



2016 Air Monitoring Network

New Jersey Department of Environmental Protection

NETWORK DESCRIPTION

In 2016, the New Jersey Department of Environmental Protection (NJDEP) Bureau of Air Monitoring (BAM) operated 35 ambient air monitoring stations. The stations vary in the number and type of monitors operating at each site. The NJDEP air monitoring program is primarily focused on the measurement of pollutants for which National Ambient Air Quality Standards (NAAQS) have been established, also known as criteria pollutants. Criteria pollutant monitoring is regulated by the United States Environmental Protection Agency (USEPA), which prescribes the design and siting of the monitoring networks, the acceptable monitoring methods, and the minimum quality assurance activities. Only data which meet USEPA requirements can be used to determine compliance with the NAAQS. There are six criteria air pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), and particulate matter (PM). 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 fine particles, less than 2.5 microns in size referred to as PM_{2.5} (1 micron = one millionth of a meter), and for inhalable particles, less than 10 microns in size, referred to as PM₁₀.

In New Jersey, O₃, CO, NO₂, and SO₂ are measured using USEPA-approved real-time monitoring methods, and data collected for these pollutants are continuously transmitted to a central data acquisition system. Once an hour, the Bureau of Air Monitoring posts this air quality data to its website (www.njaqinow.net) and to the USEPA's Air Now website (www.airnow.gov).

PM_{2.5} is measured both in real-time and with a 24-hour filter-based sampler. The filter must be installed and removed manually, and brought to the BAM lab to be weighed and analyzed. The filter-based sampler is also used to determine lead, PM₁₀, and PM_{coarse} concentrations.

Figure 2-1
Bayonne Air Monitoring Station



In addition to monitoring criteria pollutants, the NJDEP also measures “non-criteria pollutants,” or pollutants that do not have health-based National Ambient Air Quality Standards. Certain non-criteria pollutants are grouped together by their purpose or collection method. USEPA’s Photochemical Assessment Monitoring Station (PAMS) program, for example, measures non-criteria 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.

Other non-criteria pollutants that the Bureau monitors include some that are commonly emitted by motor vehicles and other combustion sources: Benzene, toluene, ethylbenzene, ortho-xylene, meta-xylene, para-xylene (measured with a “BTEX” analyzer), and black carbon (measured with an aethalometer).

Figure 2-2
USEPA-Approved PM_{2.5} Sampler
in Trenton



Five sites in the monitoring network collect samples of PM_{2.5} that are analyzed to determine the chemical makeup of the particles. These are part of USEPA’s Chemical Speciation Network (CSN). This data is used in helping to identify the primary sources of particles, and in assessing potential health effects.

Samples of volatile organic compounds (VOCs) are collected and analyzed at four monitoring sites. These non-criteria pollutants are classified as “air toxics,” pollutants that have potential 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.

Two sites, Cattus Island and Washington Crossing, are part of the National Atmospheric Deposition Network. BAM staff collect the samples and ship them to a national laboratory for analysis of acids, nutrients, and base cations in precipitation.

A number of sites within the air monitoring network also take measurements of meteorological parameters, such as temperature, relative humidity, barometric pressure, wind speed, wind direction, and solar radiation. Figure 2-1 shows the monitoring station at Bayonne (Hudson County), which measures criteria pollutant data as well as weather parameters. Figure 2-2 shows a USEPA-approved manual PM_{2.5} sampler located on the roof of the Trenton Free Public Library on Academy Street.

The map in Figure 2-3 shows the locations of all the monitoring stations that operated in 2016, and Table 2-1 lists the parameters that were measured at each site.

Figure 2-3
 New Jersey Air Monitoring Sites
 2016 Network Summary

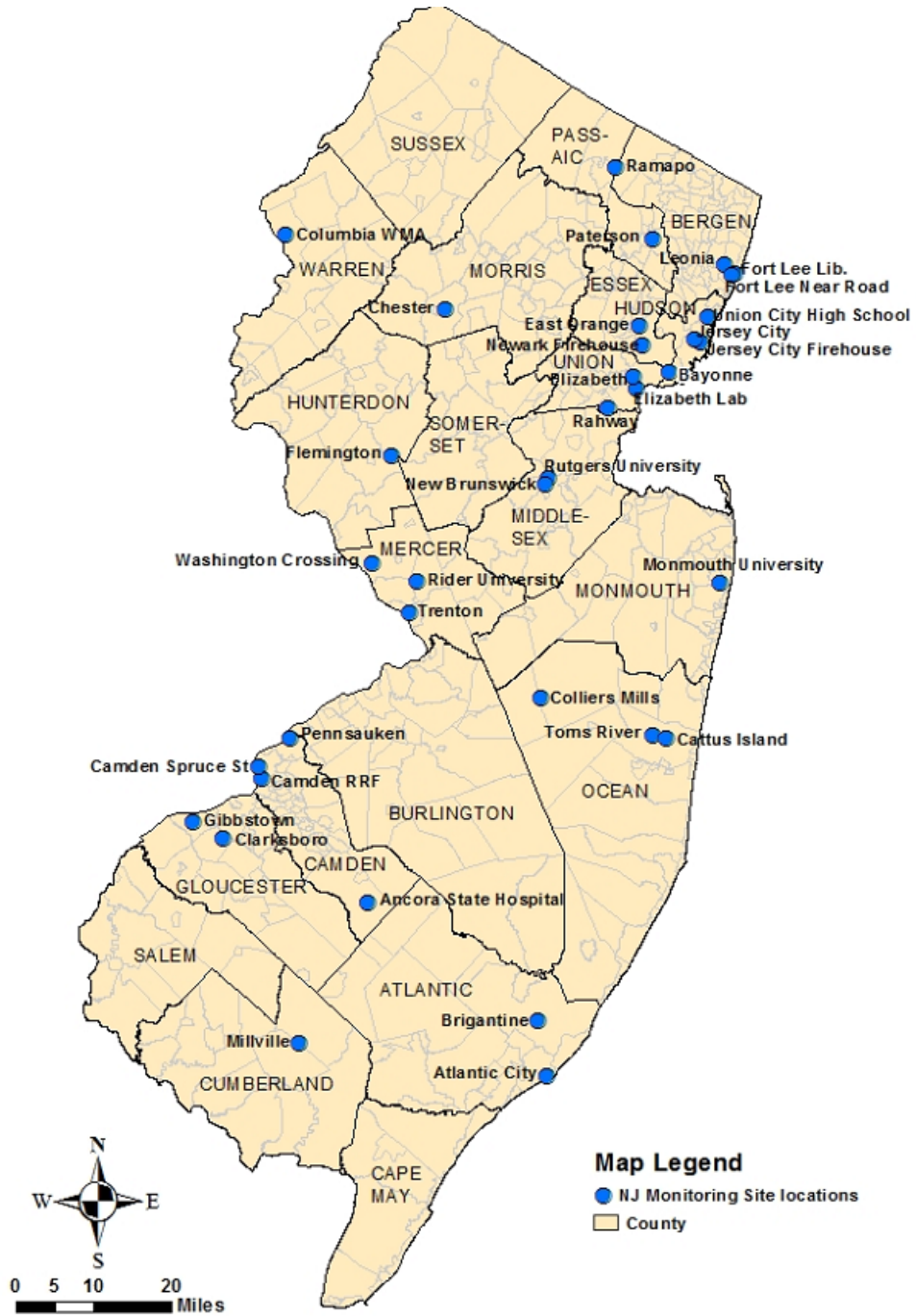


Table 2-1
2016 New Jersey Air Monitoring Network Summary

	Monitoring Station	CO	NO _x	NO _y	O ₃	SO ₂	Smoke Shade	PM _{2.5}	Real-Time PM _{2.5} TEOM	Real-Time PM _{2.5} Beta	Visibility	PM ₁₀	Lead/PM ₁₀ coarse	PM _{2.5} -Speciation	O ₃ Precursors (PAMS)	Toxics	BTEX/ Black Carbon	Acid Deposition	Mercury	Meteorological#	Rain	Solar Radiation	
1	Ancora State Hospital				1																		
2	Atlantic City							1															
3	Bayonne		1		1	1											1				1	1	
4	Brigantine				1	1		1		1	1								1	1b			
5	Camden RRF											1											
6	Camden Spruce Street	1	1		1	1		1		1				1		1	1				1	1	
7	Cattus Island																	1					
8	Chester		1		1	1		1						1		1				1b			
9	Clarksboro				1																		
10	Colliers Mills				1																		
11	Columbia WMA		1		1	1		1		1											1	1	
12	East Orange*	1b	1b																		1b		
13	Elizabeth	1				1	1b																
14	Elizabeth Lab	1	1			1	1b	2		1				1		1	1		1	1	1	1	
15	Flemington				1					1a											1	1	
16	Fort Lee Library							1															
17	Fort Lee Near Road	1	1							1							1				1	1	
18	Gibbstown							1															
19	Jersey City	1	1			1	1b																
20	Jersey City Firehouse							2		1		2											
21	Leonia				1																		
22	Millville		1		1					1													
23	Monmouth University				1																		
24	New Brunswick*							1b		1b				2b		1b				1b			
25	Newark Firehouse	1	1	1	1	1		1		1		1	1	1			1				1	1	1
26	Paterson							1															
27	Pennsauken							1															
28	Rahway							1	1														
29	Ramapo				1																		
30	Rider University				1					1											1		1
31	Rutgers University		1		1			1a		1				2a	1	1a				1a			
32	Toms River							1															
33	Trenton							1															
34	Union City High School**							1															
35	Washington Crossing																	1					
	YEAR-END TOTAL	6	9	1	16	9	0	19	1	11	1	3	1	5	1	4	5	3	2	9	7	2	

Meteorological parameters include temperature, relative humidity, barometric pressure, wind direction & wind speed.

* Monitoring site shut down in 2016

** Monitoring site started up in 2016

1 - Parameter measured in 2016

2 - Collocated parameter measured in 2016

a - Monitor started up in 2016

b - Monitor shut down in 2016

CHANGES TO THE NETWORK IN 2016

In 2016, monitoring stations in Ewing (PM_{2.5}), South Camden (PM_{2.5}), and East Orange (NO_x, CO and meteorological data) were shut down because they were close to other monitoring sites that were measuring similar data. Concern about safe access led to the relocation of the PM_{2.5} monitor from the Union City site to Union City High School. The obsolete forty-year-old smoke shade instruments at Jersey City, Elizabeth and Elizabeth Trailer were officially removed at the close of the year. The New Brunswick site was shut down after the last of the monitors were moved to the Rutgers University site, located approximately a mile away. The Jersey City site began measuring NO₂, NO and NO_x.

Table 2-2
2016 Network Changes (by Date)

Monitoring Site	Parameter(s)	Action	Date
Jersey City	NO ₂ , NO, NO _x	Startup	1/1/2016
Rutgers University	PM _{2.5}	Startup	1/1/2016
Rutgers University	Toxics	Startup	1/1/2016
Union City High School	PM _{2.5}	Startup	1/1/2016
South Camden	PM _{2.5} TEOM	Discontinued	1/14/2016
Washington Crossing	PM _{2.5}	Discontinued	1/14/2016
Ewing	PM _{2.5} TEOM	Discontinued	1/15/2016
New Brunswick	PM _{2.5}	Relocated to Rutgers	2/15/2016
Flemington	PM _{2.5} Beta	Startup	2/19/16
Ancora	Ozone	Moved from trailer to building	3/1/2016
New Brunswick	PM _{2.5} Speciation	Relocated to Rutgers	6/30/16
East Orange	CO	Shut down	7/1/16
East Orange	NO _x	Shut down	7/1/16
East Orange	Meteorological Data	Shut down	7/1/16
Rutgers University	PM _{2.5} Speciation	Startup	7/5/16
New Brunswick	Mercury	Relocated to Rutgers	10/1/16
Rutgers University	Mercury	Startup	10/31/16
Brigantine	Mercury	Discontinued	12/31/16
Chester	Mercury	Discontinued	12/31/16
Elizabeth	Smoke Shade	Discontinued	12/31/16
Elizabeth Trailer	Smoke Shade	Discontinued	12/31/16
Jersey City	Smoke Shade	Discontinued	12/31/16

Table 2-3
Key for Tables 2-1 and 2-2

CO	Carbon monoxide
NO	Nitric oxide
NO _x	Nitrogen oxides
NO ₂	Nitrogen dioxide
PM _{2.5}	Fine particles (2.5 microns or less)
PM _{2.5} Beta	Real-time Beta Attenuation PM _{2.5} analyzer
PM _{2.5} TEOM	Real-time Tapered Element Oscillating Microbalance (TEOM) PM _{2.5} analyzer
Toxics	Air toxics

REFERENCES

National Atmospheric Deposition Program. Available at <http://nadp.sws.uiuc.edu/>. Accessed 7/13/2017.

New Jersey Department of Environmental Protection. New Jersey Air Monitoring Website. Available at www.njaqinow.net/. Accessed 7/13/2017.

United States Environmental Protection Agency (USEPA). Air Pollution Monitoring. Available at <https://www3.epa.gov/airquality/montring.html>. Accessed 7/13/2017.

USEPA. Air Now. Available at <https://www.airnow.gov/>. Accessed 7/13/2017.

USEPA. Air Toxics. Available at <https://www3.epa.gov/ttnamti1/airtoxpg.html>. Accessed 7/13/2017.

USEPA. Air Toxics - Urban Air Toxics Monitoring Program. Available at <https://www3.epa.gov/ttn/amtic/uatm.html>. Accessed 7/13/2017.

USEPA. Chemical Speciation Network. Available at <https://www3.epa.gov/ttn/amtic/speciepg.html>. Accessed 7/13/2017.

USEPA. Photochemical Assessment Monitoring Stations (PAMS). Available at <https://www3.epa.gov/ttnamti1/pamsmain.html>. Accessed 7/13/2017.

USEPA. Ambient Monitoring Technology Information Center (AMTIC). Available at www.epa.gov/amtic/. Accessed 7/13/2017.