pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Commonwealth of Pennsylvania Department of Environmental Protection 2016 Annual Ambient Air Monitoring Network Plan

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Commonwealth of Pennsylvania

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List of Acronyms

APCA	Air Pollution Control Act
AQS	Air Quality System
BAM	Beta Attenuation Monitor
CAA	Clean Air Act
CBSA	Core based statistical area
CFR	Code of Federal Regulations
CSA	Combined Statistical Area
CSN	Chemical Speciation Network
CO	Carbon Monoxide
COPAMS	Commonwealth of Pennsylvania's Air Monitoring System
FDMS	Filter Dynamics Measurement System
FEM	Federal Equivalent Method
FID	Flame Ionization Detector
FRM	Federal Reference Method
IR	Infrared (radiation)
H_2S	Hydrogen Sulfide
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NCore	National Core multipollutant monitoring stations
NO	The gaseous pollutant Nitrogen Oxide
NO_2	The gaseous pollutant Nitrogen Dioxide
NOx	Oxides of Nitrogen
O_3	The gaseous pollutant Ozone
PA DEP	Pennsylvania Department of Environmental Protection
PAMS	Photochemical Assessment Monitoring Station
Pb	Lead
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PWEI	Population Weighted Emissions Index
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RA-40	NO_2 Monitoring Sites Required by U.S. EPA Regional Administrator
SIP	State Implementation Plan
SLAMS	State or Local Air Monitoring Stations
SO_2	The gaseous pollutant Sulfur Dioxide
SPM	Special Purpose Monitor
TSP	Total Suspended Particulate
TEOM	Tapered Element Oscillating Microbalance
U.S. EPA	U.S. Environmental Protection Agency
UV	Ultraviolet
VOC	Volatile Organic Compounds

Introduction

The Federal Air Pollution Control Act of 1955 was the first federal legislation enacted by Congress to provide research and technical assistance to state and local governments responsible for controlling air pollution. This Act appropriated $5 million each fiscal year from July 1955 to June 30, 1960 for the U.S. Department of Health, Education and Welfare to carry out the functions of the Act. The Clean Air Act of 1963 was the first federal legislation establishing a federal air pollution control program within the U.S. Public Health Service and authorized research into techniques for monitoring and controlling air pollution. In 1967, the Air Quality Act was enacted in order to expand federal government activities. In accordance with this law, enforcement proceedings were initiated in areas subject to interstate air pollution transport. As part of these proceedings, the federal government for the first time conducted extensive ambient monitoring studies and stationary source inspections.[1]

In 1970, Congress enacted the Clean Air Act (CAA) authorizing the U.S. Environmental Protection Agency (U.S. EPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants shown to threaten human health and welfare. Primary NAAQS were promulgated by EPA according to criteria designed to protect public health, including an adequate margin of safety to protect sensitive populations including children, asthmatics and the elderly. The secondary NAAQS were promulgated by EPA according to criteria designed to protect public welfare (decreased visibility, damage to crops, vegetation, and buildings, etc.). U.S. EPA has promulgated NAAQS for the following pollutants: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), and lead (Pb). These pollutants are commonly called the "criteria" pollutants. Table 1 on the following page lists all of the NAAQS for the criteria pollutants and is available at https://www.epa.gov/criteria-air-pollutants/naaqs-table.

In accordance with Section 107 of the CAA, 42 U.S.C. section 7407, after U.S. EPA establishes or revises a primary and/or secondary NAAQS, U.S. EPA designates areas as "attainment," "nonattainment", or "unclassifiable" areas upon review of certified and quality assured ambient air monitoring data collected by state, local and tribal governments. For areas with nonattainment designations, the state and local agencies must develop and submit to U.S. EPA revisions to State Implementation Plans (SIPs) outlining how areas will attain and maintain the standards by reducing air pollutant emissions.

[1] http://www.epa.gov/air/caa/caa_history.html

Table 1. National Ambient Air Quality Standards (NAAQS)

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month period	0.15 $\mu g/m^3$ (1)	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone [80 FR 65292, Oct 26, 2015]		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution Dec 14, 2012 [78 FR 3086, Jan 15, 2013]	$PM_{2.5}$	primary	1 year	12.0 $\mu g/m^3$	annual mean, averaged over 3 years
		secondary	1 year	15.0 $\mu g/m^3$	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sep 14, 1973]		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 $\mu g/m^3$ as a calendar quarter average) also remain in effect.

(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

The Pennsylvania Air Pollution Control Act (APCA), enacted originally on January 8, 1960, 35 P.S. Section 4001 et seq., established the framework for the Commonwealth's Air Pollution Control Program. The Declaration of Policy set forth in Section 2 of the APCA, 35 P.S. Section 4002, provides as set forth below.

It is hereby declared to be the policy of the Commonwealth of Pennsylvania to protect the air resources of the Commonwealth to the degree necessary for the (i) protection of public health, safety and well-being of its citizens; (ii) prevention of injury to plant and animal life and to property; (iii) protection of the comfort and convenience of the public and the protection of the recreational resources of the Commonwealth; (iv) development, attraction and expansion of industry, commerce and agriculture; and (v) implementation of the provisions of the Clean Air Act in the Commonwealth.

Section 4 of the APCA empowers the Pennsylvania Department of Environmental Protection (formerly the Department of Environmental Resources and hereafter referred to as the PA DEP or Department) to implement the provisions of the Clean Air Act in the Commonwealth. 35 P.S. Section 4004(1).

Since its establishment 1971, the Department has implemented air pollution control programs to protect the air resources of the Commonwealth that, with a great deal of success, have addressed major public health and welfare air quality concerns. Significant changes have occurred over the years with the program, notably with the passage of the Clean Air Act Amendments in 1990 as well as the adoption and implementation of $PM_{2.5}$ NAAQS requirements in 1997. Currently, PA DEP has an extensive air quality monitoring program that monitors not only for criteria pollutants but also for air toxics and volatile organic compounds (VOCs). A general description of air pollutants is provided in Appendix A of this document.

Ambient Air Monitoring Network Plan Requirements

On March 28, 2016, the United States Environmental Protection Agency (U.S. EPA) promulgated a final rule entitled "Revisions to Ambient Monitoring Quality Assurance and Other Requirements" for criteria pollutants. In the preamble, U.S. EPA stated that the purpose for the revisions was "to provide clarifications to existing requirements and to reduce the compliance burden of monitoring agencies operating ambient monitoring networks". These revisions focused on the network design and quality assurance requirements set forth in 40 CFR Part 58, "Ambient Air Quality Surveillance", and its associated appendices. Changes to the network design requirements included revisions to required $PM_{2.5}$ sampling frequencies, as well as revisions to requirements for annual network plan, annual data certification and data submission to U.S. EPA. Changes to quality assurance requirements included a reformatting of the quality assurance requirements appendix (40 CFR Part 58, Appendix A), revisions to precision check and performance audit concentration levels, revisions to the comparison threshold for collocated lead monitors, as well as revisions to the requirements for the submission of quality assurance data to U.S. EPA.

As revised in March 2016, pursuant to 40 CFR Sections 58.10(a) and 58.10(b), network plans must include the following for existing and proposed monitoring sites:

- A statement of whether the operation of each monitor meets the requirements of 40 CFR Part 58, Appendices A, B, C, D, and E, where applicable;
- The Air Quality System (AQS) site identification number;
- The location, including street address and geographical coordinates;
- The sampling and analysis method(s) for each measured parameter;
- The operating schedules for each monitor;
- Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal;
- The monitoring objective and spatial scale of representativeness for each monitor;
- The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS, as described in 40 CFR § 58.30;
- The Metropolitan Statistical Area (MSA), Core Based Statistical Area (CBSA), Combined Statistical Area (CSA), or other area represented by the monitor;
- The designation of lead monitors as source-oriented or non-source-oriented;
- Any lead monitor for which a waiver has been requested or granted by U.S. EPA to use Pb-PM_{10} monitoring in lieu of Pb-TSP monitoring; and
- The identification of NO_2 monitors as near-road, area-wide or vulnerable or susceptible population monitors in accordance with 40 CFR Appendix D, §4.3 "Nitrogen Dioxide (NO_2) Design Criteria"

The "Commonwealth of Pennsylvania Department of Environmental Protection 2016 Annual Ambient Air Monitoring Network Plan" has been developed to meet these requirements. The body of this document describes the PA DEP Ambient Air Network and includes network modifications. Appendix C of this document outlines the fulfilment of network design and quality assurance requirements set forth in the appendices of 40 CFR Part 58. Appendix D of this document provides site and monitor details for all monitoring sites in the PA DEP Ambient Air Monitoring Network.

Description of PA DEP's Ambient Air Monitoring Network

Ambient air quality monitoring in Pennsylvania is performed by the PA DEP and local air pollution control agencies in Philadelphia and Allegheny Counties. The Pennsylvania Department of Environmental Protection is primarily responsible for air monitoring in the Commonwealth of Pennsylvania. PA DEP has approved local monitoring agencies to perform monitoring independently in the two most populous counties in the Commonwealth. The Allegheny County Health Department (ACHD) performs ambient air monitoring in Allegheny County, while the City of Philadelphia Health Department's Air Management Services (AMS) performs ambient air monitoring in Philadelphia County. In addition to monitoring performed in the Commonwealth by PA DEP, ACHD and AMS, EPA's Clean Air Markets Division operates ozone monitors at five locations in Pennsylvania, as part of the Clean Air Status and Trends Network (CASTNET) program. Contact information for all three ambient air monitoring agencies in Pennsylvania, as well as the CASTNET program, is listed in Table 2.

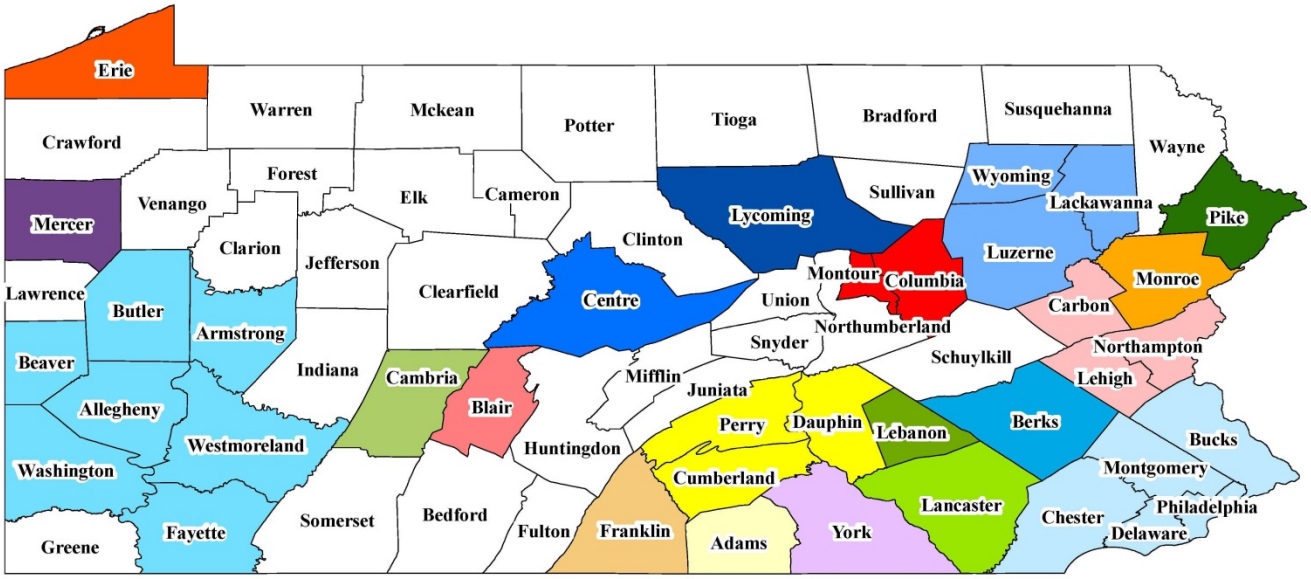
Table 2. Ambient Air Monitoring Agencies in Pennsylvania

Organization	Address and Phone	Internet
Commonwealth of Pennsylvania Department of Environmental Protection Bureau of Air Quality Division of Air Quality Monitoring	Rachel Carson State Office Building 12th Floor 400 Market Street P.O. Box 8468 Harrisburg, PA 17105-8468 (717) 787-6548	http://www.dep.pa.gov/Business/Air/BAQ/Pages/default.aspx
Allegheny County Health Department	39th Street and Penn Ave Pittsburgh, PA 15201 (412) 578-8104	http://www.achd.net/air/index.html
City of Philadelphia Department of Public Health Air Management Services	321 University Avenue Philadelphia, PA 19104 (215) 685-7584	http://www.phila.gov/health/airmanagement/
CASTNET	US EPA Clean Air Markets Division 1200 Pennsylvania Avenue, NW Mail Code 6204M Washington, DC 20460 (202) 343-9790	http://epa.gov/castnet/javaweb/index.html

This document does not provide detailed descriptions of the monitoring networks operated and maintained by the PA DEP- approved local air pollution control programs in Philadelphia and Allegheny Counties. ACHD operates a network of seventeen ambient air monitoring stations, including one multi-pollutant NCore site, throughout Allegheny County. Philadelphia AMS operates a network of twelve air monitoring sites, including one multi-pollutant NCore site and two community-based monitoring sites, located throughout Philadelphia County. In addition to criteria pollutant monitoring, these agencies also conduct monitoring for air toxics and chemical speciation of $PM_{2.5}$ at selected sites. Detailed descriptions of local networks and plans are submitted to EPA by the local agencies, and may be obtained directly from the agencies, using the contact information listed in Table 2 of this document.

The Department's monitoring strategy generally requires the installation of monitors in areas under PA DEP's jurisdiction having high population density and/or high levels of contaminants, based on EPA guidance and population information from the U.S. Office of Management and Budget (OMB). The OMB defines urbanized areas of concentrated population of 50,000 or greater as Metropolitan Statistical Areas (MSA). The Commonwealth of Pennsylvania encompasses twenty MSAs, either wholly or in part. Figure 1 displays the geographical boundaries of MSAs and population estimates for 2015 available at http://www.census.gov. Note that several MSAs include populations outside the Commonwealth, as indicated by the inclusion of one or more state abbreviations in the MSA name. The Code of Federal Regulations (CFR) sets forth minimum monitoring requirements based at least in part on population statistics for ozone, sulfur dioxide, nitrogen dioxide and particulate matter (PM) monitoring networks. PA DEP conducts air monitoring surveillance in both MSA and non-MSA regions. Appendix B of this document contains maps of PA DEP monitoring site locations, for each MSA and non-MSA region.

Figure 1. Map of Metropolitan Statistical Areas (MSA) in Pennsylvania

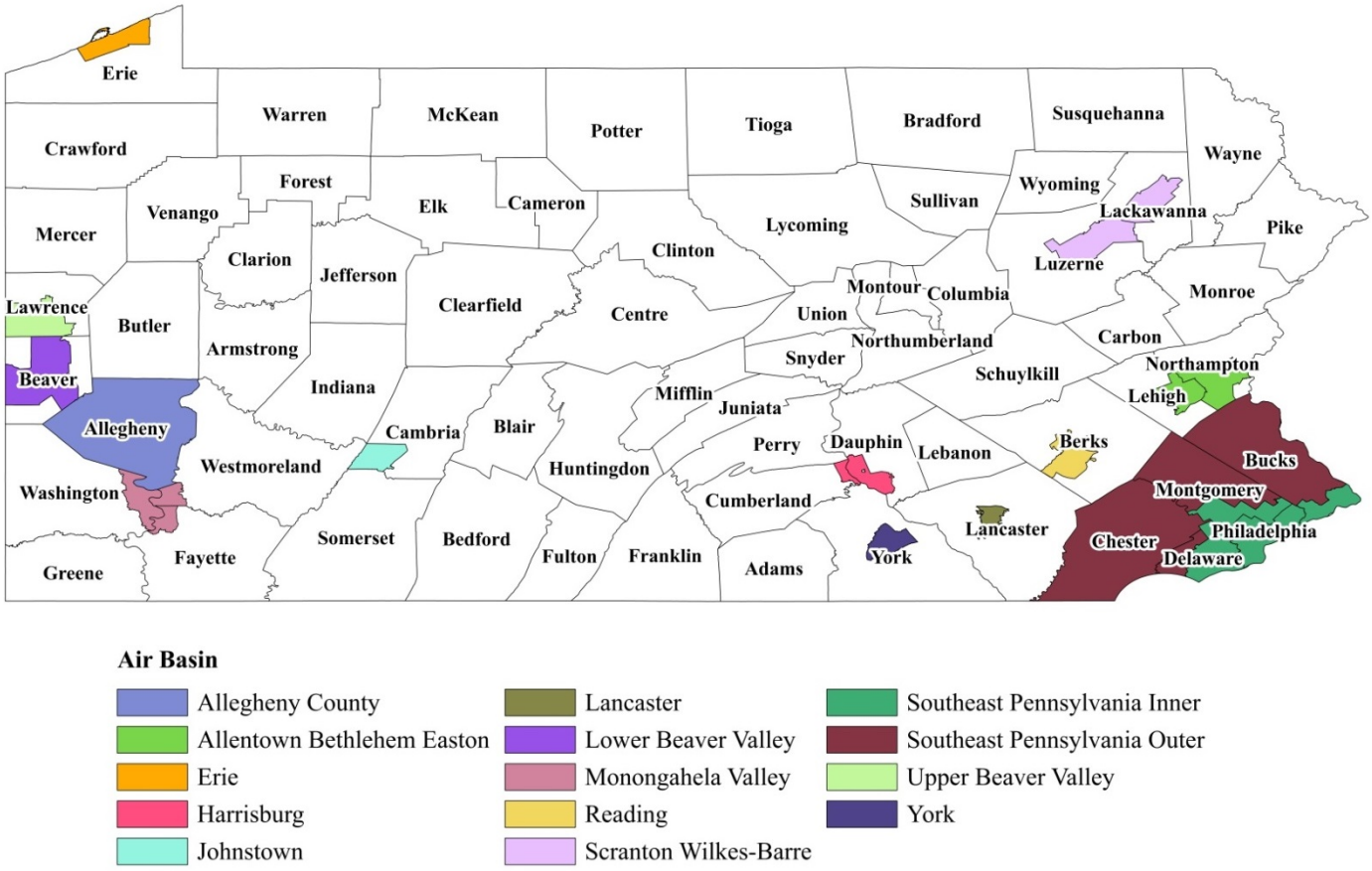


Legend:

MSA		Population	MSA		Population
	Allentown-Bethlehem-Easton, PA-NJ	832,327		New York-Newark-Jersey City, NY-NJ-PA	20,182,305
	Altoona, PA	125,593		Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	6,069,875
	Bloomsburg-Berwick, PA	85,229		Pittsburgh, PA	2,353,045
	Chambersburg-Waynesboro, PA	153,638		Reading, PA	415,271
	East Stroudsburg, PA	166,397		Scranton--Wilkes-Barre--Hazleton, PA	558,166
	Erie, PA	278,045		State College, PA	160,580
	Gettysburg, PA	102,295		Williamsport, PA	116,048
	Harrisburg-Carlisle, PA	565,006		York-Hanover, PA	442,867
	Johnstown, PA	136,411		Youngstown-Warren-Boardman, OH-PA	549,885
	Lancaster, PA	536,624		Non-MSA Regions	
	Lebanon, PA	137,067			

In addition to conducting monitoring in the federally defined MSA, almost half of the PA DEP air monitoring stations are located in the "air basins" of the Commonwealth. Air basins as defined in 25 Pa. Code § 121.1 consist of thirteen geographical areas. Figure 2 displays the geographical boundaries of these areas. PA DEP conducts air monitoring surveillance in both air basin and non-air basin regions.

Figure 2. Map of Pennsylvania Air Basins



PA DEP maintains a cooperative agreement with Pennsylvania State University's (PSU) Department of Plant Pathology for ozone monitoring in following areas of the Commonwealth: in State College, Centre County (on the grounds of the PSU arboretum), in the Moshannon State Forest, Clearfield County, and Gleason, Tioga County. PSU uses ozone data collected from this cooperative monitoring effort to determine detrimental effects to Pennsylvania's forests and crops, and to assess ozone transport in rural Pennsylvania. Under the same cooperative agreement, PSU also operates ozone and NO_2 monitors near Towanda, Bradford County to assess air quality downwind of Marcellus shale gas extraction drilling sites and gas compression facilities.

Commonwealth of Pennsylvania's Air Monitoring Network – Sites and Pollutants

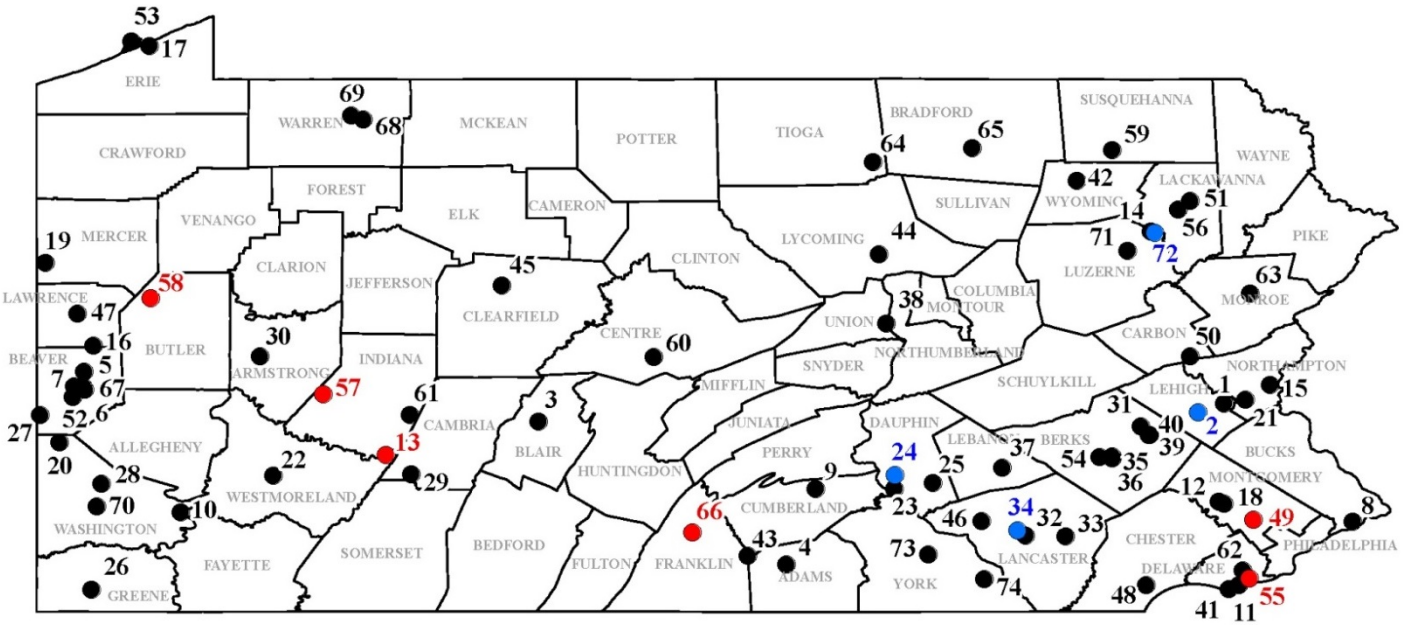
The planned 2016-2017 PA DEP Air Monitoring Network consists of 74 air monitoring stations, located in 42 of the 67 counties in Pennsylvania, and includes ambient air monitoring sites for criteria pollutants, hydrogen sulfide, and air toxics, including VOC. Descriptions of air pollutants are provided in Appendix A of this document. The PA DEP Air Monitoring Network utilizes both continuous and discrete methods of pollutant sampling.

The continuous portion of the PA DEP Air Monitoring Network utilizes a totally automatic, microprocessor-controlled system of remote stations throughout the Commonwealth. Continuous methods employ specialized instruments designed to continuously sample and analyze ambient air *in situ*. The output of these devices is hourly pollutant concentrations. These concentrations are the raw data used to calculate the various pollutant averages needed for NAAQS comparisons. A centralized computer system operated by the Bureau of Air Quality collects the raw data on an hourly basis, enabling near real-time monitoring. PA DEP utilizes continuous methods for the criteria pollutants ozone, sulfur dioxide, nitrogen dioxide, oxides of nitrogen, carbon monoxide, $PM_{2.5}$, and $PM_{10,}$ as well as for hydrogen sulfide and mercury. Various meteorological data from many of the monitoring stations are measured using continuous methods as well, including wind speed, wind direction (vector averaged and sigma theta), ambient temperature, and solar radiation.

The non-continuous portion of the PA DEP Air Monitoring Network utilizes discrete sampling methods for criteria and air toxic pollutants, with analysis of the sample performed off-site at the PA DEP Bureau of Laboratories. A discrete method is generally defined as a "manual" method of sampling for a defined or "discrete" period of time. Discrete sampling includes both filter-based and canister-based sampling. For filter-based sampling, air is actively pumped through a filter substrate, onto which air pollutants are trapped. Canister sampling utilizes vacuum pressure to fill a sampling canister over time. After sampling, the filter or canister is removed from the collection site and analyzed by the PA DEP Bureau of Laboratories in Harrisburg, PA. PA DEP utilizes discrete methods for the criteria pollutants $PM_{2.5}$ and lead, as well as air toxics, including heavy metals and VOC. In addition, PA DEP conducts filter-based $PM_{2.5}$ speciation monitoring at selected sites. Speciation analysis provides a breakdown of $PM_{2.5}$ constituent compounds. Speciation analysis is performed at the Research Triangle Institute (RTI) laboratory in Research Triangle Park, NC.

The map shown in Figure 3 displays the site locations of all ambient air monitoring stations in the PA DEP Air Monitoring Network. Table 3 provides a listing of the parameters monitored at each location. Pursuant to the SO_2 Data Requirements Rule (DRR) promulgated August 21, 2015 (80 FR 51052), additional SO_2 monitoring sites will be added to the PA DEP Air Monitoring Network (see Appendix E of this document). Monitoring sites added pursuant to the SO2 DRR are required to be installed and operational by January 1, 2017. However, because the required sites are not yet finalized, they are not included in Figure 3.

Figure 3. Map of PA DEP Air Monitoring Network



Legend: RED – Site will be discontinued in 2016-2017**; BLUE –** Site to be added in 2016-2017

Map ID	Site Name	Map ID	Site Name	Map ID	Site Name	Map ID	Site Name
1	Allentown	21	Freemansburg	41	Marcus Hook	61	Strongstown
2	**Allentown Near-road**	22	Greensburg	42	Mehoopany	62	Swarthmore
3	Altoona	23	Harrisburg	43	Methodist Hill	63	Swiftwater
4	Arendtsville	**24**	**Harrisburg Near-road**	44	Montoursville	64	Tioga County
5	Beaver Falls	25	Hershey	45	Moshannon	65	Towanda
6	Beaver Valley	26	Holbrook	46	Mt Joy	**66**	**Upper Strasburg**
7	Brighton Twp	27	Hookstown	47	New Castle	67	Vanport
8	Bristol	28	Houston	48	New Garden	68	Warren East
9	Carlisle	29	Johnstown	**49**	**Norristown**	69	Warren Overlook
10	Charleroi	30	Kittanning	50	Palmerton	70	Washington
11	Chester	31	Kutztown	51	Peckville	71	Wilkes Barre
12	Collegeville	32	Lancaster	52	Potter Township	**72**	**Wilkes Barre Near-road**
13	**Conemaugh**	33	Lancaster Downwind	53	Presque Isle	73	York
14	Duryea	**34**	**Lancaster Near-road**	54	Reading Airport	74	York Downwind
15	Easton	35	Laureldale North	**55**	**Ridley Park**	---	**Clarion County**
16	Ellwood City	36	Laureldale South	56	Scranton	---	**Fayette County**
17	Erie	37	Lebanon	**57**	**Shelocta**	---	**Indiana County**
18	Evansburg United Methodist	38	Lewisburg	**58**	**Slippery Rock**	---	**Jefferson County**
19	Farrell	39	Lyons Boro	59	Springville	---	**Lycoming County**
20	Florence	40	Lyons Park	60	State College	---	**McKean County**

Table 3. PA DEP Air Monitoring Network Sites and Parameters Monitored

Site Name	Criteria Pollutants								Non-criteria	Air Toxics			
	Ozone	Sulfur Dioxide	Nitrogen Dioxide	Carbon Monoxide	$PM_{2.5}$	$PM_{2.5}$ Speciation	PM_{10}	Lead	H_2S	VOC	Carbonyls	Metals	Mercury
Allentown	X				X		X						
Allentown (NR)			**(add)**										
Altoona	X	X			X		X						
Arendtsville	X	X	X	X	X					X	X		
Beaver Falls	X		X		X		X			**(disc)**			
Beaver Valley								X		**(add)**		X	
Brighton Twp	X	X											
Bristol	X	**(disc)**											
Carlisle					X								
Charleroi	X	X	X		X					X			
Chester	X	X	X		X	X		X		X		X	
Collegeville										X			
Conemaugh (disc)								**(disc)**					
Duryea								X					
Easton	X	X							X				
Ellwood City								X				X	
Erie	X	**(disc)**	X	X	X	X	X						
Evansburg United Methodist										X			
Farrell	X				X								
Florence	X	X			X	X							
Freemansburg	X		X		X	**(disc)**				**(disc)**			
Greensburg	X				X	X				X			
Harrisburg	X				X								
Harrisburg (NR)			**(add)**										
Hershey	X						X						
Holbrook	X	**(disc)**			X								
Hookstown	X	X											
Houston			X							X	X		
Johnstown	X	X	X	X	X	X	X						
Kittanning	X				X								
Kutztown	X												
Lancaster	X				X	X	X			X	X	X	X
Lancaster (NR)			**(add)**										
Lancaster Downwind	X				X	**(add)**							
Laureldale North								X					
Laureldale South								X					
Lebanon	X				X								
Lewisburg										X		X	
Lyons Boro								X					
Lyons Park								X					
Marcus Hook					X	X				X			
Mehoopany					**(add)**					X			

Table 3. PA DEP Air Monitoring Network Sites and Parameters Monitored (cont.)

Site Name	Criteria Pollutants								Non-criteria	Air Toxics			
	Ozone	Sulfur Dioxide	Nitrogen Dioxide	Carbon Monoxide	$PM_{2.5}$	$PM_{2.5}$ Speciation	PM_{10}	Lead	H_2S	VOC	Carbonyls	Metals	Mercury
Methodist Hill	X												
Montoursville	X						X						
Moshannon	X												
Mt Joy								X					
New Castle	X	X											
New Garden	X				X	X							
Norristown (disc)	**(disc)**	**(disc)**											
Palmerton								X					
Peckville	X												
Potter Township								X					
Presque Isle										X		X	
Reading Airport	X	X			X					X		X	
Ridley Park (disc)								**(disc)**					
Scranton	X		X	X	X								
Shelocta (disc)								**(disc)**					
Slippery Rock (disc)										**(disc)**		**(disc)**	
Springville					**(add)**					X			
State College	X	X	X		X								
Strongstown	X	X											
Swarthmore										X		X	
Swiftwater	X				X								
Tioga County	X		X		X								
Towanda	X		X		X								
Upper Strasburg (disc)								**(disc)**					
Vanport								X					
Warren East		X							X				
Warren Overlook		X											
Washington	X				X								
Wilkes Barre	X	X					X						
Wilkes Barre (NR)			**(add)**										
York	X	X	X	X	X					X			
York Downwind	X												
Clarion County					**(add)**								
Fayette County					**(add)**								
Indiana County					**(add)**								
Jefferson County					**(add)**								
Lycoming County					**(add)**								
McKean County					**(add)**								
Totals	***41***	***17***	***17***	***5***	***37***	***9***	***9***	***12***	***2***	***17***	***3***	***8***	***1***

(disc) = Site/Monitor will be discontinued in 2016-2017 **(add)** = Site/Monitor will be added in 2016-2017

(NR) = NO_2 Near-road site. U.S. EPA has proposed to remove the requirement for these monitoring sites (see the "Near-road NO_2 Site Installation Plan" section of this document)

Changes to Monitoring Sites and Monitors in 2015-2016

The Department has completed several modifications to its air monitoring network in the 2015-2016 time period. Those changes are briefly described below in Table 4.

Table 4. Summary of Changes to the PA DEP Air Monitoring Network in 2015-2016

Site Relocation
1) Relocated Ellwood City (Lawrence County) monitoring site from the Heraeus facility to a location approximately 850 feet west of the former Heraeus facility location
Monitor Relocation
2) $PM_{2.5}$ – Relocated $PM_{2.5}$ monitor from Lehigh Valley (Northampton County) to existing Allentown (Lehigh County) site
Discontinued Monitors in Criteria Pollutant Monitoring Networks
1) NO_2 – Discontinued NO_2 monitoring at Bristol (Bucks County), Lancaster (Lancaster County) and Reading Airport (Berks County) 2) CO – Discontinued CO monitoring at Charleroi (Washington County) 3) $PM_{2.5}$ – Discontinued $PM_{2.5}$ monitoring at Bristol (Bucks County) and Norristown (Montgomery County) 4) PM_{10} – Discontinued PM10 monitoring at Charleroi (Washington County), Chester (Delaware County), Nazareth (Northampton County), New Castle (Lawrence County),and York (York County)
Modifications to the $PM_{2.5}$ Network
1) Installed $PM_{2.5}$ monitors in Holbrook (Greene County) and Towanda (Bradford County)
Modifications to the Air Toxics Network
1) Discontinued carbonyl sampler at Lewisburg (Union County) 2) Installed PM_{10} monitor at Ellwood City (Lawrence County) for metals sampling

Site Relocation

Following approval of the U.S. EPA, PA DEP moved its Ellwood City (Beaver County) site, due to changes with the property lease holder. The Ellwood City monitoring site was established in 2010 as the source-oriented lead monitor for INMETCO, a heavy metals recovery facility. The Ellwood City monitoring site was formerly located on property owned by Heraeus Electro-Nite, in the Robert P. Casey Industrial Park in Ellwood City, PA. In March 2016, the Heraeus facility closed, and in April 2016, PA DEP relocated the Ellwood City monitoring station to private property approximately 850 feet east of its original location. Due to the proximity of the new location to the former location, EPA approved the retention of existing site identification code in its AQS system.

Monitor Relocation

PA DEP discontinued the Lehigh Valley (Northampton County) monitoring site December 31, 2015, and relocated the $PM_{2.5}$ FRM monitor to its multipollutant monitoring site in Allentown (Lehigh County). $PM_{2.5}$ was monitored at Allentown from 1999 to 2005 but PM2.5 monitoring was terminated at that site due to federal funding cuts. In recent years, the Lehigh Valley has undergone significant development in manufacturing, processing and warehousing, including center city Allentown and regions west. This monitor relocation will allow PA DEP to characterize $PM_{2.5}$ impacts from growing development in, and at points west of, the city of Allentown.

The Allentown-Bethlehem-Easton MSA consists of Carbon, Lehigh and Northampton Counties in Pennsylvania, as well as Warren County, New Jersey. Because Pennsylvania encompasses the majority of the MSA, both in population and land area, PA DEP relies upon monitors contained in its air monitoring network to fulfil minimum monitoring requirements in this MSA. PA DEP operates one other $PM_{2.5}$ monitor in the Allentown-Bethlehem-Easton MSA, at its Freemansburg site in Northampton County. With the move of the $PM_{2.5}$ sampler from Lehigh Valley to Allentown, the total number of $PM_{2.5}$ monitoring sites in the Allentown-Bethlehem-Easton MSA is unchanged, and minimum monitoring requirements in the MSA continue to be met. A detailed rationale for the relocation of this monitor was included in PA DEP's 2015 Annual Air Monitoring Network Plan.

Discontinued Monitors in Criteria Pollutant Monitoring Networks

Following U.S. EPA approvals, PA DEP discontinued the following SLAMS monitors in 2015:

- NO_2 – Bristol (Bucks County), Lancaster (Lancaster County) and Reading Airport (Berks County)
- CO – Charleroi (Washington County)
- $PM_{2.5}$ – Bristol (Bucks County) and Norristown (Montgomery County)
- PM_{10} – Charleroi (Washington County), Chester (Delaware County), Nazareth (Northampton County), New Castle (Lawrence County) and York (York County)

Pollutant concentrations measured at these sites were well below the relevant NAAQS, and not required to support NAAQS compliance, air quality modeling or air quality forecasting activities. PA DEP discontinued these monitors December 31, 2015. With the discontinuation of these monitors, PA DEP remains able to adequately characterize the regions or MSAs formerly containing these monitors. Detailed rationales for these monitor removals were included in PA DEP's 2015 Annual Air Monitoring Network Plan.

Modifications to the $PM_{2.5}$ Network

PA DEP installed $PM_{2.5}$ continuous BAM monitors at its monitoring sites in Holbrook (Greene County) and Towanda (Bradford County). These monitors started January 1, 2016, and are operated as SLAMS monitors, using federally-approved equivalent methods. PA DEP installed these monitors as part of its $PM_{2.5}$ network expansion into areas with increased unconventional shale gas activities. PA DEP's $PM_{2.5}$ network expansion is fully detailed under "Modifications to Air Monitoring Network: Marcellus Shale Development", contained in the next section of this document.

Modifications to the Air Toxics Network

On December 31, 2015, PA DEP discontinued monitoring for carbonyl compounds at the Lewisburg air toxics monitoring site at Bucknell University. Ambient concentrations of carbonyl compounds were consistently low at this site, and not indicative of being dominated by a single source. For these reasons, PA DEP determined that continued carbonyl sampling was unnecessary.

In April 2016, PA DEP installed a PM_{10} monitor at its Ellwood City (Beaver County) monitoring site, to provide samples for metals analysis. Results from previous toxics metals screening methods performed at this site showed elevated levels of cadmium. PA DEP installed the more analytically-precise quartz filters and PM_{10} sampling method better characterize the levels of cadmium measured at this site. The PM_{10} samplers collect smaller-sized particles (less than 10 microns in diameter) and better represent the respirable size fraction that more directly impacts human health. In addition, using quartz filters allows the Department to receive results from the lab that have a lower limit of quantification and reporting than the TSP samplers and glass filters used for the screening method.

Site and Monitoring Activity Anticipated within the Next 18 Months

PA DEP is making numerous changes to its air monitoring network over the next eighteen months. These changes are summarized below in Table 5. In addition to the changes included in this section, the establishment of new SO_2 monitoring sites to characterize maximum 1-hour ambient SO_2 concentrations pursuant to the SO_2 Data Requirements Rule is discussed in Appendix E of this document.

Table 5. Summary of Changes to the PA DEP Air Monitoring Network 2016-2017

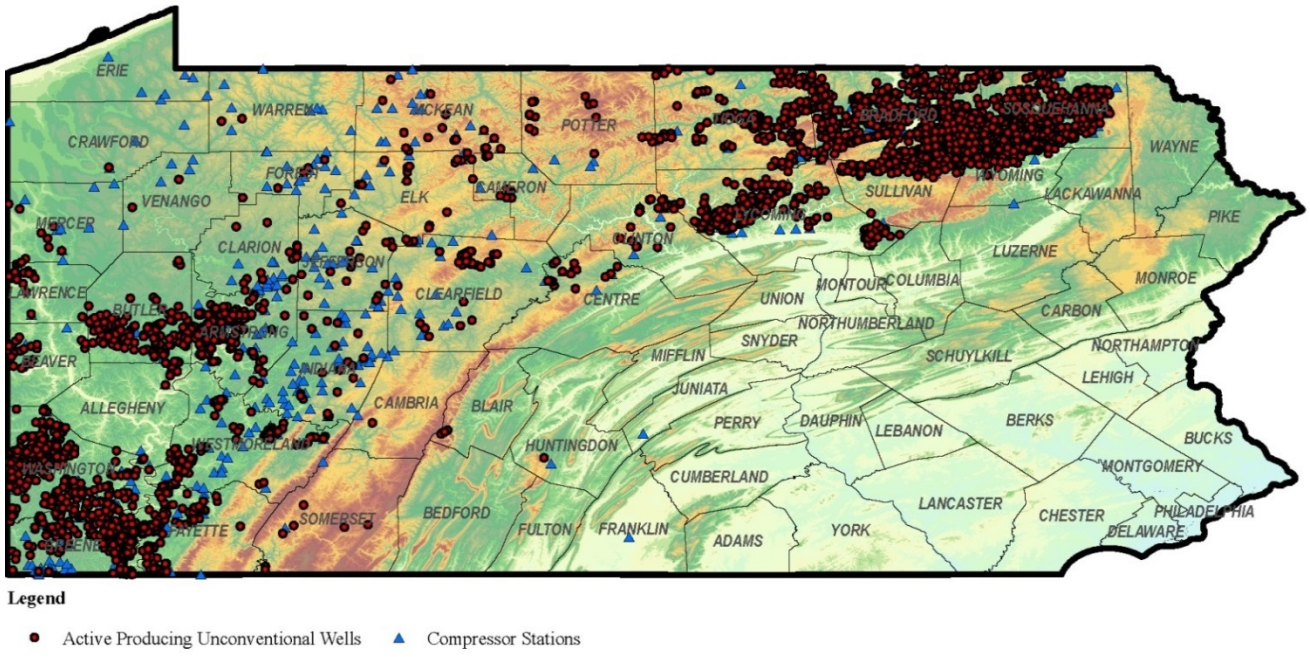
Changes Relating to Natural Gas Extraction and Processing Activities in Marcellus Shale Regions
1) Establish new SLAMS multipollutant monitoring site in Fayette County – Ozone, NOx and $PM_{2.5}$, Carbonyls and VOC 2) Expand $PM_{2.5}$ monitoring network to include monitors in Bradford, Clarion, Fayette, Greene, Indiana, Jefferson, Lycoming, McKean, Susquehanna and Wyoming Counties 3) Install carbonyl samplers in Mehoopany (Wyoming County) and Springville (Susquehanna County)
Changes Relating to the Implementation of Near-Road NO_2 Monitoring
1) Install Harrisburg (Dauphin County), Allentown (Lehigh County), Scranton (Lackawanna County) and Lancaster (Lancaster County) *Tentative equipment configuration* – NO_2/NOx, CO, $PM_{2.5}$, BC/Aethalometer, Meteorology / possibly traffic count
Changes Relating to the Annual Assessment of the Ambient Air Quality Monitoring Network
New Sites
1) Ozone – Establish ozone monitoring sites in Gettysburg (Adams County) and Chambersburg (Franklin County)
Site Terminations
1) Discontinue Norristown (Montgomery County) monitoring station 2) Discontinue lead monitoring at Conemaugh (Westmoreland County), Ridley Park (Delaware County), Shelocta (Indiana County) and Upper Strasburg (Franklin County)
Modifications to the SO_2 Network
1) Discontinue SO_2 monitoring at Bristol (Bucks County), Norristown (Montgomery County), Erie (Erie County) and Holbrook (Greene County)
Modifications to the $PM_{2.5}$ Speciation Network
1) Perform $PM_{2.5}$ speciation monitoring at the Lancaster Downwind (Lancaster County) site 2) Discontinue $PM_{2.5}$ speciation monitoring at the Freemansburg (Northampton County) site
Modifications to the Air Toxics Network
1) Relocate Swarthmore (Delaware County) monitoring site to nearby location due to building demolition 2) Relocate VOC sampling from Beaver Falls (Beaver County) site to Beaver Valley (Beaver County) site 3) Discontinue TSP-Metals and VOC sampling at Slippery Rock (Butler County) 4) Discontinue VOC sampling at Freemansburg (Northampton County 5) Replace all TSP-based metals sampling with a PM_{10}-based method; Add Antimony, Selenium and Cobalt to analyte suite
Changes Currently Being Evaluated by PA DEP
Site Relocations
1) Ozone – Moshannon (Clearfield County) – To a location more representative of Marcellus Shale activity? 2) Ozone – York Downwind (York County) – To a location actually downwind of York City? 3) $PM_{2.5}$ – Lancaster Downwind (Lancaster County) – To a location not influenced by local sources?

Modifications to Air Monitoring Network: Marcellus Shale Development

The Marcellus Shale Formation, which extends from New York into Pennsylvania, Maryland, Ohio, Virginia, and West Virginia, and covers approximately 95,000 square miles, is the most expansive shale gas play in the United States. The Marcellus play located within the borders of Pennsylvania is one of the most active shale plays in terms of drilling, with operations primarily in the southwest, northcentral and northeast portions of the state.

The extraction and processing of natural gas from Marcellus Shale involves many stages and provides many opportunities for the release of air pollutants during the process. The major stages and infrastructure involved in natural gas extraction and processing include: pad, impoundment and road construction; drilling; fracturing; flaring; condensate tanks; compressor stations; and gas processing facilities. In recent years, the number of Marcellus Shale wells drilled in Pennsylvania has rapidly increased. In 2008, the number of wells drilled to tap Marcellus Shale gas was 195. In 2015, unconventional gas wells in Pennsylvania numbered well over 6,500, associated with over 400 compressor stations. Figure 4 displays and overview of active producing unconventional gas wells, as well as compressor stations in Pennsylvania, in 2015.

Figure 4. Active Unconventional Gas Wells and Compressor Stations in 2015, Pennsylvania State-wide



Over the past several years, PA DEP has received multiple public comments on its annual air monitoring network plans, expressing concern over short term exposure to pollutants in relation to shale gas activities and the effect on susceptible populations including children, or those with respiratory difficulties. In addition, there has been an increase in the number of complaints to PA DEP's regional offices concerning Marcellus Shale operations.

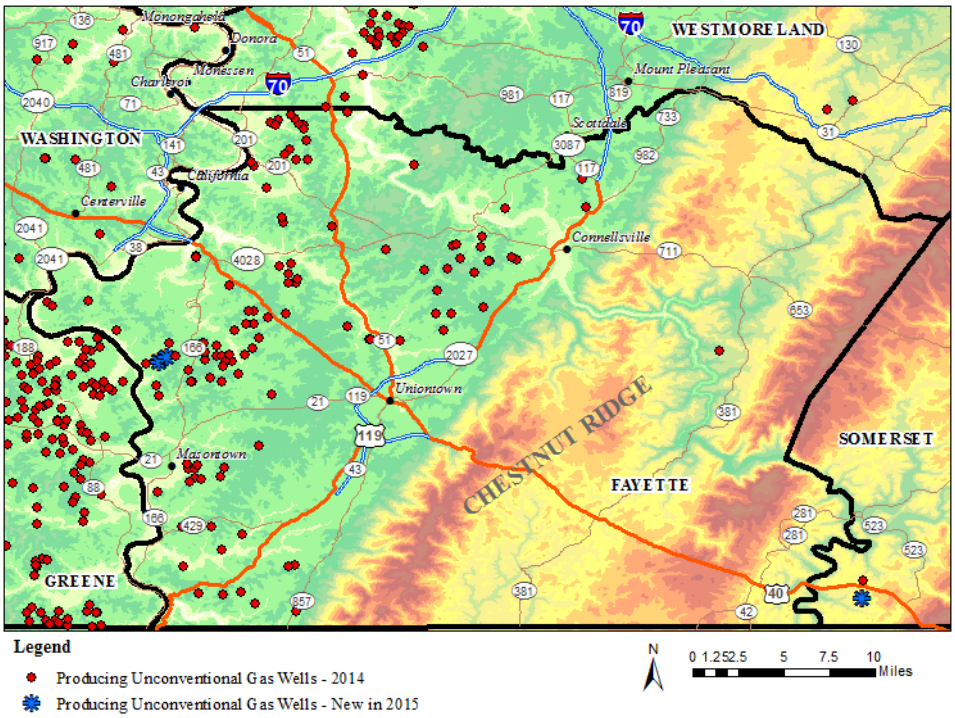
In response to the growing development of Marcellus shale gas activities and concerns about the impact of these activities on air quality, PA DEP continues to increase its ambient air monitoring in regions of growing natural gas extraction and production related to the Marcellus Shale formation. PA DEP plans to establish new monitoring sites, as well as install additional monitors in existing sites, in active Marcellus Shale regions of the state. These modifications include the following:

1) Establishment of new multipollutant monitoring site in Fayette County – Ozone, NOx, $PM_{2.5}$, Carbonyls and VOC
2) Expansion of $PM_{2.5}$ monitoring network
3) Addition of carbonyl samplers at Mehoopany and Springville

Establish New Monitoring Site in Fayette County

As outlined in its 2015 Annual Ambient Air Monitoring Network Plan, PA DEP will establish a new ambient air monitoring site in Fayette County, west of Uniontown, PA. This location west of the elevated terrain of the Chestnut Ridge bifurcation should allow for the capture of air quality impacts originating from the western portion of Fayette County, where gas production is concentrated. The current planned equipment configuration includes monitors for ozone, NO_2, $PM_{2.5}$, carbonyls and VOC. Figure 5 displays unconventional gas development in Fayette County between January 2014 and February 2015. PA DEP intends to establish this site by the end of 2016.

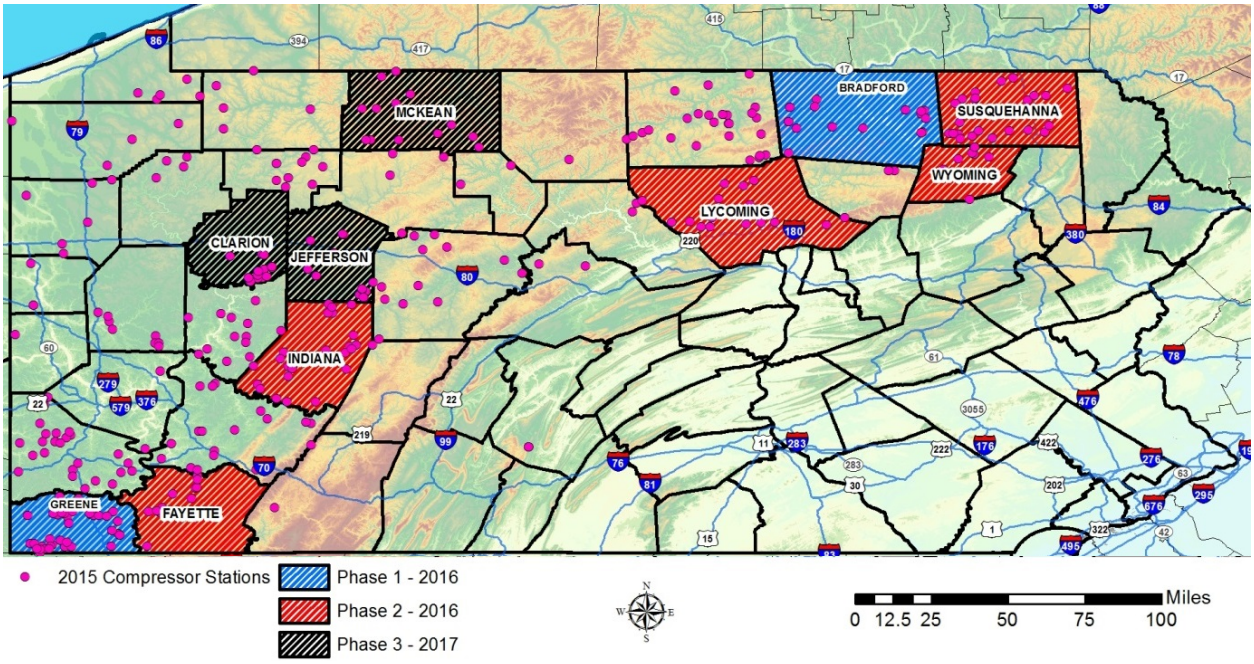
Figure 5. Unconventional Gas Wells in Fayette County, 2014-2015



Expansion of PA DEP $PM_{2.5}$ Monitoring Network

As noted in its 2015 ANP, PA has been evaluating the current complement of $PM_{2.5}$ monitoring locations with respect to shale gas activities. In response to public concerns, PA DEP has committed to installing ten $PM_{2.5}$ monitors over the next two years, in counties that have a high frequency of compressor stations but do not have a current $PM_{2.5}$ monitoring site. PA DEP will operate these monitors as SLAMS monitors, using FEM continuous method monitors. Figure 6 illustrates the counties in which PA DEP plans on expanding its $PM_{2.5}$ monitoring network, in relation to the locations of gas compressor stations.

Figure 6. Planned Expansion of PA DEP $PM_{2.5}$ Monitoring Network



New monitoring stations will be sited according to all pertinent regulations set forth in 40 CFR Part 58. PA DEP plans to have seven of the total ten sites operating by the end of 2016, with the three remaining locations in operation by the fall of 2017. Table 6 lists the planned schedule for the establishment of additional $PM_{2.5}$ monitoring sites and the counties included. As noted in the previous section, $PM_{2.5}$ monitors have already been installed at the Towanda and Holbrook sites.

Table 6. Schedule for Expansion of PA DEP $PM_{2.5}$ Monitoring Network

County	Site	Installation Date
Bradford	Installed at Towanda (420150011)	Start date 1/1/2016
Greene	Installed at Holbrook (420590002)	Start date 1/1/2016
Fayette	Site to be determined	By end of 2016
Indiana	Site to be determined	By end of 2016
Lycoming	Site to be determined	By end of 2016
Susquehanna	Springville (421150001), upon relocation of site	By end of 2016
Wyoming	Mehoopany (421310001), upon relocation of site	By end of 2016
Clarion	Site to be determined	By end of 2017
Jefferson	Site to be determined	By end of 2017
McKean	Site to be determined	By end of 2017

Add Carbonyl Samplers at Mehoopany (Wyoming County) and Springville (Susquehanna County)

In order to enhance air toxics monitoring at sites possibly impacted by shale gas activities, PA DEP will install carbonyl samplers at its existing Mehoopany (Wyoming County) and Springville (Susquehanna County) VOC monitoring sites. These two sites will also be relocated in their respective counties, in order to accommodate the shelters needed to house the $PM_{2.5}$ samples that will be added, as discussed in the previous section.

Near-road NO_2 Site Installation Plan

On February 9, 2010, the U.S. EPA strengthened the National Ambient Air Quality Standards for nitrogen dioxide by establishing a new one-hour NO_2 NAAQS of 100 ppb based on the 3-year average of the 98th percentile of yearly maximum concentration (75 FR 6474). In addition to making the NAAQS more stringent, the 2010 NO_2 NAAQS requires NO_2 monitors to be installed in regions containing high populations and/or heavily-traveled roads or highways.[2] To meet minimum monitoring requirements, at least one near-road NO_2 monitor is required in MSAs with populations exceeding 500,000. MSAs with populations greater than 2,500,000 persons, or with populations greater than 500,000 and containing a road segment with an Average Annual Daily Traffic (AADT) count of 250,000 or greater, are required to have more than one near-road NO_2 monitor.

On May 16, 2016, U.S. EPA proposed revisions to the minimum monitoring requirements for near-road NO2 monitors. The proposal removes the existing requirement for near-road NO_2 monitoring stations in Core Based Statistical Areas (CBSAs) having populations between 500,000 and 1,000,000 persons. These monitors were due to be installed and operational by January 1, 2017 (81 FR 30224). Current near-road NO_2 monitoring data in more-heavily populated areas nationwide have indicated NO_2 concentrations well below the NO_2 NAAQS. Due to the relationship between population, traffic, and expected NO_2 concentrations in the near-road environment, U.S. EPA has determined that near-road NO_2 concentrations measured in less populated areas, would likely result in even lower concentrations than what is being measured in larger urban areas. For this reason, U.S. EPA is proposing to revoke the requirement for near-road NO_2 monitoring stations in CBSAs having populations between 500,000 and 1 million persons. The public comment period on U.S. EPA's proposal will end on June 30, 2016.

In the event that U.S. EPA's proposed NO_2 near-road monitoring rule is not finalized, PA DEP will install NO_2 near-road monitoring sites in four MSAs with populations between 500,000 and 1 million persons – Allentown-Bethlehem-Easton, Harrisburg-Carlisle, Lancaster and Scranton-Wilkes-Barre-Hazleton. Table 7 displays the population and maximum AADT for these four MSAs.

Table 7. Near-road NO_2 Minimum Monitoring Requirements

MSA	2015 Population Estimate	2014 Max AADT Estimate	No. of Required Monitors
Allentown-Bethlehem-Easton, PA-NJ	832,327	89,000	1
Harrisburg-Carlisle, PA	565,006	123,000	1
Lancaster, PA	536,624	109,000	1
Scranton-Wilkes-Barre-Hazleton, PA	558,166	75,000	1

When the sites are installed, they tentatively will be configured with NO_x, CO, $PM_{2.5}$, BC/Aethalometer and meteorology. The Department is also investigating traffic count technology for possible inclusion at these sites. Proposed site locations were chosen according to guidelines found in EPA's Near Road NO_2 Monitoring Technical Assistance Document, published in June 2012, and according to siting criteria specified in 40 CFR Part 58, Appendix E.

[2] 40 CFR Part 58, Appendix D §4.3

The Harrisburg NO_2 near-road monitor will be sited along the Interstate 81 corridor between the Interstate 83 split and the U.S. Route 322 interchange, somewhere close to the Progress Ave exit, on the north side of the highway (Figures 7 and 8).

Figure 7. Location of the Harrisburg NO_2 Near-Road Monitoring Site

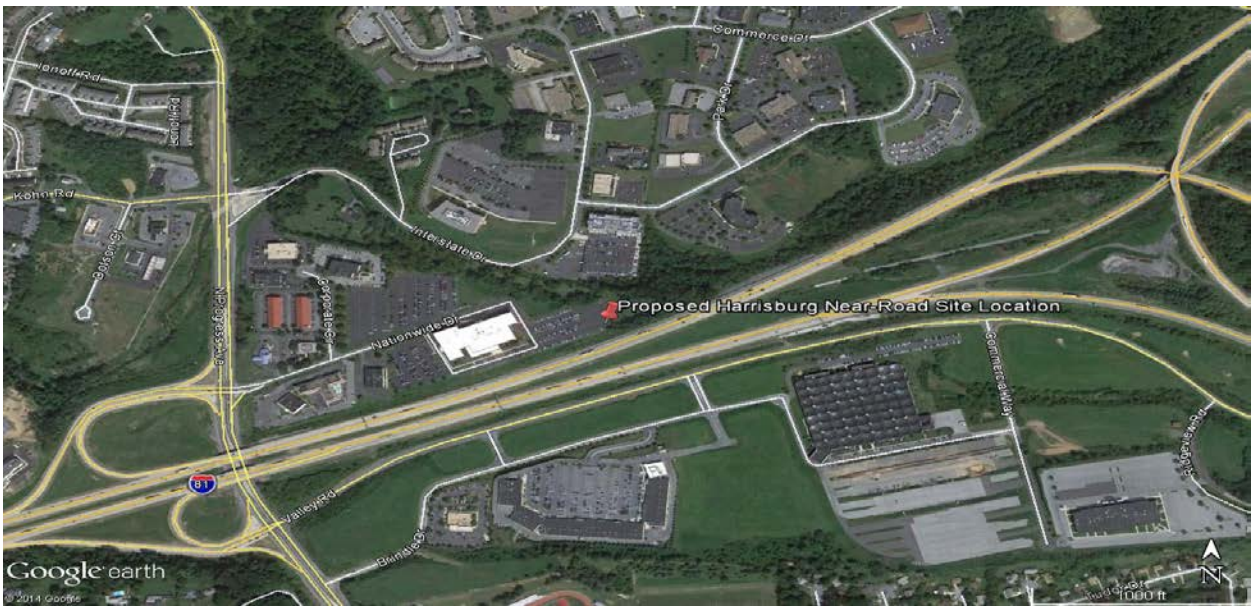


Figure 8. Location across Interstate 81 from the Expected Location of Harrisburg NO_2 Near-Road Monitoring Site - Looking West

The Allentown NO_2 near-road monitor will be placed at property near the U.S. Route 222 Exit (Hamilton Blvd) (Figures 9 and 10).

Figure 9. Location for the Allentown NO_2 Near-Road Monitoring Site

Figure 10. Location of the Allentown NO_2 Near-Road Monitoring Site – Looking East

The Lancaster NO_2 near-road monitor will be installed at property near the U.S. Route 30 and PA 283 interchange approximately 2.5 miles north of Lancaster (Figures 11 and 12).

Figure 11. Location for the Lancaster NO_2 Near-Road Monitoring Site

Figure 12. Location of the Lancaster NO_2 Near-Road Monitoring Site – Looking North

Finally, the Scranton-Wilkes-Barre NO_2 near-road monitor will be placed at the end of Plane Street close to the northbound lanes of Interstate 81 (Figures 13 and 14).

Figure 13. Location for the Scranton NO_2 Near-Road Monitoring Site

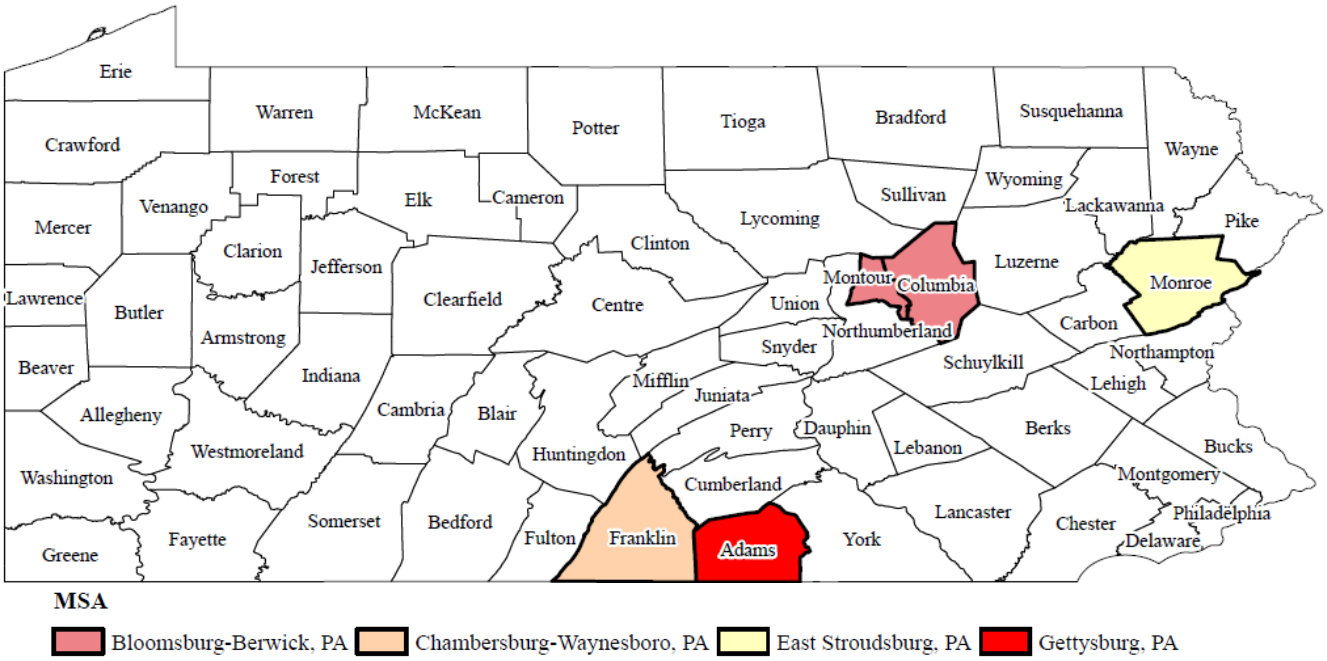
Figure 14. Location of the Scranton NO_2 Near-Road Monitoring Site – Looking West

New Air Quality Monitoring Sites for Ozone Monitoring

1) Establishment of new ozone monitoring site in the Chambersburg MSA
2) Establishment of new ozone monitoring site in the Gettysburg MSA

On March 14, 2013, the Census Bureau released the "Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas, and Combined Statistical Areas" document, which defines Metropolitan Statistical Areas (MSAs) and their boundaries. In the 2013 revision, four new MSAs were created in Pennsylvania – two MSAs in northeastern PA and two MSAs in southcentral PA. The four new MSAs are highlighted in Figure 15 below

Figure 15. Four New Pennsylvania MSA in 2013



The minimum number of ozone monitors required by 40 CFR Part 58, Appendix D is based on a combination of population and existing monitoring data, where available. Table 8 displays the minimum monitoring requirements for the four MSAs, using the most currently available data.

Table 8. Four New Pennsylvania MSAs in 2013

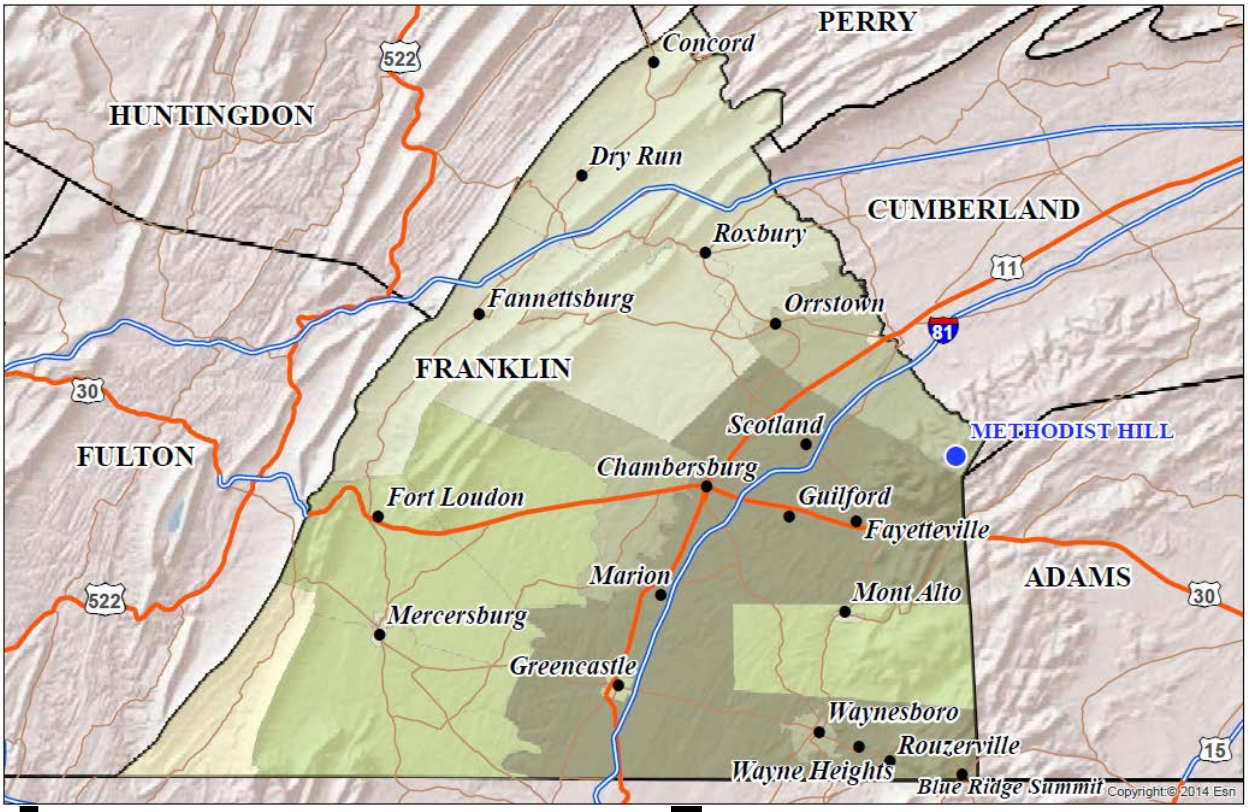
MSA	2015 Estimate Population	2015 Maximum Design Value	No. of Monitors Required	No. of SLAMS Monitors
Bloomsburg-Berwick MSA	85,229	#N/A	0	0
Chambersburg-Waynesboro MSA	153,638	64	1	1
East Stroudsburg MSA	166,397	63	0	1
Gettysburg MSA	102,295	65	1	2*
* Includes EPA CASTNET site at Arendtsville, PA. In January 2013, EPA provided notice that all ozone monitors at CASTNET sites were upgraded to comply with 40 CFR Part 58, and that data collected from these monitors will be used for NAAQS purposes, beginning with the 2011-2013 ozone monitoring season				

As shown in Table 8, the current ozone monitoring network meets the minimum monitoring requirements in these MSAs. However, with the categorization of these areas as MSAs, PA DEP will add one additional ozone monitor in both the Chambersburg and Gettysburg MSAs in locations better suited to population based monitoring. PA DEP tentatively plans to establish these sites by the end of 2017, as funding and staff resources allow.

Establish New Site in the Chambersburg MSA

PA DEP currently operates the Methodist Hill (Franklin County) in the Chambersburg MSA. This monitor is sited to be representative of transport concentrations and is sited on elevated terrain. In addition, the sample inlet probe is sited at the top end of the 2-15 meter range required by 40 CFR Part 58, Appendix E for SLAMS monitoring. With the creation of the Chambersburg-Waynesboro MSA, PA DEP will establish an additional monitoring site to be more representative of population exposure in Franklin County. Figure 16 displays the 2010 population density in Franklin County.

Figure 16. Population Density in Franklin County, PA

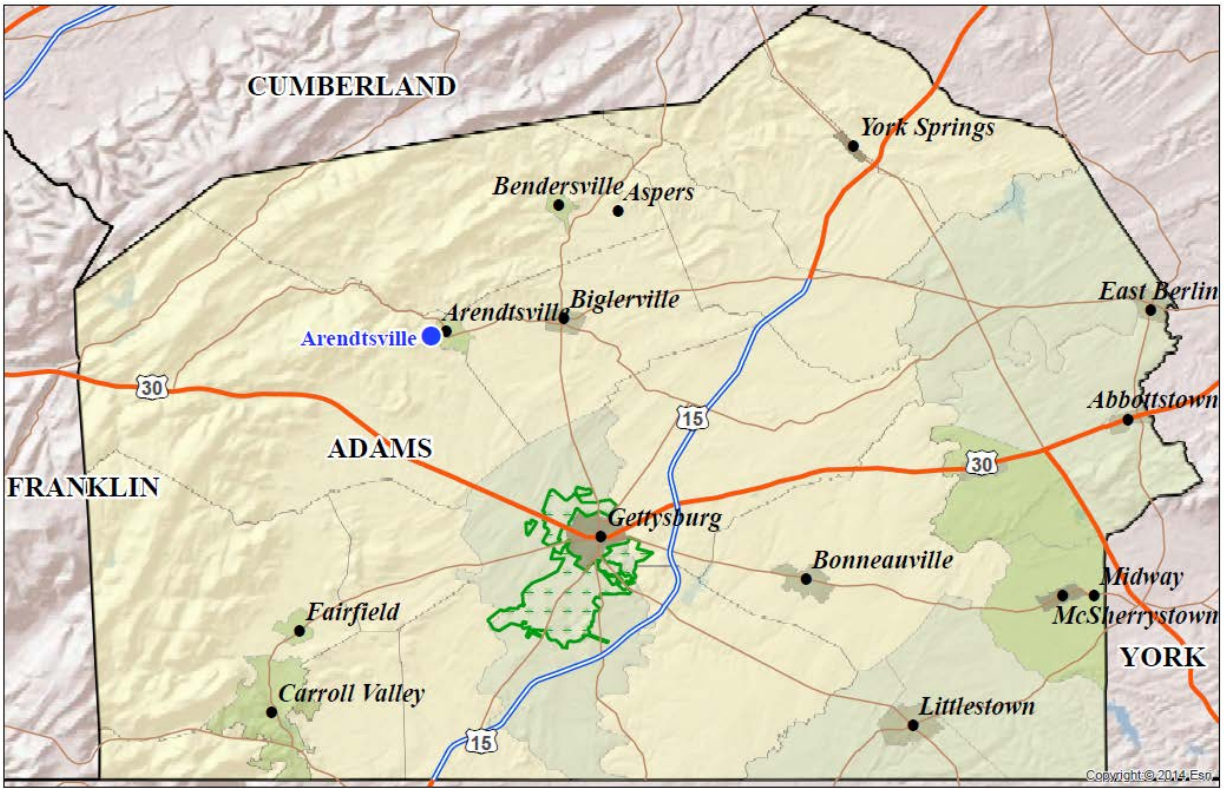


With more than 20,000 persons per square mile,[3] the Borough of Chambersburg is the most densely populated region in Franklin County. PA DEP plans to establish a monitoring site near this region.

Establish New Site in the Gettysburg MSA

In November 2014, the PA DEP installed an ozone monitor at the Arendtsville (Adams County) site. This monitor was installed to enhance the site's role as a regional background monitoring site, and to allow PA DEP to correlate measurements with the adjacent CASTNET Arendtsville site, maintained by EPA and the National Park Service. The CASTNET program was designed to provide long-term monitoring of air quality in rural area, to determine trends in regional atmospheric pollutant concentrations. Figure 17 displays the Arendtsville monitoring site, in relation to the 2010 population distribution in Adams County. With the establishment of the Gettysburg MSA, PA DEP plans to establish an additional ozone monitoring site near Gettysburg, PA to be more representative of population exposure in the MSA.

Figure 17. Population Density in Adams County, PA



[3] 2010 Census; Population density statistics are available from American Factfinder at http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

At approximately 5,900[4] persons per square mile, the McSherrystown Borough, located in southeastern Adams County, has the highest population per land area in the county. The next most densely populated area is the borough of Gettysburg, located in the central portion of the county, at approximately 4,600[4] persons per square mile. However, Adams County receives over 3.75 million visitors each year, and the most popular destination for these visitors is the Gettysburg National Military Park, surrounding the borough of Gettysburg. The height of the tourist season occurs in June – October, corresponding to the ozone monitoring season (April - October). The large influx of motor vehicles during these summer months increases the concentrations of ozone precursors, NOx and VOC, available for ozone formation. By locating a monitoring station downwind of this region, PA DEP should be able to capture the impact of this region on ambient ozone concentrations.

[4] 2010 Census; Population density statistics are available from American Factfinder at http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

Site Terminations

1) Discontinue Norristown (Montgomery County) monitoring site – Ozone and SO_2
2) Discontinue lead monitoring at the Conemaugh (Westmoreland County), Ridley Park (Delaware County), Shelocta (Indiana County) and Upper Strasburg (Franklin County) sites

40 CFR Part 58.14 allows for monitoring site discontinuation at the discretion of the U.S. EPA Regional Administrator as follows:

(c) State, or where appropriate, local agency requests for SLAMS monitor station discontinuation, subject to the review of the Regional Administrator […] *may also be approved on a case-by-case basis if discontinuance does not compromise data collection needed for implementation of a NAAQS and if the requirements of appendix D to this part, if any, continue to be met.*

Discontinue Norristown (Montgomery County) Monitoring Site

PA DEP intends to discontinue the Norristown site, as the data collected from this site is either redundant or well below the NAAQS, and not needed to support NAAQS compliance.

Norristown Ozone Monitoring

The Norristown (Montgomery County) monitoring site is located within the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA. Ozone minimum monitoring criteria set forth in 40 CFR Part 58 Appendix D require a minimum of three ozone monitors to be located within the Philadelphia-Camden-Wilmington MSA. Table 9 provides the ozone minimum monitoring requirement and ozone monitoring sites within the Philadelphia-Camden-Wilmington MSA.

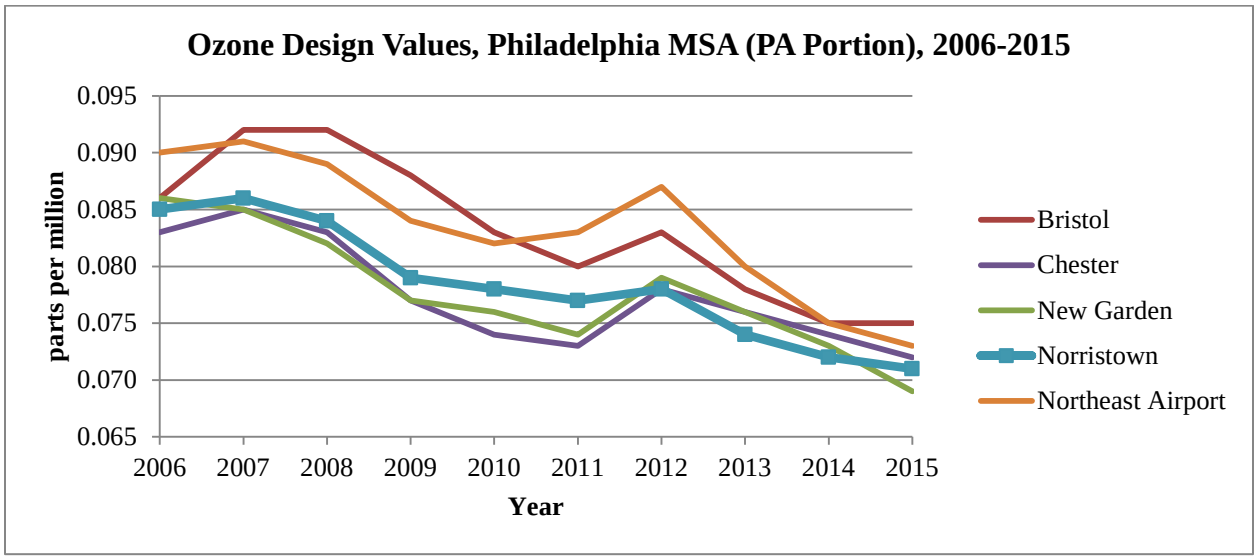
Table 9. Ozone Monitoring Requirements and Monitors in the Philadelphia-Camden-Wilmington MSA

MSA	2015 Population Estimate	Maximum 2014 Design Value in MSA	No. of Monitors Required	PA DEP SLAMS Monitors (2016-17)	Other SLAMS Monitors	Total SLAMS Monitors (2016-17)
Philadelphia-Camden-Wilmington, PA-NJ-DE-ND MSA	6,069,875	77 ppb	3	4 (3)	AMS-3; DE-4; MD-1; NJ-3	15 (14)

The Philadelphia-Camden-Wilmington MSA contains five counties in Pennsylvania – Bucks, Chester, Delaware, Montgomery and Philadelphia – as well as portions of the states of Delaware, New Jersey and Maryland. PA DEP currently operates four ozone monitoring sites within the Pennsylvania portion of the Philadelphia-Camden-Wilmington MSA: Bristol (Bucks County), Chester (Delaware County), New Garden (Chester County) and Norristown. Philadelphia AMS maintains three ozone monitoring sites in Philadelphia County – AMS Laboratory, Northeast Airport and Northeast Waste. A total of eight additional monitors are located in the Delaware, New Jersey and Maryland portions of the MSA. With the discontinuation of the Norristown monitoring site, a total of fourteen ozone monitoring sites remain in the Philadelphia-Camden-Wilmington MSA; as such, the minimum ozone monitoring requirement remains satisfied.

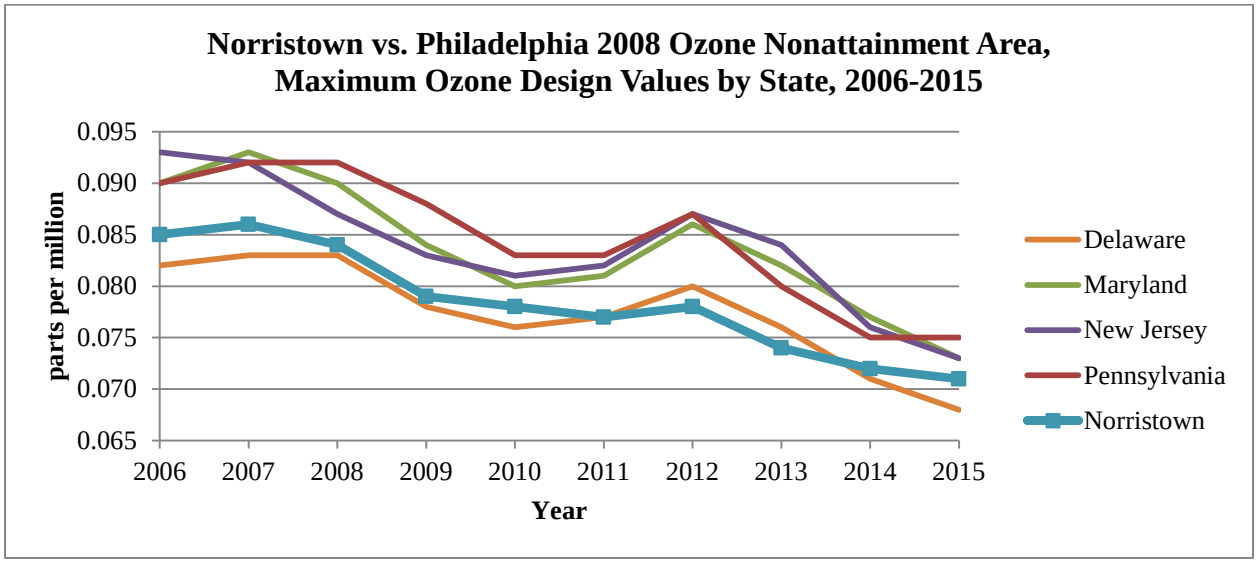
Figure 18 displays valid ozone design values for the Pennsylvanian portion of the Philadelphia-Camden-Wilmington MSA for the previous ten years. As shown, the design values for the ozone monitor in Norristown (Montgomery County) have remained consistently below the design values for the ozone monitor in Bristol (Bucks County), as well as the Northeast ozone monitor operated by Philadelphia AMS.

Figure 18. Ozone Design Values, PA Portion of Philadelphia MSA, 2006-2015



On May 21, 2012 U.S. EPA delineated the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Ozone Nonattainment Area to include all of the Philadelphia-Camden-Wilmington MSA, as well as several additional counties in NJ. Figure 19 displays valid ozone design values for the ozone monitor in Norristown compared to the rest of the Philadelphia-Wilmington-Atlantic City Ozone Nonattainment Area, by state, for 2006-2015. As shown, the ozone monitor in Norristown has remained consistently below the maximum design values at ozone monitors for the states of Maryland, New Jersey and Pennsylvania.

Figure 19. Ozone Design Values, Norristown vs. Philadelphia Nonattainment Area, 2005-2014



Norristown SO_2 Monitoring

The Norristown monitoring site also contains an SO_2 monitor, which will be discontinued as well. Details for this monitor discontinuation are included in the "Modifications to the SO_2 Network" section of this document.

Discontinue Lead Monitoring at Conemaugh, Ridley Park, Shelocta and Upper Strasburg

As described in the "Lead (Pb) Network Design Requirements " section of this document, 40 CFR Part 58 Appendix D requires lead monitoring near sources emitting greater than 0.5 tpy. Table 10 displays the four lead monitors that will be discontinued, along with their monitored source and emission rate. The table includes emission data from 2007 through 2014, the most recent available data year. The lead monitoring design requirements were established in 2008 with the revision of the NAAQS concentration level. At that time, the monitoring requirement was set as 1.0 tpy, and emissions data from 2007 were used to determine the facilities requiring monitoring. A monitoring start date of January 1, 2010 was included as part of the monitoring requirements, which PA DEP met for all of its new lead monitors installed to meet the 2008 lead NAAQS revision. In December 2010, the monitoring requirement threshold was lowered to 0.5 tpy for industrial sources.

Table 10. Discontinued Lead Monitors with Facility Emissions, 2007-2014

PA DEP Lead Site	Monitored Facility Name	Facility County	Lead Emissions, in tons per year							
			2007	2008	2009	2010	2011	2012	2013	2014
Conemaugh	Genon NE Mgmt Co/ Conemaugh Plt	Indiana	1.01	0.90	0.31	0.13	0.11	0.11	0.13	0.11
Ridley Park	Exelon Generation Co/ Eddystone	Delaware	1.38	0.70	0.03	0.03	0.01	0.00	0.00	0.00
Shelocta	Genon NE Mgmt Co/ Keystone Sta	Armstrong	0.97	1.13	0.84	0.27	0.03	0.02	0.04	0.03
Upper Strasburg	US Dept Of Defense/ Letterkenny Army Depot	Franklin	5.90	7.20	5.20	6.00	0.02	0.00	0.00	0.60

As shown, the facilities monitored by the Conemaugh, Ridley Park and Shelocta lead sites have maintained emission rates below the 0.5 tpy threshold for the past five years. For the Upper Strasburg monitor, the monitored facility is the Letterkenny Army Depot. Lead emissions from this source are as a result of the burning of ammunition. Due to the intermittent nature of this process, lead emission rates for this source have been more variable. At this time, PA DEP does not expect higher rates of lead emissions from this source.

Lead concentrations measured at these four sites have remained reliably and consistently well below the lead NAAQS of 0.15 µg/m^3. Table 11 displays detailed lead concentration data for the four lead sites that will be discontinued since installation in 2010 through 2015. Information provided in the table includes the 2015 design value, the maximum and second-maximum daily (24-hour) concentrations measured at the site, the percentage of daily samples that measured concentrations greater than 0.05 µg/m^3, the percentage of daily samples that measured concentrations lower than the laboratory method reporting limit (a "non-detect") and the number of complete calendar quarters for each year.

Table 11. Lead Concentration Data for Conemaugh, Ridley Park, Shelocta and Upper Strasburg

Site Name	2015 Design Value	Concentration Measurements 2010 - 2015				Number of Complete Quarters					
		Maximum Daily Value	2nd Max Daily Value	% Daily Values >0.05 µg/m^3	% of Non-detects	2010	2011	2012	2013	2014	2015
Conemaugh	0.05	0.115	0.049	0.3%	97.3%	4	4	3	4	4	4
Ridley Park	0.05*	0.073	0.049	0.4%	96.0%	4	2	2	2	4	4
Shelocta	0.05	0.115	0.082	1.2%	95.7%	4	1	4	4	4	4
Upper Strasburg	0.05	0.048	0.048	0.0%	97.0%	3	1	2	4	4	4

* Design value does not meet completeness requirement

As shown, none of the four lead sites that will be discontinued have measured a single daily value equal to or greater than the lead NAAQS of 0.15 µg/m^3, since their installation in January 2010. Further, these sites rarely measure concentrations greater than 1/5 the level of the NAAQS and overwhelmingly measure levels below the laboratory method reporting limit. Although not consecutive, completeness requirements have been met for at least three out of the six years evaluated, at all four sites.

With the sustained decrease in facility source emissions, and considering the low concentration measurement trends for each of these sites, PA DEP will discontinue these sites to allow for resources to be used in other aspects of the ambient air monitoring network.

Modifications to the SO_2 Network

Note: SO_2 sampling locations to be added to the monitoring network, pursuant to the SO_2 Data Requirements Rule, are addressed in Appendix E of this document.

1) Discontinue SO_2 monitoring at the Erie (Erie County), Holbrook (Greene County), Bristol (Bucks County) and Norristown (Montgomery County) sites;

As provided below in 40 CFR Section 58.14, a low-value SO_2 monitor may be discontinued at the discretion of the U.S. EPA Regional Administrator:

(c) State, or where appropriate, local agency requests for SLAMS monitor station discontinuation, subject to the review of the Regional Administrator, will be approved if any of the following criteria are met and if the requirements of appendix D to this part, if any, continue to be met. Other requests for discontinuation may also be approved on a case-by-case basis if discontinuance does not compromise data collection needed for implementation of a NAAQS and if the requirements of appendix D to this part, if any, continue to be met.

(1) Any PM $_{25}$, O_3, CO, PM_{10}, SO_2, Pb, or NO_2 SLAMS monitor which has shown attainment during the previous five years, that has a probability of less than 10 percent of exceeding 80 percent of the applicable NAAQS during the next three years based on the levels, trends, and variability observed in the past, and which is not specifically required by an attainment plan or maintenance plan. In a nonattainment or maintenance area, if the most recent attainment or maintenance plan adopted by the State and approved by EPA contains a contingency measure to be triggered by an air quality concentration and the monitor to be discontinued is the only SLAMS monitor operating in the nonattainment or maintenance area, the monitor may not be discontinued.

To assess the exceedance probability criteria described in (1) above, PA DEP used the following formula (Figure 20), found in the U.S. EPA guidance document "Ambient Air Monitoring Network Assessment Guidance, Analytical Techniques for Technical Assessments of Ambient Air Monitoring Networks (Feb 2007)":

Figure 20. NAAQS Exceedance Probability Formula

$$\bar{X} + \frac{t * s}{\sqrt{n}} < 0.8 * NAAQS$$

Where $\overline{X}$ is the average design value for the last 5 years (or more), *t* is the student's t value for *n-1* degrees of freedom at the 90% confidence level, *s* is the standard deviation of the design values, *n* is the number of records (i.e., number of design values), and NAAQS is the standard of interest.

Results of this exceedance probability test are included in the following section. PA DEP intends to discontinue the SO_2 monitors listed above, as the data collected from these sites are no longer needed to support NAAQS compliance.

Discontinue SO_2 Monitoring at Erie, Bristol, Holbrook and Norristown

As described in the "Sulfur Dioxide (SO_2) Network Design Requirements" section of this document, minimum SO_2 monitoring is required based upon a calculated Population Weighted Emissions Index, or "PWEI", value, which takes into account both the population and SO_2 emissions contained within defined MSA. Table 12 displays the SO_2 minimum monitoring requirements, PWEI values and monitoring sites in the Erie and Philadelphia-Camden-Wilmington MSA, as well as Greene County. Note that the Holbrook site is not located in an MSA, and as such has no monitoring requirement; however, for assessment purposes, Greene County totals were used in this demonstration.

Table 12. SO_2 Minimum Monitoring Requirements and Discontinued Monitors

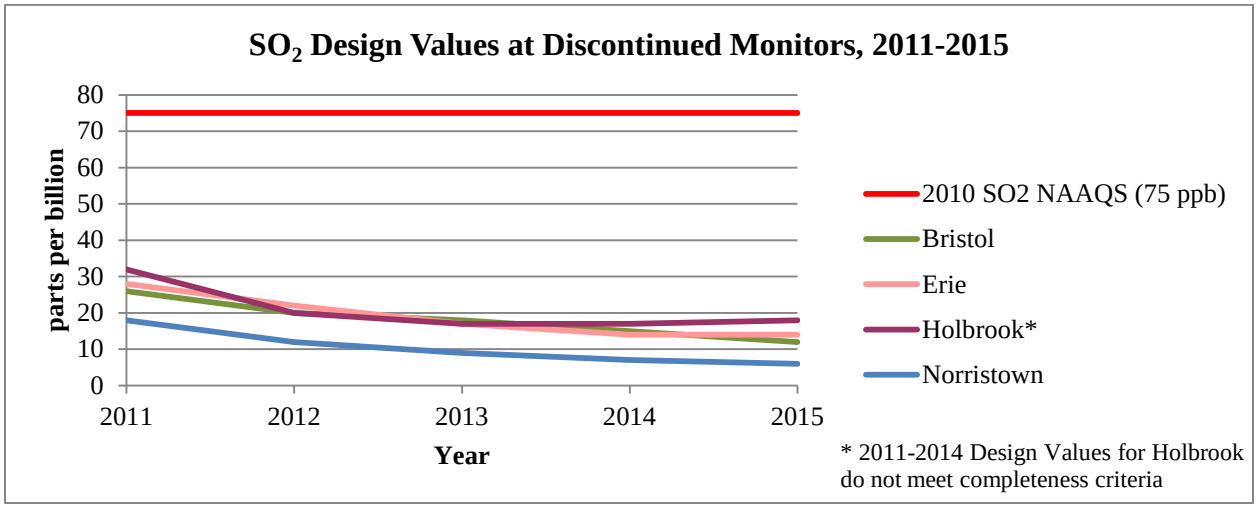
Geographic area	Population Estimate	2011 NEI SO_2 Emissions (tpy)	PWEI	No. of Monitors Required	No. of PA DEP SLAMS Monitors, Current (2016-17)	Other SLAMS Monitors	Total No. of Monitors, Current (2016-17)
Erie, PA MSA	278,045	1180.5	328	0	1 (0)		1(0)
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA	6,069,875	22737.5	138014	2	3 (1)	AMS-3; DE-4; NJ-1;	11 (9)
Greene County, PA*	37,519	2477.8	93*	N/A	1 (0)		1 (0)

*Greene County is not in an MSA, and has no minimum monitoring requirement. Information provided in this table is for discontinuation assessment purposes only.

As shown, with the discontinuation of the four SO_2 monitors, minimum SO_2 monitoring criteria will continue to be met.

Concentration values at these four monitoring sites have measured values well below the SO_2 NAAQS for previous five years. Figure 21 displays the SO_2 design value trend for the four monitors for 2011-2015.

Figure 21. SO_2 Design Values at Bristol, Erie, Holbrook and Norristown Monitoring Sites



The Holbrook monitoring site was originally established in 1997 to measure transport into the region from West Virginia, and potentially from areas in the southeast United States as air masses are funneled along the Appalachian Mountains. The Holbrook monitoring site was primarily used for ozone monitoring purposes. The ozone monitoring season runs April through October (March - October beginning in 2017) each year. Due to the remote location, monitors at the Holbrook monitoring site were commonly shut down temporarily during the winter months (November-March), as access to the site can be challenging during this period. Because of this, the SO_2 design values, which are based on three-year averaging periods, do not meet completeness requirements. Starting in 2012, PA DEP has maintained all monitors at the Holbrook site on a year-round basis.

None of the four SO_2 monitoring sites have measured a single hourly exceedance of the level of the SO_2 NAAQS during the past five years. Table 13 lists the hourly maximum 1-hour SO_2 concentrations measured during 2011-2015.

Table 13. Maximum 1-Hour SO_2 Concentrations Measurements at Bristol, Erie, Holbrook and Norristown, 2011-2015

	Maximum 1-Hour SO_2 Concentration			
Year	**Bristol**	**Erie**	**Holbrook**	**Norristown**
2011	30	29	26	19
2012	18	25	20	9
2013	18	18	35	12
2014	14	14	23	10
2015	11	38	26	8

All four SO_2 monitors have a probability of less than 10 percent of exceeding 80 percent of the SO_2 NAAQS during the next three years. Table 14 displays the exceedance probabilities for the SO_2 monitors that will be discontinued, using the exceedance test formula provided in Figure 20 of this document. SO_2 design values for each consecutive year from 2011 through 2015 were used for this analysis.

Table 14. SO_2 NAAQS Exceedance Probability Results for Bristol, Erie, Holbrook and Norristown Monitors

Using SO_2 Design Values, 2011-2015	**SO_2 NAAQS = 75 ppb, 80% of SO_2 NAAQS = 60 ppb**			
Formula Parameter	**Bristol**	**Erie**	**Holbrook***	**Norristown**
n (number of design values)	5	5	5	5
$\bar{X}$ (average of design values)	18.20	19.00	20.80	10.40
t (student's *t* value for *n-1* degrees)	2.13	2.13	2.13	2.13
s (standard deviation of design values)	5.31	6.00	6.38	4.83
Formula Result	**23**	**25**	**27**	**15**

* 2011 - 2014 SO_2 design values for Holbrook do not meet completeness criteria

Both the monitoring trends and exceedance probability assessments demonstrate that using valid SO_2 concentration measurements and summary data, the SO_2 monitors in Bristol, Erie and Norristown are highly unlikely to measure exceedances of the SO_2 NAAQS. Therefore, these monitors meet the discontinuation criteria set forth in 40 CFR Part 58.14 (c) (1) listed at the beginning of this section.

Although the Holbrook monitor does not meet completeness requirements, the data analyses show that the maximum 1-hour SO_2 concentration value measured on any day during the past five years was 35 ppb, less than ½ of the SO_2 NAAQS. In addition, with the absence of a historical record for SO_2 concentration measurements during the winter months, the Holbrook site is of limited value for SO_2 trends analysis.

Modifications to the $PM_{2.5}$ Speciation Network

1) Install $PM_{2.5}$ speciation monitor at the Lancaster Downwind (Lancaster County) $PM_{2.5}$ monitoring site
2) Discontinue $PM_{2.5}$ speciation monitor at the Freemansburg (Northampton) $PM_{2.5}$ monitoring site

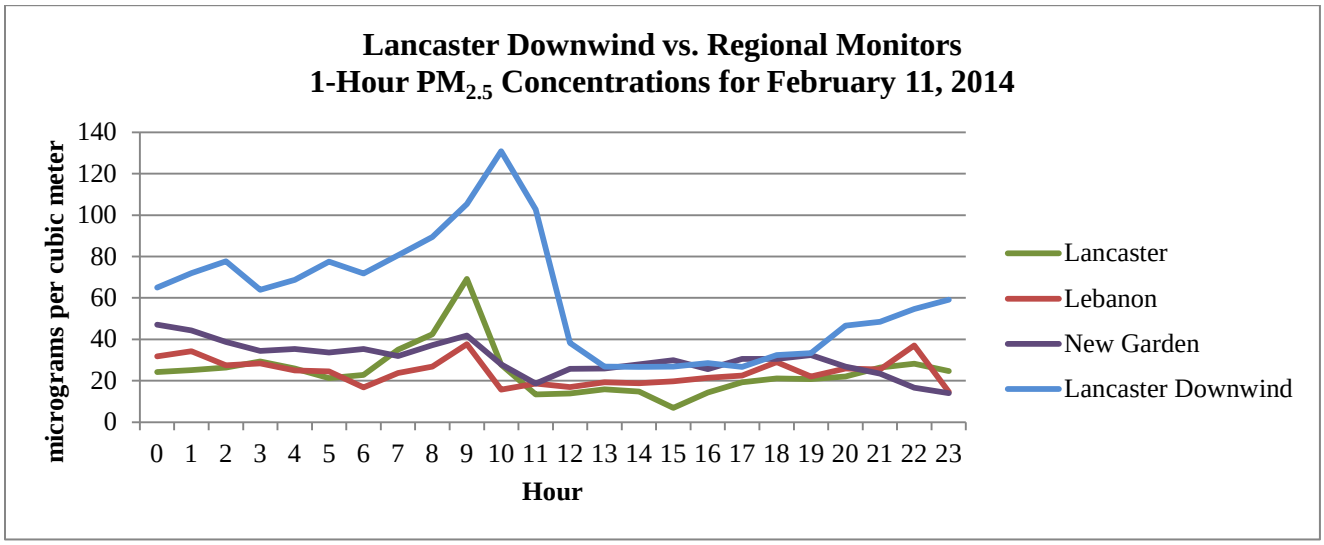
Install $PM_{2.5}$ Speciation Monitor at Lancaster Downwind (Lancaster County)

PA DEP will undertake $PM_{2.5}$ speciation monitoring at its Lancaster Downwind monitoring sites, to help determine if the Lancaster Downwind $PM_{2.5}$ monitor is being influenced by local source(s) of emissions.

The Lancaster Downwind monitoring site was originally sited in 2008 as an ozone monitoring site, at the request of EPA Region III. The original purpose was to understand ozone impacts of areas downwind of the Lancaster metropolitan area. However, by 2010, due to the population increase and the $PM_{2.5}$ concentrations measured at the Lancaster site, the minimum monitoring requirements set for in 40 CFR, Appendix D required PA DEP to install an additional $PM_{2.5}$ monitor in the Lancaster MSA. For logistical reasons, PA DEP sited the second required $PM_{2.5}$ monitor at the Lancaster Downwind site.

During the first year of operation (2014), the Lancaster Downwind $PM_{2.5}$ monitor measured elevated concentrations of $PM_{2.5}$, as opposed to other regional monitors. For example, on February 11, 2014, Lancaster Downwind's hourly $PM_{2.5}$ concentration peaked at 130.8 µg/m^3. Figure 22 illustrates the hourly $PM_{2.5}$ concentrations at the Lancaster Downwind monitor as opposed to other regional monitors. Note that one additional regional monitor, Reading Airport (Berks County), is not included in the figure, as it did not report values on February 11, 2014.

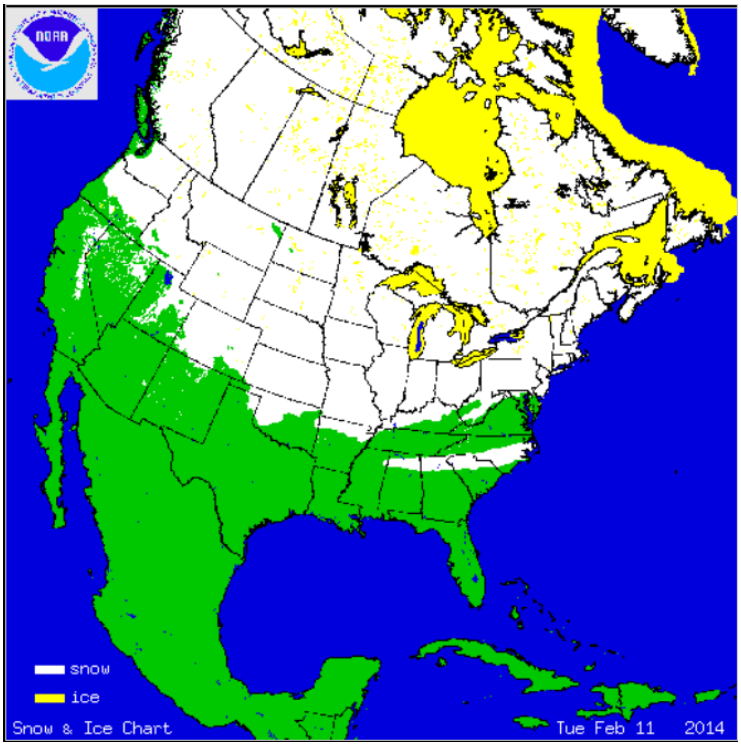
Figure 22. Lancaster Downwind vs. Other Regional Monitors' Hourly $PM_{2.5}$ Concentrations – February 11, 2014



As illustrated above in Figure 22, during the first thirteen hours on February 11, 2014, Lancaster Downwind $PM_{2.5}$ concentrations were, on average, 45 µg/m^3 higher than any of the regional monitors'

$PM_{2.5}$ concentrations. In addition, on February 11, 2014, snow covered much of Pennsylvania, as shown in Figure 23 on the following page.

Figure 23. U.S. Snow Cover Map for February 11, 2014



Source: ***http://www.ncdc.noaa.gov/snow-and-ice/snow-cover/us/20140211***

This snow pack combined with clear skies to create a strong inversion over much of eastern PA during the morning of February 11, 2014. The early morning $PM_{2.5}$ concentrations at the Lancaster Downwind monitor are indicative of low-level emission sources becoming trapped within the inversion. During the early afternoon, $PM_{2.5}$ levels collapsed at the Lancaster Downwind monitor to levels more consistent of $PM_{2.5}$ concentrations at the regional monitor locations.

To further illustrate this point, 2014's quarterly $PM_{2.5}$ concentrations were analyzed to assess the magnitude of Lancaster Downwind's $PM_{2.5}$ concentrations with respect to other regional monitors' $PM_{2.5}$ concentrations. Table 15 illustrates the 2014 quarterly averages for the Lancaster Downwind and how it compares with other regional $PM_{2.5}$ monitors. During the 1st quarter, Lancaster Downwind's quarterly average was 3.7 µg/m^3 higher than the next closest monitor, Lebanon (Lebanon County). This trend continued in the 2nd and 4th quarters.

Table 15. 2014 Quarterly $PM_{2.5}$ Concentration Averages for Lancaster Downwind and Other Regional Monitors

	Quarterly $PM_{2.5}$ Concentrations, in micrograms per cubic meter			
Site Name	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**
Lancaster Downwind	20.9	15.2	13.6	13.9
Lancaster	15.4	9.5	9.3	10.0
Lebanon	17.2	11.0	13.4	9.3
Reading Airport	14.8	8.0	8.5	8.2
New Garden	13.3	8.2	8.6	9.5

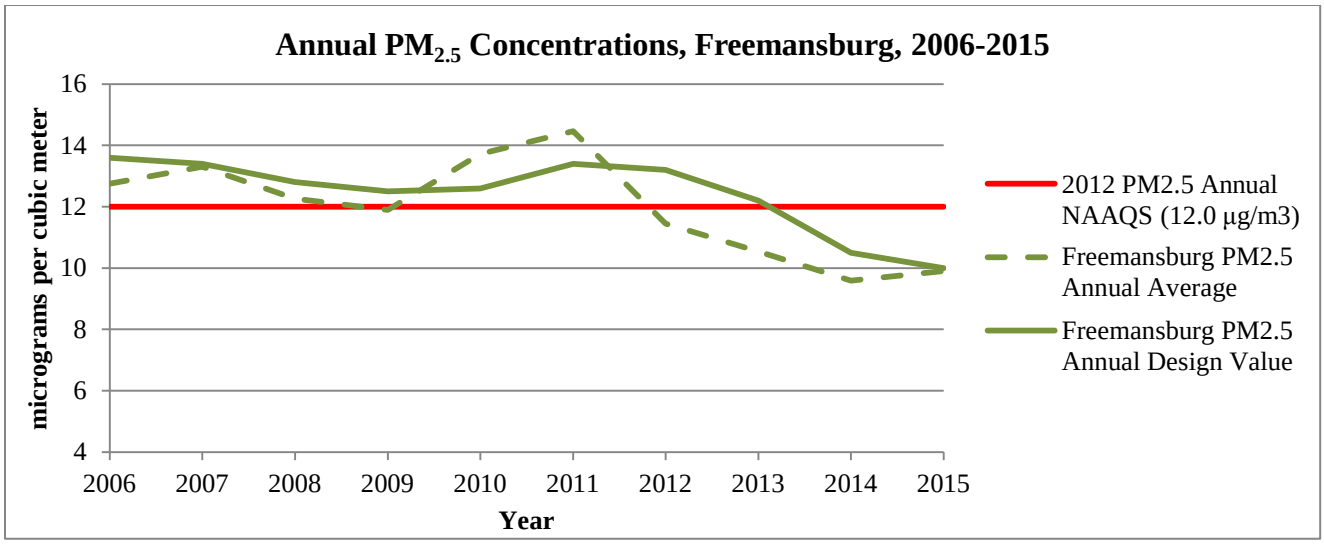
PA DEP plans to install $PM_{2.5}$ speciation monitor at the Lancaster Downwind site to identify the chemical constituents of $PM_{2.5}$ sampled at this site. Constituent data will then be compared to $PM_{2.5}$ constituent analyses from the two other $PM_{2.5}$ speciation monitoring sites in the region, Lancaster and New Garden, in order to determine if $PM_{2.5}$ concentrations measured at the Lancaster Downwind site are being impacted locally.

Discontinue $PM_{2.5}$ Speciation Monitor at Freemansburg (Northampton County)

PA DEP plans to discontinue the $PM_{2.5}$ speciation monitor at its Freemansburg site. $PM_{2.5}$ speciation monitoring is not required by U.S. EPA in this region. PA DEP will utilize the resources made available by the discontinuation of this monitor to establish $PM_{2.5}$ speciation monitoring at the Lancaster Downwind site, as outlined in the preceding section.

PA DEP has been operating a $PM_{2.5}$ speciation monitor at Freemansburg since 2002. Figure 24 illustrates the trend in 24-hour and annual average $PM_{2.5}$ concentrations over the past 10 years.

Figure 24. Annual PM2.5 Concentrations at the Freemansburg Monitoring Site, 2006-2015



As outlined in Figure 24, after a multiyear period of decline, Freemansburg's annual average $PM_{2.5}$ concentrations rose in 2010 and 2011. PA DEP addressed the cause of the higher $PM_{2.5}$ concentrations at Freemansburg in its October 2014 response to EPA's 120-day letter regarding proposed designations for the 2012 annual $PM_{2.5}$ NAAQS (https://www3.epa.gov/pmdesignations/2012standards/rec/paremarks.pdf). To summarize PA DEP's conclusions provided in its response, $PM_{2.5}$ concentration spikes observed during 2010 and 2011 by the Freemansburg $PM_{2.5}$ monitor were likely attributable the re-entrainment of iron, due to construction (earth-moving) activities undertaken in the eastern portion of the former Bethlehem Steel Facility in Bethlehem, PA. Due to the construction activities at the former iron-works facility, the ground was overturned, allowing the iron-rich soil to be available for transport under favorable atmospheric conditions. At times when light southerly winds persisted over the Freemansburg monitoring site, which is located to the north of the once former facility, the Freemansburg $PM_{2.5}$ speciation monitor captured abnormally elevated iron levels.

In its response letter, PA DEP surmised that without the local construction activity, $PM_{2.5}$ concentration values measured at the Freemansburg site would once again continue to decline, following a similar pattern as other regional $PM_{2.5}$ monitors. As Figure 24 of this document illustrates, this was the case. Since 2012, construction activity has slowed in this region, and over the past four years, $PM_{2.5}$ concentrations at Freemansburg have declined. In addition, since 2014, the annual $PM_{2.5}$ design values for Freemansburg have been consistently below the 2012 $PM_{2.5}$ NAAQS of 12.0 $\mu g/m^3$. As the $PM_{2.5}$ monitor is now monitoring attainment of both the 24-hour and annual $PM_{2.5}$ NAAQS, PA DEP is proposing to discontinue the $PM_{2.5}$ speciation monitor at Freemansburg to reallocate resources.

Modifications to the Air Toxics Network

1) Relocate Swarthmore (Delaware County) monitoring site to nearby location due to building demolition
2) Relocate VOC sampling from Beaver Falls (Beaver County) site to Beaver Valley (Beaver County) site
3) Discontinue TSP/Metals and VOC sampling at Slippery Rock (Butler County)
4) Discontinue VOC sampling at Freemansburg (Northampton County)
5) Switch all metals sampling from a TSP-based method to a PM_{10}-based method; Add Antimony, Selenium and Cobalt to analyte suite

Relocate Swarthmore (Delaware County) monitoring site to nearby location due to building demolition

Air Toxics monitoring metals has been conducted at the Swarthmore site since 1997 under a partnership agreement with Swarthmore College. The samplers are located on the roof of the school's Hicks Hall Engineering building. This building is scheduled for demolition in 2016 as a part of campus renovation to build a new Biology, Engineering and Psychology building in its place. The Department will relocate the Swarthmore monitors in the area of the College to continue monitoring of ambient air toxics in this area.

Relocate VOC sampling from Beaver Falls (Beaver County) site to Beaver Valley (Beaver County) site

Air Toxics monitoring using U.S. EPA Method TO-15 has been conducted at the Beaver Falls site since 2010. Monitored levels of TO-15 pollutants are below health-based screening concentrations for long-term exposure. Monitored data indicate a TO-15 air toxics profile generally consistent with localized mobile source emissions. As these ambient concentrations are below health based screening standards and the TO-15 pollutant concentration profile does not appear to indicate unusual, unexpected sources in the area of the monitor, the monitor will be discontinued and relocated to the Beaver Valley site where ambient air toxics metals are currently being monitored. This relocation will serve to begin collecting baseline data on area TO-15 emissions generally downwind from the area of an ethane "cracker" proposed at the location of the former Horsehead Zinc facility near Monaca.

Discontinue TSP/Metals and VOC sampling at Slippery Rock (Butler County)

Air Toxics monitoring using U.S. EPA Method TO-15 for VOCs and IO 3.5 for toxic metals has been conducted at the Slippery Rock site since 2009 under a partnership agreement with Slippery Rock University. Monitored levels of toxic pollutants are below health-based screening concentrations for long-term exposure. Because there are no long-term monitored concentrations of air toxics above health based screening values, toxics monitoring at this site will be discontinued.

Discontinue VOC sampling at Freemansburg (Northampton County)

Air Toxics monitoring using U.S. EPA Method TO-15 has been conducted at the Freemansburg site since 2010. Monitored levels of TO-15 pollutants are below health-based screening concentrations for long-term exposure. Monitored data indicate a TO-15 air toxics profile generally consistent with localized mobile source emissions. As these ambient concentrations are below health based screening standards and the TO-15 pollutant concentration profile does not appear to indicate unusual, unexpected sources in the area of the monitor, the monitor will be discontinued. Concentrations of Benzene, Toluene and other mobile source related compounds have been observed to decrease between 2010 and 2015 consistent with statewide and national trends in mobile source related pollution due to highway vehicle and motor fuels emissions reductions.

Switch TSP/Metals sampling method to PM_{10}-based method; Add Antimony, Selenium and Cobalt to analyte suite

Historically the Department has sampled for ambient air toxic metals using a sampler for total suspended particulate (TSP) consistent with methods used for the National Air Toxics Trends Station program (NATTS). The results reflect the total airborne particulate contained in the sampled air. While TSP measurements can provide a quantification of the average concentration of all suspended particulate in the air over a 24-hr sampling period, in reality only the portion of that total is actually inhaled by any one individual. Estimates of this "respirable" fraction are desired when using monitored data for screening for potential long-term exposure effects as that fraction proves a better surrogate for estimating chronic human toxic metals exposure. This has been recognized at the national level as current proposals for the revisions to the NATTS program call for replacing existing TSP metals samplers with samplers for the fraction of particulate 10 microns in aerodynamic diameter or less (PM_{10}) to better capture data on human inhalation exposure. Additionally, the NATTS revision proposal suggests supplementing the existing suite with three additional metals; Antimony, Cobalt and Selenium.

The Department is proposing to modify its metals monitoring to include Antimony, Cobalt and Selenium at its existing air toxics metals sampling sites and commence a program to replace existing TSP samplers with PM_{10} samplers capable of accurately measuring the respirable fraction. A PM_{10} sampler will be collocated with an existing TSP sampler at the Lancaster monitoring site for one year while data is collected to:

a. Establish baseline concentrations of Antimony, Cobalt and Selenium using the TSP fraction and
b. Comparing the measured metals in the collocated PM_{10} fraction to the TSP fraction.

This data will better inform the Department on the relationship of the PM_{10} fraction to the TSP fraction of the supplemented metals suite.

Actions Needing Further Consideration

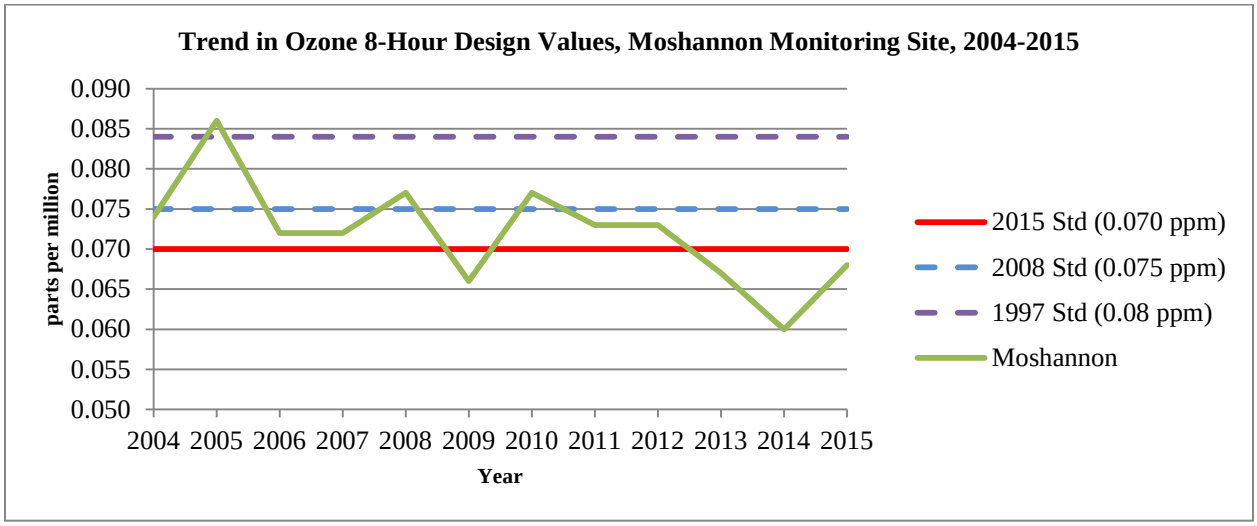
1) Relocation of Moshannon Ozone Monitor to Another Location in Clearfield County
2) Relocation of York Downwind Ozone Monitor to Another Location in York County
3) Relocation of Lancaster Downwind $PM_{2.5}$ Monitor to Another Location in Lancaster County

Relocation of Moshannon Ozone Monitor to Another Location in Clearfield County

In its 2015 Ambient Air Monitoring Network Plan, PA DEP sought comment on the relocation of the Moshannon ozone monitor to a location more representative of the impact of the increasing Marcellus Shale activity in Clearfield County.

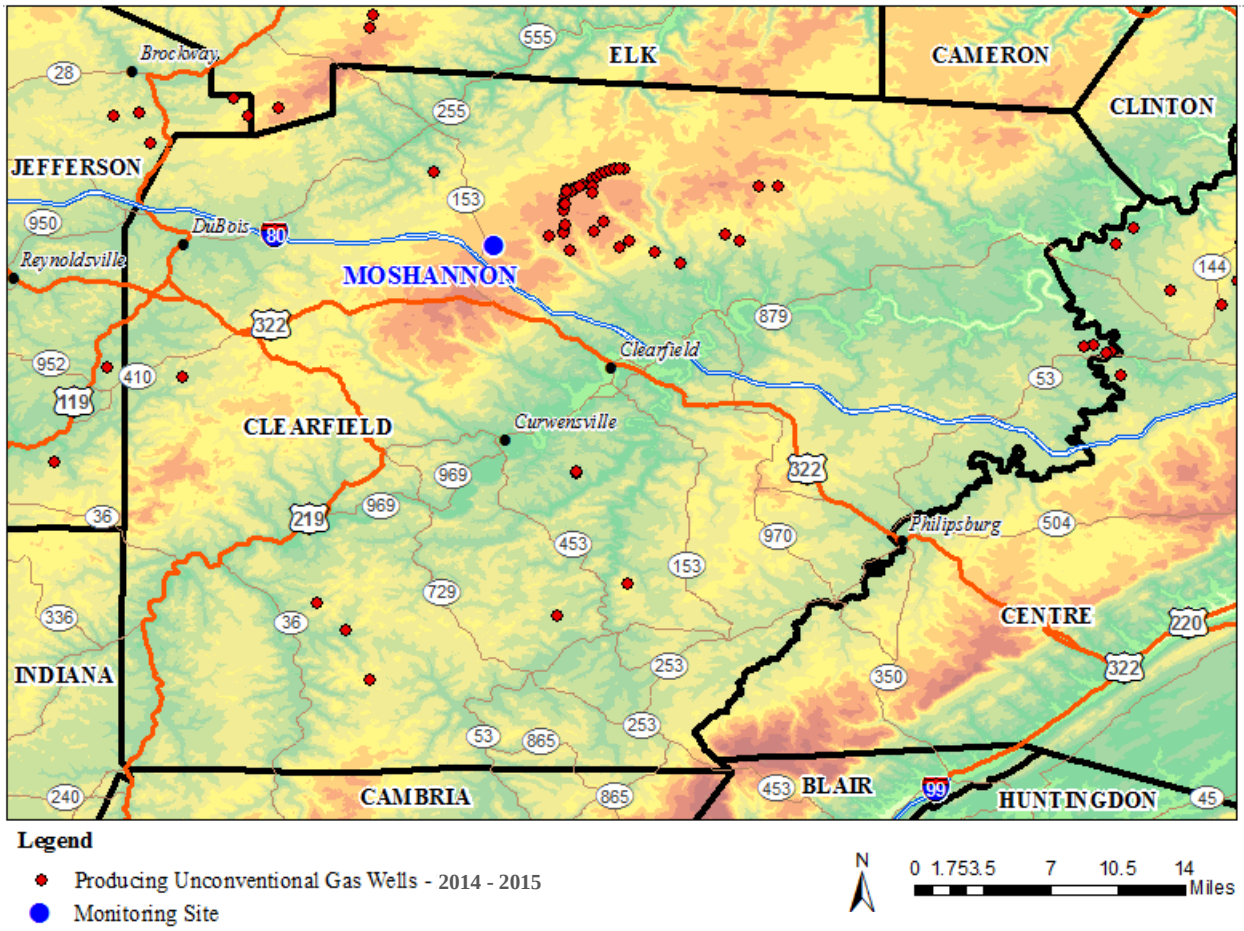
The ozone sampler at the Moshannon monitoring site was originally established in 1996 as part of a Cooperative Agreement with Pennsylvania State University to study the impact of ozone on vegetation in the Moshannon State Forest. Since the NO_x SIP Call was implemented during the 2003 ozone season, ozone concentrations have been on the decline at the Moshannon monitoring site. Clearfield County was designated as nonattainment for ozone on April 15, 2004 for the 1997 ozone standard (which established an 8-hour ozone standard of 0.08 parts per million). On April 20, 2009, Clearfield County was redesignated to attainment for the 1997 ozone standard (74 FR 11674). Figure 245 illustrates the trend in 8-hour ozone design values at the Moshannon site since 2004.

Figure 25. Trend of Ozone Design Value at the Moshannon Monitoring Site



Since the late 2000s, Marcellus Shale related activity has been on the increase across Pennsylvania. Marcellus Shale development has occurred in Clearfield County as well. Figure 26 is a map illustrating the most recent Marcellus Shale activity in Clearfield County.

Figure 26. Map of Moshannon Monitor With Respect to 2014-2015 Marcellus Shale Activity



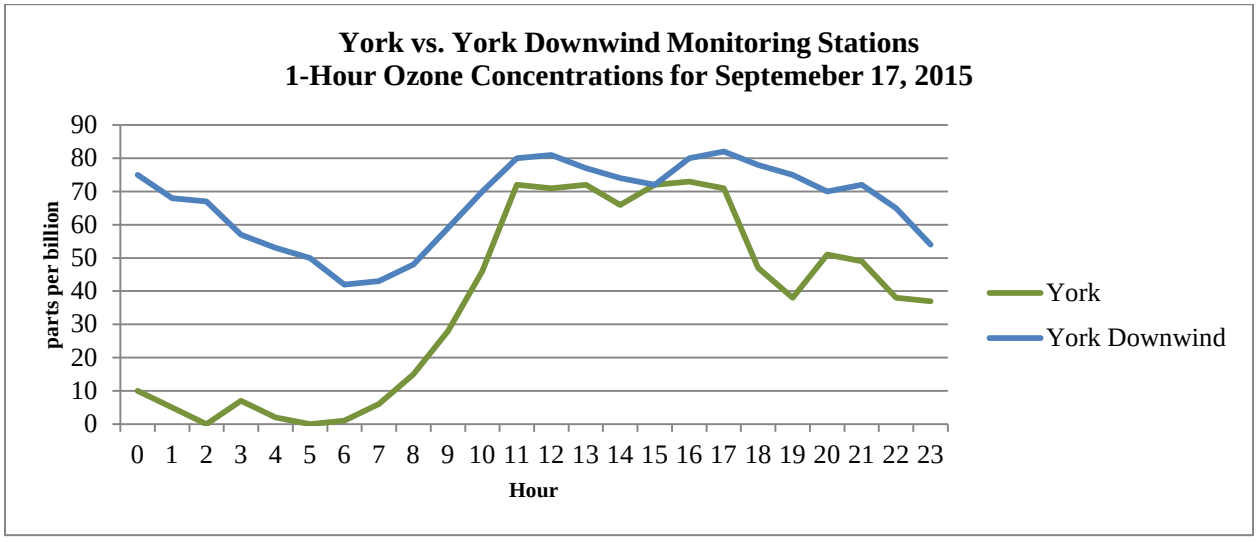
The current ozone sampler at the Moshannon monitoring site is not located in an area downwind of the major area of Marcellus Shale activity in Clearfield County. In order to understand the impact of Marcellus Shale activity on ozone formation in different parts of the Commonwealth, PA DEP recommended that the location of the Moshannon monitor, which has served its original purpose of understanding ozone's impact on vegetation in the Moshannon State Forest, be reexamined. As no comments were received regarding this change in its 2015 Ambient Air Monitoring Network Plan, PA DEP will evaluate relocating the Moshannon monitoring site as indicated.

Relocation of York Downwind Ozone Monitor to Another Location in York County

In its 2015 Ambient Air Monitoring Network Plan, PA DEP sought comment on the relocation of the York Downwind ozone monitor to a location more representative of the area of York County that is actually downwind of emissions from York City.

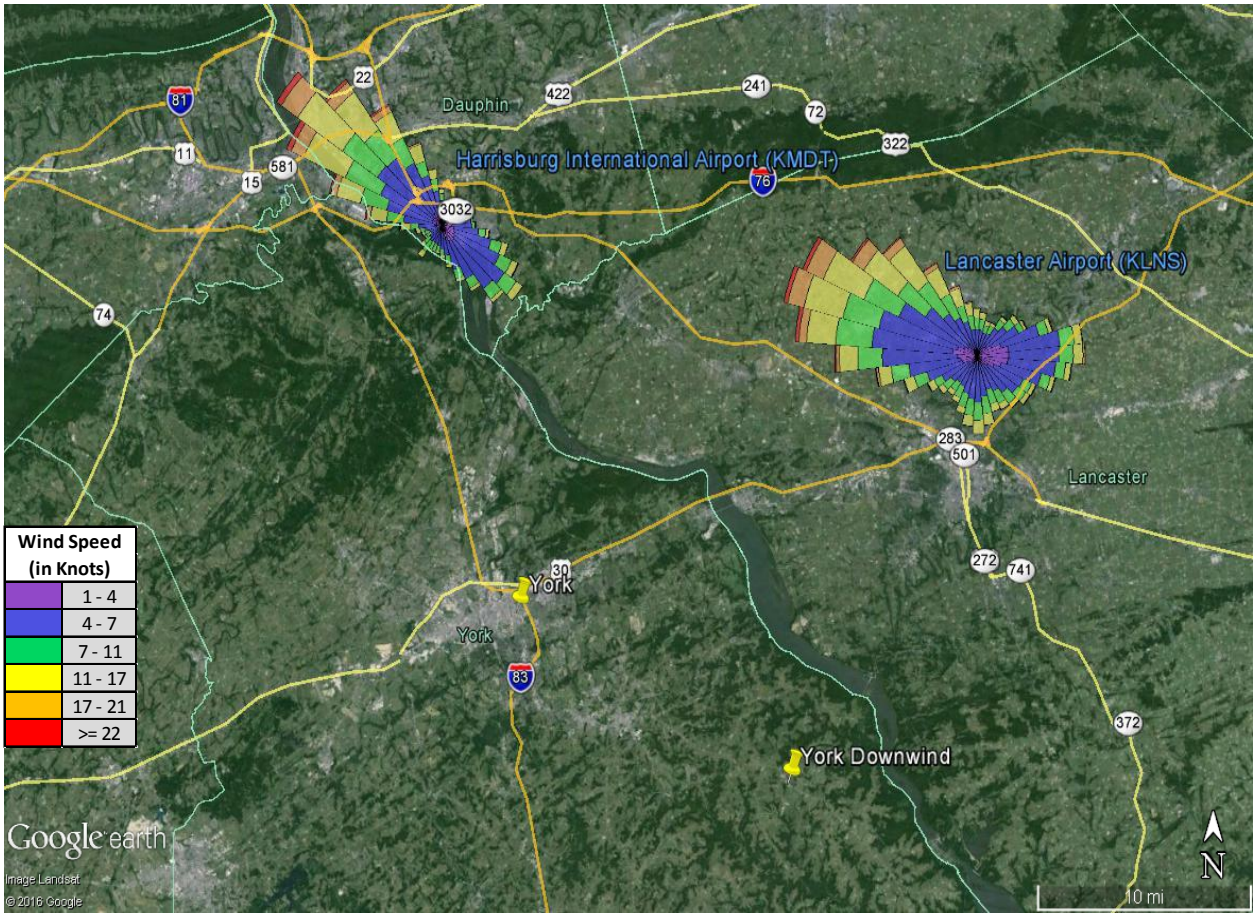
The York Downwind monitor was originally sited in 2008 at the request of EPA Region III. The original purpose was to understand ozone impacts of areas downwind of the York metropolitan area. In order to determine the area downwind of the York metropolitan area, meteorological data from the Harrisburg International Airport (KMDT) were utilized. As the monitor began operation, PA DEP began to notice significant differences in the way ozone was characterized at the York Downwind monitor as compared to the York monitor. A typical July day is outlined in Figure 27 below. In Figure 27, the York Downwind monitor's and the York monitor's hourly ozone concentrations for September 17, 2015 are plotted.

Figure 27. Hourly Ozone Concentrations for York and York Downwind, September 17, 2015



The York monitor's ozone measurements during the early morning hours hover around zero, before ramping up as the sun rises and temperatures climb. This is indicitive of NOx titration in an urbanized area. The York Downwind monitor's ozone concentrations, however, remain elevated even throughout the evening and early morning hours. This pattern commonly occurs in areas where NOx compounds are not in high enough concentrations to allow for the scavenging of ozone. The York Downwind monitor is sited in a rural part of York County. DEP has questioned whether the current York Downwind location is properly assessing concentrations downwind of the York metropolitan area. DEP has re-examined the original use of the KMDT data that was utilized in determining the location of the current York Downwind site. As stated on the National Climate Data Center (NCDC) website (http://www1.ncdc.noaa.gov/pub/data/stations/photos/20016665/20016665a-info.txt), KMDT's Automated Surface Observing System (ASOS) equipment was situated near a "levee protecting the airport from the occasional Susquehanna River flood." Figure 28 is a map illustrating the locations of the York and York Downwind sites with respect to one another. Wind roses were generated for a 5-year period (from 2011 to 2015) from Harrisburg International Airport and Lancaster Airport (KLNS) and then overlaid on the map.

Figure 28. York and York Downwind Monitor Locations and Wind Profiles Across the Region

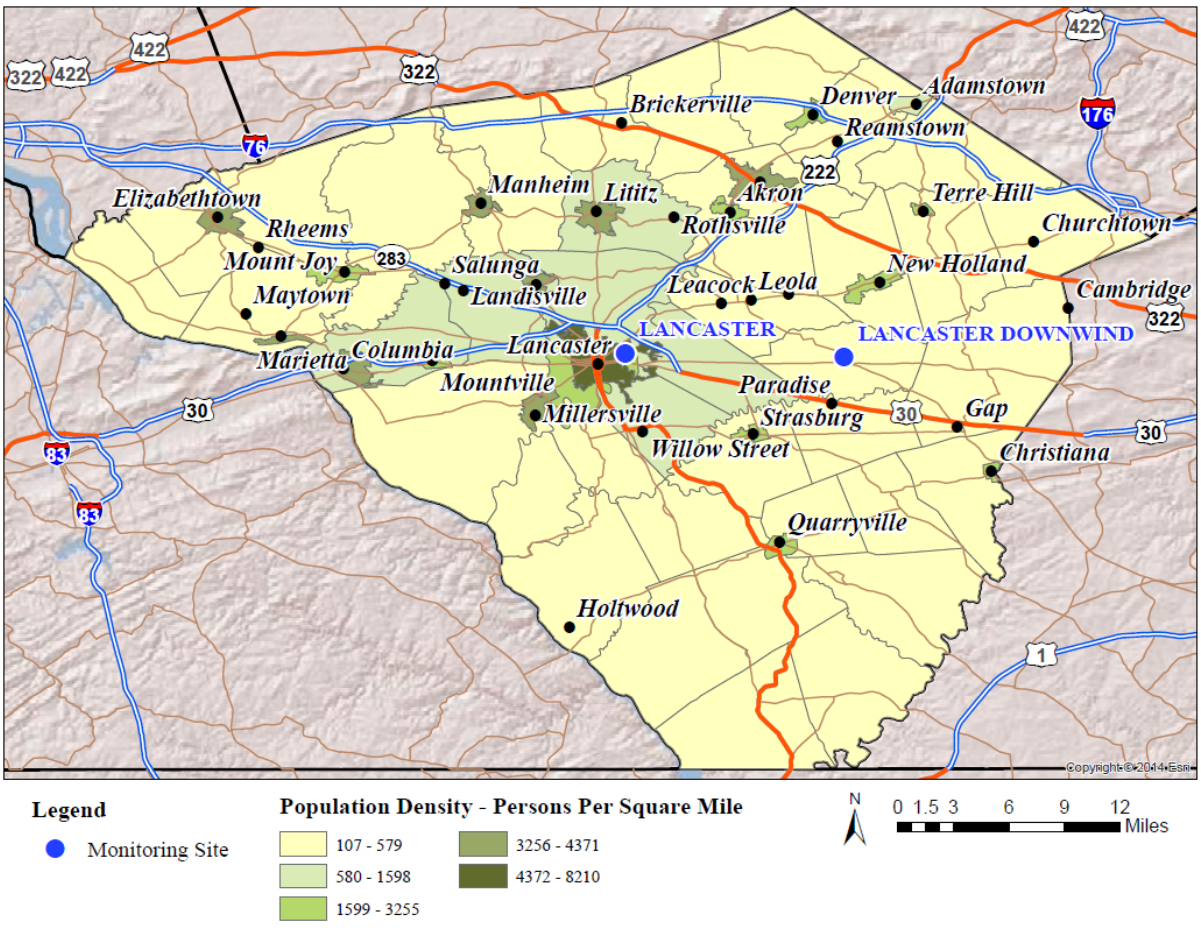


Due to the orientation of the Susquehanna River (in the north to south direction) and after analyzing the wind rose for KMDT, it has been determined that the levee is likely influencing the wind direction measurements of the ASOS. PA DEP believes that the ASOS located at KLNS would have provided a more representative wind profile to use to site the York Downwind location. The KLNS meteorological data illustrates a much stronger westerly influence as opposed to KMDT. Therefore, PA DEP recommended that the York Downwind site be moved to a location due east of the York metropolitan area (near Wrightsville, PA). As no comments were received regarding this change in its 2015 Ambient Air Monitoring Network Plan, PA DEP will evaluate relocating the York Downwind ozone monitoring site as indicated.

Relocation of Lancaster Downwind $PM_{2.5}$ Monitor to Another Location in Lancaster County

As detailed in the "Modifications to the $PM_{2.5}$ Speciation Network" section of this document, PA DEP suspects that $PM_{2.5}$ concentrations measured at the Lancaster Downwind monitoring station are impacted by local emission sources. PA DEP will perform $PM_{2.5}$ speciation monitoring at this site for a minimum of one year to aid the evaluation of $PM_{2.5}$ concentrations measured at the Lancaster Downwind monitoring site. If PA DEP determines that $PM_{2.5}$ concentrations measured at the Lancaster Downwind site are being impacted by local sources, then PA DEP will likely move the Lancaster Downwind $PM_{2.5}$ monitor to a portion of Lancaster County that is a) more representative of the ambient air in the high population areas of Lancaster County and b) an area that is not influenced by local sources. Figure 29 displays both current PA DEP $PM_{2.5}$ monitoring sites in Lancaster County, as well as population density using 2010 Census data.

Figure 29. Lancaster and Lancaster Downwind Monitor Locations With Respect to the Highest Population Density Areas in Lancaster County



Appendix A - General Descriptions of Air Pollutants

Ozone (O_3)

Ground-level ozone, or photochemical smog, is a secondary pollutant. Ozone is generally not emitted directly into the atmosphere as ozone, but rather is formed by chemical reactions between other air pollutants. The primary pollutants involved in these reactions – volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) – form ozone in the presence of sunlight and warm temperatures. Thus, sources that emit these ozone precursors are sources of ozone. Nitrogen oxides result from fossil fuel combustion and sources commonly include power plants, industrial boilers, and motor vehicles. VOCs are emitted from a variety of sources, including motor vehicles, chemical plants, refineries, and even natural (biogenic) sources. Ozone and the precursor pollutants that cause ozone also can be transported into an area from pollution sources located hundreds of miles away. Because the formation of ozone is boosted by increasing sunlight and temperatures, changing weather patterns contribute to yearly differences in ozone concentrations, with peak concentrations occurring during the summer months.

Ground-level ozone is a strong irritant to the eyes and upper respiratory system and can hamper breathing. It also damages vegetation, including forest and agricultural crops, and man-made materials such as monuments and statues.

Ozone is measured by ultraviolet absorption photometry. Air is drawn through a sample cell where ultraviolet light (254 nm wavelength) passes through it. Any light that is not absorbed by the ozone is then converted into an electrical signal proportional to the ozone concentration.

Sulfur Dioxide (SO_2)

Sulfur dioxide is a gaseous pollutant that is emitted primarily by industrial furnaces or power plants burning sulfur-containing coal or oil. The major health effects associated with high exposures to sulfur dioxide include effects on breathing and respiratory illness symptoms. The population most sensitive to sulfur dioxide includes asthmatics and individuals with chronic lung disease or cardiovascular disease. Sulfur dioxide damages vegetation, including forests and agricultural crops, and acts as a precursor to acid rain. Finally, sulfur dioxide can accelerate the corrosion of natural and man-made materials that are used in buildings and monuments, as well as paper, iron-containing metals, zinc, and other protective coatings.

Sulfur dioxide is measured with an ultraviolet fluorescence analyzer. Air is drawn through a sample cell where it is then subjected to high intensity ultraviolet light. This causes the sulfur dioxide molecules in the air to fluoresce and release light. The fluorescence is detected with a photomultiplier tube and converted to an electrical signal proportional to the SO_2 concentration.

Nitrogen Dioxide (NO_2)

Nitrogen dioxide is a highly toxic, reddish brown gas that is created primarily from fuel combustion in industrial sources and vehicles. It creates an odorous brown haze that causes eye and sinus irritation, blocks natural sunlight and reduces visibility. It can severely irritate the respiratory system and has been associated with acute effects in individuals diagnosed with respiratory disease. Nitrogen dioxide contributes to the creation of acid rain and plays a key role in nitrogen loading, adversely impacting forests and other ecosystems.

Nitrogen oxides are measured using the chemiluminescence reaction of nitric oxide (NO) with ozone (O_3). Air is drawn into a reaction chamber where it is mixed with a high concentration of ozone from an internal ozone generator. Any nitric oxide mixes with ozone to produce NO_2. Light from this reaction is detected with a photomultiplier tube and converted to an electrical signal proportional to the nitric oxide concentration. Total nitrogen oxides (NO_x) are measured by passing the air through a converter where any NO_2 in the air is reduced to nitric oxide before the air is passed to the reaction chamber. By alternately passing the air directly to the reaction chamber and through the converter before the reaction chamber, the analyzer alternately measures nitric oxide and NO_x. Nitrogen dioxide (NO_2) is measured indirectly by a subtraction of the NO from the NO_x concentrations.

Carbon Monoxide (CO)

Carbon monoxide is a byproduct of the incomplete burning of fuels. Industrial processes contribute to carbon monoxide pollution levels, but the largest man-made source of carbon monoxide is motor vehicle emissions. This pollutant is a health concern in areas of high traffic density or near industrial sources. Peak carbon monoxide concentrations typically occur during the colder months of the year when automotive emissions are greater and nighttime inversion (a weather-related phenomenon) conditions are more frequent.

Carbon monoxide is a colorless, odorless, poisonous gas that has an affinity for hemoglobin, 210 times that of oxygen. By combining with the hemoglobin in the blood, it inhibits the delivery of oxygen to the body's tissue, thereby causing or shortness of breath, asphyxia, and eventually death. The health threat from carbon monoxide is most serious for those who suffer from cardiovascular disease. At much higher levels of exposure, healthy individuals are also affected.

Carbon monoxide is measured by infrared absorption photometry. A continuous flow of air is drawn through a sample cell where infrared light passes through it. The carbon monoxide molecules absorb a portion of the infrared light. This reduces the amount of light getting to the sensor. The light is then converted into an electrical signal related to the concentration of carbon monoxide in the sample cell.

Fine Particulate Matter ($PM_{2.5}$)

Fine particulate matter emissions result primarily from industrial processes and fuel combustion - including motor vehicles, residential wood burning, and forest or agricultural fires.

Fine particles can accumulate in the respiratory system and are associated with numerous adverse health effects, including decreased lung function and increased respiratory symptoms and disease. Sensitive groups that appear to be at greatest risk include the elderly, individuals with cardiopulmonary disease such as asthma, and children. $PM_{2.5}$ is the major cause of reduced visibility in parts of the United States. Other environmental impacts occur when particles deposit onto soil, plants, water, or man-made materials such as monuments or statues.

$PM_{2.5}$ is sampled by drawing air through a specially designed inlet that excludes particles larger than 2.5 microns in diameter. For the manual Federal Reference Method (FRM) sampler, the particles are collected on a Teflon™ Microfiber filter that is weighed to determine the particulate mass. The normal sampling schedule is for a 24-hour sample to be taken daily. In addition, PA DEP utilizes Federal Equivalent Method (FEM) Met One Model 1020 and Thermo-Fisher TEOM-FDMS monitors.

Particulate Matter (PM_{10})

PM_{10} appears to represent essentially all of the particulate emissions from transportation sources and most of the emissions in the other traditional categories (coal-burning power plants, steel mills, mining operations, etc.). Although $PM_{2.5}$ is technically included in the definition of PM_{10}, the terms "PM_{10}" or "coarse" particles are commonly used to refer to particles greater than $PM_{2.5}$, but less than 10 micrometers in diameter.

Sources of coarse particles may include dust-producing process, such as crushing or grinding operations, as well as dust stirred up by vehicles traveling on roads. While they are not as much of a health concern as are fine particles, they can aggravate respiratory conditions and irritate the linings of the eyes, nose, throat and lungs. In the environment, PM_{10} contributes to reduced visibility and degradation of man-made materials.

PM_{10} is sampled continuously using a tapered element oscillating microbalance (TEOM). Air is drawn through a specially designed inlet that excludes particles larger than 10 microns in diameter. Particle accumulation causes changes in the microbalance oscillation that are recorded by the instrument.

Lead (Pb)

Lead is emitted to the atmosphere primarily from certain industrial processes, such as battery manufacturers and lead smelters. A portion of the private aviation sector is an additional source of lead emissions. As a result of the reduction in lead in gasoline, metal processing is now the major source of lead emissions.

Lead is a highly toxic metal when ingested or inhaled. It is a suspected carcinogen of the lungs and kidneys and has adverse effects on the cardiovascular, nervous, and renal systems.

The amount of lead in ambient air is measured by laboratory analysis of TSP filters using Inductively Coupled Plasma - Mass Spectrometry.

Air Toxics

Hazardous air pollutants (HAPs), commonly referred to as air toxics, are pollutants known to cause or are suspected of causing cancer or other serious human health effects or ecosystem damage. Some air toxics are released from natural sources such as volcanic eruptions and forest fires. Most air toxics originate from mobile sources (cars, trucks, buses) and stationary sources (factories, refineries, power plants). Examples of some of the 188 toxic air pollutants include heavy metals such as mercury and chromium; benzene, found in gasoline; perchloroethylene, emitted from some dry cleaning facilities; and methylene chloride, used as a solvent and paint stripper by a number of industries.

Appendix B – Sites by MSA and Non-MSA Region

Appendix B of this document displays maps of monitoring network sites organized by Metropolitan Statistical Area (MSA) regions, as described in the "Description of PA DEP's Ambient Air Monitoring Network" section of this document. MSAs are listed in alphabetical order, followed by non-MSA regions. Table B-1 below lists the MSAs and non-MSA regions, in order of presentation. Areas listed in Table B-1, but not included in the following maps, do not contain monitoring sites operated by PA DEP.

Table B-1. Metropolitan Statistical Areas and Populations

MSA Region	County (Pennsylvania Portion)
Allentown-Bethlehem-Easton MSA	Carbon, Lehigh, Northampton
Altoona, PA-NJ MSA	Blair
Bloomsburg-Berwick, PA MSA	Columbia, Montour
Chambersburg-Waynesboro, PA MSA	Franklin
East Stroudsburg, PA MSA	Monroe
Erie, PA MSA	Erie
Gettysburg, PA MSA	Adams
Harrisburg-Carlisle, PA MSA	Cumberland, Dauphin, Perry
Johnstown, PA MSA	Cambria
Lancaster, PA MSA	Lancaster
Lebanon, PA MSA	Lebanon
New York-Newark-Jersey City MSA	Pike
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA	Bucks, Chester, Delaware, Montgomery, Philadelphia
Pittsburgh, PA MSA	Allegheny, Armstrong, Beaver, Butler, Fayette, Washington, Westmoreland
Reading, PA MSA	Berks
Scranton-Wilkes-Barre-Hazleton MSA	Lackawanna, Luzerne, Wyoming
State College, PA MSA	Centre
Williamsport, PA MSA	Lycoming
York-Hanover, PA MSA	York
Youngstown-Warren-Boardman, OH-PA MSA	Mercer
Northcentral Region - Non-MSA	Bradford, Cameron, Clearfield, Clinton, Northumberland, Potter, Snyder, Sullivan, Tioga, Union
Northeast Region - Non-MSA	Schuylkill, Susquehanna, Wayne
Northwest Region - Non-MSA	Clarion, Crawford, Elk, Forest, Jefferson, Lawrence, McKean, Venango, Warren
Southcentral Region - Non-MSA	Bedford, Fulton, Huntingdon, Juniata, Mifflin
Southwest Region - Non-MSA	Greene, Indiana, Somerset

Figure B-1. Allentown-Bethlehem-Easton, PA-NJ MSA (Pennsylvania portion)

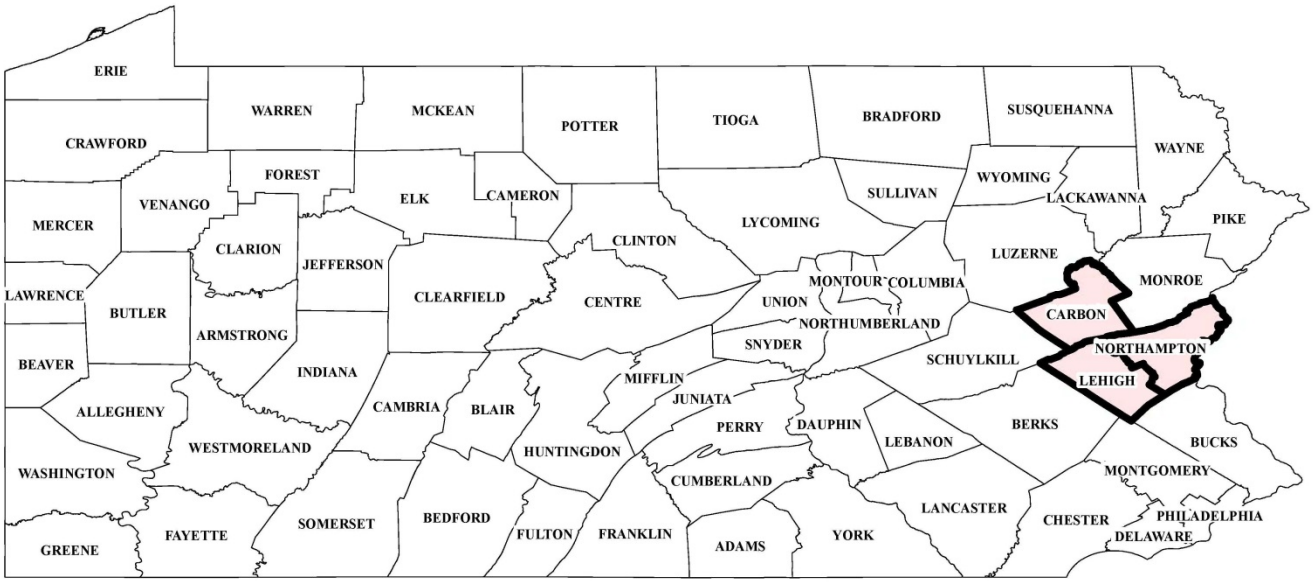


Figure B-2. Allentown-Bethlehem-Easton, PA-NJ MSA (Pennsylvania portion) Site Detail

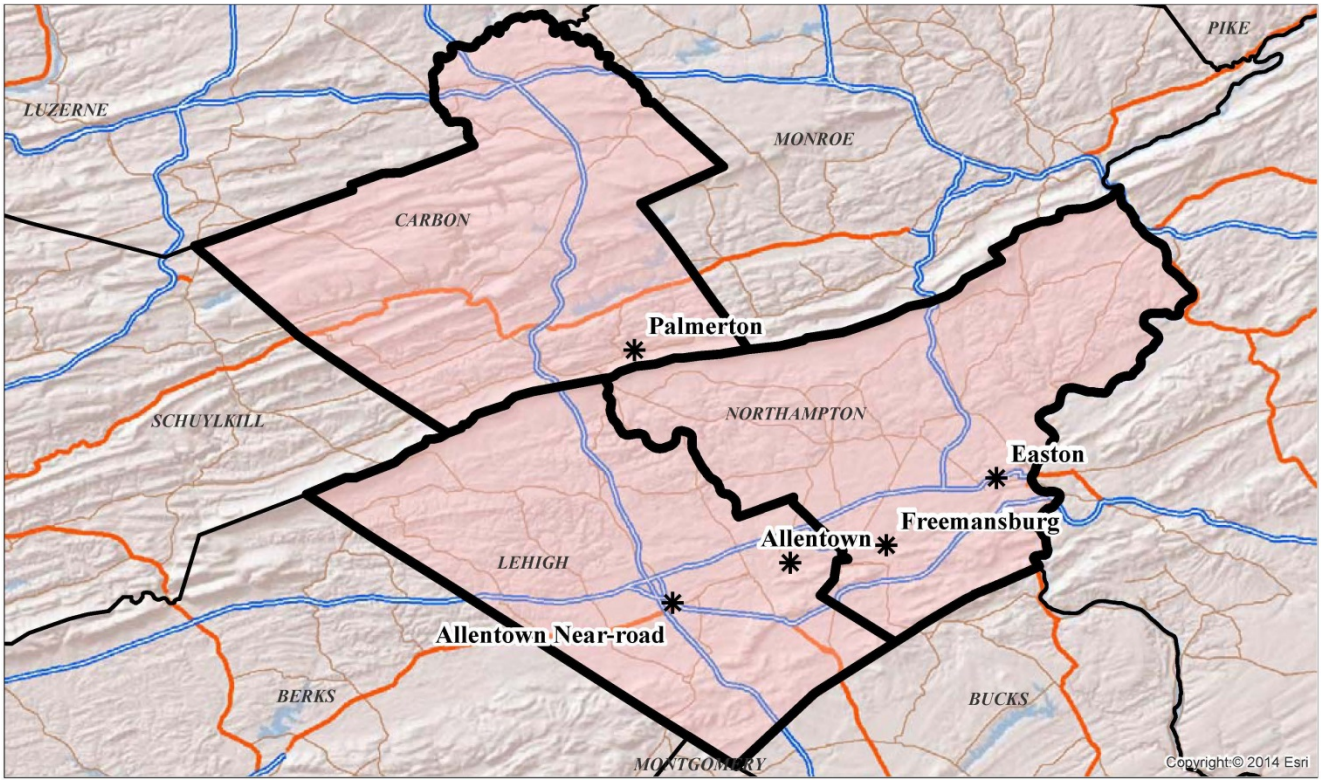


Figure B-3. Altoona, PA MSA

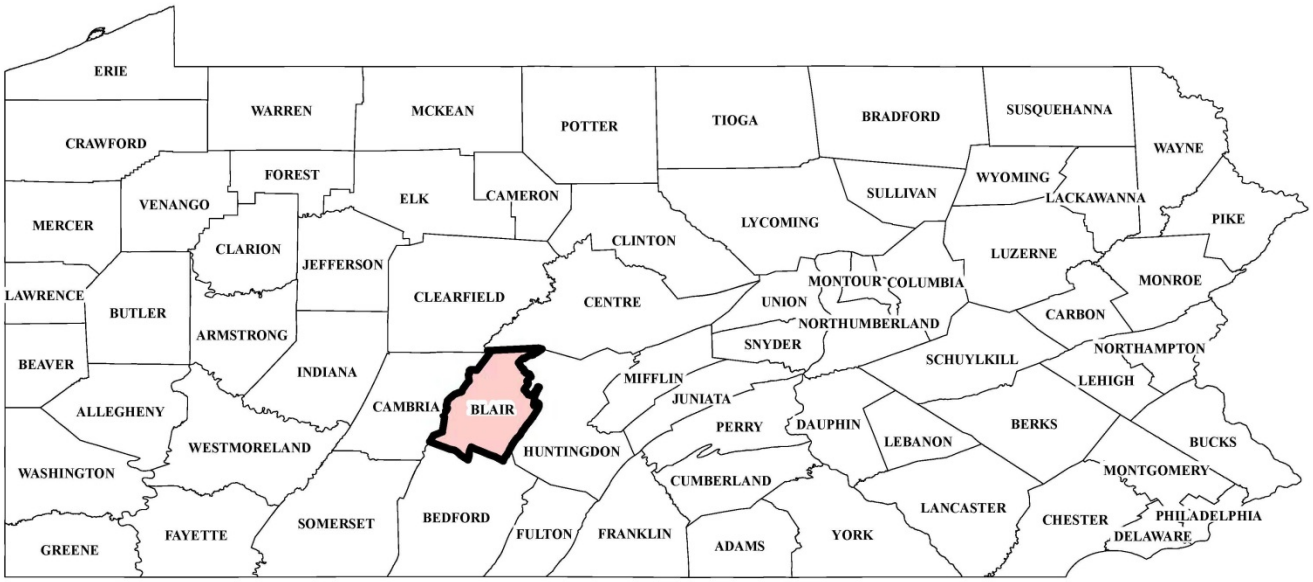


Figure B-4. Altoona, PA MSA Site Detail

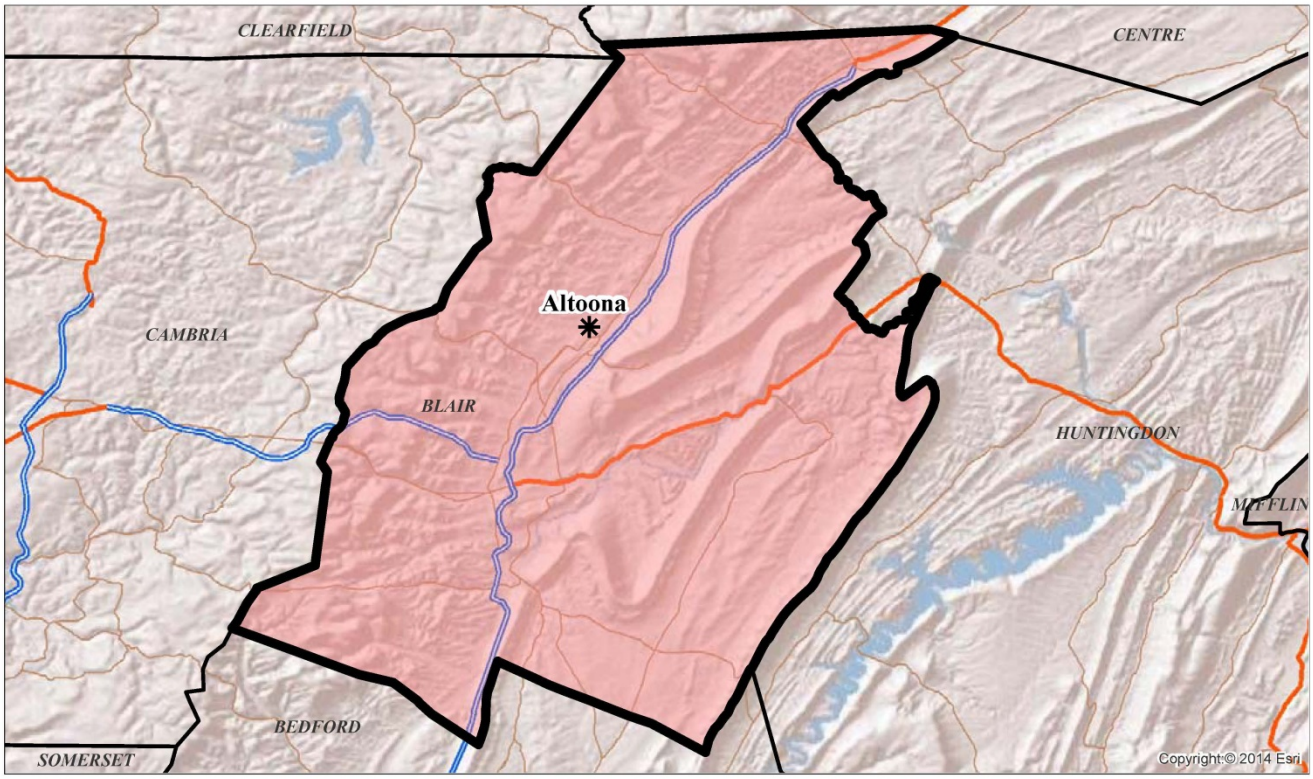


Figure B-5. Chambersburg-Waynesboro, PA MSA

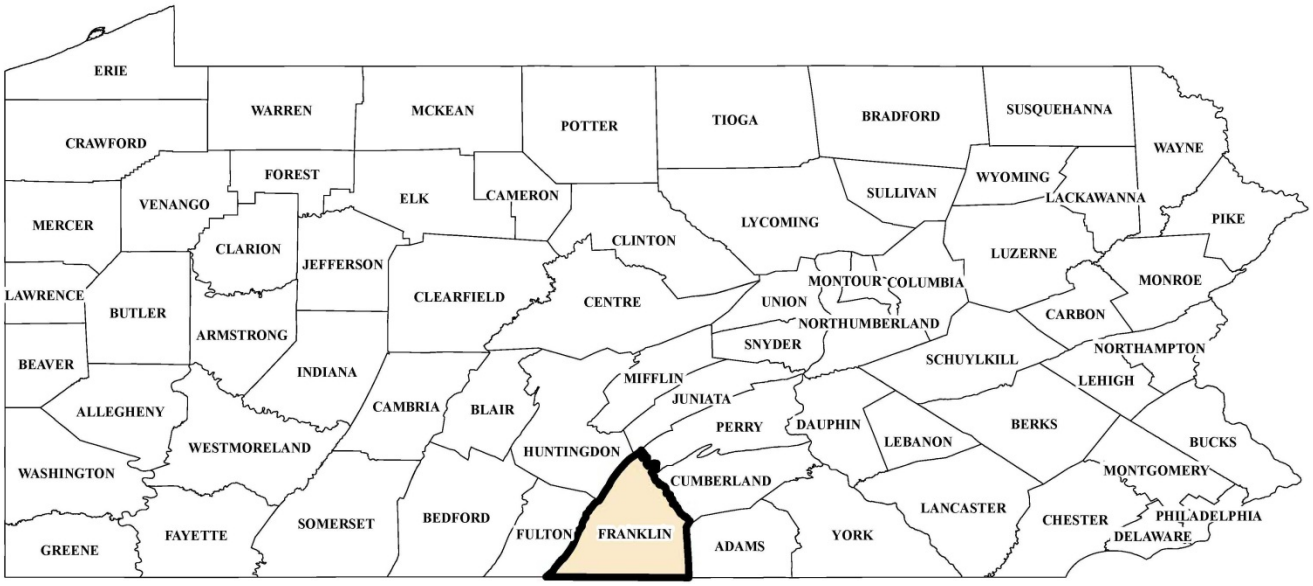


Figure B-6. Chambersburg-Waynesboro, PA MSA Site Detail

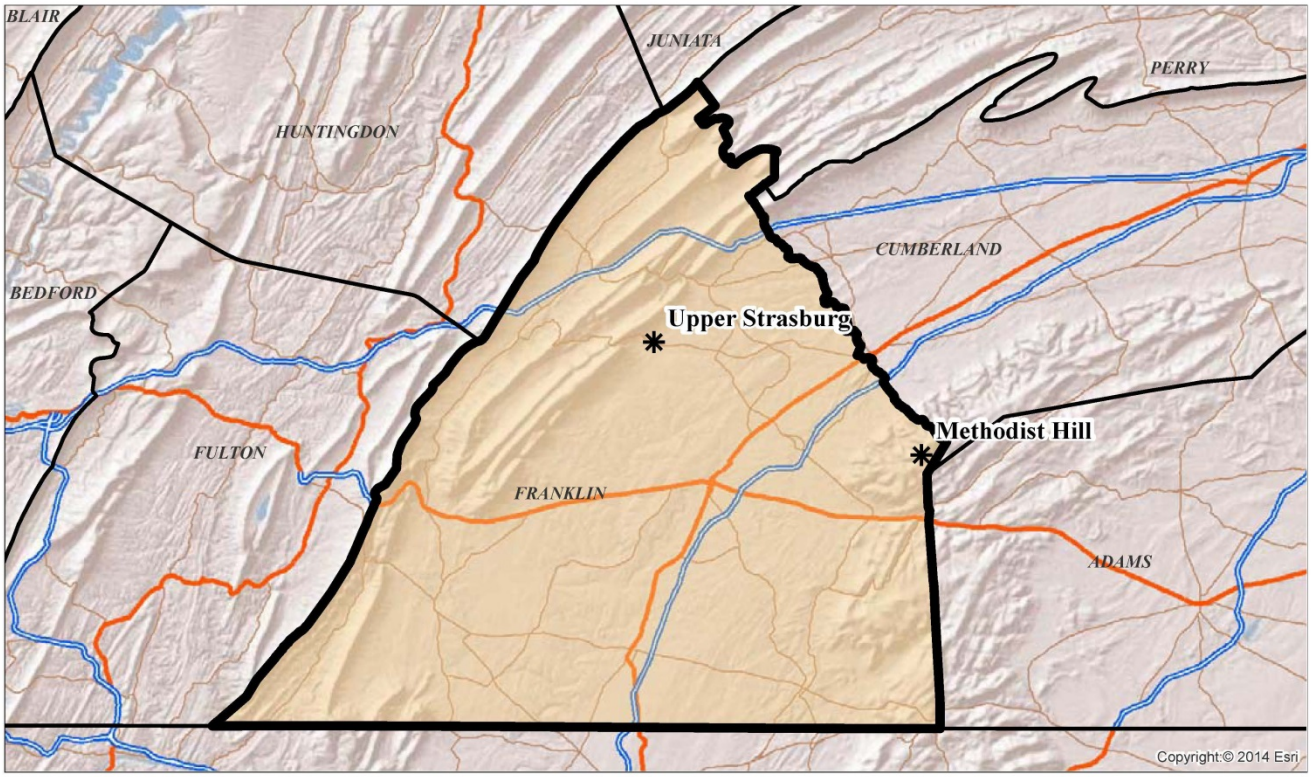


Figure B-7. East Stroudsburg, PA MSA

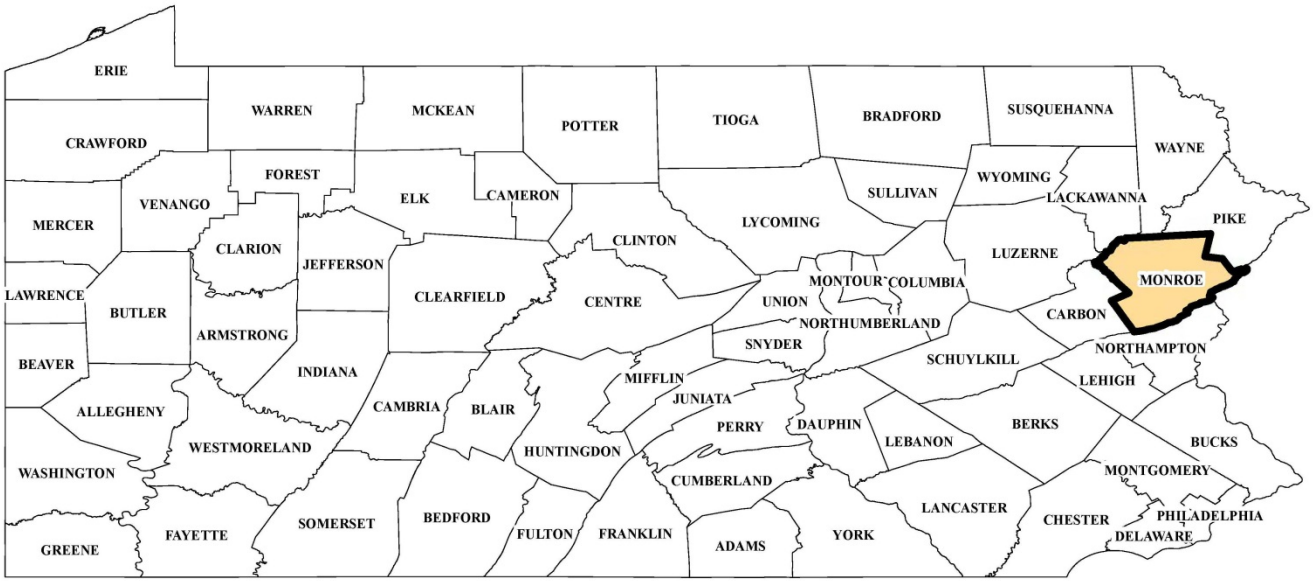


Figure B-8. East Stroudsburg, PA MSA Site Detail

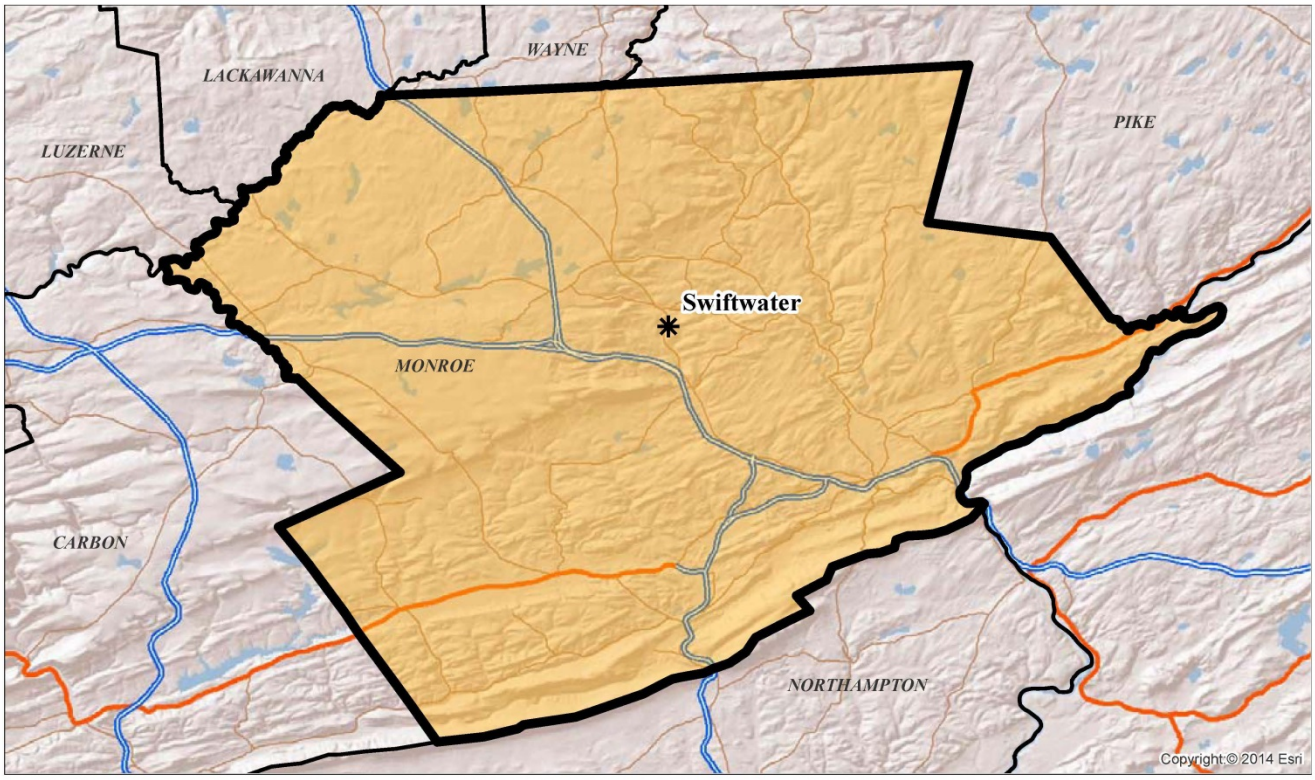


Figure B-9. Erie, PA MSA

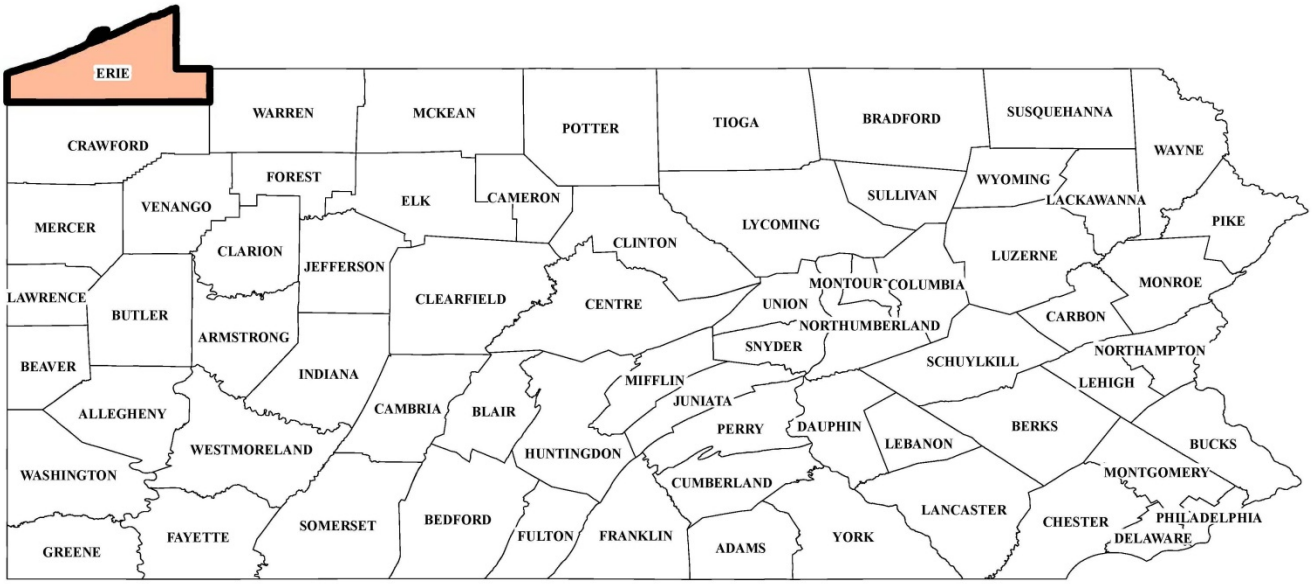


Figure B-10. Erie, PA MSA Site Detail

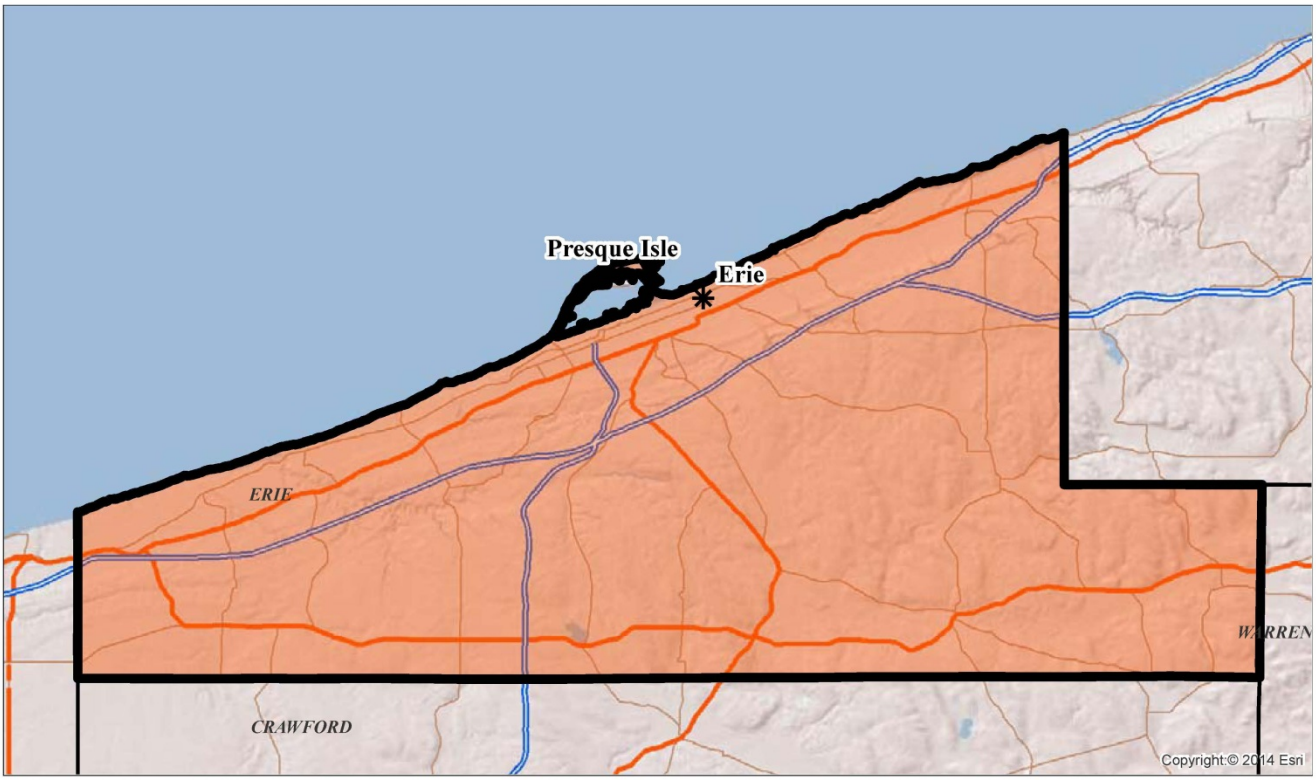


Figure B-11. Gettysburg, PA MSA

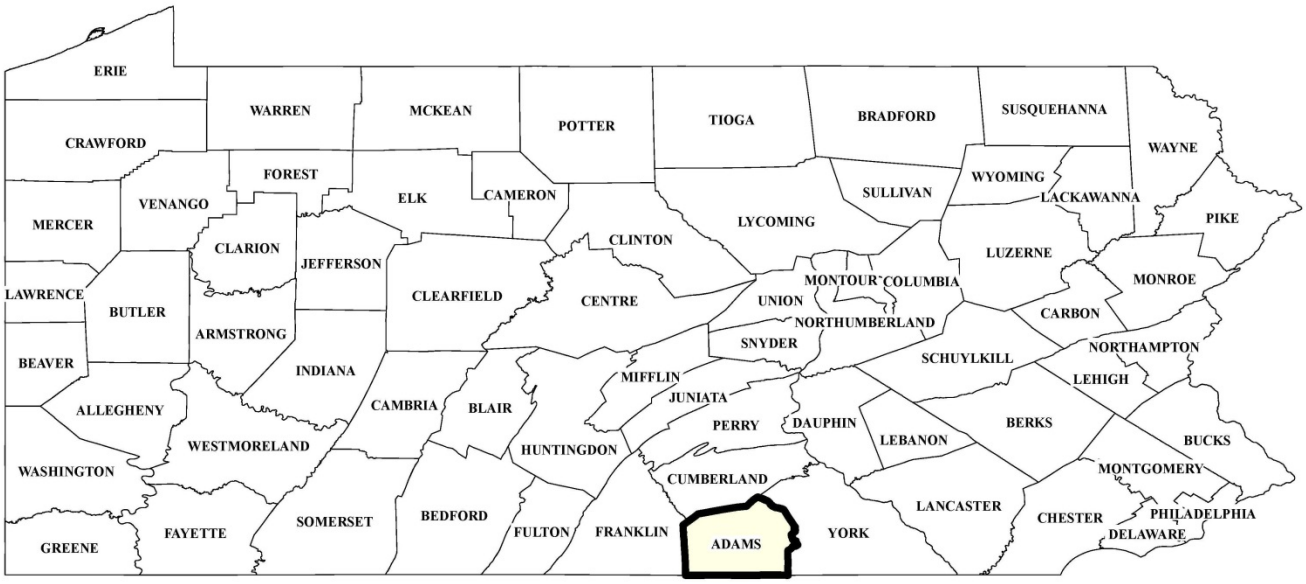


Figure B-12. Gettysburg, PA MSA Site Detail

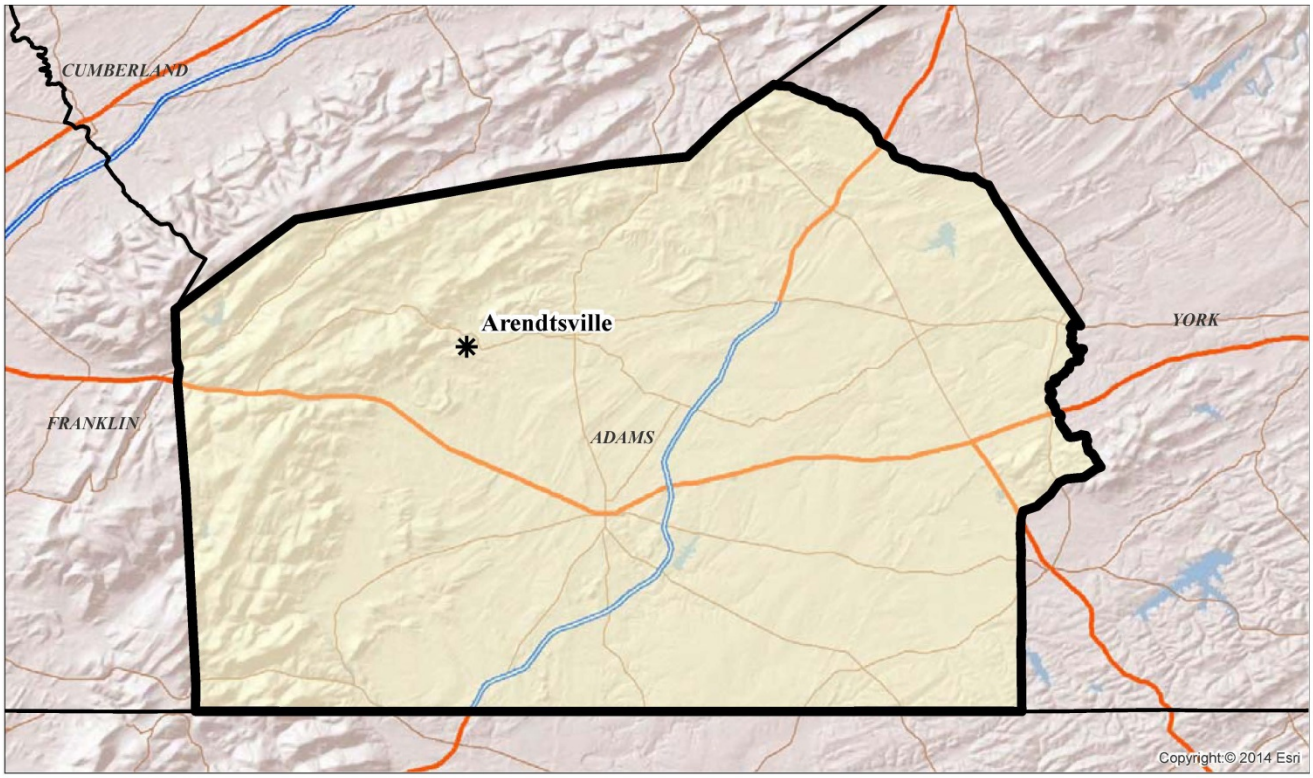


Figure B-13. Harrisburg-Carlisle, PA MSA

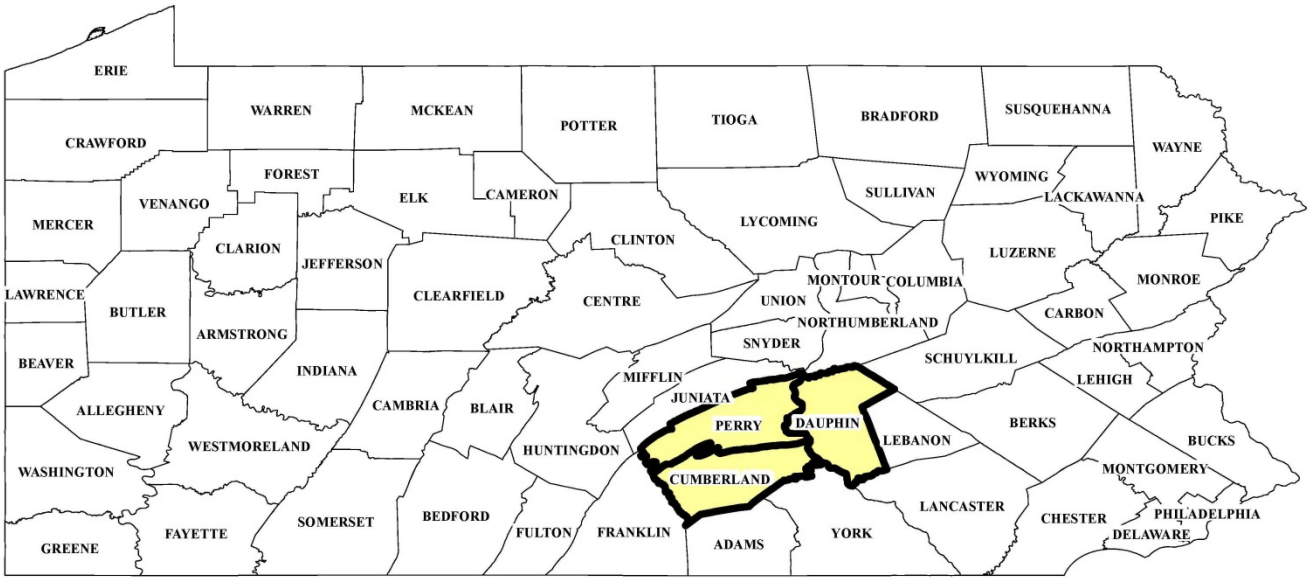


Figure B-14. Harrisburg-Carlisle, PA MSA Site Detail

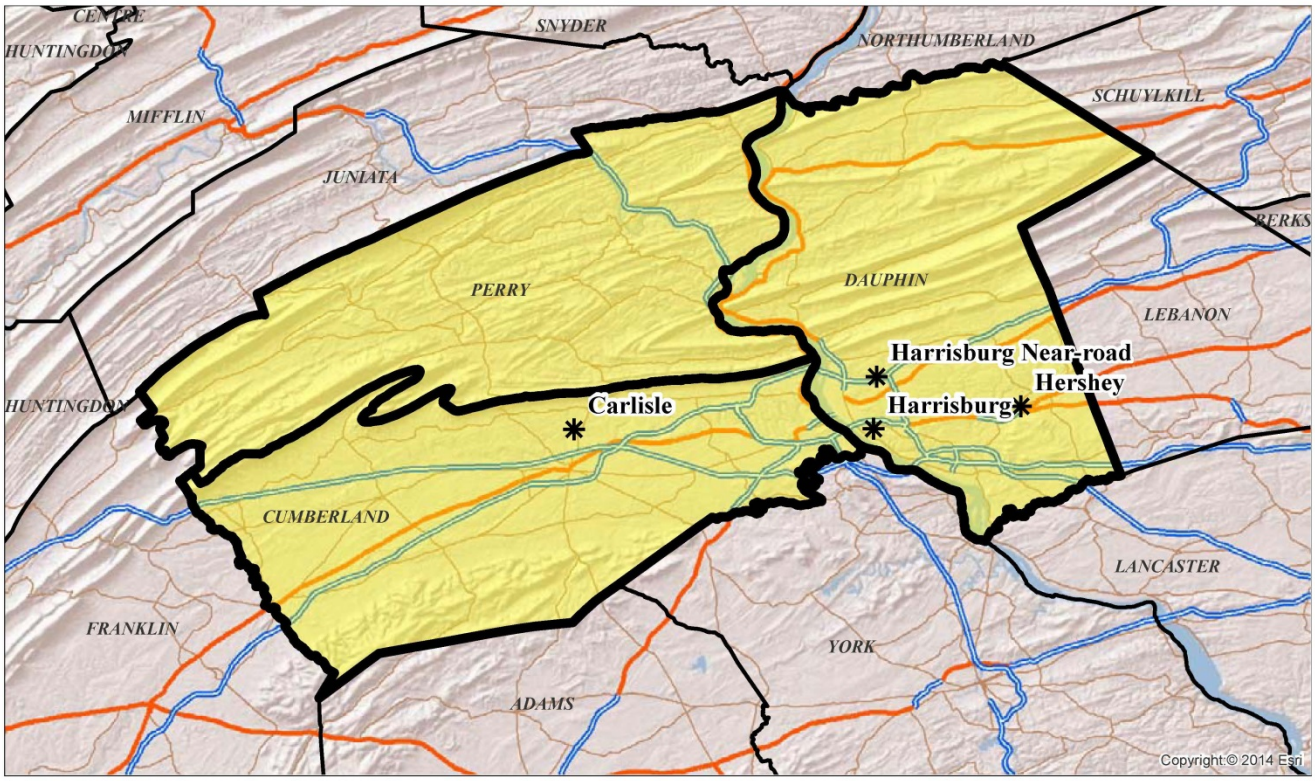


Figure B-15. Johnstown, PA MSA

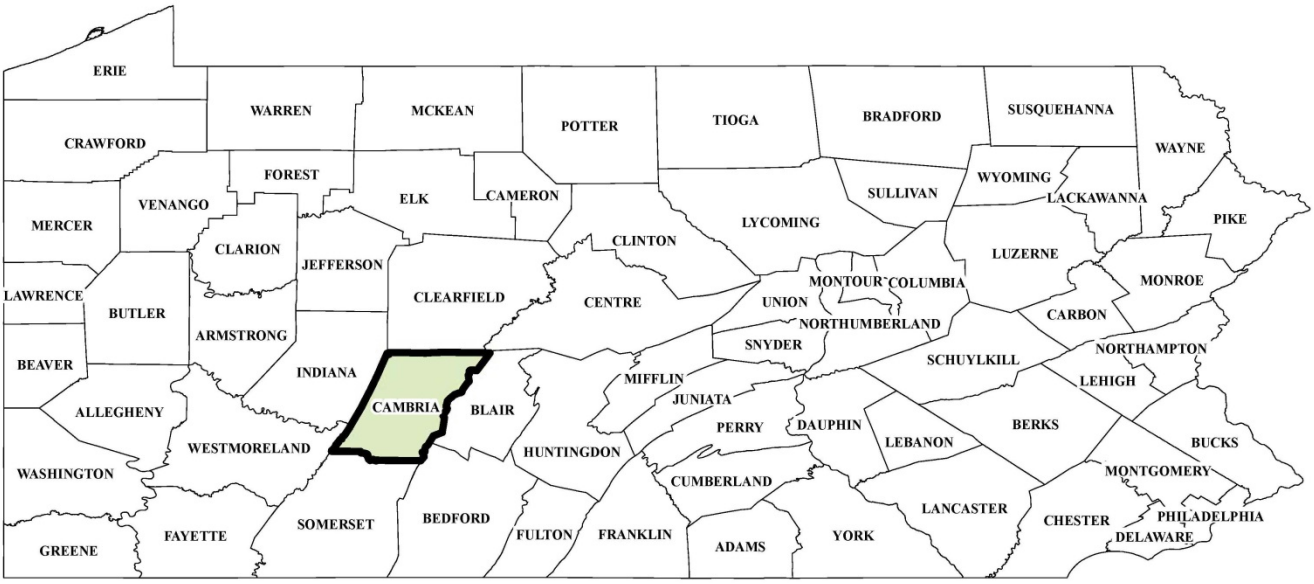


Figure B-16. Johnstown, PA MSA Site Detail

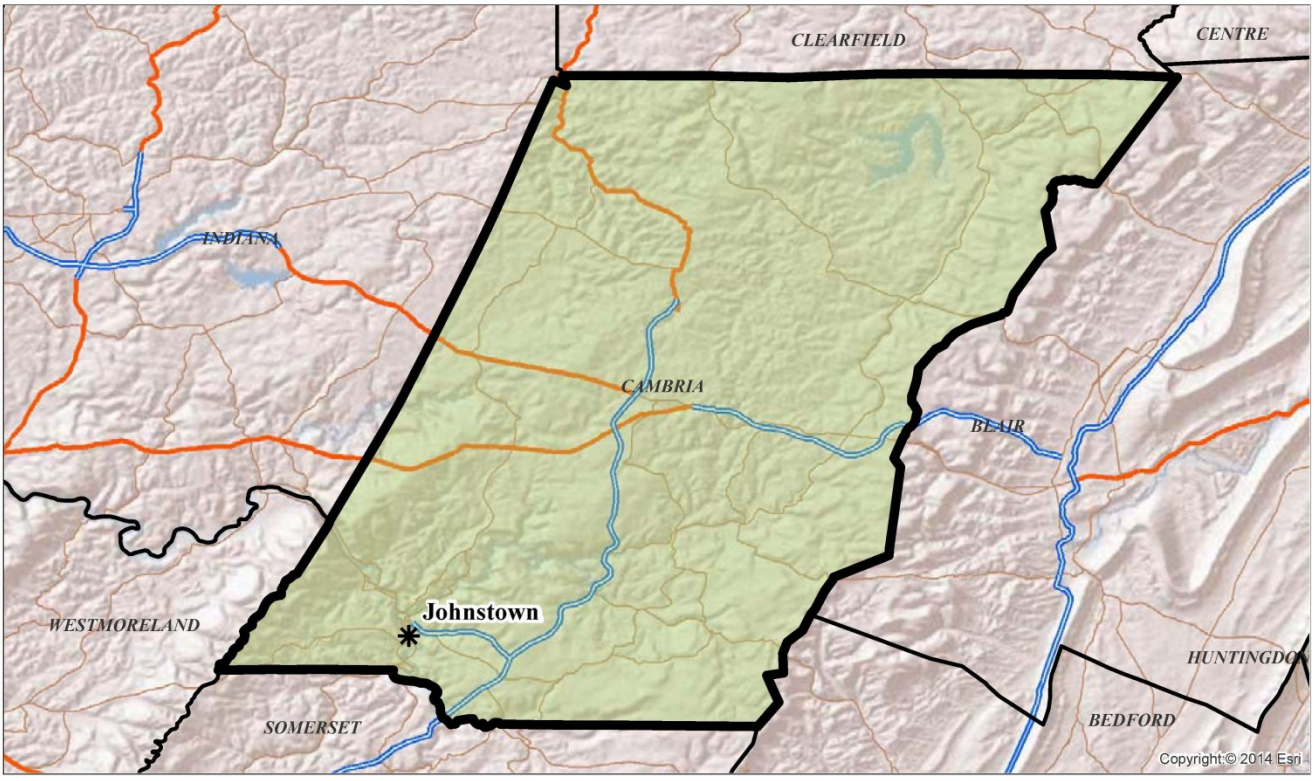


Figure B-17. Lancaster, PA MSA

Figure B-18. Lancaster, PA MSA Site Detail

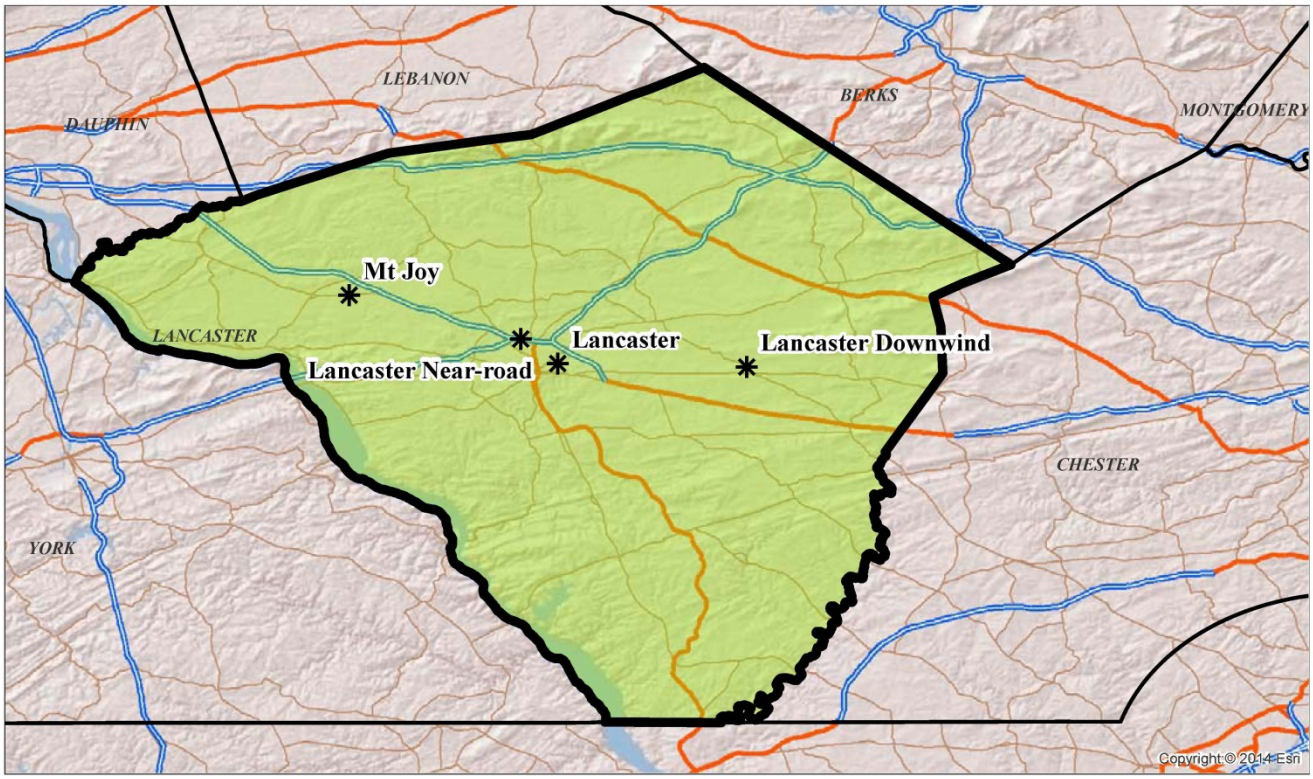


Figure B-19. Lebanon, PA MSA

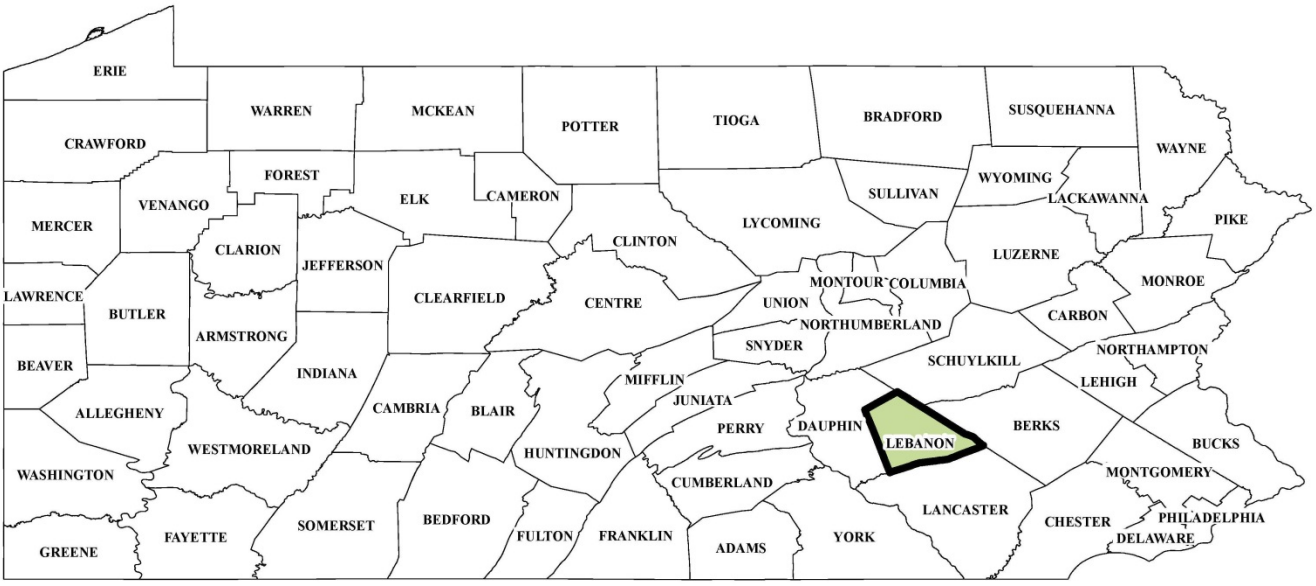


Figure B-20. Lebanon, PA MSA Site Detail

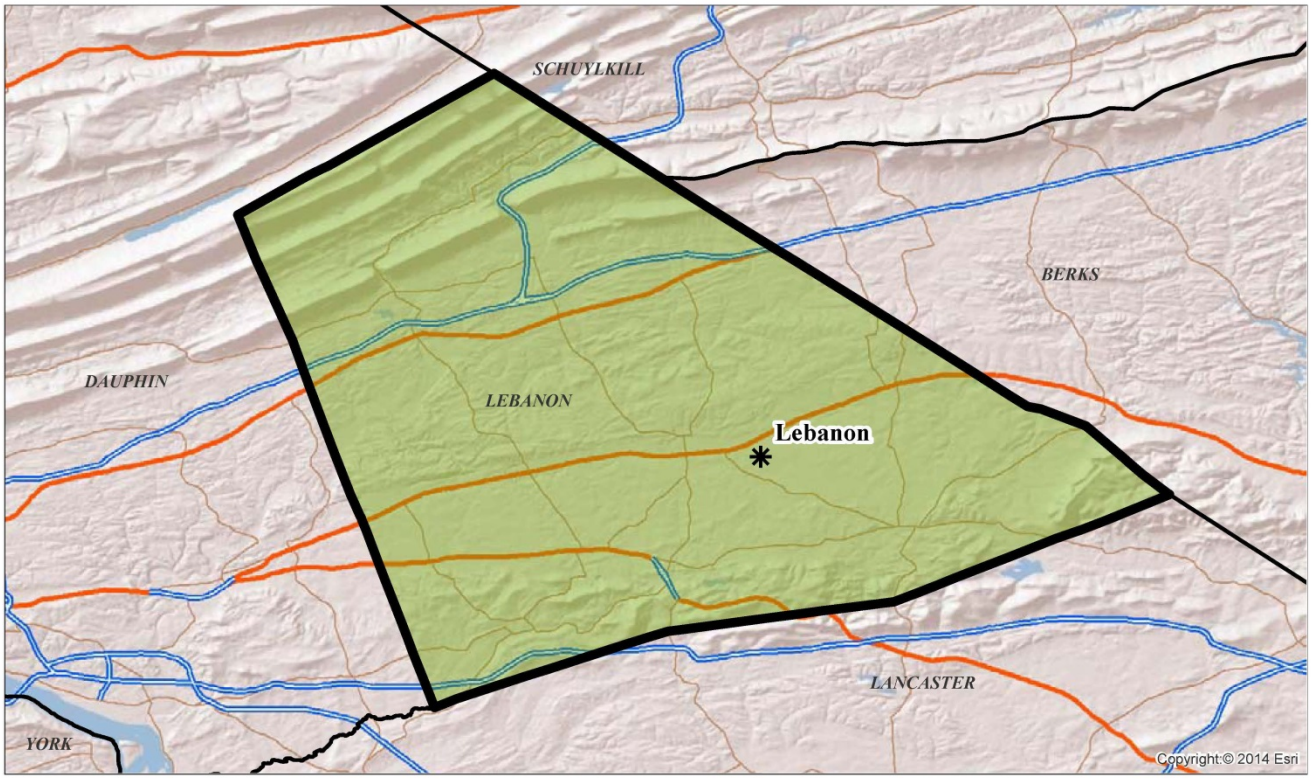


Figure B-21. Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA (Pennsylvania portion)

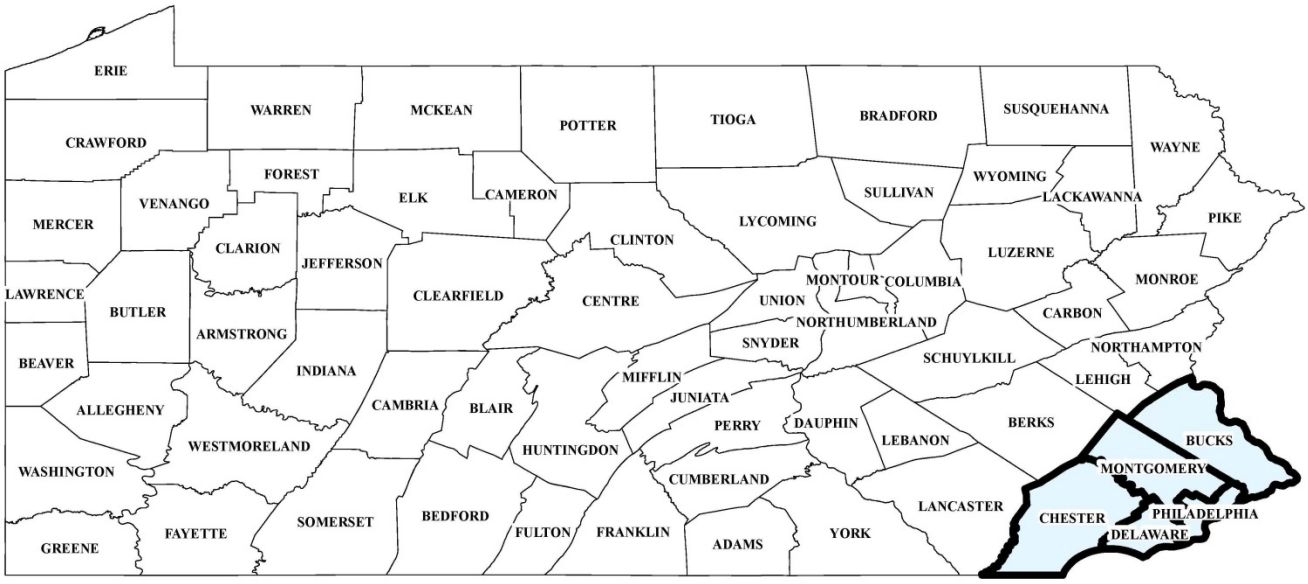


Figure B-22. Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA (Pennsylvania portion) Site Detail

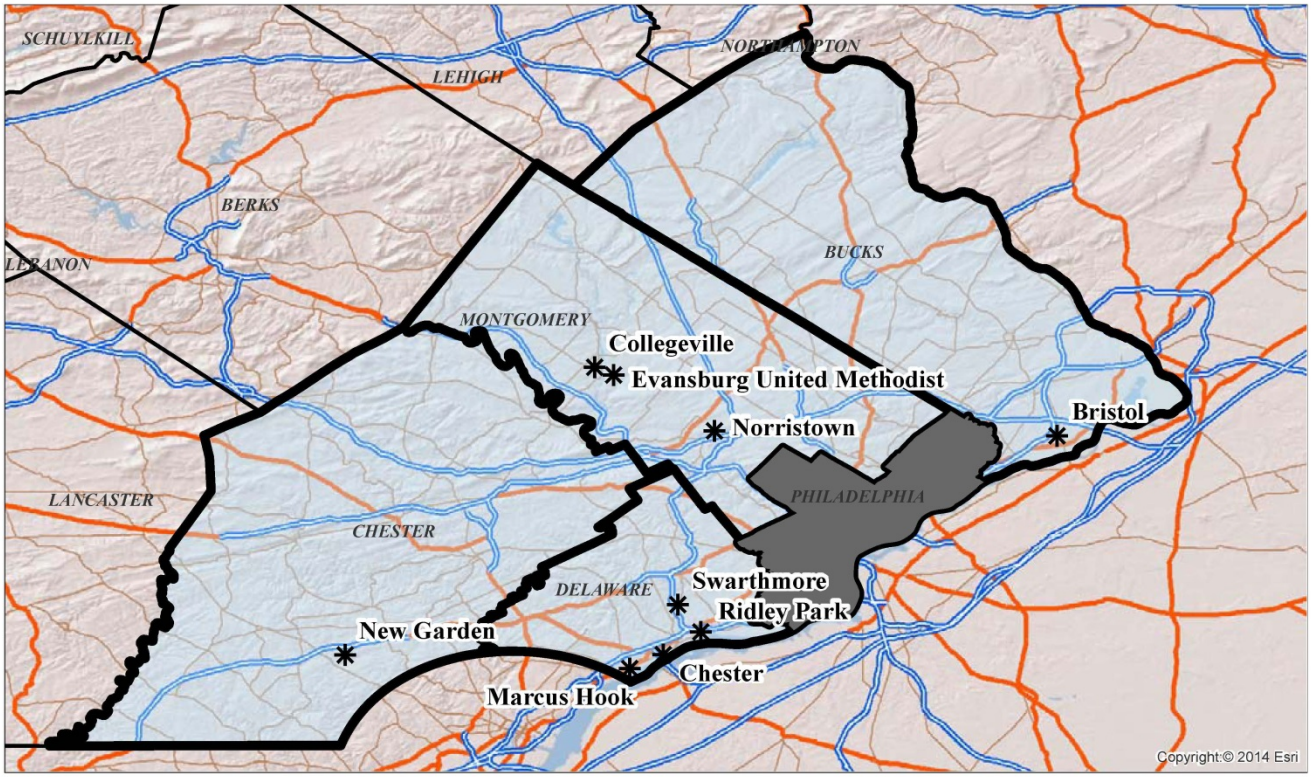


Figure B-23. Pittsburgh, PA MSA

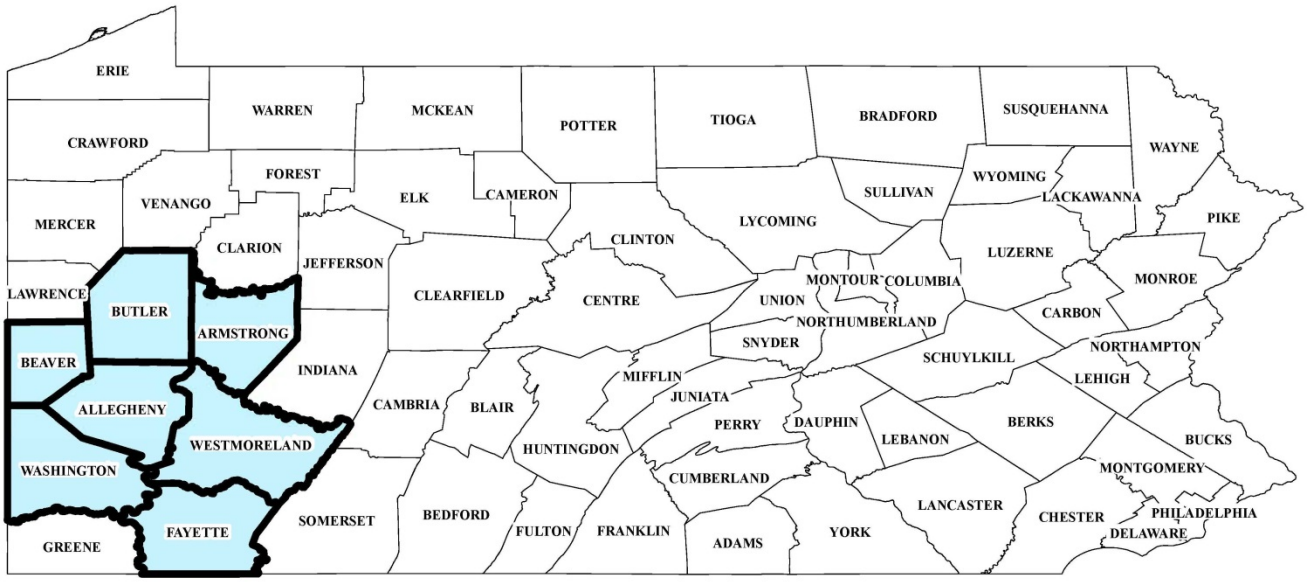


Figure B-24. Pittsburgh, PA MSA Site Detail

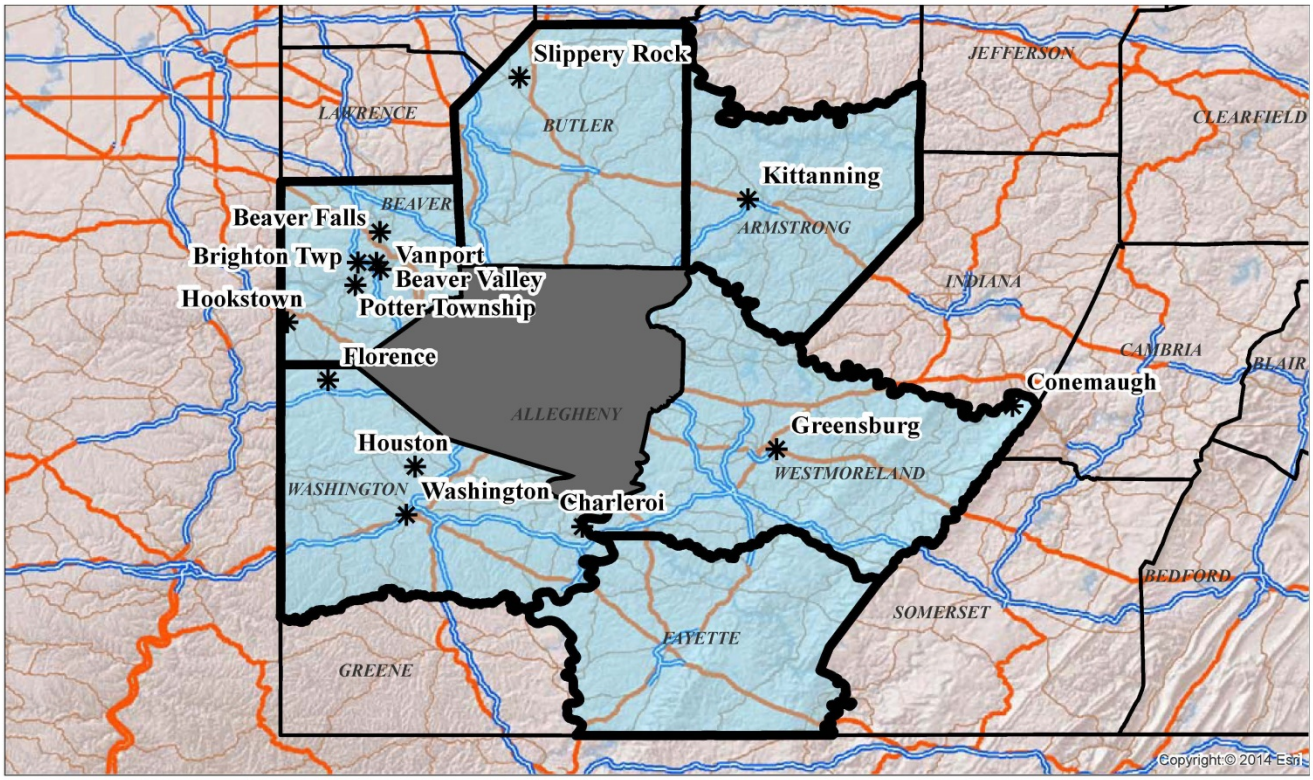


Figure B-25. Reading, PA MSA Overview

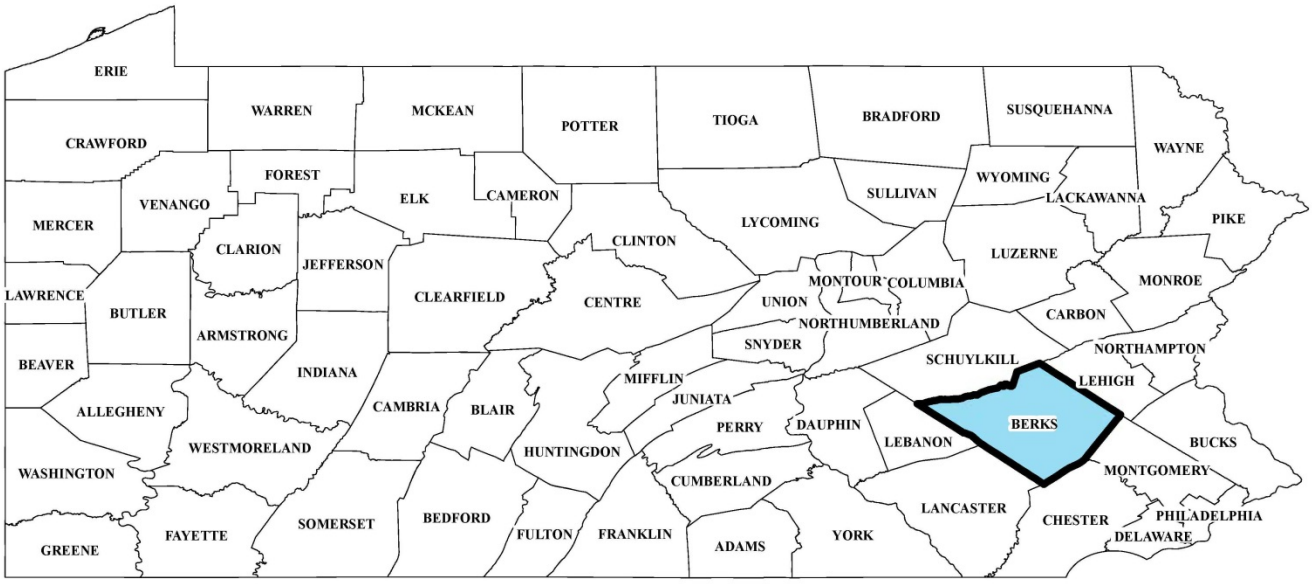


Figure B-26. Reading, PA MSA Site Detail

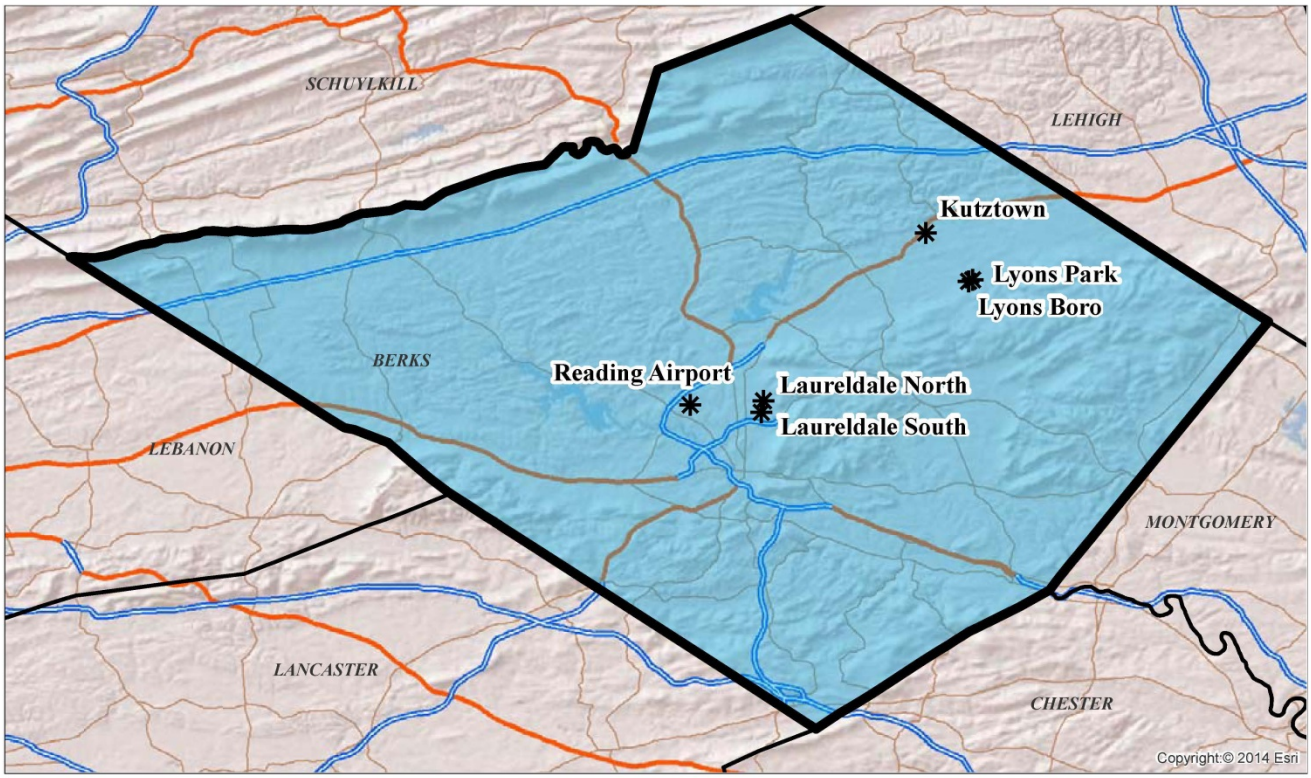


Figure B-27. Scranton-Wilkes-Barre-Hazleton, PA MSA

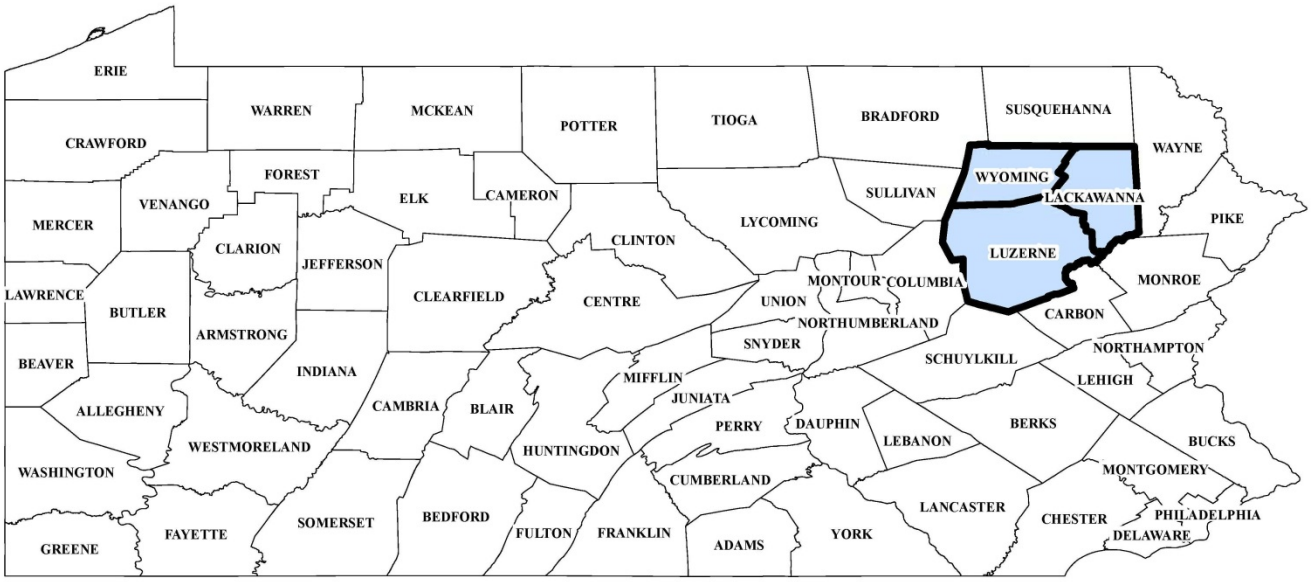


Figure B-28. Scranton-Wilkes-Barre-Hazleton, PA MSA Site Detail

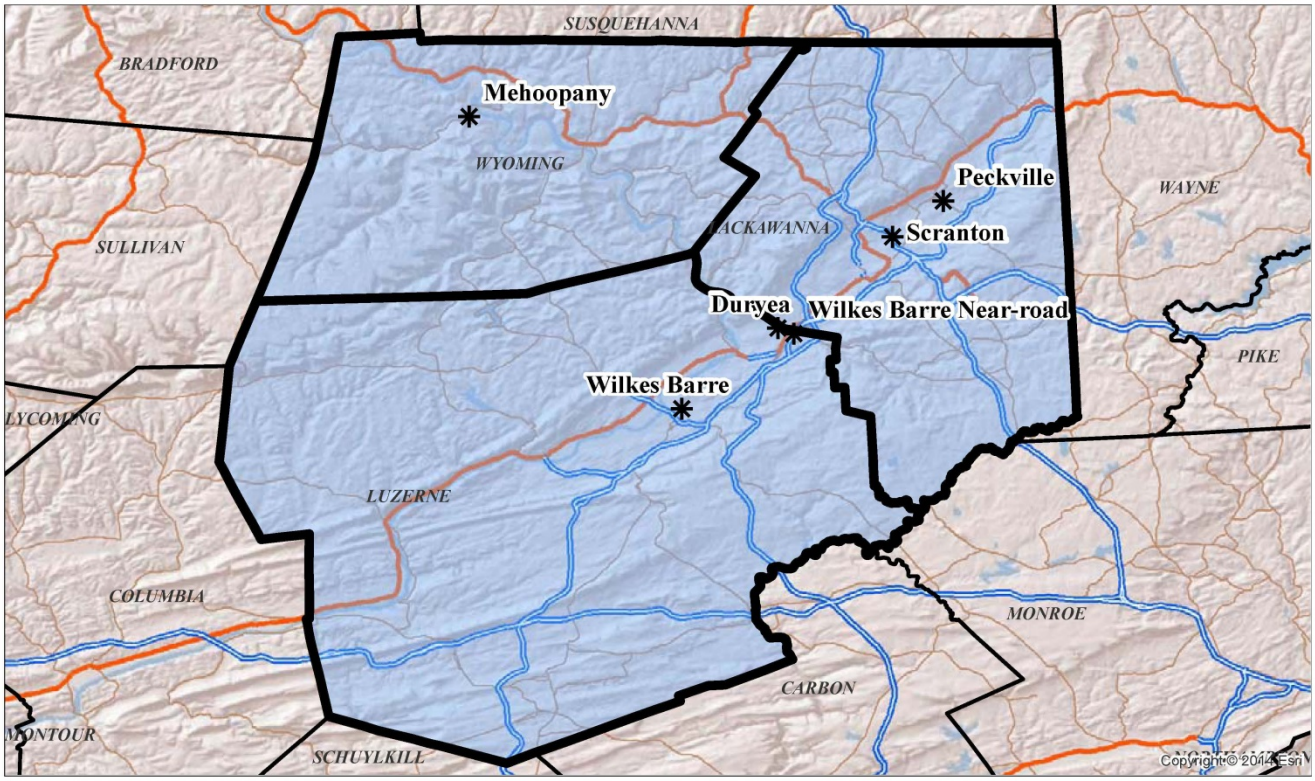


Figure B-29. State College, PA MSA

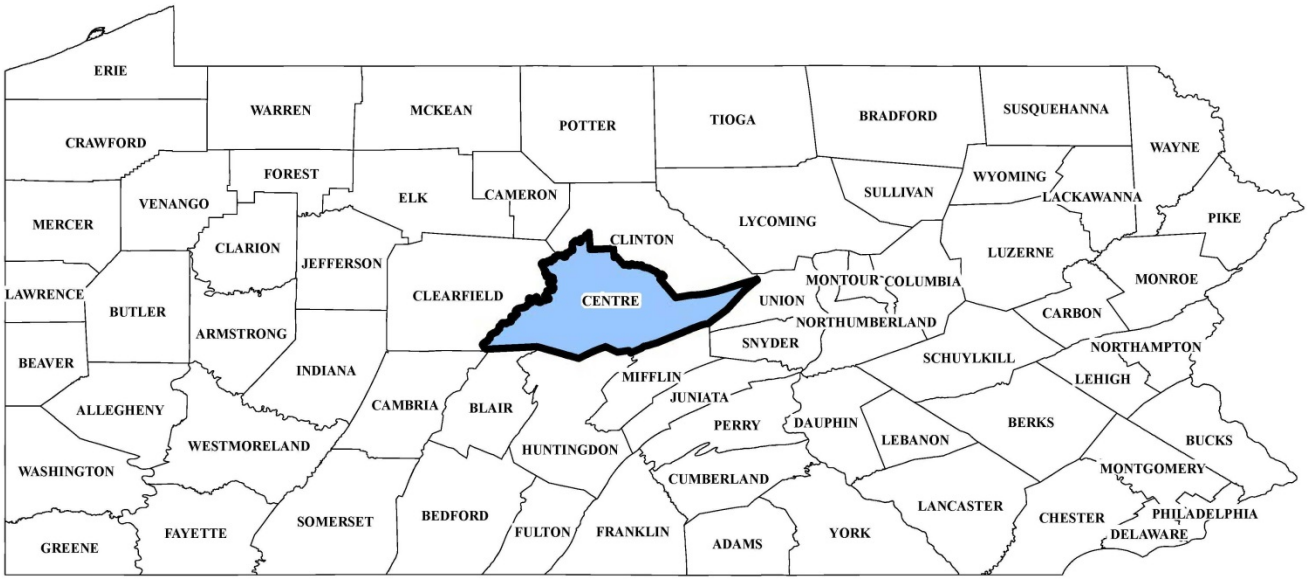


Figure B-30. State College, PA MSA Site Detail

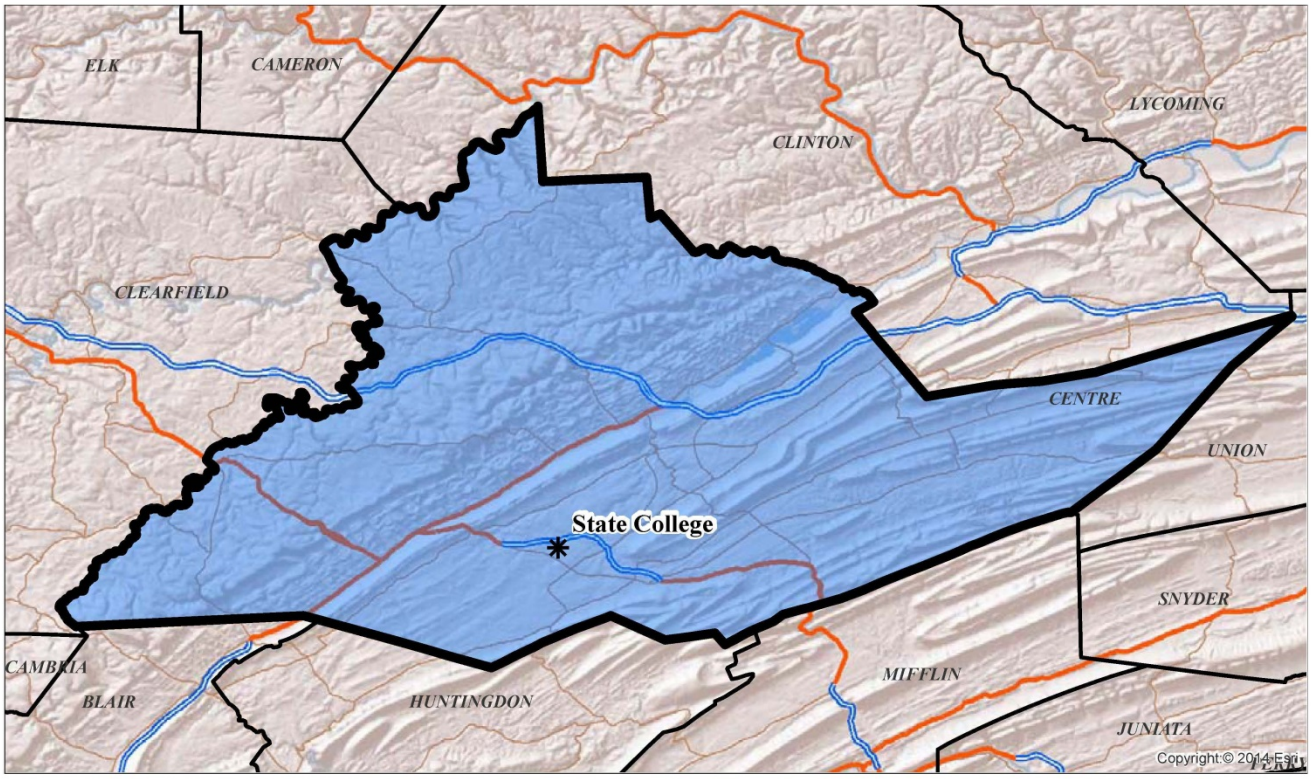


Figure B-31. Williamsport, PA MSA

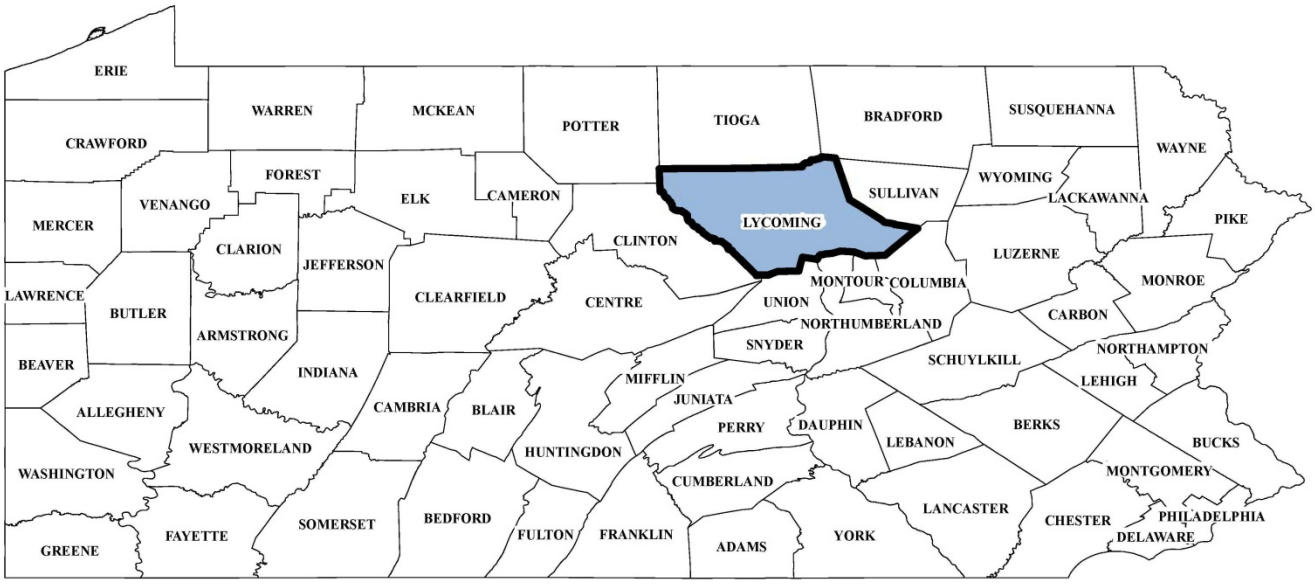


Figure B-32. Williamsport, PA MSA Site Detail

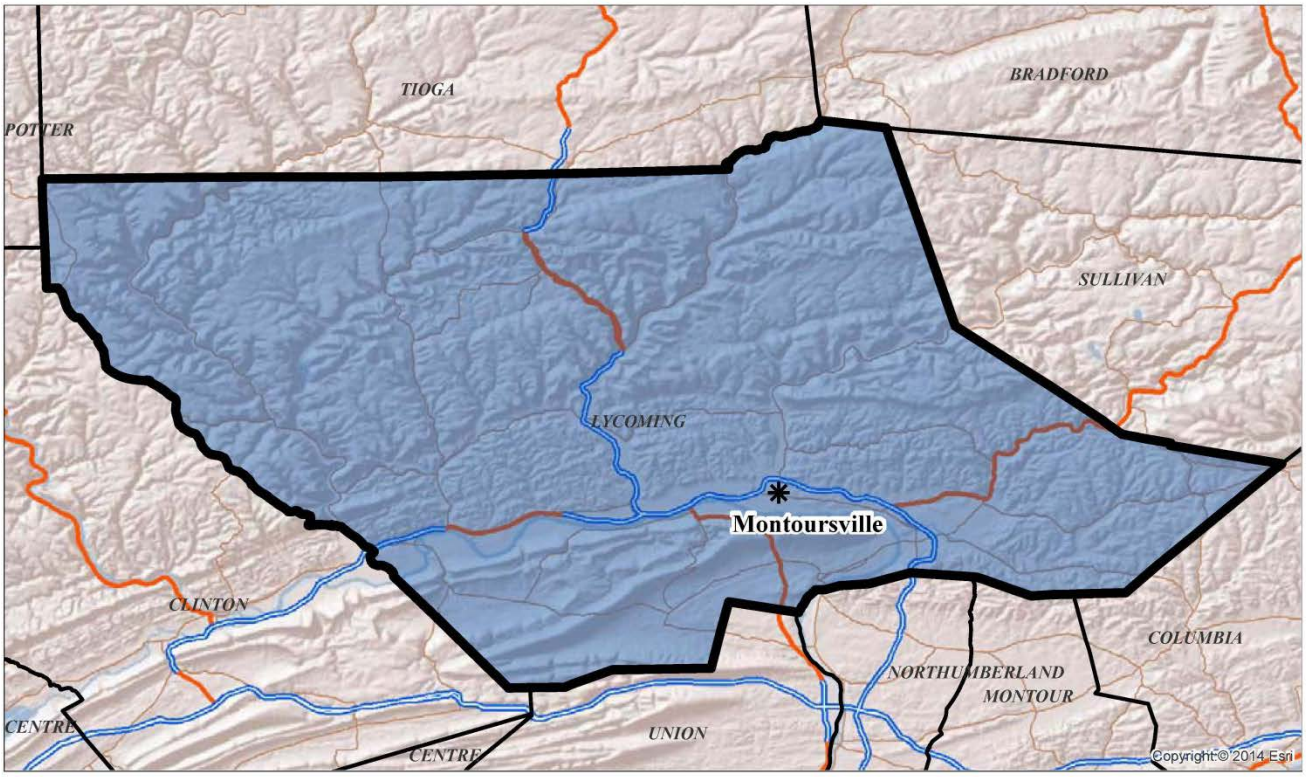


Figure B-33. York-Hanover, PA MSA

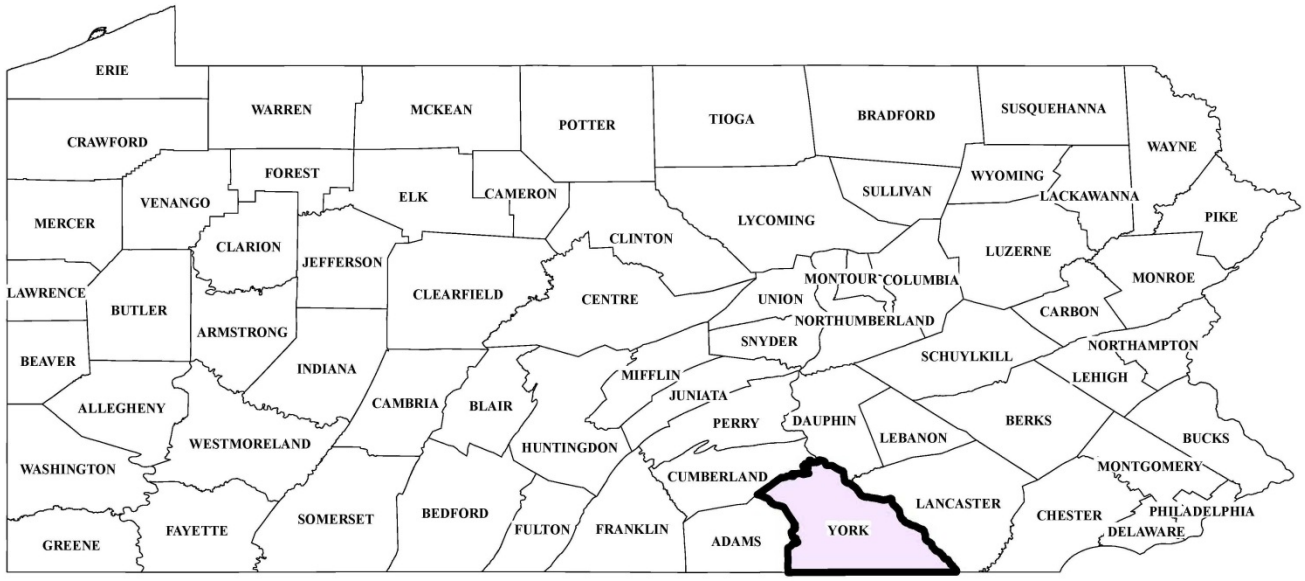


Figure B-34. York-Hanover, PA MSA Site Detail

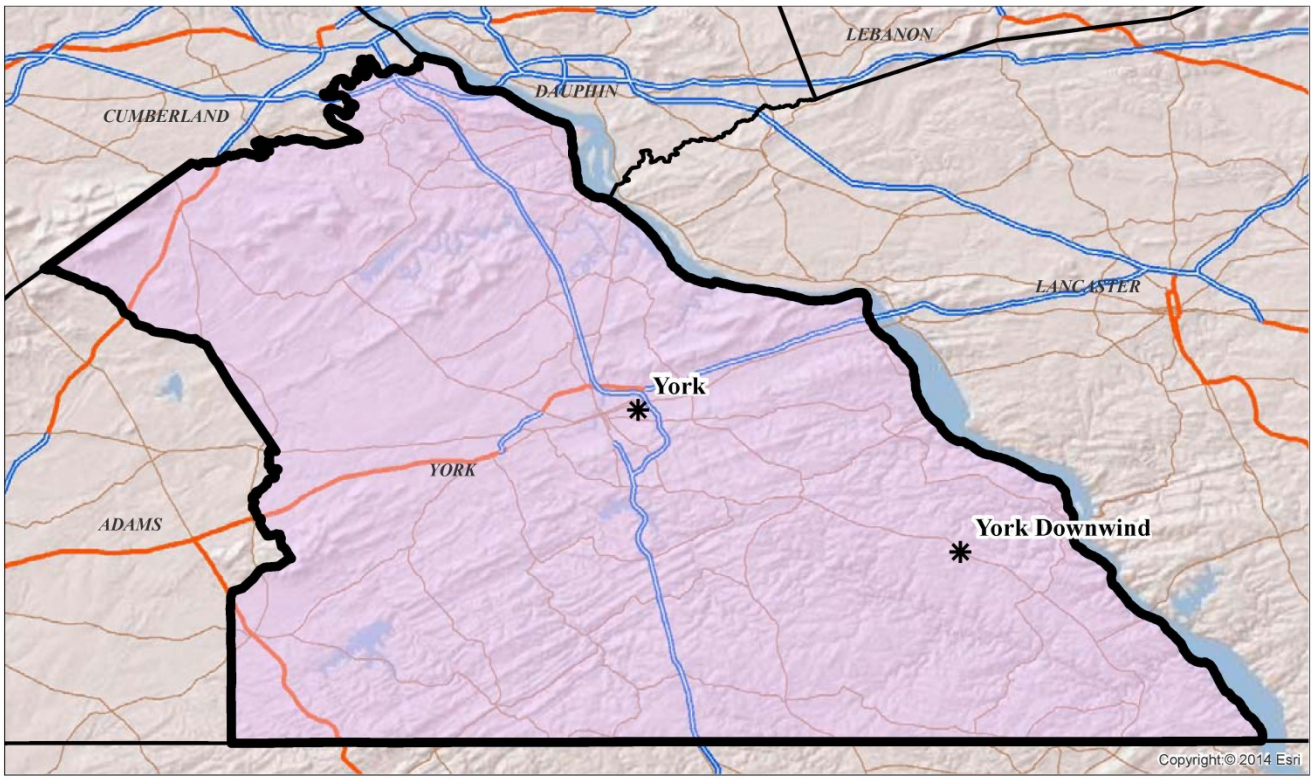


Figure B-35. Youngstown-Warren-Boardman, OH-PA MSA (Pennsylvania portion)

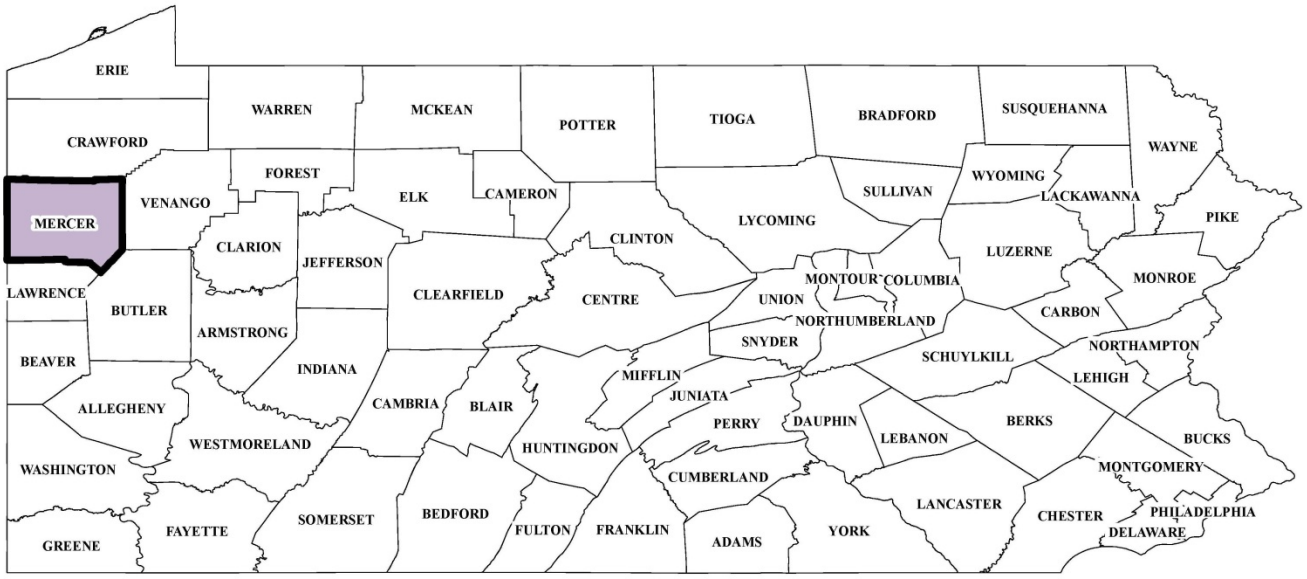


Figure B-36. Youngstown-Warren-Boardman, OH-PA MSA (Pennsylvania portion) Site Detail

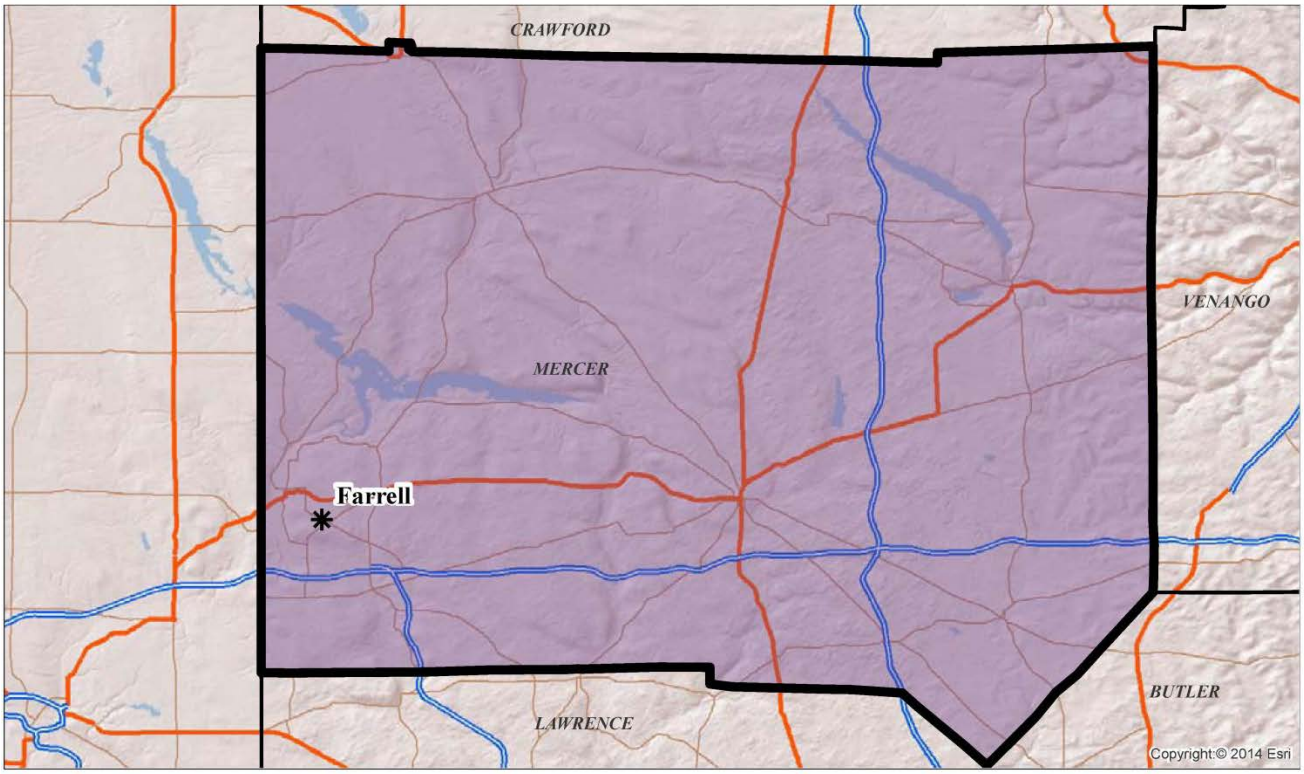


Figure B-37. Overview of the Northcentral Non-MSA Region

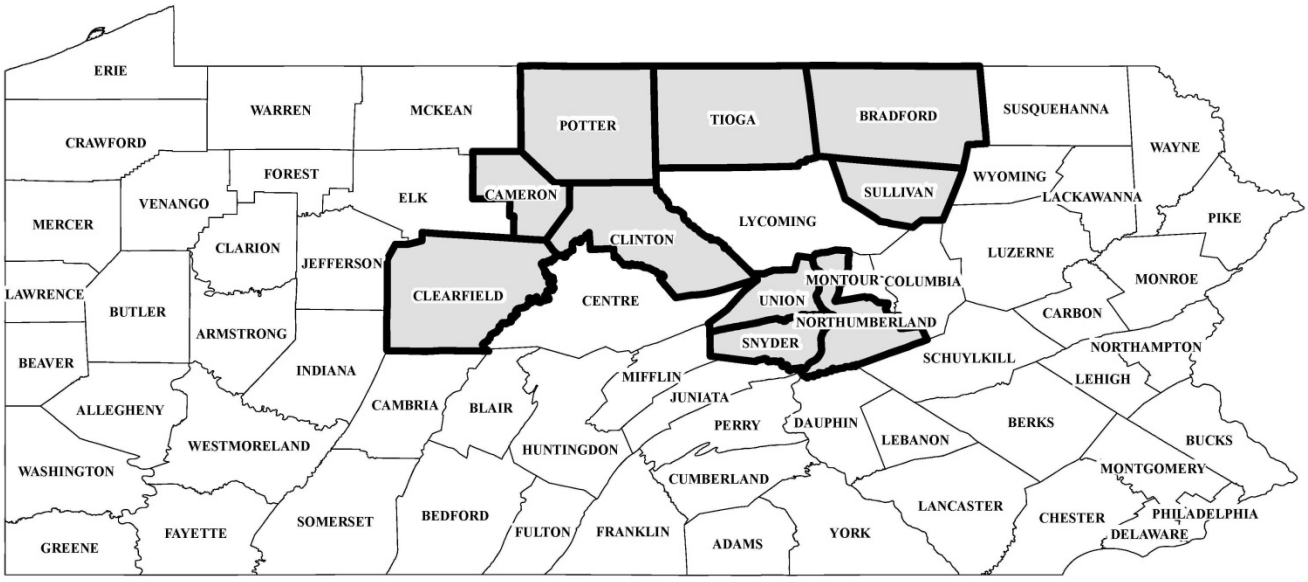


Figure B-38. Northcentral Non-MSA Region Site Detail

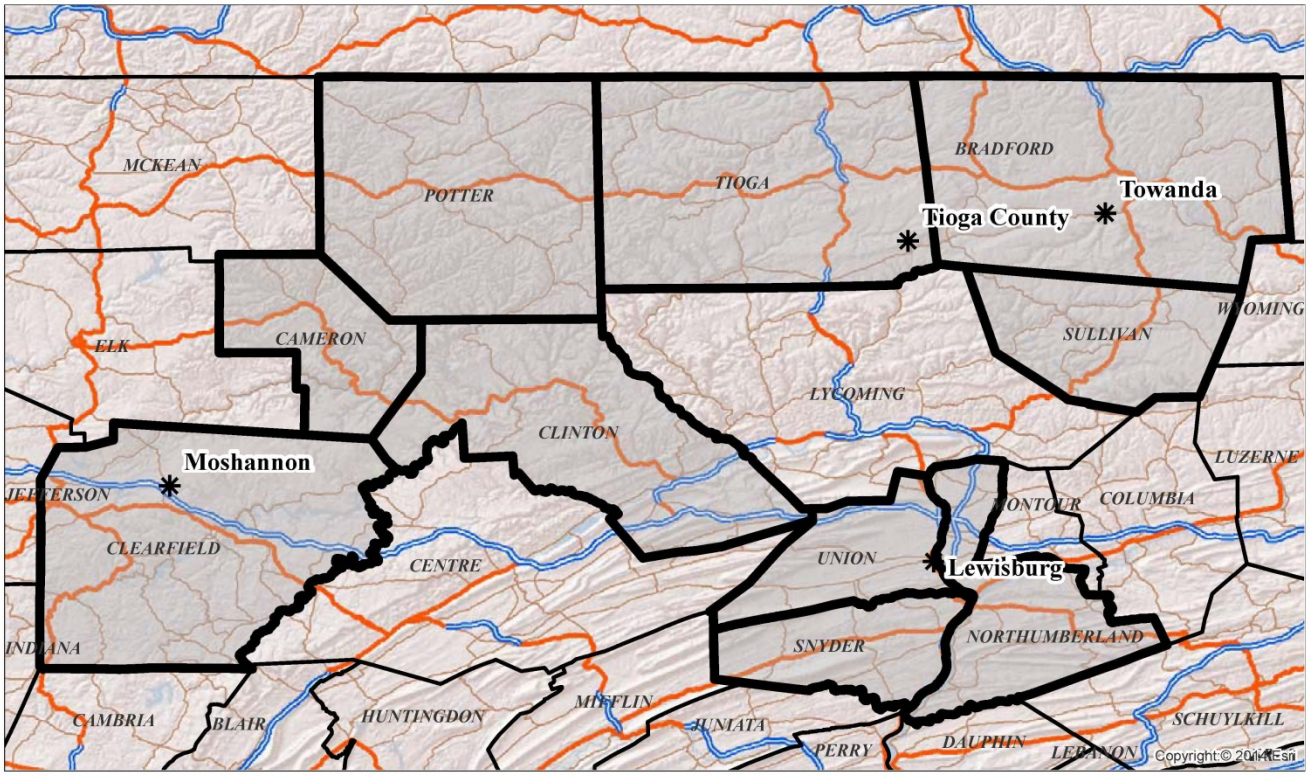


Figure B-39. Overview of the Northeast Non-MSA Region

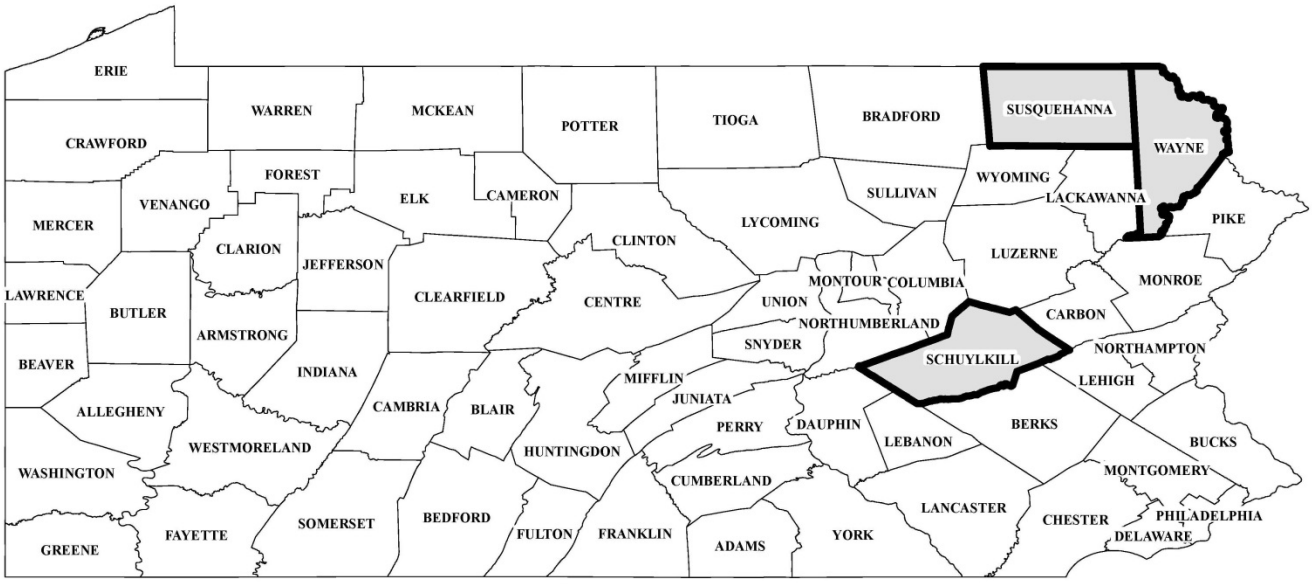


Figure B-40. Northeast Non-MSA Region Site Detail

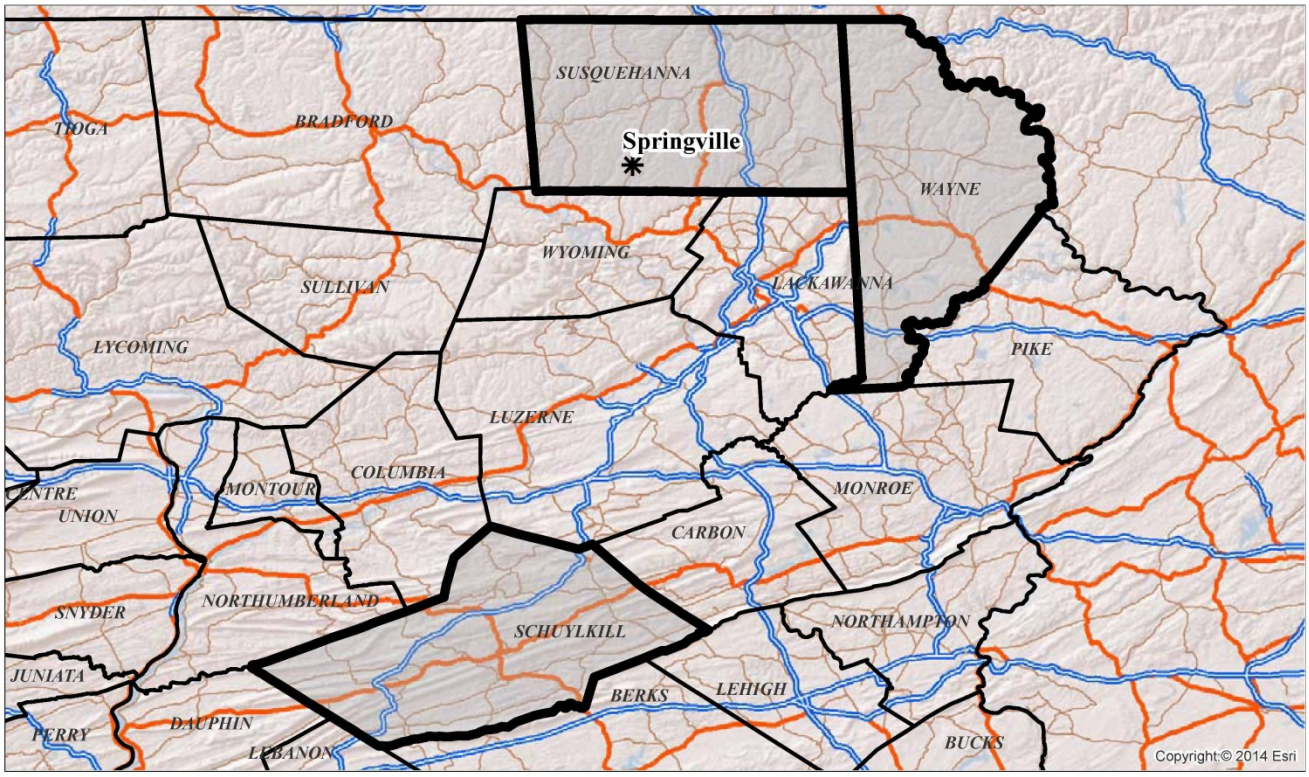


Figure B-41. Overview of the Northwest Non-MSA Region

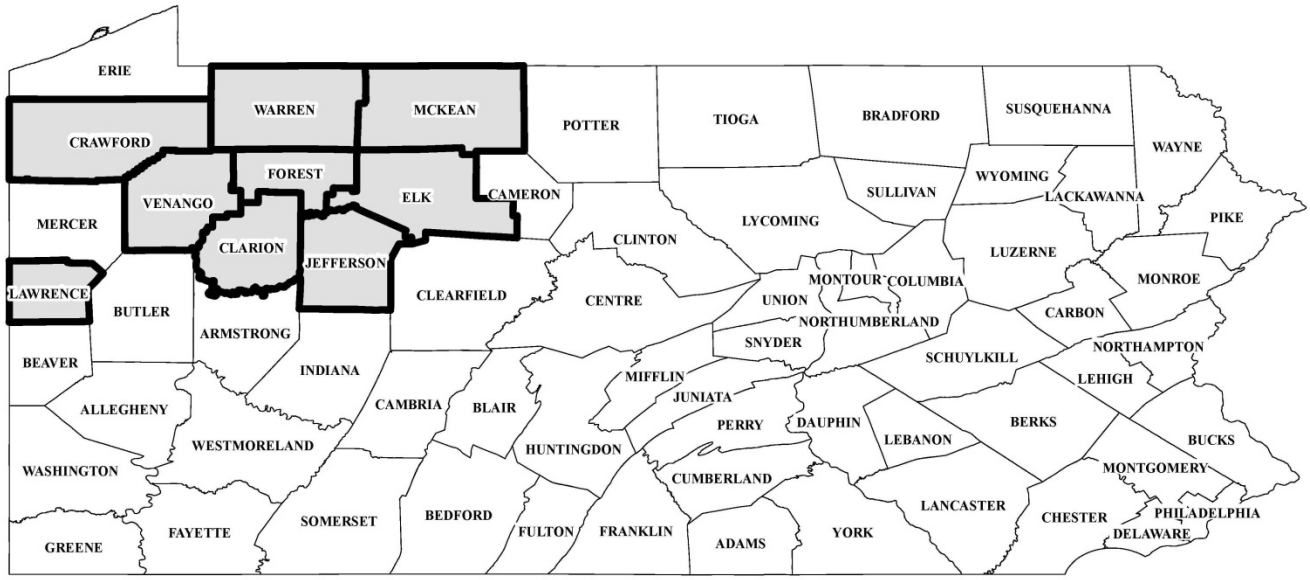


Figure B-42. Northwest Non-MSA Region Site Detail

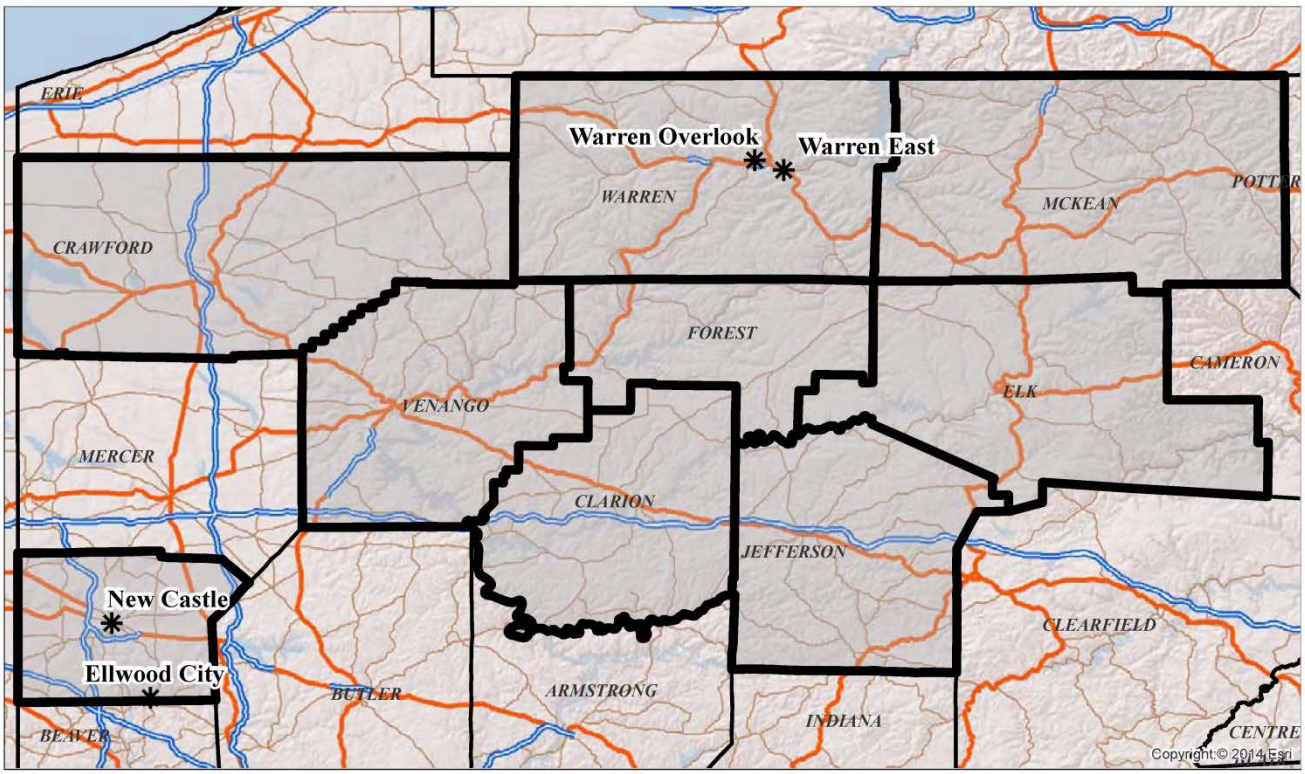


Figure B-43. Overview of the Southwest Non-MSA Region

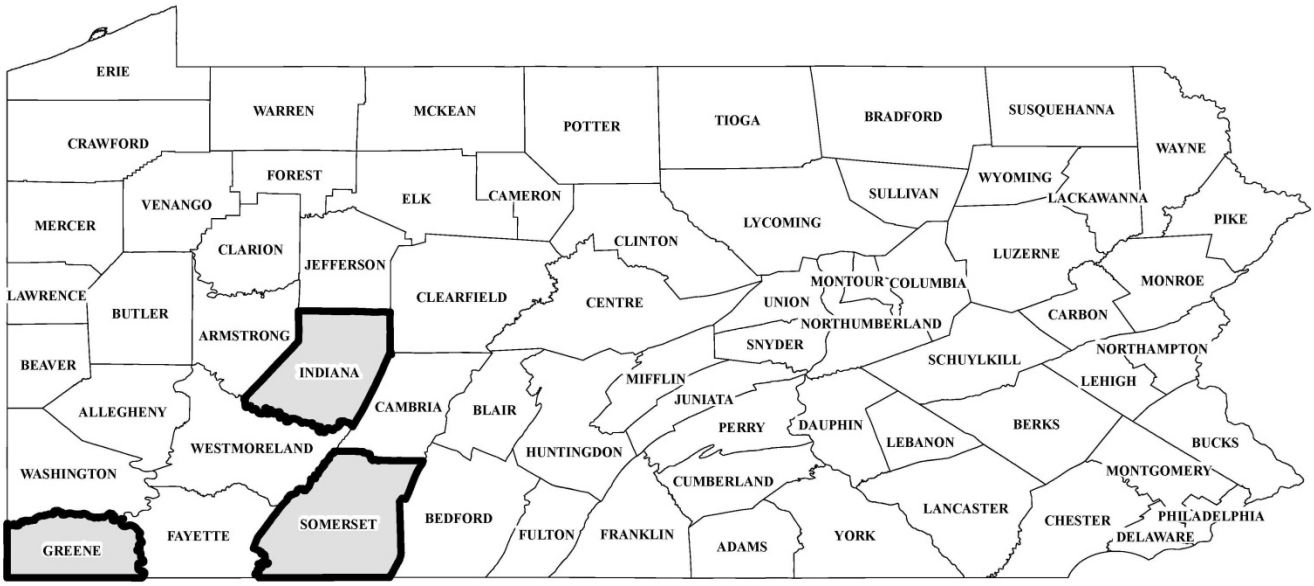
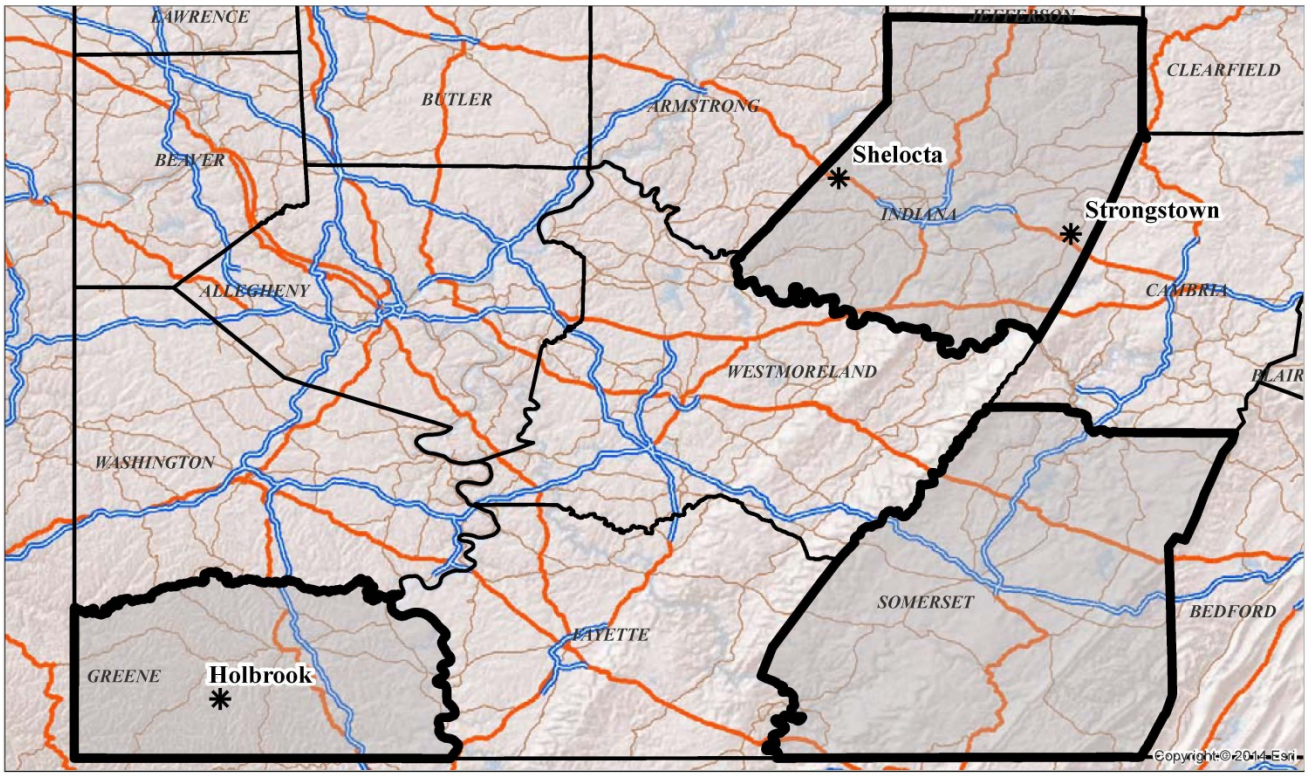


Figure B-44. Southwest Non-MSA Region Site Detail



Appendix C – Network Design and Quality Assurance Criteria

PA DEP operates its air monitoring network in accordance with all applicable requirements set forth in 40 CFR Part 58, Appendices A, B, C, D, and E.

Quality Assurance Requirements– 40 CFR Part 58, Appendix A

PA DEP operates it Ambient Air Monitoring Network in accordance with all quality assurance requirements set forth in 40 CFR Part 58, Appendix A, " Quality Assurance Requirements for Monitors used in Evaluations of National Ambient Air Quality Standards".

PA DEP has submitted Quality Assurance Project Plans (QAPP) to EPA for all criteria monitoring networks and follows the quality assurance requirements and procedures as described therein. Quality assurance data, including results from precision checks, flow rate verifications and monitor performance audits are submitted to EPA electronically, through its Air Quality System (AQS).

Collocated monitoring requirements for particulate pollutant monitoring are set forth in 40 CFR Part 58, Appendix A. These requirements are used to determine precision for the $PM_{2.5}$ and Lead monitoring networks. A collocated monitoring requirement for PM_{10} monitoring is also included in 40 CFR Part 58, Appendix A. This requirement is applicably only to manual method PM_{10} monitors. Starting January 1, 2016, all of PA DEP's PM_{10} monitoring sites employ continuous monitoring methods. As there is no collocated requirement for continuous method monitoring, PA DEP is not required to maintain a collocated PM_{10} monitoring site.

Fine Particulate Matter ($PM_{2.5}$) Collocated Monitoring Requirements

Collocated $PM_{2.5}$ monitoring requirements are set forth in 40 CFR Part 58, Appendix A as follows:

"3.2.3 Collocated Quality Control Sampling Procedures for $PM_{2.5}$. For each pair of collocated monitors, designate one sampler as the primary monitor whose concentrations will be used to report air quality for the site, and designate the other as the quality control monitor. There can be only one primary monitor at a monitoring site for a given time period.

3.2.3.1 For each distinct monitoring method designation (FRM or FEM) that a PQAO is using for a primary monitor, the PQAO must have 15 percent of the primary monitors of each method designation collocated (values of 0.5 and greater round up); and have at least one collocated quality control monitor (if the total number of monitors is less than three). The first collocated monitor must be a designated FRM monitor.

3.2.3.2 In addition, monitors selected for collocation must also meet the following requirements:

(a) A primary monitor designated as an EPA FRM shall be collocated with a quality control monitor having the same EPA FRM method designation.

(b) For each primary monitor designated as an EPA FEM used by the PQAO, 50 percent of the monitors designated for collocation, or the first if only one collocation is necessary, shall be collocated with a FRM quality control monitor and 50 percent of the monitors shall be collocated with a monitor having the same method designation as the FEM primary monitor. If an odd number of collocated monitors is required, the additional monitor shall be a FRM quality control monitor.

[…]

3.2.3.4 The collocated monitors should be deployed according to the following protocol:

(a) Fifty percent of the collocated quality control monitors should be deployed at sites with annual average or daily concentrations estimated to be within plus or minus 20 percent of either the annual or 24-hour NAAQS and the remainder at the PQAOs discretion;

[…]

(d) Sample the collocated quality control monitor on a 1-in-12 day schedule. Report the measurements from both primary and collocated quality control monitors at each collocated sampling site to AQS […]."

PA DEP performs all $PM_{2.5}$ continuous monitoring using Federal Equivalent Methods (FEM). All continuous monitors are subject to NAAQS comparison, following the site-level summary statistic procedures set forth in 40 CFR, Part 50, Appendix N, "Interpretation of the National Ambient Air Quality Standards for $PM_{2.5}$".

Table C-1 displays the total number of quality assurance collocated sites operated by PA DEP, in relation to the 15% by method requirement in 40 CFR Part 58, Appendix A, §3.2.3.1. This table includes the SPM $PM_{2.5}$ monitoring site at Marcus Hook, and provides information for monitors operating currently (as of the date of this document), as well as information regarding the installation of additional monitoring sites during 2016-2017 (see "Expansion of PA DEP $PM_{2.5}$ Monitoring Network" section of this document). Note that two of the ten monitors discussed in the $PM_{2.5}$ expansion are already in operation, as of January 1, 2016. As shown, PA DEP currently meets this requirement, and will establish one additional QA-collocated $PM_{2.5}$ monitoring pair upon the addition of eight continuous method $PM_{2.5}$ monitoring sites during 2016-2017.

Table C-1. $PM_{2.5}$ QA-Collocated Monitoring Minimum Requirements Demonstration

Primary Monitor Method	Total No. of PA DEP $PM_{2.5}$ Sites	15%	No. of PA DEP QA-Collocated $PM_{2.5}$ Monitors	No. of Addt'l QA-Collocated $PM_{2.5}$ Monitors Needed
Met-One BAM	13/21 (2016-2017)*	2/3 (2016-2017)*	2	0/1 (2016-2017)*
R&P 2025 (FRM)	16	2	2	0

* During 2016-2017, PA DEP plans to expand its $PM_{2.5}$ monitoring network by an additional 8 BAM continuous method monitoring sites, requiring 1 additional QA-collocated pair at a primary BAM site

Table C-2 provides details of quality assurance collocated $PM_{2.5}$ sites operated by PA DEP, in relation to the collocation monitor designation requirements in 40 CFR Part 58, Appendix A, §3.2.3.2. As shown, PA DEP currently meets these requirements, and will utilize an FRM method for the QA-collocated monitor that will be added upon the $PM_{2.5}$ expansion mentioned above.

Table C-2. $PM_{2.5}$ QA-Collocated Monitoring Method Requirements Demonstration

Site Name	Primary $PM_{2.5}$ Monitor Method	QA-Collocated $PM_{2.5}$ Monitor Method
Lancaster	R&P 2025 (FRM)	R&P 2025 (FRM)
York	R&P 2025 (FRM)	R&P 2025 (FRM)
Chester	Met-One BAM	R&P 2025 (FRM)
Greensburg	Met-One BAM	Met-One BAM
To be determined (2016-2017)*	Met-One BAM	R&P 2025 (FRM)

* During 2016-2017, PA DEP plans to expand its $PM_{2.5}$ monitoring network by an additional 8 BAM continuous method monitoring sites, requiring 1 additional QA-collocated pair at a primary BAM site, with a collocated FRM method monitor

Table C-3 provides details of quality assurance collocated sites operated by PA DEP, in relation to the measurement concentration collocation requirements in 40 CFR Part 58, Appendix A, §3.2.3.4. PA DEP meets these requirements.

Table C-3. $PM_{2.5}$ QA-Collocated Monitoring Site Selection Requirements Demonstration*

Site Name	24-Hour NAAQS	+/- 20% 24-Hour NAAQS	2014 Daily Design Value	Annual NAAQS	+/- 20% Annual NAAQS	2014 Annual Design Value
Lancaster	35 $\mu g/m^3$	28 – 42 $\mu g/m^3$	31 $\mu g/m^3$	12.0 $\mu g/m^3$	9.6 - 14.4 $\mu g/m^3$	11.6 $\mu g/m^3$
York			28 $\mu g/m^3$			10.7 $\mu g/m^3$
Chester			29 $\mu g/m^3$			12.3 $\mu g/m^3$
Greensburg			23 $\mu g/m^3$			10.1 $\mu g/m^3$

* During 2016-2017, PA DEP plans to expand its $PM_{2.5}$ monitoring network by an additional 8 BAM continuous method monitoring sites, requiring 1 additional QA-collocated pair at a primary BAM site, with a collocated FRM method monitor

PA DEP operates all QA-collocated $PM_{2.5}$ monitors on a 1-in-6 day schedule and reports concentration measurement data from these sites to U.S. EPA via the AQS database.

Lead (Pb) Network Collocated Monitoring Requirements

Collocated lead monitoring requirements are set forth in 40 CFR Part 58, Appendix A as follows:

"3.4.4 Collocated Quality Control Sampling for TSP Pb for monitoring sites other than non-source oriented NCore. For each pair of collocated monitors for manual TSP Pb samplers, designate one sampler as the primary monitor whose concentrations will be used to report air quality for the site, and designate the other as the quality control monitor.

3.4.4.1 A PQAO must:

(a) Have 15 percent of the primary monitors (not counting non-source oriented NCore sites in PQAO) collocated. Values of 0.5 and greater round up; and

(b) Have at least one collocated quality control monitor (if the total number of monitors is less than three).

3.4.4.2 The collocated quality control monitors should be deployed according to the following protocol:

(a) The first collocated Pb site selected must be the site measuring the highest Pb concentrations in the network. If the site is impractical, alternative sites, approved by the EPA Regional Administrator, may be selected. If additional collocated sites are necessary, collocated sites may be chosen that reflect average ambient air Pb concentrations in the network"

PA DEP maintains two QA-collocated sites in its lead monitoring network, Laureldale North and Lyons Park, both in Berks County. Table C-4 provides details of number of quality assurance collocated lead sites operated by PA DEP, in relation to the collocation monitor designation requirements in 40 CFR Part 58, Appendix A, §3.4.4. This table provides information for monitors operating currently (as of the date of this document), as well as information regarding the discontinuation of four lead monitoring sites during 2016-2017 (see "Site Terminations" section of this document). As shown, PA DEP currently meets the 15% requirement noted above, both for its current complement of sixteen monitors, as well as its planned 2016-2017 network complement of twelve monitors.

Table C-4. Lead Collocated Monitoring Minimum Requirements Demonstration.

Total No. of PA DEP Lead Monitoring Sites	15%	No. of PA DEP QA-Collocated Lead Monitors	Addt'l QA-Collocated Lead Monitors Needed
16/12 (2016-2017)	2	2	0

For 2014, the highest lead design value (maximum 3-month average 2012-2014) in PA DEP's lead monitoring network was 0.51 µg/m^3, measured at the Laureldale North (Berks County) monitoring site in 2012. Table C-5 displays the highest 3-month averages between 2013-2015, representing the 2015 design value period.

Table C-5. PA DEP Lead Concentration Values, 2013-2015

Station	County	Design Value	2013 Max 3-Month Avg	2014 Max 3-Month Avg	2015 Max 3-Month Avg
Chester	Delaware	0.01*	0.01*	0.01	0.01
Ridley Park	Delaware	0.01*	0.01*	0.01	0.01
Palmerton	Carbon	**0.16**	0.15*	0.15	**0.16**
Duryea	Luzerne	0.06	0.06	0.06	0.02
Mt Joy	Lancaster	**0.23**	0.07	**0.23**	**0.23**
Laureldale North	Berks	0.12	0.12	0.02	0.02
Lyons Boro	Berks	0.04	0.04	0.03	0.04
Lyons Park	Berks	0.02	0.02	0.02	0.02
Laureldale South	Berks	**0.17**	**0.17**	0.03	0.03
Upper Strasburg	Franklin	0.01	0.01	0.01	0.01
Potter Township	Beaver	0.08	0.08	0.02	0.01
Beaver Valley	Beaver	**0.22**	**0.22**	**0.20**	0.01
Vanport	Beaver	0.13	0.13	0.05	0.02
Conemaugh	Westmoreland	0.02*	0.02*	0.01	0.01
Shelocta	Indiana	0.01	0.01	0.01	0.01
Ellwood City	Lawrence	0.02	0.02	0.02	0.02

* Does not meet completeness requirements

In 2013, the highest value PA DEP lead sites were the Laureldale South (Berks County) and Beaver Valley (Beaver County) monitors. The Laureldale South monitor is a source-oriented lead monitor for the Exide Technologies lead-acid battery recycling plant, located just northeast of Reading, PA. In mid-2013, Exide Technologies began idling their smelting operations at this facility. The Beaver Valley monitor is a source-oriented monitor for the Horsehead Corporation zinc smelting plant in Monaca, PA. Horsehead Corporation closed this facility in late 2013/early 2014. Table C-6 displays the 3-month averages measured at these two sites. Lead concentration measurements from the Laureldale North monitor are included in the table for informational purposes. The Laureldale North monitor is an additional source-oriented site for the Exide facility.

Table C-6. Three-month Lead Concentration Averages for 2013 at Beaver Valley, Laureldale North and Laureldale South Monitoring Sites

2013 Lead Concentration 3-Month Averages (in µg/m^3)			
Month	**Beaver Valley**	**Laureldale North**	**Laureldale South**
January	0.22*	0.10	**0.17**
February	**0.18**	0.07	0.12
March	**0.16**	0.06	0.11
April	0.10	0.12	0.11
May	0.05	0.11	0.07
June	0.06	0.09	0.04
July	0.06	0.04	0.02
August	0.08	0.02	0.02
September	0.06	0.02	0.01
October	0.08	0.02	0.02
November	0.15	0.02	0.02
December	**0.18**	0.02	0.02

In 2014, the highest value PA DEP lead sites were the lead monitors at Beaver Valley and Mount Joy (Lancaster County) monitors. High lead concentrations were measured at the Beaver Valley monitor in early 2014, until the shutdown of the Horsehead site was completed. The lead monitor Mount Joy is a source-oriented monitor for the Mount Joy Wire Corporation wire manufacturing plant in Mount Joy, PA. In 2014-2015, the Mount Joy Wire Corporation made repairs and operational improvements to its facility, which has greatly reduced the number of high value concentration days measured at the Mount Joy lead monitoring site. The Mount Joy monitoring site has not measured a single 24-hour lead concentration in exceedance of the lead NAAQS since January 2015. Table C-7 displays the 3-month averages measured at these two sites.

Table C-7. Three-month Lead Concentration Averages for 2014 at Beaver Valley and Mount Joy Monitoring Sites

2014 Lead Concentration 3-Month Averages (in µg/m^3)		
Month	**Beaver Valley**	**Mount Joy**
January	**0.20**	0.09
February	0.14	0.09
March	0.09	0.05
April	0.06	0.04
May	0.03	0.04
June	0.02	0.04*
July	0.01	0.03
August	0.01	0.03
September	0.01	0.04
October	0.02	0.06
November	0.02	0.13
December	0.02	**0.23**

In 2015, the highest value PA DEP lead sites were the Mount Joy (Lancaster County) and Palmerton (Carbon County) monitoring sites. The maximum 3-month lead concentration averages measured at the Mount Joy monitoring site were for early 2015, and due to the inclusion of several high value samples that occurred during November and December 2014. As stated earlier, the improvements implemented in 2014-2015 at the source facility are evident in the trend of 3-month averages measured at the Mount Joy monitoring site during 2015. The lead monitor in Palmerton is a source-oriented monitor for the Horsehead Corporation zine powder and recycling plant in Palmerton, PA. Table C-8 displays the 3-month averages measured at these two sites.

Table C-8. Three-month Lead Concentration Averages for 2015 at Mount Joy and Palmerton Monitoring Sites

2015 Lead Concentration 3-Month Averages (in µg/m^3)		
Month	**Mount Joy**	**Palmerton**
January	**0.23**	0.04
February	0.15	0.04
March	0.05	0.09
April	0.03	0.14
May	0.03	**0.16**
June	0.03	0.15
July	0.03	0.14
August	0.03	0.12
September	0.02	0.10
October	0.03	0.08
November	0.04	0.09
December	0.04	0.09

PA DEP is reviewing the current lead concentration measurements at its monitoring sites, as well as facility information, and expects to begin QA-collocated lead monitoring at the Palmerton site by

relocating one of the QA-collocated monitors from Berks County to the lead monitoring site at Palmerton.

Quality Assurance Requirements – 40 CFR Part 58, Appendix B

PA DEP does not operate Prevention of Significant Deterioration (PSD) monitors as part of its Ambient Air Monitoring Network. Therefore, 40 CFR Part 58, Appendix B, "Quality Assurance Requirements for Prevention of Significant Deterioration (PSD) Air Monitoring", is not applicable.

Monitoring Method Requirements – 40 CFR Part 58, Appendix C

PA DEP operates it Ambient Air Monitoring Network in accordance with all monitoring method requirements set forth in 40 CFR Part 58, Appendix C, "Ambient Air Quality Monitoring Methodology". PA DEP uses EPA-approved Federal Reference Methods (FRM) or Federal Equivalent Methods (FEM) to perform all ambient air monitoring. Monitoring methods are listed in Appendix D of this document.

Network Design Requirements – 40 CFR Part 58, Appendix D

PA DEP operates it Ambient Air Monitoring Network in accordance with all network design requirements set forth in 40 CFR Part 58, Appendix D, "Network Design Criteria for Ambient Air Quality Monitoring".

Ozone (O_3) Network Design Requirements

Minimum ozone monitoring requirements are set forth in 40 CFR Part 58, Appendix D Section 4.1, "Ozone Design Criteria", as follows:

"4.1 Ozone (O_3) Design Criteria. (a) State, and where appropriate, local agencies must operate O_3 sites for various locations depending upon area size (in terms of population and geographic characteristics) and typical peak concentrations (expressed in percentages below, or near the O_3 NAAQS). Specific SLAMS O_3 site minimum requirements are included in Table D-2 of this appendix. The NCore sites are expected to complement the O_3 data collection that takes place at single-pollutant SLAMS sites, and both types of sites can be used to meet the network minimum requirements. The total number of O_3 sites needed to support the basic monitoring objectives of public data reporting, air quality mapping, compliance, and understanding O_3-related atmospheric processes will include more sites than these minimum numbers required in Table D-2 of this appendix. The EPA Regional Administrator and the responsible State or local air monitoring agency must work together to design and/or maintain the most appropriate O_3 network to service the variety of data needs in an area."

Table C-9. Minimum Ozone Monitoring Requirements

(Table D-2 of Appendix D to Part 58— SLAMS Minimum O_3 Monitoring Requirements)

MSA population [1,2]	Most recent 3-year design value concentrations ≥85% of any O3 NAAQS [3]	Most recent 3-year design value concentrations <85% of any O3 NAAQS [3,4]
>10 million	4	2
4-10 million	3	1
350,000-<4 million	2	1
50,000-<350,000 [5]	1	0

[1] *Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).*

[2] *Population based on latest available census figures.*

[3] *The ozone (O_3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.*

[4] *These minimum monitoring requirements apply in the absence of a design value.*

[5] *Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.*

These minimum ozone monitoring requirements are satisfied as detailed in Table C-10. Ambient air monitoring sites operated by agencies other than PA DEP are included in the "Other SLAMS Monitors" and "CASTNET Monitors" columns of the table. Changes to the PA DEP ozone monitoring network as described in this plan are included in the table. As shown, the number of ozone monitoring sites within the twenty Pennsylvania MSAs meets or exceeds the minimum monitoring requirement. In addition, the total ozone monitoring network encompasses a substantially greater number of monitoring sites than the minimum requirement, and includes several non-MSA regions of the state.

Table C-10. Ozone Minimum Monitoring Requirements Demonstration, 2016-2017

MSA	2015 Population Estimate	Maximum 2014 Design Value	No. of Monitors Required	PA DEP SLAMS Monitors	Other SLAMS Monitors	Total No. SLAMS Monitors	CASTNET Monitors	Addt'l Monitors Needed
Allentown-Bethlehem-Easton MSA	832,327	70	2	3	NJ-1	4		0
Altoona MSA	125,593	68	1	1		1		0
Bloomsburg-Berwick MSA	85,229	*no monitors*	0	0		0		0
Chambersburg-Waynesboro MSA	153,638	67	1	1		1		0
East Stroudsburg MSA	166,397	63	1	1		1		0
Erie MSA	278,045	71	1	1		1		0
Gettysburg MSA	102,295	67	1	1		1	PA-1	0
Harrisburg-Carlisle MSA	565,006	69	2	2		2		0
Johnstown MSA	136,411	66	1	1		1		0
Lancaster MSA	536,624	71	2	2		2		0
Lebanon MSA	137,067	71	1	1		1		0
New York-Newark-Jersey City MSA	20,182,305	75	4	0	NJ-9; NY-13	22		0
Philadelphia-Camden-Wilmington MSA	6,069,875	77	3	3	AMS-3; DE-4; MD-1; NJ-3	14		0
Pittsburgh MSA	2,353,045	75	2	8	ACHD-3	11		0
Reading MSA	415,271	71	2	2		2		0
Scranton-Wilkes-Barre-Hazleton MSA	558,166	66	2	3		3		0
State College MSA	160,580	68	1	1		1	PA-1	0
Williamsport MSA	116,048	66	1	1		1		0
York-Hanover MSA	442,867	70	2	2		2		0
Youngstown-Warren-Boardman MSA	549,885	75	2	1	OH-3	4	PA-1	0
Northcentral Non-MSA Region	*N/A*	*N/A*	*N/A*	3	*N/A*	*N/A*	*N/A*	*N/A*
Northwest Non-MSA Region	*N/A*	*N/A*	*N/A*	1	*N/A*	*N/A*	*N/A*	*N/A*
Southwest Non-MSA Region	*N/A*	*N/A*	*N/A*	2	*N/A*	*N/A*	*N/A*	*N/A*

Additional ozone monitoring requirements for maximum ozone concentration monitoring are set forth in 40 CFR Part 58, Appendix D, § 4.1 as follows:

(b) Within an O_3 network, at least one O_3 site for each MSA, or CSA if multiple MSAs are involved, must be designed to record the maximum concentration for that particular metropolitan area. More than one maximum concentration site may be necessary in some areas. Table D-2 of this appendix does not account for the full breadth of additional factors that would be considered in designing a complete O_3 monitoring program for an area. Some of these additional factors include geographic size, population density, complexity of terrain and meteorology, adjacent O_3 monitoring programs, air pollution transport from neighboring areas, and measured air quality in comparison to all forms of the O_3 NAAQS (i.e., 8-hour and 1-hour forms). Networks must be designed to account for all of these area characteristics. Network designs must be re-examined in periodic network assessments. Deviations from the above O_3 requirements are allowed if approved by the EPA Regional Administrator.

Seventeen of Pennsylvania's twenty MSAs are incorporated into Combined Statistical Areas (CSA), as defined by the U.S. Office of Management and Budget (OMB). Pennsylvania encompasses eleven CSAs, either wholly or in part. CSA include both MSAs and Micropolitan areas, and often encompass multiple states. Table C-11 displays Pennsylvania's CSAs and their component Pennsylvania MSAs, and identifies the ozone maximum concentration sites. As noted in the table, three MSAs are not included in any CSA.

Table C-11. Combined Statistical Areas (CSA), MSAs and Maximum Ozone Concentration Sites

CSA Name	Component MSA Name, Pennsylvania Portion	Max Ozone Site	AQS ID
Bloomsburg-Berwick-Sunbury, PA	Bloomsburg-Berwick, PA (MSA) Lewisburg, PA (Micropolitan) Selinsgrove, PA (Micropolitan) Sunbury, PA (Micropolitan)	*No monitoring required 40 CFR Part 58 Section 4.1*	
Erie-Meadville, PA	Erie, PA (MSA) Meadville, PA (Micropolitan)	Erie[1]	420490003
Harrisburg-York-Lebanon, PA	Gettysburg, PA (MSA)	Lebanon	420750100
	Harrisburg-Carlisle, PA (MSA)		
	Lebanon, PA (MSA)		
	York-Hanover, PA (MSA)		
Johnstown-Somerset, PA	Johnstown, PA (MSA) Somerset, PA (Micropolitan)	Johnstown[1]	420210011
New York-Newark, NY-NJ-CT-PA	Allentown-Bethlehem-Easton, PA-NJ (MSA)	*Area of expected maximum ozone concentrations occurs in CT*	
	East Stroudsburg, PA (MSA)		
	New York-Newark-Jersey City, NY-NJ-PA (MSA)		
Philadelphia-Reading-Camden, PA-NJ-DE-MD	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD (MSA)	Bristol	420170012
	Reading, PA (MSA)		
Pittsburgh-New Castle-Weirton, PA-OH-WV	Indiana, PA (Micropolitan) New Castle, PA (Micropolitan) Pittsburgh, PA (MSA)	Harrison 2	420031008
State College-DuBois, PA	DuBois, PA (Micropolitan) State College, PA (MSA)	State College[1]	420270100
Washington-Baltimore-Arlington, DC-MD-VA-WV-PA	Chambersburg-Waynesboro, PA (MSA)	*Area of expected maximum ozone concentrations occurs in MD*	
Williamsport-Lock Haven, PA	Lock Haven, PA (Micropolitan) Williamsport, PA (MSA)	Montoursville[1]	420810100
Youngstown-Warren, OH-PA	Youngstown-Warren-Boardman, OH-PA (MSA)	Farrell	420850100
Not in a CSA	Altoona, PA (MSA)	Altoona	420130801
	Lancaster, PA (MSA)	Lancaster Downwind	420710012
	Scranton-Wilkes-Barre-Hazleton, PA (MSA)	Peckville	420690101

[1] Monitor located in population center of CSA. Monitor may not be in area of expected ozone maximum concentration (downwind of urban center); however monitor is located to represent ozone exposure occurring to majority of CSA population.

Sulfur Dioxide (SO_2) Network Design Requirements

Minimum SO_2 monitoring requirements are set forth in 40 CFR Part 58, Appendix D as follows:

"4.4.2 Requirement for Monitoring by the Population Weighted Emissions Index. (a) The population weighted emissions index (PWEI) shall be calculated by States for each core based statistical area (CBSA) they contain or share with another State or States for use in the implementation of or adjustment to the SO_2 monitoring network. The PWEI shall be calculated by multiplying the population of each CBSA, using the most current census data or estimates, and the total amount of SO_2 in tons per year emitted within the CBSA area, using an aggregate of the most recent county level emissions data available in the National Emissions Inventory for each county in each CBSA. The resulting product shall be divided by one million, providing a PWEI value, the units of which are million persons-tons per year. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO_2 monitor is required within that CBSA."

These minimum SO_2 monitoring requirements are satisfied as detailed in Table C-12. PWEI values were calculated using the 2011 National Emissions Inventory (NEI) database, which is the most recent data available. Ambient air monitoring sites operated by agencies other than PA DEP are listed in the "Other SLAMS Monitors" column of the table. Changes to the PA DEP SO_2 monitoring network as described in this plan are included in the table. As shown, the number of SO_2 monitoring sites within the twenty Pennsylvania MSAs meets or exceeds the minimum monitoring requirement. In addition, the total SO_2 monitoring network encompasses a greater number of monitoring sites than the minimum requirement.

Table C-12. SO_2 Minimum Monitoring Requirements Demonstration, 2016-2017

MSA	2015 Population Estimate	2011 NEI (tons/year)	Calculated PWEI	No. of Monitors Required	PA DEP SLAMS Monitors	Other SLAMS Monitors	Total No. of Monitors	Addt'l Monitors Needed
Allentown-Bethlehem-Easton MSA	832,327	22,705.2	18,842	1	1	NJ-1	2	0
Altoona MSA	125,593	4,092.0	515	0	1		1	0
Bloomsburg-Berwick MSA	85,229	18,286.6	1,568	0	0		0	0
Chambersburg-Waynesboro MSA	153,638	459.5	70	0	0		0	0
East Stroudsburg MSA	166,397	429.1	71	0	0		0	0
Erie MSA	278,045	1,180.5	329	0	0		1	0
Gettysburg MSA	102,295	296.4	30	0	1		1	0
Harrisburg-Carlisle MSA	565,006	2,517.6	1,412	0	0		0	0
Johnstown MSA	136,411	7,235.2	997	0	1		1	0
Lancaster MSA	536,624	1,802.2	961	0	0		0	0
Lebanon MSA	137,067	815.4	111	0	0		0	0
New York-Newark-Jersey City MSA	20,182,305	54,175.0	1,088,531	3	0	NJ-6; NY-7	13	0
Philadelphia-Camden-Wilmington MSA	6,069,875	22,737.5	137,589	2	1	AMS-2; DE-4; NJ-1	8	0
Pittsburgh MSA	2,353,045	119,428.6	281,370	2	4	ACHD-5	9	0
Reading MSA	415,271	6,139.7	2,540	0	1		1	0
Scranton-Wilkes-Barre-Hazleton MSA	558,166	1,907.0	1,067	0	1		1	0
State College MSA	160,580	2,121.5	337	0	1		1	0
Williamsport MSA	116,048	601.8	70	0	0		0	0
York-Hanover MSA	442,867	26,590.2	11,720	1	1		1	0
Youngstown-Warren-Boardman MSA	549,885	9,326.6	5,160	1	0	OH-1	1	0
Northwest Non-MSA Region	*N/A*	*N/A*	*N/A*	*N/A*	3	*N/A*	*N/A*	*N/A*
Southwest Non-MSA Region	*N/A*	*N/A*	*N/A*	*N/A*	1	*N/A*	*N/A*	*N/A*

Nitrogen Dioxide (NO_2) Network Design Requirements

Minimum NO_2 monitoring requirements include requirements for near-road, area-wide and U.S. EPA Regional Administrator Required monitoring.

Near-Road NO_2 Monitoring

Near-road NO_2 monitoring requirements are set forth in 40 CFR Part 58, Appendix D as follows:

"4.3.2 Requirement for Near-road NO_2 Monitors

a) Within the NO_2 network, there must be one microscale near-road NO2 monitoring station in each CBSA with a population of 500,000 or more persons to monitor a location of expected maximum hourly concentrations sited near a major road with high AADT counts as specified in paragraph 4.3.2(a)(1) of this appendix. An additional near-road NO2 monitoring station is required for any CBSA with a population of 2,500,000 persons or more, or in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts to monitor a second location of expected maximum hourly concentrations. CBSA populations shall be based on the latest available census figures."

The Commonwealth of Pennsylvania contains seven MSAs, either wholly or in part, with populations greater than 500,000 persons (Figure 1). For the Pennsylvania portions of these MSAs, NO_2 near-road monitoring responsibilities are shared by PA DEP and the local air pollution control agencies – Allegheny County Health Department and Philadelphia Air Management Services. Near-road NO_2 monitoring network sites for the Pennsylvania portion of the Philadelphia-Camden-Wilmington and Pittsburgh MSAs are described in the annual air monitoring network plans of these county agencies. Based on minimum monitoring requirements, PA DEP will be installing near-road NO_2 monitors in four MSAs – Allentown-Bethlehem-Easton, Harrisburg-Carlisle, Lancaster and Scranton-Wilkes-Barre-Hazleton. This planned near-road NO_2 monitoring is detailed in the "Near-road NO_2 Site Installation Plan" section of this document.

Area-Wide NO_2 Monitoring

Area-wide NO_2 monitoring requirements are set forth in 40 CFR Part 58, Appendix D as follows:

"4.3.3 Requirement for Area-wide NO_2 Monitoring

(a) Within the NO_2 network, there must be one monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO_2 concentrations representing the neighborhood or larger spatial scales. PAMS sites collecting NO_2 data that are situated in an area of expected high NO_2 concentrations at the neighborhood or larger spatial scale may be used to satisfy this minimum monitoring requirement when the NO_2 monitor is operated year round. Emission inventories and meteorological analysis should be used to identify the appropriate locations within a CBSA for locating required area-wide NO_2 monitoring stations. CBSA populations shall be based on the latest available census figures."

Pennsylvania contains three MSAs with populations greater than 1,000,000 - New York-Newark-Jersey City, NY-NJ-PA MSA, Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA and Pittsburgh, PA MSA. Monitoring networks for these MSAs are operated and maintained by the New Jersey Department of Environmental Protection and New York Department of Environmental Conservation, Philadelphia County Air Management Services and the Allegheny County Health Department, respectively. No additional area-wide NO_2 monitoring is required in Pennsylvania under the minimum monitoring requirements set forth in Appendix D.

Regional Administrator-Required NO_2 Monitoring

Regional Administrator-required (RA-40) NO_2 monitoring requirements are set forth in 40 CFR Part 58, Appendix D as follows:

"4.3.4 Regional Administrator Required Monitoring

(a) The Regional Administrators, in collaboration with States, must require a minimum of forty additional NO_2 monitoring stations nationwide in any area, inside or outside of CBSAs, above the minimum monitoring requirements, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations. The Regional Administrators, working with States, may also consider additional factors described in paragraph (b) below to require monitors beyond the minimum network requirement."

U.S. EPA Region III, in consultation with PA DEP, has selected the Chester (Delaware County) and Erie (Erie County) NO_2 monitors operated by PA DEP to be designated as RA-40 monitors.

In addition to satisfying the three categories of minimum monitoring requirements described above, PA DEP maintains NO_2 monitoring sites for use in Air Quality Index (AQI) reporting and forecasting. Ambient NO_2 concentrations are used in ambient air modeling and forecasting as a surrogate for ozone formation and to characterize the strength of meteorological inversions.

Carbon Monoxide (CO) Network Design Requirements

Minimum CO monitoring requirements include requirements for near-road and EPA Regional Administrator Required monitoring.

Near-Road CO Monitoring

Near-road CO monitoring requirements are set forth in 40 CFR Part 58, Appendix D as follows:

"4.2.1 General Requirements. (a) Except as provided in subsection (b), one CO monitor is required to operate collocated with one required near-road NO_2 monitor, as required in Section 4.3.2 of this part, in CBSAs having a population of 1,000,000 or more persons. If a CBSA has more than one required near-road NO_2 monitor, only one CO monitor is required to be collocated with a near-road NO_2 monitor within that CBSA."

The Commonwealth of Pennsylvania contains three MSAs, either wholly or in part, with populations greater than 1,000,000 persons – New York-Newark-Jersey City, NY-NJ-PA MSA, Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA and Pittsburgh, PA MSA. Air quality monitoring for the New York-Newark-Jersey City MSA is performed by the New York State Department of Environmental Conservation and New Jersey Department of Environmental Protection. Air Quality

Monitoring for the Philadelphia-Camden-Wilmington MSA is shared between the Delaware Department of Natural Resources and Environmental Control, Maryland Department of the Environment, New Jersey Department of Environmental Protection, Philadelphia Air Management Services (Philadelphia County, PA) and PA DEP (remaining PA portion). Air quality monitoring for the Pittsburgh MSA is shared between the Allegheny County Health Department (Allegheny County) and PA DEP. For the Pennsylvania portions of these three MSAs, the NO_2 near-road monitoring requirements, and thus the CO monitoring requirements, are being met by the two aforementioned Pennsylvania county agencies. As such, PA DEP is not required to maintain additional CO monitors outside the Philadelphia and Allegheny County networks, for NAAQS compliance purposes.

Although not required, PA DEP plans to install CO monitors at all four future near-road NO_2 sites, to enhance PA DEP's understanding of CO concentrations in high traffic areas outside of an urban core.

Regional Administrator-Required Monitoring

Regional Administrator-required CO monitoring requirements are set forth in 40 CFR Part 58, Appendix D as follows:

"4.2.2 Regional Administrator Required Monitoring. (a) The Regional Administrators, in collaboration with states, may require additional CO monitors above the minimum number of monitors required in 4.2.1 of this part, where the minimum monitoring requirements are not sufficient to meet monitoring objectives. The Regional Administrator may require, at his/her discretion, additional monitors in situations where data or other information suggest that CO concentrations may be approaching or exceeding the NAAQS. Such situations include, but are not limited to,
(1) characterizing impacts on ground-level concentrations due to stationary CO sources,
(2) characterizing CO concentrations in downtown areas or urban street canyons, and
(3) characterizing CO concentrations in areas that are subject to high ground level CO concentrations particularly due to or enhanced by topographical and meteorological impacts. The Regional Administrator and the responsible State or local air monitoring agency shall work together to design and maintain the most appropriate CO network to address the data needs for an area, and include all monitors under this provision in the annual monitoring network plan."

As of the date of this document, the U.S. EPA Region III Administrator has not informed PA DEP that any of its monitors are needed to fulfil the RA-required CO monitoring requirement, nor requested PA DEP to establish a new CO monitoring site to fulfil this requirement.

Fine Particulate Matter ($PM_{2.5}$) Network Design Requirements

Minimum $PM_{2.5}$ monitoring requirements are set forth in 40 CFR Part 58, Appendix D as follows:

"4.7.1 General Requirements. (a) State, and where applicable local, agencies must operate the minimum number of required $PM_{2.5}$ SLAMS sites listed in Table D-5 of this appendix. The NCore sites are expected to complement the $PM_{2.5}$ data collection that takes place at non-NCore SLAMS sites, and both types of sites can be used to meet the minimum $PM_{2.5}$ network requirements. Deviations from these $PM_{2.5}$ monitoring requirements must be approved by the EPA Regional Administrator."

Table C-13. Minimum $PM_{2.5}$ Monitoring Requirements

(Table D-5 of Appendix D to Part 58—$PM_{2.5}$ Minimum Monitoring Requirements)

MSA population [1,2]	Most recent 3-year design value ≥85% of any $PM_{2.5}$ NAAQS [3]	Most recent 3-year design value <85% of any $PM_{2.5}$ NAAQS [3 4]
>1,000,000	3	2
500,000-1,000,000	2	1
50,000-<500,000 [5]	1	0

[1] *Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).*
[2] *Population based on latest available census figures.*
[3] *The PM $_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.*
[4] *These minimum monitoring requirements apply in the absence of a design value.*
[5] *Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.*

These minimum $PM_{2.5}$ monitoring requirements are satisfied as detailed in Table C-14. Ambient air monitoring sites operated by agencies other than PA DEP are included on the map, and listed in the "Other SLAMS Monitors" column of the table. Changes to the PA DEP $PM_{2.5}$ monitoring network as described in this plan (notably the planned expansion of the network as described in the "Modifications to Air Monitoring Network: Marcellus Shale Development" section of this document) are included in the table. As shown, the number of $PM_{2.5}$ monitoring sites within the twenty Pennsylvania MSAs meets or exceeds the minimum monitoring requirement. In addition, the total $PM_{2.5}$ monitoring network encompasses a substantially greater number of monitoring sites than the minimum requirement.

Table C-14. $PM_{2.5}$ Minimum Monitoring Requirements Demonstration, 2016-2017

MSA	2015 Population Estimate	2014 Max Annual Design Value	2014 Max 24-hr Design Value	No. of Monitors Required	No. of PA DEP SLAMS Monitors	Other SLAMS Monitors	Total No. of Monitors	Addt'l Monitors Needed
Allentown-Bethlehem-Easton MSA	832,327	10.5	29	2	2	NJ-2	4	0
Altoona MSA	125,593	11.7	28	1	1		1	0
Bloomsburg-Berwick MSA	85,229	*no monitors*		0	0		0	0
Chambersburg-Waynesboro MSA	153,638	*no monitors*		0	0		0	0
East Stroudsburg MSA	166,397	8.7	20	0	1		1	0
Erie MSA	278,045	11.4	25	1	1		1	0
Gettysburg MSA	102,295	10	25	0	1		1	0
Harrisburg-Carlisle MSA	565,006	11.4	31	2	2		2	0
Johnstown MSA	136,411	11.6	28	1	1		1	0
Lancaster MSA	536,624	15.9	40	2	2		2	0
Lebanon MSA	137,067	12.7	34	1	1		1	0
New York-Newark-Jersey City MSA	20,182,305	11.2	27	3	0	NJ-12; NY-10	22	0
Philadelphia-Camden-Wilmington MSA	6,069,875	12.3	32	3	2	AMS-6; DE-4; MD-1; NJ-3	16	0
Pittsburgh MSA	2,353,045	13	35	3	7	ACHD-6	13	0
Reading MSA	415,271	10.6	29	1	1		1	0
Scranton-Wilkes-Barre-Hazleton MSA	558,166	9.6	22	1	2		2	0
State College MSA	160,580	9.1	21	0	1		1	0
Williamsport MSA	116,048	*N/A*	*N/A*	0	1		1	0
York-Hanover MSA	442,867	10.7	28	1	1		1	0
Youngstown-Warren-Boardman MSA	549,885	10.5	23	2	1	OH-3	4	0
Northcentral Non-MSA Region	*N/A*	*N/A*	*N/A*	*N/A*	2	*N/A*	*N/A*	*N/A*
Northeast Non-MSA Region	*N/A*	*N/A*	*N/A*	*N/A*	1	*N/A*	*N/A*	*N/A*
Northwest Non-MSA Region	*N/A*	*N/A*	*N/A*	*N/A*	3	*N/A*	*N/A*	*N/A*
Southwest Non-MSA Region	*N/A*	*N/A*	*N/A*	*N/A*	2	*N/A*	*N/A*	*N/A*

A requirement for continuous $PM_{2.5}$ monitoring is set forth in 40 CFR Part 58, Appendix D as follows:

"4.7.2 Requirement for Continuous PM $_{2.5}$ Monitoring. The State, or where appropriate, local agencies must operate continuous PM $_{2.5}$ analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies. State and local air monitoring agencies must use methodologies and quality assurance/quality control (QA/QC) procedures approved by the EPA Regional Administrator for these required continuous analyzers."

PA DEP's planned air monitoring network for 2016-2017 includes 36 continuous $PM_{2.5}$ monitors in total, either designated as primary monitors, or collocated with FRM primary monitors. Twenty-eight of these monitors are located in MSAs. PA DEP operates all continuous $PM_{2.5}$ monitors as SLAMS monitors, with the exception of Marcus Hook, which is an SPM site, and therefore not eligible to be counted towards the continuous monitoring requirement. Table C-15 demonstrates that PA DEP either meets or exceeds the continuous $PM_{2.5}$ monitoring requirement.

Table C-15. $PM_{2.5}$ Continuous Monitoring Requirements Demonstration, 2016-2017

MSA	No. of SLAMS Monitors Required	No. of Continuous Monitors Required	No. of PA DEP SLAMS Continuous Method Monitors	Other Continuous Method Monitors	Addt'l Continuous Monitors Required
Allentown-Bethlehem-Easton MSA	2	1	2		0
Altoona MSA	1	1	1		0
Bloomsburg-Berwick MSA	0	0			0
Chambersburg-Waynesboro MSA	0	0			0
East Stroudsburg MSA	0	0	1		0
Erie MSA	1	1	1		0
Gettysburg MSA	0	0	1		0
Harrisburg-Carlisle MSA	2	1	2		0
Johnstown MSA	1	1	1		0
Lancaster MSA	2	1	2		0
Lebanon MSA	1	1	1		0
New York-Newark-Jersey City MSA	3	2		NY-2	0
Philadelphia-Camden-Wilmington MSA	3	2	2	AMS-5; MD-1	0
Pittsburgh MSA	3	2	7		0
Reading MSA	1	1	1		0
Scranton-Wilkes-Barre-Hazleton MSA	1	1	2		0
State College MSA	0	0	1		0
Williamsport MSA	0	0	1		0
York-Hanover MSA	1	1	1		0
Youngstown-Warren-Boardman MSA	2	1	1		0

A requirement for $PM_{2.5}$ regional background and transport monitoring is set forth in 40 CFR Part 58, Appendix D as follows:

"4.7.3 Requirement for $PM_{2.5}$ Background and Transport Sites. Each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport. These monitoring sites may be at community-oriented sites and this requirement may be satisfied by a corresponding monitor in an area having similar air quality in another State. State and local air monitoring agencies must use methodologies and QA/QC procedures approved by the EPA Regional Administrator for these sites. Methods used at these sites may include non-federal reference method samplers such as IMPROVE or continuous $PM_{2.5}$ monitors."

PA DEP maintains the Arendtsville, Florence, New Garden, Swiftwater and Tioga County $PM_{2.5}$ monitoring sites for purposes of regional background and transport monitoring. Table C-16 lists these sites along with their respective measurement scales and monitoring objectives.

Table C-16. $PM_{2.5}$ Regional Background and Transport Requirements Demonstration

Site Name	AQS Code	County	Measurement Scale	Monitoring Objective	Monitoring Method(s)
Arendtsville	420010001	Adams	Regional Scale	General/Background	Met-One BAM
Florence	421255001	Washington	Regional Scale	General/Background	R&P 2025 (FRM) & Met-One BAM
New Garden	420290100	Chester	Urban Scale	Regional Transport	R&P 2025 (FRM) & Met-One BAM
Swiftwater	420890002	Monroe	Urban Scale	Regional Transport	Met-One BAM
Tioga County	421174000	Tioga	Urban Scale	Regional Transport	Met-One BAM

The Arendtsville and Florence monitoring sites are situated in rural settings and are classified as general/background monitors. The locations of these monitoring sites are such that $PM_{2.5}$ impacts from any existing large SO_2, NO_2 and VOC sources would not be expected to influence the $PM_{2.5}$ concentrations measured at these sites. Located in Washington County, $PM_{2.5}$ concentrations measured at the Florence monitoring site are used to assess the background $PM_{2.5}$ concentrations for western Pennsylvania regions. $PM_{2.5}$ background concentrations in western Pennsylvania are representative of air flow patterns primarily originating in Ohio and West Virginia. Similarly, the Arendtsville monitoring site located in Adams County is used to assess background concentrations in eastern Pennsylvania, representing air flow patterns from western PA, western Maryland and West Virginia. The three regional transport sites – New Garden, Swiftwater and Tioga County – are also situated in more rural areas of PA but tend to capture regional transport of pollution. New Garden captures the emissions from the Baltimore-Washington I-95 corridor. Depending on wind direction, Swiftwater captures the emissions from the Scranton-Wilkes-Barre or the Allentown-Bethlehem-Easton MSA. Finally, Tioga County captures regional transport of emissions across the northern tier of Pennsylvania.

Particulate Matter (PM_{10}) Network Design Requirements

Minimum PM_{10} monitoring requirements are set forth in 40 CFR Part 58, Appendix D as follows:

"4.6 Particulate Matter (PM_{10}) Design Criteria. (a) Table D-4 indicates the approximate number of permanent stations required in MSAs to characterize national and regional PM_{10} air quality trends and geographical patterns. The number of PM_{10} stations in areas where MSA populations exceed 1,000,000 must be in the range from 2 to 10 stations, while in low population urban areas, no more than two stations are required. A range of monitoring stations is specified in Table D-4 because sources of pollutants and local control efforts can vary from one part of the country to another and therefore, some flexibility is allowed in selecting the actual number of stations in any one locale. Modifications from these PM_{10} monitoring requirements must be approved by the Regional Administrator."

Table C-17. Minimum PM_{10} Monitoring Requirements

(Table D-4 of Appendix D to Part 58— PM_{10} Minimum Monitoring Requirements (Approximate Number of Stations Per MSA) [1])

Population Category	High concentration[2]	Medium concentration[3]	Low concentration[4,5]
>1,000,000	6-10	4-8	2-4
500,000-1,000,000	4-8	2-4	1-2
250,000-500,000	3-4	1-2	0-1
100,000-250,000	1-2	0-1	0

[1] Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA and the State agency.
[2] High concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding the PM $_{10}$ NAAQS by 20 percent or more.
[3] Medium concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding 80 percent of the PM_{10} NAAQS.
[4] Low concentration areas are those for which ambient PM_{10} data show ambient concentrations less than 80 percent of the PM_{10} NAAQS.
[5] These minimum monitoring requirements apply in the absence of a design value.

These minimum PM_{10} monitoring requirements are satisfied as detailed in Table C-18. Ambient air monitoring sites operated by agencies other than PA DEP are listed in the "Other SLAMS Monitors" column of the table. The number of PM_{10} monitoring sites within the twenty Pennsylvania MSAs meets or exceeds the minimum monitoring requirement.

Table C-18. PM_{10} Minimum Monitoring Requirements Demonstration, 2016-2017

MSA	2015 Population Estimate	2014 Max 24-hr Average	Monitoring Requirement Range	PA DEP SLAMS Monitors	Other SLAMS Monitors	Total No. of Monitors	Addt'l Monitors Needed
Allentown-Bethlehem-Easton MSA	832,327	40	1 - 2	1		1	0
Altoona MSA	125,593	38	0	1		1	0
Bloomsburg-Berwick MSA	85,229	*no monitors*	0	0		0	0
Chambersburg-Waynesboro MSA	153,638	*no monitors*	0	0		0	0
East Stroudsburg MSA	166,397	*no monitors*	0	0		0	0
Erie MSA	278,045	27	0 - 1	1		1	0
Gettysburg MSA	102,295	*no monitors*	0	0		0	0
Harrisburg-Carlisle MSA	565,006	40	1 - 2	1		1	0
Johnstown MSA	136,411	54	0	1		1	0
Lancaster MSA	536,624	43	1 - 2	1		1	0
Lebanon MSA	137,067	*no monitors*	0	0		0	0
New York-Newark-Jersey City MSA	20,182,305	50	2 - 4	0	NJ-2	2	0
Philadelphia-Camden-Wilmington MSA	6,069,875	97	2 - 4	0	AMS-2	2	0
Pittsburgh MSA	2,353,045	70	2 - 4	1	ACHD-10	11	0
Reading MSA	415,271	*no monitors*	0 - 1	0		0	0
Scranton-Wilkes-Barre-Hazleton MSA	558,166	34	1 - 2	1		1	0
State College MSA	160,580	*no monitors*	0	0		0	0
Williamsport MSA	116,048	21	0	1		1	0
York-Hanover MSA	442,867	*no monitors*	0 - 1	0		0	0
Youngstown-Warren-Boardman MSA	549,885	39	1 - 2	0	OH-4	4	0

Lead (Pb) Network Design Requirements

Minimum lead monitoring requirements are set forth in 40 CFR Part 58, Appendix D as follows:

"4.5 Lead (Pb) Design Criteria. (a) State and, where appropriate, local agencies are required to conduct ambient air Pb monitoring near Pb sources which are expected to or have been shown to contribute to a maximum Pb concentration in ambient air in excess of the NAAQS, taking into account the logistics and potential for population exposure. At a minimum, there must be one source-oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year based on either the most recent National Emission Inventory [https://www.epa.gov/air-emissions-inventories] or other scientifically justifiable methods and data (such as improved emissions factors or site-specific data) taking into account logistics and the potential for population exposure.

[…]

(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the State or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50 percent of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under § 58.10(d)."

Table C-19 displays previously identified 0.5 tpy or greater lead sources in Pennsylvania, outside of Allegheny and Philadelphia Counties, along with their correlating PA DEP lead monitoring sites. Site locations were chosen in accordance with 40 CFR Part 58, Appendix D, based on conservative dispersion modeling, and approved by EPA Region III.

Table C-19. Lead Sources Greater Than 0.5 Tons Per Year and PA DEP Lead Monitoring Sites

		Emissions, in tons per year					
County	**Facility Name**	**2010**	**2011**	**2012**	**2013**	**2014**	**PA DEP Lead Monitoring Site**
Armstrong	Genon NE Mgmt Co/Keystone Sta	0.27	0.03	0.02	0.04	0.03	**Shelocta***
Beaver	Horsehead Corp/Monaca Smelter	5.55	5.73	5.97	5.40	1.47	Beaver Valley Vanport
Beaver	Firstenergy Gen LLC/Bruce Mansfield Plt	0.60	0.60	0.50	0.60	0.56	Potter Township
Berks	East Penn Mfg Co Inc/Battery Assembly	1.84	1.75	1.66	1.58	1.77	Lyons Boro Lyons Park
Berks	Exide Tech/Reading Smelter	0.87	0.84	1.12	0.32	*N/A (facility idle)*	Laureldale North Laureldale South
Carbon	Horsehead Corp/Palmerton	0.60	0.66	0.55	0.65	1.67	Palmerton
Delaware	Exelon Generation Co/Eddystone	0.03	0.01	0.00	0.00	0.00	**Ridley Park***
Franklin	US Dept Of Defense/Letterkenny Army Depot	6.00	0.02	0.00	0.00	0.60	**Upper Strasburg***
Indiana	Genon NE Mgmt Co/Conemaugh Plt	0.13	0.11	0.11	0.13	0.11	**Conemaugh***
Lancaster	Mt Joy Wire Corp/Mt Joy	0.50	0.50	0.52	0.52	0.52	Mt Joy
Lawrence	Inmetco/Ellwood City	0.06	0.04	0.06	0.06	0.06	Ellwood City
Luzerne	Schott North Amer Inc/Duryea	0.67	0.08	0.03	0.03	0.03	Duryea
*** Monitor that will be discontinued**							

Siting Criteria Requirements – 40 CFR Part 58, Appendix E

PA DEP operates its Ambient Air Monitoring Network in accordance with all siting criteria requirements set forth in 40 CFR Part 58, Appendix E, "Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring". PA-DEP has instituted a 5-year statewide site survey plan (corresponding with the 5-year network assessment) that examines many aspects of the site, including siting criteria. Siting criteria are also re-checked when site operators or field supervisors report construction or other activities that may impact air monitoring at the site.

Appendix D – Pennsylvania Monitoring Network Site Details

Appendix D of this document provides a detailed description of the existing monitoring network sites. This appendix includes information related to the location of the site, monitoring parameters at the site, and details about the monitors themselves in order to meet the requirements of 40 CFR Sections 58.10 (a) and 58.10 (b). Unless otherwise indicated, all sites and monitors meet siting requirements set forth in of 40 CFR Part 58, Appendices A, C, D, and E.

Table D-1 below provides details on the methods and instrumentation utilized by the Department's Air Quality Monitoring Division for all criteria and toxic pollutant monitoring. PA DEP utilizes Federal Reference Methods (FRM) and Federal Equivalent Methods in its monitoring network, for criteria pollutants. Although there are no national concentration standards for air toxic pollutants, PA DEP uses approved EPA analytical methods to determine ambient concentrations.

Table D-1. Ambient Air Monitoring Equipment and Methods

PARAMETER	MANUFACTURER/INSTRUMENT/MODEL	EPA METHOD DESIGNATION
Continuous Gaseous Sampling		
OZONE	Teledyne Advanced Pollution Instrumentation Model 400 Photometric Ozone Analyzer	Automated Equivalent Method: EQOA-0992-087 57 FR 44565, 9/28/92 63 FR 31992, 6/11/98 67 FR 57811, 9/12/02
SO_2	Teledyne Advanced Pollution Instrumentation Model 100A UV Fluorescence SO_2 Analyzer	Automated Equivalent Method: EQSA-0495-100 60 FR 17061, 4/4/95
$NO/NO_2/NO_x$	Teledyne Advanced Pollution Instrumentation Model 200A Chemiluminescence Nitrogen Oxides Analyzer for Ambient Concentrations	Automated Reference Method: RFNA-1194-099 59 FR 61892, 12/2/94
CO	Teledyne Advanced Pollution Instrumentation Model 300 CO Gas Filter Correlation Analyzer	Automated Reference Method: RFCA-1093-093 58 FR 58166, 10/29/93
H_2S	Teledyne-API Model 101E UV Fluorescence H_2S Analyzer	None
Mercury	Tekran Mercury Vapor Analyzer Model 2537A Cold Vapor Atomic Fluorescence Spectrometer (CVAFS)	EPA Compendium Method IO-5
Particulate Sampling		
$PM_{2.5}$		
Discrete	R&P Partisol-Plus Model 2025 Sequential Air Sampler w/VSCC, Thermo Fisher Scientific Partisol Model 2025i Sequential Air Sampler	Manual Reference Method: RFPS-0498-118 63 FR 18911, 4/16/98 67 FR 15567, 4/2/02 (EQPM-0202-145 redesignated as manual reference method 12/18/06)
Continuous	Met One Instruments Beta-Attenuation Mass (BAM) Model 1020	Automated Equivalent Method EQPM-0308-170 73 FR 13224, 3/12/08 73 FR 22362, 4/25/08
Continuous	R&P TEOM Series 8500a Filter Dynamics Measurement System (FDMS) and TEOM Series 1400ab	Automated Equivalent Method EQPM-0609-181 74 FR 28697, 6/17/2009

Table D-1. Ambient Air Monitoring Equipment and Methods (cont.)

PARAMETER	MANUFACTURER/INSTRUMENT/MODEL	EPA METHOD DESIGNATION
Particulate Sampling (cont.)		
$PM_{2.5}$ SPECIATION	Met One Instruments SASS $PM_{2.5}$ Ambient Chemical Speciation Air Sampler URG Corporation 3000N Sequential Particulate Speciation System	None
PM_{10}	Rupprecht & Patashnick (R&P) Tapered Element Oscillating Microbalance (TEOM) Series 1400 Ambient Particulate Monitor	Automated Equivalent Method: EQPM-1090-079 55 FR 43406, 10/29/90
LEAD	Tisch TE-5170 VFC+ Inductively Coupled Plasma - Mass Spectrometry	Manual Equivalent Method EQL-0710-192 75 FR 45627, 8/3/10
PM_{10}-based Metals	Thermo GMW PM_{10} High-Volume Air Sampler - Volumetric Model SA/G1200	Manual Reference Method: RFPS-1287-063 52 FR 45684, 12/01/87 53FR 1062, 1/15/88
TSP/Metals	Thermo GMW TSP High-Volume Air Sampler - Volumetric Flow Controlled Inductively Coupled Plasma - Mass Spectrometry (Metals)	Manual Reference Method Method Code 802 47 FR 54912, 12/6/82 48 FR 17355 4/22/83 EPA Compendium Method IO-3.5
Other Toxic Sampling		
VOC	ATEC Model 2200-12 ATEC Model 2200-102 Entech CS1200ES4	EPA Compendium Method TO-15
Carbonyl	Xontech Model 925 Automated Carbonyl Sampler ATEC Model 2200-102	EPA Compendium Method TO-11A

SITE NAME: **ALLENTOWN**

AQS ID: 420770004
MSA: Allentown-Bethlehem-Easton MSA
COUNTY: LEHIGH
MUNICIPALITY: CITY OF ALLENTOWN
LATITUDE: 40.61194445
LONGITUDE: -75.43261111
ADDRESS: STATE HOSPITAL REAR 1600 HANOVER AVE
COMMENTS: Meets federal monitoring requirements in the Allentown-Bethlehem-Easton MSA

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1984	Continuous	UV Absorption	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	1/1/2016	Continuous	Beta Attenuation	Neighborhood	Source Oriented
PM_{10}	SLAMS	5/16/1996	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure

SITE NAME: **ALTOONA**
AQS ID: **420130801**
MSA: **Altoona MSA**
COUNTY: **BLAIR**
MUNICIPALITY: **LOGAN TWP**
LATITUDE: **40.53563889**
LONGITUDE: **-78.37036111**
ADDRESS: **2ND AVE & 7TH ST**
COMMENTS: **Monitors for NAAQS compliance for criteria pollutants in Altoona MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	5/1/1978	Continuous	UV Absorption	Urban Scale	Max Ozone Concentration
SO_2	SLAMS	5/1/1978	Continuous	UV Fluorescence	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	6/1/2010	Continuous	Beta Attenuation	Neighborhood	Population Exposure
PM_{10}	SLAMS	5/17/1995	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure

SITE NAME: **ARENDTSVILLE**

AQS ID: **420010001**
MSA: **Gettysburg MSA**
COUNTY: **ADAMS**
MUNICIPALITY: **FRANKLIN TWP**
LATITUDE: **39.92330556**
LONGITUDE: **-77.30816667**
ADDRESS: **WINDING ROAD, BIGLERVILLE**
COMMENTS: **Monitors regional transport of pollutants into eastern PA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	11/1/2014	Continuous	UV Absorption	Regional Scale	Regional Transport
SO_2	SLAMS	10/6/2014	Continuous	UV Fluorescence	Urban Scale	General/Background
NO_2	SLAMS	6/24/1997	Continuous	Chemiluminescence	Urban Scale	General/Background
CO	SLAMS	6/24/1997	Continuous	Non-dispersive Infrared	Neighborhood	General/Background
$PM_{2.5}$	SLAMS	7/1/2009	Continuous	Beta Attenuation	Regional Scale	General/Background
Carbonyls	Other	6/2/1997	1 in 6	DNPH - Coated Cartridges (24 Hour)	N/A	N/A
VOC	Other	6/2/1997	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **BEAVER FALLS**
AQS ID: **420070014**
MSA: **Pittsburgh MSA**
COUNTY: **BEAVER**
MUNICIPALITY: **CITY OF BEAVER FALLS**
LATITUDE: **40.74780556**
LONGITUDE: **-80.31575**
ADDRESS: **EIGHTH STREET AND RIVER ALLEY**
COMMENTS: **Monitors for NAAQS compliance for criteria pollutants**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1974	Continuous	UV Absorption	Urban Scale	Population Exposure
NO_2	SLAMS	1/1/1974	Continuous	Chemiluminescence	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	12/1/1999	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	7/16/2004	Continuous	Beta Attenuation	Neighborhood	Population Exposure
PM_{10}	SLAMS	9/20/1995	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure
VOC (discontinue)	Other	1/2/2010	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **BEAVER VALLEY**
AQS ID: **420070007**
MSA: **Pittsburgh MSA**
COUNTY: **BEAVER**
MUNICIPALITY: **CENTER TWP**
LATITUDE: **40.671394**
LONGITUDE: **-80.314264**
ADDRESS: **200 FAIRVIEW DRIVE**
COMMENTS: **Monitors lead concentrations from nearby source**

Monitor Summary

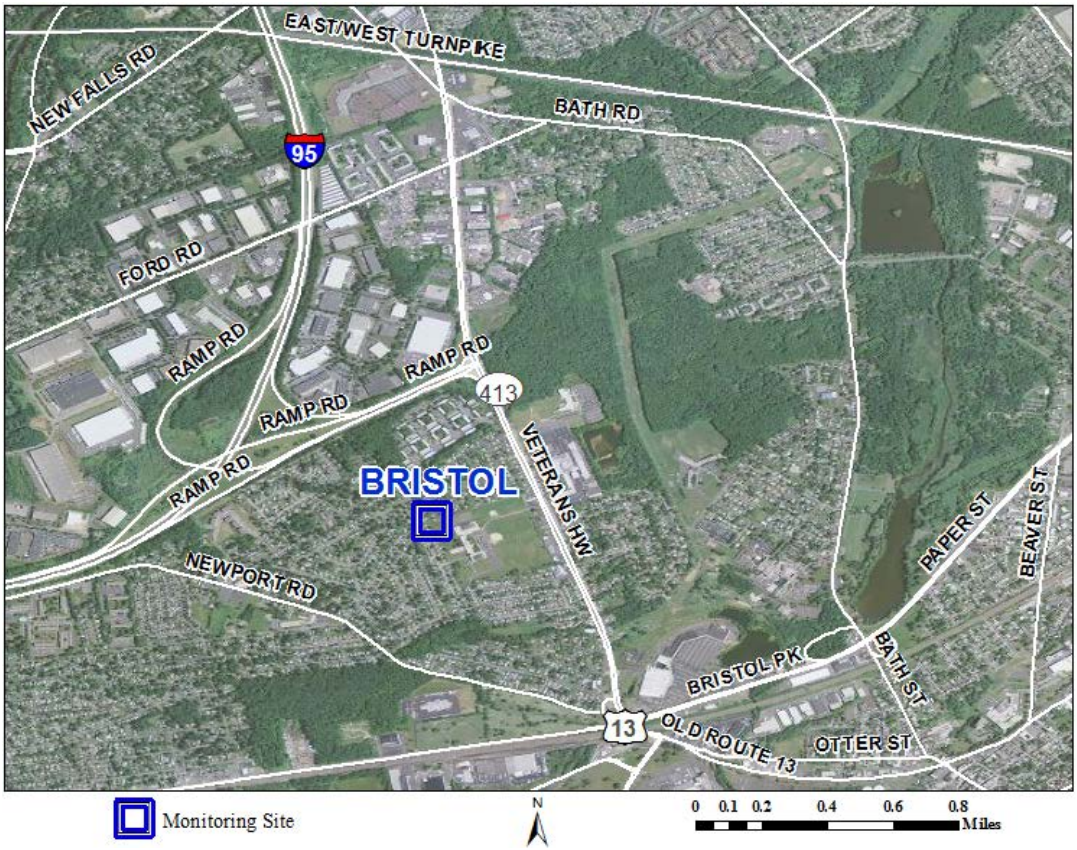
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented
TSP/Metals	Other	2/20/2011	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A
VOC (add)	Other		1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **BRIGHTON TWP**
AQS ID: **420070005**
MSA: **Pittsburgh MSA**
COUNTY: **BEAVER**
MUNICIPALITY: **BRIGHTON TWP**
LATITUDE: **40.68547222**
LONGITUDE: **-80.3605**
ADDRESS: **1015 SEBRING ROAD**
COMMENTS: **Monitors ozone and SO_2 concentrations within the Ohio River valley**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	4/20/1994	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_2	SLAMS	4/20/1994	Continuous	UV Fluorescence	Neighborhood	Highest Concentration

SITE NAME: **BRISTOL**
AQS ID: 420170012
MSA: Philadelphia-Camden-Wilmington MSA
COUNTY: BUCKS
MUNICIPALITY: BRISTOL TWP
LATITUDE: 40.10738889
LONGITUDE: -74.88247222
ADDRESS: ROCKVIEW DRIVE
COMMENTS: Monitors downwind concentration of ozone from mobile sources in the Philadelphia metro area



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1974	Continuous	UV Absorption	Neighborhood	Max Ozone Concentration
SO_2 (discontinue)	SLAMS	1/1/1974	Continuous	UV Fluorescence	Neighborhood	Population Exposure

SITE NAME: **CARLISLE**
AQS ID: **420410101**
MSA: **Harrisburg-Carlisle MSA**
COUNTY: **CUMBERLAND**
MUNICIPALITY: **NORTH MIDDLETON TWP**
LATITUDE: **40.24661111**
LONGITUDE: **-77.18372222**
ADDRESS: **IMPERIAL COURT**
COMMENTS: **Monitors fine particulate matter to meet federal monitoring requirements in the Harrisburg MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
$PM_{2.5}$	SLAMS	3/29/2001	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	1/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: **CHARLEROI**
AQS ID: **421250005**
MSA: **Pittsburgh MSA**
COUNTY: **WASHINGTON**
MUNICIPALITY: **CHARLEROI BORO**
LATITUDE: **40.14658333**
LONGITUDE: **-79.90222222**
ADDRESS: **CHARLEROI WASTE TREATMENT PLANT**
COMMENTS: **Monitors for criteria pollutants to meet federal requirements including NAAQS compliance in the Pittsburgh MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1974	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_2	SLAMS	1/1/1974	Continuous	UV Fluorescence	Neighborhood	Population Exposure
NO_2	SLAMS	1/1/1974	Continuous	Chemiluminescence	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	1/12/2016	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	4/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure
VOC	Other	5/31/2009	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **CHESTER**

AQS ID: **420450002**

MSA: **Philadelphia-Camden-Wilmington MSA**

COUNTY: **DELAWARE**

MUNICIPALITY: **CITY OF CHESTER**

LATITUDE: **39.83519445**

LONGITUDE: **-75.37211111**

ADDRESS: **FRONT ST & NORRIS ST**

COMMENTS: **Monitors criteria pollutants for NAAQS compliance in the Philadelphia-Camden-Wilmington MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1974	Continuous	UV Absorption	Urban Scale	Population Exposure
SO_2	SLAMS	4/1/1974	Continuous	UV Fluorescence	Neighborhood	Population Exposure
NO_2	SLAMS	1/1/1974	Continuous	Chemiluminescence	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	4/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure
$PM_{2.5}$ Speciation	CSN	12/1/2014	1 in 6	Gravimetric	Neighborhood	Population Exposure
Pb	SLAMS	2/1/1994	1 in 6	ICP-MS	Neighborhood	Population Exposure
VOC	Other	1/10/1995	1 in 6	Canister (24 Hour)	N/A	N/A
TSP/Metals	Other	1/10/1995	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

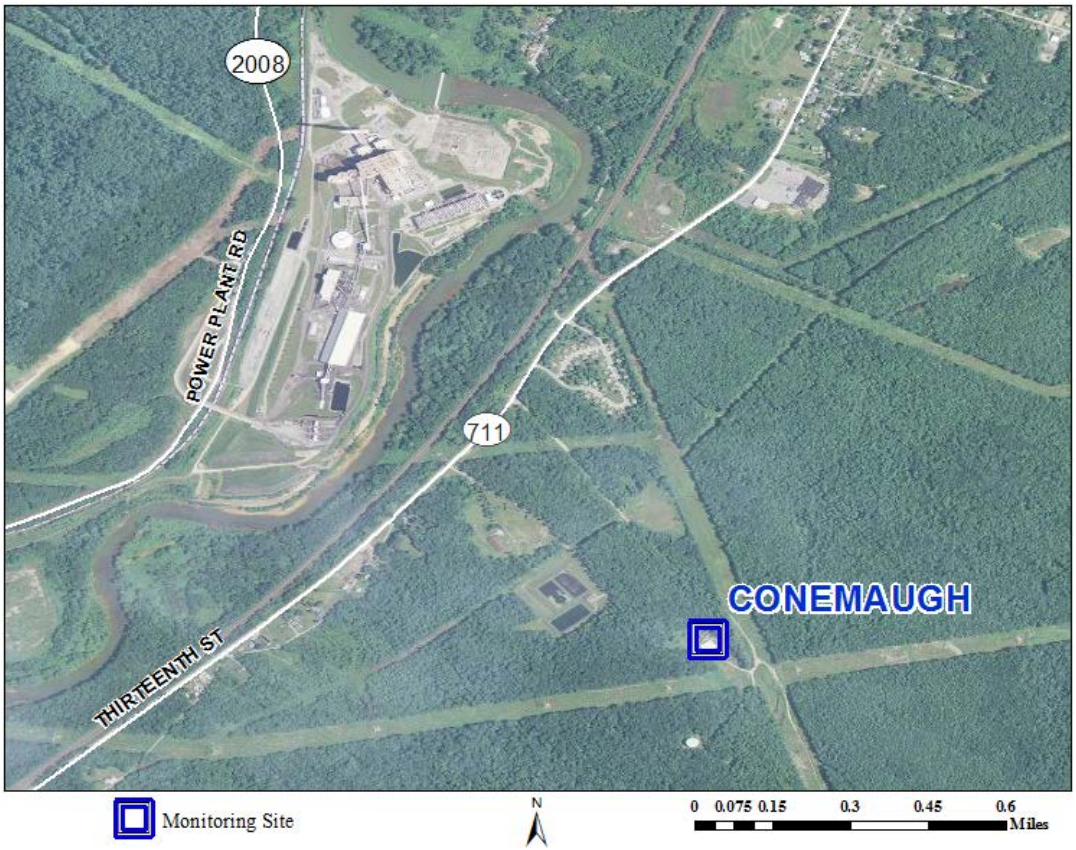
SITE NAME: **COLLEGEVILLE**
AQS ID: **420910005**
MSA: **Philadelphia-Camden-Wilmington MSA**
COUNTY: **MONTGOMERY**
MUNICIPALITY: **COLLEGEVILLE BORO**
LATITUDE: **40.1925**
LONGITUDE: **-75.4575**
ADDRESS: **URSINUS COLLEGE**
COMMENTS: **Monitors for VOCs near source**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC	Other	5/18/2007	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **CONEMAUGH**
AQS ID: 421290009
MSA: Pittsburgh MSA
COUNTY: WESTMORELAND
MUNICIPALITY: ST CLAIR TWP
LATITUDE: 40.39292
LONGITUDE: -79.02446
ADDRESS: SUGAR RUN - RT 711
COMMENTS: Monitors lead concentrations from nearby source

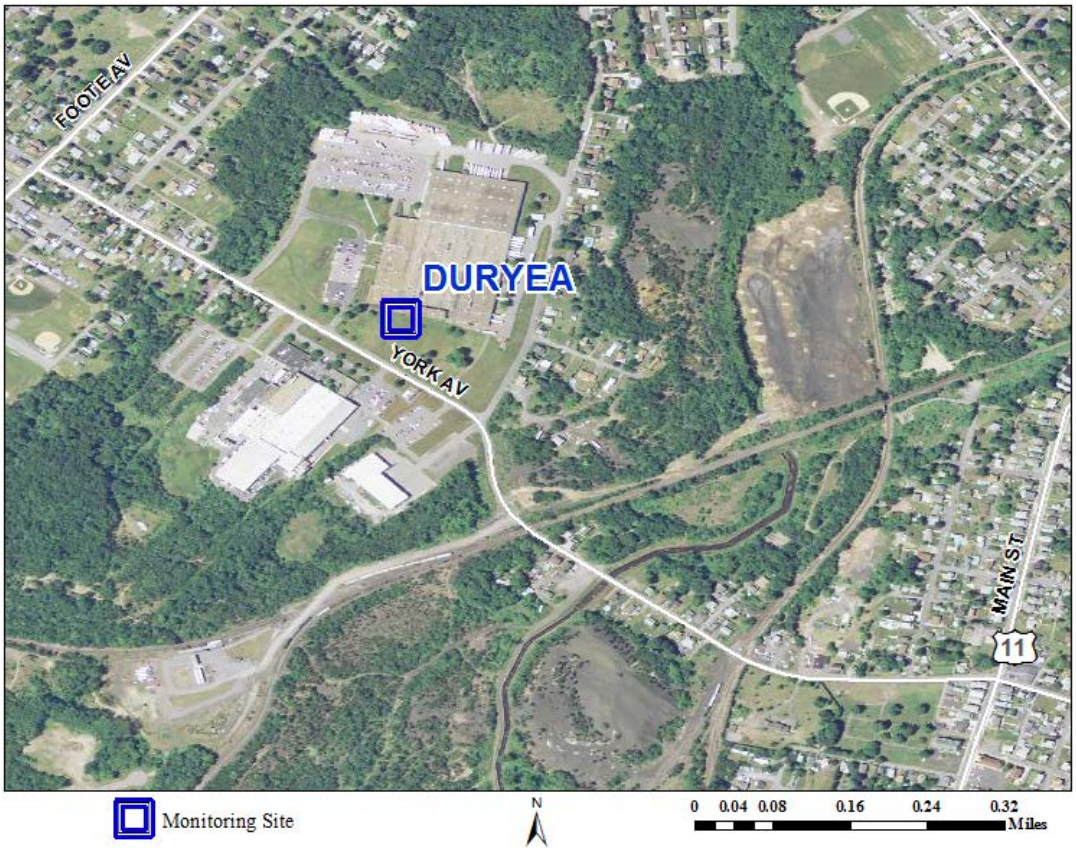
SITE WILL BE DISCONTINUED



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb (discontinue)	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **DURYEA**
AQS ID: **420790036**
MSA: **Scranton-Wilkes-Barre-Hazleton MSA**
COUNTY: **LUZERNE**
MUNICIPALITY: **DURYEA BORO**
LATITUDE: **41.348869**
LONGITUDE: **-75.747322**
ADDRESS: **401 YORK AVE**
COMMENTS: **Monitor lead concentrations close to a source region**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **EASTON**
AQS ID: **420958000**
MSA: **Allentown-Bethlehem-Easton MSA**
COUNTY: **NORTHAMPTON**
MUNICIPALITY: **WILSON BORO**
LATITUDE: **40.69230556**
LONGITUDE: **-75.23711111**
ADDRESS: **17TH AND SPRING GARDEN STREETS**
COMMENTS: **Monitors SO_2 concentrations in the Allentown-Bethlehem-Easton MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	10/20/1999	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_2	SLAMS	10/20/1999	Continuous	UV Fluorescence	Neighborhood	Population Exposure
H_2S	SPM	1/1/1986	Continuous	UV Fluorescence	Neighborhood	Population Exposure

SITE NAME: **ELLWOOD CITY**
AQS ID: 420730011
MSA: Northwest Region - Non-MSA
COUNTY: LAWRENCE
MUNICIPALITY: ELLWOOD CITY BORO
LATITUDE: 40.859409
LONGITUDE: -80.276131
ADDRESS: Spring Avenue Ext. & Arch St.
COMMENTS: Monitors lead concentrations from nearby source

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented
Metals (PM_{10}-based)	Other	4/21/2016	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

SITE NAME: **ERIE**
AQS ID: **420490003**
MSA: **Erie MSA**
COUNTY: **ERIE**
MUNICIPALITY: **CITY OF ERIE**
LATITUDE: **42.14197222**
LONGITUDE: **-80.03869444**
ADDRESS: **10TH AND MARNE STREETS**
COMMENTS: **Monitors for NAAQS compliance in the Erie MSA.**

Monitor Summary

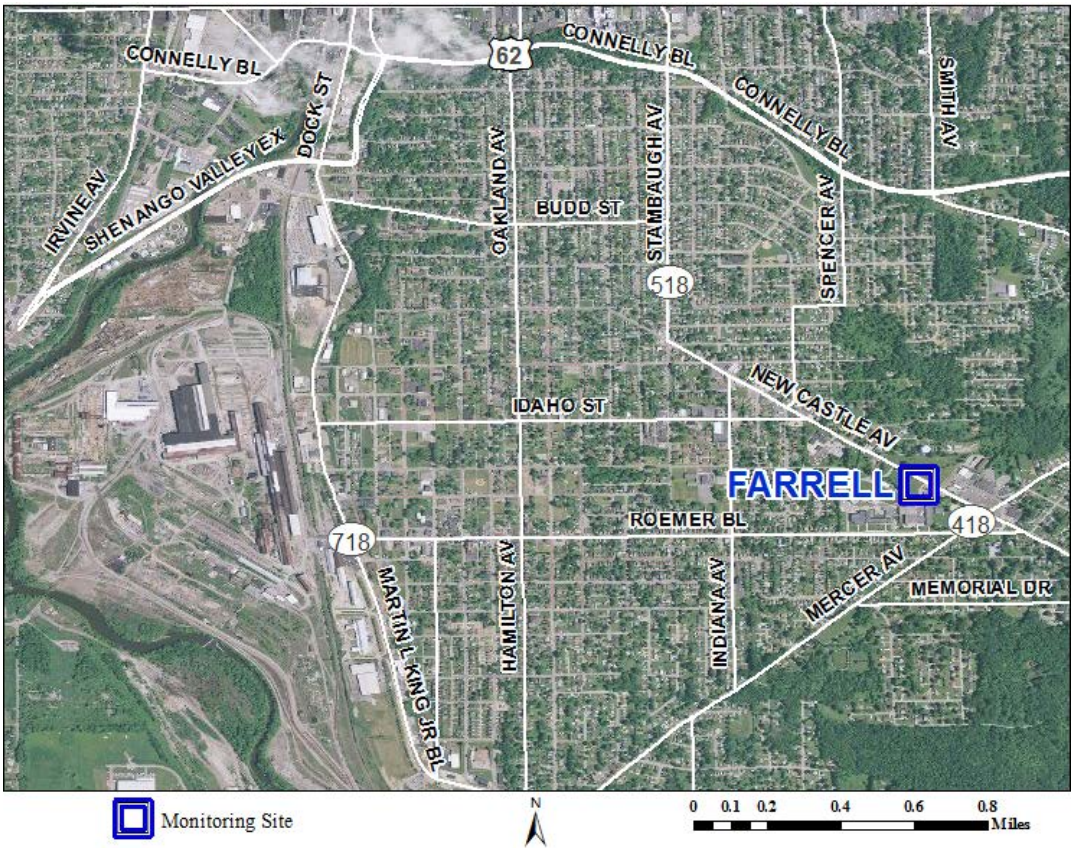
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	5/18/1988	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_2 (discontinue)	SLAMS	5/18/1988	Continuous	UV Fluorescence	Neighborhood	Population Exposure
NO_2	SLAMS	5/18/1988	Continuous	Chemiluminescence	Neighborhood	Population Exposure
CO	SLAMS	11/1/2004	Continuous	Non-dispersive Infrared	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	7/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure
$PM_{2.5}$ Speciation	CSN	1/1/2002	1 in 6	Gravimetric	Neighborhood	Population Exposure
PM_{10}	SLAMS	8/10/1995	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure

SITE NAME: **EVANSBURG UNITED METHODIST**
AQS ID: **420910016**
MSA: **Philadelphia-Camden-Wilmington MSA**
COUNTY: **MONTGOMERY**
MUNICIPALITY: **LOWER PROVIDENCE TWP**
LATITUDE: **40.183056**
LONGITUDE: **-75.434167**
ADDRESS: **3871 GERMANTOWN PIKE**
COMMENTS: **Monitors for VOC's near source**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC	Other	2/18/2009	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **FARRELL**
AQS ID: **420850100**
MSA: **Youngstown-Warren-Boardman MSA**
COUNTY: **MERCER**
MUNICIPALITY: **CITY OF FARRELL**
LATITUDE: **41.21405556**
LONGITUDE: **-80.48347222**
ADDRESS: **PA518 (NEW CASTLE ROAD) & PA418**
COMMENTS: **Meets federal monitoring requirements in the PA part of the Youngstown-Warren-Boardman MSA**

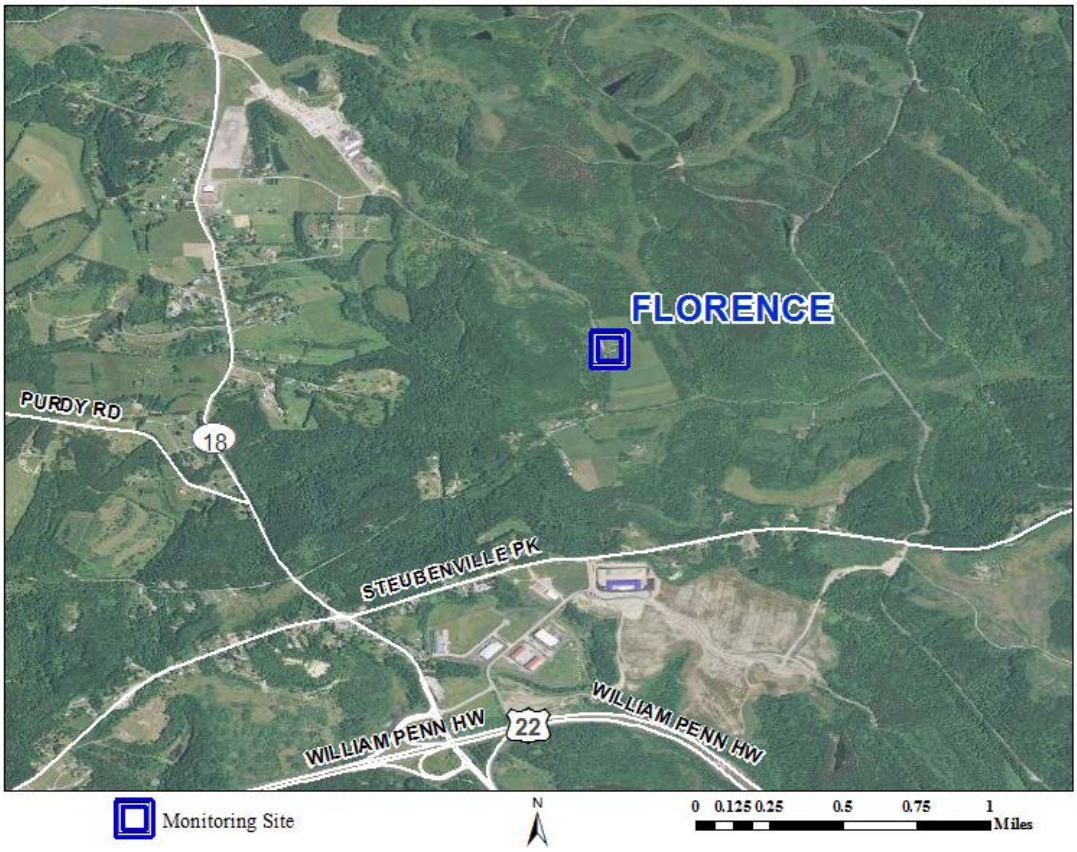


Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	9/1/1980	Continuous	UV Absorption	Urban Scale	Max Ozone Concentration
$PM_{2.5}$	SLAMS	2/1/2000	Daily	Gravimetric	Urban Scale	Population Exposure
$PM_{2.5}$	SLAMS	11/3/2010	Continuous	Beta Attenuation	Urban Scale	Population Exposure

SITE NAME: **FLORENCE**

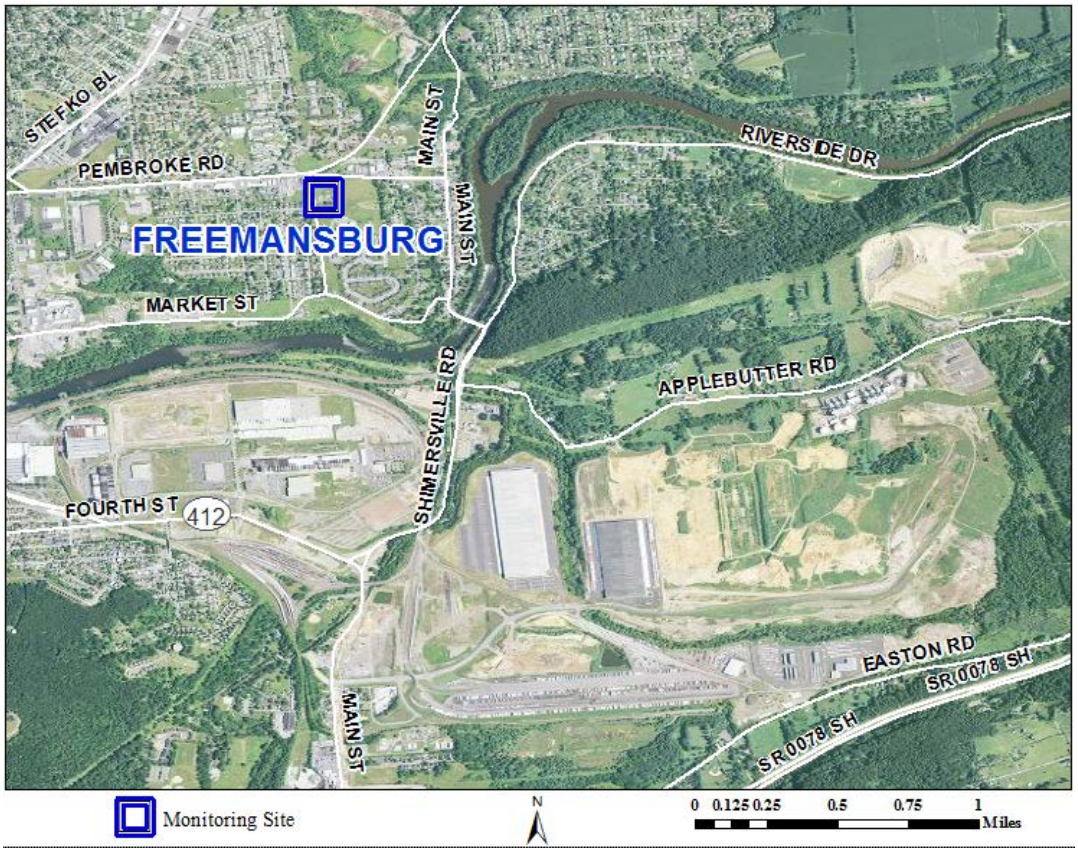
AQS ID: 421255001
MSA: Pittsburgh MSA
COUNTY: WASHINGTON
MUNICIPALITY: HANOVER TWP
LATITUDE: 40.44547222
LONGITUDE: -80.42122222
ADDRESS: HILLMAN STATE PARK - KINGS CREEK ROAD
COMMENTS: Monitors transport of pollutants into PA from upwind areas including Ohio and West Virginia



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	6/8/1995	Continuous	UV Absorption	Regional Scale	Regional Transport
SO_2	SLAMS	1/1/1982	Continuous	UV Fluorescence	Urban Scale	Regional Transport
$PM_{2.5}$	SLAMS	6/11/2012	Daily	Gravimetric	Regional Scale	General/Background
$PM_{2.5}$	SLAMS	7/1/2009	Continuous	Beta Attenuation	Regional Scale	General/Background
$PM_{2.5}$ Speciation	CSN	1/1/2002	1 in 6	Gravimetric	Regional Scale	Regional Transport

SITE NAME: **FREEMANSBURG**
AQS ID: **420950025**
MSA: **Allentown-Bethlehem-Easton MSA**
COUNTY: **NORTHAMPTON**
MUNICIPALITY: **FREEMANSBURG BORO**
LATITUDE: **40.62847222**
LONGITUDE: **-75.34158333**
ADDRESS: **WASHINGTON & CAMBRIA STS. FREEMANSBURG**
COMMENTS: **Meets federal monitoring requirements in the Allentown-Bethlehem-Easton MSA**

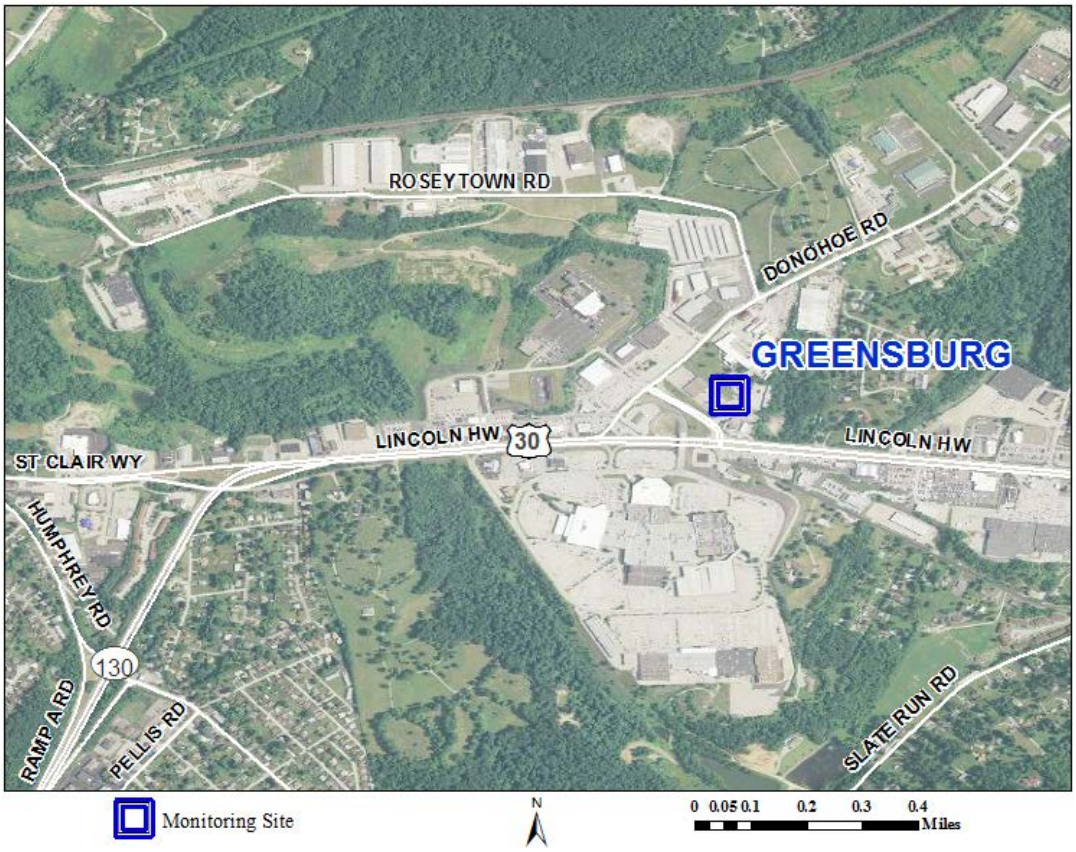


Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	8/20/1997	Continuous	UV Absorption	Neighborhood	Population Exposure
NO_2	SLAMS	8/20/1997	Continuous	Chemiluminescence	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	2/27/2012	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	7/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure
$PM_{2.5}$ Speciation (discontinue)	CSN	1/1/2002	1 in 6	Gravimetric	Neighborhood	Population Exposure
VOC (discontinue)	Other	1/8/2010	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **GREENSBURG**

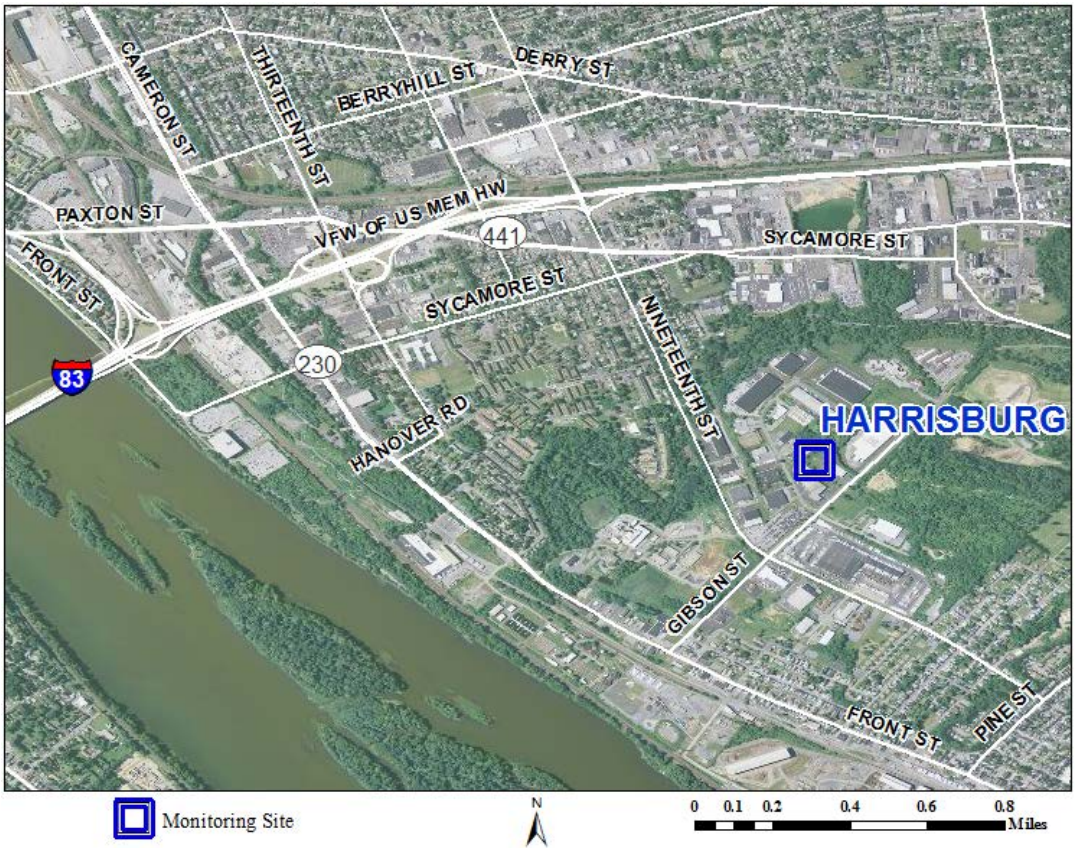
AQS ID: 421290008
MSA: Pittsburgh MSA
COUNTY: WESTMORELAND
MUNICIPALITY: HEMPFIELD TWP
LATITUDE: 40.30438889
LONGITUDE: -79.50605556
ADDRESS: DONOHOE ROAD - PENN DOT MAINT DIST BLDG
COMMENTS: Meets federal monitoring requirements in the Pittsburgh MSA and for NAAQS compliance



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	10/1/1997	Continuous	UV Absorption	Urban Scale	Population Exposure
$PM_{2.5}$	SLAMS	9/5/2012	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	7/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure
$PM_{2.5}$ Speciation	CSN	1/1/2002	1 in 6	Gravimetric	Urban Scale	Population Exposure
VOC	Other	1/2/2010	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **HARRISBURG**
AQS ID: **420430401**
MSA: **Harrisburg-Carlisle MSA**
COUNTY: **DAUPHIN**
MUNICIPALITY: **SWATARA TWP**
LATITUDE: **40.246992**
LONGITUDE: **-76.846988**
ADDRESS: **651 Gibson Blvd**
COMMENTS: **Monitors criteria pollutants for NAAQS compliance in the Harrisburg MSA**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	6/1/1978	Continuous	UV Absorption	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	1/1/2012	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	1/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: **HERSHEY**

AQS ID: **420431100**

MSA: **Harrisburg-Carlisle MSA**

COUNTY: **DAUPHIN**

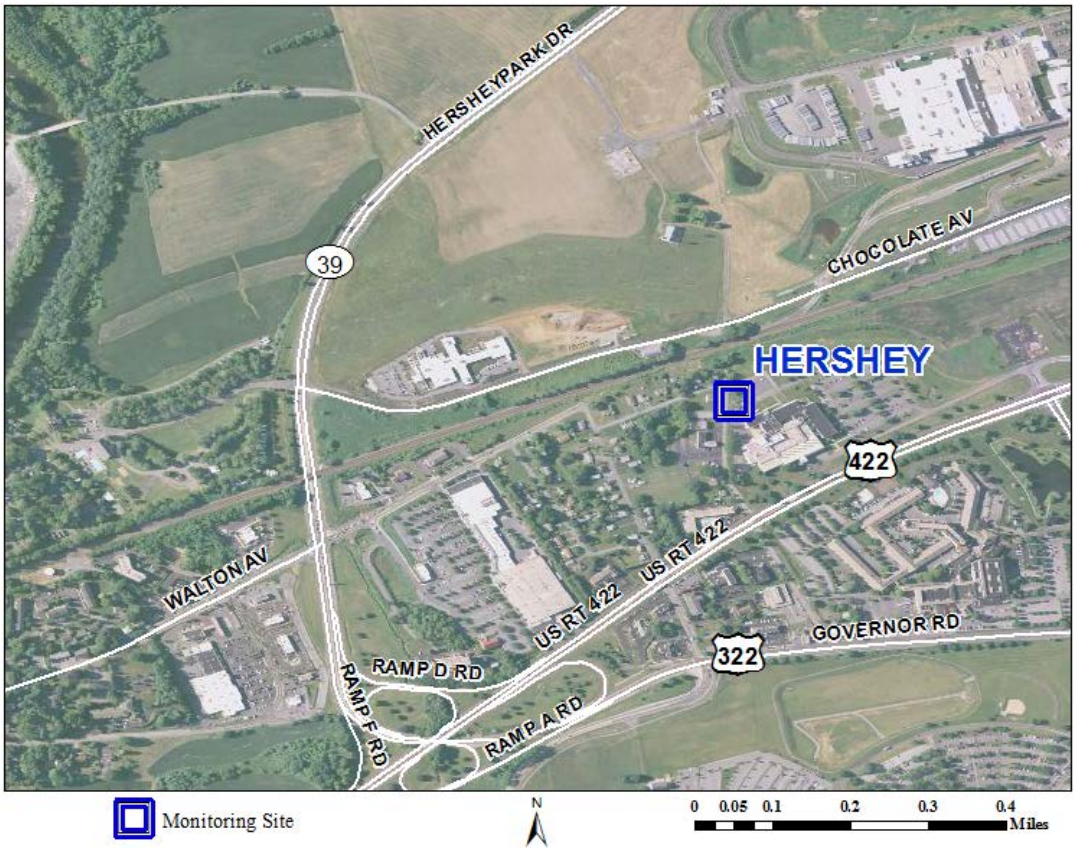
MUNICIPALITY: **DERRY TWP**

LATITUDE: **40.27241667**

LONGITUDE: **-76.68141667**

ADDRESS: **SIPE AVE & MAE STREET**

COMMENTS: **Monitors criteria pollutants for NAAQS compliance in the Harrisburg MSA; also measures concentrations downwind of the Harrisburg Metro Area**

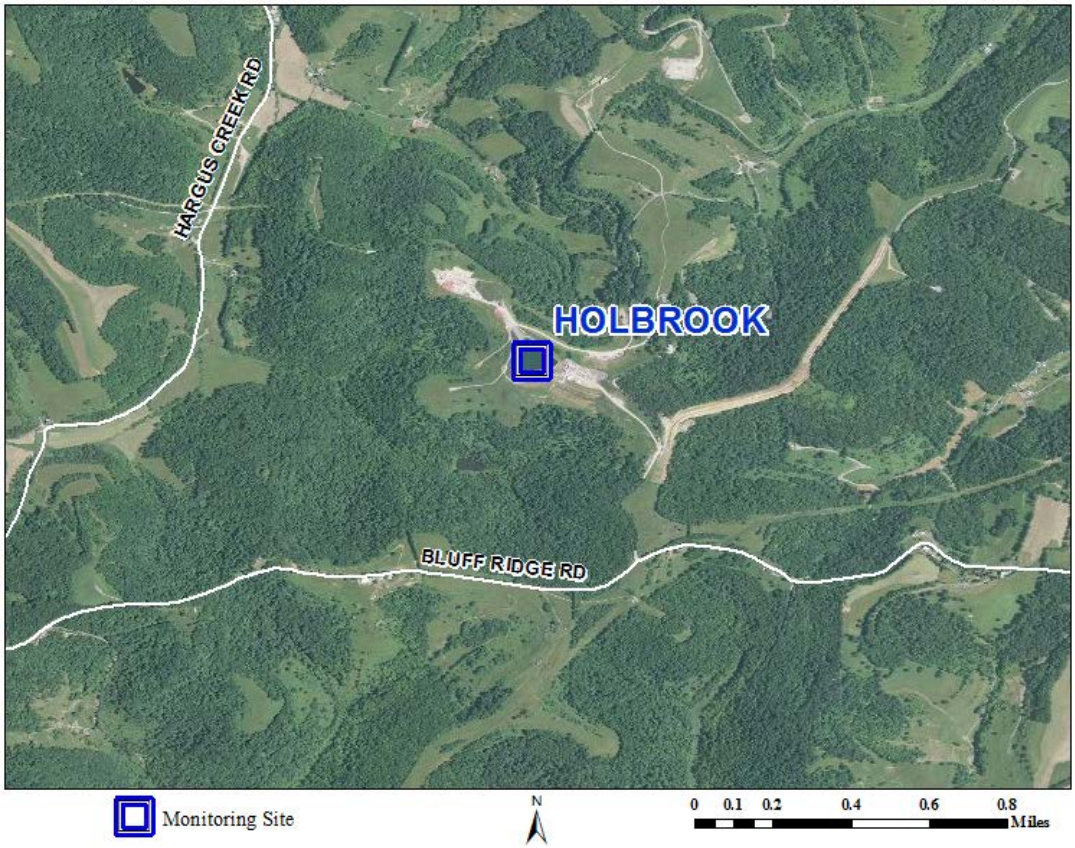


Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	8/1/1981	Continuous	UV Absorption	Urban Scale	Max Ozone Concentration
PM_{10}	SLAMS	1/19/2012	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure

SITE NAME: **HOLBROOK**

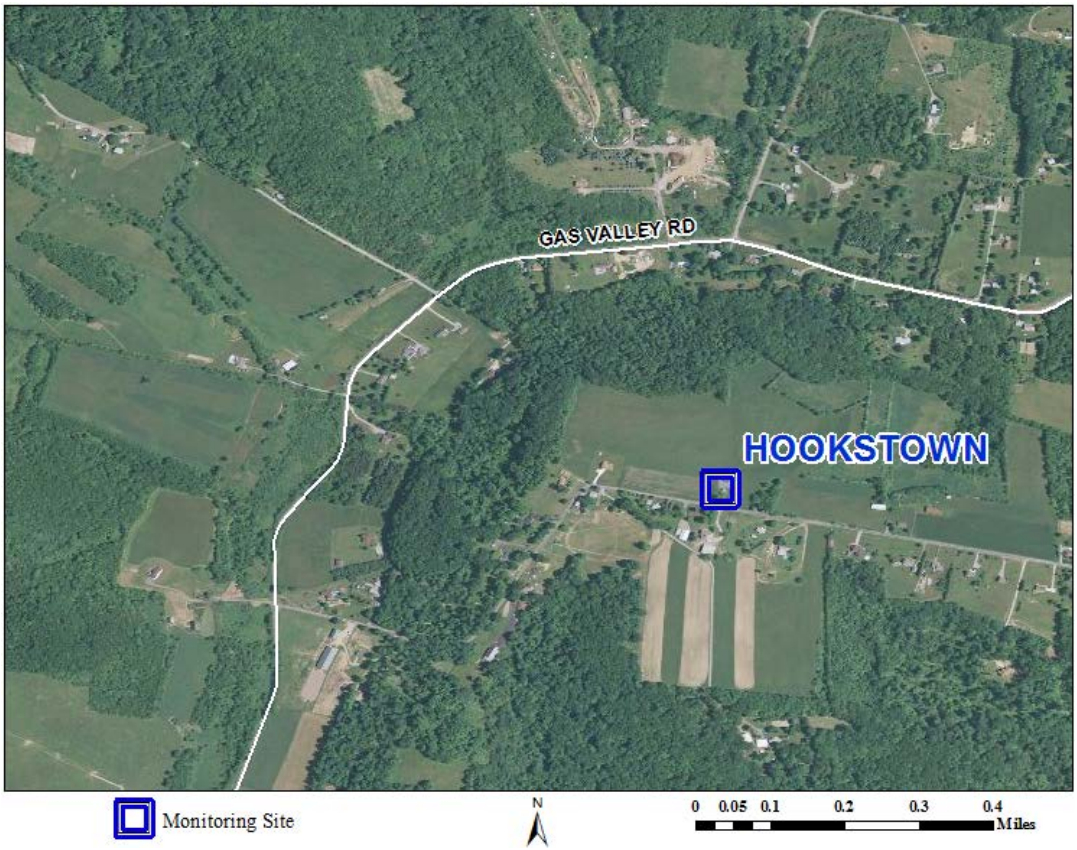
AQS ID: 420590002
MSA: Southwest Region - Non-MSA
COUNTY: GREENE
MUNICIPALITY: CENTER TWP
LATITUDE: 39.81602778
LONGITUDE: -80.28480556
ADDRESS: 4.8 KM SE OF HOLBROOK
COMMENTS: Monitors transport of pollutants into PA from WV and OH



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1997	Continuous	UV Absorption	Regional Scale	Regional Transport
SO_2 **(discontinue)**	SLAMS	1/1/1997	Continuous	UV Fluorescence	Urban Scale	Regional Transport
$PM_{2.5}$	SLAMS	1/1/2016	Continuous	Beta Attenuation	Neighborhood	Source Oriented

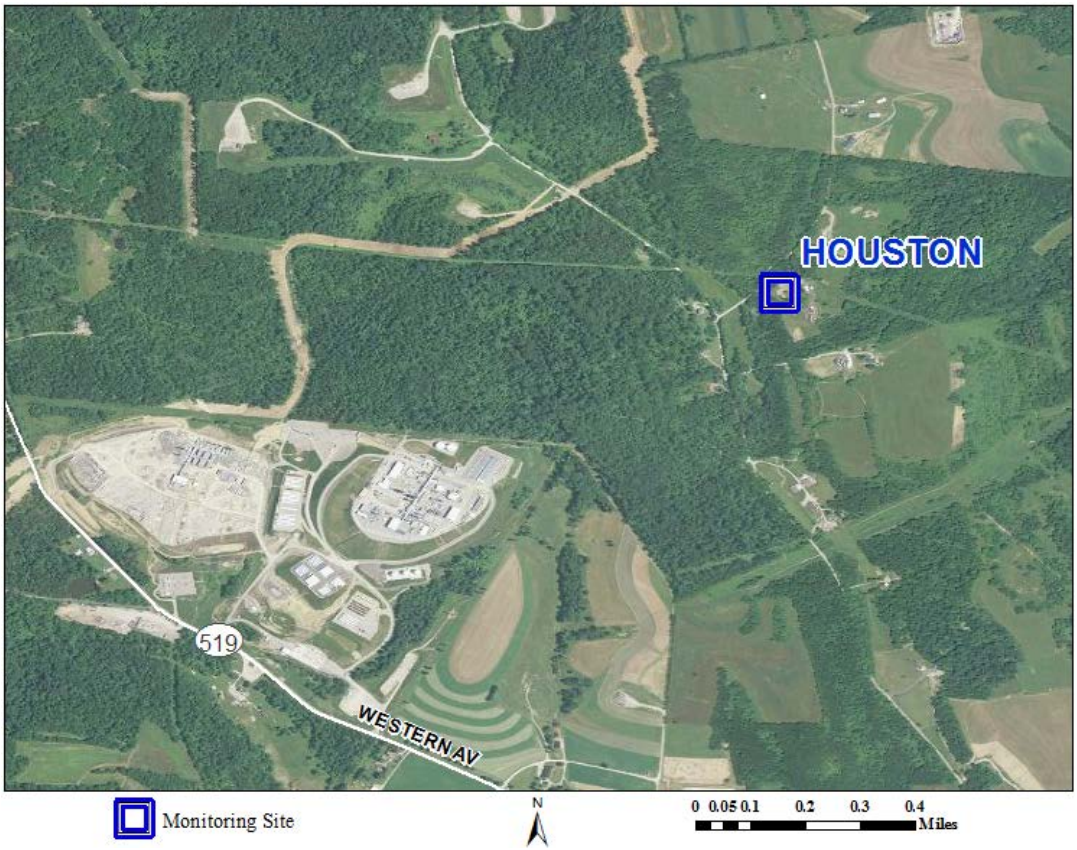
SITE NAME: **HOOKSTOWN**
AQS ID: **420070002**
MSA: **Pittsburgh MSA**
COUNTY: **BEAVER**
MUNICIPALITY: **GREENE TWP**
LATITUDE: **40.56305556**
LONGITUDE: **-80.50444445**
ADDRESS: **ROUTE 168 & TOMLINSON ROAD**
COMMENTS: **Monitors transport of pollutants into PA from WV and OH**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	6/8/1995	Continuous	UV Absorption	Regional Scale	Regional Transport
SO_2	SLAMS	1/1/1983	Continuous	UV Fluorescence	Urban Scale	Regional Transport

SITE NAME: **HOUSTON**
AQS ID: **421255200**
MSA: **Pittsburgh MSA**
COUNTY: **WASHINGTON**
MUNICIPALITY: **CHARTIERS TWP**
LATITUDE: **40.268963**
LONGITUDE: **-80.243995**
ADDRESS: **220 MEDDINGS RD**
COMMENTS: **Monitors criteria pollutants and VOC's downwind of natural gas processing facility**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
NO_2	SLAMS	7/23/2012	Continuous	Chemiluminescence	Neighborhood	Source Oriented
Carbonyls	Other	7/23/2012	1 in 6	DNPH - Coated Cartridges (24 Hour)	N/A	N/A
VOC	Other	7/23/2012	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **JOHNSTOWN**
AQS ID: **420210011**
MSA: **Johnstown MSA**
COUNTY: **CAMBRIA**
MUNICIPALITY: **CITY OF JOHNSTOWN**
LATITUDE: **40.30994445**
LONGITUDE: **-78.91544445**
ADDRESS: **MILLER AUTO SHOP 1 MESSENGER ST**
COMMENTS: **Monitors for NAAQS compliance of criteria pollutants in the Johnstown MSA**

Monitor Summary

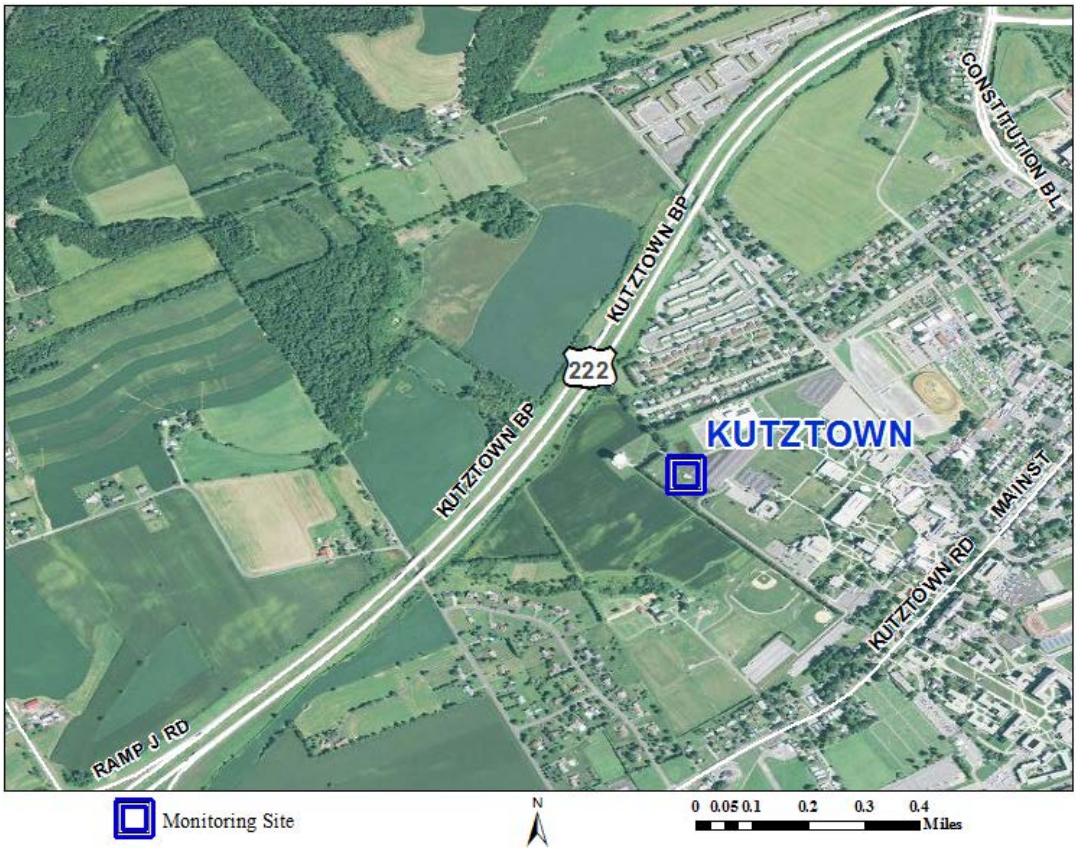
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1974	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_2	SLAMS	1/1/1974	Continuous	UV Fluorescence	Urban Scale	Population Exposure
NO_2	SLAMS	1/1/1974	Continuous	Chemiluminescence	Neighborhood	Population Exposure
CO	SLAMS	1/1/1978	Continuous	Non-dispersive Infrared	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	4/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure
$PM_{2.5}$ Speciation	CSN	1/26/2009	1 in 6	Gravimetric	Neighborhood	Population Exposure
PM_{10}	SLAMS	4/18/1996	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure

SITE NAME: **KITTANNING**
AQS ID: **420050001**
MSA: **Pittsburgh MSA**
COUNTY: **ARMSTRONG**
MUNICIPALITY: **EAST FRANKLIN TWP**
LATITUDE: **40.814**
LONGITUDE: **-79.56469445**
ADDRESS: **GLADE DR. & NOLTE RD. KITTANNING**
COMMENTS: **Monitors $PM_{2.5}$ and ozone downwind of Pittsburgh MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	8/14/1997	Continuous	UV Absorption	Urban Scale	Max Ozone Concentration
$PM_{2.5}$	SLAMS	7/1/2009	Continuous	Beta Attenuation	Urban Scale	Extreme Downwind

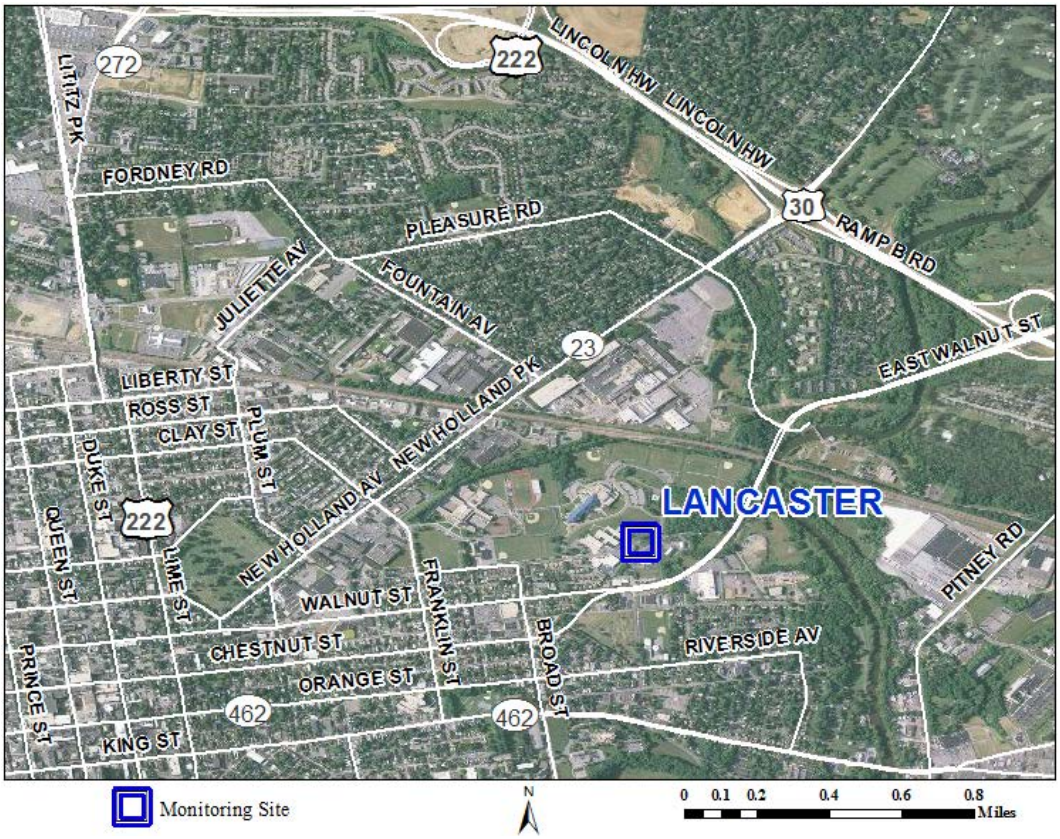
SITE NAME: **KUTZTOWN**
AQS ID: **420110006**
MSA: **Reading MSA**
COUNTY: **BERKS**
MUNICIPALITY: **MAXATAWNY TWP**
LATITUDE: **40.51408**
LONGITUDE: **-75.78972**
ADDRESS: **KUTZTOWN UNIVERSITY CAMPUS**
COMMENTS: **Measures downwind ozone concentrations of the Reading metro area**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	9/27/2007	Continuous	UV Absorption	Urban Scale	Extreme Downwind

SITE NAME: LANCASTER
AQS ID: 420710007
MSA: Lancaster MSA
COUNTY: LANCASTER
MUNICIPALITY: CITY OF LANCASTER
LATITUDE: 40.04686111
LONGITUDE: -76.28341667
ADDRESS: ABRAHAM LINCOLN JR HIGH GROFFTOWN RD
COMMENTS: Monitors for NAAQS compliance for criteria pollutants in the Lancaster MSA



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1974	Continuous	UV Absorption	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	1/1/1999	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	11/1/2003	Continuous	Beta Attenuation	Neighborhood	Population Exposure
$PM_{2.5}$ Speciation	CSN	1/1/2002	1 in 6	Gravimetric	Neighborhood	Population Exposure
PM_{10}	SLAMS	3/22/1995	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure
Carbonyls	Other	5/24/1999	1 in 6	DNPH - Coated Cartridges (24 Hour)	N/A	N/A
VOC	Other	5/24/1999	1 in 6	Canister (24 Hour)	N/A	N/A
TSP/Metals	Other	5/24/1999	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A
Mercury	Other	5/24/1999	Continuous	Tekran Vapor Analyzer	N/A	N/A

SITE NAME: **LANCASTER DOWNWIND**
AQS ID: **420710012**
MSA: **Lancaster MSA**
COUNTY: **LANCASTER**
MUNICIPALITY: **LEACOCK TWP**
LATITUDE: **40.043833**
LONGITUDE: **-76.1124**
ADDRESS: **3445 W. NEWPORT ROAD**
COMMENTS: **Measures downwind ozone concentrations of the Lancaster metro area**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	4/1/2008	Continuous	UV Absorption	Urban Scale	Extreme Downwind
$PM_{2.5}$	SLAMS	1/1/2016	Daily	Gravimetric	Urban Scale	Population Exposure
$PM_{2.5}$	SLAMS	1/1/2014	Continuous	Beta Attenuation	Urban Scale	Population Exposure
$PM_{2.5}$ Speciation (add)	CSN		1 in 6	Gravimetric		

SITE NAME: LAURELDALE NORTH
AQS ID: 420110020
MSA: Reading MSA
COUNTY: BERKS
MUNICIPALITY: MUHLENBERG TWP
LATITUDE: 40.385981
LONGITUDE: -75.912856
ADDRESS: 3139 KUTZTOWN ROAD
COMMENTS: Monitors lead concentrations from nearby sources

Monitor Summary

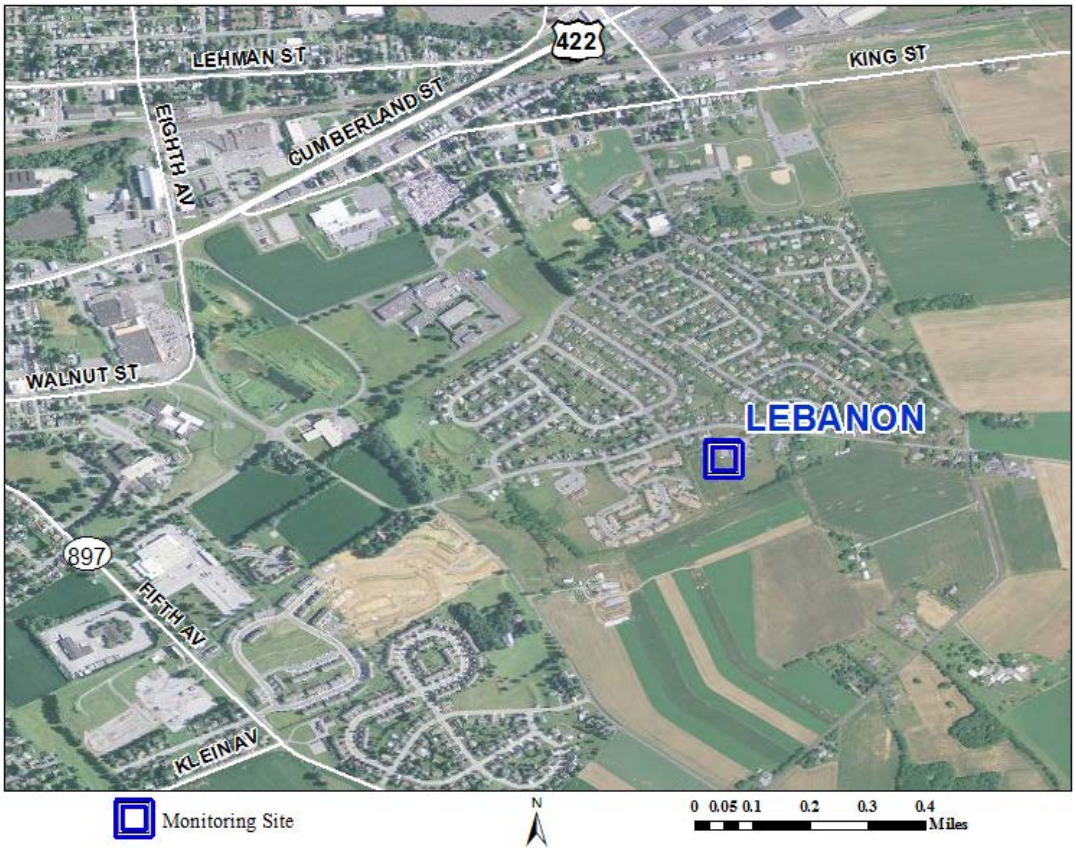
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: LAURELDALE SOUTH
AQS ID: 420111717
MSA: Reading MSA
COUNTY: BERKS
MUNICIPALITY: MUHLENBERG TWP
LATITUDE: 40.37730556
LONGITUDE: -75.91458333
ADDRESS: SPRING VALLEY ROAD
COMMENTS: Monitors lead concentrations from nearby sources – legacy site

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/1976	1 in 6	ICP-MS	Neighborhood	Source Oriented

SITE NAME: **LEBANON**
AQS ID: 420750100
MSA: Lebanon MSA
COUNTY: LEBANON
MUNICIPALITY: SOUTH LEBANON TWP
LATITUDE: 40.337328
LONGITUDE: -76.383447
ADDRESS: 1275 BIRCH RD
COMMENTS: Meets federal monitoring requirements in the Lebanon MSA



Monitor Summary

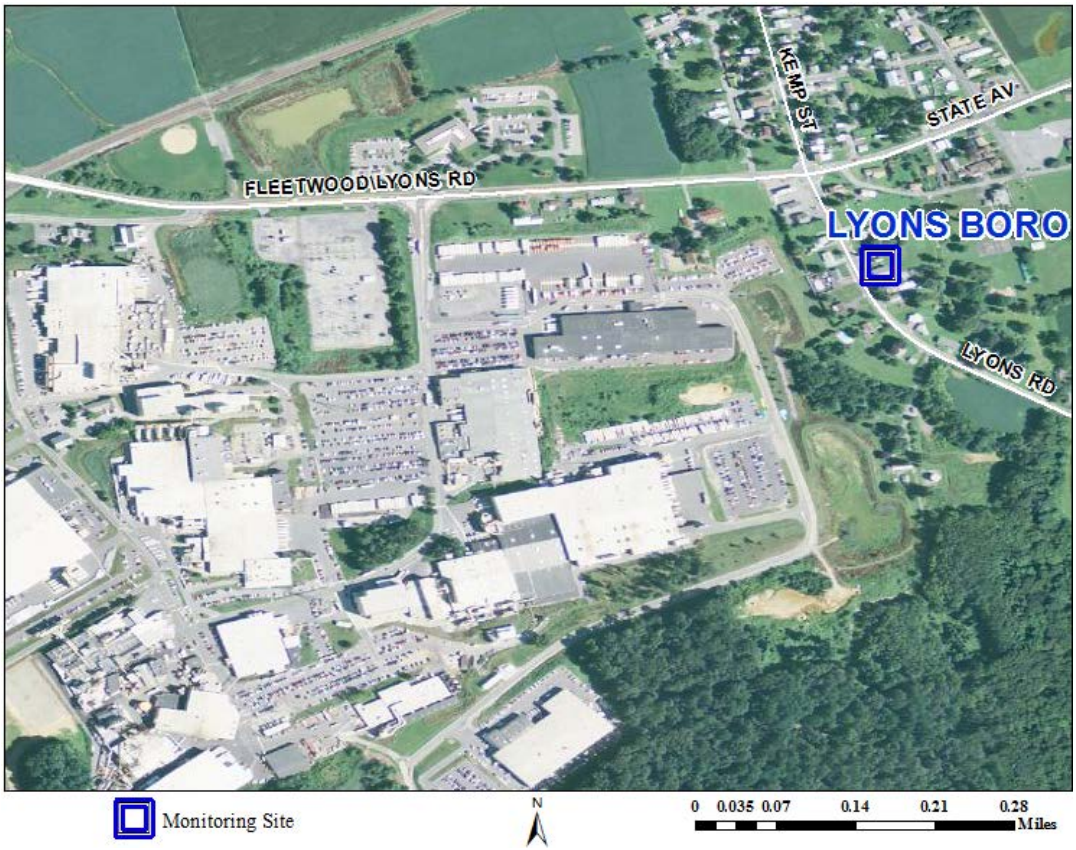
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	2/25/2011	Continuous	UV Absorption	Urban Scale	Max Ozone Concentration
$PM_{2.5}$	SLAMS	1/7/2016	Daily	Gravimetric	Urban Scale	Population Exposure
$PM_{2.5}$	SLAMS	2/25/2011	Continuous	Beta Attenuation	Urban Scale	Population Exposure

SITE NAME: **LEWISBURG**
AQS ID: **421190001**
MSA: **Northcentral Region - Non-MSA**
COUNTY: **UNION**
MUNICIPALITY: **EAST BUFFALO TWP**
LATITUDE: **40.9552**
LONGITUDE: **-76.8819**
ADDRESS: **701 MOORE AVE**
COMMENTS: **Monitors VOC concentrations near source region**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Carbonyls	Other	8/1/2003	1 in 6	DNPH - Coated Cartridges (24 Hour)	N/A	N/A
VOC	Other	8/1/2003	1 in 6	Canister (24 Hour)	N/A	N/A
TSP/Metals	Other	8/1/2003	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

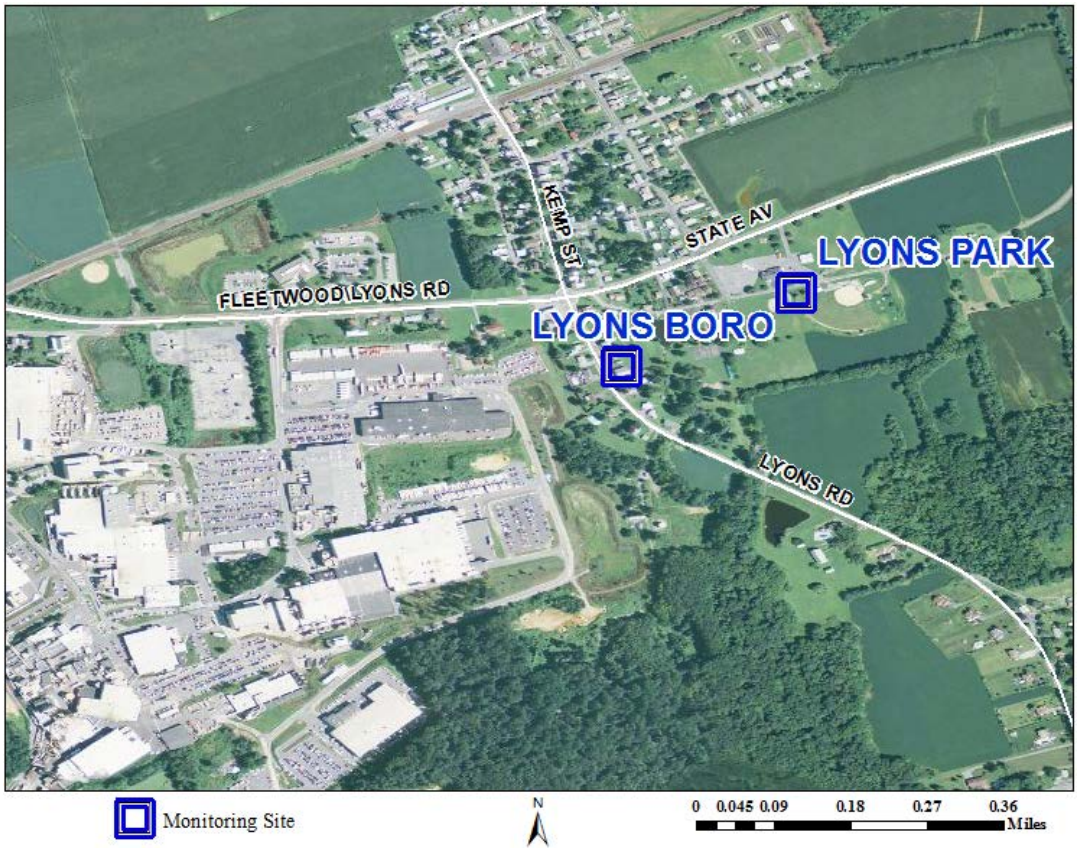
SITE NAME: **LYONS BORO**
AQS ID: **420110021**
MSA: **Reading MSA**
COUNTY: **BERKS**
MUNICIPALITY: **LYONS BORO**
LATITUDE: **40.477075**
LONGITUDE: **-75.756919**
ADDRESS: **KEMP ST.**
COMMENTS: **Monitors lead concentrations from nearby sources**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **LYONS PARK**
AQS ID: **420110022**
MSA: **Reading MSA**
COUNTY: **BERKS**
MUNICIPALITY: **LYONS BORO**
LATITUDE: **40.478319**
LONGITUDE: **-75.753947**
ADDRESS: **PARK AVE.**
COMMENTS: **Monitors lead concentrations from nearby sources**



Monitor Summary

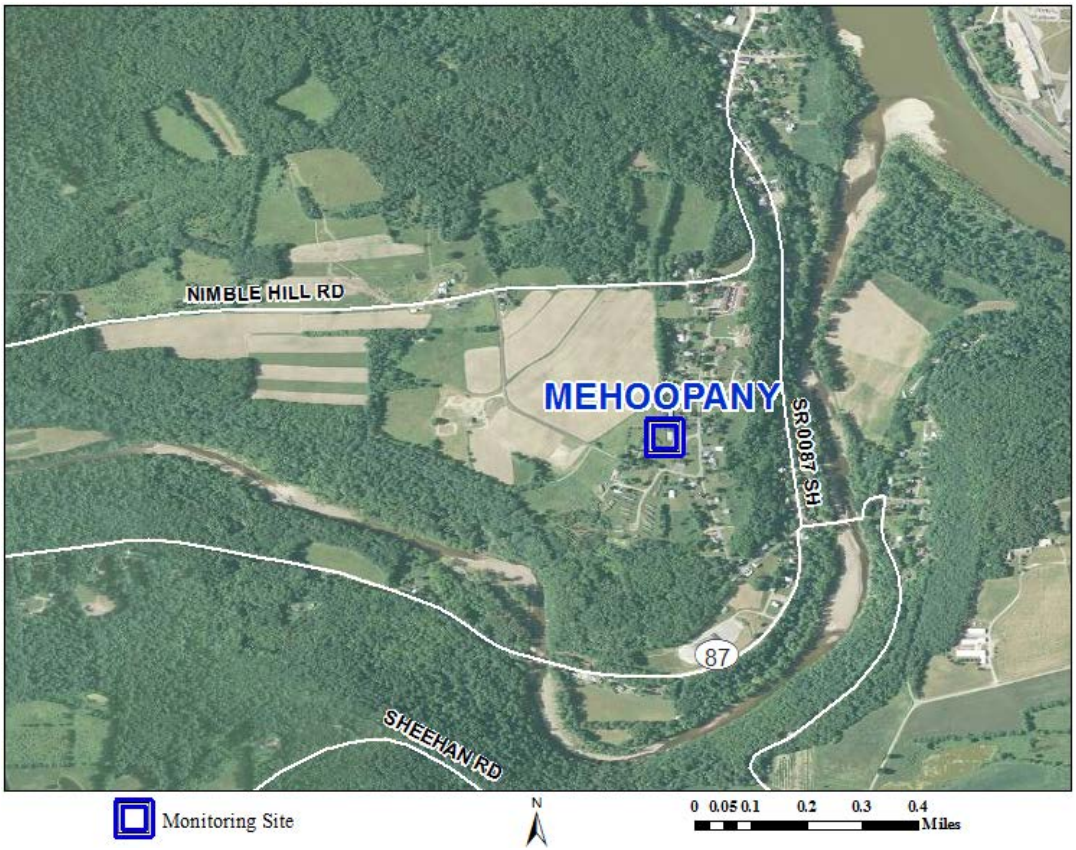
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **MARCUS HOOK**
AQS ID: **420450109**
MSA: **Philadelphia-Camden-Wilmington MSA**
COUNTY: **DELAWARE**
MUNICIPALITY: **MARCUS HOOK BORO**
LATITUDE: **39.8178**
LONGITUDE: **-75.4142**
ADDRESS: **EAST 8TH AVE & CHURCH ST.**
COMMENTS: **Monitors criteria pollutants and VOC near oil refineries**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
$PM_{2.5}$	SPM	12/1/2014	Continuous	Beta Attenuation	Neighborhood	Population Exposure
$PM_{2.5}$ Speciation	CSN	12/1/2014	1 in 6	Gravimetric	Neighborhood	Population Exposure
VOC	Other	4/2/1995	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **MEHOOPANY**
AQS ID: **421310001**
MSA: **Scranton-Wilkes-Barre-Hazleton MSA**
COUNTY: **WYOMING**
MUNICIPALITY: **MEHOOPANY TWP**
LATITUDE: **41.56583611**
LONGITUDE: **-76.06434722**
ADDRESS: **SCHOOLHOUSE RD & PEARL RD**
COMMENTS: **Monitors for VOC's downwind of natural gas production and processing facilities**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC	Other	3/16/2014	1 in 6	Canister (24 Hour)	N/A	N/A
$PM_{2.5}$ (add)	SLAMS		Continuous	Beta Attenuation		

SITE NAME: METHODIST HILL

AQS ID: 420550001

MSA: Chambersburg-Waynesboro MSA

COUNTY: FRANKLIN

MUNICIPALITY: SOUTHAMPTON TWP

LATITUDE: 39.96072222

LONGITUDE: -77.47552778

ADDRESS: FOREST ROAD - METHODIST HILL

COMMENTS: Monitors regional transport of ozone into areas east of the Appalachians

Monitor Summary

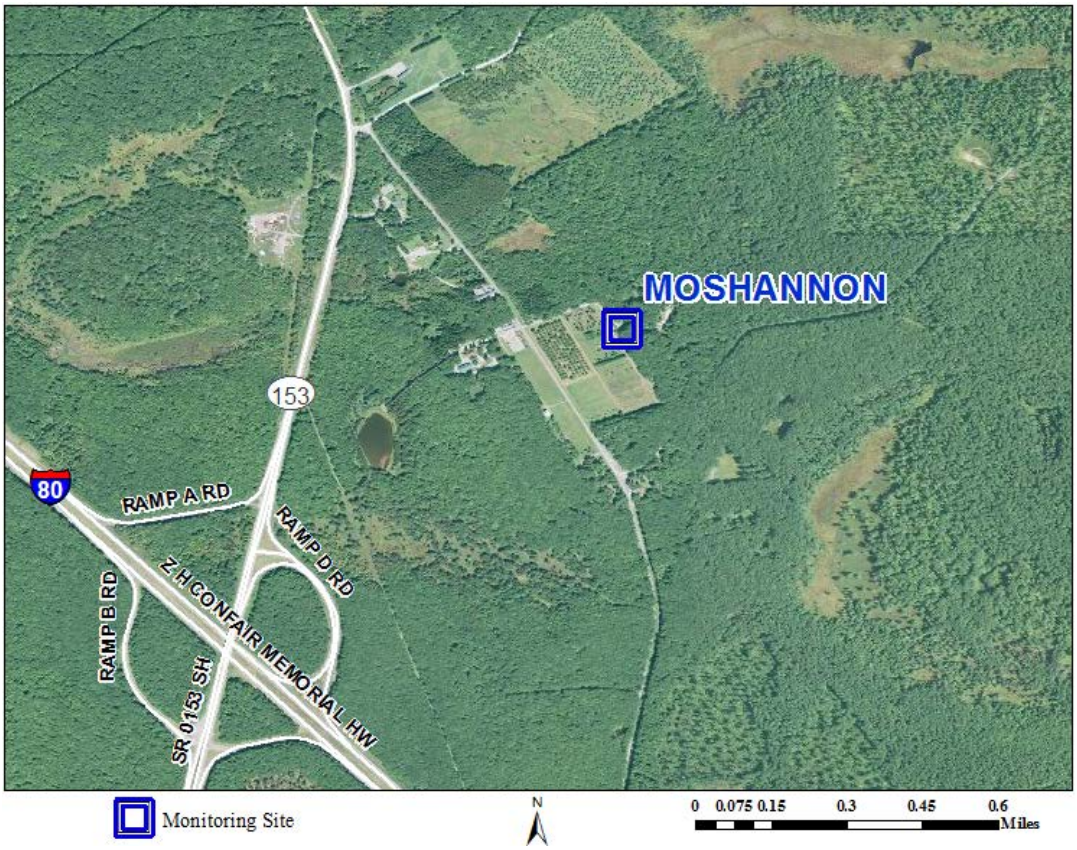
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	6/26/1996	Continuous	UV Absorption	Regional Scale	Regional Transport

SITE NAME: **MONTOURSVILLE**
AQS ID: **420810100**
MSA: **Williamsport MSA**
COUNTY: **LYCOMING**
MUNICIPALITY: **MONTOURSVILLE BORO**
LATITUDE: **41.25019445**
LONGITUDE: **-76.91344445**
ADDRESS: **899 CHERRY STREET**
COMMENTS: **Meets ozone monitoring requirements in the Williamsport MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	11/20/2001	Continuous	UV Absorption	Urban Scale	Population Exposure
PM_{10}	SLAMS	12/3/2001	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure

SITE NAME: MOSHANNON
AQS ID: 420334000
MSA: Northcentral Region - Non-MSA
COUNTY: CLEARFIELD
MUNICIPALITY: PINE TWP
LATITUDE: 41.1175
LONGITUDE: -78.52619445
ADDRESS: LOCATED NEAR S.B. ELLIOTT STATE PARK
COMMENTS: Monitors the effects of ozone on vegetation as per a research contract with Penn State University



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	4/1/1996	Continuous	UV Absorption	Regional Scale	Regional Transport

SITE NAME: **MT JOY**
AQS ID: **420710009**
MSA: **Lancaster MSA**
COUNTY: **LANCASTER**
MUNICIPALITY: **RAPHO TWP**
LATITUDE: **40.108944**
LONGITUDE: **-76.472235**
ADDRESS: **1088 EAST MAIN STREET**
COMMENTS: **Monitors lead concentrations downwind of nearby source**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/2012	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **NEW CASTLE**
AQS ID: **420730015**
MSA: **Northwest Region - Non-MSA**
COUNTY: **LAWRENCE**
MUNICIPALITY: **CITY OF NEW CASTLE**
LATITUDE: **40.99605556**
LONGITUDE: **-80.34652778**
ADDRESS: **S CROTON AVE & JEFFERSON ST.**
COMMENTS: **Monitors criteria pollutants downwind of source regions.**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1974	Continuous	UV Absorption	Urban Scale	Population Exposure
SO_2	SLAMS	1/1/1974	Continuous	UV Fluorescence	Urban Scale	Population Exposure

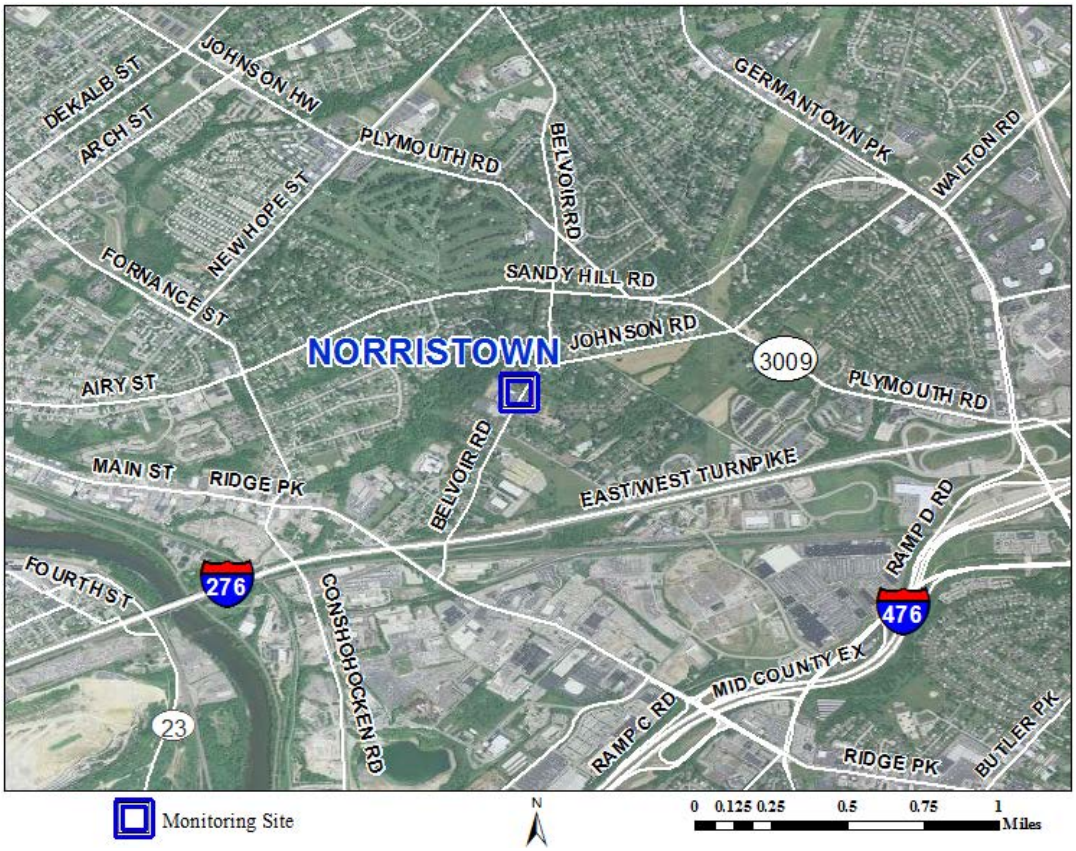
SITE NAME: **NEW GARDEN**
AQS ID: **420290100**
MSA: **Philadelphia-Camden-Wilmington MSA**
COUNTY: **CHESTER**
MUNICIPALITY: **NEW GARDEN TWP**
LATITUDE: **39.83458333**
LONGITUDE: **-75.76805556**
ADDRESS: **NEW GARDEN AIRPORT - TOUGHKENAMON**
COMMENTS: **Meets federal monitoring requirements in the Philadelphia-Camden-Wilmington MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	6/29/2000	Continuous	UV Absorption	Regional Scale	Extreme Downwind
$PM_{2.5}$	SLAMS	8/31/2012	Daily	Gravimetric	Urban Scale	Regional Transport
$PM_{2.5}$	SLAMS	7/1/2009	Continuous	Beta Attenuation	Urban Scale	Regional Transport
$PM_{2.5}$ Speciation	CSN	1/1/2002	1 in 6	Gravimetric	Regional Scale	Regional Transport

SITE NAME: **NORRISTOWN**
AQS ID: 420910013
MSA: Philadelphia-Camden-Wilmington MSA
COUNTY: MONTGOMERY
MUNICIPALITY: PLYMOUTH TWP
LATITUDE: 40.11327778
LONGITUDE: -75.30869445
ADDRESS: STATE ARMORY - 1046 BELVOIR RD
COMMENTS: Meets federal monitoring requirements in the PA part of the Philadelphia-Camden-Wilmington MSA

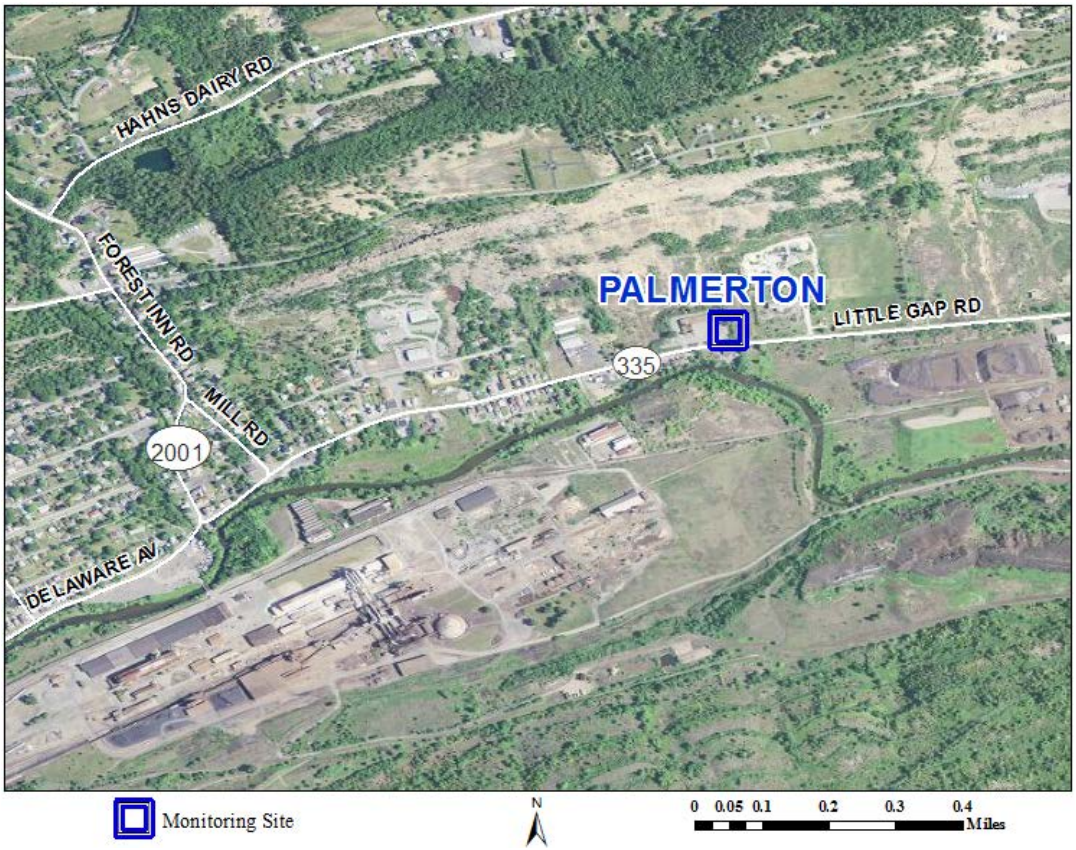
SITE WILL BE DISCONTINUED



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone (discontinue)	SLAMS	1/1/1974	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_2 (discontinue)	SLAMS	1/1/1974	Continuous	UV Fluorescence	Neighborhood	Population Exposure

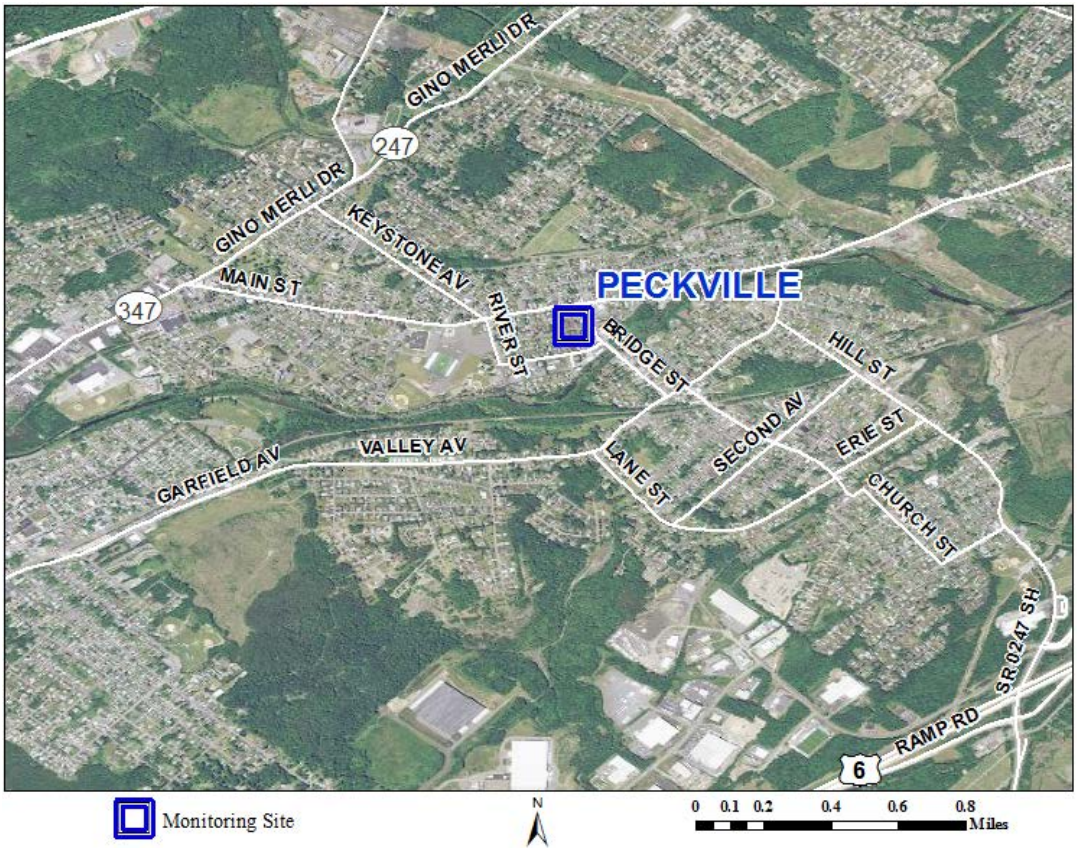
SITE NAME: **PALMERTON**
AQS ID: **420250214**
MSA: **Allentown-Bethlehem-Easton MSA**
COUNTY: **CARBON**
MUNICIPALITY: **LOWER TOWAMENSING TWP**
LATITUDE: **40.814204**
LONGITUDE: **-75.580448**
ADDRESS: **620 LITTLE GAP RD**
COMMENTS: **Monitors lead concentrations from nearby source**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	5/9/2012	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **PECKVILLE**
AQS ID: **420690101**
MSA: **Scranton-Wilkes-Barre-Hazleton MSA**
COUNTY: **LACKAWANNA**
MUNICIPALITY: **BLAKELY BORO**
LATITUDE: **41.47908333**
LONGITUDE: **-75.57819445**
ADDRESS: **WILSON FIRE CO. ERIE & PLEASANT**
COMMENTS: **Monitors ozone concentrations to meet federal requirements in the Scranton-Wilkes-Barre MSA**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	4/1/1991	Continuous	UV Absorption	Urban Scale	Max Ozone Concentration

SITE NAME: **POTTER TOWNSHIP**
AQS ID: **420070006**
MSA: **Pittsburgh MSA**
COUNTY: **BEAVER**
MUNICIPALITY: **POTTER TWP**
LATITUDE: **40.638936**
LONGITUDE: **-80.365653**
ADDRESS: **206 MOWRY RD**
COMMENTS: **Monitors lead concentrations from nearby source**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **PRESQUE ISLE**
AQS ID: **420490004**
MSA: **Erie MSA**
COUNTY: **ERIE**
MUNICIPALITY: **MILLCREEK TWP**
LATITUDE: **42.162**
LONGITUDE: **-80.1133**
ADDRESS: **EAST FISHER DR.**
COMMENTS: **Monitors VOC's and metals near source regions.**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC	Other	6/8/2000	1 in 6	Canister (24 Hour)	N/A	N/A
TSP/Metals	Other	6/8/2000	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

SITE NAME: **READING AIRPORT**
AQS ID: **420110011**
MSA: **Reading MSA**
COUNTY: **BERKS**
MUNICIPALITY: **BERN TWP**
LATITUDE: **40.38335**
LONGITUDE: **-75.9686**
ADDRESS: **1059 ARNOLD ROAD**
COMMENTS: **Monitors for NAAQS compliance for criteria pollutants in Reading MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	7/1/2007	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_2	SLAMS	7/1/2007	Continuous	UV Fluorescence	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	7/1/2007	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	7/1/2007	Continuous	FDMS Gravimetric	Neighborhood	Population Exposure
VOC	Other	6/17/2007	1 in 6	Canister (24 Hour)	N/A	N/A
TSP/Metals	Other	6/17/2007	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

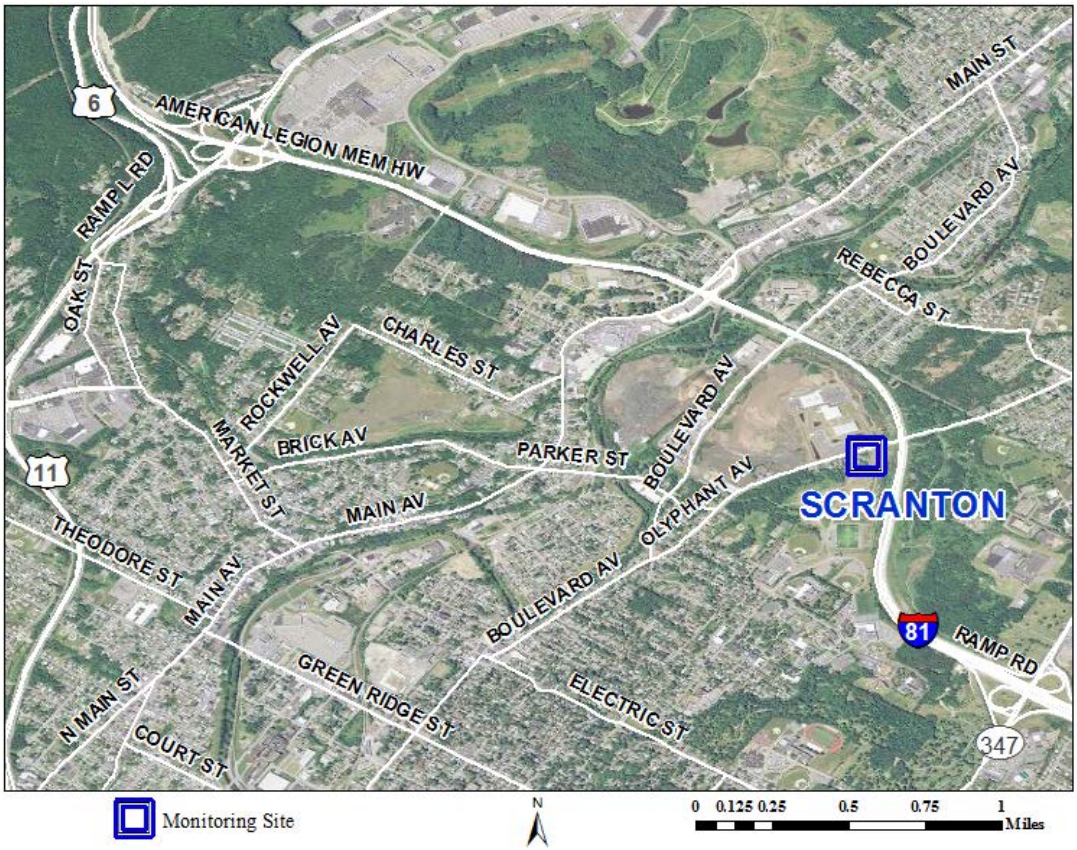
SITE NAME: **RIDLEY PARK**
AQS ID: 420450004
MSA: Philadelphia-Camden-Wilmington MSA
COUNTY: DELAWARE
MUNICIPALITY: EDDYSTONE BORO
LATITUDE: 39.862928
LONGITUDE: -75.325689
ADDRESS: INDUSTRIAL HIGHWAY (RT 291)
COMMENTS: Monitors lead concentrations near lead source

SITE WILL BE DISCONTINUED

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb (discontinue)	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **SCRANTON**
AQS ID: **420692006**
MSA: **Scranton-Wilkes-Barre-Hazleton MSA**
COUNTY: **LACKAWANNA**
MUNICIPALITY: **CITY OF SCRANTON**
LATITUDE: **41.442146**
LONGITUDE: **-75.630139**
ADDRESS: **GEORGE ST TROOP AND CITY OF SCRANTON**
COMMENTS: **Monitors for NAAQS compliance for criteria pollutants in the Scranton-Wilkes-Barre MSA**

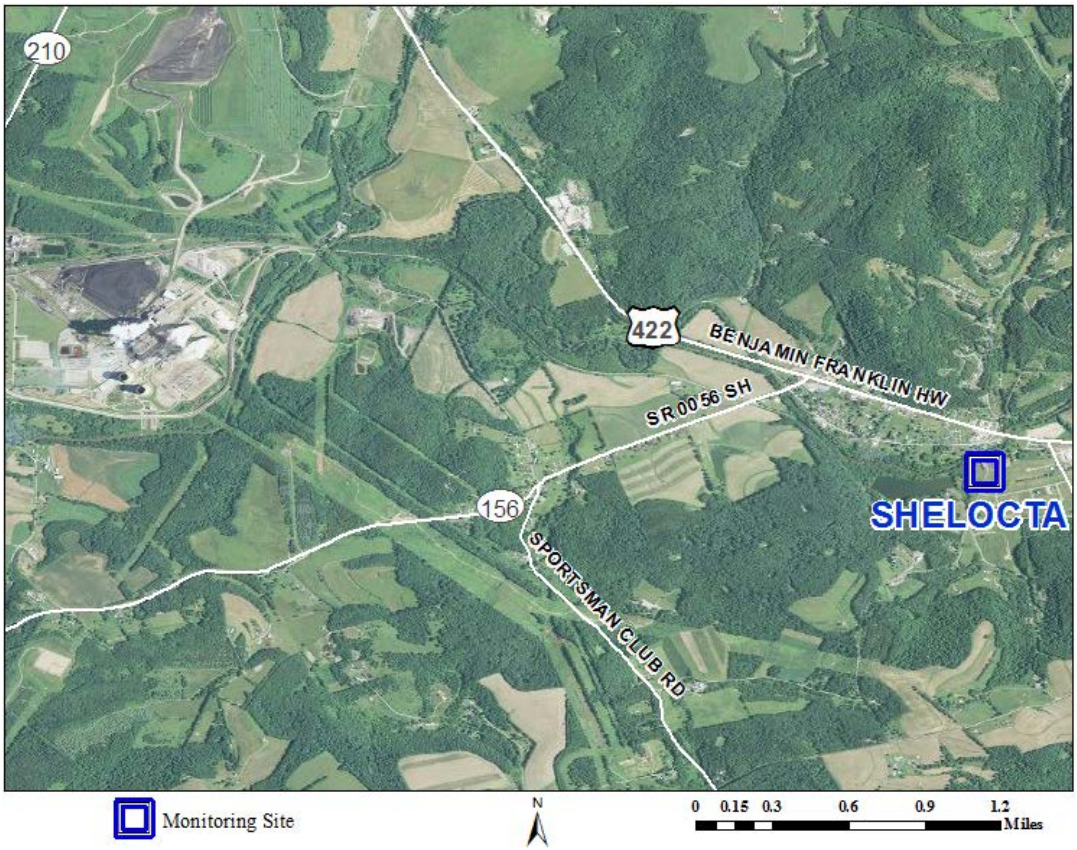


Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/14/1974	Continuous	UV Absorption	Neighborhood	Max Ozone Concentration
NO_2	SLAMS	1/1/1974	Continuous	Chemiluminescence	Neighborhood	Population Exposure
CO	SLAMS	1/1/1978	Continuous	Non-dispersive Infrared	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	7/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: SHELOCTA
AQS ID: 420630005
MSA: Southwest Region - Non-MSA
COUNTY: INDIANA
MUNICIPALITY: ARMSTRONG TWP
LATITUDE: 40.652511
LONGITUDE: -79.292769
ADDRESS: 182 SOUTH RIDGE RD
COMMENTS: Monitors lead concentrations from source area

SITE WILL BE DISCONTINUED

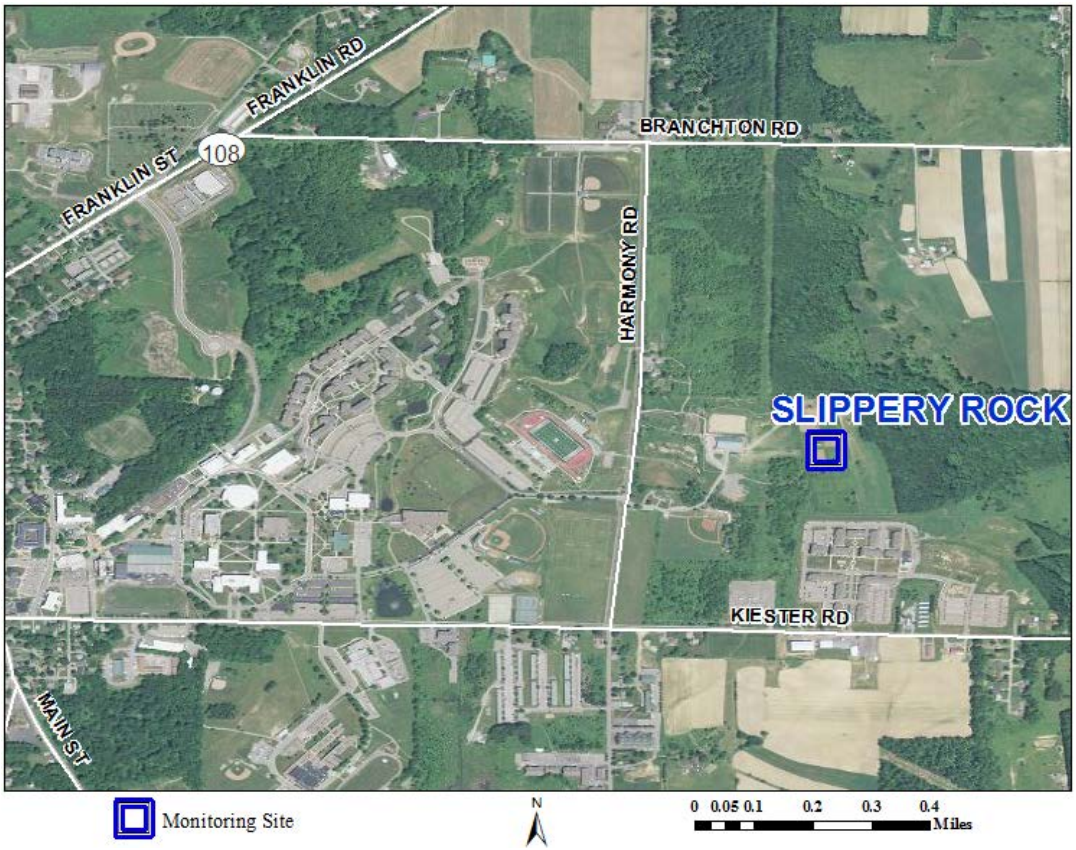


Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb (discontinue)	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: SLIPPERY ROCK
AQS ID: 420190020
MSA: Pittsburgh MSA
COUNTY: BUTLER
MUNICIPALITY: SLIPPERY ROCK TWP
LATITUDE: 41.063056
LONGITUDE: -80.030833
ADDRESS: 1 MORROW WAY
COMMENTS: Monitors VOC's from nearby source

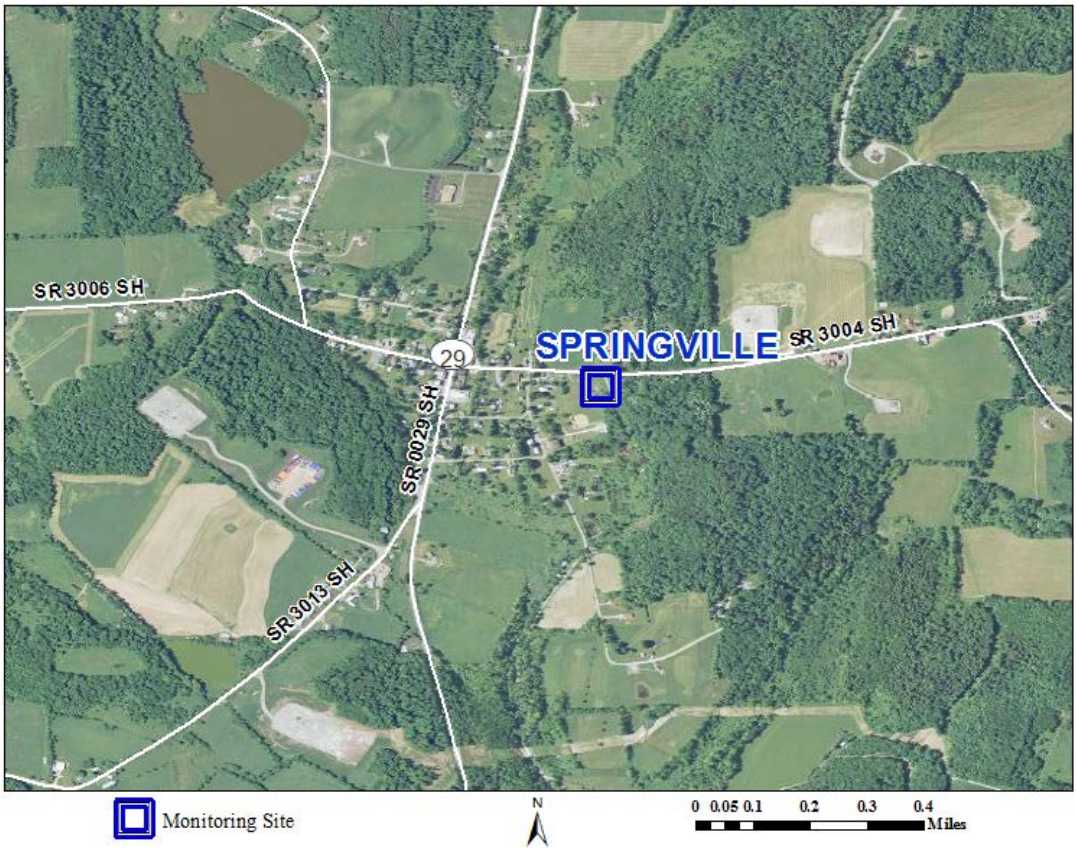
SITE WILL BE DISCONTINUED



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC (discontinue)	Other	8/29/2009	1 in 6	Canister (24 Hour)	N/A	N/A
TSP/Metal (discontinue)s	Other	8/29/2009	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

SITE NAME: **SPRINGVILLE**
AQS ID: **421150001**
MSA: **Northeast Region - Non-MSA**
COUNTY: **SUSQUEHANNA**
MUNICIPALITY: **SPRINGVILLE TWP**
LATITUDE: **41.6972**
LONGITUDE: **-75.9145**
ADDRESS: **TWP PROPERTY SR 3004**
COMMENTS: **Monitors downwind concentrations of VOC's downwind of natural gas production facilities**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC	Other	2/27/2013	1 in 6	Canister (24 Hour)	N/A	N/A
$PM_{2.5}$ (add)	SPM		Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: **STATE COLLEGE**

AQS ID: 420270100

MSA: State College MSA

COUNTY: CENTRE

MUNICIPALITY: COLLEGE TWP

LATITUDE: 40.81116667

LONGITUDE: -77.87722222

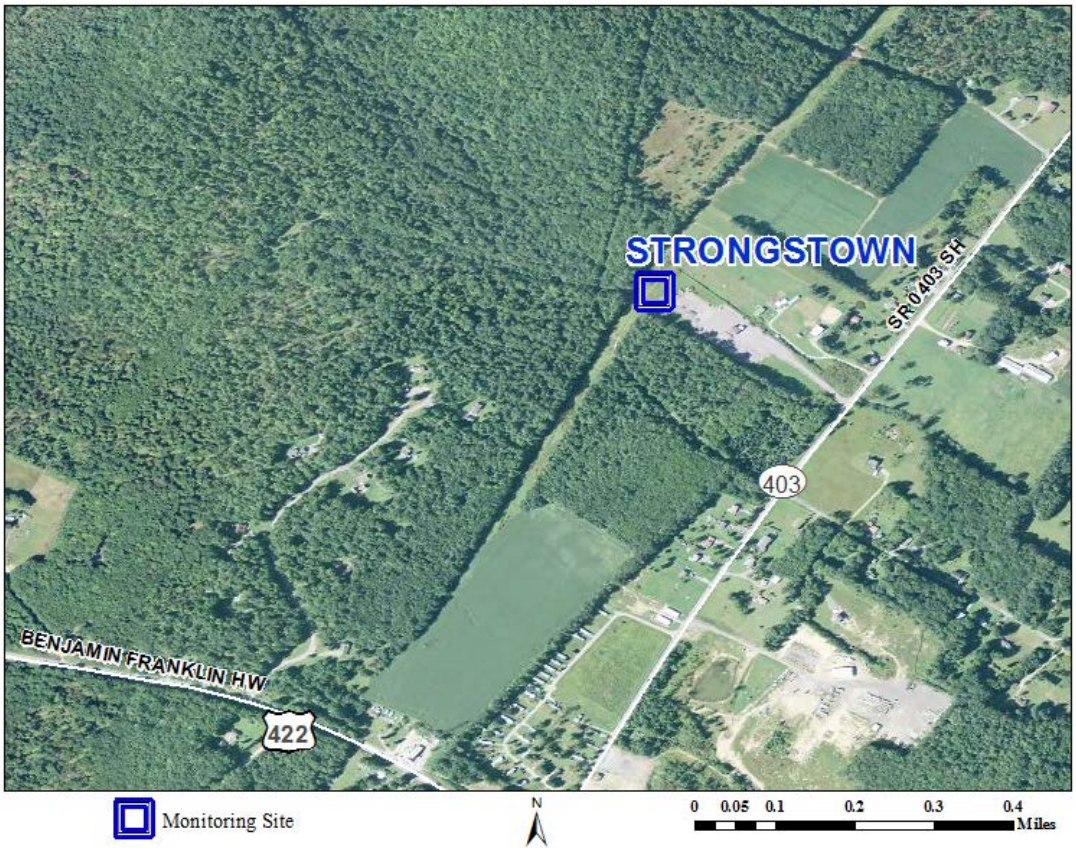
ADDRESS: PENN STATE UNIVERSITY - ARBORETUM SITE

COMMENTS: Meets federal monitoring requirements in the State College MSA

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	4/1/2000	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_2	SLAMS	3/8/2002	Continuous	UV Fluorescence	Neighborhood	Population Exposure
NO_2	SLAMS	3/8/2002	Continuous	Chemiluminescence	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	2/1/2000	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	9/1/2010	Continuous	Beta Attenuation	Neighborhood	Population Exposure

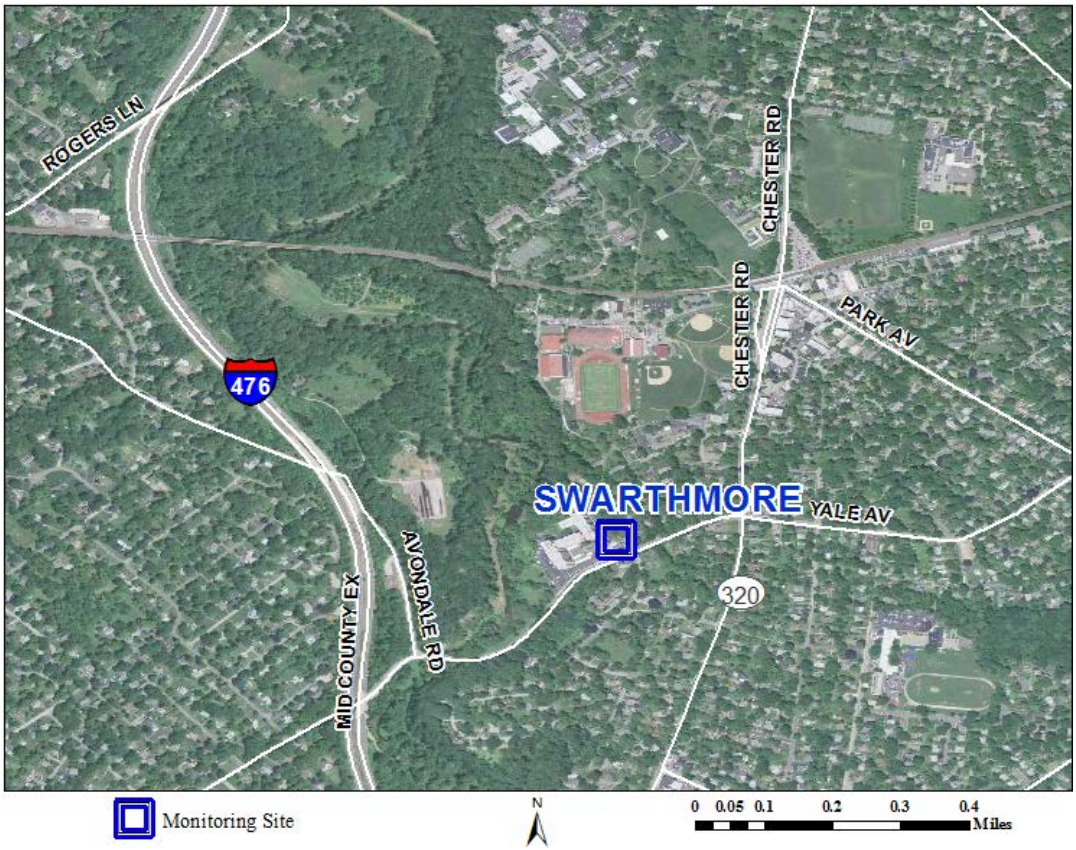
SITE NAME: **STRONGSTOWN**
AQS ID: **420630004**
MSA: **Southwest Region - Non-MSA**
COUNTY: **INDIANA**
MUNICIPALITY: **PINE TWP**
LATITUDE: **40.5633**
LONGITUDE: **-78.91997**
ADDRESS: **PA DEPT. OF TRANSPORTATION - RT. 403**
COMMENTS: **Monitors SO_2 concentrations in Indiana-Cambria County nonattainment area**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	11/1/2004	Continuous	UV Absorption	Urban Scale	Extreme Downwind
SO_2	SLAMS	11/1/2004	Continuous	UV Fluorescence	Urban Scale	Regional Transport

SITE NAME: **SWARTHMORE**
AQS ID: **420450003**
MSA: **Philadelphia-Camden-Wilmington MSA**
COUNTY: **DELAWARE**
MUNICIPALITY: **SWARTHMORE BORO**
LATITUDE: **39.8969**
LONGITUDE: **-75.3539**
ADDRESS: **500 COLLEGE AVE.**
COMMENTS: **Monitors VOC's near source region**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC	Other	1/22/1997	1 in 6	Canister (24 Hour)	N/A	N/A
TSP/Metals	Other	1/22/1997	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

SITE NAME: **SWIFTWATER**
AQS ID: **420890002**
MSA: **East Stroudsburg MSA**
COUNTY: **MONROE**
MUNICIPALITY: **POCONO TWP**
LATITUDE: **41.08306**
LONGITUDE: **-75.32328**
ADDRESS: **DEP/DCNR Pocono District Office**
COMMENTS: **Meets federal monitoring requirements in the PA part of the Stroudsburg MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	4/1/2006	Continuous	UV Absorption	Urban Scale	Extreme Downwind
$PM_{2.5}$	SLAMS	6/1/2010	Continuous	Beta Attenuation	Urban Scale	Regional Transport

SITE NAME: **TIOGA COUNTY**

AQS ID: **421174000**

MSA: **Northcentral Region - Non-MSA**

COUNTY: **TIOGA**

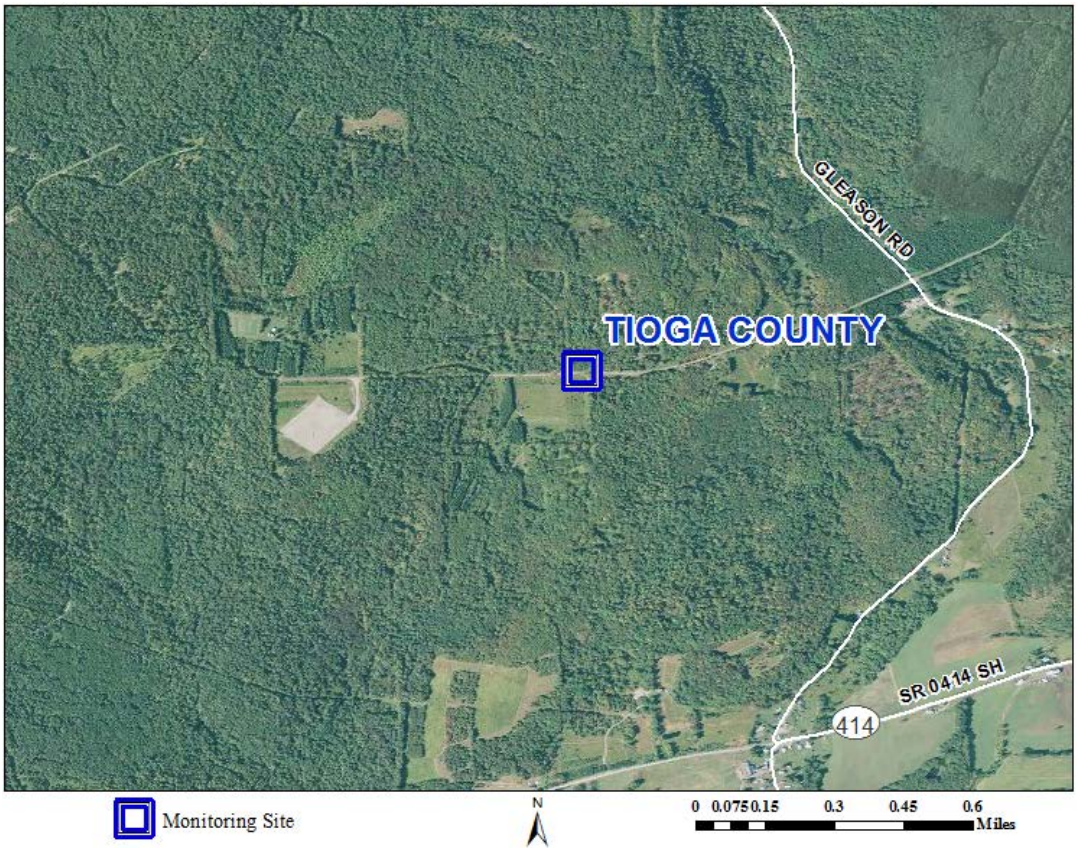
MUNICIPALITY: **UNION TWP**

LATITUDE: **41.64558333**

LONGITUDE: **-76.93797222**

ADDRESS: **TIOGA**

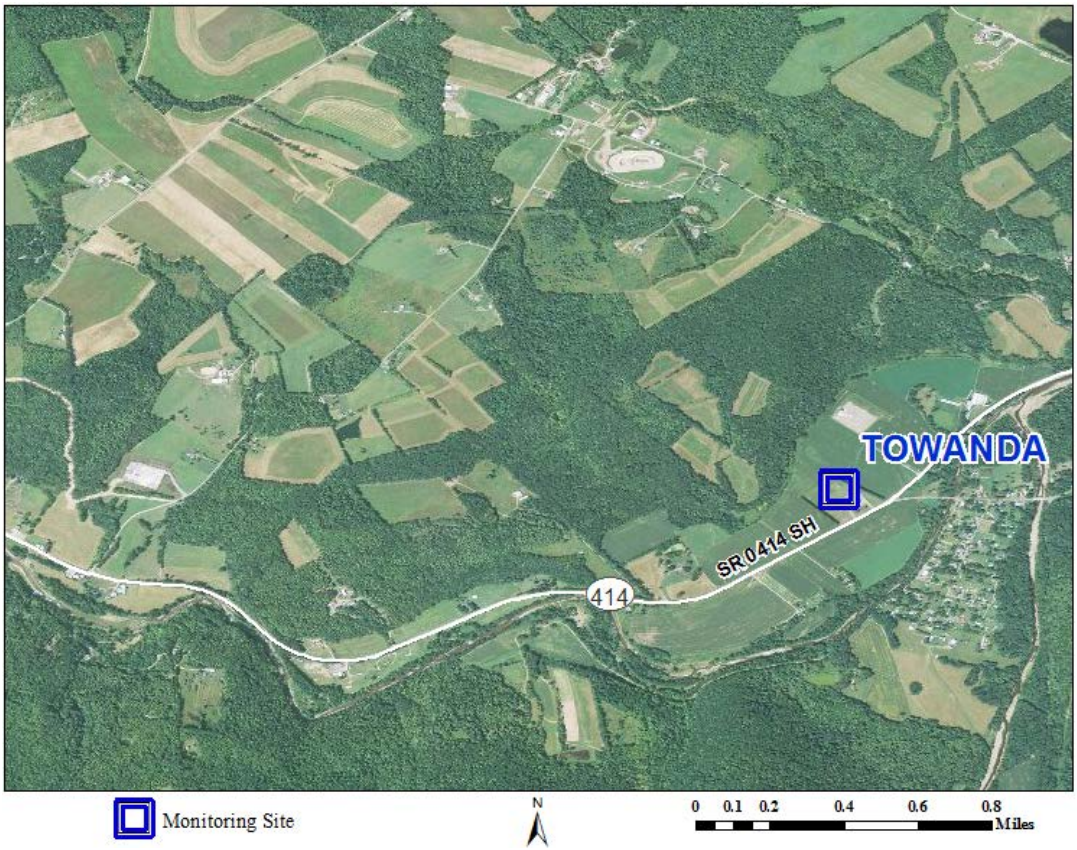
COMMENTS: **Monitors for criteria pollutants near natural gas production facilities as well as under an ozone monitoring contract with Penn State University**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	6/1/1999	Continuous	UV Absorption	Regional Scale	Regional Transport
NO_2	SLAMS	5/9/2012	Continuous	Chemiluminescence	Urban Scale	Source Oriented
$PM_{2.5}$	SLAMS	10/1/2014	Continuous	Beta Attenuation	Urban Scale	Regional Transport

SITE NAME: TOWANDA
AQS ID: 420150011
MSA: Northcentral Region - Non-MSA
COUNTY: BRADFORD
MUNICIPALITY: MONROE TWP
LATITUDE: 41.70539
LONGITUDE: -76.512876
ADDRESS: Rt. 414 &MAIN ST
COMMENTS: Monitors downwind concentration of pollutants from natural gas production facilities



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	2/27/2013	Continuous	UV Absorption	Neighborhood	Source Oriented
NO_2	SLAMS	3/1/2013	Continuous	Chemiluminescence	Neighborhood	Source Oriented
$PM_{2.5}$	SLAMS	1/1/2016	Continuous	Beta Attenuation	Neighborhood	Source Oriented

SITE NAME: **UPPER STRASBURG**
AQS ID: 420550002
MSA: Chambersburg-Waynesboro MSA
COUNTY: FRANKLIN
MUNICIPALITY: LETTERKENNY TWP
LATITUDE: 40.059828
LONGITUDE: -77.710608
ADDRESS: 9716 UPPER STRASBURG RD
COMMENTS: Monitors lead concentrations from source area

SITE WILL BE DISCONTINUED

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb (discontinue)	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **VANPORT**
AQS ID: **420070505**
MSA: **Pittsburgh MSA**
COUNTY: **BEAVER**
MUNICIPALITY: **VANPORT TWP**
LATITUDE: **40.68486111**
LONGITUDE: **-80.32291667**
ADDRESS: **TAMAQUI DR**
COMMENTS: **Monitors lead concentrations from source area – legacy site**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	3/1/1971	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **WARREN EAST**
AQS ID: **421230005**
MSA: **Northwest Region - Non-MSA**
COUNTY: **WARREN**
MUNICIPALITY: **CITY OF WARREN**
LATITUDE: **41.825708**
LONGITUDE: **-79.119952**
ADDRESS: **2044 PENNSYLVANIA AVE EAST**
COMMENTS: **Monitors hydrogen sulfide levels near source**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
SO_2	SLAMS	1/1/2012	Continuous	UV Fluorescence	Micro Scale	Population Exposure
H_2S	SPM	1/1/2012	Continuous	UV Fluorescence	Micro Scale	Source Oriented

SITE NAME: **WARREN OVERLOOK**
AQS ID: **421230004**
MSA: **Northwest Region - Non-MSA**
COUNTY: **WARREN**
MUNICIPALITY: **CONEWANGO TWP**
LATITUDE: **41.84372222**
LONGITUDE: **-79.17288889**
ADDRESS: **OVERLOOK SITE - NEAR STONE HILL ROAD**
COMMENTS: **Monitors SO_2 concentrations in the Warren nonattainment area**

Monitor Summary

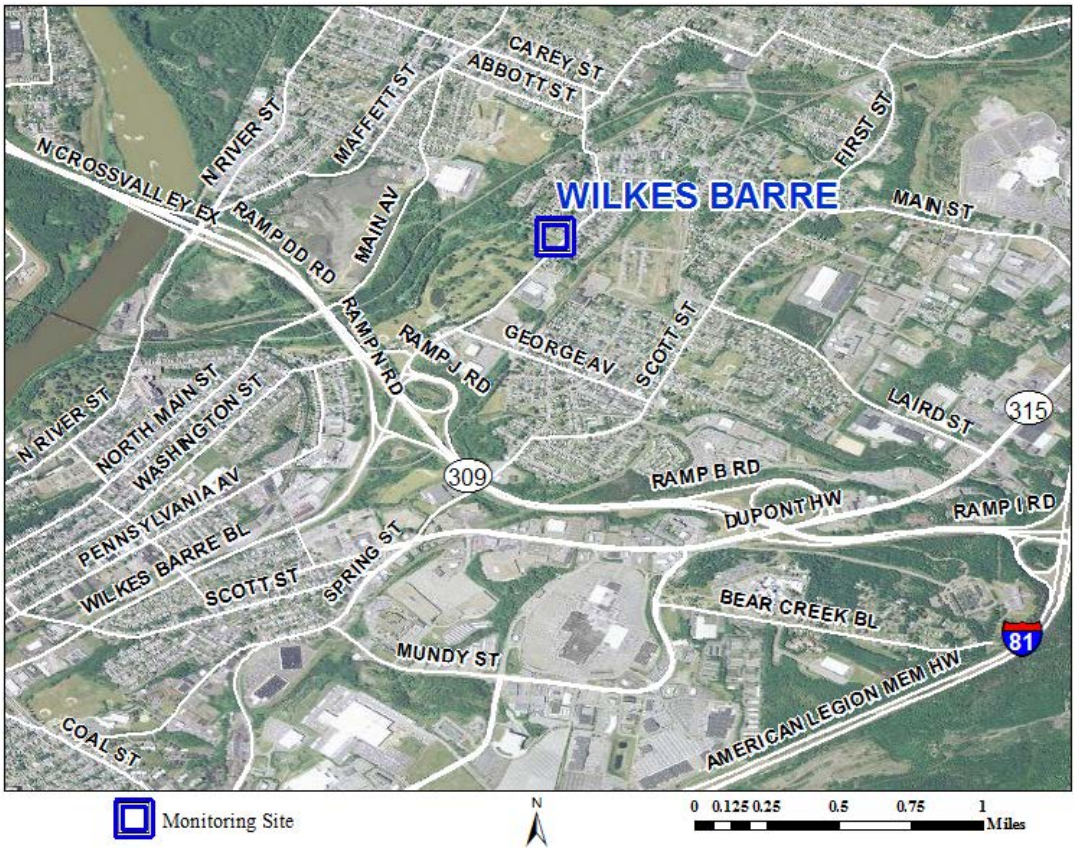
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
SO_2	SLAMS	11/25/1996	Continuous	UV Fluorescence	Neighborhood	Highest Concentration

SITE NAME: **WASHINGTON**
AQS ID: **421250200**
MSA: **Pittsburgh MSA**
COUNTY: **WASHINGTON**
MUNICIPALITY: **CITY OF WASHINGTON**
LATITUDE: **40.17063889**
LONGITUDE: **-80.26172222**
ADDRESS: **MCCARRELL AND FAYETTE STS**
COMMENTS: **Monitors for criteria pollutants so federal monitoring requirements may be met as well as NAAQS compliance.**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1984	Continuous	UV Absorption	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	1/1/1999	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	11/10/2010	Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: **WILKES-BARRE**
AQS ID: **420791101**
MSA: **Scranton-Wilkes-Barre-Hazleton MSA**
COUNTY: **LUZERNE**
MUNICIPALITY: **CITY OF WILKES-BARRE**
LATITUDE: **41.26597222**
LONGITUDE: **-75.84636111**
ADDRESS: **CHILWICK & WASHINGTON STS**
COMMENTS: **Meets federal monitoring requirements in the Scranton-Wilkes-Barre MSA**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	5/28/1982	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_3	SLAMS	5/28/1982	Continuous	UV Fluorescence	Neighborhood	Population Exposure
PM_{10}	SLAMS	10/20/1994	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure

SITE NAME: **YORK**

AQS ID: **421330008**

MSA: **York-Hanover MSA**

COUNTY: **YORK**

MUNICIPALITY: **SPRING GARDEN TWP**

LATITUDE: **39.96552778**

LONGITUDE: **-76.69958333**

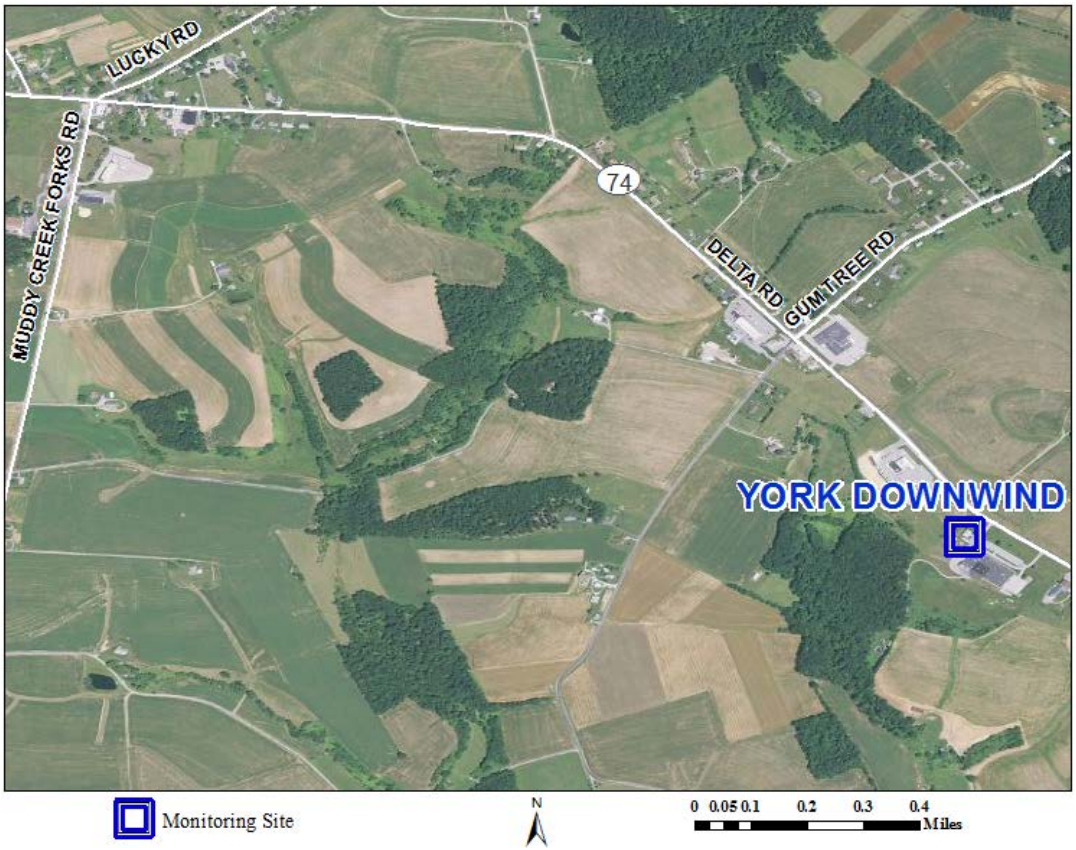
ADDRESS: **HILL ST.**

COMMENTS: **Monitors for NAAQS compliance and to meet federal monitoring requirements in the York-Hanover MSA**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1974	Continuous	UV Absorption	Urban Scale	Population Exposure
SO_2	SLAMS	4/1/1974	Continuous	UV Fluorescence	Urban Scale	Population Exposure
NO_2	SLAMS	1/1/1974	Continuous	Chemiluminescence	Neighborhood	Population Exposure
CO	SLAMS	1/1/1982	Continuous	Non-dispersive Infrared	Neighborhood	Population Exposure
VOC	Other	1/15/2011	1 in 6	Canister (24 Hour)	N/A	N/A
$PM_{2.5}$	SLAMS	1/1/1999	Daily	Gravimetric	Neighborhood	Population Exposure
$PM_{2.5}$	SLAMS	8/19/2004	Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: **YORK DOWNWIND**
AQS ID: **421330011**
MSA: **York-Hanover MSA**
COUNTY: **YORK**
MUNICIPALITY: **CHANCEFORD TWP**
LATITUDE: **39.860972**
LONGITUDE: **-76.462055**
ADDRESS: **2632 DELTA ROAD**
COMMENTS: **Measures downwind ozone concentrations of the York metro area**



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	4/22/2008	Continuous	UV Absorption	Urban Scale	Extreme Downwind

Appendix E – SO_2 Data Requirements Rule

On August 21, 2015, US EPA published the SO_2 Data Requirements Rule (DRR) in the Federal Register (80 FR 51052). US EPA developed the DRR to address the need for additional air quality data to be used for implementing the 1-hour SO_2 NAAQS. The SO_2 DRR outlines guidelines each state must follow to gather air quality data and information in areas around large SO_2 sources, where currently available data is insufficient to characterize the air quality. The air quality data developed by air agencies pursuant to the DRR may be used by the EPA in future actions to evaluate areas' air quality under the 2010 1-hour SO_2 NAAQS, including area designations and redesignations, as appropriate. The DRR is codified in 40 C.F.R. Part 51, Subpart BB ("Data Requirements for Characterizing Air Quality for the Primary SO_2 NAAQS.")

The final DRR establishes that, at a minimum, air agencies must develop and submit to EPA air quality data characterizing maximum 1-hour ambient concentrations of SO_2 around sources that emit 2,000 tons per year (tpy) or more of SO_2, either using modeling of actual source emissions or using appropriately sited ambient air quality monitors. Alternately, an air agency may avoid the requirement for air quality characterization near a source by adopting enforceable emission limits that ensure that the source will not emit more than 2,000 tpy of SO_2.

Table E-1 outlines the procedures PA DEP will perform to satisfy DRR requirements, along with the deadlines set forth in the DRR.

Table E-1. Procedures to Satisfy SO_2 Data Requirements Rule

DRR Procedure	Deadline
Submit to US EPA Region III a list of sources exceeding threshold and other sources (*e.g.* areas with clusters of sources) for which air quality will be characterized	January 15, 2016
Submit to US EPA Region III the method by which the identified areas will be characterized (monitoring, modeling or establishing an enforceable emissions limit). Include information on any new SO_2 monitoring sites established to meet the DRR in PA DEP's 2016 ANP	July 1, 2016
Begin SO_2 monitoring in areas where a monitoring approach will be used for air quality characterization (SO_2 monitoring sites established to meet the DRR will operate as SLAMS monitors)	January 1, 2017
Submit results of modeling analyses to US EPA Region III, for areas where a modeling approach will be used for air quality characterization	January 13, 2017
Submit documentation of federally-enforceable emission limits and compliance to US EPA Region III, for areas where an emissions limit approach will be used in place of air quality characterization	January 13, 2017
Submit state implementation plans for areas designated nonattainment in December 2017 for the 1-hour SO_2 NAAQS (EPA will issue final designations in December 2017 for all areas, except those that are using the monitoring approach and have monitoring networks in operation by January 1, 2017)	August 2019 (expected)
Submit state implementation plans for areas designated nonattainment in December 2020 for the 1-hour SO_2 NAAQS (EPA will issue final designations in December 2020, following the 2017-2019 3-year design value period, for all areas using the monitoring approach)	August 2020 (expected)

On January 15, 2016, PA DEP submitted a list to the U.S. EPA of SO_2 emitting sources in the Commonwealth which would undergo "air quality characterization" as required under the DRR. On March 9, 2016, PA DEP provided additional information to U.S. EPA and requested a revision to the list. U.S. EPA concurred with PA DEP's recommendation to revise the list, and approved the revised list on March 16, 2016 (https://www3.epa.gov/airquality/sulfurdioxide/drr.html). The facilities on the final list are listed in Table E-2. In order to select the appropriate facilities, the PA DEP utilized the 2014 actual SO_2 emission inventory. The SO_2 facilities listed either (1) had 2014 emission rates over 2,000 tpy, or (2) are located in proximity to other SO_2 sources, such that the combined emission from the cluster of sources have the potential to exceed the SO_2 NAAQS.

Table E-2. Pennsylvania's List of SO_2 Sources Identified Pursuant to the Data Requirements Rule

County	Facility	2014 SO_2 TPY
Allegheny	NRG MIDWEST LP / CHESWICK	4445.41
Blair	TEAM TEN / TYRONE PAPER MILL	2738.33
Cambria	EBENSBURG POWER CO / EBENSBURG COGENERATION PLT	1913.73
Cambria	CAMBRIA COGEN CO / EBENSBURG	3199.00
Cambria	INTER POWER AHLCON L / COLVER POWER PROJ	2831.83
Carbon	PANTHER CREEK POWER OPR LLC / NESQUEHONING	520.30
Clearfield	NRG REMA LLC / SHAWVILLE GEN STA	36936.24
Delaware	KIMBERLY CLARK PA LLC / CHESTER OPR	1062.79
Delaware	EXELON GENERATION CO / EDDYSTONE	155.19
Delaware	COVANTA DELAWARE VALLEY LP / DELAWARE VALLEY RES REC	316.00
Lawrence	NRG POWER MIDWEST LP / NEW CASTLE POWER PLT	3960.10
Lehigh	LAFARGE CORP / WHITEHALL PLT	323.21
Montour	PPL MONTOUR LLC / MONTOUR SES	10979.82
Northampton	NORTHAMPTON GEN CO / NORTHAMPTON	391.22
Northampton	ESSROC / NAZARETH LOWER CEMENT PLT I II III	544.50
Northampton	KEYSTONE PORTLAND CEMENT / EAST ALLEN	1354.24
Northampton	HERCULES CEMENT CO LP / STOCKERTOWN	1373.45
Northampton	NRG REMA LLC / PORTLAND GENERATING STA	3181.13
Philadelphia	PHILA ENERGY SOL REF / PES	353.87
Schuylkill	SCHUYLKILL ENERGY RES / ST NICHOLAS COGEN	1923.53
Schuylkill	WHEELABRATOR FRACKVILLE / MOREA PLT	516.25
Schuylkill	NORTHEASTERN POWER CO / MCADOO COGEN	227.59
Schuylkill	GILBERTON POWER CO / JOHN B RICH MEM POWER STA	1401.40
York	MAGNESITA REFRACTORIES / YORK	1499.97
York	PH GLATFELTER CO / SPRING GROVE	6675.82
York	BRUNNER ISLAND LLC / BRUNNER ISLAND	9815.08

For those facilities for which PA DEP submits air quality data characterizing maximum 1-hour ambient concentrations of SO_2 through air quality monitoring to meet the SO_2 DRR, a new monitor station or stations will be sited in an area or areas of maximum impact based on combined modeling of facilities. Owners and operators of facilities will be required to submit a Standard Operating Procedure (SOP) document and a Quality Assurance Project Plan (QAPP) document to PA DEP, in order to demonstrate that the SO_2 monitoring equipment will be operated in accordance with federal regulations and quality assurance guidelines. In addition to siting an SO_2 monitor, owners and

operators of facilities will be required to collocate and operate a 10-meter meteorological tower, generating hourly meteorological data. PA DEP will be responsible for auditing the field equipment once a year. The monitoring sites will also be included on EPA's TTP audit schedule.

On June 18, 2016, PA DEP published for public comment (46 Pa.B. 3140) its draft 2016 Annual Network Plan (ANP). After reviewing and considering the public comments received, PA DEP submitted a final ANP to US EPA under 40 CFR § 58.10 on September 16, 2016. PA DEP intends to publish this proposed revision to Appendix E for public comment and, after reviewing and considering any public comments received, submit a final revised Appendix E to US EPA. The reasons for this proposed revision to Appendix E are explained below.

In the draft ANP, PA DEP listed seven facilities that planned to undergo the monitoring pathway to characterize air quality with respect to the SO_2 DRR. The seven facilities are listed in Table E-3.

Table E-3. Facilities Using Source-Oriented Monitoring to Characterize Ambient SO_2 Concentrations

County	Facility	2014 SO_2 TPY
Lehigh	LAFARGE CORP / WHITEHALL PLT	323.21
Northampton	NORTHAMPTON GEN CO / NORTHAMPTON	391.22
Northampton	ESSROC / NAZARETH LOWER CEMENT PLT I II III	544.50
Northampton	KEYSTONE PORTLAND CEMENT / EAST ALLEN	1354.24
Northampton	HERCULES CEMENT CO LP / STOCKERTOWN	1373.45
York	MAGNESITA REFRACTORIES / YORK	1499.97
York	PH GLATFELTER CO / SPRING GROVE	6675.82

Since June 18, more refined modeling for the five facilities in Lehigh and Northampton counties was completed. The refined modeling indicated that monitoring was no longer necessary to comply with the SO_2 DRR. These five facilities have decided to move forward with the modeling pathway of the SO_2 DRR.

The remaining two facilities in York County (Magnesita Refractories (Magnesita) and PH Glatfelter (Glatfelter)) are moving forward with meeting the monitoring requirement of the SO_2 DRR by siting a monitor at an area of a maximum impact following guidance outlined within the SO_2 DRR Source-Oriented Monitoring Technical Assistace Document, herein labeled as the Monitoring TAD (https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf). Specifically, the methodology that was followed to conduct this modeling analysis is outlined below. Following the guidance outlined in the Monitoring TAD, the following steps were used to determine the location of the monitor location:

1.) Develop normalized hourly SO_2 emission rates for use in the dispersion model, AERMOD. Run AERMOD to assess ambient SO_2 monitoring impacts across the entire modeling domain. Calculate the normalized design values (NDVs) for every receptor in the modeling domain.

2.) Follow guidance within Appendix A of the Monitoring TAD by focusing on the highest NDVs for post analysis purposes. As outlined in the Monitoring TAD, a ratio of NDV by receptor divided by overall maximum NDV was calculated. Determine the locations of the top 200 receptors by ratioed NDV.

3.) Follow guidance within Appendix A of the Monitoring TAD by focusing on the receptors that have the greatest frequency of 1-hour daily maximum SO_2 concentrations. For purposes of this analysis, the top 200 receptors, as determined in Step 2 above, were used for the frequency calculation.

4.) Follow guidance within Appendix A of the Monitoring TAD by scoring locations of maximum NDVs and locations of highest frequency of 1-hour daily maximum SO_2 concentration

The four steps outlined above are provided in more detail below. The analysis also takes into account whether it is logistically feasible to place a monitor in a particular location based on several factors: availability of electric power and local land ownership. In addition, siting criteria outlined in 40 CFR Part 58, Appendix E will be followed when determining the final location of the monitoring site.

When the modeling analysis was completed, guidance outlined in the SO_2 NAAQS Designation Modeling Technical Assistance Document, herein labeled as the Modeling TAD (https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf) was followed. Within AERMOD, the following parameters were used:

1.) AERMOD was run with the default option with receptors out to 50 kilometers from Magnesita and Glatfelter, respectively.

2.) Emission inputs were used for Magnesita and Glatfelter. In the case of Magnesita, 2012 to 2014 actual emission parameters were used. In the case of Glatfelter, future case maximum allowable emissions were used. Glatfelter's 2012 to 2014 SO_2 emission profile is vastly different when compared to projected 2017 to 2019 emissions because of the implementation of the boiler MACT rule. Glatfelter has had to install natural gas boilers in order to comply with the boiler MACT rule. Since the monitoring will be completed during the 2017 to 2019 period and will coincide with Glatfelter's boiler MACT rule compliance period, Glatfelter's future case maximum allowable emissions were used in the modeling analysis to site the monitor. Using the actual Magnesita emission and the potential Glatfelter emissions, a scaling factor of 14.8 was used for each emission input within the model.

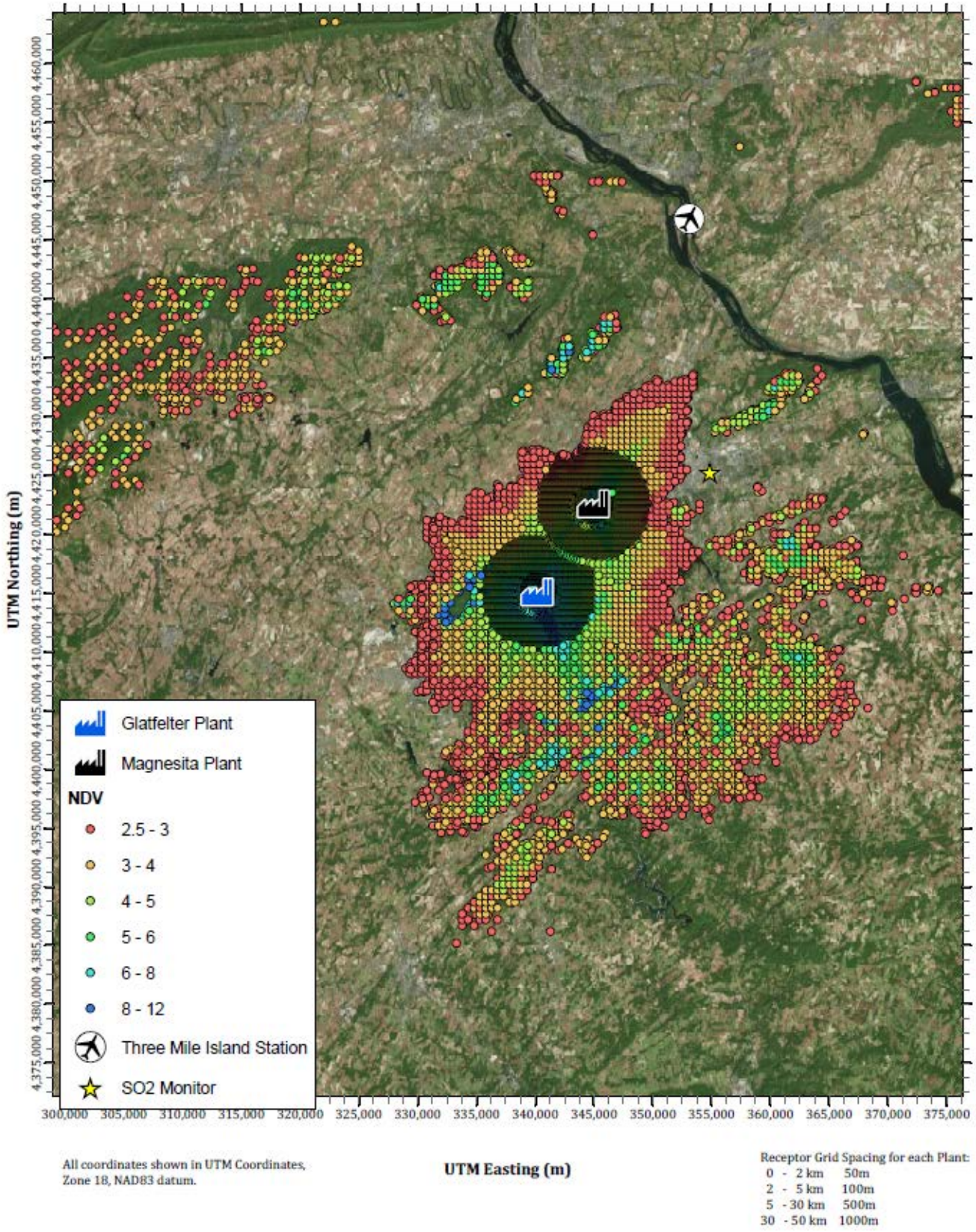
3.) Meteorological data from Three Mile Island's tower was considered representative of the Magnesita and Glatfelter modeling domains and therefore was used in the modeling analysis.

Overall, the methodology that was used to determine the prospective location of an SO_2 monitor are outlined below:

Step 1 – Calculate the normalized design values (NDVs) for every receptor in the modeling domain.

AERMOD (Version 15181) was run using the inputs outlined above. Once the modeling was completed, an NDV was calculated for every receptor in the modeling domain. Figure E-1 below illustrates the preliminary normalized design values by modeled receptor. Figure E-1 only illustrates locations that had an NDV greater than 2.5.

Figure E-1. Preliminary NDV for Each Modeled Receptor (with an NDV greater than 2.5)



Step 2 – Develop a ratio of NDV by receptor divided by overall maximum NDV and determine the locations of the top 200 receptors by ratioed NDV.

Based on the results generated from Step 1, divided each receptor's NDV by the overall maximum NDV to develop a ratio. The highest ratio will be equal to 1 and will be indicative of the location producing the maximum normalized design value. Figure E-2 below illustrates the ratio of normalized design values by modeled receptor. The map is zoomed in to the Glatfelter and Magnesita facilities because the maximum ratios were in close proximity to the Magnesita and Glatfelter facilities. Figure E-3 below displays the locations of the top 200 receptors by NDV.

Figure E-2. Preliminary Ratio of NDV for Each Modeled Receptor

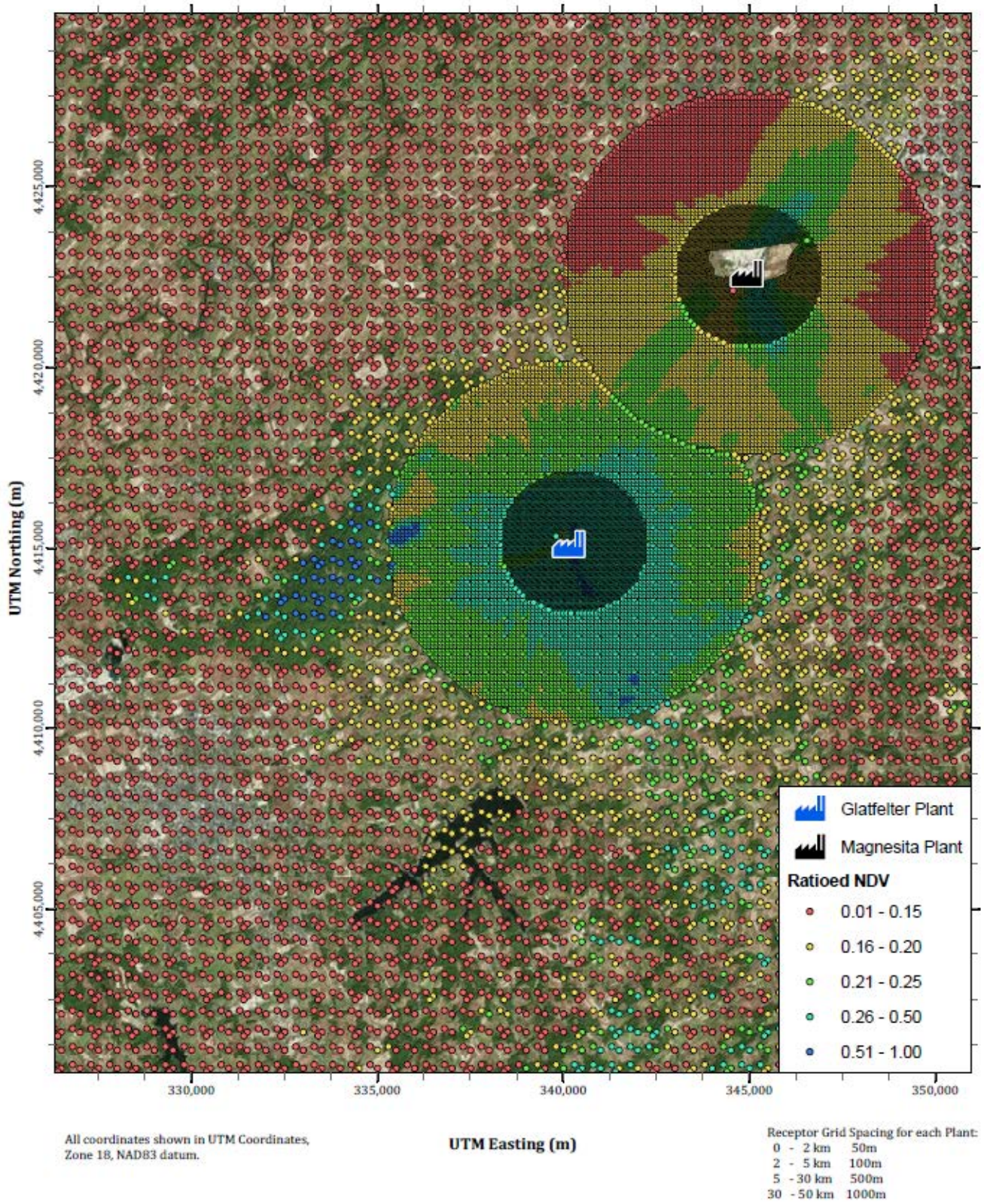
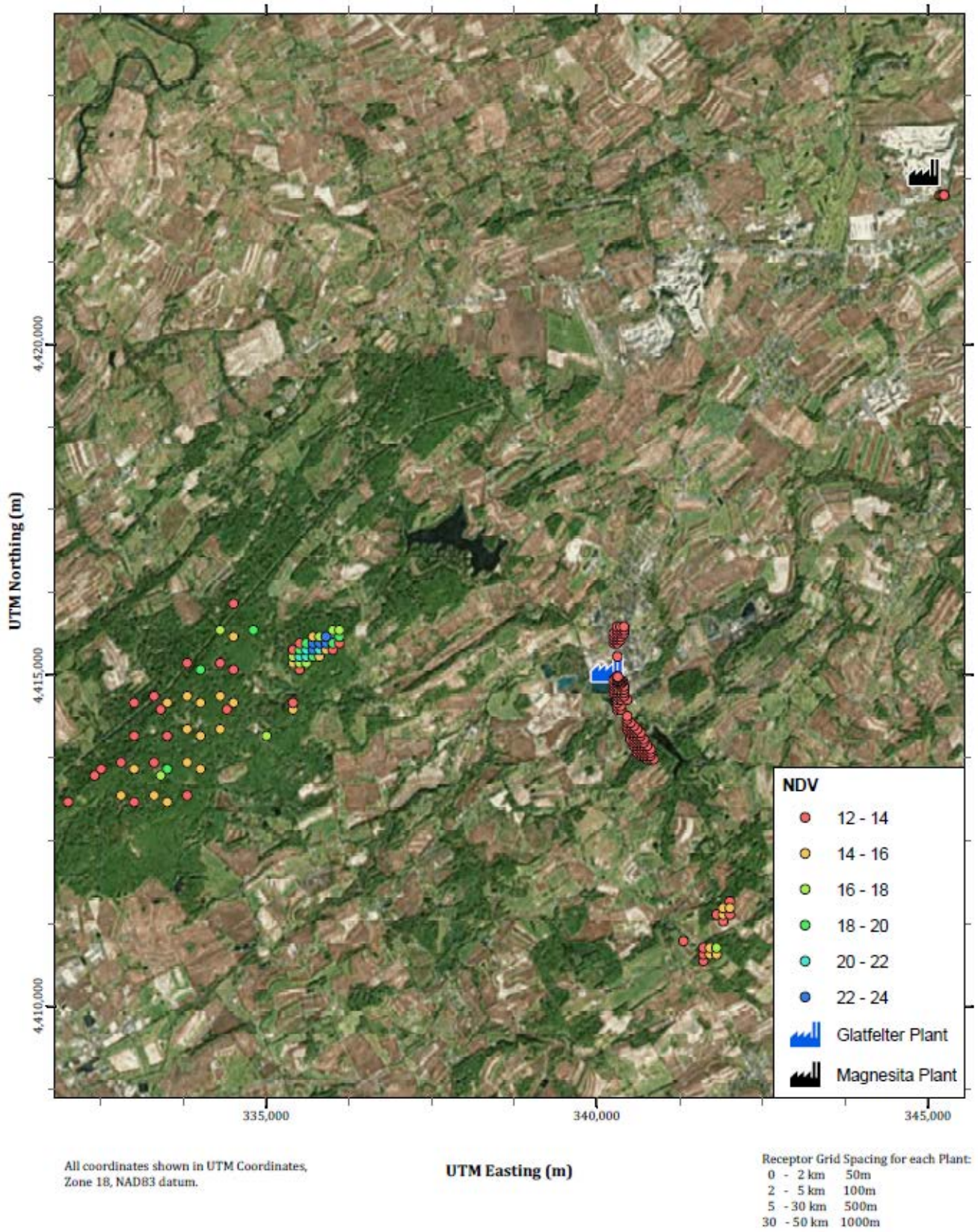


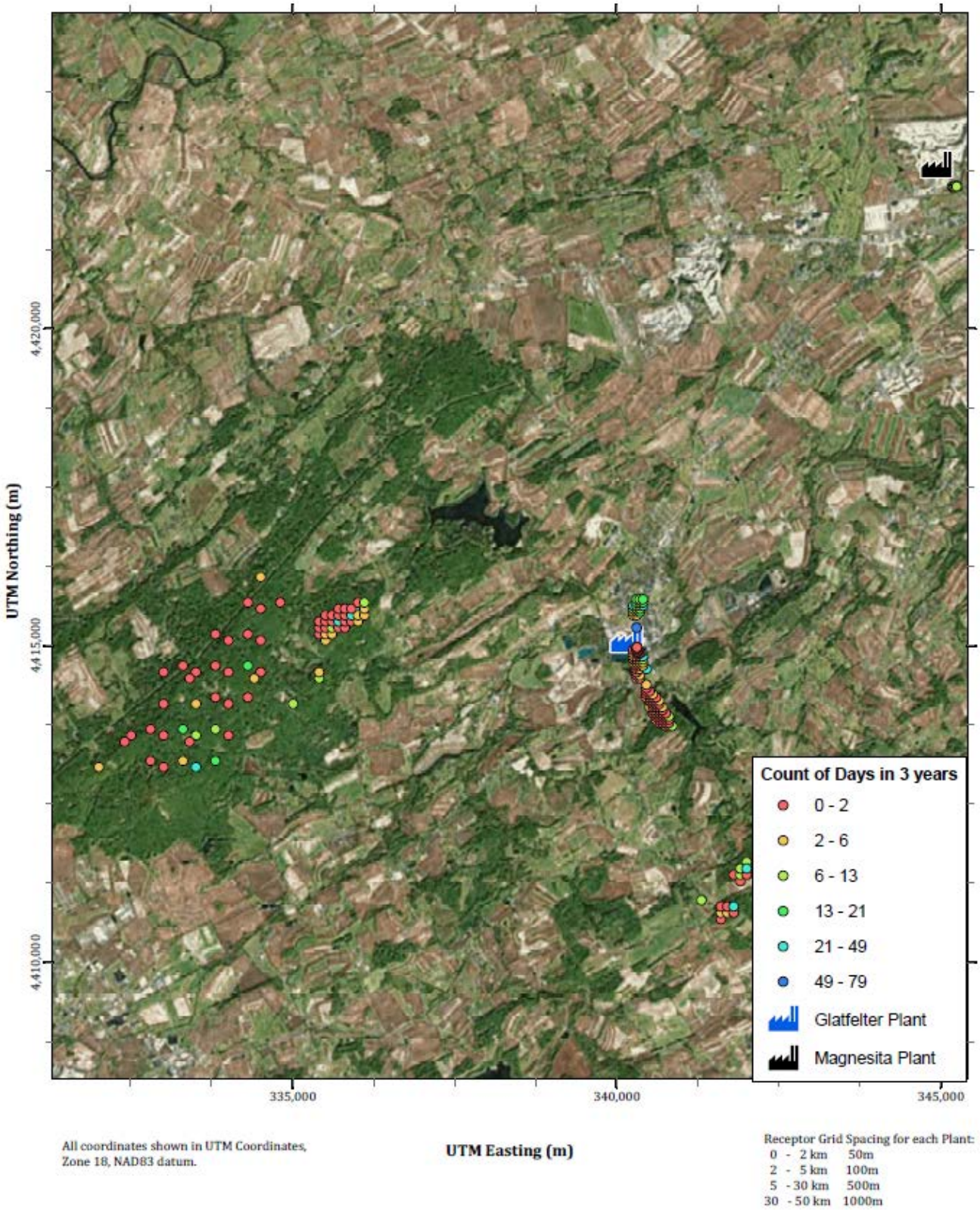
Figure E-3. Preliminary Locations and Value of the Top 200 NDVs



Step 3 – Based on the top 200 receptors established in Step 2, determine the receptors that have the greatest frequency of 1-hour daily maximum SO_2 concentrations.

Based on the results generated from Step 2, the top 200 receptors' modeling results were analyzed to determine the receptors that have the greatest frequency (number of days in the 3-year modeled period) of high concentrations. Figure E-4 below illustrates the receptors that have the greatest frequency of high concentrations.

Figure E-4. Cumulative Number of Days that the Top 200 Receptors had the 1-hour Daily Maximum Concentration Amongst All the Top 200 Receptors



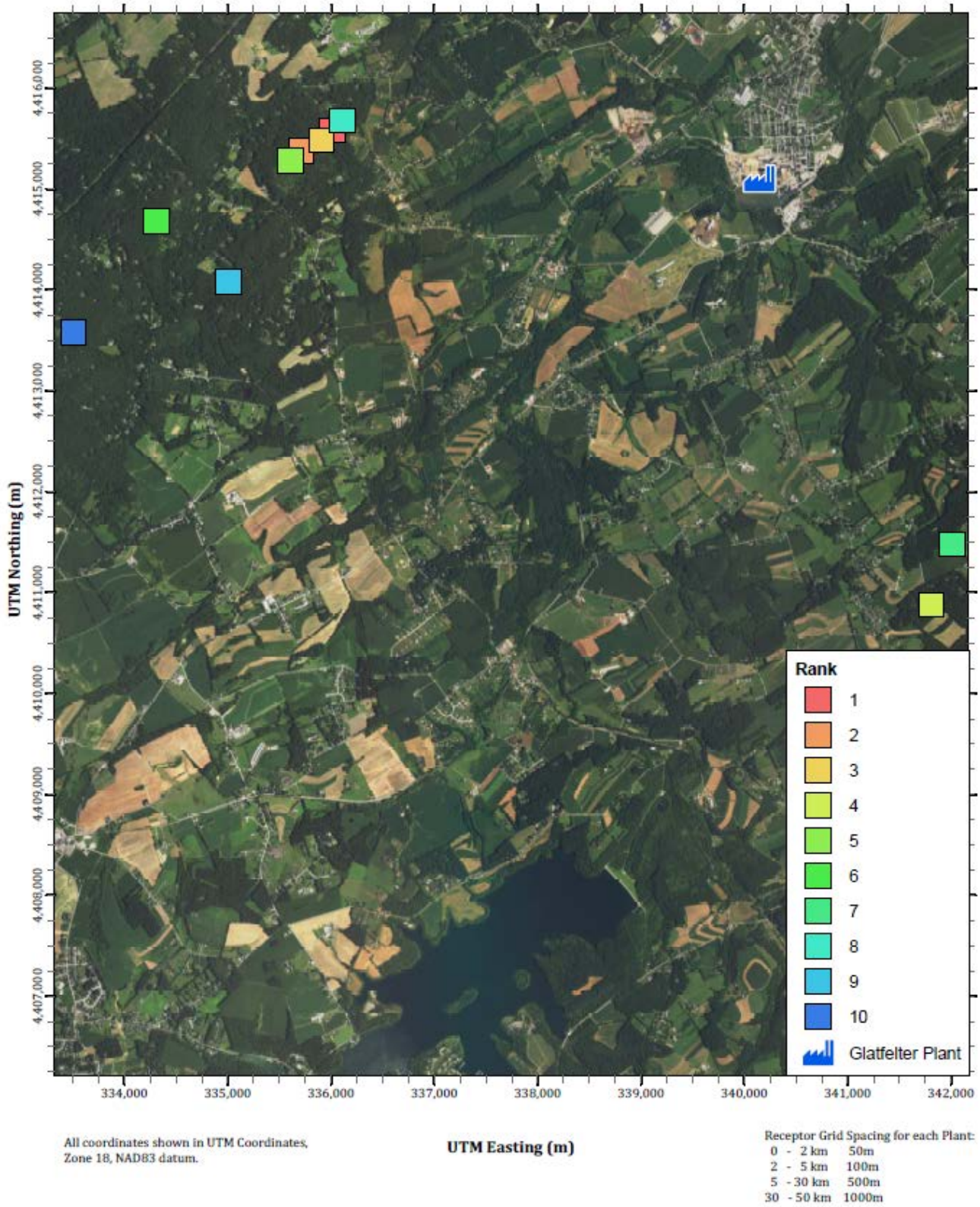
Step 4 – Based on the results of Step 2 and Step 3, score locations of maximum NDVs and locations of highest frequency of 1-hour daily maximum SO_2 concentrations.

Using the results of Step 2 and Step 3, the receptors were ranked from highest to lowest with regard to ratioed NDV and the highest frequency of 1-hour daily maximum SO_2 concentrations. The highest NDV and frequency value got a value of 1 and the lowest NDV and frequency values got a value of 200. Table E-4 below illustrates the locations and the final NDV and frequency rank along with the location's final score. Figure E-5 maps the location of the top 10 scored receptors.

Table E-4. Locations and Values of the Top 10 Receptors

UTM Coordinates		NDV Rank	Frequency Rank	Total Score
Easting (m)	Northing (m)			
336010	4415580	1	5	6
335710	4415380	5	3	8
335910	4415480	2	8	10
341810	4410880	23	9	32
335610	4451280	7	32	39
334310	4414680	34	15	49
342010	4411480	45	7	52
336110	4415680	27	26	53
335010	4414080	26	28	54
333510	4413580	18	42	60

Figure E-5. Overall Rank of the Top 10 Receptors



Glatfelter, Magnesita and the PA DEP continue to scout locations for a potential monitoring site by using the results in Figure E-5 as guidance. All ten of the top scored locations are located within trees. Potential locations of an SO_2 monitor have been centered on an area to the east of the area that scored a 1, 2, 3, 4 and 8 in the scoring analysis provided above. Figure E-6 provides a zoomed in look at the potential monitoring locations being scouted. These potential monitoring locations are marked with a RED marker in Figure E-6 below.

Figure E-6. Potential Locations for an SO_2 Monitor to Characterize Impacts from Glatfelter and Magnesita

Final monitor location will be determined after consultation with the land owner and final conversations with PA DEP and EPA Region 3.