BEFORE THE ADMINISTRATOR
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

In the Matter of:	)	
	)	
FINAL RULE,	)	
AIR QUALITY DESIGNATIONS	)	**EPA-HQ-OAR-2008-0476;**
FOR THE 2008 OZONE NATIONAL	)	**FRL-9668-2, RIN 2060-AP37**
AMBIENT AIR QUALITY STANDARDS,	)	
77 FED. REG. 30,088 (MAY 21, 2012)	)	
	)	
	)	
ANDERSON COUNTY, TENNESSEE,	)	
BLOUNT COUNTY, TENNESSEE, and	)	
KNOX COUNTY, TENNESSEE	)	
	)	
Petitioners.	)	

PETITION FOR RECONSIDERATION BY
ANDERSON COUNTY, BLOUNT COUNTY, AND KNOX COUNTY, TENNESSEE

Pursuant to Section 307 of the Clean Air Act ("CAA"), 42 U.S.C. §7607, Anderson County, Tennessee ("Anderson County"), Blount County, Tennessee ("Blount County"), and Knox County, Tennessee ("Knox County") (collectively, "Counties"), through the undersigned counsel, file this Petition for Reconsideration and request that the Administrator of the United States Environmental Protection Agency ("EPA") convene a proceeding to reconsider the "Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards," 77 Fed. Reg. 30, 088 (May 21, 2012) (the "Final Rule"). As described below, this petition is based upon new information of central relevance not available during the public comment period for the Final Rule.

INTRODUCTION

The Counties allege that EPA's promulgation of the Final Rule was arbitrary and capricious because, despite EPA's decision (made on April 10, 2010) to accept and use 2009-

2011 air monitoring data instead of 2008-2010 data, EPA nevertheless designated Anderson (partial), Blount, and Knox Counties nonattainment based on the 2009-2011 data. This action was made after the Final Rule's public comment period expired on February 3, 2012. EPA's arbitrary and capricious action designating Anderson (partial), Blount, and Knox Counties nonattainment for ozone violates the CAA and its implementing regulations, as well as EPA's written policies. EPA's decision to designate Anderson (partial) and Knox Counties--each of which had only attaining monitors using 2009-2011 data--and Blount County--in which the sole nonattaining monitor is located at high elevations and affected chiefly by long range transport, and thus not addressable by local actions--was an arbitrary and capricious action and an abuse of discretion because EPA failed to consider a boundary recommendation analysis submitted by the State of Tennessee and the Counties. Had EPA considered this analysis, it likely would not have made nonattainment designations for any of the Counties. Thus, the failure to consider this analysis is of central relevance to the outcomes in the Final Rule.

FACTUAL AND PROCEDURAL BACKGROUND

The designation process for the 2008 ozone national ambient air quality standard began on December 4, 2008, when EPA issued guidance to the states regarding governors' requirements to provide EPA with a list of all areas in the state and recommendations as to whether each area meets the ozone standard. "Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards," 77 Fed. Reg. 30, 088, 30,090 (May 21, 2012). This guidance identified important factors which EPA recommended the governors use in making their recommendations. Although EPA initially intended to make final designations by March 12, 2010, it announced its intent to reconsider the 2008 ozone standard on September 16, 2009. *Id.* EPA signed the proposed reconsideration on January 6, 2010. *Id*. Because EPA did not take

final action on this reconsideration, the standard of 0.075 parts per millions remained in effect for purposes of final designations for the 2008 standard. *Id*. at 30,091. A settlement between EPA and WildEarth Guardians required EPA to issue its final designations by May 31, 2012. *Id*.

On September 22, 2011, EPA notified its Regional Air Division Directors that it was "proceeding with initial area designations under the 2008 [ozone] standard, starting with recommendations states made in 2009 and updating them with the most current, certified air quality data." EPA Memorandum to Air Division Directors, "Implementation of the Ozone National Ambient Air Quality Standard" (Sept. 22, 2011). EPA stated that in implementing the 2008 ozone standard, it would be "mindful of the President's and Administrator's direction that in these challenging economic times, EPA should reduce uncertainty and minimize the regulatory burdens on the States." *Id*. at 1.

On December 8, 2011, EPA Region 4 notified Tennessee Governor Bill Haslam of its intended designations for Tennessee. Letter from Regional Administrator Gwendolyn Keyes Fleming to Governor Bill Haslam (Dec. 8, 2011). In this letter, EPA said that it had "preliminarily concluded that the following counties should be included as part of the Knoxville-Sevierville-La Follette nonattainment area: Anderson, Blount, Knox, Loudon and Sevier Counties, in their entirety, and a portion of Cocke County." *Id*. at 2. EPA also stated that it "will continue to work with State officials regarding the appropriate boundaries for . . . the counties in the Knoxville-Sevierville-La Follette Area. *Id*. EPA also said that Tennessee could submit additional information for use in making this boundary determination if it did so prior to February 29, 2012. *Id*.

By publication in the Federal Register on December 20, 2011, EPA announced a public comment period for its intended designations. "EPA Responses to State and Tribal 2008 Ozone

Designation Recommendations: Notice of Availability and Public Comment Period," 76 Fed. Reg. 78,872. The public comment period ended on February 3, 2012. 77 Fed. Reg. 30,088, 30,091.

By letter dated February 27, 2012, Tennessee Department of Environment and Conservation Commissioner Bob Martineau amended recommendations for the Counties, based on ambient air monitoring data from 2009-2011. Letter from Commissioner Robert J. Martineau, Jr., to Regional Administrator Gwendolyn Keyes Fleming (Dec. 22, 2012). As explained in this letter, at the time there was a question whether 2011 monitoring data completeness requirements for Knox County monitors had been met. If the Knox County data were deemed acceptable (EPA concluded the data were acceptable on April 10, 2012), TDEC recommended "limit[ing] the nonattainment area to that portion of Blount County that contains the Great Smoky Mountains National Park." *Id*. at 1.

Commissioner Martineau submitted recommendations again on April 5, 2012. . Letter from Commissioner Robert J. Martineau, Jr., to Regional Administrator Gwendolyn Keyes Fleming (Apr. 5, 2012). He reiterated that EPA should designate the Counties, other than "[t]hat portion of Blount County that contains the Great Smoky Mountains National Park," attainment because using 2009-2011 data, "only the monitor located at Look Rock in Blount County exceeds the standard of 0.075 parts per million with a calculated design value of 0.077 parts per million. This is a high elevation site located within the Great Smoky Mountains National Park which we believe is predominately influenced by long range transport." *Id*. at 1.

EPA published the Final Rule on May 21, 2012, and the Counties now petition for reconsideration of the Final Rule due to EPA's arbitrary and capricious action designating two Counties with attaining monitors (Anderson (partial) and Knox) nonattainment and designating

all of Blount County nonattainment based on one high elevation monitor influenced significantly by elevation and long range transport.

STATUTORY FRAMEWORK FOR PETITION

Under CAA section 307, the EPA Administrator shall convene a proceeding for reconsideration of a rule if a person raising objection to that rule can demonstrate that it was impracticable to raise such objection during the period for public comment or "if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review)" and "if such objection is of central relevance to the outcome of the rule." 42 U.S.C. § 7607(d).

Here, the grounds for the Counties' petition arose after the period for public comment and within the time specified for judicial review. As noted above, the public comment period for the Final Rule expired on February 3, 2012. The Counties base this petition on the grounds that EPA's acceptance of the 2009-2011 data was not made until after the close of comment period, and despite accepting these data, EPA nevertheless designated Anderson (partial), Blount, and Knox Counties nonattainment on May 21, 2012. The Counties' petition for reconsideration is therefore timely under 42 U.S.C. § 7607(d).

GROUNDS FOR RECONSIDERATION

In November 2011 the State of Tennessee revised its March 2009 recommendations for the designation of counties in the state for attainment and nonattainment with the 2008 ozone NAAQS. (Letter from Robert J. Martineau, Jr., to Gwen Keyes Fleming, dated November 8, 2011.) In that letter, TDEC recommended that for the Knoxville area, the portions of Blount, Cocke, and Sevier counties within the boundaries of the Great Smoky Mountains National Park ("Park") be designated nonattainment and that the remaining portions of those counties, as well

as the entireties of the other counties in the Knoxville CSA, be designated attainment. This recommendation was based on 2009-2011 preliminary design values. Subsequently, EPA informed the State of Tennessee that it intended to designate Anderson, Blount, Knox, Loudon, and Sevier Counties in their entireties and the portion of Cocke County within the Park boundary as nonattainment. (Letter from Gwendolyn Keyes Fleming to the Honorable Bill Haslam, dated December 8, 2011.) EPA agreed with the State's recommendation of attainment with regard to the remaining counties in the Knoxville CSA. EPA's decision was based on 2008-2010 design values and a technical analysis of five factors (i.e., an analysis of the so-called "nine factors").

After the close of the public comment period, EPA accepted the 2011 ozone data for the Knoxville CSA as complete, and used the 2009-2011 design values in making its designations with the 2008 ozone NAAQS. In April 2012, the State of Tennessee and the Counties submitted the following reanalysis of the factors EPA discussed in the attachment to its December 8, 2011 letter. This document was submitted after the close of the public comment period, and it is not clear that EPA considered the reanalysis in its designation decisions.

The Clean Air Act permits states to resubmit boundary recommendations after EPA announces an intent to modify the states' initial recommendations. 42 U.S.C. § 7407(d)(B)(ii). If the statue expressly provides this opportunity for states to submit a second set of recommendations, EPA should consider any reanalysis submitted by the states. The State of Tennessee (and the Counties) submitted the following analysis of factors after EPA announced its intent to vary from Tennessee's initial recommendations. EPA's failure to consider this analysis was arbitrary, capricious, and an abuse of discretion.

I. Factor 1: Air Quality Data

Figure 1 shows the locations of the nine ozone monitors in the Knoxville CSA and Table 5 presents the 2009 through 2011 4th highest 8-hour daily maximum ozone concentration as well as the 2009-2011 design values for each of the monitors.

Figure 1 – Knoxville CSA Ozone Monitor Locations.

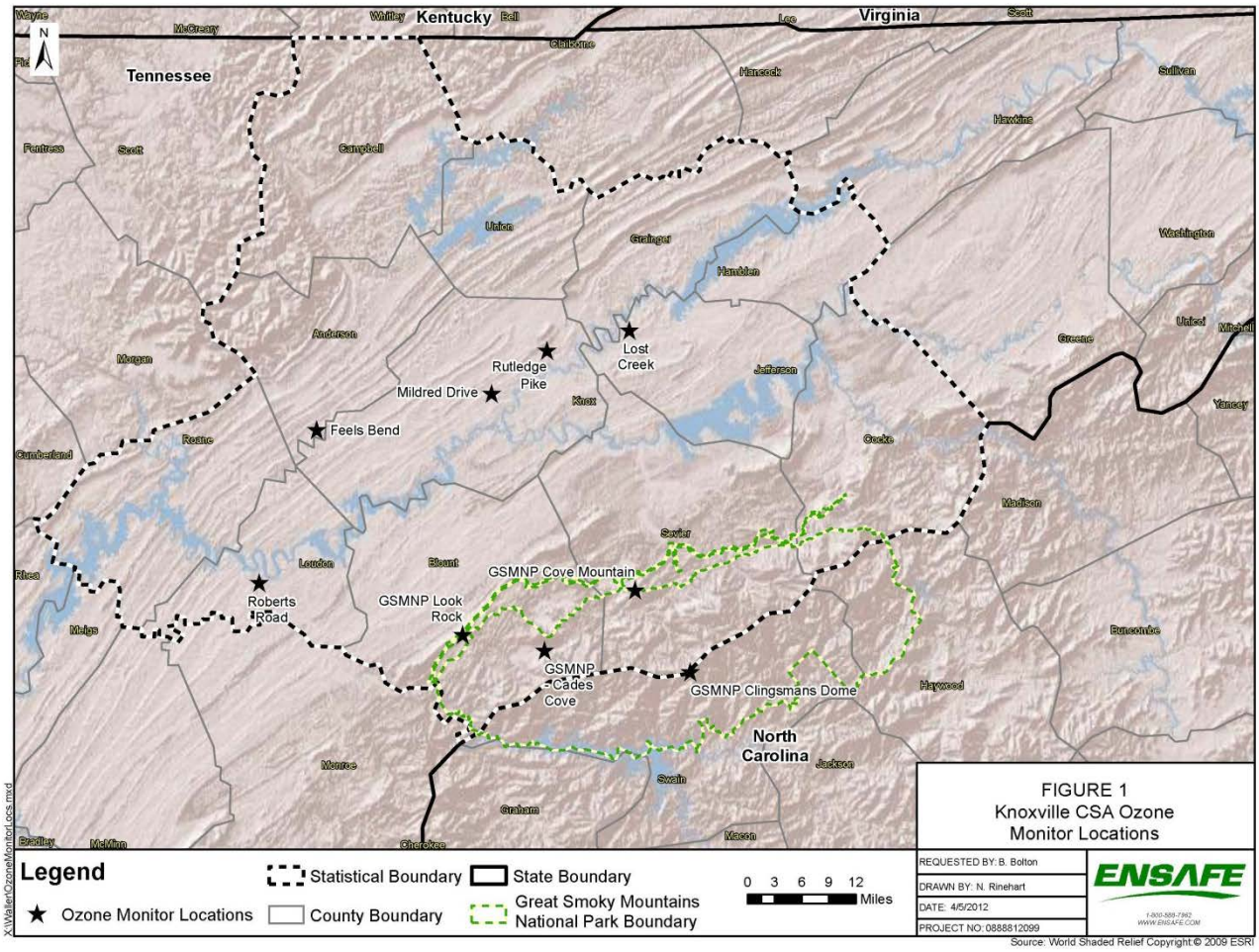


Table 5
2009-2011 Knoxville CSA 4th Highest 8-Hour Daily Maximums and Design Values

Monitor	County	2009 4th Highest 8-Hour Daily Maximum (ppb)	2010 4th Highest 8-Hour Daily Maximum (ppb)	2011 4th Highest 8-Hour Daily Maximum (ppb)	2009-2011 Design Value (ppb)
Freels Bend	Anderson	65	73	74	70
Cades Cove	Blount	62	74	68	68
Look Rock	Blount	69	81	82	77
Lost Creek	Jefferson	68	77	73	72
Mildred Drive	Knox	68	74	74	72
Rutledge Pike	Knox	66	70	74	70
Roberts Road	Loudon	68	76	75	73
Clingmans Dome	Sevier	71	77	79	75
Cove Mountain	Sevier	70	78	77	75

For the 2009-2011 period only one monitor in the Knoxville CSA exceeded the 2008 zone NAAQS: the monitor located in Blount County at Look Rock. The monitors in all of the other counties in the Knoxville CSA attained the NAAQS for this period.

II. Factor 2: Emissions and Emissions-Related Data

According to the 2008 National Emissions Inventory ("NEI") Blount, Loudon, Sevier, and Cocke Counties made very small contributions to the area-wide emissions of NO_X and VOCs, and Anderson County made a very small contribution to VOC emissions. (*See* "Emissions and Emissions-Related Data" analysis contained in the attachment to EPA's December 8, 2011 letter to the State of Tennessee.) According to the 2008 NEI, NO_X emissions in Anderson County were 12,475 tons. Of that total, 8,622 tons were emitted by TVA's Bull Run Power Plant. In the "Conclusion" section to the "Technical Analysis for Knoxville-Sevierville-La Follette" section of EPA's attachment to its December 8, 2011 letter to the State of Tennessee, EPA points out that "while SCR controls were installed at the plant (i.e., Bull Run Power Plant), there has been a steady increase in NO_X emission levels since 2006." However, since 2008 NO_X emissions from Bull Run have declined significantly. Not only have the total annual and ozone season emissions declined, but the emission rates have significantly declined as well, indicating that the SCR at the plant is effectively controlling NO_X emissions. Figure 2 and Table 6 summarize the NO_X emissions from the Bull Run Plant.

Figure 2 – NOx Emissions - TVA's Bull Run Plant, Anderson Co., TN.

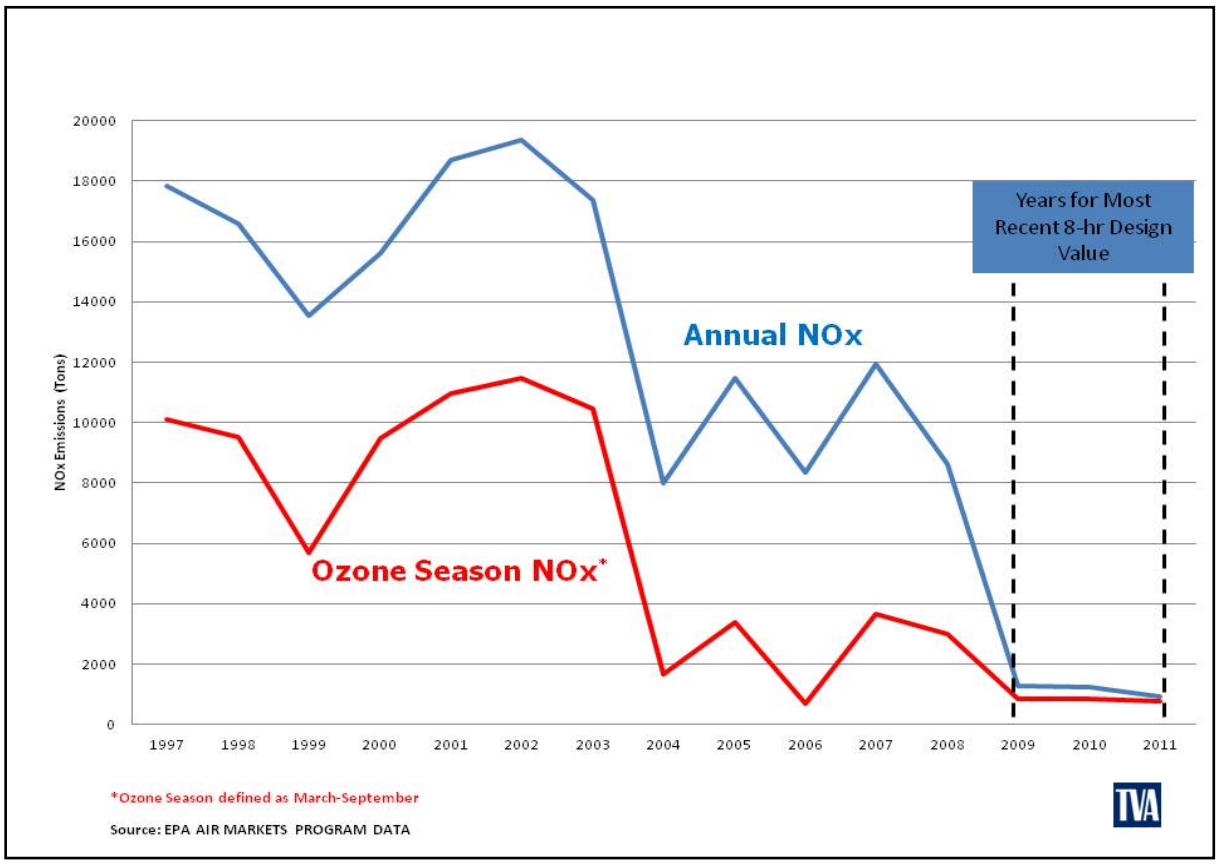


Table 6 Bull Run Power Plant NO_X Emissions*				
Year	**Annual Emissions (TPY)**	**Annual Emission Rate (lbs/mmBTU)**	**Ozone Season Emissions (TPY)**	**Ozone Season Emission Rate (lbs/mmBTU)**
2008	8,622.3	0.372	2,983.8	0.244
2009	1,270.7	0.090	843.5	0.080
2010	1,221.0	0.074	829.5	0.069
2011	912.0	0.070	758.2	0.070

* Source: EPA Air Markets Program Data

III. Factor 3: Meteorology (Weather/Transport Patterns)

In EPA's attachment to its December 8, 2011 letter to the State of Tennessee, EPA mentions an analysis of wind direction and speed for the 2008-2010 ozone season (March through October) conducted to better understand the fate and transport of precursor emissions

contributing to ozone formation. EPA's analysis of the National Weather Service data collected at Knoxville McGhee Tyson Airport indicated that southwest and west-southwest winds predominate along with a northern component.

Figure 3 – Wind Direction Percentage for Knoxville McGhee Tyson Airport, Ozone Season, 2009-2011.

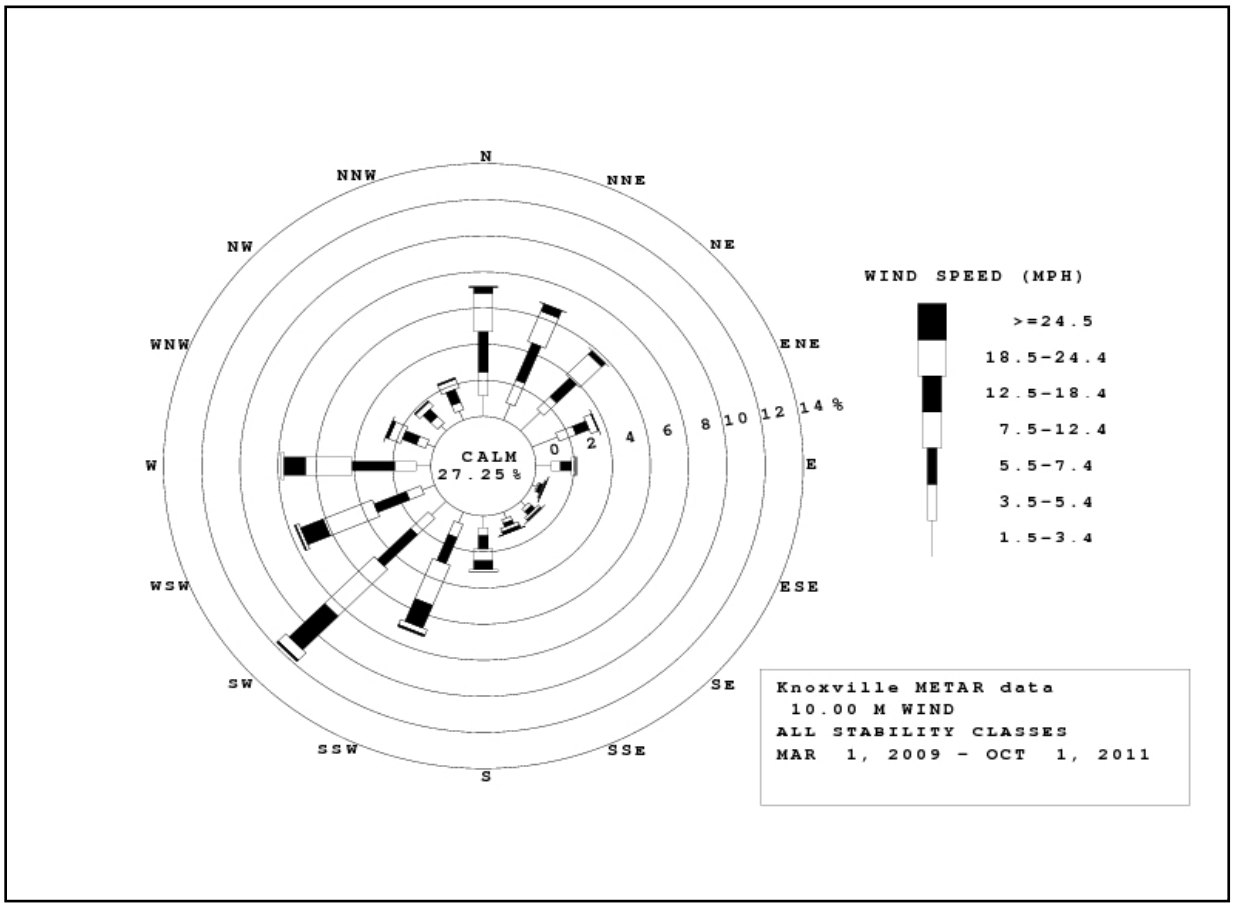


Figure 3 shows the results of a similar analysis for the 2009-2011 ozone seasons. Disregarding the calms, slightly over fifty percent of the time the wind was from the south to west quadrant. There are no significant point sources of NO_X or VOC emissions in the counties EPA intends to designate nonattainment that are in the south to west quadrant from the Look Rock monitor. Again disregarding the calms, only about one-third of the time was the wind from

the west to northeast, the direction from Look Rock in which most of the sources of NO_X and VOCs emissions are located, as well as the major population centers and transportation corridors.

IV. Factor 4: Geography/Topography (Mountain Ranges or Other Air Basin Boundaries)

Section 107(d) of the Clean Air Act requires each state's governor to provide EPA a list of all areas, or portions thereof, in the state designated as nonattainment, attainment, or unclassifiable for the ozone national ambient air quality standard. (42 U.S.C. § 7407(d)(1).) EPA designation guidance provides that potential ozone nonattainment areas "should be evaluated on a case-by-case basis." (EPA Memorandum: Area Designations for the 2008 Revised Ozone National Ambient Air Quality Standards 1, dated December 4, 2008.) Further, EPA "recognizes that these area-specific analyses conducted by states, tribes, and/or EPA may support nonattainment area boundaries that are larger or smaller than the presumptive area starting point." (*Id.*) In this guidance document, EPA also provided a list of factors that the states could consider in making their nonattainment boundary recommendations. One of these factors is identified as "geography/topography (mountain ranges or other air basin boundaries)." (*Id.*, Attachment 2.)

EPA previously has considered the impact of high elevation areas when making nonattainment designations. In North Carolina, EPA agreed to designate only areas above 4,000 feet as the nonattainment area in the Plott Balsam Mountains because "the State submitted information indicating that the violations of the 8-hour ozone standard at the monitors located at the high elevations were due to long range transport and the area was not generating emissions that caused the violations." (Letter from Region 4 Administrator to Secretary of North Carolina Department of Environment & Natural Resources, Enclosure 2, dated December 3, 2003.)

In EPA's attachment to its December 8, 2011 letter to the State of Tennessee, EPA discusses a number of analyses it conducted based on the 2008-2010 ozone seasons. EPA concluded (1) the two high elevation monitors in Sevier County (Clingmans Dome at 6655 feet above mean sea level ("MSL"), and Cove Mountain at 4150 feet above MSL) are located at "a significantly higher elevation than the Knox County monitors" and thus "measure elevated ozone levels overnight due to regional transport of tropospheric ozone formed during the daytime"; (2) the urban monitor in Knox County (Mildred Drive) exhibits a diurnal pattern typical of urban sites and predominantly impacted by urban and nearby emissions; and (3) the monitor at Look Rock (the only monitor measuring a violation of the standard during the 2009-2011 ozone seasons) exhibited a diurnal pattern characterized by impacts from both urban and nearby emissions as well as regional tropospheric ozone formed during the day, in some cases at the same time.

In EPA's analysis it did not mention the characteristics of the diurnal patterns of the other monitors in the Knoxville CSA. Some of those monitors are located nearer local emission sources and at lower elevations (e.g., Rutledge Pike in Knox County, Freels Bend in Anderson County, Lost Creek Road in Jefferson County, and Roberts Road in Loudon County). EPA also did not mention the Cades Cove monitor located just nine miles from the Look Rock monitor in Blount County at an elevation of 1850 feet above MSL.

A detailed analysis of the diurnal patterns of all the monitors in the Knoxville CSA reveals that the characteristics of the Look Rock, Clingmans Dome, and Cove Mountain monitors are generally very similar, while all the other monitors in the Knoxville CSA exhibit diurnal patterns typical of urban sites, including the monitor located at Cades Cove. Figures 4

and 5 provide examples of the diurnal patterns at each monitor during high ozone episodes in the Knoxville CSA.

Figure 4 – Ozone Concentrations Across the Knoxville CSA, June 23-26, 2009.

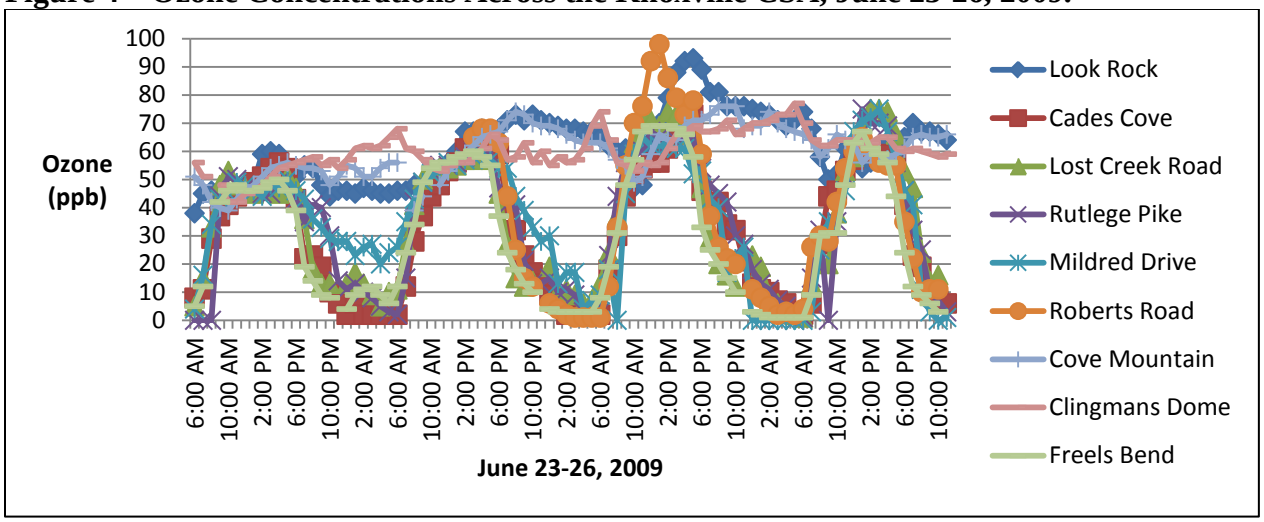
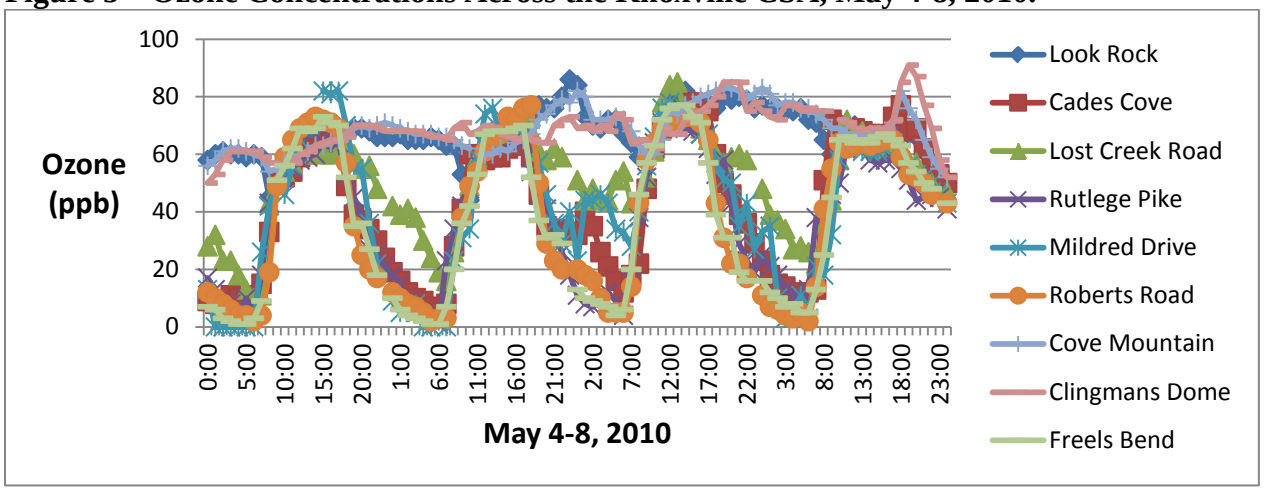


Figure 5 – Ozone Concentrations Across the Knoxville CSA, May 4-8, 2010.



Clearly, concentrations of ozone at the Look Rock monitor exhibit diurnal characteristics very similar to those at the Clingmans Dome and Cove Mountain monitors, which are remote, high elevation monitors and, as EPA suggests in its analysis, are typically predominantly influenced by regional transport of tropospheric ozone, rather than nearby emissions. Also of note is that the average 2009-2011 design value for the three high elevation monitors (Look

Rock, Clingmans Dome, and Cove Mountain) is 75.7 ppb while the average for the remaining, lower elevation monitors is 70.8 ppb (*see* Table 5).

Because the Cades Cove monitor is located in very close proximity to the Look Rock monitor but at a lower elevation, the Counties conducted a detailed analysis of back trajectories for the two sites on each day when the maximum 8-hour daily average ozone concentration at Look Rock exceeded 75 ppb. The back trajectories were computed using the National Oceanic and Atmospheric Administration's HYSPLIT model. Figures 5-10 are examples of typical pairs of back trajectories ending when the ozone concentration was at its maximum at Look Rock, and Figures 11-13 are composites of the back trajectories for each of the three years, 2009-2011.

Figure 6 – NOAA HYSPLIT Backyard Trajectory Ending at 2100 UTC 25 June 2009.

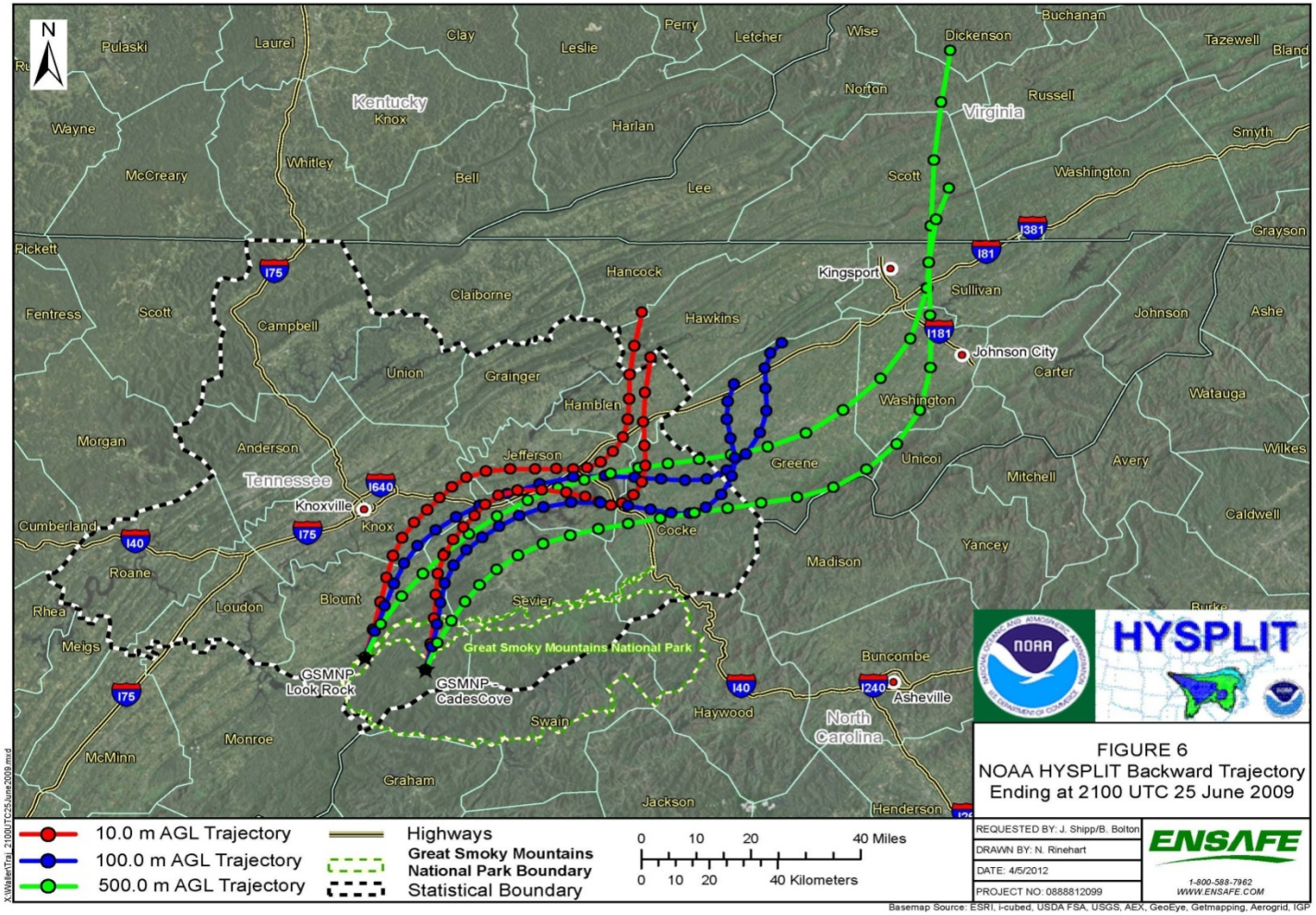


Figure 7 – NOAA HYSPLIT Backward Trajectory Ending at 2100 UTC 15 April 2010.

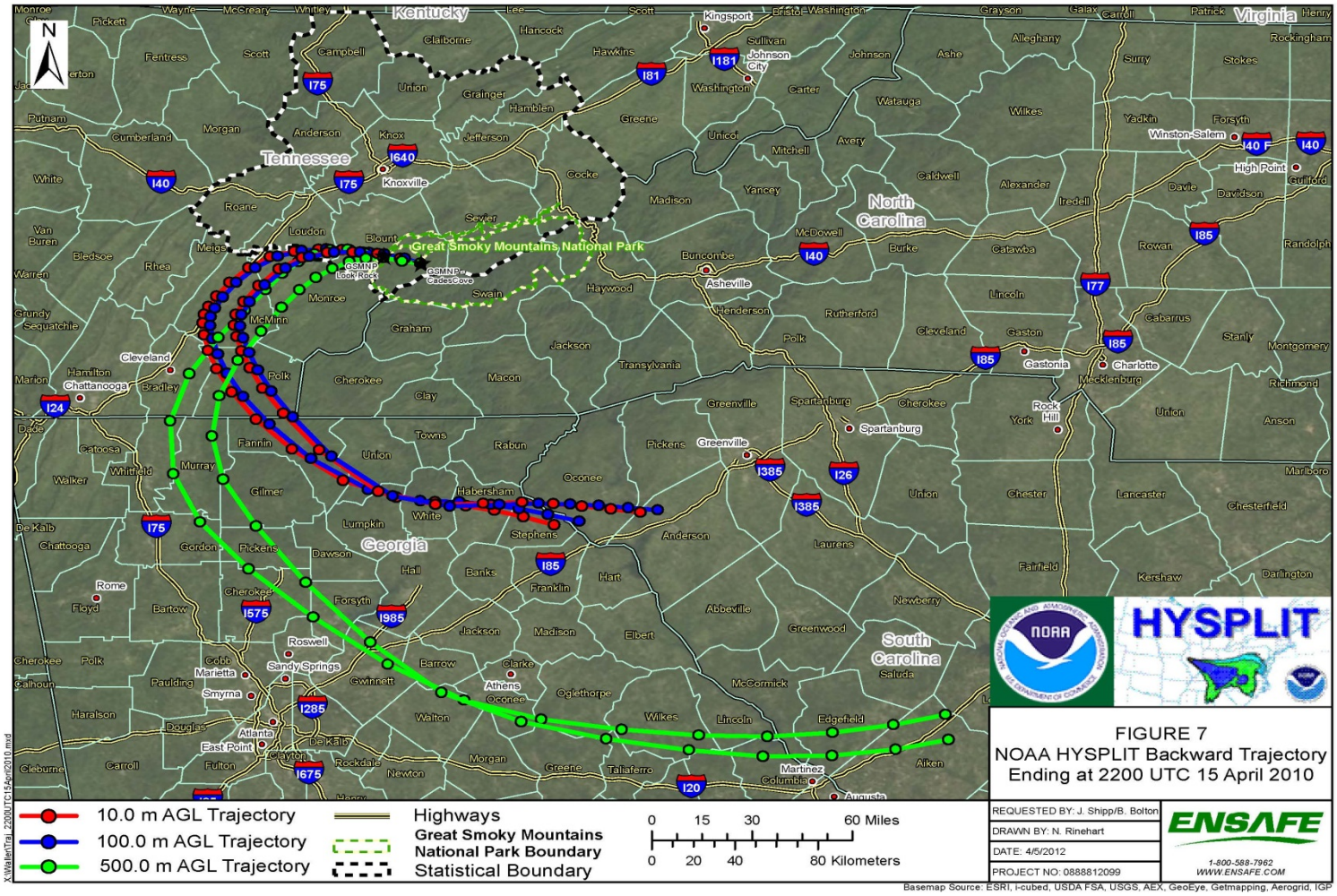


Figure 8 -- NOAA HYSPLIT Backward Trajectory Ending at 2100 UTC 6 May 2010.

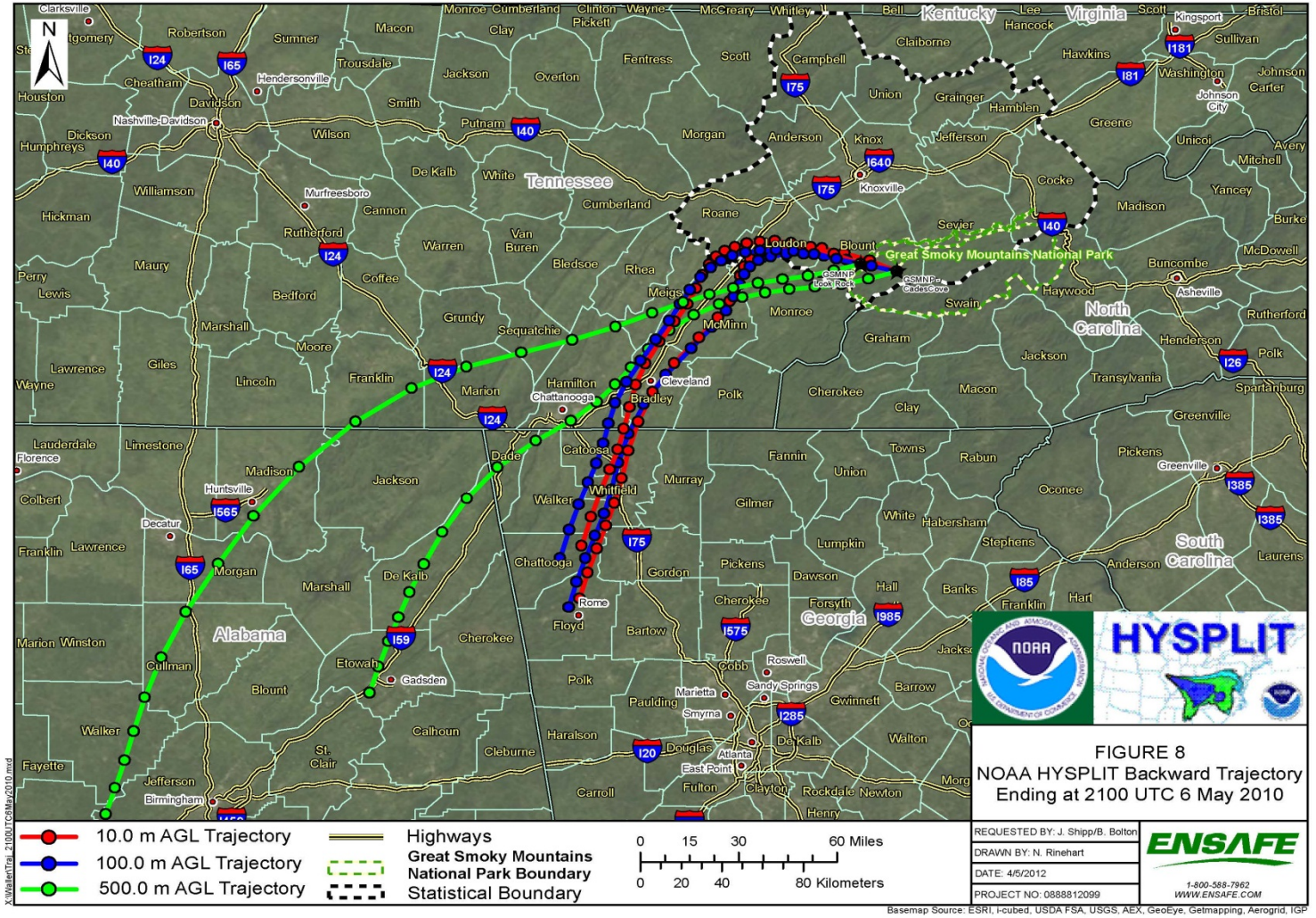


Figure 9 – NOAA HYSPLIT Backward Trajectory Ending at 2000 UTC 8 July 2010.

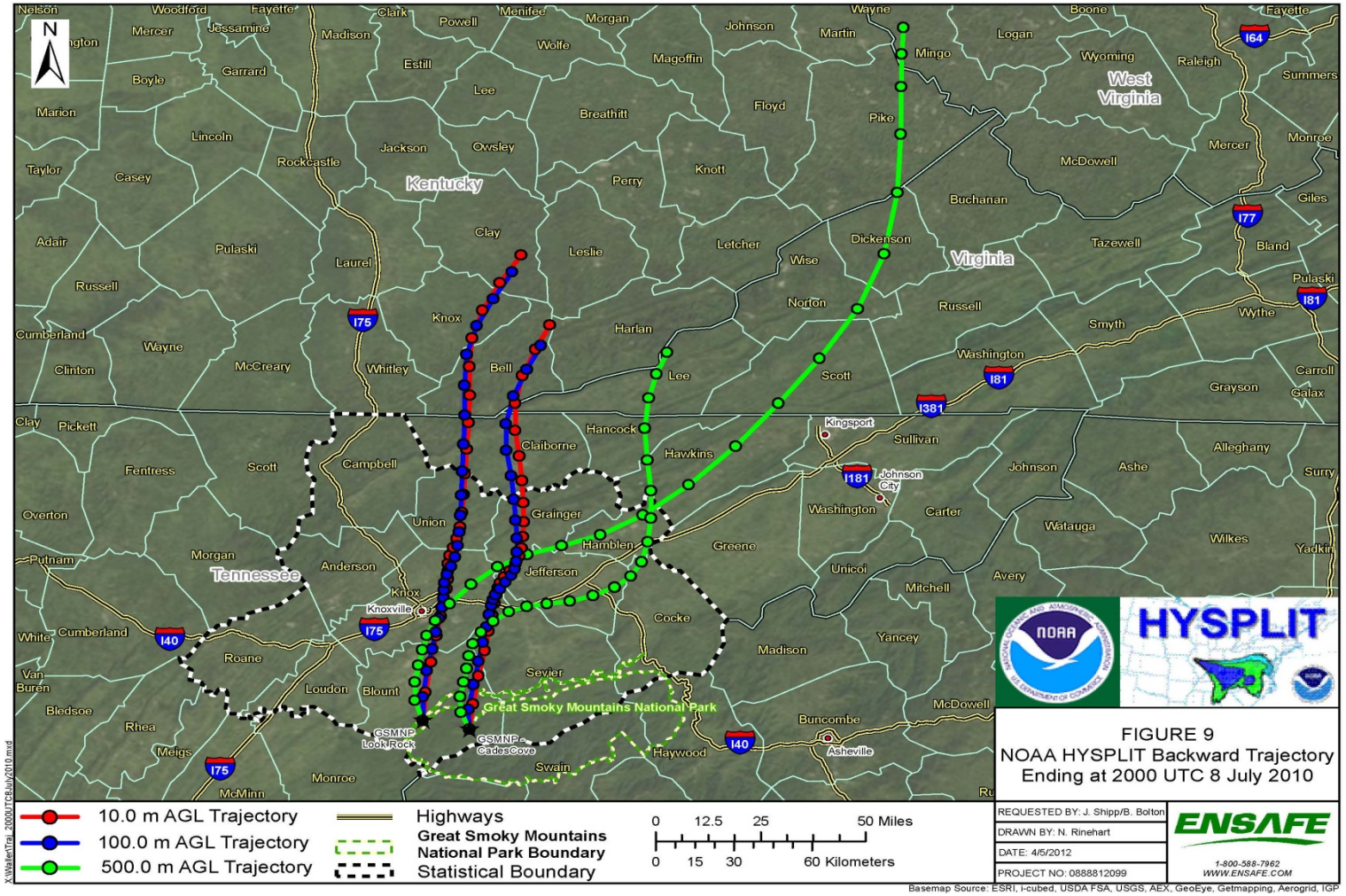


Figure 10 -- NOAA HYSPLIT Backward Trajectory Ending at 1900 UTC 3 June 2011.

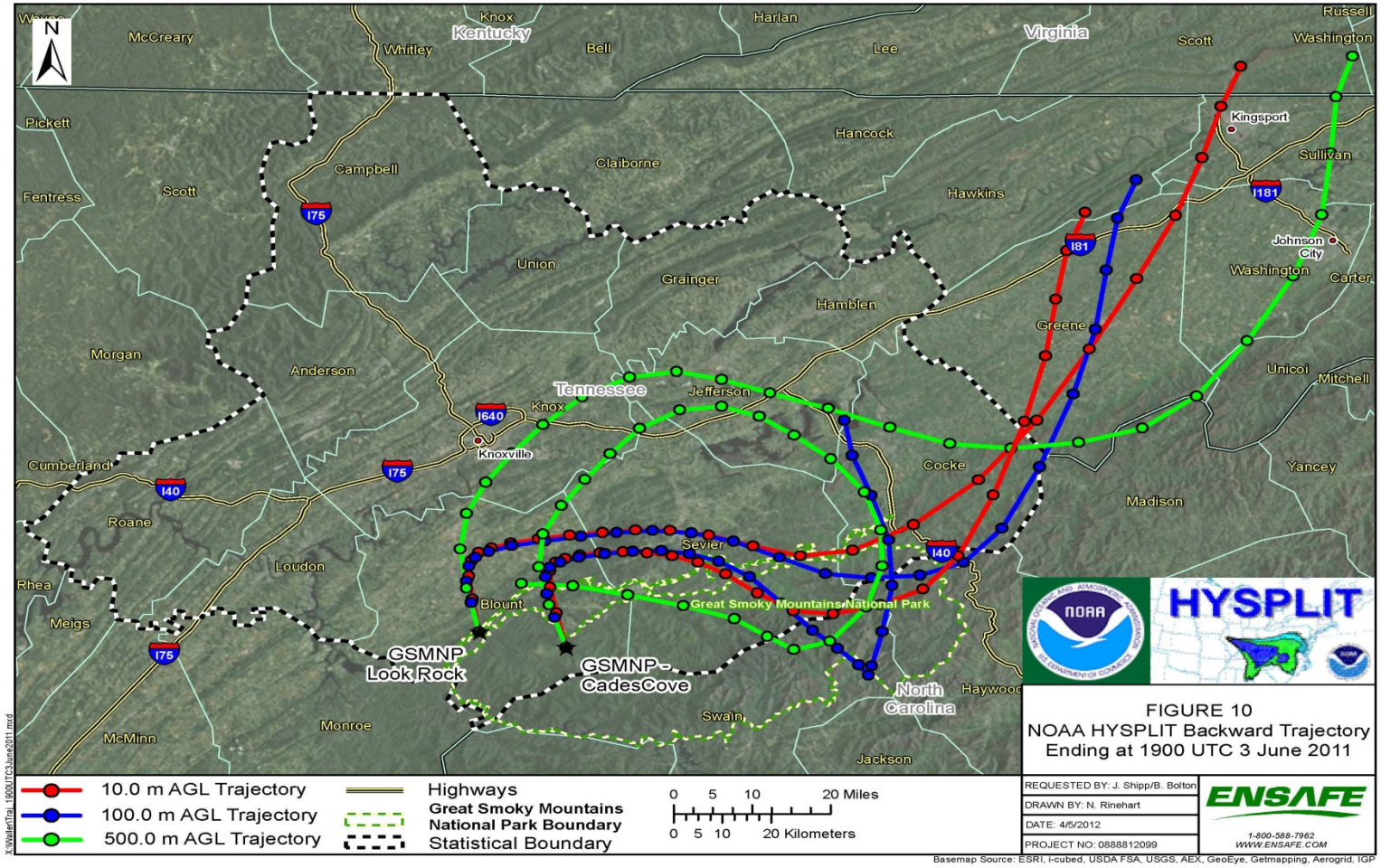


Figure 11 – NOAA HYSPLIT Backward Trajectory Ending at 2100 UTC 13 July 2011.

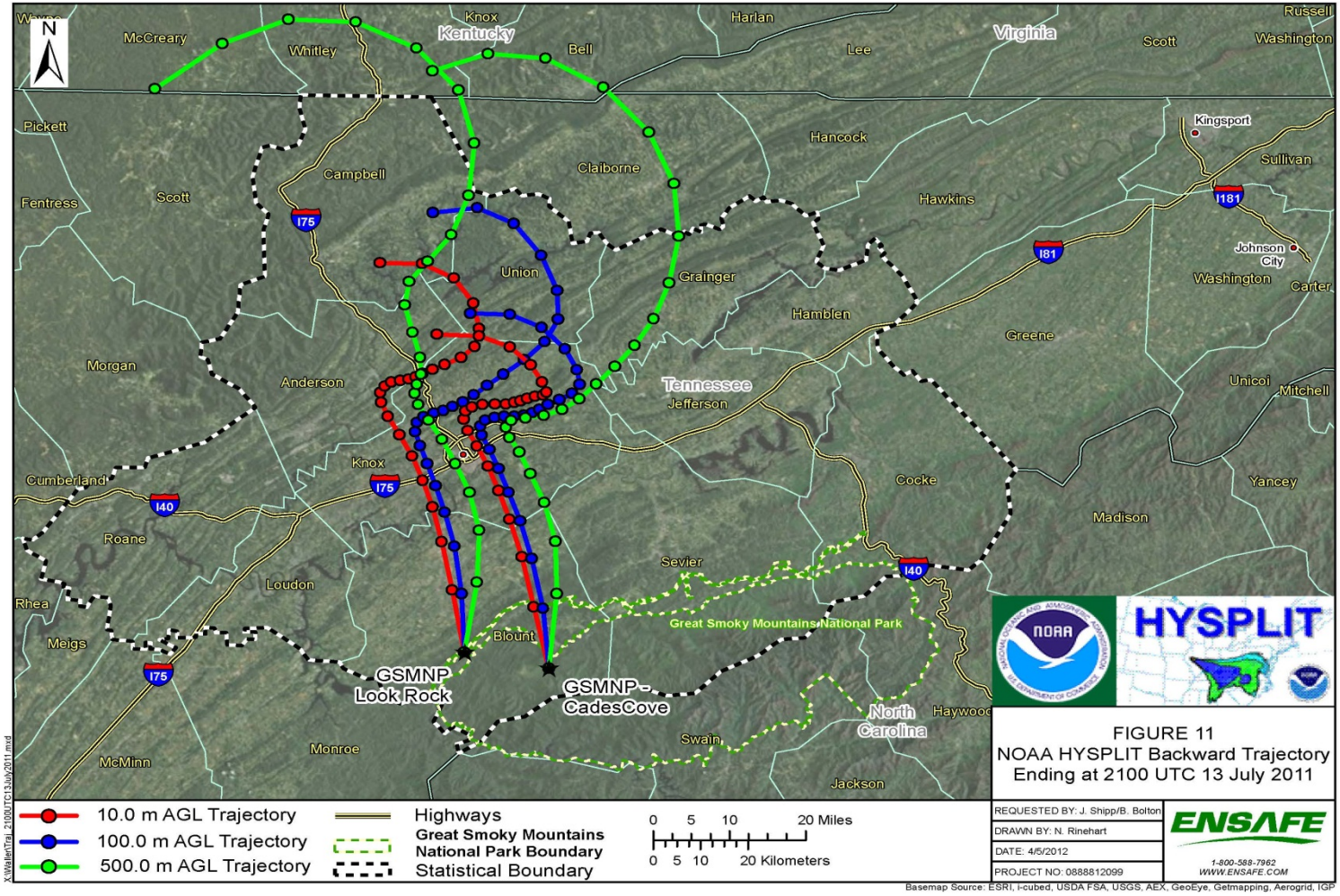


Figure 12 – NOAA HYSPLIT Model Composite Backward Trajectories for 2009.

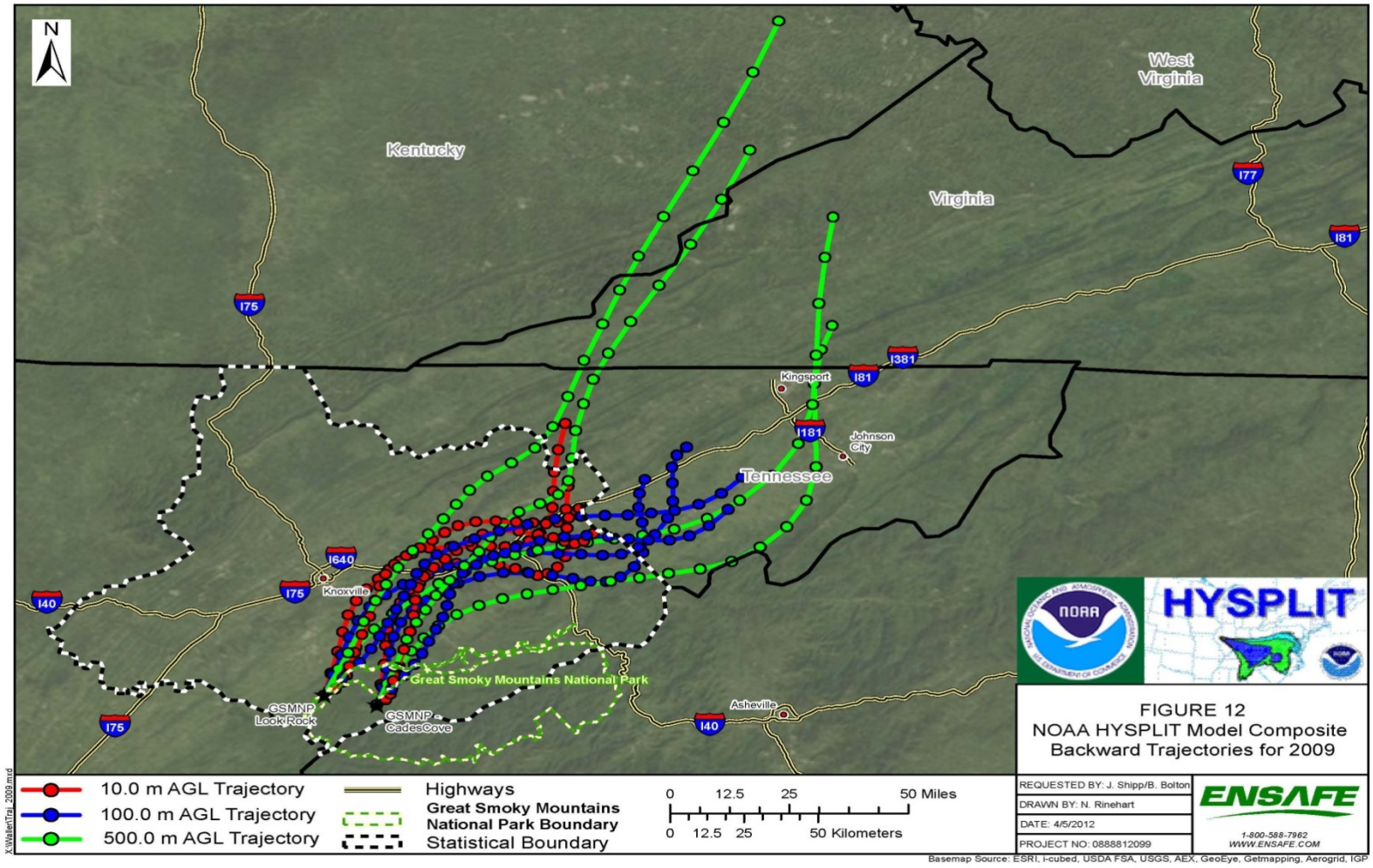


Figure 13 – NOAA HYSPLIT Model Composite Backward Trajectories for 2010.

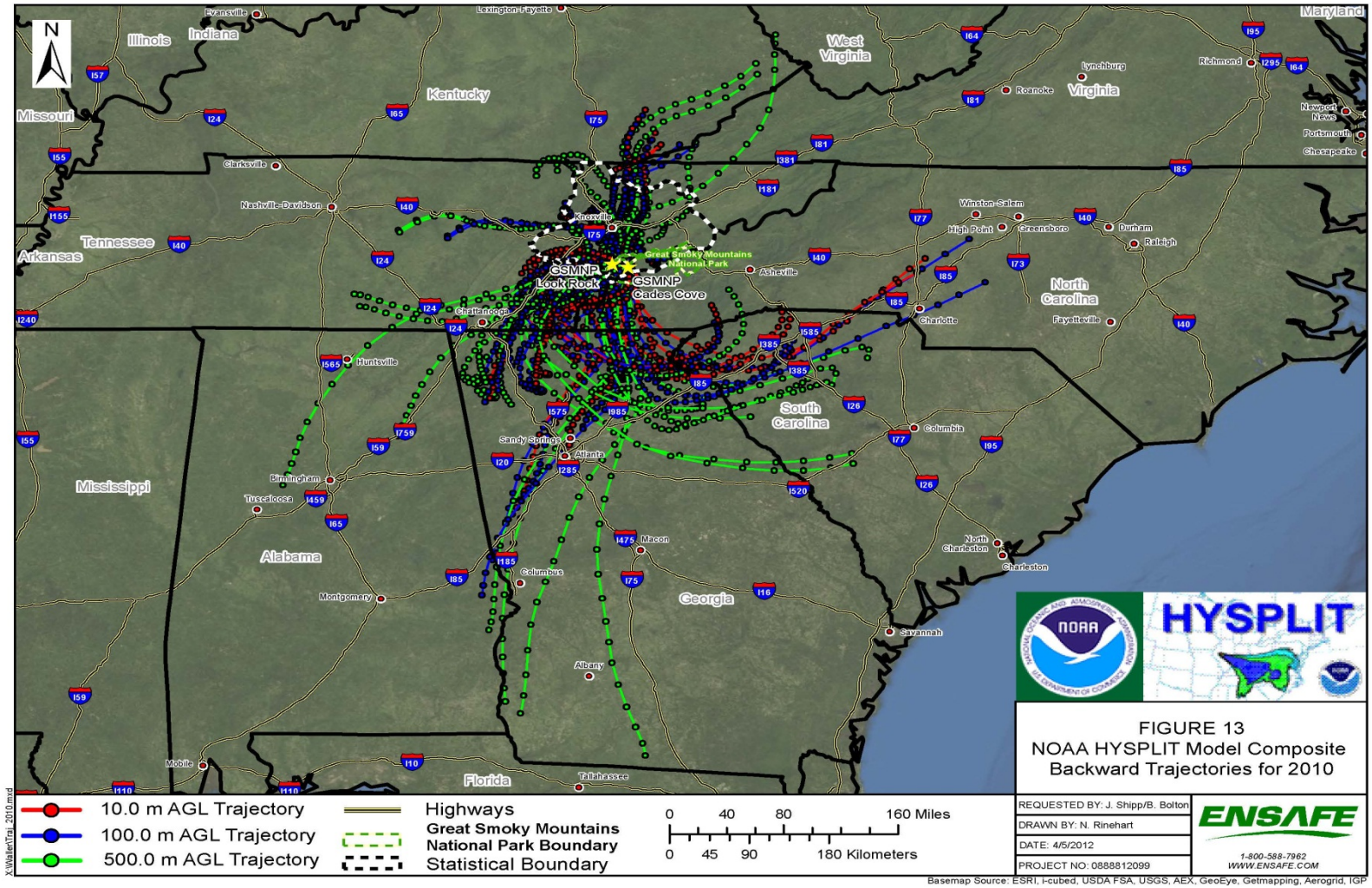
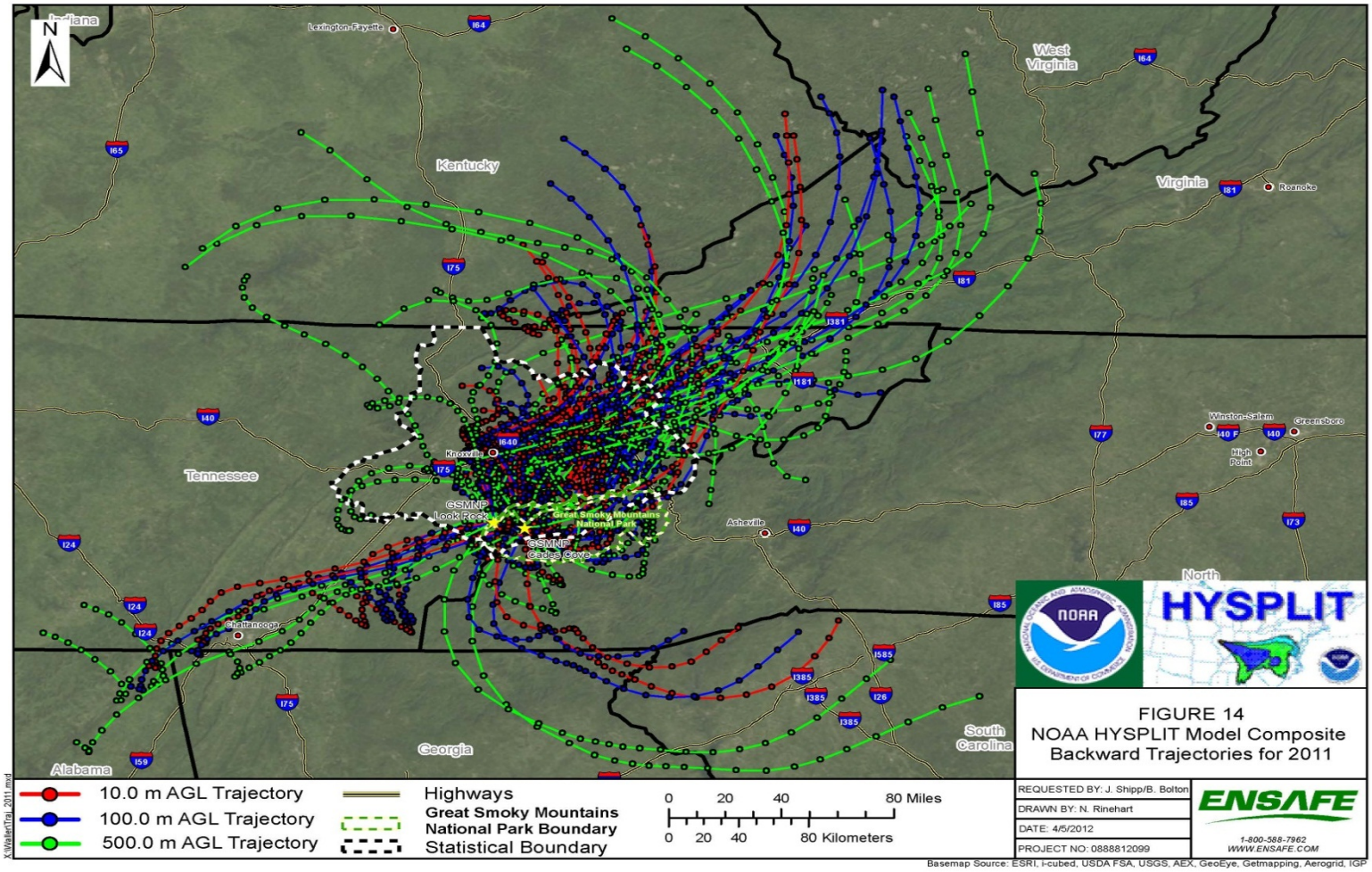
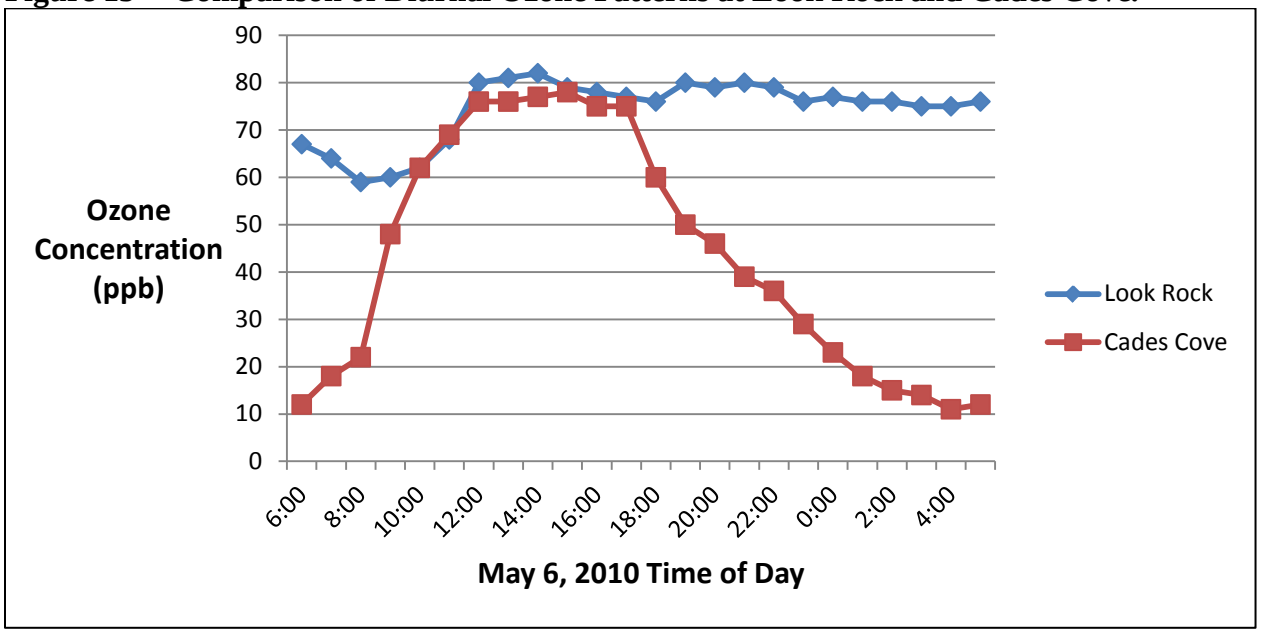


Figure 14 – NOAA HYSPLIT Model Composite Backward Trajectories for 2011.



As can be seen from these examples, based only on back trajectories, the two monitors should generally be expected to be impacted by emissions from the same general areas. However, as pointed out above, the Cades Cove monitor is not violating the 2008 ozone NAAQS. In fact it has the lowest 2009-2011 design value in the Knoxville CSA. As graphically shown in Figures 3 and 4 above, the Cades Cove monitor exhibits a diurnal ozone pattern similar to those of the other lower elevation monitors, while the Look Rock monitor exhibits a diurnal pattern similar to the other higher elevation monitors. The monitor at Look Rock is being significantly impacted by regional transport of tropospheric ozone during the nighttime hours. Figure 15 shows a typical comparison of the diurnal ozone patterns at Look Rock and Cades Cove.

Figure 15 -- Comparison of Diurnal Ozone Patterns at Look Rock and Cades Cove.



The ozone concentration at Look Rock is already high early on the morning of May 6, 2010 (67 ppb), while the concentration at Cades Cove is very low (12 ppb) due to the overnight deposition and destruction of ozone. As ozone is formed during the day, concentrations increase

dramatically at the Cades Cove monitor (to 78 ppb), while concentrations increase much less at Look Rock (to 82 ppb). However, with the coming of evening as the concentrations decline at Cades Cove, concentrations at Look Rock remain high as regional ozone is transported in and/or the nocturnal boundary layer isolates the higher elevations from the ozone destruction (titration) processes that occur at lower elevations. Consequently, the 8-hour average concentrations are higher at the higher elevations.

The data in Table 7 demonstrates the impact that higher overnight ozone concentrations have on the maximum 8-hour average concentration, and thus the ozone design value. At the Look Rock monitor the 8-hour average climbs above 75 ppb by 6 pm on May 6 and is still above 75 the next morning, while the 8-hour average at Cades Cove never exceeds 73 ppb.

Table 7
Diurnal Ozone Concentrations at Look Rock and Cades Cove
May 5-7, 2010

Time	Look Rock Ozone (ppb)	Cades Cove Ozone (ppb)	Look Rock Running 8-Hour Average (ppb)	Cades Cove Running 8-Hour Average (ppb)
2300	86	33		
0000	84	32		
0100	73	40		
0200	70	35		
0300	69	26		
0400	72	21		
0500	72	16		
0600	67	12	74	26
0700	64	18	71	25
0800	59	22	68	23
0900	60	48	66	24
1000	62	62	65	28
1100	68	69	65	33
1200	80	76	66	40
1300	81	76	67	47
1400	82	77	69	56
1500	79	78	71	63
1600	78	75	73	70

1700	77	75	75	73
1800	76	60	77	73
1900	80	50	79	70
2000	79	46	79	67
2100	80	39	78	62
2200	79	36	78	57
2300	76	29	78	51
0000	77	23	78	44
0100	76	18	77	37
0200	76	15	77	32
0300	75	14	77	27
0400	75	11	76	23
0500	76	12	76	19

The impact that this difference has over the course of all three ozone seasons (2009-2011) is illustrated by the data in Table 8. For each of the days during the three ozone seasons that the daily maximum 8-hour average ozone concentration at Look Rock exceeded 75 ppb, Table 8 lists the 6:00 AM ozone concentration for both Look Rock and Cades Cove, the maximum daytime hourly ozone concentration, and the daytime increase. The ozone concentration at Cades Cove was normally very low in the early morning, averaging only 9.0 ppb, while the early morning concentration at Look Rock was normally still high from the preceding day, averaging 64 ppb. Although daytime increases at Look Rock averaged less than the daytime increases at Cades Cove (20.4 versus 63.3 ppb), the resulting daytime ozone maximum hourly ozone concentration at Look Rock ended up much higher than Cades Cove and created an exceedance of the 8-hour ozone NAAQS. The exceedances of the 8-hour NAAQS were the result of the effects of the elevation of Look Rock.

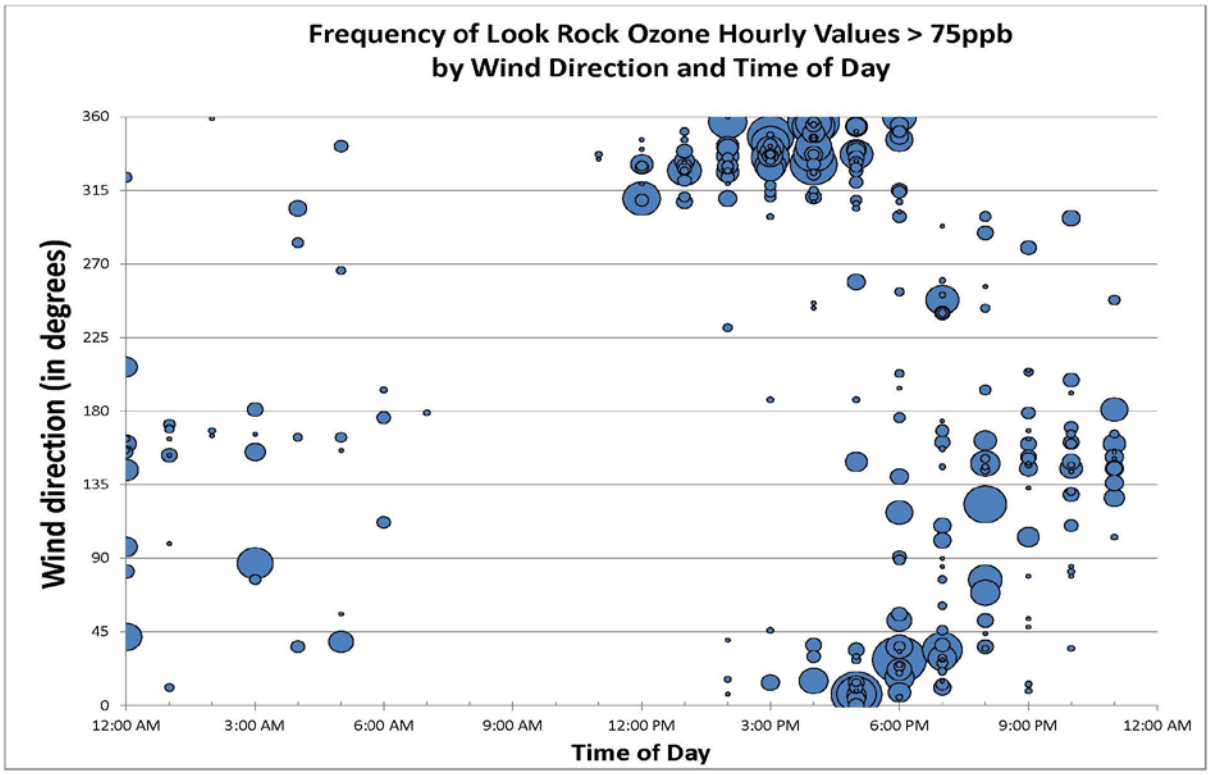
Table 8 Early Morning Ozone Concentrations at Look Rock and Cades Cove With Daytime Increases						
Date	**Look Rock 6:00 AM Ozone (ppb)**	**Cades Cove 6:00 AM Ozone (ppb)**	**Look Rock Maximum Daytime Ozone (ppb)**	**Cades Cove Maximum Daytime Ozone (ppb)**	**Look Rock Daytime Ozone Increase (ppb)**	**Cades Cove Daytime Ozone Increase (ppb)**
6/25/09	65	2	93	73	28	71
4/2/10	68	16	80	84	12	68
4/13/10	69	31	79	79	10	48
4/14/10	72	21	86	81	14	60
4/15/10	66	17	80	76	14	59
5/5/10	65	5	74	64	9	59
5/6/10	67	12	82	78	15	66
7/7/10	49	2	82	74	33	72
7/8/10	62	6	95	80	33	74
9/2/10	60	6	84	77	24	71
9/21/10	53	2	69	62	16	60
10/11/10	62	2	79	69	17	67
6/2/11	53	10	93	70	40	60
6/3/11	72	7	95	79	23	72
6/4/11	77	9	98	72	21	63
6/6/11	48	2	92	66	44	64
6/30/11	63	2	84	69	21	67
7/1/11	80	3	87	65	7	62
7/2/11	74	11	68	64	-6	53
7/13/11	65	31	91	71	26	40
8/3/11	68	5	82	68	14	63
8/12/11	53	1	82	71	29	70
9/2/11	60	3	85	71	25	68
Averages	64.0	9.0	84.3	72.3	20.4	63.3

In its attachment to its December 8, 2011 letter to the State of Tennessee, EPA discussed the frequency of ozone hourly values greater than 75 ppb by wind direction and time of day for the Look Rock site. In that discussion, EPA presented a graphic (*see* Figure 4 of the "Technical Analysis for Knoxville-Sevierville-La Follette," page 8) that showed that when hourly ozone concentrations exceed 75 ppb during the afternoon hours, the wind is predominantly from the north to northwest, while during the overnight hours the wind is predominantly from the

southeast to south-southeast. Although in the text of the discussion of this graphic EPA made a misstatement and reversed these directions, it drew the conclusion that this difference is further evidence that "both downwind urban ozone formation from Knoxville Knox County and high elevation regional transport of ozone contribute to NAAQS violations."

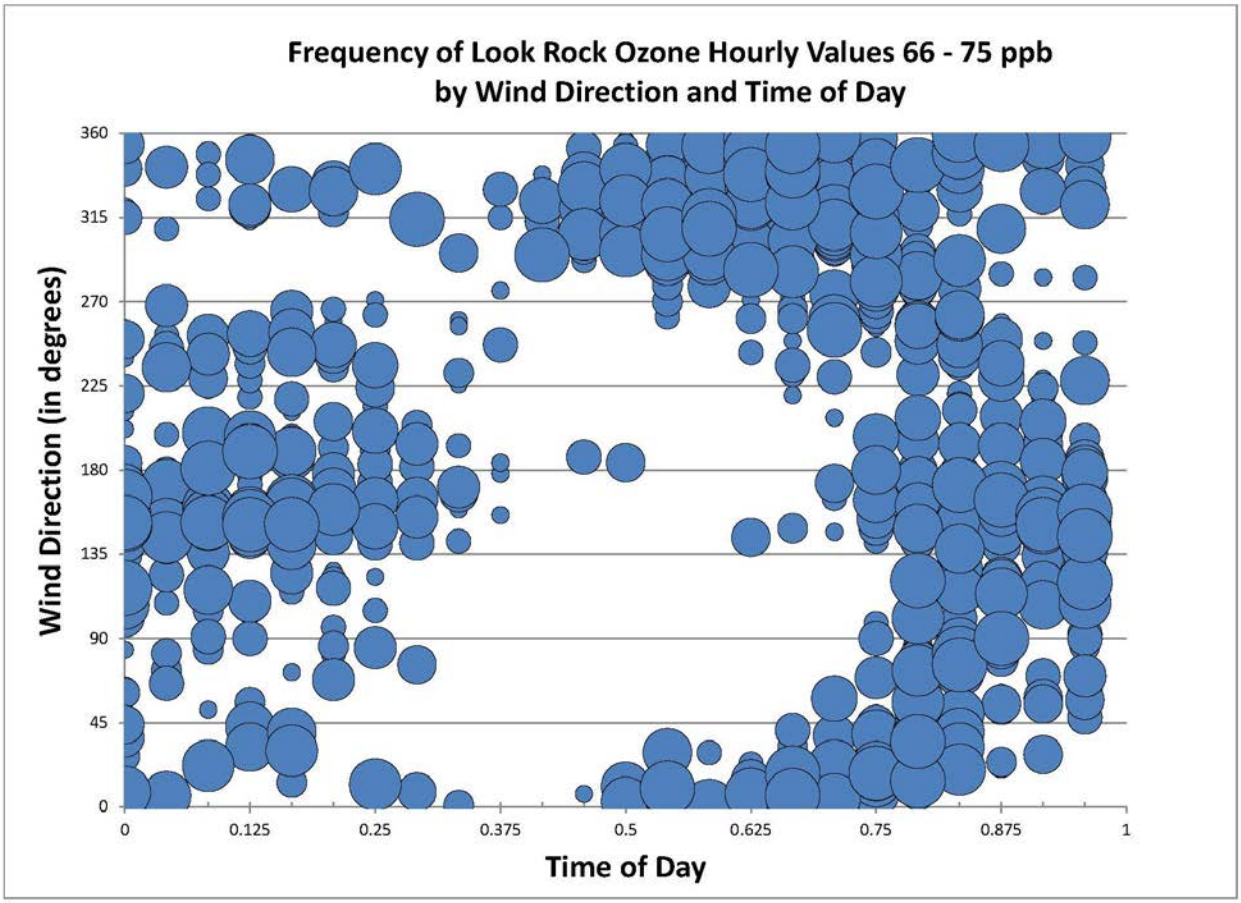
Although EPA did not state what data it used in its analysis, the Counties assume it was either 2007-2010 or 2008-2010. Therefore, the Counties repeated the analysis using the 2009-2011 ozone data for Look Rock. Figure 16 shows the results of that analysis.

Figure 16 – Frequency of Look Rock Ozone Hourly Values Greater Than 75 ppb by Wind Direction and Time of Day.



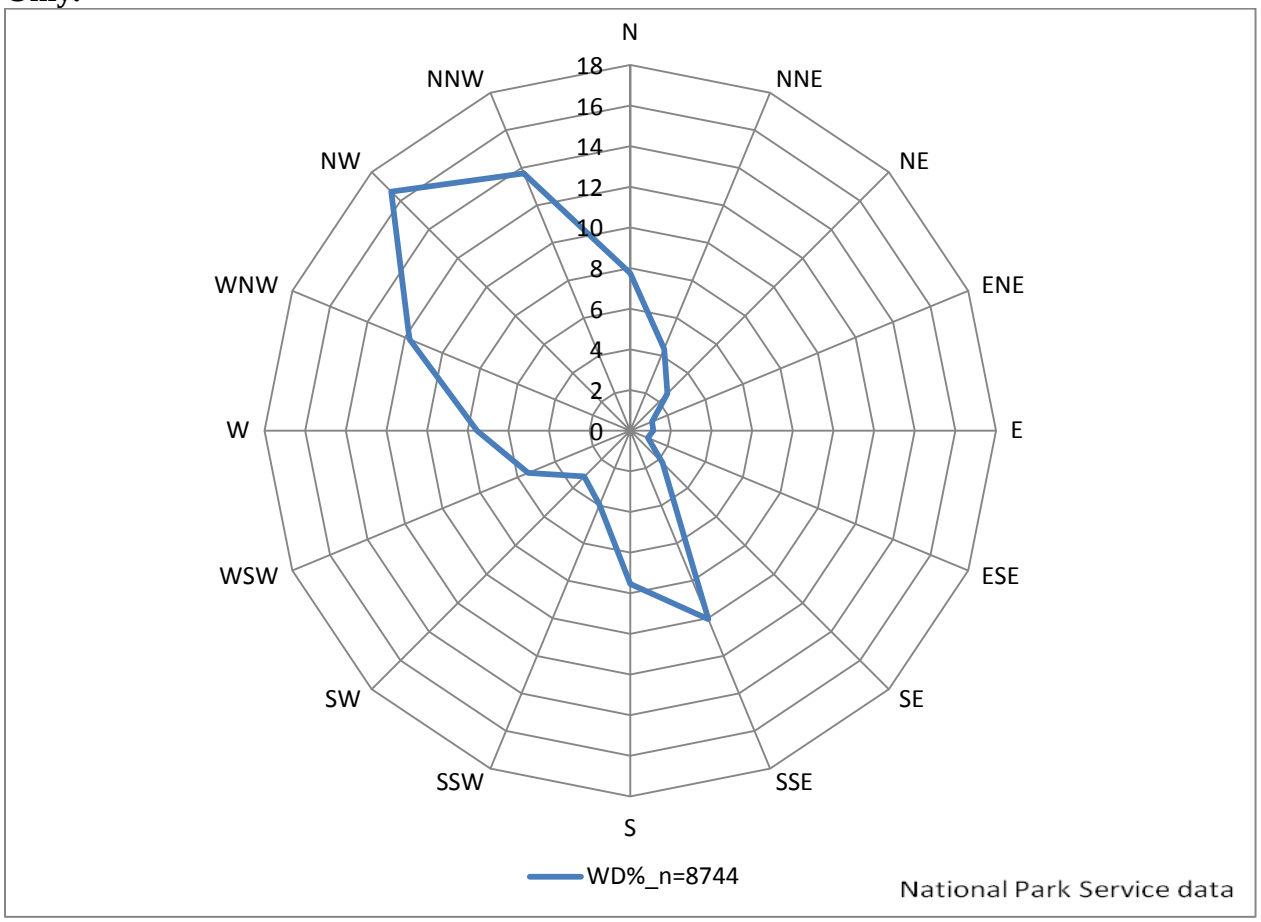
In addition to repeating EPA's analysis, the Counties also looked at the wind direction by time of day for the hours when the ozone concentration at Look Rock was 66-75 ppb. That analysis is depicted in Figure 17.

Figure 17 – Frequency of Look Rock Ozone Hourly Values 66-75 ppb by Wind Direction and Time of Day.



The Counties also constructed a wind rose based on CastNet data for the ozone seasons of 2009-2011. That wind rose is shown in Figure 18.

Figure 18 -- Wind Direction Percentage for Look Rock, Ozone Season, 2009-2011, Daytime Only.



Based on all these analyses, the Counties concluded, as EPA did, that there appears to be a change in wind direction in the evening with the wind coming from the south-southeast when the ozone concentrations exceed 75 ppb. However, from the analyses shown in Figures 17 and 18, it appears that this same phenomenon not only also occurs when the ozone concentrations are 66-75 ppb, but also appears to occur almost every day. The Counties attributed this occurrence to the settling in the early evening of the nocturnal boundary layer to an elevation below the elevation of the Look Rock monitor and the subsequent rush of air down the slope to the north-northeast from the top of the ridge (causing the wind direction to change to "from" the south southeast). This behavior is typical of a high elevation site.

The Counties drew two additional conclusions from the wind rose shown in Figure 18. First, examining the predominant wind directions measured at the Look Rock monitor (Figure 18) and comparing them to the predominant wind directions shown in Figure 2, which were measured at the Knoxville McGhee Tyson Airport, one finds that wind directions at Look Rock are markedly different. While the primary predominant wind direction measured at the Look Rock monitor was from the south-southeast with a secondary predominant direction being the northwest to north-northwest, as EPA pointed out in its analysis, the primary predominant wind direction for the Knoxville Airport is southwest to west-southwest with a secondary predominant direction of north to north-northeast.

The second conclusion drawn from the wind rose shown in Figure 18 is that there are no significant sources of emissions in any of the counties EPA intends to designate as nonattainment in the south-southeast direction from Look Rock and no major sources of emissions in the northwest direction from Look Rock, except the Bull Run Power Plant. As stated earlier (*see* Table 6), the Bull Run Power Plant has state-of-the-art NO_X controls (selective catalytic reduction) that are reducing emissions significantly. Consequently, there has been a dramatic decline in emissions and emission rate since 2008. The major urban centers and transportation corridors in the Knoxville CSA are located from north northwest to north northeast of the Look Rock monitor.

CONCLUSION

The urban areas and major transportation corridors in the Knoxville CSA are well surrounded by ozone monitors: Freels Bend in Anderson County to the west; Lost Creek Road in Jefferson County and Rutledge Pike in Knox County to the north; Clingmans Dome and Cove Mountain in Sevier County to the east; and Roberts Road in Loudon County and Cades Cove and

Look Rock in Blount County to the south. In addition there is a monitor in the midst of that urban and transportation area: Mildred Drive in Knox County. (*See* Figure 1.)

Based on the 2009-2011 design values (see Table 5) there is only one monitor out of nine in the Knoxville CSA that measured an exceedance of the 2008 ozone NAAQS. That monitor was the Look Rock monitor in Blount County. The Look Rock monitor is a high elevation, ridge top monitor located at an elevation of approximately 2700 feet above MSL.

The Cades Cove monitor is located just nine miles from the Look Rock monitor in the same county. The Cades Cove monitor is located at an elevation of approximately 1850 feet above MSL. Both monitors are located in remote locations in the Great Smoky Mountains National Park. Both monitors have very similar back trajectories on every day when the maximum 8-hour ozone concentration at Look Rock exceeded 75 ppb.

Although the two Blount County monitors are located in close proximity and share the same back trajectories, their characteristics are very different entirely as a result of the elevation at which each monitor is located.

In the late afternoon as the sun begins to set, ozone concentrations at the Cades Cove monitor begin to rapidly decline due to surface deposition and ozone destruction. This results in a rapid lowering of the 8-hour average ozone concentration. At the Look Rock monitor, on the other hand, during the evening hours as the nocturnal boundary layer settles below the elevation of the monitor, the air around the monitor is cut off from the titration reactions that destroy ozone. Consequently, 8-hour average ozone concentrations remain higher, sometime resulting in exceedances of the NAAQS.

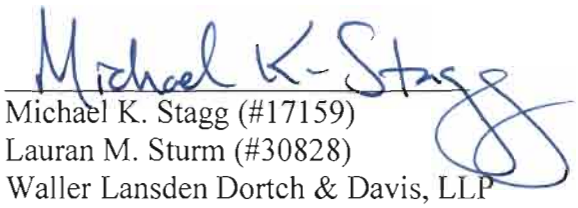
The diurnal ozone patterns at the Clingmans Dome and Cove Mountain monitors appear to be similar to Look Rock, while the diurnal patterns at the remainder of the monitors in the Knoxville CSA appear to be similar to Cades Cove.

The major urban areas and primary transportation corridors of the Knoxville CSA, as well as all but one of the major stationary sources of emissions are not located in either of the predominant wind directions from the Look Rock monitor, making it unlikely that they contribute significantly to ozone concentrations at Look Rock.

Eight of the nine monitors in the Knoxville CSA, located within and in a ring around the major urban areas and transportation corridors, did not measure an exceedance to the ozone NAAQS, and the one monitor that did measure an exceedance the 8-hour daily averages is clearly impacted by elevation; therefore, local emissions in the Knoxville CSA are not causing exceedances of the ozone NAAQS.

It is clear that the effect of elevation is the primary cause of the higher number of daily maximum 8-hour averages exceeding the NAAQS at the Look Rock monitor. It is not appropriate, as EPA concluded, to designate all of Anderson, Blount, Knox, Loudon, and Sevier Counties and a portion of Cocke County as nonattainment based only on a design value exceeding the NAAQS at one monitor that is so strongly influenced by elevation. Therefore, Anderson, Blount, and Knox Counties should have been designated attainment, or (2) alternatively, only the portion of Blount County within the boundaries of the Great Smoky Mountains National Park should have been designated nonattainment. Thus, EPA acted arbitrarily, capriciously, and in abuse of its discretion in designating all of Blount County and Knox County, as well as a portion of Anderson County, nonattainment.

Respectfully submitted and signed on this 20th day of July, 2012.



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