I-95 Corridor Planning and Finance Study (T.I.P. Project I-5133)

Environmental Screening Findings Memorandum

Prepared for the North Carolina Department of Transportation

Prepared by Michael Baker Engineering, Inc.

8000 Regency Parkway, Suite 200

Cary, North Carolina 27518

Firm License Number F-1084

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1.0 INTRODUCTION AND BACKGROUND

The North Carolina Department of Transportation (NCDOT), in cooperation with the Federal Highway Administration (FHWA), has initiated the I-95 Corridor Planning and Finance Study (I-95 Study) to determine the required capacity, safety, and preservation requirements of the I-95 corridor from the South Carolina state line to the Virginia state line. Interstate 95 (I-95) crosses the eastern portion of North Carolina from Robeson County to Northampton County, a distance of approximately 186 miles (Figure 1). Overall, I-95 is one of the major transportation facilities on the east coast of the United States, serving such metropolitan areas as Miami, Washington, D.C., Baltimore, Philadelphia, New York, and Boston.

The I-95 Study is designed to develop the purpose and need for improvements to various parts of the I-95 corridor and to assist in the development and evaluation of alternatives in order to determine those to be advanced for further study pursuant to the National Environmental Policy Act (NEPA). It is anticipated that potential alternatives will include improvements within or immediately adjacent to the existing I-95 right of way. A myriad of financing strategies, including tolling, will also be evaluated as part of the study.

The purpose of this memorandum is to describe potential environmental constraints for use in the development of study alternatives (Figure 2). A screening-level evaluation was performed based on currently available geographic information system (GIS) information for land use, zoning, demographics, natural resources, cultural resources, and hazardous waste sites. Selected ground truthing was conducted to gauge the accuracy of the existing GIS information and identify potential problem areas. Intensive field surveys for natural resources and historic sites were not performed as part of this study; therefore, the screening may substantially over- or underestimate actual resources within the project area.

Based on the collected information, an environmental features map book was prepared (Appendix A). The types of environmental data collected and reviewed are summarized in Appendix B.

2.0 STUDY AREA BOUNDARIES

As shown in Figure 2, two study areas for the environmental screening activities were developed, one for the demographic study area and one for the natural and cultural resource study area:

- **Demographic Study Area** – 10 miles on either side of existing I-95
- **Natural and Cultural Resources Study Area** – one-half mile on either side of existing I-95

The reasoning behind the two study areas was that stakeholders who regularly use I-95 may live several miles away, but should be included in project outreach activities. In-place features such as endangered species, cultural resources, or noise receptors may impact potential construction alternatives, but those resources located further from the potential alternatives will not be directly impacted by the project. There is a slightly expanded natural resource study area for air quality that covers Sampson County, which is located just over a mile from the I-95 corridor.

3.0 AREA DEMOGRAPHICS

The demographic study area was evaluated using data from the 2000 US Census. Although 2005-2007 population estimates are available from the US Census Bureau for most cities and counties in the project area, they do not allow for in-depth analysis of English proficiency. There are 13 counties in the demographic study area (Bladen, Cumberland, Edgecombe, Halifax, Harnett, Hoke, Johnston, Nash, Northampton, Robeson, Sampson, Wayne, and Wilson). Based on Census data, these counties had a population of over 1 million people, which is almost 14 percent of North Carolina's population. Approximately 860,000 people live within 10 miles of the I-95 corridor.

3.1 Environmental Justice

For purposes of environmental justice, the US Department of Transportation (USDOT) defines "minority" as those persons identifying themselves as: Hispanic, Black or African American, American Indian and Alaska Native (AIAN), Native Hawaiian and other Pacific Islander (NHPI), and Asian. "Low income" is defined as persons with household income at or below the poverty guidelines established by the US Department of Health and Human Services. "Limited English Proficiency" (LEP) populations are defined as individuals who do not speak English as their primary language and who have a limited ability to read, speak, write, or understand English (FHWA, 1998).

Potential environmental justice populations were identified at the Census tract level and are summarized in Table 1. More detailed information is included in Appendix C. The analysis identified tracts where the minority population or low-income population is 10 percentage points or more higher than the respective county average or where the minority or low-income population is at least 50 percent (regardless of the county average). These criteria are referred to as the minority and low-income thresholds in the table below.

Table 1. Census Tracts with Potential Environmental Justice Issues

Census Tract	Minority Threshold Reached	Poverty Threshold Reached
Bladen County		
950200		
950300		
Cumberland County		
000100	X	X
000200	X	X
000400	X	X
000500		
000600		
000700		
000800		
000900		
001000	X	X
001100	X	
001200	X	X
001300	X	X

Census Tract	Minority Threshold Reached	Poverty Threshold Reached
001400		
001500		
001601		
001602		
001700		
001800		
001901		
001902		
001903		
002000		
002100		
002200	X	
002300	X	
002400	X	
002501	X	
002502		
002503		
002504		
002600		
002700		
002800		
002900		
003000		
003100		
003201		
003203	X	
003204	X	
003205	X	
003302	X	
003304	X	
003305	X	
003306	X	
003307	X	
003308	X	
003309	X	
003400		
003700		
Edgecombe County		
020100	X	X
020200	X	

Census Tract	Minority Threshold Reached	Poverty Threshold Reached
020300	X	
020400	X	X
020600	X	
020700	X	
021300		
021400		
Halifax County		
990100	X	
990200		
990300		
990400		
990500	X	
990600	X	
990700	X	
990800	X	
990900	X	
991000	X	
Harnett County		
070100		X
070200	X	X
070300		
070400		
070500		
070600	X	
070700	X	
070800		
070900		
Hoke County		
970100	X	
970400	X	
Johnston County		
040100		
040200		
040300	X	X
040400		
040500		
040600	X	X
040700	X	
040800		
040900		

Census Tract	Minority Threshold Reached	Poverty Threshold Reached
041000		
041100		
041200		
041300		
041400		
041500		
Nash County		
010100	X	X
010200	X	X
010300		
010400	X	X
010502		
010503		
010504		
010600		
010700	X	
010800		
010900	X	
011000		
011100		
011200		
011300		
011400		
011500		
Northampton County		
980300	X	
980400	X	
Robeson County		
960100	X	
960200	X	
960300	X	
960400	X	
960500	X	
960600	X	
960700	X	
960800	X	X
960900		
961000		
961100		
961200		

Census Tract	Minority Threshold Reached	Poverty Threshold Reached
961300		
961400		
961500		
961600		
961700	X	
961800	X	
961900	X	
962000	X	
Sampson County		
970200		
970300		
970400		
Wayne County		
000100		
000200		
000301		
001100		
Wilson County		
000100	X	X
000200	X	X
000300	X	
000400		
000500		
000600		
000700	X	X
000801	X	X
000802	X	
000900		
001000		
001200		
001300		
001400		
001500		
001600		
001700		

Potential environmental justice issues are summarized in Figure 3. Of the 158 census tracts in the demographic study area, 67 met the environmental justice threshold. This included 21 of the 49 census tracts in Cumberland County, 6 of the 8 in Edgecombe County, 7 of the 10 in Halifax County, 4 of the 9 in Harnett County, both of those in Hoke County, 3 of the 15 in Johnston County, 5 of the 17 in Nash

County, both of those in Northampton County, 12 of the 20 in Robeson County, and 6 of the 17 in Wilson County.

3.2 Limited English Proficiency

LEP was screened at the county level (Table 2). The analysis identified counties where the number of non-native English speakers who speak English less than "very well" reaches a threshold of either 5 percent of the county population or 1,000 individuals. These criteria are referred to as the LEP threshold in Table 2. The number of Spanish speakers who spoke English less than very well exceeded 1,000 individuals in 9 of the 13 counties in the demographic study area and exceeded 5 percent of the population in Johnston and Sampson Counties. In Cumberland County, there were also more than 1,000 people who spoke a language other than Spanish and spoke English less than very well. LEP for non-Spanish speakers of other Indo-European and Asian Pacific Island languages are summarized in Table 3. LEP information is also summarized in Figure 4.

Table 2. Limited English Proficiency in the Demographic Study Area

County	Total Persons 5 years and older	Total Spanish Speaking English Less Than Very Well (SELVW)	Total Non-Spanish SELVW	Percent of Spanish SELVW	Percent Non-Spanish SELVW	Total Spanish SELVW >1,000	Percent of Spanish SELVW >5%	Total Non-Spanish SELVW >1,000	Percent of Non-Spanish SELVW >5%
Bladen	30,051	736	61	2.45%	0.20%				
Cumberland	278,459	5,473	4,329	1.97%	1.55%	X		X	
Edgecombe	51,964	945	172	1.82%	0.33%				
Halifax	53,830	367	252	0.68%	0.47%				
Harnett	84,164	2,550	546	3.03%	0.65%	X			
Hoke	30,636	1,204	332	3.93%	1.08%	X			
Johnston	112,146	5,636	498	5.03%	0.44%	X	X		
Nash	81,664	1,695	438	2.08%	0.54%	X			
Northampton	20,838	105	113	0.50%	0.54%				
Robeson	113,682	3,308	790	2.91%	0.69%	X			
Sampson	55,708	3,282	269	5.89%	0.48%	X	X		
Wayne	105,621	3,032	647	2.87%	0.61%	X			
Wilson	68,861	3,336	291	4.84%	0.42%	X			

Note: in Cumberland County, the 1,000 person threshold for non-Spanish speakers who speak English less than "very well" is met for the following language groups: Other Indo-European and Asian and Pacific Island (see Table 3)

Table 3. Limited English Proficiency for Other Indo-European or Asian/Pacific Island Language Speakers in the Demographic Study Area

County	Total Speaking English Less Than Very Well (SELVW)		Percent SELVW		SELVW > 1,000 or 5%	
	Other Indo-European	Asian/Pacific Island	Other Indo-European	Asian/Pacific Island	Other Indo-European	Asian/Pacific Island
Bladen	27	14	0.09%	0.05%		
Cumberland	1,829	2,300	0.66%	0.83%	X	X
Edgecombe	101	61	0.19%	0.12%		
Halifax	71	155	0.13%	0.29%		
Harnett	314	226	0.37%	0.27%		
Hoke	134	173	0.44%	0.56%		
Johnston	291	129	0.26%	0.12%		
Nash	142	179	0.17%	0.22%		
Northampton	94	16	0.45%	0.08%		
Robeson	408	282	0.36%	0.25%		
Sampson	106	113	0.19%	0.20%		
Wayne	289	303	0.27%	0.29%		
Wilson	159	72	0.23%	0.10%		

Primary languages spoken for each county in the demographic study area are summarized in Appendix C. In all cases, English is the most common language spoken and Spanish/Spanish Creole is the second most common language spoken. In Cumberland County, there are substantial populations that speak German, Korean, French, and Vietnamese.

3.3 Planned Growth Areas

The long-range development plans for jurisdictions within the demographic study area were also reviewed. There are several areas along I-95 that are targeted as growth areas. Cumberland County identified growth areas that included the Towns of Falcon, Wade, and Godwin (Cumberland County, 2008). The Town of Rocky Mount identified two growth areas, a Planned Growth Area (PGA) and a Smart Growth Area (SGA). The Western SGA includes the I-95 corridor, as does the PGA (City of Rocky Mount, 2003). Growth is anticipated to take place in Fayetteville, Wilson, and Roanoke Rapids in the vicinity of I-95 (Cumberland County, 2008; Johnston County, 2009; Nash County, 2009). The Fort Bragg area in Cumberland County is expected to undergo a substantial expansion based on the latest round of Base Realignment and Closure (BRAC) Commission decisions (Cumberland County, 2008).

4.0 CULTURAL AND RECREATIONAL RESOURCES

A cultural resources screening was performed as part of this study to identify sites within the natural resource study area that may be protected by Section 106 of the National Historic Preservation Act of 1966 (NHPA) and Section 4(f) of the Department of Transportation Act of 1966.

4.1 Regulatory Background

Section 106 requires federal agencies to take into account the effects of their undertakings on historic resources that are included in the National Register of Historic Places (NRHP) or that meet the criteria for the NRHP:

- Criterion A - associated with events that have made a significant contribution to the broad patterns of history; or
- Criterion B - associated with the lives of persons significant in our past; or
- Criterion C - embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D - have yielded or may be likely to yield, information important in prehistory or history.

The federal agency, in consultation with the state historic preservation office, makes an assessment of the effects of the project on the identified historic properties. The following determinations may be made: no effect, no adverse effect, or adverse effect.

Section 4(f) of the Department of Transportation Act of 1966 provides additional protection for listed or eligible historic resources. These lands can only be used for a federally-funded transportation project if there is no other feasible and prudent alternative, and the project incorporates all possible planning to minimize harm.

Where adverse effects to Section 106 and Section 4(f) resources are unavoidable, both Section 106 and Section 4(f) require minimization and mitigation of these effects.

4.2 Existing NRHP Listed Sites

There are seven sites in the natural resource study area currently listed in the NRHP. These sites are listed in Table 4 and shown in the environmental features map book in Appendix A. Of the listed sites, the Garner Farm Site (Map Sheet 80) is located in the immediate vicinity of I-95.

Table 4. NRHP Listed Sites in the Natural Resource Study Area

Site Name	Map Sheet(s)	County	Description	Year Listed
Alfred Rowland House	10	Robeson	Ca. 1880 2-story frame Greek Revival/Italianate w/2-story porch	2008
Benson Historic District	37	Johnston	Late 19th /early 20th century commercial district	1985
Four Oaks Historic District	41	Johnston	Early 20th century railroad town	2006
Union Station	46	Johnston	1924 1-story brick building	1982
Dortch House	66	Nash	Ca. 1810 federal 2-story frame house	1972
Garner Farm	80	Halifax	Ca. 1900 2-story frame house & outbuilding	1990
Roanoke Canal	81-82	Northampton	1819-1904 canal around rapids of the Roanoke River	1976

4.3 Screening Methodology and Results

Baker prepared base mapping for the NCDOT Human Environment Unit (HEU) to use in performing "windshield surveys" of additional cultural resources within one mile of the I-95 corridor (i.e., sites potentially eligible for, but not currently listed in, the NRHP). HEU staff performed these surveys in December 2009. The determination of potential sites was based on visual observation and best professional judgment from experience working with the state historic preservation office.

HEU staff located 102 sites that warrant further investigation if they are located within the area of potential effects (APE) of any proposed improvements to the I-95 corridor. The results of the screening are shown in the environmental features map book in Appendix A .

4.4 Section 4(f) and Section 6(f) Recreational Resources

Section 4(f) of the Department of Transportation Act of 1966 also protects publicly owned parks, recreation areas, and wildlife/waterfowl refuges. In addition, Section 6(f) of the Land and Water Conservation Fund (LWCF) Act (Public Law 88-578) requires that recreation land acquired or developed with assistance under this section remain in use exclusively for public outdoor recreation.

Baker contacted counties and cities in the project study area to determine potential Section 4(f) and Section 6(f) recreational resources within project APE. A total of 19 parks and recreational facilities were identified based on the information provided: 12 in Robeson County, 3 each in Johnston and Harnett Counties, and 1 in Halifax County. Based on a review of the LWCF database (http://waso-lwcf.ncrc.nps.gov/public/index.cfm), Chockoyotte Park in Halifax County and C.D. Codrington Park in Harnett County have received LWCF funding and are Section 6(f) resources. All parks are shown in the environmental features map book in Appendix A.

5.0 VOLUNTARY AGRICULTURAL DISTRICTS

In North Carolina, Voluntary Agricultural Districts (VADs) are established through county ordinances to promote the preservation and protection of farmland. Within the project study area, there are currently VAD ordinances in Cumberland, Harnett, Johnston, Wilson, and Northampton Counties. A VAD ordinance has just been passed in Nash County, but as of March 2010 no districts had been approved. Based on input from county planning organizations and local agricultural extension offices, there are several VADs located within a half mile of I-95. This includes one district in Cumberland County, three each in Harnett and Northampton Counties, four in Johnston County, and two in Wilson County. These resources are shown in the environmental features map book in Appendix A.

If future improvements to I-95 necessitate the condemnation of lands in VADs, there are public hearing requirements that must be met prior to any acquisition of right of way. Public hearing requirements for each county are summarized below.

In Cumberland County, "no state or local public agency or governmental unit may formally initiate any action to condemn any interest in qualifying farmland within a District until such agency or unit has requested the Farm Advisory Board hold a public hearing on the proposed condemnation." Upon the receipt of a notice of proposed condemnation, the Farm Advisory Board directs the Cooperative Extension Director to publish a notice in a Cumberland County general circulation newspaper within five business days. The notice will describe the action and inform area residents that the Farm Advisory

Board will hold a public meeting on the request within ten days of the receipt of the notice. The Farm Advisory Board will make a report on their findings available to the public within five days of the public hearing, which will be followed by a ten-day public comment period. After the public comment period has expired, the Farm Advisory Board will publish a final report on the condemnation request within 30 days of the initial request. "No state or local agency may formally initiate a condemnation action while the proposed condemnation is properly before the Farm Advisory Board within these time limits."

Harnett County and Wilson County use the same timelines for condemnation requests that Cumberland County uses: public notice within five business days, hearing within ten business days, five days for report findings, and ten day public comment period prior to finalizing the report. In these counties, the final report on the condemnation request will be issued within thirty days of the initial request.

In Johnston County, the Farm Advisory Board has 30 days from the public hearing to develop its report, and the public then has a 10-day public comment period. The total amount of time allowed from the receipt of the condemnation request to the publication of the final report to the rulemaking agency cannot exceed 60 days.

In Nash County, upon the receipt of a notice of proposed condemnation, the Farm Advisory Board directs the Cooperative Extension Director to publish a notice in a Cumberland County general circulation newspaper within 10 business days and the public hearing must be held within 15 business days. The Farm Advisory Board will make a report on their findings available to the public within five days of the public hearing, which will be followed by a ten-day public comment period. After the public comment period has expired, the Farm Advisory Board will publish a final report on the condemnation request within 45 days of the initial request. If the agency agrees to an extension, the agency and the Advisory Board shall mutually agree upon a schedule to be set forth in writing and made available to the public.

The December 4, 2006, Northampton Voluntary Agricultural District Ordinance has no public hearing requirements.

6.0 WATER RESOURCES

6.1 Stream and Wetland Evaluations

From south to north, the I-95 corridor passes through the Lumber, Cape Fear, Neuse, Tar-Pamlico, Roanoke, and Chowan River Basins. There are riparian buffer rules in place for the Neuse and Tar-Pamlico River Basins (NCDENR 1997 and 2005, respectively).

Baker conducted ground truthing to estimate the accuracy of the available wetland and stream data for the natural resource study area, primarily consisting of the National Wetlands Inventory (NWI) and 1:24,000 hydrographic data from the NCOneMap. This was accomplished through a "windshield survey" of wetlands and streams within and adjacent to the natural resource study area. The utility and limitations of these two data sources are recognized by the agencies regulating NCDOT activities with potential to impact wetland and stream resources [the U.S. Army Corps of Engineers (USACE) and the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ)].

While potentially useful for preliminary planning purposes, NWI-mapped wetland boundaries and mapped locations of stream channels are rarely accurate to within a meter of field-determined jurisdictional boundaries and can even be completely inaccurate or outdated. By completing a cursory field review of the readily-accessible resources mapped by NWI and hydrographic data, some confidence is gained in the accuracy of the location of these jurisdictional resources for the purposes of development of project alternatives, impact avoidance, and minimization planning. This ground truthing supplements the planning effort only and complete jurisdictional field determination and verification will be required to appropriately quantify project impacts per USACE and DWQ requirements. Selected ground truthing provided a qualitative estimate of the accuracy of the existing GIS and identified potential "problem areas" for the development of the design alternatives (e.g., large/unique wetland areas). Ground truthing of wetlands and streams was performed by Baker staff from November 16 through 19, 2009.

Using an environmental constraint map book, Baker staff reviewed natural resource "hot spots," including large wetland areas and streams shown within one-half mile on either side of I-95. The map book included GIS layers for hydric soils, NWI wetlands, Federal Emergency Management Agency (FEMA)-designated floodplains, and streams and other waterbodies projected on 2009 aerial photography. In general, the NWI and the hydrography layers appear to be reasonably accurate representations of current field conditions. No significant discrepancies were noted for about 30 percent of the 85 map pages. The inconsistencies noted in the mapping were predominantly:

1. Potentially-jurisdictional small ditches missing from the hydrographic data
2. Carolina Bays depicted as part of the hydrographic data layer are no longer apparent in areas converted to agricultural use.

General trends noted during the ground truthing were:

1. NWI-mapped wetlands depicted as forested and surrounded by agricultural land appear to retain jurisdictional status, even though some may be isolated (i.e., DWQ-jurisdictional).
2. Hydrographic data-mapped channels depicted as originating within lobes of hydric soil tend to be mapped further downstream than a field-determined jurisdictional origin.
3. Significant wetlands associated with large rivers and streams appear to be generally accurately mapped.

A GIS point shapefile was created to document the results of the ground truthing. This information is included in the environmental screening map book in Appendix A. The points note if the mapped NWI or hydrography layers are "*OK*," "Q*uestionable*," or "*In Need Of* M*odification"* as depicted.

6.2 Other Water Data

During the environmental screening, several additional data sets related to water quality were identified and are included in the environmental features map book (Appendix A). They include public water supply sources, surface water intakes, ambient water quality monitoring sites, benthic monitoring sites, wild and scenic rivers, water pipelines, water tank locations and National Pollutant Discharge and Elimination System (NPDES) permits. There is a NDPES facility (the Fayetteville Days Inn) shown in the immediate vicinity of I-95 on Map Sheet 26. A water tank is located in the immediate vicinity of I-95 on Map Sheet 84.

The Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271-1287) mandates that "[i]n all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas." The act establishes Wild Rivers as those which:

- Are free of impoundments (manmade dams)
- Have unpolluted waters
- Have watersheds or shorelines that are essentially primitive and undeveloped
- Are inaccessible except by trails.

Scenic Rivers meet the first three of the above criteria; however, they can be accessible by roadways. Through the natural resource study area, the Lumber River is listed for its cultural, fish, historic, scenic, and wildlife resources and is described as a "secluded blackwater stream with heavily forested cypress swamps; abundance of flora and fauna" (USDOI, 2009).

7.0 PROTECTED SPECIES

7.1 Threatened and Endangered Species

Some populations of plants and animals are declining because of either natural forces or their inability to compete for resources with the encroachment of humans. The North Carolina Natural Heritage Program (NHP) and the United States Fish and Wildlife Service (USFWS) lists of rare and protected animal and plant species contain 11 federally listed species known to exist in counties crossed by the natural resource study area (USFWS, 2009).

Legal protection for federally listed species, Threatened (T) or Endangered (E) status, is conferred by the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1534). This act makes illegal the killing, harming, harassing, or removing of any federally listed animal species from the wild; plants are similarly protected but only on federal lands. Section 7 of this act requires federal agencies to ensure that actions they fund or authorize do not jeopardize any federally listed species.

Organisms that are listed as Endangered (E), Threatened (T), or Federal Species of Concern (FSC) on the NHP list of Rare Plant and Animal Species are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979. The bald eagle (*Haliaeetus leucocephalus)* is protected by the Bald and Golden Eagle Protection Act of 1940 (as amended). There are nine federally listed Endangered species and one species listed as Threatened due to Similarity of Appearance (American Alligator). Federally protected species listed for counties in the natural resource study area are listed in Table 5. A brief description of the characteristics and habitat requirements of the federally protected species is included in Appendix D. Known populations of federally listed species within the natural resource study area are shown in the environmental features map book.

Table 5. Federally Protected Species in Counties within the I-95 Natural Resource Study Area

Scientific Name	Common Name	Federal Status	County(ies) Listed
Vertebrates			
Alligator mississippiensis	American Alligator	T/SA	Robeson, Cumberland, Northampton
Picoides borealis	Red-cockaded woodpecker	E	Robeson, Cumberland, Harnett, Johnston, Wilson, Nash, Halifax, Northampton
Haliaeetus leucocephalus	Bald Eagle	BGEPA	Harnett, Johnston, Wilson, Nash, Halifax, Northampton
Notropis mekistocholas	Cape Fear Shiner	E	Harnett
Invertebrates			
Neonympha mitchellii francisci	Saint Francis' satyr butterfly	E	Cumberland
Alasmidonta heterodon	Dwarf wedgemussel	E	Johnston, Wilson, Nash, Halifax
Elliptio steinstansana	Tar River spinymussel	E	Johnston, Nash, Halifax
Vascular Plants			
Rhus michauxii	Michaux's sumac	E	Robeson, Cumberland, Johnston, Wilson
Schwalbea americana	American Chafseed	E	Cumberland
Lindera melissifolia	Pondberry	E	Cumberland
Lysimachia asperulaefolia	Rough-leaf Loosestrife	E	Cumberland, Harnett

Notes: E - Endangered denotes a species in danger of extinction throughout all or a significant portion of its range

T/SA, T - Threatened denotes a species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, T/SA indicates species listed as Threatened due to similarity to a threatened species

BGEPA - Protected by the Bald and Golden Eagle Protection Act

There are listed populations of American alligators along the Black River (Map Sheet 31). There are listed populations of red-cockaded woodpeckers on Map Sheets 44-45, 55-57, and 68. There is a listed population of the Tar River Spinymussel on Map Sheet 69. There is a listed population of dwarf wedgemussel on Map Sheets 72 and 73. There is a listed population of the Rough-leaved loosestrife on Map Sheet 21.

7.2 Other Protected Species

Federal Species of Concern (FSC) species for counties in the project area are listed in Table 6.

Table 6. Federal Species of Concern (FSC) in Counties within the I-95 Natural Resource Study Area

Scientific Name	Common Name	County(ies) Listed
Vertebrates		
Anguilla rostrata	American eel	Robeson, Cumberland, Harnett, Johnston, Wilson, Nash, Halifax
Aimophila aestivalis	Bachman's sparrow	Robeson, Cumberland, Harnett, Halifax

Scientific Name	Common Name	County(ies) Listed
Noturus sp. cf. leptacanthus	Broadtail madtom	Robeson, Cumberland
Rana capito capito	Carolina crawfish frog	Robeson, Cumberland
Etheostoma mariae	Pinewoods darter	Robeson
Corynorhinus rafinesquii	Rafinesque's big-eared bat	Robeson, Northampton
Dendroica virens waynei	Black-throated green warbler	Cumberland
Myotis austroriparius	Southeastern myotis	Robeson
Heterodon simus	Southern hognose snake	Robeson, Cumberland
Pituophis melanoleucus melanoleucus	Northern pine snake	Cumberland, Harnett
Semotilus lumbee	Sandhills chub	Cumberland, Harnett
Moxostoma sp. 2	Carolina redhorse	Harnett
Noturus furiosus	Carolina madtom	Johnston, Wilson, Nash, Halifax
Dendroica cerulea	Cerulean warbler	Johnston, Halifax, Northampton
Lythrurus matutinus	Pinewoods Shiner	Johnston, Wilson, Nash
Ambloplites cavifrons	Roanoke bass	Johnston, Wilson, Halifax
Ammodramus henslowii susurrans	Eastern Henslow's sparrow	Wilson
Myotis austroriparius	Southeastern myotis	Halifax
Invertebrates		
Stylurus (=Gomphus) townesi	Bronze clubtail	Robeson
Fusconaia masoni	Atlantic pigtoe	Cumberland, Harnett, Johnston, Wilson, Nash, Halifax, Northampton
Lampsilis cariosa	Yellow lampmussel	Cumberland, Harnett, Johnston, Nash, Halifax
Gomphus septima	Septima's clubtail	Harnett,
Lasmigona subviridis	Green floater	Johnston, Nash, Halifax, Northampton
Elliptio lanceolata	Yellow lance	Johnston, Nash, Halifax
Speyeria diana	Diana fritillary (butterfly)	Nash
Orconectes virginiensis	Chowanoke crayfish	Halifax, Northampton
Vascular Plants		
Rhexia aristosa	Awned meadowbeauty	Robeson, Cumberland
Lindera subcoriacea	Bog spicebush	Robeson, Cumberland, Johnston
Macbridea caroliniana	Carolina bogmint	Robeson, Harnett, Johnston
Pteroglossaspis ecristata	False coco	Robeson, Cumberland
Amorpha georgiana var. *georgiana*	Georgia lead-plant	Robeson, Cumberland, Harnett
Myriophyllum laxum	Loose watermilfoil	Cumberland
Astragalus michauxii	Sandhills milk-vetch	Robeson, Cumberland, Harnett
Dionaea muscipula	Venus' fly-trap	Robeson, Cumberland
Danthonia epilis	Bog oatgrass	Cumberland, Harnett
Lobelia boykinii	Boykin's lobelia	Cumberland
Parnassia caroliniana	Carolina grass-of-parnassus	Cumberland, Harnett

Scientific Name	Common Name	County(ies) Listed
Chelone cuthbertii	Cuthbert turtlehead	Cumberland
Stylisma pickeringii var. *pickeringii*	Pickering's dawnflower	Cumberland, Harnett
Litsea aestivalis	Pondspice	Cumberland
Xyris scabrifolia	Roughleaf yellow-eyed grass	Cumberland, Harnett
Lilium pyrophilum	Sandhills bog lily	Cumberland, Harnett, Nash, Northampton
Thalictrum macrostylum	Small-leaved meadow-rue	Cumberland, Nash
Solidago verna	Spring-flowering goldenrod	Cumberland, Harnett, Johnston
Pyxidanthera barbulata var. *brevifolia*	Well's sandhill pixie-moss	Cumberland, Harnett
Phacelia covillei	Buttercup phacelia	Harnett
Carex impressinervia	Ravine sedge	Harnett
Rudbeckia heliopsidis	Sun-facing coneflower	Harnett
Trillium pusillum var. *virginianum*	Virginia least trillium	Johnston, Nash, Halifax
Hypericum adpressum	Bog St. John's wort	Halifax, Northampton
Scirpus flaccidifolius	Reclining bulrush	Northampton
Nonvascular Plants		
Campylopus carolinae	Savanna campylopus	Cumberland

FSC species occurrences are not shown in the enclosed map book because there are some occurrences that extend over several pages and overlap other protected resources. The information is included in the project GIS files and is summarized as follows:

- Populations of Atlantic pigtoe are listed for Map Sheets 69, 71, and 72
- Populations of Awned meadow-beauty are listed for Map Sheets 16-20
- A population of Bachman's sparrow is listed for Map Sheet 72
- Populations of Carolina madtom are listed for Map Sheets 55 and 56
- Populations of Green floater are listed for Map Sheets 81 and 82
- Populations of Rafinesque's big-eared bat are listed for Map Sheets 59-72
- A populations of Roanoke bass is listed for Map Sheet 62
- A population of Sandhills lily is listed for Map Sheet 21
- Populations of Southern hognose snake are listed for Map Sheets 28-31
- Populations of Spiked medusa are listed for Map Sheets 16-20
- Populations of Spring-flowering goldenrod are listed for Map Sheets 30-32 and 37
- Populations of Yellow lampmussel are listed for Map Sheets 69, 71, and 72
- Populations of Yellow lance are listed for Map Sheets 49, 50, 68, and 69.

8.0 AIR QUALITY

A qualitative overview of air quality issues in the project area was performed. This included a discussion of conformity status for each county and applicable long range transportation plans (LRTPs)/

improvements to I-95 currently included in an approved LRTP. Additionally, the potential for mobile source air toxics (MSAT) and particulate matter (PM2.5) hot-spot analyses that might be required in future NEPA studies for project-level improvements is discussed. Project level carbon monoxide (CO) analysis is also discussed.

8.1 Conformity Status by County

The counties located in the I-95 corridor include Robeson, Cumberland, Sampson (within 1 mile of I-95; included for the assessment of air quality only), Harnett, Johnston, Wilson, Nash, Halifax, and Northampton. None of these counties are designated as being in nonattainment of the National Ambient Air Quality Standards (NAAQS).

However, Johnston and Nash Counties are designated as being in 8-hour ozone maintenance (whole counties). Johnston County was formerly a subpart 1 nonattainment area from 2004-2007 and was redesignated to maintenance status on December 26, 2007. Nash County was also a former subpart 1 nonattainment area from 2004-2007, but was redesignated to maintenance status on January 5, 2007 (USEPA, Undated).

Robeson County is part of the Lumber River Council of Governments (COG). Cumberland, Sampson and Harnett counties are part of the Mid-Carolina COG. Wilson, Nash, Halifax, and Northampton counties are part of the Upper Coastal Plain COG. Johnston and Harnett counties are also part of the Capital Area Metropolitan Planning Organization (CAMPO). These organizations are responsible for updates to the Long Range Transportation Plans and air quality conformity issues in the I-95 Study Area.

Any recommended improvements that evolve from the I-95 Study that are not currently on the North Carolina State Transportation Improvement Plan (STIP) or an applicable LRTP would have to be placed in either the STIP or a LRTP if they potentially affect air quality attainment/nonattainment/maintenance status, regulations and/or guidance. The STIP lists the following projects in development directly related to the I-95 corridor and may have the potential for air quality discussion, analysis, and/or documentation. Please note that there are also many separately listed pavement and bridge rehabilitation projects along the entire corridor, but they are exempt from air quality analyses. Also, intersecting routes with I-95 are also included since they are in the project corridor. Current I-95 projects in existing LRTPs or the STIP include (projects listed by STIP number):

- FS-0204f, Halifax, NC 125, I-95 to Old Farm Road. Widen to multi-lanes with curb and gutter.
- I-3806, Robeson, I-95, US 74 (exit 14) to US 301-SR 1997 (exit 22). Widen to six lanes.
- I-4413, Robeson, I-95, I-95 at us 301, (no further description included in STIP).
- I-4745, Cumberland, Harnett, Johnston, I-95, I-95 Business (exit 56) north of Fayetteville in Cumberland County to I-40 (exit 81) north of Benson in Johnston County. Rehabilitate pavement and structures, widen and upgrade interchanges and add additional lanes.
- I-4927, Robeson, I-95. Construct new weigh station.
- I-5010, Harnett, I-95, NC 55. Reconfigure interchange ramp.
- K-4002, Robeson, US 74. Construct new rest area pair on future I-74 corridor east of I-95.
- K-4903, Nash, I-95. Renovate rest area pair-buildings, grounds and parking facilities. Buildings to include dual restrooms and Americans with Disabilities Act (ADA)-compliant family restroom.

- K-4904, Cumberland, I-95. Renovate rest area pair-buildings, grounds and parking facilities. Buildings to include dual restrooms and ADA-compliant family restroom.
- M-0412, statewide, I-95, corridors of the future program. Interstate Maintenance Discretionary funds (IMD) for improvements to I-95 from Florida to Virginia. North Carolina to provide funds to adjoining states under terms of an agreement.
- R-2562, Bladen, NC 87, Elizabethtown bypass in Bladen County to multi-lanes at I-95 in Cumberland County. Widen to multi-lanes.
- R-2581, Halifax, US 158 - NC 903 SR 1405 (Roanoke Chapel Road) east of Littleton to I-95 south of Roanoke Rapids. Widen to multi-lanes.
- R-2582, Northampton, US 158 - NC 46, I-95/NC 46 in Roanoke Rapids to SR 1333 (Lynch Road) east of Jackson. Widen to multi-lanes with bypass of Jackson, some new location.
- R-3822, Halifax, new route, NC 125 to south of US 158. Construct a two-lane facility parallel to I-95.
- R-4736, Harnett, I-95, Dunn. Realign I-95 northbound off ramp and service road.
- U-2519, Cumberland, Fayetteville outer loop, I-95 south of Fayetteville to west of NC 24-87 (Bragg boulevard). Freeway on new location.
- U-2561, Nash, Rocky Mount NC 43, SR 1616 (Country Club Road) to I-95. Widen to multi-lanes with curb and gutter.
- U-4415, Cumberland, Fayetteville NC 53-210 (Cedar Creek Road), I-95 east to NC 53-210 junction. Widen to multi-lanes.
- U-5026, Nash, I-95, I-95 at SR 1770 (Sunset Avenue). Convert grade separation to an interchange.
- X-0002, Cumberland, outer loop east of NC 24-87 (Bragg Boulevard) to I-95. Freeway on new location with structure over the Cape Fear River.

8.2 Mobile Source Air Toxics (MSATs)

If a proposed project does not create new or add significant capacity to highways where the average annual daily traffic (AADT) is projected to be in the range of 140,000-150,000 vehicles per day (vpd) (or greater) by the design year, then it is considered to be a project with low or no meaningful potential MSAT effects (FHWA, 2009a). The study corridor county volumes are well below half these AADT threshold volumes (NCDOT, 2007, 2008, 2009).

An MSAT analysis is not required other than documenting the basis for the determination for projects with no meaningful potential effects (i.e., projects qualifying as a categorical exclusion under 23 CFR 771.117(c); projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126; or other projects with no meaningful impacts on traffic volumes or vehicle mix). This discussion must include prototype language from FHWA's Guidance on Air Toxic Analysis in NEPA Documents specifically written for the "No analysis for projects with no potential for meaningful MSAT effects" scenario.

If a project has a low risk impact (most highway projects will fall into this category), a qualitative assessment of emissions projections should be conducted. This qualitative assessment would compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic, and the associated changes in MSATs for the project alternatives, based on VMT, vehicle mix, and speed. It would also discuss national trend data projecting substantial overall reductions in emissions due to stricter

engine and fuel regulations issued by the US Environmental Protection Agency (EPA). Because the emission effects of potential improvements to I-95 are expected to be low, there would be no appreciable difference in overall MSAT emissions among the various alternatives, including the No-Build condition.

In addition to the qualitative assessment, a NEPA document for this category of projects must include a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, in compliance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information. This discussion must include prototype language from FHWA's Guidance on Air Toxic Analysis in NEPA Documents specifically written for the "Qualitative analysis for projects with low potential MSAT effects" scenario (FHWA, 2006).

8.3 PM2.5 Hot-Spot Analyses

All of the counties included in the study corridor are designated as being in attainment of the PM2.5 standard. Additionally, proposed highway projects are likely not "Projects of Air Quality Concern" as the AADT for the facility segments are less than 100,000 and the diesel trucks are less than 8,000 per day (FHWA, 2009b). Based on 2007 NCDOT estimates, the AADT on segments of I-95 range from approximately 30,000-54,000 vpd. It is highly unlikely that these volumes will double (or triple) to exceed the threshold. Current 2008/2009 daily Tractor Trailer Semi Trucks (TTSTs) are estimated to be in the 4,800-6,000 vpd range for most of the counties along I-95 (TDR09-0405 Manual Classification Data). Cumberland and Harnett counties have estimated TTST in the low 7,000s. However, the survey totals were about 5,500-5,600 vpd, respectively (NCDOT, 2007, 2008, 2009).

Additionally, it is not likely that improvements to I-95 would cause both a minimum of 25,000 total AADT and a 2,000 diesel truck volume increase between Build and No-Build conditions. Therefore, it is likely that hot-spot analyses would not be required for potential improvements to I-95.

8.4 CO Hot-Spot Analyses

All of the counties included in the study corridor are designated as being in attainment of the CO standard. Project-level CO air quality analysis is also performed as part of the NEPA process (NCDENR, 2007). FHWA issued guidance documents in the 1980s for NEPA air quality analysis. Generally speaking, the documents recommend hotspot modeling for projects that are being evaluated as an Environmental Assessments (EAs) or Environmental Impact Statements (EISs) and recommend against modeling for Categorical Exclusions (CEs) (FHWA, 1986).

Proposed projects can not cause new air quality impacts, worsen existing impacts, or delay the timely attainment of the NAAQS. Typically, because the counties are all in attainment of the standard, quantitative modeling is performed only when affecting signalized intersections that are currently or will be at Level of Service (LOS) D or worse as a result of a proposed improvement. For the I-95 corridor, these intersections are those located on the interchange ramps.

Overall, it is highly unlikely that there will be a CO impact from improvements to I-95 as various auto emissions controls through the past few decades have eliminated all but one nonattainment area in the entire United States (a partial section of Clark County, Las Vegas, Nevada). Additionally, FHWA is proposing to streamline the CO process to screen out most projects as being unlikely to cause an impact. When/if approved, it should be used to screen out CO issues at the first level. States have also been encouraged to develop their own screening criteria.

9.0 NOISE

A qualitative analysis was performed to identify noise sensitive areas and the subsequent probability of required abatement measures. This included identifying the generalized noise sensitive land uses adjacent to I-95, the number and type of potentially affected receptors, the likelihood of reasonable and feasible mitigation in the form of a noise barrier, and a conservative barrier length, as applicable.

The qualitative analysis is summarized in Table 7 and the locations of these areas are shown in the environmental features map book (Appendix A). The table identifies the relative location of the noise sensitive land uses abutting I-95, the approximate number and type of potentially affected receptors, and reasonableness/feasibility mitigation factors to explain why either noise mitigation will likely require no further action or why further study would likely be needed. Though specific projects and/or I-95 alignment locations/lane additions are not identified at this time, the table also estimates the probability of noise barrier construction and conservative lengths.

Table 7. Qualitative Potential Noise Impact Areas

Area #	Map Sheet	General Location; Number/Type of Receptors	Reasonable/Feasible Mitigation Factors	Detailed Mitigation Analysis Needed? / Likelihood of Noise Barrier?	Approximate Barrier Length(s) (Assume 20-foot max height)
1	1	NC/SC state line, NB; South of The Border (Motel/RV/camp)	• Business Visibility • US501/301 noise • Transient clientele	No / Unlikely	N/A
2	1	Exit 1B, SB; 7 Businesses/motels	• Business Visibility • Few exterior sites	No / Unlikely	N/A
3	2/3	SR 2459, SB; 30 Residences	• Close to I-95 • SR 2459 divides the parcels	Yes / Low Probability	3000’
4	3	SR 2459, SB; 45 Residences	• Too far away	No / Unlikely	N/A
5	3	Across from Welcome Center, SB; 50 Residences	• Low density • Mostly forested	Yes / Unlikely	N/A
6	3	SR 1155, SB; 5 Residences	• Few sites • Low density	No / Unlikely	N/A
7	3/4	Annease Dr., SB; 30 Residences	• Low density • 50% near I-95	Yes / Unlikely	N/A
8	5	SR 2457, NB; 11 Residences	• Few sites • Low density • Mostly forested	No / Unlikely	N/A
9	6	SR 1201, SB; 40 Residences	• 50% are too far away	Yes / Low Probability	1000’
10	6	SR 2422, NB; 25 Planned Residences	• 50% are too far away	Yes / Low Probability	2000’
11	7	SR 1207, Back Swamp Road, SB; 20 Residences	• SR 12107 noise • Too far away • Some forestation	No / Unlikely	N/A

Area #	Map Sheet	General Location; Number/Type of Receptors	Reasonable/Feasible Mitigation Factors	Detailed Mitigation Analysis Needed? / Likelihood of Noise Barrier?	Approximate Barrier Length(s) (Assume 20-foot max height)
12	7	Exit 14, SR 1589, SB;RV campsite	• Far enough away • Transient clientele	No / Unlikely	N/A
13	8/9	Exit 17, south of SR 72, NB; 20+ Residences, airport, 2 motels	• Medium density • SR 1805 noise • Close to I-95	Yes / Low Probability	3200’ + 4000’
14	8	South of Exit 17, SB; 6 Residences	• Medium density • SR 1589 noise • Close to I-95	Yes / Unlikely	N/A
15	9	Exit 17, NB; 10+ Residences, 15+ businesses, 2+ motels	• Medium density • Business visibility • 90%+ of residences are too far away	Yes / Unlikely	N/A
16	10	Exit 19, SB; 7 Businesses/motels	• Medium density • Business visibility • Few exterior sites	No / Unlikely	N/A
17	10	Exit 19, NB; 3 Businesses/motel, 40+ residences	• Medium density • Business visibility • Commercial buildings act as noise barrier between I-95 & residences • 60% of the residences are too far away	Yes / Unlikely	N/A
18	10	Exit 20, NB; 7+ businesses/motels, 50+ residences	• High density • Some forestation • Business visibility • 75% of the residences are too far away	Yes / Unlikely	N/A
19	10	Exit 20, NB/SB; 10+ businesses/motels	• Low density • Business visibility	No / Unlikely	N/A
20	10	North of exit 20, NB; 10+ Residences	• Medium density • Mostly forested • 50% are too far away	Yes / Unlikely	N/A
21	10/11	Exits 20-22, SB; 100+ Residences	• Medium density • Medium forestation	Yes / Medium Possibility	4,500’
22	11	North of Exit 20, NB; Gilbert Carroll School, 5 businesses	• Low density • Business visibility • Exterior school activities are far away	Yes / Unlikely	N/A

Area #	Map Sheet	General Location; Number/Type of Receptors	Reasonable/Feasible Mitigation Factors	Detailed Mitigation Analysis Needed? / Likelihood of Noise Barrier?	Approximate Barrier Length(s) (Assume 20-foot max height)
23	11	South of Exit 22,NB; 10+ Businesses, 20+ residences	• Low density • Business visibility • Some forestation • Residences are too far away	Yes / Unlikely	N/A
24	11	Exit 22, NB; 10+ businesses/motels	• Low density • Business visibility	No / Unlikely	N/A
25	11	North of Exit 22, SB; 5+ Residences	• Low density • Heavily forested • Too far away	No / Unlikely	N/A
26	11	North of Exit 22, NB; 12+ Residences	• Low density • Somewhat forested • 50% are too far away	Yes / Unlikely	N/A
27	11	Exit 22, SB; School	• No exterior activities	No / Unlikely	N/A
28	12	Exit 25, SB; 20+ Residences	• Medium density • 25% are close to I-95	Yes / Low Probability	1,500’
29	13	North of Exit 25, NB; 20+ Residences	• Medium density • 90% are too far away	No / Unlikely	N/A
30	14	South of Exit 31, SB; 15+ Residences	• Low density • Some forestation • 50% are too far away	Yes / Unlikely	N/A
31	15	Exit 31, NB; 7+ Businesses/motel, 30+ residences	• Low density • Business visibility • 90% of the residences are too far away	No / Unlikely	N/A
32	15	Exit 33, NB; 9 Residences	• Low density • Heavily forested • 90% of the residents are too far away	No / Unlikely	N/A
33	15	Exit 33 SB; 25+ Residences	• Low density • Heavily forested • 90% of the residents are too far away	No / Unlikely	N/A
34	15	North of Exit 33, NB; 7 Residences	• Low density • Somewhat forested • 50% are too far away	No / Unlikely	N/A
35	17	North of SR 1723, SB; 20 Residences	• Low density • Some are too far away	Yes / Low Probability	1,000’
36	17	North of SR 1723,NB; 50+ Residences	• Low density • 30% are too far away	Yes / Low Probability	1,400’

Area #	Map Sheet	General Location; Number/Type of Receptors	Reasonable/Feasible Mitigation Factors	Detailed Mitigation Analysis Needed? / Likelihood of Noise Barrier?	Approximate Barrier Length(s) (Assume 20-foot max height)
37	17	South of Exit 40, along SR 1902, SB;10+ Residences	• Low density • Some forestation • 75% are too far away	No / Unlikely	N/A
38	17	South of Exit 40, along SR 1978, NB; 11 Residences/Parcels	• Low density • 50% built	Yes / Unlikely	N/A
39	18	South of Exit 40, NB; 25 Residences	• Low density • Heavily forested • 75% are too far away	Yes / Unlikely	N/A
40	18	Exit 40, SB;70+ Mixed businesses/ residences, mostly residential	• Medium density • Some forestation • 50% are too far away	Yes / Low Probability	4,100’
41	18	Exit 40, NB; 40+ Residences	• Medium density • US 301 noise	Yes / Low Probability	2,200’
42	19	Exit 41, SB; 100 Residences	• Medium density • Heavily forested • 75% are too far away	Yes / Low Probability	2,500’
43	20	Exit 44, SB; 30+ Residences	• Low Density • Some forestation • 50% are too far away	Yes / Low Probability	1,300’
44	22	Exit 49, SB; 15+ Businesses/motels	• Low Density • Mostly forested • Business visibility • Too far away	No / Unlikely	N/A
45	22	Exit 49, NB; 10+ Businesses/motels/ churches	• Low Density • Mostly forested • Business/church visibility • Too far away	Yes / Unlikely	N/A
46	23	Exit 52 to SR 2000, SB; 10+ Residences	• Low Density • Mostly forested • Too far away	Yes / Unlikely	N/A
47	23	South of Exit 52, NB; 50+ Residences	• Low Density • Mostly forested • 90% are too far away	Yes / Unlikely	N/A
48	24	North of Exit 52, SB; 10+ Residences	• Low Density • Some forestation	Yes / Low Probability	2,000’
49	24	North of Exit 52, NB; 40+ Residences	• Medium density • 50% are close to I-95	Yes / Medium Possibility	2,100’
50	24	South of Exit 55, SR 1887, NB; 50+ Residences	• Medium density • 30% are close to I-95	Yes / Medium Possibility	2,600’

Area #	Map Sheet	General Location; Number/Type of Receptors	Reasonable/Feasible Mitigation Factors	Detailed Mitigation Analysis Needed? / Likelihood of Noise Barrier?	Approximate Barrier Length(s) (Assume 20-foot max height)
51	24	South of Exit 55, Fairgrove Court, SB; 10+ Residences	• Low density • 50% are too far away	Yes / Low Probability	600’
52	24	Exit 55, SB; 20 Residences	• Medium density • 50% are too far away	Yes / Low Probability	1,500’
53	25	Exit 56, SB; 70+ Residences	• Medium-high density • 50% constructed	Yes / High Possibility	1,600’
54	25	Exit 56, NB; 30+ Residences	• Medium density • Medium forestation	Yes / Medium Possibility	2,100’
55	25	North of Exit 56 and SR 1828, SB; 50+ Residences	• Medium density • Medium forestation	Yes / Low Probability	3,300’
56	32	Exit 71 to south of Exit 70, SB; 20+ Residences	• Low density • Close to I-95 • SR 1811 noise	Yes / Low Probability	7,000’
57	33	South of Exit 72, SB; 55+ Residences	• Medium density • 50% of residences are too far away	Yes / Low Probability	4,100’
58	34	Exit 73, NB/SB; 100+ Residences, 10+ Businesses/motels	• Medium density • Business visibility • 75% of residences are too far away	Yes / Unlikely	N/A
59	34	South of Exit 75, SB; 50+ Residences	• Medium density • Some forestation • Nearly all residences are too far away	Yes / Unlikely	N/A
60	35	South of Exit 77, SB; 40+ Residences	• Medium density • SR 1805 noise • 50% are too far away	Yes / Unlikely	N/A
61	37/38	Exits 79-81, SB; 100+ mixed use businesses/residences, Benson Middle School	• Medium density • Business visibility • SR 1173 noise	Yes / Unlikely	N/A
62	38	Near SR 1171, 1227, SB; 20 Residences	• Low density	No / Unlikely	N/A
63	41	Exit 87, SB; 75+ Residences	• 50% are too far away	Yes / Unlikely	N/A
64	42	South of Exit 90, NB/SB; 50+ Residences, Four Oaks Middle School	• 50% are too far away • Exterior school receptors are too far away	Yes / Low Probability	2,600’
65	42	Exit 90, SB; 50+ Residences	• US 301 noise • 80% are too far away	No / Unlikely	N/A

Area #	Map Sheet	General Location; Number/Type of Receptors	Reasonable/Feasible Mitigation Factors	Detailed Mitigation Analysis Needed? / Likelihood of Noise Barrier?	Approximate Barrier Length(s) (Assume 20-foot max height)
66	44	Exit 93, SB; 100+ Residences	• Close to I-95 • Environmental justice issues (possible)	Yes / Medium Possibility	2,600’
67	44	Exit 95, SB; Johnston Community College	• Public visibility • Few exterior sites	No / Unlikely	N/A
68	45	Exit 95, NB/SB; 50+ Businesses/motels, 10 Residences	• High density (bus) • Business visibility • Low density (res) too far away	No / Unlikely	N/A
69	46	Exit 97, NB/SB; 20+ Businesses/motels, 50+ Residences	• High density • Mostly multi-family structures (condos), 75% are too far away	No / Unlikely	N/A
70	46	Exit 98, NB; RV Campsite	• Business visibility • Transient clientele	No / Unlikely	N/A
71	47	North of Exit 98, near rest area, SB; 100+ Residences	• Medium density • US 301/Railroad noise • 40% are too far away	Yes / Low Probability	1,800’
71A	48	Exit 101, SB; 12+ Residences	• Low density • 50% are close to I-95	Yes / Medium Probability	1,600’
72	48	Exit 102, SB; 30+ Residences, North Johnston Middle School	• Medium density • US 301/Railroad noise • 60% are too far away	Yes / Unlikely	N/A
73	51	Exit 106, NB; 50+ Residences	• Medium density • SR 2399 noise • 50% are too far away	Yes / Unlikely	N/A
74	51	Exit 107, NB; 10+ Businesses, 50+ Residences	• High density • Minimal forestation	Yes / Unlikely	N/A
75	56	Near SR 1154, SB; 40 Residences	• Medium density • SR 1154 noise	Yes / Unlikely	N/A
76	57	Exit 119A, SR 1160, NB; 22 Residences	• Low density • 90% are too far away	No / Unlikely	N/A
77	58	Exit 121, NB/SB; 15+ Businesses, 10 Residences	• Business visibility • Few exterior sites • Homes too far away	No / Unlikely	N/A
78	59	Near SR 1984, NB; 15+ Residences	• Business visibility • Few exterior sites	No / Unlikely	N/A
79	61	Near SR 1745 & 1981, NB; 20 Residences	• Medium density • 90% are too far away	No / Unlikely	N/A

Area #	Map Sheet	General Location; Number/Type of Receptors	Reasonable/Feasible Mitigation Factors	Detailed Mitigation Analysis Needed? / Likelihood of Noise Barrier?	Approximate Barrier Length(s) (Assume 20-foot max height)
80	61	Near SRC 85 & 1980, NB; 30 Residences	• Medium density • 75% are too far away	No / Unlikely	N/A
81	61	Near SR 85 & 1815, SB; 45 Residences	• Medium density • Too far away	No / Unlikely	N/A
82	63	North of Exit 132, SR 1706, NB; 12 Residences	• Medium density	Yes / Low Probability	1,900’
83	63	North of Exit 132, Remus Road, SB; 20 Residences	• Some forestation • 30% close to I-95	Yes / Low Probability	1,900’
84	65	South of Exit 138 & SR 1770, SB; 60+ Residences	• Mostly forested • 50% near I-95	Yes / Low Probability	2,200’
85	65	South of Exit 138 & SR 1770, NB; 100+ Residences	• 50% of the mobile homes not yet placed • 30% near I-95	Yes / Medium Possibility	1,600’
86	66	Exit 138, near SR 1604, SB; 50+ Residences	• Mostly forested • 25% near I-95	Yes / Unlikely	N/A
87	68	South of Exit 145, SB; 50+ Residences	• Mostly forested • 30% near I-95	Yes / Unlikely	N/A
88	69	Exit 145, NB; 15+ Business/Motels	• Business visibility • Few exterior sites	No / Unlikely	N/A
89	80	Exit 171, NB/SB; 20+ Business/Motels	• Business visibility • Few exterior sites	No / Unlikely	N/A
90	81	Exit 173, NB/SB; 50 Business/Motels	• Business visibility • Few exterior sites	No / Unlikely	N/A
91	81	Between Roanoke River & Exit 173, SB; 100+ Residences	• Some forestation • Mostly multi-family structures (condos)	Yes / Unlikely	N/A

NB = Northbound side of I-95
SB = Southbound side of I-95
Forestation/forested = dense/thick tree areas
Note: a 20 foot height was assumed for this analysis. NCDOT policy identifies a 25 foot maximum.
Source: Michael Baker, Jr., Inc.

9.1 Noise Summary

Generally, there are several types of noise sensitive receptors in the corridor that are considered to be Category B exterior noise receptors according to FHWA (FHWA, 1984). The most prevalent are residential dwelling units, comprising primarily of single family residences along with some multi-family structures (condominiums/apartments) in various locations. In addition, please note that NCDOT noise policy suggests using Category E (interior) for residential multi-unit complexes unless there are specific exterior areas of frequent use (NCDOT, 2004). Exterior uses at these sites would be identified for specific improvement projects as needed.

Isolated receptor locations were not analyzed because these sites would not likely meet the cost reasonableness criteria for noise barrier construction. Additionally, most noise sensitive areas with few receptors were also not analyzed if it was clearly seen that cost reasonableness or other criteria would not be met for noise barrier construction.

For most of the remaining locations, the results of this qualitative analysis indicates that noise barrier construction would not be required for one or more reasons. Most often, barriers would not be likely to meet the reasonable and/or feasible mitigation criteria established by NCDOT. Other reasons for determining barriers would not likely be required include:

- Low-medium density development
- Distance from I-95
- Sound level contributions from other road sources
- Tree shielding: moderate to heavy density forestation between the residences and I-95
- Building shielding: commercial development between the residences and I-95
- Engineering/construction/other factors, such as right-of-way, cross-street/driveway access, parallel service road location, drainage, and residential desires and/or visibility.

There are some medium to high possibility impact areas that may require noise barrier construction. A detailed noise analysis, required as part of a typical highway project, would be required to determine the feasibility and reasonableness of any proposed mitigation.

There are also some schools and churches scattered throughout the I-95 corridor. NCDOT policy identifies these as “special use areas” (playgrounds, hospitals, retirement homes, parks and camps also fall under this category for reasonableness) (NCDOT, 2004). Typically, schools and churches do not have exterior social activity areas that would warrant or benefit from noise mitigation. Based on a preliminary review of aerial photography, it appears that some of the schools in the natural resource study area have baseball diamonds, soccer fields, and/or playgrounds. Normally, these locations are temporarily occupied and have loud on-site noise generating activities. Most churches also do not have exterior social activity areas unless playgrounds or picnic pavilions exist.

When there are no exterior social activities at schools and churches, then an exterior to interior sound level conversion can be made and then compared to FHWA’s Category E criteria for interior noise. Also, with most of these receptors located relatively far enough away from I-95, it is likely that the conversions to Category E will not produce noise impacts.

There are also several commercial business areas in the study corridor that are considered Category C sites (exterior). These areas are primarily located immediately near the interchanges. Most of these commercial zones also include a mix of hotels or motels in addition to other travel service needs, office buildings, restaurants and retail shopping. Hotels and motels are considered to be Category B noise sensitive receptors, similar to a residence. However, these facilities typically do not have exterior people activity sites where occupants spend time, with the exception of pool areas. Additionally, these commercial establishments depend on their visibility from I-95 for business purposes and their proprietors do not typically desire noise barriers to be located in between their business and the road.

Furthermore, similar to the schools and churches, an exterior to interior sound level conversion can be made at impacted hotels/motels and then compared to FHWA's Category E criteria for interior noise. Based on the analysis overview of these sites, it is likely that the conversions to Category E will not generate noise impacts. And finally, for purposes of this study, RV campgrounds were deemed to be "special use areas" since they were considered to be businesses with transient clientele whose proprietors also typically desire business visibility.

9.2 Design Options

Design options to consider include:

- Using the median areas for adding through lanes to increase capacity
- Staying within the existing right-of-way wherever possible
- If outside the right-of-way, purchasing the potentially affected properties as a buffer
- Maintaining the existing forestation to provide acoustic and visual shielding between noise sensitive receptors and I-95.

Other Considerations

- A revised noise policy is in the making. NCDOT exhibited a Noise Policy Presentation on 11-04-2009 and listed that an updated policy would likely be available within 6 months.
- Updated Federal policy is expected to be finalized in mid-2010. NCDOT will incorporate federal policy changes into its own policy, as applicable.
- Earth berms should be considered where right of way is available and where drainage or access issues are not a major factor.
- The analysis assumed 20 foot wall heights for preliminary cost estimates that may be calculated at a later time. Lower top elevations that effectively mitigate for sound level impacts should be considered. NCDOT maximum height is currently 25 feet.

10.0 OTHER ENVIRONMENTAL ISSUES

Other environmental features reviewed during the environmental screening included known hazardous waste sites, animal operation facilities (feed lots), and swine lagoons within the natural resource study area. Hazardous waste sites are found in the immediate vicinity of I-95 on Map Sheets 43, 45, and 81. An animal operations facility is located in the immediate vicinity of I-95 on Map Sheet 61.

11.0 CONCLUSIONS

Findings from the environmental screening effort are summarized below:

11.1 Demographics

There are 158 census tracts in the demographic study area. Of those, 67 met established threshold for environmental justice. This included 21 of the 49 census tracts in Cumberland County, 6 of the 8 in Edgecombe County, 7 of the 10 in Halifax County, 4 of the 9 in Harnett County, both of those in Hoke County, 3 of the 15 in Johnston County, 5 of the 17 in Nash County, both of those in Northampton County, 12 of the 20 in Robeson County, and 6 of the 17 in Wilson County.

The number of Spanish speakers who spoke English less than very well exceeded 1,000 in 9 of the 13 counties in the demographic study area and exceeded 5 percent of the population in Johnston and Sampson Counties. In all cases, English is the most common language spoken and Spanish/Spanish Creole is the second most common languages spoken. In Cumberland County, there were more than 1,000 people who spoke a language other than Spanish and spoke English less than very well.

11.2 Section 4(f) and Section 106 Resources

The NCDOT HEU identified 102 sites that warrant further investigation if they are located within the area of potential effects (APE) of any proposed improvements to the I-95 corridor. This number includes seven sites currently listed in the NRHP. Of the listed sites, the Garner Farm Site (Map Sheet 80) is located in the immediate vicinity of I-95. There are 19 potential Section 106 resources in the immediate vicinity of I-95.

11.3 Voluntary Agricultural Districts

There are a total of 13 VADs in the immediate vicinity of I-95. This number includes one district in Cumberland County, three districts in Harnett and Northampton Counties, four in Johnston County, and two in Wilson County.

11.4 Water Resources

In general, the NWI and the hydrographic data appear to be reasonably accurate representations of current field conditions. No significant discrepancies were noted for about 30 percent of the 85 map pages. The inconsistencies noted in the mapping were predominantly:

1. Potentially-jurisdictional small ditches missing from the hydrographic data.
2. Carolina Bays depicted as part of the hydrographic data layer are not longer apparent in areas converted to agricultural use.

General trends noted during the ground truthing were:

1. NWI-mapped wetlands depicted as forested and surrounded by agricultural land appear to retain jurisdictional status, even though some may be isolated (i.e., DWQ-jurisdictional).
2. Hydrographic data-mapped channels depicted as originating within lobes of hydric soil tend to be mapped further downstream than a field-determined jurisdictional origin.
3. Significant wetlands associated with large rivers and streams appear to be generally accurately mapped.

During the environmental screening, the following data sets were noted in the natural resource study area: public water supply sources, surface water intakes, ambient water quality monitoring sites, benthic monitoring sites, wild and scenic rivers, water pipelines, water tank locations and NPDES permits. There is a NDPES facility (the Fayetteville Days Inn) shown in the immediate vicinity of I-95 on Map Sheet 26.

11.5 Federally Protected Species

There are nine federally listed Endangered species and one species listed as Threatened due to Similarity of Appearance (the American Alligator) in the natural resource study area. The bald eagle is protected by the Bald and Golden Eagle Protection Act of 1940 (as amended). A population of American alligators is listed along the Black River (Map Sheet 31). There are listed populations of the Endangered red-cockaded woodpecker on Map Sheets 44-45, 55-57, and 68. There is a listed population of the federally

Endangered Tar River spinymussel on Map Sheet 69. There is a listed population of the federally Endangered Dwarf wedgemussel on Map Sheets 72 and 73. There is a listed population of the federally Endangered Rough-leaved loosestrife on Map Sheet 21. There are 52 Federal Species of Concern (FSC) listed for counties in the natural resource study area.

11.6 Air Impacts

None of the counties located in the natural resource study area are designated as being in nonattainment of the NAAQS. However, Johnston and Nash Counties are designated as being in 8-hour ozone maintenance (whole counties). Johnston County was formerly a subpart 1 nonattainment area from 2004-2007 and was redesignated to maintenance status on December 26, 2007. Nash County was also a former subpart 1 nonattainment area from 04-07, but was redesignated to maintenance status on January 5, 2007.

MSAT

If a project has a low risk impact (most highway projects will fall into this category), a qualitative assessment of emissions projections should be conducted. This qualitative assessment would compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic, and the associated changes in MSATs for the project alternatives, based on VMT, vehicle mix, and speed. It would also discuss national trend data projecting substantial overall reductions in emissions due to stricter engine and fuel regulations issued by EPA. Because the emission effects of these projects are expected to be low, there would be no appreciable difference in overall MSAT emissions among the various alternatives, including the no-build condition.

In addition to the qualitative assessment, a NEPA document for this category of projects must include a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, in compliance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information. This discussion must include prototype language from FHWA's Guidance on Air Toxic Analysis in NEPA Documents specifically written for the "Qualitative analysis for projects with low potential MSAT effects" scenario.

PM2.5 Hotspot Analysis

All of the counties included in the study corridor are designated as being in attainment of the PM2.5 standard. Additionally, any proposed highway projects would not likely be "Projects of Air Quality Concern" as the AADT's are less than 100,000 and the diesel trucks are less than 8,000 per day. Therefore, it is anticipated that no PM2.5 Hotspot analyses will be required.

CO Hotspot Analysis

All of the counties included in the study corridor are designated as being in attainment of the CO standard. Based on a preliminary review, it is considered highly unlikely that there will be a CO impact from improvements to I-95 as various auto emissions controls through the past few decades have eliminated all but one nonattainment area in the entire US (a partial section of Clark County, Las Vegas, Nevada). Additionally, FHWA is proposing to streamline the CO process to screen out most projects as being unlikely to cause an impact. When/if approved, it should be used to screen out CO issues at the first level.

11.7 Noise Impacts

The environmental screening identified 92 areas that may potentially need to be modeled for noise impacts. Generally, there are several types of noise sensitive receptors in the corridor that are considered to be Category B exterior noise receptors according to FHWA. The most prevalent are residential dwelling units, comprising primarily of single family residences along with some multi-family structures (condominiums/apartments) in various locations. Isolated receptor locations were not analyzed because these sites would not likely meet the cost reasonableness criteria for noise barrier construction. Additionally, most noise sensitive areas with few receptors were also not analyzed if it was clearly seen that cost reasonableness or other criteria would not be met for noise barrier construction.

For most of the remaining locations, the results of this qualitative analysis indicate that noise barrier construction would not likely meet the reasonable and/or feasible mitigation criteria established by NCDOT.

12.0 REFERENCES

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Figures

Figure 1.
Vicinity Map
I-95 Environmental Screening Findings Memorandum

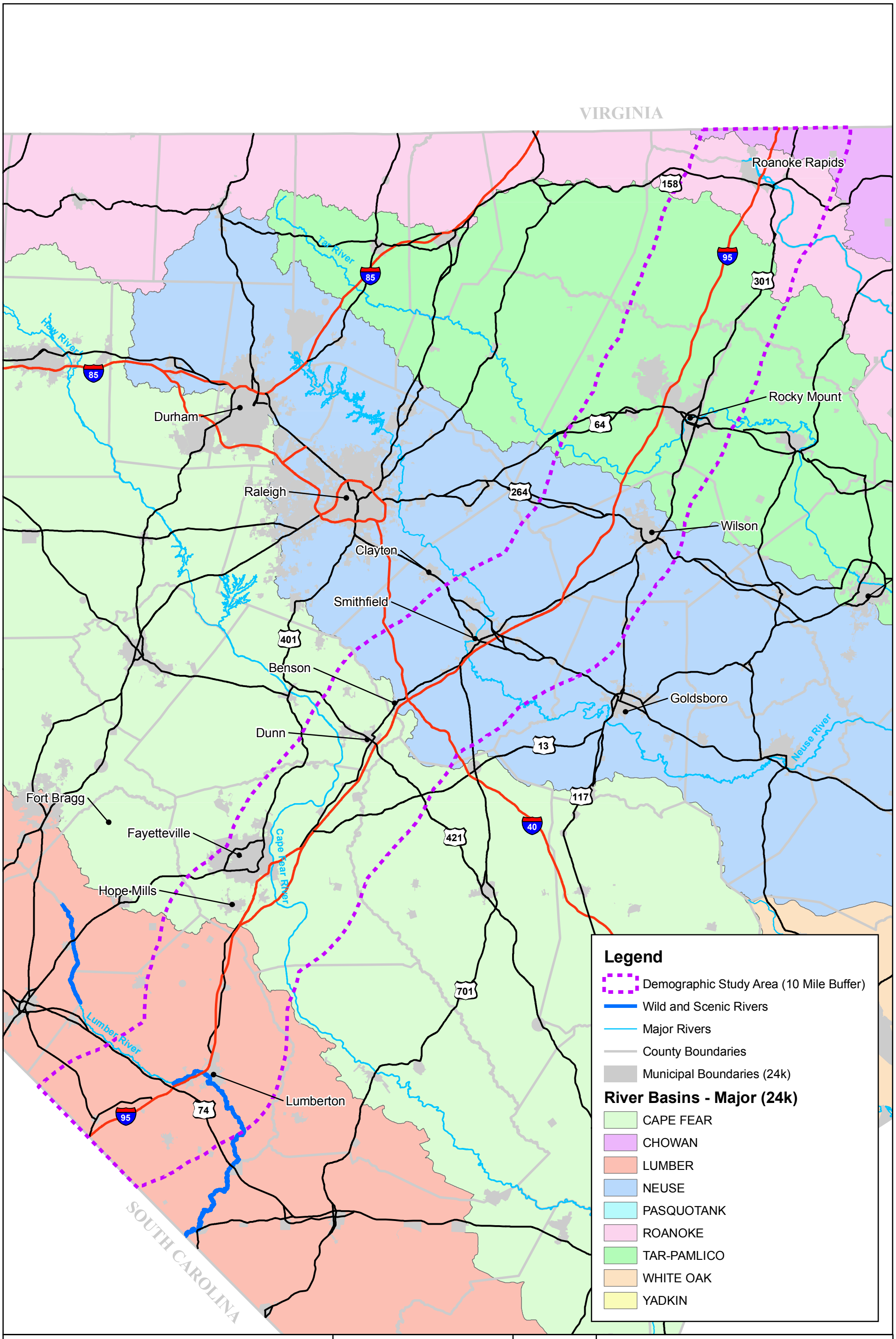

Figure 2.
River Basin Map
I-95 Environmental Screening
Findings Memorandum

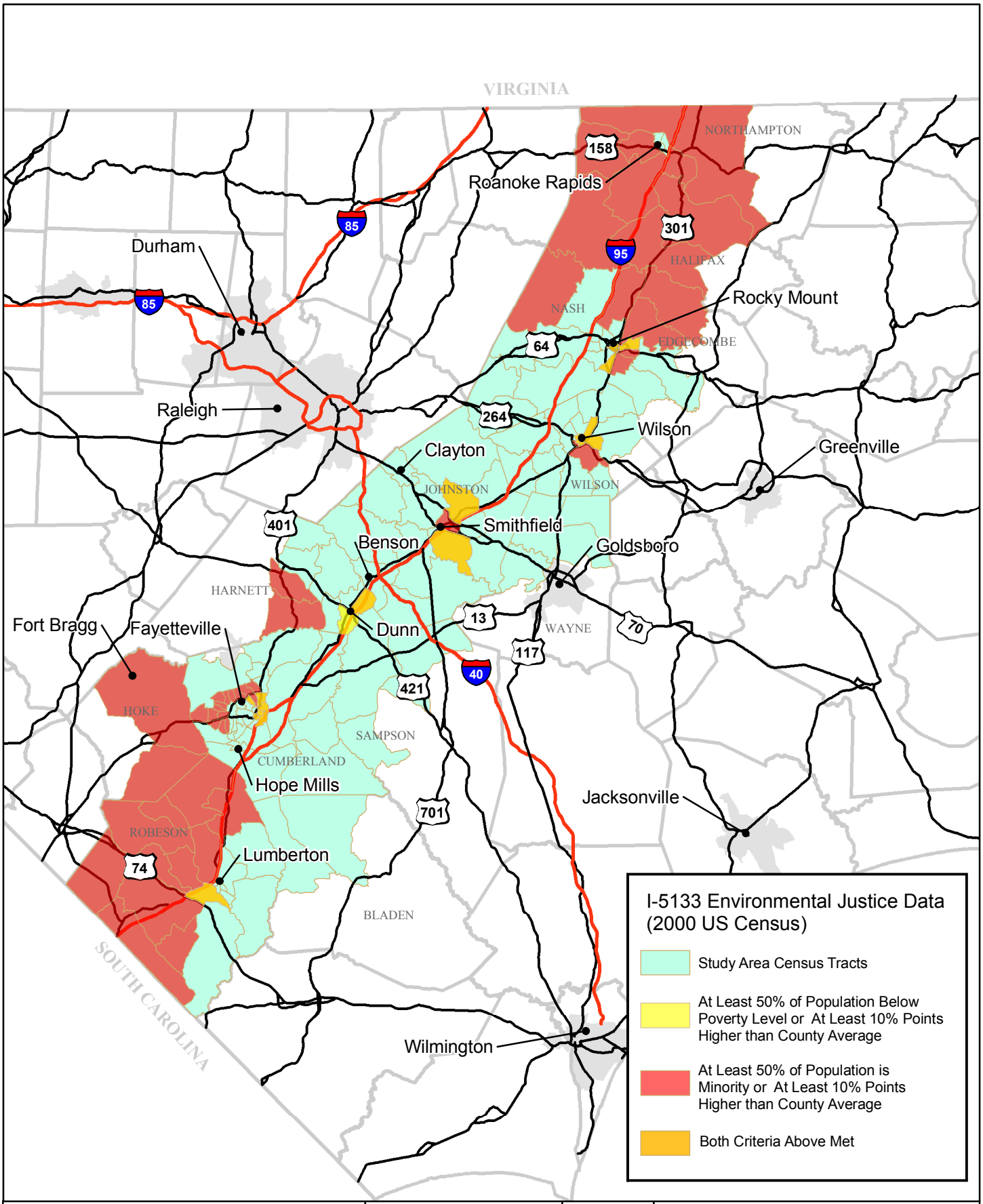

Figure 3.
Environmental Justice Map
I-95 Environmental Screening Findings Memorandum

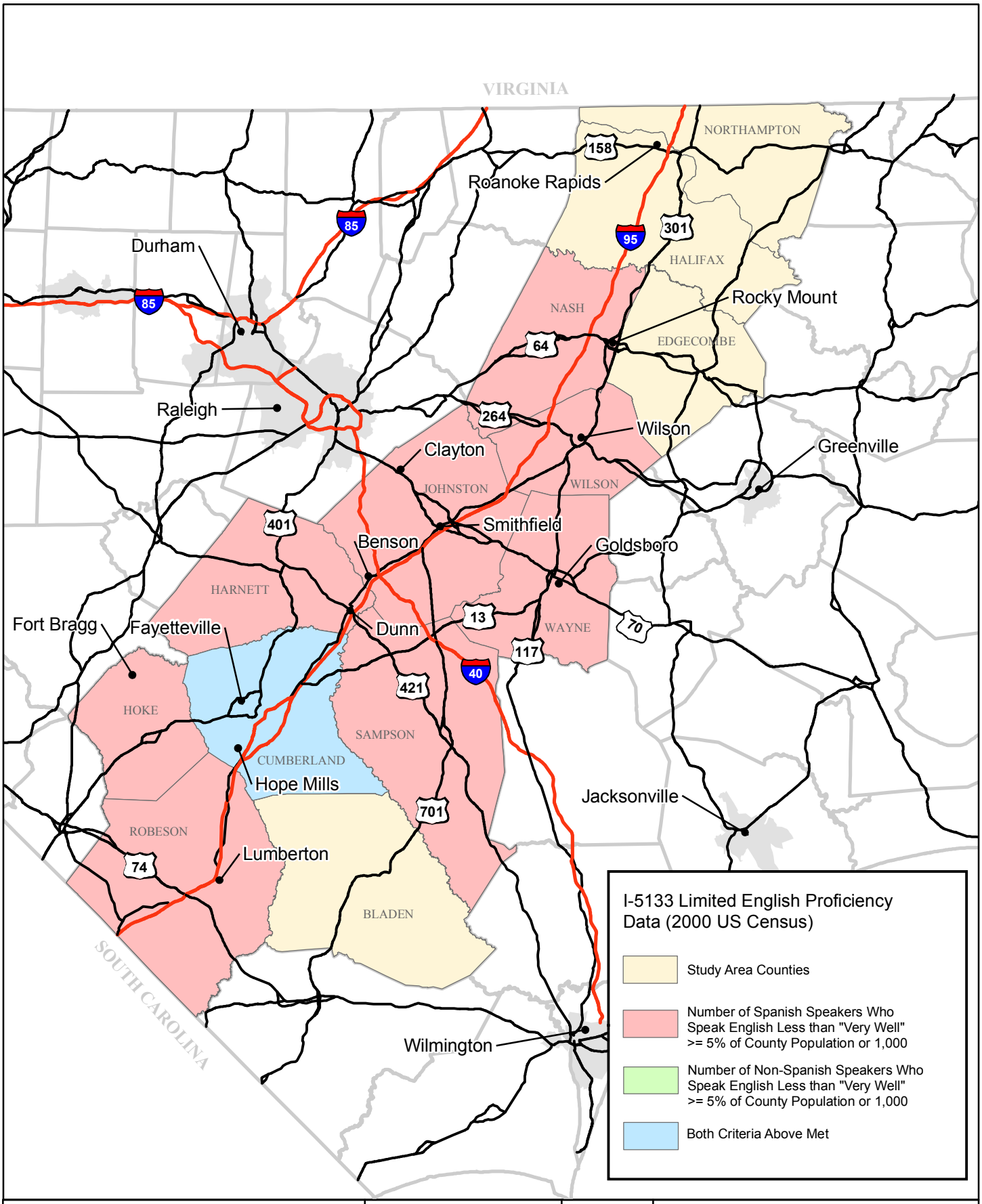

Figure 4.
Limited English Proficiency Map
I-95 Environmental Screening Findings Memorandum

Appendix A

Appendix B

Layer	Category	Subcategory	Source	Description	Geographic Coverage
Cumberland_SID_2008_Catalog.dbf	Aerial/Terrain/Survey	Aerial Photography	NCDOT	2008 Cumberland County Aerial Catalog	Cumberland County
Halifax_SID_2004_Catalog.db	Aerial/Terrain/Survey	Aerial Photography	NCDOT	2004 Halifax County Aerial Catalo	Halifax County
Harnett_SID_2008_Catalog.db	Aerial/Terrain/Survey	Aerial Photography	NCDOT	2008 Harnett County Aerial Catalo	Harnett County
Johnston_SID_2005_Catalog.db	Aerial/Terrain/Survey	Aerial Photography	NCDOT	2005 Johnston County Aerial Catalo	Johnston County
Nash_SID_2008_Catalog.dbf	Aerial/Terrain/Survey	Aerial Photography	NCDOT	2008 Nash County Aerial Catalog	Nash County
grid.shp	Aerial/Terrain/Survey	Aerial Photography	NCDOT	County Grid for Reference of Aerial Tiles	Northampton County
Northampton_SID_2005_Catalog.dbf	Aerial/Terrain/Survey	Aerial Photography	NCDOT	2005 Northhampton County Aerial Catalog	Northampton County
Robeson_SID_2008_Catalog.db	Aerial/Terrain/Survey	Aerial Photography	NCDOT	2008 Robeson County Aerial Catalo	Robeson County
Wilson_SID_2006_Catalog.dbf	Aerial/Terrain/Survey	Aerial Photography	NCDOT	2006 Wilson County Aerial Catalog	Wilson County
gd_contour_cumb.shp	Aerial/Terrain/Survey	Elevation	NCDOT	5 foot Contours	Cumberland County
gd_elevation_cumb	Aerial/Terrain/Survey	Elevation	NCDOT	Elevation Raste	Cumberland County
gd_hillshade_cumb	Aerial/Terrain/Survey	Elevation	NCDOT	Hillshading Raster	Cumberland County
gd_slope_cumb	Aerial/Terrain/Survey	Elevation	NCDOT	Slope Raster	Cumberland County
Lidar2007_Cumberland (folder	Aerial/Terrain/Survey	Elevation	NCDOT	2, 4, 20, 100 foot Contours	Cumberland County
Contour (Folder)	Aerial/Terrain/Survey	Elevation	NCDOT	Contour lines from 2007 LIDAR Data (2', 4', 20', 100' intervals)	Harnett County
elevation	Aerial/Terrain/Survey	Elevation	NCDOT	County DEM grid	Harnett County
gd_contour_harn.shp	Aerial/Terrain/Survey	Elevation	NCDOT	10 foot Contours	Harnett County
gd_contour5_harn.shp	Aerial/Terrain/Survey	Elevation	NCDOT	5 foot Contours	Harnett County
gd_hillshade_harr	Aerial/Terrain/Survey	Elevation	NCDOT	Hillshading Raster	Harnett County
gd_slope_harr	Aerial/Terrain/Survey	Elevation	NCDOT	Slope Raster	Harnett County
con_Johnston_02.zip	Aerial/Terrain/Survey	Elevation	NCDOT	Contour lines from 2007 LIDAR Data (2', 4', 20', 100' intervals)	Johnston County
con_Nash_02.zip	Aerial/Terrain/Survey	Elevation	NCDOT	Contour lines from 2007 LIDAR Data (2', 4', 20', 100' intervals)	Nash County
Nash_DOT_Contours.shp	Aerial/Terrain/Survey	Elevation	NCDOT	County 2 foot contours	Nash County
Terrain.shp	Aerial/Terrain/Survey	Elevation	NCDOT	Mountainous, Rolling, Flat terrain categories (3 polygons)	NC Statewide
con_Northamp_02.zip	Aerial/Terrain/Survey	Elevation	NCDOT	Contour lines from 2007 LIDAR Data (2', 4', 20', 100' intervals)	Northampton County
con_Robeson_02.zip	Aerial/Terrain/Survey	Elevation	NCDOT	Contour lines from 2007 LIDAR Data (2', 4', 20', 100' intervals)	Robeson County
con_Wilson_02.zip	Aerial/Terrain/Survey	Elevation	NCDOT	Contour lines from 2007 LIDAR Data (2', 4', 20', 100' intervals)	Wilson County
Nash_USGS_Monuments.shp	Aerial/Terrain/Survey	Survey	NCDOT	USGS Monument Locations	Nash County
de_blocks_cumb.shp	Demographics	Census	NCDOT	Blockgroups	Cumberland County
Census.mdb	Demographics	Census	NCDOT	1990/2000 Blocks, Block Groups, Census Tracts, Zip Codes Townships; 1970/1980 Census Boundaries	NC Statewide
buildings.shp	Infrastructure/Utilities	Infrastructure	Cumberland County	Building Footprints	Cumberland County
ut_hydrants_cumb.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Fire Hydrants	Cumberland County
ut_spipes_cumb.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Sewer Pipeline Type	Cumberland County
ut_spipes_cumb2002.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Sewer Pipeline Inventory	Cumberland County
ut_wpipes_cumb.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Water Pipeline Type	Cumberland County
ut_wpipes_cumb2002.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Water Pipeline Inventory	Cumberland County
in_airports_harn.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Airport Location (point	Harnett County

Layer	Category	Subcategory	Source	Description	Geographic Coverage
in_commctr_harn.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Police Department Locations (point	Harnett County
ut_hydrants_harn.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Fire Hydrants	Harnett County
ut_spipes_harn.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Sewer Pipeline Inventory	Harnett County
ut_spump_harn.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Sewer Pump Locations	Harnett County
ut_wpipes_harn.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Water Pipeline Inventory	Harnett County
Nash_Landfill_Convenience_Centers.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Landfill Convenience Centers	Nash County
buildings.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Buildings (polylines)	Northampton County
spipes.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Sewer Pipeline Inventory	Northampton County
spumps.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Sewer Pump Locations	Northampton County
streat.shp	Infrastructure/Utilities	Infrastructure	NCDOT	Sewer Treatment Plants	Northampton County
buildings.shp	Infrastructure/Utilities	Infrastructure	Rocky Mount	Buildings (type and year built	Rocky Mount
I95_WaterLines_5Milebuffer.shp	Infrastructure/Utilities	Infrastructure	Rocky Mount	Water lines within 5 mile buffer of I95 corrido	Rocky Mount
SewerLinesI95_5MileBuffer.shp	Infrastructure/Utilities	Infrastructure	Rocky Mount	Sewer lines within 5 mile buffer of I95 corrido	Rocky Mount
jctowers.shp	Infrastructure/Utilities	Utilities	NCDOT	Cell towers	Johnston County
Nash_Cell_Radio_Towers.shp	Infrastructure/Utilities	Utilities	NCDOT	Cell Tower Locations	Nash County
jcpark.shp	Land Use/Soils	Land Use/Cover	NCDOT	Mobile Home Parks (point locations	Johnston County
landcover.shp	Land Use/Soils	Land Use/Cover	Johnston County	Land Cover (cleared, trees, water)	Johnston County
subdiv.shp	Land Use/Soils	Land Use/Cover	Johnston County	Subdivisions	Johnston County
Public Facilities.mdb	Land Use/Soils	Land Use/Cover	NCDOT	Geodatabase of beach access sites, coastal marinas, educational institutions, state/federal land, sanitary sewer systems, and hospitals (dates not provided)	NC Statewide
Cumberland.mdb	Land Use/Soils	Soils/Farm	NCDOT	Geodatabase of Cumberland County Soils and Prime Farmland	Cumberland County
lu_farmprog_cumb.shp	Land Use/Soils	Soils/Farm	NCDOT	Farm Program Parcels	Cumberland County
Halifax.mdb	Land Use/Soils	Soils/Farm	NCDOT	Geodatabase of Halifax County Soils and Farmlar	Halifax County
Harnett.mdb	Land Use/Soils	Soils/Farm	NCDOT	Geodatabase of Harnett County Soils and Prime Farmland	Harnett County
Johnston.mdb	Land Use/Soils	Soils/Farm	NCDOT	Geodatabase of Johnston County Soils and Farmlan	Johnston County
Nash.mdb	Land Use/Soils	Soils/Farm	NCDOT	Geodatabase of Nash County Soils and Prime Farmland	Nash County
Northampton.mdb	Land Use/Soils	Soils/Farm	NCDOT	Geodatabase of Nash County Soils and Farmlan	Northampton County
Robeson.mdb	Land Use/Soils	Soils/Farm	NCDOT	Geodatabase of Robeson County Soils and Farmlar	Robeson County
Wilson.mdb	Land Use/Soils	Soils/Farm	NCDOT	Geodatabase of Wilson County Soils and Farmlan	Wilson County
jchydro.shp	Natural Resources	County Data	Johnston County	Hydrography	Johnston County
Nash_River_Basins.shp	Natural Resources	County Data	NCDOT	River Basins (Neuse & Tar-Pamlico)	Nash County
Nash_Tar_River_Reservoir.shp	Natural Resources	County Data	NCDOT	Tar River Reservoir Boundary	Nash County
Nash_USGS_Blueline_Streams.shp	Natural Resources	County Data	NCDOT	USGS Blueline Streams	Nash County
Nash_USGS_Waterbodies.shp	Natural Resources	County Data	NCDOT	Waterbodies (polygons)	Nash County

Layer	Category	Subcategory	Source	Description	Geographic Coverage
Nash_Watersheds_DWQ.shp	Natural Resources	County Data	NCDOT	DWQ Watershed Boundaries	Nash County
Nash_Watersheds_Public_Water_Supply.shp	Natural Resources	County Data	NCDOT	Public Water Supply Watersheds	Nash County
sdisch.shp	Natural Resources	County Data	NCDOT	Discharge Information (?	Northampton County
slandapp.shp	Natural Resources	County Data	NCDOT	Land Application Information (?	Northampton County
water.shp	Natural Resources	County Data	NCDOT	Waterbodies (polylines)	Northampton County
wells.shp	Natural Resources	County Data	NCDOT	Well Locations	Northampton County
wintakes.shp	Natural Resources	County Data	NCDOT	Water Intake Locations	Northampton County
wmeters.shp	Natural Resources	County Data	NCDOT	Water Meter Locations	Northampton County
wpipes.shp	Natural Resources	County Data	NCDOT	Water Pipeline Inventory	Northampton County
wtanks.shp	Natural Resources	County Data	NCDOT	Water Tank Locations	Northampton County
wtreat.shp	Natural Resources	County Data	NCDOT	Water Treatment Locations	Northampton County
hy_wetlndpotentialrest_cumb.shp	Natural Resources	Hydrography	NCDOT	Potential Wetland Restoration Sites	Cumberland County
DCM - NC CREWS.mdb	Natural Resources	Hydrography	NCDOT	NC Coastal Region Evaluation of Wetland Significance	NC Statewide
DCM - Restoration.mdb	Natural Resources	Hydrography	NCDOT	Potential Wetland Enhancement and Restoration Sites - NC Coastal Area	NC Statewide
DCM - Wetlands.mdb	Natural Resources	Hydrography	NCDOT	DCM Wetlands - NC Coastal Area	NC Statewide
Floodmaps.mdb	Natural Resources	Hydrography	NCDOT	Geodatabase with FEMA Flood Zones (LIDAR	NC Statewide
hqworw.shp	Natural Resources	Hydrography	NCOneMap	High Quality Water Outstanding Resource Water Management Zones	NC Statewide
Hydrography 24k.mdb	Natural Resources	Hydrography	NCDOT	Statewide 24K hydrography	NC Statewide
Hydrography Classification.mdb	Natural Resources	Hydrography	NCDOT	River basin and watershed boundaries	NC Statewide
Marine_Fisheries.gdb	Natural Resources	Hydrography	NCDOT	Geodatabase of anadromous fish areas and fish nursing areas	NC Statewide
National Wetland Inventory.mdb	Natural Resources	Hydrography	NCDOT	National Wetlands Inventory	NC Statewide
nwi_arc.shp	Natural Resources	Hydrography	NCOneMap	National Wetlands Inventory (lines	NC Statewide
nwi_poly.shp	Natural Resources	Hydrography	NCOneMap	National Wetlands Inventory (polygons	NC Statewide
swi.shp	Natural Resources	Hydrography	NCOneMap	Surface Water Intakes	NC Statewide
Water Supply.mdb	Natural Resources	Hydrography	NCDOT	Geodatabase of water supply watersheds, intakes, and distribution systems	NC Statewide
wsr.shp	Natural Resources	Hydrography	NCOneMap	Wild and Scenic Rivers	NC Statewide
awqms.shp	Natural Resources	Monitoring Data	NCOneMap	Ambient Water Quality Monitoring Sites	NC Statewide
benthic.shp	Natural Resources	Monitoring Data	NCOneMap	Benthic Monitoring Sites	NC Statewide
dcms.shp	Natural Resources	Monitoring Data	NCOneMap	Discharger Coalitions' Monitoring Sites	NC Statewide
fshcmntysts.shp	Natural Resources	Monitoring Data	NCOneMap	Fish Community Sampling Sites	NC Statewide
usgsgages.shp	Natural Resources	Monitoring Data	NCOneMap	USGS Gages	NC Statewide
Environmental.mdb	Natural Resources	Multiple	NCDOT	Geodatabase of monitoring sites, permit data, shellfish areas, EEP watersheds, and trout waters (dates not provided)	NC Statewide

Layer	Category	Subcategory	Source	Description	Geographic Coverage
dedreg.shp	Natural Resources	Natural Heritage	NCDOT	Dedicated and Registered Areas	NC Statewide
marea.shp	Natural Resources	Natural Heritage	NCDOT	Managed Areas	NC Statewide
mcsite.shp	Natural Resources	Natural Heritage	NCDOT	Significant Natural Heritage Areas - Macrosite Area	NC Statewide
mgsite.shp	Natural Resources	Natural Heritage	NCDOT	Significant Natural Heritage Areas - Megasite Area	NC Statewide
nheo_*.shp	Natural Resources	Natural Heritage	NCDOT	Natural Heritage Element Occurrences (points, lines, polygons)	NC Statewide
snha.shp	Natural Resources	Natural Heritage	NCDOT	Significant Natural Heritage Areas	NC Statewide
State-owned_Conservation_Easements_2009-09-08.shp	Natural Resources	Natural Heritage	NCDOT	State Owned Conservation Easements	NC Statewide
Fuel_Locations_Point.mdb	Natural Resources	Other	NCDOT	Statewide Fuel Sites	NC Statewide
Geologic.mdb	Natural Resources	Other	NCDOT	Geodatabase of dykes, faults, formations, and hydrogeology	NC Statewide
Grids USGS Quadrangle.mdb	Natural Resources	Other	NCDOT	Geodatabase of quad sheet and DOQQ indice	NC Statewide
Hazardous Materials.mdb	Natural Resources	Other	NCDOT	Geodatabase of groundwater incidents, hazmat disposal sites, hazmat facilities, and solid waste facilities	NC Statewide
lclwshdplns.shp	Natural Resources	Other	NCOneMap	Local Watershed Plans - EEF	NC Statewide
pmss.shp	Natural Resources	Other	NCOneMap	Public Municipal Stormwater Systems	NC Statewide
pwsws.shp	Natural Resources	Other	NCOneMap	Public Water Supply Water Sources	NC Statewide
trgtlclwshds.shp	Natural Resources	Other	NCOneMap	Targeted Local Watersheds - EEF	NC Statewide
aop.shp	Natural Resources	Permit Data	NCOneMap	Animal Operation Permits	NC Statewide
npdes.shp	Natural Resources	Permit Data	NCOneMap	National Pollutant Discharge Elimination System Site	NC Statewide
stormwtr_ref.shp	Natural Resources	Permit Data	NCOneMap	Stormwater Permitting Reference Layer	NC Statewide
swlg.shp	Natural Resources	Permit Data	NCOneMap	Swine Lagoons	NC Statewide
Conservation Area.mdb	Natural Resources	Protected Lands	NCDOT	Coastal Reserves, USFW Conservation Easements, Conservation Tax Credit Properties, Lands Managed Conservation Open Space, Land Trust Conservation Properties, Land Trust Priority Areas	NC Statewide
ctcp.shp	Natural Resources	Protected Lands	NCOneMap	Conservation Tax Credit Properties	NC Statewide
flo.shp	Natural Resources	Protected Lands	NCOneMap	Federal Land Ownership	NC Statewide
gml.shp	Natural Resources	Protected Lands	NCOneMap	NC Wildlife Resources Commission Gamelands	NC Statewide
lmcos.shp	Natural Resources	Protected Lands	NCOneMap	Lands Managed for Conservation and Open Space	NC Statewide
ltcp.shp	Natural Resources	Protected Lands	NCOneMap	Land Trust Conservation Properties	NC Statewide
Recreation.mdb	Natural Resources	Protected Lands	NCDOT	Geodatabase of gamelands, LWCF parks/Section 6(f), paddle trails, and state parks	NC Statewide
sol.shp	Natural Resources	Protected Lands	NCOneMap	State-Owned Lands	NC Statewide
I95Bridges.shp	Transportation	Bridges	NCDOT	I95 Corridor Bridge Locations (includes pipes/culverts and intersecting route numbers)	I95 Corridor
rail.shp	Transportation	Rail	NCDOT	Railroads	Johnston County
Nash_Railroads.shp	Transportation	Rail	NCDOT	Railroads	Nash County
railrd.shp	Transportation	Rail	NCDOT	Railroads	Northampton County
Streets.shp	Transportation	Roads	Cumberland County	County Streets	Cumberland County
Halifax_2009Centerlines.shp	Transportation	Roads	NCDOT	Halifax County Streets	Halifax County
Harnett_2009Centerlines.shp	Transportation	Roads	NCDOT	Harnett County Streets	Harnett County
jcby70.shp	Transportation	Roads	Johnston County	US 70 bypass	Johnston County

Layer	Category	Subcategory	Source	Description	Geographic Coverage
Johnson_2009Centerlines.shp	Transportation	Roads	NCDOT	Johnston County Streets	Johnston County
mrds.shp	Transportation	Roads	NCDOT	Major Roads/Corridors	Johnston County
Nash_2009Centerlines.shp	Transportation	Roads	NCDOT	Nash County Streets	Nash County
LRS_ARCS.gdb	Transportation	Roads	NCDOT	Geodatabase of NCDOT state and primary maintained road network	NC Statewide
LRS_Routes.gdb	Transportation	Roads	NCDOT	Geodatabase of NCDOT state and primary maintained road network (routed)	NC Statewide
Road_Char_Mlpst.gdb	Transportation	Roads	NCDOT	Geodatabase of NCDOT road characteristics arcs	NC Statewide
Road_Characteristics.mdb	Transportation	Roads	NCDOT	Geodatabase of NCDOT road characteristics arcs (possibly dated)	NC Statewide
SR_LookUp_Table (Folder	Transportation	Roads	NCDOT	State Route Lookup Tables (Geodatabases	NC Statewide
TIP 2004-2010.mdb	Transportation	Roads	NCDOT	Geodatabase of NCDOT Transportation Improvement Program - 2004-2010	NC Statewide
TIP 2006_2012.mdb	Transportation	Roads	NCDOT	Geodatabase of NCDOT Transportation Improvement Program - 2006-2012	NC Statewide
Transportation.mdb	Transportation	Roads	NCDOT	Geodatabase of airports, railroads, bridges, road conditions, non-system roads, bike routes, and other transportation features	NC Statewide
Street.shp	Transportation	Roads	NCDOT	Street Centerlines	Northampton County
Robeson_2009Centerlines.shp	Transportation	Roads	NCDOT	Robeson County Streets	Robeson County
streets.shp	Transportation	Roads	Rocky Mount	Streets	Rocky Mount
Wilson_2009Centerlines.shp	Transportation	Roads	NCDOT	Wilson County Streets	Wilson County
bd_ctylmt_cumb.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	City Limits	Cumberland County
cities_cl.shp	Zoning/Parcel/Political	Jurisdiction	Cumberland County	City Limits and ETJ (?)	Cumberland County
bd_county_harn.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	County Boundary	Harnett County
bd_ctylmt_harn.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	City Limits	Harnett County
bd_etj_harn.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Jurisdictional Boundaries	Harnett County
bd_twnship_harn.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Townships	Harnett County
EMS_district.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	EMS Rescue Districts	Johnston County
ESBounds_0809.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Elementary School District Boundaries	Johnston County
etj.shp	Zoning/Parcel/Political	Jurisdiction	Johnston County	Jurisdictional Boundaries	Johnston County
Fire_district.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Fire Districts	Johnston County
HSBounds_0809.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	High School District Boundaries	Johnston County
Johnson_2009CityLimits.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Johnston County City Limits	Johnston County
MSBounds_0809.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Middle School District Boundaries	Johnston County
MTD.shp	Zoning/Parcel/Political	Jurisdiction	Johnston County	Municipal Transition Districts	Johnston County
schools_0809.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	School Locations	Johnston County
tship.shp	Zoning/Parcel/Political	Jurisdiction	Johnston County	Townships	Johnston County

Layer	Category	Subcategory	Source	Description	Geographic Coverage
wdist.shp	Zoning/Parcel/Political	Jurisdiction	Johnston County	Water District Boundaries	Johnston County
Nash_2009CityLimits.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Nash County City Limits	Nash County
Nash_Commissioner_Districts.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Commissioner_Districts	Nash County
Nash_County_Boundary.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	County Boundary	Nash County
Nash_ETJS.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Nash County Jurisdictional Boundaries	Nash County
Nash_Fire_Districts.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Nash County Fire Station Districts	Nash County
Nash_Fire_Stations.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Nash County Fire Station Points	Nash County
Nash_NC_House_Districts.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	NC House District Boundaries	Nash County
Nash_NC_Senate_Districts.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	NC Senate District Boundaries	Nash County
Nash_School_Board_Districts.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	School Board District Boundaries	Nash County
Nash_Schools.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	School Locations	Nash County
Nash_Townships.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Townships	Nash County
Nash_US_Congressional_Districts.shp	Zoning/Parcel/Political	Jurisdiction	NCDOT	US Congressional Districts	Nash County
Nash_Voting_Locations.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Voting Locations	Nash County
Nash_Voting_Precincts.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Voting Precincts	Nash County
Boundaries.mdb	Zoning/Parcel/Political	Jurisdiction	NCDOT	Boundaries for Counties, Municipalities, Stateline, DOT Divisions, House/Senate/Congressional	NC Statewide
county.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	County Boundary	Northampton County
firedistricts.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Fire Districts	Northampton County
firezone.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Fire Zones	Northampton County
Northampton_2007CityLimits.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Northampton County City Limits	Northampton County
rescue.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Rescue Districts	Northampton County
twnship.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Townships	Northampton County
CRM_LIMITS_2009.shp	Zoning/Parcel/Politica	Jurisdiction	Rocky Mount	City Limits	Rocky Mount
I95Buffer.shp	Zoning/Parcel/Politica	Jurisdiction	Rocky Mount	5 mile buffer of I95 corridor	Rocky Mount
Critical.shp	Zoning/Parcel/Political	Jurisdiction	NCDOT	Fire, emergency, and other critical county locations (?)	Wilson County
Fire_District.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Wilson County Fire Districts	Wilson County
Townships.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Wilson County Township Boundaries	Wilson County
Wilson_2009Parcels.shp	Zoning/Parcel/Politica	Jurisdiction	NCDOT	Wilson County Parcels	Wilson County
CC_911Addresses_Shape.shp	Zoning/Parcel/Politica	Parcels	NCDOT	911 Address (w/ parcel numbers	Cumberland County
Cumberland_2009Parcels.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Cumberland County Parcels	Cumberland County
in_structure_cumb.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Address Matched Parcels/Structures (points	Cumberland County
Harnett_2009Parcels.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Harnett County Parcels	Harnett County
in_structure_harn.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Address Matched Parcels/Structures (points	Harnett County
Johnson_2009Parcels.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Johnston County Parcels	Johnston County
map_index.shp	Zoning/Parcel/Political	Parcels	Johnston County	Tax Map Index	Johnston County
taxatt.dbf	Zoning/Parcel/Political	Parcels	Johnston County	Tax Assessment Attributes (database)	Johnston County
Nash_2009Parcels.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Nash County Parcels	Nash County
Nash_Address_Points.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Nash County Address Points	Nash County
address.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Northampton County Address Points	Northampton County
Northampton_2009Parcels.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Northampton 2009 Parcels	Northampton County
parlines.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Parcels (polylines)	Northampton County
Robeson_2009Parcels.shp	Zoning/Parcel/Politica	Parcels	NCDOT	Robeson County Parcels	Robeson County

Layer	Category	Subcategory	Source	Description	Geographic Coverage
addresses.shp	Zoning/Parcel/Politica	Parcels	Rocky Mount	Geocoded Addresses w/ Parcel Numbers	Rocky Mount
parcels.shp	Zoning/Parcel/Politica	Parcels	Rocky Mount	Parcels	Rocky Mount
lu_zoningcnty_cumb.shp	Zoning/Parcel/Politica	Zoning	NCDOT	County Zoning	Cumberland County
lu_zoningmuni_cumb.shp	Zoning/Parcel/Politica	Zoning	NCDOT	Zoning by Municipality	Cumberland County
Halifax_2009Parcels.shp	Zoning/Parcel/Politica	Zoning	NCDOT	Halifax County Parcels	Halifax County
lr_zoningcnty1_harn.shp	Zoning/Parcel/Politica	Zoning	NCDOT	County Zoning	Harnett County
county_zoning.shp	Zoning/Parcel/Political	Zoning	Johnston County	County Zoning	Johnston County
IHI_overlay.shp	Zoning/Parcel/Political	Zoning	Johnston County	Zoning buffer (?)	Johnston County
town_zoning.shp	Zoning/Parcel/Political	Zoning	Johnston County	Town Zoning	Johnston County
Nash_County_Zoning.shp	Zoning/Parcel/Politica	Zoning	NCDOT	County Zoning	Nash County
nash_muni_zoning.shp	Zoning/Parcel/Political	Zoning	NCDOT	Zoning	Nash County
Zoning.shp	Zoning/Parcel/Politica	Zoning	Lumber	Robeson County Zoning	Robeson County

Appendix C

Table 1. Self-Identified Ethnicity in the Demographic Study Area

Census Area	Total Population	White Non-Hispanic	White Hispanic	Black/ Afr. Am. (Total)	AIAN (Total)	Asian (Total)	NHPI (Total)	Other race (Total)	Two or more races (Total)	Total Minority Population
North Carolina	**8,049,313**	**5,648,953**	**153,212**	**1,734,154**	**100,956**	**111,292**	**3,699**	**185,138**	**111,909**	**2,400,360**
Bladen County	**32,278**	**18,066**	**388**	**12,274**	**604**	**22**	**0**	**650**	**274**	**14,212**
950200	3,063	1,673	66	1060	37	0	0	141	86	**1,390**
950300	5,314	3,485	135	1540	11	14	0	128	1	**1,829**
Cumberland County	**302,963**	**159,127**	**7,315**	**105,730**	**4,696**	**6,126**	**503**	**9,748**	**9,718**	**143,836**
000100	910	329	8	551	22	0	0	0	0	**581**
000200	2,673	420	6	1999	0	120	0	84	44	**2,253**
000400	963	108	0	840	0	0	0	0	15	**855**
000500	2,392	1,503	27	620	180	16	0	34	12	**889**
000600	5,791	3,703	95	1555	10	179	0	90	159	**2,088**
000700	7,518	6,197	73	749	26	240	0	108	125	**1,321**
000800	2,768	1,826	61	801	8	12	0	15	45	**942**
000900	4,746	3,324	107	1016	7	53	0	92	147	**1,422**
001000	2,686	214	24	2429	0	3	0	6	10	**2,472**
001100	4,651	84	21	4411	0	27	0	12	96	**4,567**
001200	5,641	1,671	78	3703	11	74	0	48	56	**3,970**
001300	1,210	49	0	1097	18	0	0	14	32	**1,161**
001400	5,643	3,268	72	1813	403	26	0	50	11	**2,375**
001500	2,786	1,822	13	798	70	0	0	71	12	**964**
001601	5,274	3,808	14	966	145	26	0	114	201	**1,466**
001602	8,752	4,995	198	2681	216	169	12	238	243	**3,757**
001700	6,527	4,142	95	1604	216	117	34	131	188	**2,385**
001800	2,338	1,570	103	473	28	57	0	43	64	**768**
001901	2,684	1,661	12	559	66	67	0	101	218	**1,023**
001902	4,985	2,758	205	1463	62	96	0	177	224	**2,227**
001903	4,268	2,687	73	988	75	74	7	192	172	**1,581**
002000	7,756	3,934	215	2719	116	140	19	326	287	**3,822**
002100	4,217	2,477	74	1057	18	193	0	263	135	**1,740**
002200	2,559	432	28	1724	4	54	0	269	48	**2,127**
002300	5,151	2,336	89	2302	20	171	0	108	125	**2,815**
002400	6,236	1,676	192	3931	30	81	9	137	180	**4,560**
002501	7,479	2,940	170	3859	10	109	7	209	175	**4,539**
002502	5,801	3,503	59	1823	86	109	0	110	111	**2,298**
002503	5,145	3,233	68	1269	15	130	0	211	219	**1,912**
002504	5,333	3,148	185	1538	25	74	17	137	209	**2,185**
002600	4,397	3,084	56	995	189	3	0	32	38	**1,313**

Census Area	Total Population	White Non-Hispanic	White Hispanic	Black/ Afr. Am. (Total)	AIAN (Total)	Asian (Total)	NHPI (Total)	Other race (Total)	Two or more races (Total)	Total Minority Population
002700	6,416	4,620	69	1473	97	13	0	64	80	**1,796**
002800	5,429	4,329	25	675	180	18	29	75	98	**1,100**
002900	4,749	3,090	21	1431	61	78	0	27	41	**1,659**
003000	9,647	6,678	172	2086	400	51	0	125	135	**2,969**
003100	13,006	9,181	336	2281	467	161	19	287	274	**3,825**
003201	6,945	4,971	156	1227	111	121	21	94	244	**1,974**
003203	5,397	2,639	148	2043	69	131	9	150	208	**2,758**
003204	7,603	3,450	180	3155	177	227	0	252	162	**4,153**
003205	4,320	2,040	90	1744	15	90	0	205	136	**2,280**
003302	3,733	695	21	2677	38	50	8	62	182	**3,038**
003304	7,377	2,914	234	3192	123	373	6	271	264	**4,463**
003305	6,629	2,387	351	2936	65	369	0	120	401	**4,242**
003306	16,322	6,173	380	7410	45	461	10	829	1014	**10,149**
003307	3,563	1,156	76	1915	26	147	0	157	86	**2,407**
003308	8,176	3,512	371	3285	52	267	18	415	256	**4,664**
003309	5,418	2,689	288	1812	47	236	17	154	175	**2,729**
003400	31,791	17,398	1,430	7700	415	540	199	2343	1766	**14,393**
003700	6,317	4,691	108	1214	45	44	36	59	120	**1,626**
Edgecombe County	**55,606**	**21,822**	**294**	**32,138**	**51**	**154**	**15**	**959**	**173**	**33,784**
020100	319	28	0	287	4	0	0	0	0	**291**
020200	7,020	1,168	0	5787	17	0	0	25	23	**5,852**
020300	5,689	870	38	4705	0	60	0	0	16	**4,819**
020400	5,110	236	0	4874	0	0	0	0	0	**4,874**
020600	3,955	997	0	2795	0	0	0	107	56	**2,958**
020700	2,177	777	3	1328	0	0	0	63	6	**1,400**
021300	4,411	2,725	9	1605	6	45	0	21	0	**1,686**
021400	3,372	2,742	25	555	6	0	15	11	18	**630**
Halifax County	**57,370**	**24,247**	**99**	**30,325**	**1,628**	**375**	**15**	**252**	**429**	**33,123**
990100	3,672	1,018	0	2607	17	2	6	0	22	**2,654**
990200	5,420	4,440	6	677	26	164	0	29	78	**980**
990300	4,857	3,820	18	957	50	0	0	0	12	**1,037**
990400	3,871	2,556	7	1242	38	0	0	15	13	**1,315**
990500	9,664	4,695	29	4792	26	25	9	17	71	**4,969**
990600	4,142	1,705	7	2348	11	0	0	49	22	**2,437**
990700	4,267	1,856	0	2374	3	4	0	11	19	**2,411**
990800	5,422	363	6	3358	1415	108	0	63	109	**5,059**
990900	6,026	1,003	7	4915	25	32	0	5	39	**5,023**

Census Area	Total Population	White Non-Hispanic	White Hispanic	Black/ Afr. Am. (Total)	AIAN (Total)	Asian (Total)	NHPI (Total)	Other race (Total)	Two or more races (Total)	Total Minority Population
991000	3,751	965	6	2733	13	15	0	13	6	**2,786**
Harnett County	**91,025**	**62,574**	**2,228**	**20,297**	**1,093**	**639**	**63**	**2,319**	**1,812**	**28,451**
070100	4,599	2,763	0	1484	202	34	0	68	48	**1,836**
070200	3,400	1,612	47	1660	25	6	0	0	50	**1,788**
070300	4,752	3,513	87	1067	42	22	0	0	21	**1,239**
070400	9,095	6,982	377	1256	13	21	0	378	68	**2,113**
070500	5,959	4,748	175	715	201	0	16	49	55	**1,211**
070600	4,135	1,808	40	1978	102	44	23	48	92	**2,327**
070700	5,110	2,686	59	2109	106	7	0	97	46	**2,424**
070800	5,555	4,390	109	792	0	134	0	68	62	**1,165**
070900	8,962	6,225	461	1482	37	24	0	554	179	**2,737**
Hoke County	**33,646**	**14,073**	**937**	**12,653**	**3,695**	**477**	**73**	**992**	**746**	**19,573**
970100	14,798	7,391	664	4837	478	280	10	711	427	**7,407**
970400	6,092	1,761	13	1863	2152	89	25	81	108	**4,331**
Johnston County	**121,965**	**91,855**	**3,110**	**19,214**	**509**	**579**	**38**	**5,418**	**1,242**	**30,110**
040100	6,443	5,119	56	963	13	0	0	229	63	**1,324**
040200	15,474	11,807	372	2062	52	117	0	829	235	**3,667**
040300	9,217	4,542	514	3085	9	46	0	904	117	**4,675**
040400	3,531	2,945	17	248	4	2	0	293	22	**586**
040500	5,485	4,694	7	640	0	31	0	41	72	**791**
040600	3,208	1,670	146	1264	0	14	0	79	35	**1,538**
040700	3,402	2,217	137	865	0	0	0	115	68	**1,185**
040800	3,456	2,469	53	663	8	13	0	229	21	**987**
040900	10,973	8,231	224	1880	11	52	0	460	115	**2,742**
041000	11,534	8,319	324	2102	48	0	26	587	128	**3,215**
041100	16,488	13,466	286	2048	180	88	12	300	108	**3,022**
041200	7,673	5,962	347	642	37	0	0	611	74	**1,711**
041300	5,347	4,230	335	632	22	29	0	84	15	**1,117**
041400	6,264	4,640	71	1189	39	40	0	232	53	**1,624**
041500	13,470	11,544	221	931	86	147	0	425	116	**1,926**
Nash County	**87,420**	**53,244**	**795**	**29,665**	**274**	**413**	**23**	**2,016**	**990**	**34,176**
010100	410	53	0	352	0	0	0	5	0	**357**
010200	6,400	1,662	16	4583	12	0	0	46	81	**4,738**
010300	6,947	4,499	0	2287	0	40	0	93	28	**2,448**
010400	3,682	1,125	50	2349	0	15	0	85	58	**2,557**
010502	6,287	4,558	16	1590	22	62	0	31	8	**1,729**
010503	2,922	2,191	10	675	13	0	0	0	33	**731**

Census Area	Total Population	White Non-Hispanic	White Hispanic	Black/ Afr. Am. (Total)	AIAN (Total)	Asian (Total)	NHPI (Total)	Other race (Total)	Two or more races (Total)	Total Minority Population
010504	5,142	3,712	23	1121	0	0	0	185	101	**1,430**
010600	8,368	4,713	135	2825	33	169	18	217	258	**3,655**
010700	2,764	1,203	0	1471	7	5	0	6	72	**1,561**
010800	6,068	4,606	49	1290	8	9	5	39	62	**1,462**
010900	5,293	2,374	66	2667	54	41	0	13	78	**2,919**
011000	4,163	2,131	32	1784	45	3	0	148	20	**2,032**
011100	10,056	6,585	27	3185	38	61	0	64	96	**3,471**
011200	5,268	4,305	22	863	20	8	0	31	19	**963**
011300	4,148	2,886	161	565	19	0	0	504	13	**1,262**
011400	3,641	2,531	52	843	0	0	0	204	11	**1,110**
011500	5,861	4,110	136	1215	3	0	0	345	52	**1,751**
Northampton County	**22,086**	**8,620**	**39**	**13,113**	**53**	**32**	**0**	**62**	**167**	**13,466**
980300	6,296	1,482	0	4705	11	7	0	33	58	**4,814**
980400	5,524	2,269	39	3112	30	5	0	26	43	**3,255**
Robeson County	**123,339**	**38,049**	**2,287**	**31,414**	**45,341**	**936**	**124**	**2,928**	**2,260**	**85,290**
960100	8,009	3,787	289	2415	713	41	0	712	52	**4,222**
960200	9,641	3,196	568	2338	2835	67	0	416	221	**6,445**
960300	6,383	1,620	254	2766	1270	63	0	346	64	**4,763**
960400	9,258	689	91	647	7283	135	0	156	257	**8,569**
960500	8,685	933	18	424	6937	159	0	46	168	**7,752**
960600	5,717	591	96	733	3909	0	0	235	153	**5,126**
960700	7,493	2,009	596	632	3826	97	6	131	196	**5,484**
960800	7,076	773	0	5060	1112	45	0	25	61	**6,303**
960900	1,842	1,479	41	113	135	0	0	66	8	**363**
961000	2,179	1,332	22	530	172	46	13	34	30	**847**
961100	2,364	1,338	0	549	413	0	0	58	6	**1,026**
961200	2,614	1,579	0	676	328	18	0	0	13	**1,035**
961300	8,583	4,390	146	2100	1207	36	28	389	287	**4,193**
961400	3,424	1,876	0	825	557	49	0	74	43	**1,548**
961500	5,121	3,103	94	469	1364	0	0	68	23	**2,018**
961600	7,084	4,379	49	1403	1168	0	0	48	37	**2,705**
961700	6,101	1,818	0	2878	1291	18	0	6	90	**4,283**
961800	9,653	744	0	1826	6579	53	77	64	310	**8,909**
961900	5,081	1,408	0	2107	1408	41	0	36	81	**3,673**
962000	7,031	1,005	23	2923	2834	68	0	18	160	**6,026**
Sampson County	**60,161**	**34,247**	**2,081**	**17,932**	**1,208**	**278**	**77**	**3,740**	**598**	**25,914**
970200	5,902	3,800	399	963	176	41	17	435	71	**2,102**

Census Area	Total Population	White Non-Hispanic	White Hispanic	Black/ Afr. Am. (Total)	AIAN (Total)	Asian (Total)	NHPI (Total)	Other race (Total)	Two or more races (Total)	Total Minority Population
970300	10,662	7,814	319	1442	298	69	0	683	37	**2,848**
970400	5,288	3,704	46	1263	89	21	0	110	55	**1,584**
Wayne County	**113,329**	**67,789**	**1,729**	**37,586**	**330**	**1,078**	**67**	**3,245**	**1,505**	**45,540**
000100	9,453	8,016	147	1009	10	51	0	76	144	**1,437**
000200	3,279	2,121	32	1078	7	5	0	24	12	**1,158**
000301	9,117	7,301	42	1471	10	74	0	151	68	**1,816**
001100	9,805	7,506	85	1922	58	73	10	140	11	**2,299**
Wilson County	**73,814**	**39,485**	**1,436**	**29,350**	**125**	**333**	**8**	**2,306**	**771**	**34,329**
000100	4,100	914	50	2624	8	14	0	400	90	**3,186**
000200	1,870	97	172	1437	5	0	0	141	18	**1,773**
000300	2,584	606	13	1943	5	0	0	7	10	**1,978**
000400	6,990	3,878	90	2758	0	35	0	150	79	**3,112**
000500	8,401	7,265	34	955	0	22	8	57	60	**1,136**
000600	6,163	3,630	63	2250	29	34	0	13	144	**2,533**
000700	6,415	782	447	4597	9	85	0	462	33	**5,633**
000801	2,509	0	145	1999	0	0	0	307	58	**2,509**
000802	3,977	880	197	2646	0	15	0	193	46	**3,097**
000900	3,332	2,838	6	419	0	33	0	13	23	**494**
001000	1,710	977	6	633	6	3	0	85	0	**733**
001200	3,531	2,060	0	1395	9	0	0	67	0	**1,471**
001300	5,627	3,125	0	2410	12	8	0	0	72	**2,502**
001400	4,545	3,784	7	599	16	74	0	8	57	**761**
001500	3,739	2,773	107	575	0	0	0	262	22	**966**
001600	2,758	1,883	98	752	7	0	0	12	6	**875**
001700	3,790	3,031	0	609	19	9	0	89	33	**759**

Table 2. Environmental Justice Analysis – Poverty Data

Census Area	Total for whom poverty status determined	Income in 1999 below poverty level	% Below poverty Level	Low-Income Population >= 50%	Points Low-Income % Above County Average	Low-Income Population >=10% Above County Average	Either Poverty Threshold Reached
North Carolina	**7,805,328**	**958,667**	**12%**				
Bladen County	**31,560**	**6,622**	**21%**				
950200	3023	532	**18%**		**-3%**		

Census Area	Total for whom poverty status determined	Income in 1999 below poverty level	% Below poverty Level	Low-Income Population >= 50%	Points Low-Income % Above County Average	Low-Income Population >=10% Above County Average	Either Poverty Threshold Reached
950300	5273	775	**15%**		**-6%**		
Cumberland County	**284,529**	**36,391**	**13%**				
000100	599	289	**48%**		**35.46%**	X	X
000200	2673	1334	**50%**		**37.12%**	X	X
000400	937	226	**24%**		**11.33%**	X	X
000500	2345	461	**20%**		**6.87%**		
000600	5758	899	**16%**		**2.82%**		
000700	7492	372	**5%**		**-7.82%**		
000800	2627	386	**15%**		**1.90%**		
000900	4727	570	**12%**		**-0.73%**		
001000	2401	1044	**43%**		**30.69%**	X	X
001100	3411	603	**18%**		**4.89%**		
001200	5404	1681	**31%**		**18.32%**	X	X
001300	1210	526	**43%**		**30.68%**	X	X
001400	5405	1077	**20%**		**7.14%**		
001500	2743	426	**16%**		**2.74%**		
001601	5248	482	**9%**		**-3.61%**		
001602	8561	1026	**12%**		**-0.81%**		
001700	6409	1051	**16%**		**3.61%**		
001800	2303	321	**14%**		**1.15%**		
001901	2676	294	**11%**		**-1.80%**		
001902	4971	397	**8%**		**-4.80%**		
001903	4233	393	**9%**		**-3.51%**		
002000	7724	595	**8%**		**-5.09%**		
002100	4198	419	**10%**		**-2.81%**		
002200	2532	560	**22%**		**9.33%**		
002300	5151	1156	**22%**		**9.65%**		
002400	6201	1321	**21%**		**8.51%**		
002501	7470	589	**8%**		**-4.91%**		
002502	5305	837	**16%**		**2.99%**		
002503	5145	445	**9%**		**-4.14%**		
002504	5328	389	**7%**		**-5.49%**		
002600	4385	495	**11%**		**-1.50%**		
002700	6299	571	**9%**		**-3.72%**		
002800	5423	599	**11%**		**-1.74%**		

Census Area	Total for whom poverty status determined	Income in 1999 below poverty level	% Below poverty Level	Low-Income Population >= 50%	Points Low-Income % Above County Average	Low-Income Population >=10% Above County Average	Either Poverty Threshold Reached
002900	4654	882	**19%**		**6.16%**		
003000	9627	1086	**11%**		**-1.51%**		
003100	12936	1243	**10%**		**-3.18%**		
003201	6936	482	**7%**		**-5.84%**		
003203	5373	555	**10%**		**-2.46%**		
003204	7514	1179	**16%**		**2.90%**		
003205	4310	303	**7%**		**-5.76%**		
003302	3714	628	**17%**		**4.12%**		
003304	7332	640	**9%**		**-4.06%**		
003305	6599	709	**11%**		**-2.05%**		
003306	16267	1005	**6%**		**-6.61%**		
003307	3539	399	**11%**		**-1.52%**		
003308	8141	825	**10%**		**-2.66%**		
003309	5399	128	**2%**		**-10.42%**		
003400	17807	1667	**9%**		**-3.43%**		
003700	6282	495	**8%**		**-4.91%**		
Edgecombe County	**54,539**	**10,683**	**20%**				
020100	319	167	**52%**	X	**32.76%**	X	X
020200	6998	1851	**26%**		**6.86%**		
020300	5689	1235	**22%**		**2.12%**		
020400	5100	1959	**38%**		**18.82%**	X	X
020600	3578	668	**19%**		**-0.92%**		
020700	2168	454	**21%**		**1.35%**		
021300	4401	517	**12%**		**-7.84%**		
021400	3341	315	**9%**		**-10.16%**		
Halifax County	**55,620**	**13,295**	**24%**				
990100	3605	1169	**32%**		**8.52%**		
990200	5408	533	**10%**		**-14.05%**		
990300	4842	908	**19%**		**-5.15%**		
990400	3748	873	**23%**		**-0.61%**		
990500	9558	2102	**22%**		**-1.91%**		
990600	4135	1115	**27%**		**3.06%**		
990700	4267	758	**18%**		**-6.14%**		
990800	5396	1677	**31%**		**7.18%**		

Census Area	Total for whom poverty status determined	Income in 1999 below poverty level	% Below poverty Level	Low-Income Population >= 50%	Points Low-Income % Above County Average	Low-Income Population >=10% Above County Average	Either Poverty Threshold Reached
990900	5892	1832	**31%**		**7.19%**		
991000	2640	536	**20%**		**-3.60%**		
Harnett County	**88,110**	**13,129**	**15%**				
070100	4518	1208	**27%**		**11.84%**	X	X
070200	3357	860	**26%**		**10.72%**	X	X
070300	4542	570	**13%**		**-2.35%**		
070400	9049	1282	**14%**		**-0.73%**		
070500	5824	1078	**19%**		**3.61%**		
070600	4108	628	**15%**		**0.39%**		
070700	4203	613	**15%**		**-0.32%**		
070800	4284	743	**17%**		**2.44%**		
070900	8930	1107	**12%**		**-2.50%**		
Hoke County	**32,418**	**5,731**	**18%**				
970100	14721	2019	**14%**		**-3.96%**		
970400	6082	1332	**22%**		**4.22%**		
Johnston County	**120,182**	**15,399**	**13%**				
040100	6396	970	**15%**		**2.35%**		
040200	15462	1757	**11%**		**-1.45%**		
040300	9131	2096	**23%**		**10.14%**	X	X
040400	3530	515	**15%**		**1.78%**		
040500	5475	536	**10%**		**-3.02%**		
040600	3203	768	**24%**		**11.16%**	X	X
040700	3168	571	**18%**		**5.21%**		
040800	3263	499	**15%**		**2.48%**		
040900	10088	1070	**11%**		**-2.21%**		
041000	11324	1209	**11%**		**-2.14%**		
041100	16443	1105	**7%**		**-6.09%**		
041200	7627	1239	**16%**		**3.43%**		
041300	5347	855	**16%**		**3.18%**		
041400	6255	1174	**19%**		**5.96%**		
041500	13470	1035	**8%**		**-5.13%**		
Nash County	**85,413**	**11,478**	**13%**				
010100	407	176	**43%**		**29.81%**	X	X
010200	6294	1889	**30%**		**16.57%**	X	X

Census Area	Total for whom poverty status determined	Income in 1999 below poverty level	% Below poverty Level	Low-Income Population >= 50%	Points Low-Income % Above County Average	Low-Income Population >=10% Above County Average	Either Poverty Threshold Reached
010300	6947	1123	**16%**		**2.73%**		
010400	3682	891	**24%**		**10.76%**	X	X
010502	6228	588	**9%**		**-4.00%**		
010503	2667	100	**4%**		**-9.69%**		
010504	5142	573	**11%**		**-2.29%**		
010600	7896	784	**10%**		**-3.51%**		
010700	2764	363	**13%**		**-0.31%**		
010800	6042	514	**9%**		**-4.93%**		
010900	5276	621	**12%**		**-1.67%**		
011000	4161	692	**17%**		**3.19%**		
011100	9134	796	**9%**		**-4.72%**		
011200	5257	542	**10%**		**-3.13%**		
011300	4132	856	**21%**		**7.28%**		
011400	3597	431	**12%**		**-1.46%**		
011500	5787	539	**9%**		**-4.12%**		
Northampton County	**21,185**	**4,503**	**21%**				
980300	5571	1464	**26%**		**5.02%**		
980400	5521	1041	**19%**		**-2.40%**		
Robeson County	**119,794**	**27,326**	**23%**				
960100	7884	2051	**26%**		**3.20%**		
960200	9535	2115	**22%**		**-0.63%**		
960300	6197	1678	**27%**		**4.27%**		
960400	9245	1793	**19%**		**-3.42%**		
960500	7826	2154	**28%**		**4.71%**		
960600	5405	1307	**24%**		**1.37%**		
960700	7493	1189	**16%**		**-6.94%**		
960800	6043	2600	**43%**		**20.21%**	X	X
960900	1842	66	**4%**		**-19.23%**		
961000	2175	467	**21%**		**-1.34%**		
961100	2348	718	**31%**		**7.77%**		
961200	2473	481	**19%**		**-3.36%**		
961300	8131	1671	**21%**		**-2.26%**		
961400	3414	385	**11%**		**-11.53%**		
961500	5121	941	**18%**		**-4.44%**		

Census Area	Total for whom poverty status determined	Income in 1999 below poverty level	% Below poverty Level	Low-Income Population >= 50%	Points Low-Income % Above County Average	Low-Income Population >=10% Above County Average	Either Poverty Threshold Reached
961600	7068	1424	**20%**		**-2.66%**		
961700	5977	1398	**23%**		**0.58%**		
961800	9554	1903	**20%**		**-2.89%**		
961900	5067	1259	**25%**		**2.04%**		
962000	6996	1726	**25%**		**1.86%**		
Sampson County	**59,422**	**10,431**	**18%**				
970200	5880	766	**13%**		**-4.53%**		
970300	10626	1572	**15%**		**-2.76%**		
970400	5272	967	**18%**		**0.79%**		
Wayne County	**109,083**	**15,097**	**14%**				
000100	9406	588	**6%**		**-7.59%**		
000200	3230	521	**16%**		**2.29%**		
000301	9061	556	**6%**		**-7.70%**		
001100	8270	865	**10%**		**-3.38%**		
Wilson County	**72,141**	**13,326**	**18%**				
000100	3673	1085	**30%**		**11.07%**	X	X
000200	1660	862	**52%**	X	**33.46%**	X	X
000300	2584	508	**20%**		**1.19%**		
000400	6536	1081	**17%**		**-1.93%**		
000500	8376	403	**5%**		**-13.66%**		
000600	6130	1113	**18%**		**-0.32%**		
000700	6069	2161	**36%**		**17.14%**	X	X
000801	2477	1158	**47%**		**28.28%**	X	X
000802	3885	1006	**26%**		**7.42%**		
000900	3314	354	**11%**		**-7.79%**		
001000	1704	193	**11%**		**-7.15%**		
001200	3524	635	**18%**		**-0.45%**		
001300	5620	870	**15%**		**-2.99%**		
001400	4545	175	**4%**		**-14.62%**		
001500	3739	472	**13%**		**-5.85%**		
001600	2752	467	**17%**		**-1.50%**		
001700	3788	425	**11%**		**-7.25%**		

Table 3. Environmental Justice Analysis - Minority

Census Area	Total Population	% Minority Population	Minority Population >=50%	Minority % Points Above County Average	Minority Population >=10% Above County Average	Either Minority Threshold Reached
North Carolina	**8,049,313**	**29.82%**				
Bladen County	**32,278**	**44.03%**				
950200	3,063	**45.38%**		**1.35%**		
950300	5,314	**34.42%**		**-9.61%**		
Cumberland County	**302,963**	**47.48%**				
000100	910	**63.85%**	X	**16.37%**	X	X
000200	2,673	**84.29%**	X	**36.81%**	X	X
000400	963	**88.79%**	X	**41.31%**	X	X
000500	2,392	**37.17%**		**-10.31%**		
000600	5,791	**36.06%**		**-11.42%**		
000700	7,518	**17.57%**		**-29.91%**		
000800	2,768	**34.03%**		**-13.44%**		
000900	4,746	**29.96%**		**-17.51%**		
001000	2,686	**92.03%**	X	**44.56%**	X	X
001100	4,651	**98.19%**	X	**50.72%**	X	X
001200	5,641	**70.38%**	X	**22.90%**	X	X
001300	1,210	**95.95%**	X	**48.47%**	X	X
001400	5,643	**42.09%**		**-5.39%**		
001500	2,786	**34.60%**		**-12.87%**		
001601	5,274	**27.80%**		**-19.68%**		
001602	8,752	**42.93%**		**-4.55%**		
001700	6,527	**36.54%**		**-10.94%**		
001800	2,338	**32.85%**		**-14.63%**		
001901	2,684	**38.11%**		**-9.36%**		
001902	4,985	**44.67%**		**-2.80%**		
001903	4,268	**37.04%**		**-10.43%**		
002000	7,756	**49.28%**		**1.80%**		
002100	4,217	**41.26%**		**-6.21%**		
002200	2,559	**83.12%**	X	**35.64%**	X	X
002300	5,151	**54.65%**	X	**7.17%**		X
002400	6,236	**73.12%**	X	**25.65%**	X	X
002501	7,479	**60.69%**	X	**13.21%**	X	X
002502	5,801	**39.61%**		**-7.86%**		
002503	5,145	**37.16%**		**-10.31%**		
002504	5,333	**40.97%**		**-6.51%**		
002600	4,397	**29.86%**		**-17.62%**		

Census Area	Total Population	% Minority Population	Minority Population >=50%	Minority % Points Above County Average	Minority Population >=10% Above County Average	Either Minority Threshold Reached
002700	6,416	**27.99%**		**-19.48%**		
002800	5,429	**20.26%**		**-27.21%**		
002900	4,749	**34.93%**		**-12.54%**		
003000	9,647	**30.78%**		**-16.70%**		
003100	13,006	**29.41%**		**-18.07%**		
003201	6,945	**28.42%**		**-19.05%**		
003203	5,397	**51.10%**	X	**3.63%**		X
003204	7,603	**54.62%**	X	**7.15%**		X
003205	4,320	**52.78%**	X	**5.30%**		X
003302	3,733	**81.38%**	X	**33.91%**	X	X
003304	7,377	**60.50%**	X	**13.02%**	X	X
003305	6,629	**63.99%**	X	**16.52%**	X	X
003306	16,322	**62.18%**	X	**14.70%**	X	X
003307	3,563	**67.56%**	X	**20.08%**	X	X
003308	8,176	**57.05%**	X	**9.57%**		X
003309	5,418	**50.37%**	X	**2.89%**		X
003400	31,791	**45.27%**		**-2.20%**		
003700	6,317	**25.74%**		**-21.74%**		
Edgecombe County	**55,606**	**60.76%**				
020100	319	**91.22%**	X	**30.47%**	X	X
020200	7,020	**83.36%**	X	**22.61%**	X	X
020300	5,689	**84.71%**	X	**23.95%**	X	X
020400	5,110	**95.38%**	X	**34.63%**	X	X
020600	3,955	**74.79%**	X	**14.04%**	X	X
020700	2,177	**64.31%**	X	**3.55%**		X
021300	4,411	**38.22%**		**-22.53%**		
021400	3,372	**18.68%**		**-42.07%**		
Halifax County	**57,370**	**57.74%**				
990100	3,672	**72.28%**	X	**14.54%**	X	X
990200	5,420	**18.08%**		**-39.65%**		
990300	4,857	**21.35%**		**-36.39%**		
990400	3,871	**33.97%**		**-23.77%**		
990500	9,664	**51.42%**	X	**-6.32%**		X
990600	4,142	**58.84%**	X	**1.10%**		X
990700	4,267	**56.50%**	X	**-1.23%**		X
990800	5,422	**93.31%**	X	**35.57%**	X	X
990900	6,026	**83.36%**	X	**25.62%**	X	X
991000	3,751	**74.27%**	X	**16.54%**	X	X

Census Area	Total Population	% Minority Population	Minority Population >=50%	Minority % Points Above County Average	Minority Population >=10% Above County Average	Either Minority Threshold Reached
Harnett County	**91,025**	**31.26%**				
070100	4,599	**39.92%**		**8.67%**		
070200	3,400	**52.59%**	X	**21.33%**	X	X
070300	4,752	**26.07%**		**-5.18%**		
070400	9,095	**23.23%**		**-8.02%**		
070500	5,959	**20.32%**		**-10.93%**		
070600	4,135	**56.28%**	X	**25.02%**	X	X
070700	5,110	**47.44%**		**16.18%**	X	X
070800	5,555	**20.97%**		**-10.28%**		
070900	8,962	**30.54%**		**-0.72%**		
Hoke County	**33,646**	**58.17%**				
970100	14,798	**50.05%**	X	**-8.12%**		X
970400	6,092	**71.09%**	X	**12.92%**	X	X
Johnston County	**121,965**	**24.69%**				
040100	6,443	**20.55%**		**-4.14%**		
040200	15,474	**23.70%**		**-0.99%**		
040300	9,217	**50.72%**	X	**26.03%**	X	X
040400	3,531	**16.60%**		**-8.09%**		
040500	5,485	**14.42%**		**-10.27%**		
040600	3,208	**47.94%**		**23.26%**	X	X
040700	3,402	**34.83%**		**10.15%**	X	X
040800	3,456	**28.56%**		**3.87%**		
040900	10,973	**24.99%**		**0.30%**		
041000	11,534	**27.87%**		**3.19%**		
041100	16,488	**18.33%**		**-6.36%**		
041200	7,673	**22.30%**		**-2.39%**		
041300	5,347	**20.89%**		**-3.80%**		
041400	6,264	**25.93%**		**1.24%**		
041500	13,470	**14.30%**		**-10.39%**		
Nash County	**87,420**	**39.09%**				
010100	410	**87.07%**	X	**47.98%**	X	X
010200	6,400	**74.03%**	X	**34.94%**	X	X
010300	6,947	**35.24%**		**-3.86%**		
010400	3,682	**69.45%**	X	**30.35%**	X	X
010502	6,287	**27.50%**		**-11.59%**		
010503	2,922	**25.02%**		**-14.08%**		
010504	5,142	**27.81%**		**-11.28%**		
010600	8,368	**43.68%**		**4.58%**		

Census Area	Total Population	% Minority Population	Minority Population >=50%	Minority % Points Above County Average	Minority Population >=10% Above County Average	Either Minority Threshold Reached
010700	2,764	**56.48%**	X	**17.38%**	X	X
010800	6,068	**24.09%**		**-15.00%**		
010900	5,293	**55.15%**	X	**16.05%**	X	X
011000	4,163	**48.81%**		**9.72%**		
011100	10,056	**34.52%**		**-4.58%**		
011200	5,268	**18.28%**		**-20.81%**		
011300	4,148	**30.42%**		**-8.67%**		
011400	3,641	**30.49%**		**-8.61%**		
011500	5,861	**29.88%**		**-9.22%**		
Northampton County	**22,086**	**60.97%**				
980300	6,296	**76.46%**	X	**15.49%**	X	X
980400	5,524	**58.92%**	X	**-2.05%**		X
Robeson County	**123,339**	**69.15%**				
960100	8,009	**52.72%**	X	**-16.44%**		X
960200	9,641	**66.85%**	X	**-2.30%**		X
960300	6,383	**74.62%**	X	**5.47%**		X
960400	9,258	**92.56%**	X	**23.41%**	X	X
960500	8,685	**89.26%**	X	**20.11%**	X	X
960600	5,717	**89.66%**	X	**20.51%**	X	X
960700	7,493	**73.19%**	X	**4.04%**		X
960800	7,076	**89.08%**	X	**19.92%**	X	X
960900	1,842	**19.71%**		**-49.44%**		
961000	2,179	**38.87%**		**-30.28%**		
961100	2,364	**43.40%**		**-25.75%**		
961200	2,614	**39.59%**		**-29.56%**		
961300	8,583	**48.85%**		**-20.30%**		
961400	3,424	**45.21%**		**-23.94%**		
961500	5,121	**39.41%**		**-29.74%**		
961600	7,084	**38.18%**		**-30.97%**		
961700	6,101	**70.20%**	X	**1.05%**		X
961800	9,653	**92.29%**	X	**23.14%**	X	X
961900	5,081	**72.29%**	X	**3.14%**		X
962000	7,031	**85.71%**	X	**16.56%**	X	X
Sampson County	**60,161**	**43.07%**				
970200	5,902	**35.62%**		**-7.46%**		
970300	10,662	**26.71%**		**-16.36%**		
970400	5,288	**29.95%**		**-13.12%**		
Wayne County	**113,329**	**40.18%**				

Census Area	Total Population	% Minority Population	Minority Population >=50%	Minority % Points Above County Average	Minority Population >=10% Above County Average	Either Minority Threshold Reached
000100	9,453	**15.20%**		**-24.98%**		
000200	3,279	**35.32%**		**-4.87%**		
000301	9,117	**19.92%**		**-20.27%**		
001100	9,805	**23.45%**		**-16.74%**		
Wilson County	**73,814**	**46.51%**				
000100	4,100	**77.71%**	X	**31.20%**	X	X
000200	1,870	**94.81%**	X	**48.31%**	X	X
000300	2,584	**76.55%**	X	**30.04%**	X	X
000400	6,990	**44.52%**		**-1.99%**		
000500	8,401	**13.52%**		**-32.99%**		
000600	6,163	**41.10%**		**-5.41%**		
000700	6,415	**87.81%**	X	**41.30%**	X	X
000801	2,509	**100.00%**	X	**53.49%**	X	X
000802	3,977	**77.87%**	X	**31.37%**	X	X
000900	3,332	**14.83%**		**-31.68%**		
001000	1,710	**42.87%**		**-3.64%**		
001200	3,531	**41.66%**		**-4.85%**		
001300	5,627	**44.46%**		**-2.04%**		
001400	4,545	**16.74%**		**-29.76%**		
001500	3,739	**25.84%**		**-20.67%**		
001600	2,758	**31.73%**		**-14.78%**		
001700	3,790	**20.03%**		**-26.48%**		

Table 4. Primary Languages Spoken - Bladen County

Language	Speaking Population
English	28,511
Spanish /Spanish Creole	1,321
French (incl. Patois, Cajun)	75
German	50
Korean	28
Other Native North American languages	16
Total Sum of Serbo-Croatian	15
Total Sum of Polish	11
Total Sum of Hebrew	9
Total Sum of Arabic	8
Total Sum of Greek	7

Table 5. Primary Languages Spoken - Cumberland County

Language	Speaking Population
English	248,238
Spanish /Spanish Creole	16,536
German	3,884
Korean	2,099
French (incl. Patois, Cajun)	1,435
Vietnamese	731
Tagalog	684
Italian	482
Greek	462
Japanese	367
Thai	340
Chinese	334
Arabic	318
Other Indic languages	294
Other Pacific Island languages	219
African languages	218
French Creole	177
Russian	169
Portuguese /Portuguese Creole	159
Other Indo-European languages	155
Scandinavian languages	125
Loatian	91
Miao, Hmong	91
Hindi	88
Other West Germanic languages	88
Urdu	85
Polish	77
Other Asian languages	75
Other Native North American languages	75
Gujarathi	71
Serbo-Croatian	63
Navajo	56
Yiddish	44
Persian	41
Hebrew	32
Other and unspecified languages	18
Other Slavic languages	17
Hungarian	12
Mon-Khmer, Cambodian	9

Table 6. Primary Languages Spoken - Edgecombe County

Language	Speaking Population
English	49,580
Spanish /Spanish Creole	1,839
French (incl. Patois, Cajun)	239

Language	Speaking Population
German	114
Miao, Hmong	45
Korean	31
Italian	30
Greek	12
Scandinavian languages	10
Japanese	8
Mon-Khmer, Cambodian	8
African languages	7
Arabic	7
Hebrew	7
Other Indo-European languages	7
Tagalog	7
Other Indic languages	6
Yiddish	5
Portuguese /Portuguese Creole	2

Table 7. Primary Languages Spoken - Halifax County

Language	Speaking Population
English	52,345
Spanish /Spanish Creole	853
French (incl. Patois, Cajun)	141
African languages	76
German	70
Chinese	69
Miao, Hmong	56
Mon-Khmer, Cambodian	34
Gujarathi	30
Italian	30
Korean	24
Vietnamese	22
Other Pacific Island languages	14
Tagalog	14
Arabic	12
Yiddish	10
Asian languages	9
Greek	7
Scandinavian languages	6
French Creole	5
Other Indo-European languages	3

Table 8. Primary Languages Spoken - Harnett County

Language	Speaking Population
English	77,608
Spanish /Spanish Creole	4,923
German	380

Language	Speaking Population
French (incl. Patois, Cajun)	311
Korean	191
Urdu	88
Italian	87
Thai	78
Chinese	74
Tagalog	68
Japanese	52
Vietnamese	47
Other Pacific Island languages	44
Arabic	28
Russian	27
French Creole	25
Polish	21
Hindi	20
Other Indic languages	17
Other Native North American languages	14
Portuguese /Portuguese Creole	11
Other Indo-European languages	10
Scandinavian languages	10
Gujarathi	8
Slavic languages	7
African languages	5
Greek	5
Yiddish	5

Table 9. Primary Languages Spoken - Hoke County

Language	Speaking Population
English	27,455
Spanish /Spanish Creole	2,146
German	363
French (incl. Patois, Cajun)	96
Chinese	71
Gujarathi	71
Tagalog	65
Korean	58
Japanese	54
Mon-Khmer, Cambodian	34
Italian	32
African languages	25
Hindi	24
Other Indo-European languages	23
Loatian	20
Miao, Hmong	17
Arabic	15

Language	Speaking Population
Other Native North American languages	12
Scandinavian languages	12
Vietnamese	11
Navajo	10
Thai	9
Other and unspecified languages	8
Portuguese /Portuguese Creole	5

Table 10. Primary Languages Spoken - Johnston County

Language	Speaking Population
English	101,914
Spanish /Spanish Creole	8,700
French (incl. Patois, Cajun)	297
German	254
Italian	106
Other Indo-European languages	97
Korean	72
Persian	72
Vietnamese	65
Chinese	56
Loatian	49
Hindi	45
Other and unspecified languages	41
Gujarathi	38
Arabic	37
Greek	37
Miao, Hmong	27
Portuguese /Portuguese Creole	23
Asian languages	22
Other Indic languages	22
Urdu	22
Japanese	19
French Creole	17
Scandinavian languages	16
Mon-Khmer, Cambodian	15
Russian	15
Yiddish	15
Tagalog	13
Slavic languages	12
Hungarian	9
Thai	9
Other Native North American languages	8
Hebrew	2

Table 11. Primary Languages Spoken - Nash County

Language	Speaking Population
English	76,803
Spanish /Spanish Creole	3,310
Arabic	394
French (incl. Patois, Cajun)	337
German	139
Chinese	123
Italian	80
Japanese	69
Portuguese /Portuguese Creole	41
African languages	40
Tagalog	40
Other West Germanic languages	38
Hindi	35
Greek	33
Loatian	30
Vietnamese	25
Other Indo-European languages	24
Thai	22
Other Native North American languages	17
Hungarian	13
Polish	12
Hebrew	11
Other Indic languages	11
Korean	7
Urdu	4
Mon-Khmer, Cambodian	3
Scandinavian languages	3

Table 12. Primary Languages Spoken - Northampton County

Language	Speaking Population
English	20,292
Spanish /Spanish Creole	289
French (incl. Patois, Cajun)	139
Hindi	18
Chinese	17
German	15
Japanese	15
Korean	14
Arabic	13
Mon-Khmer, Cambodian	9
Italian	6
Portuguese /Portuguese Creole	3
Greek	2
Hungarian	2

Language	Speaking Population
Other and unspecified languages	2
Russian	2

Table 4. Primary Languages Spoken - Robeson County

Language	Speaking Population
English	105,978
Spanish /Spanish Creole	5,917
French (incl. Patois, Cajun)	353
German	284
Vietnamese	155
Urdu	105
Other Indo-European languages	98
Other and unspecified languages	95
Korean	89
Tagalog	77
Chinese	68
Hindi	63
Loatian	62
Gujarathi	60
Other Indic languages	45
Japanese	41
Other Pacific Island languages	32
African languages	30
Slavic languages	28
Polish	19
Serbo-Croatian	18
Italian	16
Miao, Hmong	14
Russian	9
Thai	7
Asian languages	5
French Creole	4
Hebrew	4
Other Native North American languages	4
Yiddish	2

Table 14. Primary Languages Spoken - Sampson County

Language	Speaking Population
English	49,455
Spanish /Spanish Creole	5,604
French (incl. Patois, Cajun)	180
German	94
Vietnamese	46

Language	Speaking Population
Korean	41
Other and unspecified languages	34
Tagalog	31
Italian	25
Other West Germanic languages	25
Chinese	24
Other Pacific Island languages	20
Other Native North American languages	19
Thai	19
Hungarian	14
Loatian	14
Other Indic languages	13
Gujarathi	12
Hindi	11
Arabic	9
Portuguese /Portuguese Creole	6
Other Indo-European languages	4
Japanese	3
Polish	3
Greek	2

Table 15. Primary Languages Spoken - Wayne County

Language	Speaking Population
English	97,987
Spanish /Spanish Creole	5,493
German	423
French (incl. Patois, Cajun)	359
Tagalog	136
Chinese	130
Asian languages	118
Arabic	113
Gujarathi	111
Japanese	101
Thai	94
Korean	92
Portuguese /Portuguese Creole	60
Vietnamese	60
Other Indic languages	46
Italian	42
African languages	35
Other Indo-European languages	26
Polish	25
Hebrew	23
Other Pacific Island languages	22
Scandinavian languages	22

Language	Speaking Population
Urdu	21
Greek	15
Other West Germanic languages	13
Serbo-Croatian	12
French Creole	10
Hindi	9
Yiddish	8
Slavic languages	6
Persian	5
Armenian	4

Table 16. Primary Languages Spoken - Wilson County

Language	Speaking Population
English	63,284
Spanish /Spanish Creole	4,762
French (incl. Patois, Cajun)	189
Persian	88
Arabic	86
German	70
Other Indic languages	66
Chinese	63
Korean	41
Hindi	33
Portuguese /Portuguese Creole	33
Japanese	28
Tagalog	23
Greek	17
Asian languages	16
Slavic languages	14
African languages	11
Urdu	9
Vietnamese	9
Italian	8
Polish	6
Hungarian	5

Table 17. Primary Languages Spoken - Demographic Study Area Totals

Language	Speaking Population
English	999,450
Spanish /Spanish Creole	61,693
German	6,140
French (incl. Patois, Cajun)	4,151
Korean	2,787

Language	Speaking Population
Vietnamese	1,171
Tagalog	1,158
Arabic	1,040
Chinese	1,029
Italian	944
Japanese	757
Greek	599
Thai	578
Other Indic languages	520
African languages	447
Other Indo-European languages	447
Gujarathi	401
Other Pacific Island languages	351
Hindi	346
Portuguese /Portuguese Creole	343
Urdu	334
Loatian	266
Miao, Hmong	250
Asian languages	245
French Creole	238
Russian	222
Persian	206
Scandinavian languages	204
Other and unspecified languages	198
Polish	174
Other Native North American languages	165
Other West Germanic languages	164
Mon-Khmer, Cambodian	112
Serbo-Croatian	108
Yiddish	89
Hebrew	88
Slavic languages	84
Navajo	66
Hungarian	55
Armenian	4

Appendix D

Descriptions of Federally Listed Species in Counties in the Natural Resource Study Area

***Alligator mississippiensis* (American Alligator)**
Federal Status: Threatened Due to Similarity of Appearance
Animal Family: Alligatoridae
Federally Listed: June 4, 1987

Alligators are large, lizard-like reptiles with broadly rounded snouts. Adults are 6 to 12 feet long and can reach lengths of 15 feet or more. They are blackish in appearance, but have pale cross bands on the back and vertical markings on the sides. Alligators inhabit rivers, swamps, estuaries, lakes, and marshes throughout the southeastern United States, from North Carolina to Texas. A population of American alligators is listed along the Black River (Map Sheet 31).

Note: A Biological Conclusion is not required since Threatened Due to Similarity of Appearance (T/SA) species are not afforded full protection under the ESA.

***Picoides borealis* (Red-Cockaded Woodpecker)**
Federal Status: Endangered
Family: Picidae
Federally Listed: October 13, 1970

The red-cockaded woodpecker once occurred from New Jersey to southern Florida and west to eastern Texas. It occurred inland in Kentucky, Tennessee, Arkansas, Oklahoma, and Missouri. The red-cockaded woodpecker is now found only in coastal states of its historic range and inland in southeastern Oklahoma and southern Arkansas. In North Carolina moderate populations occur in the Sandhills and southern coastal plain. The few populations found in the Piedmont and northern Coastal Plain are believed to be relics of former populations.

The red-cockaded woodpecker is approximately 8 inches (20.3 centimeters) long with a wingspan of 14 inches (35.6 centimeters). Plumage includes black and white horizontal stripes on its back, with white cheeks and under parts. Its flanks are streaked black. The cap and stripe on the throat and side of neck are black, with males having a small red spot on each side of the cap. Eggs are laid from April through June. Maximum clutch size is seven eggs with an average of three to five. There are listed populations of red-cockaded woodpeckers on Map Sheets 44-45, 55-57, and 68.

***Elliptio steinstansana* (Tar River spinymussel)**
Federal Status: Endangered
Family: Unionidae
Federally Listed: June 27, 1985

The Tar River spinymussel is only known to occur in North Carolina. Historically it is believed to have occurred in the Neuse and Tar River Basins in the Coastal Plain and Piedmont. Today, only a few populations are known to exist. There is a listed population of the Tar River Spinymussel on Map Sheet 69

The Tar River spinymussel is one of three freshwater mussels with spines. Juveniles may have up to 12 spines; however, they tend to lose them as they mature. It is a medium sized mussel reaching about

2.5 inches in length. It is found in rivers and large creeks in relatively silt-free gravel and or course sand with fast-flowing, well oxygenated riffles.

***Alasmidonta heterodon* (Dwarf wedgemussel)**
Federal Status: Endangered
Family: Unionidae
Federally Listed: March 14, 1990

The dwarf wedgemussel is a small freshwater mussel with a trapezoidal-shaped shell that is usually less than 1.7 inches in length and is brown to yellowish brown in color. It is historically known to exist from New Brunswick, Canada to North Carolina. Documented populations in N.C. have occurred in Johnston, Wake, Orange, Nash, Wilson, Granville, Person, Vance, Franklin and Warren Counties. There is a listed population on Map Sheets 72 and 73.

The dwarf wedgemussel inhabits creeks and rivers close to the banks, under overhangs, and around submerged logs. It is also known to live on firm substrate of sand, gravel, and muddy sand with a slow to moderate current, and requires clean water that is well oxygenated and nearly silt free. Hosts for the dwarf wedgemussel larvae (glochidia) that have been identified include the tessellated darter (*Etheostoma olmstedi*), Johnny darter (*E. nigrum*), and mottled sculpin (*Cottus bairdi*).

***Lysimachia asperulaefolia* (Rough-leaved loosestrife)**
Federal Status: Endangered
Plant Family: Primulaceae
Federally Listed: June 12, 1987

Rough-leaved loosestrife is a species endemic to the coastal plain and Sandhills of North Carolina and South Carolina. It is currently known from 35 populations in North Carolina and one in South Carolina. North Carolina's extant populations are in the following counties: Brunswick (8 populations); Pender (1 population); Bladen (1 population); Carteret (8 populations); Scotland (3 populations); Cumberland (5 populations); Onslow (3 populations); Hoke (5 populations); and Pamlico (1 population). Historically, Rough-leaved loosestrife was known from 15 other sites in Brunswick, Pender, Cumberland, Onslow, Beaufort, Columbus, Pamlico, and Richmond Counties, North Carolina, and Darlington County, South Carolina. Most of the populations are small, both in area covered and in number of stems. There is a listed population of the Rough-leaved loosestrife on Map Sheet 21.

The slender stems of this perennial herb grow from a rhizome and reach heights of 1 to 2 feet (0.3 to 0.6 meter). Whorls of 3 to 4 leaves encircle the stem at intervals beneath the showy yellow flowers. Flowering occurs from mid-May through June, with fruits present from July through October.

This species generally occurs in the ecotones or edges between longleaf pine uplands and pond pine pocosins, on moist to seasonally saturated sands, and on shallow organic soils overlaying sand. Rough-leaved loosestrife has also been found on deep peat in the low shrub community of large Carolina bays. The grass-shrub ecotone, where rough-leaved loosestrife is found, is fire-maintained, as are the adjacent plant communities (longleaf pine-scrub oak, savanna, flatwoods, and pocosin). Suppression of naturally occurring fire in these ecotones results in shrubs increasing in density and height and expanding to eliminate the open edges required by this plant. Fire suppression, drainage, and, to a lesser extent,

residential and industrial development have altered and eliminated habitat for this species and continue to be the most significant threats to the species' continued existence.

Other Federally Protected Species

The following federally protected species are listed in the Counties through which I-95 passes, but there are no known populations within the natural resource study area (one-half mile of I-95):

***Notropis mekistocholas* (Cape Fear Shiner)**
Federal Status: Endangered
Family: Cyprinidae
Federally Listed: September 26, 1987

The Cape Fear shiner is a small minnow, rarely exceeding 2.4 inches in length. It is a pale silvery yellow with a black stripe along each side. The fins are yellow and pointed, the upper lip is black, and the lower lip has a thin black bar along its edge.

Water willow (*Justicia americana*) beds in flowing areas of creeks and rivers appear to be an essential element of the species' habitat. It is found in clean, rocky streams over gravel, cobble, and boulder substrate, and is known to inhabit pools, riffles, and slow runs. Juveniles are often found in slack water, among mid-stream rock outcrops, and in side channels and pools.

***Neonympha mitchellii francisci* (Saint Francis' satyr)**
Federal Status: Endangered
Animal Family: Nymphalidae
Federally Listed: Emergency listed on April 18, 1994

The Saint Francis' satyr is a small, dark brown butterfly with conspicuous eyespots on the lower wing surface of the fore and hind legs. The eyespots are round to oval shaped with a dark maroon brown center and a straw yellow border. These spots are accentuated with two bright orange bands along the posterior wings and by two darker brown bands along the central portion of each wing.

The Saint Francis' satyr is known to inhabit wide, wet meadows dominated by sedges and other wetland graminoids. These wetlands are often relicts of beaver activity and are boggy areas that are acidic and ephemeral. Succession of these sites often leads to either a pocosin or swamp dominated forest. The larval host of the Saint Francis' satyr is thought to be grasses, sedges and rushes.

***Schwalbea americana* (American chaffseed)**
Federal Status: Endangered
Plant family: Scrophulariaceae
Federally Listed: September 29, 1992

American chaffseed is an erect perennial herb with unbranched stems (or stems branched only at the base) with large, purplish-yellow, tubular flowers that are borne singly on short stalks in the axils of the uppermost, reduced leaves (bracts). The leaves are alternate, lance-shaped to elliptic, stalkless, 1 to 2 inches long, and entire. The entire plant is densely, but minutely hairy throughout, including the flowers. Flowering occurs from April to June in the South, and from June to mid-July in the North. Chaffseed

fruits are long, narrow capsules enclosed in a sac-like structure that provides the basis for the common name. Fruits mature from early summer in the South to October in the North. Schwalbea is a hemiparasite (partially dependent upon another plant as host). Like most of the hemiparasitic Scrophulariaceae, it is not host-specific, so its rarity is not due to its preference for a specialized host. Although another species (*S. australis*) was once recognized, the genus Schwalbea is now considered to be monotypic.

Currently, 51 populations are known, including 1 in New Jersey, 1 in North Carolina, 43 in South Carolina, 4 in Georgia, and 2 in Florida. Chaffseed was never considered to be common, but populations have declined and the range has seriously contracted in recent decades. Many historic populations have been confirmed extirpated due to habitat destruction, primarily due to development. Others have been lost in the absence of habitat destruction, probably as a result of fire exclusion.

***Rhus michauxii* (Michaux's sumac)**
Federal Status: Endangered
Plant Family: Anacardiaceae
Federally Listed: September 28, 1989

Michaux's sumac is a densely pubescent rhizomatus shrub that grows 0.7 to 3.3 feet in height. The narrowly winged or wingless rachis supports nine to thirteen sessile, oblong-lanceolate leaflets that are 1.6 to 3.6 inches long, 0.8 to 2 inches wide, acute, and acuminate. The bases of the leaves are rounded and their edges are simple or doubly serrate. Plants flower in June, producing a terminal, erect, dense cluster of four to five greenish-yellow to white flowers. The plant also produces fruit, a red drupe, through the months of August to October.

This plant occurs in rocky or sandy open woods and roadsides. It is dependent on disturbance (mowing, clearing, fire) to maintain the openness of its habitat. It grows in open habitat where it can get full sunlight and is often found with other members of its genus as well as with poison ivy. Michaux's sumac is endemic to the inner Coastal Plain and Piedmont physiographic provinces of North Carolina.

***Lindera melissifolia* (Pondberry)**
Federal Status: Endangered
Plant Family: Lauraceae
Federally Listed: July 31, 1986

Pondberry, also known as southern spicebush, is an aromatic, deciduous shrub with erect stems and shoots, growing as high as 6.5 feet. It spreads vegetatively by above ground shoots (stolons). Young stems and leaves are hairy. Leaves are alternate, drooping, and oblong, with hairy edges, a pointed tip and rounded base, 2 to 4 inches long and 0.6 to 1.4 inches wide. Pondberry is characterized by the sassafras-like odor of its crushed leaves and tendency to form thickets of clonal, unbranched stems.

Small, pale, and clustered flowers appear from February through April before leaf and shoot growth begins in late April. Fruiting occurs from August to September. The fruit matures in late autumn and is fleshy, oval, bright red, and about 0.25 to 0.5 inches in diameter.

***Haliaeetus leucocephalus* (Bald eagle)**
Federal Status: Protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act

Animal Family: Accipitridae
Federally delisted: June 28, 2007

Adult bald eagles can be identified by their large white head and short white tail. The body plumage is dark-brown to chocolate-brown in color. In flight, bald eagles can be identified by their flat wing soar. Eagle nests are found in close proximity to water (within 0.5 mile) with a clear flight path to the water, in the largest living tree in an area, and having an open view of the surrounding land. Human disturbance can cause an eagle to abandon otherwise suitable habitat. The breeding season for the bald eagle begins in December or January. Fish are the major food source for bald eagles. Other sources include coots, herons, and wounded ducks. Food may be live or carrion.