

2019 Mississippi River Water Quality Data - Ford

Station	Sample Time	Sample type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	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	03/28/2019 09:50	Grab	41	4.1	204.8	341.0	13.50	7.1	0.16	31	94	0.50	3.0	99	8.4
Ford	06/20/2019 08:20	Grab	65	21.8	416.8	444.2	9.35	7.6	0.21	47	191	~ 0.02	1.8	33	23.0
Ford	08/15/2019 08:25	Grab	70	24.2	415.8	422.3	8.49	7.2	0.20	6	167	< 0.02	1.8	32	22.0
Ford	10/17/2019 08:05	Grab	38	8.1	240.2	354.9	12.59	7.0	0.17	75	157	~ 0.03	0.8	32	3.4

2019 Mississippi River Water Quality Data - Meeker

Station	Sample Time	Sample type	Air	Water	Conductivity (µS/cm)	Specific	Dissolved	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	01/16/2019 08:45	Grab	7	0.5	237.6	446.5	15.19	8.0	0.21	> 100	185	~ 0.05	1.0	21	7.4
Meeker	03/28/2019 10:10	Grab	41	3.2	168.9	289.7	14.15	7.2	0.14	39	88	0.48	2.8	43	10.0
Meeker	04/04/2019 08:55	Grab	36	3.9	167.3	280.6	14.08	7.3	0.13	54	104	0.21	2.1	32	8.4
Meeker	04/18/2019 09:05	Grab	43	6.1	195.4	305.9	12.82	7.7	0.15	41	124	< 0.02	1.7	41	26.0
Meeker	05/02/2019 08:05	Grab	45	9.2	218.5	312.9	12.22	7.6	0.15	75	113	< 0.02	1.7	33	19.0
Meeker	05/16/2019 09:15	Grab	75	16.5	294.9	352.2	10.17	7.6	0.17	65	134	< 0.02	2.1	40	26.0
Meeker	06/06/2019 08:30	Grab	70	21.3	402.6	432.8	9.49	7.2	0.21	58	166	< 0.02	1.7	38	17.0
Meeker	06/20/2019 08:40	Grab	65	21.8	417.8	445.4	9.34	7.4	0.21	44	188	< 0.02	1.6	30	19.0
Meeker	07/03/2019 07:55	Grab	70	24.7	429.0	431.1	9.00	7.6	0.21	57	164	< 0.02	1.1	26	9.1
Meeker	07/18/2019 08:35	Grab	75	26.4	448.2	436.4	8.45	7.9	0.21	43	166	< 0.02	1.6	33	17.0
Meeker	08/01/2019 08:50	Grab	70	23.9	422.6	431.5	9.57	7.3	0.21	63	167	~ 0.04	1.2	33	22.0
Meeker	08/15/2019 08:35	Grab	70	24.0	413.0	421.0	8.52	6.9	0.20	56	170	< 0.02	1.7	33	21.0
Meeker	09/05/2019 08:20	Grab	65	20.3	401.6	441.4	9.29	7.5	0.21	73	169	< 0.02	1.4	22	30.0
Meeker	09/19/2019 08:15	Grab	75	20.8	351.5	381.9	9.58	7.4	0.18	41	168	< 0.02	1.2	32	14.0
Meeker	10/03/2019 08:05	Grab	55	13.8	288.0	366.6	10.97	7.7	0.18	56	162	~ 0.04	1.1	46	6.9
Meeker	10/17/2019 08:30	Grab	39	8.0	241.2	357.1	12.56	7.2	0.17	65	156	~ 0.03	0.8	34	5.4
Meeker	11/07/2019 09:15	Grab	20	1.8	200.4	359.5	15.08	7.9	0.17	85	93.7	~ 0.05	1.2	32	5.2
Meeker	11/21/2019 09:05	Grab	34	2.9	222.2	384.4	13.97	8.6	0.18	89	162	~ 0.05	1.8	29	6.5

2019 Mississippi River Water Quality Data - Ford continued

Station	Sample Time	Sample type	Chloride (mg/L)	Dissolved	Ortho	Total	Hardness	Total	Nitrate-		Sulfate (mg/L)	Total Biological	Total	Total	Total	
				Phosphorus (mg/L)	Phosphate (mg/L)	Phosphorus (mg/L)	(mg/L CaCO3)	Kjeldahl Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)		Nitrite (mg/L)	Oxygen Demand 5-day (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)
Ford	03/28/2019 09:50	Grab	14.4	0.21	0.17	0.33	90	1.80	1.06	1.12	0.06	7.7	4.9			
Ford	06/20/2019 08:20	Grab	16.2	0.06	0.04	0.09	135	0.81	0.47	0.47	< 0.06	13.9	1.9			
Ford	08/15/2019 08:25	Grab	20.0	~ 0.03	0.02	0.06	158	0.78	0.37	0.37	< 0.06	12.3	2.1	< 0.0001	~ 0.0002	< 0.0050
Ford	10/17/2019 08:05	Grab	11.4	~ 0.05	0.04	0.07	169	0.81	0.82	0.82	< 0.06	11.9	0.8	< 0.0001	~ 0.0004	~ 0.0009

2019 Mississippi River Water Quality Data - Meeker continued

Station	Sample Time	Sample type	Chloride (mg/L)	Dissolved	Ortho	Total	Hardness	Total	Nitrate-		Sulfate (mg/L)	Total Biological	Total	Total	Total	
				Phosphorus (mg/L)	Phosphate (mg/L)	Phosphorus (mg/L)	(mg/L CaCO3)	Kjeldahl Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)		Nitrite (mg/L)	Oxygen Demand 5-day (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)
Meeker	01/16/2019 08:45	Grab	21.6	< 0.02	< 0.01	~ 0.03	215	0.71	0.93	0.93	< 0.03	11.0	0.7			
Meeker	03/28/2019 10:10	Grab	13.5	0.21	0.16	0.32	88	1.80	0.92	0.97	0.06	7.6	4.8			
Meeker	04/04/2019 08:55	Grab	11.7	0.09	0.08	0.16	91	1.10	0.74	0.74	< 0.06	8.0	2.6			
Meeker	04/18/2019 09:05	Grab	15.0	~ 0.03	~ 0.01	0.07	111	0.81	0.64	0.64	< 0.06	9.6	2.0	< 0.0001	0.0006	0.0018
Meeker	05/02/2019 08:05	Grab	14.2	< 0.02	~ 0.01	~ 0.05	130	0.73	0.41	0.41	< 0.06	11.0	1.7			
Meeker	05/16/2019 09:15	Grab	14.4	< 0.02	< 0.01	0.05	127	0.85	0.44	0.44	< 0.06	14.9	2.5	< 0.0001	~ 0.0003	~ 0.0009
Meeker	06/06/2019 08:30	Grab	17.6	~ 0.04	0.03	0.07	178	0.87	0.91	0.91	< 0.06	14.9	1.6	< 0.0001	~ 0.0003	~ 0.0009
Meeker	06/20/2019 08:40	Grab	18.4	0.07	0.04	0.10	172	0.84	0.46	0.46	< 0.06	14.2	1.8			
Meeker	07/03/2019 07:55	Grab	16.7	0.05	0.05	0.11	127	0.86	0.88	0.88	< 0.06	12.4	1.3			
Meeker	07/18/2019 08:35	Grab	16.3	0.71	0.07	0.17	199	0.66	0.74	0.74	< 0.06	14.0	1.6	< 0.0001	~ 0.0004	0.0012
Meeker	08/01/2019 08:50	Grab	17.0	~ 0.04	0.03	0.08	164	0.74	0.38	0.38	< 0.06	11.3	1.4			
Meeker	08/15/2019 08:35	Grab	19.4	~ 0.03	0.02	0.07	159	0.72	0.39	0.39	< 0.06	12.1	2.1	< 0.0001	~ 0.0003	< 0.0050
Meeker	09/05/2019 08:20	Grab	20.9	~ 0.04	0.02	0.12	161	0.98	0.50	0.50	< 0.06	13.0	1.6	< 0.0001	~ 0.0004	~ 0.0010
Meeker	09/19/2019 08:15	Grab	13.3	0.05	0.06	0.13	182	0.84	1.10	1.10	< 0.06	13.7	1.3			
Meeker	10/03/2019 08:05	Grab	15.0	0.09	0.05	0.14	158	0.88	0.60	0.60	< 0.06	10.3	1.2	< 0.0001	0.0005	0.0026
Meeker	10/17/2019 08:30	Grab	11.5	~ 0.05	0.03	0.07	147	0.80	0.82	0.82	< 0.06	11.9	0.9	< 0.0001	~ 0.0004	~ 0.0009
Meeker	11/07/2019 09:15	Grab	14.5	< 0.02	0.01	0.05	138	0.70	0.73	0.73	< 0.06	11.4	0.9			
Meeker	11/21/2019 09:05	Grab	17.3	< 0.02	0.02	~ 0.05	163	0.82	0.91	0.91	< 0.06	12.7	1.5	< 0.0001	~ 0.0004	0.0010

2019 Mississippi River Water Quality 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	03/28/2019 09:50	Grab				169	11.5	28	7
Ford	06/20/2019 08:20	Grab				247	10.2	12	~ 4
Ford	08/15/2019 08:25	Grab	< 0.0003	0.0008	~ 0.0039	237	8.3	9	4
Ford	10/17/2019 08:05	Grab	< 0.0003	0.0017	0.0050	228	12.1	8	~ 2

2019 Mississippi River Water Quality 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	01/16/2019 08:45	Grab				238	6.4	~ 2	~ 1
Meeker	03/28/2019 10:10	Grab				156	11.4	29	7
Meeker	04/04/2019 08:55	Grab				175	10.3	15	5
Meeker	04/18/2019 09:05	Grab	~ 0.0009	0.0013	~ 0.0042	194	9.4	15	4
Meeker	05/02/2019 08:05	Grab				187	9.9	11	3
Meeker	05/16/2019 09:15	Grab	~ 0.0007	0.0010	~ 0.0041	199	11.0	11	5
Meeker	06/06/2019 08:30	Grab	< 0.0003	0.0012	~ 0.0017	252	12.4	12	3
Meeker	06/20/2019 08:40	Grab				248	11.3	12	4
Meeker	07/03/2019 07:55	Grab				243	9.9	20	5
Meeker	07/18/2019 08:35	Grab	~ 0.0003	0.0013	~ 0.0037	249	12.2	15	~ 5
Meeker	08/01/2019 08:50	Grab				247	10.4	13	5
Meeker	08/15/2019 08:35	Grab	~ 0.0003	0.0008	~ 0.0013	237	8.5	10	4
Meeker	09/05/2019 08:20	Grab	~ 0.0003	0.0010	~ 0.0017	250	8.6	13	5
Meeker	09/19/2019 08:15	Grab				246	9.9	32	7
Meeker	10/03/2019 08:05	Grab	< 0.0003	0.0013	~ 0.0027	243	10.9	16	4
Meeker	10/17/2019 08:30	Grab	< 0.0003	0.0011	~ 0.0016	224	12.1	9	~ 2
Meeker	11/07/2019 09:15	Grab				216	10.7	5	~ 1
Meeker	11/21/2019 09:05	Grab	< 0.0003	0.0008	~ 0.0034	236	9.3	5	~ 2

2019 Mississippi River Water Quality Data - Wash

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	01/16/2019 09:30	Grab	7	0.2	231.7	440.4	14.92	8.0	0.21	> 100	191	0.07	1.3	20
Wash	03/28/2019 10:30	Grab	41	3.4	169.2	287.6	13.96	7.4	0.14	37	94	0.49	2.9	49
Wash	04/04/2019 09:15	Grab	37	3.8	170.1	285.5	13.98	7.3	0.14	43	106	0.23	2.1	34
Wash	04/18/2019 09:30	Grab	43	6.6	212.8	327.7	12.75	7.6	0.16	51	129	~ 0.02	1.8	39
Wash	05/02/2019 08:30	Grab	45	9.2	228.8	327.7	12.26	7.5	0.16	64	121	~ 0.03	1.5	34
Wash	05/16/2019 09:40	Grab	75	17.3	307.8	360.5	10.10	7.5	0.17	60	139	< 0.02	2.1	42
Wash	06/06/2019 08:45	Grab	70	21.4	404.9	435.0	9.51	7.3	0.21	58	169	< 0.02	1.6	36
Wash	06/20/2019 08:55	Grab	65	21.8	414.0	441.2	9.54	7.4	0.21	43	184	< 0.02	1.8	33
Wash	07/03/2019 08:10	Grab	70	24.7	427.2	429.4	9.02	7.6	0.21	48	166	< 0.02	1.0	24
Wash	07/18/2019 08:50	Grab	75	26.4	435.0	423.9	8.84	7.4	0.20	37	161	< 0.02	1.4	51
Wash	08/01/2019 09:05	Grab	70	24.1	425.8	433.2	9.53	7.3	0.21	59	165	< 0.02	1.3	32
Wash	08/15/2019 08:50	Grab	70	24.1	413.8	421.4	8.54	7.0	0.20	66	162	< 0.02	1.6	29
Wash	09/05/2019 08:35	Grab	65	20.4	399.5	438.0	9.99	7.1	0.21	70	167	< 0.02	1.3	24
Wash	09/19/2019 08:25	Grab	75	20.7	345.6	376.2	9.69	6.9	0.18	41	167	< 0.02	1.2	36
Wash	10/03/2019 08:15	Grab	55	13.7	287.1	365.9	11.13	6.9	0.18	57	158	~ 0.02	1.2	36
Wash	10/17/2019 08:40	Grab	41	8.0	241.7	358.2	12.68	7.0	0.17	69	158	~ 0.02	0.9	34
Wash	11/07/2019 09:40	Grab	20	0.7	206.1	384.1	14.75	7.2	0.18	84	339	~ 0.04	1.2	29
Wash	11/21/2019 09:25	Grab	35	2.9	227.6	393.6	13.81	8.2	0.19	79	161	0.06	2.6	32

2019 Mississippi River Water Quality 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-	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)
Wash	01/16/2019 09:30	Grab	6.2	21.1	< 0.02	< 0.01	~ 0.03	189	0.60	1.02	1.02	< 0.03	12.6	0.8
Wash	03/28/2019 10:30	Grab	11.0	14.8	0.20	0.16	0.33	84	1.70	1.03	1.09	0.06	7.9	4.9
Wash	04/04/2019 09:15	Grab	11.0	13.0	0.11	0.08	0.17	99	1.10	0.80	0.80	< 0.06	8.6	2.6
Wash	04/18/2019 09:30	Grab	24.0	19.0	~ 0.04	~ 0.01	0.08	119	0.82	0.71	0.71	< 0.06	10.1	2.0
Wash	05/02/2019 08:30	Grab	22.0	13.6	< 0.02	~ 0.01	~ 0.05	150	0.78	0.52	0.52	< 0.06	12.2	1.6
Wash	05/16/2019 09:40	Grab		14.2	< 0.02	< 0.01	0.09	151	0.80	0.57	0.57	< 0.06	16.3	2.5
Wash	06/06/2019 08:45	Grab	19.0	18.0	~ 0.03	0.03	0.07	176	0.80	1.02	1.02	< 0.06	15.2	1.6
Wash	06/20/2019 08:55	Grab	20.0	14.9	0.07	0.04	0.09	171	0.79	0.42	0.42	< 0.06	13.5	1.8
Wash	07/03/2019 08:10	Grab	11.0	16.3	0.06	0.05	0.14	144	0.99	0.96	0.96	< 0.06	10.9	1.3
Wash	07/18/2019 08:50	Grab	13.0	16.0	0.06	0.07	0.15	168	0.66	0.73	0.73	< 0.06	13.6	1.3
Wash	08/01/2019 09:05	Grab	25.0	17.1	~ 0.05	0.03	0.10	134	0.86	0.45	0.45	< 0.06	11.4	1.6
Wash	08/15/2019 08:50	Grab	20.0	19.5	~ 0.03	0.02	0.07	142	0.71	0.39	0.39	< 0.06	12.1	1.9
Wash	09/05/2019 08:35	Grab	28.0	20.6	~ 0.04	0.02	0.09	168	0.87	0.46	0.46	< 0.06	12.7	1.8
Wash	09/19/2019 08:25	Grab	16.0	13.2	~ 0.04	0.06	0.13	163	0.87	1.16	1.16	< 0.06	13.4	1.3
Wash	10/03/2019 08:15	Grab	7.0	14.2	0.09	0.05	0.11	154	0.92	0.63	0.63	< 0.06	10.4	1.2
Wash	10/17/2019 08:40	Grab	4.1	11.3	~ 0.05	0.03	0.10	145	0.81	0.80	0.80	< 0.06	12.0	0.9
Wash	11/07/2019 09:40	Grab	5.9	14.8	< 0.02	0.02	~ 0.05	130	0.66	0.81	0.81	< 0.06	12.9	1.0
Wash	11/21/2019 09:25	Grab	4.5	17.9	~ 0.03	0.02	0.07	160	0.68	0.98	0.98	< 0.06	13.6	2.4

2019 Mississippi River Water Quality 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	01/16/2019 09:30	Grab							281	7.6	~ 2	~ 1
Wash	03/28/2019 10:30	Grab							167	11.6	37	8
Wash	04/04/2019 09:15	Grab							170	9.8	14	~ 4
Wash	04/18/2019 09:30	Grab	< 0.0001	0.0006	0.0037	~ 0.0009	0.0014	~ 0.0048	204	10.0	16	6
Wash	05/02/2019 08:30	Grab							202	9.9	9	3
Wash	05/16/2019 09:40	Grab	< 0.0001	~ 0.0003	~ 0.0009	~ 0.0009	0.0009	0.0083	206	11.0	11	4
Wash	06/06/2019 08:45	Grab	~ 0.0001	~ 0.0003	~ 0.0009	< 0.0003	0.0012	0.0059	247	12.2	11	3
Wash	06/20/2019 08:55	Grab							249	11.2	12	4
Wash	07/03/2019 08:10	Grab							245	10.0	21	5
Wash	07/18/2019 08:50	Grab	< 0.0001	~ 0.0003	0.0012	~ 0.0003	0.0012	~ 0.0013	244	12.1	14	~ 4
Wash	08/01/2019 09:05	Grab							249	10.2	13	5
Wash	08/15/2019 08:50	Grab	~ 0.0002	~ 0.0004	< 0.0050	~ 0.0005	0.0011	~ 0.0016	239	8.7	9	4
Wash	09/05/2019 08:35	Grab	< 0.0001	~ 0.0004	0.0011	~ 0.0003	0.0009	< 0.0012	249	8.5	14	5
Wash	09/19/2019 08:25	Grab							249	9.7	33	6
Wash	10/03/2019 08:15	Grab	< 0.0001	0.0006	0.0012	< 0.0003	0.0013	~ 0.0020	249	10.9	16	4
Wash	10/17/2019 08:40	Grab	< 0.0001	~ 0.0004	~ 0.0008	< 0.0003	0.0010	~ 0.0017	234	11.7	9	3
Wash	11/07/2019 09:40	Grab							238	10.4	6	~ 2
Wash	11/21/2019 09:25	Grab	< 0.0001	0.0005	0.0014	~ 0.0004	0.0009	0.0061	245	9.3	7	3

2019 Mississippi River Water Quality Data - Boom

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)				Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)	Oxygen Demand (mg/L)	
Boom	01/16/2019 09:55	Grab	8	0.0	227.3	435.4	14.61	8.1	0.21	> 100	186	0.07	1.1	22
Boom	02/21/2019 09:55	Grab	11	1.3	250.3	457.2	13.62	7.6	0.22	> 100	192	0.06	1.1	21
Boom	03/28/2019 10:55	Grab	43	3.2	159.0	272.1	13.66	7.6	0.13	37	94	0.50	2.9	22
Boom	04/04/2019 09:35	Grab	38	3.5	176.5	299.8	13.61	7.6	0.14	62	110	0.20	1.9	38
Boom	04/18/2019 09:50	Grab	43	6.3	197.5	306.9	12.54	7.7	0.15	49	131	< 0.02	2.1	82
Boom	05/02/2019 08:55	Grab	46	9.6	225.6	319.7	11.82	7.6	0.15	68	116	~ 0.03	1.6	33
Boom	05/16/2019 10:00	Grab	75	18.1	297.1	341.9	9.99	7.4	0.16	46	136	< 0.02	1.8	39
Boom	06/06/2019 09:45	Grab	80	21.5	390.8	419.1	9.07	7.6	0.20	73	167	< 0.02	1.7	34
Boom	06/20/2019 09:55	Grab	65	21.7	405.8	432.9	8.98	7.6	0.21	50	186	~ 0.02	2.0	30
Boom	07/03/2019 09:00	Grab	70	24.6	410.9	413.7	8.25	7.8	0.20	66	164	< 0.02	0.9	32
Boom	07/18/2019 09:50	Grab	75	26.3	421.0	410.9	7.93	7.6	0.20	56	164	< 0.02	1.4	35
Boom	08/01/2019 10:00	Grab	70	24.1	411.8	418.6	8.66	7.5	0.20	70	161	~ 0.02	1.9	34
Boom	08/15/2019 09:45	Grab	70	24.2	402.8	409.2	8.36	7.4	0.20	65	163	< 0.02	1.2	28
Boom	09/05/2019 09:25	Grab	65	20.5	394.4	431.2	8.94	7.5	0.21	80	165	< 0.02	1.4	21
Boom	09/19/2019 09:20	Grab	75	20.6	331.7	362.4	8.97	7.1	0.17	52	160	~ 0.03	1.2	29
Boom	10/03/2019 08:55	Grab	50	13.7	276.7	353.0	10.55	6.9	0.17	65	147	~ 0.04	1.3	34
Boom	10/17/2019 09:30	Grab	45	7.9	229.6	341.0	12.04	7.1	0.16	80	154	< 0.02	0.6	32
Boom	11/07/2019 10:15	Grab	20	1.6	218.7	394.9	14.83	7.0	0.19	76	183	~ 0.05	1.2	28
Boom	11/21/2019 09:50	Grab	36	3.0	230.6	397.5	13.59	7.8	0.19	88	168	~ 0.04	1.1	28
Boom	12/12/2019 10:00	Grab	14	1.1	251.3	463.2	14.37	7.4	0.22	> 100	190	~ 0.05	0.9	26

2019 Mississippi River Water Quality - Boom 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)
Boom	01/16/2019 09:55	Grab	5.6	18.5	< 0.02	< 0.01	~ 0.03	188	0.65	0.90	0.90	< 0.03	10.3	0.7
Boom	02/21/2019 09:55	Grab	3.3	19.5	< 0.02	~ 0.01	~ 0.03	174	0.55	1.04	1.04	< 0.03	13.4	0.8
Boom	03/28/2019 10:55	Grab	8.5	14.1	0.22	0.19	0.34	85	1.70	1.07	1.14	0.06	7.8	5.7
Boom	04/04/2019 09:35	Grab	11.0	12.4	0.12	0.09	0.18	89	1.20	0.88	0.88	< 0.06	9.3	2.7
Boom	04/18/2019 09:50	Grab	25.0	12.9	~ 0.03	~ 0.01	0.08	118	0.86	0.67	0.67	< 0.06	9.1	2.1
Boom	05/02/2019 08:55	Grab	18.0	12.7	~ 0.04	~ 0.01	~ 0.05	150	1.00	0.47	0.47	< 0.06	11.4	1.6
Boom	05/16/2019 10:00	Grab		11.8	< 0.02	< 0.01	0.07	137	0.73	0.61	0.61	< 0.06	14.9	2.3
Boom	06/06/2019 09:45	Grab	19.0	15.9	0.05	0.07	0.06	178	0.89	0.93	0.93	< 0.06	13.7	1.6
Boom	06/20/2019 09:55	Grab	17.0	15.8	~ 0.04	0.04	0.09	149	0.88	0.42	0.42	< 0.06	13.6	1.8
Boom	07/03/2019 09:00	Grab	9.1	13.7	~ 0.05	0.05	0.12	166	0.77	0.86	0.86	< 0.06	9.9	1.6
Boom	07/18/2019 09:50	Grab	16.0	14.1	0.10	0.07	0.13	176	0.87	0.67	0.67	< 0.06	12.7	1.2
Boom	08/01/2019 10:00	Grab	22.0	16.1	~ 0.05	0.03	0.09	174	0.78	0.42	0.42	< 0.06	10.6	1.9
Boom	08/15/2019 09:45	Grab	20.0	16.5	~ 0.04	0.02	0.07	140	0.67	0.39	0.39	< 0.06	11.2	1.5
Boom	09/05/2019 09:25	Grab	22.0	17.9	~ 0.05	0.02	0.06	150	0.79	0.49	0.49	< 0.06	12.2	1.7
Boom	09/19/2019 09:20	Grab	15.0	12.3	~ 0.03	0.05	0.12	176	0.76	0.85	0.85	< 0.06	12.0	1.4
Boom	10/03/2019 08:55	Grab	6.8	13.7	0.07	0.04	0.08	173	0.88	0.50	0.50	< 0.06	8.6	1.3
Boom	10/17/2019 09:30	Grab	3.7	11.5	0.06	0.03	0.10	110	0.84	0.70	0.70	< 0.06	11.2	0.9
Boom	11/07/2019 10:15	Grab	6.0	14.2	< 0.02	0.02	~ 0.05	140	0.73	0.94	0.94	< 0.06	14.3	1.0
Boom	11/21/2019 09:50	Grab	6.2	15.7	< 0.02	0.01	0.05	177	0.63	1.05	1.05	< 0.06	13.2	1.6
Boom	12/12/2019 10:00	Grab	5.6	20.0	< 0.02	0.01	~ 0.02	217	0.66	1.13	1.13	< 0.06	10.8	0.8

2019 Mississippi River Water Quality - 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	01/16/2019 09:55	Grab							256	7.0	~ 1	~ 1
Boom	02/21/2019 09:55	Grab	< 0.0002	~ 0.0001	0.0006	~ 0.0001	~ 0.0006	0.0020	266	8.1	~ 1	~ 1
Boom	03/28/2019 10:55	Grab							169	11.6	35	10
Boom	04/04/2019 09:35	Grab							198	9.9	15	~ 4
Boom	04/18/2019 09:50	Grab	< 0.0001	0.0005	0.0012	~ 0.0007	0.0012	~ 0.0025	186	9.7	16	6
Boom	05/02/2019 08:55	Grab							191	9.8	10	3
Boom	05/16/2019 10:00	Grab	< 0.0001	~ 0.0003	~ 0.0008	~ 0.0008	0.0010	~ 0.0039	205	11.6	9	3
Boom	06/06/2019 09:45	Grab	< 0.0001	~ 0.0003	~ 0.0008	< 0.0003	0.0012	0.0051	237	12.2	10	3
Boom	06/20/2019 09:55	Grab							249	10.3	12	~ 3
Boom	07/03/2019 09:00	Grab							232	9.9	20	5
Boom	07/18/2019 09:50	Grab	< 0.0001	~ 0.0004	0.0011	< 0.0003	0.0013	< 0.0012	232	12.1	13	3
Boom	08/01/2019 10:00	Grab							234	10.0	13	5
Boom	08/15/2019 09:45	Grab	< 0.0001	~ 0.0003	< 0.0050	< 0.0003	0.0009	~ 0.0016	232	8.7	9	3
Boom	09/05/2019 09:25	Grab	< 0.0001	~ 0.0004	0.0010	< 0.0003	0.0010	~ 0.0012	253	8.7	13	5
Boom	09/19/2019 09:20	Grab							233	9.8	28	6
Boom	10/03/2019 08:55	Grab	< 0.0001	~ 0.0005	0.0020	< 0.0003	0.0011	~ 0.0018	237	11.6	15	4
Boom	10/17/2019 09:30	Grab	< 0.0001	~ 0.0004	0.0010	< 0.0003	0.0013	~ 0.0041	223	12.3	9	~ 2
Boom	11/07/2019 10:15	Grab							251	10.6	5	~ 1
Boom	11/21/2019 09:50	Grab	< 0.0001	~ 0.0003	~ 0.0006	< 0.0003	0.0008	~ 0.0014	245	9.1	5	~ 2
Boom	12/12/2019 10:00	Grab							283	5.9	~ 2	~ 2

2019 Mississippi River Water Quality 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)				Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)		
MWMO	01/16/2019 10:40	Grab	10	0.2	228.3	434.3	14.53	8.2	0.21	> 100	168	~ 0.06	1.7	21
MWMO	02/21/2019 10:35	Grab	12	0.6	221.0	413.3	14.02	7.7	0.20	> 100	189	0.06	1.0	21
MWMO	03/28/2019 11:25	Grab	43	3.0	156.6	269.9	13.33	7.6	0.13	38	91	0.48	3.3	43
MWMO	04/04/2019 09:55	Grab	38	3.2	149.2	255.8	13.49	7.7	0.12	63	97	0.17	1.9	33
MWMO	04/18/2019 10:15	Grab	43	6.0	191.1	300.1	12.76	7.7	0.14	57	127	< 0.02	2.0	47
MWMO	05/02/2019 09:25	Grab	46	9.3	217.0	310.0	11.77	7.8	0.15	65	113	~ 0.03	1.5	33
MWMO	05/16/2019 10:45	Grab	75	16.9	274.8	325.1	10.14	7.6	0.16	64	125	< 0.02	1.8	42
MWMO	06/06/2019 10:00	Grab	80	21.4	392.4	421.2	9.15	7.6	0.20	76	161	< 0.02	1.3	35
MWMO	06/20/2019 10:00	Grab	65	22.3	420.7	444.0	9.15	7.5	0.21	50	190	< 0.02	1.7	30
MWMO	07/03/2019 09:10	Grab	70	24.8	418.6	419.9	8.36	7.7	0.20	61	166	~ 0.03	1.0	25
MWMO	07/18/2019 10:05	Grab	75	26.8	442.0	427.4	8.12	7.5	0.20	70	168	< 0.02	1.6	31
MWMO	08/01/2019 10:15	Grab	70	24.6	418.6	422.1	8.83	7.4	0.20	63	161	< 0.02	1.6	31
MWMO	08/15/2019 09:55	Grab	70	24.5	408.8	412.4	8.59	7.4	0.20	63	168	< 0.02	1.1	29
MWMO	09/05/2019 09:35	Grab	65	20.7	400.1	435.6	9.08	7.3	0.21	83	167	< 0.02	1.2	23
MWMO	09/19/2019 09:30	Grab	75	20.7	342.8	373.7	9.06	7.1	0.18	46	163	~ 0.06	1.3	35
MWMO	10/03/2019 09:05	Grab	50	13.5	270.1	345.9	10.55	7.1	0.17	60	153	~ 0.02	1.3	43
MWMO	10/17/2019 09:45	Grab	46	7.9	239.7	356.1	12.12	7.0	0.17	74	161	~ 0.02	0.7	31
MWMO	11/07/2019 10:50	Grab	20	1.1	193.7	356.7	14.57	7.1	0.17	85	209	~ 0.03	1.1	37
MWMO	11/21/2019 10:30	Grab	34	2.9	220.9	381.7	13.45	7.4	0.18	> 100	162	~ 0.03	0.9	26
MWMO	12/12/2019 10:35	Grab	15	-0.2	150.1	289.5	15.63	7.2	0.14	73	187	0.06	1.0	24

2019 Mississippi River Water Quality 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		Nitrate-Nitrite		Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)
									Nitrogen (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Nitrite (mg/L)		
MWMO	01/16/2019 10:40	Grab	5.1	16.8	< 0.02	< 0.01	~ 0.03	190	0.58	1.02	1.02	< 0.03	11.2	0.7
MWMO	02/21/2019 10:35	Grab	3.3	18.6	< 0.02	~ 0.01	~ 0.02	166	0.57	0.98	0.98	< 0.03	105.0	0.7
MWMO	03/28/2019 11:25	Grab	10.0	14.5	0.16	0.13	0.30	90	1.70	0.84	0.89	0.05	7.2	5.2
MWMO	04/04/2019 09:55	Grab	8.1	11.5	0.08	0.06	0.14	77	1.10	0.62	0.62	< 0.06	7.0	2.5
MWMO	04/18/2019 10:15	Grab	22.0	12.2	< 0.02	~ 0.01	0.07	124	0.79	0.63	0.63	< 0.06	9.2	2.1
MWMO	05/02/2019 09:25	Grab	17.0	12.5	0.05	~ 0.01	0.05	146	0.71	0.42	0.42	< 0.06	10.6	1.5
MWMO	05/16/2019 10:45	Grab		11.6	< 0.02	< 0.01	0.05	123	0.68	0.41	0.41	< 0.06	12.4	2.2
MWMO	06/06/2019 10:00	Grab	19.0	16.8	~ 0.04	0.03	0.06	189	0.84	0.82	0.82	< 0.06	14.0	1.7
MWMO	06/20/2019 10:00	Grab	25.0	17.0	0.07	0.04	0.10	192	0.88	0.48	0.48	< 0.06	14.6	1.9
MWMO	07/03/2019 09:10	Grab	9.6	13.8	0.13	0.05	0.12	148	0.86	0.87	0.87	< 0.06	10.2	1.6
MWMO	07/18/2019 10:05	Grab	15.0	14.3	0.09	0.07	0.15	162	0.68	0.72	0.72	< 0.06	13.9	1.5
MWMO	08/01/2019 10:15	Grab	24.0	15.2	~ 0.04	0.03	0.08	162	0.82	0.36	0.36	< 0.06	10.8	1.9
MWMO	08/15/2019 09:55	Grab	18.0	16.9	~ 0.04	0.02	0.06	141	0.75	0.38	0.38	< 0.06	11.5	1.5
MWMO	09/05/2019 09:35	Grab	28.0	19.5	~ 0.04	0.02	0.07	175	0.79	0.48	0.48	< 0.06	12.5	1.6
MWMO	09/19/2019 09:30	Grab	16.0	13.4	~ 0.05	0.05	0.14	182	0.87	0.99	0.99	< 0.06	12.8	1.4
MWMO	10/03/2019 09:05	Grab	7.6	13.7	0.08	0.04	0.13	159	0.94	0.48	0.48	< 0.06	8.6	1.0
MWMO	10/17/2019 09:45	Grab	3.5	10.5	~ 0.05	0.04	0.11	147	0.79	0.89	0.89	< 0.06	12.2	0.7
MWMO	11/07/2019 10:50	Grab	5.1	11.2	< 0.02	0.02	~ 0.03	130	0.64	0.74	0.74	< 0.06	10.8	0.8
MWMO	11/21/2019 10:30	Grab	5.2	14.0	< 0.02	0.01	~ 0.04	138	0.62	0.94	0.94	< 0.06	12.1	1.0
MWMO	12/12/2019 10:35	Grab	5.2	23.2	< 0.02	~ 0.01	~ 0.03	203	0.62	1.07	1.07	< 0.06	12.4	1.0

2019 Mississippi River Water Quality 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	01/16/2019 10:40	Grab							229	7.3	~ 2	~ 1
MWMO	02/21/2019 10:35	Grab	< 0.0002	~ 0.0001	~ 0.0006	~ 0.0002	~ 0.0005	0.0021	267	8.8	~ 1	~ 1
MWMO	03/28/2019 11:25	Grab							164	11.9	35	9
MWMO	04/04/2019 09:55	Grab							158	9.7	13	4
MWMO	04/18/2019 10:15	Grab	< 0.0001	0.0005	0.0030	0.0010	0.0013	~ 0.0034	193	9.7	14	5
MWMO	05/02/2019 09:25	Grab							184	9.9	9	~ 3
MWMO	05/16/2019 10:45	Grab	< 0.0001	~ 0.0003	~ 0.0008	~ 0.0006	0.0009	~ 0.0021	185	11.3	9	4
MWMO	06/06/2019 10:00	Grab	< 0.0001	~ 0.0003	~ 0.0009	< 0.0003	0.0012	~ 0.0020	247	12.2	11	3
MWMO	06/20/2019 10:00	Grab							250	10.6	12	3
MWMO	07/03/2019 09:10	Grab							243	10.0	19	5
MWMO	07/18/2019 10:05	Grab	< 0.0001	~ 0.0005	0.0011	~ 0.0003	0.0013	< 0.0012	239	11.3	13	~ 4
MWMO	08/01/2019 10:15	Grab							242	10.2	11	5
MWMO	08/15/2019 09:55	Grab	< 0.0001	~ 0.0003	< 0.0050	~ 0.0003	0.0009	< 0.0012	235	8.4	9	3
MWMO	09/05/2019 09:35	Grab	< 0.0001	~ 0.0004	~ 0.0009	< 0.0003	0.0009	< 0.0012	253	8.9	14	5
MWMO	09/19/2019 09:30	Grab							244	9.6	23	5
MWMO	10/03/2019 09:05	Grab	< 0.0001	~ 0.0005	0.0011	< 0.0003	0.0011	~ 0.0018	231	11.4	14	4
MWMO	10/17/2019 09:45	Grab	< 0.0001	~ 0.0004	~ 0.0008	< 0.0003	0.0010	~ 0.0024	230	11.7	9	~ 2
MWMO	11/07/2019 10:50	Grab							222	10.7	6	~ 2
MWMO	11/21/2019 10:30	Grab	< 0.0001	~ 0.0003	~ 0.0006	< 0.0003	0.0007	< 0.0012	240	9.2	5	~ 2
MWMO	12/12/2019 10:35	Grab							283	7.2	~ 2	~ 2

2019 Mississippi River Water Quality Data - Shingle Up

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	04/18/2019 10:40	Grab	45	5.9	189.0	297.2	12.77	7.8	0.14	52	134	< 0.02	1.9	39
Shingle Up	05/02/2019 10:00	Grab	47	9.2	235.9	338.0	12.00	7.8	0.16	61	120	~ 0.03	1.5	34
Shingle Up	05/16/2019 11:05	Grab	75	17.1	332.1	391.3	10.86	7.7	0.19	62	155	< 0.02	2.0	38
Shingle Up	06/06/2019 10:10	Grab	80	21.4	399.0	428.0	9.27	7.6	0.21	70	157	< 0.02	1.5	33
Shingle Up	06/20/2019 10:10	Grab	65	21.4	412.6	443.3	9.32	7.5	0.21	53	191	< 0.02	1.6	33
Shingle Up	07/03/2019 09:25	Grab	70	24.5	426.1	430.1	8.50	7.7	0.21	51	167	0.22	1.0	28
Shingle Up	07/18/2019 10:15	Grab	75	26.4	454.9	442.8	8.29	7.5	0.21	53	172	< 0.02	1.7	31
Shingle Up	08/01/2019 10:20	Grab	70	24.4	417.1	422.3	9.11	7.4	0.20	67	169	< 0.02	1.6	32
Shingle Up	08/15/2019 10:05	Grab	70	24.2	407.4	413.6	8.89	7.3	0.20	62	169	< 0.02	1.4	30
Shingle Up	09/05/2019 09:50	Grab	65	20.4	393.7	431.2	9.33	7.3	0.21	75	171	< 0.02	1.4	24
Shingle Up	09/19/2019 09:40	Grab	75	20.6	349.6	381.6	9.16	7.0	0.18	47	175	< 0.02	1.4	29
Shingle Up	10/03/2019 09:15	Grab	50	13.6	275.2	351.9	10.64	7.0	0.17	59	159	~ 0.03	1.2	34
Shingle Up	10/17/2019 09:52	Grab	46	7.9	229.5	341.1	12.21	7.0	0.16	77	158	< 0.02	0.9	32
Shingle Up	11/07/2019 11:25	Grab	20	1.2	206.1	378.0	14.76	7.0	0.18	80	411	~ 0.04	1.2	36
Shingle Up	11/21/2019 11:10	Grab	34	2.8	225.4	391.0	13.75	7.6	0.19	> 100	173	~ 0.04	0.9	26

2019 Mississippi River Water Quality 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	04/18/2019 10:40	Grab	23.0	11.4	~ 0.03	~ 0.01	0.07	109	0.76	0.68	0.68	< 0.06	8.9	2.5
Shingle Up	05/02/2019 10:00	Grab	21.0	14.6	< 0.02	~ 0.01	~ 0.03	157	0.76	0.53	0.53	< 0.06	13.0	1.6
Shingle Up	05/16/2019 11:05	Grab		14.1	< 0.02	< 0.01	~ 0.05	169	0.76	0.86	0.86	< 0.06	18.9	2.3
Shingle Up	06/06/2019 10:10	Grab	19.0	16.2	~ 0.04	0.03	0.07	196	0.71	1.02	1.02	< 0.06	14.7	1.6
Shingle Up	06/20/2019 10:10	Grab	19.0	15.4		0.04	0.09	168	0.90	0.53	0.53	< 0.06	14.5	1.5
Shingle Up	07/03/2019 09:25	Grab	8.5	13.6	0.08	0.06	0.12	167	0.74	1.06	1.06	< 0.06	11.2	1.3
Shingle Up	07/18/2019 10:15	Grab	17.0	13.6	0.07	0.08	0.14	184	0.83	0.81	0.81	< 0.06	15.8	1.5
Shingle Up	08/01/2019 10:20	Grab	25.0	13.8	~ 0.04	0.03	0.09	140	0.79	0.38	0.38	< 0.06	11.1	1.9
Shingle Up	08/15/2019 10:05	Grab	18.0	16.0	~ 0.03	0.03	0.07	156	0.78	0.40	0.40	< 0.06	11.9	1.7
Shingle Up	09/05/2019 09:50	Grab	29.0	18.1	~ 0.03	0.02	~ 0.04	163	0.50	0.45	0.45	< 0.06	12.3	1.6
Shingle Up	09/19/2019 09:40	Grab	15.0	11.4	~ 0.04	0.06	0.15	172	0.85	1.14	1.14	< 0.06	14.1	1.4
Shingle Up	10/03/2019 09:15	Grab	8.1	12.9	0.08	0.05	0.11	158	0.98	0.60	0.60	< 0.06	9.4	1.2
Shingle Up	10/17/2019 09:52	Grab	3.7	10.3	0.08	0.03	0.11	155	0.80	0.72	0.72	< 0.06	11.1	0.8
Shingle Up	11/07/2019 11:25	Grab	12.0	12.9	< 0.02	0.02	~ 0.04	160	0.71	0.87	0.87	< 0.06	12.8	0.8
Shingle Up	11/21/2019 11:10	Grab	4.9	13.6	~ 0.03	0.01	~ 0.04	154	0.62	1.01	1.01	< 0.06	13.1	1.0

2019 Mississippi River Water Quality 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	04/18/2019 10:40	Grab	< 0.0001	0.0005	0.0013	~ 0.0008	0.0012	~ 0.0027	186	9.7	14	5
Shingle Up	05/02/2019 10:00	Grab							198	9.8	10	~ 3
Shingle Up	05/16/2019 11:05	Grab	~ 0.0001	~ 0.0003	~ 0.0008	~ 0.0008	0.0010	< 0.0012	211	11.2	9	3
Shingle Up	06/06/2019 10:10	Grab	< 0.0001	~ 0.0002	~ 0.0008	< 0.0003	0.0011	< 0.0012	249	11.8	10	3
Shingle Up	06/20/2019 10:10	Grab							254	10.3	11	3
Shingle Up	07/03/2019 09:25	Grab							237	9.8	22	6
Shingle Up	07/18/2019 10:15	Grab	< 0.0001	~ 0.0004	0.0011	~ 0.0003	0.0014	< 0.0012	254	12.1	11	~ 3
Shingle Up	08/01/2019 10:20	Grab							235	10.1	14	5
Shingle Up	08/15/2019 10:05	Grab	< 0.0001	~ 0.0003	< 0.0050	< 0.0003	0.0009	< 0.0012	230	8.4	10	4
Shingle Up	09/05/2019 09:50	Grab	< 0.0001	~ 0.0004	~ 0.0010	< 0.0003	0.0010	< 0.0012	243	8.9	13	5
Shingle Up	09/19/2019 09:40	Grab							249	9.4	27	6
Shingle Up	10/03/2019 09:15	Grab	< 0.0001	~ 0.0005	~ 0.0009	< 0.0003	0.0011	~ 0.0015	236	11.2	15	4
Shingle Up	10/17/2019 09:52	Grab	< 0.0001	~ 0.0004	~ 0.0008	< 0.0003	0.0011	< 0.0012	216	11.9	8	~ 2
Shingle Up	11/07/2019 11:25	Grab							231	10.6	6	~ 1
Shingle Up	11/21/2019 11:10	Grab	< 0.0001	~ 0.0003	~ 0.0006	< 0.0003	0.0008	< 0.0012	246	9.1	5	~ 2

2019 Mississippi River Water Quality 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)				Nitrogen (mg/L)	Oxygen Demand 5-day (mg/L)		
Upper	01/16/2019 11:45	Grab	12	0.0	241.7	461.7	15.62	8.3	0.22	> 100	187	~ 0.05	1.0	22
Upper	03/28/2019 11:50	Grab	45	4.1	176.0	292.7	13.51	7.8	0.14	36	92	0.49	2.9	92
Upper	04/04/2019 10:20	Grab	38	3.4	172.7	294.0	13.69	7.7	0.14	63	114	0.24	2.2	41
Upper	04/18/2019 11:05	Grab	45	6.0	218.2	342.9	13.07	7.8	0.16	42	141	< 0.02	2.2	45
Upper	05/02/2019 10:20	Grab	47	9.1	253.5	363.7	12.08	7.9	0.18	70	132	~ 0.04	1.6	33
Upper	05/16/2019 11:30	Grab	75	17.0	340.2	401.8	10.95	7.7	0.19	73	156	< 0.02	1.9	42
Upper	06/06/2019 10:20	Grab	80	21.4	393.5	422.3	9.27	7.6	0.20	72	159	< 0.02	1.3	32
Upper	06/20/2019 10:20	Grab	65	21.2	413.7	446.0	9.38	7.5	0.21	50	193	< 0.02	1.4	31
Upper	07/03/2019 09:15	Grab	80	25.1	473.1	472.6	8.14	7.8	0.23	45	182	< 0.02	0.9	31
Upper	07/18/2019 10:20	Grab	75	26.4	445.9	434.2	8.29	7.5	0.21	48	171	< 0.02	1.4	36
Upper	08/01/2019 10:25	Grab	75	22.3	478.8	505.0	9.21	7.7	0.24	63	179	< 0.02	1.4	33
Upper	08/15/2019 10:10	Grab	70	23.8	476.6	487.4	8.85	7.5	0.23	81	165	< 0.02	1.5	32
Upper	09/05/2019 09:40	Grab	65	18.9	451.1	511.0	9.18	7.5	0.25	68	186	< 0.02	1.4	20
Upper	09/19/2019 09:35	Grab	70	20.7	390.8	425.6	8.92	7.1	0.20	33	183	< 0.02	1.2	36
Upper	10/03/2019 09:20	Grab	50	13.6	283.2	361.7	10.69	7.0	0.17	61	168	~ 0.03	1.2	33
Upper	10/17/2019 10:00	Grab	47	7.9	242.8	360.9	12.28	7.0	0.17	73	159	~ 0.04	0.9	31
Upper	11/07/2019 12:00	Grab	25	1.7	233.7	421.1	14.92	6.9	0.20	83	318	~ 0.03	1.3	30
Upper	11/21/2019 11:40	Grab	34	2.8	254.0	440.7	13.95	7.4	0.21	90	184	~ 0.04	1.2	27
Upper	12/12/2019 12:00	Grab	15	-0.1	245.5	472.0	14.64	7.2	0.22	64	206	0.06	0.9	28

2019 Mississippi River Water Quality 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		Nitrate-Nitrite		Sulfate (mg/L)	Total Biological Oxygen Demand 5-day (mg/L)
									Nitrogen (mg/L)	Nitrate (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)		
Upper	01/16/2019 11:45	Grab	7.9	21.2	< 0.02	< 0.01	~ 0.03	202	0.59	0.99	0.99	< 0.03	15.7	0.8
Upper	03/28/2019 11:50	Grab	9.5	13.8	0.25	0.19	0.33	103	1.70	1.08	1.15	0.07	8.3	4.8
Upper	04/04/2019 10:20	Grab	11.0	12.8	0.12	0.10	0.18	108	1.20	1.01	1.01	< 0.06	9.9	2.7
Upper	04/18/2019 11:05	Grab	32.0	15.3	~ 0.02	0.01	0.14	102	1.00	0.90	0.90	< 0.06	12.4	2.5
Upper	05/02/2019 10:20	Grab	26.0	16.8	0.06	~ 0.01	0.06	166	0.77	0.61	0.61	< 0.06	15.9	1.8
Upper	05/16/2019 11:30	Grab	26.0	15.8	< 0.02	< 0.01	0.11	171	0.94	1.30	1.30	< 0.06	19.8	2.4
Upper	06/06/2019 10:20	Grab	16.0	14.8	~ 0.03	0.03	0.07	178	0.84	0.85	0.85	< 0.06	13.9	1.6
Upper	06/20/2019 10:20	Grab	18.0	15.4	0.08	0.04	0.10	182	0.83	0.53	0.53	< 0.06	14.6	1.4
Upper	07/03/2019 09:15	Grab	7.9	18.3	0.07	0.07	0.12	196	0.81	1.29	1.29	< 0.06	14.7	1.3
Upper	07/18/2019 10:20	Grab	15.0	13.2	0.10	0.08	0.12	155	0.82	0.79	0.79	< 0.06	15.3	1.3
Upper	08/01/2019 10:25	Grab	27.0	26.9	0.05	0.04	0.08	178	0.77	0.42	0.42	< 0.06	18.1	1.8
Upper	08/15/2019 10:10	Grab	17.0	27.3	0.05	0.03	0.08	182	0.71	0.60	0.60	< 0.06	19.2	1.7
Upper	09/05/2019 09:40	Grab	35.0	29.5	~ 0.03	0.02	0.15	201	0.90	0.56	0.56	< 0.06	20.6	1.7
Upper	09/19/2019 09:35	Grab	14.0	14.5	0.08	0.08	0.17	216	0.90	1.60	1.60	< 0.06	19.0	1.2
Upper	10/03/2019 09:20	Grab	7.9	12.9	0.08	0.05	0.10	140	0.87	0.62	0.62	< 0.06	10.1	1.1
Upper	10/17/2019 10:00	Grab	6.2	10.4	0.06	0.03	0.10	136	0.88	0.90	0.90	< 0.06	12.3	0.8
Upper	11/07/2019 12:00	Grab	6.7	15.0	< 0.02	0.02	0.06	159	0.77	1.04	1.04	< 0.06	16.5	1.0
Upper	11/21/2019 11:40	Grab	6.2	18.3	< 0.02	0.02	~ 0.04	183	0.68	1.12	1.12	< 0.06	17.3	1.2
Upper	12/12/2019 12:00	Grab	6.7	21.3	0.35	~ 0.01	~ 0.03	244	0.64	1.20	1.20	< 0.06	14.9	0.8

2019 Mississippi River Water Quality 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	01/16/2019 11:45	Grab							270	8.0	~ 2	~ 1
Upper	03/28/2019 11:50	Grab							176	11.8	33	8
Upper	04/04/2019 10:20	Grab							188	10.2	15	~ 4
Upper	04/18/2019 11:05	Grab	< 0.0001	0.0009	0.0019	0.0016	0.0017	0.0055	207	10.3	38	8
Upper	05/02/2019 10:20	Grab							219	9.7	11	3
Upper	05/16/2019 11:30	Grab	< 0.0001	~ 0.0003	~ 0.0008	~ 0.0006	0.0010	~ 0.0016	213	10.7	10	4
Upper	06/06/2019 10:20	Grab	< 0.0001	~ 0.0003	~ 0.0009	< 0.0003	0.0013	~ 0.0013	245	11.8	10	3
Upper	06/20/2019 10:20	Grab							254	10.9	11	~ 3
Upper	07/03/2019 09:15	Grab							264	9.5	21	5
Upper	07/18/2019 10:20	Grab	< 0.0001	~ 0.0004	0.0016	~ 0.0003	0.0014	< 0.0012	252	11.9	15	4
Upper	08/01/2019 10:25	Grab							290	10.1	11	5
Upper	08/15/2019 10:10	Grab	< 0.0001	~ 0.0002	< 0.0050	< 0.0003	0.0009	< 0.0012	272	8.1	6	3
Upper	09/05/2019 09:40	Grab	< 0.0001	~ 0.0002	~ 0.0006	< 0.0003	0.0009	~ 0.0016	300	8.4	10	5
Upper	09/19/2019 09:35	Grab							280	9.2	26	5
Upper	10/03/2019 09:20	Grab	< 0.0001	0.0005	0.0011	< 0.0003	0.0012	~ 0.0017	247	11.0	17	4
Upper	10/17/2019 10:00	Grab	< 0.0001	0.0007	~ 0.0008	< 0.0003	0.0010	~ 0.0041	230	11.8	9	~ 2
Upper	11/07/2019 12:00	Grab							257	10.3	6	~ 1
Upper	11/21/2019 11:40	Grab	< 0.0001	~ 0.0003	~ 0.0007	< 0.0003	0.0009	< 0.0012	273	8.9	5	~ 2
Upper	12/12/2019 12:00	Grab							309	7.0	~ 2	~ 2