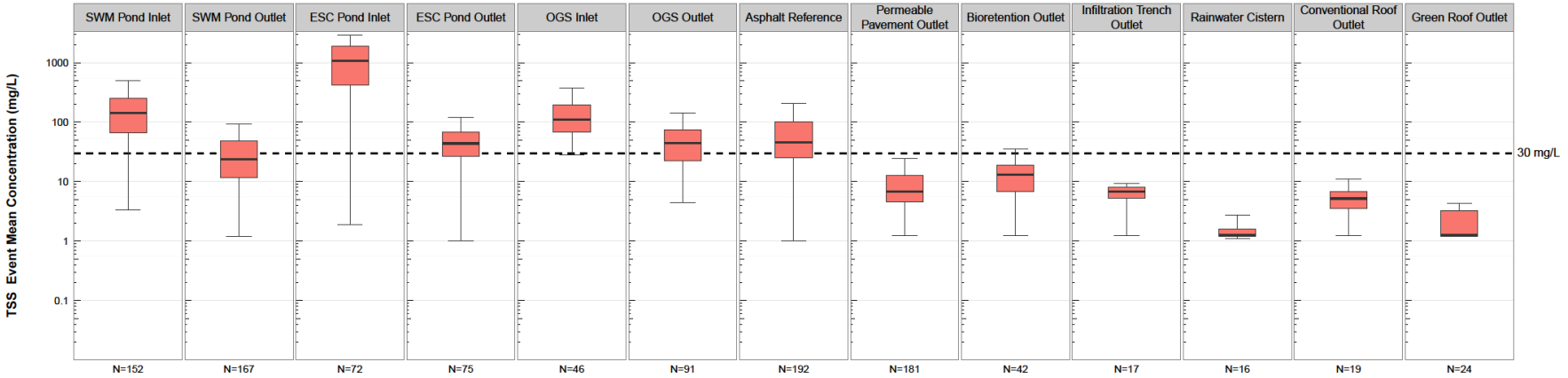
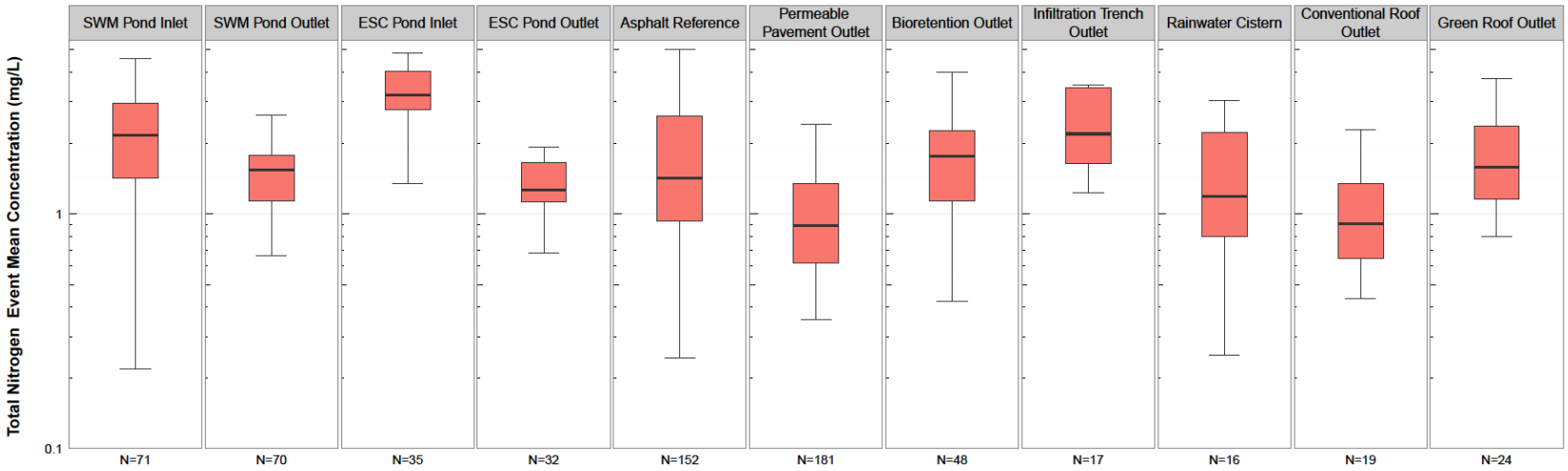
Canadian Water Quality Data

Solids; suspended



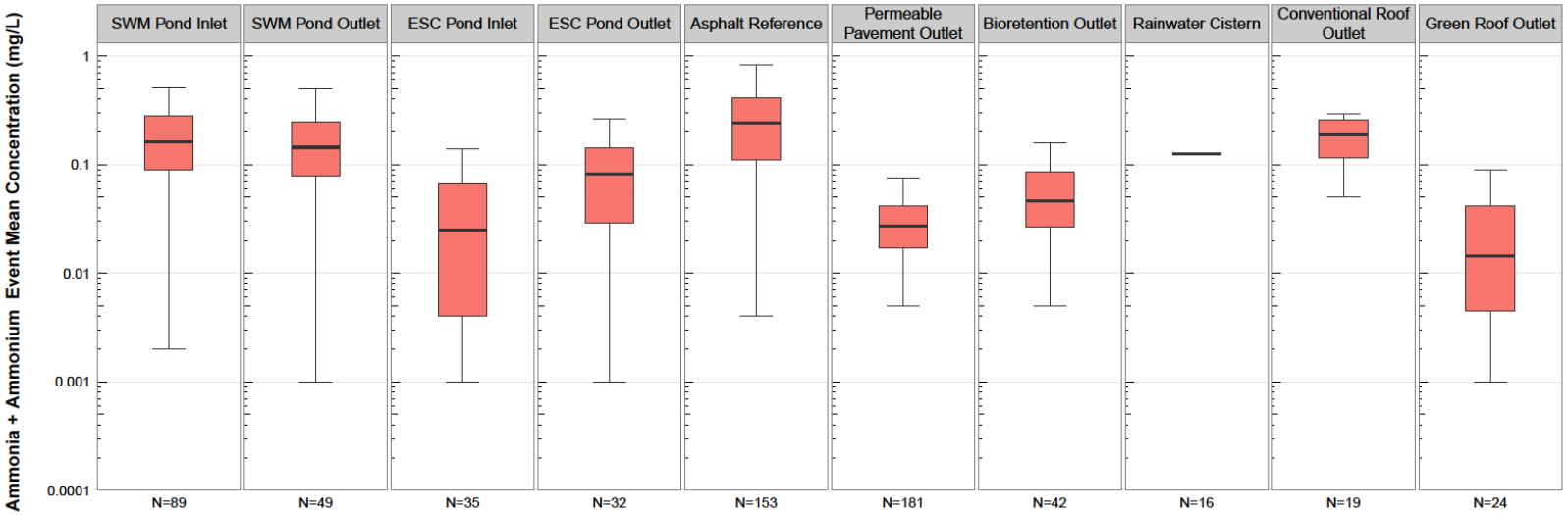
Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	152	221.39	258.63	12.99	66.01	144	255.15	752.55	86.84
SWM Pond Outlet	167	50.89	90.57	4.87	11.81	23.49	48.37	189.4	37.72
ESC Pond Inlet	72	1890.7	2657.41	135.4	415.5	1070	1887.5	8563.2	98.61
ESC Pond Outlet	75	92.15	243.24	15.41	26.5	43.8	68.25	163.8	69.33
OGS Inlet	46	145.07	113.87	34.62	68.38	109.5	195	325.75	95.65
OGS Outlet	91	64.6	72.82	8.5	22.75	44.5	74.75	213.5	62.64
Asphalt Reference	192	91.04	139.47	8.33	25.28	46.15	101.5	286.35	66.67
Permeable Pavement Outlet	181	11.16	13.19	1.25	4.6	6.8	12.7	33.6	6.63
Bioretention Outlet	42	15.87	11.94	1.25	6.8	13	19.07	40.46	14.29
Infiltration Trench Outlet	17	7.92	4.61	3.37	5.2	6.85	8	16.72	0
Rainwater Cistern	16	2.76	3.51	1.21	1.25	1.25	1.61	11.03	0
Conventional Roof Outlet	19	6.56	4.99	2.46	3.55	5.2	6.75	17.84	0
Green Roof Outlet	24	2.8	3.24	1.25	1.25	1.25	3.23	7.44	0

Nitrogen; total



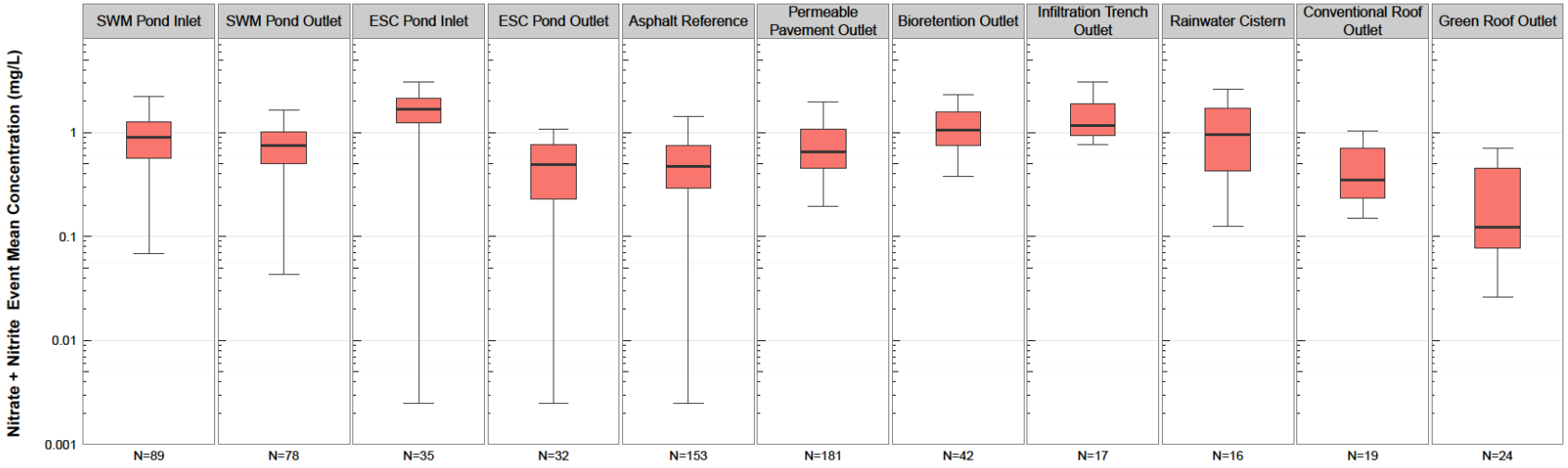
Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	71	2.65	2.5	1	1.42	2.15	2.96	5.31	NA
SWM Pond Outlet	70	1.53	0.47	0.92	1.13	1.54	1.78	2.3	NA
ESC Pond Inlet	35	4.21	3.79	1.57	2.77	3.21	4.03	9.89	NA
ESC Pond Outlet	32	1.36	0.41	0.79	1.12	1.26	1.65	1.92	NA
Asphalt Reference	152	1.99	1.56	0.45	0.93	1.42	2.6	4.83	NA
Permeable Pavement Outlet	181	1.14	1.03	0.43	0.62	0.89	1.34	2.34	NA
Bioretention Outlet	48	2.34	2.77	0.73	1.13	1.76	2.26	4.35	NA
Infiltration Trench Outlet	17	2.88	1.85	1.33	1.64	2.19	3.45	6.71	NA
Rainwater Cistern	16	1.45	0.86	0.36	0.8	1.19	2.21	2.67	NA
Conventional Roof Outlet	19	1.11	0.61	0.45	0.65	0.91	1.34	2.29	NA
Green Roof Outlet	24	1.76	0.79	0.88	1.15	1.58	2.36	3.37	NA

Nitrogen; ammonia + ammonium



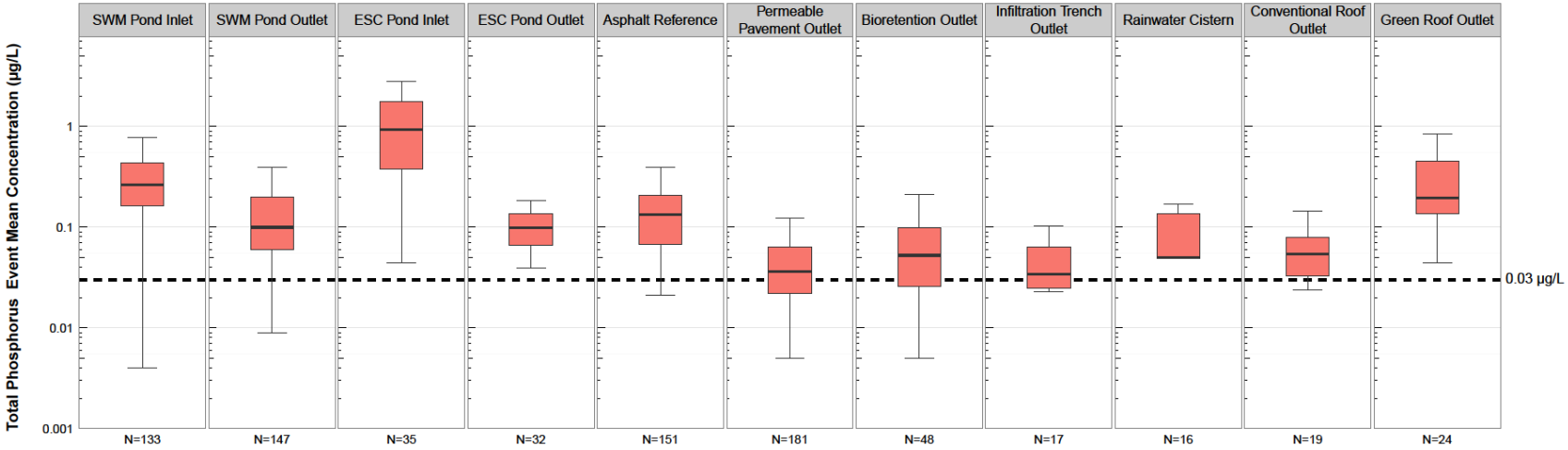
Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	89	0.3	0.63	0.01	0.09	0.16	0.28	0.81	NA
SWM Pond Outlet	49	0.2	0.17	0.01	0.08	0.14	0.25	0.5	NA
ESC Pond Inlet	35	0.04	0.06	0	0	0.02	0.07	0.16	NA
ESC Pond Outlet	32	0.09	0.07	0	0.03	0.08	0.14	0.22	NA
Asphalt Reference	153	0.36	0.46	0.03	0.11	0.24	0.41	1.14	NA
Permeable Pavement Outlet	181	0.04	0.04	0	0.02	0.03	0.04	0.12	NA
Bioretention Outlet	42	0.08	0.13	0.01	0.03	0.05	0.08	0.31	NA
Rainwater Cistern	16	0.29	0.66	0.11	0.12	0.12	0.12	0.79	NA
Conventional Roof Outlet	19	0.22	0.17	0.05	0.12	0.19	0.26	0.54	NA
Green Roof Outlet	24	0.03	0.06	0	0	0.01	0.04	0.08	NA

Nitrogen; nitrate + nitrite



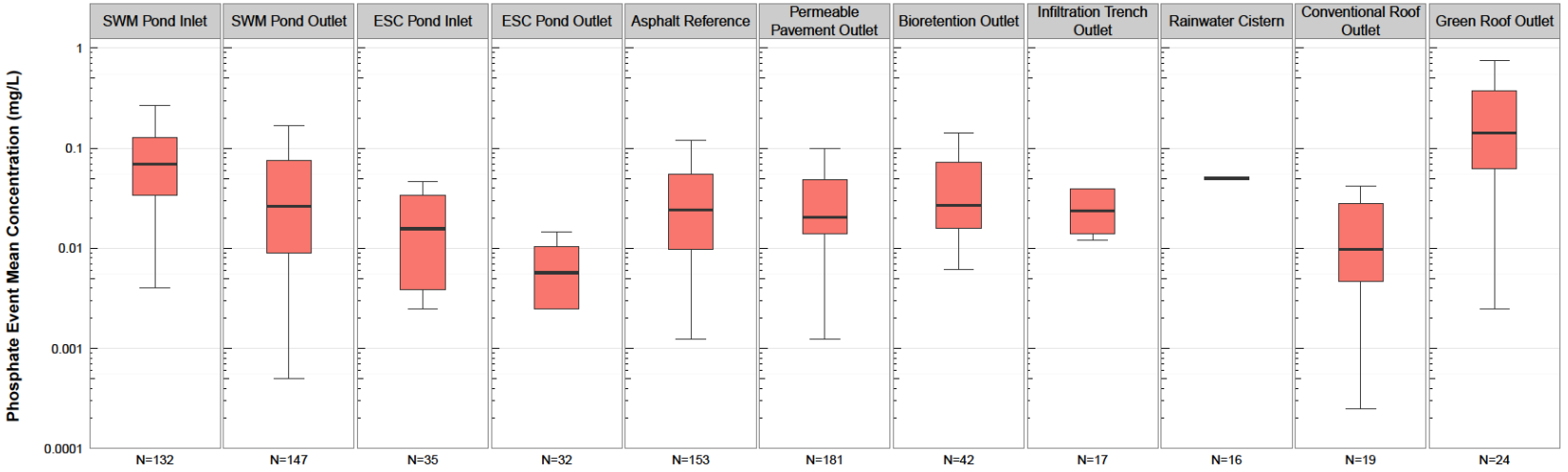
Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	89	1.06	0.73	0.4	0.56	0.9	1.27	2.65	NA
SWM Pond Outlet	78	0.73	0.34	0.11	0.51	0.75	1.02	1.15	NA
ESC Pond Inlet	35	1.66	0.88	0.12	1.24	1.69	2.12	3.28	NA
ESC Pond Outlet	32	0.52	0.39	0.04	0.23	0.49	0.77	1.02	NA
Asphalt Reference	153	0.62	0.53	0.11	0.29	0.47	0.75	1.62	NA
Permeable Pavement Outlet	181	0.86	0.69	0.28	0.45	0.65	1.07	1.92	NA
Bioretention Outlet	42	1.57	1.99	0.44	0.76	1.05	1.57	2.29	NA
Infiltration Trench Outlet	17	1.8	1.39	0.8	0.94	1.17	1.89	3.69	NA
Rainwater Cistern	16	1.12	0.85	0.12	0.43	0.95	1.7	2.47	NA
Conventional Roof Outlet	19	0.46	0.3	0.16	0.23	0.35	0.71	0.98	NA
Green Roof Outlet	24	0.28	0.32	0.03	0.08	0.12	0.45	0.71	NA

Phosphorus; total



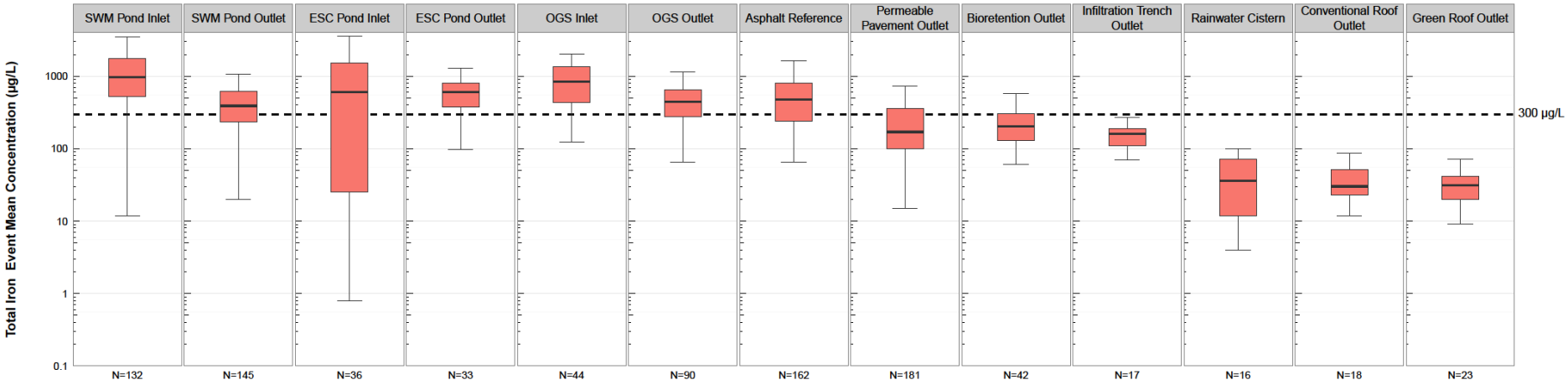
Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	133	0.34	0.3	0.08	0.16	0.26	0.43	0.82	99.25
SWM Pond Outlet	147	0.16	0.14	0.02	0.06	0.1	0.2	0.5	93.88
ESC Pond Inlet	35	2.35	3.96	0.08	0.38	0.93	1.77	12.57	100
ESC Pond Outlet	32	0.1	0.04	0.04	0.07	0.1	0.14	0.17	100
Asphalt Reference	151	0.2	0.33	0.03	0.07	0.13	0.2	0.48	94.04
Permeable Pavement Outlet	181	0.06	0.09	0.01	0.02	0.04	0.06	0.18	55.8
Bioretention Outlet	48	0.07	0.06	0	0.03	0.05	0.1	0.19	70.83
Infiltration Trench Outlet	17	0.15	0.39	0.02	0.02	0.03	0.06	0.46	58.82
Rainwater Cistern	16	0.1	0.1	0.05	0.05	0.05	0.14	0.24	100
Conventional Roof Outlet	19	0.07	0.07	0.02	0.03	0.05	0.08	0.16	73.68
Green Roof Outlet	24	0.3	0.24	0.05	0.13	0.19	0.46	0.67	100

Phosphorus; phosphate



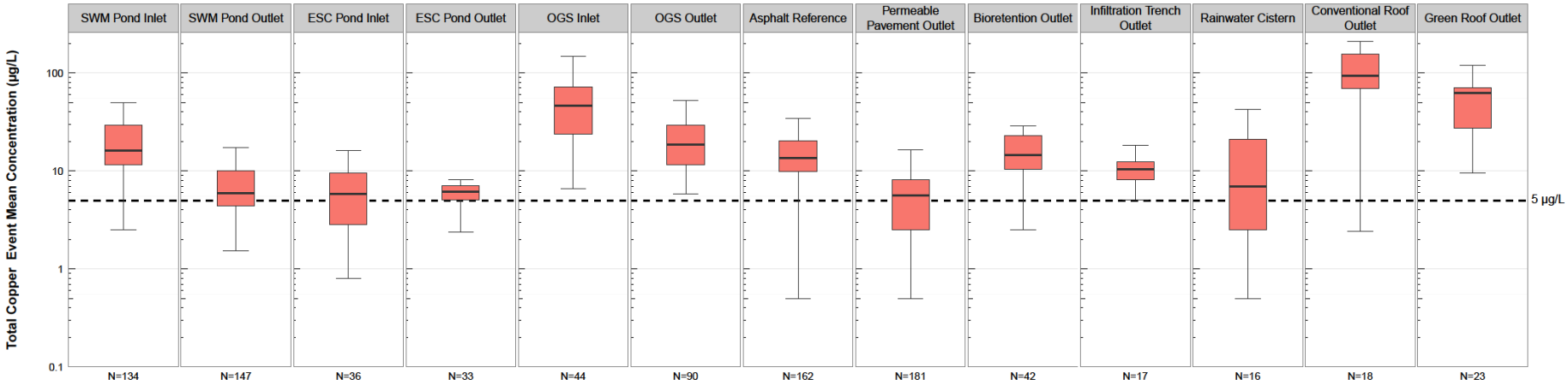
Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	132	0.6	5.56	0.01	0.03	0.07	0.13	0.5	NA
SWM Pond Outlet	147	0.08	0.13	0	0.01	0.03	0.08	0.5	NA
ESC Pond Inlet	35	0.27	0.94	0	0	0.02	0.03	1.53	NA
ESC Pond Outlet	32	0.01	0.02	0	0	0.01	0.01	0.03	NA
Asphalt Reference	153	0.08	0.25	0	0.01	0.02	0.05	0.15	NA
Permeable Pavement Outlet	181	0.04	0.04	0.01	0.01	0.02	0.05	0.12	NA
Bioretention Outlet	42	0.05	0.05	0.01	0.02	0.03	0.07	0.14	NA
Infiltration Trench Outlet	17	0.04	0.04	0.01	0.01	0.02	0.04	0.12	NA
Rainwater Cistern	16	0.05	0.01	0.04	0.05	0.05	0.05	0.05	NA
Conventional Roof Outlet	19	0.02	0.03	0	0	0.01	0.03	0.08	NA
Green Roof Outlet	24	0.23	0.23	0	0.06	0.14	0.37	0.57	NA

Iron; total



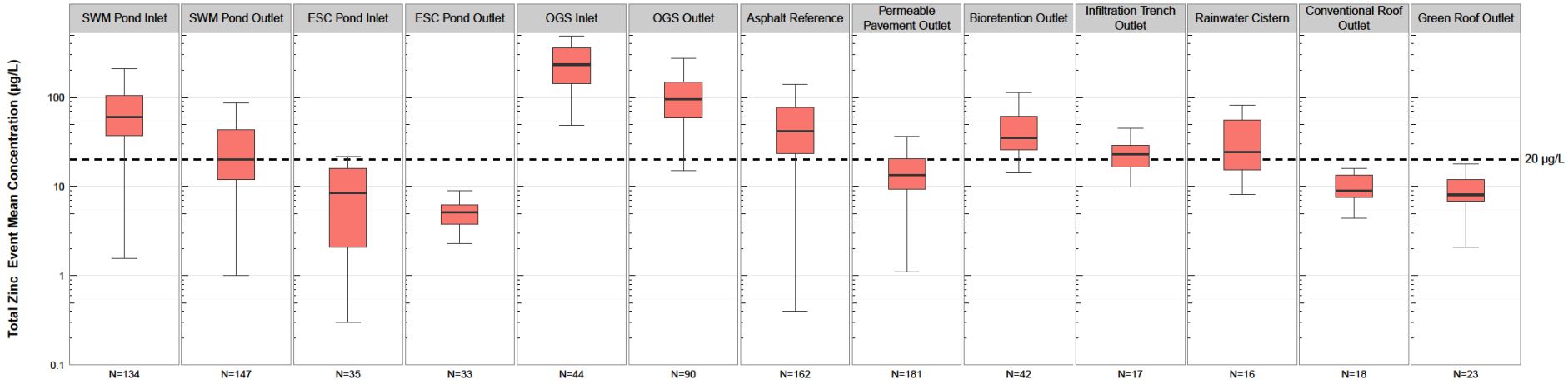
Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	132	1553.87	1847.61	241.6	522.49	976.5	1740	4937	91.67
SWM Pond Outlet	145	479.52	337.29	110.4	236	390	616.43	1049.12	65.52
ESC Pond Inlet	36	848.55	919.84	2.98	25.32	607	1535	2437.5	61.11
ESC Pond Outlet	33	592.01	295.09	137.4	381	609	806	1076	81.82
OGS Inlet	44	913.18	537.84	206.75	433.5	845.5	1370	1889.5	88.64
OGS Outlet	90	561.81	469.5	127.05	277	442.5	644	1555.5	71.11
Asphalt Reference	162	666.17	619.49	115.1	238	480	802.75	1855	65.43
Permeable Pavement Outlet	181	253	221.97	50	100	170	360	720	30.39
Bioretention Outlet	42	250.71	188.05	90	130	205	305	573	26.19
Infiltration Trench Outlet	17	166.76	85.24	70	110	160	190	326	11.76
Rainwater Cistern	16	103.49	211.9	8.5	11.78	35.75	72.12	431	6.25
Conventional Roof Outlet	18	40.59	30.55	14	23.22	30.2	50.88	93.79	0
Green Roof Outlet	23	36.84	25.18	10.1	20	31	41.5	71.49	0

Copper; total



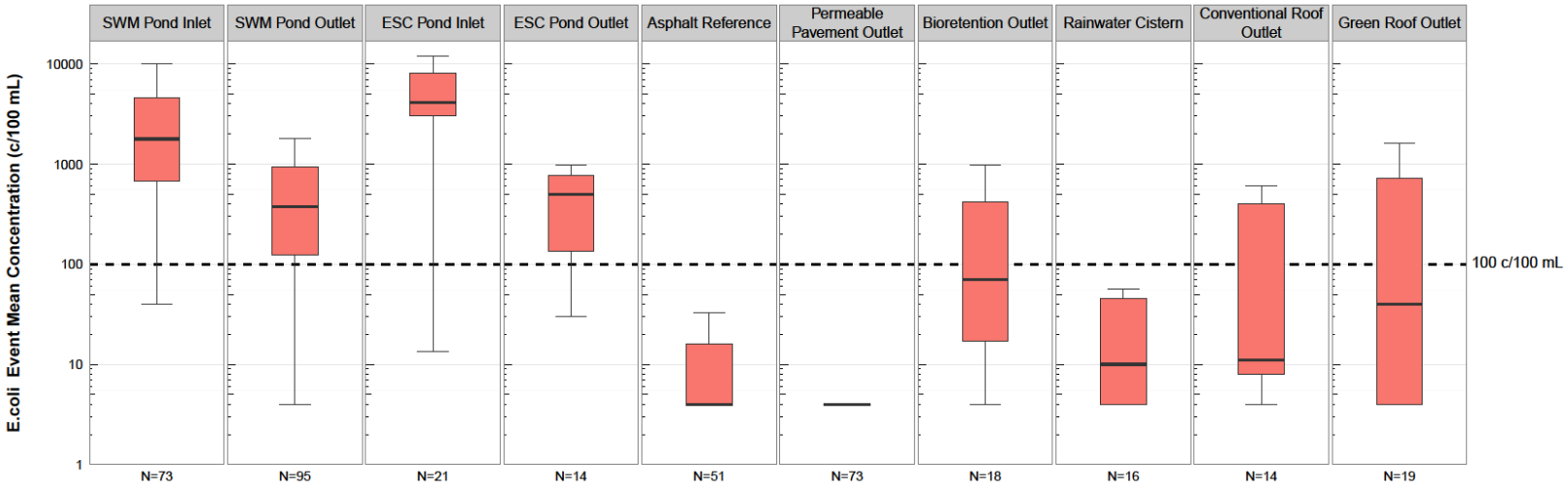
Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	134	26.12	34.85	5.57	11.62	16.15	29.07	69.6	97.01
SWM Pond Outlet	147	8.77	11.85	2.64	4.38	5.95	10	17.28	59.86
ESC Pond Inlet	36	37.46	130.87	0.8	2.84	5.83	9.5	150	58.33
ESC Pond Outlet	33	7.37	5.04	3.07	5.04	6.15	7.07	19.28	75.76
OGS Inlet	44	57.55	49.61	10.73	23.82	46.2	71.78	141.6	100
OGS Outlet	90	25	21.8	7.78	11.53	18.65	29.37	66.92	100
Asphalt Reference	162	19.68	23.18	5.72	9.85	13.55	20.32	42.6	97.53
Permeable Pavement Outlet	181	7.37	10.79	2.5	2.5	5.66	8.1	17.7	56.91
Bioretention Outlet	42	18.93	15.62	6.99	10.45	14.55	23	43.61	95.24
Infiltration Trench Outlet	17	11.01	4.89	5.78	8.1	10.4	12.3	19.7	100
Rainwater Cistern	16	15.58	19.9	1.22	2.49	6.99	21.18	49.58	56.25
Conventional Roof Outlet	18	108.57	58.51	32.49	68.8	93.95	154.75	209.15	94.44
Green Roof Outlet	23	55.52	29.1	18.57	27.25	62.7	70.25	99.72	100

Zinc; total



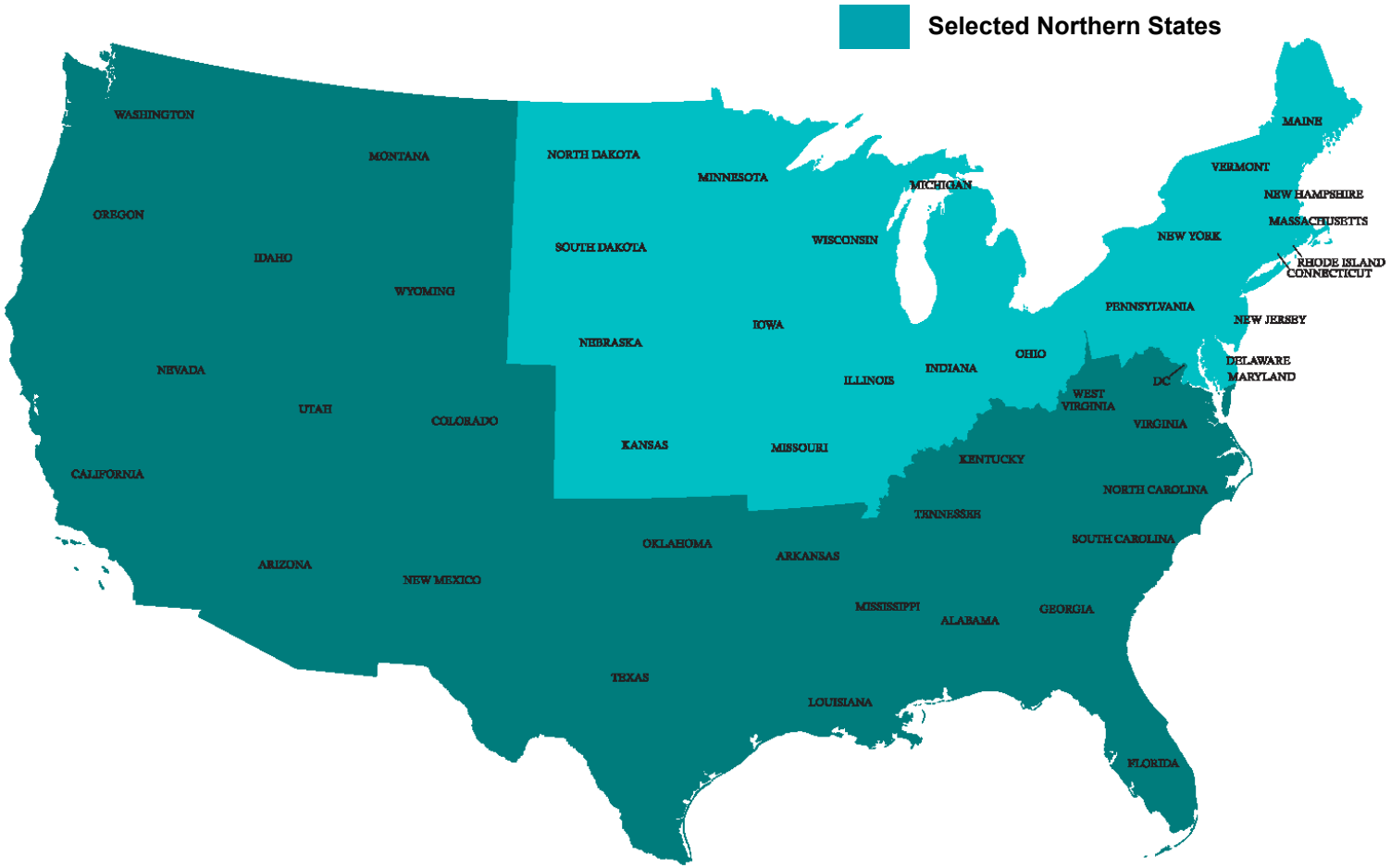
Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	134	103.32	126.15	16.46	37.3	60	105.75	358.05	93.28
SWM Pond Outlet	147	35.53	40.13	6.5	12.05	20	43.45	97.35	48.3
ESC Pond Inlet	35	12.5	17.53	0.3	2.08	8.47	16	27.5	14.29
ESC Pond Outlet	33	5.22	2.04	2.5	3.76	5.18	6.29	8.41	0
OGS Inlet	44	289.57	216.45	61.21	141.5	233	358.75	753.55	100
OGS Outlet	90	117.47	97.47	25.92	59.57	94.95	148.75	265.45	96.67
Asphalt Reference	162	88.74	153.15	12.6	23.45	42	76.65	275.85	81.48
Permeable Pavement Outlet	181	16.35	11.07	5.19	9.4	13.4	20.7	38.7	26.52
Bioretention Outlet	42	46.61	30.18	21.16	25.9	35.25	60.85	107.03	95.24
Infiltration Trench Outlet	17	26.76	13.82	12.13	16.5	22.9	28.8	51.02	58.82
Rainwater Cistern	16	43.92	51.11	9.41	15.47	24.55	55.75	114.72	68.75
Conventional Roof Outlet	18	12.75	13.64	5.86	7.5	8.92	13.5	23.48	5.56
Green Roof Outlet	23	9.08	4.77	2.27	6.83	8.09	11.95	17.39	4.35

Escherichia coli

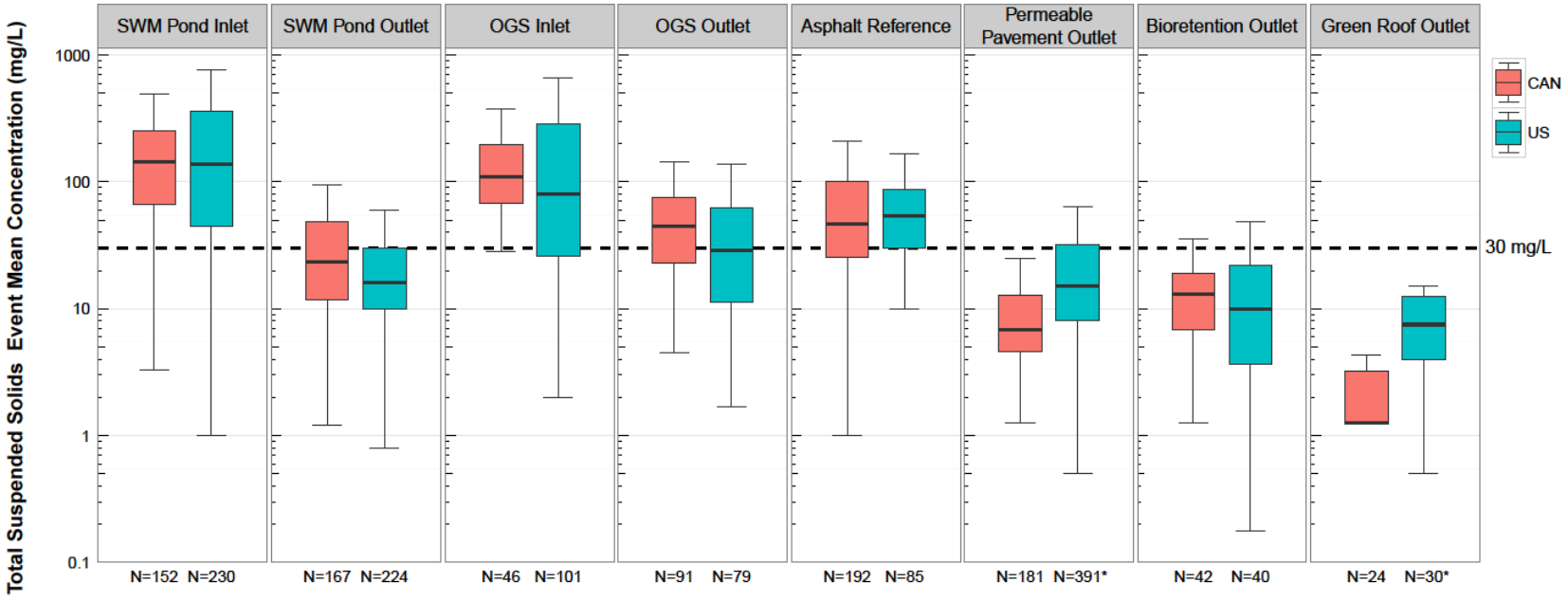


Site Type	N	Mean	Standard Deviation	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile	% Guideline Exceedance
SWM Pond Inlet	73	4462.74	6887.64	118.29	680	1780	4600	21426.13	94.52
SWM Pond Outlet	95	950.1	1515.01	10	124.19	375.87	927.82	4460	75.79
ESC Pond Inlet	21	8059.21	9283.36	20	3000	4100	8000	30000	90.48
ESC Pond Outlet	14	629.29	678.98	49.5	135	495	770	1975	78.57
Asphalt Reference	51	87.51	236.21	4	4	4	16	480	13.73
Permeable Pavement Outlet	73	17.53	57.91	4	4	4	4	48	2.74
Bioretention Outlet	18	397.44	802.92	4	17	70	415	1343	44.44
Rainwater Cistern	16	365.25	1343.49	4	4	10	45	1500	12.5
Conventional Roof Outlet	14	595.71	1301.07	4	8	11	398	3325	28.57
Green Roof Outlet	19	614.32	1229.98	4	4	40	725	2220	36.84

Canadian and United States Water Quality Data Comparison



Solids; suspended

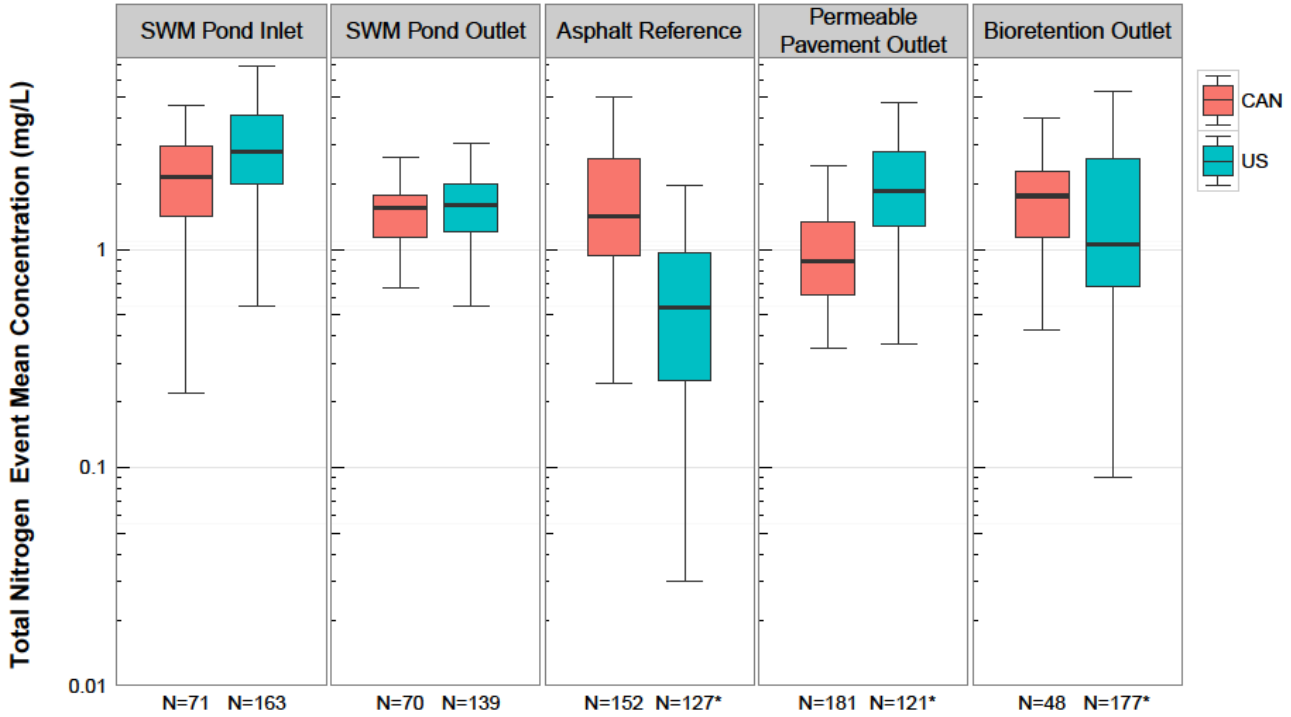


* All states were used

Site Type	Raw or Transformed	Both Samples Normally Distributed	Equal Variances	Test	Test Statistic	p Value	Statistical Significant Difference (alpha = 0.05)
SWM Pond Inlet	Log10	No	No	Wilcoxon rank sum test with continuity correction	17707	0.830	No[a]
SWM Pond Outlet	Log10	Yes	No	Welch Two Sample t-test	3.153	0.002	Yes
OGS Inlet	Log10	Yes	No	Welch Two Sample t-test	1.601	0.111	No
OGS Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	4340	0.02	Yes
Asphalt Reference	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	7801	0.56	No
Permeable Pavement Outlet	Reciprocal Square Root	No	Yes	Wilcoxon rank sum test with continuity correction	50950	2.50E-17	Yes
Bioretention Outlet	Fourth Root	Yes	No	Welch Two Sample t-test	0.348	0.729	No
Green Roof Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	166	0.001	Yes

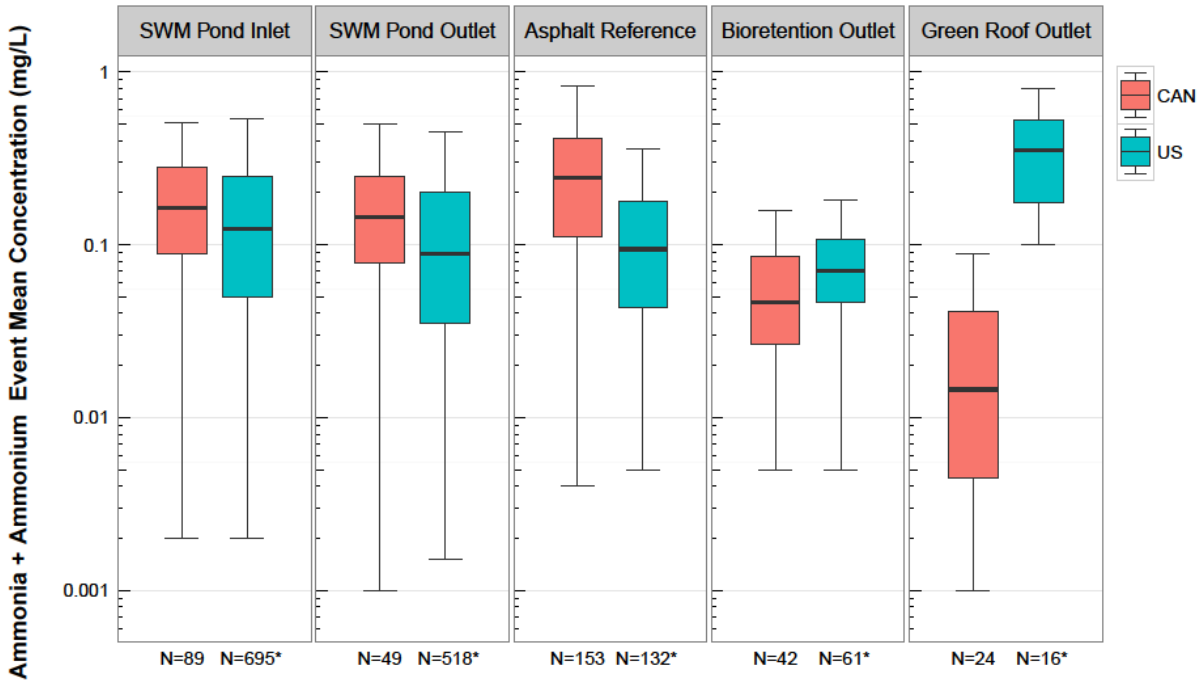
[a]Normality and homogeneity of variances assumptions are not met.

Nitrogen; total



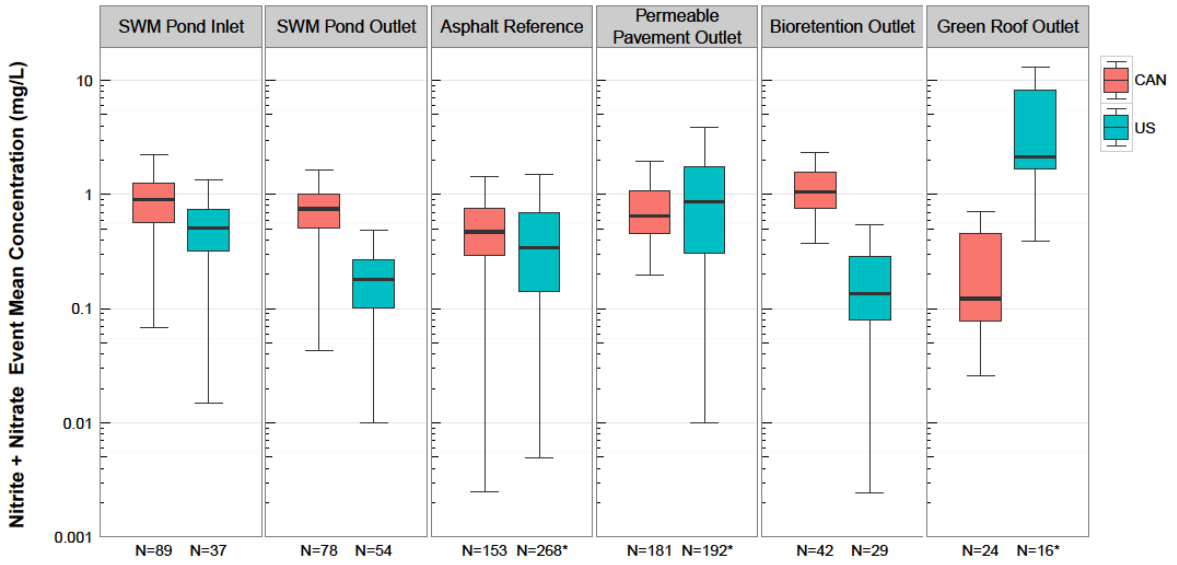
Site Type	Raw or Transformed	Both Samples Normally Distributed	Equal Variances	Test	Test Statistic	p Value	Statistical Significant Difference (alpha = 0.05)
SWM Pond Inlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	3967	0.0001	Yes
SWM Pond Outlet	Log10	Yes	Yes	Two Sample t-test	-1.5981	0.1115	No
Asphalt Reference	Log10	Yes	Yes	Two Sample t-test	11.4670	3.61E-25	Yes
Permeable Pavement Outlet	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	4672	3.11E-17	Yes
Bioretention Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	5386	0.0045	Yes

Nitrogen; ammonia + ammonium



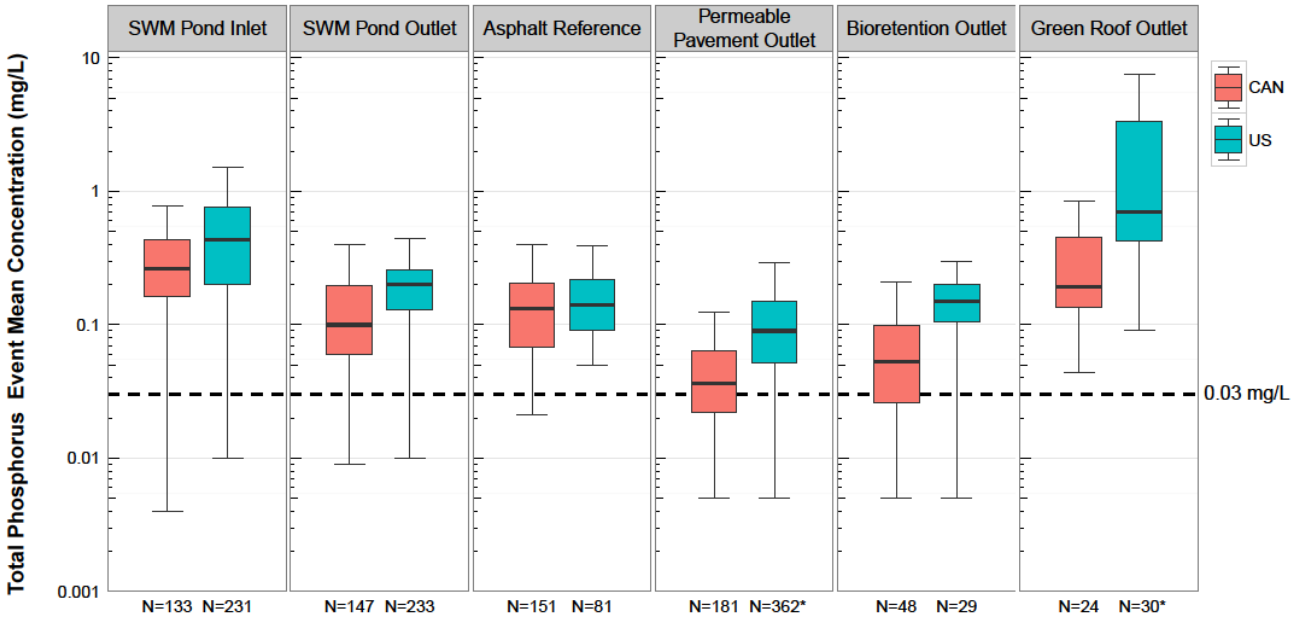
Site Type	Raw or Transformed	Both Samples Normally Distributed	Equal Variances	Test	Test Statistic	p Value	Statistical Significant Difference (alpha = 0.05)
SWM Pond Inlet	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	35789	0.0157	Yes
SWM Pond Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	15372	0.0145	Yes
Asphalt Reference	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	14895	4.71E-12	Yes
Bioretention Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	910	0.0129	Yes
Green Roof Outlet	Log10	Yes	No	Welch Two Sample t-test	-8.5157	3.69E-10	Yes

Nitrogen; nitrate + nitrite



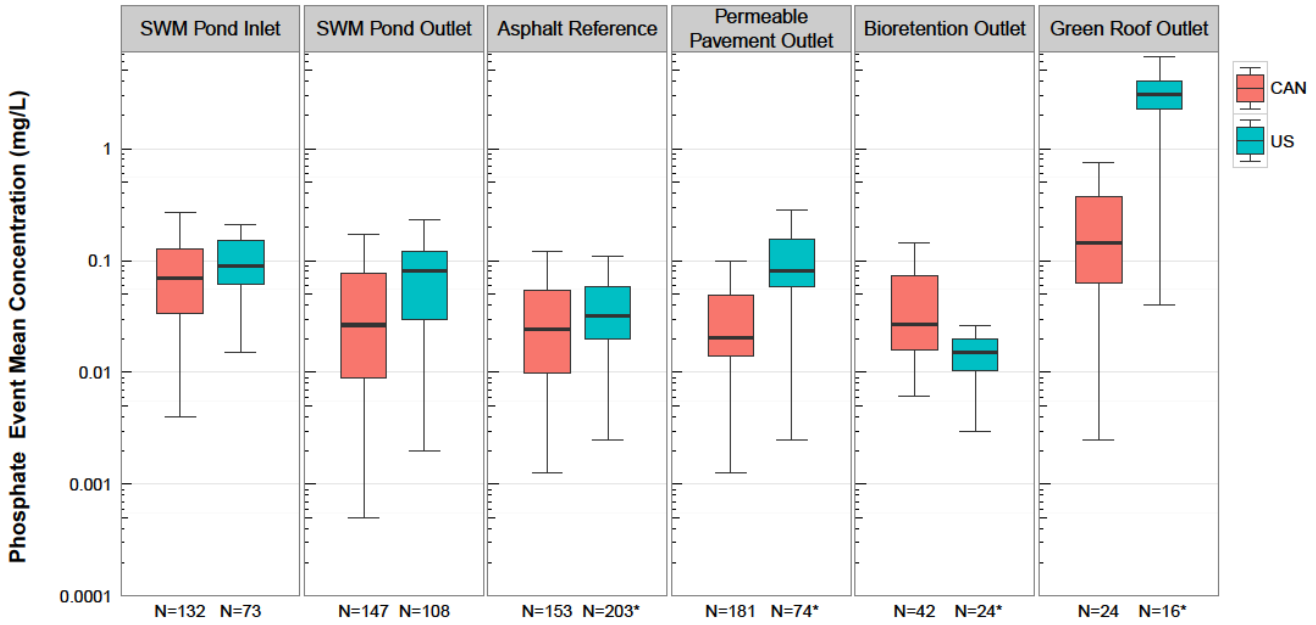
Site Type	Raw or Transformed	Both Samples Normally Distributed	Equal Variances	Test	Test Statistic	p Value	Statistical Significant Difference (alpha = 0.05)
SWM Pond Inlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	2463	1.23E-05	Yes
SWM Pond Outlet	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	3825	1.80E-15	Yes
Asphalt Reference	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	24748	0.0004	Yes
Permeable Pavement Outlet	Log10	No	No	Wilcoxon rank sum test with continuity correction	16067	0.2086	No
Bioretention Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	1206	2.99E-12	Yes
Green Roof Outlet	Log10	Yes	Yes	Two Sample t-test	-7.89	1.58E-09	Yes

Phosphorus; total



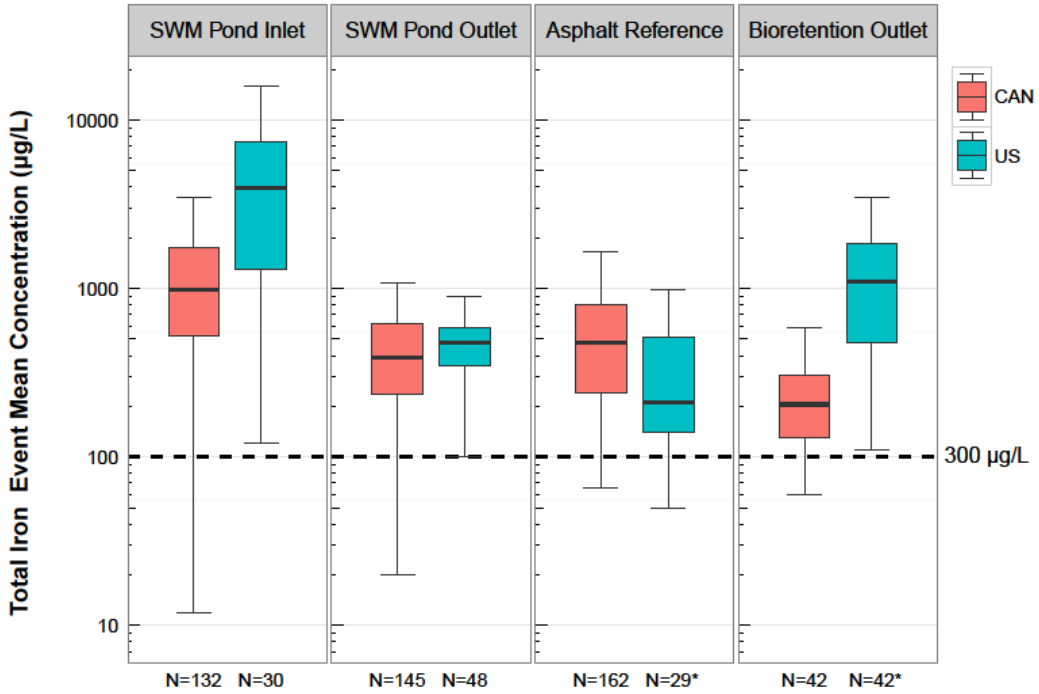
Site Type	Raw or Transformed	Both Samples Normally Distributed	Equal Variances	Test	Test Statistic	p Value	Statistical Significant Difference (alpha = 0.05)
SWM Pond Inlet	Reciprocal Square Root	No	Yes	Wilcoxon rank sum test with continuity correction	19429	2.58E-05	Yes
SWM Pond Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	10796	1.28E-09	Yes
Asphalt Reference	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	5268.5	0.08235693	No
Permeable Pavement Outlet	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	15635	2.84E-23	Yes
Bioretention Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	240	1.63E-06	Yes
Green Roof Outlet	Reciprocal Square Root	No	Yes	Wilcoxon rank sum test with continuity correction	600	3.05E-05	Yes

Phosphorus; phosphate



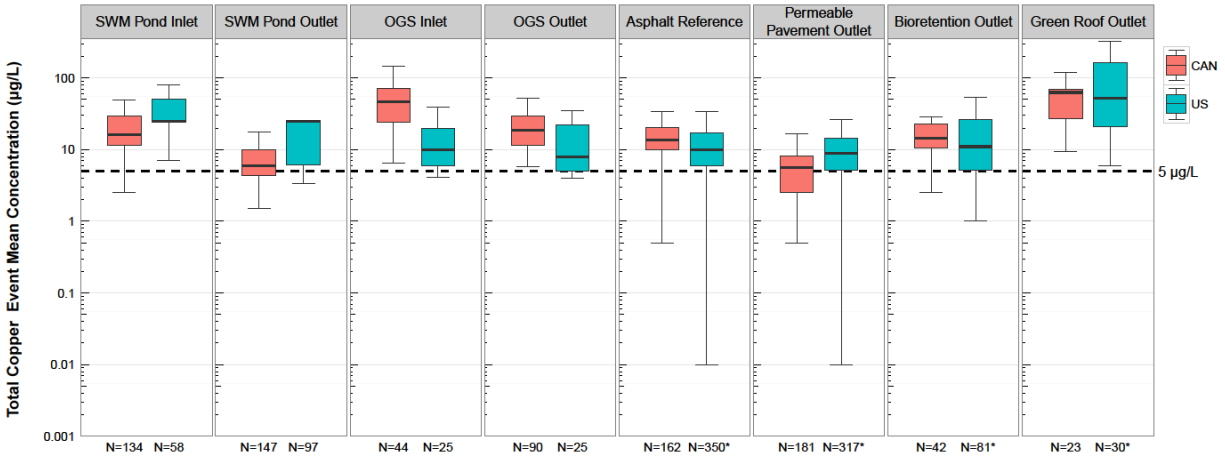
Site Type	Raw or Transformed	Both Samples Normally Distributed	Equal Variances	Test	Test Statistic	p Value	Statistical Significant Difference (alpha = 0.05)
SWM Pond Inlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	3796	0.0120	Yes
SWM Pond Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	5317	6.68E-06	Yes
Asphalt Reference	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	12793	0.00442	Yes
Permeable Pavement Outlet	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	2239	7.49E-17	Yes
Bioretention Outlet	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	730	0.0026	Yes
Green Roof Outlet	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	37	1.99E-05	Yes

Iron; total



Site Type	Raw or Transformed	Both Samples Normally Distributed	Equal Variances	Test	Test Statistic	p Value	Statistical Significant Difference (alpha = 0.05)
SWM Pond Inlet	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	905	3.60E-06	Yes
SWM Pond Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	2943.5	0.110049675	No
Asphalt Reference	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	3042.5	0.01148053	Yes
Bioretention Outlet	Log10	Yes	No	Welch Two Sample t-test	-7.962867852	5.87E-11	Yes

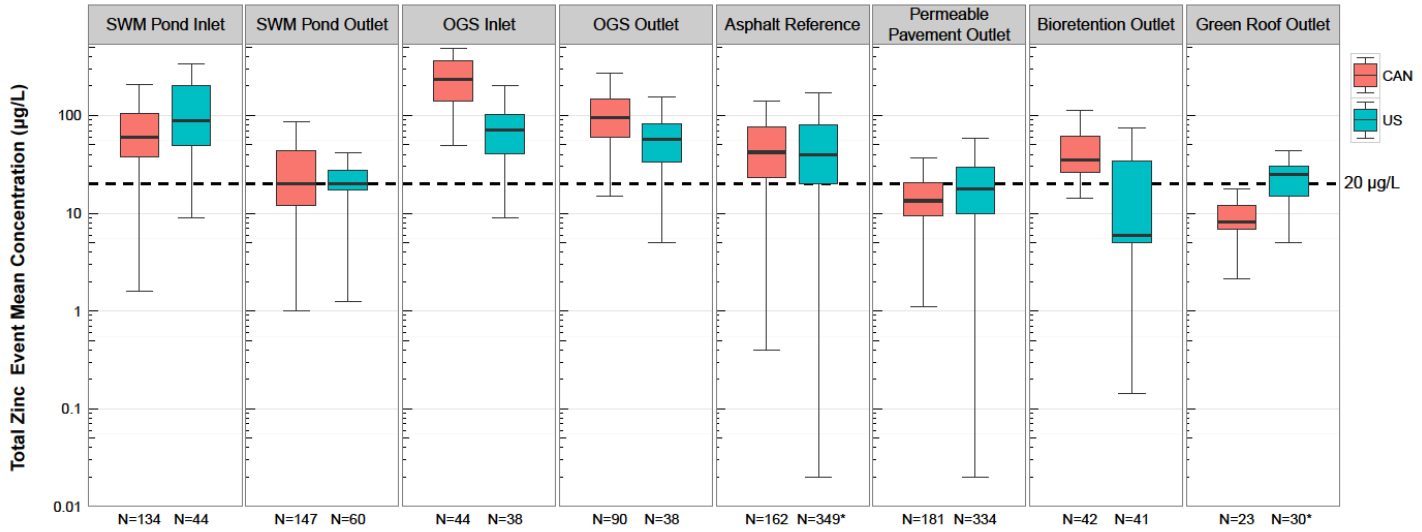
Copper; total



Site Type	Raw or Transformed	Both Samples Normally Distributed	Equal Variances	Test	Test Statistic	Value	Statistical Significant Difference (alpha = 0.05)
SWM Pond Inlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	2422.5	3.46E-05	Yes
SWM Pond Outlet	Reciprocal Square Root	No	Yes	Wilcoxon rank sum test with continuity correction	10451.5	6.28E-10	Yes
OGS Inlet	Log10	Yes	Yes	Two Sample t-test	6.216	3.72E-08	Yes
OGS Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	1627.5	0.001	Yes
Asphalt Reference	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	36325	3.02E-07	Yes
Permeable Pavement Outlet	Log10	No	No	Wilcoxon rank sum test with continuity correction	19020.5	3.71E-10	Yes[a]
Bioretention Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	1937	0.209	No
Green Roof Outlet	Log10	Yes	No	Welch Two Sample t-test	-0.543	0.590	No

[a]Normality and homogeneity of variances assumptions are not met.

Zinc; total



Site Type	Raw or Transformed	Both Samples Normally Distributed	Equal Variances	Test	Test Statistic	p Value	Statistical Significant Difference (alpha = 0.05)
SWM Pond Inlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	2279	0.024182798	Yes
SWM Pond Outlet	Reciprocal Square Root	No	Yes	Wilcoxon rank sum test with continuity correction	4230	0.646144372	No
OGS Inlet	Log10	Yes	Yes	Two Sample t-test	7.67073 7916	3.56E-11	Yes
OGS Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	2386	0.000426629	Yes
Asphalt Reference	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	30071	0.245995648	No
Permeable Pavement Outlet	Log10	No	No	Wilcoxon rank sum test with continuity correction	25730.5	0.005250484	Yes[a]
Bioretention Outlet	Raw	No	Yes	Wilcoxon rank sum test with continuity correction	1326.5	2.24E-05	Yes
Green Roof Outlet	Log10	No	Yes	Wilcoxon rank sum test with continuity correction	116	4.01E-05	Yes

[a]Normality and homogeneity of variances assumptions are not met.