State of North Carolina's

Amended Recommendation on Boundaries

For the 2008 8-Hour Ozone Standard

February 29, 2012
Governor Beverly Perdue

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Introduction

The purpose of this document is to provide the State of North Carolina's amended recommendations on boundaries for the 2008 8-hour ozone standard.

On March 12, 2008, the United States Environmental Protection Agency (EPA) promulgated a revised 8-hour ozone National Ambient Air Quality Standard (NAAQS) of 75 parts per billion (ppb). On March 12, 2009, the State of North Carolina submitted its boundary recommendation based on the ambient air quality data for 2006-2008. However, in September 2009, the EPA announced that they were going to reconsider the 2008 ozone standard and postponed implementation of this standard. It was announced that the reconsideration of the 2008 ozone standard would be withdrawn on September 2, 2011.

The EPA is now moving forward with the implementation of the 2008 ozone standard. Since most states had submitted boundary recommendations in 2009, the EPA has advised states that they will use the boundary recommendations previously submitted and update them based on the 2008-2010 ambient air quality data. The EPA requested states wishing to revise their boundary recommendations to submit them by October 28, 2011. The EPA also agreed to use 2009-2011 ambient air quality data for the designation process if a state planned to certify their 2011 data early.

North Carolina has elected to certify the 2011 ambient air quality data early. Based on the 2009-2011 data, only the Charlotte-Gastonia-Salisbury area is violating the 2008 8-hour ozone standard. In October 2011, North Carolina submitted a revised boundary recommendation, however, and there was little time to go through a full public comment process before October 28, 2011; therefore, the North Carolina Department of Environmental and Natural Resources (NCDENR) recommended the same area that was recommended in 2009 for the Charlotte-Gastonia-Salisbury area. Given the short timeframe provided by EPA in October 2011, North Carolina reserved the right to further amend the recommendation after consulting with the local elected officials and analyzing the current data.

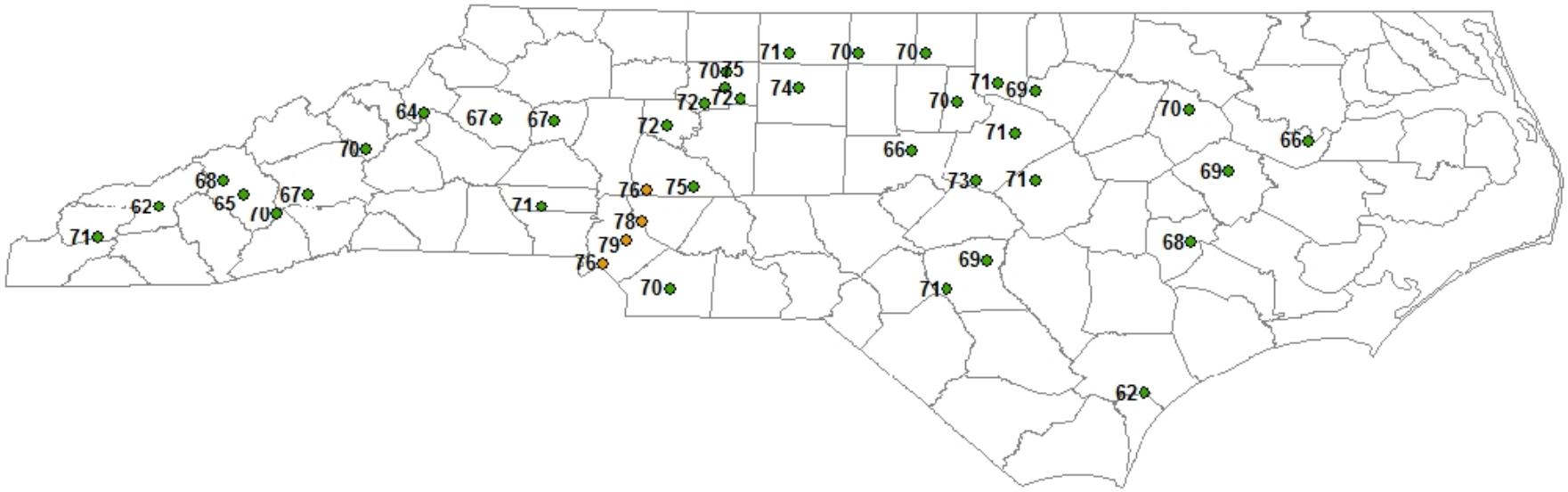
On December 8, 2011, the EPA notified Governor Perdue that they intend to support North Carolina's recommended designation and boundary for the Charlotte-Gastonia-Salisbury area. The EPA also stated that they would work with the State concerning what the appropriate boundary for this area should be. This letter started the 120-day process by which the EPA plans to designate areas as nonattainment. North Carolina has until February 29, 2012, to amend the recommendation as necessary.

Background

The Clean Air Act (CAA) requires the EPA to designate areas as attainment or nonattainment following the promulgation of a new NAAQS. The nonattainment boundaries are to be based on the data collected at the ambient air monitoring stations. The State and local air programs operate the ozone monitoring sites. The data is quality assured, and then submitted to the EPA where it becomes part of a national database. The CAA requires that the monitoring data be evaluated to determine which monitors meet the standard and which monitors violate the standard. For the 8-hour ozone standard, three years worth of data for each monitor is evaluated. The fourth

highest daily maximum 8-hour average ozone value for each of the three years is averaged together, and the resulting average is then compared to the standard. The three-year average is referred to as the design value. With their action on March 12, 2008, the EPA revised the 8-hour ozone standard to 75 ppb. Therefore, a monitored three-year average of 75 ppb meets or attains the standard, while a three-year average of 76 ppb or greater violates the ambient standard.

North Carolina evaluated the ozone monitoring data for the State for the three-year period of 2009-2011, and determined that 4 out of 40 monitors currently violate the 2008 8-hour ozone standard. Figure 1 displays a map of the 2009-2011 8-hour ozone design values for North Carolina. This map and a table used for calculating the respective design values are included in Appendix A. The four violating monitors are all located in the Charlotte-Gastonia-Salisbury metropolitan area.



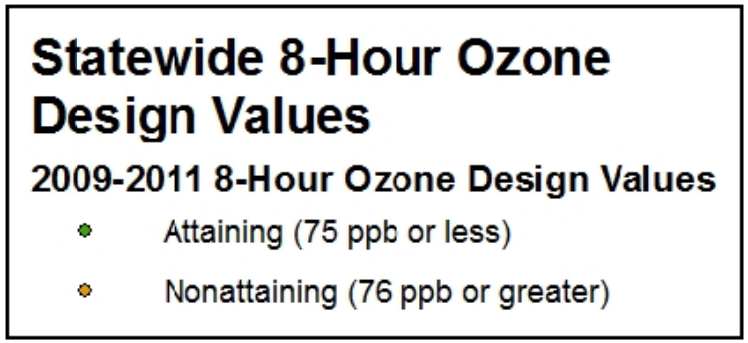


Figure 1: North Carolina's 2009-2011 8-Hour Ozone Design Values Map

Summary of Recommendation

North Carolina recommends a designation of nonattainment for the 2008 8-hour ozone standard for all of Mecklenburg County, and portions of Cabarrus, Gaston, Iredell, Lincoln, Rowan, and Union Counties. North Carolina recommends a designation of attainment for the 2008 8-hour ozone standard for the remainder of North Carolina. The nonattainment area boundary recommendation for the Charlotte-Gastonia-Salisbury combined statistical area is displayed in Figure 2. Tables 1 and 2 summarize North Carolina's recommendation of areas as nonattainment and attainment, respectively, for the 2008 8-hour ozone NAAQS.

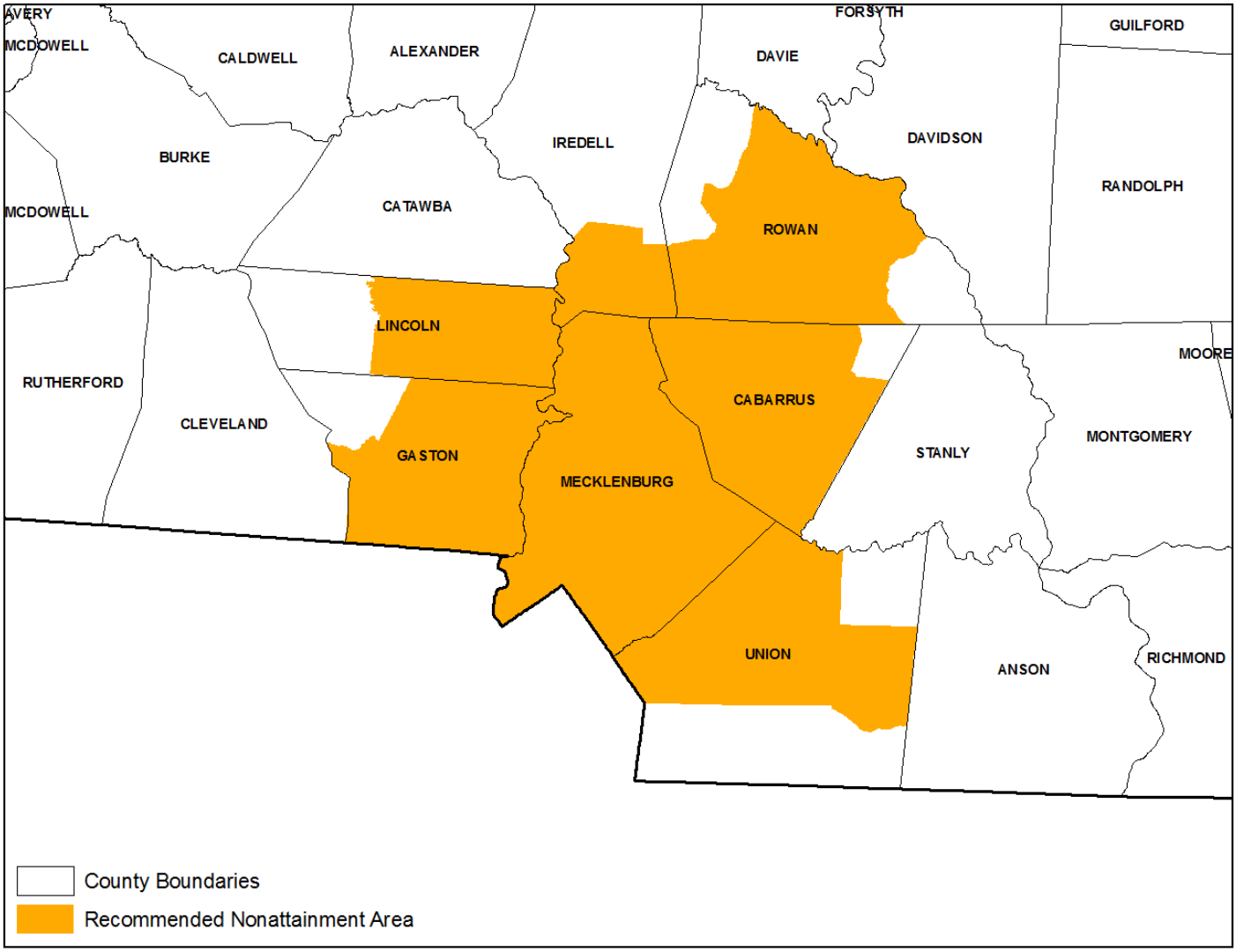


Figure 2: North Carolina's Revised Recommendation For 8-Hour Ozone Nonattainment Area Boundaries

Table 1: North Carolina Boundary Recommendation for 8-Hour Ozone Standard - Nonattainment

Designated Area	Designation Type
Charlotte-Gastonia-Salisbury Area: Cabarrus County (part) Central Cabarrus Township Georgeville Township Harrisburg Township Kannapolis Township Midland Township Mount Pleasant Township New Gilead Township Odell Township Poplar Tent Township Rimertown Township Gaston County (part) Crowders Mountain Township Dallas Township Gastonia Township Riverbend Township South Point Township Iredell County (part) Davidson Township Coddle Creek Township Lincoln County (part) Catawba Springs Township Ironton Township Lincolnton Township Mecklenburg County Rowan County (part) Atwell Township China Grove Township Franklin Township Litaker Township Locke Township Providence Township Salisbury Township Steele Township Unity Township Union County (part) Goose Creek Township Marshville Township Monroe Township Sandy Ridge Township Vance Township	Nonattainment

Table 2: North Carolina Boundary Recommendation for 8-Hour Ozone Standard - Attainment

Designated Area	Designation Type
Alamance County	Attainment
Alexander County	Attainment
Alleghany County	Attainment
Anson County	Attainment
Ashe County	Attainment
Avery County	Attainment
Beaufort County	Attainment
Bertie County	Attainment
Bladen County	Attainment
Brunswick County	Attainment
Buncombe County	Attainment
Burke County	Attainment
Cabarrus County (part)	
Gold Hill Township	Attainment
Caldwell County	Attainment
Camden County	Attainment
Carteret County	Attainment
Caswell County	Attainment
Catawba County	Attainment
Chatham County	Attainment
Cherokee County	Attainment
Chowan County	Attainment
Clay County	Attainment
Cleveland County	Attainment
Columbus County	Attainment
Craven County	Attainment
Cumberland County	Attainment
Currituck County	Attainment
Dare County	Attainment
Davidson County	Attainment
Davie County	Attainment
Duplin County	Attainment
Durham County	Attainment
Edgecombe County	Attainment
Forsyth County	Attainment
Franklin County	Attainment
Gaston County (part)	
Cherryville Township	Attainment
Gates County	Attainment
Graham County	Attainment
Granville County	Attainment

Table 2: North Carolina Boundary Recommendation for 8-Hour Ozone Standard - Attainment

Designated Area	Designation Type
Greene County	Attainment
Guilford County	Attainment
Halifax County	Attainment
Harnett County	Attainment
Haywood County	Attainment
Henderson County	Attainment
Hertford County	Attainment
Hoke County	Attainment
Hyde County	Attainment
Iredell County (part)	
Barringer Township	Attainment
Bethany Township	Attainment
Chambersburg Township	Attainment
Concord Township	Attainment
Cool Springs Township	Attainment
Eagle Mills Township	Attainment
Fallstown Township	Attainment
New Hope Township	Attainment
Olin Township	Attainment
Sharpesburg Township	Attainment
Shiloh Township	Attainment
Statesville Township	Attainment
Turnersburg Township	Attainment
Union Grove Township	Attainment
Jackson County	Attainment
Johnston County	Attainment
Jones County	Attainment
Lee County	Attainment
Lenoir County	Attainment
Lincoln County (part)	
Howards Creek Township	Attainment
North Brook Township	Attainment
Macon County	Attainment
Madison County	Attainment
Martin County	Attainment
McDowell County	Attainment
Mitchell County	Attainment
Montgomery County	Attainment
Moore County	Attainment
Nash County	Attainment
New Hanover County	Attainment
Northampton County	Attainment

Table 2: North Carolina Boundary Recommendation for 8-Hour Ozone Standard - Attainment

Designated Area	Designation Type
Onslow County	Attainment
Orange County	Attainment
Pamlico County	Attainment
Pasquotank County	Attainment
Pender County	Attainment
Perquimans County	Attainment
Person County	Attainment
Pitt County	Attainment
Polk County	Attainment
Randolph County	Attainment
Richmond County	Attainment
Robeson County	Attainment
Rockingham County	Attainment
Rowan County (part)	
Cleveland Township	Attainment
Morgan Township	Attainment
Mount Ulla Township	Attainment
Scotch Irish Township	Attainment
Rutherford County	Attainment
Sampson County	Attainment
Scotland County	Attainment
Stanly County	Attainment
Stokes County	Attainment
Surry County	Attainment
Swain County	Attainment
Transylvania County	Attainment
Tyrrell County	Attainment
Union County (part)	
Buford Township	Attainment
Jackson Township	Attainment
Lanes Creek Township	Attainment
New Salem Township	Attainment
Vance County	Attainment
Wake County	Attainment
Warren County	Attainment
Washington County	Attainment
Watauga County	Attainment
Wayne County	Attainment
Wilkes County	Attainment
Wilson County	Attainment
Yadkin County	Attainment
Yancey County	Attainment

Area Specific Recommendations on Boundaries for 8-hour Ozone Nonattainment

The amended recommendation addresses the designation area boundary criteria laid out in the December 4, 2008 memo from Robert J. Meyers, EPA Principal Deputy Assistant Administrator entitled, "Area Designations for the 2008 Revised Ozone National Ambient Air Quality Standards" (Appendix C). The designation recommendations are also consistent with the methodology behind the establishment of all existing and previous 8-hour ozone nonattainment area boundaries in North Carolina.

The purpose of the remainder of this document is to address the criteria that EPA established for considering boundaries less than the full Core Based Statistical Area (CBSA) or Combined Statistical Area (CSA) for nonattainment designation. The remaining documentation only addresses in detail those areas where North Carolina's amended recommendation is less than the full CBSA or CSA.

Charlotte-Gastonia-Salisbury Metropolitan Area Discussion

EPA's Presumptive 8-Hour Ozone Nonattainment Boundary:

The EPA's presumptive nonattainment boundary would include Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, and Union Counties.

EPA's October 2011 8-Hour Ozone Nonattainment Boundary:

The EPA's accepted nonattainment boundary would include Cabarrus, Gaston, Lincoln, Mecklenburg, Rowan, and Union Counties, and the Townships of Davidson and Coddle Creek in Iredell County

North Carolina's Revised Recommended 8-Hour Ozone Nonattainment Boundary:

North Carolina's recommended nonattainment boundary includes Mecklenburg County; the Townships of Central Cabarrus, Georgeville, Harrisburg, Kannapolis, Midland, Mount Pleasant, New Gilead, Odell, Poplar Tent and Rimertown in Cabarrus County; the Townships of Crowders Mountain, Dallas, Gastonia, Riverbend and South Point in Gaston County; the Townships of Davidson and Coddle Creek in Iredell County; the Townships of Catawba Springs, Ironton and Lincolnton in Lincoln County; the Townships of Atwell, China Grove, Franklin, Gold Hill, Litaker, Locke, Providence, Salisbury, Steele and Unity Townships in Rowan County; and the Townships of Goose Creek, Marshville, Monroe, Sandy Ridge and Vance in Union County (Figure 3).

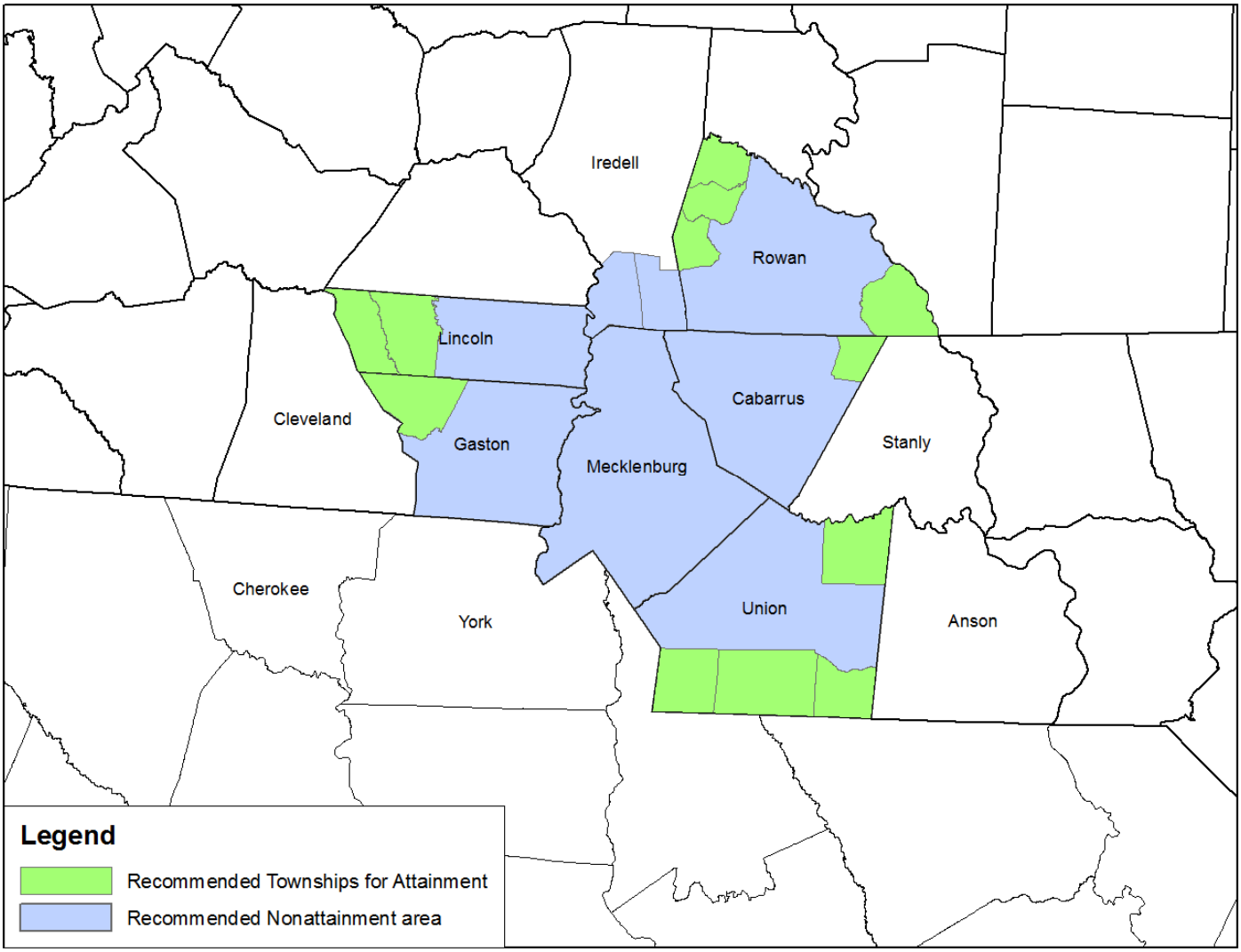


Figure 3: North Carolina's Revised Recommendation for the Charlotte-Gastonia-Salisbury CSA 8-Hour Ozone Nonattainment Area Boundaries

Charlotte-Gastonia-Salisbury CSA 8-Hour Ozone Design Values:

Table 3 below contains the design values for the monitors located in the Charlotte-Gastonia-Salisbury CSA, along with the fourth highest 8-hour average ozone concentrations for 2009 through 2011 which are used to calculate the design values. Figure 4 displays the design values at the monitor locations. Also displayed in Figure 4 are the 2009-2011 design values for Mocksville in Davie County, North Carolina (72 ppb) and Cowpens National Battlefield in Cherokee County, South Carolina (66 ppb). The data from these two monitors support the North Carolina amended boundary recommendation.

Table 3: Charlotte-Gastonia-Salisbury Regional Ozone Design Value Table

Monitoring Sites	County	Annual 4th Highest 8-hr Average			Design Value
		2009	2010	2011	2009-2011
Crouse	Lincoln	0.065	0.072	0.077	0.071
Arrowood	Mecklenburg	0.068	0.078	0.082	0.076
County Line	Mecklenburg	0.071	0.082	0.083	0.078
Garinger (Plaza)	Mecklenburg	0.069	0.082	0.088	0.079
Enochville	Rowan	0.073	0.078	0.078	0.076
Rockwell	Rowan	0.071	0.077	0.077	0.075
Monroe	Union	0.067	0.071	0.073	0.070

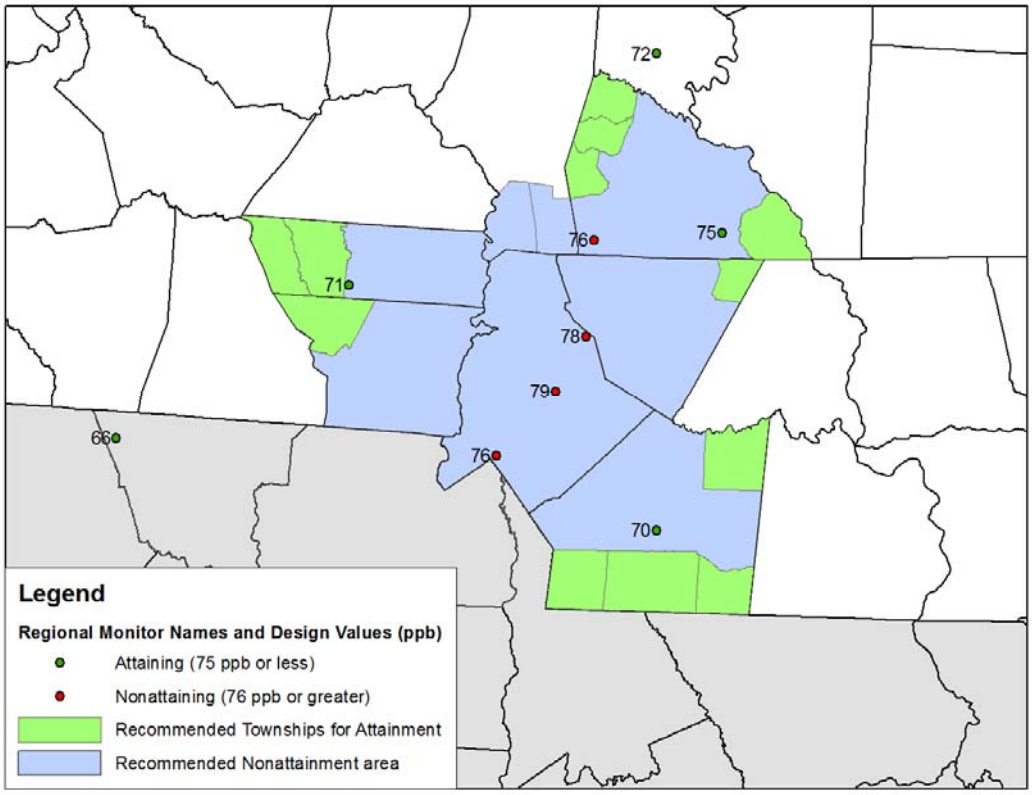


Figure 4: Charlotte-Gastonia-Salisbury Regional 2009-2011 8-Hour Ozone Design Values

Four of the monitors in the Charlotte-Gastonia-Salisbury metropolitan area currently measure the highest ozone values in the State. North Carolina recommends that the whole county of Mecklenburg and the partial counties of Cabarrus, Gaston, Iredell, Lincoln, Rowan, and Union be designated as nonattainment.

All counties within the CSA are discussed below addressing the 9 criteria the EPA identified in their nonattainment boundary guidance (Appendix C).

Anson County

This is a Metropolitan Statistical Area (MSA) county within the Charlotte-Gastonia-Salisbury CSA, and it does not have an ozone monitor located in the county. This is a mostly rural county with low emissions impacts from point sources and commuting traffic into the urbanized core of the CSA. Therefore, North Carolina is recommending no portion of the county be designated as nonattainment.

Air Quality Data*:*

As shown in Figure 4 above, the CSA has 7 monitors with design values ranging from 70 to 79 ppb. The monitor located nearest Anson County is in neighboring Union County in Monroe with a design value of 70 ppb. On days when this monitor has the highest readings, the winds generally are out of the west and southwest. Since Anson County is east of this monitor, the emissions from this county are not expected to impact the air quality on days when this monitor would observe an exceedance of the 2008 ozone standard. Additionally, any area downwind of the Monroe monitor, including Anson County, would be expected to have a design value equal to or lower than 70 ppb.

Emissions Data:

Based on 2010 emissions inventories, Anson County has annual point source emissions of 167 tons and 76 tons of nitrogen oxides (NO_x) and volatile organic compounds (VOCs), respectively. There is one major point source of NO_x in Anson County: the NCEMC Anson plant in Lilesville, emitting 119 tons per year. The NCEMC plant is in the far eastern part of the county and the CSA, and emissions from the plant would have a negligible impact on ozone concentrations within the CSA.

Population Density and Degree of Urbanization*:*

26,948 people live in Anson County. The county is predominantly rural, with all townships having a population density of 121 people per square mile or less. Figure 5 below displays the population density map for the Charlotte-Gastonia-Salisbury CSA. This low population density supports the attainment recommendation.

Traffic and Commuting Patterns*:*

Anson County has 795,460 daily Vehicle Miles Traveled (VMT), according to 2010 data. Anson County contributes less than one-tenth of 1 percent of the commuters who drive into Mecklenburg County to work each day, and ranks the lowest among commuting counties into Mecklenburg. Traffic counts are low compared with the rest of the CSA. Vehicle emissions from this county have a negligible impact on ozone concentrations in the CSA.

Growth Rates and Patterns*:*

The population in Anson County increased by 6.6% from 2000 to 2010, contrary to the 2000 census prediction that the population would decrease by 1.7% during this time period. However, even with the population increase, this is a very modest growth rate compared to the more urban areas of North Carolina and Anson County remains a very rural area. The population is expected to slightly increase from 2010 to 2020 by 1.9%. This county is not expected to grow enough to become a significant contributor to ozone concentrations in the Charlotte-Gastonia-Salisbury CSA.

Meteorology:
Winds across Anson County are climatologically from the southwest. With this climatological wind pattern, the emissions in the county are not expected to impact the ambient air quality in the CSA.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area does not include Anson County and it is not included in North Carolina's recommendations for nonattainment areas under the 2008 8-hour ozone standard.

Level of control of emissions sources*:*
There is one major point source within the county. Mobile sources are another source of NO_x emissions. The combined Federal and state control programs for mobile sources address these emissions. Anson County is not currently subject to a vehicle emissions inspection and maintenance (I/M) program. However, vehicle safety inspections in Anson County require a visual inspection of emissions equipment. Low-sulfur gasoline is required statewide.

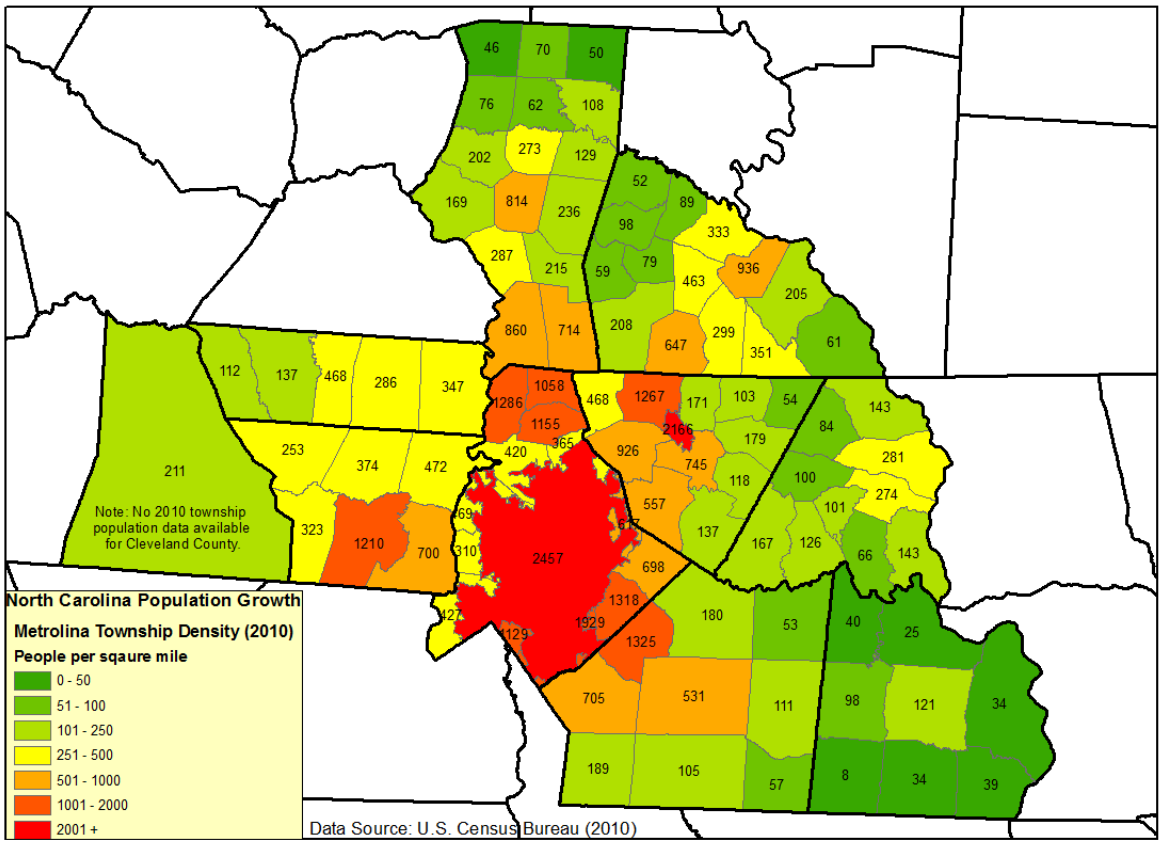


Figure 5. Population Density Map for the Charlotte-Gastonia-Salisbury CSA based on the 2010 Census

Cabarrus County

This is a MSA county within the Charlotte-Salisbury-Gastonia CSA with no ozone monitor located within the county. Most of the eastern portions of Cabarrus County are rural, with the more populated western portions commuting into Mecklenburg County. Therefore, North Carolina is recommending that a smaller portion than the entire county be designated as nonattainment.

The recommendation is that the following townships be designated as nonattainment: Central Cabarrus, Concord, Georgeville, Harrisburg, Kannapolis, Midland, Mount Pleasant, New Gilead, Odell, Poplar Tent, and Rimertown.

Air Quality Data:

As shown in Figure 4 above, the CSA has 7 monitors with design values ranging from 70 ppb to 79 ppb. The monitor nearest to Cabarrus County is located at County Line in Mecklenburg County, with a design value of 78 ppb. The closest monitor to Gold Hill Township, the only township NCDENR is recommending to be designated as attainment, is the Rockwell monitor with a design value of 75 ppb. Rockwell is more representative of the ozone values in Gold Hill Township and would be expected to have a design value below the 76 ppb standard.

Emissions Data:

Based on 2010 emissions inventories, Cabarrus County has 315 tons per year of point-source NO_x and the county has 289 tons per year of point-source VOC. There is a significant source of NO_x, 139 tons per year from the Corning, Inc. plant in Midland.

Gold Hill Township has no point sources greater than 10 tons per year of NOx and no VOC point sources. These very small sources would not be expected to contribute significantly to the ozone concentrations in the CSA.

Population Density and Degree of Urbanization:

Based on the 2010 census, 178,011 people live in Cabarrus County, of which 176,580 live in the portion recommended for nonattainment. The western portion of the county is highly populated and centered around a large interstate corridor, while the eastern portion of the county is mostly rural.

The township recommended for attainment has a population density of 54 people per square mile. This low population density supports the attainment recommendation. (Please see Appendix G for maps of population density.)

Traffic and Commuting Patterns:

Cabarrus County has 5.7 million daily VMT, according to 2010 data. Cabarrus County contributes 5.17 percent of the commuters who drive in to Mecklenburg County to work each day, most of which live in the western portion of the county. Cabarrus County ranks number 2 in commuting counties into Mecklenburg. The VMT are expected to increase to 6.5 million by 2015 and 8.1 million by 2025.

Traffic and commuting counts are quite low for Gold Hill Township, with only 0.3% of the county-wide total of commuters traveling into Mecklenburg County, supporting the attainment recommendation. Please see Appendix H for more information about commuting data from Cabarrus County.

Growth Rates and Patterns:
The population in Cabarrus County showed a significant increase between 2000 and 2010, with an increase of 34.7%. By comparison, population grew by only 13% in Gold Hill Township, much lower than the county average. A county-wide increase of 23.4% is expected between 2010 and 2020.

Meteorology:
Winds in Cabarrus County typically come from the southwest on days that ozone monitors in nearby counties exceed the standard. Less frequently, winds from the northeast are observed on days ozone monitors in nearby counties exceed the standard. With the predominant wind direction being from the southwest, Cabarrus County is impacted by emissions and ozone from Mecklenburg County. Emissions generated in the western portions of Cabarrus County drift into Rowan County.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area includes all of Cabarrus County. North Carolina is recommending the townships of Central Cabarrus, Concord, Georgeville, Harrisburg, Kannapolis, Midland, Mount Pleasant, New Gilead, Odell, Poplar Tent, and Rimertown be designated as nonattainment for the 2008 standard. This is a slight departure from the prior recommendation, but North Carolina believes this deviation is appropriate, given the design value trend at the Rockwell site and the 9-factor analysis.

Level of control of emissions sources:
Cabarrus County currently has a vehicle emissions I/M program and low-sulfur gasoline is required statewide.

Cleveland County

This is a Micropolitan Statistical Area (MiSA) county within the Charlotte-Gastonia-Salisbury CSA, and it does not have a monitor located in the county. This is a mostly rural county with a low impact from commuting traffic into the urbanized core of the CSA. Therefore, North Carolina is recommending no portion of the county be designated as nonattainment.

Air Quality Data*:*
As shown in Figure 4 above, this CSA has 7 monitors with design values ranging from 70 to 79 ppb. The North Carolina monitor located nearest Cleveland County is in neighboring Lincoln County in Crouse with a design value of 71 ppb. On days when this monitor has the highest readings, the winds generally are out of the east. Portions of Cleveland County are

located southwest of this monitor. Since there are no major NOx sources located in Cleveland County and this monitor is attaining the 2008 ozone standard, it is not likely that emissions from this county would significantly contribute to a violation of the 2008 standard in the CSA. There is another monitor located across the state line at Cowpens National Battlefield in South Carolina. The design value at Cowpens is 66 ppb. Ozone design values across Cleveland County likely range from 66-70 ppb.

Emissions Data*:*
Based on 2010 emissions inventories, Cleveland County has annual point source emissions of 150 tons and 224 tons of NO_x and VOC, respectively. There are no major point sources of NO_x or VOC.

Population Density and Degree of Urbanization*:*
Based on the 2010 census, 98,078 people live in Cleveland County. Cleveland County is predominantly a rural county with a population density of 211 people per square mile (see Figure 5). This very low population density supports the attainment recommendation.

Traffic and Commuting Patterns*:*
Cleveland County has 2,678,000 daily VMT, according to 2010 data. Cleveland County contributes less than 0.5 percent of the commuters who drive into Mecklenburg County to work each day. The VMT are expected to increase by 1.5 percent through 2020. Through-traffic (non-commuting) along I-85 and US-74 accounts for the majority of the traffic counts within the county. Vehicle emissions from this county have a negligible impact on ozone concentrations in the CSA.

Growth Rates and Patterns*:*
The population of Cleveland Country grew by 1.7% between 2000 and 2010, with a 2010 population of 98,078. The population in Cleveland County is expected to grow slightly between 2010 and 2020, with an increase of 3.8%. These are very small growth rates compared to other parts of North Carolina. This county is not expected to grow enough to become a significant contributor to ozone concentrations in the Charlotte-Gastonia-Salisbury CSA.

Meteorology:
Winds across Cleveland County are climatologically from the southwest, which makes the ozone monitor located in Lincoln County the downwind monitor. However, there are no major NOx sources located in Cleveland County and the Lincoln County monitor is attaining the 2008 ozone standard. Therefore, it is not likely that emissions from Cleveland County would significantly contribute to a violation of the 2008 ozone standard in the CSA.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area does not include Cleveland County and it is not included in North Carolina's recommendation for nonattainment areas under the 2008 8-hour ozone standard.

Level of control of emissions sources*:*
Cleveland County currently has no major point sources of NO_x or VOC. Mobile sources are another source of NO_x emissions. The combined federal and state control programs for mobile sources address these emissions. Cleveland County currently has a vehicle emissions I/M program and low-sulfur gasoline is required statewide.

Gaston County

This is a MSA county within the Charlotte-Gastonia-Salisbury CSA, and it does not have an ozone monitor located in the county. This is a high commuter county into the Charlotte area along the I-85 corridor. The northwestern portion of the county is rural, so the recommendation is for a smaller nonattainment area than the entire county.

The recommendation is that the following five townships in the southern and eastern portions of Gaston County be designated as nonattainment: Dallas, Riverbend, Crowders Mountain, Gastonia and South Point.

Air Quality Data:
As shown in Figure 4 above, this CSA has 7 monitors with design values ranging from 70 ppb to 79 ppb. The monitor located closest to Gaston County is in neighboring Lincoln County in Crouse with a design value of 71 ppb. However, on days when this monitor has the highest readings, the winds are generally out of the east. This indicates that the emissions from the northwestern portion of Gaston County are not likely to contribute to the Crouse monitor's highest ozone levels. Since a significant amount of commuter traffic from the southern and eastern townships travel into Mecklenburg County, those five townships may be impacting the ambient air quality data in this CSA. Therefore, North Carolina is recommending that these five townships be designated as nonattainment.

Emissions Data:
Based on 2010 emissions inventories, Gaston County has annual point source emissions of 6,774 tons and 477 tons of NO_x and VOC, respectively. There are some industrial sources in the county, including two electric utility plants owned by Duke Energy, which are subject to the NO_x SIP call, the Clean Air Interstate Rule (CAIR), and the NC Clean Smokestacks Act.

The Cherryville Township located in northwest Gaston County, the township NCDENR is recommending for attainment, has only a few very small NO_x and VOC point sources that would have a negligible impact on the violating monitors in this CSA.

Population Density and Degree of Urbanization:
206,086 people live in Gaston County and 189,586 people live in the five townships recommended as nonattainment, which is 92% of the County's population. The majority of

the townships in Gaston County have population densities greater than 300 people per square mile or higher, with Gastonia being the highest at over 1200 people per square mile (Figure 5).

Cherryville Township has the lowest population density of any Gaston County townships, at 253 people per square mile. NCDENR believes this low population density supports the attainment recommendation. This population density is right at the threshold mentioned in the EPA technical support document provided with the December 2011 letter (Appendix C).

Traffic and Commuting Patterns:
Gaston County has 5.7 million average daily VMT, according to 2010 data. Gaston County contributes 4.97 percent of the commuters who drive into Mecklenburg County to work each day. Gaston ranks number 4 in the commuting counties into Mecklenburg. The VMT are expected to increase to approximately 7.5 million by 2015 and 9.1 million by 2025.

Traffic and commuting counts are very low in Cherryville Township compared to the rest of the county. For Cherryville Township, there were approximately 800 trips to/from Mecklenburg County, which was under 3% of the county total and less than 0.2% of trips to/from Mecklenburg in the entire CSA. Therefore, NCDENR recommends Cherryville Township be designated attainment.

Growth Rates and Patterns:
The population in Gaston County grew approximately 8.26% from 2000 to 2010, and an additional growth of 17.2% is expected between 2010 and 2020. The majority of this growth occurred in the eastern two-thirds of the county, with the largest increases observed in Riverbend and South Point Townships, which border Mecklenburg County.

Cherryville Township's population increased by only 776 people, which corresponds to a 5.2% increase in the township's population density. The low population growth in Cherryville Township supports a designation of attainment.

Meteorology:
Winds across Gaston County are climatologically from the southwest. With this climatological wind pattern, the emissions in the county are more likely to impact northern and eastern portions of the CSA. Commuter traffic emissions as well as those of point sources (especially the two Duke Energy facilities), would have an impact on the air quality of these regions of the CSA.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area includes all of Gaston County. North Carolina is recommending Cherryville Township be designated attainment. This is a slight departure from the prior recommendation, but North Carolina believes this deviation is

appropriate, given the design value trend at both the Crouse site in Lincoln County and the Cowpens site in northern South Carolina, and the 9-factor analysis.

Level of control of emissions sources:
Gaston County currently has 2 major point sources for NO_x and no major point sources for VOCs. The two major NO_x point sources- Duke Energy's Allen and Riverbend Steam Plants- are subject to the NC Clean Smokestacks Act as well as the NO_x SIP call and CAIR. Mobile sources are another source of NO_x emissions. The combined federal and state control programs for mobile sources address these emissions. Gaston County currently has a vehicle emissions I/M program and low-sulfur gasoline is required statewide.

Iredell County

This is a MiSA county within the Charlotte-Gastonia-Salisbury CSA, and it does not have an ozone monitor located in the county. This is a high commuter county into the Charlotte area along the I-77 corridor. The northern portion of the county is rural, so the recommendation is for a smaller area than the entire county.

The recommendation is that the two townships in the southern portion of Iredell County, Coddle Creek and Davidson Townships, be designated as nonattainment.

Air Quality Data:
As shown in Figure 4 above, this CSA has 7 monitors with design values ranging from 70 ppb to 79 ppb. The monitor located closest to Iredell County is in neighboring Rowan County in Enochville with a design value of 76 ppb. However, on days when this monitor has the highest readings, the winds are generally out of the southwest, indicating that the emissions from the northern portion of Iredell County are not likely to contribute to the Enochville monitor's high ozone levels since this area is north and west of this monitor. Since a significant amount of commuter traffic from the southern two townships travel into Mecklenburg County, the lower two townships may be impacting the ambient air quality data in this CSA. Therefore, North Carolina is recommending just the two lower townships be designated nonattainment.

Emissions Data:
Based on 2010 emissions inventories, Iredell County has annual point source emissions of 2,114 tons and 916 tons of NO_x and VOC, respectively. There are some industrial sources in the county, including a natural gas pumping station, which is subject to the NO_x SIP call. The natural gas pumping station is located in the recommended nonattainment area.

Population Density and Degree of Urbanization:
159,437 people live in Iredell County and 65,385 people live in the two townships recommended as nonattainment, which is 41% of the County's population. The northern, eastern and western portions of Iredell County have low population density with 11 townships having population densities of 250 people per square mile or less. Statesville, located in central Iredell County, has a population density of 814 people per square mile.

The area being recommended for nonattainment, the two townships in the southern portion of Iredell County, is densely populated, having population density values of 860 and 714 people per square mile.

Traffic and Commuting Patterns:
Iredell County has 5.7 million average daily VMT, according to 2010 data. Iredell County contributes 1.91 percent of the commuters who drive into Mecklenburg County to work each day. Iredell ranks number 5 in the commuting counties into Mecklenburg. The VMT are expected to increase to approximately 7.3 million by 2020. Traffic counts are highest in the southern townships and decline substantially in the next tier of townships.

The southern two townships are covered by the region's Travel Demand Model, which predicts that the VMT in 2010 will be 3 million, 3.4 million by 2015, and 4.1 million in 2025.

Growth Rates and Patterns:
The population in Iredell County grew considerably from 2000 to 2010, increasing by 30%, and an additional growth of 17.2% is expected between 2010 and 2020. The majority of this growth occurred in the two southern townships being recommended for nonattainment. Figure 6 displays the percent growth between 2000 and 2010 for each township. Davidson Township's population growth was 90 percent and Coddle Creek Township's growth was 43 percent. All other townships were less than 40 percent with most being less than 20 percent.

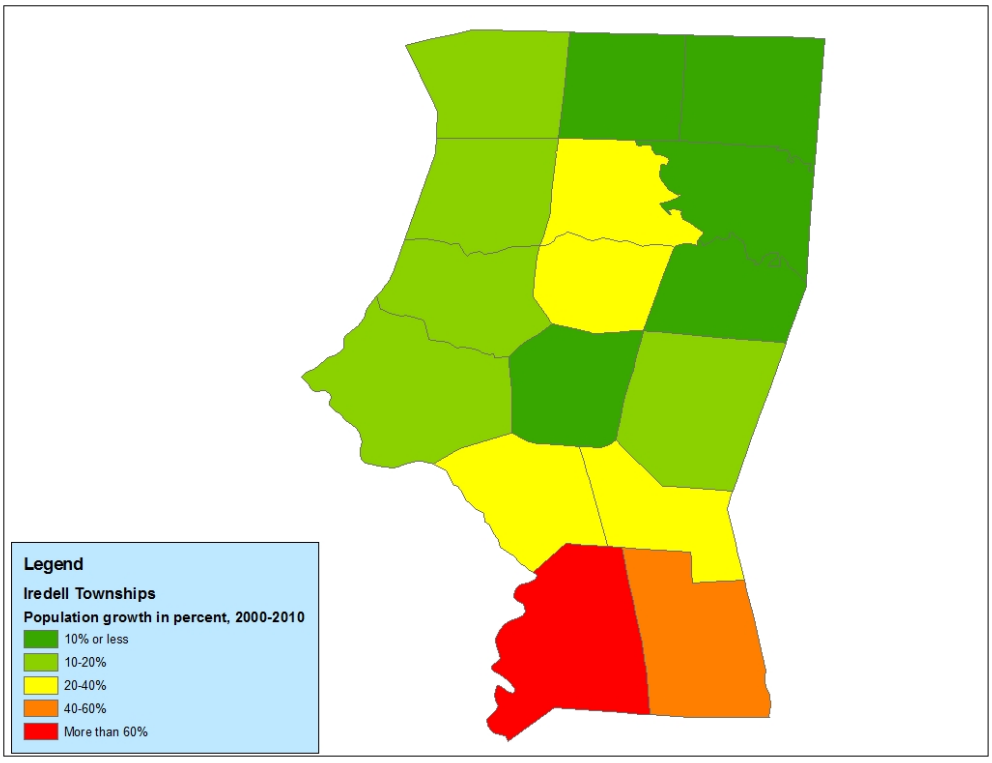


Figure 6. Percent Growth Between 2000 and 2010 for Iredell County

Meteorology:
Winds across Iredell County are climatologically from the southwest. With this climatological wind pattern, the emissions in the county are more likely to impact areas outside of the CSA. However, the commuter traffic emissions from the southern two townships would still impact the air quality in the CSA even with southwest winds. On days when the winds are from the north, the emissions will add to the Charlotte area's pollution. Therefore, North Carolina is recommending just the two lower townships be designated nonattainment.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area includes the southern portion of Iredell County, and is consistent with North Carolina's recommendation for nonattainment areas under the 2008 8-hour ozone standard.

Level of control of emissions sources:
Iredell County currently has 2 major point sources for NO_x and two major point sources for VOCs. The natural gas pumping station, located in Davidson Township, is subject to the NO_x SIP Call and has taken permit limits to address the requirements of the NO_x SIP Call. The other large NO_x source is a glass manufacturer located just outside of the recommended nonattainment area, which burns only natural gas, a lower emitting fossil fuel. Mobile sources are another source of NO_x emissions. The combined federal and state control programs for mobile sources address these emissions. Iredell County currently has a vehicle emissions I/M program and low-sulfur gasoline is required statewide.

Lincoln County

This is a MiSA county within the Charlotte-Gastonia-Salisbury CSA. There is a monitor located within the county, at the Crouse site near Lincolnton. The 2009-2011 Design Value for the Crouse site was 71 ppb, which is lower than the 75 ppb standard. The increasing population along and east of Highway 321, many of whom commute into the Charlotte area, combined with the moderate commuting traffic along Highway 321, indicates the necessity to include at least a portion of this county in the nonattainment boundary recommendation. The western portion of the county is rural, so the recommendation is for a smaller area than the entire county.

<u>The recommendation is that the three townships in the central and eastern portion of Lincoln County- Catawba Springs, Ironton and Lincolnton Townships- be designated as nonattainment.</u>

Air Quality Data:
As shown in Figure 4 above, this CSA has 7 monitors with design values ranging from 70 ppb to 79 ppb. The monitor located within Lincoln County, in Crouse, has a design value of 71 ppb. On days where the greater Charlotte area has its highest ozone days, winds are generally from the southwest. The eastern townships may be impacting the ambient air quality in this CSA. The Crouse monitor experiences higher ozone when winds are blowing

generally out of the east, from the general direction of downtown Charlotte. The two western townships are downwind of the monitor on the higher ozone days, and would be expected to have even lower ozone values than are recorded at the Crouse monitor. Therefore, North Carolina is recommending just the three eastern townships be designated nonattainment.

Emissions Data:
Based on 2010 emissions inventories, Lincoln County has annual point source emissions of 130 tons and 403 tons of NO_x and VOC, respectively. There are no major sources of NO_x emissions and only one major VOC source within the county.

The two western townships, Howards Creek and North Brook, contain no NO_x or VOC point sources. This supports the attainment recommendation for these two townships.

Population Density and Degree of Urbanization:
Based on the 2010 census, 78,265 people live in Lincoln County and 63,437 people live in the three townships recommended as nonattainment, which is 81% of the County's population. The eastern three townships within Lincoln County, where Lincolnton and Catawba Springs are located, are densely populated, with population values of 468, 286, and 347 people per square mile. This more densely populated area is located in the three eastern townships being recommended for nonattainment.

The western two townships have low population densities of 112 and 137 people per square mile. This very low population density supports the attainment recommendation.

Traffic and Commuting Patterns:
Lincoln County has 2.3 million average daily VMT, according to 2010 data. Lincoln County contributes approximately 1.49 percent of the commuters who drive into Mecklenburg County to work each day. Lincoln ranks number 6 in the commuting counties into Mecklenburg. The VMT are expected to increase to approximately 2.7 million by 2015 and 3.4 million by 2025. A significant amount of commuter traffic from the three eastern townships travels into Mecklenburg County. Therefore, the eastern townships may be impacting the ambient air quality data in this CSA and NCDENR recommends the three eastern townships be designated nonattainment.

Traffic and commuting is very low in the two western townships. Commuter traffic into Mecklenberg from the two western townships was an estimated 230 trips, which was less than 3% of the county total and less than 0.4% of the CSA total.

Growth Rates and Patterns:
The population in Lincoln County grew considerably from 2000 to 2010, increasing by 22%, and an additional growth of 20% is expected between 2010 and 2020. The majority of this growth occurred in the eastern half of the county. The population of the eastern-most township, Catawba Springs, increased by nearly 7,700 people from 2000 to 2010, which corresponds to an increase in population density of over 53%. Conversely, the two townships recommended for attainment, Howards Creek and North Brook, only grew by

1,313 and 665 people, respectively, from 2000 to 2010; this corresponds to a respective increase in population density of 17% and 13.1% for these two townships.

Meteorology:
Winds across Lincoln County are climatologically from the southwest. With this climatological wind pattern, the emissions in eastern portions of the county are more likely to impact areas over the far-northern portions of the CSA. Additionally, the commuter traffic emissions from the central and eastern three townships could impact the air quality in the CSA. Therefore, North Carolina is recommending the three central and eastern townships be designated nonattainment.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area includes all of Lincoln County. North Carolina is recommending only the townships of Catawba Springs, Ironton and Lincolnton be designated nonattainment. This is a slight departure from the prior recommendation, but North Carolina believes this deviation is appropriate, given the design value trend at the Crouse site in Lincolnton and the 9-factor analysis.

Level of control of emissions sources:
Lincoln County has one major point VOC source and no major NO_x sources. Since North Carolina is NO_x limited with respect to ozone formation, controlling man-made VOC sources does not reduce ozone concentrations. Therefore, the level of control for this VOC source should not be of consideration for nonattainment boundary designation. Mobile sources are another source of NO_x emissions, but the combined federal and state control programs for mobile sources address these emissions. Lincoln County currently has a vehicle emissions I/M program and low-sulfur gasoline is required statewide.

Mecklenburg County

This is a MSA county within the Charlotte-Salisbury-Gastonia CSA with three violating monitors. The entire county is considered urban or suburban, with high volumes of traffic commuting within and into the county from surrounding counties within the CSA. Therefore, North Carolina is recommending that all of Mecklenburg County be designated nonattainment.

Air Quality Data
As shown in Figure 4 above, this CSA has 7 monitors with design values ranging from 70 ppb to 79 ppb. Three monitors are located within the city of Charlotte, in Mecklenburg County. All three of these monitors are violating the 2008 8-hour ozone standard. The Arrowood monitor has a design value of 76 ppb, the Garinger High School monitor has a design value of 79 ppb, and the County Line monitor has a design value of 78 ppb.

Emissions Data:
Based on 2010 emissions inventories, Mecklenburg County has 208 tons per year of point-source NO_x and 198 tons per year of point-source VOC. There are no major point sources of NO_x or VOC within Mecklenburg County. (Please see Appendix F for more NO_x and VOC point source information.) Although there are no major point sources located in Mecklenburg County, this county has the highest amount of mobile source emissions in the State. These emissions contribute significantly to the ozone concentrations in the county.

Population Density and Degree of Urbanization:
Mecklenburg County has the highest population of any county in the CSA. 919,628 people live in Mecklenburg County as of 2010. The city of Charlotte has the highest population density of any township within the CSA, at over 2400 people per square mile. The lowest population densities within Mecklenburg County are within the townships immediately bordering Charlotte to the north and west. The lowest population density of these townships is 310 people per square mile. Since all townships within Mecklenburg County are above 250 people per square mile, it supports a designation of nonattainment. (Please see Appendix G for maps of population density.)

Traffic and Commuting Patterns:
Mecklenburg County has 32.4 million daily VMT, according to 2010 data. 71 percent of the commuting traffic to Mecklenburg County originates in Mecklenburg County, with the remaining 29 percent originating from surrounding counties within the CSA. Heavily-traveled roadways are observed throughout the county, in addition to high volumes of through traffic from Interstates 85 and 77. Please see Appendix H for more information about commuting in Mecklenburg County and the Charlotte-Gastonia-Salisbury CSA.

Growth Rates and Patterns:
The population in Mecklenburg County increased by 31% between 2000 and 2010. The population of Mecklenburg County is projected to grow by 19% between 2010 and 2020.

Meteorology:
Winds across Mecklenburg County vary somewhat on days with high ozone, depending on which of the three monitors is the highest; winds are generally out of the north on days where the Arrowood monitor is high, and winds are generally out of the south and west on days where the County Line monitor is high. Winds can be out of the north, south or west on days where the Garinger monitor is high, but rarely out of the east. This suggests that the ozone concentrations in Mecklenburg County are being impacted by precursor emissions originating from Mecklenburg County, which supports a designation of nonattainment for the whole County. Please see Appendix I for more information.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area includes all of Mecklenburg County, and is consistent with North Carolina's recommendation for nonattainment areas under the 2008 standard.

Level of control of emissions sources:
Mecklenburg County currently has a vehicle emissions I/M program and low-sulfur gasoline is required statewide.

Rowan County

This is a MiSA county within the Charlotte-Salisbury-Gastonia CSA with an attaining monitor located in the southeastern portion of the county and a violating monitor located in the southwestern portion of the county. The far northwestern and far southeastern portions of the county are rural. Therefore, North Carolina is recommending that a smaller portion than the entire county be designated as nonattainment.

<u>The recommendation is the following nine townships be designated nonattainment: Atwell, China Grove, Franklin, Gold Hill, Litaker, Locke, Providence, Salisbury, Steele and Unity.</u>

Air Quality Data
As shown in Figure 4 above, this CSA has 7 monitors with design values ranging from 70 ppb to 79 ppb. The monitors within Rowan County are located in the towns of Enochville (design value of 76 ppb) and Rockwell (design value of 75 ppb). The Mocksville monitor, located in Davie County just north of Rowan County, has a design value of 72 ppb. Interpolating between the Enochville and Mocksville monitors, the northwestern townships (Scotch Irish, Cleveland, Mount Ulla) would be expected to have a design value below 76 ppb. Morgan Township is typically downwind of the Rockwell monitor on days when ozone exceedances are observed, and would be expected to have a design value lower than the Rockwell design value.

Emissions Data:
Based on 2010 emissions inventories, Rowan County has 1,853 tons per year of point-source NO_x and the county has 1,418 tons per year of point-source VOC. There are several major sources of both NO_x and VOC throughout the county.

There is one major source of VOC emissions within the townships NCDENR is recommending for attainment. This source is located in Cleveland Township and emits approximately 211 tons of VOC per year. Since North Carolina is NO_x limited with respect to ozone formation, controlling man-made VOC sources does not reduce ozone concentrations. There are no sources of NO_x greater than 10 tons per year within the townships recommended for attainment. These very small NOx sources would not be expected to contribute significantly to the ozone concentrations in the CSA.

Population Density and Degree of Urbanization:
Based on the 2010 census, 138,428 people live in Rowan County, of which 128,675 live in the portion recommended for nonattainment. The far northwestern and far eastern townships in the county are mostly rural with population densities less than 100 people per square mile. Conversely, the areas recommended for nonattainment in general have a significantly higher population density and are more urban in nature (see Figure 5).

The four townships recommended to be designated attainment have population density ranging from 52 to 98 people per square mile. This very low population density supports the attainment recommendation.

Traffic and Commuting Patterns:
Rowan County has 5.3 million daily VMT, according to 2010 data. Rowan County contributes 0.96 percent of the commuters who drive in to Mecklenburg County to work each day, most of which live in the central and south-central portions of the county. Rowan County ranks number 8 in commuting counties into Mecklenburg. The VMT is expected to increase to 5.7 million by 2015 and 6.9 million in 2025.

The far northwestern and far eastern townships in the county have very low traffic counts and would have little impact on ozone concentrations in the CSA. Morgan, Mount Ulla and Scotch Irish Townships collectively account for approximately 98 trips to Mecklenburg County, which represents about 2% of the total from Rowan County and 0.02% from the entire CSA.

Growth Rates and Patterns:
The population in Rowan County increased slightly between 2000 and 2010 (5.9%). The townships recommended for attainment showed a combined population growth of 466 people during this time. Of these, Mount Ulla Township had the highest growth- 295 people, corresponding to an increase in population density of 21%. Cleveland and Scotch Irish Townships increased 4% in population density, while Morgan Township actually decreased slightly in population. The population of Rowan County is projected to grow only 6.5% between 2010 and 2020.

Meteorology:
Winds across Rowan County are climatologically from the southwest on days with high ozone. With this climatological wind pattern, the emissions from the northwestern and far eastern townships within the county have only slight impacts on the air quality within the CSA, especially given the lack of point sources and limited vehicle emissions within these townships.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area includes all of Rowan County. North Carolina is recommending the townships of Atwell, China Grove, Franklin, Gold Hill,

Litaker, Locke, Providence, Salisbury, Steele and Unity be designated nonattainment. This is a slight departure from the prior recommendation, but North Carolina believes this deviation is appropriate, given the design value trends of the Mocksville and Rockwell monitors, and the 9-factor analysis.

Level of control of emissions sources:
Rowan County currently has a vehicle emissions I/M program and low-sulfur gasoline is required statewide.

Stanly County
This is a MiSA county within the Charlotte-Gastonia-Salisbury CSA, and it does not have a monitor located in the county. This is a mostly rural county with a low impact on commuting traffic into the urbanized core of the CSA. Therefore, North Carolina is recommending no portion of the county be designated as nonattainment.

Air Quality Data*:*
As shown in Figure 4 above, this CSA has 7 monitors with design values ranging from 70 to 79 ppb. The monitor located nearest Stanly County is in neighboring Rowan County in Rockwell with a design value of 75 ppb. Winds on the highest ozone days at the Rockwell monitor typically blow from the southwest or northeast, and any emissions from Stanly County would have a negligible impact The other monitor on the eastern side of the CSA is Monroe, which has a design value of 70 ppb, well below the 2008 ozone standard. On days when the Monroe monitor has the highest ozone readings, the winds are generally out of the west and southwest.

Emissions Data*:*
Based on 2010 emissions inventories, Stanly County has annual point source emissions of 273 tons and 424 tons of NO_x and VOC, respectively. There is one major VOC point source and no major sources of NO_x emissions in Stanly County. Since Stanly County is located south and east of the Rockwell monitor and the four violating monitors, and there are no large NO_x sources located in this county, any emissions from Stanly County would have a negligible impact on the air quality in the CSA.

Population Density and Degree of Urbanization*:*
Based on the 2010 census, 60,585 people live in Stanly County. Stanly County is a predominantly rural area with most of the county having a population density of 167 people or less per square mile. Two townships in and around Albemarle are the only semi-populous areas of the county with population densities of 274 and 281 people per square mile. (Figure 5).

Traffic and Commuting Patterns*:*
Stanly County has 1,330,630 daily VMT, according to 2010 data. Stanly County contributes less than 1 percent of the commuters who drive into Mecklenburg County to work each day. Traffic counts are low compared with the rest of the CSA (See Appendix H).

Growth Rates and Patterns*:*
The population in Stanly County increased slightly from 2000 to 2010 by a rate of 4%, with a further population increase of 7.3% expected from 2010 to 2020. This is a very modest growth rate compared to the more urban areas of North Carolina and Stanly County remains predominantly a rural area. This county is not expected to grow enough to become a significant contributor to ozone exceedances in the Charlotte-Gastonia-Salisbury CSA.

Meteorology:
Winds across Stanly County are climatologically from the southwest. With this climatological wind pattern, the emissions in the county are not expected to impact the air quality in the CSA.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area does not include Stanly County and it is not included in North Carolina's recommendations for nonattainment areas under the 2008 8-hour ozone standard.

Level of control of emissions sources:
Stanly County currently has one major VOC point source and no major NOx sources. Since North Carolina is NOx limited with respect to ozone formation, controlling man-made VOC sources does not reduce ozone concentrations. Therefore, the level of control for this VOC source should not be of consideration for nonattainment boundary designation. Mobile sources are another source of NOx emissions. The combined federal and state control programs for mobile sources address these emissions. Stanly County has a vehicle emissions I/M program. Low-sulfur gasoline is required statewide.

Union County

This is a MSA county within the Charlotte-Salisbury-Gastonia CSA with an attaining monitor located in the central portion of the county. Most of the eastern and southern portions of Union County are rural, with higher population densities in the western portions commuting into Mecklenburg County. Therefore, North Carolina is recommending that a portion of the county be designated as nonattainment.

The township of Marshville was considered to be recommended for attainment, but a 50-ton point source of NO_x as well as a nonattainment request from elected officials has led NCDENR to recommend Marshville Township nonattainment.

<u>The recommendation is that the following townships be designated nonattainment - Goose Creek, Marshville, Monroe, Sandy Ridge and Vance.</u>

Air Quality Data
As shown in Figure 4 above, this CSA has 7 monitors with design values ranging from 70 ppb to 79 ppb. The monitor within Union County is located in the city of Monroe, with a design value of 70 ppb. The Monroe monitor experiences higher ozone primarily when winds are blowing from the west and southwest, from downtown Charlotte. The southern and western townships are downwind of the monitor on the higher ozone days, and would be expected to have even lower ozone values than are recorded at the Monroe monitor. Therefore, North Carolina is recommending that the five townships near and upwind of the Monroe monitor be included as nonattainment.

Emissions Data:
Based on 2010 emissions inventories, Union County has 212 tons per year of point-source NO_x and the county has 506 tons per year of point-source VOC. The only major source is located in Marshville Township with 135 tons per year of VOC and 50 tons per year of NO_x. This source is located in the area North Carolina is recommending be designated as nonattainment.

Population Density and Degree of Urbanization:
201,292 people live in Union County as 2010, of which 173,775 people live in the portion recommended for nonattainment. The eastern and southern portion of the county is mostly rural; all four townships that NCDENR is recommending be designated attainment have population densities of 189 people per square mile or less. The area recommended for nonattainment is more urbanized with three of the six townships having a population density of greater than 500 people per square mile. (Please see Appendix G for maps of population information).

Traffic and Commuting Patterns:
Union County has 5.2 million daily VMT, according to 2010 data. Union County contributes 6.84 percent of the commuters who drive in to Mecklenburg County to work each day, most of which live in the western portion of the county. Union County ranks number 1 in commuting counties into Mecklenburg. The VMT are expected to increase to 6.5 million in 2015 and 8.7 million in 2025. There is a significant amount of commuter traffic from the northern and western townships into Mecklenburg County. These townships (Monroe, Sandy Ridge, Vance and Goose Creek) may be impacting the ambient air quality data in the CSA. The 4 townships recommended for attainment have lower traffic counts compared to the 5 townships that are recommended for nonattainment. Of the 4 townships to be excluded, Jackson Township had an estimated 1563 trips to/from Mecklenburg County, which was 4.1% of the county total and 0.3% of the trips from the entire CSA. Traffic to/from Mecklenburg for the 3 other townships (Buford, Lanes Creek, and New Salem) was even less.

Growth Rates and Patterns:
The population in Union County showed a significant increase between 2000 and 2010, with an increase of 60.5%. Most of the increases were focused over the townships of Monroe, Vance, Goose Creek and Sandy Ridge. Vance Township's population increased by 27,237 from 2000 to 2010, corresponding to a 109% increase in population density. Sandy Ridge

Township increased in population by 29,245, a 181% increase in population density. The townships recommended for attainment collectively increased by 5,144 people during this time. A county-wide increase in population of 26% is expected between 2010 and 2020.

Meteorology:
Winds across Union County are climatologically from the southwest or northeast. With this climatological wind pattern, the point source emissions from the eastern and southern portions of the county have no significant impact on the degradation of the air quality within the CSA. However, the commuting traffic from the western portion of the county could impact the air quality.

Geography/Topography:
There are no special geography or topography issues to consider in this region.

Jurisdictional Boundaries:
The existing 1997 8-hour ozone standard nonattainment area includes all of Union County. North Carolina is recommending only the townships of Goose Creek, Marshville, Monroe, Sandy Ridge and Vance be designated nonattainment. This is a slight departure from the prior recommendation, but North Carolina believes this deviation is appropriate, given the design value trend at the Monroe monitor and the 9-factor analysis.

Level of control of emissions sources:
Union County currently has 1 major source of VOC's producing 136 tons per year, which is located in the recommended nonattainment boundary. NOx emissions are from minor sources and from mobile sources, and the combined federal and state control programs will address these emissions. Union County currently has a vehicle emissions I/M program and low-sulfur gasoline is required statewide.