

2020 Mississippi River Bacteria Sampling

Summary of 2020 Data

Portions of MWMO's reach of the Mississippi River are listed on the MPCA's list of impaired waters for fecal coliform pollution. In 2008, the MPCA changed the bacteria water quality standard from fecal coliform to *E. coli* for bacteria monitoring in Minnesota. The chronic standard for *E. coli* in 2B and 2Bd waters is 126 CFU/100 mL for a monthly geomean of at least five samples. The MPCA *E. coli* acute standard states that *E. coli* cannot exceed 1,260 CFU/100mL in more than 10% of the samples taken in one month. In 2020, one river sites (MR857.6W) exceeded the standard in September, as shown in Table 1. Samples were collected on the first and third Thursday of each month May through October. Therefore, the small number of samples collected each month greatly affect these results and a monthly geomean is not calculated. Most samples were taken during baseflow conditions with the exception of two sampling dates in July and September, during which samples were collected during a rain event. Figures 1-7 show the *E. coli* sample results compared to the MPCA standards, Figure 8 shows all sampling sites together, and Figure 9 shows boxplots of all samples collected from each sampling day. The *E. coli* sample results and other sampling parameters are presented in more detail in Tables 2-8.

Table 1. Sites that exceeded 1,260 MPN/100mL in >10% of samples in a given month for the Mississippi River in 2020.

Month	Sites that exceed 1,260 MPN/100 mL in > 10% of samples
April	None
May	None
June	None
July	None
August	None
September	MR857.6W
October	None

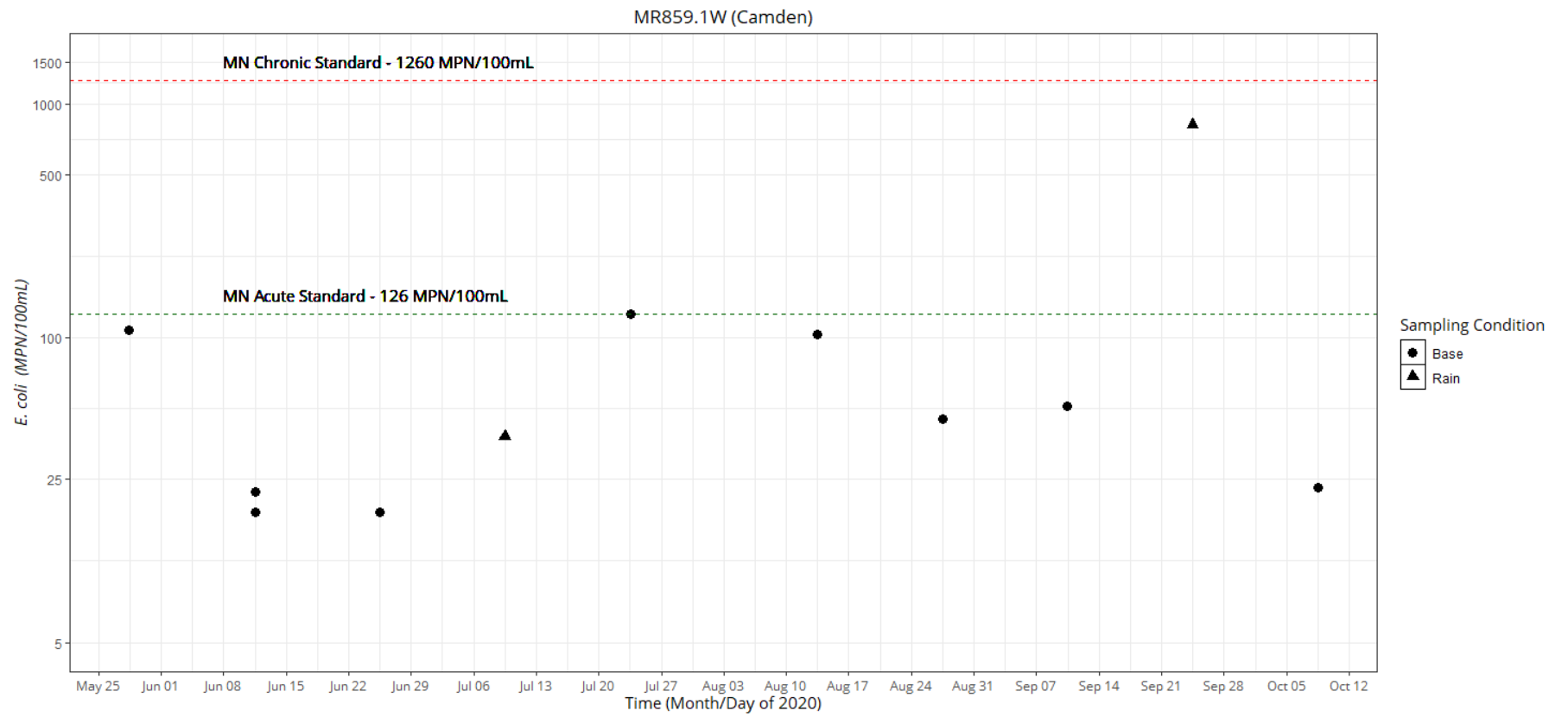


Figure 1. 2020 *E. coli* values at MR859.1W.

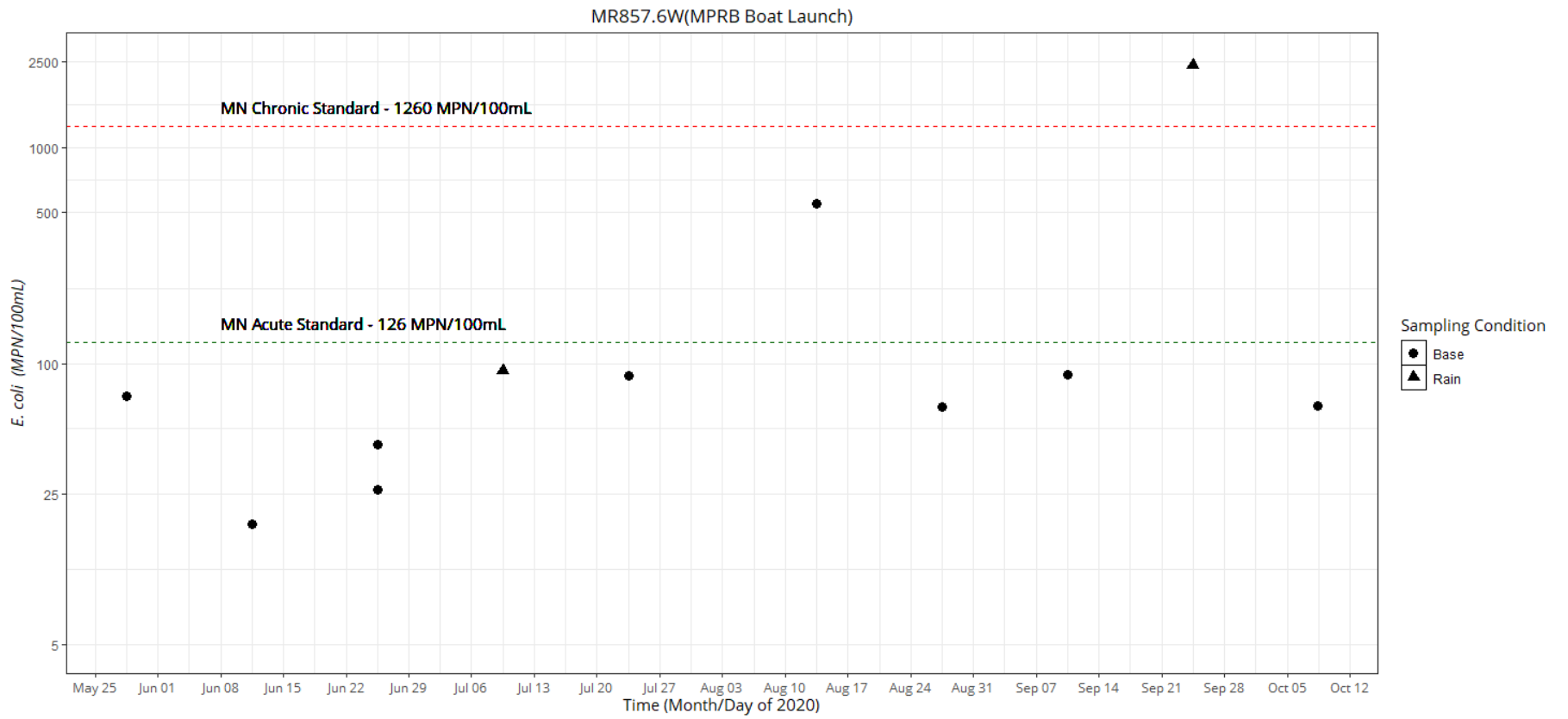


Figure 2. 2020 *E. coli* values at MR857.6W.

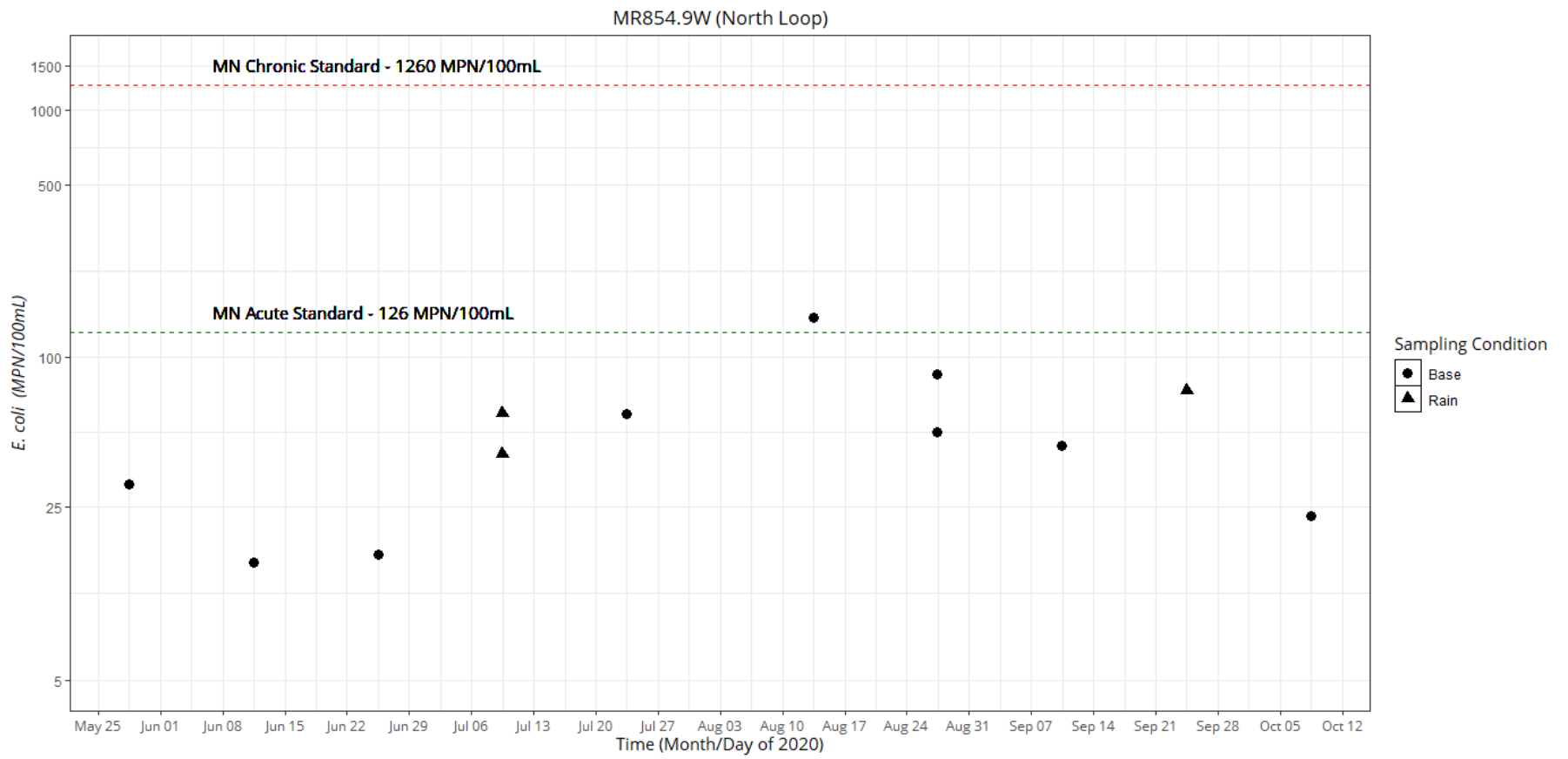


Figure 3. 2020 *E. coli* values at MR854.9W.

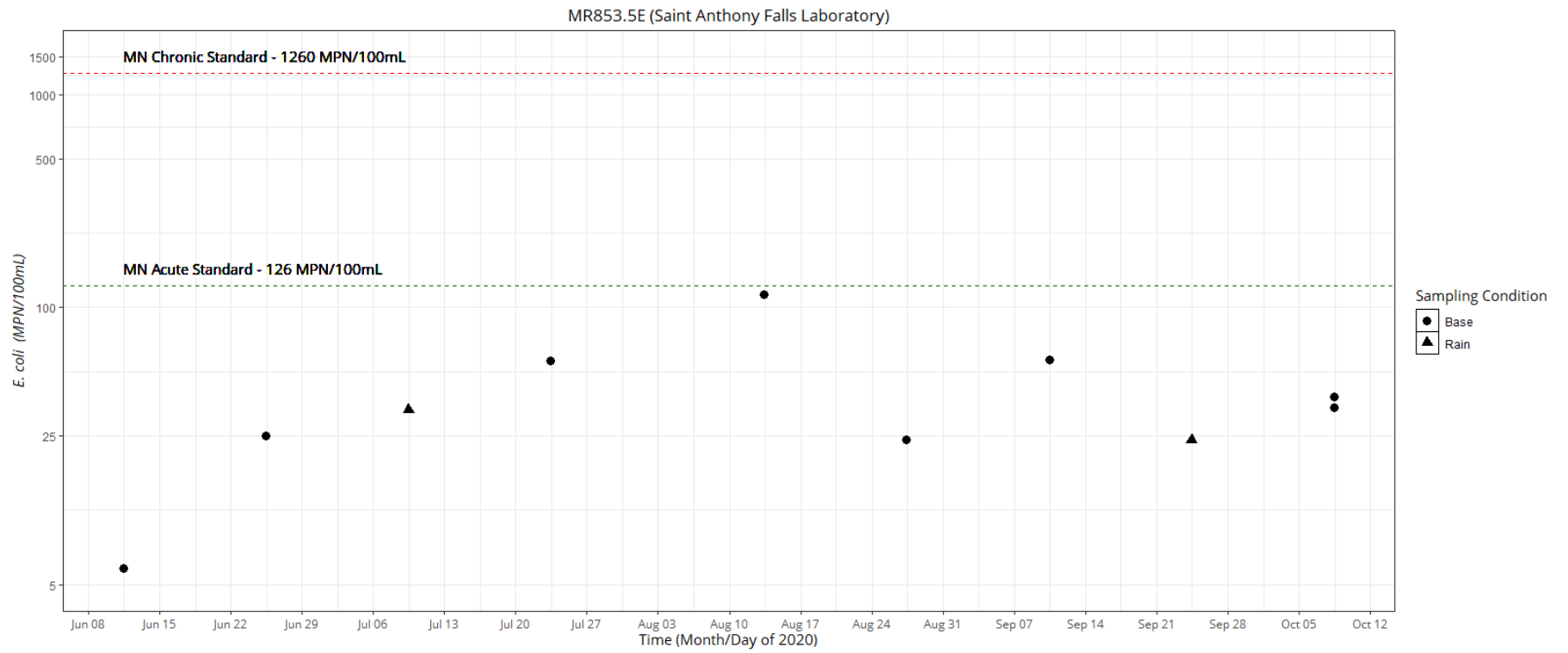


Figure 4. 2020 *E. coli* values at MR853.5E.

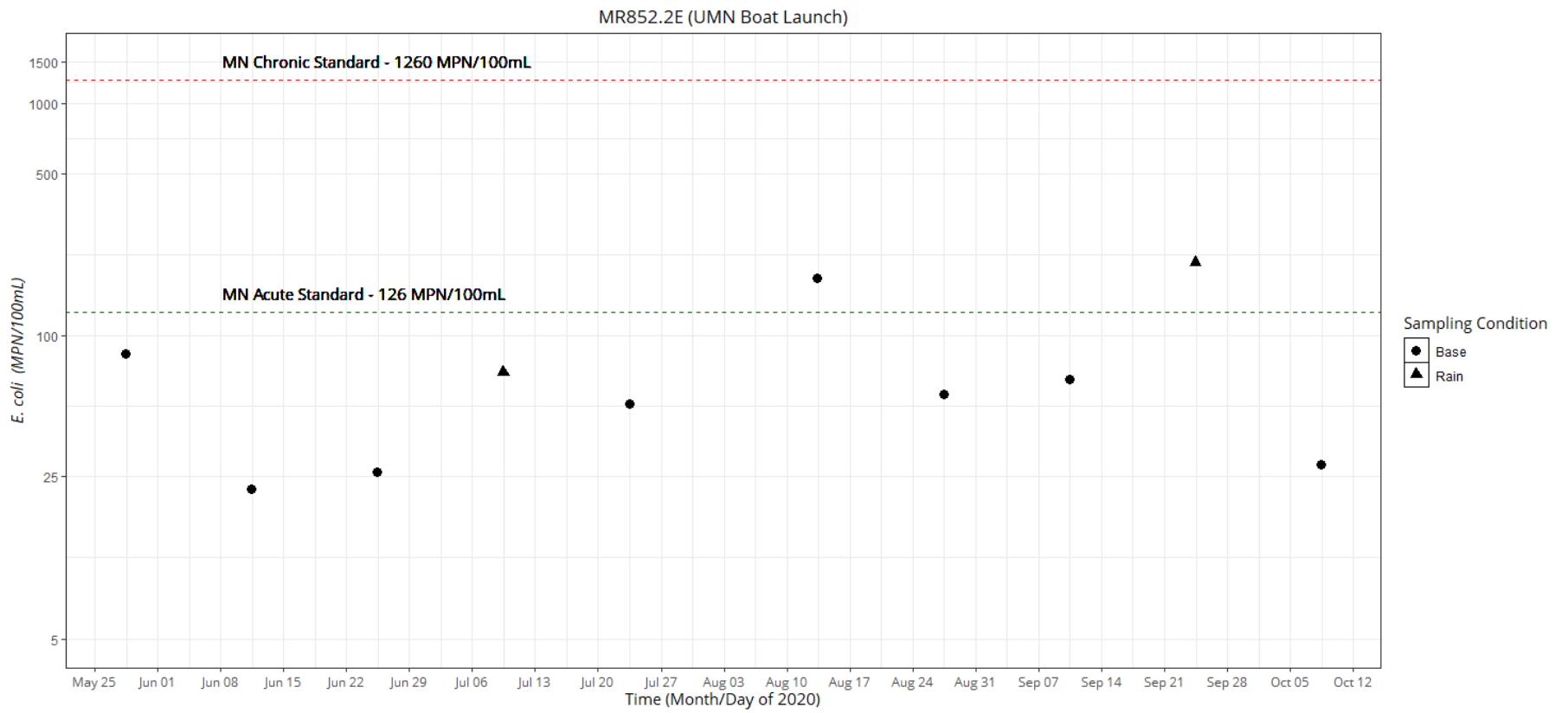


Figure 5. 2020 *E. coli* values at MR852.2E.

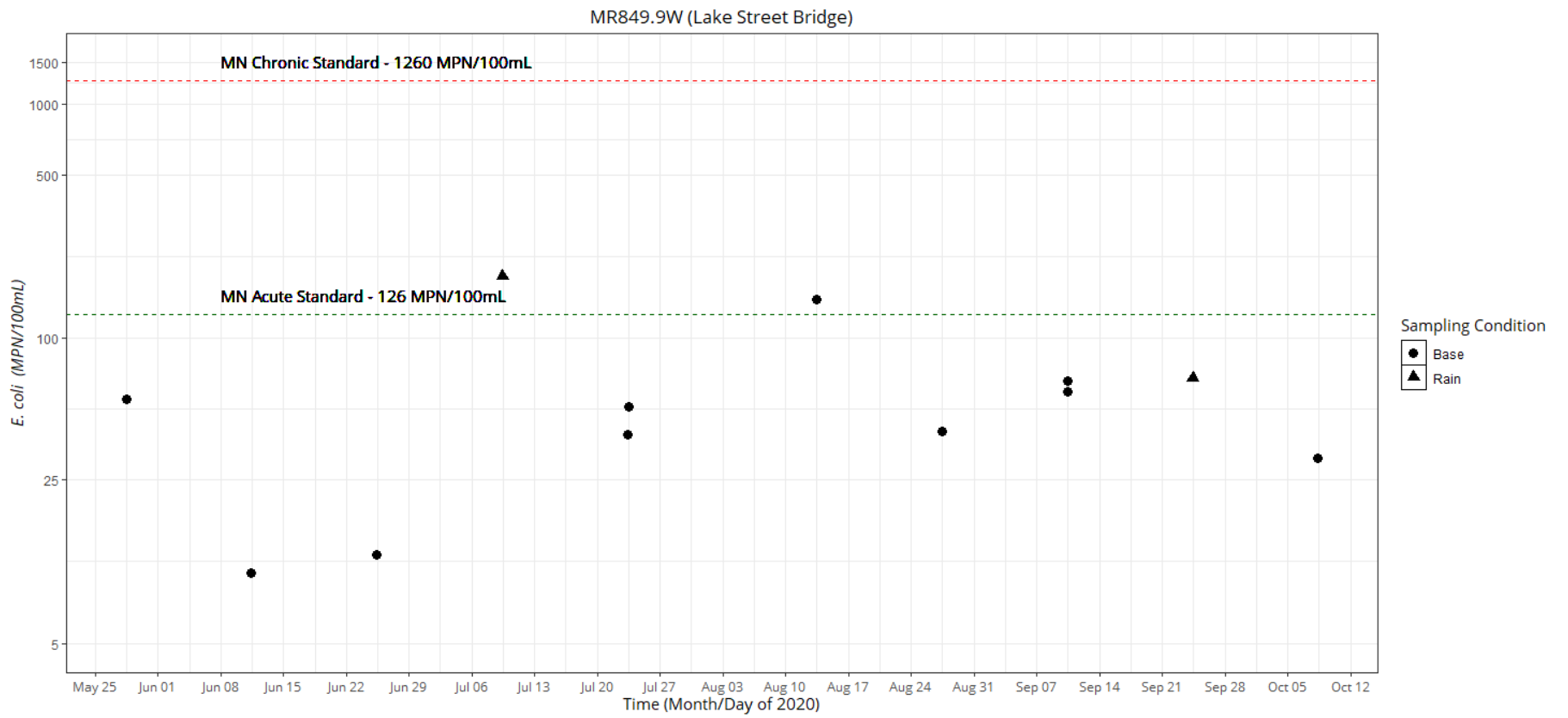


Figure 6. 2020 *E. coli* values at MR849.9W.

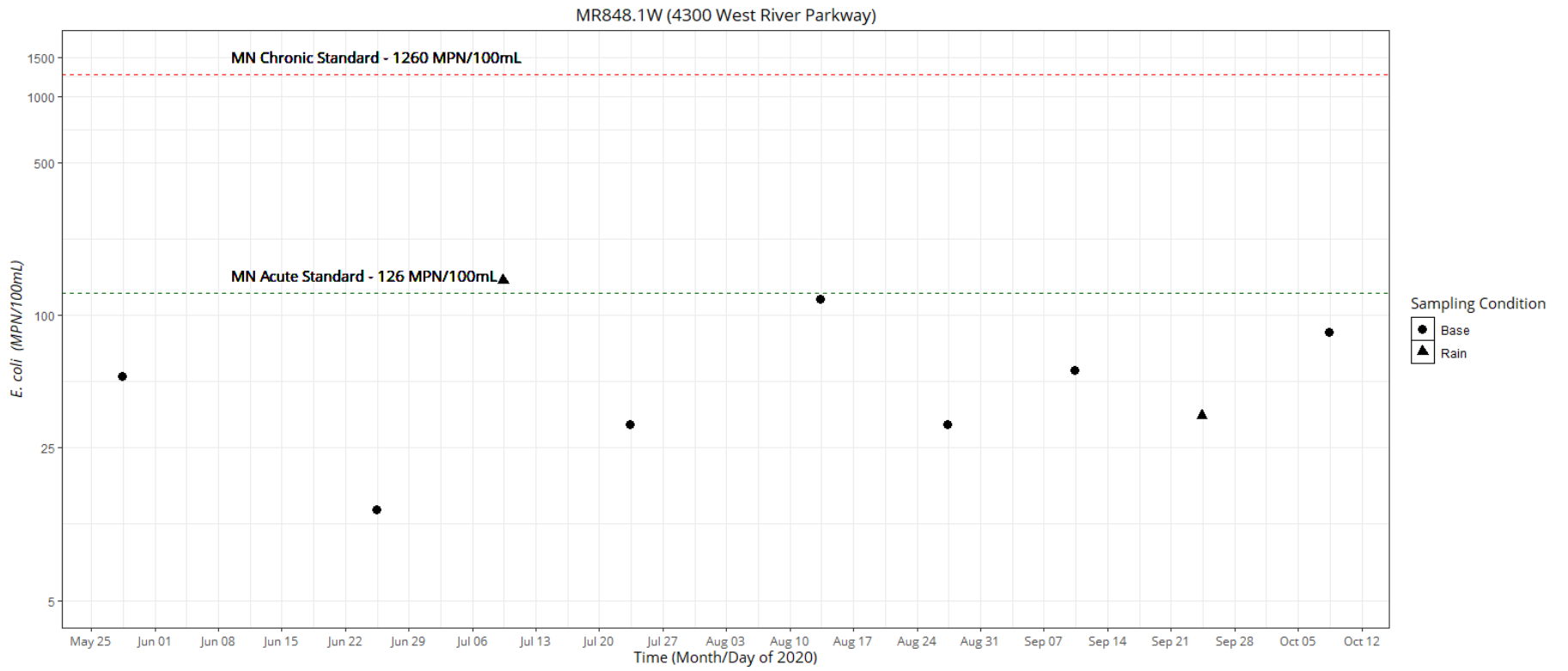


Figure 7. 2020 *E. coli* values at MR848.1W.

All Mississippi River Sites



Figure 8. 2020 *E. coli* values for all Mississippi River sites.

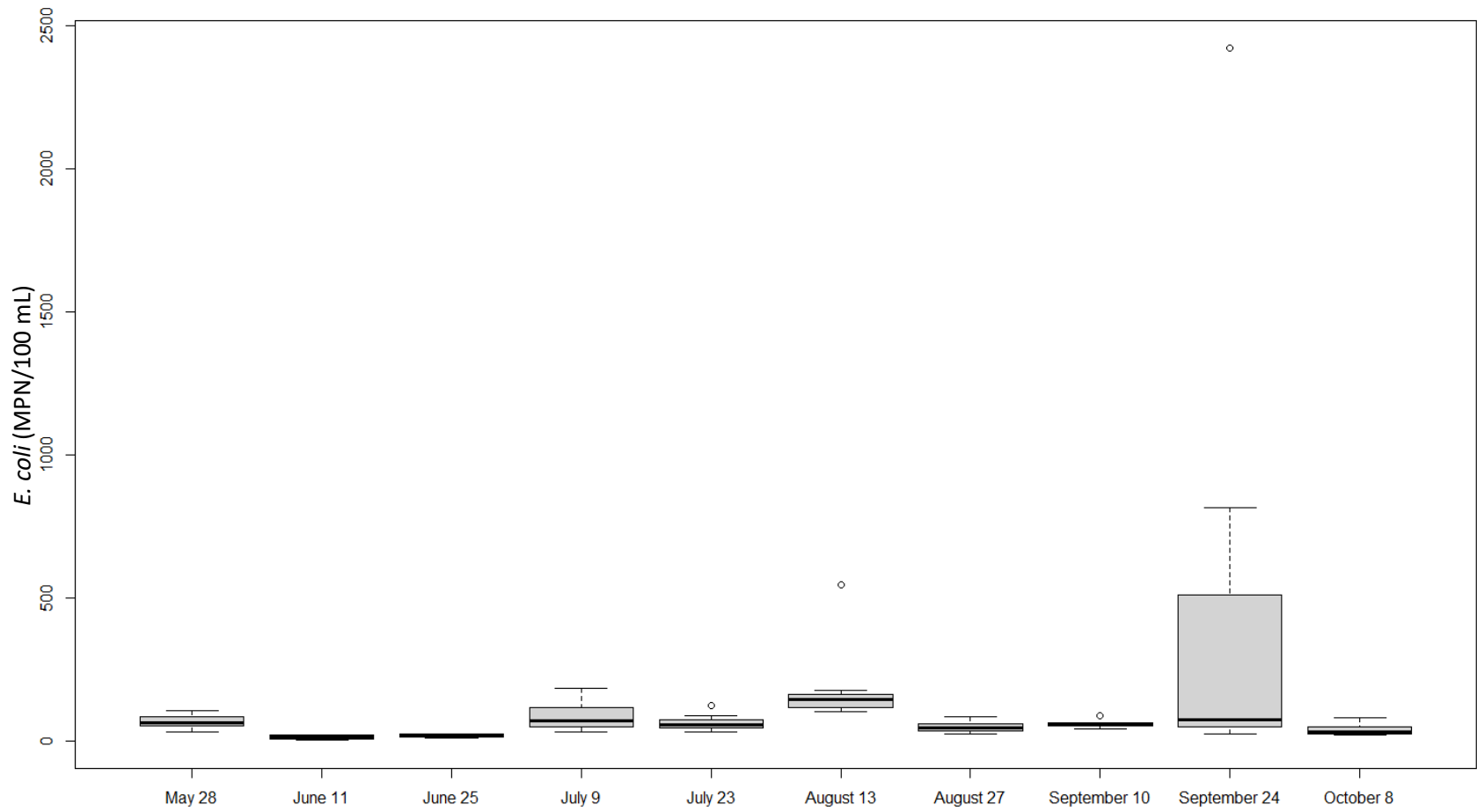


Figure 9. Boxplot of Mississippi River *E. coli* values in 2020. July 9 and September 24 were sampling dates that occurred during rain events.

Table 2. 2020 Mississippi River site MR859.1W (Camden) physical parameters and *E. coli* sample data.

Station	Sampling Time	Sampling conditions	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Salinity (ppt)	Specific Conductivity (µS/cm)	Transparency (cm)	Water Temperature (°C)	<i>E. coli</i> (CFU/100 mL)
MR859.1W	05/28/2020 09:35	Base	460.0	9.05	7.6	0.25	526.0		18.5	107.6
MR859.1W	06/11/2020 11:30	Base	439.4	9.93	7.6	0.22	454.8	71	23.2	22.1
MR859.1W	06/25/2020 11:20	Base	423.0	10.09	7.8	0.20	427.6	98	24.4	18.3
MR859.1W	07/09/2020 11:05	Rain	454.4	7.19	7.2	0.21	433.6	75	27.5	38.4
MR859.1W	07/23/2020 11:15	Base	373.0	9.57	7.7	0.18	377.1	58	24.4	125.9
MR859.1W	08/13/2020 10:35	Base	426.1	9.70	8.4	0.21	438.1	70	23.7	104.3
MR859.1W	08/27/2020 10:30	Base	340.7	8.27	8.3	0.16	335.4	56	25.8	45.0
MR859.1W	09/10/2020 10:40	Base	310.7	10.67	8.5	0.18	382.2	62	15.2	51.2
MR859.1W	09/24/2020 10:45	Rain	345.3	9.79	8.7	0.18	381.7	94	20.0	816.4
MR859.1W	10/08/2020 10:15	Base	310.0	10.77	8.7	0.19	386.3	98	14.7	23.0

Table 3. 2020 Mississippi River site MR857.6W (MPRB Boat Launch) physical parameters and *E. coli* sample data.

Station	Sampling Time	Sampling conditions	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Salinity (ppt)	Specific Conductivity (µS/cm)	Transparency (cm)	Water Temperature (°C)	<i>E. coli</i> (CFU/100 mL)
MR857.6W	05/28/2020 09:55	Base	469.0	8.81	7.6	0.26	534.0		18.6	71.2
MR857.6W	06/11/2020 11:10	Base	483.6	9.64	7.4	0.25	509.0	72	22.3	18.3
MR857.6W	06/25/2020 10:55	Base	449.8	9.42	7.7	0.22	461.9	85	23.6	25.9
MR857.6W	07/09/2020 10:45	Rain	488.0	6.98	7.1	0.22	468.4	83	27.2	93.2
MR857.6W	07/23/2020 10:55	Base	375.5	9.18	7.7	0.18	383.5	27	23.9	88.4
MR857.6W	08/13/2020 10:15	Base	420.7	9.01	8.3	0.21	440.4	70	22.7	547.5
MR857.6W	08/27/2020 10:10	Base	374.9	8.07	8.3	0.18	371.2	55	25.5	62.7
MR857.6W	09/10/2020 10:25	Base	321.8	10.36	8.5	0.19	401.7	73	14.6	88.6
MR857.6W	09/24/2020 10:15	Rain	374.1	8.88	8.5	0.20	419.9	83	19.3	> 2419.6
MR857.6W	10/08/2020 10:00	Base	325.4	10.14	8.6	0.20	410.0	> 100	14.2	64.0

Table 4. 2020 Mississippi River site MR854.9W (North Loop) physical parameters and *E. coli* sample data.

Station	Sampling Time	Sampling conditions	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Salinity (ppt)	Specific Conductivity (µS/cm)	Transparency (cm)	Water Temperature (°C)	<i>E. coli</i> (CFU/100 mL)
MR854.9W	05/28/2020 10:30	Base	439.1	9.31	7.6	0.23	468.5	83	21.7	30.9
MR854.9W	06/11/2020 10:40	Base	423.6	8.63	7.4	0.22	450.4	75	21.9	14.5
MR854.9W	06/25/2020 10:30	Base	418.2	8.03	7.8	0.20	426.7	71	24.0	15.6
MR854.9W	07/09/2020 10:20	Rain	433.6	6.74	7.1	0.19	410.2	72	28.0	59.8
MR854.9W	07/23/2020 10:30	Base	347.3	8.43	7.7	0.17	354.0	54	24.0	59.1
MR854.9W	08/13/2020 09:50	Base	396.0	8.35	8.2	0.20	409.1	58	23.3	145.0
MR854.9W	08/27/2020 09:40	Base	322.3	7.80	8.3	0.15	316.0	32	26.0	85.7
MR854.9W	09/10/2020 10:05	Base	297.2	10.05	8.6	0.18	363.9	55	15.4	44.1
MR854.9W	09/24/2020 10:00	Rain	343.9	8.88	8.6	0.18	384.3	86	19.5	74.4
MR854.9W	10/08/2020 09:40	Base	305.0	9.87	8.5	0.18	383.3	75	14.3	22.8

Table 5. 2020 Mississippi River site MR853.5E (SAFL) physical parameters and *E. coli* sample data.

Station	Sampling Time	Sampling conditions	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Salinity (ppt)	Specific Conductivity (µS/cm)	Transparency (cm)	Water Temperature (°C)	<i>E. coli</i> (CFU/100 mL)
MR853.5E	06/11/2020 10:15	Base	408.1	8.84	7.6	0.21	434.8		21.8	6.2
MR853.5E	06/25/2020 10:00	Base	399.2	8.96	7.9	0.20	411.9	62	23.4	24.6
MR853.5E	07/09/2020 09:50	Rain	424.9	7.66	7.1	0.19	402.8	73	27.9	32.7
MR853.5E	07/23/2020 10:05	Base	335.9	8.26	7.8	0.16	344.5	33	23.7	56.3
MR853.5E	08/13/2020 09:25	Base	373.4	8.73	8.5	0.18	381.8	68	23.8	115.3
MR853.5E	08/27/2020 09:15	Base	313.6	8.11	8.4	0.15	308.5	53	25.9	24.3
MR853.5E	09/10/2020 09:40	Base	288.6	10.27	8.6	0.17	356.2	70	15.1	56.8
MR853.5E	09/24/2020 09:35	Rain	337.0	9.29	8.6	0.18	377.1	78	19.4	23.8
MR853.5E	10/08/2020 09:10	Base	296.4	10.48	8.6	0.18	372.8	> 100	14.3	37.9

Table 6. 2020 Mississippi River site MR852.2E (UMN Boat Launch) physical parameters and *E. coli* sample data.

Station	Sampling Time	Sampling conditions	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Salinity (ppt)	Specific Conductivity (µS/cm)	Transparency (cm)	Water Temperature (°C)	<i>E. coli</i> (CFU/100 mL)
MR852.2E	05/28/2020 09:50	Base	413.0	9.58	7.6	0.21	441.6	50	21.6	84.2
MR852.2E	06/11/2020 09:10	Base	412.0	9.61	7.4	0.21	439.4	54	21.7	22.1
MR852.2E	06/25/2020 09:35	Base	423.7	8.51	7.7	0.21	436.1	69	23.5	25.9
MR852.2E	07/09/2020 09:25	Rain	425.8	7.15	7.1	0.19	404.6	70	27.8	70.3
MR852.2E	07/23/2020 09:40	Base	353.8	9.09	7.8	0.17	364.2	65	23.5	51.2
MR852.2E	08/13/2020 09:00	Base	386.8	8.87	8.4	0.19	399.5	46	23.3	178.2
MR852.2E	08/27/2020 08:50	Base	322.6	8.60	8.3	0.15	317.6	45	25.8	56.3
MR852.2E	09/10/2020 09:15	Base	305.1	11.12	8.5	0.18	377.4	74	15.0	65.0
MR852.2E	09/24/2020 09:15	Rain	360.7	8.92	8.6	0.19	401.2	87	19.7	206.0
MR852.2E	10/08/2020 08:50	Base	313.5	11.08	8.6	0.19	392.6	93	14.5	27.9

Table 7. 2020 Mississippi River site MR849.9W (Lake Street Bridge) physical parameters and *E. coli* sample data.

Station	Sampling Time	Sampling conditions	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Salinity (ppt)	Specific Conductivity (µS/cm)	Transparency (cm)	Water Temperature (°C)	<i>E. coli</i> (CFU/100 mL)
MR849.9W	05/28/2020 09:35	Base	417.0	9.09	7.8	0.22	447.2	58	21.5	54.8
MR849.9W	06/11/2020 08:55	Base	427.4	9.22	7.7	0.22	448.3	55	22.6	9.7
MR849.9W	06/25/2020 09:00	Base	414.3	8.40	8.1	0.20	420.7	78	24.2	12.1
MR849.9W	07/09/2020 08:55	Rain	422.8	6.90	7.4	0.19	397.6	67	28.3	185.0
MR849.9W	07/23/2020 09:10	Base	347.3	8.52	7.8	0.17	357.7	72	23.5	39.3
MR849.9W	08/13/2020 08:40	Base	376.4	8.56	8.5	0.18	387.4	52	23.5	146.7
MR849.9W	08/27/2020 08:30	Base	322.2	8.20	8.3	0.15	315.9	60	26.0	40.2
MR849.9W	09/10/2020 08:50	Base	300.1	10.73	8.5	0.18	368.3	75	15.3	65.7
MR849.9W	09/24/2020 09:00	Rain	346.3	9.08	8.7	0.18	382.7	94	20.0	67.7
MR849.9W	10/08/2020 08:30	Base	309.0	10.76	8.7	0.18	383.4	87	14.8	30.9

Table 8. 2020 Mississippi River site MR848.1W (4300 West River Parkway) physical parameters and *E. coli* sample data.

Station	Sampling Time	Sampling conditions	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Salinity (ppt)	Specific Conductivity (µS/cm)	Transparency (cm)	Water Temperature (°C)	<i>E. coli</i> (CFU/100 mL)
MR848.1W	05/28/2020 09:15	Base	415.5	8.99	8.2	0.22	447.4	67	21.3	52.9
MR848.1W	06/11/2020 08:42	Base	428.0	9.08	7.9	0.21	446.4	59	22.8	3.0
MR848.1W	06/25/2020 08:25	Base	415.0	8.30	8.5	0.20	422.0	60	24.1	13.4
MR848.1W	07/09/2020 08:30	Rain	418.1	6.97	7.8	0.19	391.5	87	28.6	143.9
MR848.1W	07/23/2020 08:30	Base	351.0	8.40	7.4	0.17	360.9	65	23.6	31.5
MR848.1W	08/13/2020 08:12	Base	377.5	8.56	8.5	0.19	387.9	54	23.6	118.7
MR848.1W	08/27/2020 08:05	Base	321.9	8.10	8.4	0.15	315.7	80	26.0	32.3
MR848.1W	09/10/2020 08:20	Base	300.2	10.63	8.5	0.18	367.1	60	15.5	56.3
MR848.1W	09/24/2020 08:30	Rain	345.4	9.25	8.5	0.18	382.6	78	19.9	35.0
MR848.1W	10/08/2020 08:05	Base	307.0	10.70	8.7	0.18	380.6	85	14.9	83.6