2018 Air Monitoring Network

New Jersey Department of Environmental Protection

NETWORK DESCRIPTION

In 2018, the New Jersey Department of Environmental Protection (NJDEP) Bureau of Air Monitoring (BAM) operated 32 ambient air monitoring stations. The monitoring stations vary in the number and type of monitors operating at each site. New Jersey's 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: ozone (O_3), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and lead (Pb). Because particulate matter encompasses such a wide range of contaminants, there are separate NAAQS for two different size fractions of particles. There are NAAQS for fine particles, less than 2.5 microns in size, also referred to as $PM_{2.5}$ (1 micron = one millionth of a meter), and another NAAQS for inhalable particles, less than 10 microns in size, referred to as PM_{10}.

Figure 2-1
Millville Air Monitoring Station

In New Jersey, O_3, NO_2, SO_2 and CO are measured using USEPA-approved real-time monitoring methods, and data 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). Data is subsequently reviewed and certified, and is available from USEPA's Air Quality Database at https://www.epa.gov/outdoor-air-quality-data.

$PM_{2.5}$ is measured with both 24-hour filter-based samplers and real-time continuous monitors. Filters must be installed and removed manually, and brought to the BAM lab to be weighed and analyzed. A filter-based sampler is also used to determine lead and PM_{10} concentrations.

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 monitored by BAM include some commonly emitted by motor vehicles and other combustion sources: benzene, toluene, ethylbenzene, xylenes (measured with a "BTEX" analyzer), and black carbon (measured with an aethalometer).

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.

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 precipitation samples and ship them to a national laboratory for analysis of acids, nutrients, and base cations.

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, precipitation, and solar radiation.

Figure 2-1 shows the monitoring station at Millville in Cumberland County. Figure 2-2 shows a filter-based manual $PM_{2.5}$ sampler located at Union City High School in Hudson County.

The locations of all the monitoring stations that operated in 2018 are shown on the map in Figure 2-3. Table 2-1 lists the parameters that were measured at each site. More details about the monitoring stations can be found in Appendix A.

The only changes to New Jersey's monitoring network in 2018 involved replacing monitoring equipment.

Figure 2-2
Filter-Based PM$_{2.5}$ Sampler
in Union City

Figure 2-3
New Jersey Air Monitoring Sites in 2018
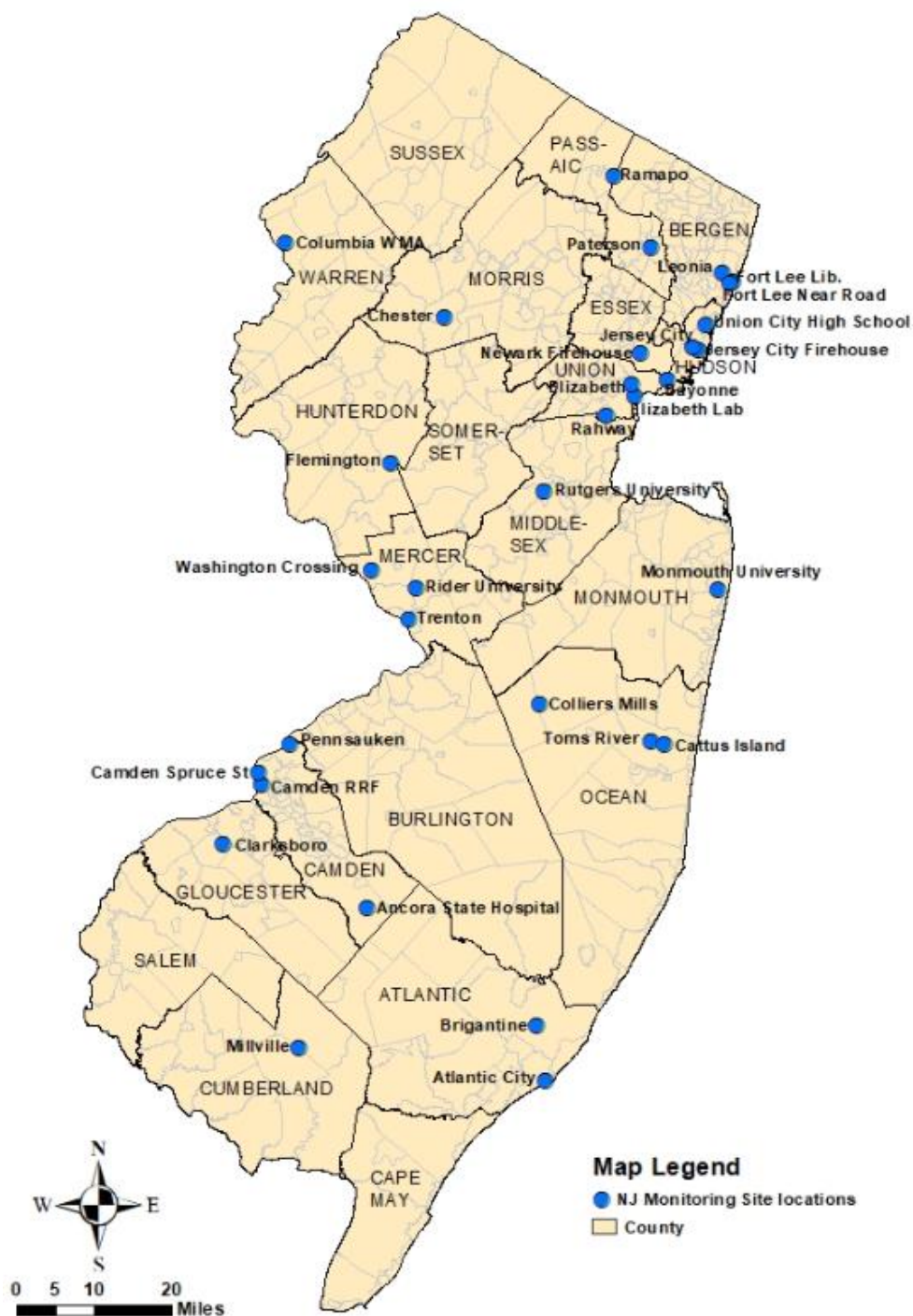
Table 2-1
2018 New Jersey Air Monitoring Network Summary

	Monitoring Station	CO	NOx	NOy	O3	SO2	PM2.5 (Filter-based)	Real-Time PM2.5	Visibility	PM10	Lead	PM2.5-Speciation	O3 Precursors (PAMS)	Toxics	BTEX & Black Carbon	Acid Deposition	Mercury	Meteorological*	Rain	Solar Radiation
1	Ancora State Hospital				X															
2	Atlantic City					X														
3	Bayonne		X		X	X									X			X	X	
4	Brigantine				X	X	X	X	X							X				
5	Camden RRF									X										
6	Camden Spruce Street	X	X		X	X	X	X				X		X	X			X	X	
7	Cattus Island															X				
8	Chester		X		X	X	X					X		X						
9	Clarksboro				X	X														
10	Colliers Mills				X															
11	Columbia		X		X	X		X										X	X	
12	Elizabeth	X				X														
13	Elizabeth Lab	X	X			X	X	X				X		X	X		X	X	X	
14	Flemington				X			X										X	X	
15	Fort Lee Library						X													
16	Fort Lee Near Road	X	X					X							X			X	X	
17	Jersey City	X	X			X														
18	Jersey City Firehouse						X	X		X										
19	Leonia				X															
20	Millville		X		X			X												
21	Monmouth University				X															
22	Newark Firehouse	X	X	X	X	X	X	X		X	X	X			X			X	X	X
23	Paterson						X													
24	Pennsauken						X													
25	Rahway						X	X												
26	Ramapo				X															
27	Rider University				X			X										X		
28	Rutgers University		X		X		X	X				X	X	X			X			
29	Toms River						X													
30	Trenton						X													
31	Union City High School						X													
32	Washington Crossing															X				
	TOTAL	6	10	1	16	9	16	12	1	3	1	5	1	4	5	3	2	8	7	1

* Meteorological parameters include temperature, relative humidity, barometric pressure, wind direction & wind speed.
X - Parameter measured in 2018

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