.016**	<0.005	<0.005	<0.005	**0.023**
	05/25/2006	0945	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	10/23/2006	1315	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Amoxicillin	Ampicillin	Cefotaxime	Cloxacillin	Oxacillin	Penicillin G	Penicillin V
Scioto River near Prospect	12/08/2005	1030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	1140	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
	08/23/2006	1145	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/18/2006	1200	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
Dublin Road WTP, F	12/07/2005	1035	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	0935	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
	08/22/2006	1325	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1005	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
Dublin Road WTP, I	12/07/2005	1040	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	0945	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
	08/22/2006	1320	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/24/2006	1000	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
Mill Creek below Marysville	12/08/2005	1215	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/22/2006	1200	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
	08/23/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	10/19/2006	1015	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
Powder Lick Run near Summersville	05/22/2006	1000	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	08/22/2006	1015	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
	10/18/2006	0930	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Table 1–2. Water-quality analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[µg/L, micrograms per liter; <, less than; WTP, water-treatment plant; F, finished water; I, intake; CW, collector well; DS, downstream; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Amoxicillin	Ampicillin	Cefotaxime	Cloxacillin	Oxacillin	Penicillin G	Penicillin V
Hap Cremean WTP, I	12/07/2005	1120	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	1010	<0. 010	<0. 010	<0. 010	<0. 010	<0.010	<0.010	<0.010
	10/24/2006	1035	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Hap Cremean WTP, F	12/07/2005	1030	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
	05/24/2006	1140	<0.005	<0.005	<0. 010	<0. 010	<0.010	<0.010	<0.010
	10/24/2006	1200	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
Scioto River DS from CW-104	12/06/2005	1130	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	1400	<0.005	<0.005	<0. 010	<0. 010	<0.010	<0.010	<0.010
	10/19/2006	1315	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
Big Walnut Creek at Sunbury	12/08/2005	0915	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	1000	<0.005	<0.005	<0. 010	<0. 010	<0.010	<0.010	<0.010
	10/18/2006	1330	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
Columbus Well Field CW-101	12/06/2005	1055	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
	05/25/2006	1010	<0.005	<0.005	<0. 010	<0. 010	<0.010	<0.010	<0.010
Parsons Avenue WTP, I	12/06/2005	1020	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
	05/23/2006	0940	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
	10/25/2006	1310	<0.005	<0.005	<0. 010	<0. 010	<0.010	<0.010	<0.010
Parsons Avenue WTP, F	12/06/2005	1015	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010
	05/25/2006	0945	<0.005	<0.005	<0. 010	<0. 010	<0.010	<0.010	<0.010
	10/23/2006	1315	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	<0.010

Table 1–3. Quality-control analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.

[All constituent concentrations in micrograms per liter; —, not measured; <, less than; WTP, water-treatment plant; DS, downstream; CW, collector well; F, finished water; I, intake; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Lincomycin	Carbadox	Tri-methoprim	Ormetoprim	Tetracycline	Anhydro-tetracycline	Epi-anhydro-tetracycline
Field blanks									
Dublin Road WTP, I	12/07/2005	1041	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Powder Lick Run near Summersville	08/22/2006	1014	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Hap Cremean WTP, F	10/24/2006	1039	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Big Walnut Creek at Sunbury	05/23/2006	0959	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Scioto River DS from CW-104	05/23/2006	1359	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Parsons Avenue WTP, F	05/23/2006	0944	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Replicates									
Powder Lick Run near Summersville	05/22/2006	1001	**0.005**	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010
Columbus Well Field CW-101	05/25/2006	1011	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010

Table 1–3. Quality-control analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[All constituent concentrations in micrograms per liter; —, not measured; <, less than; WTP, water-treatment plant; DS, downstream; CW, collector well; F, finished water; I, intake; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Chloro-tetracycline	Anhydro-chloro-tetracycline	Epi-anhydro-chloro-tetracycline	Epi-chloro-tetracycline	Iso-Chloro-tetracycline	Epi-iso-chloro-tetra-cycline	Deme-clocycline
Field blanks									
Dublin Road WTP, I	12/07/2005	1041	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Powder Lick Run near Summersville	08/22/2006	1014	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Hap Cremean WTP, F	10/24/2006	1039	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Big Walnut Creek at Sunbury	05/23/2006	0959	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Scioto River DS from CW-104	05/23/2006	1359	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Parsons Avenue WTP, F	05/23/2006	0944	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Replicates									
Powder Lick Run near Summersville	05/22/2006	1001	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Columbus Well Field CW-101	05/25/2006	1011	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010

Table 1–3. Quality-control analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[All constituent concentrations in micrograms per liter; —, not measured; <, less than; WTP, water-treatment plant; DS, downstream; CW, collector well; F, finished water; I, intake; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Oxy-tetracycline	Alpha apooxy-tetracycline	Beta apooxy-tetracycline	Epioxy-tetracycline	Minocycline	Doxycycline	Sulfathiazole
Field blanks									
Dublin Road WTP, I	12/07/2005	1041	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.005
Powder Lick Run near Summersville	08/22/2006	1014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.005
Hap Cremean WTP, F	10/24/2006	1039	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.005
Big Walnut Creek at Sunbury	05/23/2006	0959	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.005
Scioto River DS from CW-104	05/23/2006	1359	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.005
Parsons Avenue WTP, F	05/23/2006	0944	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.005
Replicates									
Powder Lick Run near Summersville	05/22/2006	1001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.005
Columbus Well Field CW-101	05/25/2006	1011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.005

Table 1–3. Quality-control analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[All constituent concentrations in micrograms per liter; — not measured; <, less than; WTP, water-treatment plant; DS, downstream; CW, collector well; F, finished water; I, intake; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Sulfa-merazine	Sulfa-methazine	Sulfa-methoxazole	Sulfa-chlor-pyradazine	Sulfa-dimethoxine	Sulfadiazine	Norfloxacin
Field blanks									
Dublin Road WTP, I	12/07/2005	1041	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Powder Lick Run near Summersville	08/22/2006	1014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hap Cremean WTP, F	10/24/2006	1039	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Big Walnut Creek at Sunbury	05/23/2006	0959	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Scioto River DS from CW-104	05/23/2006	1359	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Parsons Avenue WTP, F	05/23/2006	0944	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Replicates									
Powder Lick Run near Summersville	05/22/2006	1001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Columbus Well Field CW-101	05/25/2006	1011	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 1–3. Quality-control analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[All constituent concentrations in micrograms per liter; — not measured; <, less than; WTP, water-treatment plant; DS, downstream; CW, collector well; F, finished water; I, intake; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Ciprofloxacin	Clinafloxacin	Flumequine	Lomefloxacin	Ofloxacin	Oxolinic Acid	Sarafloxacin	Azithromycin
Field blanks										
Dublin Road WTP, I	12/07/2005	1041	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Powder Lick Run near Summersville	08/22/2006	1014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hap Cremean WTP, F	10/24/2006	1039	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Big Walnut Creek at Sunbury	05/23/2006	0959	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Scioto River DS from CW-104	05/23/2006	1359	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Parsons Avenue WTP, F	05/23/2006	0944	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Replicates										
Powder Lick Run near Summersville	05/22/2006	1001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Columbus Well Field CW-101	05/25/2006	1011	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 1–3. Quality-control analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[All constituent concentrations in micrograms per liter; — not measured; <, less than; WTP, water-treatment plant; DS, downstream; CW, collector well; F, finished water; I, intake; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Tylosin	Virginiamycin	Erythromycin-H_20	Erythromycin	Roxithromycin	Amoxocillin	Ampicillin
Field blanks									
Dublin Road WTP, I	12/07/2005	1041	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Powder Lick near Summersville	08/22/2006	1014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Hap Cremean WTP, F	10/24/2006	1039	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Big Walnut Creek at Sunbury	05/23/2006	0959	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Scioto River DS from CW-104	05/23/2006	1359	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Parsons Avenue WTP, F	05/23/2006	0944	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Replicates									
Powder Lick Run near Summersville	05/22/2006	1001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Columbus Well Field CW-101	05/25/2006	1011	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010

Table 1–3. Quality-control analyses from sampling locations in the upper Scioto River Basin, Ohio, 2005–6.—Continued

[All constituent concentrations in micrograms per liter; — not measured; <, less than; WTP, water-treatment plant; DS, downstream; CW, collector well; F, finished water; I, intake; **bold**, value exceeded detection or reporting level]

Site name	Date	Time	Cefotaxime	Cloxacillin	Oxacillin	Penicilln G	Penicillin V
Field blanks							
Dublin Road WTP, I	12/07/2005	1041	<0.010	<0.010	<0.010	<0.010	<0.010
Powder Lick Run near Summersville	08/22/2006	1014	<0.010	<0.010	<0.010	<0.010	<0.010
Hap Cremean WTP, F	10/24/2006	1039	<0.010	<0.010	<0.010	<0.010	<0.010
Big Walnut Creek at Sunbury	05/23/2006	0959	<0.010	<0.010	<0.010	<0.010	<0.010
Scioto River DS from CWl-104	05/23/2006	1359	<0.010	<0.010	<0.010	<0.010	<0.010
Parsons Avenue WTP, F	05/23/2006	0944	<0.010	<0.010	<0.010	<0.010	<0.010
Replicates							
Powder Lick Run near Summersville	05/22/2006	1001	<0.010	<0.010	<0.010	<0.010	<0.010
Columbus Well Field CW-101	05/25/2006	1011	<0.010	<0.010	<0.010	<0.010	<0.010

Appendix 2. Sample Analysis

Samples were extracted for the beta lactam and macrolides (BLM) and sulfonamides and quinolines (SQ) methods using HLB Prospekt cartridges (Waters Corp., Milford, Mass.) and for the tetracyclines (TET) method using a proprietary Glyphosate Prospekt cartridge (Spark Holland, Emmen, The Netherlands). Simatone was used as an internal standard for all three methods; the surrogate standards were oleandomycin for the BLM method, nalidixic acid and $^{13}C_6$ sulfamethazine for the SQ method, and meclocycline for the TET method. A 1.23 ng/µL solution of the internal standard, simatone, was diluted 1:20 for the BLM and SQ methods and 1:40 for the TET method. The diluted standard was added to an amber 2-mL chromatography vial and placed on the LC autosampler tray.

Samples were prepared for analysis by pipetting a 10-mL aliquot of each sample into 11-mL glass crimp-top vials. For the BLM and SQ methods, 75 mL of 6.67 ng/ml surrogate solutions were made up in distilled water, and for the TET method, in a 5% diNa-EDTA solution; 750 µL of the respective surrogate was added to each sample, standard, and blank. Standard curves were prepared for each method by diluting the respective 1-ng/µL standard mix to 1ng/mL with distilled water. Standard solutions, 10 mL in volume, were then made at concentrations of 0.01, 0.02, 0.05, 0.1, 0.2, 0.5 and 1.0 µg/L.

A duplicate sample, a 0.5- or 1.0-µg/L matrix-spiked sample, and a blank were analyzed after every 10 samples and a 1.0 µg/L standard solution after every 20. All standard solutions, blanks, and matrix spikes were treated the same as the water samples. Sample modifier solutions were added to each sample by the online SPE autosampler just prior to extraction and were prepared for the SQ and TET method by adding 250 µL of formic acid to 9.75 mL of deionized water, and for the BLM method by adding 10 ml of a 10 percent NaCl solution with 0.5 percent diNa-EDTA to an 11-mL crimp top vial.

All of the prepared samples were loaded on the online solid phase extraction (SPE) Triathalon autosampler. During analysis, the online SPE lines were rinsed with solvents and solutions configured with the Triathalon autosampler and the high-pressure dispenser. The cartridges were rinsed immediately prior to extraction. A volume of 10 ml of sample was drawn into a Teflon sample loop and dispensed through the Prospekt SPE cartridge.

The antibiotics for each method were eluted with 750 µL of ACN and separated using a liquid chromatography (LC) gradient with the A and B mobile phases listed in table 2–1 below (Meyer and others, 2007). The initial flow rates of the A and B mobile phases were decreased and contained a higher proportion of the B mobile phase to assist in eluting the Prospekt SPE cartridge. During the elution, the LC autosampler injected 20 µL of the internal standard. The isocratic mobile phase was used to increase the aqueous phase in the mobile phase stream to focus the compounds eluted from the SPE cartridge onto the head of the LC column. After the mobile phase flow had passed through the SPE cartridge, the flow rate was increased to 0.36 mL/min, and the isocratic pump flow was turned off. A 3.0 × 150 mm Luna C18(2) (Phenonomenex) with 3-µm packing was used to separate the antibiotics for each of the three methods. The LC column was rinsed for 5 minutes with 100 percent mobile phase B at the end of the gradient and then equilibrated at initial conditions for 5 minutes before the next sample analysis.

Table 2–1. Mobile phases used in the liquid chromatography/electrospray ionization-mass spectrometry (LC/ESI-MS) techniques for three common antibiotic groups.

[%, percent]

Mobile-phase name	Antibiotic groups		
	Tetracyclines	Sulfonamides and quinolones	Macrolides and beta lactams
A	0.3% formic acid	0.3% formic acid	5mM NH_4-acetate
B	1.0% formic acid	Acetonitrile	Acetonitrile
Isocratic	0.3% formic acid	0.3% formic acid	5mM NH_4-acetate