

## Horicon, WI NATTS Network Assessment Review

- Established 2009 (Relocated from Mayville, WI): Carbonyls, Chromium VI, PAHs, PM<sub>10</sub> Metals, and VOCs
  - Chromium VI ended in in 2013
- For the NATTS Network Assessment (2009-2018):
  - 11 of 18 Method Quality Objective (MQO) Core HAPs were included in the national trends
    - Benzene: Reported MDL to NATTS Target MDL ratio was greater than 2.0 in 2015.
    - Benzo(a)pyrene: Analytical precision was not reported in 2014 and 2016 and Bias % Difference was outside ±35%.
    - Carbon tetrachloride: Reported MDL to NATTS Target MDL ratio was greater than 2.0 in 2014 and 2015.
    - Chromium VI: Only three years of valid data.
    - Naphthalene: Analytical precision was not reported in 2016 and Bias %Difference was outside ±35%.
    - Tetrachloroethylene and Trichloroethylene: Reported MDLs to NATTS Target MDL ratios were greater than 2.0 in 2013, 2014, and 2015.
  - 127 of 156 pollutant datasets were suitable for trends analysis
  - Annual Average and 3-Year Rolling Average Concentrations were generally flat over time, with the exception of a few pollutants (acetaldehyde and nickel (PM<sub>10</sub>)).
  - 100% Reporting of Datasets
- Method Quality Objectives (MQO): 2009-2018
  - Completeness: Met 85% completeness in 156 of 156 pollutant datasets
  - Method Detection Limits: Met MDL Target Ratio of 1.00 in 131 of 175 pollutant datasets
  - Bias: Met ±25% for 128 of 150 pollutant datasets
  - Overall Method Precision: Met ≤15% CV for 45 of 74 pollutant datasets
  - Analytical Method Precision: Met ≤15% CV for 10 of 117 pollutant datasets
- Analytical Laboratories for 2018

VOC	Carbonyl	PM <sub>10</sub> Metals	Chromium VI	PAHs
WSLH	WSLH	WSLH	NA	WSLH

- Equipment Year Deployed

Equipment Type	VOC	Carbonyl	PM <sub>10</sub> Metals	Chromium VI	PAHs
Sampler	2009	1999	2015	2009	2017
Analytical	2006	2012	2001	2001	2004
Preconcentrator	2017	NA	NA	NA	NA
Standards Preparation	2017	NA	NA	NA	NA
Canister Cleaning	2004	NA	NA	NA	NA
Extraction	NA	NA	2016	2011	2000

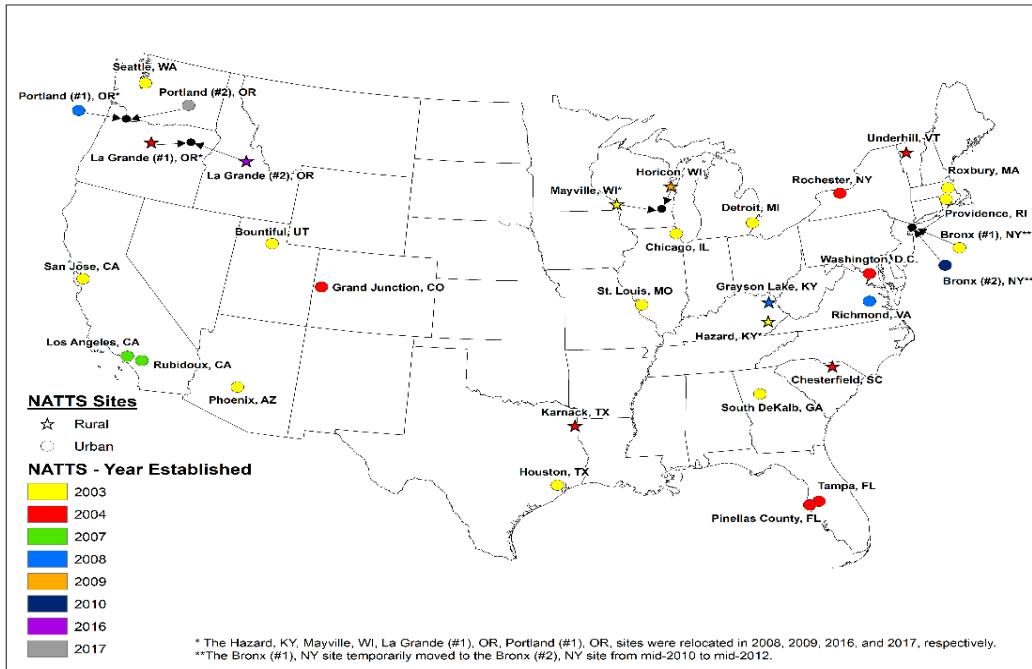
**National Summary:** NATTS data were collected at 27 locations across the United States, with sites beginning in 2003 or later (Figure 1) for 19 core HAPs. Over 528,000 concentrations (primary, secondary, and replicate) were generated and analyzed for this assessment. Pollutant datasets were scored to assess whether they were suitable for trends analysis. Each pollutant dataset was evaluated against four MQOs: Completeness; Sensitivity; Bias; and Precision. Datasets that were suitable (A- or B-rated) for six consecutive years were used for national trends analysis (Table 1).

National trends were determined by comparing the most recent 3-year blocked averages (e.g., 2013-2015 vs. 2016-2018) to determine if the NATTS Trends DQO was being met:

*To be able to detect a 15 percent difference (trend) between the annual mean concentrations of successive 3-year periods within acceptable levels of decision error.*

Of the 19 core HAPs, 18 were assessed for the NATTS Trends DQO. Due to sampling and analytical issues, acrolein was not considered for trends analysis (Table 2). This assessment showed that across the network, 15 of those 18 pollutants were decreasing between the 3-year blocks, while two of those pollutants were increasing between the 3-year blocks. One pollutant did not exhibit a trend.

**Figure 1. NATTS Site and Year Established**



**Table 1. NATTS Network Assessment: Count and Percentage of Suitable Datasets by Pollutant Group**

Pollutant Group	A-rated		B-rated		Does Not Meet	
	#	%	#	%	#	%
VOCs	1,452	53%	737	27%	555	20%
Carbonyls	523	67%	193	25%	66	8%
PM <sub>10</sub> Metals	1,418	61%	685	30%	213	9%
Chromium VI	159	74%	29	13%	27	13%
PAHs	410	74%	124	22%	18	3%
Total = 6,609	3,962	60%	1,768	27%	879	13%

**Table 2. Three-Year Block Averages for National Trends**

Pollutant	Units	# Sites	Block 1	Block 2	% Difference
Acetaldehyde	µg/m <sup>3</sup>	19	1.51	1.39	-7.7%
Arsenic (PM <sub>10</sub> )	ng/m <sup>3</sup>	21	0.71	0.68	-3.2%
Benzene	µg/m <sup>3</sup>	19	0.65	0.59	-10.2%
Benzo(a)pyrene	ng/m <sup>3</sup>	21	0.113	0.087	-23.2%
Beryllium (PM <sub>10</sub> )	ng/m <sup>3</sup>	20	0.012	0.009	-26.4%
Butadiene, 1,3-	µg/m <sup>3</sup>	19	0.071	0.063	-10.9%
Cadmium (PM <sub>10</sub> )	ng/m <sup>3</sup>	21	0.170	0.097	-43.0%
Carbon Tetrachloride	µg/m <sup>3</sup>	15	0.59	0.56	-4.7%
Chloroform	µg/m <sup>3</sup>	20	0.256	0.255	-0.4%
Chromium VI	ng/m <sup>3</sup>	18	0.029	0.026	-7.7%
Formaldehyde	µg/m <sup>3</sup>	19	2.77	2.68	-3.3%
Lead (PM <sub>10</sub> )	ng/m <sup>3</sup>	21	3.08	2.81	-8.9%
Manganese (PM <sub>10</sub> )	ng/m <sup>3</sup>	20	8.06	7.93	-1.6%
Naphthalene	ng/m <sup>3</sup>	20	66.70	51.08	-23.4%
Nickel (PM <sub>10</sub> )	ng/m <sup>3</sup>	19	1.28	1.05	-18.0%
Tetrachloroethylene	µg/m <sup>3</sup>	19	0.149	0.174	17.2%
Trichloroethylene	µg/m <sup>3</sup>	19	0.020	0.022	10.7%
Vinyl Chloride	µg/m <sup>3</sup>	17	0.0051	0.0048	-5.5%

NATTS Monitoring Site Report: Horicon, WI

Site Information

Region	5
NATTS Site Type	Rural
County	Dodge
AQS Site Code	55-027-0001
NATTS Operating Agency	WI Dept. of Natural Resources
Latitude	43.466111
Longitude	-88.621111
AQS Land Use	Agricultural
AQS Location Setting	Rural
10-Mile Population	88,344

Figure 2. NATTS Site Location



Pollutant Datasets Evaluation: Suitable for Trends (Y=yes; Y(T)=yes, and used for DQO Trends; N=No; "--"=not rated)

Final Pollutant Name	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Acetaldehyde	--	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Arsenic (PM <sub>10</sub> )	--	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Benzene	--	N <sup>a</sup>	N <sup>a</sup>	N <sup>a</sup>	N <sup>a</sup>	N <sup>a</sup>	N <sup>a,b</sup>	Y	Y	Y
Benzo(a)pyrene	--	Y	Y	N <sup>b,c</sup>	Y	N <sup>b,c</sup>	Y	N <sup>b,c</sup>	Y	Y
Beryllium (PM <sub>10</sub> )	--	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Butadiene, 1,3-	--	N <sup>c</sup>	N <sup>c</sup>	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Cadmium (PM <sub>10</sub> )	--	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Carbon tetrachloride	--	N <sup>a</sup>	N <sup>a</sup>	N <sup>a,b</sup>	N <sup>a</sup>	N <sup>a,b</sup>	N <sup>a,b</sup>	N <sup>b,c</sup>	Y	Y
Chloroform	--	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Chromium VI	--	Y	Y	Y	--	--	--	--	--	--
Formaldehyde	--	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Lead (PM <sub>10</sub> )	--	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Manganese (PM <sub>10</sub> )	--	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Naphthalene	--	Y	Y	Y	Y	Y	Y	N <sup>b,c</sup>	Y	Y
Nickel (PM <sub>10</sub> )	--	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Tetrachloroethylene	--	N <sup>a</sup>	N <sup>a</sup>	N <sup>a,b</sup>	N <sup>a,b</sup>	N <sup>a,b</sup>	N <sup>a,b</sup>	Y	Y	Y
Trichloroethylene	--	Y	Y	Y	N <sup>a,b</sup>	N <sup>a,b</sup>	N <sup>a,b</sup>	Y	Y	Y
Vinyl chloride	--	Y	N <sup>c</sup>	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)

<sup>a</sup>: Reported MDL to NATTS Target Ratio greater than 2.0

<sup>b</sup>: Analytical precision data (required since 2012) was not reported to EPA or AQS for this pollutant.

<sup>c</sup>: Bias % Difference was outside ± 35%.

**Table 3. NATTS Network Assessment Data (2003-2018) - National Distribution Statistics By Type<sup>a</sup>**

Analyte	Units	Site Type	# Data Records	% Detections	Arithmetic Mean <sup>b</sup>	Percentile Value <sup>c</sup>						
						5th	10th	25th	50th	75th	90th	95th
Acetaldehyde	µg/m <sup>3</sup>	Urban	15,704	100%	1.77 ± 0.02	0.50	0.66	0.97	1.45	2.19	3.24	4.04
	µg/m <sup>3</sup>	Rural	4,930	100%	1.20 ± 0.04	0.36	0.46	0.65	0.93	1.38	2.02	2.76
	µg/m <sup>3</sup>	All Sites	20,634	100%	1.63 ± 0.02	0.44	0.58	0.86	1.31	2.00	3.02	3.86
Arsenic (PM <sub>10</sub> )	ng/m <sup>3</sup>	Urban	14,968	97%	0.89 ± 0.04	0.10	0.19	0.34	0.58	0.99	1.70	2.41
	ng/m <sup>3</sup>	Rural	4,622	96%	0.49 ± 0.02	0.04	0.08	0.17	0.35	0.59	0.94	1.28
	ng/m <sup>3</sup>	All Sites	19,590	97%	0.79 ± 0.03	0.06	0.14	0.29	0.52	0.89	1.54	2.19
Benzene	µg/m <sup>3</sup>	Urban	15,984	99%	0.86 ± 0.01	0.25	0.30	0.43	0.66	1.05	1.64	2.21
	µg/m <sup>3</sup>	Rural	2,494	95%	0.43 ± 0.02	0.04	0.13	0.21	0.33	0.52	0.78	1.01
	µg/m <sup>3</sup>	All Sites	18,478	99%	0.81 ± 0.01	0.19	0.26	0.39	0.61	0.98	1.55	2.09
Benzo(a)pyrene	ng/m <sup>3</sup>	Urban	12,336	70%	0.096 ± 0.004	ND	ND	ND	0.04	0.11	0.24	0.37
	ng/m <sup>3</sup>	Rural	3,179	36%	0.067 ± 0.009	ND	ND	ND	ND	0.02	0.13	0.37
	ng/m <sup>3</sup>	All Sites	15,515	63%	0.090 ± 0.004	ND	ND	ND	0.03	0.10	0.23	0.37
Beryllium (PM <sub>10</sub> )	ng/m <sup>3</sup>	Urban	15,783	75%	0.051 ± 0.006	ND	ND	0.00003	0.005	0.018	0.050	0.101
	ng/m <sup>3</sup>	Rural	4,687	49%	0.023 ± 0.003	ND	ND	ND	ND	0.005	0.017	0.072
	ng/m <sup>3</sup>	All Sites	20,470	69%	0.045 ± 0.005	ND	ND	ND	0.003	0.012	0.049	0.100
Butadiene, 1,3-	µg/m <sup>3</sup>	Urban	15,388	81%	0.092 ± 0.002	ND	ND	0.025	0.058	0.114	0.215	0.302
	µg/m <sup>3</sup>	Rural	2,185	29%	0.012 ± 0.001	ND	ND	ND	ND	0.017	0.046	0.059
	µg/m <sup>3</sup>	All Sites	17,573	75%	0.082 ± 0.002	ND	ND	ND	0.049	0.104	0.199	0.287
Cadmium (PM <sub>10</sub> )	ng/m <sup>3</sup>	Urban	16,360	92%	0.21 ± 0.02	ND	0.01	0.05	0.09	0.17	0.42	0.63
	ng/m <sup>3</sup>	Rural	4,684	87%	0.10 ± 0.01	ND	ND	0.03	0.06	0.11	0.20	0.29
	ng/m <sup>3</sup>	All Sites	21,044	91%	0.18 ± 0.01	ND	0.01	0.04	0.08	0.16	0.35	0.56
Carbon Tetrachloride	µg/m <sup>3</sup>	Urban	14,713	99%	0.569 ± 0.003	0.361	0.433	0.496	0.562	0.651	0.737	0.798
	µg/m <sup>3</sup>	Rural	2,189	92%	0.534 ± 0.016	ND	0.180	0.402	0.537	0.633	0.727	0.798
	µg/m <sup>3</sup>	All Sites	16,902	98%	0.565 ± 0.003	0.304	0.408	0.490	0.559	0.649	0.736	0.798
Chloroform	µg/m <sup>3</sup>	Urban	16,068	87%	0.265 ± 0.022	ND	ND	0.093	0.132	0.217	0.420	0.668
	µg/m <sup>3</sup>	Rural	3,802	43%	0.052 ± 0.003	ND	ND	ND	ND	0.095	0.144	0.230
	µg/m <sup>3</sup>	All Sites	19,870	79%	0.224 ± 0.018	ND	ND	0.064	0.113	0.196	0.364	0.586
Chromium VI	ng/m <sup>3</sup>	Urban	8,414	74%	0.036 ± 0.002	ND	ND	ND	0.020	0.042	0.081	0.120
	ng/m <sup>3</sup>	Rural	2,586	41%	0.018 ± 0.004	ND	ND	ND	ND	0.017	0.031	0.051
	ng/m <sup>3</sup>	All Sites	11,000	66%	0.032 ± 0.001	ND	ND	ND	0.016	0.036	0.073	0.114

**Table 3. NATTS Network Assessment Data (2003-2018) - National Distribution Statistics By Type<sup>a</sup>**

Analyte	Units	Site Type	# Data Records	% Detections	Arithmetic Mean <sup>b</sup>	Percentile Value <sup>c</sup>						
						5th	10th	25th	50th	75th	90th	95th
Formaldehyde	µg/m <sup>3</sup>	Urban	16,118	100%	3.11 ± 0.04	0.66	0.99	1.60	2.47	3.84	5.63	7.25
	µg/m <sup>3</sup>	Rural	5,002	100%	2.22 ± 0.05	0.53	0.68	1.06	1.69	2.74	4.19	5.45
	µg/m <sup>3</sup>	All Sites	21,120	100%	2.90 ± 0.04	0.61	0.86	1.43	2.29	3.59	5.38	6.96
Lead (PM <sub>10</sub> )	ng/m <sup>3</sup>	Urban	16,366	100%	4.21 ± 0.13	0.72	0.98	1.55	2.64	4.56	8.35	11.90
	ng/m <sup>3</sup>	Rural	4,680	99%	2.10 ± 0.16	0.37	0.50	0.84	1.41	2.37	3.91	5.36
	ng/m <sup>3</sup>	All Sites	21,046	99%	3.74 ± 0.11	0.55	0.80	1.31	2.31	4.04	7.41	10.56
Manganese (PM <sub>10</sub> )	ng/m <sup>3</sup>	Urban	16,141	100%	9.80 ± 0.32	1.09	1.51	2.52	4.92	10.21	20.10	30.08
	ng/m <sup>3</sup>	Rural	4,627	99%	3.96 ± 0.14	0.46	0.73	1.36	2.57	4.75	8.54	12.13
	ng/m <sup>3</sup>	All Sites	20,768	100%	8.50 ± 0.25	0.85	1.23	2.15	4.18	8.89	17.98	26.70
Naphthalene	ng/m <sup>3</sup>	Urban	12,332	100%	74.63 ± 1.14	15.62	21.27	33.55	55.89	94.64	150.05	196.16
	ng/m <sup>3</sup>	Rural	3,301	100%	24.47 ± 1.38	3.74	4.73	7.74	13.86	26.25	50.88	79.17
	ng/m <sup>3</sup>	All Sites	15,633	100%	64.04 ± 1.00	6.58	10.92	23.37	45.59	83.31	137.54	181.75
Nickel (PM <sub>10</sub> )	ng/m <sup>3</sup>	Urban	16,125	97%	1.85 ± 0.05	0.25	0.41	0.67	1.11	2.00	3.52	5.27
	ng/m <sup>3</sup>	Rural	4,623	85%	0.65 ± 0.08	ND	ND	0.10	0.28	0.64	1.15	1.89
	ng/m <sup>3</sup>	All Sites	20,748	94%	1.58 ± 0.04	ND	0.15	0.47	0.92	1.73	3.14	4.74
Tetrachloroethylene	µg/m <sup>3</sup>	Urban	15,612	86%	0.25 ± 0.01	ND	ND	0.06	0.13	0.25	0.48	0.74
	µg/m <sup>3</sup>	Rural	2,272	36%	0.09 ± 0.04	ND	ND	ND	ND	0.04	0.08	0.16
	µg/m <sup>3</sup>	All Sites	17,884	79%	0.23 ± 0.01	ND	ND	0.04	0.11	0.22	0.44	0.70
Trichloroethylene	µg/m <sup>3</sup>	Urban	15,843	41%	0.040 ± 0.002	ND	ND	ND	ND	0.051	0.107	0.164
	µg/m <sup>3</sup>	Rural	3,388	13%	0.021 ± 0.003	ND	ND	ND	ND	ND	0.017	0.250
	µg/m <sup>3</sup>	All Sites	19,231	36%	0.037 ± 0.002	ND	ND	ND	ND	0.041	0.105	0.167
Vinyl Chloride	µg/m <sup>3</sup>	Urban	14,778	19%	0.0044 ± 0.0003	ND	ND	ND	ND	ND	0.0137	0.0257
	µg/m <sup>3</sup>	Rural	2,444	8%	0.0040 ± 0.0009	ND	ND	ND	ND	ND	ND	0.0156
	µg/m <sup>3</sup>	All Sites	17,222	17%	0.0043 ± 0.0003	ND	ND	ND	ND	ND	0.0126	0.0254

<sup>a</sup> Statistics presented are from pollutant datasets which were suitable for trends.

<sup>b</sup> The arithmetic mean is the average of all samples results which include actual measured values. If no chemical was registered, then a value of zero is used when calculating the mean.

<sup>c</sup> ND: No results of this chemical were registered by the laboratory analytical equipment.

**Table 4. Summary Statistics for Horicon, WI**

Analyte	Units	# Data Records	% Detection	Arithmetic Mean <sup>a</sup>	Percentile Value <sup>b</sup>						
					5th	10th	25th	50th	75th	90th	95th
Acetaldehyde	µg/m <sup>3</sup>	551	100%	1.03 ± 0.04	0.47	0.56	0.71	0.94	1.21	1.55	1.89
Arsenic (PM <sub>10</sub> )	ng/m <sup>3</sup>	535	99%	0.60 ± 0.05	0.12	0.16	0.26	0.45	0.75	1.15	1.55
Benzene	µg/m <sup>3</sup>	542	72%	0.41 ± 0.03	ND	ND	ND	0.30	0.71	1.00	1.16
Benzo(a)pyrene	ng/m <sup>3</sup>	539	16%	0.05 ± 0.01	ND	ND	ND	ND	ND	0.29	0.39
Beryllium (PM <sub>10</sub> )	ng/m <sup>3</sup>	539	3%	0.0004 ± 0.0002	ND	ND	ND	ND	ND	ND	ND
Butadiene, 1,3-	µg/m <sup>3</sup>	542	0%	0.000 ± 0.001	ND	ND	ND	ND	ND	ND	ND
Cadmium (PM <sub>10</sub> )	ng/m <sup>3</sup>	537	96%	0.081 ± 0.006	0.019	0.025	0.041	0.067	0.102	0.151	0.188
Carbon Tetrachloride	µg/m <sup>3</sup>	542	41%	0.232 ± 0.031	ND	ND	ND	ND	0.454	0.613	0.744
Chloroform	µg/m <sup>3</sup>	542	20%	0.020 ± 0.007	ND	ND	ND	ND	ND	0.058	0.133
Chromium VI	ng/m <sup>3</sup>	215	56%	0.012 ± 0.002	ND	ND	ND	0.010	0.020	0.030	0.037
Formaldehyde	µg/m <sup>3</sup>	551	100%	1.59 ± 0.07	0.58	0.68	0.97	1.42	2.03	2.71	3.08
Lead (PM <sub>10</sub> )	ng/m <sup>3</sup>	535	100%	2.26 ± 0.14	0.51	0.69	1.12	1.82	2.80	4.51	5.64
Manganese (PM <sub>10</sub> )	ng/m <sup>3</sup>	535	99%	3.70 ± 0.24	0.81	1.08	1.72	2.95	4.76	7.15	9.60
Naphthalene	ng/m <sup>3</sup>	533	99%	12.98 ± 0.96	2.44	3.39	5.34	9.07	16.84	28.43	34.61
Nickel (PM <sub>10</sub> )	ng/m <sup>3</sup>	538	86%	0.50 ± 0.05	ND	ND	0.33	0.45	0.61	0.75	0.93
Tetrachloroethylene	µg/m <sup>3</sup>	542	10%	0.037 ± 0.021	ND	ND	ND	ND	ND	ND	0.183
Trichloroethylene	µg/m <sup>3</sup>	542	2%	0.005 ± 0.006	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	µg/m <sup>3</sup>	542	0%	0.0003 ± 0.0005	ND	ND	ND	ND	ND	ND	ND

<sup>a</sup> :The arithmetic mean is the average of all samples results which included actual measured values. If no chemical was registered, then a value of zero is used.

<sup>b</sup> ND: No results of this chemical were registered by the laboratory analytical equipment.

**Table 5. Analytical Labs Supporting this Site**

Pollutant Group	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
VOCs	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH
Carbonyls	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH
PM <sub>10</sub> Metals	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH
Chromium VI	ERG	ERG	ERG	ERG	ERG	--	--	--	--	--
PAHs	ERG	ERG	ERG	ERG	WSLH	WSLH	WSLH	WSLH	WSLH	WSLH

--: Not Applicable

WSLH: Wisconsin State Laboratory of Hygiene

ERG: Eastern Research Group, Inc.

Figure 3. Horicon, WI Annual Average Concentrations

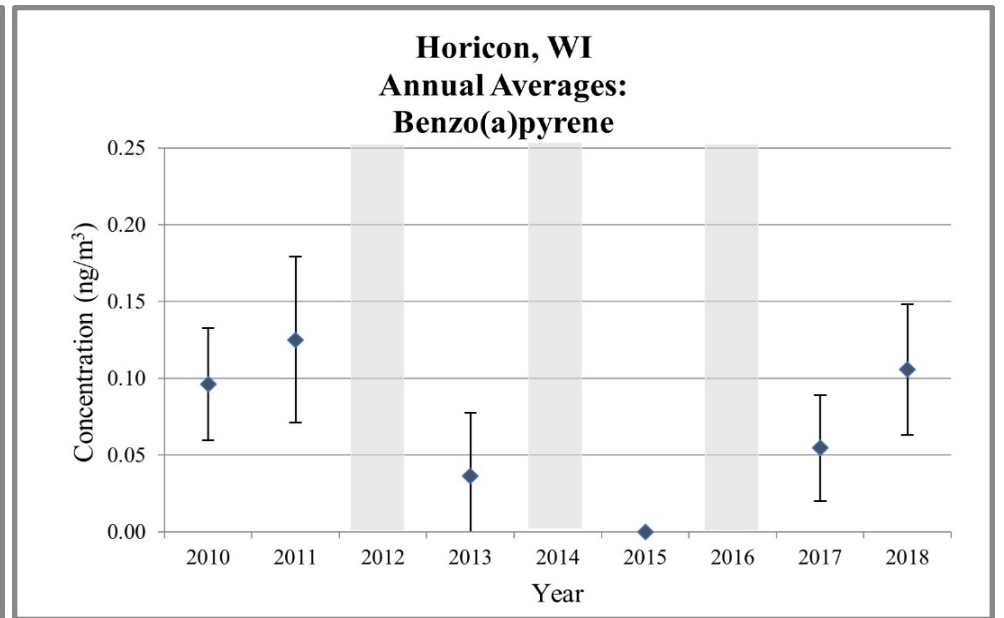
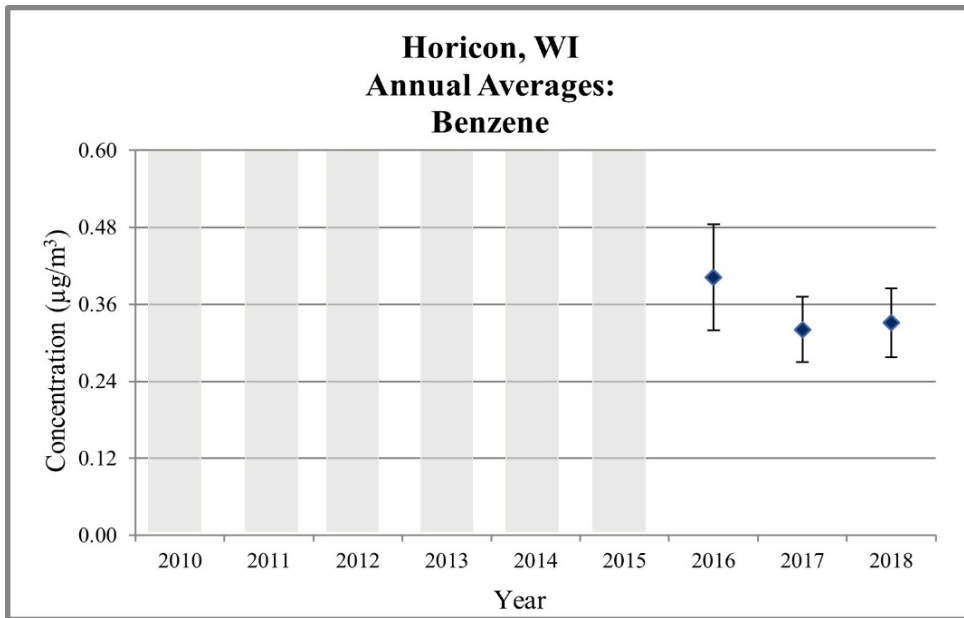
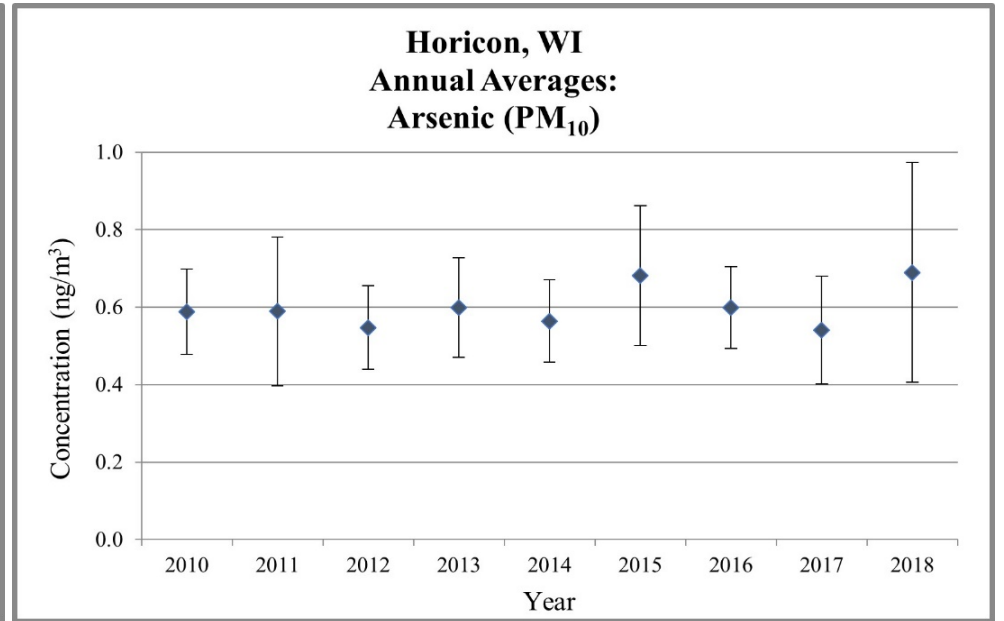
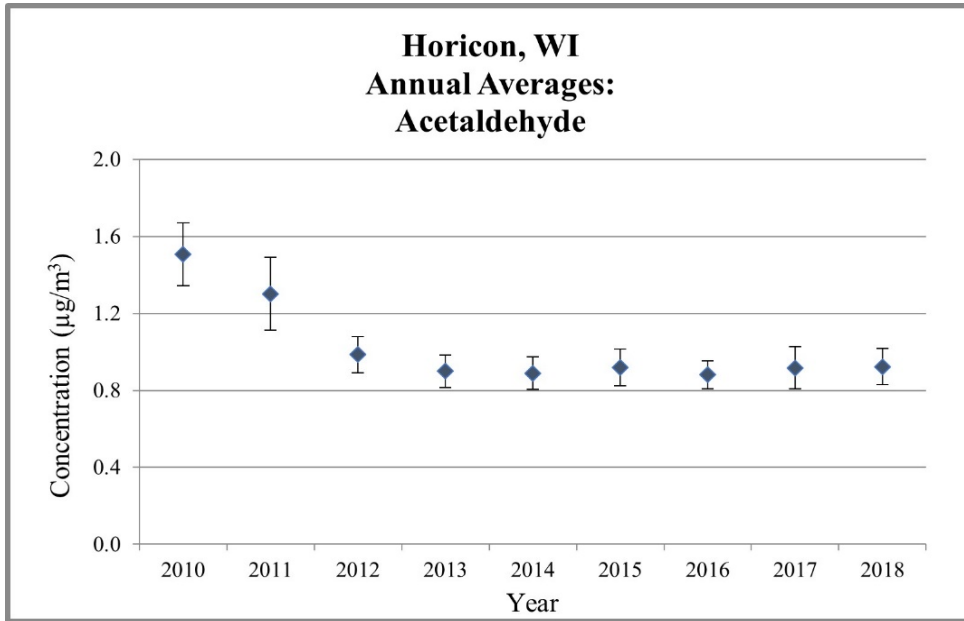


Figure 3. Horicon, WI Annual Average Concentrations

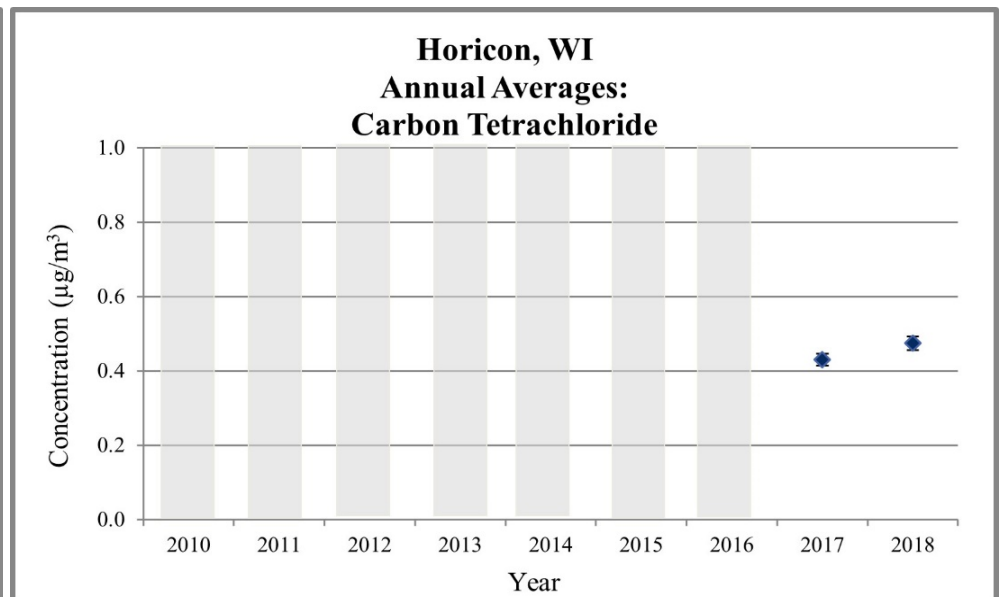
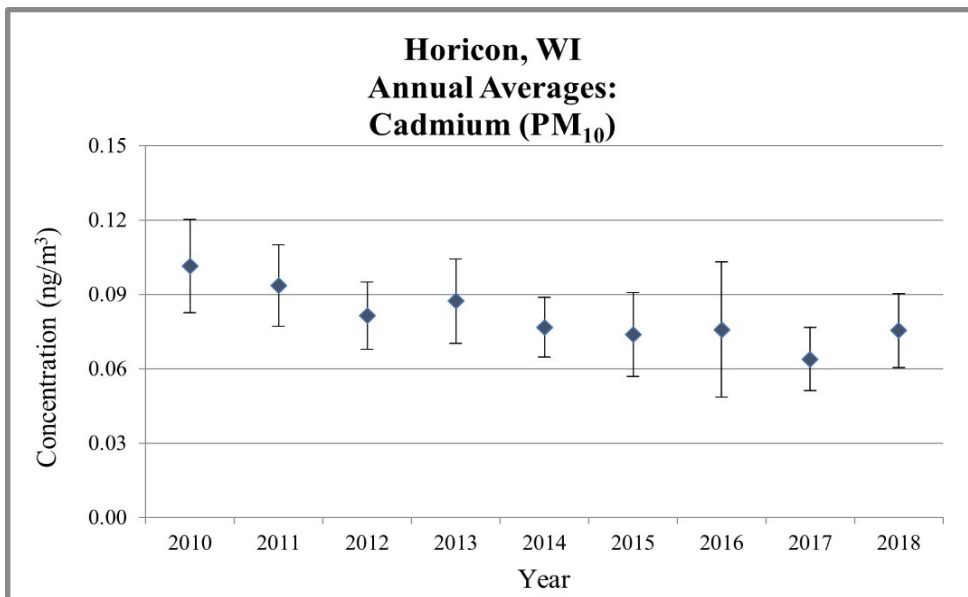
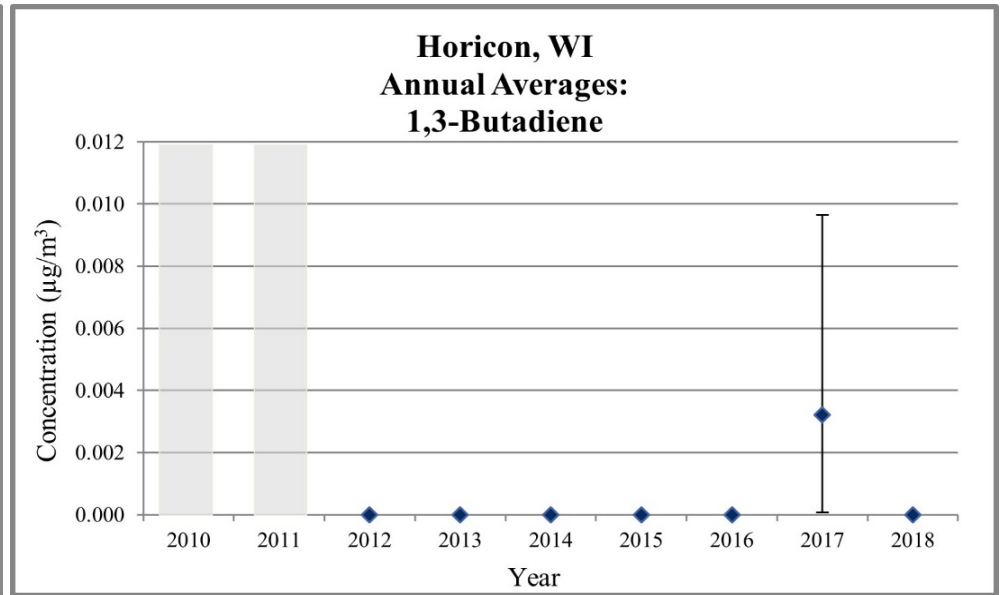
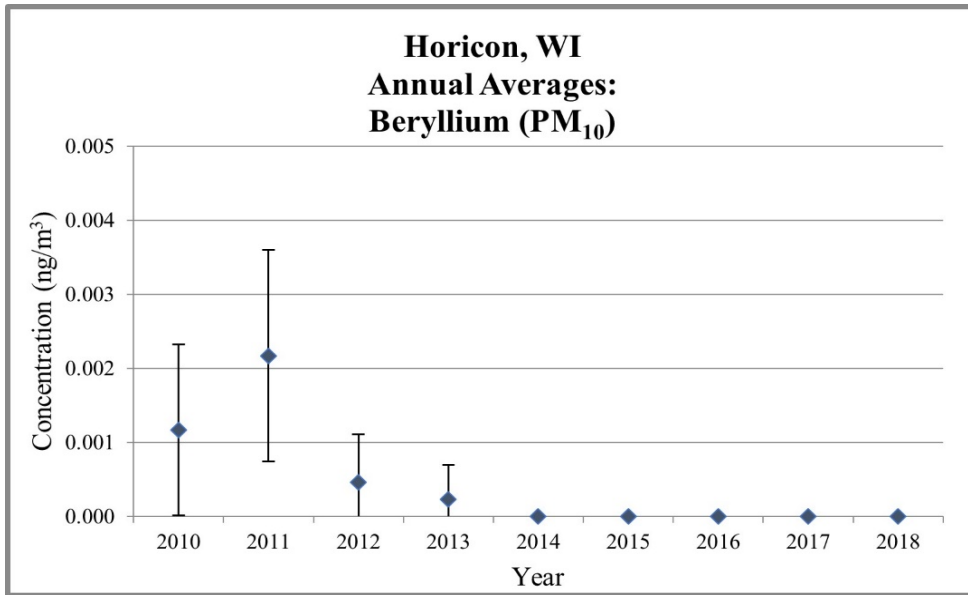




Figure 3. Horicon, WI Annual Average Concentrations

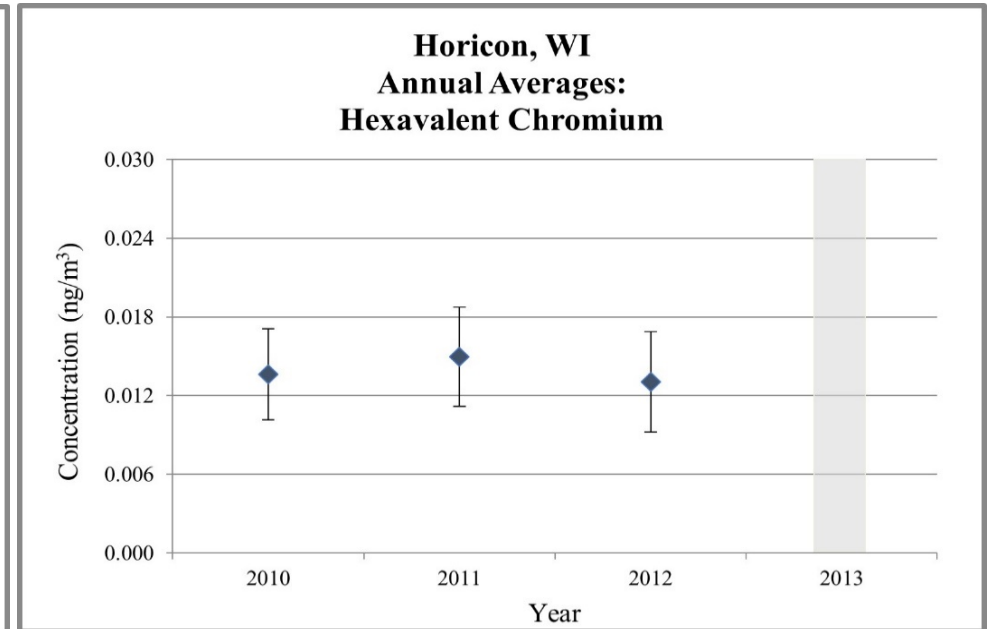
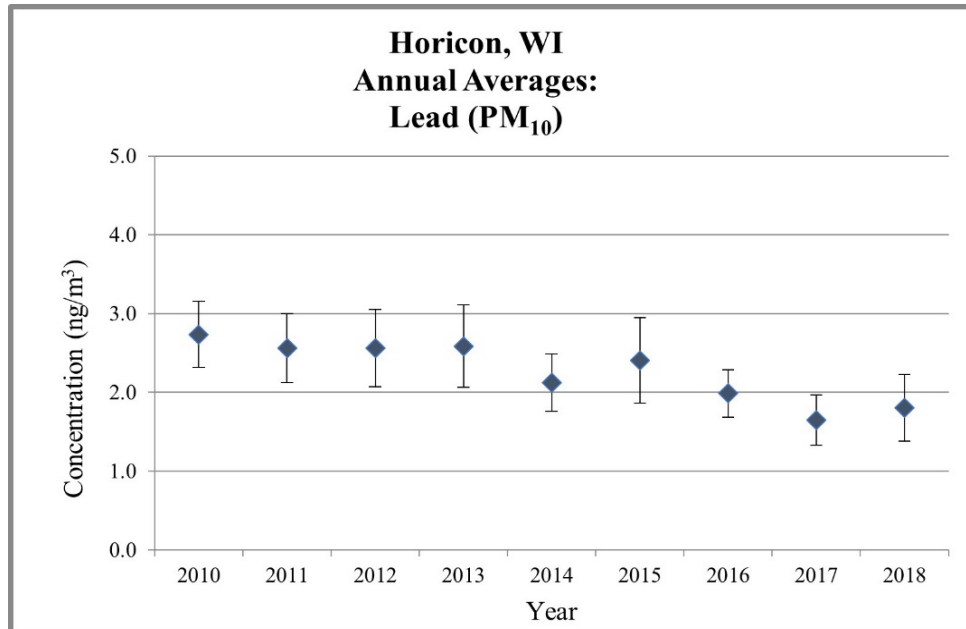
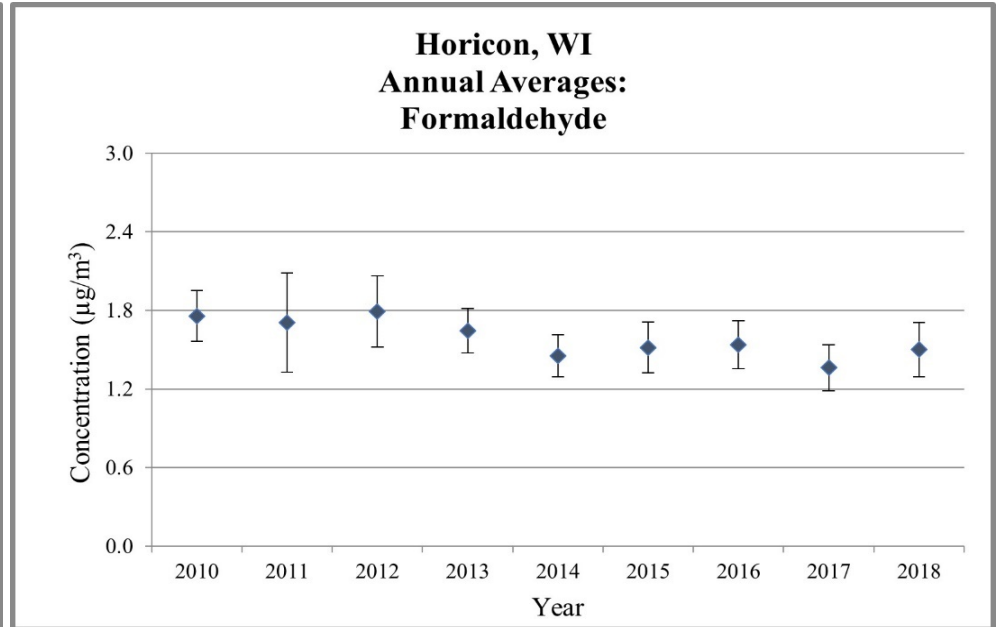
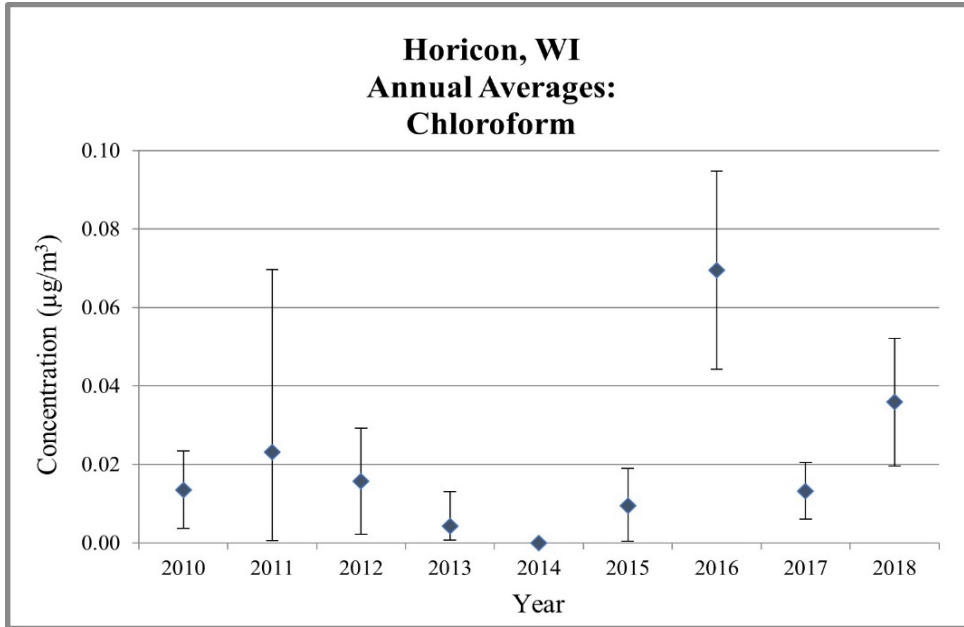


Figure 3. Horicon, WI Annual Average Concentrations

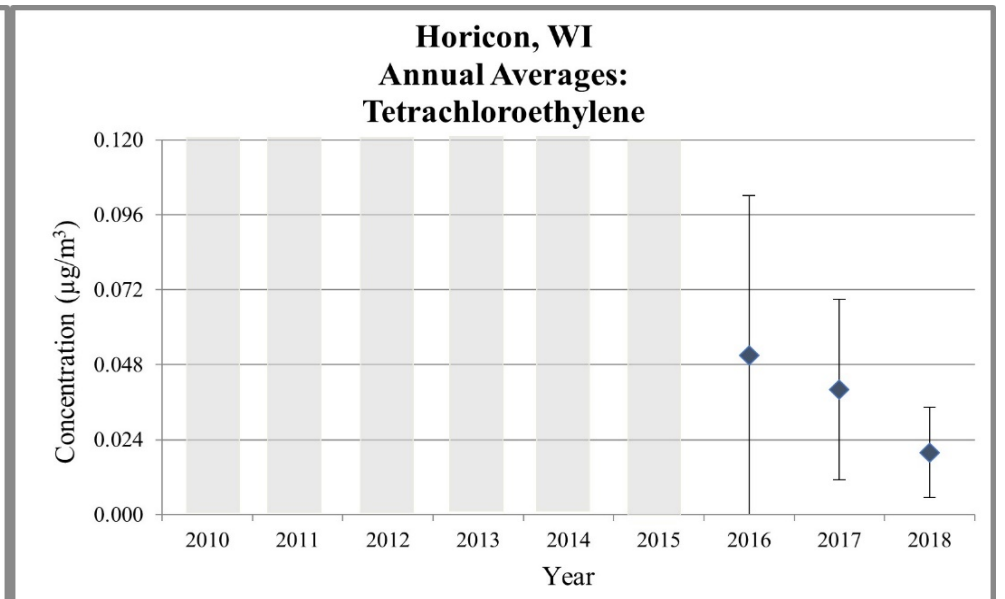
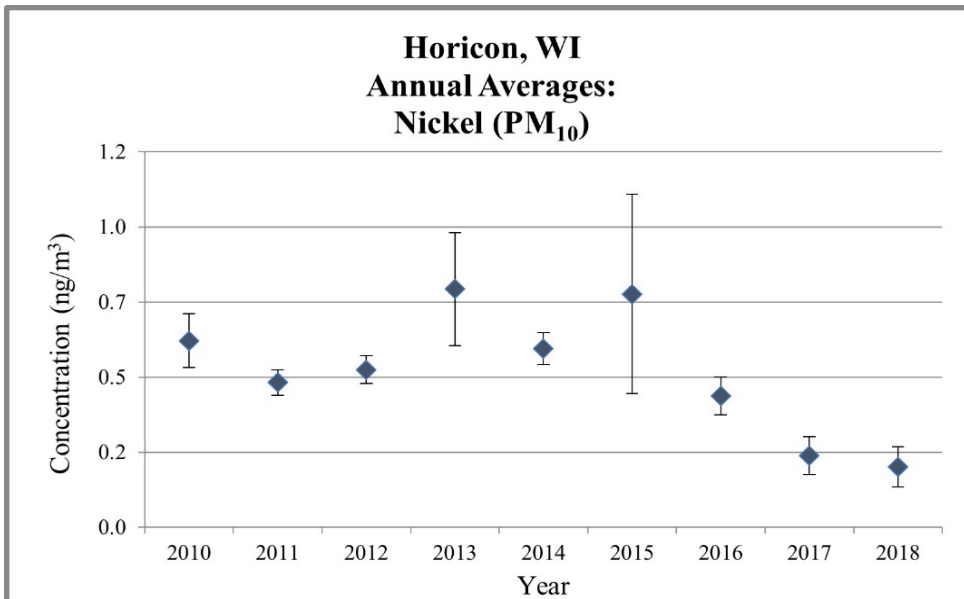
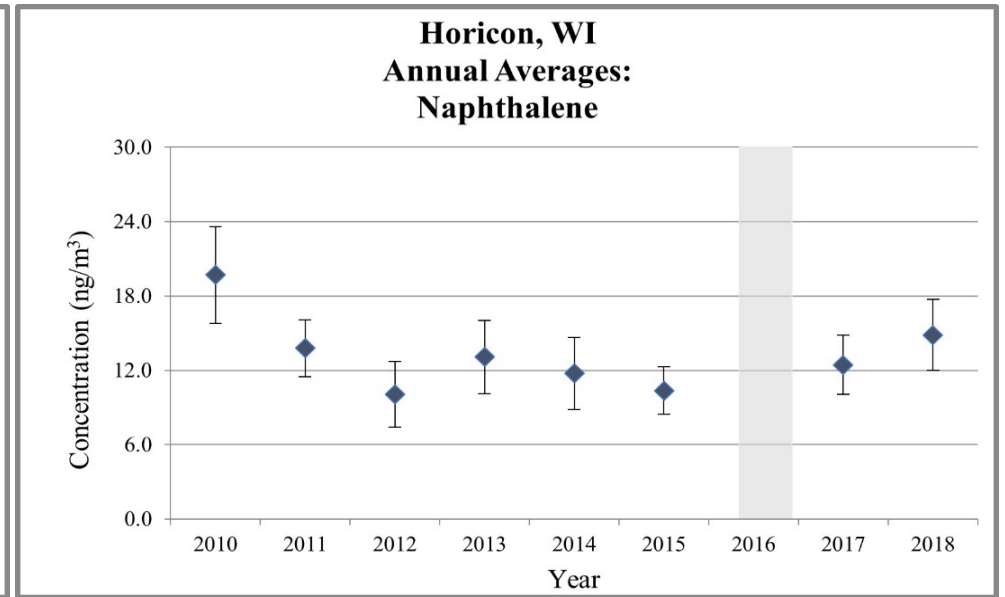
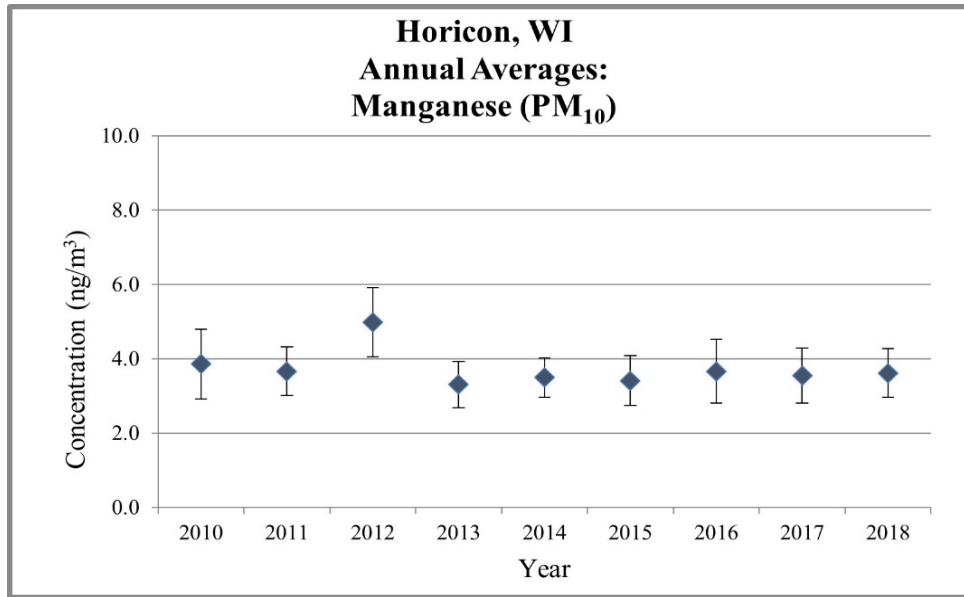
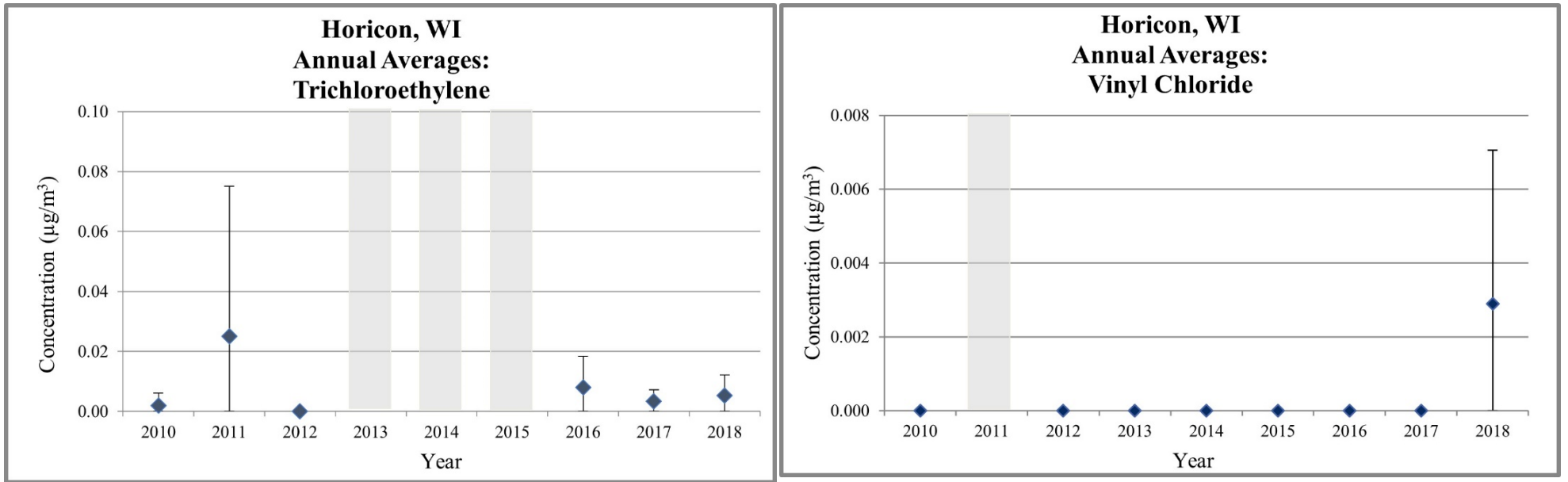



Figure 3. Horicon, WI Annual Average Concentrations



 Does not meet MQO

**Figure 4. Horicon, WI - 3-Year Rolling Average Concentrations**

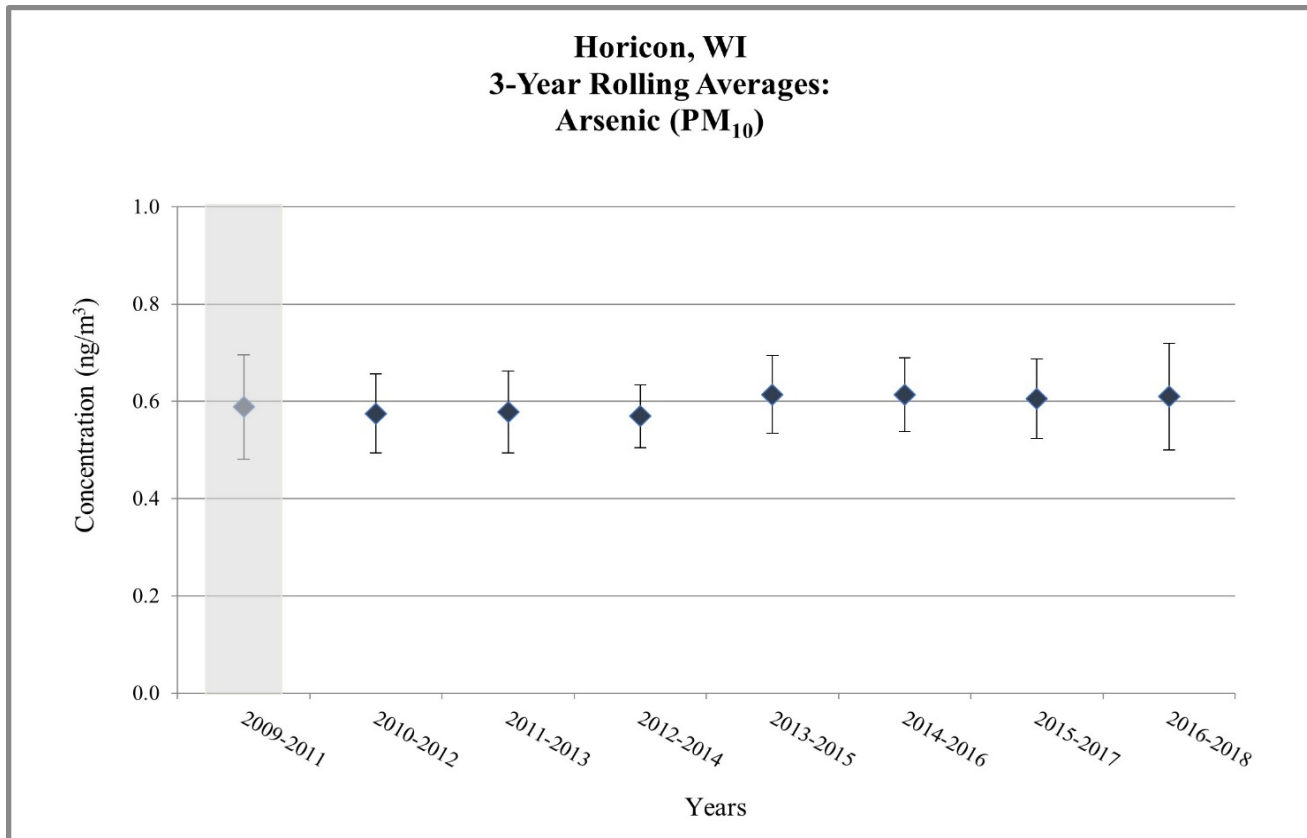
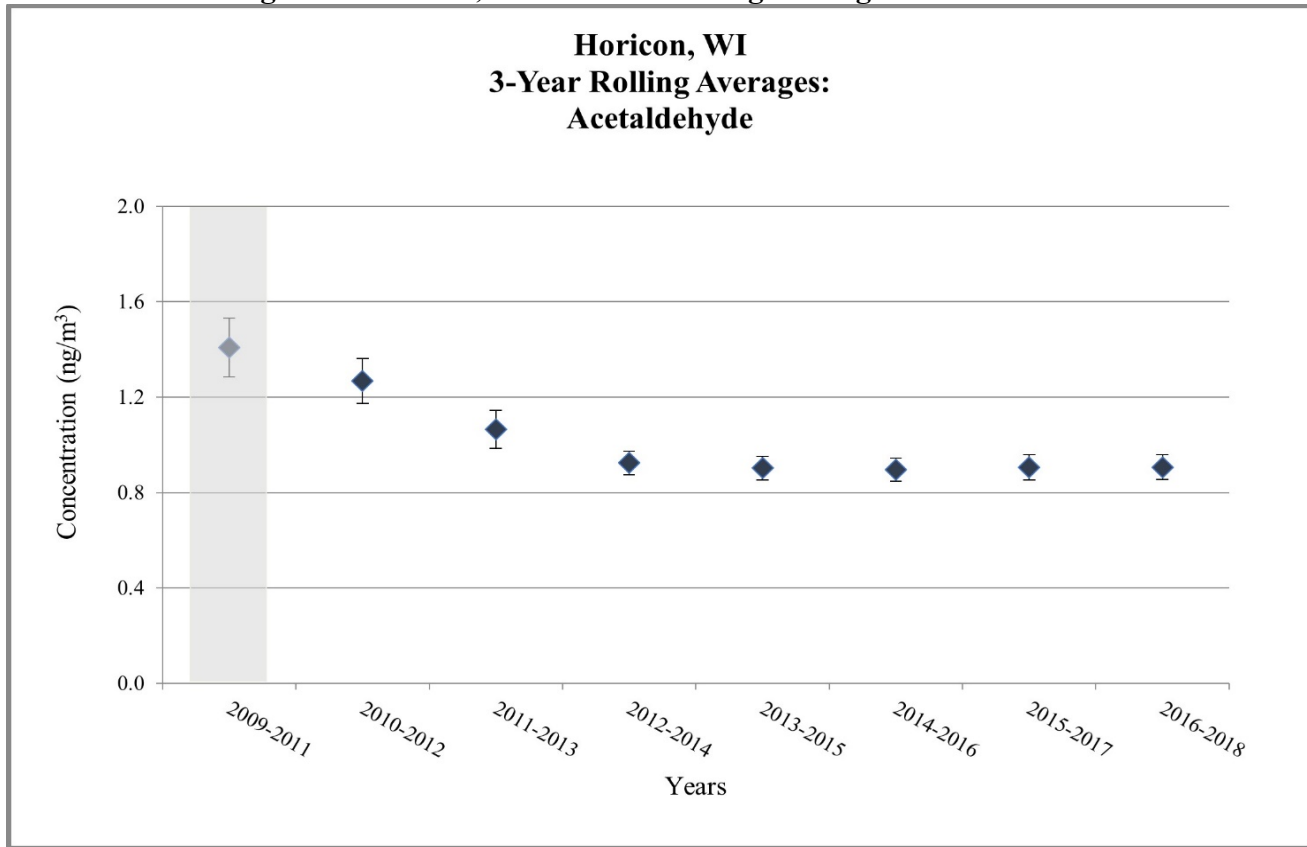


Figure 4. Horicon, WI - 3-Year Rolling Average Concentrations

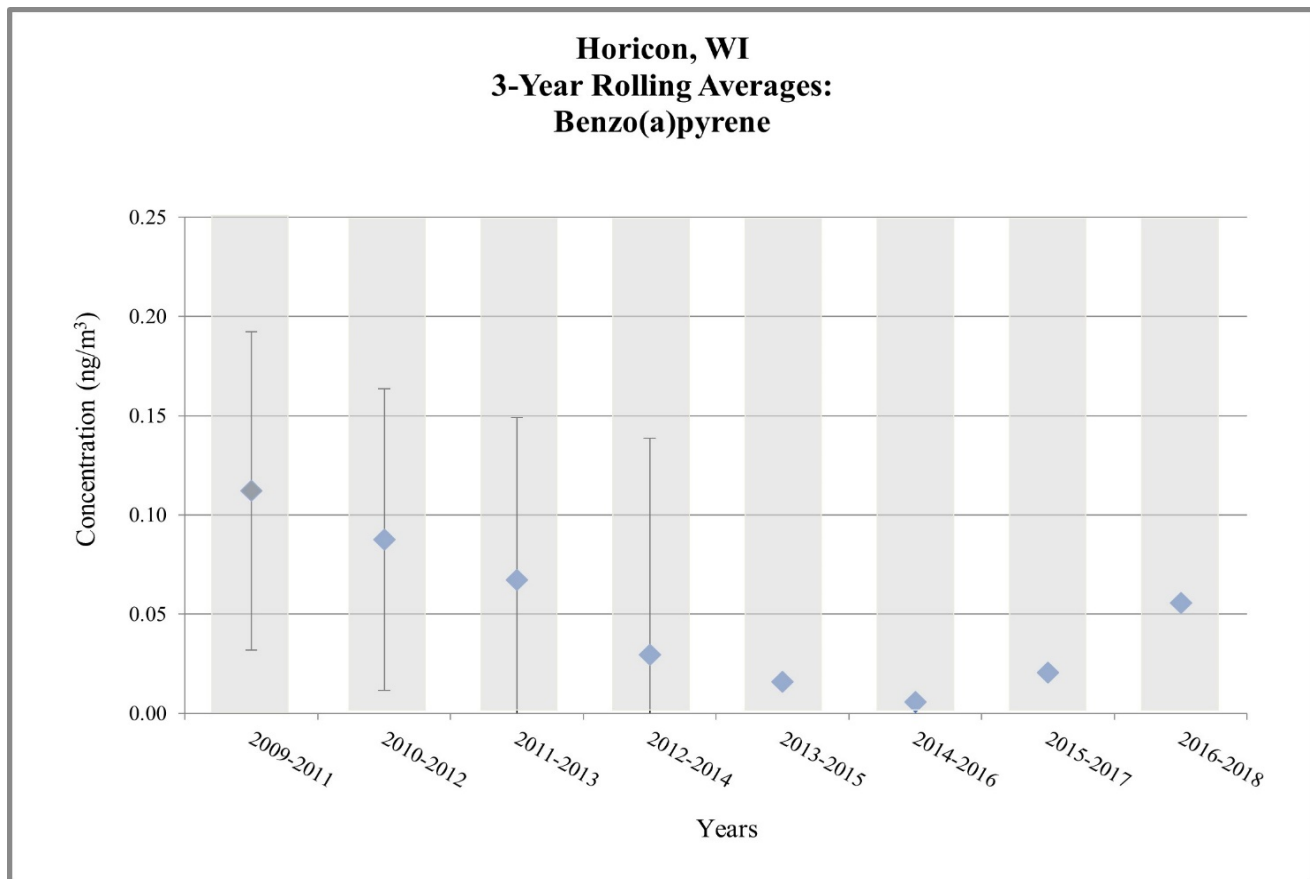
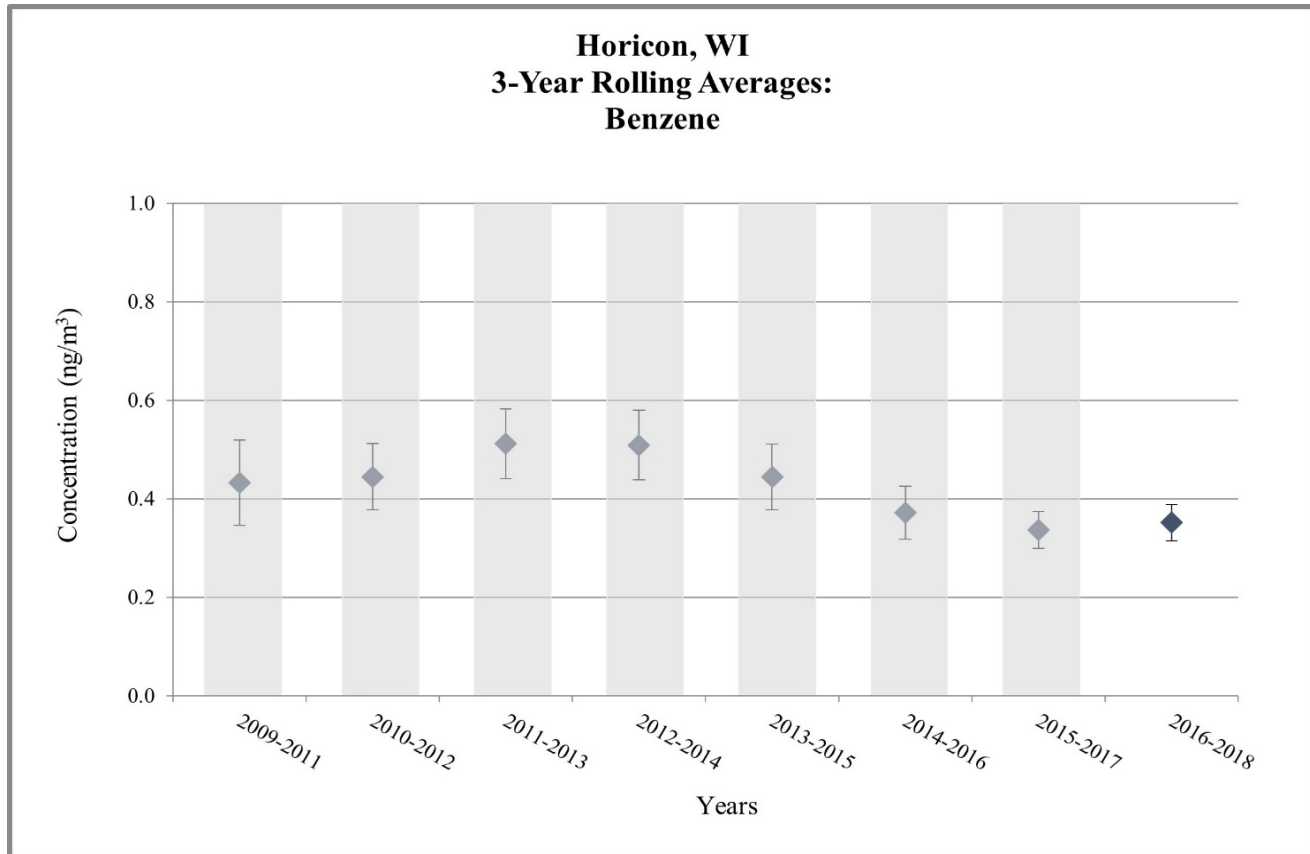


Figure 4. Horicon, WI - 3-Year Rolling Average Concentrations

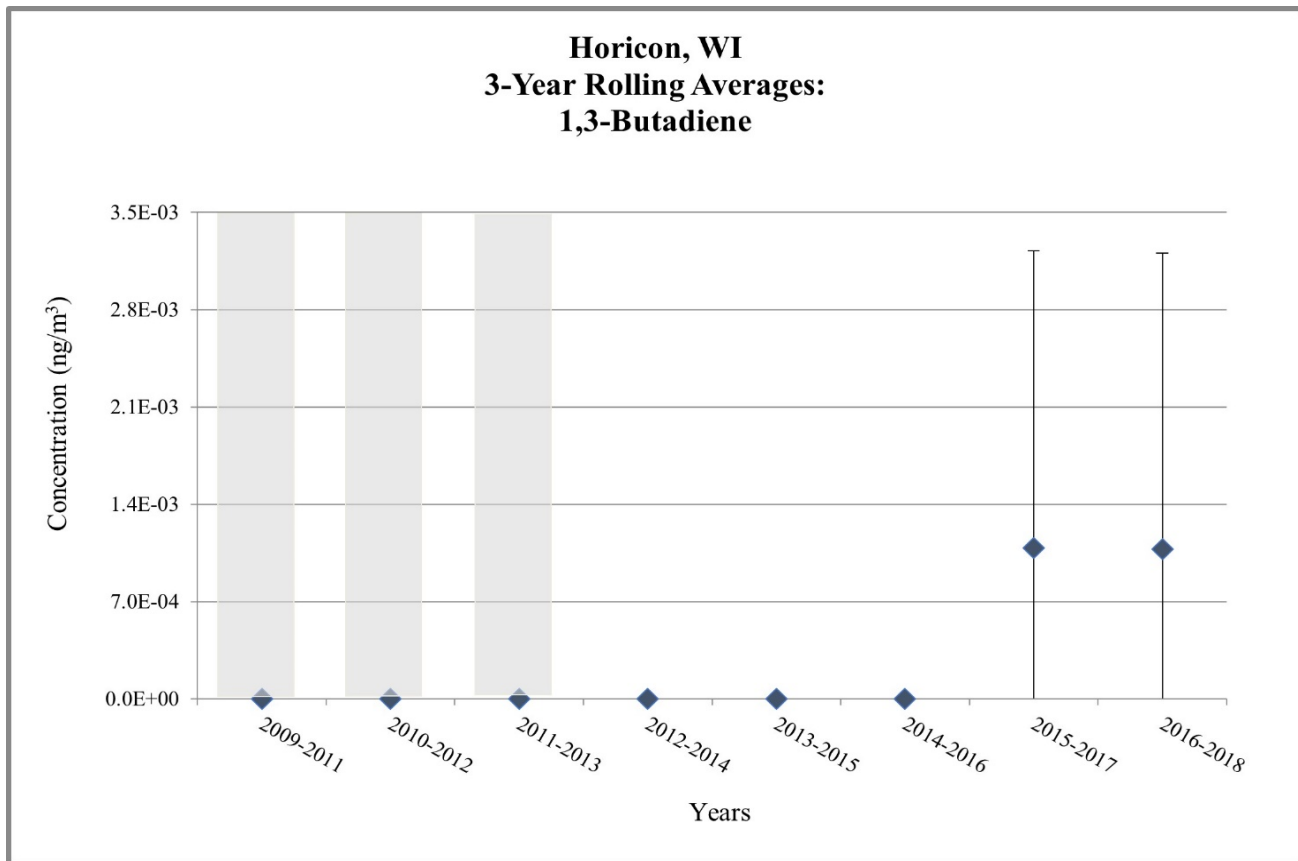
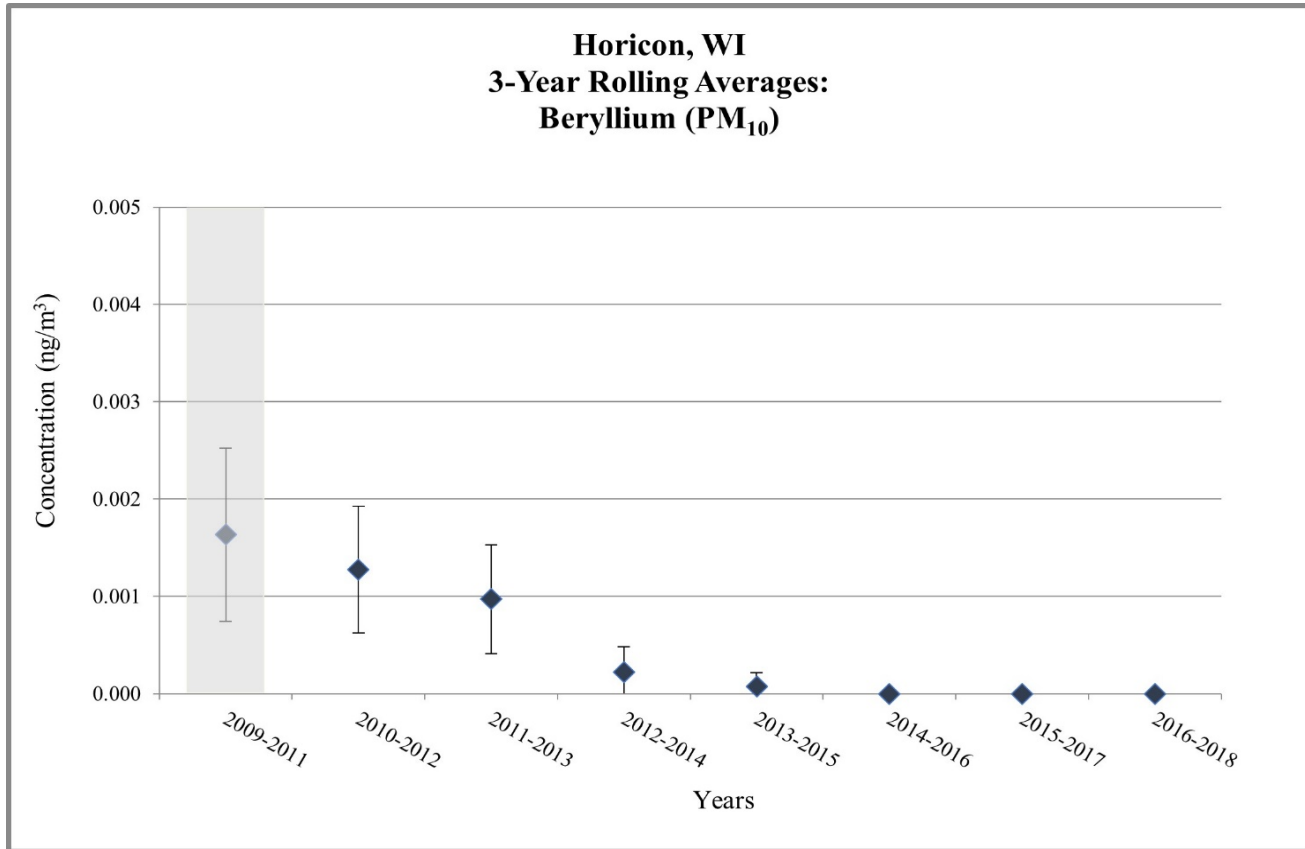


Figure 4. Horicon, WI - 3-Year Rolling Average Concentrations

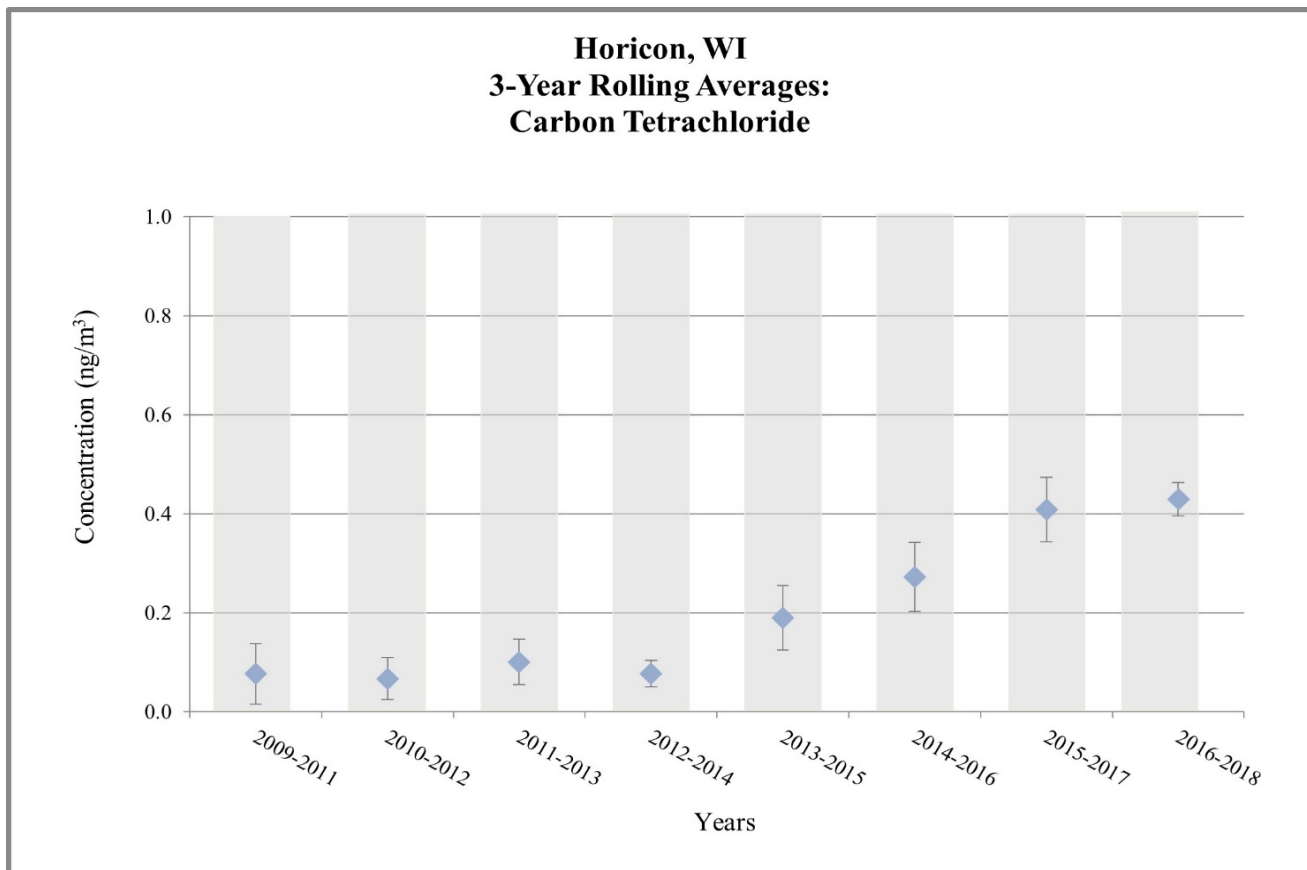
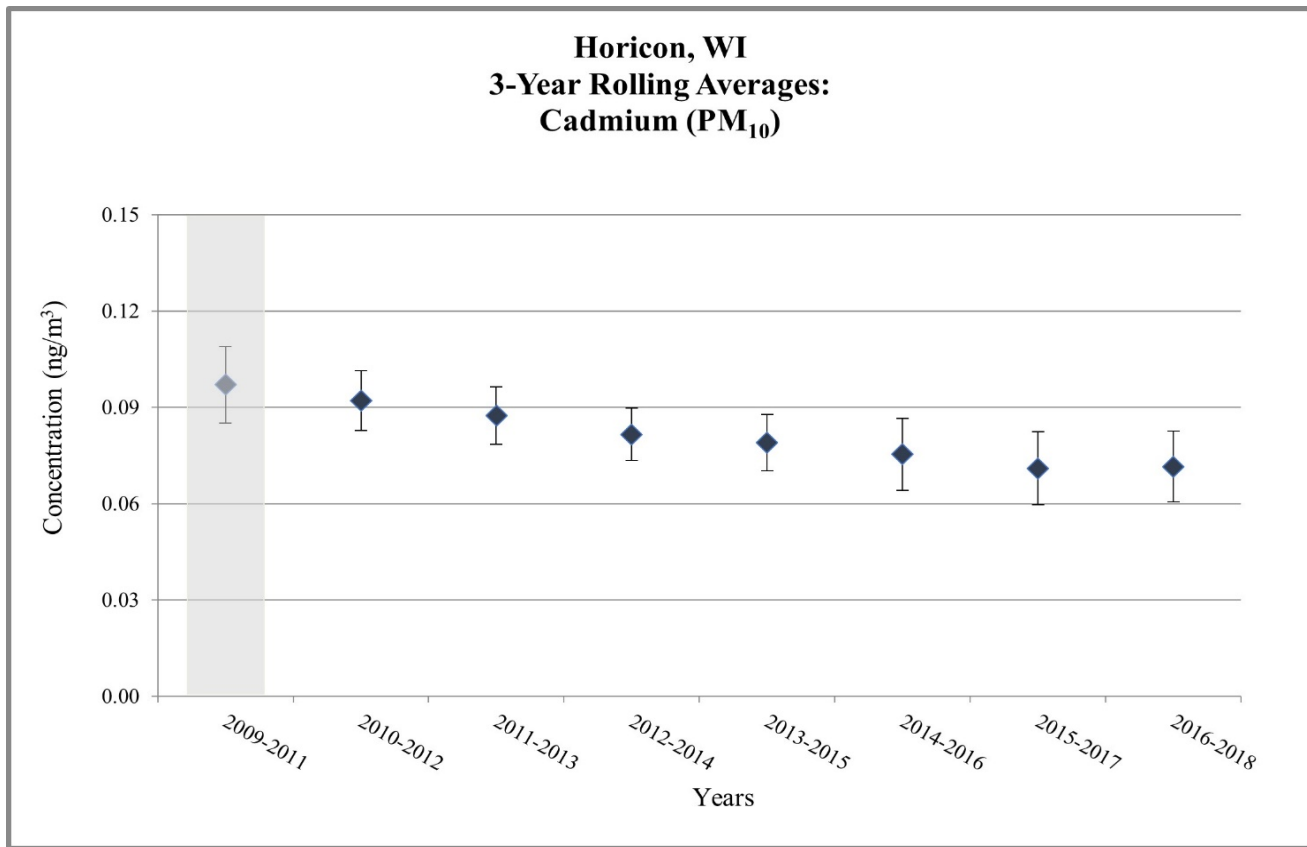


Figure 4. Horicon, WI - 3-Year Rolling Average Concentrations

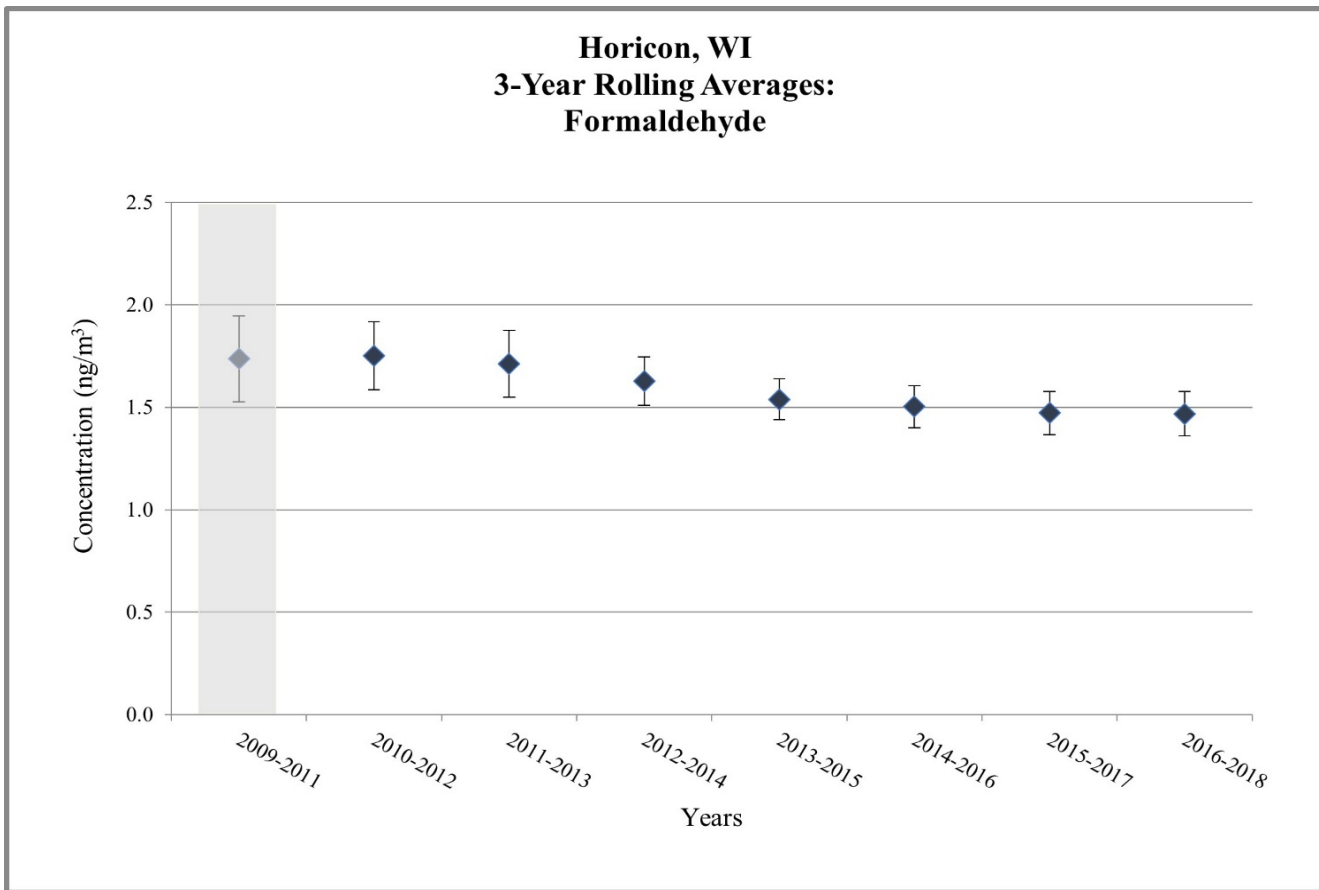
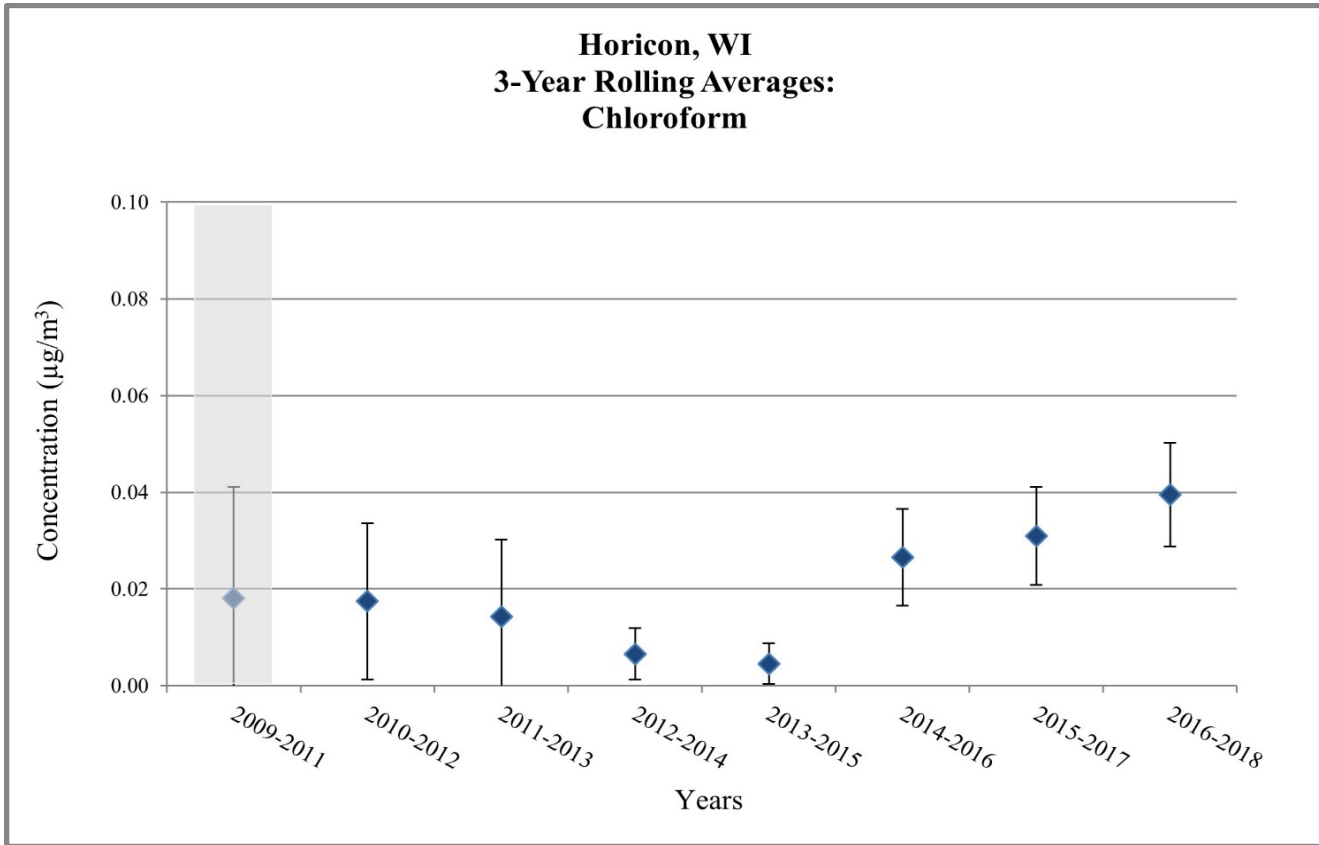




Figure 4. Horicon, WI - 3-Year Rolling Average Concentrations

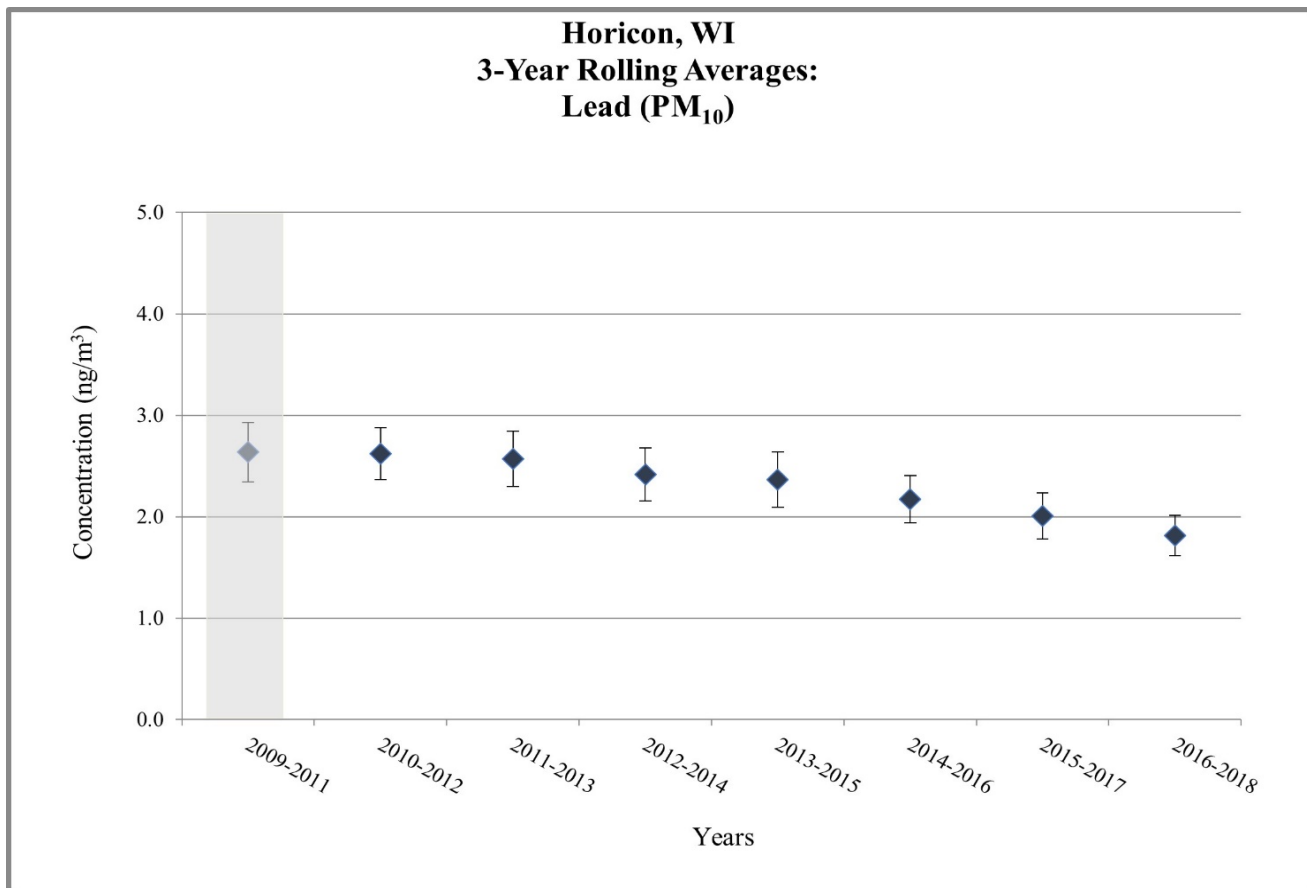
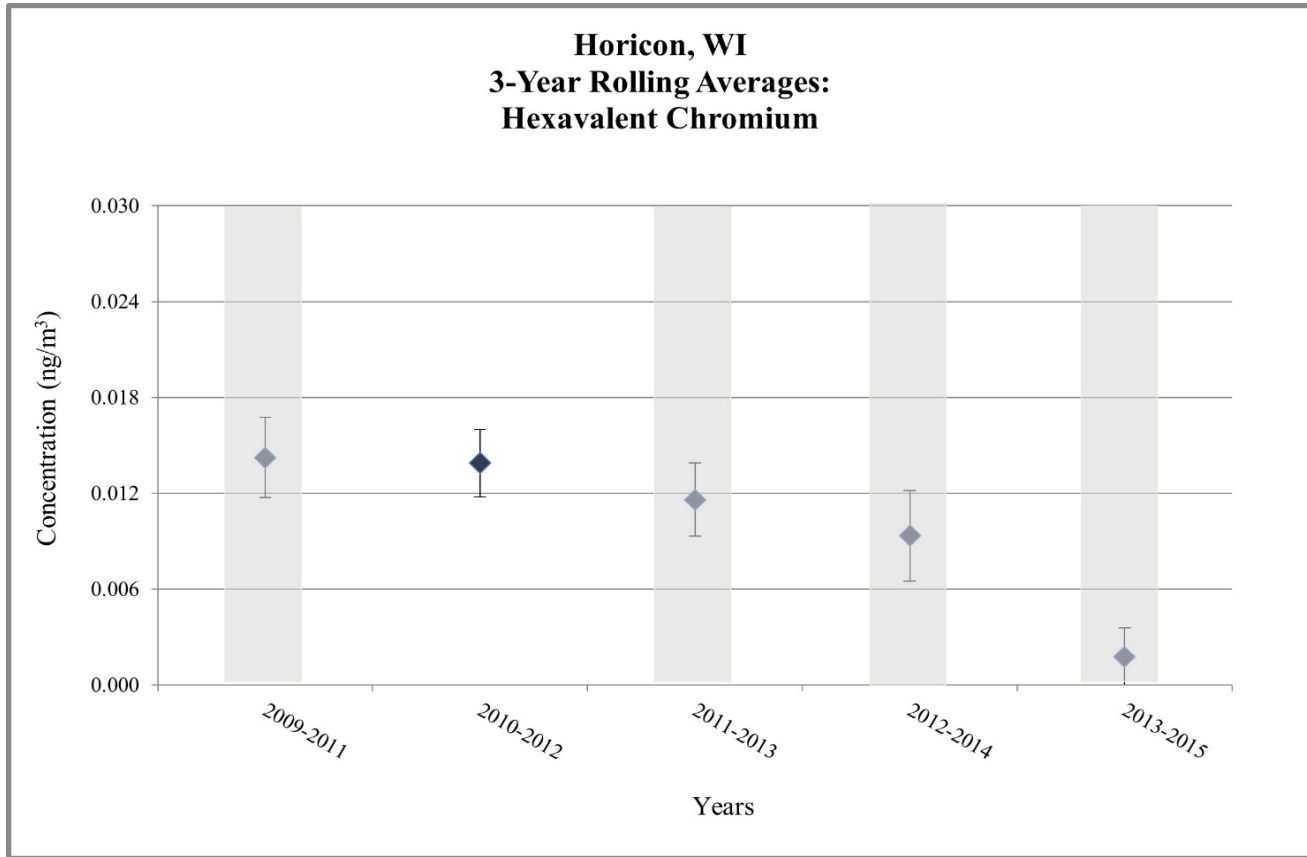


Figure 4. Horicon, WI - 3-Year Rolling Average Concentrations

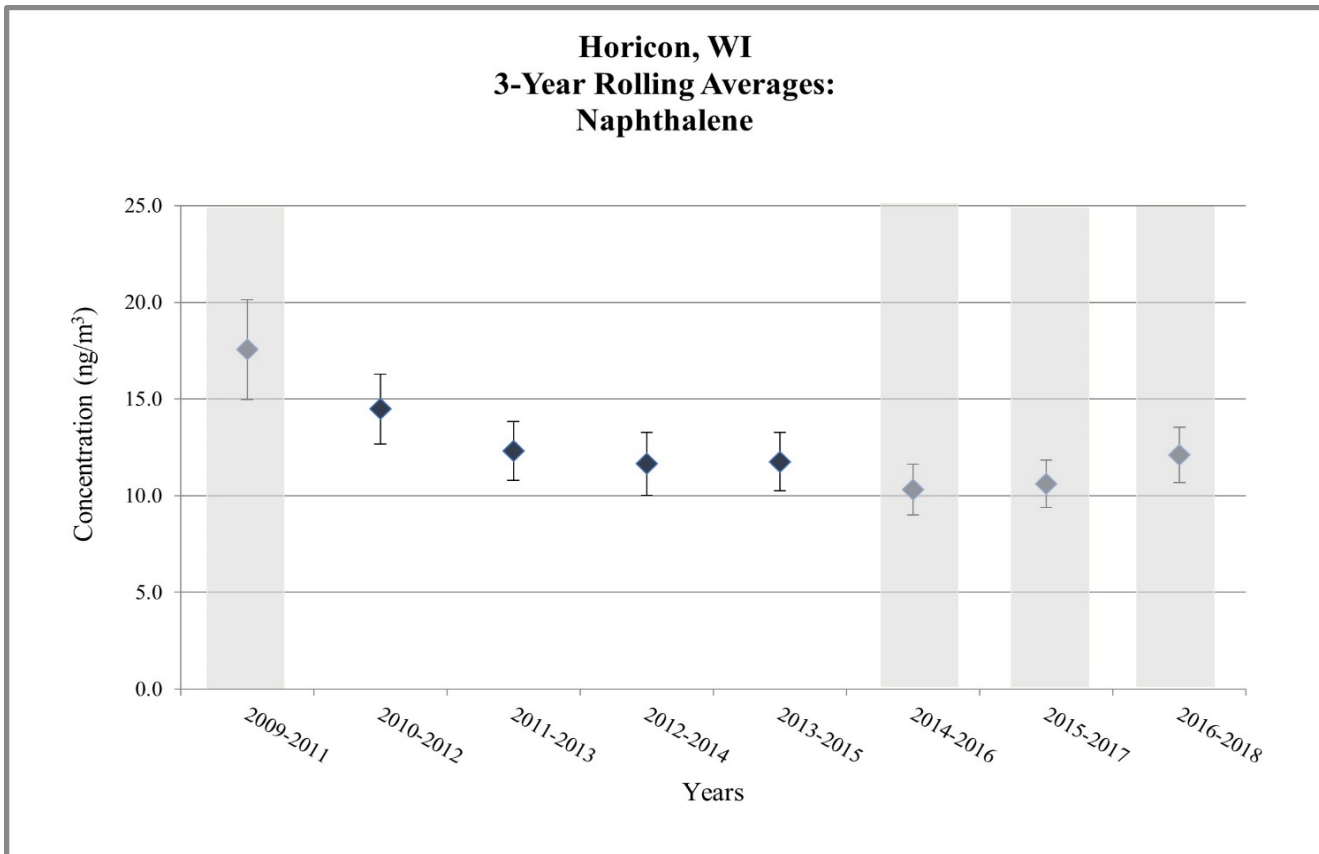
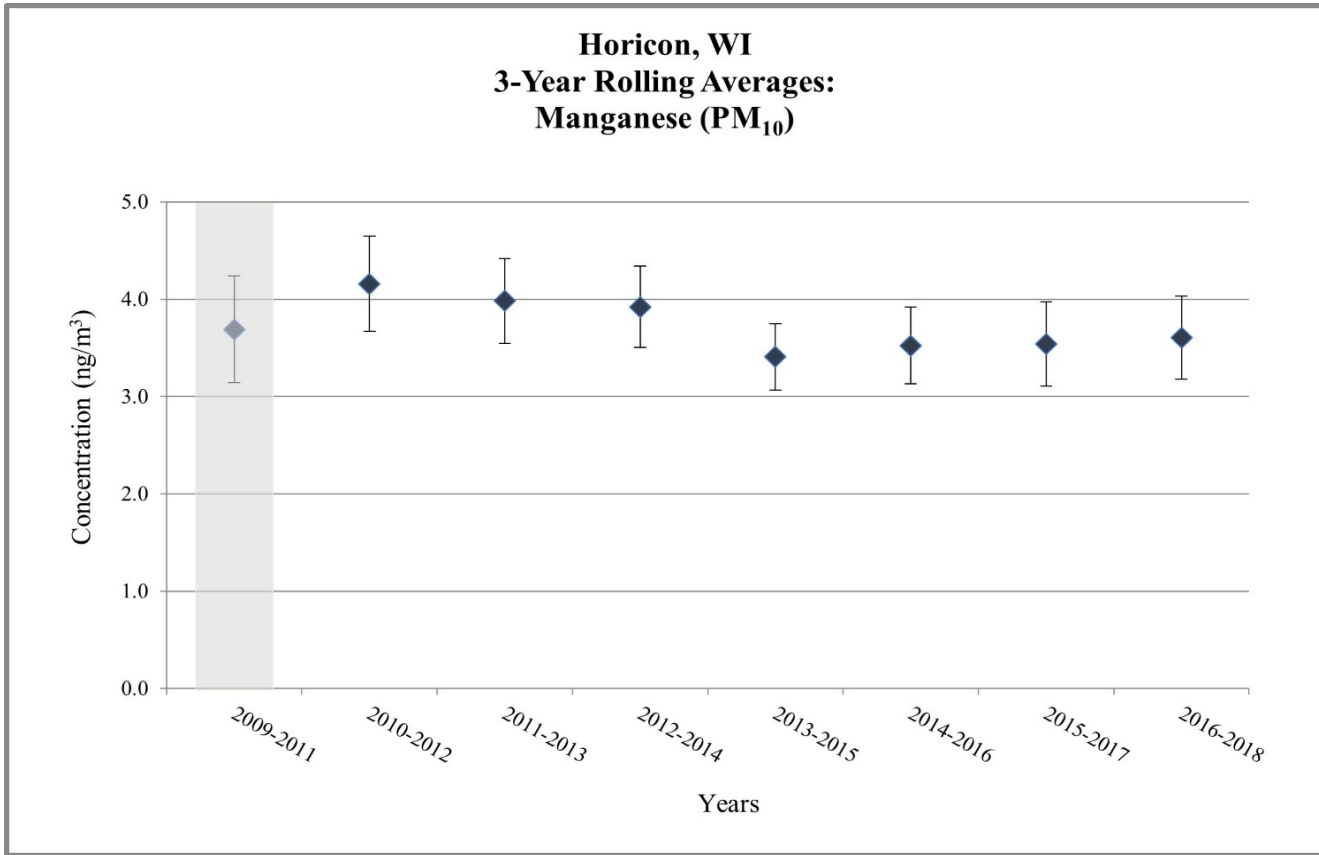


Figure 4. Horicon, WI - 3-Year Rolling Average Concentrations

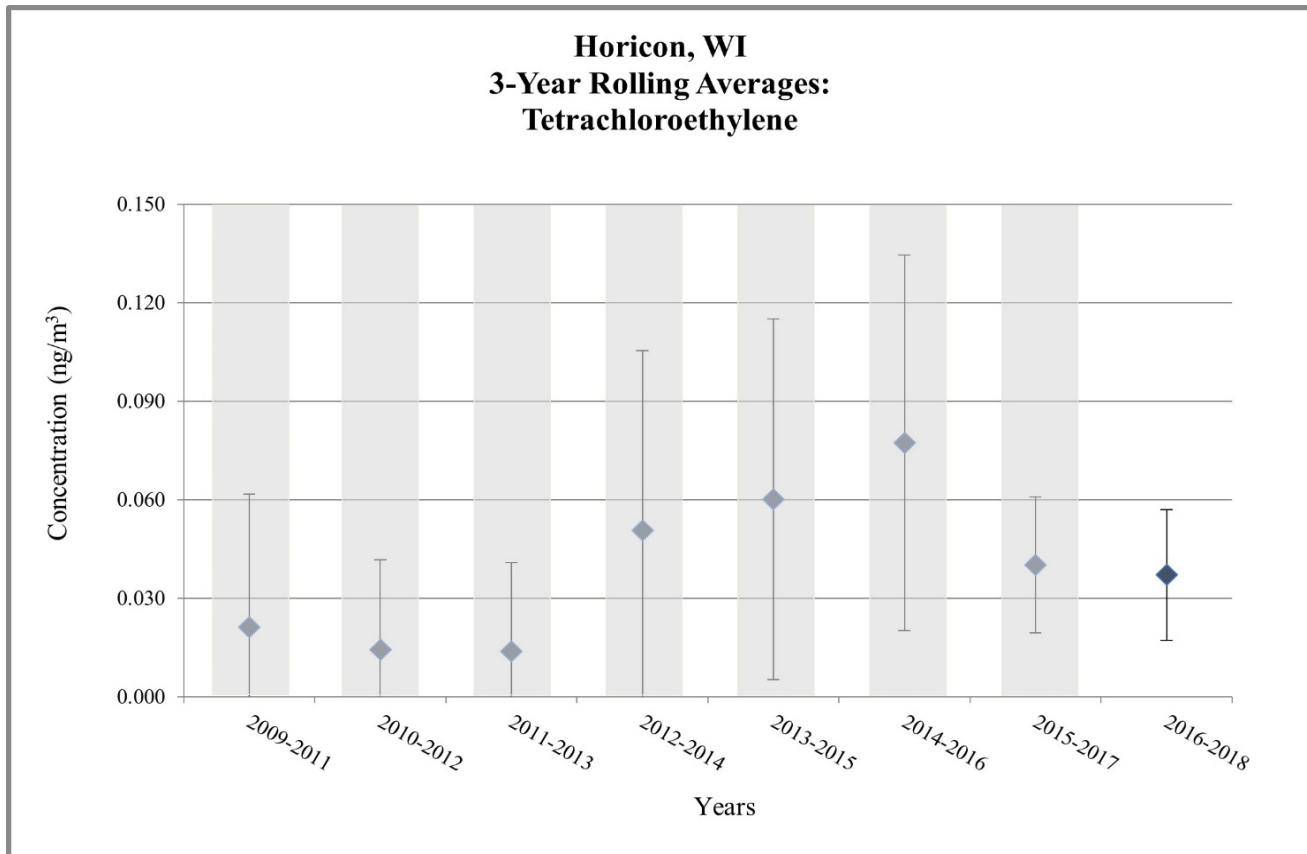
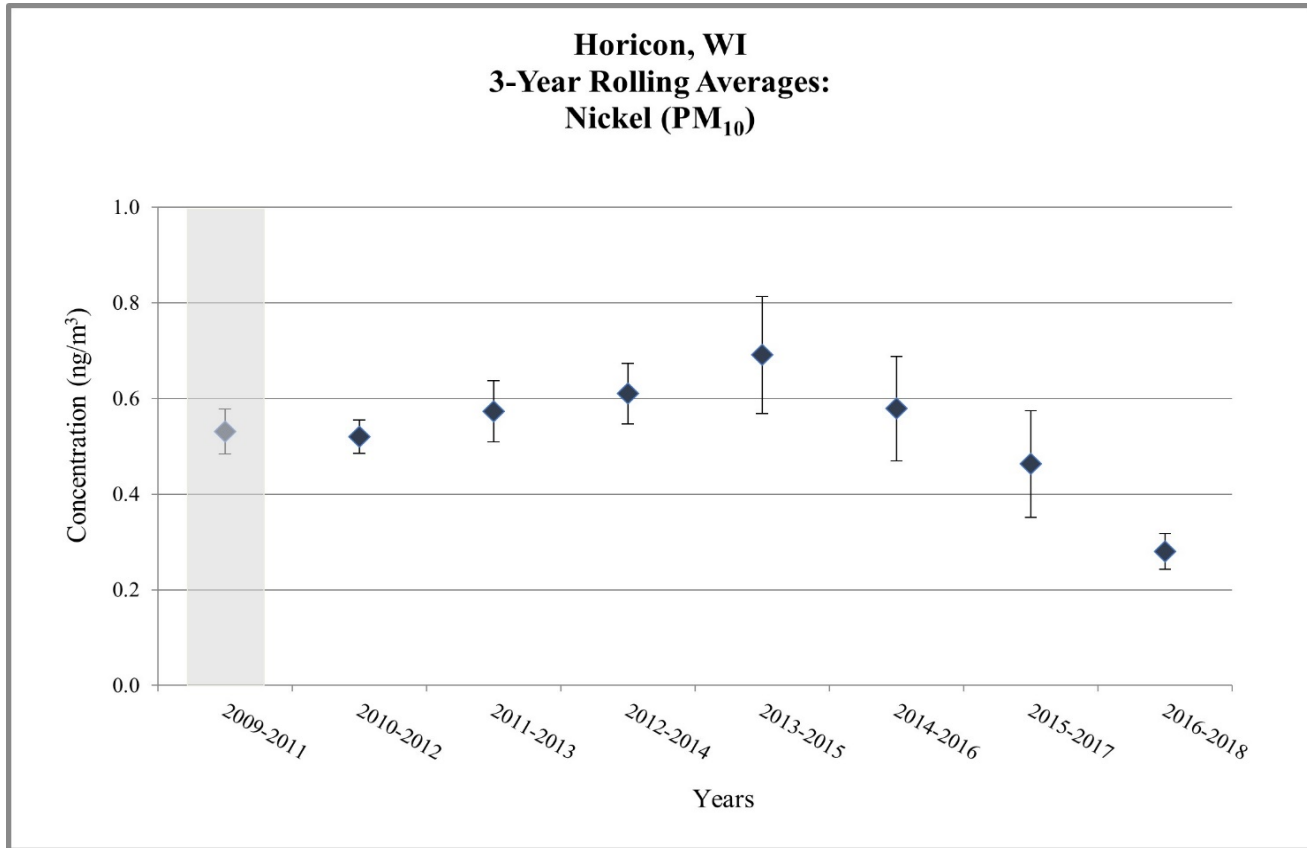
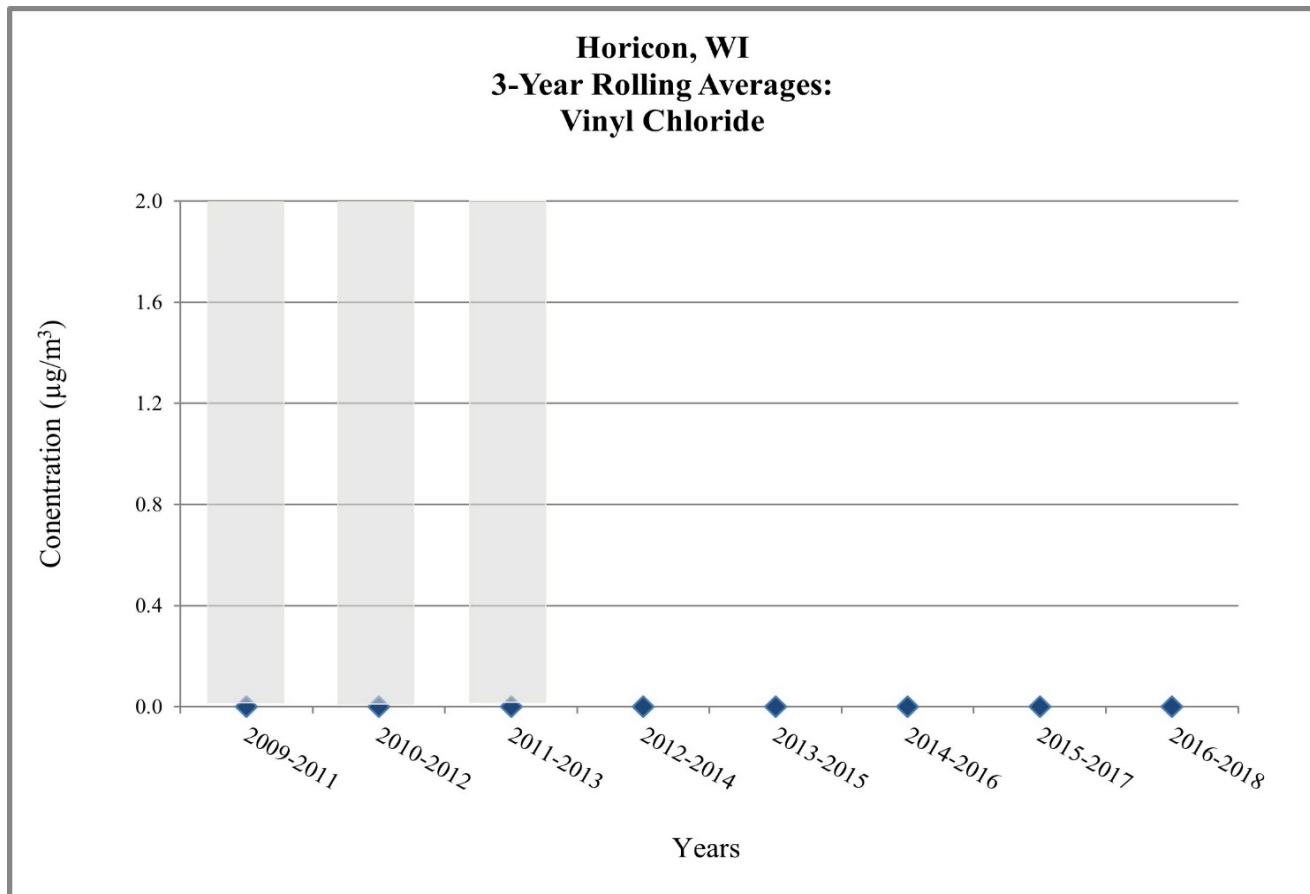
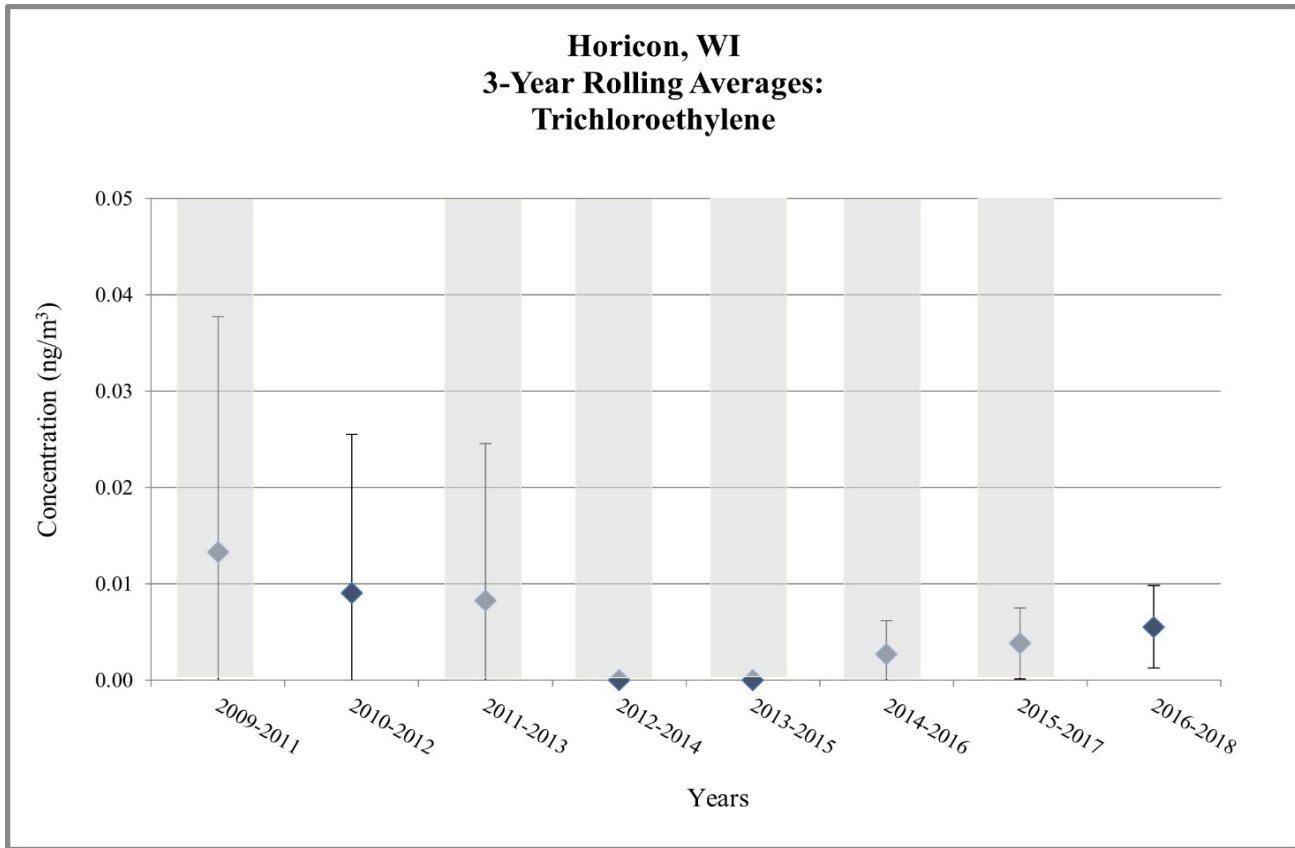



Figure 4. Horicon, WI - 3-Year Rolling Average Concentrations



 Does not meet MQO or wasn't able to collect enough samples

**Table 6. NATTS Network Assessment: MQO#1 - Completeness Percentage at Horicon, WI**

Pollutant Group	Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Carbonyl	Acetaldehyde	a	100	103	97	102	98	98	102	100	102
Carbonyl	Formaldehyde	a	100	103	97	102	98	98	102	100	102
Chromium VI	Chromium VI	a	100	100	100	--	--	--	--	--	--
PAH	Benzo(a)pyrene	a	95	97	97	100	98	97	98	100	100
PAH	Naphthalene	a	95	97	97	100	89	97	98	100	100
PM <sub>10</sub> Metals	Arsenic (PM <sub>10</sub> )	a	93	97	93	92	100	97	100	102	100
PM <sub>10</sub> Metals	Beryllium (PM <sub>10</sub> )	a	93	97	93	92	100	103	100	102	100
PM <sub>10</sub> Metals	Cadmium (PM <sub>10</sub> )	a	93	97	93	92	100	100	100	102	100
PM <sub>10</sub> Metals	Lead (PM <sub>10</sub> )	a	93	97	93	92	100	97	100	102	100
PM <sub>10</sub> Metals	Manganese (PM <sub>10</sub> )	a	93	97	93	92	100	97	100	102	100
PM <sub>10</sub> Metals	Nickel (PM <sub>10</sub> )	a	93	97	93	92	100	102	100	102	100
VOC	Benzene	a	97	97	97	100	100	98	100	100	98
VOC	Butadiene, 1,3-	a	97	97	97	100	100	98	100	100	98
VOC	Carbon tetrachloride	a	97	97	97	100	100	98	100	100	98
VOC	Chloroform	a	97	97	97	100	100	98	100	100	98
VOC	Tetrachloroethylene	a	97	97	97	100	100	98	100	100	98
VOC	Trichloroethylene	a	97	97	97	100	100	98	100	100	98
VOC	Vinyl chloride	a	97	97	97	100	100	98	100	100	98

	A-rated: ≥85%
	B-rated: Between 75% to 85%
	Does not meet: ≤75%
--	No data available

<sup>a</sup>: Scheduled sampling began midway through the year, thus, the site did not have the opportunity to collect enough samples to meet the 85% MQO.

**Table 7. NATTS Network Assessment: MQO#2 - Reported Method Detection Limits (MDLs) at Horicon, WI**

Pollutant Group	Pollutant Name	Target MDL	Units	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Carbonyl	Acetaldehyde	0.45	µg/m <sup>3</sup>	2.22	0.06	0.10	0.10	0.06	0.07	0.06	0.06	0.02	0.11
Carbonyl	Formaldehyde	0.98/0.08 <sup>a</sup>	µg/m <sup>3</sup>	0.395	0.065	0.058	0.058	0.80	0.59	1.88	0.70	0.16	0.75
Chromium VI	Chromium VI	0.08	ng/m <sup>3</sup>	0.05	0.01	0.05	0.04	0.05	--	--	--	--	--
PAH	Benzo(a)pyrene	0.91	ng/m <sup>3</sup>	0.07	0.02	0.02	0.31	0.31	0.31	0.31	0.24	0.26	0.32
PAH	Naphthalene	29.00	ng/m <sup>3</sup>	0.008	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.008
PM <sub>10</sub> Metals	Arsenic (PM <sub>10</sub> )	0.23	ng/m <sup>3</sup>	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.11
PM <sub>10</sub> Metals	Beryllium (PM <sub>10</sub> )	0.42	ng/m <sup>3</sup>	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.024	0.024	0.021
PM <sub>10</sub> Metals	Cadmium (PM <sub>10</sub> )	0.56	ng/m <sup>3</sup>	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02
PM <sub>10</sub> Metals	Lead (PM <sub>10</sub> )	15.0	ng/m <sup>3</sup>	0.001	0.001	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.001
PM <sub>10</sub> Metals	Manganese (PM <sub>10</sub> )	5.0	ng/m <sup>3</sup>	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
PM <sub>10</sub> Metals	Nickel (PM <sub>10</sub> )	2.1	ng/m <sup>3</sup>	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
VOC	Benzene	0.13	µg/m <sup>3</sup>	2.46	2.09	2.09	2.09	2.09	2.09	2.09	0.37	0.34	0.34
VOC	Butadiene, 1,3-	0.10	µg/m <sup>3</sup>	2.21	1.88	1.88	1.88	1.88	1.88	1.88	0.55	0.53	0.53
VOC	Carbon tetrachloride	0.17	µg/m <sup>3</sup>	3.70	3.15	3.15	3.15	3.15	3.15	3.15	0.52	0.48	0.48
VOC	Chloroform	0.50	µg/m <sup>3</sup>	0.98	0.83	0.83	0.83	0.83	0.83	0.83	0.24	0.22	0.22
VOC	Tetrachloroethylene	0.17	µg/m <sup>3</sup>	3.99	3.39	3.39	3.39	3.39	3.39	3.39	1.44	1.36	1.04
VOC	Trichloroethylene	0.5/0.2 <sup>a</sup>	µg/m <sup>3</sup>	1.07	0.91	0.91	0.91	2.28	2.28	2.28	0.40	0.40	0.40
VOC	Vinyl chloride	0.11	µg/m <sup>3</sup>	2.32	1.98	1.98	1.98	1.98	1.98	1.98	0.40	0.37	0.37

	A-rated: MDL to Target MDL ratio ≤ 1
	B-rated" MDL to Target MDL ratio between 1 and 2
	Does Not Meet MDL to Target MDL ratio>2
	-- No data available

<sup>a</sup>: For the 2012 sampling year, the Target MDL for this pollutant was reduced.

**Table 8. NATTS Network Assessment: MQO#3 - Bias Percent Difference at Horicon, WI**

Pollutant Group	Pollutant Name	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Carbonyls	Acetaldehyde	-9.1	2.0	-4.6	a	-2.4	-11.9	a	-0.9	10.6	-4.2
Carbonyls	Formaldehyde	-5.4	2.0	-5.8	a	-2.7	-8.9	a	-10.4	-2.4	3.7
Chromium VI	Chromium VI	5.6 <sup>b</sup>	10.5 <sup>b</sup>	a	19.5	-6.5	--	--	--	--	--
PAH	Benzo(a)pyrene	-1.7	-0.8 <sup>c</sup>	d	45.6	-4.7	-36.0	-28.3	-40.7	-24.5	-11.9
PAH	Naphthalene	-7.7	-26.4 <sup>c</sup>	d	8.0	7.1	-16.8	-33.6	-40.0	-40.1	-22.2
PM <sub>10</sub> Metals	Arsenic (PM <sub>10</sub> )	-4.0	-15.5	-2.7	10.8	-4.2	1.3	a	0.8	-2.2	-2.5
PM <sub>10</sub> Metals	Beryllium (PM <sub>10</sub> )	10.5	-6.0	3.7	14.7	4.1	e	a	5.6	2.5	-7.6
PM <sub>10</sub> Metals	Cadmium (PM <sub>10</sub> )	9.1	-17.0	-4.6	12.0	-2.2	e	a	4.2	0.2	-5.4
PM <sub>10</sub> Metals	Lead (PM <sub>10</sub> )	-14.1	-18.9	-0.3	16.8	1.6	3.9	a	4.5	2.3	-4.2
PM <sub>10</sub> Metals	Manganese (PM <sub>10</sub> )	-28.3	-17.3	8.1	16.5	-5.4	e	a	3.4	2.0	-5.3
PM <sub>10</sub> Metals	Nickel (PM <sub>10</sub> )	-13.1	-13.7	-5.1	5.2	-2.3	f	a	32.0	18.9	6.6
VOC	Benzene	-12.2	18.7	43.4	a	11.9	8.9	-3.5	25.2	-7.8	1.8
VOC	Butadiene, 1,3-	-12.8	50.0	36.8	a	10.4	2.7	-2.2	10.8	-17.7	-37.5
VOC	Carbon tetrachloride	10.9	36.7	25.4	a	16.1	-20.6	g	120.9	13.7	-6.3
VOC	Chloroform	-19.3	8.2	9.1	a	1.5	-7.8	-16.4	-0.5	0.1	4.7
VOC	Tetrachloroethylene	-18.2	7.5	20.8	a	-14.1	-26.7	-13.0	14.8	-7.0	-3.5
VOC	Trichloroethylene	-9.5	29.4	20.0	a	7.3	-8.3	-11.6	14.8	-8.8	-3.1
VOC	Vinyl chloride	-1.3	31.8	37.7	a	1.3	14.5	3.4	4.2	-10.6	2.4

	A-rated:±25%
	B-rated: Between 25% to 35% or between -25% to -35%
	Does not meet:>35% or <35%
--	No data available

<sup>a</sup>: No Proficiency Test samples were sent for this pollutant and year.

<sup>b</sup>: Proficiency Test results are from the National Contract Lab for EPA's School Air Toxics Monitoring Program. The %Difference was -5.55% in 2009 and 10.53% in 2010.

<sup>c</sup>: Bias data presented is an average of the ERG and WSLH PT results.

<sup>d</sup>: Pollutant was sampled at this site and year, but no bias data were reported.

<sup>e</sup>: The Proficiency Test sample for this pollutant was 0; the site reported a concentration as "< MDL", rather than 0. EPA accepted this result.

<sup>f</sup>: Although a Proficiency Test sample was sent to the lab supporting this site and year, the results were nullified by EPA due to QA issues.

<sup>g</sup>: Bias data result was <0.085; this entry was deemed acceptable by EPA.

**Table 9. NATTS Network Assessment: MQO#4 - Overall Method Precision %CV at Horicon, WI**

Pollutant Group	Pollutant Name	Overall Method precision % CV									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Carbonyls	Acetaldehyde	--	8.7	10.0	6.3	--	3.1	31.2	--	--	--
Carbonyls	Formaldehyde	--	9.7	10.5	7.9	--	8.4	15.0	--	--	--
Chromium VI	Chromium VI	--	21.1	9.1	16.5	a	--	--	--	--	--
PAH	Benzo(a)pyrene	--	--	5.8	a	a	a	--	a	a	
PAH	Naphthalene	--	--	9.8	4.9	16.9	31.6	9.2	--	7.3	7.3
PM <sub>10</sub> Metals	Arsenic (PM <sub>10</sub> )	--	3.0	24.1	5.6	11.6	3.5	2.7	9.8	18.5	18.9
PM <sub>10</sub> Metals	Beryllium (PM <sub>10</sub> )	--	11.5	16.7	a	a	a	a	a	a	a
PM <sub>10</sub> Metals	Cadmium (PM <sub>10</sub> )	--	4.7	30.2	61.5	16.1	40.6	8.8	18.9	33.4	45.0
PM <sub>10</sub> Metals	Lead (PM <sub>10</sub> )	--	4.4	21.6	21.4	5.3	8.5	11.1	37.3	17.1	2.4
PM <sub>10</sub> Metals	Manganese (PM <sub>10</sub> )	--	9.5	15.6	1.6	1.0	11.2	13.4	13.0	7.6	3.7
PM <sub>10</sub> Metals	Nickel (PM <sub>10</sub> )	--	28.5	18.3	3.4	25.0	17.1	31.2	26.9	45.4	13.6
VOC	Benzene	--	2.8	0.3	1.9	0.2	2.3	--	--	--	--
VOC	Butadiene, 1,3-	--	a	a	a	a	a	--	--	--	--
VOC	Carbon tetrachloride	--	a	a	a	5.5	a	--	--	--	--
VOC	Chloroform	--	a	a	a	a	a	--	--	--	--
VOC	Tetrachloroethylene	--	a	a	a	a	a	--	--	--	--
VOC	Trichloroethylene	--	a	a	a	a	a	--	--	--	--
VOC	Vinyl chloride	--	a	a	a	a	a	--	--	--	--

--

A-rated: ≤ 15% CV  
 B-rated: Between 15%CV to 25% CV  
 Does Not Meet: >25% CV or did not report Precision (required in the NATTS Workplan Template since 2012)  
 -- No data available

<sup>a</sup>: Although both primary and secondary data were reported, both sets of values were less than the MDL. Thus no %CV was calculated.



**Table 10. NATTS Network Assessment: MQO#4 - Analytical Precision %CV at Horicon, WI**

Pollutant Group	Pollutant Name	Analytical Method precision % CV									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Carbonyls	Acetaldehyde	--	--	--	a	a	a	a	a	a	2.1
Carbonyls	Formaldehyde	--	--	--	a	a	a	a	a	a	0.5
Chromium VI	Chromium VI	--	5.3	4.2	6.4	a	--	--	--	--	--
PAH	Benzo(a)pyrene	--	--	--	a	a	a	a	a	b	b
PAH	Naphthalene	--	--	--	a	a	a	a	a	0.8	1.3
PM <sub>10</sub> Metals	Arsenic (PM <sub>10</sub> )	--	--	--	a	a	a	a	a	a	a
PM <sub>10</sub> Metals	Beryllium (PM <sub>10</sub> )	--	--	--	a	a	a	a	a	a	a
PM <sub>10</sub> Metals	Cadmium (PM <sub>10</sub> )	--	--	--	a	a	a	a	a	a	a
PM <sub>10</sub> Metals	Lead (PM <sub>10</sub> )	--	--	--	a	a	a	a	a	a	a
PM <sub>10</sub> Metals	Manganese (PM <sub>10</sub> )	--	--	--	a	a	a	a	a	a	a
PM <sub>10</sub> Metals	Nickel (PM <sub>10</sub> )	--	--	--	a	a	a	a	a	a	a
VOC	Benzene	--	--	--	a	a	a	a	a	a	4.9
VOC	Butadiene, 1,3-	--	--	--	a	a	a	a	a	a	b
VOC	Carbon tetrachloride	--	--	--	a	a	a	a	a	a	4.6
VOC	Chloroform	--	--	--	a	a	a	a	a	a	b
VOC	Tetrachloroethylene	--	--	--	a	a	a	a	a	a	0
VOC	Trichloroethylene	--	--	--	a	a	a	a	a	a	b
VOC	Vinyl chloride	--	--	--	a	a	a	a	a	a	b

	A-rated: ≤ 15% CV
	B-rated: Between 15% CV to 25% CV
	Does Not Meet: >25% CV or did not report Precision (required in the NATTS Workplan Template since 2012)
	-- No data available

<sup>a</sup>: Per the NATTS Workplan template, analytical replicates were required to be reported to AQS for this sampling year

<sup>b</sup>: The primary and/or replicate value were less than the MDL, so no calculation could be made.

**Appendix A. Equipment Inventory**

<b>Pollutant Type</b>	<b>Year(s)</b>	<b>Manufacturer/Model, Extraction Type, and Year</b>
<b><i>Sampling Equipment</i></b>		
Carbonyls	2009-2018	Custom-built (Year Deployed: <1999)
Chormium VI	2009-2013	ERG Chromium VI sampler (Year Deployed: 2009)
PAHs	2009-2015	Thermo Andersen GPS-1 PUF Sampler (Year Deployed: 2009)
	2016	Thermo Andersen Hi-Vol; Thermo PS-1 Hi-Vol (Year Deployed: 2009)
	2017-2018	Tisch TE-1000 PUF+ Year Deployed: 2017)
PM <sub>10</sub> Metals	2009-2011	Anderson housing and impactor, TISCH volumetric control (Year Deployed: 2008)
	2012-2015	Anderson Hi-Vol Model 321A sampler (2 units) (Year Deployed: 2008)
	2016-2018	Tisch Hi-Vol (Year Deployed: 2015)
VOCs	2009-2018	Custom-built (Year Deployed: 2009)
<b><i>Analytical Equipment</i></b>		
Carbonyls	2009	Waters Alliance 2695 HPLC /model 2996 PDA (Year Deployed: 2005)
	2010-2012	Waters Acquity UPLC/PDA detection (Year Deployed: 2006)
	2013-2018	Waters Acquity UPLC/PDA detection (Year Deployed: 2012)
Chormium VI	2009-2013	Dionex 300 ion chromatography system (Year Deployed: 2001)
PAHs	2009	HP/Agilent 5890/5971 GC/MS (Year Deployed: 2008)
	2010-2015	HP/Agilent 6890/5973 GC/MS (Year Deployed: 2004)
	2016-2018	HP/Agilent 6890N/5973 GC/MS (Year Deployed: 2004)
PM <sub>10</sub> Metals	2009-2018	Thermo/VG Elemental PQ ExCell ICP-MS (Year Deployed: 2001)
VOCs	2009-2018	HP/Agilent 6890N/5975 GC/MS (Year Deployed: 2006)
<b><i>Preconcentrator Equipment</i></b>		
VOCs	2009-2016	Entech 7100A (Year Deployed: 2006)
	2017-2018	Entech 7200 (Year Deployed: 2017)
<b><i>Standards Preparation Equipment</i></b>		
VOCs	2009-2016	Entech 4600 (dynamic dilution) (Year Deployed: 2004)
	2017-2018	Entech DDS PG7-50.00-PSIA (dynamic dilution) (Year Deployed: 2017)
<b><i>Canister Cleaning Equipment</i></b>		
VOCs	2009-2018	Entech 3100A (Hot) (Year Deployed: 2004)
<b><i>PM<sub>10</sub> Extraction Equipment</i></b>		
PM <sub>10</sub> Metals	2009	Branson (Sonicator) (Year Deployed: 1980)
	2010-2015	Environmental Express (Hotblock) (Year Deployed: 1980)
	2016-2018	Environmental Express (Hotblock) (Year Deployed: 2016)
<b><i>Chromium VI Extraction Equipment</i></b>		
Chormium VI	2009-2010	Branson 8510 (Sonicator) (Year Deployed: 2001)
	2011-2011	Branson 8510 Sonicator/ Branson Shaker (Year Deployed: 2001/2011)
	2012-2013	Branson Shaker (Year Deployed: 2011)
<b><i>PAHs Extraction Equipment</i></b>		
PAHs	2009	Dionex -300 (ASE) (Year Deployed: 2004)
	2010-2018	Lab Line (Soxhlet) (Year Deployed: <2000)