

NETWORK APPALACHIA



Access to Global Opportunity

Enhancing access and economic opportunity, improving transportation coordination and capacity, and achieving important new energy and environmental benefits in the global economy of the 21st century.



ARC
APPALACHIAN
REGIONAL
COMMISSION



moffatt & nichol

Foreword

At the 2007 Appalachian Regional Commission (ARC) summer meeting, the Commission established a regional Study Group comprised of economic development, transportation, and international trade professionals from across Appalachia. Under a planning initiative labeled "Network Appalachia", ARC directed its Study Group to carefully evaluate changing macro-economic trends and project the affects of these trends on the Region's future commerce and on the movement of goods to, from, and across Appalachia. This document reports on the research and work done by the Network Appalachia Task Force including the findings of the four regional workshops.

The Study Group participants have been appointed by each of Appalachia's 13 member-states and the Development District Association of Appalachia. Study Group members include:

Alabama

*Mr. Rick Tucker - Executive Director, Huntsville International Airport
Mr. James Loew - Director, Florence/Lauderdale County Port Authority*

Georgia

Ms. Jane Hayse - Chief, Transportation Planning Division, Atlanta Regional Commission

Kentucky

Mr. Greg Jones - Executive Director, Southeast Kentucky Economic Development Commission

Maryland

Mr. Robert Gordon - Director, Hagerstown/Eastern Panhandle Metropolitan Planning Organization

Mississippi

Mr. Don Waldon - President, Tenn-Tom Waterway Development Council (Retired)

New York

Mr. Don Rychnowski - Director, Southern Tier West Regional Planning & Development Board

North Carolina

Ms. Susan Howard - Federal legislative Coordination, North Carolina Department of Transportation

Ohio

Mr. Tracy Drake - Executive Director, Columbiana County Port Authority.

Pennsylvania

Mr. Herb Packer - Executive Director, Penn Ports

South Carolina

Mr. Steve Pelissier - Executive Director, Appalachian Council of Governments

Tennessee

*Ms. Jeanne Stephens - Director, Long Range Planning, Tennessee Department of Transportation
Dr. Mark Burton - Director, Center for Transportation Research, University of Tennessee*

Virginia

Mr. Wayne Strickland - Executive Director, Roanoke Valley-Alleghany Regional Commission

West Virginia

Mr. Patrick Donovan - Director, Public Port Authority, West Virginia Department of Transportation

Development District Association of Appalachia

*Mr. Robert Augenstern - Director, Southern Tier East Regional Planning Development Board
Mr. Robert Culver - Executive Director, Top of Alabama Regional Council of Governments*

Network Appalachia also benefits from the support and guidance of ARC's Export Trade Advisory Council.

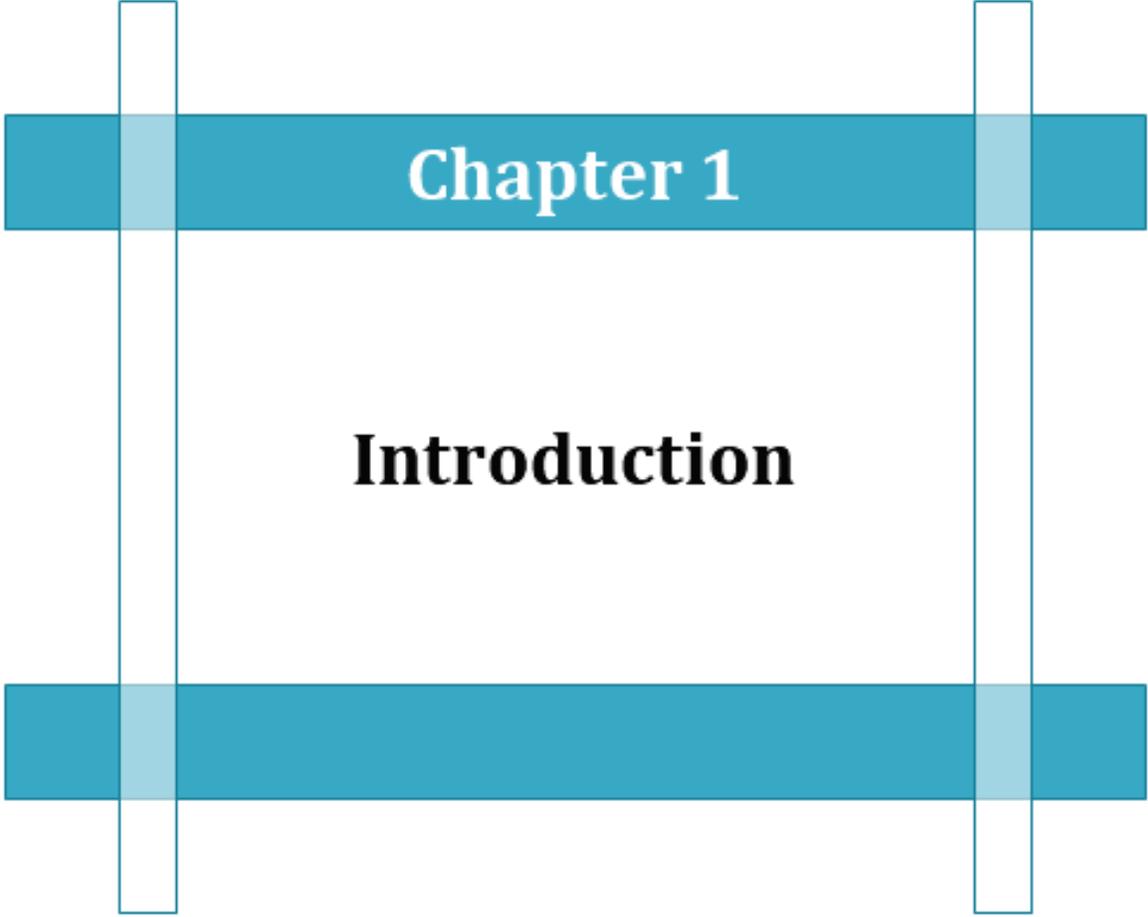
Table of Contents

1.0	Introduction.....	1
1.1	A Region Apart.....	1
1.2	ADHS - Access to Opportunity.....	2
1.3	Transition to the Global Economy.....	2
1.4	Network Appalachia.....	4
2.0	Global Trade Patterns.....	5
2.1	Containerization of Trade.....	6
2.2	Trade Barriers.....	7
2.3	Information and Communication Technology.....	8
2.4	Demographics.....	8
3.0	Appalachian Trade Perspective.....	16
3.1	Demographics and Consumption.....	16
3.2	Regional Transportation Infrastructure.....	20
3.3	Strategic Highway System.....	21
3.4	Strategic Railway System.....	22
3.5	Strategic Waterway System.....	23
3.6	Inland Ports.....	26
3.7	Coastal Ports – Global Access.....	26
3.8	Connectivity: Inland and Coastal Links.....	31
3.9	Economic, Energy, and Environmental Success – And Expanded Capacity.....	33
4.0	Access Evaluations.....	34
4.1	Access Definition.....	36
4.2	Proximity.....	36
4.2.1	Interstates.....	38
4.2.2	ADHS/ National Highway.....	39
4.2.3	Intermodal (Container) Rail Terminals.....	40
4.2.4	Multimodal Rail Terminals.....	41

4.2.5	Inland Waterway Terminals	42
4.2.6	Intermodal Rail – Interstate Highway Intersection	43
4.3	Data Compilation and Normalization	44
4.4	Weighting and Ranking.....	44
5.0	Engagement and Collaboration.....	47
5.1	Building Capacity for the Future.....	47
5.2	Putting the Capacity to Work	47
5.3	Engaging the Region	49
5.4	Many Voices. Many Ideas. One Future.....	50
5.5	Strategic Priorities	52
5.6	Tactical Opportunities	53
6.0	The Way Ahead	57
6.1	Projecting Forward: A Changing World of New Challenges and Opportunities.....	57
6.2	Positioning for Success in the 21 st Century: Network Appalachia.....	59
6.3	Proactive Planning: The Way Ahead	64

Table of Figures

Figure 2.1: World Exports of Manufactured Goods and Real GDP	5
Figure 2.2: Containerization of Natural Rubber Imports	6
Figure 2.3: Percentage of Population at Retirement Age and Average Age.....	8
Figure 2.4: Share of US Household Expenditures Goods and Services	9
Figure 2.5: Manufacturing Labor Costs in US Dollars at Prevailing Exchange Rates.....	9
Figure 2.6: Employment Shares by Type of Activity 1957 - 2006.....	10
Figure 2.7: Employment Trends in Industries Manufacturing Containerizable Goods	11
Figure 2.8: Global Trade in Manufactured Goods, Oil & Metal Commodities and Agricultural Goods	12
Figure 2.9: US International Container Volume Trade and Real GDP, Indexed to 100 in 1980	13
Figure 2.10: US Containerized Trade for Major Foreign Trade Routes	14
Figure 2.11: TEUs per 1000 Persons	15
Figure 3.1: Population Density.....	16
Figure 3.2: Retail Sales.....	17
Figure 3.3: Density of Warehouse Businesses.....	18
Figure 3.4: Projected Population Increase	19
Figure 3.5: Projected Population Growth Rate	20
Figure 3.6: Strategic Highway System	21
Figure 3.7: Strategic Railway System.....	22
Figure 3.8: Emerging Intermodal Rail Corridors	23
Figure 3.9: Strategic Waterway System	24
Figure 3.10: Emerging Intermodal Marine Highway Corridor	25
Figure 3.11: Enhancing Access to International Ports	27
Figure 3.12: ARC 2007 Import Volumes.....	28
Figure 3.13: ARC 2007 Export Volumes	29
Figure 3.14: Top ARC Import Volumes.....	30
Figure 3.15: North Asia LCMA and 2007 Import Volumes	31
Figure 3.16: North Asia LCMA and 2007 Export Volumes.....	32
Figure 4.1: ARC Counties showing Geographic Centroids (Blue) and its closest 5-Digit Zip Code (Red).....	37
Figure 4.2: National Highway Planning Network Version 2005.08	38
Figure 4.3: The ADHS network (2007).....	39
Figure 4.4: The ICTF network used in the study.....	40
Figure 4.5: The Multimodal Freight Rail Network	41
Figure 4.6: Selected Inland Waterway Ports.....	42
Figure 4.7: Selected Rail – Interstate Intersection Locations.....	43
Figure 4.8: Access Evaluation Map.....	46
Figure 5.1: Venue/Dates of Regional Workshops and Members of the Study Group.....	48
Figure 6.1: The Appalachian Development Highway System	60
Figure 6.2: Intermodal Corridors of Commerce	61
Figure 6.3: Inland Container Ports.....	63



Chapter 1

Introduction

1.0 Introduction

1.1 A Region Apart

Appalachia. This is a land stretching for over 1,000 miles along the spine of the ancient Appalachian Mountains from southern New York State to northeastern Mississippi. It encompasses a rugged landscape more than twice the size of Great Britain. Yet, with a population of only about one-third that of its trans-Atlantic neighbor, Appalachia is known for its rural lifestyles and is home to abundant natural resources, spectacular beauty, and a distinctive cultural heritage.

Famous for its rich coal deposits and dense hardwood forests, its mountain peaks and deep, forest-lined valleys have provided residents with seemingly endless natural resources. Yet, these same mountains have stood throughout history as nearly impenetrable barriers to socio-economic interaction, commerce, and prosperity. When the builders of America's Interstate Highway System confronted the rugged terrain of Appalachia, they chose to build around the Region rather than to penetrate this mountainous land with their modern highway system, a system that would shape American economic prosperity for the remainder of the 20th century. Appalachia is a place apart, a place where people have long-suffered the chronic economic consequences of physical isolation. Recognizing both the obstacles and the potential facing the Region, the President's Appalachian Regional Commission (PARC) opened its 1964 report to President Lyndon Johnson, with the following:

Appalachia is a region apart-geographically and statistically. It is a mountain land boldly up-thrust between the prosperous Eastern seaboard and the industrial Mid West – a highland region which sweeps diagonally from New York to Mississippi...

Responding to this report, Congress passed the Appalachian Regional Development Act of 1965, creating the Appalachian Regional Commission (ARC). The PARC report focused attention on the need for investment in basic public facilities and stressed that programs must also be initiated which are focused directly upon the people themselves. Finally, the report argued that progress can only be realized through the coordinated effort of a regional development organization, with state and local development units, with research and demonstration centers, and with multiple state and federal agencies. From these priorities grew unique partnerships between federal, state, and local interests, partnerships that remain at the very heart of the Appalachian Regional Commission nearly a half century later.

1.2 ADHS - Access to Opportunity

Recognizing the linkage between isolation and economic distress, the PARC report emphasized, “Developmental activity in Appalachia cannot proceed until the regional isolation has been overcome.” So fundamental was the need for enhancing Appalachia’s access that the Appalachian Regional Development Act of 1965 devoted 85% of appropriated funds to improve transportation access to, from, and within the Region and authorized the establishment of the Appalachian Development Highway System (ADHS).

Unlike conventional roadways, ADHS is a 3,090 mile near-interstate grade highway system composed of 31 individual corridors and designed to stimulate socio/economic development throughout the 13-state Appalachian Region. Specifically, ADHS was designed to provide the following benefits:

1. Link Appalachia to key external markets.
2. Enhance the flow of commerce, opening isolated areas to economic opportunity.
3. Facilitate commutation to work and delivery of key social services to residents.

Now nearly 85% complete, the impact of ADHS has been both widespread and profound. It is a bridge that overcomes the obstacle of isolation and provides important access that remains today critical to Appalachia’s economic growth and prosperity. In establishing its Strategic Plan for the time period 2005-2010, ARC called for the continued development of ADHS as one of its primary goals and committed to an increased focus on maximizing the system’s economic and employment benefits to the Region.

Looking to the future, ARC commissioned a study in 2008 entitled Economic Impact Study of Completing the Appalachian Development Highway System. The research determined that by completing the yet unfinished segments of ADHS, the Region would benefit from \$3.2 billion in new wages, \$5 billion of increased economic activity, and 80,500 new jobs. The study highlighted the importance of these final links in completing ADHS; a system and its resultant benefits that would be abbreviated for all time, if left unfinished. Finally, the study confirmed that ADHS benefits extend far beyond the borders of Appalachia, as the capacity, safety, and efficiency of ADHS is of growing importance, as so much of the nation’s highway capacity is becoming increasingly overburdened with congestion.

1.3 Transition to the Global Economy

Throughout the nearly half-century since the launch of ADHS, the economy of Appalachia, and of the United States, has been undergoing an unrelenting transformation from one almost completely dominated by domestic commerce to a new and much broader international marketplace, powered by the telecommunication forces of the world wide web and facilitated through the creation of a fully-coordinated intermodal global supply chain. This is an economic

transition that continues to present both challenges and opportunities, as it reshapes the flow of commerce to, from, and across Appalachia.

As the Region was preparing to enter into the 21st century, a 1999 study commissioned by ARC, entitled An Assessment of Intermodal Transportation Plans, Systems, and Activities in Appalachia stressed the importance of better coordinating the region's often disjointed transportation resources. The study identified only seven locations throughout the 200,000 square mile Appalachian Region that can accommodate the intermodal interchange of freight containers between trucks and trains, termed intermodal container transfer facilities (ICTF). Such limited intermodal access results in higher shipping costs and a pronounced competitive disadvantage for Appalachian businesses. Warned the study, "While ADHS has served as the centerpiece of ARC's economic development program, highways alone are no longer sufficient to help Appalachia's communities compete in the global marketplace."

Six years later the Nick J. Rahall, II Appalachia Transportation Institute undertook an important strategic look into ARC's future entitled, Meeting the Transportation Challenges of the 21st Century, Intermodal Opportunities in the Appalachian Region. The report identified emerging east-west and north-south trade lanes across Appalachia, representing important new channels of economic growth and opportunity. Taking advantage of its natural cross-roads location between the northeast, mid-Atlantic, southeast, and Midwest, the report highlighted an opportunity for Appalachia to serve as an inland-bridge, linking key coastal ports with major supplier and consumer markets in the east, south, and Midwest. The report encouraged Appalachia to position itself to attract and accommodate these growing volumes of commercial activity to, from, and across the region. The study warned that, should Appalachia fail to take advantage of this potential, these emerging corridors of commerce, and the economic benefits that they represent, could simply bypass Appalachia. The study concluded with a seven-point development blueprint for a 21st century logistics network that maximizes ADHS benefits by positioning Appalachia to capture the full economic potential of these emerging corridors of commerce:

1. Establish the institutional capacity to plan for and encourage transportation development across local, county, and state inter-jurisdictional boundaries.
2. Expand inter-disciplinary cooperation between economic development, transportation, and international trade interests.
3. Increase planning, coordination, and investment between public and private sector interests to maximize economic and employment benefits to Appalachia.
4. Through a developing system of inland ports, enhance intermodal cooperation to better connect transportation modes and strengthen the link between the Region's economy and its transportation network.
5. Take full advantage of advanced technology to strengthen the performance, responsiveness and safety of the Region's transportation network.
6. Track changing economic and commodity flow trends and proactively position Appalachia to benefit from emerging corridors of commerce.

7. Advocate for a 21st century transportation system that can enhance the competitiveness of Appalachia’s existing businesses and attract new enterprise and employment into the Region.

1.4 Network Appalachia

At the 2007 ARC summer meeting, the Commission established a regional Study Group comprising economic development, transportation, and international trade professionals from across Appalachia. Under a planning initiative labeled “Network Appalachia”, ARC directed its Study Group to carefully evaluate changing macro-economic trends and project the effects of these trends on the Region’s future commerce and on the movement of goods to, from, and across Appalachia. Next, the Study Group was charged with reviewing the Region’s transportation capabilities and their effect on Appalachia’s access to both domestic and global markets. Building on the Appalachian Development Highway System platform, the Study Group was asked to provide the Commission with a comprehensive package of recommendations on how to develop a 21st century transportation network that can maximize both economic and employment benefits to the Region and ensure that Appalachia will never again find itself “a region apart”.

The following chapters report on the research and work of the Network Appalachia Study Group, including the findings of the four regional workshops.



Chapter 2

Global Macroeconomic Trends

2.0 Global Trade Patterns

Despite episodes of oil price spikes, several financial crises, and flare ups in geopolitical tensions, global trade in manufactured goods has grown on average 7.6 percent per year over the last six decades, while inflation adjusted global GDP has grown 3.8 percent, according to World Trade Organization data, and Moffatt & Nichol estimates for 2008.

The volume index of world exports of manufactured goods has increased 64-fold between 1950 and 2008, while global real GDP has only increased 8-fold as shown in figure 2.1

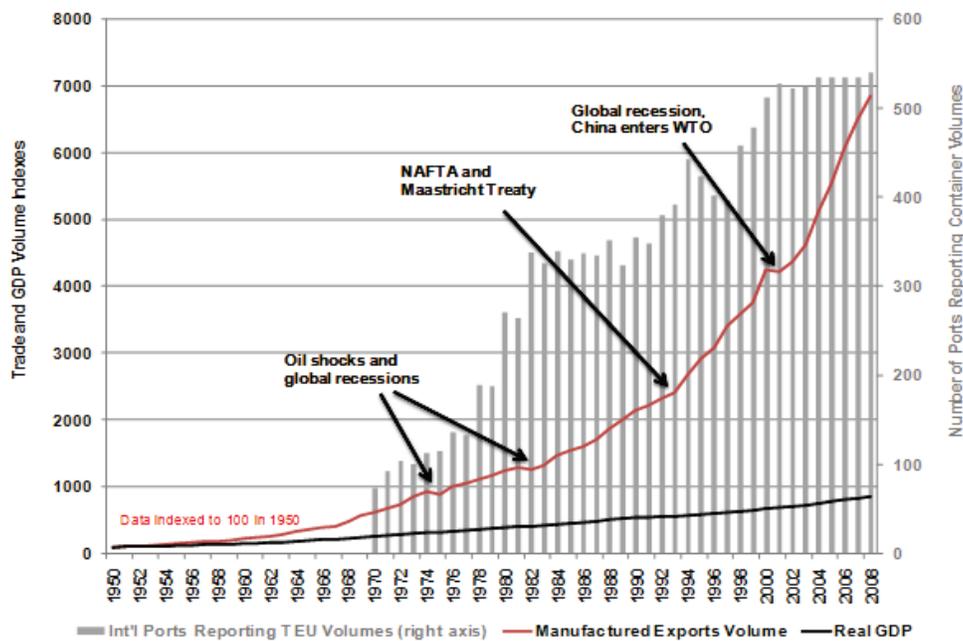


Figure 2.1: World Exports of Manufactured Goods and Real GDP, Indexed to 100 in 1950 and Number of Ports Reporting Container Volumes

Source: World Trade Organization, Containerisation International, Moffatt & Nichol

	Average Trade Growth	Average GDP Growth	Ratio of Trade to GDP Growth
1950 - 2007	7.6%	3.8%	2.0
1996 - 2007	6.6%	2.9%	2.3

Table 2.1: World Exports of Manufactured Goods and Global Real GDP Growth

Source: World Trade Organization, Moffatt & Nichol

As shown in Table 2.1, world trade in manufactured goods has grown over time twice as fast as world GDP. While economic growth is an underlying driver of trade growth, it does not fully account for trade growing twice as fast. Other long term structural factors have contributed to high growth levels. The good news is that trends for these structural factors are such that trade will continue to grow faster than GDP through the end of the next decade. The differential in the growth rates can be attributed to at least four structural factors, each of which still has ample room to continue driving global trade.

2.1 Containerization of Trade

Figure 2.1 shows, among other things, that the number of ports around the world reporting container volumes since 1970 increased from 75 to over 550 since 1970. Containerization lowers the cost of trade and therefore allows manufacturers to reach a larger market or relocate production operations to lower cost locations. Most recently there has been an increasing trend of containerizing traditional breakbulk commodities. As noted in Figure 2.2, as recently as 2004, 29.6% of imported natural rubber was containerized and 70.4% was not; as of September 2008 the trend has reversed where 62.1% of the imports were containerized and 37.9% was not. This is only one example of a global trend, and one that is expected to continue over the next

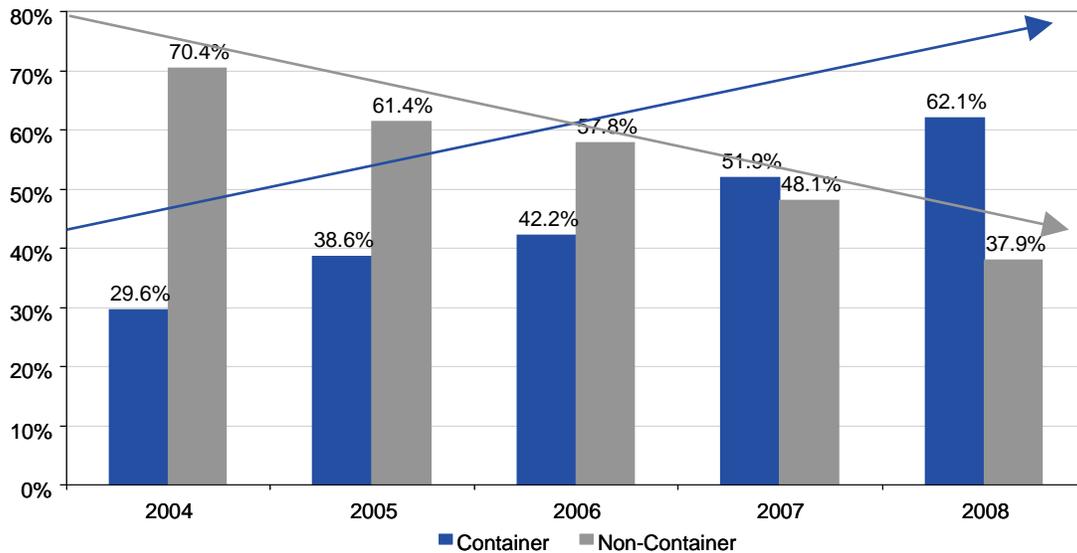


Figure 2.2: Containerization of Natural Rubber Imports

Source: US Census Bureau; Moffatt & Nichol

decade.

The outlook for future and continued containerization of commodities can be linked to the growing trade between developing economies and the rest of the world. Some of the fastest

growing trade routes in 2008 are between South America and the rest of the world including the US and China. Many of these South American nations, including Brazil, Colombia and Peru, have growing container trades which are being developed out of very primitive facilities. The Port of Callao in Peru, for example, handles approximately 25% of the volume of the Port of New York/New Jersey’s roughly 4 million TEUs (Twenty-Foot Equivalent Unit – a standard measurement of container size). What makes Callao impressive is that the current volumes are handled without the use of a single dockside modern gantry crane (these are the cranes used to load/off load containers from a vessel) while the Port of New York/New Jersey operates with approximately 50 such cranes. Callao is currently undergoing a development program, including the purchase of modern cranes, which will roughly double the port’s current capacity.

Within the US there is a growing tendency to ship agriculture exports in containers as well. The soybean industry has found in recent years that shipping in containers can help reduce costs as well as help deliver a specialized product. This refers to the customer demands for particular grades of soybeans being used in various products. By placing the soybeans in containers, the exporters have reassured customers that they are receiving the desired soybean grade which hasn’t been mixed with other grades. It has become a quality assurance mechanism, one which is increasingly being sought after in other agriculture products. The USDA has also promoted containerization as a means of maintaining the competitiveness of US agricultural exports.

2.2 Trade Barriers

Between 1947 and 2008 there have been nine global trade agreements beginning with the Global Agreement on Trade and Tariffs at the Geneva round and most recently the failed Doha Round which began several years ago. In the meantime the Maastricht Treaty in Europe and NAFTA contributed significantly to trade growth as did China’s ascension to the WTO in 2001. The Business Roundtable estimates that 50% of world trade takes place under Free Trade Agreements, with about one third of them having been established in Asia since 2001. This is presented in Table 2.2.

FTAs negotiated globally	Aproximately 300
FTAs negotiated since 2002 in Asia-Pacific	119
Percentage of world trade occurring through FTAs	50%
Countries with which China is negotiating or has proposed FTAs	28
EU FTAs	21
US FTAs	10

Table 2.2: World Free Trade Agreement Facts

Source: Business Roundtable, Moffatt & Nichol

In November 2008, China and Peru signed a free trade agreement. Canada and Colombia also signed an agreement that same month. This is indicative of two changing dynamics which are

mutually dependent. First, it shows the world is becoming more and more integrated. Nations which have existed relatively independent of one another are now becoming trade partners. Second, it shows that many of these nations which have historically relied on the US to trade with are turning elsewhere for support, which implies that the US is losing some of its clout in the global trade economy, particularly with South America. If the US is to maintain its dominance and influence with South and Central America it is important for FTAs to be established between the US and these nations.

2.3 Information and Communication Technology

The Internet is accessible worldwide so that businesses can operate production and distribution software, such as SAP, that allows them to globally manage their activities from virtually anywhere in the world. These improvements in communication technology greatly facilitate global sourcing – enabling firms to optimize production efficiencies.

2.4 Demographics

The populations of Europe, North America and Japan are aging as their baby boom generations enter retirement. In 2007 3.4 million Americans turn 62, while in 2008 an even greater number will make this transition. This group will continue to downsize residences and purchase new goods when they move to new homes. The demographic projections from the US Census Bureau shown in Figure 2.3 indicate that:

- From 1980 – 2000 just 1 in 5 people were of the retirement age
- By 2030 close to 1 in 3 people will be of the retirement age

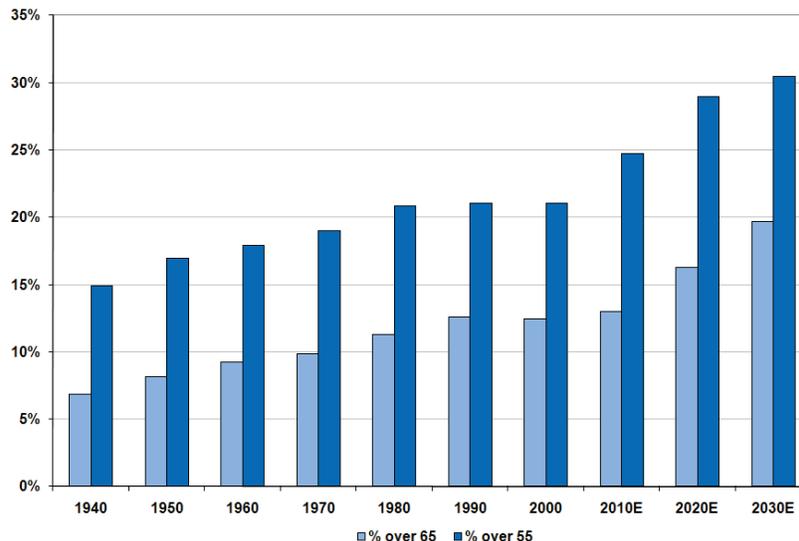


Figure 2.3: Percentage of Population at Retirement Age and Average Age

Source: US census Bureau, Moffatt & Nichol

The demand for services (leisure & entertainment, healthcare, financial advising, legal services) by older people grows faster than their demand for manufactured goods as shown in Figure 2.4.

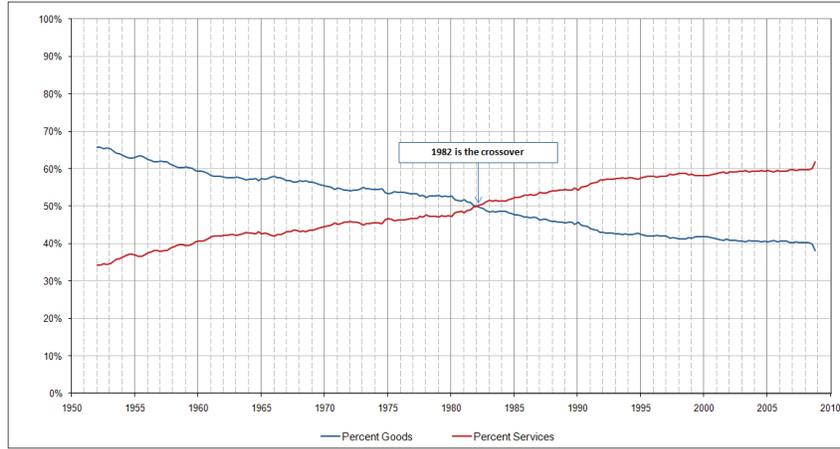


Figure 2.4: Share of US Household Expenditures Goods and Services

Source: Bureau of Economic Analysis, Moffatt & Nichol

Therefore, as the service sector bids labor away from manufacturing, the manufacturing sector, which is less location sensitive, will continue to outsource to lower cost labor locations. Manufacturing is less location sensitive due to containerization, lower trade barriers and better

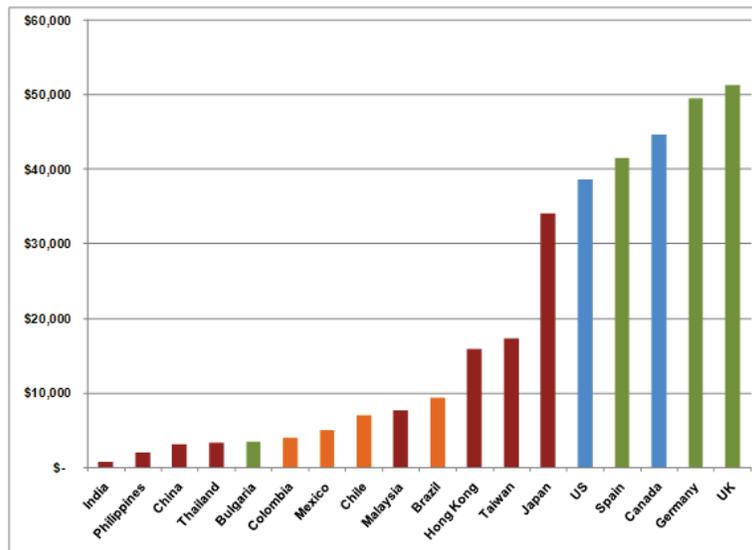


Figure 2.5: Manufacturing Labor Costs in US Dollars at Prevailing Exchange Rates

Source: International Labor Organization, Business Monitor, Moffatt & Nichol

information technology. Wages have been and remain lower in Asia. Those countries also have younger populations and offer higher demand growth for low cost manufactured goods than in mature industrialized economies. Given these patterns, indicated in Figure 2.5, outsourcing trends to Asia are not likely to reverse soon with these labor cost disparities.

Given the aging population and the cheap available labor overseas it is not surprising that employment in the US has shifted from manufacturing to services, as shown in Figure 2.6. The total value of manufactured goods produced in the US continues to rise. However, manufacturing activity in the US is increasingly capital-intensive and concentrated in high

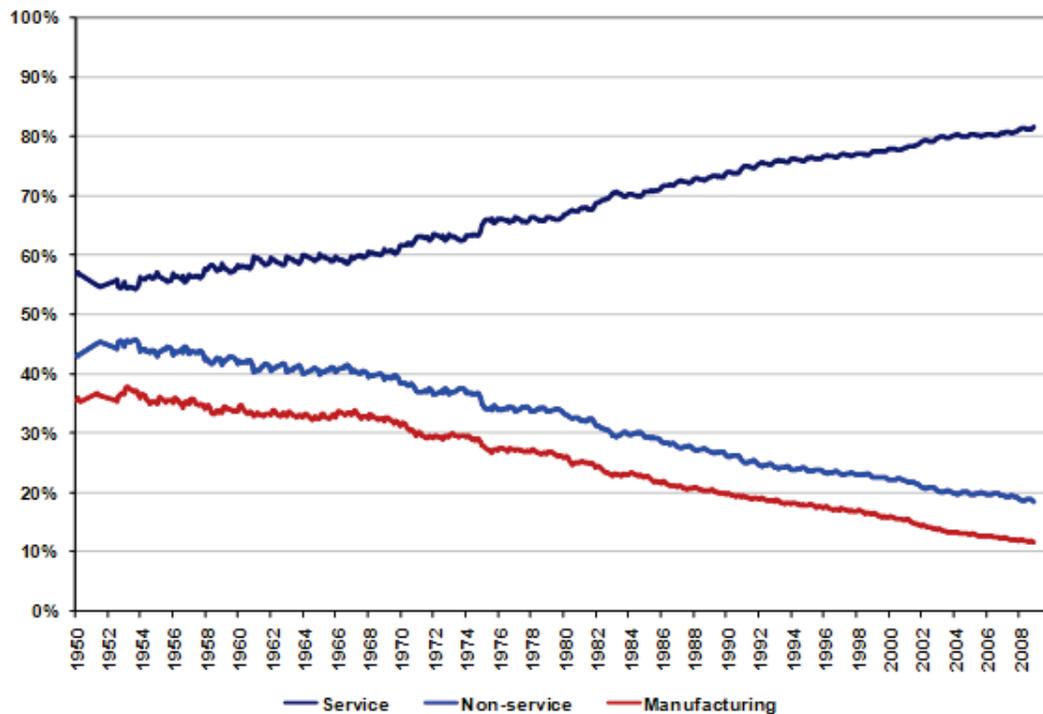


Figure 2.6: Employment Shares by Type of Activity 1957 - 2006

Source: Bureau of Labor Statistics, Moffatt & Nichol

intellectual property goods such as power and transportation equipment

This perspective implies that not all industries are likely to outsource simultaneously. The lower profit margin ones would go first and this process would continue with the next lowest profit margin ones and so on. One way to see this is to review patterns in US labor employment shown in Figure 2.7. Monthly employment for industries that manufacture containerizable goods are shown from 1990 through the middle of 2008, indexed to 100 in January 1990 to make the chart easier to read. Given that employment levels by industry vary significantly, the chart shows that

the clothing-related industries have outsourced the most and industries related to automobile manufacturing and home construction have outsourced the least.

This can be attributed to the boom in the housing market and strong auto sales that were supported through most of this decade by loans with low market interest rates. The decline in residential real estate and automobile sales is pressuring the profits and financial viability of companies in these sectors. The survivors are most likely to be the ones that have been off-shoring their production operations. Given this outlook, US manufacturing employment could

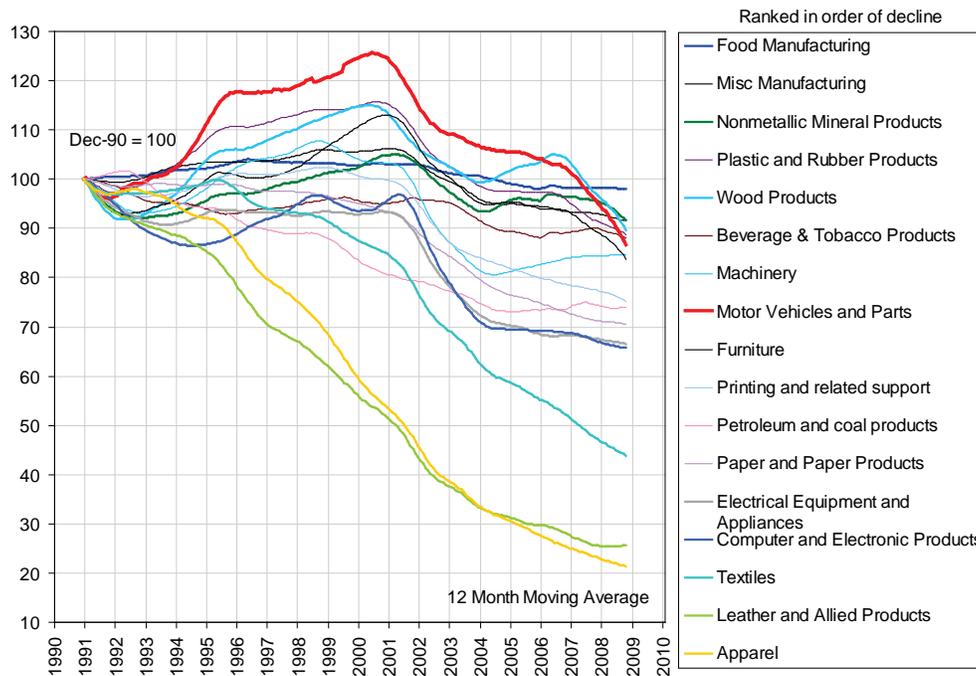


Figure 2.7: Employment Trends in Industries Manufacturing Containerizable Goods

Source: Bureau of Labor Statistics, Moffatt & Nichol

continue to fall on average by 2% per year, which would support US container volume growth – particularly during recessions, assuming the world financial system does not freeze up again.

World trade in manufactured goods has not only grown faster than global GDP but also faster than trade in energy, metals and agricultural commodities. However, this gap is expected to close. Prior to globalization beginning in the early 1970s, emerging markets exported raw materials to industrialized nations and imported manufactured goods. As factories were moved from industrialized nations to emerging market locations, there was less need for commodities to be shipped around the world. Therefore, between 1970 and 1990 commodity trade was relatively flat while trade in manufactured goods rose steadily. Since 1990, commodity exports

from mature industrialized nations to emerging markets have begun to grow. This supports increased manufacturing in those emerging markets. The recent growth in US commodity

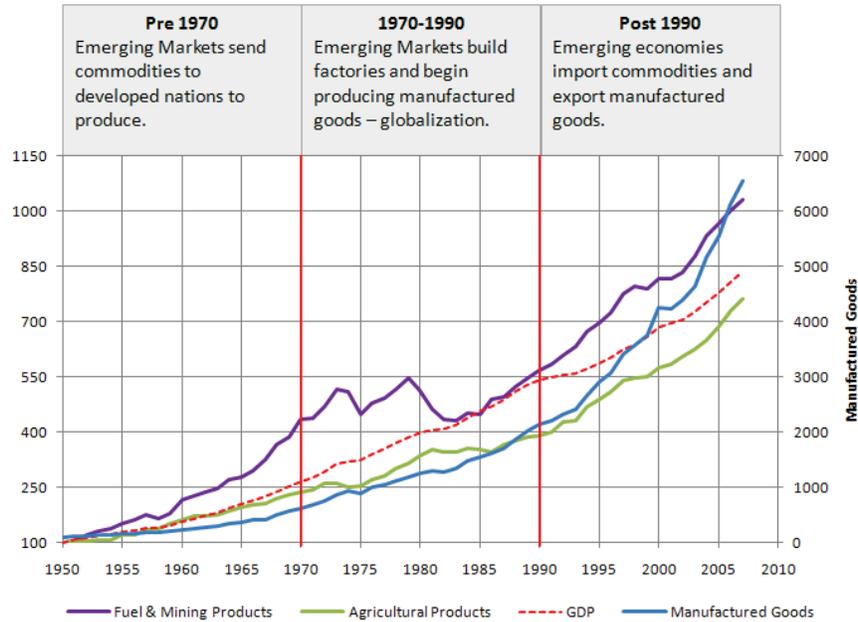


Figure 2.8: Global Trade in Manufactured Goods, Oil & Metal Commodities and Agricultural Goods

Source: World Trade Organization, Moffatt & Nichol

exports was due to the weakening foreign exchange value of the dollar and the ongoing change in the structure of world trade. It is expected that global trade of all types of goods will continue to grow. Figure 2.8 illustrates these trends.

2.5 United States Trade Trends

The global trends discussed above are particularly evident in the US. Over the last 27 years US container volumes have grown seven-fold while real GDP slightly more than doubled. Most consumer goods and some bulk commodities arrive in the US in containers.

	1981-1990		1991-2000		2001-2007		1981-2007	
	TEU Growth CAGR	TEU to GDP Ratio	TEU Growth CAGR	TEU to GDP Ratio	TEU Growth CAGR	TEU to GDP Ratio	TEU Growth CAGR	TEU to GDP Ratio
West Coast	9.8%	2.9	7.5%	2.0	7.8%	2.9	7.6%	2.4
East Coast	4.8%	1.4	5.7%	1.6	7.6%	2.9	5.5%	1.7
Gulf Coast	6.4%	1.9	8.3%	2.3	4.9%	1.8	6.6%	2.1
National	6.8%	2.0	7.2%	2.0	6.6%	2.5	6.4%	2.0

Table 2.3: Container Volume by US Region and Real GDP Growth

Source: American Association of Port Authorities, Bureau of Economic Analysis, Moffatt & Nichol

Figure 2.9 shows container volumes and real GDP, indexed to 100 in 1980. Containerization of trade began in the 1970s; however, it only became a standard for global trade in the 1980s. The chart shows that US container volume trade has grown even during recession years and near-

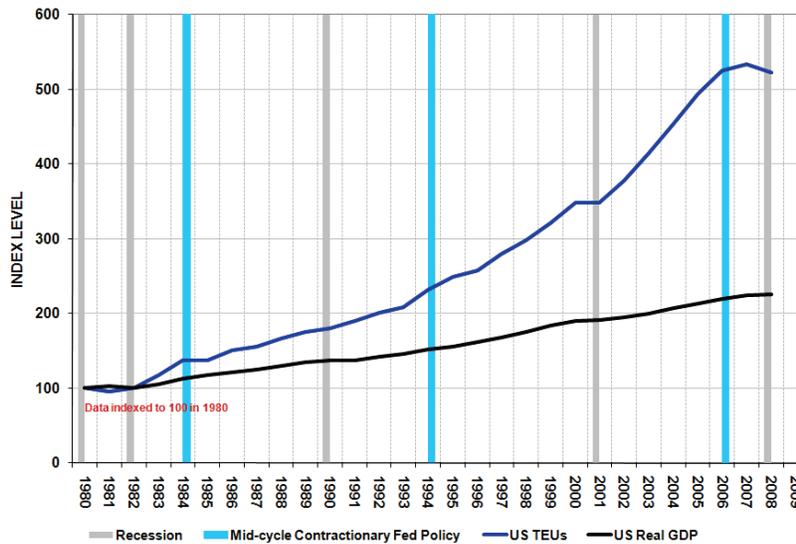


Figure 2.9: US International Container Volume Trade and Real GDP, Indexed to 100 in 1980

Source: American Association of Port Authorities, Bureau of Economic Analysis, Moffatt & Nichol

recession periods following mid-cycle Fed funds tightening. Off-shoring of manufacturing rises during periods of slow growth as companies try to sustain profit margins by cutting costs to offset flat or declining revenues.

Not all ports and regions benefited equally from growing US container volume trade. Some regions experienced higher growth than others, presented in Table 2.3. There are several reasons for this. US trade has grown fastest with Asia, beginning with Japan and Hong Kong, then Korea and other emerging Asian economies and most recently with China. Most of Asia’s trade arrives in the US via trans-Pacific services operated by various global ocean carriers. These volumes are mostly offloaded at West Coast ports. Some Asian volumes arrive via the Panama Canal at East Coast ports on “all water” service offered by the ocean carriers. South and Southeast Asian volumes move via the Suez Canal.

Figure 2.10 displays the share of US containerized trade by each of the major foreign trade routes, and how they have changed from 1997 to 2005, and the projection of share for 2015. This clearly demonstrates the dominance of the Asian trade route, reflecting the impact of the outsourcing of manufacturing to Asia.

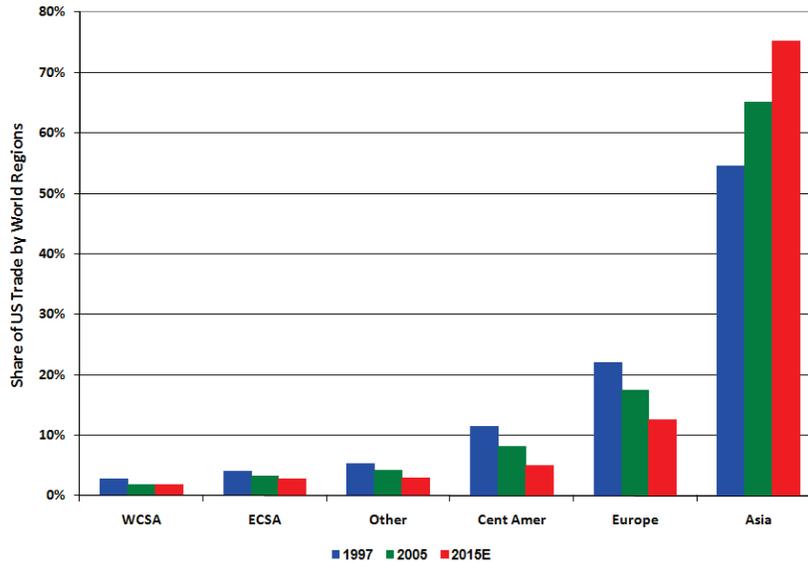


Figure 2.10: US Containerized Trade for Major Foreign Trade Routes

Source: PIERS, Moffatt & Nichol

While Figure 2.10 indicates a relatively small share for the North – South trade routes for the West Coast and East Coast of South America (WCSA, ECSA) there may be potential that could be recognized beyond these projections. While Chile has a penetration measured in TEUs (twenty foot equivalent units) per 1,000 people approaching that of the US, as shown in figure 2.11, the other economies fall far behind. With further port development in Brazil and Argentina, and continued development of these economies, the North – South trade routes could show additional growth, potentially benefiting some segments of Appalachia.

Forecasts, presented in Table 2.4, call for loaded container trade volume to grow at a compound annual growth rate (CAGR) of 6.2% over the next twenty years, sustained by further off-shoring of manufacturing and removal of trade barriers. Near to mid-term growth is expected to be slower due to the current recession; however, beyond that it is expected that trade growth will return to its historical average of 6.2%. Beyond 2020 container volume growth may slow as the structural drivers of trade will have ended.

	2007				2007-2013 CAGR			2007-2020 CAGR		
	Imports	Exports	Total	Share	Imports	Exports	Total	Imports	Exports	Total
North Asia	11,542,916	4,355,308	15,898,225	55.1%	4.9%	7.5%	5.6%	6.9%	7.1%	6.9%
SE Asia	1,600,483	788,903	2,389,386	8.3%	5.5%	7.0%	6.0%	7.4%	6.3%	7.1%
South Asia	575,977	298,761	874,738	3.0%	7.6%	8.4%	7.9%	8.5%	8.3%	8.4%
Europe	1,701,699	1,477,121	3,178,820	11.0%	3.0%	4.1%	3.5%	3.3%	3.2%	3.2%
Mediterranean	852,215	687,011	1,539,226	5.3%	3.4%	7.9%	5.5%	4.5%	6.9%	5.7%
Middle East	38,080	260,027	298,108	1.0%	4.3%	9.1%	8.5%	7.0%	7.3%	7.3%
WC S America	282,773	206,014	488,787	1.7%	3.1%	7.8%	5.2%	4.1%	4.1%	4.1%
EC S America	417,802	313,498	731,300	2.5%	3.5%	4.1%	3.8%	5.3%	3.9%	4.7%
Cent Am/Carib	943,474	1,743,340	2,686,815	9.3%	2.7%	5.0%	4.2%	3.7%	4.4%	4.2%
NAFTA	62,943	56,000	118,943	0.4%	3.2%	11.2%	7.3%	4.9%	10.7%	8.1%
Australia/NZ	130,936	200,732	331,668	1.1%	3.6%	3.2%	3.4%	5.9%	3.1%	4.3%
Africa	69,562	166,293	235,855	0.8%	3.4%	11.9%	9.7%	4.5%	11.6%	10.0%
Other	30,951	62,598	93,549	0.3%	3.1%	1.9%	2.3%	5.2%	2.5%	3.5%
Total	18,249,813	10,615,606	28,865,420	100.0%	4.6%	6.6%	5.4%	6.4%	6.1%	6.2%

Table 2.4: Loaded Forecasts by Trade Lane

Source: MarAd, Moffatt & Nichol

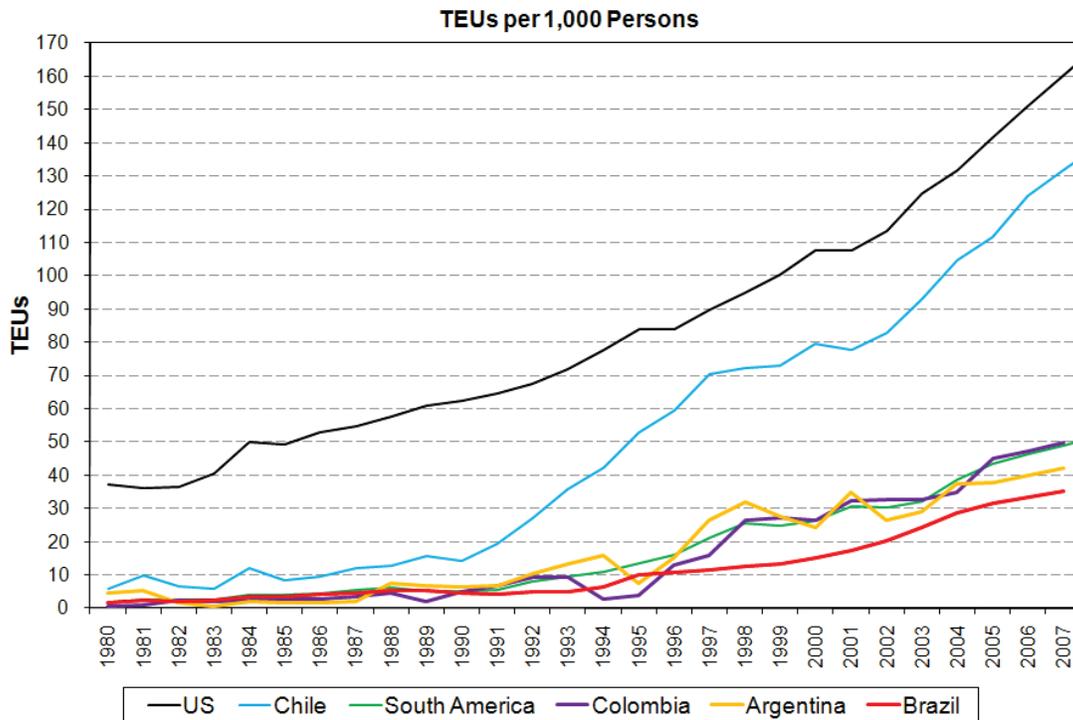
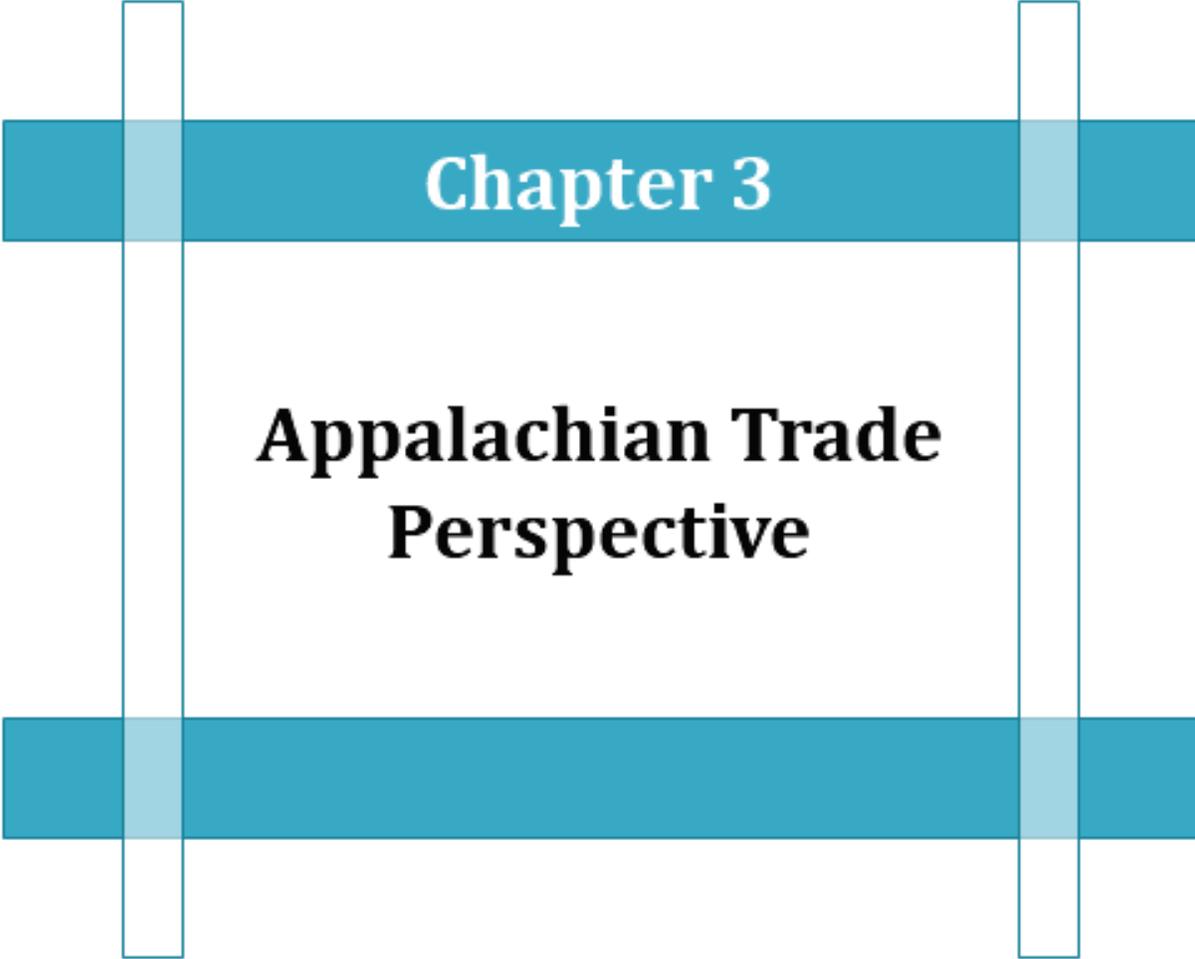


Figure 2.11: TEUs per 1000 Persons

Source: Containerisation International, PIERS, MarAd, Census Bureau, Moffatt & Nichol



Chapter 3

**Appalachian Trade
Perspective**

3.0 Appalachian Trade Perspective

The previous sections reviewed the history of the growth in world trade, the structural drivers of that growth, and the outlook for the continuation of these fundamental drivers of growth beyond the current recessionary period.

The following section will focus on a closer look at international trade characteristics and patterns as they specifically affect the Appalachian Region. The objective of this review is to identify and understand these characteristics and patterns as a foundation to assist in the identification of opportunities for transportation and trade development in the Region that can capitalize on the global and national trade trends in order to create economic development.

3.1 Demographics and Consumption

As indicated earlier, demographics are a key structural driver of the growth of trade. Population trends related to the aging of the population have driven labor conditions that have supported the outsourcing of manufacturing from the US. Population density impacts trade patterns in other ways including its impact on consumption patterns and the resulting location of transportation and distribution facilities.

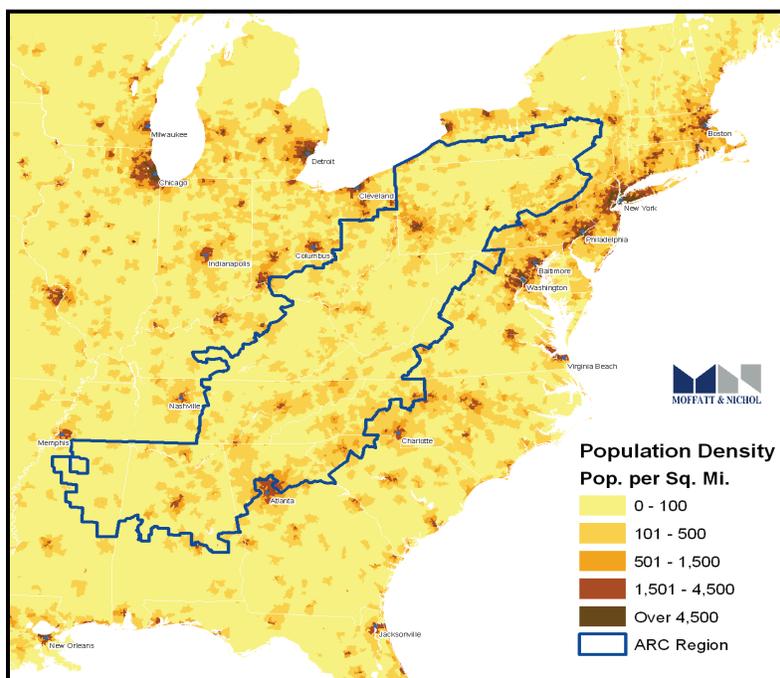


Figure 3.1: Population Density

Source: US Census Bureau

Figure 3.1 displays population density in the Appalachian Region at a county level. While the Region has a number of dense population centers on its periphery, it has relatively few such dense centers within its boundary. On the west the Region is bounded by Memphis, Nashville, Cincinnati, and Columbus, with the Northeast corridor, Charlotte, and Atlanta on the east. Within the Region, the major centers of population include Birmingham, Chattanooga, Knoxville and Pittsburgh.

Figure 3.2 displays the magnitude of retail sales by county and shows that retail consumption patterns, not surprisingly, follow population density. The value of retail sales in this analysis has been adjusted to reflect sales that correspond to commodities that might be shipped as containerized cargo. Gasoline sales, for example, are not included.

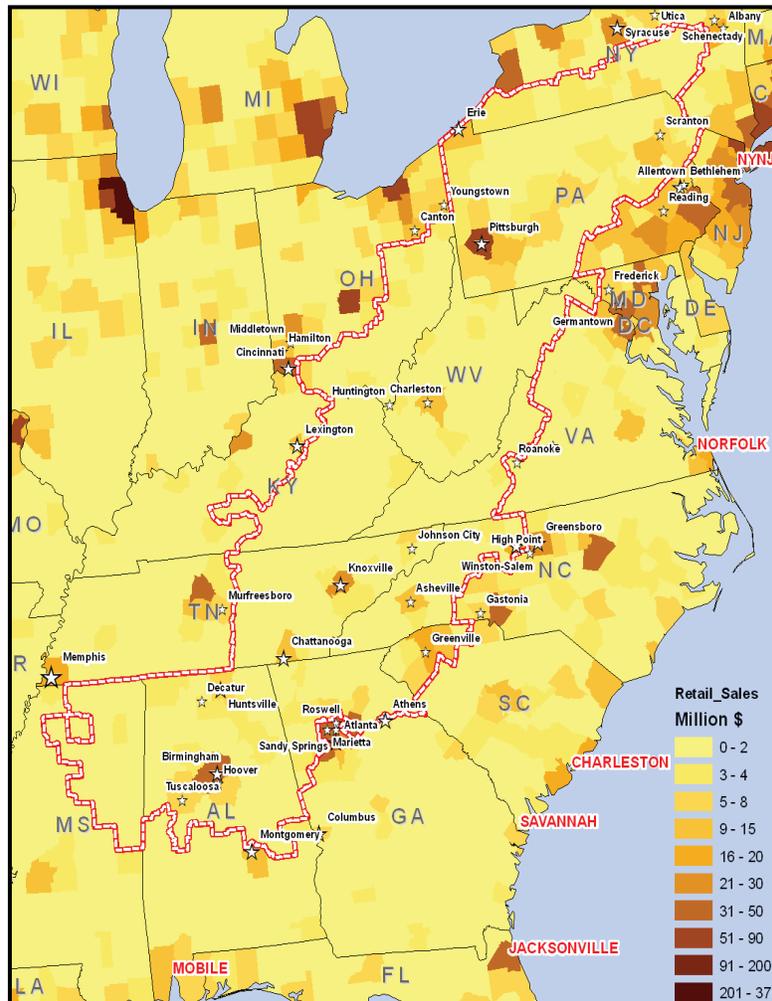


Figure 3.2: Retail Sales

Source: US Census Bureau

Similar patterns are seen in examining the geographic distribution of warehouse business revenue, as displayed in the Figure 3.3.

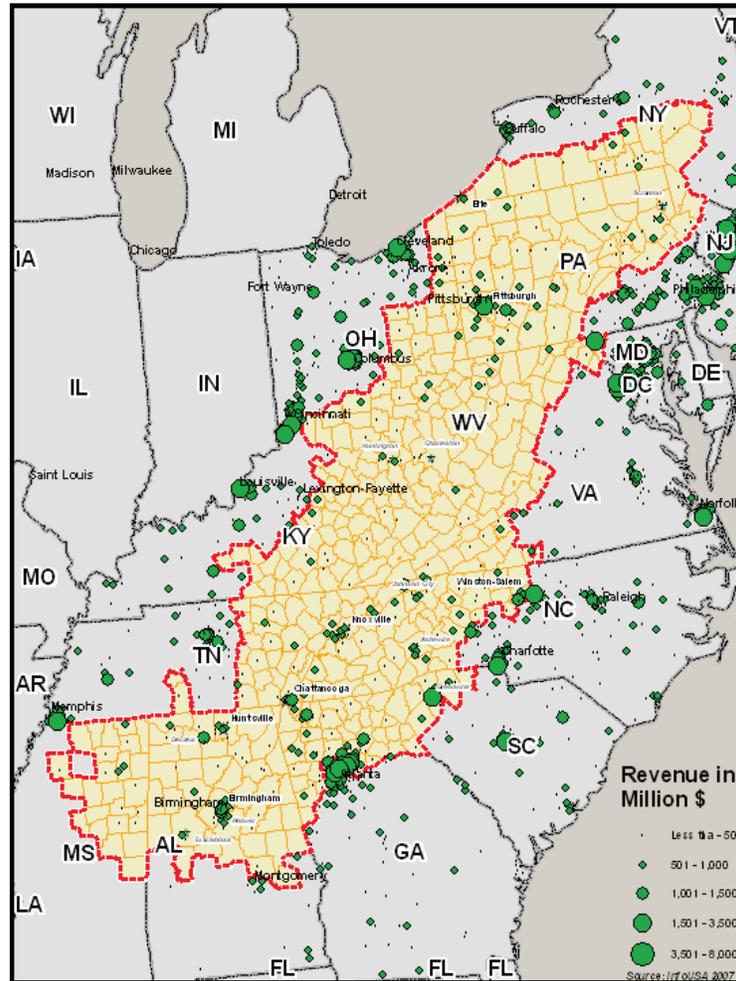


Figure 3.3: Density of Warehouse Businesses

Source: InfoUSA

In evaluating future development opportunities it is appropriate to also consider expected growth in population (and the consequent growth in consumption and business revenue.) Figures 3.4 and 3.5 display population growth in terms of absolute growth, as well as rates of growth on a county level, based on projections by the various states.

These projections are largely consistent with the national demographic trends discussed earlier. Population growth is higher in the southern parts of the Region, and particularly strong in counties bordering rapidly growing Atlanta, for example.

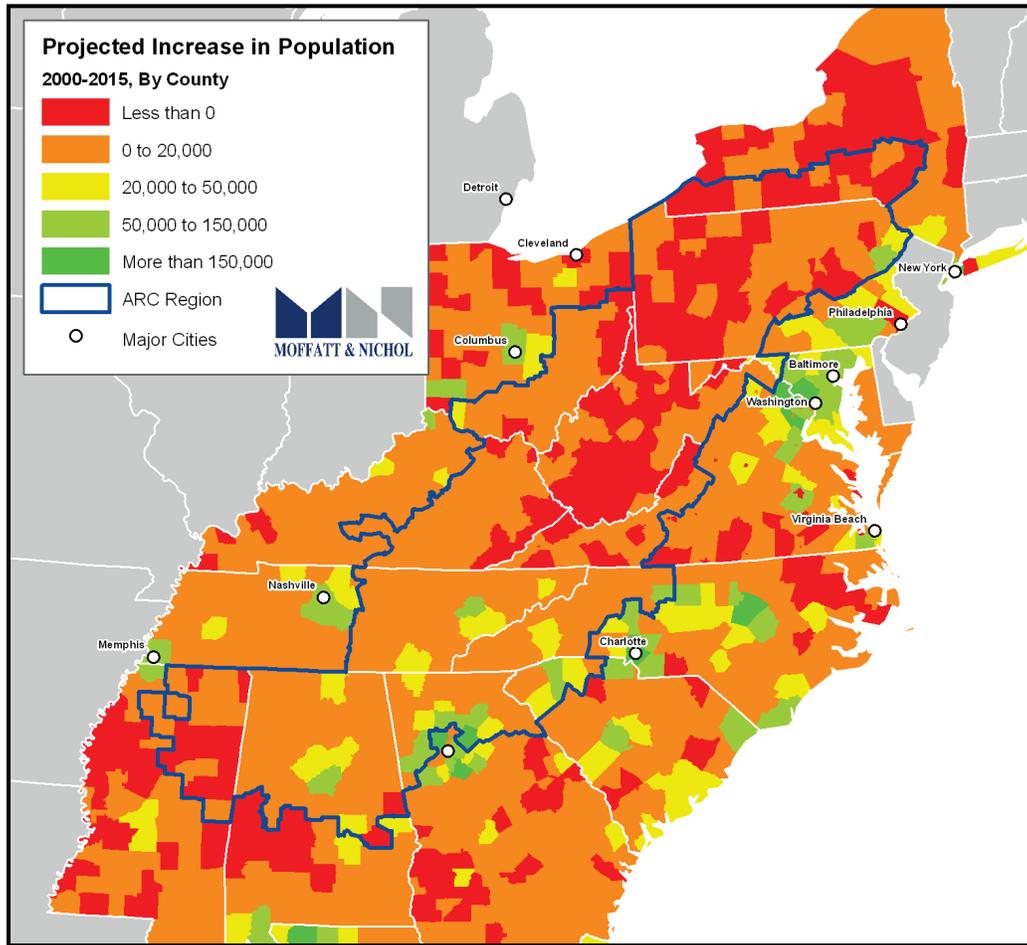


Figure 3.4: Projected Population Increase

Source: US Census Bureau

There is also growth in counties bordering the Region in the mid-Atlantic, northern Virginia area, as well as the Charlotte area. Similar patterns are evident in the Regional boundary areas near Memphis and Nashville. In the northern portion of the Region population growth is generally stagnant or even declining.

These population, and related consumption patterns and projections, can represent challenges for certain kinds of transportation and logistics development. However, there may be opportunities to develop facilities within the Region to serve the more densely populated and/or faster growing regions near the Regional boundary. International and regional distribution centers in northeastern Pennsylvania, for example, can serve the NY/NJ metropolitan region, bringing well-paying warehouse and transportation employment opportunities. With appropriate development, including additional transportation infrastructure investment, similar opportunities may exist in other parts of the Region. In addition, while the outlook for stagnant population and consumption growth can be viewed as a

challenge to certain types of development, the investment in enhanced freight mobility may have the effect of changing the growth outlook. The goal of enhancing these growth rates through transportation investments is consistent with the mission of the Appalachian Regional Commission as reflected by its investment in the ADHS.

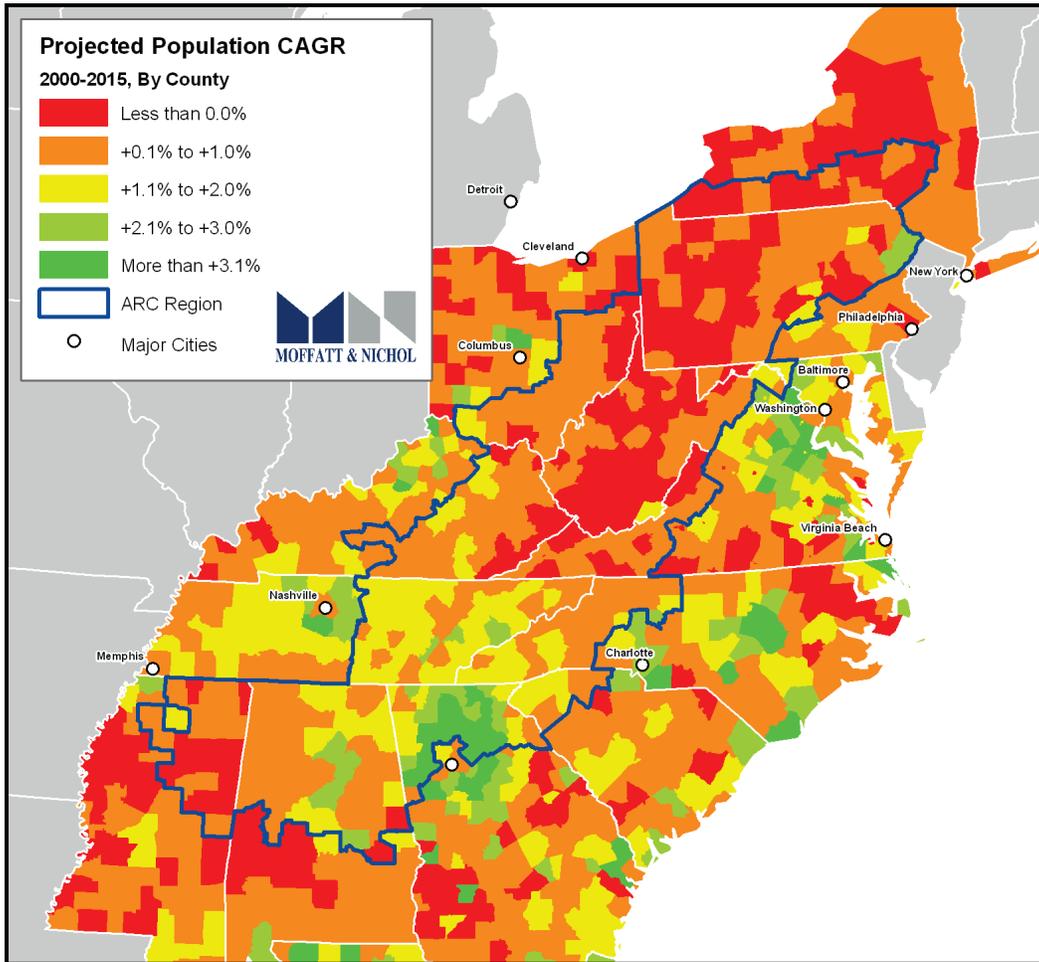


Figure 3.5: Projected Population Growth Rate

Source: US Census Bureau

3.2 Regional Transportation Infrastructure

Appalachia is served by a collection of highway, rail and inland waterway systems. These include the strategic highway system made up of the ADHS and connecting interstate highway routes in the Region. There are several other significant freight transportation resources to be considered in developing strategies and project proposals for enhancing freight mobility, particularly intermodal freight that would be utilizing the coastal deep water ports. These include the Region’s strategic rail system, and the strategic waterway system.

3.3 Strategic Highway System

Appalachia’s Strategic Highway System is comprised of the 3090 mile Appalachian Development Highway System (ADHS) and key interstate highway connections. ADHS is the first highway system in America authorized by Congress for the purpose of stimulating economic development. It features 31 individual corridors located throughout the 13 Appalachian states and is now approximately 85% complete. Appalachia’s strategic highway system helps link the Region to key external markets and enhances the flow of commerce, opening often-isolated areas to new economic opportunity. The system also helps facilitate commutation to and from work and supports delivery of key social services to the residents of Appalachia.

NETWORK APPALACHIA

Planned Strategic Highway System (including Appalachian Development Highway System and Connecting Interstate Highways)



Figure 3.6: Strategic Highway System

Importantly, the benefits of the Region’s Strategic Highway System extend far beyond the boundaries of Appalachia. The system serves as an important part of longer-distance trade corridors extending to, from, and through the Region, providing important reliability, capacity and cost efficiency benefits to the entire nation. Appalachia’s Strategic Highway System is illustrated in Figure 3.6.

3.4 Strategic Railway System

The “Strategic Railway System” of the Appalachian Region includes those mainline rail corridors providing the Region with key access to both domestic and international markets. While many of the routes were originally built to support mining and lumbering interests, the system today serves a diverse selection of both domestic and international commodities, including natural resources, manufactured goods, agricultural products, chemicals, and advanced technology components. Importantly, the Region’s system of shortline railroads plays an important role in assuring continued access to these mainline rail corridors for hundreds of the Region’s smaller towns and rural areas. Appalachia’s Strategic Railway System is illustrated in Figure 3.7

NETWORK APPALACHIA
Strategic Railway System



Figure 3.7: Strategic Railway System

Looking to the future, private and public sector interests are joining together in support of new emerging intermodal rail corridors that will significantly expand Appalachia’s connections to both domestic and international markets. These emerging intermodal rail corridors improve access to key coastal ports and feature an expansion of new inland container ports throughout the Appalachian Region. These emerging corridors include the Norfolk Southern Heartland and

Crescent Corridor initiatives and the CSX National Gateway Corridor program. Figure 3.8 illustrates Appalachia’s new emerging intermodal rail corridors.



Figure 3.8: Emerging Intermodal Rail Corridors

3.5 Strategic Waterway System

Appalachia benefits from a 1,500 mile network of inland waterways that include the Ohio River, the Tennessee River, the Cumberland River, and the Tennessee-Tombigbee Waterway. This system serves Pennsylvania, Ohio, West Virginia, Kentucky, Tennessee, Mississippi, Alabama, and northern Georgia. Historically the inland waterway system has primarily been used for the movement of large quantities of bulk commodities, raw materials and similar cargoes that require low cost transportation and can accept relatively slow transit times. Coal and petroleum (including crude oil and petroleum products) are the largest commodities by volume moving on the inland waterway system, followed by grain, aggregates, chemicals (including fertilizers) minerals, and products such as steel. The system is served by many terminals, including both private and public port facilities. Figure 3.9 illustrates Appalachia’s Strategic Waterway System.

NETWORK APPALACHIA

Strategic Waterway System



Figure 3.9: Strategic Waterway System

A recently updated report published by the Texas Transportation Institute for MARAD and the National Waterways Foundation indicates that in 2005 the inland waterways maintained by the U.S. Army Corps of Engineers handled over 624 million tons of freight resulting in an average transportation cost of \$11/ton translating into more than \$7 billion annually in transportation savings to America’s economy. The report also estimated the public benefits of the entire National Waterway System in terms of congestion issues, emissions issues, energy efficiency, safety impacts and infrastructure impacts. Among the results of this study are:

- Major waterways help avoid the addition of 58 million truck trips to our highway systems annually.
- Cargo towed on the inland waterway system generates 19.27 tons of greenhouse gases per million ton-miles, while rail freight and truck freight generate 26.88 tons and 71.61 tons respectively.
- Inland freight towing achieves 576 miles per gallon of fuel per ton of cargo as compared to 413 miles for rail and 155 for truck.

- Inland marine freight has only one fatality per billion ton-miles while rail has 22.7 and truck has 155.

There is a growing interest to more fully utilize the inland waterway system through moving containerized cargo along these marine corridors. Such container-on-barge services are common throughout Europe and Asia and are generating increased support in the United States as interest grows to find new transportation capacity and to achieve new transportation-related energy and environmental benefits. Encouraging such development, the U. S. Department of Transportation has launched its Marine Highway Corridor program, aimed at utilizing inland waterway capacity to help alleviate highway congestion along a growing number of interstate highway corridors. Appalachia’s inland waterway interests are banding together to pursue such opportunities through an Intermodal Marine Highway Corridor, as illustrated in Figure 3.10 linking Pennsylvania, West Virginia and Ohio in the north to the Tenn-Tom Waterway serving Mississippi, Tennessee and Alabama and the new coastal container port in Mobile, AL.

NETWORK APPALACHIA
Emerging Intermodal Marine Highway Corridors



Figure 3.10: Emerging Intermodal Marine Highway Corridor

3.6 Inland Ports

In addition to Appalachia’s key highway, rail and waterway corridors, the Region is also served by a variety of transportation and logistics centers, referred to as inland ports that provide a direct link between Appalachia’s businesses and its transportation system. These inland ports include both facilities designed to expedite the transfer and movement of containerized cargo, often referred to as Intermodal Container Transfer Facilities (ICTF), and facilities utilized to serve non-containerized cargo, often located in the Region’s smaller towns and in rural areas. Regardless of design, these facilities help to streamline shipping costs for local businesses, thus enhancing their competitiveness. Because of such benefits, these facilities also support community efforts to attract new enterprise and employment.

3.7 Coastal Ports – Global Access

The strong historic growth of international trade and the fundamental structural drivers of this trade that are expected to continue after the current recessionary period have been discussed in earlier sections of this report. This growth trend of international containerized trade has had a significant impact on the transportation and logistics industry in the US presenting many challenges as well as opportunities, including development potential in the Appalachian Region.

The coastal deep water ports of the US that handle this containerized trade have experienced rapid growth in demand over the past several decades. As demand has grown, ports and other components of the transportation system have reacted by adding capacity to satisfy this growing demand. The railroads that transport many of the containers to and from inland locations, have been investing in new capacity, including the major emerging corridor projects discussed earlier. The growth of Asia as a source of a large share of imports has also had its effect. Many of the Asian imports destined for regions throughout the US arrive at west coast ports, including Los Angeles and Long Beach, which, until recently, have experienced some of the highest volume growth rates. The stress on port and rail infrastructure and labor at these ports has led to growing “all-water” ocean shipping services from Asia to the Gulf and East Coast ports. The Panama Canal is being expanded to accommodate this growth.

Ocean ports face some unique problems in handling growing volume demands. The relative scarcity of land adjacent to deep water makes adding acreage to existing ocean ports or developing new ocean ports environmentally sensitive and very costly. As volume at ocean ports increases, absent increases in acreage, there are only two alternatives for increasing capacity. Containers can be “turned-over” more rapidly - that is the time they spend dwelling at ports either waiting to be picked up for delivery to customers or loaded on ships - can be reduced. This is typically achieved by charging a higher rate for this dwell time – called demurrage. Or, containers being stored in the container yard can be stacked higher and closer together – that is the storage density can be increased. This is achieved at the expense of more costly equipment and more labor. Therefore, achieving higher container yard capacity comes at a cost to terminal operators and port authorities. There are other capacity limits at ports on the

water side, such as berth capacity, which is equally, if not more costly to address. On the land side, gate capacity and roadway capacity in the port vicinity and approaching the port can also become stressed with a variety of congestion and environmental challenges.

An alternative of moving containers off the port more quickly to increase capacity requires an inland storage and staging area for these containers – an inland port. This concept usually includes an intermodal rail facility and various other distribution and logistics functions. This may include warehousing, value-added facilities and transloading facilities to transfer cargo between international containers and domestic trucks or containers to serve the domestic customers. The Appalachian Region has locations that are potential sites for the development of these types of services. In the distribution economy, inland ports and distribution centers have become significant job creation and economic development generators. In addition to the opportunity for the development of new inland ports, the proximity of Appalachia to the coastal ports is an important variable in understanding and pursuing any development potential that relates to connectivity to the international economy, as shown in Figure 3.11.

NETWORK APPALACHIA

Enhancing Access to International Ports

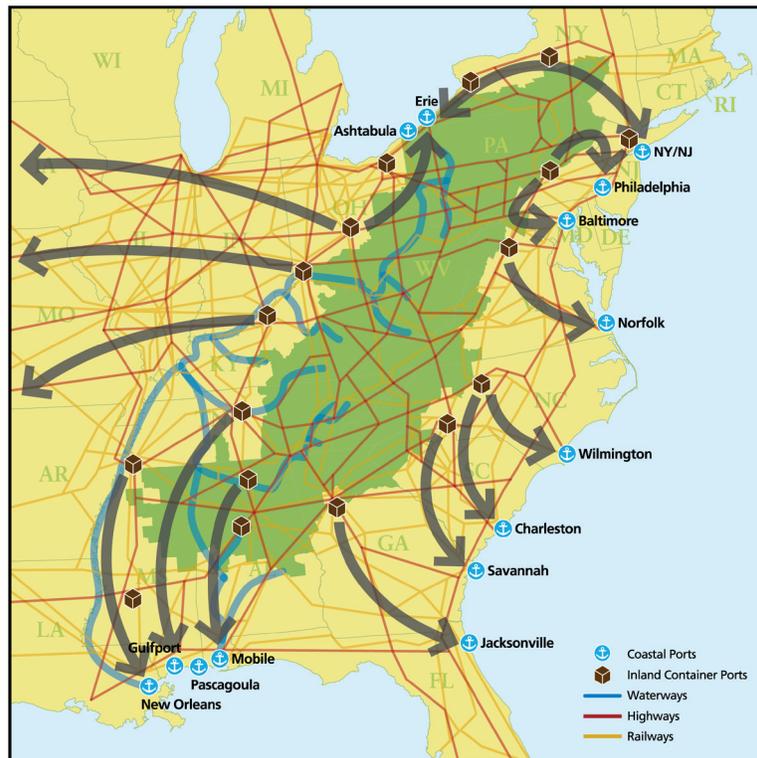


Figure 3.11: Enhancing Access to International Ports

A first step in understanding the relationship of the Region to coastal ports is to examine origins and destinations of containerized cargo in and near the Region. The Journal of Commerce publishes data developed from Customs manifests for international trade through US ports. This data (Port Import Export Reporting System – PIERS) has been used to develop a data base of containerized trade in the Appalachian Region. Using the PIERS data, and statistically enhancing it to better identify inland origins and destination, a mapping of the total imports and exports of containerized international in the Region has been developed.

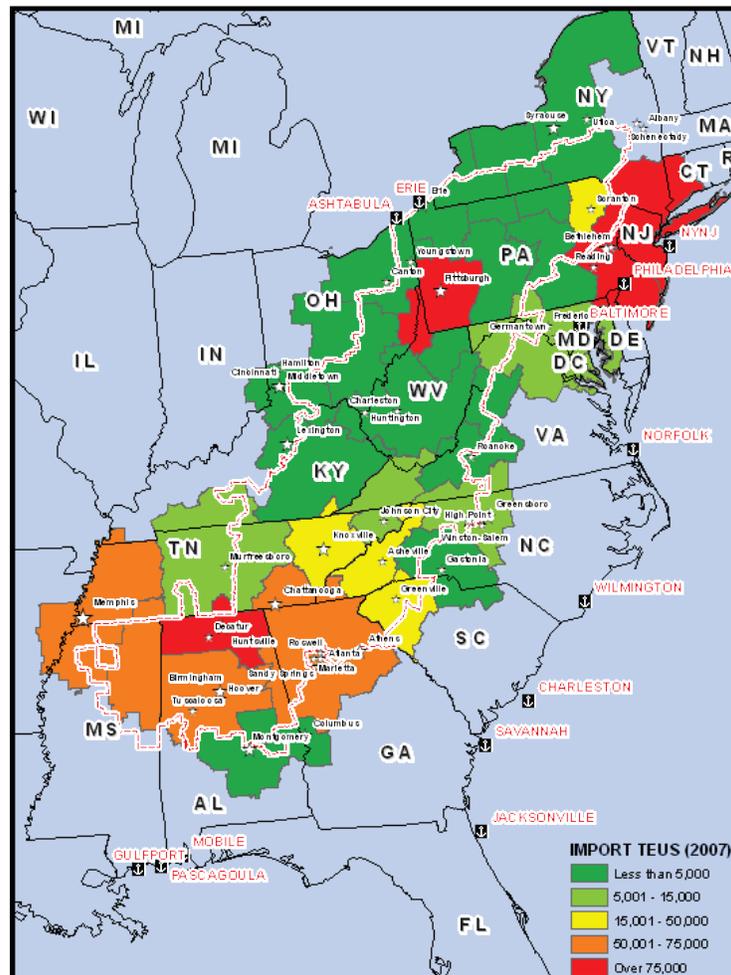


Figure 3.12: ARC 2007 Import Volumes

Figures 3.12 and 3.13, display the density of imports and exports at a BEA, (Bureau of Economic Analysis Region) level throughout Appalachia. Imports are typically shipped inland to centers of distribution resulting in high activity in a relatively few locations, generally close to population centers. However, some shipments do move directly to their ultimate destination. Exports are

much more widely distributed, following the locations of manufacturing and production locations. This difference in the origin and destinations of containers leads to issues in having sufficient empties available for exports. The containers are owned by the shipping lines and they bear the cost of repositioning the containers. The costs involved in getting empties to locations where exporters may need them might not be justified in some cases by the shipping rate that can be charged.

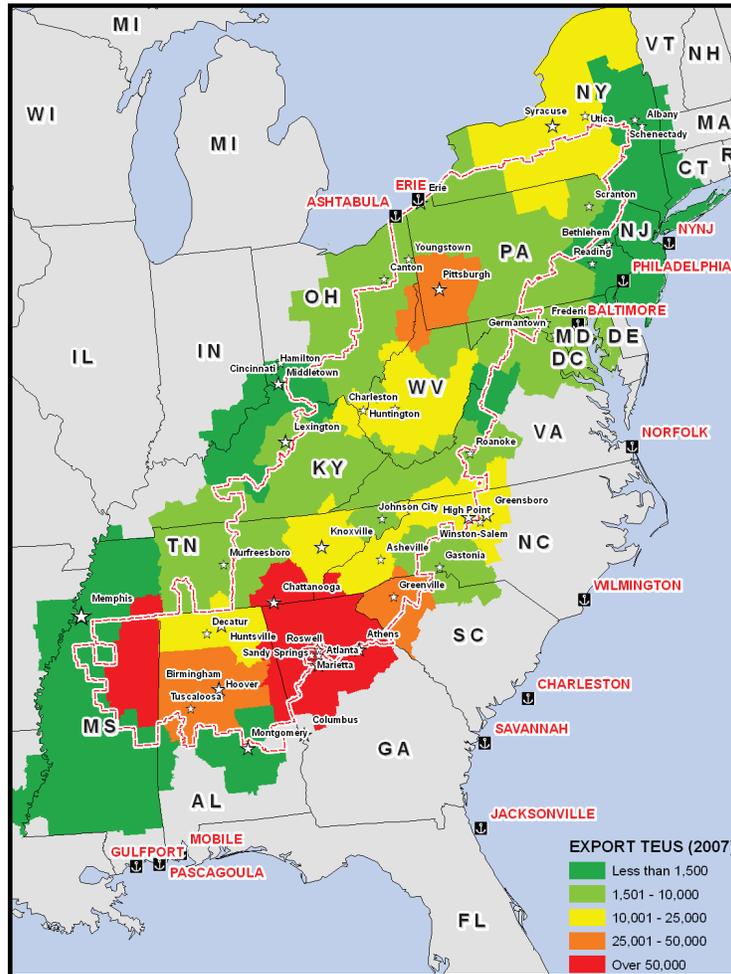


Figure 3.13: ARC 2007 Export Volumes

A summary of all imports and exports in the Appalachian Region by foreign trade region, commodity, shipper (company) and port of import/export is presented in Figure 3.14. It can be seen from these summaries that for 2007 North Asia was the dominant origin for imports with 65% of the imports in the Region, followed by Europe with 17%. For exports, North Asia was also the most popular foreign destination, although it did not dominate as greatly as on the import side. North Asia was the destination of 25% of the exports closely followed by Europe

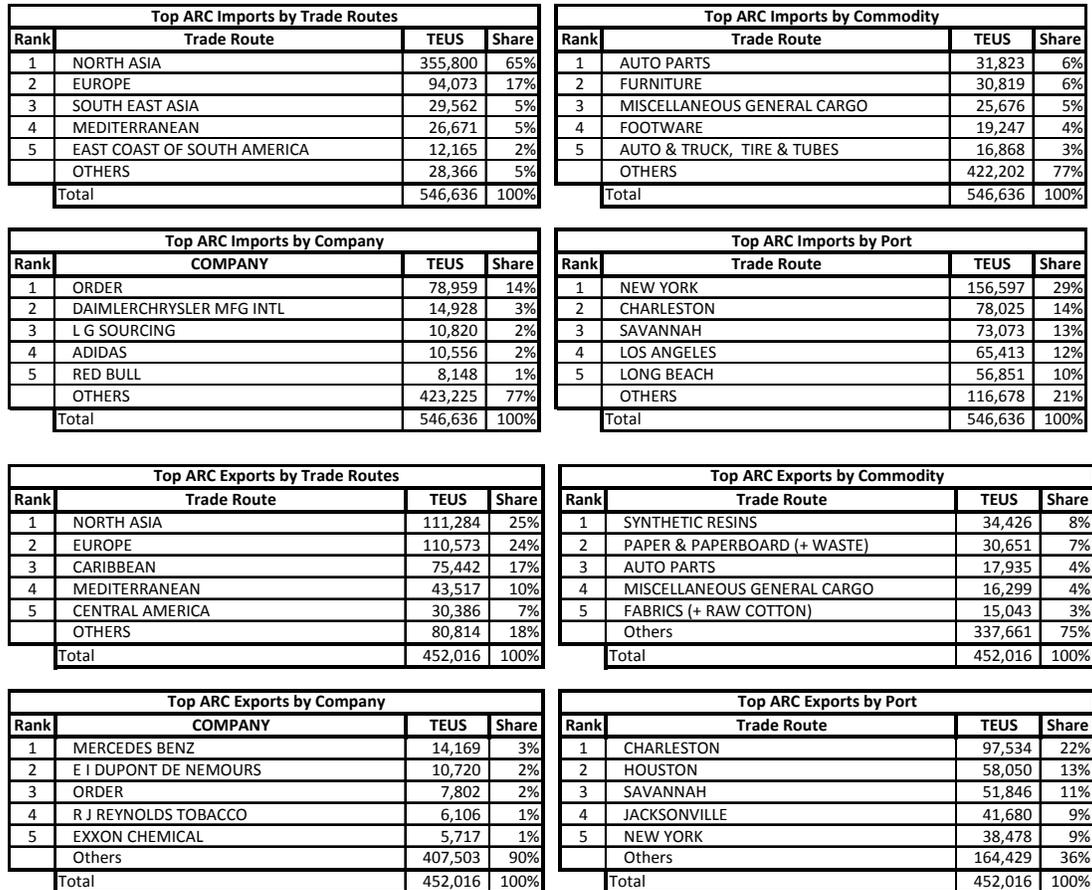


Figure 3.14: Top ARC Import Volumes

with 24%. Imports to the Region were most likely to arrive through the port of NY/NJ, followed by Charleston and Savannah, with exports moving through Charleston, Houston and Savannah. Imported commodities include auto parts, furniture, footwear and other general cargo, while exports also include resins, waste paper, and also auto parts. The major companies identified for both imports and exports are consistent with the commodities, including auto companies, chemical companies, and consumer products.

It should be understood that the origin and destinations identified in these analyses are for the international containers themselves and not necessarily the ultimate destinations of the contents of the containers. For example, many international marine containers come to the Port of Savannah and are then transloaded into domestic vans or domestic containers at major international distribution centers in the immediate vicinity of the port. These “domesticized” products are then shipped by road or rail to regional distribution centers that ultimately supply retail stores. Much of these domestic shipments could be bound for the Appalachian Region. This phenomenon is less likely to occur on the export side, although there are cases where some products may be shipped in bulk to a central point where it is consolidated and stuffed into containers.

3.8 Connectivity: Inland and Coastal Links

Further analysis of the relationship between the various regions of Appalachia and the coastal ports that serve the inland regions can be aided through the identification of the most economical routing of international containerized cargo between foreign ports and domestic inland points. For this analysis a “Least Cost Market Area” (LCMA) is developed for each port. An LCMA analysis is based on estimating the total cost to deliver an import (or export) from the foreign port to each inland point (zip code) through each alternative domestic port. Each zip code is assigned to the least cost port and the collection of all the least cost zip codes for a particular port make up its LCMA. The cost estimation incorporates ocean freight costs, port

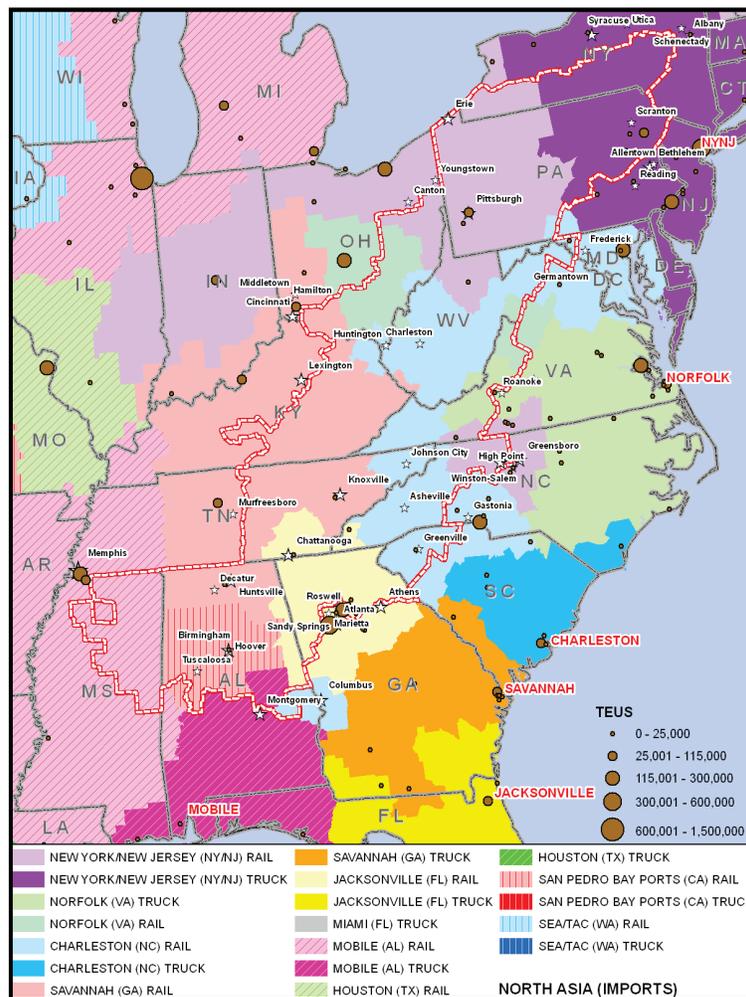


Figure 3.15: North Asia LCMA and 2007 Import Volumes

costs, and inland transportation by truck or rail. Well established cost models are used to estimate each of these cost components. Because the ocean costs vary depending on the foreign region, LCMA’s are developed for each of the major foreign trade regions.

Figures 3.15 and 3.16 display the LCMA's for North Asian imports and exports respectively, indicating the least cost port for imports and exports for the entire Appalachian Region in accessing a selection of major coastal ports. It can be seen that for some sub-regions access to a particular port is least costly by rail and for others truck would be the optimal mode. Similar analysis and maps have been prepared for other major foreign trade regions and are included in the appendix. In addition to the North Asian analyses shown here, further analyses of 2007 actual trade in the region, broken out for each significant foreign trade region was reviewed. All of these analyses and maps were used in the regional workshop sessions to supplement the local knowledge and experience of the workshop participants in identifying initial specific project or strategic concepts for enhancing Appalachian connectivity to the international marketplace and spurring economic development.

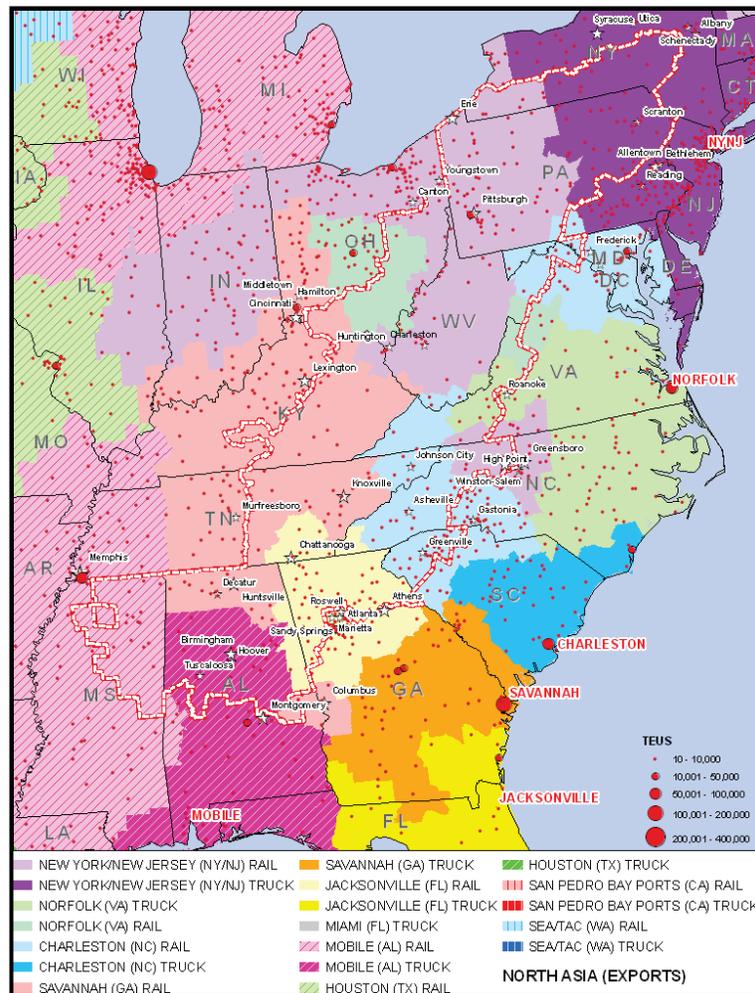


Figure 3.16: North Asia LCMA and 2007 Export Volumes

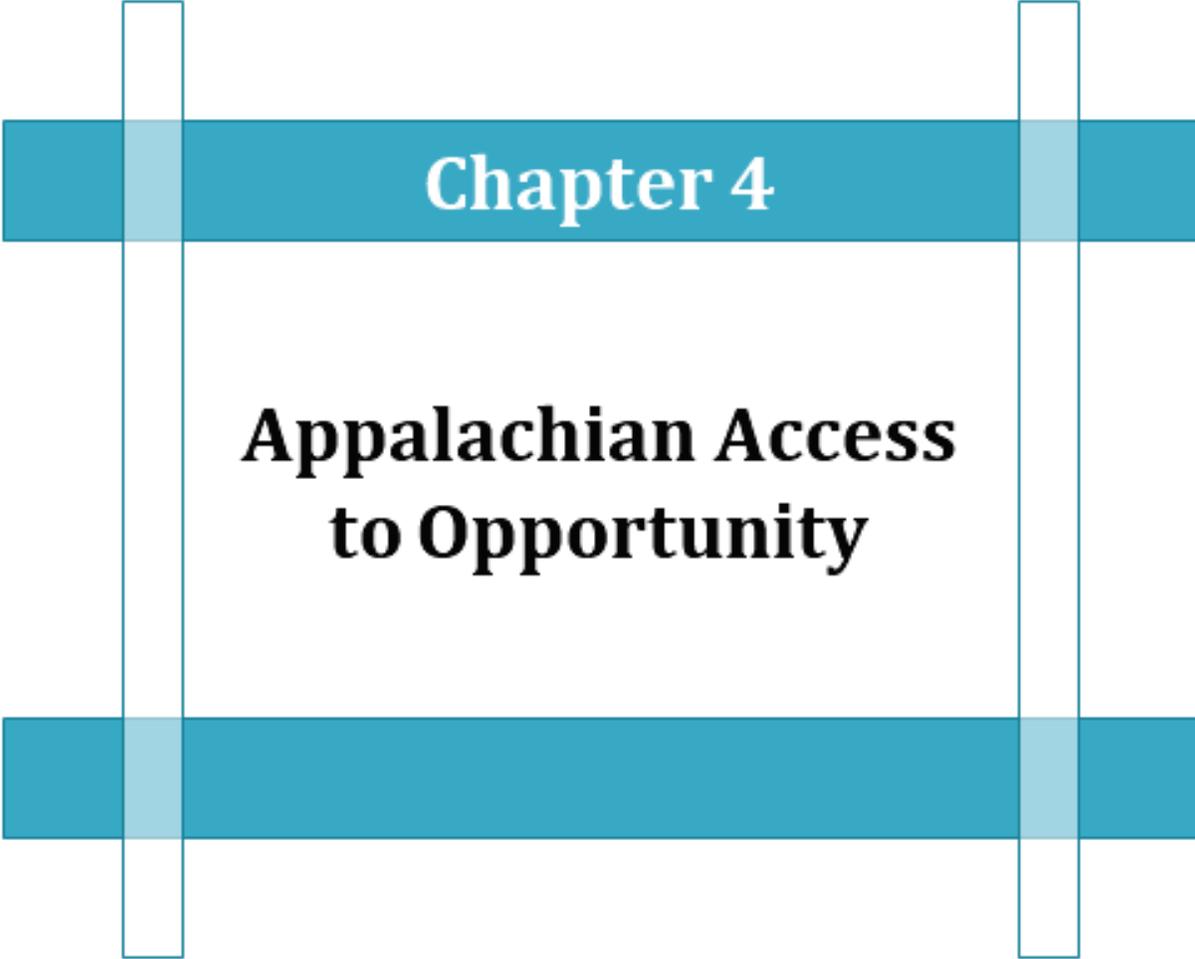
It should be noted that the LCMA analysis reflects a somewhat simplified model of the criteria that effect the routing of cargo. The cost modeling in this process is based on average costs for example, and in the marketplace, actual prices paid by various customers reflect a myriad of variables and great complexity. In addition, transportation cost is not the only criteria in determining routing decisions. Time, reliability, convenience and many other issues come into play. The PIERS data is also not a perfect representation of the actual shipments in any specific region. The source data itself is replete with gaps and the process for enhancing it, while carefully thought out, is fundamentally based on “educated guesses.” Nonetheless, these analyses and data provide additional insight and guidance, that combined with local knowledge and experience can contribute to the development of useful project and strategy concepts.

3.9 Economic, Energy, and Environmental Success – And Expanded Capacity

Transportation plays an important role in shaping economic success, while at the same time it is recognized as a major factor in addressing the energy and environmental challenges facing both Appalachia and America. While Appalachia enjoys well-developed highway, railway and waterway systems, these systems tend to be disjointed and offer too few connections between the individual modes. By better integrating the individual modes into a single, coordinated intermodal network it is possible to not only generate new economic benefits to the Region, but to also improve the energy and environmental performance of the system, as well. Through better coordination, shippers have more alternatives in how and where freight moves. They are better able to select the most appropriate mode of transport, depending on the cargo itself and its destination. While some cargos and trip distances are particularly well-suited for highway movement, others can be more cost-efficiently moved by rail and/or water transportation services, if such services are both available and accessible to the shipper.

Beyond economic considerations, the energy and environmental benefits of rail and water, especially over longer-distance trips, can generate increasingly important new benefits in reducing energy consumption and improving the overall environmental impact of the transportation system. As an example, studies indicate that moving one ton of cargo by rail is more than twice as energy efficient as by highway trip. Further, inland waterway energy efficiency for such a movement can be three times more efficient than over-the-road transportation. Both railways and waterways can also offer significant environmental benefits in terms of greenhouse gas emissions, as well.

While each mode of transportation provides critically important benefits to shippers, by better coordinating the transportation system, and the commodities that move throughout this network, it is possible to achieve important economic, energy, and environmental benefits, while at the same time expanding the overall capacity of the network.



Chapter 4

**Appalachian Access
to Opportunity**

4.0 Access Evaluations

This section describes the process employed in quantifying access to/from the Appalachian region. “Access” in this context is measured at the county level. While not intended as a “county by county” ranking, it is a relative measure of the transportation connectivity of the county to the global marketplace. It can be viewed as broadly estimating the relative attractiveness of the various counties for starting a new business, or improving and expanding an existing one with global reach. Typically, these businesses would be import or export related. The access measure also helps to highlight counties where transportation enhancements could make an improvement in the global competitiveness of business in that county. In addition, the measure proved to be a valuable tool in the regional workshops helping participants focus on the variables affecting access.

Various factors are considered when establishing a new business, most of which fall under the classical “Site Selection Criteria” that are used in site selection studies. These can be broadly classified into 4 groups:

- I. Business and Operating Conditions: This addresses issues such as transportation and utility infrastructure, access to market, workforce availability, capability and scalability.
- II. Geographically Variable Costs: These refer to costs associated to work force wages & salaries, taxes, real estate, incentives.
- III. Real Estate/Site: within a specific geographic area, real estate considerations include availability, fit, access, supporting infrastructure and lease terms.
- IV. Risks: Risk factors are always taken into account when starting a new business or expanding one. These factors include natural disaster, political environment, social/safety issues and economic/currency concerns.

However, it is important to note that each study is unique and may consider only some factors. Within the selected factors, the decision makers will look at a subset of those factors more closely than others. That is, some factors will have more weight (importance) than others within the context of the relevant study.

For the Network Appalachia Access measure, factors that have been used to quantify access have included only proximity measure to transportation link and nodes. These include proximity to:

- a) **Interstate Highway** – These are the primary links to move freight to/from global gateways (Ocean & River Ports, ICTFs etc)

- b) **ADHS/ National Highway** – Also important are the ADHS and National Highway System routes that provide connections to the Interstate.
- c) **Intermodal (Container) Rail Terminals** – This designates the Class I terminals that offer international intermodal services between ocean ports and ICTFs.
- d) **Multimodal Rail Terminals** – This includes the short line railroads and the Class I railroads excluding the intermodal routes.
- e) **Inland Waterway Port** – A well established navigable river system serves the western and northern part of the Appalachian Region. Distances to selected waterway ports on this system were included in quantifying the access of the region.
- f) **Intermodal - Interstate Intersection** – These are locations where developable land is available close to both an intermodal rail line and an interstate highway, which is assumed to have potential to establish a new business, such as a transload facility or a warehouse. As such, proximity measures to these locations were included in the analyses.
- g) **Coastal Ports** – The proximity to major coastal ports is an important factor in describing the transportation access. Relatively small distances to inland markets can be served by trucks, where as larger distances are better served by rail and barge. In either case, smaller distances from inland markets to coastal ports are deemed to be more cost effective, not only in terms of transportation costs but also in transporting goods of time sensitive value.

Other demographic and trade related factors are also important in assessing the desirability of siting decisions. While not used in determining access, these factors are important when planning for development opportunities. These factors include:

- Population density
- Workforce Availability
- Workforce Development Capability
- Wage Rate
- Import/Export Demand
- Production Density
- Warehousing Density (# of Establishments)
- Developable Land
- Utilities
- Energy Costs
- Telecommunications – Broadband Internet & Cellular Phones

4.1 Access Definition

As mentioned in 4.0, seven proximity measures were used to quantify the access ranking. A brief methodology is presented in this section that documents the ranking process.

In general, the ranking process requires estimating the distances from each county within the Appalachian region to each of the ranking factors. Once the distances are established, the data generated was then normalized to depict comparable numbers for individual data ranges. More on this will be covered in section 4.2. The next step carried out was applying weights to each of the factors. These weights introduce a relative importance hierarchy for the criteria. Once the weights are established, the final step is to compute a weighted sum of the proximity measures to produce the access ranking for each county. A three category classification was then used to produce presentation maps.

4.2 Proximity

Distances from each county to the seven other factors were measured by a number of ways. All methods required zip codes to be established as origins and destinations, as zip to zip distances are relatively simple to compute. The first step was to establish a representative zip code for each county. First, the geographical centroid of each county polygon were found. Following that, the 5-digit postal code closest to the centroid was found. This zip code, referred to as *centroid zip* in this report, was then used as an origin to measure distances from the said county. Figure 4.1 shows the zip codes selected for each county.

Depending on the potential business being assessed, its optimal location within a county may be best positioned close to populated zones, in a rural setting with considerable land availability, or anywhere in-between. For counties with large areas, there could be a significant bias in measuring distances using the centroid zip. However, for the purposes of this study, with a view of keeping methodologies uniform, the centroid zips have been used throughout. For future, more detailed studies, zip code points may be manually selected to better represent the business case study.

In subsequent sections, these centroid zips will be referred to as the origins for distance calculations.

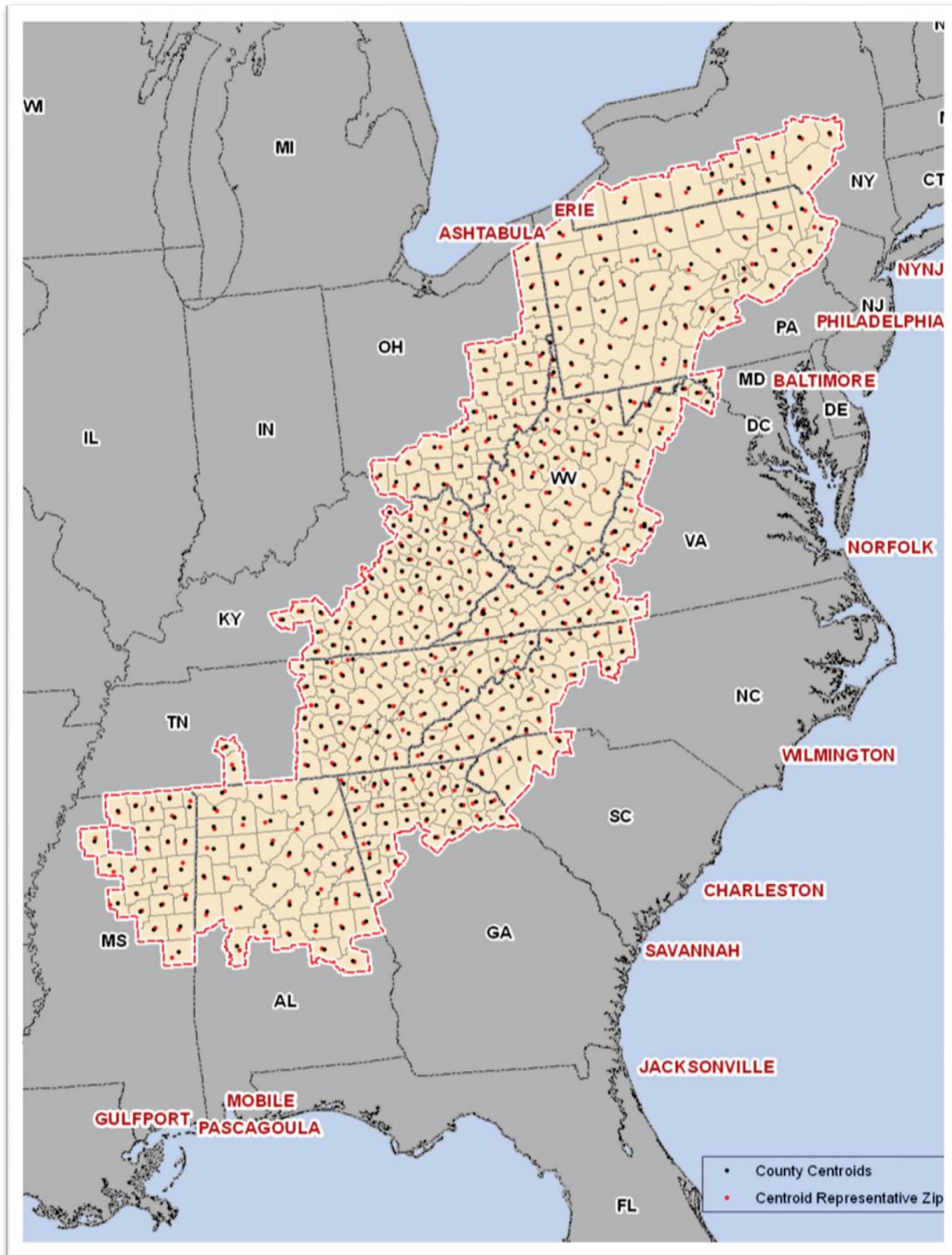


Figure 4.1: ARC Counties showing Geographic Centroids (Blue) and its closest 5-Digit Zip Code (Red)

4.2.1 Interstates

One of the key measures is the “closest distance” from a county to an interstate. PC*Miler was used to establish these distances. PC*Miler is an industry standard road routing software. Through visual inspection, a number of entry/exit ramps close to the centroid of each county were selected. PC*Miler was then run on each of the origin (county centroid) – destination (entry/exit ramps) pairs and the minimum distance was selected. This distance was then attributed to that county’s closest distance to an Interstate. The Interstate network was obtained from the National Highway Planning Network. Figure 4.2 shows the Interstate network used in this study.

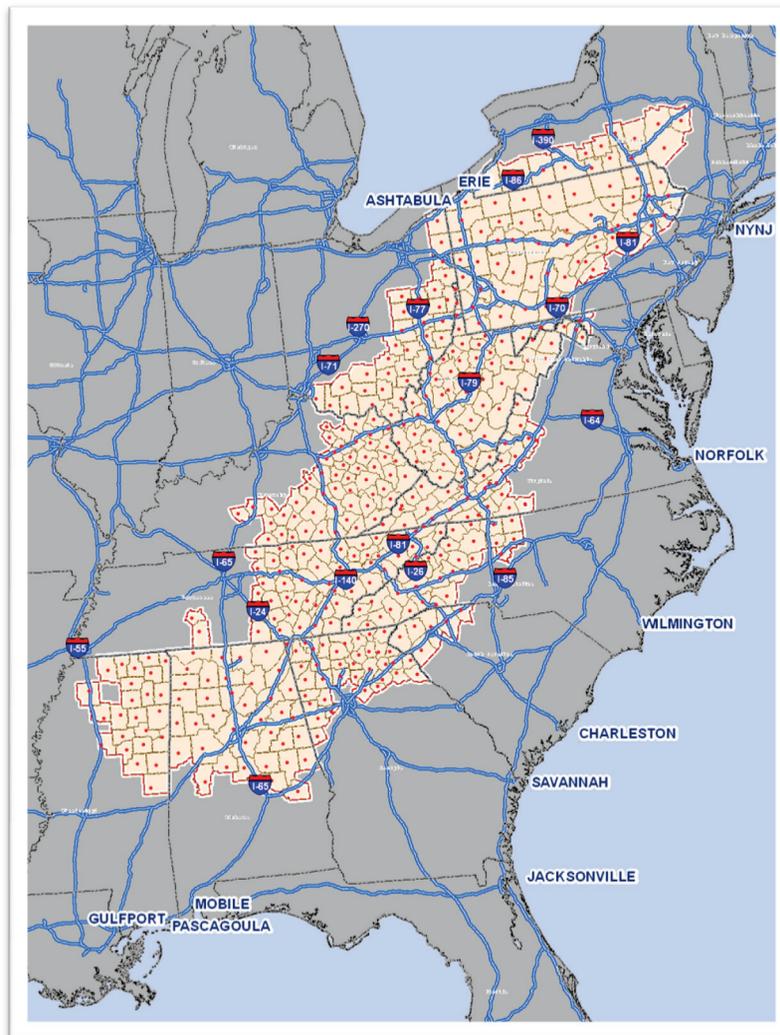


Figure 4.2: National Highway Planning Network Version 2005.08

4.2.2 ADHS/ National Highway

Many of the newer ADHS links are being built to interstate standards. The availability of the ADHS or state highways within a county provides a better access in reaching the interstate. While most of the ADHS is complete and open to the public, some reaches are yet to be completed. For the purposes of this study, distances to the ADHS were computed, even if the section was not open to the public at the time of the study. This is a forward looking approach, assuming that the sections would be completed by the time any business plan was ready to be implemented. Figure 4.3 shows the ADHS Network as of 2007. The distances to the ADHS links were established in the same way as the interstates.

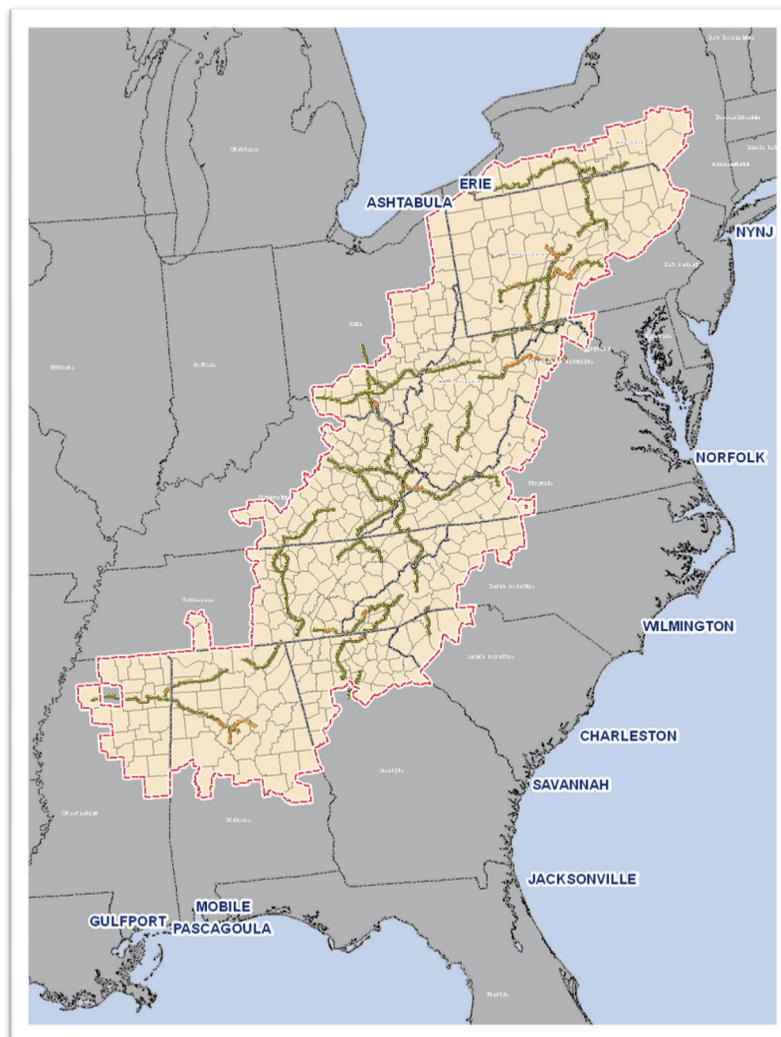


Figure 4.3: The ADHS network (2007)

4.2.3 Intermodal (Container) Rail Terminals

Rail is very efficient in moving freight to and from an ocean port over large distances. Thus access to intermodal rail vastly expands the regions reach in terms of trade. Intermodal rail provides services between ICTFs. Containerized boxes are delivered to and picked up from ICTFs by trucks. As such, access to intermodal rail was measured as road distances from county centroid zips to published ICTFs. Figure 4.4 shows the ICTF network within and at the periphery of the Appalachian region.

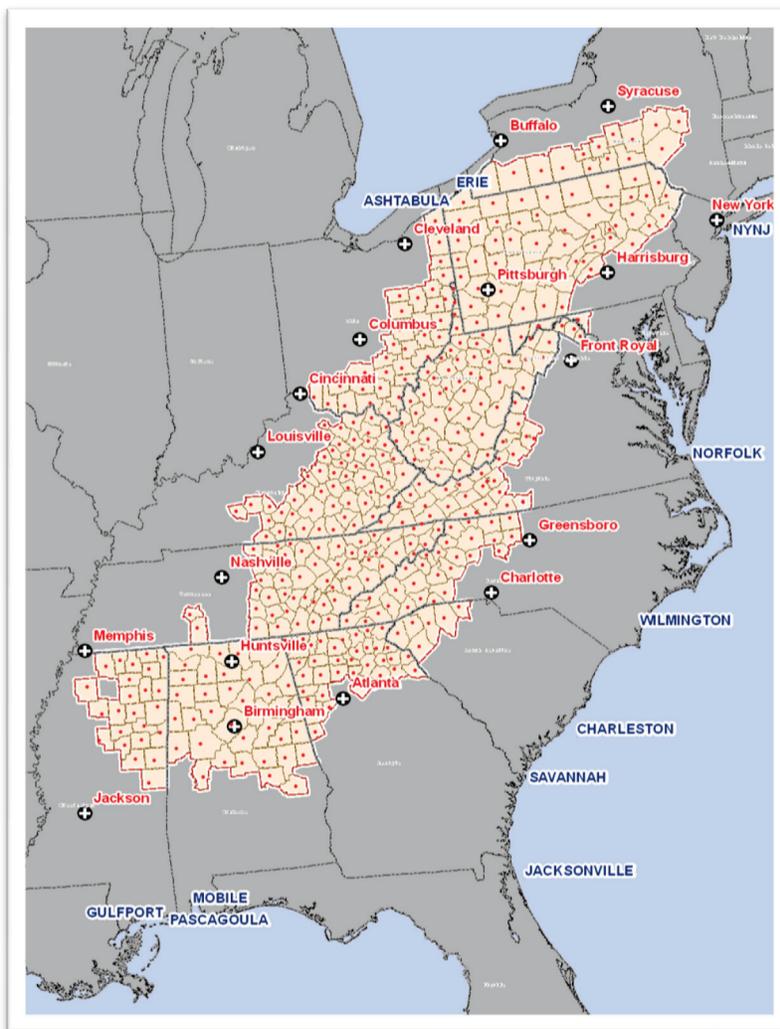


Figure 4.4: The ICTF terminals used in the study

4.2.4 Multimodal Rail Terminals

There are a number of rail freight terminals in the Region in addition to the ICTF's served by the Class I railroads. These terminals which handle a variety of types of freight other than containers may also be served by shortline and regional rail lines that serve specific locations and whose scheduling is more flexible than the published schedules of Class I railroads. Bureau of Transportation Statistics (BTS) Freight Rail Network was used in this study. This database was based on the requirements from the Commodity Flow Survey and with the different modes of DOT, supervised by RITA/BTS. Distance computation to these nodes was identical to the method used in the previous section. The Multimodal Freight Rail Network used in this study is presented in figure 4.5

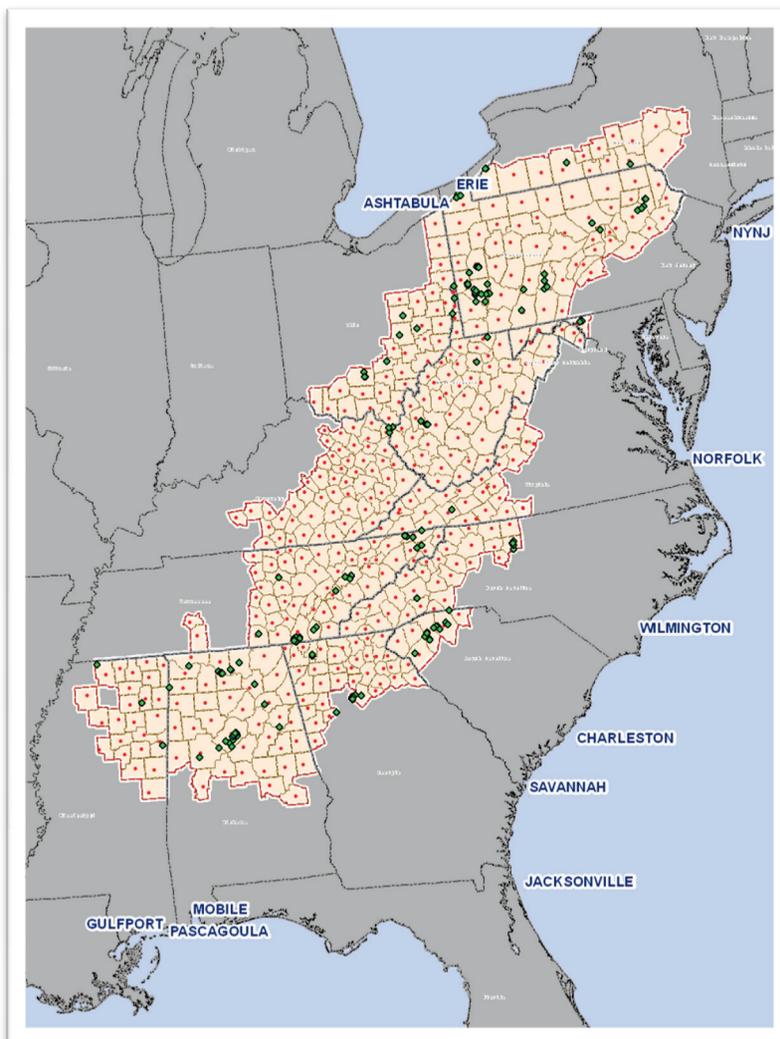


Figure 4.5: The Multimodal Freight Rail Terminals

4.2.5 Inland Waterway Terminals

A well established inland waterway system in the study region allows transportation of freight by barge along a roughly north-south direction. Commodities best suited to move on barge include heavy bulk, break bulk or goods that have delivery periods that are not time sensitive, such as perishables. This network data was obtained from the U.S. Army Corp of Engineers. The data contains numerous facilities along the waterways having multiple ports within a single zip code. For analysis purposes, a subset of the facilities was selected representing multi-user and public access facilities. Distances from each county centroid zip to each of the facilities in the sampled data was computed. This distance was then rounded off to the nearest 10 mile increment. The facilities selected for the analysis are shown in figure 4.6.

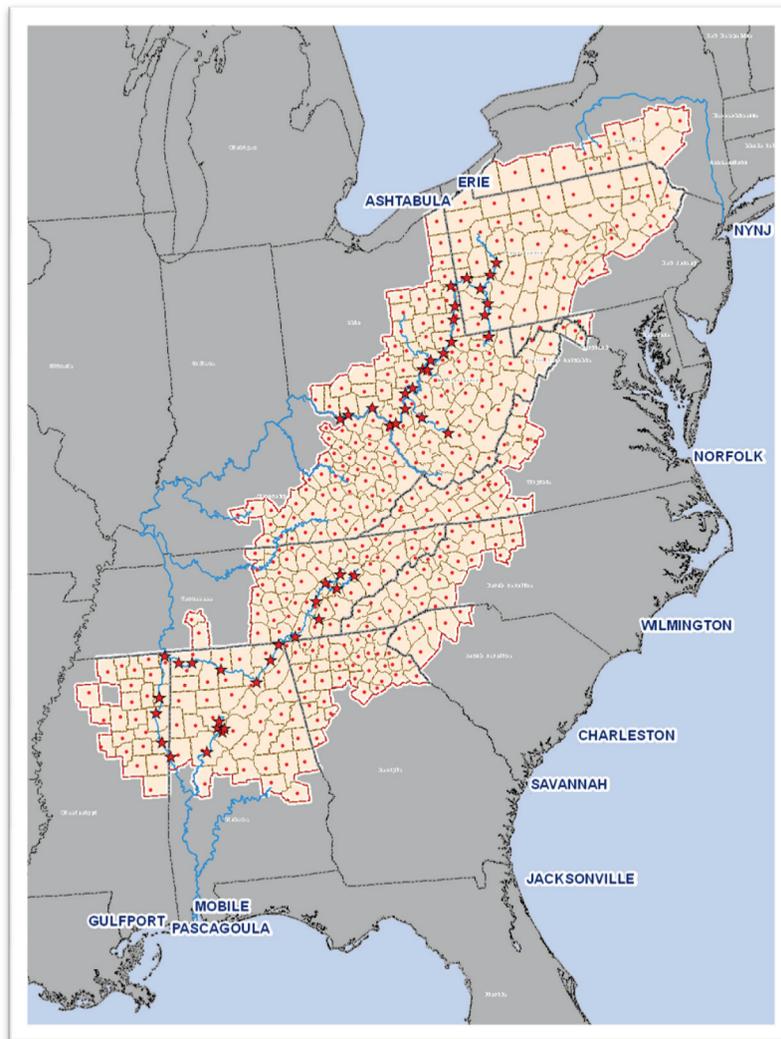


Figure 4.6: Selected Inland Waterway Ports

4.2.6 Intermodal Rail – Interstate Highway Intersection

There are locations where rail lines run close to interstates or even intersect each other. All factors being equal, these are promising locations for rail terminals, warehouses or transload operations. In order to incorporate this factor, aerial and satellite imagery were scanned to locate places where rail and interstates were close by. Similar to previous operations, distances to each of these points were gathered and used in the computation. Figure 4.7 shows the locations of the selected Rail-Interstate intersections.

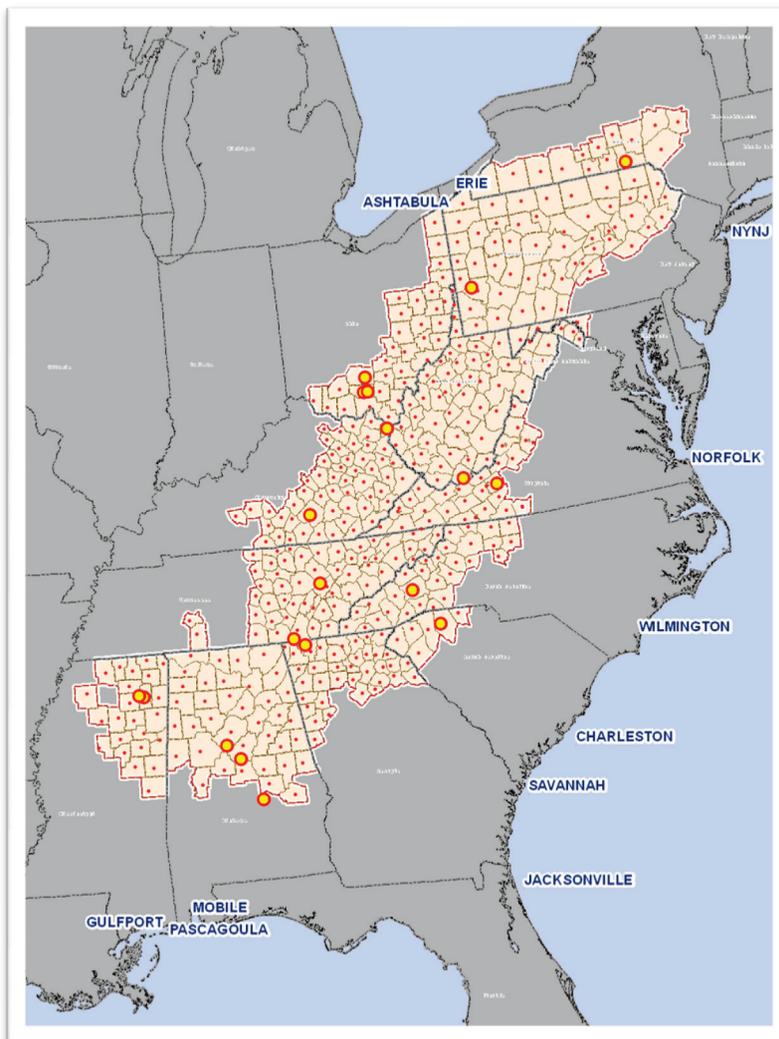


Figure 4.7: Selected Rail – Interstate Intersection Locations

4.3 Data Compilation and Normalization

Once all the data for the 428 counties (including some independent cities of Virginia State) were obtained, it was compiled in a tabular format, a portion of which is shown in Table 4.1.

State	County	Interstate Highway	ADHS/National Highway	Freight Rail Network	ICTF	Rail - Truck Intersection	Inland Waterway Port	Coastal Port
Alabama	Bibb	23.7	0.5	40	52	29	40	188
Alabama	Blount	18.6	2.4	30	43	63	30	300
Alabama	Calhoun	12.3	1.5	10	72	88	70	322
Alabama	Chambers	15.3	0.0	70	101	86	130	249
Alabama	Cherokee	17.0	1.4	30	85	69	50	340
Alabama	Chilton	8.4	0.6	50	48	16	70	215
Alabama	Clay	33.9	25.0	40	77	73	100	248
Alabama	Cleburne	10.2	0.5	20	69	100	90	318
Alabama	Colbert	50.2	2.2	40	73	95	10	374
Alabama	Coosa	24.7	0.7	70	67	46	90	214

Table 4.1: Compiled Data

To ensure that the minimum and maximum values in each data column (Interstate, ADHS/National Highway etc) reflected the same effects, the data had to be normalized.

As an illustration, in table 4.1 the minimum distance from a county to the closest interstate ramp was 8.4 miles. Similarly, the minimum distance from a county to the closest ICTF on the Intermodal Rail Network was 43 Miles. These two minimums need to reflect the same effect (advantage or disadvantage). This was done by normalizing the data between 0 (minimum) and 1 (maximum). Once again, taking table 4.1 and the data fields as an illustration, for the data column “Interstate”, 8.4 miles was transformed to 0 where as the maximum of 50.2 miles was transformed to 1 and all values in-between were scaled accordingly. The normalized data corresponding to table 4.1 is presented in table 4.2.

4.4 Weighting and Ranking

Not all of the seven criteria are deemed to offer the same advantages to businesses. Through a dialog amongst the study team, the following weights were attributed to the criteria. The weights in table 4.3 signify that the distances to Interstates, ICTFs (within the intermodal FreightRail Network) and the proximity to Rail-Road intersections were the most important at 100%. The access to the ADHS and local/regional freight rail network were given a slightly lesser weight at 90%. The Inland waterway ports were weighted at 80%.

State	County	Interstate Highway	ADHS/ National Highway	Freight Rail Network	ICTF	Rail - Truck Intersection	Inland Waterway Port	Coastal Port
Alabama	Bibb	0.24	0.00	0.22	0.21	0.13	0.10	0.23
Alabama	Blount	0.19	0.02	0.17	0.17	0.29	0.07	0.47
Alabama	Calhoun	0.12	0.01	0.06	0.29	0.40	0.17	0.51
Alabama	Chambers	0.16	0.00	0.39	0.40	0.39	0.31	0.36
Alabama	Cherokee	0.17	0.01	0.17	0.34	0.31	0.12	0.55
Alabama	Chilton	0.09	0.00	0.28	0.19	0.07	0.17	0.29
Alabama	Clay	0.34	0.20	0.22	0.31	0.33	0.24	0.36
Alabama	Cleburne	0.10	0.00	0.11	0.27	0.46	0.21	0.50
Alabama	Colbert	0.51	0.02	0.22	0.29	0.44	0.02	0.62
Alabama	Coosa	0.25	0.01	0.39	0.27	0.21	0.21	0.28

Table 4.2: Normalized Distances

The final step in the computation was to apply the weights to their corresponding criteria and generate a weighted sum. Thus the “Access” for any county was computed as

$$Access = \sum_{i=1}^n d_i * \frac{1}{w_i}$$

Where n is the number of criteria included in the study, d_i is the distance from any county centroid to criteria i and w_i is the weight assigned to criteria i . The reason of using the reciprocal of the weight is to produce a larger “access” value for smaller weights. In the approach applied, smaller distances are more advantageous than larger distances. The final “access” values for each county are then displayed using a GIS presentation with three classes, green, yellow and gray. Counties colored green are classified to having strong access, yellow denotes medium access and gray signifies low access. This is shown in figure 4.8.

Interstate Highway	ADHS/ National Highway	Freight Rail Network	Intermodal Freight Rail Network	Intermodal - Interstate Intersection	Inland Waterway Port	Coastal Port
100%	90%	90%	100%	100%	80%	100%

Table 4.3: Criteria Weights

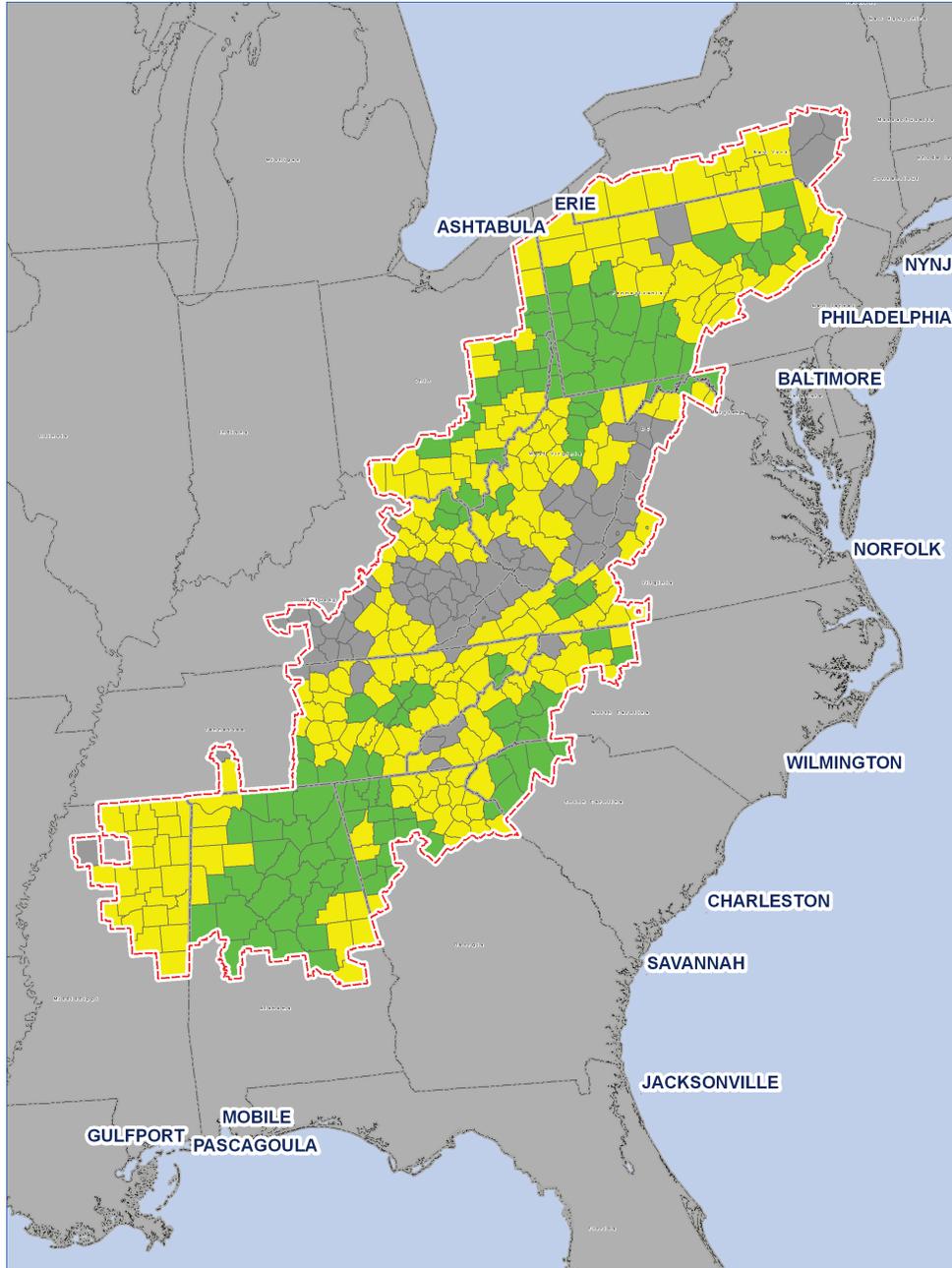
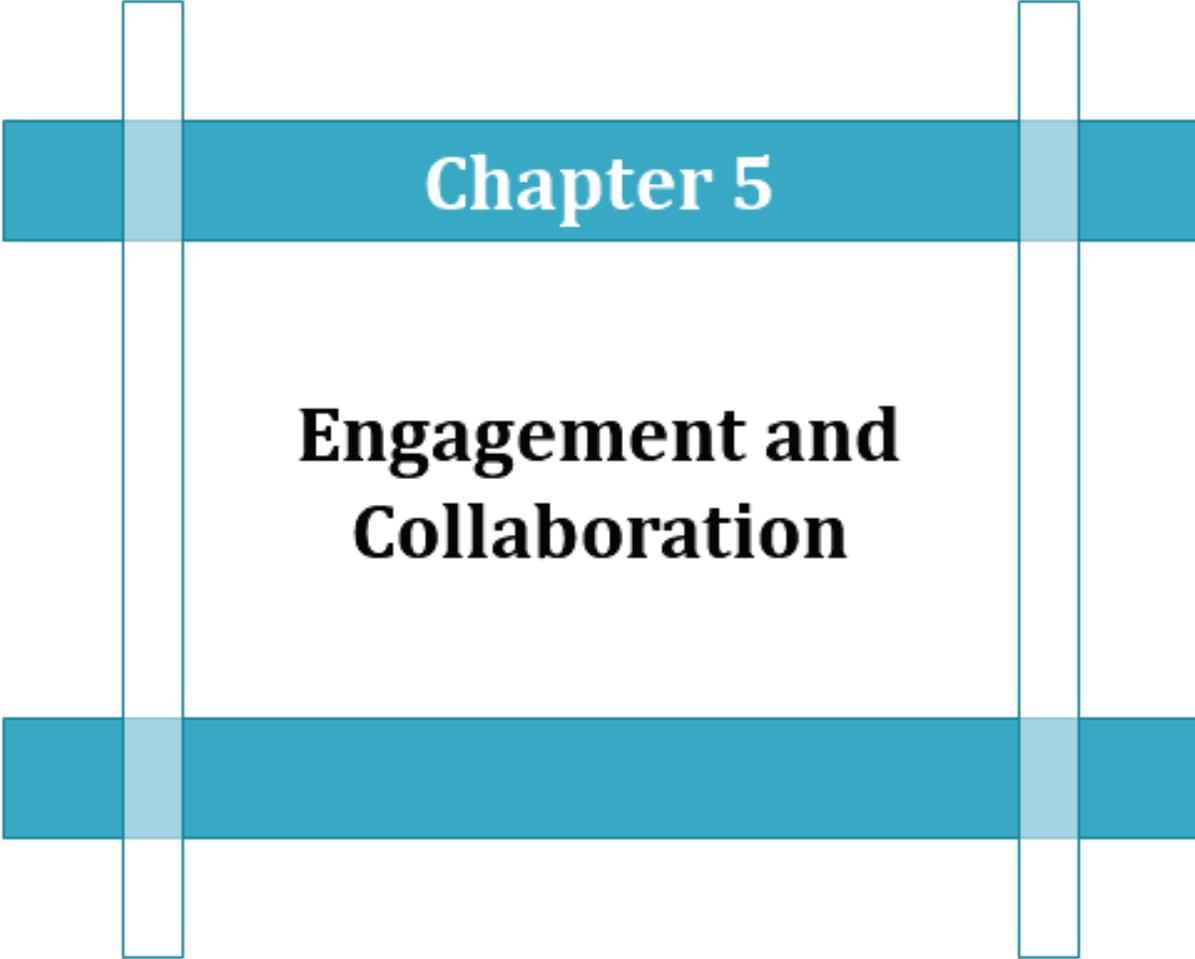


Figure 4.8: Access Evaluation Map

The graphic consists of two horizontal teal bars, one above and one below the text. Two vertical white bars with thin blue outlines cross the teal bars at their ends, creating a frame-like effect.

Chapter 5

Engagement and Collaboration

5.0 Engagement and Collaboration

5.1 Building Capacity for the Future

The 2005 ARC study entitled Meeting the Transportation Challenges of the 21st Century urged Appalachia to establish the institutional capacity to plan for and encourage transportation development across local, county, and state inter-jurisdictional boundaries. It also highlighted the importance of collaboration between transportation, economic development and international trade interests. Responding to these recommendations, ARC established a regional Study Group to provide guidance and oversight for the Network Appalachia project.

The Study Group was composed of members and their alternates designated by each of ARC's thirteen member-states and, by design, represented a balanced cross-section of transportation, economic development, and international trade expertise. It also included a designee from the ARC Federal Office and a representative of the Development District Association of Appalachia. The establishment of the Network Appalachia Study Group represents an important first step toward building inter-jurisdictional planning capacity and assuring the interdisciplinary mix necessary to prepare Appalachia for the 21st century. Members of the Study Group, as well as the dates and venues of the Network Appalachia Regional Workshops are shown in Figure 5.1.

Representing international trade expertise from across Appalachia, ARC's Export Trade Advisory Council (ETAC) would also provide constant input and support to the Study Group throughout the planning process. Financial support for the project was provided through ADHS administrative funds and the Study Group was assisted by ARC staff and by the consulting firm of Moffatt and Nichol.

5.2 Putting the Capacity to Work

Meeting for the first time on October 30 and 31, 2007, the Network Appalachia Study Group quickly formalized its planning process and outlined requirements for selecting consultant support to the project. The Study Group also committed to not only draw from a variety of research data and planning resources, but to evaluate first-hand emerging transportation and logistics challenges and opportunities from across Appalachia. During its first meeting the Study Group toured the Virginia Inland Port (VIP) in Front Royal, VA. Recognized as America's first successful inland port, this intermodal container transfer facility (ICTF) offers area businesses a seamless intermodal link directly to the Virginia Port Authority marine terminals, located over 200 miles away in Hampton Roads, VA. They learned of over \$600 million in private sector investment that has financed over 6.25 million sq. ft. of new warehousing, distribution, and manufacturing centers and generated over 7,000 new jobs, solely as a result of the high-speed and cost efficient global access provided by VIP.

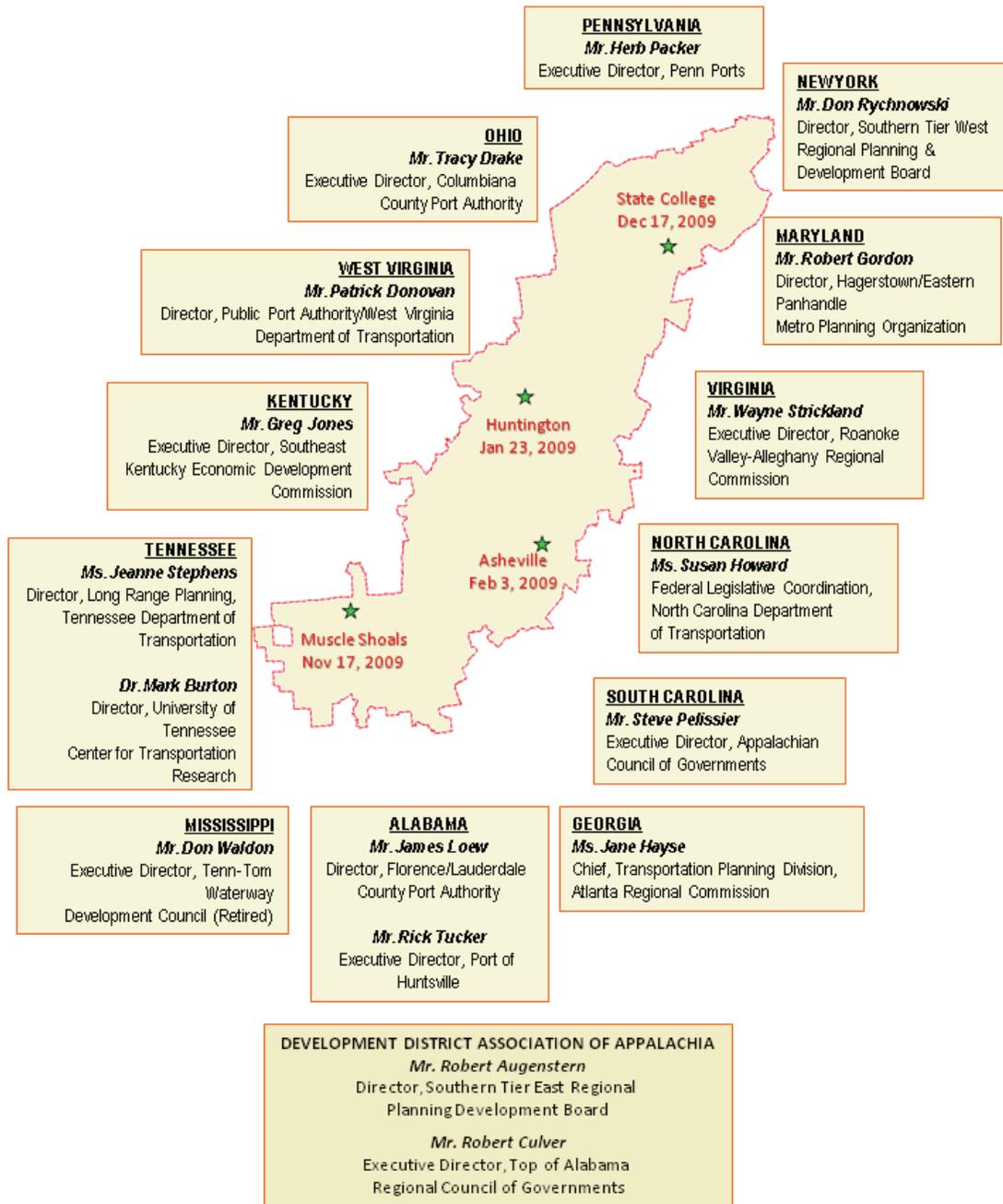


Figure 5.1: Venue/Dates of Regional Workshops and Members of the Study Group

For its second gathering, the Study Group traveled to Huntsville, Alabama on March 12 and 13, 2008 and met with representatives from Moffatt and Nichol, which had been selected to provide consulting support to the project. With the consulting team, the Study Group finalized the detailed structure of their planning process. The Study Group and its consulting team then toured the Huntsville International Airport's International Intermodal Center (IIC), an intermodal container transfer facility that, like VIP, has stimulated major private sector investment and employment growth.

At its third working session on July 9 and 10, 2008 in Savannah, Georgia, the Study Group reviewed preliminary macro-economic research that focused on changing economic trends and the affect that such changes were having on both commerce and the movement of goods to, from, and across Appalachia. Recognizing the importance of actively engaging the Region in the Network Appalachia planning process, the Study Group committed to host a series of Regional Workshops to both expand awareness of the project's transportation, economic development, and international trade issues and encourage attendees from across Appalachia to provide direct input into the planning process. Concluding its session, the Study Group was hosted by the Georgia Port Authority and provided with a hands-on presentation highlighting the dramatic growth of both Atlantic and Gulf coastal ports. The Port of Savannah program also clearly demonstrated the power of the intermodal global supply chain and the economic impact of global commerce.

Prior to its Regional Workshops, the Study Group convened in Washington, DC on September 17, 2008 to review additional economic trend analysis and to carefully assess Appalachia's existing transportation resources. The analysis confirmed that while some Appalachian areas enjoy well-developed access to both domestic and international markets, other areas suffer from underdeveloped capabilities, and others face serious access deficiencies.

5.3 Engaging the Region

At its September 17, 2008 working session, the Study Group committed itself to actively engage the Region in the Network Appalachia planning process and detailed the structure, locations, and sequencing of these Workshops. With an emphasis on active attendee collaboration and input, each Workshop event was designed to provide an overview of the macro-economic, demographic, and transportation/access issues affecting the Region. In addition, a variety of guest speakers would present information on both emerging challenges and opportunities. Following these informational briefings, attendees would be called upon to provide direct input into the process, providing strategic thoughts, ideas and concepts, as well as specific suggestions on near and mid-term opportunities to enhance their own local access. Finally, the Study Group emphasized the importance of engaging a broad and diverse Workshop audience to assure a representative cross-section of the Region. Invitations were targeted to both public and private sector officials, a multi-modal mix of transportation planners, providers, and users, academic institutions, energy and environmental interests, and, importantly, a broad cross-sample of business interests.

The Study Group decided to conduct a series of four Regional Workshops targeted to serve the southwest, southeast, central, and northern sub-regions of Appalachia. Each Workshop would be hosted by the Study Group designees representing the targeted sub-region. The Regional Workshop locations and schedules were:

Alabama/Mississippi
Muscle Shoals, AL - November 17, 2008

Maryland, New York, Pennsylvania
State College, PA – December 17, 2008

Kentucky, Ohio, Virginia, West Virginia
Huntington, WV - January 23, 2009

Georgia/North Carolina/South Carolina/Tennessee
Asheville, NC – February 3, 2009

In addition to the four Regional Workshops, the Study Group presented Network Appalachia to the 2009 Annual Conference of the Development District Association of Appalachia (DDAA) entitled “Global Appalachia: Challenges and Opportunities”. As with the Workshops, the Study Group provided a project overview and sought direct input from the 250 conference attendees.

5.4 Many Voices. Many Ideas. One Future.

In all, these events attracted nearly 500 attendees from across the Region, who joined with the Study Group and with guest presenters for an engaged and collaborative look into the future of Appalachia.

Highway planners and users focused on the need to complete the ADHS and to better plan for both improved roadways and added highway capacity across the Region. Trucking interests spoke of their support to the Appalachian businesses community, yet shared their concerns over the growing fuel costs and increasing highway congestion. They referenced a recent study by the Government Accountability Office showing over \$8 billion of increased trucking industry costs caused by highway congestion and they pointed to some of Appalachia’s major interstate highways, including I-26, I-40, I-59, I-71, I-75, I-76, I-80, I-81, and I-90, as congested highway corridors with growing reliability, efficiency, and safety concerns.

Railroad officials from the Burlington Northern Santa Fe, Norfolk Southern and CSX presented new emerging intermodal corridor programs that, through innovative public/private partnerships, will help to relieve highway congestion, provide important energy and environmental benefits, and strengthen Appalachia’s competitive access to both domestic and international markets. Featured in these presentations were Norfolk Southern’s “Heartland Corridor” through Virginia, West Virginia, and Ohio and “Crescent Corridor” serving Pennsylvania, Maryland, Virginia, North Carolina, Tennessee, South Carolina, Georgia, Alabama, and Mississippi, as well as the CSX “National Gateway Corridor” serving North Carolina, Virginia,

Maryland, Pennsylvania, West Virginia, and Ohio. Officials from the Genesee and Wyoming Railroad described the importance of Appalachia's short line railroads in maintaining safe, reliable, and cost efficient rail access for the Region's smaller communities and its many rural areas.

Navigation experts from both the Tenn-Tom Waterway and the Ohio River spoke of the safety, efficiency, and capacity offered by Appalachia's inland waterways. They committed to work together, on behalf of the Region, to establish a cooperative new Appalachian Marine Highway Corridor, stretching from Pennsylvania, Ohio, and West Virginia through Kentucky, Tennessee, and Mississippi, and on to Alabama's new Port of Mobile container terminal. Finally, the Virginia Port Authority spoke of the importance of strengthening and expanding intermodal links between coastal ports and Appalachian inland ports. They pointed to the landmark "Heartland Corridor" project between Virginia, West Virginia, and Ohio as an inter-jurisdictional, intermodal, and public/private model for transportation and economic success in the 21st century.

From an economic and employment development perspective, officials from a number of communities and from many of Appalachia's local development districts highlighted the need to better connect their communities and businesses to both domestic and international markets. Again and again they stressed the importance of assuring such access for not only larger metropolitan areas, but also for Appalachia's many smaller communities and rural areas. Many of these same officials urged ARC to increase its efforts to expand awareness of these issues and to assume a stronger advocacy role in developing a balanced and inter-connected transportation system that takes full advantage of ADHS and maximizes economic and employment benefits to the Region.

Pointing to the success of the Intermodal Container Transfer Facilities at the Virginia Inland Port and at Huntsville's International Intermodal Center, and to the new non-containerized cargo trans-load and consolidation centers in Somerset, KY, Dubois, PA, and Lenior, NC, officials urged the development of a region-wide system of inland ports to strengthen the connection between Appalachia's businesses and its transportation network. Representatives from the U.S. Commercial Service, ARC's Export Trade Advisory Council (ETAC), and from a number of Appalachia's colleges and universities spoke of the economic distress caused by the Region's historic isolation and emphasized the need to enhance the Region's connection to the global supply chain, if Appalachia is to successfully compete in the global economy. Some speakers called for taking full advantage of emerging new technologies, while others urged the Study Group to aggressively incorporate both energy and environmental issues into their planning to encourage a smarter and greener Appalachian transportation network in the future.

Perhaps the most compelling input was presented by Appalachia's businesses interests, who more than most, understand the critical importance of competitive access to both their suppliers and to their consumer markets. Speaking on behalf of a new manufacturing firm in Alabama, a company official stressed the importance of balanced highway, rail, and waterway

access. He explained that had their new location not offered such reliable, safe, and cost-efficient access, “We would have located elsewhere.” A representative from Appalachia’s wood and forest products sector pointed to a recent Virginia Tech study of the competitive advantage offered by improved transportation access. The study confirmed that over 85% of those Appalachian businesses interviewed claimed transportation as one of the most important factors in shaping their future success. This same message was powerfully reinforced when a major manufacturer in Mississippi reported that “In the years ahead, assuring safe, efficient, and reliable access to both suppliers and markets will be the single most important factor in determining the success of our firm and of our employees.

Through these Workshops, over 500 participants engaged in the Network Appalachia initiative, committing their time, vision, and energy in planning for the future of Appalachia. The Study Group then met to review and fully integrate Workshop input into the planning process. Through its evaluation, the Study Group assigned input into one of two categories. Entitled “Strategic Priorities”, the first category included ideas and suggestions that were overarching, medium-to-long term, and regional in scope. Combined, they help establish a comprehensive planning framework. Drawing from this framework and labeled “Tactical Opportunities”, the second category highlights very specific near and medium term examples of how to improve and expand local and sub-regional access to both domestic and international markets.

5.5 Strategic Priorities

Intermodal Corridors of Commerce: Appalachia’s transportation network of the 21st century will feature a fully interconnected network of highway, rail, and inland waterway corridors of both regional and national significance. These corridors will be closely linked to Appalachian businesses through a region-wide system of inland ports. Taking full advantage of the Appalachian Development Highway System as its foundation, these corridors will attract and accommodate a growing flow of both domestic and international commerce to, from, and across the Region, to the benefit of both Appalachia and its neighbors.

Economic Competitiveness: For Appalachian businesses to compete and succeed in the 21st century, they will require reliable, safe, and energy/cost efficient access to both domestic and international markets. Such access can only be achieved through a fully developed and integrated highway, rail, and inland navigation network. Such a network is essential to the competitiveness of Appalachia’s existing businesses and to the Region’s ability to attract new enterprise and employment in the future.

Planning and Coordination: The creation of the Network Appalachia Study Group represents an important first-step in building the Region’s capacity to plan for the future. This capacity is inter-jurisdictional in scope, intermodal in structure, and features a balanced blending of economic development, transportation, and international trade expertise. This comprehensive approach also recognizes the importance of both energy and environmental priorities and the

important benefits that can be achieved through improved public/private coordination and cooperation.

Partnerships: Planning for and developing Appalachia's access to opportunity in the 21st century will rely on new and innovative strategic partnerships, both internal to the Region and extending beyond its boundaries. Expanded collaboration and interaction will better coordinate economic development, transportation, and trade interests and maximize the transportation network's economic and employment contribution to the future of Appalachia.

Awareness and Advocacy: The Network Appalachia Regional Workshops confirmed a widespread recognition of the need to enhance access to future opportunity, both domestically and globally. Importantly, those who participated in the Workshops demonstrated a powerful sense of enthusiasm and confidence in the Region and in its future. The awareness that these Workshops expanded and the optimism and regional advocacy that they unleashed should be sustained to support continued planning and preparation for Appalachia's future.

Investment: In the 21st century, Appalachia's access to opportunity will require continued progress in developing the Appalachian Development Highway System (ADHS) and in better coordinating the highway system with the Region's other transportation modes. A growing region network of inland ports, serving both containerized and non-containerized cargo, will assure a direct connection between the region's transportation network and its economy. To achieve such success, appropriate planning and development financing, from both public and private sources, must be identified and established.

5.6 Tactical Opportunities

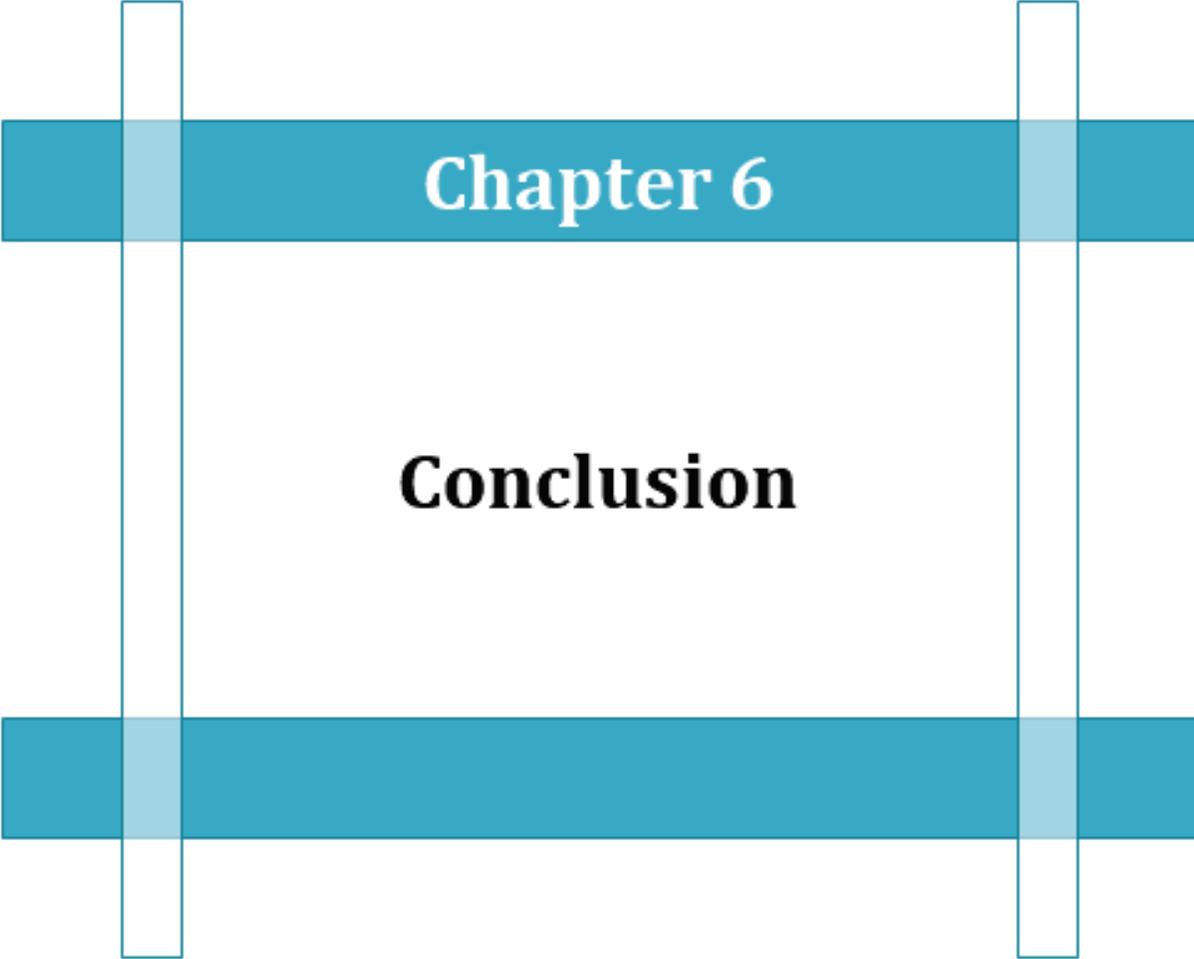
During its planning session in Baltimore, Maryland the study group assembled a package of 30 tactical projects from across Appalachia that had been identified by participants at the regional workshops. These projects represent a broad spectrum of illustrative proposals, offering a variety of multi modal approaches to enhance the regions access to both domestic and international markets.

1. **Inland Port, Intermodal Container Transfer Facility, Binghamton, NY.** Develop new intermodal inland port to enhance access to both domestic and global markets for southeastern New York and northeastern Pennsylvania.
2. **I-86 Development, NY.** Undertake improvements to ADHS Corridor T to complete a new cross-state I-86 highway corridor.
3. **Inland Port, Trans-load & Consolidation Center, Olean, NY.** Develop new trans-load and consolidation terminal in Olean, New York to enhance access to both domestic and international markets for western New York and northwest Pennsylvania.

4. **Inland Port, Trans-load & Consolidation Center, Dubois, PA.** Complete development of the Dubois Trans-load and Consolidation Terminal to enhance access to both domestic and international markets for north/central Pennsylvania.
5. **U.S. 219/Continental One Trade Corridor, NY, PA, & MD.** Undertake improvements to the Route 219 leading to the completion of the Continental One Trade Corridor, serving New York, Pennsylvania, and Maryland. .
6. **New Cross-Lake Erie Maritime Shuttle, Erie, PA.** More fully develop access to international commerce through the Port of Erie by launching new cross-Lake Erie freight and passenger services between northwest Pennsylvania and southern Ontario.
7. **Inland Port, Intermodal Container Transfer Facility, Northwest PA.** In cooperation with the Port of Erie, develop a new intermodal inland port and logistics center to enhance access to both domestic and global markets for northwest Pennsylvania and southwest New York.
8. **Inland Port, Intermodal Container Transfer Facility, Pittsburgh, PA.** In cooperation with the CSX National Gateway Corridor project, develop a new intermodal inland port to enhance access to both domestic and global markets for western Pennsylvania, eastern Ohio, and northwestern West Virginia.
9. **Inland Port, Intermodal Container Transfer Facility, Southeast PA.** In cooperation with the CSX National Gateway Corridor project, complete development of a new intermodal inland port to enhance access to both domestic and global markets for southeast Pennsylvania, northern Maryland, and northeast West Virginia.
10. **Inland Port, Intermodal Container Transfer Facility, Western Maryland.** In cooperation with the Norfolk Southern Crescent Corridor project, develop a new intermodal container transfer facility to enhance access to both domestic and international markets for western Maryland, northeast West Virginia, and southeast Pennsylvania.
11. **Inland Port, Intermodal Container Transfer Facility, Columbiana County, OH.** Complete development of Columbiana County Port Authority intermodal inland port to enhance access to both domestic and global markets for eastern Ohio, western Pennsylvania, and northwest West Virginia.
12. **Inland Port, Trans-load & Consolidation Center, Weirton, WV.** Develop new trans-load and consolidation center to enhance access both domestic and international markets for northwest West Virginia and eastern Ohio.
13. **Route 35 Highway Corridor, WV & OH.** Undertake improvements to the capacity, performance, and safety for the Route 35 Highway Corridor across WV and OH.
14. **Inland Port, Trans-load & Consolidation Center, Point Pleasant, WV.** Develop new trans-load and consolidation center to enhance access to both domestic and international markets for West Virginia and eastern Ohio.

15. **Inland Port, Intermodal Container Transfer Facility, Tri-State.** Develop new intermodal container transfer facility to enhance access to both domestic and global markets for the West Virginia, Ohio, and Kentucky Tri-state area.
16. **ADHS Corridor H Completion, WV & VA.** Complete construction of ADHS Corridor H in West Virginia and Virginia.
17. **Inland Port, Intermodal Container Transfer Facility, Roanoke Valley, VA.** In coordination with the Norfolk Southern Heartland Corridor and Crescent Corridor projects, develop a new inland port to enhance access to both domestic and international markets for southwest Virginia and southeastern West Virginia.
18. **Inland Port, Trans-load & Consolidation Center, Western North Carolina.** Develop new trans-load and consolidation center to enhance access to both domestic and international markets for western North Carolina.
19. **Murphy Gap Restoration, NC, GA, TN.** Restore abandoned rail link near Murphy, NC to reconnect western North Carolina, northern Georgia, and eastern Tennessee rail corridors, enhancing rail access for western North Carolina, northern Georgia, and eastern Tennessee.
20. **Inland Port, Intermodal Container Transfer Facility, East Tennessee.** In cooperation with the Norfolk Southern Crescent Corridor project, develop new intermodal container transfer facility to enhance access to both domestic and international markets for east Tennessee, southwest Virginia, and western North Carolina.
21. **ADHS Corridor K Completion, TN.** Complete construction of the ADHS Corridor K highway corridor linking eastern Tennessee with western North Carolina.
22. **Saluda Rail Restoration, NC, SC.** Restore rail freight service along the Asheville, NC – Spartanburg, SC route to enhance western North Carolina access to both the Crescent Corridor and to the Port of Charleston, SC.
23. **Upcountry Intermodal Corridor, SC.** Develop new intermodal rail corridor between the Spartanburg/Greenville area and the Port of Charleston to enhance Upcountry access to both domestic and international markets.
24. **North Georgia Highway Corridor, GA.** Develop improved east-west highway corridor between I-75 and I-85, enhancing access to both domestic and international markets for northern Georgia.
25. **Huntsville-Mobile Intermodal Corridor, AL.** Develop improved intermodal corridor between the International Intermodal Center in Huntsville and the Port of Mobile, enhancing access to both domestic and international markets for north Alabama.

26. **Atlanta-Huntsville-Memphis Highway Corridor, GA, AL, MS, & TN.** Plan, design, and construct a new highway trade corridor between Atlanta, Huntsville, and Memphis to enhance access to both domestic and international markets for Georgia, Alabama, Mississippi, and Tennessee.
27. **Inland Port, Intermodal Container Transfer Facility, Birmingham, AL.** In cooperation with the Norfolk Southern Crescent Corridor project, develop new intermodal container transfer facility in the Birmingham area to enhance access to both domestic and international markets for central Alabama.
28. **West Alabama Highway Corridor, AL.** Develop improved north-south Route 43 Highway Corridor between Mobile and northwest Alabama, enhancing access to both domestic and international markets for west Alabama.
29. **Tenn-Tom Intermodal Corridor, AL & MS.** Develop new intermodal container-on-barge services along the Tenn-Tom Waterway Corridor between northern Mississippi/Alabama and the Port of Mobile, enhancing access to both domestic and international markets for northeast Mississippi, northwest Alabama, and southern Tennessee.
30. **C&G Railway Corridor, MS.** Restore an abandoned rail segment to fully redevelop the cross-state Columbus and Greenville rail corridor, enhancing access to both domestic and intermodal markets for central Mississippi.



Chapter 6

Conclusion

6.0 The Way Ahead

From Isolation and Distress to Global Access and Economic Opportunity

Appalachia, “A land apart.” Much of the economic growth and prosperity of the 20th century simply by-passed Appalachia. It was through a vacuum of advocacy and leadership, a failure of planning and vision, and drought of investment that, during the first half of the past century, doomed Appalachia to physical isolation and sentenced its residents to a long and painful history of chronic economic distress. Reacting to the findings and recommendations of the President’s Appalachia Regional Commission (PARC), the Appalachia Regional Development Act of 1965 established the Appalachia Regional Commission (ARC), a program of regional advocacy, planning, and investment, joining the Tennessee Valley Authority (TVA) as one of only two sustained national regional development programs in America.

6.1 Projecting Forward: A Changing World of New Challenges and Opportunities

The 21st century brings powerful new challenges and opportunities to the businesses, communities, and the 23 million people of Appalachia. Now 85% complete, the Appalachian Development Highway System (ADHS) has made significant progress in overcoming the region’s physical isolation and its chronic economic distress. While research confirms the need to continue ADHS development, shifting economic and demographic trends call for a broader and more comprehensive planning and development framework to guide Appalachian transportation into the 21st century. An in-depth review of macro-economic trends and of the characteristics and capabilities of the Region’s current transportation resources confirms the following;

1. Over the past six decades, global trade in manufactured goods has grown on average 7.6% per year, twice as fast as the inflation adjusted growth rate of global GDP.
2. Long-term economic expansion is the underlying driver of trade growth. Additional factors also have contributed to the establishment of a global economy. These include new efficiencies in containerized intermodal transport, growth of international trade agreements, advances in transportation and information technology, and a long term pattern of demographic shifts, affecting both consumption patterns and labor markets.
3. While annual trade patterns may vary, a half-century trend of increased international commerce has permanently established a global economy for the 21st century.
4. International trade lanes between the United States and Asia will remain strong, while trade lanes connecting the United States with Canada, Mexico, Europe, and the Middle East will also remain as important corridors for international commerce. Trade lanes between the United States and South American show potential for new growth.

5. Strategically centered amidst some of America's strongest production centers and consumer markets (Midwest, Northeast, Mid-Atlantic, Southeast, etc.), Appalachia is positioned as a natural cross-roads for emerging international trade lanes linking America with markets worldwide.
6. The demographic characteristics of Appalachia feature mostly rural areas, with a number of major population centers along its periphery. Demographic trends indicate the southern portion of the Region will experience the strongest population growth in the years ahead.
7. Imports into the Region tend to consolidate toward those areas of greatest population and consumption, while exports from the Region, tend to originate from dispersed locations, more evenly spread throughout the Region.
8. Those industrial groups within Appalachia that can benefit most from enhanced domestic and global access include;
 - Industrial Machinery
 - Lumber and wood products
 - Agricultural products
 - Plastics and chemicals
 - Auto-parts and related products
 - Furniture, household goods, and related products
 - Textiles and apparel
 - Electronics and communication products
 - Environmental technologies
 - Medical instruments and supplies
9. A more coordinated and integrated transportation network provides the opportunity to better balance and diversify longer-distance movements of goods, taking more advantage of the inherent energy and environmental benefits of both railway and waterway systems. Thus, a coordinated network of intermodal corridors of commerce can enhance competitive access and overall capacity, while at the same time achieving new and increasingly important energy and environmental efficiencies for Appalachia and for America.
10. The Region is benefiting from improved highway access throughout the development of the Appalachian Development Highway System (ADHS). Appalachia also benefits from a network of railway routes, including a number of emerging intermodal corridors and an extensive system of short line railways. Importantly, the Region also benefits from a 1,500 mile system of navigable inland waterways. Increased coordination between these individual modes is essential to enhance the Region's competitive access to coastal ports, Appalachia's gateways to international trade.

6.2 Positioning for Success in the 21st Century: Network Appalachia

In a Region that for so long endured the economic consequences of isolation, ensuring access to economic opportunity in the 21st century is a priority that will shape Appalachia's success well into the new century. By fully leveraging past investment and through a planning and development framework that expands connections to both domestic and international commerce, **Appalachia is within reach of a transportation network that will position the Region as a growing cross-roads for both domestic and international commerce.** It is a network that stresses inter-jurisdictional coordination, intermodal cooperation, and the importance of public and private sector planning and investment partnerships. Importantly, it is a network that brings new economic and employment benefits to Appalachia, while at the same time providing transportation capacity, safety, and efficiency benefits to many of Appalachia's neighbors, including those facing congestion-related economic and environmental challenges. Finally, it is a balanced intermodal network that, through efficient new highway, rail, and maritime connections, provides important energy and environmental benefits to both Appalachia and the entire nation.

Network Appalachia represents a 21st century regional transportation network that establishes the domestic and international connections necessary for Appalachia to successfully compete in the global economy. It is a network that revolves around three interconnected building blocks. These include;

A. Continued Development of the Appalachia Development Highway System.

Authorized by the Appalachian Regional Development Act of 1965 the Appalachian Development Highway System (ADHS) is the first highway system in America authorized by Congress for the purpose of stimulating economic development. ADHS is a 3,090-mile near-interstate highway system composed of 31 corridors located throughout the 13 Appalachian states and is now approximately 85% complete. A recent ARC sponsored study of the economic benefits of completing ADHS highlights 80,500 new jobs and \$5.0 billion in increased value added, including \$3.2 billion in new wages per year for Appalachian workers by 2035.

Importantly, the research also spotlights ADHS benefits that extend far beyond the boundaries of Appalachia. The study confirmed that in addition to strengthening links between Appalachian communities, ADHS is an important component of longer-distance trade lanes, extending to, from, and through Appalachia. Figure 6.1 indicates Appalachia’s Strategic Highway System and pin points those sections of the ADHS that still need to be completed.

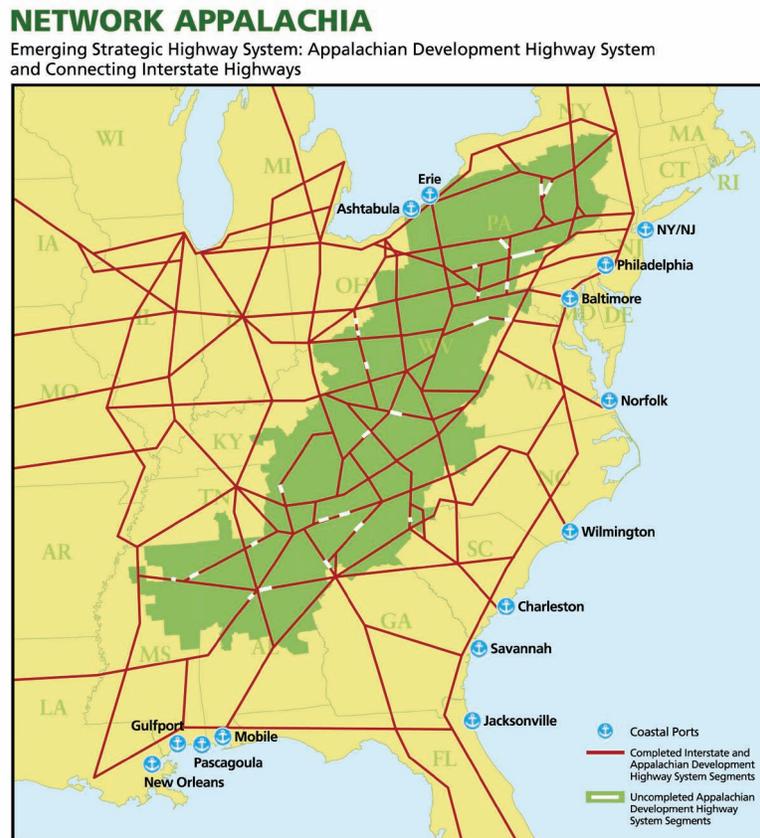


Figure 6.1: The Appalachian Development Highway System

B. Intermodal Corridors of Commerce: Appalachian Routes to Global Opportunity.

The 1999 ARC report entitled An Assessment of Intermodal Transportation Plans, Systems, and Activities in the Appalachia Region warned, “While ADHS has served as the centerpiece of ARC’s economic development program in the past, highways alone are no longer sufficient to help Appalachia’s communities compete in the global marketplace. Increasingly, the efficient movement of goods requires an intermodal

transportation system that provides access to critical supplier and consumer markets. In the 21st century, Appalachia’s growth and prosperity will depend on its ability to develop integrated intermodal transportation systems.”

Building from ADHS as its foundation, Appalachia in the 21st century will be served by an interconnected network of primary highway, rail, and inland waterway routes, each serving as designated intermodal corridor of commerce. These are corridors of both regional and national significance and establish important new Appalachian connections

NETWORK APPALACHIA

Intermodal Corridors of Commerce (Existing and in Development)



Figure 6.2: Intermodal Corridors of Commerce

to both domestic and international markets. These corridors provide for the safe, efficient, and high-speed movement of containerized international cargo between inland Appalachia and coastal ports, the Region’s gateways to global commerce. In addition, these corridors support the flow of conventional, non-containerized cargo, bound to and from both domestic and international markets. Figure 6.2 shows Appalachia’s network of Intermodal Corridors of Commerce.

Appalachian intermodal corridors of commerce are not merely a vision for the future. They are, in fact, taking shape today. Across the Region work continues on developing

ADHS corridors as well as a number of other planned highway priorities, such as the Continental One corridor and the Atlanta-Huntsville-Memphis highway corridor. Important new intermodal rail corridors are also taking shape as shown previously in Figure 3.8. These include the Norfolk Southern Heartland Corridor serving Virginia, West Virginia, and Ohio and the Crescent Corridor serving Pennsylvania, Maryland, Virginia, Tennessee, North Carolina, South Carolina, Georgia, Alabama, and Mississippi. In addition, the CSX National Gateway Corridor is expanding high speed intermodal rail service to North Carolina, Virginia, Maryland, West Virginia, Pennsylvania, and Ohio. These initiatives establishing new models for public and private sector cooperation, improving rail, highway, and maritime intermodal coordination, and creating powerful new Appalachian connections to both domestic and international markets are attracting national attention and wide-spread recognition.

For example, Gilbert E. Carmichael, Senior Chairman of the Intermodal Transportation Institute and former Federal Railroad Administrator, declared *“These are models of collaboration, cooperation, and innovation. They prove that our often-fragmented modes of transportation can work together and demonstrate the potential of building successful new public and private partnerships. Perhaps most importantly, they are creating powerful new links in the global supply chain that will stimulate economic growth and opportunity.”*

Complementing Appalachia’s emerging highway and rail corridors, a new Marine Highway initiative is focused on taking full advantage of Appalachia’s 1,500-mile system of navigable inland waterways. This was presented in figure 3.10 Patterned after successful programs in both Europe and Asia, these plans call for inland waterways to become important new links in the global supply chain, shuttling intermodal containers between inland port locations in Pennsylvania, West Virginia, Ohio, Kentucky, Tennessee, Mississippi, and Alabama and coastal ocean ports in both Mobile, AL and New Orleans, LA.

C. The Inland Ports of Appalachia: Linking Economic Success to Transportation.

While emerging corridors of commerce establish strong new Appalachian connections to both domestic and international markets, it is a region-wide system of local freight terminals, referred to as inland ports, that establish the vital connection between Appalachia’s transportation system and its economy. These inland ports are the consolidation, distribution, and warehousing centers that directly connect local businesses with the Region’s highway, railroad, and waterway corridors. Such centers come in various shapes and sizes and are tailor-designed to serve the specific needs of local communities.

Successful models include both the Virginia Inland Port in Front Royal, VA and the International Intermodal Center in Huntsville, AL. These are intermodal container transfer facilities that shift containerized cargo between trucks and trains, offering local businesses high speed/low cost intermodal access to gateway ocean ports. They also stimulate economic and employment growth, as so successfully demonstrated in both Front Royal and Huntsville. As part of the development of new emerging intermodal rail corridors, new inland container port facilities are being developed in the heart of Appalachia as shown in Figure 6.3.

NETWORK APPALACHIA

Inland Container Ports (Existing and in Development)

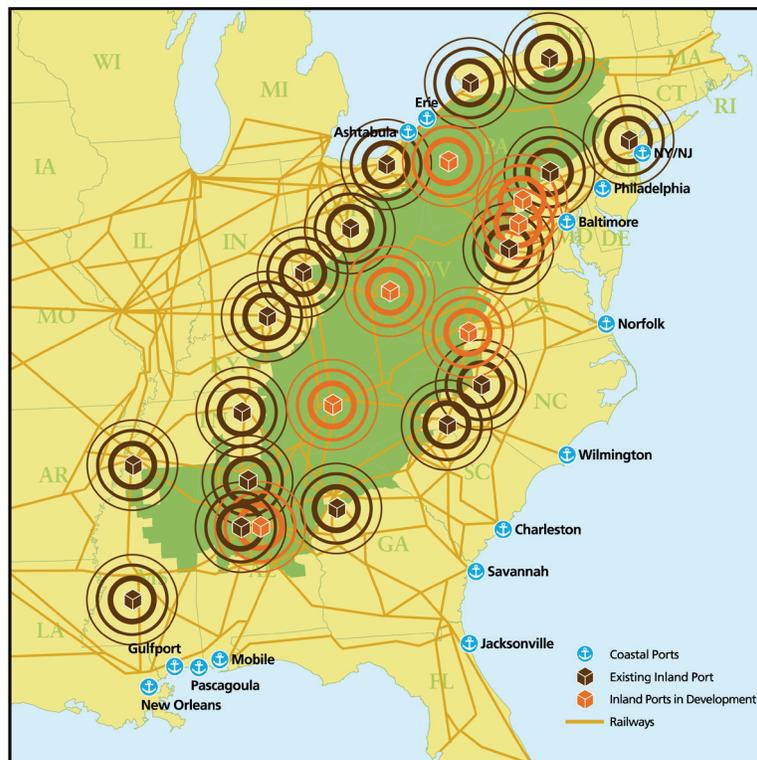


Figure 6.3: Inland Container Ports

Other models for inland port success can be found in Appalachia’s smaller towns and rural areas, such as Somerset, KY, Dubois, PA, and Lenior, NC. These centers are trans-load and consolidation terminals for conventional, non-containerized cargo. Here, local businesses gain multi-modal access that saves on transportation costs and expands market reach, while local communities gain an important new feature to attract enterprise and employment into their area. Building on the success of these models, inland port planning and development is rapidly expanding across Appalachia, opening new connections and attracting new opportunity.

6.3 Proactive Planning: The Way Ahead

A 20th century approach to transportation planning and development can no longer ensure Appalachia the domestic and global access that it will require to compete and succeed in the global marketplace. Fully incorporating the emerging economic, energy, and environmental priorities of the 21st century, a new, pro-active planning and development framework can both enhance the Region's global competitiveness and help attract new enterprise and employment into Appalachia. This new framework is outlined below:

Transportation Planning and Development Framework for Economic Competitiveness in the 21st Century

Appalachia's economic success in the 21st century will depend on reliable, safe, and cost-efficient access to domestic and international markets.

- **Advocacy and Partnerships:** Appalachia must strongly advocate for its own future, which is best accomplished through building innovative and collaborative new partnerships. Such partnerships will expand awareness of both challenges and opportunities and encourage/support increased local and regional planning activities. Proactive in nature, these partnerships will be both internal and external to the Region, feature public and private sector participation, expand coordination between transportation, economic development, and international trade interests, and strengthen Appalachia's connections to both domestic and international commerce.
- **Planning and Coordination:** To prepare for the future, a comprehensive and sustained planning process must be established that features inter-jurisdictional cooperation, intermodal coordination, and actively engages both public and private sector participation. The planning approach must be driven by economic development priorities, with strong attention to quickly emerging energy and environmental priorities.
- **Investment:** Appalachia faces a complex economic future, filled with new challenges and opportunities. Building on the historic success of the Appalachian Development Highway System, sustained transportation investment in the 21st century must be secured that is both sufficient to meet the Region's planning and development needs and flexible to encourage a strong commitment to intermodal coordination and cooperation. A new emphasis on better integrating public and private sector investment can also maximize economic and employment benefits to the Region.

In its 1964 report to President Lyndon Johnson, the President's Appalachian Regional Commission (PARC) stressed that, "Progress in Appalachia can only be realized through the coordinated effort of a regional development organization, with state and local development units, with research and demonstration centers, and with multiple state and federal agencies." For nearly a half century, the Appalachian Regional Commission has applied this model and has, time and again, demonstrated the power of advocacy, planning, and investment to create

economic and employment opportunity. Building from its past success with the Appalachian Development Highway System, it is this same collaborative approach, not aimed at overcoming past distress, but focused on creating future opportunity, that can expand connections to domestic and international commerce and serve as Appalachia's route to economic success in the global 21st century.