

# **State of South Carolina: 5-Year Ambient Air Monitoring Network Assessment for the Year 2020**

Bureau of Air Quality

South Carolina Department of Health and  
Environmental Control

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Columbia, South Carolina 29201

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## Executive Summary

On October 17, 2006, the Environmental Protection Agency (EPA) amended its ambient air monitoring regulations (40 CFR 58.10(e)) to include a requirement that the states and local monitoring agencies must conduct a network assessment once every five years:

“The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, 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. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.”

This report serves as South Carolina’s 2020 5-Year Ambient Air Monitoring Network Assessment (Assessment) and contains an analysis of the South Carolina ambient air monitoring networks as of January 1, 2020, with a discussion of proposed changes to the networks to maintain air data quality, meet regulatory and state air monitoring objectives, and to adjust for resource and financial constraints.

For this Assessment, the S.C. Department of Health and Environmental Control (Department) performed a technical review of the criteria pollutant ambient monitoring networks. The latest population data, meteorological parameters, emissions inventories data, historical data, and design value trends were used to review and assess the usefulness of the monitor placements and determine any future monitoring needs for the carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), lead, and PM<sub>10</sub> monitoring networks, which are smaller monitoring networks. The ozone and PM<sub>2.5</sub> Federal Reference Method (FRM) monitoring networks, which are larger networks, were reviewed using all data listed above, as well as application of Thiessen polygons and kriging using the Aeronautical Reconnaissance Coverage Geographic Information System (GIS). The GIS applications were used to obtain weighted scores as an indication of the value of each monitor and to produce Suitability Maps that were used to indicate which areas may need a monitor. Finally, staff evaluated all information to determine any changes needed in the monitoring networks.

Findings: All monitoring networks currently meet or are in the process of meeting (i.e. Myrtle Beach-Conway-North Myrtle Beach ozone requirement) minimum monitoring and other regulatory requirements, as well as South Carolina monitoring objectives. In the past five years, several changes to the networks have occurred. To address changes in minimum monitoring requirements for ozone, the Coastal Carolina (45-051-0008) Site was created in the Myrtle Beach-Conway-North Myrtle Beach MSA. In 2019, the first design value for this monitor slightly exceeded 85 percent of the National Ambient Air Quality Standards (NAAQS), which would require a review of the need for a second ozone monitor to be located in the MSA. Since this design value is the first complete design value for the monitor and the 2019 design value is so close to the 85 percent threshold, the Department and the State of North Carolina are working with EPA Region 4 to determine the appropriate ozone monitoring for this MSA and may wait to see what the 2020 design value is before taking action to add a second ozone monitor to the MSA.

Also, in the Greenville-Anderson MSA, the Department was notified by Clemson University that access to the Clemson (45-077-0002) Site would be lost. The new Garrison Arena (45-007-0006) Site was established to replace this site. The Garrison Arena ozone monitor became operational on March 3, 2020. The Clemson (45-077-0002) Site was discontinued and the Big Creek (45-007-0005) ozone monitor will run concurrently for the 2020 ozone season. At that time, the Department will evaluate the data and decide whether the Big Creek (45-007-0005) Site is redundant.

To address safety and siting criteria issues, the York Continuous Monitoring (CMS) (45-092-0006) Site was replaced with the York Landfill (45-091-0008) Site. Also, the Bushy Park (45-105-0002) Site was replaced with the Moncks Corner (45-015-0002) Site.

Redundant sites such as the Cowpens (45-021-0002) Site (Cherokee County), the Due West (45-001-0001) Site (Colleton County), the Bates House (45-079-019) Site (Columbia MSA), the Famoda Farm (45-045-1003) Site (Greenville-Anderson MSA), and the Ashton (45-029-0002) Site were identified and discontinued. To conserve resources, the Long Creek (45-073-0001) Site (Oconee County) was discontinued, the PM<sub>2.5</sub> speciation monitors at the Greenville ESC (45-045-0015) Site and Chesterfield (45-025-0001) Site were discontinued, and some SO<sub>2</sub> and PM<sub>10</sub> monitors are now operating on rotating schedules. Also, all monitoring sites with continuous monitors now have wireless communications.

Changes and Future Plans: The following changes have been planned and are currently being executed:

For the PM<sub>2.5</sub> monitoring network: The FAA (45-019-0048) Site and the CPW (45-019-0049) Site in the Charleston-North Charleston MSA do not meet the 40 CFR Part 58 Appendix E siting requirements due to both drip line and tree obstruction issues. The Department has tried to work with the landowners, but an acceptable solution has not been found. Therefore, the North Charleston Fire Station (45-019-0020) Site in North Charleston, South Carolina is being established to replace both sites. Once this new site is established, the

CPW (45-019-0049) Site will be discontinued. The FAA (45-019-0048) Site will run concurrently for one year with the North Charleston Fire Station (45-019-0020) Site, then be discontinued. Also, the required, collocated PM<sub>2.5</sub> monitor that was located at the FAA (45-019-0048) Site is now being temporarily housed at the T.K. Gregg (45-083-0011) Site. This monitor will be brought back to the new North Charleston Fire Station (45-019-0020) Site when it is established.

For the PM<sub>10</sub> monitoring network: The PM<sub>10</sub> monitor at the Howard High #3 (45-073-0001) Site started a two-year rotation on April 3, 2020. This monitor will not be operational for the first two years (the site will continue to be maintained). The monitor will resume operation in 2021 and run until 2022.

For the SO<sub>2</sub> monitoring network: Three SO<sub>2</sub> Special Purpose Monitors (SPM) will begin a two-year operational rotation in 2020. The York Landfill (45-091-0008) monitor and Cape Romain (45-019-0046) monitor will operate during 2020-2021. The Congaree Bluff (45-079-0021) monitor will operate during 2022-2023. Also, there is discussion about placing the SO<sub>2</sub> monitor that was operated at the Long Creek (45-073-0001) Site in another established location.

For the NO<sub>2</sub> monitoring network: A second near-road NO<sub>2</sub> monitor is expected to be established in the Charlotte-Concord Gastonia MSA when resources are available.

There are no changes expected for the CO or lead monitoring networks.

## Acronyms

AQS – Air Quality System  
BAQ – Bureau of Air Quality  
CBSA – Core-Based Statistical Area  
CFR – Code of Federal Regulation  
CO – Carbon Monoxide  
CBSA – Core Based Statistical Area  
CMS – Continuous Monitoring Site  
Department – South Carolina Department of Health and Environmental Control  
EPA – Environmental Protection Agency  
FEM – Federal Equivalent Method  
FRM – Federal Reference Method  
ID – Site Identification  
MOA – Memorandum of Agreement  
MSA – Metropolitan Statistical Area  
 $\mu\text{g}/\text{m}^3$  – Micrograms per cubic meter  
NAAQS – National Ambient Air Quality Standards  
NCore – National Core Monitoring Network  
NO – Nitric oxide  
 $\text{NO}_2$  – Nitrogen Dioxide  
 $\text{NO}_x$  – Nitrogen Oxides  
 $\text{NO}_y$  –  $\text{NO}_x$  and other oxidized species  
 $\text{PM}_{2.5}$  – Particulate Matter < 2.5 microns  
 $\text{PM}_{10}$  – Particulate Matter < 10 microns  
PPB – Parts Per Billion  
PPM – Parts Per Million  
SLAMS – State and Local Air Monitoring Station  
 $\text{SO}_2$  – Sulfur Dioxide  
SPM – Special Purpose Monitor  
TEOM – Tapered Element Oscillating Microbalance  
TPY – Tons Per Year

## Introduction

### Network Assessment Background

As required in 40 CFR 58.10, the Department submitted Assessments to the EPA for 2010 and 2015. For this 2020 Assessment, each monitoring network will be evaluated to determine the following:

*Table 1: Network Assessment Questions*

1. Does the network meets the monitoring objectives and spatial scales?
2. Are new monitoring sites are needed?
3. Are existing sites no longer needed and subject to termination?
4. Are there any new technologies appropriate for incorporation into the air monitoring network?
5. Does the network sufficiently support characterization of air quality in areas with large populations of susceptible individuals?
6. Would the discontinuance of a SLAMS monitor have an adverse impact on other data users or health studies?
7. Will changes to population-oriented sites affect PM <sub>2.5</sub> ?
8. Is additional monitoring required for lead (Pb) sources according to the most recent National Emissions Inventory (NEI)?

The evaluation for the 5-year network assessment will consider the following information in the assessments:

1. Statewide and local level population statistics,
2. Statewide ambient air monitoring network pollutant concentration trends for the past five years,
3. Network suitability to measure the appropriate spatial scale of representativeness for selected pollutants,
4. Monitoring data spatial redundancy or gaps that need to be eliminated, and
5. Programmatic trends or shifts in emphasis or funding that lead toward different data needs.

As specified in this guidance<sup>1</sup>, a network assessment consists of six steps detailed in Table 2. This document will utilize these steps in the technical assessment of South Carolina's ambient air monitoring network.

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<sup>1</sup> Ambient Air Monitoring Network Assessment Guidance: Analytical Techniques for Technical Assessments of Ambient Air Monitoring Networks  
(<http://www.epa.gov/ttn/amtic/files/ambient/pm25/datamang/network-assessment-guidance.pdf>)

*Table 2: Steps to Conduct an Ambient Air Monitoring Network Assessment*

<b>Step</b>	<b>Description</b>	<b>Information Needed</b>
1	Prepare or update a regional description, discussing important features that should be considered for network design.	Topography, climate, population, demographic trends, major emissions sources, and current air quality conditions
2	Prepare or update a network history that explains the development of the air monitoring network over time and the motivations for network alterations, such as shifting needs or resources.	Historical network specifications (e.g., number and locations of monitors by pollutant and by year in graphical or tabular format); history of individual monitoring sites
3	Perform statistical analyses of available monitoring data. These analyses can be used to identify potential redundancies or to determine the adequacy of existing monitoring sites.	Site correlations, comparisons to the National Ambient Air Quality Standards (NAAQS), trend analysis and spatial analysis
4	Perform situational analyses, which may be objective or subjective. These analyses consider the network and individual sites in more detail, taking into account research, policy, and resource needs.	Risk of future NAAQS exceedances, demographic shifts, requirements of existing state implementation plans (SIP), or maintenance plans, density or sparseness of existing networks
5	Suggest changes to the monitoring network on the basis of statistical and situational analyses and specifically targeted to the prioritized objectives and budget of the air monitoring program.	Reduction of number of sites for a selected pollutant, enhanced leveraging with other networks, and addition of new measurements at sites to enhance usefulness of data
6	Acquire the input of state and local agencies or stakeholders and revise recommendations as appropriate.	

The networks of all criteria pollutants are reviewed and assessed in this document, but due to the limitations of the analysis tools, only the ozone and PM<sub>2.5</sub> networks will be analyzed using a scoring system implemented with GIS.

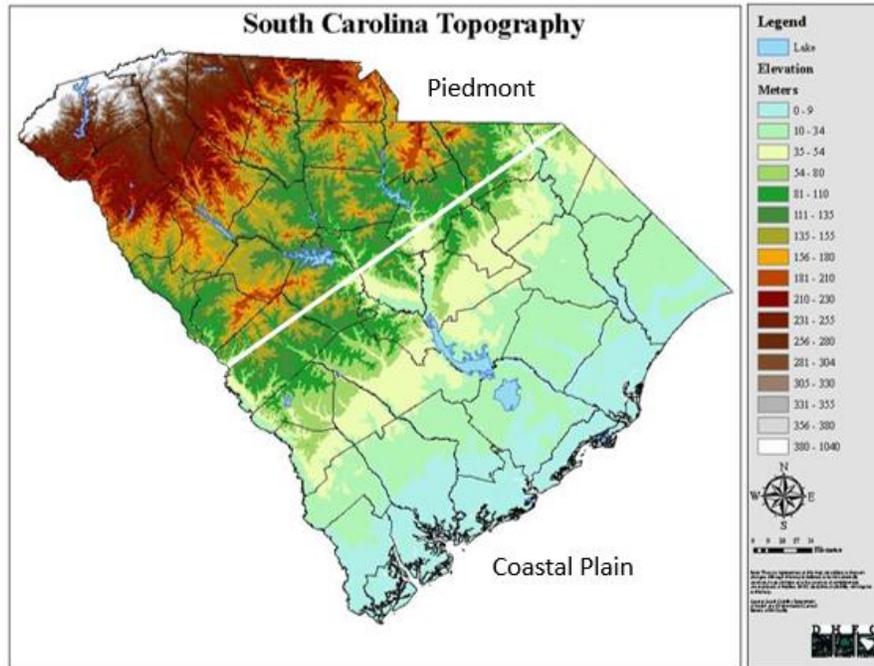
Non-criteria sampling is not required to be assessed as part of this review. The 2018 design value data, the 2018 estimated population from the United States (US) Census Bureau and the 2014 NEI were used for the calculations.

## South Carolina Information

### Topography

The topography of South Carolina is divided into two distinct areas, commonly known as the Piedmont and the Coastal Plain.

Map 1: South Carolina Topography



The line of demarcation runs from the eastern boundary of Aiken County through central Chesterfield County to the North Carolina border. West of this line, elevations begin at about 300 feet and increasing to over 1,000 feet in the extreme northwestern counties, culminating in isolated peaks of 2,000 to over 3,500 feet above mean sea level. East of the line, there are evidences of outcroppings from the lower Appalachians in a ridge of low hills and broken country between the Congaree River and the north fork of the Edisto River, and also in a hilly and rolling region in the upper Lynches River drainage basin between the Catawba-Wateree and the Great Pee Dee Rivers. In approximately one-third of the coastal plain (or what is commonly known as the upper coastal plain), the elevations decrease rather abruptly from 300 to 100 feet and continue to decrease to the coast. The major part of the coastal area is not over 60 feet above mean sea level. In this region of lower levels, to the eastward and southward, the great swamp systems of the state predominate.

The slope of the land from the mountains seaward is toward the southeast, and all of South Carolina's streams naturally follow that general direction to the Atlantic Ocean. The South Piedmont section of the state is on the eastern slope of the Appalachian Mountains, with the main ridge of the mountains about 30 miles west. To some extent, these

mountains act as a barrier for weather systems and tend to protect the area from the full force of the cold air masses during the winter months. The relatively flat areas of the Central Plains and the coastal region allow free air movement and are conducive to effective dispersion of pollutants.

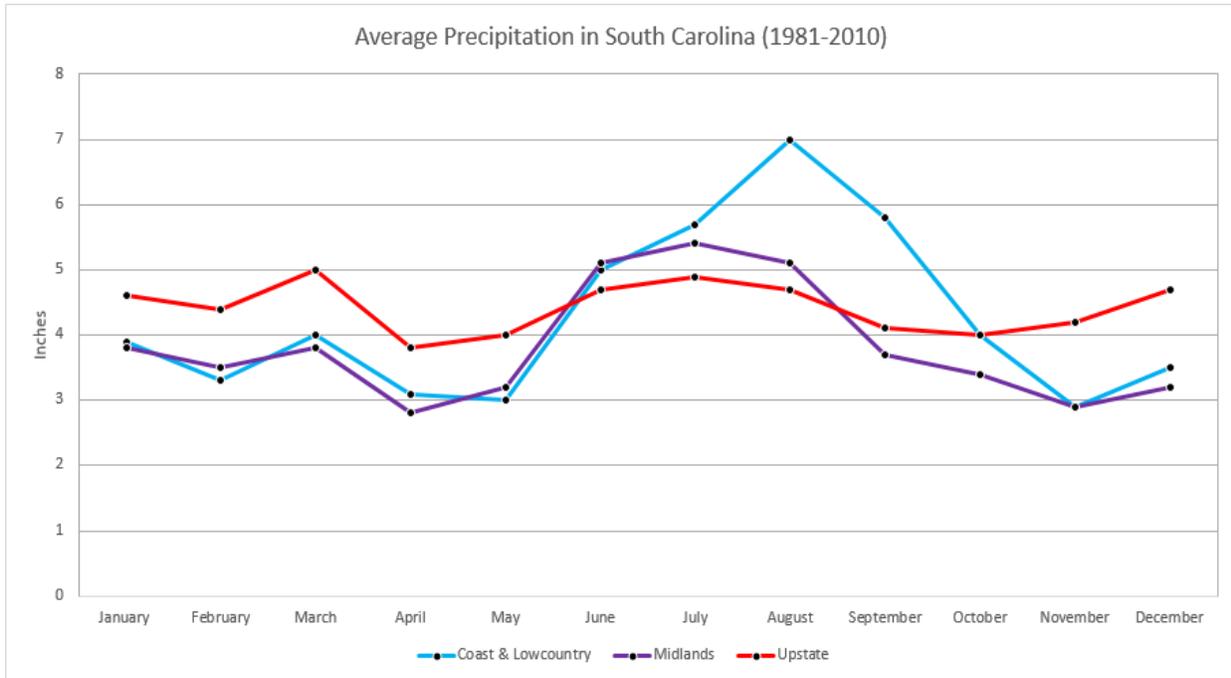
### **Climate**

South Carolina has a humid, subtropical climate with generally hot summers and mild winters. During the summer, a semi-permanent high-pressure system in the northwestern Atlantic Ocean provides the state with a warm, moist, and unstable air mass. The southern extent of the Appalachian Mountains extends into the northwest part of the state. The high elevation in the state's Blue Ridge region tends to have less subtropical characteristics than the rest of the state. During the cool season (October through April), this mountain chain tends to block or delay many cold air masses approaching from the northwest. Cold air masses that rapidly cross the mountains are warmed as the air is heated by compression when air descends on the southeastern side of the mountain chain.

Wind speed and direction are of particular interest in South Carolina for evaluating pollution, emissions, and transport. The prevailing near-surface winds are typically either from the northeast or southwest direction due in large part to the presence and orientation of the Appalachian Mountains.

As shown in Graph 1<sup>2</sup>, precipitation is fairly consistent on average across the state. The months of June, July, and August have the highest precipitation for the Upstate and Midlands regions.

Graph 1: Average Precipitation in South Carolina (1981-2010)



While in the Lowcountry, the tropical cyclones contribute to the precipitation during the summer and fall months. Extratropical cyclones contribute to precipitation during the fall, winter, and spring months. Severe weather can be a concern across the state during the spring months.

Graph 2<sup>3</sup> indicates the average high and low temperatures for the three regions of the State. Due to the higher elevations, the northwest part of the state tends to be slightly cooler than the southeast portion of the state. The state experiences overnight and morning temperature inversions, which can be particularly strong during the spring months when winds are calm, and skies are clear. These inversions prevent vertical mixing in the near-surface layer of the atmosphere and cause pollutants to be trapped near the ground.

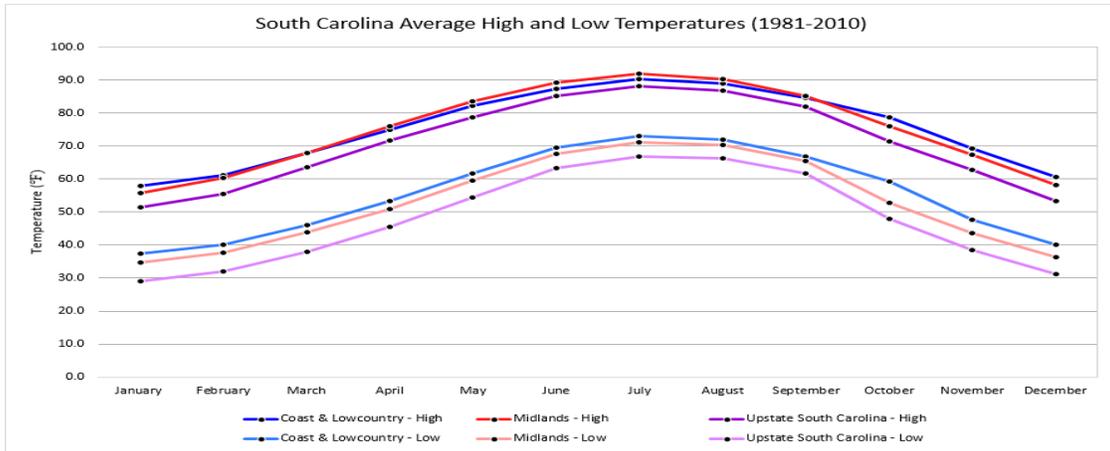
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<sup>2</sup><https://www.currentresults.com/Weather/US/average-annual-state-precipitation.php> The weather data was taken from the United States National Climatic Data Center and was collected from 1971 to 2000.

<sup>3</sup> <https://www.currentresults.com/Weather/South-Carolina/average-annual-temperatures.php> The weather data was taken from the United States National Climatic Data Center and was collected from 1981 to 2010.

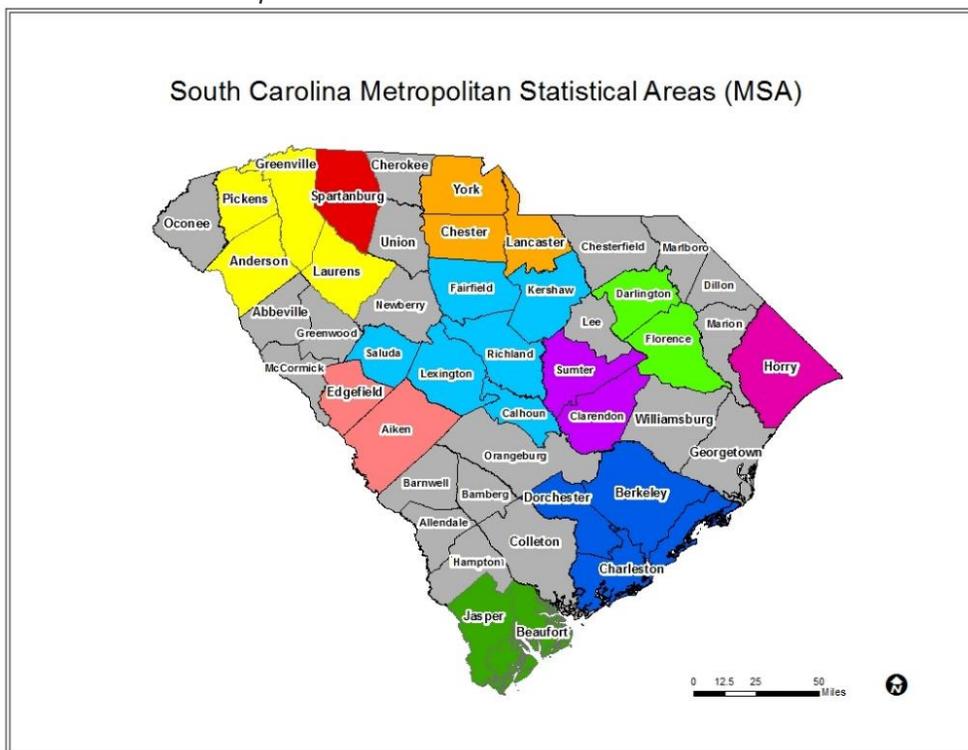
Daytime heating generally allows for better vertical mixing by afternoon hours when overnight temperature inversions do occur.

*Graph 2: South Carolina Average High and Low Temperatures (1981-2010)*



Metropolitan Statistical Areas and Regions of South Carolina  
 Metropolitan Statistical Areas (MSAs) are geographic entities defined by the United States Office of Management and Budget (OMB) and used as the basis for ambient air minimum monitoring requirements.

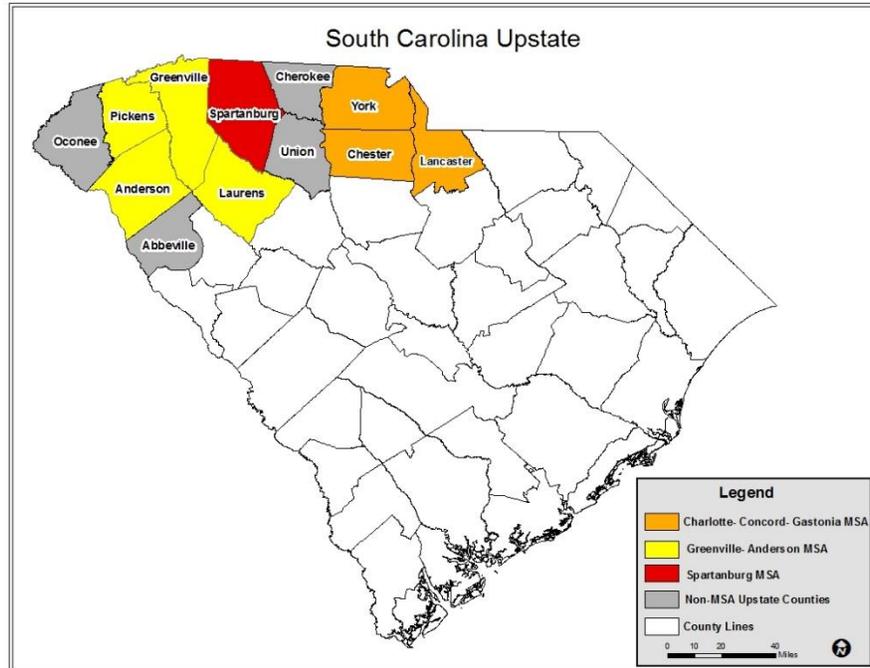
*Map 2: South Carolina MSAs and Counties*



An MSA contains a core urban area of 50,000 or more population and exhibits close economic ties to the surrounding areas. There are ten MSAs in the three regions of South Carolina (Map 2), with three of these being multi-state MSAs. Each region is discussed below.

The upper northwestern part of the state is known as the Upstate (Map 3) and includes three MSAs and four individual counties.

Map 3: The Upstate Area

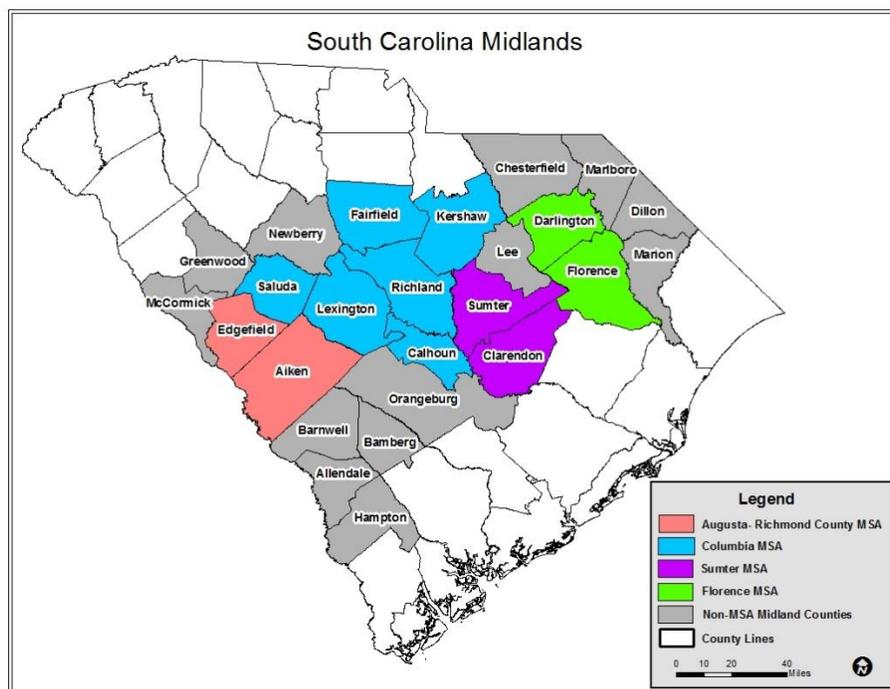


The largest MSA in this area is the Charlotte-Concord-Gastonia NC-SC MSA, which is a multi-state MSA. The North Carolina portion of this MSA includes Anson, Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan and Union Counties. The South Carolina portion of this MSA includes York, Chester, and Lancaster Counties. The principal cities in this MSA are Charlotte, Concord, and Gastonia in North Carolina and Rock Hill in South Carolina. The second largest MSA in the Upstate area is the Greenville-Anderson, SC MSA, which includes Greenville, Anderson, Laurens, and Pickens Counties, and the principal cities are Greenville and Anderson. The final MSA in this area is the Spartanburg MSA, which includes Spartanburg County, with the principal city being Spartanburg. The counties in the Upstate area that are not in an MSA include Abbeville, Cherokee, Oconee, and Union.

The Midlands area (Map 4) runs diagonally through the middle of the state between the Upstate and the Lowcountry. There are four MSAs and thirteen individual counties in this region. The largest MSA in this area is the Columbia, SC MSA and includes Calhoun, Fairfield, Kershaw, Lexington, Richland, and Saluda Counties. The principal city is Columbia.

The second largest MSA is the Augusta-Richmond County, GA-SC MSA, which includes Aiken and Edgefield Counties in South Carolina. The Georgia portion of this MSA includes Burke, Columbia, Lincoln, McDuffie, and Richmond Counties. The principal city in the Georgia portion of the MSA is Augusta-Richmond County. In the South Carolina portion of this MSA, Aiken, South Carolina is the principal city. The third largest MSA in the Midlands area is the Florence, SC MSA, which includes Florence and Darlington Counties, and the principal city is Florence. The final MSA in this area is the Sumter, SC MSA. This MSA includes Sumter and Clarendon Counties. The counties not included in any MSAs in the Midlands area include Allendale, Bamberg, Barnwell, Chesterfield, Dillon, Greenwood, Hampton, Lee, Marion, Marlboro, McCormick, Newberry, and Orangeburg.

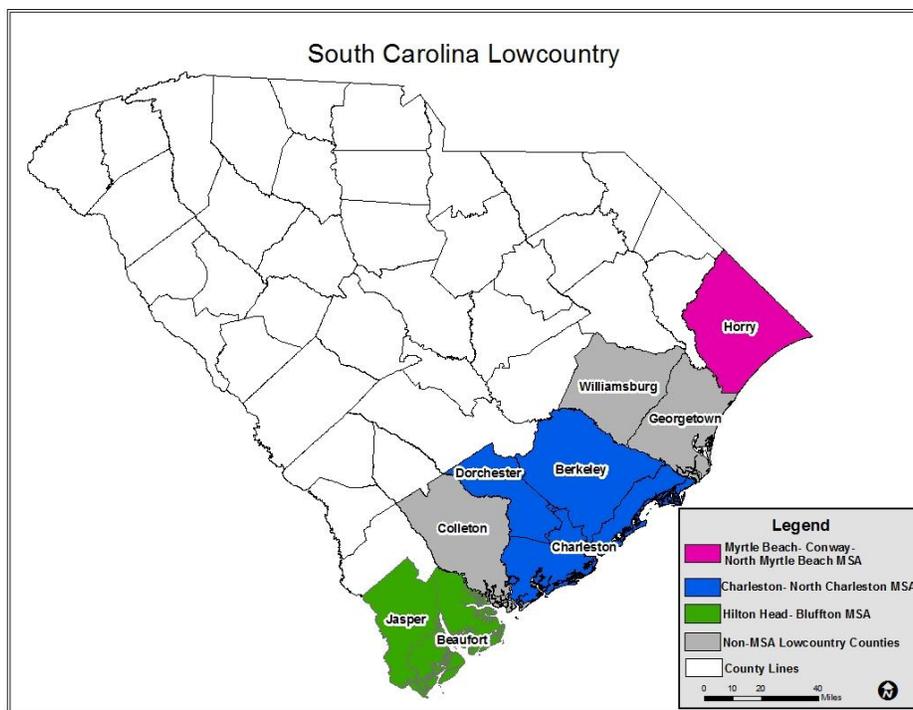
Map 4: The Midlands Area



The Lowcountry covers the coastal areas of South Carolina and includes three MSAs and three individual counties. The largest MSA is the Charleston-North Charleston, SC MSA, which includes Berkeley, Charleston, and Dorchester Counties. The principal cities are Charleston and North Charleston. The second largest MSA is the multi-state MSA of Myrtle Beach-Conway-North Myrtle Beach, SC-NC. The counties in this MSA include Brunswick County, North Carolina and Horry County, South Carolina. The principal cities are Myrtle Beach, Conway, and North Myrtle Beach, South Carolina. The final MSA is the Hilton Head-Bluffton, SC MSA. This includes Beaufort and Jasper Counties and encompasses the principal cities of Hilton Head Island and Bluffton.

The counties not included in any MSA in the Lowcountry area include Colleton, Georgetown, and Williamsburg Counties.

Map 5: The Lowcountry Area



### Sources of emissions

Currently, there are approximately 271 Title V sources in South Carolina emitting one or more of the criteria pollutants (Map 6). These sources are scattered fairly uniformly across the state with some clustering near urbanized areas and along interstates.

South Carolina has three types of operating permits: state minor, conditional major, and Title V. The type of permit issued is dependent on potential emissions and limits: Potential emissions are calculated on 8,760 hours per year operation, maximum capacity, using worst case emitting material, and no emission controls. A facility can add emission controls or other operating limits (such as hours of operation) if those limits are an enforceable limit in the permit.

The types of operating permits South Carolina issues to facilities include:

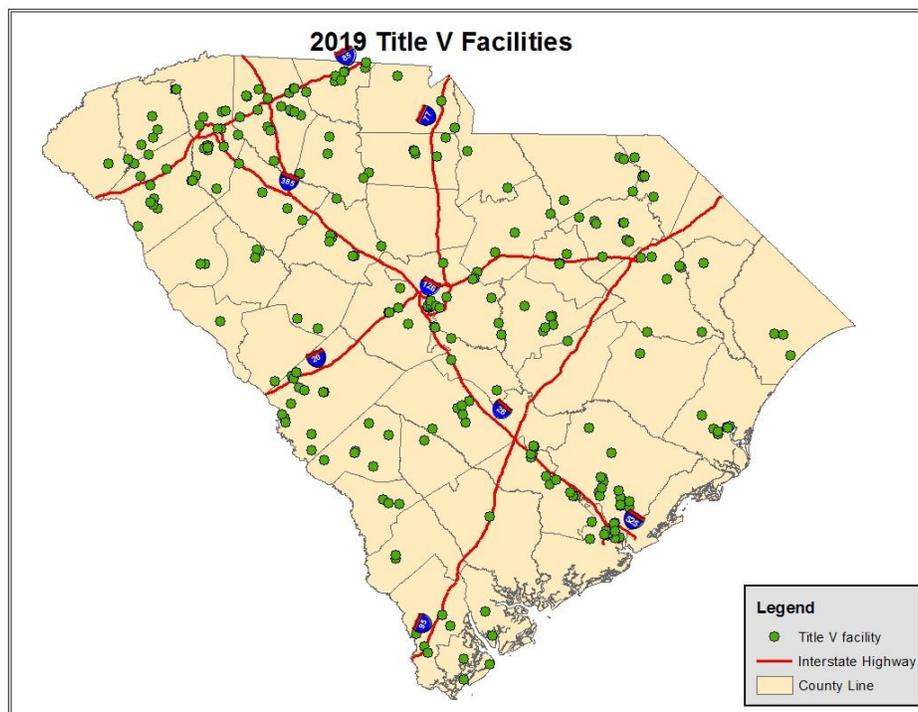
- Title V operating permits are issued to major sources, which directly emit, or have the potential to emit (PTE), greater than or equal to the major source threshold as defined by applicable federal or state regulations. This includes facilities with a PTE of 100 tons per year (tpy) or greater of any air pollutant, as defined in Section 302 of the Clean Air Act (most commonly the criteria pollutants PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, and/or VOC), and facilities that can

potentially emit 10 tons per year or more of a single hazardous air pollutant (HAP) or 25 tons per year or more of total HAPs. Facilities subject to Title V permitting program must also certify compliance with their operating permit each year.

- Conditional major operating permits are issued to sources that obtain a federally enforceable physical or operational limitation from the Department to limit or cap the source's PTE to avoid being defined as a major source. Facilities that have taken limits on their PTE also have reporting requirements related to their compliance.

- State minor operating permits are issued to facilities with a PTE below 100 tpy for criteria pollutants and below the 10 and 25 tpy limit for HAPs.

Map 6: 2019 Title V Facilities

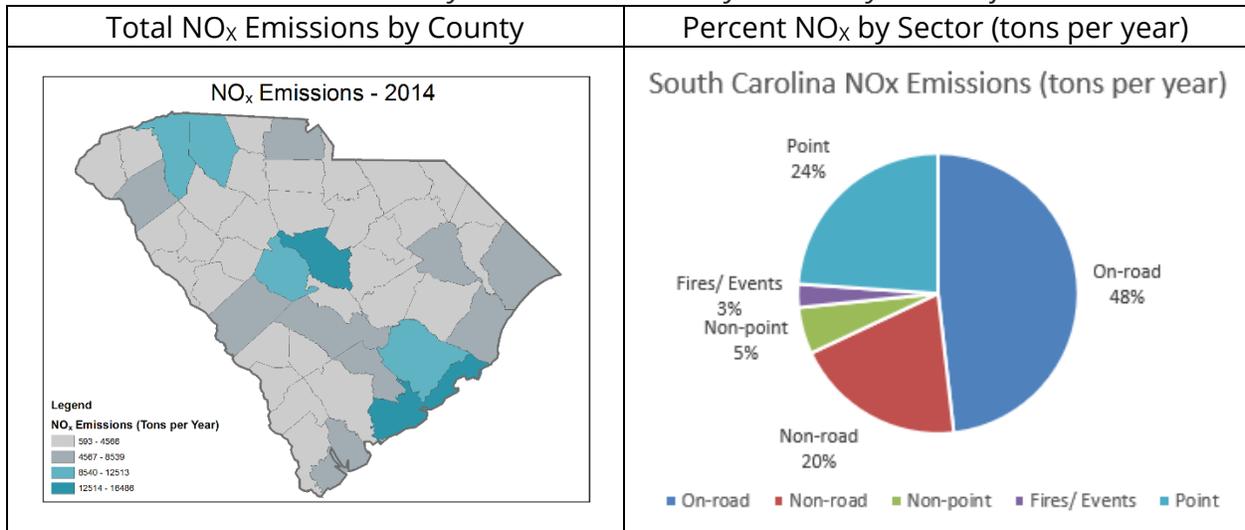


Listed below are maps and pie charts of total emissions for VOC, SO<sub>2</sub>, NO<sub>2</sub>, CO, lead, PM<sub>10</sub>, and PM<sub>2.5</sub> from the most recent NEI (2014). The maps show the total emissions for VOC, SO<sub>2</sub>, NO<sub>2</sub>, CO, lead, PM<sub>10</sub>, and PM<sub>2.5</sub> on a county-wide basis. The pie charts include the percent emissions statewide for the sectors of on-road and non-road mobile, point, non-point, and events/fires. The sector of on-road mobile sources of pollution includes most forms of transportation such as automobiles, trucks, and buses. The sector of non-road mobile sources includes a wide variety of internal combustion engines not associated with highway vehicles. Examples of non-road mobile sources include construction equipment, lawn mowers, and boats. The point sector pollution refers to a source at a fixed point, such as an industrial boiler or storage tank, that emits air pollutants. Fires and events are not

sectors but can produce significant emissions when present. In general, total emissions tend to be highest in those counties with higher populations where a large number of motor vehicles and facilities are located than in more rural counties.

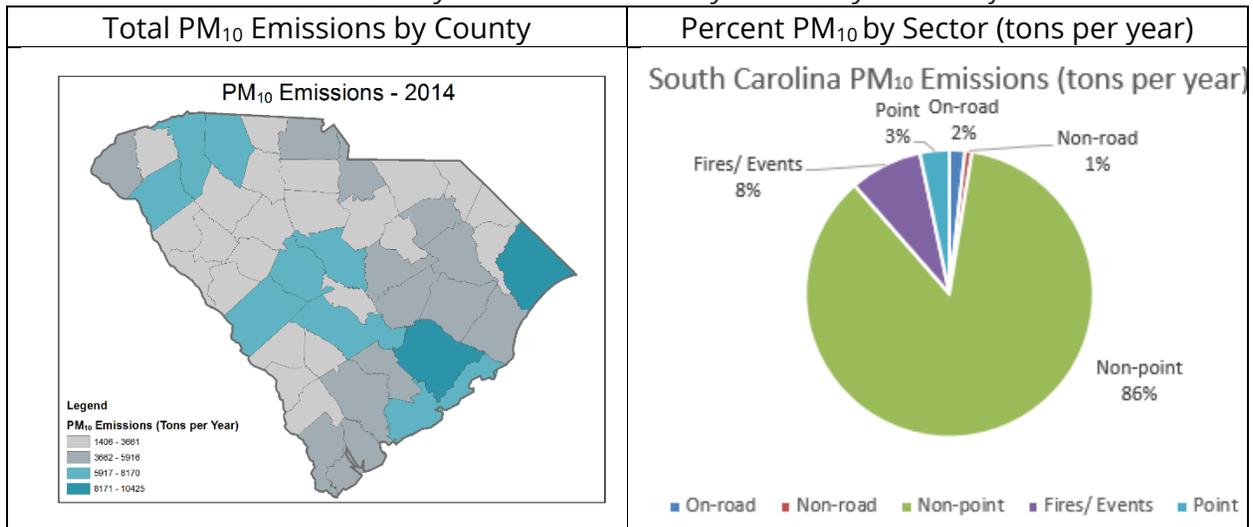
The total NO<sub>x</sub> emissions were 180,956 tons. On-road and non-road mobile sources made up approximately 68 percent of the statewide NO<sub>x</sub> emissions. Charleston (Charleston-North Charleston MSA) and Richland (Columbia MSA) Counties had the highest emissions.

Table 3: Total County Emissions and Yearly Percent by Sector of NO<sub>x</sub>



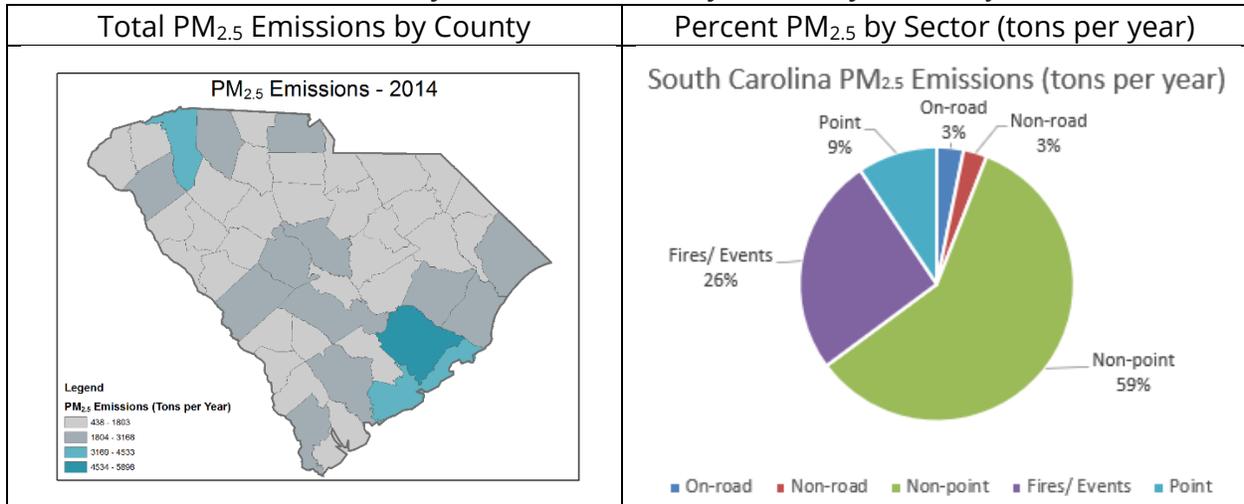
There were 321,675 tons of PM<sub>10</sub> emissions. Non-point sources made up approximately 86 percent of the total emissions. Berkeley (Charleston-North Charleston MSA) and Horry (Myrtle Beach-Conway-North Myrtle Beach MSA) Counties had the highest emissions.

Table 4: Total County Emissions and Yearly Percent by Sectors of PM<sub>10</sub>



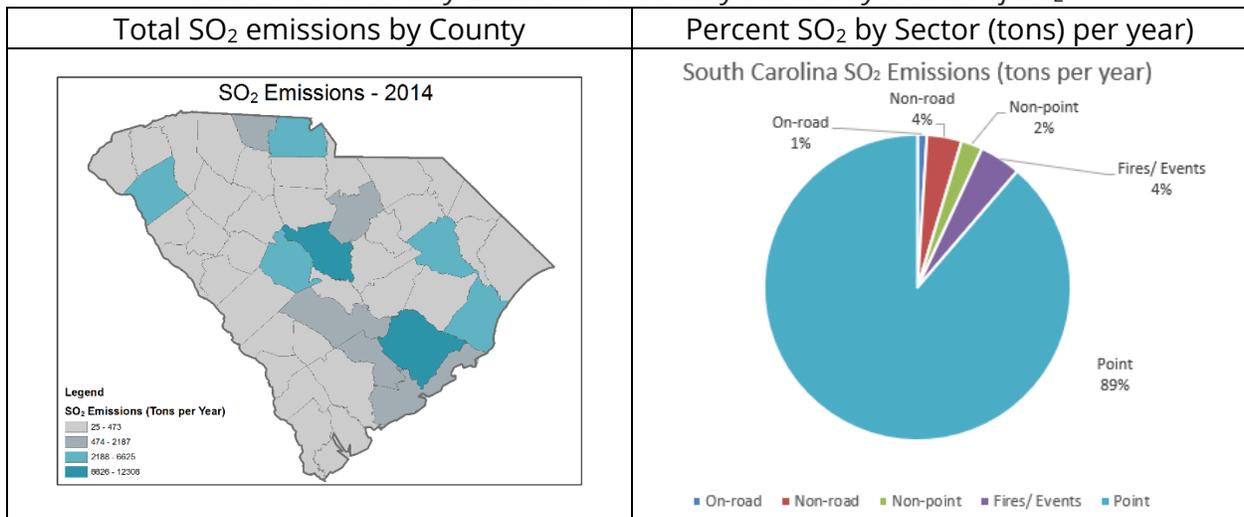
The total amount of PM<sub>2.5</sub> emissions in South Carolina was 86,186 tons. The non-point sources account for 59 percent of the total emissions. Berkeley County (Charleston-North Charleston MSA) had the highest emissions.

Table 5: Total County Emissions and Yearly Percent by Sectors of PM<sub>2.5</sub>



There were 52,781 tons of SO<sub>2</sub> emissions in South Carolina with point sources accounting for over 89 percent of total emissions. Berkeley (Charleston-North Charleston MSA) and Richland (Columbia MSA) Counties had the highest emissions.

Table 6: Total County Emissions and Yearly Percent by Sectors of SO<sub>2</sub>

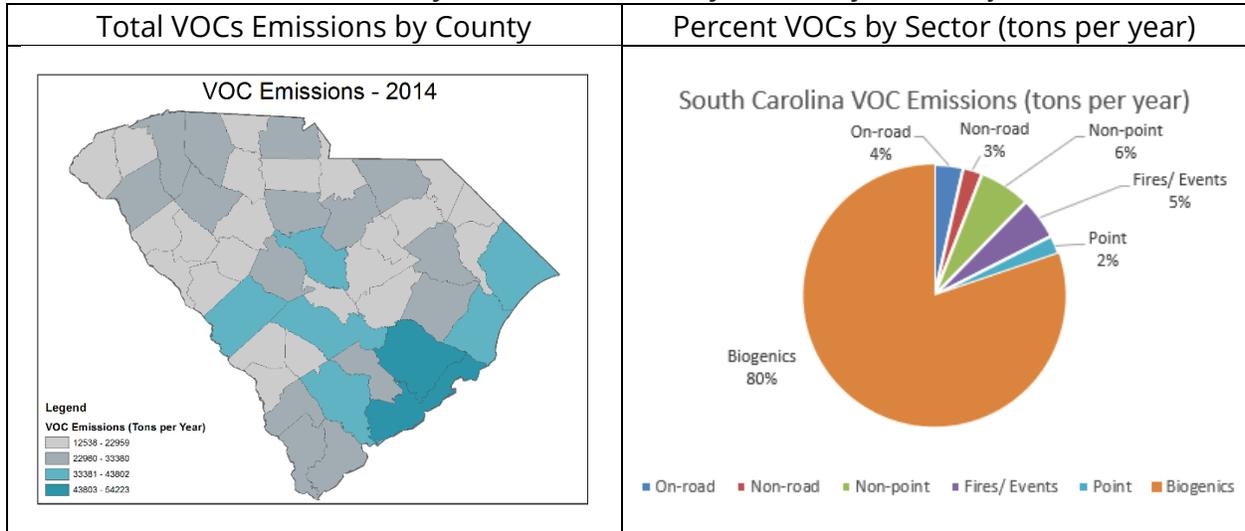


Biogenic emissions from vegetation and soil are the largest contributors to VOC emissions nationally. In South Carolina, the 2014 biogenic emissions were 896,824 tons, which is 80 percent of all VOC emissions statewide.

There were approximately 221,344 tons of anthropogenic VOCs emissions, with only 2

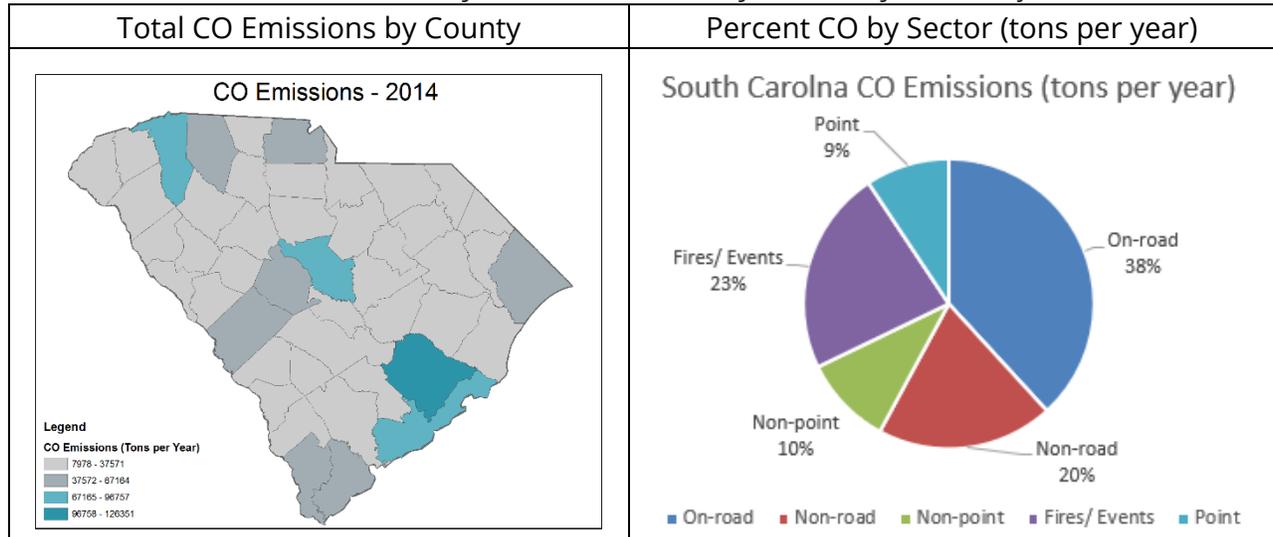
percent being from point sources. Berkeley and Charleston Counties (Charleston-North Charleston MSA) had the highest anthropogenic VOC emissions.

*Table 7: Total County Emissions and Yearly Percent by Sectors of VOCs*



In 2014, there were 1,967,942 tons of CO emissions reported in South Carolina. On-road and non-road mobile sources combined to account for more than 58 percent of the total CO emissions. Berkeley County (Charleston-North Charleston MSA) had the highest emissions.

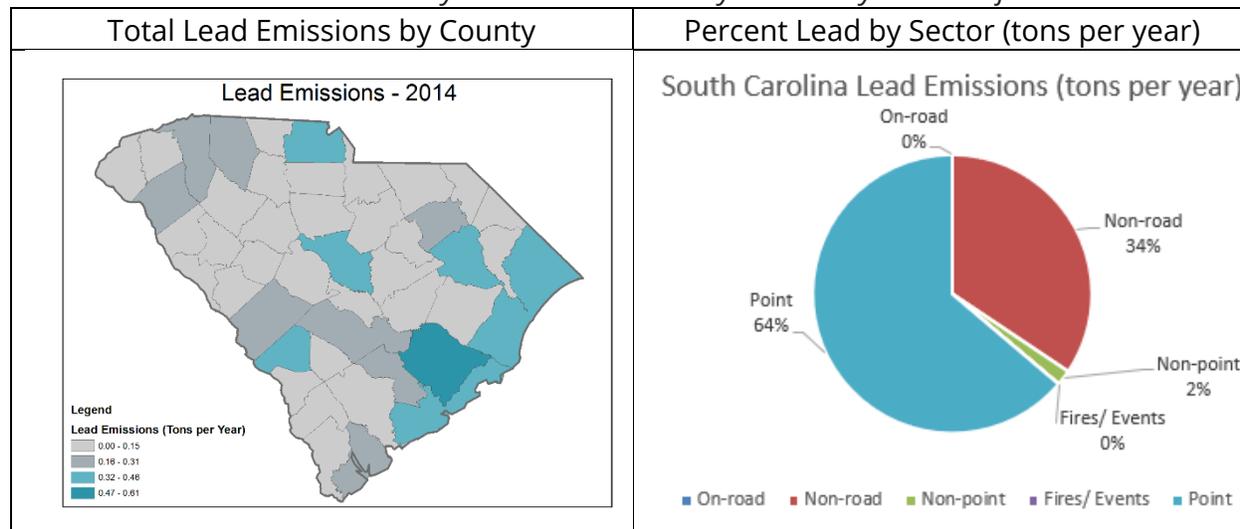
*Table 8: Total County Emissions and Yearly Percent by Sectors of CO*



The total lead emissions across South Carolina were 10.20 tons.

Point sources account for 64 percent of the lead emissions. Berkeley County (Charleston-North Charleston MSA) had the highest emissions.

*Table 9: Total County Emissions and Yearly Percent by Sectors of Lead*



### Information for Analysis of South Carolina Ambient Air Monitoring Networks

The following sections describes and analyzes each of South Carolina’s criteria pollutant networks. First, general information that apply to all networks are discussed. This includes South Carolina’s population and demographics, history of South Carolina air monitoring and current air quality, monitoring requirements for existing state implementation plans or maintenance plans, and implementation of new technologies.

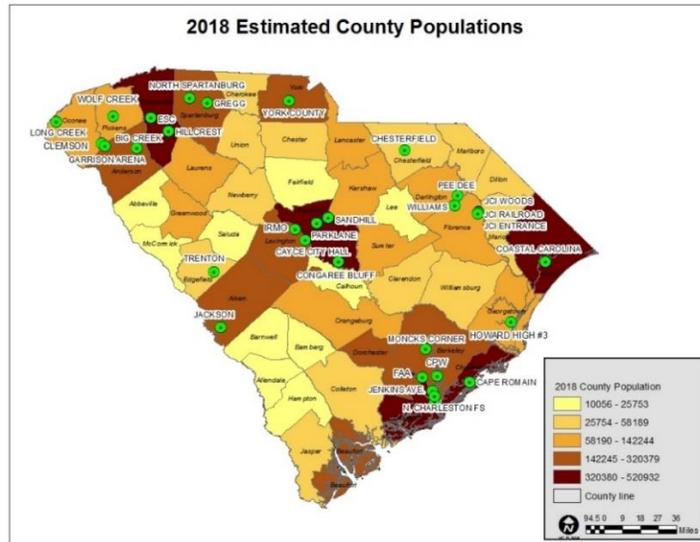
#### Population, demographics and trends

According to the United States Census Bureau<sup>4</sup>, South Carolina had a 2018 estimated population of 5,084,127, which is a 9.9 percent increase since the 2010 estimated census. This percent increase ranks South Carolina as the twenty-third largest state in the United States. The most populated counties in South Carolina (Map 7 above) are Greenville, Richland, Charleston, and Horry.

<sup>4</sup> United States Census Bureau. Counties of South Carolina. 2019. Accessed 01/07/2020. <https://data.census.gov/>

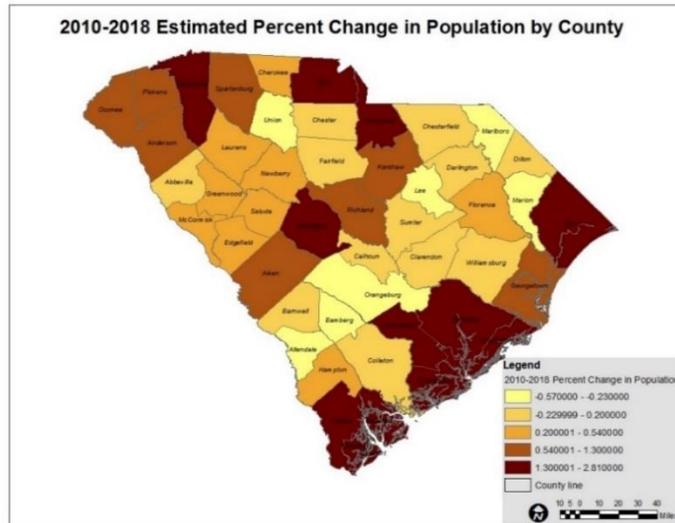
These four counties form the core areas of each of their respective Metropolitan Statistical Area and are the areas where the most ambient air monitoring is conducted.

Map 7: South Carolina 2018 Population



The map below (Map 8) shows the percent change in population by county between 2010 and 2018<sup>5</sup>. In general, the highest population growth occurred mainly in the counties along the coast of South Carolina and in the major urbanized areas of the state. Population decreases were mainly seen in more rural areas of the state.

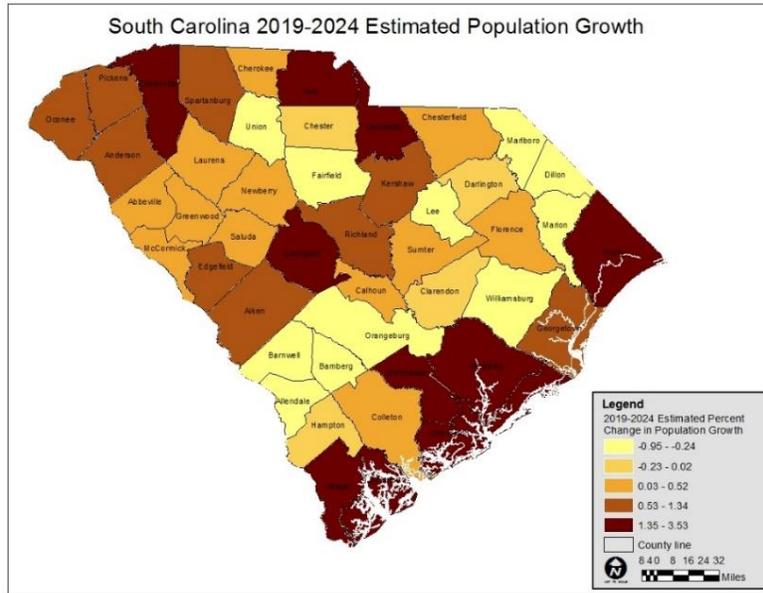
Map 8: South Carolina Population 2010-2018 Estimated Percent Change



<sup>5</sup> United States Census Bureau. 2019. 2000-2018 Estimated Populations. Accessed 01/07/2020. <https://data.census.gov/>

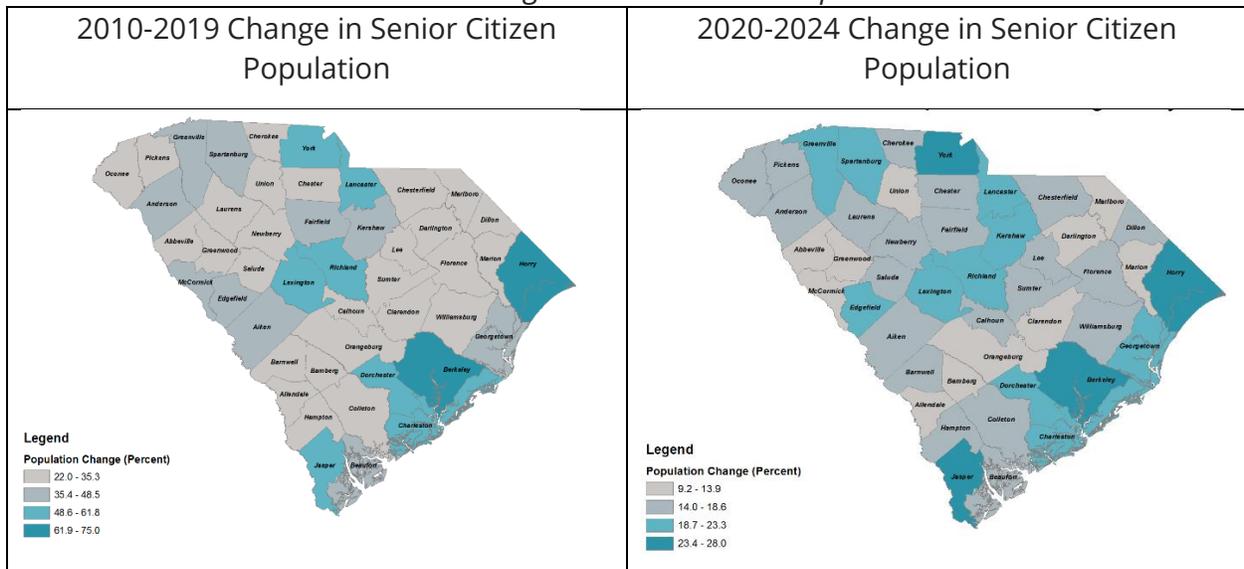
As Map 9 indicates, similar population trends are expected to continue through the year 2024.

Map 9: South Carolina Population 2019-2024 Estimated Percent Change



Population data for senior citizens and children was also analyzed. This information may be indicative of sensitive populations. For senior citizens, the 2010-2019 and 2019-2024 demographic shift were examined. This data was also examined specifically for the ozone and PM<sub>2.5</sub> FRM networks.

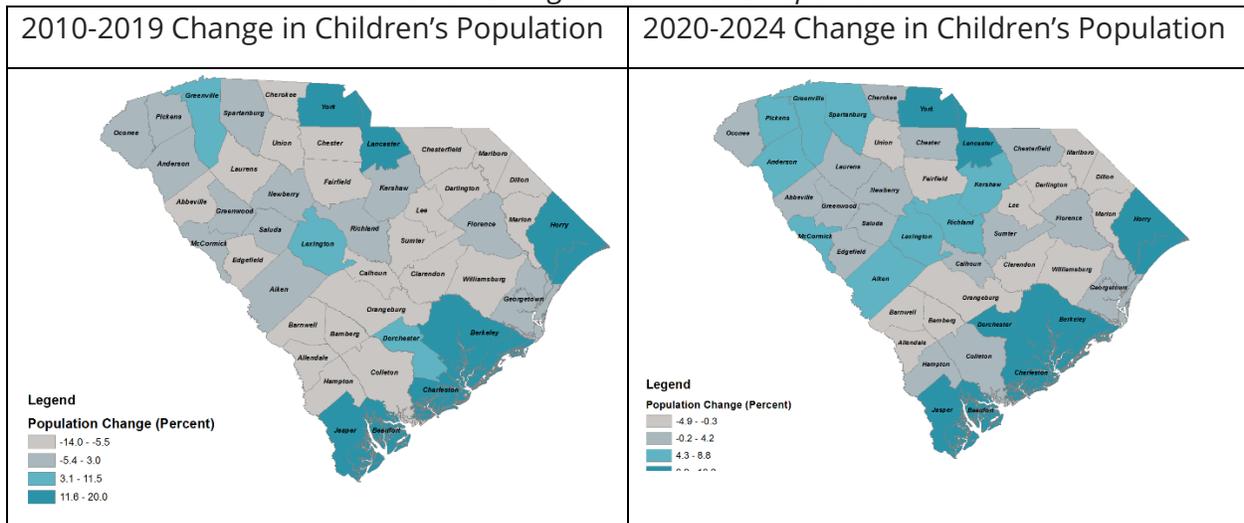
Table 10: Changes in Senior Citizen Population



The areas with the highest population change for senior citizens for 2010-2019 were along the coast in Berkeley County (Charleston-North Charleston MSA) and Horry County (Myrtle Beach-Conway-North Myrtle Beach MSA). Also, there were increases in this population in Richland and Lexington Counties (Columbia MSA) and in York County (Charlotte-Concord-Gastonia MSA). This trend is expected to continue in 2019-2024, with the coastal areas and York County in the Charlotte-Concord-Gastonia MSA receiving the majority of growth in South Carolina.

For the children’s demographic, during 2010-2019, the majority of growth was seen along the coast in Beaufort and Jasper Counties (Hilton Head-Bluffton MSA), Berkeley and Charleston Counties (Charleston-North Charleston MSA), and Horry County (Myrtle Beach-Conway-North Myrtle Beach MSA). Also, there was an increase in children’s population in York and Lancaster Counties (Charlotte-Concord-Gastonia MSA).

Table 10: Changes in Children’s Population



During 2020-2024, similar trends will continue. It is expected that the majority of growth will be along the coast and in York and Lancaster Counties (Charlotte-Concord-Gastonia MSA). Also, smaller growth will be experience in the MSAs of Greenville-Anderson, Spartanburg, Augusta-Richmond County, and Columbia. All of these areas of growth are within MSA boundaries where monitoring for criteria pollutants is required and conducted.

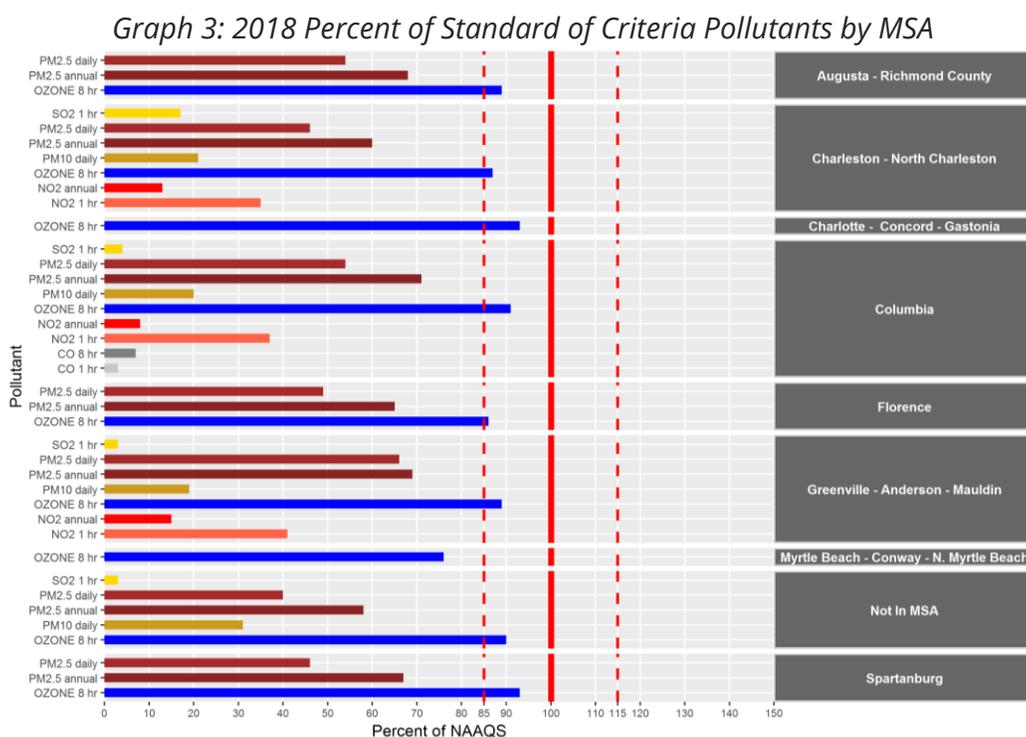
**History of South Carolina Air Monitoring and Current Air Quality Conditions**

In 1970, Congress established the Clean Air Act, which underwent major revisions in 1977 and 1990. The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (NAAQS) for ozone, particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), sulfur dioxide, nitrogen dioxide, carbon monoxide, and lead. These six principal pollutants are known as the “criteria air pollutants”. Every five years, the NAAQS must be reviewed, and possibly, revised. In 2006, the ambient air monitoring regulations were revised to include a requirement for an annual ambient air monitoring network plan and periodic network assessments.

In South Carolina, the Department, or its predecessors, have operated an air quality monitoring network since 1959. Over time, the network has continually evolved to meet the requirements and needs of the Department’s Air Program and to comply with federal requirements.

As of January 2020, South Carolina had 26 ambient air monitoring sites, containing 76 monitors. South Carolina maintains ambient air monitoring sites, with their associated monitors, to fulfill the federal minimum monitoring requirements in EPA regulation 40 CFR Part 58, Appendix D and associated Appendices.<sup>6</sup> This requires each state to maintain a minimum number of monitors to properly characterize air quality and to meet any required objectives of the monitoring network. In general, these minimum requirements are based on the MSA population, emissions, and the latest ambient air monitoring design values. South Carolina meets all minimum monitoring requirements.

The quality of the ambient air is determined by the level of pollution. Currently, all South Carolina monitors have design values below the NAAQS. In Graph 3, the 2018 criteria pollutant design values as the percentage of the standard for each criteria pollutant by MSA is presented.



The solid, red vertical line on the graph represents the standard. The dashed, red vertical lines on the graph depict ±15 percent from the standard. For the purpose of this assessment, a monitor that had a design value within ±15 percent of the standard was

<sup>6</sup> 40 CFR Part 58

deemed to be of high importance in providing information concerning NAAQS compliance. Ozone concentrations in 2018 were approximately 75–95 percent of the ozone NAAQS. The PM<sub>2.5</sub> concentrations across the state were less than 75 percent of the NAAQS.

### **Requirements of existing state implementation plans or maintenance plans**

State implementation plans and/or maintenance plans can include ambient air monitoring requirements. In South Carolina, there are ozone monitoring requirements to fulfill maintenance plans for past ozone nonattainment areas. The Charlotte-Concord-Gastonia MSA violated the 1997 ozone NAAQS. On April 30, 2004, the EPA declared a nonattainment designation for the eastern part of York County, including the Catawba Indian Nation (69 FR 23858). On December 26, 2012, that area was redesignated as attainment, and the first ten-year maintenance plan was approved (77 FR 75862). A second 10-year maintenance plan, which applies exclusively to the tribal lands of the Catawba Indian Nation was submitted on July 10, 2020.

For the 2008 ozone NAAQS, the South Carolina part of the Charlotte-Concord-Gastonia MSA that had been designated as marginal nonattainment area in South Carolina was redesignated as attainment by EPA on December 11, 2015, and the first 10-year maintenance plan was approved (80 FR 76865). A second ten-year maintenance plan will be due on December 11, 2023. For the 2015 ozone NAAQS, on November 16, 2017, all of South Carolina was designated attainment/unclassifiable by EPA (82 FR 54232).

All other criteria pollutants have infrastructure state implementation plans in place. There are no other monitoring requirements.

### **Implementation of new technologies**

The Department has changed from dial-up modems to broadband connections for all monitoring sites with continuous monitors. Prior to 2019, all South Carolina monitoring sites with Data Acquisition Systems (aka dataloggers) were remotely accessed via serial port dial-up modems. In 2019, broadband cellular modems were deployed to all needed sites. This allows for faster data downloads and enhanced troubleshooting for equipment.

## **Review of South Carolina Ambient Air Monitoring Networks**

### **Carbon Monoxide (CO) Ambient Air Monitoring Network**

*Regulations* – In 1971, the EPA established the primary and secondary CO NAAQS at 35 parts per million (ppm) for a 1-hour averaging period and 9 ppm for an 8-hr averaging period, not to be exceeded more than once a year. In 1985, the primary standard was retained, but the secondary standard was revoked. In 1994 and 2011, the primary standard was again retained. Currently, the primary CO NAAQS is set at 35 ppm for a 1-hour

averaging period and 9 ppm for an 8-hr averaging period, not to be exceeded more than once a year.

The current CO minimum monitoring criteria found in Section 4.2 of 40 CFR Part 58, Appendix D has three requirements. Each requirement is population based or an NCore requirement. The requirements are as follows:

1. Near-road CO Monitors – Each state with MSAs having a population of 1,000,000 or more people must have one CO monitor collocated with one required near-road NO<sub>2</sub> monitor to be operational by January 1, 2017. The Charlotte-Concord-Gastonia, NC-SC MSA is the only MSA in South Carolina that meets the population requirement for a collocated CO monitor. The Mecklenburg County Air Quality office operates a CO monitor at the Remount Road (37-119-0045) near road Site in Charlotte, North Carolina that became operational on January 1, 2017.

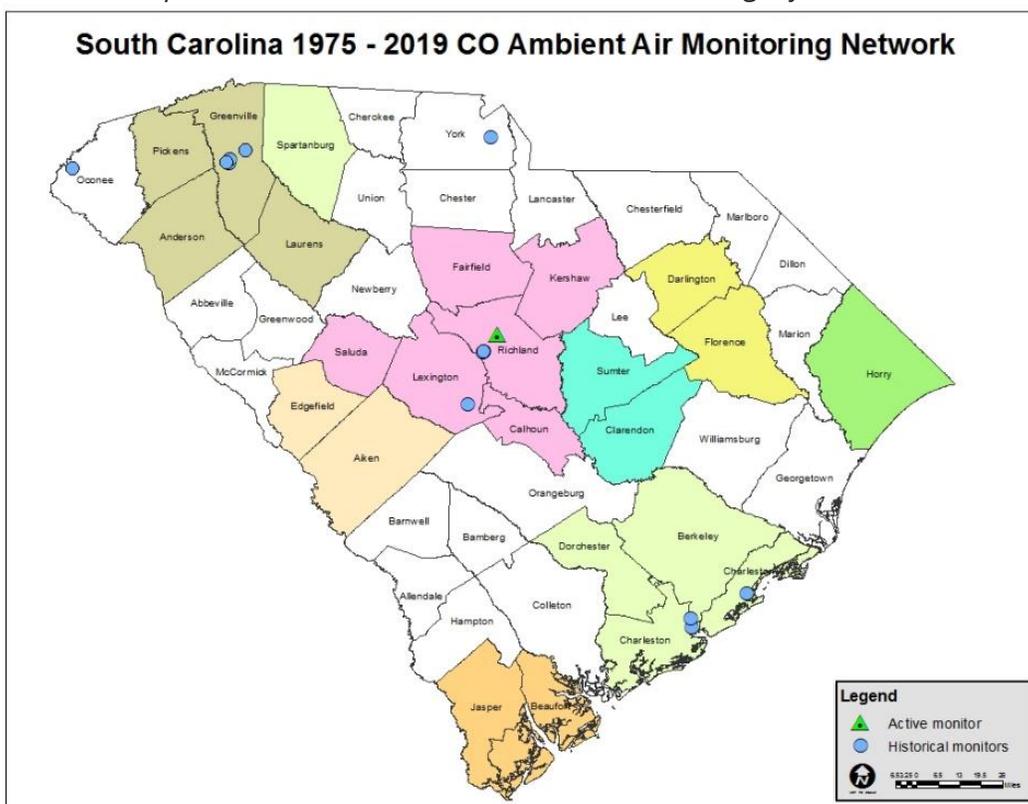
2. NCore Requirement – Each NCore site in an MSA with a population of 500,000 or more must include a CO monitor. The Parklane (45-079-0007) Site in the Columbia, SC MSA is the NCore site for South Carolina and supports one CO monitor. The Garinger (37-119-0041) Site in Mecklenburg County is also an NCore site and supports a CO monitor.

3. Regional Administrator Required Monitoring –The Regional Administrators, in collaboration with states, may require additional CO monitors above the minimum number of monitors if they believe that the minimum monitoring requirements are not sufficient to meet monitoring objectives. South Carolina does not have any required Regional Administrator Required Monitoring.

*Historical and Current Monitors* – Table 12 and Map 10 lists the historical and current South Carolina CO monitoring sites from 1975 to 2020. The Air Quality System (AQS) database indicates that in 1975, South Carolina started with two CO monitors in the Charleston-North Charleston and Columbia MSAs.

In general, these CO monitors were operated in the highest populated MSAs.

Map 10: South Carolina Historical CO Monitoring Information



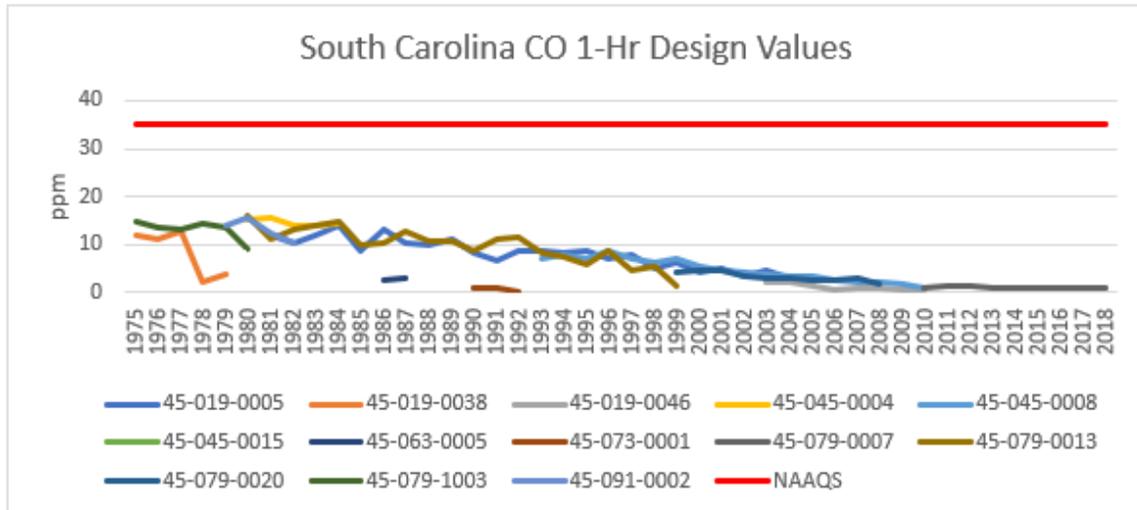
In the past 45 years, South Carolina has operated fourteen CO monitors.

Table 12: South Carolina 1975 – 2019 CO Monitoring Information

MSA or County	Site ID	Start Date	End Date
Columbia	450791003	8/29/1975	7/7/1980
Charleston-North Charleston	450190038	11/13/1975	8/28/1981
Charlotte-Concord-Gastonia	450910002	1/11/1979	4/21/1982
Columbia	450790013	7/8/1980	1/5/1999
Greenville-Anderson	450450004	8/25/1980	9/17/1984
Charleston-North Charleston	450190005	11/12/1981	1/5/2005
Columbia	450630005	5/23/1986	6/5/1987
Oconee County	450730001	8/25/1992	5/1/1994
Greenville-Anderson	450450008	2/3/1993	1/15/2010
Columbia	450790020	1/8/1999	1/7/2008
Charleston-North Charleston	450190046	2/26/2003	10/31/2010
Greenville-Anderson	450450009	1/18/2005	1/10/2008
Greenville-Anderson	450450015	1/1/2010	7/31/2012
Columbia	450790007	11/5/2010	Current

Design Value Trends and Comparison to the NAAQS – Graph 4 and Graph 5 shows the past CO design values trends. The trends have steadily declined, and the current CO design values are very low. From 1975 to 2018, the 1-hour CO design values dropped approximately 94 percent. The 2018 1-hour 2<sup>nd</sup> maximum concentration was 0.939 ppm.

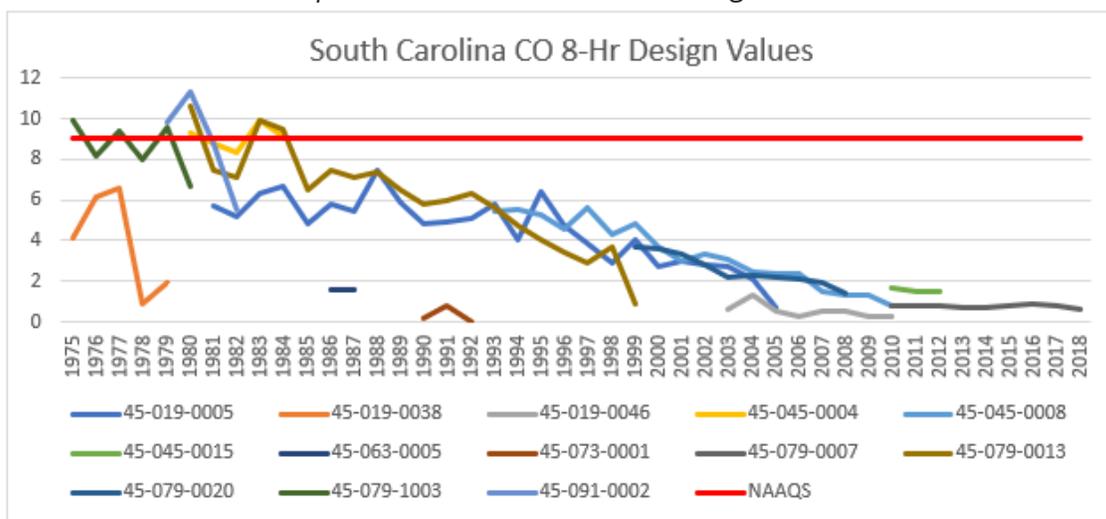
Graph 4: 1975-2018 CO 1-Hour Design Values



From 1975 to 2018, the 8-hour CO design values also dropped approximately 94 percent. Before 1985, there were some design values that exceeded the CO 8-hour NAAQS. Since the early 1980's, the CO design values have consistently dropped.

The 2018 8-hour 2<sup>nd</sup> maximum concentration was 0.6 ppm.

Graph 5: 1975-2018 CO 8-Hour Design Values



*Risk of Future Exceedances* – Table 13 contains calculations designed to predict the risk of a future NAAQS exceedance for CO based on 2014-2018 data. The purpose of this test is to see which sites are most likely to exceed the applicable NAAQS in the following three years based on previous data trends. Based on the last five years of monitoring data, there is a 90 percent confidence index that the CO monitors will not exceed 80 percent of the current NAAQS.

Table 13: CO Design Value Risk of Future Exceedance

Site ID and Name	Averaging Time	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence Interval	Is 90%CI < 80% of NAAQS?
450790007 Parklane	1-hour	1.00	1.12	1.10	1.10	0.94	1.052	0.079	1.127	Yes
	8-hour	0.7	0.8	0.9	0.8	0.6	0.760	0.114	0.869	Yes

*Density of Existing Network and Reduction of Number of Sites* – The level of CO in South Carolina is very low. The CO monitoring network meets the minimum monitoring requirements and is adequate for protection of sensitive populations and to meet state needs. No reduction in sites are planned.

*CO Network Current and Future Plans* – Because of the extremely low design values, the current network consists of one CO monitor at the Parklane (45-079-0007) (NCore) Site. Also, the North Carolina portion of the Charlotte-Concord-Gastonia NC-SC MSA has two operational CO monitors. In the next five years, there is no change expected in this monitoring network.

Table 14: Current CO Ambient Air Monitoring Network

CO Ambient Air Monitoring Network						
Site Name Site ID	Site Start Date	Pollu- tant	Scale	Objective	Desig- nation	Recommendations for Optimization
<b>Columbia MSA</b>						
Parklane	April 3, 1980	CO 42101 -1	Neighbor- hood	Population Exposure	NCore SLAMS	This monitor fulfills the Appendix D minimal NCore requirement. No planned changes.

### Sulfur Dioxide (SO<sub>2</sub>) Ambient Air Monitoring Network

*Regulations* – In 1971, the EPA set two primary NAAQS for sulfur oxides, measured as SO<sub>2</sub>. The first primary standard was set at 0.14 ppm (365 micrograms per cubic meter (µg/m<sup>3</sup>))

based on an averaged 24-hour concentration, not to be exceeded more than once a year. The second primary standard was an annual arithmetic mean set at 0.03 ppm (80 µg/m<sup>3</sup>).

In 2010, those standards were revoked and replaced with a new 1-hour standard of 75 parts per billion (ppb) based on the 3-year average of the annual 99<sup>th</sup> percentile of 1-hour daily maximum concentrations. Also, the EPA developed the population weighted emissions index (PWEI) to determine minimum monitoring requirements.

In 2015, the EPA issued the SO<sub>2</sub> Data Requirements Rule, which requires the states to identify and provide yearly data to characterize current air quality in areas with large sources of SO<sub>2</sub> emissions. In 2019, the primary standard was again reviewed and retained without revision. Currently, the primary SO<sub>2</sub> standard is set at 75 ppb based on the 3-year average of the annual 99<sup>th</sup> percentile of 1-hour daily maximum concentrations. Also, a yearly PWEI calculation is used to determine minimum monitoring requirements, and a yearly report is submitted to EPA by the states to support the SO<sub>2</sub> Data Requirements Rule.

The SO<sub>2</sub> minimum monitoring criteria has three monitoring requirements. SO<sub>2</sub> monitoring is determined using total MSA populations and emissions. The three requirements are as follows:

1. Population Weighted Emissions Index (PWEI) – The PWEI is determined using the most current population of each MSA and the most recent level of SO<sub>2</sub> emissions for each county within the MSA. The emissions data is available from the National Emissions Inventory. For any MSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO<sub>2</sub> monitors are required. For any MSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO<sub>2</sub> monitors are required. For any MSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO<sub>2</sub> monitor is required.

Table 15 gives each MSA's 2018 population, 2014 SO<sub>2</sub> emissions, the calculated PWEI, and the minimum monitoring requirements. South Carolina is required to have three SO<sub>2</sub> monitors to fulfill the PWEI requirements.

The SO<sub>2</sub> monitors located at NCore sites may satisfy the minimum monitoring requirements if that monitor is located within an MSA that is required to have one or more PWEI monitors.

*Table 15: SO<sub>2</sub> Minimum Monitoring Requirements Based on the Population Weighted Emissions Index*

<b>MSA</b>	<b>2018 CBSA Population</b>	<b>2014 CBSA SO<sub>2</sub> Emissions (Tons)</b>	<b>PWEI</b>	<b>SO<sub>2</sub> Minimum Monitors Required</b>
Charlotte-Concord-Gastonia, NC-SC MSA	2,569,213	7,624	19,588	1
Greenville-Anderson MSA	906,626	2,928	2,655	0
Columbia MSA	832,666	17,769	14,796	1
Charleston-North Charleston MSA	787,643	15,784	12,432	1
Augusta-Richmond County, GA-SC MSA	604,167	3,353	2,026	0
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	480,891	4,837	2,326	0
Spartanburg MSA	341,298	386	132	0
Hilton Head Island-Bluffton MSA	217,686	1,164	253	0
Florence MSA	204,961	3,982	816	0
Sumter MSA	106,512	191	20	0

Currently, PWEI requirements are fulfilled with the SO<sub>2</sub> monitors operating at the Garinger High School (37-119-0041) (NCore) Site in Mecklenburg County, North Carolina (Charlotte-Concord-Gastonia, NC-SC MSA), the Parklane (45-079-0007) (NCore) Site in Richland County (Columbia MSA), and the Jenkins Avenue (45-019-0003) Site in Charleston County (Charleston-North Charleston MSA).

2. Regional Administrator Required Monitoring – The Regional Administrator may require additional SO<sub>2</sub> monitoring sites above the minimum number of monitors required by the PWEI in areas that have the potential to have high SO<sub>2</sub> concentrations, in areas impacted by sources which are not conducive to modeling, or in locations with susceptible and vulnerable populations that are not otherwise being monitored. South Carolina does not have any SO<sub>2</sub> Regional Administrator Required Monitoring.

3. NCore Requirement – Each NCore site must include a SO<sub>2</sub> monitor. The Parklane (45-079-0007) Site in Columbia, South Carolina is the NCore site for South Carolina. The Garinger High School (37-119-0041) Site in Charlotte, North Carolina is also an NCore site.

The SO<sub>2</sub> Data Requirements Rule (DRR) requires air agencies to submit a yearly report on sources that have been identified as producing 2,000 or more tons of SO<sub>2</sub> emissions. There

are four facilities within South Carolina that meet this requirement: Santee Cooper Cross Generating Station, Resolute Industries (now New-Indy Catawba), International Paper – Eastover, and (Dominion, formerly SCE&G) Wateree Station. Yearly reports are submitted to the EPA.

*Historical and Current Monitors* – As Table 16 indicates, historically there have been approximately 92 SO<sub>2</sub> monitors operational in South Carolina since 1970.

*Table 16: South Carolina 1970 – 2020 SO<sub>2</sub> Monitoring Information*

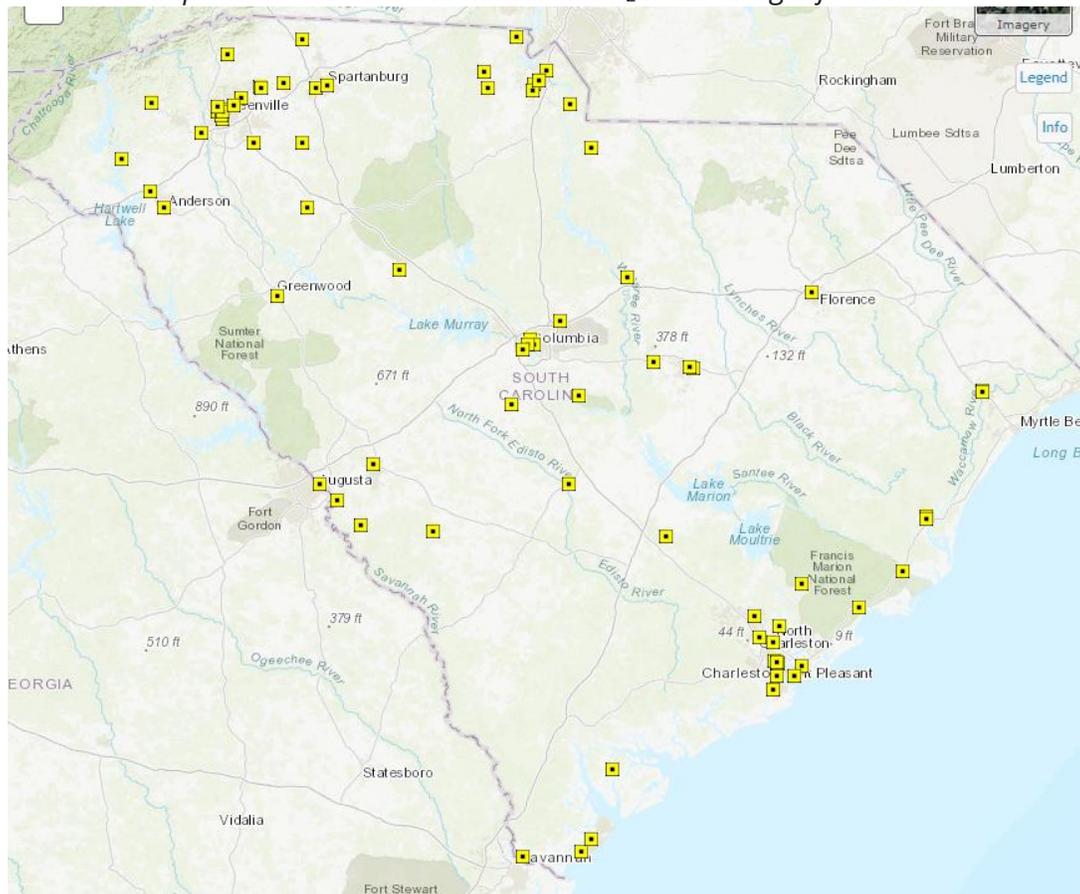
<b>MSA or County</b>	<b>Site ID</b>	<b>Start Date</b>	<b>End Date</b>
Columbia	450790002	7/14/1970	12/26/1976
Greenville-Anderson	450451002	9/9/1970	12/21/1971
Greenville-Anderson	450451003	10/7/1970	9/12/1979
Greenville-Anderson	450452001	10/10/1970	3/26/1977
Greenville-Anderson	450453001	10/18/1970	11/14/1975
Greenville-Anderson	450454001	10/20/1970	12/27/1977
Greenville-Anderson	450450002	10/20/1971	5/15/1979
Greenville-Anderson	450450003	11/20/1971	12/26/1971
Columbia	450632001	1/22/1972	5/20/1978
Orangeburg County	450750001	1/22/1972	12/27/1977
Columbia	450790003	1/22/1972	5/3/1979
Columbia	450790006	1/22/1972	5/3/1979
Columbia	450550001	1/28/1972	5/9/1979
Charlotte-Concord-Gastonia, NC-SC	450570001	1/28/1972	5/15/1979
Charlotte-Concord-Gastonia, NC-SC	450910001	1/28/1972	6/30/1977
Charlotte-Concord-Gastonia, NC-SC	450911001	1/28/1972	12/8/1976
Charlotte-Concord-Gastonia, NC-SC	450912001	1/28/1972	12/27/1977
Spartanburg	450830001	2/9/1972	5/27/1979
Augusta-Richmond County, GA-SC	450031001	4/9/1972	5/15/1979
Augusta-Richmond County, GA-SC	450030001	4/15/1972	12/27/1977
Greenville-Anderson	450070001	4/15/1972	4/3/1979
Greenville-Anderson	450771001	4/15/1972	6/30/1977
Hilton Head Island-Bluffton	450130001	4/21/1972	5/16/1979
Hilton Head Island-Bluffton	450131001	4/21/1972	10/15/1975
Charleston-North Charleston	450150001	5/3/1972	5/15/1979
Greenville-Anderson	450590001	5/3/1972	12/27/1977
Charleston-North Charleston	450190010	6/6/1972	10/27/1975
Charleston-North Charleston	450190001	6/22/1972	1/8/1978
Charleston-North Charleston	450190024	7/12/1972	6/26/1973
Charleston-North Charleston	450191001	7/16/1972	8/29/1974
Florence	450410001	8/25/1972	5/3/1979
Georgetown County	450430001	8/25/1972	5/27/1979
Myrtle Beach-Conway-North Myrtle Beach	450510006	8/25/1972	10/10/1977
Newberry County	450710001	8/31/1972	6/24/1977

<b>MSA or County</b>	<b>Site ID</b>	<b>Start Date</b>	<b>End Date</b>
Sumter	450850001	8/31/1972	12/27/1977
Charleston-North Charleston	450190031	9/1/1972	9/3/1974
Augusta-Richmond County, GA-SC	450032001	9/27/1972	12/13/1982
Augusta-Richmond County, GA-SC	450032001	9/30/1972	12/27/1977
Charleston-North Charleston	450190023	11/1/1972	9/3/1974
Georgetown County	450430006	11/1/1972	1/17/2008
Charlotte-Concord-Gastonia, NC-SC	450910004	11/10/1972	12/13/1974
Charleston-North Charleston	450190036	11/16/1972	8/27/1974
Charleston-North Charleston	450192001	11/16/1972	5/15/1979
Columbia	450791003	12/21/1972	1/7/2008
Greenville-Anderson	450071001	3/5/1973	1/1/1977
Charleston-North Charleston	450190037	7/5/1973	1/8/1978
Spartanburg	450831004	7/21/1973	6/30/1977
Hilton Head Island-Bluffton	450530001	7/27/1973	5/15/1979
Spartanburg	450830002	8/7/1973	3/26/1977
Spartanburg	450830006	10/7/1973	12/27/1977
Spartanburg	450832001	10/7/1973	7/6/1977
Greenville-Anderson	450451001	11/28/1973	4/3/1980
Hilton Head Island-Bluffton	450130001	12/10/1973	9/5/1976
Florence	450410001	12/12/1973	6/15/1977
Sumter	450850003	12/12/1973	6/10/1977
Greenwood County	450470001	1/30/1974	3/17/1977
Hilton Head Island-Bluffton	450130002	8/9/1974	5/9/1979
Charleston-North Charleston	450190038	10/14/1974	11/9/1982
Charleston-North Charleston	450190003	11/8/1974	Current
Charlotte-Concord-Gastonia, NC-SC	450910005	12/13/1974	12/27/1977
Charlotte-Concord-Gastonia, NC-SC	450910002	12/16/1974	5/1/1984
Charleston-North Charleston	450151001	4/12/1975	5/15/1979
Greenville-Anderson	450452002	3/14/1977	5/15/1979
Myrtle Beach-Conway-North Myrtle Beach	450510007	10/16/1977	2/27/1980
Greenville-Anderson	450450004	4/11/1978	8/5/1987
Greenville-Anderson	450770001	4/26/1978	5/15/1979
Charlotte-Concord-Gastonia, NC-SC	450911002	6/19/1978	2/15/1980
Charlotte-Concord-Gastonia, NC-SC	450571001	9/23/1978	5/15/1979
Charleston-North Charleston	450190043	11/14/1978	4/28/1980
Charleston-North Charleston	450150042	3/1/1979	11/30/1982
Columbia	450791006	3/24/1981	3/28/2001
Charleston-North Charleston	450190044	7/29/1981	4/27/1982
Augusta-Richmond County, GA-SC	450031001	5/20/1982	7/25/1985
Charleston-North Charleston	450190040	11/9/1982	8/6/1986
Charleston-North Charleston	450190046	8/31/1983	Current
Sumter	450851001	9/16/1983	10/1/1987
Augusta-Richmond County, GA-SC	450030003	11/7/1985	6/24/1999
Barnwell County	450110001	12/2/1985	1/2/2008

MSA or County	Site ID	Start Date	End Date
Columbia	450630005	5/14/1986	6/5/1987
Greenville-Anderson	450450008	4/7/1989	2/10/2009
Columbia	450630008	5/22/1989	Current
Oconee County	450730001	7/1/1991	Current
Charleston-North Charleston	450190046	1/13/1999	9/14/1999
Columbia	450790021	1/17/2000	Current
Orangeburg County	450750003	9/18/2002	11/9/2004
Greenville-Anderson	450450009	11/23/2004	1/10/2008
Greenville-Anderson	450070003	9/27/2005	12/14/2006
Greenville-Anderson	450450015	4/14/2008	Current
Columbia	450790007	4/1/2010	Current
Charleston-North Charleston	450190003	1/1/2011	6/30/2014
Charlotte-Concord-Gastonia, NC-SC	450910006	1/1/2012	4/15/2015
Charlotte-Concord-Gastonia, NC-SC	450910008	2/27/2017	Current

Map 11 shows that, historically, SO<sub>2</sub> monitors were mainly located in the larger MSAs, with a few monitors scattered in individual counties.

Map 11: South Carolina Historical SO<sub>2</sub> Monitoring Information



As Table 17 indicates, the SO<sub>2</sub> emissions have fallen significantly due to lower SO<sub>2</sub> emissions from fossil fuels and coal-fired power plants.

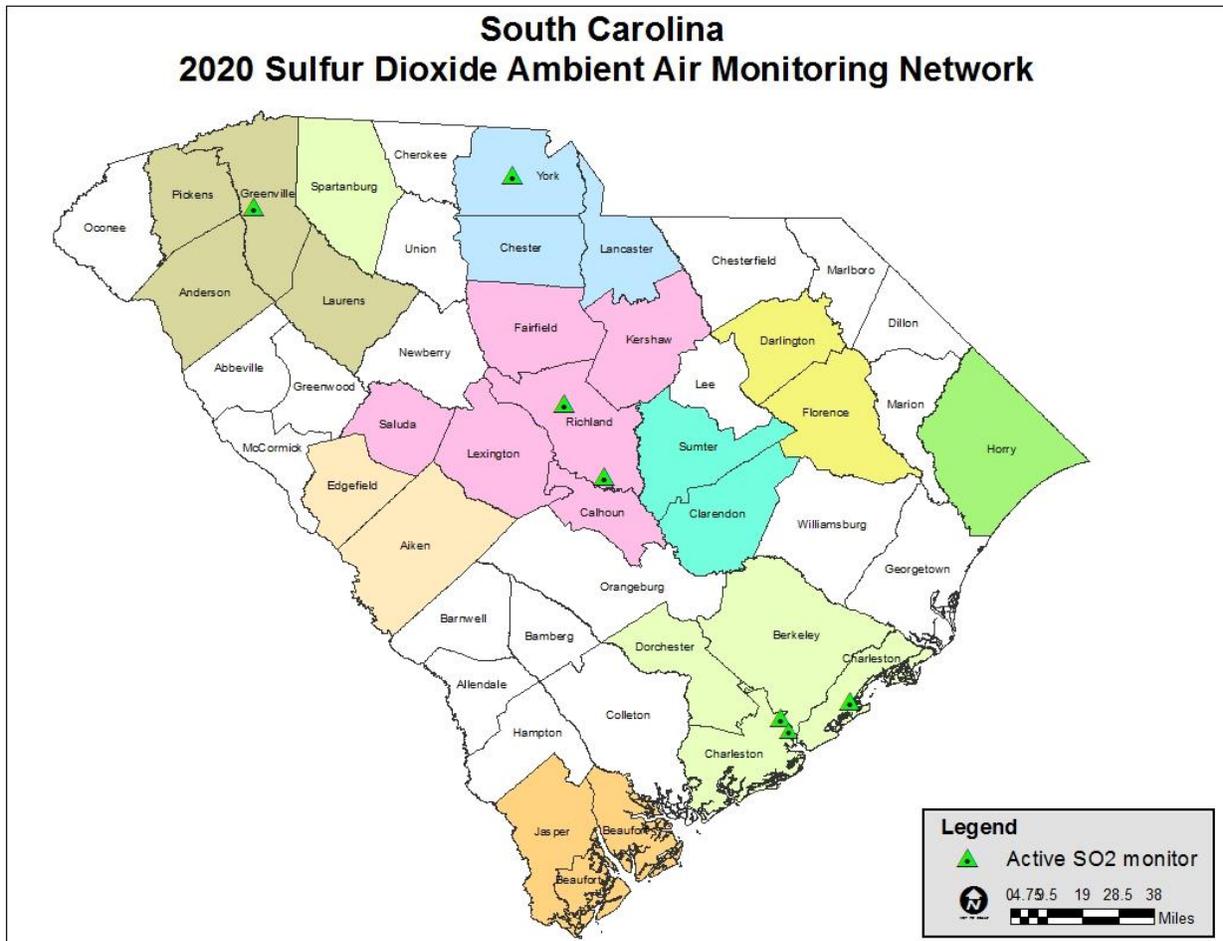
*Table 17: Changes in Population and SO<sub>2</sub> Emissions*

<b>MSA</b>	<b>2013 Population</b>	<b>2018 Population</b>	<b>2010 NEI SO<sub>2</sub> Emissions</b>	<b>2014 NEI SO<sub>2</sub> Emissions</b>
Charlotte-Concord-Gastonia, NC-SC MSA	1,758,038	2,569,213	80,344	7,624
Greenville-Anderson MSA	636,986	906,626	803.83	2,928
Columbia MSA	767,598	832,666	54,884	17,769
Charleston-North Charleston MSA	664,607	787,643	60,859	15,784
Augusta-Richmond County, GA-SC MSA	556,877	604,167	14,479	3,353
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	269,291	480,891	9,178	4,837
Spartanburg MSA	284,307	341,298	249	386
Florence MSA	205,566	204,961	14,927	3,982

Consequently, the number of required monitors has also fallen. For example, in 2013, the 2010 NEI was used to calculate the SO<sub>2</sub> PWEI. At that time, The South Carolina MSAs (including the multi-state MSAs) were required to have seven SO<sub>2</sub> monitors to fulfill the minimum monitoring requirements. In 2016, the EPA released version 1 of the 2014 NEI. From 2013 to 2018, the estimated population as reported by the United States Census Bureau showed an increase in most of the MSAs. Although the population increased, the 2014 NEI indicated an overall drop in SO<sub>2</sub> emissions statewide which resulted in a reduction in the required SO<sub>2</sub> monitors.

Currently, South Carolina is required to have three SO<sub>2</sub> monitors to fulfill the minimum monitoring requirements.

Map12: South Carolina 2019 SO<sub>2</sub> Ambient Air Monitoring Network

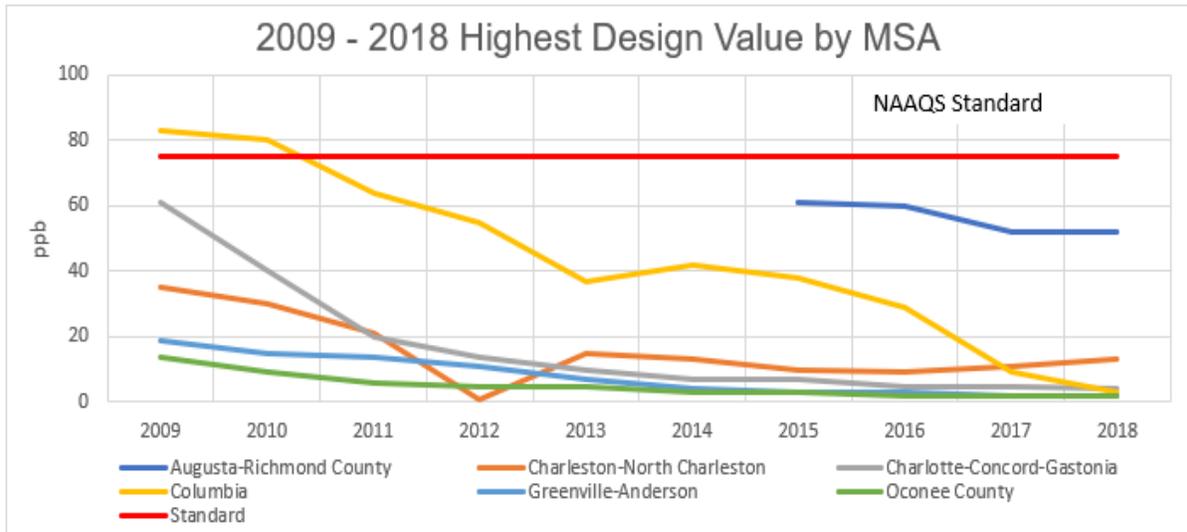


There are six active SO<sub>2</sub> monitors within South Carolina in 2019/2020. First, the two SO<sub>2</sub> monitors at the Jenkins Avenue (45-019-0003) (Charleston-North Charleston MSA) and the Parklane (45-079-0007) (Columbia MSA) monitoring sites fulfill the PWEI minimum monitoring requirements. Then, the SO<sub>2</sub> monitor at the Irving Street (45-019-0021) Site monitors ambient concentrations near the Port expansion. Finally, the monitors that are on the 2020/2021 rotation are at the York Landfill (45-091-0008) (Charlotte-Concord-Gastonia MSA), and the Cape Romain (45-019-0046) (Charleston-North Charleston MSA) Sites.

Also, there are two SO<sub>2</sub> monitors located in the North Carolina and Georgia counties which are part of the multi-state MSAs. North Carolina portion of the Charlotte-Concord-Gastonia NC-SC MSA has one operational SO<sub>2</sub> monitor at the Garinger High School (37-119-0041) (NCore) Site in Mecklenburg County. The Georgia portion of the Augusta-Richmond County, GA-SC MSA has one operational SO<sub>2</sub> monitor at the Augusta (13-245-0091) Site in Richmond County.

*Design Value Trends and Comparison to the NAAQS* – As the statewide SO<sub>2</sub> emissions have dropped, the design values have also fallen. Currently, all SO<sub>2</sub> design values are below or well below the NAAQS. Graph 6 shows the decline in the average SO<sub>2</sub> design values since 1999. In 2018, the highest SO<sub>2</sub> design value was 52 ppb reported from the Augusta (13-245-0091) site in Augusta, Georgia. Within the State of South Carolina, the highest SO<sub>2</sub> design value for that same year was 13 ppb at the Jenkins Avenue (45-019-0003) site in the Charleston-North Charleston MSA.

Graph 6: 1999-2018 South Carolina Average SO<sub>2</sub> Design Values



*Risk of Future Exceedances* – Table 18 contains calculations designed to predict the risk of a future NAAQS exceedance for SO<sub>2</sub> based on 2014-2018 data. The purpose of this test is to see which sites are most likely to exceed the applicable NAAQS in the following three years based on previous data trends. Based on the last five years of monitoring data, there is a 90 percent confidence index that the SO<sub>2</sub> monitors will not exceed 80 percent of the current NAAQS.

Table 18: SO<sub>2</sub> 1-Hour Design Value Risk of Future Exceedance

Site ID and Name	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence Interval	Is 90%CI < 80% of NAAQS?
Jenkins Ave. 450190003	13	10	9	11	13	11.2	1.789	12.904	Yes
Cape Romain	6	4	4	4	4	4.4	0.894	5.252	Yes

Site ID and Name	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence Interval	Is 90%CI < 80% of NAAQS?
450190046									
Greenville ESC 45040015	4	3	3	2	2	2.8	0.837	3.597	Yes
Irmo 450630008	42	38	29	9	3	24.2	17.398	40.773	Yes
Long Creek 450730001	3	3	2	2	2	2.4	0.548	2.922	Yes
Parklane 450790007	12	10	8	4	2	7.2	4.147	11.151	Yes
Congaree Bluff 450790021	18	18	12	4	3	11.0	7.280	17.935	Yes

*Density of Existing Network and Reduction of Number of Sites* - The level of SO<sub>2</sub> in South Carolina are very low and the SO<sub>2</sub> monitoring network meets the minimum monitoring requirements, is adequate for protection of sensitive populations and meets state needs. South Carolina currently has six active monitors. Two SO<sub>2</sub> monitors fulfill the minimum PWEI requirements (Jenkins Avenue (45-019-0003) (Charleston-North Charleston MSA) and the Parklane (45-079-0007) (Columbia MSA) monitoring sites. Two SO<sub>2</sub> monitors at the Greenville ESC (45-045-0015) and the Irving Street (45-019-0021) Site monitor for population exposure, and two SO<sub>2</sub> monitors at the York Landfill (45-091-0008) (Charlotte-Concord-Gastonia MSA) and the Cape Romain (45-019-0046) (Charleston MSA) Sites are on a two-year rotation. These two monitors are operating from 2020 through 2021. The Congaree Bluff (45-079-0021) SO<sub>2</sub> monitor (Columbia MSA) will operate from 2022 through 2023.

*SO<sub>2</sub> Monitoring Network Current and Future Plans* – Table 19 lists the current SO<sub>2</sub> ambient air monitoring sites. There are three required SO<sub>2</sub> monitors to fulfill the PWEI requirement - the Jenkins Ave. (45-019-0003) Site (Charleston MSA), the Garinger (37-119-0041) Site (Charlotte-Concord-Gastonia, NC-SC MSA), and the Parklane (45-079-0007) (Columbia MSA) SO<sub>2</sub> monitors. Also, the Greenville ESC (45-045-0015) SO<sub>2</sub> monitor will continue because it is located in a heavily industrialized area and provides needed data. The remaining three SPM SO<sub>2</sub> monitors are on a two-year rotation. The York Landfill (45-091-0008) (Charlotte-Concord-Gastonia MSA) and the Cape Romain (45-019-0046) (Charleston MSA) Sites will operate from January 1, 2020 to December 31, 2021. Then, the Congaree Bluff (45-079-0021) Site (Columbia MSA) will operate from January 1, 2022 through December 31, 2023.

Finally, the new Irving Street (45-019-0021) Site in the neck portion of Charleston (Charleston-North Charleston MSA) began operation June 11, 2020, and will be in operation for approximately two years.

In the future, the Department is considering the possible relocation of the SO<sub>2</sub> monitor that was previously operated at the Long Creek (45-073-0001) Site to another established site.

Table 19: SO<sub>2</sub> Current Ambient Air Monitoring Network

<b>SO<sub>2</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
<b>Augusta-Richmond County, GA-SC MSA</b>						
<i>Augusta 13-245-0091</i>		SO <sub>2</sub>	<i>Neighborhood</i>	<i>Population Exposure</i>		<i>Georgia monitor</i>
<b>Charleston-North Charleston, SC MSA</b>						
Jenkins Ave. Fire Station 45-019-0003	February 14, 1969	SO <sub>2</sub> 42401-1	Neighborhood	Population Exposure	SLAMS	This monitor fulfills the Appendix D SO <sub>2</sub> PWEI minimum monitoring requirement for the MSA. No planned changes.
Irving Street 45-019-0021	June 11, 2020	SO <sub>2</sub> 42401-1	Neighborhood	General/Background Population Exposure	SPM	This monitor was established 2 years to monitor ambient concentrations near the Port expansion.
Cape Romain 45-019-0046	July 11, 1983	SO <sub>2</sub> 42401-2	Regional	Source Oriented	SPM	This monitor is on a two-year rotation schedule. No planned changes.
<b>Charlotte-Concord-Gastonia, NC-SC</b>						
<i>Garinger 37-119-0041</i>					SLAMS	<i>North Carolina monitor. This monitor fulfills the Appendix D SO<sub>2</sub> PWEI minimum monitoring requirement for the MSA.</i>
York Landfill 45-091-0008	February 27, 2017	SO <sub>2</sub> 42401-1	Urban	Upwind Background	SPM	This monitor is on a 2-year rotation (2020-2021)

<b>SO<sub>2</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
						No planned changes.
<b>Columbia, SC MSA</b>						
Parklane 45-079-0007	April 3, 1980	SO <sub>2</sub> 42401-1	Neighborhood	Population Exposure/ Other	NCore SLAMS	This monitor fulfills the Appendix D NCore minimum monitoring requirement for the State and Appendix D SO <sub>2</sub> PWEI minimum monitoring requirement for the MSA.
Congaree Bluff 45-079-0021	December 27, 1999	SO <sub>2</sub> 42401-1	Neighborhood	General / Background	SPM	This monitor is on a two-year rotation (2022-2023). No planned changes.
<b>Florence, SC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Greenville-Anderson, SC MSA</b>						
Greenville Employment Security Commission 45-045-0015	April 11, 2008	SO <sub>2</sub> 42401-1	Neighborhood	Population Exposure	SLAMS	This monitors ambient SO <sub>2</sub> concentrations in a heavily populated and industrialized area. No planned changes.
<b>Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Spartanburg MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A

## **NO<sub>2</sub> Ambient Air Monitoring Network**

*Regulations* – In 1971, the EPA set the primary NO<sub>2</sub> NAAQS at 53 ppb using the annual arithmetic average. In 1985 and 1996, this standard was retained without revision. In 2010, the NO<sub>2</sub> NAAQS was modified. The primary NO<sub>2</sub> NAAQS was retained without revision at 53 ppb using the annual arithmetic average, and a new hourly standard of 100 ppb was established using the 98th percentile, 1-hour daily maximum, averaged over 3 years. Also, a

near-road NO<sub>2</sub> monitoring site requirement was added for MSAs having populations at or above 500,000 persons. This requirement was later modified to MSAs having populations at least 1,000,000 persons. The Charlotte-Concord-Gastonia MSA is the only South Carolina MSA that has at least 1,000,000 people.

Currently, the primary NO<sub>2</sub> NAAQS are a 1-hour standard at a level of 100 ppb based on the 3-year average of 98th percentile of the yearly distribution of 1-hour daily maximum concentrations and an annual standard set at a level of 53 ppb.

The four requirements for the minimum monitoring criteria are as follows:

1. Near-road NO<sub>2</sub> Monitors – Each state must have one microscale near-road NO<sub>2</sub> monitoring site in each MSA with a population of at least 1,000,000 or more persons. An additional near-road NO<sub>2</sub> monitoring site is required for any MSA with a population of 2,500,000 or more or in any MSA with a population of 1,000,000 or more that has one or more roadway segments with 250,000 or greater Annual Average Daily Traffic (AADT) counts. Before 2017, the Charlotte-Concord-Gastonia NC-SC MSA met the population requirement of at least 1,000,000 or more persons and established the Remount Road (37-119-0045) near-road Site in Charlotte, North Carolina. In 2017, this area had an estimated population that went over 2,500,000, which added another near-road NO<sub>2</sub> monitoring site requirement. In the 2019-2020 Annual Monitoring Network Plan-Mecklenburg County Air Quality document, on page 22 it states the following:

“In the EPA response to the 2018-2019 Network Plan, EPA recognized that establishing a new near-road monitoring site is a resource intensive and time-consuming process. EPA also acknowledged that the availability of resources to establish a new near-road NO<sub>2</sub> site are limited and are not currently available. EPA stated it would “...work with MCAQ over the next couple of years to determine the optimal location and timing for establishing another near-road NO<sub>2</sub> site in the Charlotte area. Additionally, the EPA will provide funding for the initial establishment of a new near-road site in the area...” MCAQ will work with the EPA to determine the optimal location and timing for establishment of an additional near-road NO<sub>2</sub> site in Mecklenburg County. As of the submission date of the 2019-2020 Monitoring Plan, EPA has not provided funding for operations, maintenance, equipment or capital expenditures in support of the operation of an additional near-road NO<sub>2</sub> monitoring station. As soon as practical and after EPA provided funding for implementation becomes available, MCAQ will work to install and operate an additional near-road NO<sub>2</sub> monitoring station in the MCAQ monitoring network.”

2. Requirements for Area-wide NO<sub>2</sub> Monitoring – Each state must have one monitoring site in each MSA with a population of 1,000,000 or more persons which will monitor a location

of expected highest NO<sub>2</sub> concentrations representing the neighborhood or larger spatial scales. The Garinger High School (37-119-0041) Site in Charlotte, North Carolina operates an area-wide NO<sub>2</sub> monitor. In 2019, the Rockwell (37-159-0021) Site will begin to operate a second NO<sub>2</sub> monitor for the purpose of AQI reporting in the future.

3. Regional Administrator Required Monitoring – The Regional Administrators, in collaboration with states, require a minimum of forty additional NO<sub>2</sub> monitoring sites above the minimum monitoring requirements (nationwide) in any area, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations. The Greenville ESC (45-045-0015) Site in the Greenville-Anderson MSA is a Regional Administrator Required Monitoring site.

4. NCore Requirement (NO/NO<sub>y</sub> Monitoring) – Each NCore site must include a NO/NO<sub>y</sub> monitor that will collect data to be used to produce conservative estimates for NO<sub>2</sub> and further ozone research. The Parklane (45-079-0007) Site in Columbia, South Carolina is the NCore site within South Carolina. The Garinger (37-119-0041) Site in Charlotte, North Carolina is also an NCore site.

Historical and Current Monitors – As Table 20 indicates, since 1969, there have been 81 NO<sub>2</sub> monitors located within South Carolina.

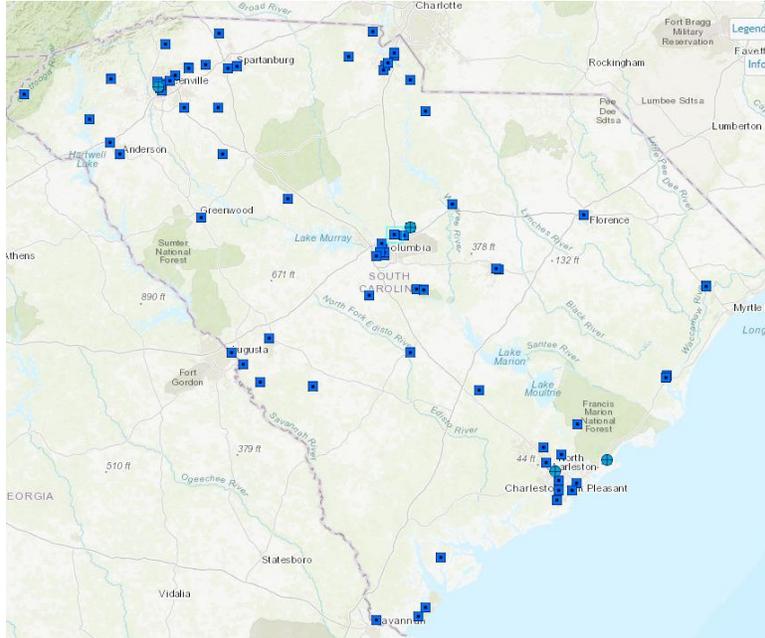
Table 20: South Carolina 1969 – 2020 NO<sub>2</sub> Monitoring Information

<b>MSA or County</b>	<b>Site ID</b>	<b>Start Date</b>	<b>End Date</b>
Augusta-Richmond County, GA-SC MSA	450030001	4/15/1972	12/27/1977
Augusta-Richmond County, GA-SC MSA	450030003	1/15/1986	1/14/2008
Augusta-Richmond County, GA-SC MSA	450031001	4/9/1972	12/7/1982
Augusta-Richmond County, GA-SC MSA	450032001	9/24/1972	12/27/1977
Charleston-North Charleston MSA	450150001	5/3/1972	7/2/1980
Charleston-North Charleston MSA	450151001	4/12/1975	7/2/1980
Charleston-North Charleston MSA	450190001	6/22/1972	1/8/1978
Charleston-North Charleston MSA	450190003	6/14/1990	
Charleston-North Charleston MSA	450190010	6/6/1972	10/27/1975
Charleston-North Charleston MSA	450190024	7/12/1972	6/26/1973
Charleston-North Charleston MSA	450190036	11/16/1972	8/27/1974
Charleston-North Charleston MSA	450190037	7/5/1973	1/8/1978
Charleston-North Charleston MSA	450190038	7/4/1974	12/31/1982
Charleston-North Charleston MSA	450190040	11/23/1982	5/31/1983
Charleston-North Charleston MSA	450190046	1/10/2006	
Charleston-North Charleston MSA	450191001	1/11/1972	7/28/1974
Charleston-North Charleston MSA	450192001	9/2/1974	7/2/1980
Charlotte-Concord-Gastonia, NC-SC MSA	450570001	1/28/1972	7/2/1980
Charlotte-Concord-Gastonia, NC-SC MSA	450571001	9/17/1978	7/2/1980
Charlotte-Concord-Gastonia, NC-SC MSA	450910001	1/28/1972	6/30/1977
Charlotte-Concord-Gastonia, NC-SC MSA	450910004	8/14/1973	12/7/1974
Charlotte-Concord-Gastonia, NC-SC MSA	450910005	12/13/1974	12/31/1982
Charlotte-Concord-Gastonia, NC-SC MSA	450911001	1/28/1972	12/8/1976
Charlotte-Concord-Gastonia, NC-SC MSA	450911002	6/19/1978	7/2/1980
Charlotte-Concord-Gastonia, NC-SC MSA	450912001	1/28/1972	12/27/1977
Charlotte-Concord-Gastonia, NC-SC MSA	450918002	7/16/2013	12/4/2013
Columbia MSA	450550001	1/28/1972	7/2/1980
Columbia MSA	450630005	6/2/1986	6/5/1987
Columbia MSA	450632001	1/22/1972	9/29/1978
Columbia MSA	450790002	1/22/1972	12/27/1977
Columbia MSA	450790003	1/22/1972	7/2/1980
Columbia MSA	450790006	1/22/1972	12/25/1982
Columbia MSA	450790007	3/1/1990	1/10/2008
Columbia MSA	450790007	2/18/2016	9/12/2016
Columbia MSA	450790015	5/30/1980	12/22/1980
Columbia MSA	450790016	7/25/1980	11/20/1980
Columbia MSA	450790021	1/17/2000	1/4/2008
Columbia MSA	450791001	6/27/2007	11/22/2013
Columbia MSA	450791001	9/15/2015	
Columbia MSA	450791003	11/30/1976	10/1/1984

<b>MSA or County</b>	<b>Site ID</b>	<b>Start Date</b>	<b>End Date</b>
Columbia MSA	450791006	3/20/1981	3/27/2001
Florence MSA	450410001	8/25/1972	12/31/1982
Greenville-Anderson MSA	450070001	4/15/1972	7/2/1980
Greenville-Anderson MSA	450071001	3/5/1973	1/1/1977
Greenville-Anderson MSA	450450002	10/20/1971	7/2/1980
Greenville-Anderson MSA	450450003	11/20/1971	12/26/1971
Greenville-Anderson MSA	450450004	8/21/1978	12/19/1982
Greenville-Anderson MSA	450450008	9/10/1990	1/15/2010
Greenville-Anderson MSA	450450009	11/23/2004	1/8/2008
Greenville-Anderson MSA	450450015	1/1/2010	
Greenville-Anderson MSA	450451001	10/7/1970	6/2/1980
Greenville-Anderson MSA	450451002	9/9/1970	12/21/1971
Greenville-Anderson MSA	450451003	10/7/1970	4/1/1977
Greenville-Anderson MSA	450452001	10/10/1970	3/26/1977
Greenville-Anderson MSA	450452002	3/14/1977	7/2/1980
Greenville-Anderson MSA	450453001	10/18/1970	11/14/1975
Greenville-Anderson MSA	450454001	10/30/1969	12/27/1977
Greenville-Anderson MSA	450590001	5/3/1972	12/27/1977
Greenville-Anderson MSA	450770001	4/26/1978	12/31/1982
Greenville-Anderson MSA	450771001	4/15/1972	6/30/1977
Hilton Head-Bluffton-Beaufort MSA	450130001	4/21/1972	7/2/1980
Hilton Head-Bluffton-Beaufort MSA	450130002	8/9/1974	7/2/1980
Hilton Head-Bluffton-Beaufort MSA	450131001	4/21/1972	11/14/1975
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	450510006	8/25/1972	10/10/1977
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	450510007	10/16/1977	7/2/1980
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	450530001	7/27/1973	4/15/1980
Spartanburg MSA	450830001	2/9/1972	12/13/1982
Spartanburg MSA	450830002	8/7/1973	3/26/1977
Spartanburg MSA	450830006	10/7/1973	12/27/1977
Spartanburg MSA	450831004	7/21/1973	6/30/1977
Spartanburg MSA	450832001	10/7/1973	7/6/1977
Sumter MSA	450850001	8/31/1972	12/27/1977
Sumter MSA	450850003	2/16/1974	7/2/1980
Barnwell County	450110001	12/2/1985	12/19/2007
Greenwood County	450470001	4/15/1972	7/2/1980
Georgetown County	450430001	8/25/1972	7/2/1980
Georgetown County	450430006	9/8/1974	12/31/1982
Newberry County	450710001	8/31/1972	6/24/1977
Oconee County	450730001	7/1/1991	6/30/1992
Orangeburg County	450750001	1/22/1972	12/27/1977
Orangeburg County	450750003	9/18/2002	11/10/2004

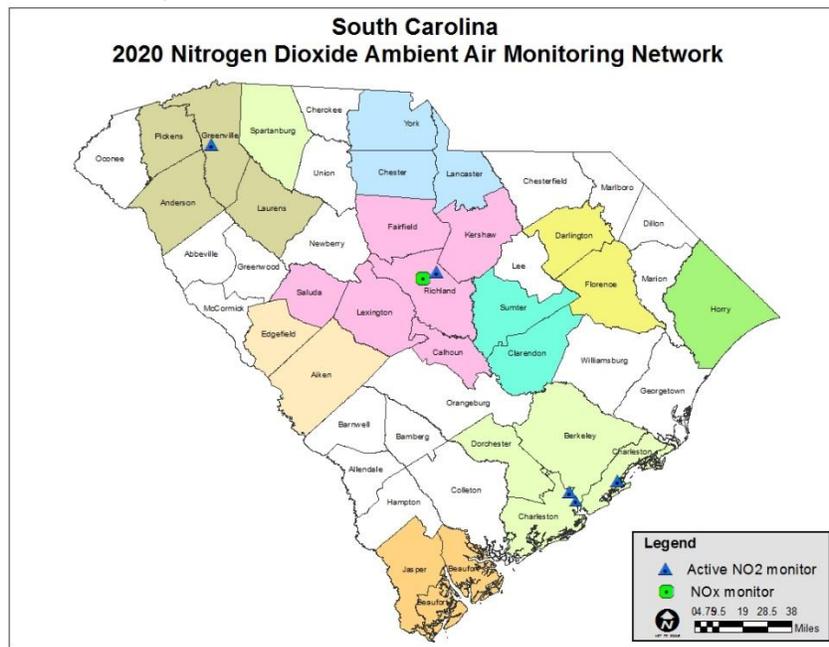
The majority of the monitors were located in the heavily populated MSAs, with a few monitors sited in individual counties.

Map 13: South Carolina Historical NO<sub>2</sub> Monitors



Currently, within South Carolina, there are four NO<sub>2</sub> monitors and one NO<sub>x</sub> monitor.

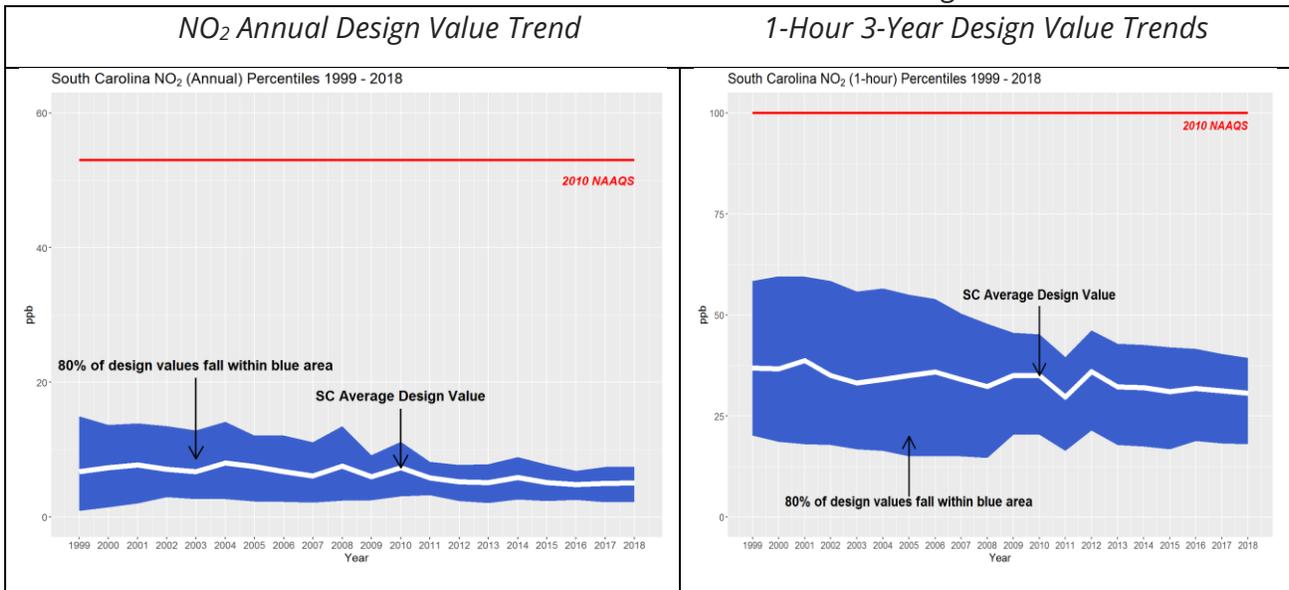
Map 14: South Carolina Current NO<sub>2</sub> Monitors



Also, in the North Carolina portion of the Charlotte-Concord-Gastonia MSA, there are three monitors (NO<sub>2</sub>, NO/NO<sub>y</sub>, and near-road).

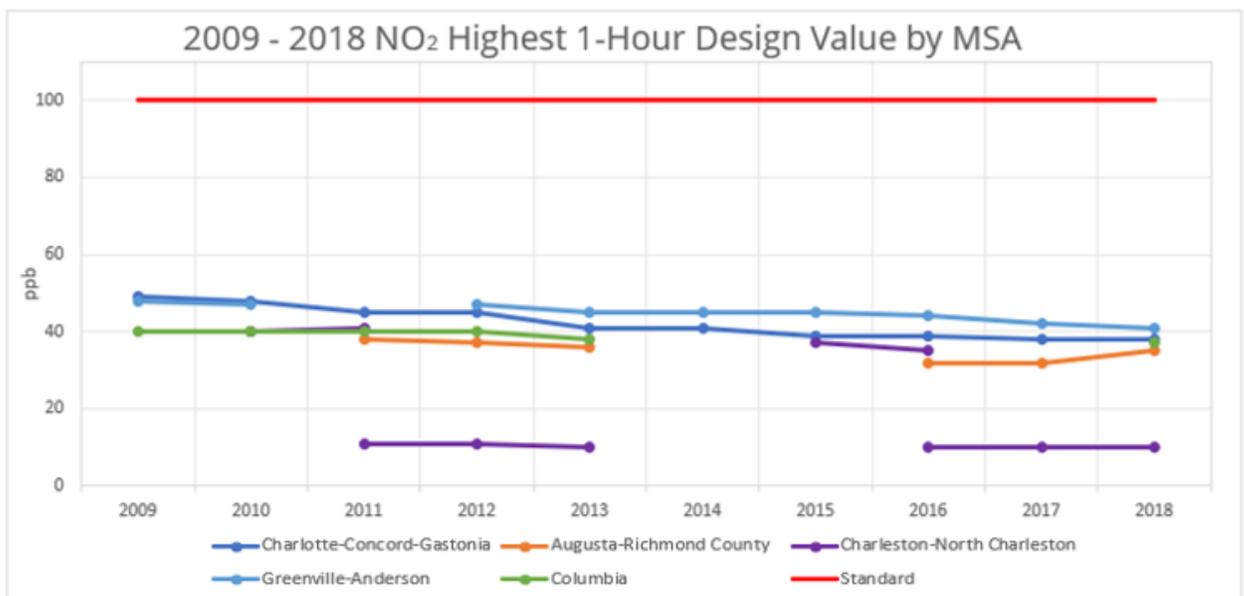
*Design Value Trends and Comparison to the NAAQS* – Table 21 shows that the NO<sub>2</sub> Annual and 1-Hour design values are below the NO<sub>2</sub> NAAQS and, for the last ten years, the trend has remained relatively unchanged.

Table 21: 1999 – 2018 NO<sub>2</sub> Annual and 1-Hour 3-Year Design Value Trends



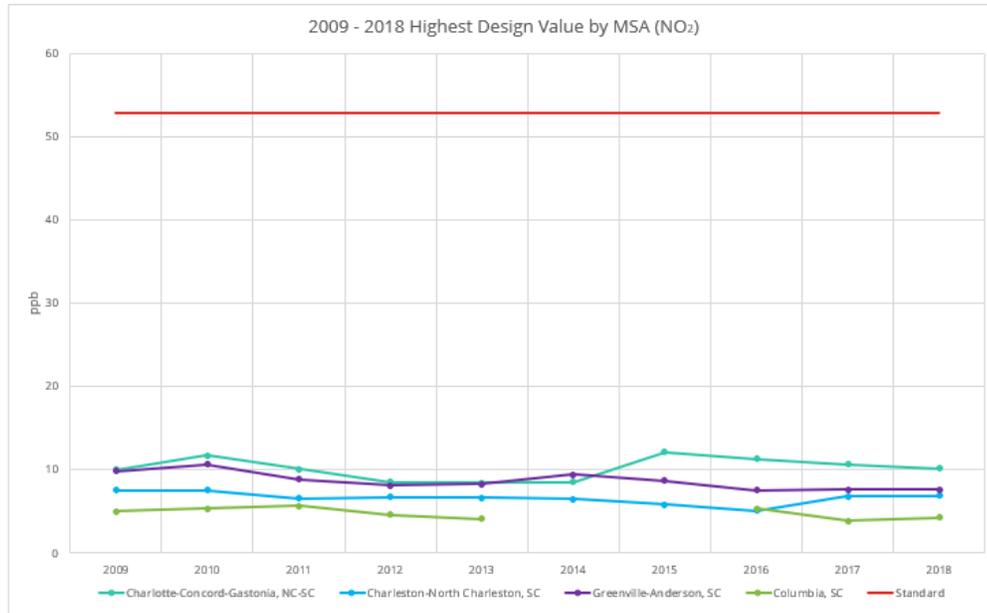
Graphs 7 and Graph 8 indicate that the Greenville-Anderson and Charlotte-Concord-Gastonia MSAs have had the highest NO<sub>2</sub> concentrations in the last ten years.

Graph 7: 10-Year Trend for Highest NO<sub>2</sub> 1-Hour 3-Year Design Values by MSA



All NO<sub>2</sub> concentrations are below the NAAQS.

Graph 8: 10-Year Trend for Highest NO<sub>2</sub> Annual Design Values by MSA



*Risk of Future Exceedances* – Table 22 contains calculations designed to predict the risk of a future NAAQS exceedance for NO<sub>2</sub> based on 2014-2018 data. The purpose of this test is to see which sites are most likely to exceed the applicable NAAQS in the following three years based on previous data trends. Based on the last five years of monitoring data, there is a 90 percent confidence index that the SO<sub>2</sub> monitors will not exceed 80 percent of the current NAAQS.

Table 22: NO<sub>2</sub> Design Value Risk of Future Exceedance

Site ID and Name	Averaging Time	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence	Is 90%CI < 80% of
450190003 Jenkins Ave.	1-hour	37	35	32	32	35	34.200	2.168	36.265	Yes
	Annual	6.55	5.87	5.14	6.86	6.93	6.270	0.758	6.992	Yes
450190046 Cape Romain	1-hour	9	9	10	10	10	9.600	0.548	10.122	Yes
	Annual	1.61	1.53	1.56	1.49	1.26	1.490	0.136	1.619	Yes
450450015 Greenville ESC	1-hour	45	45	44	42	41	43.400	1.817	45.130	Yes
	Annual	9.46	8.71	7.58	7.62	7.69	8.212	0.841	9.013	Yes

Site ID and Name	Averaging Time	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence	Is 90%CI < 80% of
450791001 Sandhill	1-hour	Insufficient data								
	Annual			4.06	3.91	4.30	4.090	0.197	4.332	Yes

*Density of Existing Network and Reduction of Number of Sites* – As Table 23 indicates, the South Carolina NO<sub>2</sub> network has nine NO<sub>2</sub>/NO/NO<sub>y</sub> monitors, three of which are in the North Carolina portion of the Charlotte-Concord-Gastonia MSA. Within South Carolina, the NO<sub>2</sub> monitors complete all regulatory monitoring requirements. At this time, there are no plans for termination of any of the NO<sub>2</sub> monitors.

Table 23: South Carolina MSAs and NO<sub>2</sub> Monitors

MSA	Site Name	Site ID	Pollutant Type
Charlotte-Concord-Gastonia	Garinger	37-119-0041	NO <sub>y</sub>
Charlotte-Concord-Gastonia	Garinger	37-119-0041	NO <sub>2</sub>
Charlotte-Concord-Gastonia	Remount Rd.	37-119-0045	Near-road
Charleston-North Charleston	Jenkins Avenue	45-019-0003	NO <sub>2</sub>
Charleston-North Charleston	Irving Street	45-019-0021	NO <sub>2</sub>
Charleston-North Charleston	Cape Romain	45-019-0046	NO <sub>2</sub>
Greenville-Anderson	Greenville ESC	45-045-0015	NO <sub>2</sub>
Columbia	Parklane	45-079-0007	NO <sub>y</sub>
Columbia	Sandhill	45-079-1001	NO <sub>2</sub>

*NO<sub>2</sub> Monitoring Network Current and Future Plans* – Within South Carolina, there are five active NO<sub>2</sub> monitors and one NO/NO<sub>y</sub> monitor. The Greenville ESC (45-045-0015) site in the Greenville-Anderson MSA fulfills the Regional Administrator Required Monitoring. The Parklane (45-079-0007) site in the Columbia MSA fulfills the NO/NO<sub>y</sub> NCore requirement for South Carolina. The Jenkins Avenue (45-019-0003) monitor in the Charleston-North Charleston MSA is an SPM monitor that is located in an urbanized and industrialized area. It monitors for highest concentration. The Irving Street (45-019-0021) Site, in the neck portion of Charleston (Charleston-North Charleston MSA) has an NO<sub>2</sub> monitor. This Site was established by the Port authority to monitor emissions for approximately two years during the Port expansion.

The Cape Romain (45-019-0046) (Charleston-North Charleston MSA) and the Sandhill (45-079-1001) (Columbia MSA) Sites have NO<sub>2</sub> monitors that historically have shown low NO<sub>2</sub> concentrations. In the future, the Department is considering possibly moving and/or putting these NO<sub>2</sub> monitors onto a rotating schedule.

The NO<sub>2</sub> and NO/NO<sub>y</sub> monitors (Charlotte-Concord-Gastonia MSA) are in the Charlotte area and are operated by the Mecklenburg County Air Quality (MCAQ) and the North Carolina Department of Environmental Quality Division of Air Quality (NCDAQ). At the Garinger (37-119-0041) site, there is a NO/NO<sub>y</sub> monitor to fulfill the NCore requirement and a NO<sub>2</sub> monitor that fulfills the area-wide NO<sub>2</sub> monitoring requirement. The Remount Rd. (37-159-0021) site is a near-road site with a NO<sub>2</sub> monitor. A second near-road NO<sub>2</sub> monitoring in the Charlotte-Concord Gastonia MSA is planned when resources are available. On page C19 of the 2019-2020 Annual Monitoring Network Plan for the North Carolina Division of Air Quality-Volume 2, it states that in 2019 or 2020, the MCAQ intends to add a NO<sub>2</sub> monitor to the Rockwell (37-159-0021) monitoring site.

Table 24: NO<sub>2</sub> Current Ambient Air Monitoring Network

<b>NO<sub>2</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollu- tant</b>	<b>Scale</b>	<b>Objective</b>	<b>Desig- nation</b>	<b>Recommendations for Optimization</b>
<b>Augusta-Richmond County, GA-SC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Charleston-North Charleston, SC MSA</b>						
Jenkins Ave. Fire Station 45-019-0003	February 14, 1969	NO <sub>2</sub> 42602-2	Neighborhood	Highest Concentr ation/Sou rce Oriented	SPM	This monitor is responsible for monitoring source-oriented facilities in a heavily populated area. No planned changes.
Irving Street 45-019-0021	June 11, 2020	NO <sub>2</sub> 42602-1	Neighborhood	Backgrou nd/Popu lation Exposure	SPM	This monitor was established for 2 years to monitor ambient concentrations near the Port expansion.
Cape Romain 45-019-0046	July 11, 1983	NO <sub>2</sub> 42602-1	Regional	General/B ackgroun d	SPM	This is an area-wide monitor. In the future, this monitor may be moved or rotated.
<b>Charlotte-Concord-Gastonia, NC-SC</b>						

<b>NO<sub>2</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollu- tant</b>	<b>Scale</b>	<b>Objective</b>	<b>Desig- nation</b>	<b>Recommendations for Optimization</b>
<i>Garinger 37-119-0041</i>		<i>NO<sub>2</sub> 42602</i>	<i>Neighborhood</i>	<i>Populatio n Exposure</i>	<i>SLAMS</i>	<i>North Carolina monitor</i>
<i>Remount Rd. 37-119-0045</i>		<i>NO<sub>2</sub> 42602</i>	<i>Microscale</i>	<i>Source- Oriented</i>	<i>SLAMS</i>	<i>North Carolina monitor</i>
<i>Rockwell 37-159-0021</i>		<i>NO<sub>2</sub> 42602</i>	<i>Neighborhood</i>	<i>General/B ackground</i>	<i>SPM</i>	<i>North Carolina monitor</i>
<b>Columbia, SC MSA</b>						
Parklane 45-079-0007	April 3, 1980	NO/NO y	Neighbor- hood	Populatio n Exposure	NCore SLAMS	This monitor fulfills an Appendix D NCore requirement for the State. No planned changes.
Sandhill Experimental Station 45-079-1001	January 1, 1959	NO <sub>2</sub> 42602-1	Urban	General / Backgrou nd Max Precursor Emissions	SPM	This monitor serves as an area-wide monitor for the Columbia area. In the future, this monitor may be moved or rotated. No planned changes.
<b>Florence, SC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Greenville-Anderson, SC MSA</b>						
Greenville Employment Security Commission 45-045-0015	April 11, 2008	NO <sub>2</sub> 42602-1	Neighbor- hood	Populatio n Exposure	SLAMS	This monitor fulfills the Appendix D RA- 40 monitoring requirement for the State.
<b>Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Spartanburg MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A

### **Lead Ambient Air Monitoring Network**

*Regulations* – In 1978, the EPA set a lead (Pb) NAAQS at 1.5 micrograms lead per cubic meter ( $\mu\text{g}/\text{m}^3$ ) averaged over a calendar quarter measured as the lead concentration in total suspended particles. In 2008, the EPA revised this standard to a  $0.15 \mu\text{g}/\text{m}^3$  of Pb in

total suspended particles (Pb-TSP) or the lead concentration in particulate matter that is 10 micrometers or less (Pb-PM<sub>10</sub>). The averaging time was a rolling 3-month period with a maximum (not-to-be-exceeded) form, evaluated over a 3-year period. In 2016, this NAAQS was retained without revision. Currently, the primary lead NAAQS is set at 0.15 µg/m<sup>3</sup>, using a rolling 3-month average that cannot be exceeded. To obtain a design value, this rolling 3-month average is averaged over 3 years.

There are three requirements for the minimum monitoring criteria. They are as follows:

1. Non-airport lead source – The minimum monitoring criteria found in 40 CFR Part 58, Appendix D, Section 4.5 requires that there must be one source-oriented monitor located to measure the maximum lead concentration at each non-airport lead source which emits 0.050 or more tons per year. South Carolina does not have any sources that exceed these thresholds.

2. Airport lead source – There must be one source-oriented monitor located to measure the maximum lead concentration from each airport which emits 1.0 or more tons per year. South Carolina does not have any sources that exceed these thresholds.

3. Collocation requirement – The lead collocation requirement found in 40 CFR Part 58, Appendix A, Section 3.4.4. requires 15 percent of the primary monitoring (not counting non-source oriented NCore sites in the primary quality assurance organization (PQAO)) to be collocated and have at least one collocated monitor, if the total number of monitors is less than three. Because the JCI site has 6 monitors, this requirement is fulfilled by the collocated monitor at the JCI Entrance (45-041-8002) site.

Also, due to a settlement agreement, the Department and Johnson Controls Incorporated (JCI) (now belonging to Clarios) must conduct source-oriented lead monitoring at three monitoring sites at the Florence Recycling Center for batteries in Florence County. On May 7, 2010, the Department issued an air synthetic minor construction permit to Johnson Controls Battery Group for the Florence Recycling Center (Permit No. 1040-0129-CA). Under a settlement agreement with several petitioners<sup>7</sup>, the Department must conduct ambient lead monitoring at three locations specified in the agreement.

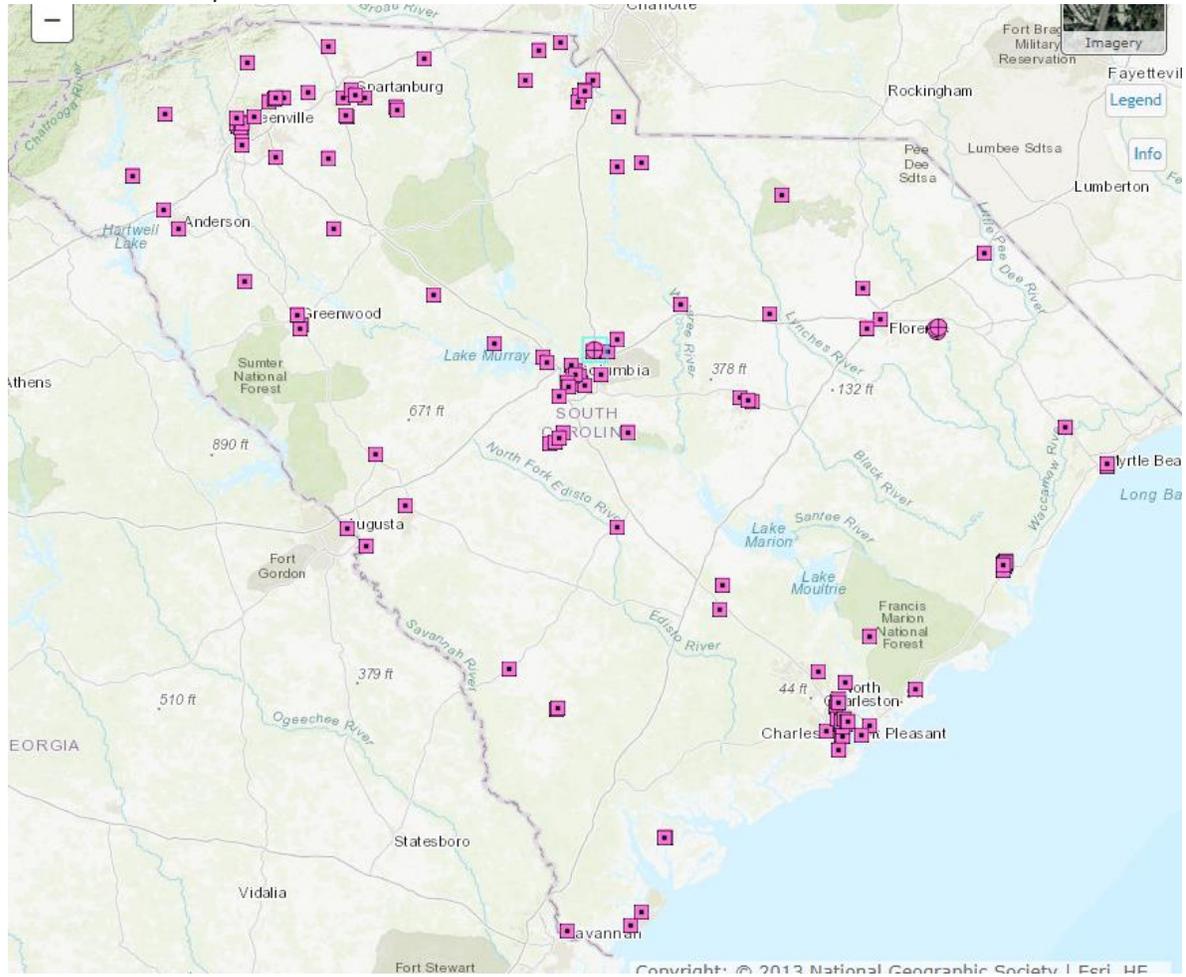
*Historical and Current Monitors* – Since 1966 (Map 15), there have been 72 lead monitors located within South Carolina. The majority of the monitors have been clustered in the more industrialized areas.

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<sup>7</sup> Coastal Conservation League and League of Women Voters of South Carolina vs South Carolina Department of Health and Environmental Control and Johnson Controls Battery Group, Inc., (State of SC, 2010).

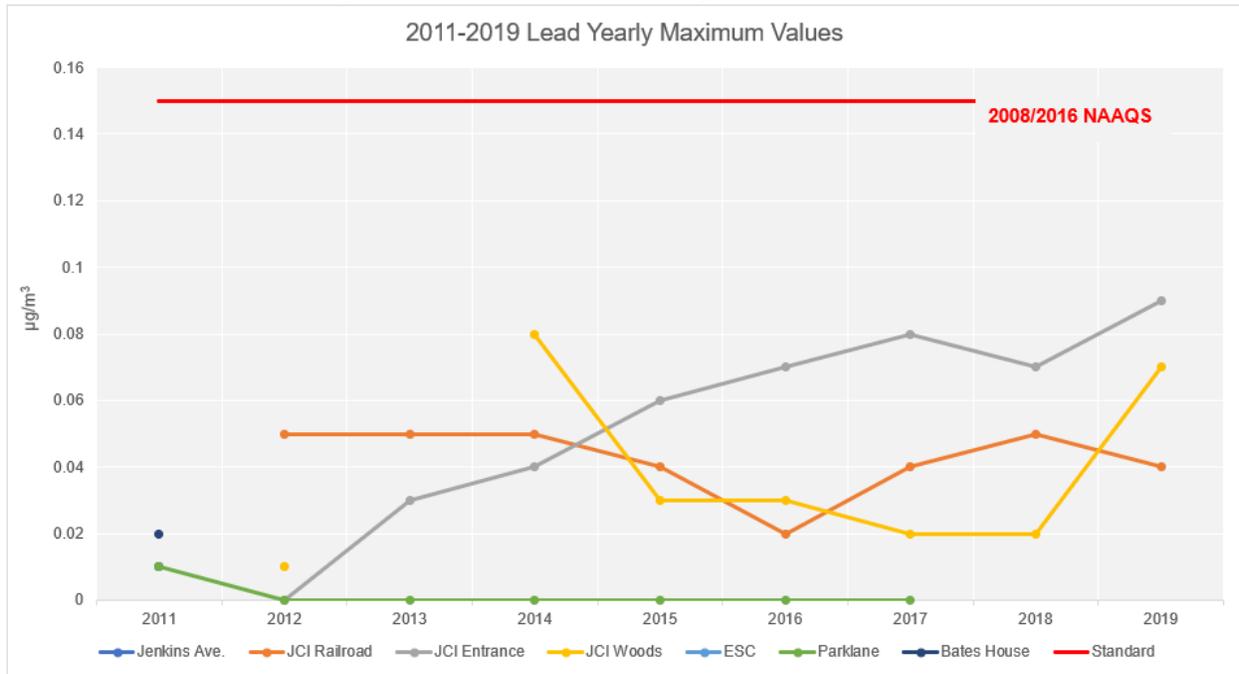
Currently, there are three monitoring sites located at Clarios in Florence County.

Map 15: South Carolina Historical and Current Lead Monitors



Maximum Value Trends and Comparison to the NAAQS – *The yearly maximum values for lead have been low. Over the last ten years, the maximum yearly value was 0.09 µg/m<sup>3</sup> recorded at the JCI Entrance (45-041-8002) Site.*

*Graph 9: 2011-2019 Lead Yearly Maximum Values*



*Risk of Future Exceedances* – Table 25 contains calculations designed to predict the risk of a future NAAQS exceedance for lead based on 2014-2018 data. The purpose of this test is to see which sites are most likely to exceed the applicable NAAQS in the following three years based on previous data trends. Based on the last five years of monitoring data, the last column indicates there is a 90 percent confidence index that the lead monitors will not exceed 80 percent of the current NAAQS.

*Table 25: Lead Risk of Future Exceedance*

Site ID and Name	Averaging Time	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence	Is 90%CI < 80% of NAAQS?
450418001 JCI Railroad	Rolling 3-month average	0.05	0.05	0.05	0.04	0.050	0.048	0.0045	0.0523	Yes

Site ID and Name	Averaging Time	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence	Is 90%CI < 80% of NAAQS?
450418002 JCI Entrance	Rolling 3-month average	0.04	0.06	0.07	0.08	0.080	0.066	0.0167	0.0819	Yes
450418003 JCI Woods	Rolling 3-month average			0.08	0.03	0.030	0.0467	0.0289	0.0822	Yes
450790007 Parklane	Rolling 3-month average	0	0	0	0		0	0	0	Yes

*Density of Existing Network and Reduction of Number of Sites* – South Carolina does not exceed the lead limits; therefore, no lead monitors are required to fulfill the federal requirements. However, there are three court-ordered monitoring sites at Clarios. The current lead monitoring fulfills the monitoring requirements specified in the settlement agreement. At this time, there are no plans for termination of any of the lead monitors.

*Lead Monitoring Network Current and Future Plans* – Currently, South Carolina does not have any sources that exceed the thresholds set by the lead NAAQS. Also, as discussed earlier, due to a settlement agreement, there are three monitoring sites at JCI (Clarios). The JCI monitors are set on a 1 in 6 day sampling schedule. The JCI Railroad (45-041-8001), JCI Entrance (45-041-8002), and JCI Woods (45-041-8003) Sites have two samplers. Each sampler runs on the 1 in 6 day sampling schedule per the EPA sampling schedule. The samplers are offset by 3 days so that samples are collected every three days. The JCI Entrance site (45-041-8002) has a third sampler. It runs on the same 1 in 6 day sampling schedule as one of the other samplers. It serves as the collocated sampler for quality control purposes.

There is a siting issue at the JCI Woods (45-041-8003) Site. This site is located in a heavily wooded area. Although many of the trees have been cut, and all of the tree obstructions in the predominant wind directions toward the source have been removed, the site does not meet the CFR 40 Part 58, Appendix E, Section 4-Spacing from Obstructions and Section 11-Summary siting requirements due to remaining tree obstructions. A waiver from the EPA has been approved for the tree obstructions. This waiver was effective April 1, 2020.

There are no changes planned for this network.

Table 26: Current Lead Ambient Air Monitoring Network

<b>Lead Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
<b>Augusta-Richmond County, GA-SC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Charleston-North Charleston, SC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Charlotte-Concord-Gastonia, NC-SC</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Columbia, SC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Florence, SC MSA</b>						
JCI-Railroad 45-041-8001	January 10, 2012	Lead 14129	Middle	Source Oriented	SPM	These two monitors are a settlement agreement requirement. No planned changes.
JCI-Entrance 45-041-8002	January 4, 2012	Lead 14129	Middle	Source Oriented	SPM	These two monitors are a settlement agreement requirement and includes the. No planned changes.
JCI-Entrance 45-041-8002	January 4, 2012	Lead 14129	Middle	Source Oriented	Colloca ted SPM	This monitor is a settlement agreement requirement and serves as the required collocated monitor. No planned changes.
JCI-Woods 45-041-8003	January 10, 2012	Lead 14129	Middle	Source Oriented	SPM	These two monitors are a settlement agreement requirement. No planned changes.
<b>Greenville-Anderson, SC MSA</b>						
	N/A	N/A	N/A	N/A	N/A	N/A
<b>Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Spartanburg MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Remainder of State</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A

## Particulate Matter (ten micrometers or less) (PM<sub>10</sub>) Ambient Air Monitoring Network

*Regulations* – In 1987, the first PM<sub>10</sub> NAAQS was set at the level of 150 µg/m<sup>3</sup> for the 24-hour standard, not to be exceeded more than once per year on average over a 3-year period and 50 µg/m<sup>3</sup> annual arithmetic mean, averaged over 3 years. In 2006, the 24-hour PM<sub>10</sub> was retained, but the annual PM<sub>10</sub> standard was revoked. In 2012, this standard was retained without revision. Currently, the standard is set at 150 µg/m<sup>3</sup> for the 24-hour standard, not to be exceeded more than once per year on average over a 3-year period.

The requirement for PM<sub>10</sub> are the minimum monitoring criteria based on the MSA population and PM<sub>10</sub> concentration. As Table 27 shows, the requirements from 40 CFR Part 58, Appendix D, Section 4.6, Table D-4 indicate the approximate number of PM<sub>10</sub> monitors required for each MSA. The low concentration areas are those for which ambient PM<sub>10</sub> data show ambient concentrations *less than* 80 percent of the PM<sub>10</sub> NAAQS. Medium concentration areas are those for which ambient PM<sub>10</sub> data show ambient concentrations *exceeding* 80 percent of the PM<sub>10</sub> NAAQS. High concentration areas are those for which ambient PM<sub>10</sub> data show ambient concentrations *exceeding* the PM<sub>10</sub> NAAQS by 20 percent or more.

*Table 27: PM<sub>10</sub> Minimum Monitoring Requirements*

<i>Table 15: PM<sub>10</sub> Minimum Monitoring Requirements (taken from Table D-4 of 40 CFR Part 58, Appendix D, Section 4.6)</i>			
<b>Population Category</b>	<b>High Concentration</b>	<b>Medium Concentration</b>	<b>Low concentration</b>
>1,000,000	6-10	4-8	2-4
500,000-1,000,000	4-8	2-4	1-2
250,000-500,000	3-4	1-2	0-1
100,000-250,000	1-2	0-1	0

All South Carolina MSAs have a long record of ambient concentrations less than 80 percent of the PM<sub>10</sub> NAAQS (low concentration).

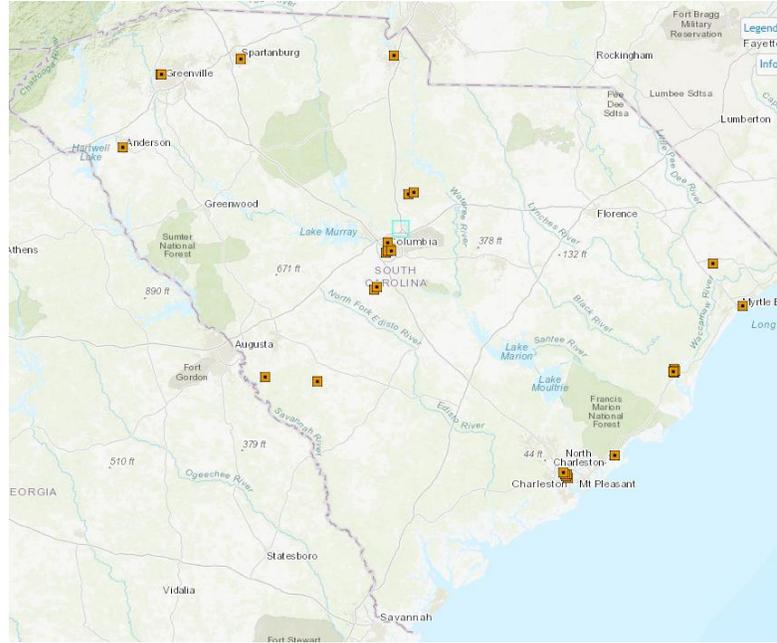
Table 28 below lists each MSA, the number of required PM<sub>10</sub> monitors, and the current PM<sub>10</sub> monitoring sites.

*Table 28: South Carolina PM<sub>10</sub> Monitoring*

<b>MSA</b>	<b>MSA Population</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>10</sub> Monitoring Sites</b>
Charlotte-Concord-Gastonia, NC-SC MSA	2,569,213	2-4	Montclair (37-119-0042) Garinger (37-119-0041)
Greenville-Anderson MSA	906,626	1-2	Greenville ESC (45-045-0015)
Columbia MSA	832,666	1-2	Cayce City Hall (45-045-0015) Parklane (45-079-0007)
Charleston-North Charleston MSA	787,643	1-2	Jenkins Ave. FS (45-019-0003)
Augusta-Richmond County, GA-SC MSA	604,167	1-2	Augusta (13-245-0091)
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	480,891	0-1	none
Spartanburg MSA	341,298	0-1	none
Hilton Head Island-Bluffton MSA	217,686	0	none
Florence MSA	204,961	0	none
Sumter MSA	106,512	0	none
Georgetown County	N/A	N/A	Howard High #3 (45-043-0011)

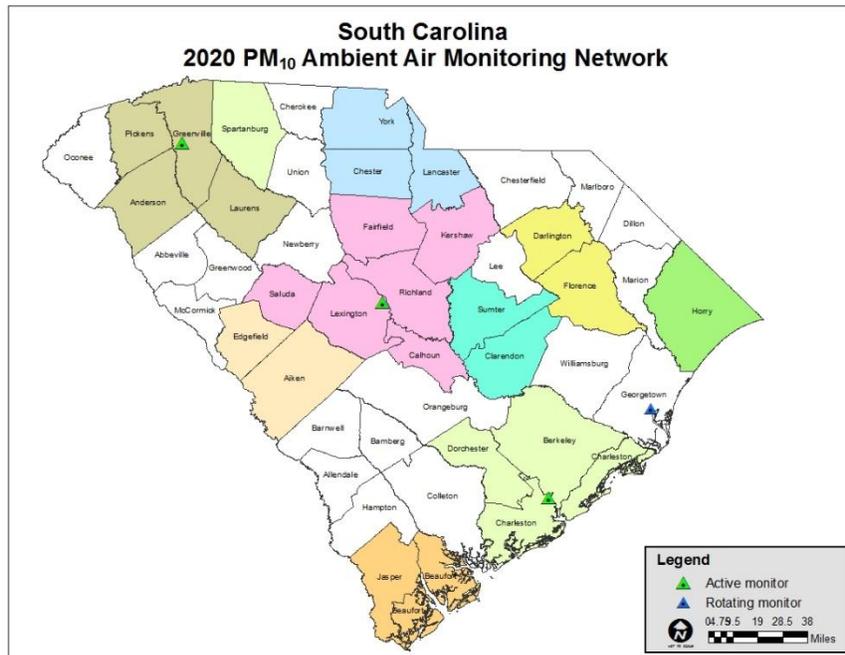
Historical and Current Monitors – Within South Carolina, there have been 35 PM<sub>10</sub> monitors since 1982 (Map 16).

Map 16: South Carolina Historical PM<sub>10</sub> Monitors



Currently, within South Carolina there are four PM<sub>10</sub> monitors operating in three MSAs and one county.

Map 17: South Carolina 2020 PM<sub>10</sub> Ambient Air Monitoring Network

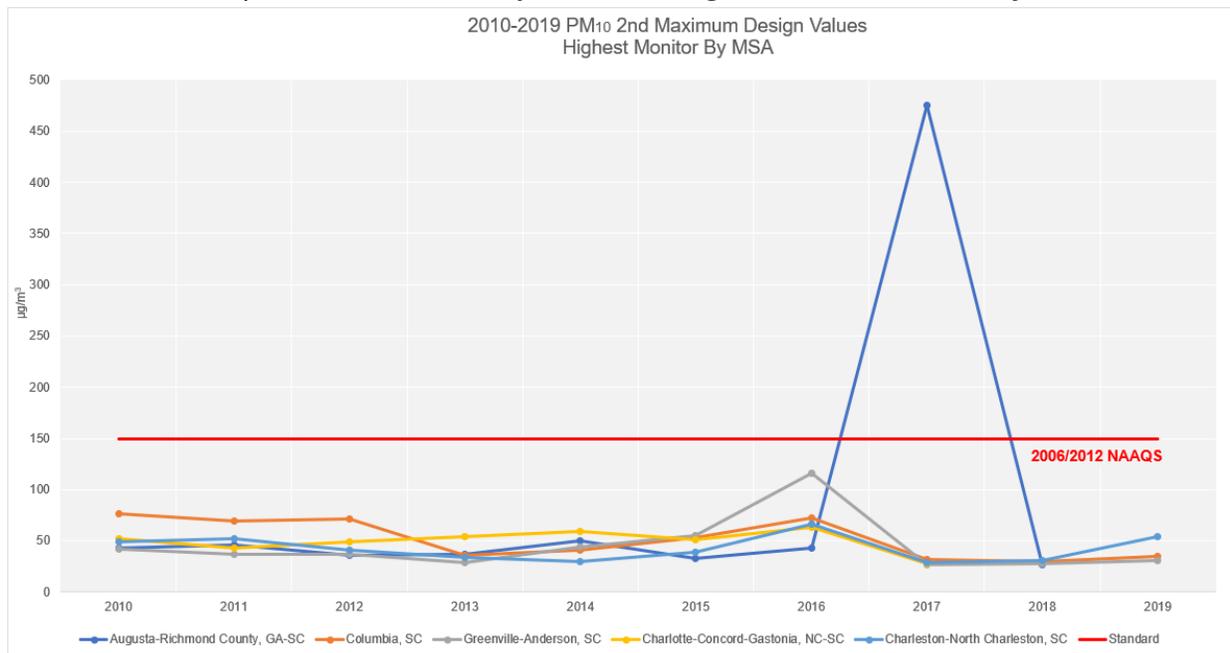


The PM<sub>10</sub> monitor at the Howard High #3 (45-043-0011) Site located in Georgetown County is on a rotating on and off two-year schedule. This monitor is not being operated for 2019 through 2020 and will be operated for 2021 through 2022.

*Design Value Trends and Comparison to the NAAQS* – The PM<sub>10</sub> concentrations have historically been very low. In the last ten years, there have been no exceedances at PM<sub>10</sub> monitors *within* South Carolina.

The exceedance on Graph 10 is from the PM<sub>10</sub> monitor at the Augusta (13-2145-0091) Site. This exceedance was the result of a prescribed burn at Fort Gordon and is discussed in further detail below. As a result, a continuous monitor was installed at this site.

*Graph 10: 10-Year Trend for PM<sub>10</sub> 2<sup>nd</sup> Highest Maximum Value by MSA*



*Risk of Future Exceedances* – Table 29 contains calculations designed to predict the risk of a future NAAQS exceedance for PM<sub>10</sub> based on 2014-2018 data. The purpose of this test is to see which sites are most likely to exceed the applicable NAAQS in the following three years based on previous data trends.

Based on the last five years of monitoring data, the last column indicates there is a 90 percent confidence index that the PM<sub>10</sub> monitors will not exceed 80 percent of the current NAAQS.

Table 29: PM<sub>10</sub> Risk of Future Exceedance PM<sub>10</sub> Risk of Future Exceedance

Site ID and Name	Averaging Time	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence	Is 90%CI < 80% of NAAQS?
450190003 Jenkins Ave.	24-hour	31	29	66	39	30	39.00	15.604	53.864	Yes
450250001 Chesterfield	24-hour	22	28	28	22	25	25.00	3.000	27.858	Yes
450430011 Howard High #3	24-hour	55	62	64	50	47	55.60	7.369	62.619	Yes
440430015 Greenville ESC	24-hour	44	55	116	27	28	54.00	36.572	88.837	Yes
450630010 Cayce City Hall	24-hour	41	51	33	32	30	37.40	8.678	45.666	Yes
450790019 Bates House	24-hour	35	53	72	13		43.25	25.198	70.085	Yes

*Density of Existing Network and Reduction of Number of Sites* – There are six PM<sub>10</sub> monitors in the PM<sub>10</sub> network which includes four PM<sub>10</sub> monitors within South Carolina, one PM<sub>10</sub> monitor in the Georgia portion of the Augusta-Richmond County, GA-SC MSA and one PM<sub>10</sub> monitor in the North Carolina portion of the Charlotte-Concord-Gastonia, NC-SC MSA. The PM<sub>10</sub> monitoring in the South Carolina MSAs meet the PM<sub>10</sub> minimum monitoring requirements and state needs, and is adequate for protection of sensitive populations.

In the Charlotte-Concord-Gastonia MSA, the Montclair (37-119-0042) Site was closed on March 31, 2019 due to eviction from the site. In the EPA’s response to South Carolina’s 2020 Network Plan (for 2019-2020), the first footnote in Table 18 on page 14 states that “the EPA is working with MAQ to establish a new PM<sub>10</sub> site in Charlotte by 2020.”

On January 25, 2017, in the Augusta-Richmond County, GA-SC, MSA, the PM<sub>10</sub> monitor at the Augusta (13-2145-0091) Site measured one exceedance due to smoke from a prescribed burn at Fort Gordon. Since this monitor is a 1:6 sampling schedule, that exceedance resulted in a violation for the 2016-2018 design value at this site. The EPA allowed the Georgia Environmental Protection Division to replace the sampler with a

continuous monitor and informed them that if this monitor continued to have exceedances, the number of required PM<sub>10</sub> monitors in this area may be reconsidered. There are no plans to discontinue any of the PM<sub>10</sub> monitors.

*PM<sub>10</sub> Monitoring Network Current and Future Plans* – As indicated in Table 30, the PM<sub>10</sub> monitoring network has six PM<sub>10</sub> monitors. In order to conserve resources, the Department decided in 2018 to put the PM<sub>10</sub> monitor at the Howard High #3 (45-043-0011) Site in Georgetown County onto a two-year rotation schedule. The industry that was located in that area has closed and the PM<sub>10</sub> emissions are very low. Therefore, from 2019-2020, this monitor will not be operated, although the Monitoring Site is still being maintained. From 2021-2022, the PM<sub>10</sub> monitor will be operational. Otherwise, there are no changes planned for this monitoring network.

Finally, the population of the Myrtle Beach-Conway-North Myrtle Beach MSA is approaching 500,000, the top of the population category shown in Table D-4 of Appendix D to Part 58- Minimum Monitoring Requirements. If the MSA population goes over 500,000, then a review of the need for a PM<sub>10</sub> and a collocated continuous PM<sub>10</sub> will be required. Currently, the Department is awaiting the results of the new Census. The Department is collaborating with EPA and North Carolina on the monitoring needs for this MSA.

Table 30: Current PM<sub>10</sub> Ambient Air Monitoring Network

<b>PM<sub>10</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
<b>Augusta-Richmond County, GA-SC MSA</b>						
<i>Augusta 13-245-0091</i>		Continuous <i>PM<sub>10</sub></i>	<i>Neighborhood</i>	<i>Population Exposure</i>		<i>Georgia monitor</i>
<b>Charleston-North Charleston, SC MSA</b>						
Jenkins Ave. Fire Station 45-019-0003	February 14, 1969	Continuous PM <sub>10</sub> 81102-3	Neighborhood	Highest Concentration	SLAMS	TEOM-Gravimetric This monitor currently fulfills the Appendix D PM <sub>10</sub> minimum monitoring requirements for the MSA. No planned changes.
<b>Charlotte-Concord-Gastonia, NC-SC</b>						
<i>Garinger 371190041</i>		Continuous <i>PM<sub>10</sub></i>				<i>North Carolina monitor</i>
<b>Columbia, SC MSA</b>						

<b>PM<sub>10</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
Cayce City Hall 45-063-0010	December 6, 2007	Continuous PM <sub>10</sub> 81102-1	Neighborhood	Population Exposure	SLAMS	TEOM-Gravimetric This monitor currently fulfills the Appendix D PM <sub>10</sub> minimum monitoring requirements for the MSA. No planned changes.
<b>Florence, SC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Greenville-Anderson, SC MSA</b>						
Greenville Employment Security Commission 45-045-0015	April 11, 2008	Continuou PM <sub>10</sub> 85101-1	Neighborhood	Population Exposure	SLAMS	TEOM-Gravimetric This monitor fulfills the Appendix D PM <sub>10</sub> minimum monitoring requirements for the MSA. No planned changes.
<b>Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Spartanburg MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Remainder of State</b>						
Howard High School #3 45-043-0011	July 15, 2008	Continuous PM <sub>10</sub> 81102-1	Neighborhood	Population Exposure/ Highest Concentration	SPM	This monitor is located in a heavily industrialized area. The monitor is on a two-year rotation. Monitoring was discontinued in April 2019. It will resume operation in January 2021. No planned changes.

## **Explanation of ArcGIS Methodology for Conducting Additional Statistical Analysis**

The PM<sub>2.5</sub> FRM and ozone networks are larger, more spatially uniform monitoring networks. Therefore, an additional ArcGIS methodology to score and rank individual ambient air monitoring sites and create suitability maps was utilized. Although these methods have some drawbacks, as is discussed below, the Department determined these methodologies to be the best tools available to objectively assign values, score individual ambient air monitoring sites, and produce visual maps that aid in reviewing the network.

The ArcGIS methodology utilizes Thiessen (Voronoi) polygons that were created to divide the state into “areas of representation” and allocate each polygon to the nearest monitor. For this assessment, Thiessen polygons did not extend beyond the state boundary to capture ambient air monitoring sites in other states. Each polygon created consisted of the points closer to one particular site than any other site. The data for the emissions and population categories were aggregated by Thiessen polygons. Monitoring sites were then scored based on these aggregated values.

There are many limitations with using Thiessen polygons. These polygons are not a true indication of which site is most representative of the pollutant concentration in a given area. Meteorology (including pollutant transport), topography, and proximity to population or emission sources are not considered, so some areas assigned to a particular monitor may actually be better represented by a different monitor. Also, Thiessen polygons tend to give more weight to rural sites and those sites on the edges of urban areas or other monitor clusters.

*Scoring Method Using Criteria and Weighting* – The criteria and percent weighting used to score each ozone and PM<sub>2.5</sub> FRM monitoring site are as follows: 2018 monitoring design values (24 percent), population change (20 percent), deviation from the NAAQS (19 percent), area emissions (15 percent), senior population (5 percent), children’s population (5 percent), time of monitor in service (5 percent), number of parameters (5 percent), and environmental justice (2 percent). Each of the scores were compiled and the criteria produced a “ranked” score for each ambient air monitoring site. The following steps were used in developing the “score:”

1. The Thiessen polygon technique described above was used to divide the ambient air monitoring network into regions defined by polygons. Each polygon contains only one site and shows the land area centered on and nearest to the monitoring site.
2. The zonal statistics of each parameter are summarized for each Thiessen polygon and reported in a table.
3. The tabular data for the appropriate parameter are then related to each ambient air monitoring site.

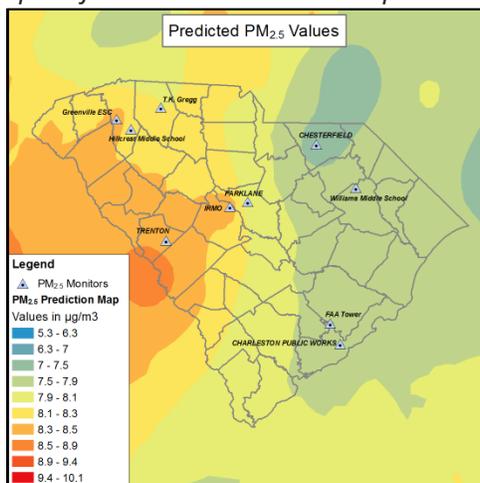
4. Each ambient air monitoring site was scored proportionately utilizing the formula  $(\text{Value} - \text{Min}) / (\text{Max} - \text{Min})$ .
5. The above steps are repeated for each parameter.
6. Scores for each category were multiplied by their weights listed above and weighted scores were summed for all the categories. Each site was ranked based on the total score using equal intervals between classifications and identified as "low," "medium" and "high" value. Final scores for ozone and PM<sub>2.5</sub> monitors are represented in their respective sections.

Because these tests required monitoring data, the ozone and PM<sub>2.5</sub> monitoring network included the Clemson (45-077-0002) and Wolf Creek (45-077-0003) Monitoring Sites in the Greenville-Anderson MSA and the Bushy Park (45-015-0002) Monitoring Site in the Charleston-North Charleston MSA.

*Suitability Maps Using Kriging* – Also, Kriging analyses were conducted to determine where additional ambient air monitoring may be needed. Kriging is a geostatistical technique used to create surfaces incorporating the statistical properties of the measured data.

The map below is an example of the surface map of predicted PM<sub>2.5</sub> values.

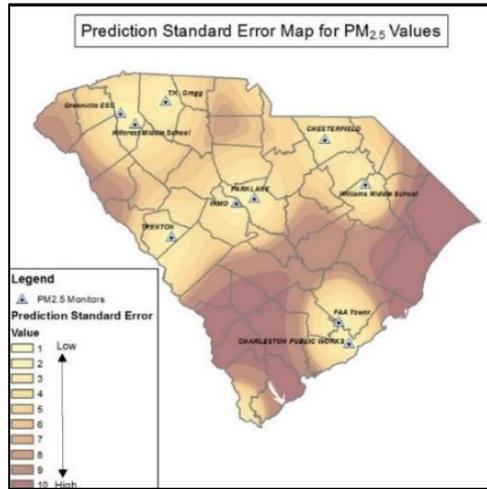
*Map 18: Example of a Predicted Values Map Produced by Kriging*



The analyses included the creation of predicted ozone and PM<sub>2.5</sub> surfaces using Kriging and maps of standard errors associated with the predicted values. To make a prediction for an unknown concentration value at the specific location, Kriging uses the fitted model from variography (spatial autocorrelation), the spatial data configuration, and the values of the measured sample points around the prediction location. The autocorrelation is a function of distance. Monitoring sites that are closer together are considered to be more alike than

farther apart. With the Kriging technique, an error or uncertainty surface was produced, (see Map 19) indicating how well the values were interpolated. The areas in darker brown color have a higher error associated with their interpolated concentrations. Areas in darker brown color have higher error associated with their interpolated concentrations.

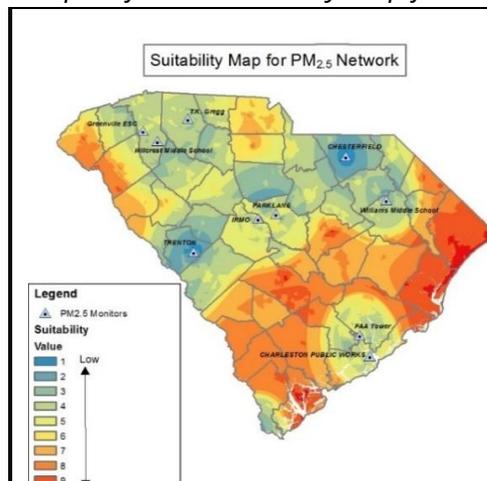
Map 19: Example of a Predicted Standard Error Map Produced by Kriging



Prediction standard error, distance to roads, population, NO<sub>x</sub> emissions, and VOC emissions grids were input to the weighted overlay analysis. The rasters were reclassified to a common scale of 1 to 10 (1 being the least suitable, 10 being the most suitable for placing new monitors). Each raster was assigned the percentage weights. Since the prediction standard error provided the most information about the uncertainty of the network, it was given the highest percentage weight.

The rasters were then overlain to produce the final suitability map for placing new monitors.

Map 20: Example of Final Suitability Map for Gap Analysis



The weighted overlay allows the user to look at the areas with the highest suitability and where the uncertainty of the network is the greatest and place new monitors if needed. The suitability map depicts the areas for possible new monitor selection. The color red indicates where new ambient air monitoring sites may be needed. This map is then used as a tool to analyze the present monitoring network and indicate possible areas (gaps) for new monitors.

### **Particulate Matter less than 2.5 microns (PM<sub>2.5</sub>) Ambient Air Monitoring Network**

*Regulations* – In July 1997, EPA determined that the PM NAAQS should be split into both particulate particles less than or equal to 10 micrometers (µm) (PM<sub>10</sub>) and particulate particles less than or equal to 2.5 µm (PM<sub>2.5</sub>). An annual PM<sub>2.5</sub> standard of 15 µg/m<sup>3</sup>, based on the 3-year average of the annual arithmetic mean and a 24-hour PM<sub>2.5</sub> standard of 65 µg/m<sup>3</sup>, based on the 3-year average of the 98th percentile of 24-hour PM<sub>2.5</sub> concentrations were established. In 2006, the level of the annual PM<sub>2.5</sub> standard was retained at 15 µg/m<sup>3</sup> and the 24-hour PM<sub>2.5</sub> standard was revised to 35 µg/m<sup>3</sup>. In 2012, the level of the annual PM<sub>2.5</sub> standard was lowered to 12 µg/m<sup>3</sup> and the 24-hour PM<sub>2.5</sub> standard was retained at 35 µg/m<sup>3</sup>.

In April 2020, the EPA proposed to retain the current standards, without revision. The final PM<sub>2.5</sub> NAAQS review is scheduled to be released in the Fall of 2020. As of June 2020, the current annual PM<sub>2.5</sub> standard is 12 µg/m<sup>3</sup> and the 24-hour PM<sub>2.5</sub> standard is 35 µg/m<sup>3</sup>.

The regulations that cover PM<sub>2.5</sub> minimum monitoring requirements can be found in 40 CFR Part 58, Appendix D, Section 4.7 and Appendix A, Section 3.2.3. The six requirements found in 40 CFR Part 58, Appendix D, Section 4.7 are as follows:

1. Required PM<sub>2.5</sub> SLAMS sites – The requirement in 40 CFR Part 58, Appendix D, Section 4.7 listed in Table 31 indicate a minimum number of required PM<sub>2.5</sub> SLAMS sites for each MSA which is based on MSA population and past design values. NCore sites can count as a monitoring site. All of the design values for the South Carolina PM<sub>2.5</sub> monitors were less than 85 percent of any of the PM<sub>2.5</sub> NAAQS.

*Table 31: Table D-5 of Appendix D to Part 58. PM<sub>2.5</sub> Minimum Monitoring Requirements*

<b>MSA population</b>	<b>Most recent 3-year design value ≥85% of any PM<sub>2.5</sub> NAAQS</b>	<b>Most recent 3-year design value &lt;85% of any PM<sub>2.5</sub> NAAQS</b>
>1,000,000	3	2
500,000-1,000,000	2	1
50,000-<500,000	1	0

At least one monitoring site must be sited in an area of expected maximum concentration. The MSAs with a population of 1,000,000 or more people (Charlotte-Concord-Gastonia MSA) must have at least one PM<sub>2.5</sub> monitor that is collocated at a near-road NO<sub>2</sub> station. The Remount (37-11-0045) Site in Charlotte, North Carolina fulfills this part of the requirement.

2. Continuous Requirement – This PM<sub>2.5</sub> monitoring requirement for continuous monitors is associated with the required PM<sub>2.5</sub> SLAMS monitoring requirement. This regulation stipulates the number of continuous PM<sub>2.5</sub> monitors that must be collocated with the minimum required PM<sub>2.5</sub> SLAMS monitors be equal to at least one-half (round up) of the minimum required PM<sub>2.5</sub> SLAMS monitors. Also, at least one required continuous monitor in each MSA must be collocated with one of the required FRM or FEM monitors, unless at least one of the required FRM/FEM monitors is itself a continuous FEM monitor, in which case, no collocation requirement applies.

In Table 32, the PM<sub>2.5</sub> monitoring sites for each MSA is listed. The number of required minimum and required continuous monitors by MSA to comply with 40 CFR Part 58, Appendix D Section 4 is also shown. The sites that fulfilled these two minimum monitoring requirements have a star in front of the site name.

*Table 32: 40 CFR Part 58, Appendix D, Section 4.7 PM<sub>2.5</sub> Minimum Monitoring Requirements*

<b>PM<sub>2.5</sub> Population Requirement</b>	<b>MSA</b>	<b>2018 Pop.</b>	<b>Site</b>	<b>Required Minimum Monitors</b>	<b>Required Continuous Monitors</b>
>1,000,000	<b>Charlotte- Concord- Gastonia</b>	2,569,213	*Garinger (37- 119-0041)	<b>2</b>	<b>1</b>
			Montclair (37-119-0042)		
			*Remount (37-119-0045)		
			Rockwell (37- 159-0021)		
500,000- 1,000,000	<b>Greenville- Anderson</b>	906,626	*Greenville ESC (45-045- 0015)	<b>1</b>	<b>1</b>
			Hillcrest (45- 045-0016)		
500,000- 1,000,000	<b>Columbia</b>	832,666	*Irmo (45- 063-0008)	<b>1</b>	<b>1</b>

<b>PM<sub>2.5</sub> Population Requirement</b>	<b>MSA</b>	<b>2018 Pop.</b>	<b>Site</b>	<b>Required Minimum Monitors</b>	<b>Required Continuous Monitors</b>
			Parklane (45-079-0007)		
500,000-1,000,000	<b>Charleston-North Charleston</b>	787,643	*CPW (45-019-0048)	<b>1</b>	<b>1</b>
			FAA (45-019-0049)		
500,000-1,000,000	<b>Augusta-Richmond County, GA-SC</b>	604,167	*Augusta (13-245-0091)	<b>1</b>	<b>1</b>
			Trenton (45-037-0001)		
50,000-<500,000	<b>Myrtle Beach-Conway-North Myrtle Beach, SC-NC</b>	480,891		<b>0</b>	<b>0</b>
50,000-<500,000	<b>Spartanburg</b>	341,298	T.K. Gregg (45-083-0011)	<b>0</b>	<b>0</b>
50,000-<500,000	<b>Hilton Head Island-Bluffton</b>	217,686		<b>0</b>	<b>0</b>
50,000-<500,000	<b>Florence</b>	204,961	Williams MS (45-041-0003)	<b>0</b>	<b>0</b>
50,000-<500,000	<b>Sumter</b>	106,512		<b>0</b>	<b>0</b>
50,000-<500,000	<b>Not in an MSA Chesterfield</b>	No requirement	Chesterfield 45-025-0001)	<b>0</b>	<b>0</b>
This site fulfills the monitoring requirement					

3. Regional Background and Transport – It is required that at least one PM<sub>2.5</sub> site must be established in each state to monitor for regional background and at least one PM<sub>2.5</sub> site to monitor regional transport. The Cape Romain (45-019-0046) Site in Charleston County is the regional background site and the Chesterfield (45-025-0001) site in Chesterfield County is the regional transport site.

4. NCore Requirement – Each state is required to operate at least one NCore site which measures PM<sub>2.5</sub> using both continuous and integrated/filter-based samplers. The Parklane (45-079-0007) Site in Columbia, South Carolina is the NCore site for South Carolina. The Garinger (37-119-0041) Site in Charlotte, North Carolina is also an NCore site.

5. Near-road PM<sub>2.5</sub> Monitoring – The EPA required the collocation of one PM<sub>2.5</sub> monitor with a near-road NO<sub>2</sub> monitor in urban areas having populations of 1,000,000 or more by January 1, 2017. The Charlotte-Concord-Gastonia, NC-SC MSA is the only MSA in South Carolina that met the population requirement for a collocated PM<sub>2.5</sub> monitor. The near-road monitoring requirement for the Charlotte-Concord-Gastonia, NC-SC MSA is being fulfilled at the Remount Road (37-119-0045) Site by the Mecklenburg County Air Quality Commission.

6. Speciation Monitoring – Chemical speciation monitoring is conducted at the Parklane (45-079-0007) Site and is funded as part of the PM<sub>2.5</sub> Speciation Trends Network (STN).

There are five requirements for PM<sub>2.5</sub> monitors found in 40 CFR Part 58, Appendix A, Section 3.2.3-Collocated Quality Control Sampling Procedures for PM<sub>2.5</sub>. They are as follows:

1. For each pair of collocated monitors, one sampler must be designated as the primary monitor and the other as the quality control monitor.

2. For each distinct monitoring method designation used for a primary monitor, the PQAQO must have fifteen percent of the primary monitors of each method designation collocated (values of 0.5 and greater round up); and have at least one collocated quality control monitor (if the total number of monitors is less than three). The first collocated monitor must be a designated FRM monitor. The South Carolina monitors use a 2025 PM<sub>2.5</sub> Sequential Air Sampler w/ very sharp cut cyclone (VSCC) as the FRM method and a Thermo 1405-F FDMS with VSCC as the FEM method.

3. A primary monitor designated as an EPA FRM shall be collocated with a quality control monitor having the same EPA FRM method designation.

4. For each primary monitor designated as an EPA FEM used by the PQAQO, 50 percent of the monitors designated for collocation, or the first if only one collocation is necessary, shall be collocated with a FRM quality control monitor and 50 percent of the monitors shall be collocated with a monitor having the same method designation as the FEM primary monitor. If an odd number of collocated monitors is required, the additional monitor shall be an FRM quality control monitor.

5. Fifty percent of the collocated quality control monitors should be deployed at sites with annual average or daily concentrations estimated to be within plus or minus 20 percent of either the annual or 24-hour NAAQS and the remainder at the PQAQOs discretion. If an

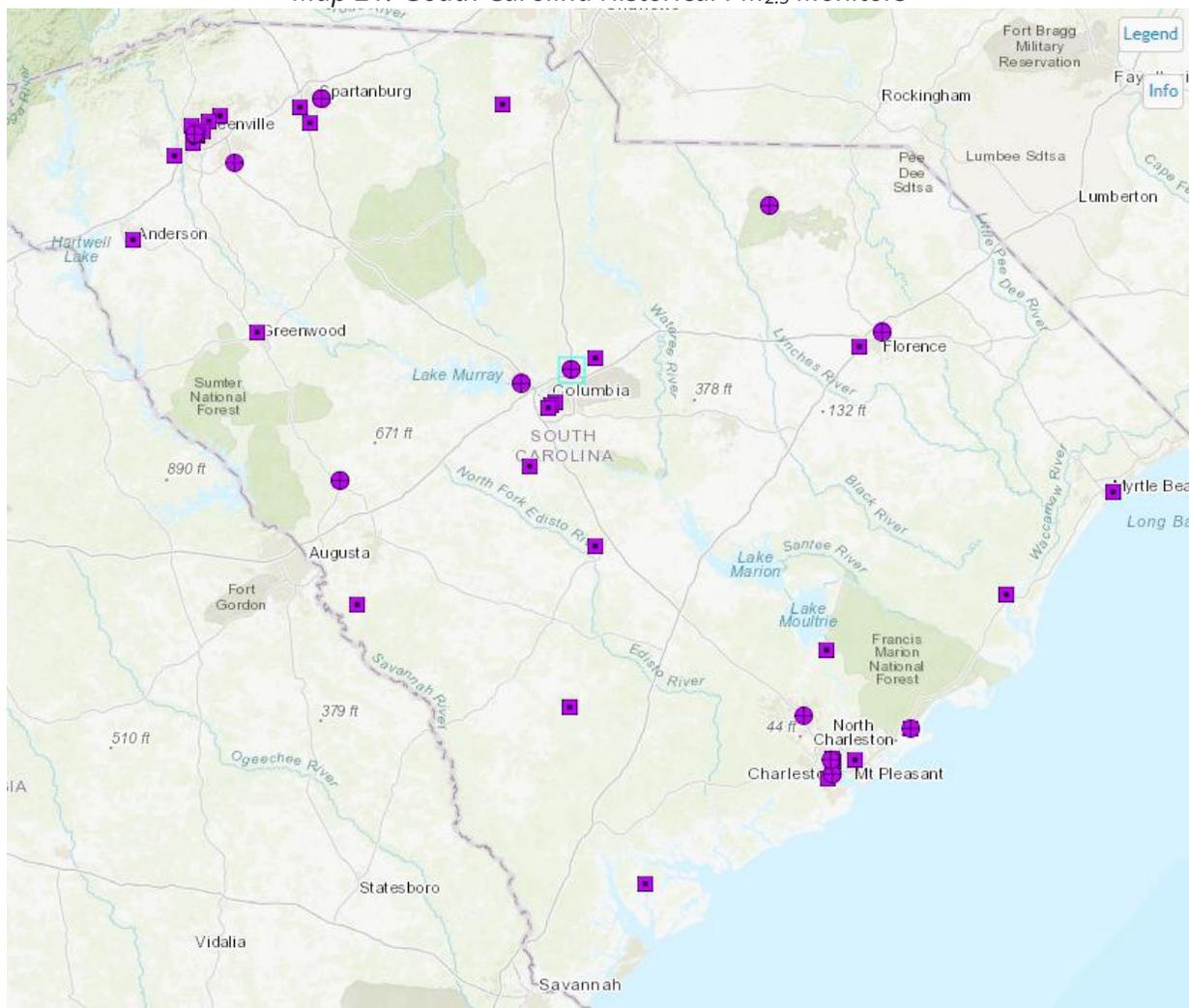
organization has no sites with annual average or daily concentrations within  $\pm 20$  percent of the annual NAAQS or 24-hour NAAQS, 50 percent of the collocated quality control monitors should be deployed at those sites with the annual mean concentrations or 24-hour concentrations among the highest for all sites in the network and the remainder at the PQA's discretion. South Carolina does not have any PM<sub>2.5</sub> sites that have annual average or daily concentrations greater than 20 percent. Table 33 lists the sites within South Carolina that fulfill the Appendix A requirements.

*Table 33: 40 CFR Part 58, Appendix A Section 3.2.3 - Collocation Requirements*

<b>PQAO</b>	<b>Method</b>	<b># Primary Monitors</b>	<b>Minimum # of Required Collocated Monitors</b>	<b>Actual Collocated Monitors</b>	<b>Sites with Collocated Monitors</b>
SC DHEC	FRM Gravimetric w/VSCC	8	1	3	Hillcrest (45-045-0016) Parklane (45-079-0007) T.K. Gregg (45-083-0011)
SC DHEC	Thermo 1405- F FDMS 2/VSCC	3	1	2	Greenville ESC (45-045-0015) Irmo (45-063-0008)

*Historical and Current Monitors* – As Map 21 indicates, historically there have been approximately 62 PM<sub>2.5</sub> monitors and seven PM<sub>2.5</sub> speciation monitors operational in South Carolina since 1986.

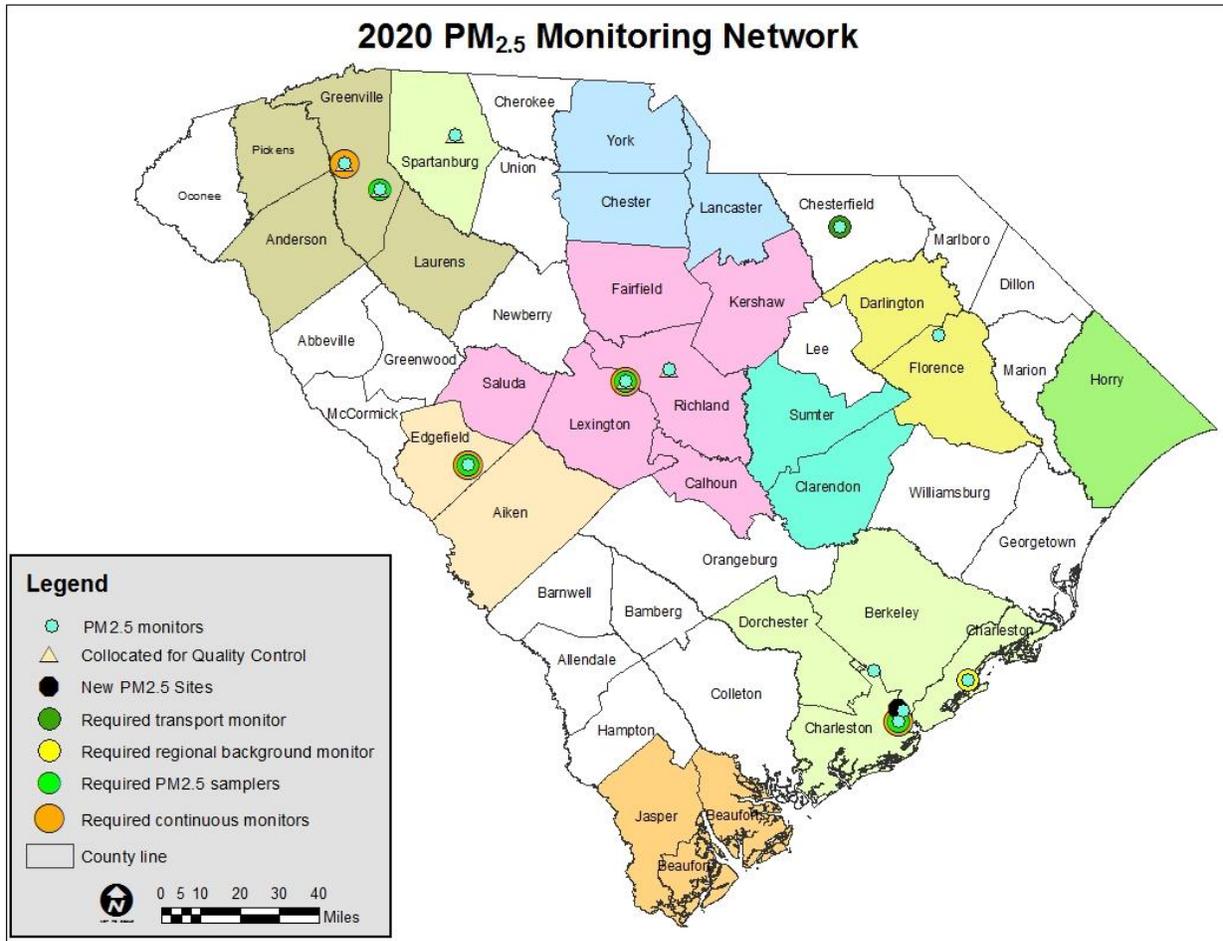
Map 21: South Carolina Historical PM<sub>2.5</sub> Monitors



In 2020, there were twenty-three PM<sub>2.5</sub> monitors and one PM<sub>2.5</sub> speciation monitor operating within South Carolina. In 2020, there will also be one new site (the black dot on map) in the Charleston-North Charleston MSA.

The new North Charleston Fire Station (45-019-0020) Site will support collocated PM<sub>2.5</sub> intermittent samplers and a continuous PM<sub>2.5</sub> monitor.

Map 22: South Carolina Current PM<sub>2.5</sub> Monitors

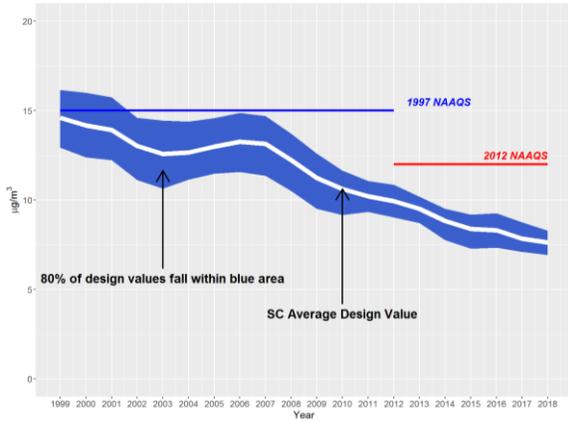


Besides the sites within South Carolina that are indicated on the above map, there are PM<sub>2.5</sub> monitors located in the Augusta-Richmond County, GA-NC and the Charlotte-Concord-Gastonia, NC-SC MSAs. The Augusta (13-245-0091) Site in Augusta, Georgia has a continuous monitor, an intermittent PM<sub>2.5</sub> monitor, and a PM<sub>2.5</sub> speciation monitor. Finally, the North Carolina part of the Charlotte-Concord-Gastonia MSA has four PM<sub>2.5</sub> monitoring sites. The Garinger (37-119-0041) Site has a continuous monitor. The Rockwell (37-159-0021) Site has a continuous collocated with an intermittent monitor, and the Remount (37-119-0045) near-road Site that has both continuous and collocated intermittent monitors.

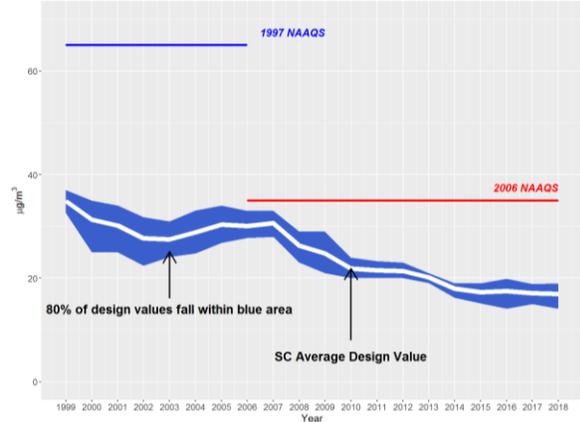
Design Value Trends and Comparison to the NAAQS – Since 1999, both the annual and 24-hour PM<sub>2.5</sub> design values (Table 34) have declined.

Table 34: 1999-2018 South Carolina Annual and 24-Hour Design Value Trends

Annual Design Values

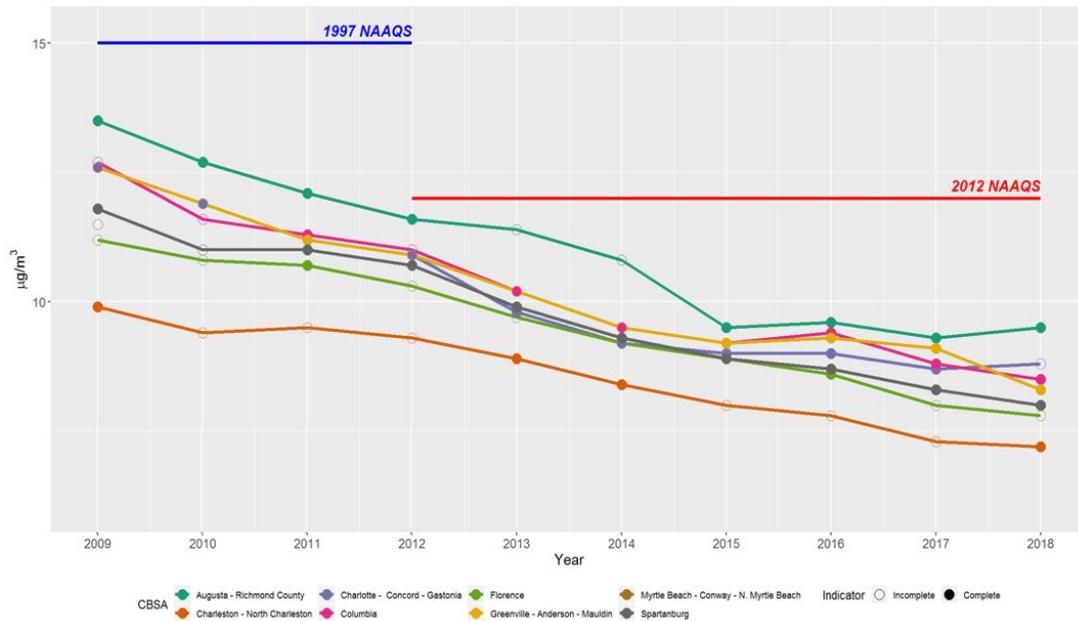


24-Hour Design Values



Graph 11 shows the ten-year PM<sub>2.5</sub> annual design value trend graph. For each year, the graphs indicate the highest design value for each MSA.

Graph 11: Ten Year PM<sub>2.5</sub> Annual Design Value Trends



Graph 12 indicates the ten-year PM<sub>2.5</sub> 24-Hour design value trend graph. All of the South Carolina PM<sub>2.5</sub> design values have been below the established NAAQS.

Graph 12: 2009-2018 PM<sub>2.5</sub> 24-Hour Design Values

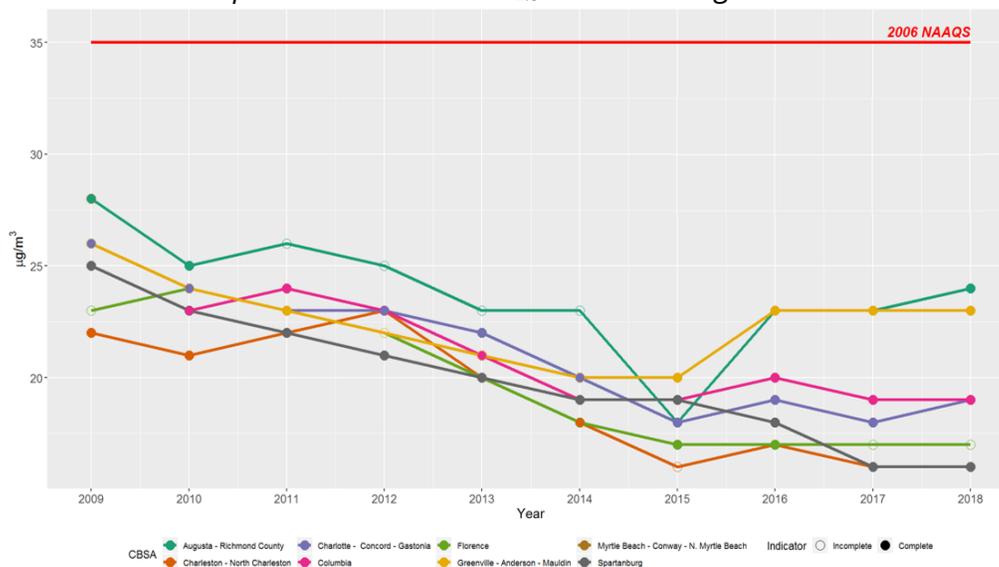


Table 35 lists the 2018 South Carolina PM<sub>2.5</sub> annual and 24-hour design values. The highest annual design value for the State was 7.9 µg/m<sup>3</sup> at the Irmo (45-063-0008) Site in the Columbia MSA. The highest 24-hour design value was 23 µg/m<sup>3</sup> at the Greenville ESC (45-045-0015) site in the Greenville-Anderson MSA.

Table 35: South Carolina 2018 PM<sub>2.5</sub> Design Values

MSA	Site Name	Site ID	PM <sub>2.5</sub> Annual (µg/m <sup>3</sup> )	PM <sub>2.5</sub> 24-hour (µg/m <sup>3</sup> )
Augusta-Richmond County	Trenton	037-0001	8.2	19
Charleston-North Charleston	FAA	019-0048	7.2	16
Charleston-North Charleston	CPW	019-0049	7.2	15
Columbia	Irmo	063-0008	8.5	19
Columbia	Parklane	079-0007	7.8	16
Florence	Williams	041-0003	*7.8	*17
Greenville-Anderson	Greenville ESC	045-0015	8.3	23
Greenville-Anderson	Hillcrest	045-0016	7.9	17
Spartanburg	T.K. Gregg	083-0011	8	16
Not in MSA	Chesterfield	025-0001	*6.9	*14
Not in MSA	Long Creek	073-0001	*6.0	*14

\*denotes design values that did not meet data completeness requirements.

*Risk of Future Exceedance* – Table 36 contains calculations designed to predict the risk of a future NAAQS exceedance for PM<sub>2.5</sub> based on 2014-2018 data. The purpose of this test is to

see which sites are most likely to exceed the applicable NAAQS in the following three years based on previous data trends. Based on the last five years of monitoring data, the last column indicates there is a 90 percent confidence index that the PM<sub>2.5</sub> monitors will not exceed 80 percent of the current NAAQS.

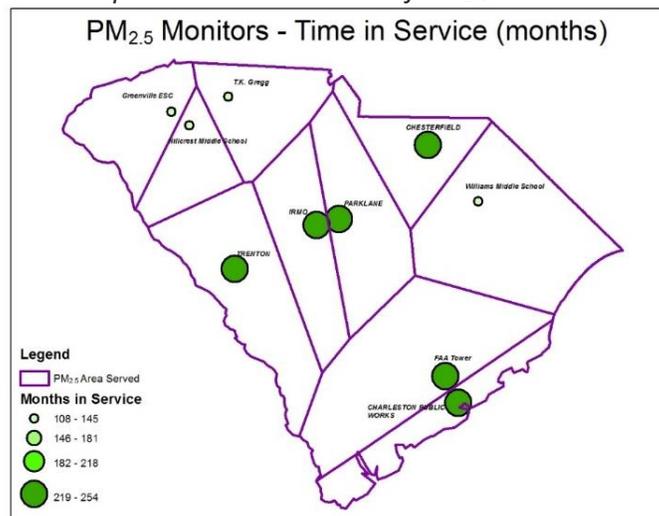
Table 36: PM<sub>2.5</sub> Risk of Future Exceedance

Site ID and Name	Averaging Time	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence	Is 90%CI < 80% of NAAQS?
FAA 450190048	Annual	8.4	8.0	7.8	7.3	7.2	7.74	0.498	8.214	Yes
CPW 450190049	Annual	7.6	7.2	7.3	7.1	7.2	7.28	0.192	7.463	Yes
Chesterfield 450250001	Annual	8.4	8.2	7.7	7.2	6.9	7.68	0.638	8.288	Yes
Trenton 450370001	Annual	8.9	8.6	8.7	8.3	8.2	8.54	0.288	8.814	Yes
Williams 450410003	Annual	9.2	8.9	8.6	8.0	7.8	8.50	0.592	9.064	Yes
Greenville ESC 450450015	Annual	9.5	9.2	9.3	9.1	8.3	9.08	0.460	9.519	Yes
Hillcrest 450450016	Annual	9.0	8.9	8.7	8.2	7.9	8.54	0.472	8.990	Yes
Irmo 450630008	Annual	9.5	9.2	9.4	8.8	8.5	9.08	0.421	9.481	Yes
Long Creek 450730001	Annual			6.0	5.7	6.0	5.90	0.173	6.113	Yes
Parklane 450790007	Annual	9.0	8.7	8.5	8.1	7.8	8.42	0.476	8.874	Yes
Bates House 450790019	Annual	9.5	9.0	8.9	7.9	7.8	8.62	0.740	9.325	Yes
T.K. Gregg 450830011	Annual	9.3	8.9	8.7	8.3	8.0	8.64	0.508	9.124	Yes
FAA 450190048	24-Hour	18.0	16.0	17.0	16.0	16.0	16.60	0.894	17.452	Yes
CPW 450190049	24-Hour	16.0	15.0	14.0	15.0	15.0	15.00	0.707	15.674	Yes
Chesterfield 450250001	24-Hour	17.0	16.0	15.0	15.0	14.0	15.40	1.140	16.486	Yes
Trenton 450370001	24-Hour	18.0	18.0	18.0	18.0	19.0	18.20	0.447	18.626	Yes

Site ID and Name	Averaging Time	2014	2015	2016	2017	2018	Average	Standard Deviation	90% Upper Confidence	Is 90%CI < 80% of NAAQS?
Williams 450410003	24-Hour	18.0	17.0	17.0	17.0	17.0	17.20	0.447	17.626	Yes
Greenville ESC 450450015	24-Hour	20.0	20.0	23.0	23.0	23.0	21.80	1.643	23.365	Yes
Hillcrest 450450016	24-Hour	18.0	19.0	18.0	17.0	17.0	17.80	0.837	18.597	Yes
Irmo 450630008	24-Hour	19.0	19.0	20.0	19.0	19.0	19.20	0.447	19.626	Yes
Long Creek 450730001	24-Hour			14.0	14.0	14.0	14.00	0.000	14.000	Yes
Parklane 450790007	24-Hour	17.0	17.0	17.0	17.0	16.0	16.80	0.447	17.226	Yes
Bates House 450790019	24-Hour	19.0	18.0	19.0	18.0	18.0	18.40	0.548	18.922	Yes
T.K. Gregg 450830011	24-Hour	19.0	19.0	18.0	16.0	16.0	17.60	1.517	19.045	Yes

*Monitors Time in Service* – Monitors that have a long historical record are valuable for tracking trends. In this analysis, monitors were ranked based on the duration of their continuous measurement records. For the purposes of this evaluation, the most important monitors are those with the longest continuous trend record.

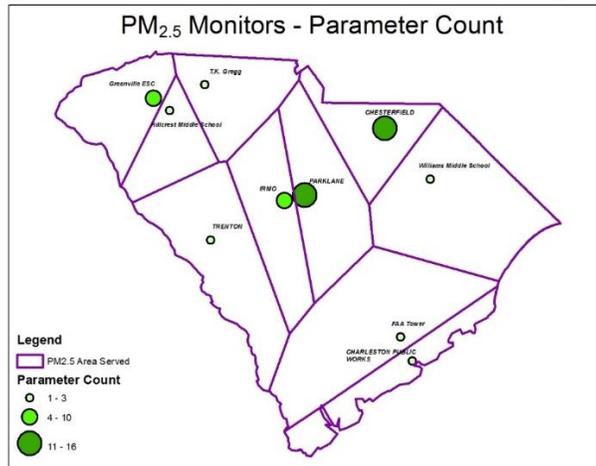
Map 23: Time in Service of PM<sub>2.5</sub> Monitors



The PM<sub>2.5</sub> monitors that have the longest time in service are located at the Chesterfield (45-025-0001) Monitoring Site in Chesterfield County, the Irmo (45-063-0008) and Parklane (45-079-0007) Monitoring Sites in the Columbia MSA, the Trenton (45-037-0001) Monitoring Site in the Augusta-Richmond County, GA\_SC MSA, and the FAA (45-019-0048) and the CPW (45-019-0049) Monitoring Sites in Charleston-North Charleston MSA.

*Parameter Count at the Site* – Sites were ranked by the number of parameters that are measured at a particular site.

Map 24: Parameter Count at PM<sub>2.5</sub> Monitoring Sites

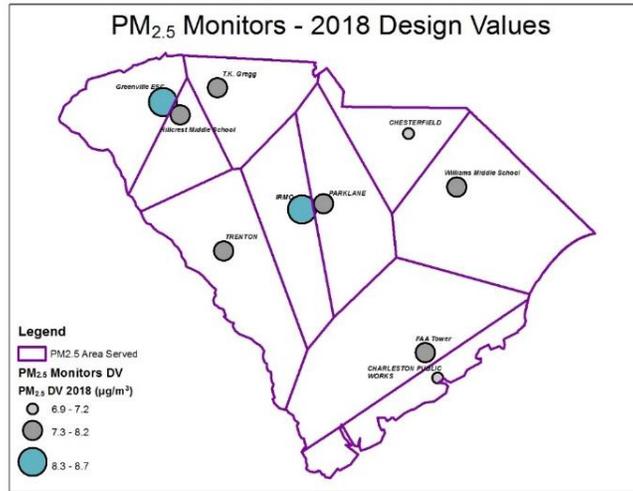


Air quality monitoring sites hosting monitors collocated with other measurement instruments are considered to be more valuable than sites where fewer parameters are measured. In addition, the operating costs can be leveraged among several instruments at these sites. This analysis is performed by counting the number of other parameters that are measured at a site. Sites with the most parameters monitored are ranked the highest. The monitoring sites with the most parameters are found at the Chesterfield (45-025-0001) Monitoring Site in Chesterfield County and the Parklane (45-079-0007) Monitoring Site in the Columbia MSA.

*Measured Concentrations* – Individual monitors were ranked based on the concentration of pollutants they measure. Monitors that measure high concentrations or design values are ranked higher than monitors that measure low concentrations. The greater the design value, the higher the site rank. If more than one standard exists for a pollutant (e.g., annual and 24-hr average), monitors can be scored for each standard. The Department used 2018 design values for the PM<sub>2.5</sub> sites to rank the ambient air monitoring sites.

The monitoring sites with the highest design values were the Irmo (45-063-0008) Site in the Columbia MSA and the Greenville ESC (45-045-0015) Site in the Greenville-Anderson MSA.

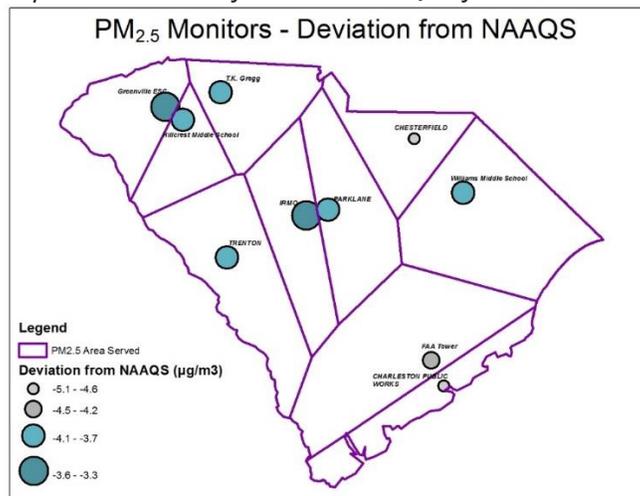
Map 25: Measured Concentrations of PM<sub>2.5</sub> Monitors



*Deviation from NAAQS* – Monitoring Sites measuring design values that are very close to the NAAQS exceedance threshold are ranked highest in this analysis. These sites may be considered more valuable for NAAQS compliance evaluation. Sites measuring concentrations well above or below the threshold do not provide as much information in terms of NAAQS compliance. This technique contrasts the difference between the standard and actual measurements or design values. If a pollutant (e.g., annual and 24-hr average) has more than one standard, sites can be scored for each standard.

The monitoring sites with the highest deviation from the NAAQS were the Irmo (45-063-0008) Site in the Columbia MSA and the Greenville ESC (45-045-0015) Site in the Greenville-Anderson MSA.

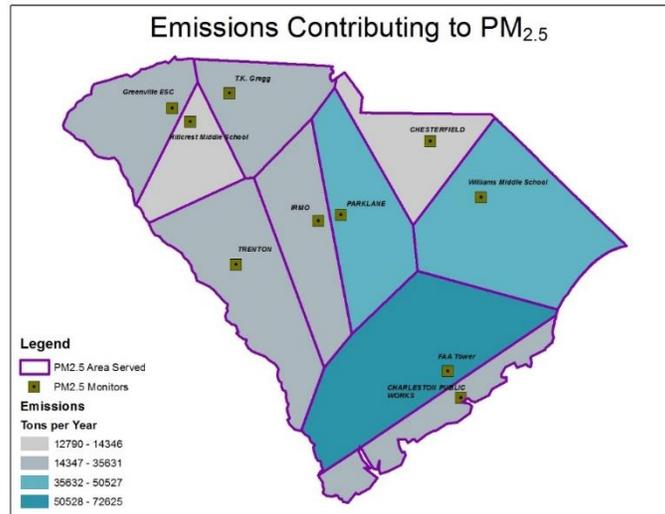
Map 26: Deviation from the NAAQS of PM<sub>2.5</sub> Monitors



*PM<sub>2.5</sub> Emissions inventory* – Emission inventory data were used to find locations where emissions of pollutants of concern are concentrated. This analysis can be scaled to various

levels of complexity, depending on available resources. At the simplest level, county-level emissions patterns, such as those in the National Emission Inventory, can be compared with monitor locations. For measuring maximum precursor or primary emissions, monitors should be placed in those counties with maximum emission density. More complex methods use gridded emissions and/or species-weighted emissions, depending on their importance producing secondary pollutants of concern.

Map 27: PM<sub>2.5</sub> Monitors Within the Areas of PM<sub>2.5</sub> Emissions

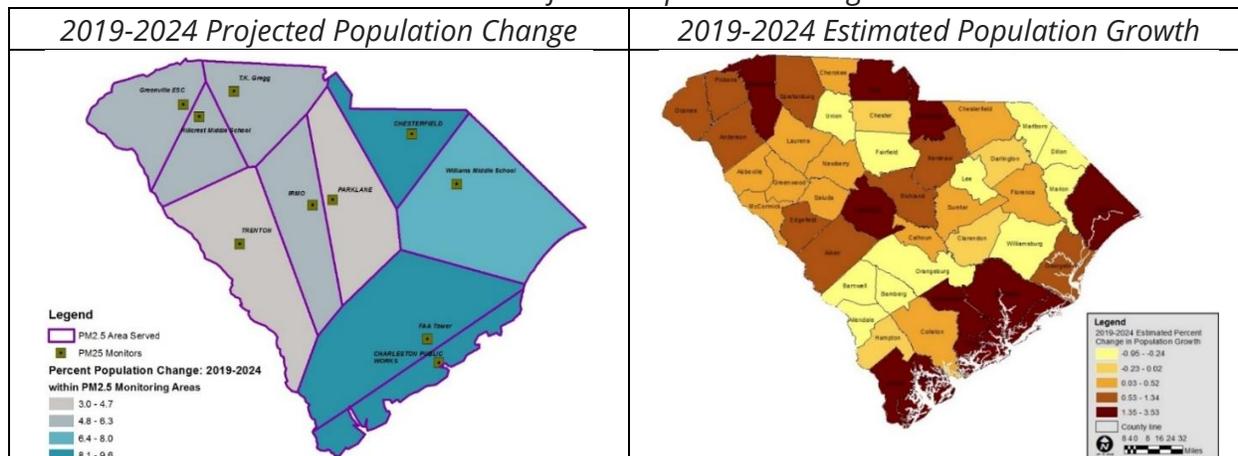


The monitoring sites were scored based on the total emissions being represented by each monitoring area (area served polygon). The monitoring site nearest the area of highest PM<sub>2.5</sub> emissions was the FAA (45-019-0048) Monitoring Site in the Charleston-North Charleston MSA.

*Population change* – High rates of population increase are associated with potential increased emissions activity and exposure. Sites were ranked on population change in the area of representation. Area of representation was estimated using the Thiessen polygons technique. The total population change at the census tract or block group level that falls within the area of coverage of a monitor is assigned to that monitor.

This technique gives more weight to sites in areas with high rates of population growth and large areas of representation.

Table 37: Projected Population Change



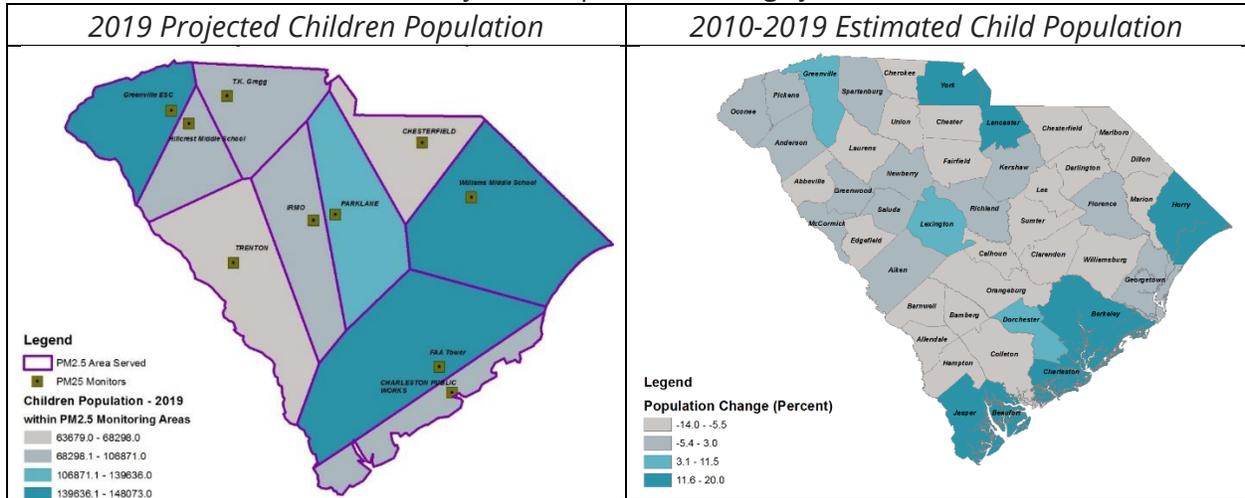
As can be seen when comparing the two maps above, the northern area with the largest projected population changes represented by PM<sub>2.5</sub> monitors were located in York, Lancaster, Kershaw, and Chesterfield Counties. These counties are represented by the Chesterfield (45-025-0001) Monitoring Site. In the southern area, the counties with the highest population change represented by PM<sub>2.5</sub> monitors are along the coast. This includes Jasper, Beaufort, Charleston, Dorchester, Berkeley, and Georgetown Counties. These counties are represented by the FAA (45-019-0048) and CPW (45-019-0049) Monitoring Sites in the Charleston-North Charleston MSA. The coastal areas tend to be “swept clean” with the sea breezes and typically have low PM<sub>2.5</sub> concentrations.

*Projected Population Change for Children (ages 18 and below)* – This test is similar to the population change test except that it focuses on the total population of younger individuals represented by each ambient air monitoring site. Sites were ranked on the population below age eighteen in the area of representation. Areas with high populations of youth may be indicative of the effects of pollution on sensitive individuals. Area of representation was estimated using the Thiessen polygons technique. The population of a county whose center falls within the area of coverage of a monitor is assigned to that monitor.

As the maps in Table 38 below indicate, the PM<sub>2.5</sub> monitor at the Greenville ESC (45-045-0015) Monitoring Site (Greenville-Anderson MSA) represents the Upstate area with the highest projected population change for children. Also, the PM<sub>2.5</sub> monitors at the Williams Middle School (45-041-0003) Site in the Florence MSA and the FAA (45-019-0048) Site in the Charleston-North Charleston MSA represent the coastal areas.

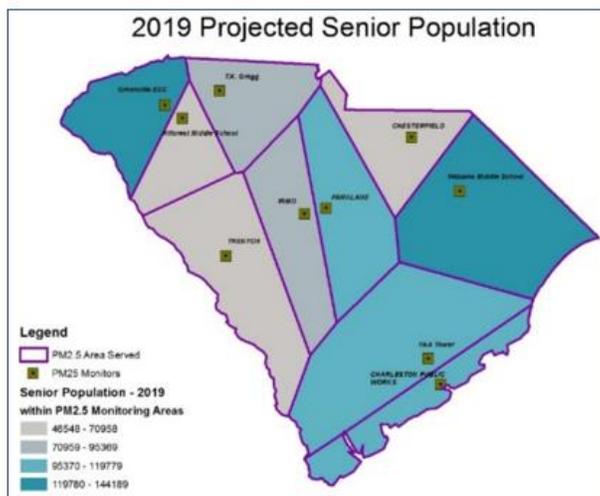
As previously stated, the sea breezes tend to “clean out” and lower the PM<sub>2.5</sub> concentrations in the coastal areas.

Table 38: Projected Population Change for Children



*Projected Population Change for age 65 and above* – This test is similar to the population change test except that it focuses on the total population of older individuals in the area represented by each ambient air monitoring site. Areas with high populations of older individuals indicate the potential for the effects of pollution on sensitive individuals. Sites once again were ranked on the population of older individuals in the area of representation. Areas of representation were estimated using the Thiessen polygons technique. The population of a county whose center falls within the area of coverage of a monitor is assigned to that monitor.

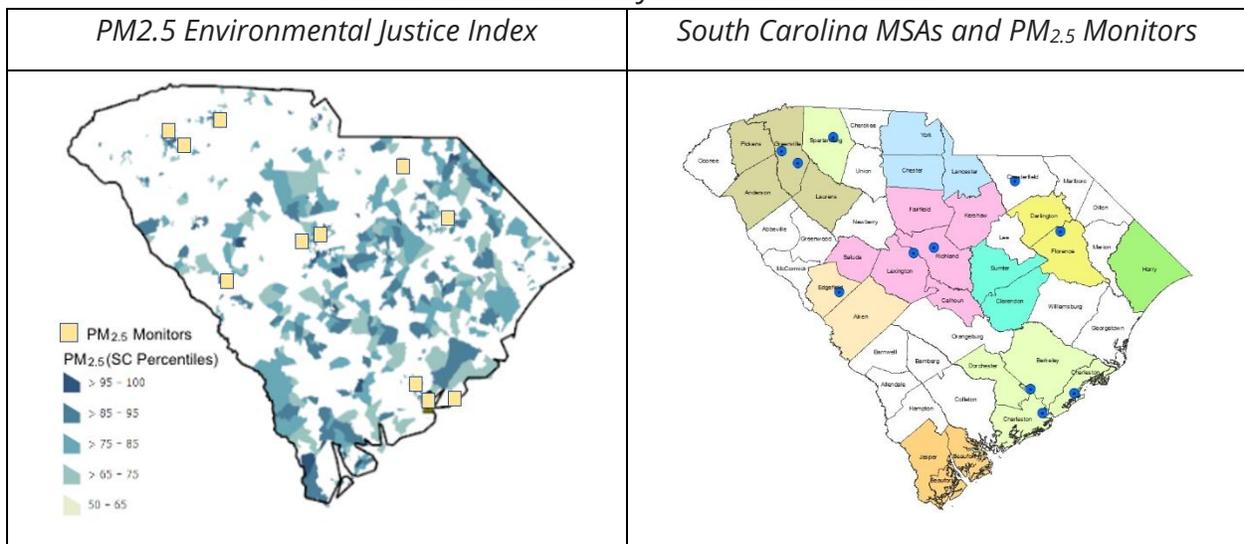
Map 28: Projected Population Change for Senior Citizens



The highest projected population changes for the senior population was in the Upstate and in the Myrtle Beach-Conway area. Both of these areas have PM<sub>2.5</sub> monitors. In the Upstate, the highest projected population changes for the senior population includes the Greenville-Anderson MSA. This area is represented by the Greenville ESC (45-045-0015) Monitoring Site in Greenville, South Carolina, which has a PM<sub>2.5</sub> monitor. The second area includes the Florence MSA, which is represented by the PM<sub>2.5</sub> monitor at the Williams Middle School (45-041-0003) Monitoring Site.

*Environmental Justice* – The Environmental Justice (EJ) ranking of the monitoring sites was based on the EJ screening tool developed by EPA. The EJ index is a combination of environmental and demographic information. There are eleven EJ Indexes reflecting the 11 environmental indicators. For this application, the PM<sub>2.5</sub> environmental indicator was used. Each of the monitoring sites was given a rank of 0 or 1, depending if the site fell outside or inside the 95 percentile EJ index score for the block group. When comparing the Environmental Justice Index map to the South Carolina MSA map, most of the EJ communities are located within the MSA boundaries, which have PM<sub>2.5</sub> monitors.

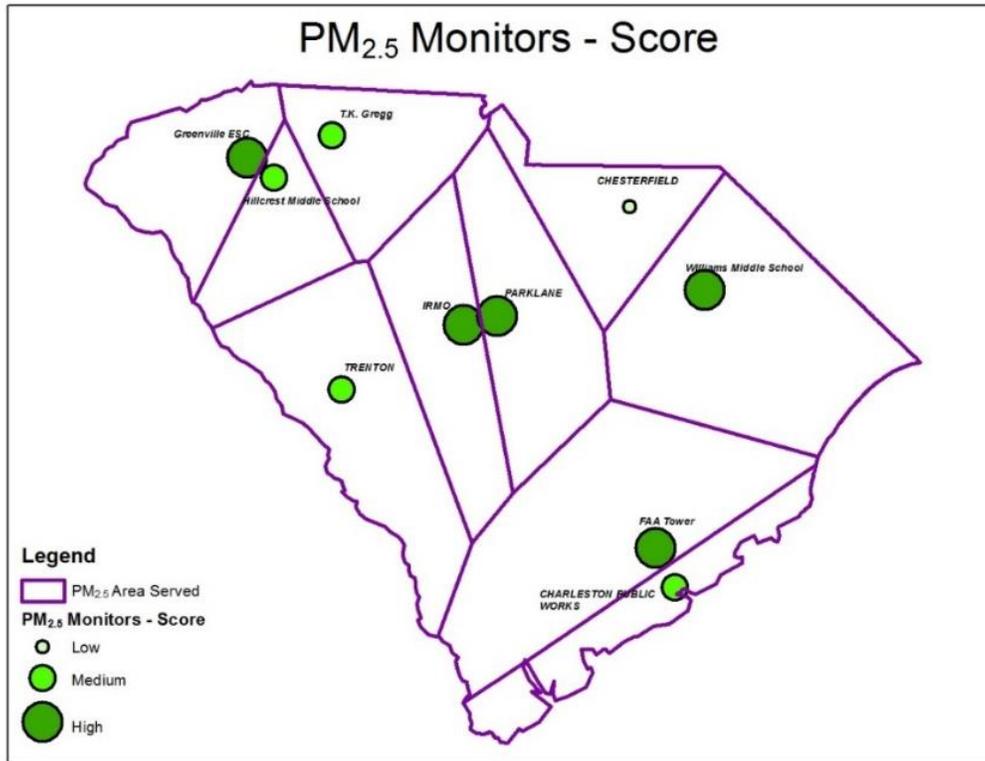
Table 39: Environmental Justice Index and MSAs



*Results of Scoring of Valuable PM<sub>2.5</sub> Monitors* – Based on the above criteria, the GIS analysis produced a final ranking for the PM<sub>2.5</sub> monitoring networks of the most and the least valuable sites. As Map 29 below shows, the scoring results indicated that the most valuable monitors are the Greenville ESC (45-045-0015) Monitoring Site in the Greenville-Anderson MSA, the Irmo (45-063-0008) and the Parklane (45-079-0007) Monitoring Sites in the Columbia MSA, the FAA (45-019-0048) Monitoring Site in the Charleston-North Charleston MSA, and the Williams Middle School (45-041-0003) Monitoring Site in the Florence MSA. The Greenville ESC (45-045-0015), Irmo (45-063-0008), FAA (45-019-0048) and Parklane (45-079-0007) monitors are all located in highly populated areas.

The Chesterfield (45-025-0001) monitor had the lowest score, but the Department believes these monitors are very valuable. Although the score was low, the Chesterfield (45-025-0001) monitors are in a rural area and are used for regional background. It is also a National Air Toxics Site (NATTS).

Map 29: Final PM<sub>2.5</sub> Scoring

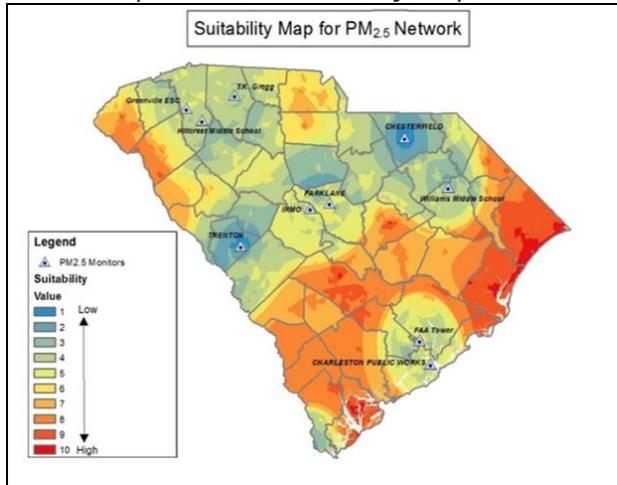


*Gap Analysis of PM<sub>2.5</sub> Monitors* – The Suitability Map produced by kriging was then examined. The blue and yellow areas are indicative of areas that have adequate PM<sub>2.5</sub> coverage. The darker orange and red regions in the Suitability Map indicates possible areas where monitors may be added.

Below is the Suitability Map (Map 30) and a comparison to the PM<sub>2.5</sub> Monitoring Network Map (Map 31). As can be seen when comparing the maps, most of the MSAs have PM<sub>2.5</sub> monitors. The remaining counties that are orange and red are rural counties that not heavily populated or industrialized and do not have heavy PM<sub>2.5</sub> emissions.

Also, the coastal counties have the advantage of the sea breezes that help lower PM<sub>2.5</sub> concentrations.

Map 30: PM<sub>2.5</sub> Suitability Map



31: PM<sub>2.5</sub> Monitoring Network



*Density of Existing Network and Reduction of Number of Sites* – There are currently twenty-three continuous and manual PM<sub>2.5</sub> monitors and one PM<sub>2.5</sub> speciation monitor operating within South Carolina. Also, in 2020, the Charleston-North Charleston MSA is scheduled to have a new PM<sub>2.5</sub> monitoring site that will operate for approximately two years in the “neck” area of Charleston. The Department does not have any plans to reduce this number of sites.

*PM<sub>2.5</sub> Monitoring Network Current and Future Plans* – The current PM<sub>2.5</sub> network meet the PM<sub>2.5</sub> minimum monitoring requirements and state needs and is adequate for protection of sensitive populations. There will be a change in PM<sub>2.5</sub> monitors in the Charleston-North Charleston MSA. The PM<sub>2.5</sub> monitors at the FAA (45-019-0048) and the CPW (45-019-0049) Monitoring Sites in this MSA have obstructed air flow and drip line issues that cannot be resolved. Therefore, the Department decided to replace these two sites with a monitoring site that is in a similar area with a more suitable location. A new site was found on the North Charleston Fire Station #2 property and will be called the North Charleston Fire Station (45-019-0020) Site. The new site meets all siting criteria and is located in the “Neck” area of Charleston. The new monitoring area is near a number of facilities, the port, and several environmental justice communities and has historically had concerns about air quality. This could mean that the North Charleston Fire Station (45-019-0020) Site may measure higher PM<sub>2.5</sub> concentrations than previously recorded at the FAA (45-019-0048) and the CPW (45-019-0049) Sites. The EPA staff has visited this site and has confirmed that it meets all siting criteria.

Once the North Charleston Fire Station (45-019-0020) Site is established, it will support two collocated PM<sub>2.5</sub> FRM intermittent samplers and a continuous PM<sub>2.5</sub> monitor. The CPW (45-019-0049) Site will be terminated after the new site’s establishment and the collocated

PM<sub>2.5</sub> FRM intermittent sampler that is temporarily being housed at the T.K. Gregg (45-083-0011) Site will be moved back to this new site. The FAA (45-019-0048) Site will run concurrently with the North Charleston Fire Station (45-019-0020) Site for one year.

Also, this MSA has recently added the Irving Street (45-019-0021) Site in conjunction with the Port Authority to monitor Port expansion activities. This Site has a continuous PM<sub>2.5</sub> monitor.

Finally, the population of the Myrtle Beach-Conway-North Myrtle Beach MSA is getting close to the top of the population category shown in Table D-5 of Appendix D to Part 58 - PM<sub>2.5</sub> Minimum Monitoring Requirements. If the MSA population goes over 500,000, then a PM<sub>2.5</sub> and a collocated continuous PM<sub>2.5</sub> may be required. Currently, the Department is talking to the EPA and North Carolina and waiting for the new Census to be published before moving forward to establish the required PM<sub>2.5</sub> monitors.

Table 40: Current PM<sub>2.5</sub> Ambient Air Monitoring Network

<b>PM<sub>2.5</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
<b>Augusta-Richmond County, GA-SC MSA</b>						
Trenton 45-037-0001	March 28, 1980	FRM PM <sub>2.5</sub> 88101-1 1:3	Urban	Extreme Downwind	SPM	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor can fulfill the Appendix D minimum monitoring requirements. No planned changes.
Trenton 45-037-0001	March 28, 1980	Continuous FEM PM <sub>2.5</sub> 88502-3	Urban	Extreme Downwind	SPM	TEOM Gravimetric 50 deg C This monitor fulfills the Appendix D continuous monitoring requirement. No planned changes.
<i>Augusta 13-245-0091</i>		<i>PM<sub>2.5</sub></i>	<i>Neighborhood</i>	<i>Population Exposure</i>		<i>Georgia monitor</i>
<i>Augusta 13-245-0091</i>		<i>Continuous PM<sub>2.5</sub></i>	<i>Neighborhood</i>	<i>Population Exposure</i>		<i>Georgia monitor</i>
<b>Charleston-North Charleston, SC MSA</b>						
North Charleston Fire Station 45-019-0020	Pending	PM <sub>2.5</sub> 88101-1	Neighborhood	Population Exposure	SLAMS	This monitor will replace the FAA and CPW Sites and fulfill the Appendix D collocation requirement for the MSA. No planned changes.
North Charleston Fire Station 45-019-0020	Pending	Continuous PM <sub>2.5</sub> 88502-3	Neighborhood	Population Exposure	SPM	This monitor will replace the CPW Site and fulfill the Appendix D continuous monitoring requirement. No planned changes.
North Charleston Fire Station 45-019-0020	Pending	PM <sub>2.5</sub> 88101-2	Neighborhood	Population Exposure	QA Collocat ed SLAMS	This monitor will replace the FAA Site (moved from T.K. Gregg) and fulfill the Appendix D collocation requirement for the MSA. No planned changes.

<b>PM<sub>2.5</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
Irving Street 45-019-0021	June 11, 2020	PM <sub>2.5</sub> 88502-3	Neighborhood	Population Exposure	SPM	This monitor was established for approximately two years by the Port Authority to monitor Port emissions.
Cape Romain 45-019-0046	July 11, 1983	Continuous PM <sub>2.5</sub> 88502-3	Regional	General/Bac kground	SLAMS	Thermo Scientific 1405-F FDMS w/SCC This monitor currently fulfills the Appendix D PM <sub>2.5</sub> background and the continuous monitoring requirement for the MSA. No planned changes.
FAA Beacon 45-019-0048	April 9, 1999	FRM PM <sub>2.5</sub> 88101-1 1:1	Neighborhood	Population Exposure	SPM	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC- Gravimetric This monitor can fulfill the Appendix D minimum monitoring requirements and will be moved to the North Charleston Fire Station after it is established.
Charleston Public Works 45-019-0049	November 20, 1998	FRM PM <sub>2.5</sub> 88101-1 1:1	Neighborhood	Population Exposure	SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC-Gravimetric This monitor can fulfill the Appendix D minimum monitoring requirements and will be moved to the North Charleston Fire Station after it is established.
Charleston Public Works 45-019-0049	November 20, 1998	Continuous PM <sub>2.5</sub> 88502-3	Neighbor- hood	Population Exposure	SPM	TEOM Gravimetric 50 deg C This monitor fulfills the Appendix D continuous requirement and will be moved to the North Charleston Fire Station after it is established.
<b>Charlotte-Concord-Gastonia, NC-SC</b>						
<i>Garinger 37-119-0041</i>		<i>PM<sub>2.5</sub></i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>	<i>North Carolina monitor</i>
<i>Garinger 37-119-0041</i>		<i>Continuous PM<sub>2.5</sub></i>	<i>Neighborhood</i>	<i>NCore</i>	<i>SLAMS</i>	<i>North Carolina monitor</i>

<b>PM<sub>2.5</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
<i>Remount Rd. 37-119-0045</i>		<i>Continuous PM<sub>2.5</sub></i>	<i>Microscale</i>	<i>Source-Oriented</i>	<i>SLAMS</i>	<i>North Carolina monitor</i>
<i>Rockwell</i>		<i>Continuous PM<sub>2.5</sub></i>	<i>Neighborhood</i>	<i>General/Back ground</i>	<i>SPM</i>	<i>North Carolina monitor</i>
<b>Columbia, SC MSA</b>						
Irmo 45-063-0008	April 7, 1989	FRM PM <sub>2.5</sub> 88101-1 1:1	Neighborhood	Population Exposure	SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor can be used to fulfill the Appendix D collocation requirement. No planned changes.
Irmo 45-063-0008	April 7, 1989	Continuous PM <sub>2.5</sub> 88101-3	Neighborhood	Population Exposure	SPM	Thermo Scientific 1405-F FDMS w/VSCC This monitor can be used to fulfill the Appendix A and Appendix D collocated and continuous requirement. No planned changes.
Parklane 45-079-0007	April 3, 1980	FRM PM <sub>2.5</sub> 88101-1 1:3	Neighborhood	Population Exposure	NCore SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the Appendix D NCore requirement for the State and minimum monitoring requirement for the MSA. No planned changes.
Parklane 45-079-0007		FRM Collocated PM <sub>2.5</sub> 88101-2 1:3	Neighborhood	Population Exposure	QA Collocated SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor can be used to fulfill the Appendix A minimum collocation requirement for the State. No planned changes.
Parklane 45-079-0007	April 3, 1980	Continuous PM <sub>2.5</sub> 88502-3	Neighborhood	Population Exposure	SLAMS	Thermo Scientific 1405-F FDMS w/SCC This monitor fulfills an Appendix D NCore

<b>PM<sub>2.5</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
						requirement and may fulfill the continuous monitoring requirement. No planned changes.
<b>Florence, SC MSA</b>						
Williams Middle School 45-041-0003	August 4, 2008	FRM PM <sub>2.5</sub> 88101-1 1:3	Neighborhood	Population Exposure/Highest Concentration	SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This Site monitors PM <sub>2.5</sub> for the MSA.
Williams Middle School 45-041-0003	August 4, 2008	Continuous PM <sub>2.5</sub> 88502-3	Neighborhood	Population Exposure	SLAMS	TEOM Gravimetric 30 deg C This Site monitors PM <sub>2.5</sub> for the MSA.
<b>Greenville-Anderson, SC MSA</b>						
Greenville Employment Security Commission 45-045-0015	April 11, 2008	FRM PM <sub>2.5</sub> 88101-1 1:1	Neighborhood	Population Exposure/Welfare Related Impacts	SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the appendix A minimum collocation requirement. No planned changes.
Greenville Employment Security Commission 45-045-0015	April 11, 2008	Continuous PM <sub>2.5</sub> 88101-3	Neighborhood	Population Exposure/Welfare Related Impacts	SPM	Thermo Scientific 1405-F FDMS w/VSCC This monitor fulfills the Appendix A and Appendix D minimum required collocation and continuous requirements. No planned changes.
Hillcrest Middle School 45-045-0016	February 17, 2009	FRM PM <sub>2.5</sub> 88101-1 1:3	Urban	Population Exposure	SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the Appendix A minimum required collocation requirements. No planned changes.

<b>PM<sub>2.5</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
Hillcrest Middle School 45-045-0016	February 17, 2009	Collocated PM <sub>2.5</sub> 88101-2 1:3	Urban	Population Exposure	QA Collocated SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the Appendix A minimum required collocation requirements. No planned changes.
<b>Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA</b>						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Spartanburg MSA</b>						
T.K. Gregg Recreation Center 45-083-0011	December 29, 2008	PM <sub>2.5</sub> 88101-1 1:1	Neighborhood	Highest Concentration	SLAMS	Thermo Scientific 1405-F FDMS w/SCC This monitor fulfills the Appendix A and Appendix D minimum monitoring and the collocation requirement for this MSA. No planned changes.
T.K. Gregg Recreation Center 45-083-0011	December 29, 2008	Continuous PM <sub>2.5</sub> 88502-3	Neighborhood	Highest Concentration	SPM	TEOM Gravimetric 50 deg C This monitor fulfills the Appendix A collocation requirement for this MSA. No planned changes.
T.K. Gregg Recreation Center 45-083-0011	December 29, 2008	FRM PM <sub>2.5</sub> 88101-2 1:6	Neighborhood	Population Exposure	QA Collocated SPM	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the Appendix A collocation requirement for the State. No planned changes.
<b>Remainder of State</b>						
Chesterfield 45-025-0001	January 6, 2000	PM <sub>2.5</sub> 88101-1 1:3	Regional	Regional Transport	SLAMS	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the Appendix D PM <sub>2.5</sub> Regional Transport requirement for the State. No planned changes.

<b>PM<sub>2.5</sub> Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
		Continuous PM <sub>2.5</sub> 88502-3	Regional	Population Exposure	SLAMS	Thermo Scientific 1405-F FDMS w/SCC No planned changes.

## Ozone Ambient Air Monitoring Network

*Regulations* – In April of 1971, the EPA set the first ozone NAAQS at 0.08 ppm with a one-hour averaging time, not to be exceeded more than one hour per year. In February of 1979, the EPA made the decision to raise the NAAQS to 0.12 ppm with a one-hour averaging time. Attainment was defined when the expected number of days per calendar year that had maximum hourly average concentration greater than 0.12 ppm was equal to or less than 1. In 1993, the ozone NAAQS was retained at 0.12 ppm. In July of 1997, the EPA lowered the standard to 0.08 ppm and changed to an 8-hour averaging time. Design values were determined by the annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years. In 2008, the EPA lowered the NAAQS to 0.075 ppm but retained the averaging time and form of calculation. In 2015, the EPA lowered the NAAQS to 0.070 ppm with the averaging time and form of calculation again being retained.

There are two requirements for minimum monitoring found in 40 CFR Part 58, Appendix D, Sections 3(a) and (b) and 40 CFR Part 58, Appendix D, Section 4.1. The requirements are as follows:

1. NCore Requirement – Each state is required to operate at least one NCore site that measures ozone. The Parklane (45-079-0007) Site in the Columbia MSA is the NCore site for South Carolina and supports one ozone monitor. Also, the Garinger (37-229-0041) Site in Charlotte, North Carolina is an NCore site with an ozone monitor.

2. Ozone SLAMS Requirement – This requirement is based on MSA population and design values. Table 41 below is taken from Table D-2 of 40 CFR Part 58, Appendix D and shows the SLAMS ozone minimum monitoring requirements.

*Table 41: Table D-2 – SLAMS Minimum Ozone Monitoring Requirements*

<b>MSA population<sup>1,2</sup></b>	<b>Most recent 3-year design value concentrations <math>\geq</math>85% of any O<sub>3</sub> NAAQS<sup>3</sup></b>	<b>Most recent 3-year design value concentrations &lt;85% of any O<sub>3</sub> NAAQS<sup>3,4</sup></b>
>10 million	4	2
4-10 million	3	1
350,000-<4 million	2	1
50,000-<350,000 <sup>5</sup>	1	0

<sup>1</sup>Minimum monitoring requirements apply to the MSA.

<sup>2</sup>Population based on latest available census figures.

<sup>3</sup>The ozone (O<sub>3</sub>) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50.

<sup>4</sup>These minimum monitoring requirements apply in the absence of a design value.

<sup>5</sup>MSA must contain an urbanized area of 50,000 or more population.

Table 42 indicates the 2018 ozone design values for ozone monitors located within MSAs. The grayed entries denote the highest design values for each MSA.

*Table 42: 2018 Population and Ozone Design Values*

<b>Site ID</b>	<b>Site Name</b>	<b>MSA</b>	<b>2018 MSA Population</b>	<b>2018 DVs (ppb)</b>
37-109-0004	Crouse	Charlotte-Concord-Gastonia, NC-SC	2,569,213	65
37-119-0041	Garinger	Charlotte-Concord-Gastonia, NC-SC	2,569,213	68
37-119-0046	University Meadows	Charlotte-Concord-Gastonia, NC-SC	2,569,213	70
37-159-0021	Rockwell	Charlotte-Concord-Gastonia, NC-SC	2,569,213	62
37-179-0003	Monroe MS	Charlotte-Concord-Gastonia, NC-SC	2,569,213	68
45-091-0008	York Landfill	Charlotte-Concord-Gastonia, NC-SC	2,569,213	63
45-007-0005	Big Creek	Greenville-Anderson	906,626	57
45-045-0016	Hillcrest	Greenville-Anderson	906,626	62
45-077-0002	Clemson	Greenville-Anderson	906,626	62
45-077-0003	Wolf Creek	Greenville-Anderson	906,626	62
45-079-0007	Parklane	Columbia	832,666	61
45-079-0021	Congaree Bluff	Columbia	832,666	55
45-079-1001	Sandhill	Columbia	832,666	64
45-015-0002	Bushy Park	Charleston-North Charleston,	787,643	58
45-019-0046	Cape Romain	Charleston-North Charleston,	787,643	61
45-037-0001	Trenton	Augusta-Richmond County, GA-SC	604,167	60
45-003-0003	Jackson Middle School	Augusta-Richmond County, GA-SC	604,167	62
13-073-0001	Evans	Augusta-Richmond County, GA-SC	604,167	60
13-245-0091	Augusta	Augusta-Richmond County, GA-SC	604,167	62
45-051-0008	Coastal Carolina	Myrtle Beach-Conway-North Myrtle Beach, SC-NC	480,891	53
45-083-0009	North Spartanburg	Spartanburg	341,298	65
45-031-0003	Pee Dee	Florence	204,961	60

Using the design values and population data from Table 42, the required ozone monitors for each MSA can be calculated. The requirements are as follows:

*Table 43: Number of Required Ozone Monitors/MSA*

<b>MSA</b>	<b>Required Ozone Monitors/MSA</b>
*Augusta-Richmond County, GA-SC MSA	2
Charleston-North Charleston, MSA	2
*Charlotte-Concord-Gastonia, NC-SC MSA	2
Columbia MSA (NCore)	2
Florence MSA	1
Greenville-Anderson MSA	2
Hilton Head Island-Bluffton MSA	0
Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA	1
Spartanburg MSA	1
Sumter MSA	0
*Minimum ambient air monitoring requirements are met cooperatively with the States of Georgia and North Carolina.	

*Historical and Current Monitors* – South Carolina has operated a total of 36 ozone monitors, with the first monitor being established in 1972. Graph 13 below shows how the number of operating ozone monitors in South Carolina has changed over the years.

*Graph 13: 1975-2018 Number of Ozone Monitors in South Carolina*

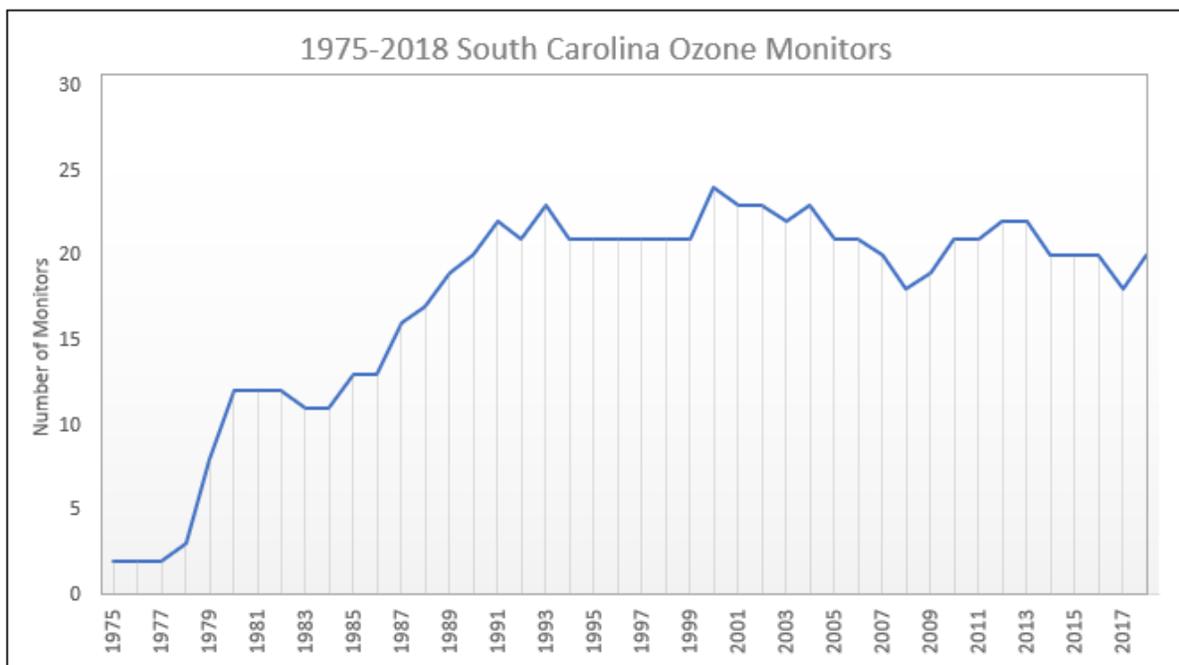


Table 44 below indicates all of South Carolina's past ozone monitors by MSA.

*Table 44: South Carolina's Historical Ozone Monitors*

<b>MSA or County</b>	<b>Site ID</b>	<b>Start Date</b>	<b>End Date</b>
Augusta-Richmond County, GA-SC	450030004	8/9/2000	11/1/2002
Charleston-North Charleston	450150002	6/26/1978	11/1/2019
Charleston-North Charleston	450150042	3/7/1979	11/2/2004
Charleston-North Charleston	450190045	5/7/1982	11/4/1982
Charlotte-Concord-Gastonia, NC-SC	450910004	1/17/1973	11/15/1974
Charlotte-Concord-Gastonia, NC-SC	450910002	12/17/1974	2/28/1980
Charlotte-Concord-Gastonia, NC-SC	450230002	3/1/1980	11/7/2007
Charlotte-Concord-Gastonia, NC-SC	450911004	5/10/1984	3/31/1993
Charlotte-Concord-Gastonia, NC-SC	450910006	3/31/1993	12/8/2016
Charlotte-Concord-Gastonia, NC-SC	450918001	5/4/2012	11/5/2013
Charlotte-Concord-Gastonia, NC-SC	450918002	7/20/2012	11/14/2013
Columbia	450791003	12/21/1972	3/31/1978
Columbia	450791004	4/4/1978	1/4/1988
Columbia	450630003	4/2/1979	11/2/1981
Columbia	450791006	3/24/1981	3/28/2001
Columbia	450791002	8/14/1989	11/1/2001
Florence	450310002	4/20/1980	11/8/1990
Greenville-Anderson	450450007	5/22/1979	1/9/1991
Greenville-Anderson	450070003	6/1/1991	11/1/2006
Greenville-Anderson	450450009	7/6/2000	9/26/2000
Greenville-Anderson	450451003	8/7/2008	11/13/2015
Greenville-Anderson	450770002	7/20/1979	11/1/2019
Greenville-Anderson	450770003	8/10/2010	11/1/2019
Hilton Head Island-Bluffton	450130003	9/16/1980	10/30/1982
Hilton Head Island-Bluffton	450130090	1/1/1987	12/31/1993
Myrtle Beach-Conway-North Myrtle Beach	450511001	7/9/1979	1/10/1984
Myrtle Beach-Conway-North Myrtle Beach	450510003	3/4/2010	12/7/2011
<b>Counties</b>			
Abbeville County	450010001	4/3/1991	1/10/2017
Barnwell County	450110001	11/18/1985	11/6/2007
Cherokee County	450210002	4/21/1988	1/27/2016
Colleton County	450290001	7/16/1979	11/17/1989
Colleton County	450290002	3/8/1990	1/8/2019
Oconee County	450730001	5/4/1989	3/1/2020
Orangeburg County	450750003	3/17/2004	11/9/2004
Union County	450870001	8/26/1983	11/1/2007
Williamsburg County	450890001	4/26/1991	11/6/2007

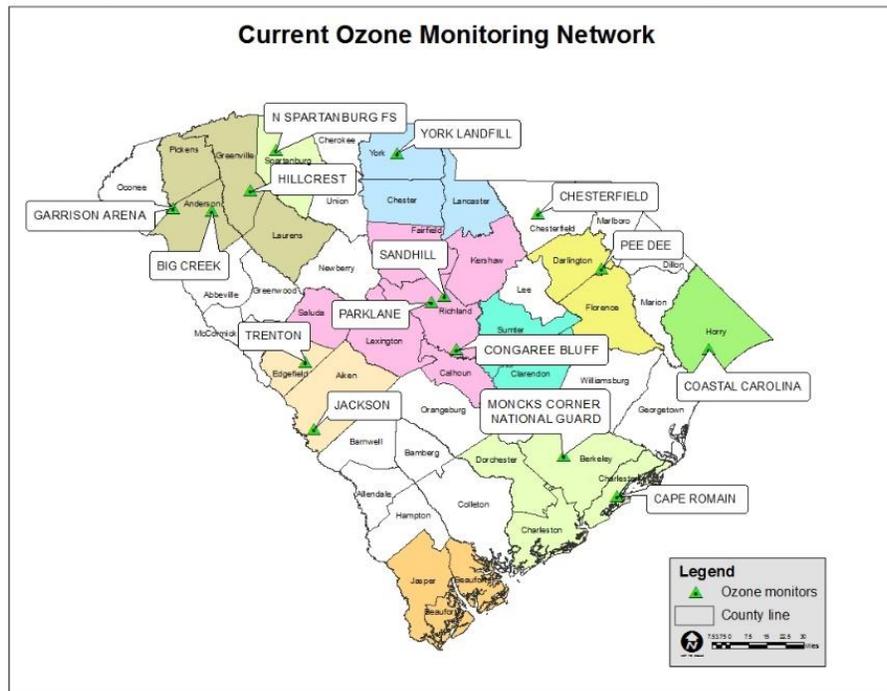
Table 45 enumerates the fifteen ozone monitors operating within South Carolina in 2020.

Table 45: South Carolina's Current Ozone Monitors

MSA or County	Site ID	Site Name	Start Date
Augusta-Richmond County	450370001	Trenton	4/3/1980
Augusta-Richmond County	450030003	Jackson Middle School	11/8/1985
Charleston-North Charleston	450190046	Cape Romain	3/5/1987
Charleston-North Charleston	450151002	Moncks Corner National Guard	9/26/2018
Charlotte-Concord-Gastonia	450910008	York Landfill	2/27/2017
Columbia	450790007	Parklane	1/6/1987
Columbia	450790021	Congaree Bluff	1/19/2000
Columbia	450791001	Sandhill	4/18/2002
Florence	450310003	Pee Dee	3/24/1993
Greenville-Anderson	450070005	Big Creek	6/6/2008
Greenville-Anderson	450450016	Hillcrest	3/4/2009
Greenville-Anderson	450070006	Garrison Arena	9/26/2018
Myrtle Beach-Conway-North Myrtle Beach	450510008	Coastal Carolina	7/27/2016
Spartanburg	450830009	N. Spartanburg Fire Station #2	4/10/1990
Counties			
Chesterfield County	450250001	Chesterfield	3/7/2002

As Map 32 indicates, all the ozone monitors except one are located within the MSAs.

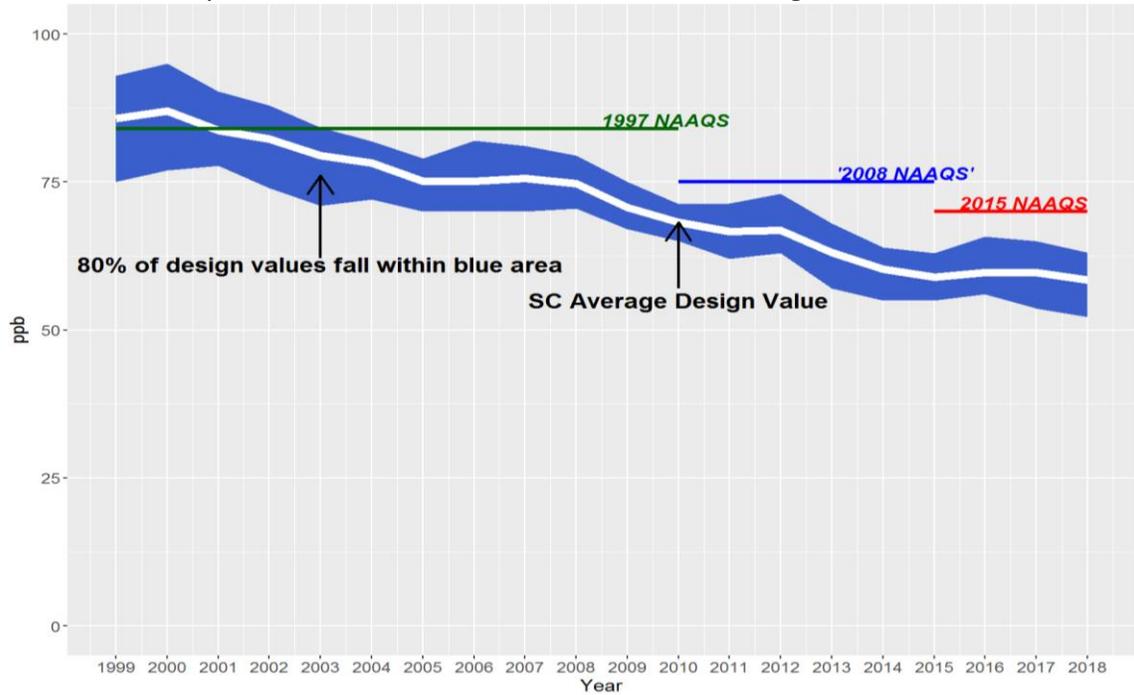
Map 32: Current South Carolina Ozone Monitoring Network



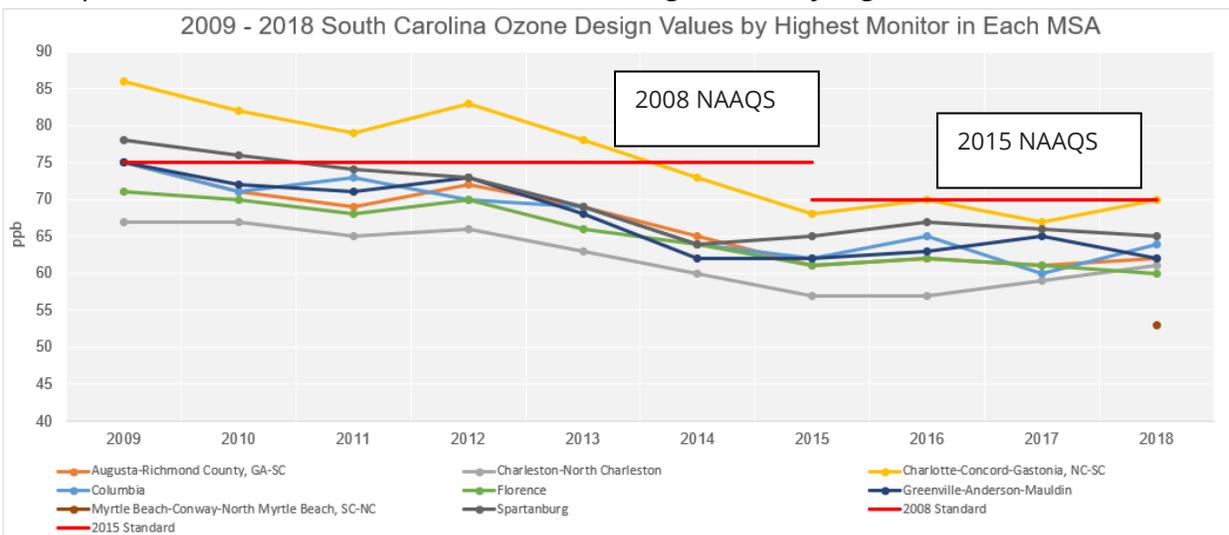
Eleven of these monitors operate only during the South Carolina Ozone Season which is from March 1st to October 31st. Five monitors operate year-round and are located at the Parklane (45-079-0007) Chesterfield (45-025-0001), Cape Romain (45-019-0046), Hillcrest (45-045-0016), and Trenton (45-037-0001) Sites.

*Design Value Trends and Comparison to the NAAQS* – As Graph 14 and Graph 15 indicate, the South Carolina ozone design value trends have decreased with time.

*Graph 14: 1999-2018 South Carolina Ozone Design Value Trend*



*Graph 15: 2009-2018 South Carolina Ozone Design Values by Highest Monitor in Each MSA*



In the last ten years, the trend has continued to decline. Since 2011, all ozone monitors within South Carolina have been below the NAAQS. The Charlotte-Concord-Gastonia MSA's highest ozone monitor had a 2018 design value of 0.070 ppb.

A design values map indicates where the design values are the highest. As expected, the Map33-Design Values Map indicate design values are higher in the more populated and industrialized areas, such as the Charlotte-Concord-Gastonia MSA, the Spartanburg MSA, and the Columbia MSA.

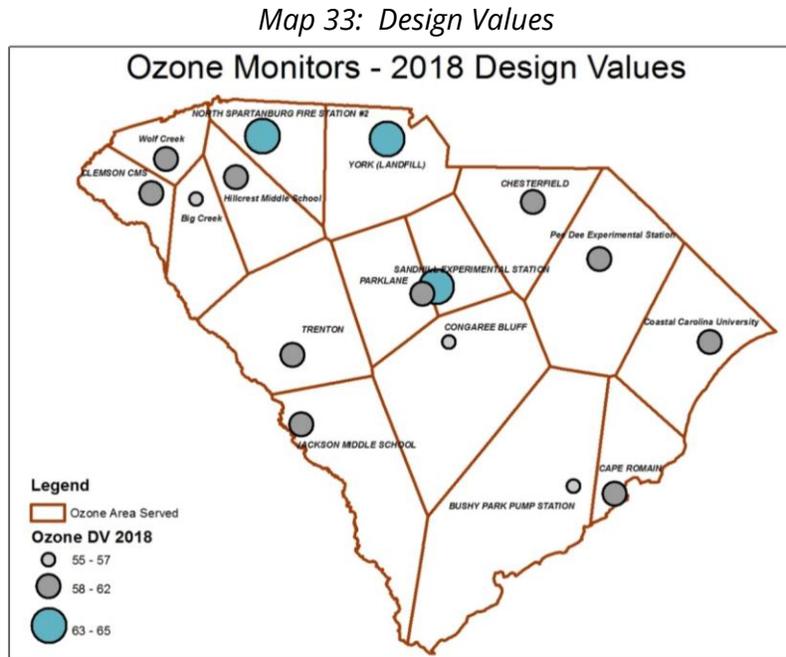


Table 46 lists all 2018 ozone design values in the South Carolina MSAs. The highest design value was 70 ppb at the University Meadows (37-119-0046) monitor in the Charlotte-Concord-Gastonia MSA. Within South Carolina, the highest ozone design value for 2018 was 65 ppb at North Spartanburg Fire Station #2 (45-083-0009) monitor in the Spartanburg MSA.

*Table 46: South Carolina 2018 Ozone Design Values*

<b>MSA</b>	<b>Site Name</b>	<b>Site ID</b>	<b>2018 Design Value (ppb)</b>
Augusta-Richmond County	Evans	13-073-0001	60
Augusta-Richmond County	Augusta	13-245-0091	62
Augusta-Richmond County	Trenton	45-037-0001	60
Augusta-Richmond County	Jackson Middle School	45-003-0003	62
Charleston-North Charleston	Bushy Park	45-015-0002	58
Charleston-North Charleston	Cape Romain	45-019-0046	61
Charlotte-Concord-Gastonia	Crouse	37-109-0004	65

<b>MSA</b>	<b>Site Name</b>	<b>Site ID</b>	<b>2018 Design Value (ppb)</b>
Charlotte-Concord-Gastonia	Garinger	37-119-0041	68
Charlotte-Concord-Gastonia	University Meadows	37-119-0046	70
Charlotte-Concord-Gastonia	Rockwell	37-159-0021	62
Charlotte-Concord-Gastonia	Monroe	37-179-0003	68
Charlotte-Concord-Gastonia	York Landfill	45-091-0008	63
Columbia	Parklane	45-079-0007	61
Columbia	Congaree Bluff	45-079-0021	55
Columbia	Sandhill	45-079-1001	64
Florence	Pee Dee	45-031-0003	60
Greenville-Anderson	Big Creek	45-007-0005	57
Greenville-Anderson	Hillcrest	45-045-0016	62
Greenville-Anderson	Clemson	45-077-0002	62
Greenville-Anderson	Wolf Creek	45-077-0003	62
Myrtle Beach-Conway-North Myrtle Beach	Coastal Carolina	45-051-0008	*53
Spartanburg	N. Spartanburg Fire Station #2	45-083-0009	65
Not in MSA			
Chesterfield County	Chesterfield	45-025-0001	*62
Oconee	Long Creek	45-073-0001	63

\*Annual Values not meeting completeness criteria

*Risk of Future Exceedance* – The Risk of Exceedance table below contains calculations designed to predict the risk of a future NAAQS exceedance for ozone based on 2014-2018 data. The purpose of this test is to see which sites are most likely to exceed the applicable NAAQS in the following three years based on previous data trends. Based on the last five years of monitoring data, the last column indicates there is a 90 percent confidence index that most of the ozone monitors will exceed 80 percent of the current NAAQS.

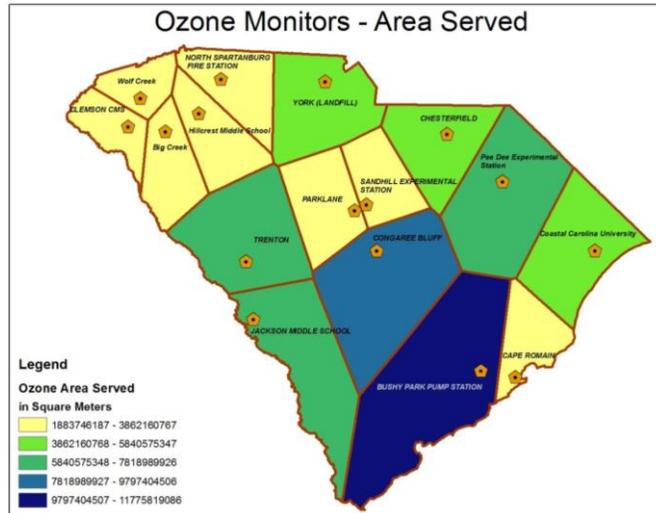
*Table 47: Ozone 8-Hour Design Value Risk of Future Exceedance*

<b>Site ID and Name</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>Average</b>	<b>Standard Deviation</b>	<b>90% Upper Confidence</b>	<b>Is 90%CI &lt; 80% of NAAQS?</b>
450030003 Jackson MS	0.060	0.600	0.060	0.059	0.062	0.060	0.001	0.061	No
450070005 Big Creek	0.062	0.058	0.060	0.059	0.057	0.059	0.002	0.061	No
450150002 Bushy Park	0.059	0.057	0.057	0.057	0.058	0.058	0.001	0.058	No
450190046	0.060	0.057	0.057	0.059	0.061	0.059	0.002	0.061	No

<b>Site ID and Name</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>Average</b>	<b>Standard Deviation</b>	<b>90% Upper Confidence</b>	<b>Is 90%CI &lt; 80% of NAAQS?</b>
Cape Romain									
450250001 Chesterfield	0.060	0.058	0.060	0.060	0.062	0.060	0.001	0.061	No
450290002 Ashton	0.055	0.054	0.056	0.055	0.056	0.055	0.001	0.056	Yes
450310003 Pee Dee	0.064	0.061	0.062	0.061	0.060	0.062	0.002	0.063	No
450370001 Trenton	0.053	0.054	0.058	0.061	0.060	0.057	0.004	0.061	No
450450016 Hillcrest	0.060	0.062	0.063	0.065	0.062	0.062	0.002	0.064	No
450730001 Long Creek	0.060	0.059	0.063	0.063	0.063	0.062	0.002	0.063	No
450770002 Clemson	0.063	0.060	0.063	0.063	0.062	0.062	0.001	0.063	No
450770003 Wolf Creek	0.059	0.058	0.060	0.061	0.062	0.060	0.002	0.062	No
450790007 Parklane	0.058	0.055	0.059	0.060	0.061	0.059	0.002	0.061	No
450790021 Congaree Bluff	0.055	0.055	0.055	0.055	0.055	0.055	0.000	0.055	Yes
450791001 Sandhill	0.064	0.620	0.065	0.064	0.064	0.175	0.249	0.412	No
450830009 NSFS	0.064	0.065	0.067	0.066	0.065	0.065	0.001	0.066	No

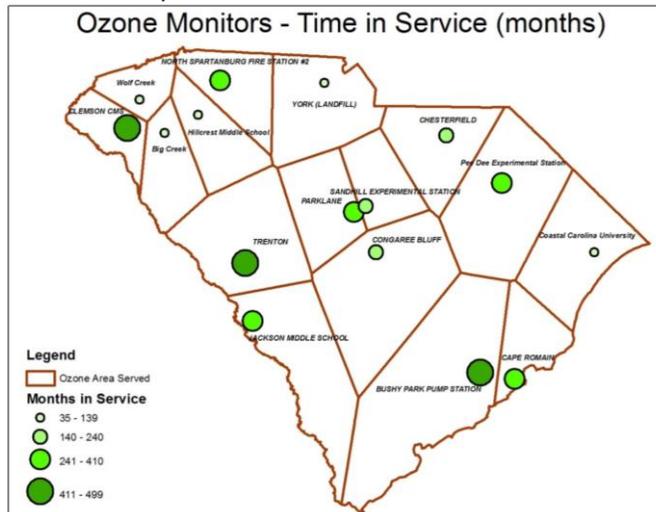
*Area Served* – Map 34 indicates the Theissen polygons that were used to score each monitor. Each polygon represents one ozone monitor.

*Map 34: Area Served*



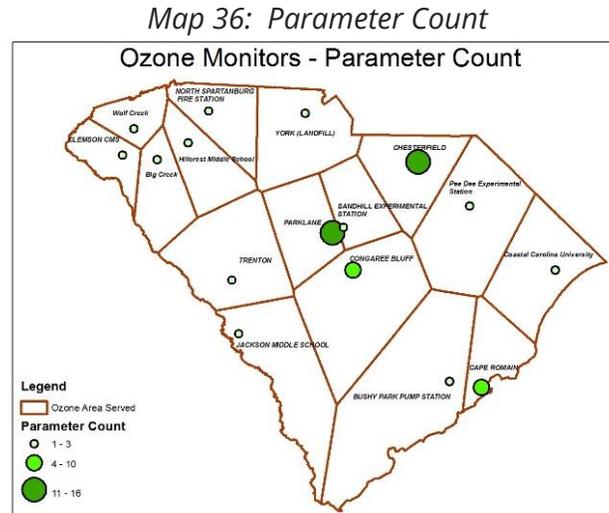
*Monitors Time in Service* – A monitoring site that has had a monitor in service an extended period of time provides data for long-term trends. Map 35 indicates that the Clemson CMS (45-045-0015) monitor, the Trenton (45-037-0001) monitor, and the Bushy Park (45-015-0002) monitor have/had the longest time in service.

*Map 35: Monitors Time in Service*

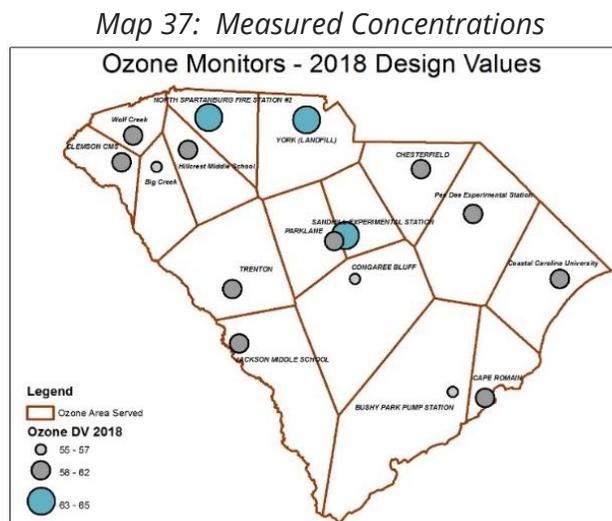


*Parameter Count at the Site* – Sites were ranked by the number of parameters that are measured at a particular site. Air quality monitoring sites hosting monitors collocated with other measurement instruments are considered to be more valuable than sites where fewer parameters are measured. In addition, the operating costs can be leveraged among several instruments at these sites.

Sites with the most parameters monitored are ranked the highest. As shown in Map 36, the monitoring sites with the most parameters are found at the Chesterfield (45-025-0001) Monitoring Site in Chesterfield County and the Parklane (45-079-0007) Monitoring Site in the Columbia MSA.



*Measured Concentrations* – Individual monitors were ranked based on the concentration of pollutants they measure. Monitors that measure high concentrations or design values are ranked higher than monitors that measure low concentrations. The greater the design value, the higher the site rank. The Department used 2018 design values for the ozone sites to rank the ambient air monitoring sites.

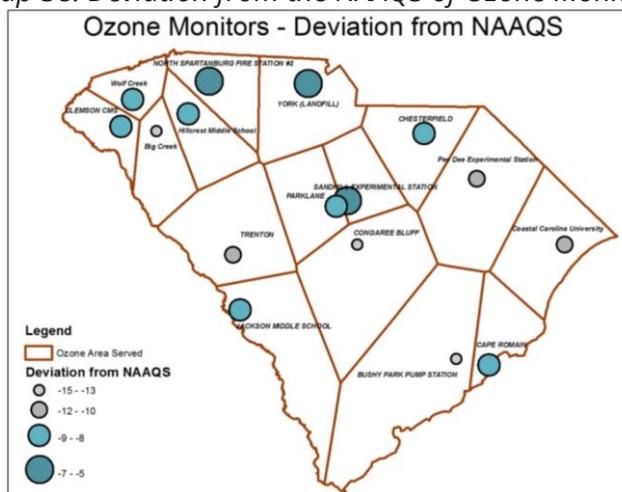


Map 37 indicates that in 2018, the monitors that recorded the highest ozone design values were located at the North Spartanburg Fire Station #2 (45-083-0009) Monitoring Site in the Spartanburg MSA, the Sandhill Experimental Station (45-079-1001) Monitoring Site in the

Columbia MSA, and the York Landfill (45-091-0008) Monitoring Site in the Charlotte-Concord-Gastonia MSA.

*Deviation from NAAQS* – The Deviation from the NAAQS map shows Sites measuring design values that are very close to the NAAQS exceedance threshold ranked as highest in this analysis.

Map 38: Deviation from the NAAQS of Ozone Monitors

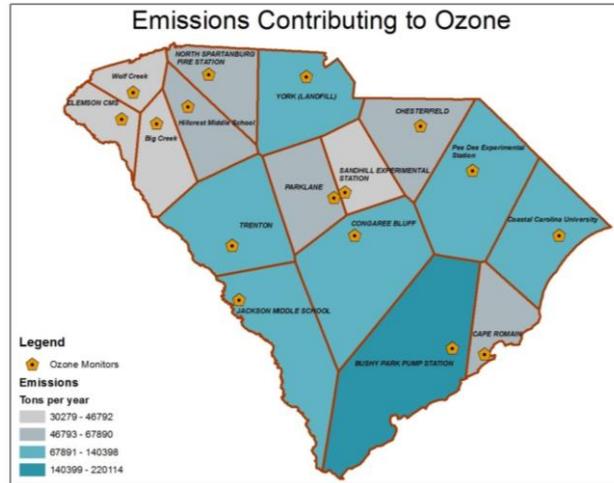


These sites may be considered more valuable for NAAQS compliance evaluation. Sites measuring concentrations well above or below the threshold do not provide as much information in terms of NAAQS compliance. This technique contrasts the difference between the standard and actual measurements or design values. The ozone monitors with the highest deviation from the NAAQS were located at the North Spartanburg Fire Station #2 (45-083-0009) Monitoring Site in the Spartanburg MSA, the Sandhill Experimental Station (45-079-1001) Monitoring Site in the Columbia MSA, and the York Landfill (45-091-0008) Monitoring Site in the Charlotte-Concord-Gastonia MSA.

*Emission inventory* –Emission inventory data were used to find locations where emissions of pollutants of concern are concentrated. This analysis can be scaled to various levels of complexity, depending on available resources. The county-level emissions patterns, such as those in the National Emission Inventory, can be compared with monitor locations. For measuring maximum precursor or primary emissions, monitors should be placed in those counties with maximum emission density. More complex methods use gridded emissions and/or species-weighted emissions, depending on their importance producing secondary pollutants of concern. The monitoring sites were scored based on the total emissions being represented by each monitoring area (area served polygon).

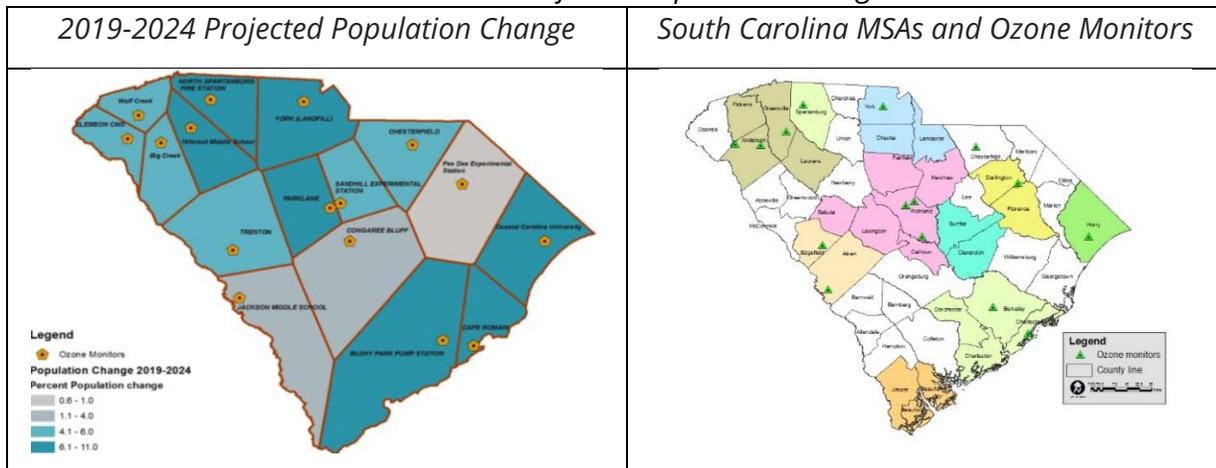
The monitoring site nearest the area of highest ozone emissions was the Bushy Park (45-015-0002) Monitoring Site in the Charleston-North Charleston MSA.

Map39: Ozone Monitors Within the Areas of Ozone Emissions



*Population change* – High rates of population increase are associated with potential increased emissions activity and exposure. Sites were ranked on population change in the area of representation. Area of representation was estimated using the Thiessen polygons technique. The total population change at the census tract or block group level that falls within the area of coverage of an ozone monitor is assigned to that monitor. This technique gives more weight to sites in areas with high rates of population growth and large areas of representation.

Table 48: Projected Population Change



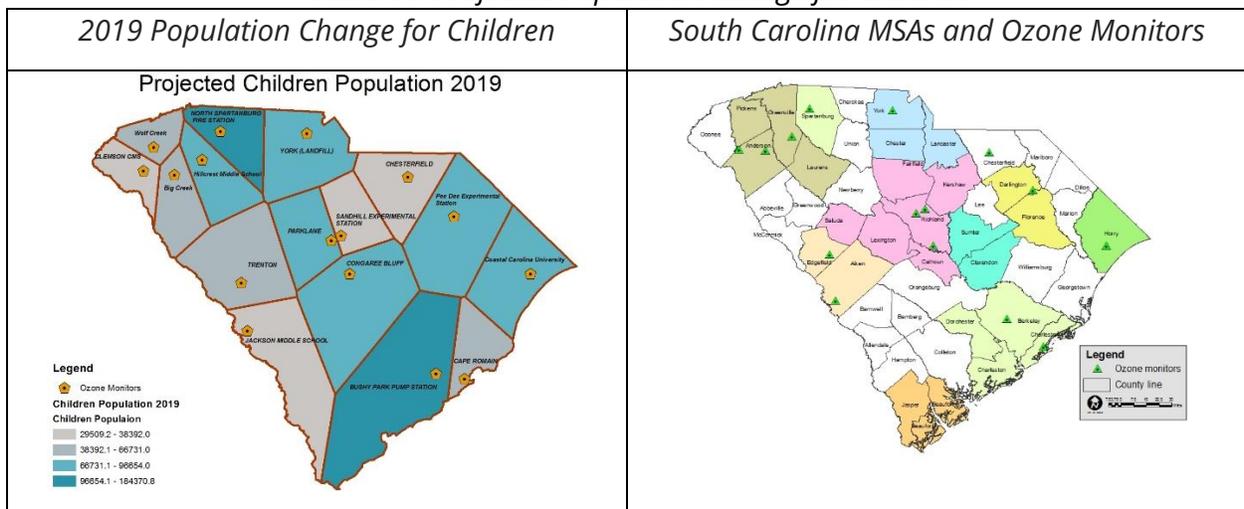
As can be seen in Table 48, when comparing the 2019-2024 Projected Population Change Map to the South Carolina MSAs and Ozone Monitors Map, the Upstate area with the largest projected population changes were located within the Spartanburg MSA, the South Carolina portion of the Charlotte-Gastonia-Concord MSA, and the Columbia MSA. These areas are

represented by ozone monitors at the North Spartanburg Fire Station #2 (45-083-0009) Site (Spartanburg MSA), the Hillcrest Middle School (45-045-0016) Monitoring Site (Greenville-Anderson MSA), the York Landfill (45-091-0008) Monitoring Site (Charlotte-Concord-Gastonia MSA), and the Parklane (45-079-0007) Monitoring Site (Columbia MSA), respectively.

In the coastal areas, all counties are expected to experience growth. These areas are represented by the Charleston-North Charleston MSA, which has ozone monitors located at the Moncks Corner National Guard (45-015-1002) and the Cape Romain (45-019-0046) Monitoring Sites. Also, the Myrtle Beach-Conway-North Myrtle Beach MSA has an ozone monitor located at the Coastal Carolina (45-051-0008) Monitoring Site.

*Estimated Population Change for Children (ages 18 and below)* – This test is similar to the population change test except that it focuses on the total population of younger individuals represented by each ambient air monitoring site. Sites were ranked on the population below age eighteen in the area of representation. Areas with high populations of youth may be indicative of the effects of pollution on sensitive individuals.

*Table 49: Projected Population Change for Children*

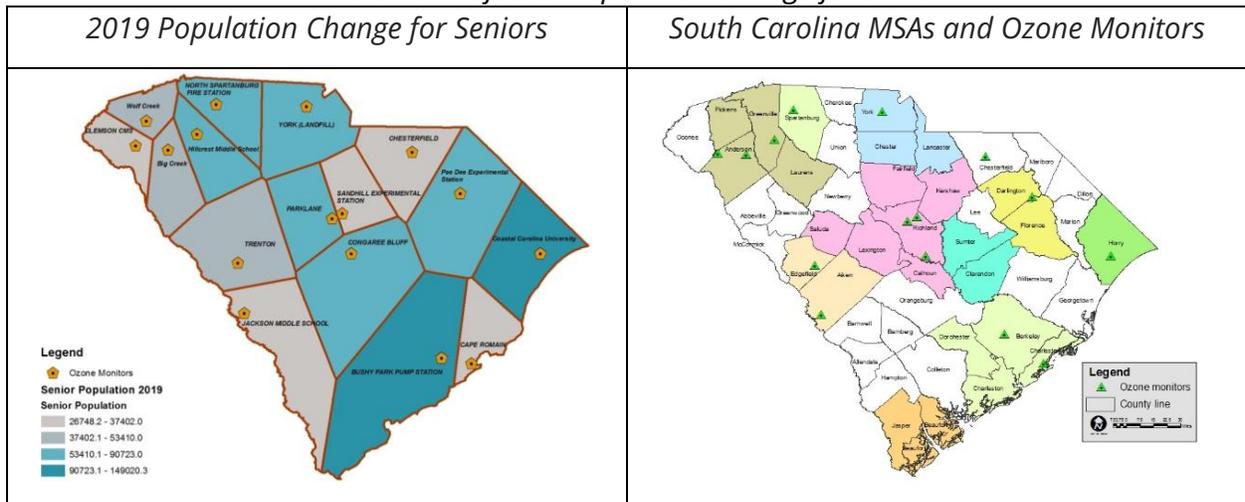


The 2019 Population Change for Children Map indicates that the highest population change for children was in the Spartanburg and the Charleston-North Charleston MSAs. These areas are represented by the ozone monitors at the North Spartanburg Fire Station #2 (45-083-0009) Site in the Spartanburg MSA and the Moncks Corner National Guard (45-015-1002) Monitoring Site in the Charleston-North Charleston MSA.

*Estimated Population Change for Seniors* – The Estimated Population Change for Seniors test is similar to the population change test except that it focuses on the total population of older individuals (65 years and above) in the area represented by each ambient air monitoring site. Areas with high populations of older individuals indicate the potential for the effects of pollution on sensitive individuals. Sites once again were ranked on the population of older individuals in the area of representation. Using the Thiessen polygons technique, the population of a county whose center falls within the area of coverage of a monitor is assigned to that monitor.

Table 50 indicates the South Carolina coastal areas saw the highest population change for seniors. These areas contain the Charleston-North Charleston and the Myrtle Beach-Conway-North Myrtle Beach MSAs. These MSAs have ozone monitors at the Moncks Corner National Guard (45-015-1002) and the Coastal Carolina (45-051-0008) Monitoring Sites, respectively.

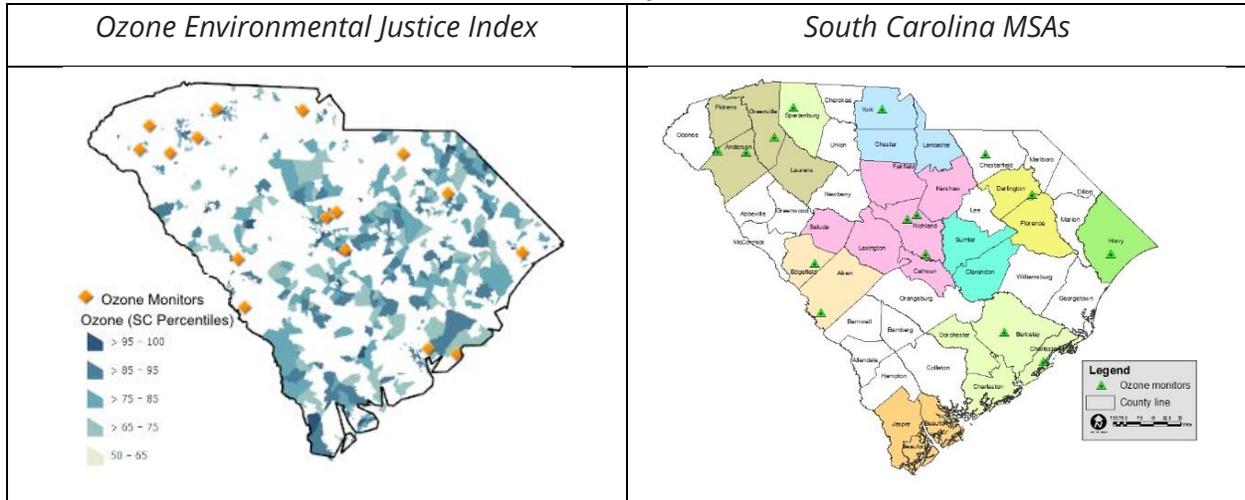
*Table 50: Projected Population Change for Seniors*



*Environmental Justice* – The environmental justice (EJ) ranking of the monitoring sites was based on the EJ screening tool developed by EPA. The EJ index is a combination of environmental and demographic information. There are eleven EJ Indexes reflecting the 11 environmental indicators. For this application, the ozone environmental indicator was used. Each of the monitoring sites was given a rank of 0 or 1, depending if the site fell outside or inside the 95 percentile EJ index score for the block group.

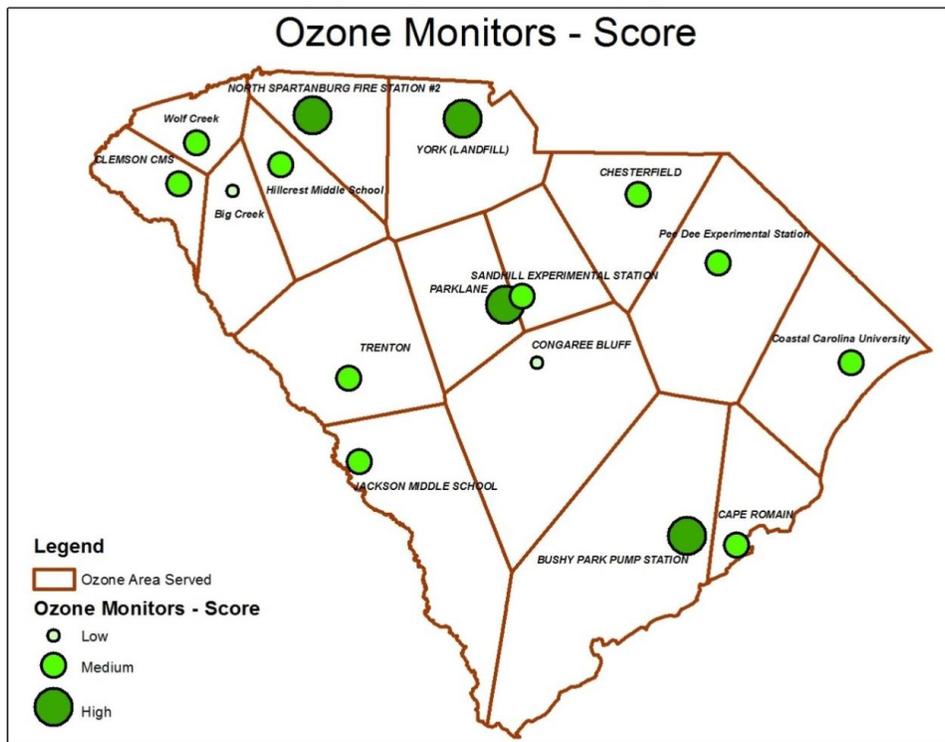
When comparing the Environmental Justice Index map to the South Carolina MSA map, most of the EJ communities are located within the MSA boundaries, which have ozone monitors.

Table 51: Environmental Justice Index and MSAs



Results of Scoring of Valuable Ozone Monitors – Based on the above criteria, the GIS analysis produced a final ranking for the ozone monitoring networks of the most and the least valuable sites.

Map 40: Final Ozone Scoring

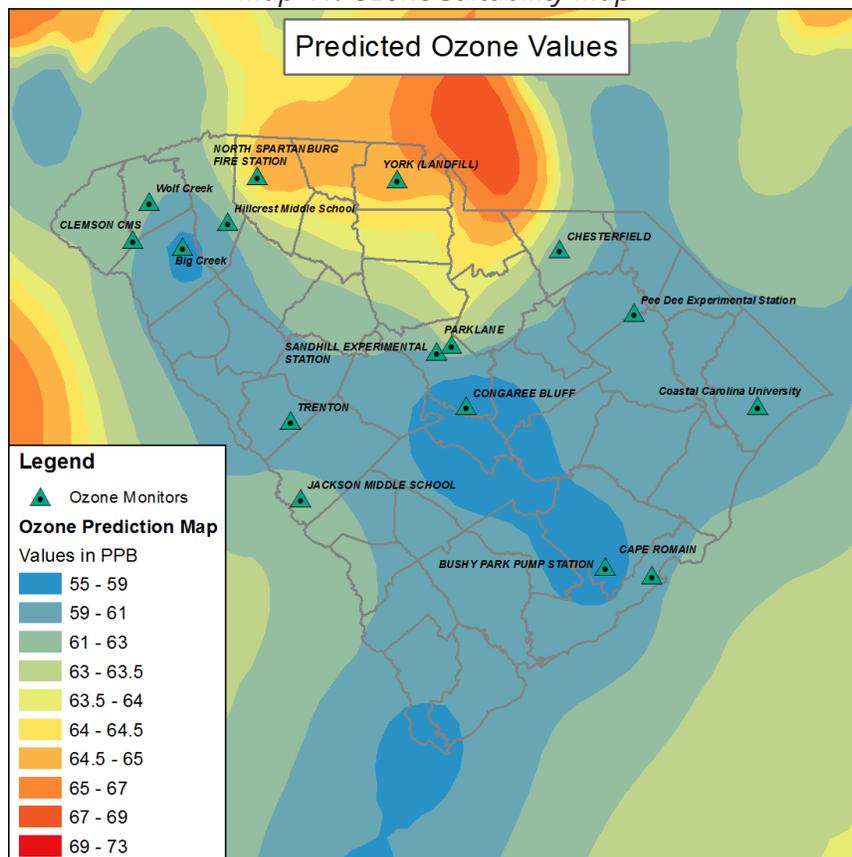


As Map 40 above shows, the scoring results indicated that the most valuable ozone monitors for the Upstate are located at the North Spartanburg Fire Station #2 (45-083-0009) Monitoring Site in the Spartanburg MSA and the York Landfill (45-091-0008) Monitoring Site in the Charlotte-Gastonia-Concord MSA. The most valuable ozone monitor for the Midlands is located at the Parklane (45-079-0007) Monitoring Site in the Columbia MSA. The most valuable ozone monitor for the Low Country is the Moncks Corner National Guard (45-015-1002) Monitoring Site in the Charleston-North Charleston MSA.

The Congaree Bluff (45-079-0021) Monitoring Site in the Columbia MSA was scored as having a low value, but this monitor is a requirement per agreement with the Congaree National Park to monitor for local conditions within the National Park.

*Gap Analysis of Ozone Monitors* – The Suitability Map produced by kriging was also examined. The blue and yellow areas indicate adequate ozone monitoring. The darker orange and red areas in the Suitability Map indicates possible areas where monitors may be added. As the color scheme in the Ozone Suitability Map indicates, the majority of South Carolina is well represented by ozone monitors and all of South Carolina is predicted to be below the NAAQS. There are also ozone monitors in the North Carolina portion of the Charlotte-Gastonia-Concord MSA.

Map 41: Ozone Suitability Map



*Density of Existing Network and Reduction of Number of Sites* – There are currently fifteen ozone monitors operating within South Carolina. In 2020, the Garrison Arena (45-007-0006) Monitoring Site in Anderson County replaced the Clemson (45-077-0002) Monitoring Site and the Wolf Creek (45-077-0002) Monitoring Site in the Greenville-Anderson MSA. Also, the Moncks Corner National Guard (45-015-1002) Monitoring Site replaced the Bushy Park (45-0-15-0002) Monitoring Site in the Charleston-North Charleston MSA. The Department does not have any plans to reduce this number of sites.

*Ozone Monitoring Network Current and Future Plans* – The current ozone network meets state needs and protects sensitive populations. Also, all MSAs meet the ozone minimum monitoring requirements except the Myrtle Beach-Conway-North Myrtle Beach MSA. The 2019 3-year ozone design value, which was 0.060 ppm, was the first design value for the Coastal Carolina (45-051-0008) Site. This is 86 percent of the ozone NAAQS and moves the minimum monitoring requirements from 1 required ozone monitor to 2 required monitors. Currently, the Department is in discussion with the EPA and North Carolina about the establishment of the second ozone monitor.

Table 52: Current PM Ozone Ambient Air Monitoring Network

<b>Ozone Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
<b>Augusta-Richmond County, GA-SC MSA</b>						
Jackson Middle School 45-003-0003	October 24, 1985	Ozone 44201-2	Urban	Upwind Background	SLAMS	This monitor currently fulfills the Appendix D minimum monitoring requirement for SC. No planned changes.
Trenton 45-037-0001	March 28, 1980	Ozone 44201-1	Urban	Maximum Concentration/ Extreme Downwind	SLAMS	This monitor currently fulfills the Appendix D minimum monitoring requirement for SC. No planned changes.
<i>Evans 13-073-0001</i>	<i>February 17, 2005</i>	<i>Ozone 44201</i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>	<i>Georgia monitor</i>
<i>Augusta 13-245-0091</i>	<i>January 1, 1976</i>	<i>Ozone 44201</i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>	<i>Georgia monitor</i>
<b>Charleston-North Charleston, SC MSA</b>						
Moncks Corner National Guard 45-015-0002	March 2, 2020	Ozone 44201-1	Urban	Max Concentration	SLAMS	This monitor currently fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.

<b>Ozone Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
Cape Romain 45-019-0046	July 11, 1983	Ozone 44201-1	Regional	General/Background	SLAMS	This monitor currently fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
<b>Charlotte-Concord-Gastonia, NC-SC</b>						
York Landfill 45-091-0008	February 27, 2017	Ozone 44201-1	Urban	Upwind Background	SLAMS	This monitors ozone for the South Carolina portion of the MSA. No planned changes.
<i>Crouse 371090004</i>		<i>Ozone 44201</i>	<i>Urban</i>	<i>General/Background</i>	<i>SLAMS</i>	<i>North Carolina monitor</i>
<i>Garinger 37-119-0041</i>		<i>Ozone 44201</i>	<i>Neighborhood</i>	<i>Highest Concentration</i>	<i>SLAMS</i>	<i>North Carolina monitor</i>
<i>University Meadows 37-119-0046</i>		<i>Ozone 44201</i>	<i>Urban</i>	<i>Highest Concentration</i>	<i>SLAMS</i>	<i>North Carolina monitor</i>
<i>Rockwell 37-159-0021</i>		<i>Ozone 44201</i>	<i>Urban</i>	<i>Highest Concentration</i>	<i>SLAMS</i>	<i>North Carolina monitor</i>
<i>Monroe Middle School 37-179-0003</i>		<i>Ozone 44201</i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SPM</i>	<i>North Carolina monitor</i>
<b>Columbia, SC MSA</b>						
Parklane 45-079-0007	April 3, 1980	Ozone 44201-1	Urban	Highest Concentration	NCore SLAMS	This monitor fulfills the Appendix D NCore for the State and minimum monitoring requirement for the MSA. No planned changes.

<b>Ozone Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Designation</b>	<b>Recommendations for Optimization</b>
Congaree Bluff 45-079-0021	December 27, 1999	Ozone 44201-1	Neighborhood	General / Background	SPM	This is a required monitor by agreement with the National Forest Service that serves the Congaree National Park. No planned changes.
Sandhill Experimental Station 45-079-1001	January 1, 1959	Ozone 44201-1	Urban	Max Ozone Concentration	SLAMS	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
<b>Florence, SC MSA</b>						
Pee Dee Experimental Station 45-031-0003	February 25, 1993	Ozone 44201-1	Urban	Max Ozone Concentration/General Background	SLAMS	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
<b>Greenville-Anderson, SC MSA</b>						
Big Creek 45-007-0005	June 4, 2008	Ozone 44201-1	Urban	Highest Concentration/Upwind Background	SLAMS	In 2020, this Site will run concurrently with the Garrison Arena (45-007-0006). Then, the Department will decide whether the Site is redundant.
Garrison Arena 45-007-0006	March 2, 2020	Ozone 44201-1	Urban	General/Background	SLAMS	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
Hillcrest Middle School 45-045-0016	February 17, 2009	Ozone 44201-1	Urban	Population Exposure	SLAMS	This monitor fulfills the Appendix D minimum

<b>Ozone Ambient Air Monitoring Network</b>						
<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollu- tant</b>	<b>Scale</b>	<b>Objective</b>	<b>Desig- nation</b>	<b>Recommendations for Optimization</b>
						monitoring requirement for the MSA. No planned changes.
<b>Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA</b>						
Coastal Carolina 45-051-0008	June 27, 2016	Ozone 44201-1	Urban	Population Exposure	SLAMS	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
<b>Spartanburg MSA</b>						
North Spartanburg Fire Station #2 45-083-0009	April 4, 1990	Ozone 44201-1	Urban	Highest Concentration	SLAMS	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
<b>Remainder of State</b>						
Chesterfield 45-025-0001	January 6, 2000	Ozone 44201-1	Regional	General/Background	SPM	This monitor provides data for rural sites. No planned changes.

**Appendix A: South Carolina Monitoring Network by MSA**

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
<b>Augusta-Richmond County, GA-SC MSA</b>							
Jackson Middle School 45-003-0003	October 24, 1985	Ozone 44201-2	Urban	Upwind Background	SLAMS	Medium	This monitor currently fulfills the Appendix D minimum monitoring requirement for SC. No planned changes.
Trenton 45-037-0001	March 28, 1980	PM <sub>2.5</sub> 88101-1 1:3	Urban	Extreme Downwind	SPM	Medium	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor can fulfill the Appendix D minimum monitoring requirements. No planned changes.
		Continuous PM <sub>2.5</sub> 88502-3	Urban	Extreme Downwind	SPM	N/A	TEOM Gravimetric 50 degC This monitor can fulfill the required PM <sub>2.5</sub> FEM continuous sampler. No planned changes.
		Ozone 44201-1	Urban	Maximum Concentration/ Extreme Downwind	SLAMS	Medium	This monitor currently fulfills the Appendix D minimum monitoring requirement for SC. No planned changes.
Augusta 13-245-0091		PM <sub>10</sub> 81102	Neighborhood	Population Exposure			Georgia monitor
		SO <sub>2</sub> 42401	Neighborhood	Population Exposure			Georgia monitor

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
		<i>PM<sub>2.5</sub></i> 88101-3	<i>Neighborhood</i>	<i>Population Exposure</i>			<i>Georgia monitor</i>
		<i>Ozone</i> 44201-1	<i>Neighborhood</i>	<i>Population Exposure</i>			<i>Georgia monitor</i>
<b>Charleston-North Charleston, SC MSA</b>							
Moncks Corner National Guard 45-015-0002	March 2, 2020	Ozone 44201-1	Urban	Max Concentration	SLAMS	N/A	This monitor currently fulfills the minimum required ozone SLAMS for MSA. No planned changes.
Jenkins Ave. Fire Station 45-019-0003	February 14, 1969	PM <sub>10</sub> 81102-3	Neighborhood	Highest Concentration	SLAMS	N/A	TEOM-Gravimetric This monitor currently fulfills the Appendix D PM <sub>10</sub> minimum monitoring requirements for the MSA. No planned changes.
		SO <sub>2</sub> 42401-1	Neighborhood	Population Exposure	SLAMS	N/A	This monitor fulfills the Appendix D SO <sub>2</sub> PWEI minimum monitoring requirement for the MSA. No planned changes.
		NO <sub>2</sub> 42602-2	Neighborhood	Highest Concentration/Source Oriented	SPM	N/A	The Department has deemed this monitor responsible for monitoring source oriented facilities in a heavily populated area. No planned changes.

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
North Charleston Fire Station 45-019-0020	PENDING	PM <sub>2.5</sub> 88101-1	Neighborhood	Population Exposure	SLAMS	N/A	This monitor will replace the FAA and CPW Sites and fulfill the Appendix D collocation requirement for the MSA. No planned changes.
		Continuous PM <sub>2.5</sub> 88502-3	Neighborhood	Population Exposure	SPM	N/A	This monitor will replace the CPW Site and fulfill the Appendix D continuous monitoring requirement. No planned changes.
		PM <sub>2.5</sub> 88101-2	Neighborhood	Population Exposure	QA Collocated SLAMS	N/A	This monitor currently fulfills the required collocation for State. No planned changes. Moved from T.K. Gregg.
Irving Street 45-019-0021	June 20, 2020	SO <sub>2</sub> 42401-1	Neighborhood	General/Background Population Exposure	SPM	N/A	This monitor was established by the Department for 2 years to monitor ambient concentrations near the Port.
		NO <sub>2</sub> 42602-1	Neighborhood	General/Background	SPM	N/A	This monitor was established by the Department for 2 years to monitor ambient concentrations near the Port.
		Continuous PM <sub>2.5</sub>	Neighborhood	Population Exposure	SPM	N/A	This monitor was established by the

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
		88502-3					Department for 2 years to monitor ambient concentrations near the Port.
Cape Romain 45-019-0046	July 11, 1983	Continuous PM <sub>2.5</sub> 88502-3	Regional	General/Background	SLAMS	N/A	Thermo Scientific 1405-F FDMS w/SCC This monitor currently fulfills the Appendix D PM <sub>2.5</sub> background and the continuous monitoring requirement for the MSA. No planned changes.
		Ozone 44201-1	Regional	General/Background	SLAMS	Medium	This monitor currently fulfills the minimum ozone SLAMS requirement for MSA. No planned changes.
		SO <sub>2</sub> 42401-2	Regional	Source Oriented	SPM	N/A	This monitor is on a two-year rotation schedule. No planned changes.
		NO <sub>2</sub> 42602-1	Regional	General/Background	SPM	N/A	This is an area-wide monitor. In the future, this monitor may be moved or rotated.
FAA Beacon 45-019-0048	April 9, 1999	PM <sub>2.5</sub> 88101-1 1:1	Neighborhood	Population Exposure	SPM	High	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC- Gravimetric This monitor can fulfill the Appendix D minimum monitoring requirements

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
							and will be moved to the North Charleston Fire Station after it is established.
Charleston Public Works 45-019-0049	November 20, 1998	PM <sub>2.5</sub> 88101-1 1:1	Neighborhood	Population Exposure	SLAMS	Medium	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC-Gravimetric This monitor can fulfill the Appendix D minimum monitoring requirements and will be moved to the North Charleston Fire Station after it is established.
		Continuous PM <sub>2.5</sub> 88502-3	Neighborhood	Population Exposure	SPM	N/A	TEOM Gravimetric 50 degC This monitor fulfills the Appendix D continuous requirement and will be moved to the North Charleston Fire Station after it is established.
<b>Charlotte-Concord-Gastonia, NC-SC</b>							
York Landfill 45-091-0008	February 27, 2017	Ozone 44201-1	Urban	Upwind Background	SLAMS	High	This monitors ozone for the South Carolina portion of the MSA. No planned changes.
		SO <sub>2</sub> 42401-1	Urban	Upwind Background	SPM	N/A	This monitor is on a 2-year rotation (2020-2021). No planned changes.
<i>Crouse</i>		<i>Ozone</i>	<i>Urban</i>	<i>General/Background</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>

<b>Site Name Site ID</b>	<b>Site Start Date</b>	<b>Pollutant</b>	<b>Scale</b>	<b>Objective</b>	<b>Desig- nation</b>	<b>Assigned Value from GIS Scoring</b>	<b>Recommendations for Optimization</b>
<i>37-109-0004</i>		<i>44201</i>					
<i>Garinger 37-119-0041</i>		<i>CO 42101</i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
		<i>SO<sub>2</sub></i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
		<i>NO<sub>2</sub> 42602</i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
		<i>Ozone 44201</i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
		<i>Continuous PM<sub>10</sub></i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
		<i>PM<sub>2.5</sub> 88101-1</i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
		<i>PM<sub>2.5</sub> 88101-3</i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
<i>Remount Rd. 37-119-0045</i>		<i>CO 42101</i>	<i>Microscale</i>	<i>Highest Concentration</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
		<i>NO<sub>2</sub> 42602</i>	<i>Microscale</i>	<i>Source-Oriented</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
		<i>PM<sub>2.5</sub> 88101-1</i>	<i>Microscale</i>	<i>Highest Concentration</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
		<i>PM<sub>2.5</sub> 88101-3</i>	<i>Microscale</i>	<i>Highest Concentration</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
<i>University Meadows 37-119-0046</i>		<i>Ozone 44201</i>	<i>Urban</i>	<i>Highest Concentration</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>
<i>Ramblewood Park 37-119-0047</i>		<i>PM<sub>10</sub></i>	<i>Neighborhood</i>	<i>Population Exposure</i>	<i>SLAMS</i>		<i>North Carolina monitor</i>

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
Friendship Park 37-119-0048		PM <sub>2.5</sub> 88101	Neighborhood	Population Exposure	SLAMS		North Carolina monitor
Rockwell 37-159-0021		Ozone 44201	Urban	Highest Concentration	SLAMS		North Carolina monitor
		PM <sub>2.5</sub> 88101	Neighborhood	Population Exposure	SLAMS		North Carolina monitor
		NO <sub>2</sub> 42602	Neighborhood	General/Background	SPM		North Carolina monitor
<b>Columbia, SC MSA</b>							
Irmo 45-063-0008	April 7, 1989	PM <sub>2.5</sub> 88101-1 1:1	Neighborhood	Population Exposure	SLAMS	High	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor can be used to fulfill the Appendix D collocation requirement. No planned changes.
		Continuous PM <sub>2.5</sub> 88101-3	Neighborhood	Population Exposure	SPM	High	Thermo Scientific 1405-F FDMS w/VSCC This monitor can be used to fulfill the Appendix A and Appendix D collocated and continuous requirement. No planned changes.
Cayce City Hall 45-063-0010	December 6, 2007	PM <sub>10</sub> 81102-1	Neighborhood	Population Exposure	SLAMS	N/A	This monitor currently fulfills the PM <sub>10</sub> minimum monitoring requirements for the MSA. No planned changes.

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
Parklane 45-079-0007	April 3, 1980	PM <sub>2.5</sub> 88101-1 1:3	Neighborhood	Population Exposure	NCore SLAMS	High	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the Appendix D NCore requirement for the State and minimum monitoring requirement for the MSA. No planned changes.
		FRM Collocated PM <sub>2.5</sub> 88101-2 1:3	Neighborhood	Population Exposure	QA Collocated SLAMS	High	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor can be used to fulfill the Appendix A minimum collocation requirement for the State. No planned changes.
		Continuous PM <sub>2.5</sub> 88502-3	Neighborhood	Population Exposure	SLAMS	High	Thermo Scientific 1405-F FDMS w/SCC This monitor fulfills an Appendix D NCore requirement and may fulfill the continuous monitoring requirement. No planned changes.
		Speciated PM <sub>2.5</sub>	Neighborhood	Population Exposure	NCore SLAMS	N/A	This monitor fulfills an NCore requirement. No planned changes.
		PM <sub>10</sub> 85101-1	Neighborhood	Population Exposure	SPM	N/A	No planned changes.

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
		PM <sub>10-2.5</sub>	Neighborhood	Population Exposure	NCore SLAMS	N/A	This monitor fulfills an NCore requirement. No planned changes.
		Ozone 44201-1	Urban	Highest Concentration	NCore SLAMS	High	This monitor fulfills the Appendix D NCore for the State and minimum monitoring requirement for the MSA. No planned changes.
		SO <sub>2</sub> 42401-1	Neighborhood	Population Exposure/Other	NCore SLAMS	N/A	This monitor fulfills the Appendix D NCore minimum monitoring requirement for the State and Appendix D SO <sub>2</sub> PWEI minimum monitoring requirement for the MSA.
		NO/NOy	Neighborhood	Population Exposure	NCore SLAMS	N/A	This monitor fulfills an Appendix D NCore requirement for the State. No planned changes.
		CO 42101-1	Neighborhood	Population Exposure	NCore SLAMS	N/A	This monitor fulfills the Appendix D minimal monitoring and NCore requirement. No planned changes.
Congaree Bluff 45-079-0021	December 27, 1999	Ozone 44201-1	Neighborhood	General / Background	SPM	Low	This is a required monitor by agreement with the National Forest Service

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
							that serves the Congaree National Park. No planned changes.
		SO <sub>2</sub> 42401-1	Neighborhood	General / Background	SPM	N/A	This monitor is on a two-year rotation (2022-2023). No planned changes.
Sandhill Experimental Station 45-079-1001	January 1, 1959	Ozone 44201-1	Urban	Max Ozone Concentration	SLAMS	High	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
		NO <sub>2</sub> 42602-1	Urban	General / Background Max Precursor Emissions	SPM	N/A	This monitor serves as an area-wide monitor for the Columbia area. In the future, this monitor may be moved or rotated. No planned changes.
<b>Florence, SC MSA</b>							
Pee Dee Experimental Station 45-031-0003	February 25, 1993	Ozone 44201-1	Urban	Max Ozone Concentration/General Background	SLAMS	Medium	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
Williams Middle School 45-041-0003	August 4, 2008	PM <sub>2.5</sub> 88101-1 1:3	Neighborhood	Population Exposure/Highest Concentration	SLAMS	High	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This Site monitors PM <sub>2.5</sub> for the MSA.
		Continuous PM <sub>2.5</sub>	Neighborhood	Population Exposure	SLAMS	N/A	TEOM Gravimetric 30 degC

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
		88502-3					This Site monitors PM <sub>2.5</sub> for the MSA.
JCI-Railroad 45-041-8001	January 10, 2012	Lead 14129	Middle	Source Oriented	SPM	N/A	These monitors are a settlement agreement requirement. No planned changes.
JCI-Entrance 45-041-8002	January 4, 2012	Lead 14129	Middle	Source Oriented	SPM	N/A	These monitors are a settlement agreement requirement and serve as the Appendix A minimum required collocated monitors. No planned changes.
JCI-Woods 45-041-8003	January 10, 2012	Lead 14129	Middle	Source Oriented	SPM	N/A	These monitors are a settlement agreement requirement. No planned changes.
<b>Greenville-Anderson, SC MSA</b>							
Big Creek 45-007-0005	June 4, 2008	Ozone 44201-1	Urban	Highest Concentration/Upwind Background	SLAMS	Low	In 2020, this Site will run concurrently with the Garrison Arena (45-007-0006). Then, the Department will decide whether this Site is redundant.
Garrison Arena 45-007-0006	March 2, 2020	Ozone 44201-1	Urban	General/ Background	SLAMS	N/A	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
Greenville Employment Security Commission 45-045-0015	April 11, 2008	PM <sub>2.5</sub> 88101-1 1:1	Neighborhood	Population Exposure/Welfare Related Impacts	SLAMS	High	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the appendix A minimum collocation requirement. No planned changes.
		Continuous PM <sub>2.5</sub> 88101-3	Neighborhood	Population Exposure/ Welfare Related Impacts	SPM	N/A	Thermo Scientific 1405-F FDMS w/VSCC This monitor fulfills the Appendix A and Appendix D minimum required collocation and continuous requirements. No planned changes.
		PM <sub>10</sub> 85101-1	Neighborhood	Population Exposure	SLAMS	N/A	TEOM-Gravimetric This monitor fulfills the Appendix D PM <sub>10</sub> minimum monitoring requirements for the MSA. No planned changes.
		SO <sub>2</sub> 42401-1	Neighborhood	Population Exposure	SLAMS	N/A	This monitor is located in a heavily industrialized, urban setting. No planned changes.
		NO <sub>2</sub> 42602-1	Neighborhood	Population Exposure	SLAMS	N/A	This monitor fulfills the Appendix D RA-40 monitoring requirement for the State.

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
Hillcrest Middle School 45-045-0016	February 17, 2009	PM <sub>2.5</sub> 88101-1 1:3	Urban	Population Exposure	SLAMS	Medium	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the Appendix A minimum required collocation requirements. No planned changes.
		Collocated PM <sub>2.5</sub> 88101-2 1:3	Urban	Population Exposure	QA Collocated SLAMS	N/A	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the Appendix A minimum required collocation requirements. No planned changes.
		Ozone 44201-1	Urban	Population Exposure	SLAMS	Medium	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
<b>Myrtle Beach-Conway-North Myrtle Beach, SC-NC MSA</b>							
Coastal Carolina 45-051-0008	June 27, 2016	Ozone 44201-1	Urban	Population Exposure	Ozone 44201-1	Urban	This monitor fulfills the Appendix D minimum monitoring requirement for the MSA. No planned changes.
<b>Spartanburg MSA</b>							
North Spartanburg	April 4, 1990	Ozone 44201-1	Urban	Highest Concentration	SLAMS	High	This monitor fulfills the Appendix D minimum

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
Fire Station #2 45-083-0009							monitoring requirement for the MSA. No planned changes.
T.K. Gregg Recreation Center 45-083-0011	December 29, 2008	PM <sub>2.5</sub> 88101-1 1:1	Neighbor- hood	Highest Concentration	SLAMS	Medium	Thermo Scientific 1405-F FDMS w/SCC This monitor fulfills the Appendix A and Appendix D minimum monitoring and the collocation requirement for this MSA. No planned changes.
		Continuous PM <sub>2.5</sub> 88502-3	Neighbor- hood	Highest Concentration	SPM	N/A	TEOM Gravimetric 50 degC This monitor fulfills the Appendix A collocation requirement for this MSA. No planned changes.
		PM <sub>2.5</sub> 88101-2 1:6	Neighbor- hood	Population Exposure	QA Collocated SPM	High	This monitor fulfills the collocation requirement for the State. This monitor will be relocated to NCFS after it starts operating.
<b>Remainder of State</b>							
Chesterfield 45-025-0001	January 6, 2000	PM <sub>2.5</sub> 88101-1 1:3	Regional	Regional Transport	SLAMS	Low	R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC This monitor fulfills the Appendix D PM <sub>2.5</sub> Regional Transport requirement for the State. No planned changes.

Site Name Site ID	Site Start Date	Pollutant	Scale	Objective	Designation	Assigned Value from GIS Scoring	Recommendations for Optimization
		Continuous PM <sub>2.5</sub> 88502-3	Regional	Population Exposure	SLAMS	N/A	Thermo Scientific 1405-F FDMS w/SCC No planned changes.
		Ozone 44201-1	Regional	General/Background	SPM	Medium	This monitor provides data for rural sites. No planned changes.
Howard High School #3	July 15, 2008	PM <sub>10</sub> 81102-1	Neighbor- hood	Population Exposure/Highest Concentration	SPM	N/A	This monitor is located in a heavily industrialized area. The monitor is on a two-year rotation. Monitoring was discontinued in April 2019. It will resume operation in January 2021. No planned changes.

## **Appendix B: Multi-State MOAs**



DHEC MOA#: 2017-429

**MEMORANDUM OF AGREEMENT**  
**ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR**  
**THE AUGUSTA - RICHMOND COUNTY**  
**METROPOLITAN STATISTICAL AREA (MSA)**

January 2017

Participating Agencies:

Georgia  
Georgia Department of Natural Resources  
Environmental Protection Division  
Air Protection Branch (GA EPD)

South Carolina  
Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality

**I. PURPOSE/OBJECTIVES/GOALS**

The purpose of this Memorandum of Agreement (MOA) is to renew the Augusta - Richmond County Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement between SCDHEC and GA EPD (collectively referred to as the "affected agencies") to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for particles of an aerodynamic diameter of 10 micrometers and less (PM10), particles of an aerodynamic diameter of 2.5 micrometers and less (PM2.5), and ozone; as well as any other criteria pollutant air quality monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all parties. This MOA will establish the terms and conditions of this collective agreement to provide adequate criteria pollutant monitoring for the Augusta - Richmond County MSA as required by 40 CFR 58 Appendix D, Section 2(e).

## **II. BACKGROUND**

The Augusta - Richmond County MSA consists of the following counties: Burke, Columbia, McDuffie, Lincoln, Richmond, Aiken and Edgefield. GA EPD has jurisdiction over Burke, Columbia, McDuffie, Lincoln, and Richmond Counties in Georgia and SCDHEC has jurisdiction over Aiken and Edgefield Counties, South Carolina. The SCDHEC and GA EPD are required by the Clean Air Act to measure for certain criteria pollutants in the ambient air in the Augusta - Richmond County Metropolitan Statistical Area (MSA). The EPA has established minimum monitoring requirements based on the size of the MSA and the quality of the air in the MSA for PM10, PM2.5, and ozone.

40 CFR 58 Appendix D, Section 2(e) states (in part):

“...The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator.”

Currently each air pollution control agency (affected agency) conducts monitoring in its respective jurisdiction and coordinates its monitoring with the other air pollution control agency within the MSA.

## **III. ROLES AND RESPONSIBILITIES**

The parties agree to the following terms and conditions:

- SCDHEC, and GA EPD (the “affected agencies”) commit to conducting appropriate monitoring in their respective jurisdictions of the MSA; as needed, to collectively meet EPA minimum monitoring requirements for the entire MSA for PM10, PM2.5, and ozone, as well as any other criteria air pollutant monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all affected agencies. The minimum air quality monitoring requirements (for PM10, PM2.5, and ozone described in 40 CFR 58) for the MSA shall apply to the MSA in its entirety and shall not apply to any sole affected agency within the MSA unless agreed upon by all affected agencies.
- The affected agencies commit to coordinating monitoring “responsibilities and requirements...to achieve an effective network design” regarding criteria air pollutant monitoring conducted in the MSA and commit to communicate unexpected or unplanned changes in monitoring activities within their jurisdictions to the other affected agency. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other

communications to discuss monitoring activities for the MSA. Each affected agency shall inform the other affected agency via telephone or e-mail of any monitoring changes occurring in its jurisdiction of the MSA at its earliest convenience after learning of the need for the change or making the changes. Such unforeseen changes may include evictions from monitoring sites, destruction of monitoring sites due to natural disasters, or similar occurrences that result in an extended (greater than 1 quarter) or permanent change in the monitoring network. At least once a year in the second quarter of the year or before June 15th, each affected agency shall make available to the other affected agency, a copy of its proposed monitoring plan for its jurisdiction within the MSA for the next year.

- Each party reserves the right to revoke or terminate this MOA at any time and for any reason by giving thirty (30) days written notice prior to the date of termination.

#### **IV. LIMITATIONS**

**A.** All commitments made in this MOA are subject to the availability of appropriated funds and each party's budget priorities. Nothing in this MOA, in and of itself, obligates SCDHEC or GA EPD to expend appropriations or to enter into any contract, assistance agreement, interagency agreement or other financial obligation.

**B.** This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between parties to this MOA will be handled in accordance with applicable laws, regulations, and procedures, and will be subject to separate subsidiary agreements that will be effected in writing by representatives of the parties.

**C.** Except as provided in Section III, this MOA does not create any right or benefit, substantive or procedural, enforceable by law or equity against SCDHEC or GA EPD, their officers or employees, or any other person. This MOA does not direct or apply to any person outside SCDHEC or GA EPD.

#### **V. PROPRIETARY INFORMATION AND INTELLECTUAL PROPERTY**

No proprietary information or intellectual property is anticipated to arise out of this MOA.

#### **VI. POINTS OF CONTACT**

The following individuals are designated points of contact for the MOA:

GA EPD: DeAnna Oser  
GA EPD Ambient Monitoring Program  
4244 International Parkway, Suite 120  
Atlanta, GA 30354

DeAnna.Oser@dnr.ga.gov  
Voice: (404) 363-7004  
FAX: (404) 363-7100

SCDHEC: Micheal Mattocks  
SCDHEC Bureau of Environmental Services  
8231 Parklane Road  
Columbia, SC 29223

mattocm@dhec.sc.gov  
Voice: (803) 896-0902  
FAX: (803) 896-0980

In the event that a point of contact needs to be changed, notification may be made via email to the other parties.

## **VII. MODIFICATION/DURATION/TERMINATION**

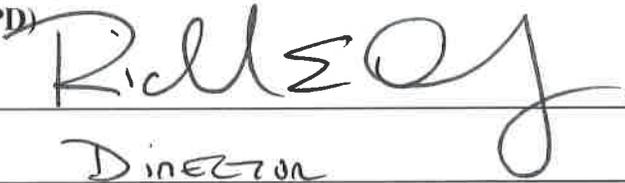
This MOA will be effective when signed by all parties. This MOA may be amended at any time by the mutual written consent of the parties. The parties will review this MOA at least once every 10 years to determine whether it should be revised, renewed, or cancelled. This MOA may be revoked or terminated by an affected agency at any time and for any reason by giving thirty (30) days written notice prior to the date of termination.

## **VIII. REFERENCE**

United States Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 58, Appendix D, "Network Design Criteria for Ambient Air Quality Monitoring", Section 2 (e), "General Monitoring Requirements."

**IX. APPROVALS**

**Georgia Department of Natural Resources, Environmental Protection Division  
(GA EPD)**

BY:   
TITLE: Director  
DATE: 2/21/17

**South Carolina Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality**

BY:   
TITLE: Bureau Chief  
DATE: 03/02/17

THIS AGREEMENT IS NOT OFFICIAL AND BINDING UNTIL SIGNED BY THE  
DHEC CONTRACTS MANAGER.

  
Francine Miller  
DHEC Contracts Manager  
DATE: 3-6-17

**MEMORANDUM OF AGREEMENT**  
**ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR**  
**THE CHARLOTTE-CONCORD-GASTONIA**  
**METROPOLITAN STATISTICAL AREA (MSA)**

July 1, 2016

Participating Agencies:

North Carolina  
Department of Environmental Quality (NCDEQ)  
Division of Air Quality (NCDAQ)

South Carolina  
Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality

Mecklenburg County, North Carolina  
Land Use and Environmental Services Agency  
Air Quality (MCAQ)

**RECEIVED**  
JUL 01 2016  
BUREAU OF AIR QUALITY

**I. PURPOSE/OBJECTIVES/GOALS**

The purpose of this Memorandum of Agreement (MOA) is to establish the Charlotte-Concord-Gastonia Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement among NCDAQ, SCDHEC, and the MCAQ (collectively referred to as the “affected agencies”) to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for criteria pollutants deemed necessary to meet the needs of the MSA as determined reasonable by all parties. This MOA will renew the terms and conditions of this collective agreement to provide adequate criteria pollutant monitoring for the Charlotte-Concord-Gastonia MSA as required by 40 CFR 58 Appendix D, Section 2(e).

**II. BACKGROUND**

The Charlotte-Concord-Gastonia MSA consists of

Cabarrus County, NC  
Gaston County, NC  
Iredell County, NC  
Lincoln County, NC  
Mecklenburg County, NC  
Rowan County, NC  
Union County, NC  
Chester County, SC  
Lancaster County, SC

York County, SC

NCDAQ has jurisdiction over Cabarrus, Gaston, Iredell, Lincoln, Rowan, and Union Counties; SCDHEC has jurisdiction over Chester, Lancaster, and York Counties; MCAQ has jurisdiction over Mecklenburg County.

The NCDAQ, SCDHEC, and MCAQ are required by the Clean Air Act to measure for certain criteria pollutants in the ambient air in the Charlotte-Concord-Gastonia MSA. The EPA has established minimum monitoring requirements based on the size of the MSA and the quality of the air in the MSA.

40 CFR 58 Appendix D, Section 2 (e) states (in part):

“... The EPA recognizes that State or local agencies must consider MSA/CSA boundaries and their own political boundaries and geographical characteristics in designing their air monitoring networks. The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator.”

Currently each air pollution control agency (affected agency) conducts monitoring in its respective jurisdiction and coordinates monitoring with the other air pollution control agencies within the MSA.

### III. ROLES AND RESPONSIBILITIES

The parties agree to the following terms and conditions:

- NCDAQ, SCDHEC, and MCAQ (the “affected agencies”) commit to conducting appropriate monitoring in their respective jurisdictions of the MSA; as needed, to collectively meet EPA minimum monitoring requirements for the entire MSA for criteria air pollutant monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all affected agencies. The minimum air quality monitoring requirements for the MSA shall apply to the MSA in its entirety and shall not apply to any sole affected agency within the MSA unless agreed upon by all affected agencies.
- The affected agencies commit to coordinating monitoring responsibilities and requirements to achieve an effective network design regarding criteria air pollutant monitoring conducted in the MSA and commit to communicate unexpected or unplanned changes in monitoring activities within their jurisdictions to the other affected agencies. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other communications to discuss monitoring activities for the MSA. Each affected party shall inform the others via telephone or e-mail of any monitoring changes occurring in its jurisdiction of the MSA at its earliest convenience after learning of the need for the change or making the changes. Such unforeseen changes may include evictions from monitoring sites, destruction of monitoring sites due to

natural disaster, or similar occurrences that result in extended change (greater than one quarter) or permanent change in the monitoring network. At least once a year in the second quarter or before June 15<sup>th</sup>, each agency shall make available to the other agency a copy of its proposed monitoring plan for its jurisdiction with the MSA for the next year.

- Each party reserves the right to revoke or terminate this MOA at any time for any reason by giving thirty (30) days written notice prior to the date of termination.

#### IV. LIMITATIONS

A. All commitments made in this MOA are subject to the availability of funds and each party's budget priorities. Nothing in this MOA, in and of itself, obligates NCDAQ, SCDHEC, or MCAQ to expend funds or to enter into any contract, assistance agreement, interagency agreement, or other financial obligation.

B. This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between parties to this MOA will be handled in accordance with applicable laws, regulations, and procedures, and will be subject to separate subsidiary agreements what will be effected in writing by representatives of the parties.

C. Except as provided in Section III, this MOA does not create any right or benefit, substantive or procedural, enforceable by law or equity against NCDAQ, SCDHEC, or MCAQ, their officers or employees, or any other person. This MOA does not direct or apply to any person outside NCDAQ, SCDHEC, or MCAQ.

#### V. PROPRIETARY INFORMATION AND INTELLECTUAL PROPERTY

No proprietary information or intellectual property is anticipated to arise out of this MOA.

#### VI. POINTS OF CONTACT

The following individuals are designated points of contact for the MOA:

NCDEQ DAQ:            Joette Steger  
                              NC DENR Division of Air Quality  
                              1641 Mail Service Center  
                              Raleigh, NC 27699-1641

[joette.steger@ncdenr.gov](mailto:joette.steger@ncdenr.gov)  
Voice/fax: 919-707-8449

SCDHEC:                Scott Reynolds  
                              SCDHEC Bureau of Environmental Health Services  
                              2600 Bull Street  
                              Columbia, SC 29201

[reynolds@dhec.sc.gov](mailto:reynolds@dhec.sc.gov)

Voice: 803-896-0902

MCAQ: Jeff Francis  
Mecklenburg County Land Use and Environmental Services Agency –  
Air Quality  
2145 Suttle Avenue  
Charlotte, NC 28208-5237

[Jeff.Francis@mecklenburgcountync.gov](mailto:Jeff.Francis@mecklenburgcountync.gov)

Phone 704-336-5430

Fax 704-336-4391

In the event that a point of contact needs to be changed, notification may be made via email to the other parties.

#### VII. MODIFICATION/DURATION/TERMINATION

This MOA will be effective when signed by all parties. This MOA may be amended at any time by the mutual written consent of all parties. The parties will review this MOA at least once every 10 years to determine whether it should be revised, renewed, or cancelled. This MOA may be revoked or terminated by an affected party at any time and for any reason by giving thirty (30) days written notice prior to the date of termination.

#### VIII. REFERENCE

United States Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 58, Appendix D, "Network Design Criteria for Ambient Air Quality Monitoring", Section 2 (e), "General Monitoring Requirements"

#### IX. APPROVALS

North Carolina Department of Environmental Quality  
Division of Air Quality (NCDAQ)

BY: Shirley C. Holman

TITLE: Director, Division of Air Quality

DATE: 6/27/2016

South Carolina Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality

BY: Ally B. Dyer

TITLE: Chief, Bureau of Air Quality

DATE: 07/05/2016

Mecklenburg County Land Use and Environmental Services Agency – Air Quality (MCAQ)  
Mecklenburg County Air Quality

BY: Kevin H. Phelan

TITLE: Director, Air Quality

DATE: 6/29/2014



Catherine E. Heigel, Director

*Promoting and protecting the health of the public and the environment*

## MEMORANDUM

July 5, 2016

**Subject:** Change of Point of Contact for South Carolina

Memorandum of Agreement on Air Quality Monitoring for Criteria Pollutants for the Charlotte-Concord-Gastonia Metropolitan Statistical Area (MSA)

**From:** Rhonda B. Thompson, SC DHEC  
Chief, Bureau of Air Quality

As of July 5, 2016, the Point of Contact for South Carolina will be Micheal Mattocks, instead of Scott Reynolds.

Micheal's contact information is below:

Micheal Mattocks  
SC DHEC – Bureau of Environmental Health Services  
2600 Bull Street  
Columbia, SC 29201  
(803)896-0856  
[mattock@dhec.sc.gov](mailto:mattock@dhec.sc.gov)

**MEMORANDUM OF AGREEMENT**  
**ON AIR QUALITY MONITORING FOR CRITERIA POLLUTANTS FOR**  
**THE MYRTLE BEACH-CONWAY-NORTH MYRTLE BEACH**  
**METROPOLITAN STATISTICAL AREA (MSA)**

July 1, 2015

Participating Agencies:

North Carolina  
Department of Environment and Natural Resources (NCDENR)  
Division of Air Quality (NCDAQ)

South Carolina  
Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality

**I. PURPOSE/OBJECTIVES/GOALS**

The purpose of this Memorandum of Agreement (MOA) is to establish the Myrtle Beach-Conway-North Myrtle Beach Metropolitan Statistical Area (MSA) Criteria Pollutant Air Quality Monitoring Agreement between NCDAQ and SCDHEC (collectively referred to as the “affected agencies”) to collectively meet United States Environmental Protection Agency (EPA) minimum monitoring requirements for ozone, as well as other criteria pollutants air quality monitoring deemed necessary to meet the needs of the MSA as determined reasonable by all parties. This MOA will establish the terms and conditions of this collective agreement to provide adequate criteria pollutant monitoring for the Myrtle Beach-Conway-North Myrtle Beach MSA as required by 40 CFR 58 Appendix D, Section 2(e).

**II. BACKGROUND**

The Myrtle Beach-Conway-North Myrtle Beach MSA consists of Horry County and Brunswick County. NCDAQ has jurisdiction over Brunswick County and SCDHEC has jurisdiction over Horry County. Brunswick County was previously included in the Wilmington (NC) MSA with New Hanover and Pender Counties. However, the United States Office of Management and Budget revised the geographic delineation in February 2013 to include Brunswick County in the Myrtle Beach-Conway-North Myrtle Beach MSA instead.

The NCDAQ and SCDHEC are required by the Clean Air Act to measure for certain criteria pollutants in the ambient air in the Myrtle Beach-Conway-North Myrtle Beach MSA. The EPA has established minimum monitoring requirements based on the size of the MSA and the quality of the air in the MSA for ozone.

40 CFR 58 Appendix D, Section 2 (e) states (in part):

“... The EPA recognizes that State or local agencies must consider MSA/CSA boundaries and their own political boundaries and geographical characteristics in designing their air monitoring networks. The EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to

divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator.”

Currently each air pollution control agency (affected agency) conducts monitoring in its respective jurisdiction and coordinates monitoring with the other air pollution control agencies with the MSA.

### III. ROLES AND RESPONSIBILITIES

The parties agree to the following terms and conditions:

- NCDAQ and SCDHEC (the “affected agencies”) commit to conducting appropriate monitoring in their respective jurisdictions of the MSA; as needed, to collectively meet EPA minimum monitoring requirements for the entire MSA for ozone, as well as other criteria air pollutant monitoring deemed necessary to meet the needs of the MSA as determined reasonable by both affected agencies. The minimum air quality monitoring requirements for the MSA shall apply to the MSA in its entirety and shall not apply to any sole affected agency within the MSA unless agreed upon by all affected agencies.
- The affected agencies commit to coordinating monitoring responsibilities and requirements to achieve an effective network design regarding criteria air pollutant monitoring conducted in the MSA and commit to communicate unexpected or unplanned changes in monitoring activities within their jurisdictions to the other affected agency. As conditions warrant, the affected agencies may conduct telephone conference calls, meetings, or other communications to discuss monitoring activities for the MSA. Each affected party shall inform the other via telephone or e-mail of any monitoring changes occurring in its jurisdiction of the MSA at its earliest convenience after learning of the need for the change or making the changes. Such unforeseen changes may include evictions from monitoring sites, destruction of monitoring sites due to natural disaster, or similar occurrences that result in extend (greater than one quarter) or permanent change in the monitoring network. At least once a year in the second quarter or before June 15<sup>th</sup>, each agency shall deliver to the other agency a copy of its proposed monitoring plan for its jurisdiction with the MSA for the next year.
- Each party reserves the right to revoke or terminate this MOA at any time for any reason by giving thirty (30) days written notice prior to the date of termination.

### IV. LIMITATIONS

A. All commitments made in this MOA are subject to the availability of funds and each party’s budget priorities. Nothing in this MOA, in and of itself, obligates NCDAQ or SCDHEC to expend funds or to enter into any contract, assistance agreement, interagency agreement, or other financial obligation.

B. This MOA is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between parties to this MOA will be handled in accordance

with applicable laws, regulations, and procedures, and will be subject to separate subsidiary agreements what will be effected in writing by representatives of the parties.

C. Except as provided in Section III, this MOA does not create any right or benefit, substantive or procedural, enforceable by law or equity against NCDAQ or SCDHEC, their officers or employees, or any other person. This MOA does not direct or apply to any person outside NCDAQ or SCDHEC.

#### V. PROPRIETARY INFORMATION AND INTELLUCTUAL PROPERTY

No proprietary information or intellectual property is anticipated to arise out of this MOA.

#### VI. POINTS OF CONTACT

The following individuals are designated points of contact for the MOA:

NC DENR DAQ: Donnie Redmond  
NC DENR Division of Air Quality  
1641 Mail Service Center  
Raleigh, NC 27699-1641

[donnie.redmond@ncdenr.gov](mailto:donnie.redmond@ncdenr.gov)  
Voice/fax: 919-707-8468

SCDHEC: Scott Reynolds  
SCDHEC Bureau of Air Quality  
2600 Bull Street  
Columbia, SC 29201

[reynolds@dhec.sc.gov](mailto:reynolds@dhec.sc.gov)  
Voice: 803-896-0902

#### VII. MODIFICATION/DURATION/TERMINATION

This MOA will be effective when signed by all parties. This MOA may be amended at any time by the mutual written consent of all parties. The parties will review this MOA at least once every 10 years to determine whether it should be revised, renewed, or cancelled. This MOA may be revoked or terminated by an affected party at any time and for any reason by giving thirty (30) days written notice prior to the date of termination.

#### VIII. REFERENCE

United States Environmental Protection Agency, Title 40 Code of Federal Regulations, Part 58, Appendix D, "Network Design Criteria for Ambient Air Quality Monitoring", Section 2 (e), "General Monitoring Requirements"

#### IX. APPROVALS

North Carolina Department of Environment and Natural Resources  
Division of Air Quality (NCDAQ)

BY: Shirley C. Holman  
TITLE: Director, Division of Air Quality  
DATE: 6/12/2015

South Carolina Department of Health and Environmental Control (SCDHEC)  
Bureau of Air Quality

BY: Myra A. Reed  
TITLE: Bureau Chief, Air Quality Bureau  
DATE: 6/22/15

## **Appendix C: Waivers**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

April 1, 2020

Rhonda B. Thompson  
Chief  
Bureau of Air Quality  
South Carolina Department of Health  
and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

Dear Ms. Thompson:

On February 12, 2020, the South Carolina Department of Health and Environmental Control (DHEC) submitted to the U.S. Environmental Protection Agency a modification to the state of South Carolina's 2019 Annual Ambient Air Monitoring Network Plan (Network Plan Addendum). The Network Plan Addendum requests approval for a 40 CFR Part 58, Appendix E monitor siting waiver to be granted for the JCI Woods lead (Pb) monitoring site (AQS ID: 45-041-8003). The monitoring regulations found in 40 CFR Part 58.10(a)(1) require that the monitoring network plan and modification be made available for public comment for at least 30 days before submission to the EPA for approval. The Network Plan Addendum was published in the State Register for public comment from October 25, 2019 to November 25, 2019, during which no comments were received.

The Network Plan Addendum requests a waiver of siting requirements for the JCI Woods Pb monitoring site. Four trees to the north and east of the site are identified as not meeting the spacing from obstructions requirement as defined in 40 CFR Part 58, Appendix E, Section 4(a):

“The distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path.”

The width and locations of the trees around the sampler are also such that the monitor siting does not meet the footnote to Table E-4 of 40 CFR Part 58, Appendix E, Section 11, requiring that the site “must have unrestricted airflow 270 degrees around the probe or sampler...”

Forty (40) CFR Part 58, Appendix E, Section 10 states that waivers of siting criteria for existing sites can be granted if either of the following criteria are met:

“10.1.1 – The site can be demonstrated to be as representative of the monitoring area as it would be if the siting criteria were being met.

10.1.2 – The monitor or probe cannot be reasonably located so as to meet the siting criteria because of physical constraints”

The EPA believes that this situation meets the waiver requirements of Section 10.1.1. As the location of the JCI Woods site is located for source-oriented monitoring, and the identified trees do not obscure the path of highest concentration from the source, the site's location is still representative of the ambient Pb concentrations around the JCI facility. The EPA therefore waives the requirements of 40 CFR Part 58, Appendix E, Section 4(a) and the footnote to Table E-4 in 40 CFR Part 58, Appendix E, Section 11, regarding the four trees to the north and east of the JCI Woods site. This site must still meet all other siting requirements found in Appendix E of 40 CFR Part 58. This waiver should be re-evaluated in the 2025 South Carolina network assessment due to the EPA by July 1, 2025.

The waiver of the specific siting requirements discussed above for JCI Woods is effective on the date of this letter. The DHEC should consult the EPA Region 4 Laboratory Services and Applied Science Division (LSASD) staff on whether quality assurance flags should be added to the data in the Air Quality System (AQS) to indicate that there were siting criteria issues at the site prior to and after the EPA approval of this siting criteria waiver. The data with QA flags for siting criteria issues would still be comparable to the Lead National Ambient Air Quality Standard.

Thank you for your collaboration with the EPA to monitor air and promote clean air in South Carolina. If you have any questions about this approval, please contact Adam Friedman at 404-562-9033.

Sincerely,

Kenneth L. Mitchell, Ph.D.  
Acting Director  
Air and Radiation Division

cc: Renee Shealy, Bureau Chief, BEHS  
Connie Turner, Director, DAQA, BEHS  
Robert J. Brown Jr., BAQ  
Mary Peyton Wall, BAQ  
G. Renee Madden, BAQ  
Laura Ackerman, Region 4 LSASD



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

MAY 26 2016

Ms. Rhonda Banks Thompson  
Chief  
Bureau of Air Quality Control  
South Carolina Department of Health and  
Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

Dear Ms. Thompson:

On March 16, 2016, the South Carolina Department of Health and Environmental Control (SC DHEC) notified the U.S. Environmental Protection Agency Region 4 that the comment period had ended for the Network Plan Addendum to the state of South Carolina's 2015 annual ambient air monitoring network plan (Network Plan Addendum). The Network Plan Addendum provided further information and proposed changes to the 2015 annual ambient air monitoring network plan (Network Plan), which was approved with three exceptions by the EPA on November 19, 2015. The Network Plan Addendum was received as two separate documents. One document proposed changes to the SC DHEC monitoring network and the other document requested waivers for monitoring siting requirements.

The EPA understands that the SC DHEC provided the public a 30-day review period for its draft Network Plan Addendum and that no comments were received.

The Network Plan Addendum proposes a number of changes to the SC DHEC's ambient air monitoring network, including:

- shutdown of four ozone (O<sub>3</sub>) monitoring sites,
- relocation of one O<sub>3</sub> monitoring site,
- startup of one O<sub>3</sub> monitoring site,
- shutdown of one multipollutant (PM<sub>2.5</sub> and PM<sub>10</sub>) site,
- a waiver of siting requirements at an O<sub>3</sub> and SO<sub>2</sub> site, and
- renewal of an existing waiver at a multi-pollutant site.

The EPA approves the requests in the Network Plan Addendum, with the following exceptions:

- The EPA is deferring making a decision on the proposed shut down of the Clemson O<sub>3</sub> site (AQS ID 45-072-0002) in order to allow more time for consideration and discussion with the SC DHEC.
- The EPA does not approve the discontinuation of O<sub>3</sub> monitoring at the Bushy Park Pump Station site (AQS ID 45-015-0002), since this site is required for the Charleston area to meet the O<sub>3</sub> minimum monitoring requirements found in 40 CFR Part 58, Appendix D. The EPA understands that the SC DHEC is currently looking for nearby property to move this monitor to. Once a suitable replacement site is found, the SC DHEC should request a relocation of the Bushy Park Pump Station O<sub>3</sub> monitor.

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- The EPA conditionally approves the establishment of the Coastal Carolina O<sub>3</sub> monitoring site, once the SC DHEC has resolved any monitor siting issues. This site will meet the requirements for O<sub>3</sub> monitoring in the Myrtle Beach-Conway-North Myrtle Beach, SC-NC Metropolitan Statistical Area. The SC DHEC should include in the next ambient air monitoring network plan evidence that the Coastal Carolina site meets air monitoring siting requirements found in 40 CFR Part 58, Appendix E.
- The EPA supports the proposed relocation for the York CMS O<sub>3</sub> monitoring site (AQS ID 45-091-0006) to the proposed York O<sub>3</sub> site (AQS ID 45-091-0007). However, the Network Plan Addendum does not provide sufficient information to approve the new location at the proposed York O<sub>3</sub> site. In addition to the information provided in the Network Plan Addendum, the SC DHEC should submit to the EPA information to demonstrate that monitoring siting criteria are met, including: zoomed in aerial photo or a site location map; site photo(s) facing from the site in each direction (N, S, E, W); applicable measurements to any obstructions, trees or roadways; and the proposed probe height for the site.

All of the approved ambient air monitoring network changes, requested in the Network Plan Addendum should also be documented in the next annual ambient air monitoring network plan, due July 1, 2016.

Details regarding the EPA's review of the Network Plan Addendum are provided in the enclosed comments.

Thank you for working with us to monitor air pollution and promote healthy air quality in South Carolina. If you have any questions or concerns, please contact Gregg Worley at (404) 562-9141 or Ryan Brown at (404) 562-9147.

Sincerely,



Carol L. Kemker  
Acting Director  
Air, Pesticides and Toxics Management Division

Enclosure

cc: Mr. Robert Brown  
Division Director, Air Planning Development SC DHEC

Mr. Scott Reynolds  
Director, Division of Air Quality Analysis, SC DHEC

The Honorable William Harris  
Chief of the Catawba Indian Nation

Mr. Darin Steen  
Director, Environmental Services, Catawba Indian Nation

Ms. Sheila Holman, Director, Division of Air Quality, NCDEQ

## 2015 State of South Carolina Ambient Air Monitoring Network Plan Addendum The U. S. EPA Region 4 Comments and Recommendations

This document contains the U.S. Environmental Protection Agency Region 4 comments and recommendations on the state of South Carolina’s 2015 ambient air monitoring network plan addendum (Network Plan Addendum). Ambient air monitoring rules, which include regulatory requirements that address network plans, data certification, and minimum monitoring requirements, among other requirements, are found in 40 CFR Part 58.

### Proposed Monitoring Discontinuations

The Network Plan Addendum proposes to discontinue five monitoring sites. The EPA is deferring the decision for the proposed shut down of the Clemson O<sub>3</sub> site (AQS ID 45-072-0002), in order to allow more time for consideration and discussion with the SC DHEC on this issue. The EPA acknowledges the discontinuation of O<sub>3</sub> monitoring at the Cowpens (AQS ID 45-021-0002) site, and approves the discontinuation of O<sub>3</sub> monitoring at the Famoda Farms (AQS ID 45-045-1003) site, as well as the discontinuation of PM<sub>2.5</sub> and PM<sub>10</sub> monitoring at the Bates House site (AQS ID 45-079-0019). See Table 1 for a summary of these requests with the EPA’s comments.

The O<sub>3</sub> minimum monitoring requirements are found in 40 CFR Part 58, Appendix D, Table D-2. These minimum requirements are based on metropolitan statistical area (MSA) boundaries as defined by the U.S. Office of Management and Budget, population estimates from the U.S. Census Bureau for these MSAs, and historical ambient air monitoring data.

**Table 1: Monitors Proposed for Discontinuation**

AQS ID	Site Name	MSA	Pollutant	Type	Comments
45-072-0002	Clemson	Greenville-Anderson-Mauldin, SC	O <sub>3</sub>	SLAMS	Deferred for further discussion with the SC DHEC.
45-021-0002	Cowpens National Battlefield	Gaffney, SC	O <sub>3</sub>	SPM	Approval not required for SPM - shutdown acknowledged. <sup>1</sup>
45-015-0002	Bushy Park Pump Station	Charleston-North Charleston-Summerville, SC	O <sub>3</sub>	SLAMS	Not Approved. A suitable replacement site should be found in the MSA.
45-045-1003	Famoda Farms	Greenville-Anderson-Mauldin, SC	O <sub>3</sub>	SLAMS	Approved
45-079-0019	Bates House	Columbia, SC	PM <sub>2.5</sub> , PM <sub>10</sub>	SLAMS	Approved. The SC DHEC will lose site access. Collocated PM <sub>2.5</sub> sampler will be moved to Parklane site (AQS ID 45-079-0007) to meet PM <sub>2.5</sub> collocation requirements.

<sup>1</sup> The Cowpens National Battlefield O<sub>3</sub> site is in a MSA that meets minimum O<sub>3</sub> monitoring requirements and is classified as a special purpose monitor (SPM). The SC DHEC does not require EPA approval to shut down this monitor since it is a SPM. The EPA acknowledges the discontinuation of this monitor and that the monitoring requirements for O<sub>3</sub> in Appendix D to 40 CFR Part 58 will continue to be met after this monitor is shutdown.

The SC DHEC requested to discontinue O<sub>3</sub> monitoring at the Famoda Farms monitoring site (AQS ID 45-045-1003). The EPA approves the shutdown of this site. The Famoda Farms monitor is one of four O<sub>3</sub> monitors operating in the Greenville-Anderson-Mauldin, SC MSA. This area is required at a minimum to have two O<sub>3</sub> monitors. Additionally, Famoda Farms has consistently recorded lower O<sub>3</sub> concentrations than the Clemson and Hillcrest Middle School monitoring sites, which are also in the Greenville area. The monitoring requirements in Appendix D to 40 CFR Part 58 will continue to be met in the Greenville area after the Famoda Farms monitor is shutdown.

At this time, the EPA does not approve the shutdown of the O<sub>3</sub> monitor at Bushy Park Pump Station. The Charleston MSA would not meet minimum O<sub>3</sub> monitoring requirements if O<sub>3</sub> monitoring at this site were discontinued. At a minimum, the Charleston MSA is required to have two regulatory O<sub>3</sub> monitors and would only have one regulatory O<sub>3</sub> monitor if monitoring at Bushy Park Pump Station were discontinued. The EPA recommends that the SC DHEC find a suitable replacement monitoring location for Bushy Park. In the meantime, the SC DHEC should continue to flag in the Air Quality System (AQS) the Bushy Park Pump Station O<sub>3</sub> data as not meeting siting requirements.

The SC DHEC expects to lose access to the property where the Bates House PM<sub>2.5</sub> and PM<sub>10</sub> monitoring site (AQS ID 45-079-0019) is located. For PM<sub>2.5</sub>, the Bates House monitoring has recorded daily and annual PM<sub>2.5</sub> design values below the national ambient air quality standards (NAAQS) for the last five years. Additionally, PM<sub>2.5</sub> concentrations recorded at the Irmo site (AQS ID 45-063-0008), which is also in the Columbia, SC MSA, have been typically higher than Bates House. Over the last five years, Irmo has had annual design values higher than Bates House, as well. The PM<sub>10</sub> levels recorded at Bates House have been well below the applicable standard for more than ten years. The EPA understands that the SC DHEC will move the collocated PM<sub>2.5</sub> sampler from Bates House to the Parklane site (AQS ID 45-079-0007) to still meet the PM<sub>2.5</sub> collocation requirements. After the Bates House monitoring site is shutdown and the PM<sub>2.5</sub> collocation requirements are met by establishing a collocated PM<sub>2.5</sub> sampler at the Parklane site, the Columbia, SC MSA will still meet monitoring requirements in Appendix D to 40 CFR Part 58 for PM<sub>10</sub> and PM<sub>2.5</sub>. Thus, EPA approves the discontinuation of monitoring at Bates House.

### Proposed Monitor Startups or Relocations

The Network Plan Addendum also proposes to relocate one O<sub>3</sub> monitor and startup one O<sub>3</sub> monitor. See Table 2 for a summary of these requests.

**Table 2: Monitors Proposed for Startup or Relocation**

AQS ID	Site Name	MSA	Pollutant	Type	Comments
45-091-0006	York	Charlotte-Gastonia-Concord NC-SC	O <sub>3</sub>	SLAMS	The EPA supports this relocation to the new site, but requests additional information in the next network plan.
45-051-0008	Coastal Carolina	Myrtle Beach-Conway-North Myrtle Beach, SC-NC	O <sub>3</sub>	SLAMS	EPA Conditionally approves site startup. The Myrtle Beach MSA will meet minimum monitoring requirements once this site is established. Site must meet siting criteria.

In its response to the 2015, Network Plan EPA approved a temporary shutdown of the York CMS monitoring site (AQS ID 45-091-0006). The SC DHEC stated in the Network Plan that it expects to lose access to the site and was looking for a replacement location. The Network Plan Addendum proposes to restart O<sub>3</sub> monitoring at a new site, York (AQS ID 45-091-0007), which is 3.5 miles northeast of the York CMS site. The EPA understands that the York CMS site is currently still operational even though the temporary shutdown was approved, and that The SC DHEC hopes to operate O<sub>3</sub> monitors concurrently at both the York CMS and York sites before discontinuing monitoring at York CMS. The York CMS monitor is an upwind location for the Charlotte-Concord-Gastonia NC-SC Core Based Statistical Area (CBSA) and typically reads lower than the other O<sub>3</sub> monitors in the CBSA. The EPA believes that the proposed York location would be representative of the same air shed as the previous York CMS monitoring site. The EPA supports the proposed location for the York O<sub>3</sub> monitoring site. However, the Network Plan Addendum does not provide sufficient information to fully approve the proposed York O<sub>3</sub> site. In addition to the information provided in the Network Plan Addendum, the SC DHEC should submit to the EPA information to demonstrate that monitoring siting criteria are met including: zoomed in aerial photo or a site location map; site photo(s) facing from the site in each direction (N, S, E, W); applicable measurements to any obstructions, trees or roadways; and the proposed probe height for the site. This information should be included in the next ambient air monitoring network plan.

The Network Plan Addendum proposes to establish a new O<sub>3</sub> monitoring site, Coastal Carolina (AQS ID 45-051-0008), in the Myrtle Beach-Conway-North Myrtle Beach, SC-NC CBSA to meet O<sub>3</sub> minimum monitoring requirements for this area. The SC DHEC provided 2011 Community Multiscale Air Quality (CMAQ) modeling output for this area in the Network Plan Addendum. The CMAQ model output indicates that the proposed Coastal Carolina site is in the area of the maximum predicted O<sub>3</sub> for the CBSA.

During the 2015 EPA technical systems audit (TSA), the EPA staff visited the proposed location for the Coastal Carolina site. The EPA noted that there was a tree dripline within ten meters of the expected monitoring probe location. This configuration would not meet the monitoring siting criteria found in 40 CFR Part 58, Appendix E, Section 5 siting requirements, "Spacing from Trees." The EPA conditionally approves the Coastal Carolina site; however, full approval is withheld until the monitoring siting criteria issue has been resolved. The SC DHEC should provide evidence that the Coastal Carolina site meets the monitoring siting criteria requirements found in Appendix E to 40 CFR Part 58 in the next ambient air monitoring network plan.

### **Proposed Waivers of Monitor Siting Criteria**

The Network Plan Addendum requests one waiver of 40 CFR Part 58, Appendix E siting requirements and the extension of an existing waiver of siting requirements. Table 3 summarizes these requests.

Under 40 CFR Part 58, Appendix E, Section 10, waivers of siting criteria for existing sites can be granted if either of the following criteria are met:

- 10.1.1 The site can be demonstrated to be as representative of the monitoring area as it would be if the siting criteria were being met.

10.1.2 The monitor or probe cannot reasonably be located to meet the siting criteria because of physical constraints (e.g., inability to locate the required type of site the necessary distance from roadways or obstructions).

**Table 3: Waivers of Siting Criteria**

AQS ID	Site Name	MSA	Pollutant	Type	Comments
45-079-0021	Congaree Bluff	Columbia, SC	O <sub>3</sub> , SO <sub>2</sub>	SPM	Waiver of siting criteria approved for the identified trees obstructing the monitor. Waiver through 2020.
45-045-0015	Greenville ESC	Greenville-Anderson-Mauldin, SC	SO <sub>2</sub> , NO <sub>2</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> , O <sub>3</sub>	SLAMS	Existing waiver of siting requirements extended through 2018.

The Network Plan Addendum requests a waiver of monitoring siting requirements for the Congaree Bluff monitoring site (AQS ID 45-079-0021). The objective of the Congaree Bluff site is to measure O<sub>3</sub> and SO<sub>2</sub> within the Congaree National Park boundaries. Within the national park boundaries, this monitor cannot be reasonably located to meet the siting criteria because of physical constraints. The EPA staff visited the Congaree Bluff site on January 25, 2016, and agree that this is the best monitoring location within the park boundaries. However, there are over forty trees surrounding the probe that do not meet the spacing from obstructions discussed in 40 CFR Part 58, Appendix E, Section 4 (a)”... The distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path...”

The configuration of obstructing trees is such that the monitor probe siting does not meet Table E-4 of 40 CFR Part 58, Appendix E, Section 11, which states that monitor location “must have unrestricted airflow 270 degrees around the probe or sampler.” The Congaree Bluff monitors have 180 degrees of unobstructed airflow due to the obstructing trees.

However, the EPA understands that the SC DHEC has trimmed the dripline of trees so that all tree driplines are no closer than ten meters from the monitoring probes, in order to comply with 40 CFR Part 58, Appendix E, Section 5 siting requirements, “Spacing from Trees.” The SC DHEC has taken reasonable steps to meet many of the siting monitoring requirements, and the EPA believes that removing over 40 trees from a national park to meet all of the siting requirements is not necessary.

The EPA waives the requirements of 40 CFR Part 58, Appendix E, Section 4 (a) and Table E-4 to 40 CFR Part 58, Appendix E, Section 11 in regards to the trees identified by The SC DHEC in the Network Plan Addendum for the Congaree Bluff site. This site must still meet all other siting requirements found in Appendix E to 40 CFR Part 58. The EPA waives these specific requirements for a period of five years. This waiver should be re-evaluated in the 2020 South Carolina network assessment.

Similarly, the Network Plan Addendum requests to renew a waiver of siting criteria for the Greenville ESC monitoring site (AQS ID 45-045-0015). In 2009, the EPA granted a waiver of siting requirements for this site based on concurrent monitoring with the previous site. The Network Plan Addendum identifies two trees that are closer than twice the distance between the top of the tree and the height of the monitoring probe. At this time, the tree configuration and spacing at the site is close to meeting siting criteria such that the EPA believes that the monitoring data is representative of data if the siting criteria were met. Also, restrictions at the location prevent a reconfiguration of equipment or removal of trees.

The EPA waives the requirements of 40 CFR Part 58, Appendix E, Section 4 (a) and Section 11 (Table E-4) in regards to the trees identified by the SC DHEC in the Network Plan Addendum for the Greenville ESC site. The EPA waives these specific requirements for a period of two years. The EPA and the SC DHEC will continue to reevaluate the waiver of these requirements and alternative solutions in upcoming ambient air monitoring network plans. The Greenville ESC site must still meet all of the other siting requirements found in Appendix E to 40 CFR Part 58.

