

Technical Report No. 63

CHLORIDE CONDITIONS AND TRENDS IN SOUTHEASTERN WISCONSIN

Appendix B

STATISTICS OF NON-CHLORIDE IONS

Table B.1
Sodium Concentrations at Chloride Impact Study Stream Water Quality Monitoring Sites

SEWRPC Site ID	Monitoring Site Name	Samples	Minimum (mg/l)	Mean (mg/l)	Maximum (mg/l)	Standard Deviation (mg/l)
1	Fox River at Waukesha	29	70.9	160.0	345.0	77.67
2	Fox River at New Munster	26	33.8	54.9	94.9	12.34
3	Mukwonago River at Mukwonago	25	13.9	20.6	47.6	6.71
4	Sugar Creek	25	15.8	21.2	30.1	3.95
6	White River near Burlington	25	14.0	26.6	37.4	4.23
8	Pewaukee River	26	77.8	132.6	336.6	59.48
9	Oak Creek	33	37.2	299.7	1,370.0	332.30
10	Pike River	29	19.2	102.2	460.0	106.86
11	Bark River Upstream	25	40.0	56.3	215.0	33.56
12	Lincoln Creek	35	84.6	600.0	2,470.0	669.67
13	Ula Creek	39	27.7	131.6	565.0	129.81
14	Sauk Creek	28	10.9	44.4	234.0	42.45
15	Kilbourn Road Ditch	33	9.7	147.6	1,030.0	233.56
16	Jackson Creek	26	16.0	32.5	59.6	9.77
18	Oconomowoc River Upstream	25	19.1	21.4	23.6	1.22
20	Oconomowoc River Downstream	25	28.1	29.7	33.7	1.38
21	East Branch Milwaukee River	25	6.9	10.4	12.5	1.30
23	Milwaukee River Downstream of Newburg	26	15.1	41.1	182.0	35.29
25	Root River Canal	28	7.8	50.9	191.0	37.00
28	East Branch Rock River	26	15.9	28.5	36.4	5.16
30	Des Plaines River	30	15.0	72.4	315.0	71.03
32	Turtle Creek	26	23.7	31.5	44.8	4.67
33	Pebble Brook	25	37.4	57.6	103.0	11.96
35	Honey Creek Upstream of East Troy	26	6.9	13.7	16.2	2.27
36	Honey Creek Downstream of East Troy	25	12.1	21.9	27.6	3.23
38	North Branch Milwaukee River	25	10.7	17.7	23.4	3.32
40	Stony Creek	25	10.5	16.6	21.5	2.19
41	Milwaukee River near Saukville	25	14.6	27.9	55.1	7.66
45	Mukwonago River at Nature Road	25	4.8	7.6	8.9	0.78
47	Fox River at Rochester	26	44.1	80.1	156.0	21.26
48	White River at Lake Geneva	25	22.6	26.4	49.3	5.23
51	Rubicon River	27	32.2	60.3	126.0	20.54
52	Cedar Creek	26	30.7	47.6	117.0	17.49
53	Honey Creek at Wauwatosa	40	90.1	831.6	3,070.0	813.10
54	Whitewater Creek	26	4.1	8.3	9.5	1.01
55	Bark River Downstream	25	51.1	54.6	59.0	2.15
57	Menomonee River at Wauwatosa	28	76.8	346.3	1,360.0	356.18
58	Milwaukee River at Estabrook Park	19	22.5	41.4	131.0	23.50
59	Root River near Horlick Dam	37	15.1	77.7	356.0	60.78
60	Root River at Grange Avenue	16	103.0	712.6	2,380.0	750.46
87	Underwood Creek	17	105.0	566.0	2,250.0	588.23

Source: SEWRPC

Table B.2
Potassium Concentrations at Chloride Impact Study Stream Water Quality Monitoring Sites

SEWRPC Site ID	Monitoring Site Name	Samples	Minimum (mg/l)	Mean (mg/l)	Maximum (mg/l)	Standard Deviation (mg/l)
1	Fox River at Waukesha	29	2.80	3.82	5.90	0.716
2	Fox River at New Munster	26	2.29	2.89	3.86	0.390
3	Mukwonago River at Mukwonago	25	1.14	1.71	2.31	0.332
4	Sugar Creek	25	1.78	2.39	3.70	0.532
6	White River near Burlington	25	1.83	2.27	4.04	0.502
8	Pewaukee River	26	1.41	2.05	3.15	0.371
9	Oak Creek	33	1.84	5.45	21.60	3.278
10	Pike River	29	2.16	3.05	5.93	0.853
11	Bark River Upstream	25	1.48	2.35	2.94	0.313
12	Lincoln Creek	35	1.24	4.20	8.35	1.644
13	Ula Creek	39	1.50	3.05	5.23	0.806
14	Sauk Creek	28	3.57	5.82	9.50	1.475
15	Kilbourn Road Ditch	33	2.88	4.71	8.35	1.341
16	Jackson Creek	26	1.29	2.28	5.37	0.937
18	Oconomowoc River Upstream	25	1.08	2.32	3.04	0.448
20	Oconomowoc River Downstream	25	2.17	2.41	2.73	0.124
21	East Branch Milwaukee River	25	0.74	1.81	2.87	0.509
23	Milwaukee River Downstream of Newburg	26	2.06	3.04	5.11	0.739
25	Root River Canal	28	2.83	4.55	8.97	1.566
28	East Branch Rock River	26	1.91	3.52	7.56	1.481
30	Des Plaines River	30	2.50	4.04	6.46	0.996
32	Turtle Creek	26	2.80	3.48	6.44	0.692
33	Pebble Brook	25	1.42	1.84	2.45	0.272
35	Honey Creek Upstream of East Troy	26	1.79	2.28	4.57	0.579
36	Honey Creek Downstream of East Troy	25	1.92	2.31	3.87	0.402
38	North Branch Milwaukee River	25	2.40	3.62	5.37	0.738
40	Stony Creek	25	1.92	2.78	4.10	0.613
41	Milwaukee River near Saukville	25	2.34	3.40	6.11	0.871
45	Mukwonago River at Nature Road	25	0.84	1.36	1.74	0.231
47	Fox River at Rochester	26	2.02	3.02	4.16	0.488
48	White River at Lake Geneva	25	1.70	1.93	2.15	0.113
51	Rubicon River	27	2.04	3.51	7.94	1.075
52	Cedar Creek	26	2.12	2.81	4.21	0.585
53	Honey Creek at Wauwatosa	40	2.92	5.72	9.68	1.780
54	Whitewater Creek	26	1.41	2.27	6.09	0.893
55	Bark River Downstream	25	1.98	2.29	2.60	0.152
57	Menomonee River at Wauwatosa	28	2.47	3.24	6.31	0.869
58	Milwaukee River at Estabrook Park	19	2.42	3.19	5.37	0.706
59	Root River near Horlick Dam	37	2.49	3.68	6.03	0.865
60	Root River at Grange Avenue	16	2.65	3.88	6.88	1.230
87	Underwood Creek	17	2.95	4.94	9.87	1.601

Source: SEWRPC

Table B.3
Calcium Concentrations at Chloride Impact Study Stream Water Quality Monitoring Sites

SEWRPC Site ID	Monitoring Site Name	Samples	Minimum (mg/l)	Mean (mg/l)	Maximum (mg/l)	Standard Deviation (mg/l)
1	Fox River at Waukesha	29	54.1	76.0	99.1	11.10
2	Fox River at New Munster	26	55.4	69.9	84.8	6.99
3	Mukwonago River at Mukwonago	25	45.6	54.9	64.5	5.56
4	Sugar Creek	25	65.3	82.0	92.6	7.17
6	White River near Burlington	25	36.0	60.8	71.4	7.47
8	Pewaukee River	26	37.8	58.8	88.2	10.99
9	Oak Creek	33	35.1	79.6	106.0	19.51
10	Pike River	29	33.0	64.7	87.1	15.31
11	Bark River Upstream	25	68.2	80.4	92.7	6.14
12	Lincoln Creek	35	35.6	87.1	126.0	22.97
13	Ula Creek	39	42.3	70.2	104.0	15.17
14	Sauk Creek	28	35.4	75.5	92.6	13.07
15	Kilbourn Road Ditch	33	23.9	63.2	116.0	22.49
16	Jackson Creek	26	21.1	74.1	85.6	12.87
18	Oconomowoc River Upstream	25	62.4	69.5	80.9	4.67
20	Oconomowoc River Downstream	25	37.6	48.8	62.5	6.38
21	East Branch Milwaukee River	25	41.7	55.6	66.4	6.24
23	Milwaukee River Downstream of Newburg	26	50.1	65.0	79.5	7.60
25	Root River Canal	28	27.8	70.0	100.0	18.04
28	East Branch Rock River	26	47.3	81.0	95.8	12.97
30	Des Plaines River	30	30.7	60.4	91.5	18.12
32	Turtle Creek	26	39.3	68.3	85.2	11.59
33	Pebble Brook	25	70.9	87.3	103.0	7.61
35	Honey Creek Upstream of East Troy	26	30.2	76.4	92.6	11.04
36	Honey Creek Downstream of East Troy	25	66.9	77.3	94.4	6.09
38	North Branch Milwaukee River	25	49.0	73.6	87.4	10.05
40	Stony Creek	25	44.2	69.9	81.3	8.52
41	Milwaukee River near Saukville	25	49.7	68.5	82.7	8.59
45	Mukwonago River at Nature Road	25	49.6	70.8	84.7	6.91
47	Fox River at Rochester	26	52.9	70.3	91.9	10.11
48	White River at Lake Geneva	25	32.1	36.1	39.3	1.69
51	Rubicon River	27	46.8	70.4	81.2	7.72
52	Cedar Creek	26	51.1	68.2	80.9	6.56
53	Honey Creek at Wauwatosa	40	55.6	93.3	126.0	19.26
54	Whitewater Creek	26	34.3	75.7	89.8	9.94
55	Bark River Downstream	25	38.4	53.5	67.5	7.92
57	Menomonee River at Wauwatosa	28	43.9	90.0	112.0	17.65
58	Milwaukee River at Estabrook Park	19	58.0	71.6	88.6	9.29
59	Root River near Horlick Dam	37	31.6	66.5	95.8	16.32
60	Root River at Grange Avenue	16	44.9	98.5	133.0	25.23
87	Underwood Creek	17	58.7	112.4	134.0	19.75

Source: SEWRPC

Table B.4
Magnesium Concentrations at Chloride Impact Study Stream Water Quality Monitoring Sites

SEWRPC Site ID	Monitoring Site Name	Samples	Minimum (mg/l)	Mean (mg/l)	Maximum (mg/l)	Standard Deviation (mg/l)
1	Fox River at Waukesha	29	27.0	38.7	48.3	5.36
2	Fox River at New Munster	26	27.7	36.2	43.4	3.53
3	Mukwonago River at Mukwonago	25	26.2	32.8	36.9	2.31
4	Sugar Creek	25	28.7	37.4	41.6	3.32
6	White River near Burlington	25	18.1	35.6	42.1	4.84
8	Pewaukee River	26	29.6	36.5	43.0	3.70
9	Oak Creek	33	14.6	34.7	47.2	9.21
10	Pike River	29	16.0	29.5	39.5	7.38
11	Bark River Upstream	25	31.0	38.1	42.1	3.02
12	Lincoln Creek	35	15.2	34.5	48.1	10.08
13	Ula Creek	39	19.9	33.8	49.4	7.37
14	Sauk Creek	28	19.1	38.1	46.0	6.58
15	Kilbourn Road Ditch	33	12.3	30.8	51.0	10.25
16	Jackson Creek	26	9.8	34.8	43.6	6.20
18	Oconomowoc River Upstream	25	32.7	36.6	40.2	2.25
20	Oconomowoc River Downstream	25	31.2	33.4	37.1	1.49
21	East Branch Milwaukee River	25	23.2	31.2	36.7	3.56
23	Milwaukee River Downstream of Newburg	26	26.2	35.4	42.3	4.54
25	Root River Canal	28	14.8	33.9	44.6	8.37
28	East Branch Rock River	26	25.1	41.0	48.5	6.66
30	Des Plaines River	30	13.7	29.9	45.7	9.27
32	Turtle Creek	26	18.6	35.9	41.5	5.18
33	Pebble Brook	25	31.4	39.4	46.7	4.12
35	Honey Creek Upstream of East Troy	26	13.2	36.5	42.0	5.79
36	Honey Creek Downstream of East Troy	25	26.2	37.2	41.4	3.55
38	North Branch Milwaukee River	25	25.6	38.4	45.8	5.35
40	Stony Creek	25	23.0	36.9	42.7	4.86
41	Milwaukee River near Saukville	25	26.0	36.7	43.0	5.06
45	Mukwonago River at Nature Road	25	22.8	33.9	38.2	3.25
47	Fox River at Rochester	26	26.3	36.8	44.0	4.20
48	White River at Lake Geneva	25	32.0	34.8	37.9	1.30
51	Rubicon River	27	23.9	38.4	46.7	4.31
52	Cedar Creek	26	26.1	37.9	43.9	4.29
53	Honey Creek at Wauwatosa	40	15.6	40.3	53.3	10.19
54	Whitewater Creek	26	15.6	38.5	43.5	5.32
55	Bark River Downstream	25	33.1	35.7	38.9	1.51
57	Menomonee River at Wauwatosa	28	20.4	39.6	50.7	7.77
58	Milwaukee River at Estabrook Park	19	27.9	37.7	46.9	5.54
59	Root River near Horlick Dam	37	16.9	33.4	53.2	8.73
60	Root River at Grange Avenue	16	18.6	46.0	63.0	11.93
87	Underwood Creek	17	23.8	45.2	53.4	8.01

Source: SEWRPC

Table B.5
Sulfate Concentrations at Chloride Impact Study Stream Water Quality Monitoring Sites

SEWRPC Site ID	Monitoring Site Name	Samples	Minimum (mg/l)	Mean (mg/l)	Maximum (mg/l)	Standard Deviation (mg/l)
1	Fox River at Waukesha	29	4.1	41.8	67.1	13.30
2	Fox River at New Munster	26	21.7	32.8	48.1	6.94
3	Mukwonago River at Mukwonago	25	13.1	18.6	24.3	2.55
4	Sugar Creek	25	17.1	23.0	27.9	3.10
6	White River near Burlington	25	10.6	22.6	28.3	4.02
8	Pewaukee River	26	12.3	25.0	33.2	4.34
9	Oak Creek	33	17.4	57.7	81.2	17.20
10	Pike River	29	18.0	50.2	78.8	14.70
11	Bark River Upstream	25	12.6	21.8	29.3	4.15
12	Lincoln Creek	35	31.3	67.3	121.0	19.61
13	Ula Creek	39	9.1	17.7	39.0	5.49
14	Sauk Creek	28	17.8	32.9	46.4	7.89
15	Kilbourn Road Ditch	33	17.1	37.6	76.3	17.29
16	Jackson Creek	26	5.0	19.0	30.0	4.57
18	Oconomowoc River Upstream	25	10.6	18.7	27.1	3.64
20	Oconomowoc River Downstream	25	15.5	17.8	20.2	1.22
21	East Branch Milwaukee River	25	2.4	8.4	14.4	2.28
23	Milwaukee River Downstream of Newburg	26	10.4	16.6	24.8	3.72
25	Root River Canal	28	18.4	46.7	75.9	13.26
28	East Branch Rock River	26	19.7	28.3	39.7	6.14
30	Des Plaines River	30	16.0	38.1	67.1	14.31
32	Turtle Creek	26	13.2	24.8	31.4	4.73
33	Pebble Brook	25	18.6	28.0	42.6	6.32
35	Honey Creek Upstream of East Troy	26	11.4	43.9	71.8	12.55
36	Honey Creek Downstream of East Troy	25	28.0	40.3	68.6	8.66
38	North Branch Milwaukee River	25	13.0	21.5	36.7	6.06
40	Stony Creek	25	11.2	17.9	34.7	4.88
41	Milwaukee River near Saukville	25	11.4	18.8	26.9	3.96
45	Mukwonago River at Nature Road	25	13.2	19.6	26.6	3.19
47	Fox River at Rochester	26	13.4	29.3	39.1	6.38
48	White River at Lake Geneva	25	21.3	23.8	25.9	1.32
51	Rubicon River	27	12.8	30.1	137.0	22.53
52	Cedar Creek	26	14.8	27.0	38.6	5.18
53	Honey Creek at Wauwatosa	40	33.1	77.0	127.0	19.92
54	Whitewater Creek	26	12.9	31.7	39.0	5.26
55	Bark River Downstream	25	17.0	19.9	23.8	1.59
57	Menomonee River at Wauwatosa	28	27.9	57.7	84.5	15.81
58	Milwaukee River at Estabrook Park	19	15.4	22.7	37.5	6.12
59	Root River near Horlick Dam	37	19.7	42.0	88.1	14.53
60	Root River at Grange Avenue	16	33.5	63.8	108.0	22.41
87	Underwood Creek	17	46.9	104.2	160.0	27.42

Source: SEWRPC

Table B.6
Hardness Concentrations at Chloride Impact Study Stream Water Quality Monitoring Sites

SEWRPC Site ID	Monitoring Site Name	Samples	Minimum (mg/l as CaCO₃)	Mean (mg/l as CaCO₃)	Maximum (mg/l as CaCO₃)	Standard Deviation (mg/l as CaCO₃)
1	Fox River at Waukesha	29	246	349	446	48.3
2	Fox River at New Munster	26	252	324	389	30.8
3	Mukwonago River at Mukwonago	25	222	272	308	19.6
4	Sugar Creek	25	281	359	403	30.9
6	White River near Burlington	25	164	298	345	37.4
8	Pewaukee River	26	233	297	394	38.8
9	Oak Creek	33	149	342	455	85.8
10	Pike River	29	148	283	374	68.3
11	Bark River Upstream	25	298	358	405	26.5
12	Lincoln Creek	35	152	360	512	96.0
13	Ula Creek	39	191	315	462	67.7
14	Sauk Creek	28	167	346	421	59.2
15	Kilbourn Road Ditch	33	111	284	486	98.0
16	Jackson Creek	26	93	329	393	57.4
18	Oconomowoc River Upstream	25	291	324	366	18.3
20	Oconomowoc River Downstream	25	227	259	309	18.1
21	East Branch Milwaukee River	25	200	267	317	30.0
23	Milwaukee River Downstream of Newburg	26	233	308	372	37.3
25	Root River Canal	28	134	314	433	79.4
28	East Branch Rock River	26	222	371	437	59.3
30	Des Plaines River	30	133	274	417	83.4
32	Turtle Creek	26	175	318	380	49.3
33	Pebble Brook	25	307	380	450	34.9
35	Honey Creek Upstream of East Troy	26	130	341	388	48.5
36	Honey Creek Downstream of East Troy	25	278	346	391	24.4
38	North Branch Milwaukee River	25	228	342	407	46.9
40	Stony Creek	25	205	326	379	41.0
41	Milwaukee River near Saukville	25	231	322	381	41.6
45	Mukwonago River at Nature Road	25	218	316	360	30.2
47	Fox River at Rochester	26	240	327	411	40.3
48	White River at Lake Geneva	25	212	233	254	8.8
51	Rubicon River	27	215	334	395	35.9
52	Cedar Creek	26	235	326	379	32.7
53	Honey Creek at Wauwatosa	40	220	399	518	85.8
54	Whitewater Creek	26	150	348	402	45.9
55	Bark River Downstream	25	241	281	329	21.4
57	Menomonee River at Wauwatosa	28	194	388	486	74.9
58	Milwaukee River at Estabrook Park	19	260	334	414	45.8
59	Root River near Horlick Dam	37	149	303	458	76.1
60	Root River at Grange Avenue	16	189	435	592	110.4
87	Underwood Creek	17	244	467	547	80.5

Source: SEWRPC