

2017 Mississippi River Water Quality Sample Data

Station	Sample Time	Sample Type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous	Chemical	
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)
Boom	01/19/2017 09:55	Grab	35	1.2	202.1	370.0	13.40	8.0	0.18	> 100	193	0.10	0.7	23
Boom	02/07/2017 10:05	Grab	25	0.1	246.7	470.9	16.00	7.9	0.22	> 100	183	0.08	0.6	21
Boom	03/16/2017 10:10	Grab	25	1.8	196.0	351.9	15.05	8.0	0.17	70	149	~ 0.04	1.4	95
Boom	04/13/2017 10:35	Grab	47	9.6	227.7	322.2	13.34	8.1	0.15	85	132	< 0.02	1.5	33
Boom	04/27/2017 10:45	Grab	33	10.2	226.6	315.6	12.09	7.9	0.15	71	124	< 0.02	1.7	35
Boom	05/11/2017 10:20	Grab	56	15.8	279.8	339.6	11.27	7.9	0.16	55	140	0.04	1.9	44
Boom	05/25/2017 10:40	Grab	58	14.0	295.1	373.9	11.49	7.9	0.18	68	149	< 0.02	1.4	35
Boom	06/15/2017 10:50	Grab	80	24.3	400.1	405.7	7.98	8.0	0.19	40	151	~ 0.03	2.0	36
Boom	06/29/2017 10:50	Grab	70	20.6	360.5	393.8	8.82	8.1	0.19	66	154	< 0.02	1.6	30
Boom	07/13/2017 10:55	Grab	65	25.5	439.5	435.6	7.13	8.1	0.21	96	154	0.02	1.6	30
Boom	07/27/2017 10:35	Grab	73	25.3	414.5	412.4	7.60	8.3	0.20	80	151	< 0.02		33
Boom	08/09/2017 10:05	Grab	66	23.2	400.7	415.4	8.06	8.3	0.20	73	156	< 0.02	1.8	32
Boom	08/24/2017 10:45	Grab	70	21.4	360.8	387.6	8.84	8.2	0.20	64	144	< 0.02	1.6	57
Boom	09/21/2017 11:05	Grab	63	20.2	369.3	406.6	9.14	8.3	0.20	76	162	< 0.02	1.7	33
Boom	09/29/2017 10:30	Grab	55	17.8	287.7	333.7	9.98	7.6	0.16	56	136	< 0.02	1.3	38
Boom	10/10/2017 11:00	Grab	40	12.4	233.1	307.2	11.60	7.6	0.15	45	111	< 0.02	1.4	44
Boom	10/30/2017 10:07	Grab	36	6.3	254.1	395.3	12.94	7.7	0.19	96	153	< 0.02	1.3	46
Boom	11/13/2017 10:10	Grab	35	1.5	249.5	470.4	14.38	7.9	0.22	> 100	179	~ 0.03	1.5	45
Boom	11/29/2017 10:06	Grab	30	3.0	271.7	468.7	13.47	8.1	0.22	76	176	< 0.02	1.3	28
Boom	12/13/2017 09:56	Grab	25	0.0	269.1	515.0	14.46	8.1	0.24	> 100	202	~ 0.03	1.4	32

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)
Boom	01/19/2017 09:55	Grab	5.7	23.6	~ 0.02	~ 0.01	< 0.02	240	0.69	0.99	< 0.03	16.0	0.6		
Boom	02/07/2017 10:05	Grab	3.2	18.5	~ 0.03	0.02	~ 0.05	256	0.70	1.22	< 0.03	16.2	0.7		
Boom	03/16/2017 10:10	Grab	6.8	12.4	< 0.02	~ 0.01	~ 0.04	168	0.70	0.73	< 0.03	11.1	1.8		
Boom	04/13/2017 10:35	Grab	20.0	11.1	< 0.02	0.01	~ 0.04	138	0.68	0.43	< 0.03	10.9	2.0		
Boom	04/27/2017 10:45	Grab	16.0	11.1	< 0.02	~ 0.01	0.06	140	0.97	0.68	< 0.03	13.7	1.7		
Boom	05/11/2017 10:20	Grab	23.5	11.2	< 0.02	0.01	0.05	152	0.89	0.84	< 0.03	15.9	2.2	< 0.0002	0.0005
Boom	05/25/2017 10:40	Grab	9.7	14.1	~ 0.03	0.03	0.08	176	1.20	1.61	< 0.03	14.1	1.4		
Boom	06/15/2017 10:50	Grab	31.0	16.7	< 0.02	0.02	0.11	172	0.98	1.08	< 0.03	14.4	2.4	< 0.0002	0.0005
Boom	06/29/2017 10:50	Grab	17.0	15.6	~ 0.03	0.02	0.07	168	0.85	0.71	< 0.03	15.6	1.6		
Boom	07/13/2017 10:55	Grab	15.0	18.4	0.03	0.02	0.04	144	0.66	0.45	< 0.03	16.4	1.7	< 0.0002	0.0002
Boom	07/27/2017 10:35	Grab	28.0	18.2	~ 0.02		0.06	149	0.84	0.27	< 0.03	12.2			
Boom	08/09/2017 10:05	Grab	35.0	16.3	< 0.02	< 0.01	0.05	153	0.81	0.18	< 0.03	11.9	2.1	< 0.0002	0.0003
Boom	08/24/2017 10:45	Grab	18.0	12.3	0.06	0.04	0.14	108	1.10	0.66	< 0.03	11.1	1.4		
Boom	09/21/2017 11:05	Grab	16.0	17.1	~ 0.04	0.02	0.08	163	0.74	0.35	< 0.03	13.4	1.7		
Boom	09/29/2017 10:30	Grab	10.0	11.8	~ 0.05	0.03	0.15	119	0.84	0.31	< 0.03	8.3	1.0		
Boom	10/10/2017 11:00	Grab	5.5	8.9	0.07	0.06	0.14	139	1.10	0.62	< 0.03	9.1	1.3		
Boom	10/30/2017 10:07	Grab	9.6	16.0	< 0.02	0.02	~ 0.04	156	0.72	0.80	< 0.03	13.4	1.0		
Boom	11/13/2017 10:10	Grab	7.5	19.6	~ 0.04	< 0.01	0.09	222	0.86	1.35	< 0.03	20.0	1.2	< 0.0002	0.0003
Boom	11/29/2017 10:06	Grab	7.2	17.6	~ 0.02	~ 0.01	~ 0.03	237	0.62	1.10	< 0.03	18.5	0.9		
Boom	12/13/2017 09:56	Grab	7.6	23.7	< 0.02	~ 0.01	~ 0.03	191	0.61	1.25	< 0.03	20.9	1.1		

2017 Mississippi River Water Quality Sample Data continued

Station	Sample Time	Sample type	Total Copper (mg/L)	Total Lead (mg/L)	Total Nickel (mg/L)	Total Zinc (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)	Total Suspended Solids (mg/L)	Volatile Suspended Solids (mg/L)
Boom	01/19/2017 09:55	Grab					274	9.2	~ 2	~ 1
Boom	02/07/2017 10:05	Grab				~ 5	8.5	3	~ 1	
Boom	03/16/2017 10:10	Grab				208	10.2	5	~ 2	
Boom	04/13/2017 10:35	Grab				191	10.4	9	3	
Boom	04/27/2017 10:45	Grab				199	13.4	16	4	
Boom	05/11/2017 10:20	Grab	< 0.0050	0.0003	0.0012	0.0028	213	12.0	14	4
Boom	05/25/2017 10:40	Grab				222	13.4	15	4	
Boom	06/15/2017 10:50	Grab	0.0028	~ 0.0004	0.0015	0.0031	250	9.8	18	6
Boom	06/29/2017 10:50	Grab				247	11.7	14	~ 4	
Boom	07/13/2017 10:55	Grab	0.0009	0.0001	0.0008	0.0013	248	9.0	6	3
Boom	07/27/2017 10:35	Grab				232	9.1	6	~ 3	
Boom	08/09/2017 10:05	Grab	0.0006	~ 0.0003	0.0009	< 0.0050	226	9.7	9	4
Boom	08/24/2017 10:45	Grab				215	10.2	20	~ 5	
Boom	09/21/2017 11:05	Grab				239	9.9	8	3	
Boom	09/29/2017 10:30	Grab				209	11.0	20	7	
Boom	10/10/2017 11:00	Grab				204	12.8	20	~ 5	
Boom	10/30/2017 10:07	Grab				239	10.6	4	~ 2	
Boom	11/13/2017 10:10	Grab	0.0007	~ 0.0002	0.0009	0.0032	294	10.4	7	3
Boom	11/29/2017 10:06	Grab				284	9.1	3	~ 2	
Boom	12/13/2017 09:56	Grab				307	8.4	~ 1	~ 1	

2017 Mississippi River Water Quality Sample Data

Station	Sample Time	Sample Type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous	Chemical	
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)
Meeker	01/19/2017 09:15	Grab	31	0.2	269.6	513.3	17.36	8.2	0.24	> 100	188	0.10	0.9	21
Meeker	02/07/2017 09:20	Grab	25	0.3	253.4	480.2	18.81	8.1	0.23	> 100	193	0.11	1.0	15
Meeker	03/16/2017 09:25	Grab	25	1.2	195.5	358.5	18.35	8.3	0.17	42	153	~ 0.04	1.6	30
Meeker	04/13/2017 09:30	Grab	47	9.9	239.4	336.4	12.87	8.1	0.16	75	132	< 0.02	1.8	32
Meeker	04/27/2017 09:45	Grab	32	10.5	242.7	335.9	11.95	8.0	0.16	61	127	< 0.02	1.9	39
Meeker	05/11/2017 09:20	Grab	52	15.6	297.9	363.1	11.38	7.7	0.17	28	143	~ 0.02	1.4	40
Meeker	05/25/2017 09:15	Grab	58	13.7	294.4	375.8	11.42	8.1	0.18	60	152	< 0.02	1.5	35
Meeker	06/15/2017 09:25	Grab	75	23.9	408.8	417.2	8.62	8.0	0.20	41	159	0.03	1.5	35
Meeker	06/29/2017 09:40	Grab	70	20.2	361.1	397.2	8.98	7.9	0.19	63	153	< 0.02	1.5	29
Meeker	07/13/2017 09:55	Grab	65	26.2	452.8	442.6	8.29	8.2	0.21	91	159	< 0.02	1.9	30
Meeker	07/27/2017 09:35	Grab	73	25.6	424.8	420.5	8.14	8.4	0.20	76	152	< 0.02		41
Meeker	08/09/2017 09:15	Grab	70	24.2	415.0	421.6	8.47	8.4	0.20	67	157	< 0.02	1.9	38
Meeker	08/24/2017 09:30	Grab	68	21.4	377.4	405.0	9.55	8.2	0.20	46	152	< 0.02	1.7	35
Meeker	09/21/2017 09:30	Grab	63	19.9	372.0	412.3	9.49	7.9	0.20	71	178	< 0.02	1.5	32
Meeker	09/29/2017 09:40	Grab	55	17.9	297.6	344.7	10.39	7.8	0.17	45	137	< 0.02	1.5	36
Meeker	10/10/2017 09:45	Grab	40	12.6	233.8	306.3	12.03	7.5	0.15	37	115	~ 0.02	1.3	41
Meeker	10/30/2017 09:20	Grab	36	6.4	277.5	429.8	14.43	7.8	0.21	50	170	0.02	1.5	48
Meeker	11/13/2017 09:15	Grab	30	1.4	242.0	440.3	14.60	7.2	0.21	> 100	169	~ 0.03	1.4	28
Meeker	11/29/2017 09:22	Grab	30	3.2	264.6	453.8	13.68	7.6	0.22	> 100	167	< 0.02	1.2	26
Meeker	12/13/2017 09:10	Grab	25	0.1	263.2	502.0	14.60	8.0	0.24	> 100	197	< 0.02	1.4	40

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen			Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)
									Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)				
Meeker	01/19/2017 09:15	Grab	2.7	86.7	< 0.02	0.02	< 0.02	232	0.70	1.03	< 0.03	17.5	0.6		
Meeker	02/07/2017 09:20	Grab	3.1	23.4	~ 0.03	0.02	~ 0.05	276	0.70	1.25	< 0.03	17.6	0.7		
Meeker	03/16/2017 09:25	Grab	5.7	15.0	< 0.02	~ 0.01	~ 0.04	200	0.68	0.65	< 0.03	11.7	1.7		
Meeker	04/13/2017 09:30	Grab	23.0	11.9	< 0.02	< 0.01	~ 0.04	144	0.83	0.47	< 0.03	12.2	2.2		
Meeker	04/27/2017 09:45	Grab	17.0	12.4	~ 0.02	0.02	0.06	148	1.00	0.92	< 0.03	15.2	2.0		
Meeker	05/11/2017 09:20	Grab	22.0	12.0	< 0.02	~ 0.01	~ 0.05	160	0.86	0.70	< 0.03	16.7	2.2	< 0.0002	0.0004
Meeker	05/25/2017 09:15	Grab	8.5	13.8	~ 0.02	0.03	0.08	176	1.04	1.48	< 0.03	13.6	1.4		
Meeker	06/15/2017 09:25	Grab	22.5	17.6	0.07	0.02	0.19	176	1.03	1.52	< 0.03	15.1	1.8	< 0.0002	0.0005
Meeker	06/29/2017 09:40	Grab	17.0	16.5	~ 0.04	0.02	0.07	180	0.87	0.59	< 0.03	15.9	1.6		
Meeker	07/13/2017 09:55	Grab	23.0	20.0	~ 0.02	0.01	~ 0.04	149	0.74	0.42	< 0.03	17.4	2.0	< 0.0002	0.0002
Meeker	07/27/2017 09:35	Grab	23.0	19.7	~ 0.02		0.06	148	0.80	0.25	< 0.03	12.6			
Meeker	08/09/2017 09:15	Grab	40.0	18.3	< 0.02	< 0.01	0.08	143	0.92	0.14	< 0.03	12.6	2.4	< 0.0002	0.0003
Meeker	08/24/2017 09:30	Grab	21.0	13.3	0.05	0.05	0.11	136	1.10	0.83	< 0.03	12.9	1.9		
Meeker	09/21/2017 09:30	Grab	16.0	18.9	~ 0.04	0.02	0.08	199	0.71	0.36	< 0.03	14.2	1.5		
Meeker	09/29/2017 09:40	Grab	14.0	12.9	~ 0.05	0.03	0.08	146	0.80	0.30	< 0.03	8.9	1.2		
Meeker	10/10/2017 09:45	Grab	10.0	9.5	0.06	0.06	0.11	138	1.00	0.68	< 0.03	9.6	1.2		
Meeker	10/30/2017 09:20	Grab	9.6	16.6	0.03	0.02	0.05	173	0.79	1.01	< 0.03	16.6	1.4		
Meeker	11/13/2017 09:15	Grab	6.0	19.4	~ 0.03	< 0.01	~ 0.04	187	0.77	1.10	< 0.03	17.0	1.2	< 0.0002	0.0002
Meeker	11/29/2017 09:22	Grab		18.0	~ 0.03	~ 0.01	~ 0.02	172	0.67	0.96	< 0.03	16.6	0.9		
Meeker	12/13/2017 09:10	Grab	6.7	23.8	~ 0.03	~ 0.01	~ 0.03	139	0.60	1.22	< 0.03	19.1	1.0		

2017 Mississippi River Water Quality Sample Data continued

Station	Sample Time	Sample type	Total Copper (mg/L)	Total Lead (mg/L)	Total Nickel (mg/L)	Total Zinc (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)	Total Suspended Solids (mg/L)	Volatile Suspended Solids (mg/L)
Meeker	01/19/2017 09:15	Grab					304	8.6	~ 2	~ 1
Meeker	02/07/2017 09:20	Grab					273	8.2	~ 2	~ 1
Meeker	03/16/2017 09:25	Grab					211	10.4	6	~ 2
Meeker	04/13/2017 09:30	Grab					202	10.7	10	3
Meeker	04/27/2017 09:45	Grab					201	12.4	17	5
Meeker	05/11/2017 09:20	Grab	< 0.0050	~ 0.0003	0.0012	0.0024	102	11.7	15	4
Meeker	05/25/2017 09:15	Grab					228	12.8	16	4
Meeker	06/15/2017 09:25	Grab	0.0009	0.0004	0.0013	0.0028	255	10.0	17	~ 5
Meeker	06/29/2017 09:40	Grab					240	11.3	10	~ 4
Meeker	07/13/2017 09:55	Grab	0.0024	~ 0.0001	0.0008	~ 0.0014	248	9.0	8	4
Meeker	07/27/2017 09:35	Grab					232	9.4	8	~ 4
Meeker	08/09/2017 09:15	Grab	0.0007	0.0003	0.0009	< 0.0050	227	9.8	11	6
Meeker	08/24/2017 09:30	Grab					223	10.2	26	7
Meeker	09/21/2017 09:30	Grab					254	9.8	7	3
Meeker	09/29/2017 09:40	Grab					213	10.9	21	6
Meeker	10/10/2017 09:45	Grab					202	13.7	21	~ 4
Meeker	10/30/2017 09:20	Grab					261	10.4	7	3
Meeker	11/13/2017 09:15	Grab	0.0013	~ 0.0002	0.0008	0.0019	272	10.7	6	3
Meeker	11/29/2017 09:22	Grab					269	8.7	3	~ 2
Meeker	12/13/2017 09:10	Grab					282	8.2	3	~ 1

2017 Mississippi River Water Quality Sample Data

Station	Sample Time	Sample Type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous	Chemical	
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Biological Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)
Ford	04/13/2017 09:20	Grab	47	10.0	239.0	334.9	13.11	8.1	0.16	78	134	< 0.02	1.8	33
Ford	07/13/2017 09:40	Grab	65	26.8	459.1	443.7	7.88	8.1	0.21	84	159	< 0.02	2.2	31
Ford	10/10/2017 09:25	Grab	40	12.7	235.8	308.1	12.08	7.2	0.15	40	112	< 0.02	1.4	48

Station	Sample Time	Sample Type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous	Chemical	
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Biological Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)
MWMO	01/19/2017 10:15	Grab	35	1.2	252.6	462.4	14.14	8.2	0.22	> 100	176	0.10	0.7	25
MWMO	02/07/2017 10:35	Grab	25	-0.1	237.8	456.1	15.07	8.0	0.22	> 100	182	0.09	0.7	17
MWMO	03/16/2017 10:40	Grab	32	1.6	190.1	344.2	14.88	7.8	0.16	75	144	~ 0.05	1.1	54
MWMO	04/13/2017 10:50	Grab	47	9.9	235.2	330.7	12.22	8.1	0.16	73	131	~ 0.02	1.5	31
MWMO	04/27/2017 10:55	Grab	33	10.1	221.9	310.3	11.31	8.0	0.15	67	123	< 0.02	1.7	35
MWMO	05/11/2017 10:35	Grab	55	15.8	294.3	356.8	10.30	7.9	0.17	54	144	< 0.02	2.0	39
MWMO	05/25/2017 10:55	Grab	58	13.9	290.3	368.5	10.81	7.9	0.18	57	148	~ 0.02	1.4	38
MWMO	06/15/2017 11:00	Grab	80	24.6	408.3	411.1	8.27	8.1	0.20	39	154	~ 0.03	1.9	32
MWMO	06/29/2017 11:10	Grab	65	20.7	359.9	392.3	8.41	8.0	0.19	70	152	< 0.02	1.4	32
MWMO	07/13/2017 11:10	Grab	65	25.6	438.6	433.4	7.31	8.2	0.21	99	154	< 0.02	1.6	31
MWMO	07/27/2017 10:50	Grab	73	25.9	416.9	410.0	8.12	8.4	0.20	72	150	~ 0.02		40
MWMO	08/09/2017 10:15	Grab	66	23.6	403.1	413.9	8.32	8.3	0.20	72	154	< 0.02	1.9	35
MWMO	08/24/2017 11:05	Grab	66	21.7	368.4	393.2	8.92	8.2	0.20	58	144	< 0.02	1.5	40
MWMO	09/21/2017 11:15	Grab	71	20.4	370.6	406.2	9.31	8.3	0.20	80	170	< 0.02	1.6	33
MWMO	09/29/2017 10:45	Grab	55	17.8	291.1	337.5	10.11	7.7	0.16	51	132	< 0.02	1.5	36
MWMO	10/10/2017 11:25	Grab	45	12.4	242.1	319.1	11.59	7.6	0.15	48	118	~ 0.06	1.5	47
MWMO	10/30/2017 10:20	Grab	36	6.3	255.0	396.6	12.91	7.6	0.19	> 100	155	< 0.02	1.3	54
MWMO	11/13/2017 10:30	Grab	35	1.4	224.1	407.8	14.54	8.1	0.19	> 100	162	~ 0.03	1.4	52
MWMO	11/29/2017 10:30	Grab	35	3.0	247.0	425.6	13.08	8.2	0.20	> 100	156	< 0.02	1.3	28
MWMO	12/13/2017 10:19	Grab	25	-0.1	245.4	470.8	14.46	8.3	0.22	> 100	191	< 0.02	1.1	23

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)
Ford	04/13/2017 09:20	Grab	24.0	11.8	< 0.02	< 0.01	0.06	136	0.84	0.44	< 0.03	12.0	2.1		
Ford	07/13/2017 09:40	Grab	30.0	21.2	< 0.02	< 0.01	~ 0.03	155	0.80	0.35	< 0.03	17.2	2.5	< 0.0002	0.0002
Ford	10/10/2017 09:25	Grab	11.0	9.3	0.07	0.06	0.16	142	1.00	0.65	< 0.03	9.2	1.3		

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)
MWMO	01/19/2017 10:15	Grab	4.1	46.7	< 0.02	~ 0.01	< 0.02	212	0.69	1.08	< 0.03	15.8	0.6		
MWMO	02/07/2017 10:35	Grab	3.6	18.7	~ 0.02	0.02	~ 0.05	276	0.73	1.16	< 0.03	15.7	0.7		
MWMO	03/16/2017 10:40	Grab	5.6	12.2	< 0.02	~ 0.01	~ 0.04	184	0.59	0.68	< 0.03	10.1	1.6		
MWMO	04/13/2017 10:50	Grab	21.0	10.8	< 0.02	< 0.01	~ 0.04	136	0.71	0.46	< 0.03	11.9	2.0		
MWMO	04/27/2017 10:55	Grab	15.0	11.5	< 0.02	0.01	~ 0.05	128	0.96	0.66	< 0.03	12.9	1.6		
MWMO	05/11/2017 10:35	Grab	25.0	11.0	< 0.02	< 0.01	~ 0.04	160	0.93	0.92	< 0.03	16.5	2.1	< 0.0002	0.0006
MWMO	05/25/2017 10:55	Grab	9.9	12.1	~ 0.03	0.03	0.07	172	0.95	1.52	< 0.03	12.6	1.4		
MWMO	06/15/2017 11:00	Grab	30.0	15.8	~ 0.03	0.02	0.15	192	0.97	1.18	< 0.03	14.8	2.5	< 0.0002	0.0006
MWMO	06/29/2017 11:10	Grab	17.0	16.2	~ 0.03	0.02	0.07	164	0.78	0.69	< 0.03	14.9	1.6		
MWMO	07/13/2017 11:10	Grab	20.0	19.6	< 0.02	~ 0.01	~ 0.05	138	0.68	0.41	< 0.03	16.3	1.7	< 0.0002	0.0002
MWMO	07/27/2017 10:50	Grab	25.0	17.5	~ 0.03		0.05	156	0.79	0.24	< 0.03	14.2			
MWMO	08/09/2017 10:15	Grab	39.0	16.1	< 0.02	< 0.01	0.08	158	0.85	0.15	< 0.03	11.6	2.2	< 0.0002	0.0003
MWMO	08/24/2017 11:05	Grab	17.0	11.3	0.06	0.05	0.12	125	1.00	0.79	< 0.03	12.3	1.6		
MWMO	09/21/2017 11:15	Grab	19.0	17.1	~ 0.03	0.02	0.06	156	0.77	0.35	< 0.03	13.9	1.5		
MWMO	09/29/2017 10:45	Grab	13.0	11.8	~ 0.05	0.03	0.07	138	0.79	0.31	< 0.03	8.2	1.2		
MWMO	10/10/2017 11:25	Grab	8.0	9.0	0.07	0.06	0.13	149	0.99	0.78	< 0.03	10.1	1.4		
MWMO	10/30/2017 10:20	Grab	9.9	15.6	~ 0.03	0.02	~ 0.04	157	0.72	0.80	< 0.03	13.1	1.1		
MWMO	11/13/2017 10:30	Grab	6.6	18.3	0.02	< 0.01	0.05	163	0.69	0.98	< 0.03	19.8	1.1	< 0.0002	0.0002
MWMO	11/29/2017 10:30	Grab	7.9	17.5	~ 0.03	0.01	~ 0.03	156	0.58	1.08	< 0.03	14.5	0.9		
MWMO	12/13/2017 10:19	Grab	5.5	22.2	~ 0.03	< 0.01	~ 0.02	149	0.54	1.05	< 0.03	17.2	0.9		

2017 Mississippi River Water Quality Sample Data continued

Station	Sample Time	Sample type	Total Copper (mg/L)	Total Lead (mg/L)	Total Nickel (mg/L)	Total Zinc (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)	Total Suspended Solids (mg/L)	Volatile Suspended Solids (mg/L)
Ford	04/13/2017 09:20	Grab					206	10.8	8	3
Ford	07/13/2017 09:40	Grab	0.0010	~ 0.0002	0.0009	0.0018	254	9.3	8	4
Ford	10/10/2017 09:25	Grab					189		20	~ 5

Station	Sample Time	Sample type	Total Copper (mg/L)	Total Lead (mg/L)	Total Nickel (mg/L)	Total Zinc (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)	Total Suspended Solids (mg/L)	Volatile Suspended Solids (mg/L)
MWMO	01/19/2017 10:15	Grab					266	9.0	~ 2	~ 1
MWMO	02/07/2017 10:35	Grab					270	8.5	~ 2	~ 1
MWMO	03/16/2017 10:40	Grab					204	10.1	5	~ 2
MWMO	04/13/2017 10:50	Grab					196	10.6	9	3
MWMO	04/27/2017 10:55	Grab					200	12.9	15	4
MWMO	05/11/2017 10:35	Grab	< 0.0050	~ 0.0003	0.0012	0.0022	217	12.0	13	4
MWMO	05/25/2017 10:55	Grab					224	12.8	14	~ 4
MWMO	06/15/2017 11:00	Grab	0.0009	~ 0.0004	0.0014	0.0038	248	9.4	20	6
MWMO	06/29/2017 11:10	Grab					222	9.6	14	~ 4
MWMO	07/13/2017 11:10	Grab	0.0008	~ 0.0001	0.0008	~ 0.0013	249	9.5	7	3
MWMO	07/27/2017 10:50	Grab					230	9.4	7	~ 3
MWMO	08/09/2017 10:15	Grab	0.0006	~ 0.0003	0.0008	< 0.0050	217	9.5	11	5
MWMO	08/24/2017 11:05	Grab					217	10.4	26	7
MWMO	09/21/2017 11:15	Grab					252	10.4	8	3
MWMO	09/29/2017 10:45	Grab					210	11.0	21	5
MWMO	10/10/2017 11:25	Grab					206	12.9	19	~ 5
MWMO	10/30/2017 10:20	Grab					230	10.8	4	~ 2
MWMO	11/13/2017 10:30	Grab	0.0006	0.0001	0.0007	0.0013	256	10.7	4	~ 2
MWMO	11/29/2017 10:30	Grab					256	8.9	3	~ 2
MWMO	12/13/2017 10:19	Grab					276	8.3	~ 2	~ 1

2017 Mississippi River Water Quality Sample Data

Station	Sample Time	Sample Type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous	Chemical	
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)
Shingle Down	01/19/2017 10:45	Grab	40	0.0	415.0	793.2	14.27	7.9	0.38	> 100	206	0.14	0.8	25
Shingle Down	02/07/2017 11:00	Grab	25	0.2	316.3	601.7	15.08	7.9	0.29		212	0.09	1.4	27
Shingle Down	03/16/2017 11:10	Grab	32	1.7	287.4	517.4	15.09	7.7	0.25	75	169	~ 0.04	1.7	32
Shingle Down	04/13/2017 11:35	Grab	47	9.6	232.7	329.3	12.27	8.2	0.16	80	133	< 0.02	1.4	33
Shingle Down	04/27/2017 11:05	Grab	33	10.0	226.7	317.4	11.58	8.0	0.15	58	122	< 0.02	1.6	39
Shingle Down	05/11/2017 10:45	Grab	55	15.8	277.2	335.9	10.47	7.9	0.16	52	136	~ 0.02	2.0	42
Shingle Down	05/25/2017 11:10	Grab	64	13.9	283.7	360.4	10.78	7.8	0.17	69	146	~ 0.02	1.3	37
Shingle Down	06/15/2017 11:10	Grab	80	24.5	402.2	406.2	8.27	8.1	0.19	39	154	~ 0.04	1.6	34
Shingle Down	06/29/2017 11:20	Grab	65	20.5	360.2	394.4	8.63	8.0	0.19	50	154	< 0.02	1.5	30
Shingle Down	07/13/2017 11:25	Grab	65	25.5	433.4	428.9	7.76	8.2	0.20	> 100	152	~ 0.03	1.5	28
Shingle Down	07/27/2017 11:10	Grab	73	25.9	412.5	405.9	8.57	8.4	0.20	69	145	< 0.02		41
Shingle Down	08/09/2017 10:25	Grab	66	23.6	397.3	408.3	8.58	8.3	0.20	73	153	< 0.02	2.0	32
Shingle Down	08/24/2017 11:15	Grab	66	21.4	373.3	400.6	9.09	8.2	0.20	55	150	< 0.02	1.5	33
Shingle Down	09/21/2017 11:30	Grab	71	20.6	369.9	404.2	9.52	8.3	0.19	77	167	< 0.02	1.5	34
Shingle Down	09/29/2017 10:55	Grab	55	17.8	286.2	331.9	9.80	7.7	0.16	42	137	< 0.02	1.5	37
Shingle Down	10/10/2017 11:40	Grab	45	12.3	236.0	311.3	11.67	7.6	0.15	45	121	~ 0.02	1.4	47
Shingle Down	10/30/2017 10:40	Grab	36	6.2	354.4	552.7	13.12	7.6	0.27	> 100	198	< 0.02	1.5	47
Shingle Down	11/13/2017 10:45	Grab	35	1.9	338.7	606.0	14.07	8.0	0.29	> 100	200	~ 0.05	1.4	39
Shingle Down	11/29/2017 10:42	Grab	35	3.1	316.2	544.0	13.22	8.2	0.26	> 100	191	< 0.02	1.4	25
Shingle Down	12/13/2017 10:35	Grab	25	0.1	305.2	582.0	14.31	8.2	0.28	> 100	219	< 0.02	1.3	43

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)
Shingle Down	01/19/2017 10:45	Grab	2.3	150.1	~ 0.03	0.02	~ 0.02	252	0.86	1.16	< 0.03	27.1	0.8		
Shingle Down	02/07/2017 11:00	Grab	4.5	44.0	0.07	0.03	0.10	324	0.90	1.29	< 0.03	15.5	1.4		
Shingle Down	03/16/2017 11:10	Grab	8.2	40.1	< 0.02	~ 0.01	0.05	212	0.69	0.83	< 0.03	21.4	1.8		
Shingle Down	04/13/2017 11:35	Grab	20.0	10.2	< 0.02	< 0.01	~ 0.04	152	0.63	0.46	< 0.03	11.4	2.0		
Shingle Down	04/27/2017 11:05	Grab	16.0	10.8	< 0.02	0.01	~ 0.03	132	0.92	0.90	< 0.03	14.1	1.5		
Shingle Down	05/11/2017 10:45	Grab	21.0	10.6	< 0.02	~ 0.01	~ 0.04	144	0.78	0.71	< 0.03	14.8	2.1	< 0.0002	0.0005
Shingle Down	05/25/2017 11:10	Grab	7.6	12.0	~ 0.02	0.03	0.07	176	0.99	1.43	< 0.03	12.8	1.3		
Shingle Down	06/15/2017 11:10	Grab	27.0	15.4	~ 0.03	0.02	0.10	176	1.10	1.21	< 0.03	14.4	2.0	< 0.0002	0.0006
Shingle Down	06/29/2017 11:20	Grab	17.0	14.8	~ 0.04	0.02	0.10	172	0.82	0.72	< 0.03	15.1	1.4		
Shingle Down	07/13/2017 11:25	Grab	20.0	17.4	~ 0.03	0.01	~ 0.03	131	0.68	0.41	< 0.03	16.1	1.7	< 0.0002	0.0002
Shingle Down	07/27/2017 11:10	Grab	23.0	17.2	~ 0.03		0.05	154	0.74	0.24	< 0.03	11.8			
Shingle Down	08/09/2017 10:25	Grab	36.0	15.9	~ 0.03	< 0.01	0.07	150	0.85	0.17	< 0.03	1.4	2.3	< 0.0002	0.0002
Shingle Down	08/24/2017 11:15	Grab	15.0	11.4	0.06	0.05	0.15	122	1.10	0.81	< 0.03	12.6	1.5		
Shingle Down	09/21/2017 11:30	Grab	16.0	16.4	~ 0.04	0.02	0.07	171	0.73	0.37	< 0.03	13.8	1.5		
Shingle Down	09/29/2017 10:55	Grab	13.0	6.4	~ 0.05	0.03	0.11	131	0.84	0.29	< 0.03	8.5	1.3		
Shingle Down	10/10/2017 11:40	Grab	7.1	8.8	0.08	0.06	0.11	144	0.98	0.68	< 0.03	9.4	1.3		
Shingle Down	10/30/2017 10:40	Grab	9.3	38.7	~ 0.03	0.02	0.08	199	0.89	1.29	< 0.03	28.4	1.3		
Shingle Down	11/13/2017 10:45	Grab	5.3	46.2	< 0.02	< 0.01	0.06	224	0.75	1.31	< 0.03	31.6	1.2	< 0.0002	0.0003
Shingle Down	11/29/2017 10:42	Grab	7.6	31.4	~ 0.03	~ 0.01	~ 0.04	193	0.72	1.32	< 0.03	25.9	1.0		
Shingle Down	12/13/2017 10:35	Grab	8.0	36.2	< 0.02	~ 0.01	~ 0.03	169	0.70	1.24	< 0.03	25.8	1.0		

2017 Mississippi River Water Quality Sample Data continued

Station	Sample Time	Sample type	Total Copper (mg/L)	Total Lead (mg/L)	Total Nickel (mg/L)	Total Zinc (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)	Total Suspended Solids (mg/L)	Volatile Suspended Solids (mg/L)
Shingle Down	01/19/2017 10:45	Grab					475	8.9	3	~ 1
Shingle Down	02/07/2017 11:00	Grab					292	5.0	16	4
Shingle Down	03/16/2017 11:10	Grab					289	9.5	6	~ 2
Shingle Down	04/13/2017 11:35	Grab					202	9.4	10	3
Shingle Down	04/27/2017 11:05	Grab					202	13.1	15	4
Shingle Down	05/11/2017 10:45	Grab	< 0.0050	~ 0.0003	0.0012	0.0044	226	12.1	14	3
Shingle Down	05/25/2017 11:10	Grab					224	13.2	14	~ 4
Shingle Down	06/15/2017 11:10	Grab	0.0008	~ 0.0004	0.0014	0.0028	251	10.0	21	6
Shingle Down	06/29/2017 11:20	Grab					241	10.9	11	3
Shingle Down	07/13/2017 11:25	Grab	0.0008	~ 0.0001	0.0008	~ 0.0011	247	9.4	7	3
Shingle Down	07/27/2017 11:10	Grab					223	9.2	10	5
Shingle Down	08/09/2017 10:25	Grab	0.0007	~ 0.0003	0.0008	< 0.0050	224	9.2	12	6
Shingle Down	08/24/2017 11:15	Grab					217	10.2	25	7
Shingle Down	09/21/2017 11:30	Grab					244	9.7	9	4
Shingle Down	09/29/2017 10:55	Grab					206	11.0	20	6
Shingle Down	10/10/2017 11:40	Grab					204	13.8	20	~ 4
Shingle Down	10/30/2017 10:40	Grab					327	9.5	5	~ 2
Shingle Down	11/13/2017 10:45	Grab	0.0008	~ 0.0002	0.0010	0.0018	362	9.2	4	~ 2
Shingle Down	11/29/2017 10:42	Grab					322	8.5	3	~ 2
Shingle Down	12/13/2017 10:35	Grab					335	8.3	~ 1	~ 1

2017 Mississippi River Water Quality Sample Data

Station	Sample Time	Sample Type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous	Chemical	
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)
Shingle Up	01/19/2017 11:00	Grab	40	0.3	248.8	471.6	14.58	8.2	0.22	> 100	181	0.10	0.8	25
Shingle Up	02/07/2017 11:10	Grab	25	0.0	263.2	503.3	15.23	8.0	0.24		201	0.10	1.2	19
Shingle Up	03/16/2017 11:15	Grab	32	1.5	215.7	391.1	15.18	7.8	0.19	65	156	~ 0.02	1.6	55
Shingle Up	04/13/2017 11:45	Grab	47	9.7	238.1	336.6	12.40	8.2	0.16	61	139	< 0.02	1.4	32
Shingle Up	04/27/2017 11:07	Grab	33	10.0	215.6	302.1	11.33	8.0	0.14	67	119	~ 0.04	1.6	39
Shingle Up	05/11/2017 10:50	Grab	55	15.9	277.5	336.3	10.54	7.9	0.16	43	134	~ 0.04	1.9	40
Shingle Up	05/25/2017 11:20	Grab	64	13.8	270.0	343.2	10.60	7.8	0.17	67	133	~ 0.03	1.0	36
Shingle Up	06/15/2017 11:20	Grab	80	24.6	406.2	409.5	8.35	8.1	0.20	33	156	~ 0.02	1.6	32
Shingle Up	06/29/2017 11:30	Grab	65	20.5	358.5	392.3	8.64	8.0	0.19	64	148	< 0.02	1.3	30
Shingle Up	07/13/2017 11:35	Grab	65	20.5	359.3	393.3	8.68	8.0	0.19	> 100	158	< 0.02	1.7	28
Shingle Up	07/27/2017 11:15	Grab	73	25.9	413.8	406.9	8.85	8.5	0.20	65	148	< 0.02		48
Shingle Up	08/09/2017 10:30	Grab	69	23.8	400.5	410.2	8.62	8.3	0.20	68	156	< 0.02	1.9	40
Shingle Up	08/24/2017 11:20	Grab	66	21.4	362.2	388.5	9.08	8.2	0.20	45	144	< 0.02	1.4	36
Shingle Up	09/21/2017 11:35	Grab	72	20.6	368.5	402.2	9.42	8.3	0.19	67	174	< 0.02	1.5	33
Shingle Up	09/29/2017 11:05	Grab	55	17.8	289.1	335.0	10.25	7.7	0.16	41	127	< 0.02	1.4	36
Shingle Up	10/10/2017 11:45	Grab	45	12.4	247.9	326.6	11.53	7.7	0.16	43	120	< 0.02	1.5	45
Shingle Up	10/30/2017 10:45	Grab	36	6.3	316.4	492.0	13.18	7.8	0.24	> 100	199	< 0.02	1.5	45
Shingle Up	11/13/2017 10:55	Grab	35	1.7	272.5	490.5	14.10	8.2	0.23	> 100	201	~ 0.04	1.5	44
Shingle Up	11/29/2017 10:50	Grab	35	3.0	279.2	482.2	13.67	8.3	0.23	> 100	182	< 0.02	1.4	65
Shingle Up	12/13/2017 10:45	Grab	25	0.0	268.3	514.0	14.56	8.3	0.24	> 100	201	< 0.02	1.3	41

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)
Shingle Up	01/19/2017 11:00	Grab	2.0	28.7	< 0.02	0.01	~ 0.02	236	0.65	0.96	< 0.03	15.0	1.0		
Shingle Up	02/07/2017 11:10	Grab	3.2	20.5	~ 0.04	0.03	0.05	260	0.74	1.45	< 0.03	19.2	0.8		
Shingle Up	03/16/2017 11:15	Grab	9.3	14.1	< 0.02	~ 0.01	0.05	184	0.71	0.87	< 0.03	13.8	1.9		
Shingle Up	04/13/2017 11:45	Grab	21.0	10.5	< 0.02	< 0.01	~ 0.04	152	0.74	0.48	< 0.03	12.5	2.1		
Shingle Up	04/27/2017 11:07	Grab	16.0	11.3	< 0.02	0.01	~ 0.05	116	0.93	0.55	< 0.03	11.2	1.6		
Shingle Up	05/11/2017 10:50	Grab	19.0	10.3	< 0.02	~ 0.01	~ 0.04	160	0.86	0.83	< 0.03	14.3	2.1	< 0.0002	0.0005
Shingle Up	05/25/2017 11:20	Grab	11.0	12.5	< 0.02	0.03	0.07	160	1.00	1.09	< 0.03	11.3	1.3		
Shingle Up	06/15/2017 11:20	Grab	26.0	15.4	0.06	0.02	0.10	176	1.10	1.23	< 0.03	14.7	2.0	< 0.0002	0.0006
Shingle Up	06/29/2017 11:30	Grab	16.0	15.3	< 0.02	0.02	0.07	184	0.87	0.70	< 0.03	14.8	1.4		
Shingle Up	07/13/2017 11:35	Grab	20.0	17.0	0.06	0.01	~ 0.04	145	0.72	0.43	< 0.03	16.7	1.8	< 0.0002	0.0002
Shingle Up	07/27/2017 11:15	Grab	36.0	17.6	~ 0.03		0.09	154	0.89	0.21	< 0.03	13.8			
Shingle Up	08/09/2017 10:30	Grab	33.0	15.7	< 0.02	< 0.01	0.05	149	0.85	0.14	< 0.03	11.2	2.3	< 0.0002	0.0003
Shingle Up	08/24/2017 11:20	Grab	15.0	11.2	0.05	0.05	0.09	138	1.00	0.68	< 0.03	11.3	1.5		
Shingle Up	09/21/2017 11:35	Grab	16.0	16.3	0.03	0.02	0.09	160	0.74	0.36	< 0.03	13.5	1.6		
Shingle Up	09/29/2017 11:05	Grab	8.9	12.0	~ 0.05	0.03	0.09	143	0.78	0.31	< 0.03	8.2	1.1		
Shingle Up	10/10/2017 11:45	Grab	8.1	9.0	0.06	0.06	0.11	152	1.00	0.75	< 0.03	10.0	1.2		
Shingle Up	10/30/2017 10:45	Grab	11.0	17.4	~ 0.03	0.02	0.07	204	0.87	1.44	< 0.03	23.4	1.3		
Shingle Up	11/13/2017 10:55	Grab	8.1	19.4	~ 0.02	~ 0.01	~ 0.05	213	0.92	1.48	< 0.03	22.0	1.3	< 0.0002	0.0002
Shingle Up	11/29/2017 10:50	Grab	6.4	17.8	0.09	~ 0.01	~ 0.04	183	0.64	1.18	< 0.03	20.5	0.9		
Shingle Up	12/13/2017 10:45	Grab	8.0	21.5	~ 0.04	~ 0.01	~ 0.02	181	0.58	1.29	< 0.03	21.3	1.0		

Station	Sample Time	Sample type	Total Copper (mg/L)	Total Lead (mg/L)	Total Nickel (mg/L)	Total Zinc (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)	Total Suspended Solids (mg/L)	Volatile Suspended Solids (mg/L)
Shingle Up	01/19/2017 11:00	Grab					245	8.9	3	~ 2
Shingle Up	02/07/2017 11:10	Grab					350	8.4	~ 2	~ 1
Shingle Up	03/16/2017 11:15	Grab					228	10.3	9	3
Shingle Up	04/13/2017 11:45	Grab					201	9.7	9	3
Shingle Up	04/27/2017 11:07	Grab					185	12.8	16	~ 5
Shingle Up	05/11/2017 10:50	Grab	< 0.0050	~ 0.0003	0.0021	0.0020	213	12.2	10	3
Shingle Up	05/25/2017 11:20	Grab					217	13.7	14	~ 4
Shingle Up	06/15/2017 11:20	Grab	0.0009	~ 0.0005	0.0014	0.0031	253	10.2	22	6
Shingle Up	06/29/2017 11:30	Grab					243	10.5	13	~ 4
Shingle Up	07/13/2017 11:35	Grab	0.0008	~ 0.0001	0.0008	~ 0.0012	251	8.8	7	3
Shingle Up	07/27/2017 11:15	Grab					221	9.1	9	~ 4
Shingle Up	08/09/2017 10:30	Grab	0.0007	~ 0.0003	0.0009	< 0.0050	222	9.6	9	4
Shingle Up	08/24/2017 11:20	Grab					214	10.3	26	6
Shingle Up	09/21/2017 11:35	Grab					247	9.8	8	3
Shingle Up	09/29/2017 11:05	Grab					206	11.1	19	5
Shingle Up	10/10/2017 11:45	Grab					207		20	~ 4
Shingle Up	10/30/2017 10:45	Grab					296	10.2	5	3
Shingle Up	11/13/2017 10:55	Grab	0.0008	~ 0.0001	0.0009	0.0027	297	10.8	5	3
Shingle Up	11/29/2017 10:50	Grab					281	8.9	4	~ 2
Shingle Up	12/13/2017 10:45	Grab					292	8.7	~ 1	~ 1

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)
Upper	01/19/2017 11:30	Grab	2.4	64.6	< 0.02	0.02	~ 0.03	224	0.77	1.19	< 0.03	23.0	0.7		
Upper	02/07/2017 11:25	Grab	3.9	36.0	~ 0.04	0.03	0.06	268	0.77	1.38	< 0.03	22.4	0.9		
Upper	03/16/2017 11:45	Grab	7.2	17.5	< 0.02	~ 0.01	~ 0.05	204	0.74	0.88	< 0.03	15.5	1.6		
Upper	04/13/2017 11:20	Grab	28.0	15.4	< 0.02	< 0.01	0.06	156	0.81	0.66	< 0.03	17.7	2.4		
Upper	04/27/2017 10:43	Grab	23.0	14.2	< 0.02	0.01	0.05	180	1.00	1.26	< 0.03	22.5	1.7		
Upper	05/11/2017 10:40	Grab	31.0	15.1	< 0.02	~ 0.01	0.05	184	1.00	1.39	< 0.03	25.1	2.5	< 0.0002	0.0005
Upper	05/25/2017 11:30	Grab	9.3	11.6	~ 0.03	0.03	0.08	164	0.94	1.37	< 0.03	12.5	1.3		
Upper	06/15/2017 11:25	Grab	26.0	14.7	~ 0.04	0.02	0.12	172	1.00	1.33	< 0.03	15.1	1.9	< 0.0002	0.0006
Upper	06/29/2017 11:15	Grab	14.0	28.5	0.06	0.03	0.08	212	0.87	0.80	< 0.03	24.7	1.4		
Upper	07/13/2017 11:25	Grab	17.0	28.0	~ 0.03	0.02	~ 0.04	146	0.63	0.43	< 0.03	23.9	1.9	< 0.0002	0.0002
Upper	07/27/2017 12:00	Grab	29.0	21.0	< 0.02		0.06	159	0.81	0.23	< 0.03	15.9			
Upper	08/09/2017 10:20	Grab	46.0	17.6	< 0.02	0.02	0.09	142	0.99	0.11	< 0.03	11.3	2.7	< 0.0002	0.0003
Upper	08/24/2017 11:25	Grab	17.0	14.6	0.09	0.07	0.13	134	1.00	1.19	< 0.03	17.9	1.6		
Upper	09/21/2017 10:45	Grab	21.0	18.4	~ 0.04	0.02	0.08	172	0.76	0.34	< 0.03	16.1	2.0		
Upper	09/29/2017 12:00	Grab	15.0	14.1	0.05	0.04	0.08	146	0.80	0.35	< 0.03	11.4	1.2		
Upper	10/10/2017 12:05	Grab	8.3	8.8	0.07	0.06	0.14	142	1.00	0.77	< 0.03	10.2	1.3		
Upper	10/30/2017 11:10	Grab	13.0	18.2	~ 0.03	0.02	0.06	224	0.83	1.48	< 0.03	24.8	1.3		
Upper	11/13/2017 11:20	Grab	7.2	23.6	~ 0.02	~ 0.01	~ 0.05	195	0.82	1.48	< 0.03	25.0	1.1	< 0.0002	0.0002
Upper	11/29/2017 11:10	Grab	6.4	21.0	~ 0.02	0.01	~ 0.03	188	0.61	1.20	< 0.03	23.1	1.0		
Upper	12/13/2017 11:30	Grab	7.3	40.6	~ 0.04	~ 0.01	~ 0.03	167	0.62	1.33	< 0.03	26.0	1.0		

2017 Mississippi River Water Quality Sample Data at Upper site continued

Station	Sample Time	Sample type	Total Copper (mg/L)	Total Lead (mg/L)	Total Nickel (mg/L)	Total Zinc (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)	Total Suspended Solids (mg/L)	Volatile Suspended Solids (mg/L)
Upper	01/19/2017 11:30	Grab					346	9.0	~ 2	~ 1
Upper	02/07/2017 11:25	Grab					526	8.6	3	2
Upper	03/16/2017 11:45	Grab					234	9.6	6	~ 2
Upper	04/13/2017 11:20	Grab					234	9.7	10	3
Upper	04/27/2017 10:43	Grab					239	12.8	14	4
Upper	05/11/2017 10:40	Grab	< 0.0050	~ 0.0003	0.0013	0.0034	261	11.8	14	4
Upper	05/25/2017 11:30	Grab					224	13.1	14	~ 4
Upper	06/15/2017 11:25	Grab	0.0009	~ 0.0005	0.0014	0.0031	245	9.3	21	6
Upper	06/29/2017 11:15	Grab					298	11.2	15	4
Upper	07/13/2017 11:25	Grab	0.0010	~ 0.0001	0.0009	~ 0.0012	288	8.9	5	3
Upper	07/27/2017 12:00	Grab					246	9.4	9	~ 4
Upper	08/09/2017 10:20	Grab	0.0010	~ 0.0003	0.0010	< 0.0050	236	9.4	10	5
Upper	08/24/2017 11:25	Grab					247	9.7	18	5
Upper	09/21/2017 10:45	Grab					244	10.2	7	4
Upper	09/29/2017 12:00	Grab					232	10.8	18	5
Upper	10/10/2017 12:05	Grab					204	13.1	20	~ 5
Upper	10/30/2017 11:10	Grab					291	9.9	5	3
Upper	11/13/2017 11:20	Grab	0.0007	~ 0.0002	0.0010	0.0022	317	10.5	5	~ 2
Upper	11/29/2017 11:10	Grab					293	8.7	3	~ 2
Upper	12/13/2017 11:30	Grab					340	8.5	~ 2	~ 1

2017 Mississippi River Water Quality Sample Data at Wash site

Station	Sample Time	Sample Type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous	Chemical	
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)
Wash	01/19/2017 09:37	Grab	35	0.3	278.7	527.8	15.11	8.1	0.25	> 100	196	0.11	0.8	23
Wash	02/07/2017 09:45	Grab	25	0.4	263.9	497.2	17.18	8.0	0.24	> 100	195	0.10	0.9	22
Wash	03/16/2017 09:55	Grab	25	1.5	209.5	379.6	15.68	8.0	0.18	77	155	~ 0.06	1.4	31
Wash	04/13/2017 09:45	Grab	47	9.9	241.0	338.7	12.64	8.1	0.16	78	135	< 0.02	1.9	34
Wash	04/27/2017 09:55	Grab	33	10.4	238.9	331.4	11.86	7.8	0.16	58	124	~ 0.04	2.0	36
Wash	05/11/2017 09:35	Grab	55	15.6	295.6	359.9	10.97	7.7	0.17	27	136	~ 0.04	1.5	37
Wash	05/25/2017 09:40	Grab	58	13.7	300.1	382.4	11.34	7.9	0.18	58	148	< 0.02	1.3	35
Wash	06/15/2017 09:00	Grab	75	23.9	405.2	413.6	8.83	8.0	0.20	39	156	~ 0.03	1.4	36
Wash	06/29/2017 09:50	Grab	70	20.2	355.1	390.6	9.08	7.8	0.19	57	153	< 0.02	1.6	31
Wash	07/13/2017 10:10	Grab	65	25.5	445.1	440.5	8.64	8.2	0.21	85	154	~ 0.03	1.9	29
Wash	07/27/2017 09:45	Grab	73	25.1	419.7	418.8	8.21	8.3	0.20	72	149	0.02		38
Wash	08/09/2017 09:25	Grab	70	23.5	405.3	417.9	8.57	8.3	0.20	60	163	< 0.02	1.7	31
Wash	08/24/2017 09:50	Grab	68	21.3	376.8	405.2	9.60	8.2	0.20	41	146	< 0.02	1.6	35
Wash	09/21/2017 09:45	Grab	63	19.8	372.3	413.3	9.48	7.8	0.20	70	168	< 0.02	1.6	35
Wash	09/29/2017 09:50	Grab	55	17.8	294.2	341.0	10.69	7.7	0.16	44	136	< 0.02	1.5	35
Wash	10/10/2017 10:05	Grab	40	12.5	235.7	309.6	12.38	7.5	0.15	31	116	0.06	1.2	47
Wash	10/30/2017 09:40	Grab	36	6.6	300.4	463.8	14.23	7.6	0.22	95	183	< 0.02	1.4	46
Wash	11/13/2017 09:45	Grab	30	1.7	256.9	462.7	14.33	7.7	0.22	> 100	182	~ 0.03	1.4	42
Wash	11/29/2017 09:45	Grab	30	3.5	282.8	480.3	13.12	7.9	0.23	> 100	170	< 0.02	1.3	28
Wash	12/13/2017 09:39	Grab	25	0.1	267.5	509.0	14.46	8.2	0.24	> 100	204	0.11	1.5	39

2017 Mississippi River Water Quality Sample Data at Wash site continued

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)
Wash	01/19/2017 09:37	Grab	3.2	48.5	< 0.02	0.02	< 0.02	226	0.61	0.99	< 0.03	17.8	0.6		
Wash	02/07/2017 09:45	Grab	1.5	24.0	~ 0.02	0.03	~ 0.05	260	0.72	1.25	< 0.03	18.8	0.8		
Wash	03/16/2017 09:55	Grab	8.0	17.2	< 0.02	~ 0.01	~ 0.04	180	0.69	0.75	< 0.03	12.6	1.5		
Wash	04/13/2017 09:45	Grab	23.0	11.9	< 0.02	< 0.01	~ 0.04	136	0.69	0.48	< 0.03	12.2	1.9		
Wash	04/27/2017 09:55	Grab	15.0	12.0	< 0.02	0.01	~ 0.05	156	0.99	0.78	< 0.03	14.5	1.7		
Wash	05/11/2017 09:35	Grab	24.0	11.7	< 0.02	< 0.01	~ 0.04	160	0.82	0.84	< 0.03	15.7	2.0	< 0.0002	0.0005
Wash	05/25/2017 09:40	Grab	8.8	13.8	~ 0.03	0.03	0.10	160	1.70	1.44	< 0.03	13.3	1.4		
Wash	06/15/2017 09:00	Grab	24.0	16.8	0.06	0.02	0.08	180	0.91	1.16	< 0.03	14.9	1.7	< 0.0002	0.0005
Wash	06/29/2017 09:50	Grab	17.0	16.0	0.04	0.02	0.07	180	0.78	0.69	< 0.03	15.4	1.6		
Wash	07/13/2017 10:10	Grab	16.0	18.7	< 0.02	0.01	~ 0.04	152	0.70	0.44	< 0.03	16.8	1.8	< 0.0002	0.0002
Wash	07/27/2017 09:45	Grab	19.0	19.5	~ 0.03		0.09	159	0.78	0.27	< 0.03	14.0			
Wash	08/09/2017 09:25	Grab	40.0	17.6	< 0.02	< 0.01	0.05	148	0.88	0.19	< 0.03	12.0	2.0	< 0.0002	0.0004
Wash	08/24/2017 09:50	Grab	18.0	12.9	~ 0.04	0.05	0.13	146	1.10	0.81	< 0.03	12.8	1.6		
Wash	09/21/2017 09:45	Grab	16.0	18.4	~ 0.04	0.02	0.06	165	0.75	0.36	< 0.03	14.1	1.6		
Wash	09/29/2017 09:50	Grab	9.6	12.3	~ 0.05	0.03	0.08	136	0.81	0.32	< 0.03	8.8	1.2		
Wash	10/10/2017 10:05	Grab	7.6	9.4	0.07	0.06	0.12	153	1.00	0.70	< 0.03	9.6	1.3		
Wash	10/30/2017 09:40	Grab	13.0	21.5	~ 0.04	0.02	0.05	215	0.78	1.34	< 0.03	19.9	1.2		
Wash	11/13/2017 09:45	Grab	6.1	22.1	~ 0.02	< 0.01	~ 0.05	184	0.73	1.19	< 0.03	19.2	1.2	< 0.0002	0.0003
Wash	11/29/2017 09:45	Grab	6.4	21.7	0.02	0.01	~ 0.03	200	0.66	1.02	< 0.03	18.4	0.9		
Wash	12/13/2017 09:39	Grab	7.2	24.6	~ 0.04	~ 0.01	~ 0.03	141	0.56	1.19	< 0.03	20.2	1.0		

2017 Mississippi River Water Quality Sample Data at Wash site continued

Station	Sample Time	Sample type	Total Copper (mg/L)	Total Lead (mg/L)	Total Nickel (mg/L)	Total Zinc (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)	Total Suspended Solids (mg/L)	Volatile Suspended Solids (mg/L)
Wash	01/19/2017 09:37	Grab					308	8.8	~ 2	~ 1
Wash	02/07/2017 09:45	Grab					277	8.3	3	~ 1
Wash	03/16/2017 09:55	Grab					224	9.8	5	~ 2
Wash	04/13/2017 09:45	Grab					203	10.3	10	3
Wash	04/27/2017 09:55	Grab					206	12.7	16	5
Wash	05/11/2017 09:35	Grab	< 0.0050	~ 0.0003	0.0012	0.0028	219	11.6	13	4
Wash	05/25/2017 09:40	Grab					231	12.6	14	~ 4
Wash	06/15/2017 09:00	Grab	0.0008	~ 0.0004	0.0013	0.0027	247	10.1	17	~ 5
Wash	06/29/2017 09:50	Grab					246	10.5	12	4
Wash	07/13/2017 10:10	Grab	0.0009	~ 0.0002	0.0009	~ 0.0015	252	9.2	8	3
Wash	07/27/2017 09:45	Grab					231	9.7	8	~ 4
Wash	08/09/2017 09:25	Grab	0.0007	~ 0.0003	0.0009	< 0.0050	206	9.7	10	~ 5
Wash	08/24/2017 09:50	Grab					223	10.2	22	~ 6
Wash	09/21/2017 09:45	Grab					247	9.6	7	3
Wash	09/29/2017 09:50	Grab					216	10.9	21	~ 5
Wash	10/10/2017 10:05	Grab					202	12.9	18	~ 4
Wash	10/30/2017 09:40	Grab					276	10.3	6	~ 2
Wash	11/13/2017 09:45	Grab	0.0007	~ 0.0002	0.0009	~ 0.0015	285	10.3	5	~ 2
Wash	11/29/2017 09:45	Grab					284	8.9	3	~ 2
Wash	12/13/2017 09:39	Grab					296	8.3	~ 2	~ 2