Response to Comments for the Draft 2013 Monitoring Plan

EPA: The draft monitoring plan dated June 5, 2012, proposes to discontinue the Wolf Creek ozone monitor in the Greenville Metropolitan Statistical Area (MSA). This same plan does not reference another current ozone monitor in this MSA - Clemson. We have also received a separate letter requesting to discontinue that ozone monitor.

EPA Region 4 is concerned that the proposal to terminate the two highest ozone monitoring sites in the Greenville MSA would leave thousands of residents without vital information about the ozone air quality in their neighborhoods. In addition, The Clemson site provides long-term historical data regarding ozone concentration trends in the Greenville MSA. The site has been in operation since 1987 and there is a lot of value maintaining this monitor in the MSA. The other three sites in the MSA have only recently begun operations in 2008 or later. The Clemson site has remained the 8-hour ozone design value site for the Greenville MSA during the three-year period that data has been collected for the newer ozone monitoring sites in the MSA.

During recent conversations with DHEC, we understand the North Spartanburg ozone site in the Spartanburg MSA has the highest design value in the larger Greenville-Spartanburg-Anderson Combined Statistical Area (CSA). Since minimum monitoring requirements are based on the MSA level and not the CSA level, we have even further reservations about discontinuing both Pickens County ozone monitoring sites (Clemson and Wolf Creek).

Further justification is needed for EPA to be able to approve the discontinuation of the Clemson site or both of the Pickens County sites.

DHEC Response

Introduction

In order to support the refinement of the ozone monitoring network in the Upstate of South Carolina (encompassing the current Anderson, Greenville and Spartanburg Metropolitan Statistical Areas) the Department of Health and Environmental Control (DHEC) added additional monitors to improve the spatial coverage and has conducted an analysis of all ozone monitoring data collected from the existing and additional monitors (Figure 1). Table 1 lists the site name, site ID, county, page in the 2012 Monitoring Plan that contains the purpose of the site and date ozone monitor was established for those monitors in the Greenville MSA Ozone Study identified in the 2012 Plan.

Recognizing that maintenance of large monitoring networks in the face of ever increasing budget cuts is no longer possible or practical, the SC Air Program conducted a significant review of the Ambient Monitoring network in 2007. DHEC has made it a priority to eliminate redundant or low value monitors, even at the cost of ending long-term monitoring records, in order to have sufficient resources to meet the mandatory monitoring requirements and data collection needed to adequately operate the program. While DHEC understands the importance of maintaining a long term monitoring record, ensuring that an area is appropriately monitored in the most efficient manner is the priority for our monitoring program.

DHEC agrees that it may be premature to terminate monitoring at the Wolf Creek site (45-077-0003) at this time and will amend the plan to indicate maintenance of the Wolf Creek Ozone

monitoring in the final 2013 Plan[1]. DHEC does seek concurrence to terminate monitoring at Clemson CMS (45-077-0002) as requested in the amendments to the 2012 Plan (dated June 4, 2012) in order to eliminate duplicative monitoring in the Greenville-Mauldin-Easley Metropolitan Statistical Area (MSA). DHEC may propose further modifications to the ozone network in the Upstate in subsequent Plans to best use resources and ensure that an efficient, adequate monitoring network is maintained.

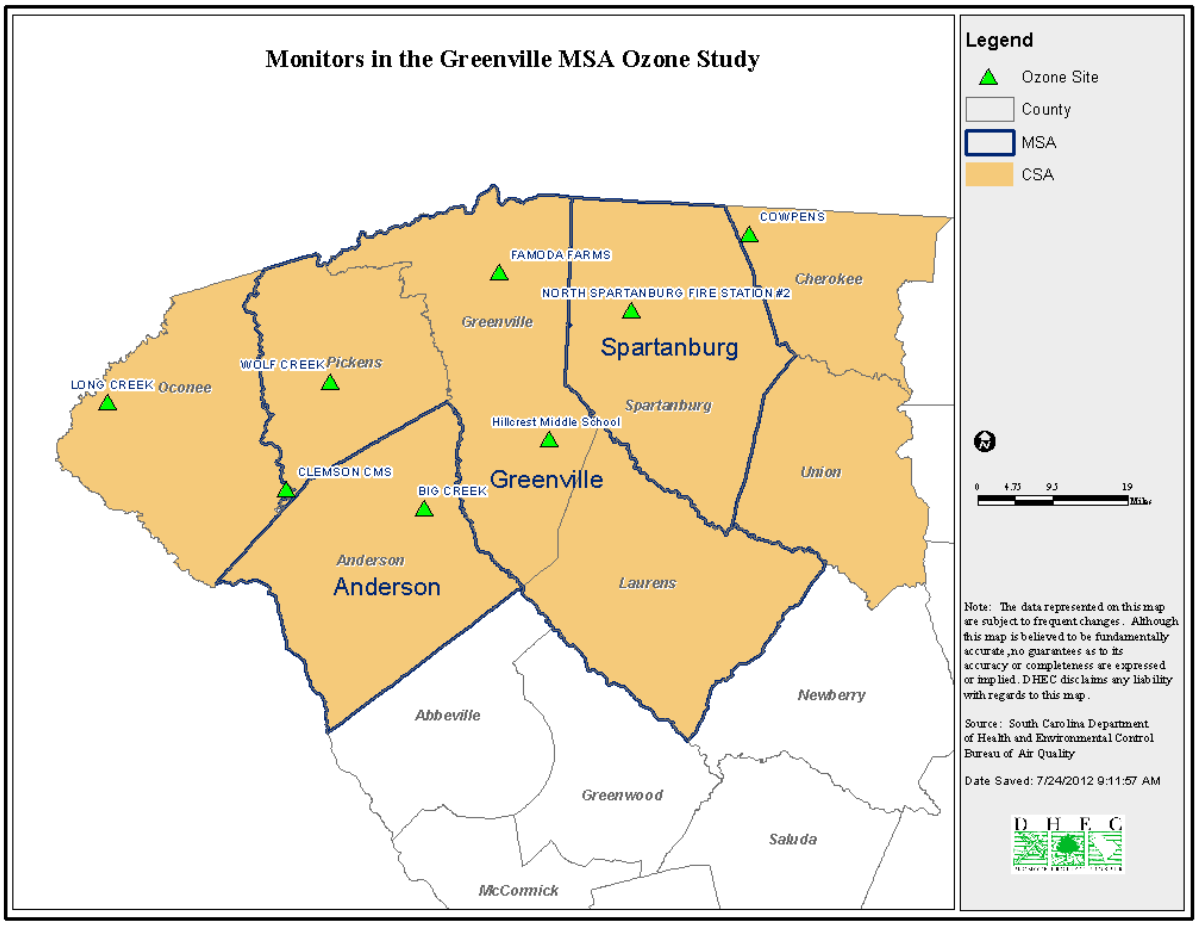
DHEC recognizes that the explicit requirements of 40 CFR 58.14, paragraph c (System Modification) for discontinuation of a State/Local Air Monitoring Station (SLAMS) are not met for the Clemson CMS monitor. However, the System Modification requirement states "Other requests for discontinuation may be approved on a case-by-case basis if discontinuance does not compromise data collection needed for implementation of a NAAQS and if the requirements of Appendix D to this part, if any, continue to be met." DHEC believes (and provides evidence below) that the continued operation of existing monitors in the Greenville-Mauldin-Easley MSA and the adjacent Anderson MSA provide appropriate data collection needed for implementation of the Ozone NAAQS. The minimum monitoring requirements specified in Appendix D will continue to be met or exceeded for the MSAs. Table 1 lists how the area monitors, as proposed, meet or exceed the minimum monitoring requirements found in Appendix D to 40 CFR Part 58. The Monitoring rule repeatedly reinforces that the Regional Administrator and the responsible monitoring agency must work together to design and maintain the most appropriate network to meet the data needs of the area.

Table 1: Listing of monitors used in this analysis

Site Name	Site ID	County	Page in 2012 Monitoring Plan	Fulfills or exceeds Appendix D requirements (MSA)	Date Established
Long Creek	45-073-0001	Oconee	22	Exceeds Seneca MSA <350,000 pop.	5/4/1989
Wolf Creek	45-077-0003	Pickens	24	Exceeds Greenville-Mauldin-Easley MSA	8/10/2010
Clemson CMS	45-077-0002	Pickens	23	----	7/20/1979
Famoda Farm	45-045-1003	Greenville	21	Meets Greenville-Mauldin-Easley MSA	8/7/2008
Hillcrest	45-045-0016	Greenville	20	Meets Greenville-Mauldin-Easley MSA	3/4/2009
Big Creek	45-007-0005	Anderson	15	Meets Anderson MSA	6/6/2008
North Spartanburg	45-083-0009	Spartanburg	25	Meets Spartanburg MSA	4/10/1990
Cowpens	45-021-0002	Cherokee	16	Meets Gaffney MSA Maintenance	4/21/1988

[1] State of South Carolina: Network Description and Ambient Air Network Monitoring Plan for Calendar Year 2013 (2013 Plan)

Figure 1: Map of monitors in the Greenville MSA Ozone Study



Background on Monitoring Configuration in the Upstate

The monitoring configuration of the 'legacy' monitoring sites operating in 2007 in the Upstate of South Carolina (west to east: Long Creek Clemson, North Spartanburg and Cowpens) predates the Greenville MSA Ozone study referenced below. Prior to the study, the Greenville- Spartanburg - Anderson MSA consisted of Greenville, Spartanburg, Anderson, Pickens and Cherokee Counties[2]. The configuration of monitors at that time included Clemson (45-077-0002: Pickens County), Long Creek (45-073-0001: Oconee County) and Powdersville (45-007-0003: Anderson County discontinued Nov 2006) sites as monitors representing upwind concentrations for the MSA while North Spartanburg (45-083-0009: Spartanburg County) and to some extent Cowpens (45-021-0002: Cherokee County) representing expected maximum downwind concentrations for the then current MSA configuration.

In October, 2006, the United States Environmental Protection Agency (EPA) published revisions to the ambient monitoring regulations[3] requiring quality assurance (QA), monitor designations, minimum

[2] http://www.census.gov/population/metro/files/lists/historical/99mfips.txt
[3] 71 FR 61236, October 17, 2006

requirements for both number and distribution of monitors among MSAs and probe siting changes. The regulation also included the requirement for an annual monitoring network plan and periodic network assessments. In June 2003[4], the Office of Management and Budget (OMB) redefined the MSA definitions for the Upstate of South Carolina separating the former single MSA into three distinct MSAs. The breakup of the original Greenville-Spartanburg-Anderson MSA into three distinct MSAs and the 2006 revision triggered new minimum monitoring requirements for each independent MSA based on the regulations found in Chapter 40, Appendix D to Part 58 of the Code of Federal Regulations. Despite this regulatory change in the monitoring requirements, DHEC believes that a monitoring network based on the original configuration is still appropriate to capture the formation of ozone and indicate population exposure during the typical air transport through this region of the state during typical high ozone episodes. The generally east to west configuration of the network mirrors the airflow along the foot of the Appalachians, the successive inputs of precursor emissions from the urbanized areas, provides data useful for the public notification for the citizens in the Upstate and the development of appropriate air management policy.

Monitoring was added in Anderson County (Big Creek) to address the regulatory requirement for the newly designated Anderson MSA, but it was done in the context of the concern about the Clemson site location very close to the MSA boundary, the historical knowledge of the development and movement of ozone in the upstate and the constellation of monitors being installed to support development of the most appropriate monitoring configuration for the region.

OMB cautions users that "OMB establishes and maintains the definitions of Metropolitan and Micropolitan Statistical Areas … solely for statistical purposes. This classification is intended to provide nationally consistent definitions for collecting, tabulating, and publishing Federal statistics for a set of geographic areas."[5] No where in the OMB bulletin does it suggest that the MSA definitions are appropriate for or include important data elements applicable to the definition of an ambient air monitoring network. While DHEC understands the need for establishing minimum monitoring requirements, EPA should allow states the flexibility to design a monitoring network within the requirements[6] that meets the State's needs using the annual monitoring plan and review process to arrive at the most appropriate network.

Clemson CMS Termination Request Background

In July 2007, DHEC submitted their first annually required[7] Network Description and Ambient Air Monitoring Plan (2008 Plan). In the 2008 Plan DHEC stated that monitoring at the Clemson CMS site (45-077-0002)[8] would be maintained through the 2008 ozone season as part of the Greenville MSA Ozone Study[9]. On October 24, 2007 EPA conditionally approved the establishment of two ozone monitoring sites as part of the Greenville MSA Ozone Study.

In 2008, DHEC designed and initiated the Greenville MSA Ozone study to investigate ozone concentration variability across the Upstate and provide information to help refine the monitoring network to better meet monitoring objectives. The study sites proposed to improve the spatial distribution of available data were not established as quickly as desired but all available data supports the objective.

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[4] Office of Management and Budget Bulletin No. 03-04, announcing metropolitan and micropolitan statistical areas as of June 6, 2003, based on application of the 2000 OMB standards to Census 2000 data, http://www.whitehouse.gov/omb/bulletins_b03-04.
[5] *Id*., at paragraph 4.
[6] 40 CFR 58Appendix D 1.1.2
[7] 40 CFR 58.10 (a)(1)
[8] State of South Carolina: Network Description and Ambient Air Network Monitoring Plan for Calendar Year 2008 (2008 Plan) at page 21
[9] *Id*., at page 32

DHEC has evaluated data from all of the previously existing and the supplementary monitors to arrive at a configuration of monitors and locations that best represent air quality in the area.

In July 2008, based on ozone data collected from 2005 – 2007, DHEC determined that it would terminate all monitoring at the Clemson CMS site (45-077-0002)[10], establish the Famoda Farm site (45-045-1003)[11] and establish a site in Southeastern Greenville County[12] in execution of the 2008 Plan. On October 27, 2008 the US Environmental Protection Agency (EPA) denied this request because "The sites above that are currently violating the NAAQS[13], cannot be terminated at this time. The monitor types for these sites must be changed back to SLAMS in AQS and they must operate for at least one additional calendar year to compare with new sites that SC DHEC is proposing to establish." On March 25, 2009 EPA submitted a follow up letter as a confirmation of discussions between DHEC and EPA staff that listed the Clemson CMS ozone monitor as a site that is "eligible to be shutdown dependent on the establishment of new sites and the data comparisons."

On February 1, 2011 DHEC submitted an amendment to the 2011 Monitoring Plan establishing the Wolf Creek monitoring site. In the cover letter to the amendment, DHEC stated "We wish to add the Wolf Creek monitoring site (45-077-0003), near the town of Pickens, in central Pickens County, to the 2011 Annual Air Network Monitoring Plan. Stakeholders in Pickens County have voiced concerns that the data being collected at the Clemson CMS monitoring site (45-077-0002 SLAMS) is not representative of ozone concentrations in Pickens County. The Wolf Creek site is expected to be better representative of both Pickens County and the Greenville-Mauldin-Easley MSA ambient ozone concentrations. Ozone data from the Wolf Creek monitoring site will be collected concurrently with, and compared to data collected at the Clemson CMS site to allow an evaluation to determine if revision of the local ozone monitoring network is appropriate. The network revisions may include redesignation of Wolf Creek as one of the two required MSA SLAMS Ozone monitors and discontinuation of the Clemson site." The EPA subsequently approved this amendment to the 2011 Monitoring Plan in a letter dated March 14, 2011.

On June 4, 2012, DHEC submitted an amendment to the 2012 Monitoring Plan requesting approval to terminate the Clemson CMS (45-077-0002) monitoring site in Pickens County. Appendix D to 40 CFR Part 58 requires only two ozone monitors for the MSA based on current population and design values. The Greenville-Mauldin-Easley Metropolitan Statistical Area (MSA) currently has four ozone monitoring stations in operation. Additional monitoring in the MSA established in 2008 and 2009 at Hillcrest (45-045-0016) and Famoda Farm (45-045-1003) can provide representative data and ozone design values for the MSA. Termination of monitoring at Clemson CMS will allow the Department to redirect limited resources to program priorities.

[10] State of South Carolina: Network Description and Ambient Air Network Monitoring Plan for Calendar Year 2009 (2009 Plan) at page 65
[11] *Id*., at page 23
[12] *Id*., at page 24
[13] On March 27, 2008, EPA finalized a revised Ozone NAAQS set at 0.075 ppm, 73 FR 16435.

Data Evaluation

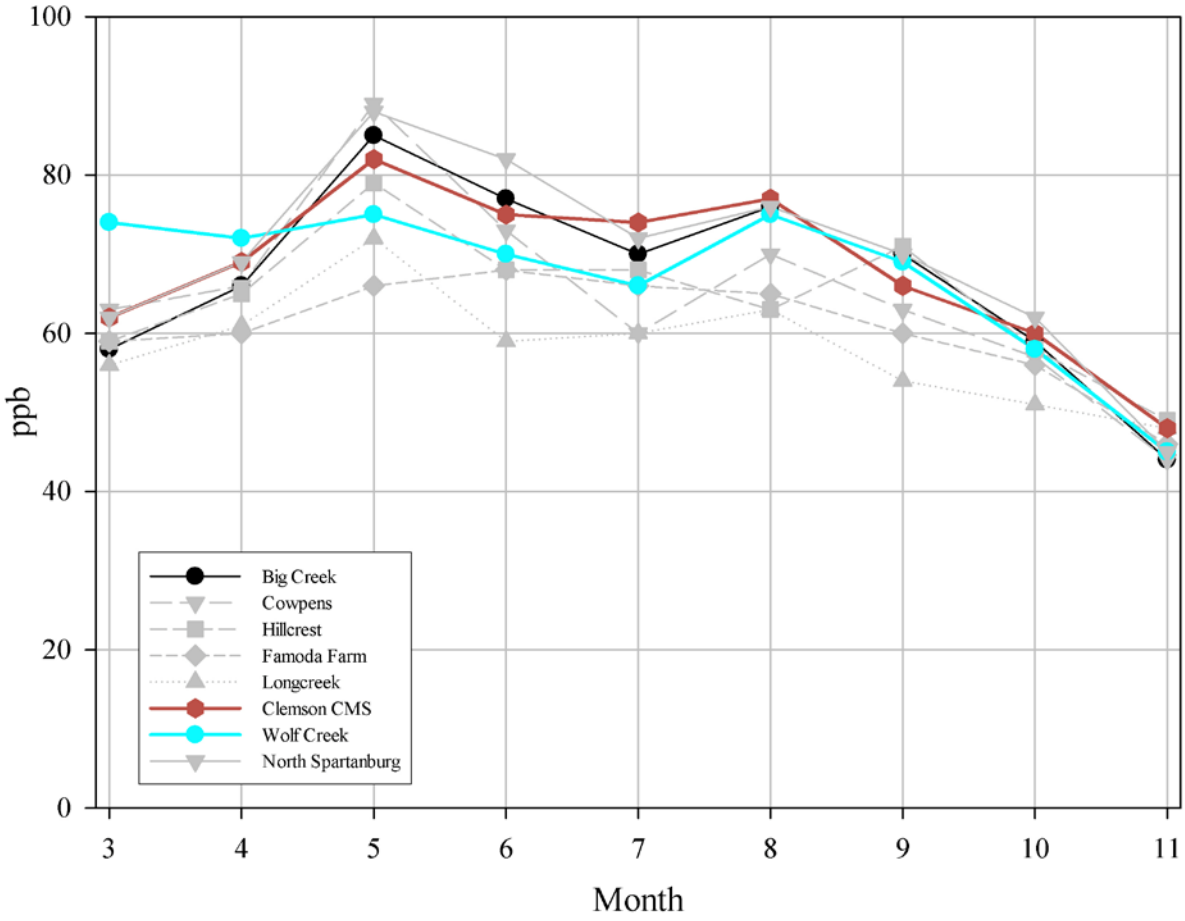
Daily maximum 8-hour average ozone concentrations for 2009 – 2011 were analyzed for monitors in the Greenville MSA Ozone Study. Correlation coefficients (Table 2) indicate a high level of relationship between all monitors was observed. The Clemson CMS site showed a very high level of correlation with Big Creek (45-007-0005) and Wolf Creek (45-077-0003) primarily due to the proximity of the monitors to each other.

Table 2: Correlation coefficients for daily maximum 8-hour average ozone concentrations 2009 - 2011

	Big Creek	Cowpens	Hillcrest	Famoda Farm	Long Creek	Clemson	Wolf Creek	North Spartanburg
Big Creek	1							
Cowpens	0.889	1						
Hillcrest	0.914	0.87	1					
Famoda Farm	0.855	0.847	0.875	1				
Long Creek	0.735	0.76	0.699	0.799	1			
Clemson	0.942	0.863	0.881	0.878	0.797	1		
Wolf Creek	0.872	0.848	0.827	0.858	0.787	0.921	1	
North Spartanburg	0.922	0.931	0.878	0.85	0.728	0.887	0.838	1

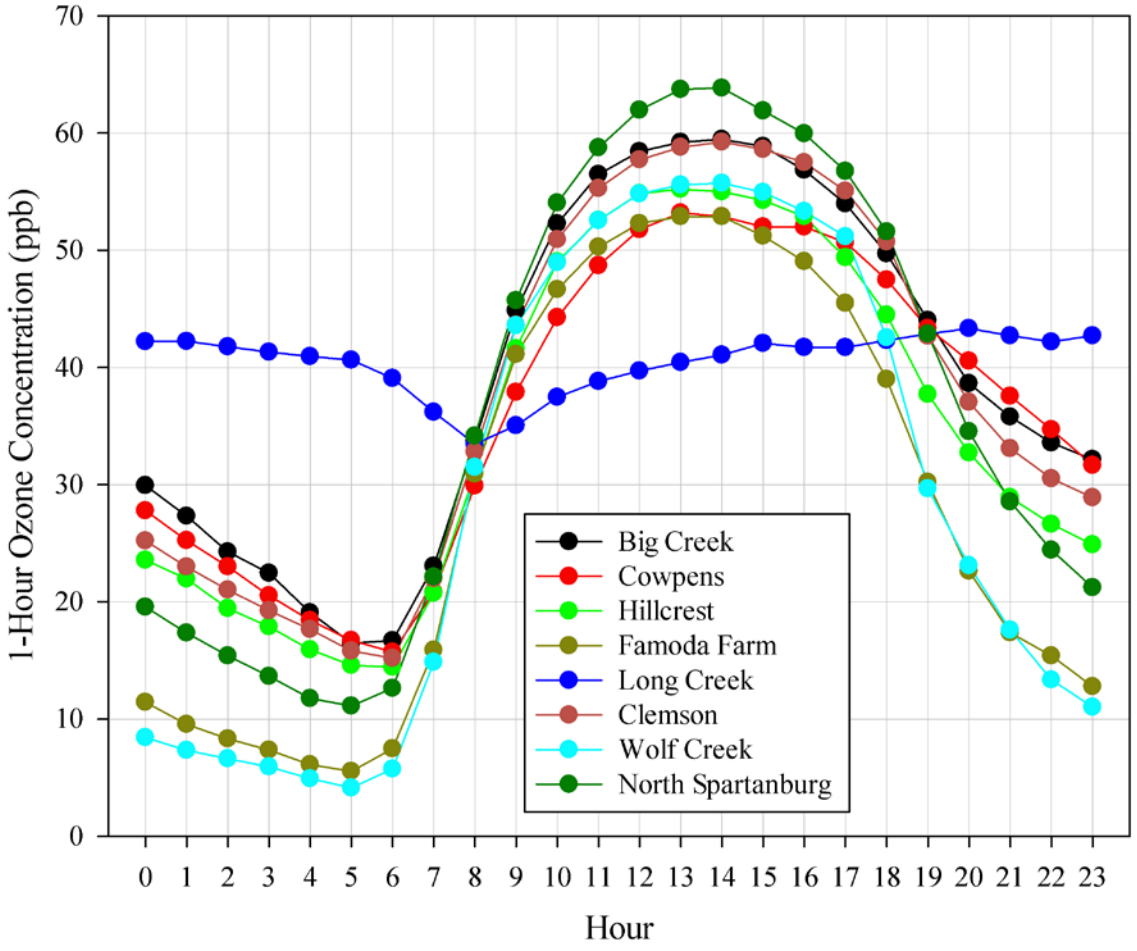
The highest daily maximum 8-hour ozone average concentrations during 2009 – 2011 were examined in order to ensure that the monitors exhibited similar behaviors in the highest values measured (Figure 2). As can be seen below the same general pattern occurred for all monitors except for the Long Creek site, which is a high elevation site and represents background/regional transport. The Big Creek, Clemson and Wolf Creek sites exhibited similar highest monthly daily maximums throughout the study period providing evidence that the monitors on the western edge of the CSA are measuring similar peak concentrations and that one or more of the monitors may be redundant.

Figure 2: Upstate Highest Daily Maximum 8-Hour Average Concentrations by Month (2009 – 2011)



Since the analysis in Figure 2 suggested elevated peak ozone concentrations during the summer months, DHEC examined the summer months of 2011 (June – August) when all monitors in the study area were operating to see if all of the monitors exhibited similar average diurnal patterns in 1-hour concentrations. As can be seen in Figure 3, variability is very similar between monitors and the overall pattern agrees at all sites except the Long Creek site which is expected due to the elevation differences between it and the other sites. During the peak in the curve in Figure 3 (approximately hours 10 -19), it is evident that Big Creek and Clemson CMS are reading almost identical concentrations suggesting that the Clemson CMS site redundant in the Upstate ozone monitoring network.

Figure 3: Average Diurnal Pattern in 1-Hour Ozone Concentrations 6/1/2011 – 8/31/2011

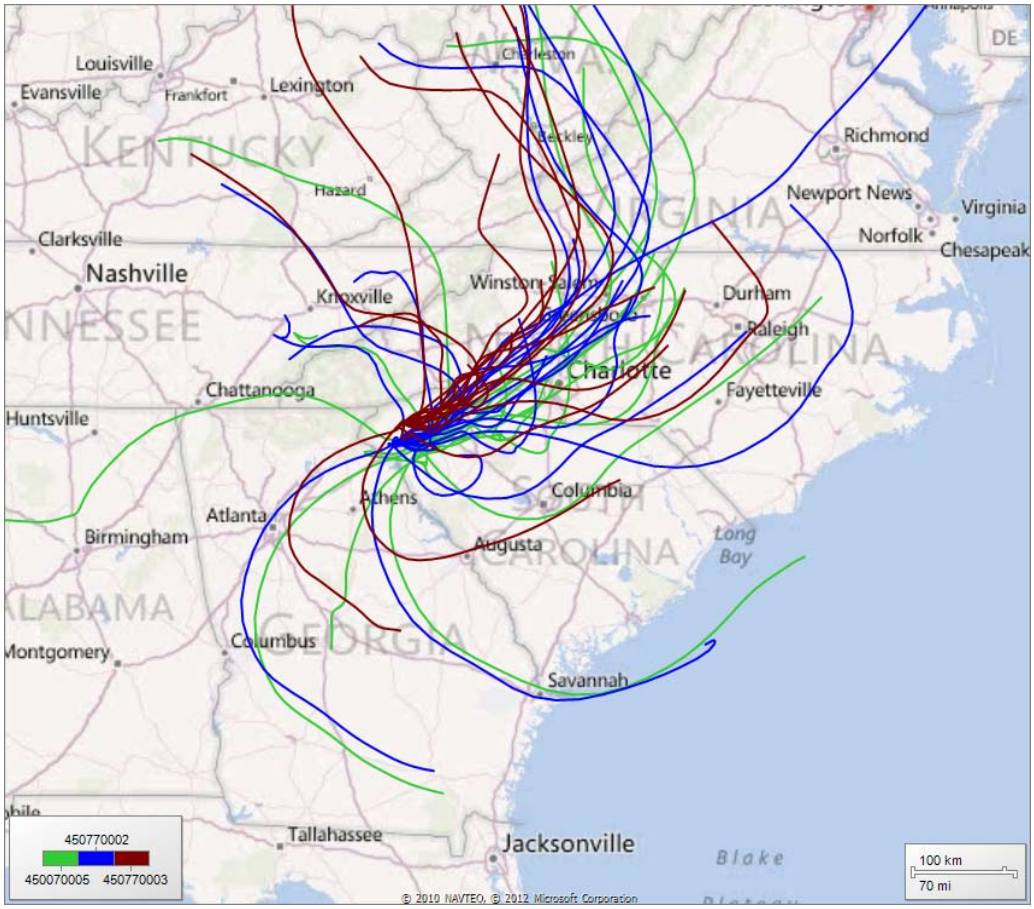


Trajectory Analysis

A trajectory analysis was conducted on all days during the summer of 2011 with daily maximum 8-hour ozone averages greater than 85% of the 2010 Ozone National Ambient Air Quality Standard (NAAQS) (Figure 4). Thirty-six hour back trajectories were run using the HYSPLIT (Hybrid Lagrangian Integrated Trajectory) model for Big Creek, Wolf Creek and Clemson CMS when the monitors exceeded 85% of the Ozone NAAQS. The backtrajectories were run using the North American Mesoscale Model (NAM) Data Assimilation System (EDAS) 40 kilometer grid at 300 meters beginning at 20 Coordinated Universal Time (UTC). A back trajectory allows the viewer to see where an air mass originated and where it travels before ending up at the impact location.

This analysis (Figure 4 presents the composite image of all trajectories examined) suggests that concentrations greater than 85% of the Ozone NAAQS exhibit similar transport regimes for the three monitors, supporting DHEC's position that all monitoring in this area of the CSA measures similar concentrations of ozone and that there are redundant monitors that can be terminated to conserve resources.

Figure 4: 36-Hour Back-trajectory Analysis for Big Creek (45-007-0005), Clemson (45-077-0002) and Wolf Creek (45-077-0003) on days that exceed 85% of the Ozone NAAQS 6/1/2011 – 8/31/2011



Conclusions

An analysis of daily maximum ozone concentrations, 1-hour ozone concentrations and 36-hour back trajectories on days with daily maximum concentrations greater than 85% of the Ozone NAAQS all show that the ozone monitors in current network configuration in and around the Greenville MSA are exposed to similar levels of pollution. Specifically, daily maximum 8-hour ozone concentrations at Big Creek and Clemson CMS and Wolf Creek are highly correlated, have similar temporal patterns in monthly maximum concentrations and exhibit very similar 1-hour peak concentrations during the summer months. Furthermore, on days that approach or exceed the level of the Ozone NAAQS, trajectory analysis suggests that three monitors are measuring concentrations in the same air mass, suggesting that there is redundant monitoring in this portion of Upstate of South Carolina. DHEC respectfully requests EPA concurrence to terminate monitoring at the Clemson CMS monitor. DHEC may consider further modifications to the ozone monitoring network in the Upstate in future monitoring plans and or amendments to approved plans.