APPENDIX A

Background Information:

Ohio River Dams, Tributaries, Flow Data, and ORSANCO's Water Quality Criteria

Appendix A. Ohio River Navigation Dams			
Mile Point	**Name**	**Normal Pool Elevation (ft)***	**Year Placed in Operation****
6.2	Emsworth	710	1921
13.2	Dashields	692	1929
31.7	Montgomery	682	1936
54.4	New Cumberland	664.5	1959
84.2	Pike Island	644	1963
126.4	Hannibal	623	1972
161.7	Willow Island	602	1972
203.9	Belleville	582	1965
237.5	Racine	560	1967
279.2	Robert C. Byrd	538	1937
341	Greenup	515	1962
436.2	Meldahl	485	1964
531.5	Markland	455	1963
606.8	McAlpine	420	1961
720.7	Cannelton	383	1972
776.1	Newburgh	358	1975
846	Uniontown	342	1975
918.5	Smithland	324	1980
938.9	Lock and Dam 52	302	1928
962.6	Lock and Dam 53	290	1929
964.6	Olmsted	290	2018

* Height of water surface above mean sea level (National Geodetic Vertical Data)

** Year placed in operation defined as when the pool was raised.

Information provided by the United States Corps of Engineers – Ohio River Division

Appendix A: Selected Tributaries to the Ohio River

Enters Ohio River at Mile Point	Stream Name	State	Stream Length (Miles)	Drainage Area (Sq. Miles)	Enters Ohio River at Mile Point	Stream Mile	State	Stream Length (Miles)	Drainage Area (Sq. Miles)
0.1	ALLEGHENY RIVER	PA	325	11,700	150.0	LEITHS RUN	OH		
0.1	MONONGAHELA RIVER	PA	128	7,400	150.2	SPRING RUN	WV		
2.1	CHARTIERS CREEK	PA		277	151.0	REAS RUN	OH		
9.5	MONTOUR RUN	PA			154.0	MIDDLE ISLAND CREEK	WV	70	560
13.7	LITTLE SEWICKLEY CREEK	PA			156.9	DENAS RUN	OH		
15.5	BIG SEWICKLEY CREEK	PA			157.7	FRENCH RUN	WV		
25.4	BEAVER RIVER	PA	21	3,130	168.6	LITTLE MUSKINGUM RIVER	OH		315
29.6	RACCOON CREEK	PA		200	170.2	DUCK CREEK	OH	52	228
40.1	LITTLE BEAVER CREEK	PA	51	510	172.2	MUSKINGUM RIVER	OH	112	8,040
47.3	LITTLE YELLOW CREEK	OH			174.3	WILLIAMS CREEK	WV		
47.6	CONGO RUN	WV			184.8	LITTLE KANAWHA RIVER	WV	160	2,320
50.6	YELLOW CREEK	OH	34	240	188.7	DAVIS RUN	OH		
60.1	KINGS CREEK	WV			192.0	LITTLE HOCKING RIVER	OH	18	103
61.7	ISLAND RUN	OH			192.5	SAWER RUN	OH		
65.3	WILLS CREEK	OH			194.0	LITTLE SAND CREEK	WV		
66.5	HARMAN CREEK	WV			199.3	HOCKING RIVER	OH	100	1,190
71.6	CROSS CREEK	OH	27	128	200.4	INDIAN RUN	OH		
75.2	BUFFALO CREEK	WV		160	201.8	LEE CREEK	WV		
81.4	SHORT CREEK	OH	29	147	203.4	ROCK RUN	OH		
90.2	WHEELING CREEK	OH	30	108	210.2	SHADE RIVER	OH		221
90.2	WHEELING CREEK	WV		300	217.0	LITTLE SANDY CREEK	WV		
94.9	MCMAHON CREEK	OH	28	91	218.6	GROUNDHOG CREEK	OH		
101.6	LITTLE GRAVE CREEK	WV			220.9	SANDY CREEK	WV		115
102.4	BIG GRAVE CREEK	WV		75	223.4	CEDAR RUN	WV		
105.0	PIPE CREEK	OH			226.2	OLD TOWN CREEK	OH		
109.5	CAPTINA CREEK	OH	39	181	227.8	TANNERS RUN	OH		
113.7	FISH CREEK	WV		250	231.4	MILL CREEK	WV		230
117.5	SUNFISH CREEK	OH	31	114	231.5	LITTLE MILL CREEK	WV		
119.8	OPOSSUM CREEK	OH			232.3	JOHNS RUN	OH		
122.2	PROCTOR CREEK	WV			234.9	TOMBLESON RUN	WV		
128.6	FISHING CREEK	WV		220	235.8	SPRING RUN	WV		
137.7	MILLER RUN	OH			236.7	VIVIAN RUN	WV		
141.3	MILL CREEK	OH			240.6	WEST CREEK	WV		
148.8	BENS RUN	WV			241.0	DUNHAM RUN	OH		
149.0	SHEETS RUN	OH			245.0	BROAD CREEK	WV		

Appendix A: Selected Tributaries to the Ohio River

Enters Ohio River at Mile Point	Stream Name	State	Stream Length (Miles)	Drainage Area (Sq. Miles)	Enters Ohio River at Mile Point	Stream Mile	State	Stream Length (Miles)	Drainage Area (Sq. Miles)
253.7	LEADING CREEK	OH	30	151	336.2	LITTLE SANDY RIVER	KY		724
255.0	STORES RUN	OH			337.4	COAL BRANCH	KY		
255.9	TEN MILE CREEK	WV			338.6	SMITH BRANCH	KY		
258.7	MILL CREEK	WV			338.9	GINAT RUN	OH		
260.6	KYGER CREEK	OH			340.8	FRANKLIN RUN	OH		
262.5	CAMPAIGN CREEK	OH			345.6	PINE CREEK	OH	48	185
263.2	OLD TOWN CREEK	WV			349.2	LITTLE SCIOTO RIVER	OH	41	233
264.2	GEORGES CREEK	OH			353.2	TYGARTS CREEK	KY		336
265.5	KANAWHA RIVER	WV	97	12200	356.4	SCIOTO RIVER	OH	237	6,510
267.3	TWO MILE CREEK	WV			361.5	TURKEY CREEK	OH		
276.0	CRAB CREEK	WV			363.2	NACE RUN	OH		
276.1	RACCOON CREEK	OH	109	684	368.4	KINNICONICK CREEK	KY		253
277.4	BURRELS RUN	OH			373.4	UPPER TWIN CREEK	OH		
279.0	TEENS RUN	OH			373.6	LOWER TWIN CREEK	OH		
282.3	SIXTEENMILE CREEK	WV			378.4	SALT LICK CREEK	KY		
284.3	EIGHTEEN MILE CREEK	WV			388.0	OHIO BRUSH CREEK	OH	57	435
287.4	LITTLE GUYANDOT RIVER	WV			389.4	SPRING RUN	OH		
296.7	TWO MILE CREEK	OH			391.0	LOWER SISTER CREEK	OH		
299.0	NINE MILE CREEK	WV			392.3	DONALDSON CREEK	OH		
303.9	PADDYS CREEK	OH			395.3	ISLAND CREEK	OH		
305.2	GUYANDOTTE RIVER	WV	66	1670	398.4	ISAACS CREEK	OH		
306.9	INDIAN GUYAN CREEK	OH			401.6	CROOKED CREEK	KY		
309.7	SYMMES CREEK	OH	70	356	402.3	ELK RUN	OH		
310.7	BUFFALO CREEK	OH			403.0	CABIN CREEK	KY		
314.0	TWELVEPOLE CREEK	WV		440	405.6	LITTLE THREE MILE CREEK	OH		
317.1	BIG SANDY RIVER	WV	27	4280	406.9	SLEEPY HOLLOW CREEK	KY		
317.4	CATLETTS CREEK	KY			409.0	FISH GUT CREEK	OH		
319.4	KEYES CREEK	KY			412.1	THREE MILE CREEK	OH		
320.1	SALLIDAY CREEK	OH			414.8	LAWRENCE CREEK	KY		
324.0	HOOD CREEK	KY			415.2	EAGLE CREEK	OH	31	154
324.3	ICE CREEK	OH			417.1	RED OAK CREEK	OH		
328.1	STORMS CREEK	OH			419.1	LEES CREEK	KY		
331.1	POND RUN	KY			422.6	STRAIGHT CREEK	OH		
332.8	UHLANDS RUND	KY			423.6	WHITE OAK CREEK	OH	49	234

Appendix A: Selected Tributaries to the Ohio River

Enters Ohio River at Mile Point	Stream Name	State	Stream Length (Miles)	Drainage Area (Sq. Miles)	Enters Ohio River at Mile Point	Stream Mile	State	Stream Length (Miles)	Drainage Area (Sq. Miles)
425.1	HOG RUN	OH			521.4	PAINT LICK CREEK	KY		
426.4	BRACKEN CREEK	KY			522.7	LITTLE SUGAR CREEK	KY		
428.6	BIG TURTLE CREEK	KY			522.9	BIG SUGAR CREEK	KY		
430.5	WRANGLING RUN	KY			527.2	BRYANT CREEK	IN		
431.6	BULL SKIN CREEK	OH			529.1	TURTLE CREEK	IN		
431.7	BYERS RUN	KY			530.3	DAN CREEK	IN		
432.5	LITTLE LOCUST CREEK	KY			530.3	CRAIGS CREEK	KY		
432.8	BIG LOCUST CREEK	KY			532.0	STEPHENS CREEK	KY		
433.2	PATTERSONS RUN	OH			535.7	PLUM CREEK	IN		
433.6	CROOKED CREEK	OH			545.8	KENTUCKY RIVER	KY	255	6970
434.4	LITTLE SNAG CREEK	KY			546.4	GREEN VALLEY CREEK	IN		
435.7	BIG SNAG CREEK	KY			546.6	LITTLE KENTUCKY RIVER	KY	35	147
443.8	LITTLE INDIAN CREEK	OH			549.6	LOCUST CREEK	KY		
445.3	BIG INDIAN CREEK	OH			550.5	INDIAN KENTUCK CREEK	IN		150
451.5	TWELVEMILE CREEK	KY			553.2	BEE CAMP CREEK	IN		
455.1	TEN MILE CREEK	OH			555.5	EAGLE HALLOW	IN		
455.3	NINE MILE CREEK	OH			556.4	MARILYN CREEK	IN		
456.5	EIGHT MILE CREEK	OH			559.5	CROOKED CREEK	IN		
463.3	LITTLE MIAMI RIVER	OH	90	1670	560.3	BIG CLIFTY CREEK	IN		
470.1	LICKING RIVER	KY	320	3670	563.6	CHAIN MILL CREEK	IN		
472.5	MILL CREEK	OH	28	166	569.5	SALUDA CREEK	IN		
484.2	MUDDY CREEK	OH			570.6	CORN CREEK	KY		
491.1	GREAT MIAMI RIVER	OH	161	5400	573.2	BAREBONE CREEK	KY		
494.8	TANNERS CREEK	IN		136	574.4	MIDDLE CREEK	KY		
498.7	LAUGHERY CREEK	IN	39	350	574.4	KNOB CREEK	IN		
499.8	WOOLPER CREEK	KY			578.4	CAMP CREEK	IN		
501.5	ISLAND BRANCH	IN			580.7	EIGHTEEN MILE CREEK	KY		
504.6	MIDDLE CREEK	KY			584.4	BULL CREEK	IN		
508.7	ARNOLD CREEK	IN			585.6	OWEN CREEK	IN		
509.9	GRANT CREEK	IN			592.8	POND CREEK	KY		
512.2	LICK CREEK	KY			595.9	HARRODS CREEK	KY		
513.6	GUNPOWDER CREEK	KY			596.9	GOOSE CREEK	KY		
514.7	LANDING CREEK	KY			602.2	SOUTH FORK BEARGRASS CREEK	KY		
517.0	BIG BONE CREEK	KY			606.5	SILVER CREEK	IN		225

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616.3	MILL CREEK CUTOFF	KY			706.3	SAMPLE RUN	IN		
617.5	KNOB CREEK	IN			707.4	ADAMS RUN	IN		
623.5	BRINLEY CREEK	IN			707.5	TOWN CREEK	KY		
624.4	EVERSOLE CREEK	IN			707.7	BULL CREEK	KY		
625.0	MILLS CREEK	KY			709.0	GOEHAGAN CREEK	KY		
629.2	FOURMILE CREEK	IN			710.6	SLICK CREEK	KY		
629.7	SALT RIVER	KY	125	2,890	710.8	CLOVER CREEK	KY		
633.3	ABRAHAMS RUN	KY			712.4	FAUCETT CREEK	KY		
634.6	MOSQUITO CREEK	IN			714.6	POND RUN	IN		
636.3	OTTER CREEK	KY			716.3	SANDY BRANCH	IN		
641.2	BIG RUN	IN			717.4	MILLSTONE CREEK	IN		
642.2	DOE RUN	KY			718.9	DEER CREEK	IN		
645.9	FLIPPINS RUN	KY			720.2	BLUE WELLS HOLLOW	IN		
647.3	BUCK CREEK	IN			721.4	INDIAN CREEK	KY		
648.1	LICK RUN	IN			724.0	CASSELBURY CREEK	IN		
651.5	FRENCH CREEK	KY			724.1	LEAD CREEK	KY		
656.9	New Amsterdam City Trib	IN			729.8	WINDY CREEK	IN		
657.0	BIG INDIAN CREEK	IN		253	731.3	ANDERSON RIVER	IN		234
659.9	COLD FRIDAY HOLLOW	KY			731.7	MUDDY GUT CREEK	KY		
661.3	POTATO RUN	IN			733.1	CROOKED CREEK	IN		
662.8	BLUE RIVER	IN		435	736.6	YELLOW CREEK	KY		
672.3	CEDAR BRANCH	KY			740.8	BIG SLOUGH	KY		
678.6	LITTLE BLUE RIVER	IN			741.3	LITTLE SANDY CREEK	IN		
684.8	BOONE HALLOW	KY			742.0	BLACKFORD CREEK	KY		124
686.3	WATSON RUN	KY			742.0	SANDY CREEK	IN		
686.5	SPRING CREEK	KY			744.2	HONEY CREEK	IN		
688.3	MILL CREEK	IN			746.8	HUFFMAN DITCH	IN		
692.5	KNOB CREEK	IN			750.5	PUP CREEK	KY		
698.6	LICK RUN	KY			752.0	YELLOW CREEK	KY		
700.8	SINKING CREEK	KY		154	757.7	PERSIMMONS DITCH	KY		
703.1	BEAR CREEK	IN			763.6	COWHIDE SLOUGH TRIB	KY		
703.9	FANNY CREEK	IN			765.2	COWHIDE SLOUGH			
704.3	BUCK CREEK	IN			769.4	FULKERSON DITCH	KY		
705.3	KINGLEY CREEK	IN			772.8	LITTLE PIGEON CREEK	IN		415

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Enters Ohio River at Mile Point	Stream Name	State	Stream Length (Miles)	Drainage Area (Sq. Miles)	Enters Ohio River at Mile Point	Stream Mile	State	Stream Length (Miles)	Drainage Area (Sq. Miles)
784.0	GREEN RIVER	KY	370	9,230	897.8	BIG GRAND PIERRE CREEK	IL		
787.2	WALKER SLOUGH				901.9	GIVENS CREEK	KY		
792.9	PIGEON CREEK			375	902.3	LUSK CREEK	IL		
796.8	BAYOU CREEK	IN			903.5	MC GILLIGAN CREEK	KY		
800.7	MOUND SLOUGH				910.1	BIG BAY CREEK	IL		
806.6	CANOE CREEK	KY			910.8	BARREN CREEK	IL		
813.2	LOGSDEN-STROOD BRANCH	IN			911.9	BAYOU CREEK	KY		
815.0	BAYOU CREEK	IN			913.7	PHELPS CREEK	KY		
827.7	CYPRESS SLOUGH				919.8	DYER HILL CREEK	KY		
827.8	MCFADDEN CREEK	IN			920.3	CUMBERLAND RIVER	KY	693	17920
832.4	SMITH CREEK	IN			923.2	DAVIS CREEK	KY		
833.6	BEAVERDAMN CREEK	IN			926.0	GOODLOW SLOUGH	KY		
840.7	BAYOU DRAIN	IN			927.6	DRAKE BRANCH			
841.9	HIGHLAND CREEK	KY			932.5	TENNESSEE RIVER	KY	652	40910
843.0	LOST CREEK	KY			933.3	ISLAND CREEK	KY		
846.9	SIBLEY CREEK	KY			935.8	BALLARD LAKE	IL		
847.8	WABASH RIVER	IL	474	33100	939.4	PERKINS CREEK	KY		
850.7	RUNNING SLOUGH	IL			940.4	SEVENMILE CREEK	IL		
867.2	SALINE RIVER	IL	27	1170	941.9	MASSAC CREEK	IL		
868.2	CANE CREEK	IL			942.7	MASSAC CREEK	KY		
868.7	DENNIS O'NAN DITCH	KY			947.5	BAYOU CREEK	KY		
873.4	TRADEWATER RIVER	KY	110	1000	947.5	ROCKY BRANCH	IL		
875.9	CAMP CREEK	KY			951.0	BAYOU CREEK			
877.0	CORNSTALK CREEK	KY			953.0	NEWTONS CREEK	IL		
877.6	HANEY CREEK	IL			953.3	BEAN BRANCH	KY		
877.7	ANTHONY CREEK	IL			956.2	REDSTONE CREEK	KY		
886.1	HURRICANE CREEK	KY			957.7	POST CREEK CUTOFF	IL		
886.4	PETERS CREEK	IL			962.9	GAR CREEK	KY		
887.3	FRANKLIN BRANCH				967.6	HUMPHREY'S CREEK	KY		
887.6	HOSICK CREEK	IL			968.9	HODGES BAYOU	IL		
889.5	BIG CREEK	IL			971.9	HESS BAYOU	IL		
892.9	DEER CREEK	KY			973.3	CACHE ISLAND	KY		
893.5	BUCK CREEK	KY			974.7	CACHE RIVER	IL		720
895.8	THREEMILE CREEK	IL			977.7	CROOKED CREEK			

Ohio River Flows

Month and Year	Ohio River Mile 84.2 Pike Island L&D				Ohio River Mile 531.5 Markland L&D				Ohio River Mile 918.5 Smithland L&D			
	Maximum	Minimum	Average	% Long-term Average	Maximum	Minimum	Average	% Long-term Average	Maximum	Minimum	Average	% Long-term Average
January 2014	110.8	16.6	55.9	96%	275.2	63.2	161.9	110%	552.8	110.3	311.4	126%
February 2014	132.1	17.9	51.5	92%	390.7	66.4	193.6	127%	487.2	87.1	261.9	100%
March 2014	100.5	25.0	50.1	72%	213.9	72.4	142.0	77%	515.0	147.3	280.1	92%
April 2014	111.1	28.6	60.5	100%	341.9	71.0	184.3	118%	619.9	118.5	379.5	143%
May 2014	155.4	39.3	74.6	159%	299.0	92.0	183.2	137%	421.8	157.2	304.3	126%
June 2014	105.2	20.9	47.3	166%	157.6	55.4	98.7	119%	184.6	109.2	144.6	92%
July 2014	48.6	14.1	25.8	122%	97.5	30.6	51.6	90%	189.8	47.4	81.7	83%
August 2014	50.6	15.1	28.0	159%	112.0	29.2	54.0	124%	143.7	43.8	78.8	114%
September 2014	22.8	9.3	13.8	69%	59.0	17.6	34.6	78%	96.8	38.6	65.4	98%
October 2014	34.2	9.4	18.9	90%	116.5	18.3	49.9	107%	194.5	32.2	89.6	119%
November 2014	110.8	16.6	31.2	91%	267.6	40.9	81.2	109%	382.3	64.6	132.6	116%
December 2014	109.1	26.8	45.6	85%	248.6	59.4	113.0	92%	355.6	108.6	184.1	94%
January 2015	73.6	23.8	37.3	64%	184.7	64.3	104.0	71%	275.8	104.4	167.6	68%
February 2015	58.6	18.2	31.9	57%	157.7	47.5	96.1	63%	215.0	67.8	141.9	54%
March 2015	190.8	17.0	99.6	143%	553.4	61.0	334.8	181%	821.9	134.4	542.9	179%
April 2015	194.4	39.6	81.2	134%	428.9	121.0	281.2	180%	631.9	251.3	488.3	184%
May 2015	40.3	13.3	22.6	48%	132.9	38.8	64.3	48%	322.4	68.1	134.1	55%
June 2015	127.9	18.4	59.4	208%	227.2	36.0	113.2	136%	376.7	71.7	183.2	116%
July 2015	110.0	11.7	53.1	251%	351.9	55.7	189.3	330%	514.6	174.5	390.8	395%
August 2015	12.7	7.2	9.3	53%	62.1	18.1	34.7	80%	170.2	25.4	82.3	118%
September 2015	47.1	6.7	9.5	47%	39.9	13.9	23.2	52%	54.6	28.0	36.8	55%
October 2015	59.0	9.5	17.8	84%	96.2	21.6	43.0	92%	123.0	32.0	57.5	77%
November 2015	44.4	14.1	25.7	75%	108.2	41.9	63.1	85%	183.6	72.1	113.8	99%
December 2015	149.6	19.1	47.8	90%	437.0	49.3	149.3	122%	548.7	83.3	200.6	102%
January 2016	105.5	22.3	42.7	73%	335.7	59.2	125.3	85%	668.7	130.9	332.0	135%
February 2016	139.1	24.4	72.5	130%	350.9	70.8	217.8	143%	474.3	132.8	296.7	114%
March 2016	97.6	24.0	53.5	77%	280.2	93.9	180.9	98%	503.6	189.0	355.2	117%
April 2016	114.3	24.7	43.1	71%	205.1	71.7	116.7	75%	298.2	143.1	219.6	83%
May 2016	78.0	23.9	48.2	103%	241.1	76.4	158.5	119%	364.4	162.9	287.0	118%
June 2016	39.5	11.6	21.4	75%	233.5	32.1	82.7	99%	250.5	62.1	114.0	72%
July 2016	24.2	7.6	12.1	57%	93.2	21.4	50.1	87%	208.1	65.3	130.1	132%
August 2016	26.8	6.5	12.7	72%	87.7	21.1	44.8	103%	178.3	50.3	116.7	168%
September 2016	22.6	6.1	10.0	50%	41.3	12.6	24.4	55%	81.4	35.1	54.0	81%
October 2016	83.2	7.7	24.6	117%	123.0	16.7	44.8	96%	161.5	31.5	67.5	90%
November 2016	32.0	14.6	21.3	62%	52.5	16.9	38.3	51%	88.7	36.8	60.2	52%
December 2016	166.5	23.4	61.4	115%	252.7	40.4	119.2	97%	285.1	78.9	161.4	82%

Ohio River Flows

	Ohio River Mile 84.2 Pike Island L&D				Ohio River Mile 531.5 Markland L&D				Ohio River Mile 918.5 Smithland L&D			
Month and Year	Maximum	Minimum	Average	% Long-term Average	Maximum	Minimum	Average	% Long-term Average	Maximum	Minimum	Average	% Long-term Average
January 2017	196.7	54.8	95.9	164%	333.3	115.0	227.2	154%	517.5	183.7	328.3	133%
February 2017	125.2	33.9	65.2	117%	199.2	77.3	128.9	84%	429.6	109.0	204.5	78%
March 2017	126.9	33.6	59.3	85%	363.2	86.5	182.4	99%	423.3	131.4	249.4	82%
April 2017	147.8	38.0	77.1	127%	293.4	111.6	195.2	125%	366.7	191.6	279.2	106%
May 2017	154.7	23.7	68.7	146%	296.7	87.8	195.0	146%	536.9	248.4	407.3	168%
June 2017	103.8	12.5	37.9	133%	254.4	42.9	108.3	130%	322.5	73.9	185.3	118%
July 2017	133.8	17.7	42.8	202%	156.4	48.7	103.3	180%	268.6	113.4	163.1	165%
August 2017	48.1	8.1	16.8	96%	169.1	14.9	49.7	115%	194.9	24.1	77.5	112%
September 2017	15.9	7.1	9.9	50%	70.7	9.7	27.8	63%	127.9	10.0	50.8	76%
October 2017	49.3	7.5	13.0	62%	94.4	12.2	38.4	82%	130.6	14.7	64.2	86%
November 2017	139.9	30.4	62.5	181%	271.7	74.3	141.7	190%	306.4	94.0	184.1	160%
December 2017	63.0	14.1	27.6	52%	157.5	30.0	68.1	56%	242.6	42.4	104.3	53%
January 2018	223.3	11.5	72.9	125%	324.6	37.7	148.5	101%	336.3	52.9	187.6	76%
February 2018	269.9	41.6	119.5	214%	631.3	121.3	341.2	223%	838.5	175.0	391.4	150%
March 2018	185.5	21.9	66.9	96%	528.3	107.9	222.6	121%	972.9	204.9	522.6	172%
April 2018	222.9	39.4	100.0	165%	460.5	150.8	304.9	196%	708.2	319.3	538.7	204%
May 2018	105.6	28.2	56.7	121%	233.3	85.6	151.0	113%	306.8	138.4	211.9	87%
June 2018	70.3	21.1	43.6	153%	208.8	59.5	112.8	135%	315.2	102.2	185.4	118%
July 2018	43.3	8.9	19.9	94%	137.9	25.5	55.5	97%	304.3	27.7	106.1	107%
August 2018	34.9	12.6	19.4	110%	94.8	30.3	62.1	143%	131.3	54.3	90.0	130%
September 2018	271.7	10.5	75.7	379%	369.5	27.4	185.6	420%	430.5	47.3	230.3	344%
October 2018	100.5	27.6	55.7	263%	300.6	56.5	125.3	268%	349.8	84.0	185.0	247%
November 2018	113.5	65.8	89.7	260%	333.9	159.5	236.1	317%	437.8	168.1	337.1	294%
December 2018	156.8	32.5	77.4	145%	405.8	86.1	236.9	193%	473.5	180.2	349.4	178%

ORSANCO's Water Quality Criteria for the Ohio River

Pollutant	Human Health		Aquatic Life		All Other Uses (e.g. Taste & Odor)
	Carcinogenic (ug/L)	Non-Carcinogenic (ug/L)	Acute (ug/L)	Chronic (ug/L)	
Acenaphthene		670[1,2]			
Acrolein		190			
Acrylonitrile	0.0511[,3]				
Aldrin	0.0000491[,3]				
alpha-BHC	0.00261[,3]				
alpha-Endosulfan		621			
Ammonia		1.0 mg/L[4]	7.3	1.0	
Anthracene		83001			
Antimony		5.61			
Arsenic		0.010 mg/L	340[6]	1506	
Asbestos		7 million			
Barium		1.0 mg/L			
Benzene	2.21[,3]				
Benzidine	0.0000861[,3]				
Benzo(a) Anthracene	0.00381[,3]				
Benzo(a) Pyrene	0.00381[,3]				
Benzo(b) Fluoranthene	0.00381[,3]				
Benzo(k) Fluoranthene	0.00381[,3]				
beta-BHC	0.00911[,3]				
beta-Endosulfan		621			
Bis(2-Chloroethyl) Ether	0.031[,3]				
Bis(2-Chloroisopropyl) Ether		14001			
Bis(2-Ethylhexyl)Phthalate	1.21[,3]				
Bromoform	4.31[,3]				
Butylbenzyl Phthalate		15001			
Cadmium			2.01[8]	0.258	
Carbon Tetrachloride	0.231[,3]				
Chlordane	0.00081[,3]				
Chloride					250 mg/L
Chlorobenzene		1302[,9]			
Chlorodibromomethane	0.41[,3]				

[1] This criterion has been revised to reflect The U.S. EPA's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.
[2] The organoleptic effect criterion is more stringent than the value for priority toxic pollutants.
[3] This criterion is based on carcinogenicity of 10^{-6} risk. Alternate risk levels may be obtained by moving the decimal point (e.g., for a risk level of 10^{-5}, move the decimal point in the recommended criterion one place to the right).
[4] Criteria applies at intakes
[5] Criteria dependant on pH or pH and temp, see formulas in section 3.2.E. and Appendix A1, A2, A3 of Pollution Control Standards, 4-day average rule (shown at pH 7.0 + most restrictive temperature)
[6] Presented in the dissolved form
[7] This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act (SDWA).
[8] Presented in the dissolved form and shown at Hardness 100, specific formulas in 3.2.F.
[9] U.S. EPA has issued a more stringent MCL. Refer to drinking water regulations (40 CFR 141) or Safe Drinking Water Hotline (1-800-426-4791) for values.

Pollutant	Human Health		Aquatic Life		All Other Uses (e.g. Taste & Odor)
	Carcinogenic (ug/L)	Non-Carcinogenic (ug/L)	Acute (ug/L)	Chronic (ug/L)	
Chloroform	5.73[10]				
Chromium III			5708	74.18	
Chromium VI			15.7126	10.5826	
Chrysene		0.00381[3]			
Copper		13002	13.48	8.968	
Cyanide		140[11]			
Cyanide (free)			22[12]	5.212	
Dibenzo(a,h) Anthracene	0.00381[3]				
Dichlorobromomethane	0.551[3]				
Dieldrin	0.0000521[3]				
Diethyl Phthalate		170001			
Dimethyl Phthalate		270000			
Di-n-Butyl Phthalate		20001			
Dissolved Oxygen			> 4.0	> 5.0	
E. Coli		<130			
Endosulfan Sulfate		621			
Endrin		0.059			
Endrin Aldehyde		0.291			
Ethylbenzene		530			
Fecal Coliform		<200			
Flouride		1.0 mg/L			
Fluoranthene		1301			
Fluorene		11001			
gamma-BHC (Lindane)		0.98			
Heptachlor	0.0000791[3]				
Heptachlor Epoxide	0.0000391[3]				
Hexachlorobenzene	0.000281[3]				
Hexachlorobutadiene	0.441[3]				
Hexachlorocyclopentadiene		402			
Hexachloroethane	1.41[3]				
Ideno(1,2,3-cd) Pyrene	0.00381[3]				
Isophorone	351[3]				
Lead			64.68	2.528	
Mercury		0.000012 mg/L	1.456	0.7746	

[10] Although a new RfD is available in IRIS, the surface water criteria will not be revised until the National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) is completed, since public comment on the relative source contribution (RSC) for chloroform is anticipated.

[11] This recommended water quality criterion is expressed as total cyanide, even though the IRIS RFD we used to derive the criterion is based on free cyanide. The multiple forms of cyanide that are present in ambient water have significant differences in toxicity due to their differing abilities to liberate the CN-moiety. Some complex cyanides require even more extreme conditions than refluxing with sulfuric acid to liberate the CN-moiety. Thus, these complex cyanides are expected to have little or no 'bioavailability' to humans. If a substantial fraction of the cyanide present in a water body is present in a complexed form (e.g., Fe4[Fe(CN)6]3), this criterion may be over conservative.

[12] Criteria shown to be applied in total recoverable form

[13] Dissolved oxygen minimum 5.0 mg/L April 15 – June 15

[14] Criteria based on 5-sample per month geometric mean

Pollutant	Human Health		Aquatic Life		All Other Uses (e.g. Taste & Odor)
	Carcinogenic (ug/L)	Non-Carcinogenic (ug/L)	Acute (ug/L)	Chronic (ug/L)	
Methyl Bromide		471			
Methylene Chloride	4.61[3]				
Methylmercury		0.3 mg/kg[15]			
Nickel		6101	4698	528	
Nitrite Nitrate Nitrogen		10 mg/L			
Nitrite Nitrogen		1 mg/L			
Nitrobenzene		171			
N-Nitrosodimethylamine	0.000691[3]				
N-Nitrosodi-n-Propylamine	0.0051[3]				
N-Nitrosodiphenylamine	3.31[3]				
Pentachlorophenol	0.271[3]				
pH				>6.0 and	
Phenol	210001[2]				
Phenolics					0.005
Polychlorinated Biphenyls	0.0000641[3,16]				
Pyrene		8301			
combined radium-226 and	4 pCi/L				
gross total alpha	15 pCi/L				
total gross beta	50 pCi/L				
total gross strontium-90	8 pCI/L				
Selenium	1709			512	
Silver	0.05 mg/L		3.228		
Sulfate					250 mg/L
Temperature		110 Deg F			
Tetrachloroethylene	0.693				
Thallium		0.24			
Toluene		13009			
Total dissolved solids					500 mg/L4
Toxaphene	0.000281[3]				
Trichloroethylene	2.53				
Vinyl Chloride	0.0253[17]				
Zinc		74002	1178	1188	
1,1,2,2-Tetrachloroethane	0.171[3]				
1,1,2-Trichloroethane	0.591[3]				
1,1-Dichloroethylene		330			
1,2,4-Trichlorobenzene		35			
1,2-Dichlorobenzene		420			
1,2-Dichloroethane	0.381[3]				
1,2-Dichloropropane	0.51[3]				

[15] This fish tissue residue criterion for methylmercury is based on a total fish consumption rate of 0.0175 kg/day.
[16] This criterion applies to total PCBs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses).
[17] This recommended water quality criterion was derived using the cancer slope factor of 1.4 (LMS exposure from birth).

Pollutant	Human Health		Aquatic Life		All Other Uses (e.g. Taste & Odor)
	Carcinogenic (ug/L)	Non-Carcinogenic (ug/L)	Acute (ug/L)	Chronic (ug/L)	
1,2-Diphenylhydrazine	0.0361[3]				
1,2-Trans-Dichloroethylene		1409			
1,3-Dichlorobenzene		320			
1,3-Dichloropropene	0.343				
1,4-Dichlorobenzene		63			
2,3,7,8-TCDD (Dioxin)	0.0000000053				
2,4,6-Trichlorophenol	1.41[3]				
2,4-Dichlorophenol		771[2]			
2,4-Dimethylphenol		3801			
2,4-Dinitrophenol		691			
2,4-Dinitrotoluene	0.113				
2-Chloronaphthalene		10001			
2-Chlorophenol		811[2]			
2-Methyl-4,6-Dinitrophenol		13			
3,3-Dichlorobenzidine	0.0211[3]				
4,4'-DDD	0.000311[3]				
4,4'-DDE	0.000221[3]				
4,4'-DDT	0.000221[3]				

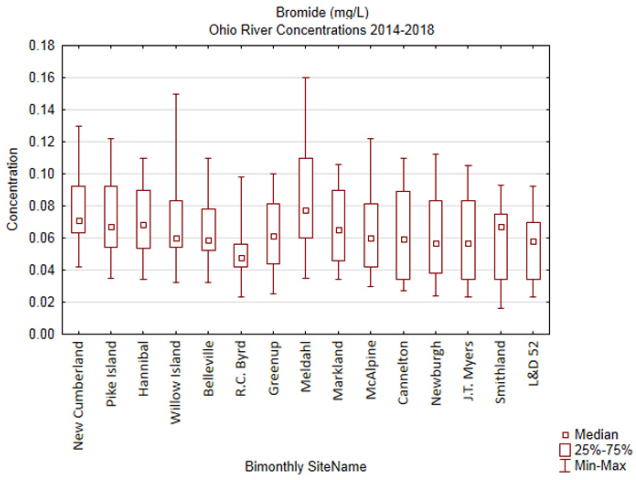
APPENDIX B

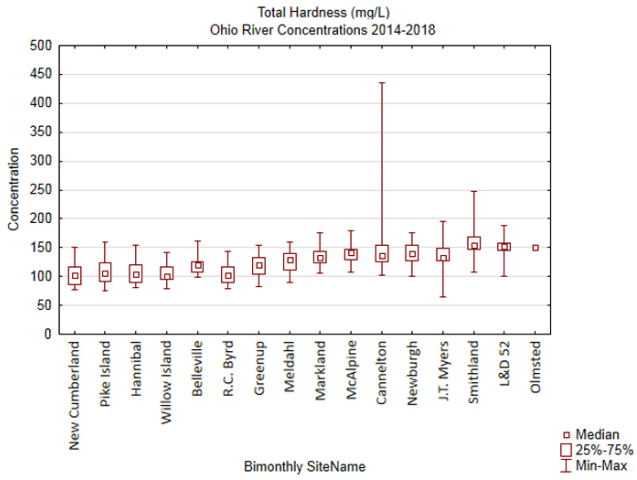
Bimonthly and Clean Metal Parameter Graphs

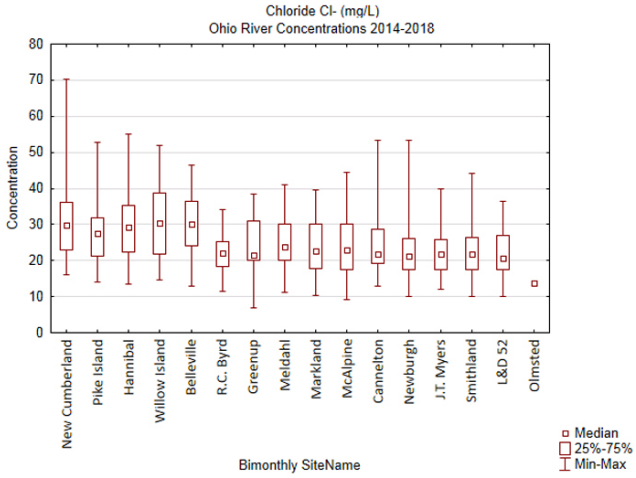
2014-2018

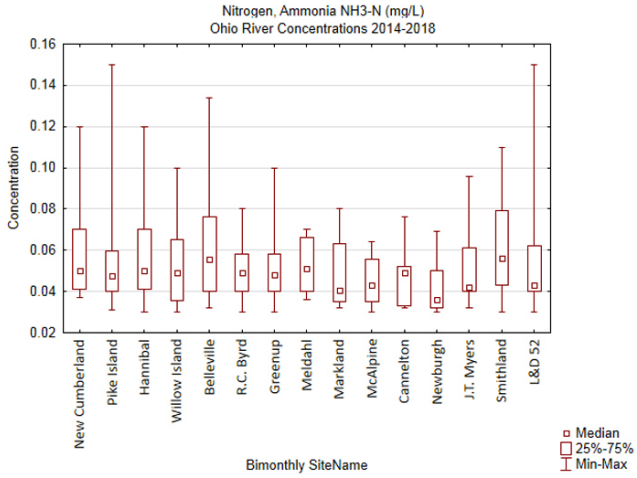
Individual results available at
www.orsanco.org/programs/water-quality-assessment

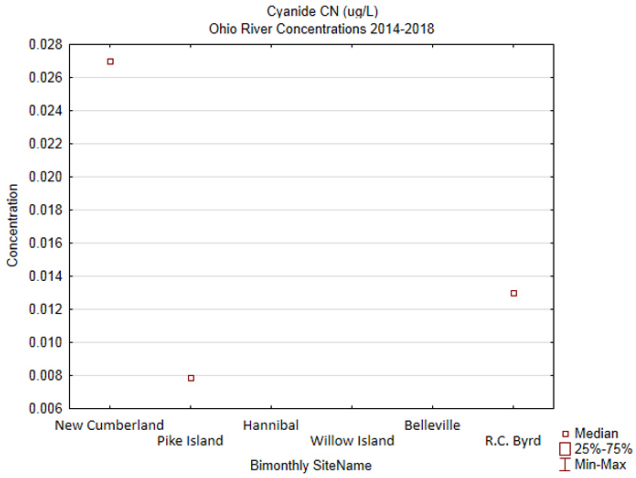
Appendix B: Bimonthly Parameter Boxplots

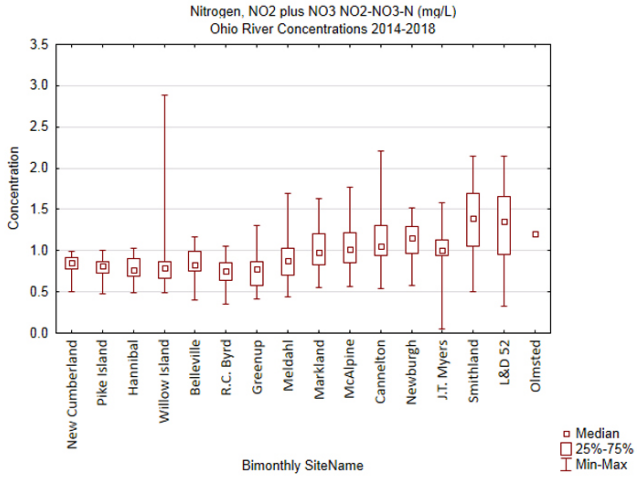




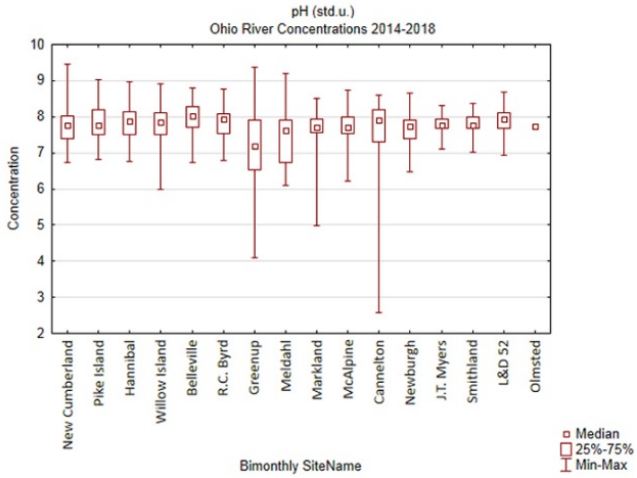


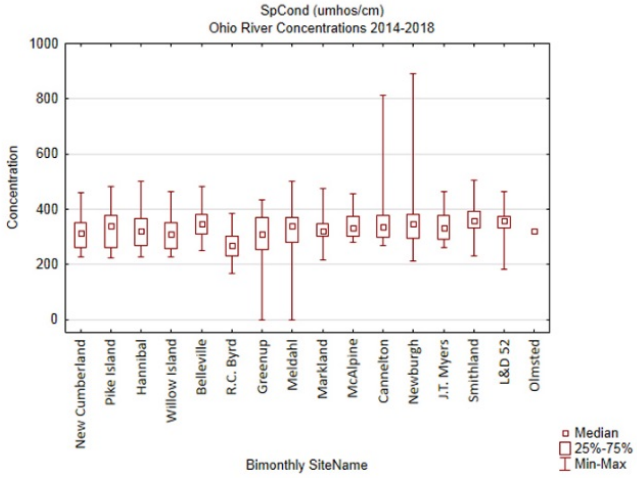


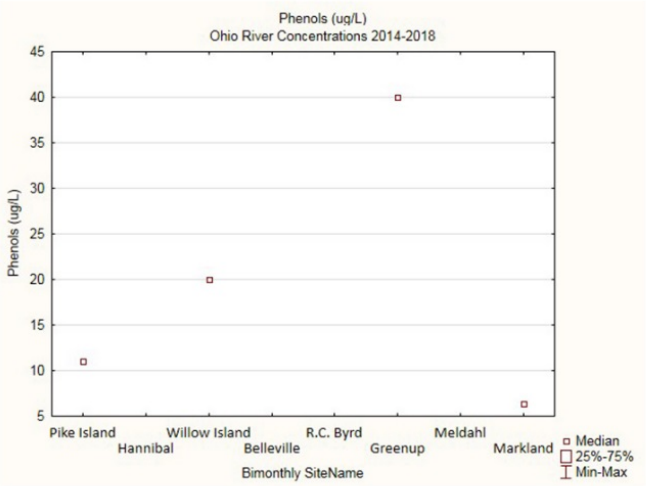


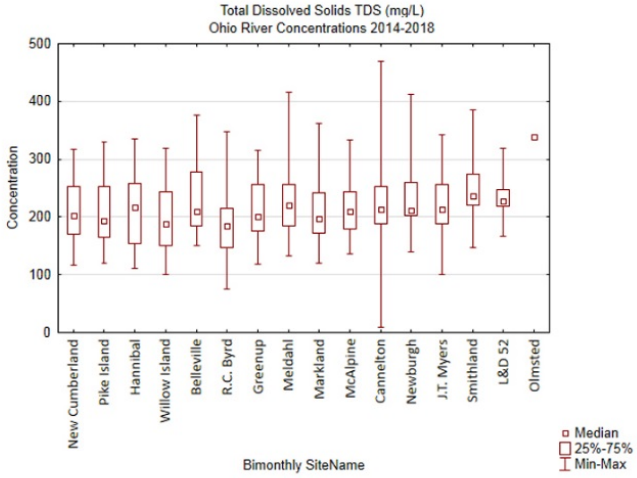


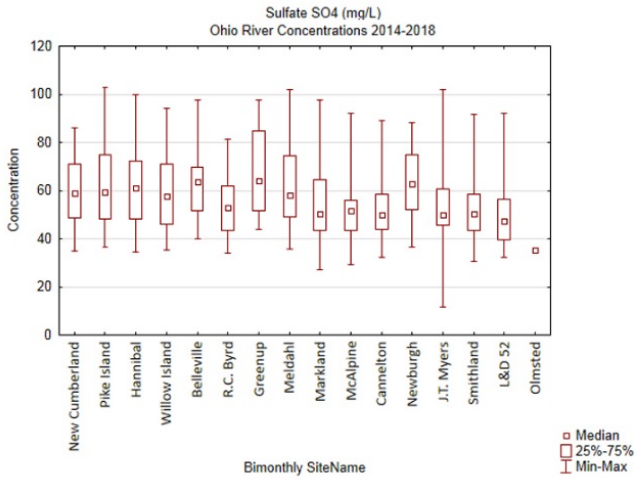
Appendix B: Bimonthly Parameter Boxplots

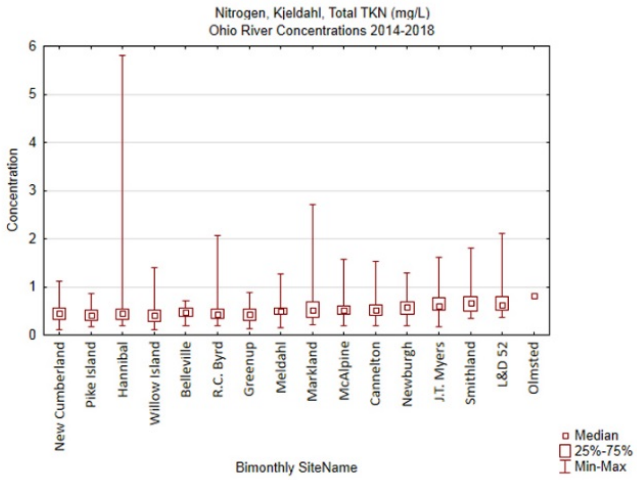




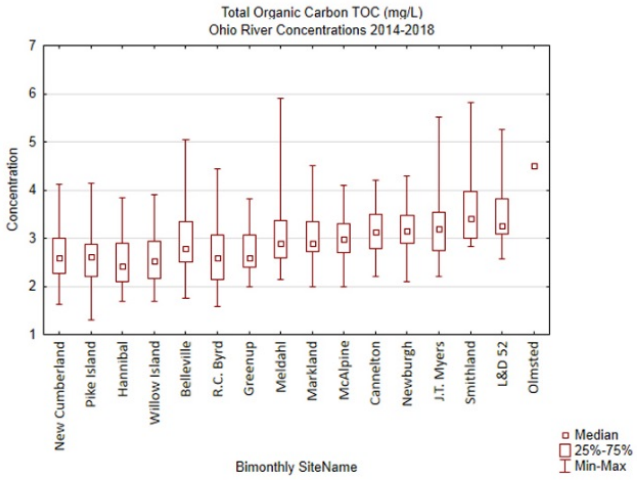


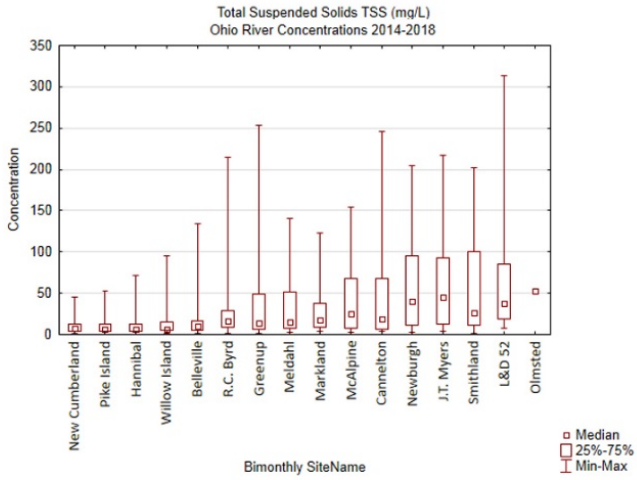


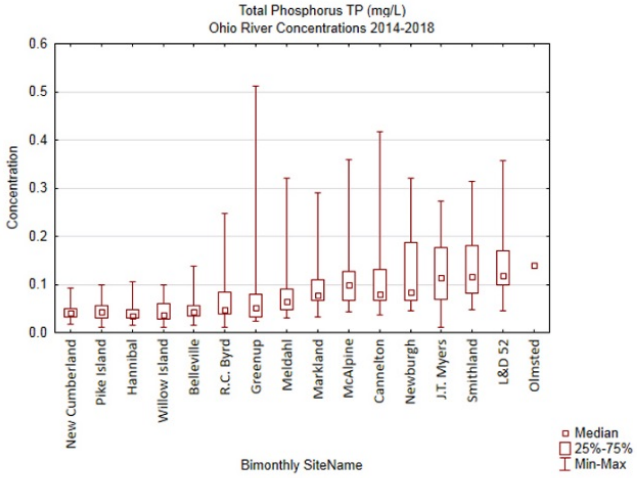




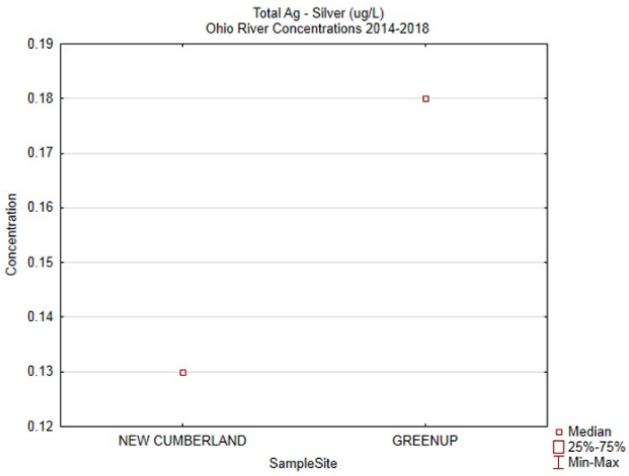
Appendix B: Bimonthly Parameter Boxplots

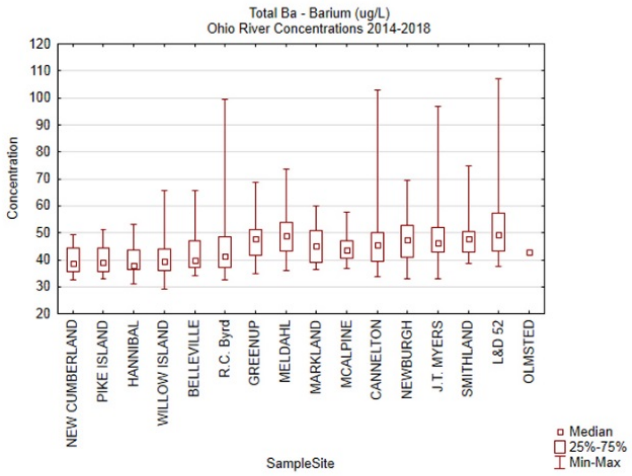


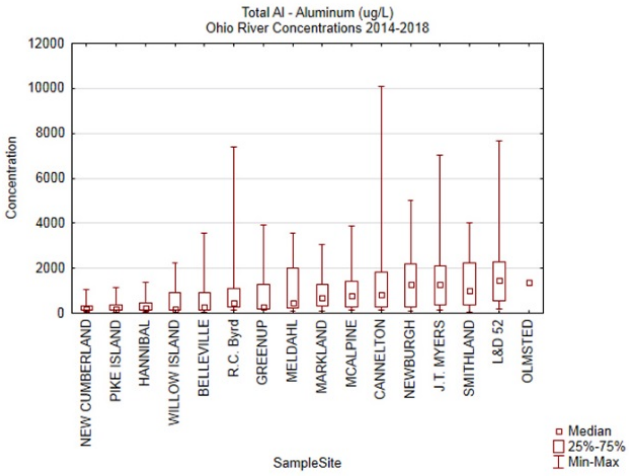


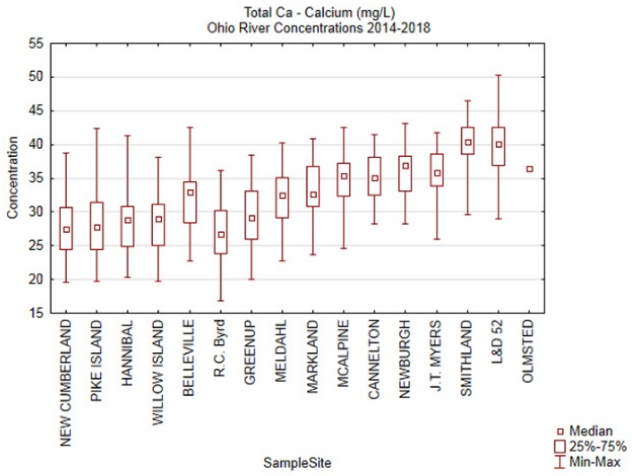


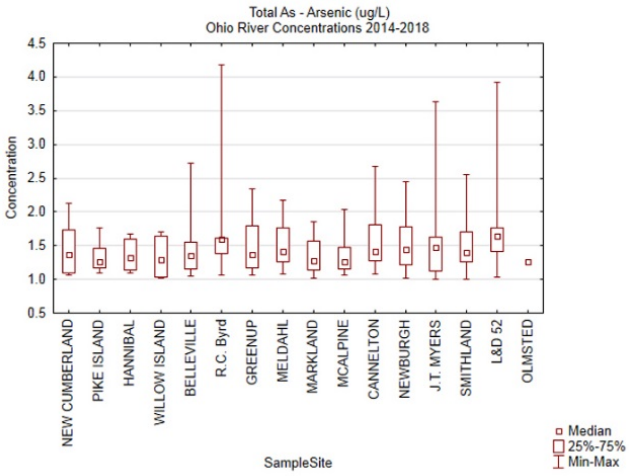
Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots

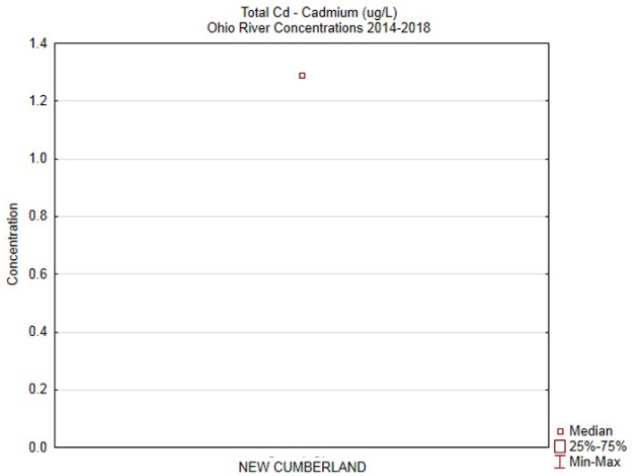




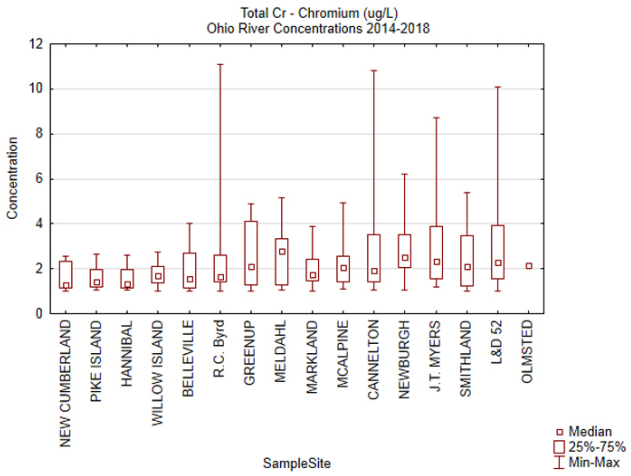


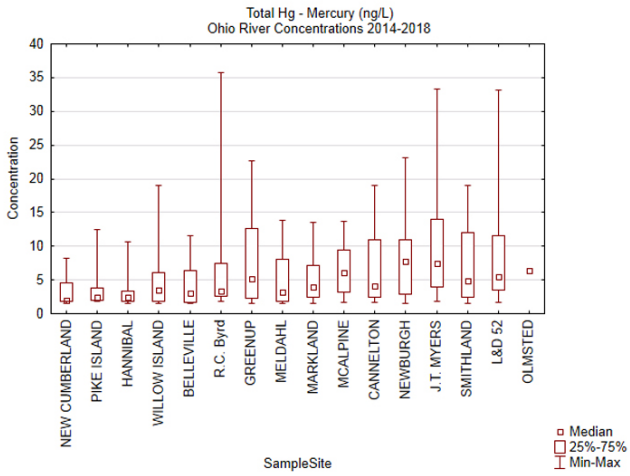


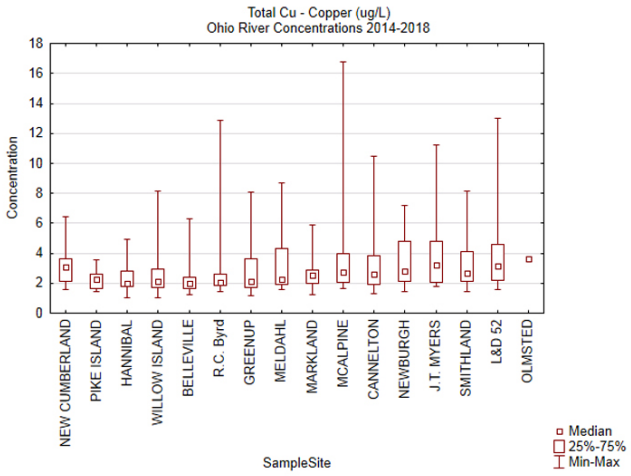


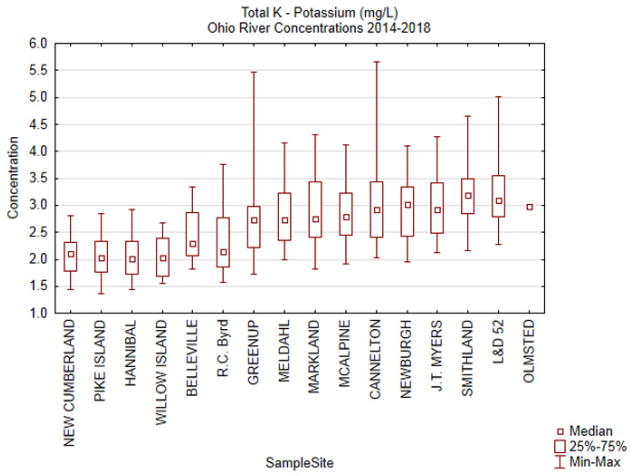


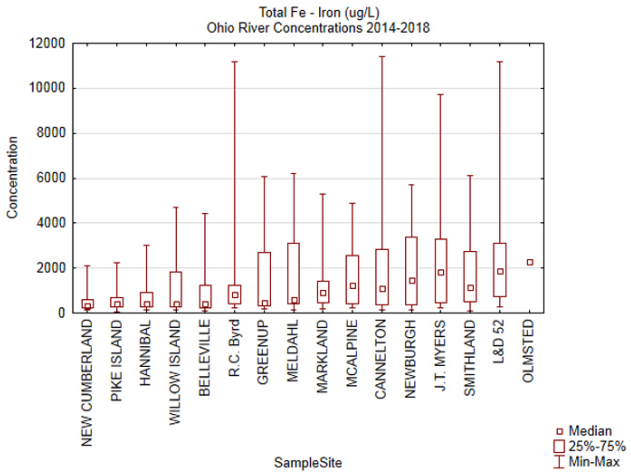
Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots

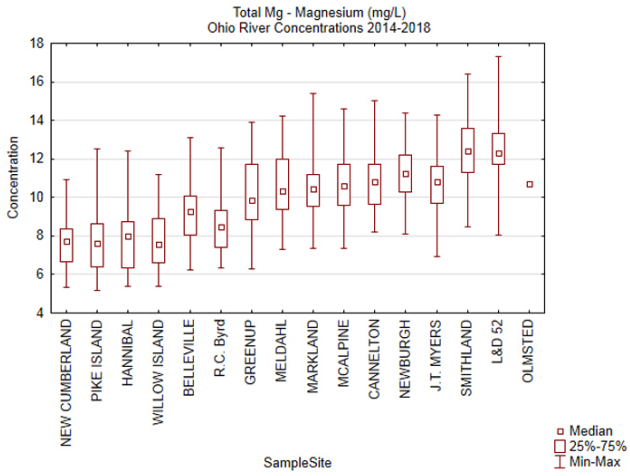




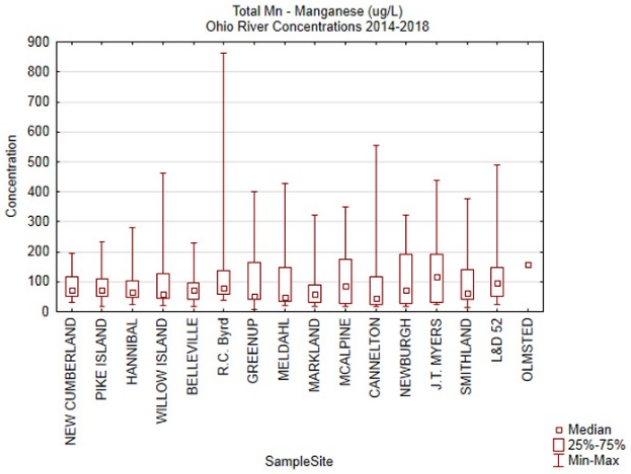


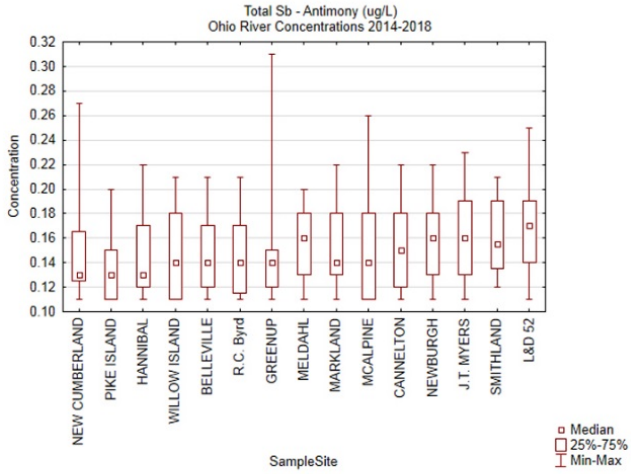


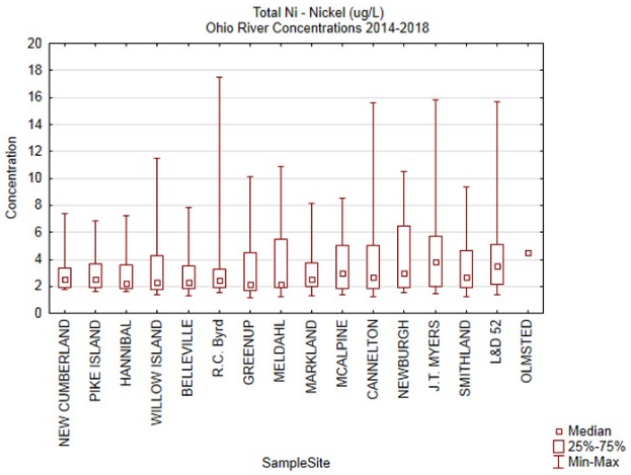


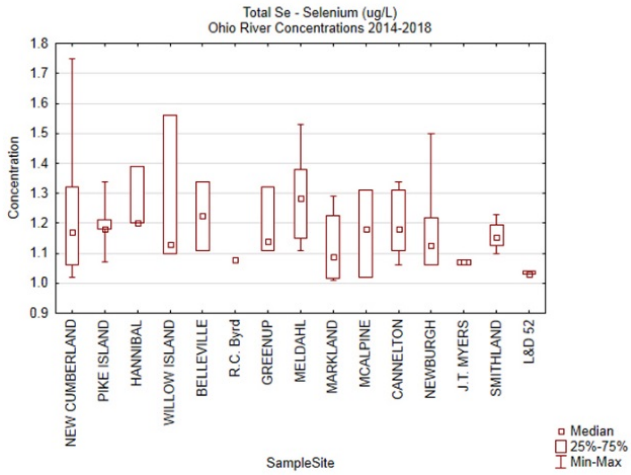


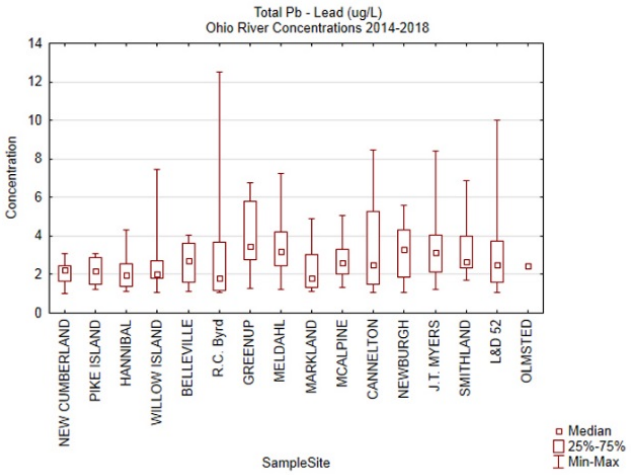
Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots

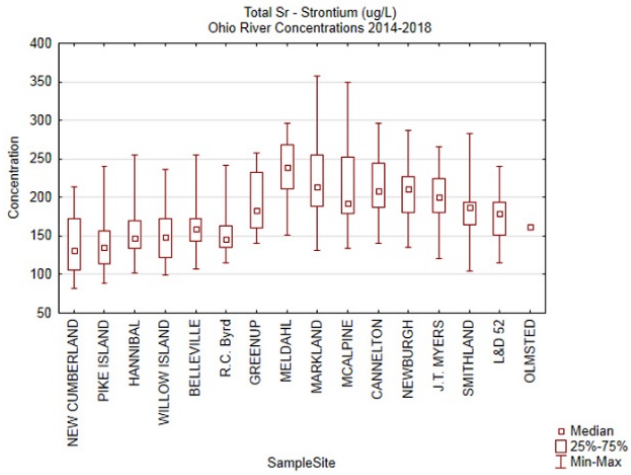




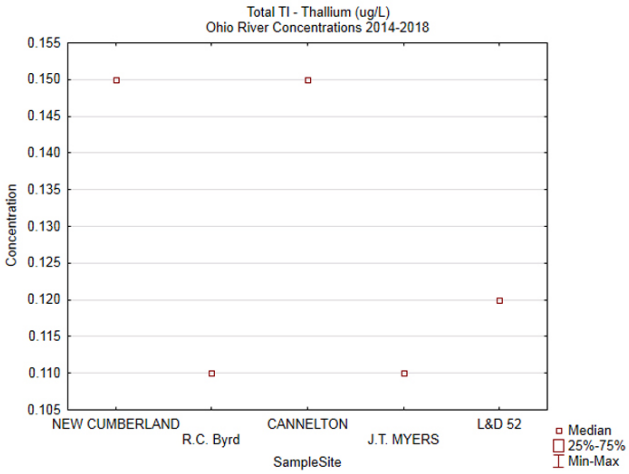


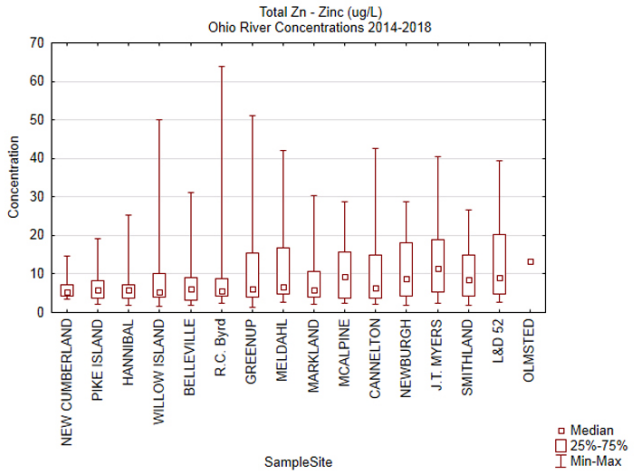






Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots





APPENDIX C

Biological Indicator Results

Fish and Macroinvertebrates, 2014-2018

Detailed population data available at
www.orsanco.org/programs/water-quality-assessment

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2014-2018

Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Overall Pool Biological Condition
1.3	Emsworth	2018	B	18.43	Poor	39.17	Good	*Averages shown are for the full compliment of 15 sites in Emsworth pool. Includes nine sites (scores not shown) on the two major tributaries to the Ohio (Monongahela & Allegheny rivers)
1.5	Emsworth	2018	B	12.82	Poor	38.66	Good	
2.8	Emsworth	2018	B	40.00	Good	27.29	Fair	
3.7	Emsworth	2018	B	14.90	Poor	26.66	Fair	
5.3	Emsworth	2018	B	9.43	Very Poor	45.55	Very Good	
5.8	Emsworth	2018	B	7.77	Very Poor	45.86	Very Good	
average pool values*				27.83	Fair	35.85	Good	
6.7	Dashields	2013	A	26.75	Fair			
7.1	Dashields	2013	C	9.92	Very Poor			
7.3	Dashields	2013	C	35.46	Good			
7.6	Dashields	2013	C	36.19	Good			
8.6	Dashields	2013	C	32.94	Good			
8.9	Dashields	2013	B	28.71	Fair			
8.9	Dashields	2013	C	46.08	Very Good			
10.0	Dashields	2013	B	24.06	Fair			
10.8	Dashields	2013	C	43.09	Very Good			
11.2	Dashields	2013	C	12.39	Poor			
11.2	Dashields	2013	B	11.15	Poor			
11.5	Dashields	2013	D	46.20	Very Good			
11.9	Dashields	2013	B	39.40	Good			
12.3	Dashields	2013	B	33.26	Good			
12.6	Dashields	2013	C	37.07	Good			
average pool values				30.85	Good			**Not Assessed 2014-2018**
13.4	Montgomery	2015	C	43.62	Very Good	23.13	Fair	
14.1	Montgomery	2015	B	41.07	Very Good	14.48	Poor	
19.2	Montgomery	2015	C	42.10	Very Good	42.72	Very Good	
20.5	Montgomery	2015	C	38.82	Good	27.56	Fair	
21.0	Montgomery	2015	C	32.80	Good	24.20	Fair	
22.0	Montgomery	2015	B	32.66	Good	13.81	Poor	
24.0	Montgomery	2015	C	31.55	Good	14.45	Poor	
24.8	Montgomery	2015	D	18.61	Poor	39.35	Good	
25.1	Montgomery	2015	B	43.23	Very Good	11.21	Poor	
26.3	Montgomery	2015	C	26.35	Fair	15.59	Poor	
27.6	Montgomery	2015	C	19.60	Poor	28.66	Fair	
29.6	Montgomery	2015	D	40.87	Very Good	20.02	Fair	
30.0	Montgomery	2015	B	21.73	Fair	0.00	Very Poor	
30.3	Montgomery	2015	C	36.42	Good	23.95	Fair	
30.8	Montgomery	2015	C	15.62	Poor	24.34	Fair	
average pool values				32.34	Good	21.56	Fair	
32.5	New Cumberland	2017	B	9.19	Very Poor	20.53	Fair	
34.8	New Cumberland	2017	B	35.31	Good	20.83	Fair	
35.3	New Cumberland	2017	B	47.04	Very Good	22.96	Fair	
38.2	New Cumberland	2017	B	18.67	Poor	60.00	Excellent	
40.7	New Cumberland	2017	C	22.81	Fair	34.55	Good	
43.3	New Cumberland	2017	B	40.08	Very Good	28.76	Fair	
44.6	New Cumberland	2017	D	30.00	Good	24.95	Fair	
46.6	New Cumberland	2017	C	35.03	Good	28.16	Fair	
46.9	New Cumberland	2017	C	20.30	Fair	27.75	Fair	
47.1	New Cumberland	2017	B	38.12	Good	14.15	Poor	
48.7	New Cumberland	2017	B	29.75	Fair	20.67	Fair	

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2014-2018

Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Overall Pool Biological Condition
50.4	New Cumberland	2017	D	30.31	Good	22.98	Fair	
50.6	New Cumberland	2017	B	9.55	Very Poor	10.78	Poor	
52.0	New Cumberland	2017	D	19.64	Poor	22.40	Fair	
52.6	New Cumberland	2017	B	32.02	Good	18.51	Poor	
average pool values				27.85	Fair	25.20	Fair	
57.6	Pike Island	2018	C	38.33	Very Good	29.40	Fair	
57.9	Pike Island	2018	C	22.50	Good	15.05	Poor	
61.3	Pike Island	2018	B	25.17	Very Good	-	-	
66.9	Pike Island	2018	B	33.94	Poor	41.58	Very Good	
67.7	Pike Island	2018	A	28.71	Very Good	-	-	
69.6	Pike Island	2018	C	12.97	Fair	-	-	*Not assessed for macros
70.4	Pike Island	2018	B	19.09	Good	42.86	Very Good	requisite number of
72.2	Pike Island	2018	D	41.45	Fair	60.00	Excellent	sites not reached.
75.0	Pike Island	2018	B	21.07	Good	-	-	
76.5	Pike Island	2018	C	16.81	Very Good	-	-	
76.6	Pike Island	2018	C	14.26	Good	60.00	Excellent	
77.8	Pike Island	2018	C	12.47	Poor	49.81	Very Good	
78.2	Pike Island	2018	B	15.20	Good	-	-	
81.9	Pike Island	2018	D	26.25	Poor	28.70	Fair	
82.9	Pike Island	2018	B	35.37	Good	60.00	Excellent	
average pool values				24.24	Fair	Not Assessed*		
84.9	Hannibal	**2013**	C	42.23	Very Good			
86.7	Hannibal	**2013**	C	42.88	Very Good			
88.6	Hannibal	**2013**	C	43.76	Very Good			
94.3	Hannibal	**2013**	C	44.26	Very Good			
96.5	Hannibal	**2013**	C	42.92	Very Good			
99.5	Hannibal	**2013**	B	26.74	Fair			
103.2	Hannibal	**2013**	C	18.58	Poor			
105.3	Hannibal	**2013**	B	25.24	Fair			
107.7	Hannibal	**2013**	C	17.99	Poor			
109.7	Hannibal	**2013**	C	26.96	Fair			
111.1	Hannibal	**2013**	B	44.80	Very Good			
111.9	Hannibal	**2013**	B	37.11	Good			
116.5	Hannibal	**2013**	D	40.42	Very Good			
118.6	Hannibal	**2013**	C	22.35	Fair			
122.2	Hannibal	**2013**	E	35.42	Good			
average pool values				34.11	Good			**Not Assessed 2014-2018**
126.9	Willow Island	2016	B	45.61	Very Good	15.27	Poor	
128.8	Willow Island	2016	D	38.44	Good	19.69	Poor	
131.8	Willow Island	2016	C	37.27	Good	46.16	Very Good	
133.3	Willow Island	2016	C	43.95	Very Good	28.22	Fair	
133.8	Willow island	2016	D	35.40	Good	25.41	Fair	
140.0	Willow Island	2016	C	28.30	Fair	28.92	Fair	
140.3	Willow Island	2016	D	41.76	Very Good	41.34	Very Good	
141.9	Willow Island	2016	D	18.84	Poor	51.27	Excellent	
147.8	Willow Island	2016	C	27.25	Fair	37.84	Good	
150.1	Willow Island	2016	D	33.56	Good	26.52	Fair	
156.2	Willow Island	2016	C	29.32	Fair	16.08	Poor	
156.5	Willow Island	2016	D	35.23	Good	18.48	Poor	
157.0	Willow Island	2016	C	42.56	Very Good	24.91	Fair	

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2014-2018

Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Overall Pool Biological Condition
157.8	Willow Island	2016	D	46.40	Very Good	28.92	Fair	
160.9	Willow Island	2016	B	32.91	Good	13.86	Poor	
average pool values				35.79	Good	28.19	Fair	
170.1	Belleville	2014	C	33.26	Good			
172.1	Belleville	2014	C	34.71	Good			
173.8	Belleville	2014	D	28.70	Fair			
175.5	Belleville	2014	C	36.29	Good			
176.6	Belleville	2014	B	10.85	Poor			
180.3	Belleville	2014	C	29.56	Fair			
181.3	Belleville	2014	D	20.13	Fair			
184.5	Belleville	2014	D	34.65	Good			
190.6	Belleville	2014	C	15.06	Poor			
192.1	Belleville	2014	D	25.44	Fair			
192.1	Belleville	2014	B	37.68	Good			
197.9	Belleville	2014	D	0.00	Very Poor			
199.5	Belleville	2014	D	24.58	Fair			
199.7	Belleville	2014	A	13.54	Poor			
199.9	Belleville	2014	E	22.55	Fair			
average pool values				24.47	Fair			
204.8	Racine	2015	C	47.73	Very Good	41.04	Very Good	
205.5	Racine	2015	C	31.02	Good	38.06	Good	
208.0	Racine	2015	D	34.93	Good	12.44	Poor	
208.4	Racine	2015	C	31.09	Good	17.36	Poor	
209.6	Racine	2015	C	38.04	Good	31.27	Good	
210.0	Racine	2015	B	38.59	Good	-	-	
211.5	Racine	2015	B	26.54	Fair	12.20	Poor	
213.9	Racine	2015	C	33.65	Good	18.17	Poor	
214.7	Racine	2015	E	16.12	Poor	28.86	Fair	
217.4	Racine	2015	D	32.57	Good	12.53	Poor	
221.0	Racine	2015	D	20.09	Fair	-	-	
222.1	Racine	2015	D	35.95	Good	32.05	Good	
223.1	Racine	2015	E	21.58	Fair	20.65	Fair	
232.4	Racine	2015	D	35.61	Good	26.33	Fair	
236.0	Racine	2015	B	19.67	Poor	23.61	Fair	
average pool values				30.88	Good	24.20	Fair	
238.7	RC Byrd	**2013**	C	42.82	Very Good			
239.2	RC Byrd	**2013**	C	30.81	Good			
240.8	RC Byrd	**2013**	B	24.10	Fair			
249.7	RC Byrd	**2013**	D	18.14	Poor			
252.5	RC Byrd	**2013**	C	49.26	Very Good			
253.0	RC Byrd	**2013**	C	41.72	Very Good			
258.0	RC Byrd	**2013**	E	27.55	Fair			
260.9	RC Byrd	**2013**	C	44.76	Very Good			
261.3	RC Byrd	**2013**	D	45.52	Very Good			
263.9	RC Byrd	**2013**	D	46.04	Very Good			
268.6	RC Byrd	**2013**	E	27.04	Fair			
270.3	RC Byrd	**2013**	D	19.38	Poor			
270.9	RC Byrd	**2013**	D	10.47	Poor			
278.0	RC Byrd	**2013**	E	14.96	Poor			
278.1	RC Byrd	**2013**	C	19.49	Poor			
average pool values				30.80	Good			**Not Assessed 2014-2018**

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2014-2018

Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Overall Pool Biological Condition
280.8	Greenup	2016	C	49.59	Very Good	31.80	Good	
280.9	Greenup	2016	C	54.20	Excellent	19.10	Poor	
281.8	Greenup	2016	C	45.91	Very Good	28.86	Fair	
284.9	Greenup	2016	C	40.52	Very Good	33.59	Good	
300.6	Greenup	2016	C	47.30	Very Good	21.40	Fair	
301.4	Greenup	2016	B	49.15	Very Good	17.05	Poor	
303.3	Greenup	2016	C	38.97	Good	24.07	Fair	
305.3	Greenup	2016	D	47.83	Very Good	22.14	Fair	
321.3	Greenup	2016	C	37.43	Good	21.56	Fair	
324.6	Greenup	2016	C	42.06	Very Good	26.45	Fair	
334.6	Greenup	2016	D	44.73	Very Good	17.45	Poor	
335.5	Greenup	2016	E	38.42	Good	17.43	Poor	
339.7	Greenup	2016	E	49.73	Very Good	20.46	Fair	
340.1	Greenup	2016	E	40.17	Very Good	24.36*	Fair	*Generated from MH Data
340.4	Greenup	2016	E	42.22	Very Good	17.85	Poor	
average pool values				44.55	Very Good	22.90	Fair	
343.1	Meldahl	2017	C	45.33	Very Good	27.86	Fair	
343.8	Meldahl	2017	C	28.00	Fair	27.67	Fair	
345.2	Meldahl	2017	B	41.57	Very Good	0.00	Very Poor	
349.9	Meldahl	2017	B	33.58	Good	30.74	Good	
351.1	Meldahl	2017	C	45.53	Very Good	22.288184	Fair	
351.5	Meldahl	2017	B	31.12	Good	46.29	Very Good	
361.2	Meldahl	2017	C	50.02	Excellent	26.74	Fair	
371.7	Meldahl	2017	D	35.43	Good	27.51	Fair	
373.7	Meldahl	2017	B	23.89	Fair	19.47	Poor	
378.5	Meldahl	2017	C	44.56	Very Good	15.68	Poor	
388.4	Meldahl	2017	C	54.08	Excellent	25.14	Fair	
399.2	Meldahl	2017	D	28.97	Fair	-	-	
403.9	Meldahl	2017	B	43.49	Very Good	11.48	Poor	
419.8	Meldahl	2017	D	18.80	Poor	16.92	Poor	
425.7	Meldahl	2017	D	17.87	Poor	12.93	Poor	
average pool values				36.15	Good	22.19	Fair	
451.8	Markland	2014	C	44.84	Very Good			
459.2	Markland	2014	D	41.39	Very Good			
460.3	Markland	2014	B	31.43	Good			
465.3	Markland	2014	C	44.63	Very Good			
466.2	Markland	2014	D	42.26	Very Good			
466.5	Markland	2014	B	46.04	Very Good			
474.6	Markland	2014	B	54.65	Excellent			
485.9	Markland	2014	D	28.12	Fair			
498.6	Markland	2014	E	33.88	Good			
510.1	Markland	2014	D	20.39	Fair			
512.6	Markland	2014	D	36.02	Good			
513.9	Markland	2014	D	42.05	Very Good			
520.8	Markland	2014	B	43.23	Very Good			
524.3	Markland	2014	D	17.89	Poor			
530.5	Markland	2014	D	38.87	Good			
average pool values				37.71	Good			
549.9	McAlpine	2014	D	34.86	Good			
561.1	McAlpine	2014	A	52.66	Excellent			

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2014-2018

Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Overall Pool Biological Condition
562.2	McAlpine	2014	D	47.36	Very Good			
567.6	McAlpine	2014	C	44.74	Very Good			
568.3	McAlpine	2014	C	48.07	Very Good			
569.1	McAlpine	2014	D	57.30	Excellent			
570.1	McAlpine	2014	D	52.67	Excellent			
572.1	McAlpine	2014	C	46.41	Very Good			
572.8	McAlpine	2014	D	27.80	Fair			
577.9	McAlpine	2014	C	42.95	Very Good			
587.4	McAlpine	2014	C	34.12	Good			
591.4	McAlpine	2014	C	50.69	Excellent			
591.8	McAlpine	2014	C	46.03	Very Good			
596.2	McAlpine	2014	D	32.67	Good			
597.5	McAlpine	2014	D	40.92	Very Good			
average pool values				43.95	Very Good			
607.9	Cannelton	2016	C	24.44	Fair	-	-	
616.6	Cannelton	2016	E	29.13	Fair	21.95	Fair	
619.8	Cannelton	2016	C	45.68	Very Good	-	-	
620.5	Cannelton	2016	E	38.17	Good	16.36	Poor	
623.6	Cannelton	2016	D	51.32	Excellent	-	-	*Not assessed for macros
626.3	Cannelton	2016	C	46.58	Very Good	-	-	high flow negatively
630.1	Cannelton	2016	D	40.19	Very Good	-	-	affected sampling.
633.3	Cannelton	2016	C	34.89	Good	35.33	Good	Requisite number of
652.1	Cannelton	2016	C	41.57	Very Good	16.83	Poor	sites not reached.
667.3	Cannelton	2016	C	46.77	Very Good	-	-	
680.5	Cannelton	2016	D	34.21	Good	17.72	Poor	
702.8	Cannelton	2016	E	60.00	Excellent	20.62	Fair	
714.1	Cannelton	2016	C	43.55	Very Good	18.39	Poor	
718.1	Cannelton	2016	E	46.33	Very Good	14.55	Poor	
719.4	Cannelton	2016	C	44.29	Very Good	14.89	Poor	
average pool values				41.81	Very Good	Not Assessed*		
721.2	Newburgh	2017	B	23.79	Fair	30.22	Good	
729.5	Newburgh	2017	D	29.69	Fair	27.51	Fair	
731.5	Newburgh	2017	C	52.52	Excellent	-	-	
738.0	Newburgh	2017	D	39.14	Good	23.31	Fair	
739.0	Newburgh	2017	C	33.42	Good	-	-	
741.1	Newburgh	2017	D	42.78	Very Good	18.23	Poor	*Not assessed for macros
744.2	Newburgh	2017	D	24.85	Fair	19.48	Poor	high flow negatively
745.2	Newburgh	2017	D	38.19	Good	20.73	Fair	affected sampling.
745.7	Newburgh	2017	D	35.39	Good	15.04	Poor	
751.5	Newburgh	2017	D	32.65	Good	19.44	Poor	
753.4	Newburgh	2017	D	45.97	Very Good	18.87	Poor	
753.7	Newburgh	2017	C	18.20	Poor	22.35	Fair	
762.9	Newburgh	2017	D	28.86	Fair	19.06	Poor	
763.6	Newburgh	2017	D	19.51	Poor	8.05	Very Poor	
774.9	Newburgh	2017	E	38.93	Good	15.27	Poor	
average pool values				33.59	Good	Not Assessed*		
779.4	JT Myers	2015	C	24.10	Fair	26.22	Fair	
789.8	JT Myers	2015	C	44.21	Very Good	44.94	Very Good	
790.4	JT Myers	2015	D	50.87	Excellent	43.76	Very Good	
800.2	JT Myers	2015	D	22.02	Fair	-	-	

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2014-2018

Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Overall Pool Biological Condition
800.6	JT Myers	2015	C	45.04	Very Good	40.60	Very Good	
808.0	JT Myers	2015	D	45.60	Very Good	33.21	Good	
808.7	JT Myers	2015	D	33.85	Good	41.64	Very Good	
813.9	JT Myers	2015	D	31.88	Good	39.43	Good	
815.6	JT Myers	2015	D	36.49	Good	48.91	Very Good	
830.5	JT Myers	2015	D	41.94	Very Good	-	-	
831.6	JT Myers	2015	C	59.78	Excellent	27.55	Fair	
831.9	JT Myers	2015	E	41.13	Very Good	40.30	Very Good	
832.8	JT Myers	2015	C	45.92	Very Good	35.12	Good	
836.1	JT Myers	2015	D	10.90	Poor	43.29	Very Good	
845.2	JT Myers	2015	D	37.61	Good	36.66	Good	
average pool values				38.09	Good	38.59	Good	
846.8	Smithland	**2013**	E	34.91	Good			
847.1	Smithland	**2013**	D	24.09	Fair			
863.0	Smithland	**2013**	E	0.00	Very Poor			
866.9	Smithland	**2013**	D	29.23	Fair			
878.1	Smithland	**2013**	D	28.91	Fair			
878.4	Smithland	**2013**	D	17.81	Poor			
882.2	Smithland	**2013**	E	33.03	Good			
883.3	Smithland	**2013**	E	30.53	Good			
893.7	Smithland	**2013**	D	41.40	Very Good			
895.9	Smithland	**2013**	D	39.86	Good			
909.9	Smithland	**2013**	D	40.53	Very Good			
912.9	Smithland	**2013**	E	36.05	Good			
913.5	Smithland	**2013**	D	30.79	Good			
914.0	Smithland	**2013**	E	37.23	Good			
917.7	Smithland	**2013**	B	43.81	Very Good			
average pool values				31.21	Good			**Not Assessed 2014-2018**
923.3	Olmsted	2014	D	40.69	Very Good			
924.4	Olmsted	2014	D	50.70	Excellent			
925.4	Olmsted	2014	D	17.51	Poor			
927.2	Olmsted	2014	D	20.96	Fair			
932.0	Olmsted	2014	D	37.24	Good			
932.8	Olmsted	2014	C	55.61	Excellent			
933.2	Olmsted	2014	D	47.20	Very Good			
940.1	Olmsted	2014	C	46.68	Very Good			
942.5	Olmsted	2014	D	23.94	Fair			
944.5	Olmsted	2014	D	31.31	Good			
945.8	Olmsted	2014	C	39.98	Good			
948.0	Olmsted	2014	D	30.53	Good			
954.6	Olmsted	2014	D	39.26	Good			
955.5	Olmsted	2014	D	38.15	Good			
961.2	Olmsted	2014	D	35.85	Good			
average pool values				37.04	Good			
966.9	Open Water	2014	D	18.96	Poor	-	-	
968.7	Open Water	2014	C	19.81	Poor	-	-	
974.0	Open Water	2014	D	30.39	Good	-	-	
976.9	Open Water	2014	E	0.00	Very Poor	-	-	
980.4	Open Water	2014	D	9.56	Very Poor	-	-	
980.8	Open Water	2014	D	5.25	Very Poor	-	-	Not Assessed

APPENDIX D

Bacteria Data

Monthly Geo Mean Results, 2014-2018

Detailed bacteria data available at
www.orsanco.org/programs/water-quality-assessment

Appendix D: Bacteria Data - Monthly Geo Mean Results 2014-2018 (shaded = insufficient sample)

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL
1.4M	Pittsburgh	Apr-14	140.94	74.25
4.3	Pittsburgh	Apr-14	199.69	97.30
1.4M	Pittsburgh	May-14		
4.3	Pittsburgh	May-14		
1.4M	Pittsburgh	Jun-14		
4.3	Pittsburgh	Jun-14		
1.4M	Pittsburgh	Jul-14		
4.3	Pittsburgh	Jul-14		
1.4M	Pittsburgh	Aug-14	740.12	280.93
4.3	Pittsburgh	Aug-14	811.39	317.29
1.4M	Pittsburgh	Sep-14	206.00	117.27
4.3	Pittsburgh	Sep-14	144.04	40.81
1.4M	Pittsburgh	Oct-14	162.11	57.95
4.3	Pittsburgh	Oct-14	121.21	52.61
86.8	Wheeling	Apr-14	70.83	42.86
92.8	Wheeling	Apr-14	117.45	144.21
86.8	Wheeling	May-14	292.88	234.39
92.8	Wheeling	May-14	407.04	456.73
86.8	Wheeling	Jun-14	350.74	617.54
92.8	Wheeling	Jun-14	866.33	1169.62
86.8	Wheeling	Jul-14	149.43	178.80
92.8	Wheeling	Jul-14	347.79	244.85
86.8	Wheeling	Aug-14	288.82	205.75
92.8	Wheeling	Aug-14	1760.87	757.14
86.8	Wheeling	Sep-14	35.89	15.70
92.8	Wheeling	Sep-14	195.47	68.64
86.8	Wheeling	Oct-14	83.83	29.53
92.8	Wheeling	Oct-14	509.57	176.45
305.1	Huntington	Apr-14	51.24	24.36
314.8	Huntington	Apr-14	144.60	36.19
305.1	Huntington	May-14	53.46	23.11
314.8	Huntington	May-14	130.23	72.97
305.1	Huntington	Jun-14	39.17	16.52
314.8	Huntington	Jun-14	83.78	35.05
305.1	Huntington	Jul-14	39.98	14.45
314.8	Huntington	Jul-14	139.82	59.93
305.1	Huntington	Aug-14	15.99	10.81
314.8	Huntington	Aug-14	152.65	76.74
305.1	Huntington	Sep-14	14.47	9.30
314.8	Huntington	Sep-14	39.32	12.94
305.1	Huntington	Oct-14	148.89	97.55
314.8	Huntington	Oct-14	37.27	21.63
462.6	Cincinnati	Apr-14	65.95	50.22
470	Cincinnati	Apr-14	243.18	193.54
477.5	Cincinnati	Apr-14	137.19	81.15
462.6	Cincinnati	May-14	72.26	41.46
470	Cincinnati	May-14	140.67	108.77
477.5	Cincinnati	May-14	109.38	67.54
462.6	Cincinnati	Jun-14	61.02	36.68
470	Cincinnati	Jun-14	53.64	31.09

Appendix D: Bacteria Data - Monthly Geo Mean Results 2014-2018 (shaded = insufficient sample)

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL
477.5	Cincinnati	Jun-14	29.69	11.97
462.6	Cincinnati	Jul-14	43.03	28.86
470	Cincinnati	Jul-14	154.47	89.84
477.5	Cincinnati	Jul-14	95.83	46.41
462.6	Cincinnati	Aug-14	50.49	39.92
470	Cincinnati	Aug-14	38.36	24.09
477.5	Cincinnati	Aug-14	62.11	29.12
462.6	Cincinnati	Sep-14	114.08	57.27
470	Cincinnati	Sep-14	30.31	25.23
477.5	Cincinnati	Sep-14	88.45	62.24
462.6	Cincinnati	Oct-14	38.09	23.01
470	Cincinnati	Oct-14	24.18	10.24
477.5	Cincinnati	Oct-14	54.42	27.73
594	Louisville	Apr-14	147.99	73.86
619.3	Louisville	Apr-14	200.64	141.34
594	Louisville	May-14	306.44	186.15
619.3	Louisville	May-14	181.83	136.10
594	Louisville	Jun-14	57.54	17.34
619.3	Louisville	Jun-14	50.77	36.90
594	Louisville	Jul-14	66.94	40.10
619.3	Louisville	Jul-14	68.69	21.82
594	Louisville	Aug-14	31.69	29.89
619.3	Louisville	Aug-14	271.05	163.41
594	Louisville	Sep-14	15.23	10.56
619.3	Louisville	Sep-14	65.71	72.33
594	Louisville	Oct-14	16.60	15.92
619.3	Louisville	Oct-14	126.88	156.85
791.5	Evansville	Apr-14	384.20	262.27
793.3	Evansville	Apr-14	320.60	321.92
791.5	Evansville	May-14	267.31	157.30
793.3	Evansville	May-14	260.99	140.60
791.5	Evansville	Jun-14	58.60	60.32
793.3	Evansville	Jun-14	283.44	225.88
791.5	Evansville	Jul-14	16.56	12.64
793.3	Evansville	Jul-14	97.41	75.69
791.5	Evansville	Aug-14	31.82	23.83
793.3	Evansville	Aug-14	68.44	53.52
791.5	Evansville	Sep-14	10.98	10.12
793.3	Evansville	Sep-14	55.02	58.73
791.5	Evansville	Oct-14	37.76	28.76
793.3	Evansville	Oct-14	62.07	30.78
1.4M	Pittsburgh	Apr-15	109.36	78.43
4.3	Pittsburgh	Apr-15	125.52	85.26
1.4M	Pittsburgh	May-15	717.34	213.19
4.3	Pittsburgh	May-15	728.52	248.91
1.4M	Pittsburgh	Jun-15	1677.53	504.74
4.3	Pittsburgh	Jun-15	2007.51	556.11
1.4M	Pittsburgh	Jul-15	700.16	179.61
4.3	Pittsburgh	Jul-15	724.10	183.34
1.4M	Pittsburgh	Aug-15	380.07	154.42

Appendix D: Bacteria Data - Monthly Geo Mean Results 2014-2018 (shaded = insufficient sample)

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL
4.3	Pittsburgh	Aug-15	373.84	146.85
1.4M	Pittsburgh	Sep-15	414.15	125.79
4.3	Pittsburgh	Sep-15	343.61	101.06
1.4M	Pittsburgh	Oct-15	222.22	73.54
4.3	Pittsburgh	Oct-15	185.81	63.62
86.8	Wheeling	Apr-15	523.22	162.74
92.8	Wheeling	Apr-15	520.54	191.85
86.8	Wheeling	May-15	45.91	13.29
92.8	Wheeling	May-15	112.00	32.00
86.8	Wheeling	Jun-15	660.76	214.34
92.8	Wheeling	Jun-15	2208.25	693.40
86.8	Wheeling	Jul-15	47.87	38.07
92.8	Wheeling	Jul-15	570.31	58.27
86.8	Wheeling	Aug-15	79.05	28.07
92.8	Wheeling	Aug-15	200.47	62.97
86.8	Wheeling	Sep-15	6.96	4.98
92.8	Wheeling	Sep-15	43.83	20.33
86.8	Wheeling	Oct-15	19.84	23.75
92.8	Wheeling	Oct-15	14.52	14.13
305.1	Huntington	Apr-15	88.98	60.74
314.8	Huntington	Apr-15	164.21	135.05
305.1	Huntington	May-15	37.74	19.87
314.8	Huntington	May-15	102.76	61.84
305.1	Huntington	Jun-15	74.66	50.97
314.8	Huntington	Jun-15	198.39	130.94
305.1	Huntington	Jul-15	276.21	133.89
314.8	Huntington	Jul-15	743.36	393.29
305.1	Huntington	Aug-15	13.54	7.67
314.8	Huntington	Aug-15	12.41	7.90
305.1	Huntington	Sep-15	6.58	4.59
314.8	Huntington	Sep-15	23.92	6.58
305.1	Huntington	Oct-15	6.06	4.00
314.8	Huntington	Oct-15	15.44	10.52
462.6	Cincinnati	Apr-15	250.72	222.40
470	Cincinnati	Apr-15	286.45	240.16
477.5	Cincinnati	Apr-15	394.97	243.77
462.6	Cincinnati	May-15	16.89	15.79
470	Cincinnati	May-15	11.45	12.68
477.5	Cincinnati	May-15	36.77	14.35
462.6	Cincinnati	Jun-15	144.41	121.84
470	Cincinnati	Jun-15	257.75	123.84
477.5	Cincinnati	Jun-15	670.83	429.76
462.6	Cincinnati	Jul-15	261.71	214.62
470	Cincinnati	Jul-15	341.89	239.79
477.5	Cincinnati	Jul-15	342.48	227.36
462.6	Cincinnati	Aug-15	125.64	95.39
470	Cincinnati	Aug-15	76.49	39.81
477.5	Cincinnati	Aug-15	418.74	214.36
462.6	Cincinnati	Sep-15	19.56	21.16
470	Cincinnati	Sep-15	18.52	10.87

Appendix D: Bacteria Data - Monthly Geo Mean Results 2014-2018 (shaded = insufficient sample)

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL
477.5	Cincinnati	Sep-15	15.75	7.13
462.6	Cincinnati	Oct-15	11.25	9.19
470	Cincinnati	Oct-15	7.28	8.37
477.5	Cincinnati	Oct-15	14.38	8.95
594	Louisville	Apr-15	269.87	281.08
619.3	Louisville	Apr-15	220.28	258.45
594	Louisville	May-15	16.68	10.90
619.3	Louisville	May-15	55.51	35.70
594	Louisville	Jun-15	32.11	22.71
619.3	Louisville	Jun-15	95.09	84.17
594	Louisville	Jul-15	478.28	175.27
619.3	Louisville	Jul-15		
594	Louisville	Aug-15	29.37	14.26
619.3	Louisville	Aug-15	296.82	219.71
594	Louisville	Sep-15	39.70	22.91
619.3	Louisville	Sep-15	34.90	17.27
594	Louisville	Oct-15	251.08	314.43
619.3	Louisville	Oct-15	69.03	53.56
791.5	Evansville	Apr-15	121.82	117.93
793.3	Evansville	Apr-15	358.92	302.09
791.5	Evansville	May-15	48.00	35.00
793.3	Evansville	May-15	221.00	207.00
791.5	Evansville	Jun-15	36.98	35.56
793.3	Evansville	Jun-15	88.83	98.73
791.5	Evansville	Jul-15	202.28	147.39
793.3	Evansville	Jul-15	243.08	337.12
791.5	Evansville	Aug-15	35.10	14.57
793.3	Evansville	Aug-15	56.95	57.54
791.5	Evansville	Sep-15	19.92	20.87
793.3	Evansville	Sep-15	81.02	100.32
791.5	Evansville	Oct-15	8.00	5.52
793.3	Evansville	Oct-15	90.13	71.54
1.4M	Pittsburgh	Apr-16	79.58	50.32
4.3	Pittsburgh	Apr-16	61.48	41.50
1.4M	Pittsburgh	May-16	236.41	97.97
4.3	Pittsburgh	May-16	301.52	117.85
1.4M	Pittsburgh	Jun-16	471.15	160.64
4.3	Pittsburgh	Jun-16	434.91	154.44
1.4M	Pittsburgh	Jul-16	365.17	98.49
4.3	Pittsburgh	Jul-16	544.30	115.44
1.4M	Pittsburgh	Aug-16	777.57	188.67
4.3	Pittsburgh	Aug-16	684.07	255.70
1.4M	Pittsburgh	Sep-16	259.19	67.28
4.3	Pittsburgh	Sep-16	205.65	67.00
1.4M	Pittsburgh	Oct-16	629.77	227.70
4.3	Pittsburgh	Oct-16	724.70	273.73
86.8	Wheeling	Apr-16	14.65	10.52
92.8	Wheeling	Apr-16	50.41	41.01
86.8	Wheeling	May-16	33.67	23.07
92.8	Wheeling	May-16	67.24	58.37

Appendix D: Bacteria Data - Monthly Geo Mean Results 2014-2018 (shaded = insufficient sample)

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL
86.8	Wheeling	Jun-16	20.17	13.54
92.8	Wheeling	Jun-16	115.15	157.65
86.8	Wheeling	Jul-16	4.98	6.88
92.8	Wheeling	Jul-16	47.17	28.33
86.8	Wheeling	Aug-16	19.16	15.20
92.8	Wheeling	Aug-16	79.16	50.63
86.8	Wheeling	Sep-16	6.63	8.75
92.8	Wheeling	Sep-16	35.91	13.89
86.8	Wheeling	Oct-16	11.08	16.80
92.8	Wheeling	Oct-16	65.62	28.12
305.1	Huntington	Apr-16	9.97	6.06
314.8	Huntington	Apr-16	71.30	37.61
305.1	Huntington	May-16	74.63	46.94
314.8	Huntington	May-16	170.20	151.07
305.1	Huntington	Jun-16	117.08	86.22
314.8	Huntington	Jun-16	163.48	105.66
305.1	Huntington	Jul-16	131.76	55.41
314.8	Huntington	Jul-16	255.51	149.41
305.1	Huntington	Aug-16	28.97	14.71
314.8	Huntington	Aug-16	24.59	11.52
305.1	Huntington	Sep-16	15.75	10.20
314.8	Huntington	Sep-16	6.06	5.28
305.1	Huntington	Oct-16	9.41	8.75
314.8	Huntington	Oct-16	9.84	7.28
462.6	Cincinnati	Apr-16	26.80	21.69
470	Cincinnati	Apr-16	29.05	20.38
477.5	Cincinnati	Apr-16	23.74	32.19
462.6	Cincinnati	May-16	60.44	52.41
470	Cincinnati	May-16	74.56	62.45
477.5	Cincinnati	May-16	68.76	46.35
462.6	Cincinnati	Jun-16	138.07	99.60
470	Cincinnati	Jun-16	112.75	63.41
477.5	Cincinnati	Jun-16	110.54	70.94
462.6	Cincinnati	Jul-16	60.38	45.15
470	Cincinnati	Jul-16	74.08	62.58
477.5	Cincinnati	Jul-16	46.48	45.67
462.6	Cincinnati	Aug-16	328.72	191.25
470	Cincinnati	Aug-16	252.47	185.45
477.5	Cincinnati	Aug-16	38.06	29.02
462.6	Cincinnati	Sep-16	12.52	9.19
470	Cincinnati	Sep-16	92.45	81.91
477.5	Cincinnati	Sep-16	43.15	22.54
462.6	Cincinnati	Oct-16	137.89	94.83
470	Cincinnati	Oct-16	75.26	38.90
477.5	Cincinnati	Oct-16	86.10	60.21
594	Louisville	Apr-16	20.53	15.23
619.3	Louisville	Apr-16	19.99	27.61
594	Louisville	May-16	177.36	156.84
619.3	Louisville	May-16	187.87	142.34
594	Louisville	Jun-16	44.37	47.70

Appendix D: Bacteria Data - Monthly Geo Mean Results 2014-2018 (shaded = insufficient sample)

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL
619.3	Louisville	Jun-16	121.30	57.85
594	Louisville	Jul-16		
619.3	Louisville	Jul-16		
594	Louisville	Aug-16	125.74	38.35
619.3	Louisville	Aug-16	326.13	174.67
594	Louisville	Sep-16	43.19	13.15
619.3	Louisville	Sep-16	54.74	25.19
594	Louisville	Oct-16	9.25	10.24
619.3	Louisville	Oct-16	80.62	70.84
791.5	Evansville	Apr-16	47.95	36.15
793.3	Evansville	Apr-16	140.34	110.65
791.5	Evansville	May-16	109.38	118.99
793.3	Evansville	May-16	209.78	255.42
791.5	Evansville	Jun-16	54.49	93.98
793.3	Evansville	Jun-16	182.56	236.18
791.5	Evansville	Jul-16	249.64	557.21
793.3	Evansville	Jul-16	608.55	536.27
791.5	Evansville	Aug-16	62.58	64.23
793.3	Evansville	Aug-16	172.53	142.29
791.5	Evansville	Sep-16	59.85	61.80
793.3	Evansville	Sep-16	77.16	93.37
791.5	Evansville	Oct-16	9.07	6.06
793.3	Evansville	Oct-16	14.47	9.97
1.4M	Pittsburgh	Apr-17		
4.3	Pittsburgh	Apr-17		
1.4M	Pittsburgh	May-17		
4.3	Pittsburgh	May-17		
1.4M	Pittsburgh	Jun-17		
4.3	Pittsburgh	Jun-17		
1.4M	Pittsburgh	Jul-17		293.07
4.3	Pittsburgh	Jul-17		349.57
1.4M	Pittsburgh	Aug-17		154.54
4.3	Pittsburgh	Aug-17		209.19
1.4M	Pittsburgh	Sep-17		
4.3	Pittsburgh	Sep-17		
1.4M	Pittsburgh	Oct-17		501.15
4.3	Pittsburgh	Oct-17		433.47
86.8	Wheeling	Apr-17	123.15	76.24
92.8	Wheeling	Apr-17	247.04	227.79
86.8	Wheeling	May-17	152.19	108.38
92.8	Wheeling	May-17	281.17	275.92
86.8	Wheeling	Jun-17		
92.8	Wheeling	Jun-17		
86.8	Wheeling	Jul-17	64.84	44.96
92.8	Wheeling	Jul-17	407.36	130.45
86.8	Wheeling	Aug-17	21.51	25.10
92.8	Wheeling	Aug-17	45.46	41.52
86.8	Wheeling	Sep-17		
92.8	Wheeling	Sep-17		
86.8	Wheeling	Oct-17	8.37	10.00

Appendix D: Bacteria Data - Monthly Geo Mean Results 2014-2018 (shaded = insufficient sample)

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL
92.8	Wheeling	Oct-17	59.46	33.26
305.1	Huntington	Apr-17	39.85	50.22
314.8	Huntington	Apr-17	94.63	184.28
305.1	Huntington	May-17	130.05	184.26
314.8	Huntington	May-17	152.36	208.77
305.1	Huntington	Jun-17	124.13	152.45
314.8	Huntington	Jun-17	126.09	146.19
305.1	Huntington	Jul-17	47.93	49.71
314.8	Huntington	Jul-17	90.55	63.01
305.1	Huntington	Aug-17	56.71	49.53
314.8	Huntington	Aug-17	59.80	74.34
305.1	Huntington	Sep-17	33.07	57.29
314.8	Huntington	Sep-17	18.15	14.40
305.1	Huntington	Oct-17	15.20	14.88
314.8	Huntington	Oct-17	79.57	152.38
462.6	Cincinnati	Apr-17		54.57
470	Cincinnati	Apr-17		130.19
477.5	Cincinnati	Apr-17		129.72
462.6	Cincinnati	May-17		224.15
470	Cincinnati	May-17		184.08
477.5	Cincinnati	May-17		224.48
462.6	Cincinnati	Jun-17		94.58
470	Cincinnati	Jun-17		153.55
477.5	Cincinnati	Jun-17		130.05
462.6	Cincinnati	Jul-17		54.04
470	Cincinnati	Jul-17		56.65
477.5	Cincinnati	Jul-17		57.40
462.6	Cincinnati	Aug-17		13.95
470	Cincinnati	Aug-17		53.81
477.5	Cincinnati	Aug-17		17.20
462.6	Cincinnati	Sep-17		9.83
470	Cincinnati	Sep-17		10.19
477.5	Cincinnati	Sep-17		40.02
462.6	Cincinnati	Oct-17		10.11
470	Cincinnati	Oct-17		41.32
477.5	Cincinnati	Oct-17		59.93
594	Louisville	Apr-17		115.24
619.3	Louisville	Apr-17		137.58
594	Louisville	May-17		171.43
619.3	Louisville	May-17		617.70
594	Louisville	Jun-17		203.86
619.3	Louisville	Jun-17		61.52
594	Louisville	Jul-17		46.73
619.3	Louisville	Jul-17		50.82
594	Louisville	Aug-17		27.38
619.3	Louisville	Aug-17		79.74
594	Louisville	Sep-17		21.91
619.3	Louisville	Sep-17		36.56
594	Louisville	Oct-17		20.34
619.3	Louisville	Oct-17		118.59

Appendix D: Bacteria Data - Monthly Geo Mean Results 2014-2018 (shaded = insufficient sample)

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL
791.5	Evansville	Apr-17		106.27
793.3	Evansville	Apr-17		138.32
791.5	Evansville	May-17		177.63
793.3	Evansville	May-17		109.31
791.5	Evansville	Jun-17		29.95
793.3	Evansville	Jun-17		69.69
791.5	Evansville	Jul-17		48.80
793.3	Evansville	Jul-17		104.35
791.5	Evansville	Aug-17		52.98
793.3	Evansville	Aug-17		182.37
791.5	Evansville	Sep-17		66.63
793.3	Evansville	Sep-17		378.13
791.5	Evansville	Oct-17		41.59
793.3	Evansville	Oct-17		113.94
1.4M	Pittsburgh	Apr-18		
4.3	Pittsburgh	Apr-18		
1.4M	Pittsburgh	May-18		117.10
4.3	Pittsburgh	May-18		73.88
1.4M	Pittsburgh	Jun-18		
4.3	Pittsburgh	Jun-18		
1.4M	Pittsburgh	Jul-18		
4.3	Pittsburgh	Jul-18		
1.4M	Pittsburgh	Aug-18		134.17
4.3	Pittsburgh	Aug-18		154.26
1.4M	Pittsburgh	Sep-18		
4.3	Pittsburgh	Sep-18		
1.4M	Pittsburgh	Oct-18		
4.3	Pittsburgh	Oct-18		
86.8	Wheeling	Apr-18	380.23	526.95
92.8	Wheeling	Apr-18	452.38	644.82
86.8	Wheeling	May-18	38.58	60.18
92.8	Wheeling	May-18	91.00	89.80
86.8	Wheeling	Jun-18		
92.8	Wheeling	Jun-18		
86.8	Wheeling	Jul-18		
92.8	Wheeling	Jul-18		
86.8	Wheeling	Aug-18		
92.8	Wheeling	Aug-18		
86.8	Wheeling	Sep-18		
92.8	Wheeling	Sep-18		
86.8	Wheeling	Oct-18	154.89	171.91
92.8	Wheeling	Oct-18	104.48	136.95
305.1	Huntington	Apr-18	128.56	255.83
314.8	Huntington	Apr-18	125.56	529.77
305.1	Huntington	May-18	66.84	70.43
314.8	Huntington	May-18	45.70	184.17
305.1	Huntington	Jun-18	54.50	110.75
314.8	Huntington	Jun-18	47.89	169.83
305.1	Huntington	Jul-18	27.19	91.11
314.8	Huntington	Jul-18	32.81	274.91

Appendix D: Bacteria Data - Monthly Geo Mean Results 2014-2018 (shaded = insufficient sample)

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL
305.1	Huntington	Aug-18	20.87	68.22
314.8	Huntington	Aug-18	16.75	60.52
305.1	Huntington	Sep-18	359.88	471.67
314.8	Huntington	Sep-18	475.84	598.47
305.1	Huntington	Oct-18	55.05	101.72
314.8	Huntington	Oct-18	79.01	251.90
462.6	Cincinnati	Apr-18		195.32
470	Cincinnati	Apr-18		859.66
477.5	Cincinnati	Apr-18		468.90
462.6	Cincinnati	May-18		133.98
470	Cincinnati	May-18		186.63
477.5	Cincinnati	May-18		122.89
462.6	Cincinnati	Jun-18		117.63
470	Cincinnati	Jun-18		169.22
477.5	Cincinnati	Jun-18		145.89
462.6	Cincinnati	Jul-18		71.01
470	Cincinnati	Jul-18		101.76
477.5	Cincinnati	Jul-18		42.87
462.6	Cincinnati	Aug-18		36.14
470	Cincinnati	Aug-18		106.36
477.5	Cincinnati	Aug-18		101.55
462.6	Cincinnati	Sep-18		351.86
470	Cincinnati	Sep-18		348.13
477.5	Cincinnati	Sep-18		426.40
462.6	Cincinnati	Oct-18		37.50
470	Cincinnati	Oct-18		43.31
477.5	Cincinnati	Oct-18		38.93
594	Louisville	Apr-18		588.22
619.3	Louisville	Apr-18		301.29
594	Louisville	May-18		72.68
619.3	Louisville	May-18		68.17
594	Louisville	Jun-18		121.62
619.3	Louisville	Jun-18		529.37
594	Louisville	Jul-18		261.84
619.3	Louisville	Jul-18		119.60
594	Louisville	Aug-18		43.84
619.3	Louisville	Aug-18		115.74
594	Louisville	Sep-18		234.81
619.3	Louisville	Sep-18		320.50
594	Louisville	Oct-18		82.41
619.3	Louisville	Oct-18		64.31
791.5	Evansville	Apr-18		234.50
793.3	Evansville	Apr-18		392.42
791.5	Evansville	May-18		81.92
793.3	Evansville	May-18		106.15
791.5	Evansville	Jun-18		661.80
793.3	Evansville	Jun-18		717.27
791.5	Evansville	Jul-18		238.14
793.3	Evansville	Jul-18		303.72
791.5	Evansville	Aug-18		62.16
793.3	Evansville	Aug-18		47.07
791.5	Evansville	Sep-18		93.78
793.3	Evansville	Sep-18		106.39
791.5	Evansville	Oct-18		45.96
793.3	Evansville	Oct-18		41.05

Appendix E

Fish Tissue Data

Consumption-Weighted Methylmercury Results 2014-2018

Appendix E: Fish Tissue Data – Consumption-weighted Methylmercury Results (* = data prior to 2014)

Sample Mile Point	Pool	Year	Species	Trophic Level	Avg Length (cm)	MeHg Result (mg/kg)	# Fish in sample	Consumption-Weighted Pool Avg MeHg in Fish Tissue (mg/kg)
0	Emsworth	2018	Sauger	4	33.8	0.0663	3	
1.2	Emsworth	2018	Common Carp	3	52.6	0.0231	2	
1.4	Emsworth	2018	Smallmouth Buffalo	3	52.0	0.0291	2	**0.085**
2.5	Emsworth	2015	Channel Catfish	3	43.3	0.0625	3	
2.5	Emsworth	2015	Freshwater Drum	3	55.3	0.248	3	
8.6	Dashields*	2013	Freshwater Drum	3	42.12	0.184	3	
10.3	Dashields*	2013	Smallmouth Buffalo	3	45.8	0.167	3	**0.179**
10.3	Dashields*	2013	Sauger	4	35.3	0.181	3	
10.3	Dashields*	2013	Walleye	4	47.5	0.187	3	
24	Montgomery	2015	Channel Catfish	3	43.3	0.0641	3	
26	Montgomery	2015	Channel Catfish	4	48.0	0.0417	1	
26	Montgomery	2014	Channel Catfish	4	46.0	0.046	2	
26	Montgomery	2018	Sauger	4	29.7	0.035	3	**0.072**
26	Montgomery	2015	Sauger	4	33.5	0.112	2	
26.3	Montgomery	2017	Channel Catfish	4	41.7	0.118	3	
29	Montgomery	2015	Common Carp	3	51.0	0.0792	3	
35.3	New Cumberland	2017	Sauger	4	34.2	0.299	3	
50.3	New Cumberland	2017	Common Carp	3	59.4	0.176	3	
50.3	New Cumberland	2017	Smallmouth Buffalo	3	44.0	0.0727	3	**0.136**
50.44	New Cumberland	2017	Walleye	4	41.4	0.139	5	
52.2	New Cumberland	2017	Channel Catfish	3	39.4	0.0609	3	
52.6	New Cumberland	2017	Common Carp	3	51.6	0.136	3	
76	Pike Island	2018	Channel Catfish	4	40.8	0.0223	3	**0.009**
99.2	Hannibal	2017	Sauger	4	33.2	0.226	3	
100	Hannibal	2015	Channel Catfish	4	41.3	0.0665	3	**0.052**
100	Hannibal	2014	Channel Catfish	4	46.7	0.262	3	
101.7	Hannibal	2018	Sauger	4	37.6	0.0626	2	
127	Willow Island	2016	Walleye	4	27.0	0.179	1	
128	Willow Island	2016	Black Crappie	3	23.0	0.0816	1	
133	Willow Island	2016	Flathead Catfish	4	46.0	0.308	1	
140	Willow Island	2016	Channel Catfish	3	40.8	0.0664	3	**0.158**
140	Willow Island	2016	Smallmouth Buffalo	3	49.3	0.238	3	
140	Willow Island	2016	Flathead Catfish	4	44.5	0.212	1	
140	Willow Island	2016	Smallmouth Bass	4	30.2	0.155	3	
140.9	Willow Island	2016	Walleye	4	27.5	0.114	1	
200	Belleville	2014	Bluegill	3	17.3	0.0763	4	
200	Belleville	2014	Common Carp	3	61.7	0.103	3	
200	Belleville	2014	Spotted Sucker	3	36.7	0.0336	3	**0.141**
200	Belleville	2014	Largemouth Bass	4	38.0	0.294	3	
200	Belleville	2014	White Bass	4	28.0	0.183	2	
204.8	Racine	2015	Freshwater Drum	3	49.0	0.252	3	
204.8	Racine	2015	Smallmouth Buffalo	3	49.3	0.122	3	
210.1	Racine	2015	Black Crappie	3	21.5	0.0409	2	
211.5	Racine	2015	Black Crappie	3	30.0	0.112	1	**0.150**
211.5	Racine	2015	Smallmouth Bass	4	39.0	0.163	2	
221	Racine	2015	Sauger	4	36.0	0.232	1	
231.8	Racine	2015	Sauger	4	35.0	0.163	2	
236	Racine	2015	Smallmouth Bass	4	29.0	0.0794	1	
266	RC Byrd*	2013	Freshwater Drum	3	39.67	0.188	3	
270	RC Byrd*	2012	Smallmouth Buffalo	3	50.53	0.242	3	
276	RC Byrd*	2012	Common Carp	3	64.3	0.125	3	**0.179**
276	RC Byrd*	2012	Channel Catfish	4	52.67	0.221	3	
278	RC Byrd*	2013	Largemouth Bass	4	37	0.131	3	
278	RC Byrd*	2013	Sauger	4	43.5	0.163	3	

Appendix E: Fish Tissue Data – Consumption-weighted Methylmercury Results (* = data prior to 2014)

Sample Mile Point	Pool	Year	Species	Trophic Level	Avg Length (cm)	MeHg Result (mg/kg)	# Fish in sample	Consumption-Weighted Pool Avg MeHg in Fish Tissue (mg/kg)
281	Greenup	2016	Freshwater Drum	3	52.0	0.148	3	
281	Greenup	2016	Smallmouth Buffalo	3	38.5	0.136	3	
281	Greenup	2016	Channel Catfish	4	57.5	0.24	3	
281	Greenup	2016	Hybrid Striper	4	57.0	0.436	3	
283	Greenup	2015	Freshwater Drum	3	42.2	0.137	3	
283	Greenup	2015	Smallmouth Buffalo	3	42.3	0.123	3	**0.176**
283	Greenup	2015	Channel Catfish	4	44.3	0.227	3	
283	Greenup	2015	Hybrid Striper	4	33.0	0.115	1	
292.1	Greenup	2017	Channel Catfish	4	47.5	0.258	2	
340	Greenup	2016	Largemouth Bass	4	34.0	0.172	2	
340	Greenup	2016	Sauger	4	36.5	0.29	3	
356	Meldahl	2016	Channel Catfish	3	41.7	0.119	3	
356	Meldahl	2014	Sauger	4	31.3	0.175	3	
357.3	Meldahl	2018	Channel Catfish	3	37.3	0.0048	3	
357.3	Meldahl	2017	Channel Catfish	4	44.8	0.0919	3	**0.031**
357.3	Meldahl	2018	Sauger	4	34.9	0.0192	4	
357.3	Meldahl	2017	Sauger	4	38.7	0.262	3	
388.6	Meldahl	2017	Sauger	4	33.1	0.188	3	
439.5	Markland	2018	Channel Catfish	4	39.6	0.0226	3	
439.5	Markland	2017	Sauger	4	32.3	0.274	2	
439.5	Markland	2015	Sauger	4	32.3	0.199	3	
440	Markland	2015	Channel Catfish	3	43.3	0.13	3	
440	Markland	2017	Channel Catfish	4	39.5	0.139	3	
440	Markland	2016	Channel Catfish	4	49.0	0.303	1	
440	Markland	2014	Channel Catfish	4	50.7	0.156	3	
440	Markland	2018	Sauger	4	35.9	0.0468	3	
440	Markland	2016	Sauger	4	31.8	0.328	4	
440	Markland	2014	Sauger	4	29.7	0.179	3	
455	Markland	2016	Hybrid Striper	4	58.5	0.699	1	**0.193**
455	Markland	2016	Saugeye	4	48.5	0.364	1	
486	Markland	2014	White Bass	4	36.3	0.491	2	
490	Markland	2014	Freshwater Drum	3	43.8	0.145	3	
494.9	Markland	2015	Black Crappie	3	21.5	0.0754	2	
499.9	Markland	2015	White Crappie	3	26.3	0.0743	3	
511	Markland	2014	Sauger	4	33.0	0.155	3	
513	Markland	2014	Bluegill	3	15.8	0.104	5	
516.9	Markland	2015	Freshwater Drum	3	36.5	0.172	1	
516.9	Markland	2015	Largemouth Bass	4	32.8	0.0752	3	
569	McAlpine	2014	Channel Catfish	4	50.3	0.228	3	
570	McAlpine	2014	Smallmouth Buffalo	3	20.5	0.14	3	
575	McAlpine	2016	Channel Catfish	3	40.7	0.178	3	
575.4	McAlpine	2018	Channel Catfish	4	42.6	0.0158	3	
575.4	McAlpine	2018	Sauger	4	27.5	0.0409	3	
576	McAlpine	2014	Freshwater Drum	3	48.3	0.275	3	
578	McAlpine	2014	Channel Catfish	4	55.3	0.276	3	**0.136**
578	McAlpine	2014	Sauger	4	30.3	0.203	2	
579.7	McAlpine	2015	Channel Catfish	3	34.7	0.0587	3	
579.7	McAlpine	2017	Channel Catfish	4	38.6	0.167	3	
580	McAlpine	2014	Channel Catfish	4	47.0	0.159	1	
606	McAlpine	2014	White Bass	4	24.8	0.0924	2	
629.9	Cannelton*	2012	Freshwater Drum	3	47.5	0.167	3	
629.9	Cannelton*	2012	Smallmouth Buffalo	3	47.5	0.0883	2	**0.230**

Appendix E: Fish Tissue Data – Consumption-weighted Methylmercury Results (* = data prior to 2014)

Sample Mile Point	Pool	Year	Species	Trophic Level	Avg Length (cm)	MeHg Result (mg/kg)	# Fish in sample	Consumption-Weighted Pool Avg MeHg in Fish Tissue (mg/kg)
739	Newburgh	2017	Channel Catfish	4	41.5	0.204	1	
739	Newburgh	2017	Sauger	4	37.6	0.321	2	
745.2	Newburgh	2017	Channel Catfish	4	43.0	0.0686	1	
751.5	Newburgh	2018	Sauger	4	24.8	0.0279	2	**0.119**
752	Newburgh	2014	Channel Catfish	4	54.0	0.0683	1	
755	Newburgh	2016	Sauger	4	27.8	0.166	4	
775	Newburgh	2017	Common Carp	3	58.0	0.12	3	
775	Newburgh	2017	Channel Catfish	4	44.9	0.236	2	
777	J.T. Myers	2016	Bigmouth Buffalo	3	55.7	0.374	3	
777	J.T. Myers	2015	Bigmouth Buffalo	3	45.3	0.121	3	
777	J.T. Myers	2015	Bigmouth Buffalo	3	59.7	0.256	3	
777	J.T. Myers	2016	Channel Catfish	3	41.0	0.0629	3	
777	J.T. Myers	2015	Channel Catfish	3	42.0	0.112	2	
777	J.T. Myers	2016	Smallmouth Buffalo	3	40.7	0.131	3	
777	J.T. Myers	2015	Smallmouth Buffalo	3	36.0	0.0908	2	
777	J.T. Myers	2015	Smallmouth Buffalo	3	49.0	0.163	1	
777	J.T. Myers	2015	Hybrid Striper	4	32.7	0.156	3	
777	J.T. Myers	2015	Hybrid Striper	4	48.3	0.179	3	
777	J.T. Myers	2016	Largemouth Bass	4	40.5	0.199	1	
777	J.T. Myers	2016	Largemouth Bass	4	53.0	0.612	1	**0.180**
777	J.T. Myers	2016	Sauger	4	40.0	0.242	2	
777	J.T. Myers	2015	White Bass	4	36.0	0.212	2	
789.8	J.T. Myers	2015	White Bass	4	35.0	0.13	1	
790.4	J.T. Myers	2015	Channel Catfish	4	53.0	0.0889	3	
799.2	J.T. Myers	2015	Spotted Bass	4	29.3	0.209	3	
808	J.T. Myers	2015	Smallmouth Buffalo	3	50.5	0.222	1	
813.9	J.T. Myers	2015	Common Carp	3	59.0	0.193	1	
813.9	J.T. Myers	2015	Freshwater Drum	3	56.0	0.35	1	
813.9	J.T. Myers	2015	Smallmouth Buffalo	3	45.0	0.0765	2	
831.9	J.T. Myers	2015	White Bass	4	34.0	0.148	1	
832.8	J.T. Myers	2015	Common Carp	3	58.5	0.104	2	
888	Smithland	2016	Sauger	4	35.5	0.378	1	
888.3	Smithland	2018	Redear Sunfish	3	24.4	0.061	3	
890	Smithland	2018	Smallmouth Buffalo	3	33.5	0.0281	3	
890	Smithland	2016	Channel Catfish	4	51.7	0.188	3	
891.9	Smithland	2017	Channel Catfish	4	42.0	0.168	3	
891.9	Smithland	2015	Channel Catfish	4	48.3	0.133	3	
891.9	Smithland	2018	Hybrid Striped Bass	4	31.5	0.0356	3	**0.208**
892	Smithland	2014	Largemouth Bass	4	39.8	0.34	2	
912	Smithland	2017	Bigmouth Buffalo	3	56.0	0.595	3	
912	Smithland	2017	Common Carp	3	50.3	0.0869	3	
912	Smithland	2017	Smallmouth Buffalo	3	44.6	0.188	3	
912	Smithland	2017	Channel Catfish	4	44.7	0.156	3	
912	Smithland	2017	Largemouth Bass	4	30.3	0.228	3	
932	Olmsted	2014	Channel Catfish	3	41.7	0.0559	3	
932	Olmsted	2014	White Bass	4	34.2	0.28	3	
934	Olmsted	2014	Channel Catfish	4	54.7	0.055	3	**0.202**
947	Olmsted	2014	Black Buffalo	3	43.0	0.274	3	
955	Olmsted	2014	Smallmouth Buffalo	3	42.7	0.179	3	
972	Open Water	2017	Freshwater Drum	3	36.9	0.141	3	
972	Open Water	2018	Channel Catfish	4	22.0	0.0423	3	
974	Open Water	2016	Channel Catfish	3	38.0	0.06	2	
974	Open Water	2014	Channel Catfish	3	30.8	0.071	2	**0.100**
974	Open Water	2014	Common Carp	3	55.5	0.144	2	
974	Open Water	2014	Common Carp	3	64.5	0.139	1	
974	Open Water	2014	Freshwater Drum	3	32.5	0.103	3	
974	Open Water	2014	Freshwater Drum	3	43.5	0.486	1	

APPENDIX F

2015 Harmful Algal Bloom Data

Microcystin Results

Appendix F: 2015 Harmful Algal Bloom Data – Microcystin Results

Date	ORM	River	Location Description	Microcystin by ELISA*	Total Microcystins by LC/MS**	Units
9/1/2015	54.4	Ohio	New Cumberland L&D	<0.30	-	ug/L
9/9/2015	54.4	Ohio	New Cumberland L&D	<0.30	-	ug/L
9/16/2015	54.4	Ohio	New Cumberland L&D	<0.30	-	ug/L
9/30/2015	54.4	Ohio	New Cumberland L&D	<0.30	-	ug/L
8/26/2015	55.0	Ohio	RDB	1.5	-	ug/L
8/26/2015	65.0	Ohio	LDB-D	<0.30	-	ug/L
8/21/2015	65.2	Ohio	From River near Steubenville Intake	<0.30	-	ug/L
8/21/2015	65.3	Ohio	Steubenville Water Intake	<0.30	-	ug/L
9/9/2015	65.3	Ohio	Steubenville Water Intake	<0.30	-	ug/L
8/21/2015	70.8	Ohio	Follansbee	<0.30	-	ug/L
8/26/2015	74.7	Buffalo Creek	Buffalo Creek RM 0.1 (WV)	<0.30	-	ug/L
8/26/2015	74.7	Buffalo Creek	Buffalo Creek RM 1.0 (WV)	0.97	-	ug/L
9/16/2015	74.7	Buffalo Creek	Buffalo Creek	<0.30	-	ug/L
8/26/2015	81.4	Short	Short Creek (OH)	2.5	-	ug/L
9/9/2015	81.4	Short	Short Creek (OH)	<0.30	-	ug/L
9/16/2015	81.4	Short	Short Creek (OH)	<0.30	-	ug/L
8/26/2015	84.0	Ohio	LDB	0.41	-	ug/L
8/21/2015	84.1	Ohio	On Ohio River near mouth of Short Creek	0.558	-	ug/L
9/1/2015	84.2	Ohio	Pike Island	2.3	-	ug/L
9/9/2015	84.2	Ohio	Pike Island	<0.30	-	ug/L
9/16/2015	84.2	Ohio	Pike Island	3.8	-	ug/L
9/30/2015	84.2	Ohio	Pike Island	<0.30	-	ug/L
10/7/2015	84.2	Ohio	Pike Island	<0.30	-	ug/L
8/27/2015	84.5	Ohio	LDB	4.8	-	ug/L
8/21/2015	86.8	Ohio	OR 86.9	<0.30	-	ug/L
8/27/2015	86.8	Ohio	LDB	<0.3	-	ug/L
8/27/2015	86.8	Ohio	LDB-D	3.1	-	ug/L
8/28/2015	86.8	Ohio	Wheeling water intake	<0.30	-	ug/L
9/9/2015	86.8	Ohio	Wheeling water intake	<0.30	-	ug/L
9/9/2015	89.8	Ohio	Wheeling Island Back Channel	0.98	-	ug/L
9/16/2015	90.2	Ohio	Ohio River @ Wheeling Island	1.4	-	ug/L
8/21/2015	93.8	Ohio	Bellaire WTP	<.30	-	ug/L
9/9/2015	113.8	Fish Creek	Fish Creek (WV) Mouth	0.45	-	ug/L
9/16/2015	113.8	Fish Creek	Fish Creek (WV) near Woodland Bridge	150	-	ug/L
9/16/2015	113.8	Fish Creek	Fish Creek (WV) Mouth	<0.30	-	ug/L
10/7/2015	113.8	Fish Creek	Fish Creek (WV) near Woodland Bridge	<0.30	-	ug/L
8/27/2015	115.0	Ohio	RDB	630	-	ug/L
8/27/2015	115.0	Ohio	LDB	59	-	ug/L
9/9/2015	115.0	Ohio	ORM 115-RDB	42	-	ug/L
9/9/2015	115.0	Ohio	ORM 115-LDB	2.4	-	ug/L
9/16/2015	115.0	Ohio	LDB	0.3	-	ug/L
9/16/2015	115.0	Ohio	RDB	11	-	ug/L
10/7/2015	115.0	Ohio	RDB	<0.30	-	ug/L
9/1/2015	126.4	Ohio	Hannibal	3	-	ug/L
9/9/2015	126.4	Ohio	Hannibal	<0.30	-	ug/L
9/16/2015	126.4	Ohio	Hannibal	<0.30	-	ug/L
9/30/2015	128.4	Ohio	Hannibal	<0.30	-	ug/L
8/28/2015	137.2	Ohio	Sistersville water intake	1.8	-	ug/L
9/9/2015	137.2	Ohio	Sistersville water intake	1.2	-	ug/L
9/2/2015	161.7	Ohio	Willow Island	3.1	-	ug/L

Appendix F: 2015 Harmful Algal Bloom Data – Microcystin Results

Date	ORM	River	Location Description	Microcystin by ELISA*	Total Microcystins by LC/MS**	Units
9/2/2015	203.9	Ohio	Belleville	4.2	-	ug/L
10/14/2015	230.6	Ohio	RAC1	0.763	<0.50	ug/L
10/14/2015	237.3	Ohio	RAC2	<0.15	<0.5	ug/L
9/9/2015	238.1	Ohio	38° 55' 18" - 81° 54' 16"	-	0.45	ug/L
9/9/2015	263.1	Ohio	38° 52' 29" - 82° 08' 17"	-	11	ug/L
9/2/2015	265.0	Ohio	Point Pleasant	250	-	ug/L
10/1/2015	265.3	Ohio	Ohio River at Point Pleasant	<0.30	-	ug/L
9/9/2015	265.6	Kanawha	38° 49' 46" - 82° 07' 38" , Kanawha RM 0.7	-	<0.25	ug/L
9/9/2015	266.7	Ohio	38° 49' 29" - 82° 09' 17"	-	51	ug/L
9/9/2015	277.9	Ohio	38° 41' 58" - 82° 11' 02"	-	34	ug/L
8/31/2015	279.2	Ohio	RC Byrd	0.96	-	ug/L
9/2/2015	279.2	Ohio	RC Byrd	5.1	-	ug/L
9/17/2015	282	Ohio	O282.0 BAF	0.232	<0.50	ug/L
9/1/2015	304.0	Ohio	Huntington- River Intake	0.92	-	ug/L
9/9/2015	305.2	Guyandotte	38° 25' 52" - 82° 23' 29" , Guyandotte RM 0.1	-	20	ug/L
9/9/2015	308.1	Ohio	38° 25' 29" - 82° 26' 25" , LDB Huntington	-	8.6	ug/L
10/21/2015	322.7	Ohio	Ohio Ohio River at Ashland	<0.15	<0.50	ug/L
10/21/2015	336.4	Little Sandy	Little sandy Greenup boat ramp	1.38	2.12	ug/L
10/21/2015	336.4	Little Sandy	Little sandy Little sandy DW intake	0.21	<0.50	ug/L
10/29/2015	336.4	Little Sandy	Little sandy Greenup boat ramp	<0.15	<0.50	ug/L
10/29/2015	336.4	Little Sandy	Little sandy Little Sandy DW intake	<0.15	<0.50	ug/L
9/9/2015	340.7	Ohio	38° 38' 33" - 82° 51' 37"	-	3.6	ug/L
9/2/2015	341.0	Ohio	Greenup	1.8	-	ug/L
9/9/2015	341.5	Ohio	Greenup tailwater	-	2.8	ug/L
9/21/2015	341.8	Ohio	O341.8 RDB	6.11	4.38	ug/L
10/29/2015	342.7	Ohio	Ohio Ohio River at Ashland	<0.15	<0.50	ug/L
10/21/2015	354.7	Ohio	Ohio South shore bank	<0.15	<0.50	ug/L
10/29/2015	354.7	Ohio	Ohio South Shore bank	<0.15	<0.50	ug/L
9/9/2015	356	Ohio	Portsmouth ramp		3.6	ug/L
9/21/2015	356.1	Ohio	O356.1 RDB	9.47	6.65	ug/L
9/9/2015	356.7	Ohio	On Ohio DS Scioto	-	590	ug/L
9/21/2015	356.7	Ohio	O356.7 RDB	4.07	3.21	ug/L
10/21/2015	368.1	Kiniconic	Kiniconic creek Ohio River at Garrison	0.193	<0.50	ug/L
10/29/2015	368.1	Kiniconic	Kiniconic Creek Garrison ramp	<0.15	<0.50	ug/L
10/21/2015	378.3	Salt Lick Creek	Salt lick creek Vanceburg ramp	2.5	2.19	ug/L
10/29/2015	378.3	Salt Lick Creek	Salt lick creek, Vanceburg Ramp Vanceburg boat ramp	<0.15	<0.50	ug/L
9/21/2015	405.5	Ohio	O405.5 RDB	255	177	ug/L
10/21/2015	405.5	Ohio	Ohio DP&L	<0.15	<0.50	ug/L
10/29/2015	405.5	Ohio	Ohio DP&L	<0.15	<0.50	ug/L
9/9/2015	407	Ohio	Maysville intake	-	6.6	ug/L
9/21/2015	408.4	Ohio	O408.4 LDB	2.25	0.917	ug/L
9/3/2015	414	Ohio	ORSANCO - 0414-HAB-RDB	>5.00	120	ug/L
10/21/2015	414	Ohio	Ohio	0.167	<0.50	ug/L
10/29/2015	414	Ohio	Ohio	<0.15	<0.50	ug/L
9/3/2015	424	Ohio	ORSANCO - 0424-HAB-RDB	0.157	<0.50	ug/L
9/3/2015	434	Ohio	ORSANCO - 0434-HAB-RDB	44.9	28.3	ug/L
9/21/2015	434	Ohio	O434.0 RDB	0.552	<0.50	ug/L

Appendix F: 2015 Harmful Algal Bloom Data – Microcystin Results

Date	ORM	River	Location Description	Microcystin by ELISA*	Total Microcystins by LC/MS**	Units
9/9/2015	434.2	Ohio	Chilo ramp	-	1.4	ug/L
10/21/2015	434.2	Ohio	Ohio Chilo park/ramp	<0.15	<0.50	ug/L
10/29/2015	434.2	Ohio	Ohio Chilo ramp	0.891	0.677	ug/L
11/2/2015	434.2	Ohio	Ohio	-	-	ug/L
9/2/2015	436.2	Ohio	Meldahl	0.37	-	ug/L
9/3/2015	460.2	Ohio	ORSANCO - OR 460.2	<0.15	<0.50	ug/L
9/15/2015	462.6	Ohio	ORM 462.6	9.78	8.84	ug/L
10/6/2015	462.6	Ohio	O462.6-R	0.675	1.01	ug/L
9/25/2015	463	Ohio	O463.0 LDB	0.326	<0.50	ug/L
9/8/2015	468.8	Ohio	OR 468.8	-	1900	ug/L
9/3/2015	469.8	Ohio	ORSANCO - OR 469.8	<0.15	<0.50	ug/L
9/8/2015	470	Ohio	OR 470	-	12	ug/L
9/8/2015	470	Ohio	ORSANCO - 0470-HAB-RDB	78.8	53.6	ug/L
9/15/2015	470	Ohio	ORM 470	1.82	0.822	ug/L
9/22/2015	470	Ohio	O470.0 RDB	15.7	14.2	ug/L
9/25/2015	470	Ohio	O470.0 RDB	0.659	<0.50	ug/L
10/6/2015	470	Ohio	Ohio River RDB 470.0	<0.15	<0.50	ug/L
9/3/2015	470.3	Ohio	ORSANCO - OR 470.3 LDB	<0.15	<0.50	ug/L
9/15/2015	477.5	Ohio	ORM 477.5	9.24	7.64	ug/L
10/6/2015	477.5	Ohio	ORM 477.5 Mid	0.194	<0.50	ug/L
9/8/2015	493.5	Ohio	ORSANCO - 0493.5-HAB-RDB	<0.15	<0.50	ug/L
9/8/2015	515	Ohio	ORSANCO - 0515-HAB-RDB	402	273	ug/L
10/20/2015	515	Ohio	Ohio Near day mark 514.9	<0.15	<0.50	ug/L
10/27/2015	515	Ohio	ORM 515	<0.15	<0.50	ug/L
9/8/2015	531	Ohio	ORSANCO - 0531-HAB-LDB	23.2	17.6	ug/L
10/20/2015	531	Ohio	Ohio Near bull nose of markland L&D	<0.15	<0.50	ug/L
10/27/2015	531	Ohio	Ohio Near bullnose of L&D	<0.15	<0.50	ug/L
9/1/2015	531.5	Ohio	Markland	0.79	-	ug/L
9/9/2015	533	Ohio	ORSANCO - 0533-HAB-LDB	<0.150	-	ug/L
9/9/2015	558	Ohio	ORSANCO - 0558-HAB-RDB	0.93	-	ug/L
9/9/2015	558	Ohio	ORSANCO - 0558-HAB-RDB DUP	2.70	-	ug/L
9/9/2015	580	Ohio	ORSANCO - 0580-HAB-LDB	0.17	-	ug/L
9/9/2015	603	Ohio	ORSANCO - 0603-HAB-LDB	<0.150	-	ug/L
9/9/2015	605	Ohio	ORSANCO - 0605-HAB-MID	<0.150	-	ug/L
9/1/2015	606.8	Ohio	McAlpine	<0.30	-	ug/L
9/23/2015	607.5	Ohio	MID, downstream of McAlpine	0.84	<0.5	ug/L
9/23/2015	619.3	Ohio	Ohio River 619.3	0.465	<0.5	ug/L
9/23/2015	629.9	Salt River	Salt River Trib @ 0.2 SRM LDB, from boat at the ramp	0.757	<0.5	ug/L
9/23/2015	630	Ohio	Ohio River at 630 MID	0.35	<0.5	ug/L
9/23/2015	646	Ohio	Ohio River at 646 LDB	8.36	5.9	ug/L
9/23/2015	663	Ohio	Ohio River at 663 RDB	7.44	5.34	ug/L
9/23/2015	720.5	Ohio	Ohio River at 720.5 RDB	<0.15	-	ug/L
9/29/2015	720.7	Ohio	Cannelton L&D	0.948	<0.50	ug/L
9/23/2015	727.2	Ohio	Ohio River at 727.2 RDB	<0.15	<0.5	ug/L
9/29/2015	742.1	Ohio	Gandview Ramp	0.156	<0.50	ug/L
9/29/2015	776.1	Ohio	Newburgh L&D	0.298	<0.50	ug/L
10/8/2015	776.1	Ohio	Newburgh L&D	59.1	36.4	ug/L
10/14/2015	776.1	Ohio	Ohio @ Newburgh	0.186	<0.50	ug/L
9/15/2015	782	Ohio	ORM 782.0 BAF sampling Site	<0.15	<0.50	ug/L
10/8/2015	791.2	Ohio	791.5 RDB	0.21	<0.50	ug/L

Appendix F: 2015 Harmful Algal Bloom Data – Microcystin Results

Date	ORM	River	Location Description	Microcystin by ELISA*	Total Microcystins by LC/MS**	Units
10/14/2015	791.2	Ohio	Ohio LST Dock	0.175	<0.50	ug/L
9/29/2015	803.9	Ohio	Henderson Ramp	0.298	<0.50	ug/L
10/7/2015	803.9	Ohio	803.9 LDB	0.23	<0.5	ug/L
10/14/2015	803.9	Ohio	Ohio Henderson ramp	0.186	<0.50	ug/L
10/7/2015	846	Ohio	JT Myers L&D	<0.15	<0.50	ug/L
10/7/2015	918.5	Ohio	Smithland L&D	<0.15	<0.5	ug/L