February 10, 2004

Mr. Donald S. Welsh
Regional Administrator
EPA Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Dear Mr. Welsh:

Pursuant to Section 107 (d) (1) (A) of the Clean Air Act and on behalf of the Governor of the Commonwealth of Virginia, I hereby submit the final recommendations and comments on the designations of areas in Virginia under the 8-hour Ozone National Ambient Air Quality Standard (NAAQS). Furthermore, this letter is in direct response to your December 3, 2003, letter to the Governor that identified the EPA proposed intentions regarding the designation of areas in Virginia under this standard.

I commend the ongoing efforts of the Environmental Protection Agency (EPA) in developing and implementing regional and national strategies to address ozone and ozone precursor emissions. We believe that the growing preponderance of evidence shows that these measures will go a long way towards bringing most areas in the Country into compliance with the ozone and other standards in a more efficient and less burdensome manner. I also applaud the EPA's development of innovative programs such as the Early Action Compact (EAC) process that provides areas with more flexibility in meeting air quality standards.

The final recommendations of the Commonwealth are transmitted with this letter. A summary of these recommendations is provided below for each nonattainment area. In addition, Enclosures I to VI contain additional information in support of these recommendations.

Northern Virginia Nonattainment Area

The Commonwealth's recommendation for this area, which is part of the greater Washington, D. C. Metropolitan Statistical Area (MSA), has been that the nonattainment area be the same as the previous 1-hour nonattainment area with the addition of Fauquier County. However, the addition of Fauquier

County was solely based on the fact that previous ozone air quality data showed that this area was not in compliance with the ozone standard. Current data indicates that this jurisdiction is now in compliance with the standard. Therefore, the Commonwealth recommends that Fauquier County be designated attainment for the ozone standard. An evaluation in support of this recommendation can be found in Enclosure IV.

Richmond Nonattainment Area

The Commonwealth's recommendation for this area is that the nonattainment area be the same as the previous 1-hour nonattainment area. The EPA has proposed that all of Charles City County, the City of Petersburg and Prince George County be added to the nonattainment area. The Commonwealth does not agree with this proposal based on a further analysis of ozone related criteria. Therefore, the Commonwealth recommends that these additional jurisdictions be designated attainment for the ozone standard. Additional evaluations in support of this recommendation can be found in Enclosures IV and V.

Hampton Roads Nonattainment Area

The Commonwealth's recommendation for this area is that the nonattainment area be the same as the previous 1-hour nonattainment area. The EPA has proposed that Gloucester and Isle of Wight Counties be added to the nonattainment area. The Commonwealth does not agree with this proposal based on a further analysis of ozone related criteria. Therefore, the Commonwealth recommends that these additional jurisdictions be designated attainment for the ozone standard. Additional evaluations in support of this recommendation can be found in Enclosures IV and V.

Fredericksburg Nonattainment Area

The Commonwealth's recommendation for this area is that a separate nonattainment area be established for the Fredericksburg area in order to best meet the individual planning needs of the area. As a condition for the approval of this request, EPA is requiring that this area be classified at the same level of nonattainment as the Washington, D.C. area. A Memorandum of Understanding between the EPA and the Commonwealth is currently being processed for approval to meet this requirement.

Caroline County

The Commonwealth is recommending that Caroline County be designated as a separate nonattainment area. This recommendation is being made on behalf and at the request of Caroline County even though the ozone monitor in this County is currently in compliance with the ozone standard. With this in mind, it is recommended that this nonattainment area be classified at the lowest possible level allowed under the pending implementation guidance. Caroline County desires to participate in the air quality planning process with the Fredericksburg nonattainment area.

Roanoke Nonattainment Area
The Commonwealth's recommendation for this area is that the nonattainment area be established based on the 1999 boundary of the Metropolitan Statistical Area (MSA). In addition, the Commonwealth and the EPA have entered into an Early Action Compact for this marginal nonattainment area. As such, the EPA should continue to honor its commitment to defer the effective date of the nonattainment designation for this area as long as it continues to meet its obligations under the Compact.

Frederick County/Winchester Nonattainment Area
The Commonwealth's recommendation for this area is that the nonattainment area should consist of Frederick County and the City of Winchester. In addition, the Commonwealth and the EPA have entered into an Early Action Compact for this marginal nonattainment area. As such, the EPA should continue to honor its commitment to defer the effective date of the nonattainment designation for this area as long as it continues to meet its obligations under the Compact.

Shenandoah National Park Nonattainment Area
The Commonwealth's recommendation for this area has been that the nonattainment area should consist of the portion of the Shenandoah National Park within Madison and Page Counties. This designation is appropriate due to the overwhelming transport situation that exists at this high elevation monitor.

In summary, the Commonwealth of Virginia requests that the EPA adopt the final recommendations concerning the designation of areas in Virginia under the 8-hour ozone standard. In addition, the Commonwealth specifically requests that the EPA reconsider its intention to expand the Hampton Roads and Richmond nonattainment areas.

Thank you again for this opportunity to provide input on this important issue for Virginia. Please contact me if you have any questions concerning these recommendations.

Sincerely,

Robert G. Burnley

Enclosures

cc: W. Tayloe Murphy, Jr.
Judith Katz
John M. Daniel, Jr.
RGB:dlm

ENCLOSURE I
OZONE DESIGN VALUES FOR VIRGINIA MONITORS
(2001 TO 2003)

2001-2003 Fourth Highest Daily Maximum Ozone 8-hour Averages Units, Parts Per Billion (ppb)					
Monitoring Sites	**AIRS ID**	**2001**	**2002**	**2003**	**3-year Avg.**
Wythe Co.	511970002	76	85	81	80
Roanoke Co.	511611004	89	91	77	**85**
Rockbridge Co.	511630003	82	78	75	78
Page Co.	511390004	86	79	83	82
Frederick Co.	510690010	86	91	79	**85**
Fauquier Co.	510610002	82	84	76	80
Caroline Co.	510330001	86	85	81	84
Richmond Area:					
Chesterfield Co.	510410004	86	93	79	**86**
Henrico Co.	510870014	91	98	83	**90**
Hanover Co.	510850003	91	106	86	**94**
Charles City Co.	510360002	89	105	79	**91**
Tidewater Area:					
Hampton	516500004	85	102	83	**90**
Suffolk - TCC	518000004	85	98	83	**88**
Suffolk - Holland	518000005	75	92	79	82
Northern Virginia Area:					
Loudoun Co.	511071005	93	102	83	**92**
Stafford Co.	511790001	86	94	85	**88**
Prince William Co.	511530009	89	87	86	**87**
Arlington Co.	510130020	98	112	87	**99**
Alexandria	515100009	91	103	83	**92**
Fairfax Co. – Lee Park	510590030	96	108	89	**97**
Fairfax Co. - McLean	510595001	90	99	75	**88**
Fairfax Co. – Mt. Vernon	510590018	95	106	91	**97**
Fairfax Co. - Chantilly	510590005	93	92	83	**89**
Fairfax Co. - Annandale	510591005	NA	108	83	NA
Madison Co. – Shenandoah National Park	511130003	90	86	86	**87**

Sites in RED exceeded the 8-hour ozone standard for 2001-2003

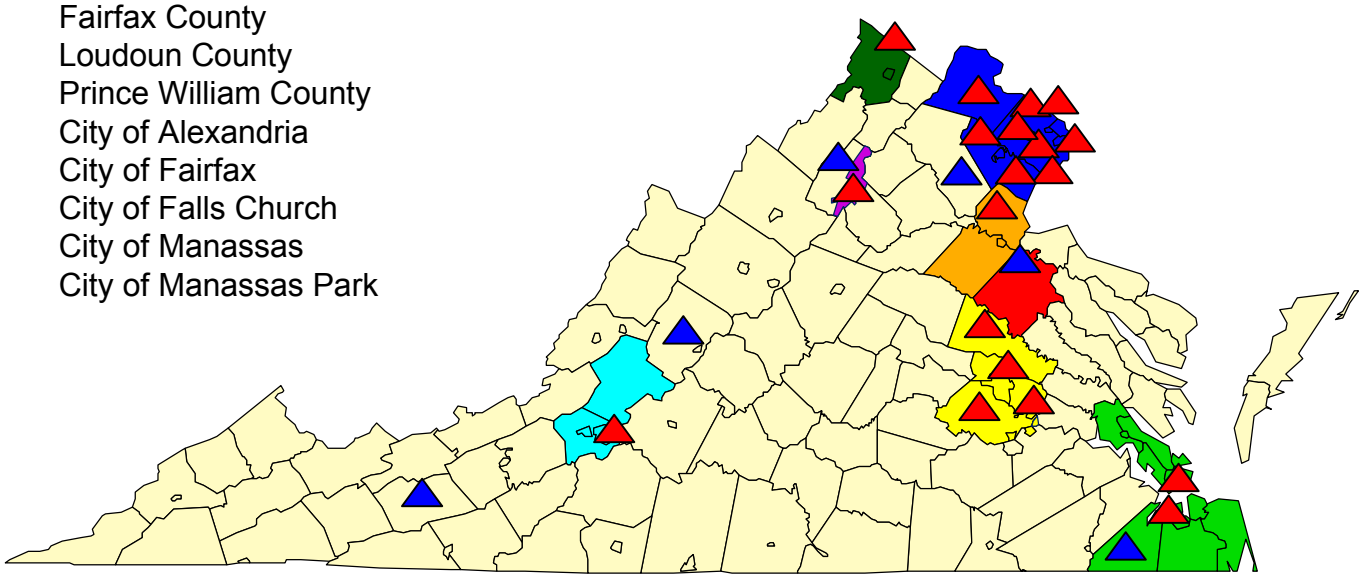
Enclosure II
The Commonwealth of Virginia

Frederick County Nonattainment Area
Frederick County
City of Winchester

Fredericksburg Nonattainment Area
Spotsylvania County
Stafford County
City of Fredericksburg

Northern VA/MD Nonattainment Area
Arlington County
Fairfax County
Loudoun County
Prince William County
City of Alexandria
City of Fairfax
City of Falls Church
City of Manassas
City of Manassas Park

Caroline County Nonattainment Area
Caroline County



Shenandoah National Park Nonattainment Area
Shenandoah National Park
(the portions in Page and Madison Counties)

Roanoke Nonattainment Area
Botetourt County
Roanoke County
City of Roanoke
City of Salem
Town of Vinton

Hampton Roads Nonattainment Area
James City County
York County
City of Chesapeake
City of Hampton
City of Newport News
City of Norfolk
City of Poquoson
City of Portsmounth
City of Suffolk
City of Virginia Beach
City of Williamsburg

Richmond Nonattainment Area
Charles City County (partial)
Chesterfield County
Hanover County
Henrico County
City of Colonial Heights
City of Hopewell
City of Richmond

Nonattainment Monitor

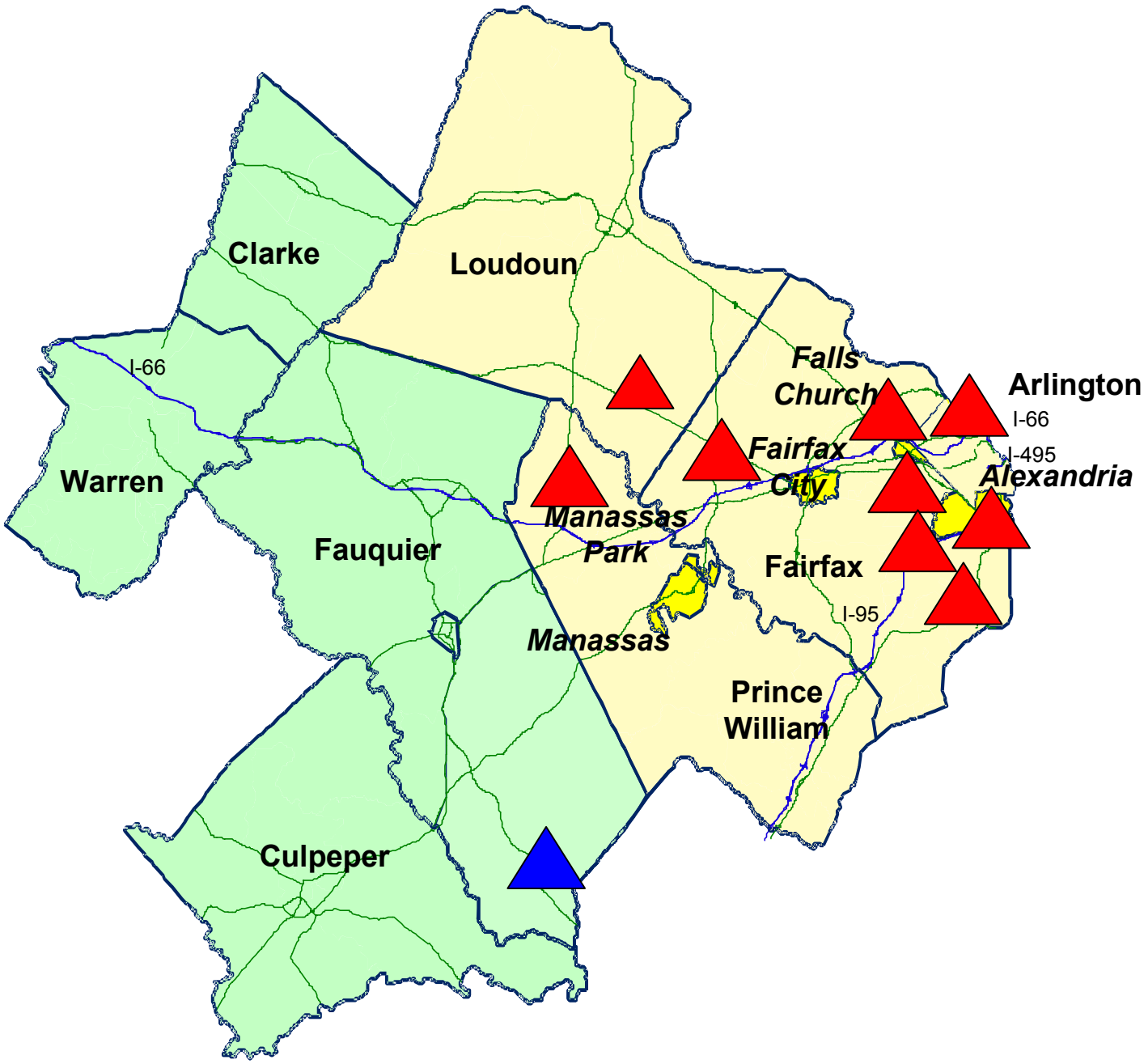
Attainment Monitor

N

8-hour Ozone Nonattainment Area Boundary

Northern Virginia/Maryland

Source: VDOT County Map Series



Jurisdictions within the Nonattainment Area

Jurisdictions within the MSA but outside of the Nonattainment Area

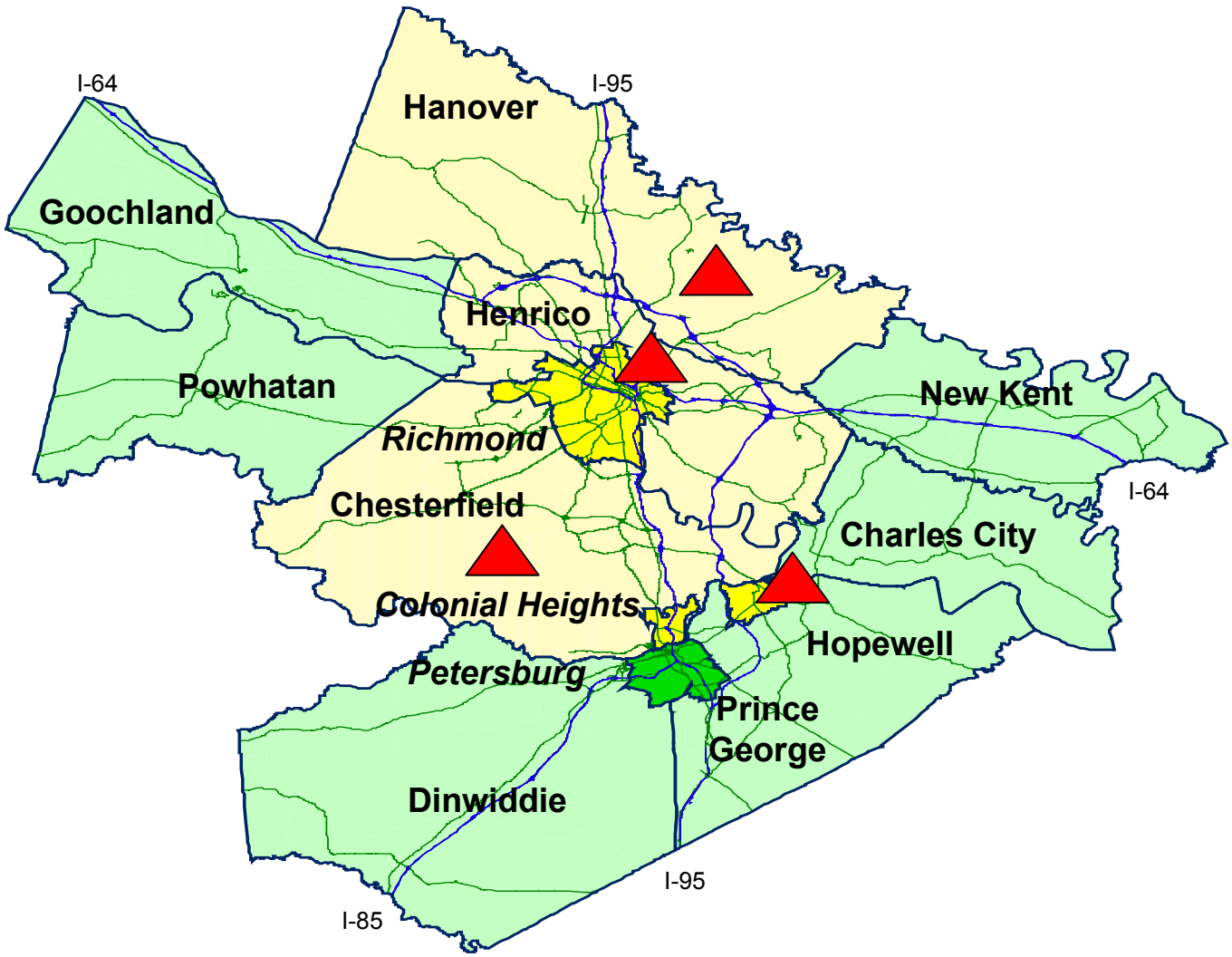
Nonattainment Monitor

Attainment Monitor

8-hour Ozone Nonattainment Area Boundary

Richmond, Virginia MSA

Source: VDOT County Map Series



Jurisdictions within the Nonattainment Area

Jurisdictions within the MSA but outside of the Nonattainment Area

Nonattainment Monitor

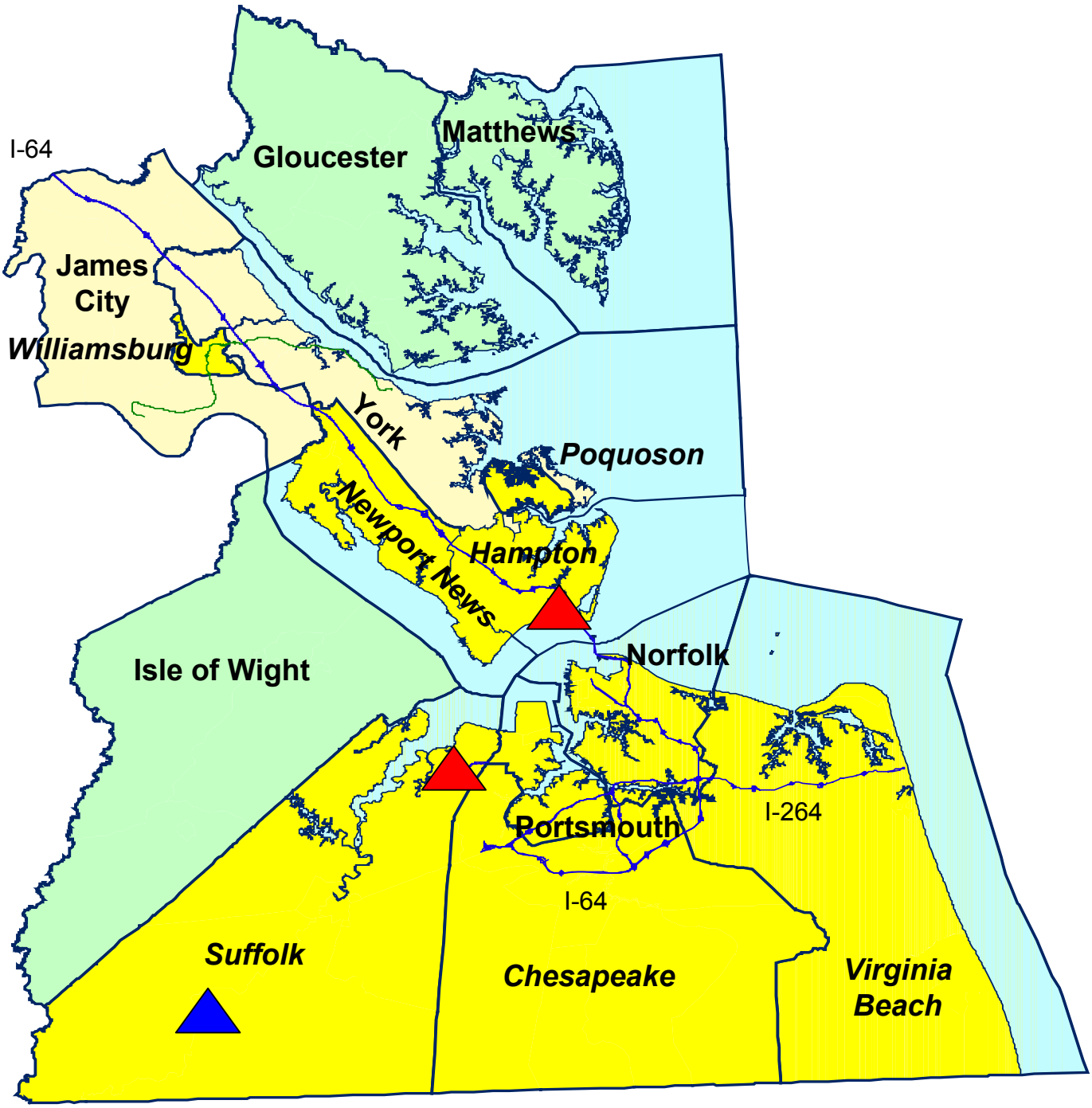
Attainment Monitor

N

8-hour Ozone Nonattainment Area Boundary

Hampton Roads, Virginia MSA

Source: VDOT County Map Series



Jurisdictions within the Nonattainment Area

Jurisdictions within the MSA but outside of the Nonattainment Area

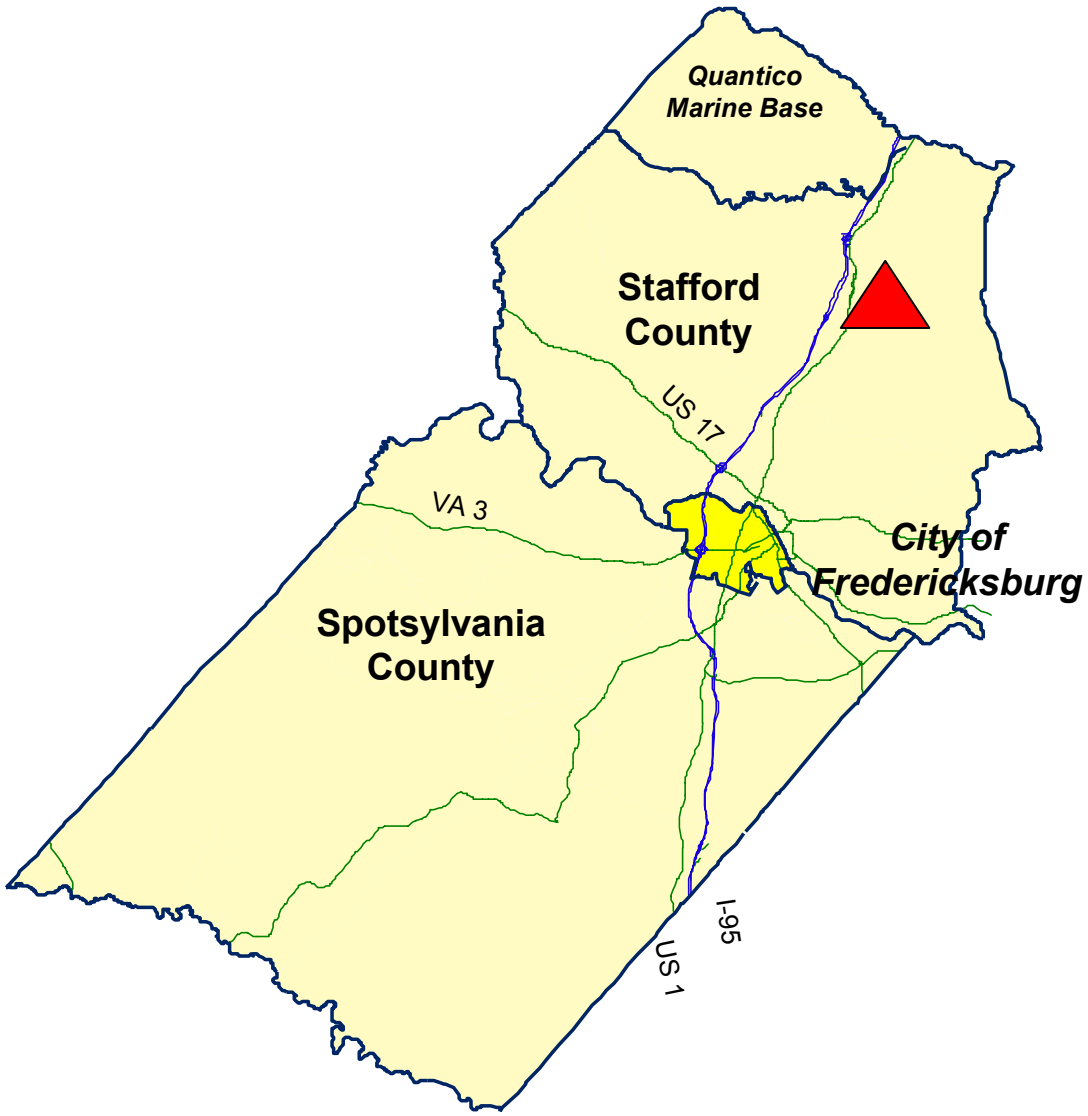
Nonattainment Monitor

Attainment Monitor

8-hour Ozone Nonattainment Area Boundary

Fredericksburg, Virginia

Source: VDOT County Map Series



Jurisdictions within the Nonattainment Area

Jurisdictions within the MSA but outside of the Nonattainment Area

Nonattainment Monitor

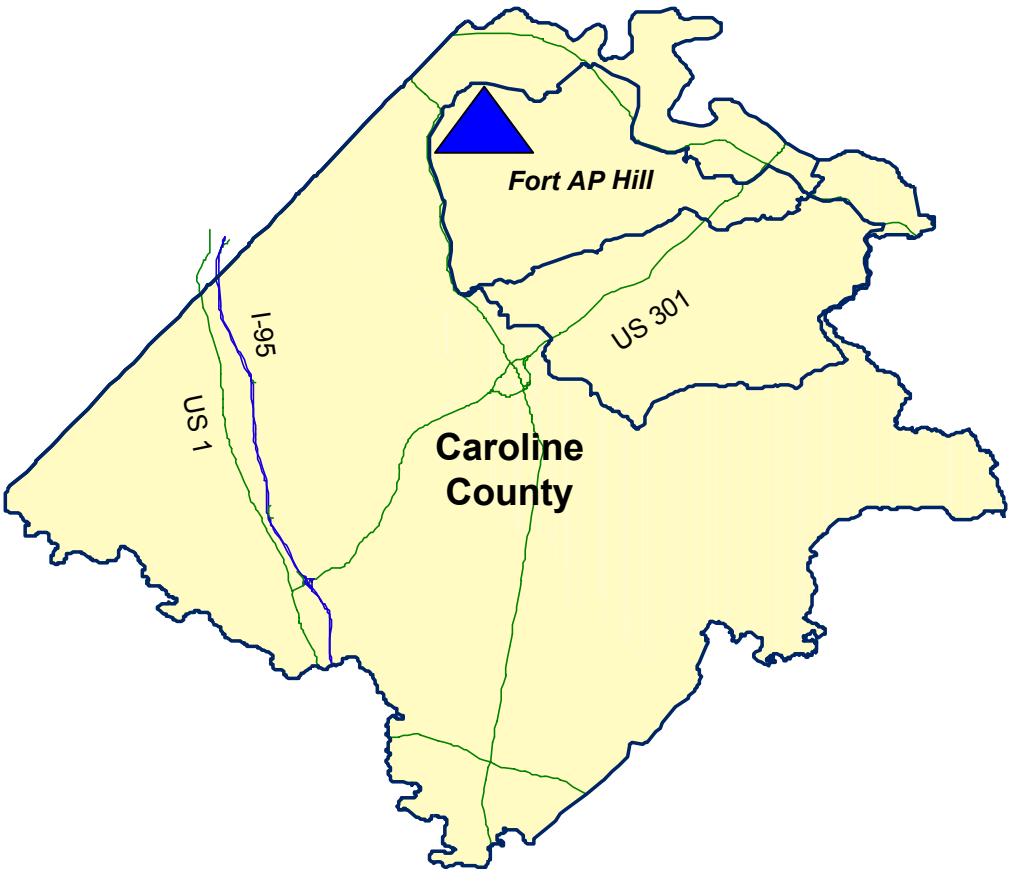
Attainment Monitor

N

8-hour Ozone Nonattainment Area Boundary

Caroline County, Virginia

Source: VDOT County Map Series



Jurisdictions within the Nonattainment Area

Jurisdictions within the MSA but outside of the Nonattainment Area

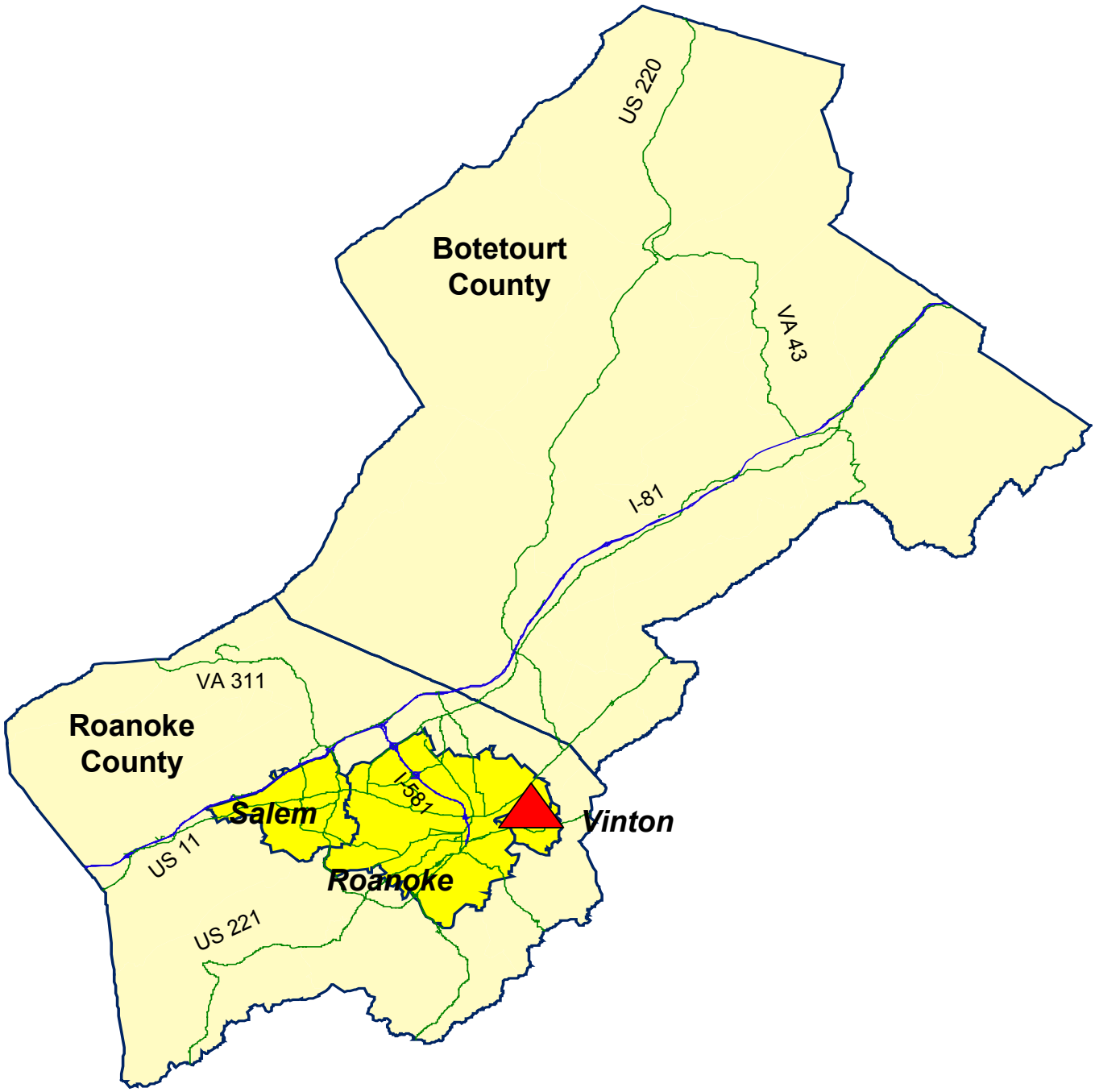
Nonattainment Monitor

Attainment Monitor

8-hour Ozone Nonattainment Area Boundary

Roanoke, Virginia MSA

Source: VDOT County Map Series



Jurisdictions within the Nonattainment Area

Jurisdictions within the MSA but outside of the Nonattainment Area

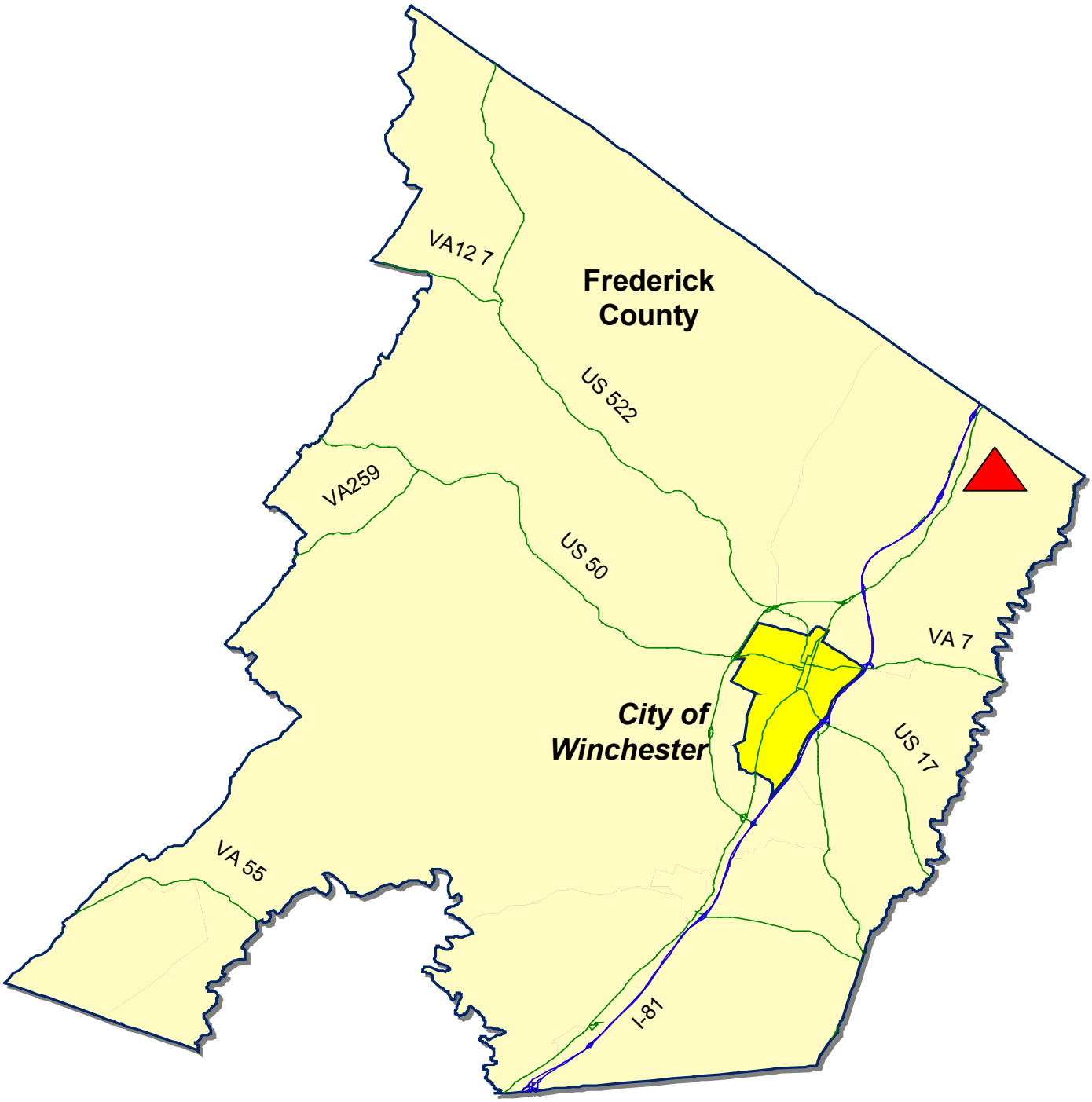
Nonattainment Monitor

Attainment Monitor

8-hour Ozone Nonattainment Area Boundary

Frederick County, Virginia

Source: VDOT County Map Series



Jurisdictions within the Nonattainment Area

Jurisdictions within the MSA but outside of the Nonattainment Area

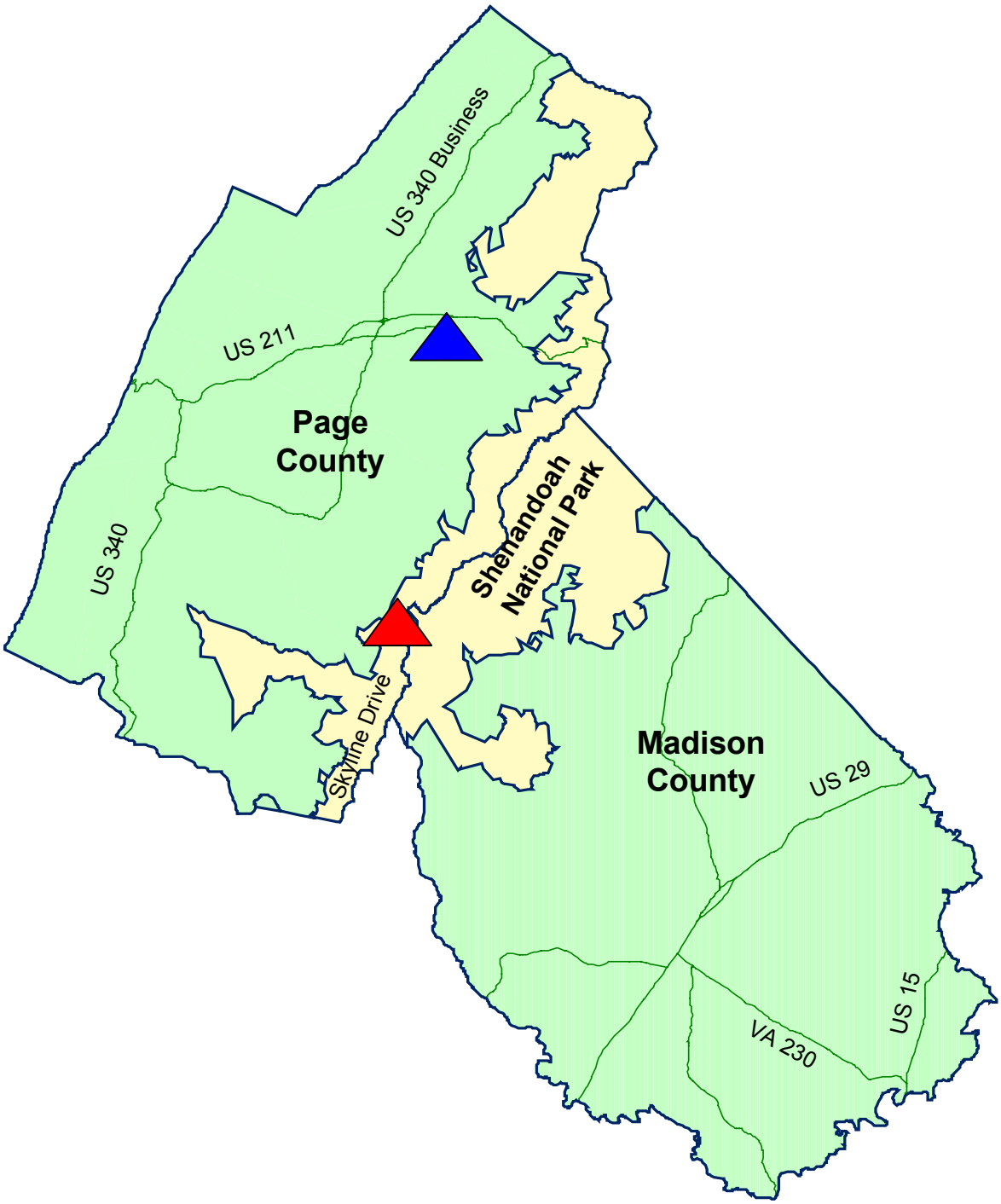
Nonattainment Monitor

Attainment Monitor

8-hour Ozone Nonattainment Area Boundary

Shenandoah National Park

Source: VDOT County Map Series



Jurisdictions within the Nonattainment Area

Jurisdictions within the MSA but outside of the Nonattainment Area

Nonattainment Monitor

Attainment Monitor

N

8-hour Ozone Nonattainment Area Boundary

Enclosure III

48. In §81.347, the table entitled "Virginia-Ozone" is revised to read as follows:

§ 81.347 Virginia

* * * * *

Virginia-Ozone (8-Hour Standard)

Designated Area	Designation	Classification
	Type	Type
Norfolk-Virginia-Beach Newport News (Hampton Roads) Area		
Chesapeake…….	Nonattainment	
Hampton…….	Nonattainment	
James City County……..	Nonattainment	
Newport News……	Nonattainment	
Norfolk……	Nonattainment	
Poquoson……	Nonattainment	
Portsmouth…….	Nonattainment	
Suffolk……	Nonattainment	
Virginia Beach……	Nonattainment	
Williamsburg……..	Nonattainment	
York County……..	Nonattainment	
Richmond Area		
Charles City County (part)…… Beginning at the intersection of State Route 156 and the Henrico/ Charles City County Line, proceeding south along State Route 5/156 to the intersection with State Route 106/156, proceeding south along Route 106/ 156 to the intersection with the Prince George/Charles City County line, proceeding west along the Prince George/Charles City County line to the intersection with the Chesterfield/Charles City County line, proceeding north along the Chesterfield/Charles City	Nonattainment	

County line to the intersection with the Henrico/Charles City County line, proceeding north along the Henrico/Charles City County line to State Route 156.		
Chesterfield County……	Nonattainment	
Colonial Heights…….	Nonattainment	
Hanover County…….	Nonattainment	
Henrico County……..	Nonattainment	
Hopewell…….	Nonattainment	
Richmond……	Nonattainment	
Washington Area		
Alexandria……..	Nonattainment	
Arlington County……	Nonattainment	
Fairfax…….	Nonattainment	
Fairfax County……	Nonattainment	
Falls Church……	Nonattainment	
Loudoun County…….	Nonattainment	
Manassas…….	Nonattainment	
Manassas Park……	Nonattainment	
Prince William County……...	Nonattainment	
.	Nonattainment	
Fredericksburg Area		
Fredericksburg……	Nonattainment	
Spotsylvania County……..	Nonattainment	
Stafford County……..	Nonattainment	
Caroline Area		
Caroline County……..	Nonattainment	
Roanoke Area		
Botetourt County……	Nonattainment	
Roanoke……..	Nonattainment	
Roanoke County…….	Nonattainment	
Salem……..	Nonattainment	
Frederick County……	Nonattainment	
Winchester……..	Nonattainment	
Madison County (part)……	Nonattainment	
Beginning at the intersection of Page County/Rappahannock County/Madison County, proceeding southeastward along the Madison County/		

Rappahannock County line to the intersection of the eastern boundary of Shenandoah National Park, proceeding southward along the eastern boundary of Shenandoah National Park to the intersection of the Madison County/Page County line, proceeding northward along the Madison County/Page County line until the intersection at Page County/Rappahannock County/Madison County.		
Page County (part)…….. Beginning at the intersection where the Page County/ Rockingham County line intersects with the western boundary of Shenandoah National Park, proceeding northward along the western boundary of Shenandoah National Park to the Page County/ Warren County line, proceeding southeastward along the Page County/Warren County line to the intersection with the Rappahannock County line, proceeding southward along the Page County/Rappahannock County line to the intersection with the Madison County line, proceeding southward along the Madison County/Page County line to the intersection of the Greene County line, proceeding westward along the Greene County/Page County line until the intersection of the Rockingham County line, proceeding westward along the Rockingham County/Page County line until the intersection with the western boundary of Shenandoah National Park.	Nonattainment	
Accomack County	Attainment/Unclassifiable	
Albemarle County	Attainment/Unclassifiable	
Alleghany County	Attainment/Unclassifiable	

Amelia County	Attainment/Unclassifiable	
Amherst County	Attainment/Unclassifiable	
Appomattox County	Attainment/Unclassifiable	
Augusta County	Attainment/Unclassifiable	
Bath County	Attainment/Unclassifiable	
Bedford	Attainment/Unclassifiable	
Bedford County	Attainment/Unclassifiable	
Bland County	Attainment/Unclassifiable	
Bristol	Attainment/Unclassifiable	
Brunswick County	Attainment/Unclassifiable	
Buchanan County	Attainment/Unclassifiable	
Buckingham County	Attainment/Unclassifiable	
Buena Vista	Attainment/Unclassifiable	
Campbell County	Attainment/Unclassifiable	
Carroll County	Attainment/Unclassifiable	
Charles City County (part)	Attainment/Unclassifiable	
Remainder of county		
Charlotte County	Attainment/Unclassifiable	
Charlottesville	Attainment/Unclassifiable	
Clarke County	Attainment/Unclassifiable	
Clifton Forge	Attainment/Unclassifiable	
Covington	Attainment/Unclassifiable	
Craig County	Attainment/Unclassifiable	
Culpeper County	Attainment/Unclassifiable	
Cumberland County	Attainment/Unclassifiable	
Danville	Attainment/Unclassifiable	
Dickenson County	Attainment/Unclassifiable	
Dinwiddie County	Attainment/Unclassifiable	
Emporia	Attainment/Unclassifiable	
Essex County	Attainment/Unclassifiable	
Fauquier County	Attainment/Unclassifiable	
Floyd County	Attainment/Unclassifiable	
Fluvanna County	Attainment/Unclassifiable	
Franklin	Attainment/Unclassifiable	
Franklin County	Attainment/Unclassifiable	
Galax	Attainment/Unclassifiable	
Giles County	Attainment/Unclassifiable	
Gloucester County	Attainment/Unclassifiable	
Goochland County	Attainment/Unclassifiable	
Grayson County	Attainment/Unclassifiable	
Greene County	Attainment/Unclassifiable	
Greensville County	Attainment/Unclassifiable	
Halifax County	Attainment/Unclassifiable	
Harrisonburg	Attainment/Unclassifiable	
Henry County	Attainment/Unclassifiable	
Highland County	Attainment/Unclassifiable	
Isle Of Wight County	Attainment/Unclassifiable	

King And Queen County	Attainment/Unclassifiable	
King George County	Attainment/Unclassifiable	
King William County	Attainment/Unclassifiable	
Lancaster County	Attainment/Unclassifiable	
Lee County	Attainment/Unclassifiable	
Lexington	Attainment/Unclassifiable	
Louisa County	Attainment/Unclassifiable	
Lunenberg County	Attainment/Unclassifiable	
Lynchburg	Attainment/Unclassifiable	
Madison County (part)	Attainment/Unclassifiable	
Remainder of county		
Martinsville	Attainment/Unclassifiable	
Mathews County	Attainment/Unclassifiable	
Mecklenburg County	Attainment/Unclassifiable	
Middlesex County	Attainment/Unclassifiable	
Montgomery County	Attainment/Unclassifiable	
Nelson County	Attainment/Unclassifiable	
New Kent County	Attainment/Unclassifiable	
Northampton County	Attainment/Unclassifiable	
Northumberland County	Attainment/Unclassifiable	
Norton	Attainment/Unclassifiable	
Nottoway County	Attainment/Unclassifiable	
Orange County	Attainment/Unclassifiable	
Page County (part)	Attainment/Unclassifiable	
Remainder of county		
Patrick County	Attainment/Unclassifiable	
Petersburg	Attainment/Unclassifiable	
Pittsylvania County	Attainment/Unclassifiable	
Powhatan County	Attainment/Unclassifiable	
Prince Edward County	Attainment/Unclassifiable	
Prince George County	Attainment/Unclassifiable	
Pulaski County	Attainment/Unclassifiable	
Radford	Attainment/Unclassifiable	
Rappahannock County	Attainment/Unclassifiable	
Richmond County	Attainment/Unclassifiable	
Rockbridge County	Attainment/Unclassifiable	
Rockingham County	Attainment/Unclassifiable	
Russell County	Attainment/Unclassifiable	
Scott County	Attainment/Unclassifiable	
Shenandoah County	Attainment/Unclassifiable	
Smyth County	Attainment/Unclassifiable	
South Boston	Attainment/Unclassifiable	
Southampton County	Attainment/Unclassifiable	
Staunton	Attainment/Unclassifiable	
Surry County	Attainment/Unclassifiable	
Sussex County	Attainment/Unclassifiable	
Tazewell County	Attainment/Unclassifiable	

Warren County	Attainment/Unclassifiable	
Washington County	Attainment/Unclassifiable	
Waynesboro	Attainment/Unclassifiable	
Westmoreland County	Attainment/Unclassifiable	
Wise County	Attainment/Unclassifiable	
Wythe County	Attainment/Unclassifiable	

ENCLOSURE IV

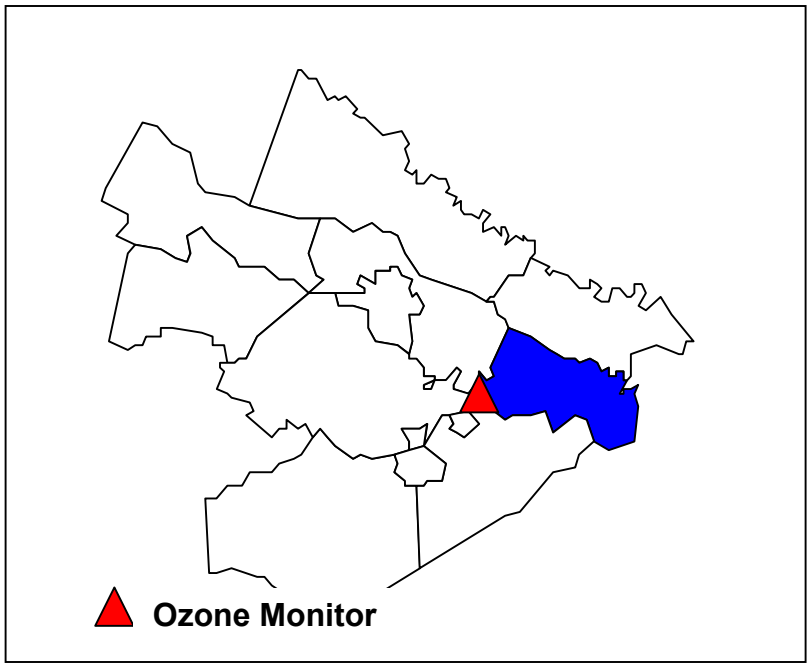
RESPONSE TO EPA PROPOSAL FOR THE DESIGNATION OF NONATTAINMENT AREAS UNDER THE 8-HOUR OZONE STANDARD IN THE COMMONWEALTH OF VIRGINIA

AND

OZONE CRITERIA EVALUATION AND FINAL RECOMMENDATIONS FOR SELECTED VIRGINIA JURISDICTIONS

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

CHARLES CITY COUNTY

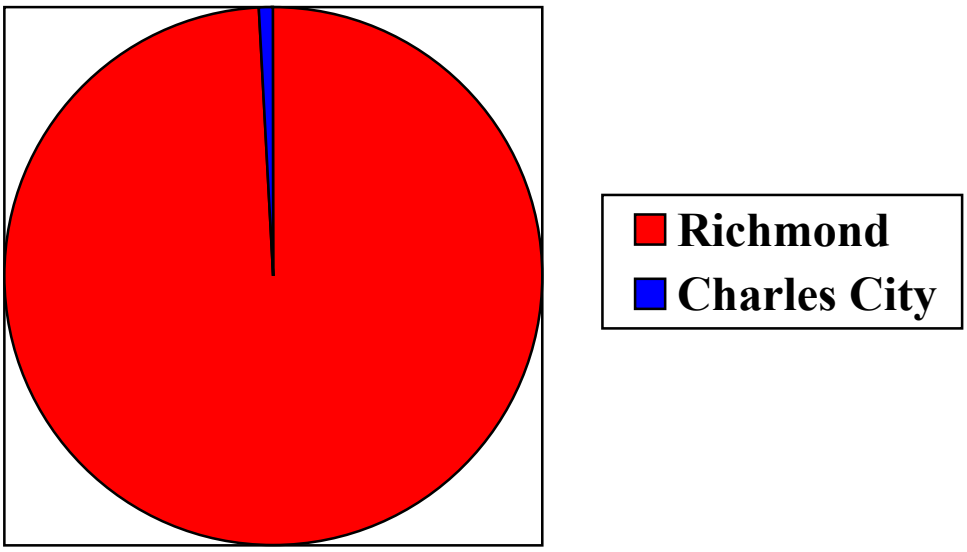


Analysis of Ozone Related Criteria	
Emissions (1999)	1.3 tpd VOC and 1.4 tpd NO_X (0.6% of ozone precursor emissions in the Richmond MSA)
Emissions Density	0.015 tpd per square mile
Population (2000)	6,926 - 38 per square mile (0.7% of the total Richmond MSA population)
Population Growth	Population expected to grow to 7,900 (14%) by 2010 which represents only 1% of the total population growth expected in the Richmond MSA
Air Quality	**Out of Compliance** - Design Value (2001 to 2003): **91 ppb**
Commuting Patterns	53% of the County workforce commutes into the Richmond area
Daily VMT (1999)	269,079 Daily Vehicle Miles of Travel (1% of daily VMT in the Richmond MSA)
Major Sources	Currently there are no major stationary sources of ozone precursor emissions. One peaking power facilities have been permitted in the County but will be subject to the State NO_X reduction (SIP Call) regulation.
Meteorology	Prevailing ground level winds from the Southwest during the summer. See Enclosure V for further meteorological analysis.
Geography	County is located to the East of the proposed nonattainment area
Boundaries	County is part of the Richmond MSA
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.

Figure 1 – Ranking of Selected Ozone Criteria for the Virginia Jurisdictions in the Richmond

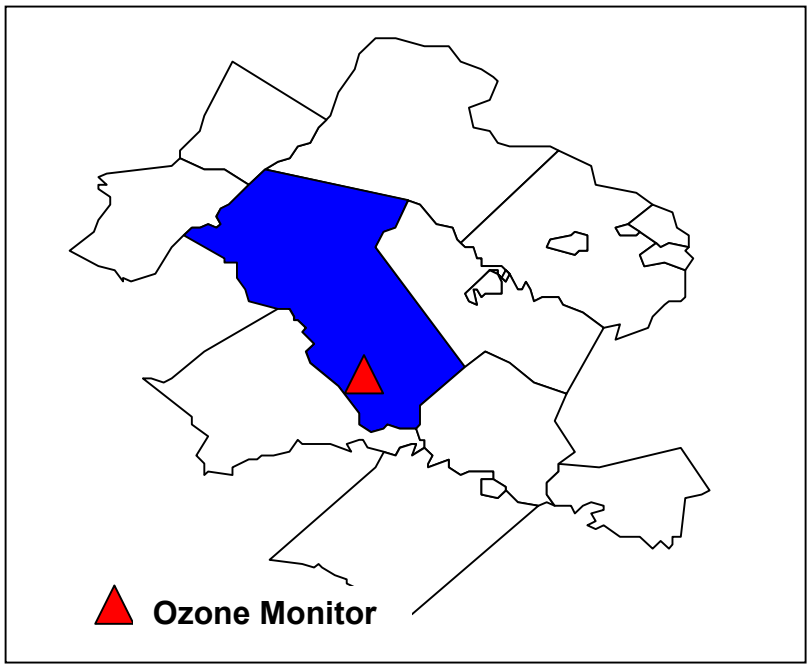
CITY/COUNTY	Percent Emissions for Area	Percent Population for Area	Percent Growth for Area	Comb. Average Percent	Emission Density (per sq. mile)	Population Density (per sq. mile)	Monitor?
CHESTERFIELD COUNTY	30.7	26.1	57.7	38.2	0.314	610	Y
HENRICO COUNTY	14.7	26.3	14.9	18.6	0.268	1,102	Y
HANOVER COUNTY	8.3	8.7	19.9	12.3	0.076	183	Y
RICHMOND CITY	17.6	19.8	-11.9	8.5	1.270	3,293	
HOPEWELL CITY	14.2	2.2	-0.5	5.3	6.037	2,175	
POWHATAN COUNTY	1.1	2.2	8.7	4.0	0.019	86	
GOOCHLAND COUNTY	2.3	1.7	5.2	3.0	0.034	59	
PRINCE GEORGE COUNTY	3.1	3.3	1.4	2.6	0.051	125	
DINWIDDIE COUNTY	2.4	2.5	2.3	2.4	0.021	49	
NEW KENT COUNTY	1.6	1.4	3.1	2.0	0.033	64	
PETERSBURG CITY	2.4	3.4	-2.3	1.2	0.448	1,475	
COLONIAL HEIGHTS CITY	1.1	1.7	0.5	1.1	0.622	2,259	
CHARLES CITY COUNTY	0.6	0.7	1.0	0.8	0.015	38	Y
TOTAL	100	100	100		0.148	338	

Figure 2 – Contribution of Charles City County to Selected Ozone Criteria for the Richmond MSA



Final State Recommendation: The existing 1-hour maintenance boundary within Charles City County as defined by 60 FR 54310 should be continued as the 8-hour ozone noattainment boundary within the County. The remainder of the County should be classified as an attainment/unclassifiable area.

FAUQUIER COUNTY

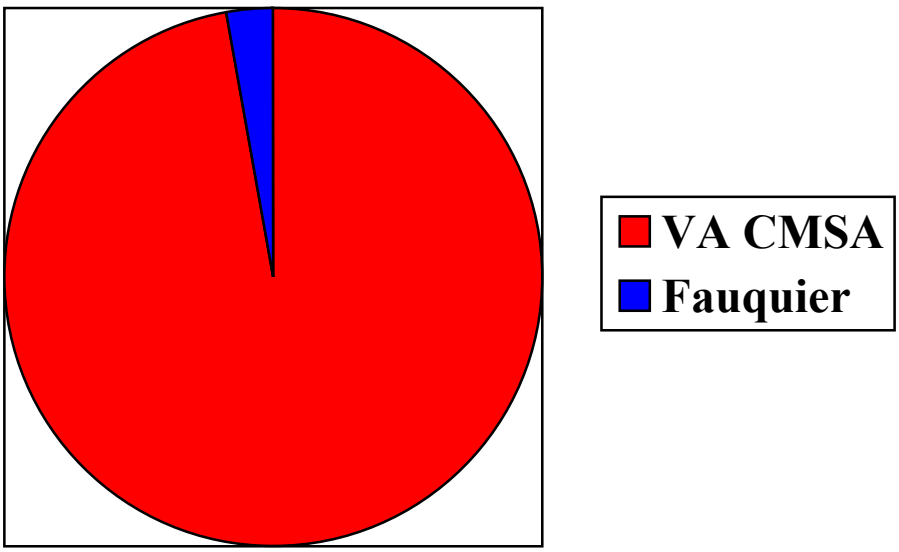


Analysis of Ozone Related Criteria	
Emissions (1999)	9.4 tpd VOC and 9.8 tpd NO_X (4.2% of ozone precursor emissions in the VA portion of the CMSA)
Emissions Density	0.029 tpd per square mile
Population (2000)	55,139 - 85 per square mile (2.5% of the total CMSA population in VA)
Population Growth	Population expected to grow to 58,796 (7%) by 2010 which represents only 1.4% of the total population growth expected in the VA portion of the CMSA
Air Quality	**In Compliance** - Design Value (2001 to 2003): **80 ppb**
Commuting Patterns	51% of the County workforce commutes into the proposed nonattainment area
Daily VMT (1999)	2,560,738 Daily Vehicle Miles of Travel (4.8% of daily VMT in the VA portion of the CMSA). Significant through traffic on Interstate 66 and Route 17.
Major Sources	Currently there are no major stationary sources of ozone precursor emissions. Two peaking power facilities have been permitted in the County but both will be subject to the State NO_X reduction (SIP Call) regulation.
Meteorology	Prevailing ground level winds from the Southwest during the summer
Geography	County is located to the West and Southwest of the proposed nonattainment area
Boundaries	County is part of the Baltimore/Washington CMSA
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.

Figure 1 – Ranking of Selected Ozone Criteria for the Virginia Jurisdictions in the Baltimore/Washington CMSA

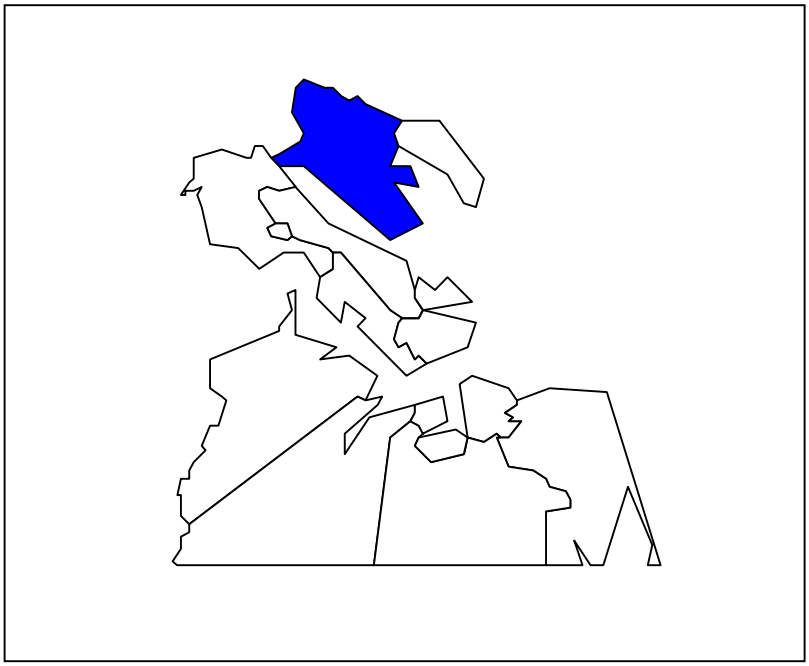
CITY/COUNTY	Percent Emissions for Area	Percent Population for Area	Percent Growth for Area	Comb. Average Percent	Emission Density (per sq. mile)
FAIRFAX COUNTY	37.0	46.2	39.6	40.9	0.421
PRINCE WILLIAM COUNTY	16.6	15.0	18.2	16.6	0.218
LOUDOUN COUNTY	8.6	7.8	11.9	9.5	0.076
STAFFORD COUNTY	4.4	4.3	12.4	7.0	0.075
SPOTSYLVANIA COUNTY	5.4	4.2	8.1	5.9	0.061
ARLINGTON COUNTY	6.4	8.7	1.4	5.5	1.138
ALEXANDRIA CITY	9.1	5.9	-1.7	4.5	2.755
FAUQUIER COUNTY	4.2	2.5	1.4	2.7	0.029
WARREN COUNTY	1.9	1.5	2.5	1.9	0.040
CULPEPER COUNTY	2.1	1.6	1.3	1.7	0.026
FREDERICKSBURG CITY	1.5	0.9	2.1	1.5	0.673
KING GEORGE COUNTY	1.6	0.8	2.0	1.5	0.040
CLARKE COUNTY	1.1	0.6	0.8	0.9	0.029
TOTAL	100	100	100		0.128

Figure 2 – Contribution of Fauquier County to Selected Ozone Criteria for the Virginia Portion of the Baltimore/Washington CMSA



Final State Recommendation: Fauquier County should be classified as an attainment/unclassifiable area for the 8-hour ozone standard.

GLOUCESTER COUNTY

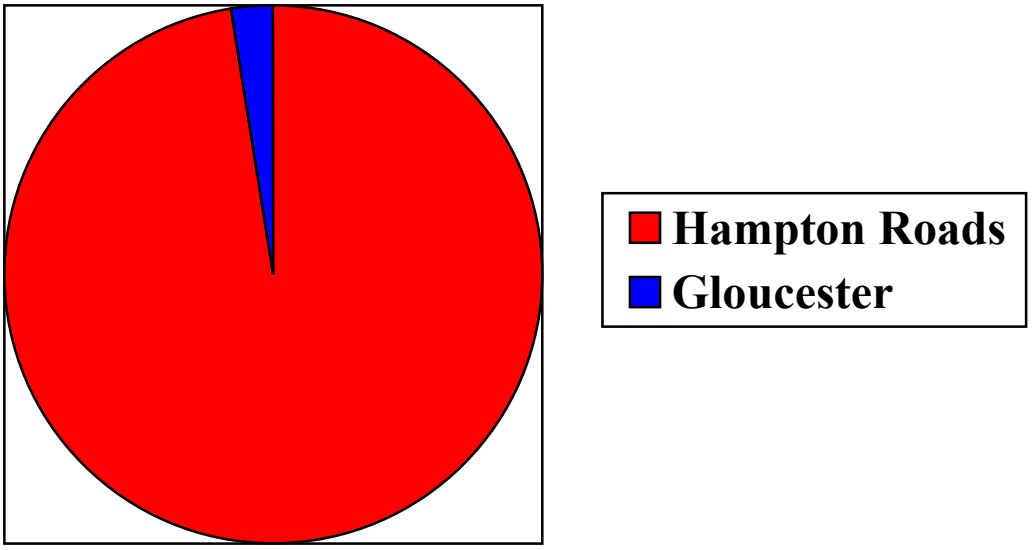


Analysis of Ozone Related Criteria	
Emissions (1999)	4.1 tpd VOC and 3.9 tpd NO_X (1.7% of ozone precursor emissions in the Hampton Roads MSA)
Emissions Density	0.037 tpd per square mile
Population (2000)	34,780 - 161 per square mile (2.2% of the total Hampton Roads MSA population)
Population Growth	Population expected to grow to 41,495 (19%) by 2010 which represents only 3.9% of the total population growth expected in the Hampton Roads MSA
Air Quality	No ozone monitor in the County
Commuting Patterns	48% of the County workforce commutes into the proposed nonattainment area
Daily VMT (1999)	901,484 Daily Vehicle Miles of Travel (2.7% of daily VMT in the Hampton Roads MSA). Significant through traffic on Route 17. There is only one road that enters into the nonattainment area from this County.
Major Sources	Currently there are no major stationary sources of ozone precursor emissions.
Meteorology	Prevailing ground level winds from the Northeast during the summer. See Enclosure V for further meteorological analysis.
Geography	County is located to the North and Northeast of the proposed nonattainment area
Boundaries	County is part of the Hampton Roads MSA
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.

Figure 1 – Ranking of Selected Ozone Criteria for the Jurisdictions in the Hampton Roads MSA

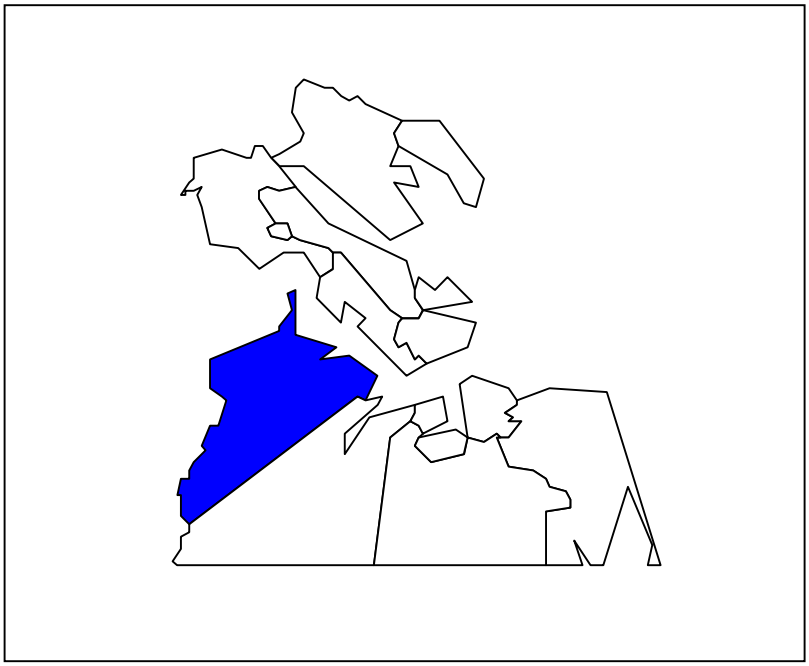
CITY/COUNTY	Percent Emissions for Area	Percent Population for Area	Percent Growth for Area	Comb. Average Percent	Emission Density (per sq. mile)	Population Density (per sq. mile)	Monitor?
VIRGINIA BEACH CITY	14.8	27.4	43.7	28.7	0.287	1,713	
CHESAPEAKE CITY	20.3	12.8	32.7	21.9	0.286	585	
YORK COUNTY	12.9	3.6	12.7	9.7	0.587	533	
NEWPORT NEWS CITY	9.7	11.6	5.8	9.0	0.686	2,638	
NORFOLK CITY	12.2	15.1	-11.3	5.3	1.089	4,363	
SUFFOLK CITY	4.3	4.1	6.6	5.0	0.051	159	Y
HAMPTON CITY	7.4	9.4	-2.0	4.9	0.689	2,828	Y
JAMES CITY COUNTY	4.5	3.1	7.0	4.9	0.152	337	
PORTSMOUTH CITY	6.4	6.5	-3.8	3.0	0.923	3,033	
ISLE OF WIGHT COUNTY	4.4	1.9	2.6	3.0	0.068	94	
GLOUCESTER COUNTY	1.7	2.2	3.9	2.6	0.037	161	
WILLIAMSBURG CITY	0.6	0.8	0.8	0.7	0.356	1,405	
MATHEWS COUNTY	0.4	0.6	0.9	0.6	0.024	107	
POQUOSON CITY	0.3	0.7	0.6	0.6	0.098	745	
TOTAL	100	100	100		0.230	743	

Figure 2 – Contribution of Gloucester County to Selected Ozone Criteria for the Hampton Roads MSA



Final State Recommendation: Gloucester County should be classified as an attainment/unclassifiable area for the 8-hour ozone standard.

ISLE OF WIGHT COUNTY

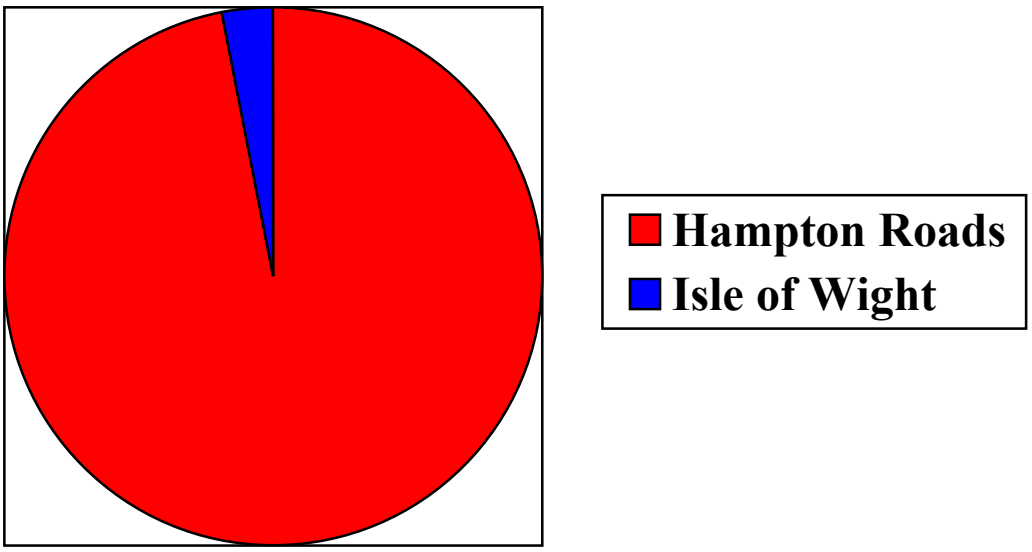


Analysis of Ozone Related Criteria	
Emissions (1999)	8.2 tpd VOC and 13.1 tpd NO_X (4.4% of ozone precursor emissions in the Hampton Roads MSA)
Emissions Density	0.068 tpd per square mile
Population (2000)	29,728 - 94 per square mile (1.9% of the total Hampton Roads MSA population)
Population Growth	Population expected to grow to 34,098 (15%) by 2010 which represents only 2.6% of the total population growth expected in the Hampton Roads MSA
Air Quality	No ozone monitor in the County
Commuting Patterns	55% of the County workforce commutes into the proposed nonattainment area
Daily VMT (1999)	825,044 Daily Vehicle Miles of Travel (2.4% of daily VMT in the Hampton Roads MSA). Significant through traffic on Route 460.
Major Sources	There are three major stationary sources of ozone precursor emissions in the County. One of these sources accounts for over 50% of total County emissions and is subject to the State NO_X reduction rule and pending MACT VOC reductions.
Meteorology	Prevailing ground level winds from the Northeast during the summer. See Enclosure V for further meteorological analysis.
Geography	County is located to the West and Southwest of the proposed nonattainment area
Boundaries	County is part of the Hampton Roads MSA
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.

Figure 1 – Ranking of Selected Ozone Criteria for the Jurisdictions in the Hampton Roads MSA

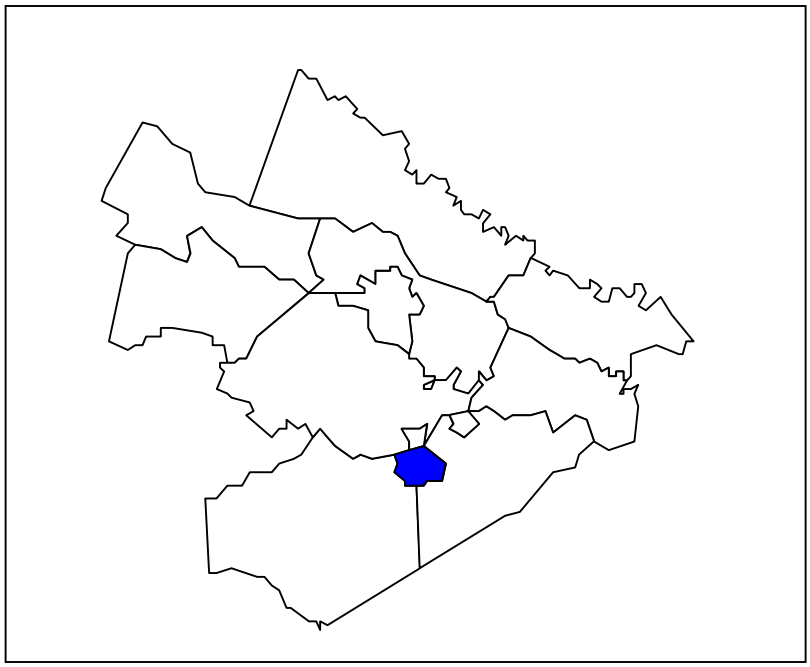
CITY/COUNTY	Percent Emissions for Area	Percent Population for Area	Percent Growth for Area	Comb. Average Percent	Emission Density (per sq. mile)	Population Density (per sq. mile)	Monitor?
VIRGINIA BEACH CITY	14.8	27.4	43.7	28.7	0.287	1,713	
CHESAPEAKE CITY	20.3	12.8	32.7	21.9	0.286	585	
YORK COUNTY	12.9	3.6	12.7	9.7	0.587	533	
NEWPORT NEWS CITY	9.7	11.6	5.8	9.0	0.686	2,638	
NORFOLK CITY	12.2	15.1	-11.3	5.3	1.089	4,363	
SUFFOLK CITY	4.3	4.1	6.6	5.0	0.051	159	Y
HAMPTON CITY	7.4	9.4	-2.0	4.9	0.689	2,828	Y
JAMES CITY COUNTY	4.5	3.1	7.0	4.9	0.152	337	
PORTSMOUTH CITY	6.4	6.5	-3.8	3.0	0.923	3,033	
ISLE OF WIGHT COUNTY	4.4	1.9	2.6	3.0	0.068	94	
GLOUCESTER COUNTY	1.7	2.2	3.9	2.6	0.037	161	
WILLIAMSBURG CITY	0.6	0.8	0.8	0.7	0.356	1,405	
MATHEWS COUNTY	0.4	0.6	0.9	0.6	0.024	107	
POQUOSON CITY	0.3	0.7	0.6	0.6	0.098	745	
TOTAL	100	100	100		0.230	743	

Figure 2 – Contribution of Isle of Wight County to Selected Ozone Criteria for the Hampton Roads MSA



Final State Recommendation: Isle of Wight County should be classified as an attainment/unclassifiable area for the 8-hour ozone standard.

CITY OF PETERSBURG

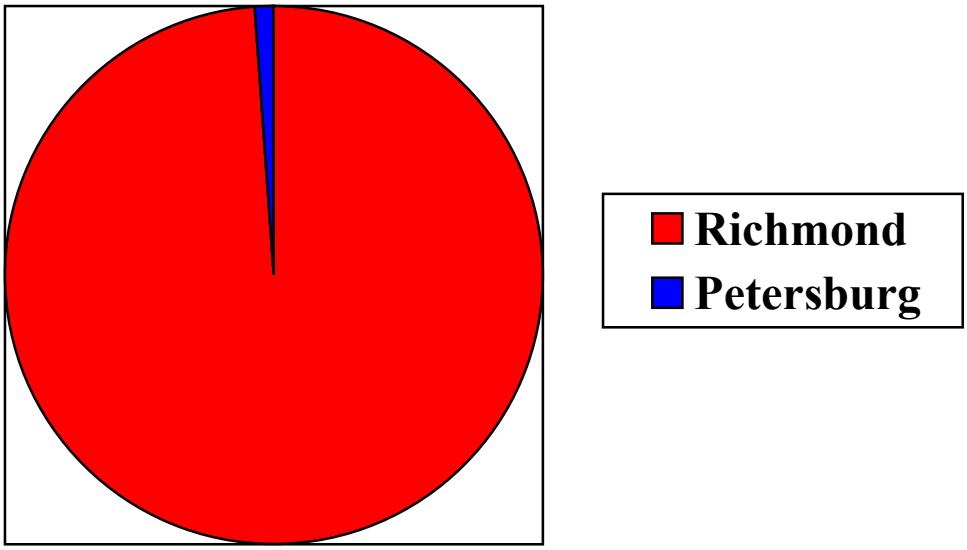


Analysis of Ozone Related Criteria	
Emissions (1999)	5.6 tpd VOC and 4.7 tpd NO_X (2.4% of ozone precursor emissions in the Richmond MSA)
Emissions Density	0.448 tpd per square mile
Population (2000)	33,740 – 1,475 per square mile (3.4% of the total Richmond MSA population in VA)
Population Growth	Population expected to **decrease to** 31,502 (-7%) by 2010 which represents only –2.3% of the total population growth expected in the Richmond MSA
Air Quality	No ozone monitor in the County
Commuting Patterns	38% of the City workforce commutes into the Richmond area
Daily VMT (1999)	795,117 Daily Vehicle Miles of Travel (3% of daily VMT in the Richmond MSA). Major through traffic on Interstates 85 and 95.
Major Sources	Currently there are no major stationary sources of ozone precursor emissions.
Meteorology	Prevailing ground level winds from the Southwest during the summer. See Enclosure V for further meteorological analysis.
Geography	City is located to the Southeast of the proposed nonattainment area
Boundaries	City is part of the Richmond MSA
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.

Figure 1 – Ranking of Selected Ozone Criteria for the Virginia Jurisdictions in the Richmond

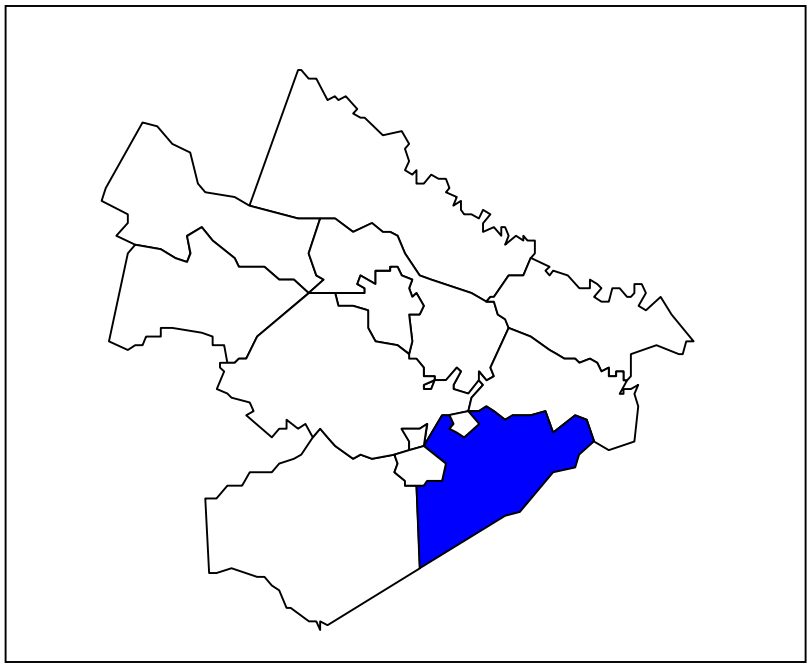
CITY/COUNTY	Percent Emissions for Area	Percent Population for Area	Percent Growth for Area	Comb. Average Percent	Emission Density (per sq. mile)	Population Density (per sq. mile)	Monitor?
CHESTERFIELD COUNTY	30.7	26.1	57.7	38.2	0.314	610	Y
HENRICO COUNTY	14.7	26.3	14.9	18.6	0.268	1,102	Y
HANOVER COUNTY	8.3	8.7	19.9	12.3	0.076	183	Y
RICHMOND CITY	17.6	19.8	-11.9	8.5	1.270	3,293	
HOPEWELL CITY	14.2	2.2	-0.5	5.3	6.037	2,175	
POWHATAN COUNTY	1.1	2.2	8.7	4.0	0.019	86	
GOOCHLAND COUNTY	2.3	1.7	5.2	3.0	0.034	59	
PRINCE GEORGE COUNTY	3.1	3.3	1.4	2.6	0.051	125	
DINWIDDIE COUNTY	2.4	2.5	2.3	2.4	0.021	49	
NEW KENT COUNTY	1.6	1.4	3.1	2.0	0.033	64	
PETERSBURG CITY	2.4	3.4	-2.3	1.2	0.448	1,475	
COLONIAL HEIGHTS CITY	1.1	1.7	0.5	1.1	0.622	2,259	
CHARLES CITY COUNTY	0.6	0.7	1.0	0.8	0.015	38	Y
TOTAL	100	100	100		0.148	338	

Figure 2 – Contribution of Petersburg City to Selected Ozone Criteria for the Richmond MSA



Final State Recommendation: Petersburg County should be classified as an attainment/unclassifiable area for the 8-hour ozone standard.

PRINCE GEORGE COUNTY

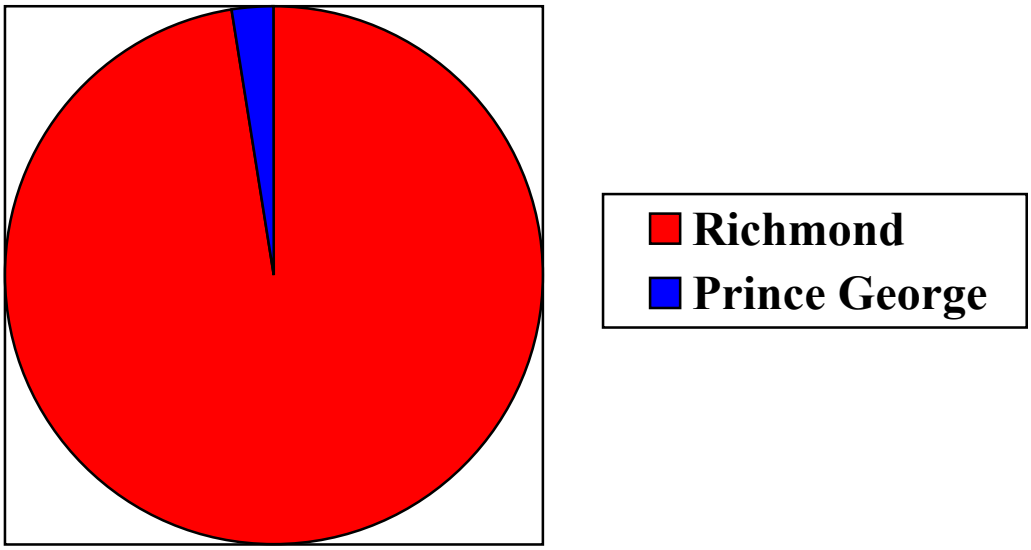


Analysis of Ozone Related Criteria	
Emissions (1999)	5.1 tpd VOC and 8.4 tpd NO_X (2.6% of ozone precursor emissions in the Richmond MSA)
Emissions Density	0.051 tpd per square mile
Population (2000)	33,124 - 125 per square mile (3.3% of the total Richmond MSA population)
Population Growth	Population expected to grow to 34,504 (4%) by 2010 which represents only 1.4% of the total population growth expected in the Richmond MSA
Air Quality	No ozone monitor in the County
Commuting Patterns	37% of the County workforce commutes into the Richmond area
Daily VMT (1999)	1,205,014 Daily Vehicle Miles of Travel (5% of daily VMT in the Richmond MSA). Major through traffic on Interstates 95 and 295.
Major Sources	Currently there are no major stationary sources of ozone precursor emissions.
Meteorology	Prevailing ground level winds from the Southwest during the summer. See Enclosure V for further meteorological analysis.
Geography	County is located to the Southeast of the proposed nonattainment area
Boundaries	County is part of the Richmond MSA
Level of Controls	Currently subject to attainment permit and control requirements. Emissions should be significantly reduced by regional and national controls.

Figure 1 – Ranking of Selected Ozone Criteria for the Virginia Jurisdictions in the Richmond

CITY/COUNTY	Percent Emissions for Area	Percent Population for Area	Percent Growth for Area	Comb. Average Percent	Emission Density (per sq. mile)	Population Density (per sq. mile)	Monitor?
CHESTERFIELD COUNTY	30.7	26.1	57.7	38.2	0.314	610	Y
HENRICO COUNTY	14.7	26.3	14.9	18.6	0.268	1,102	Y
HANOVER COUNTY	8.3	8.7	19.9	12.3	0.076	183	Y
RICHMOND CITY	17.6	19.8	-11.9	8.5	1.270	3,293	
HOPEWELL CITY	14.2	2.2	-0.5	5.3	6.037	2,175	
POWHATAN COUNTY	1.1	2.2	8.7	4.0	0.019	86	
GOOCHLAND COUNTY	2.3	1.7	5.2	3.0	0.034	59	
PRINCE GEORGE COUNTY	3.1	3.3	1.4	2.6	0.051	125	
DINWIDDIE COUNTY	2.4	2.5	2.3	2.4	0.021	49	
NEW KENT COUNTY	1.6	1.4	3.1	2.0	0.033	64	
PETERSBURG CITY	2.4	3.4	-2.3	1.2	0.448	1,475	
COLONIAL HEIGHTS CITY	1.1	1.7	0.5	1.1	0.622	2,259	
CHARLES CITY COUNTY	0.6	0.7	1.0	0.8	0.015	38	Y
TOTAL	100	100	100		0.148	338	

Figure 2 – Contribution of Prince George County to Selected Ozone Criteria for the Richmond MSA



Final State Recommendation: Prince George County should be classified as an attainment/unclassifiable area for the 8-hour ozone standard.

Enclosure V

Meteorological Evaluation of the Hampton Roads & Richmond Areas in Response to the EPA Proposal to Expand the Ozone Nonattainment Boundaries

Background

In 1997 the U. S. Environmental Protection Agency promulgated a new 8-hour ozone National Ambient Air Quality Standard (NAAQS). As one of the first steps in implementing any new air quality standard, the air quality status of areas must be established by making designations of attainment, nonattainment, or unclassifiable for the standard involved. These designations are generally made on an area or jurisdictional basis and are based on air quality (monitoring) data and related criteria such as ozone precursor emissions, population, expected growth, meteorology, and other data. As stipulated by the Clean Air Act (CAA), states make recommendations on the area designations to the EPA based on the established criteria, and then the EPA makes final designation determinations based on these state recommendations and other factors.

The Commonwealth of Virginia originally made designation recommendations under the 8-hour ozone standard for Virginia in June of 2000. These same recommendations were then reaffirmed in a July 2003 letter to the EPA. The nonattainment boundaries and jurisdictions recommended for the Hampton Roads and Richmond areas were that same as those included in the maintenance areas for the 1-hour ozone standard:

Hampton Roads

James City County
York County
City of Chesapeake
City of Hampton
City of Newport News
City of Norfolk
City of Poquoson
City of Portsmouth
City of Suffolk
City of Virginia Beach
City of Williamsburg

Richmond

Charles City County (partial jurisdiction)
Chesterfield County
Hanover County
Henrico County
City of Colonial Heights
City of Hopewell
City of Richmond

The EPA initially agreed with the recommendations for Hampton Roads and Richmond in a response letter in January 2001. However, in a December 3, 2003 letter to Governor of Virginia, the EPA provided and documented its proposed final determination and designation of nonattainment areas in Virginia. As part of this determination, the EPA is proposing to expand the Hampton Roads and Richmond nonattainment areas to include the following:

Hampton Roads Nonattainment Area Expansion

- Include Gloucester County
- Include Isle of Wight County

Richmond Nonattainment Area Expansion

- Include all of Charles City County
- Include the City of Petersburg
- Include Prince George County

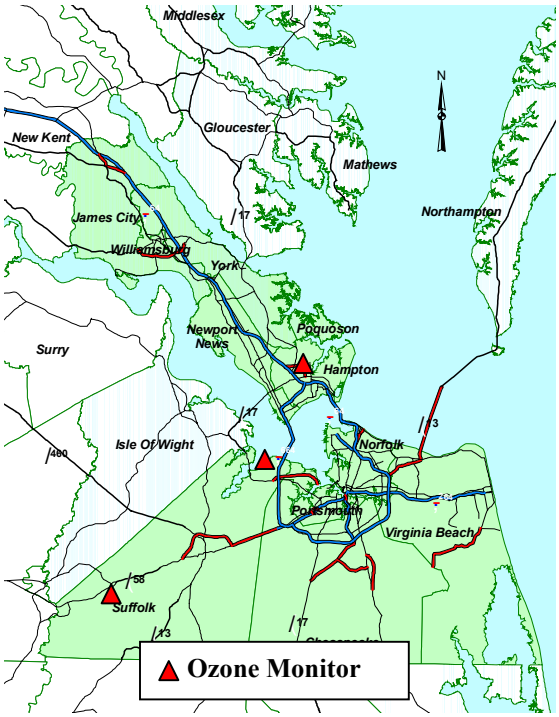
The Commonwealth stands by its recommendations for these nonattainment areas and has developed a response to the EPA proposal. Due to the substantial impact that meteorological conditions have on both the formation and transport of ozone, the following analysis has been performed to further support the state recommendations and a request for the EPA's reconsideration of their proposal for these areas.

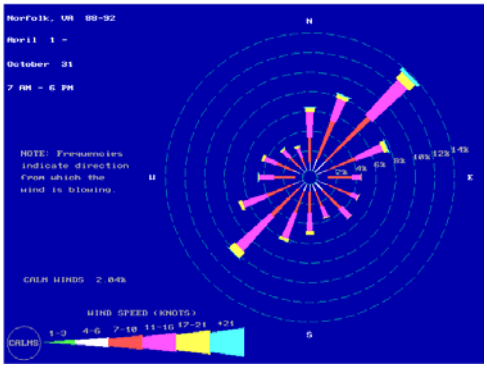
Meteorological Discussion and Analysis

Meteorology in terms of temperature, winds, sunlight, and other factors plays a significant role in the formation of ozone. As such, ozone is often a result of hot, stagnant weather conditions associated with typical summer high-pressure systems. Add to this the upper air mechanism of ozone transport, and the ingredients for classic ozone episodes are in place.

In terms of evaluating air quality and/or contribution to air quality from a given area, the main measures involve actual air quality monitoring data (if available) or the evaluation of other criteria that contribute to ozone formation and transport. This specific analysis deals with the prevailing meteorological conditions on the Hampton Roads and Richmond areas in relationship to the locations of monitors and the geographic location of the jurisdictions that the EPA has proposed to add to the nonattainment areas. Since only one of these additional jurisdictions have an ozone monitor located in it, this analysis focuses mainly on the movement of air generally in the summer and specifically during ozone exceedance days.

Figure 1: Hampton Roads Area Ozone Monitor Locations & Summer Wind Direction (Wind Rose)





Generally, summer weather conditions produce prevailing winds in the Hampton Roads area from the Northeast (due to sea breeze). A secondary prevailing flow originates from the Southwest. Under both these prevailing conditions, the impact (in terms of emissions and ozone transport) from Gloucester and Isle of Wight Counties would be minimal on the ozone monitors in Hampton Roads since Gloucester County is to the Northwest of the main urbanized area (and all the monitors) and Isle of Wight County is to the west/southwest of this core area.

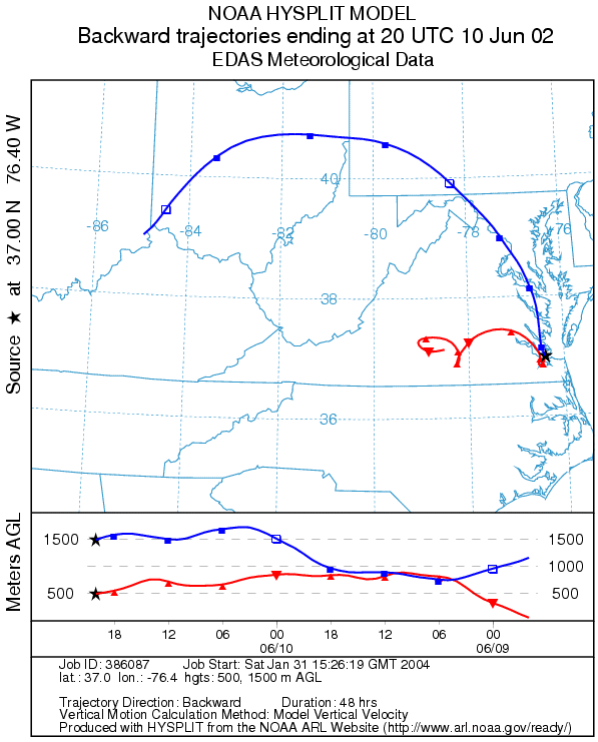
To further evaluate air movement during a typical summer and specifically during recorded high ozone days, an analysis of ground and upper air movement has been performed on a recent ozone season. The summer of 2002 was selected for this purpose due to the fact that this was a relatively active ozone season in Virginia. To perform this analysis, a series of ground and transport level air mass back trajectories were performed as follows:

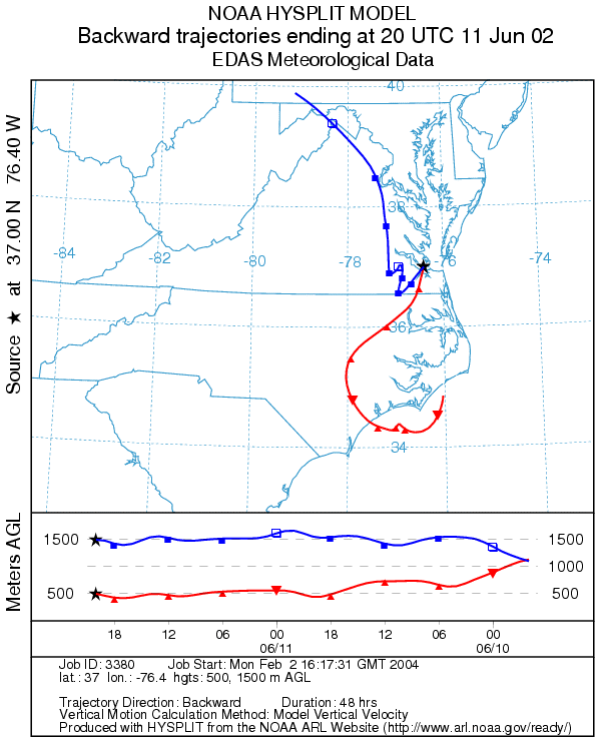
- Time span: 48 hours prior to the afternoon of the ozone exceedance
- Near-Ground level elevation: 500 meters
- Transport level elevation: 1,500 meters

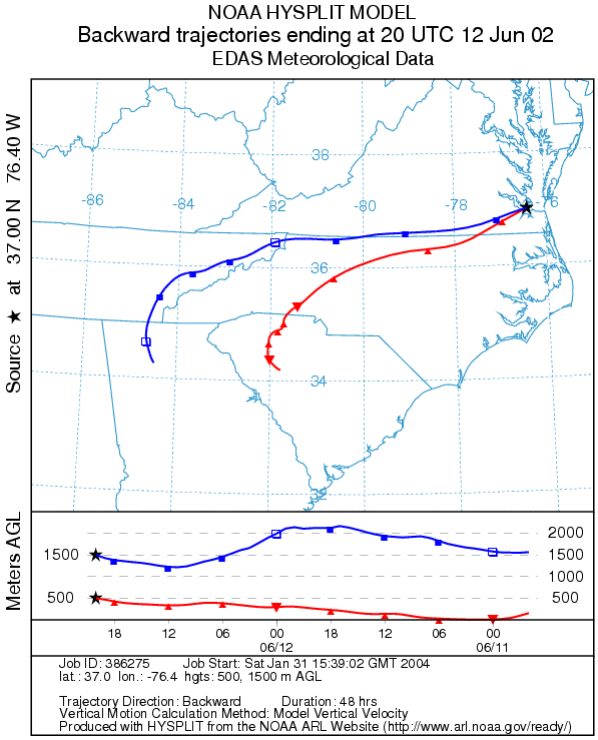
Back trajectories were calculated using the National Oceanic and Atmospheric Administration's (NOAA) Hybrid Single-Particle Lagrangian Integrated Trajectory HYSPLIT) model via the NOAA Air Resources Lab Realtime Environmental Applications and Display System (http://www.arl.noaa.gov/ready/hysplit4.html).

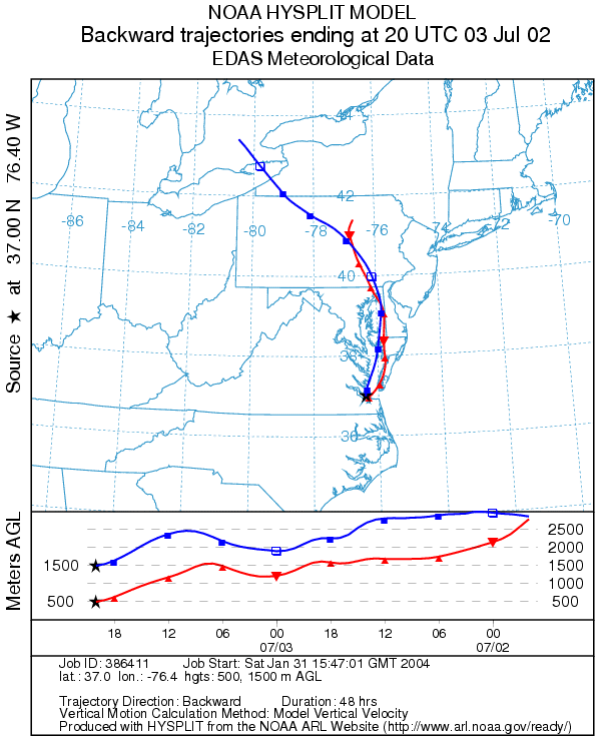
The 13 days during the summer of 2002 that have been evaluated and the observed 8-hour and 1-hour ozone averages are presented in Table 1 at the end of this report. The graphic results of this analysis for these exceedance days at the Suffolk and Hampton monitors are presented below:

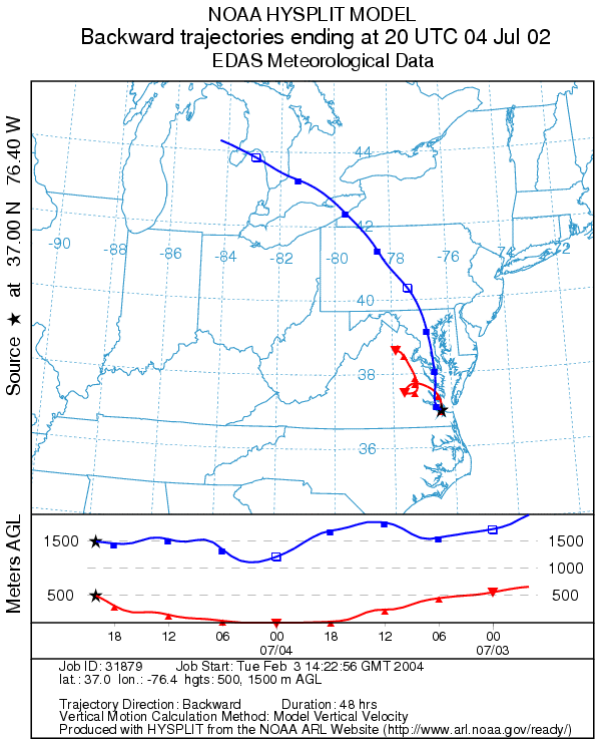
City of Hampton Monitor

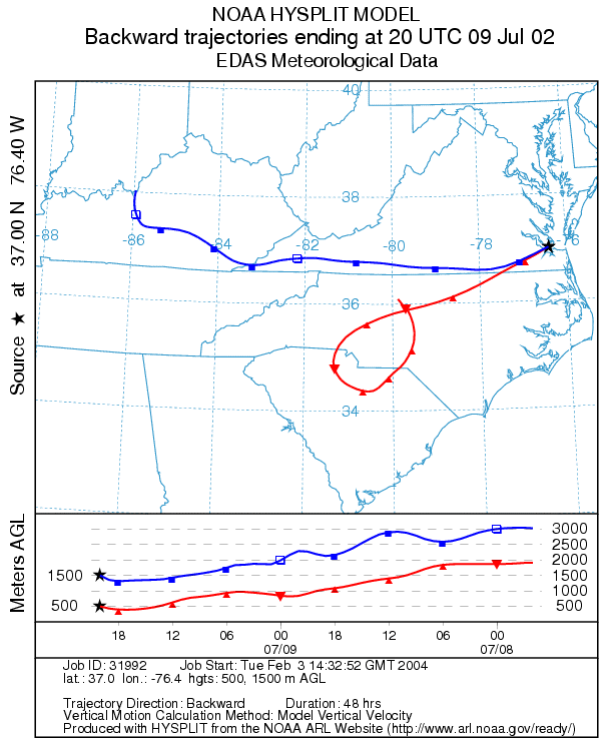


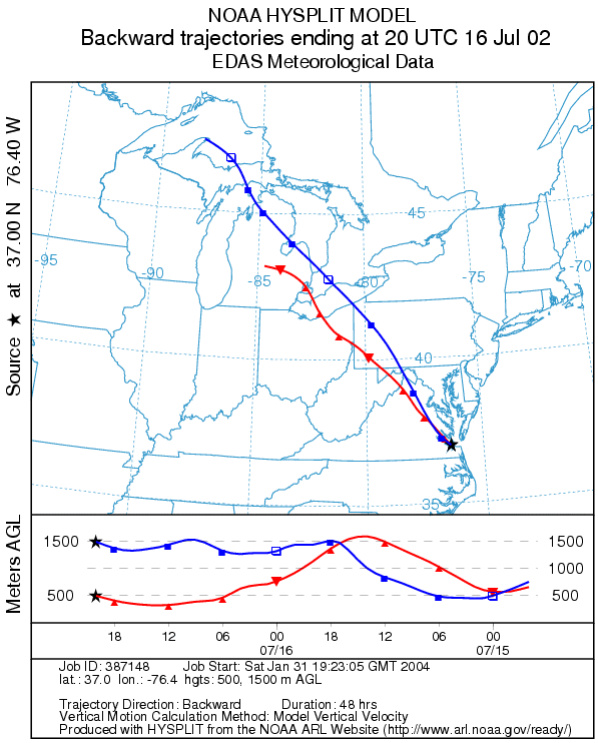


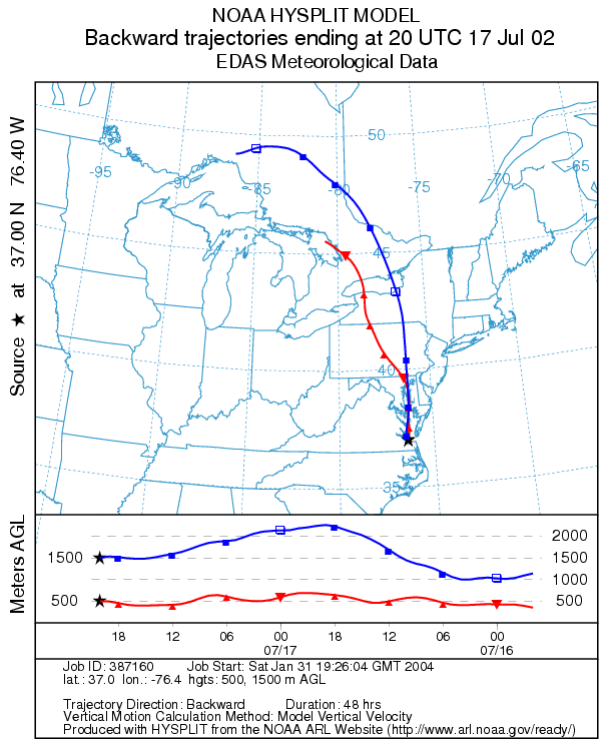


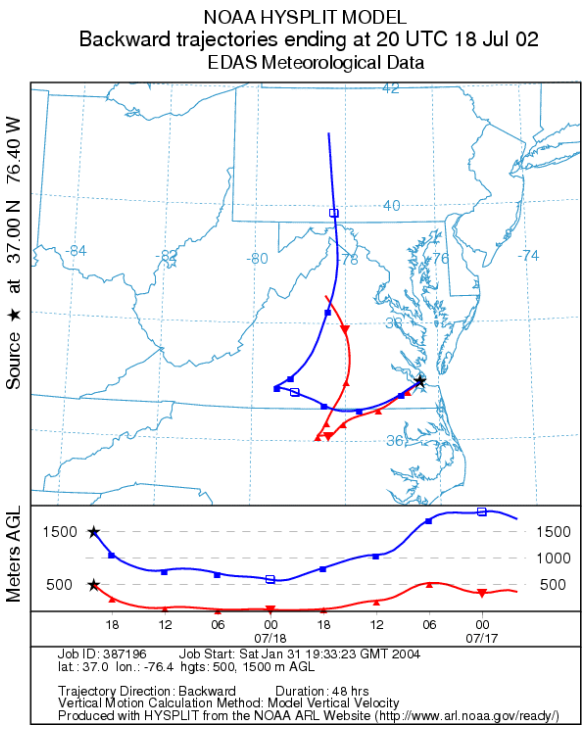



NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 04 Jul 02
EDAS Meteorological Data
Source ★ at 37.00 N 76.40 W
Meters AGL
Job ID: 31879 Job Start: Tue Feb 3 14:22:56 GMT 2004
lat.: 37.0 lon.: -76.4 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 09 Jul 02
EDAS Meteorological Data
Source ★ at 37.00 N 76.40 W
Meters AGL
Job ID: 31992 Job Start: Tue Feb 3 14:32:52 GMT 2004
lat.: 37.0 lon.: -76.4 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 16 Jul 02
EDAS Meteorological Data
Source ★ at 37.00 N 76.40 W
Meters AGL
Job ID: 387148 Job Start: Sat Jan 31 19:23:05 GMT 2004
lat.: 37.0 lon.: -76.4 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 17 Jul 02
EDAS Meteorological Data
Source ★ at 37.00 N 76.40 W
Meters AGL
Job ID: 387160 Job Start: Sat Jan 31 19:26:04 GMT 2004
lat.: 37.0 lon.: -76.4 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 18 Jul 02
EDAS Meteorological Data
Source ★ at 37.00 N 76.40 W
Meters AGL
Job ID: 387196 Job Start: Sat Jan 31 19:33:23 GMT 2004
lat.: 37.0 lon.: -76.4 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
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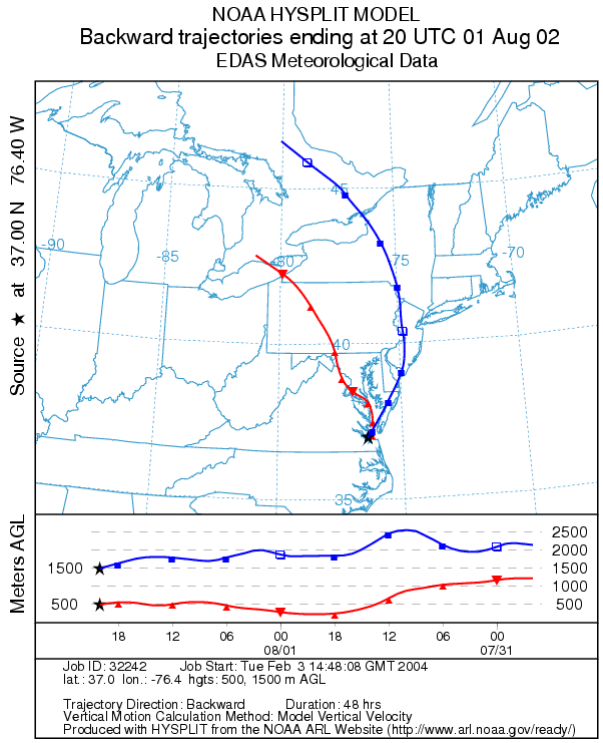
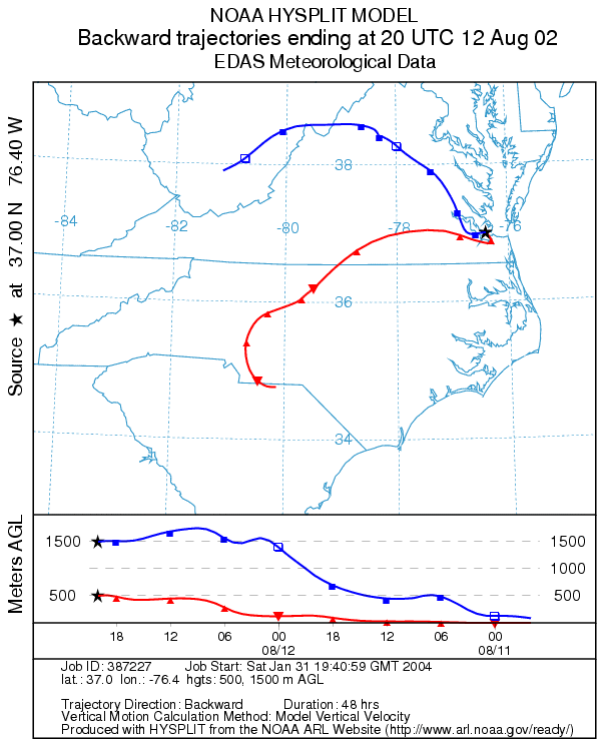
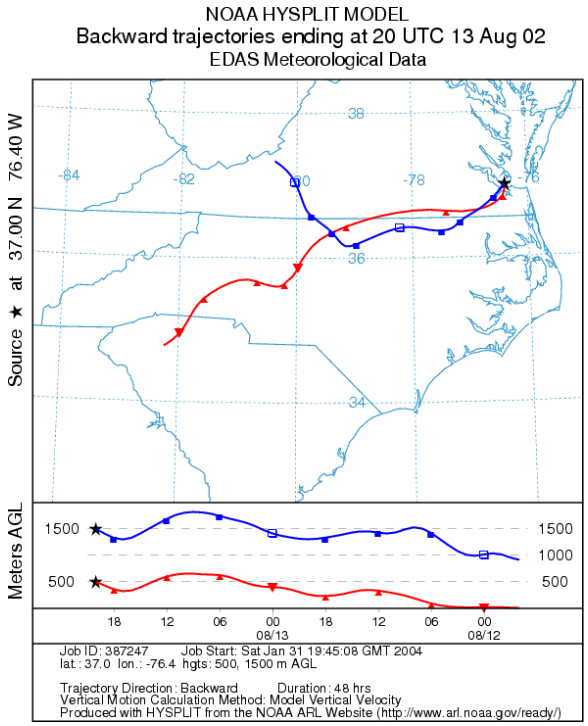
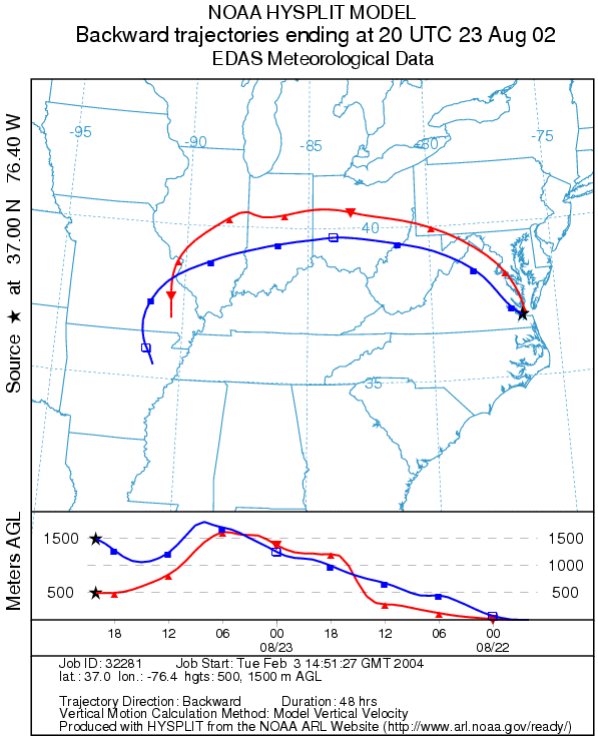
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

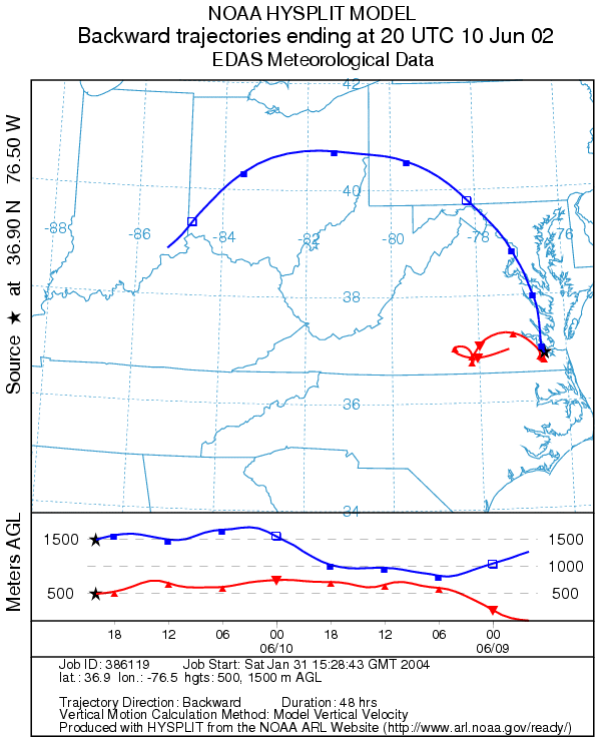

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 01 Aug 02
EDAS Meteorological Data
Source ★ at 37.00 N 76.40 W
Meters AGL
Job ID: 32242 Job Start: Tue Feb 3 14:48:08 GMT 2004
lat.: 37.0 lon.: -76.4 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

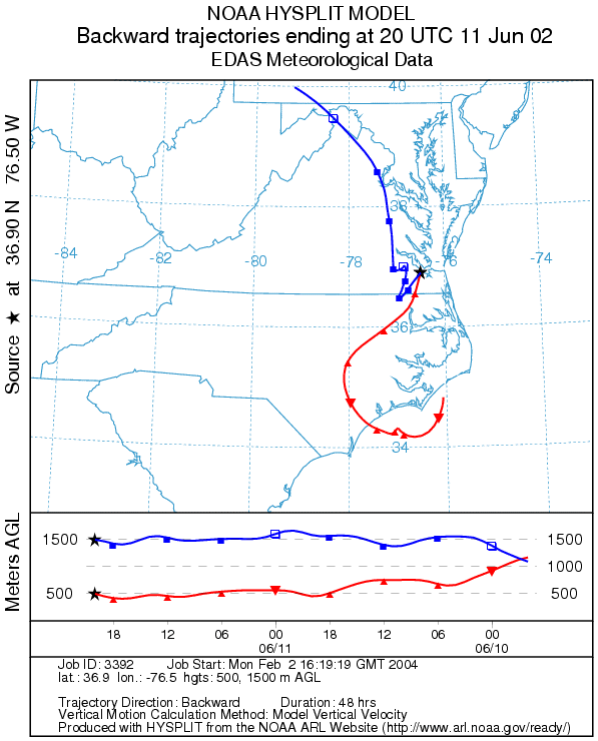

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 12 Aug 02
EDAS Meteorological Data
Source ★ at 37.00 N 76.40 W
Meters AGL
Job ID: 387227 Job Start: Sat Jan 31 19:40:59 GMT 2004
lat.: 37.0 lon.: -76.4 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 13 Aug 02
EDAS Meteorological Data
Source ★ at 37.00 N 76.40 W
Meters AGL
Job ID: 387247 Job Start: Sat Jan 31 19:45:08 GMT 2004
lat.: 37.0 lon.: -76.4 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

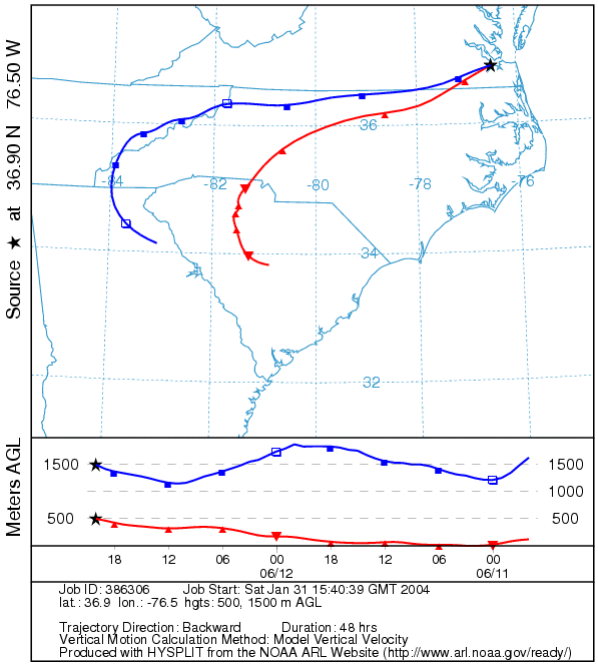


Suffolk County (Tidewater Community College) Monitor

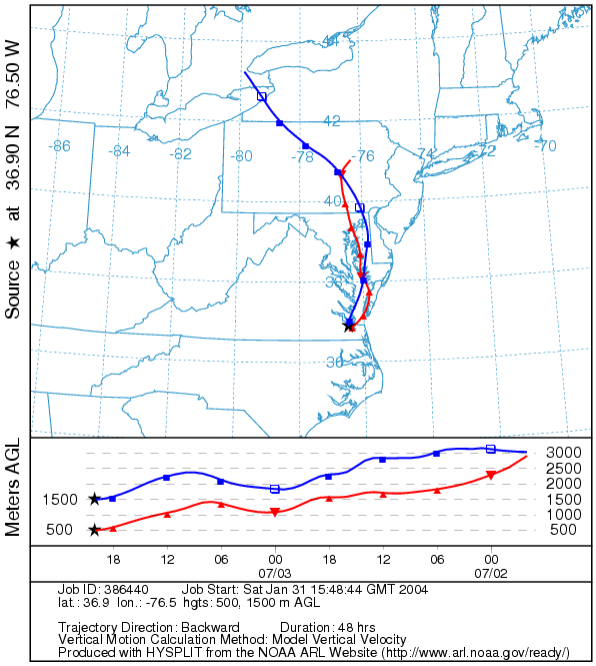




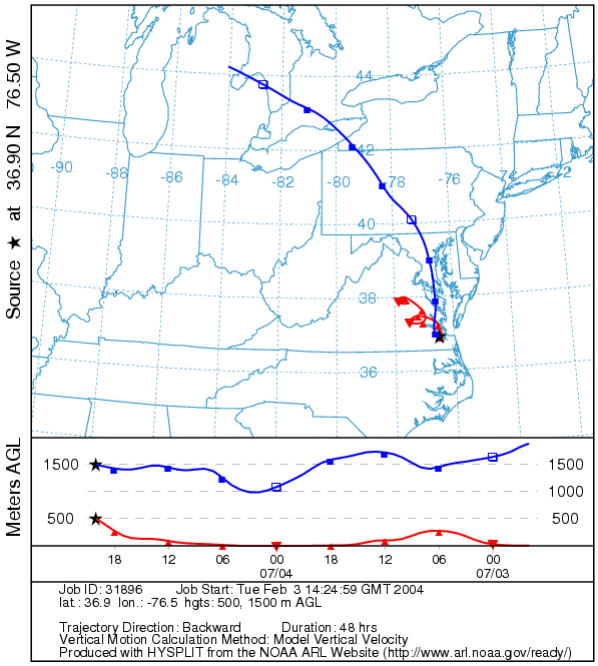
NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 12 Jun 02
EDAS Meteorological Data



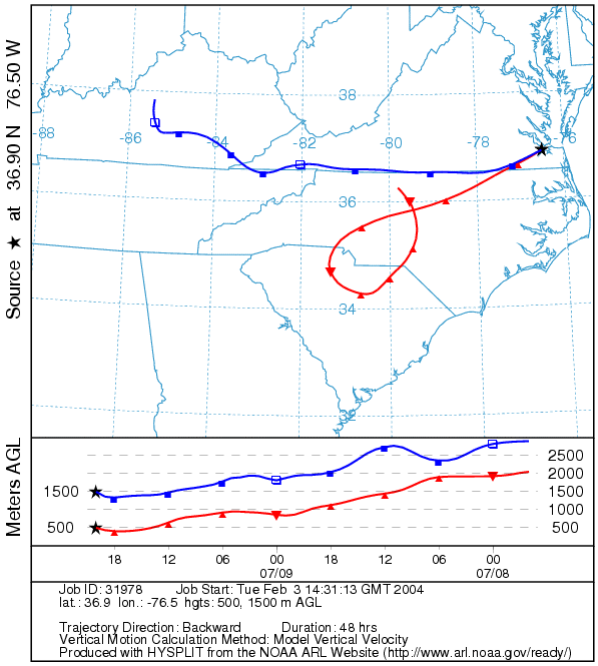
NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 03 Jul 02
EDAS Meteorological Data

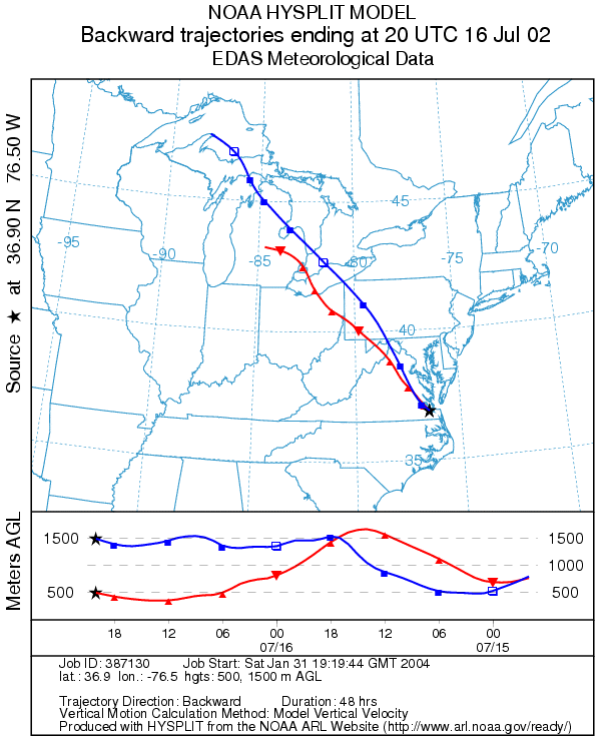


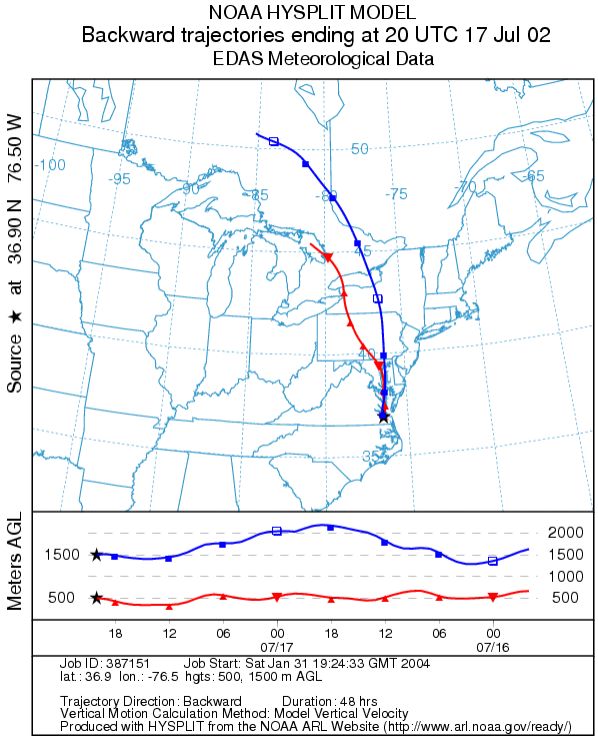
NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 04 Jul 02
EDAS Meteorological Data

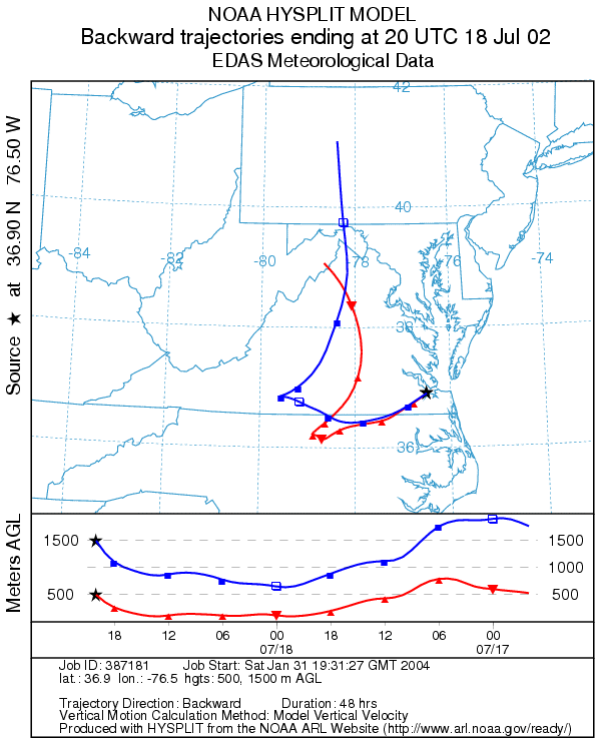


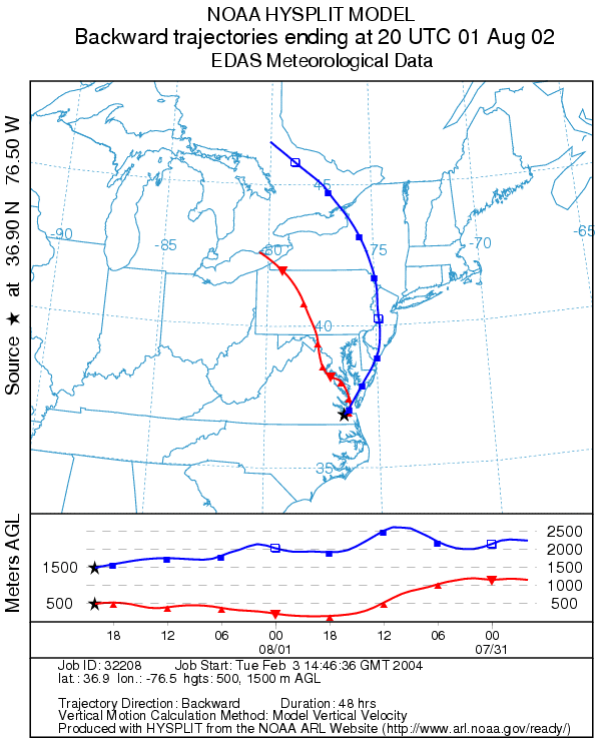
NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 09 Jul 02
EDAS Meteorological Data

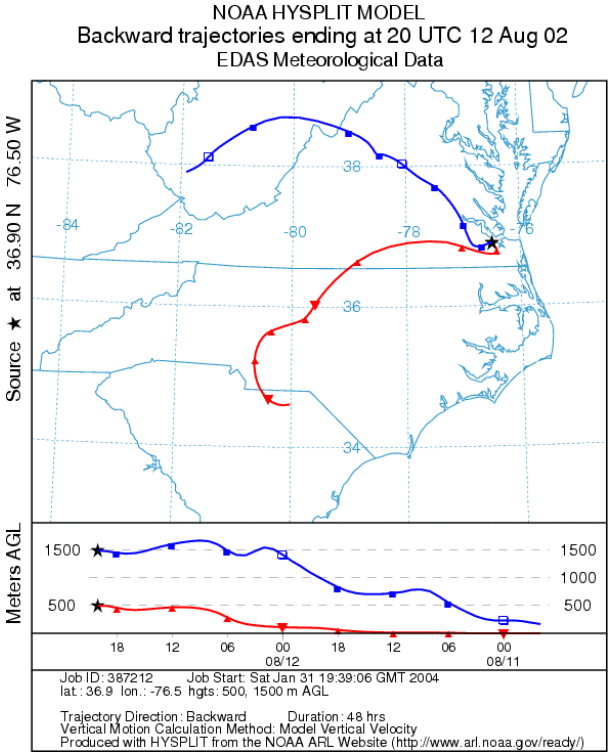


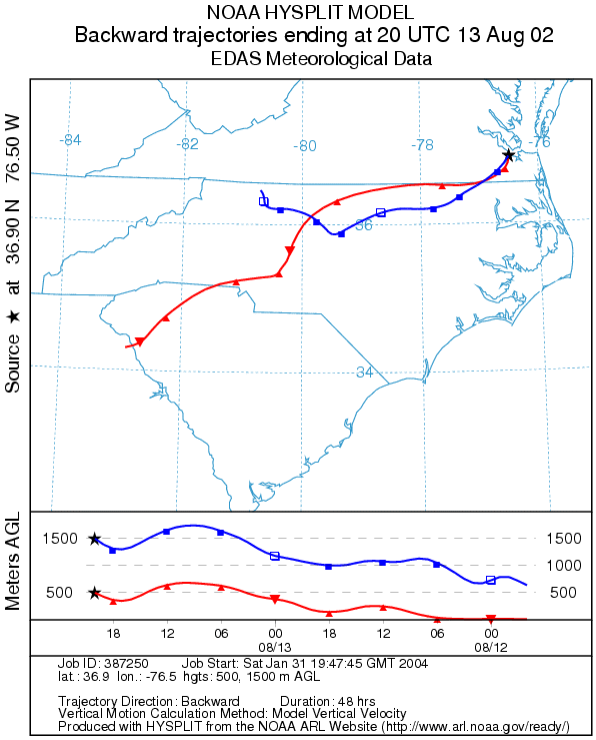

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 16 Jul 02
EDAS Meteorological Data
Source ★ at 36.90 N 76.50 W
Meters AGL
Job ID: 387130 Job Start: Sat Jan 31 19:19:44 GMT 2004
lat.: 36.9 lon.: -76.5 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

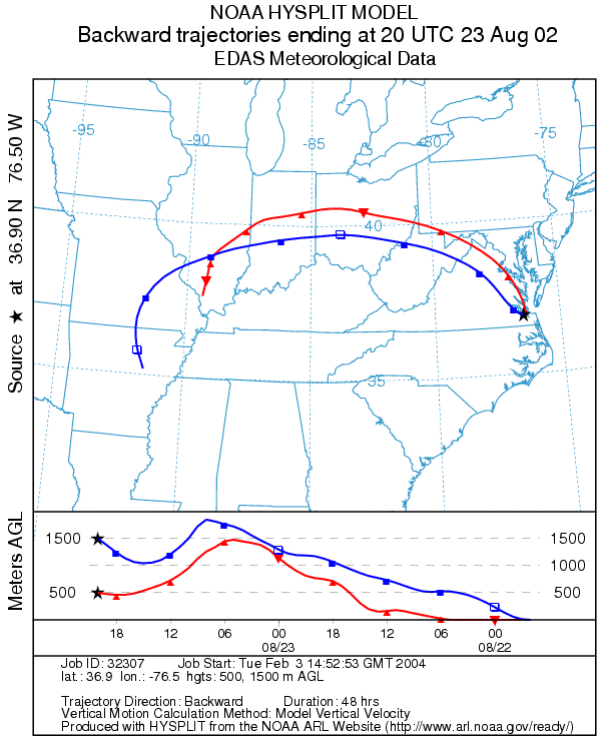

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 17 Jul 02
EDAS Meteorological Data
Source ★ at 36.90 N 76.50 W
Meters AGL
Job ID: 387151 Job Start: Sat Jan 31 19:24:33 GMT 2004
lat.: 36.9 lon.: -76.5 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 18 Jul 02
EDAS Meteorological Data
Source ★ at 36.90 N 76.50 W
Meters AGL
Job ID: 387181 Job Start: Sat Jan 31 19:31:27 GMT 2004
lat.: 36.9 lon.: -76.5 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 01 Aug 02
EDAS Meteorological Data
Source ★ at 36.90 N 76.50 W
Meters AGL
Job ID: 32208 Job Start: Tue Feb 3 14:46:36 GMT 2004
lat.: 36.9 lon.: -76.5 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 12 Aug 02
EDAS Meteorological Data
Source ★ at 36.90 N 76.50 W
Meters AGL
Job ID: 387212 Job Start: Sat Jan 31 19:39:06 GMT 2004
lat.: 36.9 lon.: -76.5 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

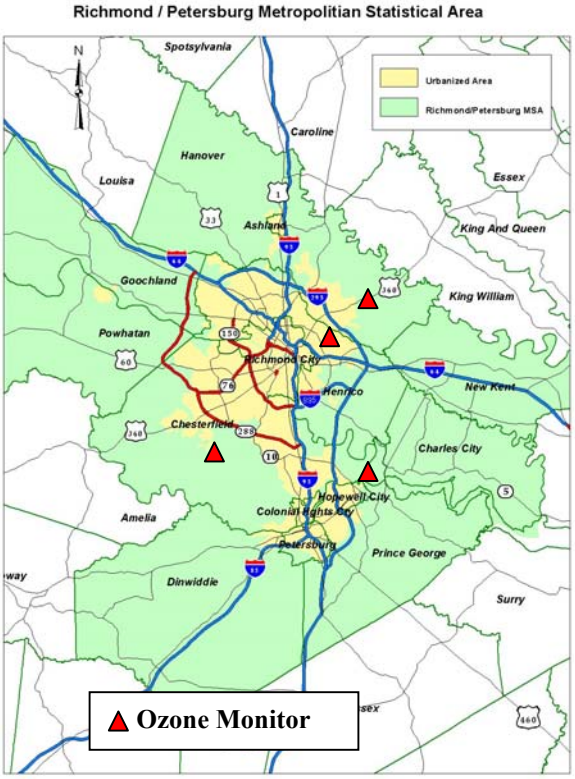

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 13 Aug 02
EDAS Meteorological Data
Source ★ at 36.90 N 76.50 W
Meters AGL
Job ID: 387250 Job Start: Sat Jan 31 19:47:45 GMT 2004
lat.: 36.9 lon.: -76.5 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

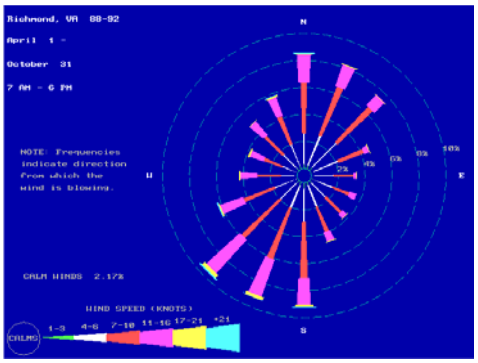

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 23 Aug 02
EDAS Meteorological Data
Source ★ at 36.90 N 76.50 W
Meters AGL
Job ID: 32307 Job Start: Tue Feb 3 14:52:53 GMT 2004
lat.: 36.9 lon.: -76.5 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

Conclusion

Of the 13 ozone exceedance days evaluated for the Hampton and Suffolk TCC monitors during the summer of 2002, only 3 days exhibited any near-ground level air movement through Gloucester County from the North or Northwest before reaching either of these monitors. During 6 days, near-ground level air movement is observed through Isle of Wight County from the West or Southwest. During the majority of these ozone episode days, air movement was from the North and/or Northeast (7 days). Under the majority of these episode days, the jurisdictions in question had little or no impact in terms of transported ozone or emissions on the Hampton or Suffolk monitors. Evaluation of the other monitor in the Hampton Roads area was not performed due to the fact that this monitor in Southern Suffolk County is currently in compliance with the 8-hour ozone standard.

Figure 1: Richmond Area Ozone Monitor Locations & Summer Wind Direction (Wind Rose)





Generally, summer weather conditions produce prevailing winds in the Richmond area from the Southwest. A secondary prevailing flow originates from the Northeast. Under both these prevailing conditions, the impact (in terms of emissions and ozone transport) from Charles City and Prince George County would not direct impact the nearest ozone monitor in Charles City County since the majority of the land area of these jurisdictions is to the east of this monitor.

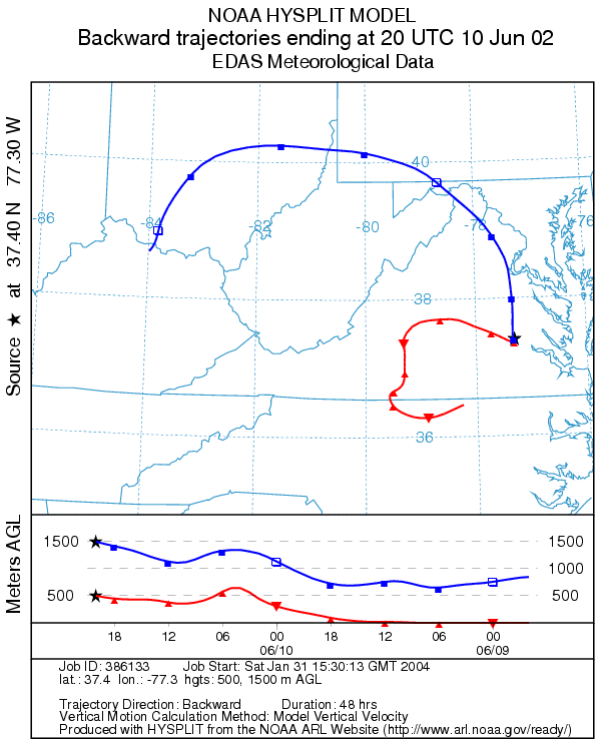
To further evaluate air movement during a typical summer and specifically during recorded high ozone days, an analysis of ground and upper air movement has been performed on a recent ozone season. The summer of 2002 was selected for this purpose to the fact that this was a relatively active ozone season in Virginia. To perform this analysis, a series of ground and transport level air mass back trajectories were performed as follows:

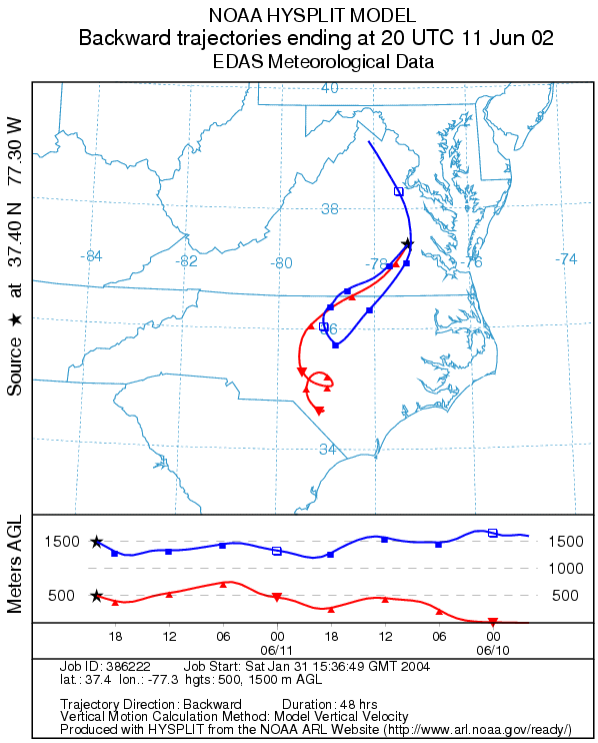
- Time span: 48 hours
- Near-Ground level elevation: 500 meters
- Transport level elevation: 1,500 meters

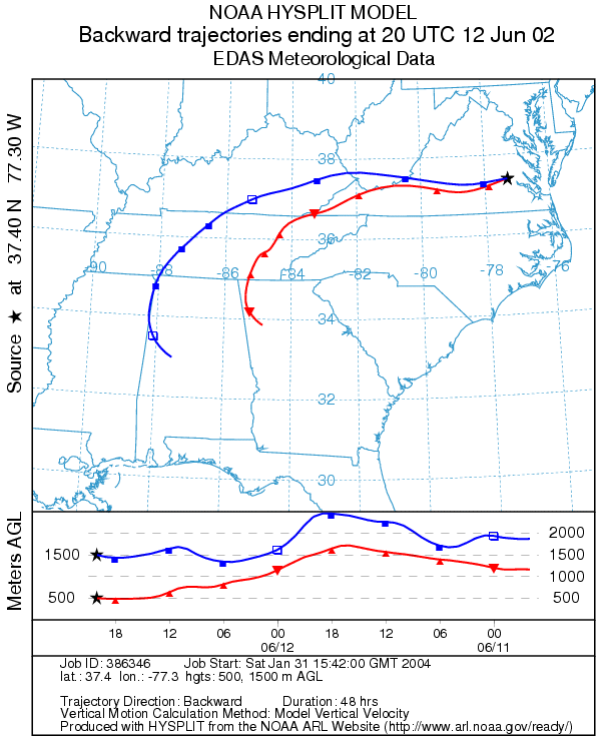
Back trajectories were calculated using the National Oceanic and Atmospheric Administration's (NOAA) Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model via the NOAA Air Resources Lab Realtime Environmental Applications and Display System (http://www.arl.noaa.gov/ready/hysplit4.html).

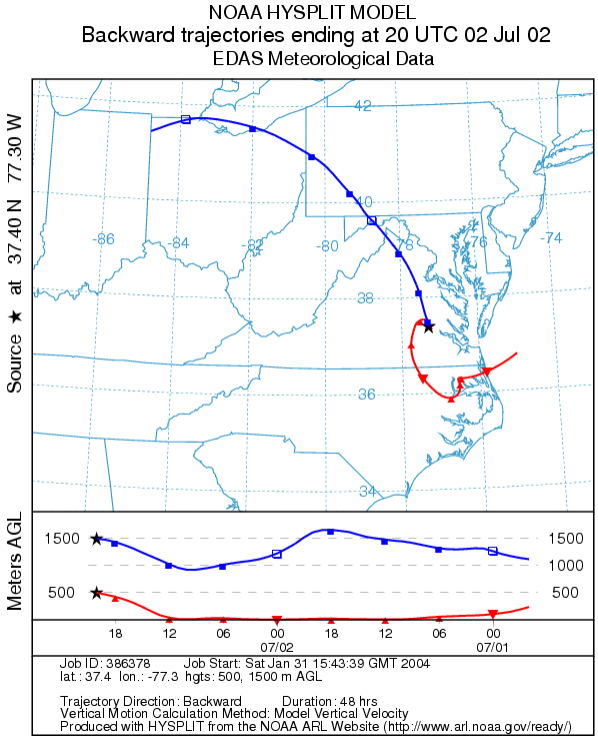
The 15 days during the summer of 2002 that have been evaluated and the observed 8-hour and 1-hour ozone averages are presented in Table 1 at the end of this report. The graphic results of this analysis for these exceedance days at the Charles City monitor are presented below:

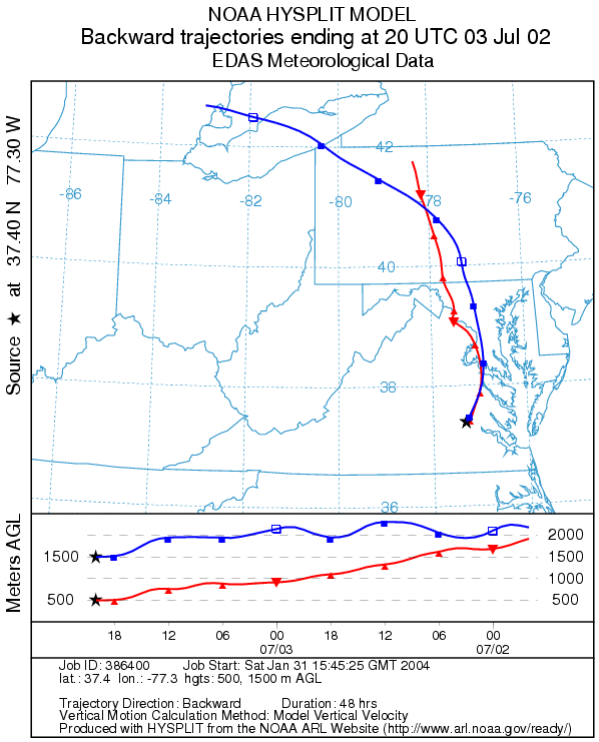
Charles City County Monitor

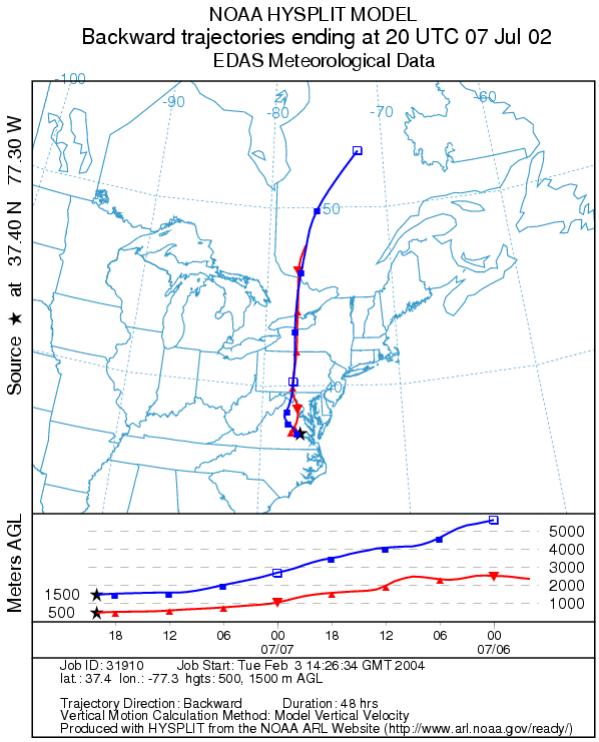


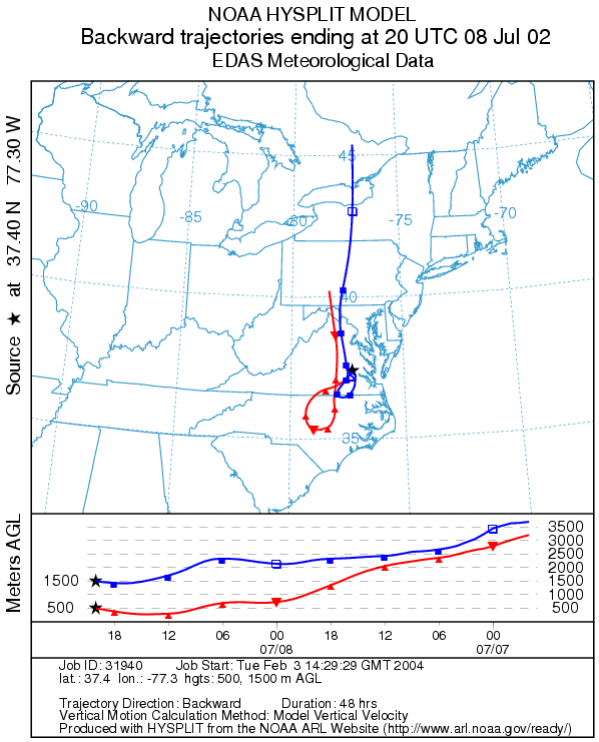


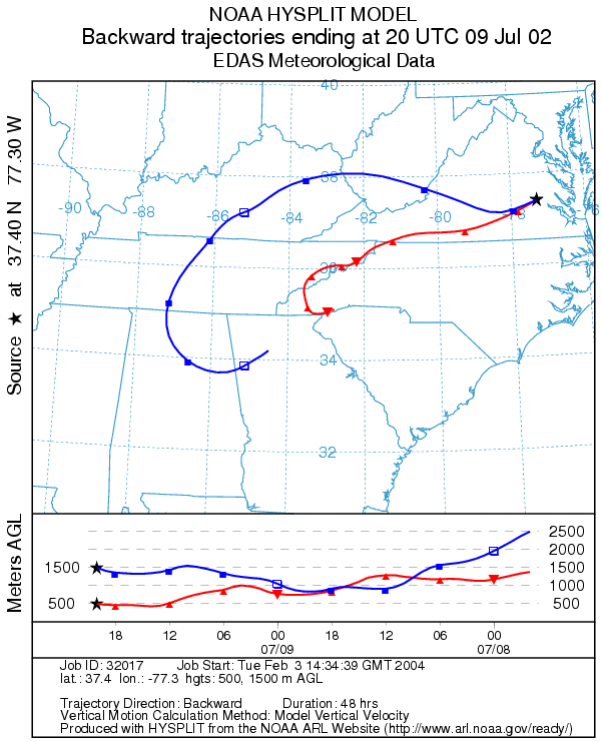


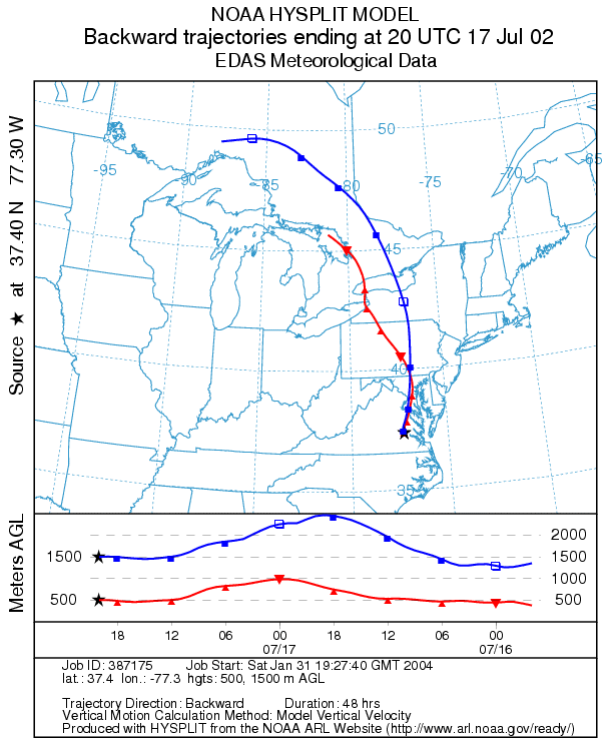


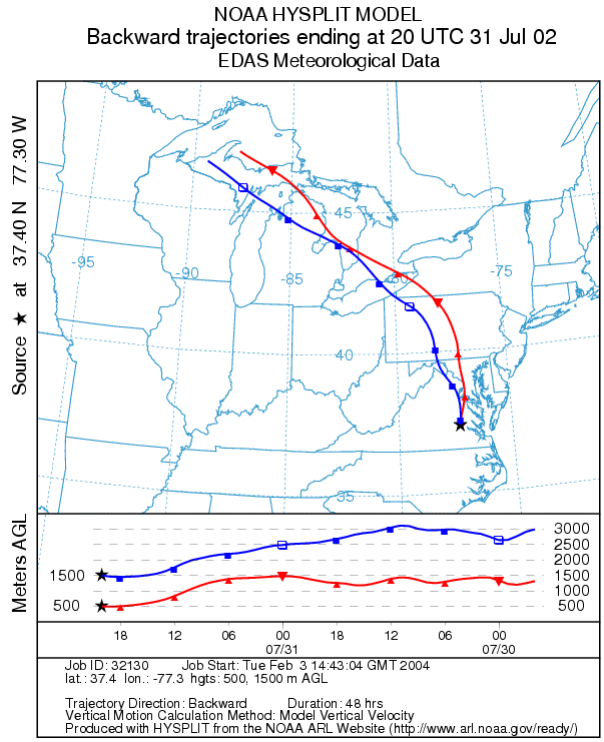

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 03 Jul 02
EDAS Meteorological Data
Source ★ at 37.40 N 77.30 W
Meters AGL
Job ID: 386400 Job Start: Sat Jan 31 15:45:25 GMT 2004
lat: 37.4 lon.: -77.3 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

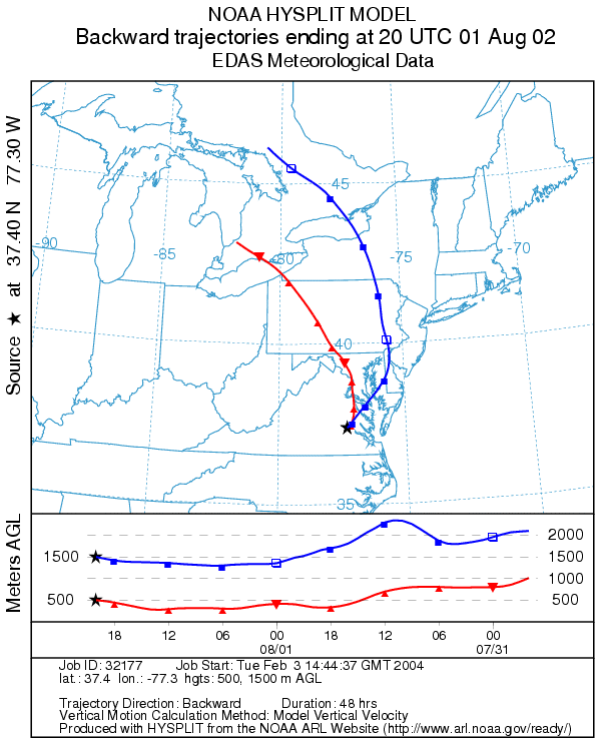

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 07 Jul 02
EDAS Meteorological Data
Source ★ at 37.40 N 77.30 W
Meters AGL
Job ID: 31910 Job Start: Tue Feb 3 14:26:34 GMT 2004
lat: 37.4 lon.: -77.3 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

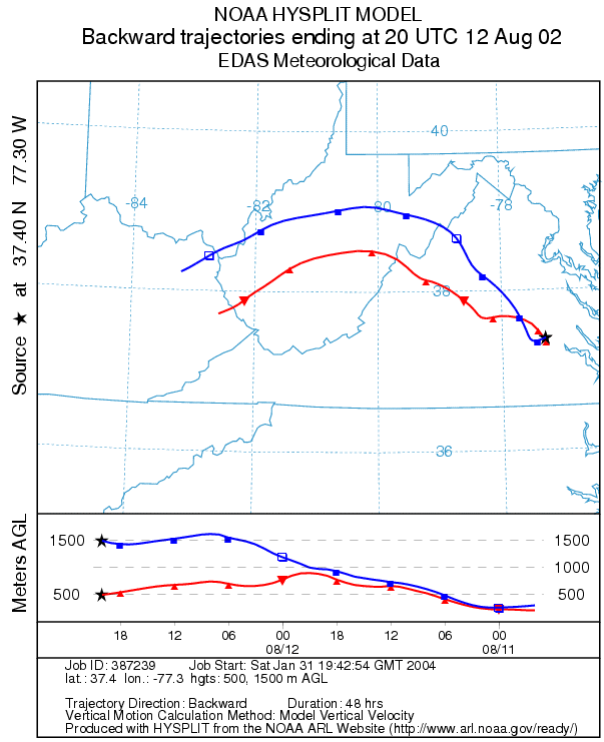

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 08 Jul 02
EDAS Meteorological Data
Source ★ at 37.40 N 77.30 W
Meters AGL
Job ID: 31940 Job Start: Tue Feb 3 14:29:29 GMT 2004
lat: 37.4 lon.: -77.3 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 09 Jul 02
EDAS Meteorological Data
Source ★ at 37.40 N 77.30 W
Meters AGL
Job ID: 32017 Job Start: Tue Feb 3 14:34:39 GMT 2004
lat: 37.4 lon.: -77.3 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

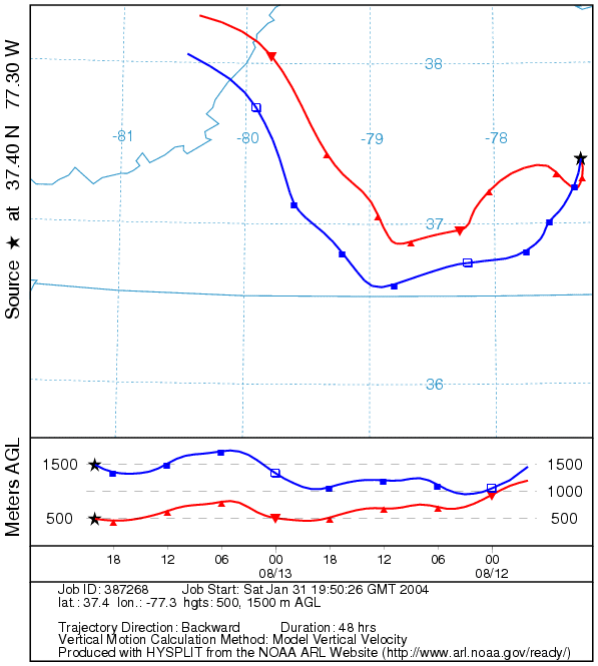

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 17 Jul 02
EDAS Meteorological Data
Source ★ at 37.40 N 77.30 W
Meters AGL
Job ID: 387175 Job Start: Sat Jan 31 19:27:40 GMT 2004
lat : 37.4 lon.: -77.3 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 31 Jul 02
EDAS Meteorological Data
Source ★ at 37.40 N 77.30 W
Meters AGL
Job ID: 32130 Job Start: Tue Feb 3 14:43:04 GMT 2004
lat : 37.4 lon.: -77.3 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

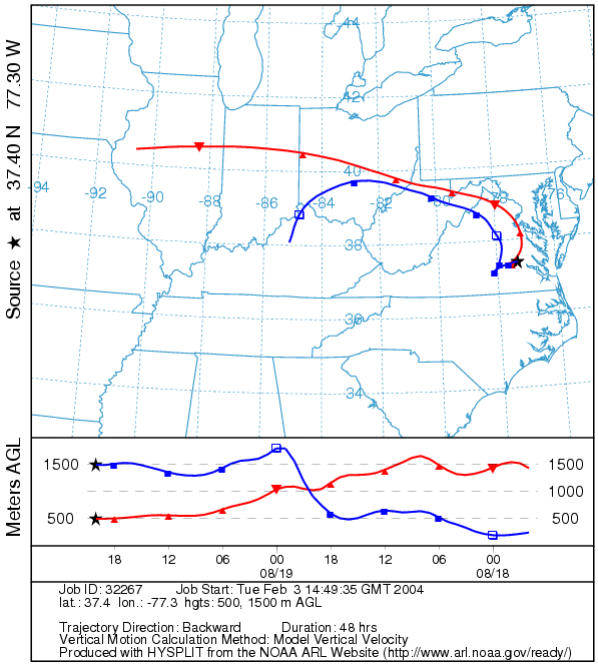

NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 01 Aug 02
EDAS Meteorological Data
Source ★ at 37.40 N 77.30 W
Meters AGL
Job ID: 32177 Job Start: Tue Feb 3 14:44:37 GMT 2004
lat : 37.4 lon.: -77.3 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)


NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 12 Aug 02
EDAS Meteorological Data
Source ★ at 37.40 N 77.30 W
Meters AGL
Job ID: 387239 Job Start: Sat Jan 31 19:42:54 GMT 2004
lat : 37.4 lon.: -77.3 hgts: 500, 1500 m AGL
Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

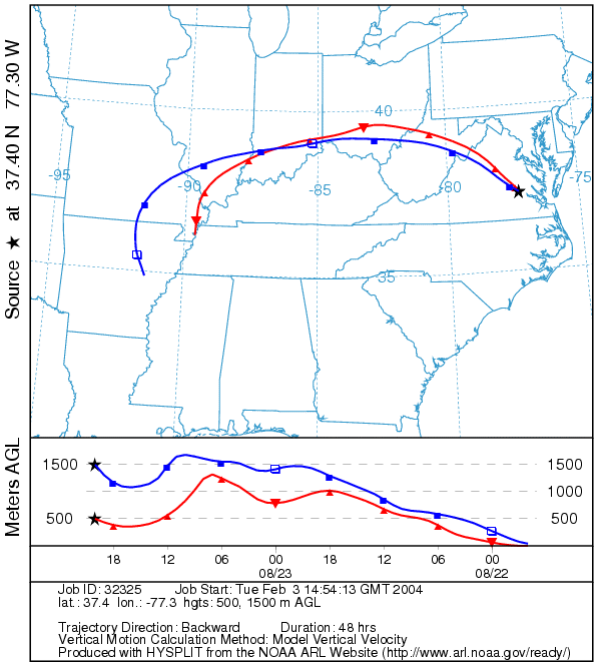
NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 13 Aug 02
EDAS Meteorological Data



NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 19 Aug 02
EDAS Meteorological Data



NOAA HYSPLIT MODEL
Backward trajectories ending at 20 UTC 23 Aug 02
EDAS Meteorological Data



Conclusion

Of the 15 ozone exceedance days evaluated for the Charles City monitor during the summer of 2002, only 3 days exhibited any ground level air movement through the Charles City/Petersburg/Prince George area from the Southwest before reaching the ozone monitor. During the majority of the ozone episode days analyzed, air movement was from the North and/or the West (9 days). Under the majority of the episode days the area in question had little or no impact in terms of transported ozone or emissions on the Charles City monitor. Evaluation of the other monitors in the Richmond area was not performed due to the fact that wind direction in the area rarely originates from the East or Southeast.

Analysis Summary

This meteorological analysis indicates that the air movement leading up to the majority of the ozone exceedance days during the summer of 2002 originated from directions other than those that would traverse through the areas that the EPA has proposed to add to the Hampton Roads and Richmond 8-hour ozone nonattainment areas. Therefore, these areas have little or no impact on these ozone exceedances or contribution to them.

Table 1: 2002 Ozone Exceedance Days Evaluated (8-hour and 1-hour Averages in Parts Per Billion)

	8-hour	***1-hour***
6/10:		
Hampton	**87**	**97**
Suffolk-TCC	**85**	**93**
Charles City Co.	**105**	**131**
6/11:		
Hampton	**87**	**94**
Suffolk-TCC	**86**	**91**
Charles City Co.	**103**	**110**
6/12:		
Hampton	**85**	**91**
Suffolk-TCC	**88**	**94**
Charles City Co.	**104**	**124**
7/2:		
Charles City Co.	**105**	**119**
7/3:		
Charles City Co.	**98**	**106**
Hampton	**98**	**106**
Suffolk-TCC	**98**	**108**
7/4:		
Hampton	**106**	**117**
Suffolk-TCC	**111**	**125**
7/7:		
Charles City Co.	**98**	**110**
7/8:		
Charles City Co.	**86**	**97**
7/9:		
Suffolk-TCC	**89**	**94**
Hampton	**89**	**95**
Charles City Co.	**87**	**99**

7/16:

Suffolk-TCC	**98**	**120**
Hampton	**88**	**92**

7/17:

Suffolk-TCC	**105**	**116**
Hampton	**117**	**134**
Charles City Co.	**120**	**164**

7/18:

Suffolk-TCC	**88**	**99**
Hampton	**96**	**106**

7/31:

Charles City Co.	**85**	**93**

8/1:

Charles City Co.	**94**	**111**
Suffolk-TCC	**97**	**113**
Hampton	**95**	**104**

8/12:

Suffolk-TCC	**89**	**108**
Hampton	**91**	**121**
Charles City Co.	**105**	**114**

8/13:

Hampton	**102**	**128**
Suffolk-TCC	**93**	**116**
Charles City Co.	**117**	**137**

8/19:

Charles City Co.	**93**	**119**

8/23:

Hampton	**103**	**108**
Suffolk-TCC	**89**	**96**
Charles City Co.	**92**	**101**