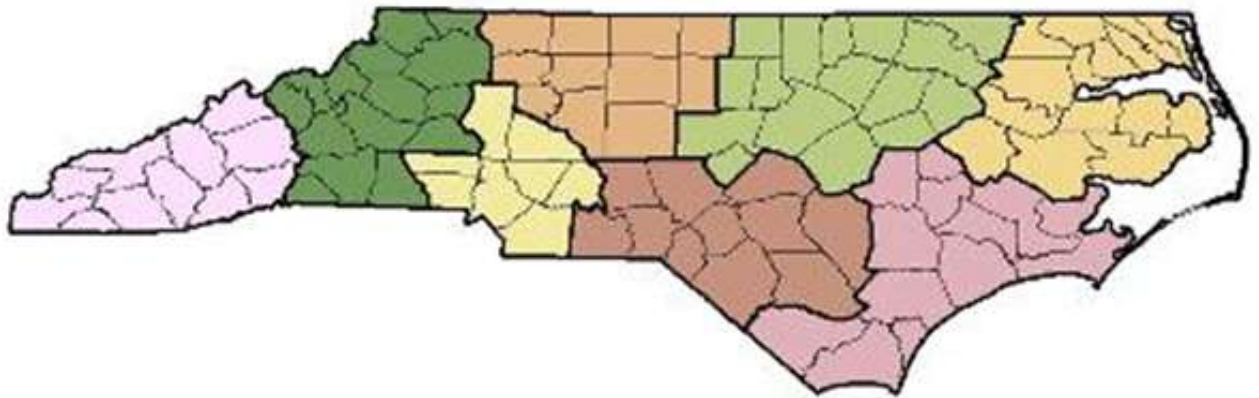


2010 FIVE-YEAR NETWORK ASSESSMENT FOR NORTH CAROLINA

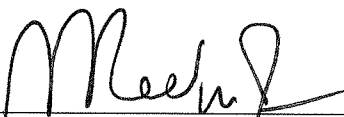


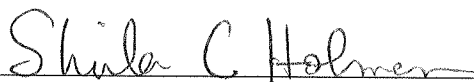
July 1, 2010

North Carolina Division of Air Quality
A Division of the North Carolina Department
of Environment and Natural Resources
Mail Service Center 1641
Raleigh, North Carolina 27699-1641

CERTIFICATION

By the signatures below, the North Carolina Division of Air Quality (NCDAQ) certifies that the information contained in the 2010 Five-Year Network Assessment for North Carolina is complete and accurate at the time of submittal to EPA Region 4. However, due to circumstances that may arise do to changes in the monitoring regulations, population growth, and air quality, some network information may change. These changes will be discussed in the Annual Network Plans submitted each year.

Signature  _____ Date 7/1/10
Donald D. Redmond, Jr.
Ambient Monitoring Section Chief, NCDAQ

Signature  _____ Date 7/1/10
Sheila C. Holman
Director, NCDAQ

Executive Summary

The North Carolina Division of Air Quality (NCDAQ) and its local program partners (Forsyth County Environmental Affairs Department, Mecklenburg County Air Quality, and Western North Carolina Regional Air Quality Agency) operate a network of monitors to measure various air pollutants. These monitors are located in a variety of locations across the state to determine:

- population exposure,
- maximum concentrations,
- background concentrations, and
- air pollution transported from other regions.

The most well-known air pollutants are ozone and particulate matter, but we also monitor for nitrogen oxides, sulfur dioxide, carbon monoxide, and lead.

The USEPA has for years required the state to publish an annual plan of changes to its monitoring network. Now there is an additional requirement to publish a five-year network assessment. The annual plan contains details of the monitoring network; this five-year network assessment is a look forward at the projected needs of ambient air monitoring program. The need for changes to the program is driven by a number of factors, including:

- changes to the national ambient air quality standards due to better understanding of the science,
- increases in population or shifts in that population,
- new emission sources,
- changes in technology, and
- the availability of funding and other resources.

As the rest of this document (and the associated annual network plan) discuss in detail, the following changes to the monitoring network are anticipated over the next five years:

- Four additional ozone monitoring sites are required; three are to meet new EPA rules (Burlington, Goldsboro, Jacksonville) and one is because of increased population (Wilmington),
- Five additional nitrogen dioxide sites are required to meet new EPA rules; four are near-road sites (Charlotte, Durham, Greensboro, Raleigh) and one is an area-wide site (Raleigh),
- Five additional sulfur dioxide sites are required to meet new EPA rules (Asheville, Charlotte-Gastonia-Concord, Durham-Chapel Hill, Greensboro-High Point, Hickory),
- Two source-oriented lead sites may be needed due to proposed EPA rules (Charlotte/Douglas International Airport in Charlotte, Fort Bragg in Fayetteville),
- Two photochemical assessment monitoring stations may be needed depending on the proposed ozone standard classification (Charlotte),
- Other sites may be added or upgraded to improve our understanding of the impact of emissions control measures, industrial expansion, population growth patterns, or the transport of pollutants into or out of a region,

- Miscellaneous moves of existing sites are expected because of construction or other activities near the monitoring site or to comply with new EPA rules, and
- The NCDAQ also expects to begin a significant effort to replace its aging monitoring shelters and equipment.

Finally, it is important to note that despite what all this additional monitoring might suggest, the air in North Carolina is getting cleaner and the trend is expected to continue well into the future. The monitoring network is vital to demonstrate that the state is providing a healthy environment for its citizens in the face of tightened national standards and increased population and industrial expansion.

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Chapter 1 Introduction

The requirement to submit an assessment of the air quality surveillance system is provided for in 40 CFR §58.10 (d) which states:

“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 where new technologies are appropriate for incorporation in 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. For PM_{2.5}, the assessment also must identify needed changes to population-oriented sites. 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 first assessment is due July 1, 2010.”

The assessment should provide a description of the networks and the relative value of each monitor and station with consideration of the data users. Annual monitoring network plans are to provide for actual proposed changes to the networks that are consistent with the findings of the five year assessment.

The rest of this document provides the information requested in §58.10 (d) for the North Carolina Division of Air Quality and the Western North Carolina Regional Air Quality Agency in the following order:

- Chapter 2 Status of Network Monitoring Objectives Defined in Appendix D
- Chapter 3 Need for New Sites
- Chapter 4 Existing Sites That Are No Longer Needed and Can Be Terminated
- Chapter 5 Evaluation of New Technologies to Benefit the Ambient Air Monitoring Network
- Chapter 6 Ability of Existing and Proposed Sites to Support Air Quality Characterization of Areas With Relatively High Populations of Susceptible Individuals (e.g., Children With Asthma)
- Chapter 7 Effect On Data Users For Any Sites That Are Being Proposed For Discontinua
- Chapter 8 Needed Changes To PM_{2.5} Population-Oriented Sites

The Forsyth County Environmental Affairs Department and Mecklenburg County Air Quality have submitted separate 5-year assessments for their networks.

Chapter 2 Status of Network Monitoring Objectives Defined in Appendix D

This chapter provides the Network Monitoring Objectives defined in Appendix D to 40 Code of Federal Regulations (CFR) 58 and states whether the 2010 North Carolina Monitoring Network meets those objectives. This chapter is organized as follows:

- 2.1 DESIGN CRITERIA FOR NATIONAL CORE MONITORING SITES
- 2.2 POLLUTANT-SPECIFIC DESIGN CRITERIA FOR STATE AND LOCAL AIR MONITORING STATION (SLAMS) SITES
- 2.3 NETWORK DESIGN FOR PHOTOCHEMICAL ASSESSMENT MONITORING STATIONS (PAMS)

Currently North Carolina is meeting the network monitoring objectives defined in Appendix D for all networks. The Wilmington MSA crossed the 350,000 population threshold based on the most recent population (2009) estimates and is now required to have a second ozone monitor, which we expect to operate next ozone season (2011). NCDAQ is working on identifying a location for that monitor in Brunswick County near the community of Leland.

2.1 DESIGN CRITERIA FOR NATIONAL CORE MONITORING SITES

The State of North Carolina is required to operate two National Core (NCore) monitoring sites. The North Carolina Division of Air Quality (NCDAQ) operates one of those NCore sites and Mecklenburg County Air Quality (MCAQ) operates the other. The status of the NCore site operated by the NCDAQ is provided in Chapter IX of the 2010 Annual Monitoring Network Plan for The North Carolina Division of Air Quality Volume 1 Network Descriptions. Currently, the State of North Carolina is meeting the design criteria for NCore sites.

2.2 POLLUTANT-SPECIFIC DESIGN CRITERIA FOR STATE AND LOCAL AIR MONITORING STATION (SLAMS) SITES

This subsection describes the network monitoring objectives for each of the criteria pollutants and is organized as follows:

- 2.2.1 Ozone (O₃) Design Criteria
- 2.2.2 Carbon Monoxide (CO) Design Criteria
- 2.2.3 Nitrogen Dioxide (NO₂) Design Criteria
- 2.2.4 Sulfur Dioxide (SO₂) Design Criteria
- 2.2.5 Lead (Pb) Design Criteria
- 2.2.6 Particulate Matter (PM₁₀) Design Criteria
- 2.2.7 Fine Particulate Matter (PM_{2.5}) Design Criteria
- 2.2.8 Coarse Particulate Matter (PM_{10-2.5}) Design Criteria

2.2.1 Ozone (O₃) Design Criteria

State and, where appropriate, local agencies must operate O₃ sites for various locations depending upon area size (in terms of population and geographic characteristics) and typical peak concentrations (expressed in percentages below or near the O₃NAAQS). Specific SLAMS O₃ site minimum requirements are included in Table D-2 of 40 CFR 58

Appendix D. The NCore sites are expected to complement the O₃ data collection that takes place at single pollutant SLAMS sites, and both types of sites can be used to meet the network minimum requirements. The total number of O₃ sites needed to support the basic monitoring objectives of public data reporting, air quality mapping, compliance, and understanding O₃-related atmospheric processes will include more sites than these minimum numbers required in Table D–2. The EPA Regional Administrator and the responsible State or local air monitoring agency must work together to design and/or maintain the most appropriate O₃ network to service the variety of data needs in an area. Within an O₃ network, at least one O₃ site for each Metropolitan Statistical Area (MSA), or Combined Statistical Area (CSA) if multiple MSAs are involved, must be designed to record the maximum concentration for that particular metropolitan area. More than one maximum concentration site may be necessary in some areas.

Currently the NCDAQ is required to operate 22 monitors in 12 MSAs. The NCDAQ meets or exceeds those requirements in all but two MSAs. The NCDAQ does not operate any monitors in the Virginia Beach-Norfolk-Newport News MSA because we have an agreement with the Virginia Department of Environmental Quality (VA-DEQ) that they will maintain the required number of monitors for the MSA, fulfilling our Appendix D monitoring requirements. The NCDAQ operates only one ozone monitor in the Wilmington MSA. However, this MSA is now required to have two ozone monitors because its estimated population has recently crossed the 350,000 threshold. More information on the ozone monitoring network is provided in Chapter V of the 2010 Annual Monitoring Network Plan for The North Carolina Division of Air Quality Volume 1 Network Descriptions.

2.2.2 Carbon Monoxide (CO) Design Criteria

There are no minimum requirements in 40 CFR 58 Appendix D for the number of CO monitoring sites. However, continued operation of existing SLAMS CO sites using Federal Reference Method (FRM) or Federal Equivalent Method (FEM) is required until discontinuation is approved by the EPA Regional Administrator. Where SLAMS CO monitoring is ongoing, at least one site must be a maximum concentration site for that area under investigation. In North Carolina there are currently three SLAMS sites that must operate until 2015 to meet the conditions of the State's Maintenance Plan for CO. Two of these sites are maximum concentration sites. The third site, located in Mecklenburg County, is not a maximum concentration site because MCAQ received a waiver for the requirement to have a SLAMS site at a maximum concentration site. These sites may be discontinued in 2015 depending on what changes EPA makes to the CO NAAQS and whether the existing sites will meet the new CO monitoring requirements. More information on the carbon monoxide monitoring network is provided in Chapter III of the 2010 Annual Monitoring Network Plan for The North Carolina Division of Air Quality Volume 1 Network Descriptions.

2.2.3 Nitrogen Dioxide (NO₂) Design Criteria

The subsections below provide specific details about the design criteria in Appendix D to 40 CFR 58 and how the North Carolina network measures up.

2.2.3.1 Requirement for Near-road NO₂ Monitors

Within the NO₂ network, there must be one micro-scale near-road NO₂ monitoring station in each Core-Based Statistical Area (CBSA) with a population of 500,000 or more persons to monitor a location of expected maximum hourly concentrations sited near a major road with high Average Annual Daily Traffic (AADT) counts. CBSA populations shall be based on the latest available census figures. The near-road NO₂ monitoring stations shall be selected by ranking all road segments within a CBSA by AADT and then identifying a location or locations adjacent to those highest ranked road segments, considering fleet mix, roadway design, congestion patterns, terrain, and meteorology, where maximum hourly NO₂ concentrations are expected to occur and siting criteria can be met in accordance with Appendix E of 40 CFR 58. When a State or local air monitoring agency identifies multiple acceptable candidate sites where maximum hourly NO₂ concentrations are expected to occur, the monitoring agency shall consider the potential for population exposure in the criteria utilized to select the final site location. These monitoring sites are required to be identified in the 2012 Annual Network Monitoring Plan and operational by January 1, 2013. As a result, the NCDAQ is not yet subject to these requirements.

2.2.3.2 Requirement for Area-wide NO₂ Monitoring

Within the NO₂ network, there must be one monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO₂ concentrations representing the neighborhood or larger spatial scales. Emission inventories and meteorological analysis should be used to identify the appropriate locations within a CBSA for locating required area-wide NO₂ monitoring stations. CBSA populations shall be based on the latest available census figures. Again, these monitoring sites are required to be identified in the 2012 Annual Network Monitoring Plan and operational by January 1, 2013. As a result, the NCDAQ is not yet subject to these requirements.

2.2.3.3 Regional Administrator Required Monitoring

The Regional Administrators, in collaboration with States, must require a minimum of 40 additional NO₂ monitoring stations nationwide in any area, inside or outside of CBSAs, above the minimum monitoring requirements, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations. The Regional Administrators, working with States, may also consider additional factors to require monitors to be sited inside or outside of CBSAs in which:

- (i) The required near-road monitors do not represent all locations of expected maximum hourly NO₂ concentrations in an area and NO₂ concentrations may be approaching or exceeding the NAAQS in that area;
- (ii) Areas that are not required to have a monitor in accordance with the monitoring requirements and NO₂ concentrations may be approaching or exceeding the NAAQS; or
- (iii) The minimum monitoring requirements for area-wide monitors are not sufficient to meet monitoring objectives.

The Regional Administrator and the responsible State or local air monitoring agency should work together to design and/or maintain the most appropriate NO₂ network to address the data needs for an area, and include all monitors under this provision in the

annual monitoring network plan. These monitoring sites, if any, are required to be identified in the 2012 Annual Network Monitoring Plan and operational by January 1, 2013. As a result, the NCDAQ is not yet subject to these requirements and has received no indication that we will have any Regional Administrator monitoring requirements to meet.

2.2.4 Sulfur Dioxide (SO₂) Design Criteria

The subsections below provide specific details about the design criteria in Appendix D to 40 CFR 58 and how the current North Carolina sulfur dioxide network measures up. More information on the network is provided in Chapter IV of the 2010 Annual Monitoring Network Plan for The North Carolina Division of Air Quality Volume 1 Network Descriptions.

2.2.4.1 Requirement for Monitoring by the Population Weighted Emissions Index

For the SO₂ monitoring network the EPA developed the population weighted emissions index (PWEI). The PWEI is calculated for each CBSA by multiplying the population of each CBSA, using the most current census data or estimates, by the total amount of SO₂ in tons per year emitted within the CBSA area, using an aggregate of the most recent county level emissions data available in the National Emissions Inventory for each county in each CBSA. The resulting product is divided by 1,000,000, providing a PWEI value, the units of which are million persons-tons per year. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO₂ monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO₂ monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO₂ monitor is required within that CBSA.

The SO₂ monitoring site(s) required as a result of the calculated PWEI in each CBSA shall satisfy minimum monitoring requirements if the monitor is sited within the boundaries of the parent CBSA and is one of the following site types (as defined in section 1.1.1 of 40 CFR 58 Appendix D): population exposure, highest concentration, source impacts, general background, or regional transport. SO₂ monitors at NCore stations may satisfy minimum monitoring requirements if that monitor is located within a CBSA that is required to have one or more PWEI monitors.

The EPA calculated PWEI values for every CBSA and according to their calculations, North Carolina will be required to operate 10 PWEI monitors in 8 CBSAs: Virginia Beach-Norfolk-Newport News, Charlotte-Gastonia-Concord, Greensboro-High Point, Durham-Chapel Hill, Winston-Salem, Asheville, Hickory, and Wilmington. The NCDAQ has an agreement with the VA-DEQ that they will maintain the required number of monitors for the Virginia Beach-Norfolk-Newport News MSA so the NCDAQ did not consider adding PWEI SO₂ monitors in Currituck County. Figure 1 shows the proposed locations for the other eight required PWEI SO₂ monitors in North Carolina. Most of these monitors would be population exposure monitors except for the New Hanover (HN) monitor in the Wilmington CBSA, which is a highest concentration monitor. All of these monitoring sites already exist and three of these sites (GR, HA, and HN) already have SO₂ monitors.



Figure 1. Proposed PWEl SO₂ Monitoring Sites for 2013

2.2.4.2 Regional Administrator Required Monitoring

The Regional Administrator may require additional SO₂ monitoring stations above the minimum number of PWEl monitors required, where the minimum monitoring requirements are not sufficient to meet monitoring objectives. The Regional Administrator may require, at his/her discretion, additional monitors in situations where an area has the potential to have concentrations that may violate or contribute to the violation of the NAAQS, in areas impacted by sources which are not conducive to modeling, or in locations with susceptible and vulnerable populations, which are not monitored under the minimum PWEl monitoring provisions. The Regional Administrator and the responsible State or local air monitoring agency shall work together to design and/or maintain the most appropriate SO₂ network to provide sufficient data to meet monitoring objectives. At this time, the NCDAQ anticipates that there will not be a need for Regional Administrator Required SO₂ monitoring in North Carolina. The minimum required PWEl monitors should more than meet the needs for SO₂ monitoring in North Carolina especially with the significant decrease in SO₂ emissions from coal-fired power plants resulting from implementation of the Clean Smoke Stacks Act.

2.2.5 Lead (Pb) Design Criteria

State and, where appropriate, local agencies are required to conduct ambient air Pb monitoring taking into account Pb sources which are expected to or have been shown to contribute to a maximum Pb concentration in ambient air in excess of the NAAQS, the potential for population exposure, and logistics. The current requirements in 40 CFR 58 Appendix D are for at least one source-oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from each Pb source that emits 1.0 or more tons per year based on either the most recent National Emission Inventory (<http://www.epa.gov/ttn/chief/eiinformation.html>) or other scientifically justifiable methods and data (such as improved emissions factors or site-specific data) taking into account logistics and the potential for population exposure. The EPA is proposing to

lower this requirement to sources emitting 0.5 or more tons per year. Currently the NCDAQ is not required to operate any source-oriented SLAMS sites.

The EPA listed three facilities in NC as emitting 1.0 or more tons of lead per year based on 2005 or 2006 data; however, none of those facilities were emitting 1.0 or more tons of lead per year in 2008 or 2009, so the NCDAQ applied for and received a waiver for all three sites. The EPA currently lists two facilities in NC as emitting 0.5 or more tons of lead per year. One of these facilities does not emit 0.5 or more tons of lead per year, so either it will no longer be listed in the inventory or the NCDAQ will apply for a waiver so that monitoring will not be required at its fence-line. The second site is a Federal military installation that emits various amounts of lead depending on the level of activity occurring at the site. The NCDAQ has requested guidance from the EPA on how to handle the monitoring requirements for this site.

Appendix D also requires a certain number of population-oriented monitors. The EPA is proposing to change the population-oriented monitoring requirements to require population-oriented monitors only at NCore sites. These population-oriented monitors may be required to be operational starting January 1, 2011. As a result, both of the NCore sites in North Carolina may begin analyzing the low-volume PM₁₀ samples collected at the sites for lead on a one-in-six day schedule starting January 1, 2011.

2.2.6 Particulate Matter (PM₁₀) Design Criteria

Table D-4 of Appendix D to 40 CFR 58 indicates the approximate number of permanent stations required in MSAs to characterize national and regional PM₁₀ air quality trends and geographical patterns. The number of PM₁₀ stations in areas where MSA populations exceed 1,000,000 must be in the range from 2 to 10 stations, while in low population urban areas no more than two stations are required. A range of monitoring stations is specified in Table D-4 because sources of pollutants and local control efforts can vary from one part of the country to another and therefore, some flexibility is allowed in selecting the actual number of stations in any one locale. Modifications from these PM₁₀ monitoring requirements must be approved by the Regional Administrator.

Currently Table D-4 of Appendix D to 40 CFR 58 requires North Carolina to operate between eight and 21 PM₁₀ analyzers in 10 MSAs. The Virginia Beach-Norfolk-Newport News, Charlotte-Gastonia-Concord and Raleigh-Cary MSAs are each required to have between two and four PM₁₀ analyzers. The NCDAQ has an agreement with the VA-DEQ that they will maintain the required number of monitors for the Virginia Beach-Norfolk-Newport News MSA. Currently, the VA-DEQ operates two PM₁₀ monitors in the Virginia Beach-Norfolk-Newport News MSA, meeting the Appendix D requirements. MCAQ operates five PM₁₀ monitors in the Charlotte-Gastonia-Concord MSA exceeding the Appendix D requirements. The NCDAQ operates one PM₁₀ monitor in the Raleigh-Cary MSA and received a waiver from the Regional Administrator for the second required monitor. The NCDAQ is required to operate one to two PM₁₀ monitors in the Greensboro-High Point and Durham-Chapel Hill MSAs. Currently, the NCDAQ operates one PM₁₀ monitor in the Greensboro-High Point MSA and no PM₁₀ monitors in the Durham-Chapel Hill MSA. The NCDAQ plans to add a PM₁₀ monitor to the Durham-Chapel Hill MSA in 2011 to meet the minimum monitoring requirements. Five MSAs have requirements for between zero and one PM₁₀ monitor: Winston-Salem, Asheville,

Hickory, Fayetteville, and Wilmington. The Forsyth County Environmental Affairs Department operates two PM₁₀ monitors in Winston-Salem, exceeding the Appendix D requirements. The NCDAQ operates a PM₁₀ monitor in Hickory and Fayetteville. Currently the Asheville and Wilmington MSAs do not have a PM₁₀ monitor.

More information on these sites is provided in Chapter VI of the 2010 Annual Monitoring Network Plan for The North Carolina Division of Air Quality Volume 1 Network Descriptions.

2.2.7 Fine Particulate Matter (PM_{2.5}) Design Criteria

The subsections below provide specific details about the design criteria in Appendix D to 40 CFR 58 and how the North Carolina network measures up. More information on the fine particulate matter network is provided in Chapter VII of the 2010 Annual Monitoring Network Plan for The North Carolina Division of Air Quality Volume 1 Network Descriptions.

2.2.7.1 General Requirements

State, and where applicable local, agencies must operate the minimum number of required PM_{2.5} SLAMS sites listed in Table D-5 of Appendix D to 40 CFR 58. The NCore sites are expected to complement the PM_{2.5} data collection that takes place at non-NCore SLAMS sites, and both types of sites can be used to meet the minimum PM_{2.5} network requirements. The required monitoring stations or sites must be sited to represent community-wide air quality. These monitoring stations will typically be at neighborhood or urban scale. At least one monitoring station is to be sited in a population-oriented area of expected maximum concentration. For areas with more than one required SLAMS, a monitoring station is to be sited in an area of poor air quality.

Table D-5 of Appendix D to 40 CFR 58 requires North Carolina to operate two PM_{2.5} analyzers in the Virginia Beach-Norfolk-Newport News MSA, two in the Charlotte-Gastonia-Concord and Raleigh-Cary MSAs and one in the Greensboro-High Point and Durham-Chapel Hill MSAs. The NCDAQ has an agreement with the Virginia Department of Environmental Quality (VA-DEQ) that VA-DEQ will maintain the required number of monitors for the Virginia Beach-Norfolk-Newport News MSA. Currently, the VA-DEQ operates three PM_{2.5} monitor in the Virginia Beach-Norfolk-Newport News MSA, exceeding the Appendix D requirements. Currently MCAQ operates three PM_{2.5} analyzers in the Charlotte-Gastonia-Concord MSA and the NCDAQ operates one, exceeding the requirements of Appendix D. The NCDAQ operates three PM_{2.5} analyzers in the Raleigh-Cary MSA and two in the Greensboro-High Point and Durham-Chapel Hill MSAs, exceeding the Appendix D requirements.

2.2.7.2 Requirement for Continuous PM_{2.5} Monitoring

The State, or where appropriate, local agencies must operate continuous PM_{2.5} analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of Appendix D to 40 CFR 58. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/Approved Regional Method (ARM) monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies. State and local air monitoring agencies must use methodologies and quality

assurance/quality control (QA/QC) procedures approved by the EPA Regional Administrator for these required continuous analyzers.

Currently Table D-5 of Appendix D to 40 CFR 58 requires North Carolina to operate one continuous PM_{2.5} analyzers in each of the following five MSAs: Virginia Beach-Norfolk-Newport News, Charlotte-Gastonia-Concord, Raleigh-Cary, Greensboro-High Point, and Durham-Chapel Hill. The NCDAQ has an agreement with the VA-DEQ that VA-DEQ will maintain the required number of monitors for the Virginia Beach-Norfolk-Newport News MSA. Currently, the VA-DEQ operates one continuous monitor in the Virginia Beach-Norfolk-Newport News MSA, which meets the Appendix D requirements. Currently MCAQ operates two continuous PM_{2.5} analyzers in the Charlotte-Gastonia-Concord MSA and the NCDAQ operates one continuous PM_{2.5} analyzer in the Raleigh-Cary, Greensboro-High Point, and Durham-Chapel Hill MSAs, which meet the Appendix D requirements.

2.2.7.3 Requirement for PM_{2.5} Background and Transport Sites

Each State shall install and operate at least one PM_{2.5} site to monitor for regional background and at least one PM_{2.5} site to monitor regional transport. These monitoring sites may be at community-oriented sites and this requirement may be satisfied by a corresponding monitor in an area having similar air quality in another State. State and local air monitoring agencies must use methodologies and QA/QC procedures approved by the EPA Regional Administrator for these sites. Methods used at these sites may include non-federal reference method samplers such as IMPROVE or continuous PM_{2.5} monitors.

The NCDAQ has designated a regional background and a regional transport monitor for each of the three regions of North Carolina – the western mountain area, the central piedmont area, and the eastern coastal plain area. These monitors are located at Kenansville (regional background) and Jamesville (regional transport) on the eastern coastal plain, Candor (regional background) and Cherry Grove (regional transport) in the central piedmont, and Boone (regional background) and Bryson City (regional transport) in the western mountains. Thus, the NCDAQ meets the Appendix D requirements.

2.2.7.4 PM_{2.5} Chemical Speciation Site Requirements

Each State shall continue to conduct chemical speciation monitoring and analyses at sites designated to be part of the PM_{2.5} Speciation Trends Network (STN). The selection and modification of these STN sites must be approved by the Regional Administrator. The PM_{2.5} chemical speciation urban trends sites shall include analysis for elements, selected anions and cations, and carbon. Samples must be collected using the monitoring methods and the sampling schedules approved by the Regional Administrator. Chemical speciation is encouraged at additional sites where the chemically resolved data would be useful in developing State Implementation Plans and supporting atmospheric or health effects related studies.

Mecklenburg County Air Quality currently operates a PM_{2.5} STN at the NCore Station in Mecklenburg County, meeting the Appendix D requirements. In addition to this STN site, the NCDAQ operates four PM_{2.5} Chemical Speciation sites, two in former nonattainment areas, one at an NCore site, and the fourth at a PM_{2.5} precursor monitoring site. The Forsyth Environmental Affairs Department operates a PM_{2.5} Chemical Speciation site at

Hattie Avenue in Winston-Salem for health effects related studies. The Western North Carolina Regional Air Quality Agency operates a PM_{2.5} Chemical Speciation site in Asheville.

2.2.8 Coarse Particulate Matter (PM_{10-2.5}) Design Criteria

The subsections below provide specific details about the design criteria in Appendix D to 40 CFR 58 and whether the North Carolina network meets these requirements.

2.2.8.1 General Monitoring Requirements

The only required monitors for PM_{10-2.5} are those required at NCore Stations. The NCDAQ and Mecklenburg County Air Quality are currently operating PM_{10-2.5} at both of the NCore Stations in North Carolina, meeting the Appendix D requirements.

2.2.8.2 PM_{10-2.5} Chemical Speciation Site Requirements

PM_{10-2.5} chemical speciation monitoring and analyses is required at NCore sites. The selection and modification of these sites must be approved by the Regional Administrator. Samples must be collected using the monitoring methods and the sampling schedules approved by the Regional Administrator. All NCore monitoring is scheduled to begin in 2011 so currently there are no requirements to do PM_{10-2.5} chemical speciation monitoring in North Carolina, and the NCDAQ is meeting these Appendix D requirements.

2.3 NETWORK DESIGN FOR PHOTOCHEMICAL ASSESSMENT MONITORING STATIONS (PAMS)

The PAMS program provides more comprehensive data on O₃ air pollution in areas classified as serious, severe, or extreme nonattainment for O₃ than would otherwise be achieved through the NCore and SLAMS sites. More specifically, the PAMS program includes measurements for O₃, oxides of nitrogen, VOC, and meteorology. Currently, North Carolina does not have any ozone nonattainment areas that are classified as serious, severe, or extreme and thus is not required to have any PAMS sites.

Chapter 3 Need for New Sites

This chapter describes the need for new sites in North Carolina over the next five years. The need for sites was determined based on requirements listed in 40 CFR 58 Appendix D, estimated changes in population and air quality over the next five years, proposed changes to Appendix D that will occur in the next year, possible changes to the NAAQS that will occur in the next couple of years, and projected needs of the state. Table 1 lists the new sites that may be needed in the next five years as a result of these considerations.

Table 1. Possible Future Sites and Site Upgrades in the Next Five Years

NCORE SITES				
AQS Site Id Number	Site Name	Monitor Type	Proposed Changes	Time Frame
371590021	Rockwell	SLAMS	Upgrade site to be NCore-like	2011
OZONE SITES				
AQS Site Id	Site Name	Monitor	Proposed Changes	Time

Number		Type		Frame
37001000X	Burlington	SLAMS	Possible new site to meet possible new ozone monitoring requirements	2012 or 2013
37019xxxx	Brunswick	SLAMS	New site in Wilmington MSA to meet Appendix D requirements	4/1/2011
370870008	Junaluska E.S.	SLAMS	Site to replace the ozone monitor at the Health Dept.	4/1/2011
37129000X	New Castle Hayne Site	SLAMS	The current Castle Hayne site may need to move depending on how Titan impacts the site monitoring objectives	4/1/2014
37133000X	Jacksonville	SLAMS	Possible new site to meet possible new ozone monitoring requirements	2012 or 2013
37191000X	Goldsboro	SLAMS	Possible new site to meet possible new ozone monitoring requirements	2012 or 2013

NITROGEN DIOXIDE SITES

AQS Site Id Number	Site Name	Monitor Type	Proposed Changes	Time Frame
370270003	Lenoir	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2012
370511003	Golfview	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2014
37063001X	Durham	SLAMS	New near-road monitoring site on I-40	1/1/2013
370690001	Franklinton	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2012
37081001X	Greensboro	SLAMS	New near-road monitoring site on I-40	1/1/2013
371170001	Jamesville	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2014
37119004X	Charlotte	SLAMS	New near-road monitoring site on I-277	1/1/2013
371290002	Castle Hayne	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2013
371570099	Bethany	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2013
371830014	Millbrook	SLAMS	New area-wide NO2 monitor added to site	1/1/2013
37183002X	Raleigh	SLAMS	New near-road monitoring site on I-40	1/1/2013

SULFUR DIOXIDE SITES

AQS Site	Site Name	Monitor	Proposed Changes	Time
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Id Number		Type		Frame
370130008	Aurora #3	SLAMS	Site will replace current Aurora site when PCS Phosphate begins mining where the monitor is located.	2015
370270003	Lenoir	SLAMS	New PWEI monitor for Hickory MSA	1/1/2013
370630015	Durham Armory	SLAMS	New PWEI monitor for Durham-Chapel Hill MSA	1/1/2013
370810013	Mendenhall	SLAMS	New PWEI monitor for Greensboro-High Point MSA	1/1/2013
370870008	Junaluska E.S.	SLAMS	New PWEI monitor for Asheville MSA	1/1/2013
371191005	Arrowood	SLAMS	New PWEI monitor for Charlotte-Gastonia-Concord MSA	1/1/2013
371570099	Bethany	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2011
371590021	Rockwell	SLAMS	Add year-round trace-level sulfur dioxide monitor for fine particle precursor monitoring	2010 or 2011
371590022	Enochville	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2012

LEAD SITES

AQS Site Id Number	Site Name	Monitor Type	Proposed Changes	Time Frame
37xxxxxxx	Fort Bragg	SLAMS	May need a source oriented lead monitor on or near Fort Bragg	2012 or 2013
371190041	Garinger	NCORE	Start analyzing low-volume PM ₁₀ samples for lead on a 1-in-6 day schedule	2011 or 2012
371190042	Montclair	SLAMS	Start analyzing low-volume PM ₁₀ samples for lead on a 1-in-6 day schedule	2011 or 2012
37119004X	Douglas Airport	SLAMS	May need a source oriented lead monitor on or near Douglas Airport	2012 or 2013
371830014	Millbrook	NCORE	Start analyzing low-volume PM ₁₀ samples for lead on a 1-in-6 day schedule	2011 or 2012

PM₁₀ SITES

AQS Site Id Number	Site Name	Monitor Type	Proposed Changes	Time Frame
370330001	Cherry Grove	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2013
370630015	Durham	SLAMS	Add a low-volume PM ₁₀ monitor to	1/1/2011

	Armory		meet Appendix D requirements	
370710016	Grier Middle School	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2012
371110004	East Marion	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2011
371170001	Jamesville	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2012
371230001	Candor	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2011

FINE PARTICULATE MATTER SITES

AQS Site Id Number	Site Name	Monitor Type	Proposed Changes	Time Frame
37019xxxx	Brunswick	Special Purpose	Possible rotating 2-in-4 year monitoring site	2012 or later
370510009	William Owen	QA Collocated	Add collocated continuous monitor if TEOM is approved as an ARM	2011 or later
370650004	Springfield Rd	Nonregulatory	Add continuous monitor for forecasting in Rocky Mount	2010
371010002	West Johnston	SLAMS	Add continuous monitor to meet Appendix D requirements	1/1/2012
37129000X	New Castle Hayne Site	SLAMS	The current Castle Hayne site may need to move depending on how Titan impacts the site monitoring objectives	4/1/2014
37133000X	Jacksonville	Special Purpose	Possible rotating 2-in-4 year monitoring site	2014 or later
371890003	Boone	Nonregulatory	Add continuous monitor when one becomes available	2011 or later

COARSE PARTICULATE MATTER SITES

AQS Site Id Number	Site Name	Monitor Type	Proposed Changes	Time Frame
370330001	Cherry Grove	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2013
370350004	Hickory	SLAMS	Convert high-volume PM ₁₀ to a low-volume PM ₁₀ for PM _{10-2.5}	2012 or later
370510009	William Owen	SLAMS	Convert high-volume PM ₁₀ to a low-volume PM ₁₀ for PM _{10-2.5}	2012 or later
370610002	Kenansville	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2013

370630015	Durham Armory	SLAMS	Add a low-volume PM ₁₀ monitor to meet Appendix D requirements	1/1/2011
370710016	Grier Middle School	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2012
371110004	East Marion	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2014
371170001	Jamesville	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2012
371190041	Garinger	NCORE	PM _{coarse} speciation monitoring may be required in the future	2011 or later
371230001	Candor	Special Purpose	Proposed background site for PSD modeling and industrial expansion operating on a 1-in-3 year rotation	1/1/2014
371830014	Millbrook	NCORE	PM _{coarse} speciation monitoring may be required in the future	2011 or later

PAMS SITES

AQS Site Id Number	Site Name	Monitor Type	Proposed Changes	Time Frame
371190041	Garinger	PAMS	May be need if Metrolina area is classified as serious for ozone	2011 or later
371590021	Rockwell	PAMS	May be need if Metrolina area is classified as serious for ozone	2011 or later

3.1 NCORE SITES

Although the EPA does not require the State of North Carolina to operate any additional NCore sites, the NCDAQ has plans to upgrade the Rockwell site in Rowan County to an NCore-like site within the next five years.

3.2 POLLUTANT-SPECIFIC SLAMS SITES

3.2.1 Ozone (O₃) Sites

The NCDAQ does not meet 40 CFR 58 Appendix D minimum ozone monitoring requirements for the Wilmington MSA. Consequently, the NCDAQ is searching for a location in Brunswick County to locate an ozone monitoring station. The NCDAQ anticipates that this monitoring station would most likely be located in the Leland area of Brunswick County. The NCDAQ plans to have this monitoring station operational by the beginning of ozone season in 2011.

The NCDAQ is also following the situation with the permitting of the Titan concrete plant in Wilmington. The proposed facility would be across the street and about one mile from the existing Castle Hayne ozone monitoring site. If the facility is built, after it becomes operational, the NCDAQ will reassess the Castle Hayne ozone monitoring station to ensure it still meets its intended monitoring objectives. As a result of that

assessment, the NCDAQ may establish a new ozone monitoring site at another location in the Wilmington area.

Toward the end of 2010, the USEPA will come out with new ozone monitoring regulations that may require the NCDAQ to establish ozone monitoring sites in the three MSAs that currently do not have ozone design values: Burlington, Goldsboro, and Jacksonville. These monitors would need to be operational in 2012 or 2013.

3.2.2 Carbon Monoxide (CO) Sites

The NCDAQ does not plan to add any additional CO monitoring sites in the next five years unless the monitoring regulations are changed to require additional CO monitoring in areas currently not being monitored. The NCDAQ does plan to upgrade the CO equipment used at the Rockwell monitoring station from a high sensitivity CO monitor to a trace-level CO monitor as soon as another trace-level CO monitor can be obtained either in late 2010 or early 2011.

More information on the CO monitoring stations is provided in Chapter III of the 2010 Annual Monitoring Network Plan for The North Carolina Division of Air Quality Volume 1 Network Descriptions.

3.2.3 Nitrogen Dioxide (NO₂) Sites

The subsections below provide specific details about sites that are proposed to be added to the network in the next five years.

3.2.3.1 Requirement for Near-road NO₂ Monitors

The NCDAQ anticipates that by 2012 when the near road NO₂ monitoring sites are required to be identified in the Annual Network Monitoring Plan that North Carolina will have four CBSAs with a population of 500,000 or more persons based on the latest available census figures. These CBSAs are Charlotte-Concord-Gastonia, Raleigh-Cary, Greensboro-High Point, and Durham-Chapel Hill. For these four areas the MCAQ and the NC-DENR will need to monitor in locations of expected maximum hourly concentrations sited near a major road with high AADT counts. Figure 2 shows the approximate location of these four near-road NO₂ monitors based on 2008 AADT counts.



Figure 2. Expected Locations of Near-road and Area-wide NO₂ Monitors in 2013.

3.2.3.2 Requirement for Area-wide NO₂ Monitoring

North Carolina has two CBSAs with a population of 1,000,000 or more persons (excluding Currituck County which is in the Virginia Beach-Norfolk-Newport News MSA). Thus, two area-wide NO₂ monitors will be required in North Carolina – one in Mecklenburg County and one in Wake County – to monitor a location of expected highest NO₂ concentrations representing the neighborhood or larger spatial scales. These monitors may be placed at existing sites (such as Garinger and Millbrook) if those sites are situated in an area of expected high NO₂ concentrations at the neighborhood or larger spatial scale. These two monitoring sites will be identified in the 2012 Annual Network Monitoring Plan and operational by January 1, 2013.

3.2.3.3 Regional Administrator Required Monitoring

The NCDAQ is not subject to any current requirement to add any Regional Administrator Required NO₂ monitoring sites in North Carolina during the next five years. The minimum required near-road and area-wide monitors should more than meet the needs for NO₂ monitoring in North Carolina.

3.2.3.4 Background PSD Industrial Expansion Monitoring Sites

The NCDAQ also has a proposal to add Special Purpose background NO₂ monitors at six sites: Lenoir (Caldwell County), Bethany (Rockingham County), Golfview (Cumberland County), Franklinton (Franklin County), Castle Hayne (New Hanover County) and Jamesville (Martin County). These monitors would operate for one year out of every three to provide data for use in Prevention of Significant Deterioration modeling for industrial expansion.

3.2.4 Sulfur Dioxide (SO₂) Sites

The subsections below provide specific details about sites that are proposed to be added to the network in the next five years. More information on these sites is provided in

Chapter IV of the 2010 Annual Monitoring Network Plan for the North Carolina Division of Air Quality Volume 1 Network Descriptions.

3.2.4.1 Population Weighted Emissions Index Sites

Based on the EPA calculated PWEI values for every CBSA, the NCDAQ plans to begin operating four new PWEI SO₂ monitors in North Carolina in 2013 and MCAQ plans to begin operating one new PWEI SO₂ monitor in Mecklenburg County. These five new monitors would be population exposure monitors. The five new monitors would be added to existing ozone sites at the Durham Armory in the Durham-Chapel Hill MSA, Mendenhall School in the Greensboro-High Point MSA, Lenoir in the Hickory MSA, Junaluska School in the Asheville MSA, and Arrowood in the Charlotte-Concord-Gastonia MSA. These sites are shown in Figure 1.

3.2.4.2 Regional Administrator Required Monitoring Sites

The NCDAQ has no current requirement to add any Regional Administrator Required SO₂ monitoring sites in North Carolina during the next five years. The minimum required PWEI monitors should more than meet the needs for SO₂ monitoring in North Carolina especially with the significant decrease in SO₂ emissions from coal-fired power plants resulting from implementation of the Clean Smoke Stacks Act.

3.2.4.3 Background PSD Industrial Expansion Monitoring Sites

The NCDAQ decided to modify its background PSD Industrial Expansion SO₂ Monitoring Network starting in 2011. Three new Special Purpose background SO₂ monitors will be added to the three existing sites: Lenoir (Caldwell County), Bethany (Rockingham County), and Enochville (Rowan County). These monitors would operate for one year out of every three to provide data for use in Prevention of Significant Deterioration modeling for industrial expansion. Bethany will operate in 2011, Enochville in 2012, and Lenoir in 2013.

3.2.4.4 Other SLAMS SO₂ Monitoring Sites

The NCDAQ plans to add a SLAMS SO₂ monitor to the Rockwell monitoring site sometime in the next five years. Sometime around 2015 the NCDAQ may also need to start a new Aurora PCS monitoring site. PCS Phosphate estimates that they will begin mining in the vicinity of the current monitor sometime in 2015. At that time the current site will need to be shut down and the equipment relocated to a new site.

3.2.5 Lead (Pb) Sites

The NCDAQ and MCAQ plan to begin monitoring lead in 2011 or 2012. The NCDAQ may place one source-level monitor at the fence-line of Fort Bragg in Hoke or Cumberland County. This site emits various amounts of lead depending on the level of training activity occurring at the site. The NCDAQ has requested guidance from the EPA on how to handle the monitoring requirements for this Federally-owned and operated site. MCAQ may need to do some type of lead monitoring at the fence line of Douglas International Airport in Charlotte. However, this airport is expected to be removed from the list of airports requiring lead monitoring when the EPA revises the lead emission inventory estimates for airports.

Both of the NCore sites in North Carolina (Garinger in Charlotte and Millbrook in Raleigh) as well as Montclaire in Charlotte will begin analyzing for lead in 2011 or 2012. If the issues with the low-volume PM₁₀ lead method are worked out with the Office of Research and Development, low-volume PM₁₀ samples collected at the sites will be analyzed for lead on a one-in-six day schedule.

3.2.6 Particulate Matter (PM₁₀) Sites

The NCDAQ plans to add a SLAMS PM₁₀ monitor to the Durham-Chapel Hill MSA in 2011 to meet the minimum monitoring requirements in Table D-4 of Appendix D to 40 CFR 58. This monitor will be a low volume PM₁₀ analyzer.

The NCDAQ also plans to add Special Purpose background PM₁₀ monitors at five sites: Grier School (Gaston County), Marion (McDowell County), Cherry Grove (Caswell County), Candor (Montgomery County), and Jamesville (Martin County). These monitors would operate for one year out of every three to provide data for use in Prevention of Significant Deterioration modeling for industrial expansion.

More information on these sites is provided in Chapter VI of the 2010 Annual Monitoring Network Plan for the North Carolina Division of Air Quality Volume 1 Network Descriptions.

3.2.7 Fine Particulate Matter (PM_{2.5})

The subsections below provide specific details about sites that are proposed to be added to the network in the next five years. More information on these sites is provided in Chapter VII of the 2010 Annual Monitoring Network Plan for the North Carolina Division of Air Quality Volume 1 Network Descriptions.

3.2.7.1 General PM_{2.5} Sites

The NCDAQ does not have any definite plans during the next five years to add additional PM_{2.5} monitoring stations anywhere in North Carolina unless the standard is lowered or the monitoring requirements in 40 CFR 58 Appendix D change. However, the NCDAQ has considered establishing some rotating special purpose PM_{2.5} monitoring sites in the eastern part of the state where the fine particle concentrations are lower. These would be sites that would operate for two years out of every four years. Such an arrangement would allow the NCDAQ to monitor in more areas of the state with the current resources of equipment and people. Potential locations for rotating sites would be in Lenoir, Onslow, Brunswick, and Pitt Counties.

The NCDAQ is also following the situation with the permitting of the Titan concrete plant in Wilmington. The proposed facility would be across the street and about one mile from the existing Castle Hayne monitoring site. If the facility is built, the NCDAQ will reassess the current Castle Hayne monitoring station to ensure that it still meets its intended monitoring objectives. As a result of that assessment, the NCDAQ may establish a new PM_{2.5} monitoring site at another location in the Wilmington area.

3.2.7.2 Requirement for Continuous PM_{2.5} Monitoring

To meet the Appendix D requirements, sometime in the future the NCDAQ anticipates needing to add a continuous PM_{2.5} analyzer in the Raleigh-Cary MSA. This continuous

PM_{2.5} analyzer will be located at the West Johnston site in Johnston County and will begin operation in 2012 or 2013.

In 2010 the NCDAQ is adding a continuous PM_{2.5} analyzer to the Springfield Road site in Rocky Mount. The NCDAQ wants to upgrade this site so that the Rocky Mount area can be added to the PM_{2.5} forecast areas in North Carolina. The NCDAQ also has plans to add a continuous PM_{2.5} monitor to the Boone site in Watauga County when resources become available. Also if the Tapered-Element Oscillating Microbalance (TEOM) is approved as an ARM, the NCDAQ will begin operating a collocated TEOM site at the William Owen School site in Fayetteville.

3.2.7.3 PM_{2.5} Background and Transport Sites

The NCDAQ does not plan to add any PM_{2.5} regional background or PM_{2.5} regional transport sites in the next five years.

3.2.7.4 PM_{2.5} Chemical Speciation Site

The NCDAQ does not plan to add any PM_{2.5} chemical speciation urban trends sites in the next five years.

3.2.7.5 Wind Speed and Direction Sensors at PM_{2.5} Sites

The NCDAQ plans to add wind speed and direction sensors to three PM_{2.5} monitoring sites in 2010. These sites are Colfax (Guilford County), Durham Armory (Durham County) and Pitt County Agricultural Center (Pitt County).

3.2.8 Coarse Particulate Matter (PM_{10-2.5})

3.2.8.1 General PM_{10-2.5} Monitoring Sites

The NCDAQ is proposing in 2011 to start a fourth PM_{10-2.5} monitoring station in the Durham-Chapel Hill Metropolitan Statistical Area at the Durham Armory monitoring site. Additional PM₁₀ monitoring stations may be converted to PM_{10-2.5} monitoring stations as equipment for PM_{10-2.5} monitoring becomes available. Eventually PM_{10-2.5} monitoring may also occur in the Fayetteville and Hickory MSAs at the William Owen and Hickory Water Tower sites, respectively. If the need arises in 2012 for background PM_{10-2.5} measurements, the background PM₁₀ monitoring network may be converted to a background PM_{10-2.5} network. The background PM₁₀ monitoring network consists of six sites located at Kenansville (Duplin County), Jamesville (Martin County), Candor (Montgomery County), Grier School (Gaston County), Marion (McDowell County), and Cherry Grove (Caswell County).

3.2.8.2 PM_{10-2.5} Chemical Speciation Sites

PM_{10-2.5} chemical speciation monitoring and analyses is required at NCore sites. The NCDAQ may need to add PM_{10-2.5} chemical speciation monitoring at the Millbrook NCore monitoring station and the MCAQ may need to add PM_{10-2.5} chemical speciation monitoring at the Garinger NCore monitoring station at some time in the future when the Administrator clarifies the requirements for this monitoring. The NCDAQ and MCAQ will do the type of monitoring at the locations and on the time-line specified by the Administrator.

3.3 PHOTOCHEMICAL ASSESSMENT MONITORING STATIONS (PAMS)

Currently the NCDAQ does not have any PAMS sites. However, if the Metrolina area is classified as Serious, MCAQ and the NCDAQ will be required to establish two PAMS in the Charlotte area. At this time, MCAQ is planning on expanding the Garinger NCore site to a PAMS if PAMS monitoring becomes required and the NCDAQ is planning on expanding the Rockwell NCore-like station to a PAMS. These two sites would begin as PAMS one year after the Metrolina area is classified as serious.

Chapter 4 Existing Sites That Are No Longer Needed and Can Be Terminated

4.1 NCORE SITES

The North Carolina Division of Air Quality (NCDAQ) does not plan to terminate any NCore sites in the next five years. More information on the NCore site operated by the NCDAQ is provided in Chapter IX of the 2010 Annual Monitoring Network Plan for the North Carolina Division of Air Quality Volume 1 Network Descriptions.

4.2 POLLUTANT-SPECIFIC SLAMS SITES

4.2.1 Ozone (O₃) Sites

The NCDAQ does not have any plans to discontinue any ozone sites in the next five years unless (1) the owner of the property evicts the monitor from the site and the NCDAQ cannot find a suitable place to relocate the monitor or (2) the NCDAQ is required to add additional monitors to other MSAs and does not have the resources to do so without discontinuing existing monitors that are not required by 40 CFR 58 Appendix D.

The NCDAQ is being evicted from the Waynesville Health Department ozone site at the end of the 2010 ozone season. This site will be shut down at the start of the 2011 ozone season and replaced with a new ozone site located across the street at the Junaluska Elementary School.

Existing monitors that are not required by 40 CFR 58 Appendix D that could possibly be discontinued so that the equipment could be used in other MSAs include the West Johnston monitor in the Raleigh-Cary MSA and the Bushy Fork monitor in the Durham-Chapel Hill MSA. If these monitors were discontinued, their last year of operation would be either 2011 or 2012 depending upon when the equipment needs to be relocated to other MSAs.

Another existing ozone monitoring site that the NCDAQ is considering discontinuing so that the monitoring equipment can be relocated to an MSA that currently does not have an ozone monitor is the Lenoir Community College site. The equipment from this site may be relocated to the Jacksonville or Goldsboro MSA if the EPA requires ozone monitoring in those MSAs.

The only other ozone site the NCDAQ may potentially discontinue in the next five years is the Castle Hayne ozone monitoring site. The NCDAQ is following the situation with the permitting of the Titan concrete plant in Wilmington. The proposed facility would be

across the street and about one mile from the existing Castle Hayne monitoring site. If the facility is built and it becomes operational, the NCDAQ will need to reassess the Castle Hayne monitoring station to ensure that the site still meets its intended monitoring objectives. As a result of that assessment, the NCDAQ may discontinue the Castle Hayne ozone monitoring site and establish a new site at another location in the Wilmington area.

More information on the ozone sites operated by the NCDAQ that could be discontinued is provided in Chapters II and V of the 2010 Annual Monitoring Network Plan for the North Carolina Division of Air Quality Volume 1 Network Descriptions.

4.2.2 Carbon Monoxide (CO) Sites

Currently, the NCDAQ plans to shut down the Crabtree SLAMS CO monitor in 2015 or 2016 after it is no longer required to meet the conditions of the State's Maintenance Plan for Carbon Monoxide. The high sensitivity carbon monoxide monitor at Rockwell may be upgraded to a trace-level monitor in 2010 or 2011 when funds become available to purchase the necessary equipment. More information on the CO sites operated by the NCDAQ is provided in Chapter III of the 2010 Annual Monitoring Network Plan for The North Carolina Division of Air Quality Volume 1 Network Descriptions.

4.2.3 Nitrogen Dioxide (NO₂) Sites

The NCDAQ currently does not operate any NO₂ sites. The local programs in Forsyth County and Mecklenburg County do not plan to make any changes to their existing NO₂ sites. As a result there are no NO₂ sites in North Carolina that will be discontinued in the next five years.

4.2.4 Sulfur Dioxide (SO₂) Sites

The subsections below provide specific details about sites that are proposed for discontinuation in the next five years as well as proposed technology and sampling schedule changes at various sites. More information on these sites is provided in Chapter IV of the 2010 Annual Monitoring Network Plan for the North Carolina Division of Air Quality Volume 1 Network Descriptions.

4.2.4.1 Population Weighted Emissions Index Sites

Currently, there are no PWEI sites in North Carolina. These sites will begin operating in 2013. As a result there are no plans to discontinue any PWEI sites in the next five years. Although the PWEI sites may initially be operated using existing analog technology, the NCDAQ plans to upgrade to trace-level monitors using digital technology sometime after 2015.

4.2.4.2 Regional Administrator Required Monitoring Sites

Currently there are no Regional Administrator Required SO₂ monitoring sites in North Carolina. The NCDAQ anticipates that these sites will not be required in the state at this time.

4.2.4.3 Background PSD Industrial Expansion Monitoring Sites

The NCDAQ discontinued the Bryson City SLAMS SO₂ monitor in April 2010 because of problems that occurred when the monitor had to be relocated to a new location after the NCDAQ was evicted from the original location. In the next five years, the NCDAQ

may discontinue some more of the existing and newly proposed PSD industrial expansion monitoring sites if the measured concentrations at these sites are not significantly lower than the concentrations measured at the new PWEI sites. Specific PSD industrial expansion sites that may be discontinued are the Pittsboro site in the Durham-Chapel Hill MSA and the Bethany site in the Greensboro-High Point MSA. In 2015 or sometime thereafter, the remaining PSD industrial expansion monitors will be upgraded to trace-level monitors that use digital technology.

4.2.4.4 Other SLAMS SO₂ Monitoring Sites

The NCDAQ does not plan to discontinue any of the other SLAMS SO₂ monitoring sites unless the NCDAQ gets evicted from the current Aurora PCS monitoring site. Sometime around 2015, PCS Phosphate will begin mining in the area where the monitor is currently located. Before mining operations start, the site will need to be shut down and the equipment will need to be relocated to another site.

4.2.5 Lead (Pb) Sites

Currently there are no lead monitoring sites in North Carolina. Sites required by the new lead monitoring regulations will begin operating in 2011 or 2012. As a result, the NCDAQ has no plans to terminate any lead monitoring sites in the next five years. More information on the lead monitoring network is provided in Chapter VIII of the 2010 Annual Monitoring Network Plan for the North Carolina Division of Air Quality Volume 1 Network Descriptions.

4.2.6 Particulate Matter (PM₁₀) Sites

The only SLAMS PM₁₀ monitor that the NCDAQ plans to discontinue in the next five years is the PM₁₀ monitor at Kenansville. At the end of 2010, the NCDAQ plans to shut down this monitor and convert it to a Special Purpose monitor that operates one year out of every three years.

If the EPA eliminates the PM₁₀ standard in 2011 and replaces it with a PM₁₀₋₂₅ or PM coarse standard, the NCDAQ will convert the current PM₁₀ SLAMS and background networks to PM₁₀₋₂₅ or PM coarse networks in 2012.

More information on the PM₁₀ monitoring network is provided in Chapter VI of the 2010 Annual Monitoring Network Plan for the North Carolina Division of Air Quality Volume 1 Network Descriptions.

4.2.7 Fine Particulate Matter (PM_{2.5})

The subsections below provide specific details about sites that are proposed for discontinuation in the next five years as well as proposed technology and sampling schedule changes at various sites. More information on these sites is provided in Chapter VII of the 2010 Annual Monitoring Network Plan for the North Carolina Division of Air Quality Volume 1 Network Descriptions.

4.2.7.1 General PM_{2.5} Sites

The NCDAQ does not have any definite plans to discontinue any PM_{2.5} monitoring sites in the next five years. However, the NCDAQ is following the situation with the permitting of the Titan concrete plant in Wilmington. The proposed facility would be across the street and about one mile from the existing Castle Hayne monitoring site. If the

facility is built, the NCDAQ will reassess the Castle Hayne monitoring station to ensure the monitoring site still meets its intended monitoring objectives. As a result of that assessment, the NCDAQ may discontinue the Castle Hayne PM_{2.5} monitoring site and establish a new site at another location in the Wilmington area.

The NCDAQ has also been considering converting some of its SLAMS PM_{2.5} monitoring sites that are no longer required to Special Purpose PM_{2.5} monitoring sites that would operate for two years out of every four. Doing this rotation would allow the NCDAQ to continue to collect air quality data in areas with low concentrations of PM_{2.5} without permanently committing resources to the area. For example, the NCDAQ is considering converting the SLAMS monitor at Lenoir Community College to a Special Purpose PM_{2.5} monitoring site and alternating this monitor between the site in Lenoir County and a new site to be established in Brunswick County.

The NCDAQ will also change the technology used at several of the PM_{2.5} sites to reduce the number of manual FRM monitors in use throughout the network. Sites where the manual FRM monitors are likely to be discontinued and replaced with continuous FEM or ARM monitors are: Hopedale Road in Alamance County, Grier School in Gaston County, Marion in McDowell County, Dillard School in Wayne County and Castle Hayne in New Hanover County.

The NCDAQ may also reduce the sampling schedules at sites where one-in-one day sampling is no longer required to one-in-three day sampling. This change in sampling schedule will occur at the Millbrook site in Raleigh when the BAM study ends at the end of 2010 or in early 2011 and at the Mendenhall site in Greensboro at the end of 2010 or earlier. The NCDAQ will also reduce the number of collocated PM_{2.5} analyzers it operates by shutting down the collocated monitor at Mendenhall at the end of 2010 or earlier. The Marion collocated monitor is also scheduled to be shut down when the technology at the Marion site is upgraded to some type of continuous monitor.

4.2.7.2 Continuous PM_{2.5} Monitoring Sites

The NCDAQ plans to discontinue one of the two continuous PM_{2.5} analyzers at the three BAM study sites at the end of the BAM study. At the Millbrook BAM study site the BAM study will end at the end of 2010 or in early 2011. At the Bryson City BAM study site the BAM study will end in early 2011 and at the Castle Hayne BAM study site the BAM study will end in late 2011. Most likely, the NCDAQ will discontinue the TEOM and keep the BAM operational at these three sites. If more BAMs are purchased within the next five years, they may be used to replace existing continuous monitors at sites such as Jamesville in Martin County.

4.2.7.3 PM_{2.5} Background and Transport Sites

The NCDAQ does not plan to discontinue any PM_{2.5} regional background or PM_{2.5} regional transport sites in the next five years. However, the NCDAQ may change the technology used to measure concentrations of PM_{2.5} regional background or PM_{2.5} regional transport throughout the state. As resources become available, the NCDAQ plans to convert the Jamesville (regional transport on the eastern coastal plain), Cherry Grove (regional transport in the central piedmont), Boone (regional background) and Bryson City (regional transport in the western mountains) to sites with only continuous

PM_{2.5} monitors. As a result, sometime in the next five years the manual PM_{2.5} monitors at these sites may be discontinued.

4.2.7.4 PM_{2.5} Chemical Speciation Site

The NCDAQ does not plan to discontinue any PM_{2.5} chemical speciation urban trends sites in the next five years.

4.2.7.5 Wind Speed and Direction Sensors at PM_{2.5} Sites

The NCDAQ does not plan to discontinue any wind speed and direction sensors collocated at PM_{2.5} monitoring sites in the next five years.

4.2.8 Coarse Particulate Matter (PM_{10-2.5})

4.2.8.1 General PM_{10-2.5} Monitoring Sites

The NCDAQ does not have any plans to discontinue any PM_{10-2.5} monitoring stations in the next five years.

4.2.8.2 PM_{10-2.5} Chemical Speciation Sites

The NCDAQ currently does not have any PM_{10-2.5} chemical speciation monitoring sites to discontinue so does not have plans to discontinue any of these type of sites in the next five years.

4.3 PHOTOCHEMICAL ASSESSMENT MONITORING STATIONS (PAMS)

The NCDAQ currently does not have any PAMS to discontinue. During the next five years the NCDAQ does not plan to discontinue any of the remaining PAMS-like sites.

Chapter 5 Evaluation of New Technologies to Benefit the Ambient Air Monitoring Network

NCDAQ is considering an array of new technologies as a means to meet increasing demands in a time of decreasing resources. EPA has revised a number of ambient standards and related monitoring requirements in a short period of time, increasing the burden on state and local programs with no assurance of full funding. Meanwhile, the nation is in a serious economic depression, which has reduced the available resources (people and funding) available to comply with the new standards. NCDAQ wrote to EPA earlier this year expressing this concern and our inability to fully comply with the new requirements without full funding.

In the meantime, we are evaluating new technologies that would allow us to do more with less. These new technologies are discussed more fully below, but include:

- Telemetry
- Automated monitors
- E-DAS
- eLogs
- Passive ammonia
- Satellite imagery
- Handheld devices
- New monitors

Each of these technologies must be carefully evaluated to ensure it provides more benefit than it costs, especially since near-term cash flow is problematic.

5.1 Telemetry

NCDAQ is looking to ensure telemetric access to all of its remote monitors, especially the PM_{2.5} FRM machines. A history of filter exchange problems, with associated missed samples, has led field staff to not trust the FRM machines. As a result they often make special trips to the FRM sites to ensure that the sample collection occurred. These trips take several hours per week from the technicians' schedules. NCDAQ has acquired several communications boards to install in the more remote machines so that technicians can check an FRM unit from their office. Although there is an added cost to put these units "online", the cost is offset by freeing up the technician to perform higher priority tasks. It also improves technician morale and satisfaction by being able to determine whether the FRM sampled without making a special trip.

5.2 Automated monitors

Also related to the PM_{2.5} FRM, NCDAQ is evaluating switching from manual monitors to new automated ones. This is driven by the manpower-intensive nature of the PM_{2.5} FRM program, coupled with the inherent delays in obtaining limited data. Today's society has grown to expect real-time information, whether it is news, personal communications, or air quality forecasts, including monitoring data. Although FRM's do not satisfy this demand, continuous monitors provide much more data much more quickly. In addition to FRMs, NCDAQ currently operates several Beta Attenuation Monitors (BAMs) and a network of TEOMs. The TEOMs owned and operated by NCDAQ will no longer be supported by the manufacturer beyond a few more years. The need to replace these continuous monitors also drives our switch from manual monitors to new automated ones. NCDAQ is required to operate a certain number of continuous monitors and switching to the new automated monitors will allow us to replace two monitors with one. We have made the decision to purchase no more FRMs. We expect to continue operating the existing ones for at least several more years, but as they retire we will replace them with continuous monitors.

5.3 E-DAS

NCDAQ expects to upgrade to AirVision eventually. The main reason we have not yet accomplished the upgrade is the requirement for more powerful computers than those currently running E-DAS. NCDAQ needs to upgrade two computers with more Random Access Memory (RAM) and more Central Processing Unit (CPU) capacity. NCDAQ buys computers in bulk through a statewide purchasing contract. Budgetary restrictions have deferred NCDAQ's block purchase of new computers for the past two years; exemptions are allowed only for "emergency" replacements, i.e., as long as it keeps running we will have to use the existing hardware/software.

5.4 eLogs

NCDAQ has developed a series of electronic logbooks (eLogs) to help document the various activities that occur in the field and to communicate them to the central office. Although it requires a culture change to move from paper to electronic format, the field offices and central office have embraced the change and are now fine-tuning the details.

5.5 Passive ammonia monitoring

North Carolina has a special interest in ammonia monitoring because of the prevalence of animal operations in the state, especially swine and poultry. As a state, we are still struggling with how to handle the wastes produced by these highly concentrated operations, as well as the resulting ammonia emissions. Although public complaints are usually related to odors, environmental professionals understand that the more pressing ammonia issue is related to nitrogen deposition into our waterways. We are also concerned with the increasing contribution of ammonia in the production of fine particles as we see significant reductions in NO_x and SO₂ from our coal-burning power plants. Because of this concern with ammonia, NCDAQ has operated several ammonia monitors over the years.

However, we are switching over to new passive monitors. The passive monitors may be more appropriate from a scientific perspective, and they are much less expensive to operate. The cost savings in switching to this new technology will actually allow us to expand the geographical scope of the ammonia monitoring. Although the data will take longer to be available to the public, we expect no issues because ammonia emission levels are generally below the detectable limits of the current monitors and so provide limited information to the public anyway.

5.6 Satellite imagery

Satellite imagery is emerging as a useful monitoring tool, even if it is somewhat limited. NCDAQ is particularly interested in satellite data to help us with our exceptional events packages – especially as the ambient standards approach background levels. In June 2010 we funded one of our chemists to attend a NASA course in Maryland to better understand how to use (and not use) the data produced by satellites.

5.7 Handheld devices

Traditionally, NCDAQ computers and laptops that were deemed obsolete for office work were transferred to ambient monitoring sites just prior to being discarded. Although these machines did not have the capacity for running the latest office software, they were deemed adequate for ambient monitoring operations. While it makes no difference to the monitors, the technicians are complaining about the laptops. They are heavy, have short battery lives, and the screens are difficult to read in bright sunlight. Our younger technicians are purchasing relatively inexpensive, lightweight, handheld electronic devices for their personal use and are demanding that we consider such devices for their field work. Although NCDAQ laptop purchases are on hold for budget reasons during the economic downturn, we expect to research handheld devices to replace obsolete laptops in the future.

5.8 New monitors

Similar to handheld devices, we understand that new generation monitors are web-based. One of our local programs is pioneering the effort with web-based monitors and we expect to learn from their experience. As we purchase new monitors we will consider going with web-based machines. However, we must consider the fact that it may be more of a challenge to switch over a large statewide network than a small local network.

Chapter 6 Ability of Existing and Proposed Sites to Support Air Quality Characterization of Areas With Relatively High Populations of Susceptible Individuals (e.g., Children With Asthma)

One way NCDAQ assures that populations of susceptible children are represented by ambient monitors is by locating monitoring sites on school grounds, especially elementary and middle schools. Eight of 40 ozone and 10 of 34 particle monitors in the North Carolina network are on school property. There are a number of other advantages to locating monitoring sites on school property:

- In urban areas, schools are typically the place with enough open area for adequate siting
- Schools do not charge us rent or other fees
- It is easy to defend a monitor located on school property. While there have been instances of opposition or criticism of a monitor located near a major roadway or industrial facility, such complaints disappear when noted that the monitor is on a school playground. If the community is OK locating a school next to these sources, then they should support locating a monitor there to characterize the air.
- Monitors on school property provide teaching opportunities. Field staff report that science teachers often include the school's monitor in a lesson plan, and schedule NCDAQ for "show and tell" with the students. This reinforces other NCDAQ programs at schools, such as anti-idling and school bus retrofits, that the children often take home to their families.

Chapter 7 Effect On Data Users For Any Sites That Are Being Proposed For Discontinuation

The NCDAQ does not expect any of the sites proposed for discontinuation will impact data users. This conclusion is based on the fact that when feasible, the discontinued sites will be replaced by another similar site, and some sites collect data that few external customers use. If the NCDAQ is required to shut down certain ozone sites so that the equipment can be relocated to new required sites in other MSAs, the loss of these ozone sites may impact some data users. In some cases the impact may be small because other monitors will exist in the MSA that can be used to estimate ozone values at the location where the monitor was shut down.

Chapter 8 Needed Changes To PM_{2.5} Population-Oriented Sites

Locations of PM_{2.5} monitoring sites were determined in the late 1990s based on the data from the 1990 census. The PM_{2.5} monitoring sites and the ozone monitoring sites existing in 2010 are shown overlaid on maps showing the population density based on the 2000 census in Figure 3 through Figure 10. These maps show that the PM_{2.5} monitoring sites are still located in highly populated areas based on the 2000 census data. Thus, at this time the NCDAQ does not recommend any changes to the PM_{2.5} population-oriented sites.

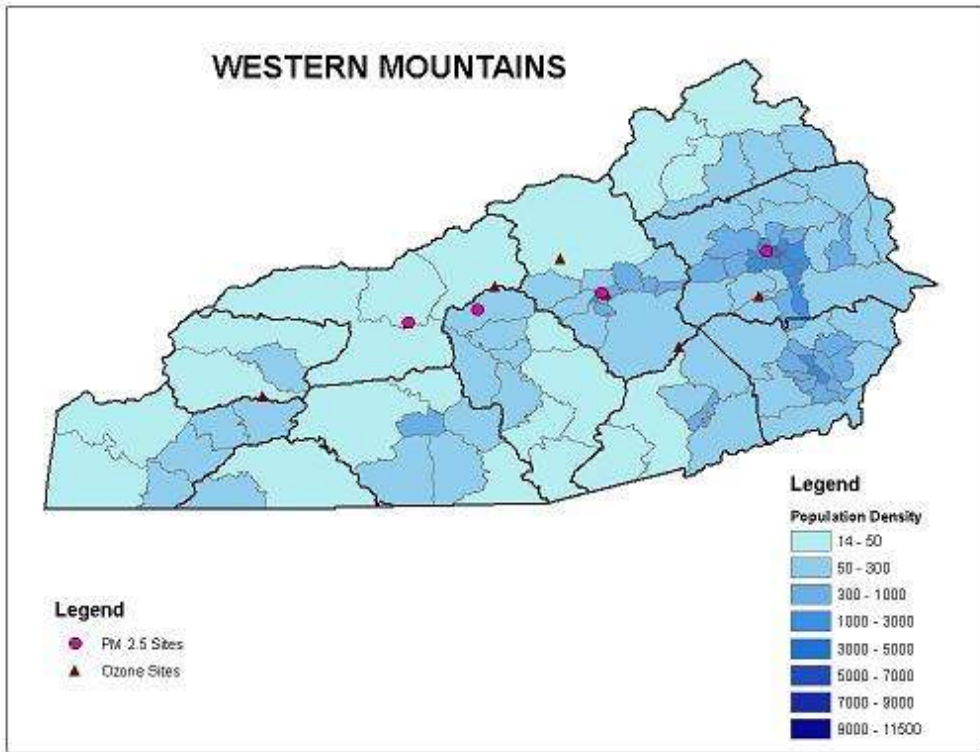


Figure 3. Location of PM_{2.5} and Ozone Monitors Compared to 2000 Population Density in the Western Mountains

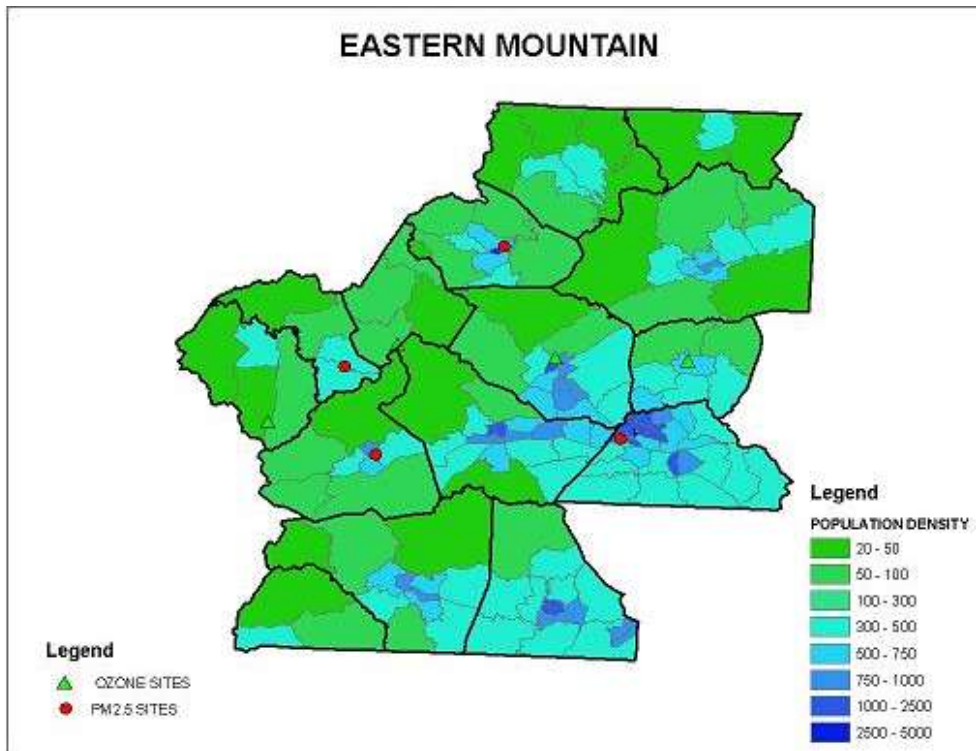


Figure 4. Location of PM_{2.5} and Ozone Monitors Compared to 2000 Population Density in the Eastern Mountains

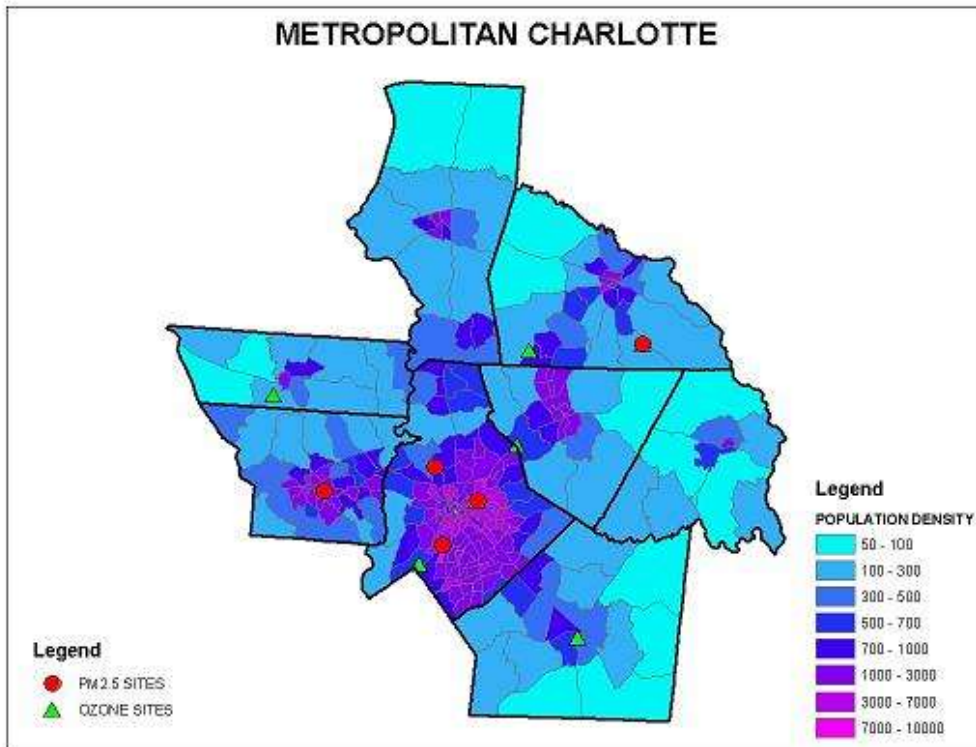


Figure 5. Location of PM_{2.5} and Ozone Monitors Compared to 2000 Population Density in Metropolitan Charlotte

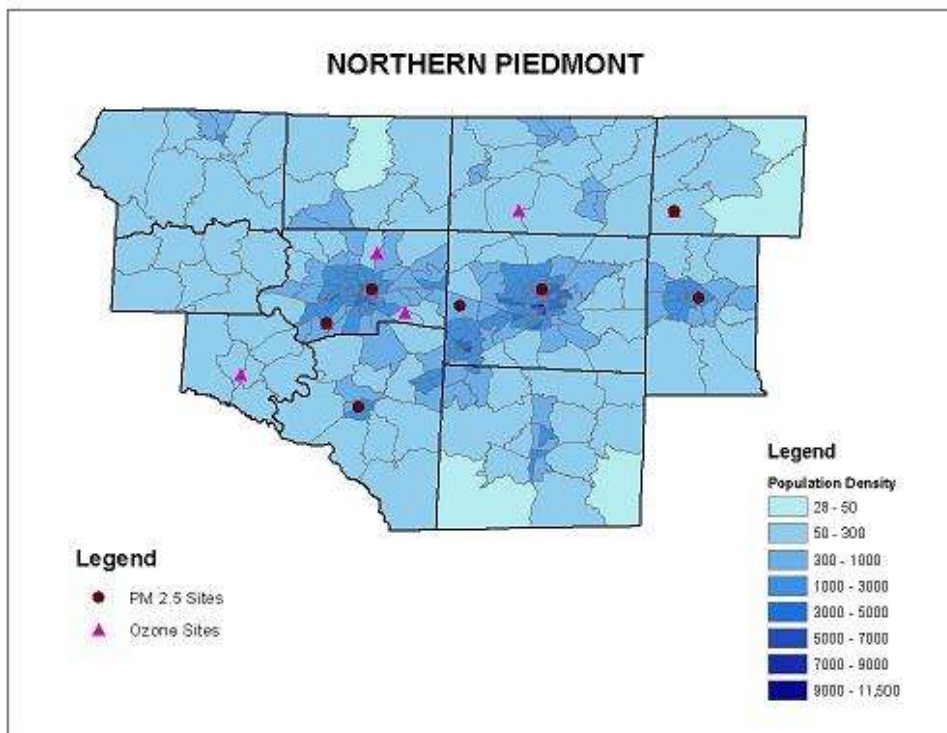


Figure 6. Location of PM_{2.5} and Ozone Monitors Compared to 2000 Population Density in the Northern Piedmont

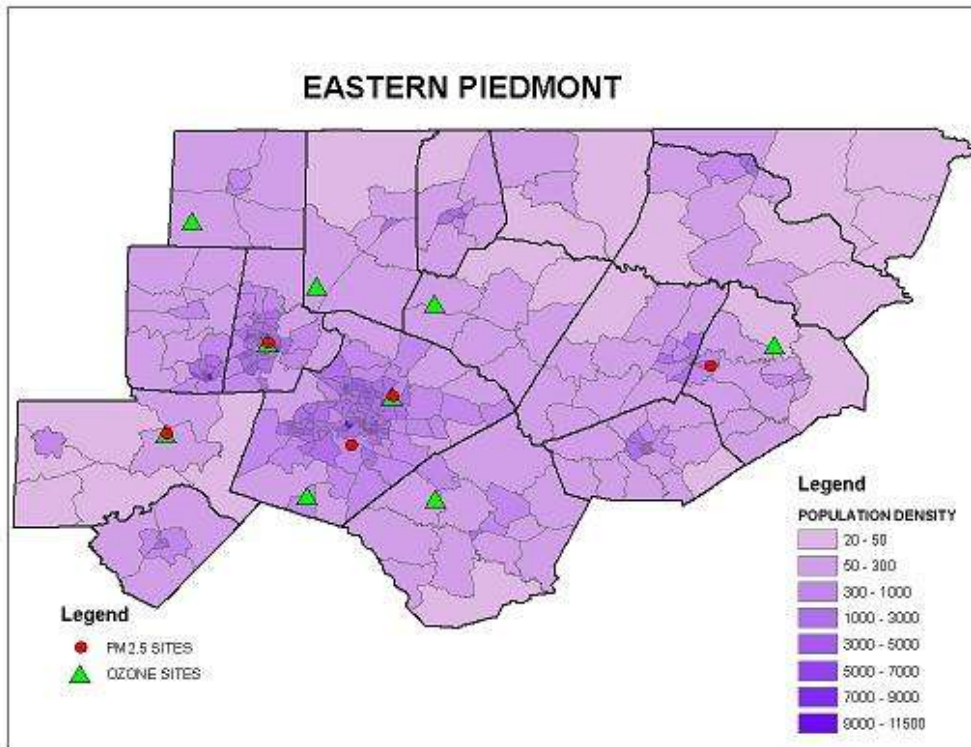


Figure 7. Location of PM_{2.5} and Ozone Monitors Compared to 2000 Population Density in the Eastern Piedmont

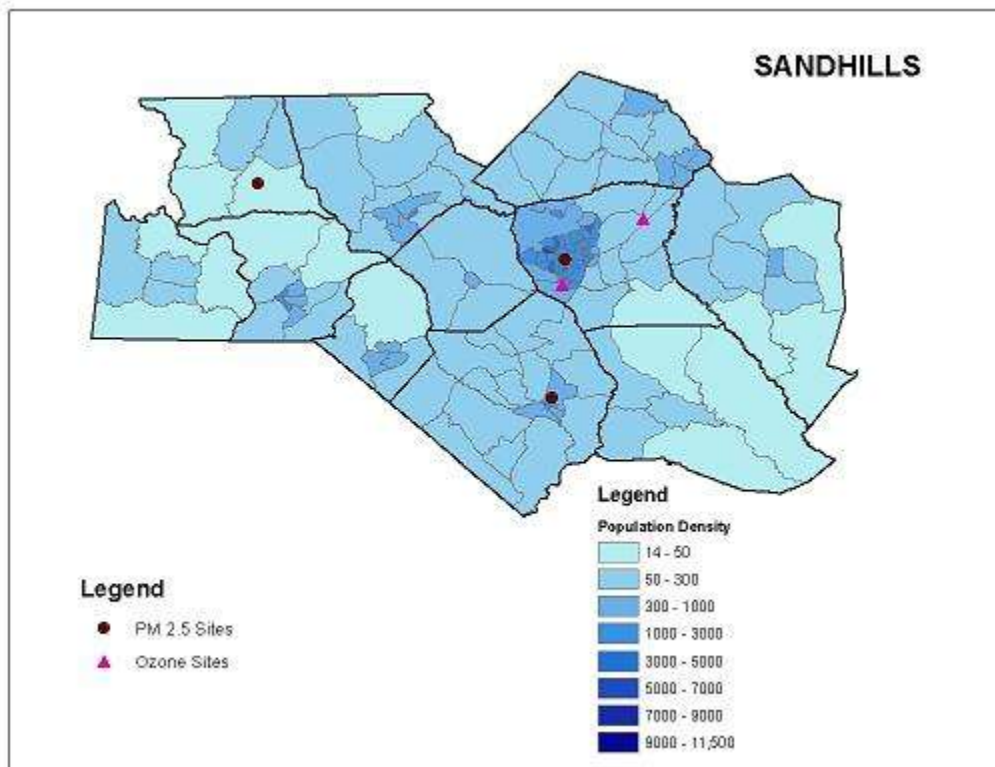


Figure 8. Location of PM_{2.5} and Ozone Monitors Compared to 2000 Population Density in the Sand hills

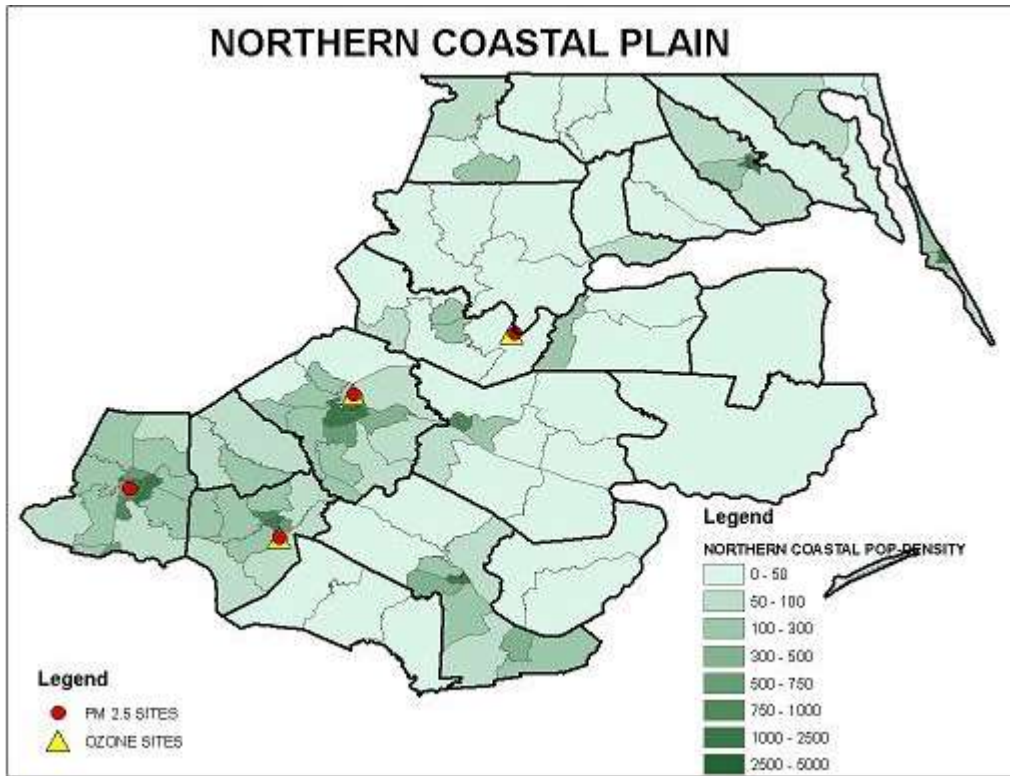


Figure 9. Location of PM_{2.5} and Ozone Monitors Compared to 2000 Population Density in the Northern Coastal Plain

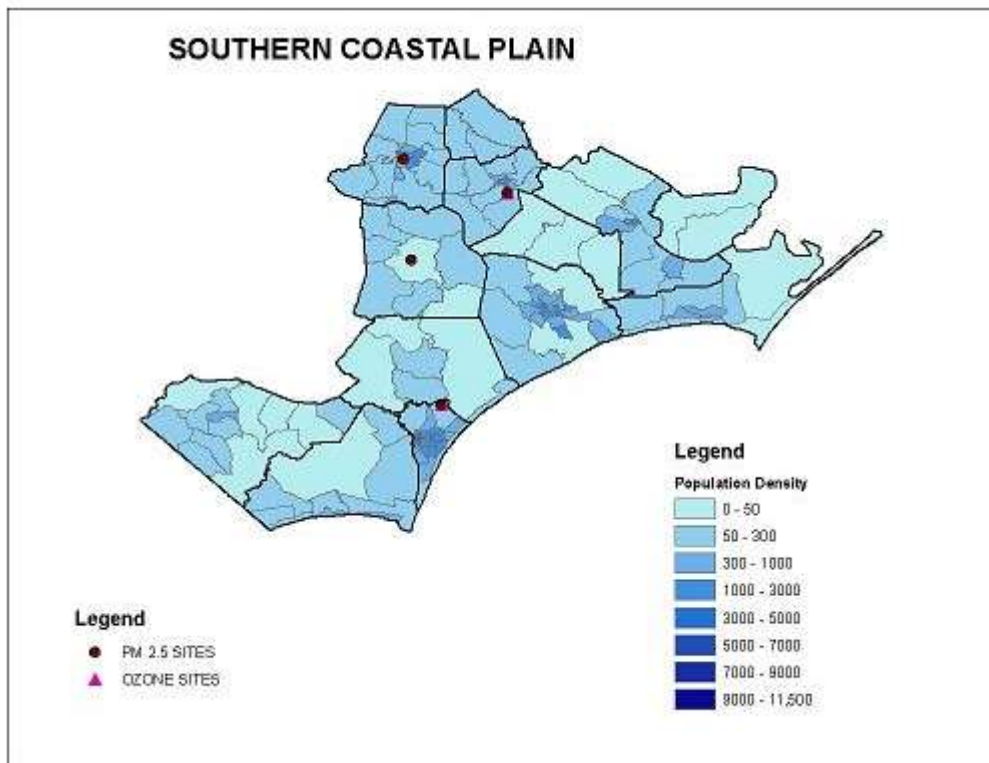


Figure 10. Location of PM_{2.5} and Ozone Monitors Compared to 2000 Population Density in the Southern Coastal Plain

Chapter 9 Monitoring Network Infrastructure Needs

For the most part this document has addressed expanding portions of the ambient monitoring network, mostly to meet new EPA requirements. But the rest of network is aging -- much of its equipment is more than 10 years old and many of its shelters are more than 20 years old. NCDAQ has been notified by at least one vender that they will discontinue support our equipment in a couple of years. Although this does not affect the current operation of the network, we see it as a priority to begin making capital investments to update the network.

Most of our monitoring shelters are 8'x8' buildings constructed by the low bidder. While the newest of these buildings were built in 1997 or later, many are from the 1980's. Although still functional, their physical condition is as you would expect for 15-25 year-old low-cost structures. The NCDAQ is currently developing specifications and identifying funding to replace them with a new generation of more energy-efficient shelters. We anticipate a phased approach, purchasing new buildings as funding is available.

Likewise, the older monitoring equipment is still fully functional, but it is no longer state-of-the-art. The equipment is in better condition than the shelters. However, we must realize that the equipment, too, has a limited useful life and we must plan for its eventual replacement.

Full Federal funding of all new monitoring requirements is essential for NCDAQ to maintain the existing infrastructure. Otherwise, NCDAQ will be forced to ration its limited resources and make decisions about whether to fully implement new monitoring requirements or to short-change existing ones.

List of Acronyms and Glossary

AADT	Average Annual Daily Traffic
AQCR	Air Quality Control Region: An interstate or intrastate area designated by the U.S. Environmental Protection Agency (EPA) for the attainment and maintenance of National Ambient Air Quality Standards (NAAQS).
ARM	Approved Regional Method
BAM	Beta Attenuation Monitor
CBSA	Core-Based Statistical Area
CFR	Code of Federal Regulations
CO	Carbon Monoxide: A colorless, odorless, highly poisonous gas, formed by the incomplete combustion of carbon or a carbonaceous material, such as gasoline.
CPU	Central Processing Unit
CSA	Combined Statistical Area: Combined Statistical Areas, defined by the U.S. Office of Management and Budget (OMB) , are aggregates of adjacent metropolitan or micropolitan statistical areas that are linked by commuting ties.
CSN	Chemical Speciation Network
DAQ	North Carolina Division of Air Quality: The Division of Air Quality, part of the N.C. Department of Environment and Natural Resources, works with the state's citizens to protect and improve outdoor, or ambient, air quality in North Carolina for the health and benefit of all and enforces state and federal air pollution regulations.
E-DAS	Electronic Data Acquisition System
EPA	The United States Environmental Protection Agency: The EPA works to protect human health and to safeguard the natural environment -- air, water and land -- upon which life depends.
FEM	Federal Equivalent Method
FRM	Federal Reference Method:
GR	Garinger High School NCore monitoring station in Mecklenburg County
HA	Hattie Avenue multi-pollutant SLAMS site in Forsyth County
HN	New Hanover SO ₂ monitoring station in New Hanover County
I40	Interstate Highway 40
I77	Interstate Highway 77
I85	Interstate Highway 85
I95	Interstate Highway 95

IMPROVE	Interagency Monitoring of Protected Visual Environments
MCAQ	Mecklenburg County Air Quality
MSA	Metropolitan Statistical Area: Metropolitan Statistical Areas have at least one urbanized area of 50,000 or more population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties.
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration: an Executive Branch agency of the United States government, responsible for the nation's civilian space program and aeronautics and aerospace research.
NCDAQ	North Carolina Division of Air Quality: The Division of Air Quality, part of the N.C. Department of Environment and Natural Resources, works with the state's citizens to protect and improve outdoor, or ambient, air quality in North Carolina for the health and benefit of all and enforces state and federal air pollution regulations.
NCORE	National Core or National Community Representative: Describes monitoring stations where multiple pollutants are measured to evaluate long term trends.
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
O ₃	Ozone
PAMS	Photochemical Assessment Monitoring Stations
Pb	Lead
PM	Particulate Matter
PM ₁₀	Particles with an aerodynamic diameter of 10 micrometers or less
PM _{10-2.5}	Particles with an aerodynamic diameter between 2.5 and 10 micrometers
PM _{2.5}	Fine particles: Particles with an aerodynamic diameter of 2.5 micrometers or less
ppb	Parts per billion
ppm	Parts per million
PWEI	Population Weighted Emission Index
QA/QC	Quality Assurance/Quality Control
RAM	Random Access Memory
SLAMS	State and Local Air Monitoring Stations. Describes single or multiple pollutant monitoring stations required by 40 CFR Appendix D that are not NCore Stations or that operate for longer than two years.
SO ₂	Sulfur Dioxide

TEOM	Tapered Element Oscillating Microbalance
USEPA	The United States Environmental Protection Agency: The EPA works to protect human health and to safeguard the natural environment -- air, water and land -- upon which life depends.
VA-DEQ	Virginia Department of Environmental Quality
VOC	Volatile Organic Compound