NEW YORK
STATE OF
OPPORTUNITY.

Department of
Environmental
Conservation

2021 ANNUAL MONITORING NETWORK PLAN

New York State Ambient Air Monitoring Program

BUREAU OF AIR QUALITY SURVEILLANCE
DIVISION OF AIR RESOURCES
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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1.0 Introduction

As part of the regulations finalized by the U.S. Environmental Protection Agency (EPA) on October 17th, 2006, monitoring agencies are required to "adopt and submit to the Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations including FRM, FEM, NCore stations, CSN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations." This document is prepared and submitted as part of the fulfillment of these requirements.

1.1 Background

New York State began a concerted effort to control air pollution back in 1957, when the State Legislature enacted one of the nation's first comprehensive air pollution control laws. An Air Pollution Control Board was established to develop and direct a public information program for monitoring contaminant levels, and to conduct area studies and inventories outlining major problems. In December 1964, New York State developed air quality standards to protect its citizens against adverse health effects. These standards provided a long-range planning tool and established numerical air quality limits for the following contaminants: particulates, sulfur dioxide, carbon monoxide, oxidants, hydrogen sulfide, fluoride, beryllium and sulfuric acid mist.

In 1966, the Legislature responded to the increasing pollution levels by restructuring the administrative authority into the Department of Health, under which the Division of Air Resources was created. Major legislation was also introduced to provide increased efficacy of rules and regulations. That year also marked the severe New York City Thanksgiving holiday air pollution episode brought upon by a temperature inversion that lasted through the weekend.

When the first Earth Day was held in 1970, it had become apparent that pollution abatement strategies in place were inadequate, and air quality—along with water quality and solid waste—became cornerstones of the emerging U.S. environmental conscience. The 1970 Clean Air Act Extension, and the establishment of the U.S. Environmental Protection Agency in that same year, were defining moments in the history of air quality in this country. That same year, the Department of Environmental Conservation (NYSDEC) in was created The Division of Air Resources was transferred to the new NYSDEC and its administrative functions restructured and streamlined. Nine new regional offices were established to carry out responsibilities relating to pollution control of sources within their respective part of the State.

In 1977, the first set of Clean Air Act amendments was adopted because many states failed to meet mandated targets. One of the most effective of these was the New Source Review (NSR), which addresses older facilities that had been "grandfathered" by the original law. In 1990, additional amendments to the Clean Air Act included provisions for attainment and maintenance of national ambient air quality standards,

mobile sources, air toxics, acid deposition control, permits, stratospheric ozone and global climate protection, enforcement; visibility improvement near National Parks, and other provisions relating to research, development and air monitoring.

Through the years, ambient monitoring has always been an important and integral part of the overall effort to manage our environmental resources. The Bureau of Air Quality Surveillance, which was originally established in the Division of Air Resources under the Department of Health in 1966, has been performing ambient air monitoring since.

BAQS currently operates the following monitors: 28 ozone, 18 SO_2, 10 NO_x (including 3 NO_y), 9 CO, 21 FRM $PM_{2.5}$, 21 TEOM $PM_{2.5}$, 5 FRM PM_{10}, 5 T640 optical PM instruments($PM_{2.5}$,PM_{10}, PMcoarse), 8 CSN, 2 speciated carbon, 6 black carbon (aethalometer), 2 wet deposition mercury, 4 particulate sulfate, 7 acid deposition, 1 low volume TSP-lead, 2 PM_{10} metals, 12 toxics, 11 carbonyls, 2 PAMS, 2 PAHs, and 12 meteorological stations. Figures 2.1 and 2.2 below show the geographic locations of monitoring sites in all nine regions of the State.

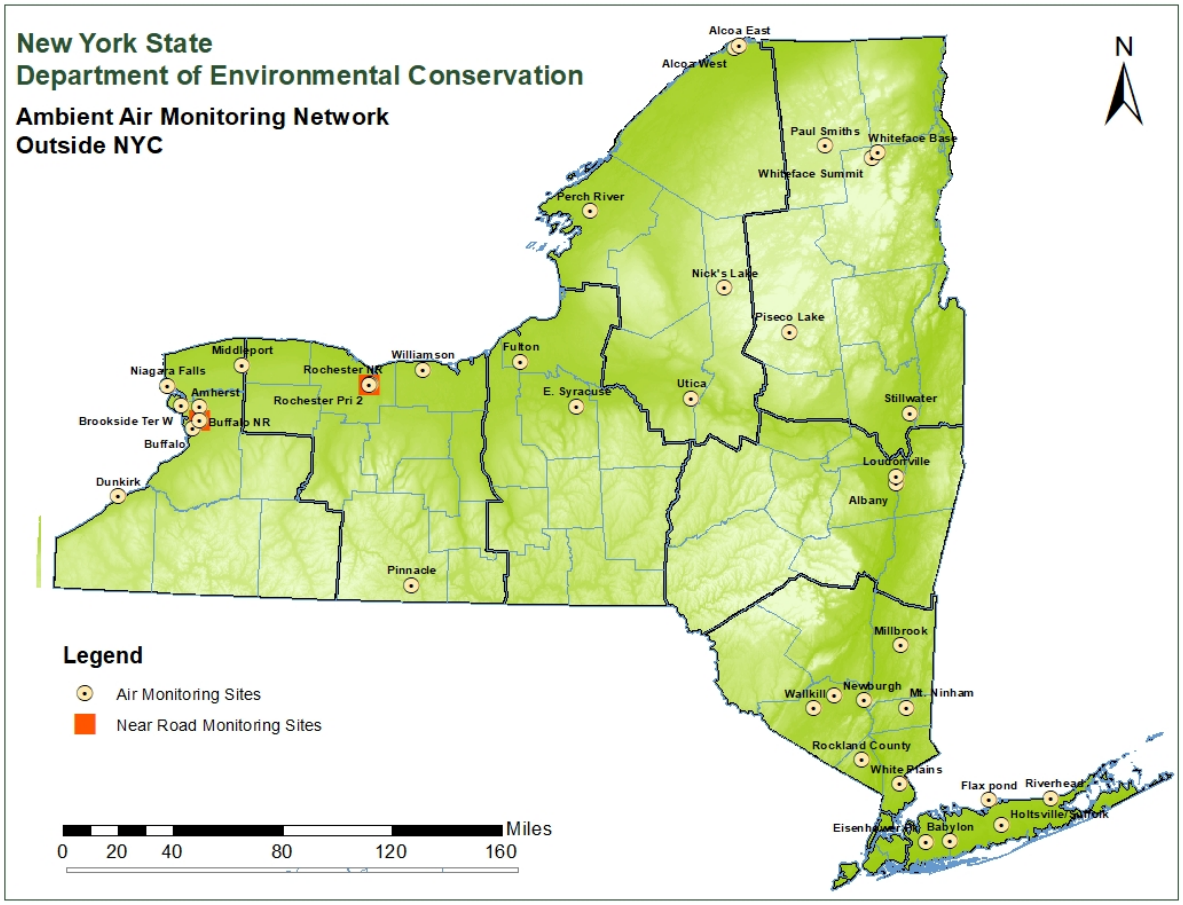

Figure 1.1 Map of Ambient Air Monitoring Sites in New York State, Excluding NYC

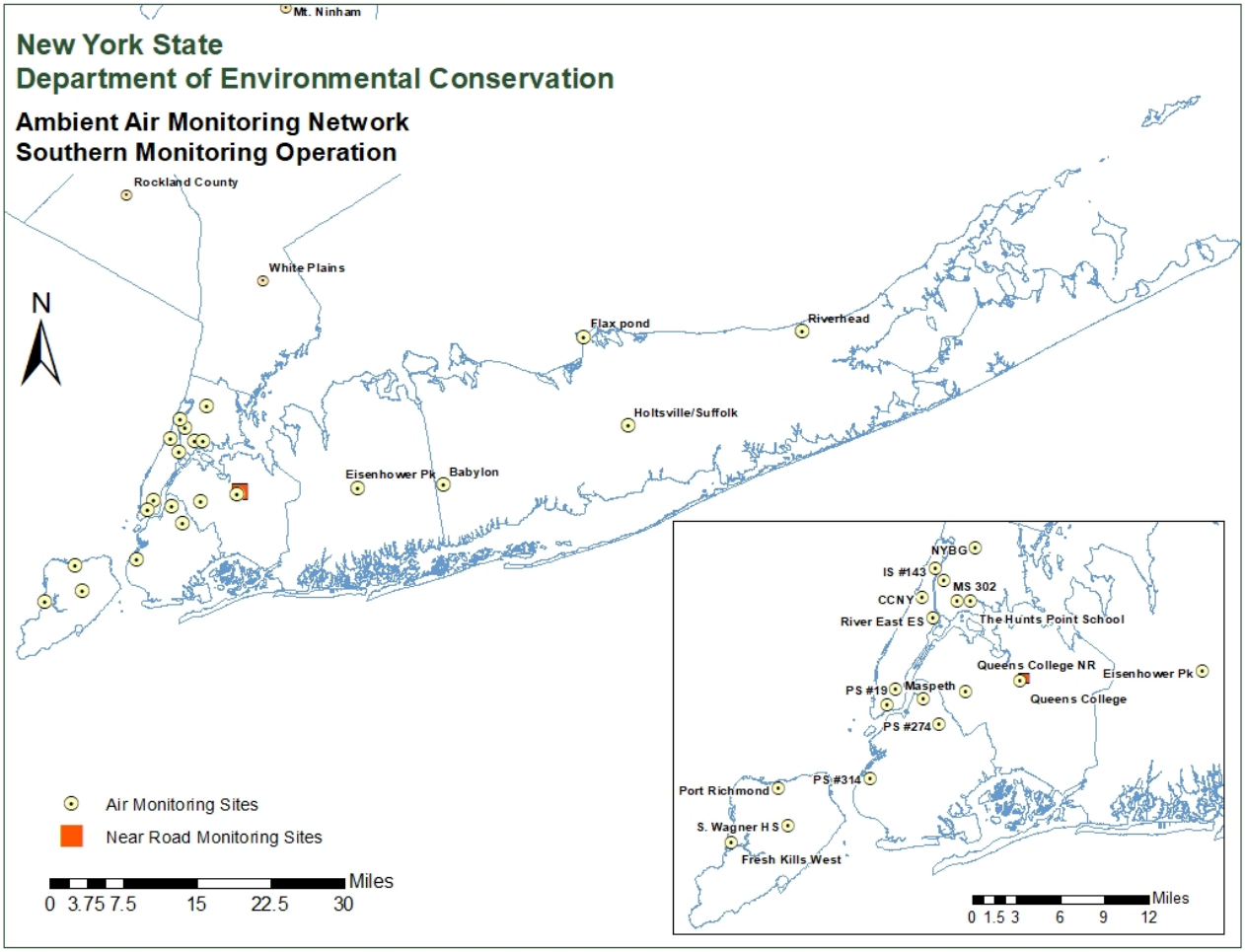

Figure 1.2 Map of Ambient Air Monitoring Sites in NYC

1.2 Environmental Justice Areas

Environmental justice (EJ) is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

A map of potential EJ areas in the State is shown in Figure 1.3. In our network, there are 20 air monitors, 14 of which downstate, sited within areas designated as such..

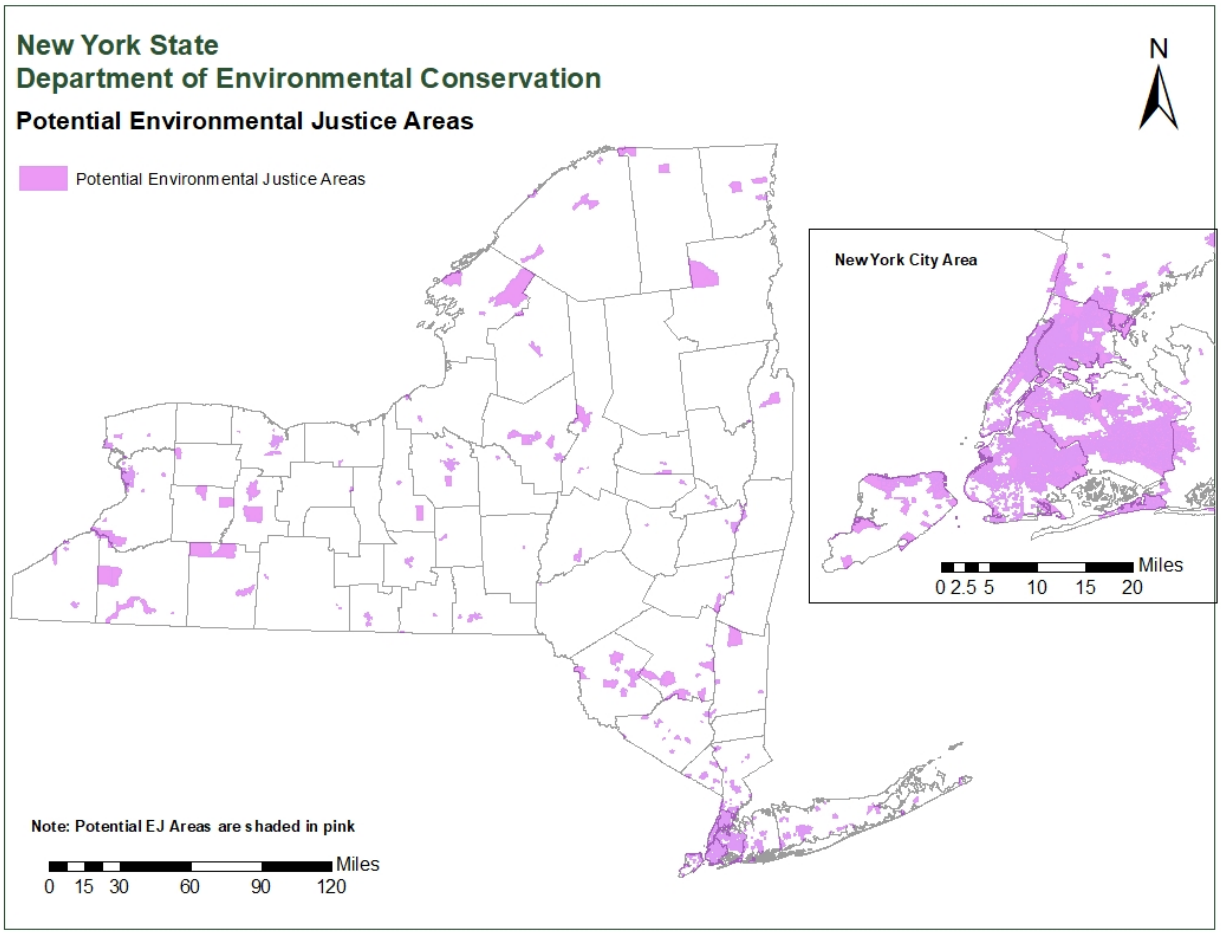

Figure 1.3 Potential Environmental Justice Areas in New York State

2.0 Monitoring Related Research and Investigations

In addition to the routine monitoring work, bureau staff collaborate with researchers from other agencies and academic institutions on a multitude of air pollution related studies. These endeavors provided valuable data for the regulatory, scientific, and health research communities. Study findings are communicated through journal publications, as well as presentations at technical meetings and conferences. Listings of peer-reviewed scientific articles and oral/poster presentations resulting from recent BAQS monitoring activities are provided below from 2019 to current

2.1 Publications

Tian Y., M. LaFarr, J. Yun, K. Civerolo, W. Hao, E. Zalewsky and L.Zhou, Analyzing meteorological and chemical conditions for two high ozone events over the New York City and Long Island region, IGARSS 2020 - 2020 IEEE International Geoscience and Remote Sensing Symposium (Conference Paper)

Rattigan, O.V., A.C. Carpenter, K.L. Civerolo and H.D. Felton. Pollutant measurements at near road and urban background sites in New York, USA. Atmospheric Pollution Research, 11, 859-870, 202

Donald Ward Jr, Thomas Gentile & Henry Felton, Comparison of Current Federal Reference Methods for Ambient Lead Measurements Adjacent to a Secondary Lead Smelter, Journal of the Air & Waste Management Association, 2019. DOI: 10.1080/10962247.2019.1587554

Zhang, J., M. Ninneman, E. Joseph, M.J. Schwab, B. Shrestha, and J.J. Schwab (2020), "Mobile laboratory measurements of high surface ozone levels and spatial heterogeneity during LISTOS 2018: Evidence for sea-breeze influence", J. Geophys. Res., https://doi.org/10.1029/2019JD031961

Ninneman, Matthew, Sarah Lu, Xianliang Zhou, and James Schwab, "On the Importance of Surface-Enhanced Renoxification as an Oxides of Nitrogen Source in Rural and Urban New York State". ACS Earth Space Chem. 2020, 4, 1985−1992, https://doi.org/10.1021/acsearthspacechem.0c00185

Zhang, J., J. Mak, Z. Wei, C. Cao, M. Ninneman, J. Marto, and J. J. Schwab, "Long Island enhanced aerosol event during 2018 LISTOS: Association with heatwave and marine influences", Environmental Pollution 270 (2021) 116299, https://doi.org/10.1016/j.envpol.2020.116299

Marto, J., J. Zhang, and J. J. Schwab, "Plume analysis from field evaluations of a portable air quality monitoring system", Journal of the Air & Waste Management Association, https://doi.org/10.1080/10962247.2020.1834010

Zhang, J., S. Lance, X. Wang, and J. J. Schwab, "Estimation of aerosol liquid water from optical scattering instruments using ambient and dried sample streams", Atmos. Environ., 239, 117787, https://doi.org/10.1016/j.atmosenv.2020.117787

Zhang, J., S. Lance, J. Marto, Y. Sun, B.A. Crandall, J. Wang, J. J. Schwab, "Fog processing of aerosols in a rural forest environment: insights from high resolution aerosol mass spectrometry", Geophys. Res. Lett., 47, e2020GL089714. https://doi.org/10.1029/2020GL089714

Brotzge, J.A., J. Wang, C.D. Thorncroft, E. Joseph, N. Bain, N. Bassill, N. Farruggio, J.M. Freedman, K. Hemker, Jr., D. Johnston, E. Kane, S. McKim, S D. Miller, J. R. Minder, P. Naple, S. Perez, J.J. Schwab, M.J. Schwab, and J. Sicker, (2020). "A Technical Overview of the New York State Mesonet Standard Network", J.Atmos. Oceanic Technol., 37, 1827-1845, DOI: 10.1175/JTECH-D-19-0220.1

Yu, Fangqun, Gan Luo, Arshad Arjunan Nair, James J. Schwab, James P. Sherman, and Yanda Zhang, "Wintertime new particle formation and its contribution to cloud condensation nuclei in the Northeastern United States", Atmos. Chem. Phys., 20, 2591–2601, 2020, https://doi.org/10.5194/acp-20-2591-2020

Croft, D. P., W. Zhang, S. Lin, S. W. Thurston, P. K. Hopke, M. Masiol, S. Squizzato, E. van Wijngaarden, M. J. Utell, and D. Q. Rich, The association between respiratory, infection and air pollution in the setting of air quality policy and economic change, Annals of the American Thoracic Society, 16, 321-330, 2019.

Masiol, M., S. Squizzato, M.-D. Cheng, D. Q. Rich, and P. K. Hopke, Differential probability functions for investigating long-term changes in local and regional air pollution sources, Aerosol and Air Quality Research, 19, 724-736, 2019.

Masiol, M., S. Squizzato, D. Q. Rich, and P. K. Hopke, Long-term trends (2005-2016) of source apportioned PM2.5 across New York State, Atmospheric Environment, 201, 110-120, 2019.

Squizzato, S., M. Masiol, F. Emami, D. C. Chalupa, M. J. Utell, D. Q. Rich, and P. K. Hopke, Long-term changes of source apportioned particle number concentrations in a metropolitan area of the northeastern United States, Atmosphere, 10, doi:10.3390/atmos10010027, 2019.

2.2 Posters/Presentations

Yun, J., W. Hao, E. Zalewsky, Y. Tian, and K. Civerolo, Evaluation of Four Different Methods to Calculate Relative Response Factors and Estimated Future Year Ozone Design Values, 19th Annual CMAS Conference, Chapel Hill, NC, 2020. (talk, virtual, paper)

Yun, J., E. Zalewsky, W. Hao, Y. Tian, and K. Civerolo, Biogenic Emissions Impact on Predicted Ozone by CMAQ and CAMx Models using 2016 Emissions Platform, NYSDEC BAQAR's poster session, Albany, NY, January 31, 2020. (poster)

Donald Ward, Stephen DeSantis, and Thomas Gentile; Lead (Pb) in Wallkill New York – A State Air Toxics Regulation Success Story, 2019

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2.3 NYSDEC Collaborations

The Bureau of Air Quality Surveillance collaborates with many different research groups by providing access to NYSDEC air monitoring stations as well as data produced by BAQS. These collaborations vary in duration and scope, depending to the goals of the research partners. Below are some of the collaborations currently underway at various DEC air monitoring stations.

New York City Community Air Survey (NYCCAS)
The New York City Department of Health and Mental Hygiene and CUNY - Queens College are conducting the New York City Community Air Survey (NYCCAS) to evaluate how air quality differs across New York City. This program studies how pollutants from traffic, buildings (boilers and furnaces), and other sources impact air quality in different neighborhoods.

Columbia University at Queens College
Researchers at Columbia University are currently monitoring fine particulates at Queens College as part of a research project using a MetOne Neighborhood Particulate Monitor. The study includes monitors located on the Columbia University campus to determine how air pollution relates to student decision making and preferences. Data are collected from students on the campus and these data are merged with pollution data to assess the correlation. Data collected at Queens College are being used to compare and calibrate the monitor at Columbia. The study began at Queens College in January 2017 and has continued.

NESCAUM Long Island Sound Tropospheric Ozone Study (LISTOS)
Beginning in 2018, a group of State, Federal and Academic researchers will begin to examine ozone precursor and ozone formation from the I-95 corridor through NYC, Long Island, Long Island Sound and on to Connecticut and Rhode Island. The work is being designed to complement the PAMS network and in fact will be incorporated into the Enhanced Monitoring Plan for NY, CT and NJ. Additional information about LISTOS is available on NESCAUM's website: http://www.nescaum.org/documents/listos

Combining Low-Cost AQ Sensors with NYS Mesonet for Fine-Scale Monitoring in NYC PIs: Scott Miller PhD, Atmospheric Sciences Research Center, SUNYA Sarah Lu, PhD, Atmospheric Sciences Research Center, SUNYA Md. Aynul Bari, Department of Environmental and Sustainable Engineering, SUNYA

Long-Term Monitoring of Methane within New York State Phase I Findings and Plans for Phase II: Assessing Trends in Sources and Characterizing Hot Spots; Lee Murray, University of Rochester

Mobile Laboratory Measurements of Methane, Ethane, and Co-pollutants from Landfills, Oil and Gas Systems, and Other Sources in New York State; James Schwab, SUNY Albany

Atmospheric Measurements in Support of Methane Source Characterization within New York State – Harlem; Roisin Commane, Columbia University

3.0 Criteria Contaminants

EPA is required to set National Ambient Air Quality Standards (NAAQS) for wide-spread pollutants from numerous and diverse sources considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings. The Clean Air Act requires periodic review of the science upon which the standards are based and the standards themselves. Listed below are the NAAQS for six principal pollutants, which are called "criteria" pollutants.

Table 3.1 National Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Times	Level	Averaging Times
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour (1)	None	
	35 ppm (40 mg/m^3)	1-hour (1)		
Lead	0.15µg/m^3(2)	Rolling 3-month Average	Same as Primary	
Nitrogen Dioxide	53 ppb	Annual (Arithmetic Mean)	Same as Primary	
	100 ppb	1-hour (3)	None	
Particulate Matter (PM_{10})	150µg/m^3	24-hour (4)	Same as Primary	
Particulate Matter ($PM_{2.5}$)	12.0µg/m^3	Annual (5) (Arithmetic Mean)	Same as Primary	
	35µg/m^3	24-hour (6)	Same as Primary	
Ozone	0.070 ppm (2015 std)	8-hour (7)	Same as Primary	
Sulfur Dioxide	75 ppb	1-hour (8)	3-hour (1)	0.5 ppm (1300µg/m^3)

[1] Not to be exceeded more than once per year.
[2] Effective 1/12/2009, replaces the previous quarterly average value of 1.5µg/m^3
[3] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).
[4] Not to be exceeded more than once per year on average over 3 years.
[5] To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 12.0µg/m^3. Effective March 18, 2013.
[6] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35µg/m^3 (effective December 17, 2006).
[7] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.070 ppm (effective December 28, 2015).
[8] Effective August 23, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

3.1 Carbon Monoxide

Carbon monoxide, a colorless and odorless gas, is produced as a primary pollutant during the combustion of fossil and biomass fuels. Vegetation also can emit CO directly into the atmosphere as a metabolic by-product. Sources such as motor vehicles, non-road combustion engines or vehicles, and biomass burning can cause high concentrations of CO. Motor vehicle exhaust contributes about 60 percent of all CO emissions nationwide. Indoor sources include unvented, malfunctioning, or misused combustion appliances, combustion engines in garages or basements, and tobacco combustion.

CO enters the bloodstream through the lungs and reduces oxygen delivery to the body's organs and tissues. The health threat from levels of CO sometimes found in the ambient air is most serious for those who suffer from cardiovascular disease such as angina pectoris. At much higher levels of exposure not commonly found in ambient air, CO can be poisonous, and even healthy individuals may be affected.

There are two primary NAAQS for ambient CO: a 1-hour average of 35 ppm and an 8-hour average of 9 ppm. These concentrations are not to be exceeded more than once per year. There currently are no secondary standards for CO.

The number of monitors and concentration trends chart over the years in New York State are depicted in Figure 3.1. It clearly demonstrates that the current ambient levels of CO are well below the NAAQS, despite the continual increase in automobiles and vehicle-miles traveled in the State. As of 2002, all counties in the State have achieved attainment designation.

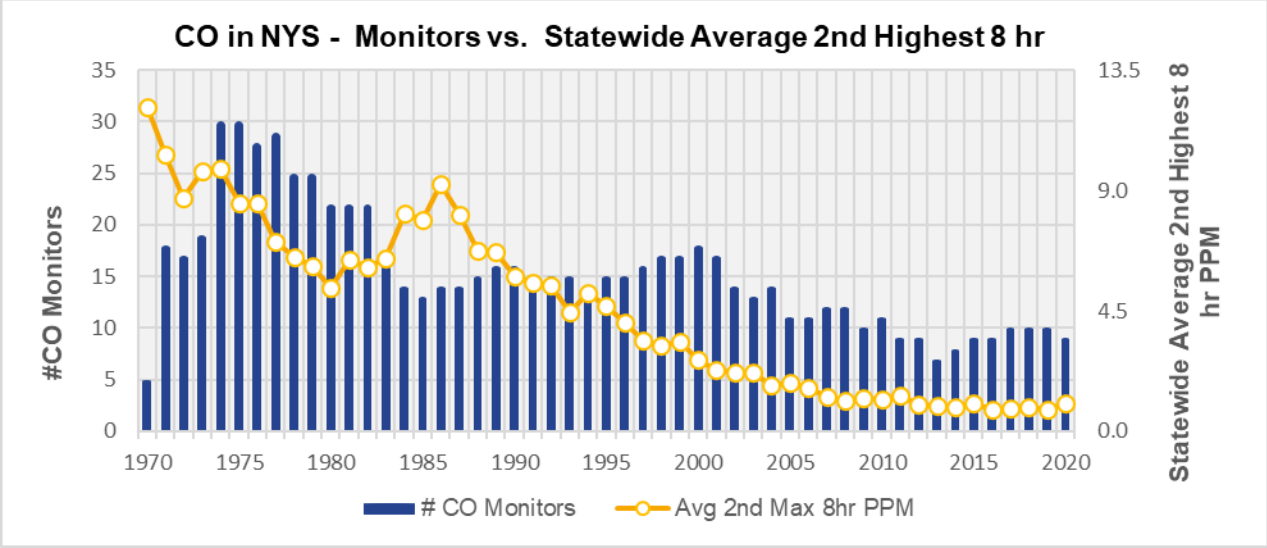


Figure 3.1 Carbon Monoxide Monitors and Concentration Trends

NYSDEC uses TEI Model 48C and Teledyne API 300 EU instruments that employ the NDIR gas filter correlation method for the continuous measurement of CO. Currently there are nine CO monitors in operation statewide, including the near-road sites in Buffalo and Rochester, as shown in Figure 3.2.

3.1.1 Near-Road CO Monitoring

The EPA updated the monitoring regulations for CO in August 2011adding a requirement to perform CO monitoring at one location on a busy roadway in each city (CBSA) with a population over 1 million. The near-road CO monitors are expected to be collocated with the existing near-road monitors established for monitoring NO_2. The NYSDEC currently operates Near-Road CO at all near-road sites.

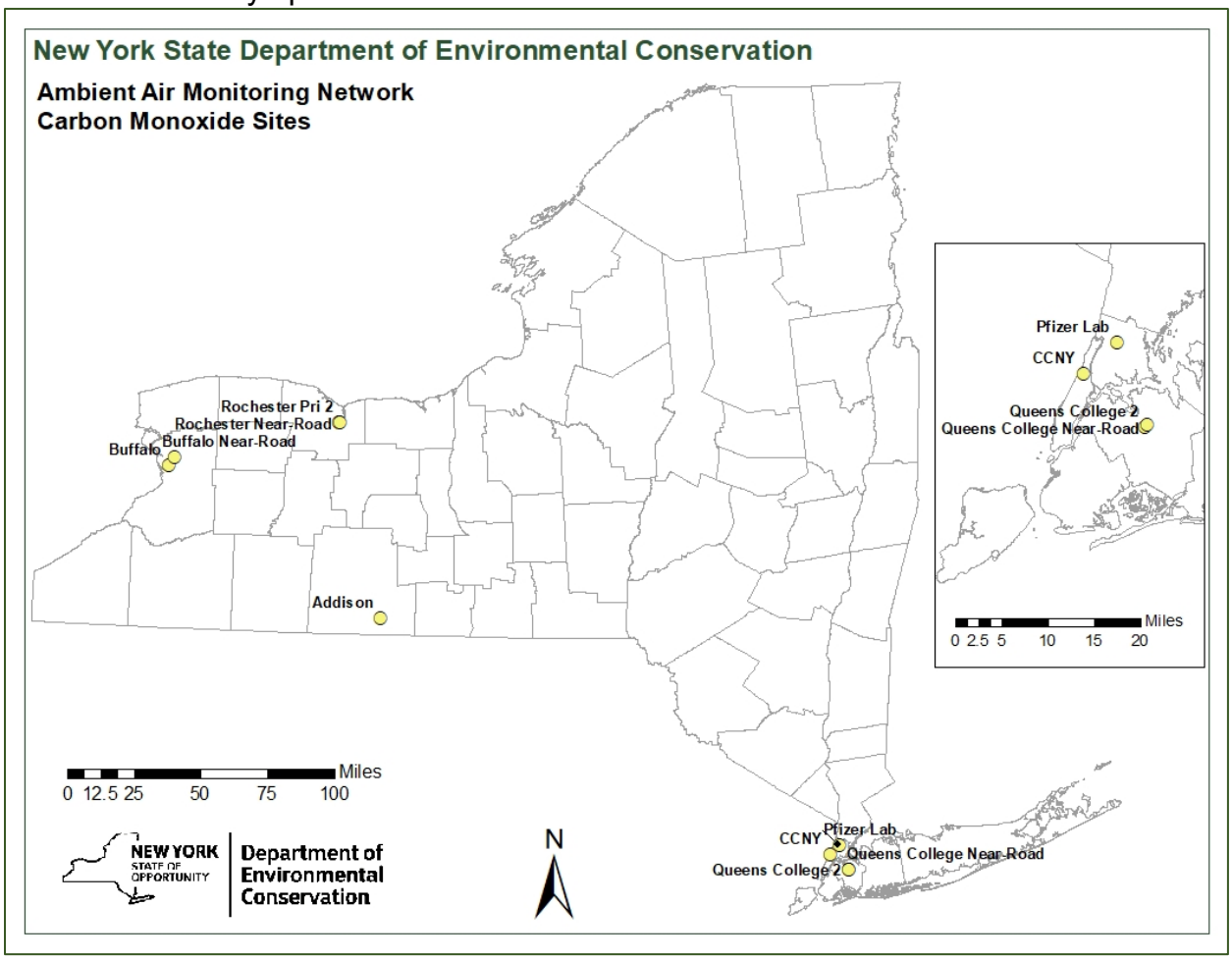


Figure 3.2 Map of Carbon Monoxide Monitoring Sites

3.2 Nitrogen Dioxide

Many chemical species of nitrogen oxides (NOx) exist, but most concerning for human health is nitrogen dioxide (NO2). Breathing air with a high concentration of NO2 can irritate airways in the human respiratory system. Such exposures over short periods can aggravate respiratory diseases, particularly asthma. Long exposures to elevated concentrations of NO2 may contribute to developing asthma and can increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly, are generally at greater risk for the health effects of NO2. NO2 along with other NOx reacts with other chemicals in the air to form both particulate matter and ozone. Both of these are also harmful when inhaled due to effects on the respiratory system.

Natural sources include intrusion of stratospheric nitrogen oxides, bacterial and volcanic action, and lightning. The major source of anthropogenic emissions of nitrogen oxides into the atmosphere is the combustion of fossil fuels in stationary sources (heating, power generation) and in motor vehicles (internal combustion engines). Other contributions of nitrogen dioxide to the atmosphere come from specific non-combustion industrial processes, such as the manufacture of nitric acid, the use of explosives and welding. Indoor sources include tobacco smoking and the use of gas-fired appliances and oil stoves.

The level for both the primary and secondary NAAQS for NO2 is 53 ppb annual arithmetic average (mean), not to be exceeded. In January 2013, the EPA revised the NAAQS to include an hourly standard of 100 ppb. Figure 3.3 shows the number of monitoring sites and NO2 concentration trends over the years.

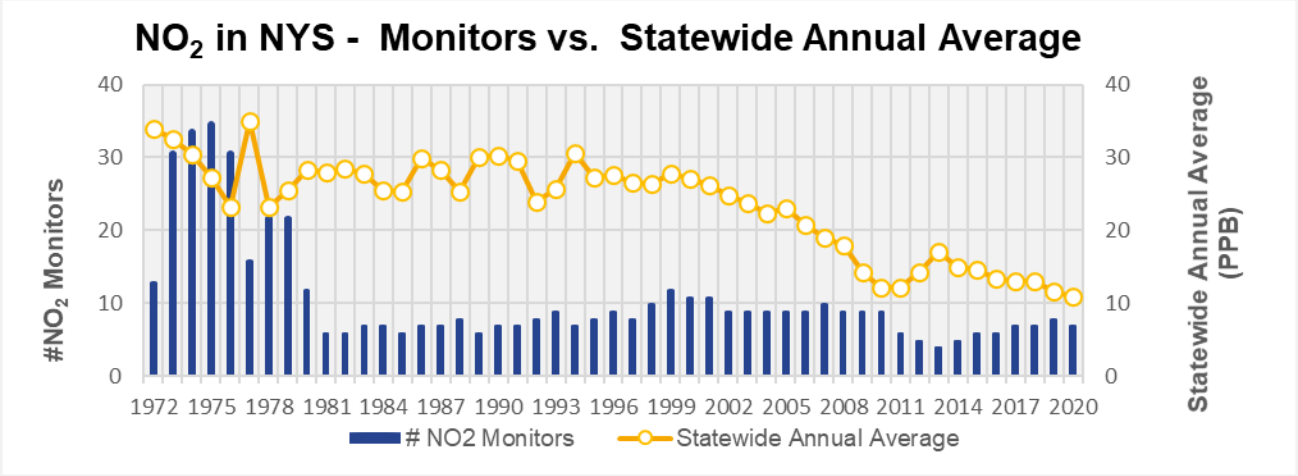


Figure 3.3 Nitrogen Dioxide Monitors and Concentration Trends

In New York, the TEI Model 42C instruments are deployed for continuous NO_2 measurements using the gas phase chemiluminescence method. Currently there are four NO_x monitoring sites statewide, and NO/NO_y monitors in Rochester, Pinnacle, and Queens College (both NO_2 and NO_y) as shown in Figure 4.4. NO/NO_y measurements are included within the NCore multi-pollutant site requirements and the PAMS program. These NO/NO_y measurements will produce conservative estimates for NO_2 that can be used to ensure tracking continued compliance with the NO_2 NAAQS. NO/NO_y monitors are used at these sites because it is important to collect data on total reactive nitrogen species for understanding O_3 photochemistry. In 2012, we discontinued using the (NO/NO_y) values as NO_2 from these three sites for statewide annual

average calculations. The upturn in the trend line around 2012 is a result of excluding the low concentration sites Pinnacle and Rochester, and not an indication of a statewide increase.

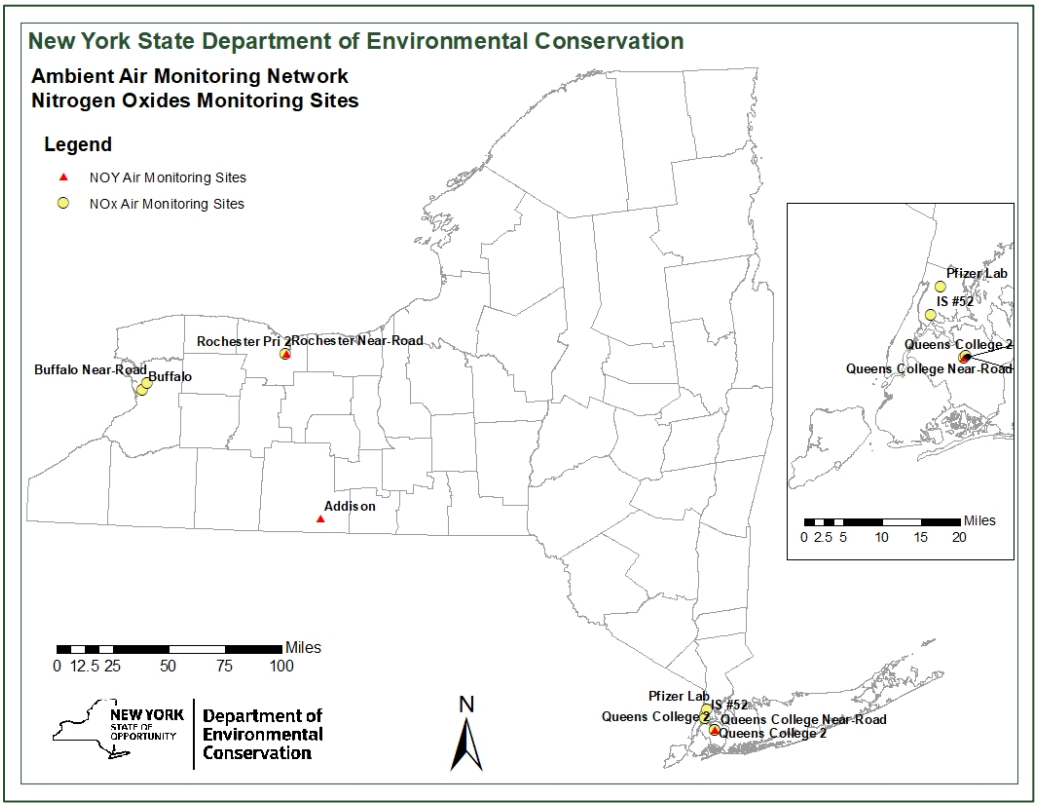


Figure 3.4 Map of Nitrogen Oxides Monitoring Sites

3.2.1 Near-Road NO2 Monitoring

The primary aim of the near-road NO_2 network is to monitor where peak, ambient NO_2 concentrations are expected to occur as a result of on-road mobile source emissions. The sites will also represent the worst case for population exposure for each CBSA since the sites are at locations where NO_2 concentrations are expected to be high for one or more hours at a time.

Table 3.3 Characteristics for New York State Near-Road Sites

	Buffalo	Rochester	Queens
Target Road	I90 between Exit 51 and Exit 52	I490 Winton Road Acc	I495 between Main St. – Kissena Blvd
AADT (Rank)	131,020 (2)	110,990 (3)	166,340 (115)
Distance from probe to Target Road	20 meters	20 meters	28 meters
Probe Height	4 meters	4 meters	4 meters
Start Date	4/1/2014	12/18/2014	Est. 1/1/2016
Latitude	42° 55’ 16” N	43° 8'42.08" N	40°44'21.49" N
Longitude	-78° 45’ 58” W	-77°33'27.59" W	-73°49'3.76" W

Near-road NO_2 monitoring commenced at the Buffalo and Rochester sites on April 1, 2014, and December 18, 2014, respectively. The Queens Near-Road began operation on April 1st, 2017.

3.3 Lead

Exposure to lead occurs through ingestion of lead in food, water, soil, or dust and through inhalation. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, and/or behavioral disorders. Additionally, even low levels of Pb exposure may cause central nervous system damage in fetuses and children.

In November of 2008 EPA published the final rule for the revision of the NAAQS for lead to not exceed 0.15µg/m3 in total suspended particles averaged over rolling 3-months evaluated over a 3-year period. As part of the lead monitoring requirements, agencies are required to monitor ambient air near lead sources which are expected or to have a potential to exceed the NAAQS. At a minimum, monitoring agencies must monitor near lead sources that emit 1.0 ton per year (tpy) or more.

The new regulations replaced the requirements for population-oriented sampling with Pb monitors at the urban NCore sites. In addition, an airport monitoring study was done to determine the need for monitoring of airports that emit less than 1.0 tpy of lead. A 12-month monitoring study at Brookhaven Airport concluded in October 2012. The Republic Airport monitoring began in October 2012, and completed a year later. Both sites exhibited lead concentrations significantly below the NAAQS, and EPA approved the discontinuation of monitoring.

Federal Reference Method particulate lead samples are collected on glass fiber filters using a standard TSP high volume sampler which are subsequently analyzed by the laboratory using atomic absorption spectroscopy. Under the new rule, EPA is allowing Pb-PM_{10} in lieu of Pb-TSP where the maximum 3-month arithmetic mean Pb concentration is expected to be less than 0.10µg/m^3 (i.e., two thirds of the NAAQS) and where sources are not expected to emit ultra-coarse Pb. The population oriented Pb monitors at the NCore or NATTS sites are located away from known sources of Pb and utilize Pb-PM_{10} samplers.

There is one Pb-TSP monitoring site in operation in Wallkill near a lead-acid battery recycling facility. The source-oriented monitoring site (AQS site ID # 36-071-3002) is in place as the facility had the potential to exceed the level of the NAAQS. Two urban CBSA monitors (low volume PM10) are operating at the NATTS sites in the Bronx and Rochester

In October 2016, the facility in Wallkill installed new emission control technologies that have led to reduced emissions of lead into the environment. As a result, the NYSDEC closed a redundant Pb-TSP site at Ballard Road at the end of 2017 because of low values. Additionally, the NYSDEC has transitioned the equipment from high volume TSP sampling to low volume TSP sampling.

The 2020 three-month rolling average values for the TSP and PM10 lead sites are listed in Table 4.4, and Table 4.5, respectively. The data show the lead levels are well below the standard of 0.15µg/m3. Due to site access issues caused by the COVID-19 Pandemic, data are not available for some months.

Table 3.4 2020 3-Month Rolling Average Lead for TSP Lead

2020 TSP Lead 3-Month Rolling Average, ng/m^3	
Month	**Wakefern food**
January	0.005
February	0.005
March	0.006
April	COVID-19: no site access
May	COVID-19: no site access
June	COVID-19: no site access
July	COVID-19: no site access
August	0.010
September	0.009
October	0.005
November	0.006
December	0.006
Maximum	**0.010**

Table 3.5 2020 3-Month Rolling Average PM_{10} Lead for Urban Sites

2020 PM_{10} Lead 3-Month Rolling Average, ng/m^3		
Month	**IS52**	**Rochester**
January	0.0033	0.0013
February	0.0022	0.0014
March	COVID-19: no site access	0.0012
April	COVID-19: no site access	0.0011
May	COVID-19: no site access	0.0012
June	COVID-19: no site access	0.0015
July	COVID-19: no site access	0.0024
August	COVID-19: no site access	0.0021
September	COVID-19: no site access	0.0020
October	0.0027	0.0015
November	0.0029	0.0018
December	0.0013	0.0018
Maximum	**0.0033**	**0.0024**

3.4 Particulate Matter

3.4.1 PM_{10}

In 1987, EPA revised the 1971 standards in order to protect against adverse health effects of inhalable airborne particles that can be deposited in the lower (thoracic) regions of the human respiratory tract, with PM_{10} as the indicator. EPA established primary and secondary PM_{10} standards for two averaging times: 150µg/m^3 (24-h average, with no more than one expected exceedance per year) and 50µg/m^3 (expected annual arithmetic mean, averaged over three years). After the most recent scientific review on PM, EPA issued the final rule in December 2006 revising the $PM_{2.5}$ standards, at the same time revoking the PM_{10} annual standard while retaining the 24-hr standard at 150µg/m^3.

Starting in 2004, the R&P Partisol 2025 samplers were used for manual PM_{10} collection by removing the $PM_{2.5}$ size selective inlet. The filter cartridges are submitted to RTI (EPA contract laboratory) for mass analysis. Figure 4.7 shows the number of monitors and the composite annual arithmetic mean for PM_{10}.

On figure 3.7, there is a break in the graph during 2005, due to a changeover in equipment causing there to be only one quarter of data for the entire year. The small increase observed in 2015 is due to elevated readings at the Buffalo, NY site. In March of 2015 the land use type changed at the Buffalo site following the sale of an adjacent land parcel, introducing a local source of PM_{10}. This caused the values to no longer be regionally representative. In the future the DEC may relocate the PM_{10} monitor to a nearby site that is not influenced by the local source.

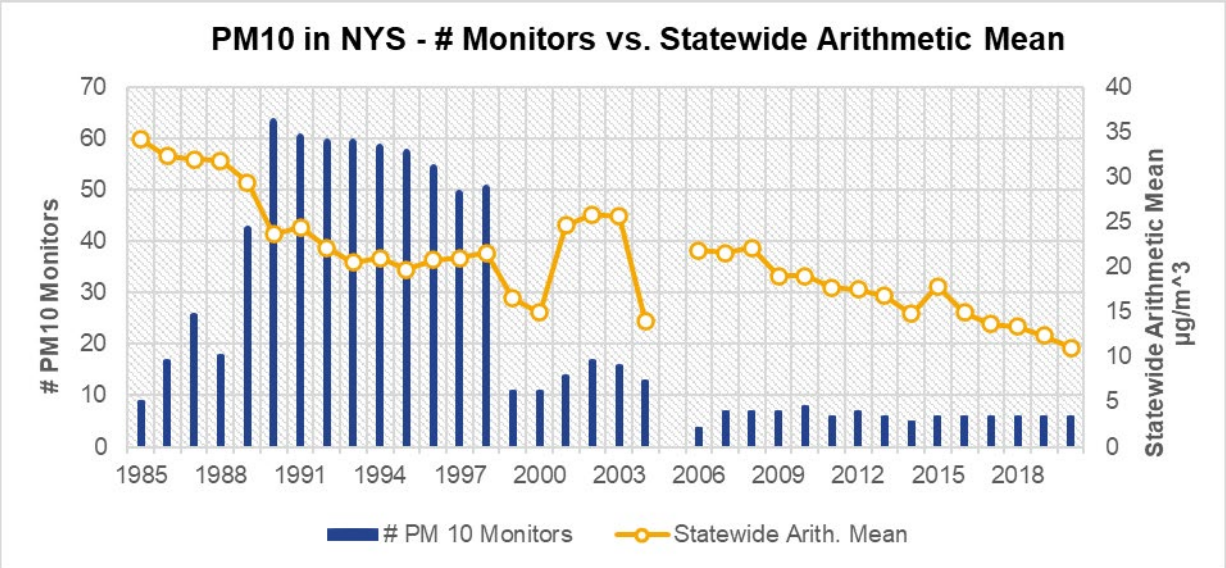


Figure 3.7 PM_{10} Monitors and Concentration Trends

Currently, there are five such sites in operation on a one in six days schedule, as shown in Figure 3.8.

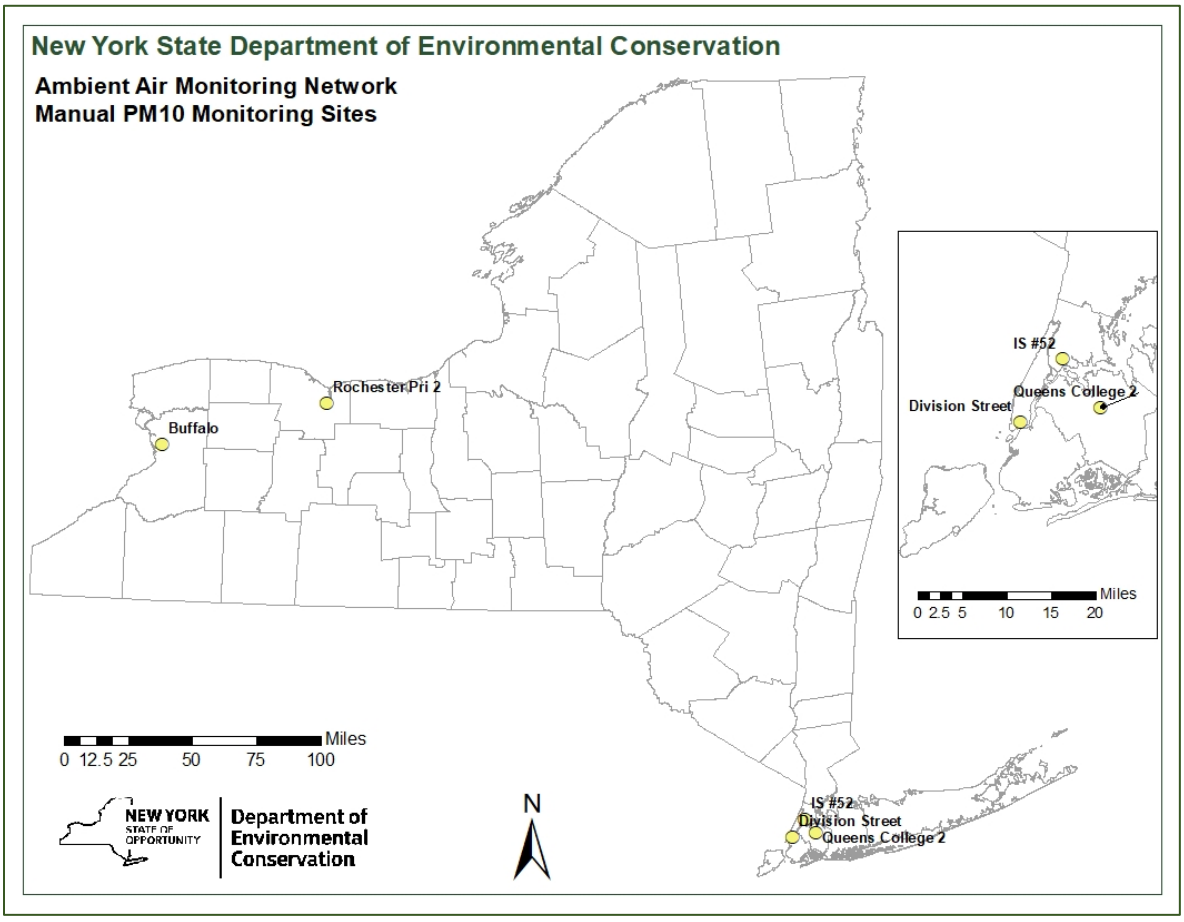


Figure 3.8 Map of PM_{10} Monitoring Sites

Continuous PM_{10} data are also obtained using Thermo Scientific 1405-DF instruments that simultaneously measure $PM_{2.5}$, PMcoarse (PM_{10} - $PM_{2.5}$) and PM_{10} mass concentrations at the IS 52, Queens College, East Syracuse, Rochester, and Pinnacle State Park sites. The DEC also employs Teledyne T640 PM Mass Monitors for real-time measurements at certain sites

3.4.2 $PM_{2.5}$

In July 1997, EPA Administrator promulgated significant revisions to the PM NAAQS, after taking into account scientific information and assessments. Two new $PM_{2.5}$ standards were set: an annual standard of 15µg/m^3, based on the 3-year average of annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors; and a 24-hr standard of 65µg/m^3, based on the 3-year average of the 98th percentile of 24-hr $PM_{2.5}$ concentrations at each population-oriented monitor within an area. To continue to address coarse-fraction particles, the annual PM_{10} standard was retained, and the form, but not the level, of the 24-hr PM_{10} standard was revised to be

based on the 99th percentile of 24-hr PM_{10} concentrations at each monitor in an area. The secondary standards were revised by making them identical in all respects to the $PM_{2.5}$ and PM_{10} primary standards.

EPA lowered the NAAQS for PM in December of 2006 to provide increased protection of public health and welfare, respectively. EPA revised the level of the 24-hour $PM_{2.5}$ standard from 65 to 35 micrograms per cubic meter ($\mu g/m^3$) and retained the level of the annual $PM_{2.5}$ standard at $15\mu g/m^3$. Regarding PM_{10}, the 24-hour standard was retained, but the annual PM_{10} standard was revoked. On Dec. 14, 2012 EPA further strengthened the nation's air quality standards for fine particle pollution to by revising the primary annual $PM_{2.5}$ standard from 15 to 12 micrograms per cubic meter ($\mu g/m^3$) and retaining the 24-hour fine particle standard of $35\mu g/m^3$. The new standards became effective on March 18, 2013.

The 2012 PM NAAQS added a network monitoring requirement for $PM_{2.5}$. A $PM_{2.5}$ monitor must be installed in CBSAs with populations over 1 Million near a busy road segment. The monitor deployments are staged with the monitors required in CBSAs over 2.5 Million by 1/1/2015 and the rest by 1/1/2017. The data from these sites will be used to evaluate the impact of emissions from busy roadways in urban areas. The NYSDEC installed near-road $PM_{2.5}$ monitors in Buffalo and Rochester in 2014 at the Queens site in 2017.

The NYSDEC $PM_{2.5}$ monitoring network deploys a combination of filter based Federal Reference Method (FRM) samplers, continuous mass monitors, filter based speciation samplers and continuous speciation samplers. The data from the FRM samplers are used to determine if the State's air quality meets the National Ambient Air Quality Standards (NAAQS). The continuous mass sampler data are used for the reporting of near real-time air quality data for health-related warnings and forecasts. The speciation filter sampler data are used to determine the chemical constituents that make up $PM_{2.5}$. The continuous speciation data are used to examine the short-term fluctuations in the concentrations of individual species or components that make up $PM_{2.5}$.

3.4.3. $PM_{2.5}$ Monitoring Instrumentation

The filter based FRM samplers used in New York are the Model 2025 sequential samplers made by the Thermo Environmental Company (Franklin, MA). The sampler has been designated by EPA as a reference method instrument for $PM_{2.5}$ particle collection. The designation is: RFPS-0498-118.

Currently, there are 21 FRM monitors in operation statewide, as shown in Figure 3.9.

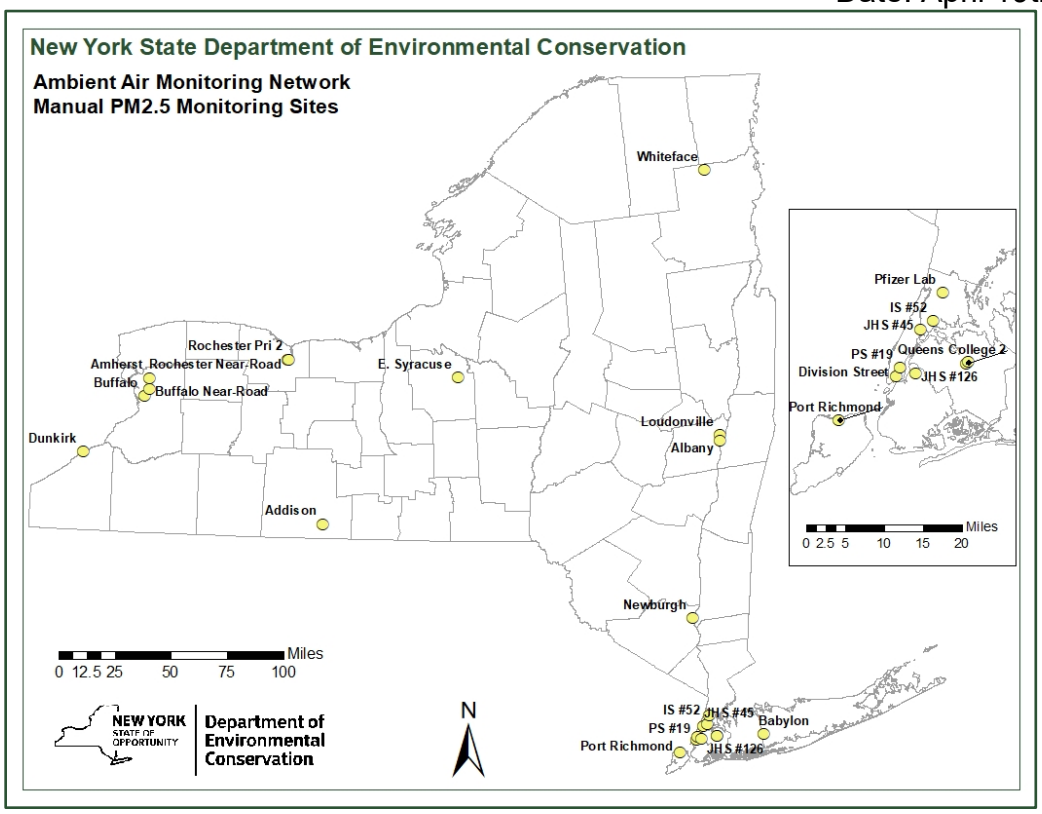


Figure 3.9 Map of Manual $PM_{2.5}$ (FRM) Monitoring Network

Figure 3.10 below shows the number of manual $PM_{2.5}$ monitoring sites and the composite annual arithmetic means in New York State since the network was implemented in 1998.

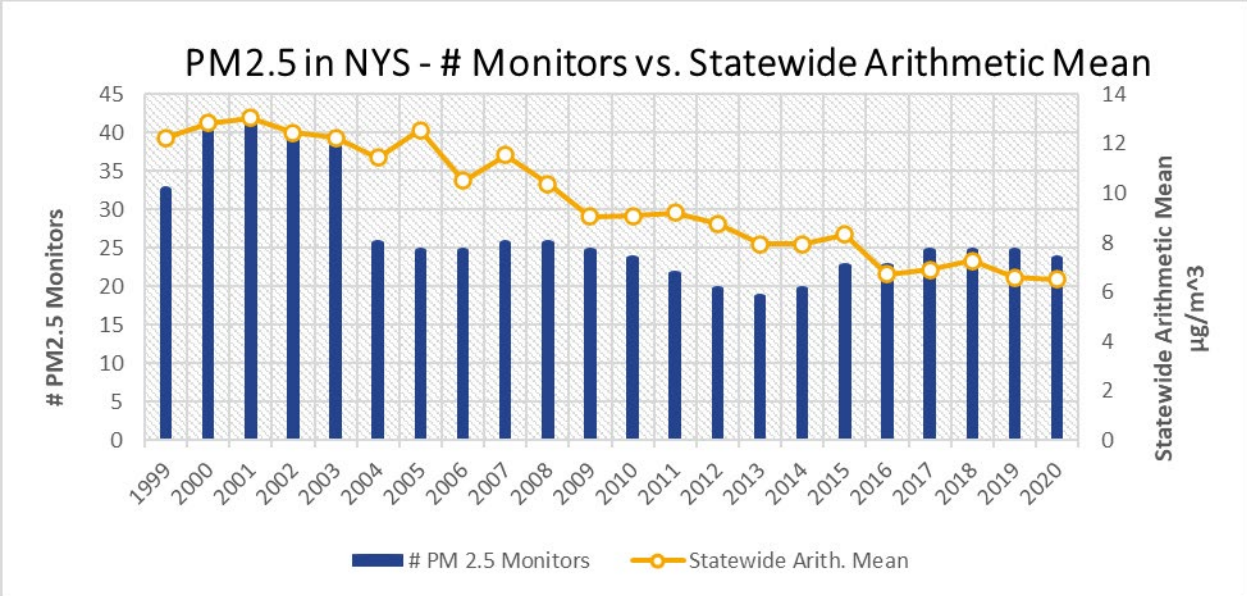


Figure 3.10 $PM_{2.5}$ Monitors and Concentration Trends

3.4.4 Continuous PM Monitoring

Continuous mass monitoring is performed primarily with a network of TEOM 1400ab instruments. In addition, there are five Thermo Scientific 1405-DF's and Teledyne T640's to simultaneously measure $PM_{2.5}$, PM Coarse (PM_{10} - $PM_{2.5}$) and PM_{10} mass concentrations. These instruments have received designation by EPA for PM_{10} but not for $PM_{2.5}$. $PM_{2.5}$ is more difficult to measure than PM_{10} with automated samplers because $PM_{2.5}$ contains a higher fraction of volatile components. The heated measurement sensor for the TEOM reduces the amount of volatile mass measured as compared to filter based FRMs. The NYSDEC utilizes non-linear data adjustments to make the TEOM data more comparable with the FRM data. This element of the $PM_{2.5}$ monitoring network provides the data used for public reporting purposes including the NYSDEC website and for $PM_{2.5}$ forecasting.

The TEOM data are compared to the filter based FRM annually, and the comparison allows the analysts to create non-linear correction factors that modify the TEOM data to more closely resemble FRM data. This is necessary because FRM data is not available for near real-time public reporting purposes.. The NYSDEC now submits TEOM data from each site in its original unadjusted format as well as the adjusted data to match more closely with the FRM.

There are 29 continuous $PM_{2.5}$ monitoring sites as shown in Figure 3.11.

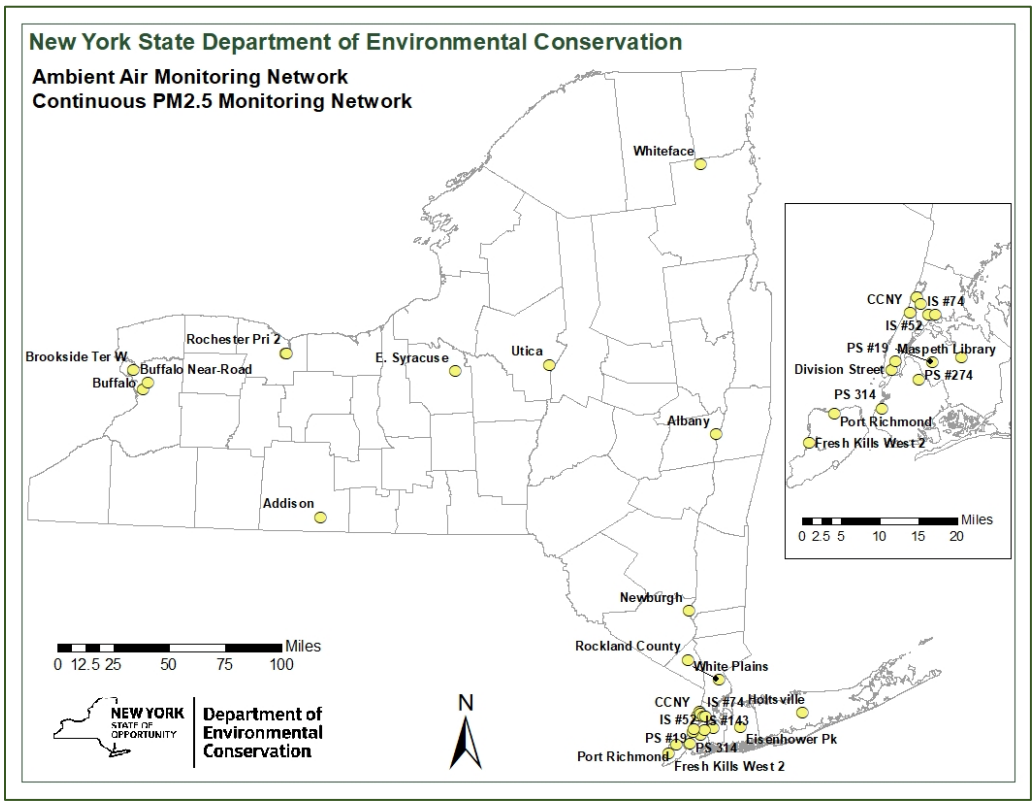


Figure 3.11 Map of Continuous $PM_{2.5}$ Monitoring Network

The NYSDEC also operates some of the newest continuous mass monitors which have undergone Federal Equivalent Method (FEM) designation. These instruments collect more of the volatile PM mass that the filter based FRM may or may not retain depending on the environmental conditions during and after the period in which the filter sample was collected. NYSDEC has been evaluating the technological improvements that have led to the current $PM_{2.5}$ continuous FEMs for more than 10 years. The Thermo Scientific 1405-DF FEM performed better than the other instruments in on-site deployments at urban and rural locations in the state. Currently, there are five 1405-DF's deployed (IS 52, Queens College, East Syracuse, Rochester, and Pinnacle) to simultaneously measure $PM_{2.5}$, PM Coarse (PM_{10} - $PM_{2.5}$) and PM_{10} mass concentrations. After multiple iterations of revisions and modifications from the manufacturer, these DF's can finally produce data that compare well with the FRM's. Therefore, the hourly data are sent to AQS with the parameter code 88101, a designation that will include these measurements for attainment status determination.

3.4.5 Speciation

There are eight sites in New York State operating with the Speciation Trends Network (CSN) sampling protocol. The NYSDEC uses eight MetOne SuperSass and URG 3000N samplers for the collection of samples for the speciation of $PM_{2.5}$. The samplers collect 3 and 1 filter samples respectively every third day or sixth day for a period of 24 hours. Five operate on a 1-in-3 day schedule and three operate on a 1-in-6 day schedule. All these sites host collocated FRM and continuous mass monitoring instruments. The samples are then sent to an EPA contract laboratory for chemical analysis. There are over fifty species consisting of ions, metals and carbon species quantified by the analyses.

To address inconsistencies in carbon sampling and analysis procedures used in urban CSN/SLAMS and rural IMPROVE programs, EPA determined that the URG sampler would be used at all CSN sites. The conversion was completed 2008 for all of the NY sites. Figure 3.12 shows the eight CSN sites currently in operation.

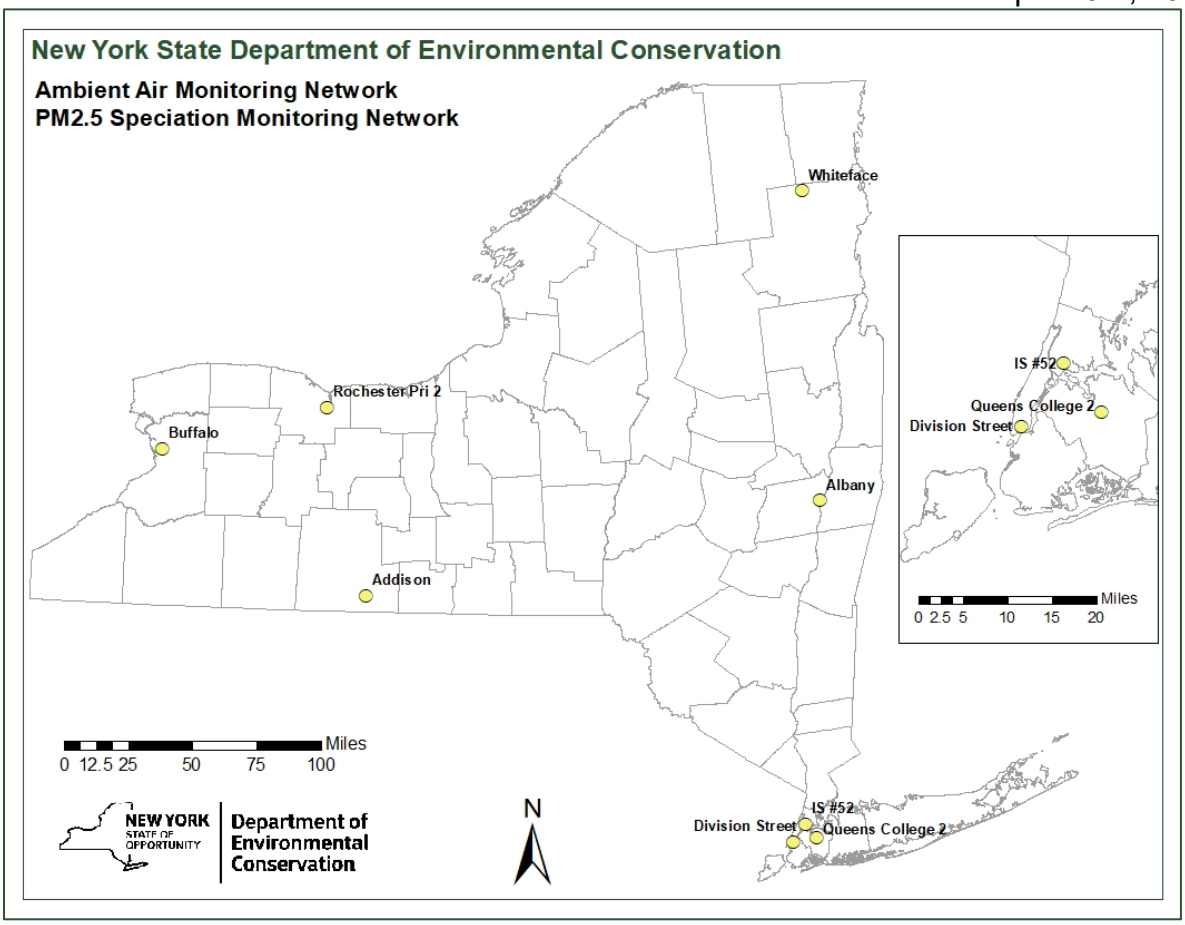


Figure 3.12 Map of Speciation Sampling Sites

3.4.6 Continuous Speciation

The NYSDEC recognizes the value of high resolution measurements (hourly or higher) of $PM_{2.5}$ species. This data is useful for the examination of pollutant trends (and temporal patterns) and is critically important for areas facing non-attainment for the $PM_{2.5}$ NAAQS. Identifying seasonality of species is necessary to develop control strategies. Long term monitoring is vital to this effort because in addition to changes in source emissions changes in meteorology also affect PM pollution.

The NYSDEC continuous speciation program is expanding and currently includes monitoring at urban and rural locations. *Sulfate, organic carbon, elemental carbon and black carbon species data are collected at hourly or higher frequency*. In this manner, both the regional and inter-urban variability of these species are being investigated. The NYSDEC uses instruments to examine the species of $PM_{2.5}$ on a higher frequency than what is available from the filter-based speciation sampling network. This continuous speciation data is useful in the examination of source strengths and the relationship between pollutant concentrations and meteorology. The operation of continuous speciation equipment is also less expensive than long-term filter species measurements due to the high costs associated with filter lab analysis. Operation of continuous

speciation in conjunction with 24-hr CSN sampling is beneficial in accounting for biases in measurements when a change to the CSN method occurs as happened for example in the case of the CSN carbon which was changed to the IMPROVE method in 2007.

NYSDEC has been using the continuous speciation data in NYC to examine temporal patterns such as diurnal and day of week patterns of aerosol species related to source strengths and meteorology. For example, elemental carbon, black carbon and primary pollutant NO_x in NYC track throughout the day with peak concentrations in the morning coincident with the early commute period. Mobile emissions in the early morning occur into a shallow boundary layer which concentrates pollutants near ground level. An elevation in boundary layer height during the day leads to a dispersion of pollutants and a less pronounced afternoon/evening peak. Concentrations of these species are also higher on weekdays compared to weekends indicating that local mobile emissions are a significant source of these species. During winter months organic carbon sometimes shows similar patterns to EC and NO_x reflecting the primary organic component most likely from mobile emissions. Throughout the year however organic carbon does not track the primary pollutants but is more correlated with $PM_{2.5}$ mass (and sulfate during summer months) indicating that there is a significant regional or non-local contribution to organic carbon measured in NYC.

3.4.7 Ultrafine Particulate Monitoring

Ultrafine particles (UFPs) are aerosols with an aerodynamic diameter of 0.1 μm (100 nm) or less. There is a growing concern in the public health community about the contribution of UFPs to human health. Despite their modest mass and size, they dominate in terms of the number of particles in the ambient air. A concern about UFPs is their potential ability to reach deeply into the lungs. Moreover, UFPs have a high surface area and potential to absorb a substantial amount of toxic organic compounds.

NYSDEC first began ultrafine particulate monitoring at Queens College in June of 2009. The Queens College NCore site was selected for the UPM to complement a suite of parameters already being measured there. This instrument provides continuous measurements of size distribution and particle number concentrations of fine particles below one micron, in the range from to 20 to 500 nanometers. Data on particle size distribution and concentration will provide valuable information for the understanding of PM2.5 formation mechanisms, as well as source apportionment determination.

Monitoring for ultrafine particles in New York has expanded since 2009. There are now monitors in NYC, at near-road locations in Buffalo, Rochester, and Queens, and one located in a rural area in the Southern Tier. Preliminary data suggest that the ultrafine particles are regional in nature, though some size fractions are impacted by local mobile sources. These sites utilize an API Model 651 which counts particles larger than 7 nanometers. Data from these ultrafine monitors are being uploaded to the EPA AQS database for use by researchers looking into this field of research.

3.5 Sulfur Dioxide

Sulfur dioxide (SO_2), a colorless, reactive gas, is produced during the burning of sulfur-containing fuels such as coal and oil, during metal smelting, and by other industrial processes. It belongs to a family of gases called sulfur oxides (SO_x). Major sources include power plants, industrial boilers, petroleum refineries, smelters, iron and steel mills. Generally, the highest concentrations of sulfur dioxide are found near large fuel combustion sources.

High concentrations of SO2 can result in temporary breathing impairment for asthmatic children and adults who are active outdoors. Short-term exposures of asthmatic individuals to elevated SO2 levels while at moderate exertion may result in reduced lung function that may be accompanied by symptoms such as wheezing, chest tightness, or shortness of breath. Other effects that have been associated with longer-term exposures to high concentrations of SO2, in conjunction with high levels of PM, include respiratory illness, alterations in the lungs' defenses, and aggravation of existing cardiovascular disease.

Additionally, there are a variety of environmental concerns associated with high concentrations of SO_2. Because SO_2, along with NO_x, is a major precursor to acidic deposition (acid rain), it contributes to the acidification of soils, lakes, and streams and the associated adverse impacts on ecosystems. Sulfur dioxide exposure to vegetation can increase foliar injury, decrease plant growth and yield, and decrease the number and variety of plant species in a given community. Sulfur dioxide also is a major precursor to $PM_{2.5}$ (aerosols), which is of significant concern to human health, as well as a main pollutant that impairs visibility. Finally, SO_2 can accelerate the corrosion of natural and man-made materials (e.g., concrete and limestone) that are used in buildings and monuments, as well as paper, iron-containing metals, zinc, and other protective coatings.

Figure 3.13 shows the number of SO_2 monitors and the composite annual means in New York State over the years.

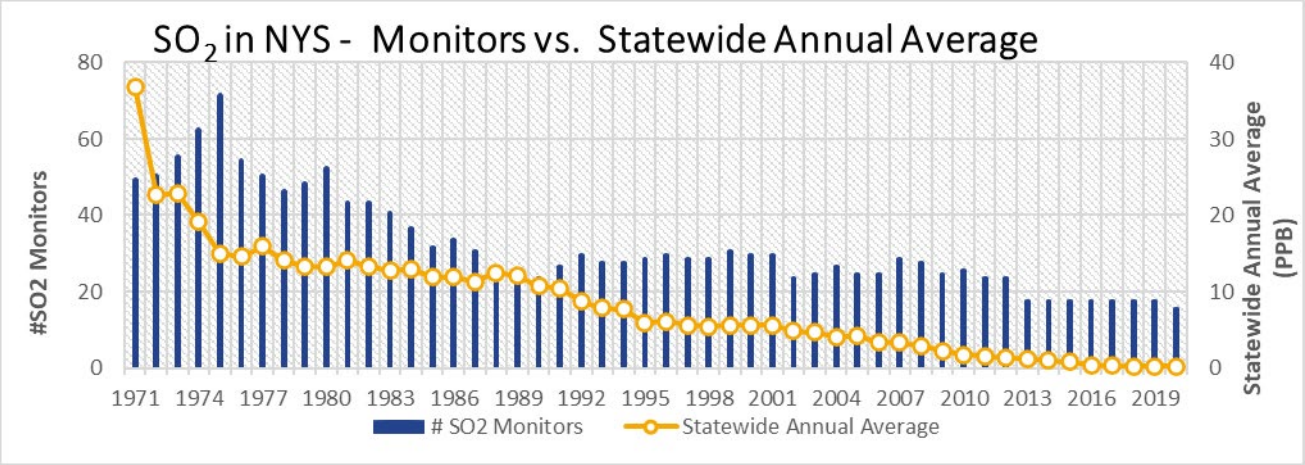


Figure 3.13 Sulfur Dioxide Monitors and Concentration Trends

Effective August 23, 2010, the EPA is also establishing requirements for an SO_2 monitoring network, and replaced the existing 24-hour and annual standards with a new short-term standard based on the 3-year average of the 99th percentile of the yearly distribution of 1-hour daily maximum SO_2 concentrations at 75 ppb. These new provisions require monitors in areas where there is an increased coincidence of population and SO_2 emissions. On September 21, 2015, the U.S. Environmental Protection Agency finalized requirements for air agencies to monitor or model ambient sulfur dioxide (SO2) levels in areas with large sources of SO2 emissions to help implement the 1-hour SO2 National Air Ambient Quality Standard (NAAQS). This final rule which is known as the Data Requirements Rule (DRR) establishes that, at a minimum, air agencies must characterize air quality around sources that emit 2,000 tons per year (tpy) or more of SO2. The DRR allows sources to accept enforceable emission limits to reduce their emissions to a level less than 2000 tons per year or to determine through dispersion modeling that there are no ambient air concentrations of SO2 above the NAAQS or to monitor air quality to ensure that there are no exceedances of the primary SO2 NAAQS.

There are two sources in New York that have elected to characterize air quality in areas near their facilities by monitoring in order to satisfy the DRR. The facilities established and operated SO2 monitors at locations that are acceptable to the NYSDEC and EPA. The primary objective of this monitoring is to determine the 1-hour concentration of SO2 at the location or locations where the maximum impact from the source is expected to occur. The NYSDEC utilized dispersion modeling to determine how many monitors were necessary for each source as well as to determine the acceptable locations where these monitors could be established. The Cayuga East and Cayuga West sites were closed at the end of 2019, and thus do not appear on the map below

There are 18 SO_2 monitors in operation currently, as shown in Figure 4.15. TEI Model 43C and 43i TLE instruments using the pulsed fluorescence method are deployed in the network.

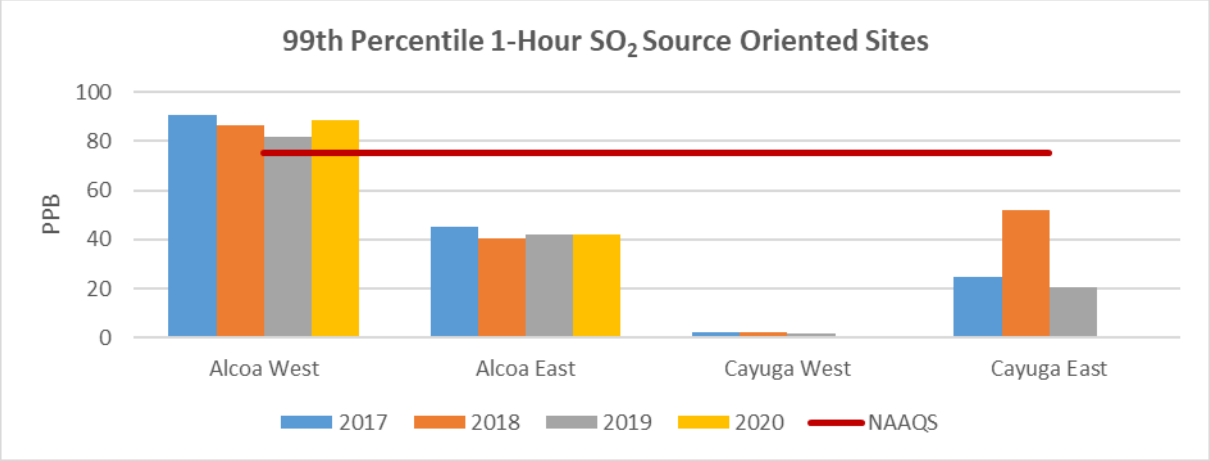


Figure 3.14 Source Oriented Sulfur Dioxide Monitors and Concentration Trends

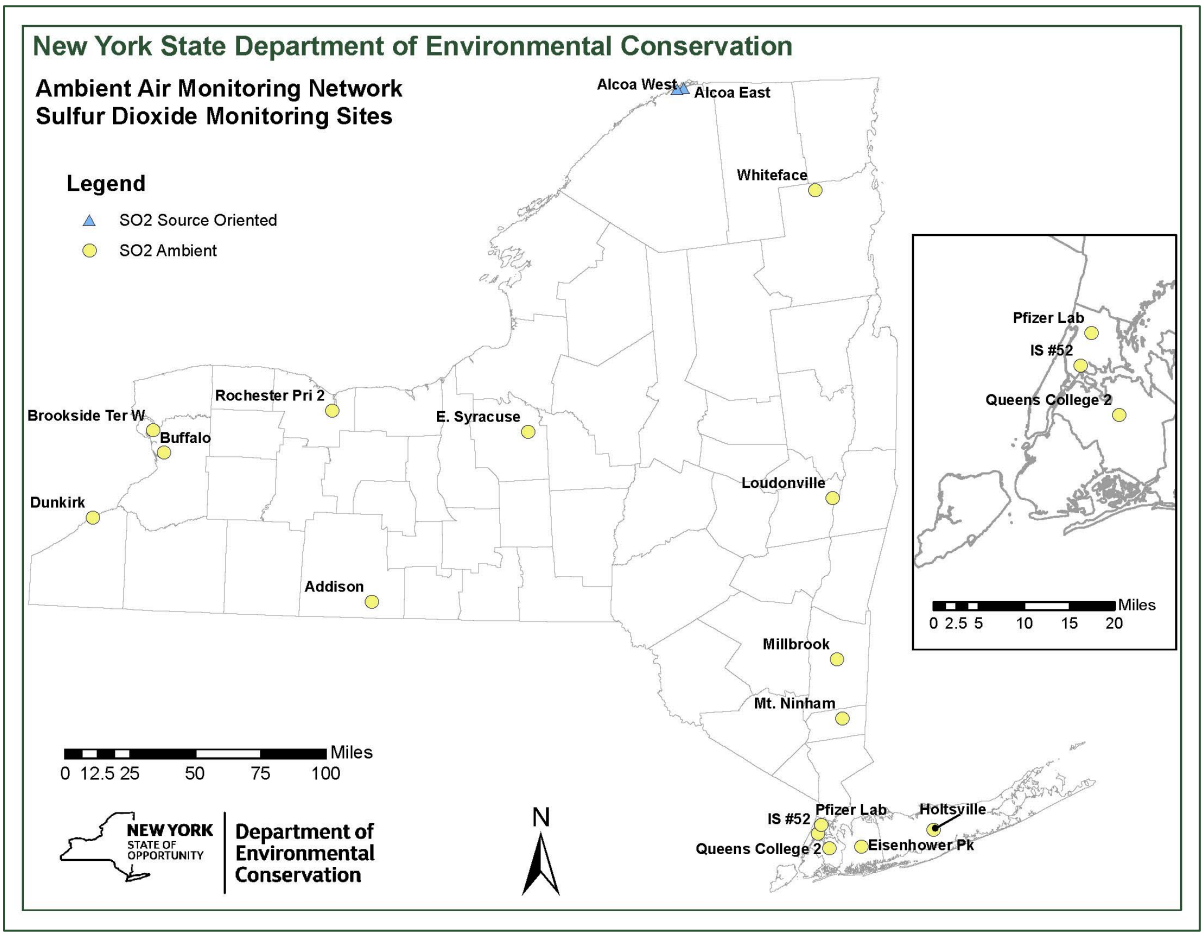


Figure 3.15 Map of Sulfur Dioxide Monitoring Sites

3.6 Ozone

Ozone is a molecule made up of three oxygen atoms (O3), a very reactive gas, and even at low concentrations it is irritating and toxic. It occurs naturally in small amounts in the earth's upper atmosphere, and in the air of the lower atmosphere after a lightning storm. In the stratosphere, between 10km and 50km above the earth's surface, it forms the Ozone Layer. This is an important protective layer that filters out most of the harmful ultra-violet radiation from the sun. When ozone is present at ground level and in the troposphere (10-18 km above earth's surface) it is considered a pollutant and a greenhouse gas. Ozone is a primary ingredient of smog. Short-term (1- to 3-hour) and prolonged (6- to 8-hour) exposures to ambient O3 concentrations have been linked to a number of health effects

Ground-level O3 remains a pervasive pollution problem in the United States. Ozone is formed in the atmosphere by the reaction of volatile organic compounds (VOCs) and NOx in the presence of heat and sunlight, which are most abundant in the summer. VOCs are emitted from a variety of sources, including motor vehicles, refineries, consumer products, and natural sources. Changing weather patterns contribute to

yearly differences in O3 concentrations. Ozone and the precursor pollutants that cause O3 also can be transported into an area from sources located hundreds of miles upwind.

Exposures to O3 result in lung inflammation, aggravate preexisting respiratory diseases such as asthma, and may make people more susceptible to respiratory infection. Children active outdoors during the summer when O3 levels are at their highest are most at risk of experiencing such effects. Other at-risk groups include adults who are active outdoors and individuals with preexisting respiratory disorders. .

EPA initially established primary and secondary NAAQS for photochemical oxidants on April 30, 1971. Both primary and secondary standards were set at an hourly average total photochemical oxidants, not to be exceeded more than one hour per year. Revisions to the NAAQS were made in 1979, and again in 1997. In July 1997 EPA revised the O3 standards by replacing the existing primary 1-hr average standard with an 8-hr average set at a level of 0.08 ppm. The form of the primary standard was changed to the annual fourth-highest daily maximum 8-hr average concentration, averaged over three years. The 8-hr ozone standard (primary and secondary) was lowered to 0.075 ppm on May 27, 2008, at which time the 1-hr standard was revoked.

In 2015, the EPA updated the NAAQS for ground-level ozone, based on extensive scientific evidence about ozone's effects. Under the October 2015 rule, the primary standard was lowered to 0.070 ppm, which took effect January 1st, 2016. In addition to lowering the 8-hr ozone standard, the 2015 ozone rule expanded the monitoring season of 32 states including New York. The New York ozone monitoring season now runs from March 1 through the end of October. The number of ozone monitors and concentration trends for the 8-hr standard in New York State for the past three decades is shown in Figure 3.16.

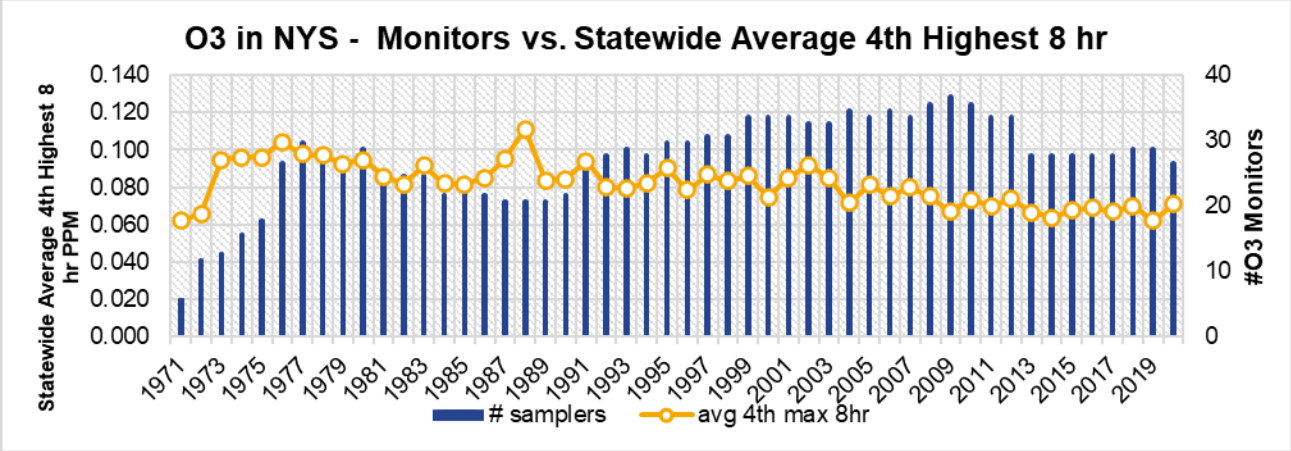


Figure 3.16 Ozone Monitors and 8-hr Concentration Trends

At present, the NYSDEC operates API T400 ozone monitors statewide, which use the UV photometric method for detection. The site locations are depicted in Figure 3.17 below.

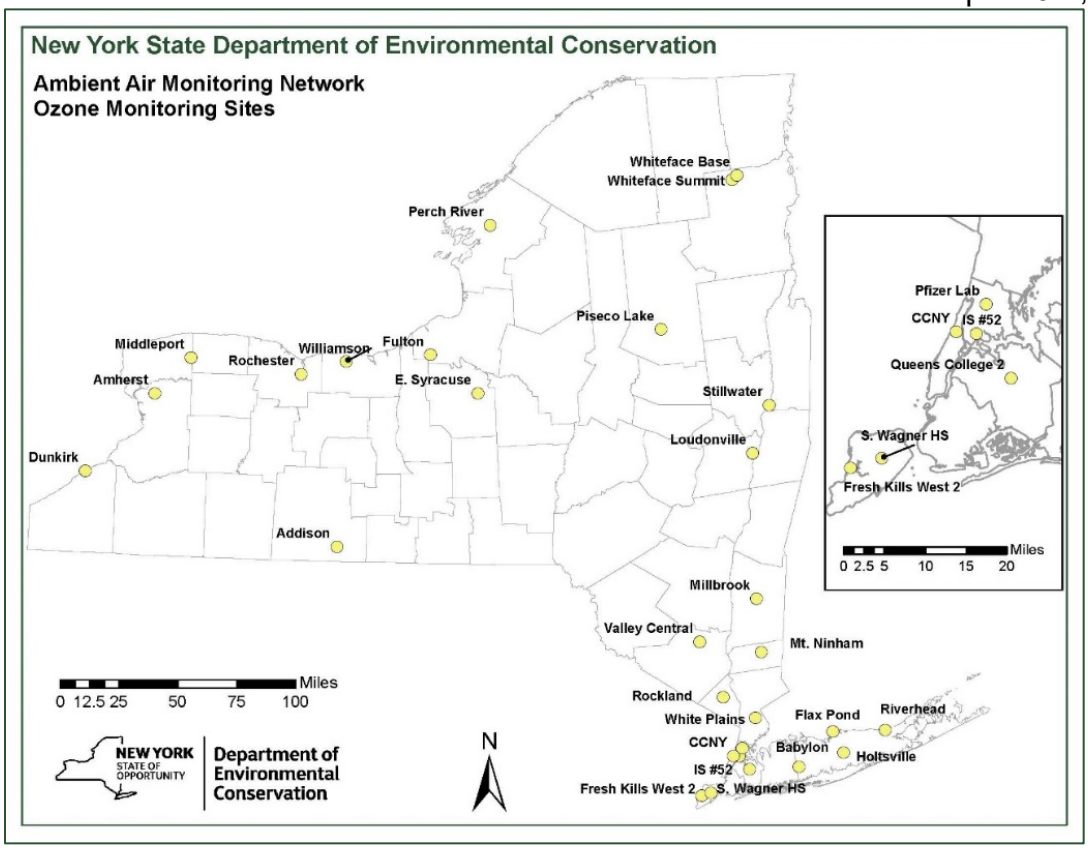


Figure 3.17 Map of Ozone Monitoring Sites

5.0 Air Toxics Program

In general, EPA uses ambient air toxics monitoring to support the efforts to reduce human exposure and health risks from air toxics. The monitoring data provided by the ambient air toxics monitoring program is intended to support four major objectives:

- Establish trends and evaluate the effectiveness of air toxics emissions reduction strategies.
- Characterize ambient concentrations (and deposition) in local areas. Air toxics originate from local sources and can concentrate in relatively small geographical areas, producing the greatest risks to human health.
- Provide data to support, evaluate, and improve air quality models. Air quality models are used to develop emission control strategies, perform exposure assessments, and assess program effectiveness.
- Provide data to support scientific studies to better understand the relationship between ambient air toxics concentrations, human exposure, and health effects from these exposures.

EPA's national air toxics monitoring program is comprised of four different monitoring efforts:

- National Air Toxics Trends Stations (NATTS)
- EPA funded local-scale projects to assess conditions at the local level
- Existing State and local program monitoring
- Persistent bio-accumulative toxics monitoring

The aim for the NATTS network is to supply long-term monitoring data for certain priority air toxics across representative areas of the country to show overall trends for these pollutants. Currently, there are 23 NATTS established in 22 cities. The two New York NATTS sites are in the Bronx, and Rochester.

5.1 National Air Toxics Trends Stations (NATTS)

EPA's Urban Air Toxics Program identified 33 high-priority urban air toxics. From these 33 air toxics EPA developed a list of 19 "core" air toxics representing the pollutants for which EPA eventually wants to develop trends information. However, because of limitations in available methodologies, EPA decided that at a minimum, in starting the network, each of the NATTS should monitor for at least 6 of these 19 pollutants. These six pollutants are considered national air toxics "drivers" (i.e., pollutants of concern in all areas of the country).

Table 5.1 NATTS Pollutants of Concern

Required Monitoring	Desired Monitoring
1,3-butadiene	trichloroethylene
acrolein	tetrachloroethylene

Required Monitoring	Desired Monitoring
arsenic	beryllium
formaldehyde	nickel
benzene	cadmium
	acetaldehyde
	1,2-dichloropropene
	carbon tetrachloride
	lead
	chloroform
	manganese
	methylene chloride
	vinyl chloride

For the two NATTS sites, New York will perform analysis of 42 VOCs (Table 5.2), and 12 carbonyls (Table 5.6). More details on the sampling and analysis are provided in the NY Toxics Monitoring, and Photochemical Assessment Monitoring Stations sections, respectively. In addition, low volume PM_{10} Teflon filters are collected for trace metals analysis using ICP-MS. The targeted metals include: arsenic, beryllium, cadmium, lead, manganese, nickel, antimony, cobalt, and selenium, with the last three being potential future HAPs.

Polycyclic Aromatic Hydrocarbons (PAHs) sampling at the Rochester and IS 52 sites began in July 2008. The collection media consists of one 110 mm diameter glass microfiber filter and a tubular glass cartridge containing a combination of Polyurethane Foam (PUF) and XAD-2 resin. The exposed samples are shipped to an EPA contract laboratory (ERG) for analysis.

5.2 NY Toxics Monitoring Network

The NY ambient air toxics monitoring program was first established in 1985 as part of the Governor's Air Monitoring Modernization Capital Budget Program. New York State has been operating a toxics monitoring network, funded entirely by State monies since 1990. Currently, there are 11 sites statewide collecting 24-hr canister samples for VOC analysis in a 1-in-6 day interval. See section on NY Toxics Monitoring Network.

The goal is to monitor air quality related to toxics in the State's urban, industrial, residential, and rural areas. Implementation of this program started the development of a long-term toxics air quality database for New York State. The database will be used to define, attain, and preserve good air quality in New York State. The data defines actual air quality impacts of the VOCs. The data is used in the design and management of New York's air quality, including risk assessment, modeling, planning and trend analysis.

Volatile organic compounds are collected in stainless steel canisters contained in a sampler known as an ambient air canister sampler. The sampler is an air flow calibrated sampling device that pumps ambient air into the canister. A special stainless-steel diaphragm pump provides a constant pressure to push the sample through the sampler. A relief valve is used to maintain a steady pressure for the sample flow controller. Samples are collected at a one in six days' frequency and shipped back to the Rensselaer laboratory facility for analysis.

The analysis methodology is a modified version of EPA method TO-15. An aliquot of air sample is taken from the canister at a controlled flow and temperature onto an Entech Model 7100A preconcentrator. The preconcentration process involves a series of steps. The first trap consists of glass beads/Tenax held at -110℃ which is then heated to room temperature to remove water/moisture in the sample. The next trap in line consists of Tenax held at - 30℃. The contaminants of interest are then desorbed at 150℃ and collected on the cryofocuser held at -150℃. The sample is then rapidly heated for column injection using a Varian GC coupled with a Saturn MS detection. This method of analysis allows positive identification by retention time and molecular mass.

Concentration trends charts for some ubiquitous VOCs are provided below Annual averages are weighted by the number of samples on a given year.

Table 5.2 Target List of Volatile Organic Compounds

Chemical	Alternative Names and Notes	CAS Number	AQS ID
Acrolein	2-Propenal; Acrylic aldehyde; Acrylaldehyde	107-02-8	43505
Benzene	Benzol	71-43-2	45201
Benzyl chloride	Chloromethylbenzene; Chlorotoluene	100-44-7	45809
1,3-Butadiene	Butadiene	106-99-0	43218
Carbon tetrachloride	Tetrachloromethane	56-23-5	43804
Chlorobenzene	Monochlorobenzene; Benzene chloride	108-90-7	45801
Chloroform	Trichloromethane	67-66-3	43803
1,4-Dichlorobenzene(p)	p-Dichlorobenzene	106-46-7	45807
1,3-Dichloropropene	Includes cis and trans isomers	542-75-6	43841
Ethyl Chloride	Chloroethane	75-00-3	43812
Ethylbenzene	Ethylbenzol; Phenylethane	100-41-4	45203
Ethylene dibromide	1,2-Dibromoethane	106-93-4	43843
Ethylene dichloride	1,2-Dichloroethane	107-06-2	43815
Ethylidene dichloride	1,1-Dichloroethane	75-34-3	43813
Methyl bromide	Bromomethane	74-83-9	43819
Methyl chloride	Chloromethane	74-87-3	43801
Methyl chloroform	1,1,1-Trichloroethane	71-55-6	43814
Methyl tert-butyl ether	MTBE	1634-04-4	43372
Methylene chloride	Dichloromethane	75-09-2	43802
Propylene dichloride	1,2-Dichloropropane	78-87-5	43829
Styrene	Ethenylbenzene, Vinyl benzene	100-42-5	45220
1,1,2,2-Tetrachloroethane	Tetrachloroethane	79-34-5	43818
Tetrachloroethylene	Perchloroethylene; Perc	127-18-4	43817
Toluene	Methylbenzene	108-88-3	45202

Chemical	Alternative Names and Notes	CAS Number	AQS ID
1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzol	120-82-1	45810
1,1,2-Trichloroethane	Vinyl Trichloride	79-00-5	43820
Trichloroethylene	Trichloroethene; TCE	79-01-6	43824
Vinyl chloride	Chloroethylene	75-01-4	43860
Vinylidene chloride	1,1-Dichloroethylene; 1,1-Dichloroethene	75-35-4	43826
o-Xylene	1,2-Dimethyl benzene	95-47-6	45204
m,p-Xylenes	Dimethyl benzenes	1330-20-7	45102
1,2 Dichlorobenzene	*ortho*-Dichlorobenzene, *o*-Dichlorobenzene	95-50-1	45805
1,3 Dichlorobenzene	*m*-Dichlorobenzene; *meta*-Dichlorobenzene	541-73-1	45806
1,2,4-Trimethylbenzene	pseudocumene	95-63-6	43348
1,3,5-Trimethylbenzene	Mesitylene	108-67-8	45207
Hexachloro-1,3-Butadiene	Hexachlorobutadiene	87-68-3	43844
Cis-1,2-Dichloroethylene	1, 2-dichloroethylene	156-59-2	43218
Dichlorodifluoromethane	Freon-12	75-71-8	43823
Trichlorofluoromethane	Freon-11	75-69-4	43811
Trichlorotrifluoroethane	Freon 113, 1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	43821
Dichlorotetrafluoroethane	Freon 114	76-14-2	43852
Bromodichloromethane	Bromodichloromethane, Bromo(dichloro)methane, Dichlorobromomethane	75-27-4	43828

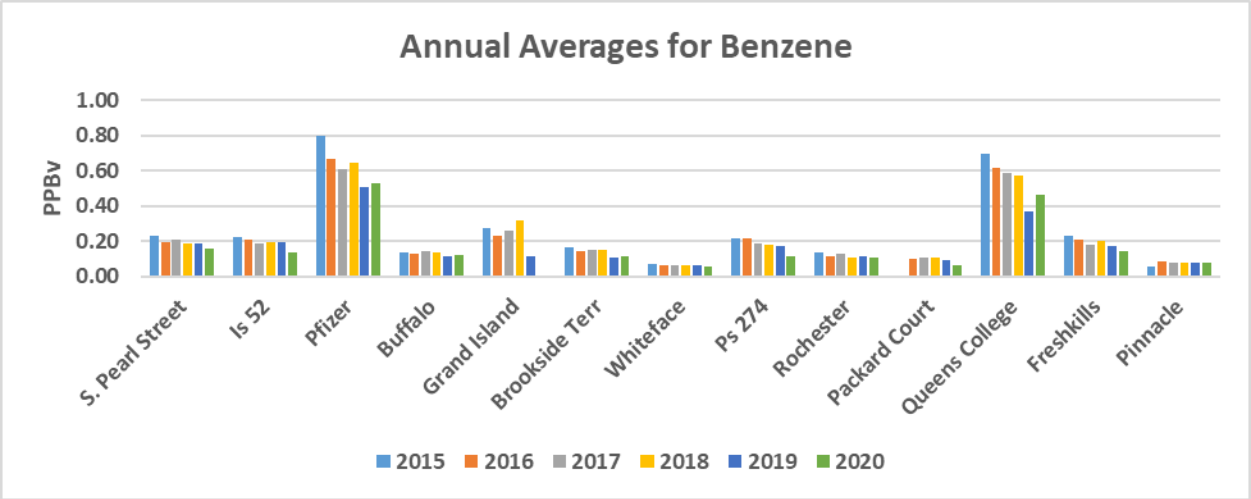


Figure 5.1 Annual Averages for Benzene

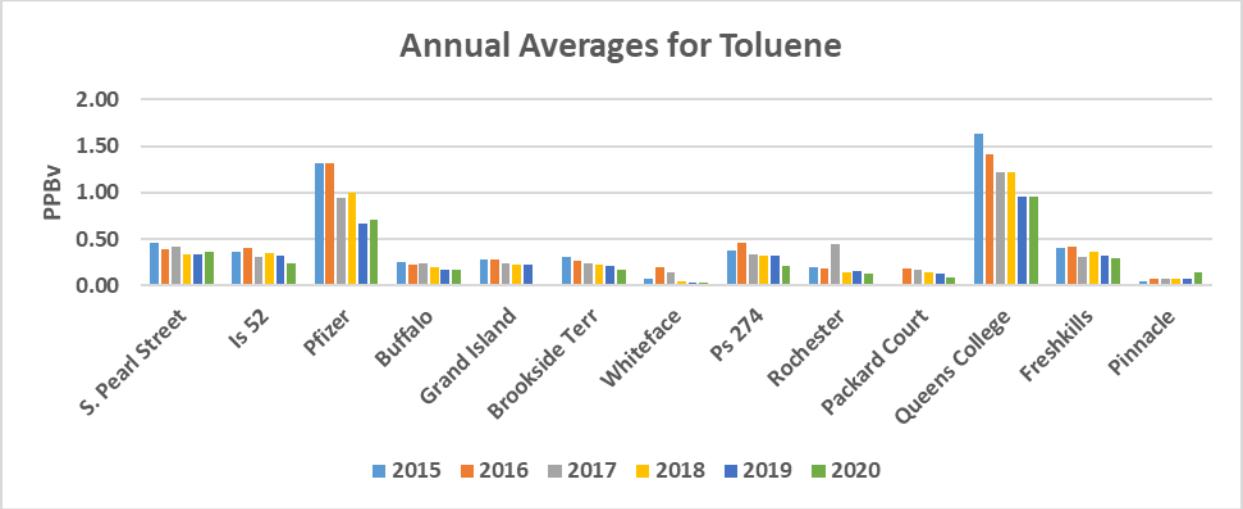


Figure 5.2 Annual Averages for Toluene

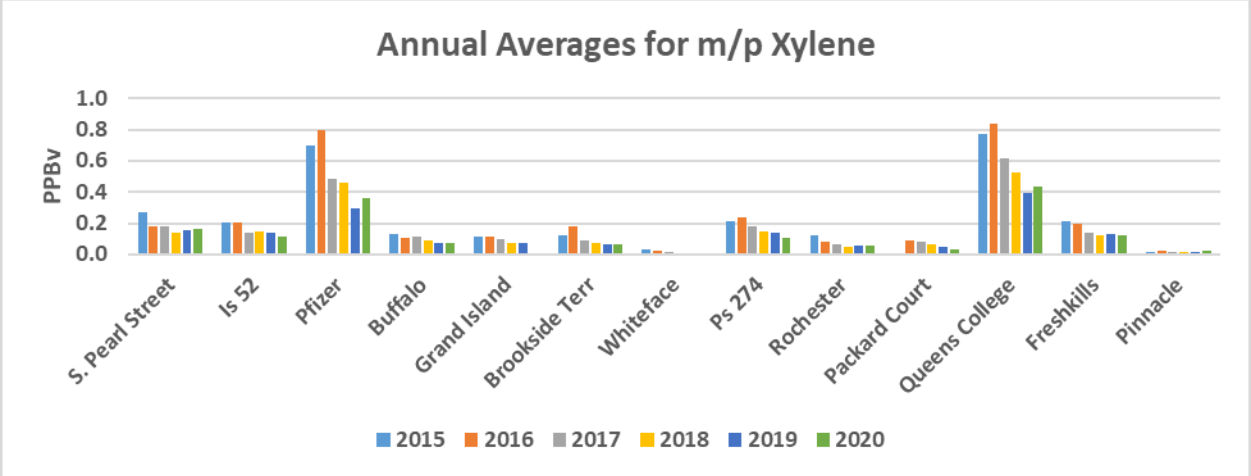


Figure 5.3 Annual Averages for *m,p*-Xylene

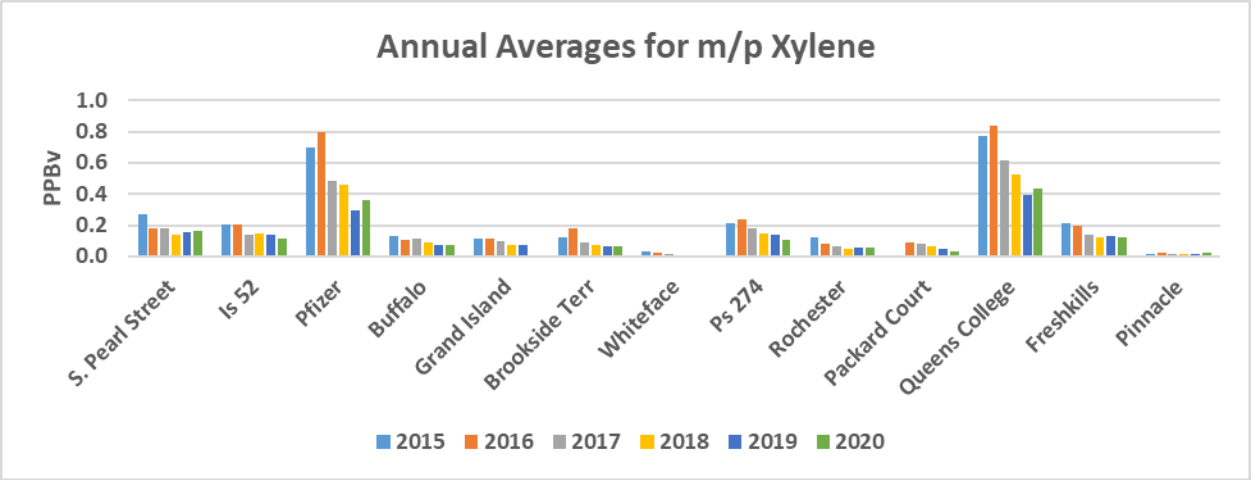


Figure 5.4 Annual Averages for *o*-Xylene

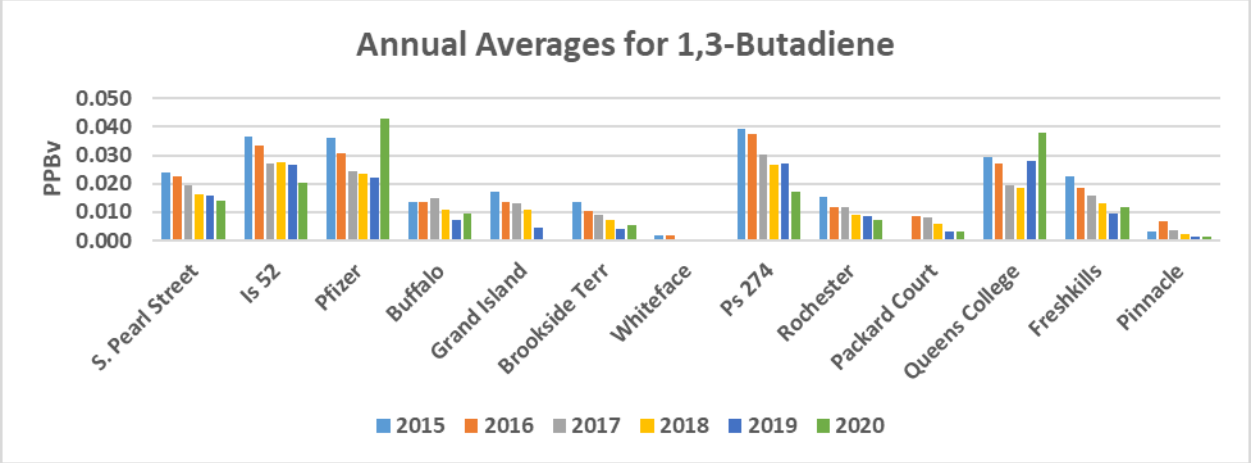


Figure 5.5 Annual Averages for 1,3-Butadiene

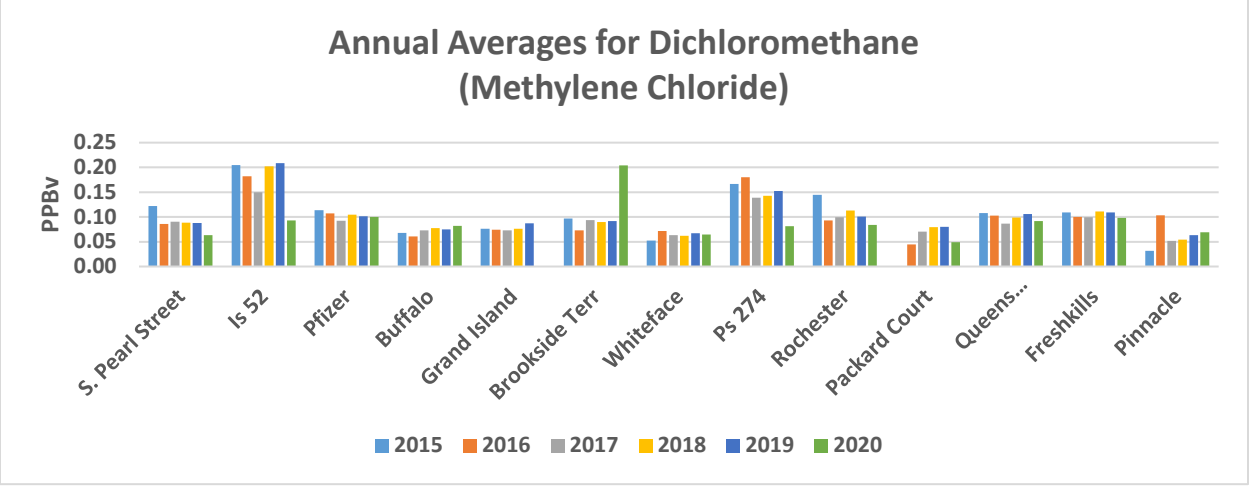


Figure 5.6 Annual Averages for Dichloromethane

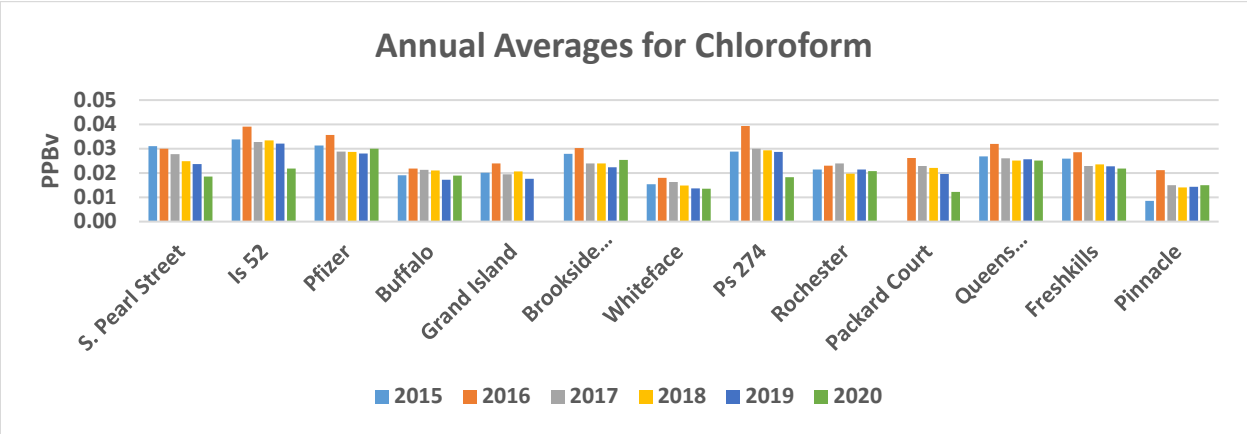


Figure 5.7 Annual Averages for Chloroform

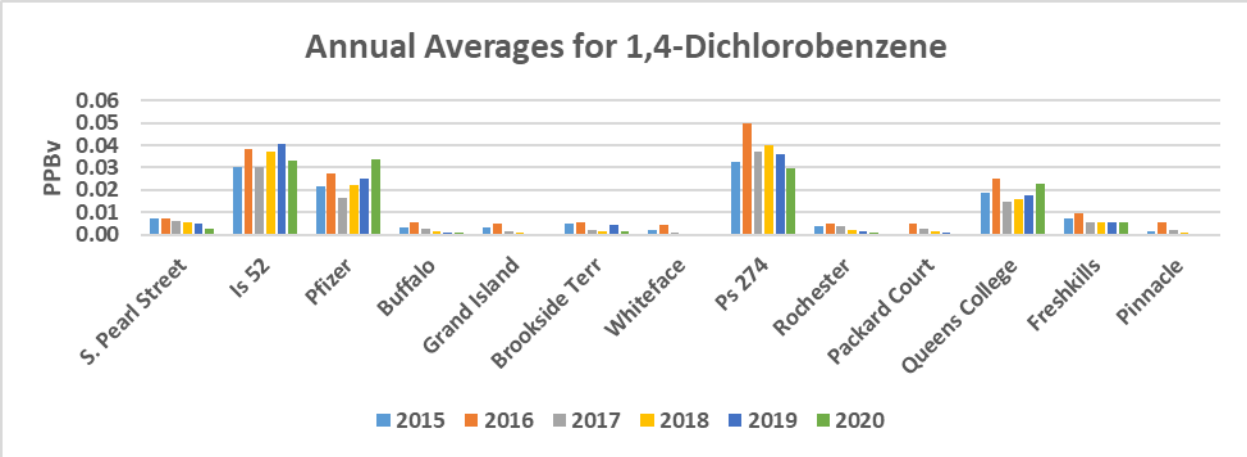


Figure 5.8 Annual Averages for 1,4-Dichlorobenzene

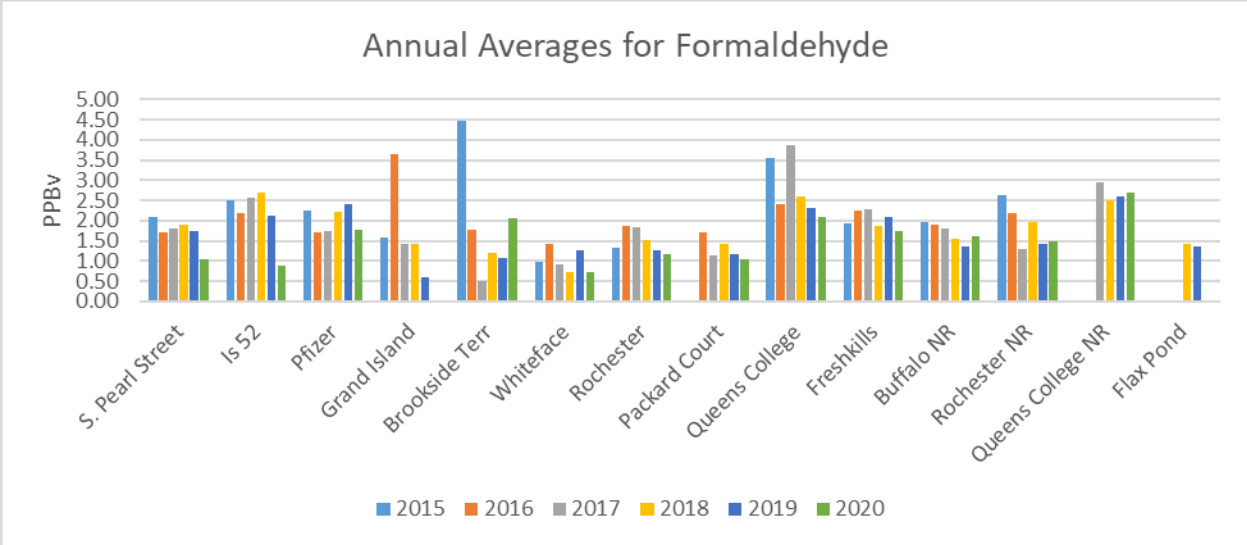


Figure 5.9 Annual Averages for Formaldehyde†

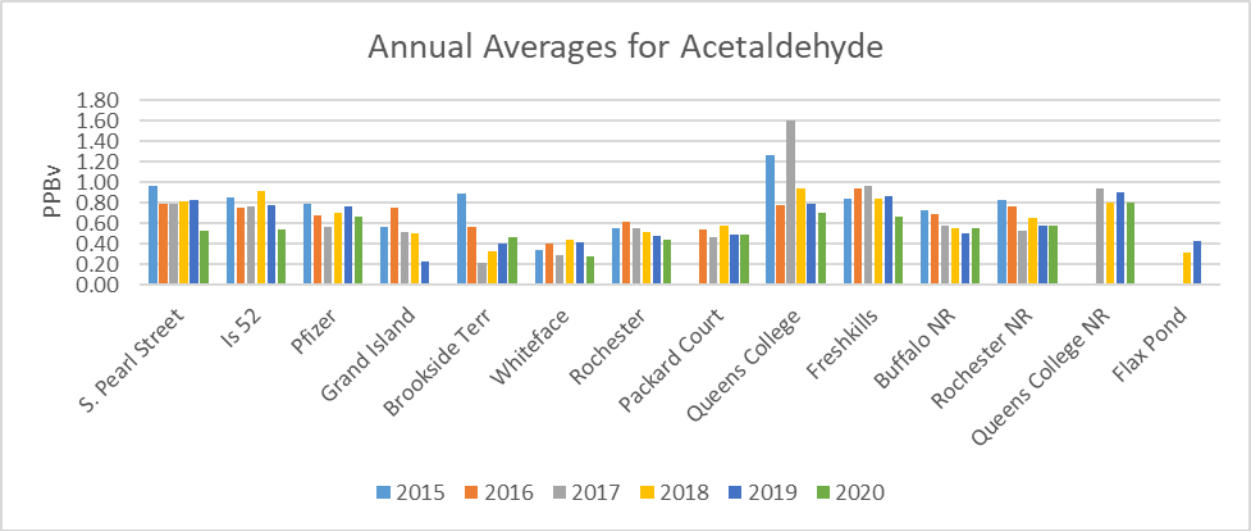


Figure 5.10 Annual Averages for Acetaldehyde

Currently, there are 12 toxics monitoring sites in operation for the measurement of VOCs, and 11 sites for carbonyls statewide. These locations are shown in Figure 5.11 below.

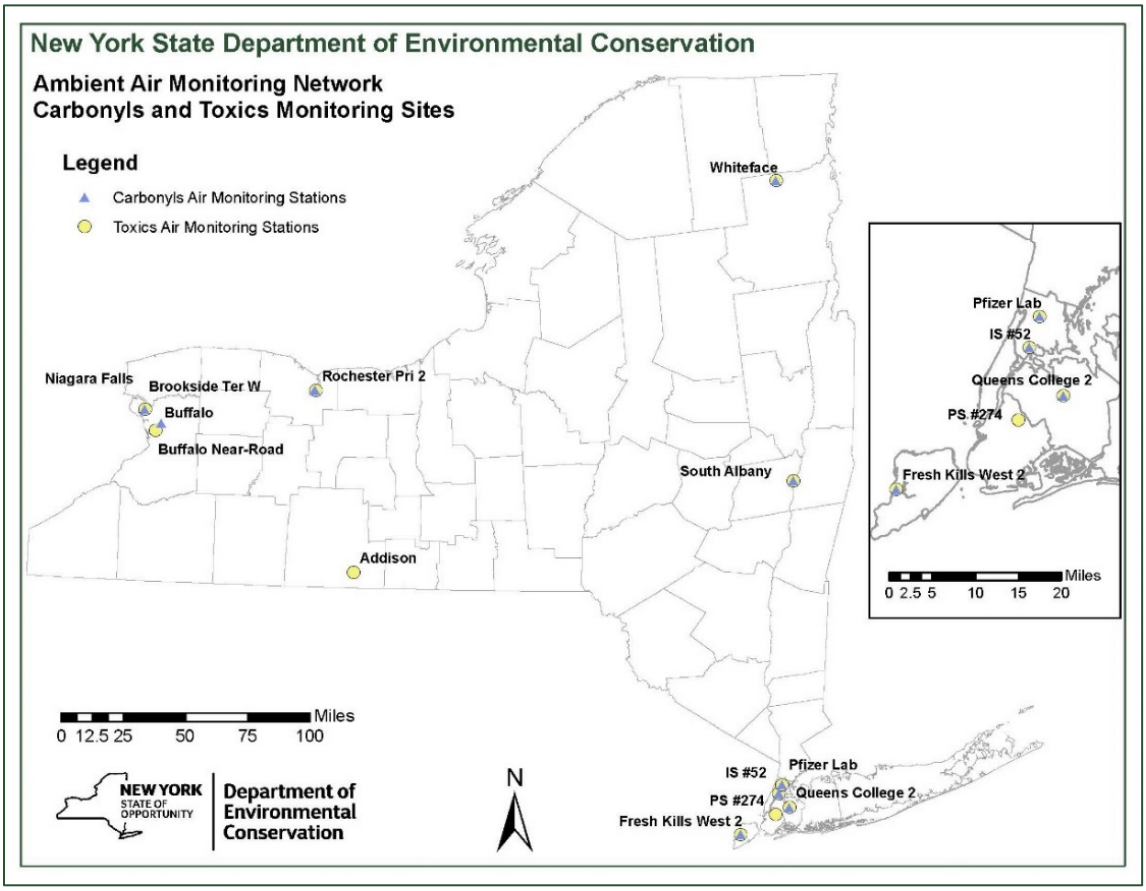


Figure 5.11 Map of Toxics Monitoring Sites

5.3 Photochemical Assessment Monitoring Stations (PAMS)

The 1993 revisions to 40 CFR Part 58 provide for the establishment and maintenance of network of Photochemical Assessment Monitoring Stations (PAMS). The purpose of the PAMS program is to provide an air quality database that will assist in evaluating and modifying control strategies for attaining the O3 National Ambient Air Quality Standard (NAAQS). PAMS data will also be used to better characterize the nature and extent of the O3 problem, track VOC and NOx emission inventory reductions, assess air quality trends, and determine whether areas of New York remain in nonattainment of the O3 NAAQS.

The parameters to be measured at a PAMS site varies with the site's ozone nonattainment designation and whether a site is upwind or downwind from O3 precursor source areas. These parameters are O3, oxides of nitrogen, speciated volatile organic compounds (VOCs) and specific meteorological measurements. As part of the October 2015 Ozone rule, the EPA revised the Photochemical Assessment Monitoring Stations (PAMS) Network requiring states that operate PAMS sites to measure nitrogen dioxide, hourly speciated VOCs, eight-hour averaged carbonyls on every third day and hourly averaged mixing height.

The two PAMS sites in New York were originally located in the Bronx at the New York Botanical Gardens and in Queens at the Queensborough Community College. The revised monitoring network plan for PAMS required PAMS sites to be installed at NCore sites in MSAs with a population over 1 Million. This requirement had placed PAMS stations in Queens and in Rochester. The NYSDEC received waivers to move the PAMS site from Queens to the existing site in the Bronx and from Rochester to a new location on Long Island north of Stony Brook.

The Bronx location was selected instead of Queens because the Bronx better represents a source region for Ozone precursors than Queens. This is important for determining how much local sources contribute to VOCs and nitrogen species that contribute to Ozone formation in downwind regions.

The Long Island location was selected instead of Rochester because counties in the New York Metro Area, lower Hudson Valley, Long Island, New Jersey, and Connecticut are not meeting the Ozone NAAQS. The highest Ozone design values in the non-attainment area are at locations on the southern shore of Connecticut. The area on the north shore of Long Island is well suited to determine Ozone precursor concentrations for pollutants likely to cross Long Island Sound and influence the high design value sites in Connecticut. Air masses typically travel from the Southwest to the Northeast in the summertime when Ozone levels are highest. The location selected for the new PAMS monitoring site on Long Island is in Flax Pond Marine Laboratory in the Village of Oldfield in Setauket, NY.

The Table 5.3 lists the chronology of monitoring at these sites.

Table 5.3 Information on PAMS Sites

Site Name	Parameters	Implementation Date
New York Botanical Garden	NOx	Jun-94
	CO	Jun-94
	O_3	Jun-94
	VOCs	Jun-94
	Carbonyls	Jun-94
	NMOC	Sep-99
Queens Community College closed 12/2001	NOx	May-98
	CO	May-98
	O_3	May-98
	SO_2	May-98
	VOCs	Jun-98
	Carbonyls	Sep-97
	NMOC	Aug-98
Flax Pond	NO_2 / NO_y	Jun-19
	O_3	Jun-18
	VOC	Jun-18
	Carbonyls	Jun-18
NY Mesonet Site	Boundary Height	Jun-18
	Solar Radiation	Jun-18

For gaseous parameters, Table 5.4 lists the sampling instruments and analysis methods.

Table 5.4 Instrumentation for Gaseous Pollutants

Parameter	Instrument	Analysis Method	Frequency
NO	TEI 42C/API T200	Chemiluminescent	Continuous
NO_2	TAPI T500	Cavity Attenuation	Continuous
NO_2	TAPI T200P	Photolytic Chem.	Continuous
NO_y	TEI 42C/API T200	Chemiluminescent	Continuous
O_3	TEI 49C/API T400	Ultraviolet	Continuous
CO	TEI 48C/API T300	Infrared	Continuous

Volatile organic compounds are monitored using Summa canisters samples followed by laboratory GCMS analysis as well as by an on-site real-time GC. The on-site GC system consists of a Markes Unity Air Server-Thermal Desorber System integrated with an Agilent GC. The Summa canisters are shipped to the Rensselaer laboratory facility and analyzed with an Entech preconcentrator with an Agilent GCMS System.

All parameters except for the summer intensive VOCs and carbonyls are run on a continuous basis year-round. VOC system startup is scheduled for June 1st each year. The VOC and Carbonyl intensive sampling ends August 31st after the final system

audit. Twenty-four-hour carbonyl and canister samples are continued on a 1-in-6-day schedule throughout the year

The methods and sampling frequencies are provided in Table 5.7 below.

Table 5.7 VOC Methods and Sampling Frequencies

Sampling Method	Analytical Method	Frequency
Method TO-14a	GC/FID	Hourly
TO-15 (24-hr)	GC/MS	Every 6 day
TO-15 (40 min)	GC/MS	Once a week

Carbonyls are sampled using DNPH cartridges and analyzed with HPLC according to EPA Method TO-11a. The target compound list is provided in Table 5.6 below.

Table 5.6 Target Compound List for Carbonyl Sampling

Compound	AIRS Code
acetaldehyde	43503
acetone	43551
benzaldehyde	45501
crotonaldehyde	43516
formaldehyde	43502
hexanal	43517
methacrolein	43515
m-tolualdehyde	45504
n-butyraldehyde	43510
propionaldehyde	43504
valeraldehyde	43518

The targeted compounds are listed below:

Table 5.8 PAMS Target Compounds List

Compound	AIRS #
ethene	43203
acetylene	43206
ethane	43202
propene	43205
propane	43204
isobutane	43214
1-butene	43280
n-butane	43212
trans-2-butene	43216
cis-2-butene	43217
isopentane	43221
1-pentene	43224
n-pentane	43220
isoprene	43220
trans-2-pentene	43226
cis-2-pentene	43227
2,2-dimethylbutane	43227
cyclopentane	43242
2-,3-dimethylbutane	43284
2-methylpentane	43285
3-methylpentane	43230
n-hexane	43231
n-hexene *added 1997*	43245
Methylcyclopentane	43262
2,4-dimethylpentane	43247
benzene	45201

Compound	AIRS #
cyclohexane	43248
2-methylhexane	43263
2,3-dimethylpentane	43291
3-methylhexane	43249
2,2,4-trimethylpentane	43250
n-heptane	43232
Methylcyclohexane	43261
2,3,4-trimethylpentane	43252
toluene	45202
2-methylheptane	43960
3-methylheptane	43253
n-octane	43233
ethylbenzene	45203
m,p-xylene	45109
styrene	45220
o-xylene	45204
nonane	43235
isopropylbenzene	45210
n-propylbenzene	45209
m-ethyltoluen *added 1995*	45212
p-ethyltoluene *added 1995*	45213
1,3,5-trimethylbenzene	45207
o-ethyltoluene *added 1995*	45211
1,2,4-trimethylbenzene	45208
n-decane	43238
1,2,3trimethylbenzene *added 1995*	45225

Compound	AIRS #
1,3-diethylbenzene *added 1995*	45218
1,4 diethylbenzene *added 1995*	45219
n-undecane	43954
dodecane *added 1997*	45218
tnmoc	43102
pamshc	43000
1,3-Butadiene	43218
Isoprene	43243
2,2-Dimethylbutane	43244
alpha.-Pinene	43256
beta.-Pinene	43257

6.0 NCore Sites

The National Core Monitoring Program (NCore) is an EPA initiative to redesign a portion of the National air monitoring network. The existing compliance-oriented network is set up with a parameter specific design that is targeted at the relatively high concentrations near the NAAQS. The data from this network is not as accurate at the low levels needed for trends analysis and model validation. The single parameter design is also not well suited to multi-pollutant health studies, integrated model assessment or the analysis of source attribution through comparisons of co-pollutants from sources to receptors.

The NCore program has been designed around approximately 75 sites nationwide that are sited to represent large urban areas away from significant individual sources. A smaller subset of these sites are located in rural areas. The NYSDEC operates two urban NCore sites and one rural NCore site. The sites are:

Table 6.1 NCore Sites

AQS ID #	Site Name	General Location
36-081-0124	Queens College	Located in Kew Gardens, Queens, NY
36-055-1007	Rochester	Located Southeast of Rochester, NY
36-101-0003	Pinnacle	Located 15 mi. Southwest of Corning, NY

Pinnacle is the only rural site of the three and it was also selected as one of ten pilot NCore sites. This site has hosted monitoring appropriate for the objectives of the NCore program due to its involvement with several research programs, so it was well suited to take on the more difficult monitoring parameters required from the NCore monitoring program. SUNY Albany ASRC researchers have been making low level trace gas measurements at this site for the past ten years. Home built analyzers for low level CO and NO_y were employed. These prototype instruments required extensive post sampling data processing. They measured “true” NO_2 using direct photolysis method. Commercially available instruments are used for monitoring low level SO_2, continuous particulate sulfate, and OC/EC particulate carbon. In addition, real-time ammonia data are collected using two different methods - NO chemiluminescence with catalytic conversion, and ion mobility spectrometer.

6.1 NCore Monitoring Objectives

a.) Timely Reporting of Data to the Public
b.) Support for Development of Emission Strategies
c.) Accountability of Emission Strategy Progress
d.) Support for Long-Term Health Assessments
e.) Compliance
f.) Support to Scientific Studies
g.) Support to Ecosystem Assessments

6.2 NCore Primary Monitoring Parameters

The NCore sites are required to be sited in conjunction with the $PM_{2.5}$ FRM network and the $PM_{2.5}$ speciation network. These parameters are supplemented with the NCore specific parameters that include NO_y, Low Level CO and Low Level SO_2.

NO_y which is defined as the sum of all reactive nitrogen oxides includes NO, and NO_2, and other nitrogen oxides referred to as NO_z. The NCore program requires NO_y monitoring because it is the best indicator of the results from NO_x reduction strategies, it is valuable for ecosystem assessments, it is important for model evaluation and it supports NO_2 estimates for health effects studies.

CO is important to the NCore program because it is used in model evaluation, it is a surrogate for many combustion related pollutants, it is included in health effect studies and it can be used to assess control programs. CO is also monitored under the existing criteria monitoring program but NCore requires more accuracy at lower concentrations and siting that makes the data more representative of wider areas than the existing network.

SO_2 is important for model evaluation because of its role in sulfate formation which is a large percentage of $PM_{2.5}$ mass particularly in the Northeast. SO_2 is also important for some health effect studies and like CO it must be monitored accurately at low concentrations to meet the objectives of the NCore program.

Nitric acid (HNO_3) and ammonia (NH_3) are both compounds of interest in EPA's NCore program, but they are not yet required because the sampling methodology is not yet fully developed. Both compounds are useful for model evaluation because of their contribution to PM formation.

To meet the monitoring requirements, trace level instruments for SO_2 and CO as well as NO_y measurements were all operational at the three NCore sites since the beginning of 2011.

7.0 Acid Deposition Monitoring Network

At the end of 2012, NYSDEC discontinued the existing acid rain monitoring program and transitioned 7 monitoring locations to the National Acid Deposition Program (NADP). The old acid deposition program was established in response to the State Acid Deposition Control Act (SADCA) in 1985. This program was designed to provide measurements of acid deposition and related quantities necessary to assess the effectiveness of sulfur control policy and other strategies aimed at reducing the effects of acid rain. By all measures, the monitoring program, as well as the NO_x and SO_x control strategies has improved the environment. For example, the deposition of Sulfate statewide has decreased by more than 60% since the monitoring program began and the concentrations of acidic pollutants continue to decline.

The transition to the NADP has resulted in savings to NYSDEC, provided better and more useful data for use in regulation development and allows for the comparison of

data from New York with other acid sensitive regions across the country. Additionally, because the NADP program provides a uniform operational framework, the data from existing NADP sites within New York and in neighboring states can be utilized in the analysis of deposition in New York. The NADP program office transitioned from the University of Illinois to the University of Wisconsin on March 1, 2018. This should have no effect on field operations or data quality. Data from all the NADP sites can be accessed from: http://nadp.slh.wisc.edu/data/

Table 7.1 Acid Deposition Monitoring Network

The NYSDEC monitoring locations that were transitioned to the NADP in January 2013 and November 2015	The other NADP sites currently operating in New York but sponsored by other organizations are:
NY06 Bronx	NY01 Alfred
NY28 Piseco Lake	NY08 Aurora Research Farm
NY43 Rochester (Established 2013)	NY10 Chautauqua
NY59 Wanakena	NY20 Huntington Wildlife
NY92 Amherst (Established 2013)	NY22 Akwesasne Mohawk-Fort Covington
NY93 Paul Smith's College	NY52 Bennett Bridge
NY94 Nick's Lake (Established 2015)	NY67 Ithaca (NADP/AirMoN)
	NY68 Biscuit Brook
	NY96 Cedar Beach, Southold
	NY98 Whiteface Base (Previously operated by NYSDEC)
	NY99 West Point

8.0 Anticipated Changes in the Next 18 Months

8.1 Miscellaneous Projects

Monitoring staff provide technical support and maintenance for several portable field instruments. The advanced leak detection and repair (LDAR) equipment purchased by EPA for NYSDEC has proven to be extremely valuable during recent field deployments at petroleum storage facilities and compressor stations. In addition to the Forward Looking Infrared (FLIR) camera, staff maintain and calibrate H_2S real-time instruments as well as train Regional staff for their proper field use. Also available for Regional field deployment are wood smoke monitoring kits that measure black carbon, $PM_{2.5}$ and wind speed/direction. Laboratory staff prepare, and ship evacuated canisters fitted with orifice flow devices to the Regions as needed for whole air grab sampling. These samples are returned to the laboratory facility for VOC analysis.

8.2 Proposed Changes and Additions at Existing Sites

As part of the requirements specified in the revised Monitoring Regulations Parts 53 and 58, a network assessment was performed to determine “if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network.” As a result of this exercise, NYSDEC is proposing the following modifications to the existing network

Carbon Monoxide
Due to the downward trend in CO concentrations, the NYSDEC plans to change the CO monitor at CCNY to a “trace” version. This will make the data more comparable to the NCore and PAMS sites.

Sulfur Dioxide
Due to lower ambient concentrations and the closure of many upwind sources of SO2, the NYSDEC plans to remove monitors for SO2 from the Loudonville, Millbrook, Mt Ninham, East Syracuse and Dunkirk sites. Additionally, continuous Sulfate monitoring will be discontinued at the Pinnacle site. SO2 monitors will be maintained in the larger cities, the NCore sites and in the Adirondacks.

Change PM-2.5 Sampling Frequency to 1-in-6 Day
The NYSDEC plans to install additional continuous PM-2.5 FEMs later in 2021. This will allow the frequency of collection for the collocated filter-based the sampling frequencies to be reduced. NYSDEC will reduce filter-based sampling to 1–in-6 day at Buffalo, Buffalo Near Road, East Syracuse, Rochester, Rochester near Road, Albany, Pinnacle, IS52, and Queens Near Road. Additionally, the PM-2.5 speciation at Pinnacle will also be reduced to a 1-in-6 day frequency.

9.0 Monitoring Sites

The Bureau's tasks and responsibilities are carried out by staff in four Sections. While the field operators are stationed throughout the State, the managers are physically located in the Central Office in Albany (Northern Monitoring, Network Operations), our Region 2 Office in Long Island City (Southern Monitoring), and the SUNY East Campus in Rensselaer (Monitoring Support). Functionally, the Northern Monitoring Section is responsible for ambient air monitoring sites in upstate New York north of and including the counties of Rockland and Putnam. The Southern Monitoring Section is responsible for ambient air monitoring sites in the counties of Westchester, Nassau, Suffolk, and those counties comprising the City of New York. Currently there are 55 active sites statewide. Figures 9.1 and 9.2 show monitoring site locations for the two monitoring operations, respectively.

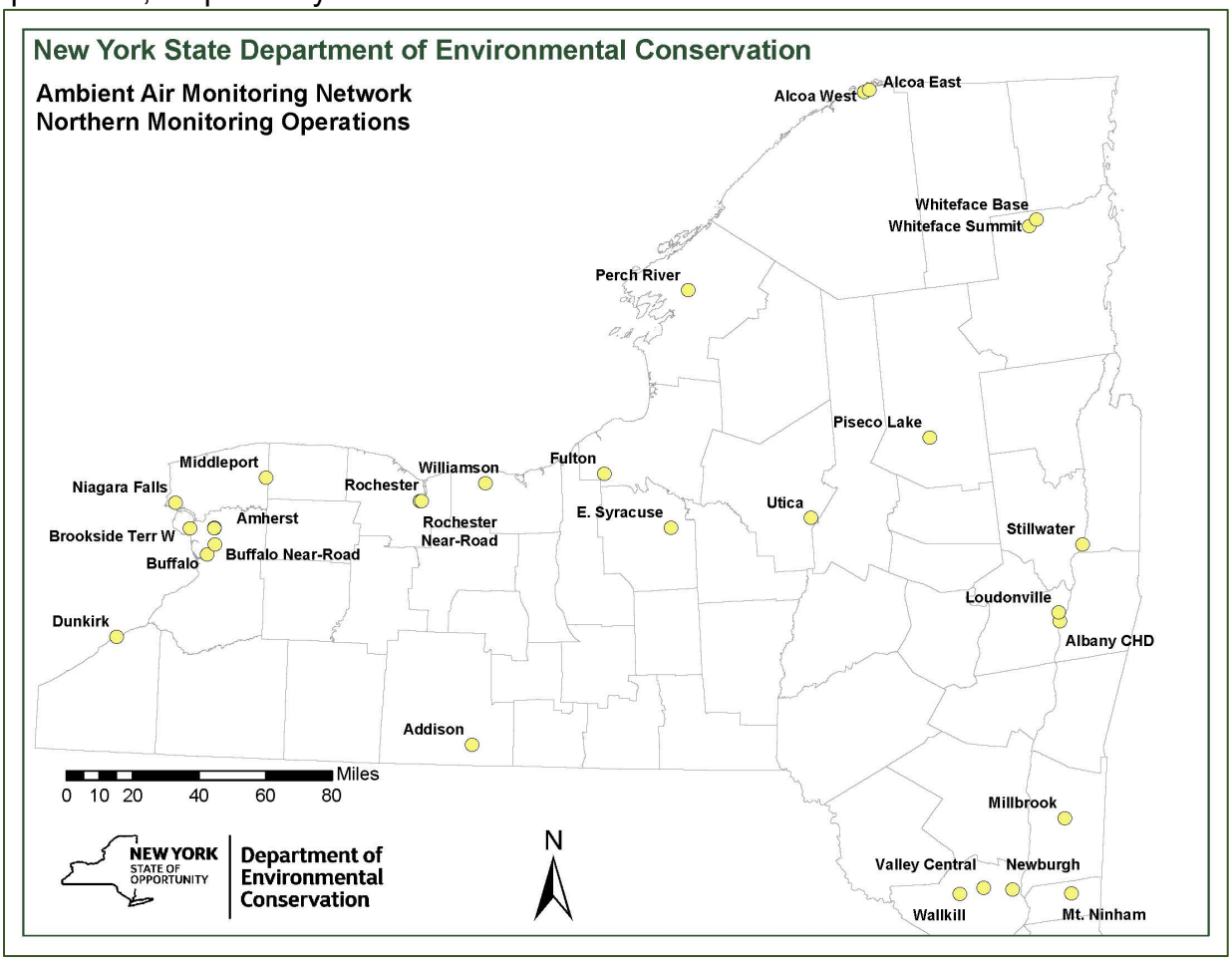


Figure 9.1 Site Locations for Northern Monitoring Operation

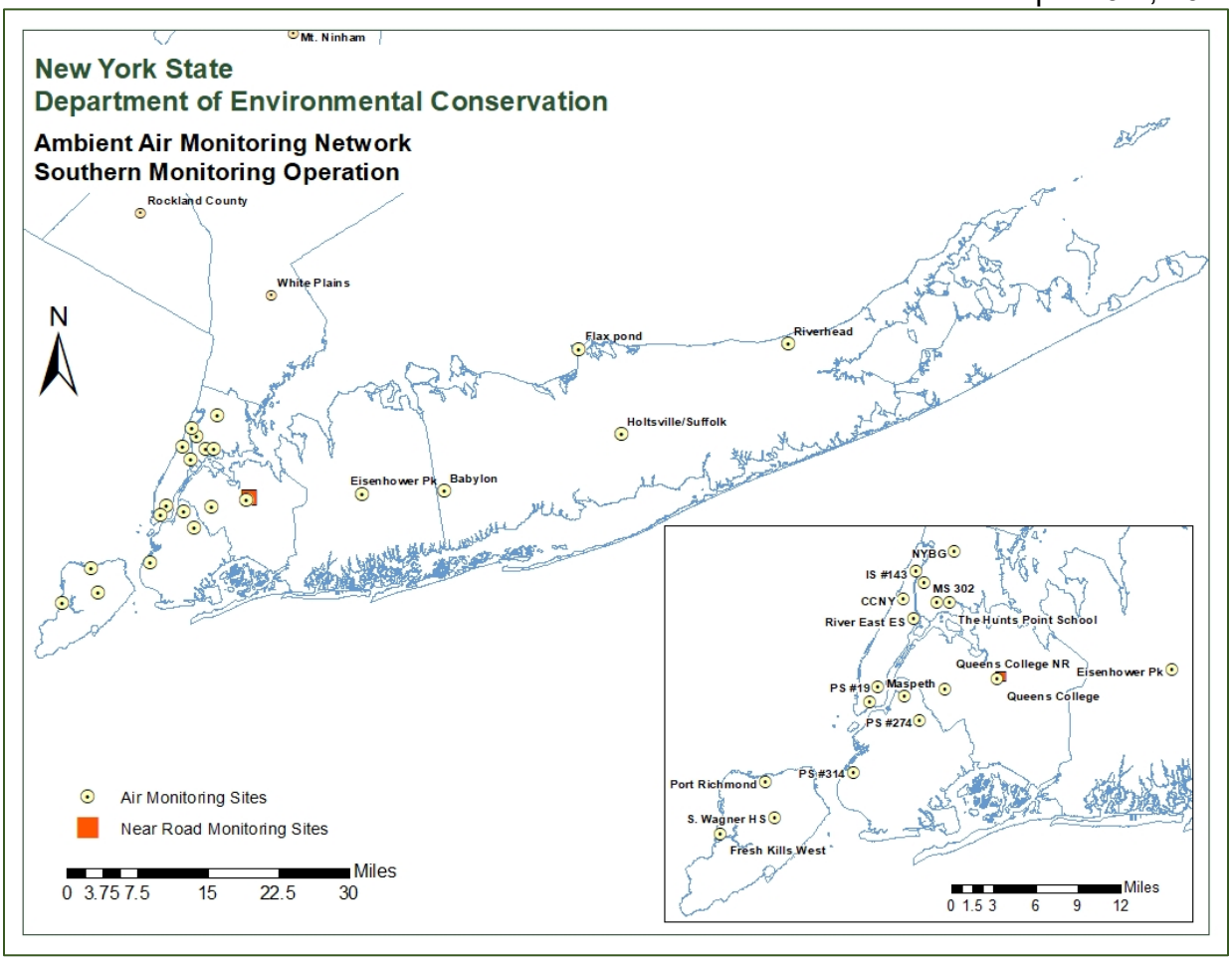


Figure 9.2 Site Locations for Southern Monitoring Operation

Information pertaining to each monitoring site including site photo, location, parameters monitored, sampling frequency, and analysis methodologies is provided below for the two monitoring operations.

Most of the monitoring sites meet the siting criteria requirements for the parameters monitored as specified in Appendix E of 40 CFR Part 50. For the few sites that do not meet all of the siting requirements, we have demonstrated to EPA that in all instances the site is as representative of the monitoring area as it would be if the siting criteria were being met, and that the monitor or probe cannot reasonably be located so as to meet the siting criteria because of physical constraints. Waivers have been granted by the Regional Administrator for these sites.

9.1 Northern Monitoring Sites

Table 9.1 Locations of Northern Monitoring Sites

DEC Region	AIRS #	DEC #	Site Name	County	Location	NYSDEC Sampling?
3	36-027-0007	1328-01	Millbrook	Dutchess	Forest Research Station	Y
3	36-071-0002	3502-04	Newburgh	Orange	Public Safety Building	Y
3	36-071-5001	3527-01	Valley Central	Orange	Valley Central High School	Y
3	36-071-3002	3566-09	Wallkill Wakefern	Orange	Wakefern Food	Y
3	36-079-0005	3951-01	Mt. Ninham	Putnam	NYSDEC Headquarters	Y
4	36-001-0005	0101-13	Albany	Albany	Albany County Health Department	Y
4	36-001-0012	0101-33	Loudonville	Albany	Reservoir	Y
4	36-001-0013	0101-34	South Albany	Albany	S Pearl Street	Y
5	36-031-0002	1567-03	Whiteface Summit	Essex	Summit Building	Y
5	36-031-0003	1567-04	Whiteface Lodge	Essex	ASRC (Base Lodge)	Y
5	36-041-0005	2050-01	Piseco Lake	Hamilton	Airport	Y
5	36-091-0004	4567-01	Stillwater	Saratoga	Saratoga Historical Park	Y
6	36-033-0004	1655-01	Paul Smiths	Franklin	Paul Smith College	N
6	36-043-0005	2167-03	Nick's Lake	Herkimer	Campground	N
6	36-045-0002	2223-01	Perch River	Jefferson	Game Management Building	Y
6	36-065-2001	3202-01	Utica	Oneida	Utica Health Dept.	Y
6	36-089-0004	4402-08	Alcoa West	St. Lawrence	Pontoon Bridge Rd	Y
6	36-089-0005	4402-07	Alcoa East	St. Lawrence	NY-131	Y
7	36-067-1015	3353-09	E. Syracuse	Onondaga	Enterprise Parkway	Y
7	36-075-0003	3754-01	Fulton	Oswego	820 County Rt. 8	Y
8	36-055-1007	2701-22	Rochester	Monroe	Yarmouth Rd (RG&E Substation)	Y
8	36-055-0015	2701-23	Rochester Near-Road	Monroe	I-490 and 1775 East Ave	Y
8	36-101-0003	5001-04	Pinnacle	Steuben	Pinnacle State Park	Y
8	36-117-3001	5863-01	Williamson	Wayne	Wayne County Occupational Center	Y
9	36-029-0002	1451-03	Amherst	Erie	450 Maple Rd, Amherst Parks Dept.	Y
9	36-029-1014	1472-14	Tonawanda II	Erie	192 Brookside Terrace West	Y
9	36-063-1006	3120-02	Middleport	Niagara	Sewage Treatment Plant	Y
9	36-013-0006	0601-04	Dunkirk	Chautauqua	Sewage Treatment Plant	Y
9	36-029-0005	1401-18	Buffalo	Erie	Off Dingens Street, near Weiss	Y
9	36-029-0023	1455-02	Buffalo Near-Road	Erie	I-90 Mile Post 424.6 East Bound Side	Y
9	36-063-7001	3102-26	Niagara Falls	Niagara	Packard Court Community Center	Y

Albany County Health Department

Address: South Ferry and Green Streets
Albany, NY 12202

AQS Number: 36-001-0005
DEC Number: 0101-13
County: Albany
Statistical Area: Albany-Schenectady-Troy
Coordinates: Lat: 42.64225 Lon: -73.75464

Nearest Meteorological Data
NOAA/NWS: WBAN14735
MESONET Site: SCHO

This site was established in 1973 as a TSP site. Over time, it has progressed to PM_{10} and is now a collocated $PM_{2.5}$ FRM site. A continuous R&P TEOM is also operated at the Albany County Health Department. Speciation sampling was added in January 2008.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$ Collocated	Low volume FRM R&P 2025 Method 145	Gravimetric	1-in-3
$PM_{2.5}$	R&P TEOM 1400 Method 701	TEOM 50ºC	Continuous
$PM_{2.5}$ Speciation Ions and Elements	Met One Super SASS Method 811	XRF	1-in-6
$PM_{2.5}$ Speciation Carbon	URG 3000 Method 838	IMPROVE TOR	1-in-6
Black Carbon	Magee Scientific Aethalometer Method 866	Optical Absorption	Continuous
Ultrafine	API 651 at 3.0 lpm and 7 nm cut point Method 173	Water-Based Condensation Particle Counter	Continuous

Alcoa West

Address: 327 Pontoon Bridge Rd
Massena, NY 13662

Site Info:
AQS Number: 36-089-0004
DEC Number: 4402-08
County: St. Lawrence
Statistical Area: Ogdensburg-Massena
Coordinates: Lat: 44.95546 Lon: -74.90780

Nearest Meteorological Data
NOAA/NWS: WBAN:94725
MESONET Site: LOUI

This site was established in 2017 to comply with the Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard (80 FR 51052) that requires that NYSDEC provide data to characterize the 1-hour ambient air concentration of SO2 in areas near known large SO2 sources. The Alcoa West site is designed to capture down-wind emissions from the Alcoa Massena West Aluminum Plant.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Sulfur Dioxide	TEI 43i Method 560	Pulsed Fluorescence	Continuous

Alcoa East

Address: 2019 NY-131,
Massena, NY 13662

Site Info:
AQS Number: 36-089-0005
DEC Number: 4402-07
County: St. Lawrence
Statistical Area: Ogdensburg-Massena
Coordinates: Lat: 44.96541 Lon: - 74.87500

Nearest Meteorological Data
NOAA/NWS: WBAN:94725
MESONET Site: LOUI

This site was established in 2017 to comply with the Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard (80 FR 51052) that requires that NYSDEC provide data to characterize the 1-hour ambient air concentration of SO2 in areas near known large SO2 sources. The Alcoa East site is designed to capture up-wind emissions from the Alcoa Massena West Aluminum Plant.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Sulfur Dioxide	TEI 43i Method 560	Pulsed Fluorescence	Continuous

Amherst

Address: Town of Amherst Parks Department
& Audubon Golf Course
450 Maple Road
Amherst, NY 14221

Site Info:
AQS Number: 36-029-0002
DEC Number: 1451-03
County: Erie
Statistical Area: Buffalo - Niagara Falls, NY
Coordinates: Lat: 42.99328 Lon: -78.77153

Nearest Meteorological Data
NOAA/NWS: WBAN:14747
MESONET Site: BUFF

This site was established in July 1972. Amherst is a permanent ozone and nitrogen dioxide site. It is located on land behind the Town of Amherst Parks Department Maintenance building and alongside the Audubon Golf Course in a suburban area. This site measures ozone for the Buffalo area and transport from points west. Acid deposition and $PM_{2.5}$ monitoring was relocated here from the Niagara Falls site following its closure.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Adsorption	Continuous
$PM_{2.5}$ Collocated	Low volume FRM R&P 2025 Method 145	Gravimetric	1-in-6
Acid Deposition	NCON Bucket Style Collector Model 00-120-2	Central Analytical Laboratory at the Illinois Water Survey: IC, ICP-OES, FIA	Weekly

Buffalo

Address: NYS Thruway Authority
Bridge Maintenance Facility
Access Road
Buffalo, NY 14206

Site Info:
AQS Number: 36-029-0005
DEC Number: 1401-18
County: Erie
Statistical Area: Buffalo - Niagara Falls, NY
Coordinates: Lat: 42.87691 Lon: -78.80981

Nearest Meteorological Data
NOAA/NWS: WBAN:14747
MESONET Site: BUFF

This site was originally established in January 1969 and is considered an urban scale site. Buffalo is the main monitoring site for the Buffalo area. It is located on the access road to the New York State Thruway Authority Bridge Maintenance Facility in an urbanized area. It is near interstate 190 and was downwind of significant industrial sources in the 1970s. The impact from industrial sources had been drastically reduced over the past two decades. Toxics and filter based PM_{10} monitoring were relocated here from the Niagara Falls upon site closure.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Oxides of Nitrogen (NO, NO_2, NO_X)	42i Method 560	Chemiluminescence	Continuous
Sulfur Dioxide	TEI 43i Method 560	Pulsed Fluorescence	Continuous
Carbon Monoxide	TEI 48C Method 054	Gas Filter Correlation CO Analyzer	Continuous
$PM_{2.5}$	Low volume FRM R&P 2025 Method 145	Gravimetric	1-in-3 Day
$PM_{2.5}$	TEOM Thermo 1405 Method 701 and 702	TEOM 50ºC Gravimetric	Continuous
$PM_{2.5}$ Speciation Ions and Elements	Met One Super SASS Method 811	IC, XRF RTI Laboratory	Every 6th Day
$PM_{2.5}$ Speciation Carbon	URG 3000 Method 838	IMPROVE TOR	Every 6th Day
PM_{10}	R&P Partisol 2025 Method 127	Gravimetric	Every 3rd Day
Toxics	Canister Method 150	GC/MS	1 day in 6
$PM_{2.5}$ Speciation Carbon	URG 3000 Method 838	IMPROVE TOR	Every 6th Day

Buffalo Near-Road

Address: I90 Mile Post 424.6 East Bound Side
Cheektowaga, NY 14225

Site Info:
AQS Number: 36-029-0023
DEC Number: 1455-02
County: Erie
Statistical Area: Buffalo - Niagara Falls, NY
Coordinates: Lat: 42.921111 Lon: -78.766111

Nearest Meteorological Data
NOAA/NWS: WBAN:14747
MESONET Site: BUFF

This site was established in 2013 under the new NO_x rule that became effective January 2010. After a brief shake-down period, valid NO_2 measurements were reported beginning April 2014. A $PM_{2.5}$ TEOM, a 1-in-3 day FRM sampler, and a CO instrument were added subsequently.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Oxides of Nitrogen (NO, NO_2, NO_x)	API Model 200A/E NO Analyzer Method 099	Chemiluminescence	Continuous
Carbon Monoxide	API 300EU Method 593	Gas Filter Correlation CO Analyzer	Continuous
$PM_{2.5}$	TEOM Thermo 1405 Methods 701 and 702	TEOM 50ºC Gravimetric	Continuous
Black Carbon	Magee Scientific Aethalometer Method 866	Optical Absorption	Continuous
Ultrafine	API 651 at 3.0 lpm and 7 nm cut point Method 173	Water-Based Condensation Particle Counter	Continuous
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1-in-6 days

Dunkirk

Address: City of Dunkirk Sewage Treatment Plant
Wright Park Drive
Dunkirk, NY 14048

Site Info:
AQS Number: 36-013-0006
DEC Number: 0601-04
County: Chautauqua
Statistical Area: Buffalo - Niagara Falls, NY
Coordinates: Lat: 42.49963 Lon: -79.31881

Nearest Meteorological Data
NOAA/NWS: WBAN:14747
MESONET Site: FRED

The Dunkirk monitoring trailer was established in 1999 as a regional transport site. It is located at the western edge of New York on the shores of Lake Erie at the City of Dunkirk's Sewage Treatment Plant. It is approximately 200 feet from Lake Erie in a suburban neighborhood. With the predominant wind direction from the west, this site measures the background levels of pollution entering the state.

$PM_{2.5}$ monitoring was relocated here from the Westfield site upon its closure.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Sulfur Dioxide	TEI 43i Method 560	Pulsed Fluorescence	Continuous
Ozone	API T400Method 087	Ultraviolet Absorption	Continuous
$PM_{2.5}$	Low volume FRM R&P 2025 Method 145	Gravimetric	1-in-3 days, 24-hour

East Syracuse

Address: 5895 Enterprise Parkway
Syracuse, NY 13202

Site Info:
AQS Number: 36-067-1015
DEC Number: 3353-09
County: Onondaga
Statistical Area: Syracuse
Coordinates: Lat: 43.05235 Lon: -76.05921

Nearest Meteorological Data
NOAA/NWS: WBAN:14771
MESONET Site: FAYE

This site was established in 1991 in commercial area of suburban Syracuse. It is the primary air monitoring site in the Syracuse metropolitan area. In 1999, the site became part of the original $PM_{2.5}$ FRM monitoring network.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
$PM_{2.5}$	Low volume FRM R&P 2025 Method 145	Gravimetric	1-in-3 days, 24-hour
$PM_{2.5}$, PMcoarse, PM_{10}	Teledyne T640 at 5.0 LPM Method 236	Broadband spectroscopy	Continuous
Sulfur Dioxide	TEI 431 Method 560	Pulsed Fluorescence	Continuous

Fulton

Address: Granby Community Center
820 County Route 8
Fulton, NY 13069

Site Info:
AQS Number: 36-075-0003
DEC Number: 3754-01
County: Oswego
Statistical Area: Syracuse, NY
Coordinates: Lat: 43.28428 Lon: -76.46324

Nearest Meteorological Data
NOAA/NWS: WBAN:54773
MESONET Site: OSWE

The Fulton site was initiated on October 3, 2002, to measure the Ozone downwind of the Rochester area. Fulton is a seasonal automated ozone site, requiring minimal operator attention. The location in the Granby Community Center offers easy and secure access for DEC staff to perform site maintenance.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous

Loudonville

Address: 300 Albany Shaker Road
Albany, NY 12211

Site Info:
AQS Number: 36-001-0012
DEC Number: 0101-33
County: Albany
Statistical Area: Albany-Schenectady-Troy
Coordinates: Lat: 42.68075 Lon: -73.75733

Nearest Meteorological Data
NOAA/NWS: WBAN:14735
MESONET Site: SCHO

This site was established in 1986 as a neighborhood scale, population exposure site. The site was expanded as part of the NYSDEC Acid Deposition Network. It is located in suburban Albany, in close proximity to Interstate 90. $PM_{2.5}$ sampling was added in January 2008.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
Sulfur Dioxide	TEI 43i Method 560	Pulsed Fluorescence	Continuous
Carbon Monoxide	TEI 48C Method 054	Non-Dispersive Infrared	Continuous
$PM_{2.5}$	Low volume FRM R&P 2025 Method 145	Gravimetric	1-in-3

Middleport

Address: Middleport Sewage Treatment Plant
3825 North Hartland Road
Middleport, NY 14105

Site Info:
AQS Number: 36-063-1006
DEC Number: 3120-02
County: Niagara
Statistical Area: Buffalo - Niagara Falls, NY
Coordinates: Lat: 43.22386 Lon: -78.47888

Nearest Meteorological Data
NOAA/NWS: WBAN:14768
MESONET Site: MEDI

This site was established in 1980 as a Buffalo downwind site. Middleport is a seasonal ozone site, operating between April and November. It is located on land adjacent to the Middleport Sewage Treatment Plant in a rural and largely agricultural area. Ozone is measured for regional transport from Buffalo and points west.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400Method 087	Ultraviolet Absorption	Continuous

Millbrook

Address: Institute of Ecosystem Studies
Forest Road
Millbrook, NY 12545

Site Info:
AQS Number: 36-027-0007
DEC Number: 1328-01
County: Dutchess
Statistical Area: Dutchess County, NY
Coordinates: Lat: 41.78555 Lon: -73.74136

Nearest Meteorological Data
NOAA/NWS: WBAN:64756
MESONET Site: DOVE

This site was established in 1990 as a replacement for the site in the city of Poughkeepsie. The site was suggested by researchers at the Institute of Ecosystem Studies when they suspected that the ozone values in the rural and agricultural area might be higher than those of the high traffic city monitor. The site is shared by the scientists at IES, and researchers there value the data. Sulfur dioxide measurements were added in June 2011.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400Method 087	Ultraviolet Absorption	Continuous
Sulfur Dioxide	TEI 43i TLE Method 560	Pulsed Fluorescence	Continuous

Niagara Falls Packard Court

Address: Packard Court Community Center
4200 Pine Ave,
Niagara Falls, NY 14301

Site Info:
AQS Number: 36-063-7001
DEC Number: 3120-26
County: Niagara
Statistical Area: Buffalo - Niagara Falls, NY
Coordinates: Lat: 43.096528 Lon: -79.010500

Nearest Meteorological Data
NOAA/NWS: WBAN:14747
MESONET Site: BUFF

This site was established in 2015 due to the presence of manufacturing and chemical industries on the area. The ambient air monitoring data that will be collected at the site will provide valuable information to the NYSDEC's Region 9 air staff and will assist in addressing community concerns.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Toxics	Canister Method 150	GC/MS	1-in-6 days
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1-in-6 days

Newburgh

Address: Public Safety Building
55 Broadway
Newburgh, NY 12550

Site Info:
AQS Number: 36-071-0002
DEC Number: 3502-04
County: Orange
Statistical Area: New York, NY
Coordinates: Lat: 41.49916 Lon: -74.00885

Nearest Meteorological Data
NOAA/NWS: WBAN:14714
MESONET Site: BEAC

Newburgh was established in 2000 as part of the NYS $PM_{2.5}$ FRM network. It currently has both a 1-in-3 day FRM and continuous R&P 1400 TEOM. This site has been used to calculate the "FRM Like" values that are reported to the EPA for the TEOMs in New York City, Albany, Newburgh, and Utica.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	Low volume FRM R&P 2025 Method 145	Gravimetric	1-in-3
$PM_{2.5}$	R&P TEOM 1400 Method 702	TEOM 50ºC	Continuous

Nick's Lake Campground

Address: 278 Bisby Roads
Old Forge, NY 13420

Site Info:
AQS Number: 36-043-0005
DEC Number: 2167-03
County: Herkimer
Statistical Area: Utica-Rome, NY
Coordinates: Lat: 43.68578 Lon: -74.98538

Nearest Meteorological Data
NOAA/NWS: WBAN:14714
MESONET Site: BEAC

This site was established in 1987 at the Nick's Lake Campground as part of the Acid Deposition program in the Adirondack Park. Sampling of ozone and SO_2 were discontinued at this site at the end of 2019

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Acid Deposition	NCON Bucket Style Collector Model 00-120-2	Central Analytical Laboratory at the Illinois Water Survey: IC, ICP-OES, FIA	Weekly

Mt Ninham

Address: NYSDEC Multiple Use Area
Gypsy Trail Road
Kent, NY 10512

Site Info:
AQS Number: 36-079-0005
DEC Number: 3951-01
County: Putnam
Statistical Area: New York, NY
Coordinates: Lat: 41.45589 Lon: -73.70977

Nearest Meteorological Data
NOAA/NWS: WBAN:14757
MESONET Site: BREW

This site was established in 1987 as part of the NYSDEC Acid Deposition program in the lower Hudson Valley. The surrounding area is primarily forest and rural. The O_3 and SO_2 are both operated continuously without seasonal interruption. The O_3 data show transport from the metropolitan area of NY and NJ. Ozone readings are reported to EPA.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
Sulfur Dioxide	TEI 43i TLE Method 560	Pulsed Fluorescence	Continuous

Paul Smith's College

Address: Route 86 and 30
Paul Smiths, NY 12970

Site Info:
AQS Number: 36-033-0004
DEC Number: 1655-01
County: Franklin
Coordinates: Lat: 44.43426 Lon: -74.24593

Nearest Meteorological Data
NOAA/NWS: WBAN:94740
MESONET Site: GABR

This site was established in 2003 in partnership with Paul Smith's College. The site is used as a teaching center by the school. It is maintained and operated by employees of the college with QA and technical support provided by DEC. As of January 2020, this site was transitioned to Acid Deposition only.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Acid Deposition	NCON Bucket Style Collector Model 00-120-2	Central Analytical Laboratory at the Illinois Water Survey: IC, ICP-OES, FIA	Weekly

Perch River

Address: Perch River Game Management Area
Vaadi Road
LaFargeville, NY 13656

Site Info:
AQS Number: 36-045-0002
DEC Number: 2223-01
County: Jefferson
Statistical Area:
Coordinates: Lat: 44.08747 Lon: -75.97316

Nearest Meteorological Data
NOAA/NWS: WBAN:94790
MESONET Site: WELL

This site was established in 1992 as an Eastern Lake Ontario Ozone site. Perch River is a seasonal automated ozone site, requiring minimal operator attention. It is located in the Game Management Building at a DEC owned site, which allows BAQS easy and secure access.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400Method 087	Ultraviolet Absorption	Continuous

Pinnacle

Address: Pinnacle State Park
1904 Pinnacle Road
Addison, NY 14801

Site Info:
AQS Number: 36-101-0003
DEC Number: 5001-04
County: Steuben
Statistical Area:
Coordinates: Lat: 42.09142 Lon: -77.20978

Nearest Meteorological Data
NOAA/NWS: WBAN:14748
MESONET Site: ADDI

This site was originally established in the mid 1990s by the Atmospheric Sciences Research Center to provide PAMs data upwind of the Northeast corridor. The NYSDEC has been collaborating on research initiatives at this site and now is responsible for many routine parameters reported from this site. This site has been selected by EPA and DEC as a rural NCore site. Ozone, Low Level SO_2, NO_y and continuous $PM_{2.5}$ and PM_{10} from this site are reported to EPA

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	TEI 49i Method 047	Ultraviolet Absorption	Continuous
Low Level SO_2	TEI 43i TLE Method 560	Pulsed Fluorescence	Continuous
Low Level CO	API 300EU Method 593	Non-Dispersive Infrared	Continuous
NO_y	TEI 42i Method 699	Chemiluminescence	Continuous
$PM_{2.5}$	Low volume FRM R&P 2025 Method 145	Gravimetric	1 day in 3
$PM_{2.5}$, PMcoarse, PM_{10}	Teledyne T640 at 5.0 LPM Method 236	Broadband spectroscopy	Continuous
$PM_{2.5}$ Speciation Ions and Elements	Met One Super SASS Method 811	IC, XRF RTI Laboratory	1 day in 3
$PM_{2.5}$ Speciation Carbon	URG 3000 Method 838	IMPROVE TOR	1 day in 3
Sulfate	TEI 5020i	Pulsed Fluorescence	Semi-continuous
Toxics	Canister Method 150	GC/MS	1-in-6
Black Carbon	Magee Scientific Aethalometer Method 866	Optical Absorption	Continuous
Ultrafine	API 651 at 3.0 lpm and 7 nm cut point Method 173	Water-Based Condensation Particle Counter	Continuous

Piseco Lake

Address: Piseco Airport
Piseco Lake, NY 12139

Site Info:
AQS Number: 36-041-0005
DEC Number: 2050-01
County: Hamilton
Statistical Area:
Coordinates: Lat: 43.44957 Lon: -74.51625

Nearest Meteorological Data
NOAA/NWS: WBAN:64775
MESONET Site: PISE

This site was established in 1988 at the Piseco Airport as part of the Acid Deposition program in the southern Adirondacks. The O_3 and SO_2 are both operated continuously without seasonal interruption. Ozone readings are reported to EPA.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
Sulfur Dioxide	TEI 43i Method 560	TEI 43i Method 560	Continuous
Acid Deposition	NCON Bucket Style Collector Model 00-120-2	Central Analytical Laboratory at the Illinois Water Survey: IC, ICP-OES, FIA	Weekly

Rochester

Address: RG&E Substation
30 Yarmouth Road
Rochester, NY 14610

Site Info:
AQS Number: 36-055-1007
DEC Number: 2701-22
County: Monroe
Statistical Area: Rochester
Coordinates: Lat: 43.14618 Lon: -77.54822

Nearest Meteorological Data
NOAA/NWS: WBAN:14768
MESONET Site: RUSH

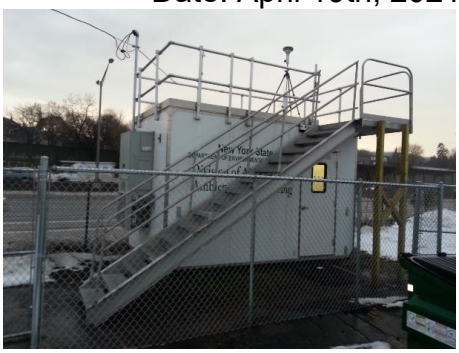
This site was established in 2004 to consolidate monitoring operations in the Rochester area. This is the major site in upstate New York and has been selected as a $PM_{2.5}$ Speciation Trends site, a NATTs site and an NCORE site. The Ozone and continuous $PM_{2.5}$ readings from this site are reported to EPA. The site is also used by researchers from several universities for short term monitoring studies. Current research monitoring includes elemental mercury and ultra-fine particle counting. Data from this site is often integrated in the work from the PM Health Center which is located at the University of Rochester Medical Center. The Rochester PM Center is one of five in the country.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400Method 087	Ultraviolet Absorption	Continuous
Sulfur Dioxide	TEI 43i Method 560	TEI 43i Method 560	Continuous
Low Level CO	API 300EU Method 593	Non-Dispersive Infrared	Continuous
NO_y	TEI 42i Method 699	Chemiluminescence	Continuous
$PM_{2.5}$	Low volume FRM R&P 2025 Method 145	Gravimetric	1-in-6
$PM_{2.5}$, PMcoarse, PM_{10}	Teledyne T640 at 5.0 LPM Method 236	Broadband spectroscopy	Continuous
PM_{10}	R&P Partisol 2025 Method 127	Gravimetric	1-in-6
PM_{10} - Metals	Method 907	ICPMS	1-in-6
$PM_{2.5}$ Speciation	Met One Super SASS Method 841	RTI Laboratory	1-in-3
$PM_{2.5}$ Speciation Carbon	URG 3000 Method 838	IMPROVE TOR	1-in-3
Black Carbon	Magee Scientific Aethalometer Method 866	Optical Absorption	Continuous

Parameter	Sampling Method	Analysis Method	Schedule
Mercury Elemental	Tekran 2537B	In situ cold vapor atomic fluorescence	5-minute average
Toxics	Canister Method 150	GC/MS	1-in-6
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1-in-6
Polycyclic Aromatic Hydrocarbons (PAH)	Tisch TE 5007 Method 145	GC/MS EPA/ERG Lab	1-in-6
Mercury Wet Deposition	NCON Model 00-125-2 automatic sampler	Frontier Geosciences: cold vapor atomic fluorescence	Weekly
Acid Deposition	NCON Bucket Style Collector Model 00-120-2	Central Analytical Laboratory at the Illinois Water Survey: IC, ICP-OES, FIA	Weekly

Rochester Near-Road



Address: I-490 and 1775 East Ave
Rochester, NY 14610

Site Info:
AQS Number: 36-055-0015
DEC Number: 2701-23
County: Monroe
Statistical Area: Rochester
Coordinates: Lat: 43.145021 Lon: -77.557608

Nearest Meteorological Data
NOAA/NWS: WBAN:14768
MESONET Site: RUSH

This site was established in late December 2014, under the new NO_x rule that became effective January 2010. Full operation commenced in January 2015.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Low Level CO	API 300EU Method 593	Non-Dispersive Infrared	Continuous
Oxides of Nitrogen (NO, NO2, NOX)	TAPI – T200UP Method 074	Photolytic Method	Continuous
$PM_{2.5}$	R&P TEOM 1400 Method 701 & 702	TEOM 50ºC	Continuous
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1-in-6
Black Carbon	Magee Scientific Aethalometer Method 866	Optical Absorption	Continuous
Ultrafine	API 651 at 3.0 lpm and 7 nm cut point Method 173	Water-Based Condensation Particle Counter	Continuous

Stillwater

Address: Saratoga National Historical Park
Stillwater, NY 12170

Site Info:
AQS Number: 36-091-0004
DEC Number: 4567-01
County: Saratoga
MSA: Albany-Schenectady-Troy, NY
Coordinates: Lat: 43.01209 Lon: -74.64890

Nearest Meteorological Data
NOAA/NWS: WBAN:14768
MESONET Site: SCHA

This site was established in 1988 in rural eastern Saratoga County north of Albany, NY. It is located in a room adjacent to the library at the Saratoga National Historical Park. The site offers insight into transport up the main travel corridor in the region and along the Hudson River valley.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous

Tonawanda II

Address: 192 Brookside Terrace West
Tonawanda, NY 14150

Site Info:
AQS Number: 36-029-1014
DEC Number: 1472-14
County: Erie
Statistical Area: Buffalo - Niagara Falls, NY
Coordinates: Lat: 42.99813 Lon: -78.89926

Nearest Meteorological Data
NOAA/NWS: WBAN:14747
MESONET Site: BUFF

The Tonawanda monitoring site was originally established in 1968 on the grounds of the Town of Tonawanda Sewage Treatment Plant as a source impact site for Sulfur Dioxide. In 2007, the sulfur dioxide monitor was moved to this current location as part of the Tonawanda Community Air Quality Study. This site borders a residential neighborhood and the industrial complex and is approximately 0.2-mile northeast of the original historic site.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Sulfur Dioxide	TEI 43C Method 060	Pulsed Fluorescence	Continuous
$PM_{2.5}$	TEI 1405 Method 701 & 702	TEOM 50ºC Gravimetric	Continuous
Toxics	Canister Method 150	GC/MS	1-in-6
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1-in-6

Utica

Address: Utica Health Department
406 Elizabeth Street
Utica, NY 13501

Site Info:
AQS Number: 36-065-2001
DEC Number: 3202-01
County: Oneida
Statistical Area: Utica- Rome, NY
Coordinates: Lat: 43.09892 Lon: -75.22506

Nearest Meteorological Data
NOAA/NWS: WBAN:64775
MESONET Site: HERK

The Utica Health Department site was established in 1957 as a TSP site. The site monitored PM_{10} between 1991 and 1998. In 2003, a continuous $PM_{2.5}$ was installed at the Utica site.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P TEOM 1400 Method 701 & 702	TEOM 50ºC	Continuous

Valley Central H.S.

Address: 1175 Route 17 K
Montgomery, NY 10940

Site Info:
AQS Number: 36-071-5001
DEC Number: 3527-01
County: Orange
MSA: Newburgh, NY-PA
CBSA: New York-N New Jersey-Long Island, NY, NJ,CT,PA
Coordinates: Lat: 41.52375 Lon: -74.21534

Nearest Meteorological Data
NOAA/NWS: WBAN:04789
MESONET Site: WALL

This site was established in 1995 in suburban Newburgh in Montgomery, Orange County. It is a single parameter Ozone monitoring site. It is the only ozone monitor in Orange County and the data is reported to EPA. The public has shown great interest in the data generated in this area of the state.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous

Wallkill Wakefern Food

Address: 260 Ballard Rd.
Middletown, New York 10941

Site Info:
AQS Number: 36-071-3002
DEC Number: 3566-09
County: Orange
Statistical Area: Newburgh, NY-PA
Coordinates: Lat: 41.45869 Lon: -74.35404

Nearest Meteorological Data
NOAA/NWS: WBAN:04789
MESONET Site: OTIS

This site is the only routine lead monitoring sites in upstate New York, located in the vicinity of RSR Corporation and established as high priority SLAMS lead source-oriented monitoring sites. The site on Ballard Road was upwind of RSR. In August 2011, an additional low volume PM_{10} sampler was put in place for daily mass and lead analysis at the Wakefern site when measurements from the prior winter showed unusually high values for a couple of sample dates. The PM_{10} mass data collected at this site was low and mass determination was discontinued in November 2012. Monitoring at the Scotchtown site downwind of RSR was discontinued at the end of 2015.

In October 2016, the facility in Wallkill installed new emission control technologies that has led to reduced emissions of lead into the environment. As a result, the NYSDEC closed the Pb-TSP site at Ballard Road and moved the co-located sampler to the Wakefern Food site at the end of 2017. The Ballard Road site was chosen for closure due to existing difficulties with the sites electrical systems, and because the site has historically shown lower values that the Wakefern Food site. Additionally, the NYSDEC transitioned the monitoring method at Wakefern food from high volume TSP sampling to low volume low volume TSP sampling. The new non-FRM/FEM monitoring method shall remain for so long as there are no changes to the emissions from the source, and the new method does not detect levels exceeding half the NAAQS.

Parameter	Sampling Method	Analysis Method	Schedule
Lead	Low-Vol PM_{10}	XRF	1 in 6

Whiteface Lodge

Address: University at Albany
Atmospheric Science Research
Center Field Station
Wilmington, NY 12997

Site Info:
AQS Number: 36-031-0003
DEC Number: 1567-04
County: Essex
Statistical Area:
Coordinates: Lat: 44.39308 Lon: -73.85890

Nearest Meteorological Data
NOAA/NWS: WBAN:94733
MESONET Site: WFMB

This site was established in 1974 at the Atmospheric Science Research Center field station at Whiteface Mountain. This site is run in cooperation with the ASRC at UAlbany. The site was used as the site of the 2002 summer intensive $PM_{2.5}$ field study to provide detailed real time chemical and physical data for PM and its co-pollutants. Ozone and continuous $PM_{2.5}$ readings are reported to EPA. Acid deposition, gaseous SO2, and ammonia samples are collected by ASRC.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
Sulfur Dioxide	TEI 43i Method 560	Pulsed Fluorescence	Continuous
$PM_{2.5}$	Low volume FRM R&P 2025 Method 145	Gravimetric	1 day in 6
$PM_{2.5}$	TEI 1405 Method 701 & 702	TEOM 50ºC Gravimetric	Continuous
$PM_{2.5}$ Speciation	Met One Super SASS Method 841	RTI Laboratory	1 day in 6
Sulfate	TEI 5020i	Pulsed Fluorescence	Semi-continuous
Carbon	URG 3000 Method 838	IMPROVE TOR	1 day in 6
Toxics	Canister Method 150	GC/MS	1 day in 6
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1 day in 6
$PM_{2.5}$ Speciation Carbon	URG 3000 Method 838	IMPROVE TOR	1-in-3
Acid Deposition	NCON Bucket Style Collector Model 00-120-2	Central Analytical Laboratory at the Illinois Water Survey: IC, ICP-OES, FIA	Weekly

Parameter	Sampling Method	Analysis Method	Schedule
Gaseous SO_2, HNO_3; particulate SO_4^{2-}, NO_3^- ,NH_4^+; elemental Ca, Na, Mg, Cl	CASTNet filter pack	CASTNet Analytical Laboratory	Weekly
Ammonia	Radiello Diffusive Sampler	NADP's Central Analytical Laboratory	Biweekly
Black Carbon	Magee Scientific Aethalometer Method 866	Optical Absorption	Continuous

Whiteface Summit

Address: Wilmington, NY 12997

Site Info:
AQS Number: 36-031-0002
DEC Number: 1567-03
County: Essex
Statistical Area:
Coordinates: Lat: 44.36608 Lon: -73.90312

Nearest Meteorological Data
NOAA/NWS: WBAN:94733
MESONET Site: WFMB

This site was established in 1980 at the Atmospheric Science Research Center Lab at the Summit of Whiteface Mountain. It is a special purpose Ozone site run in cooperation with the ASRC at the University at Albany. Data from this site should not be used for NAAQS comparison as it is a high-altitude research site.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Photometric	Continuous

Williamson

Address: Wayne County Occupational Center
4440 Ridge Road
Williamson, NY 14589

Site Info:
AQS Number: 36-117-3001
DEC Number: 5863-01
County: Wayne
Statistical Area: Rochester, NY
Coordinates: Lat: 43.23086 Lon: -77.17136

Nearest Meteorological Data
NOAA/NWS: WBAN:14768
MESONET Site: ONTA

This site was established in 1979 as a downwind Ozone site for the Rochester metropolitan area. Williamson is a seasonal ozone site, located in a storage building at the Wayne County Occupational Center. The site is located in a rural, mostly agricultural area and is an important location used to verify the attainment status of the Rochester region.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous

9.2 Southern Monitoring Sites

Table 9.2 Locations of Southern Monitoring Sites

DEC Region	AIRS #	DEC #	Site Name	County	Location	NYSDEC Sampling?
1	36-059-0005	2950-10	Eisenhower Park	Nassau	740 Merrick Avenue	Y
1	36-103-0002	5150-02	Babylon	Suffolk	72 Gazza Blvd - Water Authority	Y
1	36-103-0009	5150-10	Holtsville	Suffolk	57 Division St., Sagamore Junior High	Y
1	36-103-0004	5155-01	Riverhead	Suffolk	39 Sound Avenue	Y
2	36-005-0080	7094-05	Morrisania II	Bronx	Family Care Ctr, 1225-57 Gerard Ave	Y
2	36-005-0112	7094-08	IS 74	Bronx	730 Bryant Avenue	Y
2	36-005-0133	7094-10	Pfizer Lab (NYBG)	Bronx	200th Street & Southern Boulevard	Y
2	36-005-0110	7094-07	IS 52	Bronx	681 Kelly Street, E 156th Street	Y
2	36-047-0052	7095-07	PS 314	Kings	330 59th Street	Y
2	36-047-0122	7095-43	JHS 126	Kings	424 Leonard Street	Y
2	36-047-0118	7095-98	PS 274	Kings	800 Bushwick Ave	Y
2	36-061-0079	7093-08	JHS 45	New York	2351 1st Avenue	Y
2	36-061-0115	7093-15	IS 143	New York	511 W 182nd Street	Y
2	36-061-0128	7093-21	PS 19	New York	185 1st Avenue	Y
2	36-061-0134	7093-24	Division Street	New York	Division Street	Y
2	36-061-0135	7093-25	CCNY	New York	160 Convent Avenue	Y
2	36-081-0120	7096-13	Maspeth Library	Queens	69-70 Grand Avenue	Y
2	36-081-0124	7096-15	Queens College II	Queens	NYSDEC Monitoring Building	Y
2	36-081-0125	7096-16	Queens College Near Road	Queens	I-495 H Harding Expressway and 153rd St	Y
2	36-085-0067	7097-01	Susan Wagner	Richmond	1200 Manor Road (near Brielle Ave)	N
2	36-085-0055	7097-03	Port Richmond	Richmond	364 Port Richmond Avenue	Y
2	36-085-0111	7097-17	Fresh Kills West	Richmond	310 West Service Road	Y
3	36-119-2004	5902-04	White Plains	Westchester	Water District Pumping Station	Y
3	36-087-0005	4353-02	Rockland County	Rockland	Conklin Orchard	Y

Babylon

Address: Farmingdale Water District
72 Gazza Blvd.
Babylon, NY 11735

Site Info:
AQS Number: 36-103-0002
DEC Number: 5150-02
New York State County: Suffolk
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.74529 N Lon: -73.41919

Nearest Meteorological Data
NOAA/NWS: WBAN:54787
MESONET Site: WANT

The Babylon air monitoring station was originally established in the 1970's as a continuous sulfur dioxide and ozone site. Located on Long Island, downwind from New York City, the site continues to measure urban ozone levels in the New York City metropolitan area.

In 1999 a Federal Reference Method fine particulate ($PM_{2.5}$) sampler was added to the site. This $PM_{2.5}$ monitor is part of the overall $PM_{2.5}$ monitoring network used for comparison to the National Ambient Air Quality Standards.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Photometric	Continuous
$PM_{2.5}$	Low volume FRM TEI 2025i Method 145	Gravimetric	1 day in 3

CCNY

Address: City College of New York
Administration Building
160 Convent Avenue
New York, NY 10031

Site Info:
AQS Number: 36-061-0135
DEC Number: 7093-25
New York State County: New York
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.81976 Lon: -73.94825
Coordinates: Lat: 40.74529 N Lon: -73.41919

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: MANH

The City College of New York - CCNY air monitoring site was established during the summer of 2007. This site includes an ozone analyzer and a continuous fine particulate ($PM_{2.5}$) sampler. Fine particulate monitoring utilizes a $PM_{2.5}$ R&P Tapered Element Oscillating Microbalance (TEOM).

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
Carbon Monoxide	TEI 48i-TLE Method 554	Non-Dispersive Infrared	Continuous
$PM_{2.5}$	TEI 1405 Method 701 & 702	Gravimetric TEOM 50ºC	Continuous

Division Street

Address: New York City Department of Education
Public School 124
40 Division Street
New York, NY 10002

Site Info:
AQS Number: 36-061-0134
DEC Number: 7093-24
County: New York
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.71436 Lon: -73.99518

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: MANH

This site was established in September 2006. Initially the site contained a continuous fine particulate ($PM_{2.5}$) Tapered Element Oscillating Microbalance (TEOM). In March 2007, the FRM $PM_{2.5}$, PM_{10} and MetOne Speciation samplers were added following the emergency shut- down of the Canal Street Post Office (36-061-0062). Reference EPA letter: Ruvo to Lavin dated: March 14, 2007. The URG 3000 Carbon sampler was added in May 2007.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P TEOM 1400 Method 701 & 702	TEOM 50ºC	Continuous
	R&P Partisol 2025 Method 145	Gravimetric	1 day in 3
$PM_{2.5}$ Speciation	Met One Super SASS Method 811	XRF	1 day in 3
Carbon	URG 3000 Method 838	IMPROVE TOR	1 day in 3
PM_{10}	R&P Partisol 2025i Method 127	Gravimetric	1 day in 6

Eisenhower Park

Address: Nassau County Park, Recreation and Museums
Eisenhower Park
740 Merrick Avenue
Westbury, NY 11590

Site Info:
AQS Number: 36-059-0005
DEC Number: 2950-10
New York State County: Nassau
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.74316 Lon: -73.58549

Nearest Meteorological Data
NOAA/NWS: WBAN:54787
MESONET Site: WANT

The Eisenhower Park air monitoring station was originally established as a Nassau County Health Department air monitoring site. It was operated with support from the NYSDEC until 2000 when NYSDEC took over complete control of the site. The continuous fine particulate ($PM_{2.5}$) monitoring data from this site are reported to EPA.

NO_2 monitoring was terminated at this site on March 31, 2011. Ultrafine Particle monitoring was discontinued in June 2010.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Sulfur Dioxide	Thermo 43i Method 560	Pulsed Fluorescence	Continuous
$PM_{2.5}$	R&P TEOM 1405 Method 701 & 702	TEOM 50ºC Gravimetric	Continuous

Flax Pond

Address: Flax Pond Marine Laboratory
15 Shore Dr. Setauket-East Setauket NY 11733

Site Info:
AQS Number: 36-103-0044
DEC Number: 5151-12
New York State County: Suffolk
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.961017 Lon: -73.139046

Nearest Meteorological Data
NOAA/NWS: WBAN:14719
MESONET Site: STON

In 2018, the site supported 1-hr VOC, 8-hr Carbonyl and Ozone measurements from June 1st through August. In 2019, true NO_2 and NO_y will be added to the site.
The site will also support additional equipment that are integral to the Long Island Sound Tropospheric Ozone Study (LISTOS). The Enhanced Monitoring Plan (EMP) for PAMS has more information regarding the LISTOS program.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Toxics	Canister Method 150	GC/MS	1-in-6 days
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1-in-6 days
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
PAMS precursor	Method 128	GC/FID	Continuous
Oxides of Nitrogen (NO, NO_2, NO_y)	Chemiluminescence Thermo Electron 42C-Y, 42i-Y Method 674	Chemiluminescence	Continuous
NO_2	Teledyne Model T500U Method 212	Chemiluminescence	Continuous

Fresh Kills West

Address: 310 West Service Road
Fresh Kills Landfill
Staten Island, NY 10314

Site Info:
AQS Number: 36-085-0111
DEC Number: 7097-17
New York State County: Richmond
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.58027 Lon: -74.19832

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: STAT

The Fresh Kills West air monitoring station was established in July 1999 as part of an air quality study of the Fresh Kills Landfill and the startup of the methane gas flare at the landfill. Following the end of the Landfill study, the Fresh Kills West site became part of NYSDEC's core ambient air monitoring program.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	TEI 1405Method 701 & 702	TEOM 50ºC Gravimetric	Continuous
Toxics	Canister Method 150	GC/MS	1-in-6 days
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1-in-6 days

Holtsville

Address: Sagamore Junior High School
57 Division Street
Holtsville, NY 11742

Site Info:
AQS Number: 36-103-0009
DEC Number: 5151-10
New York State County: Suffolk
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.82799 Lon: -73.05754

Nearest Meteorological Data
NOAA/NWS: WBAN:04781
MESONET Site: STON

The Holtsville air monitoring station was established by the Suffolk County Department of Health Services - Division of Environmental Quality in the late 1990s. NYSDEC established an ozone analyzer at the site during the 2006 ozone season. In June of 2010, NYSDEC took over control of the site, following personnel changes in the Suffolk County Department of Health Services. NYSDEC expanded its monitoring by added sulfur dioxide and fine particulate matter.

The parameters monitored and certified by NYSDEC are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
$PM_{2.5}$	R&P TEOM 1405 Method 701 & 702	TEOM 50ºC Gravimetric	Continuous

IS 143

Address: New York City Department of Education
Junior High School 143
511 West 182nd Street
New York, NY 10033

Site Info:
AQS Number: 36-061-0115
DEC Number: 7093-15
County: New York
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.84888 Lon: -73.93059

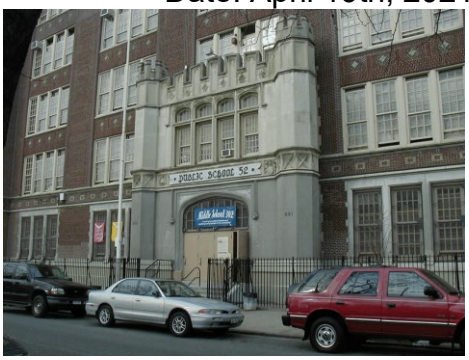
Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: BRON

The IS143 site was established in 2000 as a continuous fine particulate ($PM_{2.5}$) monitoring site. The site utilizes an R&P Tapered Element Oscillating Microbalance (TEOM). This site is located in an urbanized, residential area of Manhattan.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P TEOM 1405 Method 701 & 702	TEOM 50ºC Gravimetric	Continuous

IS 52 / MS 302



Address: New York City Department of Education
Public School 52/Middle School 302
681 Kelly Street
Bronx, NY 10455

Site Info:
AQS Number: 36-005-0110
DEC Number: 7094-07
County: Bronx
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.8162 Lon: -73.9020

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: BRON

This site was established in 1999 as a replacement site for Public School 155. Initially the site contained ozone, oxides of nitrogen, sulfur dioxide, and continuous . Following an upgrade of the electricity, additional monitoring parameters were added, creating one of the premier particulate sampling sites in New York City. The site contains criteria pollutant parameters and methods along with many experimental methods.

This site was temporarily shut down June 2010 until July 2012 due to extensive construction at the school. The monitoring for NATTS parameters was moved to Morrisania II during that period. This site is now back to full operation.

The parameters normally monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400Method 087	Ultraviolet Photometric	Continuous
Oxides of Nitrogen	TEI 42C Method 074	Chemiluminescence	Continuous
Low Level SO_2	TEI 43i TLE Method 560	Pulsed Fluorescence	Continuous
$PM_{2.5,}$ PM_{10}, PMcoarse	Black Carbon	Magee Scientific Aethalometer Method 866	Optical Absorption
$PM_{2.5}$	Low volume FRM R&P 2025 Method 145	Gravimetric	1 day in 3
$PM_{2.5}$ Speciation Ions and Elements	Met One Super SASS Method 811	IC, XRF	1 day in 3
$PM_{2.5}$ Speciation Carbon	URG 3000 Method 838	IMPROVE TOR	1 day in 3

Parameter	Sampling Method	Analysis Method	Schedule
PM_{10}	Low volume FRM R&P 2025 Method 127	Gravimetric	1 day in 6[a]
PM_{10} - Metals	Method 907	ICPMS	1 day in 6[a]
Black Carbon	Magee Scientific Aethalometer Method 866	Optical Absorption	Continuous
Elemental Carbon/ Organic Carbon	Sunset Laboratory Method 975	Thermal Optical	Semi-Continuous
Polycyclic Aromatic Hydrocarbons-PAH	Tisch TE 5007 Method 145	GC/MS EPA/ERG Lab	1 day in 6
Toxics	Canister Method 150	GC/MS	1 day in 6 [a]
Carbonyl	DNPH tube Method 202	HPLC - Ultraviolet Absorption	1 day in 6 [a]

[a] Collocated unit

IS 74

Address: New York City Department of Education
Intermediate School 74 (MS 201)
730 Bryant Avenue
Bronx, NY 10474

Site Info:
AQS Number: 36-005-0112
DEC Number: 7094-08
County: Bronx
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.81551 Lon: -73.88553

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: BRON

The Intermediate School 74 site was established in 2000 as a continuous fine particulate ($PM_{2.5}$) monitoring station. The site utilizes an R&P Tapered Element Oscillating Microbalance (TEOM). This site is located in an urbanized, residential area of the Hunts Point area of the Bronx.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P TEOM 1400 Method 701 & 702	TEOM 50ºC Gravimetric	Continuous

JHS 126

Address: New York City Department of Education
424 Leonard Street
Junior High School 126
Brooklyn, NY 11222

Site Info:
AQS Number: 36-047-0122
DEC Number: 7095-43
New York State County: Kings
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.71961 Lon: -73.94771

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: MANH

The JHS 126 air monitoring station was established in 2000 as a Hi-Volume PM_{10} and Lead monitoring site. In January 2001, a Federal Reference Method fine particulate ($PM_{2.5}$) sampler was added. This $PM_{2.5}$ sampler is part of the overall $PM_{2.5}$ monitoring network used for comparison to the National Ambient Air Quality Standards. PM_{10} sampling was discontinued December 2005. TSP-lead sampling was terminated at the end of 2009. The necessary monitoring is conducted at IS 52 in the Bronx.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P Partisol 2025i Method 145	Gravimetric	1 day in 3

JHS 45

Address: New York City Department of Education
Junior High School 45
2351 First Avenue
New York, NY 10035

Site Info:
AQS Number: 36-061-0079
DEC Number: 7093-08
New York State County: New York
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.79970 Lon: -73.93432

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: MANH

The JHS 45 air monitoring station was originally established in 1981 as a sulfur dioxide, fine and coarse particulate (dichotomous samplers) and Total Suspended Particulate site. The site was shut down in 1985 and then reestablished as a Federal Reference Method fine particulate ($PM_{2.5}$) monitoring site in January 2000. A duplicate $PM_{2.5}$ sampler was installed in January 2006 after being removed from the PS 59 station to continue to provide accuracy data for the $PM_{2.5}$ network. The FRM $PM_{2.5}$ samplers at JHS 45 are part of the overall $PM_{2.5}$ monitoring network used for comparison to the National Ambient Air Quality Standards.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$[1]	TEI 2025i Method 145	Gravimetric	1 day in 3

[1] Collocated samplers

Maspeth Library

Address: Queens Public Library - Maspeth
69-70 Grand Avenue
Maspeth, NY 11378

Site Info:
AQS Number: 36-081-0120
DEC Number: 7096-13
County: Queens
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.72698 Lon: -73.89313

Nearest Meteorological Data
NOAA/NWS: WBAN:14732
MESONET Site: QUEE

The Maspeth Library was established as a continuous fine particulate ($PM_{2.5}$) monitoring site in 2000. The site utilizes an R&P Tapered Element Oscillating Microbalance (TEOM). This site is located in an urbanized, residential area in the vicinity of two major New York City roadways, the Long Island Expressway and the Brooklyn-Queens Expressway.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P TEOM 1400 Method 701 & 702	TEOM 50ºC	Continuous

Morrisania II

Address: Morrisania Diagnostic and Treatment Center
1225-57 Gerard Avenue
Bronx, NY 10452

Site Info:
AQS Number: 36-005-0080
DEC Number: 7094-05
New York State County: Bronx
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.83606 Lon: -73.92009

Nearest Meteorological Data
NOAA/NWS: WBAN:14732
MESONET Site: BRON

The Morrisania II air monitoring station was originally established in 1989 as a Hi-Volume PM_{10} site. Currently this site operates a continuous $PM_{2.5}$ instrument for AQI forecasting.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P TEOM 1400 Method 701 & 702	TEOM 50ºC	Continuous

Pfizer Plant Research Laboratory

Address: 200th Street and Southern Blvd.
Bronx, NY 10458-5126

Site Info:
AQS Number: 36-005-0133
DEC Number: 7094-10
New York State County: Bronx
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.86790 Lon: -73.87809

Nearest Meteorological Data
NOAA/NWS: WBAN:14732
MESONET Site: BRON

This site was established in the Harding Laboratory at the New York Botanical Garden in January 1995. This site was originally established for the Photochemical Assessment Monitoring Station (PAMS) program with some summa canister sampling beginning in June 1994. During the summer of 2006, the New York Botanical Garden completed construction on the Pfizer Plant Research Laboratory. This is a state-of-the-art laboratory and research facility that replaced the Harding laboratory. Through an agreement with NYSDEC, NYBG provided space in the new facility for NYSDEC's ambient air monitoring station.

Starting with the 2006 PAMS season the continuous GC was moved to the new monitoring site at the Pfizer Lab. The ozone, sulfur dioxide, oxides of nitrogen, carbon monoxide, methane/non-methane, canisters, and carbonyl samplers were moved to the Pfizer Lab the end of December 2006. The FRM $PM_{2.5}$ sampler was moved to the Pfizer Laboratory on January 1, 2008. The FRM fine particulate ($PM_{2.5}$) sampler installed at the Pfizer Laboratory is part of the overall $PM_{2.5}$ monitoring network used for comparison to the National Ambient Air Quality Standards.

On January 9, 2008, the Mercury Deposition Network (MDN) Automatic Precipitation Sampler and the ETI Instrument Systems NOAH IV Total Precipitation Measurement System was installed as part of establishing a MDN site at Pfizer Laboratory. The Tekran Elemental and Reactive Gas Mercury equipment was installed in August 2008. In December 2015, NYS switched to only utilizing Elemental Mercury methods of measurements.

This site is being utilized for the New York City Community Air Survey as part of the PlaNYC initiative.

The parameters monitored are indicated in the following table:

Pfizer Plant Research Laboratory

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
Low Level SO_2	TEI 43i TLE Method 560	Pulsed Fluorescence	Continuous
Oxides of Nitrogen (NO, NO_2, NO_y)	Thermo Electron 42i-Y Method 674	Chemiluminescence	Continuous
NO_2	Teledyne Model T500U Method 212	Cavity Attenuated Phase Shift Spectroscopy	Continuous
Low Level CO	API 300EU Method 593	Non-Dispersive Infrared	Continuous
$PM_{2.5}$	TEI 2025i Method 145	Gravimetric	1 day in 3
PAMS precursor	Method 128	GC/FID	Continuous
Toxics	Canister Method 150	GC/MS	1 day in 6
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1 day in 6 Daily (PAMS)
Mercury Elemental	Tekran 2537B	In situ cold vapor atomic fluorescence	5-minute average
Mercury Wet Deposition	N-CON Systems MDN 00-125-2 Automatic Sampler, NOAH IV Total Precipitation Measurement System	Wisconsin Geosciences: cold vapor atomic fluorescence	Weekly collection
Acid Deposition	NCON Bucket Style Collector Model 00-120-2	Central Analytical Laboratory at the WI Sate laboratory of Hygiene: IC, ICP-OES, FIA	Weekly collection

Port Richmond

Address: United States Post Office
Port Richmond Station
364 Port Richmond Avenue
Staten Island, NY 10302

Site Info:
AQS Number: 36-085-0055
DEC Number: 7097-03
New York State County: Richmond
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.63307 Lon: -74.13719

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: STAT

The Port Richmond air monitoring station was originally established as a Hi-Volume PM_{10} site in 1984. In December 1999, a Federal Reference Method fine particulate ($PM_{2.5}$) sampler was installed. This FRM $PM_{2.5}$ sampler is part of the overall $PM_{2.5}$ monitoring network used for comparison to the National Ambient Air Quality Standards. In April 2011, a TEOM was added to this site following the shutdown of the PS 44 monitoring station.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P TEOM 1400 Method 701 & 702	TEOM 50ºC	Continuous
	Low volume FRM R&P 2025i Method 145	Gravimetric	1 day in 3

PS 19

Address: New York City Department of Education
Public School 19
185 First Avenue
New York, NY 10003

Site Info:
AQS Number: 36-061-0128
DEC Number: 7093-21
New York State County: New York
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.73000 Lon: -73.98446

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: MANH

The PS 19 air monitoring station was established as a Federal Reference Method fine particulate ($PM_{2.5}$) monitoring site in October 2001. The FRM $PM_{2.5}$ sampler at PS 19 is part of the overall $PM_{2.5}$ monitoring network used for comparison to the National Ambient Air Quality Standards. The continuous $PM_{2.5}$ TEOM was added in June 2007.

This site is temporally closed as the building undergoes maintenance

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	Low volume FRM R&P 2025i Method 145	Gravimetric	1 day in 3
	R&P TEOM 1405 Method 701 & 702	TEOM 50ºC Gravimetric	Continuous

PS 274

Address: New York City Department of Education
Public School 274
800 Bushwick Avenue
Brooklyn, NY 11221

Site Info:
AQS Number: 36-047-0118
DEC Number: 7095-98
County: Kings
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.69454 Lon: -73.92769

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: BKLN

The Public School 274 site was established in 2000 as a continuous fine particulate ($PM_{2.5}$) monitoring station. The site utilizes an R&P Tapered Element Oscillating Microbalance (TEOM). This site is located in an urbanized, residential/industrial area of Brooklyn.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P TEOM 1400 Method 701 & 702	TEOM 50ºC	Continuous
Toxics	Canister Method 150	GC/MS	1-in-6 days

PS 314

Address: New York City Department of Education
Public School 314
330 59th Street
Brooklyn, NY 11220

Site Info:
AQS Number: 36-047-0052
DEC Number: 7095-07
County: Kings
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.64182 Lon: -74.01871

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: BKLN

The Public School 314 site was first established in 1982 as a Hi-Volume inhalable particulate (PM_{10}) station. In 2003, the site became a continuous fine particulate ($PM_{2.5}$) monitoring site with the installation of an R&P Tapered Element Oscillating Microbalance (TEOM). This site is located in an urbanized, residential/industrial area in the vicinity of the Gowanus Expressway.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
$PM_{2.5}$	R&P TEOM 1400 Method 701 & 702	TEOM 50ºC	Continuous

Queens College II

Address: NYSDEC Air Monitoring Building
CUNY - Queens College Campus
65-30 Kissena Blvd.
Flushing, NY 11367

Site Info:
AQS Number: 36-081-0124
DEC Number: 7096-15
County: Queens
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.73614 Lon: -73.82153

Nearest Meteorological Data
NOAA/NWS: WBAN:14732
MESONET Site: QUEE

NYSDEC originally began monitoring at Queens College for ozone and sulfur dioxide in 1978. This continued until 1997 when the monitoring equipment was removed from Queens College during a major building renovation project on the campus. The AQS number for the original Queens College site was 36-081-0004. The Queens College II site was originally established during the summer of 2001 for an intensive air pollution study that was coordinated with the State University of New York - University of Albany - Atmospheric Sciences Research Center. In September 2006 the site was redesigned and expanded in a newly constructed building on the Queens College campus. This site is one of three NCore sites in New York State.

This site is being utilized for the New York City Community Air Survey as part of the PlaNYC initiative.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
Low Level SO_2	TEI 43i TLE Method 560	Pulsed Fluorescence	Continuous
Oxides of Nitrogen (NO, NO_2, NO_x)	TEI 42i- TL Method 574	Chemiluminescence	Continuous
NO_y	TEI 42i-Y Method 674	Chemiluminescence	Continuous
Low Level CO	API 300EU Method 593	Non-Dispersive Infrared	Continuous
$PM_{2.5}$	TEI 2025i Method 145	Gravimetric	1 day in 3
$PM_{2.5}$ Speciation Ions and Elements	MetOne Super SASS Method 811	IC, XRF	1 day in 3
$PM_{2.5}$, PMcoarse, PM_{10}	Thermo Scientific 1405 DF FDMS Method 790	TEOM 30°C Gravimetric	Continuous
PM_{10}	TEI 2025i Method 127	Gravimetric	1 day in 6

Parameter	Sampling Method	Analysis Method	Schedule
Carbon	URG 3000 Method 838	IMPROVE TOR	1 day in 3
	Sunset Laboratory Method 895	Thermal Optical	Semi-continuous
Sulfate	TEI 5020i Method 875	Pulsed Fluorescence	Semi-continuous
Toxics	Canister Method 150	GC/MS	1 day in 6
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1 day in 6
Ultrafine	TSI 3783 at 3.0 lpm and 7 nm cutpoint Method 173	Water-Based Condensation particle counter	Continuous
Particle Count	TSI 3031 Method 031	Electrical Mobility	Continuous
$PM_{2.5}$, PMcoarse, PM_{10}	Teledyne T640 at 5.0 LPM Method 236	Broadband spectroscopy	Continuous

Queens College Near-Road

Address: I-495, H Harding Expwy and 153rd St
Flushing, NY 11367

Site Info:
AQS Number: 36-081-0125
DEC Number: 7096-16
County: Queens
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.739264 Lon: -73.817694

Nearest Meteorological Data
NOAA/NWS: WBAN:14732
MESONET Site: QUEE

The New York City Near-Road site at Queens College was established in March 2017 under the new NOx rule that became effective on January 2010. Full operation of the site was commenced on April 1, 2017.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Low Level CO	API 300EU Method 593	Non-Dispersive Infrared	Continuous
Oxides of Nitrogen (NO, NO2, NOX)	TAPI – T200UP Method 074	Photolytic Method	Continuous
PM2.5	Thermo TEOM 1405 Method 701 & 702	TEOM 50ºC Gravimetric	Continuous
Ultrafine	TSI 3783 at 3.0 lpm and 7 nm cut point Method 173	Water-Based Condensation Particle Counter	Continuous
Black Carbon	TAPI 633 Aethalometer Method 866	Optical Absorption	Continuous
Carbonyl	DNPH Cartridge Method 202	HPLC - Ultraviolet Absorption	1-in-6 days
PM2.5	Low volume FRM 2025. Method 145	Gravimetric	1-in-3 days

Riverhead

Address: Cornell University
College of Agriculture and Life Sciences
Long Island Horticultural Research Center
3059 Sound Avenue
Riverhead, NY 11901

Site Info:
AQS Number: 36-103-0004
DEC Number: 5155-01
New York State County: Suffolk
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.96078 Lon: -72.71238

Nearest Meteorological Data
NOAA/NWS: WBAN:14719
MESONET Site: SOUT

The Riverhead air monitoring station was established in 1992 as a seasonal ozone site. This site is utilized as a regional ozone site, given its downwind proximity to New York City.

The parameter monitored is indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous (during the NYS Ozone Season)

Rockland County

Address: Conklin Orchard
South Mountain Road
Pomona, NY 10970

Site Info:
AQS Number: 36-087-0005
DEC Number: 4353-02
New York State County: Rockland
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 41.18208 Lon: -74.02819

Nearest Meteorological Data
NOAA/NWS: WBAN:14719
MESONET Site: SOUT

The Rockland County site was originally established as a demonstration study requested by the Rockland County Department of Health. This is the third and permanent location for the Rockland County monitor

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
$PM_{2.5}$	TEOM Thermo 1405 Method 701 & 702	TEOM Gravimetric50ºC	Continuous

Susan Wagner

Address: New York City Department of Education
Susan E. Wagner High School
1200 Manor Avenue
Staten Island, NY 10314

Site Info:
AQS Number: 36-085-0067
DEC Number: 7097-01
New York State County: Richmond
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 40.59664 Lon: -74.12525

Nearest Meteorological Data
NOAA/NWS: WBAN:94728
MESONET Site: STAT

The Susan Wagner ambient air monitoring station was established in the 1970's. This site is one of the long-term ozone trends sites in New York City. The site is a year-round ozone site.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Seasonal

White Plains

Address: White Plains Water Pump Station Garage
240 Orchard Street
White Plains, NY 10601

Site Info:
AQS Number: 36-119-2004
DEC Number: 5902-04
New York State County: Westchester
Statistical Area: New York City Metropolitan Area
Coordinates: Lat: 41.05192 Lon: -73.76366

Nearest Meteorological Data
NOAA/NWS: WBAN:94745
MESONET Site: BRON

The White Plains ambient air monitoring station was originally established in the 1970's.

The parameters monitored are indicated in the following table:

Parameter	Sampling Method	Analysis Method	Schedule
Ozone	API T400 Method 087	Ultraviolet Absorption	Continuous
$PM_{2.5}$	Thermo Scientific TEOM 1405 Method 701 & 702	TEOM 50ºC Gravimetric	Continuous