

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		Enters Ohio River at Mile Point	Stream Mile	State	Stream Length (Miles)	Drainage Area (Sq. Miles)
			Length (Miles)	Drainage Area (Sq. Miles)					
0.1	ALLEGHENY RIVER	PA	325	11,700	150.0	LEITCHS 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	MONTGOUR 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		

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Enters Ohio River at Mile Point				Stream		Enters Ohio River at Mile Point				Stream			
Stream Name				State	Length (Miles)	Drainage Area (Sq. Miles)	Stream Mile				State	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			

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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)
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 HOLLOW	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	BARBONE 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	LUCK 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 HOLLOW	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		Enters Ohio River at Mile Point		Stream	
Stream Name	State	Length (Miles)	Drainage Area (Sq. Miles)	River at Mile Point	Stream Mile	State	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 BEAVERDAM 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

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 2016	105.50	22.30	42.75	0.76	335.70	59.20	125.27	0.80	668.70	130.90	332.05	1.22
February 2016	139.10	24.40	72.50	1.33	350.90	70.80	217.80	1.33	474.30	132.80	296.73	1.12
March 2016	97.60	24.00	53.48	0.75	280.20	93.90	180.93	0.87	503.60	189.00	355.20	1.03
April 2016	114.30	24.70	43.13	0.71	205.10	71.70	116.72	0.65	298.20	143.10	219.55	0.72
May 2016	78.00	23.90	48.25	1.03	241.10	76.40	158.54	1.09	364.40	162.90	286.96	1.06
June 2016	39.50	11.60	21.39	0.73	233.50	32.10	82.66	0.91	250.50	62.10	114.03	0.71
July 2016	24.20	7.60	12.09	0.55	93.20	21.40	50.07	0.73	208.10	65.30	130.12	1.07
August 2016	26.80	6.50	12.68	0.74	87.70	21.10	44.77	1.00	178.30	50.30	116.68	1.61
September 2016	22.60	6.10	10.02	0.54	41.30	12.60	24.39	0.54	81.40	35.10	53.97	0.78
October 2016	83.20	7.70	24.64	1.24	123.00	16.70	44.77	0.91	161.50	31.50	67.46	0.85
November 2016	32.00	14.60	21.27	0.69	52.50	16.90	38.26	0.49	88.70	36.80	60.22	0.50
December 2016	166.50	23.40	61.41	1.11	252.70	40.40	119.21	0.86	285.10	78.90	161.39	0.74
January 2017	196.70	54.80	95.91	1.69	333.30	115.00	227.21	1.46	517.50	183.70	328.35	1.20
February 2017	125.20	33.90	65.19	1.20	199.20	77.30	128.88	0.79	429.60	109.00	204.47	0.77
March 2017	126.90	33.60	59.31	0.83	363.20	86.50	182.38	0.88	423.30	131.40	249.41	0.72
April 2017	147.80	38.00	77.09	1.28	293.40	111.60	195.23	1.09	366.70	191.60	279.20	0.92
May 2017	154.70	23.70	68.75	1.47	296.70	87.80	194.98	1.34	536.90	248.40	407.28	1.50
June 2017	103.80	12.50	37.87	1.29	254.40	42.90	108.32	1.19	322.50	73.90	185.33	1.16
July 2017	133.80	17.70	42.75	1.95	156.40	48.70	103.28	1.51	268.60	113.40	163.11	1.34
August 2017	48.10	8.10	16.84	0.98	169.10	14.90	49.71	1.11	194.90	24.10	77.53	1.07
September 2017	15.90	7.10	9.91	0.53	70.70	9.70	27.82	0.61	127.90	10.00	50.82	0.74
October 2017	49.30	7.50	13.00	0.66	94.40	12.20	38.37	0.78	130.60	14.70	64.24	0.81
November 2017	139.90	30.40	62.45	2.04	271.70	74.30	141.69	1.80	306.40	94.00	184.09	1.52
December 2017	63.00	14.10	27.61	0.50	157.50	30.00	68.06	0.49	242.60	42.40	104.30	0.48
January 2018	223.30	11.50	72.87	1.29	324.60	37.70	148.47	0.95	336.30	52.90	187.57	0.69
February 2018	269.90	41.60	119.50	2.20	631.30	121.30	341.18	2.09	838.50	175.00	391.44	1.48
March 2018	185.50	21.90	66.88	0.93	528.30	107.90	222.57	1.07	972.90	204.90	522.56	1.52
April 2018	222.90	39.40	99.98	1.65	460.50	150.80	304.87	1.71	708.20	319.30	538.71	1.78
May 2018	105.60	28.20	56.72	1.22	233.30	85.60	150.95	1.04	306.80	138.40	211.89	0.78
June 2018	70.30	21.10	43.64	1.48	208.80	59.50	112.83	1.24	315.20	102.20	185.41	1.16
July 2018	43.30	8.90	19.88	0.91	137.90	25.50	55.48	0.81	304.30	27.70	106.10	0.87
August 2018	34.90	12.60	19.36	1.12	94.80	30.30	62.07	1.38	131.30	54.30	89.98	1.24
September 2018	271.70	10.50	75.75	4.05	369.50	27.40	185.58	4.10	430.50	47.30	230.32	3.34
October 2018	100.50	27.60	55.65	2.81	300.60	56.50	125.28	2.54	349.80	84.00	185.01	2.34
November 2018	113.50	65.80	89.72	2.93	333.90	159.50	236.06	2.99	437.80	168.10	337.08	2.78
December 2018	156.80	32.50	77.40	1.40	405.80	86.10	236.86	1.70	473.50	180.20	349.37	1.60

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 2019	158.20	30.60	73.98	1.31		386.70	121.60	254.67	1.64		567.50	226.50	428.63	1.57	
February 2019	217.90	38.10	104.29	1.92		528.20	124.90	353.49	2.16		845.30	241.20	601.66	2.27	
March 2019	75.80	24.40	47.34	0.66		435.50	79.90	198.41	0.95		679.50	206.40	432.35	1.26	
April 2019	116.50	23.20	61.04	1.01		285.70	76.60	177.39	0.99		508.00	198.40	337.77	1.11	
May 2019	106.40	24.00	60.24	1.29		234.30	77.00	159.23	1.10		460.20	163.30	309.29	1.14	
June 2019	136.30	33.50	74.06	2.52		337.70	98.80	189.50	2.09		571.60	182.40	340.01	2.13	
July 2019	89.60	16.90	44.08	2.01		148.30	47.90	100.57	1.47		459.90	80.70	188.69	1.55	
August 2019	53.50	10.70	17.92	1.04		133.50	26.50	49.45	1.10		102.00	31.70	62.15	0.86	
September 2019	36.80	8.30	13.57	0.73		63.50	12.40	29.00	0.64		76.40	14.10	35.74	0.52	
October 2019	30.40	9.50	16.55	0.84		68.60	12.40	36.40	0.74		101.20	12.50	48.28	0.61	
November 2019	97.50	17.20	36.59	1.20		156.40	34.30	76.49	0.97		203.30	54.90	112.45	0.93	
December 2019	130.30	22.60	59.98	1.09		388.70	73.00	170.68	1.23		475.50	138.60	294.75	1.35	
January 2020	119.60	46.40	71.18	1.26		267.60	141.60	202.54	1.30		486.70	242.40	398.94	1.46	
February 2020	158.60	40.80	81.39	1.50		489.00	113.00	253.40	1.55		662.10	246.60	452.24	1.71	
March 2020	190.20	43.00	83.77	1.17		373.90	134.30	244.82	1.18		603.20	301.70	427.64	1.24	
April 2020	108.00	47.60	78.57	1.30		298.00	123.10	222.78	1.25		586.00	228.70	348.49	1.15	
May 2020	124.90	30.70	56.51	1.21		396.70	106.10	248.99	1.71		510.50	171.10	366.27	1.35	
June 2020	35.20	10.40	17.95	0.61		189.00	45.50	92.56	1.02		419.70	81.70	154.87	0.97	
July 2020	17.00	8.40	11.63	0.53		83.50	17.80	39.98	0.59		238.20	39.90	89.68	0.74	
August 2020	31.40	6.10	11.37	0.66		93.40	18.80	43.52	0.97		210.60	39.50	91.33	1.26	
September 2020	31.40	6.30	12.30	0.66		124.30	20.00	50.47	1.12		198.00	27.60	80.99	1.18	
October 2020	45.00	6.30	10.38	0.52		140.50	16.30	37.05	0.75		217.40	22.00	51.18	0.65	
November 2020	34.10	11.80	21.85	0.71		157.30	36.00	80.33	1.02		249.20	52.50	135.22	1.12	
December 2020	112.90	21.30	45.10	0.82		191.40	56.80	115.79	0.83		228.70	93.10	160.21	0.73	

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				

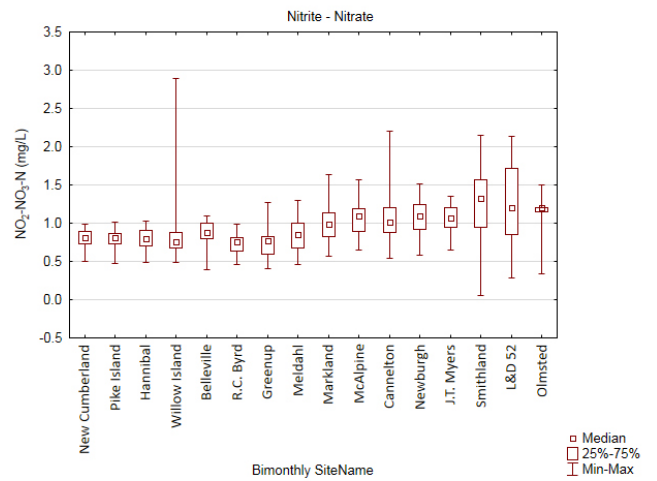
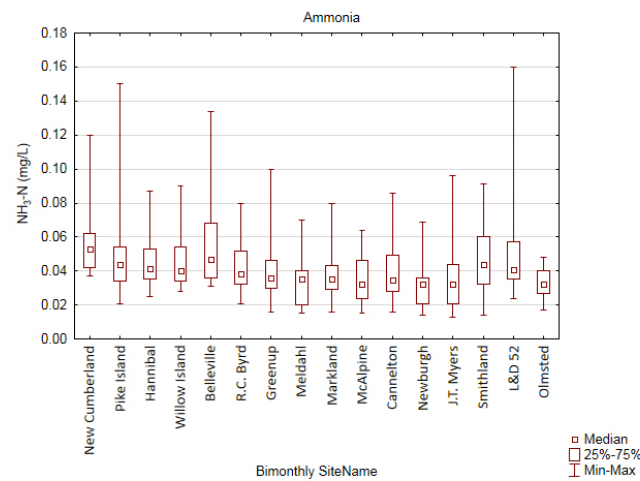
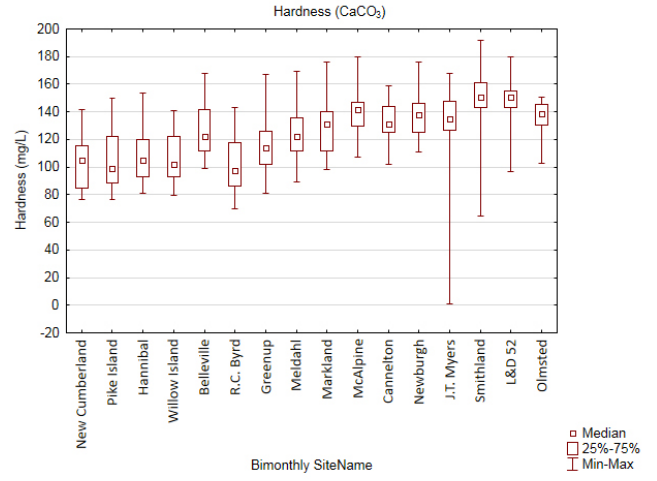
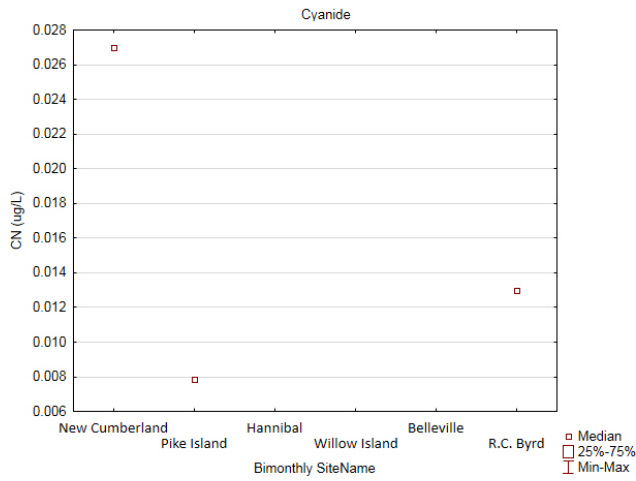
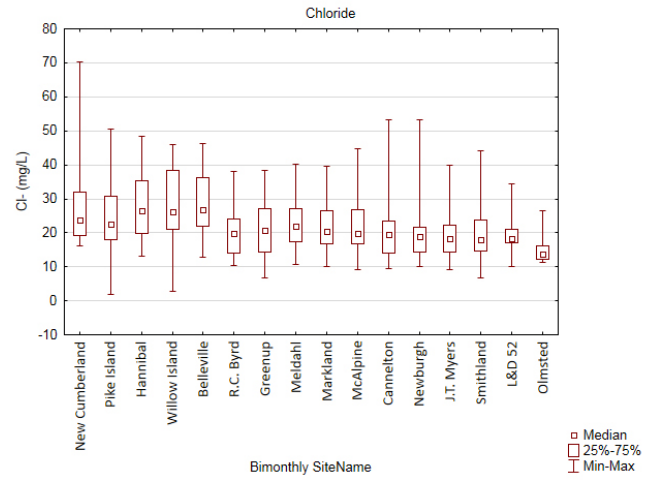
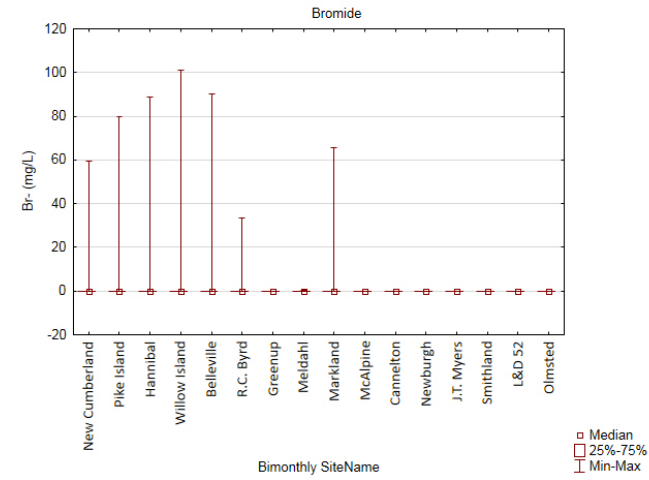
APPENDIX B

Bimonthly and Clean Metal Parameter Graphs

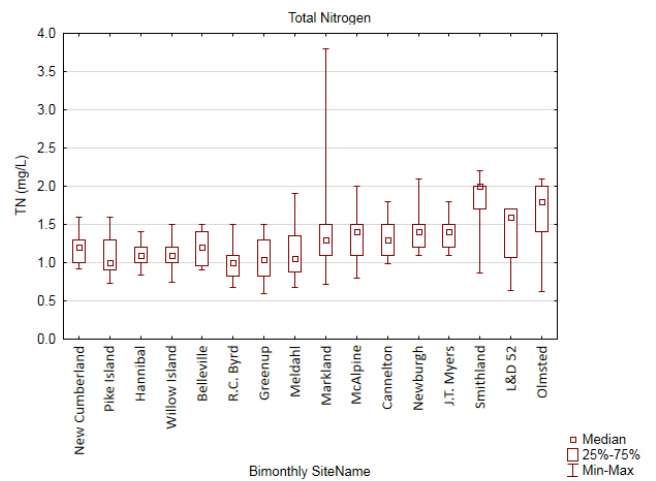
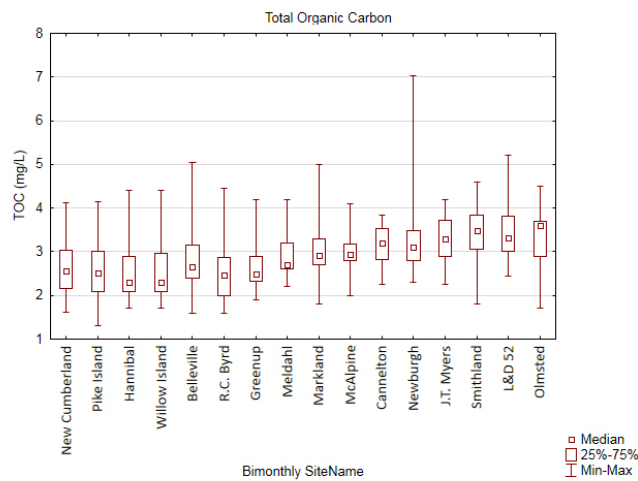
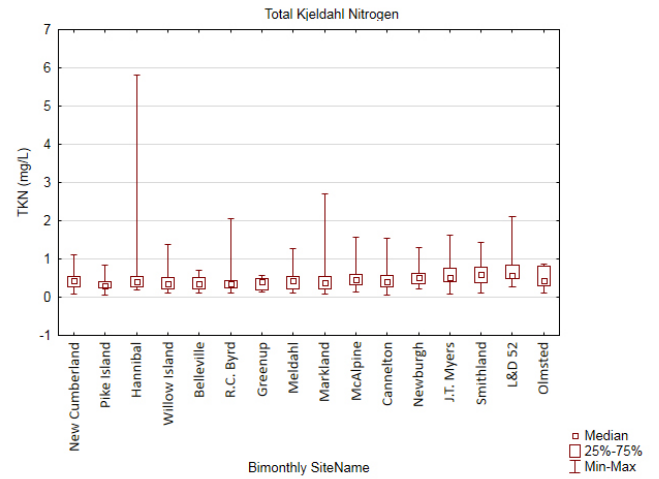
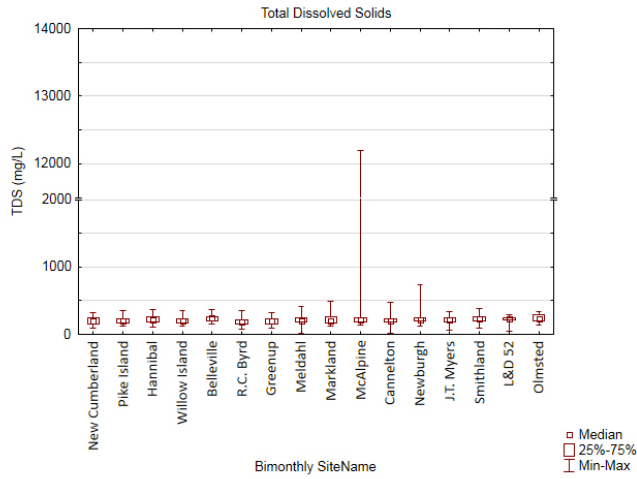
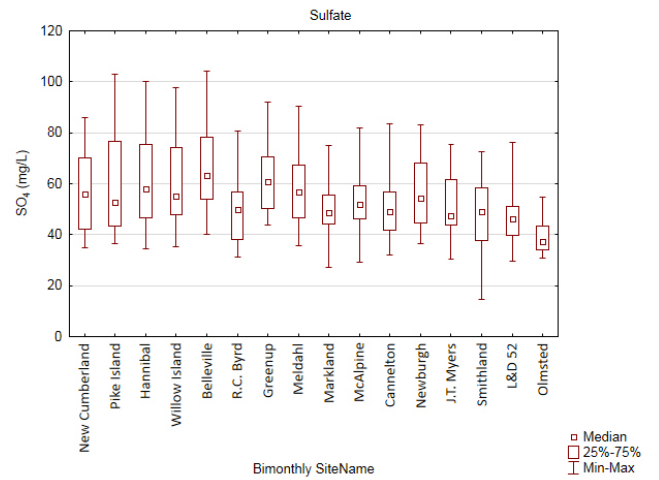
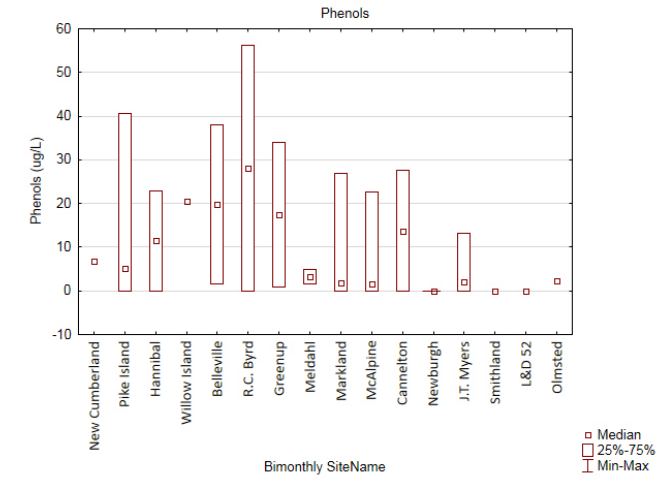
2016-2020

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

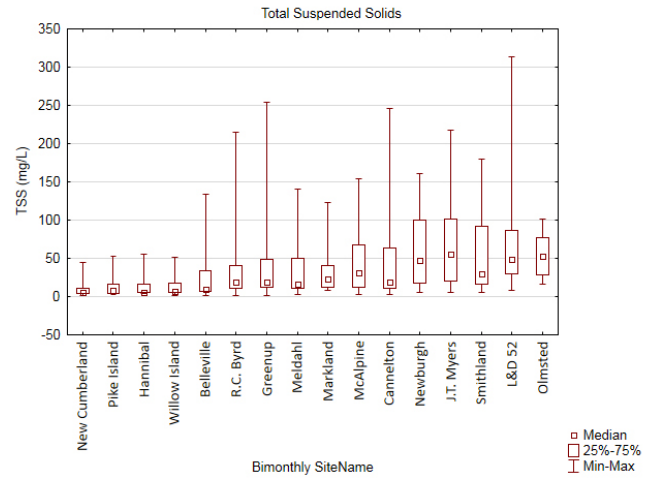
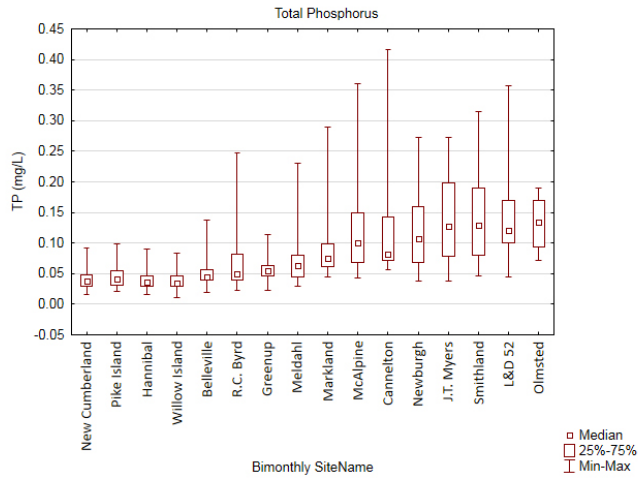
Appendix B: Bimonthly Parameter Boxplots



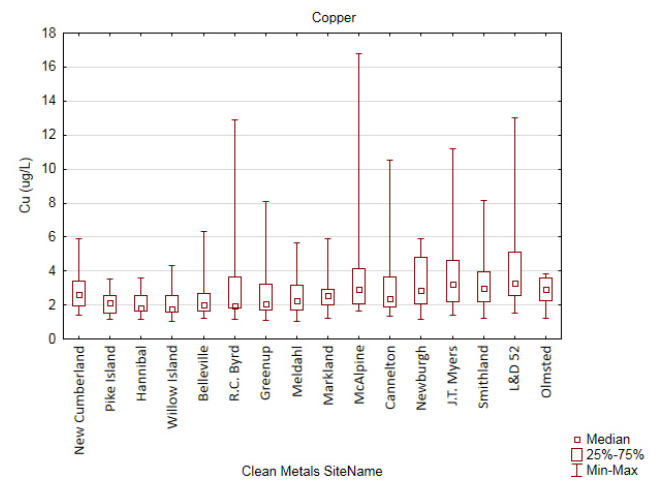
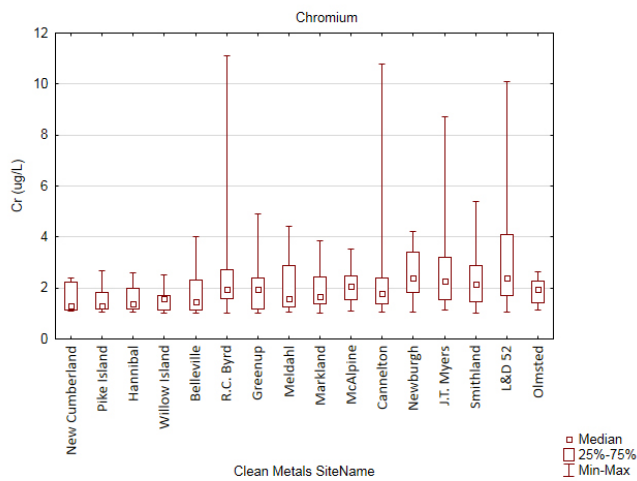
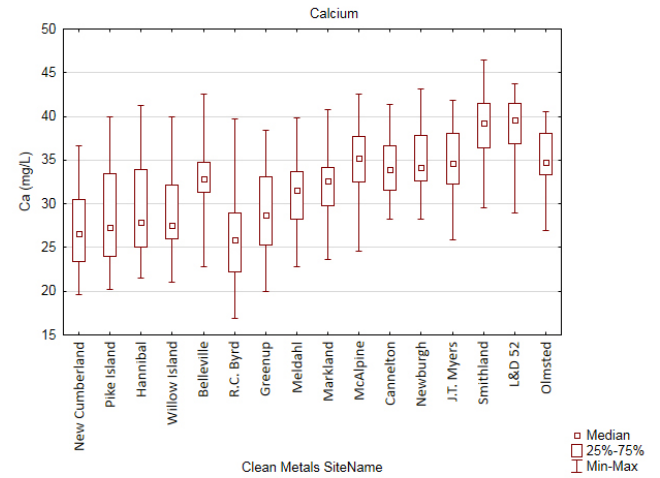
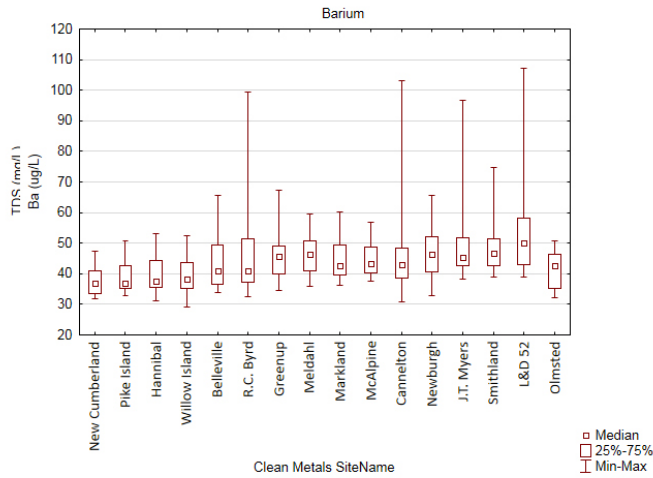
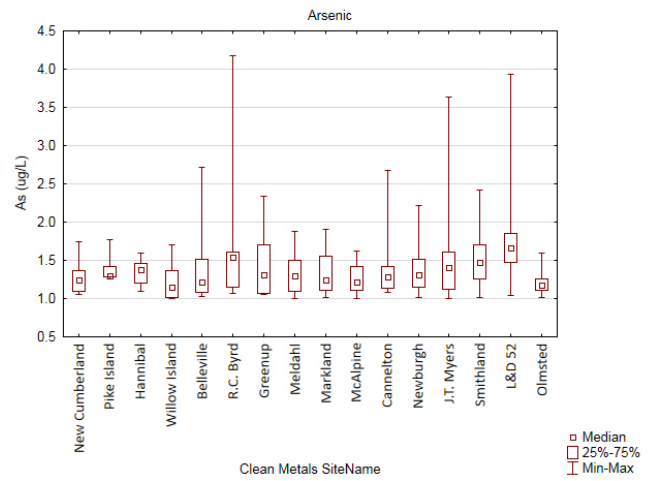
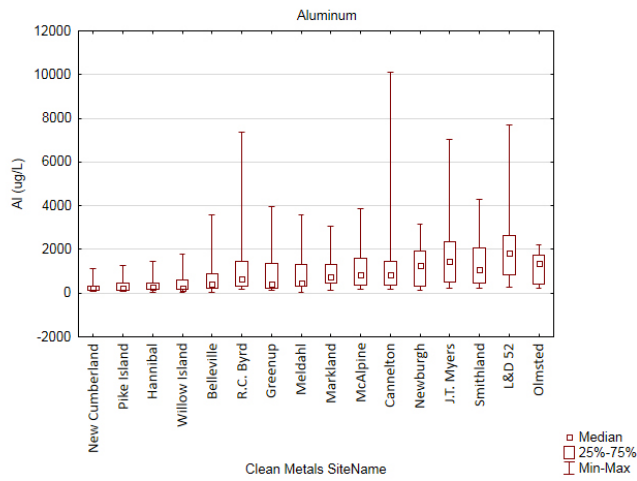
Appendix B: Bimonthly Parameter Boxplots



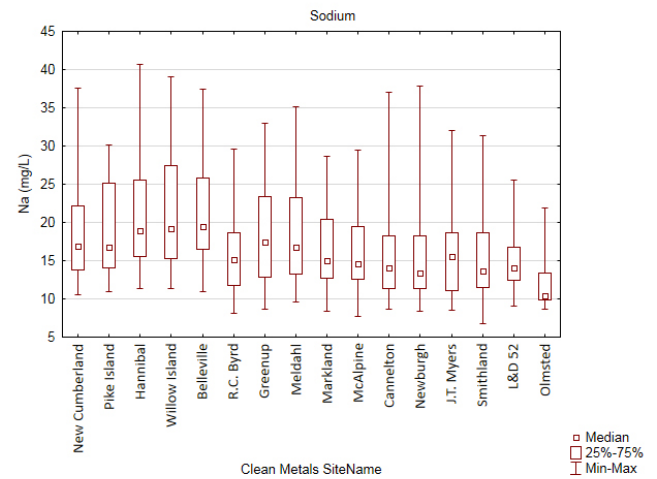
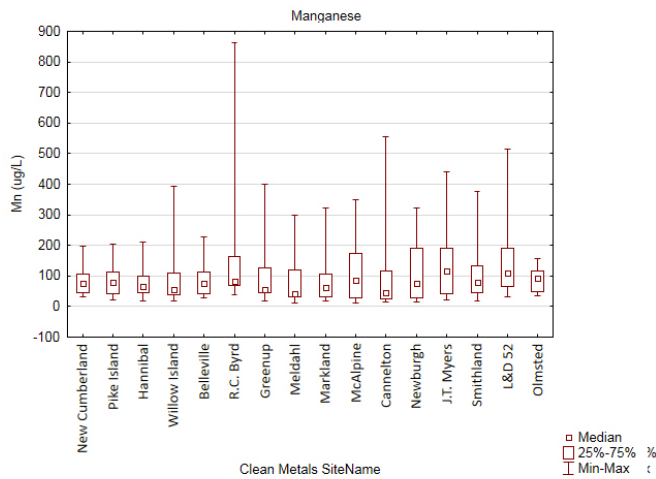
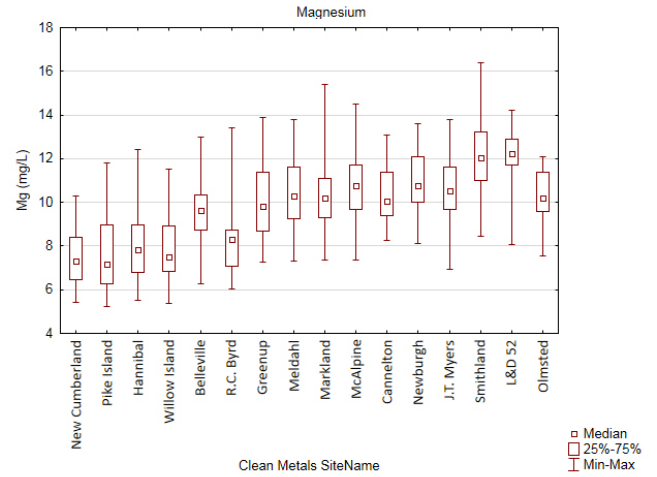
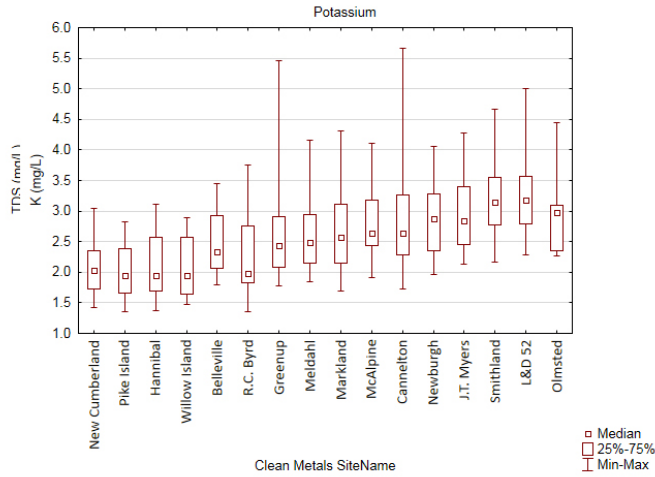
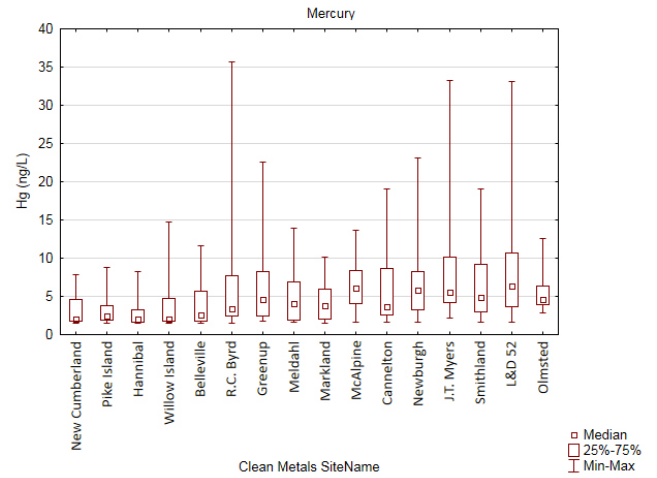
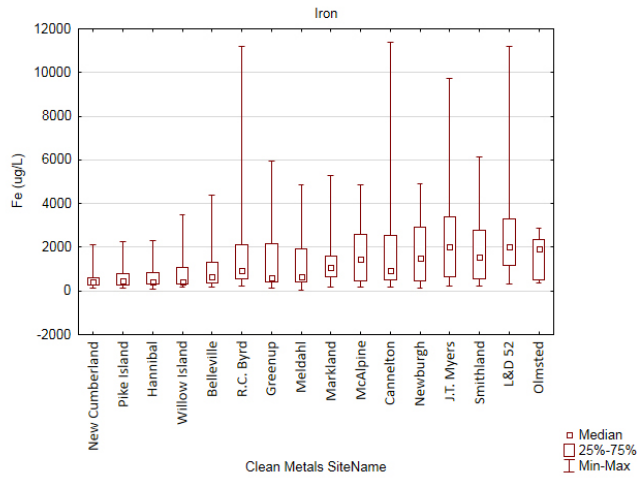
Appendix B: Bimonthly Parameter Boxplots



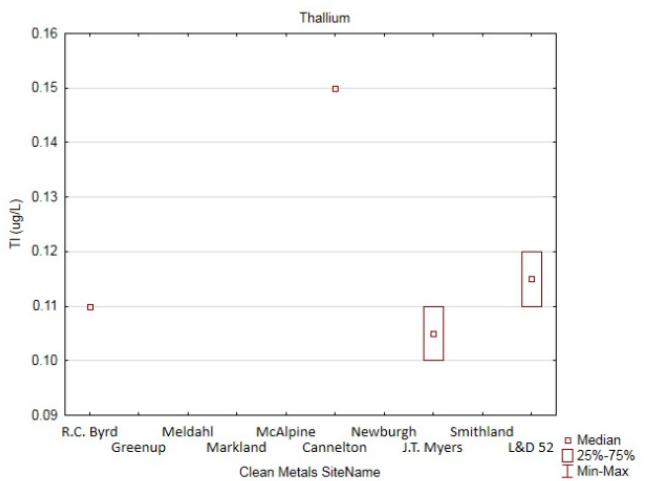
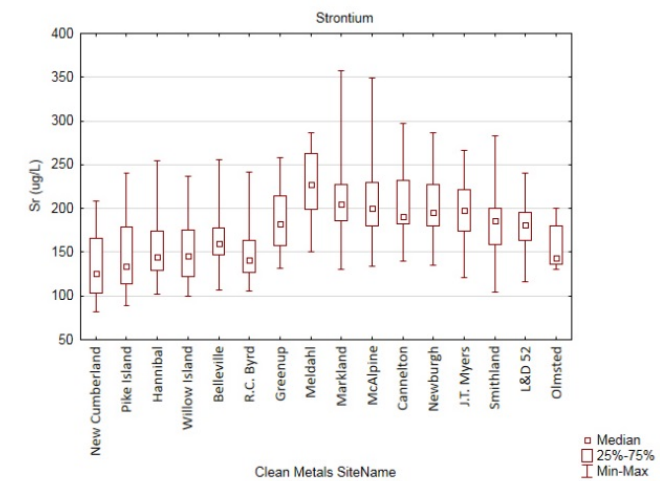
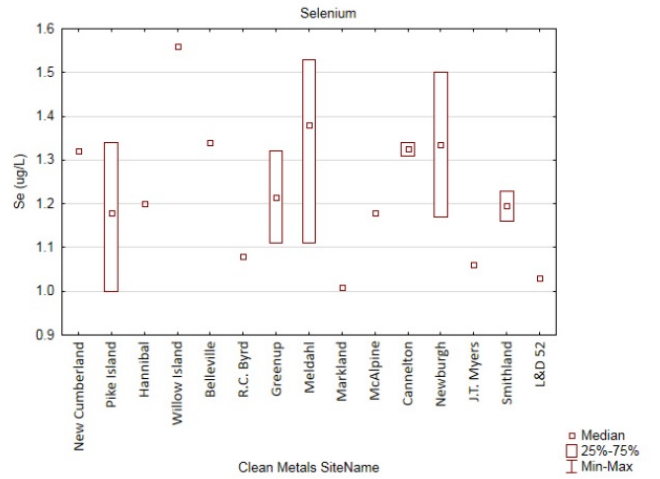
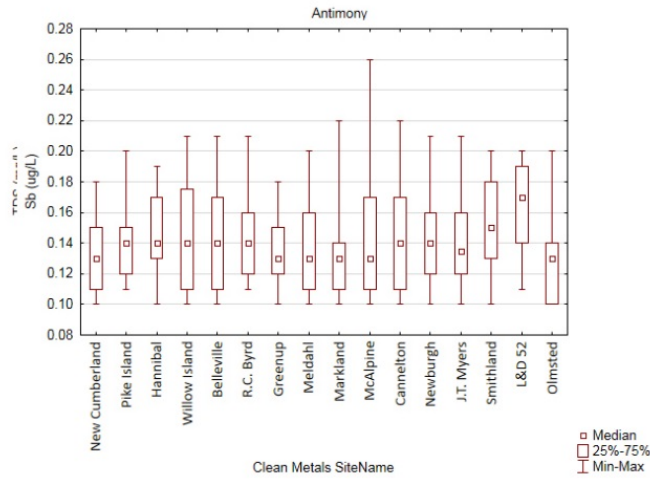
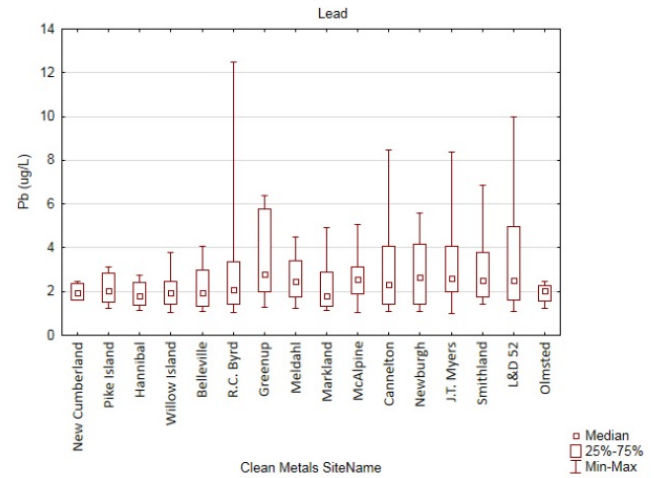
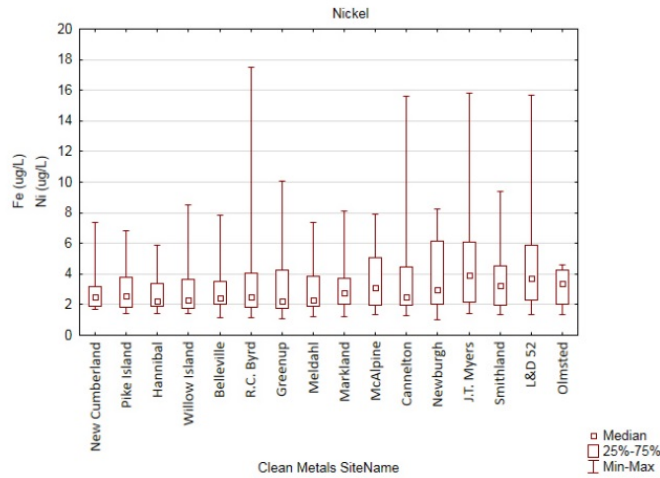
Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots



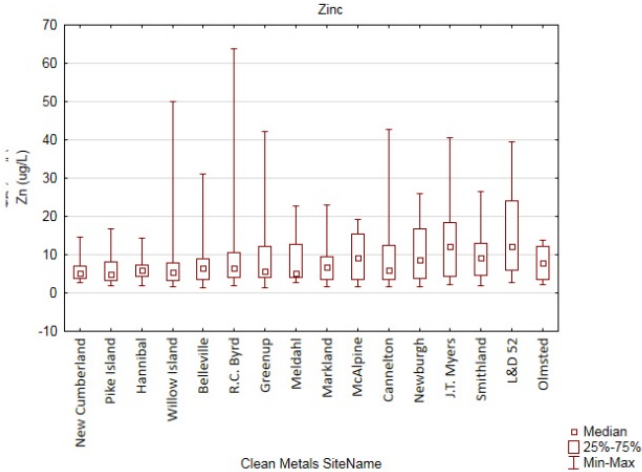
Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots



Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots



Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots



APPENDIX C

Biological Indicator Results

Fish and Macroinvertebrates, 2016-2020

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

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2016-2020

Mile Point	Pool	Year	Habitat Type	m ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Aquatic Life Use Assessment
1.3	Emsworth	2018	B	18.43	Poor	39.17	Good	the full compliment of 15 sites in Emsworth pool. Includes nine sites (scores not shown) on the two major tributaries to the Ohio
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	Fully Supporting
6.7	Dashields	2013	A	26.75	Fair	-	-	Not Assessed 2016-2020
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	-	-	Fully Supporting
13.4	Montgomery	2015	C	43.62	Very Good	23.13	Fair	Not Assessed 2016-2020
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	Fully Supporting
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 2016-2020

Mile Point	Pool	Year	Habitat Type	m ORFln Score	mORFln Biological Condition	ORMIn Score	ORMIn Biological Condition	Aquatic Life Use Assessment
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	Fully Supporting
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 requisite number of sites not reached.
70.4	Pike Island	2018	B	19.09	Good	42.86	Very Good	
72.2	Pike Island	2018	D	41.45	Fair	60.00	Excellent	
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*		Fully Supporting
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	-	-	Not Assessed 2016-2020
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	-	-	Fully Supporting
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 2016-2020

Mile Point	Pool	Year	Habitat Type	m ORFln Score	mORFln Biological Condition	ORMIn Score	ORMIn Biological Condition	Aquatic Life Use Assessment
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	Fully Supporting
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	-	-	Not Assessed 2016-2020
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	-	-	Fully Supporting
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	Not Assessed 2016-2020
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	Fully Supporting
241.4	RC Byrd	2019	B	23.71	Fair	-	-	
243.6	RC Byrd	2019	D	13.04	Poor	42.94	Very Good	
255.0	RC Byrd	2019	E	27.07	Fair	18.90	Poor	
257.5	RC Byrd	2019	D	16.19	Poor	15.30	Poor	
259.1	RC Byrd	2019	E	32.01	Good	19.62	Poor	
259.4	RC Byrd	2019	E	28.72	Fair	13.48	Poor	
260.1	RC Byrd	2019	E	21.41	Fair	13.27	Poor	
264.3	RC Byrd	2019	C	30.37	Good	24.68	Fair	
266.1	RC Byrd	2019	C	34.82	Good	18.61	Poor	
269.1	RC Byrd	2019	D	28.57	Fair	27.36	Fair	
270.1	RC Byrd	2019	D	23.70	Fair	29.84	Fair	
273.4	RC Byrd	2019	D	32.34	Good	19.76	Poor	
273.7	RC Byrd	2019	E	31.32	Good	27.07	Fair	
274.2	RC Byrd	2019	E	33.54	Good	20.17	Fair	
274.6	RC Byrd	2019	E	23.18	Fair	22.50	Fair	
average pool values				26.67	Fair	22.39	Fair	Fully Supporting

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2016-2020

Mile Point	Pool	Year	Habitat Type	m ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Aquatic Life Use Assessment
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	Fully Supporting
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	22.28818	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	Fully Supporting
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	-	-	Not Assessed 2016-2020
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	-	-	Fully Supporting
549.9	McAlpine	2014	D	34.86	Good	-	-	
561.1	McAlpine	2014	A	52.66	Excellent	-	-	

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2016-2020

Mile Point	Pool	Year	Habitat Type	mORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Aquatic Life Use Assessment
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	-	-	Not Assessed 2016-2020
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	-	-	Fully Supporting
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 high flow negatively affected sampling. Requisite number of sites not reached.
626.3	Cannelton	2016	C	46.58	Very Good	-	-	
630.1	Cannelton	2016	D	40.19	Very Good	-	-	
633.3	Cannelton	2016	C	34.89	Good	35.33	Good	
652.1	Cannelton	2016	C	41.57	Very Good	16.83	Poor	
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*		Fully Supporting
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 high flow negatively affected sampling.
744.2	Newburgh	2017	D	24.85	Fair	19.48	Poor	
745.2	Newburgh	2017	D	38.19	Good	20.73	Fair	
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 2016-2020

Mile Point	Pool	Year	Habitat Type	mORFln Score	mORFln Biological Condition	ORMln Score	ORMln Biological Condition	Aquatic Life Use Assessment
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	Not Assessed 2016-2020
855.9	Smithland	2019	D	22.15	Good	9.32	Very Poor	
856.7	Smithland	2019	D	7.51	Fair	6.13	Very Poor	
862.2	Smithland	2019	D	42.01	Very Poor	18.95	Poor	
870.0	Smithland	2019	E	33.88	Fair	6.97	Very Poor	
872.0	Smithland	2019	D	40.55	Fair	15.66	Poor	
880.6	Smithland	2019	E	47.70	Poor	-	-	*Not assessed for macro samples did not pass quality control standards
886.3	Smithland	2019	E	45.62	Good	24.09	Fair	
887.2	Smithland	2019	D	32.13	Good	23.10	Fair	
890.0	Smithland	2019	C	46.77	Very Good	21.35	Fair	
892.2	Smithland	2019	E	37.32	Good	20.63	Fair	
897.1	Smithland	2019	D	42.23	Very Good	14.75	Poor	
897.5	Smithland	2019	E	60.00	Good	14.74	Poor	
902.2	Smithland	2019	D	44.15	Good	16.04	Poor	
905.3	Smithland	2019	E	44.91	Good	25.77	Fair	
910.0	Smithland	2019	D	37.72	Very Good	21.28	Fair	
average pool values				38.98	Very Good	Not Assessed*		Fully Supporting
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	-	-	Not Assessed 2016-2020
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	-	-	Fully Supporting
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

OHIO RIVER VALLEY WATER SANITATION COMMISSION

Survey of Ohio River Water Utilities for the 2022 Biennial Assessment of Ohio River Water Quality Conditions (For the period Jan. 1, 2016 – Dec. 31, 2020)

Water Utility Name: Click here to enter text.	Company/Facility: Click here to enter text.	
1. Your Name:	Click here to enter text.	
Title:	Click here to enter text.	
Phone & Email:	Click here to enter text.	
2. Since January 2016, did you close your intake as a result of Ohio River water quality conditions in order to avoid MCL violations?		☐ Yes ☐ No
Date of incident	Incident Description (contaminants, cause, source, length of occurrence, etc.)	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
3. Since January 2016, did your plant have any MCL violations caused in whole or part by Ohio River water quality conditions?		☐ Yes ☐ No
Date of incident	Incident Description (contaminants, cause, source, length of occurrence, etc.)	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
4. Since January 2016, was “nonroutine” or extraordinary treatment necessary to comply with SDWA MCLs as a result of Ohio River water quality conditions?		☐ Yes ☐ No
Date of incident	Incident Description (contaminants, cause, source, length of occurrence, etc.)	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	
Click here to enter a date.	Click here to enter text.	

APPENDIX E

Bacteria Data

Monthly Geo Mean Results, 2016-2020

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

Appendix D: Bacteria Data - Monthly Geo Mean Results 2016-2020

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	<i>E. Coli</i> Concentration Geo Mean No./100mL
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
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

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	<i>E. Coli</i> Concentration Geo Mean No./100mL
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	137.89	94.83
470	Cincinnati	Aug-16	328.72	191.25
477.5	Cincinnati	Aug-16	252.47	185.45
470	Cincinnati	Sep-16	38.06	29.02
462.6	Cincinnati	Sep-16	12.52	9.19
477.5	Cincinnati	Sep-16	92.45	81.91
462.6	Cincinnati	Oct-16	43.15	22.54
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
619.3	Louisville	Jun-16	121.30	57.85
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
793.7	Evansville	Apr-16	140.34	110.65
791.5	Evansville	May-16	109.38	118.99
793.7	Evansville	May-16	209.78	255.42
791.5	Evansville	Jun-16	54.49	93.98
793.7	Evansville	Jun-16	182.56	236.18
791.5	Evansville	Jul-16	249.64	557.21
793.7	Evansville	Jul-16	608.55	536.27
791.5	Evansville	Aug-16	62.58	64.23
793.7	Evansville	Aug-16	172.53	142.29
791.5	Evansville	Sep-16	59.85	61.80
793.7	Evansville	Sep-16	77.16	93.37
791.5	Evansville	Oct-16	9.07	6.06
793.7	Evansville	Oct-16	14.47	9.97
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	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	Jul-17	64.84	44.96
92.8	Wheeling	Jul-17	407.36	130.45

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	<i>E. Coli</i> Concentration Geo Mean No./100mL
86.8	Wheeling	Aug-17	21.51	25.10
92.8	Wheeling	Aug-17	45.46	41.52
86.8	Wheeling	Oct-17	8.37	10.00
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
619.3	Louisville	Jun-17		203.86
594	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

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	<i>E. Coli</i> Concentration Geo Mean No./100mL
619.3	Louisville	Sep-17		36.56
594	Louisville	Oct-17		20.34
619.3	Louisville	Oct-17		118.59
791.5	Evansville	Apr-17		106.27
793.7	Evansville	Apr-17		138.32
791.5	Evansville	May-17		177.63
793.7	Evansville	May-17		109.31
791.5	Evansville	Jun-17		29.95
793.7	Evansville	Jun-17		69.69
791.5	Evansville	Jul-17		48.80
793.7	Evansville	Jul-17		104.35
791.5	Evansville	Aug-17		52.98
793.7	Evansville	Aug-17		182.37
791.5	Evansville	Sep-17		66.63
793.7	Evansville	Sep-17		378.13
791.5	Evansville	Oct-17		41.59
793.7	Evansville	Oct-17		113.94
1.4M	Pittsburgh	May-18		117.10
4.3	Pittsburgh	May-18		73.88
1.4M	Pittsburgh	Aug-18		134.17
4.3	Pittsburgh	Aug-18		154.26
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	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
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

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	<i>E. Coli</i> Concentration Geo Mean No./100mL
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
793.7	Evansville	Apr-18		392.42
791.5	Evansville	May-18		81.92
793.7	Evansville	May-18		106.15
791.5	Evansville	Jun-18		661.80
793.7	Evansville	Jun-18		717.27
791.5	Evansville	Jul-18		238.14
793.7	Evansville	Jul-18		303.72
791.5	Evansville	Aug-18		62.16
793.7	Evansville	Aug-18		47.07
791.5	Evansville	Sep-18		93.78
793.7	Evansville	Sep-18		106.39
791.5	Evansville	Oct-18		45.96
793.7	Evansville	Oct-18		41.05
1.4M	Pittsburgh	May-19		130.60
4.3	Pittsburgh	May-19		181.16
1.4M	Pittsburgh	Aug-19		134.15
4.3	Pittsburgh	Aug-19		107.89
1.4M	Pittsburgh	Sep-19		85.59
4.3	Pittsburgh	Sep-19		92.06
1.4M	Pittsburgh	Oct-19		405.12
4.3	Pittsburgh	Oct-19		351.50
86.8	Wheeling	Apr-19		122.69
92.8	Wheeling	Apr-19		191.34

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	<i>E. Coli</i> Concentration Geo Mean No./100mL
86.8	Wheeling	May-19		83.18
92.8	Wheeling	May-19		141.18
86.8	Wheeling	Jun-19		253.28
92.8	Wheeling	Jun-19		517.50
86.8	Wheeling	Jul-19		125.15
92.8	Wheeling	Jul-19		190.87
86.8	Wheeling	Aug-19		28.71
92.8	Wheeling	Aug-19		14.31
86.8	Wheeling	Sep-19		36.79
92.8	Wheeling	Sep-19		39.26
305.1	Huntington	Apr-19		44.79
314.8	Huntington	Apr-19		132.74
305.1	Huntington	May-19		155.01
314.8	Huntington	May-19		194.21
305.1	Huntington	Jun-19		359.68
314.8	Huntington	Jun-19		409.83
305.1	Huntington	Jul-19		58.74
314.8	Huntington	Jul-19		204.35
305.1	Huntington	Aug-19		33.06
314.8	Huntington	Aug-19		98.86
305.1	Huntington	Sep-19		13.20
314.8	Huntington	Sep-19		17.94
305.1	Huntington	Oct-19		26.72
314.8	Huntington	Oct-19		43.79
462.6	Cincinnati	Apr-19		139.29
470	Cincinnati	Apr-19		164.91
477.5	Cincinnati	Apr-19		163.80
462.6	Cincinnati	May-19		105.76
470	Cincinnati	May-19		135.90
477.5	Cincinnati	May-19		79.91
462.6	Cincinnati	Jun-19		431.51
470	Cincinnati	Jun-19		666.72
477.5	Cincinnati	Jun-19		444.44
462.6	Cincinnati	Jul-19		69.98
470	Cincinnati	Jul-19		144.52
477.5	Cincinnati	Jul-19		236.22
462.6	Cincinnati	Aug-19		26.07
470	Cincinnati	Aug-19		86.92
477.5	Cincinnati	Aug-19		30.84
462.6	Cincinnati	Sep-19		7.28
470	Cincinnati	Sep-19		7.60
477.5	Cincinnati	Sep-19		17.98
462.6	Cincinnati	Oct-19		4.31
470	Cincinnati	Oct-19		6.67
477.5	Cincinnati	Oct-19		9.02
594	Louisville	Apr-19		318.07
619.3	Louisville	Apr-19		315.37
594	Louisville	May-19		165.78
619.3	Louisville	May-19		155.50
594	Louisville	Jun-19		620.70

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	<i>E. Coli</i> Concentration Geo Mean No./100mL
619.3	Louisville	Jun-19		798.52
594	Louisville	Jul-19		123.44
619.3	Louisville	Jul-19		108.15
594	Louisville	Aug-19		67.17
619.3	Louisville	Aug-19		360.47
594	Louisville	Sep-19		22.18
619.3	Louisville	Sep-19		27.51
594	Louisville	Oct-19		8.37
619.3	Louisville	Oct-19		9.09
791.5	Evansville	Apr-19		255.03
793.7	Evansville	Apr-19		178.38
791.5	Evansville	May-19		47.74
793.7	Evansville	May-19		30.96
791.5	Evansville	Jun-19		206.79
793.7	Evansville	Jun-19		230.33
791.5	Evansville	Jul-19		138.47
793.7	Evansville	Jul-19		157.03
791.5	Evansville	Aug-19		96.61
793.7	Evansville	Aug-19		127.20
791.5	Evansville	Sep-19		37.16
793.7	Evansville	Sep-19		44.43
791.5	Evansville	Oct-19		14.45
793.7	Evansville	Oct-19		27.77
86.8	Wheeling	Jun-20		10.00
92.8	Wheeling	Jun-20		76.68
86.8	Wheeling	Jul-20		10.00
92.8	Wheeling	Jul-20		199.81
86.8	Wheeling	Aug-20		11.49
92.8	Wheeling	Aug-20		127.23
86.8	Wheeling	Sep-20		17.89
92.8	Wheeling	Sep-20		94.87
86.8	Wheeling	Oct-20		13.20
92.8	Wheeling	Oct-20		208.79
305.1	Huntington	May-20		187.97
314.8	Huntington	May-20		637.45
305.1	Huntington	Jun-20		49.13
314.8	Huntington	Jun-20		243.23
305.1	Huntington	Jul-20		35.46
314.8	Huntington	Jul-20		49.62
305.1	Huntington	Aug-20		42.60
314.8	Huntington	Aug-20		89.22
305.1	Huntington	Sep-20		38.60
314.8	Huntington	Sep-20		854.66
305.1	Huntington	Oct-20		26.13
314.8	Huntington	Oct-20		213.38
462.6	Cincinnati	May-20		634.42
470	Cincinnati	May-20		632.57
477.5	Cincinnati	May-20		838.58
462.6	Cincinnati	Jun-20		59.56
470	Cincinnati	Jun-20		140.62

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	<i>E. Coli</i> Concentration Geo Mean No./100mL
477.5	Cincinnati	Jun-20		122.97
462.6	Cincinnati	Jul-20		36.62
470	Cincinnati	Jul-20		419.96
477.5	Cincinnati	Jul-20		119.01
462.6	Cincinnati	Aug-20		6.56
470	Cincinnati	Aug-20		15.03
477.5	Cincinnati	Aug-20		22.82
462.6	Cincinnati	Sep-20		6.88
470	Cincinnati	Sep-20		21.02
477.5	Cincinnati	Sep-20		42.22
462.6	Cincinnati	Oct-20		15.06
470	Cincinnati	Oct-20		58.50
477.5	Cincinnati	Oct-20		158.17
594	Louisville	May-20		256.21
619.3	Louisville	May-20		281.09
594	Louisville	Jun-20		135.20
619.3	Louisville	Jun-20		118.70
594	Louisville	Jul-20		33.84
619.3	Louisville	Jul-20		39.30
594	Louisville	Aug-20		23.62
619.3	Louisville	Aug-20		39.41
594	Louisville	Sep-20		16.18
619.3	Louisville	Sep-20		21.04
594	Louisville	Oct-20		13.91
619.3	Louisville	Oct-20		26.56
791.5	Evansville	May-20		123.50
793.7	Evansville	May-20		129.73
791.5	Evansville	Jun-20		152.45
793.7	Evansville	Jun-20		117.30
791.5	Evansville	Jul-20		33.28
793.7	Evansville	Jul-20		40.87
791.5	Evansville	Aug-20		40.85
793.7	Evansville	Aug-20		187.58
791.5	Evansville	Sep-20		26.46
793.7	Evansville	Sep-20		38.45
791.5	Evansville	Oct-20		72.42
793.7	Evansville	Oct-20		72.42

Appendix F

Fish Tissue Data

Consumption-Weighted Methylmercury Results

2016-2020

Appendix E: Fish Tissue Data – Consumption-weighted Methylmercury Results

Sample River Mile	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	0.083
1.2	Emsworth	2018	common carp	3	52.55	0.0231	2	
1.3	Emsworth	2018	common carp	3	52.55	0.0231	2	
1.4	Emsworth	2018	smallmouth buffalo	3	52	0.0291	2	
2.5	Emsworth	2020	smallmouth bass	4	33.1	0.0802	5	
2.5	Emsworth	2020	walleye	4	44	0.129	2	
2.5	Emsworth	2020	black buffalo	3	49	0.223	3	
2.5	Emsworth	2020	common carp	3	57	0.117	3	
2.5	Emsworth	2020	freshwater drum	3	40.6	0.12	3	
9	Dashields	2020	hybrid striper	4	55.3	0.214	3	0.109
9	Dashields	2020	sauger	4	37.5	0.11	3	
9	Dashields	2020	smallmouth bass	4	27.1	0.0683	4	
9	Dashields	2020	bluegill	3	18.2	0.0339	4	
9	Dashields	2020	common carp	3	57.3	0.107	3	
9	Dashields	2020	freshwater drum	3	49.2	0.306	3	
14	Montgomery	2020	common carp	3	55	0.225	3	0.192
14	Montgomery	2020	freshwater drum	3	53.5	0.292	3	
26	Montgomery	2018	sauger	4	29.7	0.035	3	
26.3	Montgomery	2017	channel catfish	4	41.7	0.118	3	
26.3	Montgomery	2019	sauger	4	36.2	0.224	3	
35.3	New Cumberland	2017	sauger	4	34.2	0.299	3	0.136
50.3	New Cumberland	2017	common carp	3	59.4	0.176	3	
50.3	New Cumberland	2017	smallmouth buffalo	3	44	0.0727	3	
50.44	New Cumberland	2017	walleye	4	41.44	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	
58.2	Pike Island	2020	flathead catfish	4	41.4	0.166	4	0.113
58.2	Pike Island	2020	sauger	4	34.1	0.157	5	
58.2	Pike Island	2020	freshwater drum	3	46.2	0.259	3	
58.2	Pike Island	2020	smallmouth buffalo	3	47.5	0.213	3	
74	Pike Island	2019	smallmouth bass	4	31	0.0783	5	
74	Pike Island	2020	smallmouth buffalo	3	48.4	0.231	5	
74.5	Pike Island	2020	freshwater drum	3	29.3	0.196	5	
76	Pike Island	2018	channel catfish	3	40.8	0.0223	3	
85	Hannibal	2020	flathead catfish	4	33.3	0.105	3	0.114
85	Hannibal	2020	sauger	4	34.6	0.143	5	
91	Hannibal	2020	hybrid striper	4	40	0.109	3	
91	Hannibal	2020	black buffalo	3	54.5	0.189	4	
91	Hannibal	2020	silver redhorse	3	32.9	0.0699	5	
99.2	Hannibal	2017	sauger	4	33.2	0.226	3	
101.7	Hannibal	2018	sauger	4	37.6	0.0626	2	
127	Willow Island	2016	walleye	4	27	0.179	1	0.148
128	Willow Island	2016	black crappie	3	23	0.0816	1	
129	Willow Island	2020	freshwater drum	3	48.7	0.244	3	
129	Willow Island	2020	smallmouth buffalo	3	53.4	0.152	4	
133	Willow Island	2016	flathead catfish	4	46	0.308	1	
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	Willow Island	2016	channel catfish	3	40.8	0.0664	3	
140	Willow Island	2016	smallmouth buffalo	3	49.3	0.238	3	
140.9	Willow Island	2016	walleye	4	27.5	0.114	1	

Appendix E: Fish Tissue Data – Consumption-weighted Methylmercury Results

Sample River Mile	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)
186	Belleville	2020	flathead catfish	4	23.4	0.0832	4	0.223
186	Belleville	2020	freshwater drum	3	56.8	0.338	3	
186	Belleville	2020	smallmouth buffalo	3	53	0.28	4	
202.1	Belleville	2020	largemouth bass	4	27.2	0.133	3	
219.5	Racine	2020	flathead catfish	4	29.2	0.117	4	0.141
219.5	Racine	2020	sauger	4	37.3	0.176	3	
219.5	Racine	2020	common carp	3	61.3	0.123	3	
219.5	Racine	2020	smallmouth buffalo	3	49.6	0.329	4	
221	Racine	2020	largemouth bass	4	32	0.124	3	
221	Racine	2020	sauger	4	36	0.186	3	
221	Racine	2020	black buffalo	3	56.7	0.192	3	
221	Racine	2020	bluegill	3	17	0.0709	3	
221	Racine	2020	freshwater drum	3	50.5	0.345	3	
221	Racine	2020	silver redhorse	3	39.8	0.0806	2	
221	Racine	2020	white crappie	3	23.8	0.0834	3	
238	R.C. Byrd	2020	flathead catfish	4	33.9	0.172	6	0.118
238	R.C. Byrd	2020	sauger	4	31.9	0.126	5	
265	R.C. Byrd	2019	spotted bass	4	30.3	0.184	3	
265.7	R.C. Byrd	2020	bluegill	3	15.5	0.0775	3	
265.7	R.C. Byrd	2020	smallmouth buffalo	3	36	0.0368	3	
265.7	R.C. Byrd	2020	white crappie	3	24.3	0.0719	3	
265.7	R.C. Byrd	2020	white crappie	3	33.9	0.0719	3	
266.2	R.C. Byrd	2019	sauger	4	35.3	0.261	3	
273.7	R.C. Byrd	2019	river carpsucker	2	40.3	0.15	3	0.190
281	Greenup	2016	channel catfish	4	57.5	0.24	3	
281	Greenup	2016	hybrid striper	4	57	0.436	3	
281	Greenup	2016	freshwater drum	3	52	0.148	3	
281	Greenup	2016	smallmouth buffalo	3	38.5	0.136	3	
292.1	Greenup	2017	channel catfish	4	47.5	0.258	2	
292.1	Greenup	2019	channel catfish	3	34.8	0.131	3	
317	Greenup	2020	sauger	4	39.5	0.232	5	
340	Greenup	2016	largemouth bass	4	34	0.172	2	
340	Greenup	2016	sauger	4	36.5	0.29	3	0.119
356	Meldahl	2016	channel catfish	3	41.7	0.119	3	
357.3	Meldahl	2017	channel catfish	4	44.8	0.0919	3	
357.3	Meldahl	2017	sauger	4	38.7	0.262	3	
357.3	Meldahl	2018	sauger	4	34.9	0.0192	4	
357.3	Meldahl	2018	channel catfish	3	37.3	0.0048	3	
388.6	Meldahl	2017	sauger	4	33.1	0.188	3	
432	Meldahl	2020	largemouth bass	4	35.5	0.325	3	
432	Meldahl	2020	black buffalo	3	56.7	0.176	3	
432	Meldahl	2020	black crappie	3	21	0.0754	3	
432	Meldahl	2020	bluegill	3	14.8	0.08	4	
432	Meldahl	2020	common carp	3	56.2	0.158	3	
432	Meldahl	2020	smallmouth buffalo	3	41.8	0.151	3	
432	Meldahl	2020	white crappie	3	28.2	0.182	3	

Appendix E: Fish Tissue Data – Consumption-weighted Methylmercury Results

Sample River Mile	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)
439.5	Markland	2017	sauger	4	32.25	0.274	2	0.173
439.5	Markland	2018	channel catfish	3	39.6	0.0226	3	
440	Markland	2016	channel catfish	4	49	0.303	1	
440	Markland	2017	channel catfish	4	39.5	0.139	3	
440	Markland	2016	sauger	4	31.75	0.328	4	
440	Markland	2018	sauger	4	35.9	0.0468	3	
455	Markland	2016	hybrid striper	4	58.5	0.699	1	
455	Markland	2016	saugeye	4	48.5	0.364	1	
464	Markland	2020	black buffalo	3	34.5	0.13	3	
464	Markland	2020	bluegill	3	14.7	0.0277	3	
464	Markland	2020	common carp	3	57.3	0.153	3	
464	Markland	2020	smallmouth buffalo	3	53.8	0.362	3	
464	Markland	2020	white crappie	3	23	0.0633	3	
546	McAlpine	2020	largemouth bass	4	31.8	0.0829	3	0.103
546	McAlpine	2020	spotted bass	4	34.8	0.195	3	
546	McAlpine	2020	freshwater drum	3	35.8	0.157	3	
546	McAlpine	2020	smallmouth buffalo	3	47.8	0.233	3	
547	McAlpine	2020	bluegill	3	13.9	0.0589	4	
575	McAlpine	2016	channel catfish	3	40.7	0.178	3	
575.4	McAlpine	2018	sauger	4	27.5	0.0409	3	
575.4	McAlpine	2018	channel catfish	3	42.6	0.0158	3	
579.7	McAlpine	2017	channel catfish	4	38.6	0.167	3	0.253
607	Cannelton	2020	hybrid striper	4	56	0.303	2	
607	Cannelton	2020	black buffalo	3	53.3	0.377	3	
607	Cannelton	2020	freshwater drum	3	44.8	0.182	3	
607	Cannelton	2020	smallmouth buffalo	3	43.5	0.265	3	
608	Cannelton	2020	common carp	3	68.5	0.124	3	
739	Newburgh	2017	channel catfish	4	41.5	0.204	1	0.136
739	Newburgh	2017	sauger	4	37.6	0.321	2	
745.2	Newburgh	2017	channel catfish	4	43	0.0686	1	
751.5	Newburgh	2018	sauger	4	24.8	0.0279	2	
751.8	Newburgh	2018	sauger	4	24.8	0.0279	2	
755	Newburgh	2016	sauger	4	27.8	0.166	4	
755	Newburgh	2020	black buffalo	3	53.3	0.273	3	
755	Newburgh	2020	smallmouth buffalo	3	46	0.165	3	
755	Newburgh	2016	silver carp	2	41.7	0.0698	3	
775	Newburgh	2017	channel catfish	4	44.9	0.236	2	
775	Newburgh	2017	common carp	3	58	0.12	3	
777	J.T. Myers	2016	largemouth bass	4	40.5	0.199	1	0.236
777	J.T. Myers	2016	largemouth bass	4	53	0.576	1	
777	J.T. Myers	2016	largemouth bass	4	53	0.577	1	
777	J.T. Myers	2016	largemouth bass	4	53	0.612	1	
777	J.T. Myers	2016	sauger	4	40	0.242	2	
777	J.T. Myers	2016	bigmouth buffalo	3	55.7	0.374	3	
777	J.T. Myers	2016	channel catfish	3	41	0.0629	3	
777	J.T. Myers	2016	smallmouth buffalo	3	40.7	0.131	3	
802	J.T. Myers	2020	black buffalo	3	52	0.138	3	
802	J.T. Myers	2020	freshwater drum	3	45.7	0.331	3	

Appendix E: Fish Tissue Data – Consumption-weighted Methylmercury Results

Sample River Mile	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)
888	Smithland	2016	sauger	4	35.5	0.378	1	0.151
888.3	Smithland	2018	redeer sunfish	3	24.4	0.061	3	
890	Smithland	2016	channel catfish	4	51.7	0.188	3	
890	Smithland	2018	smallmouth buffalo	3	33.5	0.0281	3	
891.9	Smithland	2017	channel catfish	4	42	0.168	3	
891.9	Smithland	2018	hybrid striper	4	31.5	0.0356	3	
897.1	Smithland	2019	smallmouth buffalo	3	33	0.0968	3	
897.5	Smithland	2019	spotted bass	4	30.8	0.284	2	
897.5	Smithland	2019	redeer sunfish	3	24.7	0.12	3	
912	Smithland	2017	channel catfish	4	44.7	0.156	3	
912	Smithland	2017	largemouth bass	4	30.3	0.228	3	
912	Smithland	2017	bigmouth buffalo	3	56	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	
919	Olmsted	2020	spotted bass	4	37	0.252	3	0.236
919	Olmsted	2020	freshwater drum	3	52	0.221	3	
919	Olmsted	2020	smallmouth buffalo	3	45.7	0.0979	3	
926	Olmsted	2020	black buffalo	3	46.8	0.259	3	
933	Olmsted	2020	smallmouth bass	4	41.5	0.271	2	
934	Olmsted	2020	bigmouth buffalo	3	57.8	0.399	3	
972	Open Water	2018	channel catfish	4	22	0.0423	3	0.100
972	Open Water	2017	freshwater drum	3	36.9	0.141	3	
974	Open Water	2016	channel catfish	3	38	0.06	2	

APPENDIX G

2019 Harmful Algal Bloom Data

Microcystin Results

Appendix F: 2019 Harmful Algal Bloom Data – Microcystin Results

Date	River	River Mile	Bank	Depth	Location Description	Microcystin by Abraxis ELISA (ug/L)	Microcystin by MBio ELISA (ug/L)	Microcystin by LC MS/MS (ug/L)
9/12/19	Big Sandy	5.5	MID	Surface	Kenova, WV	-	0.8	-
9/12/19	Ohio	306	LDB	Intake	Huntington, WV	ND	-	-
9/12/19	Ohio	306	LDB	Surface	Huntington, WV	-	ND	-
9/12/19	Ohio	319.7	LDB	Intake	Ashland, KY	-	-	0.963
9/12/19	Ohio	319.7	LDB	Surface	Ashland, KY	-	1.4	-
9/12/19	Ohio	327	RDB	Surface	Ironton, OH	-	0.7	-
9/12/19	Ohio	327.6	LDB	Surface	Russell KY	-	ND	-
9/12/19	Ohio	337.2	LDB	Surface	Coal Branch Creek	-	-	1.76
9/12/19	Ohio	341	MID	Surface	Greenup Dam	-	-	7.08
9/12/19	Ohio	341	MID	Surface	Greenup Dam	-	8.2	-
9/12/19	Ohio	356	RDB	Surface	Portsmouth, OH	-	ND	-
9/12/19	Ohio	378	LDB	Surface	Vanceburg, KY	-	ND	-
9/13/19	Ohio	306	LDB	Intake	Huntington, WV	ND	-	-
9/14/19	Ohio	306	LDB	Intake	Huntington, WV	ND	-	-
9/16/19	Ohio	306	LDB	Intake	Huntington, WV	ND	-	-
9/18/19	Ohio	306	LDB	Intake	Huntington, WV	ND	-	-
9/19/19	Ohio	306	LDB	Intake	Huntington, WV	ND	-	-
9/19/19	Ohio	470	LDB	Surface	Cincinnati, OH	-	3.5	-
9/19/19	Ohio	477.5	RDB	Surface	Anderson Ferry	-	>4.3	-
9/20/19	Ohio	462.8	LDB	Surface	GCWW Intake	-	ND	-
9/20/19	Ohio	462.8	RDB	Surface	GCWW Intake	-	ND	-
9/20/19	Ohio	462.9	LDB	Intake	No. KY Intake	ND	-	-
9/20/19	Ohio	464	LDB	Surface	No. KY Intake	ND	-	-
9/20/19	Ohio	470	LDB	Surface	Cincinnati, OH	-	ND	-
9/20/19	Ohio	470	RDB	Surface	Cincinnati, OH	-	>5	-
9/21/19	Ohio	462.9	LDB	Intake	No. KY Intake	ND	-	-
9/21/19	Ohio	464	LDB	Surface	Aquaramp Marina	0.62	-	-
9/22/19	Ohio	462.9	LDB	Intake	No. KY Intake	ND	-	-
9/22/19	Ohio	464	LDB	Surface	Aquaramp Marina	ND	-	-
9/23/19	Ohio	462.9	LDB	Intake	No. KY Intake	ND	-	-
9/23/19	Ohio	464	LDB	Surface	Aquaramp Marina	ND	-	-
9/24/19	Ohio	462.8	RDB	Surface	GCWW Intake	-	-	ND
9/24/19	Ohio	467.8	MID	Surface	Schmidt Field	-	-	24.5
9/24/19	Ohio	467.8	MID	Surface	Schmidt Field	-	23.2	-
9/24/19	Ohio	470	LDB	Surface	Cincinnati, OH	-	-	38.4
9/24/19	Ohio	470	MID	Surface	Cincinnati, OH	-	-	0.28
9/24/19	Ohio	470	RDB	Surface	Cincinnati, OH	-	-	825
9/24/19	Ohio	470	RDB	Surface	Cincinnati, OH	-	-	1020
9/24/19	Ohio	470	MID	Surface	Cincinnati, OH	-	1.1	-
9/24/19	Ohio	477.5	RDB	Surface	Anderson Ferry	-	-	101
9/26/19	Ohio	409	RDB	Surface	Aberdeen, OH	>25	-	-
9/26/19	Ohio	417	RDB	Surface	Ripley, OH	ND	-	-
9/26/19	Ohio	435	RDB	Surface	Chilo, OH	2.63	-	-
9/26/19	Ohio	439	RDB	Surface	Neville, OH	10.3	-	-
9/26/19	Ohio	439	RDB	Surface	Neville, OH - Duplicate	11.8	-	-
9/26/19	Ohio	445	RDB	Surface	Point Pleasant, OH	0.375	-	-
9/26/19	Ohio	450	RDB	Surface	New Richmond, OH	ND	-	-
9/26/19	Ohio	462	RDB	Surface	Coney Island	ND	-	-
9/26/19	Ohio	466	RDB	Surface	Schmidt Field	3.99	-	-
9/26/19	Ohio	470	RDB	Surface	Cincinnati, OH	ND	-	-
9/26/19	Ohio	493.6	RDB	Surface	Lawrenceburg, IN	30	-	-
9/26/19	Ohio	493.6	RDB	Surface	Lawrenceburg, IN	31	-	-
9/26/19	Ohio	493.6	RDB	Surface	Lawrenceburg, IN	-	>4.8	-
9/26/19	Ohio	506.3	RDB	Surface	Rising Sun, IN	ND	-	-

Appendix F: 2019 Harmful Algal Bloom Data – Microcystin Results

Date	River	River Mile	Bank	Depth	Location Description	Microcystin by Abraxis ELISA (ug/L)	Microcystin by MBio ELISA (ug/L)	Microcystin by LC MS/MS (ug/L)
9/26/19	Ohio	518.5	RDB	Surface	Patriot, IN	2	-	-
9/26/19	Arnolds Creek			Surface	Enters Ohio River at 508.7	7.9	-	-
9/26/19	Laughery Creek			Surface	Enters Ohio River at 498.8	28	-	-
10/1/19	Ohio	128.7	LDB	Surface	New Martinsville, WV	ND	-	-
10/1/19	Ohio	462.6	RDB	Surface	GCWW Intake	-	-	18.2
10/1/19	Ohio	468.7	MID	Surface	Schmidt Field	-	-	64.8
10/1/19	Ohio	470	RDB	Surface	Cincinnati, OH	-	-	159
10/1/19	Ohio	470	MID	Surface	Cincinnati, OH	-	-	74.2
10/1/19	Ohio	470	LDB	Surface	Cincinnati, OH	-	-	81.4
10/1/19	Ohio	477.5	RDB	Surface	Anderson Ferry	-	-	835
10/1/19	Fishing Creek			Surface	Enters Ohio River at 128.6	ND	-	-
10/2/19	Ohio	327	RDB	Surface	Ironton, OH	1.58	-	-
10/2/19	Ohio	356	RDB	Surface	Portsmouth, OH	ND	-	-
10/2/19	Ohio	409	RDB	Surface	Aberdeen, OH	6.34	-	-
10/2/19	Ohio	435	RDB	Surface	Chilo, OH	>25	-	-
10/2/19	Ohio	439	RDB	Surface	Neville, OH	0.699	-	-
10/2/19	Ohio	445	RDB	Surface	Point Pleasant, OH	10.4	-	-
10/8/19	Ohio	462.8	RDB	Surface	GCWW Intake	-	10	-
10/8/19	Ohio	470	LDB	Surface	Cincinnati, OH	-	3.4	-
10/8/19	Ohio	470	MID	Surface	Cincinnati, OH	-	ND	-
10/8/19	Ohio	470	RDB	Surface	Cincinnati, OH	-	6	-
10/8/19	Ohio	477.5	RDB	Surface	Anderson Ferry	0.369	-	-
10/8/19	Ohio	477.5	RDB	Surface	Anderson Ferry	-	ND	-
10/8/19	Ohio	846	RDB	Surface	JT Meyers Lock and Dam	-	ND	-
10/8/19	Ohio	562.6	RDB	Surface	Hanover, IN	-	>3.9	-
10/9/19	Ohio	327	RDB	Surface	Ironton, OH	-	1	-
10/9/19	Ohio	356	RDB	Surface	Portsmouth, OH	-	3.2	-
10/9/19	Ohio	409	LDB	Surface	Maysville, KY	-	5.4	-
10/9/19	Ohio	409	RDB	Surface	Aberdeen, OH	-	8.1	-
10/9/19	Ohio	419	RDB	Surface	Dover, OH	-	2.4	-
10/9/19	Ohio	428	LDB	Surface	Augusta, KY	-	6.6	-
10/9/19	Ohio	435	RDB	Surface	Chilo, OH	-	3.5	-
10/9/19	Ohio	439	RDB	Surface	Neville, OH	-	>20	-
10/9/19	Ohio	445	RDB	Surface	Point Pleasant, OH	-	12.6	-
10/9/19	Ohio	531.5	LDB	Surface	Markland Lock and Dam	-	>8.2	-
10/9/19	Ohio	545.5	LDB	Surface	Carrolton, KY	2491.5	-	-
10/9/19	Ohio	557.9	RDB	Surface	Madison, IN	>5000	-	-
10/9/19	Ohio	563	RDB	Surface	Hanover, IN	9.89	-	-
10/9/19	Ohio	776.1	RDB	Surface	Newburgh Lock and Dam	-	ND	-
10/15/19	Ohio	462.8	RDB	Surface	GCWW Intake	143.35	-	-
10/15/19	Ohio	470	LDB	Surface	Cincinnati, OH	68.5	-	-
10/15/19	Ohio	470	MID	Surface	Cincinnati, OH	6.62	-	-
10/15/19	Ohio	470	RDB	Surface	Cincinnati, OH	16.56	-	-
10/15/19	Ohio	477	RDB	Surface	Anderson Ferry	0.082	-	-
10/16/19	Ohio	409	LDB	Surface	Maysville, KY	-	ND	-
10/16/19	Ohio	409	RDB	Surface	Aberdeen, OH	-	0.5	-
10/16/19	Ohio	419	RDB	Surface	Dover, OH	-	0.7	-
10/16/19	Ohio	428	LDB	Surface	Augusta, KY	-	0.5	-
10/16/19	Ohio	435	RDB	Surface	Chilo, OH	-	0.7	-
10/16/19	Ohio	439	RDB	Surface	Neville, OH	-	8.9	-
10/16/19	Ohio	445	RDB	Surface	Point Pleasant, OH	-	0.8	-
10/16/19	Ohio	531.5	LDB	Surface	Markland Lock and Dam	0.262	-	-
10/16/19	Ohio	545.5	LDB	Surface	Carrolton, KY	4.735	-	-
10/16/19	Ohio	557.9	RDB	Surface	Madison, IN	4.622	-	-

Appendix F: 2019 Harmful Algal Bloom Data – Microcystin Results

Date	River	River Mile	Bank	Depth	Location Description	Microcystin by Abraxis ELISA (ug/L)	Microcystin by MBio ELISA (ug/L)	Microcystin by LC MS/MS (ug/L)
10/16/19	Ohio	563	RDB	Surface	Hanover, IN	12.325	-	-
10/16/19	Ohio	781.9	RDB	Surface	Evansville, IN upstream	0.056	-	-
10/16/19	Ohio	797.6	RDB	Surface	Evansville, IN downstream	<0.05	-	-
10/16/19	Ohio	803.9	LDB	Surface	Henderson, KY	0.354	-	-
10/22/19	Ohio	462.8	RDB	Surface	GCWW Intake	<0.05	-	-
10/22/19	Ohio	470	RDB	Surface	Cincinnati, OH	<0.05	-	-
10/22/19	Ohio	470	MID	Surface	Cincinnati, OH	<0.05	-	-
10/22/19	Ohio	470	LDB	Surface	Cincinnati, OH	<0.05	-	-
10/22/19	Ohio	477.5	RDB	Surface	Anderson Ferry	<0.05	-	-
10/22/19	Ohio	531.5	LDB	Surface	Markland Lock and Dam	0.225	-	-
10/22/19	Ohio	557.9	RDB	Surface	Madison, IN	0.242	-	-
10/22/19	Ohio	563	RDB	Surface	Hanover, IN	0.227	-	-
10/22/19	Ohio	776.1	RDB	Surface	Newburgh Lock and Dam	0.218	-	-
10/23/19	Ohio	409	RDB	Surface	Aberdeen, OH	-	0.6	-
10/23/19	Ohio	435	RDB	Surface	Chilo, OH	-	15.5	-
10/23/19	Ohio	439	RDB	Surface	Neville, OH	-	ND	-
10/23/19	Ohio	445	RDB	Surface	Point Pleasant, OH	-	ND	-
10/23/19	Ohio	889.9	RDB	Surface	Elizabethtown, IL	-	0.3	-
10/24/19	Ohio	598.4	LDB	Surface	Jeffersonville, IN	0.132	-	-
10/24/19	Ohio	601.2	LDB	Surface	Louisville, KY	0.19	-	-
10/24/19	Ohio	602.2	LDB	Surface	Louisville, KY	0.141	-	-
10/24/19	Ohio	603.5	RDB	Surface	Louisville, KY	185.85	-	-
10/24/19	Ohio	604.5	LDB	Surface	Louisville, KY	1.122	-	-
10/24/19	Ohio	605.5	LDB	Surface	Louisville, KY	2.397	-	-
10/24/19	Ohio	628.3	LDB	Surface	West Point, KY	1.28	-	-
10/24/19	Ohio	644.1	LDB	Surface	Brandenburg, KY	0.35	-	-
10/29/19	Ohio	462.8	RDB	Surface	GCWW Intake	<0.05	-	-
10/29/19	Ohio	470	LDB	Surface	Cincinnati, OH	<0.05	-	-
10/29/19	Ohio	470	MID	Surface	Cincinnati, OH	<0.05	-	-
10/29/19	Ohio	470	RDB	Surface	Cincinnati, OH	0.515	-	-
10/29/19	Ohio	477	RDB	Surface	Anderson Ferry	<0.05	-	-
10/30/19	Ohio	435	RDB	Surface	Chilo, OH	-	ND	-
10/30/19	Ohio	439	RDB	Surface	Neville, OH	-	ND	-
10/30/19	Ohio	545.5	LDB	Surface	Carrollton, KY	<0.05	-	-
10/30/19	Ohio	557.9	RDB	Surface	Madison, IN	<0.05	-	-
10/30/19	Ohio	563	RDB	Surface	Hanover, IN	<0.05	-	-
10/31/19	Ohio	598.4	LDB	Surface	Jeffersonville, IN	<0.05	-	-
10/31/19	Ohio	601.2	LDB	Surface	Louisville, KY	<0.05	-	-
10/31/19	Ohio	602.2	LDB	Surface	Louisville, KY	0.866	-	-
10/31/19	Ohio	603.5	RDB	Surface	Louisville, KY	2.883	-	-
10/31/19	Ohio	604.5	LDB	Surface	Louisville, KY	0.1	-	-
10/31/19	Ohio	605.5	LDB	Surface	Louisville, KY	0.09	-	-
11/5/19	Ohio	435	RDB	Surface	Chilo, OH	-	ND	-