The North Carolina Geographer

Volume 16, 2008

From the Editor

Dear fellow Geographers:

This 16th volume of *The North Carolina Geographer* is the first to be produced at the University of North Carolina at Greensboro. The journal continues to provide an outlet for research articles, reviews, and commentary relevant to the geography of the state. In this volume Olga Smirnova, Gerald Ingalls, and Russell Smith examine the influences of annexation and incorporation on the urban geography of the state. James Burke and Elisabeth Nelson present an in depth historical-political analysis of amendments to the state constitution that help shaped the landscape we know today. Bradley Bereitschaft considers patterns of ozone production at a new scale of analysis - the megapolitan area. And Shirley Robinson and Roberta Williams provide two views of Carolina landscapes.

Good reading!

Michael E. Lewis
Editor

On the Cover: Pilot Knob in Surrey County, North Carolina has served as a beacon to travelers for centuries.

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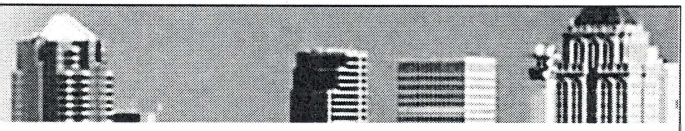

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For Undergraduate Information:

Contact: Dr. Michael Lewis
336-334-3912
melewis@uncg.edu

For Graduate Information:

Contact: Dr. Roy Stine
336-334-3915
geograd@uncg.edu

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Research Articles

Carolina Landscapes

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Annexation, Incorporation and the Health of Central Cities in North and South Carolina

Olga Smirnova
East Carolina University

Gerald Ingalls
University of North Carolina Charlotte

During the last four decades of the twentieth century North and South Carolina experienced rapid population growth and significant development of their metropolitan centers. In both states metropolitan population growth outstripped overall growth by more than 20 percent. However, the distribution of population growth within metropolitan centers was strikingly different. This study compares legislation provisions on annexation incorporation and special district formation in the two states and utilizes data from multiple sources to explore the relative impact of two substantially different policy climates. The principle focus is on annexation policies and incorporation statues and their impact on the pattern of growth and expansion of central cities and their suburbs. We argue that the differences in growth patterns can be linked to striking differences in annexation policy; particularly policies regarding involuntary annexation. And further, that the annexation and incorporation policy differences between the two states have impacted the formation of special district government

Introduction

Over the past half century as academics and the public have addressed the status of urban America one constant has been the images of declining, impoverished central cities and expanding, flourishing suburbs (Berube 2003, Gleaser 2003, Greenstein and Wiewel 2000). Solutions for dealing with such uneven rates of development and the consequential inequities within metropolitan areas often involve regional level policies (Downs 1994, Gottlieb 2000, Olberding 2002). We suggest another alternative lies in state capitols. We argue that providing cities with the ability to annex unincorporated, built-up areas outside their borders can and have played an important role in managing uneven growth and development within urban regions.

The debate over annexation is hardly one-dimensional. On the one hand, there are those who argue that efficient growth policies on annexation and incorporation allow cities to provide uniform services (Tyer 1995, Rusk 2003), manage growth and maintain vitality through the extension of their tax base (Kearney, 1990). This "new" economic development theory has challenged the traditional expansionist practices of metropolitan development that lead to urban sprawl (Teitz 1994, Wievel et al 1993, Imbroscio 1995). It provides new perspectives with its focus on equity and attention to distribution policies (Teitz 1994, Wievel et al 1993), its shift from supply side to demand side approach (Teitz 1994), and its emphasis of endogenous growth and development (Teitz 1994, Schneider and Teske 1993, Imbroscio 1995, Segedy 1997, Porter 1997). This shift of paradigms leads to shifts in attention towards solutions rooted in regional structures rather than local ones. As Hamilton, et al (2004) and Paytas (2003) argue, urban administrative

(government) fragmentation can even reduce metropolitan competiveness by reducing regional consensus and retarding the ability to adapt. Some carry this argument further by suggesting that providing cities the freedom to annex urban growth at their fringes can be a cure for fragmented governmental structures because it can create "sound urban development [which] is essential to economic development [of the region]" (Tyer 1995). Annexation helps to create "elastic cities" (Rusk 1993) which are better able to adapt to changing conditions. Control of suburbs by central cities permits them to plan for the development instead of "responding" to what has happened (Kearney 1990). MSAs with growing and healthy cores experienced higher and more positive growth than those with declining cores (Voith 1998). Finally, some have argued that annexation also reduced segregation by race and income (Rusk 1993), afforded economies of scale, which improved efficiency of service delivery (Feiock and Carr 1996), and reducedcities that result. In this argument smaller municipalities have closer ties to the community, more flexibility, and lower taxes. Debates between proponents and opponents of annexation can be placed in a larger framework of the debates over advantages and disadvantages of centralization and decentralization (Tiebout 1956, Foster 1997, Olberding 2002).

Opponents of strong annexation statues often base their arguments in part on bureaucratic inefficiencies and fear of big government (Spencer 2000). Tiebout (1956) advanced one of the major arguments in favor of decentralization arguing that allowing people to allocate themselves to communities that satisfy their preferences can significantly enhance the provision of public goods and services. This way, only the most effective communities will survive. Other arguments revolve more around the reduction in representative government produced by annexation and the larger cities that result. In this argument smaller municipalities have closer ties to the community, more flexibility, and lower taxes. Debates between proponents and opponents of annexation can be placed in a larger framework of the debates over advantages and disadvantages of centralization and decentralization (Tiebout 1956, Foster 1997, Olberding 2002).

Does Annexation Policy Impact Patterns of Urban Growth and Development?

One aspect of the debate over annexation seems evident. Since annexation policies are established by state legislatures, a boundary between states with markedly different annexation policy should make a significant difference in the structure of metropolitan areas and in the growth and development of urban centers. In few instances is this more apparent than across the boundary dividing North and South Carolina. The former is held to have one of the most liberal annexation policies in the US and the annexation process minimizes the restrictions on municipalities seeking to absorb surrounding territory and population (Palmer and Lindsey 2001). Rusk (2003, 6) argues North Carolina has "the best annexation laws; they virtually guarantee their cities will be successful." South Carolina statues are seen as more conservative and municipal annexation of surrounding populated territory is difficult to near impossible. In one view South Carolina annexation policy encourages local government fragmentation (Tyler 1995); in another the inability of South Carolina cities to annex growth within their urbanized areas constrains the growth and expansion of South Carolina cities and places them in a competitive disadvantage to the counterparts around the country (Rusk 2003). We endorse this argument and suggest that, in an administrative vacuum created when municipalities cannot expand, local governments and/or the population residing in unincorporated built up areas turn to special districts as means of providing services.

In this paper we examine state policies on annexation and on closely related processes such as incorporation and the creation of special districts in North and South Carolina. We address the impact of variation in these policies on urban, particularly MSA and central city, growth. We argue a vibrant, growing and

healthy center is an important element in overall economic and social health of the urban region. We suggest that policies that restrict expansion of what is most often the largest city in an urban region act to the detriment of both the central city and the urban region.

Using evidence from state statues on annexation and incorporation, data from the US Census of Population covering the four decades from 1960 to 2000, data from the US Census of Government from 1962 to 2002, and population projections for each state, we examine 24 MSAs (Figure 1) in both North and South Carolina. We use the 2000 definition of MSAs to set the bounds of our data collection for the entire period of our examination.

We explore relationships among annexation and incorporation policy in North and South Carolina and the population growth of MSA central cities. We ask these questions:

1. Are there important differences in the annexation and incorporation polices between North and South Carolina?
   a. What are the impacts of the policies on annexation and incorporation in each state?
   b. What is the actual pattern of annexation and incorporation in each state and how do these compare to other states in the US?

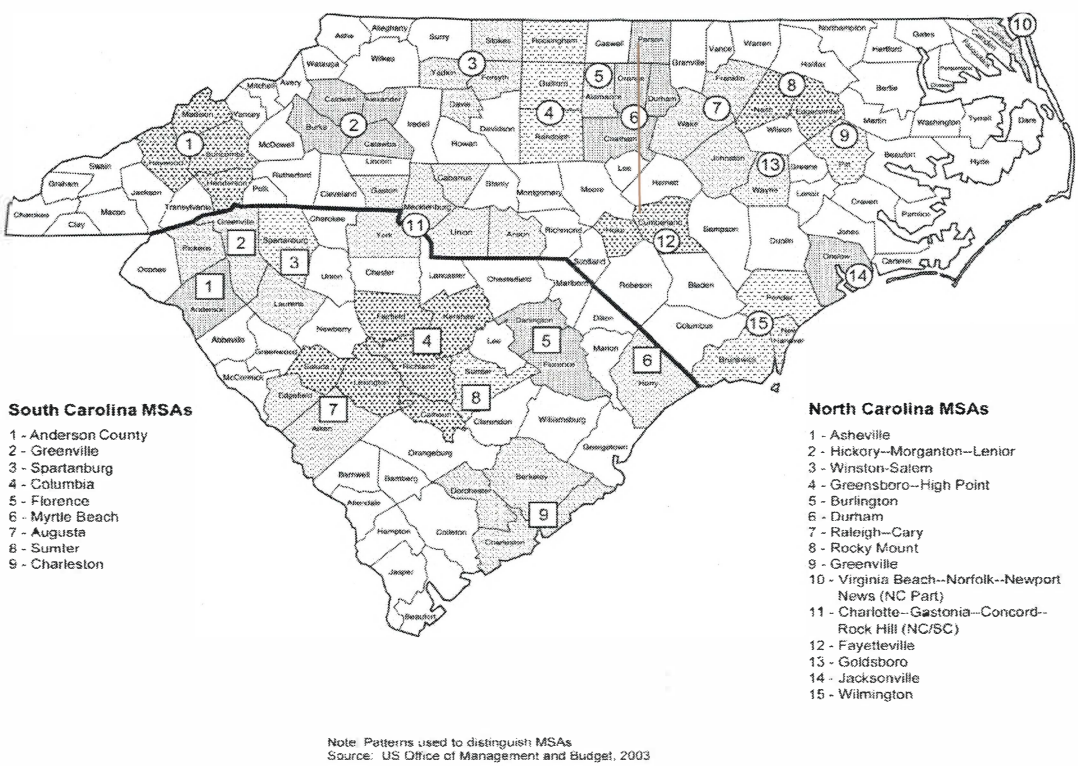

Figure 1. Metropolitan Statistical Areas (MSAs) in North and South Carolina.

2. Do differences in annexation statutes and patterns of annexation and incorporation influence the growth of central cities within North and South Carolina MSAs?
3. What impact do the annexation and incorporation statues in North and South Carolina have on the growth in the number of special districts within their MSAs?

Annexation and Incorporation Policies In North and South Carolina

Table 1 summarizes elements of statues that act as constraining or facilitating elements and those methods, conditions and standards that impact annexation. While constraining and facilitating factors in the statues of both states are relatively similar, there is one critically important difference. A South Carolina city trying to annex surrounding built up areas would have to get approval from the landowners in both the territory annexing and that being annexed. This is clearly a most daunting obstacle and one that North Carolina cities do not have to face since no vote is taken in the area to be annexed.

There is another critical difference in the policies of the two states: the absence of clear-cut development standards in South Carolina. Tyer (1995) suggested that South Carolina's consideration of annexation petitions on a case-by-case basis introduces further barriers; he cited the 1989 efforts of Columbia, South Carolina to strip-annex[1] a luxurious mall as an example. He pointed out that the protracted case ultimately resulted in decreasing even further the number of available annexation options in South Carolina. The resulting rules were considered quite restrictive to annexation procedures.

North Carolina makes the regulations and guidelines extremely clear and they have withstood countless judicial challenges. Basically, if the area to be annexed is contiguous, has 2.5 persons per acre or is developed to urban standards, it can be annexed.

A similar picture emerges when we examine incorporation statutes: municipal incorporation is considerably more difficult in South Carolina. Again we see that North Carolina has very specific standards which make incorporation quite feasible. A legislative commission must approve any bill proposing a new incorporated place before it can be considered by the full legislature. In North Carolina no new municipality can be formed:

> "If the proposed city is within 1 mile of a city with a population of 5,000-9,999 people; three miles of a city of 10,000-24,999; four miles of 25,000-49,999; or five miles of 50,000 or over, the [*Legislative*] Commission may not make a positive recommendation for the incorporation of the proposed city (Summary of Municipal Incorporation Procedure, 2001)."

Once again the two states have some similarities in statutes and procedures, but South Carolina has more restrictive rules, in this case requirements regarding distance from the proposed new city and its nearest neighbor. While there are provisions for exceptions, in South Carolina no incorporation can take place within five miles of the nearest existing municipality (South Carolina Legislature On-Line, 2008).

While policies in both North and South Carolina allow municipalities to absorb surrounding territory, annexation is far less likely to be an instrument of regional growth management in South Carolina than in its neighbor to the north. Incorporation of built-up, growth centers outside of municipalities is also less likely in South Carolina.

[1]Strip-annexation refers to a method in which a municipality is trying to annex the territory which is connected only by a small strip of land.

Table 1. Annexation Facilitators and Constraints in North and South Carolina

Constraining Factors		
North Carolina	**In Common**	**South Carolina**
Public Hearing	*Judicial Review*	*Voter Approval*
Service Plan		*Approval of County*
Boundary Agency		
Impact Reports		
Facilitating Factors		
North Carolina	**In Common**	**South Carolina**
Noncontiguous Annexation	*Cross-county Annexation*	
	Local Resolution/Ordinance	
	Petition by Property Owners	
	Municipally Owned Land	
Regulations		
North Carolina		**South Carolina**
Four Methods		
Legislative Action		*100% freeholder petition*
Voluntary (Contiguous)		*75% freeholder petition*
Voluntary (Non Contiguous)		*25% elector petition and election*
Development Standards		
Conditions		
Area must be contiguous		*Area must be contiguous*
Non-contiguous area must be within 3 miles		
Council approval		*Approval of majority of electors*
Annexed area has no vote		
Development Standards:		
60 percent urban use		*Case-by-Case Review*
2 persons per acre		
60 percent lots/tract of >5 acres and one person/acre		

Sources: Compiled by authors from *Summary of Municipal Incorporation Procedure in North Carolina* (2001), *South Carolina Legislation Online* (2009), *Charlotte-Mecklenburg Planning Commission* (2008).

Special District Formation and Intergovernmental Agreements

Besides differences in annexation laws, South and North Carolina have very different laws governing inter-local government agreements and special district formation. It is helpful to highlight those differences and their interactions with annexation provisions. The major underlining difference in the two states is Home Rule in South Carolina and Dillon's Rule in North Carolina. According to Dillon's Rule, municipalities are the creatures of state legislation and limited to what is explicitly permitted to them in the statutes. North Carolina municipalities have to seek provisions in the legislature that will allow them to enter inter-local agreements or form special districts. South Carolina municipalities do not have to have explicit provisions of inter-local agreements or

special districts because they are allowed to do anything within their powers unless it is explicitly prohibited by the state legislature.

Inter-local agreements

North Carolina Statutes explicitly allows inter-local cooperation between general-purpose governments. Taylor and Basset (2007) questioned whether governments enter such agreements only when annexation costs are prohibitive. It appears that at least in the case of North Carolina with liberal annexation laws, this is not true. That is, current North Carolina legislation not only makes annexation relatively easy (Palmer and Lindsey 2001), but also provides incentives for local governments to enter inter-local agreements. The combination of these two powers certainly acts to reduce the level of administrative fragmentation within the state's urban regions. As a case in point, consider the case of the city of Charlotte and Mecklenburg County. The two governments have entered agreements on provision of most services, and for most part, the city and the county are functionally consolidated.

South Carolina legislation does not explicitly address inter-local agreements that would allow "more than minor adjustments to municipal boundaries" (Taylor and Bassett 2007, p. 123). Perhaps it does not have to do so since under Home Rule municipalities can form and enter their own inter-local agreements without state's explicit permission.

Special Districts

In North Carolina the application of Dillon's Rule appears to limit the formation of special districts to specific circumstances designed to cope with a specified set of issues such as beach erosion, downtown and urban area revitalization, transit oriented development, drainage projects, sewage collection and disposable systems, lighting on interstates, off-street parking facilities, and watershed improvement projects. The formation of regional public authorities is also limited to specified places in the state (NC Statutes Articles 25-27).[2] In fact, both of the largest NC transportation authorities were created after the North Carolina General Assembly passed enabling legislation. Taken together with the ability of municipalities to annex rather freely, these restrictions appear to dampen the growth of special districts in the state. By explicitly setting the limits on special district formation and allowing much greater latitude in interlocal agreements, current North Carolina legislation allows high levels of boundary elasticity.

South Carolina legislation does not appear to encourage the proliferation of special districts, but neither does it limit their purpose and geographic scope. If municipalities cannot annex or expand to deliver services to the growth and development at their fringes, there must be some provision for service provision within urban regions. We argue that the growth of special districts in South Carolina reflects the response to this demand.

Comparing Patterns of Annexation and Incorporation in North and South Carolina

Annexation

North and South Carolina annexation policies appear to be markedly different on the elements that matter – can municipalities use annexation to keep pace with growth? However, do these policy differences make a difference in how municipalities in the two states annex? If we compare North and South Carolina to the remainder of the US, the answer

[2] While article 25, chapter 160A, allows dependent public authorities with the boards appointed by and monitored by municipalities, articles 26 and 27 specify more regional structures that apply only to certain areas in the state. Article 26 defines regional public transportation authorities and enables the creation of Triangle Transit (http://triangletransit.org/about/history/). Article 27 identifies 5 contiguous counties, where at least two counties have population of 250,000 and over; this last article has led to the creation of transportation authority in the TRIAD area (http://www.partnc.org/history.html).

seems to be a tentative yes. Despite different policies, annexations in both states occurred frequently
during the period between 1970 and 1998 with the frequency of annexations increasing from the decades of the 1970s to the 1980s and leveling off from the 1980s to the 1990s (Table 2 and Figure 2).

North Carolina municipalities did annex 30-40% more often than South Carolina over the entire period, but cities and towns in both states annexed quite liberally. These patterns of annexation are similar to one another but not all that comparable to other states and to US averages.

Cities in South Carolina performed almost twice the number of annexations (8,230) as the average for all states; only seven other states annexed more frequently during the period from 1970-1998. Cities in North Carolina executed almost three times (11,245) the average number of annexations in the 49 other states during this period.

While considerably less than the 30,890 annexations that took place in Illinois, North Carolina still ranked among the top five states in total number of annexations. Municipalities in both states appear to use the power to annex quite frequently. The major difference between the two states comes in the patterns of annexation, more specifically in what is being annexed. The total population and amount of land annexed in each state from 1970-2000 were markedly different (Table 2 and Figure 3). While, both states annexed considerably less territory than national leaders such as Texas and California, the amount of territory annexed by North Carolina cities was still 2.5 times the national average, and over 2.7 times that annexed by South Carolina. North Carolina's cities annexed territory that included hundreds of thousands of residents and hundreds of square miles each decade from 1970 to 2000; the total population of all of the South Carolina annexations (in all cities) never reached 100,000 per decade and declined in each decade from the 1970s to the 1990s (Figure 3).

Table 2. Patterns of Annexation in US and Selected States, 1970-1998

Unit	Total Number Annexations	Total Square Miles Annexed	Total Population Annexed
United States Total	203,271	26,534	7,760,000
State Averages	4,065	530	155,200
The Carolinas			
North Carolina	11,245	1,248	862,000
South Carolina	8,230	459	198,000
States With Higher Levels of Annexation			
California	14,539	2,348	659,000
Texas	12,563	3,115	1,132,000
Florida	13,763	1,264	354,000
Illinois	30,830	1,096	395,000
States With Lowest Levels of Annexation			
Maine	2	1.4	0
New Hampshire	0	0	0

Source: Computed by authors from Municipal Year books (2004, 2005).

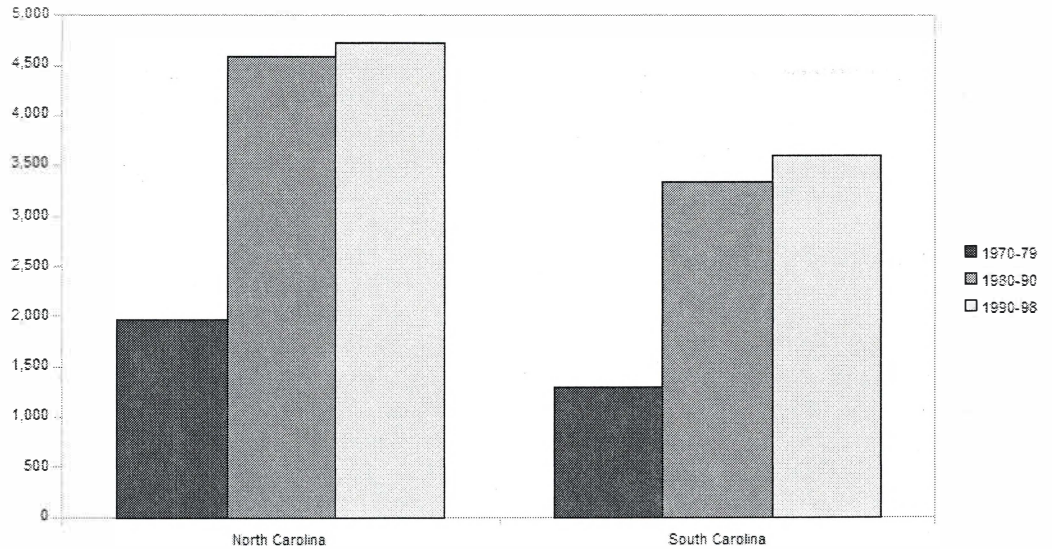

Figure 2. Number of Annexations in North and South Carolina, by decade, 1970-2000.
Data Source: Computed from Municipal Yearbooks for 2004, 2005.

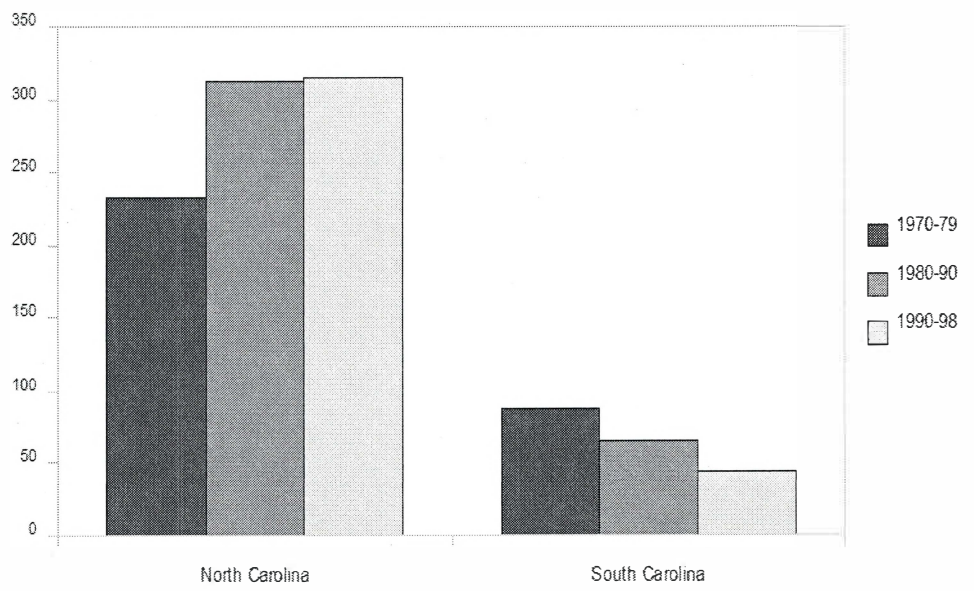

Figure 3. Total Population (1,000s) annexed in North and South Carolina, by decade, 1970-2000.
Data Source: Computed from Municipal Yearbooks for 2004, 2005.

North Carolina municipalities annexed 4.4 times the population of those in South Carolina. The number of annexations, amount of territory annexed, and total population annexed by North Carolina municipalities increased markedly from the 1970s to the 1980s and continued at the same pace during the 1990s. The reverse was true in South Carolina; the state witnessed a relatively high number of annexations, but the typical annexation seems to have been a small amount of territory and small populations. The typical annexation in South Carolina absorbed territory averaging 0.056 square miles and a population of 24 persons; in North Carolina it was 0.111 and 78 respectively.

One way North Carolina stood apart from its counterparts around the nation was in how its municipalities made use of annexation to absorb population at their fringes. Only cities in Texas annexed more population than North Carolina during this period. In all categories – number, territory and
population annexed – North Carolina ranked near the top.

Comparable Rates of Urban Growth, Different Rates of Central City Growth

While North and South Carolina have very different patterns of annexation, the contrast was not a function of differing rates of population growth. During the last four decades of the twentieth century both North and South Carolina experienced considerable population growth and significant development of their metropolitan areas. From 1960 to 2000 both states saw MSA population growth outstrip overall state growth. Over this period both states experienced strong overall population growth with rates of 77 and 68 percent in North Carolina and South Carolina respectively. Population growth rates within urban regions (MSAs) were also reasonably similar: North Carolina MSAs grew by 97 percent; South Carolina's by 84 percent. However, the pattern of this population growth within metropolitan areas in each state was strikingly different. The suburbs of South Carolina MSAs grew much faster than their central cities (106 to 15 percent). A similar comparison in North Carolina revealed a more balanced pattern, with central city expansion exceeding suburban growth (119 to 86 percent) (Table 3). While we cannot directly link the difference in the growth rates of central cities of MSAs to variation in annexation policies across the state line, the evidence strongly suggests that is the case.

Table 3. Population Growth Patterns in North and South Carolina, 1960-2000

	Total Growth in State Population		MSA Growth		Central City Growth		Growth of Counties of Central Cities		Growth of MSA Population Outside of Central Cities	
	NC	SC	NC	SC	NC	SC	NC	SC	NC	SC
60-'69	12	9	17	13	17	1	22	14	10	20
70-'79	16	21	16	23	13	0	16	16	17	37
80-'89	13	12	17	14	25	8	19	8	13	19
90-'99	21	15	24	16	33	6	27	13	23	18
60-'00	77	68	97	84	119	15	114	61	80	132

We compared the population growth of those counties containing central cities versus the population of in the "suburbs" which we measured by examining growth in counties outside of the central city county. The patterns of growth reflected in Table 3 suggest that the two states did demonstrate different patterns of population growth within their MSAs. Over the period from 1960 to 2000 central county populations of North Carolina MSAs grew by 114 percent, which was considerably greater than that of their MSA population growth. In South Carolina central county populations grew by 61 percent considerably less than their MSAs. Non-central county growth was 80 percent in North Carolina less than overall MSA growth and 132 percent in South Carolina, more than 60% faster than the growth of their MSAs. Perhaps the population expansion within the MSAs of North Carolina was such that much of new growth from 1960 to 2000 could be largely contained within the county in which the central city is located. Despite the inability of central cities to annex in South Carolina, population growth is still occurring. Apparently in South Carolina a considerable part of this growth is being absorbed within the parts outside the central city and county. In North Carolina, where annexation of high growth areas was more feasible, central city growth outpaced that of the suburbs.

Table 4 offers another way to examine the patterns of population change within MSAs in North and South Carolina. In both states the proportion of the total population residing in MSAs grew steadily and by similar amounts between 1960 and 2000. By 2000 two-thirds of North Carolina's population lived in MSA counties; in South Carolina, three-quarters did. Both states became increasingly more urban in the last half of the 20th century. Interestingly, the distribution of the population within the MSAs also shifted steadily.

Table 4. Comparing Central City and Non-Central City Populations, 1960-2000 and 2007

State	1960	1970	1980	1990	2000	2007
Ratio of MSA Population to Total State Population						
North Carolina	61%	64%	64%	67%	68%	70%
South Carolina	69%	71%	73%	74%	75%	75%
Ratio of MSA Central City Population to Total State Population						
North Carolina	20%	21%	20%	22%	25%	27%
South Carolina	16%	14%	12%	12%	11%	10%
Ratio of MSA, Non-Central City to Total State Population						
North Carolina	41%	43%	44%	44%	43%	43%
South Carolina	53%	57%	61%	63%	64%	65%

Source: Computed by authors from U.S. Census of Population, and population estimates from North Carolina Office of State Budget and Management, and South Carolina Community Profiles.

The proportion of total state population living in central cities steadily declined in South Carolina (from 16 percent in 1960 to 11 percent in 2000) and increased by similar amounts in North Carolina (20 percent to 25 percent). At the same time, suburbs (the percentage of the MSA population living outside the central city) in North Carolina grew only slightly (2 percent) while in South Carolina the percentage of the state's population living in non-central city locations grew from 53 percent in 1960 to 64 percent in 2000. These data suggest that suburban growth in South Carolina happened at the expense of its central cities.

If projection data are an indication, the percentage of the state's population living in MSA counties will continue to grow at approximately the same rate as in the previous four decades. North Carolina central cities will continue to grow relative to the state's total population and decline in South Carolina. In 2007 North Carolina central cities accounted for an estimated 27 percent of state's total population. In South Carolina, 2006 population estimates suggested that the proportion of the state's total population living in central cities had declined to 11 percent. These data strongly suggest that for more than a half century, their metropolitan areas are absorbing much of the growth of both states. In North Carolina much of this metropolitan growth is being absorbed by their central cities; in South Carolina, central cities seem to be stagnant or even declining and the growth is occurring in the municipalities and unincorporated places outside the central cities.

Incorporation

Do less restrictive annexation policies in North Carolina promote the use of incorporation as a defensive mechanism against absorption in unincorporated areas outside municipalities? While, we cannot directly link rates of incorporation to rates of annexation, the number of new municipalities in North Carolina grew faster than in its southern neighbor. As can be seen in Figure 4 the growth in the number of municipalities within MSAs was rather stagnant in both states, particularly during the period from 1962-1982. However, from 1982 to 2002, the number of new municipalities in North Carolina MSAs increased markedly. Overall from 1962-2002, the growth of municipalities was greater in North Carolina (31%) than in its neighbor (7%). Interestingly, the policies regarding annexation in North Carolina were written in 1959 and implemented beginning in the 1960s and 1970s.

North Carolina policies not only allow different methods for annexation, but also leave room for incorporation of new municipalities. A closer look at the geographic pattern of new incorporated places reveals that some of the unincorporated com the path of annexation appears to have responded by incorporating. Of the 35 incorporations that took place in North Carolina during the 1990s, 12 were directly in the path of Charlotte's high growth sectors (Ingalls and Rassel 2005). Ten of these incorporations occurred in Charlotte's rapidly expanding southern sector; all ten were in Union County, which borders Mecklenburg (Charlotte) to the south. In truth, these incorporations may not always be in response to growth of the central city. For example, the ten new municipalities in the southern growth sector of Charlotte were probably a reaction to the explosive growth of other municipalities in Mecklenburg County and in Union County. In South Carolina suburban communities lack incentives to form regional organizations, have limited abilities to incorporate and even less opportunity to annex. Hence, increasingly over the past two decades communities have resorted to the formation of special districts

Special Districts

Have more the restrictive annexation and incorporation policies in South Carolina promoted the growth of special districts when compared to its neighbor? Data summarized in Figure 4 suggest the answer is yes. There has been a general upward trend in the number of special districts in the US and both states mimic this trend to some extent. In both states the number of special districts increased significantly from 1962 to 1972 and leveled off after 1972. However, in South Carolina growth in special districts accelerated after 1982.

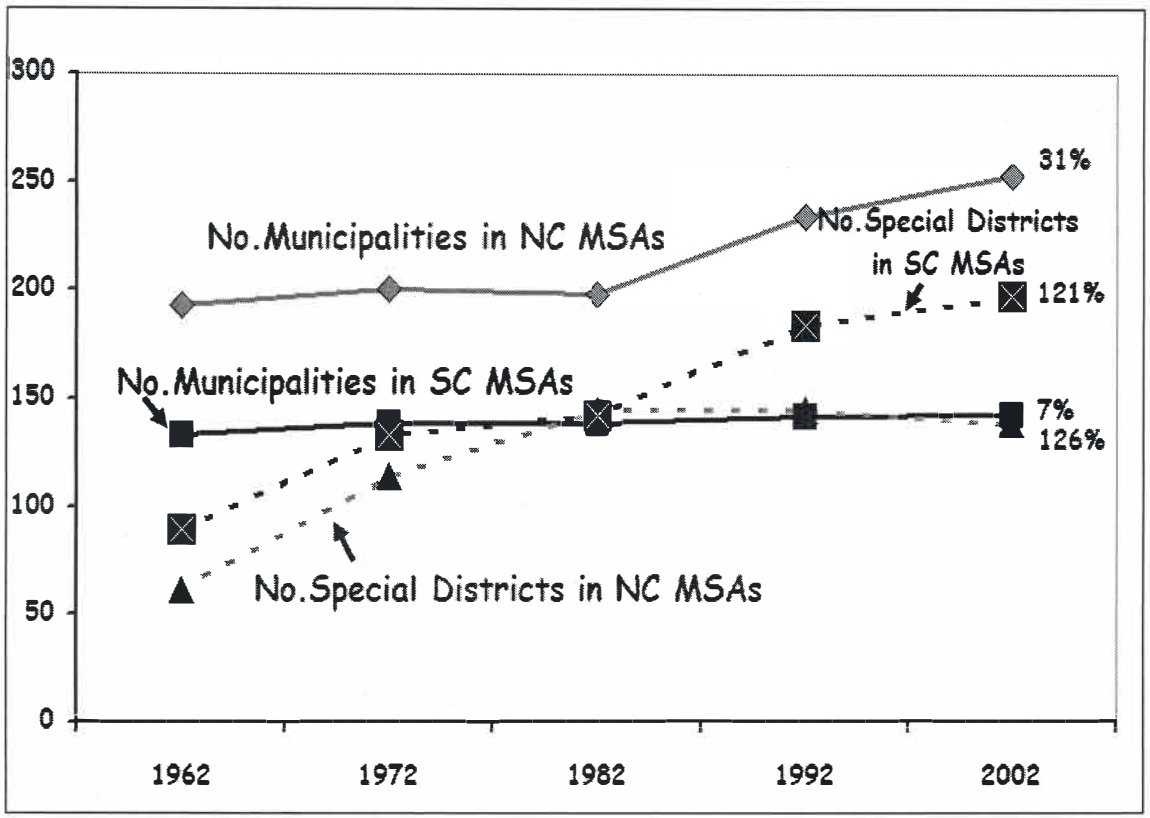

Figure 4. Growth in Governments in North and South Carolina, 1960-2000

Overall South Carolina had a 121 percent increase in the number of special districts formed in metropolitan areas from 1962 to 2002.

Starting from a smaller base number, North Carolina had a larger overall increase in special districts (126 percent) during this same period; however, from 1982 to 2002 the number of special districts has remained the same or decreased slightly. During the period of 1977-1992, there were 77 new special districts created in North Carolina and 118 in South Carolina. In 2002, there were a total of 138 special districts in North Carolina metropolitan areas and 197 in South Carolina MSAs.

When cities cannot or do not provide services outside their municipal limits, then special districts provide an alternative route for financing and service delivery. Evidence suggests that the ability of North Carolina cities to annex may have lessened the need for new special districts. The opposite appears true in South Carolina. Communities wanting local control over their issues can exercise their incorporation powers in North Carolina. They can also enter intergovernmental agreements to facilitate the cooperation within the region.

Charlotte versus Greenville and Columbia

In 2000 Charlotte and Columbia were the two largest cities in their respective states. They were also the centers of the two of the three largest MSAs in each state. In 2000 Greenville was the largest MSA in South Carolina. If we examine the patterns of annexations, incorporations and central city growth between 1960 and 2000, in these three largest MSAs and cities in both states we find

Table 5. Population changes: Charlotte, Columbia, and Greenville MSAs

Charlotte MSA	Population		
	1960	**2000**	**Percent Change**
MSA	655,902	1,165,834	117%
City of Charlotte	201,564	540,828	168%
	Governments		
	1962	**2002**	**Percent Change**
Number Municipalities	33	45	36%
Number Special Districts	9	14	56%
	Annexations		
	1970	**2000**	**Percent Change**
Number Annexations	17	29	n/a
Land Area	76	242.27	219%
Columbia MSA	**Population**		
	1960	**2000**	**Percent Change**
MSA	498,145	647,158	89%
City of Columbia	97,433	116,278	19%
	Governments		
	1962	**2002**	**Percent Change**
Number Municipalities	31	29	-6%
Number Special Districts	9	27	200%
	Annexations		
	1970	**2000**	**Percent Change**
Number Annexations	42	70	n/a
Land Area	106	125	18%
Greenville MSA	**Population**		
	1960	**2000**	**Percent Change**
MSA	349,443	559,940	85%
City of Greenville, SC	66,188	56,002	-15%
	Governments		
	1962	**2002**	**Percent Change**
Number Municipalities	20	18	-10%
Number Special Districts	23	46	100%
	Annexations		
	1970	2000	Percent Change
Number Annexations	20	28	n/a
Land Area	21	26	26%

Source: Computed from U.S. Census of Governments, 1962-2002 and Census of Population, 1960-2000 Boundary and Annexation Survey (Land area 1970), Charlotte-Mecklenburg Planning Commission. 2008

a different picture emerges. Charlotte and Columbia grew by 168 and 19 percent, respectively, while Greenville had a 15 percent decline in its population.

Rusk (2003) compared the growth during the 1990s within the urbanized areas of Greenville and Columbia to similar sized counterparts in other parts of the country. His summary is instructive. Columbia and Greenville captured 28 and 19 percent of their counties growth whereas the comparable cities in states with less restrictive annexation policies averaged 70 and 77 percent respectively. He strongly suggested that the results are felt in the pocketbooks of residents by greater financial costs due to substantially lower bond ratings for cities in South Carolina. Interestingly, one of comparable cities Rusk used for Greenville was Raleigh. His conclusion: "With North Carolina's annexation laws, Greenville (Bond rating of A1) could have been Raleigh (Bond rating of Aaa)." (Rusk 2003, 6)

In the period from 1962 to 2002, the number of municipalities within the Charlotte MSA increased from 33 to 45 while the Columbia and Greenville MSAs witnessed declines in the number of municipalities from 31 to 29 and 20 to 18, respectively. The number of special districts in the Charlotte MSA went from 9 in 1962 to 14 in 2002. Columbia's MSA saw a three-fold increase from 9 to 27 over the same time period; the number of special districts in the Greenville MSA doubled from 23 to 46. Based on these three examples, we find additional support for the argument that South Carolina's urban regions have increasingly relied on special districts to provide the public services needed as their population expanded. The result has been increasing levels of administrative fragmentation, further isolation and stagnation of central cities in South Carolina.

Overall the City of Charlotte population increase outstripped that of the urban region by more than 40 percent, while the two South Carolina cities lagged far behind the growth in their urban regions with Greenville losing 15 percent of its population from 1960-2000. In the Charlotte MSA where incorporation is more common, the number of municipalities grew considerably; in South Carolina each urban region actually had a decline in the number of municipalities. Of course the reverse was true of special districts. In Greenville and Columbia the number of special districts in each MSA grew by triple digits; in Charlotte there was an increase, but nowhere near those in its southern neighbor.

Again it is annexation that distinguishes the two states. From 1960 to 2000 Charlotte's land area expanded more than three fold, all through annexation. Since virtually all of the population growth in Charlotte since 1960 has occurred in these annexed territories, it is relatively safe to assume that the City of Charlotte would be a much smaller territory and have considerably less population in 2000 had it not had the power to expand to absorb the growth at its edges. One estimate suggests that, "Annexation has enabled Charlotte's land area to double since 1980 to about 287 square miles as of June 30, 2008" (Charlotte-Mecklenburg Planning Department 2008). Table 5 provides a more direct comparison of the levels of annexation by the three cities between 1970 and 2000. Charlotte tripled its territory during this time frame. Columbia and Greenville were able to grow despite strict annexation laws. As Carr and Feiock (2001) pointed out annexation restrictions do not necessarily limit the frequency of annexations; however, restrictions can and do affect the nature of annexations. The two South Carolina cities appear to have resorted to annexing territories with much lower densities to avoid restrictions.[3]

[3] Tyer (1995) indicated that Columbia had the ability to utilize South Carolina annexation law before additional restrictions were imposed, i.e., the requirement that cities needed permission from 75% of the owners. The power to annex, however limited in comparison to North Carolina options, might have helped the city of Columbia to grow, albeit slightly.

Summary and Conclusions

Amidst some similarities in the annexation statutes, there are a couple crucial differences -- obtaining the approval of the voters in the area to be annexed and setting development standards -- that lead to very different results. These differences appear to matter a good deal. Despite similar growth rates in total state population and MSA populations and similar proportions of MSA population to state population, there are marked differences in where population growth occurs within the MSAs of the two states. Both states are leaders among the 50 states in frequencies of annexation; however, when the municipalities of North Carolina annex, the amount of territory and population they take in are significantly greater than in South Carolina. We attribute these differences to the state legislation that controls the way cities can grow, incorporate, and develop – particularly the requirement that those being annexed must approve the action. Clearly this most often simply means that annexation of any significant population will not occur.

Anecdotal evidence suggests differences in state annexation policies are directly tied to disparities in central city growth patterns. North Carolina annexation laws permit breathing room for central cities allowing growth not only in suburbs but also in central cities. This growth can be found not only when we look at the central cities, but also the growth of central city counties. In North Carolina, incorporation statues facilitate the formation of new municipalities and allow some unincorporated communities to avoid annexation. In a sense, some municipalities might evoke defensive incorporation to avoid annexation by expanding central cities. In our case study of Charlotte, six smaller towns existed prior to the period of our study and before the auto-induced, Greenfields sprawl began; their existence has not yet inhibited the expansion of the central city. On the other hand, South Carolina annexation laws and restrictive incorporation procedures all but throttle central cities and assure that population growth will be suburban and largely non-municipal. The result appears to have been an explosion of special districts that compensate for the failure of any centrally administered service delivery. The provisions for interlocal agreements only appear to facilitate functional consolidation in North Carolina. Again Charlotte serves as an example of what might be. Functionally consolidated, countywide services such as schools, water and sewer, elections and voting, tax assessment, building permits and inspections, health and mental health, library, social services and parks and recreation, planning and zoning serve to integrate critical city and county services and assure uniform and equitable delivery.

The strikingly different patterns of central city growth in North and South Carolina offer support for Voith's (1989) assertion that MSAs with growing and healthy cores experienced higher and more positive growth than those with declining cores. If we look to the future, the differences appear to magnify. Current *projected* rates of growth suggest that by 2010 ten of the fourteen central cities in North Carolina will have experienced triple digit rates of population growth over the 57 years from 1960-2007; only two will have grown at rates of less than one percent per year. In South Carolina only Myrtle Beach will have grown by triple digits; Anderson, Greenville and Spartanburg, South Carolina experienced negative rates of growth from 1960 to 2000 (Table 6).

It is possible to argue that their vital cores facilitate the steady, healthy pace of population growth in North Carolina MSAs. Certainly North Carolina policy made it easier for cities to annex making central cities borders more elastic contributing to the vitality of the central cities and their urban regions. While our data do not permit us to say the reverse is true for South Carolina, where rates of MSA growth have fallen behind its northern neighbor, our analysis leads us to strongly agree with Rusk's (2003, 8) admonition: "The growing weakness of the state's cities may ultimately act as a drag on South Carolina's economic growth." By his estimate North Carolina's MSAs accounted for 86 percent of the state's growth in personal income, 88 percent of job growth and 90

percent of the statistical population growth (Rusk 2008). Clearly these urban centers have been the economic engines that have driven the North Carolina economy. As Rusk (2008) suggests the state's central cities are also models of fiscal health that can be linked to their ability to annex. He points out that Charlotte, Winston-Salem, Raleigh, Durham and Chapel Hill represent 5 of the 30 cities (out of 541) in the US with blue-chip Aaa bond ratings; this he links to their ability to "annex new, high-value, 'suburban' tax base; zero-elastic cities cannot" (Rusk 2008, 3). Our data certainly confirm the health of the North Carolina's central cities. And we suggest that increased restrictions on annexation appear to have slowed the development of South Carolina's central cities, which in turn may well have influenced the overall growth of its MSAs. At the time of this writing, a study commission empanelled to examine annexation policy in North Carolina has delivered its recommendations and the legislature is debating this issue. One of the panel's top recommendations was to change annexation laws such that a vote of approval would be required in both the area to be annexed and in the municipality instituting the annexation. In light of this research, such a move would have an extremely negative impact on the health of North Carolina cities. Our investigation suggests that if these provisions had been in place over the past four to five decades, North Carolina would look a good deal more like South Carolina in terms of the vitality of its urban centers. Our evidence suggests that policy differences across this state boundary have had an important impact on the development of urban centers and their regions in these two states. The ability to annex urban growth and development at their fringes seems to have been a critical element in assuring the health of central cities in North Carolina compared to its neighbor to the south.

Table 6. Central City Population Growth, 1960-2007

Central City	1960 Population	2006/7 Projected Population	Percent Growth 1960-2007
North Carolina Cities			
Asheville	60,192	74,764	24%
Burlington	33,199	49,343	49%
Charlotte	201,564	674,656	235%
Durham	78,302	222,472	184%
Fayetteville	47,106	181,453	285%
Goldsboro	28,273	37,341	32%
Greensboro	119,574	248,111	107%
Greenville	22,860	76,222	233%
Hickory	19,328	40,520	110%
Jacksonville	13,491	77,301	473%
Raleigh	93,931	367,098	291%
Rocky Mount	32,147	56,288	75%
Wilmington	44,013	100,746	129%
Winston-Salem	111,135	224,889	102%
Total North Carolina Central City Population	**905,115**	**2,431,204**	**169%**
Total North Carolina Population	**4,556,155**	**9,061,032**	**99%**
Ratio: Central City to State	**20%**	**27%**	
South Carolina Cities			
Anderson	41,316	26,242	-36%
Charleston	65,921	107,845	64%
Columbia	97,433	119,961	23%
Florence	24,722	31,284	27%
Greenville	66,188	57,428	-13%
Myrtle Beach	7,834	28,597	265%
Spartanburg	44,352	38,561	-13%
Sumter	23,062	39,159	70%
Total South Carolina Central City Population	**370,828**	**449,077**	**21%**
Total South Carolina Population	**2,382,594**	**4,321,249**	**81%**
Ratio: Central City to State	**16%**	**10%**	

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Municipal Incorporation Activity and the Clustering of New Municipalities in North Carolina: 1990 - 2008

Russell M. Smith
Winston-Salem State University

Between 1990 and 2008, North Carolina experienced the second greatest number of municipal incorporations of any state in the Union. Examining the spatial distribution of these newly incorporated municipalities (NIMs) within North Carolina reveals that the Piedmont Region, Metropolitan Statistical Areas and Micropolitan Statistical Areas saw a greater number of incorporations than the Coastal and Mountain Regions or Non-Metropolitan Areas of North Carolina. Additionally, the clustering of new municipalities within certain counties and MSA's reveals that a 'herd mentality' exists among incorporating entities. This so-called 'herd mentality' is characterized by multiple unincorporated areas surrounding larger municipalities defensively preventing the annexation of their community into the larger neighboring municipality by creating a new municipality of their own.

Introduction

Since 1990 North Carolina witnessed a plethora of municipal incorporations. The process of creating a new municipality is essentially a geographic phenomenon. New cities create new boundaries and subsequently regulation, representation, and taxation. New municipalities also affect existing municipalities by fragmenting metropolitan areas (Jonas, 1991; Orfield, 1997; Carruthers, 2003), creating new competition for limited resources (Foster, 1997; Rusk 2003) and adding additional service providers to a region (Tiebout, 1956; Purcell, 2001). This paper will explore the outcome of the municipal incorporation process in North Carolina through an examination of the frequency and location of new cities.

The benefits and costs of municipal incorporation on metropolitan governance have been debated by metropolitan reformers and public choice proponents for decades (Tiebout, 1956; Ostrom et al., 1961; Schneider, 1986; Downs, 1994; Orfield, 1997; Rusk, 2003). Metropolitan reformers believe that the incorporation of an unincorporated area results in the duplication of services and adds unnecessary municipal providers to the metropolitan arena. Reformers contend that the amalgamation of governments would result in larger cities that are more efficient providers of public services by providing scale economies and manipulating government boundaries to more effectively 'capture' the tax revenues of suburban residents (Jonas, 1991; Orfield, 1997; Rusk, 2003).

Conversely, public-choice proponents argue that the proliferation of municipalities leads to more competition and drives down the cost of public services (Tiebout, 1956). Purcell (2001, 616) states "a more politically fragmented metropolis promotes efficiency because residents, functioning as municipal consumers, choose from among different bundles of services and tax rates that the various municipalities offer" and, in effect, 'vote with their feet'.

The purpose of this paper is to report the spatial distribution of newly incorporated municipalities (NIMs) in North Carolina between 1990 and 2008. A NIM is a new municipality (e.g. city, town, village) that was incorporated or created by the General Assembly of North Carolina between January 1, 1990 and December 31, 2008. I will also

discuss the unique clustering pattern of NIMs within certain regions of North Carolina. Examining the spatial distribution of the NIMs of North Carolina provides a greater geographic understanding of the incorporation process.

Municipal Incorporation Research

Research focused exclusively on municipal incorporation is limited. Nonetheless, this paper draws upon the scholarly work that has been completed on the spatial distribution of municipal incorporation activity and the legislation that guides the municipal incorporation process in North Carolina.

Research conducted on other types of boundary change initiatives (i.e. annexation, special districts, consolidations/mergers and secessions) has included a distinct spatial approach. Numerous studies have focused on the frequency and location of annexation activity within the United States (Dye, 1964; Wheeler, 1965, Galloway and Landis, 1986; Liner, 1993; Carr and Feiock, 2001). Foster's (1997) work on special district formation in the United States includes a limited geographic analysis. Finally, Marando (1979) completed one of the first national examinations of consolidation efforts within the United States that included a spatial dimension.

Few studies have examined the spatial distribution of new municipalities in the United States. (Miller, 1981; Rigos and Spindler 1991; Burns, 1994; Ingalls and Rassel 2005; Smith and Debbage, 2006). Several of these studies have indirectly alluded to a unique geographic pattern of clustering that is associated with newly incorporated municipalities. Miller's (1981) study on municipal incorporation activity in Los Angeles County following the implementation of the 'Lakewood Plan' contains a narrow geographic focus and is more focused on the political forces at play resulting in numerous incorporations in Los Angeles County. However, the study does highlight the unique clustering pattern of NIMs within the study area and attributes the clustering to annexation efforts of existing municipalities.

Ingalls and Rassel's (2005) examination into political fragmentation within the Charlotte metropolitan region provided a glimpse into the level of municipal incorporation activity within that region. The authors determined that of the 44 municipalities located within the Charlotte metropolitan region, 39 were incorporated before 1930 and that comparatively speaking the region had a low level of fragmentation. The authors also note that "of the 12 municipalities created since 1970 all were in the path of Charlotte's high growth sectors; in fact 10 were in the direct path of the southern high growth sector moving outward from Charlotte into western and northern Union County" (Ingalls and Rassel, 2005, 23).

More recently, Smith and Debbage (2006) conducted a more explicit geographical analysis of NIMs in an attempt to articulate the essential spatial attributes of newly incorporated municipalities that were established between 1990 and 2005 in the South U.S. Census Region. The authors found that a complex and uneven distribution of NIMs exists with a clustering of NIMs in specific counties and states. They argued that this clustering effect emerged partly through a 'herd mentality' in which unincorporated communities within close geographic proximity learn from and follow in the footsteps of the first successful municipal incorporation in the region.

Rigos and Spindler (1991) examined the frequency of incorporation at the state level and provided insight into the numbers of incorporations that have occurred around the country. However, their study did not include any discussion on the clustering of NIMs. The study generally showed that incorporations occurred more often in the Southwestern States and less frequently in New England States. This is primarily the result of the large number of existing government entities already located in New England. Additionally, higher population states also tended to have more incorporations than smaller states.

Finally, Burns' (1994) is one of the few national examinations of incorporation to discuss growth in numbers of municipalities and special districts. Between 1942 and 1987 the United States added 2,980 municipalities (Burns, 1994). Burns' research examines the relationship between services, taxes, race,

supply and entrepreneurs and incorporation activity but did not discuss any geographic pattern to municipal incorporation.

Municipal Incorporation Legislation In North Carolina

Municipal incorporation is the legal process established by state statutes through which a new city is created. In North Carolina, a municipal incorporation or a "city" is defined as follows:

> "City" means a municipal corporation organized under the laws of this State for the better government of the people within its jurisdiction and having the powers, duties, privileges, and immunities conferred by law on cities, towns, and villages. The term "city" does not include counties or municipal corporations organized for a special purpose. "City" is interchangeable with the terms "town" and "village," is used throughout this Chapter in preference to those terms, and shall mean any city as defined in this subdivision without regard to the terminology employed in charters, local acts, other portions of the General Statutes, or local customary usage. The terms "city" or "incorporated municipality" do not include a municipal corporation that, without regard to its date of incorporation, would be disqualified from receiving gasoline tax allocations by G.S. 136-41.2(a), except that the end of status as a city under this sentence shall not affect the levy or collection of any tax or assessment, or any criminal or civil liability, and shall not serve to escheat any property until five years after the end of such status as a city, or until September 1, 1991, whichever comes later (NCGS 160A-1(2)).

In other States the terms city, town and village often elude to a population size variation and differing levels of service provisions which are not applicable for North Carolina municipalities. For example, the City of Charlotte (North Carolina's largest incorporated municipality) may lobby the General Assembly and ask that its name be changed to the Village of Charlotte if the elected officials were so inclined.

Municipal incorporation standards are not uniform. The United States' Federalist system of government allows individual States to develop different standards. For example, some States require a high minimum population threshold be met before incorporation is an option (e.g. Florida and Washington) and other States do not have any population requirement (e.g. Missouri and Oklahoma). Some States have a minimum distance between the proposed city and any existing cities, as is the case in North and South Carolina. The U.S. Advisory Commission on Intergovernmental Relations (USACIR) concluded that:

> "Procedures for incorporation typically include: (1) presentation of a petition from the community describing the boundaries and the population of the proposed municipality, (2) an election to ascertain popular support for the incorporation, and (3) certification by the secretary of state that the election results support creation of the municipality and that all legal requirements for incorporation have been met" (U.S. Advisory Commission on Intergovernmental Relations (USACIR 1993, 12).

In North Carolina the procedure for incorporation is similar to that outlined above by the USACIR for many areas of the United States. No area may incorporate without the approval of the North Carolina General Assembly. In recent years and partially due to the flood of requests described in this paper, the North Carolina General Assembly has called upon the Joint Legislative Commission on Municipal Incorporations to make rulings in favor or against municipal incorporation for proposed areas.

The Joint Commission on Municipal Incorporations must receive the following information in order to make a ruling in favor or against the incorporation of a new municipality. First, the Joint Commission must receive a petition from the area that wishes to incorporate signed by at least 15% of the registered voters of the area. Secondly, the proposed name of the city and a map depicting the proposed city limits must be provided. Next, a statement that the proposed city will have a budget ordinance with an ad valorem tax levy of at least five cents (5¢) on the one hundred dollar ($100.00)

valuation upon all taxable property within city limits must be submitted. Finally, the proposed municipality must deliver a statement that lists at least four public services that will be offered to the new cities residents (NCGS 120A-163).

Lawerence and Millonzi (2007) offer an excellent overview of the incorporation process in North Carolina in their book Incorporation of a North Carolina Town. The authors provide a how to guide to incorporating a community in North Carolina that includes: why an area would incorporate, alternatives to incorporation, how an area would incorporate, the opportunities and responsibilities of municipalities, budget and financing advice and suggestions for getting started. Their work is a comprehensive effort on the essentials of municipal incorporation in North Carolina.

Data and Methodology

The data presented in this paper comes from two primary sources: the US Census Bureau and the State of North Carolina's Office of State Budget and Management. The 46 newly incorporated municipalities that were established in North Carolina were identified by utilizing the U.S. Census Bureau Boundary and Annexation Survey. The federal listing of NIMs was cross-checked against the State of North Carolina's Office of State Budget and Management Incorporation Activity inventory.

Since 1990 North Carolina has experienced an overall population increase of 38.5%, adding approximately 2.6 million people. This population growth has changed North Carolina from a largely rural and small town centered state into a more urban and metropolitan state with several large urban centers.

In addition to examining municipal incorporation activity for the State of North Carolina as a whole, the spatial distribution of municipal incorporation activity is also presented for 3 regions of North Carolina: the Coastal, Piedmont and Mountain Regions. Incorporation activity will be reported by Metropolitan, Micropolitan and Non-Metropolitan Areas. The U.S. Census Bureau assigns North Carolina 15 Metropolitan Statistical Areas (MetroSAs) and 26 Micropolitan Statistical Areas (MicroSAs). Only 29 out of North Carolina's 100 counties are designated as Non-Metropolitan. Finally, the spatial distribution of NIMs in North Carolina's 100 Counties will be provided.

Findings:

Municipal Incorporation Activity by State

North Carolina's 46 NIMs accounted for 11.6% of all municipal incorporation activity that occurred in the United States between 1990 and 2008. These 46 municipal incorporations trail only the State of Texas in number (47) and percentage of new municipal incorporations (11.9%). An examination into the population size and population growth rates of the top five States for municipal incorporation activity does not provide a clear explanation for the clustering of NIMs within these few States (Table 1).

Rigos and Spindler (1991) argued in their state level analysis that the frequency of incorporations is not dependent on urbanization and population growth, or even on the pace of urbanization. Analysis of recent incorporations and legislative debates in the North Carolina General Assembly suggest North Carolina's liberal annexation standards as a probable cause for high levels of NIM activity. In other words, the relative ease with which land may be annexed in North Carolina may indirectly result in more municipal incorporation activity.

North Carolina is one of 22 states that allow municipal annexation without the consent of the affected property owners (Palmer and Lindsey 2001). Unincorporated areas may utilize municipal incorporation as a defensive response rising out of a fear of involuntary annexation (Rigos and Spindler, 1991).

Municipal Incorporation Activity by Region

The 46 NIMs established between 1990 and 2008 are not evenly distributed in North Carolina (Figure 1). The majority of new municipalities are clustered within the Piedmont Region of central North Carolina. The

Table 1. Top Five States for Municipal Incorporations, 1990 – 2008

State	Municipal Incorporations	US Percentage of Municipal Incorporations	2008 Population	Population Growth Rate 1990 - 2008
Texas	47	11.9%	24,326,974	43.2%
North Carolina	**46**	**11.6%**	**9,227,016**	**38.5%**
Missouri	33	8.4%	5,911,605	15.5%
Alabama	30	7.6%	4,661,900	15.4%
Florida	23	5.8%	18,328,340	41.7%

Source: US Census Bureau

Piedmont contains 35% of the counties but accounted for 61% of the municipal incorporations (Table 2). Barron (1996, B1) argued in the *Greensboro News & Record* that "incorporation fever has swept through the Piedmont recently as small, rural communities have decided to become towns rather than get swallowed by a nearby city."

The Town of Oak Ridge, located in Guilford County just outside the City of Greensboro is a prime example of a Piedmont Region NIM. Oak Ridge had a 2000 U.S. Census population of 3,988 and a population density of 272 people per square mile. The town is primarily a bedroom community for the surrounding cities of Greensboro, Kernersville, and Winston-Salem. As one of the founding members of Oak Ridge stated "A group of us got together and formed a committee because we knew Summerfield, which had been incorporated a few years earlier, Kernersville and Greensboro were interested in moving into this area" (Hairston, 2007). Although Oak Ridge was initially incorporated to protect itself from annexation by nearby larger neighbors, it has recently expressed interest into expanding its municipal limits.

Table 2. Municipal Incorporation Activity by North Carolina Region, 1990 – 2008

Region	Municipal Incorporations	Percentage of Municipal Incorporations
Piedmont (35 Counties)	28	60.9%
Coastal (41 Counties)	13	28.3%
Mountain (24 Counties)	5	10.8%

Source: US Census Bureau

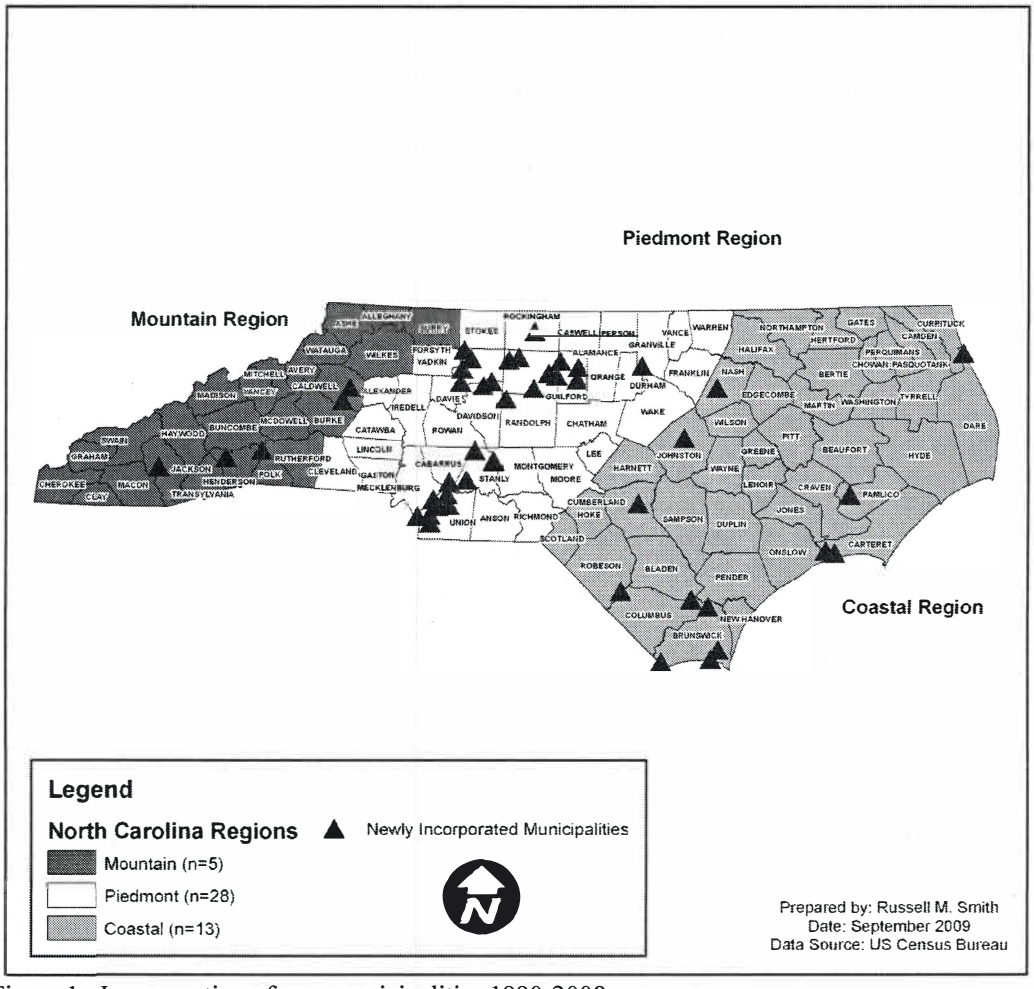

Figure 1. Incorporation of new municipalities 1990-2008.

The Coastal Region witnessed the second most municipal incorporations, adding 13 new cities or 28.3% of all municipal incorporations to the 41 county-region. The Coastal region is primarily associated with new out-of-state transplants who are retiring along the coast (Orr and Stuart, 2000). The Town of St. James, located in Brunswick County, is an excellent example of a Coastal Region NIM that has attracted its fair share of northern transplants. St. James was originally conceived as a gated and planned community in the growing Wilmington area in the mid-1980's. It was not until 1999 that the Town of St. James was officially incorporated by the legislature of North Carolina (St. James, 2009). Harper (2009, 27) noted that the gate as well as other amenities "was among the marketing ploys that brought many a northerner south."

As Figure 1 highlights, the Mountain Region witnessed the fewest municipal incorporations with only 5 new municipalities being created. The Town of Mills River in Henderson County is an example of one of the 5 NIMs created in this Region. Incorporated in 2003, Mills River had been a long established community within Henderson County. However, "through the years, the residents of the Mills River have had little input into how our community has grown"

(Mills River, 2009). As a result, the community created an Incorporation Committee and began the task of creating a city that would "maintain the area's character of farms, homes, and businesses with minimal taxes and regulations" (Mills River, 2009).

While population size and population growth rate may not explain municipal incorporation activity at the State level, the impacts of these two variables may offer a partial explanation for the clustering of NIMs at the regional level. The Piedmont Region had the largest population (5,322,042 in 2007) and population growth rate (45.6%) compared to the Coastal Region (2,612,739 in 2007 and 27% population growth rate) and the Mountain Region (1,134,617 in 2007 and 23.6% population growth rate). The combination of population size and population growth rate within the Piedmont Region seems to be creating a situation in which existing cities feel the need to annex property near their edges in order to capture the tax dollars of fleeing or newly relocated residents. This may spur the defensive incorporation of unincorporated communities that feel threatened by annexation activity. Additionally, the population size and population growth rate in the Piedmont Region may cause unincorporated areas to feel the need to provide public services (e.g. water/sewer service, zoning, police protection, fire protection) to a growing population on the fringe of existing urban areas.

Municipal Incorporation Activity by Metro or, Micro Statistical Area and Non-Metro Area

North Carolina's newest cities display an unusual geographic pattern when examined by Metropolitan Statistical Area, Micropolitan Statistical Area and Non-Metropolitan Area (Figure 2). Almost 70% of all new cities created in North Carolina between 1990 and 2008 were located in one of North Carolina's 15 Metropolitan Statistical Areas (Table 3). Of the 32 new cities incorporated in an MSA, 2 Metropolitan Statistical Areas had a significant clustering of new cities. Eight new cities were established and clustered together within Charlotte-Gastonia-Concord MSA and 7 new cities were located in the Greensboro-High Point MSA. Other Metropolitan Statistical Areas witnessing multiple municipal incorporations included: Winston-Salem, Burlington, and Wilmington MSAs. Surprisingly, the 3 county Raleigh-Cary MSA only had 1 municipality incorporate during the study period despite being the second most populated MSA in the state.

The Greensboro-High Point MSA experienced an incorporation frenzy that lasted throughout the 1990s, generating 7 NIMs during the study period. At the center of this incorporation fever was the City of Greensboro, which developed detailed plans to annex 45 square miles of property and capture an additional 22,000 residents during the early 1990s (Barstow 1993). Greensboro's planned unilateral annexation activity clearly spurred the incorporation of several of the region's newest towns including Oak Ridge, Pleasant Garden, Sedalia and Summerfield.

Table 3. Municipal Incorporation Activity by Metropolitan Statistical Area, Micropolitan Statistical Area or Non-Metropolitan Area, 1990 – 2008

Area	Number	Percentage
Metropolitan Statistical Areas (MSAs)	32	69.6%
Micropolitan Statistical Areas (μSAs)	10	21.7%
Non-Metro/Micro Statistical Areas	4	8.7%

Source: U.S. Census Bureau

Only 10 (22%) of the new municipal incorporations were located in a Micropolitan Statistical Area, some of which experienced clustering. For example, the Albermarle MicroSA witnessed the clustering of three new municipalities, and two new municipalities clustered within the Morehead City MicroSA and Thomasville-Lexington MicroSA, respectively. Only 4 new cities were located in Non-Metropolitan Areas. Two of those four cities clustered in Columbus County.

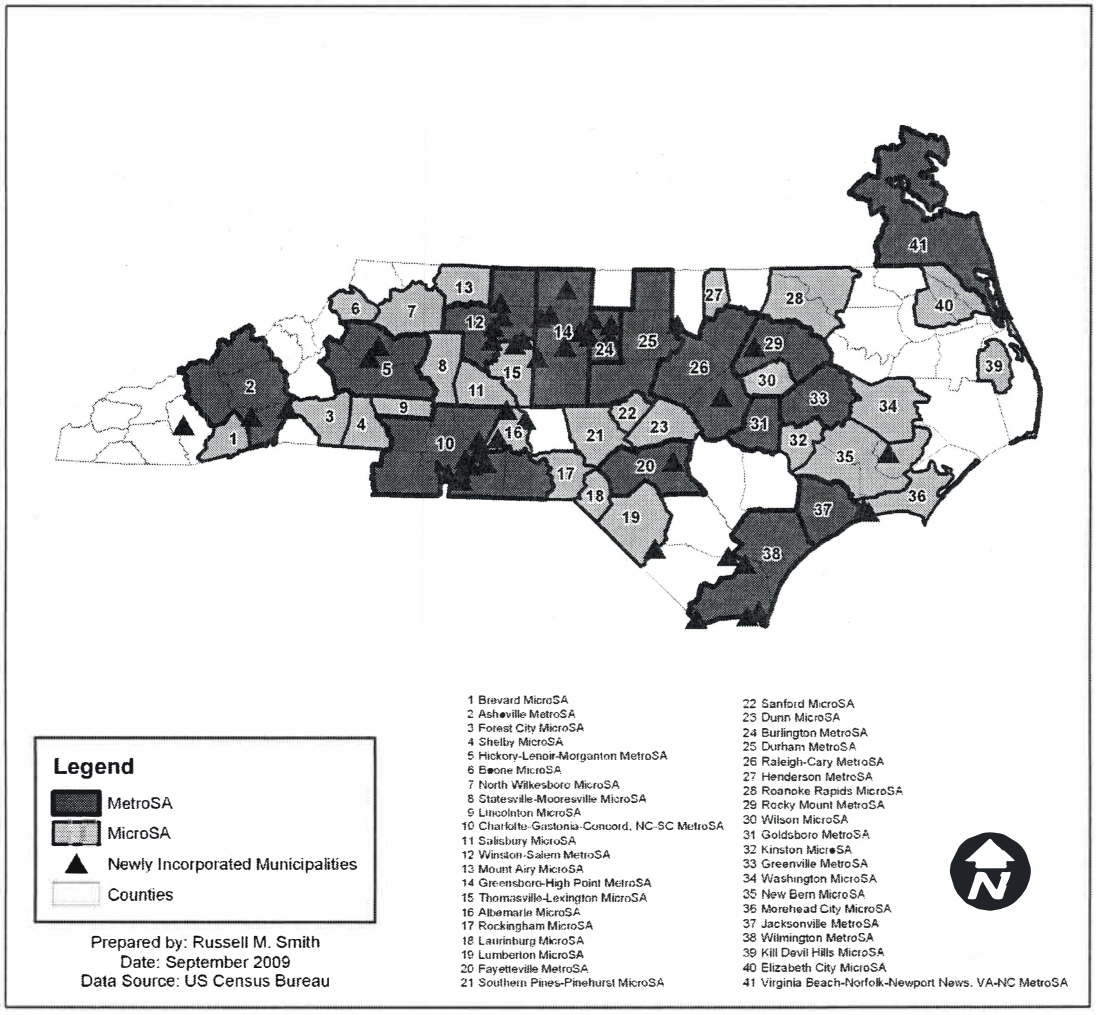

Figure 2. Municipal incorporation activity by Metro and Micro Statistical Area, 1990-2008

Municipal Incorporation Activity by County

Examining municipal incorporation activity by each of the 100 North Carolina Counties reveals a unique clustering effect that occurs within individual counties. Almost 70% (69.5%) of the NIMs established in North Carolina are located in a county with at least one other NIM (Table 4). For example, Union County, (just outside of Charlotte) contains 7 NIMs (Figure 3). Guilford County, (including Greensboro) is home to 5 new municipalities. Meanwhile, Alamance County, Brunswick County, Forsyth County, and Stanly County all witnessed the incorporation of 3 municipalities between 1990 and 2008.

Table 4. Counties with Multiple Municipal Incorporations, 1990 - 2008 Source: US Census Bureau

County	Number of Municipal Incorporations
Union	7
Guilford	5
Alamance	3
Brunswick	3
Forsyth	3
Stanly	3
Carteret	2

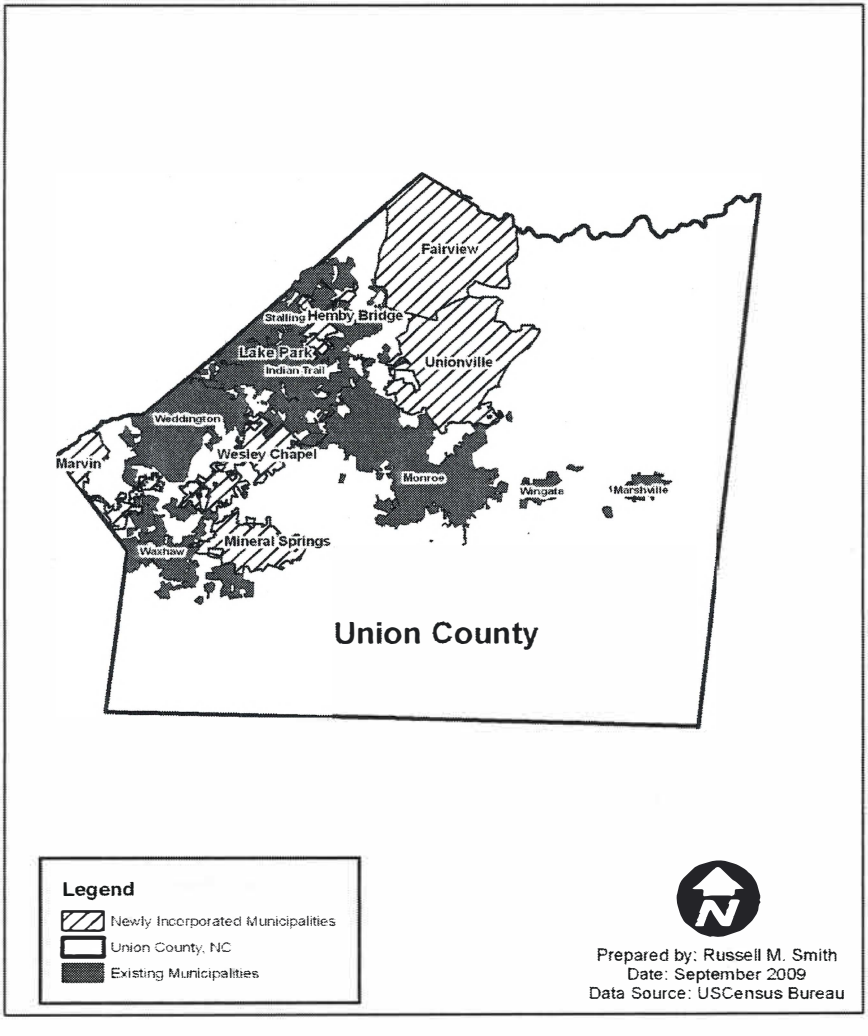

Figure 3. Municipal Incorporation Activity in Union County, NC 1990 – 2008.

Conclusions and the Future

The spatial distribution of Newly Incorporated Municipalities in North Carolina between 1990 and 2008 reveals a clustering pattern. Almost 70% of NIMs are located within an MSA and almost 70% of all NIMs are also located in a county with another NIM. The clustering clearly alludes to common motives to incorporate. Thus, a herd mentality unfolds, in which the establishment of one new city motivates nearby unincorporated communities to move towards incorporation. Areas being considered for annexation often believe that the existing municipality will destroy or manipulate their distinct local identity (Miller 1981). The effort to protect that identity through incorporation promotes the herd mentality as numerous communities within a region seek a potential way to escape the perceived or real threat of annexation from nearby existing municipality

Equally interesting is the fact that the clustering phenomenon can be detected at the Micropolitan and Non-Metropolitan scales, although at differing intensity. This result lends credence to the theory that a herd mentality may be present across all geographies but is in greater abundance in more heavily populated urban areas.

The General Assembly of North Carolina recently formed a committee to examine North Carolina's annexation standards. One of their recommendations would remove existing municipalities' ability to conduct unilateral annexations. If North Carolina amends current law and removes the ability of cities to unilaterally annex property against residents' wishes, it may greatly influence municipal incorporations in North Carolina. The defensive clustering pattern depicted in this paper may change. The deficiency of North Carolina based scholarship on this topic affords numerous opportunities for future research initiatives on municipal incorporation. This paper reports observations from the existing data. A study currently underway more closely examines the quantitative relationship between municipal incorporation and annexation activity in North Carolina. Other research endeavors might analyze the demographic and socio-economic differences and similarities between Metropolitan, Micropolitan and Non-Metropolitan NIMs in the state.

Municipal incorporation impacts the lives of millions of Americans. Developing a more detailed theory on this form of boundary change would be a welcomed addition to the literature and promote understanding of the evolution of urban form.

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Amending the North Carolina Constitution: Spatial and Political Enfranchisement as Portrayed By Delegate Votes and Voter Representation in 1835

James C. Burke
Cape Fear Community College

Elisabeth S. Nelson
University of North Carolina Greensboro

The most significant event in the political history of antebellum North Carolina was the convention that assembled at Raleigh on 4 June 1835 to amend the North Carolina Constitution. At that time, it had become apparent that the North Carolina Constitution of 1776 was seriously flawed. When the convention was adjourned on 11 June 1835, the delegates had prepared amendments that abolished borough representation, secured better representation for the western counties, allowed for election of the governor by the people rather than the Legislature, and removed certain religious qualifications for holding office. Unfortunately, they also submitted an abrogation the right of free persons of color to vote. When the amendments were submitted to the citizens of the state for ratification, the tabulation of popular vote reflected a stark contrast between the counties of the east, favoring rejection of the amendments, and the counties of the Piedmont and Mountains that supported their ratification. With such a solid division between the regions, it is difficult to determine county-level sentiment on any particular amendment. The votes of the delegates to the convention, however, were not always so clearly divided along sectional lines when they were crafting the amendments. By mapping the spatial distribution of the votes of the delegates on the individual amendments, county-level attributes of the popular vote emerge.

Introduction

This study analyzes the votes of the delegates on several amendments recorded in *Proceedings and Debates of the Convention of North Carolina called to amend The Constitution of the State, which assembled at Raleigh, June 4, 1835* and the *Journal of the Convention, Called by the Freemen of North-Carolina, to Amend the Constitution of the State, Which Assembled in the City of Raleigh, on the 4th of June, and Continued in Session Until the 11th day of July Thereafter* to determine whether the resulting tabulation of votes on certain amendments suggests voting along sectional interests or other spatial patterns. In addition, we examined the results of the popular vote and compare the number of votes to statistics on the federal population, free white population, and revenue of the counties found in the earlier *Proceeding of a Meeting of Members of the Legislature held in Raleigh, January 11, 1834 with an Address to the People of North Carolina, on the subject of Amending the Constitution of the State*.

The resulting maps show that the votes of the delegates on each of the selected amendments illustrate a more complex distribution of sentiments at the county level on different issues than is commonly assumed. The delegates did, on occasion, vote along sectional lines, but just as often voted in accordance with their county's interest, such as the amendments abolishing borough representation and abrogating the right of free persons of color to vote. On other amendments, a pattern, including blocks of counties

within regions, would appear voting contrary to others in the same region.

The *Vote of the People* appears at glance to be clearly divided east and west, but when the voting totals are compared to the population of the counties within these divisions the vote is less representative of all the people. Voter percentages are dismally small in some counties, and at their maximum, amount to less than 18 percent. This is telling evidence of the low level of political enfranchisement that existed for the general population at this point in the state's history.

Historical Background

Of North Carolina's thirty-five counties in 1776, twenty-nine were in the Coastal Plain. Much of the Piedmont and all Mountains were too sparsely populated to be divided into counties proportional to the size of these regions. The old constitution allowed each county one senator and two representatives in the legislature. Since nearly the entire population of the state was engaged in agriculture, the constitution allowed seven borough towns to sent one member to the House of Commons so that commercial interests of the state would be represented. Anticipating expansion into the interior regions of the state, the General Assembly established a permanent capital in Wake County named Raleigh in 1788. As the population of the state grew, large counties in the central and western parts of the state were created, although the smaller counties of the east retained control over the legislature. It had become apparent that the North Carolina Constitution of 1776 was seriously flawed in other respects: the old constitution contained archaic qualifications and restrictions for holding office, and it promoted the interests of slave-owning eastern planters over that of the middling farmer majority. It also presented administrative obstacles to a coherent program of economic development and internal improvements. Yet, early efforts to amend the constitution met with failure. For example, when representatives of the western counties introduced resolutions to amend the constitution in 1821, the eastern majority rejected them. It would take a crisis to galvanize support for reform. The controversy over relocation of the capital to Fayetteville after the State House in Raleigh burnt in 1831 set in motion a successful movement to amend the constitution (Conner, 1908, 3-8).

Intertwined with the need for fair representation, the counties of the Piedmont and Mountains desired road, canals, and railroads. Throughout the 1820s, the need for internal improvements was the greatest source of discord between the eastern and western counties. Sectional differences had hampered the realization of first plan for a state system of canals and turnpikes that was championed by Judge Archibald Murphey. Legislators from the eastern counties were inclined to relegate the execution of navigational improvements to private companies rather than accept state aid for the projects that would primarily serve their interest. This was motivated by the fear that state aid in the east would lead to state aid in other regions of the state, and the wealthy east would be taxed to pay for improvements in the interior. The politicians of the southwestern counties and mountains, however, gradually organized into a political block with the persistence to attain greater representation, and after the State House fire, they alignment of interests in the southeastern "Cape Fear counties." Westerners were not concerned about the location of the capital, but the friends of the movement to locate the capital to Fayetteville offered to support their efforts to amend the constitution. The legislature continued to meet in Raleigh. During the 1831-32 Session of the General Assembly, the alliance managed to defeat a bill to appropriate funds to rebuild the State House. However, the Cape Fear region was not supportive of the convention bill introduced by their allies, and it was defeated. The reformers managed to arrange an unofficial poll on the subject of a constitutional convention in 1833 that almost succeeded in convincing the General Assembly to pass a convention bill, but it was again defeated. The alliance between the eastern and western counties solidified after the 1833-34 Session of the General Assembly. During the same year, two internal improvements conventions were held in Raleigh. The offshoot of these conventions was a flood of acts during the session to incorporate railroads. However, conservative legislators blocked any recommendations for aid, including funding for surveys. This was particularly frustrating to eastern commercial interests (Jeffrey, 1989, 52-60).

On the evening of 11 January 1834, after the General Assembly rejected the bill for a constitutional convention, Charles Fisher of Rowan County, James Seawell of Fayetteville, and representatives from Anson, Buncombe, Granville, Iredell, Rockingham, Stokes, and Wilkes counties, all favoring the constitutional convention, met to plan their next course

of action. The representatives resolved to form an Executive Committee to prepare and publish essays on amending the constitution of the state. In addition, they planned to publish the bill rejected that day, and to establish committees in the individual counties to distribute the publications and collect contributions to offset costs (North Carolina, 1834c, 3-4). Through the spring and summer of 1834, the supporters of amending the state constitution began distributing pamphlets and holding rallies, pressing the campaign into the eastern counties (Jeffrey, 1989, 62). The fund of a state system of internal improvements is discussed in the *Proceeding of a Meeting of Members of the Legislature, held in Raleigh, January 11, 1834; with an Address to the People of North-Carolina, on the Subject of Amending the Constitution of the State*:

> This subject presents a forcible appeal to such among you as *desire* to see the State embark upon a scheme of Internal Improvements. – Were a loan taken by the State, sufficient to commence operations on such a work, the funds must be under the control of a Government whose *necessary* expenses exceed the ordinary revenue of $15,000 per year, and who does not know, that the system would be a "scapegoat," to the sin of all other expenditures, and become odious? Would the people at large be taught to discriminate when it is notorious that few among you possess or have sought after any knowledge of our finances for many years? Depend upon it, you will never command money for the expenditure, or enterprize to pursue a system of great public works, if you are to rely upon an increase of taxes equal to the present deficiency of revenue for governmental purposes, added to enlarged demand on it for the interest of a State debt.

Simply stated, the expense of government had increased as new counties were added, yet many of these counties were not contributing enough in taxes to maintain their administration. While a program of internal improvements was necessary for the prosperity of the state, the increasing costs of government would continue to consume tax revenues and reduce available funds in the treasury to finance those improvements. Simply stated, the expense of government had increased as new counties were added, yet many of these counties were not contributing enough in taxes to maintain their administration. While a program of internal improvements was necessary for the prosperity of the state, the increasing costs of government would continue to consume tax revenues and reduce available funds in the treasury to finance those improvements.

The efforts of the reformers contributed momentum to the movement throughout the year of 1834. Governor David L. Swain pressed the subject of a constitutional convention in his message to the General Assembly in 1834, and the convention bill passed on 5 January 1835. When the convention convened on 4 June 1835, its delegates included the most respected men in the state, and each a freeholder of at least one hundred acres from the county they represented. The most notable of these included Governor Swain, Judge William Gaston, and Charles Fisher. Nathaniel Macon, who was chosen to be president of the convention, would perform the last great service of his career (Konkle, 1922, 144-148, 150-152). Macon, at seventy-eight years old, had spent much of his life in Congress and had known the framers of the first North Carolina State Constitution. While his selection as president did not hold special political significance, he was the undisputed authority on the 1776 constitution. Macon, Gaston, and Swain dominated the proceeding of the convention (Lefler and Newsome, 1973, 353-354).

The convention debates reflect the conflict between the two side's visions of North Carolina. Nathaniel Macon clearly supported the cause of education, an issue that was linked to the internal improvement movement. However, he did not believe that North Carolina was a commercial state, and its lack of a good port along with the "sickly" environment of the southeast section placed it in a poor position to compete with other states. Promoting public education would make the citizens of North Carolina virtuous, if not great. Nathaniel Macon took a different approach in some remarks about the degraded condition of the state, noting that North Carolinians were independent and "in general more happy," even though they lacked the more conspicuous trapping of prosperity (North Carolina, 1836, 43, 92). Macon did not want to see the constitution rewritten; he merely wanted amendments appropriate to meet the changed conditions and to satisfy the political and economic demands of the western section of the state. He wanted to see suffrage based on mature judgment rather than property, public education supported by taxation, annual legislatures, the recording of individual votes – *viva voce* – in legislature, religious liberty, and the election of state officers and judges to specific terms. He was not concerned with commercial fads or internal improvements (Dodd, 1903, 387-389). To a degree, the convention achieved many of these objectives.

However, Macon was disappointed that the convention approved biennial sessions.

In the course of the debates, James Wellborn, a delegate from Wilkes County, stated that the disparity between the representation of the eastern and western counties had been responsible for the failure of a system of internal improvements, including both the Central Rail Road and the plan to connect the Cape Fear and Yadkin. Mr. Wilson, of Perquimans, questioned the motives of the west in seeking equal representation. He believed that Mr. Wellborn's statements exposed the desire of the western counties' representatives for railroads and canals to give them an outlet to the ocean. However, the opening of new territory to the south and west would continue to encourage out-migration from the state. A railroad connecting the west to the Atlantic could not reverse conditions. Jesse Speight, of Greene County, remarked that a railroad from the seaboard to the mountains was impossible. The state did not have the capital for such a project, and the profits from transporting produce would not sustain it. Railroads made their money from passenger service. Nevertheless, if the citizens of the east were to be taxed for railroads, they should have a say in how the money was distributed. Mr. Speight stated that a mutual jealousy existed in the state between east and west, and among all the river basins. The only possible way to get the cooperation of the representatives of the opposing sections of the state was to extend political favors. He hoped he could bring before the legislature a plan to build a railroad from Beaufort to New Bern and a railroad from Fayetteville to the western region. He thought these projects were practical (North Carolina, 1836, 86-87, 98-99, 123-125).

The subjects of internal improvement and education intersected in the debates on other issues such as borough representation, the number of representatives in the House of Commons, and other administrative considerations of government. Those constitutional changes that altered the nature of representation would indirectly influence the cause of internal improvements. The convention, however, embraced other proposed amendments, such as the removal of religious qualifications for holding office. This provision of the 1776 constitution remained untested, and perhaps ignored. The new amendment changed the qualifications, but excluded non-Christians. The debates devoted to the topic of religious qualification for holding office were of no consequence because such a provision was inconsistent with the Constitution of the United States. Under the new constitution, the composition of the House of Commons consisted of 90 to 120 members, based on population numbers. This gave the western counties fair representation according to their population size. However, the east retained an advantage because three-fifths of its large slave population was included in the total county population in the same way employed by the Federal Government determine representation. The *Federal Number* does not reflect the actual slave population. Three-fifths of the actual slave population was added to the free population to determine the number of seats for the slave states in the House of Representatives in Congress. The Senate of North Carolina, apportioned to the tax value districts, gave the eastern counties additional advantages (Hamilton, 1916, 13-15). Another new amendment to the North Carolina State Constitution abrogated the right of "Free Persons of Color" to vote.

North Carolina under the new constitution

The convention adjourned on 11 July 1835 and the constitution was put to popular vote several months later. The citizens ratified the North Carolina State Constitution of 1835 by a majority of 5,165 votes (26,711 for ratification, 21,606 against). The vote was divided along sectional lines with most easterners voting for rejection (North Carolina, 1836, 400, 425). Contrary to the long accepted view, the movement to amend the convention involved bipartisan cooperation between the Democrats and the Whigs. The popular election of the governor, as Judge Gaston noted, would stimulate party politics within the electorate. The citizens would lend their support to the party that served the interests of the whole state (Jeffrey, 1989, 64-65). Edward B. Dudley, North Carolina's first popularly elected governor was elected in 1836. He belonged to the Whig Party. This national political party was formed in opposition to the Democratic Party and Andrew Jackson. Its platform supported economic development and internal improvements. The citizens of the state continued to elect Whig governors until 1850. Charles Manly, the last Whig governor, left office in January of 1851. The politics of the improvement-minded Whig party would shape the railroad movement in North Carolina during its first period of construction.

Edward B. Dudley was a harmonizing force in North Carolina politics. He focused on practical issues

rather than partisan concerns, and entertained a liberal viewpoint. Having served in Congress from 1829 to 1831, he refused to run for another term. In 1830, he had published a circular that opposed the Cherokee removal that irritated some in the westernmost section of the state that anticipated the opening of this region to settlement. However, when he ran for governor during 1836, his platform was unambiguous: he favored a bipartisan effort to improve the state, and bring it a condition where it would be economically competitive with its neighbors. His views on internal improvements made him an attractive candidate in the western counties in spite of being an easterner. He possessed a congenial personality, great wealth, and tendency to follow his principals doggedly (Hamilton, 1916, 36; Jeffrey, 1989, 75). Governor Dudley, with the aid of his colleague William Graham, labored to reorganize the finances of the state during the 1836-37 Session of the General Assembly. The central achievement of this session was the two-fifths investment on the part of the state for several railroad projects, including the Cape Fear & Western Rail Road from Fayetteville to the Yadkin River, the Wilmington & Raleigh Rail Road, and the North Carolina Central Rail Road from Beaufort to Fayetteville (Konkle, 1922, 176). The new statute channeled the distribution of the federal surplus into the stock of the railroad companies and the dividends from the stocks would be applied to the fund for public education called the Literary Fund (North Carolina, 1837b, 346-352).

Mapping the Votes

The Vote of the People

Culturally, politically, and economically, North Carolina has always been divided into four sections. These sections are the Cape Fear Region, the Northeastern Counties, the Piedmont, and the Mountains. Physically, North Carolina is divided into the Tidewater, Inner Coastal Plain, Piedmont, and Mountains. When a map is produced from the popular vote on the question of ratification or rejection of the amendments, all of the counties of the Coastal Plain and a few bordering Piedmont counties voted to reject ratification, while the rest of the Piedmont counties and all of Mountain counties were in favor (Figure 1). The popular vote was 26,771 for ratification, and 21,606 for rejection (Convention of North Carolina, 1835, 425). However, the percentage of the whites represented in this vote was small (Figure 2).

The map of the final vote of the convention on the question of submitting the new constitution to the people for ratification or rejection, shows that many of the Coastal Plain counties approved the ordinance (North Carolina, 1835, 400; Figure 3). Mapping the federal population using the same regional distributions (physiographic) shows that the federal population increases west of the Coastal Plain (Figure 4). The low number of voters for each county compared to county population reflects the lack of political enfranchisement of the majority. Another important element associated with "The Vote of the People" is that the voting portion of the population in each county is a good representation of the proportion of the whites in the Federal Number. This does not mean that the voters represented a cross-section of their community. The total voters comprised only 10.23 percent of the total white population (or 14.36 percent of the total free population).

Borough Representation

On Wednesday 10 June 1835, the convention took up the question of Borough Representation in the House of Commons. The topic was debated through the next day, (North Carolina, 1835, 13, 18-20; North Carolina, 1836, 32-60). The third resolution of the convention stated:

> *Resolved*, That a Committee be appointed to enquire and report whether any, and of any, what amendments are proper to be made to the said Constitution, as to the exclusion in whole, or in part, of Borough Members from the House of Commons.
> (North Carolina, 1835, 13)

The delegates voted on striking the whole of the resolution from the word "resolved" after considering a proposal from Alexander Gaston of Hyde County that Edenton, New Bern, and Wilmington should retain borough representation. The vote to strike the whole resolution was defeated by six votes (North Carolina, 1835, 20; Figure 5). The map of the votes illustrates scattered support for retaining Borough Representation in the eastern counties, and even some support in the west. However, the resolution does not appear to have evoked strong sectional resistance.

Religious Qualification Amendment

A proposed amendment to *Section 32* of the North Carolina Constitution of 1776 intended to

remove or alter the religious qualifications for office holding was intensely debated during the NC Constitutional Convention of 1835. Though the religious qualification had been in place since 1776, it had never been used to prevent anyone from holding office.

> That no person who shall deny the being of God, or the truth of the *Protestant* Religion, or the divine authority either of the Old or New Testament, or who shall hold Religious principles incompatible with the freedom and safety of the State, shall be capable of holding any office or place of trust or profit in the Civil department within the State.
> (North Carolina, 1836, 416)

The State had never put in place a tribunal to determine the faith of anyone seeking office. Further, Judge William Gaston, the most respected member of the delegates next to Nathanial Macon, was a Roman Catholic. Nathanial Macon (1758-1837), the president of the convention, a proponent the anti-Federalism, and a protégé of Willie Jones, the political mind behind the North Carolina Constitution of 1776, stood in opposition to the religious qualification. Macon had stated early in the debate on this issue that "Politics and Religion was the very essence of hypocrisy," and that non-Christians should not be barred from holding office if they have the qualifications (Dodd, 1903, 387-390; North Carolina, 1836, 246). Yet, in spite of that fact, the debate on amending it was one of the longest of the convention – 119 pages of the *Proceedings*. The resulting vote was 74 to 51 in favor of the change (Figure 6). This was the vote on the final wording of the proposed amendment, the delegates having voted on several versions of the amendment. The majority agreed on a version that favored the Christian faith.

Insomuch as the delegates labored long for the right wording, and the present North Carolina Constitution of 1971 retains the phrase "any person who shall deny the being of Almighty God," the whole is rendered moot by Article VI of the United States Constitution. To discern a political object on the part of the proponents, then and now, other than making a statement, is difficult.

Disenfranchisement of Freedmen

The distribution of the votes of the delegates on the amendment that removed the right of free persons of color to vote varied from region to region. The delegates of the counties in the north and northeast tended to support it, whereas the delegates from most of the Cape Fear and Piedmont did not. The counties having a split vote between delegates were spread across regions (Figure 7). As William Gaston noted in the debates, the amendment was not aimed at granting a right, but taking one away. It would be particularly unjust to take away this right from a person "who possessed a freehold, was an honest man, and a Christian." He felt that allowing free person of color a voice in political life would foster their loyalty to state (North Carolina, 1836, 79).

Ballot or Voice Voting

The vote of the delegates on the resolution for the amendment on requiring the member of the General Assembly to vote *viva voce* rather than by ballot when electing officers was adopted 84 to 40. The change allowed the votes of each member, yea or nay, to be entered into the record. In this way, the constituents of the members would know how their representatives voted. Nathaniel Macon did not think there was much difference between voting by ballot or *viva voce*, but he preferred the latter. Regardless, he did not think the government or human nature was as dishonest as often represented, and any representative should be open about the way he voted. William Gaston thought otherwise, stating that representatives would vote along party lines if their votes were recorded. The majority approved the resolution (North Carolina, 1836, 179-181). The vote of the delegates was split for most counties throughout the state, with only one delegate voting in a number of counties (Figure 8).

Amendment On Biennial Elections

The vote of the delegates on the resolution for the amendment on biennial elections passed 85 to 35. This change to the constitution removed the need for annual elections, and was a matter of economy and convenience. Several of the delegates debated against the change vigorously on the grounds that biennial sessions of the General Assembly would deprive the people of the opportunity of the "redress of grievances and strengthening their laws." Others, such as Charles Fisher of Rowan County, thought the people would gain by biennial elections because their selection of representatives would be more informed, and would not adopt the attitude that unfavorable results could be undone in following year's election (North Carolina, 1836, 184-201). The distribution of the delegate's votes shows firm resistance in the northeast (Figure 9).

Gubernatorial Elections

The resolution on the amendment allowing for the election of the governor by popular vote, as with the members of the House of Commons, passed 74 to 44. Nathaniel Macon did not think that there was a difference between an election of the governor by the General Assembly or by popular vote. As he noted, the governor of North Carolina had little power, and "next to nothing to do." Had the state granted the office of governor greater authority as was the case in other states, the governor might exercise undue power over legislation. However, the benefit of public election to the post would negate the practice of legislators working to put their friends into the position. Mr. Gaston stated that the election of the governor by popular vote would lead to the "General Ticket system," or party politics, because the organization required a statewide campaign for the office (North Carolina, 1836, 335-339). This had not been the situation with politics in North Carolina up to that time. With the single exception of the presidential elections, the voters aligned themselves with parties organized under regional and county committees.

The distribution of the votes of the delegates on this resolution show some resistance to the change in the northeast and northeastern Tidewater, but the delegates from the Cape Fear, Piedmont, and Western counties supported the change. Iredell County appears to be the only county to the west that rejected the resolution. Edgecombe, Sampson, and Wayne counties are the only contiguous counties where a single delegate voted yea and the other abstained. Orange County delegates voted likewise (Figure 10).

Conclusions

Without the constitutional reforms put in place during the North Carolina State Constitutional Convention of 1835, it is unlikely that railroad development would have progressed during the late 1830s. The failure of earlier railroad schemes and the inability of the General Assembly to adopt a state plan for internal improvements are strongly associated with the undemocratic nature of North Carolina politics under the North Carolina Constitution of 1776. The amendments to the constitution allowed for the development of political parties along the national model, the election of the governor by popular vote rather than by the legislature, and diminished the sectional nature of North Carolina politics. Internal improvement became central to future policy in this environment. However, the abrogation of the vote for free persons of color was a setback in the political progress that exemplifies other aspects of the new constitution. The number of free persons of color in antebellum North Carolina was small, and did not represent a serious threat to the hegemony of the state's ruling classes. It can be attributed to the paranoia that spread through the South following the slave insurrections led by freed blacks such as Nat Turner and Denmark Vesey, and the growing antislavery movement in the North along with the publications of its journalists Benjamin, Lundy, William Lloyd Garrison, and David Walker, a North Carolina native (Freehling, 1966, 49-52).

Mapping the votes of the delegates shows the complex underpinning of the seemly monolithic popular vote. The delegates from the counties of the Coastal Plain were often divided on various amendments: the delegates from Cape Fear counties often aligned with those in the Piedmont and Mountains, as did the counties of the northern Tidewater with the Piedmont. On certain amendments, the vote in opposition or in favor was concentrated in the Piedmont and Mountains. While is it difficult to address all the causes of the diverse voting patterns of the delegates, it should be apparent that rigid sectionalism did not influence the votes of the delegates as so often is assumed. We must look to other cultural and economic intersection factors for the counties – such as transportation, cash crops, educational advantages, the distribution of religious organizations, the cultural origin of a county's original settlers – to approach determining any causal relationships for the votes of the delegates. However, it is clear that the delegate's votes reflect a state wide desire for constitutional reform with one or more amendments, even though some delegates and the residents of their counties rejected the whole package of amendments.

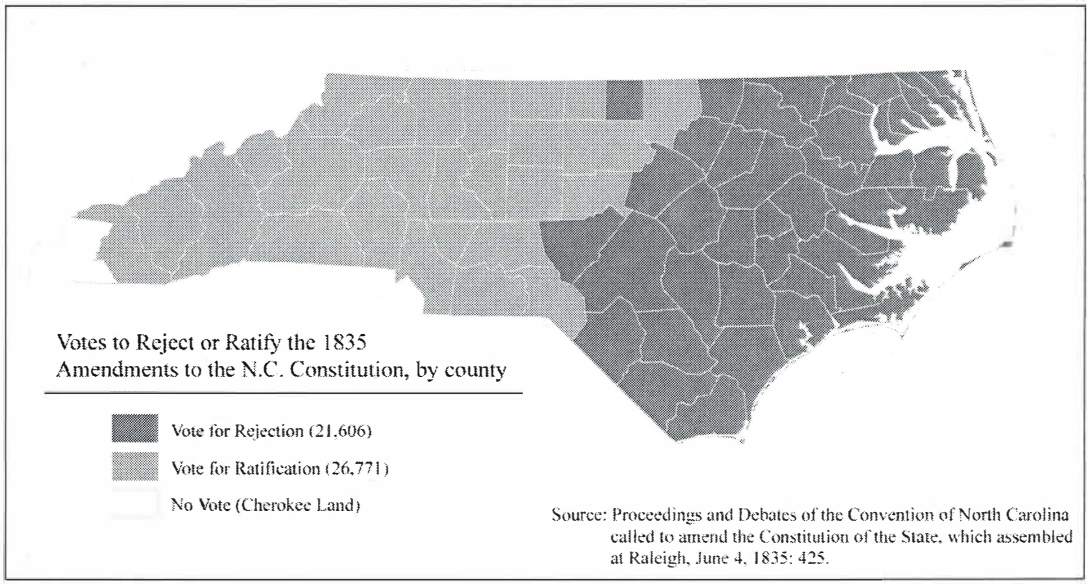

Figure 1. The popular vote to ratify or reject the North Carolina State Constitution of 1835 was close, 26,771 to 21,606. The Western counties and most of the Piedmont counties voted to ratify. The entire Coastal Plain region voted to reject. The Cherokee Lands were not represented at the convention.

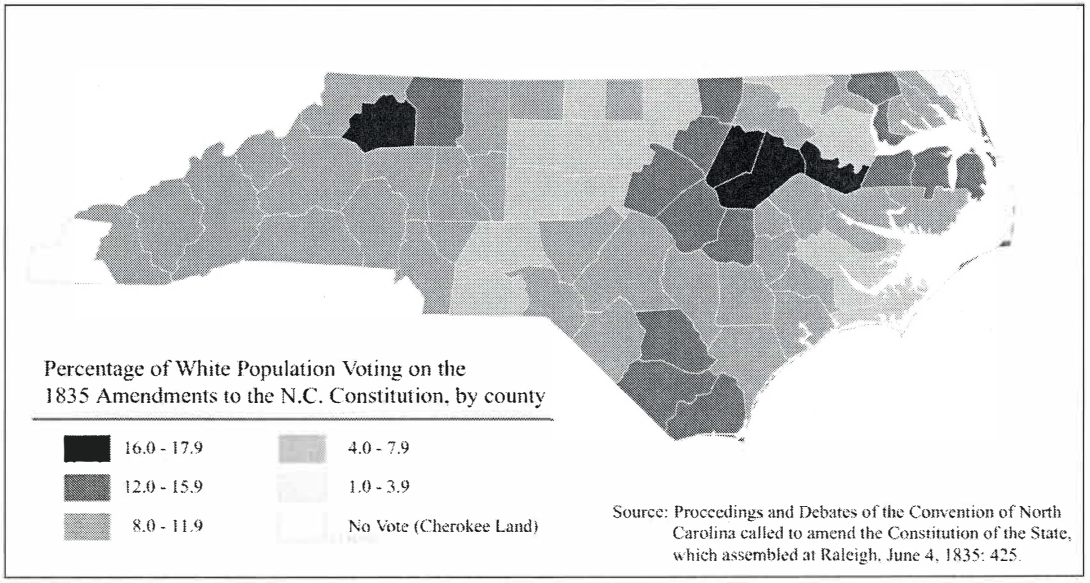

Figure 2. Voter participation by the White population in each county participating in the vote to ratify or reject was small.

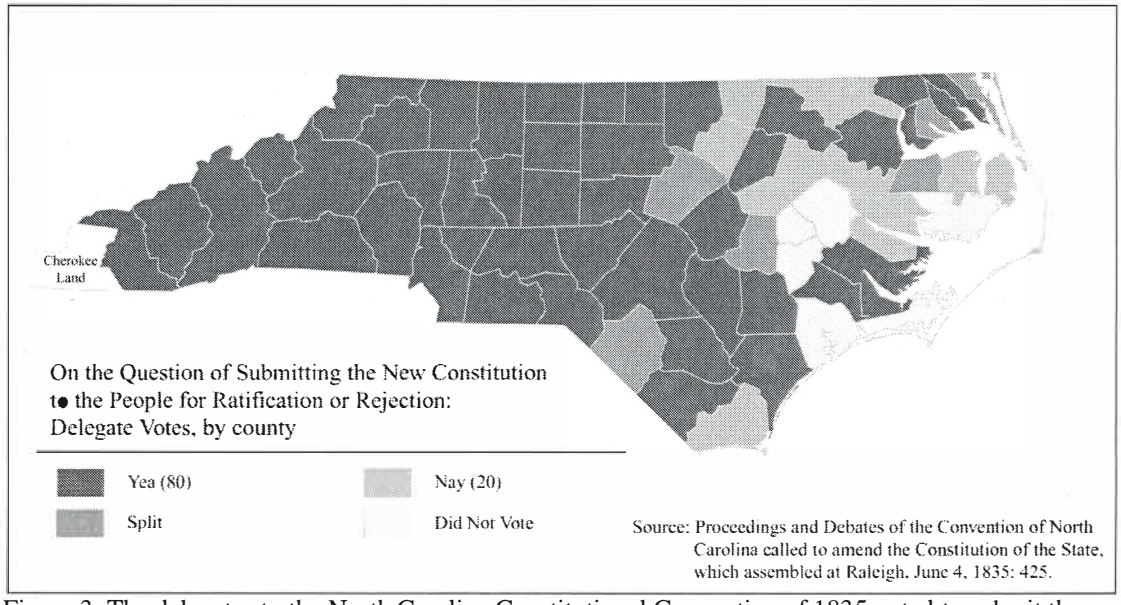

Figure 3. The delegates to the North Carolina Constitutional Convention of 1835 voted to submit the new constitution to the citizens of the state for ratification or rejection. This map shows the distribution of the votes of the delegates. While the vote was unanimously in favor of this action in the western counties, the delegates of the eastern counties were divided.

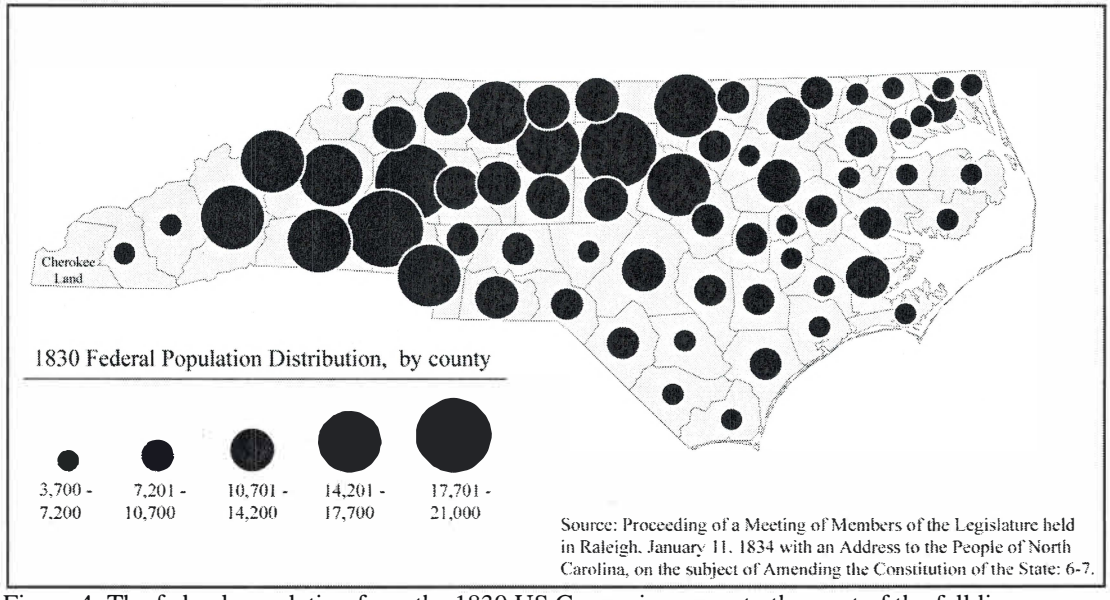

Figure 4. The federal population from the 1830 US Census increases to the west of the fall line. Yancey County, though not formed in 1840, is an estimate based on the population of the surrounding counties.

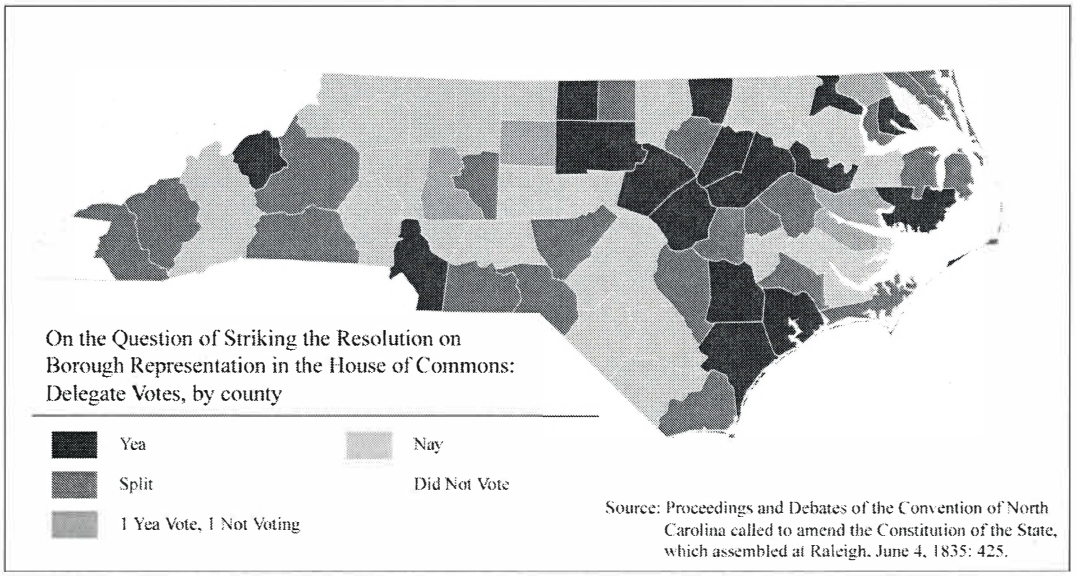

Figure 5. The vote on the question to strike down the resolution abolishing Borough Representation in the House of Commons.

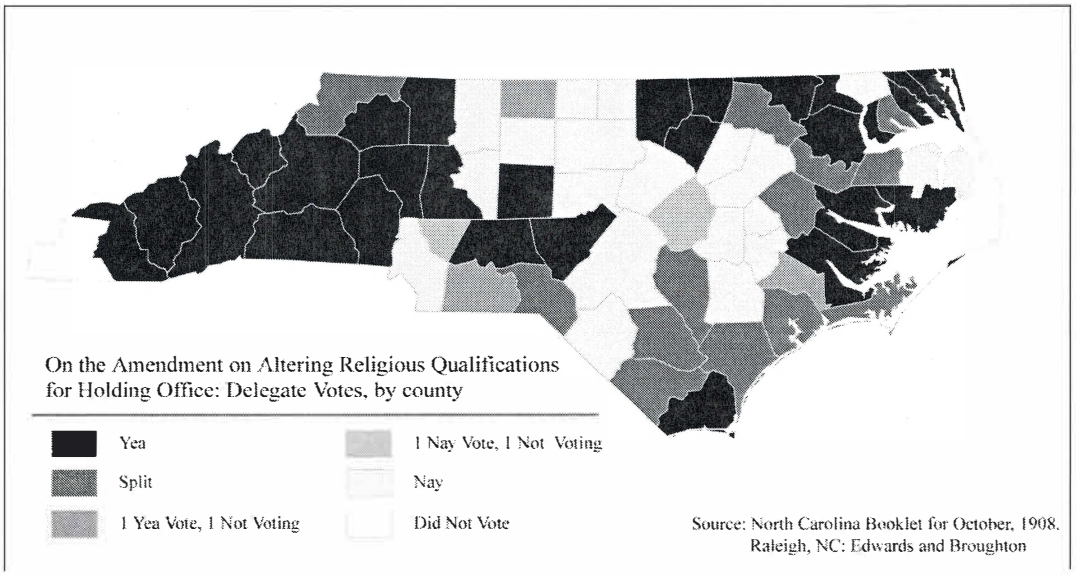

Figure 6. The distribution of votes on amending the religious qualifications for holding office. The vote was 74 in favor, and 51 against the amendment. Some delegates voting against the amendment were opposed to any religious qualifications (Conner, 1908, 21).

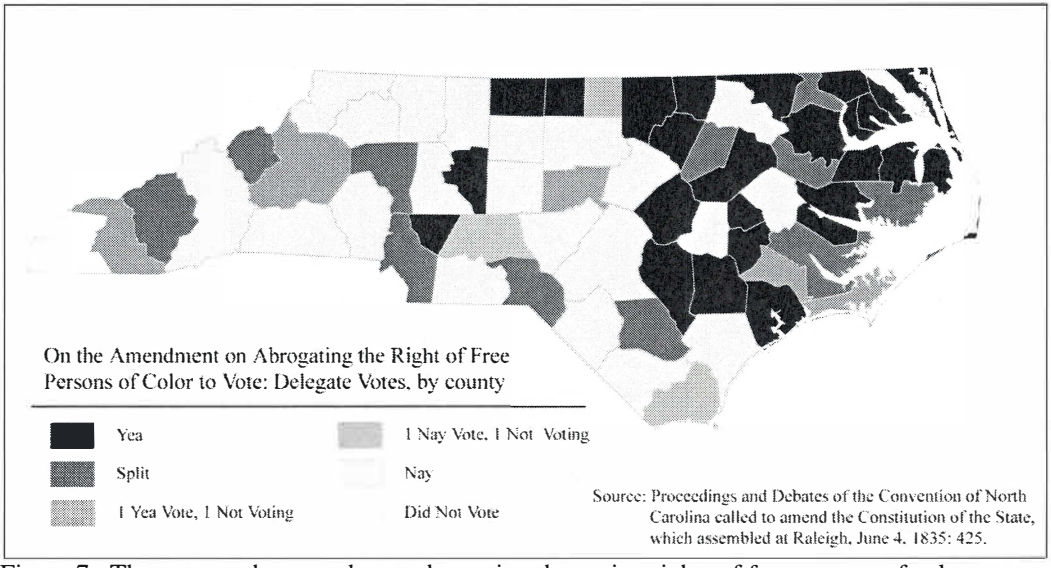

Figure 7. The vote on the amendment abrogating the voting rights of free persons of color. The vote was very close, 66 to 61 in favor of submitting the amendment to popular vote.

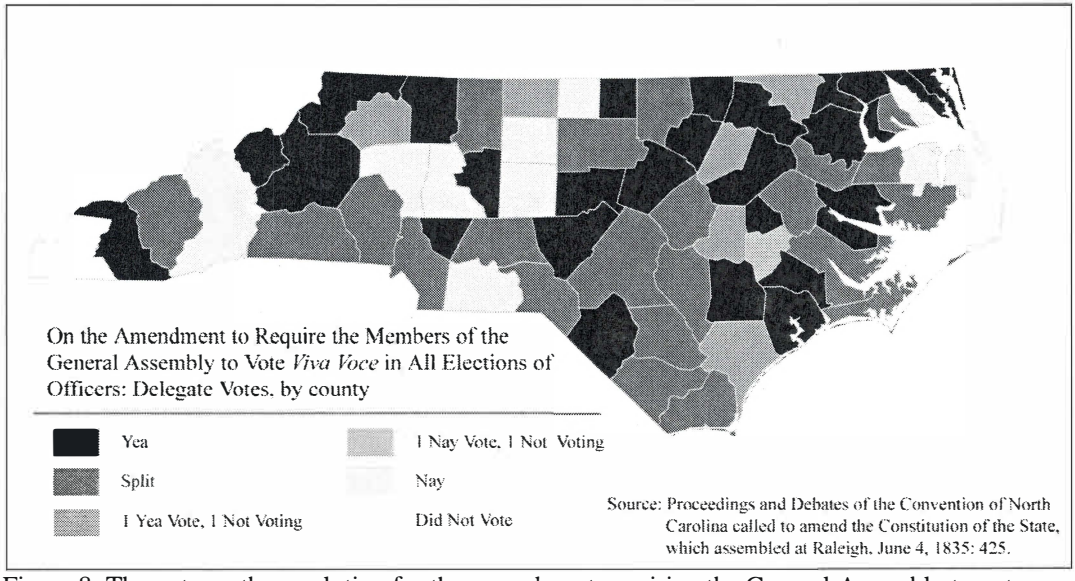

Figure 8. The vote on the resolution for the amendment requiring the General Assembly to vote.

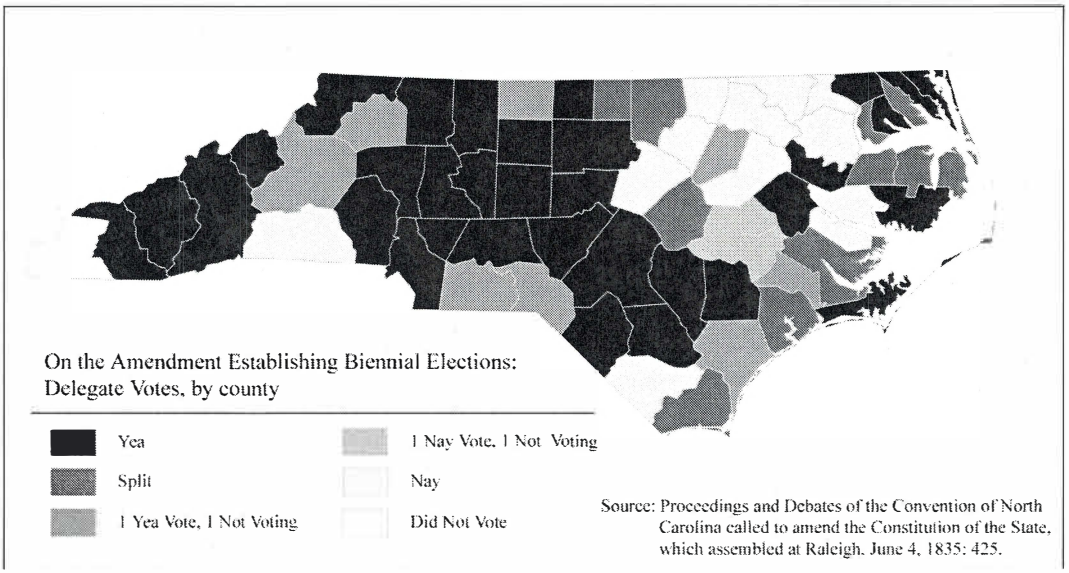

Figure 9. The vote on the resolution for the amendment providing for biennial elections was supported by a majority of the delegates across the state's diverse regions. However, a block of delegates representing northeastern counties rejected the resolution.

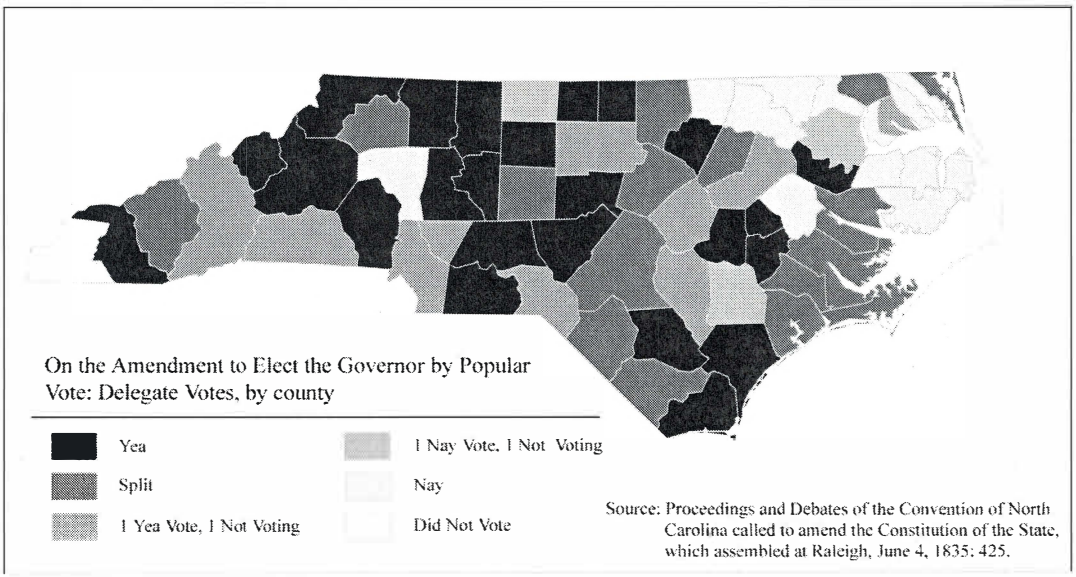

Figure 10. The resolution to amend the constitution to provide for the election of the governor by popular vote passed 74 to 44. Delegates in the northeastern counties as well as those in the northern Tidewater resisted the change. As with other votes, the votes were split for many counties.

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Spatial-Temporal Distribution of Tropospheric Ozone in the Carolina Piedmont Megapolitan Area

Bradley J.F. Bereitschaft,
University of North Carolina Greensboro

Tropospheric ozone, a key component of photochemical smog, is a significant hazard to biological systems. Ozone is of particular concern in highly populated urban regions where large numbers of people may be exposed to unsafe concentrations, resulting in impaired respiratory function and an increased risk of heart disease. This article explores the spatial-temporal distribution of tropospheric ozone within the Carolina Piedmont megapolitan area over the ten-year period 1998 – 2007. Analyzing both the spatial distribution and temporal trends of tropospheric ozone levels at this scale is particularly useful for understanding how large urban agglomerations influence regional air quality through the "sharing" of air pollution. The influence of various localized variables known to affect the surface concentration and distribution of ozone, including climatic conditions and the emission of point and non-point precursor chemicals, were also investigated.

Introduction

Tropospheric ozone, a key component of photochemical smog, is a significant hazard to biological systems (Burnett et al., 1994; Krupa et al., 1995). Known to impair respiratory function and increase certain risks associated with heart disease, ozone is of particular concern in highly populated urban regions (Bell et al., 2004; Schlink et al., 2006). In an effort to mitigate this hazard, considerable research has been conducted to understand the factors that contribute to the formation, movement, and distribution of ground-level ozone.

Since the dawn of the industrial age, anthropogenic production and release of ozone precursor emissions (primarily nitrogen oxides (NOx) and volatile organic compounds (VOC)) from point (e.g., industrial operations, power plants) and non-point sources (e.g., vehicular exhaust, building emissions) has contributed significantly to rising tropospheric ozone levels (Berntsen et al., 1997; Syri et al., 1999). Tropospheric ozone is readily produced in the atmosphere when nitrogen oxides and VOCs undergo a series of chemical reactions in the presence of sunlight (Atkinson, 2000). The photochemical production and spatial distribution of tropospheric ozone, however, is not only influenced by abundance of precursor emissions, but also site-specific topography, wind speed and direction, intensity of ultraviolet (UV) radiation, temperature and other local climatic variables (Fuglestvedt and Jonson, 1995; Guicherit and Roemer, 2000; Stathopoulou et al., 2008).

The distribution of ozone has been studied using a variety of techniques over a number of spatial scales. Caballero et al. (2007) estimated the spatial variability of ozone over a 5872 km^2 area along the southeast coast of Spain using multiple linear regression. Values of ozone concentration were estimated using the regressed relationship between altitude, distance to precursor sources, and ozone. Liu and Rossini (1996) used the spatial interpolation technique of kriging to predict mean outdoor ozone concentrations at particular home sites within the Toronto metropolitan area. They found predicted ozone values obtained using kriging were more accurate than using a simple nearest-neighbor (proximity polygon) approach. Similarly, Matejıcek, Engst, and Janour

(2006) used inverse distance weighting (IDW) and ordinary kriging to conduct a spatial analysis of ozone and NO_2 levels over Prague. In a review of ozone-mapping studies, Diem (2003) found that 19 of 50 studies used some form of kriging to produce ozone surfaces, making it the most popular modeling technique.

This study uses ordinary kriging to model the distribution of surface ozone at a newly conceptualized megapolitan region, a scale of urban agglomeration proposed by Lang and Knox (2008). Megapolitan regions include multiple metropolitan statistical areas and their surrounding countryside. My analysis focused on the Carolina Piedmont megapolitan region, one of twenty such regions defined by Lang and Knox (2008). The main objectives were to characterize the spatial and temporal trends in the distribution of tropospheric ozone within and around the Carolina Piedmont megapolitan area during the ten year period 1998 – 2007, and in doing so to better understand to what extent ozone levels in adjacent metropolitan areas may influence one another and the surrounding countryside.

Study Area and Methodology

The Carolina Piedmont megapolitan region spans 50 counties in North Carolina and South Carolina (Figure 1). The area includes 157 census-defined urbanized areas, 18 micropolitan statistical areas, 10 metropolitan statistical areas (MSAs), and four adjacent combined statistical areas (CSAs) (Raleigh-Durham-Cary, NC, Greensboro-Winston-Salem-High Point, NC, Charlotte-Gastonia-Salisbury, NC, and Greenville-Spartanburg-Anderson, SC). At the heart of this region of near contiguous urbanization is the Interstate-85 corridor that facilitates intra-urban travel between major urban nodes within the region and inter-urban travel between the Carolina Piedmont and its neighboring megapolitan regions: Atlanta, GA to the south, and Washington-Baltimore, VA/MA to the north. The area is generally confined to the piedmont region of North and South Carolina, characterized topographically by gently rolling hills, and located between the Appalachian Mountain range to the west and the Carolina coastal plain to the east. The climate of the region is subtropical throughout with warm, humid summers, mild winters, and moderate annual precipitation.

As of 2007, the projected population of the Carolina Piedmont region was 7,353,520, an increase of approximately 14 percent from 2000 (derived from U.S. Census data). This growth is twice the rate of the national average of 7 percent over the same period. Not all areas of the region, however, have experienced population growth. Seven counties have had negative growth over the last eight years. These counties line the periphery of the study area and are predominately rural. Counties with the greatest gains in population are in close proximity to the I-85 corridor or are located within the region's four CSAs. These four CSAs serve as the major population nodes within the Carolina Piedmont. Thus, while the region is growing as whole, there also appears to be a significant rural to urban shift in population.

2.2 Data Acquisition

Ozone data was obtained from the Environmental Protection Agency's (EPA) AirData online database. AirData provides a user-friendly interface to query annual summaries of air pollution measurements throughout the United States. The database contains both emission data (amount of pollutants released annually from point and non-point sources) and ambient pollutant concentration data gathered at over 4000 certified monitoring stations. Annual county-level ozone precursor emission data was obtained for 1990 and 1996 - 2002, point-source precursor emission data for 1990, 1996, 1999, and 2002, and complete monitor-specific ozone concentration data from 1998 - 2007. These years included the full range of emission data available through AirData.

A total of 71 ozone monitoring stations were used, including 43 within, and 28 surrounding, the Carolina Piedmont study area (Figure 1). The additional 28 monitors were used to eliminate edge effects within the study area and to understand the distribution of ozone immediately beyond the borders of the Carolina

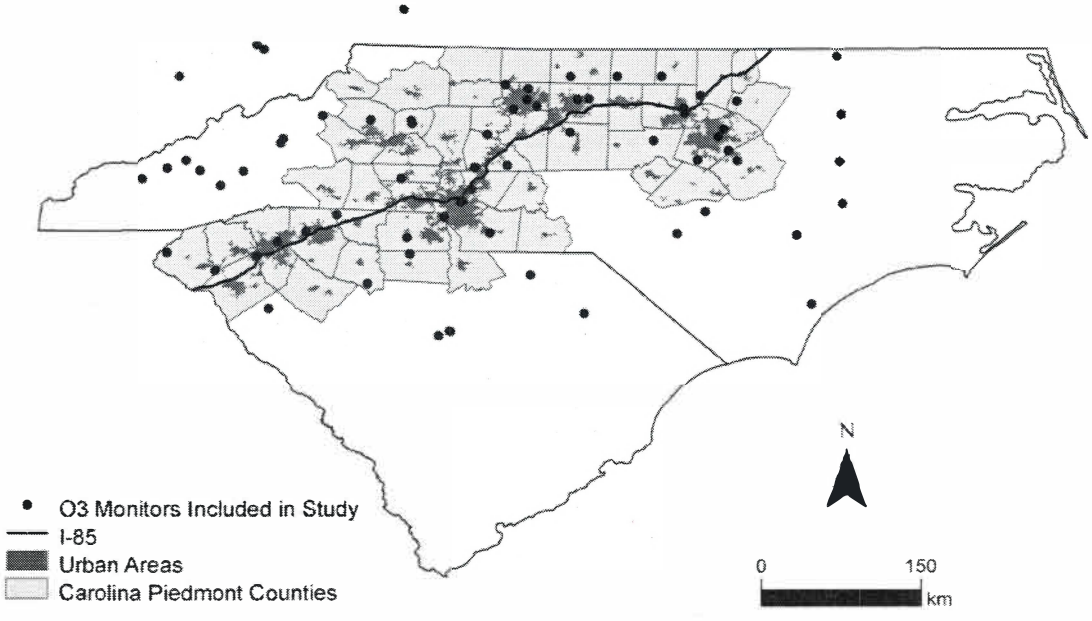

Figure 1. Carolina piedmont counties and urban areas included in the megapolitan regional study area

Piedmont. Data regarding annual 4th maximum 8-hour ozone concentrations and number of annual 8-hour ozone exceedances for the years 1998 through 2007 were obtained for each monitoring station for the period in which they operated (not all stations were in operation for the full 10 years). Annual ozone exceedances refer to the number of 4th highest 8-hour ozone concentrations that were greater than the EPA standard threshold of 0.075 ppm.

Additional climatic data regarding regional maximum temperature, average temperature, and precipitation was obtained by special request through the Southeast Regional Climate Center (SERCC). SERCC provided annual climate averages for North and South Carolina for the years 1998 through 2007. Using the Geostatistical Analyst extension in ArcGIS, ordinary kriging was used to produce ozone surface layers indicating the spatial distribution of 4th maximum 8-hour ozone concentrations across the Carolina Piedmont megapolitan area for every other odd year from 1999 through 2007 (Figure 2). The density of ozone monitors within the Carolina Piedmont provided low prediction standard errors relative to the area outside. Where the distribution of ozone exhibited anisotrophy or noticeable spatial trends, the spatial model was adjusted accordingly. The semivariance of ozone concentrations in 1999, for example, varied considerably between the northwest-southeast direction and the northeast-southwest direction, indicating anisotrophy. The distribution of ozone also exhibited a secondary trend with ozone concentrations greatest near

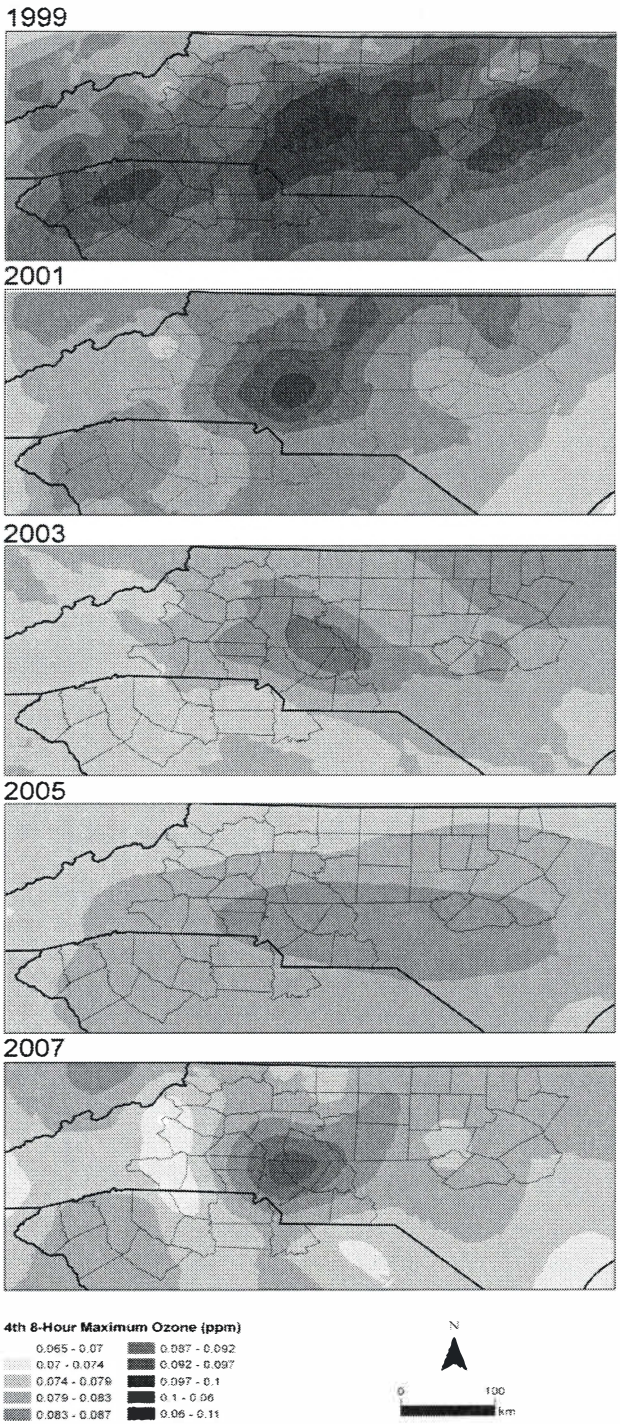

Figure 2. Annual 4th maximum 8-hour ozone concentrations every odd year 1999-2007.

the center of the study area and diminishing toward the edges. This calibration process, carried out within Geostatistical Analyst for every surface created, was used to minimize prediction errors when possible.

Ordinary kriging was also used to produce a surface of average number of annual ozone exceedances during the period 1998-2007. Ozone exceedance indicates what areas are not in compliance with EPA ozone standards. According to the EPA's 2008 standards, an exceedance occurs when the 4th highest ozone concentration over an 8-hour period is above 0.075 ppm. (Stone, 2008) The location and magnitude of VOC and NOx precursor emissions from known point sources (e.g. factories, power plants) are shown in Figures 3 and 4 respectively.

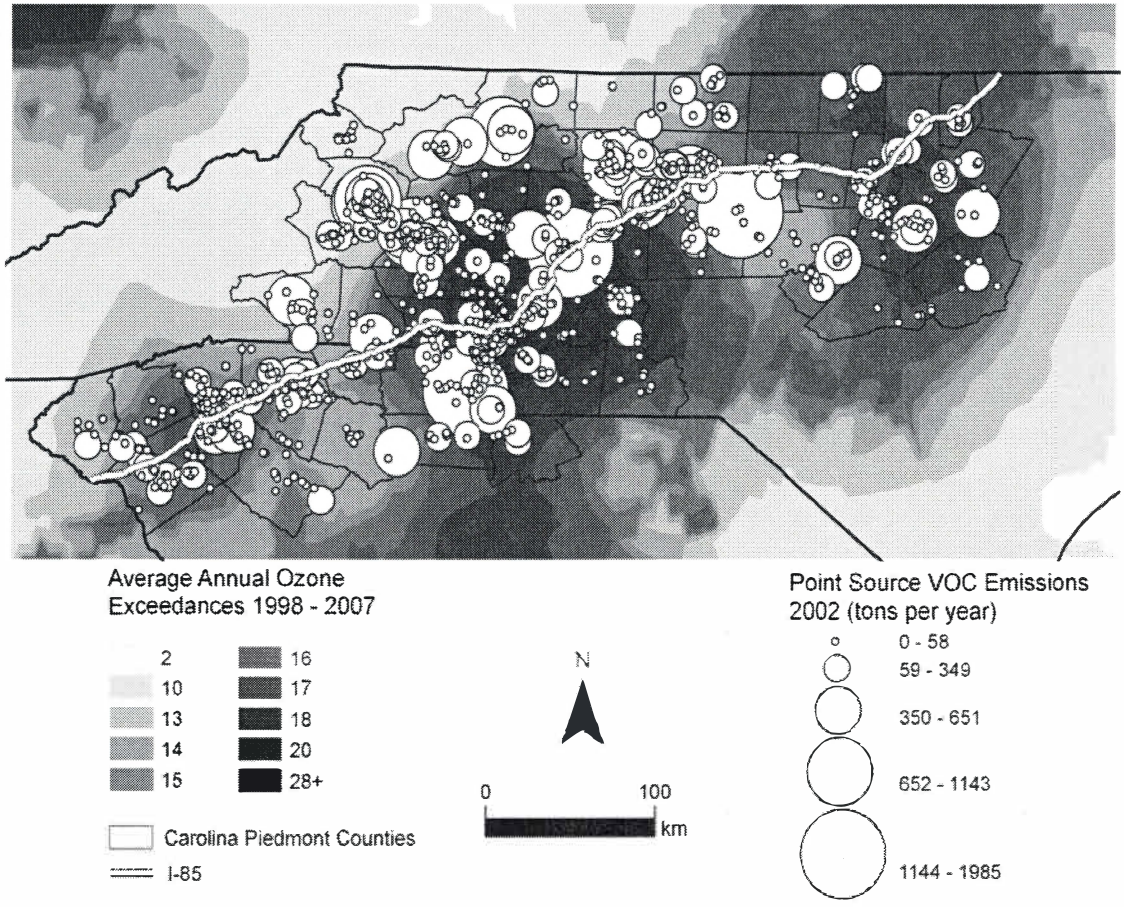

Figure 3. Average annual ozone exceedances 1998-2007 overlain with the location and magnitude of point-source emissions of volatile organic compounds (VOCs) in 2002.

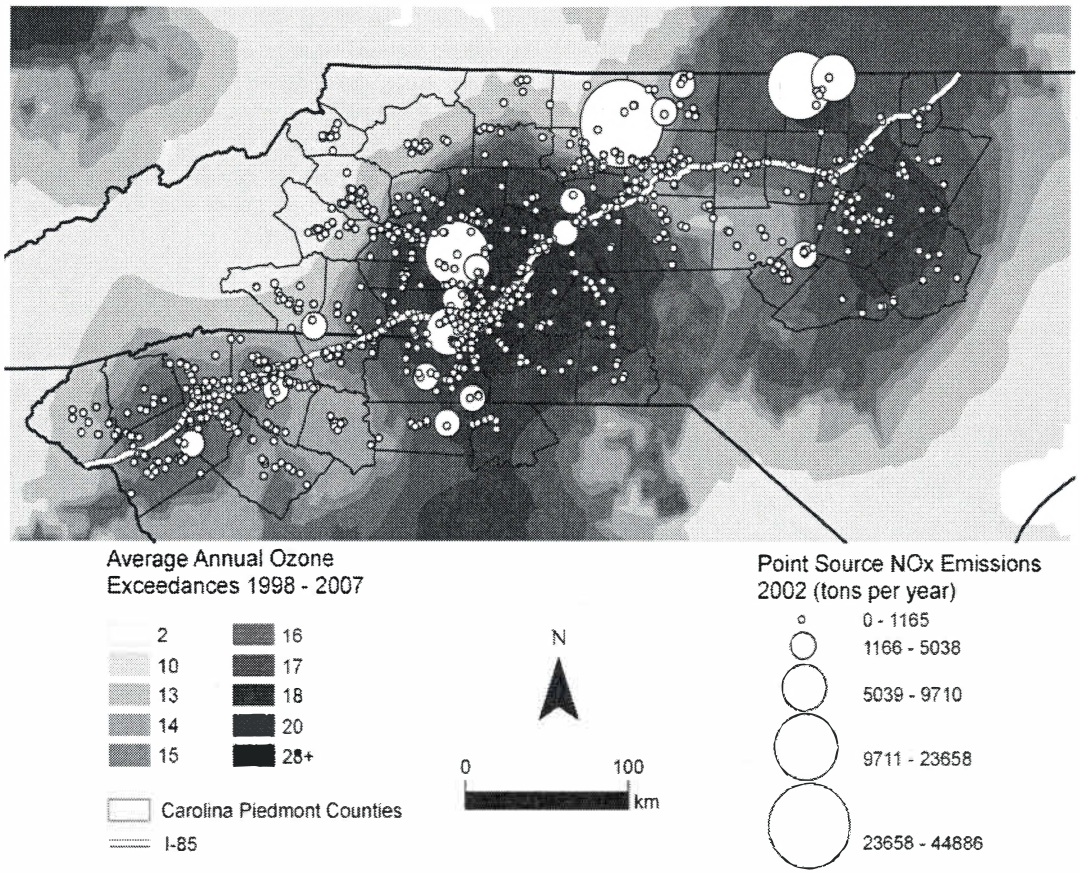

Figure 4. Average annual ozone exceedances 1998-2007 overlain with the location and magnitude of point-source emissions of nitrogen oxide (NOx) in 2002.

The emissions data was obtained for 2002, the last year such data was available. The point sources were mapped on top of a background layer of average annual ozone exceedances to allow visualization of the potential spatial relationships between precursor emissions and ozone levels. These two figures however, do not include non-point source emissions (e.g. vehicle tailpipe emissions), which are far more spatially diffuse. Figure 5 indicates total precursor emissions (point and non-point source) by county in 2002, with an overlay layer of average ozone concentrations.

In order to identify highly populated areas exposed to numerous ozone exceedances over the period 1998-2007, it was first necessary to produce a fine-grained map detailing the distribution of population throughout the Carolina Piedmont region. An intermediate map was produced using census-block level population data (2000) for the entire bi-state region. Highly populated areas, consisting of census blocks with greater than 386 people per square kilometer (the census definition of urban) were used to produce an urban map layer. A map of ozone exceedances for the

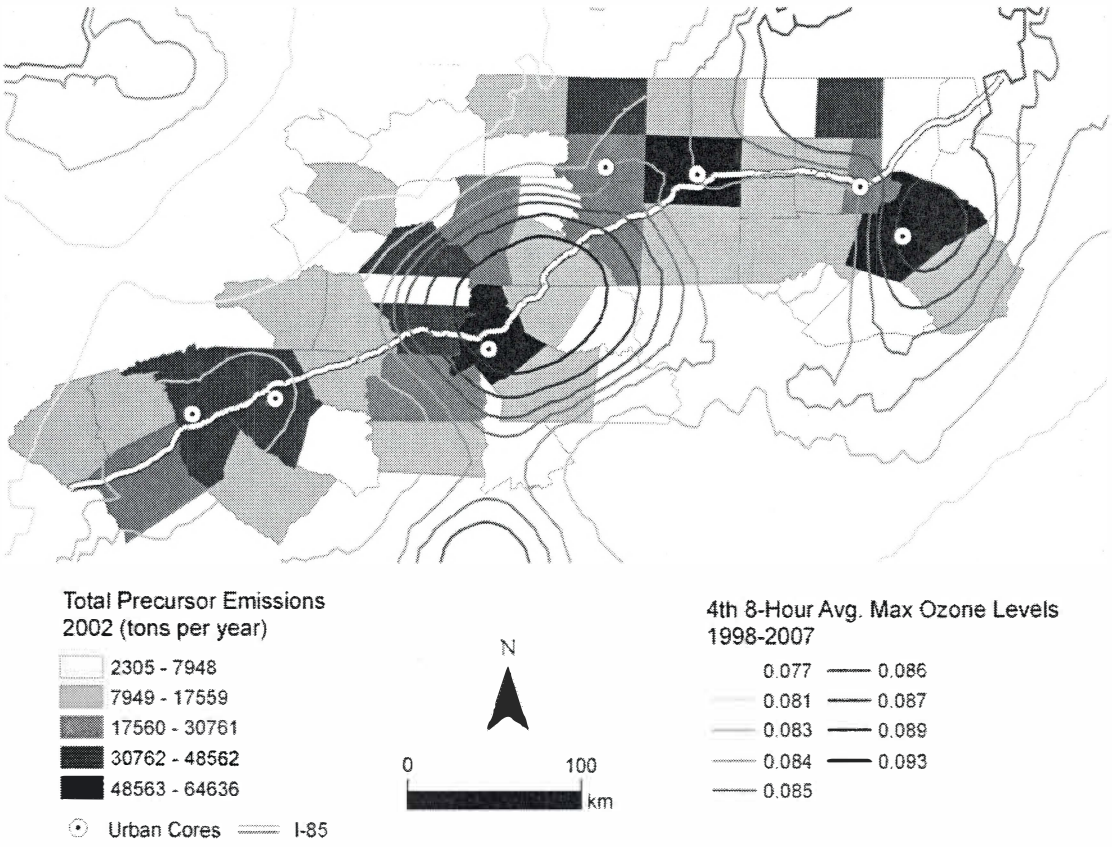

Figure 5. Total precursor emissions by county with an overlay map of average ozone concentrations 1998-2007.

period 1998-2007 was then used as an overlay to identify urban exposure to ozone exceedences.

Discussion

From 1998 to 2007, the average 4th maximum 8-hour ozone concentration recorded throughout the Carolina Piedmont decreased from 0.0965 ppm to 0.0821 ppm, a 17.5 percent reduction (Figure 6). By comparison, the national average 4th maximum 8-hour ozone concentration also decreased markedly from 0.0857 ppm to 0.0763 ppm, a 12.2 percent reduction. Similarly, the number of 8-hour ozone exceedances decreased from 1998 to 2007 in the Carolina Piedmont (36.6 to 13.7) and throughout the U.S. (17.3 to 7.5). In the Carolina Piedmont region, the average annual ozone concentration ranged from a high of 0.0963 ppm in 2002 to 0.0745 ppm only two years later in 2004. Average annual ozone concentrations in the Carolina Piedmont were consistently higher than the national average.

Figure 2 provides a visualization of the changes in ozone concentrations within the Carolina Piedmont region from 1999 to 2007. As illustrated in Figure 6, ozone concentrations over this time period exhibit a general decline,

census blocks exposed to ozone exceedances.

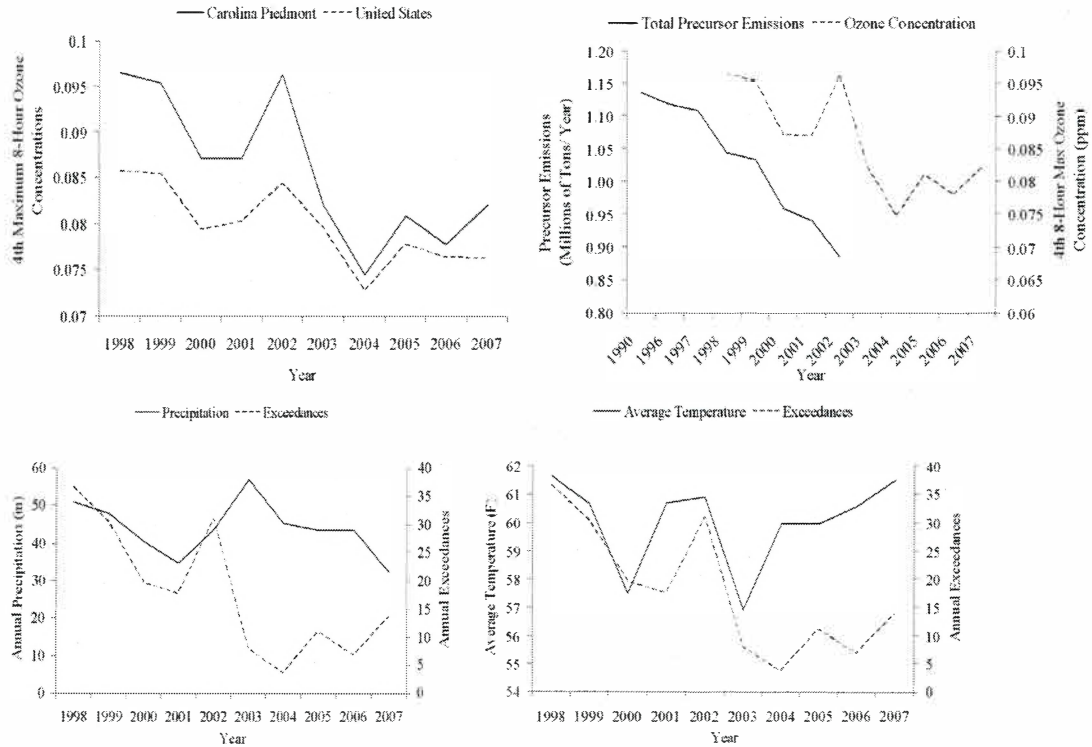

Figure 6. Summary of piedmont ozone concentrations vs. U.S., precursor emissions vs. ozone concentration, and precipitation and temperature in comparison to annual ozone exceedences.

though they spiked briefly in 2002. It is clear that there existed three "hotpspots" of relatively high ozone concentrations in 1999. These ozone hotspots were generally located over the Greenville-Spartanburg, Charlotte, and Raleigh-Durham metropolitan areas. By 2001, overall ozone concentrations had decreased, with one well defined node of high ozone concentration over the Charlotte area. This area of high ozone extends northward into Greensboro-Winston-Salem-High Point, likely affecting the area's annual ozone concentrations and the number of ozone exceedances. Charlotte remains the main source node of ozone concentrations in 2003, 2005 and 2007, though concentrations are noticeably reduced in 2003 and 2005. It is possible to better identify and gauge the impact of these ozone source nodes by observing ozone levels averaged over the entire 1998-2007 period. Figures 3 and 4 indicate that the highest levels of ozone exist over the Charlotte metropolitan area, with secondary nodes over Raleigh-Durham (the "Triangle") and Greenville-Spartanburg. The effective ozone airshed of Charlotte extends well beyond the borders of its municipal or metropolitan boundaries. Both point-source and non-point source emissions of ozone precursors (NOx and VOCs) decreased from 1990 to 2002. During this period, point-source emissions decreased by 17 percent, while non-point source emissions decreased by 35 percent.

In addition, 45 of 50 counties within the Carolina Piedmont experienced a decrease in total precursor emissions. Although the available data overlaps only over a five year period, both total precursor emissions and average ozone concentrations exhibit an overall decline (Figure 6). The location of point-sources of VOCs and NOx in 2002 can be observed in Figures 3 and 4 respectively. The largest number of point sources and greatest emissions appear to be clustered around the I-85 corridor, where industrial activity is most concentrated. Counties with the highest overall emissions are generally located around urban core areas where both elevated levels of industrial and vehicular activity take place. Counties with the highest non-point precursor emissions are all highly urbanized and located within the region's four largest metropolitan areas. In most counties, a significant majority (>70 percent) of ozone precursor emissions are from non-point sources, making their contribution to local ozone concentrations of particular importance (unpublished data, EPA, 2002). The spatial relationships between total precursor emissions by county and average ozone concentrations (1998-2007) are illustrated in Figure 5.

The urban areas exposed to the greatest number of average annual ozone exceedances period over the 10 year study are generally located within the northeast quadrant of the Charlotte metropolitan area. Northeast Charlotte, Kannapolis, and portions of Huntersville, experienced an average 25 or more ozone exceedances per year. This area represents approximately 6 percent of the Carolina Piedmont's population. Outside the Charlotte area, most urbanized clusters within the Carolina Piedmont (representing approximately 75 percent of the population) have experienced between an average of 10 and 20 ozone exceedances per year. Less than one percent of the population, located at the far-west edge of the study area, experienced less than ten 8-hour exceedances per year.

The link between climatic fluctuations and annual ozone levels were also explored. Figure 6 indicates fluctuations in average annual precipitation within the Carolina Piedmont megapolitan area. When compared with the annual changes in number of ozone exceedances, it appears that the two variables have a negative relationship (i.e., as annual precipitation increases, ozone exceedances decrease). As annual temperature increases, number of ozone exceedances also increase (Figure 6). The relationship between temperature and ozone exceedances begins to widen after 2003, possibly as a result of the decrease in precursor emissions. Nevertheless, the positive association between annual temperature and ozone exceedances is largely maintained throughout the 10 year period.

Conclusions

The spatial distribution of ozone throughout the Carolina Piedmont area is clearly influenced by the concentration of human settlement and activity. This is expected given that the majority of ozone precursor emissions are from non-point sources, which are most abundant in highly-populated urban areas. Produced in lower quantities, the impact of point-source emissions, such as those from factories, power plants, and other industrial processes, are likely to have less impact on local ozone concentrations.

The use of kriging to estimate annual ozone concentrations and exceedances has provided an effective means of visualizing the distribution of ozone within and between the major metropolitan areas of the Carolina Piedmont. The spatial distribution of ozone exceedances indicates that the Charlotte area experienced the highest levels of tropospheric ozone in the bi-state region. Ozone produced over Charlotte, however, was not confined to the area's urban core, but rather extended well into neighboring urban areas as well as the surrounding countryside. The "Triad," a combined statistical area of 1.5 million approximately 100 km northeast of Charlotte, is close enough to receive considerable amounts of transported ozone and ozone precursors from Charlotte. Though the interaction of airsheds is highly variable on an hourly to annual basis, and

dependent on prevailing wind directions and weather patterns, these data suggest that considerable ozone "sharing" occurs between individual metropolitan areas within the Carolina Piedmont. The ozone models created in this study, however, are only snapshots of annual variations and cannot account for the full range of inter-urban ozone transportation that might occur under specific daily, monthly, or seasonal conditions.

The reduction in ozone concentrations and number of ozone exceedances within the Carolina Piedmont region between 1998 and 2007 are likely related to both a general decrease in precursor emissions as well as fluctuations in climatic conditions, including annual temperature and precipitation. While the overall trend is towards a reduction in ambient ozone levels at the surface, which is expected given the reduction in precursor emissions, it is possible to see that prevailing weather conditions can upset this trend on an annual basis. For example, in 2002 ozone concentrations and ozone exceedances spike to their highest level during the 10-year period, despite a decrease in ozone levels over the previous four years. Precursor emissions, however, continue to decrease in 2002 as they had for the previous seven years. The elevated ozone levels experienced in 2002 may have resulted from the brief spike in temperature and lower precipitation totals over the previous one to two years.

It is interesting to note that while the population in the Carolina Piedmont rose by 14 percent from 1998 to 2007, non-point source ozone precursors (produced primarily from mobile sources) actually declined by 17 percent (at least during the five-year overlap period 1998-2002; see Figure 6). Given that one would expect emissions to increase with a rise in population and associated vehicular traffic, the decline in non-point source emissions suggests that more stringent vehicle emissions standards applied by the EPA in 1994, and again in 2004, are having a beneficial effect. The current 6-year lag in EPA-reported point-source emissions, however, precludes comparison with the most recent ozone concentration and exceedances data, which are updated monthly.

One of the benefits of kriging is the ability to obtain prediction errors at every location within the predicted surface. The prediction standard error for the average 4th maximum 8-hour ozone concentration (1998-2007) ranged from 0.00435 ppm to 0.00656 ppm. The most reliable predictions are primarily within the bounds of the Carolina Piedmont megapolitan area, where the majority of ozone monitors are located. Given the size of the study area, it would have been ideal to have more than 71 data points, though unfortunately no additional sources of ozone data are known. This suggests the difficulty of accurately producing ozone surface layers at smaller scales, such as the city or metropolitan-level, with the available data.

This case study demonstrates that the megapolitan region is a useful scale at which to study the distribution of tropospheric ozone. Though tropospheric ozone and other air pollutants can disperse great distances, there is clearly a zone of influence within which a particular urban center can significantly impact the air quality of the surrounding region. Urban areas that produce very little ozone can still experience numerous ozone exceedances and high ozone concentrations due to the influence of neighboring communities. This is of particular relevance in megapolitan regions where inter-urban dispersion of ozone and the "sharing" of air pollution is common. From an air quality perspective, it is therefore reasonable to investigate these large urban agglomerations as a single functional unit, in order to better understand the movement and distribution of pollutants as well as the underlying factors that influence their production.

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Marble Minstrels, Voiceless Stones: Confederate monuments in North Carolina county seats

Shirley Robinson
Independent Scholar

Monuments to North Carolina's Civil War dead became a part of the state's human landscape soon after the war ended in 1865. The monuments vary in shape and size from the impressive statues in the grounds of the capitol in Raleigh to simple grave markers found in cemeteries across the state. They provide a very visible and readily accessible source of information on the way people remember the thousands of North Carolinians who fought and died for the Confederacy. Most county monuments were built in the period from 1895 (when the state's Civil War monument was unveiled) until about 1930. Although the rate of monument building slowed after that time and monuments became simpler in form, counties continued to build monuments throughout the twentieth century. In the period from 1980 to the present, several new monuments were built and existing monuments were restored and enhanced. This continued building activity raises the questions: what purpose do these monuments serve, and has that purpose changed over time?

This article presents the results of a field study of seventy-nine Civil War monuments. The monuments selected are those located in county seats and dedicated to those "sons of the county" who fought and died in the War. The study therefore does not include monuments which are dedicated to other groups or are located in towns which are not county seats. Figure 1 shows the distribution of Confederate monuments in county seats across the state. Notice that there are no county monuments in the northwestern part of the state, probably because this area has traditionally been believed to have been more pro-Union than pro-Confederate. In Orange County there is no Civil War monument in the county seat to the citizens of the county. Also some counties in the eastern part of the state (including Duplin and Martin) have no official county monuments commemorating the Civil War.

The map shows how the earliest monuments were built in what were the well-established cities of the time, including Charlotte, Greensboro and New Bern, and that five contiguous counties Wilkes, Surry, Stokes, Yadkin, and Davie, built memorials to their Civil War dead after 1980. (For a map of North Carolina towns with county Confederate monuments see Figure 2. For a list of monuments by county see Table 1.)

Primary evidence for the study comes from the monuments themselves, including their location, form, and inscriptions. Further information can be found in the collection of chapter histories compiled by the North Carolina Division of the United Daughters of the Confederacy (U.D.C.) first published in 1947 and reprinted in 2007. In this book, members of each U. D. C. chapter in North Carolina recorded the history of their activities, including their extensive work in finding support for building Confederate monuments. Mrs. B.L. Smith's work on North Carolina's Confederate monuments and memorials published in 1941 provides accounts and photographs of a large number of monuments, including many of the ones in county seats.

In 1983 John Winberry published the results of his survey of more than seventy Civil War monuments and their impact on townscapes in southern states, including North Carolina. He suggested that the county monuments, constructed on the grounds of the courthouse, are not just images of the past but also part of the present and represent a desire on the part of southern communities to return to the social and moral values of a past time.

Photographs of North Carolina's Civil War monuments can be found in Ralph Widener's 1982 study of Confederate monuments across the country, and in Michael Hardy's 2006 collection, *Remembering North Carolina's Confederates.* For an architectural perspective on the monuments, see the guidebooks to the historic architecture of North Carolina compiled by Catherine Bishir and Michael Southern.

Among North Carolina's 100 counties, 74 (including five of the eleven counties formed after the Civil War) have at least one monument dedicated to their Confederate soldiers. Site visits to the monuments showed that most share certain similarities even though their locations, forms and inscriptions vary according to the time of their construction. There are also two monuments (in Currituck and Lincoln counties) which are different from any of the others.

Monuments built in the first thirty years after the war were seen as expressions of grief for the fallen and, with one exception (Cabarrus County) were placed in cemeteries. The monument in Cross Creek Cemetery in Fayetteville was the earliest to be unveiled and is one of the first war memorials to be constructed in any of the former Confederate states. Of the ten county monuments erected during this time, four are in the form of simple The pattern of counties having their own monument persisted even in the period of intensive monument building, 1896-1930. Monuments built in this period served a different purpose from the earlier ones. The War had been over for more than thirty years and concerned citizens, especially the U.D.C. and the Sons of Confederate Veterans wanted to make sure that the reasons why the South went to war would not be forgotten and that what they believed to be the true history of the South would be remembered. Monuments built during this period are therefore usually impressive stone shafts with marble or bronze statues of soldiers. Their inscriptions are designed to portray the soldiers as heroes and in some cases, to provide a justification, etched obelisks with brief inscriptions, (Cumberland, Johnston, Mecklenburg, Wake).

The earliest example of what came to be the most popular form of monument, a raised statue of a Confederate soldier, was unveiled by the Ladies Memorial Association of New Hanover County in 1872. The monument with its statue " a likeness of one of the young soldiers of Wilmington" can still be seen in the Oakdale Cemetery. Wayne, Craven, and Guilford counties all followed suit with monuments consisting of shafts topped with soldiers, placed in cemeteries and bearing inscriptions reflecting grief for the lost. It is significant that these monuments and every one that followed feature representations not of Confederate generals or political leaders, but of the infantrymen, the sons, brothers, fathers and friends of those left behind.

It was important to the counties of North Carolina that each one had its own monument in remembrance of its citizens who died in the War. There is only one example of two counties sharing a monument. The monument honoring the "soldiers and sailors of Halifax and Northampton Counties" is in Weldon in Halifax County. Even in the vast majority of cases where the basic form of plinth, shaft and statue of soldier form the monument, no two monuments are exactly the same. The figures of the soldiers are varied: some are clean-shaven, others have beards and mustaches, some wear hats, others have caps. Almost all the soldiers have a rifle; most of them are holding it with the butt resting on the ground, a few have their rifles at the ready (Franklin, Granville, Vance). Some counties chose to use an obelisk without a statue (Buncombe, Henderson). Some chose very unusual forms: a pillared cover for a drinking fountain (Lincoln), a granite globe (Currituck). Inscriptions vary

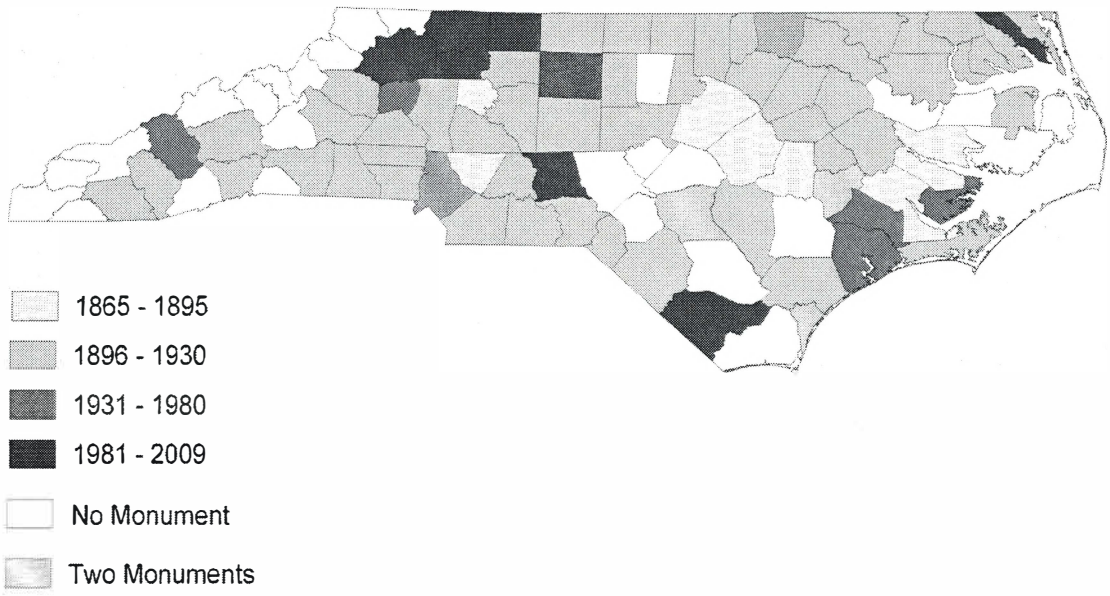

Figure 1. County level distribution of Confederate monuments by period of construction.

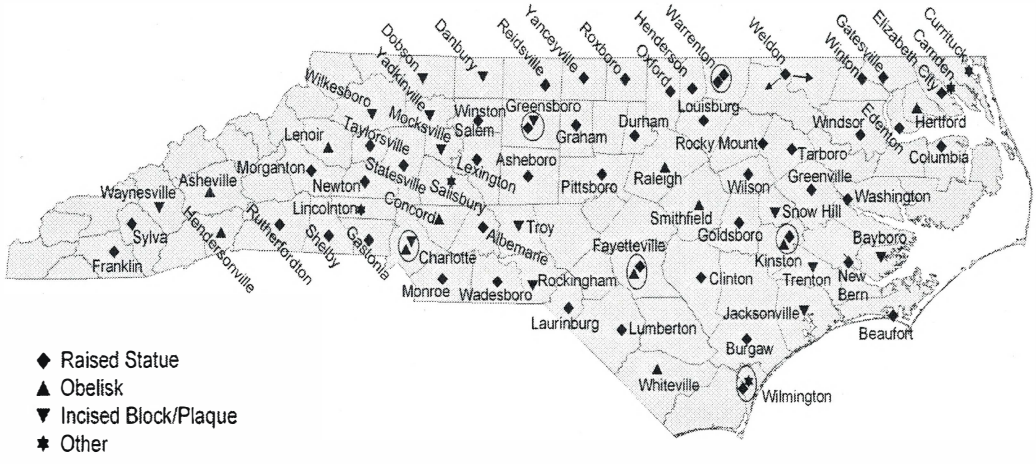

Figure 2. Towns with Confederate monuments by monument type.

from the very simple to those that include quotations from poems and statements about the reasons for the war. Many monuments also carry the names of the organizations that sponsored their construction.

The pattern of counties having their own monument persisted even in the period of intensive monument building, 1896-1930. Monuments built in this period served a different purpose from the earlier ones. The War had been over for more than thirty years and concerned citizens, especially the U.D.C. and the Sons of Confederate Veterans wanted to make sure that the reasons why the South went to war would not be forgotten and that what they believed to be the true history of the South would be remembered. Monuments built during this period are therefore usually impressive stone shafts with marble or bronze statues of soldiers. Their inscriptions are designed to portray the soldiers as heroes and in some cases, to provide a justification, etched in stone, for why the Confederacy went to war.

In order to fulfill their purpose of educating the citizens of the county, especially children, the monuments were not tucked away in cemeteries, but placed downtown often on the grounds of the county courthouse. The fact that many of them received public funds to help with construction costs also made this placement appropriate, and conveyed the impression that the views expressed on the monuments had the approval of the local government. In three counties, where monuments already existed in cemeteries, an additional monument was erected downtown during this period (Cumberland, Lenoir, Warren). Nowadays, given that in many towns the commercial activity has shifted from the downtown area to shopping malls on the bypass, these monuments are no longer seen by very many people.

Some monuments were placed at intersections of downtown streets. In later years, many of them had to be moved because of increased amounts of traffic, including Davidson, Caldwell, and Scotland. The Rowan County monument, however, still stands at the intersection of Church and West Innes Streets in downtown Salisbury. Rockingham County placed their monument on a traffic island in downtown Reidsville, and as recently as 2009 placed a new concrete barrier around it to protect it from careless drivers. In two cases when new county courthouses were built the county went to the expense of moving the Confederate monument to the new courthouse site (Gaston, Robeson).

What do these monuments mean to us today? Only two of them are truly original works of art. The Rowan County monument was designed by the sculptor Frederick Ruckstuhl and cast in bronze by the Luppens Foundry in Brussels, Belgium. It features a figure of Fame holding a laurel wreath in her hand and supporting a very young soldier. It represents, in the words of the artist, "the dying of the Confederate army in the arms of Fame." In downtown Wilmington, the statue erected in 1924, a bronze sculpture by Francis Packer, features two soldiers representing "courage and self-sacrifice." The majority of other county monuments were produced by various companies, including the McNeel Marble Company in Marietta, Georgia who specialized in such structures and marketed their services to groups wishing to build memorials.

What the monuments do tell us is that the way people wanted to remember the Civil War soldiers changed over time. Grief for the dead expressed by the early monuments changed into the desire to portray the civil war soldiers as heroes. The words "Our Confederate Dead" appear on the early monuments, where many of the later ones say "Our Confederate Heroes." Excerpts from heroic poems are inscribed on several monuments, including "The Charge of the Light Brigade" (Pitt, Franklin), and "The Bivouac of the Dead," (Alamance, Forsyth).

Some counties decided to use their monument not only to honor the heroes but to provide a permanent record of why the Confederate soldiers went to war. The soldiers of the Confederacy were fighting to protect the southern "nation" and make of it a new country. The Bertie, Scotland and Caswell County monuments all refer to the soldiers' service to "their country," and the Craven County monument refers to the soldiers' "native land."

The inscriptions on county monuments bear witness to the belief that the Confederate States rose in response to a perceived Northern aggression that threatened to destroy states' rights and constitutional liberties. "[Our soldiers] believed in our social institutions and our rights of self-government imperiled by the avowed hostility of a large section of the union," (Anson County monument). The Taylorsville attorney, V. G. Beckham who designed the Alexander County monument in 1958, points out in its inscription that the soldiers were fighting "not for the preservation of slavery but for our greatest heritage – states' rights." A monument to the soldiers of Mecklenburg County erected outside Charlotte's City Hall in 1977 describes how the soldiers "struggled nobly for the cause of independence and constitutional self-government."

The number of statues that face North makes it tempting to suggest that they were put in a position that deliberately demonstrates an intention to repel any future invasion on the part of Union soldiers. This idea does not hold up to examination. As John Winberry discovered in his study, the orientation of the statues seems to have been determined by their placement in front of the courthouse. (He therefore asked the next logical question, "why do courthouses in the South face North?" – but did not provide an answer). The soldier on the monument usually faces in the same direction as the courthouse, with his back to the building. An exception is the Chowan County monument, which in its original location faced towards the courthouse and as the soldier has his rifle at the ready, he appeared to be about to fire into the building. This monument has been moved, and is now in downtown Edenton.

In defining the Civil War as protecting states' rights, it was understood to be a continuation of the fight for freedom from the Revolutionary War. A plaque added to the Wilson County monument in 2003 describes the "reverences for freedom that their grandfathers held when they fought the British during the American Revolution."

The county monuments provided a very effective means of ensuring that even though the war may have been lost, The Cause was not forgotten. The Franklin County monument in Louisburg says it best. "At Appomattox, God said to the Confederate soldier, About Face /In obedience to the celestial order/ There was a change of front/ And the gray line faced the future/ Unashamed and unafraid."

In more recent times, counties constructed monuments as memorials to their citizens who served and died in all wars that have involved the United States and some have included the Civil War dead on those monuments, (Montgomery, Yadkin). A few acknowledge that some sons of North Carolina fought on the other side in the War between the States. In a unique memorial Henderson County in 2008 erected a marble plaque with the following inscription: "In honor of the citizens of Henderson County who served in the Union army during the Civil War for the preservation of the United States of America and in gratitude to their families."

Many monuments acknowledge the support of the community fundraising efforts responsible for their construction. The North Carolina Chapters of the U.D.C. were by far the most active of such groups and are mentioned by name on thirty- six of the seventy-six monuments.

In some cases, wealthy individuals stepped forward to fund a monument. The impressive marble statue in Nash County (now unfortunately missing four of its original five marble figures) was paid for by Robert H. Ricks, a Confederate veteran. (The local chapter of the U.D.C. took the money they had raised for a monument and sent it to France to benefit the soldiers fighting in the First World War.) In Burke County, in 1918 a Confederate veteran provided the funds needed to replace the finial on the monument with a bronze soldier. The finial can still be seen by the side of the statue in the grounds of the courthouse in Morganton. The story behind the Currituck County monument is told on an interpretative panel at the site of the courthouse in Currituck. The county decided in 1912 to build a raised

statue of a soldier and got as far as constructing the base when the money ran out. Ten years later, Mr. Joseph Knapp, a wealthy industrialist who had a summer residence in Currituck County, offered to pay for a statue of a soldier. The county commissioners accepted the offer. However, when faced by strongly negative popular feeling, the commissioners changed their minds. Mr. Knapp was from Philadelphia.

Costs for county monument construction ranged from $1,000 to $15,000, with most of them in the $2,000 – 3,000 range. Some communities were able to reach their fundraising goals quickly. The Cleveland Guards Chapter of the U.D.C. in Shelby raised $2,500 in just one year. More typical was Rutherford County where it took eight years to find the $2,500 needed. Chapters of the U.D.C. organized oyster suppers, balls, and quilt raffles. In Forsyth County, the proceeds from ticket sales to the first moving picture ever shown in the county were used to help defray the cost of their Confederate monument.

Many of North Carolina's Civil War monuments have now passed their centenary and it speaks to the persistence of the respect for the monuments and what they represent that many local communities have managed to find the funds to restore, refurbish and make additions to their monuments. Restoration of damaged monuments began as early as 1928, when the Warren County monument, built in 1903 and placed in Fairview Cemetery, had to be entirely rebuilt at a cost of $800.00. Unfortunately, despite the restoration efforts undertaken in Guilford County in 1969 and again in 1984, the monument erected in 1888 in Green Hill cemetery in Greensboro shows serious signs of damage. In 1990 the Robert F. Hoke Chapter of the U.D.C. successfully raised the $14,000 needed to take apart the Rowan County bronze and granite monument to clean and repair the damages to the structure caused by standing in the middle of Salisbury's traffic for more than eighty years. Cleveland County refurbished the monument in Shelby in 1991, and Iredell County marked the centenary of its monument with a re-dedication marked by a new plaque in 2006. The Lenoir County monument, after two previous relocation moves, has recently been placed in front of Kinston's Visitor Center giving it a place of prominence in the city's attractions.

"Peace to their Ashes, Honor to their memory, Glory to their cause" is inscribed on the Vance County monument erected in 1910. The statement provides a succinct expression of the purpose of this and other monuments. The emphasis placed on each of these three ideas has changed over the years since the war. The earliest monuments reflect the grief caused by the enormous loss of human lives. From 1896-1930, monuments were designed to represent the fallen soldiers as heroes who died in a glorious cause. As the twentieth century progressed and other wars took the lives of North Carolinians some counties built monuments to honor those who died in all wars. In recent years (from 1980 to the present) some counties have built new monuments that include lists of the names of Civil War soldiers, (Davie, Wilkes) and some counties have added such lists to monuments that already exist (Wayne, Alexander).

The distribution of Confederate monument building in North Carolina illustrates the traditional spirit of local independence. Each county felt the need for a monument of its own, which though sharing similarities with others, was unique to them. The character and variety of these seventy-nine distinct memorials demonstrates the complexity of civil war remembrance in the counties of North Carolina.

Figure 3. Cumberland County. Obelisk in a cemetery (period 1, 1868-1895).

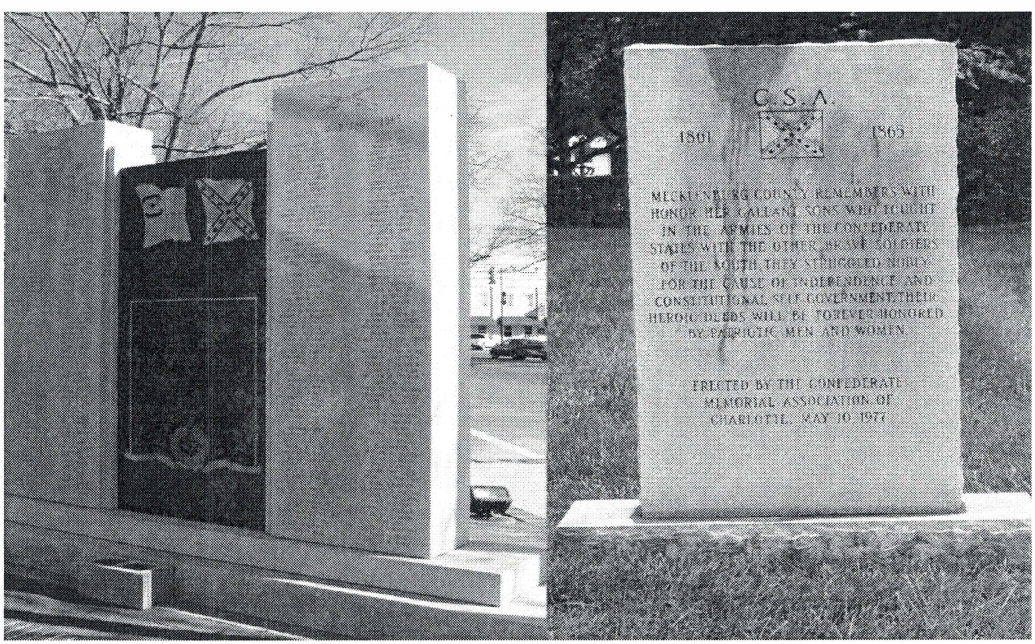

Figure 4. Stone incised with list of names in Davie County (left, period 4, 1981-2009), and an engraved marker in Mecklenburg County (right, period 3, 1931-1980).

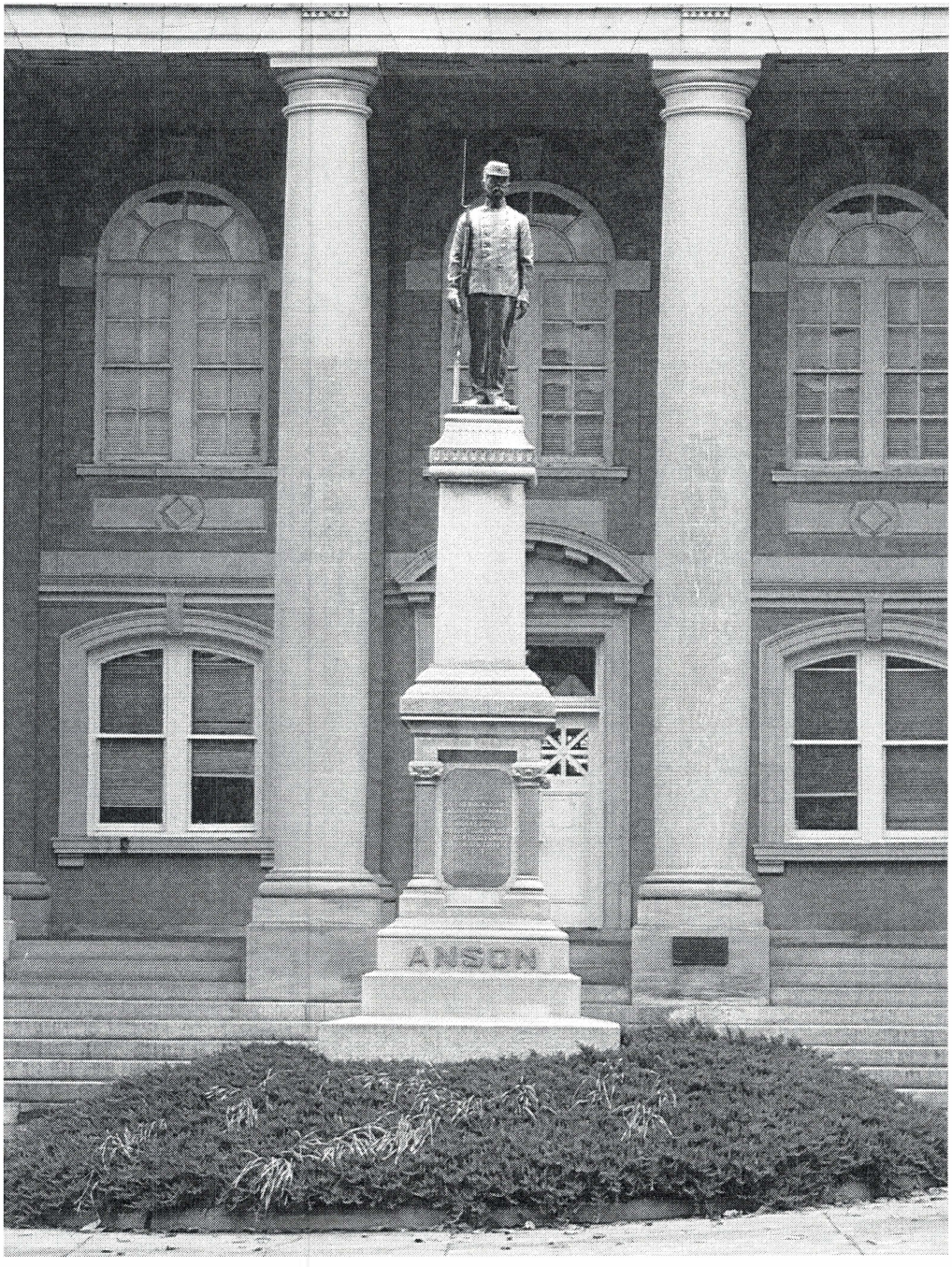

Figure 4. Statue placed in front of the Anson County courthouse (period 2, 1896-1930).

Table 1. Location, form, and sponsors of monuments surveyed in this study, with year of placement.

County	County Seat	Date	Form	Location	Sponsors *=named on monument
Alamance	Graham	1914	Raised statue	Courthouse	Graham Chapter, UDC*
Alexander	Taylorsville	1958	Raised statue	Courthouse	Local attorney - V G Beckham
Anson	Wadesboro	1906	Raised statue	Courthouse	Anson Chapter, UDC*
Beaufort	Washington	1888	Raised statue	Oakdale cemetery	Ladies Memorial Association
Bertie	Windsor	1896	Raised statue	Courthouse	Confederate Veterans Assoc of Bertie *
Buncombe	Asheville	1905	Obelisk with finial	Courthouse	Asheville Chapter UDC and Friends*
Burke	Morganton	1918	Raised statue	Courthouse	Samuel McDowell Tate Chapter, UDC
Cabarrus	Concord	1889	Obelisk with finial	Courthouse	
Caldwell	Lenoir	1910	Obelisk	Courthouse	Vance Chapter of the UDC Caldwell County*
Camden	Camden	2002	Brick walk	Courthouse	Local citizens
Carteret	Beaufort	1926	Raised statue	Courthouse	Fort Macon Chapter, UDC Beaufort*
Caswell	Yanceyville	1921	Raised statue	Courthouse	Caswell County Chapter, UDC*
Catawba	Newton	1907	Raised statue	Courthouse	People of Catawba County*
Chatham	Pittsboro	1907	Raised statue	Courthouse	Winnie Davis Chapter, UDC*
Chowan	Edenton	1904	Raised statue	S. Broad St.	Bell Battery Chapter, UDC*
Cleveland	Shelby	1906	Raised statue	Old courthouse	UDC*
Columbus	Whiteville	2005	Obelisk	Whiteville Cem.	Sons of Confederate Veterans*
Craven	New Bern	1885	Raised statue	Cedar Grove Cem.	New Bern Ladies Memorial Association*
Cumberland	Fayetteville	1868	Obelisk with cross	Cross Creek Cem.	Ladies Memorial Association
Cumberland	Fayetteville	1902	Raised statue	Morgan Road	Women of Cumberland County
Currituck	Currituck	1922	Granite globe	Courthouse	
Davidson	Lexington	1905	Raised statue	Courthouse	Robert E Lee Chapter UDC*
Davie	Mocksville	1987	Incised block	Courthouse	
Durham	Durham	1924	Raised statue	Courthouse	People of Durham County*
Edgecombe	Tarboro	1904	Raised statue	Tarboro Commons	William Dorsey Pender Chapter, UDC
Forsyth	Winston Salem	1905	Raised statue	Courthouse	James P. Gordon Chapter, UDC*

Franklin	Louisburg	1914	Raised statue	Louisburg College	Joseph J. Davis Chapter, UDC
Gaston	Gastonia	1912	Raised statue	Courthouse	Gastonia Chapter, UDC + J D Moore Chapter Children of the Confederacy*
	Gatesville	1915	Raised statue	Courthouse	Confederate Memorial Organization *
Granville	Oxford	1909	Raised statue	Public Library	Granville Grays Chapter, UDC
Greene	Snow Hill	1929	Block with plaque	Courthouse	Greene County Chapter UDC*
Guilford	Greensboro	1888	Raised statue	Green Hill Cem.	Ladies Memorial Association*
Guilford	Greensboro	1986	Block with plaque	Davie & McGee	Sons of Confederate Veterans*
Halifax	Weldon	1908	Raised statue	Maplewood Cem.	Junius Daniel Chapter UDC*
Haywood	Waynesville	1940	Block with plaque	Old Courthouse	Haywood Chapter UDC*
Henderson	Hendersonville	1903	Obelisk	Courthouse	
Hertford	Winton	1913	Raised statue	Courthouse	Hertford County Chapter, UDC
Iredell	Statesville	1905	Raised statue	Courthouse	UDC and Ruben Campbell Camp of Veterans
Jackson	Sylva	1915	Raised statue	Courthouse	
Johnston	Smithfield	1887	Obelisk	Riverside Cem.	admirers and fellow citizens*
Jones	Trenton	1960	Block with plaque	Courthouse	Trenton Chapter, UDC*
Lenoir	Kinston	1880	Obelisk	Maplewood Cem.	UDC*
Lenoir	Kinston	1924	Raised statue	New Bern Road	A.M. Waddell Chapter, UDC*
Lincoln	Lincolnton	1911	Water fountain cover	Courthouse	Wallace Reinhardt Chapter, Children of the Confederacy*
Macon	Franklin	1909	Raised statue	Courthouse	Macon County Monument Association
Mecklenburg	Charlotte	1887	Obelisk	Elmwood Cem.	Women of Charlotte*
Mecklenburg	Charlotte	1977	Incised block	City Hall	Confederate Memorial Association*
Montgomery	Troy	1998	Incised Block	Courthouse	
Nash	Rocky Mount	1917	Raised statue	Battle Park	Robert H Ricks, Confederate Veteran
New Hanover	Wilmington	1872	Raised statue	Oakdale Cemetery	Ladies Memorial Association*
New Hanover	Wilmington	1924	Statue of two soldiers	3rd and Dock St	Gabriel James Boney, Confederate Veteran*
Onslow	Jacksonville	1957	Block with plaque	Courthouse	Onslow Guards Chapter UDC*
Pamlico	Bayboro	1940	Block with plaque	Courthouse	Oriental Neuse Chapter UDC*

Pasquotank	Elizabeth City	1911	Raised statue	Courthouse	D H Hill Chapter, UDC*
Pender	Burgaw	1914	Raised statue	Courthouse	Pender County Chapter, UDC*
Perquimans	Hertford	1912	Obelisk	Courthouse	Perquimans Chapter, UDC*
Person	Roxboro	1922	Raised statue	Courthouse	Person County Chapter, UDC*
Pitt	Greenville	1914	Raised statue	Courthouse	People of Pitt County*
Randolph	Asheboro	1911	Raised statue	Courthouse	Randolph Chapter, UDC*
Richmond	Rockingham	1930	Block with plaque	Courthouse	Pee Dee Guards UDC
Robeson	Lumberton	1907	Raised statue	Courthouse	UDC*
Rockingham	Reidsville	1910	Raised statue	Scales Street	Reidsville-Rockingham Chapter UDC
Rowan	Salisbury	1909	Statue of soldier	W. Innes Street	UDC*
Rutherford	Rutherfordton	1910	Raised statue	Courthouse	Davis-Dickson- Mills Chapter UDC*
Sampson	Clinton	1916	Raised statue	Courthouse	Ashford-Sillers Chapter UDC*
Scotland	Laurinburg	1910	Raised statue	Courthouse	Laurinburg-Scotland Chapter UDC
Stanly	Albemarle	1925	Raised statue	2nd street	Albemarle Chapter, UDC*
Stokes	Danbury	1990	Incised Block	Courthouse	Stokes County Historical Society + Sons of Confederate Veterans*
Surry	Dobson	2000	Incised Block	Courthouse	Sons of Confederate Veterans*
Tyrrell	Columbia	1902	Raised statue	Courthouse	Tyrrell Monument Association*
Union	Monroe	1910	Raised statue	Courthouse	Monroe Chapter UDC*
Vance	Henderson	1910	Raised statue	Courthouse	Vance County Chapter UDC*
Wake	Raleigh	1870	Obelisk	Oakwood Cem.	Ladies Memorial Association
Warren	Warrenton	1903	Raised statue	Fairview Cem.	Memorial Association of Warren County*
Warren	Warrenton	1913	Raised statue	Courthouse	Warren Chapter UDC and Sons of Warren*
Wayne	Goldsboro	1883	Raised statue	Willowdale Cem.	Goldsboro Rifles*
Wilkes	Wilkesboro	1998	Incised block	North Bridge St.	Sons of Confederate Veterans*
Wilson	Wilson	1902	Raised statue	Maplewood Cem.	
Yadkin	Yadkinville	1987	Incised block	Courthouse	Veterans of Foreign Wars*

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North Carolina's Birdseye Maps

Roberta Williams
University of North Carolina Greensboro

The nineteenth-century was a time of tremendous change in The United States. Great technological advances fed the assurgency of the Industrial Revolution and American capitalism. Newly built factories forever changed the American landscape and the creation of a middleclass, comprised mostly of innovative businessmen (factory owners and other small businesses owners), was the result of a surging economy. Phenomenal population increases were fueled by the arrival of thousands of immigrants who fled Europe for the promise of land in a nation full of promise. Amidst all of this change and development, America also found itself in the throes of a debilitating civil war. The clash between North and South ended in the Confederate states being absorbed into the Union but the losses suffered by the South, and the period of restoration that followed proved to retard industrialism in the South compared to the North.

The majority of the American bird's eye maps captured the growth of the nation during the nineteenth-century by focusing on the change taking place in the North. The maps were akin to modern day web pages providing information about the town, and encouraging community awareness, while demonstrating full-fledged civic pride (Kreiger, 2008). Because the plantation society of the South subsisted on a predominantly agricultural economy, bird's eye map makers took little notice of the South until after the Civil War when industry and development made its mark on the southern landscape. This paper examines six of the fourteen the bird's eye maps of North Carolina that cover the span of time from Reconstruction into the first second decade of the twentieth century, thereby providing a continuous record of post-War development.

Introduction

John Reps (1984) has suggested that approximately 5000 bird's eye maps were created during the nineteenth-century and the first two decades of the twentieth-century. The Library of Congress holds close to 1800 maps and of these, only 75 maps exist of cities in the southeast. There are fourteen maps of North Carolina cities; this total is only bested by Virginia and Georgia with 21 and 15 maps, respectively. The remainder of the southeastern states (South Carolina, Florida, Alabama and Mississippi) range from 13 maps to none. The North Carolina maps are especially interesting as they cover the entire spectrum of time from Reconstruction (1872) to the turn of the twentieth century which corresponds to what is thought to be the "Golden Age" of the bird's eye maps.

The bird's eye maps were essentially a "for profit" endeavor. Map makers focused on small towns that were easily accessible, easily drawn and easily sold. They played to the civic pride of the town's inhabitants creating flawless portraits of American aspiration while capitalizing on political and social change that affected much of the country. However, while factories were being built and immigrant farmers settled land in the North, the South remained tied to an agricultural economy managed mostly by wealthy plantation owners. Therefore, the formula used to create bird's eye maps of Northern cities was not transferable to the sprawling Southern plantations. This situation changed after The Civil War and is most noticeable in the North Carolina bird's eye maps. This paper looks at six of the maps, tracing the resurgence of the state from 1872 to 1913.

The only maps available for this study were from the on-line collection of bird's eye maps from the Library of Congress. Twelve cities were the subject of fourteen bird's eye maps (there are two maps of Asheville and two of Rocky Mount) that captured North Carolina cities. Many of the maps were created by Albert Ruger, who is thought to be the most significant of the hundreds of bird's eye map makers, and Thaddeus M. Fowler, Ruger's contemporary. Fowler, too, is one of the major map makers; his "career spanned the entire period of the [bird's eye] map production" (LOC) from directly after the Civil War (1865) until 1922.

Six maps have been chosen for this study because of their significance in tracing the history of the state after The Civil War, as well as documenting the change in use that was part of the evolution of the bird's eye maps. These maps include Raleigh, Greensboro, Winston-Salem, Black Mountain, and two maps of Asheville.

Bird's Eye Maps of Major Cities

Raleigh, 1872

This map of Raleigh (Figure 1) was one of the earliest maps to be produced of a southern city after the Civil War. Camille Drie, the artist, also created maps of Columbia and Charleston, South Carolina during the same year as the Raleigh map. Of French origins, Drie who like many other bird's eye map makers was trained as an engineer, is probably most famous for his centennial map of St. Louis, which is comprised of 110 separate bird's eye bird's eye maps. Note the insets on the Raleigh map. These "vignettes" were popular ways of emphasizing important buildings and businesses on the maps. Undoubtedly, they were signs of civic pride as the inclusion of the vignettes would incur more cost to those who underwrote the cost of the map. In the case of the Raleigh map, it seems that local or state government must have commissioned the map as the yet-to-be-built state penitentiary and a "lunatic asylum" are featured in the bottom corners.

Greensboro, 1891

Nineteen years after Drie's view of Raleigh was published, Albert Ruger (the "Father of the American bird's eye maps) traveled south to make maps of several North Carolina cities, including this one of Greensboro (Figure 2). The elaborate cartouche, with the inset drawings of the court house and post office, is again indicative of how the city's residents wanted their town to be portrayed. The cartouche would have cost extra, as did the inclusion of the two civic buildings. Private businesses listed in the map's legend would also have paid extra to have their building featured on the map. The railroad and depot in the front of the map are icons of a prosperous, mercantile city with ties to other cities. The inclusion of the city's population in the map's cartouche (population=8000) speaks of a growing population and the plots of empty land that spread towards the horizon indicate that the city is ready and eager to grow even farther.

Winston-Salem, 1891

The next stop on the railroad line was Winston-Salem. Also drawn by Albert Ruger, the map of Winston-Salem (Figure 3) was drawn in the same year as Greensboro and Asheville. The population of the city at this time was 11,000 as mentioned below the map's title. The lengthy legend, an indication of the town's prosperity, may have prohibited the use of a cartouche, such as the one on the Greensboro map. The undulating landscape is an interesting facet of this map and, as in the case of the Greensboro map, Winston-Salem is depicted as having lots of room for expansion.

Asheville, 1891 and 1912

These two maps of Asheville are important for many reasons. First, and perhaps most obvious, is the increase in town size and density between 1891 and 1912. Ruger's map (Figure 4), drawn in 1891 only hints at what Asheville would look like in a little over 20 years. The tendency towards using the bird's eye maps as instruments of advertising and tourism, an evolution of the bird's eye maps in the late nineteenth- and early twentieth-centuries, is also readily apparent. The vignettes on the bottom of the map refer to hotels one may like to stay in, and a "sanitarium" perhaps for those recuperating from an illness. Also included in the vignettes is a small scale map of the city's attempt to extend the length of South Main Street. The exclusion of a legend is very unusual for Ruger.

Fowler's map (Figure 5) shows the dramatic change in city size. The population has risen from 11,500 in 1890 to 31,000 twenty –two years later. While the vignettes emphasize the industry and businesses in the Asheville area, the writing at the bottom functions almost as a gazetteer, another advertising strategy that attempted to draw people to the city. Included in the text are measurements of altitude, mean temperature, atmosphere, and soil conditions, as well as road and rail conditions—a testimony to Asheville as "an ideal all-the-year-round resort."

Black Mountain, 1912

Black Mountain, North Carolina (Figure 6) is a curious mixture of text, legend, photographs and bird's eye map and is an excellent example of how the bird's eye maps deteriorated into blatant instruments of advertising at the turn of the twentieth-century. The map itself has become a quickly sketched, watercolor-like drawing that appears to play a supporting role in attracting visitors to Black Mountain "the gateway to the most beautiful mountains in all America..." Text describes many of nature's beauties that can be found in and around Black Mountain, photos (that have replaced the drawn vignette) indicate more social activities that can be found in the area and the legend gives examples of businesses and civic officials in Black Mountain. The bird's eye map has become somewhat redundant.

Discussion

The years following the Civil War were a turbulent time for many Southern cities as they began to rebuild and adjust to new social and economic changes. As the region slowly transformed into an industrial economy, investors and developers began to turn their attention to the South. Undoubtedly, the bird's eye map makers saw this as a golden opportunity to move into a new market and by 1872, one of the first cities to be drawn was Raleigh, North Carolina. However, it wasn't until seventeen years later, when industrialized southern cities demonstrated signs of growth that a first serious attempt to map North Carolina cities was undertaken by Albert Ruger. Thaddeus Fowler and others followed in Ruger's footsteps some fifteen to twenty years later, but no one map maker was ever successful in establishing a foothold in the South. There may be several reasons for this.

First, when the bird's eye map making trade became popular in the North, the map makers were concentrating on small towns that had common roots and community cohesiveness. The maps were created to celebrate civic pride. Southern cities, especially those that were once rural areas, probably didn't have the same sense of community as in the North. In addition, most new industries were the result of Northern investors, and indigenous Southerners, who had experienced a traumatic change in lifestyle as a result of the War, may have felt that they had little to celebrate.

Another reason why the bird's eye maps were not popular in the South could be due to the time of their creation. By the end of the nineteenth-century the maps had lost some of their appeal and by the twentieth-century (as seen in the Black Mountain map) the map itself was only a supporting document in the tourism trade. Oddly, the maps experienced juxtaposition with the vignettes and legends. What had once been supporting material to the map became the center of interest while the map was pushed further into the background. What had once been considered a piece of fine artwork was now replicated and given away by the thousands to invite tourism and business into a particular city.

The North Carolina bird's eye maps showed a state in flux, but one that responded well to the challenges following the Civil War. The map of Raleigh in 1872 shows a town expanding and growing into a capital city. Greensboro and Winston-Salem are bustling cities full of potential to become industrialized, and the maps of Asheville and Black Mountain speak of a thriving tourist trade near the end of the nineteenth-century and into the twentieth. These maps and other North Carolina bird's eye maps demonstrate how quickly the state rebounded from the War to become part of the Industrial Revolution and a leader in the tourism trade.

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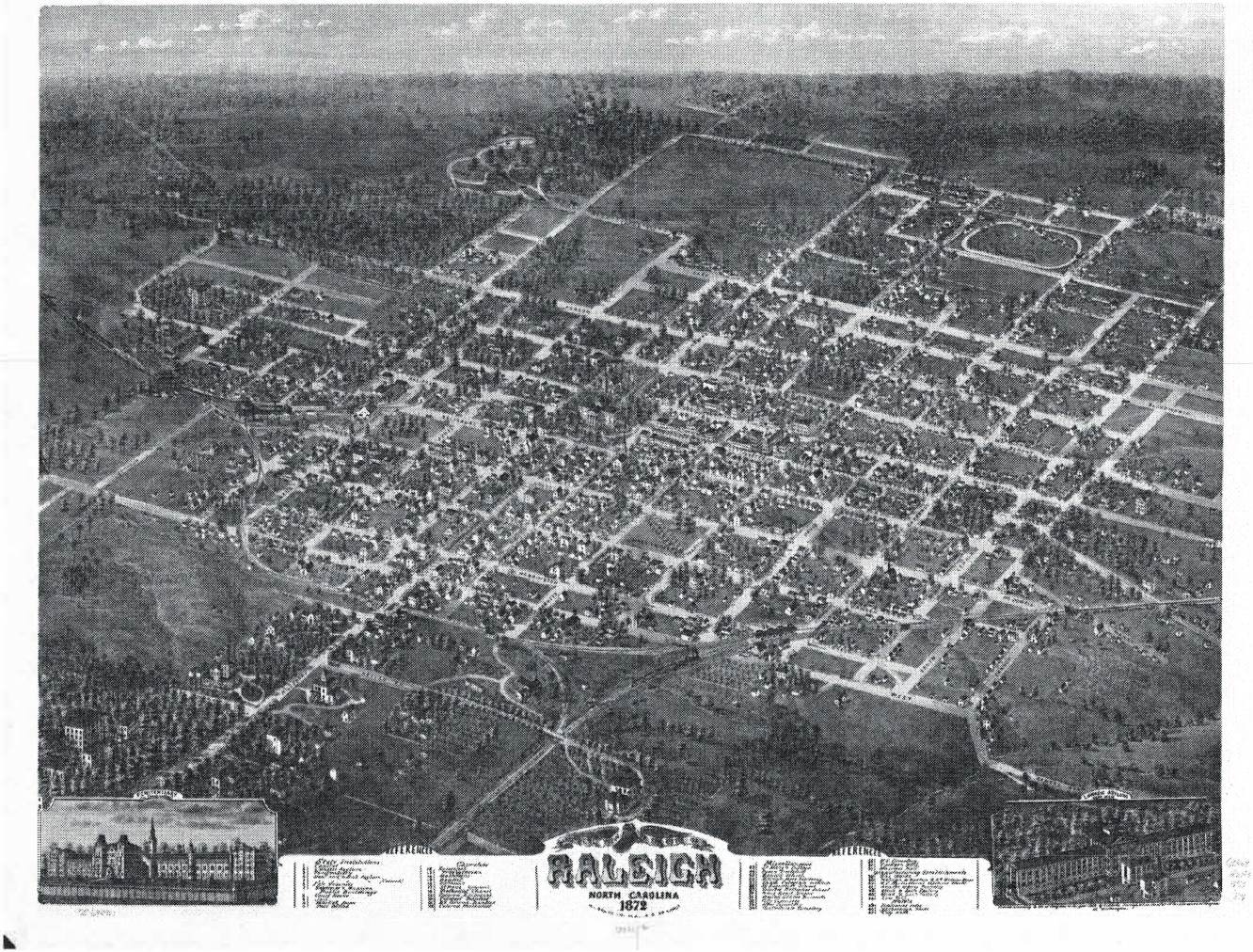

Figure 1. Raleigh, North Carolina, 1874. Drawn by Camille Drie. Downloaded from The Library of Congress, 8/7/2009.

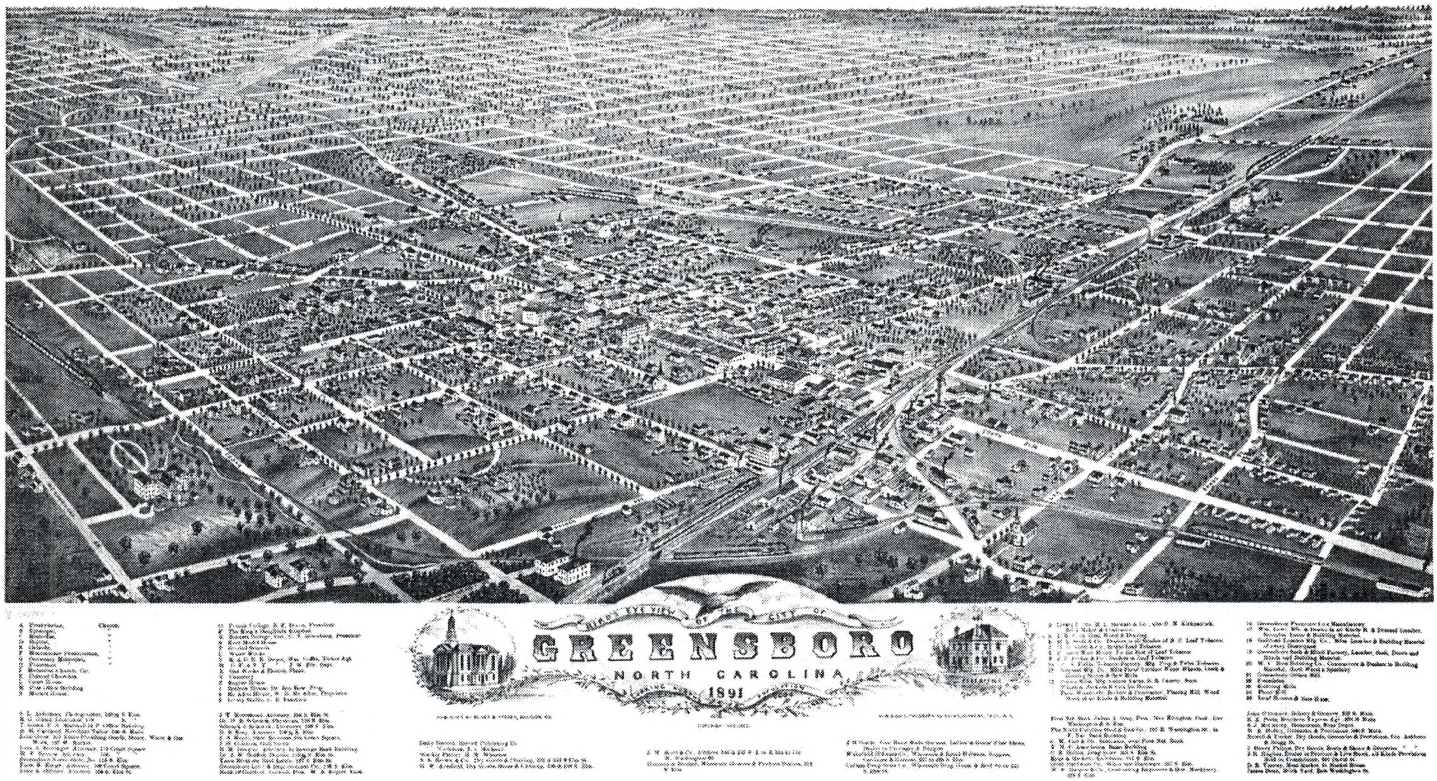

Figure 2. Greensboro, N.C., 1891. Drawn by Albert Ruger. Downloaded from The Library of Congress, 8/7/2009

Figure 3. Winston-Salem, N.C., 1891. Drawn by Albert Ruger. Downloaded from The Library of Congress, 8/7/2009

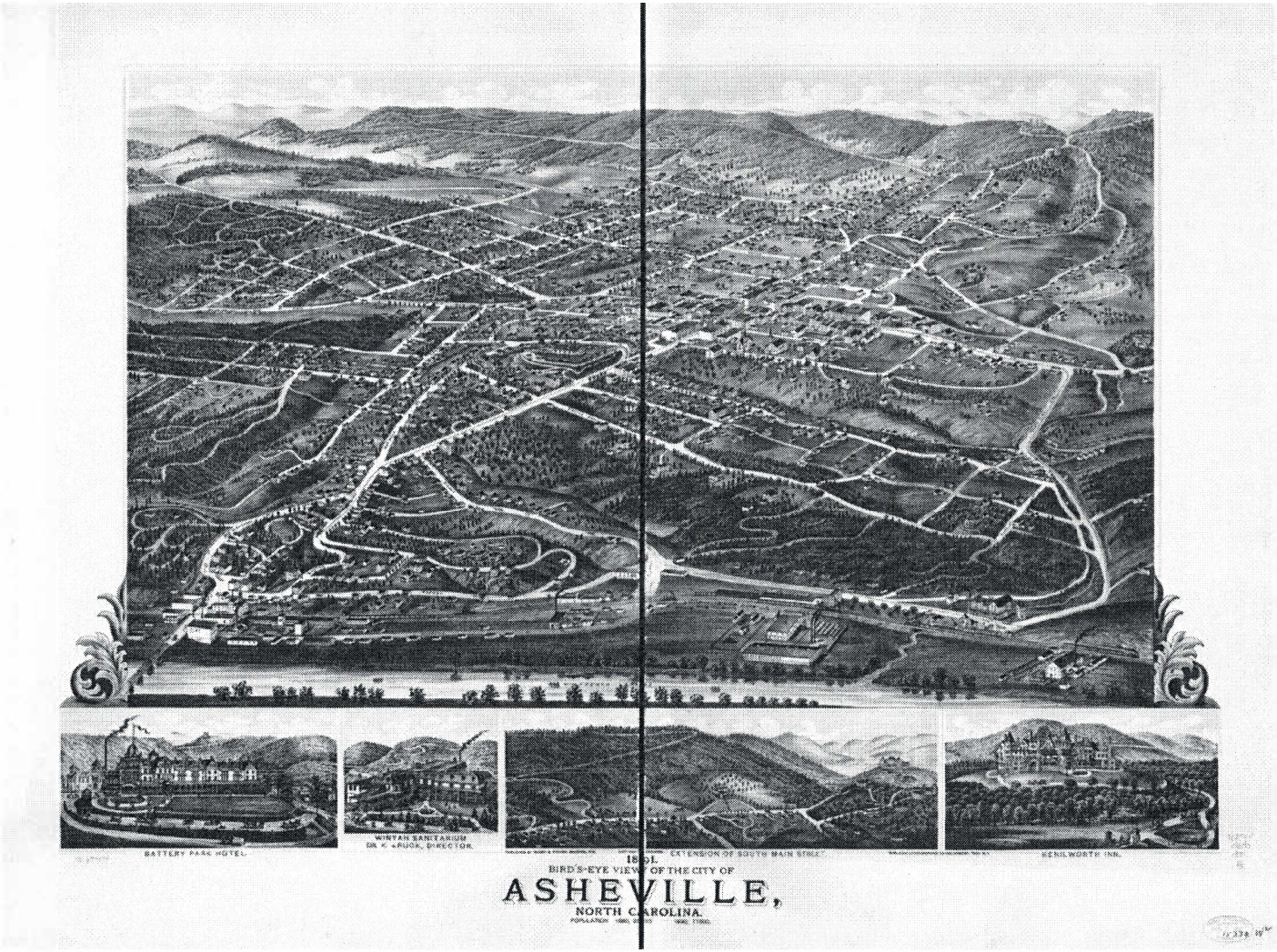

Figure 4. Asheville, N.C., 1891. Drawn by Albert Ruger. Downloaded from The Library of Congress, 8/7/2009.

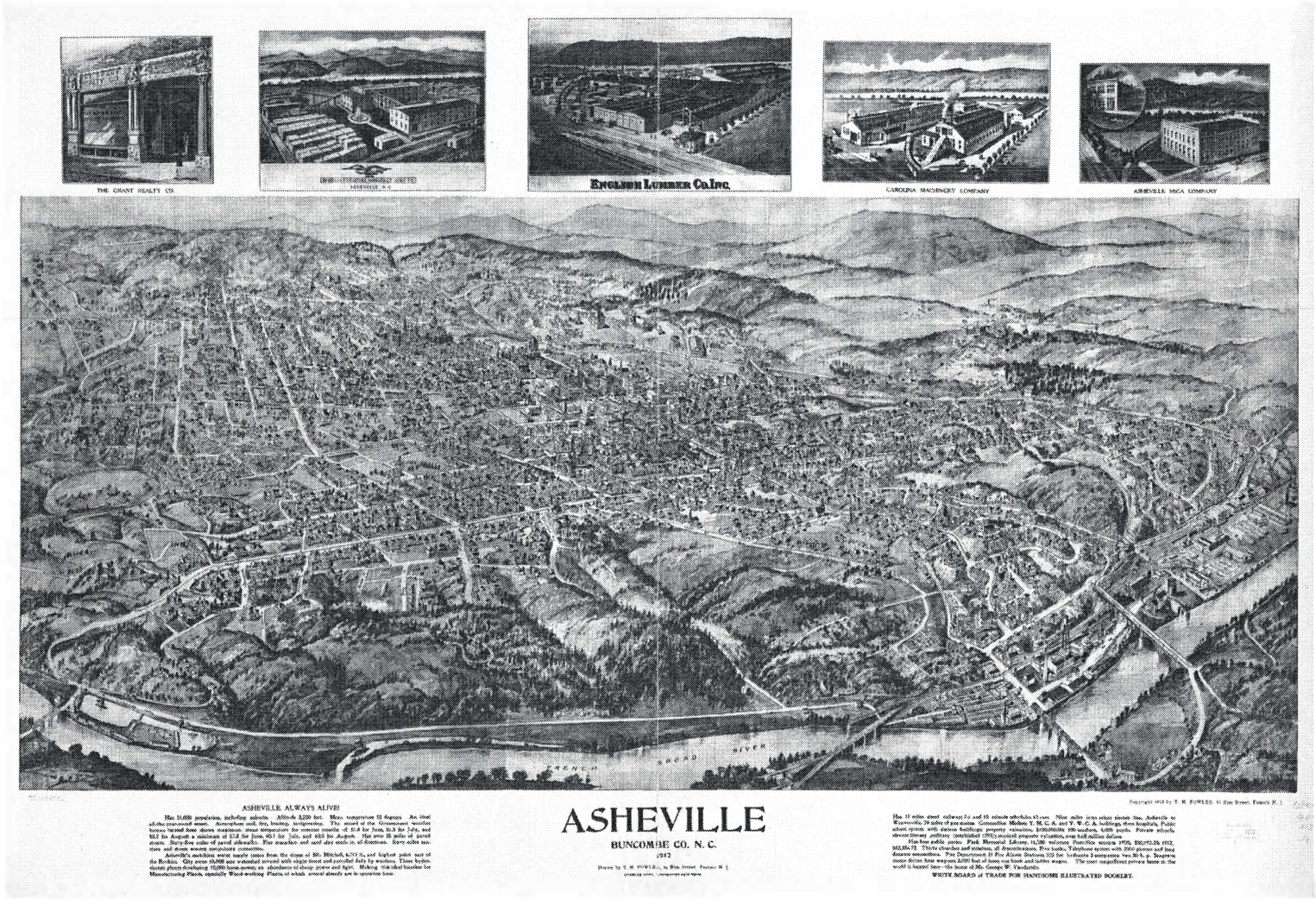

Figure 5. Asheville, N.C., 1912. Drawn by Albert Ruger. Downloaded from The Library of Congress, 8/7/2009.

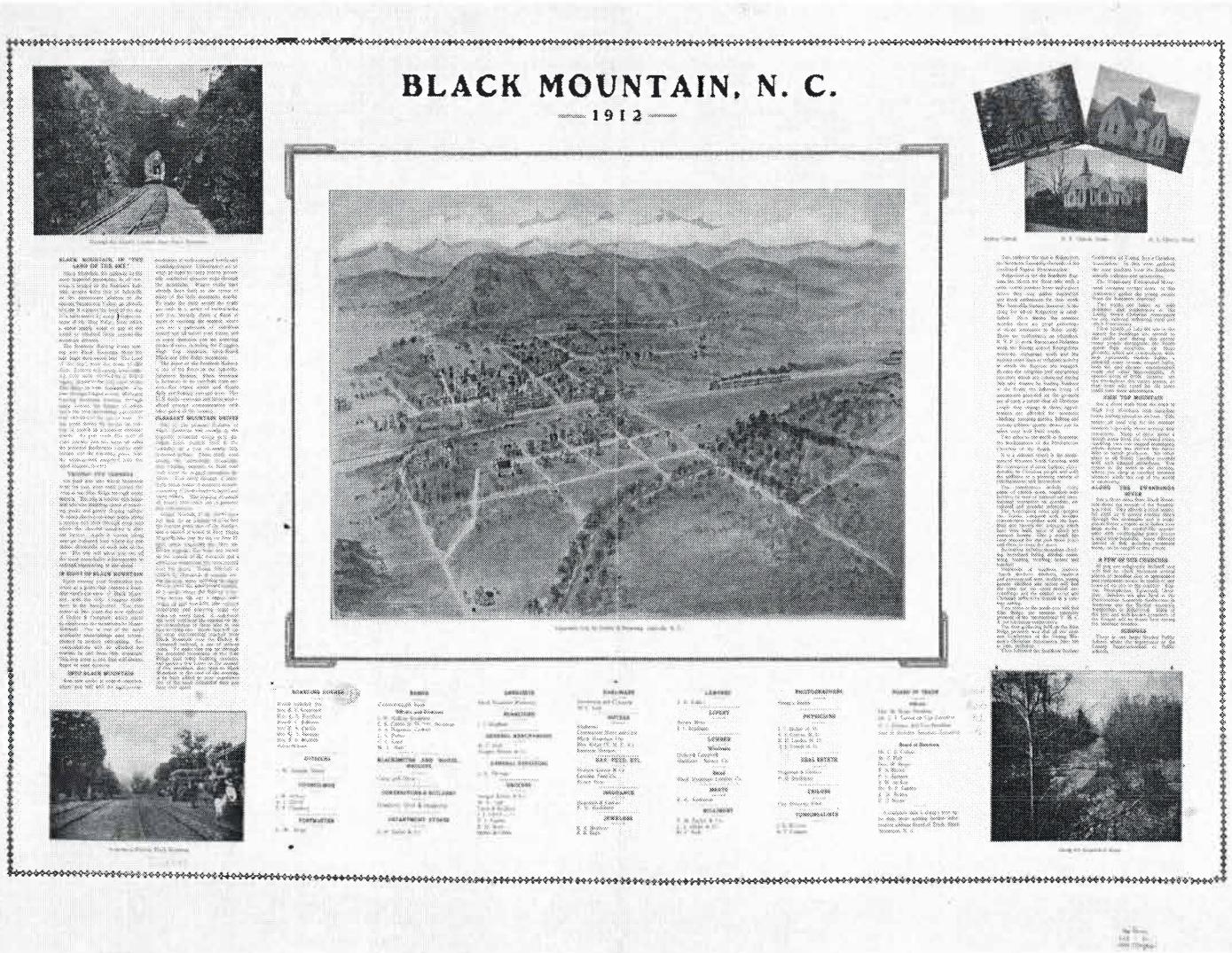

Figure 6. Asheville, N.C., 1912. Drawn by Albert Ruger. Downloaded from The Library of Congress, 8/7/2009.

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- All manuscripts should be ready to print single sided on standard 8.5 X 11 inch paper, double spaced, with 1.25 inch margins, using 10 point type. Times Roman type font is preferred.
- References are to be listed on separate pages, double spaced, and follow the Publication Manual of the American Psychological Association (APA style guide) as used in journals published by the Association of American Geographers (*Annals,* or *The Professional Geographer).*
- Figures and tables should be submitted on separate pages at the end of the manuscript. Electronic versions or figures or maps should be in .TIFF format to provide for the best reproduction in the journal. Also provide a list of figures and tables on a page separate from the main text of the manuscript.
- High quality black and white images may be included. Original digital images are preferred to paper photographs.

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Michael E. Lewis, Editor
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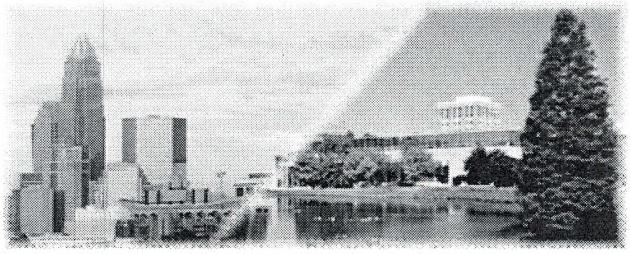

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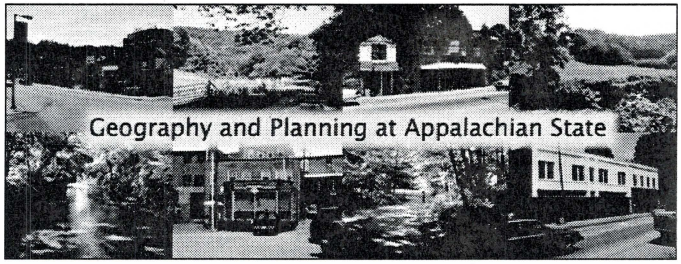

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For further information, please contact:

Department Chair: Dr. Jim Young (youngje@appstate.edu)
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Department of Geography and Planning
Appalachian State University
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The University of North Carolina at Chapel Hill is the oldest state university in the country and is one of the nation's premiere public institutions, with extensive and state-of-the-art resources and a range of nationally and internationally recognized academic programs. Set within this environment is Geography, a collegial, dynamic, and highly productive department of 16 faculty, including national and international leaders in areas of human geography, earth systems science and geographic information science. Geography offers the B.A., M.A., and Ph.D. degrees, with most graduate students pursuing the doctorate. The department enjoys excellent collaboration with a set of leading interdisciplinary programs on campus, including the Carolina Population Center, Carolina Environment Program, Shep Center for Health Services Research, Center for Urban and Regional Science, International Studies and Latin American Studies.

Undergraduate Program. UNC's Department of Geography offers a broadly based B.A. degree with concentration in three areas-the geography of human activity, earth systems science, and geographic information sciences. A well-equipped teaching lab directly supports undergraduate teaching and research in Geography, while a range of state-of-the-art facilities can be found at several venues on campus. Students are urged to participate in the University's superior undergraduate programs and resources, undergraduate research, and internships. The department has a student exchange program with Kings College London.

Graduate Program. Our graduate program reflects our ongoing commitment to the highest quality research and our intention to continue to direct resources toward our primary research strengths: Earth Systems Science, Geographical Information Sciences, Globalization, Social Spaces, and Human-Nature Studies. These areas are integrated in individual and group research projects, while interdisciplinary cooperation is also highly valued. Reciprocal agreements with other universities in the Triangle allow graduate students to take courses at Duke University and North Carolina State. Funding is available through fellowship, research assistantships and teaching assistantships. Current graduate research is carried out both locally and globally on six continents with funding from a range of agencies including NSF, NASA, USDA, HUD, NIH and EPA as well as a set of private endowments. Recent graduates have regularly found positions in leading universities, government agencies and private enterprise.

***For more information,* contact Dr. Larry Band, Chair, Department of Geography, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3220. Telephone: (919) 962-8901. Email: lband@email.unc.edu**

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Research Articles

Carolina Landscapes