pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Commonwealth of Pennsylvania Department of Environmental Protection 2018 Annual Ambient Air Monitoring Network Plan

September 2018

Tom Wolf, Governor
Commonwealth of Pennsylvania

Patrick McDonnell, Secretary
Department of Environmental Protection

www.dep.pa.gov

This page intentionally left blank

Table of Contents

List of Tables

List of Figures

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
DRR	Data Requirements Rule
EMP	Enhanced Monitoring Plan
FEM	Federal Equivalent Method
FRM	Federal Reference Method
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	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	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 μg/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 μg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 μg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 μg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 μg/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 μg/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) to implement the provisions of the Clean Air Act in the Commonwealth. 35 P.S. Section 4004(1).

Since its establishment in 1971, the PA DEP 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 titled "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 2018 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 fulfillment 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 or EPA networks operated within the state. 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.

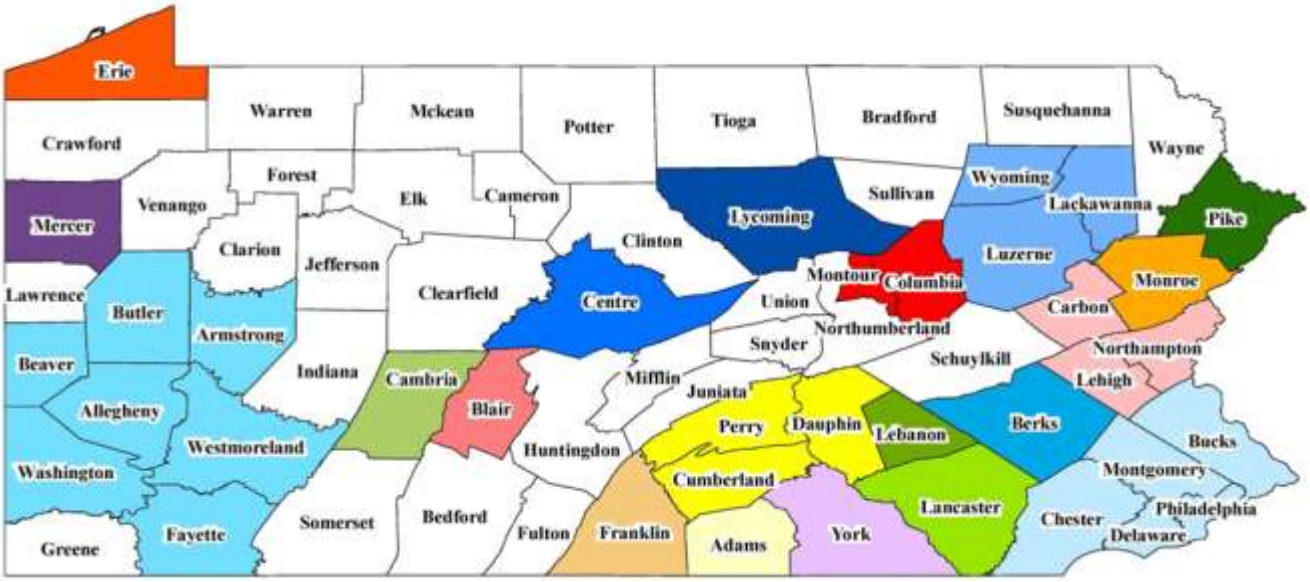
PA DEP's monitoring strategy generally requires the installation of monitors in areas under PA DEP's jurisdiction having high population density and/or high levels of contaminants, based on EPA guidance. The Code of Federal Regulations (CFR) sets forth minimum monitoring requirements based, at least in part, on core based statistical area (CBSA) population statistics for ozone, sulfur dioxide, nitrogen dioxide and particulate matter (PM) monitoring networks. As required by the CFR, PA DEP uses population statistics available from the U.S. Office of Management and Budget (OMB) to identify areas of concentrated populations.

The OMB delineates urbanized areas of concentrated populations into Metropolitan Statistical Areas (MSA) and micropolitan statistical areas. In general, areas with concentrated urban centers of 50,000 or greater are delineated as Metropolitan Statistical Areas (MSA), while areas with concentrated urban centers of 10,000 or greater, but less than 50,000 are delineated as micropolitan statistical areas. Information regarding CBSA delineations can be found on the U.S. Census Bureau's website at https://www.census.gov/programs-surveys/metro-micro/about.html. Population estimates are calculated by OMB and are publically available from the U.S. Census Bureau at https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

The Commonwealth of Pennsylvania encompasses thirty-seven defined CBSA, including twenty MSA and seventeen micropolitan statistical areas. PA DEP conducts air monitoring surveillance in both MSA, micropolitan and non-CBSA regions. CBSA in Pennsylvania are displayed in Figures 1 and 2 on the following pages. In addition, Appendix B of this document contains a list of Pennsylvania counties in each MSA, micropolitan and non-CBSA region, as well as maps of PA DEP monitoring site locations, for each defined area.

Figure 1 displays the geographical boundaries of MSAs and population estimates for 2017. Note that several MSAs include populations outside the Commonwealth, as indicated by the inclusion of one or more state abbreviations in the MSA name.

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

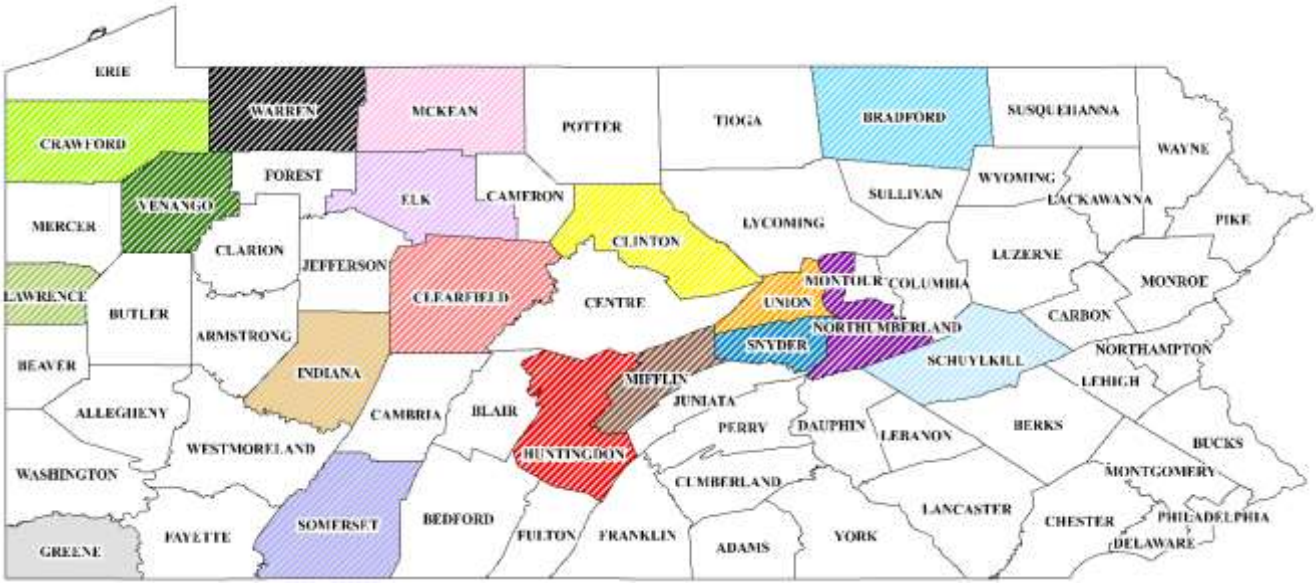


Legend:

MSA		Population	MSA		Population
	Allentown-Bethlehem-Easton, PA-NJ	835,652		New York-Newark-Jersey City, NY-NJ-PA	20,153,634
	Altoona, PA	124,650		Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	6,070,500
	Bloomsburg-Berwick, PA	84,763		Pittsburgh, PA	2,342,299
	Chambersburg-Waynesboro, PA	153,851		Reading, PA	418,812
	East Stroudsburg, PA	166,098		Scranton--Wilkes-Barre--Hazleton, PA	555,225
	Erie, PA	276,207		State College, PA	161,464
	Gettysburg, PA	102,180		Williamsport, PA	115,248
	Harrisburg-Carlisle, PA	568,033		York-Hanover, PA	443,744
	Johnstown, PA	134,732		Youngstown-Warren-Boardman, OH-PA	544,746
	Lancaster, PA	538,500		Non-MSA Regions	
	Lebanon, PA	138,863			

Figure 2 displays the geographical boundaries of micropolitan statistical areas with 2017 population estimates.

Figure 2. Map of Micropolitan Statistical Areas in Pennsylvania



Legend:

MSA		Population	MSA		Population
	Bradford, PA	41,330		Oil City, PA	51,762
	DuBois, PA	79,685		Pottsville, PA	142,569
	Huntingdon, PA	45,491		Sayre, PA	60,853
	Indiana, PA	84,953		Selinsgrove, PA	40,801
	Lewisburg, PA	44,595		Somerset, PA	74,501
	Lewistown, PA	46,388		St Marys, PA	30,197
	Lock Haven, PA	38,998		Sunbury, PA	92,029
	Meadville, PA	86,159		Warren, PA	39,659
	New Castle, PA	87,069			

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

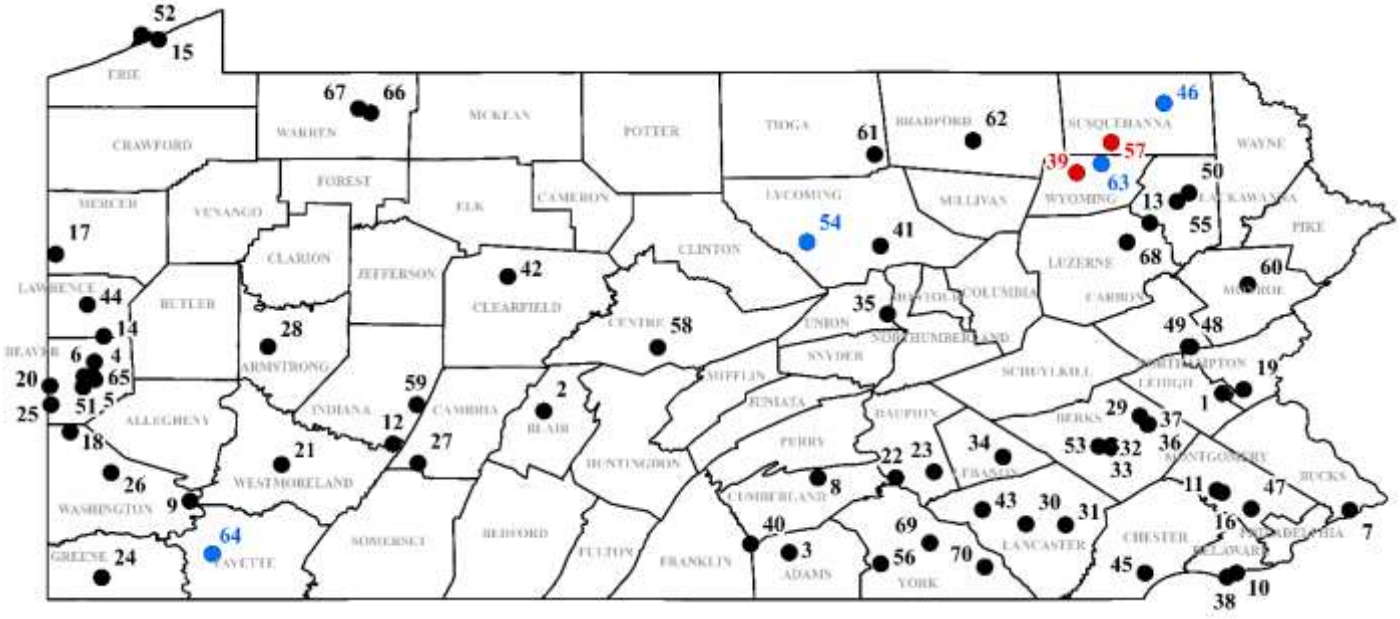
The planned 2018-2019 PA DEP Air Monitoring Network consists of 70 air monitoring stations, located in 41 of the 67 counties in Pennsylvania, and includes ambient air monitoring sites for criteria pollutants, hydrogen sulfide and air toxics, including VOCs. Descriptions of air pollutants are provided 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. 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. 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 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. PA DEP utilizes discrete methods for the criteria pollutants $PM_{2.5}$ and lead, as well as air toxics, including heavy metals and VOCs. 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.

Figure 3. Map of PA DEP Air Monitoring Network



Legend: RED – Site will be discontinued in 2018-2019**; BLUE –** Site will be added in 2018-2019

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

Table 3. PA DEP Air Monitoring Network Sites and Parameters Monitored, 2018-2019

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						
Altoona	X	X			X								
Arendtsville	X	X	X	X	X	X				X	X		
Beaver Falls	X		X		X		X						
Beaver Valley								X		X		X	
Brighton Twp	X	X											
Bristol	X												
Carlisle					X								
Charleroi	X	X	X		X					X			
Chester	X		X		**(disc)**	**(disc)**		X		X		X	
Collegeville										X			
Conemaugh								X					
Duryea								X					
Ellwood City								X				X	
Erie	X		X	X	X		X						
Evansburg United Methodist										X			
Farrell	X				X								
Florence	X	X			X	X							
Freemansburg	X	X	X		X								
Glasgow												X	
Greensburg	X				X	X				X			
Harrisburg	X				X								
Hershey	X						X						
Holbrook	X				X								
Hookstown	X	X											
Houston	X		X		X					X	X		
Johnstown	X	X	X	X	X	X	X						
Kittanning	X				X								
Kutztown	X												
Lancaster	X				X	X	X			X	X	X	**(disc)**
Lancaster Downwind	X				X	X							
Laureldale North								X					
Laureldale South								X					
Lebanon	X				X	**(add)**							
Lewisburg										X		X	
Lyons Boro								X					
Lyons Park								X					
Marcus Hook					X					X			
Mehoopany (disc)										**(disc)**			
Methodist Hill	X												
Montoursville	X												
Moshannon	X												

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
Mt Joy								X					
New Castle	X												
New Garden	X				X	X							
New Milford (add)					**(add)**					**(add)**	**(add)**		
Norristown	X				X								
Palmerton								X					
Palmerton Electric												X	
Peckville	X												
Potter Township								X					
Presque Isle										X		X	
Reading Airport	X	X			X					X		X	
Salladasburg (add)					**(add)**								
Scranton	X		X	X	X								
Spring Grove		X											
Springville (disc)										**(disc)**			
State College	X	X	X		X								
Strongstown	X	X											
Swiftwater	X												
Tioga County	X		X		X								
Towanda	X		X		X								
Tunkhannock (add)					**(add)**					**(add)**	**(add)**		
Uniontown (add)	**(add)**		**(add)**		**(add)**					**(add)**	**(add)**		
Vanport								X					
Warren East		X							X				
Warren Overlook		X											
Wilkes Barre	X	X					X						
York	X	X	X		X					X			
York Downwind	X												
Clarion County					**(add)**								
Indiana County					**(add)**								
Jefferson County					**(add)**								
McKean County					**(add)**								
Totals	***42***	***16***	***14***	***4***	***37***	***9***	***7***	***13***	***1***	***17***	***6***	***9***	***1***

(disc) = Site/Monitor will be discontinued in 2018-2019

(disc)* = One of either the Chester or Marcus Hook $PM_{2.5}$ speciation monitors will be discontinued in 2018-2019

(add) = Site/Monitor will be added in 2018-2019

Changes to Monitoring Sites and Monitors in 2017-2018

PA DEP completed several modifications to its air monitoring network during 2017-2018. The changes are summarized in Table 4.

Table 4. Summary of Changes to the PA DEP Air Monitoring Network, 2017-2018

Site Terminations
1) Discontinued Easton (Northampton County) monitoring station (ozone, H_2S, SO_2)
2) Discontinued Washington (Washington County) monitoring station (ozone, $PM_{2.5}$)
3) Discontinued lead monitoring at Ridley Park (Delaware County)
Discontinued Monitors in Criteria Pollutant Monitoring Networks
1) Discontinued SO_2 monitoring at Chester (Delaware County) and New Castle (Lawrence County) sites
2) Discontinued CO monitoring at the York (York County) site
3) Discontinued $PM_{2.5}$ monitoring at the Swiftwater (Monroe County) site
4) Discontinued PM_{10} monitoring at the Altoona (Blair County) and Montoursville (Lycoming County) sites
Added Monitors in Criteria Pollutant Monitoring Networks
1) Installed ozone and $PM_{2.5}$ monitors at the Houston (Washington County) site
2) Installed SO_2 monitor at the Freemansburg (Northampton County) site
Modifications to the Air Toxics Network
1) Established Glasgow (Beaver County) metals monitoring site
2) Discontinued Swarthmore (Delaware County) VOC and metals monitoring site
3) Replaced TSP-based metals sampling with PM_{10}-based method; Added Antimony, Selenium and Cobalt to analyte suite

The sections below discuss the items listed in Table 4 above. In Table 4, PA DEP discusses the discontinuation of several sites and monitors. Regardless of the discontinuations, PA DEP still meets its regulatory requirement, such as minimum monitoring based on population, for monitoring ambient air in various portions of the Commonwealth. Additional information on PA DEP meeting these requirements is outlined in Appendix C: Network Design and Quality Assurance Criteria section of this document.

Site Terminations

Following U.S. EPA approvals, PA DEP discontinued the following monitoring sites:

- Easton (Northampton County) – ozone, H_2S, SO_2
- Ridley Park (Delaware County) – lead
- Washington (Washington County) – ozone, $PM_{2.5}$

Monitored concentration values 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 monitoring sites in February and March, 2018. Detailed rationales for these site terminations were included in PA DEP's 2017 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 2017-2018:

- SO_2 – Chester (Delaware County) and New Castle (Lawrence County)
- CO –York (York County)
- $PM_{2.5}$ – Swiftwater (Monroe County)
- PM_{10} – Altoona (Blair County) and Montoursville (Lycoming 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 in February and March, 2018. 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 2017 Annual Air Monitoring Network Plan.

Added Monitors in Criteria Pollutant Monitoring Networks

PA DEP added the following SLAMS monitors in 2017-2018:

- SO_2 – Freemansburg (Northampton County)
- Ozone and $PM_{2.5}$ – Houston (Washington County)

As stated in the 2017 Ambient Air Monitoring Network Plan, PA DEP installed an SO_2 monitor at Freemansburg (Northampton County), following the termination of the Easton monitoring site, also in Northampton County, to continue to support SO_2 monitoring in the region.

In response to public comments to its 2017 Ambient Air Monitoring Network Plan, PA DEP decided to relocate the ozone and $PM_{2.5}$ monitors from the discontinued Washington (Washington County) site to the Houston monitoring site, also in Washington County. The Houston site is approximately seven miles north of the former Washington site. The location of the Houston site is more effectively downwind of several shale gas compressor stations, which are concentrated in the northern and western portion of Washington County, than was the location of the former Washington site. Therefore,

PA DEP installed the ozone and $PM_{2.5}$ monitors at this site to continue to support air quality monitoring in the area in light of ongoing shale gas activities in the region.

Modifications to the Air Toxics Network

In February 2018, PA DEP discontinued the Swarthmore (Delaware County) monitoring site. Air Toxics metals and VOC monitoring had been conducted at the Swarthmore site since 1997 under a partnership agreement with Swarthmore College. The college is in the process of building demolishment and renovations, and has concluded its partnership agreement with PA DEP.

PA DEP has replaced its TSP samplers used for metals monitoring with a more analytically-precise PM_{10} sampling method using quartz filters, as well as added antimony, cobalt and selenium to the analyte suite. These changes are in line with current proposals for the revisions to the National Air Toxics Trends Station program (NATTS) program. PM_{10} sampling better capture data on human inhalation exposure, as PM_{10} better represents the respirable fraction of particulate matter in ambient air. In addition, the use of quartz filters with this PM_{10}-based method allows for a lower limit of quantification than the TSP samplers and glass filters used for the screening method. Detailed rationales for these changes were provided in PA DEP's 2017 Annual Ambient Air Monitoring Network Plan.

Ambient metals data from the East Liverpool, OH/Glasgow, PA area indicated elevated levels of manganese. PA DEP, Ohio EPA, West Virginia DEP, the federal Agency for Toxic Substances and Disease Registry (ATSDR) and EPA Regions III and V collaborated to analyze the available data and establish additional monitoring locations. In October 2017, PA DEP reestablished the Glasgow monitoring site in co-operation the U.S. EPA to continue to monitor ambient metals in the western Beaver County area operating both a PM-10 and TSP sampler. In February 2018, EPA entered into a consent decree with the SH Bell company requiring the company to install and operate three monitoring systems to measure respirable manganese concentrations. These systems began collecting data on August 20, 2017. Information about the consent decree and the sample data collected by the SH Bell company can be found at https://www.epa.gov/oh/east-liverpool-ohio-and-glasgow-borough-pennsylvania-air-monitoring-data#Status.

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.

Table 5. Summary of Planned Changes to the PA DEP Air Monitoring Network, 2018-2019

Changes Relating to Natural Gas Extraction and Processing Activities in Shale Gas Regions
1) Install new monitoring sites in Fayette, Lycoming, Susquehanna and Wyoming Counties 2) Continue to explore new monitoring sites in Clarion, Indiana, Jefferson and McKean Counties
Changes Relating to the Annual Assessment of the Ambient Air Quality Monitoring Network
Modifications to the $PM_{2.5}$ Networks
1) Install $PM_{2.5}$ speciation monitor at the Lebanon (Lebanon County) site 2) Discontinue $PM_{2.5}$ monitoring the Chester site (Delaware County) 3) Discontinue $PM_{2.5}$ speciation monitoring the Chester site (Delaware County)
Modifications to the Air Toxics Network
1) Relocate VOC sampling from Springville (Susquehanna County) and Mehoopany (Wyoming County) to New Milford (Susquehanna County) and Tunkhannock (Wyoming County), respectively, and add Carbonyl sampling to each of these sites 2) Discontinue operations of the Mercury monitor at the Lancaster site

Modifications to Air Monitoring Network: Shale Gas Development

The extraction and processing of natural gas from shale gas 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 shale gas wells drilled in Pennsylvania has rapidly increased.

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 shale gas operations.

As a result of these comments and complaints, PA DEP has begun to establish new monitoring sites and install $PM_{2.5}$ monitors in shale gas producing counties across the Commonwealth. Currently, the Department has installed $PM_{2.5}$ monitors at its Holbrook monitoring site in Greene County, its Tioga County monitoring site in Tioga County and its Towanda monitoring site in Bradford County. PA DEP's plans for additional $PM_{2.5}$ monitoring activities in shale gas counties are outlined in the sections below.

Current Deployment of $PM_{2.5}$ Monitoring Sites

As outlined in its 2017 Annual Ambient Air Monitoring Network Plan, the Department is in the process of establishing ambient air monitoring sites in four shale gas producing counties within PA. The four counties are as follows:

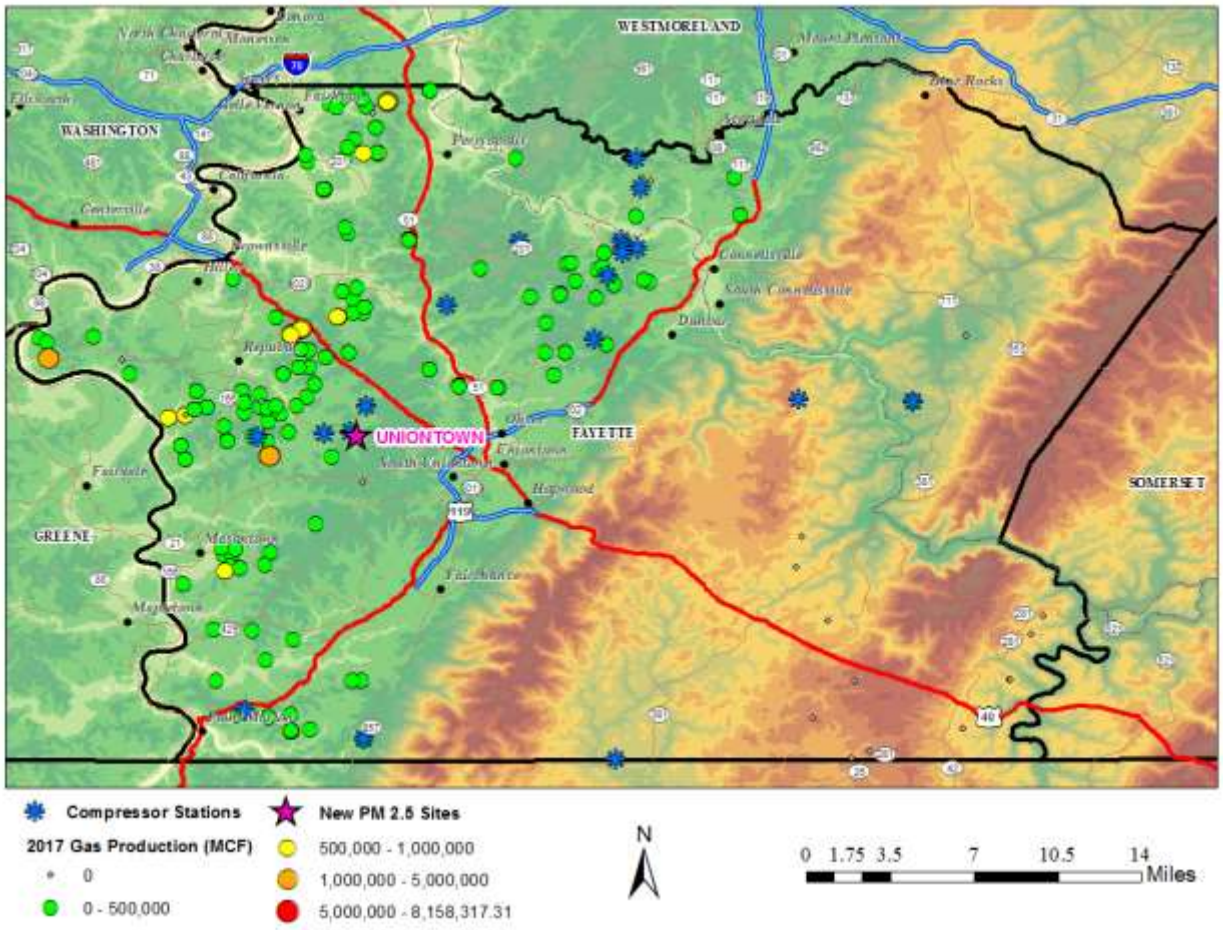
1. Fayette County
2. Lycoming County
3. Susquehanna County
4. Wyoming County

Below, each county listed above is outlined with a map showing the exact location of the ambient air monitoring site. The Department is in the process of finalizing leases and installing the new ambient air monitoring site. Each of the sites listed below in this section will have ambient air monitoring data being collected and reported to the public by the end of 2018.

Fayette County

The Department is establishing a new multi-pollutant 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. Figure 4 below illustrates the location of its Fayette County monitor, labeled as Uniontown. In addition to the location of Uniontown monitoring site, the location of the compressor stations and amount of gas well production in 2017 (as reported in OGRE) are highlighted on the map. The site has been added to Appendix D, on page D-67. The current equipment configuration includes monitors for ozone, NO_2, $PM_{2.5}$, carbonyls and VOC.

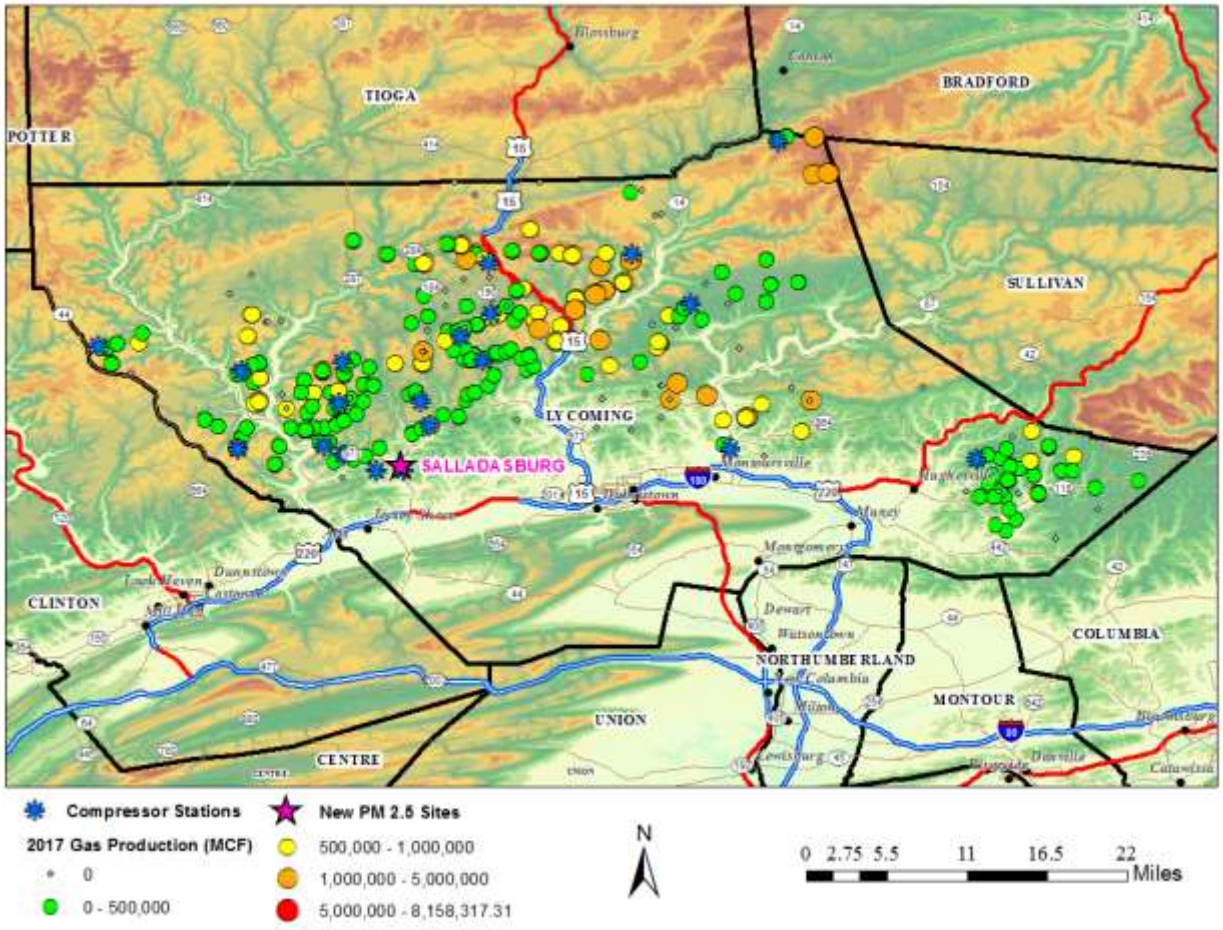
Figure 4. Location of Uniontown Monitor with Respect to Compressor Stations and Gas Well Production



Lycoming County

The Department is establishing a new $PM_{2.5}$ monitoring site in western Lycoming County. The location of the monitoring site will be within Salladasburg Borough at the Salladasburg Elementary School. Figure 5 below illustrates the location of its Lycoming County monitor, labeled as Salladasburg. In addition to the location of Salladasburg monitoring site, the location of the compressor stations and amount of gas well production are highlighted on the map. The site has been added to Appendix D, on page D-57.

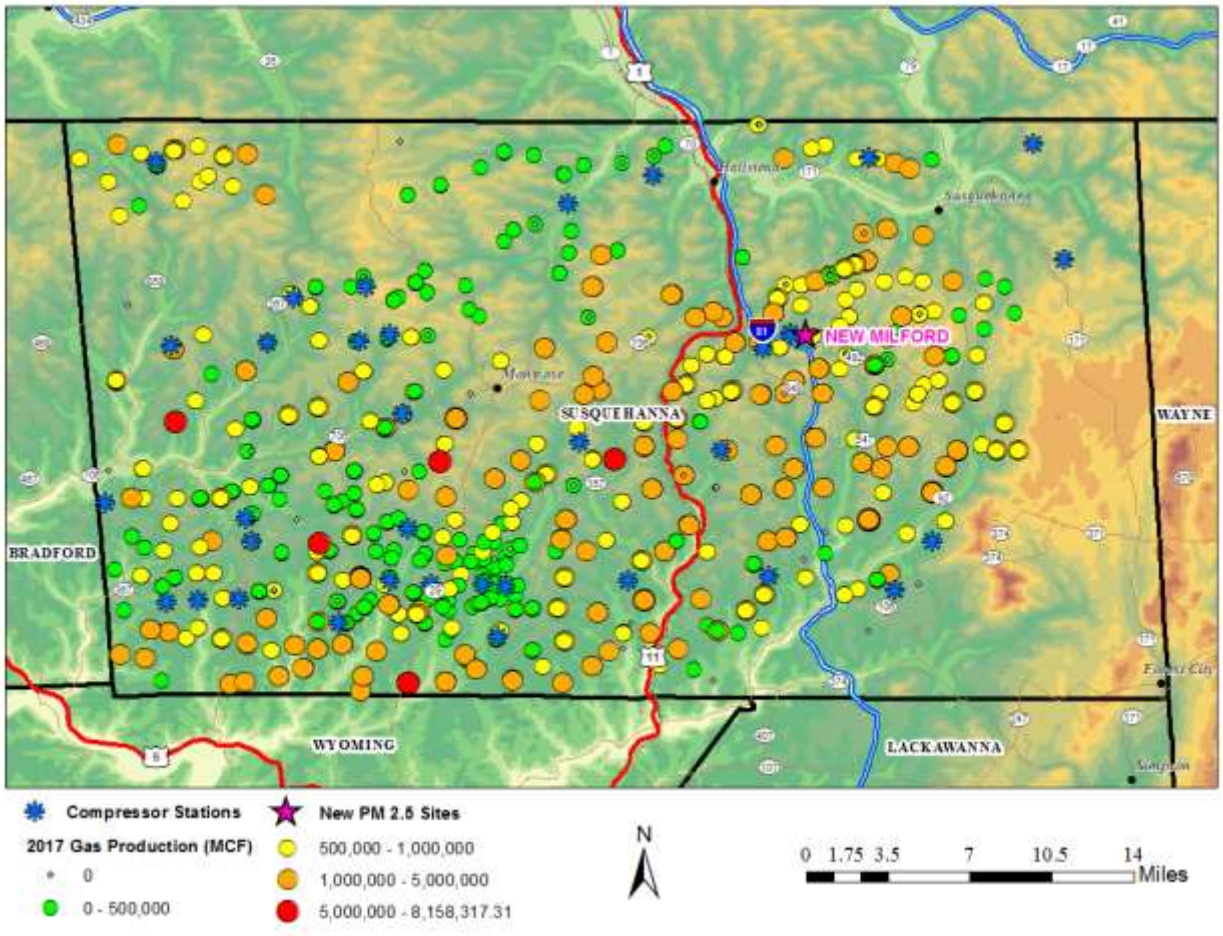
Figure 5. Location of Salladasburg Monitor with Respect to Compressor Stations and Gas Well Production



Susquehanna County

The Department is establishing a new $PM_{2.5}$ monitoring site in Susquehanna County. The location of the monitoring site in Susquehanna County is downwind of major gas producing wells and compressor stations. Figure 6 below illustrates the location of its Susquehanna County monitor, labeled as New Milford. In addition to the location of New Milford monitoring site, the location of the compressor stations and amount of gas well production are highlighted on the map. The site has been added to Appendix D, on page D-49. The current equipment configuration includes monitors for $PM_{2.5}$, carbonyls and VOC.

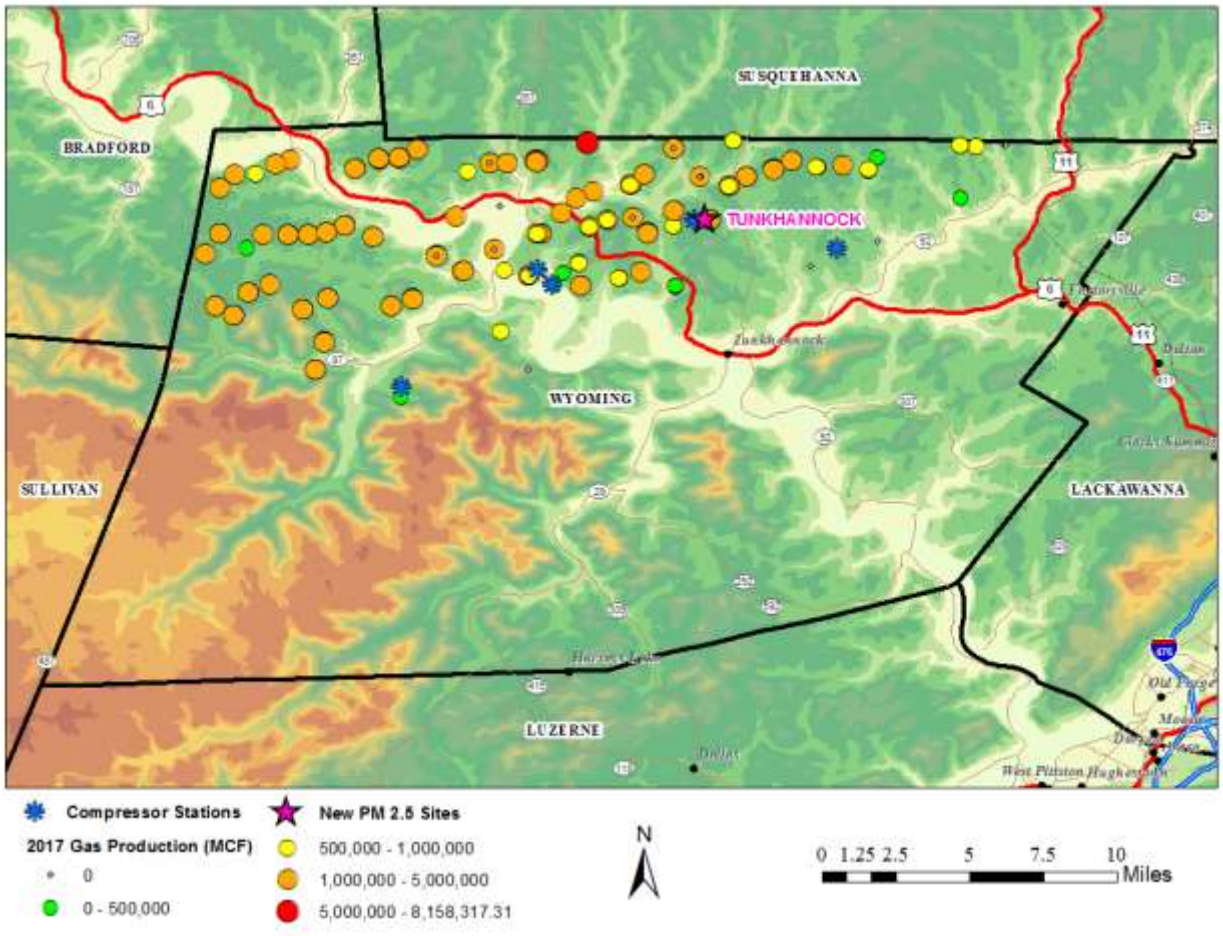
Figure 6. Location of New Milford Monitor with Respect to Compressor Stations and Gas Well Production



Wyoming County

The Department is establishing a new $PM_{2.5}$ monitoring site in Wyoming County. The location of Wyoming County monitoring site is downwind of major gas producing wells and compressor stations. Figure 7 below illustrates the location of its Wyoming County monitor, labeled as Tunkhannock. In addition to the location of the Tunkhannock monitoring site, the location of the compressor stations and amount of gas well production are highlighted on the map. The site has been added to Appendix D, on page D-66. The current equipment configuration includes monitors for $PM_{2.5}$, carbonyls and VOC.

Figure 7. Location of Tunkhannock Monitor with Respect to Compressor Stations and Gas Well Production



Additional Potential $PM_{2.5}$ Monitoring Sites

The Department continues to explore the potential to site additional $PM_{2.5}$ monitoring sites in four counties that have active shale gas production. The four counties are as follows:

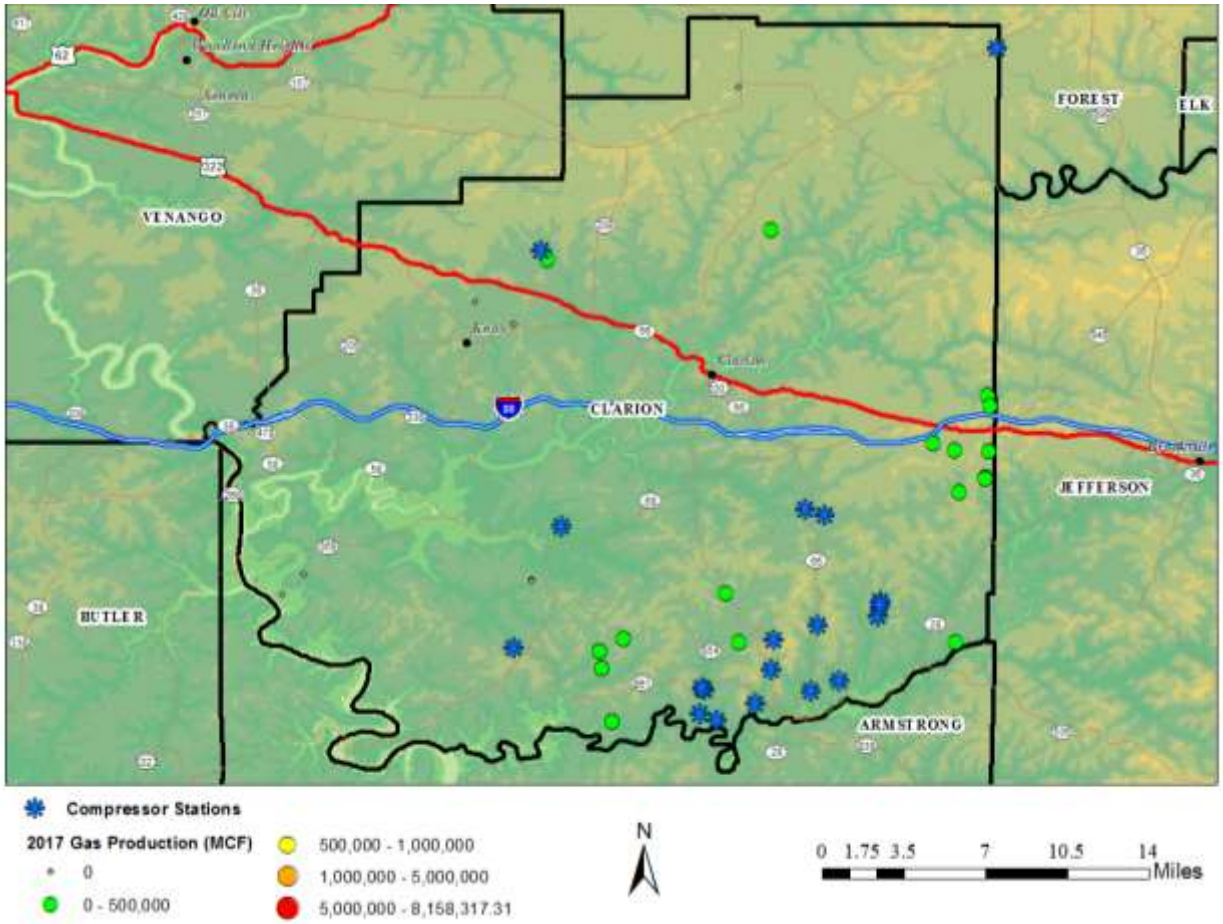
1. Clarion County
2. Indiana County
3. Jefferson County
4. McKean County

Below, the Department has produced maps illustrating the locations of the compressor stations and gas well production within each of the counties listed above. These maps will help to guide the decision-making process in establishing siting criteria to ensure that the new ambient air monitoring sites are downwind of the Marcelles Shale gas areas within each respective county.

Clarion County

Clarion County has 19 compressor stations and 21 gas wells that reported production in 2017. In Figure 8 below, the Department highlights the locations of the compressor station and gas well production within Clarion County. Using the map below as guidance, the Department continues to study the county for a potential location of an ambient air monitoring site. An ambient air monitoring site is likely to be sited in Clarion County in 2019.

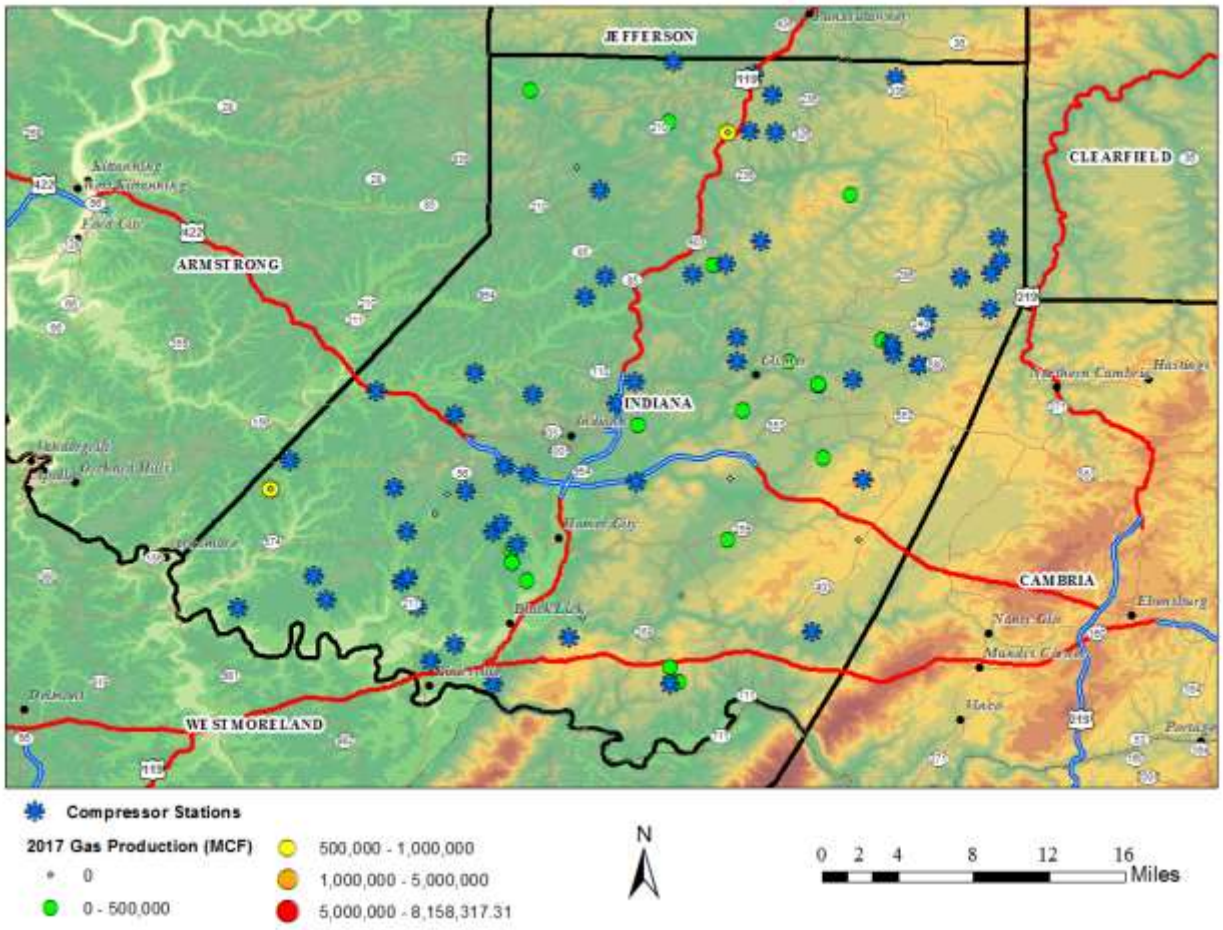
Figure 8. Clarion County Compressor Stations and Gas Well Production



Indiana County

Indiana County has 56 compressor stations and 30 gas wells that reported production in 2017. In Figure 9 below, the Department highlights the locations of the compressor station and gas well production within Indiana County. Using the map below as guidance, the Department continues to study the county for a potential location of an ambient air monitoring site. An ambient air monitoring site is likely to be sited in Indiana County in 2019.

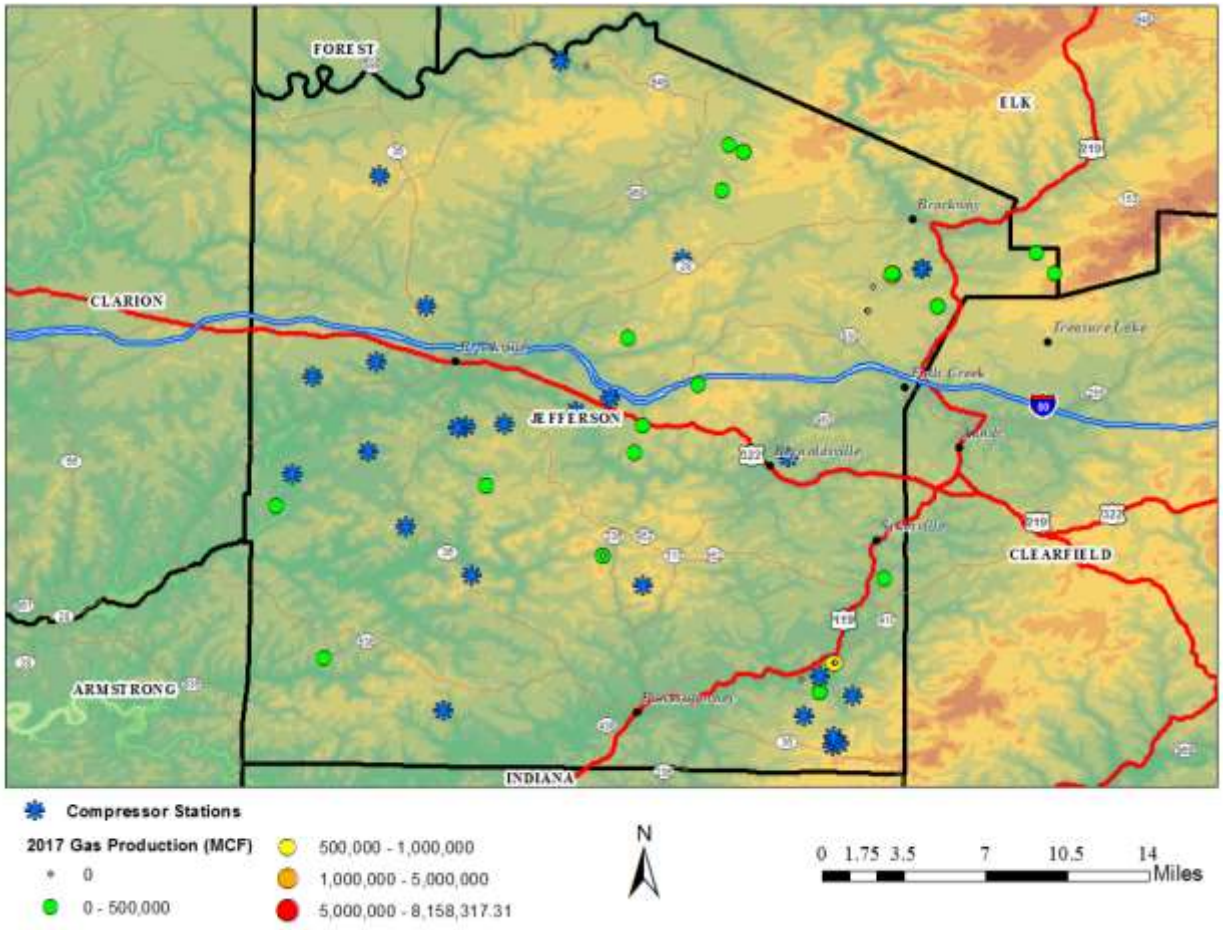
Figure 9. Indiana County Compressor Stations and Gas Well Production



Jefferson County

Jefferson County has 25 compressor stations and 3 gas wells that reported production in 2017. In Figure 10 below, the Department highlights the locations of the compressor station and gas well production within Jefferson County. Using the map below as guidance, the Department continues to study the county for a potential location of an ambient air monitoring site. An ambient air monitoring site is likely to be sited in Jefferson County in 2019.

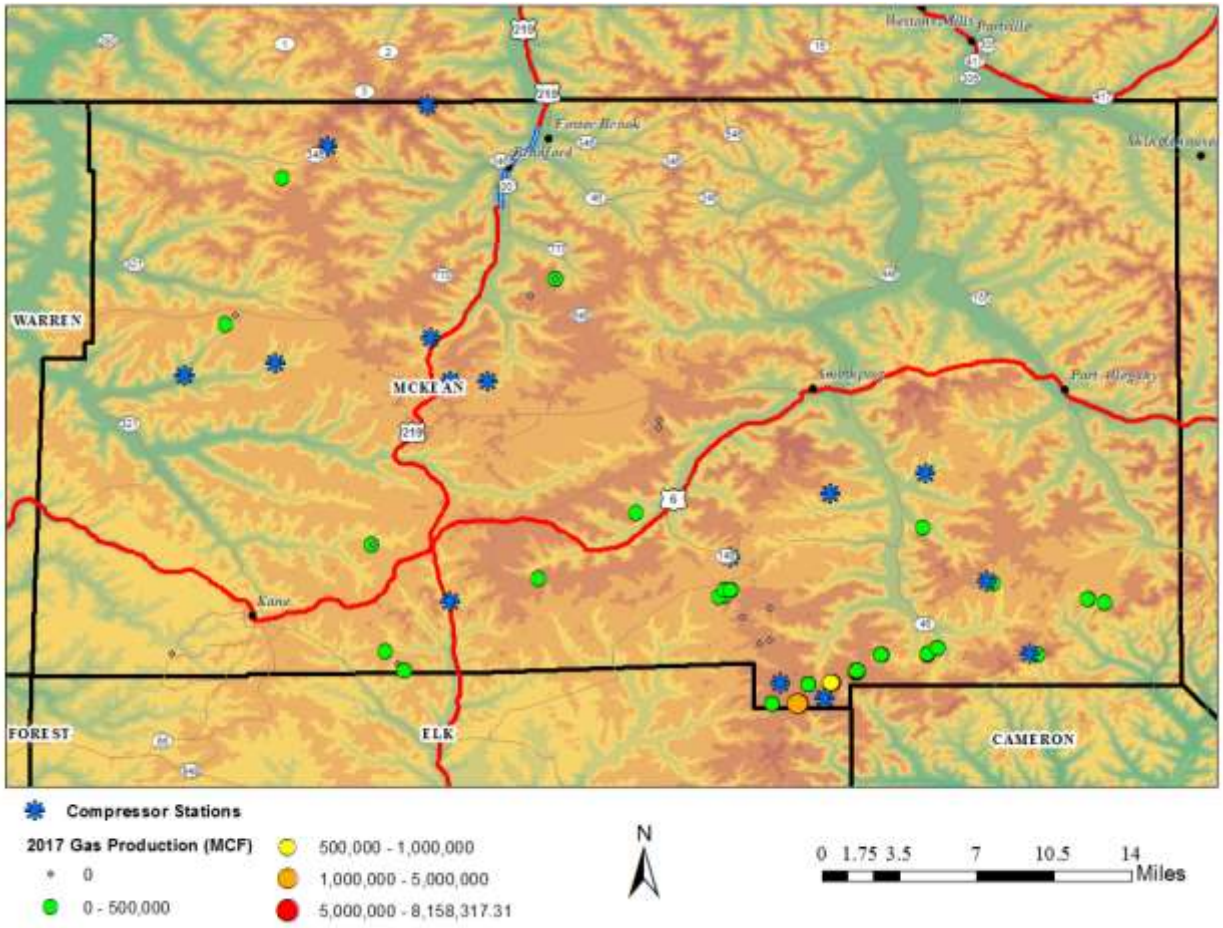
Figure 10. Jefferson County Compressor Stations and Gas Well Production



McKean County

McKean County has 15 compressor stations and 81 gas wells that reported production in 2017. In Figure 11 below, the Department highlights the locations of the compressor station and gas well production within McKean County. Using the map below as guidance, the Department continues to study the county for a potential location of an ambient air monitoring site. An ambient air monitoring site is likely to be sited in McKean County in 2019.

Figure 11. McKean County Compressor Stations and Gas Well Production



Modifications to the $PM_{2.5}$ Speciation Network

1) Install $PM_{2.5}$ speciation monitor at the Lebanon (Lebanon County) $PM_{2.5}$ monitoring site
2) Discontinue $PM_{2.5}$ speciation monitor at Chester (Delaware County) $PM_{2.5}$ monitoring site

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

PA DEP will install a $PM_{2.5}$ speciation monitor at its Lebanon site to help determine if the Lancaster Downwind $PM_{2.5}$ monitor is being influenced by local source(s) of emissions.

The Lebanon monitoring site was originally installed in February 2011, to meet the $PM_{2.5}$ and ozone minimum monitoring requirements of the newly-created Lebanon MSA. In 2012, the Lebanon $PM_{2.5}$ monitor recorded an annual average of 14.25 µg/m^3, exceeding the 2012 $PM_{2.5}$ annual standard of 12.0 µg/m^3. In 2014, the Lebanon monitor again recorded an annual average exceeding the standard at 12.73 µg/m^3. The 3-year annual design value 2012-2014 at the Lebanon site was 12.7 µg/m^3.

In December 2014, EPA designated Lebanon County as being in nonattainment of the 2012 $PM_{2.5}$ standard. These designations became final in January 2015 (https://www.gpo.gov/fdsys/pkg/FR-2015-01-15/pdf/2015-00021.pdf).

Figure 12 and Figure 13 illustrate the trend in 24-hour and annual average $PM_{2.5}$ concentrations, respectively, over the past 5 years.

Figure 12. $PM_{2.5}$ 24-Hour 98th Percentile Concentrations at Lancaster, Lancaster Downwind and Lebanon

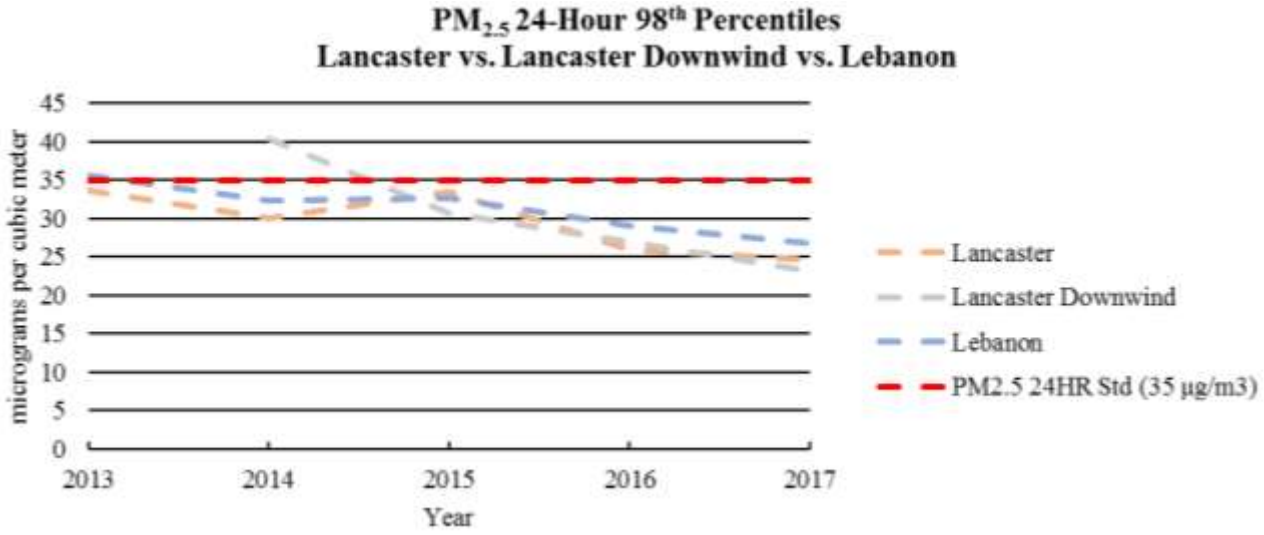
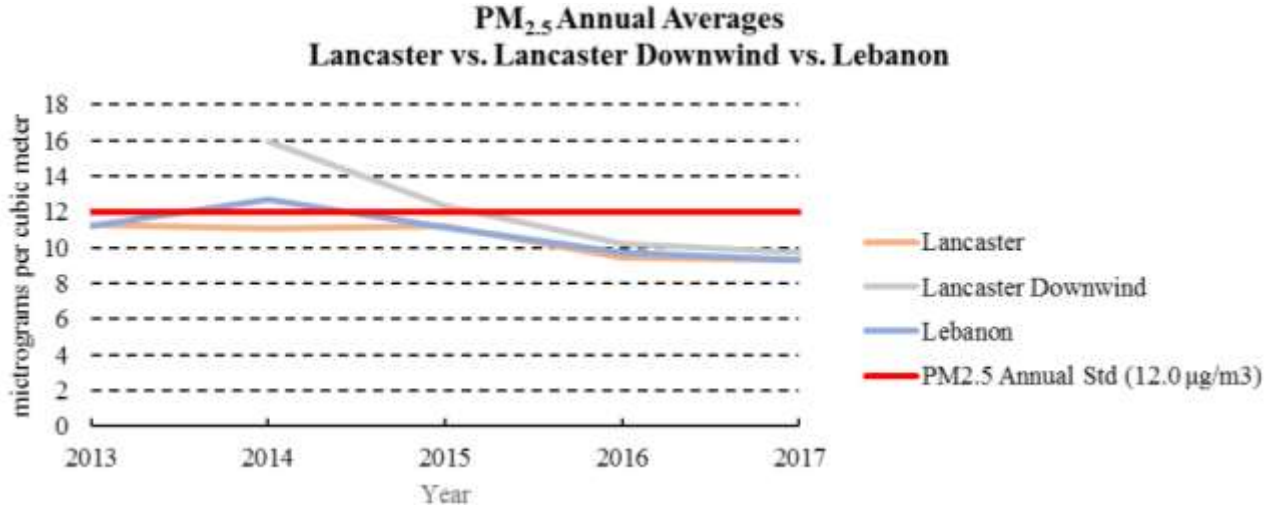


Figure 13. $PM_{2.5}$ Annual Averages Lancaster vs. Lancaster Downwind vs. Lebanon



As illustrated in Figures 12 and 13, Lebanon's $PM_{2.5}$ concentrations have been on the decline over the last couple of years. Although we have seen the decline in $PM_{2.5}$ concentrations, PA DEP is interested in learning whether any $PM_{2.5}$ speciated data similarities exist between Lebanon and the two $PM_{2.5}$ speciation monitors in Lancaster County. Overall, Lancaster and Lebanon counties have been a concern of the PA DEP due to increased level of ammonia emissions from this region of Pennsylvania. Having a $PM_{2.5}$ speciation monitor at Lebanon will allow the PA DEP to better assess the impacts of ammonia emissions on $PM_{2.5}$ formation specifically in Lebanon County and also assist in any future State Implementation Plan revisions due to a tightening of the $PM_{2.5}$ standard in the future.

Discontinue $PM_{2.5}$ Speciation Monitor at Chester

PA DEP will discontinue the $PM_{2.5}$ speciation monitor at its Chester site. $PM_{2.5}$ speciation monitoring is not required by U.S. EPA in this region.

Over the last two years, Marcus Hook's $PM_{2.5}$ concentration has been lower than Chester's $PM_{2.5}$ concentration. This is depicted in Figure 14 and Figure 15 below. PA DEP addressed the cause of the higher $PM_{2.5}$ concentrations at Chester along with its intent to site a $PM_{2.5}$ monitor at Marcus Hook in its 2014 Annual Monitoring Network Plan. The purpose of the $PM_{2.5}$ installation was to compare the $PM_{2.5}$ readings at the Department's Marcus Hook monitoring site to the $PM_{2.5}$ readings at the Department's Chester monitoring site. Based on historical $PM_{2.5}$ speciation data from its Chester monitoring site, the Department believed that the $PM_{2.5}$ data being measured at Chester was source influenced. Therefore, since December 2014, the Department has been monitoring for $PM_{2.5}$ and $PM_{2.5}$ speciation at its Chester and Marcus Hook air monitoring sites. An analysis of all available $PM_{2.5}$ speciation data is provided below.

Figure 14. $PM_{2.5}$ 98th Percentiles Chester vs. Marcus Hook

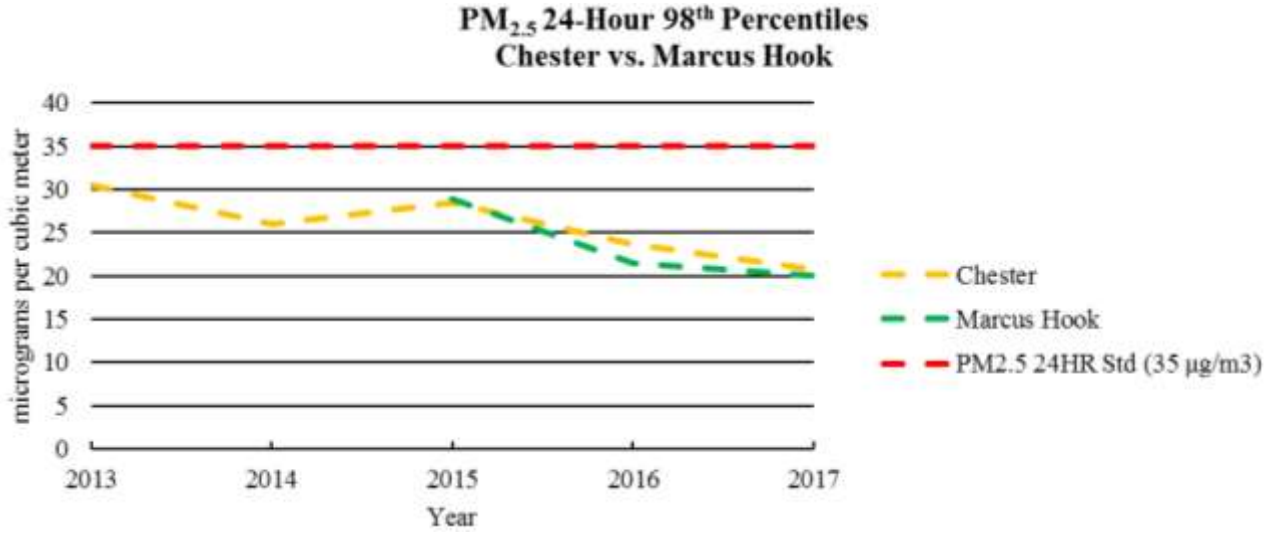
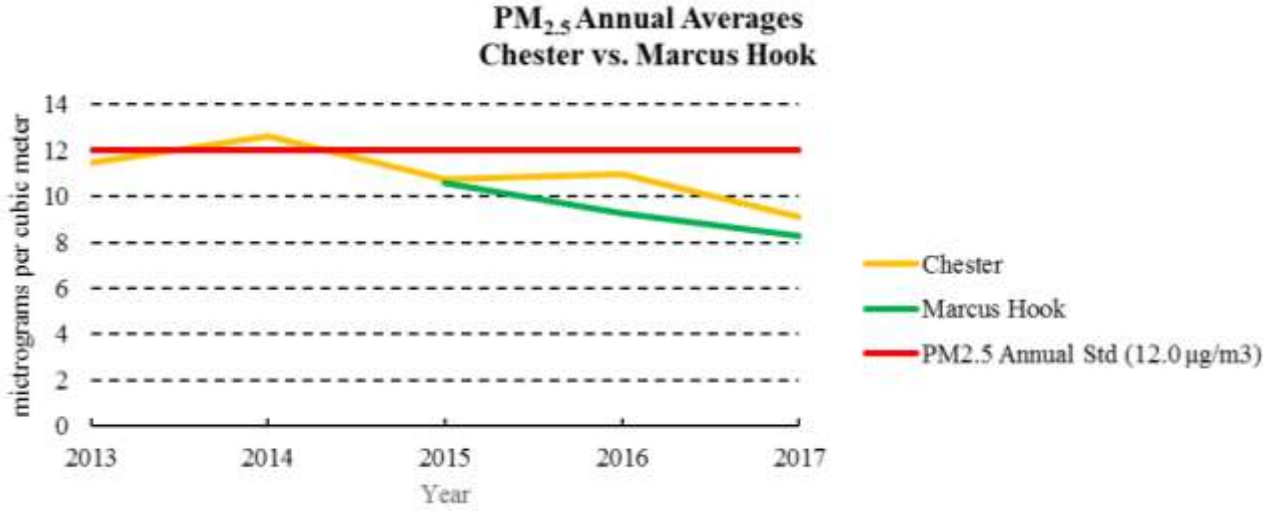


Figure 15. $PM_{2.5}$ Annual Averages Chester vs. Marcus Hook



Chester and Marcus Hook $PM_{2.5}$ Comparison Study

The Chester air monitoring site is located on the Evonik Degussa property in Chester, PA. Figure 16 below illustrates the location of the Chester monitoring site with respect to Evonik Degussa and PQ Corporation.

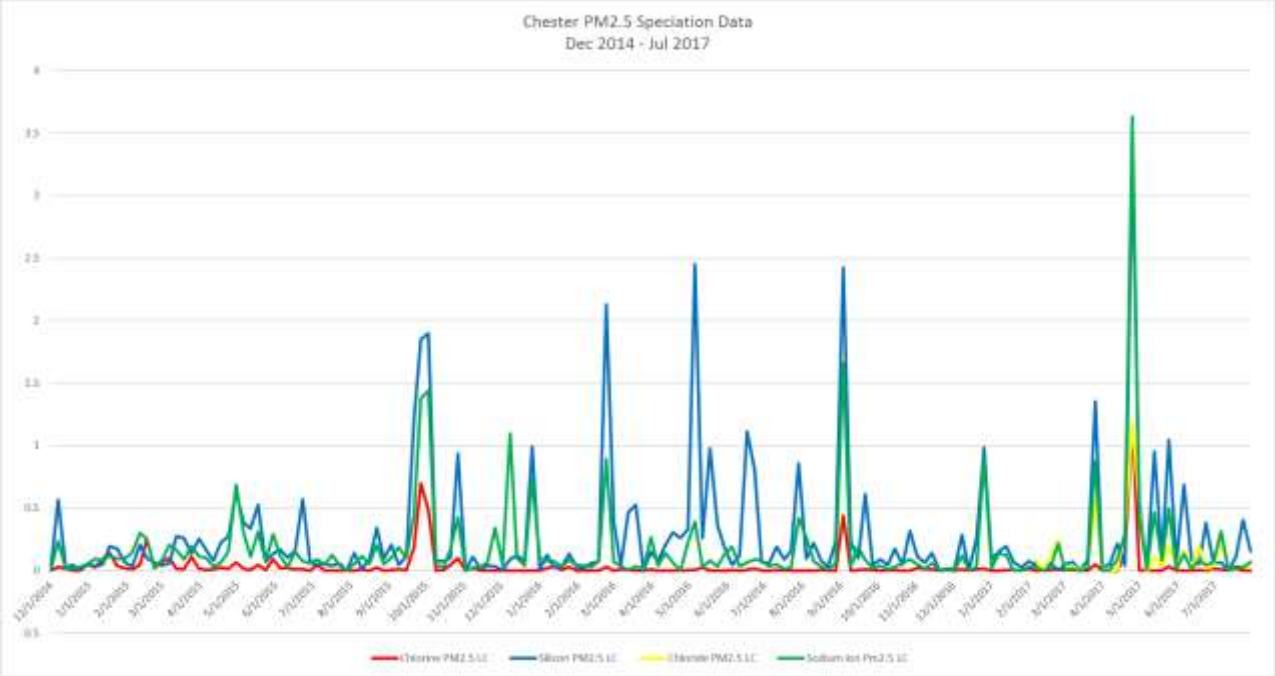
Figure 16. Location of the Chester Site and the Evonik Degussa and PQ Corporation Facilities

$PM_{2.5}$ and $PM_{2.5}$ speciation data was analyzed from the Chester monitoring site from December 2014 to July 2017 (quality assured $PM_{2.5}$ speciation data is only available up through the end of July 2017). The $PM_{2.5}$ speciation data is collected once every six days (1-in-6) and then analyzed by an EPA contracted lab. The Department analyzed the data after the data had been quality assured. When analyzing the data, the Department focused on the trace elements (the list of trace elements does not include sulfates, nitrates, elemental and organic carbon, and ammonium) of $PM_{2.5}$ that rose to levels above 0.5 $\mu g/m^3$ on at least one of the days during the analysis period. The four trace elements that rose to that level included the following:

1. Chloride (analysis began in 2017)
2. Chlorine
3. Silicon
4. Sodium ion

Figure 17 displays the trend of the four trace elements listed above at the Chester site.

Figure 17. Trend of Four Trace Elements of PM2.5 at Chester Site, Dec 2014 - Jul 2017



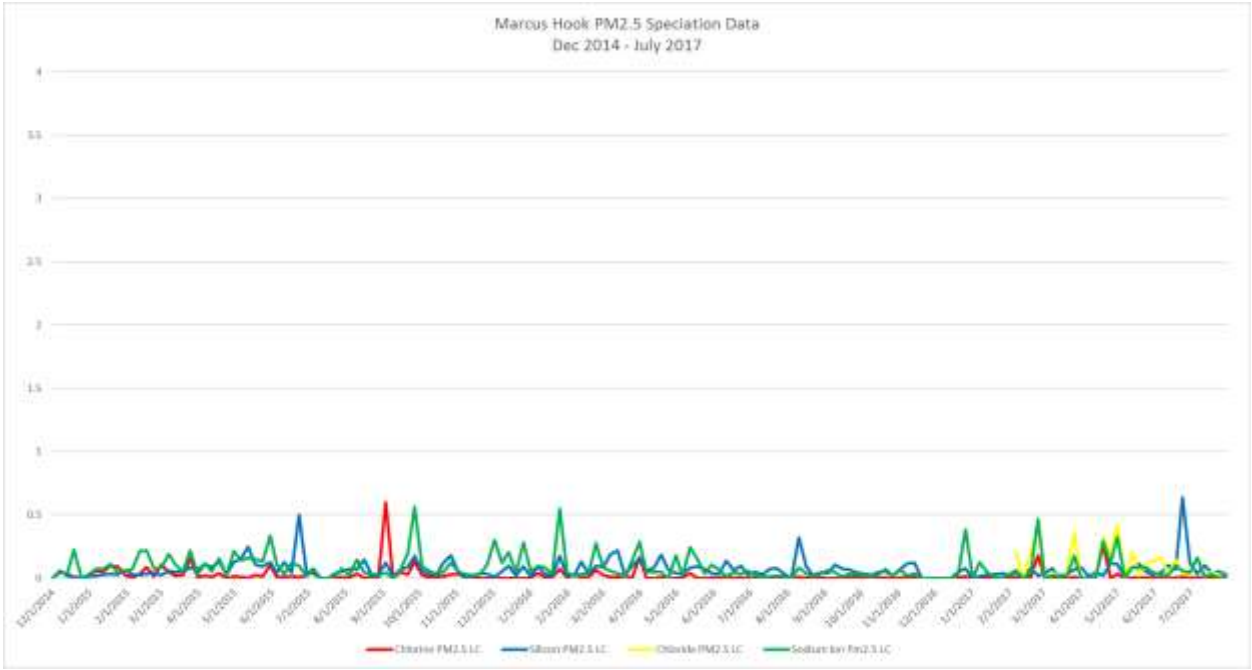
Of the four trace elements displayed in Figure 17, silicon was the highest trace element concentration for 120 out of 163 samples analyzed from December 2014 to July 2017. Silicon concentration reached above 0.5 µg/m^3 during 25 of these days. During at least half of the days that silicon spiked, so did the sodium ion. In addition, on several of the days, chlorine spiked along with silicon and the sodium ion. Once chloride began to be analyzed in 2017, chloride began to spike as silicon and the sodium ion rose.

In addition to the speciated $PM_{2.5}$ measurements at the Chester site, the Department was collecting $PM_{2.5}$ speciation data at its Marcus Hook site. A map illustrating the location of the Chester site with respect to the Marcus Hook site is found in Figure 18 below. The Chester and Marcus Hook monitoring sites are approximately 2.5 miles apart from one another.

Figure 18. Map of the Chester Site with Respect to the Marcus Hook Site

For purposes of comparison, the Department analyzed the same four trace elements outlined above from the speciated $PM_{2.5}$ data collected at the Marcus Hook site. Figure 19 below displays the trend in the four trace elements at the Marcus Hook site from December 2014 to July 2017.

Figure 19. Trend of Four Trace Elements of PM2.5 at Marcus Hook Site, Dec 2014 - Jul 2017



At the Marcus Hook site, there were only two days in which silicon concentration reached the 0.5 µg/m^3 threshold. In addition, chloride, chlorine, and the sodium ion concentrations spiked at various times during the period but never much above 0.5 µg/m^3. There definitely appears to be a different signal of the trace elements that influence $PM_{2.5}$ growth at Marcus Hook as compared to Chester.

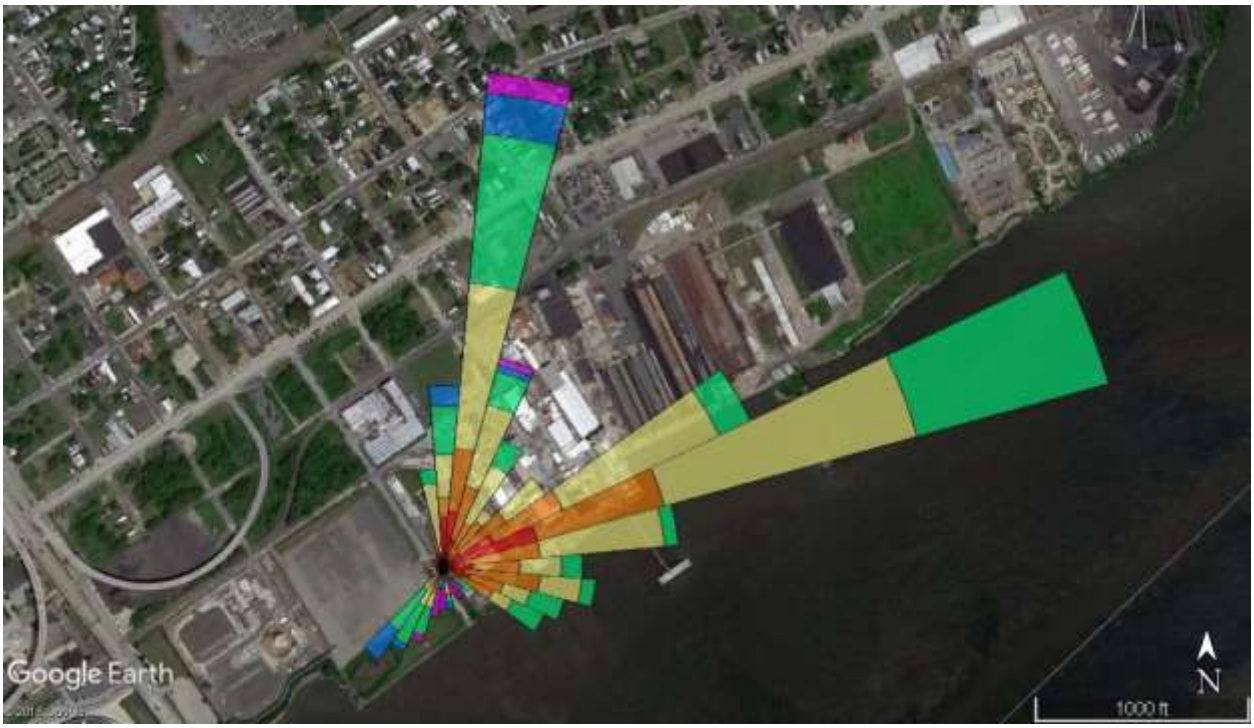
The 25 days in which silicon exceeded 0.5 µg/m^3 at the Chester site are outlined in Table 6 below. Of the 25 days, 22 days had valid 24-hour average $PM_{2.5}$ concentrations recorded with the Chester and Marcus Hook $PM_{2.5}$ monitors. The respective 24-hour average $PM_{2.5}$ concentrations are displayed in the table below for both the Chester and Marcus Hook sites. Of the 22 valid days, Chester's $PM_{2.5}$ concentration was higher on 16 days or approximately 73% of the time.

Table 6. Chester's and Marcus Hook's 24-Hour Average $PM_{2.5}$ Concentrations on Days When Silicon Exceeded 0.5 mg/m^3 at the Chester Site

Date	Chester 24-Hour $PM_{2.5}$ Concentrations (µg/m^3)	Marcus Hook 24-Hour $PM_{2.5}$ Concentrations (µg/m^3)
12/7/2014	11.2	#N/A
4/30/2015	9.8	11
5/18/2015	15.7	20.9
6/23/2015	10.2	#N/A
9/21/2015	7.4	5.1
9/27/2015	13.4	11.2
10/3/2015	9	1.6
10/27/2015	11.3	7.1
12/26/2015	11	9.2
2/24/2016	11.1	5.6
3/19/2016	5.5	2.9
5/6/2016	12.3	3.8
5/18/2016	16.1	8.2
6/17/2016	7.9	8.9
6/23/2016	8.3	11
7/29/2016	10.6	11
9/3/2016	22	8.1
9/21/2016	13.6	8.8
12/26/2016	15.7	11
3/26/2017	20.8	6.7
4/25/2017	19.6	3.4
5/1/2017	9	7.5
5/13/2017	8.2	1.6
5/25/2017	5.8	#N/A
6/6/2017	5.9	8.3

The 24-hour averaged $PM_{2.5}$ data and the $PM_{2.5}$ speciation data at the Marcus Hook and Chester sites illustrate that there are local sources that are impacting the Chester monitoring site. To discern the potential location of the sources, the Department analyzed the meteorological data, specifically wind speed and wind direction, at the Chester site on the days when the silicon reached at least the 0.5 µg/m^3 threshold. A wind rose was then developed to signify the direction and the magnitude the wind was blowing on the days which had silicon rise above 0.5 µg/m^3. Figure 20 displays the wind rose superimposed on a map of the Chester site and respective local sources.

Figure 20. Wind Rose on Days When Silicon Exceeded 0.5 mg/m^3 at the Chester Site



Primarily, the wind was blowing out of the north or out of the east during hours when the daily silicon concentration reached above 0.5 µg/m^3. As referenced in Figure 16, the Chester site is situated to the south and west of the Evonik Degussa and PQ Corporation facilities. Since the wind is blowing directly over both facilities during the days when silicon is spiking, the two facilities are likely sources of the silicon. After reviewing the corporate websites of both facilities (Evonik Degussa and PQ Corporation), the Department was able to ascertain that both facilities develop various types of silica and silicate. In some cases, the silicate is combined with sodium to form both sodium silicate liquids and solids. Figure 17 illustrates the various spikes of sodium that coincide with the spikes in silicon at the Chester site.

To that end, since the intent of the Chester $PM_{2.5}$ monitoring site was to monitor the impacts of $PM_{2.5}$ in the community of Chester and not of one or two facilities in the Chester area, the Department is proposing to discontinue its $PM_{2.5}$ monitoring site (both its continuous and speciation monitors) at the Chester site and making the Marcus Hook its permanent $PM_{2.5}$ site in eastern Delaware County. The discontinuation of the Chester $PM_{2.5}$ speciation monitor will allow the Department to site a $PM_{2.5}$ speciation monitor at its Lebanon monitoring site.

Modifications to the Air Toxics Network

1) Relocate VOC sampling from Springville (Susquehanna County) to New Milford (Susquehanna County) and add Carbonyl sampling
2) Relocate VOC sampling from Mehoopany (Wyoming County) to Tunkhannock (Wyoming County) and add Carbonyl sampling
3) Install VOC and Carbonyl sampling at Uniontown (Fayette County) monitoring station.
4) Discontinuing the Mercury sampler at the Lancaster site

PA DEP plans to install toxic monitoring for VOC using U.S. EPA Method TO-15 and Carbonyl using U.S. EPA Method 8315A at New Milford, Tunkhannock and Uniontown. These three new sites are part of PA DEP's monitoring network expansion in regions impacted by shale gas activity. Maps and further information of the new site locations are located in "Current Deployment of $PM_{2.5}$ Monitoring Sites." The current monitoring locations in Susquehanna and Wyoming Counties are unable to support additional monitoring equipment. Therefore, VOC sampling will be relocated from these current locations to the new site locations as part of an expanded suite of monitored pollutants.

The Department has operated a Tekran Mercury monitor at the Lancaster site since 1999. This equipment has reached the end of its service life and is not currently scheduled to be replaced. In the future the Department will evaluate continuing to operate mercury monitoring equipment at the Lancaster or other ambient air quality monitoring site.

Enhanced Monitoring Plan

40 CFR Part 58, Appendix D, Section 5(h), states the following:

"[s]tates with Moderate and above 8-hour O_3 nonattainment areas and states in the Ozone Transport Region as defined in 40 CFR 51.900 shall develop and implement an Enhanced Monitoring Plan (EMP) detailing enhanced O_3 and O_3 precursor monitoring activities to be performed. The EMP shall be submitted to the EPA Regional Administrator no later than October 1, 2019 or two years following the effective date of a designation to an O_3 nonattainment classification of "moderate" or above, whichever is later. At a minimum, the EMP shall be reassessed and approved as part of the 5-year network assessments required under 40 CFR 58.10(d). The EMP will include monitoring activities deemed important to understanding the O_3 problems in the state. Such activities may include, but are not limited to, the following:

(1) Additional O_3 monitors beyond the minimally required under paragraph 4.1 of this appendix,
(2) Additional NO_X or NO_y monitors beyond those required under 4.3 of this appendix,
(3) Additional speciated VOC measurements including data gathered during different periods other than required under paragraph 5(g) of this appendix, or locations other than those required under paragraph 5(a) of this appendix, and
(4) Enhanced upper air measurements of meteorology or pollution concentrations."

On April 30, 2018, EPA designated five counties within PA as being "marginal" nonattainment with respect to the 2015 ozone NAAQS. The five counties of Bucks, Chester, Delaware, Montgomery, and Philadelphia, encompasses the Philadelphia region. Even though the one nonattainment area in PA was

not classified as being in "moderate" nonattainment, PA DEP is outlining its initial plans for its Enhanced Monitoring Plan. Those plans include the following:

1. Continue to monitor ozone year-round at all locations where ozone is currently being monitored under the Department's jurisdiction
2. Continue to monitor NOx year-round at all locations where NO_2 is currently being monitored under the Department's jurisdiction
3. Continue to monitor speciated VOC measurements year-round (1-in-6 day sampling) at all locations where VOCs are being monitored under the Department's jurisdiction.

As referenced above, PA DEP's current activities of continuing to monitor ozone, NO_2 and VOCs year-round will satisfy the recommendation of activities as outlined in 40 CFR 58, Appendix D, Section 5(h). Any additional activities the PA DEP pursues in relation with its development of the EMP will be outlined in its 2019 Annual Ambient Air Monitoring Network Plan.

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 Teledyne Model 602 BetaPLUS 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 187 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 CBSA and Non-CBSA Region

Appendix B of this document displays maps of monitoring network sites organized by Core-Based Statistical Area (CBSA) regions, as described in the "Description of PA DEP's Ambient Air Monitoring Network" section of this document. CBSA are listed in alphabetical order, by type. Metropolitan Statistical Areas (MSAs) are listed first, followed by Micropolitan statistical Areas (Micro Areas) and non-CBSA regions. Table B-1. Core-Based Statistical Areas and Pennsylvania Counties below lists the CBSAs and non-CBSA regions, in order of presentation, along with their component Pennsylvania counties. Note that areas listed in Table B-1. Core-Based Statistical Areas and Pennsylvania Counties, but not included in the following maps, do not contain monitoring sites operated by PA DEP.

Table B-1. Core-Based Statistical Areas and Pennsylvania Counties

CBSA Name	County (Pennsylvania Portion)
Metropolitan Statistical Areas (MSA)	
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
Micropolitan Statistical Areas	
Bradford, PA Micropolitan Area	McKean
DuBois, PA Micropolitan Area	Clearfield
Huntingdon, PA Micropolitan Area	Huntingdon
Indiana, PA Micropolitan Area	Indiana
Lewisburg, PA Micropolitan Area	Union

CBSA Name	County (Pennsylvania Portion)
Lewistown, PA Micropolitan Area	Mifflin
Lock Haven, PA Micropolitan Area	Clinton
Meadville, PA Micropolitan Area	Crawford
New Castle, PA Micropolitan Area	Lawrence
Oil City, PA Micropolitan Area	Venango
Pottsville, PA Micropolitan Area	Schuylkill
Sayre, PA Micropolitan Area	Bradford
Selinsgrove, PA Micropolitan Area	Snyder
Somerset, PA Micropolitan Area	Somerset
St. Marys, PA Micropolitan Area	Elk
Sunbury, PA Micropolitan Area	Northumberland
Warren, PA Micropolitan Area	Warren
Non-CBSA Regions	
Northcentral Non-CBSA Region	Cameron, Potter, Sullivan, Tioga
Northeast Non-CBSA Region	Susquehanna, Wayne
Northwest Non-CBSA Region	Clarion, Forest, Jefferson
Southcentral Non-CBSA Region	Bedford, Fulton, Juniata
Southwest Non-CBSA Region	Greene

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

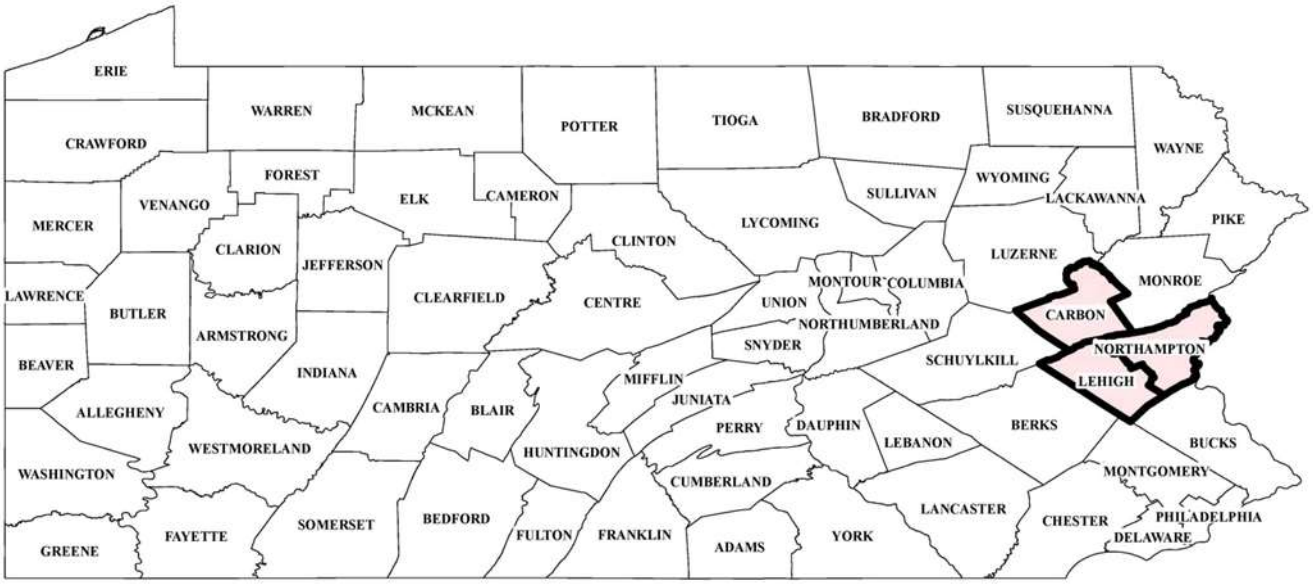


Figure B-2. Allentown-Bethlehem-Easton, PA-NJ MSA (Pennsylvania portion) Site Detail

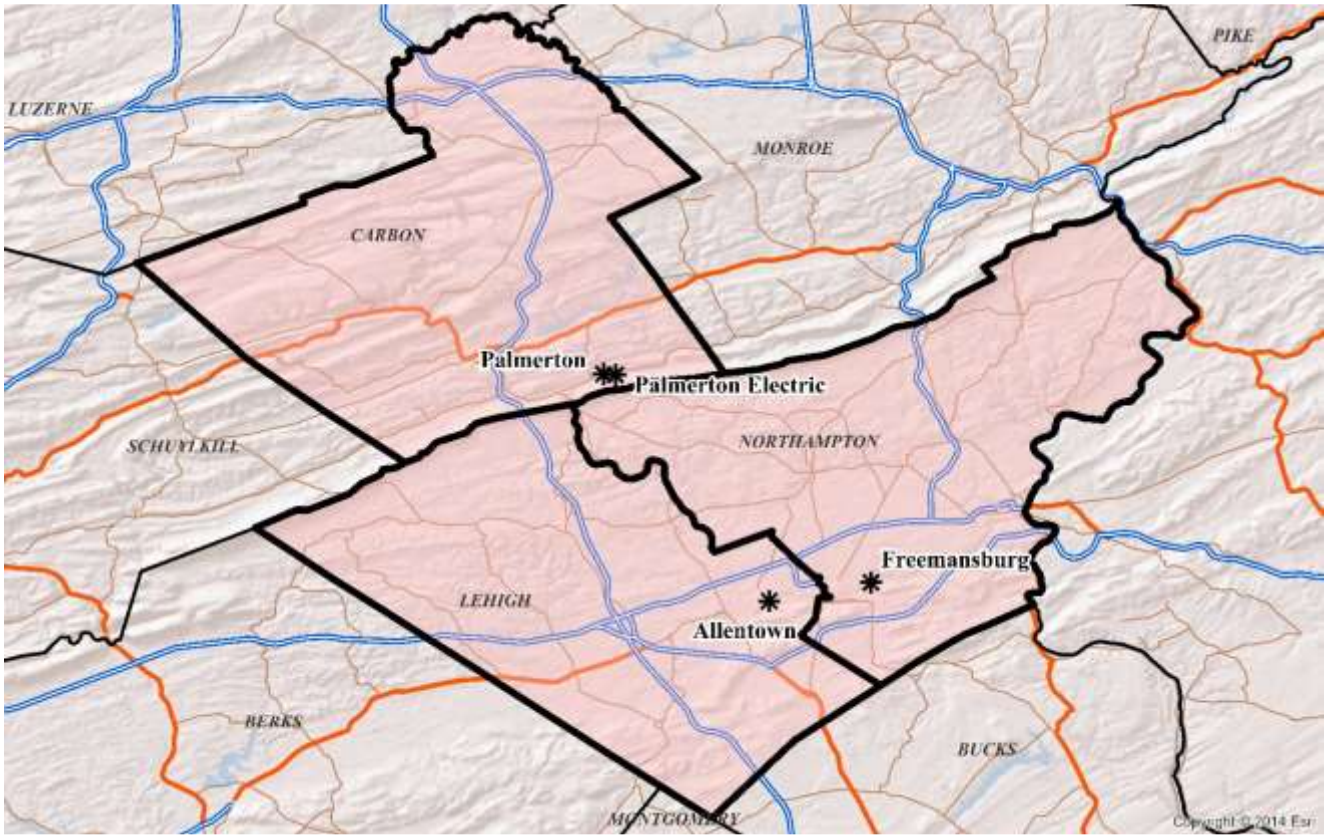


Figure B-3. Altoona, PA MSA

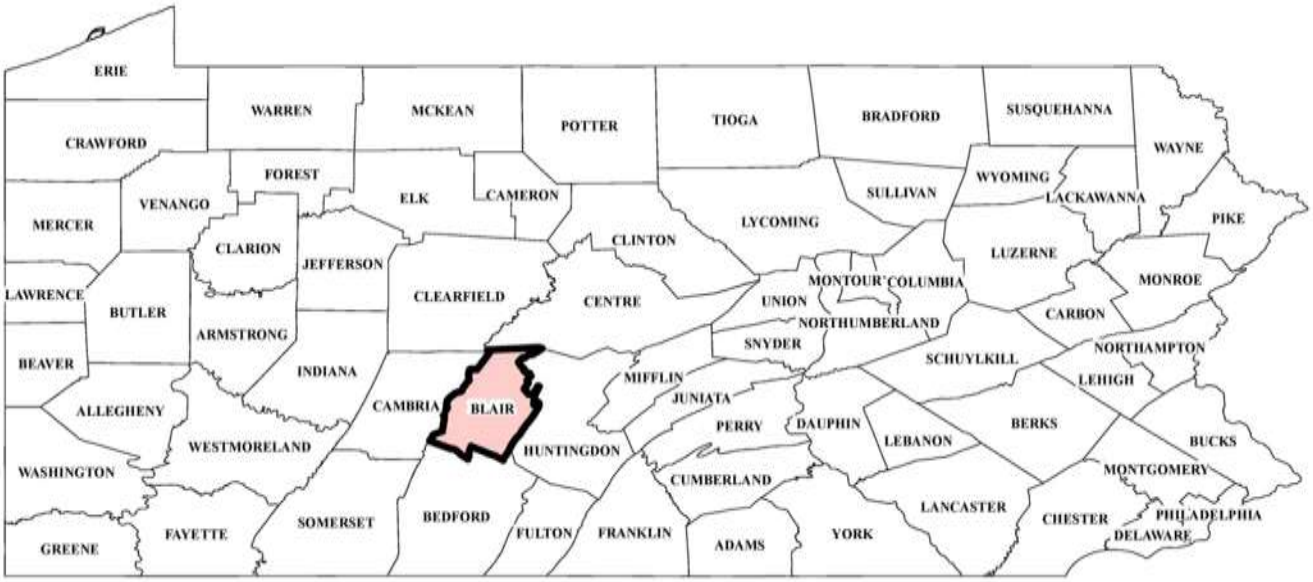


Figure B-4. Altoona, PA MSA Site Detail

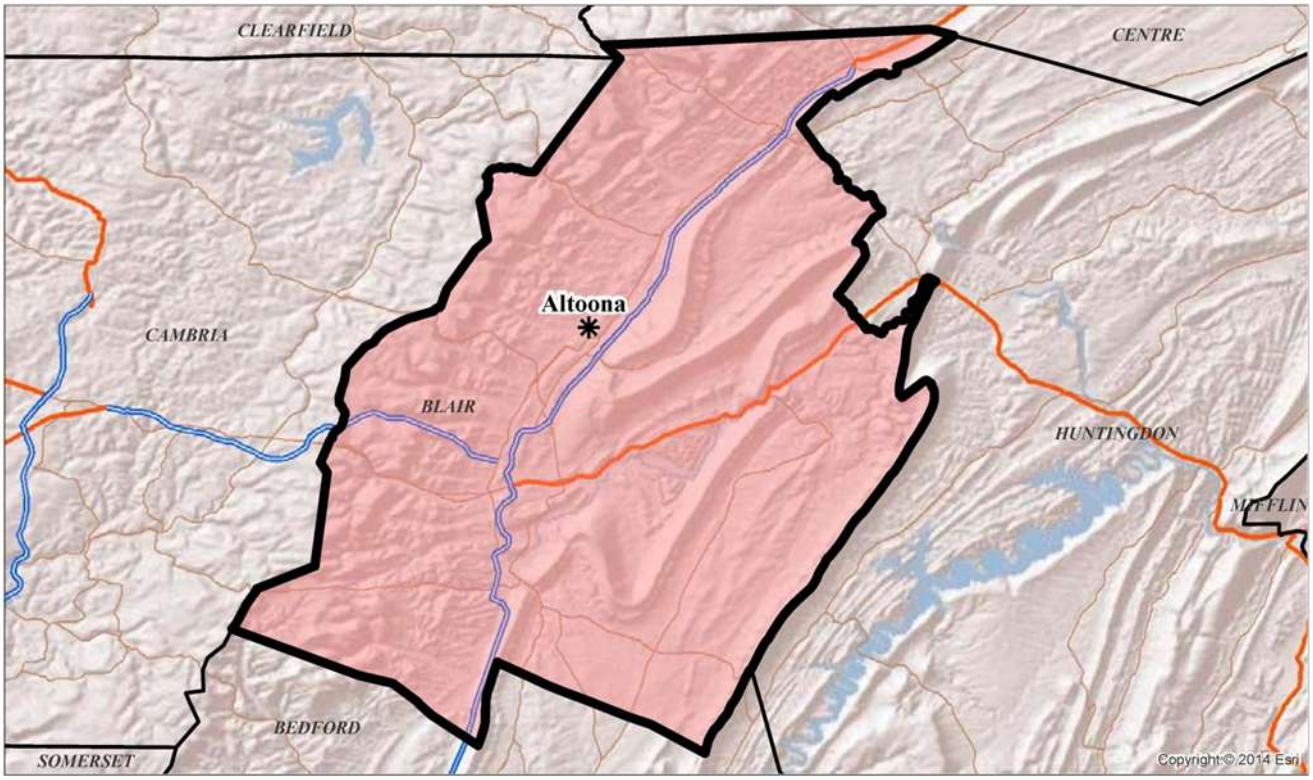


Figure B-5. Chambersburg-Waynesboro, PA MSA

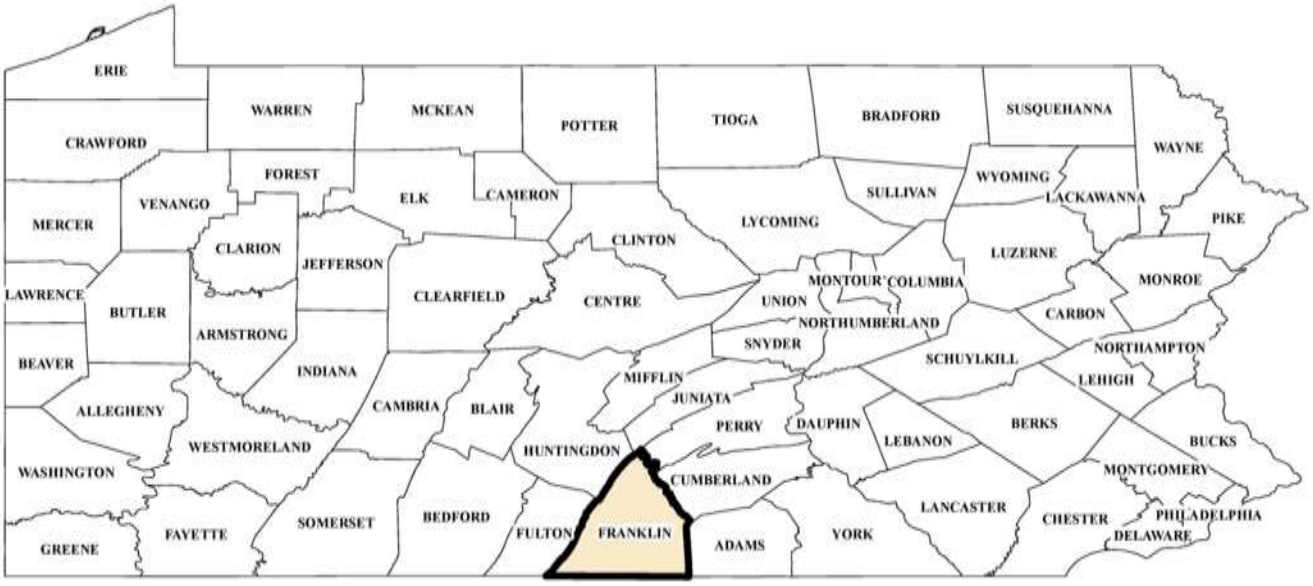


Figure B-6. Chambersburg-Waynesboro, PA MSA Site Detail

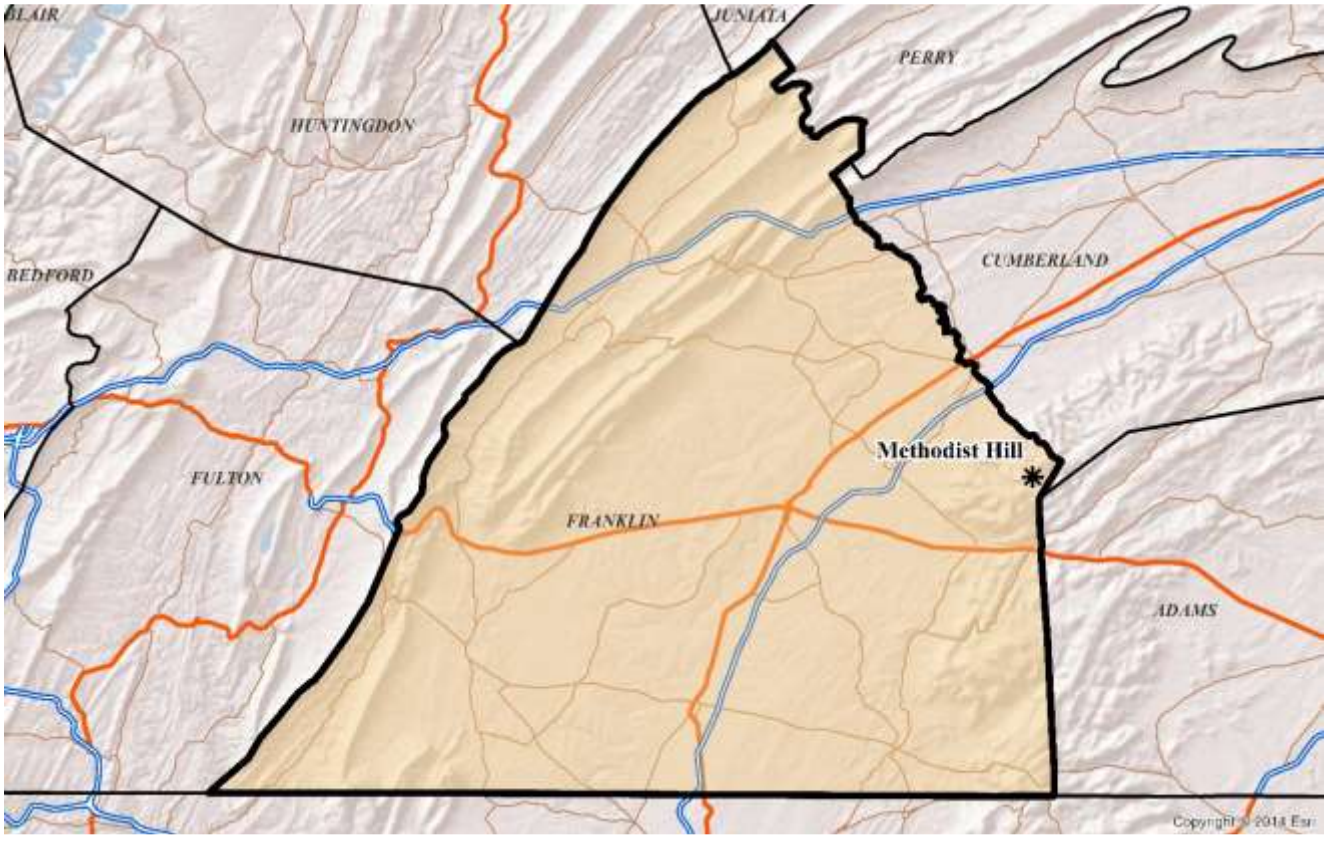


Figure B-7. East Stroudsburg, PA MSA

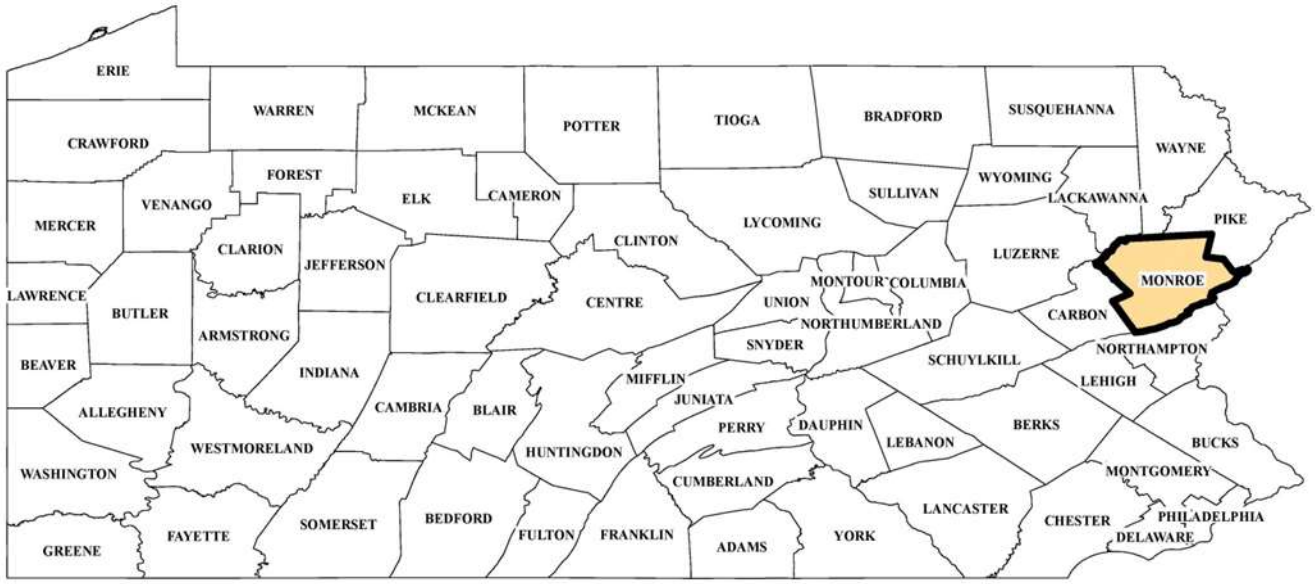


Figure B-8. East Stroudsburg, PA MSA Site Detail

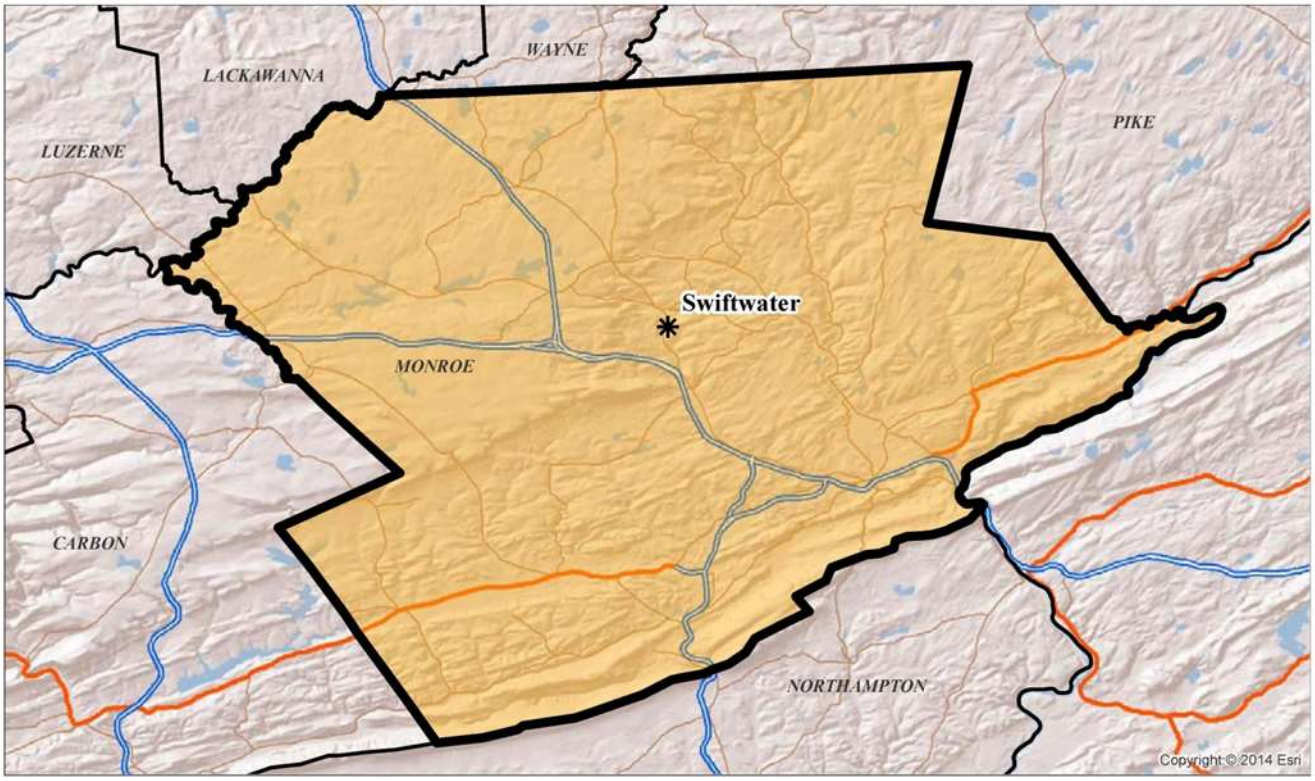


Figure B-9. Erie, PA MSA

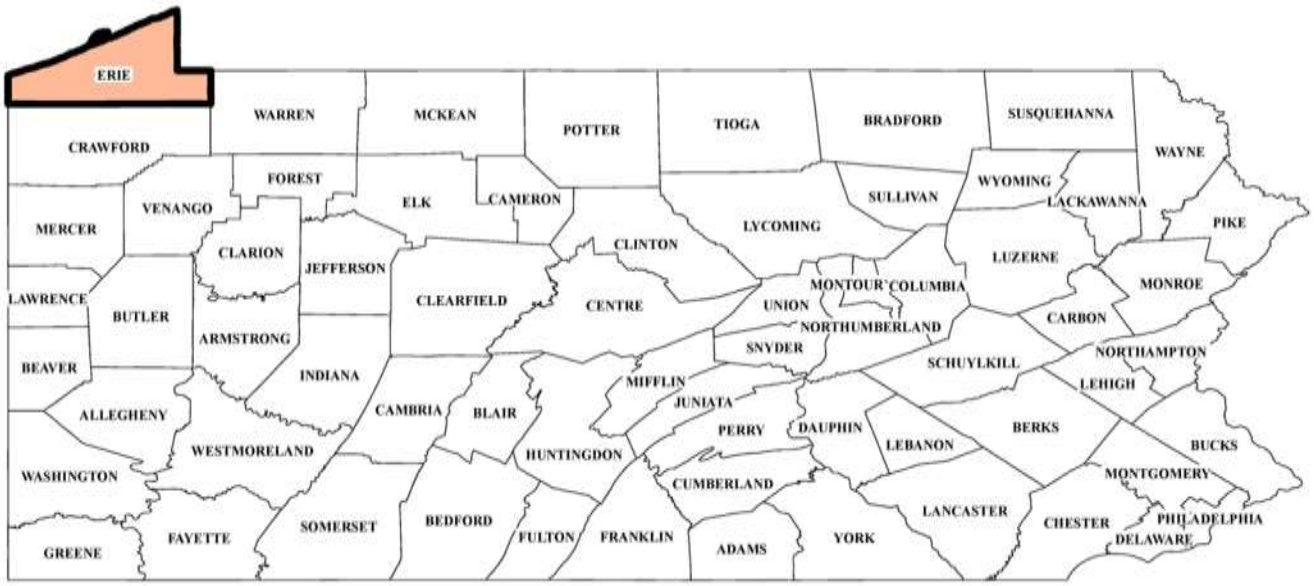


Figure B-10. Erie, PA MSA Site Detail

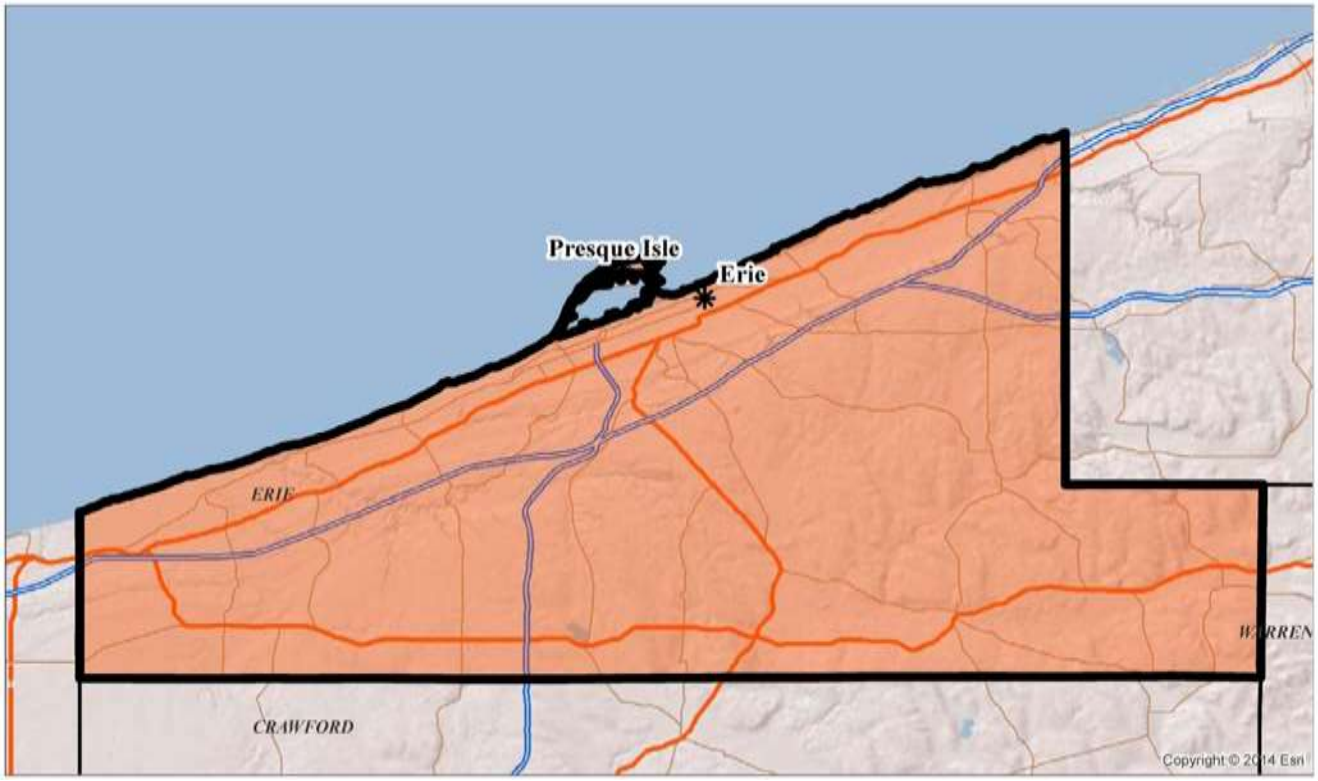


Figure B-11. Gettysburg, PA MSA

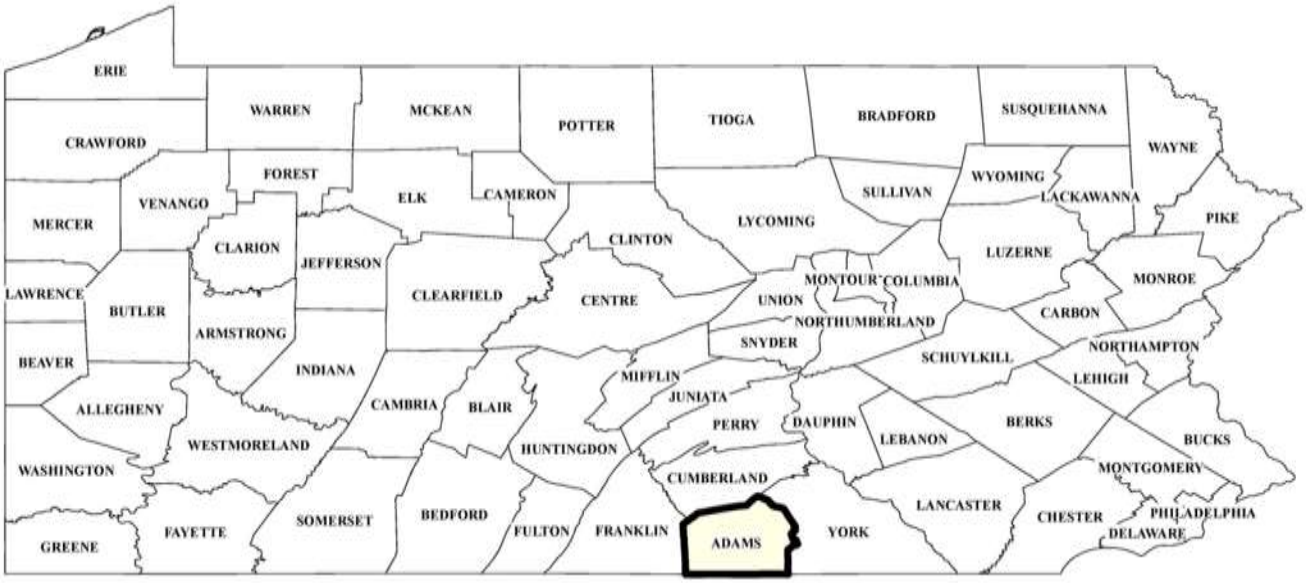


Figure B-12. Gettysburg, PA MSA Site Detail

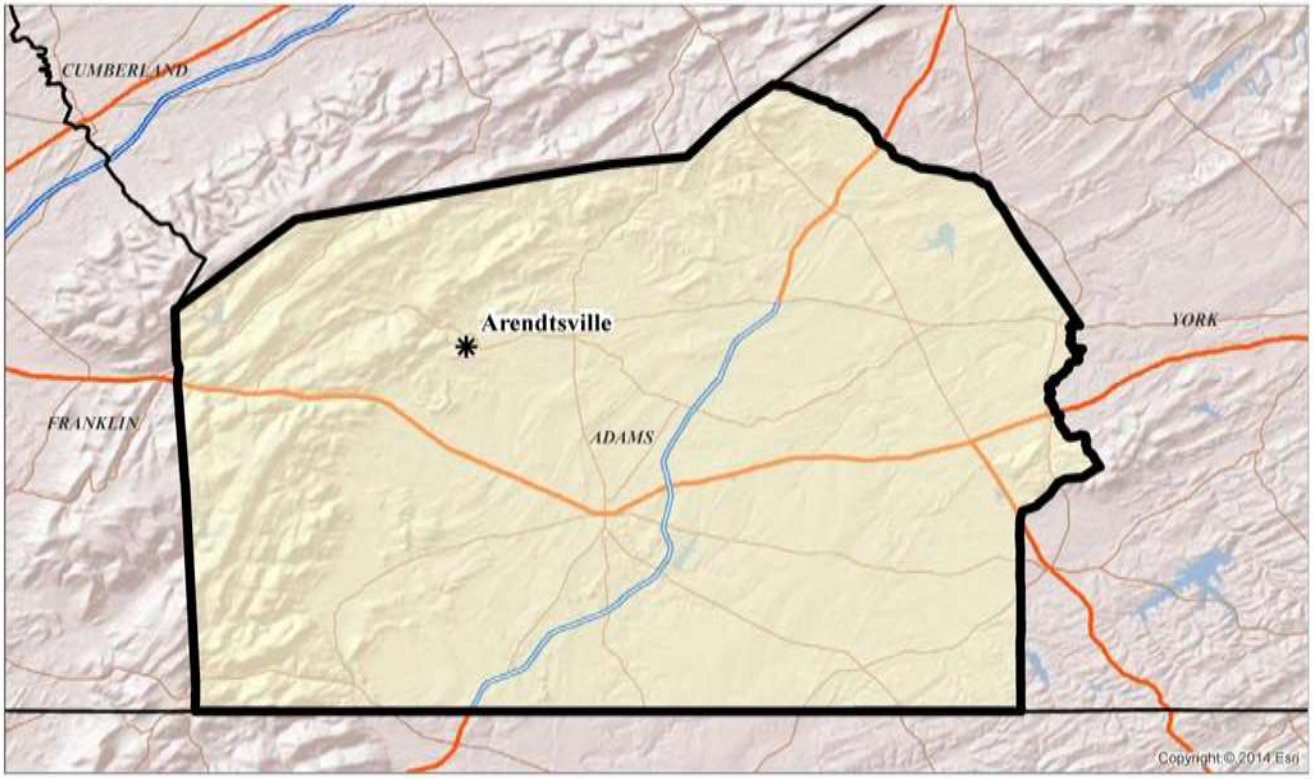


Figure B-13. Harrisburg-Carlisle, PA MSA

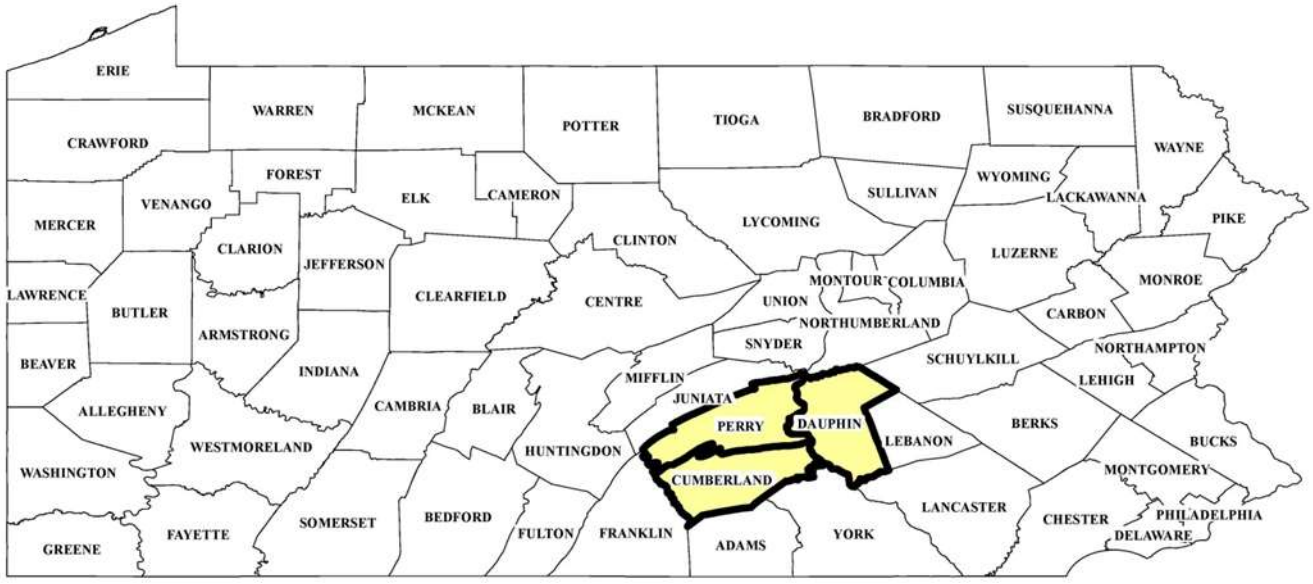


Figure B-14. Harrisburg-Carlisle, PA MSA Site Detail

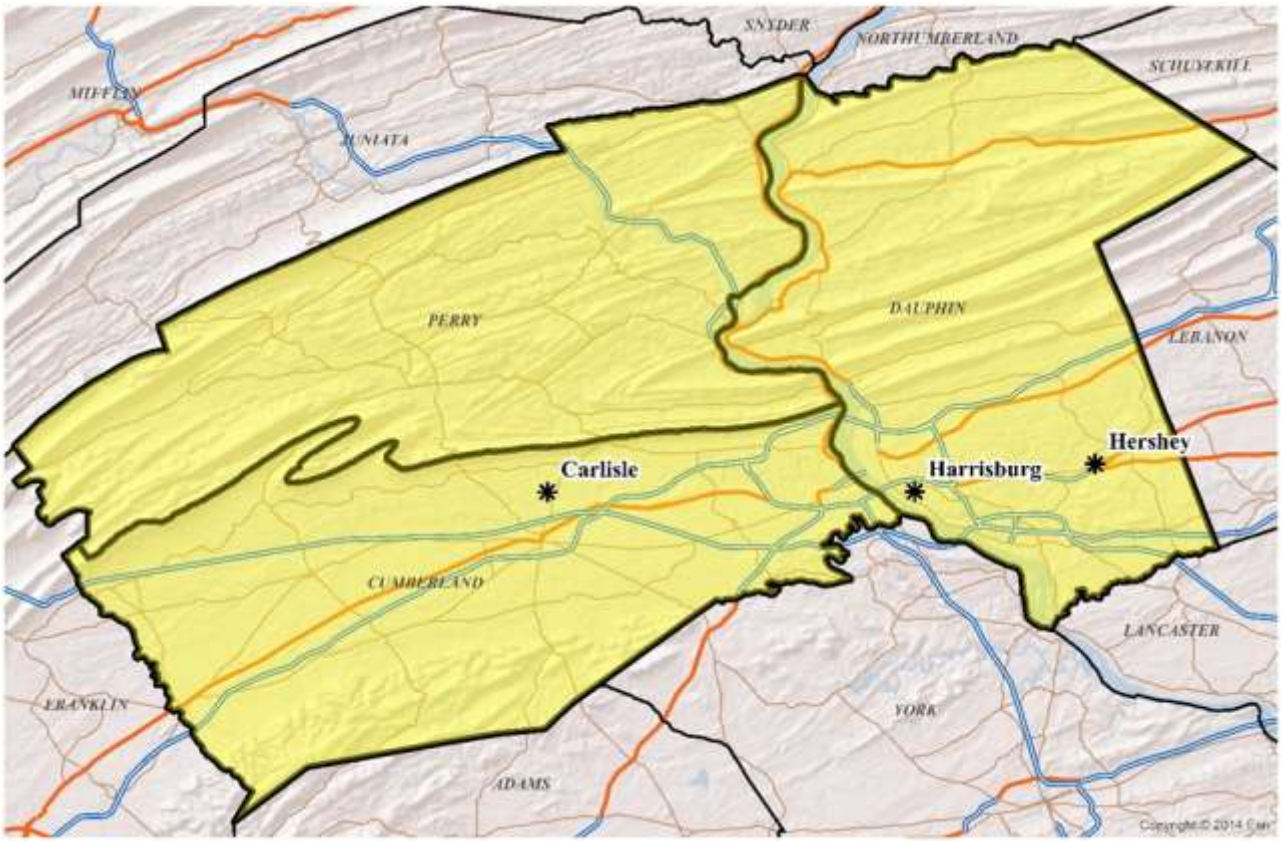


Figure B-15. Johnstown, PA MSA

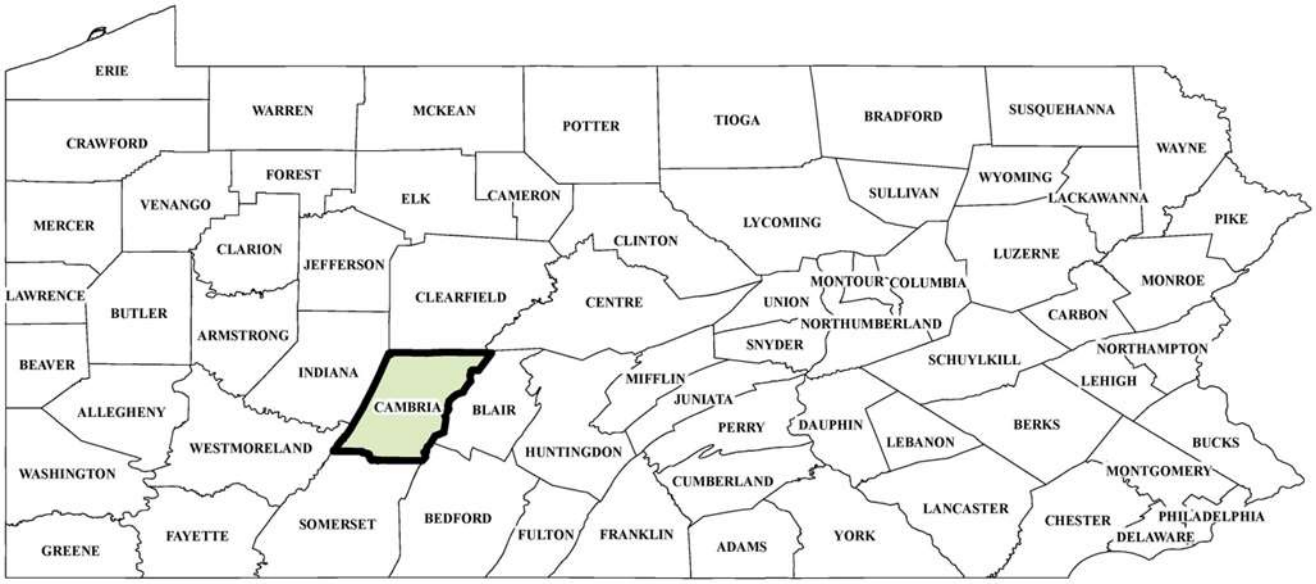


Figure B-16. Johnstown, PA MSA Site Detail

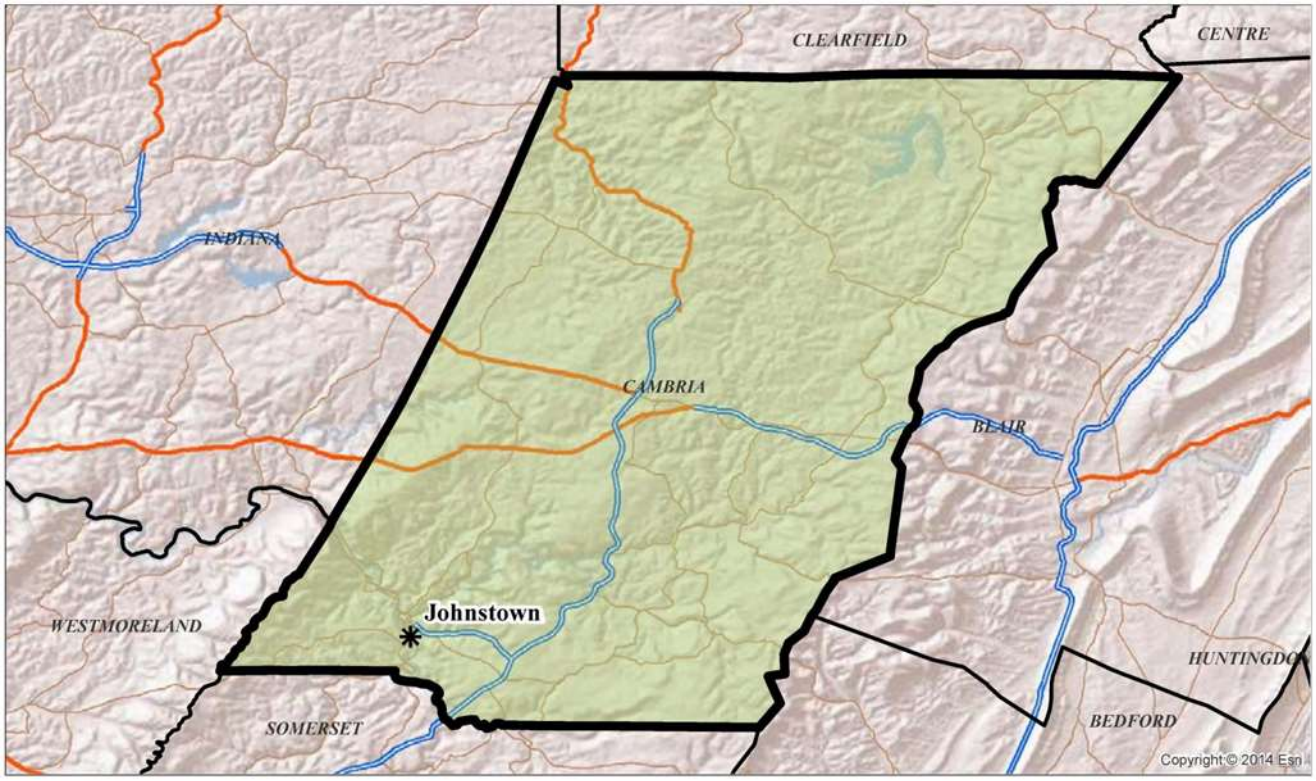


Figure B-17. Lancaster, PA MSA

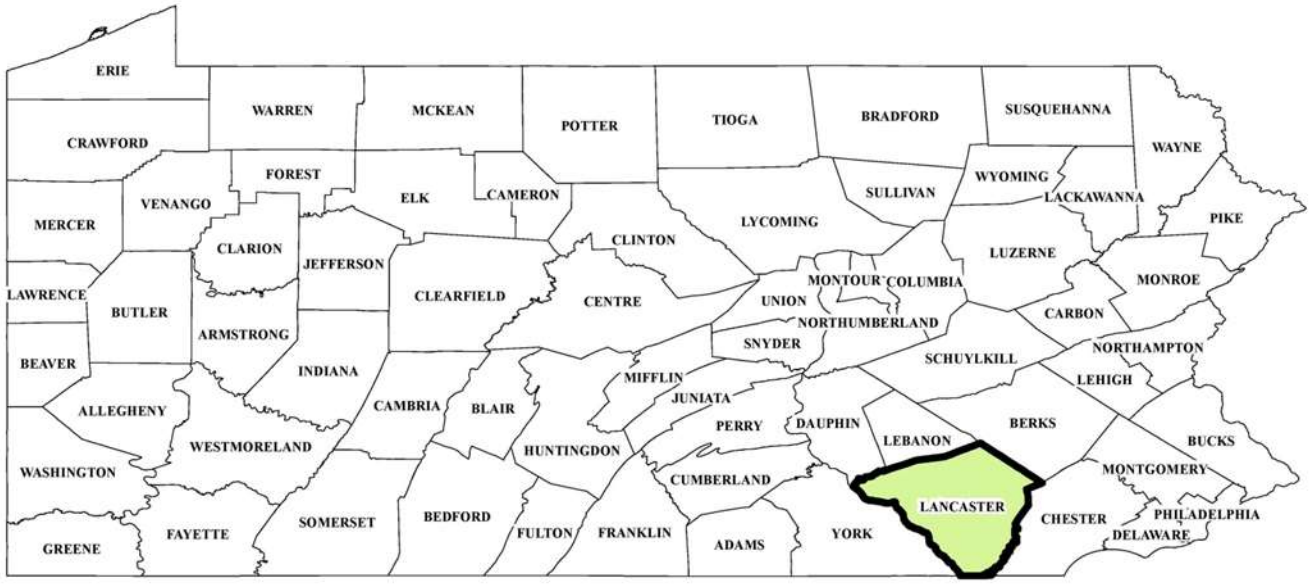


Figure B-18. Lancaster, PA MSA Site Detail

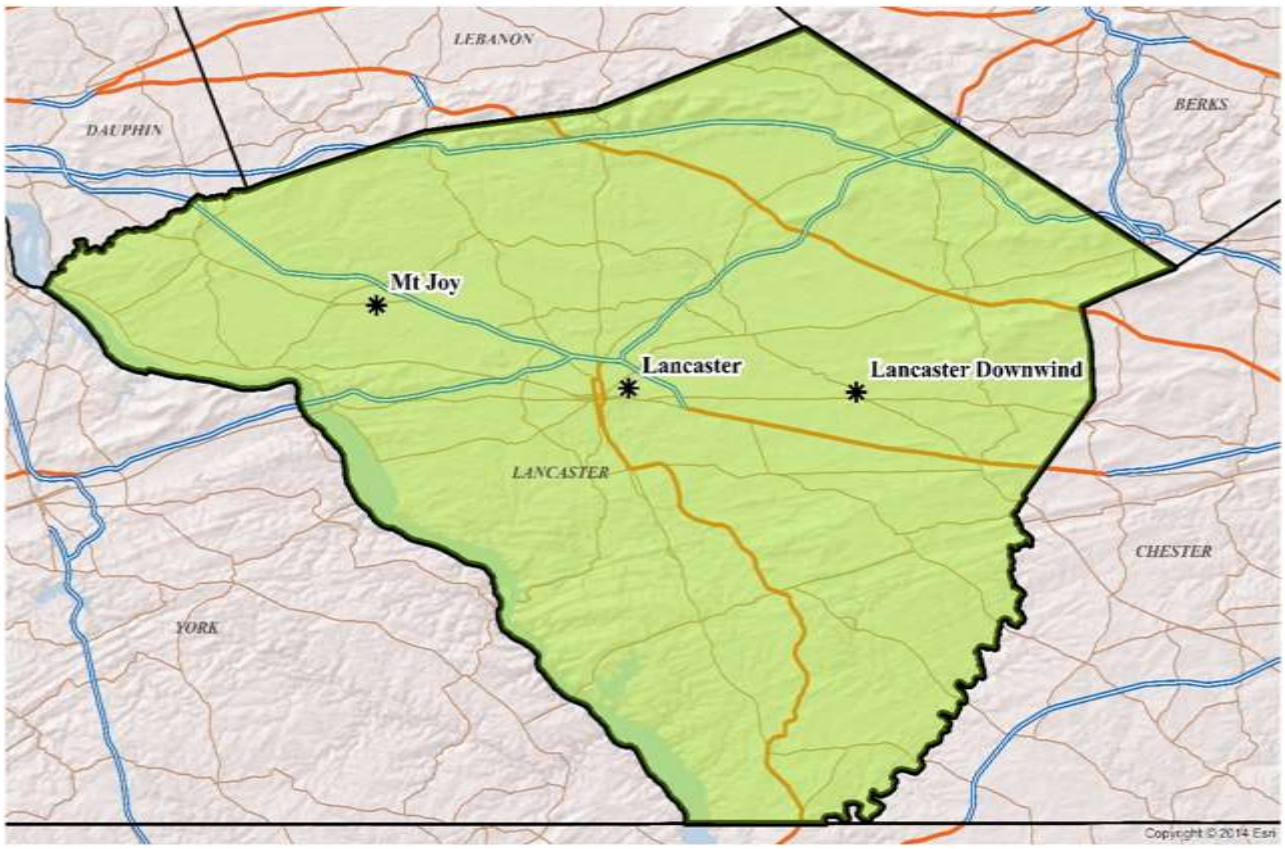


Figure B-19. Lebanon, PA MSA

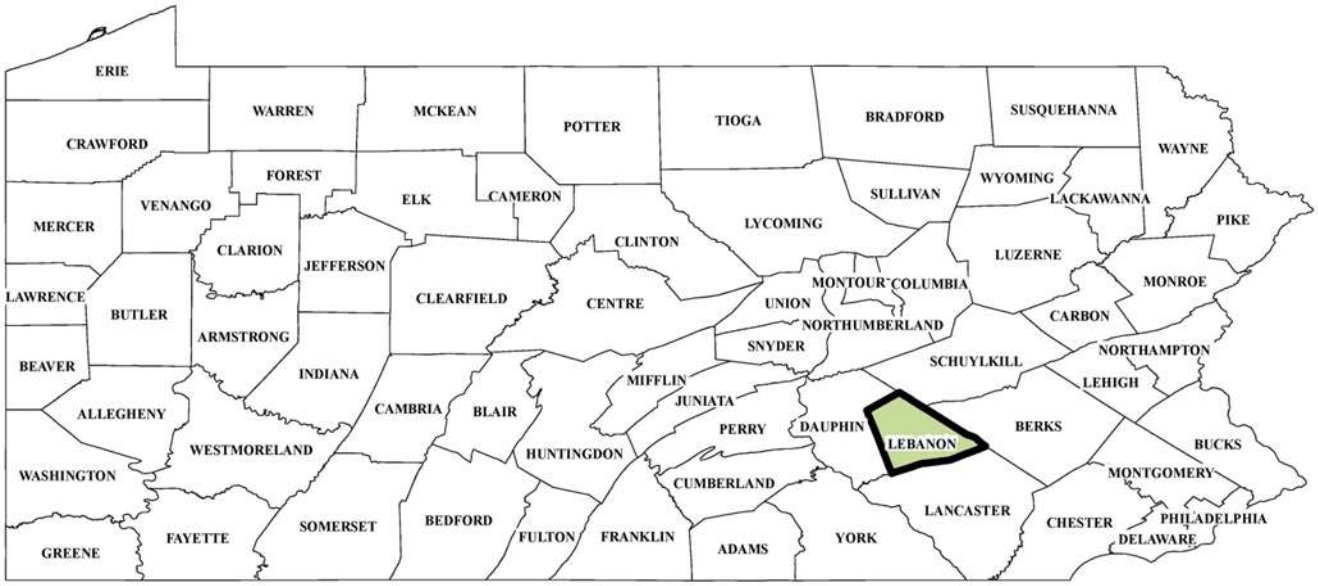


Figure B-20. Lebanon, PA MSA Site Detail

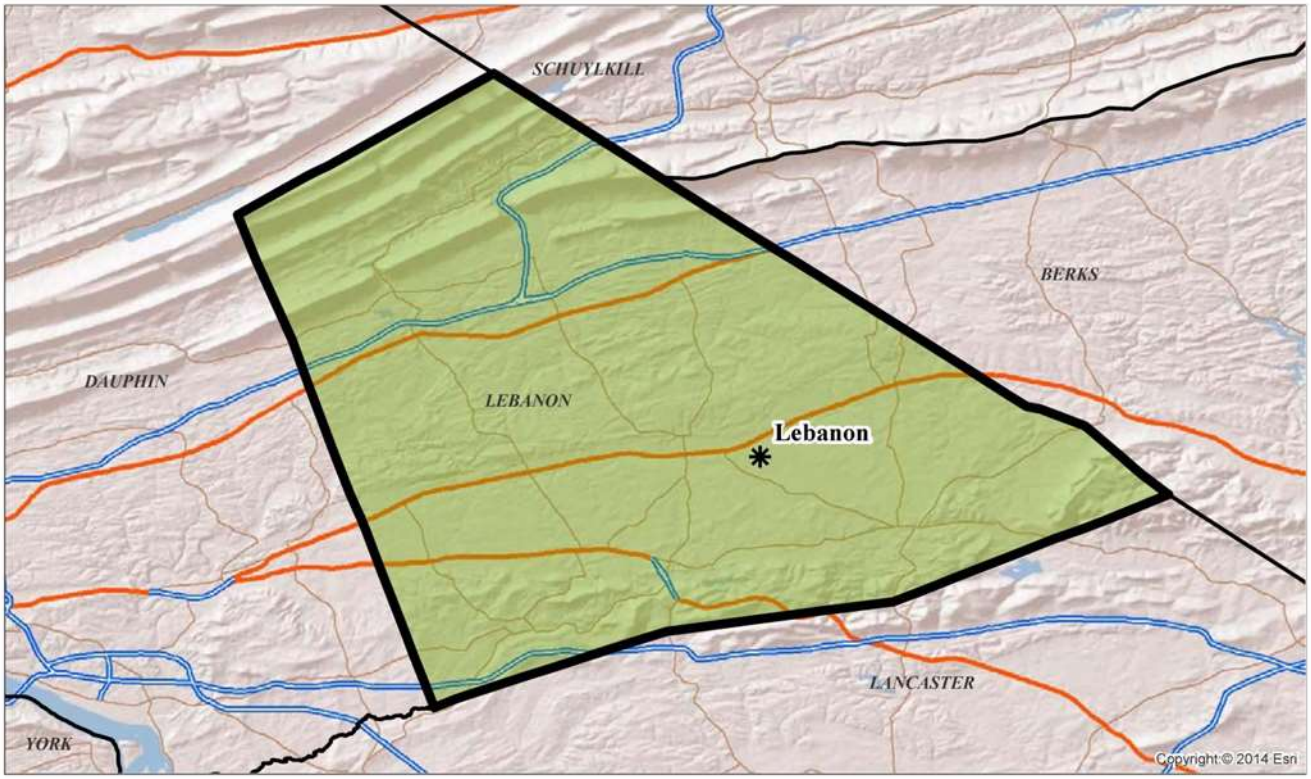


Figure B-21. Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA (Pennsylvania portion)

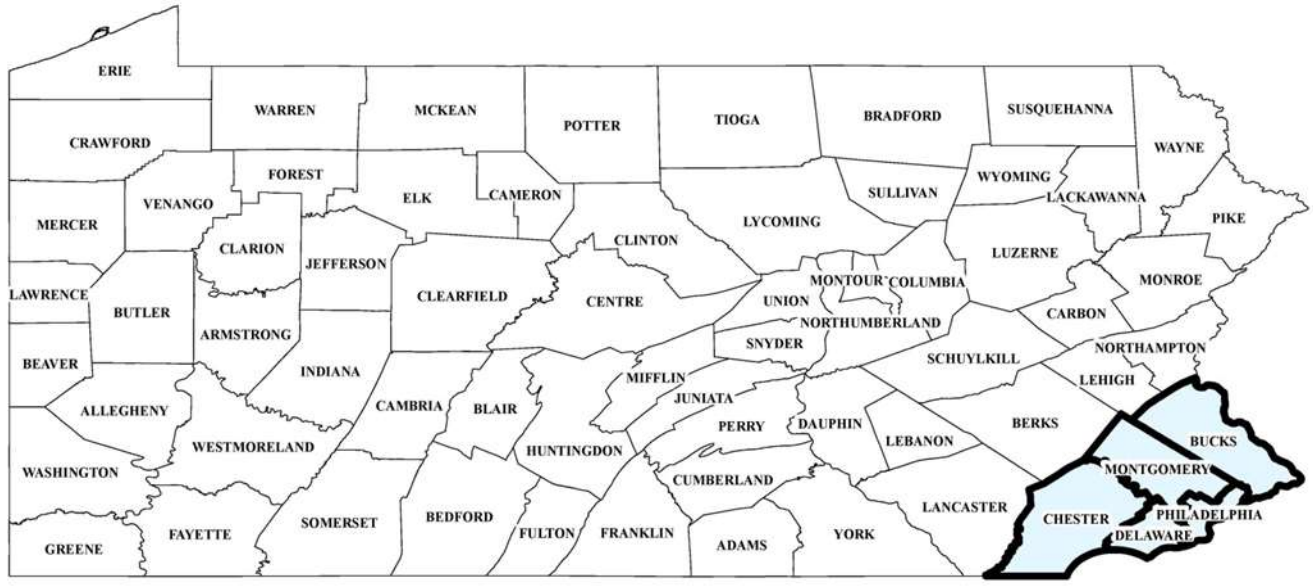


Figure B-22. Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA (Pennsylvania portion) Site Detail

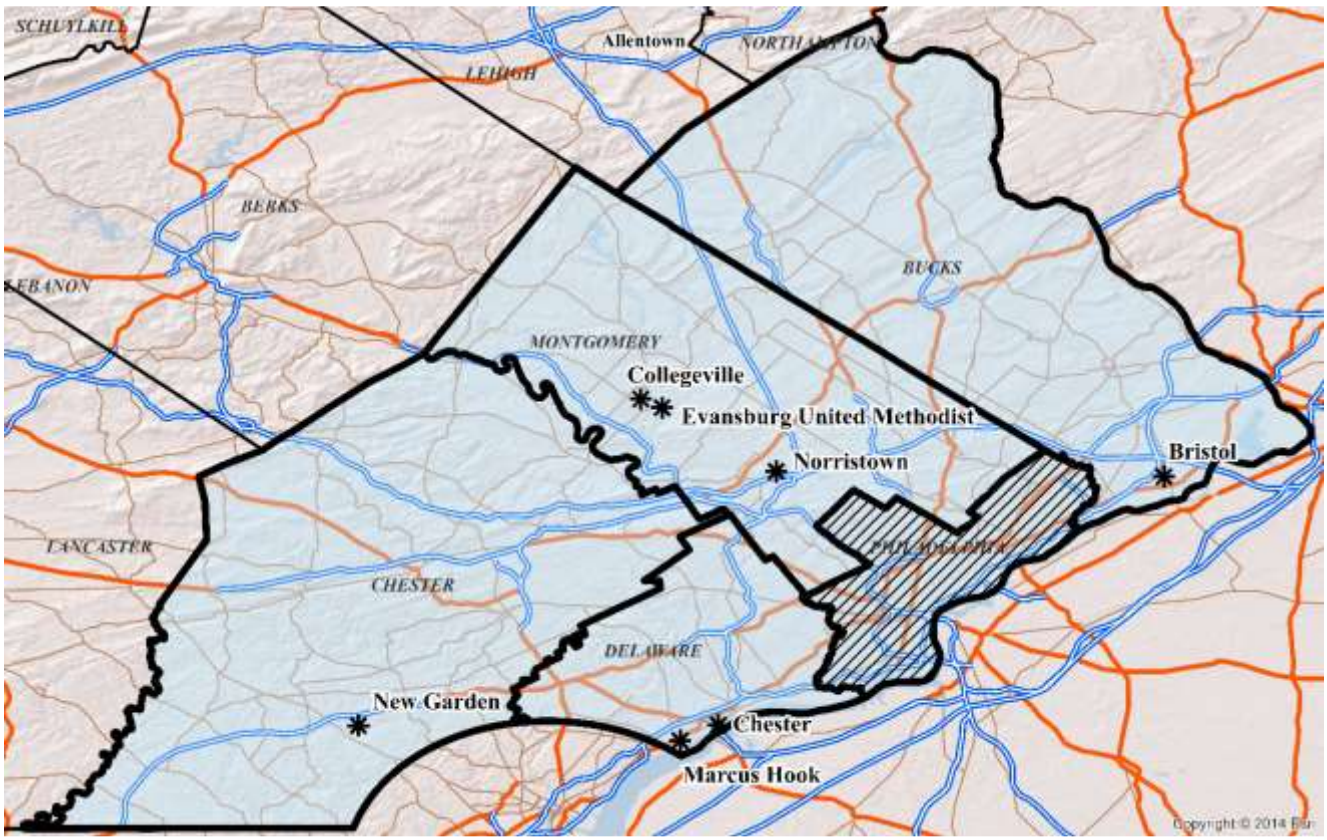


Figure B-23. Pittsburgh, PA MSA

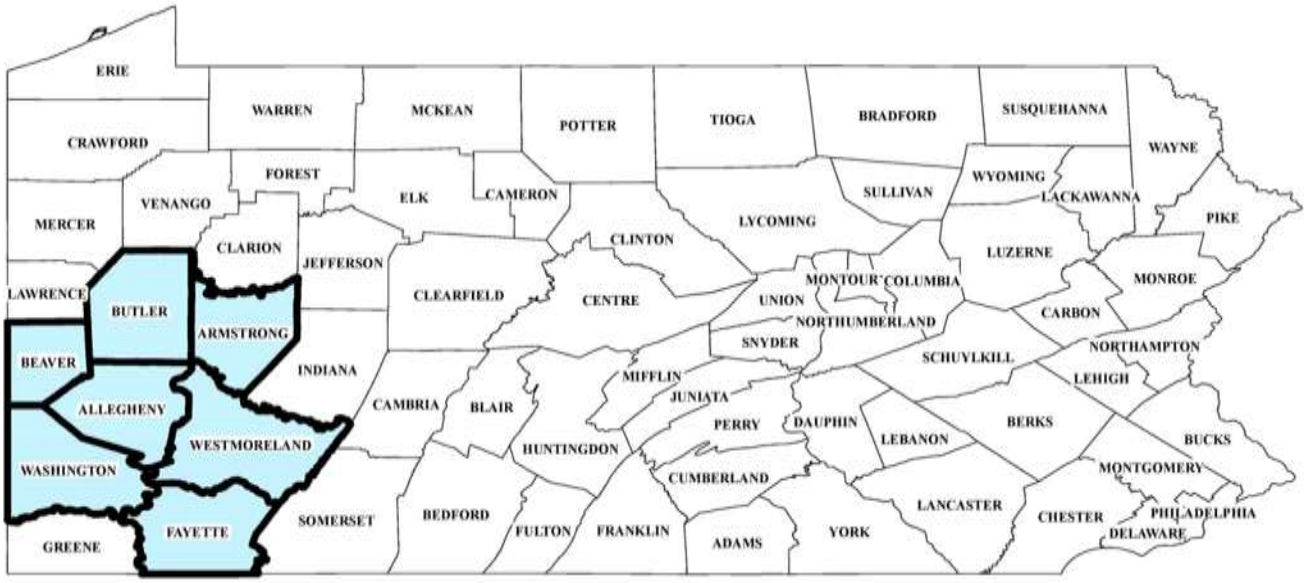


Figure B-24. Pittsburgh, PA MSA Site Detail

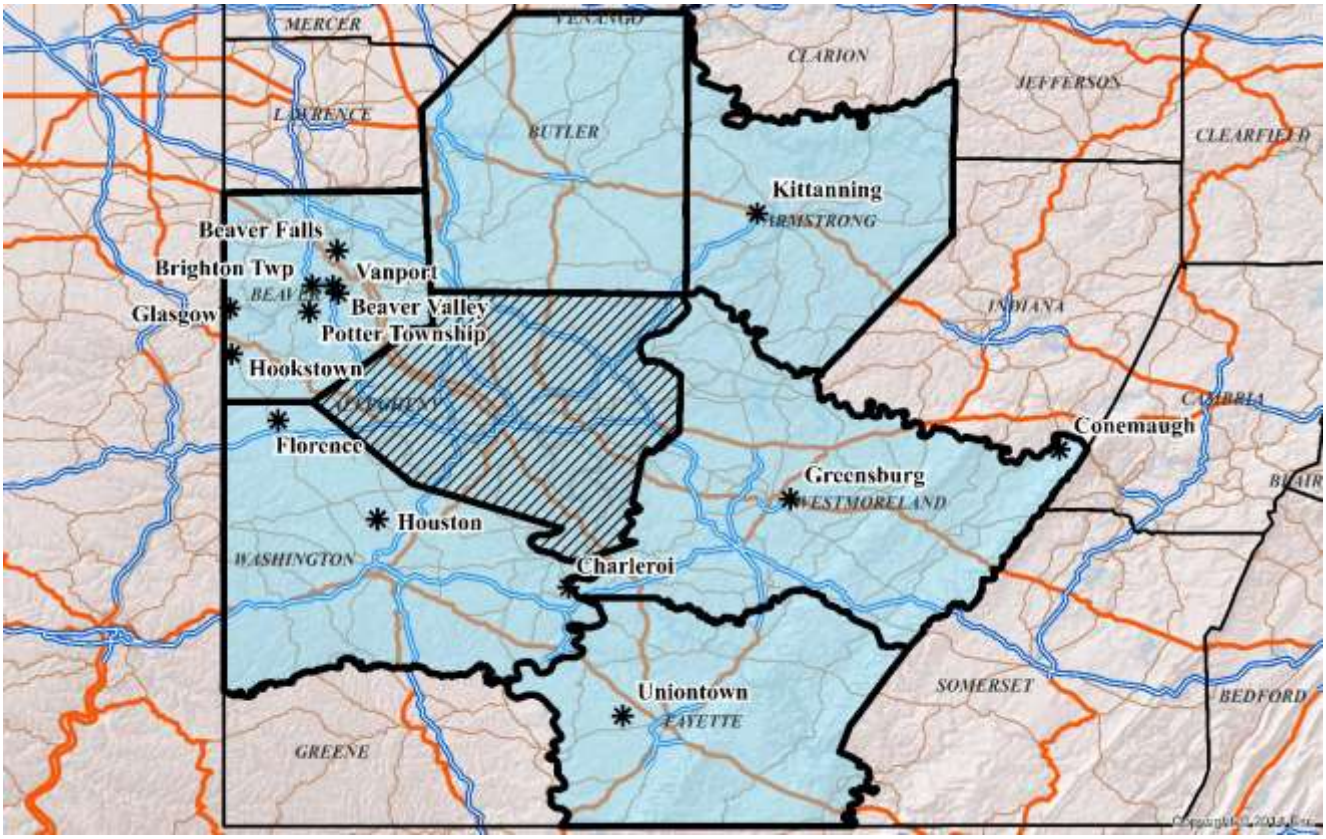


Figure B-25. Reading, PA MSA Overview

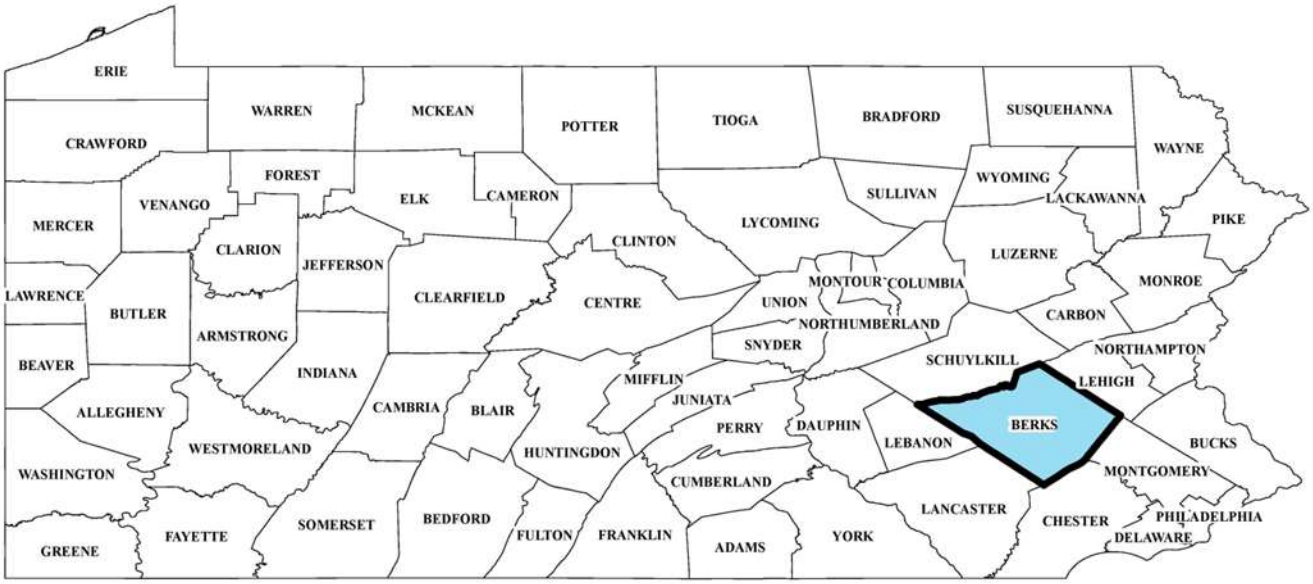


Figure B-26. Reading, PA MSA Site Detail

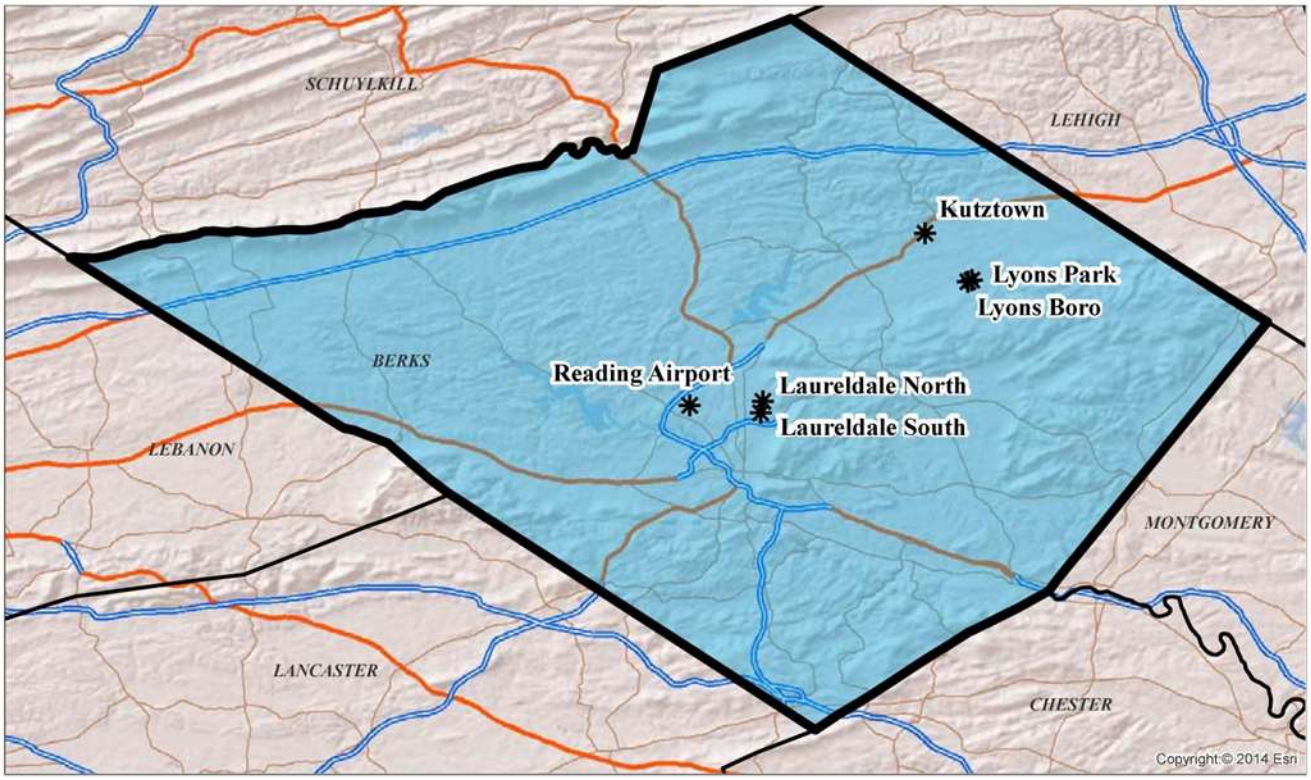


Figure B-27. Scranton-Wilkes-Barre-Hazleton, PA MSA

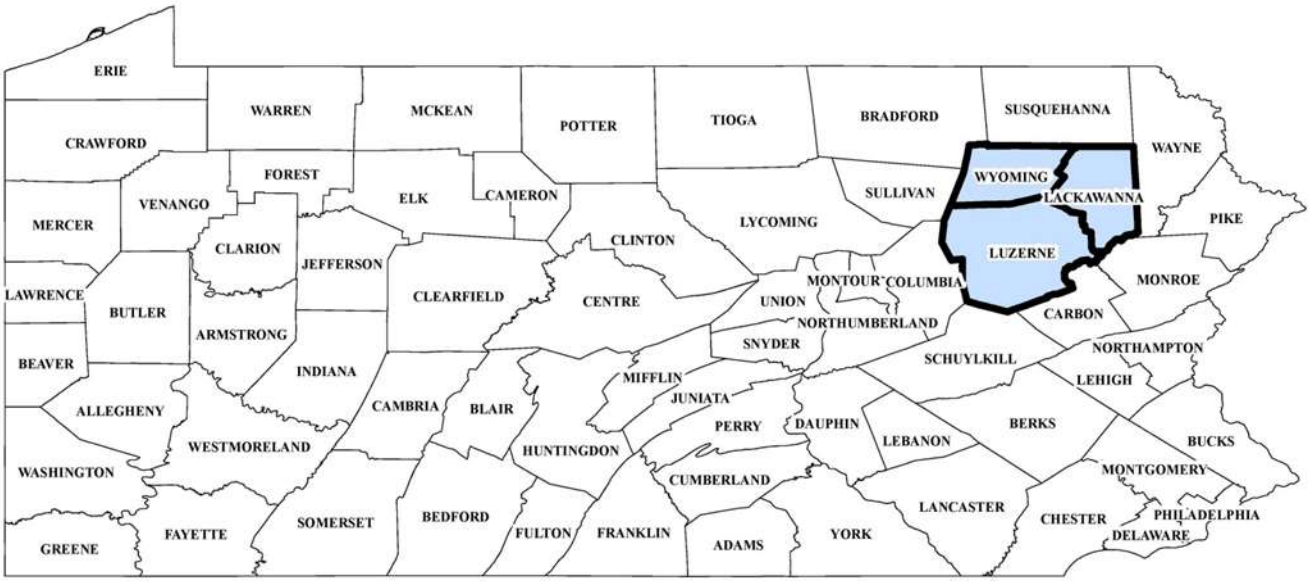


Figure B-28. Scranton-Wilkes-Barre-Hazleton, PA MSA Site Detail

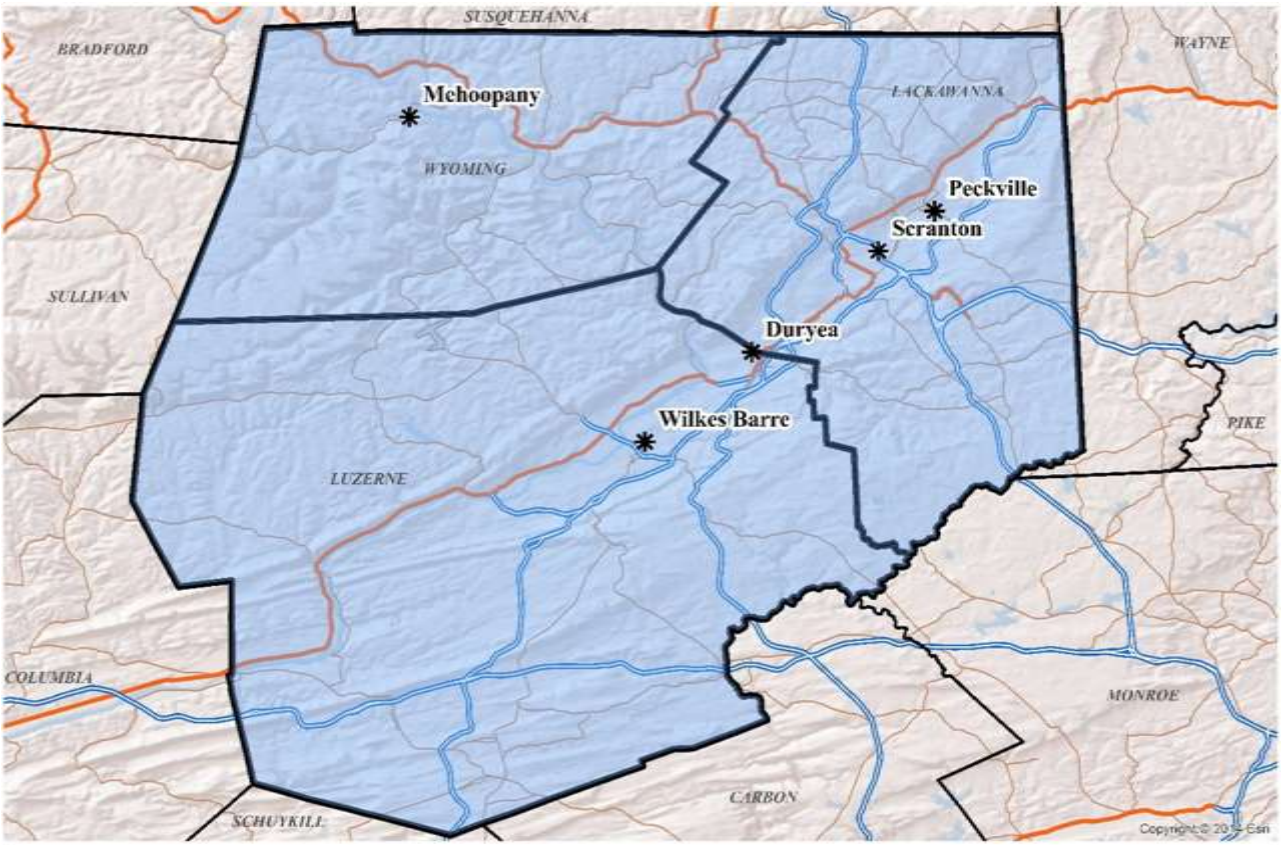


Figure B-29. State College, PA MSA

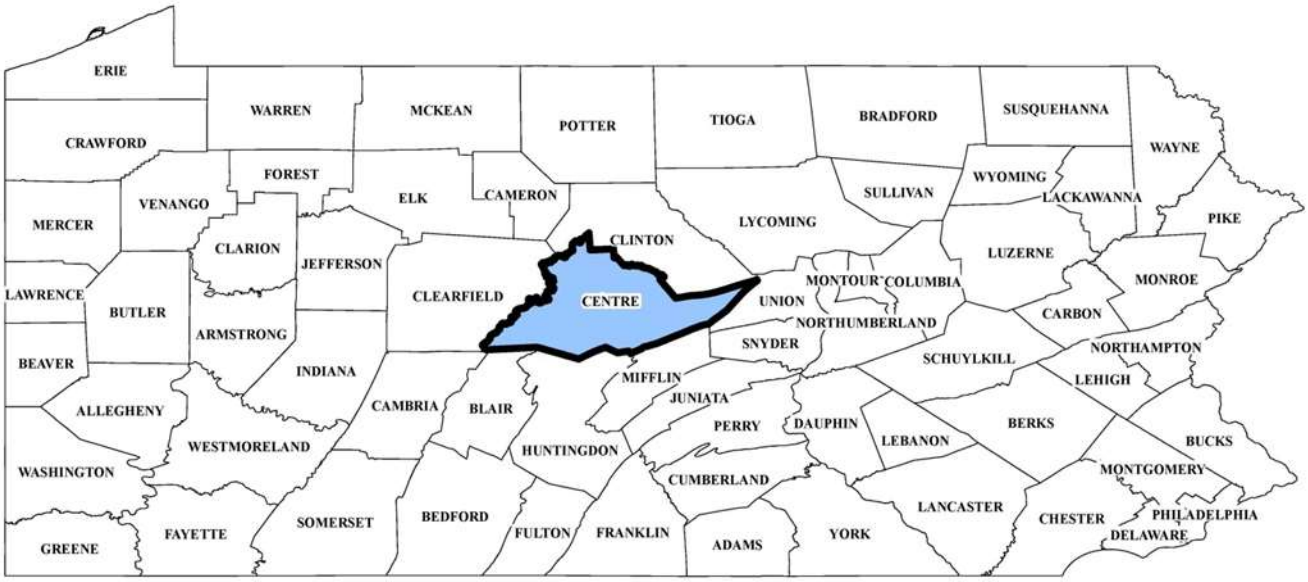


Figure B-30. State College, PA MSA Site Detail

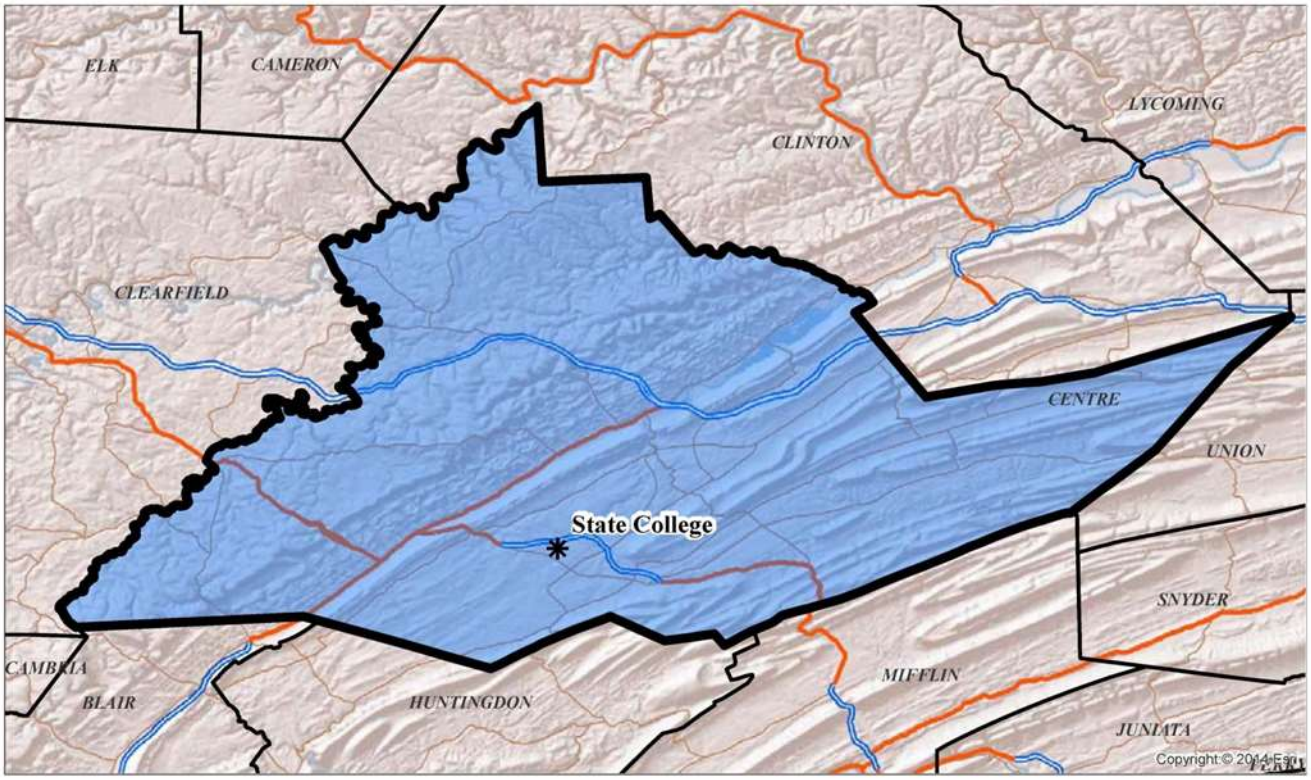


Figure B-31. Williamsport, PA MSA

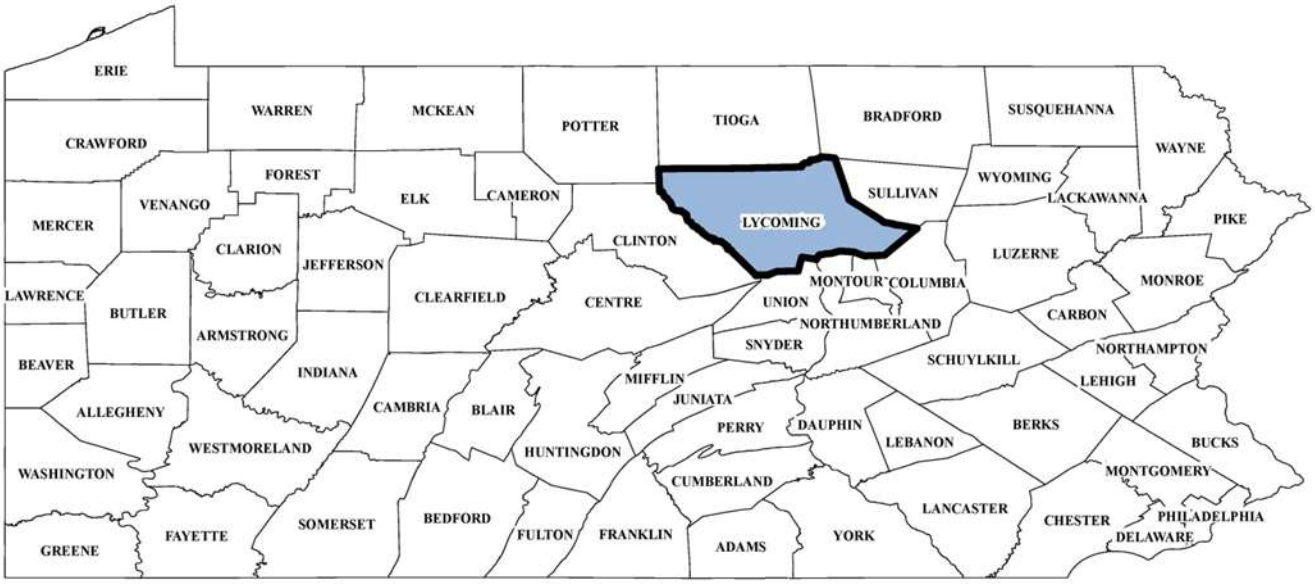


Figure B-32. Williamsport, PA MSA Site Detail

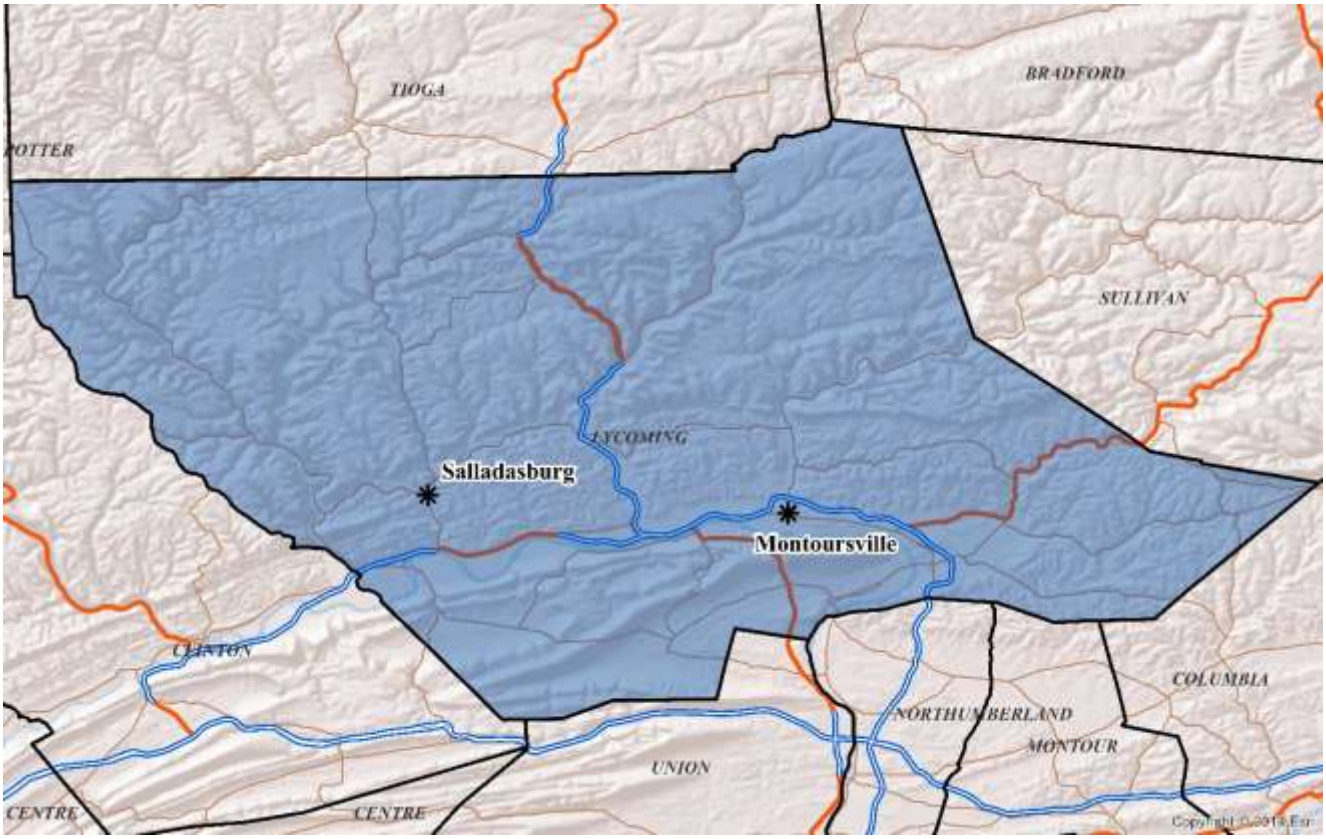


Figure B-33. York-Hanover, PA MSA

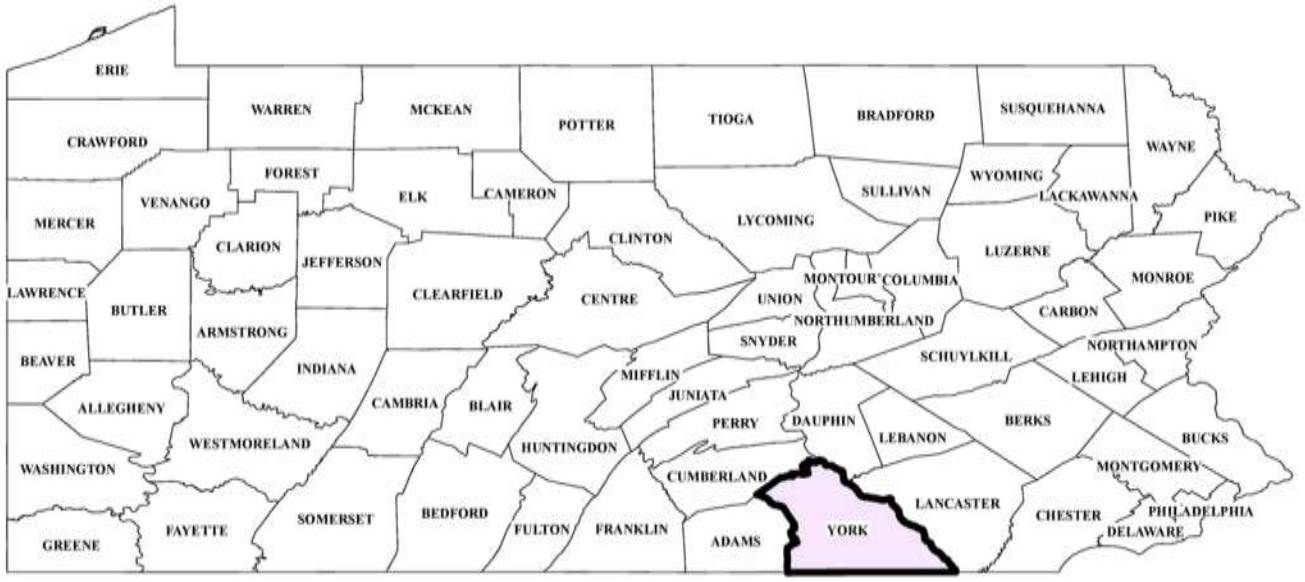


Figure B-34. York-Hanover, PA MSA Site Detail

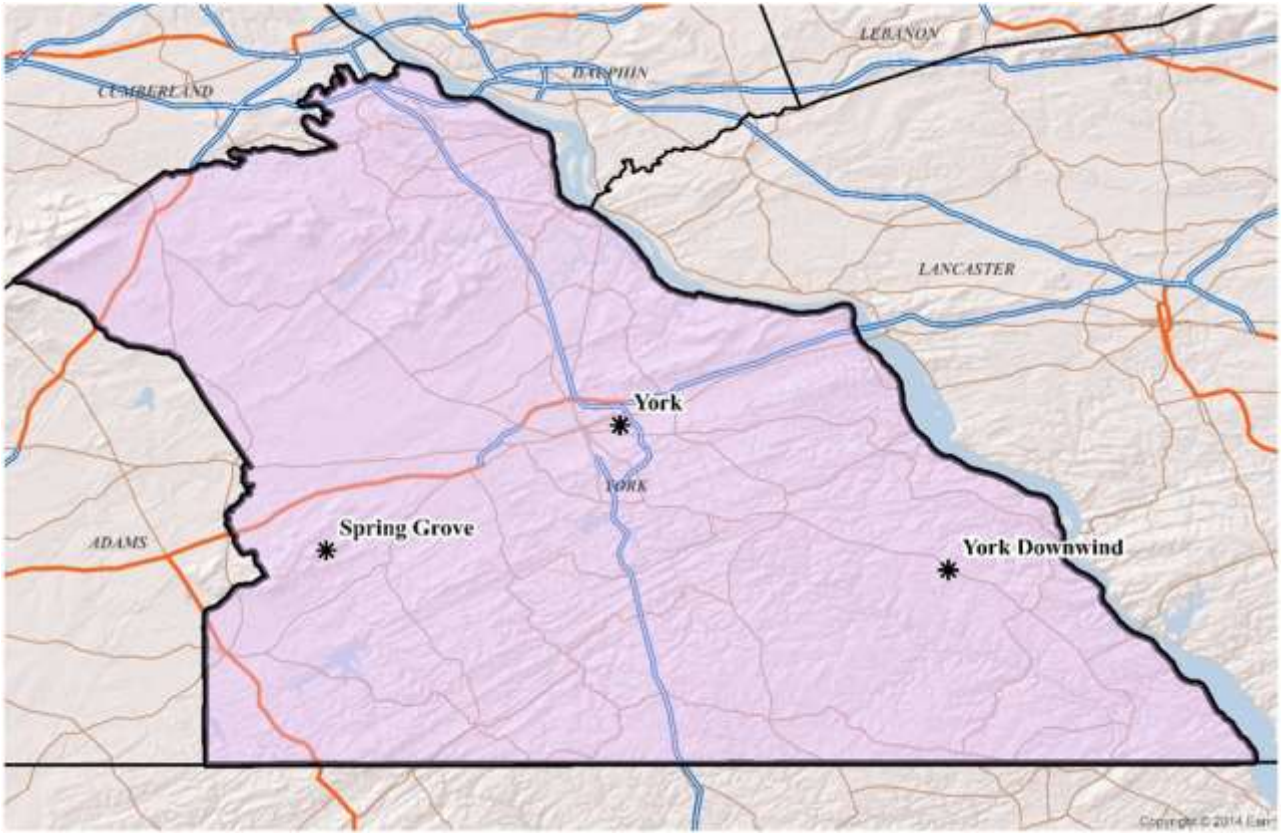


Figure B-35. Youngstown-Warren-Boardman, OH-PA MSA (Pennsylvania portion)

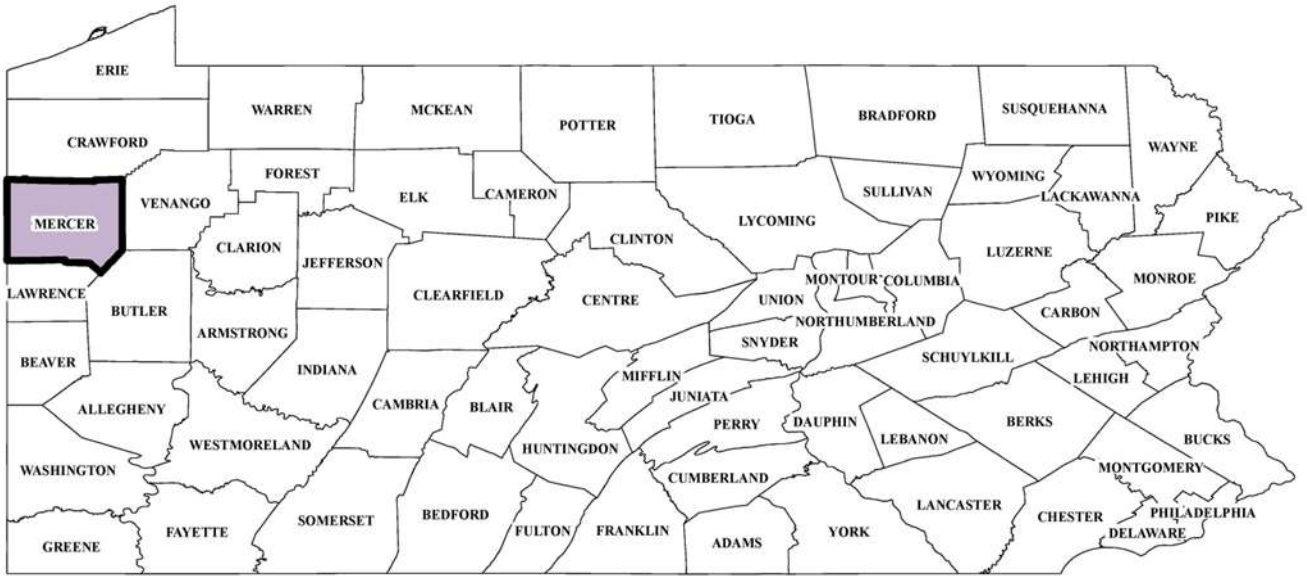


Figure B-36. Youngstown-Warren-Boardman, OH-PA MSA (Pennsylvania portion) Site Detail

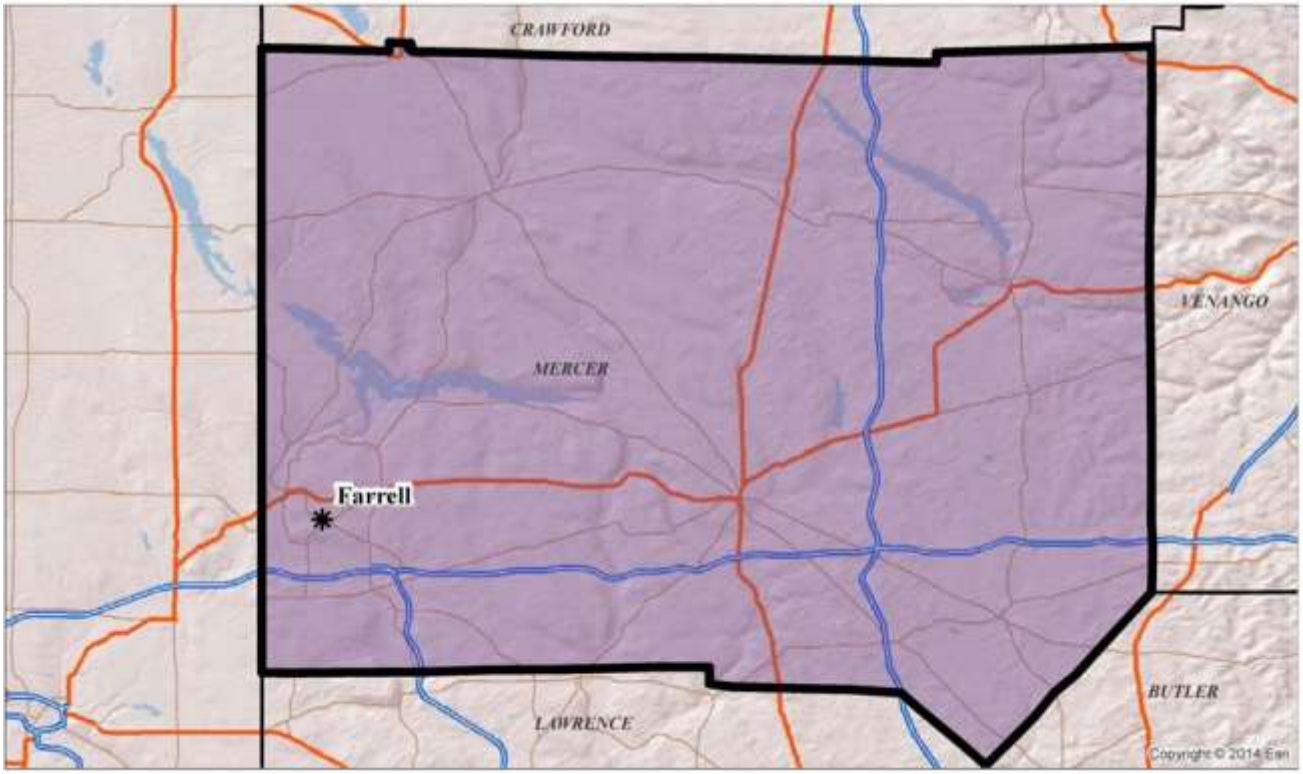


Figure B-37. Overview of the DuBois, PA Micro Area

Figure B-38. DuBois, PA Micro Area Site Detail

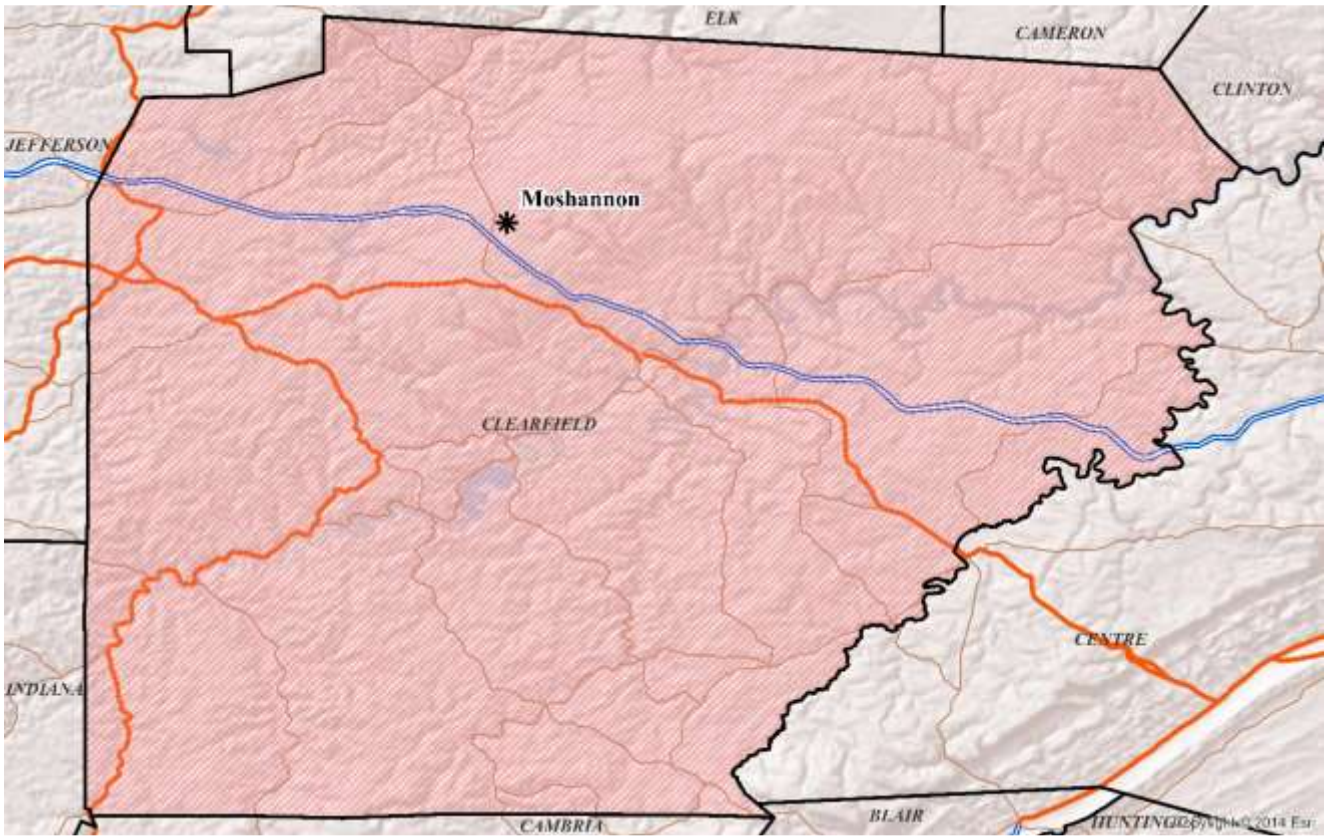


Figure B-39. Overview of the Indiana, PA Micro Area

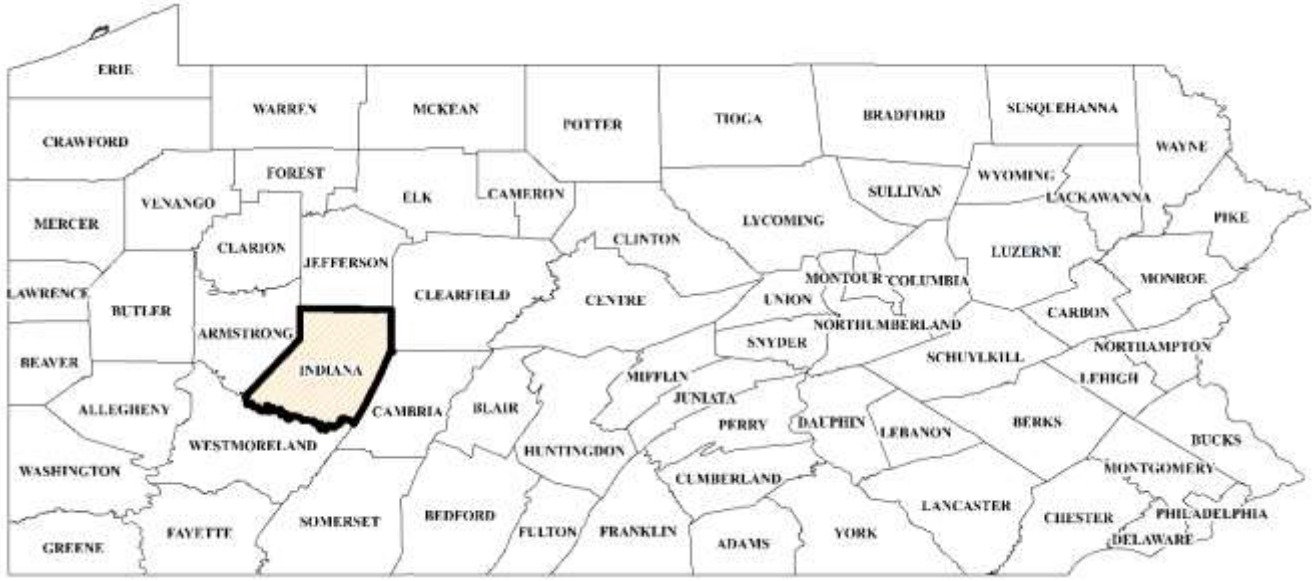


Figure B-40. Indiana, PA Micro Area Site Detail

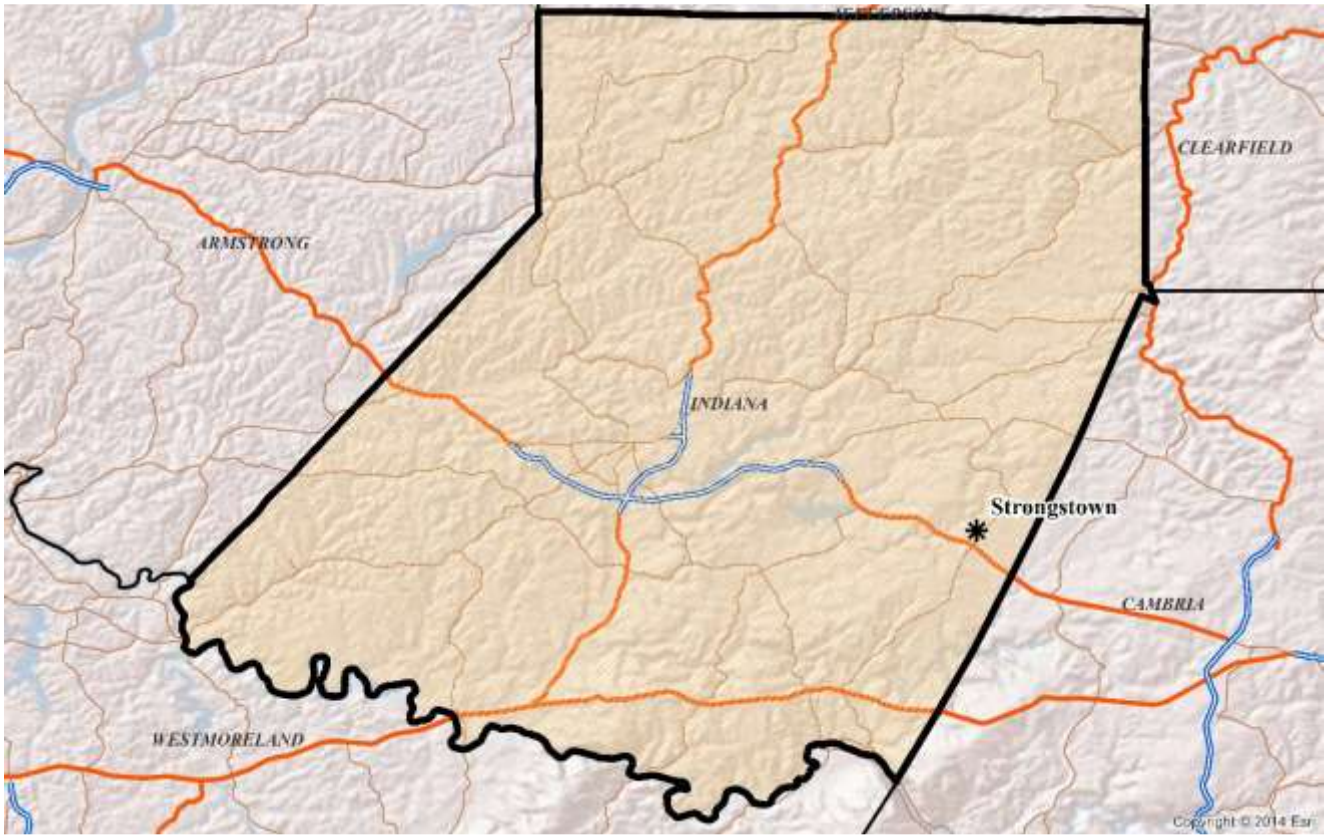


Figure B-41. Overview of the Lewisburg, PA Micro Area

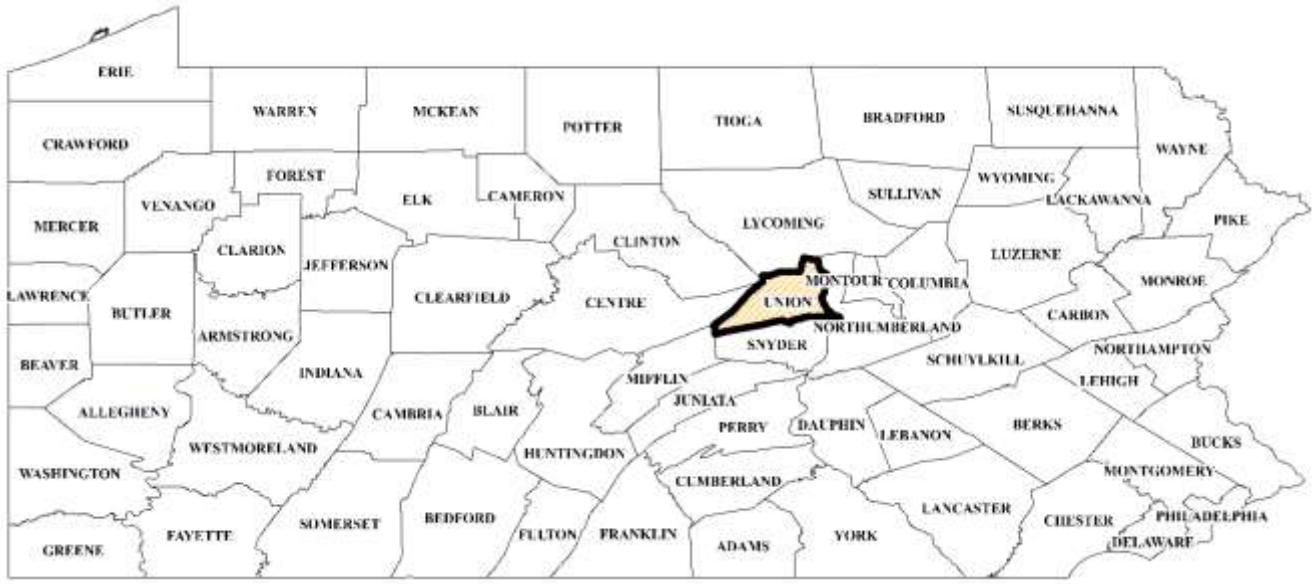


Figure B-42. Lewisburg, PA Micro Area Site Detail

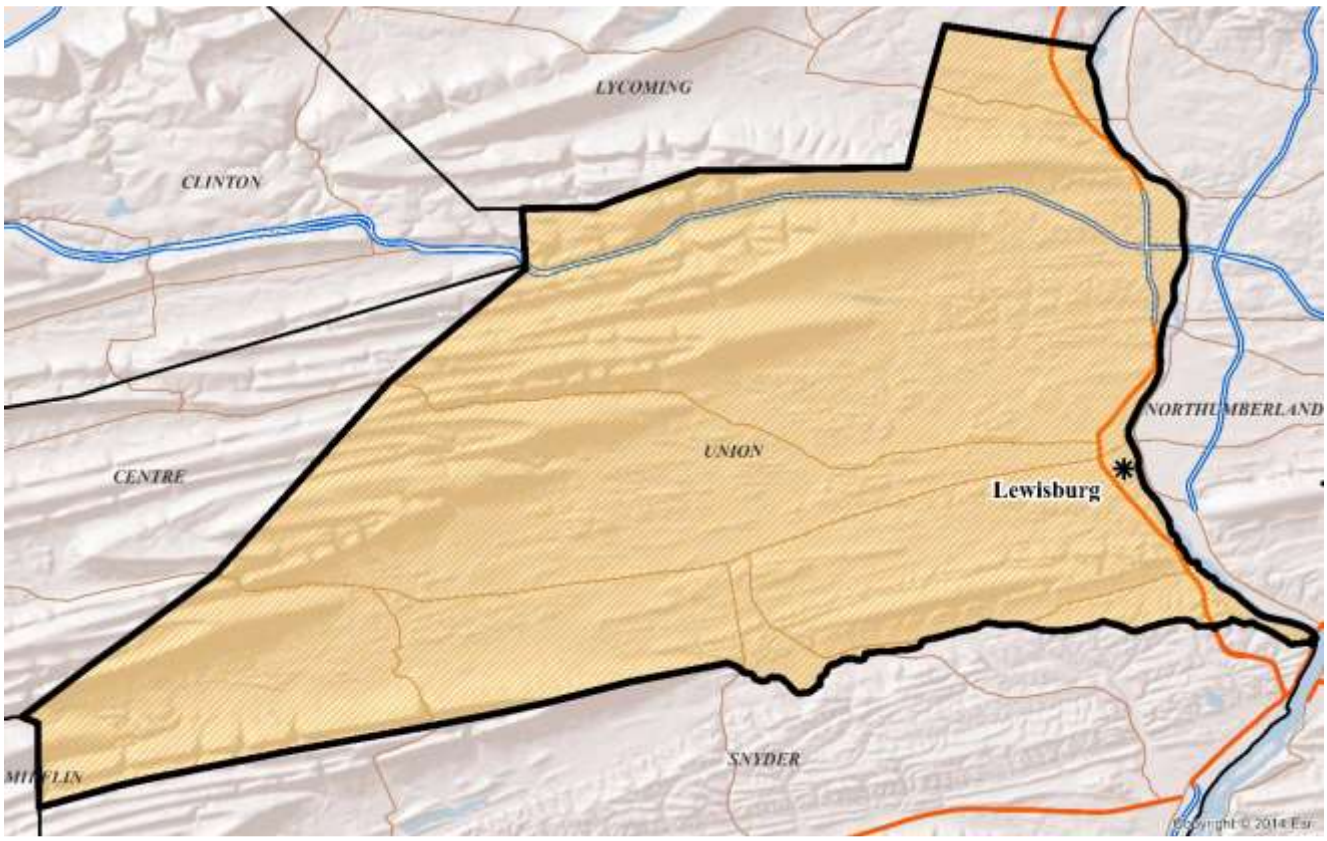


Figure B-43. Overview of the New Castle, PA Micro Area

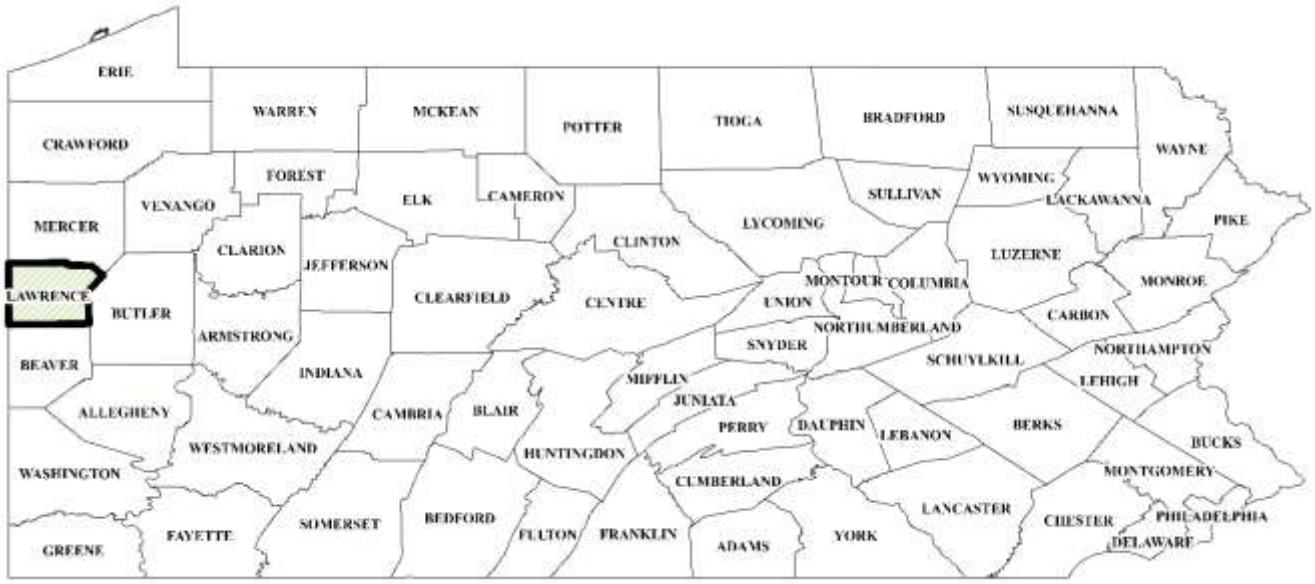


Figure B-44. New Castle, PA Micro Area Site Detail

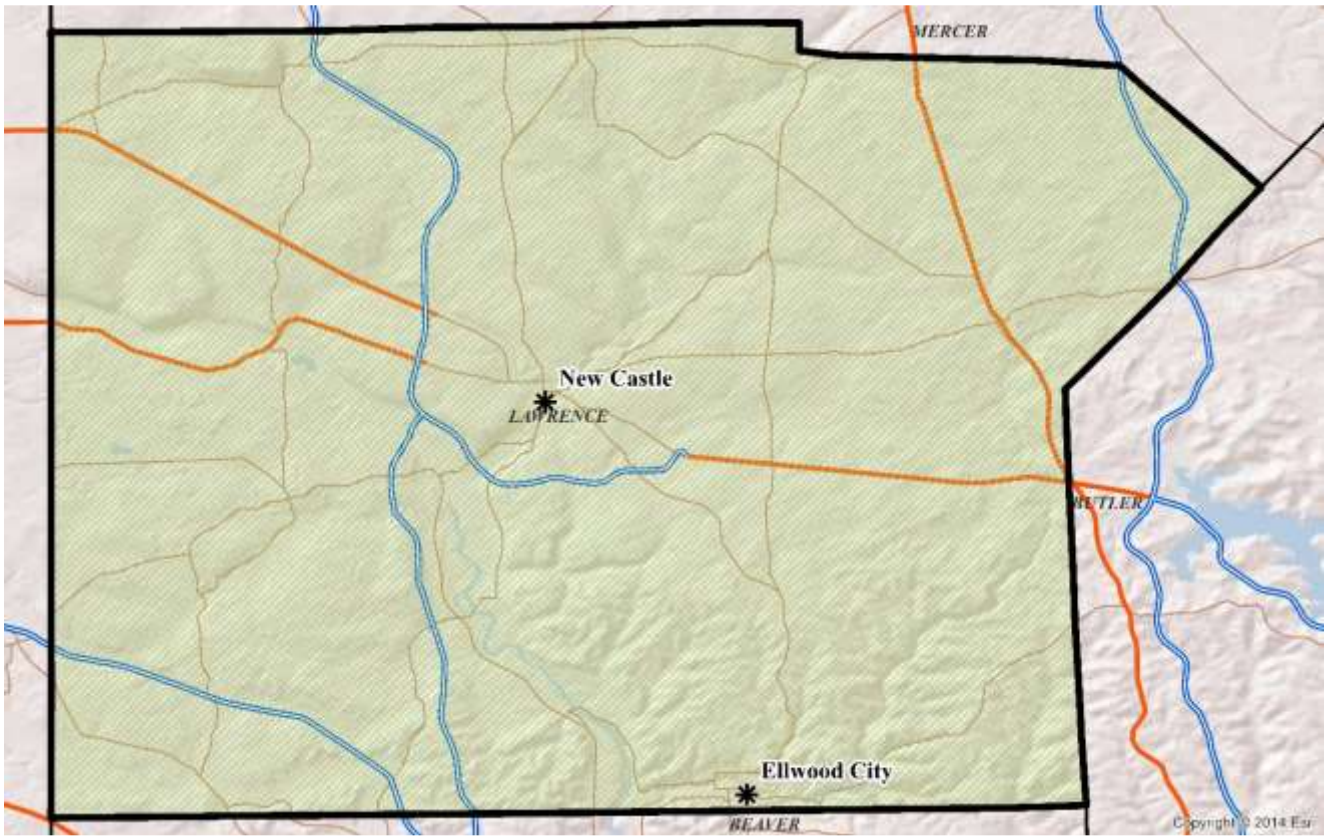


Figure B-45. Overview of the Sayre, PA Micro Area

Figure B-46. Sayre, PA Micro Area Site Detail

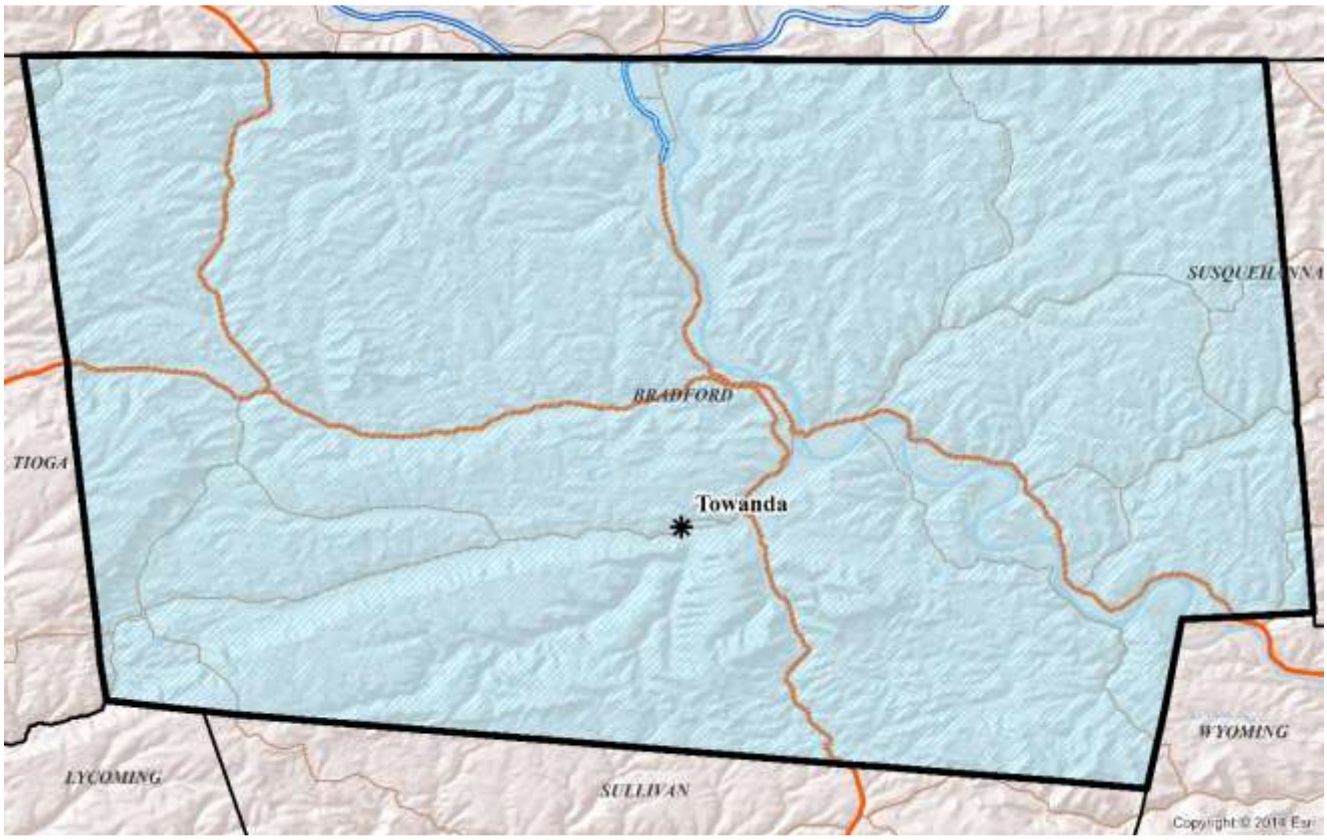


Figure B-47. Overview of the Warren, PA Micro Area

Figure B-48. Warren, PA Micro Area Site Detail

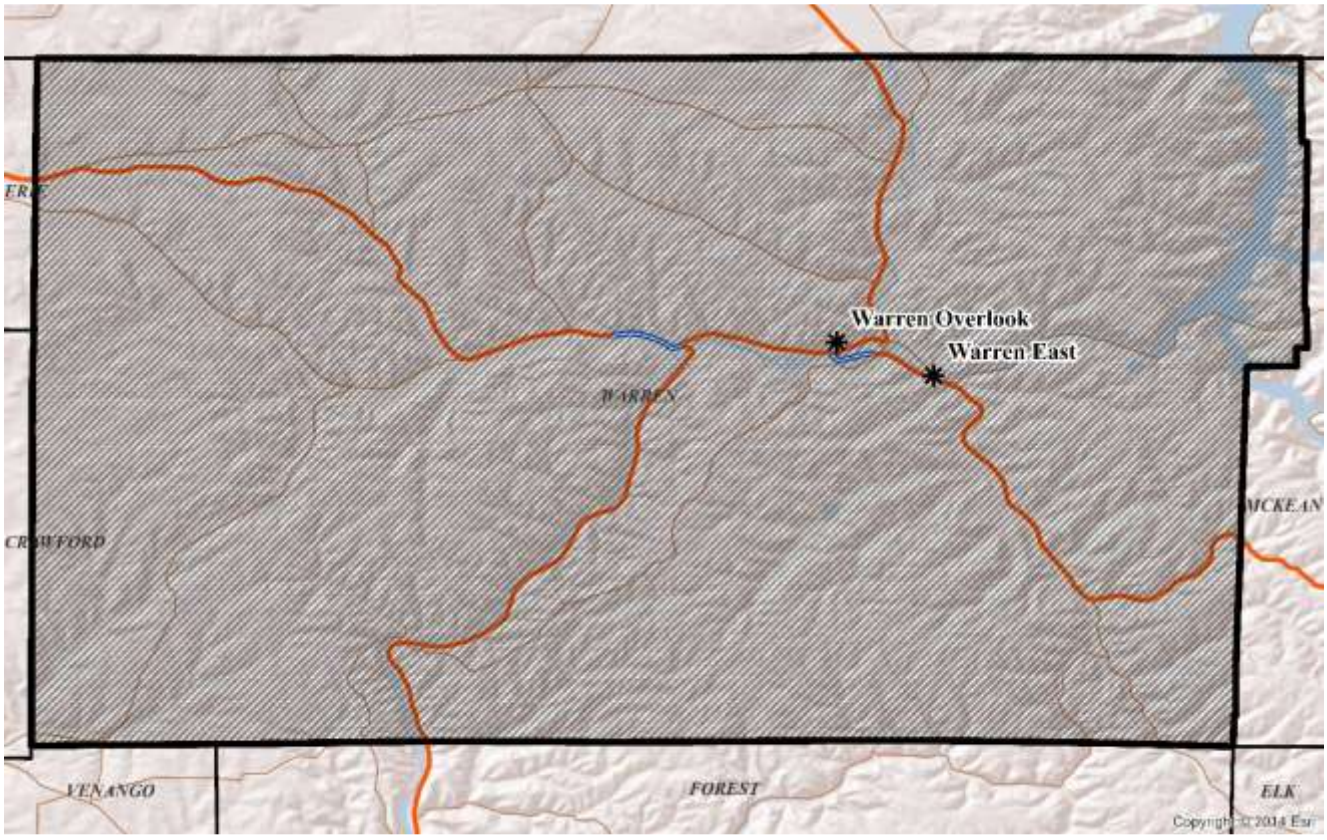


Figure B-49. Overview of the Northcentral Non-CBSA Region

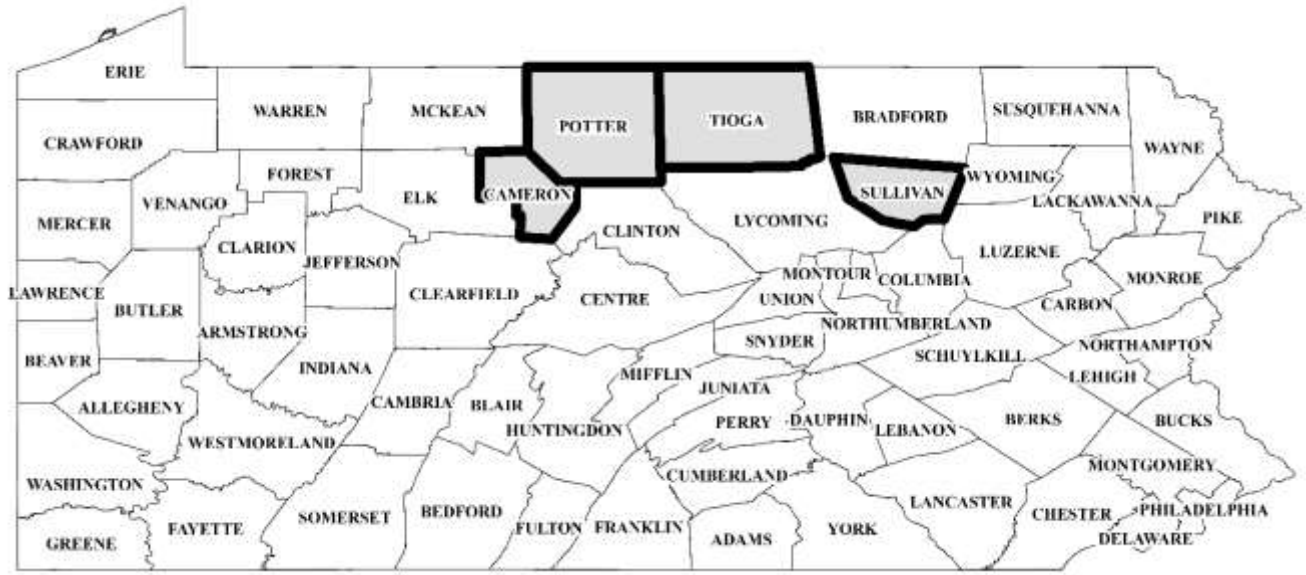


Figure B-50. Northcentral Non-CBSA Region Site Detail

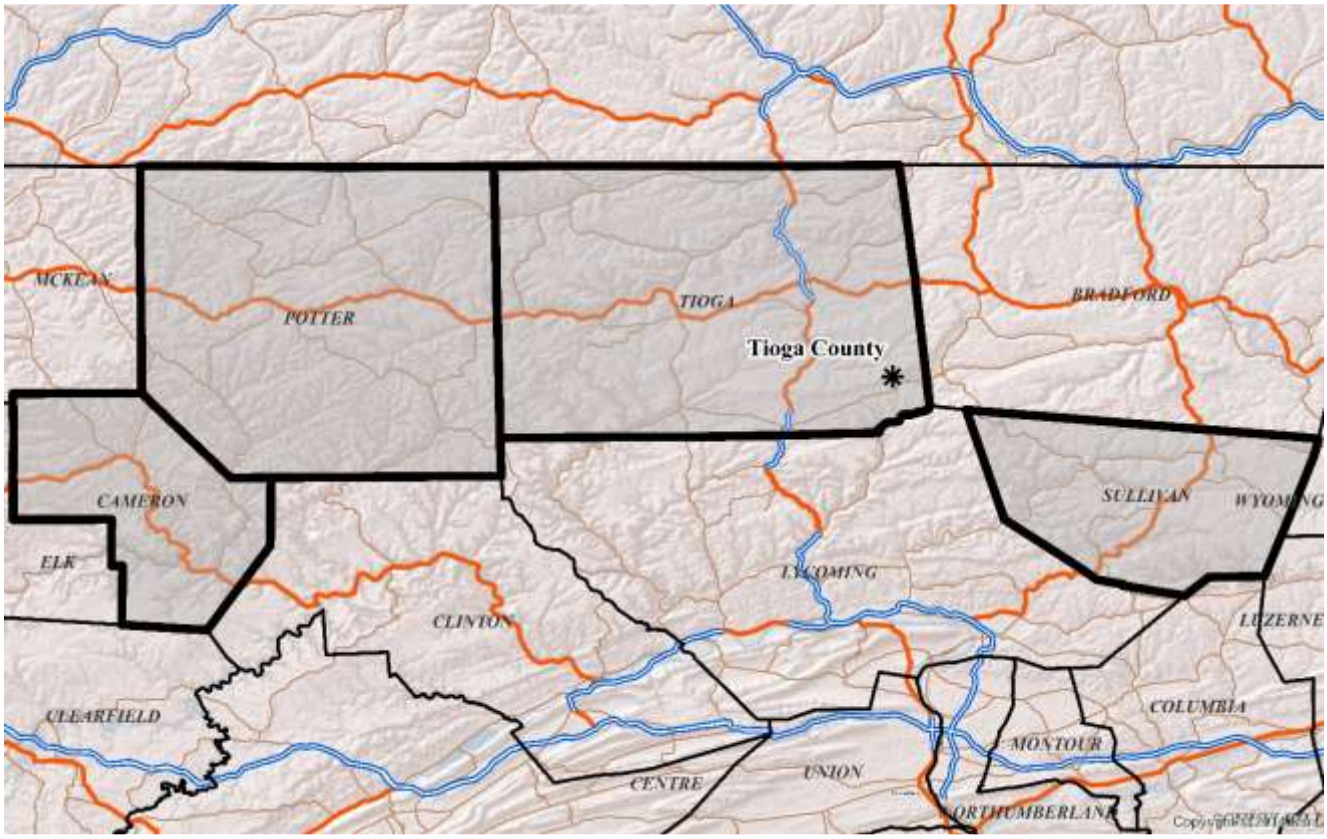
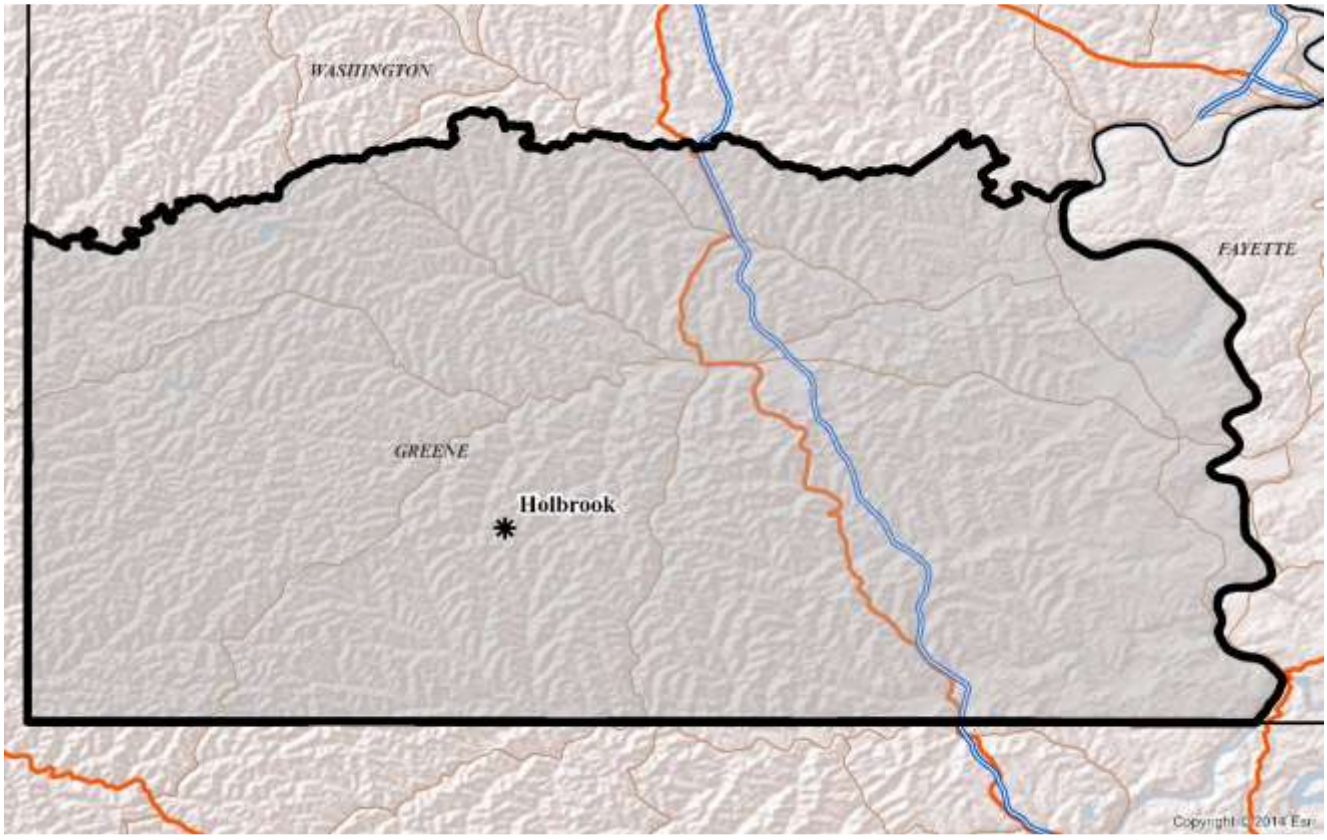


Figure B-51. Overview of the Northeast Non-CBSA Region

Figure B-52. Northeast Non-CBSA Region Site Detail

Figure B-53. Overview of the Southwest Non-CBSA Region

Figure B-54. Southwest Non-CBSA 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 applicable only to manual method PM_{10} monitors. 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 information for the proposed 2018-2019 monitoring network. As shown, PA DEP currently meets the 15% collocation by method requirement.

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
R&P 2025 (FRM)	8	1	1	0
Met-One BAM	9	1	2	0
Teledyne 602 Beta+	16/20 (2018-2019)*	2/3 (2018-2019)*	2	0

* During 2018-2019, PA DEP plans to expand its $PM_{2.5}$ monitoring network by an additional 4 Teledyne 602 Beta+ method monitoring sites. At that time, PA DEP will install one additional QA-collocated FRM monitor at a site utilizing a Teledyne 602 Beta+ method as the primary $PM_{2.5}$ monitor.

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 the collocation monitor designation requirement.

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)
New Garden	Met-One BAM	R&P 2025 (FRM)
Chester	Met-One BAM	R&P 2025 (FRM)
Greensburg	Teledyne 602 Beta+	Teledyne 602 Beta+
Harrisburg	Teledyne 602 Beta+	R&P 2025 (FRM)

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	2017 Daily Design Value	Annual NAAQS	+/- 20% Annual NAAQS	2017 Annual Design Value
Lancaster	35 $\mu g/m^3$	28 – 42 $\mu g/m^3$	28 $\mu g/m^3$	12.0 $\mu g/m^3$	9.6 - 14.4 $\mu g/m^3$	10.0 $\mu g/m^3$
New Garden			24 $\mu g/m^3$			10.1 $\mu g/m^3$
Chester			24 $\mu g/m^3$			10.3 $\mu g/m^3$
Greensburg			20 $\mu g/m^3$			9.4 $\mu g/m^3$
Harrisburg			26 $\mu g/m^3$			9.5 $\mu g/m^3$

PA DEP operates all QA-collocated $PM_{2.5}$ monitors at a minimum of 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 currently maintains two QA-collocated sites in its lead monitoring network, Palmerton and Laureldale North (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. As shown, PA DEP meets the 15% requirement noted above.

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
13	2	2	0

Table C-5 displays the highest 3-month averages between 2014-2016, representing the 2016 design value period. Values above the level of the lead NAAQS (0.15 µg/m^3) are indicated in red.

Table C-5. PA DEP Lead Concentration Values, 2014-2016

Station	County	Design Value (µg/m^3)	2014 Max 3-Month Avg (µg/m^3)	2015 Max 3-Month Avg (µg/m^3)	2016 Max 3-Month Avg (µg/m^3)
Beaver Valley	Beaver	**0.20**	**0.20**	0.01	0.01
Chester	Delaware	0.01	0.01	0.01	0.01
Conemaugh	Westmoreland	0.01*	0.01	0.01	0.01
Duryea	Luzerne	0.06	0.06	0.02	0.01
Ellwood City	Lawrence	0.03	0.02	0.02	0.03
Laureldale North	Berks	0.03	0.02	0.02	0.03
Laureldale South	Berks	0.03	0.03	0.03	0.01
Lyons Boro	Berks	0.04	0.03	0.04	0.03
Lyons Park	Berks	0.02	0.02	0.02	0.02
Mt. Joy	Lancaster	**0.23**	**0.23**	**0.23**	0.07
Palmerton	Carbon	**0.16**	0.15	**0.16**	0.11
Potter Township	Beaver	0.02	0.02	0.01	0.01
Ridley Park	Delaware	0.01	0.01	0.01	0.01
Vanport	Beaver	0.05	0.05	0.02	0.02

* Does not meet completeness requirements

Although Mt. Joy has the higher 2016 design value of the two sites, the 3-month average establishing that value is due to concentrations measured before site improvements and repair in 2014-2015. As detailed in PA DEP's 2017 Annual Ambient Air Monitoring Network Plan, both the pattern (number of high value days) and value of concentrations measured at the Palmerton site indicate that this site is more accurately identified at the measuring the highest lead concentrations in the network. Therefore,

PA DEP installed a collocated monitor at Palmerton to meet the requirements set forth in 40 CFR Part 58, Section 3.4.4.2 (a).

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-6. 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-7. 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 micropolitan areas and non-MSA regions of the state.

Ozone (O_3) Network Design Requirements

Minimum ozone monitoring requirements are set forth in 40 CFR Part 58, Appendix D Section 4.1.

Table C-7. Ozone Minimum Monitoring Requirements Demonstration, 2018-2019

MSA	2017 Population Estimate	Maximum 2016 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	840,550	70	2	3	NJ-1	4		0
Altoona MSA	123,457	64	1	1		1		0
Bloomsburg-Berwick MSA	84,204	No monitors	0	0		0		0
Chambersburg-Waynesboro MSA	154,234	59	0	1		1		0
East Stroudsburg MSA	168,046	67	1	1		1		0
Erie MSA	274,541	65	1	1		1		0
Gettysburg MSA	102,336	66	1	1		2	PA-1	0
Harrisburg-Carlisle MSA	571,903	66	2	2		2		0
Johnstown MSA	133,054	63	1	1		1		0
Lancaster MSA	542,903	70	2	2		2		0
Lebanon MSA	139,754	69	1	1		1		0
New York-Newark-Jersey City MSA	20,320,876	76	4	0	NJ-9; NY-13	22		0
Philadelphia-Camden-Wilmington MSA	6,096,120	80	3	4	AMS-3; DE-4; MD-1; NJ-3	15		0
Pittsburgh MSA	2,333,367	70	2	9	ACHD-3	12		0
Reading MSA	417,854	70	2	2		2		0
Scranton-Wilkes-Barre-Hazleton MSA	555,426	67	2	3		3		0
State College MSA	162,660	65	1	1		2	PA-1	0
Williamsport MSA	113,841	64	1	1		1		0
York-Hanover MSA	446,078	70	2	2		2		0
Youngstown-Warren-Boardman MSA	541,926	68	2	1	OH-3	5	PA-1	0
DuBois, PA Micro Area	79,685	66	*N/A*	1		1		*N/A*

MSA	2017 Population Estimate	Maximum 2016 Design Value	No. of Monitors Required	PA DEP SLAMS Monitors	Other SLAMS Monitors	Total No. SLAMS Monitors	CASTNET Monitors	Addt'l Monitors Needed
Indiana, PA Micro Area	84,953	70	*N/A*	1		1		*N/A*
New Castle, PA Micro Area	87,069	66	*N/A*	1		1		*N/A*
Sayre, PA Micro Area	60,853	57	*N/A*	1		1		*N/A*
Somerset, PA Micro Area	74,501	63	*N/A*	0		1	PA-1	*N/A*
St. Marys, PA Micro Area	30,197	66	*N/A*	0		1	PA-1	*N/A*
Northcentral Non-MSA Region	*N/A*	64	*N/A*	1		1		*N/A*
Southwest Non-MSA Region	*N/A*	68	*N/A*	1		1		*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-8 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-8. 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-9. PWEI values were calculated using the 2014 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 thirty-seven Pennsylvania CBSAs 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-9. SO_2 Minimum Monitoring Requirements Demonstration, 2018-2019

CBSA	2017 Population Estimate	2014 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	840,550	9744.8	8191	1	1	NJ-1	2	0
Altoona MSA	123,457	4206.6	519	0	1		1	0
Bloomsburg-Berwick MSA	84,204	11332	954	0	0		0	0
Chambersburg-Waynesboro MSA	154,234	315.4	49	0	0		0	0
East Stroudsburg MSA	168,046	312.8	53	0	0		0	0
Erie MSA	274,541	280.4	77	0	0		0	0
Gettysburg MSA	102,336	161.5	17	0	1		1	0
Harrisburg-Carlisle MSA	571,903	1615	924	0	0		0	0
Johnstown MSA	133,054	8267.3	1100	0	1		1	0
Lancaster MSA	542,903	877.8	477	0	0		0	0
Lebanon MSA	139,754	576.4	81	0	0		0	0

CBSA	2017 Population Estimate	2014 NEI (tons/year)	Calculated PWEI	No. of Monitors Required	PA DEP SLAMS Monitors	Other SLAMS Monitors	Total No. of Monitors	Addt'l Monitors Needed
New York-Newark-Jersey City MSA	20,320,876	109.2	2219	0	0	NJ-6; NY-7	13	0
Philadelphia-Camden-Wilmington MSA	6,096,120	8080.4	49259	1	0	AMS-2; DE-4; NJ-1	7	0
Pittsburgh MSA	2,333,367	62549.8	145952	2	4	ACHD-5	9	0
Reading MSA	417,854	1452.7	607	0	1		1	0
Scranton-Wilkes-Barre-Hazleton MSA	555,426	1487.3	826	0	1		1	0
State College MSA	162,660	1545.5	251	0	1		1	0
Williamsport MSA	113,841	928.4	106	0	0		0	0
York-Hanover MSA	446,078	18636.6	8313	1	2		2	0
Youngstown-Warren-Boardman MSA	541,926	183.7	100	0	0	OH-1	1	0
Bradford, PA Micro Area	41,330	2255.5	93	0	0		0	0
DuBois, PA Micro Area	79,685	37294.6	2972	0	0		0	0
Huntingdon, PA Micro Area	45,491	274.1	12	0	0		0	0
Indiana, PA Micro Area	84,953	135547.3	11515	1	1		1	0
Lewisburg, PA Micro Area	44,595	105.4	5	0	0		0	0
Lewistown, PA Micro Area	46,388	152.2	7	0	0		0	0
Lock Haven, PA Micro Area	38,998	118.3	5	0	0		0	0
Meadville, PA Micro Area	86,159	450.7	39	0	0		0	0
New Castle, PA Micro Area	87,069	4141.9	361	0	0		0	0
Oil City, PA Micro Area	51,762	1722.8	89	0	0		0	0
Pottsville, PA Micro Area	142,569	5001.3	713	0	0		0	0
St. Marys, PA Micro Area	60,853	733.8	45	0	0		0	0
Sayre, PA Micro Area	40,801	1626.2	66	0	0		0	0
Selinsgrove, PA Micro Area	74,501	259.5	19	0	0		0	0
Somerset, PA Micro Area	30,197	622.4	19	0	0		0	0
Sunbury, PA Micro Area	92,029	720.5	66	0	0		0	0
Warren, PA Micro Area	39,659	954.1	38	0	2		2	0

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

On December 22, 2016, U.S. EPA finalized revisions to the minimum monitoring requirements for near-road NO_2 monitors. The revision 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 have been installed and operational by January 1, 2017 (81 FR 96381). 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 NO_2 monitoring station in each CBSA with a population of 1,000,000 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 NO_2 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 1,000,000 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 three MSAs (Figure 1), either wholly or in part, with populations greater than 1,000,000 persons. These three MSA are the New York-Newark-Jersey City, NY-NJ-PA MSA, the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA, and the Pittsburgh, PA MSA. NO_2 near-road monitoring for the New York-Newark-Jersey City MSA is performed by the New Jersey Department of Environmental Protection. NO_2 near-road monitoring for the Pennsylvania portion of the Philadelphia-Camden-Wilmington MSA is performed by Philadelphia Air Management Services. NO_2 near-road monitoring for the Pittsburgh MSA is performed by the Allegheny County Health Department. Near-road NO_2 monitoring network sites for the these MSAs are described in the annual air monitoring network plans of these agencies.

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.

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 fulfill the RA-required CO monitoring requirement, nor requested PA DEP to establish a new CO monitoring site to fulfill 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-10. 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-11. 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: shale gas 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-11. $PM_{2.5}$ Minimum Monitoring Requirements Demonstration, 2018-2019

MSA	2017 Population Estimate	2017 Max Annual Design Value	2017 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	840,550	9.1	24	1	2	NJ-1	3	0
Altoona MSA	123,457	9.2	23	0	1		1	0
Bloomsburg-Berwick MSA	84,204	No monitors		0	0		0	0
Chambersburg-Waynesboro MSA	154,234	No monitors		0	0		0	0
East Stroudsburg MSA	168,046	7.1	18	0	0		0	0
Erie MSA	274,541	8.3	19	0	1		1	0
Gettysburg MSA	102,336	8.3	20	0	1		1	0
Harrisburg-Carlisle MSA	571,903	9.5	26	1	2		2	0
Johnstown MSA	133,054	10.8	25	1	1		1	0
Lancaster MSA	542,903	10.8	28	2	2		2	0
Lebanon MSA	139,754	10.1	30	1	1		1	0
New York-Newark-Jersey City MSA	20,320,876	10.1	23	2	0	NJ-12; NY-11	23	0
Philadelphia-Camden-Wilmington MSA	6,096,120	10.6	25	3	4	AMS-6; DE-5; MD-1; NJ-4	20	0
Pittsburgh MSA	2,333,367	13	37	3	7	ACHD-9	15	0
Reading MSA	417,854	9.1	26	0	1		1	0
Scranton-Wilkes-Barre-Hazleton MSA	555,426	9.1	20	1	2		2	0
State College MSA	162,660	8	20	0	1		1	0
Williamsport MSA	113,841	No monitors		0	1		1	0
York-Hanover MSA	446,078	9.6	23	0	1		1	0
Youngstown-Warren-Boardman MSA	541,926	9.8	22	1	1	OH-3	4	0
Bradford, PA Micro Area	41,330	No monitors		*N/A*	1			
Indiana, PA Micro Area	84,953	No monitors		*N/A*	1			
Sayre, PA Micro Area	60,853	7.2	16	*N/A*	1		1	*N/A*
Northcentral Non-MSA Region	*N/A*	8.5	17	*N/A*	1		1	*N/A*
Northeast Non-MSA Region	*N/A*	No monitors		*N/A*	1		1	*N/A*
Northwest Non-MSA Region	*N/A*	No monitors		*N/A*	2		2	*N/A*
Southwest Non-MSA Region	*N/A*	6.1	14	*N/A*	1		1	*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 2018-2019 includes 34 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. Table C-12 demonstrates that PA DEP either meets or exceeds the continuous $PM_{2.5}$ monitoring requirement.

Table C-12. $PM_{2.5}$ Continuous Monitoring Requirements Demonstration, 2018-2019

MSA	No. of SLAMS Monitors Required	No. of Continuous Monitors Required	No. of PA DEP SLAMS Continuous Method Monitors	Other Continuous Method Monitors	Total No. of Continuous Method Monitors	Addt'l Continuous Monitors Required
Allentown-Bethlehem-Easton MSA	1	1	2	NJ-1	3	0
Altoona MSA	0	0	1		1	0
Bloomsburg-Berwick MSA	0	0	0		0	0
Chambersburg-Waynesboro MSA	0	0	0		0	0
East Stroudsburg MSA	0	0	0		0	0
Erie MSA	0	0	1		1	0
Gettysburg MSA	0	0	1		1	0
Harrisburg-Carlisle MSA	1	1	2		2	0
Johnstown MSA	1	1	1		1	0
Lancaster MSA	2	1	2		2	0
Lebanon MSA	1	1	1		1	0
New York-Newark-Jersey City MSA	2	1	0	NJ-6; NY-2	8	0
Philadelphia-Camden-Wilmington MSA	3	2	4	AMS-5; DE-2; MD-1; NJ-1	13	0
Pittsburgh MSA	3	2	6	ACHD-3	9	0
Reading MSA	0	0	1		1	0
Scranton-Wilkes-Barre-Hazleton MSA	1	1	2		2	0
State College MSA	0	0	1		1	0
Williamsport MSA	0	0	1		1	0
York-Hanover MSA	0	0	1		1	0
Youngstown-Warren-Boardman MSA	1	1	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 and Tioga County $PM_{2.5}$ monitoring sites for purposes of regional background and transport monitoring. Table C-13 lists these sites along with their respective measurement scales and monitoring objectives.

Table C-13. $PM_{2.5}$ 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	Met-One BAM
New Garden	420290100	Chester	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 regional transport sites – New Garden 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, while 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-14. 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.

Minimum PM_{10} monitoring requirements for Pennsylvania MSAs are detailed in

Table C-15. Ambient air monitoring sites operated by agencies other than PA DEP are listed in the "Other SLAMS Monitors" column of the table. As shown, based on 2017 concentration data, both the Philadelphia-Camden-Wilmington MSA may require one additional SLAMS monitor to fulfill minimum monitoring requirements. PA DEP expects that any additional PM_{10} monitoring required in the Philadelphia-Camden-Wilmington MSA will be performed by either Philadelphia Air Management Services or New Jersey DEP, and has no plans to install a PM_{10} monitor in any of the four counties around Philadelphia County. The number of PM_{10} monitoring sites within the remaining Pennsylvania MSAs meets or exceeds the minimum monitoring requirement.

Table C-15. PM_{10} Minimum Monitoring Requirements Demonstration, 2018-2019

MSA	2017 Population Estimate	2017 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	840,550	37	1 - 2	1		1	0
Altoona MSA	123,457	37	0	0		0	0
Bloomsburg-Berwick MSA	84,204	No monitors	0	0		0	0
Chambersburg-Waynesboro MSA	154,234	No monitors	0	0		0	0
East Stroudsburg MSA	168,046	No monitors	0	0		0	0
Erie MSA	274,541	31	0 - 1	1		1	0
Gettysburg MSA	102,336	No monitors	0	0		0	0
Harrisburg-Carlisle MSA	571,903	34	1 - 2	1		1	0
Johnstown MSA	133,054	36	0	1		1	0
Lancaster MSA	542,903	39	1 - 2	1		1	0
Lebanon MSA	139,754	No monitors	0	0		0	0
New York-Newark-Jersey City MSA	20,320,876	36	2 - 4	0	NJ-2	2	0
Philadelphia-Camden-Wilmington MSA	6,096,120	81	2 - 4	0	AMS-1	1	1
Pittsburgh MSA	2,333,367	108	2 - 4	1	ACHD-8	9	0
Reading MSA	417,854	No monitors	0 - 1	0		0	0
Scranton-Wilkes-Barre-Hazleton MSA	555,426	29	1 - 2	1		1	0
State College MSA	162,660	No monitors	0	0		0	0
Williamsport MSA	113,841	31	0	0		0	0
York-Hanover MSA	446,078	No monitors	0 - 1	0		0	0
Youngstown-Warren-Boardman MSA	541,926	39	1 - 2	0	OH-4	4	0

Lead (Pb) Network Design Requirements

Minimum 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-16 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-16. Lead Sources Greater Than 0.5 Tons Per Year and PA DEP Lead Monitoring Sites

		Emissions, in tons per year					
County	**Facility Name**	**2012**	**2013**	**2014**	**2015**	**2016**	**PA DEP Lead Monitoring Site**
Beaver	Horsehead Corp/Monaca Smelter	5.97	5.40	1.47	*(facility idle)*	*(facility idle)*	Beaver Valley
							Vanport
Beaver	Firstenergy Gen LLC/Bruce Mansfield Plt	0.50	0.60	0.56	0.30	0.30	Potter Township
Berks	East Penn Mfg Co Inc/Battery Assembly	1.66	1.58	1.77	1.28	1.52	Lyons Boro
							Lyons Park
Berks	Exide Tech/Reading Smelter	1.12	0.32	*(facility idle)*	*(facility idle)*	*(facility idle)*	Laureldale North
							Laureldale South
Carbon	Horsehead Corp/Palmerton	0.55	0.65	1.67	1.81	1.84	Palmerton
Indiana	Genon NE Mgmt Co/Conemaugh Plt	0.11	0.13	0.11	0.11	0.10	Conemaugh
Lancaster	Mt Joy Wire Corp/Mt Joy	0.52	0.52	0.52	0.52	0.52	Mt Joy
Lawrence	Inmetco/Ellwood City	0.06	0.06	0.06	0.05	0.06	Ellwood City
Luzerne	Schott North Amer Inc/Duryea	0.03	0.03	0.03	0.01	0.01	Duryea

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 PA DEP's Air Quality Monitoring Division for all criteria and toxic pollutant monitoring. PA DEP utilizes Federal Reference Methods (FRM) and Federal Equivalent Methods (FEM) 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 T400 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 Latest Modification: 08/2010; 05/2013; 07/2014; 9/2015
SO_2	Teledyne Advanced Pollution Instrumentation, Model T100 UV Fluorescence SO_2 Analyzer	Automated Equivalent Method: EQSA-0495-100 60 FR 17061, 4/4/95 Latest Modification: 08/2010; 05/2013; 07/2014; 9/2015
	Thermo Environmental Instruments, Inc./Thermo Electron Model 43i Pulsed Fluorescence SO2 Analyzer	Automated Equivalent Method: EQSA-0486-060 51 FR 12390, 4/10/86 Latest Modification: 10/2015
$NO/NO_2/NO_x$	Teledyne Advanced Pollution Instrumentation, Model T200 Chemiluminescence Nitrogen Oxides Analyzer for Ambient Concentrations	Automated Reference Method: RFNA-1194-099 59 FR 61892, 12/2/94 Latest modifications: 03/2009; 08/2010; 10/2012; 5/2013; 06/2014; 07/2014; 9/2015
CO	Teledyne Advanced Pollution Instrumentation, Model T300 CO Gas Filter Correlation Analyzer	Automated Reference Method: RFCA-1093-093 58 FR 58166, 10/29/93 Latest Modification: 08/2010; 05/2013; 07/2014; 9/2015
H_2S	Teledyne Advanced Pollution Instrumentation, Model T101 UV Fluorescence H_2S Analyzer	None

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

PARAMETER	MANUFACTURER/INSTRUMENT/MODEL	EPA METHOD DESIGNATION
Particulate Sampling		
$PM_{2.5}$		
Discrete	Thermo Fisher Scientific Partisol® 2025i Sequential $PM_{2.5}$ Air Sampler with a BGI VSCC™	Manual Reference Method: RFPS-0498-118 67 FR 15567, 4/2/02 (EQPM-0202-145 redesignated as manual reference method 12/18/06) Latest modification: 06/2011
Continuous	Met-One Instruments, Inc. Beta-Attenuation Mass (BAM), Model 1020 – $PM_{2.5}$ FEM Configuration	Automated Equivalent Method EQPM-0308-170 73 FR 13224, 3/12/08 73 FR 22362, 4/25/08 Latest modifications: 7/2010; 8/2010; 8/2012; 3/2015; 9/2015, 4/2017
	Teledyne Advanced Pollution Instrumentation, Model 602 BetaPLUS Particle Measurement System	Automatic Equivalent Method EQPM-0912-204 77 FR 60985, 10/5/2012
	Teledyne Advanced Pollution Instrumentation, Model T640, PM Mass Monitor	Automated Equivalent Method EQPM-0516-236 81 FR 45285, 07/13/2016
$PM_{2.5}$ SPECIATION	Met One Instruments SASS $PM_{2.5}$ Ambient Chemical Speciation Air Sampler URG Corporation 3000N Sequential Particulate Speciation System	None
PM_{10}	Thermo Scientific TEOM® 1400AB/TEOM® 1405 Continuous Ambient Particulate Monitor	Automated Equivalent Method: EQPM-1090-079 55 FR 43406, 10/29/90 Latest modification: 12/2008
LEAD	Tisch TE-5170 VFC+ Analysis by Inductively Coupled Plasma - Mass Spectrometry	Manual Equivalent Method EQL-0710-192 75 FR 45627, 8/3/10
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
Metals (TSP-based)	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 2200-22	EPA Compendium Method TO-15
Carbonyl	ATEC Model 2200	EPA Compendium Method 8315A

SITE NAME: **ALLENTOWN**
AQS ID: **420770004**
CBSA: **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**
CBSA: **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

SITE NAME: **ARENDTSVILLE**
AQS ID: **420010001**
CBSA: **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
$PM_{2.5}$ Speciation	CSN	1/1/2002	1 in 6	Gravimetric	Urban Scale	General/Background
VOC	Other	6/2/1997	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME:	**BEAVER FALLS**
AQS ID:	**420070014**
CBSA:	**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

SITE NAME: **BEAVER VALLEY**
AQS ID: **420070007**
CBSA: **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

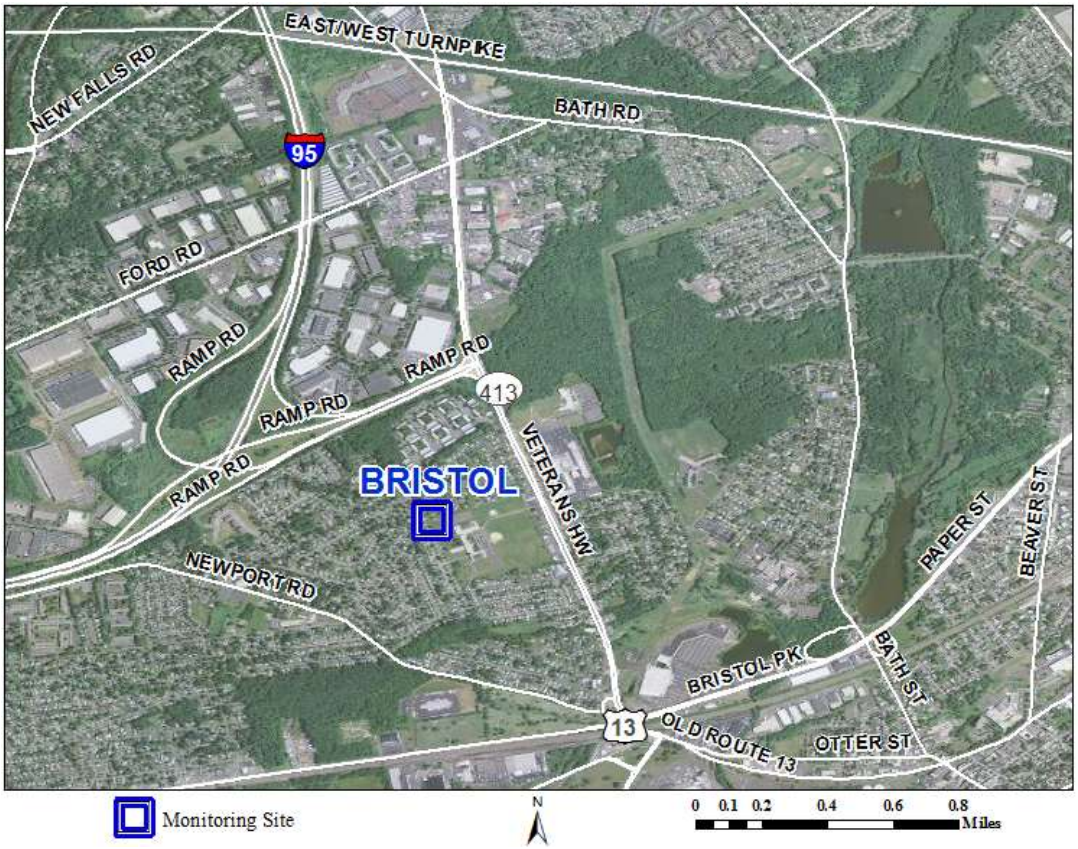
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	1/1/2010	1 in 6	ICP-MS	Middle Scale	Source Oriented
Metals	Other	2/20/2011	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A
VOC	Other	New 2017-18	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **BRIGHTON TWP**
AQS ID: **420070005**
CBSA: **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

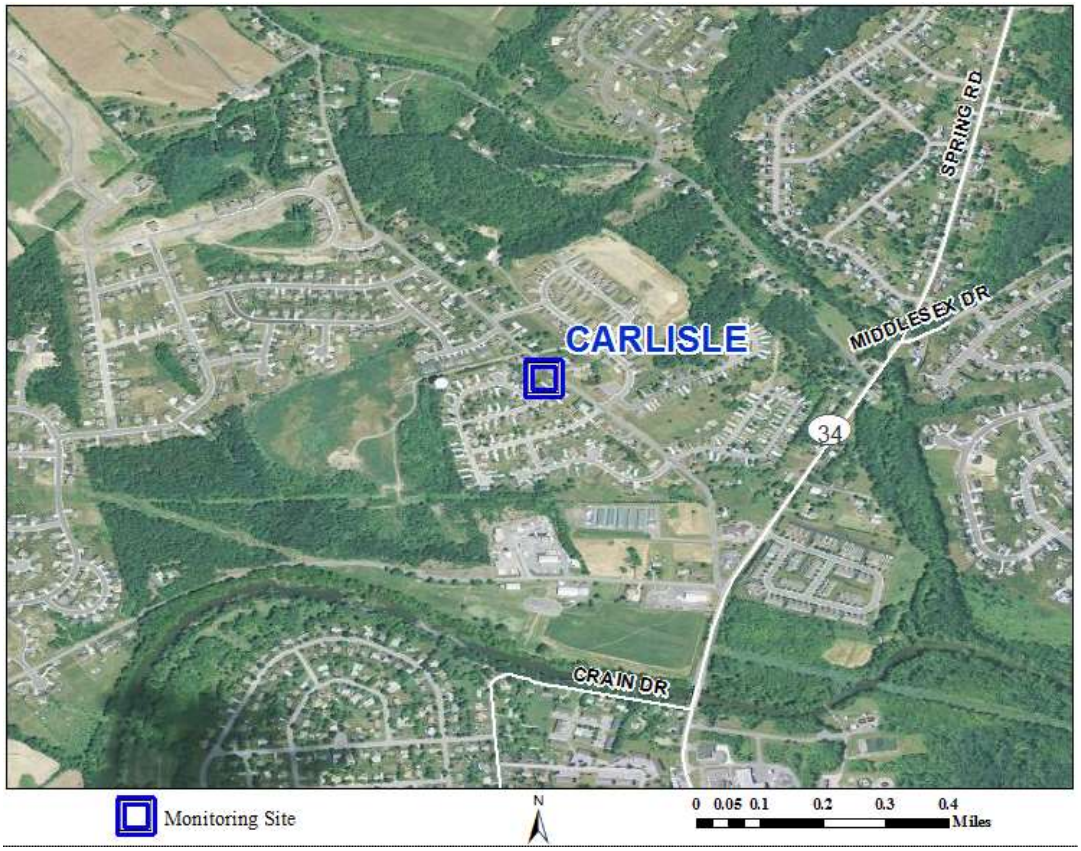
SITE NAME: **BRISTOL**
AQS ID: **420170012**
CBSA: **Philadelphia-Camden-Wilmington MSA**
COUNTY: **BUCKS**
MUNICIPALITY: **BRISTOL TWP**
LATITUDE: **40.10738889**
LONGITUDE: **-74.88247222**
ADDRESS: **ROCKVIEW DRIVE**
COMMENTS: **Monitors downwind concentration of ozone from mobile sources in the Philadelphia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

SITE NAME: **CARLISLE**
AQS ID: **420410101**
CBSA: **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
CBSA: 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
CBSA: 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
NO_2	SLAMS	1/1/1974	Continuous	Chemiluminescence	Neighborhood	Population Exposure
$PM_{2.5}$ (Disc)	SLAMS	4/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure
$PM_{2.5}$ Speciation (Disc)	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
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
CBSA: 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

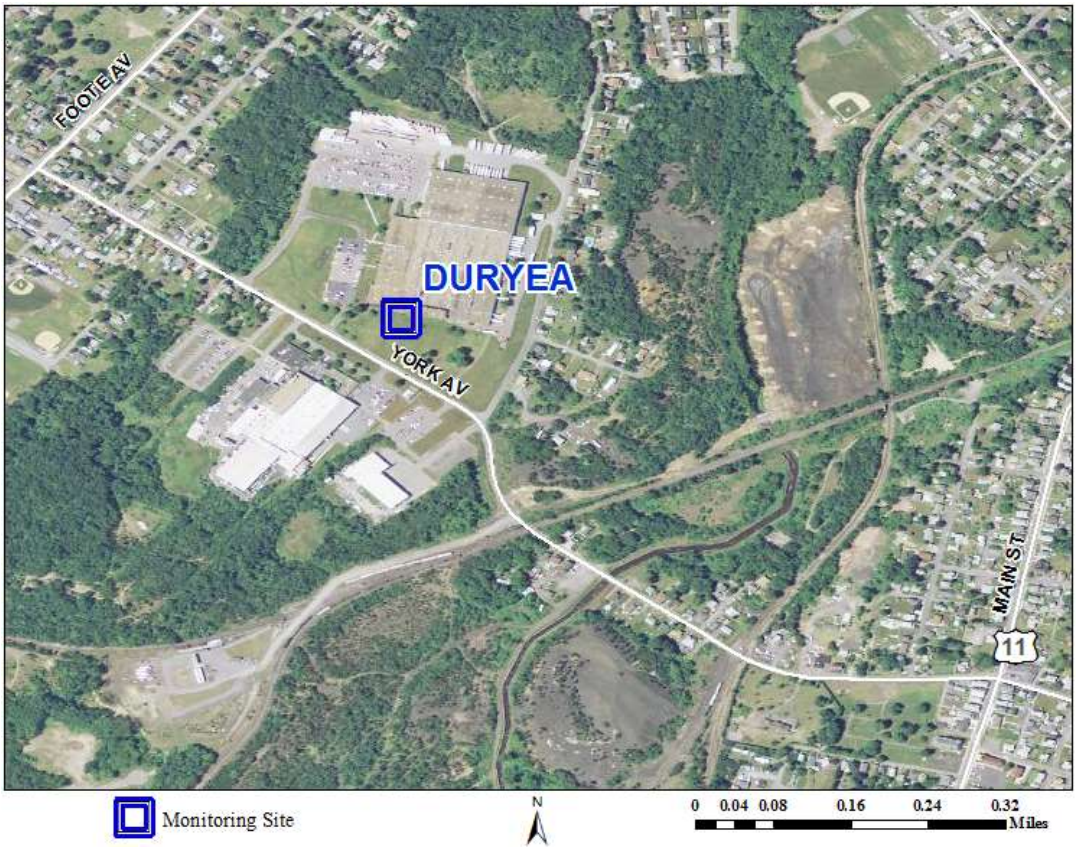
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC	Other	5/18/2007	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **CONEMAUGH**
AQS ID: **421290009**
CBSA: **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**

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: **DURYEA**
AQS ID: **420790036**
CBSA: **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: ELLWOOD CITY
AQS ID: 420730011
CBSA: New Castle Micropolitan Area
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	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**
CBSA: **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

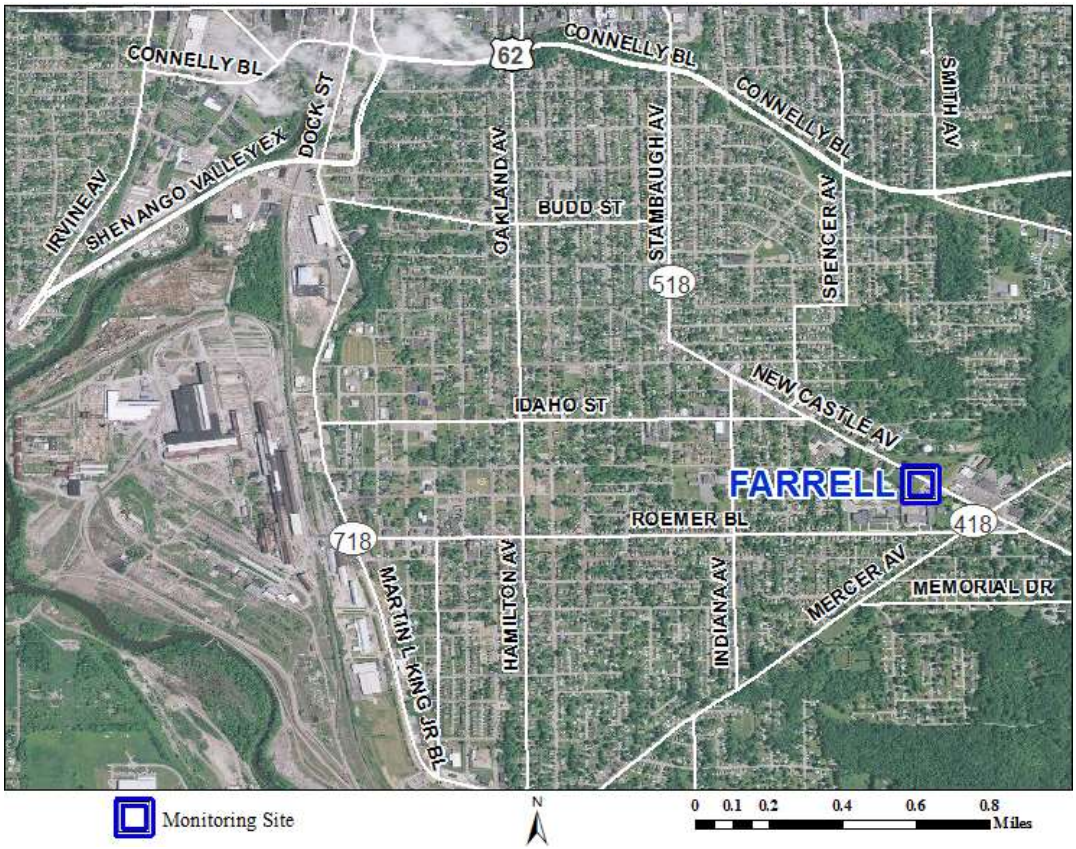
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	5/18/1988	Continuous	UV Absorption	Neighborhood	Population Exposure
NO_2	SLAMS	5/18/1988	Continuous	Chemiluminescence	Neighborhood	Population Exposure
CO	SLAMS	11/1/2004	Continuous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

SITE NAME:	**EVANSBURG UNITED METHODIST**
AQS ID:	**420910016**
CBSA:	**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

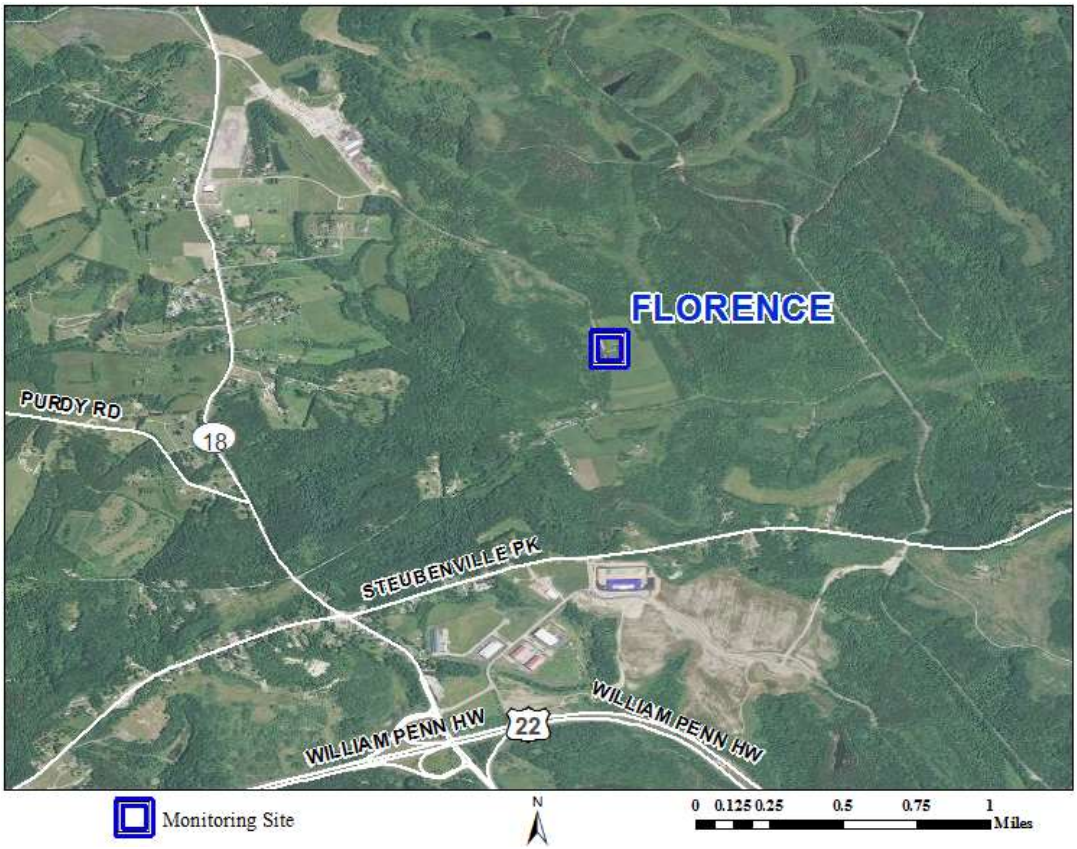
SITE NAME: **FARRELL**
AQS ID: **420850100**
CBSA: **Youngstown-Warren-Boardman MSA**
COUNTY: **MERCER**
MUNICIPALITY: **CITY OF FARRELL**
LATITUDE: **41.21405556**
LONGITUDE: **-80.48347222**
ADDRESS: **PA518 (NEW CASTLE ROAD) & PA418**
COMMENTS: **Meets federal monitoring requirements in the PA part 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	11/3/2010	Continuous	Beta Attenuation	Urban Scale	Population Exposure

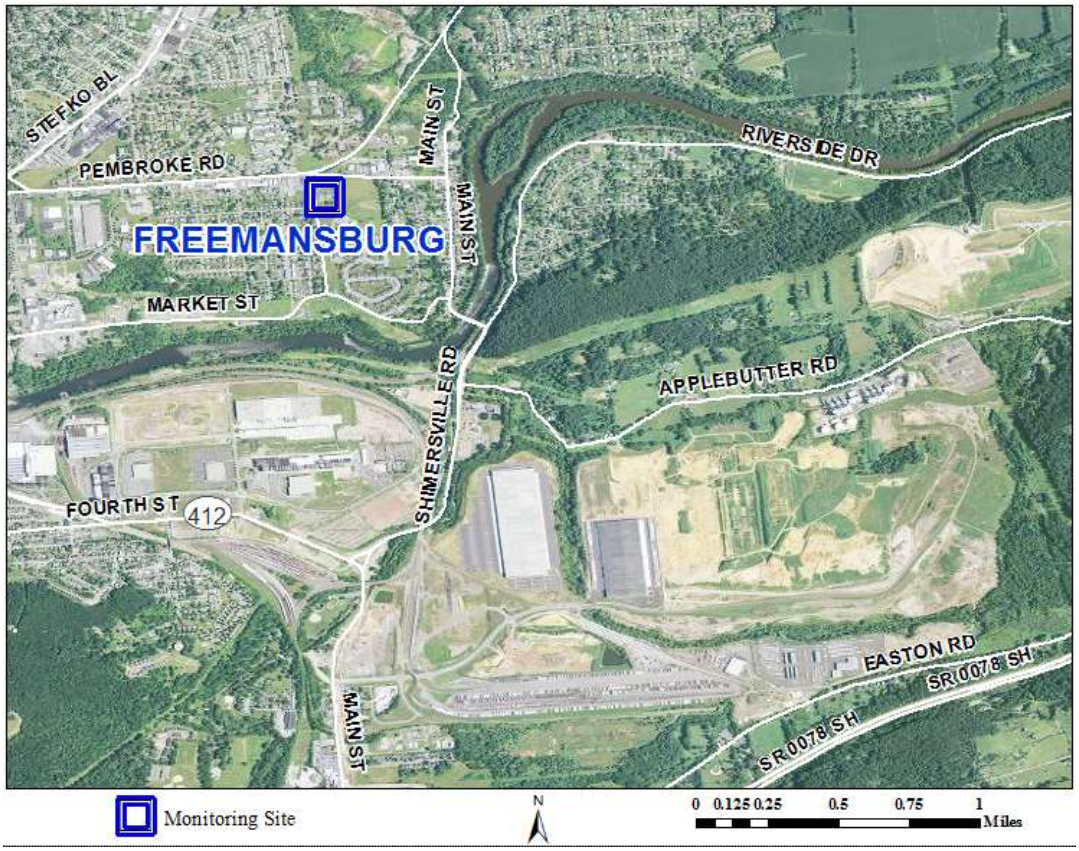
SITE NAME: **FLORENCE**
AQS ID: 421255001
CBSA: Pittsburgh MSA
COUNTY: WASHINGTON
MUNICIPALITY: HANOVER TWP
LATITUDE: 40.44547222
LONGITUDE: -80.42122222
ADDRESS: HILLMAN STATE PARK - KINGS CREEK ROAD
COMMENTS: Monitors transport of pollutants into PA from upwind areas including Ohio and West Virginia



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	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**
CBSA:	**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
SO_2	SLAMS	2/21/2018	Continuous	UV Fluorescence	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

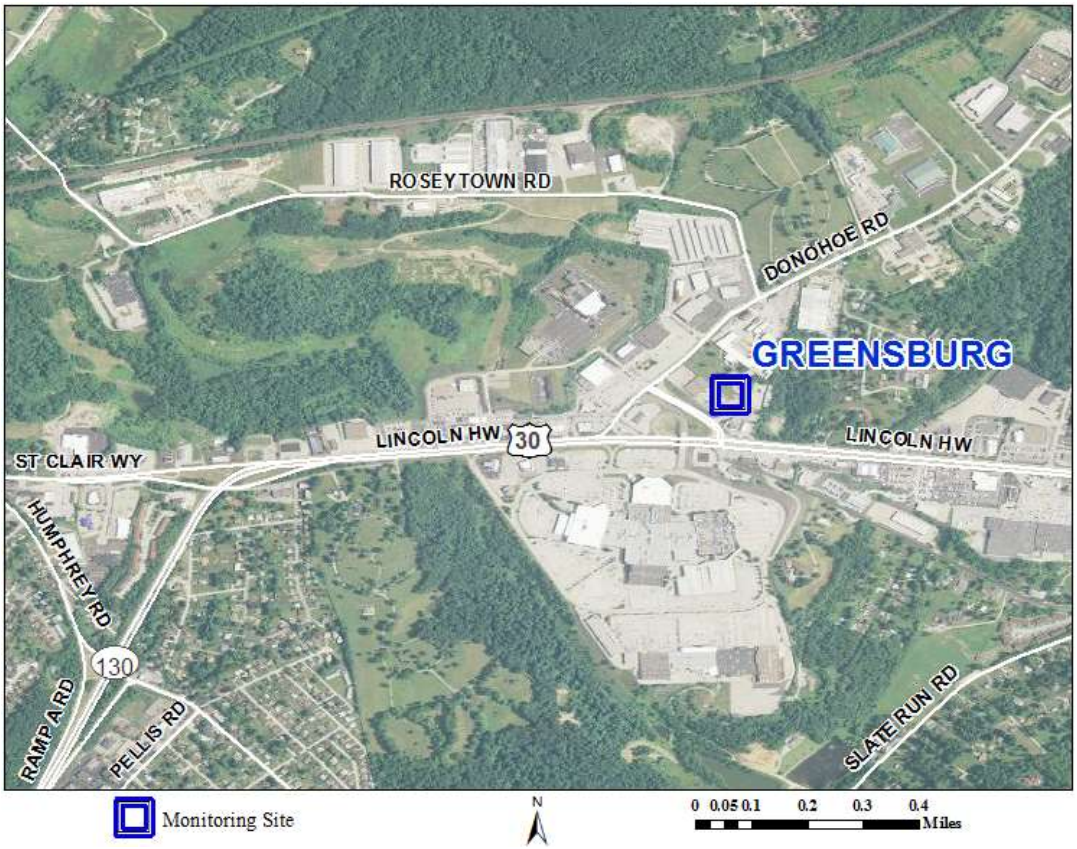
SITE NAME: **GLASGOW**
AQS ID: **420070035**
CBSA: **Pittsburgh MSA**
COUNTY: **BEAVER**
MUNICIPALITY: **GLASGOW BOROUGH**
LATITUDE: **40.644637**
LONGITUDE: **-80.508413**
ADDRESS: **UNION LANE**
COMMENTS: **Measures ambient levels of heavy metals near local source**

Photo not available

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Metals	Other	10/16/2017	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A
Metals (TSP-based)	Other	10/16/2017	1 in 6	High Volume Sampler with Glass Filter (24 Hour)	N/A	N/A

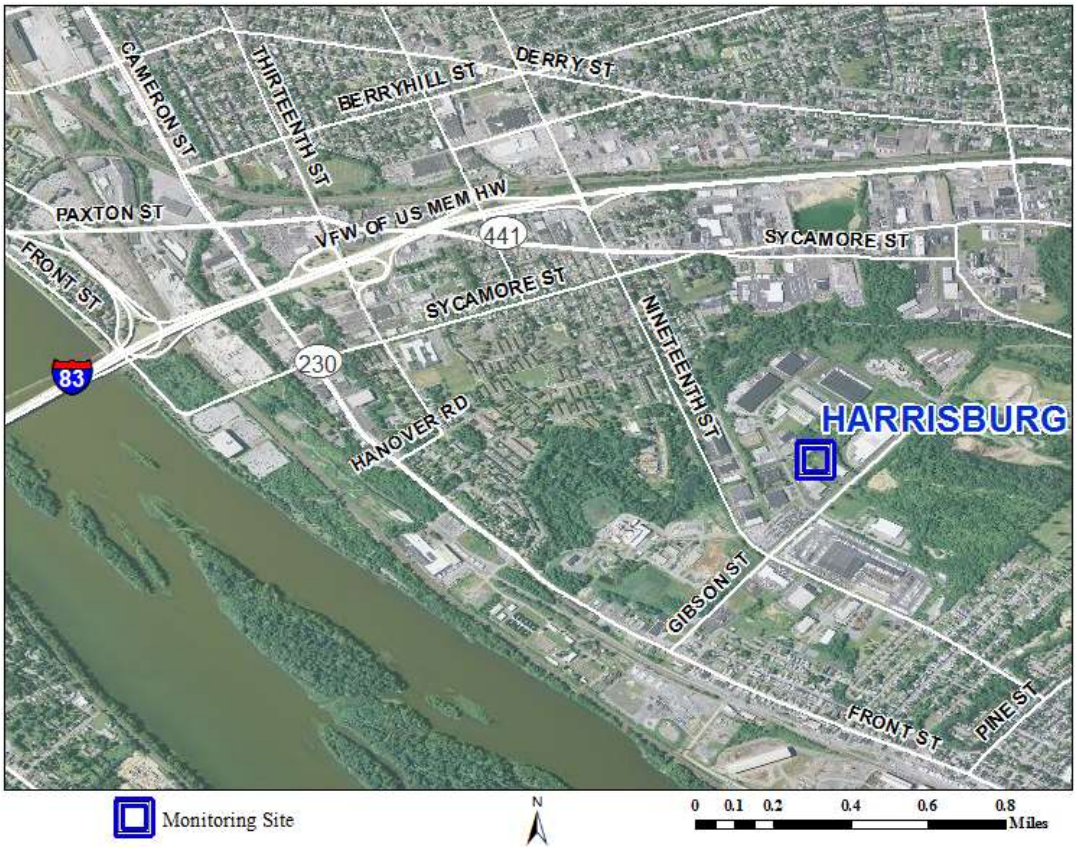
SITE NAME: **GREENSBURG**
AQS ID: **421290008**
CBSA: **Pittsburgh MSA**
COUNTY: **WESTMORELAND**
MUNICIPALITY: **HEMPFIELD TWP**
LATITUDE: **40.30438889**
LONGITUDE: **-79.50605556**
ADDRESS: **DONOHOE ROAD - PENN DOT MAINT DIST BLDG**
COMMENTS: **Meets federal monitoring requirements in the Pittsburgh 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	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

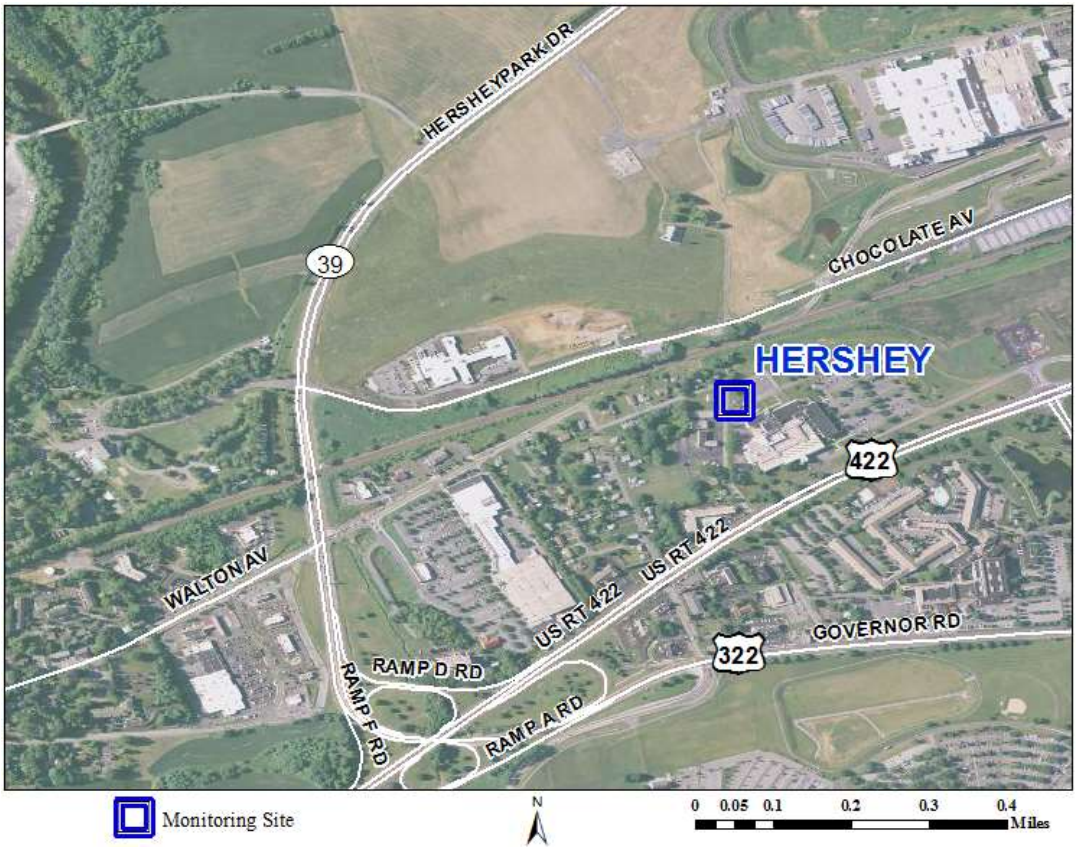
SITE NAME: **HARRISBURG**
AQS ID: **420430401**
CBSA: **Harrisburg-Carlisle MSA**
COUNTY: **DAUPHIN**
MUNICIPALITY: **SWATARA TWP**
LATITUDE: **40.246992**
LONGITUDE: **-76.846988**
ADDRESS: **651 Gibson Blvd**
COMMENTS: **Monitors criteria pollutants for NAAQS compliance in the Harrisburg MSA**



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	1/1/2009	Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: **HERSHEY**
AQS ID: **420431100**
CBSA: **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

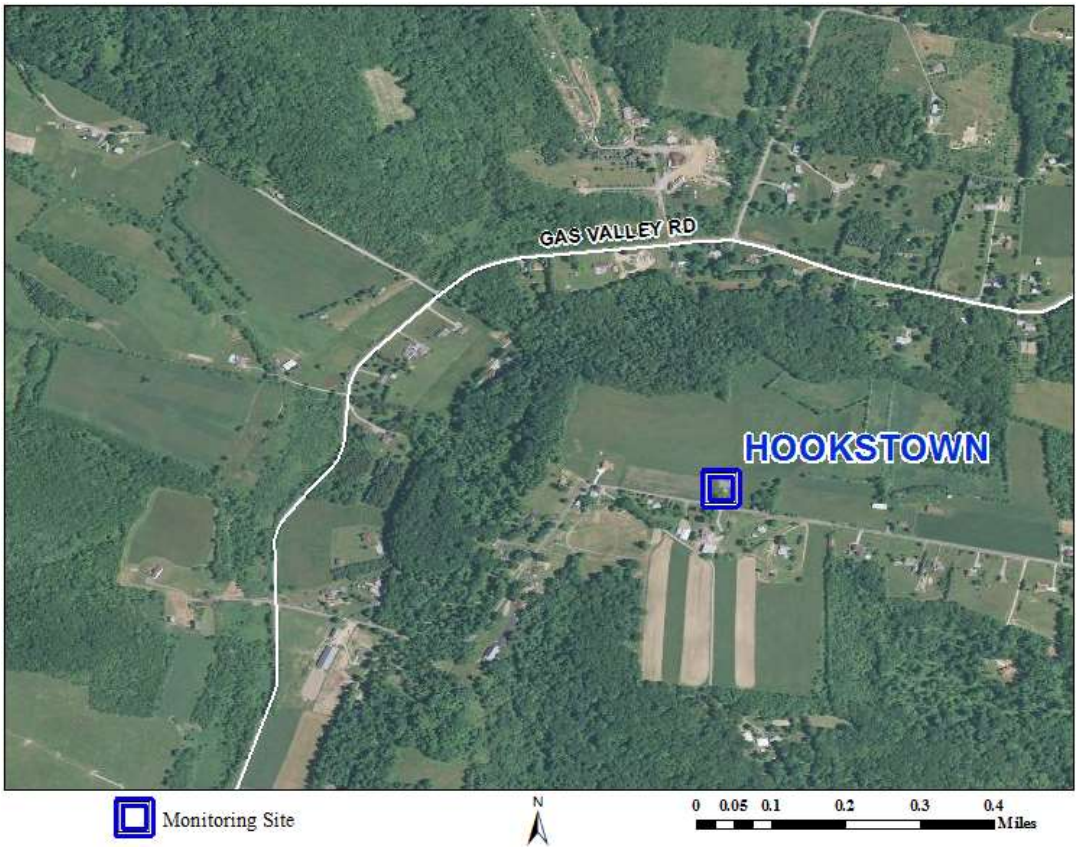
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	8/1/1981	Continuous	UV Absorption	Urban Scale	Max Ozone Concentration
PM_{10}	SLAMS	1/19/2012	Continuous	TEOM Gravimetric	Neighborhood	Population Exposure

SITE NAME: **HOLBROOK**
AQS ID: **420590002**
CBSA: **Southwest Region - Non-CBSA**
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
$PM_{2.5}$	SLAMS	1/1/2016	Continuous	Beta Attenuation	Neighborhood	Source Oriented

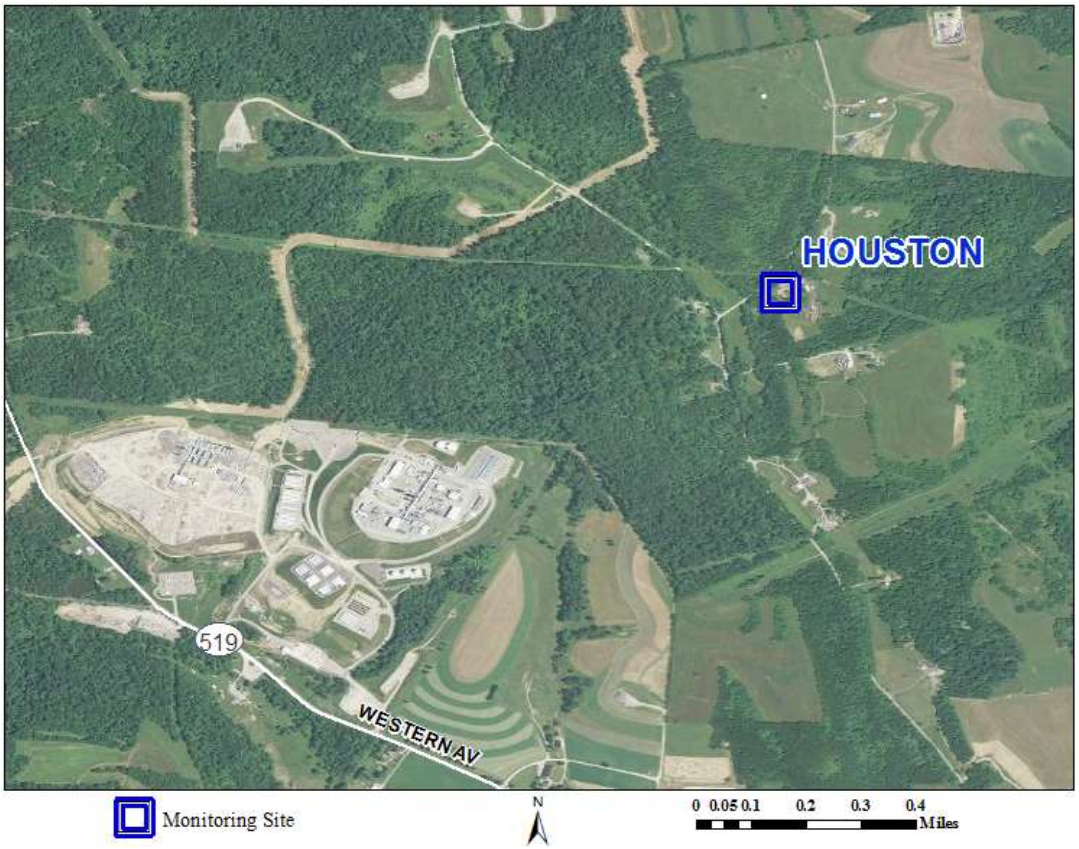
SITE NAME: **HOOKSTOWN**
AQS ID: **420070002**
CBSA: **Pittsburgh MSA**
COUNTY: **BEAVER**
MUNICIPALITY: **GREENE TWP**
LATITUDE: **40.56305556**
LONGITUDE: **-80.50444445**
ADDRESS: **ROUTE 168 & TOMLINSON ROAD**
COMMENTS: **Monitors transport of pollutants into PA from WV and OH**



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**
CBSA: **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*
Ozone	SLAMS	3/14/2018	Continuous	UV Absorption	Neighborhood	Source Oriented
NO_2	SLAMS	7/23/2012	Continuous	Chemiluminescence	Neighborhood	Source Oriented
$PM_{2.5}$	SLAMS	New 2017-18	Continuous	Beta Attenuation	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**
CBSA: **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

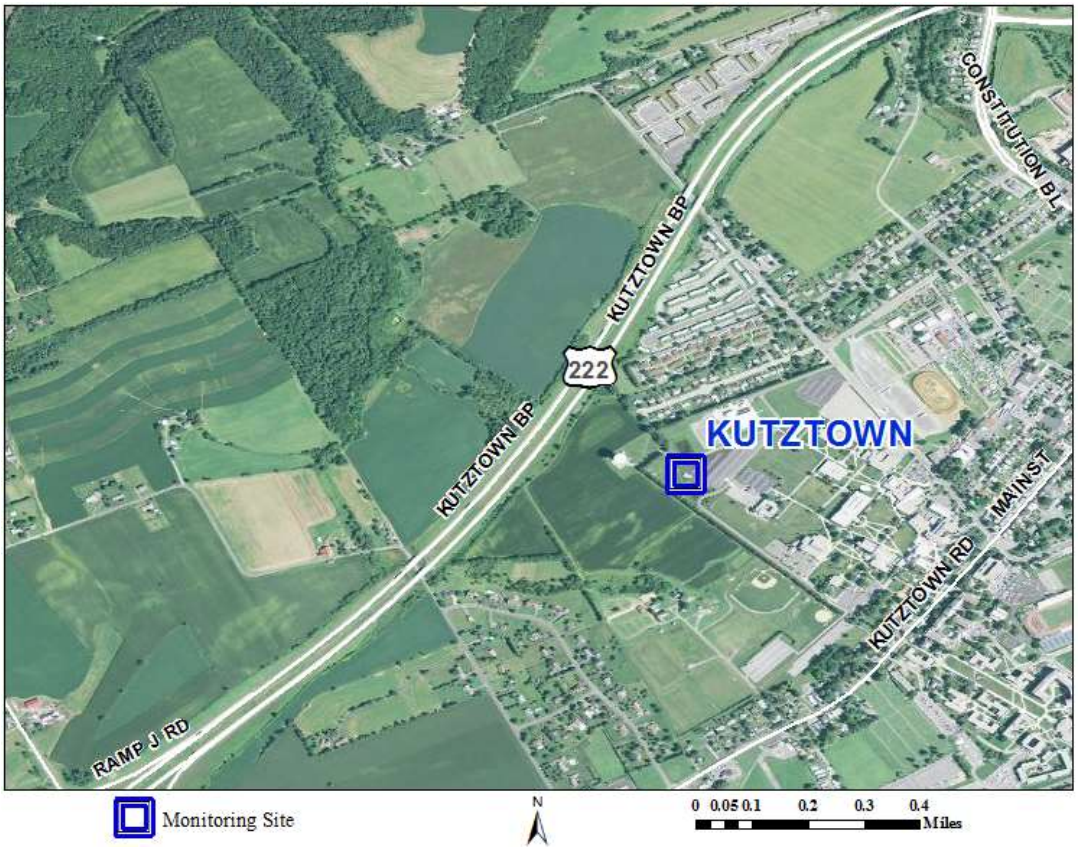
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	1/1/1974	Continuous	UV Absorption	Neighborhood	Population Exposure
SO_2	SLAMS	1/1/1974	Continuous	UV Fluorescence	Urban Scale	Population Exposure
NO_2	SLAMS	1/1/1974	Continuous	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
CBSA: 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

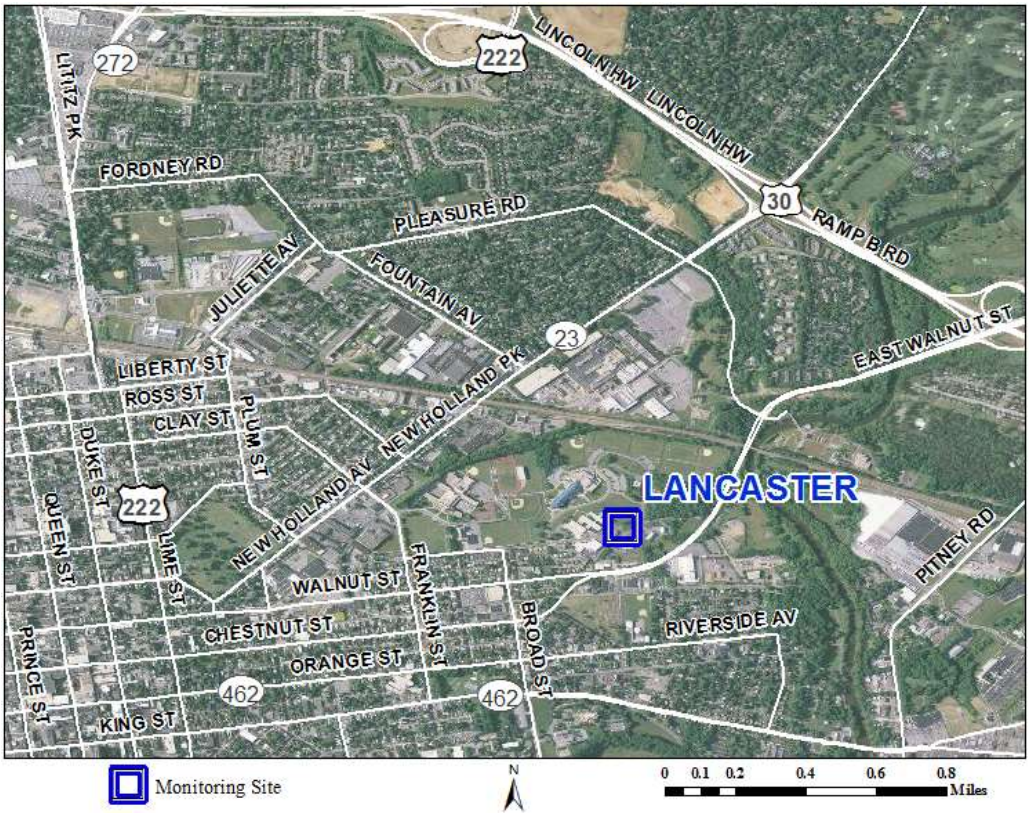
SITE NAME: KUTZTOWN
AQS ID: 420110006
CBSA: Reading MSA
COUNTY: BERKS
MUNICIPALITY: MAXATAWNY TWP
LATITUDE: 40.51408
LONGITUDE: -75.78972
ADDRESS: KUTZTOWN UNIVERSITY CAMPUS
COMMENTS: Measures downwind ozone concentrations of the Reading metro area



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**
CBSA: **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
Metals	Other	5/24/1999	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A
Mercury (Disc)	Other	5/24/1999	Continuous	Tekran Vapor Analyzer	N/A	N/A

SITE NAME: LANCASTER DOWNWIND
AQS ID: 420710012
CBSA: 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	CSN	11/1/2016	1 in 6	Gravimetric	Urban Scale	Population Exposure

SITE NAME: **LAURELDALE NORTH**
AQS ID: **420110020**
CBSA: **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
CBSA: 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**
CBSA: **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

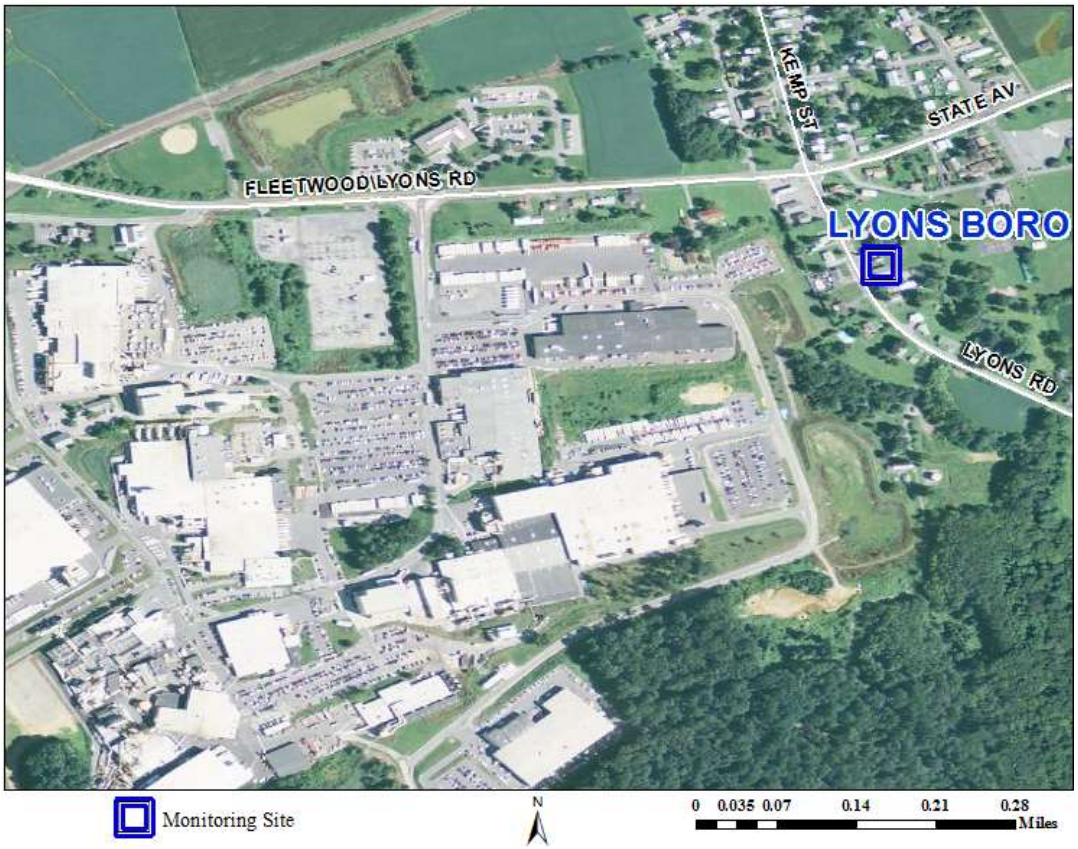
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	2/25/2011	Continuous	UV Absorption	Urban Scale	Max Ozone Concentration
$PM_{2.5}$	SLAMS	1/7/2016	Daily	Gravimetric	Urban Scale	Population Exposure
$PM_{2.5}$	SLAMS	2/25/2011	Continuous	Beta Attenuation	Urban Scale	Population Exposure
$PM_{2.5}$ Speciation (add)	CSN	New 2017-18	1 in 6	Gravimetric	Urban Scale	Population Exposure

SITE NAME: **LEWISBURG**
AQS ID: **421190001**
CBSA: **Lewisburg Micropolitan Area**
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*
VOC	Other	8/1/2003	1 in 6	Canister (24 Hour)	N/A	N/A
Metals	Other	8/1/2003	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

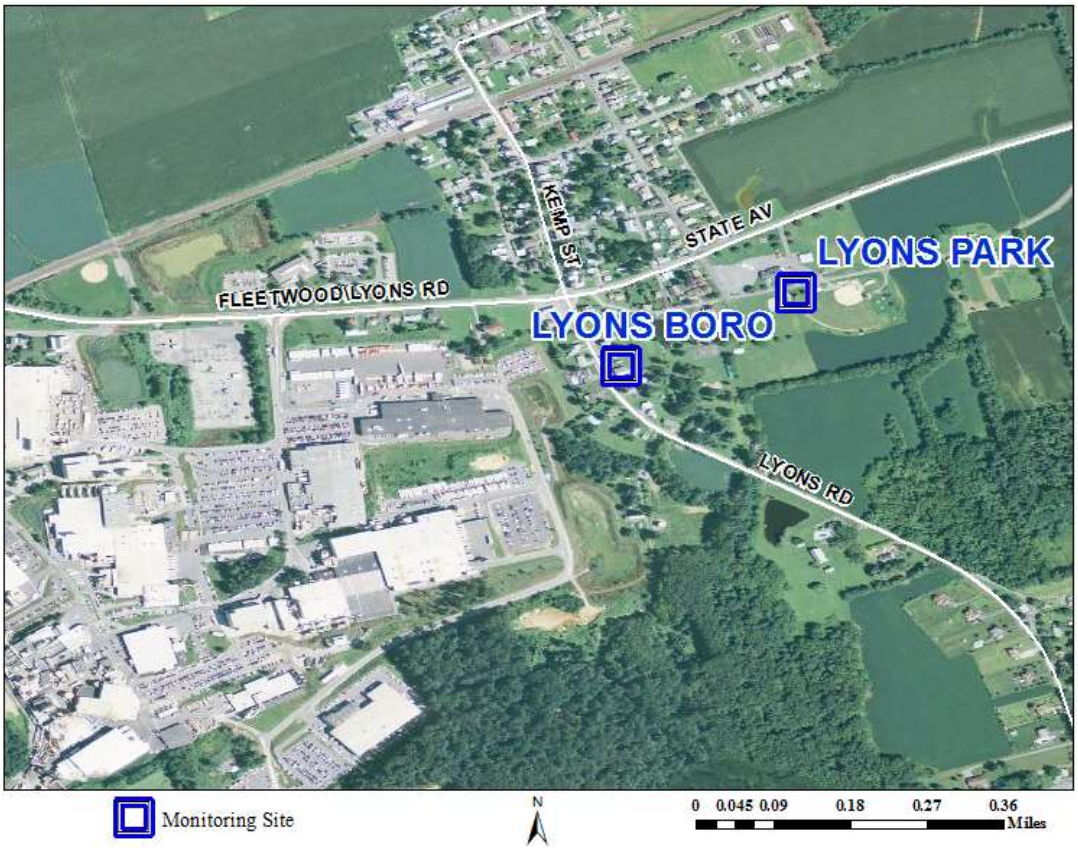
SITE NAME: **LYONS BORO**
AQS ID: **420110021**
CBSA: **Reading MSA**
COUNTY: **BERKS**
MUNICIPALITY: **LYONS BORO**
LATITUDE: **40.477075**
LONGITUDE: **-75.756919**
ADDRESS: **KEMP ST.**
COMMENTS: **Monitors lead concentrations from nearby sources**



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**
CBSA: **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**
CBSA: **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
CBSA: 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

This site will be discontinued.

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC (discontinue)	Other	3/16/2014	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME:	**METHODIST HILL**
AQS ID:	**420550001**
CBSA:	**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

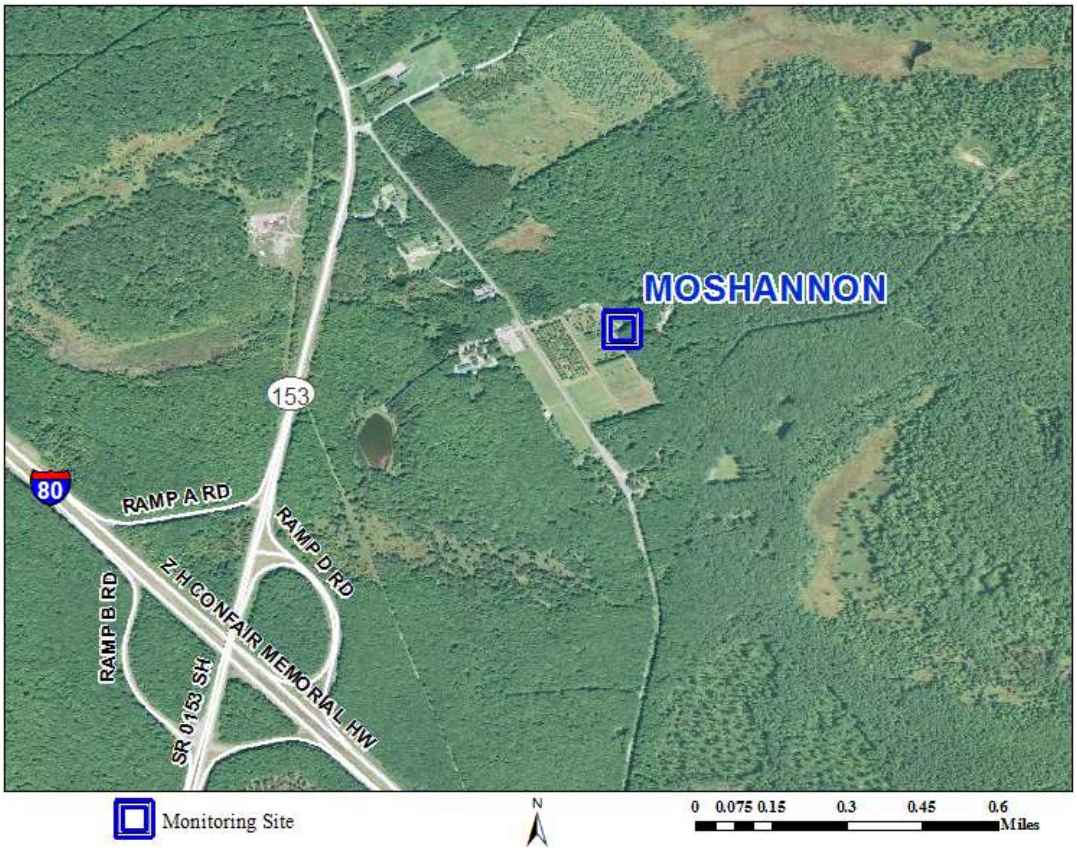
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	6/26/1996	Continuous	UV Absorption	Regional Scale	Regional Transport

SITE NAME: **MONTOURSVILLE**
AQS ID: **420810100**
CBSA: **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

SITE NAME: **MOSHANNON**
AQS ID: **420334000**
CBSA: **DuBois Micropolitan Area**
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**
CBSA: **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**
CBSA: **New Castle Micropolitan Area**
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

SITE NAME: NEW GARDEN
AQS ID: 420290100
CBSA: 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	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

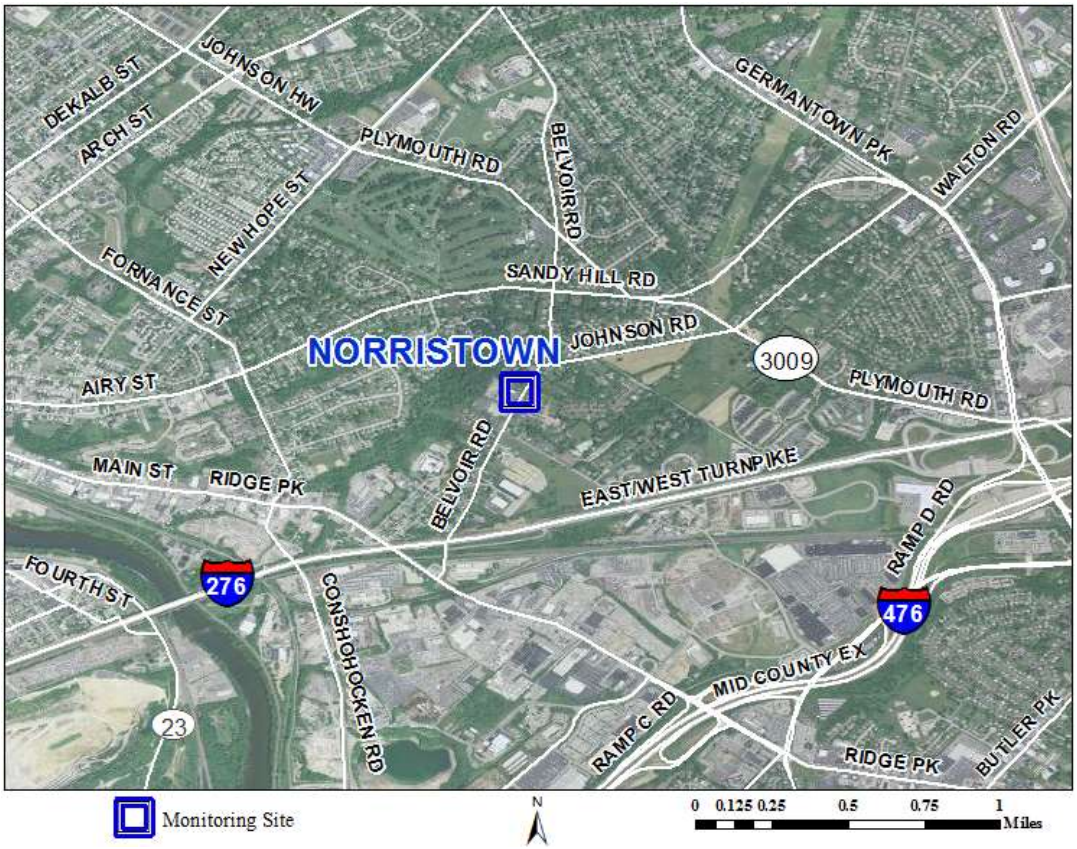
SITE NAME: **NEW MILFORD**
AQS ID: **421150215**
CBSA: **Northeast Region – Non-CBSA**
COUNTY: **SUSQUEHANNA**
MUNICIPALITY: **NEW MILFORD TWP**
LATITUDE: **41.867336**
LONGITUDE: **-75.686602**
ADDRESS: **HALL RD**
COMMENTS: **$PM_{2.5}$ network expansion due to shale gas activities**

Photo not available

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
$PM_{2.5}$	SLAMS	New 2017-18	Continuous	Beta Attenuation	Neighborhood	Source Oriented
Carbonyls	Other		1 in 6	DNPH - Coated Cartridges (24 Hour)	N/A	N/A
VOC	Other		1 in 6	Canister (24 Hour)	N/A	N/A

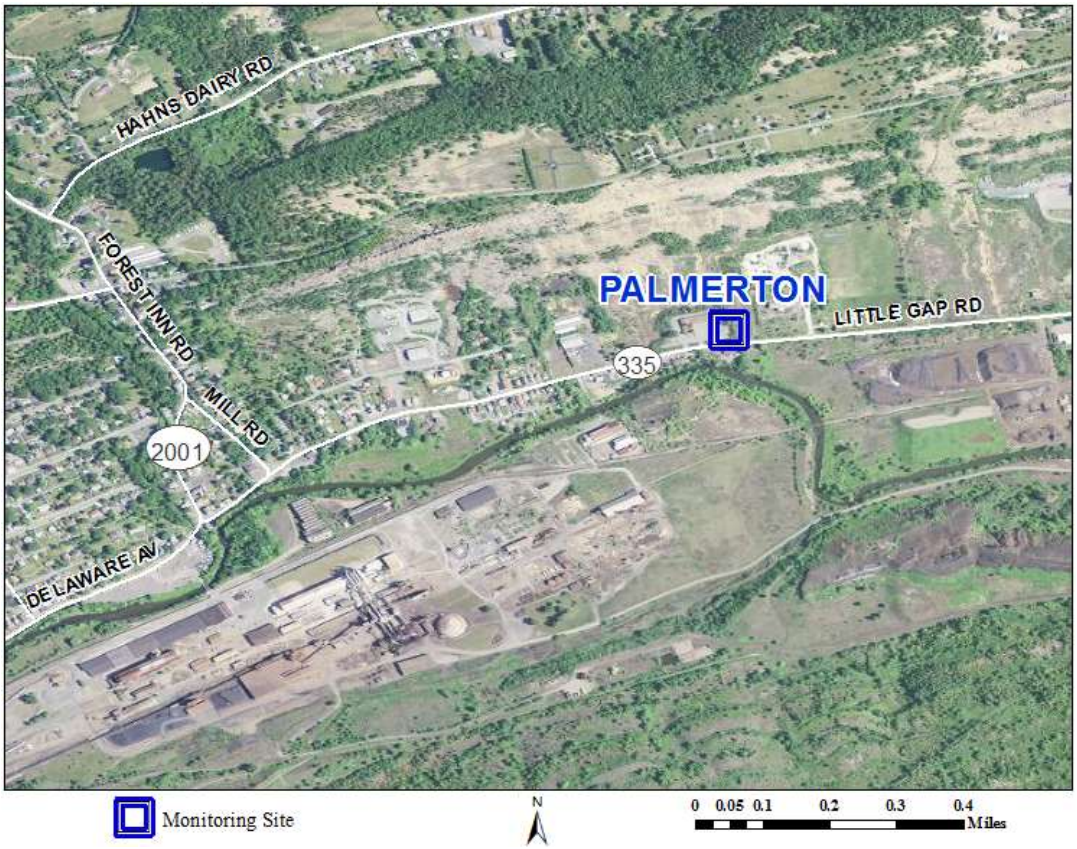
SITE NAME: NORRISTOWN
AQS ID: 420910013
CBSA: Philadelphia-Camden-Wilmington MSA
COUNTY: MONTGOMERY
MUNICIPALITY: PLYMOUTH TWP
LATITUDE: 40.11327778
LONGITUDE: -75.30869445
ADDRESS: STATE ARMORY - 1046 BELVOIR RD
COMMENTS: Meets federal monitoring requirements in the PA part of the Philadelphia-Camden-Wilmington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



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	10/30/2003	Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: **PALMERTON**
AQS ID: **420250214**
CBSA: **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

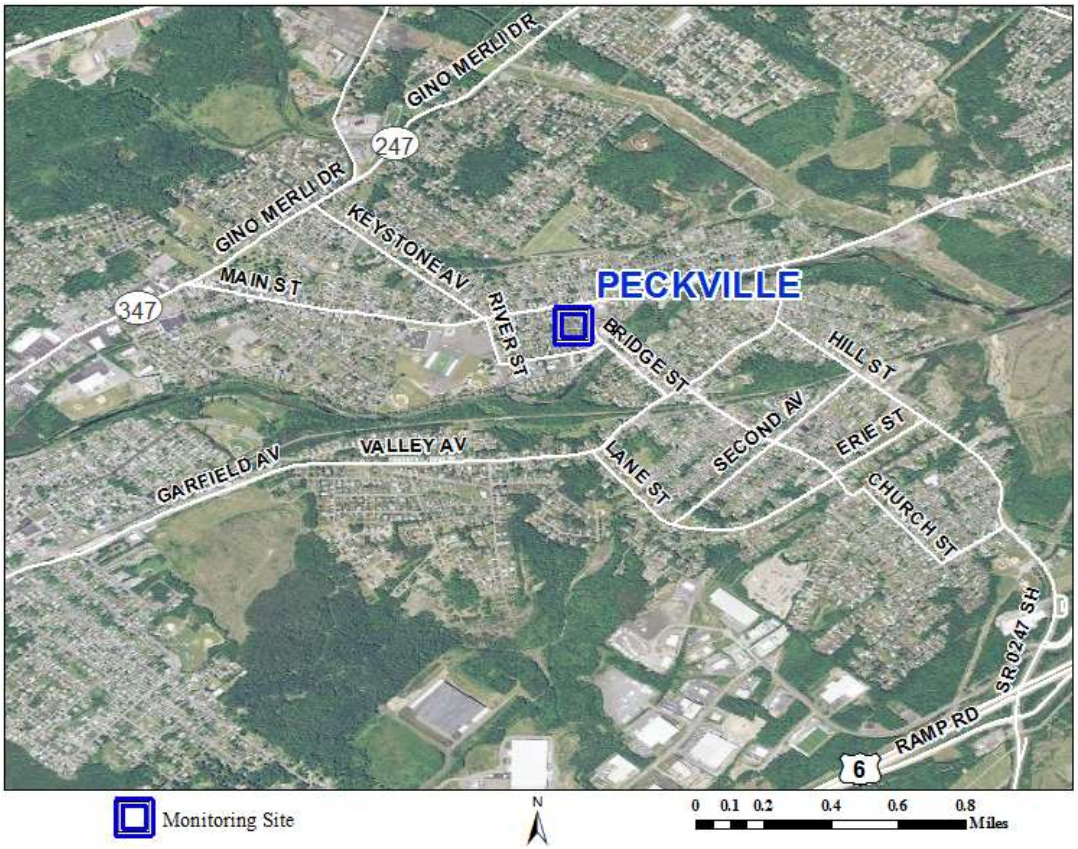
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Pb	SLAMS	5/9/2012	1 in 6	ICP-MS	Middle Scale	Source Oriented

SITE NAME: **PALMERTON ELECTRIC**
AQS ID: **420250300**
CBSA: **Allentown-Bethlehem-Easton MSA**
COUNTY: **CARBON**
MUNICIPALITY: **LOWER TOWAMENSING TWP**
LATITUDE: **40.81329**
LONGITUDE: **-75.56979**
ADDRESS: **LITTLE GAP RD**
COMMENTS: **Monitors metals near source region**

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Metals	Other	4/1/2017	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A
Metals (TSP-based)	Other	1/1/2017	1 in 6	High Volume Sampler with Glass Filter (24 Hour)	N/A	N/A

SITE NAME: **PECKVILLE**
AQS ID: **420690101**
CBSA: **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**
CBSA: **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**
CBSA: **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
Metals	Other	6/8/2000	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

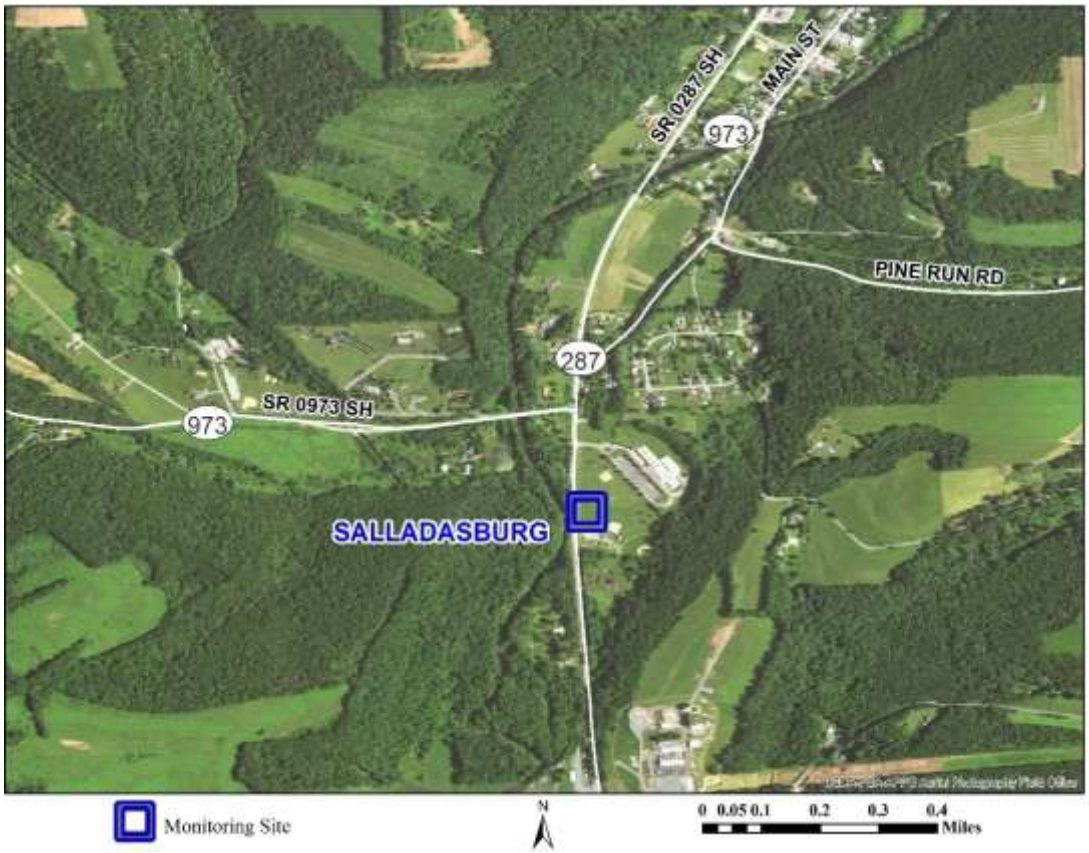
SITE NAME: **READING AIRPORT**
AQS ID: **420110011**
CBSA: **Reading MSA**
COUNTY: **BERKS**
MUNICIPALITY: **BERN TWP**
LATITUDE: **40.38335**
LONGITUDE: **-75.9686**
ADDRESS: **1059 ARNOLD ROAD**
COMMENTS: **Monitors for NAAQS compliance for criteria pollutants in Reading MSA**

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	Beta Attenuation	Neighborhood	Population Exposure
VOC	Other	6/17/2007	1 in 6	Canister (24 Hour)	N/A	N/A
Metals	Other	6/17/2007	1 in 6	High Volume Sampler with Quartz Filter (24 Hour)	N/A	N/A

SITE NAME: **SALLADASBURG**
AQS ID: **420810419**
CBSA: **Williamsport MSA**
COUNTY: **LYCOMING**
MUNICIPALITY: **MIFFLIN TWP**
LATITUDE: **41.266263**
LONGITUDE: **-77.231189**
ADDRESS: **SALLADASBURG ELEMENTARY SCHOOL**
COMMENTS: **$PM_{2.5}$ network expansion due to shale gas activities**

Photo not available



Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
$PM_{2.5}$	SLAMS	New 2017-18	Continuous	Beta Attenuation	Neighborhood	Source Oriented

SITE NAME: **SCRANTON**
AQS ID: **420692006**
CBSA: **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: **SPRING GROVE**
AQS ID: **421330012**
CBSA: **York MSA**
COUNTY: **York**
MUNICIPALITY: **JACKSON TWP**
LATITUDE: **39.8751**
LONGITUDE: **-76.912256**
ADDRESS: **ORCHARD RD**
COMMENTS: **Source monitor to fulfill SO_2 DRR requirements**

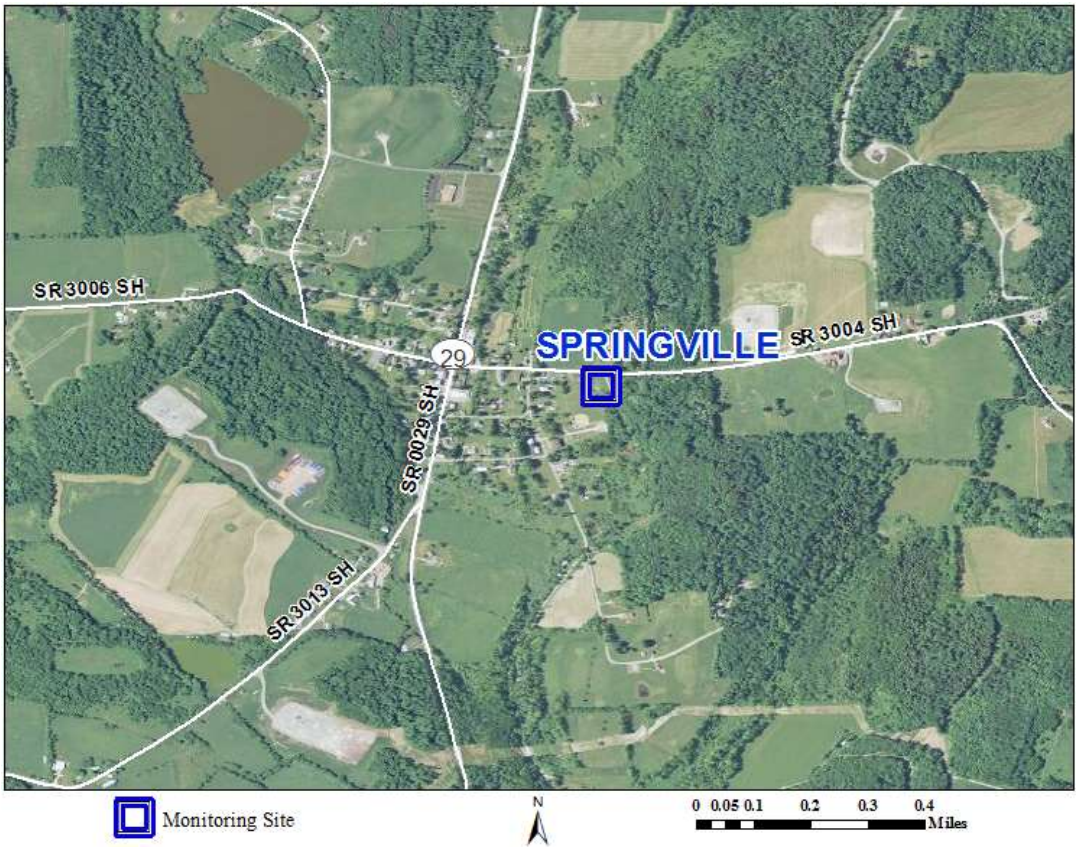
Photo not available

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
SO_2	SLAMS	1/1/2017	Continuous	Pulsed Fluorescence	Urban Scale	Source Oriented

SITE NAME: **SPRINGVILLE**
AQS ID: **421150001**
CBSA: **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**

This site will be discontinued.



Monitor Summary

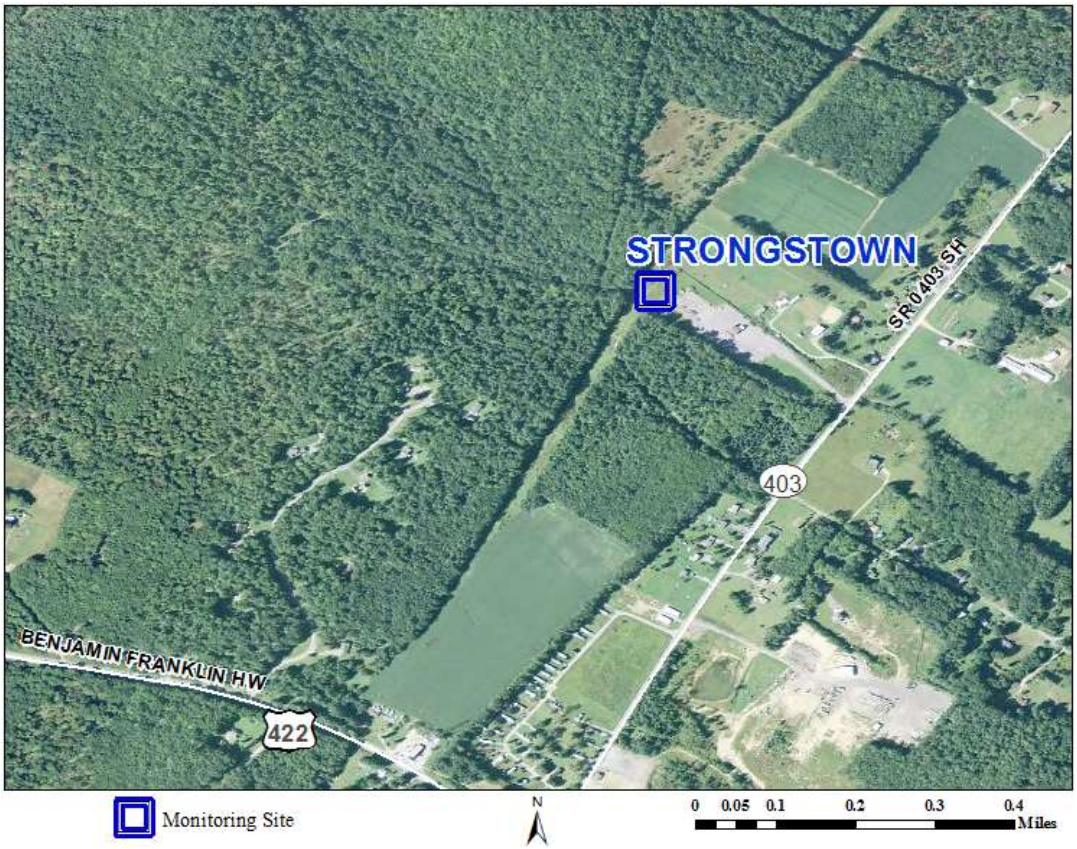
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
VOC (discontinue)	Other	2/27/2013	1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **STATE COLLEGE**
AQS ID: **420270100**
CBSA: **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	9/1/2010	Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: **STRONGSTOWN**
AQS ID: **420630004**
CBSA: **Indiana Micropolitan Area**
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

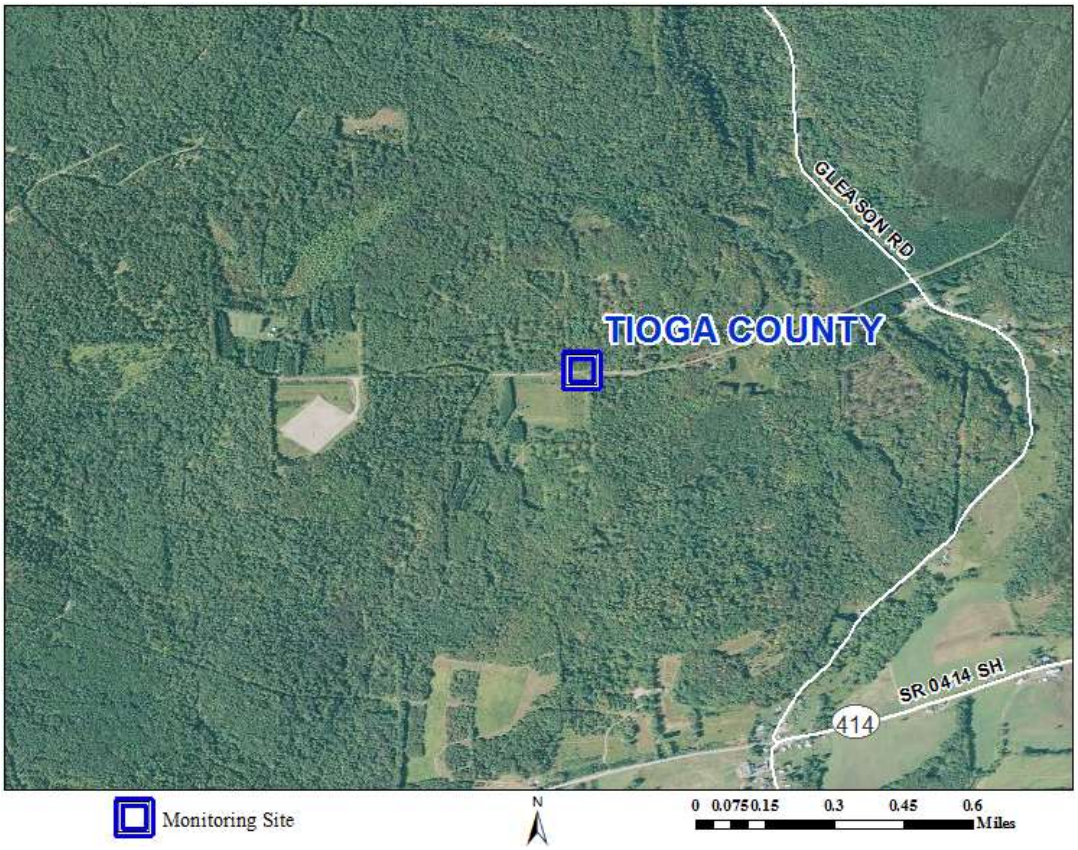
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	11/1/2004	Continuous	UV Absorption	Urban Scale	Extreme Downwind
SO_2	SLAMS	11/1/2004	Continuous	UV Fluorescence	Urban Scale	Regional Transport

SITE NAME: **SWIFTWATER**
AQS ID: **420890002**
CBSA: **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 portion of the East 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

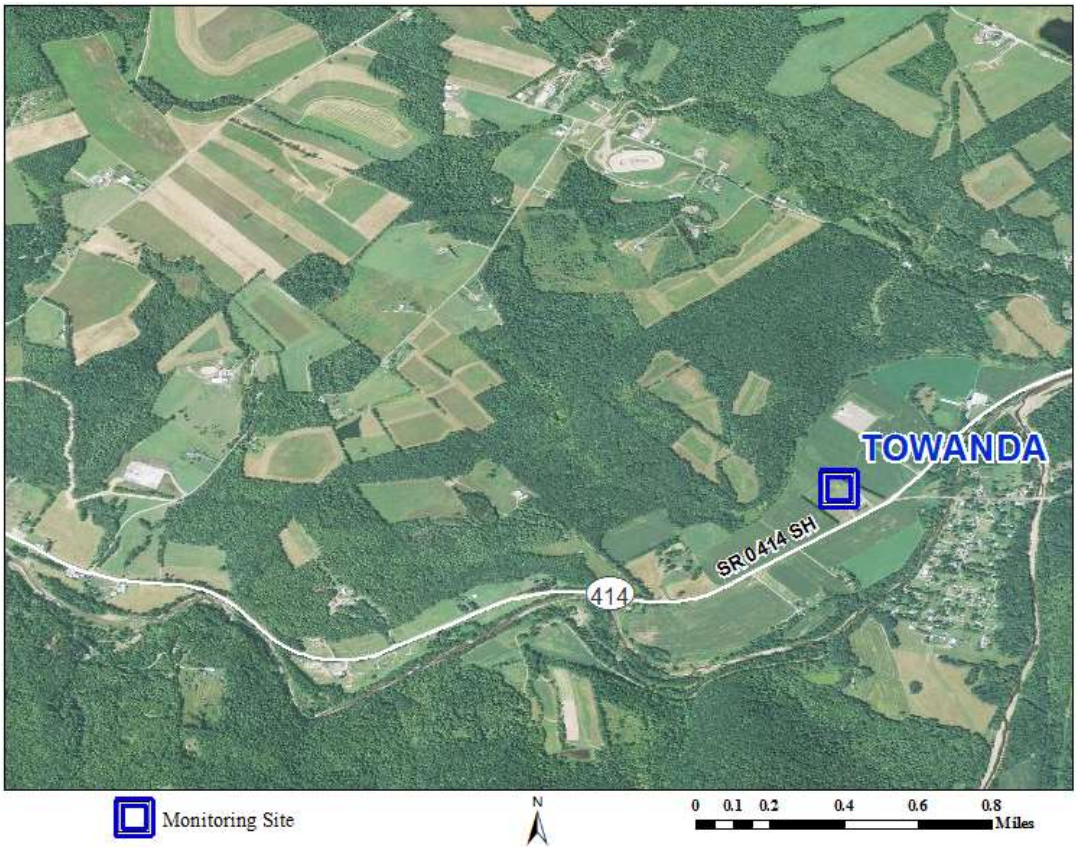
SITE NAME: **TIOGA COUNTY**
AQS ID: **421174000**
CBSA: **Northcentral Region - Non-CBSA**
COUNTY: **TIOGA**
MUNICIPALITY: **UNION TWP**
LATITUDE: **41.64558333**
LONGITUDE: **-76.93797222**
ADDRESS: **TIOGA**
COMMENTS: **Monitors for criteria pollutants near natural gas production facilities as well 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**
CBSA: **Sayre Micropolitan Area**
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: **TUNKHANNOCK**
AQS ID: **421310010**
CBSA: **Scranton-Wilkes-Barre-Hazleton MSA**
COUNTY: **WYOMING**
MUNICIPALITY: **LEMON TWP**
LATITUDE: **41.605244**
LONGITUDE: **-75.95774**
ADDRESS: **BAKER HIRKEY RD**
COMMENTS: **$PM_{2.5}$ network expansion due to shale gas activities**

Photo not available

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
$PM_{2.5}$	SLAMS	New 2017-18	Continuous	Beta Attenuation	Neighborhood	Source Oriented
Carbonyls	Other		1 in 6	DNPH - Coated Cartridges (24 Hour)	N/A	N/A
VOC	Other		1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **UNIONTOWN**
AQS ID: **420510524**
CBSA: **Pittsburgh MSA**
COUNTY: **FAYETTE**
MUNICIPALITY: **MENALLEN TWP**
LATITUDE: **39.917663**
LONGITUDE: **-79.805499**
ADDRESS: **NEW SALEM RD**
COMMENTS: **$PM_{2.5}$ network expansion due to shale gas activities**

Photo not available

Monitor Summary

Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
Ozone	SLAMS	New 2017-18	Continuous	UV Absorption	Neighborhood	
NO_2	SLAMS		Continuous	Chemiluminescence	Neighborhood	Source Oriented
$PM_{2.5}$	SLAMS		Continuous	Beta Attenuation	Neighborhood	Source Oriented
Carbonyls	Other		1 in 6	DNPH - Coated Cartridges (24 Hour)	N/A	N/A
VOC	Other		1 in 6	Canister (24 Hour)	N/A	N/A

SITE NAME: **VANPORT**
AQS ID: **420070505**
CBSA: **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**
CBSA: **Warren Micropolitan Area**
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

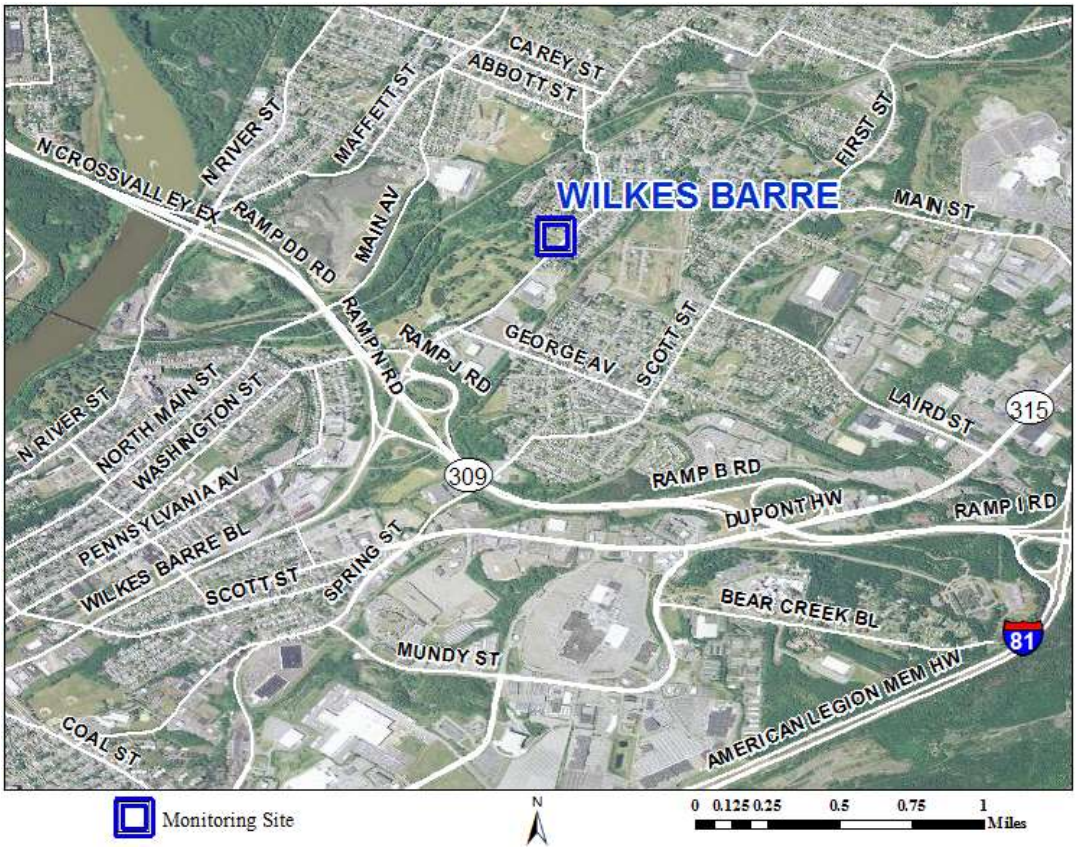
Monitor	*Network*	*Start Date*	*Sample Frequency*	*Method Description*	*Monitoring Scale*	*Appendix D Objectives*
SO_2	SLAMS	1/1/2012	Continuous	UV Fluorescence	Micro Scale	Population Exposure
H_2S	SPM	1/1/2012	Continuous	UV Fluorescence	Micro Scale	Source Oriented

SITE NAME: **WARREN OVERLOOK**
AQS ID: **421230004**
CBSA: **Warren Micropolitan Area**
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: **WILKES-BARRE**
AQS ID: **420791101**
CBSA: **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_2	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**
CBSA: **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
VOC	Other	1/15/2011	1 in 6	Canister (24 Hour)	N/A	N/A
$PM_{2.5}$	SLAMS	8/19/2004	Continuous	Beta Attenuation	Neighborhood	Population Exposure

SITE NAME: **YORK DOWNWIND**
AQS ID: **421330011**
CBSA: **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