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		

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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)
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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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 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
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

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 2021	123.10	15.40	45.89	0.81	297.00	50.30	138.79	0.89	601.60	81.60	230.81	0.85
February 2021	77.80	15.20	31.35	0.58	231.70	74.80	139.78	0.86	323.50	154.40	228.64	0.86
March 2021	203.60	24.30	60.93	0.85	534.70	108.10	238.32	1.15	716.50	252.90	455.44	1.32
April 2021	55.00	17.00	29.68	0.49	223.90	53.80	109.87	0.62	364.60	95.50	193.32	0.64
May 2021	125.20	9.00	50.77	1.09	236.50	37.90	128.38	0.88	369.00	78.50	218.43	0.80
June 2021	59.10	9.80	24.67	0.84	156.60	26.20	82.99	0.91	194.90	90.20	140.38	0.88
July 2021	86.70	15.10	33.76	1.54	145.80	36.20	80.77	1.18	256.40	63.30	160.75	1.32
August 2021	63.90	7.90	21.68	1.26	140.30	16.30	53.54	1.19	182.60	43.30	82.16	1.13
September 2021	117.30	10.90	26.90	1.44	181.90	25.60	63.55	1.40	204.30	41.50	94.48	1.37
October 2021	84.70	12.70	24.56	1.24	143.60	26.00	47.70	0.97	150.40	39.40	80.52	1.02
November 2021	71.10	22.00	33.82	1.10	152.30	43.10	71.74	0.91	234.20	88.00	134.98	1.12
December 2021	94.40	24.00	45.49	0.83	192.10	47.90	109.53	0.79	277.40	78.20	189.75	0.87
January 2022	152.40	16.30	55.29	0.98	399.40	60.10	188.10	1.21	607.70	120.80	347.28	1.27
February 2022	218.70	17.30	94.34	1.74	426.50	48.80	267.59	1.64	635.20	99.00	355.91	1.34
March 2022	138.40	41.60	72.01	1.00	425.10	112.40	224.13	1.08	666.00	261.90	458.53	1.33
April 2022	111.20	40.90	66.86	1.11	216.50	87.60	144.59	0.81	381.20	187.60	277.88	0.92
May 2022	205.70	27.60	64.07	1.37	399.70	87.00	166.40	1.15	405.30	138.00	222.51	0.82
June 2022	37.80	13.20	22.03	0.75	141.70	39.00	90.87	1.00	240.10	65.50	137.10	0.86
July 2022	16.40	7.30	11.09	0.51	168.40	31.30	58.74	0.86	204.70	44.00	85.50	0.70
August 2022	22.30	9.40	15.08	0.87	150.10	34.60	76.02	1.70	229.20	55.50	132.73	1.83
September 2022	22.90	9.40	15.19	0.81	93.60	20.60	43.20	0.95	111.10	20.20	59.32	0.86
October 2022	38.10	10.00	17.07	0.86	82.90	19.00	36.20	0.73	92.40	24.10	44.49	0.56
November 2022	110.40	9.60	37.44	1.22	160.10	24.10	67.27	0.85	157.00	34.20	75.73	0.63
December 2022	66.10	26.90	41.82	0.76	138.10	51.40	90.37	0.65	160.90	62.70	114.31	0.52

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

2018-2022

Parameters with majority values below detection limits not displayed

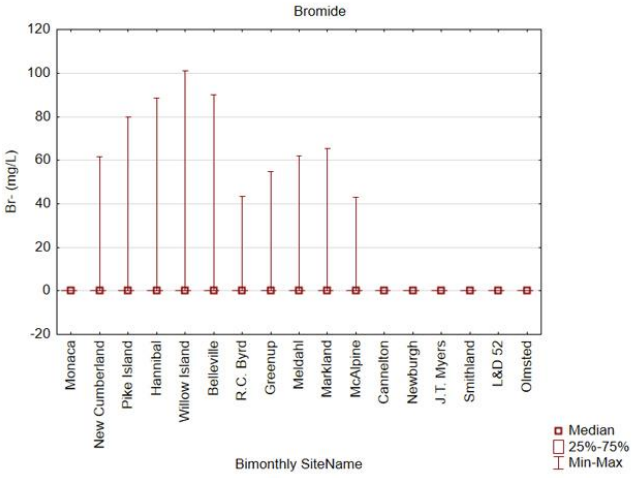
Individual results available at

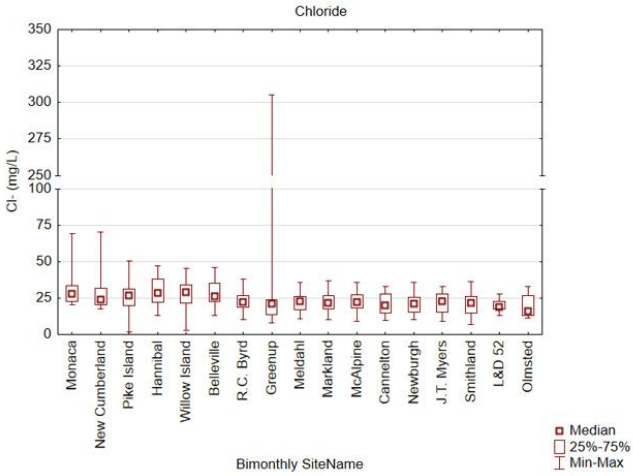
www.orsanco.org/programs/bimonthly-water-quality-sampling

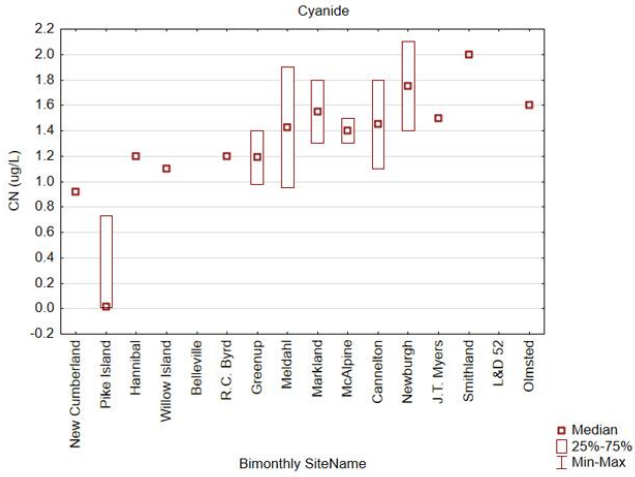
and

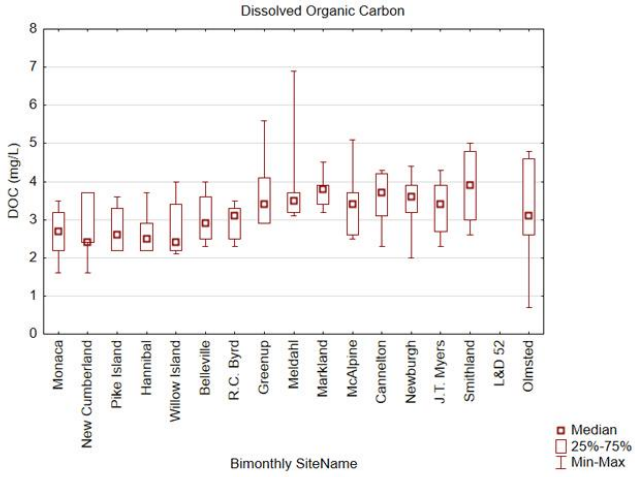
www.orsanco.org/data/clean-metals

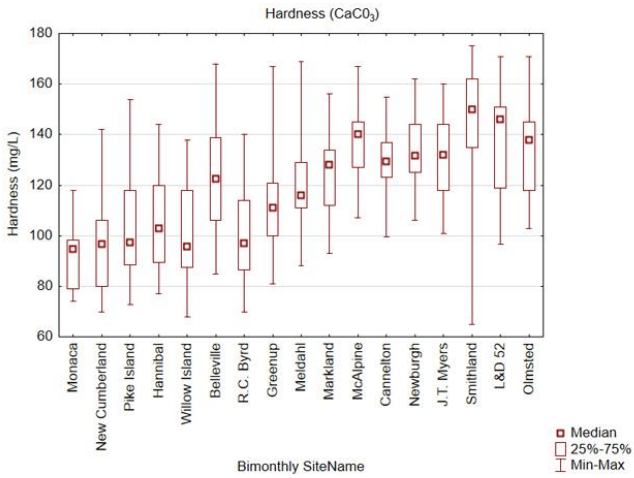
Appendix B: Bimonthly Parameter Boxplots

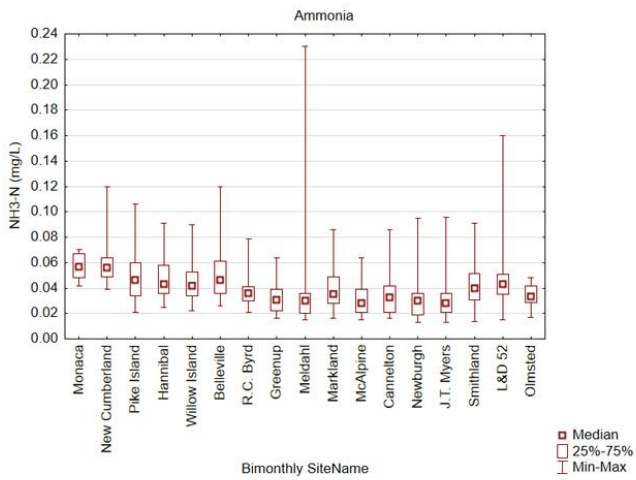




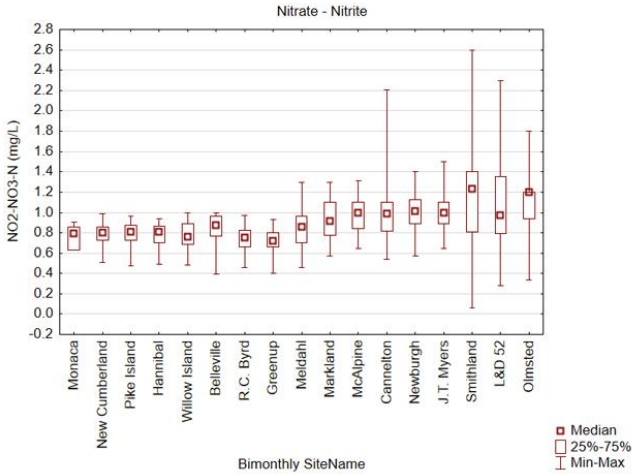


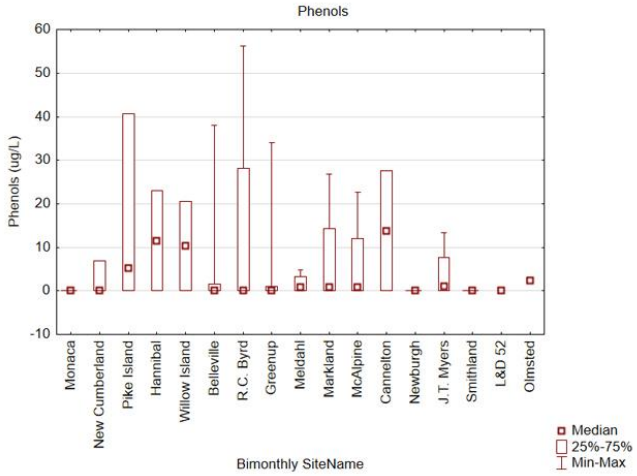


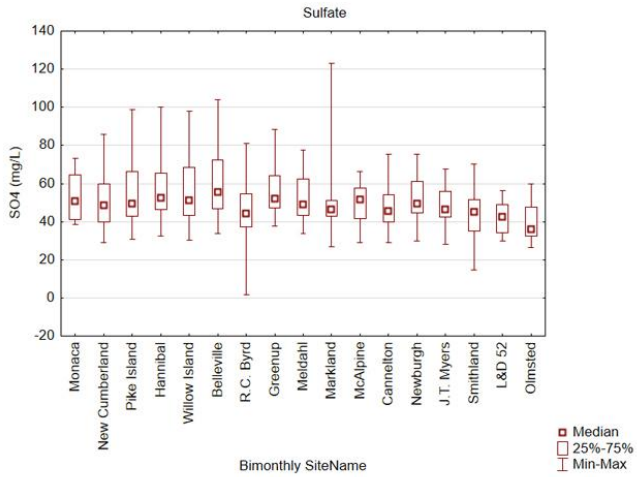


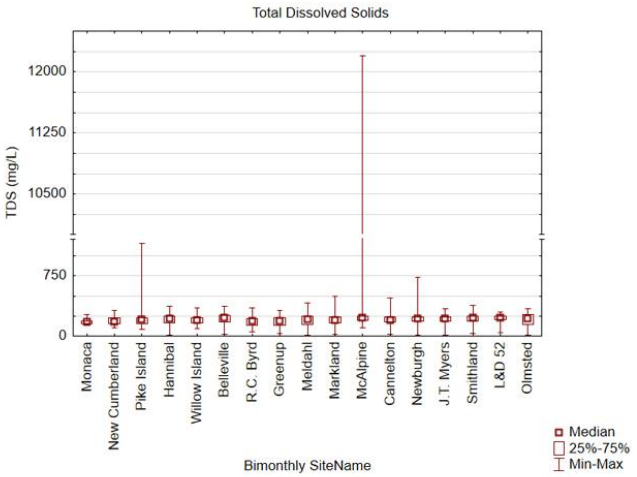


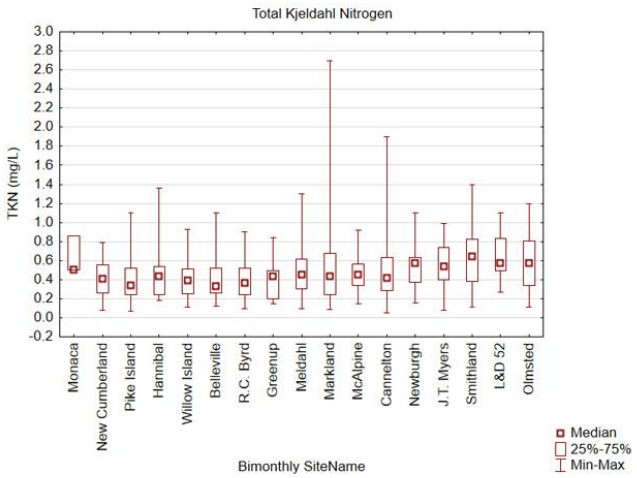
Appendix B: Bimonthly Parameter Boxplots

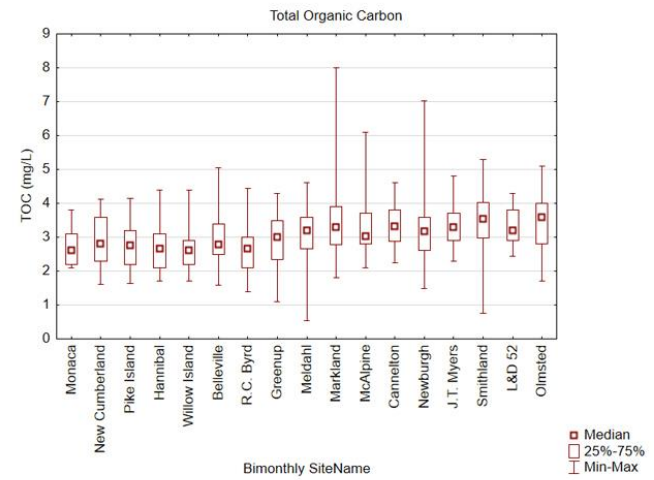




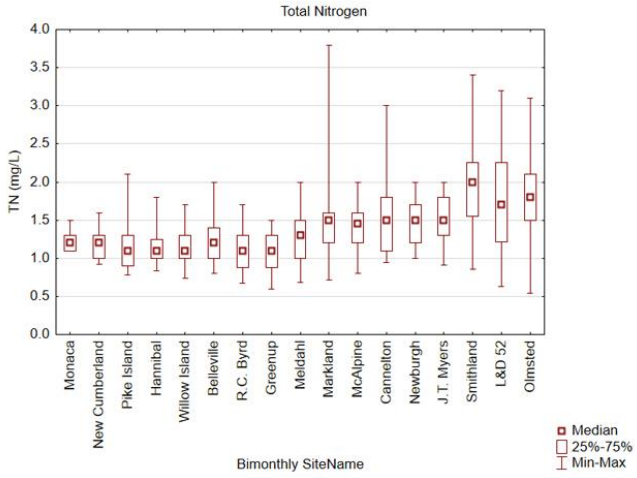


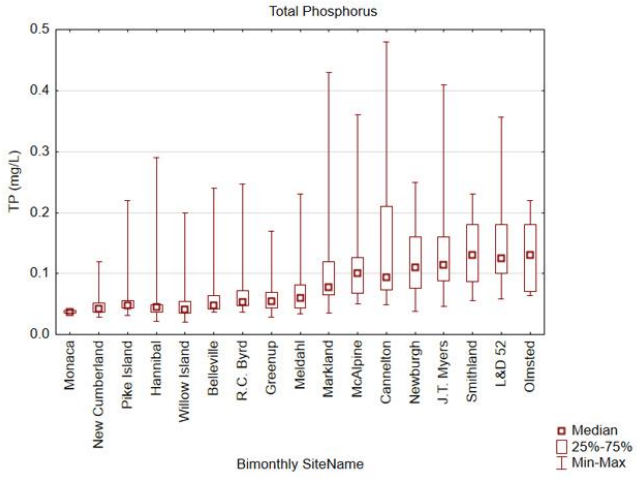


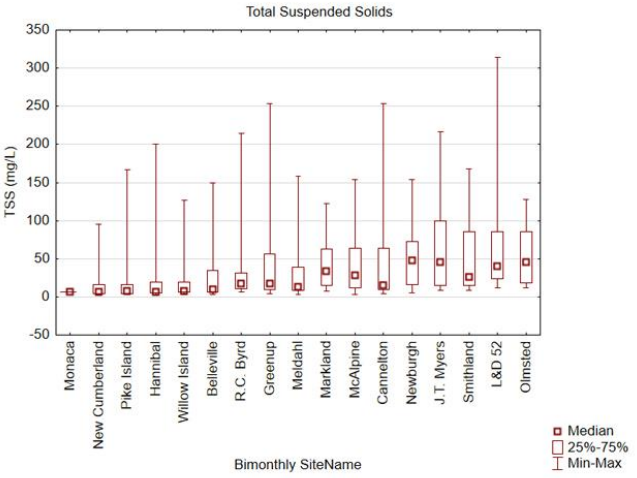




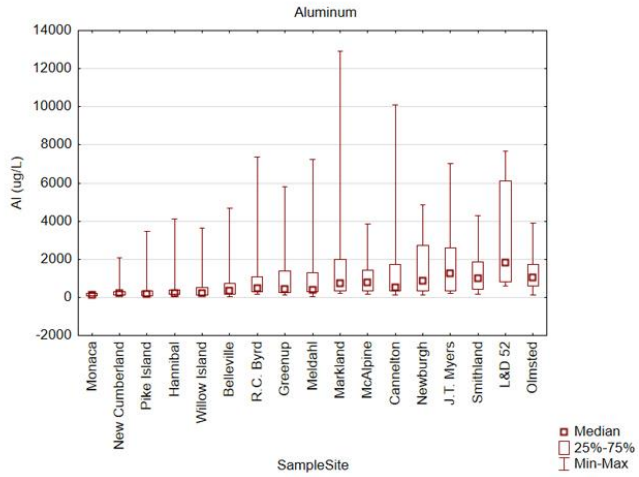
Appendix B: Bimonthly Parameter Boxplots

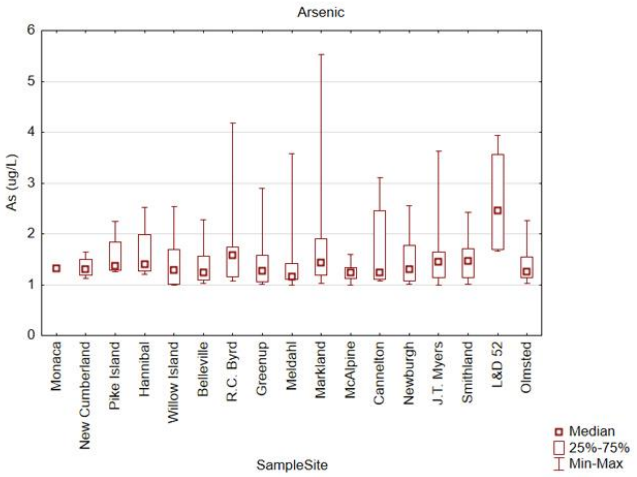


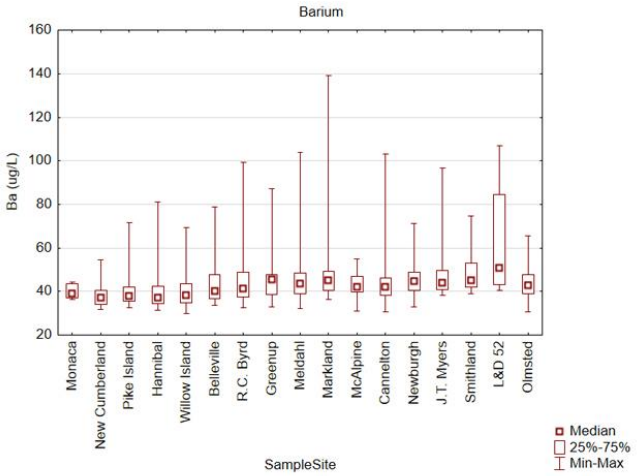


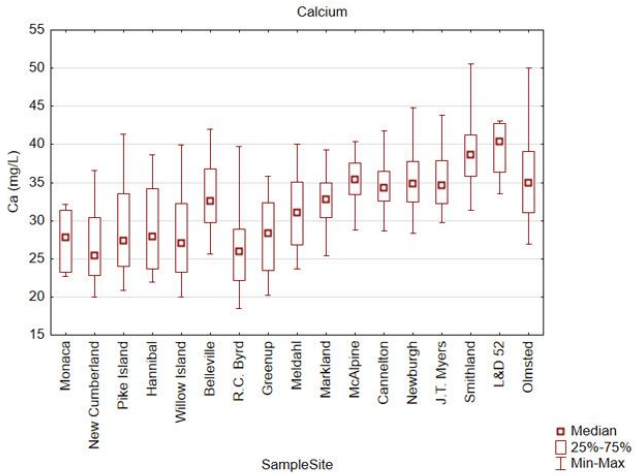


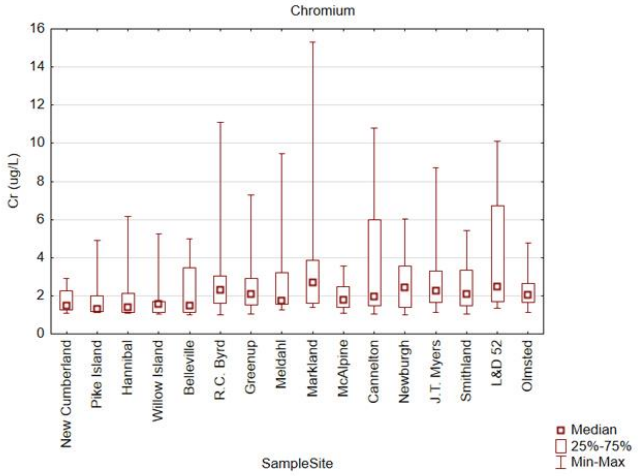
Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots

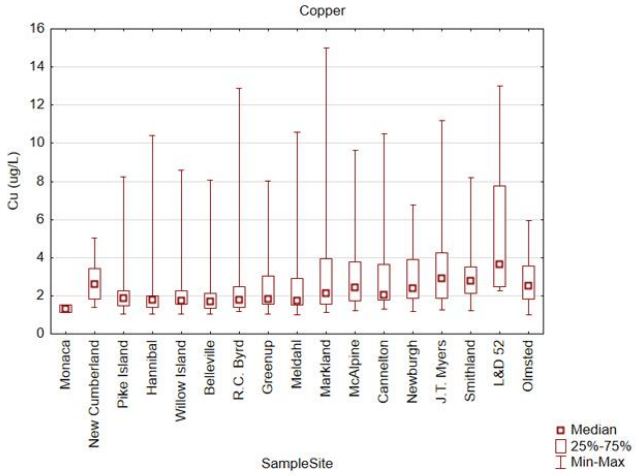




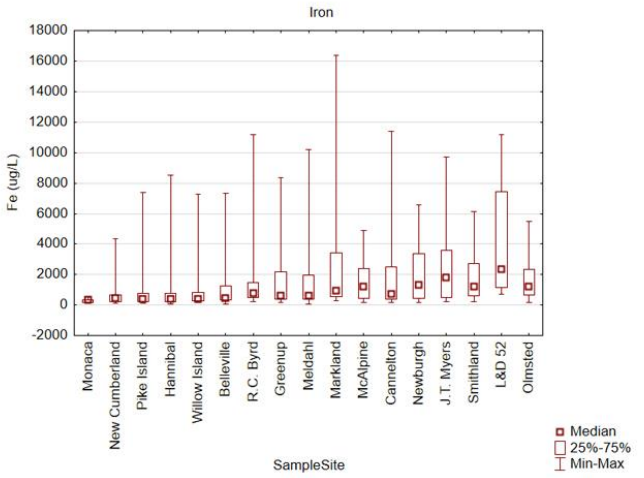


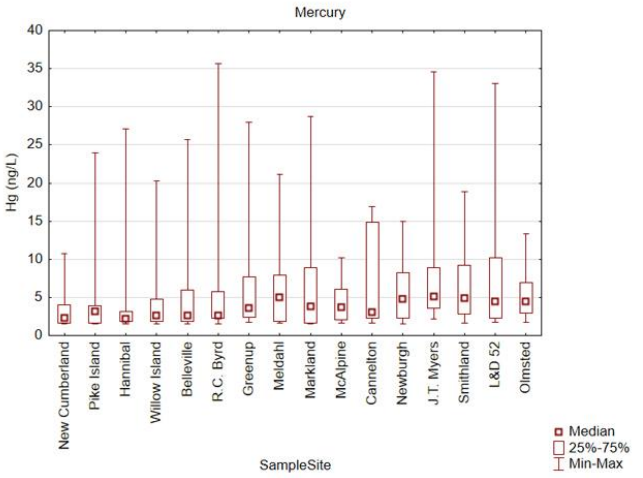


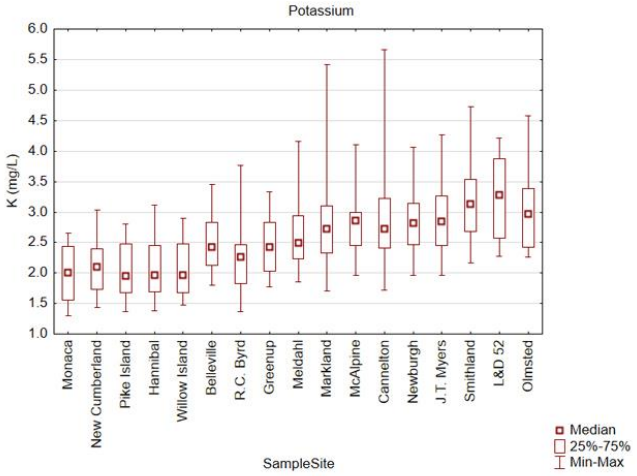


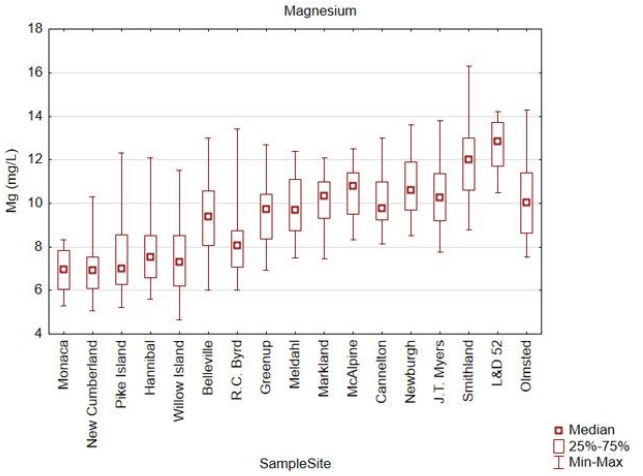


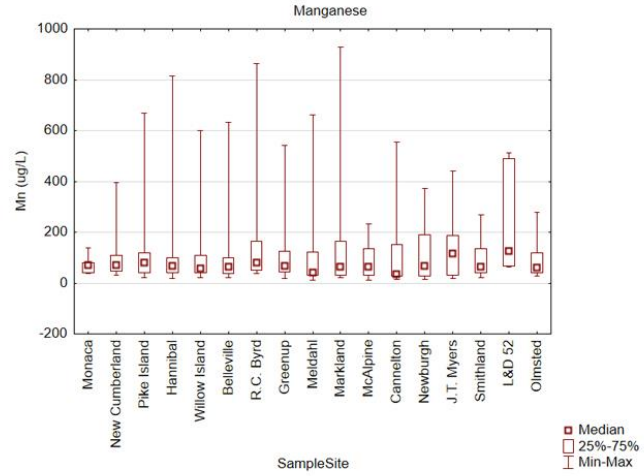
Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots

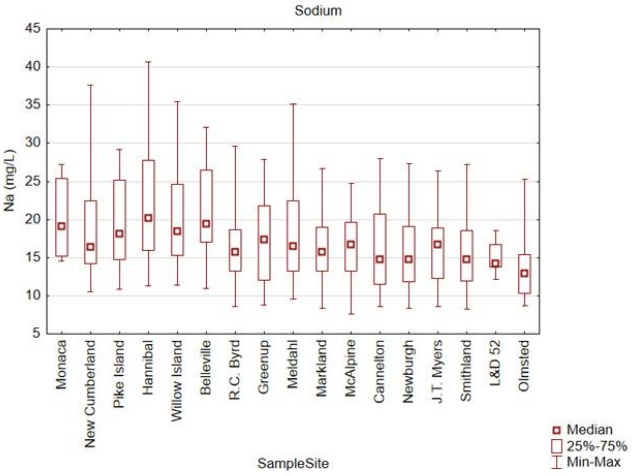




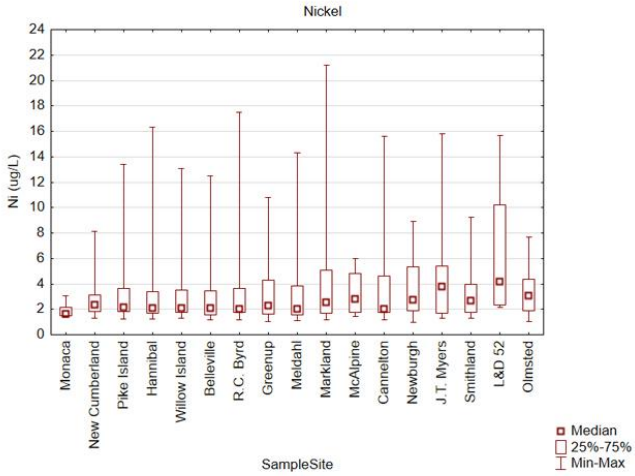


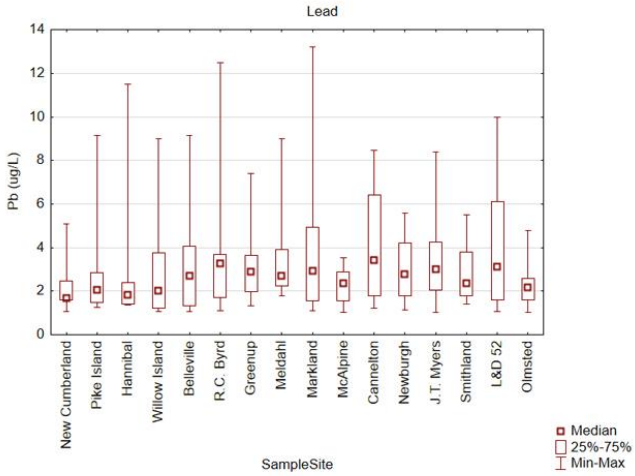


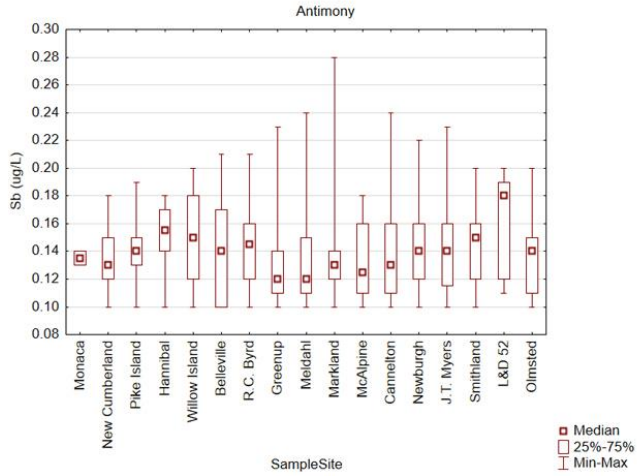


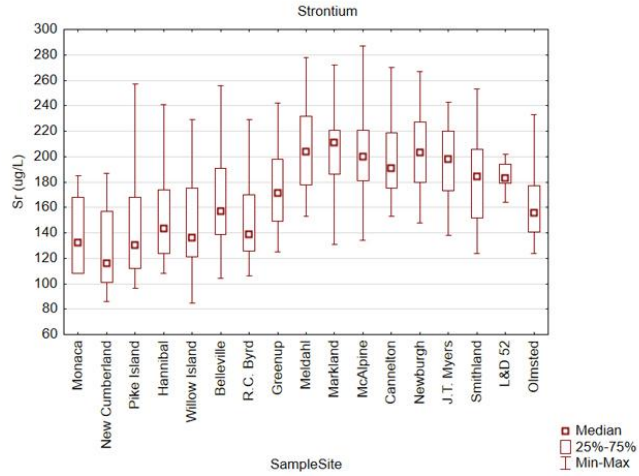


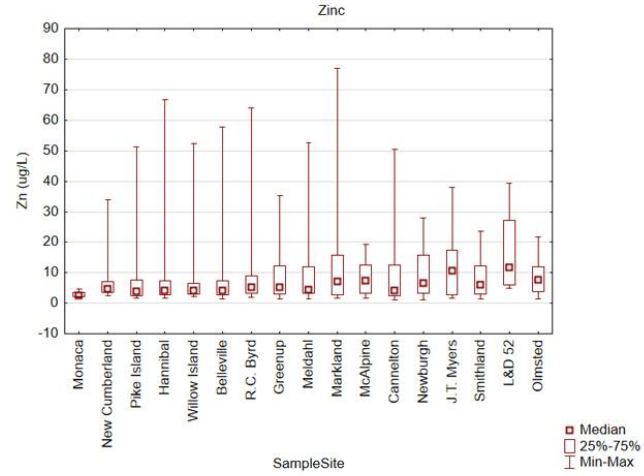
Appendix B: Clean Metals (Total Recoverable) Parameter Boxplots











APPENDIX C

Biological Indicator Results

Fish and Macroinvertebrates, 2018-2022

Detailed population data available at

www.orsanco.org/data/fish-population

and

www.orsanco.org/data/macroinvertebrates

Appendix C: Biological Indicator Results – Fish and Macroinvertebrates 2018-2022

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
1.5	Emsworth	2018	B	12.82	Poor	38.66	Good	sites in Emsworth pool.
2.8	Emsworth	2018	B	40.00	Good	27.29	Fair	Includes nine sites (scores
3.7	Emsworth	2018	B	14.90	Poor	26.66	Fair	not shown) on the two
5.3	Emsworth	2018	B	9.43	Very Poor	45.55	Very Good	major tributaries to the
5.8	Emsworth	2018	B	7.77	Very Poor	45.86	Very Good	Ohio (Monongahela &
average pool values*				27.83	Fair	35.85	Good	**Fully Supporting**
6.5	Dashields	2021	A	24.27	Fair	29.85	Fair	
6.8	Dashields	2021	C	18.73	Poor	37.90	Good	
7.2	Dashields	2021	C	19.09	Poor	27.52	Fair	
7.5	Dashields	2021	C	27.30	Fair	36.53	Good	
7.9	Dashields	2021	C	46.37	Very Good	41.02	Very Good	
8.7	Dashields	2021	B	37.19	Good	23.87	Fair	
9.4	Dashields	2021	C	34.44	Good	12.09	Poor	
9.6	Dashields	2021	B	36.13	Good	38.43	Good	
10.4	Dashields	2021	C	30.54	Good	35.42	Good	
10.8	Dashields	2021	C	40.85	Very Good	23.59	Fair	
11.2	Dashields	2021	B	29.13	Fair	26.41	Fair	
11.8	Dashields	2021	D	31.00	Good	20.94	Fair	
12.1	Dashields	2021	B	36.72	Good	19.56	Poor	
12.4	Dashields	2021	B	37.91	Good	18.97	Poor	
12.5	Dashields	2021	C	36.29	Good	37.81	Good	
average pool values				32.40	Good	28.66	Fair	**Fully Supporting**
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	**Not Assessed 2018-2022**
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	**Not Assessed 2018-2022**
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	

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Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn 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	**Not Assessed 2018-2022**
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
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*		**Fully Supporting**
85.1	Hannibal	2021	D	29.16	Fair	60.00	Excellent	
86.8	Hannibal	2021	C	39.63	Good	29.60	Fair	
88.4	Hannibal	2021	C	28.88	Fair	33.72	Good	
94.8	Hannibal	2021	B	36.29	Good	60.00	Excellent	
95.1	Hannibal	2021	B	36.58	Good	11.10	Poor	
97.6	Hannibal	2021	B	32.53	Good	32.94	Good	
100.3	Hannibal	2021	D	45.25	Very Good	51.27	Excellent	
104.1	Hannibal	2021	E	25.47	Fair	25.10	Fair	
106.9	Hannibal	2021	C	35.05	Good	34.83	Good	
108.3	Hannibal	2021	C	38.93	Good	26.60	Fair	
109.4	Hannibal	2021	D	40.70	Very Good	-	-	
111.5	Hannibal	2021	C	23.22	Fair	36.16	Good	
119.8	Hannibal	2021	D	9.28	Very Poor	31.94	Good	
122.7	Hannibal	2021	E	22.33	Fair	32.60	Good	
124.9	Hannibal	2021	B	12.63	Poor	36.01	Good	
average pool values				30.39	Good	35.85	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	**Not Assessed 2018-2022**
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	

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Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Aquatic Life Use Assessment
157.8	Willow Island	**2016**	D	46.40	Very Good	28.92	Fair	**Not Assessed 2018-2022**
160.9	Willow Island	**2016**	B	32.91	Good	13.86	Poor	
average pool values				35.79	Good	28.19	Fair	**Fully Supporting**
163.4	Belleville	2022		20.01	Fair	44.44	Very Good	
169.3	Belleville	2022		35.70	Good	49.25	Very Good	
171.5	Belleville	2022		33.55	Good	37.38624	Good	
174.0	Belleville	2022		31.60	Good	60.00	Excellent	
174.6	Belleville	2022		25.58	Fair	49.25	Very Good	
176.4	Belleville	2022		27.77	Fair	49.38	Very Good	
177.9	Belleville	2022		13.06	Poor	30.47	Good	
182.7	Belleville	2022		25.84	Fair	44.29	Very Good	
184.8	Belleville	2022		13.90	Poor	38.30	Good	
187.2	Belleville	2022		15.23	Poor	-	-	
193.5	Belleville	2022		23.13	Fair	13.86	Poor	
195.6	Belleville	2022		7.63	Very Poor	29.18	Fair	
196.1	Belleville	2022		8.79	Very Poor	17.62	Poor	
198.0	Belleville	2022		7.89	Very Poor	18.82	Poor	
198.7	Belleville	2022		24.03	Fair	30.24	Good	
average pool values				20.91	Fair	36.61	Good	**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 2018-2022**
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**

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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	**Not Assessed 2018-2022**
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	-	-	
340.4	Greenup	**2016**	E	42.22	Very Good	17.85	Poor	
average pool values				44.55	Very Good	22.80	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	**Not Assessed 2018-2022**
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**
442.6	Markland	2021	C	48.79	Very Good	-	-	
444.6	Markland	2021	A	46.88	Very Good	-	-	
450.5	Markland	2021	B	31.79	Good	-	-	
458.1	Markland	2021	D	17.66	Poor	29.08334	Fair	
460.1	Markland	2021	C	40.93	Very Good	-	-	
469.0	Markland	2021	C	45.52	Very Good	32.07	Good	
471.6	Markland	2021	A	9.12	Very Poor	45.42	Very Good	
486.8	Markland	2021	B	49.05	Very Good	15.04	Poor	
493.2	Markland	2021	D	38.59	Good	-	-	
515.5	Markland	2021	B	36.29	Good	31.16	Good	
515.8	Markland	2021	B	38.29	Good	16.93	Poor	
525.1	Markland	2021	D	30.43	Good	18.70	Poor	
525.5	Markland	2021	D	44.27	Very Good	19.61	Poor	
527.0	Markland	2021	C	43.97	Very Good	16.03	Poor	
527.7	Markland	2021	C	50.37	Excellent	25.84	Fair	
average pool values				38.13	Good	24.99	Fair	**Fully Supporting**
536.3	McAlpine	2021	D	25.01	Fair	18.25	Poor	
551.8	McAlpine	2021	D	28.83	Fair	23.90	Fair	

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Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn Biological Condition	Aquatic Life Use Assessment
552.0	McAlpine	2021	C	56.99	Excellent	17.41	Poor	
557.8	McAlpine	2021	C	38.42	Good	-	-	
559.5	McAlpine	2021	D	53.06	Excellent	43.10	Very Good	
571.8	McAlpine	2021	C	44.80	Very Good	19.46	Poor	
576.2	McAlpine	2021	C	35.71	Good	48.82	Very Good	
581.1	McAlpine	2021	D	45.43	Very Good	27.03	Fair	
589.6	McAlpine	2021	C	37.72	Good	20.27	Fair	
589.9	McAlpine	2021	D	37.45	Good	19.00	Poor	
594.6	McAlpine	2021	D	44.52	Very Good	30.74	Good	
595.4	McAlpine	2021	D	40.02	Very Good	41.74	Very Good	
598.8	McAlpine	2021	D	21.49	Fair	20.0377	Fair	
599.5	McAlpine	2021	D	35.31	Good	19.88	Poor	
600.2	McAlpine	2021	D	17.39	Poor	16.12	Poor	
average pool values				37.48	Very Good	26.13	Fair	**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	-	-	
626.3	Cannelton	**2016**	C	46.58	Very Good	-	-	
630.1	Cannelton	**2016**	D	40.19	Very Good	-	-	**Not Assessed 2018-2022**
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	-	-	*Not assessed for macros
680.5	Cannelton	**2016**	D	34.21	Good	17.72	Poor	high flow negatively
702.8	Cannelton	**2016**	E	60.00	Excellent	20.62	Fair	affected sampling.
714.1	Cannelton	**2016**	C	43.55	Very Good	18.39	Poor	Requisite number of
718.1	Cannelton	**2016**	E	46.33	Very Good	14.55	Poor	sites not reached.
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	
744.2	Newburgh	**2017**	D	24.85	Fair	19.48	Poor	**Not Assessed 2018-2022**
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	*Not assessed for macros
753.4	Newburgh	**2017**	D	45.97	Very Good	18.87	Poor	high flow negatively
753.7	Newburgh	**2017**	C	18.20	Poor	22.35	Fair	affected sampling.
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	-	-	

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Mile Point	Pool	Year	Habitat Type	*m* ORFIn Score	mORFIn Biological Condition	ORMIn Score	ORMIn 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	**Not Assessed 2018-2022**
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 macros
886.3	Smithland	2019	E	45.62	Good	24.09	Fair	samples did not pass
887.2	Smithland	2019	D	32.13	Good	23.10	Fair	quality control standards
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**
943.6	Olmsted	2022	D	17.98	Poor	49.02	Very Good	
945.6	Olmsted	2022	D	33.81	Good	35.82	Good	
946.5	Olmsted	2022	D	25.30	Fair	60.00	Excellent	
947.2	Olmsted	2022	D	35.98	Good	40.52	Very Good	
961.1	Olmsted	2022	D	19.20	Poor	-	-	
958.9	Olmsted	2022	D	22.45	Fair	35.46	Good	
957.0	Olmsted	2022	D	28.44	Fair	-	-	
934.0	Olmsted	2022	D	28.25	Fair	48.02813	Very Good	
930.1	Olmsted	2022	D	25.31	Fair	28.95	Fair	
922.4	Olmsted	2022	C	27.21	Fair	43.51	Very Good	
921.2	Olmsted	2022	D	19.74	Poor	46.05	Very Good	
925.3	Olmsted	2022	D	17.48	Poor	58.33	Excellent	
924.7	Olmsted	2022	C	19.52	Poor	34.74	Good	
956.2	Olmsted	2022	D	20.95	Fair	43.11304	Very Good	
956.5	Olmsted	2022	C	28.72	Fair	42.01	Very Good	
average pool values				24.69	Good	43.50	Very 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 2024 Biennial Assessment of Ohio River Water Quality Conditions
(For the period Jan. 1, 2018 – Dec. 31, 2022)

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 2018, 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 2018, 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 2018, 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, 2018-2022

Shaded areas denote when data were qualified or not collected

Detailed bacteria data available at
www.orsanco.org/programs/contact-recreation-bacteria

Appendix E: Bacteria Data - Monthly Geo Mean Results 2018-2022

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL	State Criteria Applied No./100mL
1.4M	Pittsburgh	Apr-18			
4.3	Pittsburgh	Apr-18			
1.4M	Pittsburgh	May-18		117	126
4.3	Pittsburgh	May-18		74	126
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	126
4.3	Pittsburgh	Aug-18		154	126
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	527	130
92.8	Wheeling	Apr-18	452	645	130
86.8	Wheeling	May-18	39	60	130
92.8	Wheeling	May-18	91	90	130
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	155	172	130
92.8	Wheeling	Oct-18	104	137	130
305.1	Huntington	Apr-18	129	256	130
314.8	Huntington	Apr-18	126	530	130
305.1	Huntington	May-18	67	70	130
314.8	Huntington	May-18	46	184	130
305.1	Huntington	Jun-18	55	111	130
314.8	Huntington	Jun-18	48	170	130
305.1	Huntington	Jul-18	27	91	130
314.8	Huntington	Jul-18	33	275	130
305.1	Huntington	Aug-18	21	68	130
314.8	Huntington	Aug-18	17	61	130
305.1	Huntington	Sep-18	360	472	130
314.8	Huntington	Sep-18	476	598	130
305.1	Huntington	Oct-18	55	102	130
314.8	Huntington	Oct-18	79	252	130
462.6	Cincinnati	Apr-18		195	126
470	Cincinnati	Apr-18		860	126
477.5	Cincinnati	Apr-18		469	126
462.6	Cincinnati	May-18		134	126
470	Cincinnati	May-18		187	126
477.5	Cincinnati	May-18		123	126
462.6	Cincinnati	Jun-18		118	126
470	Cincinnati	Jun-18		169	126
477.5	Cincinnati	Jun-18		146	126

Appendix E: Bacteria Data - Monthly Geo Mean Results 2018-2022

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL	State Criteria Applied No./100mL
462.6	Cincinnati	Jul-18		71	126
470	Cincinnati	Jul-18		102	126
477.5	Cincinnati	Jul-18		43	126
462.6	Cincinnati	Aug-18		36	126
470	Cincinnati	Aug-18		106	126
477.5	Cincinnati	Aug-18		102	126
462.6	Cincinnati	Sep-18		352	126
470	Cincinnati	Sep-18		348	126
477.5	Cincinnati	Sep-18		426	126
462.6	Cincinnati	Oct-18		37	126
470	Cincinnati	Oct-18		43	126
477.5	Cincinnati	Oct-18		39	126
594	Louisville	Apr-18		588	130
619.3	Louisville	Apr-18		301	130
594	Louisville	May-18		73	130
619.3	Louisville	May-18		68	130
594	Louisville	Jun-18		122	130
619.3	Louisville	Jun-18		529	130
594	Louisville	Jul-18		262	130
619.3	Louisville	Jul-18		120	130
594	Louisville	Aug-18		44	130
619.3	Louisville	Aug-18		116	130
594	Louisville	Sep-18		235	130
619.3	Louisville	Sep-18		321	130
594	Louisville	Oct-18		82	130
619.3	Louisville	Oct-18		64	130
791.5	Evansville	Apr-18		234	125
793.3	Evansville	Apr-18		392	125
791.5	Evansville	May-18		82	125
793.3	Evansville	May-18		106	125
791.5	Evansville	Jun-18		662	125
793.3	Evansville	Jun-18		717	125
791.5	Evansville	Jul-18		238	125
793.3	Evansville	Jul-18		304	125
791.5	Evansville	Aug-18		62	125
793.3	Evansville	Aug-18		47	125
791.5	Evansville	Sep-18		94	125
793.3	Evansville	Sep-18		106	125
791.5	Evansville	Oct-18		46	125
793.3	Evansville	Oct-18		41	125
1.4M	Pittsburgh	Apr-19			
4.3	Pittsburgh	Apr-19			
1.4M	Pittsburgh	May-19		131	126
4.3	Pittsburgh	May-19		181	126
1.4M	Pittsburgh	Jun-19			
4.3	Pittsburgh	Jun-19			
1.4M	Pittsburgh	Jul-19			
4.3	Pittsburgh	Jul-19			
1.4M	Pittsburgh	Aug-19		134	126
4.3	Pittsburgh	Aug-19		108	126
1.4M	Pittsburgh	Sep-19		86	126

Appendix E: Bacteria Data - Monthly Geo Mean Results 2018-2022

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL	State Criteria Applied No./100mL
4.3	Pittsburgh	Sep-19		92	126
1.4M	Pittsburgh	Oct-19		405	126
4.3	Pittsburgh	Oct-19		351	126
86.8	Wheeling	Apr-19	380	123	130
92.8	Wheeling	Apr-19	452	191	130
86.8	Wheeling	May-19	39	83	130
92.8	Wheeling	May-19	91	141	130
86.8	Wheeling	Jun-19		253	130
92.8	Wheeling	Jun-19		517	130
86.8	Wheeling	Jul-19		125	130
92.8	Wheeling	Jul-19		191	130
86.8	Wheeling	Aug-19		29	130
92.8	Wheeling	Aug-19		14	130
86.8	Wheeling	Sep-19		37	130
92.8	Wheeling	Sep-19		39	130
86.8	Wheeling	Oct-19			
92.8	Wheeling	Oct-19			
305.1	Huntington	Apr-19		45	130
314.8	Huntington	Apr-19		133	130
305.1	Huntington	May-19		155	130
314.8	Huntington	May-19		194	130
305.1	Huntington	Jun-19		360	130
314.8	Huntington	Jun-19		410	130
305.1	Huntington	Jul-19		59	130
314.8	Huntington	Jul-19		204	130
305.1	Huntington	Aug-19		33	130
314.8	Huntington	Aug-19		99	130
305.1	Huntington	Sep-19		13	130
314.8	Huntington	Sep-19		18	130
305.1	Huntington	Oct-19		27	130
314.8	Huntington	Oct-19		44	130
462.6	Cincinnati	Apr-19		139	126
470	Cincinnati	Apr-19		165	126
477.5	Cincinnati	Apr-19		164	126
462.6	Cincinnati	May-19		106	126
470	Cincinnati	May-19		136	126
477.5	Cincinnati	May-19		80	126
462.6	Cincinnati	Jun-19		432	126
470	Cincinnati	Jun-19		667	126
477.5	Cincinnati	Jun-19		444	126
462.6	Cincinnati	Jul-19		70	126
470	Cincinnati	Jul-19		145	126
477.5	Cincinnati	Jul-19		236	126
462.6	Cincinnati	Aug-19		26	126
470	Cincinnati	Aug-19		87	126
477.5	Cincinnati	Aug-19		31	126
462.6	Cincinnati	Sep-19		7	126
470	Cincinnati	Sep-19		8	126
477.5	Cincinnati	Sep-19		18	126
462.6	Cincinnati	Oct-19		4	126
470	Cincinnati	Oct-19		7	126

Appendix E: Bacteria Data - Monthly Geo Mean Results 2018-2022

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL	State Criteria Applied No./100mL
477.5	Cincinnati	Oct-19		9	126
594	Louisville	Apr-19		318	130
619.3	Louisville	Apr-19		315	130
594	Louisville	May-19		166	130
619.3	Louisville	May-19		155	130
594	Louisville	Jun-19		621	130
619.3	Louisville	Jun-19		799	130
594	Louisville	Jul-19		123	130
619.3	Louisville	Jul-19		108	130
594	Louisville	Aug-19		67	130
619.3	Louisville	Aug-19		360	130
594	Louisville	Sep-19		22	130
619.3	Louisville	Sep-19		28	130
594	Louisville	Oct-19		8	130
619.3	Louisville	Oct-19		9	130
791.5	Evansville	Apr-19		255	125
793.3	Evansville	Apr-19		178	125
791.5	Evansville	May-19		48	125
793.3	Evansville	May-19		31	125
791.5	Evansville	Jun-19		207	125
793.3	Evansville	Jun-19		230	125
791.5	Evansville	Jul-19		138	125
793.3	Evansville	Jul-19		157	125
791.5	Evansville	Aug-19		97	125
793.3	Evansville	Aug-19		127	125
791.5	Evansville	Sep-19		37	125
793.3	Evansville	Sep-19		44	125
791.5	Evansville	Oct-19		14	125
793.3	Evansville	Oct-19		28	125
1.4M	Pittsburgh	Apr-20			
4.3	Pittsburgh	Apr-20			
1.4M	Pittsburgh	May-20			
4.3	Pittsburgh	May-20			
1.4M	Pittsburgh	Jun-20			
4.3	Pittsburgh	Jun-20			
1.4M	Pittsburgh	Jul-20			
4.3	Pittsburgh	Jul-20			
1.4M	Pittsburgh	Aug-20			
4.3	Pittsburgh	Aug-20			
1.4M	Pittsburgh	Sep-20			
4.3	Pittsburgh	Sep-20			
1.4M	Pittsburgh	Oct-20			
4.3	Pittsburgh	Oct-20			
86.8	Wheeling	Apr-20			
92.8	Wheeling	Apr-20			
86.8	Wheeling	May-20			
92.8	Wheeling	May-20			
86.8	Wheeling	Jun-20		10	130
92.8	Wheeling	Jun-20		77	130
86.8	Wheeling	Jul-20		10	130
92.8	Wheeling	Jul-20		200	130

Appendix E: Bacteria Data - Monthly Geo Mean Results 2018-2022

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL	State Criteria Applied No./100mL
86.8	Wheeling	Aug-20		11	130
92.8	Wheeling	Aug-20		127	130
86.8	Wheeling	Sep-20		18	130
92.8	Wheeling	Sep-20		95	130
86.8	Wheeling	Oct-20		13	130
92.8	Wheeling	Oct-20		209	130
305.1	Huntington	Apr-20			
314.8	Huntington	Apr-20			
305.1	Huntington	May-20		188	130
314.8	Huntington	May-20		637	130
305.1	Huntington	Jun-20		49	130
314.8	Huntington	Jun-20		243	130
305.1	Huntington	Jul-20		35	130
314.8	Huntington	Jul-20		50	130
305.1	Huntington	Aug-20		43	130
314.8	Huntington	Aug-20		89	130
305.1	Huntington	Sep-20		39	130
314.8	Huntington	Sep-20		855	130
305.1	Huntington	Oct-20		26	130
314.8	Huntington	Oct-20		213	130
462.6	Cincinnati	Apr-20			
470	Cincinnati	Apr-20			
477.5	Cincinnati	Apr-20			
462.6	Cincinnati	May-20		634	126
470	Cincinnati	May-20		633	126
477.5	Cincinnati	May-20		839	126
462.6	Cincinnati	Jun-20		60	126
470	Cincinnati	Jun-20		141	126
477.5	Cincinnati	Jun-20		123	126
462.6	Cincinnati	Jul-20		37	126
470	Cincinnati	Jul-20		420	126
477.5	Cincinnati	Jul-20		119	126
462.6	Cincinnati	Aug-20		7	126
470	Cincinnati	Aug-20		15	126
477.5	Cincinnati	Aug-20		23	126
462.6	Cincinnati	Sep-20		7	126
470	Cincinnati	Sep-20		21	126
477.5	Cincinnati	Sep-20		42	126
462.6	Cincinnati	Oct-20		15	126
470	Cincinnati	Oct-20		59	126
477.5	Cincinnati	Oct-20		158	126
594	Louisville	Apr-20			
619.3	Louisville	Apr-20			
594	Louisville	May-20		256	130
619.3	Louisville	May-20		281	130
594	Louisville	Jun-20		135	130
619.3	Louisville	Jun-20		119	130
594	Louisville	Jul-20		34	130
619.3	Louisville	Jul-20		39	130
594	Louisville	Aug-20		24	130
619.3	Louisville	Aug-20		39	130

Appendix E: Bacteria Data - Monthly Geo Mean Results 2018-2022

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL	State Criteria Applied No./100mL
594	Louisville	Sep-20		16	130
619.3	Louisville	Sep-20		21	130
594	Louisville	Oct-20		14	130
619.3	Louisville	Oct-20		27	130
791.5	Evansville	Apr-20			
793.3	Evansville	Apr-20			
791.5	Evansville	May-20		124	125
793.3	Evansville	May-20		130	125
791.5	Evansville	Jun-20		152	125
793.3	Evansville	Jun-20		117	125
791.5	Evansville	Jul-20		33	125
793.3	Evansville	Jul-20		41	125
791.5	Evansville	Aug-20		41	125
793.3	Evansville	Aug-20		188	125
791.5	Evansville	Sep-20		26	125
793.3	Evansville	Sep-20		38	125
791.5	Evansville	Oct-20		72	125
793.3	Evansville	Oct-20		72	125
1.4M	Pittsburgh	Apr-21			
4.3	Pittsburgh	Apr-21			
1.4M	Pittsburgh	May-21			
4.3	Pittsburgh	May-21			
1.4M	Pittsburgh	Jun-21			
4.3	Pittsburgh	Jun-21			
1.4M	Pittsburgh	Jul-21			
4.3	Pittsburgh	Jul-21			
1.4M	Pittsburgh	Aug-21		97	126
4.3	Pittsburgh	Aug-21		108	126
1.4M	Pittsburgh	Sep-21		194	126
4.3	Pittsburgh	Sep-21		156	126
1.4M	Pittsburgh	Oct-21			
4.3	Pittsburgh	Oct-21			
86.8	Wheeling	Apr-21		16	130
92.8	Wheeling	Apr-21		99	130
86.8	Wheeling	May-21		62	130
92.8	Wheeling	May-21		170	130
86.8	Wheeling	Jun-21		13	130
92.8	Wheeling	Jun-21		197	130
86.8	Wheeling	Jul-21		22	130
92.8	Wheeling	Jul-21		359	130
86.8	Wheeling	Aug-21		10	130
92.8	Wheeling	Aug-21		136	130
86.8	Wheeling	Sep-21			
92.8	Wheeling	Sep-21		601	130
86.8	Wheeling	Oct-21			
92.8	Wheeling	Oct-21			
305.1	Huntington	Apr-21		26	130
314.8	Huntington	Apr-21		79	130
305.1	Huntington	May-21		34	130
314.8	Huntington	May-21		125	130
305.1	Huntington	Jun-21		75	130

Appendix E: Bacteria Data - Monthly Geo Mean Results 2018-2022

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL	State Criteria Applied No./100mL
314.8	Huntington	Jun-21		58	130
305.1	Huntington	Jul-21		44	130
314.8	Huntington	Jul-21		77	130
305.1	Huntington	Aug-21		38	130
314.8	Huntington	Aug-21		204	130
305.1	Huntington	Sep-21		16	130
314.8	Huntington	Sep-21		110	130
305.1	Huntington	Oct-21		18	130
314.8	Huntington	Oct-21		175	130
462.6	Cincinnati	Apr-21		8	126
470	Cincinnati	Apr-21		17	126
477.5	Cincinnati	Apr-21		18	126
462.6	Cincinnati	May-21		72	126
470	Cincinnati	May-21		179	126
477.5	Cincinnati	May-21		72	126
462.6	Cincinnati	Jun-21		48	126
470	Cincinnati	Jun-21		122	126
477.5	Cincinnati	Jun-21		102	126
462.6	Cincinnati	Jul-21		36	126
470	Cincinnati	Jul-21		117	126
477.5	Cincinnati	Jul-21		111	126
462.6	Cincinnati	Aug-21		76	126
470	Cincinnati	Aug-21		71	126
477.5	Cincinnati	Aug-21		56	126
462.6	Cincinnati	Sep-21		25	126
470	Cincinnati	Sep-21		28	126
477.5	Cincinnati	Sep-21		34	126
462.6	Cincinnati	Oct-21		16	126
470	Cincinnati	Oct-21		79	126
477.5	Cincinnati	Oct-21		149	126
594	Louisville	Apr-21		34	130
619.3	Louisville	Apr-21		45	130
594	Louisville	May-21		50	130
619.3	Louisville	May-21		90	130
594	Louisville	Jun-21		108	130
619.3	Louisville	Jun-21		293	130
594	Louisville	Jul-21		150	130
619.3	Louisville	Jul-21		188	130
594	Louisville	Aug-21		37	130
619.3	Louisville	Aug-21		70	130
594	Louisville	Sep-21		25	130
619.3	Louisville	Sep-21		25	130
594	Louisville	Oct-21		20	130
619.3	Louisville	Oct-21		23	130
791.5	Evansville	Apr-21		11	125
793.3	Evansville	Apr-21			
791.5	Evansville	May-21		44	125
793.3	Evansville	May-21		74	125
791.5	Evansville	Jun-21		162	125
793.3	Evansville	Jun-21		104	125
791.5	Evansville	Jul-21		25	125

Appendix E: Bacteria Data - Monthly Geo Mean Results 2018-2022

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL	State Criteria Applied No./100mL
793.3	Evansville	Jul-21		144	125
791.5	Evansville	Aug-21		48	125
793.3	Evansville	Aug-21		130	125
791.5	Evansville	Sep-21		64	125
793.3	Evansville	Sep-21		18	125
791.5	Evansville	Oct-21		20	125
793.3	Evansville	Oct-21		72	125
1.4M	Pittsburgh	Apr-22			
4.3	Pittsburgh	Apr-22			
1.4M	Pittsburgh	May-22			
4.3	Pittsburgh	May-22			
1.4M	Pittsburgh	Jun-22			
4.3	Pittsburgh	Jun-22			
1.4M	Pittsburgh	Jul-22		97	126
4.3	Pittsburgh	Jul-22		87	126
1.4M	Pittsburgh	Aug-22		152	126
4.3	Pittsburgh	Aug-22		139	126
1.4M	Pittsburgh	Sep-22			
4.3	Pittsburgh	Sep-22			
1.4M	Pittsburgh	Oct-22		81	126
4.3	Pittsburgh	Oct-22		107	126
86.8	Wheeling	Apr-22	95	109	130
92.8	Wheeling	Apr-22	146	156	130
86.8	Wheeling	May-22	29	42	130
92.8	Wheeling	May-22	146	170	130
86.8	Wheeling	Jun-22			
92.8	Wheeling	Jun-22			
86.8	Wheeling	Jul-22	13	18	130
92.8	Wheeling	Jul-22	227	283	130
86.8	Wheeling	Aug-22	16	14	130
92.8	Wheeling	Aug-22	268	371	130
86.8	Wheeling	Sep-22	11	10	130
92.8	Wheeling	Sep-22	318	386	130
86.8	Wheeling	Oct-22	16	15	130
92.8	Wheeling	Oct-22	111	194	130
305.1	Huntington	Apr-22	17	43	130
314.8	Huntington	Apr-22	255	448	130
305.1	Huntington	May-22	21	82	130
314.8	Huntington	May-22	44	170	130
305.1	Huntington	Jun-22	95	91	130
314.8	Huntington	Jun-22	191	290	130
305.1	Huntington	Jul-22	32	44	130
314.8	Huntington	Jul-22	71	113	130
305.1	Huntington	Aug-22	66	161	130
314.8	Huntington	Aug-22	105	135	130
305.1	Huntington	Sep-22	11	10	130
314.8	Huntington	Sep-22	33	47	130
305.1	Huntington	Oct-22	16	16	130
314.8	Huntington	Oct-22	24	20	130
462.6	Cincinnati	Apr-22		26	126
470	Cincinnati	Apr-22		48	126

Appendix E: Bacteria Data - Monthly Geo Mean Results 2018-2022

Mile Point	Station	Month-Year	Fecal Coliform Concentration Geo Mean No./100mL	*E. coli* Concentration Geo Mean No./100mL	State Criteria Applied No./100mL
793.3	Evansville	Jul-21		144	125
791.5	Evansville	Aug-21		48	125
793.3	Evansville	Aug-21		130	125
791.5	Evansville	Sep-21		64	125
793.3	Evansville	Sep-21		18	125
791.5	Evansville	Oct-21		20	125
793.3	Evansville	Oct-21		72	125
1.4M	Pittsburgh	Apr-22			
4.3	Pittsburgh	Apr-22			
1.4M	Pittsburgh	May-22			
4.3	Pittsburgh	May-22			
1.4M	Pittsburgh	Jun-22			
4.3	Pittsburgh	Jun-22			
1.4M	Pittsburgh	Jul-22		97	126
4.3	Pittsburgh	Jul-22		87	126
1.4M	Pittsburgh	Aug-22		152	126
4.3	Pittsburgh	Aug-22		139	126
1.4M	Pittsburgh	Sep-22			
4.3	Pittsburgh	Sep-22			
1.4M	Pittsburgh	Oct-22		81	126
4.3	Pittsburgh	Oct-22		107	126
86.8	Wheeling	Apr-22	95	109	130
92.8	Wheeling	Apr-22	146	156	130
86.8	Wheeling	May-22	29	42	130
92.8	Wheeling	May-22	146	170	130
86.8	Wheeling	Jun-22			
92.8	Wheeling	Jun-22			
86.8	Wheeling	Jul-22	13	18	130
92.8	Wheeling	Jul-22	227	283	130
86.8	Wheeling	Aug-22	16	14	130
92.8	Wheeling	Aug-22	268	371	130
86.8	Wheeling	Sep-22	11	10	130
92.8	Wheeling	Sep-22	318	386	130
86.8	Wheeling	Oct-22	16	15	130
92.8	Wheeling	Oct-22	111	194	130
305.1	Huntington	Apr-22	17	43	130
314.8	Huntington	Apr-22	255	448	130
305.1	Huntington	May-22	21	82	130
314.8	Huntington	May-22	44	170	130
305.1	Huntington	Jun-22	95	91	130
314.8	Huntington	Jun-22	191	290	130
305.1	Huntington	Jul-22	32	44	130
314.8	Huntington	Jul-22	71	113	130
305.1	Huntington	Aug-22	66	161	130
314.8	Huntington	Aug-22	105	135	130
305.1	Huntington	Sep-22	11	10	130
314.8	Huntington	Sep-22	33	47	130
305.1	Huntington	Oct-22	16	16	130
314.8	Huntington	Oct-22	24	20	130
462.6	Cincinnati	Apr-22		26	126
470	Cincinnati	Apr-22		48	126

Appendix F

Fish Tissue Data

Consumption-Weighted Methylmercury Results 2018-2022

Detailed fish tissue data available at

www.orsanco.org/data/fish-tissue

Appendix F: Fish Tissue Data – Consumption-weighted Methylmercury Results 2018-2022

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)
0.0	Emsworth	2018	Sauger	4	33.8	0.0663	3	**0.083**
2.5	Emsworth	2020	Smallmouth Buffalo	4	33.1	0.0802	5	
2.5	Emsworth	2020	Walleye	4	44	0.1290	2	
2.5	Emsworth	2020	Black Buffalo	3	49	0.2230	3	
1.3	Emsworth	2018	Common Carp	3	52.55	0.0231	2	
1.2	Emsworth	2018	Common Carp	3	52.55	0.0231	2	
2.5	Emsworth	2020	Common Carp	3	57	0.1170	3	
2.5	Emsworth	2020	Freshwater Drum	3	40.6	0.1200	3	
1.4	Emsworth	2018	Smallmouth Buffalo	3	52	0.0291	2	
9.0	Dashields	2020	Hybrid Striped Bass	4	55.3	0.2140	3	**0.140**
9.0	Dashields	2020	Sauger	4	37.5	0.1100	3	
13.0	Dashields	2021	Sauger	4	40.9	0.2580	3	
9.0	Dashields	2020	Smallmouth Buffalo	4	27.1	0.0683	4	
12.0	Dashields	2021	Smallmouth Buffalo	4	36.1	0.1670	3	
11.0	Dashields	2021	Black Buffalo	3	42	0.1820	3	
9.0	Dashields	2020	Bluegill	3	18.2	0.0339	4	
11.5	Dashields	2021	Common Carp	3	51.1	0.1870	3	
9.0	Dashields	2020	Common Carp	3	57.3	0.1070	3	
9.0	Dashields	2020	Freshwater Drum	3	49.2	0.3060	3	
26.0	Montgomery	2019	Channel Catfish	4	37	0.0846	2	**0.193**
26.0	Montgomery	2018	Sauger	4	29.7	0.0350	3	
26.3	Montgomery	2019	Sauger	4	36.2	0.2240	3	
26.0	Montgomery	2021	Sauger	4	42.2	0.2600	3	
14.0	Montgomery	2020	Common Carp	3	55	0.2250	3	
14.0	Montgomery	2020	Freshwater Drum	3	53.5	0.2920	3	
35.3	New Cumberland	2017	Sauger	4	34.2	0.2990	3	**0.136**
50.3	New Cumberland	2017	Common Carp	3	59.4	0.1760	3	
50.3	New Cumberland	2017	Smallmouth Buffalo	3	44	0.0727	3	
50.4	New Cumberland	2017	Walleye	4	41.44	0.1390	5	
52.2	New Cumberland	2017	Channel Catfish	3	39.4	0.0609	3	
52.6	New Cumberland	2017	Common Carp	3	51.6	0.1360	3	
76.0	Pike Island	2018	Channel Catfish	4	40.8	0.0223	3	**0.175**
58.2	Pike Island	2020	Channel Catfish	4	45.5	0.1370	4	
69.0	Pike Island	2019	Channel Catfish	4	45.8	0.0340	4	
74.0	Pike Island	2020	Channel Catfish	4	49	0.1390	4	
58.2	Pike Island	2020	Flathead Catfish	4	41.4	0.1660	4	
58.2	Pike Island	2020	Sauger	4	34.1	0.1570	5	
74.0	Pike Island	2019	Smallmouth Buffalo	4	31	0.0783	5	
74.5	Pike Island	2020	Freshwater Drum	3	29.3	0.1960	5	
58.2	Pike Island	2020	Freshwater Drum	3	46.2	0.2590	3	
58.2	Pike Island	2020	Smallmouth Buffalo	3	47.5	0.2130	3	
74.0	Pike Island	2020	Smallmouth Buffalo	3	48.4	0.2310	5	
105.0	Hannibal	2019	Channel Catfish	4	40.9	0.1850	5	**0.064**
99.2	Hannibal	2019	Channel Catfish	4	43.5	0.0898	1	
102.0	Hannibal	2020	Channel Catfish	4	47.5	0.1620	5	
105.0	Hannibal	2019	Channel Catfish	4	53.2	0.1190	6	
85.0	Hannibal	2020	Flathead Catfish	4	33.3	0.1050	3	
91.0	Hannibal	2020	Hybrid Striped Bass	4	40	0.1090	3	
85.0	Hannibal	2020	Sauger	4	34.6	0.1430	5	
101.7	Hannibal	2018	Sauger	4	37.6	0.0626	2	
90.0	Hannibal	2021	Black Buffalo	3	47.4	0.0210	2	
91.0	Hannibal	2020	Black Buffalo	3	54.5	0.1890	4	
89.5	Hannibal	2021	Common Carp	3	62.2	0.0074	3	
91.0	Hannibal	2020	Silver Redhorse	3	32.9	0.0699	5	
129.0	Willow Island	2020	Channel Catfish	3	30.3	0.0977	3	**0.064**
129.0	Willow Island	2020	Freshwater Drum	3	48.7	0.2440	3	
129.0	Willow Island	2020	Smallmouth Buffalo	3	53.4	0.1520	4	
186.0	Belleville	2020	Flathead Catfish	4	23.4	0.0832	4	**0.231**
202.1	Belleville	2020	Largemouth Bass	4	27.2	0.1330	3	
199.0	Belleville	2022	Largemouth Bass	4	36.75	0.2480	2	
186.0	Belleville	2020	Freshwater Drum	3	56.8	0.3380	3	
186.0	Belleville	2020	Smallmouth Buffalo	3	53	0.2800	4	

Appendix F: Fish Tissue Data – Consumption-weighted Methylmercury Results 2018-2022

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)
221.0	Racine	2020	Channel Catfish	4	40	0.1780	3	
221.0	Racine	2020	Channel Catfish	4	49.8	0.2070	2	
219.5	Racine	2020	Flathead Catfish	4	29.2	0.1170	4	
221.0	Racine	2020	Largemouth Bass	4	32	0.1240	3	
221.0	Racine	2020	Sauger	4	36	0.1860	3	
219.5	Racine	2020	Sauger	4	37.3	0.1760	3	
221.0	Racine	2020	Black Buffalo	3	56.7	0.1920	3	**0.152**
221.0	Racine	2020	Bluegill	3	17	0.0709	3	
219.5	Racine	2020	Common Carp	3	61.3	0.1230	3	
221.0	Racine	2020	Freshwater Drum	3	50.5	0.3450	3	
221.0	Racine	2020	Silver Redhorse	3	39.8	0.0806	2	
219.5	Racine	2020	Smallmouth Buffalo	3	49.6	0.3290	4	
221.0	Racine	2020	White Crappie	3	23.8	0.0834	3	
273.5	R.C. Byrd	2019	Channel Catfish	4	42	0.1460	1	
238.0	R.C. Byrd	2020	Flathead Catfish	4	33.9	0.1720	6	
238.0	R.C. Byrd	2020	Sauger	4	31.9	0.1260	5	
266.2	R.C. Byrd	2019	Sauger	4	35.3	0.2610	3	
265.0	R.C. Byrd	2019	Spotted Bass	4	30.3	0.1840	3	**0.109**
265.7	R.C. Byrd	2020	Bluegill	3	15.5	0.0775	3	
274.7	R.C. Byrd	2019	Channel Catfish	3	33	0.0853	1	
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	
294.0	Greenup	2022	Channel Catfish	4	41	0.1620	3	
317.0	Greenup	2020	Sauger	4	39.5	0.2320	5	**0.157**
292.1	Greenup	2019	Channel Catfish	3	34.8	0.1310	3	
357.3	Meldahl	2018	Channel Catfish	4	37.3	0.0048	3	
357.0	Meldahl	2021	Channel Catfish	4	43.7	0.0991	3	
357.0	Meldahl	2022	Channel Catfish	4	45.33333	0.1330	3	
432.0	Meldahl	2020	Largemouth Bass	4	35.5	0.3250	3	
357.3	Meldahl	2018	Sauger	4	34.9	0.0192	4	
354.0	Meldahl	2021	Sauger	4	35.5	0.2050	1	**0.114**
432.0	Meldahl	2020	Black Buffalo	3	56.7	0.1760	3	
432.0	Meldahl	2020	Black Crappie	3	21	0.0754	3	
432.0	Meldahl	2020	Bluegill	3	14.8	0.0800	4	
432.0	Meldahl	2020	Common Carp	3	56.2	0.1580	3	
432.0	Meldahl	2020	Smallmouth Buffalo	3	41.8	0.1510	3	
432.0	Meldahl	2020	White Crappie	3	28.2	0.1820	3	
439.5	Markland	2018	Channel Catfish	4	39.6	0.0226	3	
440.0	Markland	2021	Channel Catfish	4	42	0.1600	3	
464.0	Markland	2021	Channel Catfish	4	46.7	0.0083	3	
460.0	Markland	2021	Channel Catfish	4	50.1	0.0294	3	
440.0	Markland	2018	Sauger	4	35.9	0.0468	3	
440.0	Markland	2021	Sauger	4	39.4	0.2610	1	
440.0	Markland	2022	Sauger	4	41.15	0.2690	2	
525.0	Markland	2021	Spotted Bass	4	30.7	0.0076	3	
464.0	Markland	2020	Black Buffalo	3	34.5	0.1300	3	
464.0	Markland	2020	Bluegill	3	14.7	0.0277	3	**0.059**
464.0	Markland	2020	Common Carp	3	57.3	0.1530	3	
528.0	Markland	2021	Redear Sunfish	3	20.1	0.0074	3	
487.0	Markland	2021	Smallmouth Buffalo	3	34.3	0.1640	3	
459.0	Markland	2021	Smallmouth Buffalo	3	38	0.1640	3	
459.0	Markland	2021	Smallmouth Buffalo	3	38	0.1150	3	
464.0	Markland	2020	Smallmouth Buffalo	3	53.8	0.3620	3	
464.0	Markland	2020	White Crappie	3	23	0.0633	3	
464.0	Markland	2021	White Crappie	3	33.2	0.3190	3	

Appendix F: Fish Tissue Data – Consumption-weighted Methylmercury Results 2018-2022

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)
578.0	McAlpine	2021	Channel Catfish	4	39	0.0086	3	
575.4	McAlpine	2018	Channel Catfish	4	42.6	0.0158	3	
546.0	McAlpine	2020	Largemouth Bass	4	31.8	0.0829	3	
575.4	McAlpine	2018	Sauger	4	27.5	0.0409	3	
585.0	McAlpine	2021	Smallmouth Buffalo	4	34.3	0.0083	3	
600.0	McAlpine	2021	Spotted Bass	4	33	0.0082	3	
590.0	McAlpine	2021	Spotted Bass	4	33.8	0.0649	3	
546.0	McAlpine	2020	Spotted Bass	4	34.8	0.1950	3	**0.053**
590.0	McAlpine	2021	Black Buffalo	3	64.8	0.0171	3	
547.0	McAlpine	2020	Bluegill	3	13.9	0.0589	4	
558.0	McAlpine	2021	Bluegill	3	15.4	0.0084	5	
597.0	McAlpine	2021	Bluegill	3	15.5	0.0092	5	
546.0	McAlpine	2020	Channel Catfish	3	34.3	0.1850	3	
546.0	McAlpine	2020	Freshwater Drum	3	35.8	0.1570	3	
546.0	McAlpine	2020	Smallmouth Buffalo	3	47.8	0.2330	3	
607.0	Cannelton	2020	Channel Catfish	4	39	0.1330	3	
607.0	Cannelton	2020	Channel Catfish	4	48.2	0.0829	3	
607.0	Cannelton	2020	Hybrid Striped Bass	4	56	0.3030	2	
607.0	Cannelton	2020	Black Buffalo	3	53.3	0.3770	3	**0.201**
608.0	Cannelton	2020	Common Carp	3	68.5	0.1240	3	
607.0	Cannelton	2020	Freshwater Drum	3	44.8	0.1820	3	
607.0	Cannelton	2020	Smallmouth Buffalo	3	43.5	0.2650	3	
773.0	Newburgh	2020	Channel Catfish	4	36	0.1130	3	
756.0	Newburgh	2020	Channel Catfish	4	49.2	0.0930	3	
751.8	Newburgh	2018	Sauger	4	24.8	0.0279	2	
751.5	Newburgh	2018	Sauger	4	24.8	0.0279	2	**0.157**
752.0	Newburgh	2022	Sauger	4	33	0.2900	1	
755.0	Newburgh	2020	Black Buffalo	3	53.3	0.2730	3	
755.0	Newburgh	2020	Smallmouth Buffalo	3	46	0.1650	3	
777.0	J.T. Myers	2022	Sauger	4	28.2	0.1830	3	
777.0	J.T. Myers	2022	Sauger	4	28.86667	0.2060	3	
802.0	J.T. Myers	2020	Black Buffalo	3	52	0.1380	3	
840.0	J.T. Myers	2022	Bluegill	3	14.3	0.1010	2	**0.177**
844.0	J.T. Myers	2022	Bluegill	3	15.56667	0.1140	3	
842.0	J.T. Myers	2022	Bluegill	3	15.625	0.0834	4	
824.0	J.T. Myers	2022	Common Carp	3	56.13334	0.1640	3	
802.0	J.T. Myers	2020	Freshwater Drum	3	45.7	0.3310	3	
888.0	Smithland	2021	Channel Catfish	4	36.5	0.0073	3	
891.9	Smithland	2019	Channel Catfish	4	38.2	0.0902	3	
888.0	Smithland	2022	Channel Catfish	4	48.5	0.4160	1	
891.9	Smithland	2018	Hybrid Striped Bass	4	31.5	0.0356	3	
897.5	Smithland	2019	Spotted Bass	4	30.8	0.2840	2	**0.075**
888.3	Smithland	2018	Redear Sunfish	3	24.4	0.0610	3	
897.5	Smithland	2019	Redear Sunfish	3	24.7	0.1200	3	
897.1	Smithland	2019	Smallmouth Buffalo	3	33	0.0968	3	
890.0	Smithland	2018	Smallmouth Buffalo	3	33.5	0.0281	3	
959.0	Olmsted	2022	Channel Catfish	4	47	0.1050	1	
933.0	Olmsted	2020	Channel Catfish	4	50.3	0.1290	3	
933.0	Olmsted	2020	Smallmouth Buffalo	4	41.5	0.2710	2	
919.0	Olmsted	2020	Spotted Bass	4	37	0.2520	3	**0.210**
934.0	Olmsted	2020	bigmouth buffalo	3	57.8	0.3990	3	
926.0	Olmsted	2020	Black Buffalo	3	46.8	0.2590	3	
919.0	Olmsted	2020	Freshwater Drum	3	52	0.2210	3	
919.0	Olmsted	2020	Smallmouth Buffalo	3	45.7	0.0979	3	
972.0	Open Water	2019	Channel Catfish	4	37	0.0656	2	
974.0	Open Water	2021	Channel Catfish	4	43.6	0.0074	2	
972.0	Open Water	2022	Channel Catfish	4	50.66667	0.1490	3	
974.0	Open Water	2022	Sauger	4	38.75	0.3270	2	**0.126**
972.0	Open Water	2018	Channel Catfish	3	22	0.0423	3	
965.0	Open Water	2022	Common Carp	3	49.83333	0.2360	3	
966.0	Open Water	2022	Freshwater Drum	3	33.96667	0.2310	3	

APPENDIX G

2019 Harmful Algal Bloom Data

Microcystin Results

Appendix G: 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 G: 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 G: 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	Carrolton, 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	-