



# 2013 Network Summary

New Jersey Department of Environmental Protection

## NETWORK DESCRIPTION

In 2013, the New Jersey Department of Environmental Protection (NJDEP) operated 39 ambient air monitoring stations. The individual monitoring stations vary in terms of the number and type of measurements taken, and how the data collected from each site are used. Most of the monitoring program focuses on criteria pollutants which are pollutants for which National Ambient Air Quality Standards (NAAQS) have been established.

Criteria pollutant monitoring is regulated by the United States Environmental Protection Agency (USEPA) which prescribes the minimum number of sites that must be operated, the monitoring methods to be used, the general locations in which they must be placed, and quality assurance protocols that must be followed. Data which meet USEPA requirements can then be used to determine if the area being monitored meets the NAAQS for the pollutants measured. There are six criteria air pollutants: Carbon Monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>), Particulate Matter, and Sulfur Dioxide (SO<sub>2</sub>). In part because Particulate Matter encompasses such a wide range of contaminants, there are NAAQS for two different size fractions of particles. There are separate standards for particles less than 10 microns (1 micron = one millionth of a meter) or PM<sub>10</sub>, and for particles less than 2.5 microns (PM<sub>2.5</sub>).

In New Jersey, most of the criteria air pollutants are measured using USEPA approved monitoring methods. Data retrieved from these contaminants are thus available in near real-time. The Bureau of Air Monitoring posts air quality updates to both its web site ([www.njaginow.net](http://www.njaginow.net)) and the USEPA's AirNow web site ([www.airnow.gov](http://www.airnow.gov)) once every hour. The manually collected USEPA's approved PM<sub>2.5</sub> samplers pull air through a filter for 24-hours and the filters are weighed before and after sampling. The concentration of particles is then calculated. While this method is quite accurate, it takes several weeks to get results. In order to include PM<sub>2.5</sub> levels in the hourly updates provided, the NJDEP uses continuous PM<sub>2.5</sub> monitors. The Bureau has recently upgraded the PM<sub>2.5</sub> continuous network by replacing older continuous TEOM instruments with USEPA approved PM<sub>2.5</sub> Beta Attenuation analyzers.

Figure 1

Rider University Air Monitoring Station  
Mercer County, New Jersey



In addition to monitoring criteria pollutants, several other types of measurements are made. Non-criteria pollutants are important for a variety of reasons. They may play a role in chemical reactions that take place in the atmosphere. The Photochemical Assessment Monitoring Station (PAMS) program, for example, measures pollutants that are important in the formation of ozone. Since most ozone is not directly emitted from sources but forms in the atmosphere when volatile organic compounds and oxides of nitrogen react in the presence of sunlight, it is important to know the levels of these “precursor” pollutants. The PAMS program is described in more detail in a separate section of this report. Other non-criteria monitoring instruments used throughout the network are the BTEX analyzer (which measures near real-time benzene, toluene, ethylbenzene, m,p-xylene, and o-xylene) and the aethalometer which collects real-time Black Carbon measurements at various urban air monitoring sites.

Some sites in the monitoring network collect samples of particulate matter that are analyzed to determine the chemical makeup of the particles. These are termed “PM<sub>2.5</sub> Speciation Sites”. This data is used in helping to identify the primary sources of particles, and in assessing potential health effects.

At other locations samples are taken and analyzed for non-criteria pollutants that are classified as “air toxics”. These are pollutants that have known health effects but for which NAAQS have not been established. They can be carcinogenic or have other serious health effects and are very diverse in their chemical composition.

Other sites within the network take measurements of atmospheric deposition, visibility, mercury and weather parameters such as wind speed and direction. Some monitoring sites are suitable for measuring a wide variety of pollutants while others are suitable for only one or two. An example of an air monitoring station is the Rider University site located in Lawrenceville, New Jersey shown in Figure 1. This site measures criteria pollutant data as well as weather parameters. Figure 2 shows a USEPA approved manual sampler to measure PM<sub>2.5</sub> located on the roof of the Hooper Avenue Elementary School in Toms River, Ocean County.

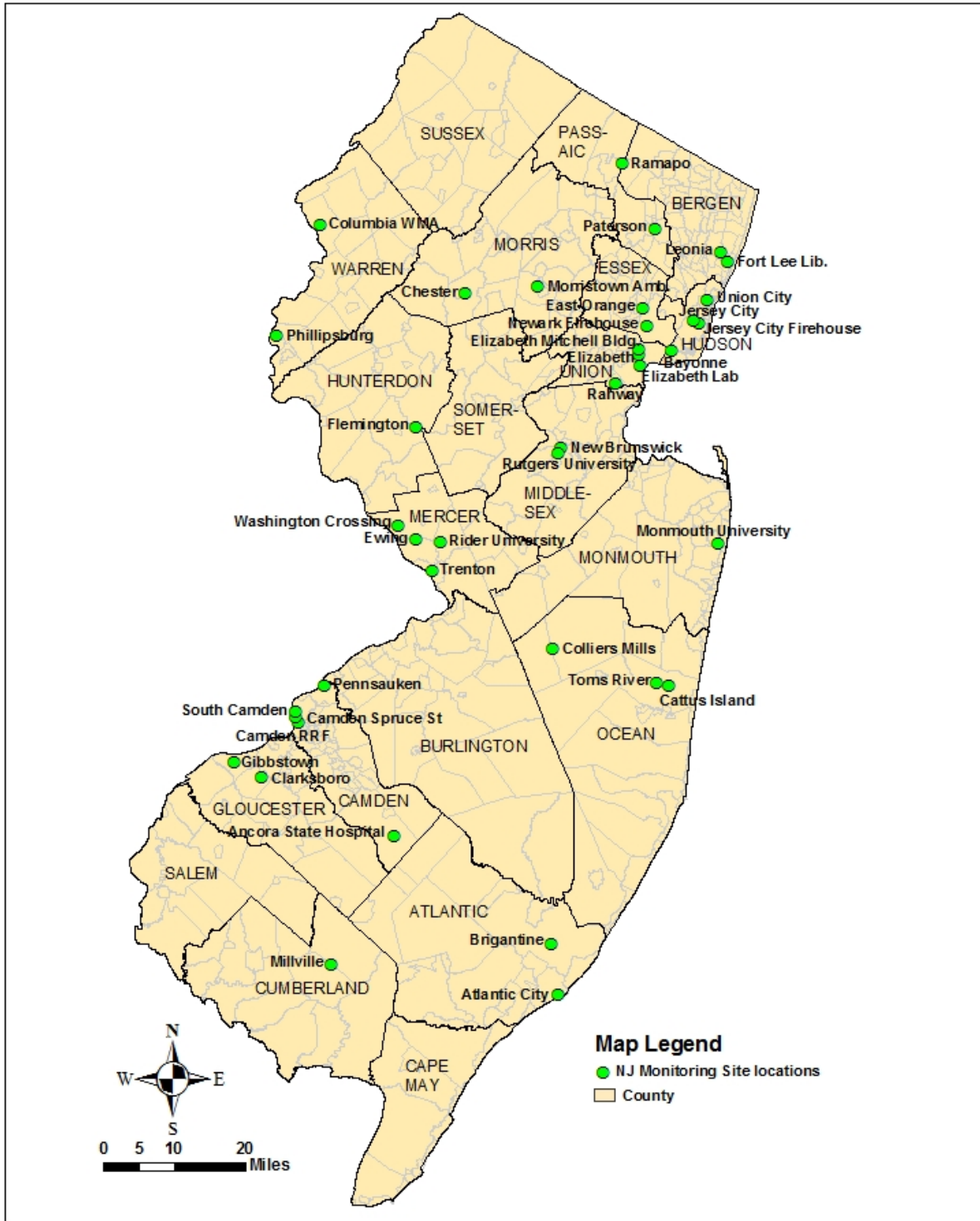
The map in Figure 3 shows the locations of all the sites that operated in 2013, and Table 1 shows which parameters were measured at each site.

Figure 2  
USEPA-approved PM<sub>2.5</sub> Sampler in  
Toms River, Ocean County



Figure 3

# New Jersey Air Monitoring Sites 2013 Network Summary




**Table 1  
2013 Monitoring Network Chart**


	CO	NO <sub>x</sub>	NO <sub>y</sub>	O <sub>3</sub>	SO <sub>2</sub>	Smoke Shade	PM <sub>2.5</sub>	PM <sub>2.5</sub> -Speciation	Real-Time PM <sub>2.5</sub> TEOM	Real-Time PM <sub>2.5</sub> Beta	Visibility	PM <sub>10</sub>	O <sub>3</sub> Precursors - PAMS	VOCs/ Carbonyls	BTEX/ Black Carbon	Lead	Acid Deposition	Mercury	Barometric Pres./ Relative Humidity	Solar Radiation	Temperature	Wind Speed/ Direction	
Ancora State Hospital				Y																			
Atlantic City							Y																
Bayonne		Y		Y	Y																		
Brigantine				Y	Y		Y		Y	Y	Y						Y <sup>1</sup>	Y					
Camden RRF												Y											
Camden Spruce Street	Y	Y		Y	Y		Y	Y						Y	Y				Y		Y	Y	
Cattus Island																	Y						
Chester		Y		Y	Y		Y	Y						Y				Y		Y			
Clarksboro				Y																			
Colliers Mills				Y																			
Columbia WMA		Y		Y	Y		Y		Y										Y		Y	Y	
East Orange	Y	Y																	Y		Y	Y	
Elizabeth	Y				Y	Y																	
Elizabeth Lab	Y	Y			Y	Y	Y	Y	Y	Y				Y	Y			Y				Y	
Elizabeth Mitchell Bldg							Y																
Ewing									Y														
Flemington				Y					Y											Y	Y	Y	Y
Fort Lee Library							Y																
Gibbstown							Y																
Jersey City	Y				Y	Y																	
Jersey City Firehouse							Y		Y			Y											
Leonia				Y																			
Millville		Y		Y						Y													
Monmouth University				Y																			
Morristown Amb Squad							Y																
New Brunswick							Y	Y	Y	Y				Y				Y					
Newark Firehouse	Y	Y	Y	Y	Y		Y	Y	Y	Y					Y	Y			Y	Y	Y	Y	Y
Paterson							Y																
Pennsauken							Y																
Phillipsburg							Y																
Rahway							Y		Y														
Ramapo				Y																			
Rider University				Y																Y	Y	Y	Y
Rutgers University		Y		Y									Y							Y <sup>2</sup>	Y <sup>2</sup>	Y <sup>2</sup>	Y <sup>2</sup>
South Camden									Y														
Toms River							Y																
Trenton							Y																
Union City							Y																
Washington Crossing							Y										Y						
TOTAL	6	9	1	16	9	3	21	5	10	5	1	2	1	4	3	1	3	4	7	5	7	8	

Y - Measuring Parameter Data in 2013

<sup>1</sup> The United States Fish and Wildlife Service is responsible for sample collection

<sup>2</sup> Meteorological measurements at the Site are collected by Rutgers University

 Began measuring data in 2013. See Table 2 (page 5)

 Re-started measuring data in 2013. See Table 2 (page 5)

 Shut-down measuring data in 2013. See Table 2 (page 5)

## CHANGES TO THE NETWORK, 2013

In 2013, TEOM real-time PM<sub>2.5</sub> analyzers were replaced by Beta Attenuation analyzers at Brigantine, Elizabeth Lab, New Brunswick, and Newark Firehouse, while a TEOM analyzer was shut-down at Columbia WMA. BTEX analyzers and aethalometers were installed at the Camden Spruce Street, Elizabeth Lab, and Newark Firehouse. The Newark Firehouse station started measuring lead and the Camden Spruce Street station started measuring VOCs, carbonyls, PM<sub>2.5</sub> speciation and meteorological parameters. In March 2013, the Millville site, which was temporarily shut down in December 2012, was re-established and resumed collecting ozone, nitrogen oxides and real-time PM<sub>2.5</sub> data. In June and into July 2013, the Bayonne site, which was temporarily shut down in October 2012 due to damage caused by Superstorm Sandy, resumed measuring ozone, nitrogen oxides, and sulfur dioxide.

**Table 2**  
**2012-2013 Network Changes**

Monitoring Site	Parameter(s)	Action	Date
East Orange	Barometric Pressure, Relative Humidity, Temperature, Wind Direction, Wind Speed	Start-up	08/17/12
Bayonne	NOx, O <sub>3</sub> , SO <sub>2</sub>	Temporary Shut-down	10/29/12
Cattus Island	Acid Deposition	Start-up	12/04/12
Millville	NOx, O <sub>3</sub> ,	Temporary Shut-down	12/05/12
Millville	Real Time PM <sub>2.5</sub> (TEOM)	Shut-down	12/05/12
Camden Spruce Street	BTEX, Black Carbon	Start-up	01/01/13
Elizabeth Lab	BTEX, Black Carbon	Start-up	01/02/13
Camden Spruce Street	VOC, Carbonyls	Start-up	01/04/13
Newark Firehouse	Pb	Start-up	01/04/13
Camden Spruce Street	PM <sub>2.5</sub> Speciation	Start-up	01/28/13
Millville	O <sub>3</sub>	Re-start	03/01/13
Millville	NOx	Re-start	03/15/13
Elizabeth Lab	Real-Time PM <sub>2.5</sub> (Beta analyzer)	Start-up	05/03/13
Camden Spruce Street	Barometric Pressure, Relative Humidity, Temperature, Wind Direction, Wind Speed	Start-up	05/10/13
Elizabeth Lab	Real-Time PM <sub>2.5</sub> (TEOM)	Shut-down	05/10/13
Brigantine	Real-Time PM <sub>2.5</sub> (TEOM)	Shut-down	05/13/13
Bayonne	NOx	Re-start	06/12/13
Bayonne	O <sub>3</sub>	Re-start	06/17/13

Monitoring Site	Parameter(s)	Action	Date
Newark Firehouse	Real-Time PM <sub>2.5</sub> (TEOM)	Shut-down	06/24/13
New Brunswick	Real-Time PM <sub>2.5</sub> (TEOM)	Shut-down	06/30/13
Bayonne	SO <sub>2</sub>	Re-start	07/01/13
Brigantine	Real-Time PM <sub>2.5</sub> (Beta analyzer)	Start-up	07/25/13
Millville	Real-Time PM <sub>2.5</sub> (Beta analyzer)	Start-up	07/25/13
Newark Firehouse	BTEX, Black Carbon	Start-up	07/25/13
Newark Firehouse	Real-Time PM <sub>2.5</sub> (Beta analyzer)	Start-up	07/25/13
New Brunswick	Real-Time PM <sub>2.5</sub> (Beta analyzer)	Start-up	10/16/13
Columbia WMA	Real-Time PM <sub>2.5</sub> (TEOM)	Shut-down	11/24/13

## REFERENCES

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