

US EPA ARCHIVE DOCUMENT

**Appendices to North Carolina's  
AQMP Documentation**

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**Appendix A: Population Growth Information for North Carolina**

<b>State Population Growth: April 1, 2000 to July 1, 2007</b>							
<b>State or Nation</b>	<b>7/1/2007 Population</b>	<b>Size Rank</b>	<b>4/1/2000 Population</b>	<b>7.25 Yr. Population Growth</b>			
				<b>Amount</b>		<b>Percent</b>	
				<b>Value</b>	<b>Rank</b>	<b>Value</b>	<b>Rank</b>
<b>United States</b>	301,621,157	n/a	281,424,602	20,196,555	n/a	7.177	n/a
<b>California</b>	36,553,215	1	33,871,653	2,681,562	2	7.917	18
<b>Texas</b>	23,904,380	2	20,851,790	3,052,590	1	14.639	6
<b>New York</b>	19,297,729	3	18,976,821	320,908	17	1.691	42
<b>Florida</b>	18,251,243	4	15,982,824	2,268,419	3	14.193	7
<b>Illinois</b>	12,852,548	5	12,419,647	432,901	12	3.486	34
<b>Pennsylvania</b>	12,432,792	6	12,281,054	151,738	28	1.236	45
<b>Ohio</b>	11,466,917	7	11,353,145	113,772	31	1.002	46
<b>Michigan</b>	10,071,822	8	9,938,480	133,342	30	1.342	44
<b>Georgia</b>	9,544,750	9	8,186,816	1,357,934	4	16.587	4
<b>North Carolina</b>	9,061,032	10	8,046,491	1,014,541	6	12.608	9
<b>New Jersey</b>	8,685,920	11	8,414,347	271,573	20	3.227	37
<b>Virginia</b>	7,712,091	12	7,079,030	633,061	7	8.943	15
<b>Washington</b>	6,468,424	13	5,894,140	574,284	8	9.743	12
<b>Massachusetts</b>	6,449,755	14	6,349,105	100,650	32	1.585	43
<b>Indiana</b>	6,345,289	15	6,080,517	264,772	21	4.354	31
<b>Arizona</b>	6,338,755	16	5,130,632	1,208,123	5	23.547	2
<b>Tennessee</b>	6,156,719	17	5,689,262	467,457	11	8.216	17
<b>Missouri</b>	5,878,415	18	5,596,683	281,732	18	5.034	27
<b>Maryland</b>	5,618,344	19	5,296,506	321,838	16	6.076	21
<b>Wisconsin</b>	5,601,640	20	5,363,715	237,925	22	4.436	30
<b>Minnesota</b>	5,197,621	21	4,919,492	278,129	19	5.654	25
<b>Colorado</b>	4,861,515	22	4,302,015	559,500	10	13.006	8
<b>Alabama</b>	4,627,851	23	4,447,351	180,500	25	4.059	32
<b>South Carolina</b>	4,407,709	24	4,011,816	395,893	14	9.868	11
<b>Louisiana</b>	4,293,204	25	4,468,958	-175,754	50	-3.933	50
<b>Kentucky</b>	4,241,474	26	4,042,285	199,189	24	4.928	28
<b>Oregon</b>	3,747,455	27	3,421,436	326,019	15	9.529	13
<b>Oklahoma</b>	3,617,316	28	3,450,654	166,662	26	4.830	29
<b>Connecticut</b>	3,502,309	29	3,405,602	96,707	33	2.840	38
<b>Iowa</b>	2,988,046	30	2,926,382	61,664	40	2.107	40
<b>Mississippi</b>	2,918,785	31	2,844,656	74,129	37	2.606	39
<b>Arkansas</b>	2,834,797	32	2,673,398	161,399	27	6.037	22
<b>Kansas</b>	2,775,997	33	2,688,824	87,173	34	3.242	36
<b>Utah</b>	2,645,330	34	2,233,198	412,132	13	18.455	3
<b>Nevada</b>	2,565,382	35	1,998,257	567,125	9	28.381	1
<b>New Mexico</b>	1,969,915	36	1,819,046	150,869	29	8.294	16

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**State Population Growth: April 1, 2000 to July 1, 2007**

<b>State or Nation</b>	<b>7/1/2007 Population</b>	<b>Size Rank</b>	<b>4/1/2000 Population</b>	<b>7.25 Yr. Population Growth</b>			
<b>West Virginia</b>	1,812,035	<b>37</b>	1,808,350	3,685	<b>48</b>	0.204	<b>48</b>
<b>Nebraska</b>	1,774,571	<b>38</b>	1,711,265	63,306	<b>39</b>	3.699	<b>33</b>
<b>Idaho</b>	1,499,402	<b>39</b>	1,293,956	205,446	<b>23</b>	15.877	<b>5</b>
<b>Maine</b>	1,317,207	<b>40</b>	1,274,923	42,284	<b>43</b>	3.317	<b>35</b>
<b>New Hampshire</b>	1,315,828	<b>41</b>	1,235,786	80,042	<b>36</b>	6.477	<b>19</b>
<b>Hawaii</b>	1,283,388	<b>42</b>	1,211,537	71,851	<b>38</b>	5.931	<b>23</b>
<b>Rhode Island</b>	1,057,832	<b>43</b>	1,048,319	9,513	<b>47</b>	0.907	<b>47</b>
<b>Montana</b>	957,861	<b>44</b>	902,195	55,666	<b>42</b>	6.170	<b>20</b>
<b>Delaware</b>	864,764	<b>45</b>	783,600	81,164	<b>35</b>	10.358	<b>10</b>
<b>South Dakota</b>	796,214	<b>46</b>	754,844	41,370	<b>44</b>	5.481	<b>26</b>
<b>Alaska</b>	683,478	<b>47</b>	626,931	56,547	<b>41</b>	9.020	<b>14</b>
<b>North Dakota</b>	639,715	<b>48</b>	642,200	-2,485	<b>49</b>	-0.387	<b>49</b>
<b>Vermont</b>	621,254	<b>49</b>	608,827	12,427	<b>46</b>	2.041	<b>41</b>
<b>District of Columbia</b>	588,292	<b>n/a</b>	572,059	16,233	<b>n/a</b>	2.838	<b>n/a</b>
<b>Wyoming</b>	522,830	<b>50</b>	493,782	29,048	<b>45</b>	5.883	<b>24</b>

Annual Population Growth --- North Carolina/United States							
Date	North Carolina Population	Growth		United States Population	Growth		Difference NC-US
		Amount	Percent		Amount	Percent	
July 1990	6,662,523			249,622,814			
		120,301	1.8056		3,358,127	1.3453	0.4604
July 1991	6,782,824			252,980,941			
		112,604	1.6601		3,533,283	1.3967	0.2635
July 1992	6,895,428			256,514,224			
		145,593	2.1114		3,404,364	1.3272	0.7843
July 1993	7,041,021			259,918,588			
		144,992	2.0592		3,207,233	1.2339	0.8253
July 1994	7,186,013			263,125,821			
		157,168	2.1871		3,152,572	1.1981	0.9890
July 1995	7,343,181			266,278,393			
		156,095	2.1257		3,115,891	1.1702	0.9556
July 1996	7,499,276			269,394,284			
		156,248	2.0835		3,252,641	1.2074	0.8761
July 1997	7,655,524			272,646,925			
		153,527	2.0054		3,207,179	1.1763	0.8291
July 1998	7,809,051			275,854,104			
		142,100	1.8197		3,186,064	1.1550	0.6647
July 1999	7,951,151			279,040,168			
		128,626	1.6177		3,154,140	1.1304	0.4873
July 2000	8,079,777			282,194,308			
		123,788	1.5321		2,917,722	1.0339	0.4981
July 2001	8,203,565			285,112,030			
		115,728	1.4107		2,775,991	0.9736	0.4371
July 2002	8,319,293			287,888,021			
		101,856	1.2243		2,559,623	0.8891	0.3352
July 2003	8,421,149			290,447,644			
		117,229	1.3921		2,743,867	0.9447	0.4474
July 2004	8,538,378			293,191,511			
		140,711	1.6480		2,704,386	0.9224	0.7256
July 2005	8,679,089			295,895,897			
		190,353	2.1932		2,858,922	0.9662	1.2270
July 2006	8,869,442			298,754,819			
		191,590	2.1601		2,866,338	0.9594	1.2007
July 2007	9,061,032			301,621,157			



### Annual County Population Totals 2000-2009

<i>County</i>	Estimated							Projected		
	July 2000	July 2001	July 2002	July 2003	July 2004	July 2005	July 2006	July 2007	July 2008	July 2009
ALAMANCE	131,405	133,736	135,874	136,252	137,031	138,364	139,786	141,466	143,122	144,715
ALEXANDER	33,694	33,974	34,262	34,535	35,146	35,818	36,296	36,778	37,173	37,540
ALLEGHANY	10,703	10,776	10,852	10,798	10,868	10,877	11,012	11,120	11,192	11,268
ANSON	25,314	25,276	25,262	25,180	25,628	25,672	25,371	25,107	24,894	24,753
ASHE	24,477	24,804	24,754	25,072	25,108	25,420	25,774	26,120	26,427	26,650
AVERY	17,335	17,663	17,835	17,990	17,862	17,906	18,174	18,256	18,282	18,297
BEAUFORT	45,039	45,282	45,480	45,518	45,682	45,896	46,346	46,770	47,081	47,342
BERTIE	19,764	19,758	19,765	19,744	19,612	19,526	19,355	19,186	19,064	18,945
BLADEN	32,326	32,469	32,572	32,666	32,908	32,805	32,870	32,972	33,029	33,179
BRUNSWICK	73,874	76,676	79,227	81,817	85,060	89,481	94,964	100,107	104,485	108,178
BUNCOMBE	206,780	208,306	210,034	212,224	214,976	216,272	221,320	226,175	229,486	232,639
BURKE	89,225	89,172	89,094	88,744	88,744	88,267	88,663	89,280	89,508	89,806
CABARRUS	132,146	136,316	139,878	143,340	146,168	150,228	157,179	163,804	169,181	173,695
CALDWELL	77,813	78,092	78,372	78,208	78,434	78,640	79,298	79,940	80,387	80,793
CAMDEN	6,921	7,054	7,302	7,848	8,496	9,020	9,284	9,560	9,905	10,279
CARTERET	59,454	59,692	60,124	60,756	61,882	62,900	63,558	64,200	64,971	65,775
CASWELL	23,559	23,663	23,722	23,716	23,624	23,674	23,523	23,457	23,480	23,525
CATAWBA	142,466	145,378	146,299	146,608	147,687	148,797	151,128	153,455	155,315	157,080
CHATHAM	49,697	51,062	52,520	53,742	54,868	56,123	57,707	59,243	60,595	61,845
CHEROKEE	24,369	24,609	25,010	25,250	25,769	26,113	26,816	27,316	27,771	28,223
CHOWAN	14,157	14,158	14,316	14,294	14,397	14,411	14,664	14,921	15,041	15,142
CLAY	8,817	8,971	9,177	9,375	9,636	9,865	10,144	10,356	10,576	10,790
CLEVELAND	96,428	96,731	97,047	97,376	97,216	96,818	96,714	96,744	96,740	96,854
COLUMBUS	54,760	54,731	54,746	54,473	54,404	54,248	54,656	55,087	55,277	55,455
CRAVEN	91,665	92,706	92,494	93,402	93,192	94,208	95,558	96,872	97,833	98,661
CUMBERLAND	302,921	302,545	305,767	308,217	309,862	304,382	306,545	308,255	308,984	310,541
CURRITUCK	18,301	18,810	19,658	20,598	21,894	22,976	23,518	24,171	24,940	25,777
DARE	30,211	31,134	32,216	33,310	34,223	34,576	34,674	34,945	35,300	35,860
DAVIDSON	147,674	148,999	150,606	151,867	152,978	154,180	155,348	156,591	157,932	159,332

### Annual County Population Totals 2000-2009

<i>County</i>	Estimated							Projected		
	July 2000	July 2001	July 2002	July 2003	July 2004	July 2005	July 2006	July 2007	July 2008	July 2009
DAVIE	35,112	36,157	36,712	37,190	37,868	38,814	39,836	40,831	41,761	42,592
DUPLIN	49,259	49,945	50,562	50,791	51,436	51,788	52,710	53,640	54,352	55,103
DURHAM	224,586	229,340	232,935	235,388	238,294	241,681	246,824	251,667	255,670	259,419
EDGECOMBE	55,525	55,032	54,773	53,844	53,637	52,890	52,644	52,382	51,922	51,563
FORSYTH	307,105	310,752	314,130	317,150	320,132	325,724	331,859	337,726	343,085	347,692
FRANKLIN	47,596	48,826	50,398	51,656	52,778	54,005	55,315	56,677	57,866	59,028
GASTON	190,573	191,217	191,428	191,183	191,600	193,771	197,232	200,415	202,851	204,614
GATES	10,529	10,562	10,695	10,790	10,910	11,188	11,602	11,910	12,194	12,408
GRAHAM	8,010	8,064	8,044	8,052	8,069	8,048	8,109	8,165	8,194	8,228
GRANVILLE	48,863	49,954	51,478	52,258	52,667	53,196	53,840	54,606	55,332	56,016
GREENE	18,979	19,059	19,504	19,854	19,969	20,186	20,833	20,978	21,164	21,378
GUILFORD	422,065	425,380	427,841	430,744	433,808	440,914	449,078	456,757	463,933	470,364
HALIFAX	57,314	57,197	56,986	56,725	56,400	55,959	55,606	55,273	54,956	54,707
HARNETT	91,581	93,856	96,056	97,619	99,447	101,486	103,714	105,892	107,961	110,051
HAYWOOD	54,195	54,706	55,180	55,838	56,296	56,249	56,662	57,101	57,376	57,759
HENDERSON	89,680	91,416	92,856	94,538	96,158	97,751	100,107	102,424	104,399	106,293
HERTFORD	22,905	23,180	23,871	23,736	23,678	23,781	23,878	24,004	24,066	24,113
HOKE	33,919	34,842	35,955	36,922	38,518	40,429	42,202	43,866	45,544	47,157
HYDE	5,844	5,736	5,833	5,695	5,590	5,562	5,511	5,489	5,457	5,426
IREDELL	123,765	127,949	130,488	133,229	135,831	139,419	145,234	150,787	155,194	158,965
JACKSON	33,232	33,644	34,122	34,950	35,528	35,650	36,312	36,920	37,331	37,745
JOHNSTON	123,095	127,719	132,491	136,407	141,422	146,222	151,589	156,887	161,889	166,843
JONES	10,379	10,286	10,224	10,176	10,219	10,224	10,318	10,409	10,461	10,512
LEE	49,430	50,370	51,226	52,014	52,992	54,152	55,282	56,387	57,472	58,488
LENOIR	59,583	59,286	59,080	58,780	58,367	58,210	58,172	58,189	58,161	58,083
LINCOLN	64,137	65,458	66,340	67,349	68,054	69,438	71,302	73,107	74,677	76,008
MCDOWELL	42,345	42,786	42,840	43,032	43,017	43,119	43,632	44,167	44,525	44,853
MACON	29,944	30,448	30,950	31,330	31,846	32,373	33,076	33,797	34,427	35,028
MADISON	19,660	19,718	19,815	19,972	20,186	20,259	20,454	20,673	20,846	21,018

### Annual County Population Totals 2000-2009

<i>County</i>	Estimated							Projected		
	July 2000	July 2001	July 2002	July 2003	July 2004	July 2005	July 2006	July 2007	July 2008	July 2009
MARTIN	25,502	25,281	25,092	24,882	24,655	24,458	24,396	24,338	24,231	24,112
MECKLENBURG	699,742	715,905	732,253	749,804	767,609	795,362	826,893	857,379	885,061	909,258
MITCHELL	15,728	15,866	15,945	15,910	15,984	15,851	15,906	15,942	15,925	15,949
MONTGOMERY	26,885	27,044	27,155	27,323	27,080	27,342	27,506	27,697	27,900	28,069
MOORE	75,046	75,962	77,284	78,123	79,314	80,628	82,292	83,933	85,416	86,828
NASH	87,570	88,192	88,874	89,492	90,494	91,393	92,220	93,088	93,969	94,871
NEW HANOVER	161,032	163,711	166,054	168,977	174,217	179,944	184,120	188,206	192,925	197,578
NORTHAMPTON	22,086	22,064	21,758	21,722	21,464	21,488	21,524	21,554	21,567	21,544
ONslow	149,462	149,698	152,205	156,646	159,674	157,760	161,212	163,688	164,791	166,175
ORANGE	116,134	118,376	119,376	120,168	120,644	122,052	123,766	125,046	126,576	128,049
PAMLICO	12,919	12,824	12,975	12,986	13,004	13,068	13,097	13,131	13,175	13,236
PASQUOTANK	34,938	34,955	35,855	36,352	37,536	38,760	39,956	41,069	42,057	42,937
PENDER	41,292	42,038	43,178	43,706	45,060	46,599	48,724	50,757	52,456	53,981
PERQUIMANS	11,411	11,564	11,661	11,706	11,788	12,148	12,442	12,757	13,045	13,247
PERSON	35,727	36,078	36,730	36,936	36,858	37,125	37,448	37,776	38,114	38,390
PITT	134,019	135,046	137,472	138,726	141,080	143,126	146,403	149,397	151,959	154,430
POLK	18,418	18,761	18,832	18,846	18,874	18,950	19,080	19,247	19,402	19,562
RANDOLPH	130,919	132,483	133,488	134,887	135,708	137,122	138,586	140,134	141,761	143,341
RICHMOND	46,575	46,598	46,595	46,410	46,329	46,586	46,700	46,824	46,970	47,032
ROBESON	123,483	124,266	124,779	125,422	126,304	127,644	129,048	130,474	131,821	133,120
ROCKINGHAM	91,965	91,948	92,423	92,362	91,795	91,737	91,830	91,977	92,084	92,095
ROWAN	130,684	131,958	132,862	133,080	132,798	133,157	134,540	135,931	137,053	138,024
RUTHERFORD	63,029	63,436	63,250	63,357	63,116	63,185	63,178	63,226	63,342	63,447
SAMPSON	60,362	61,058	61,679	62,128	62,552	63,403	64,057	64,764	65,641	66,508
SCOTLAND	35,939	35,759	35,658	35,520	36,716	36,761	36,994	37,246	37,382	37,533
STANLY	58,284	58,713	58,871	58,851	58,834	58,854	59,128	59,431	59,662	59,901
STOKES	44,812	45,153	45,350	45,637	45,960	46,156	46,335	46,560	46,841	47,201
SURRY	71,315	71,540	71,848	71,912	72,092	72,878	72,990	73,196	73,731	74,243
SWAIN	13,017	13,168	13,287	13,342	13,436	13,650	13,938	14,219	14,455	14,645

**Annual County Population Totals 2000-2009**

	Estimated							Projected		
<i>County</i>	July 2000	July 2001	July 2002	July 2003	July 2004	July 2005	July 2006	July 2007	July 2008	July 2009
TRANSYLVANIA	29,348	29,336	29,420	29,452	29,652	29,846	30,360	30,815	31,133	31,414
TYRRELL	4,123	4,178	4,134	4,238	4,174	4,205	4,240	4,289	4,325	4,334
UNION	125,405	131,876	138,883	144,747	151,862	161,260	172,087	182,304	191,072	198,696
VANCE	43,130	43,757	44,082	43,750	43,683	43,478	43,920	44,367	44,543	44,702
WAKE	634,599	660,625	680,350	701,177	723,849	755,968	790,007	822,356	853,260	881,117
WARREN	20,030	19,968	19,944	19,994	19,943	20,088	19,969	19,894	19,888	19,920
WASHINGTON	13,698	13,572	13,580	13,456	13,419	13,414	13,360	13,314	13,281	13,243
WATAUGA	42,726	42,774	42,920	42,742	42,798	42,855	43,410	43,775	44,016	44,253
WAYNE	113,382	113,468	113,768	113,883	114,809	115,328	114,930	115,100	115,613	116,281
WILKES	65,771	66,270	66,693	66,886	66,846	66,682	66,925	67,201	67,344	67,519
WILSON	73,980	74,454	75,264	75,585	76,139	76,730	77,468	78,224	78,912	79,574
YADKIN	36,413	36,608	36,948	36,804	37,050	37,409	37,810	38,229	38,650	39,060
YANCEY	17,837	18,055	17,926	17,896	18,022	18,143	18,368	18,589	18,765	18,932

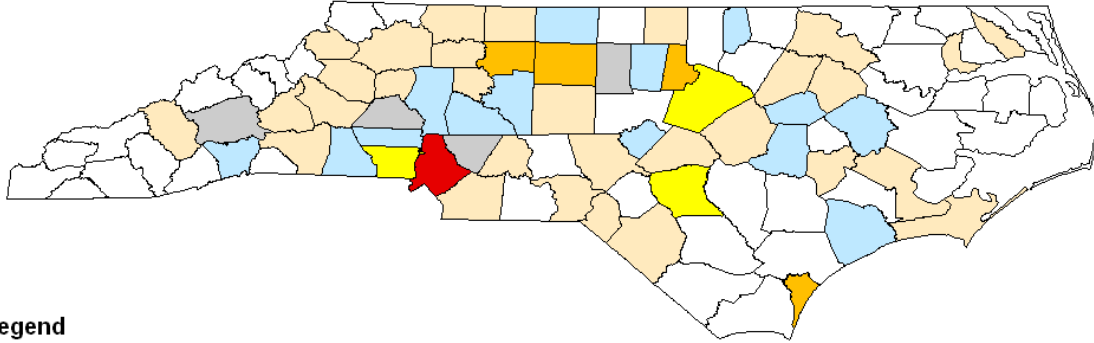
	Estimated							Projected		
<b>NORTH</b>	July 2000	July 2001	July 2002	July 2003	July 2004	July 2005	July 2006	July 2007	July 2008	July 2009
<b>CAROLINA</b>	8,079,242	8,199,814	8,313,779	8,415,955	8,531,293	8,672,544	8,860,341	9,040,824	9,201,151	9,348,744

<b>Metropolitan Statistical Area Population Estimates for July 1, 2006</b>					
<b>MeSA</b>		<b>July_06</b>	<b>April_00</b>	<b>Growth</b>	
	County	Estimate	EstBase	Number	...%...
<b>Asheville</b>		<b>398,543</b>	<b>369,172</b>	<b>29,371</b>	<b>8.0</b>
	BUNCOMBE	221,320	206,299	15,021	7.3
	HAYWOOD	56,662	54,034	2,628	4.9
	HENDERSON	100,107	89,204	10,903	12.2
	MADISON	20,454	19,635	819	4.2
<b>Burlington</b>		<b>139,786</b>	<b>130,794</b>	<b>8,992</b>	<b>6.9</b>
	ALAMANCE	139,786	130,794	8,992	6.9
<b>Charlotte-Gastonia-Concord</b>		<b>1,378,762</b>	<b>1,165,780</b>	<b>212,982</b>	<b>18.3</b>
	ANSON	25,371	25,275	96	0.4
	CABARRUS	157,179	131,030	26,149	20.0
	GASTON	197,232	190,310	6,922	3.6
	MECKLENBURG	826,893	695,427	131,466	18.9
	UNION	172,087	123,738	48,349	39.1
<b>Durham</b>		<b>465,745</b>	<b>423,800</b>	<b>41,945</b>	<b>9.9</b>
	CHATHAM	57,707	49,334	8,373	17.0
	DURHAM	246,824	223,306	23,518	10.5
	ORANGE	123,766	115,537	8,229	7.1
	PERSON	37,448	35,623	1,825	5.1
<b>Fayetteville</b>		<b>348,747</b>	<b>336,608</b>	<b>12,139</b>	<b>3.6</b>
	CUMBERLAND	306,545	302,962	3,583	1.2
	HOKE	42,202	33,646	8,556	25.4
<b>Goldsboro</b>		<b>114,930</b>	<b>113,329</b>	<b>1,601</b>	<b>1.4</b>
	WAYNE	114,930	113,329	1,601	1.4
<b>Greensboro-High Point</b>		<b>679,494</b>	<b>643,446</b>	<b>36,048</b>	<b>5.6</b>
	GUILFORD	449,078	421,048	28,030	6.7
	RANDOLPH	138,586	130,470	8,116	6.2
	ROCKINGHAM	91,830	91,928	-98	-0.1
<b>Greenville</b>		<b>167,236</b>	<b>152,693</b>	<b>14,543</b>	<b>9.5</b>
	GREENE	20,833	18,974	1,859	9.8
	PITT	146,403	133,719	12,684	9.5

<b>Metropolitan Statistical Area Population Estimates for July 1, 2006</b>					
<b>MeSA</b>		<b>July_06</b>	<b>April_00</b>	<b>Growth</b>	
<b>Hickory-Morganton-Lenoir</b>		<b>355,385</b>	<b>342,141</b>	<b>13,244</b>	<b>3.9</b>
	ALEXANDER	36,296	33,609	2,687	8.0
	BURKE	88,663	89,145	-482	-0.5
	CALDWELL	79,298	77,710	1,588	2.0
	CATAWBA	151,128	141,677	9,451	6.7
<b>Jacksonville</b>		<b>161,212</b>	<b>150,355</b>	<b>10,857</b>	<b>7.2</b>
	ONSLOW	161,212	150,355	10,857	7.2
<b>Raleigh-Cary</b>		<b>996,911</b>	<b>797,025</b>	<b>199,886</b>	<b>25.1</b>
	FRANKLIN	55,315	47,260	8,055	17.0
	JOHNSTON	151,589	121,900	29,689	24.4
	WAKE	790,007	627,865	162,142	25.8
<b>Rocky Mount</b>		<b>144,864</b>	<b>142,991</b>	<b>1,873</b>	<b>1.3</b>
	EDGECOMBE	52,644	55,606	-2,962	-5.3
	NASH	92,220	87,385	4,835	5.5
<b>Va. Beach-Norfolk-Newport News</b>		<b>23,518</b>	<b>18,190</b>	<b>5,328</b>	<b>29.3</b>
	CURRITUCK	23,518	18,190	5,328	29.3
<b>Wilmington</b>		<b>327,808</b>	<b>274,550</b>	<b>53,258</b>	<b>19.4</b>
	BRUNSWICK	94,964	73,141	21,823	29.8
	NEW HANOVER	184,120	160,327	23,793	14.8
	PENDER	48,724	41,082	7,642	18.6
<b>Winston-Salem</b>		<b>455,840</b>	<b>421,934</b>	<b>33,906</b>	<b>8.0</b>
	DAVIE	39,836	34,835	5,001	14.4
	FORSYTH	331,859	306,044	25,815	8.4
	STOKES	46,335	44,707	1,628	3.6
	YADKIN	37,810	36,348	1,462	4.0
<b>Total MeSA</b>		<b>6,158,781</b>	<b>5,482,808</b>	<b>675,973</b>	<b>12.3</b>
<b>Total MiSA</b>		<b>1,975,082</b>	<b>1,869,171</b>	<b>105,911</b>	<b>5.7</b>
<b>NON MeSA-MiSA</b>		<b>726,478</b>	<b>694,834</b>	<b>31,644</b>	<b>4.6</b>
<b>NORTH CAROLINA</b>		<b>8,860,341</b>	<b>8,046,813</b>	<b>813,528</b>	<b>10.1</b>

Appendix B: Population Density Maps for North Carolina

### 1990 Population Density



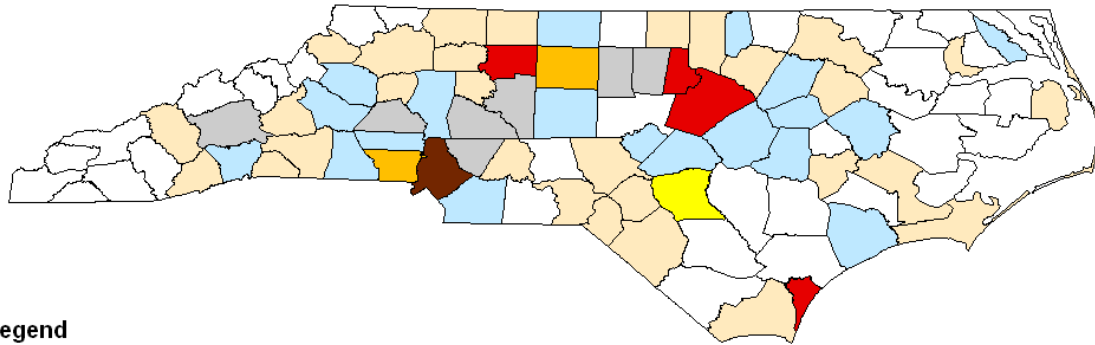
**Legend**

**1990 Population Density**

1990 Population / Area (SQ MILES)

White	8.83003288 - 75.0000000
Light Orange	75.0000001 - 150.0000000
Light Blue	150.0000001 - 250.0000000
Grey	250.0000001 - 375.0000000
Yellow	375.0000001 - 525.0000000
Orange	525.0000001 - 700.0000000
Red	700.0000001 - 1000.0000000
Brown	1000.0000001 - 2000.0000000
Black	2000.0000001 - 5000.0000000

### 2000 Population Density



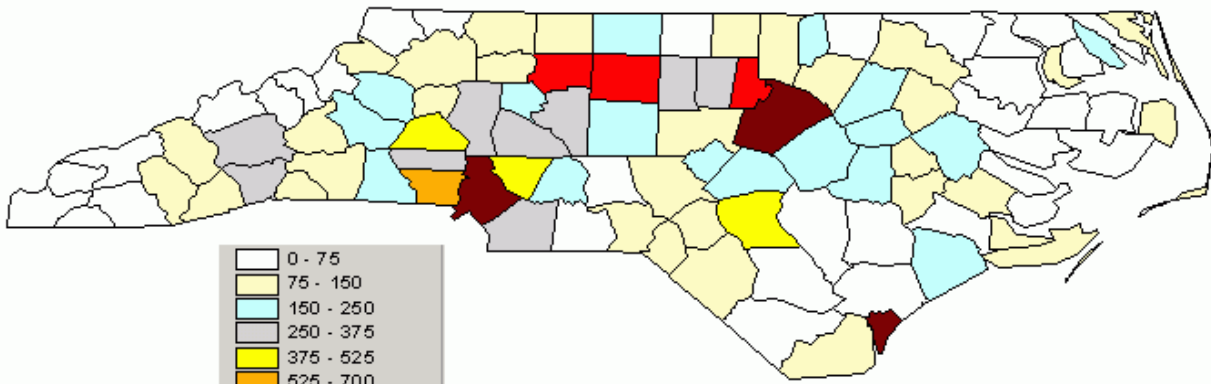
#### Legend

##### 2000 Population Density

2000 Poulation / Area (SQ MILES)

- 9.507 - 75.00
- 75.01 - 150.0
- 150.1 - 250.0
- 250.1 - 375.0
- 375.1 - 525.0
- 525.1 - 700.0
- 700.1 - 1000
- 1001 - 2000
- 2001 - 5000

### Population Density, 2010

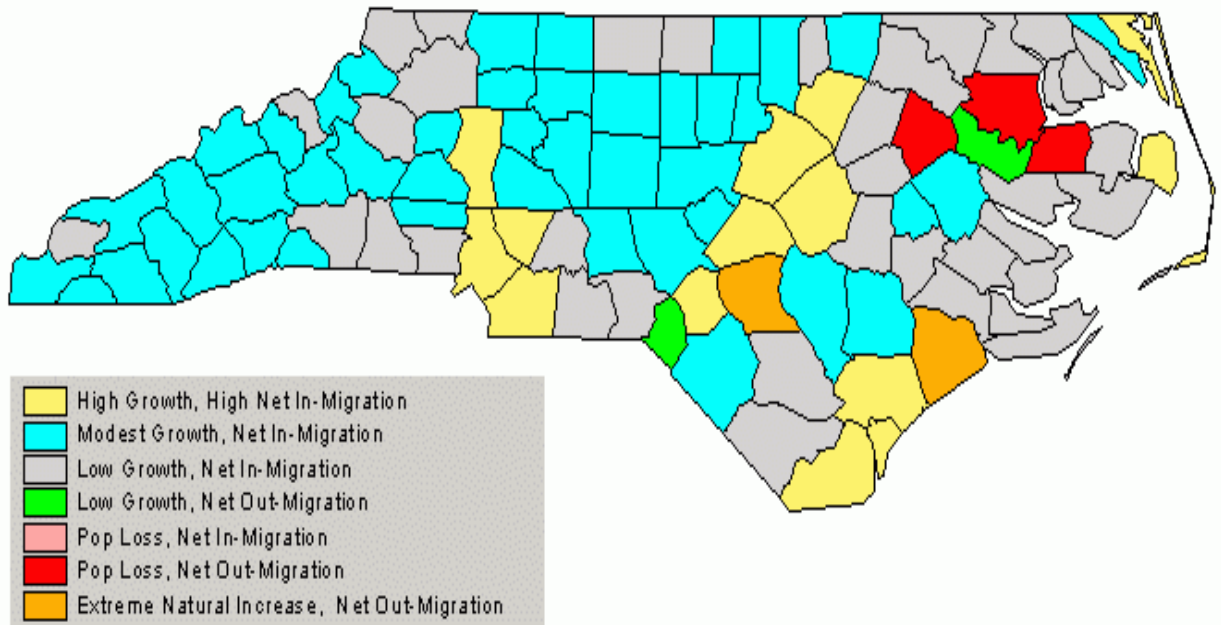


- 0 - 75
- 75 - 150
- 150 - 250
- 250 - 375
- 375 - 525
- 525 - 700
- 700 - 1000
- 1000 - 2000
- 2000 - 5000

Density is defined as persons per square mile of land area.



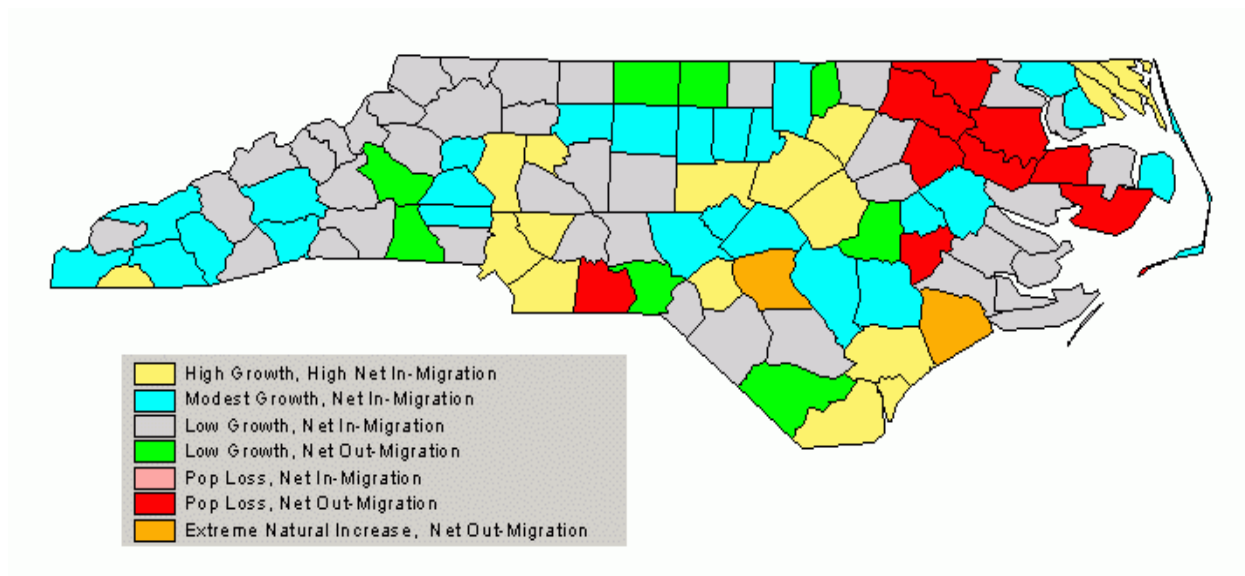
### POPULATION GROWTH 1990 TO 2000



Average county growth is equivalent to the growth rate of the state as whole. Since the growth rate of the state as a whole for this map (21.32%) is positive, Modest Growth is centered around this rate. To give Modest Growth and Low Growth equal ranges, Modest Growth is defined as from 2/3 to 1&1/3 the state Growth rate. Thus, for this map:

High Growth -----	greater than 28.43%
Modest Growth -----	14.22% to 28.43%
Low Growth -----	0.00% to 14.22%

## POPULATION GROWTH 2000 TO 2010



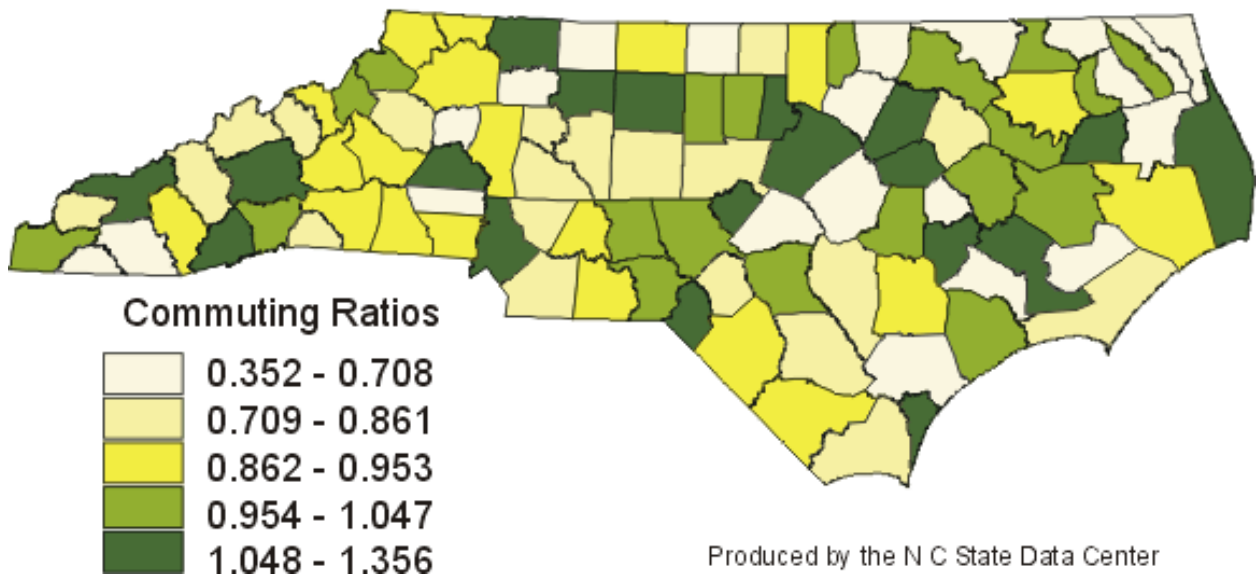
Average county growth is equivalent to the growth rate of the state as whole. Since the growth rate of the state as a whole for this map (17.44%) is positive, modest growth is centered around this rate. To give modest growth and low growth equal ranges, modest growth is defined from 2/3 to 1 1/3 the state growth rate. Thus, for this map:

High Growth -----	greater than 23.26%
Modest Growth -----	11.63% to 23.26%
Low Growth -----	0.00% to 11.63%

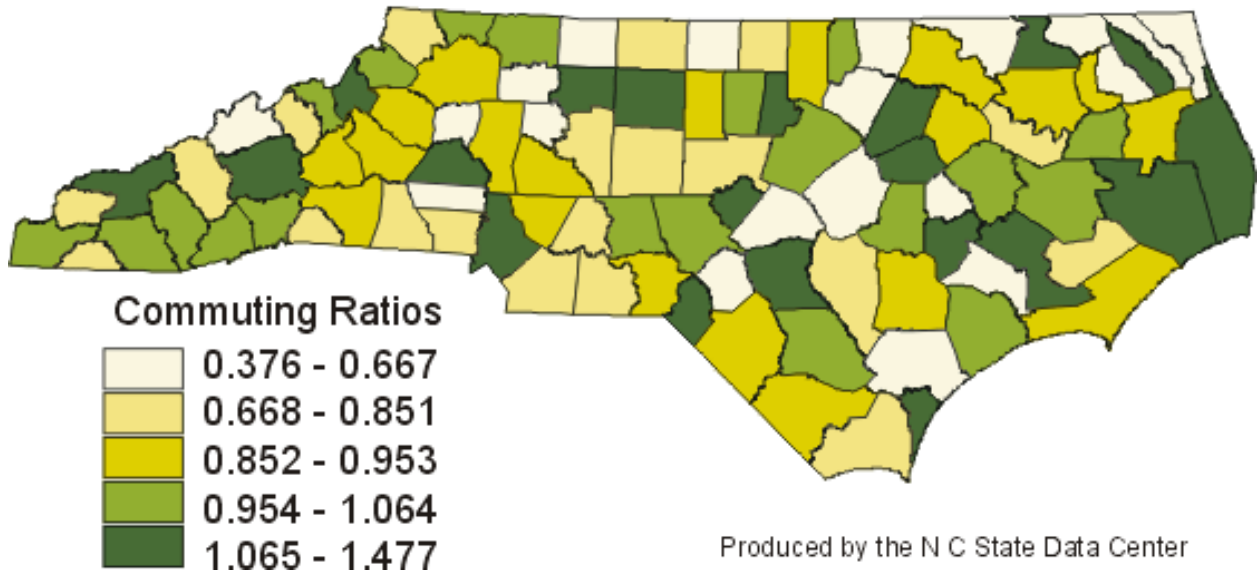
**Appendix C: Commuting Patterns for North Carolina Counties**

**Commuting Ratio** -- The ratio of persons working in the county to employed residents of the county. A value of one implies zero net commuting; a value greater than one corresponds to net in commuting; less than one, to net out commuting.

## Commuting Ratios, 1990

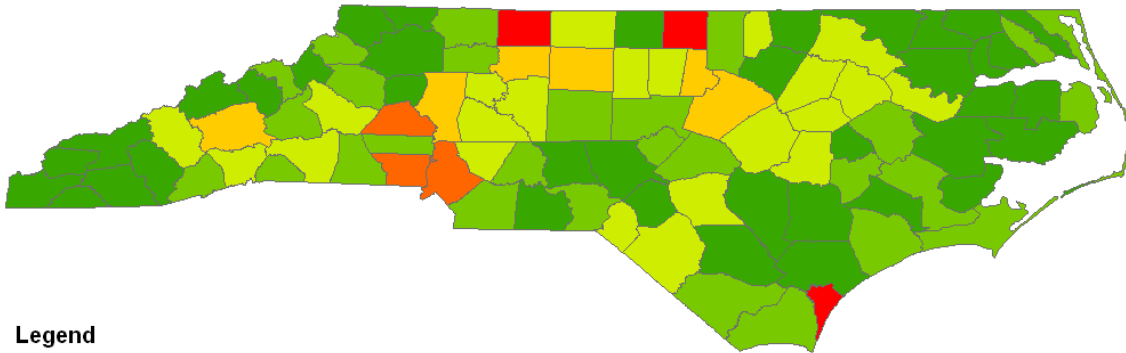


# Commuting Ratios, 2000



Appendix D: Emission Density Plots for North Carolina







County Total 2002 NOx Emissions,  
Normalized By Area



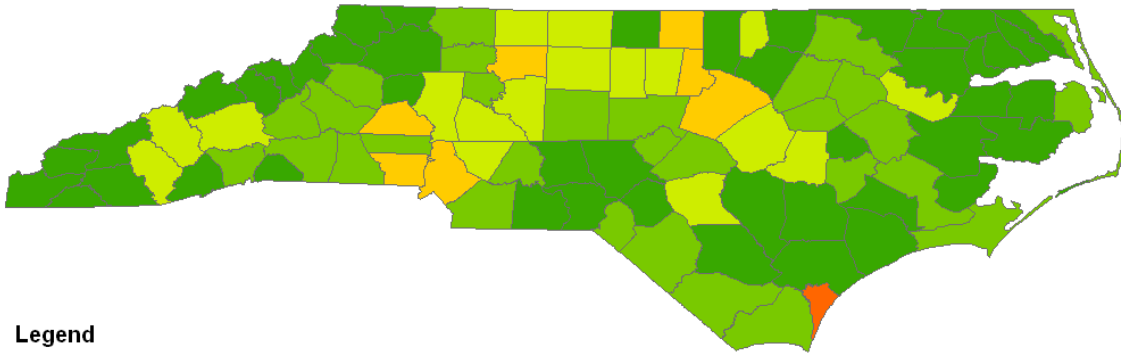
**Legend**

**2002**

**TOTAL NOX / AREA (SQ MILES)**

-  0.984329623 - 5.00000000
-  5.00000001 - 10.00000000
-  10.00000001 - 25.00000000
-  25.00000001 - 50.00000000
-  50.00000001 - 75.00000000
-  75.00000001 - 100.00000000

### County Total 2009 NOx Emissions, Normalized By Area



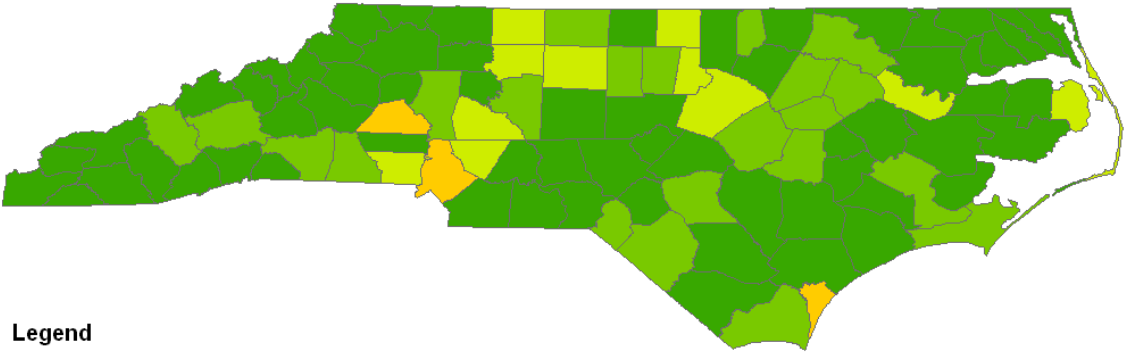
**Legend**

**2009**

TOTAL NOX / AREA (SQ MILES)

- 0.8102 - 5.000
- 5.001 - 10.00
- 10.01 - 25.00
- 25.01 - 50.00
- 50.01 - 75.00
- 75.01 - 100.0

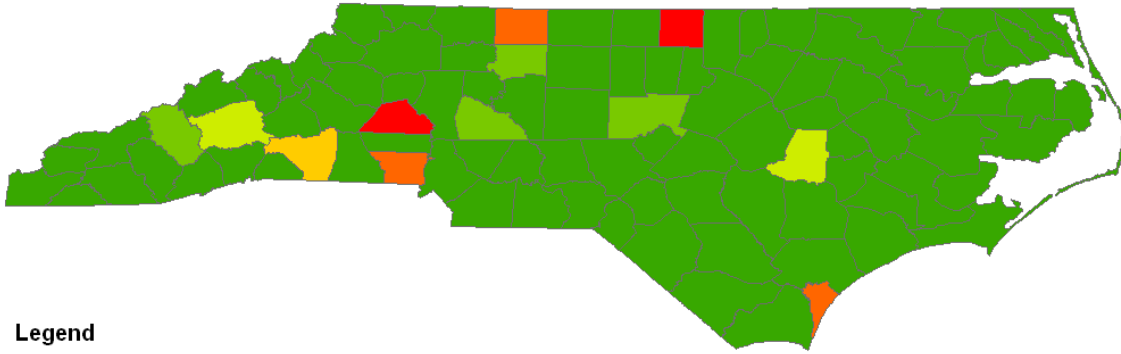
### County Total 2018 NOx Emissions, Normalized By Area



**Legend**  
**2018**  
TOTAL NOX / AREA (SQ MILES)

Dark Green	0.6885 - 5.000
Light Green	5.001 - 10.00
Yellow-Green	10.01 - 25.00
Yellow	25.01 - 50.00
Orange	50.01 - 75.00
Red	75.01 - 100.0







### County Total 2002 SO2 Emissions, Normalized By Area



**Legend**

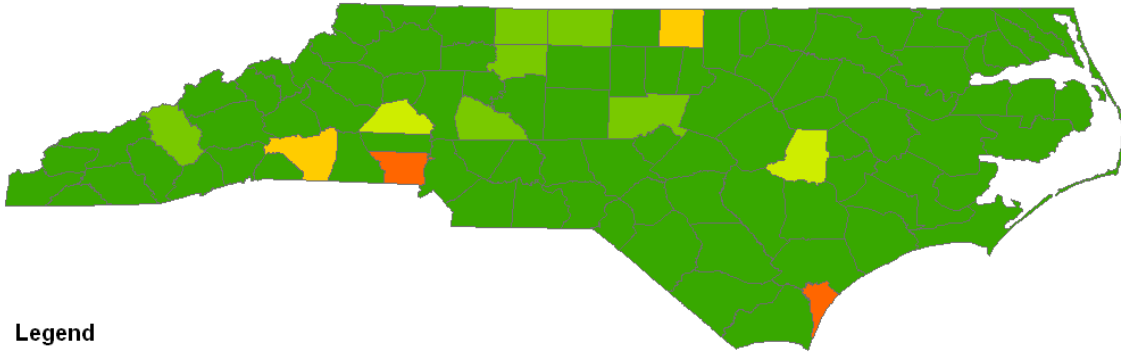
**2002**

**TOTAL SO2 / AREA (SQ MILES)**

-  0.099368269 - 10.0000000
-  10.0000001 - 25.0000000
-  25.0000001 - 50.0000000
-  50.0000001 - 100.0000000
-  100.0000001 - 200.0000000
-  200.0000001 - 350.0000000



### County Total 2009 SO2 Emissions, Normalized By Area



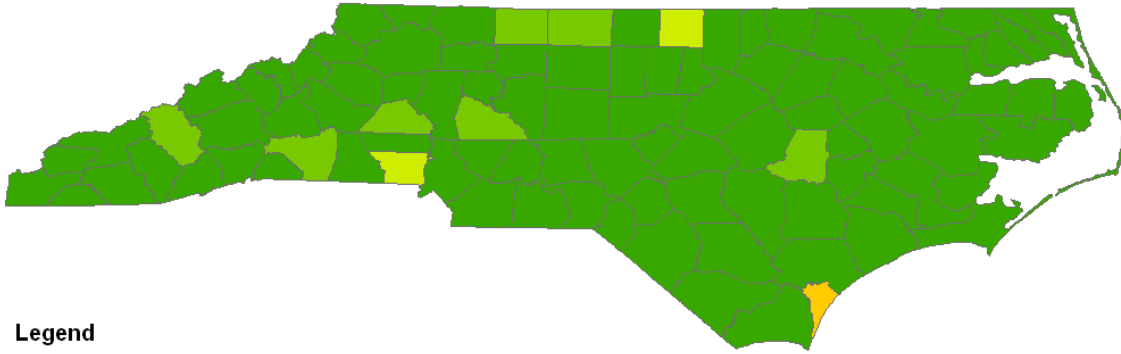
**Legend**

**2009**

**TOTAL SO2 / AREA (SQ MILES)**

- 0.034484191 - 10.0000000
- 10.00000001 - 25.0000000
- 25.00000001 - 50.0000000
- 50.00000001 - 100.0000000
- 100.0000001 - 200.0000000
- 200.0000001 - 350.0000000

### County Total 2018 SO2 Emissions, Normalized By Area



**Legend**

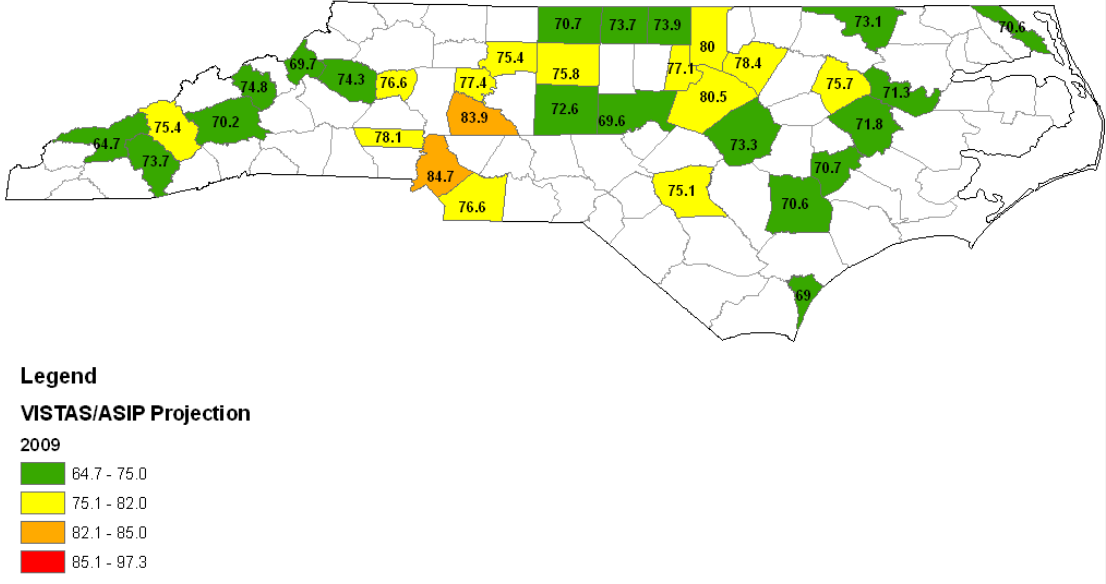
**2018**

**TOTAL SO2 / AREA (SQ MILES)**

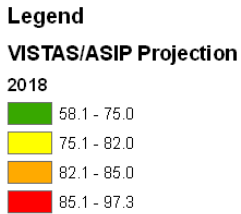
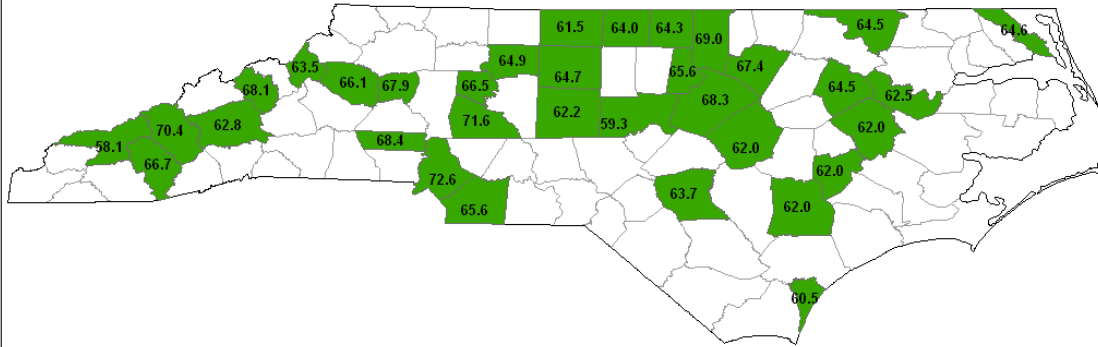
- 0.026626008 - 10.0000000
- 10.00000001 - 25.0000000
- 25.00000001 - 50.0000000
- 50.00000001 - 100.0000000
- 100.0000001 - 200.0000000
- 200.0000001 - 350.0000000

Appendix E: 2009 and 2018 Modeling Projections for North Carolina for Ozone and Fine Particulate Matter

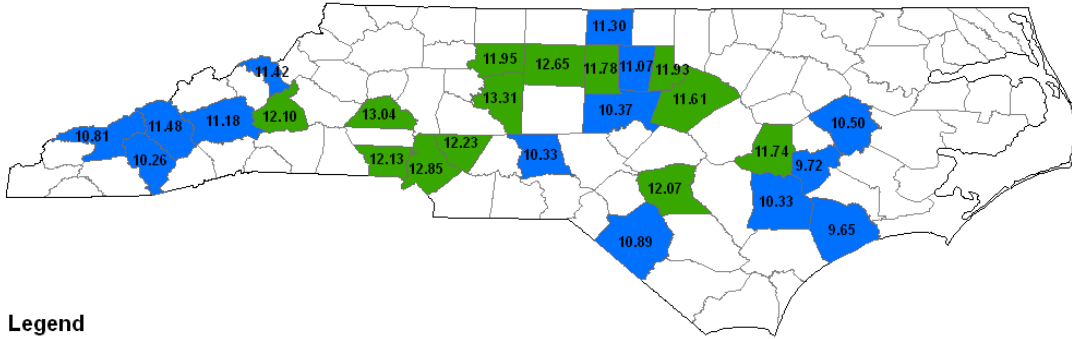
VISTAS/ASIP 2009 8-hour Ozone Future Design Values



**VISTAS/ASIP 2018 8-hour Ozone Future Design Values**



VISTAS/ASIP 2009 Annual PM2.5 Future Design Values



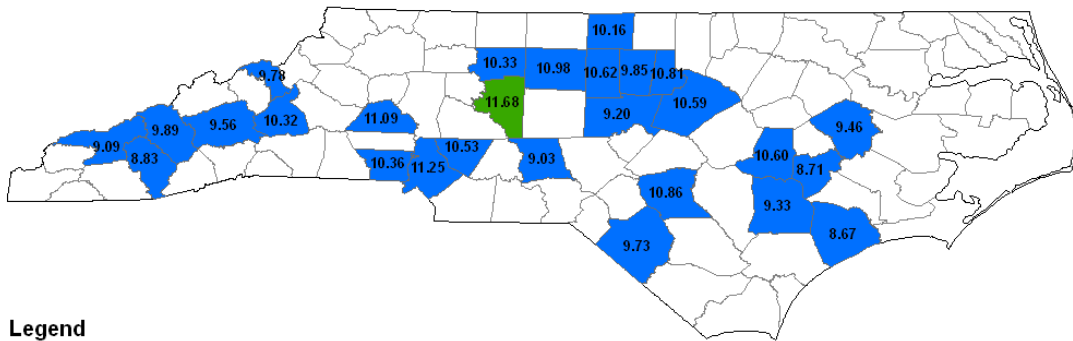
Legend

VISTA/ASIP Projection Annual PM2.5

2009

- 9.65 - 11.50
- 11.51 - 13.50
- 13.51 - 14.50
- 14.51 - 15.00
- 15.01 - 15.50
- 15.51 - 16.01

### VISTAS/ASIP 2018 Annual PM2.5 Future Design Values



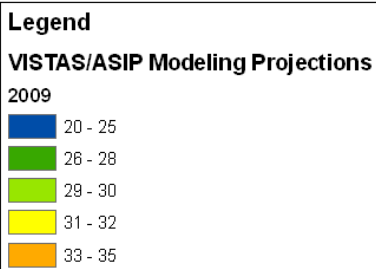
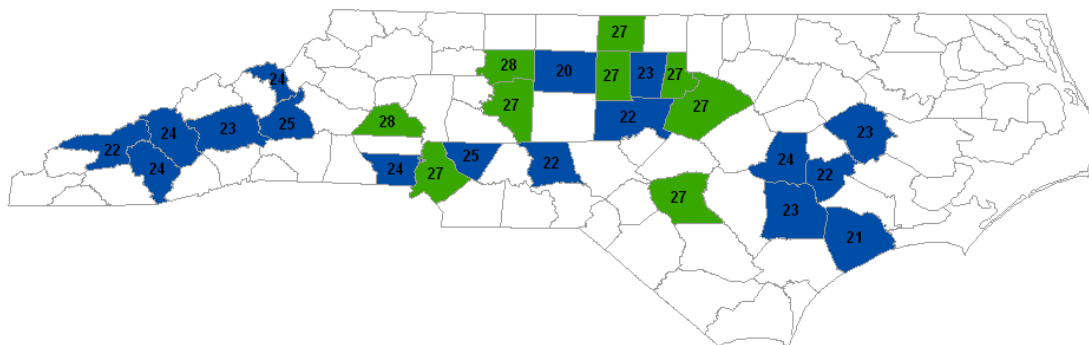
#### Legend

VISTA/ASIP Projection Annual PM2.5

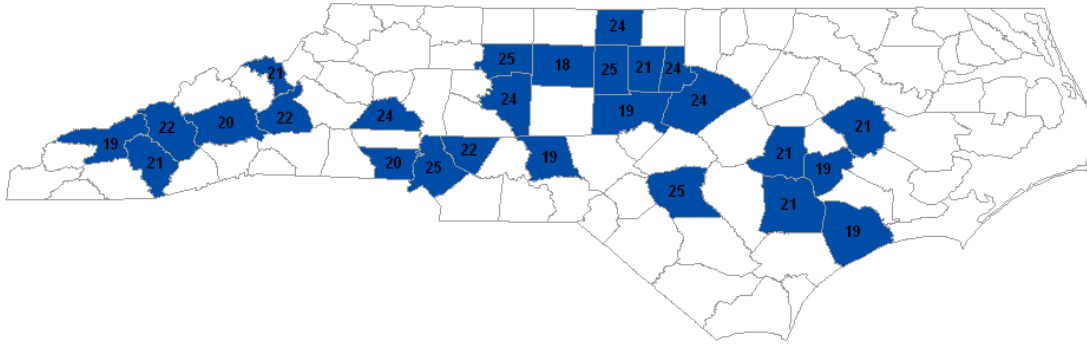
2018

- 8.67 - 11.50
- 11.51 - 13.50
- 13.51 - 14.50
- 14.51 - 15.00
- 15.01 - 15.50
- 15.51 - 16.01

### VISTAS/ASIP 2009 Daily PM2.5 Future Design Values



### VISTAS/ASIP 2018 Daily PM2.5 Future Design Values



**Legend**  
**VISTAS/ASIP Modeling Projections**  
2018

- 18 - 25
- 26 - 28
- 29 - 30
- 31 - 32
- 33 - 35



## Appendix F: Rule Worksheet for North Carolina

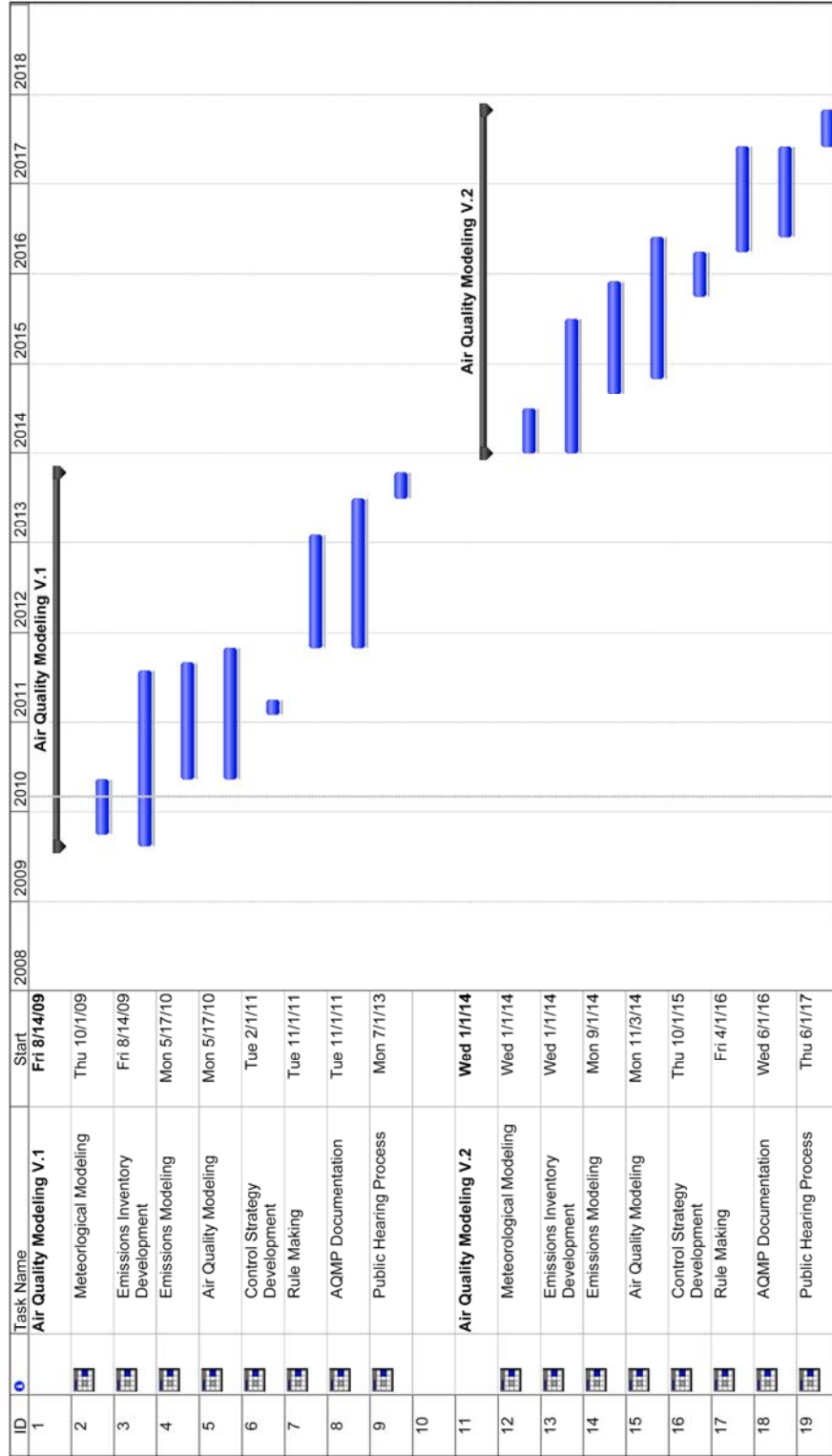
The purpose of this worksheet is to highlight and track steps required to carry a rule from concept to final rule status.

Present Rule Concept for Approval:	
	The rule concept is presented to the AQC for approval to proceed with formalizing a draft rule.
	Write the draft rule.
	Email internal draft rule to central office supervisors, regional air quality supervisors, permit coordinators, and compliance coordinators.
	Conduct stakeholders' meeting if appropriate.
	Post draft rule on <a href="http://daq.state.nc.us/rules/draft">http://daq.state.nc.us/rules/draft</a> .
	Email website link to Mike's update list.
	Email website link to all of DAQ.
Present the Draft Rule:	
	Present the draft rule to the AQC.
*	Note 1. Ideally this is done after the completion of the draft economic assessment and a summary table, which are included as part of the agenda item presenting the draft rule to the AQC for a vote. If the summary table is not included, put a short statement before the draft rule describing the rule change and purpose.
	Submit the 101 package (draft rule, 101 Form, statement of purpose, OSBM Fiscal Form, economic assessment, rule summary table, and occasionally a federal form [e.g., CAMR, BART]) to the Administrative Procedures Coordinator (APAC) to obtain signatures.
*	Note 2. Presentation of the draft rule to the AQC and submittal of the 101 package to the APAC are usually done about the same time.
*	<b>Note 3. The OSBM must review and approve the draft economic assessment prior to publication in the NC Register if State expenditures will increase due to the draft rule or the assessment concludes that the annual expenditures by all parties will be "substantial" (at least \$3,000,000 per 12 month period).</b>
*	Note 4. The APAC will submit the completed 101 package with a transmittal letter to the Governor's office at least 30 days prior to publication in the NC Register if the fiscal note concludes that local governments' expenditures or revenues will be impacted from rule adoption.
*	Note 5. The APAC will submit completed package with transmittal letter to the Department of Transportation at least 30 days prior to publication in the NC Register if the adoption of the rule by the EMC would result in an increase costs to DOT.
	Submit fiscal note package (draft rule, 101 Form, summary table, economic assessment, OSBM Fiscal Form) with transmittal letter when the 101 package is filed to: <ol style="list-style-type: none"> <li>1. League of Municipalities (Ann Watkins)</li> <li>2. Association of County Commissioner (Jim Blackburn)</li> <li>3. Fiscal Research (Kristin Walker).</li> </ol>
	Present the draft rule to the EMC with a request to take the rule to public hearing.
	Note 6. Presentation to the EMC normally occurs 30 days after approval by the AQC, unless the AQC requests a waiver of the 30 day requirement from the EMC.
Filing the Hearing Announcement in the North Carolina Register	
	Request a hearing officer assignment (Director requests the EMC Chairman to assign).
*	Note 7. Typically, staff finds an EMC member who agrees to be the hearing officer. Staff requests the Director to email the EMC Chairman to request the appoint the hearing officer.
	Establish the hearing officer's availability
	Arrange for hearing room assignments
	Send Notice of Text and Hearing Form along with copy of draft rule for APAC's signature.
*	Note 8. Each rule starts on a new page with the appropriate comment for filing with the NC Register
*	Note 9. If there are many pages, talk to APAC to see if Rule Development Branch should provide three hard copies of the draft rules.
	Prepare five newspaper transmittal letters, public notices, and the hearing officer's appointment letter for the Director's signature.

*	Note 10. Fax the newspaper letters with the public notice along with a promise to send an electronic copy of the public notice if requested (insures receipt of fax by newspaper as they will request it electronically).
*	Note 11. Public notice required 30 days prior to the hearing (USEPA requirement).
	Draft regional office transmittal letter with copy of rule and public notice.
	Remove the draft rule from <a href="http://daq.state.nc.us/draft">http://daq.state.nc.us/draft</a> and post a copy of the hearing notice and draft rule at <a href="http://daq.state.nc.us/rules/hearings/">http://daq.state.nc.us/rules/hearings/</a> .
	Draft USEPA transmittal letter for Director's signature with copy of public note and draft rule.
*	Note 12. Send USEPA package so they receive it at least 30 days before the hearing.
	Draft local program transmittal letters with copy of public note and draft rule for Mike's signature.
	Mail public notice with return card to people on the mailing list.
	Mail public notice, return card, and copy of draft rule to people on the paid list.
<b>Rule Hearing</b>	
	Arrange for staff, supplies, and transportation to hearing site.
	Assist the hearing officer with hearing comments.
<b>Assemble the Hearing Record</b>	
	Assemble the hearing record.
	Discuss the hearing record with the Director or Deputy Director.
	Send an electronic copy or a hard copy (hearing officer's preference).
	Discuss the hearing record with the hearing officer and modify as necessary.
	Place the hearing officer's report on the EMC agenda after the hearing officer approves the hearing record.
	Send the EMC Administrator (EMCA) an electronic copy of the hearing record.
*	Note 13. Ask EMCA for the agenda page numbering system to be used in the hearing record and then deliver the hearing record to her approximately 20 days prior to the next EMC meeting (for printing and mailing to EMC members). If there are less than 20 days before the next EMC meeting, the EMCA will provide shipping labels to Rule Development to send out CDs or hard copies of the hearing report to Commission members. If the hearing record is greater than 100 pages, discuss with EMCA what hearing record format she wishes to receive (electronic or hard copy).
<b>Hearing Officer Presents Hearing Record to the EMC</b>	
	Assist the hearing officer with hearing record presentation.
<b>Filing for the Code - Post EMC Rule Approval</b>	
	Submit permanent rule form and copy of each EMC adopted rule to the APAC.
*	Note 14. Submit forms (one for each rule) and rules to the APAC with the appropriate comment (e.g., code or with changes) before the 20th of the month that the EMC adopted the rule. Ask the APAC if she wants the forms and rules in electronic form or hard copies (original and four copies). The APAC signs the permanent rule form for the EMC Chairman. The APAC will submit the rules to the Rules Review Commission (RRC) for approval.
<b>Attend the RRC Meeting</b>	
*	Note 15. Rules approved by the RRC will be sent by RRC to OAH for publication in the NCAC.
*	Note 16. Rules with RRC recommended technical changes will be changed by DAQ and returned to the RRC before the formal RRC meeting.
*	Note 17. A rule objected to by the RRC will be reintroduced to the EMC by DAQ after modification to satisfy the RRC's objection. The EMC will approve or disapprove the modification. If approved, the rule will be returned to the RRC for final approval. The rule will be sent by RRC to OAH for publication in the NCAC. If the EMC disapproves the modification the rule dies.
<b>Post Rule Adoption Requirements</b>	
	Draft transmittal letters to the USEPA requesting approval of the rule as part of the SIP with five copies of the hearing record and rule. Include a copy of each of the five affidavits of printing the newspaper hearing announcement.
*	Note 18. Additionally, send appropriate transmittal letters to appropriate USEPA program administrators [e.g., Title V, HAP, etc.] other than the SIP Administrator along with a copy of the rule, affidavits of printing, and a copy of the hearing record.
	After RRC rule approval, remove the draft rule from <a href="http://daq.state.nc.us/hearing/">http://daq.state.nc.us/hearing/</a> and post a

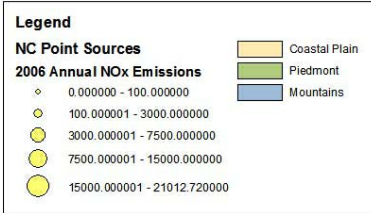
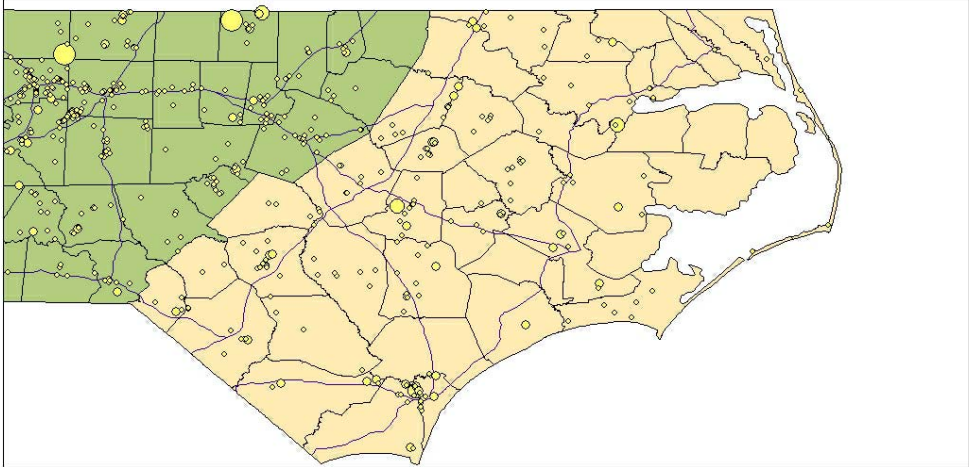
	copy of the final rule at <a href="http://daq.state.nc.us/rules/adopted/">http://daq.state.nc.us/rules/adopted/</a> .
	Mail copies of the rule to people who requested a copy at the rule (filled out the hearing card).
	Mail a rule copy to each local program.
	Mail four rule copies to the Office of the Attorney General.
	Mail two rule copies to the Small Business Office.
	Update the Rule Book.
	Place the original copy of the hearing record and supporting documents in with the permanent files.
	Save five copies of the hearing record in files for possible future use.
	Remove the rule from <a href="http://daq.state.nc.us/adopted">http://daq.state.nc.us/adopted</a> and post updated rule at <a href="http://daq.state.nc.us/rules/rules/">http://daq.state.nc.us/rules/rules/</a> .

### Appendix G – AQMP Timescale

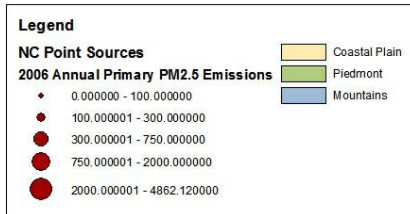
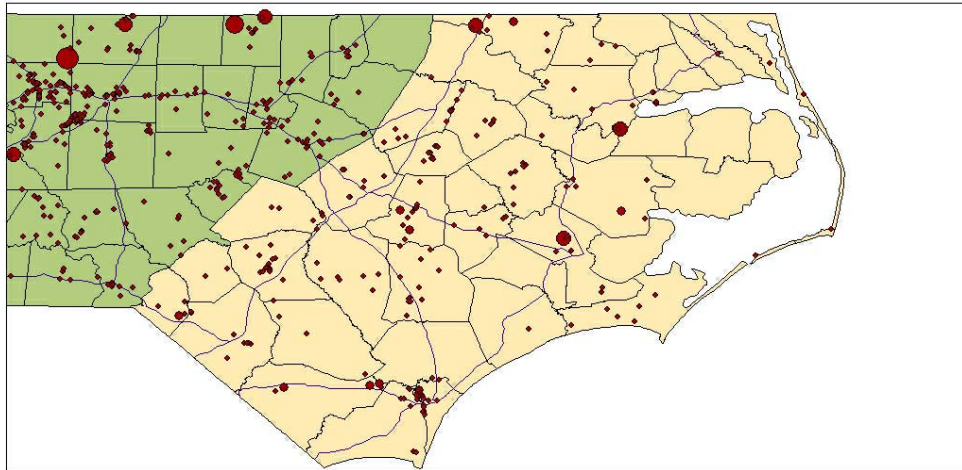


# Appendix H – Maps of Point Source Emissions and Highway Networks per Region Across NC

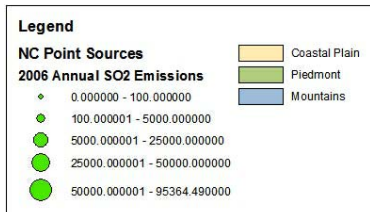
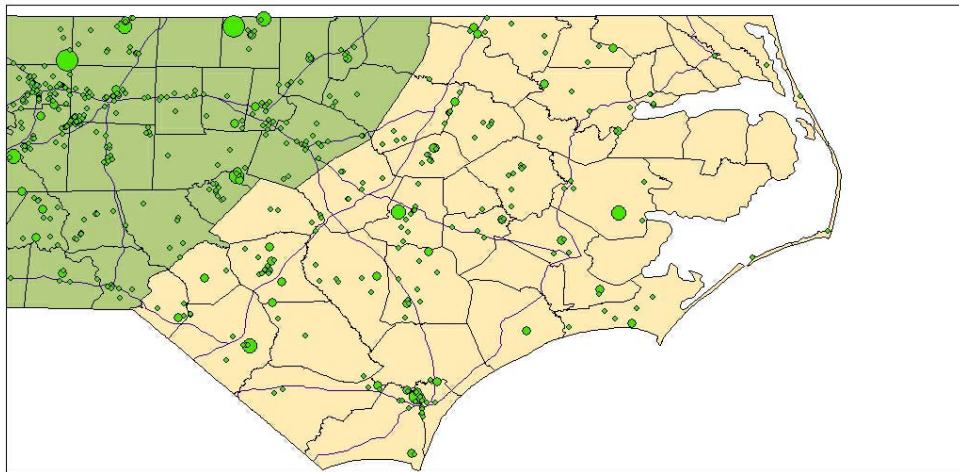
## Coastal Region 2006 Annual NOx Emissions



### Coastal Region 2006 Annual PM<sub>2.5</sub> Emissions

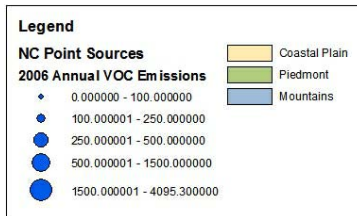
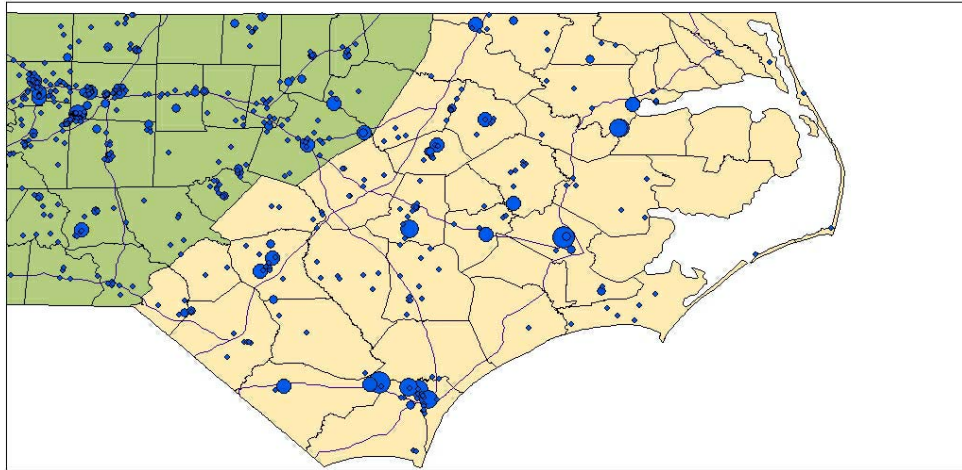


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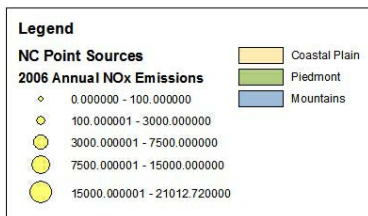
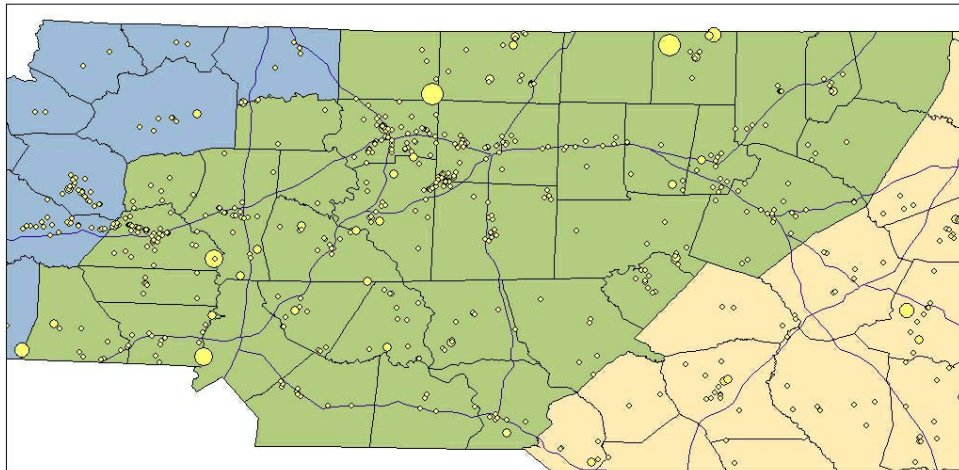




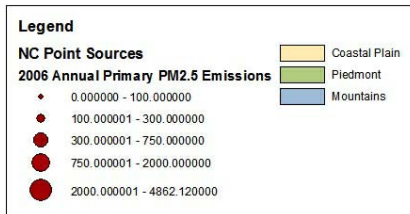
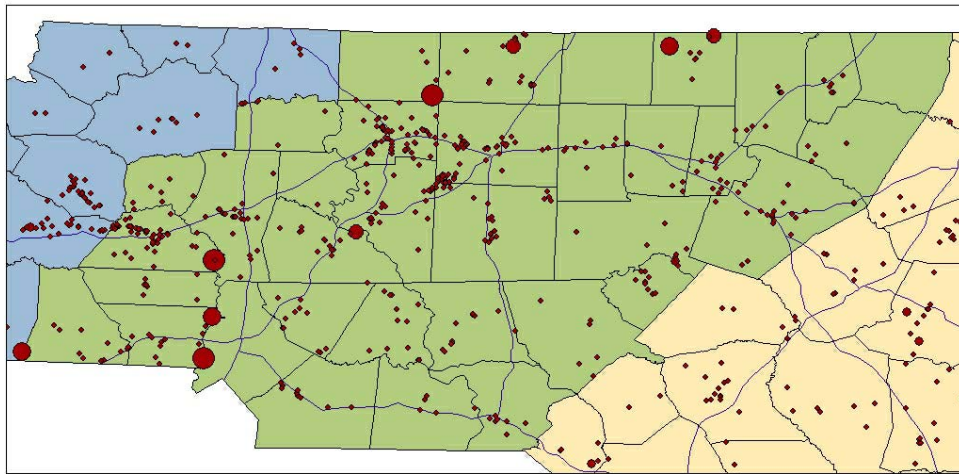
### Coastal Region 2006 Annual VOC Emissions



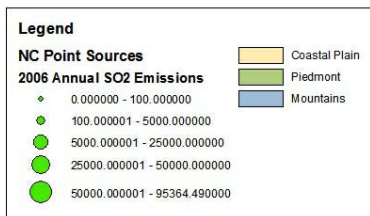
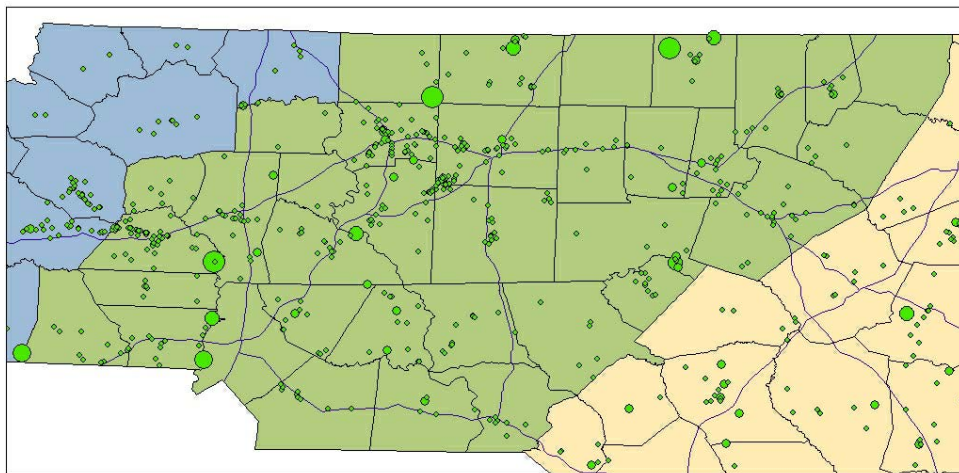
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### Piedmont Region 2006 Annual PM<sub>2.5</sub> Emissions

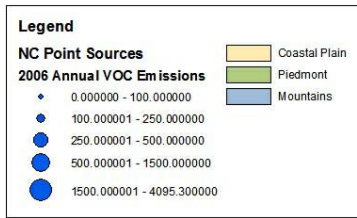
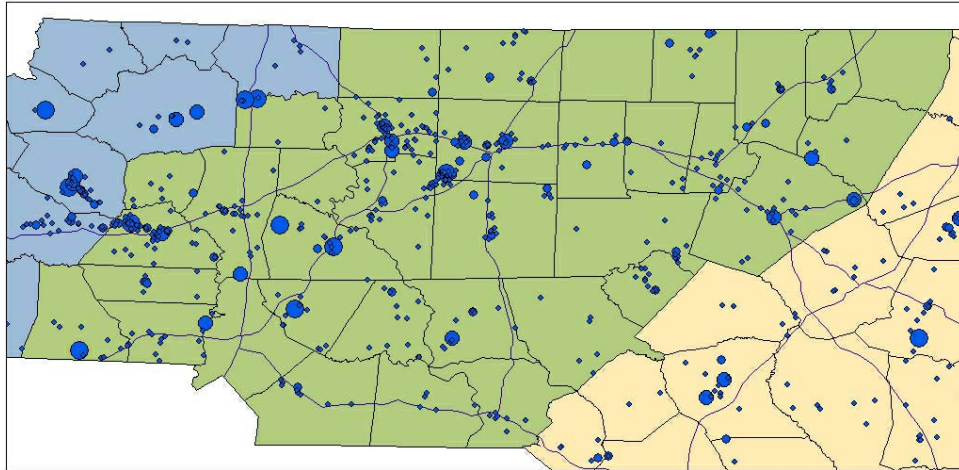


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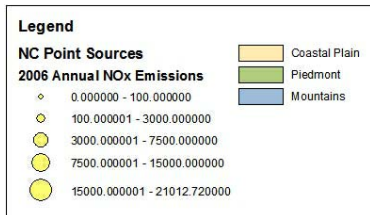
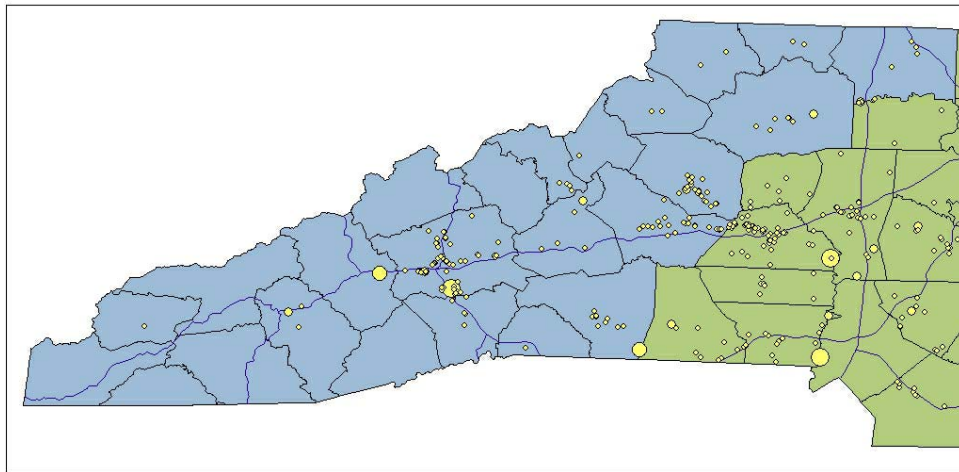




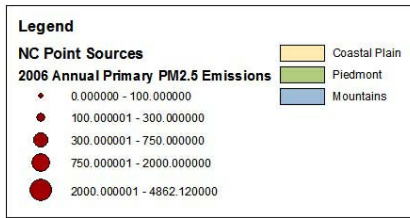
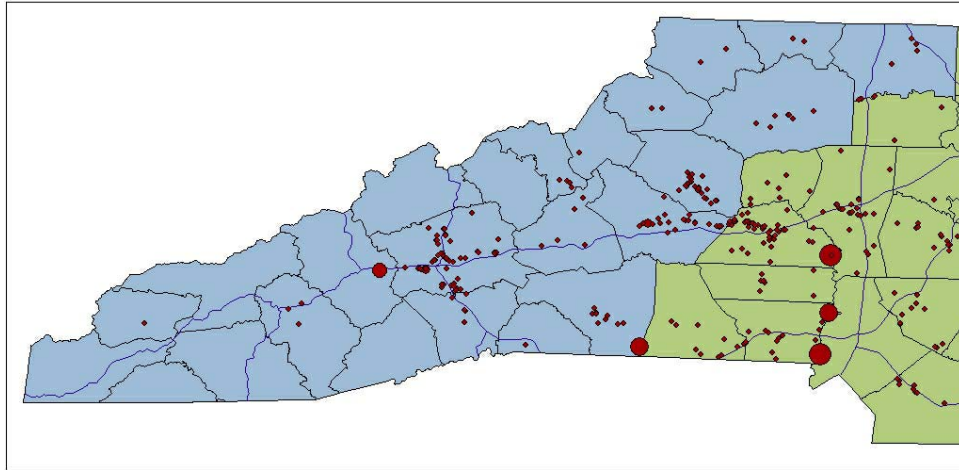
### Piedmont Region 2006 Annual VOC Emissions



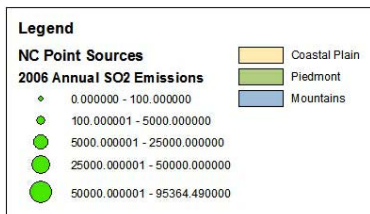
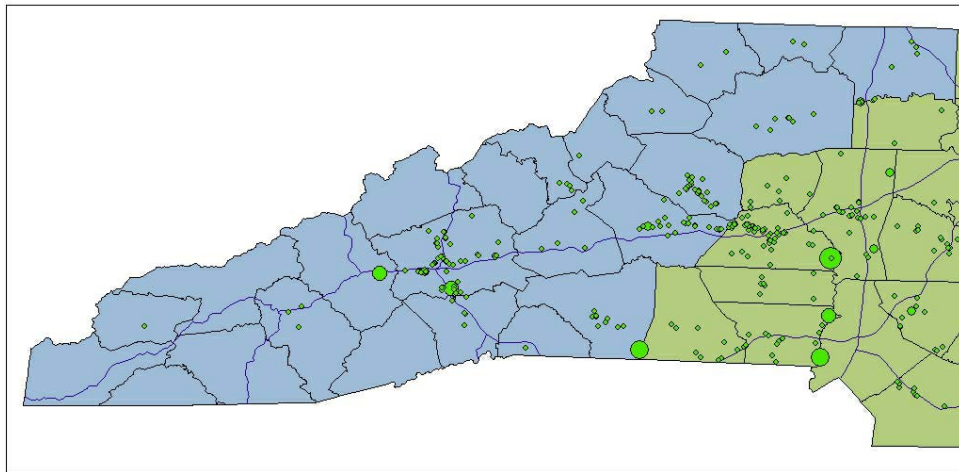
### Mountains Region 2006 Annual NOx Emissions



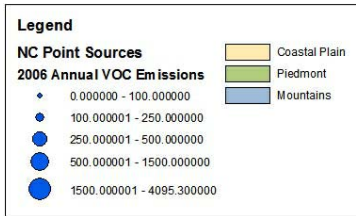
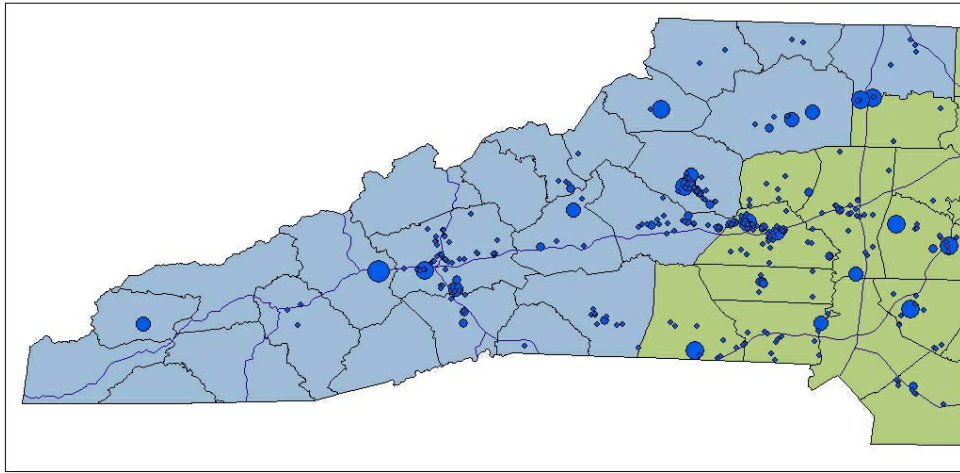
Mountains Region 2006 Annual PM<sub>2.5</sub> Emissions



Mountains Region 2006 Annual SO<sub>2</sub> Emissions

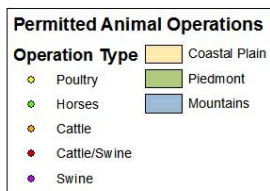
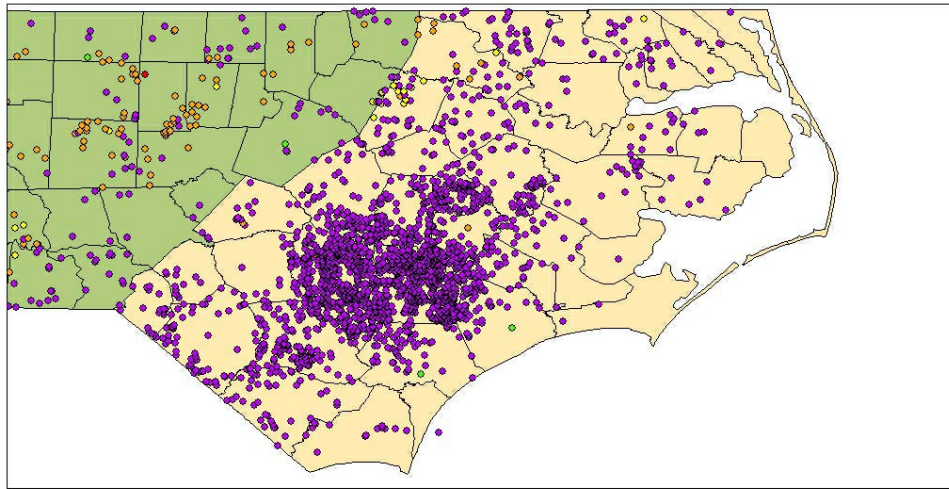


# Mountains Region 2006 Annual VOC Emissions

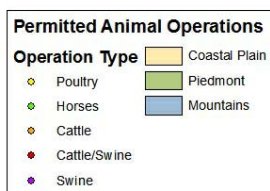
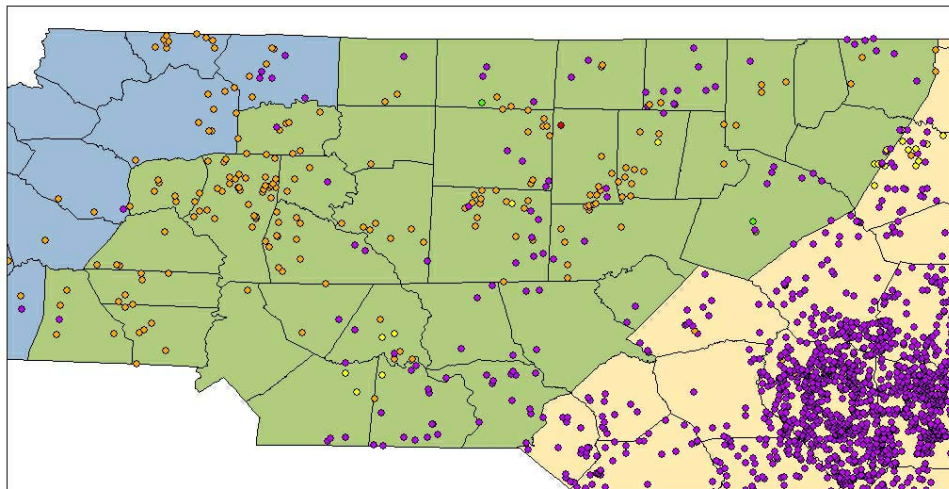


# Appendix I – Maps of Permitted Animal Operations per Region Across NC

## Coastal Region Permitted Animal Operations

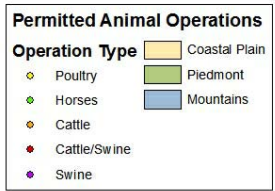
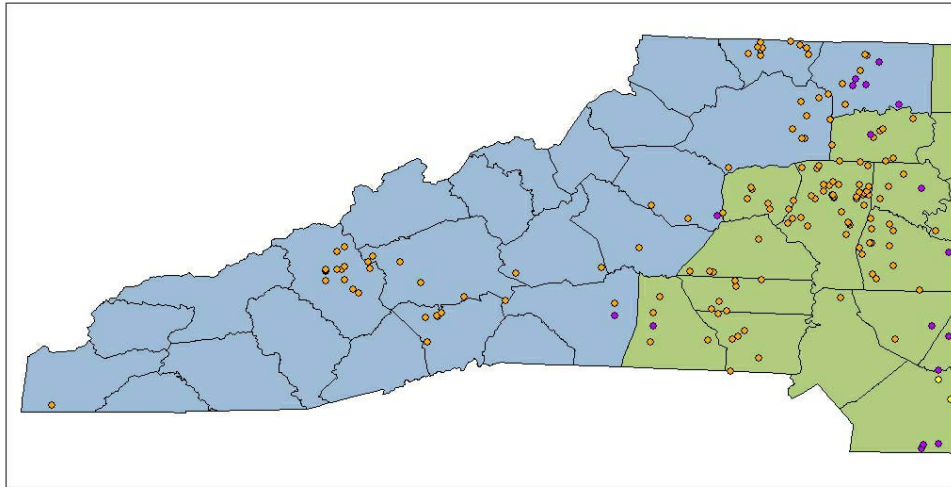


## Piedmont Region Permitted Animal Operations





### Mountains Region Permitted Animal Operations



## Appendix J – Climate Action Plan Advisory Group Recommendations

### Residential, Commercial and Industrial GHG Mitigation Options

	Mitigation Option Name	GHG Reductions (MMtCO <sub>2</sub> e)			Net Direct Cost (Million \$)	Cost-Effectiveness (\$/tCO <sub>2</sub> e)
		2010	2020	Total 2007–2020	2007–2020 (NPV)	
<b>Residential, Commercial, and Industrial (RCI)</b>						
RCI–1	Demand Side Management Programs for the RCI Sectors - Recommended Case: “Top-Ten States” EE Investment	1.9	11.6	77.1	–1,895	–25
RCI–2	Expand Energy Efficiency Funds	1.5	8.0	54.8	–1,346	–25
RCI–3	Energy Efficiency Requirements for Government Buildings	0.0	1.1	6.4	–88	–14
RCI–4	Market Transformation and Technology Development Programs	0.0	2.0	10.5	–339	–32
RCI–5	Improved Appliance and Equipment Efficiency Standards	0.0	1.0	5.3	–336	–63
RCI–6	Building Energy Codes	0.5	3.5	23.1	–400	–17
RCI–7	“Beyond Code” Building Design Incentives and Targets, Incorporating Local Building Materials and Advanced Construction	0.7	5.2	34.2	–494	–14
RCI–8	Education (Consumer, Primary/Secondary, Post-Secondary/Specialist, College and University Programs)	Not quantified				
RCI–9	Green Power Purchasing (required for state facilities) and Bulk Purchasing Programs for Energy Efficiency or Other Equipment	0.1	0.5	3.5	11	3
RCI–10	Distributed Renewable and Clean Fossil Fuel Power Generation	1.2	4.6	33.5	392	12
RCI–11	Residential, Commercial, and Industrial Energy and Emissions Technical Assistance and Recommended Measure Implementation	0.5	2.1	14.9	–494	–33
	<b>Sector Total After Adjusting for Overlaps</b>	<b>5.3</b>	<b>33.0</b>	<b>218.7</b>	<b>–3,994</b>	<b>–18</b>
	<b>Reductions From Recent Actions**</b>	<b>0.5</b>	<b>1.2</b>	<b>10.1</b>		

	Mitigation Option Name	GHG Reductions (MMtCO <sub>2</sub> e)			Net Direct Cost (Million \$)	Cost-Effectiveness (\$/tCO <sub>2</sub> e)
		2010	2020	Total 2007–2020	2007–2020 (NPV)	
<b>Residential, Commercial, and Industrial (RCI)</b>						
RCI-1	Demand Side Management Programs for the Residential, Commercial and Industrial Sectors	0.3	0.7	6.2		
RCI-2	Expand Energy Efficiency Funds	0.2	0.4	3.6		
RCI-6	Building Energy Codes	0.0	0.0	0.0		
RCI-9	Green Power Purchasing (required for state facilities) and Bulk Purchasing Programs for Energy Efficiency or Other Equipment	0.0	0.0	0.3		
	<b>Sector Total Plus Recent Actions</b>	<b>5.8</b>	<b>34.2</b>	<b>228.8</b>		

Energy GHG Mitigation Options

	Mitigation Option Name	GHG Reductions (MMtCO <sub>2</sub> e)			Net Direct Cost (Million \$)	Cost-Effectiveness (\$/tCO <sub>2</sub> e)
		2010	2020	Total 2007–2020	2007–2020 (NPV)	
<b>Energy Supply (ES)</b>						
ES-1	Renewable Energy Incentives	0.01	0.04	0.33	15	45.1
ES-2	Environmental Portfolio Standard					
ES-2a	Original Analysis	6.94	44.3	288.7	1,634	5.7
ES-2b	20% Combined Target	5.90	23.4	166.2	409.80	2.5
ES-2c	Load Growth Offset Target	5.53	22.3	160.3	393.95	2.5
ES-3	Removing Barriers to CHP and Clean DG	0.69	2.8	20.1	127.98	6.4
ES-4	CO <sub>2</sub> Tax and/or Cap-and-Trade					
ES-4a	Electric Sector Only	0.84	3.3	20.4	119	5.8
ES-4b	Economy-wide	1.84	7.1	47.7	284	6.0
ES-5	Legislative Changes to Address Environmental and Other factors	Not quantified				
ES-6	Incentives for Advanced Coal					
ES-6a	Replacement of New 800 MW Pulverized Coal Plant	0.00	3.9	31.0	949	30.6
ES-6b	Replacement of Existing 800 MW Pulverized Coal Plant	0.00	5.4	42.9	2,061	48.1
ES-7	Public Benefit Charge	0.8	3.4	24.4	329	13.5
ES-8	Waste to Energy	0.0	0.0	0.02	–0.7	–36.8
ES-9	Incentives for CHP and Clean DG	Combined with ES-3				
ES-10	NC GreenPower Renewable Resources Program	0.01	0.2	0.95	35	37.0
	<b>Sector Total After Adjusting for Overlaps*</b>	<b>6.5</b>	<b>62.7</b>	<b>375</b>	<b>–5.9</b>	<b>–0.016</b>
	<b>Reductions From Recent Actions (None)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<b>Sector Total Plus Recent Actions*</b>	<b>6.5</b>	<b>62.7</b>	<b>375</b>	<b>–5.9</b>	<b>–0.016</b>



Transportation and Land Use GHG Mitigation Options

	Mitigation Option Name	GHG Reductions (MMtCO <sub>2</sub> e)			Net Direct Cost (Million \$)	Cost-Effectiveness (\$/tCO <sub>2</sub> e)
		2010	2020	Total 2007–2020	2007–2020 (NPV)	
	<b>Transportation and Land Use (TLU)</b>					
TLU-1a	Land Development Planning	2.6	8.0	58.2	Net savings	
TLU-1b	Multi-Modal Transportation and Promotion (formerly TLU-2)	3.7	5.8	52.4	-1,300	-25
TLU-3a	Surcharges to Raise Revenue	1.2	2.2	15.7	-1,800	-117
TLU-3b	Rebates/ Feebates to Change Fleet Mix	0	< 0.5	2.8	Not quantified	-40 to +10
TLU-4	Truckstop Electrification	Included in TLU-8			Net savings	
TLU-5	Tailpipe GHG Standards	0	8.1	44.5	-1,150	-38
TLU-6	Biofuels Bundle	1.9	4.5	35.4	Not quantified	
TLU-7	Procure Efficient Fleets	Included in TLU-6				
TLU-8	Idle Reduction/Elimination Policies	0.1	0.2	2.2	-6	-4
TLU-9	Diesel Retrofits	0.3	2.2	13.5	Not quantified	
TLU-11	Pay-As-You Drive Insurance	2.3	5.3	42.0	Expected net savings	
TLU-12	Advanced Technology Incentives	Not quantified				
TLU-13	Buses – Clean Fuels	Included in TLU-6				
	<b>Sector Total After Adjusting For Overlaps</b>	<b>11.1</b>	<b>25.5</b>	<b>232.3</b>	<b>-4,350</b>	<b>-19</b>
	<b>Reductions From Recent Actions (None)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<b>Sector Total Plus Recent Actions</b>	<b>11.1</b>	<b>25.5</b>	<b>232.3</b>	<b>-4,350</b>	<b>-19</b>

US EPA ARCHIVE DOCUMENT

Agriculture, Forestry and Waste GHG Mitigation Options

	Mitigation Option Name	GHG Reductions (MMtCO <sub>2</sub> e)			Net Direct Cost (Million \$)	Cost-Effectiveness (\$/tCO <sub>2</sub> e)
		2010	2020	Total 2007–2020	2007–2020 (NPV)	
	<b>Agriculture, Forestry, and Waste (AFW)</b>					
AFW-1	Manure Digesters & Energy Utilization	0.2	0.9	6.4	199	32
AFW-2	Biodiesel Production (incentives for feedstocks and production plants)	0.2	0.8	5.1	286	56
AFW-3	Soil Carbon Management (including organic prod. methods incentives)	0.2	0.2	3.0	–16	–5
AFW-4a	Preservation of Working Land–Agricultural Land	0.2	0.3	2.6	290	114
AFW-4b	Preservation of Working Land–Forest Land (formerly AFW-7)	1.7	4.3	36	112	3
AFW-5	Agricultural Biomass Feedstocks for Electricity or Steam Production	0.009	0.02	0.2	10	54
AFW-6	Policies to Promote Ethanol Production	0.9	6.9	38	200	5
AFW-8	Afforestation and/or Restoration of Nonforested Lands	0.2	2.4	15	128	9
AFW-9&10	Expanded Use of Forest Biomass and Better Forest Management	1.5	5.9	48	–639	–13
AFW-11	Landfill Methane and Biogas Energy Programs	1.1	2.9	20	23	1
AFW-12	Increased Recycling Infrastructure and Collection	0.2	0.5	4.1	52	13
AFW-13	Urban Forestry Measures	1.4	4.3	34	–376	–11
	<b>Sector Total After Adjusting For Overlaps</b>	<b>7.9</b>	<b>29</b>	<b>213</b>	<b>270</b>	<b>1</b>
	<b>REDUCTIONS FROM RECENT ACTIONS (None)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<b>Sector Total Plus Recent Actions</b>	<b>7.9</b>	<b>29</b>	<b>213</b>	<b>270</b>	<b>1</b>

Cross Cutting GHG Mitigation Options

	Mitigation Option Name	GHG Reductions (MMtCO <sub>2</sub> e)			Net Direct Cost (Million \$)	Cost-Effectiveness (\$/tCO <sub>2</sub> e)
		2010	2020	Total 2007–2020	2007–2020 (NPV)	
	<b>Cross-Cutting Issues (CC)</b>					
CC-1	GHG Inventories and Forecasts	<i>Not quantified</i>				
CC-2	GHG Reporting	<i>Not quantified</i>				
CC-3	GHG Registry	<i>Not quantified</i>				
CC-4	Public Education and Outreach	<i>Not quantified</i>				
CC-5	Adaptation	<i>Not quantified</i>				
CC-6	Options for Goals or Targets (for CAPAG in support of LCGCC)	<i>Not quantified</i>				

## Appendix K – USEPA AQMP Framework Crosswalk

<u>USEPA AQMP Framework</u>	<u>North Carolina AQMP</u>
Executive Summary	Lay of the Land
Overview	Lay of the Land
Air Quality Requirements and Goals	Conceptual Model
Air Quality, Health and Ecosystem Challenges	Conceptual Model
Air Emissions Assessment	Lay of the Land/Conceptual Model
Strategy for Managing Emissions and from New and Existing Sources	Control Strategy
Future Air Quality	Conceptual Model
Implementation	Control Evaluation Strategy/ Communication Strategy
Evaluation	Control Evaluation Strategy
Looking Beyond Current Requirements	Conceptual Model

## Appendix L – North Carolina Air Quality Multi-pollutant Plan Documentation Outline

- 1.0 Introduction
  - 1.1 What is an AQMP
  - 1.2 Air Quality Issues of Concern
    - 1.2.1 NAAQS
    - 1.2.2 Regional Haze
    - 1.2.3 Air Toxics
    - 1.2.4 Climate Change
    - 1.2.5 Ecosystem
  - 1.3 Nature of the Situation in NC
    - 1.3.1 Emissions Inventory Trends/Pie Charts
    - 1.3.2 Current Ambient Levels
    - 1.3.3 Nonattainment areas
    - 1.3.4 Class I areas' Glidepaths & Reasonable Progress Goals
  - 1.4 Monitoring Network Description
  - 1.5 Stakeholder Consultation Process
- 2.0 Regulatory Framework
  - 2.1 Rule Making Process
  - 2.2 Permitting Process
  - 2.3 Clean Air Act Requirements
  - 2.4 State Only Regulations
  - 2.5 Legislative Actions
- 3.0 Control Strategy Pathways and Options
  - 3.1 Electric Generating Sources
  - 3.2 Industrial Sources
  - 3.3 Area Sources
  - 3.4 Highway Mobile Sources
  - 3.5 Off-Road Mobile Sources
- 4.0 Technical Evaluation
  - 4.1 Addressed through Regional Modeling
  - 4.2 Carbon Monoxide
  - 4.3 Lead
  - 4.4 Greenhouse Gases
  - 4.5 Air Toxics
  - 4.6 Uncertainties and Variability
- 5.0 Evaluation Results
  - 5.1 Ozone
    - 5.1.1 Introduction
    - 5.1.2 Current Air Quality
    - 5.1.3 Modeling Results
    - 5.1.4 Clean Air Act Requirements
    - 5.1.5 Motor Vehicle Emission Budgets
  - 5.2 Fine Particulate Matter

- 5.2.1 Introduction
- 5.2.2 Current Air Quality
- 5.2.3 Modeling Results
- 5.2.4 Clean Air Act Requirements
- 5.2.5 Motor Vehicle Emission Budgets
- 5.3 Sulfur Dioxide
  - 5.3.1 Introduction
  - 5.3.2 Current Air Quality
  - 5.3.3 Modeling Results
  - 5.3.4 Clean Air Act Requirements
- 5.4 Nitrogen Dioxide
  - 5.4.1 Introduction
  - 5.4.2 Current Air Quality
  - 5.4.3 Modeling Results
  - 5.4.4 Clean Air Act Requirements
  - 5.4.5 Motor Vehicle Emission Budgets
- 5.5 Carbon Monoxide
  - 5.5.1 Introduction
  - 5.5.2 Current Air Quality
  - 5.5.3 Clean Air Act Requirements
  - 5.5.4 Motor Vehicle Emission Budgets
- 5.6 Lead
  - 5.6.1 Introduction
  - 5.6.2 Current Air Quality
  - 5.6.3 Clean Air Act Requirements
- 5.7 Regional Haze
  - 5.7.1 Introduction
  - 5.7.2 Current Visibility
  - 5.7.3 Source Contributions to Visibility
  - 5.7.4 Reasonable Progress Assessment
  - 5.7.5 Modeling Results
  - 5.7.6 Long-Term Strategy
  - 5.7.7 Reasonable Progress Goals
- 5.8 Greenhouse Gases
  - 5.8.1 Introduction
  - 5.8.2 Emissions Inventory – Base Year and Future Years
    - Source/Sector Contributions to Emissions
    - Examination of co-benefits and dis-benefits of non-greenhouse gases
  - 5.8.3 Emerging Issues
    - Black Carbon
  - 5.8.4 Mitigation
    - Clean Air Act Requirement/Federal Legislation
    - Reduction Mandates
    - Voluntary Actions
  - 5.8.5 Adaptation
    - Anticipated Impact
    - Sector Specific Response
- 5.9 Air Toxics
  - 5.9.1 Introduction
  - 5.9.2 Ambient Air Monitoring Results—Urban Air Toxics

- 5.9.3 Future EPA MACT/ GACT/ Residual Risk Rules Requirements
- 5.9.4 NC State Rules Requirements / Control Measures Applied
- 5.9.5 Emission Inventory Results and Trends
  - Stationary Sources
  - Mobile Sources
- 5.9.6 Risk Assessment (Model)
  - Toxic/Hazardous Air Pollutants
  - Community/Areas
  - Industries / Sources
- 5.9.7 Reasonable Progress Assessment
  - Toxic/Hazardous Air Pollutants
  - Community/Areas
  - Industries / Sources
  - Emerging Alternative / BioFuels

6.0 Commonality/Synergy Analysis Between Criteria and Toxic Pollutant Issues

- 6.1 Community/Areas
- 6.2 Industries / Sources
- 6.3 (NC State Rules) Requirements for Alternative /Bio Fuels
- 6.4 Health Effects / Visibility Benefits

7.0 Chemical Accidental Release Program (112(r))

- 7.1 Technical Hazards
- 7.2 Toxics of Most Concern
- 7.3 Emission Density Plots or Population Exposure Plots

8.0 Ecosystem Health

- 8.1 Acid Deposition
- 8.2 Nitrogen Deposition
- 8.3 Mercury Deposition

9.0 Education and Outreach

10.0 Next Steps

- 10.1 Emerging Issues
  - 10.1.1 What is happening now that will be reviewed next plan
  - 10.1.2 Temperature rise impacts on air quality
  - 10.1.3 Emergence of Alternative and Bio-Fuels
- 10.2 Lessons Learned
- 10.3 Periodic Update Schedule

## Appendix M – Stakeholders Comments

*P. Phillips*

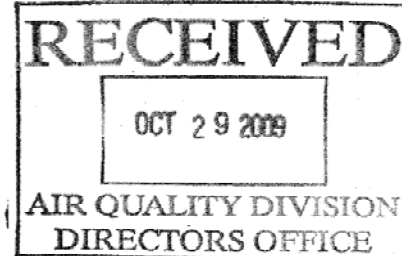


October 28, 2009

Ms. Sheila Holman, Deputy Director  
North Carolina Division of Air Quality  
1641 Mail Service Center  
Raleigh, NC 27699

Dear Ms. Holman:

*Sheila*



Centralina Council of Governments staff appreciate the opportunity to comment on the Air Quality Management Plan documents being prepared by the Division of Air Quality as part of the US EPA's pilot project.

We commend the staff for developing a series of extremely well-thought-out documents and processes, and are particularly supportive of several aspects of this process. In particular:

- The concept of multiple-pollutant planning supports both the identification of effective multiple-pollutant control strategies and potential unintended consequences.
- It is heavily stakeholder-oriented, and offers the potential to engage many more organizations, particularly community groups, in air quality improvement.
- It provides the potential for a higher profile for dangerous pollutants, particularly toxics, that have skated "under the radar" in the media, compared to the attention that ground-level ozone receives. This higher profile should encourage additional action.
- It offers a structured process and approach to considering control strategies across multiple pollutants, as noted above. This is particularly important when all sectors—public, private, and non-profit—are concerned with cost-effectiveness and getting the best return on investments.
- This approach also has the potential for producing greater emissions reductions through more strategic actions.
- It offers a way to consider climate change and greenhouse gas control strategies in an integrated manner.
- It provides better "background" and technical support statewide, which is especially important as EPA begins reconsideration of standards for a number of criteria pollutants.

We understand that the AQMP is not a replacement for the SIP, or for the transportation conformity process. That reduces many of the concerns that we have about a statewide AQMP. However, we would want to make very sure that nothing in the AQMP, either its outputs or the process, links non-attainment areas in any way such that problems in one area would impact other areas. This caveat holds for both SIP and transportation conformity processes.

We also understand that one goal of the AQMP is to create better "rolling" updates of modeling results, and to avoid the ongoing "crisis approach" to developing multiple individual-pollutant SIPs. There is no question that this would be a very desirable outcome. However, close consultation with transportation partners who provide modeling inputs will be needed to make this a reality. This process should truly be "effective streamlining" without additional workloads on local governments who are also resource-strapped. It is very important that the AQMP process in no way make transportation conformity harder, riskier, or more costly—because the connection between the conformity process in itself and emissions reductions is somewhat nebulous. Streamlining this process could permit limited resources to be shifted to measures that actually do reduce pollution.



Ms. Shelia Holman, Deputy Director  
North Carolina Division of Air Quality  
Page 2

We would also note that many of the pollutants being considered in an AQMP behave differently and may need to be planned for differently, particularly in terms of their geography. Perhaps the AQMP approach will encourage more local engagement around those pollutants that have more local impacts, such as many toxics. This would be a positive development, because it would engage local people in addressing a local issue and create a greater sense of ownership.

As a stakeholder in this process, we appreciate the opportunity to comment, and look forward with working with NCDQA for successful implementation that improves air quality statewide.

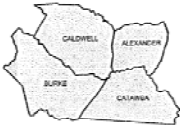
Sincerely,



A. R. Sharp  
Executive Director

cc: CCOG Executive Board  
Rebecca Yarbrough, Assistant Director

Midtown Plaza Building - 1300 Baxter Street, Suite 450  
PO Box 35008, Charlotte, North Carolina 28235  
Phone: 704-372-2416 Fax: 704-347-4710  
[www.centralina.org](http://www.centralina.org)



**UNIFOUR AIR QUALITY COMMITTEE**  
 736 4<sup>th</sup> Street SW, PO Box 9026  
 Hickory, NC 28603  
 (828) 322-9191 \* (828) 322-5991 fax



Phyllis D. Jones, EIT, Environmental Engineer  
 NC DENR, Division of Air Quality  
 Planning Section, Attainment Planning Branch  
 Area Sources Team Leader  
 1641 Mail Service Center  
 Raleigh, NC 27699-1641

Subject: Unifour Air Quality Oversight Committee (UAQOC) comments on air quality multi-pollutant (AQMP) process

Dear Ms. Jones:

I am writing on behalf of the Unifour Air Quality Oversight Committee and the Unifour Air Quality Committee (UAQC), representing the Hickory-Morganton-Lenoir areas in North Carolina (also known as the Unifour Area). We appreciate the extension of the public comment period as well as the information provided during the Stakeholder Meeting held on Wednesday, October 7<sup>th</sup>. We hope that the Division of Air Quality (DAQ) will continue to update us as you make progress in finalizing the AQMP process.

The UAQC has been committed to improving air quality in the region through a multitude of various strategies, and has benefitted from cooperation with DAQ in the past. As you know, the Early Action Compact (EAC) process has been beneficial and a key reason why our ozone and PM2.5 levels have improved. The EAC has been recognized by EPA for its success, and it has also provided a means to the public and private sectors to be engaged in the air quality planning process. We hope that progressive methods such as the EAC can have a place in the AQMP.

The UAQC also believe that public involvement is important, and that it is a key element in the process. If at any point you would like to use our staff or meeting facility during the public involvement stage please let us know.

In closing, please let us know if we can offer any assistance as you go through the rule making process.

Sincerely,

Kitty Barnes, Chair  
 UAQOC

Serving the Air Quality needs of **Alexander County** • Taylorsville • **Burke County** • Connelly Springs • Drexel • Glen Alpine • Hildebran • Morganton • Rutherford College • Valdese • **Caldwell County** • Cahaj's Mountain • Cedar Rock • Gamewell • Granite Falls • Hudson • Lenoir • Rhodhiss • Sawmills • **Catawba County** • Brookford • Catawba • Claremont • Conover • Hickory • Long View • Maiden • Newton

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US EPA ARCHIVE DOCUMENT

29 October 2009

Ms. Phyllis D. Jones  
Division of Air Quality  
1741 Mail Service Center  
Raleigh, NC 27699-1641

Subject: Air Quality Management Plan

Dear Ms. Jones,

I am pleased to submit the following comments on the proposed Air Quality Management Plan (AQMP) on behalf of the members of the Manufacturing and Chemical Industry Council of North Carolina (MCIC). MCIC appreciates the Division's extension of the original comment period and the informative briefing that was hosted by DAQ on October 7<sup>th</sup>.

MCIC shares the Division's position belief that a multi-pollutant air quality management planning process has considerable merit. However, we have several concerns related to the Division's ability to implement such a plan. Our specific concerns are summarized below.

#### **Clean Air Act Amendments Required**

As the Division staff noted during the October 7 briefing, in order for the Division and EPA to fully implement a multi-pollutant AQMP, the Clean Air Act will need to be amended. We believe that there is little desire in Congress or in the Obama administration to undertake such amendments in the near term. Thus, even if the Division of Air Quality and EPA reach agreement on a AQMP process, implementation of the AQMP process will be frustrated by the plain language of the Clean Air Act.

#### **Lack of Funding Commitment by EPA**

Although EPA has solicited proposals from state and local programs concerning the AQMP and has selected three (3) entities to participate in what has been described as a "pilot" program, North Carolina has not received any funding support to prepare the documents required by the EPA pilot program. Neither has EPA provided any firm commitment to waive or defer compliance timelines contained in the Clean Air Act. We believe that if EPA was serious about the AQMP, the agency should be willing to provide funding to the selected pilot agencies as well as a commitment to waive current schedules.

#### **Inefficient Use of Limited Resources**

MCIC is aware of the resource limitations under which DAQ operates. In fact, MCIC actively lobbied for an increase in Title V permit fees during the last legislative session in an effort to insure that DAQ had the resources necessary to fully implement its responsibilities. We are concerned that the AQMP will add additional financial burdens to the DAQ. As recently as the Fall CAPCA meeting last week, DAQ Director Keith Overcash acknowledged the agency's resource limitations. It would appear that development of the AQMP will have to be undertaken at the same time DAQ is working to comply with ozone and PM2.5 SIP development requirements resulting in unnecessary and unaffordable duplication of staff effort. We do not

feel that it is wise to expend limited resources on an AQMP that, due to constraints contained in the Clean Air Act, has little opportunity to ever be fully implemented. It would appear that a wiser course would be to seek and obtain the needed amendments to the Act before putting limited resources at risk.

If you have any questions concerning MCIC's comments, please feel free to call me (919-834-9459, ext. 31) at your convenience.

Sincerely,

A. Preston Howard, Jr., P.E.  
President

## Jones, Phyllis

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**From:** Frank H. Sheffield Jr. - 5507 [FHS@wardandsmith.com]  
**Sent:** Wednesday, September 16, 2009 5:24 PM  
**To:** Jones, Phyllis  
**Subject:** Comments on AQMP

**Categories:** AQMP

Ms. Jones, as someone who has been involved with air quality issues for the past 35 years in various capacities, including as a special assistant to the Governor of Texas during passage of the 1977 Clean Air Act Amendments, a project manager for Radian Corporation in helping EPA develop several NSPS rules (industrial boilers, refinery wastewater, residential woodstoves), as one of the original developers of the NC Air Toxics Program (Lee Daniel will remember), as legal counsel for major agricultural interests in NC involving animal operations, I believe this new initiative duplicates (or may simply continue) numerous past efforts undertaken over the past 35 + years to address these issues. I suppose the new element is Climate Change and the attempt to integrate Greenhouse Gas Emissions control into the planning effort.

The objective should be very simple: reduce air emissions of all types as much as possible and don't let up! Reduce as much and as fast as technologically and economically feasible.

While every major policy initiative these days seems to require formation of a stakeholder group, such groups are difficult to sustain and require a large amount of time and effort on the part of both staff and participants. I am pleased that someone younger than me is interested and able to embrace a new initiative such as this, but please understand that others have been working to clean our air for several decades and can be proud of what has been accomplished to date. If this project will continue that progress, that is commendable.

Best wishes for your new project.

Frank Sheffield



**Frank H. Sheffield Jr.**  
Attorney

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**Ward and Smith, P.A.**  
1001 College Court (28562) | Post Office Box 867  
New Bern, NC 28563-0867  
T: 252.672.5507 | F: 252.672.5477 | M: 252.671.5501  
[V-card | www.wardandsmith.com](http://www.wardandsmith.com)

## Jones, Phyllis

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**From:** JHSoutherland [jhsoutherland@bellsouth.net]  
**Sent:** Monday, August 24, 2009 5:51 PM  
**To:** Abraczinskas, Michael; Jones, Phyllis  
**Subject:** Re: AQMP Communication Strategy and Control Strategy Evaluation Process Documents  
**Attachments:** jhsoutherland.vcf

Looks like a good package. However, it leaves a few gaps to fill in with what exactly the stakeholders need to know (technically), how much time might be involved, any cost reimbursements, how many meetings, when, where, etc. What interfaces with legislative committees and other groups will there be etc. When will you be looking for stakeholders, over what time period and how will they be selected? When you get to that point, I might be interested - as a public citizen. I don't imagine that there will be a "swarm" of people knocking at the door to get in because it sounds like WORK.

JimS