SEVEN PORTALS STUDY

An Investigation of Economic Development in North Carolina Through Logistics Villages

Eastern Region

Final Report

December 31, 2011

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Abstract

The goal of this study was investigating potential logistics villages within one of the seven economic development regions across the state, specifically the Eastern Region. The initial focus was proximity for air, rail, and highway connectivity at potential sites, but the study discovered other possibilities for successful villages. Each village is evaluated for strengths, weaknesses, and needs, with emphasis on identifying what infrastructure improvements are needed to support such a village at that location. The study does not recommend specific sites above others. The major findings from this study are incorporated into a master report covering the entire state titled *Seven Portals Study – An Investigation of How Economic Development Can be Encouraged in North Carolina Through Infrastructure Investment.*

Through research, data analyses, and outreach efforts to businesses, economic development offices, local officials, and planning offices, five potential logistics villages, including the Port of Morehead City and Global TransPark, were investigated for their strengths, weaknesses and needs in support of major shipment activity. The region is focusing business development in these areas: aerospace, biotech/ pharmaceuticals/ life science, food processing/ agri-industry, marine trades/ boat building, military/ defense, and tourism and entertainment.

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Seven Portals Study

An Investigation of Economic Development in North Carolina Through Logistics Villages

EASTERN REGION REPORT

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For the

Governor's Logistics Task Force
and
The North Carolina Department of Transportation

Final Report

December 31, 2011

Disclaimer

The contents of this report reflect the views of the authors and not necessarily the views of the University. The authors are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the North Carolina Governor's Office, the North Carolina Department of Transportation, the North Carolina Department of Commerce, nor any other state agency or state authority at the time of publication. This report does not constitute a standard, specification, or regulation.

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This regional study was accomplished through the dedicated efforts of a small study team which is part of a much larger study team looking at both statewide issues and other commerce regions. The study team members for this region included:

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Executive Summary

Governor Beverly Perdue has initiated a program of remaking government to be more efficient and more responsive to public needs, including enhancing the long-term prosperity of the state's citizens. The Department of Transportation Secretary, Eugene Conti, has responded to the Governor's mandate by instituting managerial and programmatic reforms in the department's planning, budgeting, and project selection processes.[1] A new state Strategic Transportation Plan is now being prepared. The new process includes the consideration of specific measurable criteria across several dimensions, including contribution to economic competitiveness, and allows for cross-unit cooperation on projects of regional concern.[2]

Despite the marked improvements, this new, still-evolving project-oriented system leaves open the possibility that a comprehensive system of linked projects with broad regional or statewide significance might not receive the close attention the potential benefits might warrant and that possibility might be larger for projects which cross geographic and policy domains. Indeed, those responding to an NCDOT survey preferred that segments, rather than entire projects, be ranked. Accordingly, the need for linked transportation investments in support of long distance goods movement has brought several interest group organizations, such as the *I-95 Corridor Coalition* (which has recently completed a vision study) and *North America's Corridor Coalition (NASCO)*, into existence.[3]

In recognition of that possibility, Lieutenant Governor Walter Dalton was appointed chair of a task force to consider one of those policy domains with significant competitiveness impact: logistics. The Seven Portals Study, mounted under the broad guidance of Roberto Canales, Charlie Diehl, and Jed McMillan, examines a policy area which crosses transportation, commerce, and regional needs.

The goal of this study was investigating potential logistics villages within one of the seven economic development regions across the state. The initial focus was proximity for air, rail, and highway connectivity at potential sites, but the study discovered other possibilities for successful villages. Each village is evaluated for strengths, weaknesses, and needs, with emphasis on identifying what infrastructure improvements are needed to support such a village at that location. The study does not recommend specific sites above others. The major findings from this study are incorporated into a master report covering the entire state titled *Seven Portals Study – An Investigation of How Economic Development Can be Encouraged in North Carolina Through Infrastructure Investment.*

[1] Policy to Projects, http://www.ncdot.gov/download/performance/Policy_to_Projects.pdf

[2] See information on NCDOT's Strategic Prioritization Process (http://www.ncdot.org/performance/reform/prioritization/) which includes economic competitiveness as a criterion in highway mobility projects in addition to Benefit/Cost Ratio. NCDOT recommends the use of TREDIS (http://tredis.com/) software system in calculating benefits against baseline growth. According to NCDOT documents there is some political resistance to using formal criteria to investment decisions.

[3] See http://i95coalition.org/ and http://www.nascocorridor.com/, respectively. Such organizations have grown up around several major long distance freight routes.

This report provides a preliminary assessment of the possible role of logistics villages in boosting the economic competitiveness – and thus employment and incomes – in the Eastern Region of the State of North Carolina (**Figure ES-1**). This report is one of a set of seven, each considering similar questions for each of North Carolina's seven Department of Commerce partner regions.

Figure ES-1: North Carolina Eastern Region in Statewide Context

Our analysis is built on regional growth theory and trade theory. Regional economies grow as a result of investments and increases in productivity which are accelerated by regional specialization and trade. Logistics improvements reduce the frictions (costs) of trade, thereby supporting increased specialization and trade and, therefore, regional income growth. As the national and state economies restructure, they reorganize spatially, creating new needs and new constraints.

Because the primary impact of logistics interventions is to provide benefit to existing users (direct impacts), we examine regional and wider patterns in the movement of goods. Because the indirect impacts (catalytic effects) of logistics interventions can affect regional specialization and growth, we also examine economic trends and the evolution of the role of the Eastern Region in a state-wide and national context.[4]

While the economy of the Eastern Region has long lagged behind that of the Triangle Region to its west and while the current economic crisis is hurting all areas of the state, the prospects for prosperity in the East over the long term are promising. The region has the combination of amenities, functional resources, and cost that can attract employers and residents.

Improved logistics, which is generally seen as including all relevant transportation, inventory, and administration costs entailed in moving goods between producers and consumers, and, more broadly, supply chain management has the potential to contribute to making the Eastern Region

[4] The NCDOT has well-established methodologies for measuring the direct and indirect impacts of infrastructure investments. See http://www.ncdot.org/doh/preconstruct/pe/ICI_Guidance.html.

of North Carolina a more viable site for industry, a more effectively serviced residential area, and a more efficient freight transit corridor by reducing the total costs of production, transportation, and inventory.

Logistics improvements are just one of several critical factors in further development. A well-trained labor force and an efficient labor market without the costs implied by siting in major metropolitan areas in North Carolina or elsewhere are also critical to attracting industry. An aging population seeking cost-effective retirement residences will add to the region's prospects. Both labor force and retirees will demand an amenity-rich living environment – making strong land use controls and a set of political and social institutions oriented towards maximizing the public welfare and able to resolve potential conflicts critical to future growth.

The western edge of the Eastern Region encompasses a portion of I-95 – a north-south freight corridor which is sometimes termed "America's Main Street" and is of national, as well as state, importance. Should the state decide to embark upon developing a major deepwater seaport to accommodate the anticipated growth in container imports, the accompanying corridor channeling the goods to market will likely traverse a portion of the Eastern Region.

In this report, we make a preliminary site assessment of five possible locations for logistics villages – defined areas within which all activities relating to transport, logistics and distribution of goods, both for national and international transit are carried out by various operators. The logistics village concept was distilled from existing practice and further refined and has the potential to improve logistics operations at break-in-bulk intermodal transfer points where volumes are sufficiently large to justify the large fixed investments and costs sufficiently lowered to attract logistics service providers. These may facilitate the shipment of agricultural and manufactured goods originating in the region, the distribution of mainly consumer goods to regional residents, and the transshipment of goods which are merely traveling through the region. The needs of the military forces in the East present their own challenges.

In addition to possibly addressing logistics performance issues, the logistics villages have the potential to add to the state's set of growth poles. Growth poles can enhance overall regional prosperity by anchoring growth and development, thereby attracting additional investment by increasing the possibility for firms to benefit from the economies of agglomeration which might not be attained by unfocussed investments.

Such logistically-anchored growth poles have the further potential advantage of ameliorating land use conflict among the Eastern Region's present and potential economic bases. Agricultural crops and meat production remain important to the Eastern portion of the state. These are land-intensive activities which may be threatened by residential encroachment. The military may be the region's primary growth driver. Nevertheless, despite the deep-seated welcome of the military in the region and the state, land use encroachment threatens the military operations with the greatest potential to generate regional economic spin-off effects. Much of the encroachment is caused by amenity-seeking residential development along the seaside and bayside which also benefits the region. Advanced manufacturing in the region may concentrate along the I-95 Corridor as the Triangle Region pushes "mid-tech" activities outward and, possibly, along an envisioned technology corridor stretching between Rocky Mount and Greenville. In order to

attract and retain high-skill labor, the region will need to offer natural and cultural amenities along with homes at reasonable prices. Logistics villages may be a key component of a region-wide land use and economic development plan which seeks to maximize benefit.

Logistics infrastructure has both real and fiscal impacts. Any investment decisions will need to balance the two. The Clinton Administration favored the latter consideration, choosing to strengthen the economy by reducing public debt, rather than investing in infrastructure. Economists, while wholeheartedly acknowledging the impact of well-directed public spending on increasing economic efficiency, are frequently less than enthusiastic about the ability of infrastructure investment per se to generate economic development in countries, such as the U.S., which already have large stocks. Therefore, project selection will need to be done with care and likely include mechanisms for attracting private capital. The North Carolina Turnpike Authority has already begun attracting resources to fill some of the state's most pressing transportation needs. A similar mechanism may be needed to address logistics needs.

Three of our five sites in the Eastern Region are centered on operating airports, one on the Port of Morehead City, and one on a large tract five miles east of Rocky Mount. The airports are the Global TransPark at Kinston Jetport, Jacksonville Airport, and Rocky Mount Airport. None of these airports are central logistics centers at the present time. With the opening of the Spirit AeroSystems manufacturing facility in Kinston on 1 July 2010, the TransPark has the potential to support periodic cargo charter flights transferring completed airframe components to the Airbus facility in southern France but completed output is likely to travel mainly by rail to Morehead City and further by ship. The Port of Morehead City handles break bulk and bulk commodities which make Morehead City a significant export and import portal for the state. The port may be overshadowed by its sister to the south but both are dwarfed by the more established ports to the north and south of the state.

Our findings include:

- Economic and demographic change sets the stage for state policy.
    - The national and state economy continues to restructure towards a greater reliance on producer services as a source of wealth creation. Nevertheless, analysis confirms the continuing importance of primary production and especially durable manufacturing in the national and state economy.
    - As the national and state economy restructures, it is going through a process of geographic realignment, with population, employment, and wealth creation increasingly located in large metropolitan regions and in fast-growing mid-sized metropolitan regions, such as Charlotte and the Triangle.
    - Those related processes create new economic opportunities even as they close off old ones.
- The Eastern Region has both suffered and benefitted from ongoing economic changes.
    - The region lost much of its producer services employment to corporate consolidation and relocation. The region has also lost substantial manufacturing employment which it is unlikely to regain.
    - The military and agriculture (plus the related manufacturing processing) appear to be the Eastern Region's two main growth drivers. The coast is also a significant resort and retirement destination which creates a third growth driver.

  - Health-related employment, which acts as a social safety net, concentrates in Greenville.
- New economic realities create a larger volume of trade which seeks new paths.
  - New patterns of trade induce a need for transportation and logistics infrastructure which have the potential to reduce trade costs. A literature affirms the wisdom of investing in logistics infrastructure slightly ahead of anticipated demand. Such investments often find private funding at favorable rates.
  - An extensive literature affirms the continuing importance of transportation (logistics) costs on regional employment growth and inter-regional trade along with appropriately skill-adjusted labor costs.
  - Both theory and empirical research suggest that transportation infrastructure is not an effective driver of local economic growth, however. Infrastructure-led and real estate-based development efforts have poor track records of success.
- The Eastern Region can satisfy some state and national logistics needs.
  - North Carolina, including the Eastern Region, is an important component of East Coast north-south road and rail freight corridors.
  - The state is rich in transportation infrastructure and suffers markedly less from congestion than neighbors to the south, e.g., Atlanta, and the north, e.g., Washington D.C. and points further northeast.
  - Morehead City has some under-utilized land which can be used to fill demand for port infrastructure.
- Logistics villages may help address regional logistics needs and may thereby help address regional employment generation goals.
  - A modal shift or a break-in-bulk (either consolidation or deconsolidation) at a sufficient scale of activity to make operations cost-effective are necessary characteristics of logistics nodes. Existing literature suggests the positive impact of logistics villages on reducing vehicle miles travelled (VMT) and on rationalizing land use.
  - The five sites selected for our investigation either already fill or potentially can fill important logistics and industrial siting functions. Of these, the Global TransPark offers the most well-developed immediate opportunities for development for large and small industrial users.
  - Having made no rigorous assessment of regional demand, we make no recommendations about the efficacy or desirability of public or private investment. Moreover, the Eastern Region has a large supply of sites which may be attractive for industrial and logistics purposes.
- With a combined population which barely exceeds that of Wake County, the Eastern Region of North Carolina represents a minor market and a modest amount of productive resources. Nevertheless, we are optimistic about the region's future as businesses and households search for cost-effective locations to produce and to live. Growth will likely diffuse from the Triangle to the west and the coast on the east, and possibly be anchored by centers of excellence, such as the Global TransPark.

1 Introduction

> "North Carolina may not have a golden age to look back to, but it does not have to, for its golden age is now."[5]

The ongoing economic crisis highlights a regional competitiveness issue. For decades, the state has been in the throes of a transition from an old economy based on the erstwhile "big three" – tobacco, textiles, and furniture – to a new economy based on the new "big five" – technology, pharmaceuticals, financial services, food processing and vehicle parts.[6] That transition has also been characterized as three separate transitions:

1) A shift within manufacturing from labor-intensive to capital-intensive industries requiring that labor transform from mill hands to skilled machine operators;
2) A shift within the non-agricultural sector from manufacturing to trade, service, and government employment implying an occupational conversion from blue collar to white collar work; and
3) A shift within the agricultural sector from small farms relying extensively on tobacco income to larger firms diversifying into many commodities but specializing heavily on hogs and poultry which has been tied to the rise of contract farming.[7]

That transition has favored the state's Piedmont region, specifically Charlotte and the Triangle, over other areas of the state with some amenity-based growth along the coast and in the mountains. Much of the rest of the state has suffered in the transition, particularly the long-lagging eastern portion of the state, possibly creating a "dual economy."[8] It is often claimed that the area east of I-95, if it were to be considered separately, would be the poorest state in the nation. Despite its reputation as a prosperous growth state, North Carolina's per capita income is only about 90 percent of the national average – and the ratio has been declining for a decade.

Much has changed for the worse since the beginning of the economic crisis. The state's growth poles, largely untouched in the recession at the beginning of the decade, are now sputtering. The era of banking consolidation, which helped fuel Charlotte's ascendency over the last several decades, has largely run its course. While Charlotte is likely to hold on to its position in the management of commercial banking, it has not proved to be competitive for most high-end corporate finance banking functions. The Triangle, which had been counting on medicine and pharmaceuticals to help power its growth over the next several decades, has seen the end of the National Institute of Health's doubling program increasing research funding and the sector has been faced with research funding that is not keeping pace with inflation. Concerns over growing

[5] Daniel Elazar "Introduction" in Jack D. Fleer, *North Carolina Government and Politics*, University of Nebraska Press, Lincoln NE, 1994, p. xxvii, quoted in Mike McLaughlin (1997) "Trends in the North Carolina Economy: An Introduction" *North Carolina Insight* p. 2, December.
[6] Michael L. Walden (2008) *North Carolina in the Connected Age: Challenges and Opportunities in a Globalizing Economy*, Chapel Hill, The University of North Carolina Press.
[7] Bill Finger (1997) "Making the Transition to a Mixed Economy" *North Carolina Insight* 4-18, December.
[8] Greg Sampson, former director of the Employment Security Commission, stated, "The non-metropolitan areas are weaker due in part to a lack of attractiveness to new industry of all kinds." Quoted in Bill Finger, 1997, page 5. The assessment of a "dual economy" is attributed to Sampson.

health care costs are pushing pharmaceutical production, and even research and development, and healthcare (through the growth of medical tourism), overseas.

The central theme of Thomas Freidman's popular book, *The World is Flat*, is that no jobs are safe from overseas outsourcing. IBM's largest unit may no longer be in the Triangle; that distinction reportedly belongs to a sizeable research facility in India. GSK has sent much of its production to Asia and also maintains research facilities there. Banking has already outsourced many operations to overseas locations. Each of the old and new pillars of the North Carolina economy face significant competition from overseas and other national locations. Because retail, government, and many other jobs both support and depend upon the state's export sectors, the state's entire economy is at risk.

How will the state prosper in the coming years of ever-increasing competition? At this point, few economists are hypothesizing a rapid return to high economic growth rates. Research suggests that it can be seven years before full recovery following a financial crisis such as that of 2008-2009. Nevertheless, Treasury Secretary Timothy Geithner, in a recent interview, communicated his conviction that the U.S. can build a broad-based prosperity in the coming years. "America is good at supplying the manufactured goods, the services, and the agricultural products the world needs," he claimed.[9]

Given that the major markets are distant from North Carolina, reducing overall logistics – or supply chain management – costs can make North Carolina labor more competitive – and thus more highly paid. Not all needs can be met, however. The benefits of the infrastructure needed to reduce direct producer costs do not always outweigh the costs of building and maintaining that infrastructure. Given that the U.S., North Carolina in particular, has already invested significant funds in transportation infrastructure, consensus opinion is that careful project selection methods must be increasingly used to avoid misspending public funds. Many transportation infrastructure projects do not have the desired effects and therefore do not achieve positive benefit-cost ratios. Moreover, benefits can often be obtained by using existing infrastructure more efficiently, and at less cost.

Transportation improvements have been a double-edged sword for North Carolina. Historically, decreasing transportation costs, brought about by railroads and later highways, increased the value of North Carolina effort by making production for Northeast U.S. markets cost-effective but, more recently, they have also made North Carolina vulnerable to low-cost labor in Asia and elsewhere. Firms often substitute transportation for labor costs.

Over the last several decades, North Carolina has taken a two-pronged approach to its competitiveness problem. The state has been upgrading the quality of its labor supply in order to be attractive for more complex, capital-intensive production than it was able to support in the past. By building on a system of job training centers founded under the leadership of Governor Luther Hodges, Terry Sanford laid the groundwork for what subsequently became the state's community college system. The state has also been improving access to the work force in smaller towns and rural areas since Governor James Martin began a process to construct four-

[9] Charlie Rose interview,12 October 2010

lane highways reaching to within 10 miles of 90 percent of the state's population through the formation of the state's Highway Trust Fund.

In order to fully participate in the prosperity of the coming years, North Carolina will need its own (state) export sectors – whether agricultural or manufactured goods or in services. The latter might include banking, software development, product development and tourism, which incorporates providing retirement destinations for a growing number of baby boomers.

Just as it has in the past, the product cycle can help fuel North Carolina's continued growth. As textile and furniture production in New England became too expensive many decades ago, North Carolina offered an alternative. When electronics production later faced similar cost difficulties, the state did the same. The cost savings were repeated, by building on existing resources, for some aspects of banking and for research and development in electronics, pharmaceuticals, and other fields. More recently, North Carolina has benefitted from the movement of automobile manufacturing from the Midwest to the South. Although the state has yet to successfully attract an assembly plant, the relocation of assembly plants, driven partly by a search for less expensive labor, partly by decreasing transportation costs, and partly by the shifting geographic locus of U.S. population, has made the state a more attractive location for parts suppliers.[10] Accordingly, it has gained a number of prominent parts producers which feed supply chains reaching across much of the south. Similarly, the state has had success at attracting aircraft manufacturing, another century-old industry long beset by high costs at its previous locations, with its global supply chains. The state needs to proactively address ongoing trends.

In this chapter, 1) we review the mandate given to the Seven Portals Study team, 2) outline three useful frameworks for understanding logistics needs, 3) discuss the value of logistics villages in addressing competitiveness challenges, and 4) summarize the governance challenges tied with improving logistics. The frameworks are critical to understanding the needs of important stakeholders at different stages of their decision-making process and for understanding how the need for logistics infrastructure arises. Infrastructure does not create its own demand in an infrastructure-rich environment such as the United States. Logistics villages are important and effective interventions when all stakeholders benefit. Governance issues are critical to generating finance.

1.1 *Our mandate*

This report is a component of a broad collective effort to support regional economic development in North Carolina by charting a path to improve logistics in all areas of the state. The effort has its origins in the Statewide Logistics Plan. Our effort, focusing on the Eastern Region, is just one component of the Seven Portals Study. A portion of the larger effort may be devoted to improving infrastructure and site development but logistics – more broadly supply chain management – is primarily a matter of coordinating flows of products, people, information, and money.

[10] North Carolina may be too far east to support an assembly plant in an era in which a single mid-continent facility often fills national demand. See, for example, Thomas Klier and Jim Rubenstein (2010) "The Changing Geography of North American Motor Vehicle Production," Federal Reserve Bank of Chicago.

1.1.1 Statewide Logistics Plan for North Carolina

In response to House Bill 1005, Session Law 2007-551, the North Carolina Office of State Budget and Management coordinated the development of a statewide logistics plan that addresses the state's long-term economic, mobility and infrastructure needs. The key plan objectives were 1) an identification of priority commerce needs, 2) an enumeration of transportation infrastructure actions including multimodal solutions that will support key industries vital to the state's long-term economic growth, and 3) a timetable to meet the identified needs.[11] This report builds on the Statewide Logistics Plan for North Carolina. Therefore, it is important to review the central finding of that report. The central question of the report is: What kinds of transportation infrastructure investments – airports, highways, rail links, ports – support our vision of North Carolina's destiny? The State Logistics Plan was designed to be consistent with *One North Carolina*.[12]

The report recommended focusing on several key initiatives, arranged in short, medium and long-term strategies. Quoting directly from pages 103-104 of the report:

- Short-term
  - *Enhance the primary highways*: Commonly perceived as the "interstates", but truly encompassing all limited access facilities, these highways are the backbone of the state's trucking network. Principal initiatives should focus on capacity investments, ramp improvements, dedicated use facilities (e.g., truckways), more and better truck stops, and 24/7/365 support for trucking activities (e.g., permits, inspections, internet access and support) and Intelligent Transportation Systems for monitoring, messaging road conditions and managing traffic flows. New technology to help improve system velocity should be explored and implemented.
  - *Mitigate congestion in collection/distribution networks*: Primarily located in urban areas, these collection/distribution networks, which are typically urban freeways, arterials, collector-distributors are critical to logistics efficiency and effectiveness. Principal initiatives should focus on capacity investments, turning radius improvements, and route guidance support, through ITS investments. Another initiative should also be explored to extend local pick-up and delivery hours of operation. Many municipalities have curfews on truck deliveries which forces trucks to deliver during the same time period many highway corridors are experiencing peak travel demand.
- Medium-term
  - *Land banking*: Whether one's attention is focused on a new port, distribution centers, free-trade zones, future rights-of-way, or protection of existing ones, the State needs to protect land that can be used for freight facilities and corridors, now and in the future.
  - *Make investments in a few new corridors*: In a few sharply-focused instances, the State should make investments in new facilities in corridors that will help the state achieve future milestones in economic prosperity. One example is the corridor

[11] http://www.ncdot.org/download/business/committees/logistics/fact_sheet.pdf

[12] The Department of Commerce One North Carolina Fund helps recruit and expand quality jobs in high value-added, knowledge-driven industries.

from Charlotte to Wilmington. Another is I-95. The investments can be heavily focused on one mode or multiple modes. In some instances, these investments may be coupled to long-range strategic initiatives. Tolling and truck only lanes may be an area to explore.

- Long-term
  - *Create air cargo support*: Perhaps more controversial, but equally more strategic, are investments in air cargo capacity statewide, airside and landside. Not just limited to the current three major hubs, but in a more general sense, provide easy, close-at-hand access to air cargo across the entire state. Following the paradigm of the State's 1989 Intrastate Highway Trust Fund, embark on investments that would create runways accessible to regional jets across the entire state. This idea, more than the others, requires careful analysis and assessment, but it could position the state in a unique, leap-forward position so it can participate to the fullest extent in high-tech industries, such as bio-medical manufacturing and aerospace, which are of high value, produce high-paying jobs, and capitalize on the knowledge-based economy the State is developing.
  - It is also important to invest in programmatic initiatives that allow the State to monitor the health of the freight logistics system so it can be responsive to emerging needs, pro-active in its investments, and cognizant of investment opportunities and challenges.

The report concentrated on addressing the needs of the state's economy and of logistics services providers as revealed in congestion on through roads and local feeder streets while banking land for infrastructure which demand projections suggest will be needed in the foreseeable future, including developing a few enhanced freight corridors. Over the long term, the report advised improving administrative management structures and exploring the expansion of air cargo service throughout the state. The report asked:

> "For instance, what if every town and city in North Carolina was within 30 minutes of a 7,000-foot ILS Category III-C runway? That would mean, under any and all weather conditions, that a landing site for a regional jet would be close at hand. In hours, products could get to market anywhere in North America. It would mean upgrading some of the lower tier airports in the state. All the population centers in North Carolina would be reachable, for either inbound or outbound flights, anytime. Consistent with a knowledge-based economy, it would make every area in the state attractive to companies that engage in biotechnology, information and communications technology, and business and financial services, consistent with One NC and the Department of Commerce's objectives, let alone tourism and other person-focused service industries."[13]

That question provided the basis for what would eventually become the Seven Portals Study. The question immediately focuses attention on the level of demand needed to support scheduled or chartered regional jet flights and the value of such service (how much they would be willing to pay) to businesses and individuals. The question also suggests that, to the extent such air service is valuable, firms and individuals might make location decisions which placed them in

[13] Pages 2 and 3 of the Report.

direct proximity to the airports at which such service is already available. Less immediately, it directs attention to the complementary factors in firm location decision-making – labor markets and political institutions.

1.1.2 The Seven Portals Study

In order to accomplish the objectives identified in the Statewide Logistics Plan, the Governor established a Task Force, chaired by the Lieutenant Governor, which was charged with 1) assessing the existing resources and project future needs of the state's multimodal transportation systems (aviation, highway, rail and transit), as well as water, sewer and broadband capabilities 2) investigating reductions or transfer of functions from existing governance structures to aid efficiency and avoid duplication, 3) identifying the regional programs and infrastructure that support industries vital to the State's long term economic viability, 4) exploring public-private partnerships in transportation and economic development that support the overall plan, and 5) recommending short, medium and long range plans to the Governor and General Assembly which will integrate their operation seamlessly and manage state funds more strategically.

Four subcommittees, "Best Practices," "Governance," "Commerce," and "Regional Hub Design," were formed to aid the Governor's Task force in their charge. The last subcommittee has also been termed the Regional Hub Design Subcommittee. The Subcommittee has been charged with exploring "the feasibility of regional transportation hubs to make sure the entire state of North Carolina is moving forward."[14] Accordingly, the "Seven Portals" study is an investigation into the feasibility of developing business hubs in the seven commerce economic development regions across North Carolina based around a 7,000 ft (or longer) runway having Class III instrumentation for all-weather landings and departures.[15] The concept, initially presented in the "Statewide Logistics Plan for North Carolina,"[16] was thereby further refined by the Governor's Logistics Task Force.

The underlying concept is similar to creating a business hub like the Global TransPark and the efforts underway through the Piedmont Triad Partnership – and the new efforts can build on the experience of both. Part of the study will be to determine how many hubs could fit the criteria established for future success. The analyses were not to be in-depth, but rather preliminary investigations to determine 1) what problems might arise from selecting particular sites, 2) the overall economic climate of that region, 3) the willingness of that area to work with the state, and 4) the infrastructure needs and known environmental constraints, to make this happen. One key component of the study is a targeted investigation into the entire logistics needs of businesses that would utilize such business hubs. Recommendations for the short (0-5 years), medium (5-15 years), and long (15-25 years) were sought.

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[14] http://www.ncdot.gov/_templates/download/external.html?pdf=http://www.ncdot.org/download/business/committees/logistics/meeting_rhd_100621.pdf

[15] George F. List, Robert S. Foyle, and Alixandra Demers (2010) "Seven Portals Study Proposal and Master Agreement"

[16] George F. List, Robert S. Foyle, Henry Canipe, John Cameron, Erik Stromberg (2008) *Statewide Logistics Plan for North Carolina; An Investigation of the Issues with Recommendations for Action, Final Report*, North Carolina Office of State Budget and Management, May 13.

1.1.3 The Eastern Region

The mandate has evolved in the course of the project but the goal of boosting economic competitiveness through logistics interventions has remained the same. Although no area of the state suffers from serious congestion, in some areas, such as the Central Piedmont region, transportation demand sometimes outstrips infrastructure supply, implying that congestion relief will be a prominent logistics need. Although we have identified some needs (in particular, North-South connections are lacking), in the Eastern Region, along with much of the Coastal Plain, additional infrastructure investment is not necessarily the primary economic development need.

1.2 *Complementary frameworks for evaluating logistics needs*

We build on three complementary theoretical traditions in evaluating the logistics needs of the Eastern Region. These frameworks address logistics needs in progressively greater detail. The frameworks are favored by regional economic developers, transportation planners, and private sector operations managers, respectively. Each audience is a stakeholder in logistics planning.

The first, regional growth theory and regional trade theory, is strong at explaining the regional location of production. The second, based on models of transportation decisions, assumes location decisions have been made and provides the apparatus for projecting the flows of shipments in some detail. The third, supply chain management, bridges sourcing, production, and distribution, in an operational optimization model. These approaches are not inconsistent with each other but they have not yet been tightly integrated. Complete planning models still remain beyond reach.

Before reviewing these frameworks, we quote directly from a recent U.K. government report which summarized consensus knowledge about the overall impact of transport in the success of modern economies.

- "History has shown a compelling link between the transport system and economic prosperity, with new transport connections enabling new economic relationships to be forged.
- In mature economies such as the UK, with established transport networks, the benefits from improved transport are likely to be greatest when focusing on congestion and bottlenecks. Though at a global level, increasing international connectivity may yet have an ongoing role in enabling new trading relationships that could unlock significant growth benefits.
- Transport cannot of itself create growth: it is an enabler that can improve productivity when other conditions are right. Economic growth itself causes rising transport demands which, if left unchecked, can put the transport network under strain, damaging productivity and competitiveness.
- How infrastructure is used can be as important as the overall level of investment.

- Looking forward, transport's key economic role is likely to be in supporting the success of the UK's highly productive urban areas in the global market place, and enabling efficient freight distribution."[17]

These findings provide a baseline which is also useful to North Carolina. Analysis in the U.S. suggests that freight bottlenecks are a substantial source of increased logistics costs in the U.S.[18] While almost none of these bottlenecks are within state borders, several are along the major corridors needed to get North Carolina goods to market.

1.2.1 Regional growth theory and regional trade theory

Regional economic growth is based on increases in labor and capital (factor accumulation) and enhancements in productivity. Our focus here is on trade and logistics. Productivity-enhancing technological improvements, such as those embodied in capital equipment, allow the substitution of machines for labor resulting in increased economies of scale and, when complemented by declining costs of transportation and coordination, specialization and trade. Accordingly, the level and pattern of national and international trade is based on regional comparative advantage, economies of scale in production, and the costs of delivering goods.[19] Logistics infrastructure is a factor of production insofar as it facilitates trade by decreasing overall delivery costs.

Capital and technology are able to move quickly between regions. Accordingly, contemporary regional comparative advantage is, to a large degree, based on the amount, variety, and cost of labor available. Labor is generally the largest cost element in production and, along with transportation costs, the one which varies most saliently across locations. To be sure, fertile land is critical to agriculture and mineral deposits are central to mining but direct primary production, though essential, constitutes a small proportion of the economy. Natural amenities, such as mountains, coastlines, lakes, and other bodies of water along with a mild climate also have an attraction. Their impact, while measurable, doesn't appear to have a consistent impact.

Because firms often need to assemble diverse sets of people with complex skills, those that do, tend to locate in or near large metropolitan regions. Concentrations of population facilitate the operation of labor markets for specialized skills. While an abundant supply of low-cost, low-skill labor has historically been a competitive factor driving economic growth in North Carolina, the increased sophistication of the production process, on the one hand, and the emergence of other sources of low-cost, low-skill labor, on the other, have increased the importance of low-cost high and mid-skilled labor as a productive factor in the state, favoring the larger metropolitan regions.

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[17] *The Eddington Transport Study, The case for action: Sir Rod Eddington's advice to Government* p. 11 http://webarchive.nationalarchives.gov.uk/+/http://www.dft.gov.uk/adobepdf/187604/206711/executivesummary.pdf

[18] Estimated Cost of Freight Involved in Highway Bottlenecks http://www.fhwa.dot.gov/policy/otps/freight.pdf

[19] E.g., Paul Krugman (1980) "Scale Economies, Product Differentiation, and the Pattern of Trade," *The American Economic Review* 79: 950-959; Anthony J. Venables and Nuno Limão (2002) "Geographical disadvantage: a Heckscher–Ohlin–von Thünen model of international specialization," *Journal of International Economics* 58: 239-263; Henry G. Overman, Patricia Rice, and Anthony J. Venables, (2010) "Economic Linkages across Space," *Regional Studies* 44: 17–33.

Increasing economies of scale in production (much of which is internal to establishments) imply that, in some cases, a single or a small number of establishments can supply the large majority of global demand for a particular product. Such economies of scale in production sometimes create a need for complex supply and distribution systems as final consumer demand is spread across the globe, even if unevenly. The emergence of national and even inter-national supply chains for computer components, pharmaceuticals, and other products in what is sometimes termed the global disassembly line, with each producer located in what it believes to be an optimal and distribution chains which are equally broad has been well-documented.

The continuing long-term decline of transportation and coordination costs has been crucial to the emergence of the contemporary system of supply, production, and distribution. Without low-cost transportation, global supply and distribution channels would not be practical for many goods. East Asia could not have become the "workshop of the world" without low-cost transportation. More immediately, North Carolina could not have become a significant site of national and global manufacturing production without low-cost transportation. While extreme, some economists have begun to consider production location patterns in the case that moving many goods is nearly costless.[20]

Institutional factors can have significant impacts on production costs. Direct and indirect taxes, although necessary for providing collective benefits such as infrastructure and human capital upgrading, impose costs. Lengthy and uncertain approval processes increase the cost of establishing facilities. While taxes and regulations result in net benefit to regions, some observers feel that the tax burden in North Carolina is too narrowly based. We are unsure of the spatial impacts of tax policy and do not consider the subject further.

Site considerations are critical for some sectors. Economic location theory holds that site selection is a complex hierarchical decision beginning with the perceived need for capital investment. That need is generally based on the pending introduction of a new product or the perception that existing capacity is insufficient for existing or anticipated demand. Firms may also be likely to consider investing in new locations when their existing plants are nearing the end of their economic lives. The basic investment decision is held to trigger a two-stage search for a new site: first, an optimal region is chosen and then a specific site is selected. However, some sectors have sufficiently stringent site requirements, possibly a large footprint or need for rail or water access that they may be forced to climb back down the decision-making tree by a shortage of appropriate sites in the best possible region.

The more closely firm needs can be specified and the attending operational costs can be measured and modeled, the more systematic site searches are likely to be. The availability of extensive information in electronic form means that the site selection process has changed substantially over the past several decades. Site visits are now more likely to be for information confirmation than for data discovery. Firm needs cannot always be measured precisely, however. Producer services, for example, have lists of must-haves but, because many hope to be

[20] Edward L. Glaeser and Janet E. Kohlhase (2004) "Cities, Regions, and the Decline of Transport Costs," *Papers in Regional Science*, 83: 197-228.

able to recruit labor from outside the region, they need to make assessments of intangibles like amenities and social atmosphere in making location decisions. In response, some localities have embarked on sustained campaigns to upgrade their built, social, and cultural environments.[21]

In what follows, we survey selected key broad factors determining the location of potentially footloose economic activities with an emphasis on those which may be most sensitive to logistics. Even agriculture and amenity-based development are affected by these same factors.

1.2.1.1 Transportation cost: Market potential as an indicator of the efficacy of logistics-related infrastructure

Transportation costs are an important component of the trade framework outlined above. Because the Seven Portals project is an effort to boost economic development by improving the access of producers in all regions of North Carolina to markets, we provide a summary of a basic exploration of the efficacy of local and regional infrastructure investments in improving that access. We stress that the following analysis is preliminary and incomplete.

Figure 1-1 shows the location of final private consumer demand in the U.S. using Bureau of Economic Analysis data for personal income in 2008, the latest available data. We concentrate on the domestic market because most North Carolina production is oriented primarily towards the U.S. market. Although this is an imperfect measure because it does not adequately tap the demand represented by those living on retirement income or government transfers, more complete measures will correspond closely. Consumer demand is concentrated in large populous – and prosperous – metropolitan areas which are generally distant from North Carolina. (The measure does not adequately track the distribution of demand for intermediate products, however.)

[21] Richard Florida cite?

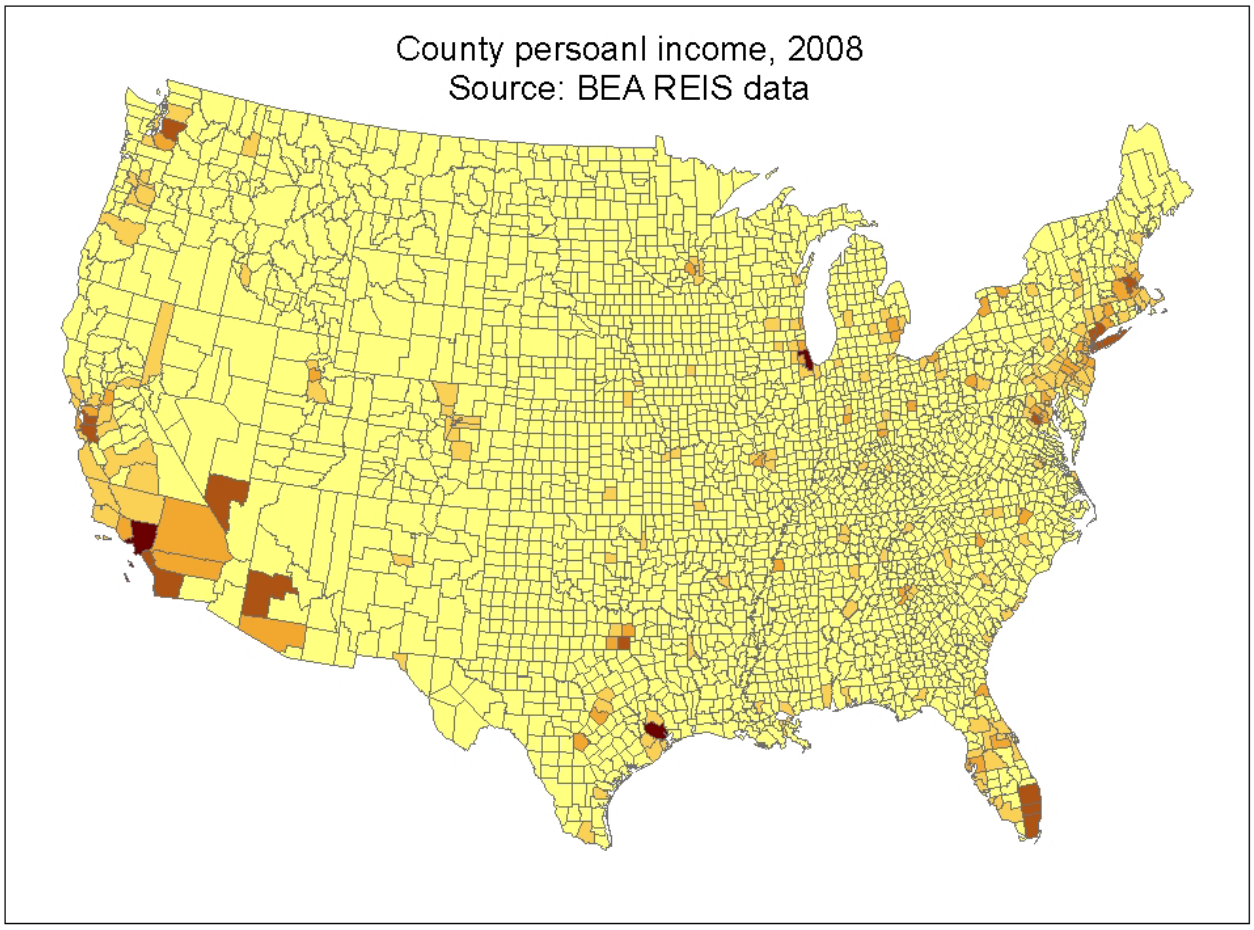

Figure 1-1: County Personal Income

Because counties need not be self-sufficient and because metropolitan regions are often comprised of multiple populous counties, the market potential within a specific distance is sometimes used. While the population within a certain radius is sometimes used as a measure, weighting by income gives a more accurate indicator of total demand. Figure 1-2 shows this measure for each county in the continental U.S. Although using counties as units of analysis and inter-county distance based on county centroids creates imperfections, the outlines of geographically concentrated regions of demand become visible. Some production in North Carolina is oriented towards serving the Boston-Washington megalopolis (mega-region) and industry informants offered that the State's proximity to that market (combined with other factors) as an explanation for the growth of specific industries in the State.

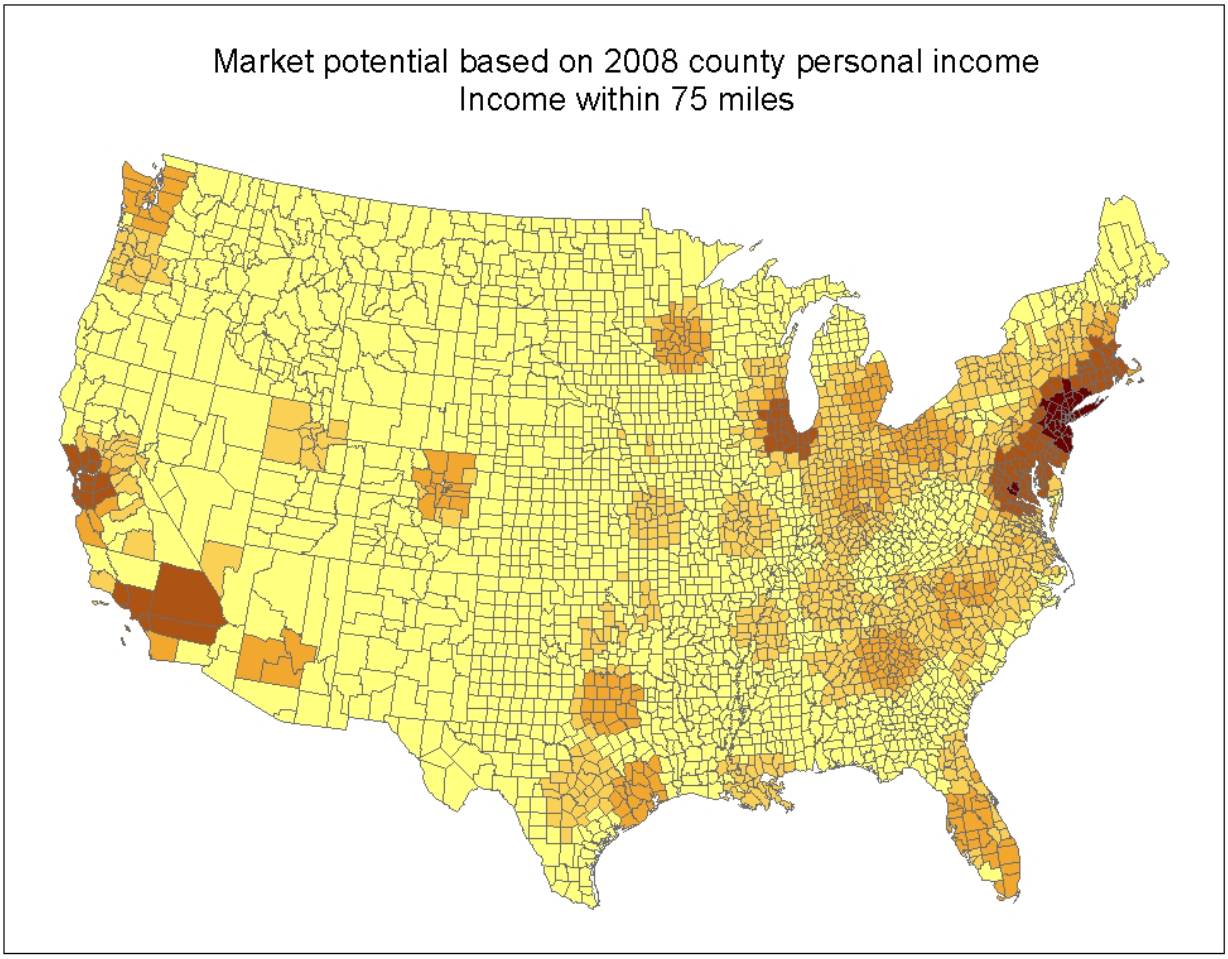

Figure 1-2: Market Potential Based on County Personal Income within 75 Miles

Although, as we discuss in the following chapter, much shipping is local, some products travel over long distances. In assessing the suitability of specific counties as viable production sites for distant markets, weighting the markets in particular locations by their distance from the specific potential production sites yields an improved measure of market potential.[22] The distance decay function likely varies with the product, heavier products being more difficult to transport. Figure 1-3 shows the market potential for U.S. counties based on great circle distances and a distance decay which assumes that products lose half their value over a distance of 250 miles. That choice is largely arbitrary and we use that distance only because it is comparable to prior research. The less distance matters, the wider the circle of high accessibility surrounding the core Northeast market.[23]

[22] The family of market potential models is based on Chauncey D. Harris (1954) "The Market as a factor in the Localization of Industry in the United States," *Annals of the Association of American Geographers* 44: 315-348.
[23] M.E. O'Kelly and M.W. Horner (2003) "Aggregate accessibility to population at the county level: U.S. 1940-2000" *Journal of Geographical Systems* 5: 2-23. Distance to all markets, not just the Northeast, are in the calculations.

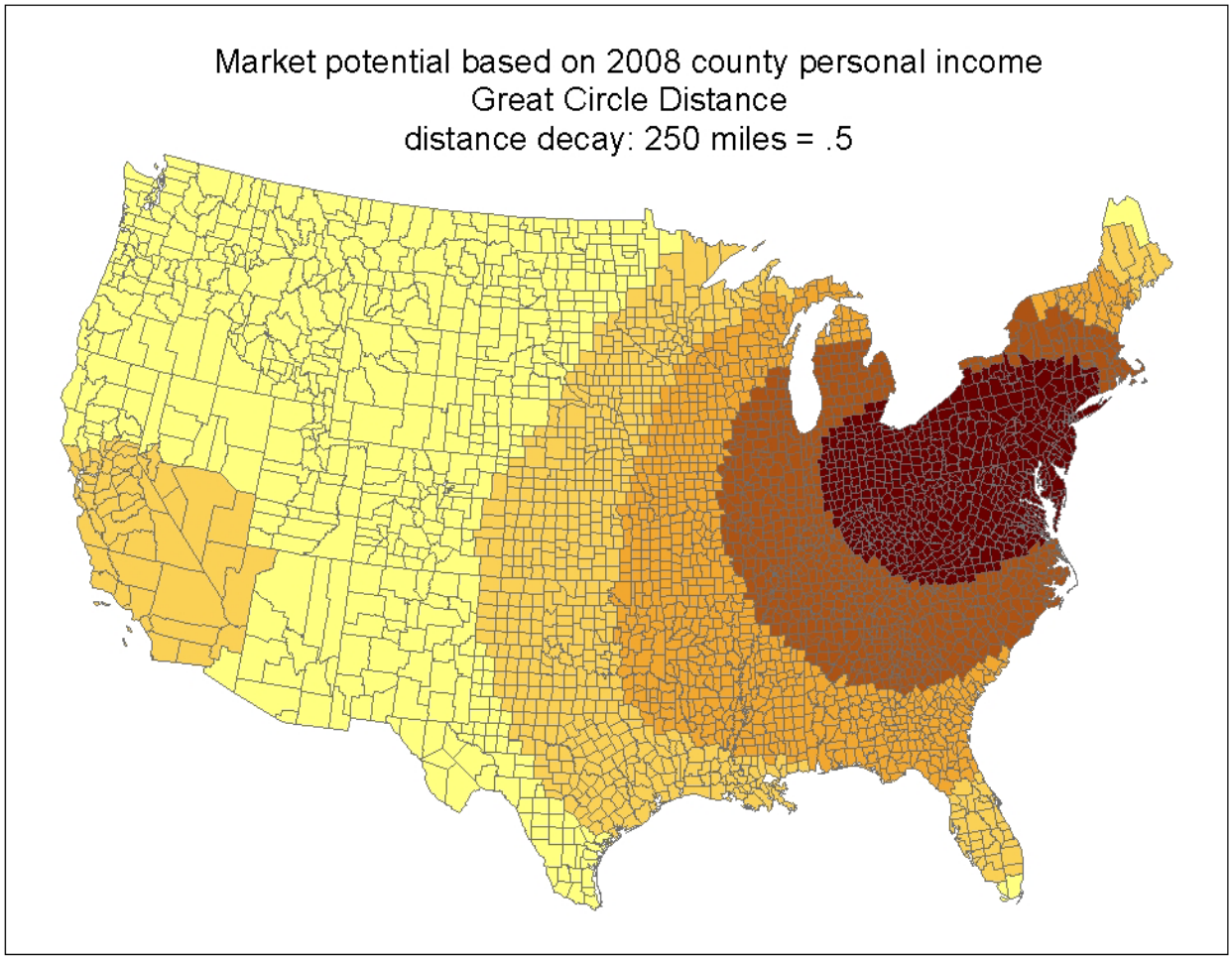

Figure 1-3: Market Potential Based on County Personal Income Based on Great Circle Distance

The exact values of the market potential for each county are less important for us than the relative values among counties. The larger the difference among counties, the more salient transportation costs will be in determining business location decisions. The great circle distances may represent an ideal-type measure. The costs of covering distance may decline but the distances themselves will never change. Figure 1-4 re-estimates market potential based on highway impedances.[24] Highway impedances adjust distance to account for the ease of driving with rural Interstate highways being assigned a low impedance while congested urban roads receive a high score. Incorporating impedances shifts the assessment of specific locations somewhat as some have better endowments of highways which speed products to their destinations.

[24] All distances and impedances were obtained from the Center for Transportation Analysis at Oak Ridge National Laboratories http://cta.ornl.gov/transnet/.

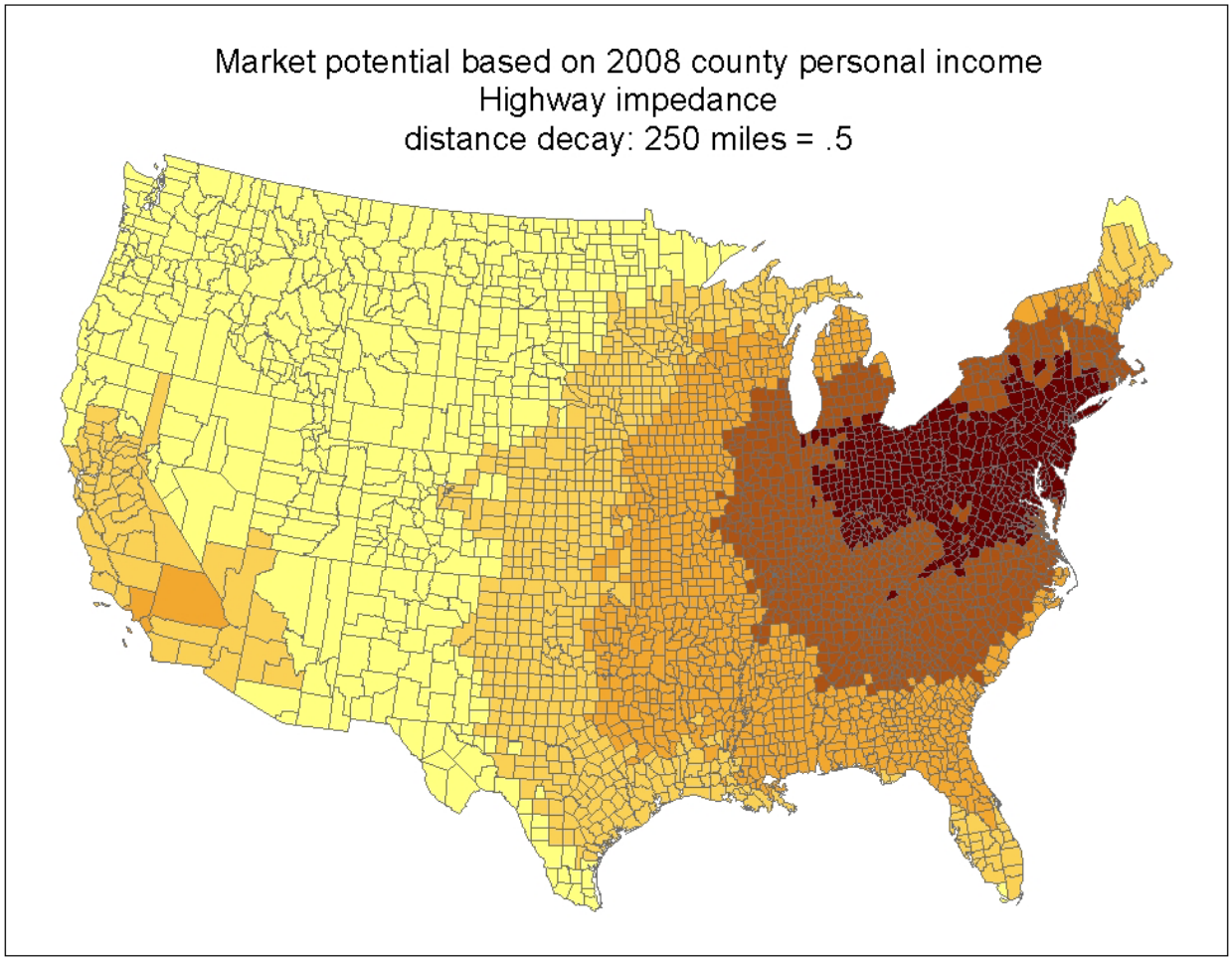

Figure 1-4: Market Potential Based on County Personal Income Based on Highway Impedance

The difference between measures of market potential based on great circle distances and those based on highway impedances provides a broad brush measure of the benefit of investments in transportation infrastructure in improving the market accessibility of specific locations. Figure 1-5 shows the potential improvement in market potential based on the same distance decay function used above. The map suggests that some North Carolina counties could benefit substantially from transportation improvements. The measure does not include the costs of the improvements and the degree of improvement implied by the map may not be realistic but the measure does highlight the possibility.

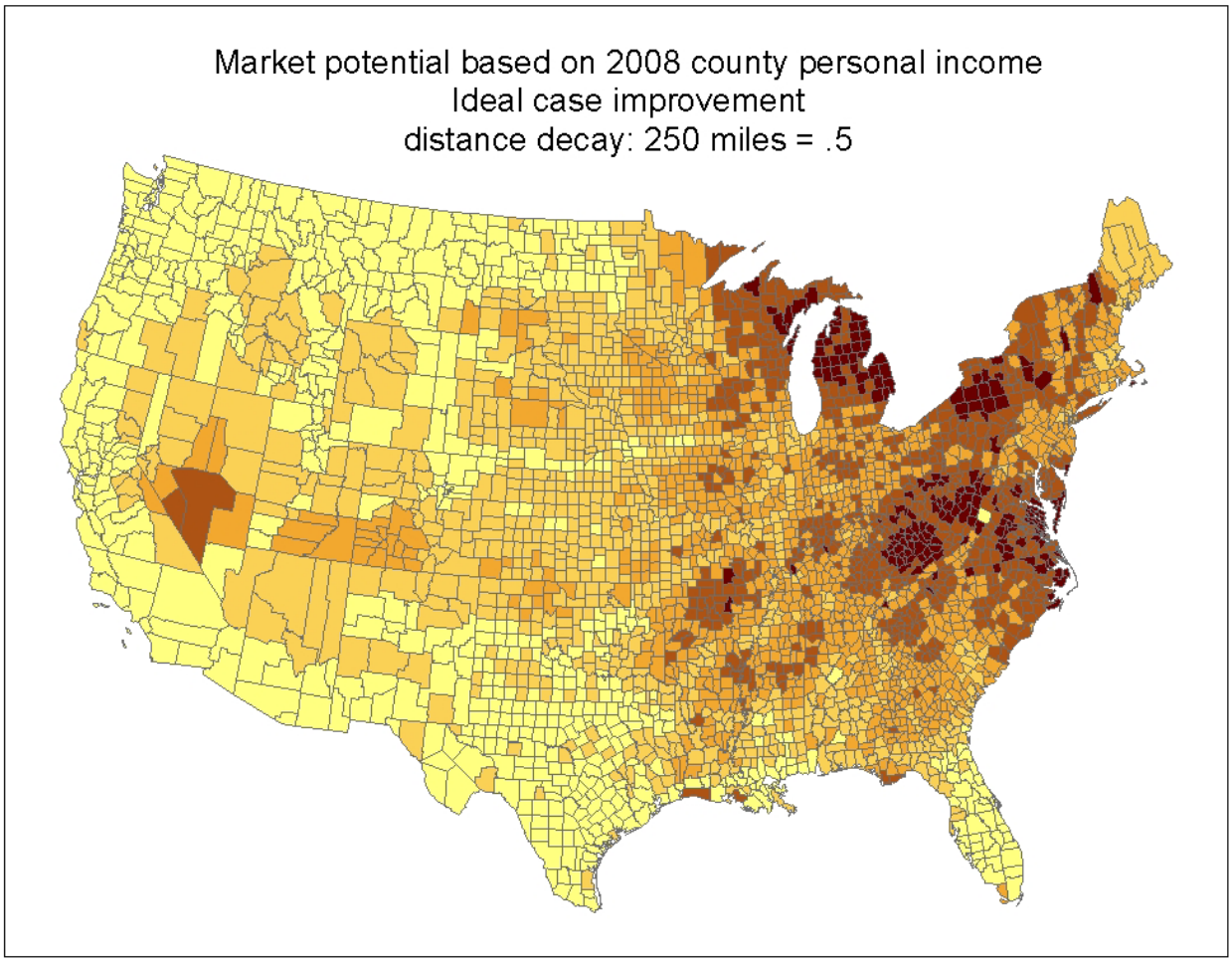

Figure 1-5: Ideal Case Market Potential Improvement

As mentioned above, North Carolina counties are often quite distant from the most attractive markets. The investments which would have the greatest impact on improving market potential could be nearby – or they could be quite distant. In order to address this question, we measured the potential improvement using a steeper distance decay, in this case based on the loss of fifty percent of the value within 50 miles (not shown), and then compared the proportional local improvement to the proportional total improvement. The choice of distance decay parameters is largely arbitrary but it does tap the degree to which market potential-improving interventions are local. Figure 1-6 show the results of that exercise. They suggest that while local improvements do have impacts, the benefits may be modest. The locations which are most impacted by local improvements are those in the congested metropolitan regions. Stated in other terms which anyone who has ever driven from North Carolina to New York will have experienced, shaving 15 minutes off the journey to the nearest Interstate highway would produce less time savings than avoiding the hours of sitting in gridlocked D.C. traffic would. These distant bottlenecks may increase the need for intermodal shipping in the future.

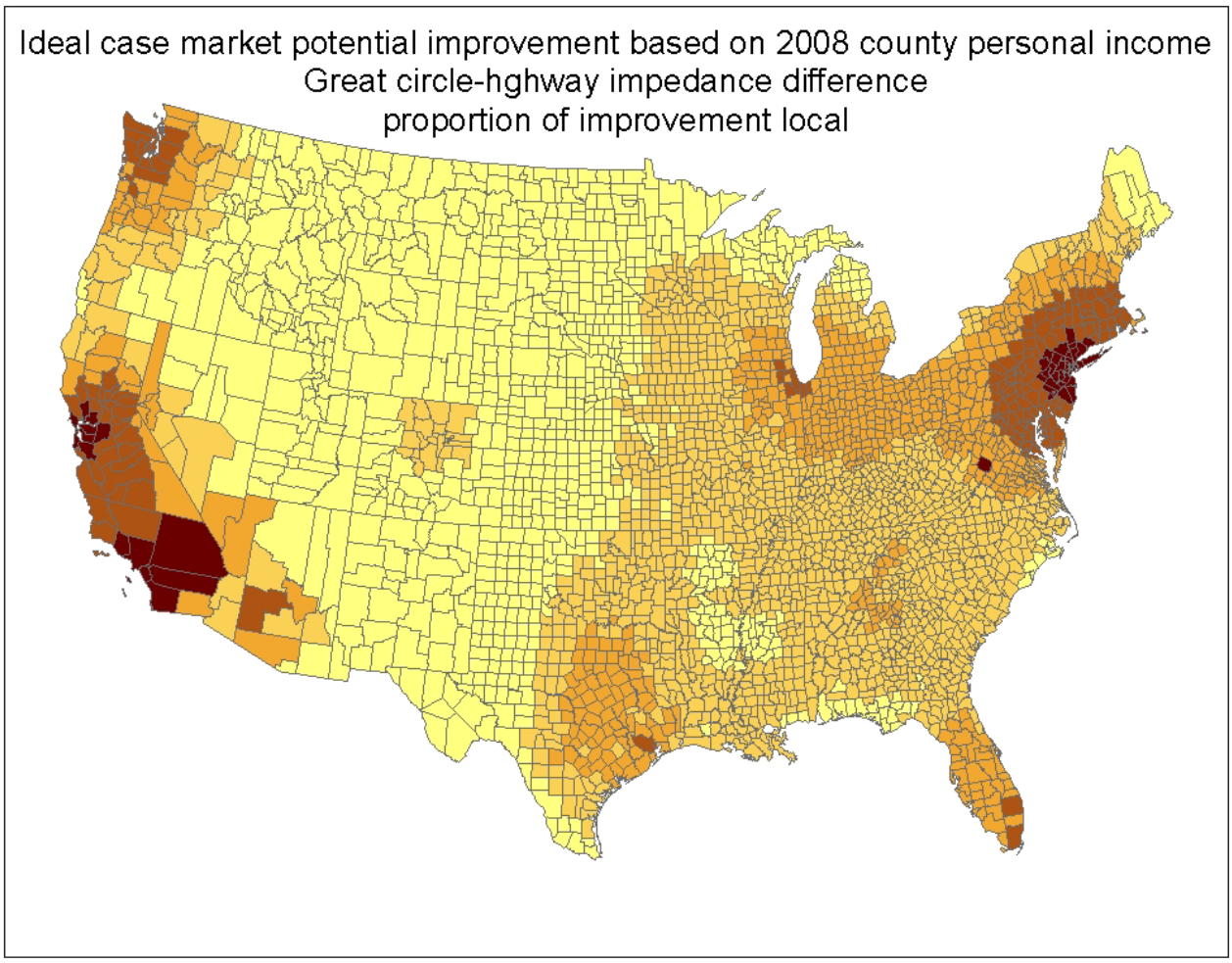

Figure 1-6: Ideal Case Market Potential Improvement: Proportion Local

These results should be seen as illustrative, rather than definitive. Each industry has somewhat different circumstances. We have considered only the last leg of the journey of finished products to market here. The U.S. has a complex system of production wherein suppliers need to orient themselves to the needs of their immediate customers. In fact, some North Carolina automobile parts suppliers ship primarily away from the major markets. Nevertheless, the assembly plants which they serve were sited taking full account considerations similar to those here. The analysis highlights that distance to market is generally not the only, or even the most salient, factor in business location decisions. The availability of suitable industrial sites and labor availability and cost are often critical.

While we have discussed only highway impedances, similar results were found using road-rail-road inter-modal connections. Intermodal rail connections have the potential, should an adequate system of freight handling emerge, to streamline movement through congested metropolitan highways. Intermodalism will require access sites. Such sites can form excellent anchors for

logistics villages. Perhaps the key finding of this section is that the cross-county variation in accessibility to distant markets, as measured by market potential, is less than dramatic.[25]

1.2.1.2 Comparative advantage: Labor composition and skill-adjusted labor cost

As noted above, contemporary business location decisions can often be understood on the basis of transportation costs, economies of scale (which may be internal to an establishment), and labor supply, specifically skill availability and cost. Each sector, and indeed each firm and establishment, may have a slightly different set of transportation costs, economies of production, and labor needs. Therefore, the attraction of each location to business cannot be assessed in general. Rather, the question needs to be addressed with respect to each businesses individual needs.

We explored variations in transportation costs to market in the previous section. Here, we briefly survey labor availability and labor cost in the Eastern Region in national and statewide context. Figure 1-7 shows standardized wages – that is, average wages if each area contained workers in the same distribution as the entire U.S. – for some 2,000 Census PUMAs (geographic areas). The data are from the combined American Community Survey waves for 2005-2007. In this simple, illustrative analysis, wages were calculated for six education levels (primary school only, less than high school, high school graduates, education beyond high school but no college degree, college graduates, and those with graduate and professional degrees). More detail on occupation and experience would be needed for a more complete analysis.

[25] Lim H, Thill J-C, (2008) "Intermodal freight transportation and regional accessibility in the United States" *Environment and Planning A* 40(8): 2006-2025.

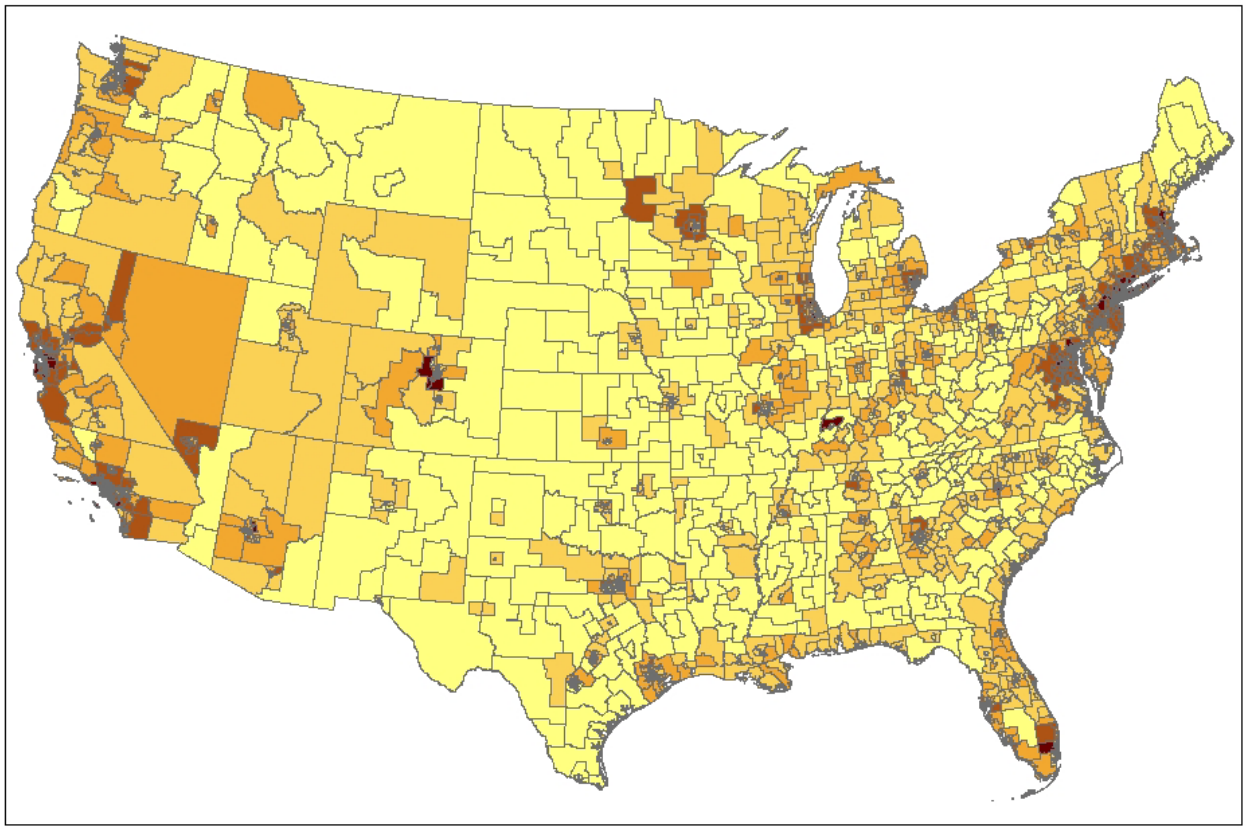

Figure 1-7: Standardized Wages Calculated on the Basis of National Education Distribution

The map above shows that labor costs vary significantly and suggest that producers may need to balance transportation costs to market with labor costs and other factors in making business location decisions. Figure 1-7 and, in more detail, Figure 1-8: Standardized Wages (North Carolina view) show that standardized wages, combining all skill levels, are relatively low in North Carolina and that wages across much of the East tend to be low by North Carolina standards. The maps also suggest that while North Carolina skill-adjusted wages are low, they are not necessarily strongly competitive compared to the rural Midwest and the broad Mississippi Valley.

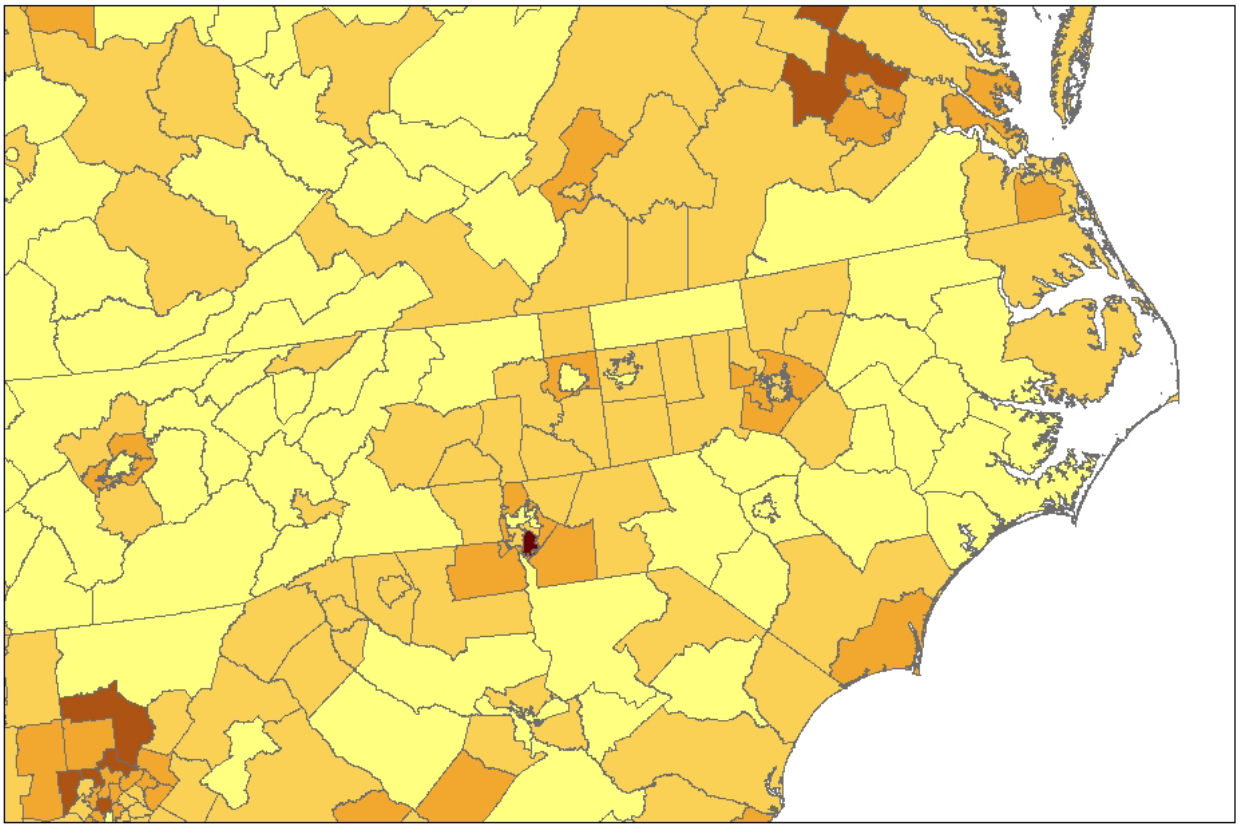

Figure 1-8: Standardized Wages (North Carolina view)

We need to stress the ambiguous nature of wage data. First, the Bureau of Economic Analysis tracks full labor costs, including wages, health, retirement, and other costs, but the Census only records reported wages in the American Community Survey. True labor costs could be higher in regions where extensive non-cash benefits are common. Second, while a dollar is a dollar throughout the U.S., its purchasing power varies substantially. The same wage may buy a larger house in North Carolina than in New York City. On the other hand, if the school system is not of good quality, tuition for private schools may counter-balance the housing benefit. Amenities, such as educational institutions, cultural facilities, recreational opportunities, and natural beauty may be important considerations which affect true wage rates. There is a large subjective element in such considerations but they have effects on the work effort an employee is willing to expend for a given wage. There may also be a gap between what a native would be willing to accept as a wage in order to maintain long-standing ties in a community and what an outsider would require.

Health care costs are another large labor cost component which is not adequately measured by BEA and ACS data. Health care costs have been increasing rapidly over the past decade or more. Whether as employees, dependents, or community members, and whether insured or not, employees need to support a portion of those costs. Health care costs are becoming a significant source of labor cost and variations in health care costs are therefore becoming a significant aspect of labor costs in making capital investment and location decisions. As a partial

illustration of the variation in health care costs, Figure 1-9 illustrates the incidence of diabetes in the U.S. Diabetes has become a widespread chronic disease generating significant costs in itself and is an indicator of other long-term health care costs. Such chronic diseases also suggest higher than average absenteeism and "presenteesism" – at work but not fully functioning. Similar maps have appeared in publications for location specialists such as *Site Selection*.

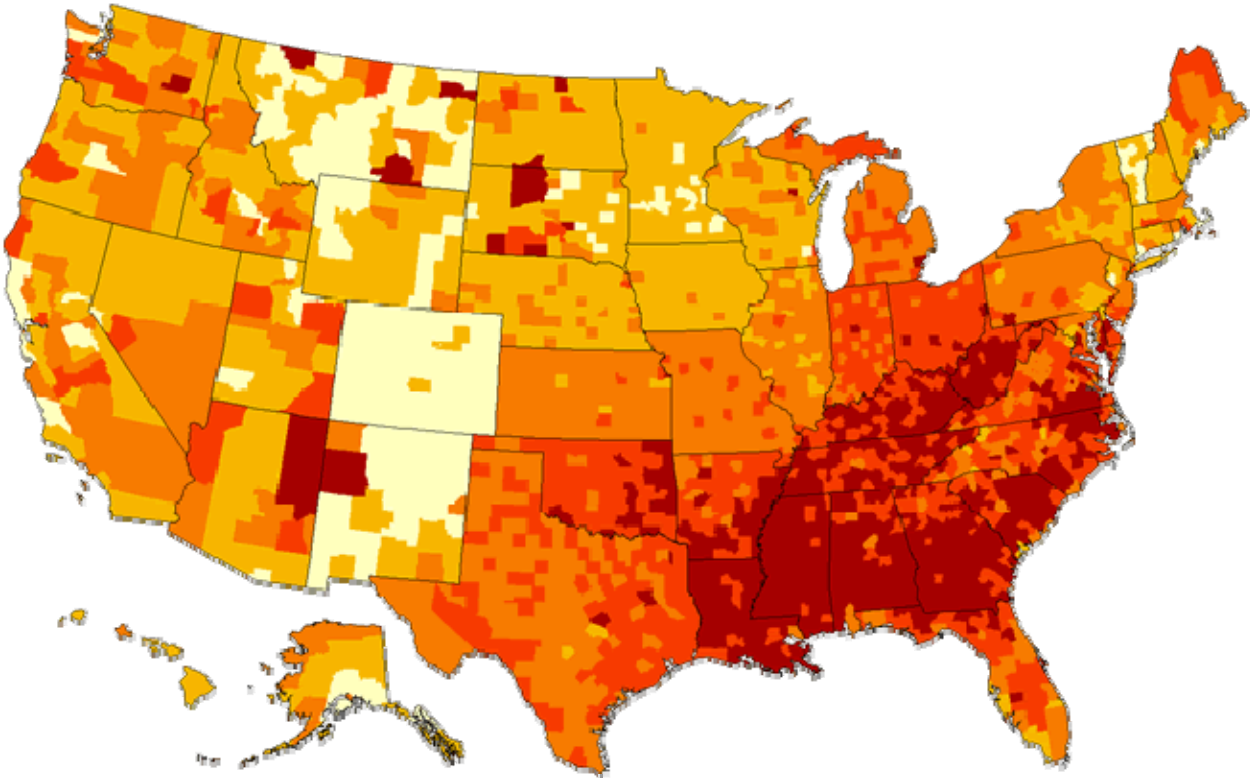

Figure 1-9: Diabetes Incidence in the U.S.

We now examine labor costs and availability is more detail for the Eastern Region. Table 1-1 presents annual employment in the state as a whole, the Eastern Region, and each of the four sub-regions. As suggested above, the region's employment base is comparatively small. Except for Pitt County, one of the four sub-regions, employment density is lower than it is in the state as a whole. Wages in the region average 80 percent of the state's below national average rate. In the Pitt County sub-region, wages average 88 percent of the state's rate. In the Central sub-region, the average is 74 percent.

Table 1-1: Employment, Wages, and Employment Density, Eastern Region 2009

	Average Employment	Average Weekly Wage	Land area	Employment per sq. mile
North Carolina	3,825,750	$766.08	48,710.9	78.54
Eastern Region	375,143	$615.94	6,937.2	54.08
North	97,373	$646.60	1,424.0	68.38
Central	94,716	$569.53	2,043.8	46.34
Coastal	113,192	$594.66	2,814.7	40.21
Pitt	69,862	$670.62	654.7	106.71

Employment composition may account for some of the wage difference between the Eastern Region and the state. Table 1-2 compares employment and measures of annual wages for broad occupational groups for the Eastern Region and the state as a whole. Estimates of annual, rather than weekly, wages are shown here. The second to last column shows the region's proportion of the state's labor force and the degree of over- or under-representation of each occupation. The first key point in the table is that several knowledge-intensive managerial and professional occupations, often seen as vital to contemporary economic development, are under-represented in the region. Several occupations generally found in public employment and, of course, farming, are over-represented. The second key point is that, taking occupation into account, the wage differentials appear to diminish compared to the overall figures. Production occupations, critical to manufacturing and goods movement, still enjoy a wage discount compared to the state as a whole although it is modest. Closer examination might modify those results.

Table 1-2: Eastern Carolina Occupational Employment and Annual Wages

Occupation	North Carolina Employment	Estimated Annual wage Entry	Mean	Median	Experience	North Carolina's Eastern Part. Employment	Estimated Annual wage Entry	Mean	Median	Experience	Degree of representation	Proportion of Median wage
	4,063,420					382,980	$16,771.00	$33,371.00	$26,802.00	$41,670.00	9.43%	
Management Occupations	190,340	$51,510.00	$97,650.00	$85,300.00	$120,720.00	13,380	$44,555.00	$80,031.00	$70,753.00	$97,770.00	0.75	82.95%
Business and Financial Operations Occupations	159,550	$35,970.00	$58,780.00	$53,520.00	$70,180.00	10,450	$30,598.00	$52,413.00	$48,939.00	$63,320.00	0.69	91.44%
Computer and Mathematical Occupations	91,000	$43,050.00	$72,530.00	$69,650.00	$87,280.00	3,800	$35,188.00	$57,552.00	$56,075.00	$68,734.00	0.44	80.51%
Architecture and Engineering Occupations	57,180	$37,250.00	$62,880.00	$59,210.00	$75,700.00	4,380	$35,412.00	$58,180.00	$57,435.00	$69,564.00	0.81	97.00%
Life, Physical, and Social Science Occupations	40,760	$34,200.00	$58,530.00	$51,370.00	$70,700.00	2,440	$30,533.00	$52,183.00	$46,750.00	$63,008.00	0.64	91.01%
Community and Social Services Occupations	55,150	$24,880.00	$37,160.00	$35,800.00	$43,300.00	7,330	$25,073.00	$35,935.00	$34,551.00	$41,366.00	1.41	96.51%
Legal Occupations	21,310	$32,540.00	$76,610.00	$53,260.00	$98,650.00	2,400	$28,096.00	$63,169.00	$44,991.00	$80,705.00	1.19	84.47%
Education, Training, and Library Occupations	256,960	$20,940.00	$39,860.00	$36,850.00	$49,320.00	27,800	$20,392.00	$39,083.00	$36,291.00	$48,429.00	1.15	98.48%
Arts, Design, Entertainment, Sports, and Media Occ	39,290	$21,720.00	$42,610.00	$36,090.00	$53,060.00	2,480	$19,326.00	$38,627.00	$30,654.00	$48,278.00	0.67	84.94%
Healthcare Practitioners and Technical Occupations	218,200	$33,480.00	$64,390.00	$52,690.00	$79,850.00	21,980	$29,646.00	$61,654.00	$49,463.00	$77,658.00	1.07	93.88%
Healthcare Support Occupations	146,300	$17,240.00	$23,530.00	$21,880.00	$26,680.00	16,360	$15,723.00	$21,667.00	$19,775.00	$24,638.00	1.19	90.38%
Protective Service Occupations	90,130	$20,250.00	$33,530.00	$30,900.00	$40,170.00	12,140	$24,611.00	$33,632.00	$30,975.00	$38,143.00	1.43	100.24%
Food Preparation and Serving Related Occupations	351,140	$14,600.00	$18,730.00	$16,330.00	$20,790.00	35,380	$14,600.00	$17,721.00	$15,748.00	$19,281.00	1.07	96.44%
Building & Grounds Cleaning & Maintenance Occup.	128,130	$15,930.00	$22,030.00	$20,220.00	$25,080.00	12,290	$14,804.00	$20,167.00	$18,669.00	$22,848.00	1.02	92.33%
Personal Care and Service Occupations	82,470	$15,160.00	$22,720.00	$19,100.00	$26,500.00	9,030	$14,643.00	$19,957.00	$17,740.00	$22,614.00	1.16	92.88%
Sales and Related Occupations	428,830	$15,960.00	$33,170.00	$23,310.00	$41,780.00	39,090	$15,245.00	$26,985.00	$20,264.00	$32,856.00	0.97	86.93%
Office and Administrative Support Occupations	632,680	$20,000.00	$30,430.00	$28,750.00	$35,640.00	56,290	$18,592.00	$28,010.00	$26,164.00	$32,719.00	0.94	91.01%
Farming, Fishing, and Forestry Occupations	8,040	$15,340.00	$25,750.00	$22,610.00	$30,960.00	2,090	$14,449.00	$23,549.00	$18,428.00	$28,099.00	2.76	81.50%
Construction and Extraction Occupations	201,120	$22,560.00	$33,520.00	$31,180.00	$39,000.00	20,240	$21,131.00	$31,830.00	$29,796.00	$37,179.00	1.07	95.56%
Installation, Maintenance, and Repair Occupations	170,770	$24,850.00	$39,410.00	$37,150.00	$46,690.00	16,930	$23,202.00	$37,300.00	$34,416.00	$44,349.00	1.05	92.64%
Production Occupations	382,910	$19,050.00	$29,780.00	$27,000.00	$35,150.00	38,960	$17,768.00	$28,426.00	$25,534.00	$33,756.00	1.08	94.57%
Transportation and Material Moving Occupations	311,160	$17,460.00	$28,720.00	$25,300.00	$34,350.00	27,750	$16,554.00	$26,387.00	$23,750.00	$31,303.00	0.95	93.87%

In order to place Eastern Region labor costs in national context, we mapped mean earnings by county of employment from the latest available Bureau of Economic Analysis data. The results are shown in Figure 1-10 and, in larger scale, in Figure 1-11. No scale is shown but the colors provide a general guide to labor costs. The maps suggest a modest labor cost advantage in the Eastern Region.

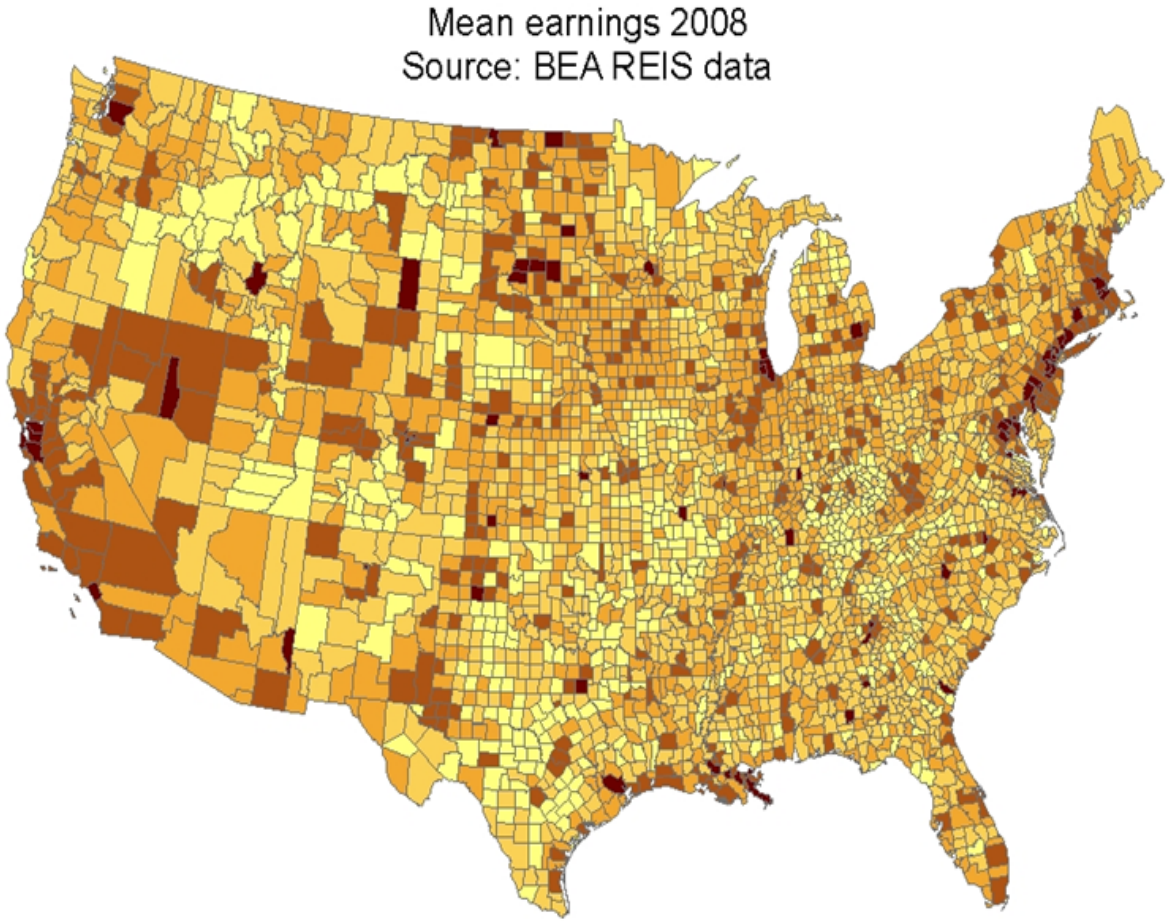

Figure 1-10: Mean Earnings, 2008 (National view)

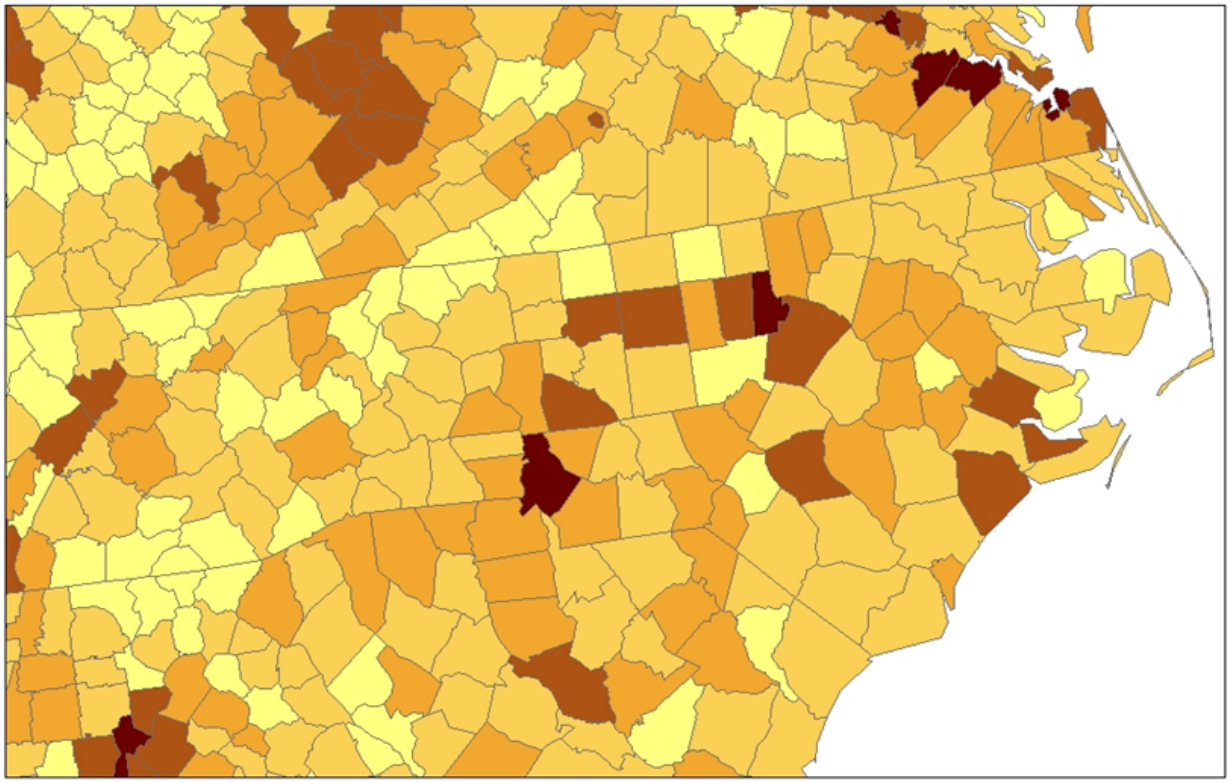

Figure 1-11: Mean Earnings, 2008 (Regional view)

A possible next step might be to calculate skill-standardized wage and labor availability profiles for a number of likely candidate sectors. Regional economists sometimes use such profiles in assessing regional competitiveness as regions sometimes specialize in particular types of labor. Lester Thurow, former dean if MIT's Sloan School once quipped that Boston was an expensive place to hire cheap labor but a cheap place to hire inexpensive labor.

1.2.1.3 Favored locations for growth

The expanding economy and the growing need for firms to assemble people with diverse sets of skills combined with the fact that much of the space in central cities is generally occupied implies that much of the labor force and population growth over the past several decades has occurred on the peripheries of the largest metropolitan areas with some growth in the medium-sized metropolitan areas such as Charlotte and the Triangle. As metropolitan regions increase in size, thresholds for the emergence of particular specialized business services and for the provision of desired amenities, whether commercial, cultural, or natural, can be met allowing those areas to attract economic activities yielding higher value-added.[26]

[26] From this point of view, Charlotte is still too small to hold the very specialized labor needed for corporate finance activities.

Table 1-3 provides an overview of national growth trends over the last several decades. The fringe counties of the largest metropolitan areas stand out as having increased their share of national (personal) income by 3.5 percent while increasing their share of the population by 2.3 percent. Mid-sized metropolitan area counties, such as Wake and Mecklenburg, increased their share of nation (personal) income by 1.7 percent and population by just slightly more. The largest absolute increases in income were in the relatively few central counties in the largest metropolitan areas and in the counties comprising medium-sized metropolitan areas. It is important to notice that rural counties which are adjacent to metropolitan areas fare better than those which are not, as population and employment diffuses out from regional growth poles.

Table 1-3: Income and Population Growth 1969-1970 to 2005-2006 by County Type

Type of county	# of counties	Personal income 1969-1970	Personal income 2005-2006	Population 1969	Population 2006			Later income / earlier income	Relative income growth	Later population / earlier population	Relative population growth	Income growth / population growth
All	3,068	797,104,387	10,553,267,107	200,221,967	296,715,625	9,756,162,720	96,493,658	13.2395	1.0000	1.4819	1.0000	1.0000
Large metropolitan	181	391,352,311	4,959,477,311	83,967,730	118,263,909	4,568,125,000	34,296,179	12.6727	0.9572	1.4084	0.9504	1.0071
Central large metro	49	274,503,706	3,040,389,970	59,441,795	74,940,790	2,765,886,264	15,498,995	11.0760	0.8366	1.2607	0.8507	0.9834
Fringe large metro	132	116,848,605	1,919,087,341	24,525,935	43,323,119	1,802,238,736	18,797,184	16.4237	1.2405	1.7664	1.1920	1.0407
Medium metro	260	177,601,173	2,526,175,073	45,285,068	72,224,939	2,348,573,900	26,939,871	14.2239	1.0744	1.5949	1.0762	0.9983
Small metro	185	60,918,317	888,814,246	17,166,316	28,251,351	827,895,929	11,085,035	14.5903	1.1020	1.6457	1.1105	0.9923
Large rural, adjacent	172	43,481,541	594,956,865	12,509,025	19,682,739	551,475,324	7,173,714	13.6830	1.0335	1.5735	1.0618	0.9734
Large rural, non-adjacent	147	26,580,543	333,378,748	8,211,408	11,514,282	306,798,205	3,302,874	12.5422	0.9473	1.4022	0.9462	1.0012
Medium rural, adjacent	553	39,457,205	544,759,298	12,986,616	19,976,172	505,302,093	6,989,556	13.8063	1.0428	1.5382	1.0380	1.0047
Medium rural, non-adjacent	722	39,758,385	454,056,232	13,520,754	17,270,967	414,297,847	3,750,213	11.4204	0.8626	1.2774	0.8620	1.0007
Small rural, adjacent	240	6,275,586	103,625,662	2,263,033	3,848,783	97,350,076	1,585,750	16.5125	1.2472	1.7007	1.1476	1.0868
Small rural, non-adjacent	608	11,679,329	148,023,675	4,312,017	5,682,483	136,344,346	1,370,466	12.6740	0.9573	1.3178	0.8893	1.0765
Metro-non-metro	0.1437	0.7138	0.7093	0.6455	0.6420	0.7090	0.6346					
non-metro	2,442	167,232,587	2,178,800,478	53,802,853	77,975,426			13.0286	0.9841	1.4493	0.9780	1.0062
metro	626	629,871,800	8,374,466,629	146,419,114	218,740,199			13.2955	1.0042	1.4939	1.0081	0.9962
All	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	0.00%					
Large metropolitan	5.90%	49.10%	46.99%	41.94%	39.86%	-2.10%	-2.08%					
Central large metro	1.60%	34.44%	28.81%	29.69%	25.26%	-5.63%	-4.43%					
Fringe large metro	4.30%	14.66%	18.18%	12.25%	14.60%	3.53%	2.35%					
Medium metro	8.47%	22.28%	23.94%	22.62%	24.34%	1.66%	1.72%					
Small metro	6.03%	7.64%	8.42%	8.57%	9.52%	0.78%	0.95%					
Large rural, adjacent	5.61%	5.45%	5.64%	6.25%	6.63%	0.18%	0.39%					
Large rural, non-adjacent	4.79%	3.33%	3.16%	4.10%	3.88%	-0.18%	-0.22%					
Medium rural, adjacent	18.02%	4.95%	5.16%	6.49%	6.73%	0.21%	0.25%					
Medium rural, non-adjacent	23.53%	4.99%	4.30%	6.75%	5.82%	-0.69%	-0.93%					
Small rural, adjacent	7.82%	0.79%	0.98%	1.13%	1.30%	0.19%	0.17%					
Small rural, non-adjacent	19.82%	1.47%	1.40%	2.15%	1.92%	-0.06%	-0.24%					
Metro-non-metro												
non-metro	79.60%	20.98%	20.65%	26.87%	26.28%							
metro	20.40%	79.02%	79.35%	73.13%	73.72%							

Counties classified according to Calvin Beale's (U.S. DoA ERS) categorization
Some independent cities combined with their adjacent county

Charlotte and the Triangle, centered on Mecklenburg and Wake Counties, respectively, are North Carolina's two main growth poles. As they have grown, Charlotte and the Triangle, have also spun off residences and lower value-added employment, along with some high value-added employment, to their peripheries. In this sense, these growth poles help power growth in a widening circle of influence allowing some North Carolina locations to capture employment which likely would have otherwise emerged in other states.

Manufacturing location is increasingly difficult to trace using the size of labor force as an indicator. Manufacturing has continued to become increasingly capital intensive. Accordingly, as the productivity of workers has grown, the percentage of the labor force engaged in manufacturing has declined. The following table provides one assessment of overall manufacturing location patterns.[27]

Table 1-4: Rules of Thumb for Manufacturing Location

Highly customized product with short lead time expectations	will be	Produced closest to dense customer concentrations
Bulky products where logistics costs outweigh labor cost differentials		Produced in a low labor cost spot in region
High contribution margin products usually requiring asset-intensive manufacturing		Produced in tax havens
a) Products with lower logistics profile where labor is a significant component of the product b) Products for companies who don't do landed cost analyses c) Very inexpensive product with fixed demand planning cycles		Produced in lowest global labor cost location

The table suggests the cases in which "home market advantage" has a significant effect and the trade-offs between transportation costs, the mobility of workers, and industrial agglomeration.[28]

North Carolina's competitive position has changed with the decreasing costs of access to Asia's growing urban labor force. At the same time, some manufacturing, now located in the Northeast and Midwest, may find relocation to the state attractive, especially as capital equipment replacement needs arise. Proactively addressing the logistics needs of the possible recruits could have a positive economic development return.

1.2.1.4 The product cycle as a source of North Carolina development

For domestic and international firms, North Carolina is an intermediate cost location between the U.S. economic heartland (which is largely the Northeast, the Pacific Coast, and, to a surprising

[27] Ed Feitzinger, formerly of HP [full cite]

[28] Donald R. Davis and David E. Weinstein (2003) "Market access, economic geography, and comparative advantage: an empirical test," *Journal of International Economics* 59: 1-23; Diego Puga (1998) "The rise and fall of regional inequalities," *European Economic Review* 34: 203-334, respectively.

degree, still the Midwest), and overseas. Figure 1-12 offers a schematic overview. Intermediate costs are competitive when a location can provide commensurate benefits. U.S. firms, for example, might choose a North Carolina site for certain operations as a compromise between their traditional location in the Northeast, Midwest, or Pacific West and relocating overseas. Similarly, foreign firms might select North Carolina as an option halfway between exporting to the U.S. and producing closer to core U.S. markets. The North Carolina economy benefits from any factor which widens the space between the core and peripheral zones of the global economy.

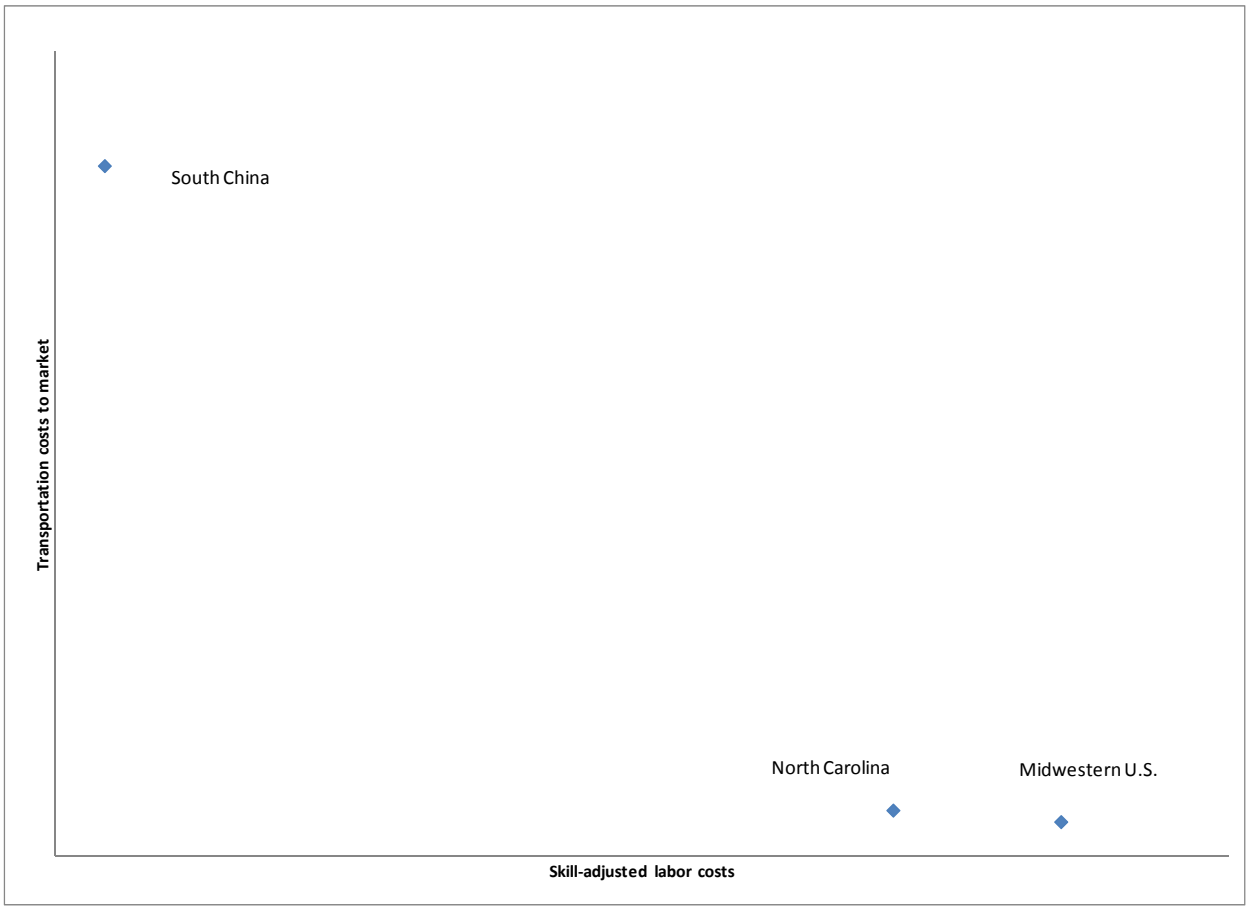

Figure 1-12: Industry Site Requirements and Location Choice

While North Carolina continues to rank highly on many surveys of business climate, the state is not always the low-cost location for many industries. North Carolina competes with locations across much of the South and, increasingly, even with sites in the Midwest. Accordingly, North Carolina manufacturers may need to ship products substantial distances on tight time schedules. North Carolina automotive parts producers, for example, may maintain just-in-time distribution and supply chains which may reach several states away, highlighting the importance of logistics and transportation infrastructure in making the state an attractive location for production.

1.2.1.5 Linking the elements

Many factors can have an impact of regional economic growth. Figure 1-13 summarizes the major factors most relevant to this project. Reductions in generalized transportation costs (including all aspects of costs) expand the effective spatial market area of production at a particular location. When that expansion includes desired markets, such reductions in cost can 1) enable new forms of trade among industries and locations, 2) reduce cargo loss and enhance reliability of existing trade movements, 3) expand the size of markets and enable economies of scale in production and distribution, and 4) increase productivity through access to more diverse and specialized labor, supply and buyer markets.[29] The magnitude of the transportation improvement impact depends upon the degree of cost reduction (minor improvements have small impacts) and the regional endowments of productive resources. The supply of such resources, labor and other inputs is reflected in their cost. Transportation improvements have an impact on regional economic development because they open up, mainly human, resources for better uses. "Bridges to nowhere" incur costs and generate no benefit. Transportation improvements have their strongest payoffs when there is a need for new capital investments whether in new capacity, replacement capacity, or a combination of the two (as suggested by product cycle theory).

[29] Paraphrased from Glen Weisbrod (2008) "Models to predict the economic development impact of transportation projects: historical experience and new applications," *Annals of Regional Science* 42: 519-543, p. 521.

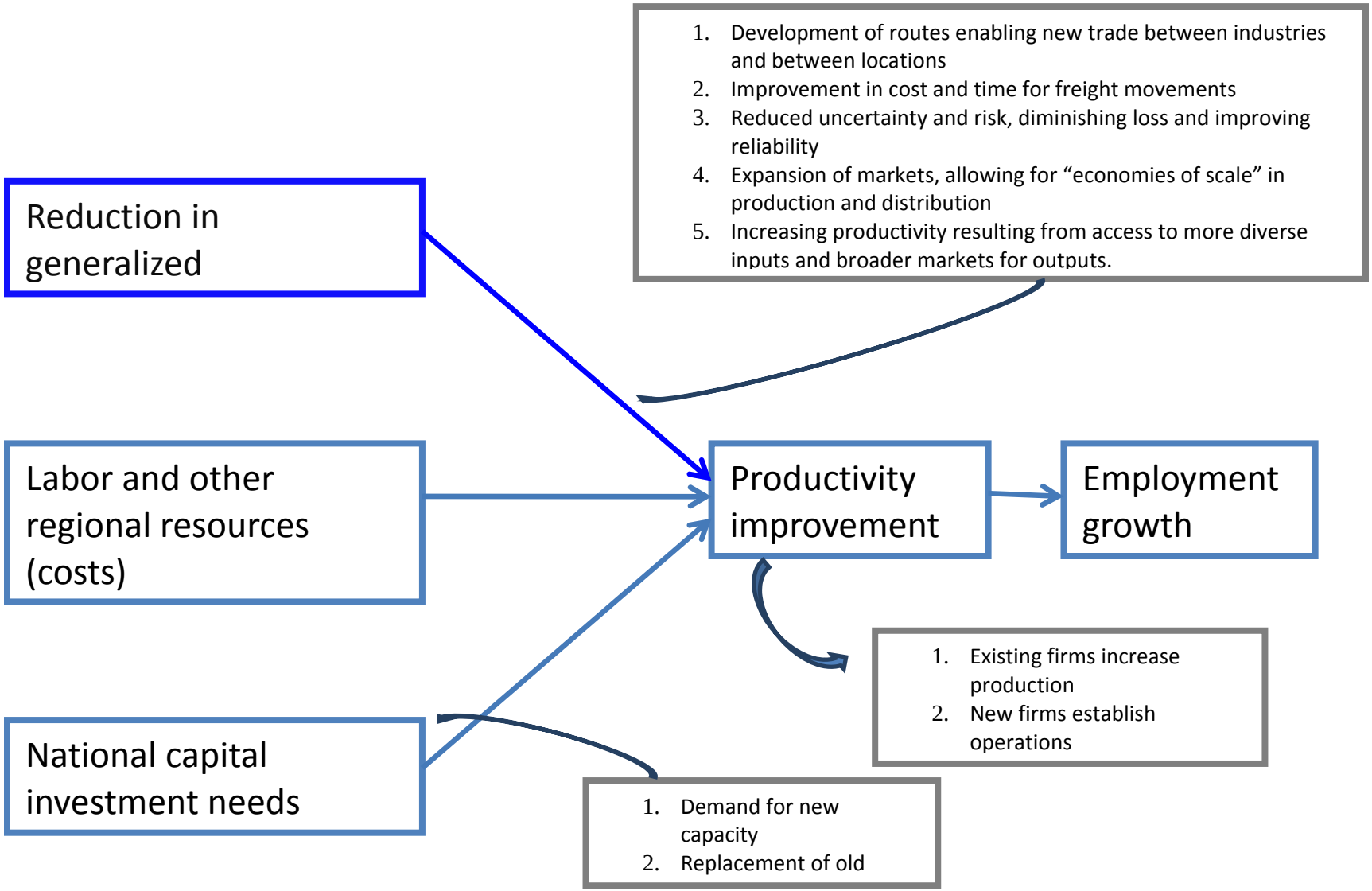

Figure 1-13: Transportation Improvements Interact with Regional Resources and Investment Trends to Accelerate Regional Employment Growth

Although abstract, transportation economists have developed a framework for conceptualizing and, with the availability of detailed data, measuring the impact of transportation improvements. Figure 1-14 summarizes those impacts in simplified form. The curve, DD, represents the demand for freight transportation from a specific location along a freight corridor to the market area local producers serve. P_0 and Q_0 represent the costs and quantity, respectively, of freight transportation from that point before an improvement is made. P_1 and Q_1 represent the costs and quantity after the investment which reduces the cost of getting to market. Area A in the figure represents the benefit to existing users of the freight corridor. These are shipments which would have been made in any case but benefit from the cost reductions. Because the cost of shipping decreases after the improvements, the quantity demanded would tend to increase. Area B in the figure represents those induced effects. Historically, unless there is a step change in accessibility (which may require coordinated investments at many other locations), the induced effects tend to be relatively small. North Carolina already has a well-developed transportation system. The size of the effect depends upon the price elasticity of transportation. Moreover, given the realities of changing population and real income, not all increases in traffic can be attributed to increases in accessibility.

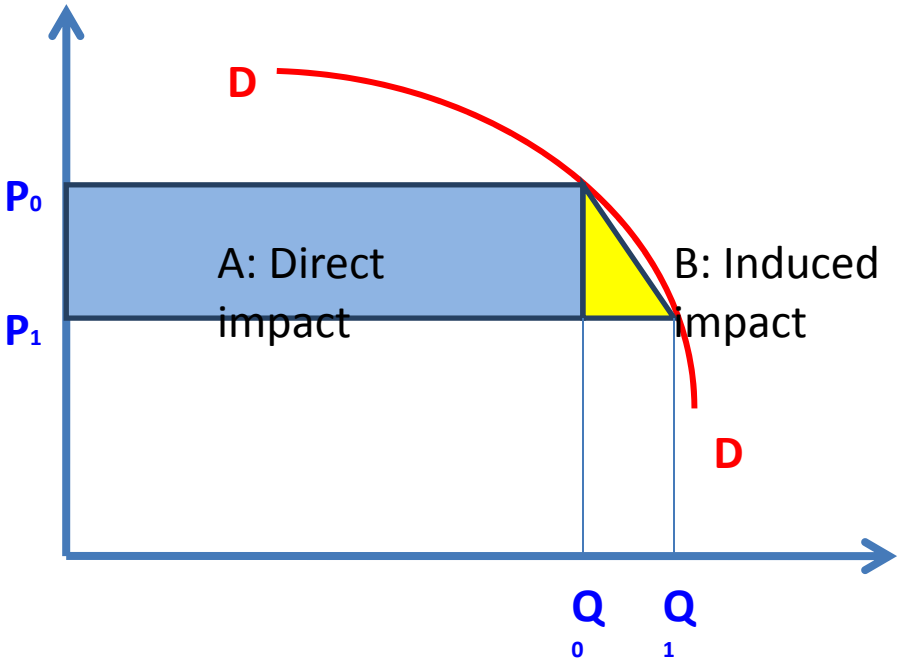

Figure 1-14: Framework for Understanding the Direct and Indirect (Catalytic) Impacts of Transportation Improvements on a Regional Economy

1.2.2 Four-step models of transportation and infrastructure needs

The framework above is most useful for understanding business location decision-making. Transportation planners attempting to measure and project infrastructure needs require a lower altitude view. The State Logistics Plan identified three complementary policy levers useful in statewide logistics planning. These policy levers each begin with the existing and projected demand. Producers and consumers are distributed in space according to considerations which they consider advantageous. These spatial distributions create supply chains and distribution networks – the pattern of freight transportation. Freight infrastructure, provided by public bodies, carriers, and others, either pro-actively or in catch-up mode, helps facilitate the desired shipments. Desired trade patterns and infrastructure networks produce the distribution of commodity flows and vehicle (trucks, rail cars, and aircraft) use patterns. Laws, regulations, and practices influence the way in which these aspects of the logistics system work together and the path they follow into the future.

Planners differ in their approaches to optimizing the logistics system. Economic development specialists and land use planners tend to use land use regulations as levers to improve logistics functioning. There is a tradition of land use controls in the U.S. dating back nearly a century. According to the *land use* approach, land use determines logistics patterns which determines infrastructure which, in turn, channels the flows of commodities. Transportation planners often begin from the *existing and projected flows*, using that to determine infrastructure needs which may then alter logistics patterns and ultimately economic structure – much as major highways sometimes channel, but do not generate, growth. Lawyers and political scientists may see *laws, regulations and policies* regulating exchange and transport as "arms-length" levers steering the system. Carbon taxes and usage taxes, for example, are techniques for improving market mechanisms by capturing and charging for negative externalities. Imposing true costs on users may bring about market solutions to complex logistics issue, maximizing economic product, reliability of the transportation system, sustainability, and enhancing the quality of life.[30]

Given the centrality of market demand in all three approaches, researchers sometimes use an adaptation of the general hierarchical four-step transportation demand model to understand freight infrastructure needs. The four steps of the standard model are 1) trip generation, 2) trip distribution, 3) mode choice, and 4) route assignment. The basic model has been developed in several variants and offers a useful conceptual framework for understanding transportation infrastructure needs. The model starts with the broadest decisions and works towards the narrower.

Trip generation taps the volume of originating or terminating shipments in a region by type of good and purpose (intermediate good or final purchase). The U.S. Department of Transportation's Commodity Flow Survey and other sources provide such data for broad geographic regions. Population and household counts and forecasts are important for determining wholesale and retail distribution needs. Economic and employment forecasts help determine originating shipment needs. The location of major central freight places such as ports and of major corridors help determine transshipment needs. Ideally, historical and forecasted shipment

[30] Page 16 of the Plan report, after a conceptual framework developed by Cambridge Systematics.

information would be available in geographic and product detail but, at this stage of the analysis, it is not.

Trip distribution links freight origins with shipment destinations. Often such information is lacking so estimates are sometimes made by using a modified gravity model function, wherein the volumes of production is tied to volumes of consumption, mediated by distance.

Mode choice refers to the volume of shipments between origins and destinations using each transportation mode.[31] The total landed cost concept is often used in determining mode choice for freight shipments. Because each good and potentially each shipment has different constraints and needs, a logistics cost equation incorporating transportation costs, inventory costs, along with the potential costs of missed sales or of late deliveries or of spoilage may be calculated for each shipment before a mode choice is made.[32]

Route assignment concerns the allocation of shipments between an origin and destination by a particular mode to a route. Route choices respond to capacity and congestion to minimize transportation costs.

The route assignment problem for freight can be quite complex because the optimum shipment size from the point of view of the shipper and consignee may be significantly smaller than that from the point of view of the transportation provider. Therefore, in some cases, shipments may be consolidated at particular points which are advantageous for break-in-bulk shifts (often intermodal interchanges) until a sufficiently large shipment can be accumulated. Busier interchanges minimize the wait needed. Below particular traffic thresholds, direct shipment without consolidation may be more advantageous because the waiting time, with its associated costs, outweighs the potential savings in transportation time.

Backhaul costs can also have an impact on route choice. Shipments are one way but the vehicle and/or container which delivered the shipment must generally return to the point of origin. If it returns empty, the shipment generates twice the vehicle miles as necessary and a multiple of the minimum possible cost. The possibility of a return load might help sway a route choice decision.

The consolidation and backhaul concerns and the cost savings they potentially imply help give rise to a structured network of shipments instead of a diffuse tangle of point-to-point shipments. The emergence of such a hierarchy depends upon the evolution of cost savings and speed advantages along trunk routes which typically develop between major markets. These trunk routes may entail a modal shift but sometimes they do not (as when feeder truck or air routes meet main lines). Busy routes also develop because transportation infrastructure channels traffic due to the economies of providing through roads or mainline rail lanes. The differences in trunk line and "last mile" costs have been estimated to be as large as tenfold.

These four steps are not actually sequential decisions. The broader total landed cost framework includes production costs, so that transportation costs and location decisions can affect each

[31] Daniel McFadden won a Nobel Prize for advancing understanding of mode choice.
[32] Bowerscox, Closs, and Cooper, Supply Chain Logistics Management

other. In order to be competitive locations for industry – whether goods-producing or service-producing – the total costs of resource procurement, production, including labor, and shipment to market needs to be the minimum possible. Therefore, skill development systems, labor markets, and effective political institutions are also critical to competiveness.

Infrastructure spending is an investment in prosperity. As such infrastructure is expected to produce a social and a financial return. Welfare economics provides the basic framework for evaluation but a number of distributional concerns have resulted in some modifications. Satisfying demand – or potential demand – depends upon the cost-effectiveness of doing so. Once aggregate demand is estimated and allocated among points, modes, and routes, a decision needs to be made with respect to the relative costs and benefits of satisfying those needs. That decision is represented in partial and very simplified form in Figure 1-15. Public investments in freight transportation can be justified when the spatial expansion of producers' market area increases production sufficiently to generate the increased tax revenue through a range of taxes plus users' fees to finance the project.

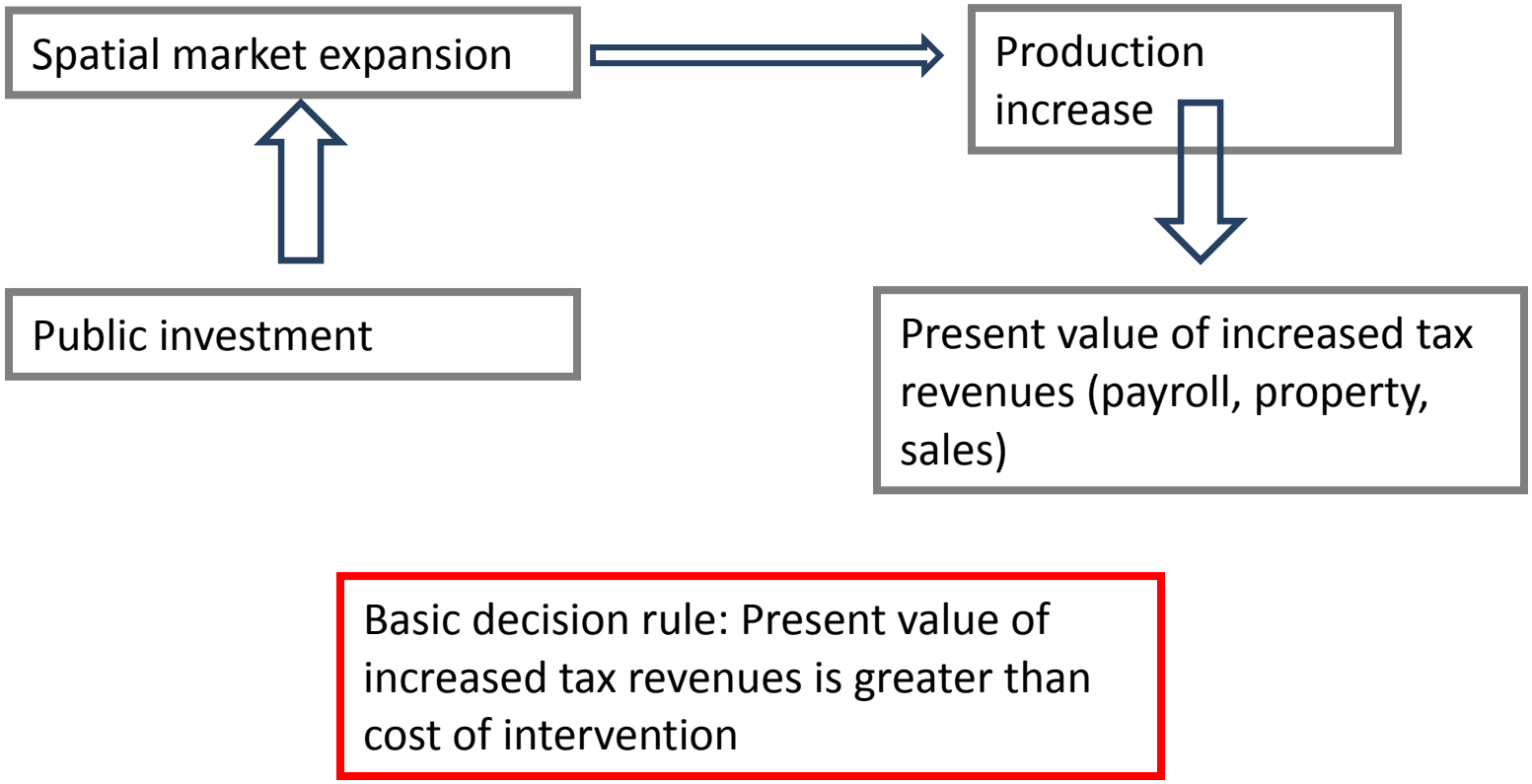

Figure 1-15: Basic Transportation Intervention Decision-Making Rule

Infrastructure implies shared costs and benefits. Sharing, in turn, implies a political coalition which is prepared to distribute each. Many infrastructure projects are stranded on the need to satisfy all members of a distributional coalition which may not share in the costs but which insists on collecting political rents. Therefore, effective infrastructure provision requires not only a solid value proposition, which some do not, but also a firm agreement to allow stepped investments to proceed without undue post hoc bargaining.

National agencies are shifting from a top-down to a bottoms-up approach to approach to infrastructure funding in order to better allocate limited funds. The proposed national infrastructure bank is one such effort. By having localities and projects compete for funding and by requiring that local investment be forthcoming, agencies are able to secure buy-in to funded projects, minimizing the risks of cost overruns which often turn potentially viable projects into poor investments which do not create a social return.[33]

1.2.3 The role of logistics in enhancing regional economic competitiveness

As useful as the preceding framework is in transportation planning, individual businesses, or rather networks of cooperating businesses, have a somewhat different lens on the same issues.

From a firm's point of view, optimizing the supply chain can be a source of competitive advantage. The supply chain is "a combination of processes, functions, activities, relationships, and pathways along which products, services, information, and financial transactions move in and between enterprises, in both directions."[34] In a manufacturing company, the supply chain can be directly involved in up to 80 percent of the enterprise's total cost structure while 60 percent may be more commonplace. While the definition above may seem too encompassing by including almost everything included under the term, "operations," the concept emphasizes that production takes place across establishments and that the process is not complete until the product is fully delivered.

From the point of view of the shipper, the key issue is one of minimizing cost while reaping the maximum possible benefit, whether through labor cost savings, inventory reductions, or transport costs. A logistics, or supply chain management, perspective on transportation yields two critical insights. First, transportation reliability can have a substantial impact on total supply chain costs. Second, under some conditions, increased spending on transportation yields supply chain cost savings. The key mediating consideration is inventory cost. Reliability decreases the need for safety stocks. Rapid, reliable transportation can be a factor in reducing optimal shipment sizes which can affect inventory and production savings.

Logistics is an important subset of all supply chain activities but is nevertheless quite broad. The World Bank, whose International Trade Department has been engaged in an extensive effort to

[33] The Economic Development Administration has transformed itself into an effective instrument of economic development by requiring that all Federal funds be leveraged by local public and private sources. Doing so minimizes waste and discourages projects with poor chances of success or inadequate local commitment.
[34] John Gattorna [complete cite ??]

improve international and domestic trade conditions, has examined six general factors in compiling their Logistics Performance Index:

- Efficiency of the customs clearance process,
- Quality of trade and transport infrastructure,
- Ease of arranging competitively priced shipments,
- Logistics competence and quality of logistics services,
- Ability to track and trace consignments, and
- Timeliness of shipment delivery.[35]

These concerns are far broader than transportation costs and infrastructure *per se*. They include the speed and reliability of shipments, the ease of shipping, and the length of border delays.

Survey evidence indicates that senior managers believe logistics performance is important to customer service level, profitability, and competitive advantage.[36] Accordingly, logistics costs are a factor in determining regional economic growth and they may be a factor in enhancing North Carolina's competitiveness. Firms often attempt to reduce total – production, transportation, and inventory – costs in order to maximize their profits. Broadly considered, production at low-cost locations often entails higher transportation and inventory costs (much like residing further away from a center city often implies lower land and housing costs but higher commuting costs and time commitments). Consequently, reducing logistics costs can improve the competitiveness of a particular region, much as a new highway or train line can boost home construction in areas of expanding demand.

The costs of production are privately borne but effective collective provision can reduce those costs, as when labor markets reduce the costs of labor or when efficient public administration reduces capital investment costs or when shared infrastructure reduces the costs of water supply, power, or transportation.[37] By helping to reduce total landed cost by reducing transportation costs or inventory costs through speed and reliability, logistics infrastructure may be an important aspect of a strategy to enhance North Carolina economic competitiveness and it may be a component of a broad economic strategy to raise economic welfare among a broad section of the American population by re-industrializing the U.S.[38] In order for that to occur, productivity must be increased, in part, through an efficient logistics system.

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[35] *Connecting to Compete: Trade Logistics in the Global Economy, The Logistics Performance Index and Its Indicators, 2010*.

[36] Lauri Ojala May 6, 2010 World Bank PREM Day.

[37] Infrastructure has been defined as the basic physical and organizational structures needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function. The term frequently refers to the technical networks which support a society, such as roads, water supply, sewers, power grids, and telecommunications. Functionally, infrastructure facilitates the production of goods and services. Roads enable the transport of raw materials to a factory, and also for the distribution of finished products to markets. Like chemical catalysts, they are necessary to production but are not significantly consumed in the process. Accordingly, the term, infrastructure" is sometimes used to refer to basic social services such as schools and hospitals which are also necessary for a system of production.

[38] Although we only mention transportation and inventory costs, the logic extends to not missing important sales opportunities and other components of cost.

In North Carolina, logistics entails shipping goods in to meet rising business and household consumption needs and it entails shipping goods out from North Carolina producers to markets which may be in any part of the world. Transportation links producers and consumers. Because infrastructure construction and operation entails high capital costs, some types of infrastructure cannot be effectively provided until a certain threshold of activity is achieved. The amount and type of infrastructure needed depends critically upon which industries are producing what products for which markets and shipped along which trade lanes. Although infrastructure is often built with extra capacity, in the absence of a strong history of growing demand, such investments are risky. Unfortunately, the history of large transportation infrastructure projects is replete with disappointing outcomes resulting from overestimating future demand and underestimating costs.[39]

Logistics activities have land use needs. These include the roadways, rail lines, and pipeline rights-of-way but also the intermodal and break-in-bulk terminals and warehousing facilities that hold inventory until further processing. The terminals are relatively low value-added activities which tend to be chased to the urban periphery as cities grow and they tend to be unwelcome neighbors in residential and many commercial areas. The multi-sectoral nature of the North Carolina economy requires that logistics activities be performed and that they interfere as little as possible with incompatible land uses such as tourism, and residences.

The World Bank Logistics Competitiveness Index ranks the United States as 15th overall in an international comparison, suggesting substantial room for improvement. Using cross-national data over time, Warren Hausman, Hau Lee, and Uma Subramanian have found that a one percent reduction in direct shipping costs led to a 1.414 percent increase in the value of trade; a one percent reduction in other trade-related costs resulted in a .251 percent increase in trade; a similar decrease in average trade-related time brought about a .143 percent increase; and a one percent reduction in the standard deviation of processing time (increased reliability) was responsible for a .308 percent increase in trade. These results are not directly transferable to North Carolina but they suggest that the possibilities for improvement could have positive results.

1.3 *Logistics villages as a solution to congestion, transport cost, and land use conflicts*

Logistics villages (also called freight villages or integrated logistics centers) offer a potential solution to congestion (and therefore transport cost) and land use conflict problems while generating tax revenue and employment for the locality in which they are situated. Like many planning concepts, logistics villages are distillations and refinements of existing practices. The following section is abstracted from a more complete project document which is included as an appendix.

[39] Flyvbjerg, Bent, Nils Bruzelius, and Werner Rothengatter, (2003) *Megaprojects and Risk: An Anatomy of Ambition*, Cambridge: Cambridge University Press.

A logistics village can be conceptualized as "a defined area within which all activities relating to transport, logistics and the distribution of goods, both for national and international transit, are carried out by various operators."[40] "Freight villages reflect a modern way of organizing logistics, transport and goods distribution activities and usually include warehouses, distribution centers, storage areas, offices, truck services, bank, postal, insurance services and in certain cases Customs infrastructures."[41] While there are several definitions, most include intermodal transport and the active management of shared facilities as keystone features. A few include the condition of the goods remaining in the same transport load unit for the entire journey but others include load aggregation and disaggregation in their definitions.

Logistics villages are sometimes contrasted with planned unit developments (PUDs) for freight and logistics purposes. Similar to logistics villages, freight PUDs are also clusters of modern warehouses and freight facilities with favorable locations along major transport routes. The most important differentiation drawn is the absence of shared services which is at the heart of the logistic village concept.[42] Figure 1-16 summarizes the major sources of logistics village advantage.

[40] Howard J. Mann, Manager, Freight Planning, NYMTC, "Freight Village: What it is, What it does, Feasibility in NYMTC Region," undated brownbag presentation. Most works cited include a similar definition of a logistics village.
[41] Athanasios Ballis and George Mavrotas (2007) "Freight village design using the multicriteria method PROMETHEE," *Operational Research. An International Journal* 7(2): 213-232.
[42] Roberta E. Weisbrod, Ernest Swiger, Gerhardt Muller, F. Mack Rugg, Mary Kay Murphy, "Global Freight Villages: A Solution to the Urban Freight Dilemma," undated manuscript.

Figure 1-16: Sources of Logistics Village Productivity Impacts (Outgoing)

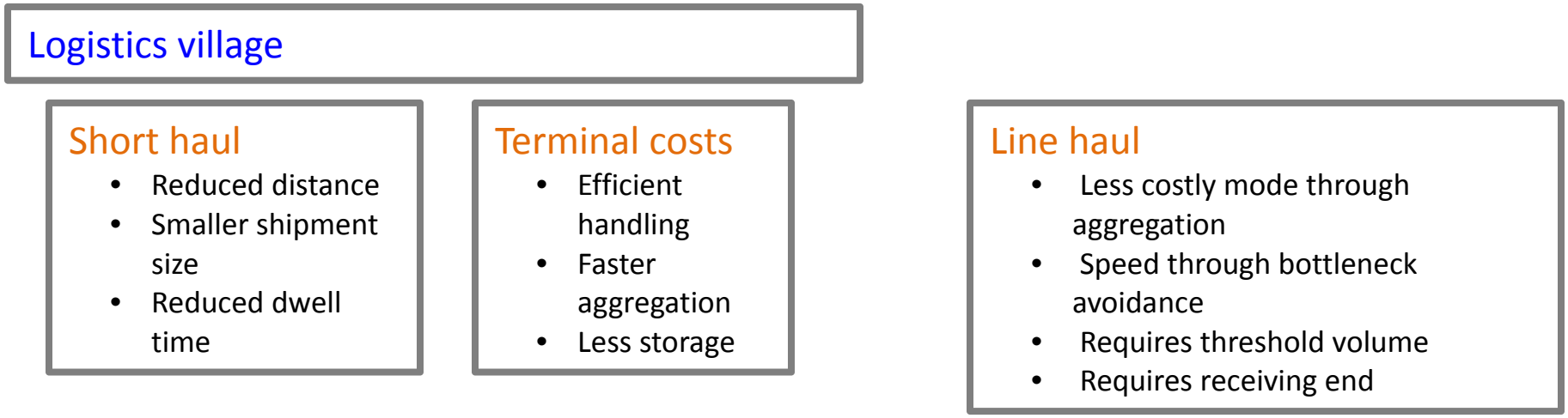

Figure 1-17 presents one possible schematic view of the development of logistics village functionality over time. Functionality can increase as traffic increases, meeting minimum thresholds for a growing set of ancillary services. Accordingly, a high level of traffic is critical to the development of logistics villages.

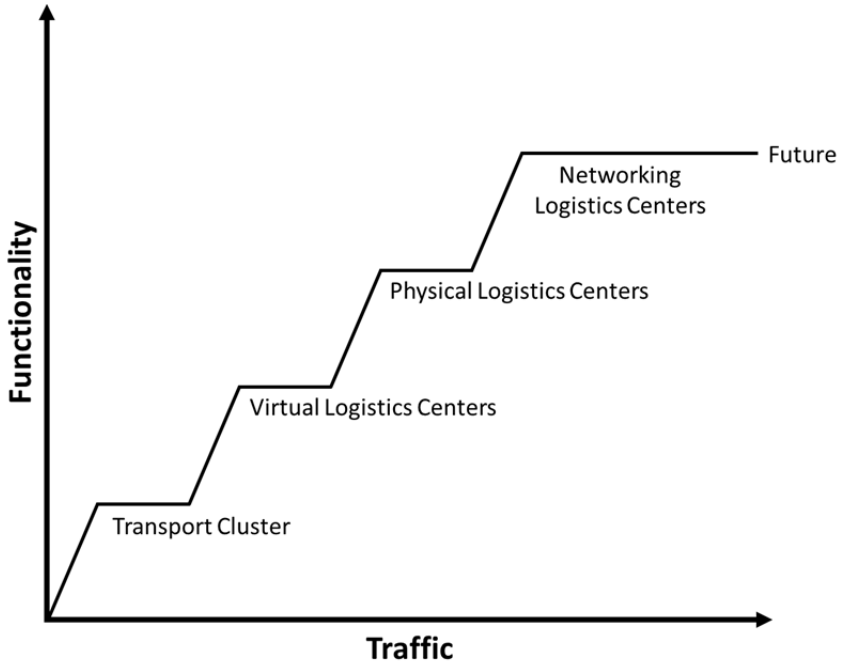

Figure 1-17: Stages in Logistics Villages Growth[43]

Logistics villages are elements of integrated transport chains which need to respond to the needs of shippers and consignees, even if they do not create those chains. As such, logistics villages complement transportation networks and their functions will likely continue to expand as logistics needs change. Logistics villages are attractive to users because access to low-cost trunk service with minimal terminal costs can reduce their overall costs.

Logistics villages focus on transportation, intermodal operations, and ancillary activities. Therefore they are usually located close to intermodal transport links, seaports, and/or airports, often on the outskirts of metropolitan areas. Inland ports, often combined with Free Trade Zones, but not always offering multimodal options are sprinkled throughout the U.S.

The logistics village concept promises to deliver public and private benefits by building on economies of scale and scope. Logistics villages aim to provide public benefits primarily by supporting intra- and inter-national trade by reducing logistics costs while relieving road congestion by reducing truck vehicle miles traveled (VMT) through intermodalism. The latter might improve urban air quality by reducing the pollution associated with truck traffic and, especially, traffic congestion. Successful logistics villages may generate congestion in their immediate vicinity, however, as trucks attempt access and egress at peak hours.

[43] Lars Bentzen (2004). "Best Practices on Logistics Centres." Final NeLoc Conference. Turku. 15 January.

Logistics villages may also facilitate the expansion of growth sectors and generate employment in and of themselves, possibly benefiting regional economies. The logistics village concept has become especially popular in areas on the fringes of major metropolitan areas because they may restore disused manufacturing brownfield sites to local tax roles and because they may provide jobs, however limited in number, to under-employed populations. This type of site is sometimes redeveloped as mixed use residential or office complexes but such uses are not supported by market demand in all available locations.

In addition, as logistics activities increase in scale, and thus footprint, logistics villages offer the prospect of rationalized land use wherein freight traffic can blend with other land uses. In developed countries, the conflict between logistic, residential, recreational, and other commercial uses has increased, often resulting in freight sprawl and increasing delivery costs. Owing to the complementary nature of freight networks and infrastructure, logistics villages ameliorate conflict by concentrating facilities, reducing the footprint of externalities and by partially separating passenger and cargo traffic.

Logistics villages need to provide advantages to businesses in order to induce them to participate. The primary business benefit, particularly when disused brownfield manufacturing sites near the centers of major metropolitan areas are redeveloped, may be market proximity. For many of the potential tenants of say, Tremley Point in New Jersey, an alternative location may be just west of Allentown, Pennsylvania, which would imply an extra hour drive each way before central markets can be reached.

Access to multimodal transport is a second potential benefit to those serving major metropolitan markets. Freight often travels long distances to reach markets. In these cases, a multimodal journey, often sea-land or rail-road but to a lesser extent air-road, becomes either necessary for intercontinental shipments while road-rail-road or road-air-road shipments may be (or become) cost-effective for intra-continental shipments. An efficient multimodal transfer can be an attraction to logistics providers and shippers.

Intermodalism is the core concept in a logistic village. Therefore many of the 60 plus logistics villages said to be operating in the U.S. are centered on rail yards. Others are attached to seaports. A few are connected to airports but, because the physical volume of cargo is much smaller in that case and the shipments are quickly expedited, they may be significantly smaller. Given sufficient flow-through, the terminus of the long distance means of transportation acts as an effective anchor for transfer and ancillary activities.

The physical transfer of cargo between modes entails considerable expense and slows product flow. Therefore the benefits need to outweigh the slowdown in terms of cost, congestion relief, or overall speed. So far intermodalism in the U.S. has only been viable along busy trunk routes particularly those connecting the domestic with overseas markets. Intermodalism is beginning to be viable for some long distance trunk routes between major U.S. metropolitan areas. For example, a dedicated “cool train” bringing perishables from the West Coast to the East terminates near Albany, N.Y. where goods are then transferred to truck for distribution throughout the Northeast. The intermodal journey does take longer than truck-only shipment and

a significant amount of driving is still required but the intermodal option saves on overall shipping cost and eliminates the need for cross-country highway journeys, relieving pressure on highway capacity.

Logistics villages have succeeded where the economies of use are clear to all parties. In busy metropolitan areas where competition for land and zoning regulations sometimes forces logistics service providers to choose between an inconvenient, distant site and a logistics village, logistics villages have been able to concentrate activities into limited areas. Some logistics villages have been developed without significant public funds and are able to generate financial returns for investors. Their advantage for the non-metropolitan areas of land-rich North Carolina, especially in the absence of an intermodal transfer, has yet to be confirmed.

1.4 *Creating the coalitions to power logistics infrastructure success*

Developing a successful logistics village requires finding common interests for competing parties. Land owners would like to maximize the value of their land. Business owners would like to maximize shareholder value. Regional governments strive to maximize regional investment. There is a danger that short-term rent-seeking will result in a "subsidy hold-up" at the expense of the state government and taxpayers. There is danger that those benefitting from public investments will seek to avoid their fair share of the costs. There are signs that the last issue has already affected some state economic development investments.

The alignment of stakeholder interests and incentives underlies the choice of a logistics village governance model. While a privatized logistics village with sizable landholdings to prevent freeloading might be an adequate solution, a logistics village that operated at a loss might still be a net regional benefit if the positive economic spillovers in terms of business revenues and employment generated, especially the so-called "catalytic effects," were greater than the operating deficit. Increased regional tax revenues could recoup the operational loss.

The potential for positive economic spillovers in terms of gains to business efficiency and employment generation – catalytic effects – raises the issue of broader logistics village governance. An optimal logistics village governance structure would encourage the maximization of regional benefit.

Regional governance integrating infrastructure investment and land use plans has been an elusive goal at least as far back as the 1920s when the Regional Plan Association published its landmark initial plan for the growing New York Metropolis. Despite the frequent calls for regional governance, progress has been slow. The prospects for regional governance with genuine authority are slim. Most existing arrangements don't touch land use regulation. Although the lack of regional governance is possibly regrettable, the evidence for or against a relationship between regional governance and competitiveness is slim. There are several reasons for the lack of such evidence. Competing localities could have a positive effect on efficiency and therefore attracting businesses.

A special purpose government similar to school boards, water and sewer districts, or library districts, is an option to coordinate investment and land use as are regional revenue-sharing arrangements. Regional tax-base or revenue sharing involves each participating community designating some part of its assessed value base, or of a stream of tax revenues, for inclusion in a regional pool that is then divided among all localities in the pool by some formula, usually involving total population and perhaps other variables. The assessed values or revenue streams to be included in the base from which the shared pool is derived could potentially include only those added to each community subsequent to the date at which this arrangement is adopted by the state legislature.

For each property developed after the date of agreement, some percentage of the assessed value is retained by the locality where the property is built, and the remainder is placed in a regional pool of assessed values. This arrangement implies that incremental development revenues are shared but those stemming from the existing municipal bases are not. That apportionment process implies that localities with large, established tax bases are not unfairly burdened.

The basic purposes of sharing tax bases are (1) to reduce competition among communities for non-residential properties to add to their tax bases, since such properties added to any community also add to the pool shared by all communities; (2) to create a fairer distribution of tax benefits from properties created in each community that impose costs upon surrounding communities too; (3) to reduce disparities in assessed values per capita among communities within the same region so as to provide more equalized (but not equal) bases for financing local government services, including education; and (4) to permit regional land-use planning across a territory that contains parts of several different municipalities, each of which would not receive equal shares of future developments if rational plans were adopted for the region as a whole.

In response to the general aversion to regional government and to adding additional layers of government, forms of informal governance have arisen in the U.S. and elsewhere. In fact, even in countries where regional governments have the requisite powers, informal bodies are an essential component of logistics village governance.

Regional partnerships for economic development have been increasing in number, creating what have been sometimes termed, “virtual regions.” These vary considerably in form and mission. Sometimes virtual regions develop in the form of narrowly-circumscribed horizontal (municipality to municipality or county to county) inter-local agreements. More often, a form of public-private partnership emerges. North Carolina’s Eastern Regional Partnership, formed in support of the Global TransPark effort is one example.

These virtual governments share several characteristics. They focus on areas of substantive strategic concern. They seek the development of government capacity, not the expansion of government. They are directly or indirectly fueled by coalitions of interest groups from public, private, and non-profit sectors and they frequently employ a facilitated procedure to develop a shared vision and means of collaboration.

In the wake of the recent financial crisis, there has been increased public concern with the socialization of risk. These days, the public often seems to be replacing private business as risk-

taking entrepreneurs. Each region must decide what level of risk it is willing to bear in its investment partnerships with private firms that have the potential to generate substantial regional spillovers.

Infrastructure financing practices may expose the public to risks that are not warranted by the potential benefits. Subsidies result in the cost of capital being under-estimated. There is often also an opportunity cost of freight-related development that is hidden by public ownership. Land could be used for other purposes. More importantly, because projects are not financed on a stand-alone basis, regions can under-estimate the risks associated with particular projects. Regions, therefore, sometimes invest in speculative projects – many of which turn out to not generate the anticipated revenue.

Some regions are beginning to experiment with a form of project financing in which the private firms bear the risk but also enjoy tax advantages. In an era when freight can easily be re-routed, there is no clear need for the public to assume the risk of speculative investment. Private infrastructure investment, backed only by anticipated revenues, is in fact common overseas and becoming more so in the U.S.

1.5 *Summary*

This report is rooted in the Department of Commerce' One North Carolina program which seeks to expand high value-added, knowledge-intensive jobs in the state in order to build regional income and expand the number of high quality jobs and in the Department of Transportation's Statewide Logistics Plan. That plan recommended enhancing primary highways, and mitigating congestion in collection/distribution networks in the short term, banking land for future development where demand is not yet evident but expected and investing in a few new corridors in the medium term, and developing air cargo support and monitoring the health of the freight logistics system over the long term.

A Task Force charged with assessing existing resources and future needs, improving governance structures including the formation of public-private partnerships, identifying the infrastructure needed to support vital industries, and making appropriate recommendations was formed. This report is a component of that effort.

States and regions invest in transportation infrastructure in order to generate citizen benefit. The primary benefit of such investment is not the employment created by the construction of the infrastructure but in the increased trade and welfare benefits the infrastructure makes possible.[44] Such investments can benefit the users already in place by reducing the costs of commuting (and thus labor costs) and of shipping (and thus of the product – or reducing the impetus to move overseas in search of yet lower labor costs). Viewed in that larger context, it is not logistics infrastructure per se that increases the competitiveness of particular regions but a combination of labor cost and with economies of agglomeration (which may be largely or entirely internal to individual establishments) combined with transportation and logistics costs which impact

[44] Douglas Holtz-Eakin and Martin Wachs (2011) *Strengthening Connections Between Transportation Investments and Economic Growth*, Bipartisan Policy Center, January 21.

regional competitiveness. Capital costs and technology availability also have an impact but these may be nearly perfectly mobile in the U.S. context.

Economists have found those factors to be salient, in varying degrees for various economic sectors in determining regional comparative advantage.[45] North Carolina is already rich in infrastructure endowments. While possibly slipping somewhat from its erstwhile status as the "good roads state," the state has invested heavily in urban and rural road construction, in ports, in rail, and in airports. These investments have given North Carolina excellent, even if imperfect access to national and global markets.

Accordingly, researchers have found that the productivity of public investments to have generally declined.[46] Some have suggested that, barring a major mode shift, aside from relieving congestion, regions can expect only modest impacts from further investments.[47] Potential benefits do exist but project selection requires careful analysis of demand. Given that logistics is only part of the total cost consideration, constructing logistics infrastructure may be most effective as a component of an economic development strategy when all other resources are already in place. That was the case when the railway opened up southern labor pools, growing as mechanization forced many off the land to find work in the developing cities and towns, to northern markets. The market demand, the capital, and the labor were in place just waiting for the costs of connection to be reduced. When they were, the logistics facilities catalyzed economic development. Later, the Interstate Highway system reinforced the connections, further reducing logistics costs but no system of logistics could have preserved competitiveness against the lower production costs overseas.

Some observers claim that the U.S. is facing an infrastructure crisis today. As evidence they often cite growing the congestion of existing facilities. We have scanned evidence that suggests that North Carolina as a site for production may be enhanced by relieving that congestion but that congestion is, with a few notable exceptions in the metropolitan areas, out of state.

Project evaluation for logistics villages will be complex. In addition to the usual considerations for any infrastructure investment: will the benefits in terms of reduced production and shipment costs needs to outweigh the costs of developing and maintaining the infrastructure including the potential crowding out of private investment, investments in logistics villages will need to address the question of whether logistics providers operating in the region will see sufficient benefit to use – and help pay for – the facilities. These considerations are critical in an era of

[45] Gordon H. Hanson (2005) "Market Potential, Increasing Returns, and Geographic Concentration," *Journal of International Economics* 67: 1-24.
[46] Jan-Egbert Sturm (1998) *Public Capital Expenditure in OECD Countries: The Causes and Impact of the Decline in Public Capital Spending*, Edward Elgar.
[47] Piet Rietveld (1989) "Infrastructure and Regional Development: A survey of multi-regional economic models," *The Annals of Regional Science* 23: 255-274; Sir Rod Eddington (2006) *Transport's Role in Sustaining the UK's Productivity and Competitiveness*, Department for Transport, December; Banister, D. and Berechman, J. (2000). *Transport Investment and Economic Development.* Chapter 6, University College-London Press, 131-160. Jan Oosterhaven and Thijs Knaap (2003) "Spatial Economic Impacts of Transport Infrastructure Investments," Pages 87-101 in A. Pearman, P. Mackie, and J. Nellthorp, (eds.) *Transport Projects, Programmes, and Policies: Evaluation Needs and Capabilities*, Ashgate, Aldershot; T.R. Lakshmanan (2011) "The broader economic consequences of transport infrastructure investments," *Journal of Transport Geography* 19: 1-17.

limited public funds and a political environment that is not always friendly to additional public spending.

A suitable governance structure is needed which will ensure efficient investment and operations of logistics infrastructure. That governance structure will likely include private participation and regional risk sharing in order to ameliorate rent-seeking. The state has already begun to experiment with partially self-sufficient toll roads. North Carolina already has a number of potential quasi-governmental vehicles for expanded efforts. As a step towards project evaluation, we now survey the Eastern Region in more detail in order to progress a step closer to assessments of both logistics demands and of selected regional resources.

2 Overview of the Eastern Region

> Sen. John Kerr (D-Wayne) "Without the military, we'd have nothing. Everybody would have to commute to Raleigh or Charlotte."[48]

The Eastern Region is one of seven economic development planning regions created by the Department of Commerce.[49] The region is comprised of 13 counties covering some 7,000 square miles (5,710 square miles of land) which form a rough pie-shaped slice of eastern North Carolina reaching from Raleigh's outer suburbs to the Atlantic Ocean's Crystal Coast. Figure 2-1shows the counties in the region and its component sub-regions.[50] The North sub-region contains Nash, Edgecombe, and Wilson Counties along with the Cities of Rocky Mount and Wilson. The Central sub-region is comprised of Wayne, Lenoir, Greene, and Duplin Counties. The Coastal sub-region includes Onslow, Carteret, Craven, Pamlico, and Jones Counties. Pitt County with the City of Greenville and Eastern Carolina University is sometimes considered as its own sub-region. The demarcation of sub-regions is based mainly on cross-county commuter flows but each sub-region has a distinct economy.

[48] Senator John Kerr (D-Wayne) quoted in Renée Elder (2006) "More than Economics: The Military's Broad Impact on Eastern North Carolina" *North Carolina Insight* p. 77, February.

[49] Much of the material in this section was taken or adapted from Strategic Planning Committee (2006) *A Vision Plan for North Carolina's Eastern Region*, North Carolina Eastern Region Commission, May. The *Comprehensive Economic Development Strategy* developed by the Eastern Carolina Council in 2007 covers nine of the Eastern Region 13 counties and contains similar analyses and recommendations.

[50] The North Carolina Eastern Region Commission created these sub-regions based on geography, economic base, and commuting patterns.

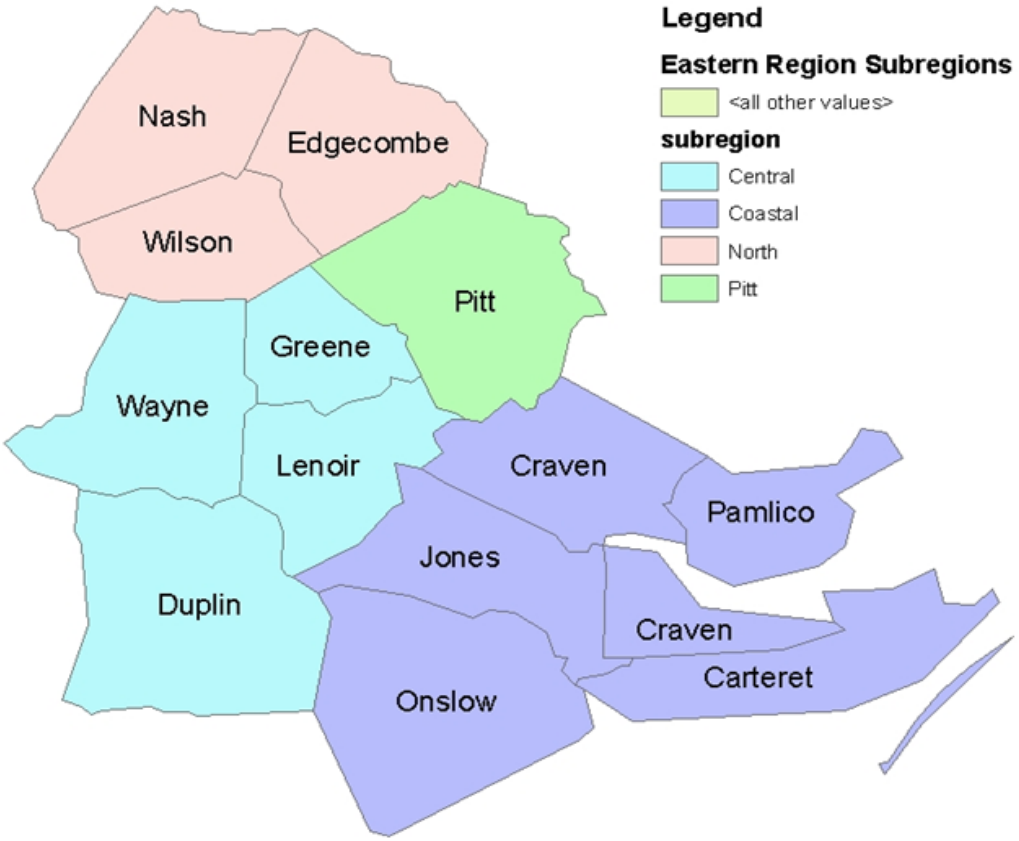

Figure 2-1: Overview of Eastern Region and its Component Sub-regions

In addition to the seven regions created by the Department of Commerce, the Department of Transportation has divided the state into 14 divisions, with the Eastern Region spreading over portions of NCDOT Divisions 2, 3, and 4. These divisions are aggregated into eight regions and three super-regions. The Eastern Region is in the NCDOT Eastern super region and comprises portions of the Eastern/OBX and Cape Fear regions.

The NCDOT Transportation Planning Branch has also demarcated the state into two planning units (Eastern and Western) and six planning groups, which comprise 17 Metropolitan Planning Organizations (MPOs) and 20 Rural Planning Organizations (RPOs) charged with assessing passenger and freight traffic demand and ranking needed transportation improvements which are incorporated into the Transportation Improvement Plans (TIPs) which are the basis for state transportation investments. The Eastern Region includes the Jacksonville, Goldsboro, Greenville, and Rocky Mount MPOs as well as all of the Down East and Eastern Carolina RPOs (components of the Southeast Planning Group) and portions of the Mid-East and Upper Coastal Plain RPOs (components of the Northeast Planning Group). The entire Eastern Region is subsumed by the Eastern Planning Unit.

North Carolina is also demarcated into 17 regional Councils of Government, with the Eastern Region including the territory of the Eastern Carolina Council of Governments and portions of the counties served by the Upper Coastal Plain Council of Governments and the Mid-East Commission. We note that a significant portion of the Eastern Region is said to be functionally-oriented towards Norfolk as evidenced by television viewership and public service delivery.

Many counties and municipalities support land use planning departments which implement the decisions and promote the visions of their governing bodies in cooperation with county and municipal economic development offices with active outreach efforts. The multiplicity of regional demarcations indicates that the Department of Commerce regions are only one of several potential bases for transportation planning and regional governance. As we have discovered, none are sufficiently broad to adequately address logistics needs.

In this chapter, we 1) outline a partial vision for the Eastern Region, 2) survey the regional logistics drivers, 3) describe regional logistics flows in state-wide and national context, and 4) discuss two aspects of non-transportation infrastructure. The broad context of drivers and flows is needed because, as noted in the Statewide Logistics Plan, logistics needs are demand driven. In order to be successful, interventions need to be able to meet demand more cost effectively than existing arrangements. We assess selected aspects of the region's non-transportation infrastructure which are directly related to regional economic development prospects.

2.1 *A Partial Vision for the Economic Future of the Eastern Region*

Based on our analysis of the available data, on the reports and vision statements generated by regional bodies, and on conversations with regional informants, we outline here a partial vision for the possible economic future of the Eastern Region. We stress that this is a very incomplete vision which emphasizes specific the aspects of the present and future economy of the region most relevant to the Seven Portals project. Summaries of the vision statements of two regional organizations are included in an appendix.

The vision builds on three primary sectors in which the coastal region of the state has an apparent competitive advantage: the military, agriculture plus the related value-added activities, and amenity-driven retirement and recreation. We expect the region to attract some manufacturing, in part directly or indirectly related to the military and its needs. There is also the possibility of continued food processing employment. The retirement-based growth will likely accentuate the demand for medical care, which is centered in Greenville. Greenville may continue to evolve as the region's center of high-skill, knowledge-intensive activities.

The backbone of the vision is a military-friendly region, well-prepared to fill the needs of a military which is restructuring its logistics and support (including maintenance, repair, and overhaul activities), reducing its overall spending, and likely preparing for another round of base consolidations. The region will stretch from the Norfolk area, through Elizabeth City in the Northeast with its Coast Guard installation, Jacksonville and its several Marine facilities which are likely, if adequate provision is made, to grow further in the anticipated next BRAC round to

Goldsboro and Fayetteville, home to Seymour-Johnson Air Force Base and Fort Bragg, respectively. The region will provide robust – redundant – links to ports (Norfolk, Morehead City, Wilmington, Sunny Point, and possibly Charleston SC). The military sometimes needs access to a large amount of capacity at short notice. No single facility can guarantee full readiness at all times. The Global TransPark may take on a role as central depot in addition to supplying the capacity to support massive movements of goods and personnel.

Agriculture and agriculturally-linked economic development will likely continue to operate in dispersed locations, capitalizing on soil quality and labor availability. In the future, a multi-modal rail link to the Northeast may be required. Should the region need to export large quantities of meat to Asian markets via chartered freighters, the Global TransPark could support that trade and the strong likelihood of a return cargo might attract additional investment and employment to the TransPark.

Retirement-based development will likely diffuse inland from the coast, as it already has, and east from the Triangle area first to amenity-rich towns and villages and later possibly to planned unit developments. The general lack of adequate health care, recreational, and cultural facilities in most of the East will likely slow such diffusion.

Manufacturing and other goods-processing activities will likely continue to be drawn to the region, albeit at a modest rate. Spirit Aerospace promises to continue to grow and, due to the high salaries, have positive effects throughout the region. Most manufacturing in the region, however, will likely locate near I-95 to take advantage of the superior access but also because such locations provide a compromise between access to skilled professionals which are attracted to the well-developed labor market of the Triangle and the cultural, social, and educational amenities it has to offer and the low-cost labor and land markets of the East. The I-95 corridor may also emerge as a center for distribution serving the entire coastal plain to the east and the Triangle to the west.

The growth will be powered by a combination of regional demographic changes and product cycle-induced relocations. This vision is tempered by the considerations mentioned throughout this report. The region needs to address several “chicken-egg” issues in jumpstarting some activities and it will need a strategy to continue ratcheting up the value chain if it is to escape its historical dependence upon low value-added activities.

2.2 *Logistics drivers: Economic trends in the Nation and the State*

Logistics needs arise in the context of spatially distributed supply and demand (shipment generation in the terms of our framework). We provide a brief overview of selected economic trends affecting the Eastern Region, North Carolina, and the U.S. These trends suggest a complex competitiveness problem which logistics can contribute to addressing.

Table 2-1 provides an overview of average annual growth rates for real GDP, population, and total employment compiled from Bureau of Economic Analysis data for the latest two decades

available. Three points stand out. First, North Carolina outpaces national growth on all three indicators in both time periods. Second, growth rates for all indicators decrease in the more recent decade. Third, the differential between the nation and the state growth rates changes. The growth of North Carolina GDP and employment becomes more like the lower national rates while the differential increases for population. The continuing growth of population and lagging of production has resulted in the North Carolina per capita GDP slipping relative to the nation.

Table 2-1: Overview of National and State Growth Rates

		1989-1999	1999-2009
Real GDP	U.S.	3.26%	1.81%
	N.C.	4.35%	1.84%
Population	U.S.	1.23%	0.96%
	N.C.	1.91%	1.66%
Total employment	U.S.	1.71%	0.73%
	N.C.	2.26%	0.81%

Source: BEA

GDP data is not available for counties. Available data suggest a lagging region. Including the eastern edge of the Piedmont, the lowlands, and the coast, the Eastern Region is united in its generally slow rate of growth.[51] As such, the region has long been object of state-wide concern.[52]

Figure 2-2 charts the trends in population growth for the region, its constituent counties, and two North Carolina reference counties in historical context. A century ago, when the state had a heavily agriculturally-based economy, the region dwarfed both Mecklenburg and Wake Counties in population size and several counties approached the two reference counties in size. But while the growth of Mecklenburg and Wake has been accelerating, the Eastern Region has languished. Now both Mecklenburg and Wake appear poised to overtake the entire Eastern Region in population size within the next decade.

[51] The Kenan Insitute of Private Enterprise (2010) Eastern North Carolina Resource and Opportunity Assessment Study.

[52] See, for example, John Quinterno (2006) "Eastern North Carolina at Work: What Are the Region's Economic Engines?" North Carolina Insight 2-37, February; Tom Lambeth (2001) "Why Eastern North Carolina's Future Matters to the Rest of the State" *North Carolina Insight* 3-9, December; and Joanne Scharer (2001) "How Does the East Compare to the Rest of North Carolina?" *North Carolina Insight* 10-41, December.

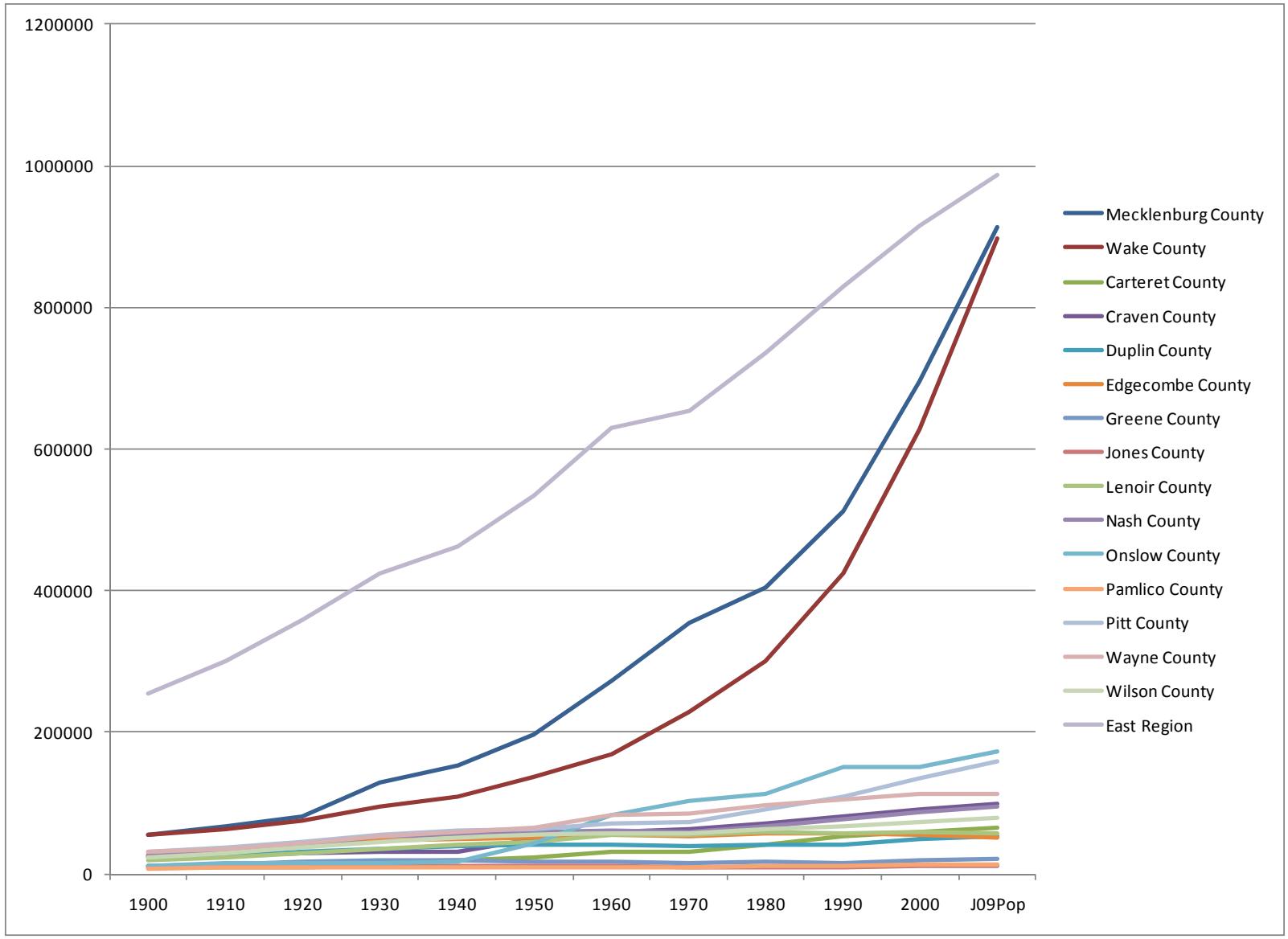

Figure 2-2: Eastern Region Population Growth in Context

Table 2-2 provides an overview of recent population growth in the Eastern Region. In 2000, the Eastern Region counted 916,141 residents. By 2009, it had an estimated 986,548, an increase of 70,407. On a percentage basis, the Eastern Region is growing at somewhat less than one-fourth of the rate of Wake County and approximately half that of the state as a whole.

Table 2-2: Recent Population Trends in the Eastern Region

				Average annual growth rates		
	1990	2000	2009	1990-2000	2000-2009	1990-2009
United States	248,709,873	281,421,906	307,006,550	1.24%	0.97%	1.11%
North Carolina	6,628,637	8,049,313	9,380,884	1.94%	1.70%	1.83%
Mecklenburg County	511,433	695,454	913,639	3.07%	3.03%	3.05%
Wake County	423,380	627,846	897,214	3.94%	3.97%	3.95%
Carteret County	52,556	59,383	64,423	1.22%	0.91%	1.07%
Craven County	**81,613**	**91,436**	**98,529**	1.14%	0.83%	0.99%
Duplin County	39,995	49,063	53,177	2.04%	0.89%	1.50%
Edgecombe County	56,558	55,606	51,853	-0.17%	-0.78%	-0.46%
Greene County	15,384	18,974	20,658	2.10%	0.94%	1.55%
Jones County	9,414	10,381	10,071	0.98%	-0.34%	0.36%
Lenoir County	57,274	59,648	56,387	0.41%	-0.62%	-0.08%
Nash County	**76,677**	**87,420**	**94,743**	1.31%	0.89%	1.11%
Onslow County	**149,838**	**150,355**	**173,064**	0.03%	1.56%	0.76%
Pamlico County	11,372	12,934	12,422	1.29%	-0.45%	0.46%
Pitt County	**107,924**	**133,798**	**159,057**	2.15%	1.92%	2.04%
Wayne County	**104,666**	**113,329**	**113,811**	0.80%	0.05%	0.44%
Wilson County	66,061	73,814	78,353	1.11%	0.66%	0.90%
East Region	829,332	916,141	986,548	1.00%	0.82%	0.91%

While there is some growth in several counties, the population increase is modest – generally below that of the state and nation. Onslow County, with its combination of an expanding military presence and increasing demand for coastal area homes is the largest county. Pitt County with the only major university in the region has also been growing quickly. Other counties are beginning to feel the influence of Wake County's rapid growth. Edgecombe, Jones, Lenoir, and Pamlico Counties lost population during the past decade. Edgecombe and Lenoir have done so since 1990. Pitt County, and during the 1990s, Duplin and Greene Counties, grew more rapidly than the state average (albeit from small bases in the latter two cases).

The region experienced net out-migration in the 1990s and the region's population is aging. Young adults, in search of career opportunities and a better quality of life, have been especially prone to leave, resulting in a "brain drain" for the region. Accordingly, while semi-skilled and unskilled workers are abundant (supplemented perhaps by an influx of Hispanics during the 1990s and the last decade), skilled mechanical and technical workers are in short supply and

regional employers report that it is difficult to recruit and retain doctors, managers, engineers, and other professionals. Not surprisingly, the region lags behind the rest of the state in educational attainment and has a higher rate of poverty.[53]

2.2.1 The Eastern Region and North Carolina as economic producer

All major sectors of the U.S. economy have grown in real terms but, as Figure 2-3 shows, the relative importance of the value-added by both durable and non-durable goods manufacturing has declined markedly while the contribution of what are collectively known as producer services has correspondingly increased over the last four and a half decades. In 1963, manufacturing accounted for 27 percent of the national economy but by 2008 it was responsible for 12 percent of GDP. Correspondingly, producer services grew from 21 percent of the national economy to 34 percent.

[53] Eastern Carolina Council (2007) The Comprehensive Economic Development Strategy. The counties included are discussed at the beginning of the section.

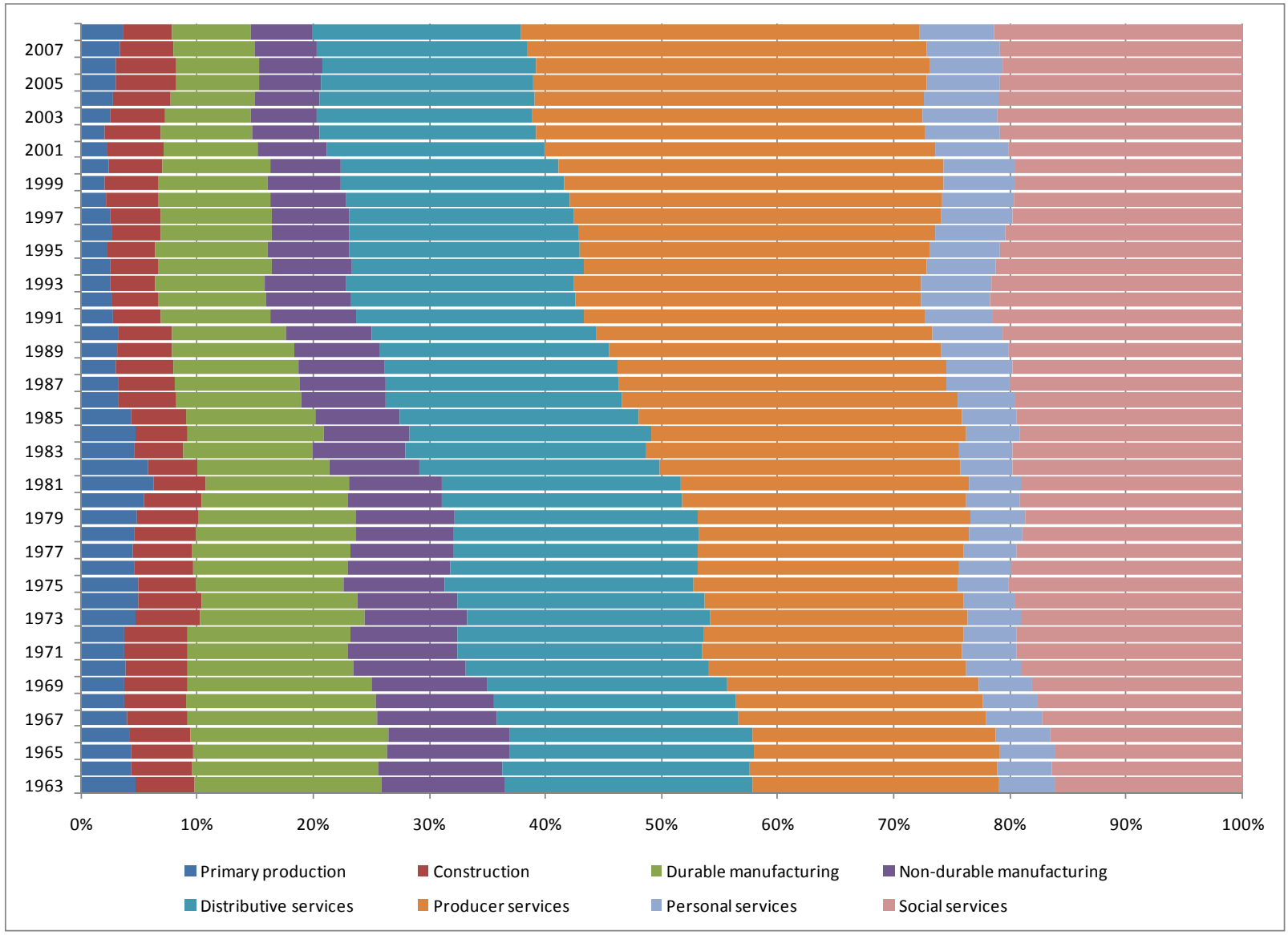

Figure 2-3: Components of the U.S. Economy, 1963-2008

North Carolina began and ended the 1963-2008 period more heavily dependent upon manufacturing than the nation as a whole, as seen in Figure 2-4. In 1963, manufacturing accounted for 41 percent of the state's economy and together with farming and other forms of primary production nearly half. Like the rest of the nation, manufacturing decreased in importance, down to 20 percent in 2008. And like the rest of the nation, producer services grew in importance, in North Carolina from 14 to 31 percent of the economy. Where North Carolina differs from the nation as a whole is in durable manufacturing. While non-durable manufacturing dropped from 33 to 12 percent of the state's GDP (due, in part, to declines in apparel and tobacco), durable manufacturing has maintained an approximate 8 percent of the state's economy.

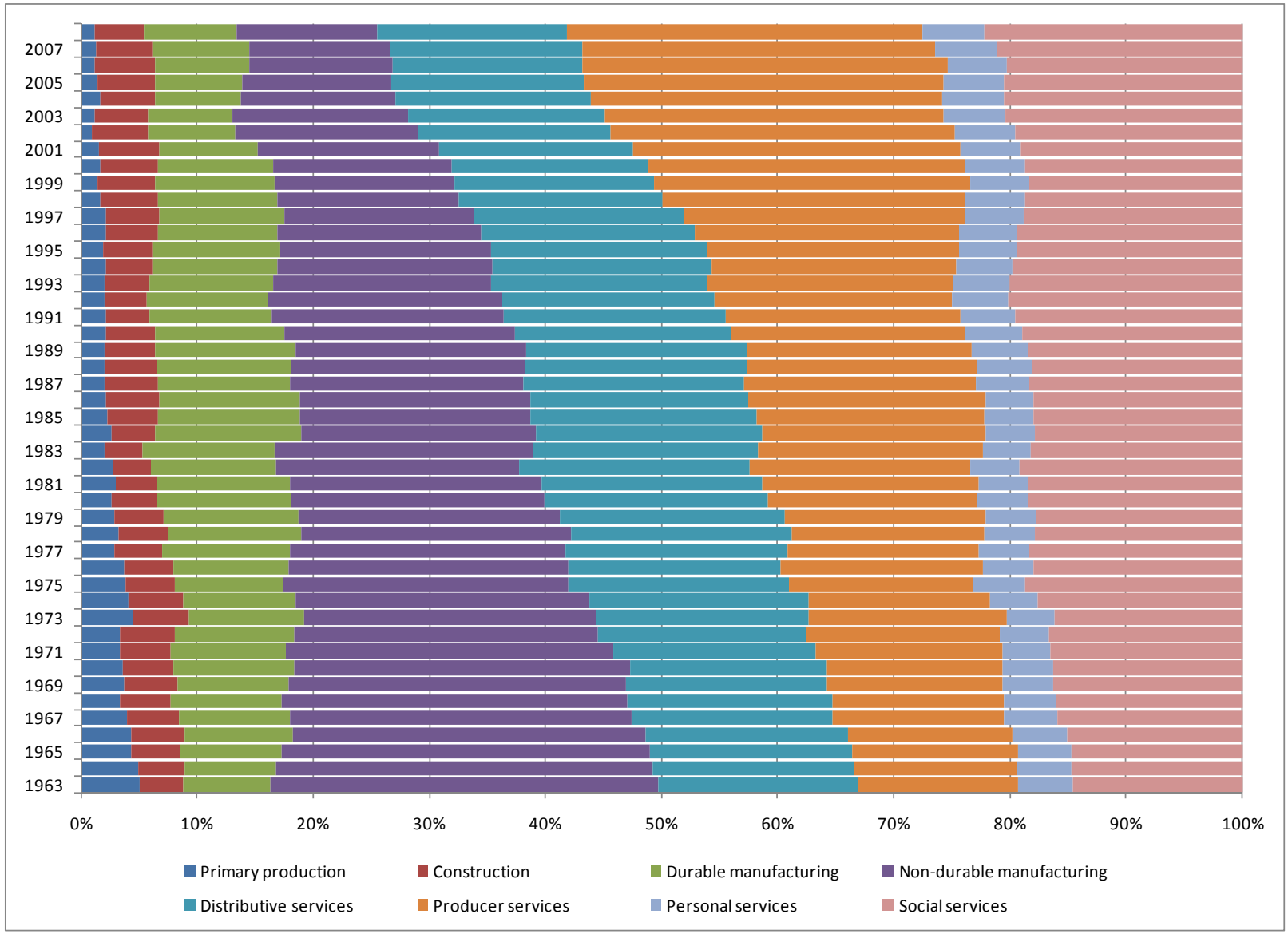

Figure 2-4: Components of the North Carolina Economy, 1963-2008

The set of industries in the durable manufacturing sector continues to change, however. Product cycle theory continues to be a useful guide to Carolina growth prospects. As textiles production costs became too expensive in the Northeast, rail transportation helped make North Carolina a viable production site for Northeastern markets. A similar pattern followed for shoes, furniture, and, to a degree, tobacco (which was home-grown to a much larger degree). Later, electronics, automobiles, aircraft, and producer services were to follow. Air transportation made it possible for firms based in the Northeast to spinoff research activities and later a growing array of back office (producer service) functions to North Carolina. Banking was able to grow in North Carolina thanks, in part, to a favorable history, far-sighted leadership, and the advantages conveyed by a combination of telecommunications, air transportation, and favorable costs. With a long presence, the military is also becoming a growth sector for the North Carolina economy and an anchor for manufacturing.

Employment trends are perhaps somewhat less rosy. The region began the decade with 354,833 jobs and ended it with 349,189 for a loss of 5,644. Even the region's peak employment, in 2007, was only 368,184 which is a 13,351 increase over 2000 levels – a 3.8 percent increase over the seven-year interval. Figure 2-5 and Figure 2-6 compare state and regional employment trends over the past two decades, respectively. While the 1990s were a time of growth for the state, the 2000s were a period of slump, rapid recovery, and decline. The Eastern Region shared some of that 1990s growth but the last decade has been much more uncertain and the growth in the middle of the decade was timid.

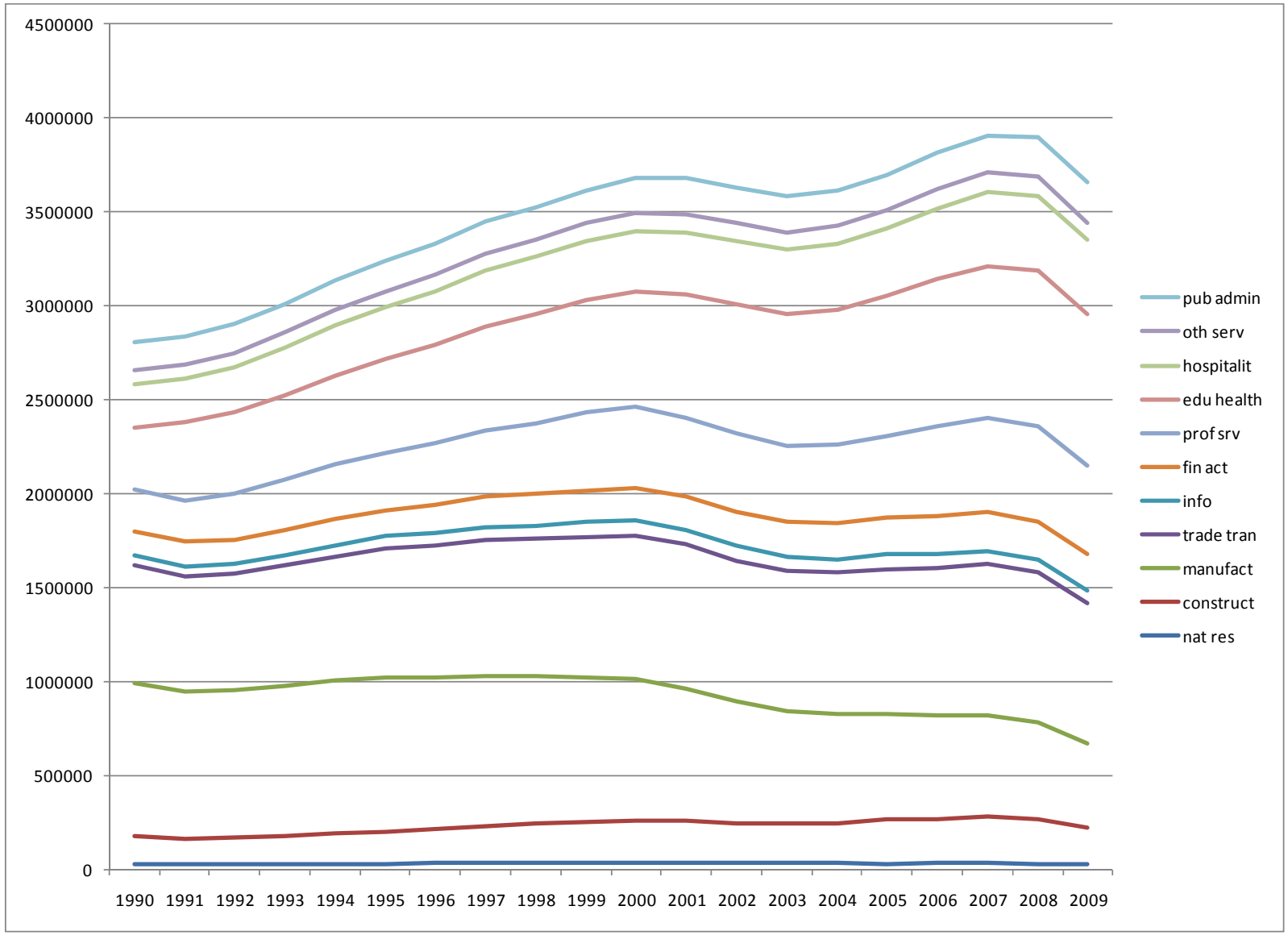

Figure 2-5: North Carolina Statewide Employment Trends by Sector, 1990-2009

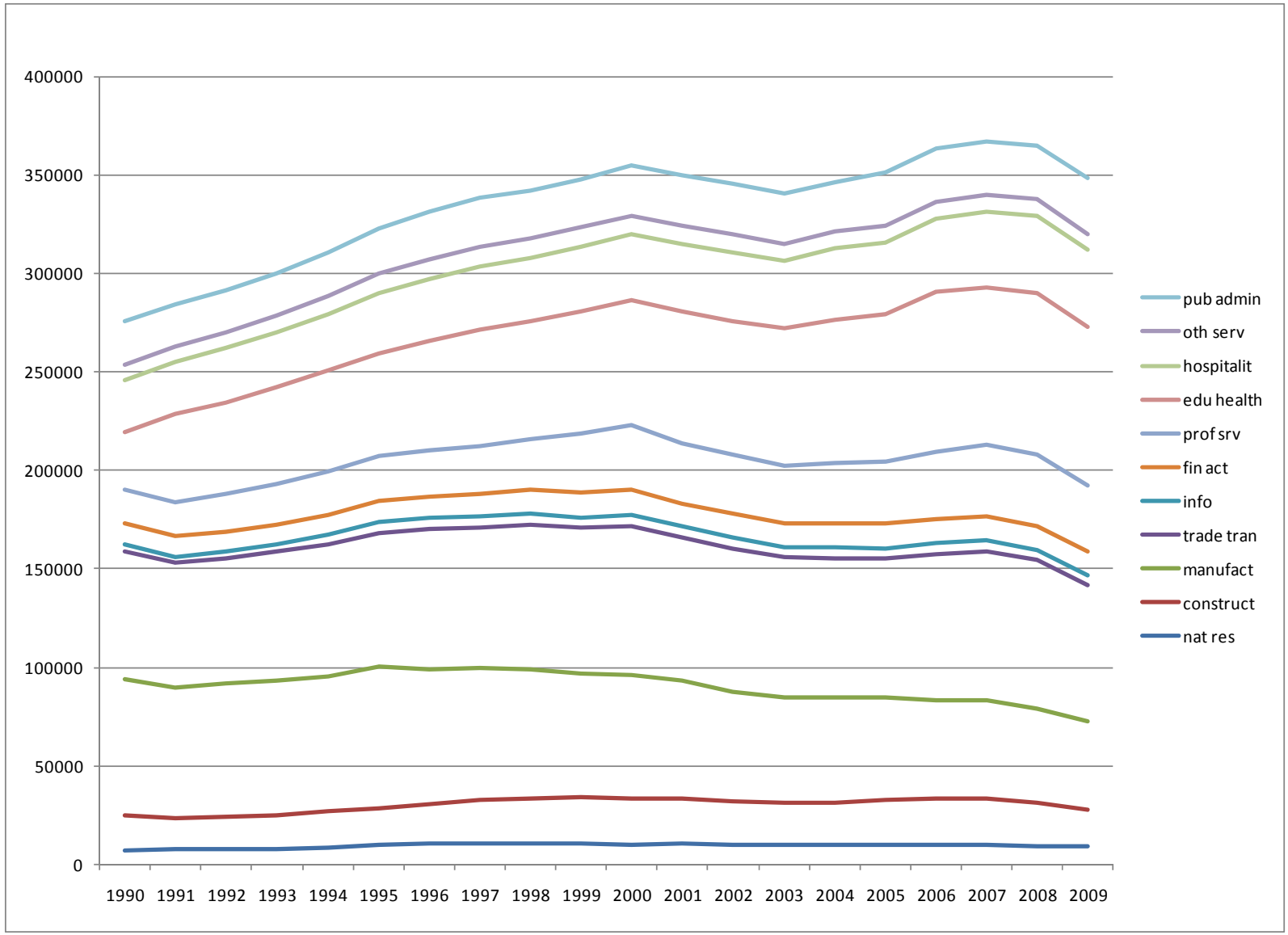

Figure 2-6: Eastern Region Employment Trends by Sector, 1990-2009

The aggregate employment trends mask a more fundamental change. For both state and region, on the basis of the percentage of the labor force, the growth of health care employment has been a near-perfect substitute for the decline of manufacturing employment. To a large extent, medical care employment has become North Carolina's social safety net. Figure 2-7 and Figure 2-8 highlight the sectoral changes in employment in increasing detail. The growth of health care employment over the last decade can be seen as compensating for the decline in manufacturing. There was also a shift within manufacturing with chemical manufacturing (mainly pharmaceuticals) adding employment even as many traditional manufacturing sectors lost employment to overseas competitors and to automation.

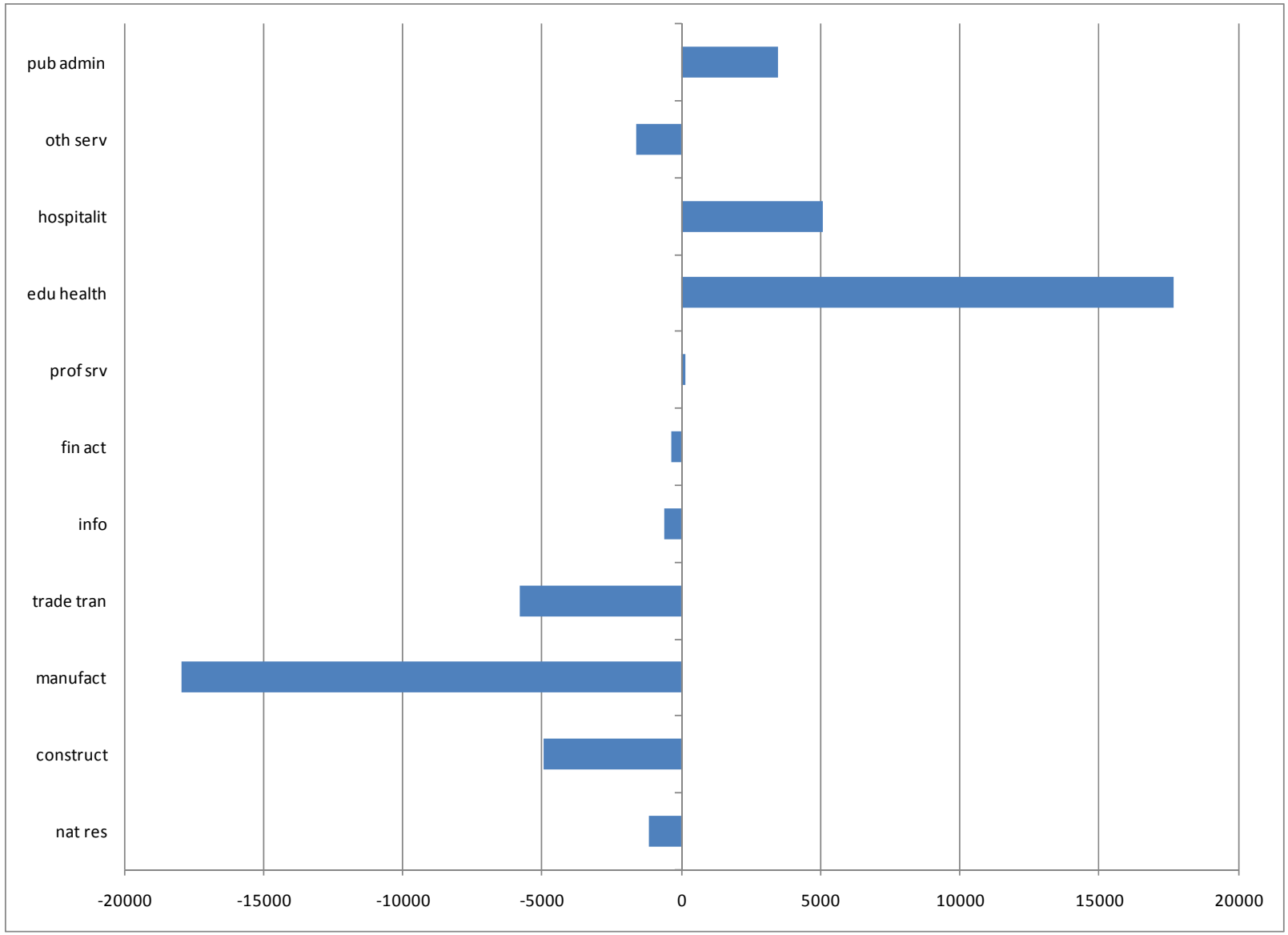

Figure 2-7: Eastern Region Employment Change by Sector, 2000-2009

A 2007 report by the Eastern Carolina Council concludes, "Products manufactured primarily for local and regional markets in a low skilled to semi-skilled environment, remain viable in the region. Manufacturers of labor intensive products for retail consumption, such as apparel have moved production off-shore. Manufacturers of technology based products, requiring a highly skilled workforce that demands big city amenities, are locating in urban areas around universities. This has left the ECC region, which is primarily rural and lacking in skilled workers with a stagnant economy. In the process, many local economies have become dependent on one or two industries."[54] The prognosis for manufacturing employment is not rosy. No manufacturing industry is among the State's fastest-growing industries and only one – animal slaughtering and processing – is expected to be in the top 50 during the 2007-2017 period.[55] Although that industry is expanding in the Eastern Region, opposition is increasing. Recently, one Eastern Region city allocated $1 million for legal fees to fight the establishment of a slaughterhouse near municipal limits.[56]

[54] Eastern Carolina Council (2007), p. 54.
[55] The North Carolina Commission on Workforce Development (2007) State of the North Carolina Workforce: An Assessment of the State's Labor Force Demand and Supply, 2007-2017, January.
[56] Matt Ehlers (2010) "A chance to lure 1,100 jobs, or 'an industry of the past'?" *The News and Observer*, Sunday, December 19, pp. 1, 6.

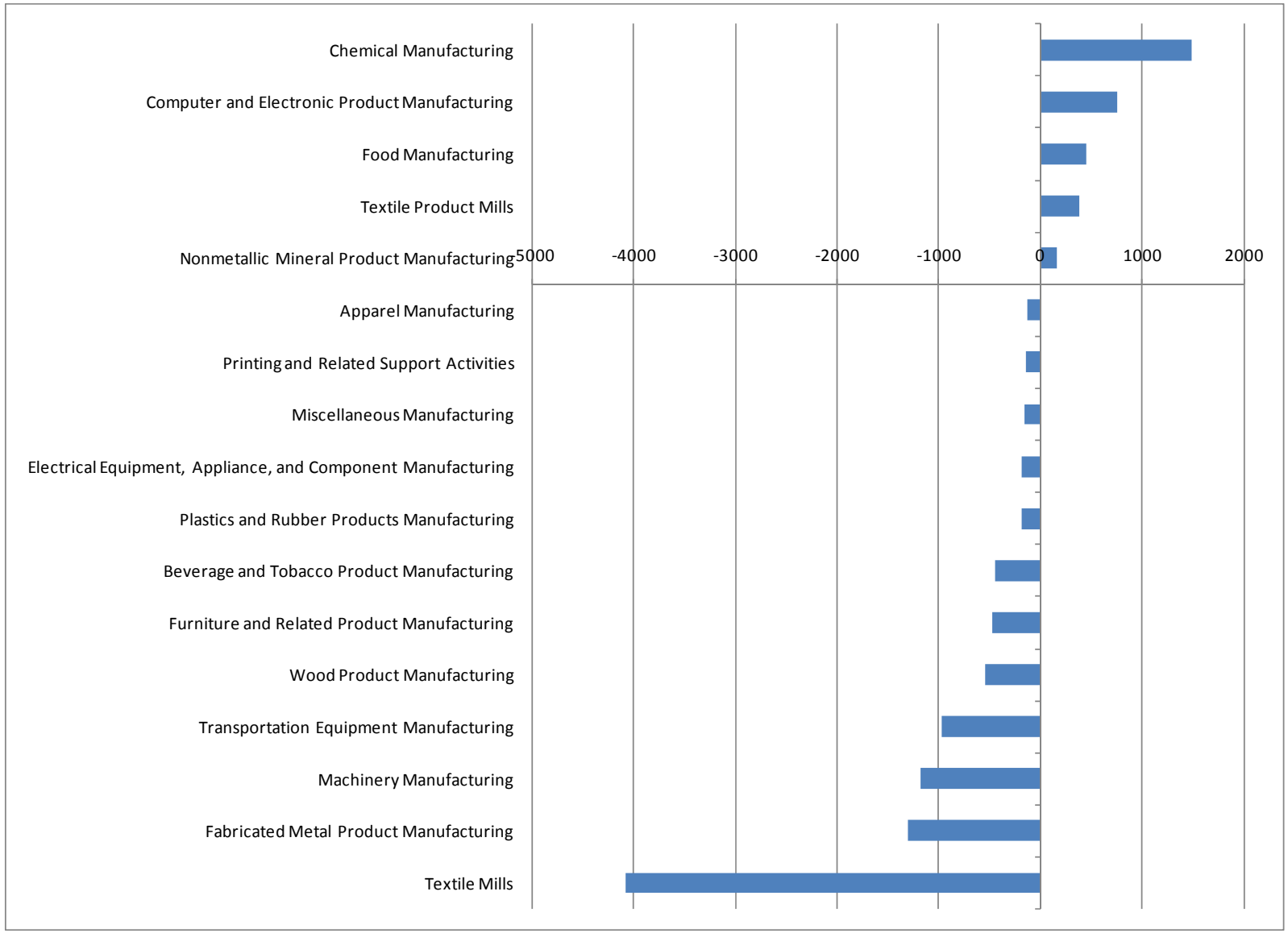

Figure 2-8: Eastern Region Manufacturing Employment Change, 2000-2009

An examination of trends in the sources of personal income (the closest we can come to an estimate of regional GDP) suggests that manufacturing income decline was not as pronounced as the employment decline. The data summarized in Figure 2-9 suggests that it was mainly the marginal manufacturing employment which disappeared. Note also that the region is heavily dependent upon government employment for regional income, with 40 percent of total personal income stemming from that source. The significant military presence in the region helps add to that.

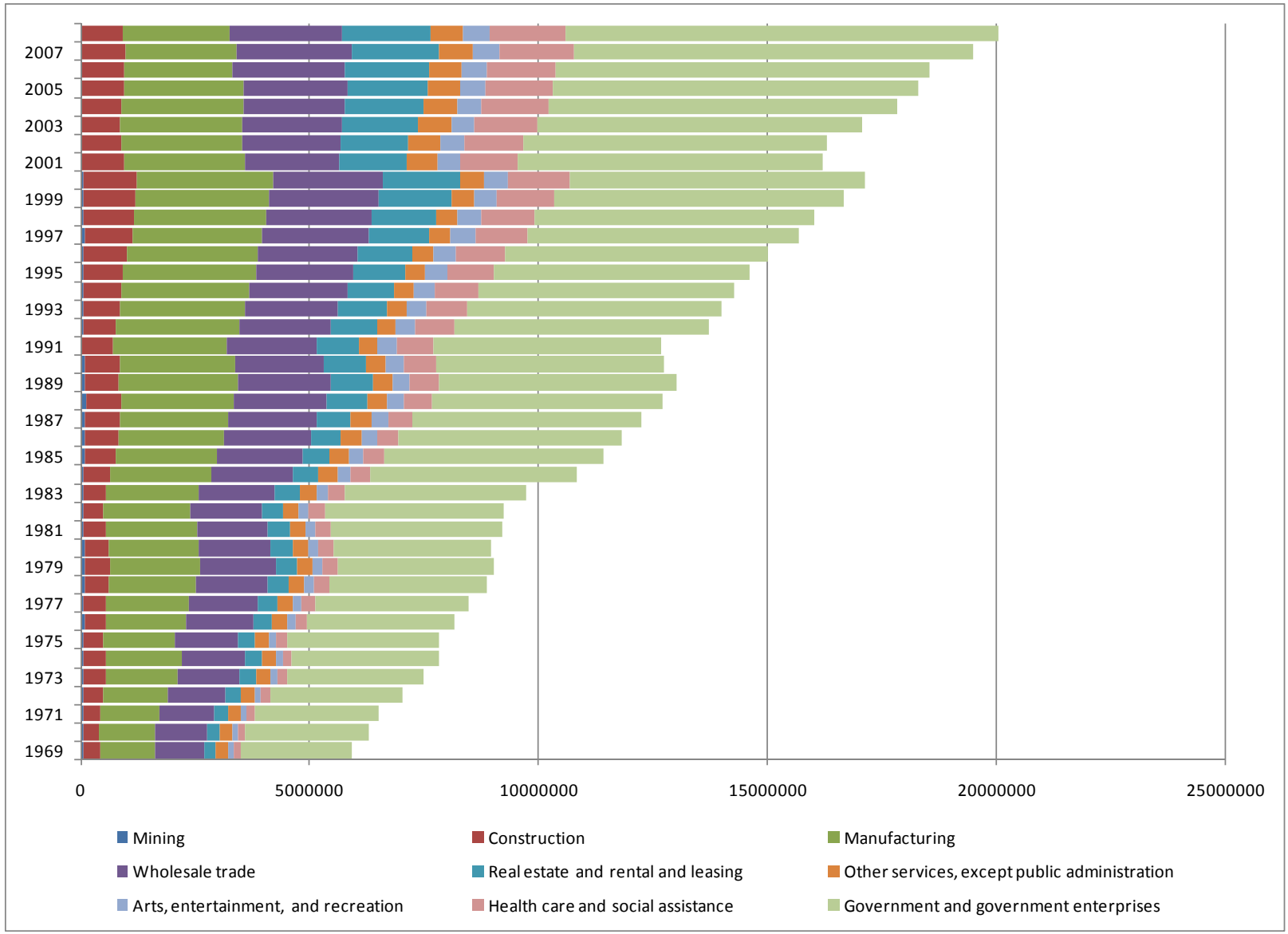

Figure 2-9: Eastern Region Sources of Personal Income, 1969-2008

The region's roster of prominent corporate names includes BSH Home Appliances, Consolidated Diesel, Moen, Hatteras Yachts, Grady White Boats, Becton Dickinson, DSM Pharmaceuticals, Merck & Co., Hospira, Butterball, LLC, Cheesecake Factory, Sarah Lee Bakery Group, Smithfield Foods, Sanderson Farms, Honeywell International, General Electric, Kidde Aerospace and, since 1 July 2010, Spirit AeroSystems. The employment trends reviewed above are heavily dependent upon these and several other firms which means that regional prosperity may be disproportionately affected – for better or worse – by the strategic business decisions of a small number of firms compared to the natural, social, and cultural resources of the region.

Each of the Eastern Region's sub-regions, shown in Figure 2-1 above, has its own set of economic foci. The North sub-region depends on manufacturing tied to the Triangle just slightly further to the west, particularly along the U.S. 64 and 264 corridors. Pitt County and Greenville growth is thought to be tied to East Carolina University and the university's role as a regional health care institution. The Coast sub-region depends upon its access to water amenities, including tourism, retirement living, and marine trades such as boat building. The Central and North sub-regions continue to maintain a dependence on tobacco and agriculture. Camp Lejeune, Cherry Point, and Seymour-Johnson not only support military needs, they provide sources of earnings for Onslow, Craven, and Wayne Counties, respectively.

2.2.1.1 The Future of the Eastern Region

In order to support future economic prosperity, the state and several partner organizations have identified a small number of industrial sectors for recruitment. In general, these strategic target areas are not attempts at regional industrial policy but judgment calls about potential growth sectors which, by virtue of past history, expressions of interest, or potential cost advantage. They represent attempts to capture a portion of the national share of the sector, rather than efforts to grow the sector per se.

Table 2-3: North Carolina Department of Commerce Strategic Priority Recruitment Sectors

Sector	N.C. Dept of Commerce	Research Triangle	Charlotte	Southeast	Northeast	Eastern
Aerospace	#				#	#
Automotive	#	#	#		#	
Biotech/Pharma/Life Science	#	#			#	#
Chemicals/Plastics/Rubber	#					
Furnishings	#			#		
Information & Communications (ICT)	#	#				
Military/Defense	#	#	#	#		#
Textiles	#			#		
International	#					
Nanoscale Technologies		#				
Logistics & Distribution		#		#	#	
Alternative Energy (Environmental)			#	#		
Finance/Insurance			#			
Marine Trades/Boat Building				#	#	#
Food Processing/Agri?Industry				#		#
Metalworking				#		
Tourism & Entertainment	#				#	#
Advanced Materials						

Source: http://www.nccommerce.com/NR/rdonlyres/C0417629-0437-44B6-A59A-01528D91D5AF/0/20090512_targetindustrysectors.pdf

provides an overview of the North Carolina Department of Commerce strategic priority sectors for recruitment and support.[57] The Department of Commerce has identified ten areas for support. The partnering economic development organizations suggested another eight sectors of mainly regional interest. The sectors named by the state are (in alphabetical order) aerospace, automotive, biotech/pharmaceuticals/life science, chemicals/plastics/rubber, furnishings, information and communications (ICT), military/defense, textiles, international business (export promotion), and tourism and entertainment. Some of these are emerging fields but others are not. Despite the loss of manufacturing employment, textiles, for example, still benefits from an extensive state-wide knowledge support network which continues to make North Carolina an advantageous location for sophisticated textile products. The partner organizations identified advanced materials, alternative energy (recently adopted by the state as a priority sector), finance/insurance (also recently adopted by the state), food processing/agri-industry, logistics and distribution, marine trades/boat building, metalworking, and nanoscale technologies as regional target areas.[58]

[57] http://www.nccommerce.com/en/BusinessServices/LocateYourBusiness/WhyNC/ProfilesOfIndustry/

[58] A recent document summarizing the Department of Commerce Strategic Marketing Plan focuses on Aerospace, Aviation and Defense, Automotive, Truck and Heavy Equipment, Biotechnology, Pharmaceutical and Life Sciences, Energy, Financial Services, and Information and Communication Technology. http://partners.thrivenc.com/recruitment-and-development-marketing-plan/target-audience-industry-sectors-2/

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Furnishings	#			#		
Information & Communications (ICT)	#	#				
Military/Defense	#	#	#	#		#
Textiles	#			#		
International	#					
Nanoscale Technologies		#				
Logistics & Distribution		#		#	#	
Alternative Energy (Environmental)			#	#		
Finance/Insurance			#			
Marine Trades/Boat Building				#	#	#
Food Processing/Agri?Industry				#		#
Metalworking				#		
Tourism & Entertainment	#				#	#
Advanced Materials						

Source: http://www.nccommerce.com/NR/rdonlyres/C0417629-0437-44B6-A59A-01528D91D5AF/0/20090512_targetindustrysectors.pdf

The Eastern Region has identified aerospace, biotech/pharmaceuticals/life science, food processing/agri-industry, marine trades/boat building, military/defense, and tourism and entertainment as target areas. The aerospace industry in the Eastern Region is anchored by the recently opened Spirit Aviation facilities in Kinston.[59] Biotech is seeded by several plants along the western edge of the region which are in the immediate orbit of the Triangle.[60] Food processing is supported by the region's specialization in agriculture and the relatively easy access to markets via the I-95 corridor. Marine trades are supported by contact with the coast and historical specialization. Military support activities are linked to Camp Lejeune and other installations in or near the region. Tourism and recreation are anchored by popular seacoast resort areas and inland nature preserves. Interestingly, the region did not name logistics and distribution as a priority area.

The North Carolina Eastern Region Commission uncovered 24 existing, emerging, and potential industrial clusters which generate – or may generate – significant regional employment. These are summarized in Table 2-4, taken from the Commission's 2006 report. Industrial clusters are sets of productive activities which are linked in a value chain or by relying on similar resources. These sets of activities have the potential to cross-subsidize each other, better leveraging private and public investments.[61]

[59] NC State University (2009) "Ready to Soar: Aviation and Aerospace in North Carolina."
[60] UNC Planning professor emeritus Harvey Goldstein has identified such "mid-tech" economic production as a likely growth sector for the state and has suggested that they will likely concentrate in the outer reaches of the state's two large metropolitan regions.
[61] Institute for Economic Development (1997) Applying Cluster Analysis to North Carolina's Regions, University of North Carolina, January.

Table 2-4: Summary of Benchmark Analysis Findings for North Carolina's Eastern Region

	Membership in Extended Buyer-Supplier Chains	Membership in Extended High-Tech Buyer-Supplier Chains
Existing	Textiles & Apparel Packaged Food Products Feed Products Tobacco Products Farming Appliances Grain Milling Wood Processing Marine Trades Hotels & Transportations Services (Tourism) Military (industry)	
Emerging	Pharmaceuticals Construction Machinery & Distribution Equip. Concrete & Brick Bldg Products Wood Bldg Products	Pharmaceuticals Engine Equip.
Potential	Metalworking & Fabricated Metal Products Precision Instruments Nonresidential Building Products Rubber Products	Industrial Machinery & Distribution Equip. Military (Aviation) Wiring Devices & Switches Precision Instruments Cable Manufacturing

Source: North Carolina Eastern Region Commission (2006)

Declining and mature industries have a significant presence on the list of existing, emerging, and potential clusters. The Eastern Region is likely to need to rely on the product cycle dynamics discussed above. Price for performance will likely be critical to employment growth in the region.

The region has targeted 15 industrial clusters for further development. These are listed in Table 2-5.

Table 2-5 Targeted Clusters for North Carolina's Eastern Region

- Pharmaceuticals & Medicine Manufacturing
- Kitchen building products
- Wood Kitchen Cabinets & Countertops Manufacturing
- Appliances
- Food Manufacturing and Wholesaling (including high value-added agriculture)
- 'Advanced' Manufacturing
- Electrical Instruments

- Engine Equipment
- Heating Equipment
- Marine Trades
- Tourism (including Retiree Attraction)
- Military & Military Procurement
- Construction
- Logistics
- Aviation

Source: North Carolina Eastern Region Commission (2006)

Many factors might hold businesses in North Carolina or attract new ones to the state. Capital is of course critical but it is held to be very mobile, following opportunities as they arise. Taxes have an effect but reducing taxes on business while the overall tax burden remains high relative to needed government services delivered may not result in a clear-cut advantage. Labor is generally thought to be the most important production input, comprising approximately 80 percent of overall business spending. Price for value and an appropriate set of public services, rather than price per se, is thought to be a key site selection and business success factor. The North Carolina Commission on Workforce Development has identified the following eight major labor force trends affecting the state's future economic development consistent with the forces identified above.[62]

- Many traditional NC manufacturing industries are shedding jobs
- North Carolina's traditional "middle jobs" are disappearing
- New job creation is concentrating in fast-growing urban areas
- Many areas are not prospering
- Future prosperity depends on achieving higher educational attainment levels
- Baby-boom retirements will deplete labor force talent
- High skill in-migrants can help close the skills gap
- Low skill in-migrants present opportunities and challenges

Advanced services and manufacturing require skilled, specialized personnel, rather than the inexpensive, motivated labor that powers much agricultural industry. The specialization points to the growing importance of large labor markets which facilitate the efficient matching of labor with employment opportunities. The high skill requirements point toward an educated, potentially footloose, labor force which is sensitive to the quality of life factors enhanced by public amenities.

Available population (Figure 2-10) and employment (Figure 2-11) projections suggest that the Eastern Region will continue to grow slowly. Wake County and the other North Carolina growth pole, Mecklenburg County, will likely continue their relative ascendency. Projections are only extrapolations of past trends, however. New policies or other factors could change trends from

[62] State of the North Carolina Workforce: An Assessment of the State's Labor Force Demand and Supply, 2007 – 2017, The North Carolina Commission on Workforce Development, January 2007

their projected baseline. Past trends and available population projections suggest only a modest need for new logistics infrastructure in the Eastern Region.

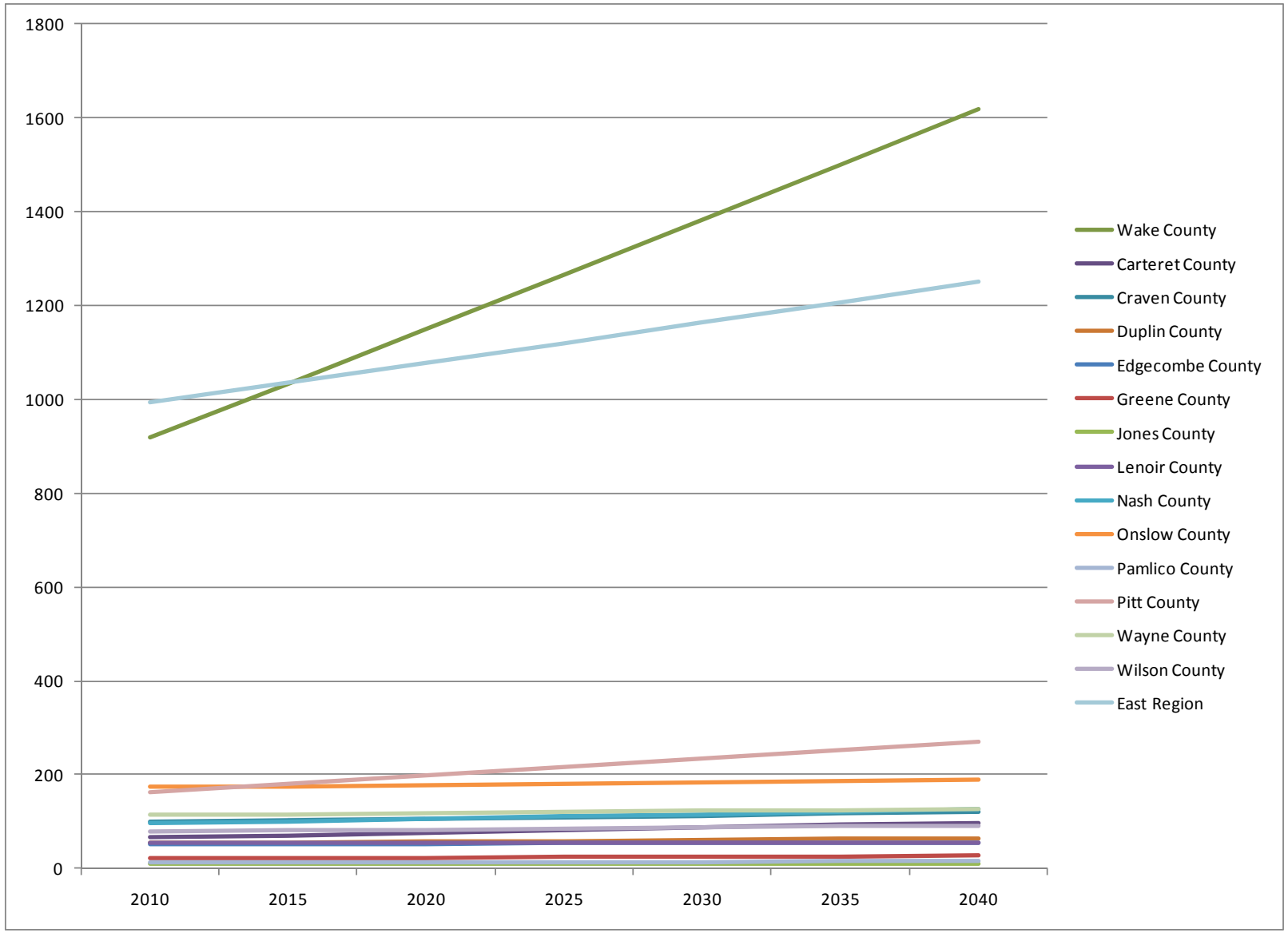


Figure 2-10: Population Projections for Eastern Region

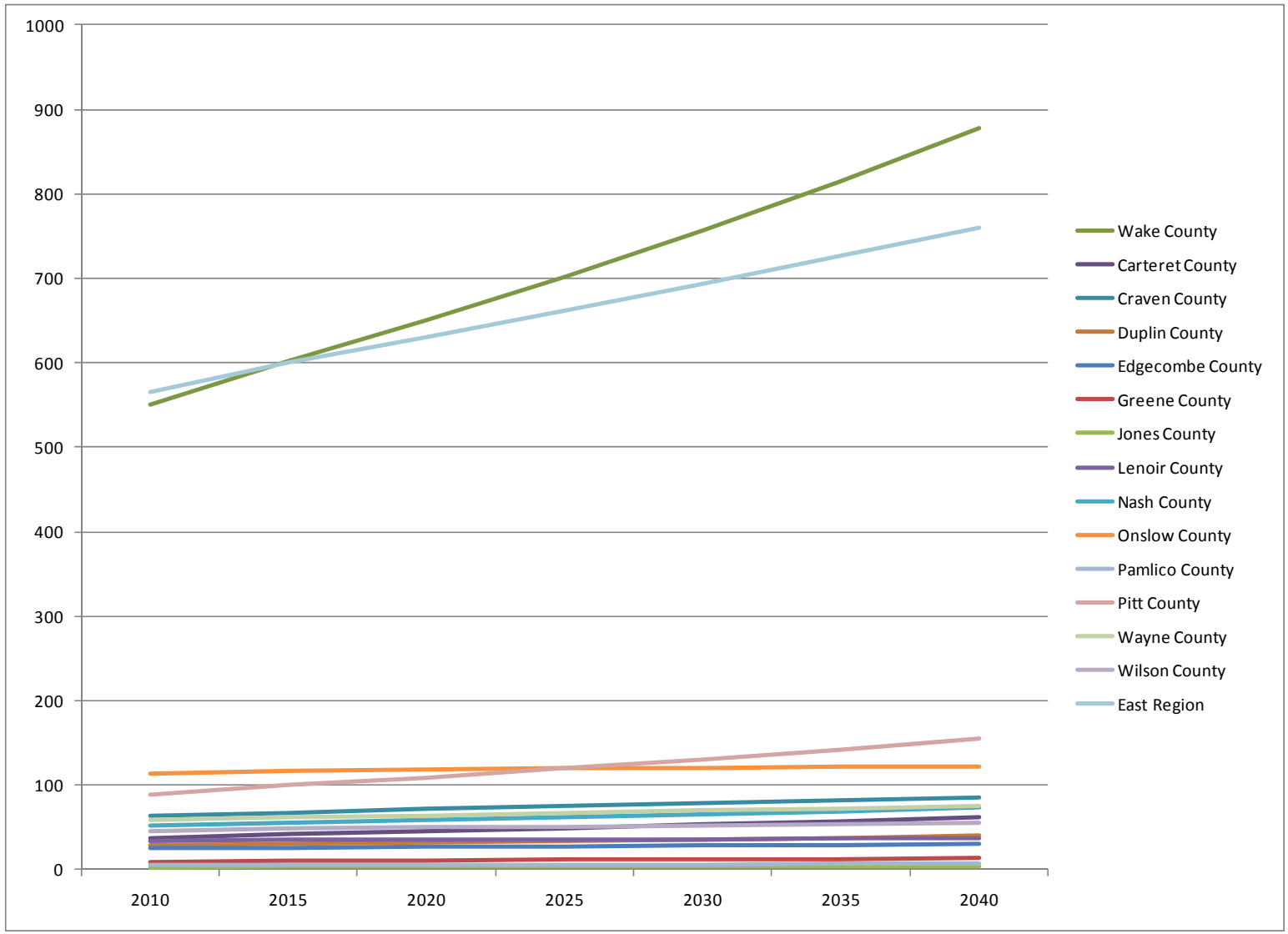


Figure 2-11: Employment Projections for the Eastern Region

In the following several sections we examine the major sources of potential growth in the Eastern Region. Directly and indirectly, the military may have the greatest potential to generate high-income employment in the region. Agriculture and the related manufacturing (food processing) can generate employment but much of that is at comparatively low wages. Agriculture does generate a significant amount of income, however. Retirement and recreation-based growth can generate retail, health, and personal service employment.

2.2.2 Military-Fueled Growth in the Eastern Region

Several actors in the state have suggested building upon the large and growing military presence in the state as an economic growth generator.[63] North Carolina's military installations and related industry have an estimated $23 billion impact on the state's economy, reportedly summing to seven percent of gross state product in 2007.[64] Most of the state's military personnel are located in the coastal region of the state, reaching from the Coast Guard Aviation Depot near Elizabeth City in the Northeast through the several Marine Corps Facilities (Camp Lejeune, Cherry Point, and New River) near Jacksonville to Seymour-Johnson AFB in Goldsboro to the Army's Fort Bragg in the Fayetteville Sand Hills.

With six major bases and several smaller installations, a pre-BRAC estimate was that one-eighth of all U.S. troops were in North Carolina. Only California, Virginia, and Texas could claim more.[65] The military offers opportunities for the Eastern Region, but also challenges: investments are needed to upgrade infrastructure, facilities, and amenities in order to be attractive for military expansion. Table 2-6 provides an overview of the military bases in Eastern Carolina.

Table 2-6: Military Bases in Eastern Carolina

						BRAC changes	
		Date		Military	Civilian	Military	Civilian
	Installation	Established	Location (county)	Positions	Jobs	Positions	Jobs
1	Fort Bragg	1918	Cumberland, Hoke, Harnett, Moore	*52,000*	*8,500*	4,078	247
2	Pope Air Force Base	1919	Cumberland, Hoke, Harnett	*6,543*	*774*	-4,821	808
3	Camp Lejeune and Air Station New River	1941	Onslow	*43,100*	*4,800*	-182	-1
4	Marine Corps Air Station Cherry Point	1954	Craven	*8,987*	*5,771*	-48	-656
5	Seymour Johnson Air Force Base	1942	Wayne	*4,298*	*542*	345	17
6	Coast Guard Support Center	1940	Pasquotank	*900*	*575*		
7	Sunny Point Military Ocean Terminal	1955	Brunswick	*12*	*230*		
	Total Affflated Jobs:			**115,840**	**21,192**		

Source: N.C. Lieutenant Governor's Office, *www.1tgov.nc.us1BRACLinks.aqp.*

[63] North Carolina can boast at least three state-wide organizations vying to increase military-related business: North Carolina Military Business Center (http://www.ncmbc.us/), North Carolina Military Foundation (http://www.ncmilitary.org/), and North Carolina Defense Business Association (http://www.ncdba.com/) and at least three regionally-oriented efforts: Military Growth Task Force of North Carolina's Eastern Region (http://www.nceastmgtf.org/), All-American Defense Corridor (http://www.bracrtf.com/documents/all_american_brochure.pdf), and the Northeast Commission's aviation cluster (http://www.ncnortheast.info/Business_Environment/Targeted_Business_Clusters/Aviation.htm).

[64] *The 2009 North Carolina Defense Asset Inventory and Target Industry Cluster Analysis: A Strategy for Growing North Carolina's Defense and Homeland Security Economy*, North Carolina Military Foundation, July 2009

[65] Renée Elder (2006) "More than Economics: The Military's Broad Impact on Eastern North Carolina" *North Carolina Insight* 64-110, February.

The direct military presence is growing through the 2005 round of Base Realignment and Closure (BRAC) process and the Grow the Force and Grow the Army initiatives. North Carolina, possibly because of its existing military deployments, comparatively low costs, and moderate distance from Washington D.C. is gaining a greater military presence from BRAC. Fort Bragg has been assigned U.S. Army Forces Command and Army Reserve Command and Camp Lejeune is now home to Marine Corps Special Operations Command. The state is likely to benefit from any future military realignment process. The growth initiatives are linked to the military operations in Iraq and Afghanistan and will, therefore, likely be temporary. Nevertheless, the 11,500 additional Marines connected to the Grow the Force initiative have almost all arrived.

Table 2-7 provides an overview of the pace of growth. By July 2009, all but 170 of the 11,477 new service members and civilian employees allocated by the decisions of the 2005 Base Realignment and Closure Commission (BRAC), the Marine Corps' "Grow the Force" (GTF) initiative, and, somewhat farther afield, the Army's "Grow the Army" (GTA) plan, had arrived in the region. Particularly in the Eastern Region, the increase in personnel has been rapid. In addition to the military personnel and civilian employees, additional employment will be induced by serving the needs of the new residents (although many of those opportunities may lure regional discouraged workers back into the labor force). Specialized personnel will be needed for the new civilian jobs at Marine Special Operations Command (MARSOC), for those associated with the introduction of the F-35B at Cherry Point, for the increased use of unmanned aerial systems, and for the full fielding of the MV-22 at MCAS New River. This influx of new growth may represent the largest single job growth event in the state of North Carolina since the World War II era.[66]

[66] Regional Growth Management Plan, Military Growth Task Force of North Carolina's Eastern Region, October 2009

Table 2-7: Growth of Military Personnel in the Eastern Region

(Quarterly Progress towards Annual Planned Growth)

	2006	2007	2008	2009	2010	2011
Active Duty	51,730	53,705	56,623	62,169	63,800	
Civilians	10,351	10,351	10,738	11,258	11,335	
Total Actual	62,081	64,056	67,361	73,427	75,135	
Total Planned	62,081	64,056	68,434	70,147	71,963	73,558

Fiscal Year (11 Oct - 30 Sep)

* Report is compiled on a quarterly basis and numbers are pulled on last day of the quarter.

MCB Camp Lejeune Active Duty and Civilian Population Totals as of 30 June 2010

	2006	2007	2008	2009	2010	2011
Active Duty	36,823	38,798	41,432	45,443	46,679	
Civilians	4,509	4,509	4,769	5,218	5,407	
Total Actual	41,332	43,307	46,201	50,661	52,086	
Total Planned	41,332	43,307	47,114	48,270	49,575	49,913

Fiscal Year (1 Oct - 30 Sep)

* Report is compiled on a quarterly basis and numbers are pulled on last day of the quarter.

MCAS New River Active Duty and Civilian Population Totals as of 30 June 2010

	2006	2007	2008	2009	2010	2011
Active Duty	6,487	6,487	6,504	6,884	7,132	
Civilians	474	474	534	562	580	
Total Actual	6,961	6,961	7,038	7,446	7,712	
Total Planned	6,961	6,961	6,997	7,033	7,069	8,372

Fiscal Year (I Oct - 30 Sep)

Report is compiled on a quarterly basis and numbers are pulled on last day of the quarter.

* New River baseline adjusted to correct previous error.

MCAS Cherry Point Active Duty and Civilian Population Totals as of 30 June 2010

	2006	2007	2008	2009	2010	2011
Active Duty	8,420	8,420	8,687	9,842	9,989	
Civilians	5,368	5,368	5,435	5,478	5,348	
Total Actual	13,788	13,788	14,122	15,320	15,337	
Total Planned	13,788	13,788	14,323	14,844	15,319	15,273

Fiscal Year (I Oct - 30 Sep)

Report is compiled on a quarterly basis and numbers are pulled on last day of the quarter.

In order to build on the growing military presence in the state, the North Carolina Military Foundation identified six market areas which hold the potential to build on North Carolina strengths. These are:

- Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance ("C4ISR")
- Fuel and Power Sources
- Human Factors
- Performance Materials
- RESET Support Activities
- Unmanned Systems

The military favors Eastern Carolina and Eastern Carolina favors the military but much of the state's strengths in these areas are outside the Eastern region, so aside from direct operations, much of the envisioned military-related growth may occur outside the Eastern Region. We note that many of the tenants of the Global TransPark and several of the manufacturing installations along the I-95 Corridor have connections to the military, however. Nevertheless, the military may be the Eastern Region's main economic growth sector.

The additional residents brought in by BRAC and GTF place strains on regional infrastructure. The upgrading of U.S. 17 has been identified as a priority, as has the implementation of an Intelligent Traffic System to smooth traffic, thereby reducing the investments needed. The needs are much broader. A recent report, cited above, identifies 108 regional needs and makes 467 specific recommendations.[67] The report noted a substantial shortage of qualified child care specialists, a stressed health care system (particularly since some military needs were transferred to civilian systems), and seriously lacking amenities. According to the report, "Statistics related to quality of life amenities in the region demonstrate a well-below average ranking in all areas. Library space, cultural events, parks and playing fields, hotel options, meeting spaces, events and venues for single Marines, water access points, and retail venues that are important to both civilian and military residents lag behind state averages. … [I]improvement in this area is a vital element in the process of assimilating growth."

Less immediately, military sources have noted growing land use encroachment issues. In order to address that issue, the military has participated in two Joint Land Use Studies. One with Onslow County (completed February 2003) and another with xxx and xx Counties (completed November 2002). While some progress has been made, some municipalities have not taken action. Encroachment and a lack of amenities could endanger "the goose that laid the golden egg" for Eastern Carolina.

We note a lack of cooperation and coordination with the All-American Defense Corridor, centered on Fort Bragg to the west and those centered on the Coast Guard station in Elizabeth City to the north. While Fort Bragg is in the Southeast Region and the Coast Guard's installation in Elizabeth City in the Northeast, planning for military support should probably be state-wide and possibly include the Norfolk region also to ensure maximum benefit in the coastal region.

[67] The region was defined as Carteret, Craven, Duplin, Jones, Onslow, Pamlico, and Pender Counties.

2.2.3 Agriculture-Fueled Growth in the Eastern Region

We estimate that agricultural production and the related manufacturing was responsible for $47.0 billion in value-added in 2008. That is equivalent to 11.75 percent of state GDP. That estimate could be revised downward. It is based on calculations which assume that the value-added by farms is equivalent to sales. That generally does not hold as farms need to make large outlays for seed, fertilizer, agricultural chemicals, and other expenses. Livestock producers need to buy grain and other inputs. In addition, to the extent individual farms buy partially grown animals for further feeding, farm sales may count the same animal multiple times. To be sure, some of the purchases may be provided by in-state sources which might otherwise have gone unrecognized in the analysis but some, particularly grain purchases, are largely from out-of-state.

Agriculture's economic contribution to the state may be much less than our estimate. Perhaps the key indicators of the paltry economic returns to agriculture are the low wages and poor working conditions associated with agricultural work. Many small and medium-sized farmers apparently fare little better. Nevertheless, agriculture can be critical to some localities.[68]

Agriculture remains an important source of income and (state) export products in the Eastern Region of North Carolina.[69] In Duplin County, for example, 90 percent of the tax base is directly related to agriculture. Table 2-8 summarizes recent available information on agricultural production in North Carolina with an emphasis on the eastern portion of the state. Tobacco, in particular, remains important but meat production, chickens, turkeys, and pork, are central. Meat production entails the import of feed from the Midwest, largely by rail. Much of the meat produced is shipped via I-95 to markets in the Boston-Washington region. A combination of access to that market, labor costs, and size of rural landholding has been cited as the key location factors for meat production.

[68] Figures generated by Michael Walden (http://www.ag-econ.ncsu.edu/faculty/walden/agribusiness-state2008.pdf) were the basis for our calculations. Walden's calculations also included distribution and retail, including restaurants, of agricultural products produced out of state.

[69] Mike McLaughlin and Katherine Dunn (2006) "Agriculture: Still King of the Eastern North Carolina Economy?" *North Carolina Insight* 38-63, February.

Table 2-8: Selected North Carolina Agricultural Production Indicators by Region, 2009

Commodity	Region State total	Eastern Region	Northeast Region	Southeast Region	Elsewhere in State	Percent in Eastern NC
Annual crop production						
Corn For Grain	85,898,800	25,092,700	30,305,700	16,130,800	14,369,600	83.3%
Cotton Upland	701,000	154,100	443,600	68,400	34,900	95.0%
Hay Other (Dry)	1,888,000	264,600	1,800	235,100	1,386,500	26.6%
Peanuts for Nuts	209,519,000	47,210,000	126,548,000	35,761,000		100.0%
Soybeans	57,663,600	17,140,500	19,591,500	9,025,500	11,906,100	79.4%
Sweet Potatoes	6,618,000	3,268,000		1,690,000	1,660,000	74.9%
Tobacco Air-Cure	3,154,000				3,154,000	0.0%
Tobacco Flue-Cur	411,803,000	170,628,000	42,985,000	62,484,000	135,706,000	67.0%
Wheat Winter All	26,526,000	6,672,000	9,881,000	3,343,000	6,630,000	75.0%
Annual poultry production						
Broilers	739,200,000	99,100,000	67,400,000	144,000,000	428,700,000	42.0%
Turkeys	33,380,000	15,846,000		12,835,000	4,699,000	85.9%
Animal stock						
Hogs & Pigs	9,380,600	4,381,000	442,500	4,067,000	490,100	94.8%
Cattle & Calves						
All Cattle	845,100	70,000	15,200	61,900	698,000	17.4%
Beef Cows	379,700	36,200	5,700	30,900	306,900	19.2%
Milk Cows	41,700				41,700	0.0%

Hog production has been restricted for several years because of issues surrounding waste handling. It is unclear how soon those restrictions may be eased. While some parties suggest that the waste can be used in biofuel production, not all questions have been satisfactorily addressed. In the mean time, immature hogs are sometimes transported to locations in nearby states, mainly Virginia, for the final stages of their growth. Much of the hog production occurs in tightly vertically-integrated organizations of contract farming under the supervision of Smithfield Foods and Premium Standard Farms.

There have been suggestions that pork has the potential to become a major export product (some is exported already). Personnel from trade associations suggest that ocean would be the most likely mode of transport.

In addition to the commodities listed in Table 2-8, wood and wood products are important areas of production.

At a recent meeting of the State Logistics Task Force, representatives of several trade associations reiterated a desire to increase truck weight limits on secondary roads.[70] A large portion of agricultural production takes place in locations not served by primary roads. Transporting product out and supplies in constitutes a significant cost for this sector. Each trade

[70] Governor's Logistics Task Force Meeting, Nash Community College Business and Industry Center, Rocky Mount, January 19, 2011. Presentations should be available via website.

representative emphasized a willingness of operators to pay higher user fees to finance the improvements needed to create the benefit.

2.2.4 Retirement-Fueled Growth in the Eastern Region

North Carolina also receives an economic boost from amenity-driven tourism and retirement development along the cost and in the mountains. As the coast fills, the development has begun to move bayside and inland. The same pattern may be emerging in the mountains with the growth spilling into the western Piedmont.

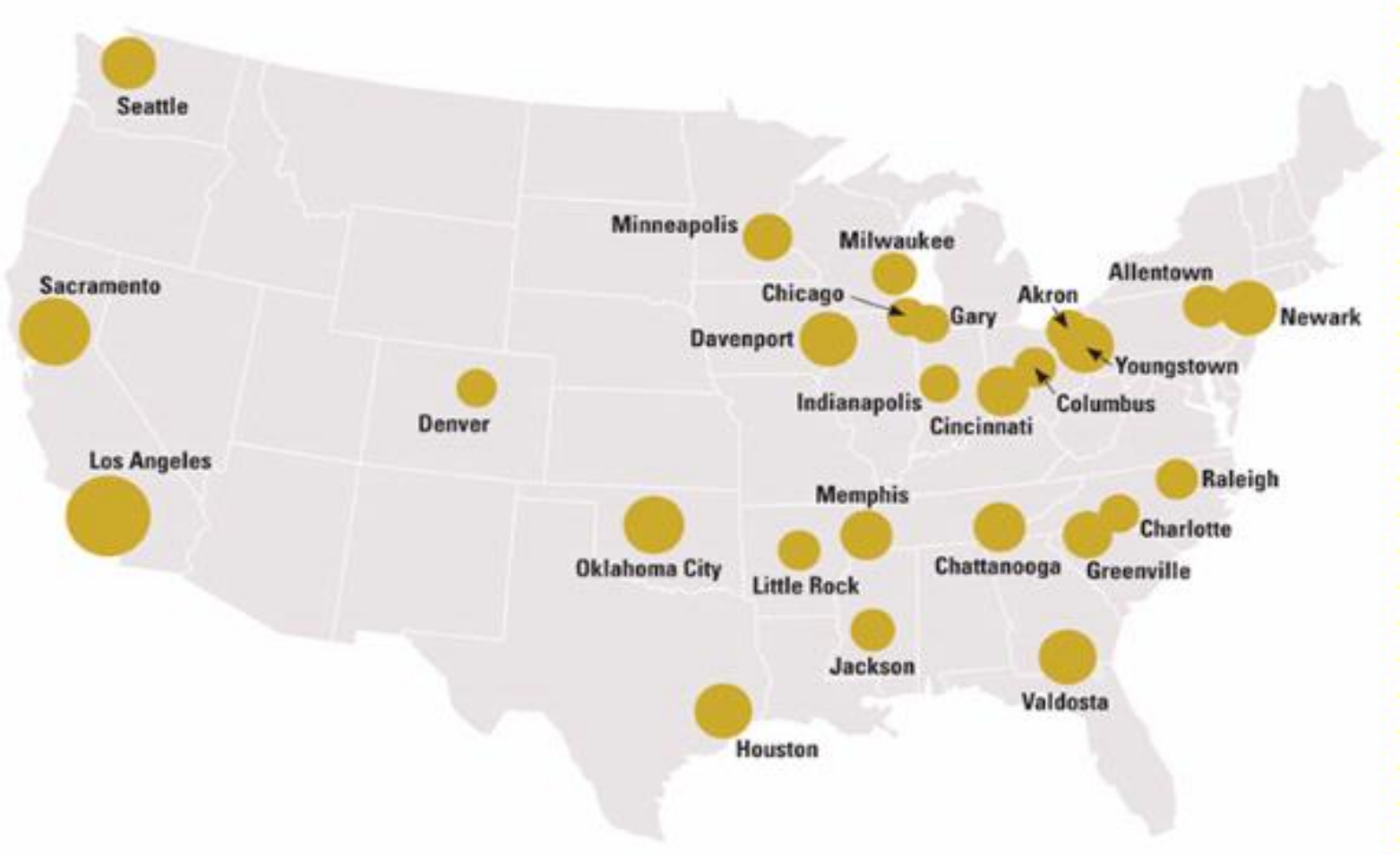
The coastal and mountain regions of the state have benefitted from retirement and quasi-retirement migration in recent years. Other regions in the state have also grown, but there the mix of motivations is somewhat different. A stream of retirees and near-retirees follow their children to the growing metropolitan regions of the state and another stream returns to the areas in which parents or grandparents grew up. In selected areas in the mountains and near the coast, the natural amenities are stronger and the in-migrants are less likely to have family ties to their migration destinations. Amenity-driven residential development has diffused from the Northeast down and from Florida up the Atlantic Coast. North Carolina's coast was comparatively late in developing because of its location which is relatively remote from major population centers and major traffic arteries. Over the last decade or so, coastal development has spread from the ocean side to the bay side and then has jumped to the mainland side of the bays in many cases.

Much of the growth has been to serve vacationers but a significant proportion has been oriented towards retirees and near-retirees seeking year round homes. In some areas of the Atlantic Coast, the influx of population over age 65 may have even ebbed somewhat as the flow of those aged 55-64 has surged. Many of those have the energy and financial resources to potentially become economic growth generators in their own right by continuing in their professions or be establishing new businesses. Indeed, researchers have noticed that many of the incoming entrepreneurs have a pre-existing non-work connection to Eastern Carolina. At the very least, the newcomers create demands for retail, restaurants, health services, and other consumer needs.

The influx is likely to continue as baby boom retirement gathers steam. The magnitude and nature of the future stream is uncertain, however. In many ways, the pre-boomers were pushed on a wave of prosperity throughout their careers by the approach of the boomers themselves. A smaller proportion of the larger boomer cohorts may have the savings which many recent in-migrants have had. Further, some of the growth in the East was aided by a real estate bubble. Homeowners who had experienced significant price appreciation in major U.S. metropolitan markets could easily finance such a move. In some cases, the migration could be money-saving as housing cost and real estate tax differentials more than compensated for any added costs for family visits. Now that the bubble has burst, in-migration will be slowed. It is too early to predict the magnitude of the decrease, however. Such migration may be largely limited to the young old. Aside from Greenville, much of the region lacks adequate sophisticated health care delivery.

One implication of retirement-fueled growth in the Eastern Region is the increasing need for distribution center space. A recent analysis performed by Cushman and Wakefield, a real estate consultancy, indicated that the Raleigh area is a likely growth market for distribution. The result

of their analysis is shown in Figure 2-12. To be sure, much of the draw is likely the continuing high rates of population growth in the Triangle but, because of land availability, price, and access to I-95, the western edge of the Eastern Region is a likely target for such investment. Distribution centers in that area can easily serve both the Triangle and the entire coastal "fan."



Source: Cushman and Wakefield analysis reported in Site Selection

Figure 2-12: Projected Demand for New Distribution Center Space

2.2.5 Manufacturing-Fueled Growth in the Eastern Region

The three likely major growth drivers were discussed in the preceding sections. Eastern Region leaders maintain high hopes for manufacturing-fueled economic development. Figure 2-13 highlights the existing, emerging, and potential manufacturing growth clusters in the Eastern Region. The vertical axis in the figure indicates the average wage in each sector. The horizontal axis measures the degree of regional dependence upon each sector, relative to a national baseline. The size of the bubbles taps the amount of employment in each included sector and the color of the bubble indicates a judgment by the Eastern Region staff about sectoral growth potential.

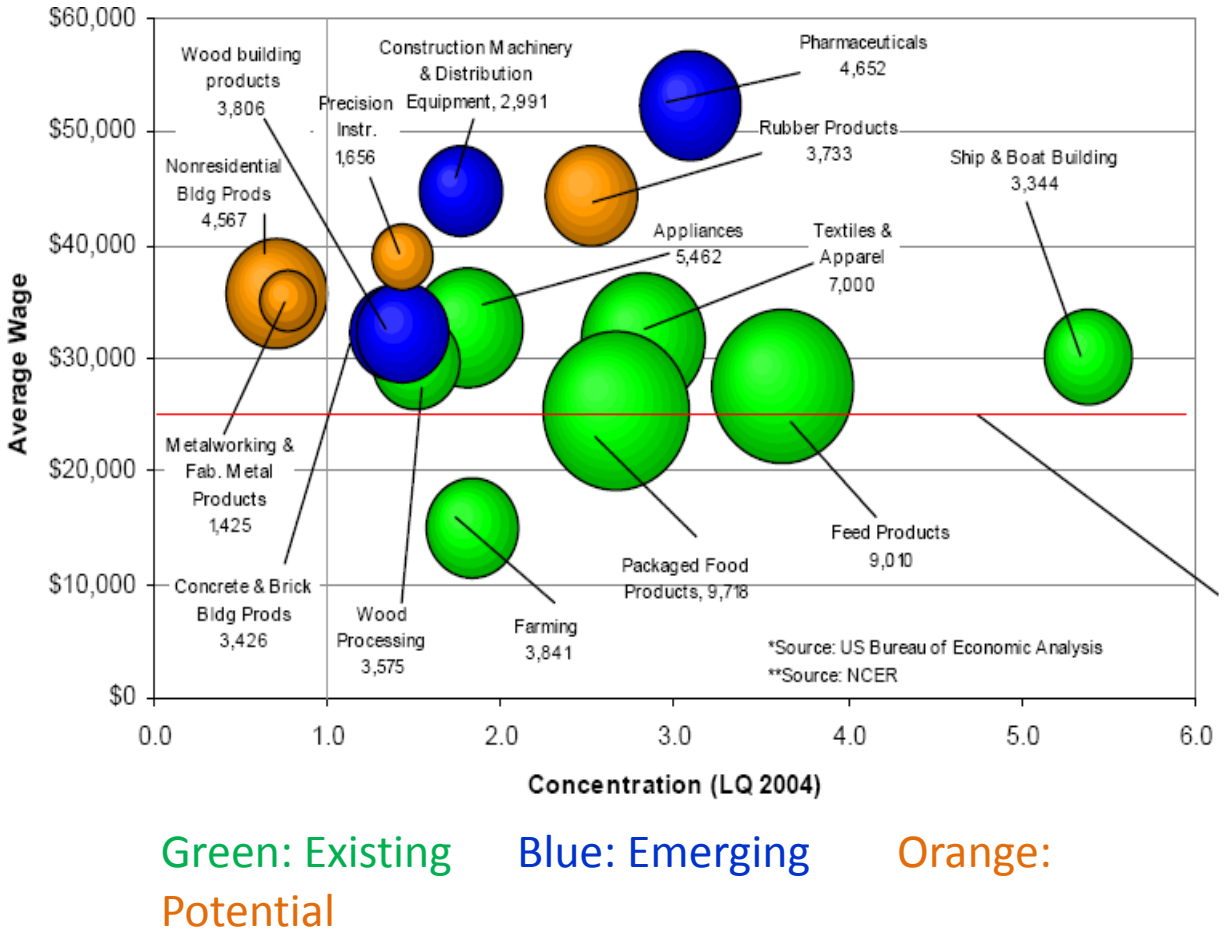


Figure 2-13: Existing, Emerging, and Potential Manufacturing Growth Clusters in the Eastern Region

Some of the sectors indicated build directly on the region's agricultural production, implying that agriculture's impact is far larger than that suggested by statistics on its direct contribution to state GDP. Not all of the potential growth is welcomed as evidenced by a recent decision on the part of the City of Wilson to budget up to $1 million for legal fees to fight the establishment of a high tech chicken processing plant near city limits, mentioned above.

Employment in some of the sectors shown may be concentrated in one or two firms. It is unclear whether such employment represents the initial seeds from which larger clusters will develop or whether they are continuations of the long-standing trend of manufacturers seeking to avoid agglomeration and the increased labor costs which might develop. In many sectors, even JIT delivery can imply a full day of trucking.

2.2.6 The North Carolina Eastern Region as a point of transhipment

North Carolina supports several major north-south transshipment routes. I-95, sometimes termed "America's Main Street," is a major passenger and freight corridor. In addition, much of the rail traffic is said to be en route between points further south, including the ports of Charleston and Savannah, and the major markets in the Boston-Washington corridor. Additional seaborne imports are destined for the Midwest. Those transshipment routes may be able to anchor logistics villages serving North Carolina markets and North Carolina producers.

2.3 *Logistics flows: Existing shipment patterns*

The previous section discussed many of the factors which affect trip generation. We handle the remaining three steps together and in a somewhat different order beginning with the present mode choice distribution before surveying the limited data available on shipment distribution and then focusing on logistics villages. Figure 2-14 provides an overview of the major surface flows of U.S. cargo.

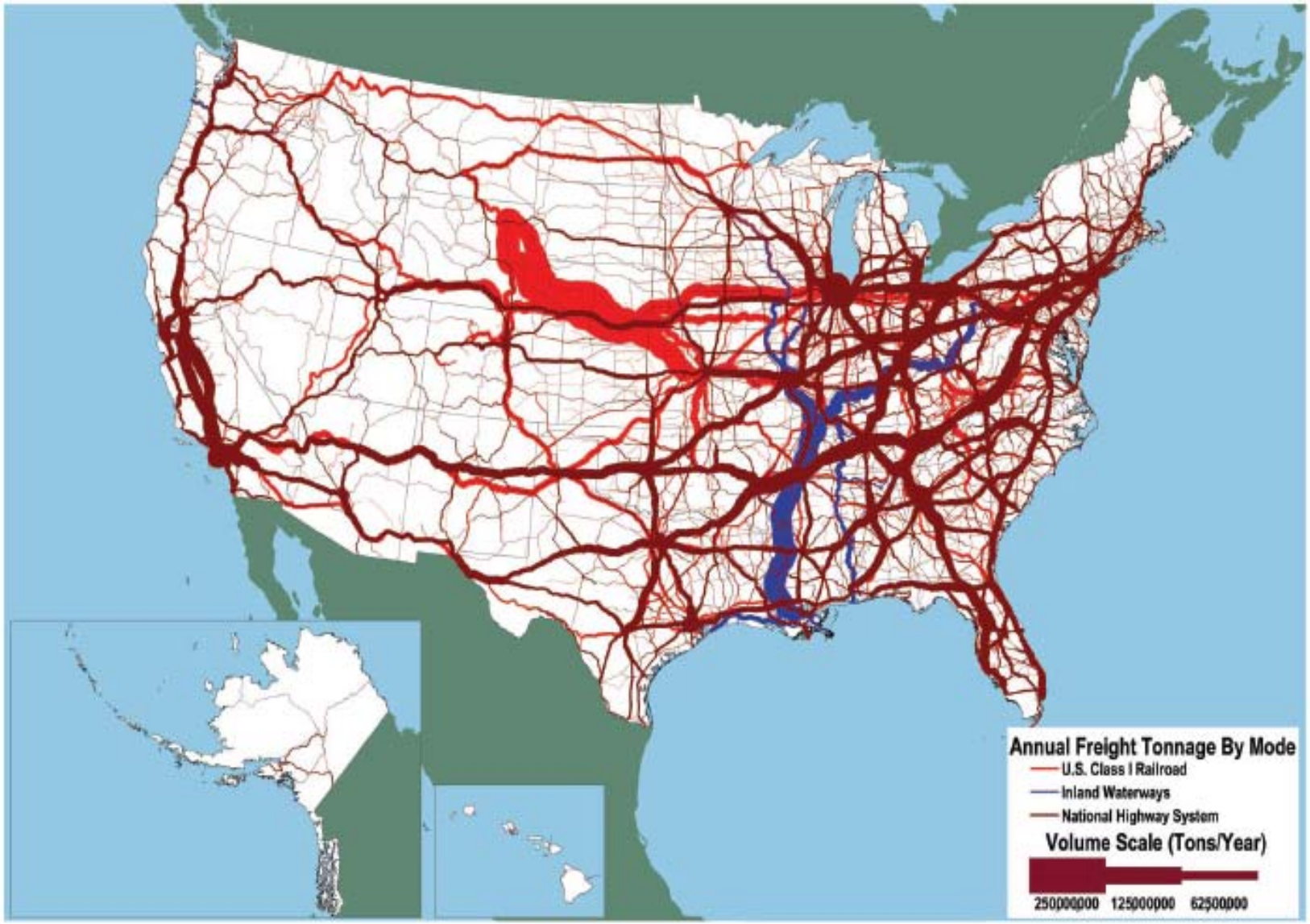


Figure 2-14: Overview of U.S. Cargo Flows

Table 2-9 shows the distribution of freight shipments by mode in 2007 according to the most recently released Commodity Flow Survey data. Truck alone accounts for 71.3 percent of U.S. shipments by value and 40.1 percent of the total ton-miles shipped. Rail alone accounts for 3.7 percent by value but 40.2 percent of the ton-miles shipped. Coal shipments comprise approximately half of the rail ton-miles. Multi-modal truck and rail account for 1.6 percent of U.S. shipments by value and 5.9 percent of the ton-miles. Multi-modal truck and air may account for as much as 15.6 percent of U.S. shipments by air (but less than one percent of the ton-miles). That figure includes parcel, U.S.P.S., and couriers (which includes integrators such as FedEx and UPS). An unknown portion of those shipments are via surface only. Excluding the couriers, 2.2 percent of U.S. shipments by value travel via air.

Table 2-9: Characteristics of Shipments by Origin, 2007

	United States, All sectors					North Carolina, All sectors				
Meaning of Mode category	Value($mil)	Value %	Ton-miles (mil)	Ton-miles %	Avg miles	Value($ mil)	Value %	miles (mil)	Ton-miles %	Avg miles
All modes	11,684,872	100.0	3,344,658	100.0	619	363,549	100.0	52,366	100.0	463
Single modes	9,539,037	81.6	2,894,251	86.5	234	321,289	88.4	46,632	89.1	232
Truck	8,335,789	71.3	1,342,104	40.1	206	311,617	85.7	41,290	78.9	216
For-hire truck	4,955,700	42.4	1,055,646	31.6	599	197,509	54.3	33,330	63.6	529
Private truck	3,380,090	28.9	286,457	8.6	57	114,108	31.4	7,960	15.2	69
Rail	436,420	3.7	1,344,040	40.2	728	4,235	1.2	5,232	10.0	244
Water	114,905	1.0	157,314	4.7	520	-	0.0	-	0.0	-
Shallow draft	91,004	0.8	117,473	3.5	144					
Great Lakes	-	0.0	6,887	0.2	657					
Deep draft	23,058	0.2	32,954	1.0	923	-	0.0	-	0.0	-
Air (incl truck and air)	252,276	2.2	4,510	0.1	1,304	5,399	1.5	110	0.2	775
Pipeline	399,646	3.4	-	0.0	-					
Multiple modes	1,866,723	16.0	416,642	12.5	975	32,719	9.0	4,727	9.0	720
Parcel, U.S.P.S. or courier	1,561,874	13.4	27,961	0.8	975	28,975	8.0	628	1.2	719
Truck and rail	187,248	1.6	196,772	5.9	1,007	2,873	0.8	3,764	7.2	662
Truck and water	58,389	0.5	98,396	2.9	1,429	847	0.2	320	0.6	2,860
Rail and water	13,892	0.1	47,111	1.4	1,928	-	0.0	-	0.0	-
Other multiple modes	45,320	0.4	46,402	1.4	1,182	22	0.0	5	0.0	580
Other and unknown modes	279,113	2.4	33,764	1.0	116	9,541	2.6	1,007	1.9	101

The lower panel of the table provides equivalent figures for the State of North Carolina. North Carolina is more dependent upon truck and less dependent upon rail and intermodal services than the country as a whole, providing preliminary evidence that a system of logistics villages in the state may be viable.

Table 2-10 provides an overview of the mode choice decisions by U.S. shippers for a moderately detailed categorization of commodities. The table shows the flows by weight (which is indicative of investment cost) and value (which suggests the value of the shipment to shipper, consignee, and the public). The value of this table is that, if the actual or forecasted commodities shipped from or to a region are known, the information provides a good first approximation to transportation infrastructure needs. Those mode choices need not be static and can shift as cost structures and infrastructure availability evolves. Unfortunately, publicly-available data is not available at a sufficient level of detail to aid in infrastructure planning at a regional level.

Table 2-10: U.S. Commodity Shipments by Mode

By weight of shipments
(Total weight/percent of commodity by mode)

Mode	Commodity																					
	Alcoholic beverages	Animal feed	Articles-base metal	Base metals	Basic chemicals	Building stone	Cereal grains	Chemical prods.	Coal	Coal-n.e.c.	Crude petroleum	Electronics	Fertilizers	Fuel oils	Furniture	Gasoline	Gravel	Live animals/fish	Logs	Machinery	Meat/seafood	Metallic ores
Air, air & truck	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.3	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Other Intermodal	0.2	0.6	0.6	1.1	1.0	0.7	0.3	1.0	3.8	0.2	0.0	5.8	0.0	1.4	0.8	0.2	0.2	0.2	0.0	0.6	0.2	48.3
Pipeline & Unknown	0.9	1.2	1.7	2.4	24.5	0.5	0.7	1.4	12.3	79.5	91.9	3.7	1.8	30.7	1.7	34.1	2.1	0.0	0.2	1.3	1.6	0.9
Rail	5.7	10.1	3.2	12.6	20.5	0.0	13.4	0.4	68.3	4.5	0.0	0.9	29.3	1.1	0.6	0.7	3.7	0.0	0.3	0.8	0.5	34.7
Truck	92.2	87.8	94.1	81.1	41.1	98.7	79.7	96.6	12.6	13.7	0.9	87.9	66.2	55.3	96.6	59.1	90.6	99.8	99.3	96.9	97.4	10.6
Truck and rail	0.4	0.1	0.1	0.2	0.2	0.0	0.2	0.1	0.3	0.1	0.0	0.7	0.4	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.6
Water	0.6	0.2	0.2	2.6	12.7	0.1	5.7	0.2	2.7	2.1	7.1	0.1	2.4	11.6	0.0	5.8	3.4	0.0	0.2	0.0	0.3	4.9
Total	107,216	255,398	189,177	346,451	346,719	32,936	1,317,655	115,720	1,270,209	2,536,886	928,767	54,440	301,032	609,687	47,647	1,137,083	2,258,205	107,952	444,726	214,839	98,136	93,580

	Milled grain prods.	Misc. mfg. prods.	Mixed freight	Motorized vehicles	Natural sands	Newsprint/paper	Nonmetal min. prods.	Nonmetallic minerals	Other ag prods.	Other foodstuffs	Paper articles	Pharmaceuticals	Plastics/rubber	Precision instrument	Printed prods.	Textiles/leather	Tobacco prods.	Transport equip.	Unknown	Waste/scrap	Wood prods.	Total
Air, air & truck	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.6	0.4	0.3	0.0	1.4	0.0	0.0	0.0	5,296
Other Intermodal	0.1	3.1	0.8	0.8	0.0	0.2	0.1	0.1	0.3	0.1	0.8	3.9	0.8	3.4	2.7	6.2	1.3	0.5	0.0	0.1	0.2	156,571
Pipeline & Unknown	1.0	7.9	1.6	8.2	2.7	1.0	2.3	1.7	0.6	1.7	1.8	19.6	1.8	0.6	4.3	3.9	0.7	0.9	4.3	0.3	2.4	3,909,352
Rail	9.3	0.5	0.3	8.5	3.4	22.4	2.9	13.8	5.6	8.5	1.3	0.0	22.8	0.0	0.5	0.9	0.0	13.9	0.8	7.4	10.9	1,904,603
Truck	87.4	87.8	97.0	80.2	91.4	75.7	93.7	81.4	88.0	88.4	95.4	75.9	73.9	95.4	91.9	88.5	97.9	80.6	94.3	90.7	86.1	12,390,000
Truck and rail	1.3	0.1	0.2	2.0	0.0	0.6	0.2	0.2	0.4	0.7	0.7	0.0	0.5	0.0	0.2	0.2	0.1	0.0	0.0	0.4	0.4	37,210
Water	0.8	0.4	0.0	0.2	2.4	0.1	0.8	2.9	5.1	0.6	0.1	0.0	0.2	0.0	0.0	0.0	0.0	2.6	0.5	1.1	0.1	582,030
Total	119,822	91,942	358,764	141,791	570,663	122,807	1,156,788	214,052	446,039	522,113	76,398	28,040	143,410	20,019	70,392	61,989	5,697	47,118	529,830	1,022,411	418,955	18,980,000

By value of shipments
(Total value/percent of commodity by mode)

Mode(Mode)	Commodity																					
	Alcoholic beverages	Animal feed	Articles-base metal	Base metals	Basic chemicals	Building stone	Cereal grains	Chemical prods.	Coal	Coal-n.e.c.	Crude petroleum	Electronics	Fertilizers	Fuel oils	Furniture	Gasoline	Gravel	Live animals/fish	Logs	Machinery	Meat/seafood	Metallic ores
Air, air & truck	0.0	0.0	0.7	0.4	0.6	0.0	0.0	0.3	0.0	0.0	0.0	10.9	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.6	0.2	0.0
Other Intermodal	0.4	2.5	8.1	1.4	2.2	1.1	0.3	4.4	1.6	0.1	0.0	26.9	0.1	0.5	2.5	0.1	0.2	0.1	0.1	2.9	0.3	3.5
Pipeline & Unknown	2.3	2.2	5.2	3.8	17.5	1.7	1.4	2.6	11.3	86.3	90.9	8.4	3.3	24.9	4.7	30.4	3.9	0.2	4.1	2.5	2.4	2.6
Rail	3.1	7.4	1.0	6.1	13.2	0.1	19.0	0.2	74.8	2.3	0.0	0.3	17.9	0.7	0.2	0.5	3.5	0.0	2.0	0.6	0.3	2.4
Truck	93.3	87.6	84.7	87.8	57.0	97.0	70.3	92.3	9.7	10.0	1.1	53.3	75.8	63.7	92.1	64.4	90.1	99.6	93.2	93.2	96.8	88.1
Truck and rail	0.7	0.2	0.1	0.1	0.5	0.1	0.6	0.1	0.5	0.0	0.0	0.1	0.7	0.0	0.2	0.0	0.0	0.0	0.3	0.2	0.1	2.6
Water	0.2	0.1	0.1	0.4	8.9	0.0	8.5	0.1	2.0	1.2	8.0	0.1	2.2	10.2	0.0	4.6	2.3	0.0	0.3	0.0	0.1	0.7
Total	131,951	56,966	373,882	272,061	149,037	5,015	89,555	247,933	36,120	672,943	82,745	973,469	39,357	120,174	170,895	293,233	15,646	123,454	15,264	1,412,120	238,368	14,458

	Milled grain prods.	Misc. mfg. prods.	Mixed freight	Motorized vehicles	Natural sands	Newsprint/paper	Nonmetal min. prods.	Nonmetallic minerals	Other ag prods.	Other foodstuffs	Paper articles	Pharmaceuticals	Plastics/rubber	Precision instrument	Printed prods.	Textiles/leather	Tobacco prods.	Transport equip.	Unknown	Waste/scrap	Wood prods.	Total
Air, air & truck	0.0	2.3	0.2	0.4	0.0	0.0	0.4	0.1	0.2	0.0	0.1	4.0	0.7	16.9	1.0	0.5	0.0	25.4	0.0	0.1	0.1	270,940
Other Intermodal	0.6	22.9	3.1	2.5	1.1	0.7	2.5	0.5	0.6	0.8	2.7	17.3	5.0	42.4	12.4	12.7	1.2	3.7	0.1	0.1	0.8	842,371
Pipeline & Unknown	1.2	7.6	2.6	18.9	4.2	2.2	4.1	3.8	1.7	2.8	4.5	3.3	4.0	3.9	6.6	7.5	2.0	0.6	21.4	0.5	3.5	1,465,509
Rail	2.6	0.3	0.4	8.8	4.9	15.2	2.9	13.9	2.9	3.8	0.5	0.0	8.5	0.0	0.1	0.1	0.0	2.4	0.1	6.1	7.6	319,232
Truck	94.4	66.9	93.4	65.3	89.2	81.4	89.7	81.0	92.8	91.6	91.6	75.3	81.3	36.7	79.9	79.1	96.8	67.8	78.3	89.7	87.5	9,068,401
Truck and rail	1.1	0.1	0.3	4.0	0.1	0.4	0.2	0.2	0.4	0.9	0.7	0.0	0.6	0.1	0.0	0.1	0.1	0.0	0.0	2.4	0.6	61,588
Water	0.1	0.0	0.0	0.1	0.6	0.1	0.3	0.5	1.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.1	0.1	74,811
Total	126,851	434,289	969,861	868,085	4,281	96,219	169,084	11,195	204,124	417,190	113,803	543,114	340,525	212,754	251,004	558,667	95,094	270,093	564,980	113,859	203,135	12,100,000

Table 2-11 provides more detailed information about the shipments originating (first and third panels) and ending (second and fourth panels) in North Carolina. Three-fourths of the shipments (by weight) remain in state; 87 percent of North Carolina shipments and 61 percent of out-of-state shipments by weight are sent to locations in the state or the three contiguous states with direct Interstate access, South Carolina, Virginia, and Tennessee. (Georgia is also contiguous with North Carolina but it is likely that much of the shipment to that state travels via South Carolina Interstate corridors.) By value, those percentages are 49 percent, 63 percent, and 26 percent, respectively. With respect to inbound shipments, 80 percent by weight originate in North Carolina or the three contiguous neighbors and 37 percent of the out-of-state by weight shipments to North Carolina originate in the three neighboring states. By value, the figures are 71 and 22 percent, respectively.

Table 2-11: North Carolina Commodity Shipments, Origins and Destinations

Total outbound flows by weight

Destination	Weight	Percent of total	Cumulative percent
NC rem	134,240	30.83	30.83
NC Charl	69,629	15.99	46.82
NC Ralei	60,965	14.00	60.83
NC Green	60,346	13.86	74.69
VA rem	26,435	6.07	80.76
SC rem	13,658	3.14	83.90
GA Atlan	5,690	1.31	85.20
KS rem	5,054	1.16	86.36
TN rem	3,884	0.89	87.25
VA Virgi	3,856	0.89	88.14
VA Richm	3,326	0.76	88.90
GA rem	3,201	0.74	89.64
SC Spart	3,038	0.70	90.34
SC Green	3,012	0.69	91.03
PA rem	2,062	0.47	91.50
FL Miami	1,989	0.46	91.96
NJ New Y	1,777	0.41	92.37
VA Washi	1,734	0.40	92.77
IL Chica	1,280	0.29	93.06
WV	1,212	0.28	93.34
Mode			
Truck	377,355	86.67	86.67
Commodity			
Gravel	69,256	15.91	15.91
Nonmetal min. prods	44,897	10.31	26.22
Coal-n.e.c.	30,265	6.95	33.17
Wood prods.	29,842	6.85	40.02
Natural sands	29,297	6.73	46.75
Waste/scrap	23,952	5.50	52.25
Logs	22,404	5.15	57.40
Mixed freight	18,329	4.21	61.61
Unknown	16,136	3.71	65.32
Gasoline	12,254	2.81	68.13

Total outbound flows by value

Destination	Value	Percent of total	Cumulative percent
NC rem	63,389	16.01	16.01
NC Charl	49,873	12.59	28.60
NC Green	43,385	10.96	39.56
NC Ralei	37,850	9.56	49.11
SC rem	16,524	4.17	53.29
VA rem	12,989	3.28	56.57
GA Atlan	12,268	3.10	59.67
PA Phila	7,009	1.77	61.44
NJ New Y	6,651	1.68	63.11
GA rem	6,149	1.55	64.67
TN rem	6,096	1.54	66.21
CA Los A	6,051	1.53	67.73
PA rem	6,029	1.52	69.26
VA Virgi	5,610	1.42	70.67
SC Green	5,531	1.40	72.07
VA Richm	5,332	1.35	73.42
FL Miami	5,319	1.34	74.76
IL Chica	4,473	1.13	75.89
TX Dalla	3,619	0.91	76.80
NY New Y	3,518	0.89	77.69
Mode			
Truck	354,021	89.40	89.40
Commodity			
Textiles/leather	45,630	11.52	11.52
Machinery	40,751	10.29	21.81
Mixed freight	40,255	10.17	31.98
Pharmaceuticals	31,310	7.91	39.88
Electronics	24,326	6.14	46.03
Tobacco prods.	21,126	5.33	51.36
Plastics/rubber	17,281	4.36	55.73
Motorized vehicles	16,816	4.25	59.97
Unknown	13,963	3.53	63.50
Furniture	13,271	3.35	66.85

Table 2-11: North Carolina Commodity Shipments, Origins and Destinations (continued)

Total inbound flows by weight

Origin	Weight	Percent of total	Cumulative percent
NC rem	151,530	30.70	30.70
NC Charl	72,668	14.72	45.43
NC Green	52,444	10.63	56.05
NC Ralei	48,539	9.83	65.89
SC Spart	24,620	4.99	70.87
KY rem	22,390	4.54	75.41
SC rem	17,135	3.47	78.88
WV	15,816	3.20	82.09
VA rem	12,702	2.57	84.66
OH rem	9,995	2.03	86.69
GA rem	7,097	1.44	88.12
GA Atlan	5,071	1.03	89.15
TN rem	5,040	1.02	90.17
VA Virgi	3,673	0.74	90.92
SC Green	2,791	0.57	91.48
OH Cinci	1,989	0.40	91.89
VA Richm	1,956	0.40	92.28
IN rem	1,930	0.39	92.67
AL rem	1,877	0.38	93.05
PA rem	1,476	0.30	93.35
Mode			
Truck	371,264	75.22	75.22
Rail	76,081	15.42	90.64
Pipeline & Unknown	42,764	8.66	99.30
Water	2,090	0.42	99.73
Other Intermodal	787	0.16	99.89
Truck and rail	482	0.10	99.98
Air, air & truck	83	0.02	100.00
Commodity			
Gravel	67,438	13.66	13.66
Nonmetal min. prods	48,261	9.78	23.44
Coal-n.e.c.	38,192	7.74	31.18
Coal	36,904	7.48	38.66
Wood prods.	30,042	6.09	44.74
Natural sands	26,607	5.39	50.14
Logs	24,450	4.95	55.09
Cereal grains	22,856	4.63	59.72
Waste/scrap	22,517	4.56	64.28
Other ag prods.	17,286	3.50	67.78

Total inbound flows by value

Origin	Value	Percent of total	Cumulative percent
NC rem	61,577	16.83	16.83
NC Charl	55,482	15.16	31.99
NC Green	40,767	11.14	43.14
NC Ralei	36,670	10.02	53.16
SC rem	16,714	4.57	57.73
GA Atlan	11,390	3.11	60.84
TN rem	9,247	2.53	63.37
SC Spart	9,026	2.47	65.83
VA rem	7,670	2.10	67.93
GA rem	5,459	1.49	69.42
SC Green	4,619	1.26	70.68
IL Chica	4,157	1.14	71.82
NJ New Y	4,128	1.13	72.95
KY rem	3,810	1.04	73.99
OH rem	3,685	1.01	75.00
TX Dalla	3,517	0.96	75.96
PA rem	3,335	0.91	76.87
IN rem	3,263	0.89	77.76
CA Los A	3,154	0.86	78.62
NY New Y	3,094	0.85	79.47
Mode			
Truck	306,720	83.83	83.83
Pipeline & Unknown	23,149	6.33	90.16
Other Intermodal	21,755	5.95	96.10
Rail	7,485	2.05	98.15
Air, air & truck	4,936	1.35	99.50
Truck and rail	1,410	0.39	99.88
Water	425	0.12	100.00
Commodity			
Machinery	39,013	10.66	10.66
Mixed freight	32,225	8.81	19.47
Textiles/leather	28,593	7.81	27.29
Pharmaceuticals	23,006	6.29	33.57
Motorized vehicles	22,361	6.11	39.68
Electronics	22,133	6.05	45.73
Tobacco prods.	21,092	5.76	51.50
Misc. mfg. prods.	14,606	3.99	55.49
Unknown	13,093	3.58	59.07
Plastics/rubber	12,798	3.50	62.57

Table 2-11: North Carolina Commodity Shipments, Origins and Destinations (continued)

Interstate outbound flows by weight

Destination	Weight	Percent of total	Cumulative percent
VA rem	26,435	23.99	23.99
SC rem	13,658	12.39	36.38
GA Atlan	5,690	5.16	41.54
KS rem	5,054	4.59	46.13
TN rem	3,884	3.52	49.65
VA Virgi	3,856	3.50	53.15
VA Richm	3,326	3.02	56.17
GA rem	3,201	2.90	59.07
SC Spart	3,038	2.76	61.83
SC Green	3,012	2.73	64.56
PA rem	2,062	1.87	66.43
FL Miami	1,989	1.81	68.24
NJ New Y	1,777	1.61	69.85
VA Washi	1,734	1.57	71.42
IL Chica	1,280	1.16	72.58
WV	1,212	1.10	73.68
CA Los A	1,137	1.03	74.71
OH rem	1,046	0.95	75.66
TX Dalla	1,014	0.92	76.58
IN rem	977	0.89	77.47
Mode			
Truck	82,866	75.19	75.19
Pipeline & Unknown	20,387	18.50	93.68
Rail	6,316	5.73	99.42
Other Intermodal	470	0.43	99.84
Truck and rail	101	0.09	99.93
Air, air & truck	64	0.06	99.99
Water	10	0.01	100.00
Commodity Commodity	Frequency	Percent	Cumulative Percent
Coal-n.e.c.	20,111	18.25	18.25
Wood prods.	7,639	6.93	25.18
Mixed freight	6,854	6.22	31.40
Gravel	5,741	5.21	36.61
Nonmetal min. prods	5,649	5.13	41.73
Plastics/rubber	4,525	4.11	45.84
Meat/seafood	4,094	3.71	49.55
Textiles/leather	4,051	3.68	53.23
Newsprint/paper	3,758	3.41	56.64
Unknown	3,562	3.23	59.87

Interstate outbound flows by value

Destination	Value	Percent of total	Cumulative percent
SC rem	16,524	8.20	8.20
VA rem	12,989	6.45	14.65
GA Atlan	12,268	6.09	20.73
PA Phila	7,009	3.48	24.21
NJ New Y	6,651	3.30	27.51
GA rem	6,149	3.05	30.56
TN rem	6,096	3.03	33.59
CA Los A	6,051	3.00	36.59
PA rem	6,029	2.99	39.58
VA Virgi	5,610	2.78	42.37
SC Green	5,531	2.74	45.11
VA Richm	5,332	2.65	47.76
FL Miami	5,319	2.64	50.40
IL Chica	4,473	2.22	52.62
TX Dalla	3,619	1.80	54.41
NY New Y	3,518	1.75	56.16
FL rem	3,298	1.64	57.80
MA Bosto	2,975	1.48	59.27
IN India	2,799	1.39	60.66
SC Spart	2,607	1.29	61.96
Mode			
Truck	175,573	87.13	87.13
Pipeline & Unknown	10,936	5.43	92.56
Other Intermodal	9,602	4.77	97.32
Air, air & truck	2,835	1.41	98.73
Rail	2,333	1.16	99.89
Truck and rail	227	0.11	100.00
Water	3	0.00	100.00
Commodity Commodity	Frequency	Percent	Cumulative Percent
Textiles/leather	33,766	16.76	16.76
Mixed freight	17,000	8.44	25.19
Electronics	16,595	8.24	33.43
Machinery	16,137	8.01	41.44
Pharmaceuticals	15,447	7.67	49.10
Plastics/rubber	13,569	6.73	55.84
Furniture	9,715	4.82	60.66
Motorized vehicles	8,061	4.00	64.66
Misc. mfg. prods.	7,859	3.90	68.56
Coal-n.e.c.	6,077	3.02	71.57

Table 2-11: North Carolina Commodity Shipments, Origins and Destinations (continued)

Interstate inbound flows by weight

Origin	Weight	Percent of total	Cumulative percent
SC Spart	24,620	14.62	14.62
KY rem	22,390	13.30	27.92
SC rem	17,135	10.18	38.10
WV	15,816	9.39	47.49
VA rem	12,702	7.54	55.03
OH rem	9,995	5.94	60.97
GA rem	7,097	4.22	65.19
GA Atlan	5,071	3.01	68.20
TN rem	5,040	2.99	71.19
VA Virgi	3,673	2.18	73.37
SC Green	2,791	1.66	75.03
OH Cinci	1,989	1.18	76.21
VA Richm	1,956	1.16	77.37
IN rem	1,930	1.15	78.52
AL rem	1,877	1.12	79.64
PA rem	1,476	0.88	80.51
IL rem	1,452	0.86	81.37
IL Chica	1,250	0.74	82.12
TX rem	1,188	0.71	82.82
LA rem	1,124	0.67	83.49
Mode			
Truck	76,775	45.60	45.60
Rail	63,761	37.87	83.47
Pipeline & Unknown	26,384	15.67	99.14
Other Intermodal	618	0.37	99.51
Truck and rail	482	0.29	99.79
Water	273	0.16	99.95
Air, air & truck	79	0.05	100.00
Commodity			
Coal	36,870	21.90	21.90
Coal-n.e.c.	28,037	16.65	38.55
Cereal grains	12,738	7.57	46.12
Nonmetal min. prods	9,013	5.35	51.47
Wood prods.	7,838	4.66	56.12
Other foodstuffs	6,815	4.05	60.17
Other ag prods.	6,229	3.70	63.87
Logs	4,942	2.94	66.81
Base metals	4,488	2.67	69.47
Plastics/rubber	4,295	2.55	72.02

Interstate inbound flows by value

Origin	Value	Percent of total	Cumulative percent
SC rem	16,714	9.75	9.75
GA Atlan	11,390	6.65	16.40
TN rem	9,247	5.40	21.79
SC Spart	9,026	5.27	27.06
VA rem	7,670	4.48	31.54
GA rem	5,459	3.19	34.72
SC Green	4,619	2.70	37.42
IL Chica	4,157	2.43	39.84
NJ New Y	4,128	2.41	42.25
KY rem	3,810	2.22	44.47
OH rem	3,685	2.15	46.62
TX Dalla	3,517	2.05	48.68
PA rem	3,335	1.95	50.62
IN rem	3,263	1.90	52.53
CA Los A	3,154	1.84	54.37
NY New Y	3,094	1.81	56.17
OH Colum	3,089	1.80	57.97
WV	2,914	1.70	59.67
FL Jacks	2,874	1.68	61.35
AL rem	2,692	1.57	62.92
Mode			
Truck	128,272	74.84	74.84
Other Intermodal	18,371	10.72	85.56
Pipeline & Unknown	11,595	6.77	92.33
Rail	6,851	4.00	96.33
Air, air & truck	4,754	2.77	99.10
Truck and rail	1,410	0.82	99.92
Water	132	0.08	100.00
Commodity			
Textiles/leather	16,729	9.76	9.76
Electronics	14,402	8.40	18.16
Machinery	14,399	8.40	26.57
Motorized vehicles	13,607	7.94	34.51
Misc. mfg. prods.	9,859	5.75	40.26
Plastics/rubber	9,085	5.30	45.56
Mixed freight	8,970	5.23	50.79
Other foodstuffs	7,340	4.28	55.08
Pharmaceuticals	7,143	4.17	59.24
Coal-n.e.c.	6,495	3.79	63.03

Five or six bulk commodities account for half the weight of the outbound shipments. Six or seven commodities account for half the outbound value. Textiles/leather, mixed freight, electronics, machinery, pharmaceuticals, plastics/rubber, furniture, motorized vehicles and parts, and miscellaneous manufactured products – all broad categories to be sure – account for two-thirds of all North Carolina shipments out of state. As suggested above, North Carolina shipping relies heavily on trucks.

North Carolina has a wide range of freight needs. The greatest part of the weight, and much of the value, is regional. Heavy commodities imply significant infrastructure costs to facilitate that trade. On the other hand, the data suggests that there may be sufficient traffic along selected corridors to support a mode other than truck.

The Freight Analysis Framework's Commodity Flow Survey data subdivide North Carolina into four regions: Charlotte, the Triad, the Triangle, and the rest of the state. An initial analysis of origin-destination pairs suggests heavy traffic throughout the Piedmont and southward along the I-85 corridor to Spartanburg SC and Atlanta GA (not shown). Somewhat smaller linkages reach to Los Angeles, Miami, Chicago, and Philadelphia, suggesting a possible role for some sort of trunk line service.

2.3.1 North Carolina Trucking Corridors

Figure 2-16 shows the forecasted truck traffic in 2035. Comparing this figure with truck traffic in 2002 (Figure 2-15) shows that Interstates 40, 85, and 95 are expected to be the most heavily used corridors because of their interstate connectivity and lower delays associated with freeways. Within the Eastern Region, Nash and Wilson counties include I-95, Wilson and Wayne counties include I-795 (between Wilson and Goldsboro), and Duplin county includes I-40. These four counties are the western counties in the Eastern Region. The other nine counties in the region rely on several key east-west routes (U.S. 64, 70, and 264) connecting to these interstates, along with two major north-south routes (U.S. 17 and 258) which serve as their commerce and tourism corridors. U.S. 70 is the primary east-west route connecting the Port of Morehead City with I-95 at Smithfield and I-40 south of Garner/Raleigh, extending both east-west and north-south connectivity within and through the state.

Although portions of the U.S. 70 corridor have been upgraded to controlled access highway status, its development probably has lagged compared to the other major east-west routes in the Eastern Region. The need for upgrading the remaining sections – resulting in capacity, speed, and safety improvements – may become particularly acute as the Port of Morehead City expands to process additional bulk and breakbulk goods and to possibly include import and export container operations.

The NC Department of Transportation has established a Strategic Highway Corridors initiative to provide better access to major activity centers throughout the state, including Eastern Region freight terminals (such as the Port of Morehead City and the Global TransPark at Kinston), military bases (including Seymour Johnson Air Force Base in Goldsboro and the Marine Corps

Air Station at Cherry Point in Havelock), and tourist destinations (such as the Crystal Coast).[71] This transportation initiative will help support the three major pillars of the Eastern Region identified above (the military, agriculture, and tourism/recreation) by facilitating the personal transportation and, more immediately, by supporting logistics operations and commerce throughout the region.

Aside from the facilities tied together by U.S. 70 (Strategic Highway Corridor #46), companion corridors (Strategic Highway Corridor #47 – NC 24, U.S. 70) will link Fayetteville (Fort Bragg) to Jacksonville (Camp Lejeune) and the Port of Morehead City, strengthen intra-regional connections (Strategic Highway Corridor #54 – U.S. 258), and bind the region more strongly with ports to the south and north. To that end, the N.C. Board of Transportation has established the Highway 70 Committee and the Highway 17 Committee (Strategic Highway Corridors #51, #52) to focus specific attention and analyses on the role these corridors play in serving the state's needs in the coastal region and what improvements will best accommodate future travel demand needs.

[71] http://www.ncdot.org/doh/preconstruct/tpb/shc/overview/

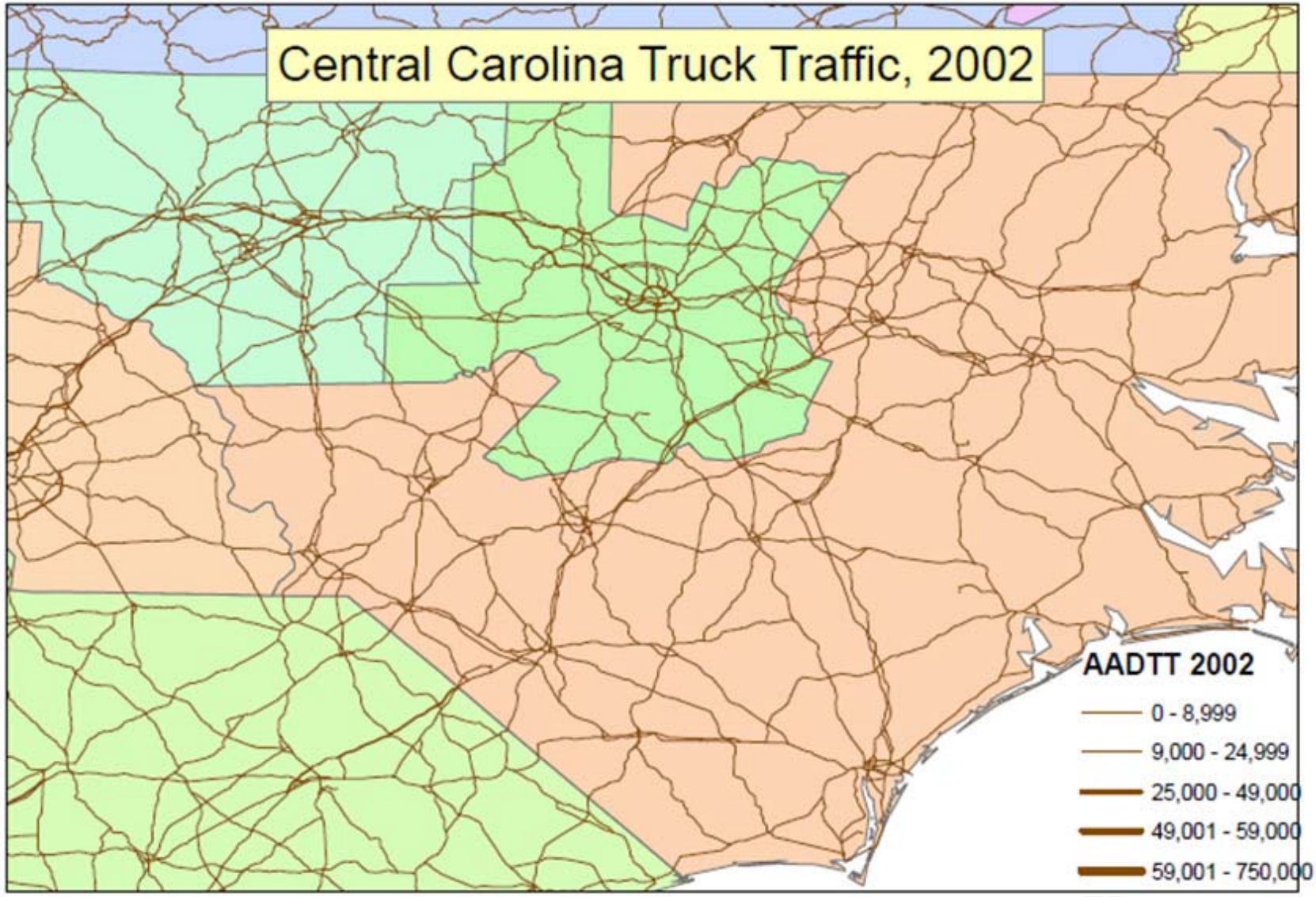


Figure 2-15: Central Carolina Truck Traffic, 2002

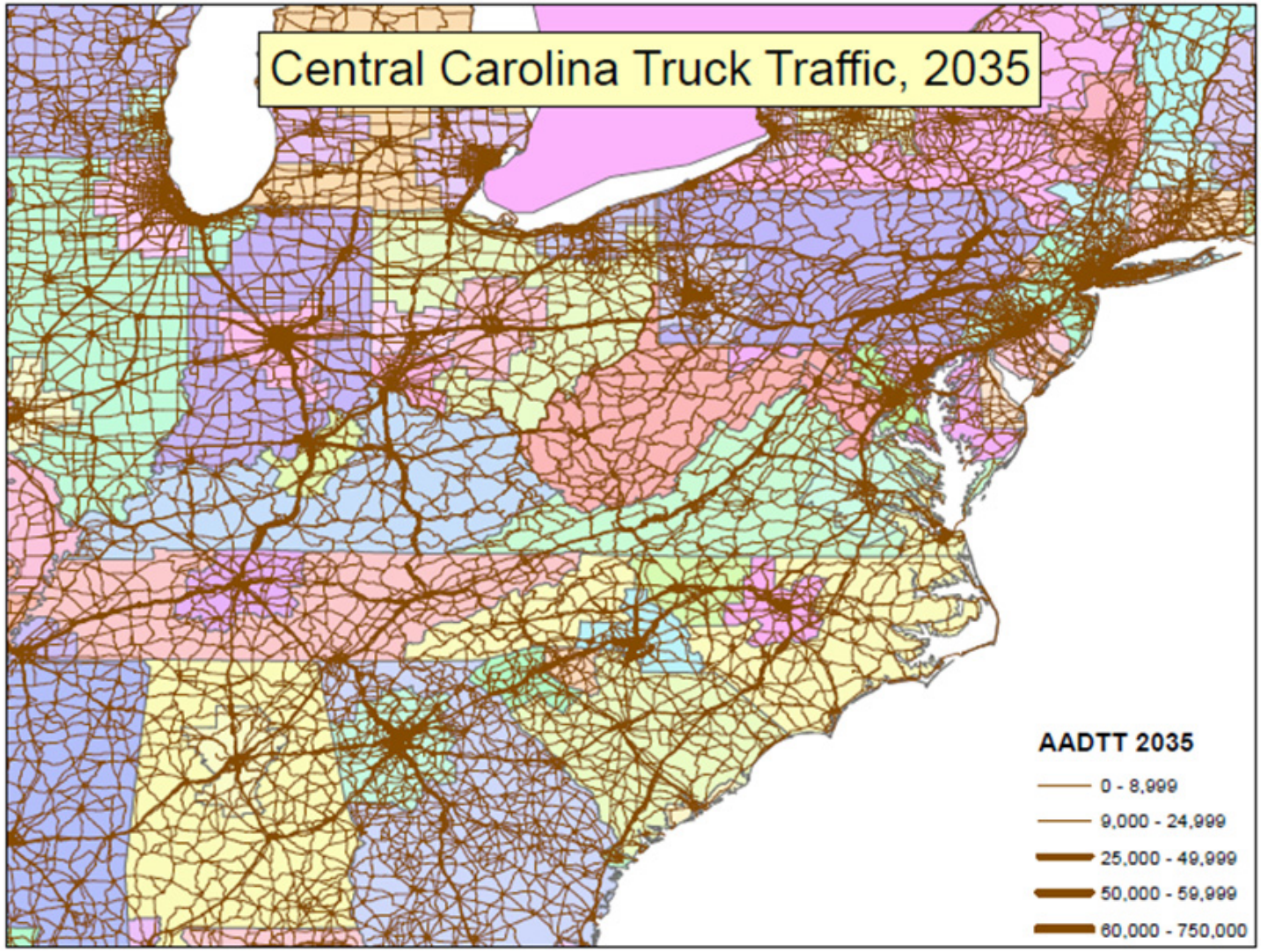


Figure 2-16: Central Carolina Truck Traffic, 2035

2.3.2 North Carolina Rail Corridors

Figure 2-17 presents recent information on U.S. shipments by rail. Coal accounts for approximately half of U.S. rail tonnage, so that coal shipments dominate the map. Until recently, bulk products have dominated U.S. rail shipments.

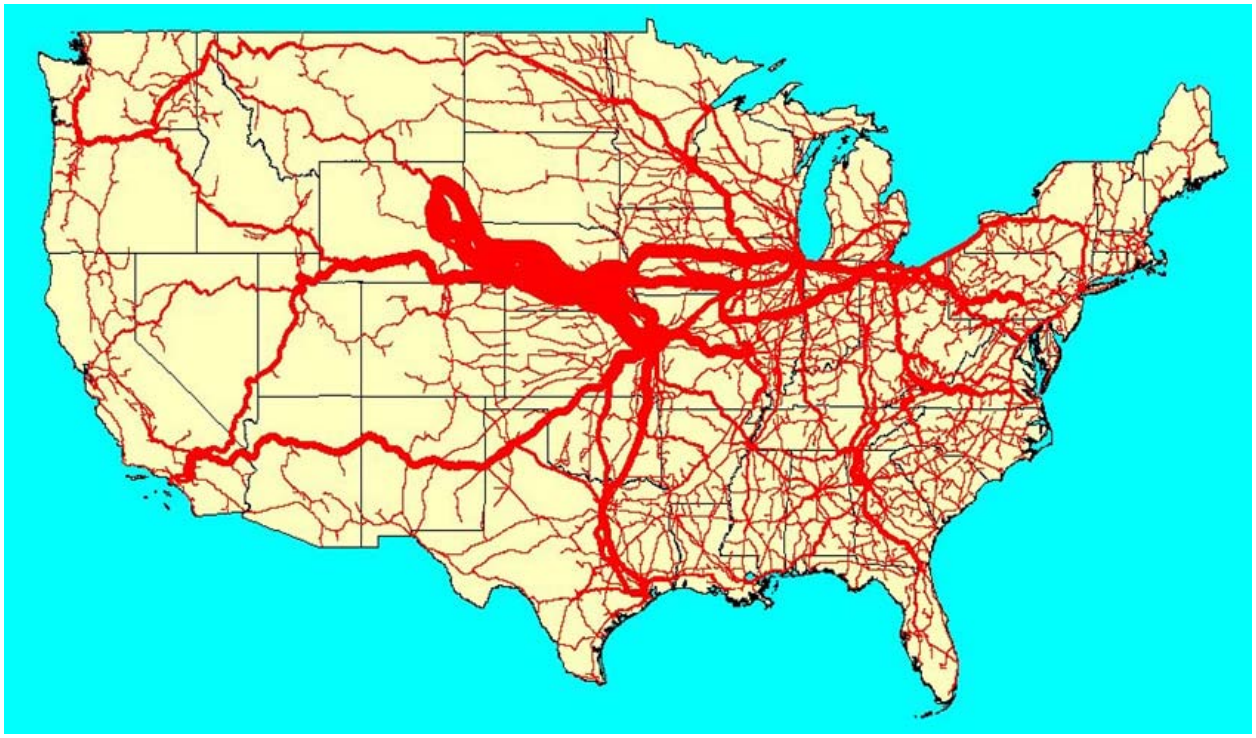


Figure 2-17: U.S. Rail Traffic

Intermodal rail shipments have been growing rapidly. In Figure 2-18, several popular intermodal routes are visible, including one from Los Angeles east. An increase in intermodal traffic from Mexico north along the NAFTA Corridor is expected should energy cost, urban Chinese wages, or the relative value of Chinese currency increase. Accordingly, a set of rail-based intermodal terminals are developing along that corridor which also serve east-west traffic.[72]

[72] Unfortunately, the Public Use Rail Waybill sample appears to suppress much needed information for North Carolina.

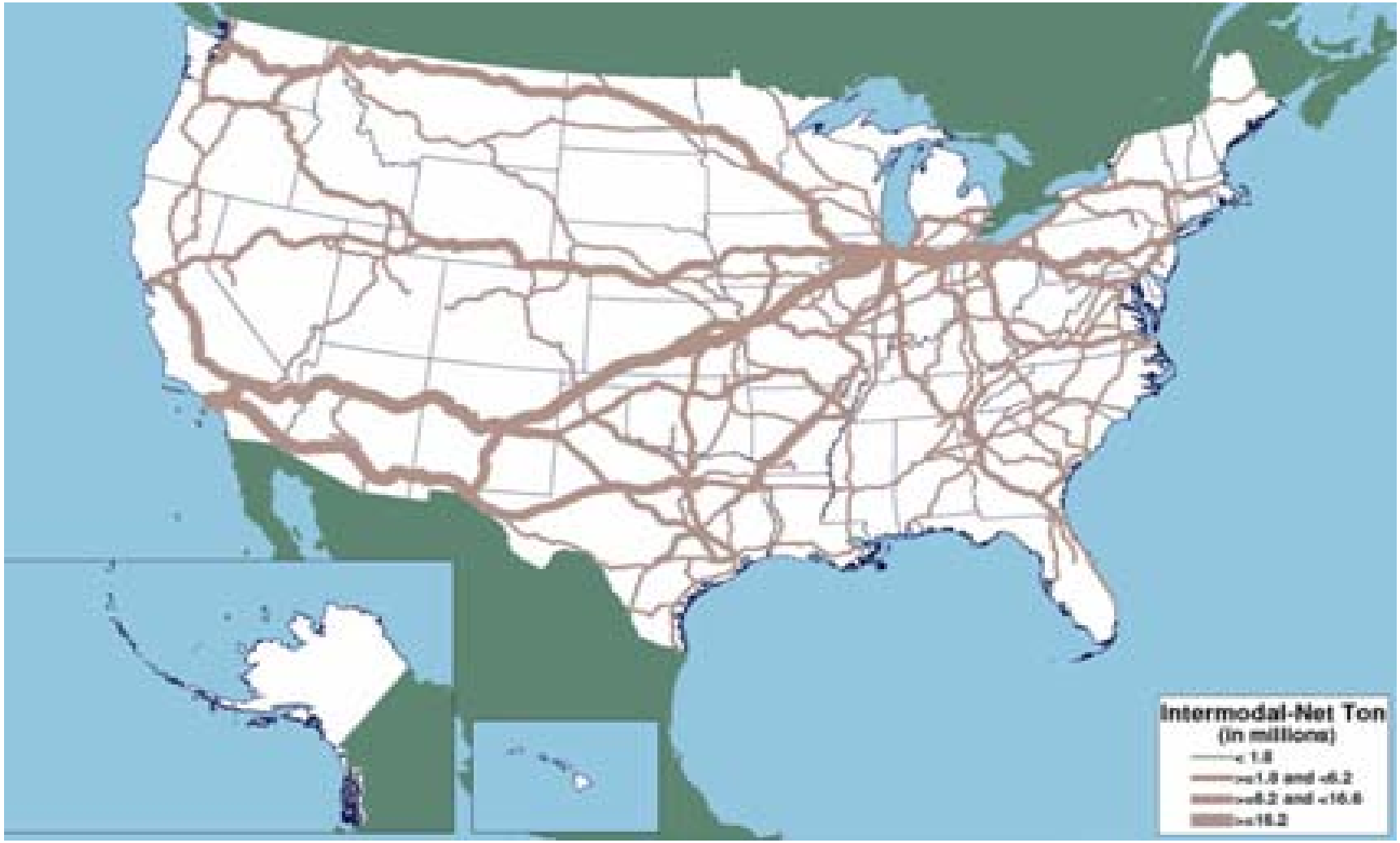


Figure 2-18: U.S. Intermodal Rail Traffic Flows

Figure 2-19 shows the major intermodal routes emerging in the eastern portion of the U.S. The CSX National Gateway connects the Port of Wilmington to the Midwest by heading north along the coast past Norfolk and Baltimore before turning inland. Norfolk Southern is anticipating three to four double-stack trains daily from the Virginia ports to the Midwest along the recently completed Heartland Express route as Panama Canal traffic increases. It may be possible for cargo moving through North Carolina ports to link into the Norfolk Southern system at Roanoke. The frequent train sere will relieve pressure on port land use capacity. Service to the Front Royal Inland Port could also increase to serve destinations closer to the East Coast. Norfolk Southern's Crescent Corridor serves an arc from New Orleans to New York City, touching base at Charlotte and the Triad along the way. An intermodal multimodal waterway corridor is also emerging along the Mississippi, Ohio, and Tennessee-Tombigbee waterways to serve Midwest cargo markets.

Figure 2-19: Emerging Intermodal Rail Corridors

According to NCDOT documents, the demand for freight rail service in North Carolina will be driven by the state's position midway on the Atlantic Seaboard, by population and income growth, and by five main sectors which are special demand drivers. Manufacturing, agriculture, energy, and construction are particularly dependent upon rail for transporting materials competitively – minimizing the combination of transportation costs, inventory costs, and risks. In addition, military realignments and the attendant logistics needs will be increasingly important in the coming years.[73] Despite their efforts, the Rail Division is concerned that transportation investments at the state level may not be fully consistent with local and regional economic development and land use plans nor does the state transportation plan fully reflect private sector, city and county development needs nor does it encourage smart growth including urban infill and freight villages.[74]

2.3.3 North Carolina Seaports

In both absolute terms and in relation to domestic economic production, U.S. international trade has risen substantially over the past several decades. On balance, the U.S. has a deficit in the trade in goods which has generally widened. That is, even with oil excluded, the U.S. imports more than it exports. The increase in overseas sourcing has been held responsible for at least a portion of the manufacturing employment dislocation in North Carolina over the last several decades.

Much of the nation's international trade crosses a land border with its largest trading partner, Canada. A substantial proportion of the trade crosses a land border to the South. Mexico has slipped from its position as the second-largest trading partner at the turn of the century but is still a major partner. Seaports are the gateways for most of the remaining trade (at least by weight). Much of the growth in seaborne shipments has been in containerized cargo with containers being used for seemingly ever broadening types of cargo. Even some bulk goods, including agricultural products such as soy beans, are now shipped in containers. Table 2-12 summarizes traffic at selected U.S. seaports.

[73] North Carolina Department of Transportation, *2009 Rail Plan Executive Summary*, http://www.bytrain.org/quicklinks/reports/2009_railplanexecsum.pdf. The North Carolina Rail Plan looks at the demographic and economic drivers behind the demand for rail transportation, the status of the current rail system, and the capital investment needs required to maintain a strong rail network.
[74] *2009 Rail Plan Executive Summary*, p. 9.

Table 2-12: Traffic at Selected U.S. Container Seaports

	2009	2008	2007	2006	2005	2000	1995	1990	2009-2005	2000-2005	1990-2000
1 Los Angeles	6,748,995	7,849,985	8,355,039	8,469,853	7,484,624	4,879,429	2,555,206	2,116,410	-9.83%	53.39%	130.55%
2 Long Beach	5,067,597	6,350,125	7,312,465	7,289,365	6,709,818	4,600,787	2,843,502	1,598,078	-24.47%	45.84%	187.90%
3 New York/New Jersey	4,561,528	5,265,058	5,299,105	5,092,806	4,785,318	3,050,006	2,262,792	1,898,436	-4.68%	56.90%	60.66%
4 Savannah	2,356,512	2,616,126	2,604,312	2,160,168	1,901,520	948,699	626,151	419,079	23.93%	100.43%	126.38%
5 Oakland	2,050,030	2,236,244	2,388,182	2,390,262	2,272,525	1,776,922	1,549,886	1,124,123	-9.79%	27.89%	58.07%
6 Houston	1,797,198	1,795,320	1,768,627	1,606,786	1,594,366	1,061,525	704,010	502,035	12.72%	50.20%	111.44%
7 Hampton Roads	1,745,228	2,083,278	2,128,366	2,046,285	1,981,955	1,347,364	1,077,846	788,760	-11.94%	47.10%	70.82%
8 San Juan (FY)	1,673,745	1,684,883	1,695,134	1,729,294	1,727,389	2,333,788	1,539,000	711,474	-3.11%	-25.98%	228.02%
9 Seattle	1,584,596	1,704,492	1,973,505	1,987,360	2,087,929	1,488,020	1,479,076	1,171,091	-24.11%	40.32%	27.06%
10 Tacoma	1,545,853	1,861,352	1,924,934	2,067,186	2,066,447	1,376,379	1,092,087	937,691	-25.19%	50.14%	46.78%
11 Charleston	1,181,353	1,635,534	1,754,376	1,968,474	1,986,586	1,632,747	1,023,903	801,105	-40.53%	21.67%	103.81%
12 Honolulu (FY)	1,049,420	1,124,388	1,125,382	1,113,789	1,077,468	461,102	805,036	399,117	-2.60%	133.67%	15.53%
13 Miami (FY)	807,069	828,349	884,945	976,514	1,054,462	868,178	656,175	373,851	-23.46%	21.46%	132.23%
14 Port Everglades (FY)	796,160	985,095	948,680	864,030	797,238	676,760	632,789	256,327	-0.14%	17.80%	164.02%
15 Jacksonville (a) (FY)	754,352	697,494	710,073	768,239	777,318	708,028	529,547	154,491	-2.95%	9.79%	358.30%
16 Baltimore	525,296	612,877	610,466	627,947	602,475	508,320	534,556	474,301	-12.81%	18.52%	7.17%
17 Anchorage	343,278	544,315	504,844	485,760	516,367	432,296	345,865	136,279	-33.52%	19.45%	217.21%
18 Wilmington(DE)	259,964	267,684	284,352	262,856	250,507	192,091	156,940	91,623	3.78%	30.41%	109.65%
19 New Orleans (a)	229,067	235,324	250,649	175,957	200,766	278,932	198,424	157,037	14.10%	-28.02%	77.62%
20 Wilmington(NC)	225,176	196,040	191,070	177,634	148,784	105,110	104,038	92,720	51.34%	41.55%	13.36%
21 Philadelphia	222,900	255,994	253,492	247,211	204,912	198,680	107,094	65,309	8.78%	3.14%	204.22%

North Carolina is home to two seaports. The larger is at Wilmington, the smaller at Morehead City. A new, larger, container port has been proposed for Southport. Those development plans have been shelved.[75] According to recent data, the existing ports have been ranked as the 45th and 65th largest ports by tonnage in the U.S., respectively. Wilmington ranks 36th, 44th, and 45th in terms of export, import, and total value. Morehead City, the smaller of the two, ranks 53rd, 64th, and 64 on the same yardsticks. During the second half of the last decade, Wilmington container traffic grew more quickly than the U.S. port average.

We compare Wilmington's traffic to that in other U.S. ports in order to put the port traffic in national perspective. Wilmington processes approximately 1/50th the number of TEUs as Los Angeles/Long Beach, 1/20th the number of the Port of New York and New Jersey, 1/10th as many as Savannah, more than 1/8th as many as Hampton Roads, and 1/5th the number of Charleston. Just as distance to major markets and through routes helps explain the relatively late development of the Carolina coast, those same factors help explain the relatively small size of the state's ports. Geography and operational costs figure prominently in logistics siting decisions.

Compared to neighboring ports, Wilmington is relatively remote from concentrated centers of cargo demand. The Virginia ports are less than 200 miles from the large Washington DC market with significant areas of demand, such as Richmond, even closer. Savannah is 250 miles from Atlanta which is also a strong market. At 250 miles, Charleston is somewhat more distant from Atlanta but is closer to the industrial markets of the South Carolina Piedmont and just over 200 miles from Charlotte. Wilmington is only marginally closer to Charlotte and less well connected. Wilmington is more distant than the neighboring ports to the large Atlanta markets and those of the Northeast. Savannah, Charleston, and the Virginia ports each have rail service from both Norfolk Southern and CSX. Wilmington is not as well served.

[75] [need Ports Authority cites]

Table 2-13: North Carolina Port Throughput

Wilmington						Morehead City					Total			
Ten Year Tonnage Trend														
Year	Breakbulk	Container	Bulk	Total	TEU's	Breakbulk	Container	Bulk	Total	TEU's	Breakbulk	Container	Bulk	Total
2010	207,335	1,917,237	1,304,755	3,429,237	250,048	198,965	0	1,569,747	1,768,712	0	406,300	1,917,237	2,874,502	5,197,949
2009	413,446	1,338,436	1,322,963	3,074,844	194,608	167,454	0	1,725,432	1,892,886	0	580,900	1,338,436	3,048,395	4,967,730
2008	701,993	1,404,401	1,361,815	3,468,209	204,896	231,072	0	1,652,863	1,883,935	0	933,065	1,404,401	3,014,678	5,352,144
2007	897,776	1,174,335	1,368,550	3,440,661	173,111	276,128	0	1,862,213	2,138,441	0	1,173,904	1,174,335	3,230,763	5,579,102
2006	1,235,331	955,370	1,270,589	3,461,290	166,625	375,998	0	1,922,386	2,298,384	0	1,611,329	955,370	3,192,975	5,759,674
2005	1,271,417	781,046	951,601	3,004,064	133,723	315,440	0	2,115,309	2,430,749	0	1,586,857	781,046	3,066,910	5,434,813
2004	1,054,214	624,170	648,381	2,326,765	96,077	214,948	0	2,000,643	2,215,591	0	1,269,162	624,170	2,649,024	4,542,356
2003	976,082	613,923	630,799	2,220,804	99,677	243,574	0	1,296,618	1,540,692	0	1,219,656	613,923	1,927,417	3,761,496
2002	1,001,728	628,800	490,929	2,121,457	91,784	213,583	0	1,294,005	1,507,588	0	1,215,311	628,800	1,784,934	3,629,045
2001	844,052	600,014	768,376	2,212,442	96,380	240,203	0	2,516,973	2,757,176	0	1,084,255	600,014	3,285,349	4,969,618

10 – Year Vessel Trend						
Fiscal						
Year	Ships	Barges	Ships	Barges	Ships	Barges
2010	442	0	122	465	564	465
2009	362	0	118	415	480	415
2008	339	0	124	414	463	414
2007	381	0	153	436	534	436
2006	429	9	164	411	593	420
2005	362	14	156	348	518	362
2004	328	48	168	250	496	298
2003	320	122	153	191	473	313
2002	341	100	132	209	473	309
2001	364	100	177	521	541	621

Because of its presence in the Eastern Region, we focus on the port at Morehead City. Most imports coming through the port are from Mexico, Venezuela, and Indonesia and most of the exports it handles are to India, Brazil, and China. Table 2-13 shows the ten-year trend in traffic. Total tonnage fluctuates but appears to be on a downward trend. The table also shows trends the number of ships and barges visiting the port. Ship movements also appear to be on a gradual downward trend with an average of approximately 120 ships calling in the last several years. Barge movements declined from a high of 740 in 1997 to a low of 191 in 2003. After 2003 barge movements started increasing again to over 450 in the 2010 fiscal year. Morehead City Port handles about 1.17 barges and 0.328 ships per day.

2.3.4 North Carolina Airports

Aside from 80,000 miles of state-owned roadways (nearly 15,000 of which are primary roads), 13,578 state-maintained bridges, and nearly 3,700 miles of track (317 miles of the railroad is owned by the state) which carry 60 freight and 8 passenger lines serving twelve North Carolina cities, North Carolina is home to some 300 airports. Seventy-two of those are publicly-owned components of the National Plan of Integrated Airport Systems (NPIAS).[76] Figure 2-20 provides a state-wide overview. Nine of those airports have regularly scheduled passenger service: Charlotte-Douglas, Raleigh-Durham, Piedmont Triad, Wilmington International, Asheville Regional, Fayetteville Regional, Albert J. Ellis (Jacksonville/Camp Lejeune), Coastal Carolina (New Bern/Morehead/Beaufort), and Pitt-Greenville. The general aviation airports have been divided three groups according to local population size and rate of growth, local average annual income, tourist revenues, and potential airport function. There are 16 regional business airports (red), 27 community airports with the capability of handling business aircraft (green), 17 small community rural airports (blue), and three National Park Service airports providing access to the Outer Banks.[77] The Department of Aviation has established a set of ranked requirements for each set of airports and has instituted a program of financing airport improvements according to priorities set by the state.

[76] NCDOT, Division of Aviation (2006) "North Carolina General Aviation Development Plan," October.
[77] Richard Wallis (n.d.) North Carolina – General Assembly Global Engagement Committee: North Carolina Aviation .

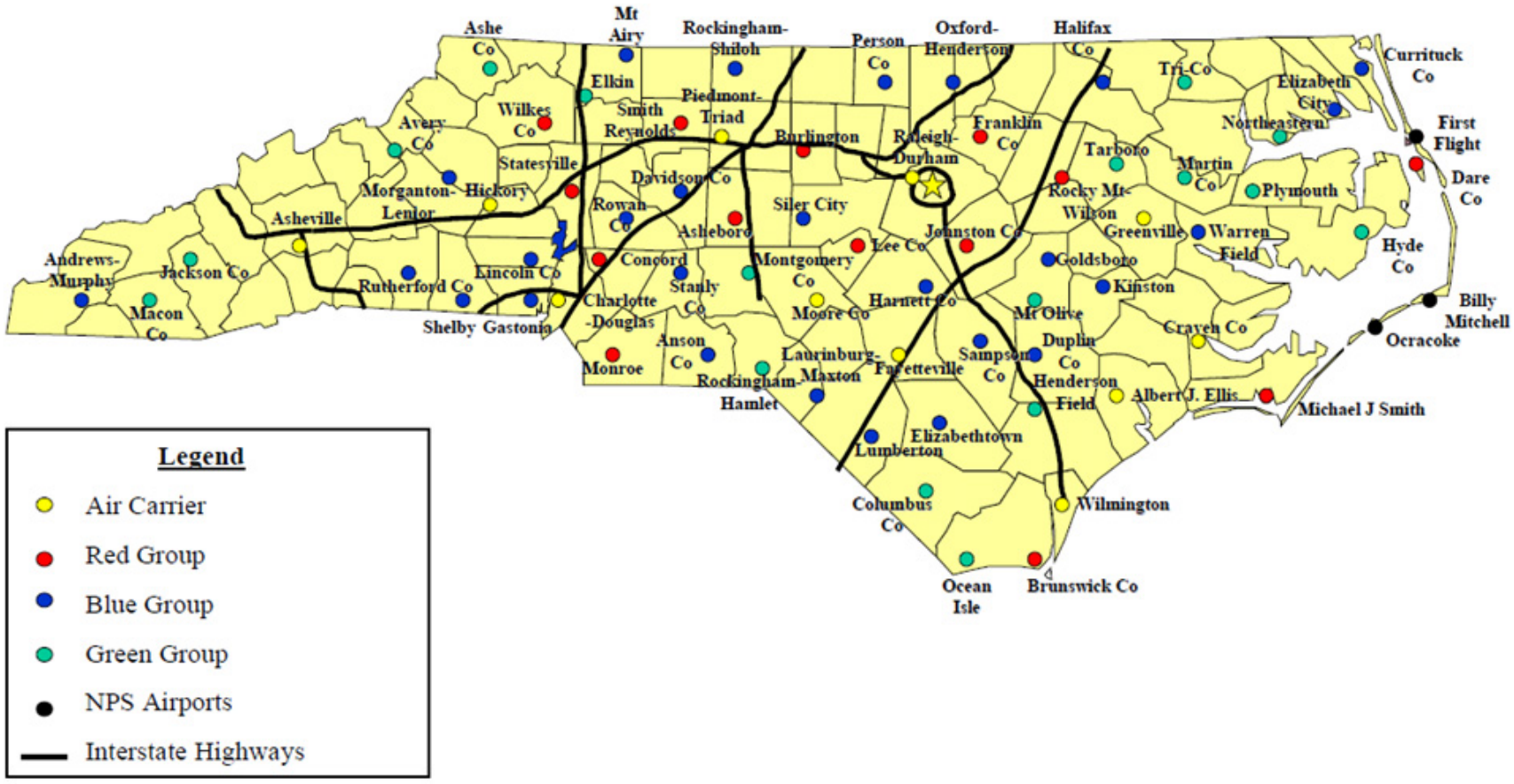


Figure 2-20: North Carolina NPIAS Airports

As seen in Table 2-14, the 75 North Carolina NPIAS public airports represent 103 runways, the key infrastructural component. Eighteen of those runways are over 7,000 feet, the critical length specified for this report. Half are over 5,000 feet long. An eight-passenger Gulfstream 650 can land and take-off in 6,000 feet. A Cessna Citation needs 5,200 feet. A five-passenger HondaJet requires just over 3,000 feet. Single engine propeller aircraft require less space. A 70-passenger Bombardier Q400 Dash 8 turboprop regional airliner needs less than 5,000 feet. A large number of airports in this state are able to service business jets and larger aircraft.

Table 2-14: North Carolina Runways

	City	County	Facility Name	Location ID	Runway ID	Runway Length	Runway Width
1	AHOSKIE	HERTFORD	TRI-COUNTY	ASJ	'01/19	4502	75
2	ALBEMARLE	STANLY	STANLY COUNTY	VUJ	'04R/22L	5500	100
					'04L/22R	3500	75
3	ANDREWS	CHEROKEE	WESTERN CAROLINA RGNL	RHP	'08/26	5500	100
4	ASHEBORO	RANDOLPH	ASHEBORO RGNL	HBI	'03/21	5501	100
5	ASHEVILLE	BUNCOMBE	ASHEVILLE RGNL	AVL	'16/34	8001	150
6	BEAUFORT	CARTERET	MICHAEL J. SMITH FIELD	MRH	'08/26	4249	100
					'03/21	4191	150
					'14/32	4001	100
7	BURLINGTON	ALAMANCE	BURLINGTON-ALAMANCE RGNL	BUY	'06/24	4999	99
8	CHAPEL HILL	ORANGE	HORACE WILLIAMS	IGX	'09/27	4005	75
9	CHARLOTTE	MECKLENBURG	CHARLOTTE/DOUGLAS INTL	CLT	'18C/36C	10000	150
					'18R/36L	9000	150
					'18L/36R	8676	150
					'05/23	7502	150
10	CLINTON	SAMPSON	CLINTON-SAMPSON COUNTY	CTZ	'06/24	5000	75
11	CONCORD	CABARRUS	CONCORD RGNL	JQF	'02/20	7400	100
12	CURRITUCK	CURRITUCK	CURRITUCK COUNTY RGNL	ONX	'05/23	5500	150
13	EDENTON	CHOWAN	NORTHEASTERN RGNL	EDE	'01/19	6000	100
14	ELIZABETH CITY	PASQUOTANK	ELIZABETH CITY CG AIR STATION/RGNL	ECG	'10/28	7219	150
					'01/19	4518	150
15	ELIZABETHTOWN	BLADEN	CURTIS L BROWN JR FIELD	EYF	'15/33	4998	75
16	ELKIN	SURRY	ELKIN MUNI	ZEF	.		
17	ENGELHARD	HYDE	HYDE COUNTY	7W6	'11/29	4700	100
18	ERWIN	HARNETT	HARNETT RGNL JETPORT	HRJ	'05/23	5000	75
19	FAYETTEVILLE	CUMBERLAND	FAYETTEVILLE RGNL/GRANNIS FIELD	FAY	'04/22	7709	150
					'10/28	4801	150
20	FRANKLIN	MACON	MACON COUNTY	1A5	'07/25	4400	75
21	GASTONIA	GASTON	GASTONIA MUNI	AKH	'03/21	3770	100
22	GOLDSBORO	WAYNE	GOLDSBORO-WAYNE MUNI	GWW	'05/23	5499	99
23	GREENSBORO	GUILFORD	PIEDMONT TRIAD INTL	GSO	'05R/23L	10001	150
					'05L/23R	9000	150
					'14/32	6380	150
24	GREENVILLE	PITT	PITT-GREENVILLE	PGV	'02/20	6505	150
					'08/26	4997	150
					'15/33	2687	150
25	HATTERAS	DARE	BILLY MITCHELL	HSE	'07/25	3000	75
26	HICKORY	CATAWBA	HICKORY RGNL	HKY	'06/24	6400	150
					'01/19	4400	150
27	JACKSONVILLE	ONSLOW	ALBERT J ELLIS	OAJ	'05/23	7100	150
28	JEFFERSON	ASHE	ASHE COUNTY	GEV	'10/28	4293	75
29	KENANSVILLE	DUPLIN	DUPLIN CO	DPL	'05/23	6002	75
30	KILL DEVIL HILLS	DARE	FIRST FLIGHT	FFA	.		
31	KINSTON	LENOIR	KINSTON RGNL JETPORT AT STALLINGS FLD	ISO	'05/23	11500	150
32	LEXINGTON	DAVIDSON	DAVIDSON COUNTY	EXX	'06/24	5004	99
33	LINCOLNTON	LINCOLN	LINCOLNTON-LINCOLN COUNTY RGNL	IPJ	'05/23	5500	100
34	LOUISBURG	FRANKLIN	TRIANGLE NORTH EXECUTIVE	LHZ	'05/23	5498	100
35	LUMBERTON	ROBESON	LUMBERTON MUNI	LBT	'05/23	5502	150
					'13/31	5003	150
36	MANTEO	DARE	DARE COUNTY RGNL	MQI	'05/23	4305	100
					'17/35	3301	73
37	MAXTON	SCOTLAND	LAURINBURG-MAXTON	MEB	'05/23	6503	150
					'13/31	3753	150

Table 2-14: North Carolina Runways (continued)

38	MONROE	UNION	CHARLOTTE-MONROE EXECUTIVE	EQY	'05/23	5500	100
39	MORGANTON	CALDWELL	FOOTHILLS REGIONAL	MRN	'03/21	5500	75
40	MOUNT AIRY	SURRY	MOUNT AIRY/SURRY COUNTY	MWK	'18/36	4301	75
41	MOUNT OLIVE	WAYNE	MOUNT OLIVE MUNI	W40	'05/23	5255	75
42	NEW BERN	CRAVEN	COASTAL CAROLINA REGIONAL	EWN	'04/22	6004	150
					'14/32	4000	150
43	NORTH WILKESBORO	WILKES	WILKES COUNTY	UKF	'01/19	6200	100
44	OAK ISLAND	BRUNSWICK	CAPE FEAR RGNL JETPORT/HOWIE FRANKLIN FLD	SUT	'05/23	5505	100
45	OCEAN ISLE BEACH	BRUNSWICK	ODELL WILLIAMSON MUNI	60J	'06/24	4000	75
46	OCRACOKE	HYDE	OCRACOKE ISLAND	W95	'06/24	2999	60
					'H1	100	100
47	OXFORD	GRANVILLE	HENDERSON-OXFORD	HNZ	'06/24	5002	97
48	PINEHURST/SOUTHER	MOORE	MOORE COUNTY	SOP	'05/23	5503	150
49	PLYMOUTH	WASHINGTON	PLYMOUTH MUNI	PMZ	'03/21	5500	75
50	RALEIGH/DURHAM	WAKE	RALEIGH-DURHAM INTL	RDU	'05L/23R	10000	150
					'05R/23L	7500	150
					'14/32	3570	100
51	REIDSVILLE	ROCKINGHAM	ROCKINGHAM COUNTY NC SHILOH	SIF	'13/31	5199	100
52	ROANOKE RAPIDS	HALIFAX	HALIFAX COUNTY	RZZ	'05/23	4006	75
					'16/34	2100	150
53	ROANOKE RAPIDS				'02/20	5500	100
54	ROCKINGHAM	RICHMOND	RICHMOND COUNTY	RCZ	'14/32	5000	100
					'04/22	3009	500
55	ROCKY MOUNT	NASH	ROCKY MOUNT-WILSON RGNL	RWI	'04/22	7100	150
56	ROXBORO	PERSON	PERSON COUNTY	TDF	'06/24	6005	100
57	RUTHERFORDTON	RUTHERFORD	RUTHERFORD CO - MARCHMAN FIELD	FQD	'01/19	5000	100
58	SALISBURY	ROWAN	ROWAN COUNTY	RUQ	'02/20	5501	100
59	SANFORD	LEE	RALEIGH EXEC JETPORT AT SANFORD-LEE COUNTY	TTA			
60	SHELBY	CLEVELAND	SHELBY-CLEVELAND COUNTY RGNL	EHO	'05/23	5002	100
61	SILER CITY	CHATHAM	SILER CITY MUNI	5W8	'04/22	5000	75
62	SMITHFIELD	JOHNSTON	JOHNSTON COUNTY	JNX	'03/21	5500	100
63	SPRUCE PINE	AVERY	AVERY COUNTY/MORRISON FIELD/	7A8	'17/35	3000	60
64	STAR	MONTGOMERY	MONTGOMERY COUNTY	43A	'03/21	4001	75
65	STATESVILLE	IREDELL	STATESVILLE RGNL	SVH	'10/28	7006	100
66	SYLVA	JACKSON	JACKSON COUNTY	24A	'15/33	3003	50
67	TARBORO	EDGECOMBE	TARBORO-EDGECOMBE	ETC	'09/27	4000	60
68	WADESBORO	ANSON	ANSON COUNTY - JEFF CLOUD FIELD	AFP	'16/34	5498	100
69	WALLACE	PENDER	HENDERSON FIELD	ACZ	'09/27	3998	75
70	WASHINGTON	BEAUFORT	WARREN FIELD	OCW	'05/23	5000	100
					'17/35	5000	150
					'11/29	4000	150
71	WHITEVILLE	COLUMBUS	COLUMBUS COUNTY MUNI	CPC	'06/24	5500	75
72	WILLIAMSTON	MARTIN	MARTIN COUNTY	MCZ	'03/21	5000	75
73	WILMINGTON	NEW HANOVER	WILMINGTON INTL	ILM	'06/24	8016	150
					'17/35	7004	150
74	WILSON	WILSON	WILSON INDUSTRIAL AIR CENTER	W03	'03/21	4500	150
					'09/27	4500	150
					'15/33	4499	150
75	WINSTON SALEM	FORSYTH	SMITH REYNOLDS	INT	'15/33	6655	150
					'04/22	3938	150

Table 2-15 shows that North Carolina makes use of those airports. Eight airports support significant commercial passenger operations; 13 offer cargo service. Fifty-nine airports log over 10,000 operations (takeoffs and landings) per year. Twenty nine support over 10,000 itinerant general aviation operations per year, suggesting heavy business use. (We are assuming most pleasure flying begins and ends at the based airport. In tourist areas, a large proportion of itinerant general aviation is likely for pleasure.) The importance of the military can be seen in that 33 support over 1,000 military operations in a year. Many of these may be simple touch-and-go landings for training but the military does use several airports for logistic purposes.

Table 2-15: Aircraft Operations at North Carolina Airports

Obs	City	County	Facility Name	Location ID	Owner	Distance From CBD	Direction From CBD	Airport Land Area	Single Engine GA	Multi-Engine GA	Jet Engine GA	Military Operational	Operations Commercial	Operations Air Taxi	Operations G A Local	Operations GA Itin	Operations Military	Total Operations	Proportion GA Itinerant
1	AHOSKIE	HERTFORD	TRI-COUNTY	ASJ	TRI-COUNTY AIRPORT AUTH.	9	W	250	8	0	1	.	.	200	6,000	6,800	100	13,100	53.1%
2	ALBEMARLE	STANLY	STANLY COUNTY	VUJ	STANLY COUNTY	4	NE	800	16	2	0	.	.	-	11,506	1,974	6,350	19,830	14.6%
3	ANDREWS	CHEROKEE	WESTERN CAROLINA RGNL	RHP	CHEROKEE COUNTY	2	W	206	47	20	0	.	.	1,000	14,000	5,000	500	20,500	26.3%
4	ASHEBORO	RANDOLPH	ASHEBORO RGNL	HBI	CITY OF ASHEBORO	6	SW	454	35	9	1	.	.	-	8,000	7,000	500	15,500	46.7%
5	ASHEVILLE	BUNCOMBE	ASHEVILLE RGNL	AVL	CITY OF ASHEVILLE	9	S	900	80	28	10	.	588	18,032	16,776	28,275	4,117	67,788	62.8%
6	BEAUFORT	CARTERET	MICHAEL J. SMITH FIELD	MRH	BEAUFORT-MOREHEAD ARPT AUTH	1	N	412	52	9	1	.	.	3,728	33,549	3,728	2,795	43,800	10.0%
7	BURLINGTON	ALAMANCE	BURLINGTON-ALAMANCE RGNL	BUY	BURLINGTON-ALAMANCE AIRPORT AUTHORI	3	SW	500	99	18	5	.	.	1,000	26,000	23,000	450	50,450	46.9%
8	CHAPEL HILL	ORANGE	HORACE WILLIAMS	IGX	UNIVERSITY OF N CAROLINA	1	N	420	20	7	.	.	.	100	4,000	1,500	100	5,700	27.3%
9	CHARLOTTE	MECKLENBURG	CHARLOTTE/DOUGLAS INTL	CLT	CITY OF CHARLOTTE	4	W	5000	12	9	55	10	320,462	179,048	.	24,170	1,804	525,484	100.0%
10	CLINTON	SAMPSON	CLINTON-SAMPSON COUNTY	CTZ	SAMPSON COUNTY/CITY OF CLINTON	2	SW	114	24	1	2	.	.	100	4,000	500	600	5,200	11.1%
11	CONCORD	CABARRUS	CONCORD RGNL	JQF	CITY OF CONCORD	7	W	750	110	35	28	.	259	9,919	13,723	44,282	359	68,542	76.3%
12	CURRITUCK	CURRITUCK	CURRITUCK COUNTY RGNL	ONX	COUNTY OF CURRITUCK	4	S	250	23	4	0	.	.	500	3,500	14,000	7,000	25,000	80.0%
13	EDENTON	CHOWAN	NORTHEASTERN RGNL	EDE	TOWN OF EDENTON	3	SE	734	30	3	0	.	.	500	6,000	7,000	300	13,800	53.8%
14	ELIZABETH CITY	PASQUOTANK	ELIZABETH CITY CG AIR STATION/RGNL	ECG	USCG SUPPORT CENTER	3	SE	850	24	4	0	13	.	620	6,500	9,000	44,000	60,120	58.1%
15	ELIZABETHTOWN	BLADEN	CURTIS L BROWN JR FIELD	EYF	TOWN OF ELIZABETHTOWN	2	SE	212	10	2	0	.	.	.	5,000	9,000	500	14,500	64.3%
16	ELKIN	SURRY	ELKIN MUNI	ZEF	TOWN OF ELKIN	3	NE	91	15	2	0	.	.	.	7,000	6,000	350	13,350	46.2%
17	ENGELHARD	HYDE	HYDE COUNTY	7W6	HYDE COUNTY	7	N	387	0	0	0	.	.	50	1,000	2,500	500	4,050	71.4%
18	ERWIN	HARNETT	HARNETT RGNL JETPORT	HRJ	HARNETT COUNTY	4	NW	152	32	5	2	.	.	300	30,000	14,000	7,000	51,300	31.8%
19	FAYETTEVILLE	CUMBERLAND	FAYETTEVILLE RGNL/GRANNIS FIELD	FAY	CITY OF FAYETTEVILLE	3	S	1308	39	10	6	.	8,871	9,412	1,415	13,269	5,855	38,822	90.4%
20	FRANKLIN	MACON	MACON COUNTY	1A5	MACON COUNTY AIRPORT AUTHORITY	3	NW	90	24	5	0	.	.	500	4,000	4,000	500	9,000	50.0%
21	GASTONIA	GASTON	GASTONIA MUNI	AKH	CITY OF GASTONIA	4	S	280	28	4	2	.	.	1,000	40,000	9,000	40	50,040	18.4%
22	GOLDSBORO	WAYNE	GOLDSBORO-WAYNE MUNI	GWW	CITY OF GOLDSBORO & WAYNE CO	3	N	249	34	4	2	.	.	2,000	6,500	6,700	1,000	16,200	50.8%
23	GREENSBORO	GUILFORD	PIEDMONT TRIAD INTL	GSO	PIEDMONT TRIAD ARPT AUTH.	7	W	2800	56	28	12	.	14,065	36,220	4,528	27,967	1,501	84,281	86.1%
24	GREENVILLE	PITT	PITT-GREENVILLE	PGV	PITT CO & GREENVILLE CITY	2	N	872	46	6	6	.	2,719	12,500	16,500	16,000	500	48,219	49.2%
25	HATTERAS	DARE	BILLY MITCHELL	HSE	NATIONAL PARK SERVICE	4	E	100	0	0	0	.	.	100	4,000	5,000	100	9,200	55.6%
26	HICKORY	CATAWBA	HICKORY RGNL	HKY	CITY OF HICKORY	3	W	739	45	18	7	.	-	.	12,280	27,766	458	40,504	69.3%
27	JACKSONVILLE	ONSLOW	ALBERT J ELLIS	OAJ	ONSLOW COUNTY	10	NW	675	17	4	.	.	7,920	2,200	11,000	8,800	6,900	36,820	44.4%
28	JEFFERSON	ASHE	ASHE COUNTY	GEV	ASHE COUNTY	3	E	106	22	0	0	.	.	.	3,900	6,000	500	10,400	60.6%
29	KENANSVILLE	DUPLIN	DUPLIN CO	DPL	DUPLIN COUNTY	2	NW	250	12	2	3	.	.	-	5,500	9,000	3,000	17,500	62.1%
30	KILL DEVIL HILLS	DARE	FIRST FLIGHT	FFA	NATIONAL PARK SERVICE	1	W	40	0	0	0	.	.	1,000	23,000	14,000	120	38,120	37.8%
31	KINSTON	LENOIR	KINSTON RGNL JETPORT AT STALLINGS FLD	ISO	NORTH CAROLINA	3	NW	1255	28	6	10	.	257	1,192	4,812	9,658	13,433	29,352	66.7%
32	LEXINGTON	DAVIDSON	DAVIDSON COUNTY	EXX	DAVIDSON COUNTY ARPT AUTH	3	SW	75	44	11	2	.	.	500	5,000	3,000	500	9,000	37.5%
33	LINCOLNTON	LINCOLN	LINCOLNTON-LINCOLN COUNTY RGNL	IPJ	CITY OF LINCOLNTON & LINCOLN	5	E	453	65	7	0	.	.	-	15,300	17,900	900	34,100	53.9%
34	LOUISBURG	FRANKLIN	TRIANGLE NORTH EXECUTIVE	LHZ	FRANKLIN COUNTY	5	SW	388	58	9	1	.	.	-	42,300	18,000	2,500	62,800	29.9%
35	LUMBERTON	ROBESON	LUMBERTON MUNI	LBT	CITY OF LUMBERTON	3	W	485	36	3	0	.	.	1,000	10,000	12,000	2,000	25,000	54.5%
36	MANTEO	DARE	DARE COUNTY RGNL	MQI	DARE COUNTY	1	NW	340	41	5	0	.	.	6,000	6,000	9,000	500	21,500	60.0%
37	MAXTON	SCOTLAND	LAURINBURG-MAXTON	MEB	TOWN OF LAURINBURG & MAXTON	3	N	4290	13	0	0	.	.	5,000	8,000	10,000	20,000	43,000	55.6%
38	MONROE	UNION	CHARLOTTE-MONROE EXECUTIVE	EQY	CITY OF MONROE	5	NW	206	71	10	3	.	.	4,100	30,500	20,500	1,000	56,100	40.2%
39	MORGANTON	CALDWELL	FOOTHILLS REGIONAL	MRN	FOOTHILLS REGIONAL AIRPORT AUTHORIT	6	NE	1170	56	5	1	.	.	1,000	9,000	6,500	500	17,000	41.9%
40	MOUNT AIRY	SURRY	MOUNT AIRY/SURRY COUNTY	MWK	CITY OF MOUNT AIRY & SURRY COUNTY	3	SE	147	33	3	3	.	.	1,000	9,000	7,000	200	17,200	43.8%
41	MOUNT OLIVE	WAYNE	MOUNT OLIVE MUNI	W40	TOWN OF MT OLIVE AND WAYNE COUNTY	3	NE	108	10	1	0	.	.	.	10,000	4,500	50	14,550	31.0%
42	NEW BERN	CRAVEN	COASTAL CAROLINA REGIONAL	EWN	CRAVEN COUNTY	3	SE	785	75	2	2	.	4,000	4,642	12,078	817	21,536	43,073	6.3%
43	NORTH WILKESBORO	WILKES	WILKES COUNTY	UKF	WILKES COUNTY	4	NE	259	21	3	6	.	.	2,000	4,000	2,000	100	8,100	33.3%
44	OAK ISLAND	BRUNSWICK	CAPE FEAR RGNL JETPORT/HOWIE FRANKLIN FLD	SUT	BRUNSWICK CO ARPT COMMISSION	1	NE	185	47	2	0	.	.	-	30,000	44,000	3,000	77,000	59.5%
45	OCEAN ISLE BEACH	BRUNSWICK	ODELL WILLIAMSON MUNI	60J	TOWN OF OCEAN ISLE BEACH	1	N	30	10	0	0	.	.	.	10,000	8,000	.	18,000	44.4%
46	OCRACOKE	HYDE	OCRACOKE ISLAND	W95	NATIONAL PARK SERVICE	1	E	50	0	0	0	.	.	100	3,000	3,000	10	6,110	50.0%
47	OXFORD	GRANVILLE	HENDERSON-OXFORD	HNZ	OXFORD-HENDERSON ARPT AUTH	4	NE	220	38	7	0	.	.	120	10,800	13,200	1,200	25,320	55.0%
48	PINEHURST/SOUTHER	MOORE	MOORE COUNTY	SOP	COUNTY OF MOORE	3	N	500	60	7	2	.	.	854	2,300	5,300	100	8,554	69.7%
49	PLYMOUTH	WASHINGTON	PLYMOUTH MUNI	PMZ	WASHINGTON COUNTY	2	S	390	10	2	0	.	.	275	6,000	3,000	2,000	11,275	33.3%
50	RALEIGH/DURHAM	WAKE	RALEIGH-DURHAM INTL	RDU	RALEIGH-DURHAM ARPT AUTH	9	NW	5000	104	37	40	17	45,793	44,290	18	26,120	2,646	118,867	99.9%
51	REIDSVILLE	ROCKINGHAM	ROCKINGHAM COUNTY NC SHILOH	SIF	ROCKINGHAM COUNTY	8	NW	220	45	6	0	.	.	-	15,000	9,000	100	24,100	37.5%
52	ROANOKE RAPIDS	HALIFAX	HALIFAX COUNTY	RZZ	CITY OF ROANOKE RAPIDS	3	SW	281	23	1	0	.	.	2,300	13,000	15,000	1,200	31,500	53.6%
53	ROANOKE RAPIDS	HALIFAX	HALIFAX-NORTHAMPTON RGNL	IXA	HALIFAX-NORTHAMPTON RGNL ARPT AUTH	8	S	797	17	1	.	.	.	.	1,200	1,400	300	2,900	53.8%
54	ROCKINGHAM	RICHMOND	RICHMOND COUNTY	RCZ	RICHMOND COUNTY	3	S	340	10	1	0	.	.	-	5,000	5,000	60	10,060	50.0%
55	ROCKY MOUNT	NASH	ROCKY MOUNT-WILSON RGNL	RWI	ROCKY MOUNT-WILSON ARPT AUTH	7	SW	364	10	4	1	.	112	1,276	8,521	19,302	621	29,832	69.4%
56	ROXBORO	PERSON	PERSON COUNTY	TDF	PERSON COUNTY	6	S	218	28	6	0	.	.	550	15,000	18,000	1,200	34,750	54.5%
57	RUTHERFORDTON	RUTHERFORD	RUTHERFORD CO - MARCHMAN FIELD	FQD	RUTHERFORD COUNTY ARPT AUTH	3	N	140	45	7	3	.	.	-	25,000	8,000	500	33,500	24.2%
58	SALISBURY	ROWAN	ROWAN COUNTY	RUQ	ROWAN COUNTY	3	SW	400	66	10	4	10	.	1,000	16,000	22,100	3,900	43,000	58.0%
59	SANFORD	LEE	RALEIGH EXEC JETPORT AT SANFORD-LEE COUNTY	TTA	SANFORD-LEE COUNTY RGNL ARPT AUTH	7	NE	700	94	12	4	.	.	2,000	48,000	12,000	1,000	63,000	20.0%
60	SHELBY	CLEVELAND	SHELBY-CLEVELAND COUNTY RGNL	EHO	CITY OF SHELBY	3	SW	225	27	4	0	.	.	-	10,000	8,000	200	18,200	44.4%
61	SILER CITY	CHATHAM	SILER CITY MUNI	5W8	TOWN OF SILER CITY	3	SW	92	19	5	0	.	.	.	4,000	16,500	1,000	21,500	80.5%
62	SMITHFIELD	JOHNSTON	JOHNSTON COUNTY	JNX	JOHNSTON CO ARPT AUTH	3	NW	463	82	9	3	.	.	-	40,350	32,000	1,000	73,350	44.2%
63	SPRUCE PINE	AVERY	AVERY COUNTY/MORRISON FIELD/	7A8	AVERY COUNTY ARPT AUTHORITY	4	NE	32	23	2	0	.	.	.	2,000	3,000	1,000	6,000	60.0%
64	STAR	MONTGOMERY	MONTGOMERY COUNTY	43A	MONTGOMERY COUNTY	0	NE	65	11	5	0	.	.	.	1,300	1,500	2,000	4,800	53.6%
65	STATESVILLE	IREDELL	STATESVILLE RGNL	SVH	CITY OF STATESVILLE	3	SW	382	28	13	26	.	.	1,000	19,000	16,000	200	36,200	45.7%
66	SYLVA	JACKSON	JACKSON COUNTY	24A	JACKSON CO ARPT AUTHORITY	3	SE	147	13	0	0	.	.	150	1,600	2,500	400	4,650	61.0%
67	TARBORO	EDGECOMBE	TARBORO-EDGECOMBE	ETC	TARBORO-EDGECOMBE ARPT AUTH	2	N	86	4	1	0	.	.	800	2,000	2,000	500	5,300	50.0%
68	WADESBORO	ANSON	ANSON COUNTY - JEFF CLOUD FIELD	AFP	ANSON COUNTY	3	N	286	20	2	0	.	.	-	2,500	4,000	200	6,700	61.5%
69	WALLACE	PENDER	HENDERSON FIELD	ACZ	TOWN OF WALLACE	1	SW	145	20	1	0	.	.	200	4,500	10,000	1,200	15,900	69.0%
70	WASHINGTON	BEAUFORT	WARREN FIELD	OCW	CITY OF WASHINGTON	0	NE	479	26	4	0	.	.	2,100	17,000	8,000	1,000	28,100	32.0%
71	WHITEVILLE	COLUMBUS	COLUMBUS COUNTY MUNI	CPC	COLUMBUS COUNTY	3	S	214	18	2	0	.	.	2,100	3,600	6,500	500	12,700	64.4%
72	WILLIAMSTON	MARTIN	MARTIN COUNTY	MCZ	COUNTY OF MARTIN	6	W	110	5	0	0	.	.	-	2,000	2,000	500	4,500	50.0%
73	WILMINGTON	NEW HANOVER	WILMINGTON INTL	ILM	NEW HANOVER COUNTY	3	NE	1800	82	41	10	.	6,317	17,016	5,155	27,351	5,561	61,400	84.1%
74	WILSON	WILSON	WILSON INDUSTRIAL AIR CENTER	W03	CITY OF WILSON	3	N	775	30	5	2	.	.	700	5,000	6,000	700	12,400	54.5%
75	WINSTON SALEM	FORSYTH	SMITH REYNOLDS	INT	FORSYTH COUNTY	3	NE	702	67	14	17	.	165	2,238	10,634	2,670	99	15,806	20.1%

Table 2-16 summarizes Bureau of Transportation Statistics information on passenger and cargo flows at each airport. As North Carolina's only passenger airline hub, Charlotte-Douglas accounts for approximately three-fourths of the passenger enplanements in the state. Charlotte-Douglas is notable for having the lowest per passenger cost of enplanement in the U.S., in part, because it has achieved a volume sufficient to allow its expensive capital investments to be effectively used. The busiest three airports, all in the Piedmont, account for the very large majority of passenger and cargo traffic. Other airports have important regional impacts, connecting travelers to regional destinations, acting as reliever cargo nodes, and anchoring businesses in particular locations. The Division of Aviation has estimated that of aviation's $11.81 billion overall economic impact on the North Carolina economy in 2006, $1.88 billion was a result of general aviation.

Table 2-16: North Carolina Air Passenger and Air Cargo Trends

Passengers handled by North Carolina Airports

	City Name	Code	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Charlotte, NC	CLT	15,253,842	16,506,432	17,768,482	16,472,592	19,606,073	20,025,380	20,922,204	21,585,873	21,383,201	19,721,819	21,692,479	21,294,054	21,978,769	23,345,532	24,310,443	28,720,367	30,072,881	33,615,542	35,016,664	34,944,896
2	Raleigh/Durham, NC	RDU	9,491,208	9,304,722	9,512,452	9,072,349	8,002,563	5,906,306	5,979,724	6,314,564	6,888,208	8,343,121	9,813,998	9,137,566	7,976,300	7,911,379	8,707,213	9,512,997	9,564,266	10,120,396	9,693,156	8,974,715
3	Greensboro/High Point, NC	GSO	2,036,930	1,863,887	1,837,343	2,108,171	4,454,879	3,722,491	2,544,895	2,109,597	2,474,904	2,530,425	2,430,528	2,238,879	2,162,038	2,580,386	2,617,325	2,628,961	2,180,036	2,186,515	2,116,027	1,725,466
4	Wilmington, NC	ILM	264,186	240,226	246,710	276,792	346,895	345,605	362,576	385,147	387,444	367,000	410,206	378,120	388,911	415,599	534,217	679,623	622,743	782,011	797,643	797,194
5	Asheville, NC	AVL	276,916	325,828	315,917	357,133	505,627	444,266	391,190	416,988	418,424	355,466	432,768	416,080	404,028	445,714	482,186	630,244	577,834	582,128	564,837	586,126
6	Fayetteville, NC	FAY	273,234	294,842	268,988	296,728	338,815	310,930	320,294	301,149	273,060	245,696	236,924	137,016	155,672	242,591	248,781	306,505	311,182	353,189	403,440	463,951
7	Jacksonville/Camp Lejeune, NC	OAJ	107,850	134,871	107,586	97,950	126,027	66,780	44,743	51,726	51,237	39,915			19,744	88,077	93,026	191,361	180,122	243,403	262,387	251,238
8	New Bern/Morehead/Beaufort, NC	EWN	3,486	12,257											37,176	134,177	110,376	190,078	171,505	209,953	224,234	227,588
9	Greenville, NC	PGV	4,762	21,947								131	395	240	19,215	68,681	58,276	97,612	88,843	94,061	104,191	117,570
10	Cabarrus, NC	JQF																	253	4,177	11,413	14,509
11	Cherry Point, NC	NKT		1,624	1,100	334	347	1,785	6,993	867	146	486	721	803	1,604	3,107	9,194	10,743	5,346	5,800	8,353	10,586
12	Kinston, NC	ISO	35,820	40,949	14,559	130			262				272	4	142	3,315	6,018	48,605	46,098	29,993	17,583	10,544
13	Fayetteville, NC	POB	150	280	665	104	1,441	1,302	3,680	876	27,308	1,252	4,287	105	686	3,820	6,970	4,488	5,587	3,605	5,518	7,556
14	Winston-Salem, NC	INT				64		30			184	21	219	0	2,170	2,486	6,358	2,243	1,580	2,146	3,583	5,150
15	Hickory, NC	HKY								51			0	0	0	532	106	22,795	464	94		156
16	So.Pines/Pinhrst/Aberdeen, NC	SOP																7	5,469	8,539		68
17	Wadesboro, NC	AFP																				14
18	Morganton, NC	MRN																		2		
19	Rocky Mount, NC	RWI													72	1,168	73	0	152	565		
20	Roxboro, NC	TDF																				
21	Elizabeth City, NC	ECG																	150			
22	Edenton, NC	EDE																			8	
23	Statesville, NC	SVH																				
24	Albemarle, NC	VUJ																			12	
			27,748,384	28,747,865	30,073,802	28,682,347	33,382,667	30,824,875	30,576,561	31,166,838	31,904,116	31,605,332	35,022,797	33,602,867	33,146,527	35,246,564	37,190,562	43,046,629	43,834,511	48,242,119	49,229,049	48,137,327

Cargo handled by North Carolina Airports

	City Name	Code	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Charlotte, NC	CLT	187,993,309	216,046,385	243,101,642	205,264,484	210,078,096	208,474,857	214,566,208	213,578,034	192,812,755	225,519,323	242,362,815	155,237,243	179,994,546	359,316,315	360,970,326	382,957,315	343,032,181	296,907,611	265,962,909	239,364,781
2	Raleigh/Durham, NC	RDU	81,466,620	79,140,333	88,091,992	84,617,033	81,922,327	57,537,181	51,693,791	51,833,413	49,091,633	49,030,343	53,795,233	38,968,421	78,050,518	223,030,236	233,928,394	224,111,345	228,894,032	225,426,539	210,028,354	183,788,408
3	Greensboro/High Point, NC	GSO	36,620,416	36,500,539	34,635,080	65,505,764	55,307,556	44,908,654	36,391,317	41,542,484	32,242,687	31,877,006	24,815,762	15,168,500	57,036,146	183,485,848	188,770,406	184,078,941	182,327,907	172,183,294	176,291,319	171,132,983
4	New Bern/Morehead/Beaufort, NC	EWN												2,994	875,598	3,588,217	3,836,257	3,875,235	4,167,018	4,124,550	4,117,404	4,257,430
5	Wilmington, NC	ILM	1,078,382	1,109,220	1,083,598	1,007,167	1,081,386	1,106,965	1,150,423	1,131,210	955,720	890,531	840,967	791,534	1,442,425	3,631,130	3,809,016	3,842,508	3,625,743	3,666,814	3,445,179	3,236,559
6	Cherry Point, NC	NKT		1,101,130					70,180			216,420			786,356		861,274	1,001,105	58,482	555,648	574,416	139,061
7	Asheville, NC	AVL	1,354,262	1,574,690	1,656,280	1,786,165	1,830,339	1,480,975	1,485,126	1,221,229	1,012,587	871,557	2,069,661	1,755,455	2,558,674	2,376,848	1,885,140	619,793	459,667	737,874	149,459	138,660
8	Rocky Mount, NC	RWI										1,023	1,142	48,341	3,932	13,530	2,155,593	180,897	1,047,923	1,849,613	158,715	134,949
9	Hickory, NC	HKY									46,967		27,862	7,783	2,782	2,532	28,614	20,760	49,695		40,630	81,039
10	Fayetteville, NC	FAY	1,476,756	1,583,545	2,108,222	2,545,298	2,344,636	2,298,327	1,940,150	1,834,896	1,371,496	773,705	623,499	286,153	93,111	306,892	117,590	150,400	98,499	109,371	216,304	46,609
11	Greenville, NC	PGV								301			462	13,897	19,505	84,837	68,664	115,840	63,918	75,701	40,649	34,349
12	Fayetteville, NC	POB						148,703	164,878		2,573	152,554	24,000	64,310	307,743	579,767	479,879	343,960	201,540	2,221,122	252,406	25,927
13	Kinston, NC	ISO	190,163	161,536	69,763							31,173			55,938	5,425	9,234	42,529	12,321	1	25,567	20,118
14	Jacksonville/Camp Lejeune, NC	OAJ	175,248	268,100	288,353	315,003	256,376	77,761	26,698	26,284	31,720	17,715			6,190	24,452	16,381	41,159	26,106	16,321	15,130	19,231
15	Morganton, NC	MRN														1,152	6,017	40,259	15,631	0	9,338	18,201
16	Roxboro, NC	TDF														19,676	158,324	54,314	45,440	11,093	16,037	9,480
17	Cabarrus, NC	JQF																7,000				
18	Winston-Salem, NC	INT				575							10,500			1,972	3,011	2,302				
19	So.Pines/Pinhrst/Aberdeen, NC	SOP													793,830	452	339		1	10		
20	Wadesboro, NC	AFP																				
21	Elizabeth City, NC	ECG																				
22	Edenton, NC	EDE																				
23	Statesville, NC	SVH															4,574	2,715	7,589			
24	Albemarle, NC	VUJ																				
			310,355,156	337,485,478	371,034,930	361,041,489	352,820,716	316,033,423	307,488,771	311,167,851	277,568,138	309,381,350	324,571,903	212,344,631	322,027,294	776,469,281	797,109,033	801,488,377	764,133,693	707,885,562	661,343,816	602,447,785

Despite the heavy use of the existing airports, there is modest indication of the need for additional capacity. Charlotte has recently completed a third parallel runway. Piedmont Triad International has also completed the construction of a major parallel runway. Several airports might attract some additional traffic, modest by state standards but possibly with far reaching consequences for the local economy, should runways be lengthened. Charlotte-Monroe Airport has been able to attract several manufacturers on the basis of proximity to Charlotte, a diverse work force, and a 5,500 foot runway. The level of demand may not imply a need for a major new central logistics hub, however.

2.4 *Eastern North Carolina Non-Transportation Infrastructure*

In Eastern North Carolina, infrastructure needs may outstrip infrastructure supply – and the region's ability to finance improvements.[78] In general, infrastructure adequacy has lagged in the East but over the past decade, accelerated spending has substantially reduced the gap. Some lags are likely to remain. Water and sewer in the Eastern Region, for example, tend to be provided by small systems which are relatively more expensive to operate than those available in other parts of the state. Utilities are expensive in some areas of the Eastern Region which may act as a brake on development. A lack of affordable housing may also have a negative impact. Some observers feel that while the new four-lane highways allow easy access between the Piedmont and the beach, long stretches of road in the interior of the region remain undeveloped. Here, we focus on three salient aspects of infrastructure: higher education resources, internet broadband access, and water supply.

2.4.1 Eastern Region Higher Education Resources

The Eastern Region is endowed with a strong system of post-secondary school education which is oriented towards supporting individual career development and regional economic development. The region's community colleges are perhaps the backbone of that system because they are most directly oriented towards those goals.

With 11 community colleges, the Eastern Region offers easy access to these educational resources. No person or business located in the Region is more than a 30-minute drive from one of the campuses. The following list highlights selected programs of special relevance to aeronautics and logistics.

- Coastal Carolina Community College (Onslow)
- Carteret Community College
- Craven Community College
  Aviation Systems Technology - Students enrolled in Craven Aviation Systems Technology program get hands-on training with a wide variety of military and civilian aircraft. They become familiar with a complete array of aircraft systems, from nose to tail. As they progress, they become eligible to test for Federal Aviation Administration

[78] Leslie Boney III (2001) "Does Eastern North Carolina Have the Infrastructure Needed for Growth?" *North Carolina Insight* 42-80, December.

(FAA) certifications in both Airframe and Powerplant (A&P). The A&P certification can be a very valuable credential to have when seeking employment in military or civilian aviation.

- Edgecombe Community College
  A certificate program in logistics is currently being planned.
- James Sprunt Community College (Duplin)
- Lenoir Community College
  Aerospace Manufacturing and Repair - These new programs are designed to serve the growing aerospace industry in Eastern North Carolina, and will include curriculum degree & diploma programs in aerospace manufacturing and repair as well as customized industry programs for workforce readiness training opportunities. Lenoir Community College is proud to be taking a leading role in developing aerospace manufacturing training to support pathways for employment related to careers such as aerospace assembly technicians, composite mechanics, logistics and material handling, manufacturing process support, quality assurance, automated machine operators and programmers, and other support positions. Recent examples of aerospace industry growth include Spirit AeroSystems' decision to locate a new composites manufacturing facility at the North Carolina Global TransPark, and continued growth of aerospace manufacturing and repair with existing employers such as FRC East at the Marine Corps Air Station Cherry Point and Mountain Air Cargo.

- Nash Community College
  Certificate in Warehousing and Logistics. This certificate prepares the workforce for future needs around issues of logistics and transportation.
- Pamlico Community College
- Pitt Community College
  The Industrial Systems Technology curriculum is designed to prepare or upgrade individuals to service, maintain, repair, or install equipment for a wide range of industries. Instruction includes theory and skill training needed for inspecting, test, troubleshooting, and diagnosing industrial equipment and physical facilities.
- Wayne Community College
  The faculty of the aviation program is committed to providing education excellence in the field of Aviation Systems Technology. The AST degree program provides an essential first step towards a career as an aviation mechanic.
- Wilson Community College

Five colleges and universities complement the offerings of community colleges.

- East Carolina University, located in Greenville, is the premier educational and research institution serving the Eastern Region. It is a Doctoral II research-intensive university and an important partner in the economic development of the Region.
- Barton College, located in Wilson, is a private 4-year liberal arts institutional and academic community of approximately 1,300 students and 200 faculty and staff. Nationally recognized for its programs in education, deaf education, nursing and social work and its championship men's athletic teams

- Mount Olive College is a private liberal arts college offering programs designed to meet the needs of a diverse student population. Mount Olive College enrolls more than 3,300 students annually at its seven locations, including Mount Olive, Goldsboro, Jacksonville, New Bern, and Washington in the Eastern Region.
- North Carolina Wesleyan College located in Rocky Mount NC, enrolls about 2,200 total with 900 students in the traditional program and 1,300 students enrolled in the evening college program.

In association with other universities in North Carolina, the 2+2 Engineering degree program has been designed for those undergraduates who are able to attend their first two years of study at another location. After finishing the first two years of matriculation requirements for the engineering degree, students then finish their studies at NC State University, NC A&T, or UNC-Charlotte. In addition, Embry-Riddle Aeronautical University offers undergraduate and graduate courses in several aeronautical fields at its Seymour Johnson AFB campus via on-site classroom instruction and distance learning. Economic development personnel throughout the region have noted the readiness of all the campuses of the UNC system to support industrial recruitment and economic development efforts.

2.4.2 Broadband internet service

Internet service is essential for moving the masses of detailed, real-time information necessary for the coordination of today's supply chains. MCNC has embarked on an ambitious program of extending "middle mile" internet connections to many of North Carolina's rural counties. "Middle mile" service links local cable and telecom providers ("last mile") with the national and international internet backbone. This investment will increase the speed and capacity of the Eastern Region's internet access, allowing more efficient residential and commercial usage.

The overall project impacts 69 counties containing 2.3 million households, 5.9 million residents, 4,000 community anchor institutions, and 160,000 businesses. In the Eastern Region, Carteret, Craven, Edgecombe, Nash, Onslow, Pitt, and Wilson Counties will receive improved internet access. Duplin, Greene, Jones, Lenoir, and Pamlico Counties will not be affected. Figure 2-21 provides an overview of the improvement project.

Figure 2-21: Improved Internet Broadband Service in North Carolina

2.4.3 Water Supply as a Potential Constraint on Regional Growth

Much of the Eastern Region faces water supply constraints. Figure 2-22 shows that the central portion of the Eastern Region is a dewatering zone. In 1998, the water level was 150 feet below the top of the aquifer, at some measuring places. A portion to the west of the central area is a declining water level zone. Ground water levels were dropping at rates of up to 8 feet per year. A long strip towards the coast, but still inland, is a salt water encroachment zone. That is, water from the salt water bays behind the barrier beaches was filtering into the aquifer.

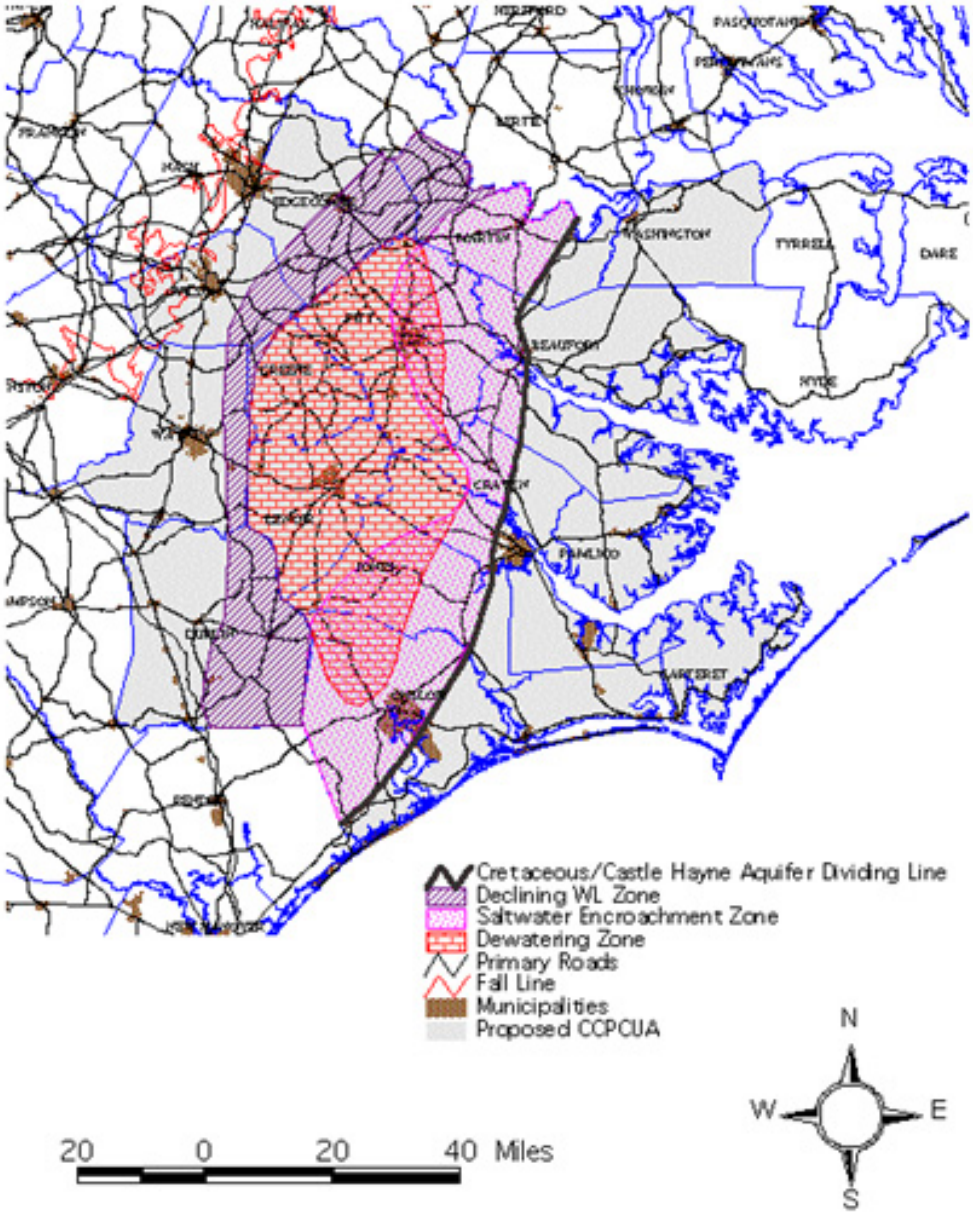


Figure 2-22: Cretaceous Aquifer Zones

Since 2002, the Central Coast Plain Capacity Use Area Rule (and its revisions), have been in effect progressively limiting the amount of permissible withdrawals from the Cretaceous aquifers. The total costs for meeting the requirements of the rule were estimated to be $216 million earlier in the decade resulting in a slight decrease in projected economic output.[79] The North Carolina Department of Environmental and Natural Resources, Division of Water Resources reports good progress being made on tapping into surface water, aquifers which recharge more quickly, and other sources, although such sources are likely to be somewhat more costly than the water supply which had been in use. Despite the progress, residents in one portion of the region have recently objected to a water-intensive industrial development which builds on the region's agricultural strengths, partially on the grounds that it would deplete existing needed residential and agricultural water supplies.

2.5 *Summary: Assessing the Visions*

Since 2001, the region's manufacturers announced mass-layoffs affecting over 15,000 workers. These lay-offs are largely due to consolidation and down-sizing in tobacco production and continued contraction of the textile and apparel industries. These jobs will likely never return. While manufacturing continued to lose employment, the region's service sector added net new jobs. The service sector jobs were created primarily in the military, healthcare, education, and accommodation and food services industries, often at lower rates of pay than the jobs they replaced. On the other hand, the region benefited economically from the military buildup, an aging population searching for less expensive retirement homes and driving service employment, rising employment in high-skilled occupations, and growing preferences for dining out and domestic travel.[80]

The region may have worked its way into a "Catch-22" situation. Substantial investments in educational institutions have not raised the qualifications of the regional labor force (although they may have helped many individuals find rewarding employment elsewhere). Substantial investments in infrastructure have not generated commensurate employment.

[79] North Carolina Rural Economic Development Center, Inc., "Water Woes in Eastern North Carolina: Facing the Facts, Reaching Solutions," May 2002.
[80] Page 4 of which regional report?

3 Possible Logistics Villages

> "I'm one of those who is convinced if you build it, they will come. … If you build the right thing."[81]

The North Carolina Eastern Region contains ten public airports with an average of 29,000 annual operations each, three military air installations, and one of North Carolina's two seaports. Three of those airports, in Greenville, Jacksonville, and New Bern, have scheduled air service and an average annual operations of almost 43,000. Two of the remainder, with a somewhat higher than average number of operations, were assigned to us for consideration as logistics sites and are discussed below. The remaining five airports, in Beaufort, Kenansville, Goldsboro, Mount Olive, and Wilson, each have average annual operations of 21,000. Discussions of the four sites assigned to us by project management follows.

3.1 *Logistics Villages 1 and 2 – Rocky Mount Airport and Edgecombe County's Kingsboro-Rose Megasite*

The Rocky Mount metropolitan area encompasses all of both Edgecombe and Nash counties and has a population of 146,000 residents (2009). The area grew from cotton mill activity associated with proximity to the Tar River. As a connection point between the Southeastern and Northeastern US, Rocky Mount benefited from passenger rail service, which survives to date. Located 45 minutes away from Raleigh, and 55 minutes from Raleigh Durham Airport, the Rocky Mount metropolitan area is in the midst of an economic restructuring, moving away from textiles manufacturing activity and farming. Figure 3-1 offers an aerial view.

[81] Jennifer Lantz, Executive Director, Wilson Economic Development Council quoted in Leslie Boney III (2001) "Does Eastern North Carolina Have the Infrastructure Needed for Growth?" *North Carolina Insight* page 46, December.

Figure 3-1: Aerial View of Rocky Mount Airport

3.1.1 Current Situation

Airport Infrastructure: The Rocky-Mount-Wilson Airport (RWI) is just 6.5 miles from Rocky Mount, 9 miles from Wilson and minutes from I-95, US 64, 264, 301 and NC 98. The airport has a 150 ft wide, 7,100 ft long runway and Category I instrumentation. Organizationally, the airport is owned by three counties (Edgecombe, Nash, and Wilson) and the cities of Rocky Mount and Wilson.

The airport is used mostly for general aviation, with a few local manufacturers (e.g., Cummins) sporadically bringing in parts needed for time-sensitive manufacturing activities. Water and sewer run are available in the area. Land around the airport has been acquired by the County which can support "through the fence" operations (selling hangar space to private parties but with access to the airport). The short concession/lease periods for hangar space on airport land is often viewed as a barrier to generating more general aviation activity. The land can also be used in business/industrial recruitment for activities that could rely on excellent airport access.

The airport is being positioned as a business/corporate airport. Airport staff is collaborating with the Carolinas Gateway Partnership in funding and developing a new business plan that replaces an outdated master plan and solidifies the future strategy as a business airport.

Most competition comes from the Wilson Industrial Airport, a former military airport given to the City of Wilson. Because the City of Wilson owns the land to the Industrial Airport, it has been able to sell part of it to corporate clients. Although the current runway length (4,500 ft) limits the appeal to corporate clients, extensions to 5,500 ft are being considered. Given the land development that has happened around the Wilson Industrial airport, the feasibility of flying in and out of it with larger jets is questioned by some.

Rail Infrastructure: CSX provide service in the area, the heart of Rocky Mount. The Nash County Railroad is a 15-mile short line railroad that connects to CSX. The railroad is six miles or so from the airport.

The railroad service in the area has created opportunities for attracting industrial tenants. Three sites, the Kingsboro-Rose site (CSX), the Corbett Site (Nash County Railroad), and a transloading site (Nash County Railroad) are among the options currently available.

Of the sites available, the Kingsboro-Rose site deserves additional mentions because it is the largest with more than 1,300 acres available. The site has the CSX line running through the south boundary of the site, but no rail spur exists. The site has water available, with a 16" water main located along US 64 Alternate (along site's entire northern boundary. A similar main down Kingsboro Road (site's western boundary) also is available. It connects to an 8" main located south of site on SR 1224 forming a loop allowing water to feed in two directions.

Sewer services are provided by Edgecombe Water & Sewer District #1. A 12" force main is located along US 64 Alternate. A 10" line fronts site's western boundary along Kingsboro Road and runs west along US 64 Alt. to Rocky Mount's wastewater treatment plant. There is a 12" gravity sewer and wastewater pumping station on south side of US 64 on Kingsboro Road.

The Kingsboro-Rose site is served by Piedmont Natural Gas. A 6" hp steel gas line is located along US 64 Alternate and Kingsboro Road (site's western boundary). Electric power is provided by Edgecombe-Martin County Electric Membership Corp.

Although the site is currently zone agricultural/residential (AR 30), all environmental and geotechnical studies to support an industrial site have been completed.

Road infrastructure: There are 3 major highways that intersect in Rocky Mount: U.S. Route 64, Interstate 95, and U.S. Route 301. Interstate 95 runs through a portion of West Rocky Mount, US 64 is a major east-west freeway through the city, and US 301 forms the major north-south thoroughfare through the city. Regionally, the area has interstate-quality roads to Norfolk. Connections south and southeast (e.g., Global Transpark) need improvement.

Major projects included in the TIP include:

- NC 33 from Tarboro to Greenville
- Rocky Mount Northern Connector, with widening to multi-lanes and new right of way
- I-95 Interchange with Sunset Avenue programmed in TIP

Commuting patterns are similar for the counties in the area. Using the US Census Bureau's Local Employment Dynamics (LED) extracted on November 2008, about half of county residents commute to work sites within the county. The proximity to Wake County is manifested by the relatively large share of residents who commute to work there.

From	Edgecombe	Nash
To		
Edgecombe	14,468	20,816
Nash	5,981	5,512
Wake	2,096	3,985
Pitt	1,058	838
Wilson	1,048	3,340
Other	4,285	7,051

Broadband: The metropolitan area is well served by broadband, owing to the fact that several regional headquarters (e.g., Carolina Telephone & Telegraph) were headquartered in the area. A grant of the Golden Leaf Foundation assisted Edgecombe in bringing high speed internet to most developed areas in the county. With Greenville to the East and the Research Triangle to the West, Rocky Mount appears well positioned to be part of an east-west technology corridor.

3.1.2 Projected Economy and Trade Patterns

The economic restructuring has hit the Rocky Mount area particularly hard. Farming and textiles were core areas of activity that have suffered from global shifts in production. As of September 2010, the unemployment rate was 13.2% and 11.1% for Edgecombe County and Nash County, respectively. Major strengths of the area include its specialization in pharmaceuticals (e.g., Hospira), packaged food products, construction machinery and distribution equipment (e.g., Cummins), feed products, appliances, rubber products, and textiles. Of these, rubber products have been identified in previous economic development studies as potential clusters of future economic activity. [82]

There are important warehousing and distribution activities in the Rocky Mount Area. One of the largest warehouses for QVC, several prepared and fresh food operations (Sara Lee, Cheesecake Factory, and MBN), logistics providers (Crown and McLane) and distributors (Eagle) find their home in this area. Support from economic development planners has been

[82] Center for Regional Economic Competitiveness (2006), A Vision Plan for North Carolina's Eastern Region, 66 pages.

instrumental in attracting and retaining some of these industries. A foreign trade sub-zone was created for Cummins, and zone boundary re-adjustments have been provided for Crown Logistics and other manufacturers.

Two community colleges (Edgecombe and Nash Community Colleges) and one private university (North Carolina Wesleyan) are located within the metropolitan area. The community colleges play an important role in upgrading the skills of the workforce to suit the needs to potential industrial recruits. Their mode is sometimes reactive –responding to inquiries from regional and state economic development planners for training and curricular need. In other instances, the community colleges have been proactive. For example, Nash Community College created a certificate in Warehousing and Logistics in order to prepare the workforce for future needs around issues of logistics and transportation. Unfortunately, courses have tended to be undersubscribed. Edgecombe Community College is also considering a similar certificate program.

North Carolina Wesleyan enrolls about 900 students their traditional residential programs at the Rocky Mount campus. Over 1,000 are enrolled in evening programs in Rocky Mount, Goldsboro, and the satellite campus in Morrisville. NC Wesleyan is also involved in the Gateway Technology Center – a partnership between NC State, ECU, NC Wesleyan and the community colleges in Nash, Edgecombe, Wilson and Halifax counties. The center is designed to provide the region's adults with access to higher education courses through distance learning.

With funding from the NC Assembly, the two community colleges joined by NC Wesleyan and other state educational institutions, formed the *Upper Coastal Plain Learning Council (UCPLC)* in 2008. The UCPL covers Edgecombe, Halifax, Nash, Northampton and Wilson Counties. The Council focuses on strategies to achieve the UNC-Tomorrow recommendations to increase access to higher education through UNC institutions and Community Colleges. To date, the emphasis has been on the overall economic status of the region, workforce development, and improved health care.

3.2 *Logistics Village 3 – North Carolina Global Transpark*

The Kinston Regional Jetport is the heart of the Global TransPark economic development project, a 2,500 acre aviation/aerospace, logistics and industrial complex. At the heart of this state-owned and operated project is the airport. At 11,500 feet, the length of its runway, one of the longest commercial runways on the East Coast between New York and Atlanta, is one of its major attractions. The airport is also in the process of upgrading its instrument landing system (ILS) from Category I to Category III. The approved GTP Master Plan made allowances for a second, parallel, runway.

The North Carolina Global TransPark has its origins in a December 1990 concept paper written by John Kasarda.[83] The concept paper was forwarded to then-Governor James G. Martin in February 1991. Although the concept paper recommended locating the TransPark in a busy metropolitan region, a political decision was made to locate the facility in the east. As suggested

[83] John D. Kasarda (1990) "A Global Air Cargo-Industrial Complex for the State of North Carolina," December; relayed to Governor James G. Martin, February 21, 1991.

above, the east has long been one of the "shadows in the Sunbelt" which has suffered from a lack of accessibility and lack of a skilled labor force. It was thought that perhaps a major investment in infrastructure could reverse regional fortunes.

The state announced its intentions, thereby setting up a contest among areas in the East for the new infusion of government funding. The contest was important in galvanizing local support. In order to be considered, applicants needed to meet a number of governance requirements which would diminish the degree of post hoc bargaining on the part of local actors once the state had made a decision.

Three localities were among the finalists. Kinston won out. In 1996, a Grant of Authority was extended to the NC Global TransPark Authority. Today, the NC GTP is a state-owned and operated 13-county regional economic development project. As noted above, the North Carolina Department of Transportation ranks the Kinston Jetport as a second-tier general aviation airport. The airport boasts extensive aviation infrastructure including a 58,800 sq. ft. cargo building with air and ground access. Figure 3-2 gives an aerial view of the GTP site.

Figure 3-2: Aerial View of Kinston Regional Jetport

Centrally located in Eastern North Carolina, the GTP is 1.5 hours from Raleigh via four-lane highway and 1.5 hours from the Wilmington port. The NC Global TransPark in Kinston, NC is situated on 2,400 acres of its own land and offers 5,775 acres of fully permitted industrial land for immediate development. Buildings and sites are immediately available. Extensive economic development support and special financing options are available. Figure 3-3 provides another view.

Figure 3-3: Alternative Aerial View of NC Global TransPark

The NC Global TransPark is the headquarters for for Foreign Trade Zone (FTZ) #214, one of six in the state. Operated by Longistics, the home location of the FTZ is on site at Kinston Regional Jetport. A second location is in Tarboro, some 50 miles north of the GTP along U.S. 258, operated by Kanban Logistics. This location is only about 25 miles from I-95 using U.S. 64. An FTZ subzone includes the Consolidated Diesel Company facility in Whitakers, NC approximately ten miles north of Rocky Mount on U.S. 301.

3.2.1 Current Situation

Approximately 900 acres are available for immediate development. Most available sites offer utilities within 500 feet (Figure 3-4). Table 3-1 lists the facilities at the GTP main site. Figure 3-5 shows the tenant locations in the facilities. Existing facilities are largely occupied and the GTP management has identified the need for additional "spec" space in order to be able to attract

the large proportion of potential clients who are looking for already existing facilities. Table 2-16Table 2-16 above summarizes cargo and passenger service trends at GTP.

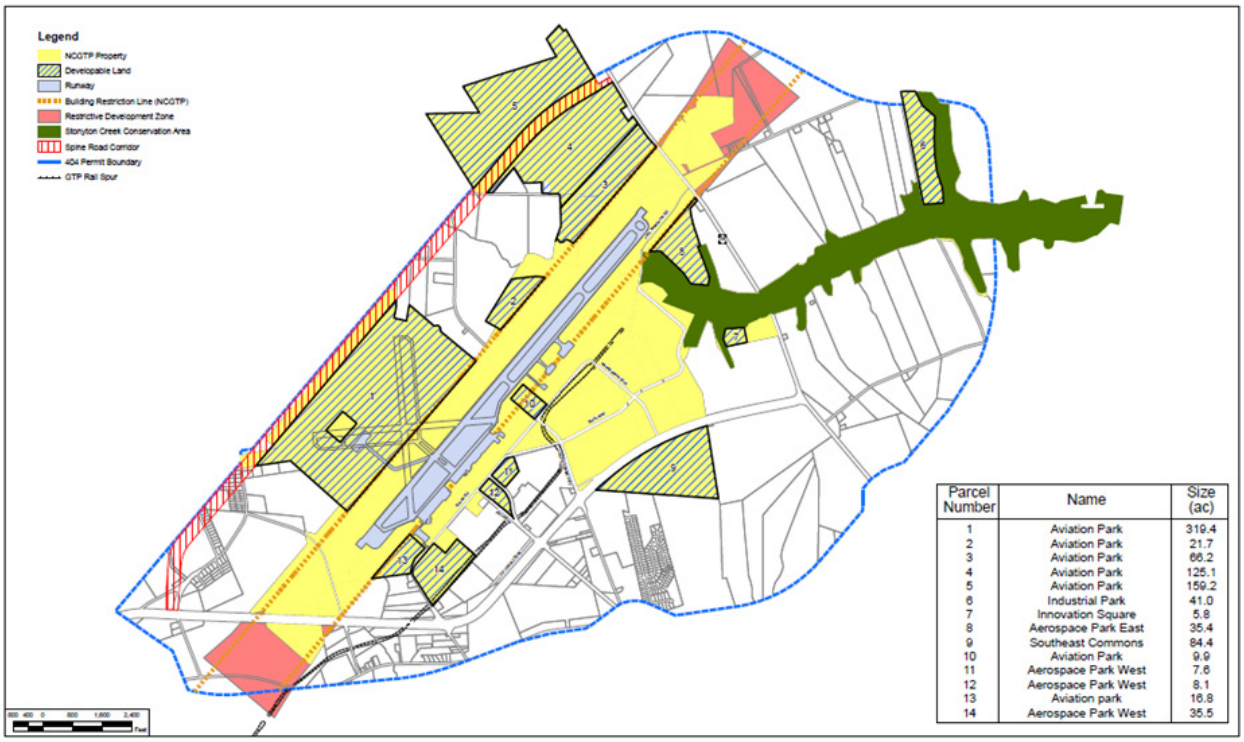


Figure 3-4: Global TransPark Master Properties

Table 3-1: NC Global TransPark Authority Facilities

	Leasable SF	Leased		Available
T-Hangars (Set of 10)	12,312	12,312		0
Highway Patrol Hangar	3,491	3,491		0
FBO Hangars (2)	39,050	39,050		0
General Aviation terminal	4,112	4,112		0
Airport Terminal	7,876	615		7,261
North Cargo Bldg	58,800	58,800		0
			26,400	
			11,400	
			21,000	
South Cargo Bldg	5,311	5,311		0
GTP-1	120,000	120,000		0
GTP-2	19,030	19,030		0
GTP-3	27,500	27,500		0
GTP-4 Hangar	19,600	0		19,600
GTP-5 (SIS)	20,000	20,000		0
GTP-6 (Spirit)	600,000	600,000		0
Administration Bldg	8,475	8,475		0
	945,557	918,696		26,861
Percentage		97%		3%

1. North Cargo Building
   - MJE Telestructure
   - Longistics
   - Spirit
2. T-Hangars
3. Highway Patrol
4. Segrave Aviation/ Delta AirElite
5. FBO/GAT
6. Henley Aviation
7. GTP – 3 Spirit
8. GTP – 5 SIS
9. Airport Terminal
10. Commerce Overseas
11. Forestry Service
12. GTP–1 New Breed
13. GTP–2 AARF & Schenker Logistics
14. GTP–4 Hangar
15. Mountain Air Cargo
16. Composite Center
16A. Admin Bldg.
    - NC Eastern Region
    - Emergency Management
17. Spirit AeroSystems

Figure 3-5: GTP Tenant Locations

The Global TransPark received a large boost when Spirit AeroSystems was recruited to the site. (See Figure 3-6.) Spirit is a Boeing spin-out which manufactures fuselage components for large aircraft. The Kinston facility won contracts to manufacture the leading wing spar (a large beam) and a portion of the fuselage roof for the new Airbus 350, a 250-400 plus-seat twin aisle passenger aircraft. The A 350, like the Boeing 787 Dreamliner, are members of a new generation of carbon fiber construction aircraft. The Spirit facility uses spools of carbon fiber as input and, once production begins, will ship the manufactured components via a rail spur to be completed by November 2011 to the Port of Morehead City and then by ship to the large Airbus facility in southern France.

Figure 3-6: Aerial View of Spirit Manufacturing Site

The Spirit facility is supported by a $100 million grant from the Golden Leaf Foundation, the state-owned vehicle for dispensing the state's tobacco settlement. Mid-November 2010 estimates placed Spirit employment at 163. The company hopes to employ 1,000 within a few years on the basis of existing orders as A 350 production ramps up. While Spirit is said to be seeking additional contracts, the A 350 work, just summarized, is their complete order book as of this writing.

Spirit has attracted additional tenants to the GTP. Some of these are Spirit logistics service providers with so far relatively modest operations. The announcement of its opening has, however, sparked interest by firms which do not do business with Spirit. Spirit's location

decision has raised awareness of the GTP and increased the social legitimacy of the site, meaning that subsequent location decisions may not need to be as heavily subsidized as Spirit's has been.

3.2.2 Projected Economy and Trade Patterns

The Global TransPark is envisioned as a strategic location for global businesses engaged in aerospace, advanced manufacturing, logistics and related sectors. The following industries are targeted based on the GTP Master Plan and corroborating research:

- Aerospace & Aviation
- Advanced Manufacturing
- Logistics & Supply Chain Management
- Emergency Response & Disaster Relief
- Defense & Security

The GTP focuses its marketing efforts towards corporate site selectors, site location consultants, and company executives within the identified target industries. The marketing program is engaged in a number of objectives designed to promote the TransPark, enhance its development, and foster the agency's mission. The Marketing Committee, composed of board members and key staff, works to:

- generate inquiries about business location and expansion
- raise awareness of the GTP nationally and internationally
- maximize marketing resources by engaging partners as appropriate
- develop and nurture relationships with partners, stakeholders, and audiences
- collaborate with the academic community to identify and capitalize on new opportunities

Anchor tenant Spirit AeroSystems may be using the runway for its operations with large charter air cargo aircraft, such as the Antonov or Beluga. In order to attract scheduled air cargo service and increase its revenue stream, GTP management is arguing that more infrastructure is needed besides the long runway and upgraded ILS. Improvements being discussed include a taxiway on the north east end of the runway in order to encourage more development on the north side of the airport and upgrading the fuel farm in order to efficiently service large cargo aircraft.

The 5.7-mile rail spur from the GTP to the main line to the Port of Morehead City scheduled for completion in November 2011. Rail service will be operated by Norfolk Southern. The full extension of C. F. Harvey Parkway from Highway 258 to Highway 70 is scheduled for completion in the fall of 2013, representing a major improvement in highway access to and from the GTP. GTP leadership is trying to gain an Interstate shield for the site. A limited access highway could make the site more attractive to potential tenants but the impact is likely to be marginal. A four-lane highway is already in place and, even with a limited access highway, it will still take more than an hour to reach Raleigh.

In the Global TransPark's Master Plan, it was envisioned that an important function of the GTP would be to serve as a multimodal/transmodal facility. There is increased speculation that, with the imminent completion of the rail spur, the GTP could serve as an inland port complementing those in Charlotte and Greensboro. All three are along the North Carolina Railroad route

connecting the Port of Morehead City to the Piedmont. As noted below, the Morehead City port appears to have sufficient land to handle the expected traffic volume but will allow little space for storage and handling, perhaps necessitating facilities further inland. The port does not now accommodate container traffic. The North Carolina Ports Authority has made no decision to develop container capacity there.

The U.S. military is reportedly a factor in the decisions of many, if not most, of GTP's tenants to locate at Kinston Jetport. Some of the tenants serve the regional military installations directly. For others, that or a similar location is thought to be necessary for earning military contracts in the future. The military may be the region's most important growth industry. It is possible that the GTP could position itself for a likely future realignment of military logistics systems. What are disadvantages for most commercial tenants are often advantages for military tenants. As noted above, the military appears to be undergoing a process of spatial filtering away from developed regions and increasingly towards those which are lagging economically.

3.3 *Logistics Village 4 – Jacksonville Airport*

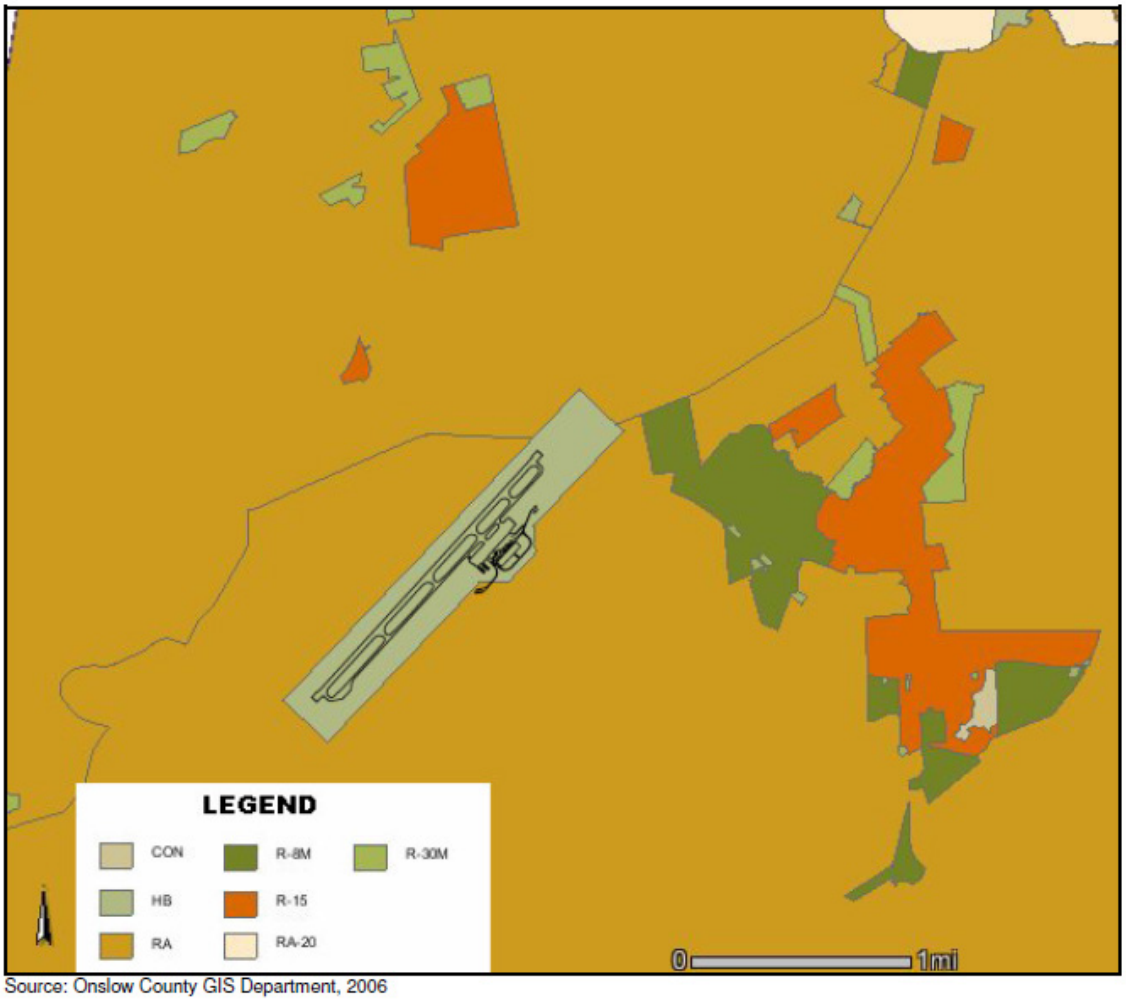
Albert J. Ellis Airport (OAJ) is a county-owned public-use airport in Onslow County, located approximately ten miles northwest of Jacksonville and Camp Lejeune. The airport has a single 7,100 by 150 foot runway and a passenger terminal with three gates. Open since 1971, the airport is served by Delta Connection to Atlanta and US Airways Express to Charlotte. The airport is served by two cargo aircraft operators which provide services in cooperation with express service providers. The airport is also used by general aviation and the military. An industrial park is located six miles from the airport. Figure 3-7 provides an aerial view of the airport.

Figure 3-7: Aerial View of Jacksonville Airport

3.3.1 Current Situation

For the year ending July 31, 2010, the airport reported 36,820 aircraft operations – approximately 100 per day. Nearly 20,000 of those operations were accounted for by general aviation (over half locally-based). The air carriers accounted for 7,900 operations. Table 2-15 and Table 2-16, above, provide information on passenger, cargo, and operations trends. The military, which also operates airfields at nearby New River and Cherry Point Marine Corps Air Stations, accounted for nearly 6,900 operations. The airport offers a fixed based operator, Jacksonville Flying Service, which provides fueling, maintenance, flight instruction and aircraft rentals.

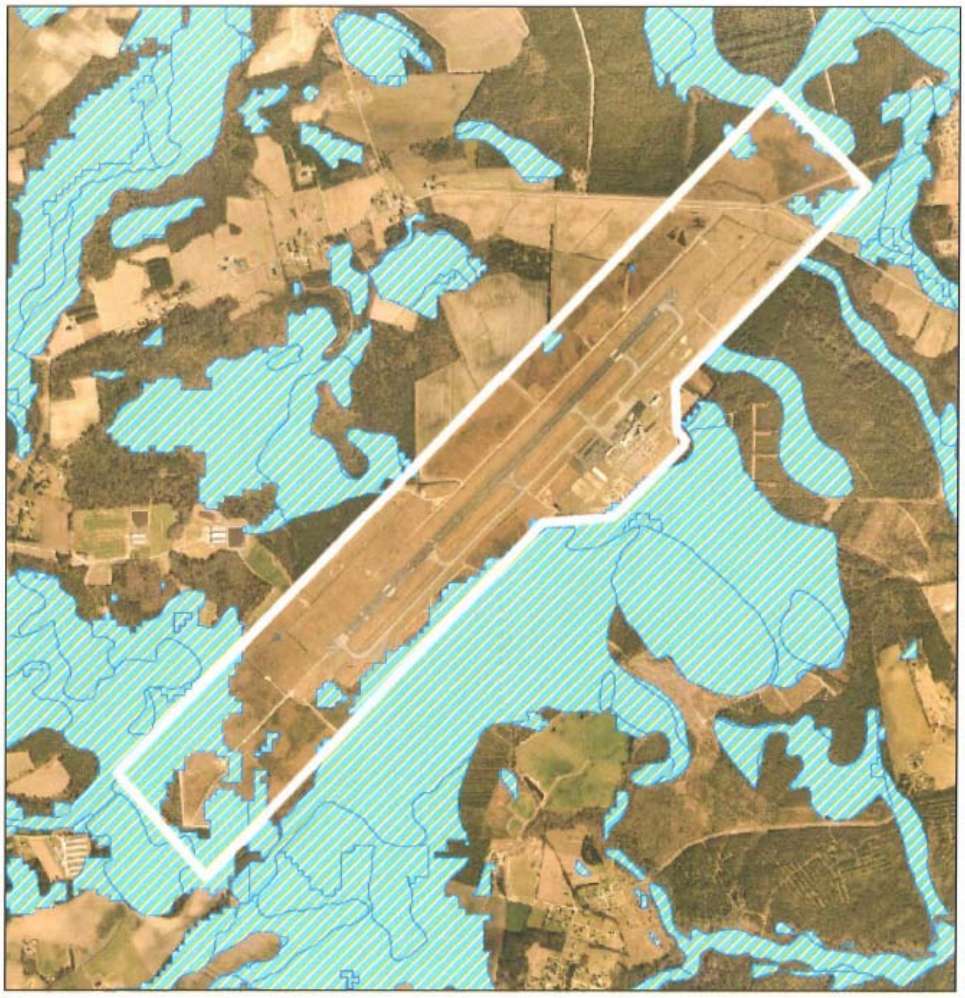
The airport itself covers 675 acres but is almost entirely surrounded by forest and open agricultural land which is mostly zoned for rural agricultural use. Figure 3-8 shows the zoning in the area surrounding the airport. Although the land surrounding the airport is mostly vacant, it is not necessarily developable. Portions of the land are included in the U.S. fish and Wildlife Services National Wetlands Inventory. Figure 3-9 shows that.



Source: Onslow County GIS Department, 2006

CON Conservation
HB Highway Business
RA Rural Agricultural
R-8M Residential 8
R-15 Residential 15
RA-20 Residential 20
R-30M Residential 30

Figure 3-8: Land Use Surrounding Jacksonville Airport



Source: Onslow County GIS Department, 2006

Figure 3-9: Jacksonville Airport Area Wetland Areas

3.3.2 Projected Economy and Trade Patterns

Jacksonville Airport plays an integral role in the regional community by supporting and promoting economic development, including tourism, by enhancing local quality of life by providing air access to desired destinations via the Atlanta and Charlotte hubs, and supporting national security by providing air transportation for local bases. According to recent data, the airport generates 345 jobs with an annual payroll $4.4 million and a total economic impact of $44 million.

Airport strategy is to take a leading role in economic development by providing facilities, such as hangars for business jets, somewhat ahead of demand. Existing cargo traffic is modest and adequately handled on the general aviation apron. Due to its small size, proximity to larger airports, and airline pricing policy, the airport loses a significant proportion of the passenger traffic in its market area. Airport management and their consultants expect the same situation to

hold for future traffic growth, with air freight customers tending to truck to the larger airports in Wilmington and Raleigh-Durham. That baseline assessment is tempered, however, by the potential impacts of the FedEx regional hub in Greensboro and by decisions of the military.

If the growth in the military presence continues, Jacksonville airport's role in the region may change to be an increasingly important conduit for military personnel, their dependents, and military contractors. It may therefore be necessary to expand service once traffic reaches thresholds beyond that to the USAir and Delta hubs. In particular, service to Washington DC, although National Airport is capacity constrained, could become a priority.

3.4 *Logistics Village 5 – Port of Morehead City*

North Carolina can boast of two major seaports. The Port of Wilmington handles mainly containers while the Port of Morehead City process bulk and breakbulk goods. The Port of Morehead City is slated to serve the Spirit plant at the Global TransPark once a rail spur is completed in November 2011.

A recent report on the strategic opportunities open to North Carolina ports stated that the market for bulk and breakbulk cargo is likely to be stable. That implies that greater growth will be found in container handling. That report explored the possibility of enlarged container capacity at the Port of Wilmington and of establishing container service at the Port of Morehead City, most likely on Radio Island to allow the existing port operations to continue.[84]

3.4.1 Current Situation

One of the deepest ports on the US East Coast, the Port of Morehead City is located just four miles from the Atlantic Ocean just south of the Outer Banks. Accordingly, the ocean channel is a relatively short six miles. Figure 3-10 provides an aerial overview of the Port of Morehead City. The port boasts nine berths stretching over 5,500 linear feet of ship dockage and 1,487 linear feet of barge dockage. The wharves are of concrete pile and deck construction and the berths are fronted by a rubber fender system. Berth deck heights average 10 ft. above mean lower low water. Mean tide change is less than three feet with water speeds of 2-3 knots. There are no overhead navigation obstructions (such as bridges and high tension wires). The port has two turning basins with 1,350 foot and 2,200 foot diameters and depths of 45 and 35 feet, respectively. The port channel depth is 45 feet below mean lower low water inside the harbor (47 foot outside), and the width of the channel is between 400 and 820 feet, giving it the potential to handle very large container ships. The channel characteristics are comparable to those of several nearby ports. The Port of Charleston in South Carolina, for example, has a depth of 47 feet at its entrance and 45 feet elsewhere at mean low water level.

[84] Moffat and Nichol (2011) *NCSPA Port Business Case Project*, North Carolina Ports Authority, February

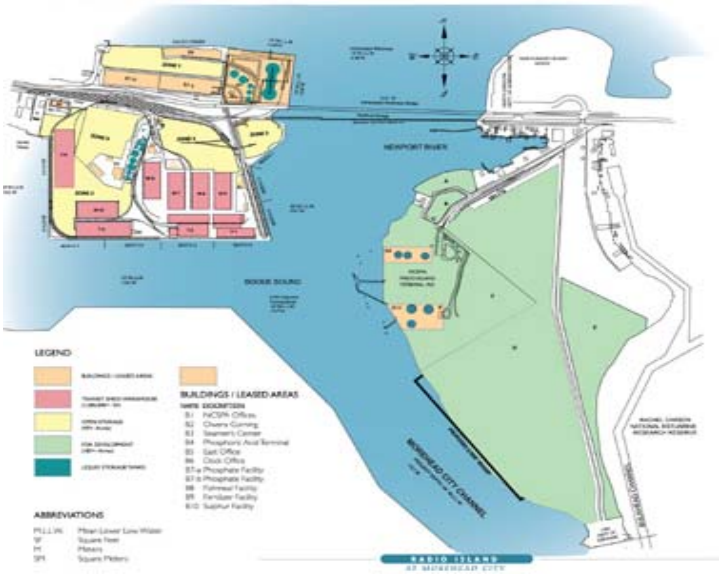


Figure 3-10: Aerial View of Port of Morehead City

The port does not handle container traffic at this time. It does handle breakbulk and bulk cargo.[85] Two berths are served by a modern shiploader with a maximum loadout rate of 3,000 tons per hour of dry bulk cargo. Available open storage dry bulk facilities can transfer up to 800 tons per hour. The port is also equipped with covered dry bulk facilities with export conveyor systems capable of handling up to 1,000 tons per hour. One multi-purpose bridge crane with a 115 foot outreach and 63 foot backreach at 40 tons is equipped for grapple or bucket lifts and can handle bulk, breakbulk and container cargo. The port also has two 115-ton-capacity gantry cranes, one 125-ton mobile crane, and 39 lift trucks with up to 70,000 lb. capacities and special attachments to accommodate a variety of cargoes requiring special attention. The berths are adjacent to contiguous open apron areas which are at least 35 feet wide.

Over one million sq. ft. of storage are available. The space includes almost 500,000 sq. ft. of prime covered warehouse with sprinkler protection and an additional 530,000 sq. ft. of transit

[85] Loose cement, grains, ores, and similar commodities are termed bulk cargo, whereas packaged but non-containerized cargo shipped as units (bags, bales, barrels, boxes, drums, pallets, or vehicles) is termed break bulk.

storage (including a 177,000-square foot warehouse to house high value commodities such as paper, steel, and lumber). The latter facility, which opened in 2007, features 29-foot ceilings and easy access to ocean berths. The warehouses have a capacity of 225,000 tons for dry-bulk and an open storage dry-bulk facility with annual capacity of 2 million tons. In addition, there are 30 acres of paved and 9 acres of semi-improved open storage area with rail access to berths, transit sheds, warehouses and open storage. The terminal is well-lighted and has 24-hour security provided by North Carolina State Port Police. Across the Newport River from the port, Radio Island is a fully-serviced land 150 acres in size, available for industrial development. This island is linked to the mainland by a bascule bridge.

The port is C-TPAT (Customs-Trade Partnership against Terrorism) certified, allowing quicker processing times. The port is served by barge, rail, and road and offers direct transfer of heavy lift and dimensional loads between vessel and rail or truck. Daily rail service is provided by Norfolk Southern Railway with terminal switching provided by Morehead & South Fork Railroad. The port has a certified railroad scale and substantial rail car storage is available. One secured port gate entry expedites the arrival and departure of motor carriers. Two certified truck scales with weighmasters are available 24 hours per day. Access to Interstates 95 and 40 is available via U.S. Highways 70 and 17. Immediate access is via local roads, however. The port is within 700 miles of more than 70 percent of the industrial base of the United States.

As a leading exporter of phosphate, the Port of Morehead City features a dry-bulk facility with a 225,000-ton capacity warehouse and open dry-bulk storage. Sulfur products dominate imports but the port is the second largest importer in the country for natural rubber. With the deployments in the Middle East, military hardware has become an important export. Exports of general merchandise have been fluctuating over the past decade.

The Port of Morehead City is home to one of North Carolina's six FTZs. The FTZ is meant to help Morehead City area businesses gain a competitive advantage by delaying, reducing, or eliminating U.S. Customs duties. The Morehead City FTZ offers 190,374 square feet of warehouse space and an undeveloped foreign trade zone covering 40 acres. The FTZ accommodates storage, manipulation, exhibition and limited manufacturing operations. U.S. Customs duties average xx percent of the value of the goods being imported.

Radio Island is located across a channel from the main port and is partially developed for liquid bulk activities. Radio Island could potentially be developed as a container terminal, most likely, due to the relatively small land area, for a dedicated service provider. Some of the port's land on Radio Island is leased but it is not intensively used. There are also residential tenants on Radio Island. These are likely minor constraints on the site's development potential.

Morehead City Port and Radio Island are accessible by truck and rail but significantly scaling up traffic will likely create congestion problems unless a bypass around the developed area is created. Developing Radio Island will likely require upgrading an existing bridge across the intra-coastal waterway to handle increased traffic. The main highway and the rail line both run along a lengthy commercial strip (approximately 3.5 miles) with numerous turnouts and grade crossings. Train speeds would necessarily be low, blocking even emergency traffic for long

intervals. Constructing a number of bridge crossings might reduce the burden sufficiently to allow the use of trains to transport containers.

An alternative, northern road route might be possible using the Gallants Channel Bridge (underway), the (yet unfunded) Northern Carteret Bypass and Havelock Bypass to rejoin U.S. 70 west of Havelock. These road improvements are components of a development program improving U.S. 70 to I-95. A rail connection might be more palatable to local residents, tourists, and military users than heavy truck traffic along the region's main access route. The northern bypass route would require a local truck haul and likely significant additional investment in rail infrastructure.

3.4.2 Projected Economy and Trade Patterns

The Moffat and Nichol report estimates that a container port on Radio Island could potentially reach over 1.2 million TEU of capacity. Converting the main Morehead City port area to serve container traffic could create a port with a 500,000 TEU capacity. Either option might require an off-site inter-modal rail yard but with the continuing improvement in container stacking and picking software, it might be possible to transfer directly from a ship to a shuttle train which stopped at an inland distribution point. That inland point might be in the far western area of the Eastern Region where the rail line meets the main NS and CSX north-south routes on the outskirts of Raleigh or it could be further inland, possibly at one of the state's inland ports in Charlotte or Greensboro.

The Moffat and Nichol report discussed the possibilities for North Carolina port development. Additional studies are underway to explore those possibilities further. Without wanting to pre-empt the finding of the ongoing and future studies, which may support conclusions very different from the ones drawn here, the likely outcome of those studies can be anticipated now. As pointed out repeatedly in the Moffat and Nichol report, expanding capacity at either the Port of Wilmington or the Port of Morehead City will be expensive, requiring substantial capital investment by a broad set of parties.

The needed investments are of several types. First, the cost of dredging channels to a depth sufficient to allow new larger ships to access berths can be expensive in itself. Second, the required investments in port infrastructure, particularly for a greenfield site such as Radio Island, will be substantial. Third, and most importantly, according to the report, a "viable rail connection with competitive rates to allow access to intermodal operations is the single most important landside infrastructure improvement required to assist the NCSPA to maintain/gain market share for containerized products."[86] Such connections do not now exist at either North Carolina port and it is likely that railroads will not be highly motivated to provide that service on favorable terms since NS and CSX are both providing hinterland service at the Virginia ports, Charleston, and Savannah. They have already captured much of the potential inland market for intermodal services and, unless they face capacity constraints or could capture a significant number of additional customers, additional capital investment would erode their profit margins.

[86] ES 10.

At the same time, according to the same report, the need for investment and benefit to North Carolina are not demonstrated. First, "the Mid and South Atlantic port region will not see a shortage of container space into the next decade, based on known and confirmed expansion strategies being adopted."[87] That time span could be significantly longer as trade trends are unlikely to continue as they have in the recent past. Wage increases in China, revaluation of Chinese currency, and increases in fuel costs will tend to favor hemispheric, rather than inter-continental trade. Moreover, the current fiscal and economic situation may force a partial reordering of the global economy. Second, even if North Carolina ports can't serve the state, "other Mid and South Atlantic regional ports will quickly meet [core North Carolina] cargo demand instead."[88] Third, improving the critical intermodal access barely improves service to North Carolina according to the Moffat and Nichol "least cost market area" analysis. Rather, the investments mainly improve the ability of North Carolina ports to compete for contested (low-margin) markets in the near Midwest. Since port operation in North Carolina cover marginal costs but not capital costs, North Carolina may need to disproportionately bear the burden of capital investment while effectively subsidizing port users out-of-state.[89] Given those conditions, it is likely that the State of North Carolina will take a conservative approach to port investments.

3.5 *Section Summary*

This section of the report has provided a basic summary of the four possible sites for logistics villages selected for consideration. Each of them has their strengths and the potential to fill a logistics-enabled economic development function. Indeed, they are each doing so now. In the following section, we compare the sites to each other.

[87] P. 55.
[88] ES 9.
[89] Assessment on port charges: personal communication with xxx.

4 Summary

"The No. 1 economic development issue is the quality of the work force."[90]

Every piece of land has a highest and best use. As regional conditions change, that highest and best use may also change. Wilderness forests are cleared for farmland, farmland yields to factories and homes, factories are replaced by offices and entertainment venues. Logistics facilities, as vital but locally unwanted land uses, are often relegated to the metropolitan periphery. Much of small town and rural North Carolina has based its economy on manufacturing for decades.

In many areas, the relocation of logistics facilities generates unnecessary additional trucking VMT and congestion. Moreover, as shipping grows faster than the economy and population, highway capacity constraints become increasingly salient. Although most shipping is local and intermodal shipments are only a small portion of total shipping, intermodal shipments are a larger proportion of long distance shipments and they may increase in importance. As discussed above, intermodal shipments are beginning to replace coal as the main source of revenue for some railroads.

Road-rail intermodalism requires modal infrastructure. A system of rail and air connected inland ports has been developing in the U.S. over the last decade or so, mainly along the NAFTA superhighway and along major east-west freight corridors. The demand for intermodal freight transportation in North Carolina where the predominant cargo flow is north-south may grow as potential trade patterns shift, road congestion increases, fuel prices rise, and the supply of truck drivers diminishes. We have not attempted to project the likelihood or the timing of such shifts.

Such shifts could give rise to a demand for compact logistics villages which would also address land use coordination issues. The Eastern Region's economic bases have potential points of conflict. Industrial users and logistics service providers have little motivation to locate in particular places without the need for an intermodal transfer. If a factory is able to ship in truckloads, a North Carolina trucking company can pack the truck at the shipper's facility and deliver it anywhere in the continental U.S. within approximately 48 hours with no need for an intermediate logistics facility or a need to locate near such a facility. If a retailer needs to service a wide area, they can purchase their own land at a location which fits their market area which has a service radius determined by their needs without a strong need to be near other logistics providers. A small minority of businesses do require immediate access to logistics infrastructure. These will be attracted. Accordingly, the state's two major efforts to catalyze economic development on the basis of infrastructure investment, the Global TransPark and the Piedmont Triad Aerotropolis, have required extensive public investment but have been slow to generate employment.

[90] J. Mac Halliday quoted in Bill Finger (1997) "Making the Transition to a Mixed Economy" *North Carolina Insight* page 13, December.

Some actors in the Eastern Region envision a high technology corridor reaching from Rocky Mount to Greenville which is likely to bypass all sites considered. Ironically the fastest growth in the Eastern Region is in the areas which are arguable the least accessible – Pitt County and along the Coast. The coast, the military installations, and Eastern Carolina University may be the major direct and indirect attractions.

Contemporary theory and research suggest that labor availability and price may be the critical factor in the location decisions of most footloose industries. In that regard, the Eastern Region's professional certification program has significant promise to ameliorate one of the major concerns in site selection. Firms which have recently established facilities in the Eastern Region have repeatedly stated their pleasure with the labor supply. While the testimony should be taken as a mark of approval, it also indicates that those wishing to establish facilities underestimate the resources the Eastern Region can offer. We also note a need for commercial, cultural, and recreational amenities in attracting and retaining labor.

Even if investment in logistics facilities may not be a strong lever facilitating growth, there is a need to meet existing and projected demand. An assessment of the five selected sites follows.

4.1 *Logistics Villages Compared*

A modal shift or a break-in-bulk (either consolidation or deconsolidation) at a sufficient scale of activity to make operations cost-effective are necessary characteristics of logistics nodes. Table 4-1 shows our assessments for the five selected sites based on the available information discussed above. Although four of the five selected sites are operating logistics facilities, they are not major centers. Morehead City Port, by far the busiest, is small compared to other East Coast ports.

Table 4-1: Defining Logistics Center Characteristics for Selected Sites: Present Conditions

	Rocky Mount	**Edgecombe County**	**Kinston**	**Jacksonville**	**Morehead City**
Modal shift (Transloading)	Some	None	Minimal	Minimal	Present
Break-in-bulk (Consolidation/ Deconsolidation)	Some	None	Not significant at present	Not significant at present	Some
Scale of flow	Not significant at present	None	Not significant at present	Not significant at present	Moderate

In order to develop as a significant logistics processing site, a location needs to meet certain necessary pre-conditions. Access to major freight corridors, a hinterland, and available land are critical but the availability of a support infrastructure can also be important. Table 4-2 includes our initial assessments for the selected sites. Our judgment is that each of the sites has potential for further development.

Table 4-2: Necessary Pre-conditions for Logistics Village Development

	Rocky Mount	Edgecombe County	Kinston	Jacksonville	Morehead City
Access to major freight corridor	Direct access to I-95	Off U.S. 64; 10 miles to I-95	One hour to I-95 (could be shortened to 50 minutes)	40 minutes to I-40; 35 minutes to Camp Lejeune	Remote deep water; two hours to I-95
Hinterland	Convenient to Raleigh	U.S. 64 East; Convenient to Raleigh	Small	Convenient to Camp Lejeune and coast	Possible
Available land for development	Yes	Significant	Significant	Yes	Yes
Land use constraints	Few	Few	Few	Some wetlands	Resort area
Supporting physical infrastructure	Utilities available	Utilities available; rail line along boundary	Almost all in place Rail line; highway coming	Most need to be installed	Direct rail connection to I-95 corridor and central Piedmont
Educational institutions	College; community college	College; community college	Community college	Community college	Community college

Table 4-3 considers the pre-conditions for development in more detail using Version 8 of an assessment matrix developed by product leadership as a guide. The matrix has been modified somewhat from its January 2011 incarnation. We discuss geographic reach, the economic sectors served, site preparedness, and upfit costs.

The geographic reach of a logistics facility is determined by the users. Morehead City attracts shippers with an inter-regional and international reach. Little of the throughput originates in the Eastern Region or ends its journey there. The depth of the channel has determined the port's growth. With the opening of the Spirit plant, Kinston has developed an international reach. Jacksonville traffic is almost exclusively regional and is based on a fairly small hinterland. Rocky Mount airport traffic is not international. The Edgecombe County site has potential to serve a regional hinterland.

As discussed earlier in the report, selected economic sectors are deemed important to the state's and the region's economic future. Morehead City is an export portal for some agricultural products. Kinston has the potential to serve as a point of export for meat production if demand materializes. Eastern Carolina does export some wood products, crops, and meat production by sea. Environmental constraints limit some types of production, most notably pork. Should those constraints be eased, it is unclear whether North Carolina producers would find export markets more attractive than domestic markets. Some informants in the meat processing industry have expressed doubt about sustained demand for air transportation to agricultural export markets. As noted above, at a recent Logistics Task Force meeting, representatives of agricultural trade groups stated a concern for improved access to secondary feeder roads and no concern about long distance facilities. Should exports rise, additional cool chain facilities may be needed.

Greenville is the Region's center for health and wellness. Employment in that sector is growing rapidly. We did not consider any sites in that sub-region. Jacksonville airport offers access to coastal recreational areas. As noted above, several pharmaceutical manufacturers have facilities in the outer reaches of the Triangle metropolitan region. With a site-based research protocol, we have not investigated their needs for specialized cool chain facilities.

Several of the airports in the region provide support for military training and logistics. Jacksonville is important for passengers travelling to or from the Marines' facilities. Given the large military presence in the eastern portion of the state, all facilities have a potential military role. Most of the GTP tenants have a direct or indirect military connection and the facility should consider positioning itself for a larger role following the next round of BRAC realignments.

The coast is the region's major tourist destination. It is served by Jacksonville airport.

The Spirit Aerosystems facility at the GTP is the region's major aerospace manufacturing facility. Additional manufacturers are located along the I-95 corridor in the North sub-region.

We have added a category of advanced manufacturing. The Eastern Region, along with much of the country is trying to attract advanced manufacturing facilities. Advanced manufacturing is an amorphous category but the effort is based on the continuing importance of especially durable manufacturing to the U.S. economy and the ongoing technological change within manufacturing which loosens bonds to established locations. The region appears to be at least moderately successful in attracting this type of manufacturing but, aside from the Global TransPark, was not able to discern any concentrations.

Each of the selected sites is prepared for at least one of the targeted sectors. Each offers acceptable, if not excellent, highway access. Only Morehead City port is served by rail at the present time but the GTP will have a completed spur within a few months. Three of the sites are active airports, so they are served by air. All are reasonably close to multiple active seaports. Morehead City is the closest but if a booking cannot be secured there, Wilmington and other options are readily available.

All selected sites have some land available. Only Kinston and the Edgecombe County site can accommodate users with needs for large parcels but such parcels can be found throughout much of the region. Power, gas, water, sewer, and IT is available at all selected sites. Users vary in their need for each. All enjoy community college and university support. It appears to be the policy of the UNC and Community College systems to support economic development wherever needs are throughout the state.

We make no assessments about upfit costs. Recent experience with Southport strongly suggests that even with careful engineering analysis, the confidence intervals on such estimates are very large. Moreover, development costs depend upon intended use. Morehead City, for example, is an operating port. Some possible additional uses would require little capital investment. Developing the port as a container port would likely require significant investment. We note, however, that the Global TransPark is largely in place with shovel-ready parcels available on

short notice for large and small tenants. Utilities are available at the boundary of the individual parcels (not the boundary of the development site as a whole). The GTP is the only site with a business plan calling for the continuing construction of facilities ready for immediate occupancy. (Unfortunately, space is limited at the moment.)

All sites tap into a regional labor pool. The total labor supply in the region is modest – although, as noted above, larger, more skilled, and more work-ready than some businesses had expected. While there is the possibility that the regional labor supply will reach certain limits, the region exports labor and increased opportunities will likely lead to higher retention and in-migration.

Because each sector and each firm have their own specific needs, it is not possible to rank the sites independent of expressed demand. The sites vary in their acceptability on standard site selection checklists but those lists only very imperfectly capture firm needs. Internal firm personnel have access to complete information on operating procedures, costs, and needs. Individual needs are likely to vary substantially – as is evidenced in the variety of business location decisions made.

Table 4-3: Detailed Comparative Assessments

	Rocky Mount	Edgecombe County	Kinston	Jacksonville	Morehead City
Geographic Reach	Regional	Potential site for DCs serving the Eastern "fan"	Potential international reach	Scheduled connections to regional passenger and cargo hubs	Regional barge and international ship connections
Economic Sector					
Agriculture	Some		Potential use for agricultural exports		Export portal for some products
Health & Wellness				Proximate to resort areas	
Military Support			Military use of field	Passenger support for families, contractors and others; Military use of field	
Tourism				Direct scheduled and GA access to coastal recreation areas	
Aerospace Manufacturing			Spirit Aviation Facility		
Advanced Manufacturing	Emerging	Emerging	Emerging		
Preparedness					
Highway	Near I-95	Off U.S. 64 10 miles east of I-95	Off U.S. 70, approximately one hour from I-95	Near coastal, military destinations	On U.S. 70, limited capacity
Rail	Nearby rail trunk line	Adjacent rail trunk line	Spur to site to be completed in 2011		Rail connection to inland destinations
Air	7,100' runway	No airport	11,500' runway for large aircraft accessibility	7,100' runway	Small airport nearby; difficult to expand
Maritime Support					Significant port
Land	Adequate on-airport space; off-airport land available	Substantial land available	Substantial land available in large and small plots; short-term shortage of "spec" space	Adequate for foreseeable needs; industrial park 8 miles away	Adequate but not copious land availability
Power/Gas		Available at site boundary			
IT			The GTP network is a T1 – 1.54MBPS (1.54 million bits per second) system connected to an external digital T1 circuit T1 by Embarq		
Water/Sewer		Available at site boundary			
CC/Univ Support	Available	Available	Available	Available	Available
Environmental				Wetlands may limit real estate development	
Tax Incentives	Tier 2	Tier 1	Tier 1	Tier 3	Tier 3
Grants, other funding					
Inter-Institutional Org					
Labor Pool					
Upfit Cost					
Nearest Port					

We evaluated the potential each site in the Eastern Region to function effectively as logistics infrastructure. Our baseline point of reference was as 1) a logistics village but we also considered the possibilities for each site to function as 2) a regional portal or gateway, 3) an inland port, 4) a general aviation business airports handling passengers or cargo, and 5) a specialized cargo facility location. Table 4-4 summarizes our initial assessments.

Table 4-4: Alternative Functions for Selected Sites

	Rocky Mount	Edgecombe County	Kinston	Jacksonville	Morehead City
Logistics Village			Possible air-oriented logistic village		Operating ocean port
Regional Portal		Potential	Possible		International ocean port
Inland Port			Possible		Existing ocean port
General Aviation Airport	Existing general aviation activity, cargo, and military use	Can use Rocky Mount or RDU	Existing general aviation activity, cargo, and military use	Existing scheduled service, general aviation activity, and military use	Constrained small airport nearby
Specialized Logistics Facility	Possible	Possible	Possible	Possible	Possible

4.2 *A caveat*

We have not conducted a complete study of all possible logistics sites in the Eastern Region. A recent visit to the Carolina Gateways Partnership serving just two of the 13 counties in the region – Nash and Edgecombe – turned up 3,762 acres of certified industrial sites in 12 different parcels in addition to the Kingsboro-Rose Mega Site discussed above. There were 2,273 acres of "other industrial sites" spread over 19 parcels and 1,366 acres of undeveloped industrial land in seven parcels also being marketed at the present time. In addition, a number of completed commercial buildings, some in well-established industrial parks were also listed as being available. Some of these sites have good highway access and, less frequently, are near rail lines. Additional properties might readily become available should their owners come to believe that potential buyers exist. A search in EDIS turns up 139 available buildings and 152 available sites (some of which share the same location) for the Eastern Region.

We have no basis for assessing the relative attractions of the selected sites against other currently or potentially on the market. Price will certainly have an impact upon development potential. Industrial users often have idiosyncratic needs. They have been able to satisfy those needs at locations other than the sites selected for study and many businesses will likely continue to do so in the future. Without a need for a modal shift, strong land use controls, or a shortage of suitable sites, industrial users are unlikely to be strongly attracted to any specific site.

Property-led regional economic development, whether through industrial parks, enterprise zones, or research parks, has a poor track record. Developer desire rarely matches business demand. Obviously, because all economic development has land use needs, some property development efforts eventually turn out to be successful. Available land is a prerequisite for many forms of economic development but it is rarely the determining factor outside of congested metropolitan

areas. That reality does not imply that the selected sites should not be developed, only that the developers need to base their investments on realistic assessments of both immediate and long-term demands.