2017 Groundwater Quality Survey and Contaminant Trends Study Report

MCD staff collects a groundwater sample from a groundwater monitoring well

Executive Summary

To analyze groundwater quality, MCD staff collected water samples from 12 monitoring wells located in the buried valley aquifer during the spring and fall of 2017. The goal of the study was to provide a better understanding of human impact on groundwater quality. The water was analyzed for the presence of E. coli, major ions, nutrients, volatile organic compounds and endocrine disruptors.

Results show that groundwater samples met primary drinking water standards and health based screening levels in water collected at 7 of the 12 monitoring wells.

Parameters that exceeded a primary drinking water standard in at least one groundwater sample included trichloroethene, nitrite, nitrate, and manganese. Parameters that exceeded secondary drinking water standards in at least one groundwater sample included iron, manganese, and total dissolved solids.

Analysis of chloride and sodium in groundwater samples show elevated concentrations of both parameters in samples collected from three monitoring wells. It is possible these results indicate anthropogenic sources, such as the use of road salt for deicing and discharge of wastewater from water softeners. Analysis of groundwater samples for endocrine disruptor compounds showed 15 different compounds present at very low concentrations. Some of the endocrine disruptor compounds detected were herbicides which suggests they originated from agricultural or lawn care sources. Other compounds likely originated from wastewater inflows to the aquifer.

Trend analysis of anthropogenic contaminants show declining levels of trichloroethene in one monitoring well with a history of trichloroethene detections. Nitrate concentrations in groundwater samples vary widely from each well and from spring to fall. However, one well did appear to show an upward trend in nitrate. Concentrations of chloride and sodium also vary widely and show fluctuations in wells with a history of elevated concentrations. Concentrations of natural occurring contaminants such as arsenic, iron, and manganese, did not show strong evidence of increasing or decreasing trends.

The results of this study are consistent with the results of previous studies which show that low levels of anthropogenic contaminants are not uncommon in sensitive, shallow sand and gravel aquifer settings. This underscores the need for proactive groundwater protection to manage the quality of buried valley aquifer resources in southwest Ohio.

Introduction

MCD staff collected samples from 12 groundwater monitoring wells to survey groundwater quality in the buried valley aquifer (see Figure 1). The purpose of the study was to provide a better understanding of human impacts on groundwater quality. All of the wells chosen for the study are surrounded by land uses with the potential to release contaminants into the aquifer.

The wells selected for the study are installed in unconfined sand and gravel aquifers with permeable soils at the surface. Seven of the wells are screened at shallow (< 50 feet) depths. Table 1 summarizes depths and screened intervals for all of the monitoring wells in this survey.

MCD equipped each monitoring well with a bladder pump installed within the screened interval of the well. The bladder pumps allow low-flow purging techniques to be used (Puls and Barcelona, 1996).

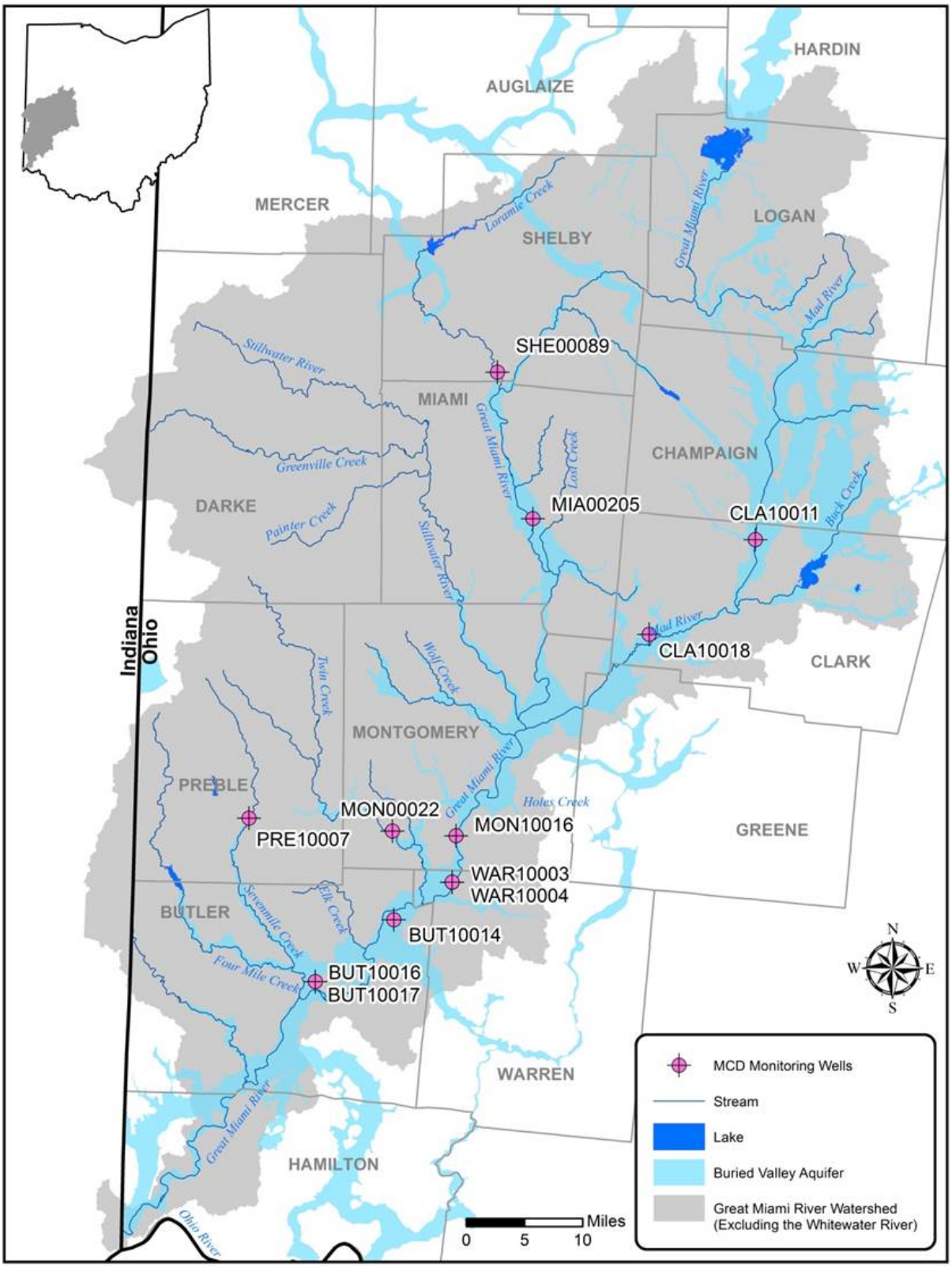
Samples were collected twice in 2017; once between May 8 and 12 (spring 2017) and once between September 29 and October 9 (fall 2017). The water was analyzed for a range of parameters including E. coli, major ions, metals, nutrients, volatile organic compounds (VOCs), and a list of 98 organic compounds suspected of being endocrine disruptors.

The World Health Organization (WHO) along with the International Programme on Chemical Safety (IPCS) provided the following definition of an endocrine disruptor: *An endocrine disruptor is an exogenous substance or mixture that alters function(s) of the endocrine system and consequently causes adverse health effects in an intact organism, or its progeny, or (sub)populations.*

Table 1 – *Construction details for groundwater quality monitoring wells*

Monitoring Well ID	Casing Diameter (in)	Well Depth (ft)	Screened Interval (ft)	Aquifer Screened
BUT10014	2	40	35 - 40	Sand and Gravel
BUT10016	2	65	60 - 65	Sand and Gravel
BUT10017	2	39	34 - 39	Sand and Gravel
CLA10011	2	60	55 - 60	Sand and Gravel
CLA10018	2	16	11 - 16	Sand and Gravel
MIA00205	2	24	19 - 24	Sand and Gravel
MON00022	2	15	10 - 15	Sand and Gravel
MON10016	2	108	88 - 108	Sand and Gravel
PRE10007	2	60	40 - 60	Sand and Gravel
SHE00089	2	43	38 - 43	Sand and Gravel
WAR10003	2	67	62 - 67	Sand and Gravel
WAR10004	2	32.5	27.5 – 32.5	Sand and Gravel

Figure 1 – *Locations of monitoring wells*



Duplicate samples were also collected from one location during each sampling event to evaluate laboratory precision. Field blanks were collected to assess potential contamination from field conditions during sampling.

The results of this study were compared with federal drinking water standards and health based screening levels. Drinking water standards are generally more stringent than other water standards, so groundwater that meets drinking water standards should be suitable for other uses.

National Primary Drinking Water Regulations for parameters are legally enforceable standards set by the U.S. EPA that apply to public water systems. Primary standards set maximum contaminant levels (MCLs) that help protect public health by limiting the contaminant levels in drinking water. National Secondary Drinking Water Standards are advisable guidelines addressing secondary maximum contaminant levels (SMCLs) that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. The U.S. EPA recommends, but does not require, that public water systems incorporate secondary standards. The U.S. EPA Office of Water also publishes non enforceable health-based screening levels (HBSLs) for some constituents which may pose potential human-health concerns but do not yet have an enforceable standard. HBSLs are used as a supplement for evaluating contaminants in drinking water in a human-health context.

Results

The samples collected at 7 of the 12 monitoring wells met all human health-based drinking water standards including MCLs and HBSLs for both sampling events (see Table 2). See Appendices A and B for the analytical results.

At least one parameter in groundwater samples from monitoring wells BUT10014, BUT10016, BUT10017, CLA10018, and WAR10003 exceeded an MCL or HBSL. Spring and fall groundwater samples collected from monitoring well BUT10014 exceeded the MCL for Trichloroethene (TCE). The spring and fall groundwater samples collected from monitoring well BUT10016 exceeded the HBSL for manganese. Spring groundwater samples collected from monitoring wells BUT10014 and WAR10003 exceeded the MCL for nitrite. The spring groundwater sample collected from monitoring well BUT10017 exceeded the MCL for nitrate. Nitrate concentrations in the spring and fall groundwater samples collected from monitoring well CLA10018 exceeded the MCL. Nitrite, Nitrate, Manganese, and TCE were the only parameters detected at concentrations exceeding human-health-based drinking water standards.

Samples collected at 11 of the 12 monitoring wells exceeded an SMCL for at least one parameter in the spring sampling event (see Table 2). Parameters present above an SMCL occurred in groundwater samples from 9 of the 12 monitoring wells for the fall event. Parameters present at concentrations exceeding SMCLs included iron, manganese, and total dissolved solids.

There were also detections of parameters which reflected anthropogenic sources of contaminants that did not exceed any regulatory standards. These contaminants included chloride, sodium, and fifteen organic compounds suspected of being endocrine disruptors. Chloride and sodium are

Table 2 – Summary of significant detections of constituents in groundwater

Spring 2017		**Benchmark**		**Sample Sites**					
Parameter	**Units**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
Chloride	mg/L	SMCL	250	79.2					
Nitrogen, Nitrite	mg/L	MCL	1	**1.54**					
Nitrogen, Nitrate	mg/L	MCL	10			**11.4**		**14.6**	
Iron	mg/L	SMCL	0.3		**1.64**		**2.91**		
Manganese	mg/L	HBSL, SMCL	0.3, 0.05		**0.390**		**0.0588**		**0.0870**
Molybdenum	mg/L	HBSL	0.04		**0.0473**				
Sodium	mg/L	-	-	48.6					
Total Dissolved Solids	mg/L	SMCL	500	**607**	**666**	**764**		**804**	
Trichloroethene	µg/L	MCL	5	**22.8**					
Acesulfame K	ng/L	-	-	**87**		39			
Atrazine	ng/L	MCL	3,000						
BPA	ng/L	HBSL	400,000				14		
DEA	ng/L	-	-						
DEET	ng/L	-	-						
Iohexal	ng/L	-	-				12		
Meclofenamic Acid	ng/L	-	-						5.8
Metolachor	ng/L	HBSL	700,000						
OUST	ng/L	HHBP	1,925,000			54			
Propylparaben	ng/L	-	-						
Simazine	ng/L	MCL	4,000						
Sucralose	ng/L	-	-						
4-nonylphenol	ng/L	-	-	120					

MCL – Maximum Contaminant Level set by USPEA
SMCL – Secondary Maximum Contaminant Level set by USEPA
HBSL – Non enforceable Health Based Screening Level based on (1) latest USEPA Office of Water policies for establishing drinking water benchmarks and (2) most recent USEPA peer reviewed toxicity information
NA – Not analyzed
Numbers in bold exceed a benchmark
Samples from sites in red exceeded at least one MCL or HBSL

Table 2 – Summary of significant detections of constituents in groundwater *continued*

Spring 2017		**Benchmark**		**Sample Sites**					
Parameter	**Units**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
Chloride	mg/L	SMCL	250		114			101	
Nitrogen, Nitrite	mg/L	MCL	1					**2.88**	
Nitrogen, Nitrate	mg/L	MCL	10						3.11
Iron	mg/L	SMCL	0.3		**0.452**	**1.83**		**1.87**	
Manganese	mg/L	HBSL, SMCL	0.3, 0.05		**0.0856**		**0.228**	**0.0528**	
Molybdenum	mg/L	HBSL	0.04						
Sodium	mg/L	-	-		68.2			36.6	
Total Dissolved Solids	mg/L	SMCL	500	**1320**	**1080**	**892**		**596**	
Trichloroethene	µg/L	MCL	5						
Acesulfame K	ng/L	-	-		200	660			62
Atrazine	ng/L	MCL	3,000		7.0				330
BPA	ng/L	HBSL	400,000						110
DEA	ng/L	-	-		26				
DEET	ng/L	-	-						
Iohexal	ng/L	-	-						
Meclofenamic Acid	ng/L	-	-						
Metolachor	ng/L	HBSL	700,000						16
OUST	ng/L	HHBP	1,925,000						
Propylparaben	ng/L	-	-			7.9			
Simazine	ng/L	MCL	4,000						13
Sucralose	ng/L	-	-		170	310			410
4-nonylphenol	ng/L	-	-						

MCL – Maximum Contaminant Level set by USPEA
SMCL – Secondary Maximum Contaminant Level set by USEPA
HBSL – Non enforceable Health Based Screening Level based on (1) latest USEPA Office of Water policies for establishing drinking water benchmarks and (2) most recent USEPA peer reviewed toxicity information
NA – Not analyzed
Numbers in bold exceed a benchmark
Samples from sites in red exceeded at least one MCL or HBSL

Table 2 – Summary of significant detections of constituents in groundwater *continued*

Fall 2017		**Benchmark**		**Sample Sites**					
Parameter	**Units**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
Chloride	mg/L	SMCL	250	78.9					
Nitrogen, Nitrate	mg/L	MCL	10			7.54		**15.6**	4.49
Iron	mg/L	SMCL	0.3		**1.66**		**3.18**		
Manganese	mg/L	HBSL, SMCL	0.3, 0.05		**0.425**		**0.0623**		**0.0798**
Sodium	mg/L	-	-	51.6					
Total Dissolved Solids	mg/L	SMCL	500						
Trichloroethene	µg/L	MCL	5	**22.0**					
Acesulfame K	ng/L	-	-	**94**		190			
Atrazine	ng/L	MCL	3,000						
BPA	ng/L	HBSL	400,000				13		
Caffeine	ng/L	-	-						
DEET	ng/L	-	-				20		
OUST	ng/L	HHBP	1,925,000			51			
Salicylic Acid	ng/L	-	-						
Sucralose	ng/L	-	-			200			
4-nonylphenol	ng/L	-	-				300		

MCL – Maximum Contaminant Level set by USPEA
SMCL – Secondary Maximum Contaminant Level set by USEPA
HBSL – Non enforceable Health Based Screening Level based on (1) latest USEPA Office of Water policies for establishing drinking water benchmarks and (2) most recent USEPA peer reviewed toxicity information
NA – Not analyzed
Numbers in bold exceed a benchmark
Samples from sites in red exceeded at least one MCL or HBSL

Table 2 – Summary of significant detections of constituents in groundwater

Fall 2017		**Benchmark**		**Sample Sites**					
Parameter	**Units**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
Chloride	mg/L	SMCL	250		87.3			93.9	
Nitrogen, Nitrate	mg/L	MCL	10						
Iron	mg/L	SMCL	0.3		**0.243**	**1.85**		**1.94**	
Manganese	mg/L	HBSL, SMCL	0.3, 0.05		**0.0786**		**0.255**	**0.0535**	
Sodium	mg/L	-	-		51.9			32.9	
Total Dissolved Solids	mg/L	SMCL	500	**750**	**538**			**568**	
Trichloroethene	µg/L	MCL	5						
Acesulfame K	ng/L	-	-		630	760		72	38
Atrazine	ng/L	MCL	3,000	7.0					
BPA	ng/L	HBSL	400,000						
Caffeine	ng/L	-	-	5.6					
DEET	ng/L	-	-	28		44	11	37	
OUST	ng/L	HHBP	1,925,000						
Salicylic Acid	ng/L	-	-	310			140		390
Sucralose	ng/L	-	-		160	170			
4-nonylphenol	ng/L	-	-					230	

MCL – Maximum Contaminant Level set by USPEA
SMCL – Secondary Maximum Contaminant Level set by USEPA
HBSL – Non enforceable Health Based Screening Level based on (1) latest USEPA Office of Water policies for establishing drinking water benchmarks and (2) most recent USEPA peer reviewed toxicity information
NA – Not analyzed
Numbers in bold exceed a benchmark
Samples from sites in red exceeded at least one MCL or HBSL

present in groundwater naturally, but human activities can elevate the concentration of these elements well above background levels. Endocrine disruptors are manufactured compounds and their presence in groundwater reflects human sources of contaminants such as human sewage and use of lawn care and agriculture chemicals on land over the buried valley aquifer.

VOCs

TCE is a VOC used primarily to remove grease from fabricated metal parts. The MCL for trichloroethene is 5 µg/L. TCE was detected in both the spring and fall groundwater samples collected from monitoring well BUT10014 at concentrations of 22.8 and 22.0 µg/L respectively. Well BUT10014 is located at Smith Park in Middletown close to the former Aeronca Air Products site, a site which underwent environmental cleanup activities (Robinson and Richter, 2012). A TCE contaminant plume is present in the aquifer south of the site. The City of Middletown and Ohio EPA have been tracking the extent of the TCE contamination in recent years (Joe Smindak, Ohio Environmental Protection Agency, personal communication, September 8, 2017).

Nutrients

Nitrite concentrations measured in spring groundwater samples from monitoring wells BUT10014 and WAR10003 exceeded the MCL of 1 mg/L. Nitrite was not detected in any other monitoring well during the spring or fall sampling events. Common sources of nitrite in groundwater include fertilizers, sewage and septic tanks, and animal waste.

Nitrate concentrations measured in spring groundwater samples from monitoring wells BUT10017 and CLA10018 exceeded the MCL of 10 mg/L. The nitrate concentration measured in the fall groundwater sample collected from monitoring well CLA10018 also exceeded the MCL of 10 mg/L. Nitrate concentrations in all of the remaining samples were below the drinking MCL, although concentrations in groundwater samples from wells BUT10017 (fall sample), MIA00205 (fall sample), and WAR10004 (spring sample), exceeded 3.0 mg/L. According to Madison and Brunett (1985), nitrate concentrations in excess of 3.0 mg/L in groundwater are often indicative of anthropogenic sources. Similar to nitrite, common sources of nitrates in groundwater include fertilizers, sewage and septic tanks, and animal waste.

Nuisance Contaminants

Iron, manganese, and total dissolved solids are generally considered to be “nuisance” contaminants. These contaminants are present naturally in groundwater from the buried valley aquifer system. However, their presence does not typically pose a health threat. They can, however, have adverse aesthetic impacts causing water to appear cloudy or colored. They can also adversely impact plumbing fixtures, stain laundry, and cause taste and odor issues. The SMCL for Iron is 0.3 mg/L. Groundwater samples collected from wells BUT10016, CLA10011, MON10016, PRE10007, and WAR10003 exceeded this standard for both sampling events in 2017.

The SMCL for manganese is 0.05 mg/L. Manganese concentrations in groundwater samples collected from wells BUT10016, CLA10011, MIA00205, MON10016, SHE00089, and WAR10003 exceeded this standard for both sampling events. Manganese also has a HBSL of 0.3

mg/L. Manganese concentrations in both spring and fall groundwater samples collected from well BUT10016 exceeded this standard.

The SMCL for total dissolved solids is 500 mg/L. Groundwater samples collected from wells BUT10014, BUT10016, BUT10017, CLA10018, MON00022, MON10016, PRE10007, and WAR10003 had concentrations which exceeded this standard for at least one of the two sampling events.

Chloride and Sodium

Chloride has an SMCL of 250 mg/L. There are no drinking water benchmarks for sodium. Background levels of chloride in the buried valley aquifer system typically do not exceed 50 mg/L (Spieker, 1968), and (Debrewer et al, 2000). Kunz and Sroka (2004) reported mean background concentrations of chloride ranging from 13 to 23 mg/L in shallow unconsolidated aquifers in Champaign, Clark, and Pickaway counties Ohio. MCD examined chloride and sodium concentration data from literature sources and determined that chloride concentrations above 70 mg/L and sodium concentrations above 43 mg/L in local sand and gravel aquifers likely reflect anthropogenic sources (Kunz and Sroka, 2004 and Ohio EPA, 2015). These concentrations are at the high end of the typical range for sand and gravel aquifers in Ohio as reported by Ohio EPA, 2015. Chloride concentrations measured in groundwater samples from monitoring wells BUT10014, MON10016, and WAR10003 were well above 70 mg/L and likely reflect anthropogenic sources. Sodium concentrations in groundwater samples from monitoring wells BUT10014 and MON10016 exceeded 43 mg/L and also likely reflect anthropogenic sources. Anthropogenic sources of chloride and sodium include road salt applications for deicing and private and municipal wastewater from homes with water softeners.

Endocrine Disruptors

A total of 15 endocrine disruptor compounds were detected in groundwater samples from at least one monitoring well during the two 2017 sampling events. Compounds detected and the common uses of each compound are shown in the table 3 below. None of the compounds were detected at

Table 3 – Endocrine disruptor compounds detected and their use

Compound	**Use**
Acesulfame K	Artificial sweetener
Atrazine	Herbicide
Caffeine	Stimulant
Bisphenol A (BPA)	Used in the production of plastics and epoxy resins
Deethylatrazine (DEA)	Metabolite of atrazine
Diethyltoluamide (DEET)	Active ingredient in insect repellents
Iohexal	Contrasting agent used during X-rays
Meclofenamic Acid	Drug used for joint, muscular pain, and arthritis
Metolachor	Herbicide
OUST	Herbicide
Propylparaben	A preservative found in many water-based cosmetics
Salicylic Acid	Key ingredient in topical anti-acne products

Compound	Use
Simazine	Herbicide
Sucralose	Artificial sweetener
4-nonylphenol	Producing antioxidants, lubricating oil additives, and detergents

concentrations exceeding an MCL or HBSL. Compounds detected in the hundreds of nanograms per liter range in at least one groundwater sample included the artificial sweeteners acesulfame K and sucralose, the herbicide atrazine, BPA, and 4-nonlyphenol. With the exception of herbicides, most of the compounds detected likely reflect impact from human contaminant sources including home and municipal sewage treatment systems.

Contaminant Trends

Groundwater quality data collected from its network of 12 monitoring wells was also examined for trends in contaminant concentrations. MCD has conducted groundwater quality monitoring on a twice per year basis since spring 2014 at four of the monitoring wells. The other monitoring wells in the network have not been sampled for as long of a period of time. The chemical parameters TCE, nitrate, chloride, and sodium for analysis were selected as parameters indicative of anthropogenic sources. The parameters arsenic, iron, and manganese were selected to examine trends in naturally occurring contaminant concentrations.

Contaminants Indicative of Anthropogenic Sources

TCE
TCE was detected at concentrations exceeded the drinking water MCL in groundwater samples from monitoring well BUT10014 at all eight sampling events going back to spring 2014 (see figure 2). The maximum concentration of TCE (28.8 µg/L) was measured in the fall 2014 groundwater sample. Concentrations of TCE are trending down and reached a low of 15.4 µg/L during the fall 2017 sampling event.

Nitrate
Nitrate concentrations in monitoring wells CLA10018 and BUT10017 consistently exceed 3 mg/L and likely reflect anthropogenic sources of nitrate to the aquifer in which they are screened (see figure 3). Concentrations of nitrate in groundwater samples from monitoring well CLA10018 have increased since the spring 2016 sampling event and have exceeded the MCL for the last three sampling events. Concentrations of nitrate in groundwater samples collected from monitoring well BUT10017 fluctuate from event to event but remain high enough to suggest anthropogenic impact. Nitrate concentrations measured in groundwater samples from monitoring wells MIA00205 and WAR10004 are often below the 3 mg/L threshold indicative of anthropogenic sources but have exceeded the threshold on at least one occasion.

Figure 2 – *TCE concentrations in monitoring well BUT10014*

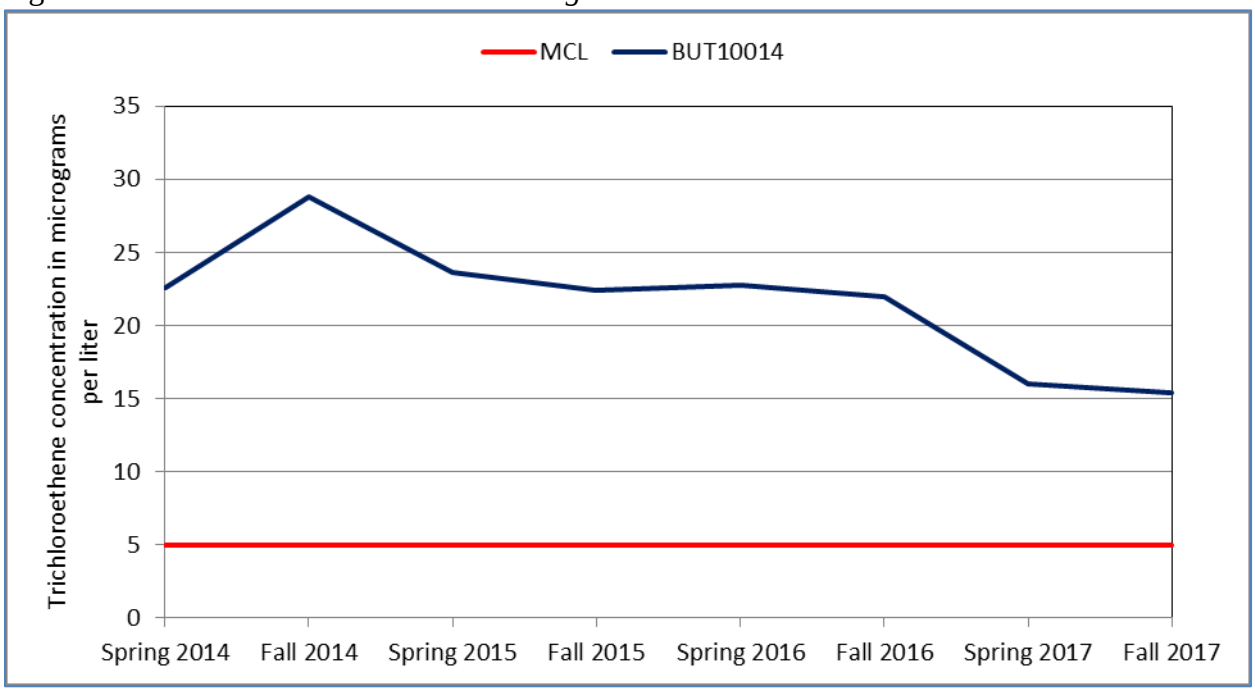
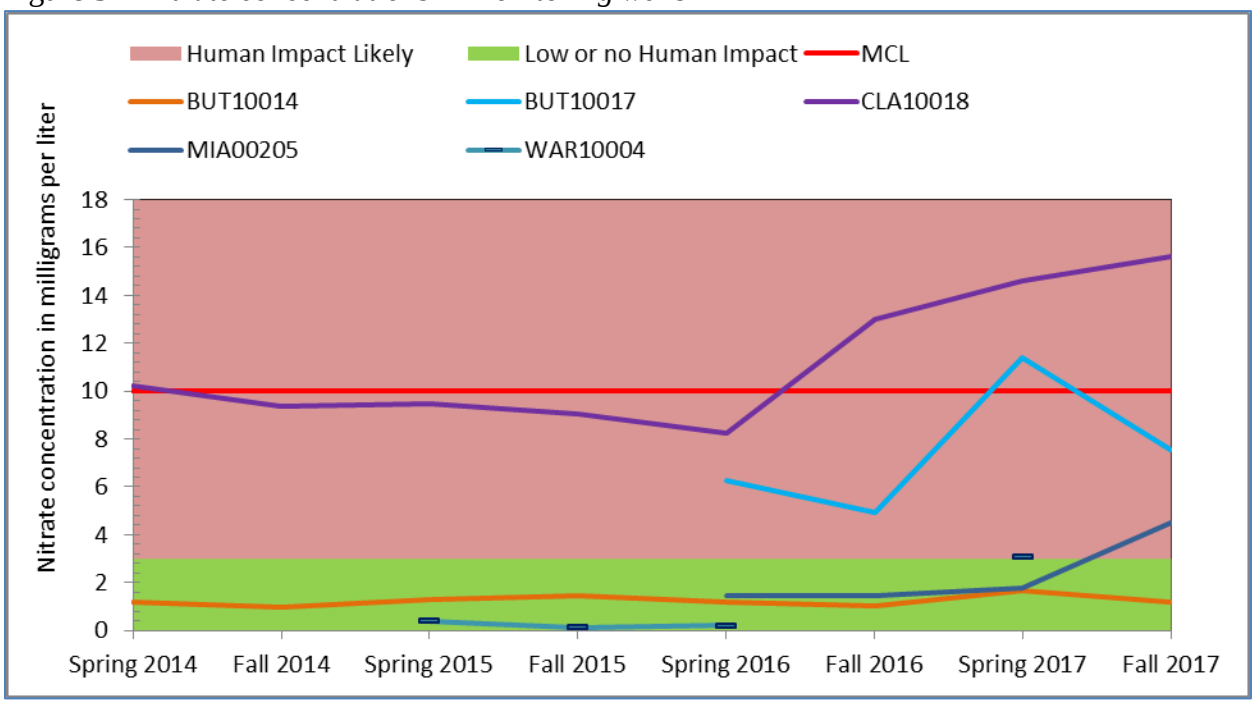


Figure 3 – *Nitrate concentrations in monitoring wells*



Chloride and Sodium

Chloride concentrations measured in groundwater samples collected from monitoring wells BUT10014, MON10016, and WAR10003 have been consistently higher than 70 mg/L and above

the concentrations measured in samples from the other monitoring wells (see figure 4). Chloride concentrations in samples show up and down fluctuations from sampling event to sampling event. Likewise, sodium concentrations in the same three wells remain above concentrations measured in groundwater samples collected from the other monitoring wells (see figure 5). Sodium concentrations measured in groundwater samples from monitoring well BUT10014 seem to be trending up since the spring 2014 sampling event.

Naturally Occurring Contaminants

Arsenic

Arsenic was present at detectable concentrations in groundwater samples collected from monitoring wells BUT10016, CLA10011, MON00022, and PRE10007 (see figure 6). None of the measured arsenic concentrations in groundwater samples exceeded the drinking water MCL of 10 µg/L. Arsenic concentrations in monitoring well BUT10016 have remained consistently between 4 and 6 µg/L since the spring 2014 sampling event. The highest measured arsenic concentrations occurred in groundwater samples collected from monitoring well CLA10011.

Iron

There does not appear to be any upward or downward trend in iron concentrations for any of the monitoring wells. It should be noted that concentrations of dissolved iron greater than 0.1 mg/L in groundwater are often associated with the presence of arsenic in the glacial aquifer system of the northern United States (Thomas, 2007). Iron concentrations in groundwater samples collected from monitoring wells BUT10016, CLA10011, MON10016, PRE10007, and WAR10003 consistently exceed the drinking water SMCL of 0.3 mg/L (see figure 7). Groundwater samples from monitoring wells BUT10016, CLA10011, and PRE10007 consistently have iron concentrations above 0.1 mg/L and detectable concentrations of arsenic.

Manganese

Manganese concentrations in groundwater samples from monitoring wells BUT10016, CLA10011, MIA00205, MON10016, SHE00089, and WAR10003 consistently exceeded the SMCL of 0.05 mg/L (see figure 8). Manganese concentrations measured in groundwater samples from monitoring well BUT10016 were the highest of all the monitoring wells and consistently exceeded the HBSL for manganese of 0.3 mg/L. There does not appear to be any strong upward or downward trends in manganese concentrations for any of the monitoring wells. Manganese concentrations appear to be fairly consistent from sampling event to sampling event.

Figure 4 – *Chloride concentrations in monitoring wells*

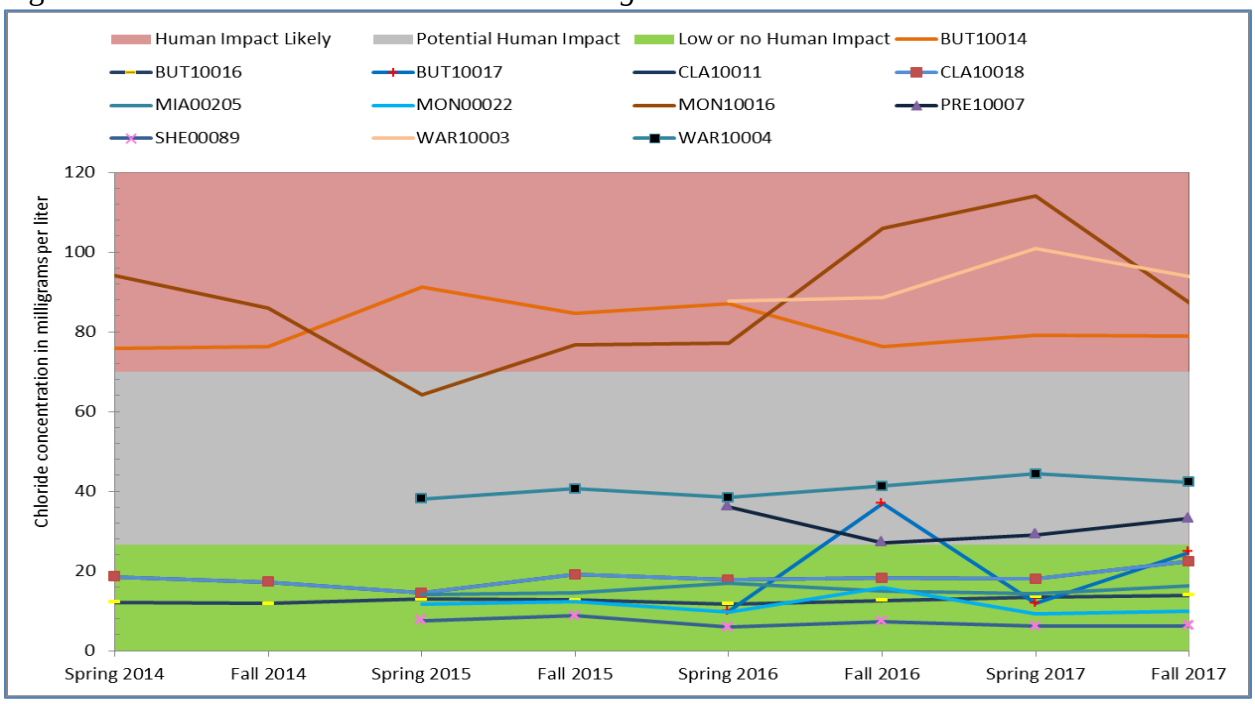


Figure 5 – *Sodium concentrations in monitoring wells*

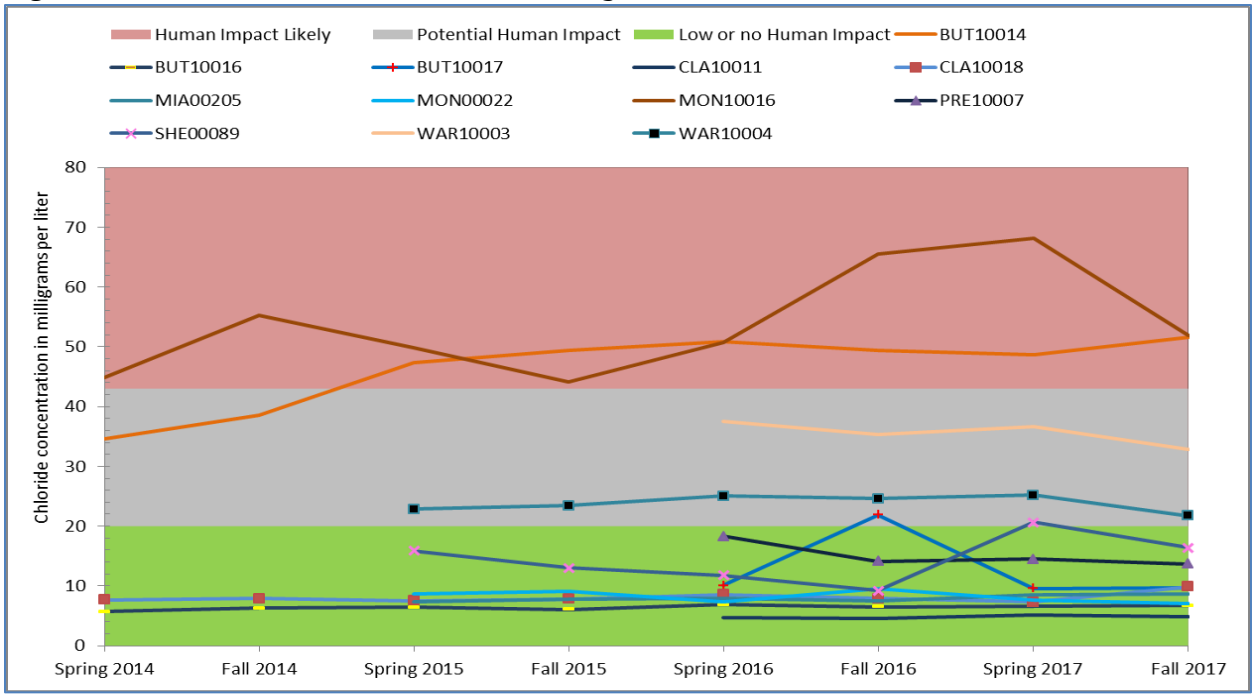


Figure 6 – *Arsenic concentrations in monitoring wells*

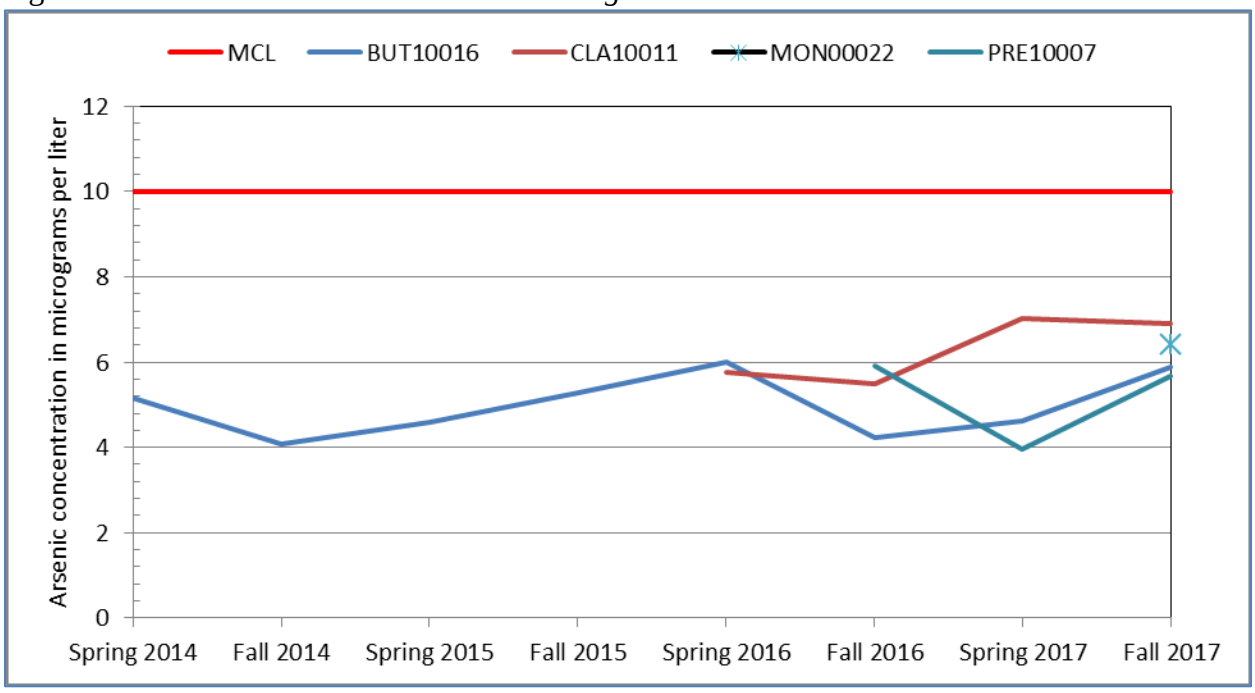


Figure 7 – *Iron concentrations in monitoring wells*

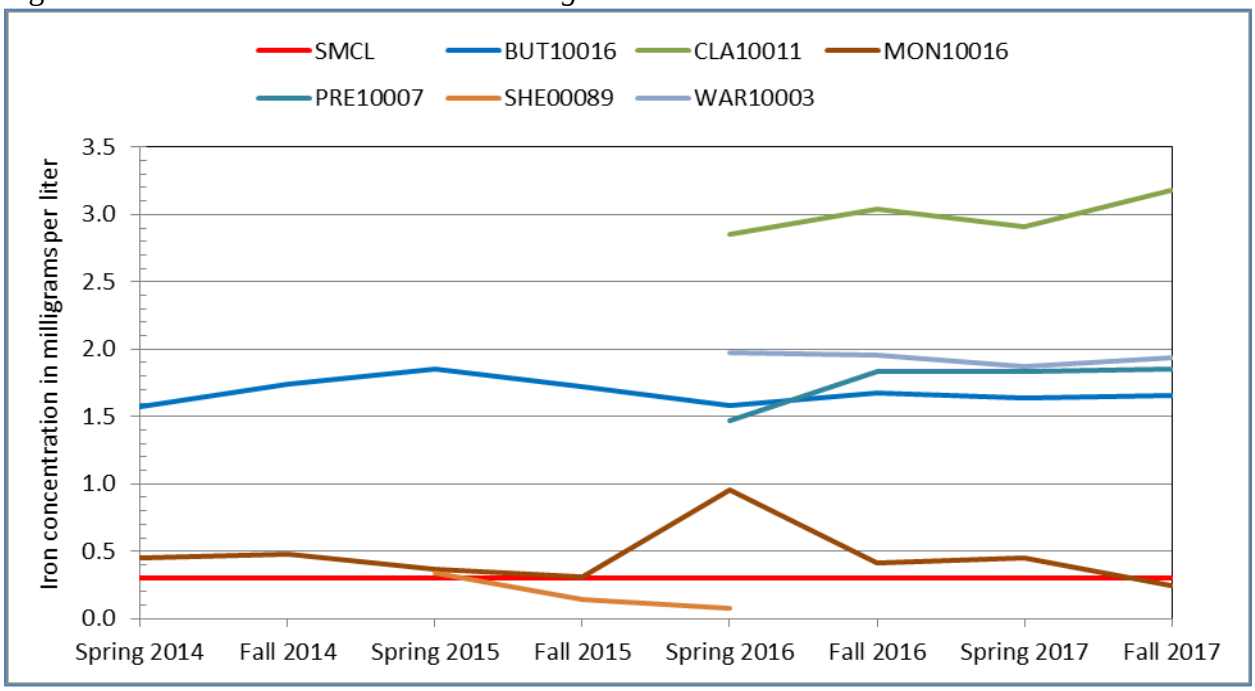
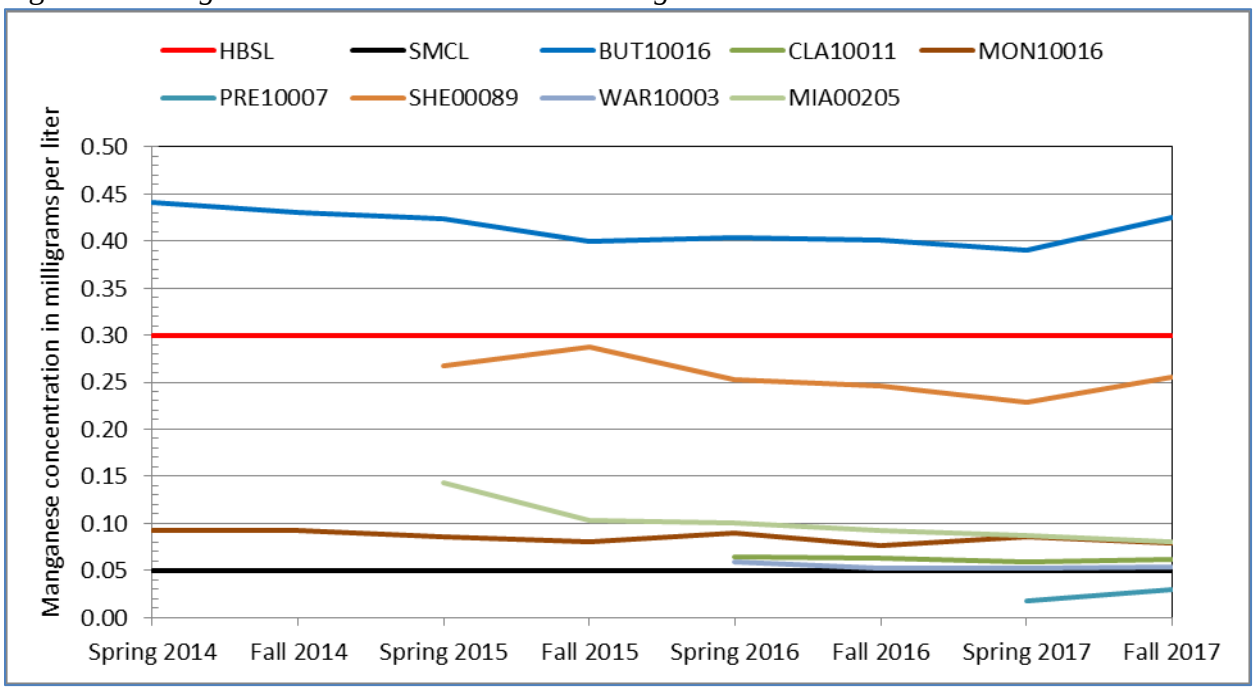


Figure 8 – *Manganese concentrations in monitoring wells*



Conclusions

While the sample set of this study was small and the results cannot be used to generalize about the health of the entire buried valley aquifer, the results can be used to better understand which contaminants may be impacting groundwater quality in the buried valley aquifer. Furthermore, when the results are compared with previous studies, trends of groundwater quality in the aquifer begin to emerge. Anthropogenic contaminants such as nitrate, chloride and sodium, and VOCs are detected in groundwater samples from sensitive aquifer settings such as shallow unconfined sand and gravel aquifers (Ohio Environmental Protection Agency, 2015), (Rowe et al, 2004), and (Stuck, 2016). Low concentrations of potential endocrine disruptor compounds are also found in shallow sand and gravel aquifers suggesting an inflow of wastewater from home sewage treatment systems or municipal wastewater treatment systems. These findings underscore the importance of managing land use over the buried valley aquifer so as to preserve the quality of the water. Proactive groundwater protection programs are critical to ensure the quality of groundwater in our region.

References

Debrewer, L.M., Rowe, G.L., Reutter, D.C., Moore, R.C., Hambrook, J.A., and Baker, N.T., 2000, Environmental Setting and Effects on Water Quality in the Great and Little Miami River Basins, Ohio and Indiana: U.S. Geological Survey Water-Resources Investigation Report 99-4201.

Kunz, A.E., and Sroka, B.N., 2004, Effects of Highway Deicing Chemical on Shallow Unconsolidated Aquifers in Ohio-Final Report: USGS Scientific Investigations Report 2004-5150.

Madison, R.J., and Brunett, J.O., 1985, Overview of the Occurrence of Nitrate in Ground-Water in the United States: USGS Water Supply Paper 2275, pp. 93-105.

Ohio Environmental Protection Agency, 2015, Major Aquifers in Ohio and Groundwater Quality in Ohio: Division of Drinking and Ground Waters Fact Sheet, October 2015.

Puls, R.W., and Barcelona, M.J., 1996, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures: EPA/540/S-95/504, 12 p.

Robinson, A., and Richter, E., 2012, Industrial Cleanup Funding Might Have to be Paid Back: Journal-News, Sunday March 11, 2012, From http://www.journal-news.com/. Accessed May 19, 2015.

Rowe, G.L., Reutter, D.C., Runkle, D.L., Hambrook, J.A., Janosy, S.D., and Hwang, L.H., 2004, Water Quality in the Great and Little Miami River Basins, Ohio and Indiana, 1999- 2001: U.S. Geological Survey Circular 1229.

Spieker, A.M., 1968, Ground-Water Hydrology and Geology of the Lower Great Miami River Valley Ohio: U.S. Geological Survey Professional Paper 605-A.

Stuck, R., 2016, Source Water Monitoring Report for The Hamilton to New Baltimore Ground Water Consortium, January through June, 2016: Unpublished.

Thomas, M.A., 2007, The Association of Arsenic with Redox Conditions, Depth, and Ground-Water Age in the Glacial Aquifer System of the Northern United States: U.S. Geological Survey Scientific Investigations Report 2007-5036.

Appendix A – Major Ions, Metals, Nutrients, VOCs, and other Parameters

Spring 2017					Benchmark		Sample Sites												
Parameter	**Units**	**Method**	**PQL**	**MDL**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**PRE10007**	**MIA00205**	**MON00022**	**MON10016**	**SHE00089**	**WAR10003**	**WAR10004**	**Code**
Dissolved Oxygen	mg/L	Field Measured			—	—	2.32				5.81	0.26		0.30			2.18	2.52	Field
pH	S.U.	Field Measured			SMCL	6.5 - 8.5	6.84	7.24	7.00	6.92	6.93	7.01	6.99	6.65	7.08	7.04	7.35	7.47	Field
Specific Conductance	mS/cm	Field Measured			—	—	1018	676	761	822	792	841	700	1091	1139	675	818	509	Field
Temperature	°C	Field Measured			—	—	13.90	12.80	13.00	12.10	11.10	12.50	11.70	11.80	13.50	12.20	13.99	13.56	Field
Ammonia	mg/L	EPA 350.1	0.200	0.0732	—	—	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	0.241	< 0.200	< 0.200	Major Ions
Chloride	mg/L	SM 4500-CL-E	2.00	0.806	SMCL	250	79.2	13.5	11.8	18.4	18.0	29.1	14.4	9.31	114	6.14	101	44.4	Major Ions
Fluoride	mg/L	SM 4500 F-C	0.200	0.0174	MCL	4	< 0.200	0.236	< 0.200	0.235	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	0.490	0.225	0.240	Major Ions
Nitrite Nitrogen as NO2-N	mg/L	SM 4500 NO3-F	0.100	0.0210	MCL	1	**1.54**	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	**2.88**	< 0.100	Major Ions
Nitrogen, Nitrate-Nitrite	mg/L	SM 4500 NO3-F	0.100	0.0157	MCL	10	1.69	< 0.100	**11.4**	< 0.100	**14.6**	< 0.100	**1.76**	< 0.100	< 0.100	< 0.100	**3.12**	**3.11**	Major Ions
Nitrogen, Total Kjeldahl	mg/L	EPA 351.2	0.500	0.165	—	—	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	1.11	< 0.500	< 0.500	< 0.500	< 0.500	Major Ions
Phosphorus	mg/L	SW 6010B	0.100	0.00452	—	—	< 0.100	0.106	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	Major Ions
Silica	mg/L	EPA 200.7/SW 6010	0.107	0.00296	—	—	10.6	13.5	9.86	15.1	8.23	10.8	9.52	7.15	9.94	10.7	13.3	7.68	Major Ions
Sulfate	mg/L	EPA 375.4 Modified	10.0	3.80	SMCL	250	33.3	53.7	23.0	78.6	< 20.0	44.7	33.8	170	48.0	28.4	82.9	25.5	Major Ions
Total Hardness	mg/L	EPA 200.7	0.662	0.0850	—	—	408	303	336	426	349	373	352	527	369	310	416	248	Major Ions
Total Orthophosphate, as P	mg/L	SM 4500 P-F	0.100	0.0218	—	—	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	Major Ions
Aluminum	mg/L	SW 6010B	0.100	0.00561	MCL	0.2	< 0.100	0.172	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	Metals
Antimony	mg/L	SW 7041	0.00300	0.00110	MCL	0.006	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	Metals
Arsenic	mg/L	SW 7060A	0.00300	0.000763	MCL	0.01	< 0.00300	0.00461	< 0.00300	0.00701	< 0.00300	0.00397	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	Metals
Barium	mg/L	SW 6010B	0.00500	0.000747	MCL	2	0.217	0.210	0.0426	0.0531	0.0652	0.203	0.109	0.0777	0.114	0.137	0.192	0.0544	Metals
Beryllium	mg/L	SW 6010B	0.000500	0.0000236	MCL	0.004	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	Metals
Boron	mg/L	SW 6010B	0.100	0.00328	HBSL	6000	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	0.200	< 0.100	Metals
Cadmium	mg/L	SW 7131A	0.000200	0.0000702	MCL	0.005	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	Metals
Calcium	mg/L	SW 6010B	0.100	0.0174	—	—	112	77.1	90.3	107	82.4	89.0	97.3	143	95.3	74.8	101	56.1	Metals
Chromium, Hexavalent	mg/L	SM 3500 Cr B	0.0100	0.00480	MCL	0.1	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	Metals
Cobalt	mg/L	SW 6010B	0.00500	0.000815	—	—	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	Metals
Copper	mg/L	SW 6010B	0.00500	0.000566	SMCL	1	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	Metals
Iron	mg/L	SW 6010B	0.0500	0.00534	SMCL	0.3	< 0.0500	**1.64**	< 0.0500	**2.91**	< 0.0500	**1.83**	< 0.0500	< 0.0500	**0.452**	0.0635	**1.87**	< 0.0500	Metals
Lead	mg/L	SW 7421	0.00200	0.000738	MCL	0.015	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	Metals
Lithium	mg/L	SW 6010B	0.00500	0.0000315	—	—	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	0.00934	< 0.00500	0.00509	0.00578	< 0.00500	Metals
Magnesium	mg/L	SW 6010B	0.100	0.0101	—	—	31.4	26.8	26.7	38.5	34.8	36.7	26.5	41.3	31.9	29.8	40.0	26.3	Metals
Manganese	mg/L	SW 6010B	0.00500	0.00153	HBSL, SMCL	0.3, 0.05	< 0.00500	**0.390**	< 0.00500	**0.0588**	< 0.00500	0.0180	**0.0870**	< 0.00500	**0.0856**	**0.228**	**0.0528**	< 0.00500	Metals
Molybdenum	mg/L	SW 6010B	0.0100	0.00207	HBSL	0.04	0.0147	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	Metals
Nickel	mg/L	SW 6010B	0.00500	0.00118	HBSL	0.1	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	Metals
Potassium	mg/L	SW 6010B	1.00	0.0397	—	—	5.04	1.27	2.67	< 1.00	1.53	2.06	1.22	3.44	3.36	1.45	2.50	2.24	Metals
Silver	mg/L	SW 6010B	0.00200	0.000384	HBSL	0.1	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	Metals
Sodium	mg/L	SW 6010B	1.00	0.0631	—	—	48.6	6.62	9.58	5.11	7.30	14.5	8.56	7.61	68.2	20.6	36.6	25.2	Metals
Strontium	mg/L	SW 6010B	0.00500	0.000527	HBSL	4	0.682	0.401	0.145	0.293	1.96	1.23	0.330	0.408	0.485	0.637	1.01	0.353	Metals
Thallium	mg/L	SW 7841/EPA 279.2	0.00100	0.000407	MCL	0.002	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	Metals
Vanadium	mg/L	SW 6010B	0.00500	0.000517	—	—	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	Metals
Zinc	mg/L	SW 6010B	0.0100	0.00138	HBSL	2	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.0141	Metals
Alkalinity, Total (As CaCO3)	mg/L	SM 2320B	25.0	25.0	—	—	367	241	337	302	286	306	297	367	314	318	290	204	Other
Biochemical Oxygen Demand	mg/L	SM 5210B	2.00	2.00	—	—	< 2.00	34.4	10.1	3.16	< 2.00	< 2.00	3.11	< 2.00	< 2.00	3.16	< 2.00	< 2.00	Other
Carbonaceous Biological Oxyg	mg/L	EPA 405.1/SM 5210	2.00	2.00	—	—	< 2.00	6.36	3.09	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 20.0	< 2.00	< 2.00	< 2.00	Other
Chemical Oxygen Demand	mg/L	HACH 8000	5.00	4.68	—	—	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	Other
Cyanide, Total	mg/L	EPA 335.4	0.0100	0.00195	MCL	0.2	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	Other
Phenolics, Total Recoverable	mg/L	EPA 420.4	0.0100	0.00336	—	—	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.0130	< 0.0100	0.0140	< 0.0100	Other
Total Dissolved Solids (Residu	mg/L	SM 2540C	5.00	1.67	SMCL	500	**607**	**666**	**764**	472	**804**	**892**	375	**1320**	**1080**	387	**596**	356	Other
Total Organic Carbon	mg/L	SM 5310C	1.00	0.142	—	—	1.29	< 1.00	1.18	1.15	1.32	< 1.00	< 1.00	1.15	1.15	< 1.00	1.53	< 1.00	Other
E. coli	MPN/100 ml	Colilert	1.00		MCL	0	**1.00**	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	**1.00**	< 1.00	< 1.00	< 1.00	< 1.00	Pathogens
1,1,1,2-Tetrachloroethane	ug/L	SW 8260B	1.00	0.220	HBSL	1	< 5.00												VOC
1,1,1-Trichloroethane	ug/L	SW 8260B	1.00	0.283	MCL	200	< 5.00												VOC
1,1,2,2-Tetrachloroethane	ug/L	SW 8260B	1.00	0.230	HBSL	1	< 5.00												VOC
1,1,2-Trichloroethane	ug/L	SW 8260B	1.00	0.337	MCL	5	< 5.00												VOC
1,1-Dichloroethane	ug/L	SW 8260B	1.00	0.274	—	—	< 5.00												VOC
1,1-Dichloroethene	ug/L	SW 8260B	1.00	0.224	MCL	7	< 5.00												VOC
1,1-Dichloropropene	ug/L	SW 8260B	1.00	0.213	—	—	< 5.00												VOC
1,2,3-Trichlorobenzene	ug/L	SW 8260B	1.00	0.228	—	—	< 5.00												VOC
1,2,3-Trichloropropane	ug/L	SW 8260B	1.00	0.271	HBSL	30	< 5.00												VOC

Spring 2017					Benchmark		Sample Sites											
Parameter	Units	Method	PQL	MDL	Type	Value	BUT10014	BUT10016	BUT10017	CLA10011	CLA10018	MIA00205	MON00022	MON10016	PRE10007	SHE00089	WAR10003	WAR10004
1,2,4-Trichlorobenzene	ug/L	SW 8260B	1.00	0.214	MCL	70	< 5.00											
1,2,4-Trimethylbenzene	ug/L	SW 8260B	1.00	0.194	—	—	< 5.00											
1,2-Dibromo-3-chloropropane	ug/L	SW 8260B	5.00	0.869	MCL	0.2	< 10.0											
1,2-Dibromoethane	ug/L	SW 8260B	1.00	0.192	MCL	0.05	< 5.00											
1,2-Dichlorobenzene	ug/L	SW 8260B	1.00	0.570	MCL	600	< 5.00											
1,2-Dichloroethane	ug/L	SW 8260B	1.00	0.300	MCL	5	< 5.00											
1,2-Dichloropropane	ug/L	SW 8260B	1.00	0.230	MCL	5	< 5.00											
1,3,5-Trimethylbenzene	ug/L	SW 8260B	1.00	0.199	—	—	< 5.00											
1,3-Dichlorobenzene	ug/L	SW 8260B	1.00	0.197	HBSL	600	< 5.00											
1,3-Dichloropropane	ug/L	SW 8260B	1.00	0.237	—	—	< 5.00											
1,4-Dichlorobenzene	ug/L	SW 8260B	1.00	0.214	MCL	75	< 5.00											
2,2-Dichloropropane	ug/L	SW 8260B	1.00	0.262	—	—	< 5.00											
2-Butanone	ug/L	SW 8260B	10.0	2.75	—	—	< 20.0											
2-Chlorotoluene	ug/L	SW 8260B	1.00	0.217	—	—	< 5.00											
2-Hexanone	ug/L	SW 8260B	10.0	0.0779	HBSL	40	< 20.0											
4-Chlorotoluene	ug/L	SW 8260B	1.00	0.241	HBSL	100	< 5.00											
4-Isopropyltoluene	ug/L	SW 8260B	1.00	0.182	—	—	< 5.00											
4-Methyl-2-pentanone	ug/L	SW 8260B	10.0	1.91	—	—	< 20.0											
Acetone	ug/L	SW 8260B	20.0	3.76	HBSL	6000	< 20.0											
Acetonitrile	ug/L	SW 8260B	20.0	2.41	—	—	< 40.0											
Acrolein	ug/L	SW 8260B	10.0	1.49	HBSL	4	< 20.0											
Acrylonitrile	ug/L	SW 8260B	10.0	0.388	HBSL	0.06	< 20.0											
Allyl chloride	ug/L	SW 8260B	1.00	0.250	—	—	< 5.00											
Benzene	ug/L	SW 8260B	1.00	0.269	MCL	5	< 5.00											
Bromobenzene	ug/L	SW 8260B	1.00	0.221	HBSL	60	< 5.00											
Bromochloromethane	ug/L	SW 8260B	1.00	0.293	HBSL	90	< 5.00											
Bromodichloromethane	ug/L	SW 8260B	1.00	0.232	MCL	80	< 5.00											
Bromoform	ug/L	SW 8260B	1.00	0.231	MCL	80	< 5.00											
Bromomethane	ug/L	SW 8260B	1.00	0.494	HHBP	140	< 5.00											
Carbon Disulfide	ug/L	SW 8260B	10.0	0.242	HBSL	700	< 20.0											
Carbon Tetrachloride	ug/L	SW 8260B	1.00	0.241	MCL	5	< 5.00											
Chlorobenzene	ug/L	SW 8260B	1.00	0.265	MCL	100	< 5.00											
Chloroethane	ug/L	SW 8260B	1.00	0.261	—	—	< 5.00											
Chloroform	ug/L	SW 8260B	1.00	0.269	MCL	80	< 5.00											
Chloromethane	ug/L	SW 8260B	1.00	0.318	—	—	< 5.00											
cis-1,2-Dichloroethene	ug/L	SW 8260B	1.00	0.296	MCL	70	< 5.00											
cis-1,3-Dichloropropene	ug/L	SW 8260B	1.00	0.234	HBSL	0.3	< 5.00											
Dibromochloromethane	ug/L	SW 8260B	1.00	0.645	MCL	80	< 5.00											
Dibromomethane	ug/L	SW 8260B	1.00	0.299	—	—	< 5.00											
Dichlorodifluoromethane	ug/L	SW 8260B	1.00	0.242	HBSL	1000	< 5.00											
Ethylbenzene	ug/L	SW 8260B	1.00	0.168	MCL	700	< 5.00											
Hexachlorobutadiene	ug/L	SW 8260B	1.00	0.277	HBSL	0.9	< 5.00											
Iodomethane	ug/L	SW 8260B	10.0	1.10	—	—	< 10.0											
Isopropylbenzene	ug/L	SW 8260B	1.00	0.204	HBSL	700	< 5.00											
m,p-Xylene	ug/L	SW 8260B	5.00	0.410	MCL	10000	< 10.0											
Methyl tert-Butyl Ether	ug/L	SW 8260B	5.00	0.239	—	—	< 10.0											
Methylene Chloride	ug/L	SW 8260B	1.00	0.164	MCL	5	< 5.00											
Naphthalene	ug/L	SW 8260B	5.00	0.212	HBSL	100	< 5.00											
n-Butylbenzene	ug/L	SW 8260B	1.00	0.167	—	—	< 5.00											
n-Hexane	ug/L	SW 8260B	5.00	0.225	—	—	< 5.00											
n-Propylbenzene	ug/L	SW 8260B	1.00	0.204	—	—	< 5.00											
o-Xylene	ug/L	SW 8260B	1.00	0.220	MCL	10000	< 5.00											
sec-Butylbenzene	ug/L	SW 8260B	1.00	0.193	—	—	< 5.00											
Styrene	ug/L	SW 8260B	1.00	0.210	MCL	100	< 5.00											
tert_Butylbenzene	ug/L	SW 8260B	1.00	0.193	—	—	< 5.00											
Tetrachloroethene	ug/L	SW 8260B	1.00	0.230	MCL	5	< 5.00											
Toluene	ug/L	SW 8260B	1.00	0.231	MCL	1000	< 5.00											
trans-1,2-Dichloroethene	ug/L	SW 8260B	1.00	0.225	MCL	100	< 5.00											
trans-1,3-Dichloropropene	ug/L	SW 8260B	1.00	0.203	HBSL	0.3	< 5.00											
Trichloroethene	ug/L	SW 8260B	1.00	0.295	MCL	5	**16.0**											
Trichlorofluoromethane	ug/L	SW 8260B	1.00	0.250	HBSL	2000	< 5.00											
Vinyl acetate	ug/L	SW 8260B	1.00	0.282	—	—	< 10.0											
Vinyl Chloride	ug/L	SW 8260B	1.00	0.224	MCL	2	< 1.00											

Fall 2017					Benchmark		Sample Sites											
Parameter	Units	Method	PQL	MDL	Type	Value	BUT10014	BUT10016	BUT10017	CLA10011	CLA10018	MIA00205	MON00022	MON10016	PRE10007	SHE00089	WAR10003	WAR10004
Dissolved Oxygen	mg/L	Field Measured			—	—												
pH	S.U.	Field Measured			SMCL	6.5 - 8.5												
Specific Conductance	mS/cm	Field Measured			—	—												
Temperature	°C	Field Measured			—	—												
Ammonia	mg/L	EPA 350.1	0.200	0.0732	—	—	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
Chloride	mg/L	SM 4500-CL-E	2.00	0.806	SMCL	250	78.9	13.9	24.7	24.8	22.4	16.2	9.98	87.3	33.1	6.22	93.9	42.3
Fluoride	mg/L	SM 4500 F-C	0.200	0.0174	MCL	4	< 0.200	0.240	< 0.200	0.230	0.231	< 0.200	< 0.200	< 0.200	< 0.200	0.485	0.202	0.221
Nitrite Nitrogen as NO2-N	mg/L	SM 4500 NO3-F	0.100	0.0210	MCL	1	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
Nitrogen, Nitrate-Nitrite	mg/L	SM 4500 NO3-F	0.100	0.0157	MCL	10	1.21	< 0.100	7.54	< 0.100	**15.6**	4.49	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
Nitrogen, Total Kjeldahl	mg/L	EPA 351.2	0.500	0.165	—	—	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500
Phosphorus	mg/L	SW 6010B	0.100	0.00452	—	—	< 0.100	0.111	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
Silica	mg/L	EPA 200.7/SW 6010	0.107	0.00296	—	—	12.7	15.1	11.3	16.3	10.5	10.8	9.57	10.2	11.8	11.9	14.4	8.53
Sulfate	mg/L	EPA 375.4 Modified	10.0	3.80	SMCL	250	59.5	53.7	17.5	82.3	18.5	28.0	223	45.9	48.2	30.7	80.9	27.0
Total Hardness	mg/L	EPA 200.7	0.662	0.0850	—	—	443	323	352	448	381	375	608	335	366	346	400	256
Total Orthophosphate, as P	mg/L	SM 4500 P-F	0.100	0.0218	—	—	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
Aluminum	mg/L	SW 6010B	0.100	0.00561	MCL	0.2	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
Antimony	mg/L	SW 7041	0.00300	0.00110	MCL	0.006	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300	< 0.00300
Arsenic	mg/L	SW 7060A	0.00300	0.000763	MCL	0.01	< 0.00300	0.00589	< 0.00300	0.00689	< 0.00300	< 0.00300	0.00640	< 0.00300	0.00568	< 0.00300	< 0.00300	< 0.00300
Barium	mg/L	SW 6010B	0.00500	0.000747	MCL	2	0.263	0.240	0.0464	0.0595	0.0929	0.125	0.108	0.113	0.218	0.158	0.203	0.0592
Beryllium	mg/L	SW 6010B	0.000500	0.0000236	MCL	0.004	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500
Boron	mg/L	SW 6010B	0.100	0.00328	HBSL	6000	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	0.196	< 0.100
Cadmium	mg/L	SW 7131A	0.000200	0.0000702	MCL	0.005	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	0.000423	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200
Calcium	mg/L	SW 6010B	0.100	0.0174	—	—	123	83.7	95.0	114	92.0	105	168	88.2	88.4	85.6	98.5	58.7
Chromium, Hexavalent	mg/L	SM 3500 Cr B	0.0100	0.00480	MCL	0.1	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400	< 0.00400
Cobalt	mg/L	SW 6010B	0.00500	0.000815	—	—	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Copper	mg/L	SW 6010B	0.00500	0.000566	SMCL	1	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Iron	mg/L	SW 6010B	0.0500	0.00534	SMCL	0.3	< 0.0500	**1.66**	< 0.0500	**3.18**	< 0.0500	< 0.0500	< 0.0500	0.243	**1.85**	< 0.0500	**1.94**	< 0.0500
Lead	mg/L	SW 7421	0.00200	0.000738	MCL	0.015	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	0.00395	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Lithium	mg/L	SW 6010B	0.00500	0.0000315	—	—	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	0.0120	< 0.00500	< 0.00500	0.00526	< 0.00500	< 0.00500
Magnesium	mg/L	SW 6010B	0.100	0.0101	—	—	32.7	27.7	28.0	39.6	36.8	27.4	45.7	27.8	35.2	32.2	37.3	26.5
Manganese	mg/L	SW 6010B	0.00500	0.00153	HBSL, SMCL	0.3, 0.05	< 0.00500	**0.425**	< 0.00500	**0.0623**	< 0.00500	**0.0798**	0.0370	**0.0786**	0.0291	**0.255**	**0.0535**	< 0.00500
Molybdenum	mg/L	SW 6010B	0.0100	0.00207	HBSL	0.04	< 0.0100	0.0112	0.0106	0.0263	0.0198	< 0.0100	< 0.0100	< 0.0100	0.0240	0.0228	< 0.0100	0.0123
Nickel	mg/L	SW 6010B	0.00500	0.00118	HBSL	0.1	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	0.0152	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Potassium	mg/L	SW 6010B	1.00	0.0397	—	—	4.56	1.46	2.67	1.07	2.21	1.51	4.23	2.74	2.09	1.64	2.31	2.35
Silver	mg/L	SW 6010B	0.00200	0.000384	HBSL	0.1	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Sodium	mg/L	SW 6010B	1.00	0.0631	—	—	51.6	6.70	9.75	4.80	9.88	8.66	7.08	51.9	13.7	16.4	32.9	21.7
Strontium	mg/L	SW 6010B	0.00500	0.000527	HBSL	4	0.759	0.428	0.145	0.313	2.70	0.361	0.504	0.453	1.29	0.779	1.01	0.413
Thallium	mg/L	SW 7841/EPA 279.2	0.00100	0.000407	MCL	0.002	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Vanadium	mg/L	SW 6010B	0.00500	0.000517	—	—	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Zinc	mg/L	SW 6010B	0.0100	0.00138	HBSL	2	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.0108	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Alkalinity, Total (As CaCO3)	mg/L	SM 2320B	25.0	25.0	—	—	373	233	268	316	286	299	413	295	300	315	190	151
Biochemical Oxygen Demand	mg/L	SM 5210B	2.00	2.00	—	—	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 5.00	< 2.00	< 5.00	< 2.00	< 2.00	< 2.00
Carbonaceous Biological Oxyg	mg/L	EPA 405.1/SM 5210	2.00	2.00	—	—	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 5.00	< 2.00	< 5.00	< 2.00	< 2.00	< 2.00
Chemical Oxygen Demand	mg/L	HACH 8000	5.00	4.68	—	—	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
Cyanide, Total	mg/L	EPA 335.4	0.0100	0.00195	MCL	0.2	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Phenolics, Total Recoverable	mg/L	EPA 420.4	0.0100	0.00336	—	—	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Total Dissolved Solids (Residu	mg/L	SM 2540C	5.00	1.67	SMCL	500	485	322	337	495	380	394	**750**	**538**	429	382	**568**	335
Total Organic Carbon	mg/L	SM 5310C	1.00	0.142	—	—	1.22	1.02	1.20	1.17	1.04	< 1.00	2.27	1.30	1.24	< 1.00	1.08	< 1.00
E. coli	MPN/100 ml	Colilert	1.00		MCL	0	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,1,2-Tetrachloroethane	ug/L	SW 8260B	1.00	0.220	HBSL	1	< 5.00											
1,1,1-Trichloroethane	ug/L	SW 8260B	1.00	0.283	MCL	200	< 5.00											
1,1,2,2-Tetrachloroethane	ug/L	SW 8260B	1.00	0.230	HBSL	1	< 5.00											
1,1,2-Trichloroethane	ug/L	SW 8260B	1.00	0.337	MCL	5	< 5.00											
1,1-Dichloroethane	ug/L	SW 8260B	1.00	0.274	—	—	< 5.00											
1,1-Dichloroethene	ug/L	SW 8260B	1.00	0.224	MCL	7	< 5.00											
1,1-Dichloropropene	ug/L	SW 8260B	1.00	0.213	—	—	< 5.00											
1,2,3-Trichlorobenzene	ug/L	SW 8260B	1.00	0.228	—	—	< 5.00											
1,2,3-Trichloropropane	ug/L	SW 8260B	1.00	0.271	HBSL	30	< 5.00											
1,2,4-Trichlorobenzene	ug/L	SW 8260B	1.00	0.214	MCL	70	< 5.00											
1,2,4-Trimethylbenzene	ug/L	SW 8260B	1.00	0.194	—	—	< 5.00											
1,2-Dibromo-3-chloropropane	ug/L	SW 8260B	5.00	0.869	MCL	0.2	< 10.0											
1,2-Dibromoethane	ug/L	SW 8260B	1.00	0.192	MCL	0.05	< 5.00											

Fall 2017					Benchmark		Sample Sites											
Parameter	Units	Method	PQL	MDL	Type	Value	BUT10014	BUT10016	BUT10017	CLA10011	CLA10018	MIA00205	MON00022	MON10016	PRE10007	SHE00089	WAR10003	WAR10004
1,2-Dichlorobenzene	ug/L	SW 8260B	1.00	0.570	MCL	600	< 5.00											
1,2-Dichloroethane	ug/L	SW 8260B	1.00	0.300	MCL	5	< 5.00											
1,2-Dichloropropane	ug/L	SW 8260B	1.00	0.230	MCL	5	< 5.00											
1,3,5-Trimethylbenzene	ug/L	SW 8260B	1.00	0.199	—	—	< 5.00											
1,3-Dichlorobenzene	ug/L	SW 8260B	1.00	0.197	HBSL	600	< 5.00											
1,3-Dichloropropane	ug/L	SW 8260B	1.00	0.237	—	—	< 5.00											
1,4-Dichlorobenzene	ug/L	SW 8260B	1.00	0.214	MCL	75	< 5.00											
2,2-Dichloropropane	ug/L	SW 8260B	1.00	0.262	—	—	< 5.00											
2-Butanone	ug/L	SW 8260B	10.0	2.75	—	—	< 20.0											
2-Chlorotoluene	ug/L	SW 8260B	1.00	0.217	—	—	< 5.00											
2-Hexanone	ug/L	SW 8260B	10.0	0.0779	HBSL	40	< 20.0											
4-Chlorotoluene	ug/L	SW 8260B	1.00	0.241	HBSL	100	< 5.00											
4-Isopropyltoluene	ug/L	SW 8260B	1.00	0.182	—	—	< 5.00											
4-Methyl-2-pentanone	ug/L	SW 8260B	10.0	1.91	—	—	< 20.0											
Acetone	ug/L	SW 8260B	20.0	3.76	HBSL	6000	< 20.0											
Acetonitrile	ug/L	SW 8260B	20.0	2.41	—	—	< 40.0											
Acrolein	ug/L	SW 8260B	10.0	1.49	HBSL	4	< 20.0											
Acrylonitrile	ug/L	SW 8260B	10.0	0.388	HBSL	0.06	< 20.0											
Allyl chloride	ug/L	SW 8260B	1.00	0.250	—	—	< 5.00											
Benzene	ug/L	SW 8260B	1.00	0.269	MCL	5	< 5.00											
Bromobenzene	ug/L	SW 8260B	1.00	0.221	HBSL	60	< 5.00											
Bromochloromethane	ug/L	SW 8260B	1.00	0.293	HBSL	90	< 5.00											
Bromodichloromethane	ug/L	SW 8260B	1.00	0.232	MCL	80	< 5.00											
Bromoform	ug/L	SW 8260B	1.00	0.231	MCL	80	< 5.00											
Bromomethane	ug/L	SW 8260B	1.00	0.494	HHBP	140	< 5.00											
Carbon Disulfide	ug/L	SW 8260B	10.0	0.242	HBSL	700	< 20.0											
Carbon Tetrachloride	ug/L	SW 8260B	1.00	0.241	MCL	5	< 5.00											
Chlorobenzene	ug/L	SW 8260B	1.00	0.265	MCL	100	< 5.00											
Chloroethane	ug/L	SW 8260B	1.00	0.261	—	—	< 5.00											
Chloroform	ug/L	SW 8260B	1.00	0.269	MCL	80	< 5.00											
Chloromethane	ug/L	SW 8260B	1.00	0.318	—	—	< 5.00											
cis-1,2-Dichloroethene	ug/L	SW 8260B	1.00	0.296	MCL	70	< 5.00											
cis-1,3-Dichloropropene	ug/L	SW 8260B	1.00	0.234	HBSL	0.3	< 5.00											
Dibromochloromethane	ug/L	SW 8260B	1.00	0.645	MCL	80	< 5.00											
Dibromomethane	ug/L	SW 8260B	1.00	0.299	—	—	< 5.00											
Dichlorodifluoromethane	ug/L	SW 8260B	1.00	0.242	HBSL	1000	< 5.00											
Ethylbenzene	ug/L	SW 8260B	1.00	0.168	MCL	700	< 5.00											
Hexachlorobutadiene	ug/L	SW 8260B	1.00	0.277	HBSL	0.9	< 5.00											
Iodomethane	ug/L	SW 8260B	10.0	1.10	—	—	< 10.0											
Isopropylbenzene	ug/L	SW 8260B	1.00	0.204	HBSL	700	< 5.00											
m,p-Xylene	ug/L	SW 8260B	5.00	0.410	MCL	10000	< 10.0											
Methyl tert-Butyl Ether	ug/L	SW 8260B	5.00	0.239	—	—	< 10.0											
Methylene Chloride	ug/L	SW 8260B	1.00	0.164	MCL	5	< 5.00											
Naphthalene	ug/L	SW 8260B	5.00	0.212	HBSL	100	< 5.00											
n-Butylbenzene	ug/L	SW 8260B	1.00	0.167	—	—	< 5.00											
n-Hexane	ug/L	SW 8260B	5.00	0.225	—	—	< 5.00											
n-Propylbenzene	ug/L	SW 8260B	1.00	0.204	—	—	< 5.00											
o-Xylene	ug/L	SW 8260B	1.00	0.220	MCL	10000	< 5.00											
sec-Butylbenzene	ug/L	SW 8260B	1.00	0.193	—	—	< 5.00											
Styrene	ug/L	SW 8260B	1.00	0.210	MCL	100	< 5.00											
tert_Butylbenzene	ug/L	SW 8260B	1.00	0.193	—	—	< 5.00											
Tetrachloroethene	ug/L	SW 8260B	1.00	0.230	MCL	5	< 5.00											
Toluene	ug/L	SW 8260B	1.00	0.231	MCL	1000	< 5.00											
trans-1,2-Dichloroethene	ug/L	SW 8260B	1.00	0.225	MCL	100	< 5.00											
trans-1,3-Dichloropropene	ug/L	SW 8260B	1.00	0.203	HBSL	0.3	< 5.00											
Trichloroethene	ug/L	SW 8260B	1.00	0.295	MCL	5	**15.4**											
Trichlorofluoromethane	ug/L	SW 8260B	1.00	0.250	HBSL	2000	< 5.00											
Vinyl acetate	ug/L	SW 8260B	1.00	0.282	—	—	< 10.0											
Vinyl Chloride	ug/L	SW 8260B	1.00	0.224	MCL	2	< 1.00											

MCL - Maximum Contaminant Level set by USEPA
SMCL - Secondary Maximum Contaminant Level set by USEPA
AMCL - Alternative Maximum Contaminant Level set by USEPA
HBSL - Non enforceable Health Based Screening Level based on (1) latest USEPA Office of Water
HHBP - Human Health Benchmark for Pesticides set by USEPA
— No drinking water benchmark set for the compound
Numbers in bold exceed a benchmark

Appendix B – Endocrine Disruptor Compounds

Spring 2017				Benchmark		Sample Sites											
Parameter	Units	Method	Detection Limit	Type	Value	BUT10014	BUT10016	BUT10017	CLA10011	CLA10018	MIA00205	MON00022	MON10016	PRE10007	SHE00089	WAR10003	WAR10004
2,4-D	ng/L	LC-MS-MS	5	MCL	70,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-nonylphenol - semi quantitative	ng/L	LC-MS-MS	100	—	—	120	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-tert-Octylphenol	ng/L	LC-MS-MS	50	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acesulfame-K	ng/L	LC-MS-MS	20	—	—	87	ND	39	ND	ND	ND	ND	200	660	ND	ND	62
Bendroflumethiazide	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BPA	ng/L	LC-MS-MS	10	HBSL	400,000	ND	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND
Butalbital	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butylparaben	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloramphenicol	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Clofibric Acid	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diclofenac	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Estradiol	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Estriol	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Estrone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethinyl Estradiol - 17 alpha	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylparaben	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Gemfibrozil	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ibuprofen	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iohexal	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	12	ND	ND	ND	ND	ND	ND	ND	ND
Iopromide	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isobutylparaben	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylparaben	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naproxen	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propylparaben	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	7.9	ND	ND	ND
Salicylic Acid	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sucralose	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	ND	ND	ND	ND	170	310	ND	ND	410
Triclocarban	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Triclosan	ng/L	LC-MS-MS	10	HHBP	2,100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Warfarin	ng/L	LC-MS-MS	5	HBSL	2,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,7-Dimethylxanthine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetaminophen	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Albuterol	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Amoxicillin (semi-quantitative)	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Androstenedione	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Atenolol	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Atrazine	ng/L	LC-MS-MS	5	MCL	3,000	ND	ND	ND	ND	ND	ND	7	ND	ND	ND	ND	330
Bezafibrate	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromacil	ng/L	LC-MS-MS	5	HBSL	700,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Caffeine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbadox	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbamazepine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carisoprodol	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloridazon	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorotoluron	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cimetidine (semi quantitative)	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cotinine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyanazine	ng/L	LC-MS-MS	5	HBSL	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DACT	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DEA	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110
DEET	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	26	ND	ND	ND	ND
Dehydronifedipine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIA	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diazepam	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Spring 2017				Benchmark		Sample Sites											
Parameter	Units	Method	Detection Limit	Type	Value	BUT10014	BUT10016	BUT10017	CLA10011	CLA10018	MIA00205	MON00022	MON10016	PRE10007	SHE00089	WAR10003	WAR10004
Dilantin	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diltiazem	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diuron	ng/L	LC-MS-MS	5	HBSL	2,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Erythromycin	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Flumeqine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoxetine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isoproturon	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ketoprofen	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ketorolac	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lidocaine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lincomycin	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Linuron	ng/L	LC-MS-MS	5	HHBP	54,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lopressor	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Meclofenamic Acid	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	5.8	ND	ND	ND	ND	ND	ND
Meprobamate	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metazachlor	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metformin	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metolachlor	ng/L	LC-MS-MS	5	HBSL	700,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	16
Nifedipine (semi quantitative)	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Norethisterone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OUST (Sulfameturon,methyl)	ng/L	LC-MS-MS	5	HHBP	1,925,000	ND	ND	54	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oxolinic acid	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentoxifylline	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenazone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Primidone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Progesterone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propazine	ng/L	LC-MS-MS	5	HBSL	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Quinoline	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Simazine	ng/L	LC-MS-MS	5	MCL	4,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13
Sulfachloropyridazine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfadiazine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfadimethoxine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamerazine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamethazine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamethizole	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamethoxazole	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfathiazole	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCEP	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCPP	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TDCPP	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Testosterone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Theobromine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Theophylline (semi-quantitative)	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thiabendazole	ng/L	LC-MS-MS	5	HHBP	231,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trimethoprim	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Fall 2017				Benchmark		Sample Sites											
Parameter	Units	Method	Detection Limit	Type	Value	BUT10014	BUT10016	BUT10017	CLA10011	CLA10018	MIA00205	MON00022	MON10016	PRE10007	SHE00089	WAR10003	WAR10004
2,4-D	ng/L	LC-MS-MS	5	MCL	70,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-nonylphenol - semi quantitative	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	300	ND	ND	ND	ND	ND	ND	230	ND
4-tert-Octylphenol	ng/L	LC-MS-MS	50	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acesulfame-K	ng/L	LC-MS-MS	20	—	—	94	ND	190	ND	ND	ND	ND	630	760	ND	72	38
Bendroflumethiazide	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BPA	ng/L	LC-MS-MS	10	HBSL	400,000	ND	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND
Butalbital	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butylparaben	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloramphenicol	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Clofibric Acid	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diclofenac	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Estradiol	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Estriol	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Estrone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethinyl Estradiol - 17 alpha	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylparaben	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Gemfibrozil	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ibuprofen	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iohexal	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iopromide	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isobutylparaben	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylparaben	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naproxen	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propylparaben	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Salicylic Acid	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	ND	ND	ND	310	ND	ND	140	ND	390
Sucralose	ng/L	LC-MS-MS	100	—	—	ND	ND	200	ND	ND	ND	ND	160	170	ND	ND	ND
Triclocarban	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Triclosan	ng/L	LC-MS-MS	10	HHBP	2,100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Warfarin	ng/L	LC-MS-MS	5	HBSL	2,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,7-Dimethylxanthine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetaminophen	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Albuterol	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Amoxicillin (semi-quantitative)	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Androstenedione	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Atenolol	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Atrazine	ng/L	LC-MS-MS	5	MCL	3,000	ND	ND	ND	ND	ND	ND	7	ND	ND	ND	ND	ND
Bezafibrate	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromacil	ng/L	LC-MS-MS	5	HBSL	700,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Caffeine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	5.6	ND	ND	ND	ND	ND
Carbadox	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbamazepine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carisoprodol	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloridazon	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorotoluron	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cimetidine (semi quantitative)	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cotinine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyanazine	ng/L	LC-MS-MS	5	HBSL	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DACT	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DEA	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DEET	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	20	ND	ND	28	ND	44	11	37	ND
Dehydronifedipine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIA	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diazepam	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dilantin	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diltiazem	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diuron	ng/L	LC-MS-MS	5	HBSL	2,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Erythromycin	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Flumeqine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoxetine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isoproturon	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Fall 2017				Benchmark		Sample Sites											
Parameter	**Units**	**Method**	**Detection Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
Ketoprofen	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ketorolac	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lidocaine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lincomycin	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Linuron	ng/L	LC-MS-MS	5	HHBP	54,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lopressor	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Meclofenamic Acid	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Meprobamate	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metazachlor	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metformin	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metolachlor	ng/L	LC-MS-MS	5	HBSL	700,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nifedipine (semi quantitative)	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Norethisterone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OUST (Sulfameturon,methyl)	ng/L	LC-MS-MS	5	HHBP	1,925,000	ND	ND	51	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oxolinic acid	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentoxifylline	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenazone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Primidone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Progesterone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propazine	ng/L	LC-MS-MS	5	HBSL	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Quinoline	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Simazine	ng/L	LC-MS-MS	5	MCL	4,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfachloropyridazine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfadiazine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfadimethoxine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamerazine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamethazine	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamethizole	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfamethoxazole	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfathiazole	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCEP	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCPP	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TDCPP	ng/L	LC-MS-MS	100	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Testosterone	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Theobromine	ng/L	LC-MS-MS	10	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Theophylline (semi-quantitative)	ng/L	LC-MS-MS	20	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thiabendazole	ng/L	LC-MS-MS	5	HHBP	231,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trimethoprim	ng/L	LC-MS-MS	5	—	—	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

MCL - Maximum Contaminant Level set by USEPA
SMCL - Secondary Maximum Contaminant Level set by USEPA
AMCL - Alternative Maximum Contaminant Level set by USEPA
HBSL - Non enforceable Health
HHBP - Human Health Benchmark for Pesticides set by USEPA
— No drinking water benchmark set for the compound
Numbers in bold exceed a benchmark

MCD
MIAMI CONSERVANCY DISTRICT

38 E. Monument Avenue

Dayton, Ohio 45402

Phone: (937) 223-1271

Fax: (937) 223-4730

www.MCDWater.org