

2018 Mississippi River Water Quality Sample Data - Ford

Station	Sample Time	Sample type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	pH	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous	Chemical	Chlorophyll-a (µg/l)
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)					Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)	
Ford	03/14/2018 09:30	Grab	30	3.2	283.0	485.0	12.90	7.4	0.23	> 100	189	0.11	1.4	20	11
Ford	05/03/2018 09:15	Grab	65	14.0	230.8	292.5	11.00	7.2	0.14	59	113	< 0.02	2.7	32	29
Ford	07/18/2018 09:15	Grab	72	25.9	332.7	327.0	8.72	7.7	0.15	39	135	< 0.02	1.4	49	16
Ford	10/17/2018 09:15	Grab	37	6.7	224.0	344.5	12.95	7.8	0.17	44	145	~ 0.04	1.8	37	11

2018 Mississippi River Water Quality Sample Data - Meeker

Station	Sample Time	Sample type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	pH	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous	Chemical	Chlorophyll-a (µg/l)
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)					Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)	
Meeker	03/14/2018 09:55	Grab	30	3.8	292.1	491.3	13.80	7.8	0.24	> 100	197	~ 0.03	1.4	20	8.7
Meeker	04/09/2018 09:05	Grab	28	2.3	264.5	466.8	14.10	7.8	0.22	> 100	178	0.16	2.6	28	15.5
Meeker	04/19/2018 09:05	Grab	40	3.6	253.7	429.7	12.77	7.4	0.21	> 100	167	0.15	3.1	30	17.0
Meeker	05/03/2018 09:35	Grab	65	13.9	233.7	296.5	10.61	7.3	0.14	55	113	< 0.02	2.7	31	28.0
Meeker	05/17/2018 09:10	Grab	65	19.2	322.4	362.5	9.91	7.7	0.17	40	155	0.03	2.6	30	41.5
Meeker	06/07/2018 09:30	Grab	65	22.2	353.7	373.4	9.87	7.3	0.18	46	170	< 0.02	1.6	34	19.0
Meeker	06/21/2018 09:30	Grab	70	23.1	373.7	387.6	9.23	7.6	0.19	26	153	< 0.02	1.3	50	12.0
Meeker	07/05/2018 09:35	Grab	75	24.4	396.6	401.3	9.09	7.6	0.19	46	167	< 0.02	1.2	42	5.6
Meeker	07/18/2018 09:30	Grab	73	25.9	335.9	330.1	8.81	7.8	0.16	36	137	< 0.02	1.2	52	14.0
Meeker	08/02/2018 09:20	Grab	59	23.7	383.7	393.8	9.08	7.8	0.19	53	171	0.44	2.0	42	
Meeker	08/16/2018 08:50	Grab	72	26.5	396.8	385.5	8.03	8.1	0.18	63	164	0.09	2.0	32	44.0
Meeker	09/05/2018 09:15	Grab	63	22.6	360.9	377.9	8.78	7.4	0.18	71	154	< 0.02	1.8	41	26.0
Meeker	09/25/2018 09:30	Grab	52	17.7	338.8	393.5	9.80	7.3	0.19	62	157	< 0.02	1.4	31	13.0
Meeker	10/03/2018 09:05	Grab	60	12.3	333.1	439.9	10.84	7.5	0.21	79	179	< 0.02	1.6	33	16.0
Meeker	10/17/2018 09:35	Grab	37	6.7	229.2	352.7	13.02	7.4	0.17	45	126	< 0.02	2.1	38	11.0
Meeker	11/15/2018 09:10	Grab	33	0.2	189.7	360.2	15.26	9.9	0.17	82	164	~ 0.04	1.1	31	6.9
Meeker	12/20/2018 09:15	Grab	36	1.9	244.0	437.2	16.32	7.5	0.21	> 100	184	0.04	1.1	30	

2018 Mississippi River Water Quality Sample Data - Ford continued

Station	Sample Time	Sample type	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen		Nitrate-Nitrite		Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)	Total Copper (mg/L)
								(mg/L)	(mg/L)	(mg/L)	(mg/L)					
Ford	03/14/2018 09:30	Grab	27.9	< 0.02	~ 0.01	~ 0.02	170	0.62	1.10	< 0.03	16.3	1.7				
Ford	05/03/2018 09:15	Grab	11.6	~ 0.03	0.01	0.08	111	0.89	0.43	< 0.03	9.7	3.1				
Ford	07/18/2018 09:15	Grab	10.6	0.14	0.05	0.12	111	0.95	0.44	0.44	< 0.03	8.7	1.2	< 0.0002	0.0028	0.0014
Ford	10/17/2018 09:15	Grab	12.4	~ 0.04	0.04	0.11	154	0.94	1.34	1.34	< 0.03	14.0	1.8	< 0.0002	0.0009	0.0015

2018 Mississippi River Water Quality Sample Data - Meeker continued

Station	Sample Time	Sample type	Chloride (mg/L)	Dissolved Phosphorus (mg/L)	Ortho Phosphate (mg/L)	Total Phosphorus (mg/L)	Hardness (mg/L CaCO3)	Total Kjeldahl Nitrogen		Nitrate-Nitrite		Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)	Total Copper (mg/L)
								(mg/L)	(mg/L)	(mg/L)	(mg/L)					
Meeker	03/14/2018 09:55	Grab	28.5	~ 0.02	< 0.01	~ 0.03	164	0.62	1.06	< 0.03	16.4	1.8				
Meeker	04/09/2018 09:05	Grab	28.6	0.04	0.01	0.07	171	1.05	0.98	< 0.03	16.0	2.8				
Meeker	04/19/2018 09:05	Grab	25.0	~ 0.04	0.02	0.11	149	1.20	1.04	< 0.03	14.4	3.4	< 0.0002	0.0003	0.0014	
Meeker	05/03/2018 09:35	Grab	12.8	~ 0.04	0.02	0.08	120	0.96	0.44	< 0.03	9.8	3.2				
Meeker	05/17/2018 09:10	Grab	14.8	< 0.02	< 0.01	0.10	139	0.89	0.19	< 0.03	11.6	2.6	< 0.0002	< 0.0005	0.0008	
Meeker	06/07/2018 09:30	Grab	13.0	~ 0.04	0.04	0.08	120	0.99	< 0.05	< 0.03	11.6	1.6				
Meeker	06/21/2018 09:30	Grab	12.2	0.07	0.06	0.15	139	1.30	1.23	< 0.03	14.9	1.3				
Meeker	07/05/2018 09:35	Grab	14.0	0.07	0.07	0.12	173	0.92	1.08	1.08	< 0.03	12.6	1.7			
Meeker	07/18/2018 09:30	Grab	10.7	0.09	0.05	0.12	139	1.00	0.46	0.46	< 0.03	8.9	1.1	< 0.0002	0.0023	0.0016
Meeker	08/02/2018 09:20	Grab	13.7	0.06	0.03	0.09	146	1.10	0.52	0.52	< 0.03	15.9	2.3			
Meeker	08/16/2018 08:50	Grab	17.5	< 0.02	~ 0.01	0.06	138	0.95	0.16	0.16	< 0.03	13.5	2.3	< 0.0002	0.0002	0.0013
Meeker	09/05/2018 09:15	Grab	17.8	~ 0.04	0.03	0.07	156	0.96	0.40	0.40	< 0.03	12.0	1.9			
Meeker	09/25/2018 09:30	Grab	19.8	0.06	0.04	0.05	171	0.87	0.84	0.84	< 0.03	14.3	1.3			
Meeker	10/03/2018 09:05	Grab	18.3	0.05	0.03	0.09	189	1.10	1.47	1.47	< 0.03	25.4	1.6			
Meeker	10/17/2018 09:35	Grab	12.3	~ 0.04	0.03	0.14	144	1.20	6.27	6.27	< 0.03	14.8	2.0	< 0.0002	0.0008	0.0015
Meeker	11/15/2018 09:10	Grab	17.0	< 0.02	~ 0.01	0.25	177	0.67	0.92	0.92	< 0.03	15.4	1.1			
Meeker	12/20/2018 09:15	Grab	19.8	< 0.02	< 0.01	~ 0.03	206	0.59	1.00	1.00	< 0.03	15.5	0.8	< 0.0002	0.0001	0.0006

2018 Mississippi River Water Quality Sample Data - Ford continued

Station	Sample Time	Sample type	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	03/14/2018 09:30	Grab				264	8.4	~ 2	~ 1
Ford	05/03/2018 09:15	Grab				170	10.6	13	~ 5
Ford	07/18/2018 09:15	Grab	~ 0.0005	0.0019	0.0050	222	16.4	22	5
Ford	10/17/2018 09:15	Grab	~ 0.0005	0.0015	0.0032	201	12.9	21	~ 4

2018 Mississippi River Water Quality Sample Data - Meeker continued

Station	Sample Time	Sample type	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	03/14/2018 09:55	Grab				267	7.4	3	~ 2
Meeker	04/09/2018 09:05	Grab				280	10.2	5	3
Meeker	04/19/2018 09:05	Grab	0.0005	0.0010	< 0.0050	251	10.9	8	3
Meeker	05/03/2018 09:35	Grab				170	10.4	13	5
Meeker	05/17/2018 09:10	Grab	0.0002	0.0009	0.0113	221	10.1	13	5
Meeker	06/07/2018 09:30	Grab				219	11.4	11	4
Meeker	06/21/2018 09:30	Grab				250	12.5	31	6
Meeker	07/05/2018 09:35	Grab				256	14.2	21	~ 5
Meeker	07/18/2018 09:30	Grab	~ 0.0005	0.0018	< 0.0050	209	17.0	23	5
Meeker	08/02/2018 09:20	Grab				254	13.8	17	6
Meeker	08/16/2018 08:50	Grab	~ 0.0002	0.0011	0.0032	236	11.2	9	5
Meeker	09/05/2018 09:15	Grab				237	9.5	13	~ 5
Meeker	09/25/2018 09:30	Grab				246	9.7	21	~ 5
Meeker	10/03/2018 09:05	Grab				284	11.7	11	~ 4
Meeker	10/17/2018 09:35	Grab	~ 0.0004	0.0016	0.0039	225	12.7	18	~ 4
Meeker	11/15/2018 09:10	Grab				228	22.0	4	~ 2
Meeker	12/20/2018 09:15	Grab	< 0.0001	< 0.0050	< 0.0050	256	9.1	~ 2	~ 1

2018 Mississippi River Water Quality Sample Data - Wash

Station	Sample Time	Sample type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous		
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Oxygen Demand	5-day Demand
Wash	03/14/2018 10:25	Grab	30	3.3	279.8	478.2	13.70	7.9	0.23	> 100	192	< 0.02	1.3	19
Wash	04/09/2018 09:40	Grab	28	2.1	260.3	463.3	13.85	7.9	0.22	> 100	169	0.16	2.6	28
Wash	04/19/2018 09:50	Grab	40	3.8	276.3	464.3	12.97	7.4	0.22	73	171	0.14	< 2.7	30
Wash	05/03/2018 09:50	Grab	65	13.8	229.9	292.6	10.62	7.3	0.14	55	115	< 0.02	2.7	29
Wash	05/17/2018 09:30	Grab	65	19.2	323.9	364.4	9.94	7.8	0.17	38	153	~ 0.04	2.3	31
Wash	06/07/2018 10:00	Grab	65	22.3	352.6	372.0	10.03	7.5	0.18	43	162	< 0.02	1.5	37
Wash	06/21/2018 09:55	Grab	70	23.1	369.5	383.6	9.22	7.6	0.18	24	154	0.06	1.3	52
Wash	07/05/2018 09:45	Grab	75	24.4	392.1	397.0	9.29	7.6	0.19	42	165	< 0.02	1.2	40
Wash	07/18/2018 09:45	Grab	74	25.9	336.8	331.0	8.85	7.9	0.16	35	133	< 0.02	1.4	52
Wash	08/02/2018 09:30	Grab	60	23.7	387.3	397.4	9.04	7.7	0.19	51	173	~ 0.05	1.8	40
Wash	08/16/2018 09:05	Grab	72	26.2	397.1	388.1	8.20	8.1	0.18	61	159	< 0.02	1.9	30
Wash	09/05/2018 09:25	Grab	63	22.6	360.1	377.3	8.89	7.5	0.18	61	145	~ 0.04	1.9	42
Wash	09/25/2018 09:38	Grab	52	17.7	338.9	393.8	10.03	7.3	0.19	53	158	< 0.02	1.4	31
Wash	10/03/2018 09:30	Grab	60	12.4	336.0	442.7	10.85	7.3	0.21	72	174	~ 0.03	1.5	35
Wash	10/17/2018 09:45	Grab	37	6.6	229.9	346.4	13.48	7.4	0.17	46	135	0.05	1.7	38
Wash	11/15/2018 09:55	Grab	34	0.5	199.3	374.7	14.55	7.8	0.18	74	166	~ 0.03	1.1	29
Wash	12/20/2018 09:55	Grab	35	1.8	243.2	436.7	14.68	8.0	0.21	> 100	188	~ 0.03	1.3	27

2018 Mississippi River Water Quality Sample Data - Wash continued

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved	Ortho	Total	Hardness (mg/L CaCO3)	Total	Nitrate (mg/L)	Nitrate-	Sulfate (mg/L)	Total Biological	
					Phosphorus (mg/L)	Phosphate (mg/L)	Phosphorus (mg/L)		Kjeldahl Nitrogen (mg/L)		Nitrite (mg/L)		Oxygen Demand 5-day (mg/L)	
Wash	03/14/2018 10:25	Grab	9.6	26.3	< 0.02	< 0.01	~ 0.03	175	0.57	0.97	< 0.03	15.7	1.8	
Wash	04/09/2018 09:40	Grab	14.0	30.0	~ 0.04	0.01	0.07	162	0.99	0.99	< 0.03	15.7	2.9	
Wash	04/19/2018 09:50	Grab	17.0	32.1	~ 0.04	0.03	0.10	151	1.20	1.17	0.03	15.3	3.1	
Wash	05/03/2018 09:50	Grab	27.0	11.6	~ 0.02	0.01	0.08	113	0.89	0.42	< 0.03	9.7	3.1	
Wash	05/17/2018 09:30	Grab	39.0	14.7	< 0.02	< 0.01	0.07	134	0.91	0.19	< 0.03	11.6	2.5	
Wash	06/07/2018 10:00	Grab	18.0	12.9	~ 0.04	0.04	0.09	122	0.97	0.69	< 0.03	11.4	1.5	
Wash	06/21/2018 09:55	Grab	11.0	11.7	0.07	0.06	0.15	160	1.10	1.13	< 0.03	14.8	1.2	
Wash	07/05/2018 09:45	Grab	11.0	13.3	0.07	0.06	0.12	151	0.95	1.02	1.02	< 0.03	12.2	1.2
Wash	07/18/2018 09:45	Grab	13.0	11.0	0.08	0.05	0.12	149	0.97	0.46	0.46	< 0.03	9.0	1.5
Wash	08/02/2018 09:30	Grab		13.5	~ 0.05	0.03	0.11	148	1.10	0.50	0.50	< 0.03	16.1	2.2
Wash	08/16/2018 09:05	Grab	47.0	17.1	~ 0.03	~ 0.01	0.06	135	1.00	0.18	0.18	< 0.03	13.6	2.1
Wash	09/05/2018 09:25	Grab	26.0	17.5	~ 0.04	0.03	0.06	156	0.80	0.38	0.38	< 0.03	12.1	1.9
Wash	09/25/2018 09:38	Grab	16.0	19.3	~ 0.04	0.05	0.06	161	0.91	0.86	0.86	< 0.03	14.5	1.3
Wash	10/03/2018 09:30	Grab	17.0	19.6	0.05	0.03	0.08	210	1.00	1.48	1.48	< 0.03	25.0	1.4
Wash	10/17/2018 09:45	Grab	11.0	11.9	0.06	0.04	0.11	141	0.94	1.26	1.26	< 0.03	14.6	1.6
Wash	11/15/2018 09:55	Grab	6.7	18.4	~ 0.04	~ 0.01	~ 0.04	181	0.79	1.07	1.07	< 0.03	16.8	1.1
Wash	12/20/2018 09:55	Grab		19.0	< 0.02	< 0.01	~ 0.02	220	0.65	1.00	1.00	< 0.03	15.4	0.8

2018 Mississippi River Water Quality Sample Data - Wash continued

Station	Sample Time	Sample type	Total Cadmium (mg/L)	Total Chromium (mg/L)	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	03/14/2018 10:25	Grab							269	7.6	~ 2	~ 1
Wash	04/09/2018 09:40	Grab							269	10.0	4	~ 2
Wash	04/19/2018 09:50	Grab	< 0.0002	0.0003	0.0013	~ 0.0003	0.0011	< 0.0050	273	10.7	8	3
Wash	05/03/2018 09:50	Grab							125	11.4	13	~ 4
Wash	05/17/2018 09:30	Grab	< 0.0002	< 0.0005	0.0009	~ 0.0002	0.0009	0.0152	218	10.1	12	5
Wash	06/07/2018 10:00	Grab							224	11.4	14	4
Wash	06/21/2018 09:55	Grab							239	12.7	30	7
Wash	07/05/2018 09:45	Grab							252	14.1	21	6
Wash	07/18/2018 09:45	Grab	< 0.0002	0.0020	0.0014	~ 0.0005	0.0017	< 0.0050	209	16.9	22	6
Wash	08/02/2018 09:30	Grab							254	14.0	15	5
Wash	08/16/2018 09:05	Grab	< 0.0002	0.0004	0.0012	~ 0.0003	0.0012	0.0027	236	11.2	10	5
Wash	09/05/2018 09:25	Grab							225	9.6	15	5
Wash	09/25/2018 09:38	Grab							251	9.7	24	7
Wash	10/03/2018 09:30	Grab							279	11.8	12	~ 4
Wash	10/17/2018 09:45	Grab	< 0.0002	0.0008	0.0014	0.0005	0.0013	0.0035	223	12.6	21	6
Wash	11/15/2018 09:55	Grab							252	12.8	5	3
Wash	12/20/2018 09:55	Grab	< 0.0002	~ 0.0001	0.0005	< 0.0001	< 0.0050	< 0.0050	266	9.3	3	~ 1

2018 Mississippi River Water Quality Sample Data - Boom

Station	Sample Time	Sample type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous		
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Oxygen Demand	5-day Demand
Boom	02/14/2018 10:15	Grab	30	1.0	247.7	457.1	13.78	7.6	0.22	> 100	203	< 0.02	1.1	18
Boom	03/14/2018 10:45	Grab	30	2.9	283.6	490.9	13.22	8.0	0.24	> 100	191	< 0.02	1.4	20
Boom	04/09/2018 09:55	Grab	31	2.9	249.3	430.8	13.50	7.9	0.21	95	176	0.16	2.6	25
Boom	04/19/2018 10:15	Grab	45	3.8	266.1	446.8	13.01	7.5	0.21	81	170	0.13	2.7	31
Boom	05/03/2018 11:05	Grab	65	13.7	218.3	278.2	10.87	7.7	0.13	63	109	< 0.02	2.5	30
Boom	05/17/2018 10:30	Grab	65	19.3	307.7	345.2	9.42	8.0	0.17	46	143	~ 0.05	2.4	31
Boom	06/07/2018 11:00	Grab	65	22.1	336.0	355.9	8.92	7.6	0.17	49	158	< 0.02	1.4	37
Boom	06/21/2018 10:40	Grab	70	23.0	383.8	398.8	8.47	7.6	0.19	47	161	0.12	1.4	59
Boom	07/05/2018 10:35	Grab	75	24.4	380.9	385.3	8.34	7.8	0.18	58	158	0.02	1.8	41
Boom	07/18/2018 10:25	Grab	74	25.8	314.2	309.2	8.04	7.9	0.15	44	131	< 0.02	1.2	52
Boom	08/02/2018 10:35	Grab	61	23.8	382.7	391.9	8.75	8.1	0.19	61	175	< 0.02	1.7	40
Boom	08/16/2018 09:50	Grab	77	26.2	391.1	382.1	7.81	8.3	0.18	72	160	0.12	2.0	32
Boom	09/05/2018 10:00	Grab	62	22.5	349.7	367.4	8.45	7.7	0.18	80	161	0.04	1.9	36
Boom	09/25/2018 10:20	Grab	53	17.6	330.7	385.5	9.30	7.6	0.19	63	150	~ 0.04	1.2	31
Boom	10/03/2018 10:10	Grab	61	12.4	324.8	428.1	10.56	7.5	0.21	84	176	~ 0.02	1.5	35
Boom	10/17/2018 10:55	Grab	41	6.5	208.9	323.4	12.69	7.6	0.15	43	120	0.03	1.8	40
Boom	11/15/2018 10:25	Grab	35	2.1	194.8	346.2	14.18	7.6	0.16	89	160	0.08	1.2	31
Boom	12/20/2018 10:25	Grab	34	1.8	237.8	427.3	13.42	8.1	0.20	> 100	185	< 0.02	1.1	20

2018 Mississippi River Water Quality Sample Data - Boom continued

Station	Sample Time	Sample type	Chlorophyll-a (µg/l)	Chloride (mg/L)	Dissolved	Ortho	Total	Hardness (mg/L CaCO3)	Total	Nitrate (mg/L)	Nitrate-	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological
					Phosphorus (mg/L)	Phosphate (mg/L)	Phosphorus (mg/L)		Kjeldahl Nitrogen (mg/L)		Nitrite (mg/L)			Oxygen Demand 5-day (mg/L)
Boom	02/14/2018 10:15	Grab	1.6	20.5	< 0.02	~ 0.01	< 0.02	226	0.49	1.14		< 0.03	16.0	0.8
Boom	03/14/2018 10:45	Grab	8.4	27.4	< 0.02	< 0.01	~ 0.03	182	0.61	0.98		< 0.03	16.3	1.8
Boom	04/09/2018 09:55	Grab	16.0	21.8	~ 0.04	0.02	0.07	179	1.00	0.99		< 0.03	15.3	2.8
Boom	04/19/2018 10:15	Grab	16.0	24.6	~ 0.05	0.03	0.10	168	1.10	1.25		0.03	15.7	3.3
Boom	05/03/2018 11:05	Grab	27.0	10.9	~ 0.04	0.02	0.09	110	0.91	0.39		< 0.03	9.0	3.0
Boom	05/17/2018 10:30	Grab	33.0	14.1	~ 0.02	< 0.01	~ 0.05	134	0.74	0.13		< 0.03	9.6	2.8
Boom	06/07/2018 11:00	Grab	16.0	12.2	~ 0.04	0.03	0.08	107	0.86	0.60		< 0.03	10.1	1.3
Boom	06/21/2018 10:40	Grab	11.0	10.4	0.10	0.06	0.13	170	1.00	1.22		< 0.03	15.7	1.4
Boom	07/05/2018 10:35	Grab	9.1	12.6	0.07	0.06	0.11	126	0.98	0.84	0.84	< 0.03	10.6	1.8
Boom	07/18/2018 10:25	Grab	13.0	9.7	0.08	0.06	0.10	128	0.97	0.37	0.37	< 0.03	7.6	1.2
Boom	08/02/2018 10:35	Grab		12.7	0.19	0.03	0.09	143	1.10	1.17	1.17	< 0.03	15.4	1.9
Boom	08/16/2018 09:50	Grab	44.0	16.2	< 0.02	~ 0.01	0.06	124	0.92	0.12	0.12	< 0.03	13.3	2.3
Boom	09/05/2018 10:00	Grab	29.0	16.9	~ 0.05	0.03	0.06	168	0.97	0.42	0.42	< 0.03	12.1	2.1
Boom	09/25/2018 10:20	Grab	12.0	19.4	~ 0.03	0.04	0.06	166	0.87	0.82	0.82	< 0.03	13.3	1.1
Boom	10/03/2018 10:10	Grab	15.0	17.2	0.06	0.03	0.08	206	0.96	1.39	1.39	< 0.03	23.8	1.4
Boom	10/17/2018 10:55	Grab	11.3	11.4	0.06	0.04	0.12	154	1.10	3.38	3.38	< 0.03	12.6	1.9
Boom	11/15/2018 10:25	Grab	6.5	15.2	< 0.02	~ 0.01	0.05	171	0.70	1.12	1.12	< 0.03	14.9	1.1
Boom	12/20/2018 10:25	Grab		16.9	< 0.02	< 0.01	~ 0.04	204	0.54	0.96	0.96	< 0.03	15.1	0.8

2018 Mississippi River Water Quality Sample Data - Boom continued

Station	Sample Time	Sample type	Total Cadmium (mg/L)	Total Chromium (mg/L)	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	02/14/2018 10:15	Grab	< 0.0004	~ 0.0003	0.0022	~ 0.0002	0.0035	< 0.0100	268	7.7	~ 1	~ 1
Boom	03/14/2018 10:45	Grab							272	7.7	~ 2	~ 2
Boom	04/09/2018 09:55	Grab							223	10.9	5	~ 2
Boom	04/19/2018 10:15	Grab	< 0.0002	0.0002	0.0014	~ 0.0003	0.0011	< 0.0050	258	10.4	6	~ 2
Boom	05/03/2018 11:05	Grab							161	10.9	10	~ 4
Boom	05/17/2018 10:30	Grab	< 0.0002	< 0.0005	0.0007	~ 0.0002	0.0008	0.0032	206	9.8	11	5
Boom	06/07/2018 11:00	Grab							204	11.6	13	4
Boom	06/21/2018 10:40	Grab							244	12.6	31	6
Boom	07/05/2018 10:35	Grab							244	14.4	19	~ 5
Boom	07/18/2018 10:25	Grab	< 0.0002	0.0018	0.0012	~ 0.0004	0.0015	0.0082	207	17.6	19	5
Boom	08/02/2018 10:35	Grab							246	14.1	16	5
Boom	08/16/2018 09:50	Grab	< 0.0002	0.0002	0.0011	~ 0.0001	0.0010	0.0036	234	11.1	9	5
Boom	09/05/2018 10:00	Grab							231	9.6	15	6
Boom	09/25/2018 10:20	Grab							253	9.8	18	5
Boom	10/03/2018 10:10	Grab							272	11.9	11	~ 3
Boom	10/17/2018 10:55	Grab	< 0.0002	0.0008	0.0014	~ 0.0005	0.0014	0.0032	215	13.0	18	~ 4
Boom	11/15/2018 10:25	Grab							219	12.3	3	3
Boom	12/20/2018 10:25	Grab	< 0.0002	~ 0.0001	~ 0.0005	< 0.0001	< 0.0050	< 0.0050	264	9.1	~ 2	~ 1

2018 Mississippi River Water Quality Sample Data - MWMO

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)
MWMO	02/14/2018 10:58	Grab	30	0.6	261.3	489.1	13.76	7.6	0.23	> 100	198	< 0.02	1.1	21
MWMO	03/14/2018 11:30	Grab	35	2.5	265.8	465.6	15.96	8.0	0.22	> 100	192	0.16	1.4	24
MWMO	04/09/2018 10:35	Grab	32	2.4	251.2	441.2	13.75	8.0	0.21	> 100	181	0.16	2.7	28
MWMO	04/19/2018 10:40	Grab	45	3.0	231.5	399.3	13.30	7.6	0.19	75	151	0.19	2.7	32
MWMO	05/03/2018 11:20	Grab	65	14.3	238.7	299.7	11.15	7.8	0.14	57	120	< 0.02	2.5	30
MWMO	05/17/2018 10:40	Grab	68	19.4	323.7	362.8	9.33	8.1	0.17	46	152	0.07	2.8	36
MWMO	06/07/2018 11:10	Grab	65	22.2	345.4	365.1	9.19	7.7	0.17	59	168	< 0.02	1.6	34
MWMO	06/21/2018 10:55	Grab	70	23.3	371.3	383.8	8.95	7.6	0.18	40	153	< 0.02	1.4	48
MWMO	07/05/2018 10:55	Grab	75	24.8	402.5	404.2	8.49	7.8	0.19	42	163	< 0.02	1.3	38
MWMO	07/18/2018 10:40	Grab	76	26.0	331.3	325.1	8.25	7.9	0.15	42	135	< 0.02	1.1	43
MWMO	08/02/2018 10:45	Grab	61	23.4	370.9	382.3	8.86	8.1	0.18	64	167	~ 0.03	1.6	39
MWMO	08/16/2018 10:05	Grab	78	26.6	393.0	381.4	8.23	8.3	0.18	71	160	< 0.02	2.0	30
MWMO	09/05/2018 10:15	Grab	62	22.4	349.6	367.6	8.61	7.7	0.18	67	152	~ 0.03	1.8	33
MWMO	09/25/2018 10:35	Grab	53	17.5	331.2	386.4	9.39	7.7	0.19	62	157	~ 0.06	1.4	31
MWMO	10/03/2018 10:20	Grab	61	12.7	331.1	433.2	10.57	7.6	0.21	77	178	~ 0.02	1.5	38
MWMO	10/17/2018 11:05	Grab	42	6.4	208.1	322.5	12.55	7.6	0.15	48	162	< 0.02	1.7	37
MWMO	11/15/2018 11:30	Grab	38	1.3	187.4	342.8	16.66	7.7	0.16	> 100	157	0.07	1.3	31
MWMO	12/20/2018 11:05	Grab	34	1.9	240.4	429.6	13.49	8.1	0.20	> 100	182	< 0.02	1.2	24

2018 Mississippi River Water Quality Sample Data - MWMO 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)	Nitrate-Nitrite (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)
MWMO	02/14/2018 10:58	Grab	3.9	24.0	< 0.02	< 0.01	< 0.02	231	0.60	1.11		< 0.03	15.7	0.9
MWMO	03/14/2018 11:30	Grab	10.0	24.3	< 0.02	< 0.01	< 0.02	201	0.54	1.01		< 0.03	15.0	1.8
MWMO	04/09/2018 10:35	Grab	16.0	22.1	0.05	0.02	0.07	162	0.99	1.04		< 0.03	15.3	2.8
MWMO	04/19/2018 10:40	Grab	17.5	24.1	0.04	0.02	0.10	119	1.20	0.88		< 0.03	12.8	3.1
MWMO	05/03/2018 11:20	Grab	29.0	11.1	~ 0.05	0.01	0.09	120	0.99	0.47		< 0.03	10.1	2.7
MWMO	05/17/2018 10:40	Grab	41.0	14.8	0.03	< 0.01	0.06	137	0.96	0.17		< 0.03	11.8	3.1
MWMO	06/07/2018 11:10	Grab	16.0	12.5	~ 0.04	0.04	0.07	135	1.00	0.70		< 0.03	11.5	1.6
MWMO	06/21/2018 10:55	Grab	12.0	10.3	0.07	0.06	0.14	165	1.30	1.15		< 0.03	15.2	1.4
MWMO	07/05/2018 10:55	Grab	9.1	12.4	0.08	0.06	0.12	168	0.99	0.91	0.91	< 0.03	11.9	1.2
MWMO	07/18/2018 10:40	Grab	17.0	9.7	0.11	0.05	0.13	122	1.00	0.46	0.46	< 0.03	8.5	1.1
MWMO	08/02/2018 10:45	Grab		12.3	0.06	0.03	0.11	158	1.00	0.48	0.48	< 0.03	14.3	1.8
MWMO	08/16/2018 10:05	Grab	52.0	16.4	< 0.02	~ 0.01	0.06	151	1.00	0.14	0.14	< 0.03	13.0	2.5
MWMO	09/05/2018 10:15	Grab	27.0	15.6	~ 0.04	0.03	0.06	153	0.99	0.40	0.40	< 0.03	10.9	1.7
MWMO	09/25/2018 10:35	Grab	12.0	18.5	~ 0.04	0.04	0.08	153	0.90	0.86	0.86	< 0.03	13.6	1.6
MWMO	10/03/2018 10:20	Grab	15.0	16.8	0.07	0.04	0.08	216	0.95	1.43	1.43	< 0.03	24.7	1.6
MWMO	10/17/2018 11:05	Grab	9.9	13.8	0.06	0.06	0.12	193	1.00	2.11	2.11	< 0.03	22.0	1.6
MWMO	11/15/2018 11:30	Grab	6.1	14.8	0.05	~ 0.01	~ 0.05	157	0.66	0.85	0.85	< 0.03	14.0	1.2
MWMO	12/20/2018 11:05	Grab		16.4	< 0.02	< 0.01	~ 0.04	215	0.55	1.00	1.00	< 0.03	14.7	0.6

2018 Mississippi River Water Quality Sample Data - MWMO continued

Station	Sample Time	Sample type	Total Cadmium (mg/L)	Total Chromium (mg/L)	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	02/14/2018 10:58	Grab	< 0.0004	~ 0.0002	~ 0.0010	< 0.0002	~ 0.0009	< 0.0100	271	8.1	< 1	~ 1
MWMO	03/14/2018 11:30	Grab							263	8.2	4	3
MWMO	04/09/2018 10:35	Grab							266	10.5	5	3
MWMO	04/19/2018 10:40	Grab	< 0.0002	0.0002	0.0012	~ 0.0003	0.0009	< 0.0050	232	10.7	7	3
MWMO	05/03/2018 11:20	Grab							178	9.8	10	4
MWMO	05/17/2018 10:40	Grab	< 0.0002	< 0.0005	0.0007	0.0002	0.0009	0.0030	214	10.1	14	6
MWMO	06/07/2018 11:10	Grab							211	11.5	12	3
MWMO	06/21/2018 10:55	Grab							237	12.6	29	6
MWMO	07/05/2018 10:55	Grab							245	13.9	19	5
MWMO	07/18/2018 10:40	Grab	< 0.0002	0.0024	0.0015	~ 0.0004	0.0017	0.0087	222	17.0	21	5
MWMO	08/02/2018 10:45	Grab							252	14.2	16	~ 5
MWMO	08/16/2018 10:05	Grab	< 0.0002	0.0003	0.0010	~ 0.0002	0.0012	0.0026	239	11.2	10	5
MWMO	09/05/2018 10:15	Grab							225	9.6	15	5
MWMO	09/25/2018 10:35	Grab							240	9.6	22	5
MWMO	10/03/2018 10:20	Grab							275	11.6	12	~ 3
MWMO	10/17/2018 11:05	Grab	< 0.0002	0.0008	0.0014	~ 0.0004	0.0015	0.0023	261	12.4	19	~ 4
MWMO	11/15/2018 11:30	Grab							185	13.3	4	~ 2
MWMO	12/20/2018 11:05	Grab	< 0.0002	~ 0.0001	~ 0.0005	< 0.0001	< 0.0050	< 0.0050	252	9.2	~ 2	~ 1

2018 Mississippi River Water Quality Sample Data - Shingle Up

Station	Sample Time	Sample type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	Salinity (ppt)	Transparency (cm)	Alkalinity (mg/L)	Ammonia	Carbonaceous		
			Temperature (°F)	Temperature (°C)		Conductivity (µS/cm)	Oxygen (mg/L)				pH	Nitrogen (mg/L)	Oxygen Demand	5-day Demand
Shingle Up	03/14/2018 11:50	Grab	35	3.0	275.5	475.6	14.18	8.1	0.23	> 100	191	< 0.02	1.4	25
Shingle Up	04/09/2018 10:55	Grab	35	2.5	261.7	459.2	14.03	8.0	0.22	> 100	185	0.14	2.6	28
Shingle Up	04/19/2018 11:05	Grab	45	4.0	275.6	459.9	13.84	7.7	0.22	50	178	0.16	2.7	28
Shingle Up	05/03/2018 11:30	Grab	65	13.7	220.4	280.7	10.65	7.9	0.13	56	114	< 0.02	2.5	31
Shingle Up	05/17/2018 10:55	Grab	70	19.4	325.3	364.4	10.13	8.1	0.17	46	151	~ 0.02	2.4	33
Shingle Up	06/07/2018 11:25	Grab	65	22.1	335.4	355.3	9.32	7.7	0.17	66	161	0.03	1.6	37
Shingle Up	06/21/2018 11:06	Grab	70	22.9	342.3	356.7	8.49	7.7	0.17	47	148	~ 0.02	1.4	53
Shingle Up	07/05/2018 11:10	Grab	75	24.4	405.3	410.1	8.77	7.7	0.20	49	173	~ 0.03	1.3	38
Shingle Up	07/18/2018 10:45	Grab	77	25.8	314.0	309.4	8.26	7.9	0.15	39	127	< 0.02	1.3	52
Shingle Up	08/02/2018 11:00	Grab	62	23.3	381.0	393.6	9.09	8.1	0.19	64	173	0.05	1.7	41
Shingle Up	08/16/2018 10:20	Grab	75	26.5	387.8	377.3	8.70	8.4	0.18	63	160	0.11	2.2	30
Shingle Up	09/05/2018 10:25	Grab	62	22.2	342.8	362.2	8.76	7.8	0.17	73	149	< 0.02	1.6	41
Shingle Up	09/25/2018 10:50	Grab	53	17.4	328.3	383.9	9.50	7.7	0.18	51	158	~ 0.03	1.4	30
Shingle Up	10/03/2018 10:25	Grab	62	12.5	330.3	434.4	10.66	7.7	0.21	85	177	~ 0.02	1.5	36
Shingle Up	10/17/2018 11:15	Grab	42	6.5	210.8	326.1	12.57	7.6	0.16	44	134	~ 0.04	1.7	39
Shingle Up	11/15/2018 12:00	Grab	38	0.8	215.1	400.5	14.50	7.8	0.19	93	180	0.08	1.4	31
Shingle Up	12/20/2018 11:35	Grab	34	2.0	256.7	458.2	12.16	8.2	0.22	> 100	194	~ 0.03	1.1	24

2018 Mississippi River Water Quality Sample Data - Shingle Up 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)	Nitrate-Nitrite (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)
Shingle Up	03/14/2018 11:50	Grab	8.1	24.3	< 0.02	< 0.01	~ 0.03	178	0.64	1.07		< 0.03	16.1	1.8
Shingle Up	04/09/2018 10:55	Grab	17.0	22.3	~ 0.04	0.02	0.07	207	1.00	1.09		< 0.03	16.8	2.9
Shingle Up	04/19/2018 11:05	Grab	21.0	24.1	0.05	0.04	0.11	196	1.20	1.36		0.04	17.0	3.3
Shingle Up	05/03/2018 11:30	Grab	27.0	11.0	0.05	0.01	0.09	107	0.89	0.47		< 0.03	9.0	2.9
Shingle Up	05/17/2018 10:55	Grab	41.0	12.9	< 0.02	< 0.01	0.05	136	0.90	0.19		< 0.03	11.2	2.8
Shingle Up	06/07/2018 11:25	Grab	13.0	11.5	~ 0.04	0.03	0.07	106	0.83	0.58		< 0.03	9.8	1.5
Shingle Up	06/21/2018 11:06	Grab	4.7	9.6	0.06	0.05	0.12	137	1.10	1.01		< 0.03	12.4	1.3
Shingle Up	07/05/2018 11:10	Grab	9.2	12.4	0.07	0.07	0.13	169	0.93	1.04	1.04	< 0.03	13.2	1.2
Shingle Up	07/18/2018 10:45	Grab	14.0	9.2	0.08	0.05	0.12	129	0.96	0.40	0.40	< 0.03	7.4	1.2
Shingle Up	08/02/2018 11:00	Grab		12.3	0.05	0.03	0.16	154	1.05	0.55	0.55	< 0.03	15.9	1.9
Shingle Up	08/16/2018 10:20	Grab	47.0	15.5	~ 0.03	< 0.01	0.06	179	0.96	0.12	0.12	< 0.03	12.7	2.6
Shingle Up	09/05/2018 10:25	Grab	25.0	14.6	~ 0.04	0.03	0.06	158	0.81	0.41	0.41	< 0.03	10.9	1.6
Shingle Up	09/25/2018 10:50	Grab	12.0	15.1	~ 0.05	0.05	0.07	156	0.91	1.04	1.04	< 0.03	15.1	1.5
Shingle Up	10/03/2018 10:25	Grab	15.0	16.3	0.06	0.04	0.09	213	1.00	1.46	1.46	< 0.03	25.4	1.4
Shingle Up	10/17/2018 11:15	Grab	13.0	10.6	~ 0.04	0.04	0.11	158	0.86	1.15	1.15	< 0.03	13.3	1.6
Shingle Up	11/15/2018 12:00	Grab	7.5	17.4	< 0.02	0.01	~ 0.05	205	0.74	1.26	1.26	< 0.03	20.7	1.3
Shingle Up	12/20/2018 11:35	Grab		18.7	~ 0.03	< 0.01	~ 0.02	222	0.60	1.08	1.08	< 0.03	17.8	0.7

2018 Mississippi River Water Quality Sample Data - Shingle Up continued

Station	Sample Time	Sample type	Total Cadmium (mg/L)	Total Chromium (mg/L)	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	03/14/2018 11:50	Grab							254	9.9	~ 2	~ 1
Shingle Up	04/09/2018 10:55	Grab							278	11.5	6	~ 2
Shingle Up	04/19/2018 11:05	Grab	< 0.0002	0.0002	0.0013	~ 0.0003	0.0012	< 0.0050	269	10.0	8	4
Shingle Up	05/03/2018 11:30	Grab							165	10.7	12	~ 5
Shingle Up	05/17/2018 10:55	Grab	< 0.0002	< 0.0005	0.0007	~ 0.0002	0.0009	0.0032	211	10.1	13	5
Shingle Up	06/07/2018 11:25	Grab							204	11.7	12	4
Shingle Up	06/21/2018 11:06	Grab							243	12.9	26	6
Shingle Up	07/05/2018 11:10	Grab							267	14.1	21	~ 5
Shingle Up	07/18/2018 10:45	Grab	< 0.0002	0.0024	0.0013	~ 0.0004	0.0016	< 0.0050	215	17.4	18	5
Shingle Up	08/02/2018 11:00	Grab							255	14.7	17	6
Shingle Up	08/16/2018 10:20	Grab	< 0.0002	0.0003	0.0010	~ 0.0002	0.0011	0.0023	238	11.1	10	5
Shingle Up	09/05/2018 10:25	Grab							229	9.4	15	~ 5
Shingle Up	09/25/2018 10:50	Grab							259	9.7	26	6
Shingle Up	10/03/2018 10:25	Grab							277	11.8	11	4
Shingle Up	10/17/2018 11:15	Grab	< 0.0002	0.0009	0.0014	~ 0.0004	0.0014	0.0026	210	13.5	18	~ 4
Shingle Up	11/15/2018 12:00	Grab							266	12.3	6	~ 2
Shingle Up	12/20/2018 11:35	Grab	< 0.0002	~ 0.0002	0.0006	< 0.0001	< 0.0050	< 0.0050	275	9.2	~ 2	~ 1

2018 Mississippi River Water Quality Sample Data - Upper

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)
Upper	01/17/2018 11:00	Grab	6	0.0	288.8	552.4	16.07	8.3	0.26	> 100	194	0.08	1.3	29
Upper	02/14/2018 11:40	Grab	30	0.2	402.7	765.0	13.95	7.7	0.37	> 100	211	< 0.02	1.2	20
Upper	03/14/2018 12:20	Grab	35	3.5	283.2	480.4	14.10	8.2	0.23	> 100	192	0.07	1.4	17
Upper	04/09/2018 11:20	Grab	35	3.0	463.7	800.0	15.20	8.1	0.39	84	193	0.15	2.8	29
Upper	04/19/2018 11:40	Grab	45	4.1	304.0	506.0	13.82	7.9	0.24	78	177	0.16	2.9	27
Upper	05/03/2018 11:40	Grab	65	13.7	229.5	292.6	11.17	7.9	0.14	54	120	< 0.02	2.7	42
Upper	05/17/2018 10:25	Grab	75	18.3	369.1	423.2	10.27	8.2	0.20	50	172	0.08	2.9	34
Upper	06/07/2018 11:45	Grab	65	22.1	335.4	355.3	9.32	7.7	0.17	58	162	< 0.02	1.6	35
Upper	06/21/2018 11:20	Grab	72	22.8	369.4	385.6	8.67	7.8	0.18	36	162	0.08	1.5	50
Upper	07/05/2018 11:00	Grab	75	23.2	453.7	469.6	8.35	7.9	0.23	40	193	< 0.02	1.4	40
Upper	07/18/2018 11:00	Grab	77	25.9	342.8	336.9	8.42	8.0	0.16	39	138	< 0.02	1.3	45
Upper	08/02/2018 11:10	Grab	62	23.3	381.2	394.1	9.15	8.1	0.19	61	173	~ 0.06	1.7	40
Upper	08/16/2018 10:15	Grab	82	26.1	446.8	437.4	8.77	8.7	0.21	62	170	0.21	2.5	30
Upper	09/05/2018 11:30	Grab	63	21.5	420.7	451.1	8.71	7.9	0.22	67	177	< 0.02	1.9	41
Upper	09/25/2018 11:10	Grab	53	15.9	365.2	442.1	9.24	7.7	0.21	58	172	~ 0.04	1.3	32
Upper	10/03/2018 11:00	Grab	67	13.7	374.2	476.6	10.26	7.8	0.23	81	189	< 0.02	1.6	38
Upper	10/17/2018 11:05	Grab	40	7.6	280.4	419.7	12.26	7.9	0.20	39	128	< 0.02	1.6	42
Upper	11/15/2018 12:35	Grab	40	1.0	228.6	422.0	14.54	7.6	0.20	96	181	0.11	1.3	31
Upper	12/20/2018 12:10	Grab	34	2.0	261.3	465.4	11.02	8.2	0.22	> 100	196	< 0.02	1.2	27

2018 Mississippi River Water Quality Sample Data - Upper 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)	Nitrate-Nitrite (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)
Upper	01/17/2018 11:00	Grab	3.6	77.0	< 0.02	~ 0.01	< 0.02	235	0.65	1.10		< 0.03	21.1	0.7
Upper	02/14/2018 11:40	Grab	3.3	88.1	< 0.02	< 0.01	< 0.02	254	0.58	1.14		< 0.03	23.5	0.9
Upper	03/14/2018 12:20	Grab	11.0	24.2	~ 0.02	< 0.01	~ 0.03	200	0.48	1.08		< 0.03	16.1	1.8
Upper	04/09/2018 11:20	Grab	16.0	120.1	0.05	0.01	0.07	198	1.10	0.92		< 0.03	21.3	3.0
Upper	04/19/2018 11:40	Grab	19.0	27.2	0.06	0.04	0.11	164	1.20	1.39		0.04	18.1	3.1
Upper	05/03/2018 11:40	Grab	29.0	10.5	~ 0.03	0.01	0.08	117	0.90	0.44		< 0.03	9.77	2.8
Upper	05/17/2018 10:25	Grab	46.0	20.2	~ 0.05	< 0.01	0.32	153	1.20	0.42		< 0.03	17.1	3.6
Upper	06/07/2018 11:45	Grab	14.0	11.2	~ 0.04	0.04	0.07	120	0.86	0.70		< 0.03	11.4	1.5
Upper	06/21/2018 11:20	Grab	11.0	11.4	0.09	0.07	0.15	168	1.20	1.22		< 0.03	15.7	1.2
Upper	07/05/2018 11:00	Grab	13.0	17.5	0.09	0.08	0.14	177	1.00	1.49	1.49	< 0.03	18.7	1.4
Upper	07/18/2018 11:00	Grab	16.0	9.8	0.07	0.06	0.13	136	1.00	0.47	0.47	< 0.03	9.64	1.3
Upper	08/02/2018 11:10	Grab		12.1	~ 0.04	0.04	0.10	151	1.10	0.56	0.56	< 0.03	15.9	1.8
Upper	08/16/2018 10:15	Grab	42.0	27.0	< 0.02	< 0.01	0.06	207	1.10	0.12	0.12	< 0.03	20.9	2.7
Upper	09/05/2018 11:30	Grab	34.0	25.4	~ 0.03	0.03	0.07	202	0.97	0.42	0.42	< 0.03	19.3	2.4
Upper	09/25/2018 11:10	Grab	12.0	22.3	0.05	0.06	0.08	182	0.81	1.18	1.18	< 0.03	20.4	1.4
Upper	10/03/2018 11:00	Grab	15.0	19.4	0.06	0.04	0.10	224	1.00	1.59	1.59	< 0.03	30.1	1.5
Upper	10/17/2018 11:05	Grab	7.9	11.3	~ 0.05	0.04	0.28	132	0.99	1.22	1.22	< 0.03	12.9	1.9
Upper	11/15/2018 12:35	Grab	10.0	19.8	0.06	0.02	0.06	198	0.72	1.20	1.20	< 0.03	21.4	1.2
Upper	12/20/2018 12:10	Grab		21.5	< 0.02	< 0.01	~ 0.02	232	0.56	1.12	1.12	< 0.03	18.8	0.7

2018 Mississippi River Water Quality Sample Data - Upper continued

Station	Sample Time	Sample type	Total Cadmium (mg/L)	Total Chromium (mg/L)	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	01/17/2018 11:00	Grab							< 5	8.1	< 1	~ 1
Upper	02/14/2018 11:40	Grab	< 0.0004	~ 0.0002	0.0017	< 0.0002	~ 0.0011	< 0.0100	376	7.6	< 1	~ 1
Upper	03/14/2018 12:20	Grab							270	7.9	~ 2	~ 2
Upper	04/09/2018 11:20	Grab							461	9.6	5	3
Upper	04/19/2018 11:40	Grab	< 0.0002	0.0002	0.0013	~ 0.0003	0.0012	< 0.0050	278	10.4	6	3
Upper	05/03/2018 11:40	Grab							168	10.7	12	~ 5
Upper	05/17/2018 10:25	Grab	< 0.0002	0.0014	0.0009	~ 0.0002	0.0016	0.0035	250	9.8	13	6
Upper	06/07/2018 11:45	Grab							221	11.5	14	4
Upper	06/21/2018 11:20	Grab							247	12.5	30	7
Upper	07/05/2018 11:00	Grab							299	13.6	21	~ 5
Upper	07/18/2018 11:00	Grab	< 0.0002	0.0024	0.0014	~ 0.0004	0.0018	< 0.0050	221	17.2	23	6
Upper	08/02/2018 11:10	Grab							253	13.8	15	5
Upper	08/16/2018 10:15	Grab	< 0.0002	0.0002	0.0012	~ 0.0001	0.0011	0.0028	274	10.8	8	5
Upper	09/05/2018 11:30	Grab							270	8.9	16	7
Upper	09/25/2018 11:10	Grab							282	9.5	17	5
Upper	10/03/2018 11:00	Grab							303	11.8	10	~ 4
Upper	10/17/2018 11:05	Grab	< 0.0002	0.0008	0.0013	~ 0.0004	0.0014	0.0027	207	13.3	20	~ 4
Upper	11/15/2018 12:35	Grab							269	12.5	7	3
Upper	12/20/2018 12:10	Grab	< 0.0002	~ 0.0001	0.0005	< 0.0001	< 0.0050	< 0.0050	277	9.1	~ 2	~ 1