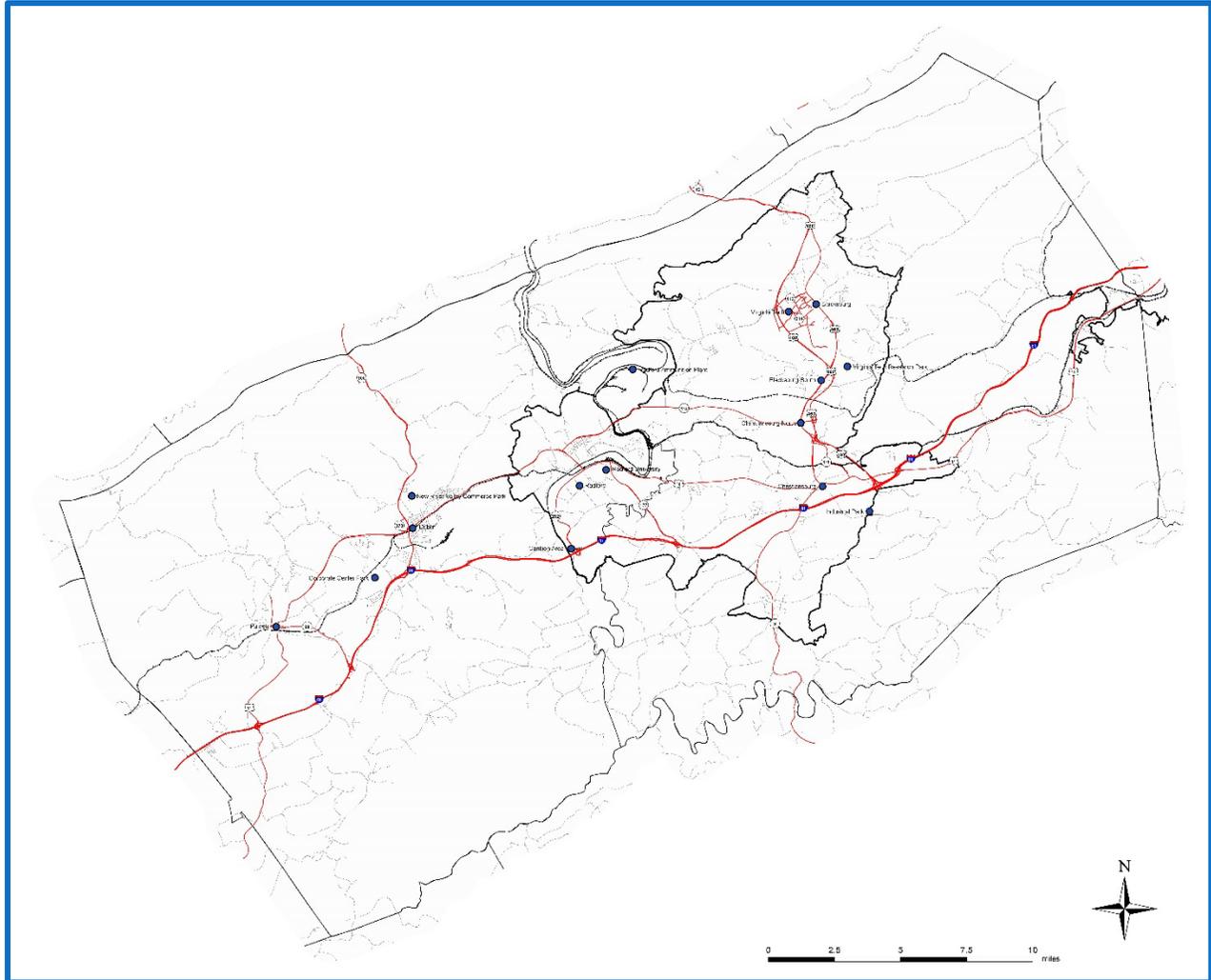


VMTP 2025 Needs Assessment

Regional Needs Profile



New River Valley Region

December 2015

1. NEEDS ASSESSMENT PURPOSE

The VMTP 2025 Needs Assessment is an essential element of the overall VTrans2040 Statewide Transportation Plan for Virginia. Based on the VTrans 2040 Vision and policy directives from the Governor’s office, the VMTP 2025 Needs Assessment is based on two principal objectives of transportation policy with the aim of enhancing economic competitiveness. These are 1) to attract and retain the 21st century workforce, and 2) to support goods movement for Virginia businesses.

This document is one portion of the overall Needs Assessment for regional Networks that deals with the Needs Assessment for the New River Valley Region. There is a separate document entitled “[VMTP 2025 Needs Assessment: Regional Networks Introduction](#),” that provides an overall introduction into the background and methodology of the Needs Assessments. In this document, details are provided on the 2025 Needs development process, as well as the economic factors shaping regional Transportation Needs. This introductory document provides a foundation for the regional needs described here. The focus of this Transportation Needs Assessment is to identify the Transportation Needs that are part of the New River Valley Regional Network, and that would support regional industries and workforces.

Defining Transportation Needs

Transportation Needs, as considered in the 2025 Needs Assessment, are defined as the gap between the transportation system in place currently that serves the current industries in a region, and the future transportation system needed to serve the desired future economy in the region. The gap between the Transportation Needs and economic conditions is the basis for the findings in this report. The following sections outline the New River Valley regional Economic Profile, regional Transportation Profile, and regional Transportation Needs.

Defining a Regional Network

This portion of the Needs Assessment deals with a Regional Network. For the purposes of the VMTP Needs Assessment, the final determination of each Regional Network has been developed as part of the outreach process in working with each region. Additional information about how the Regional Networks were defined is referenced in the introductory document, “[VMTP 2025 Needs Assessment: Regional Networks Introduction](#).”

In the New River Valley Region, the initial needs analysis area included Montgomery County, Pulaski County, and the City of Radford. However, as shown in the Needs Assessment, below, other areas beyond the immediate needs analysis area were considered in the Needs Assessment as well. For example, in New River Valley, this included passenger markets, such as Lynchburg to the East, and freight markets to the North via Interstate 81. These areas were considered in a number of quantitative and qualitative ways when developing the regional needs profile.

2. ECONOMIC PROFILE

A. Introduction

The Trends Analysis conducted as part of the VTrans2040 Vision Plan showed strong indications that future economic success for both states and regions will hinge on attracting and retaining increasingly scarce talented workers, particularly from among the well-educated Millennials. In addition, future goods movements will be critical to supporting Virginia’s current and emerging businesses. A key part of understanding emerging Transportation Needs statewide is understanding the current and future economic conditions in different parts of the state. The Needs Assessment therefore focuses on understanding the major economic dynamics of each region and using that understanding to shape Transportation Needs.

The Study Team used available data from state and national sources, as well as input from New River Valley stakeholders to identify an overall current economic profile for the region. The components of the current economic profiles layers together demographic and economic characteristics of the region. The Regional Profile incorporates the following baseline data for each region:

- Demographic Characteristics
- Top Industries by Employment, Output and Location Quotient
- Workforce Characteristics
- Top Employers
- Activity centers, characteristics and travel markets (as defined by existing centers of employment as modified by input from stakeholders in each region)

B. Demographics

At a regional level, research regarding basic demographics was analyzed as a foundation for understanding regional economic dynamics. The economic and demographic data analyzed in this report support insights regarding which workforce and/or key age groups are currently present in the region. This information is important to inform potential types of investments to attract and retain the desired workforce.

Statewide Demographics

According to the Weldon Cooper Center, the current population in the state of Virginia is 8,185,867. By the year 2025, the Commonwealth of Virginia’s population is projected to increase by between 1 million, to 1.5 million. Statewide per-capita incomes are expected to rise 21%, from 44,765 to 54,226.

Table 1: Statewide Population Projections

Current Population - 2012	Weldon Cooper 2025 Projection	Woods &Poole 2025 Projection
8,185,867	9,203,977	9,740,553

Source: Weldon Cooper Center for Public Service, Demographic Research Group, Intercensal Estimates for Virginia, Counties and Cities: 2010-2012, and Woods and Poole Economics, Incorporated, 2014 State Profile District of Columbia, Maryland, and Virginia. Washington DC

Regional Demographics

Substantial population growth is projected for the New River Valley Region. Projections range from 14,000 to 20,000 new residents in the region by the year 2025. (Refer to Table 2).

Table 2: New River Valley Population Projections

Current Population - 2012	Weldon Cooper 2025 Projection	Woods & Poole 2025 Projection
178,933	198,428	192,470

Source: Weldon Cooper Center for Public Service, Demographic Research Group, Intercensal Estimates for Virginia, Counties and Cities: 2010-2012, and Woods and Poole Economics, Incorporated, 2014 State Profile District of Columbia, Maryland, and Virginia.

Table 3 provides a closer look at population projections by jurisdiction within the New River Valley Virginia Region.

Table 3: County and City Population Projections.

Jurisdiction	2010 Population	Weldon 2025 Projection	% Change
Montgomery County	94,392	110,492	17.1%
Pulaski County	34,872	36,021	3.3%
City of Radford	16,408	17,844	8.6%

Source: US Census 2010 Demographic Profile; and Weldon Cooper Center for Public Service, Demographic Research Group, Intercensal Estimates for Virginia, Counties and Cities: 2010-2012

Population growth is also expected to be accompanied by a demographic shift, with a higher percentage of the population over the age of 60. Figure 1 shows the current and projected population in the New River Valley Region, broken down by age cohort. There is clear growth in the 60+ and 15-24 age cohorts.

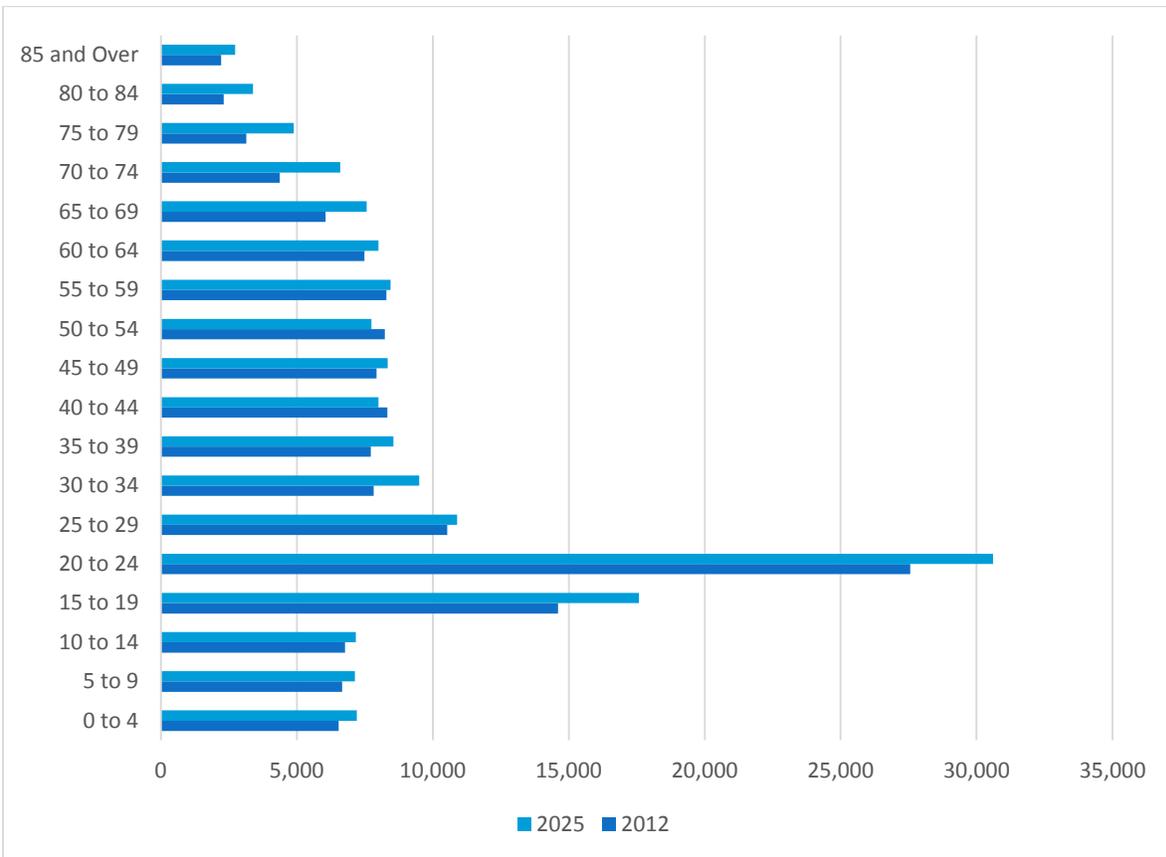


Figure 1: Population by Age in the year 2012 and Projected for the year 2025
 Source: Woods & Poole Economics, Incorporated. 2014 State Profile District of Columbia, Maryland, and Virginia. Washington DC. 2014. <http://www.woodsandpoole.com>. Accessed June 18, 2014.

In addition to growing population, regional income levels are also projected to rise. According to Woods & Poole Economics Inc., per-capita income for the region is expected to rise 17%, slightly less than the state average of 21%, from \$28,843 to \$33,878.

C. Current Industry Strengths

The following economic measures were used to analyze the strength and characteristics of the current regional economy in the New River Valley area.

Top Industries by Output

Economic output is the total value of all goods and services produced in an economy within a given timeframe. Unlike Gross Domestic Product, it includes the value of salaries. It is a common indicator used in economic analysis to determine whether an economy is growing or contracting by comparing output during two different points in time. Manufacturing is the strongest industry in the New River Valley region when measured by economic output. This can be attributed to the high economic value of goods produced in the transportation, and electric industries, both of which fall under the broader Manufacturing category and are well represented in the region. Public Administration, also called Government by some data sources, is the second most prominent industry by output. (Refer to Table 4).

Table 4: Current Industries by Output.

Top Industries	% of Output
Manufacturing	26%
Public Administration	17%
Retail	15%
Professional Services	9%
Wholesale Trade	8%

Source: IHS Global Insight Data, 2012

Economic Sectors

Economic profiles for all 15 regions in Virginia were developed using a breakdown of industry sectors developed by the Study Team¹. Industry data on Output were aggregated into three broad economic sectors for each region, defined as Local, Knowledge and Freight sectors. Figure 2 below provides a summary of the predominance of each economic sector by output in the New River Valley area in 2012.

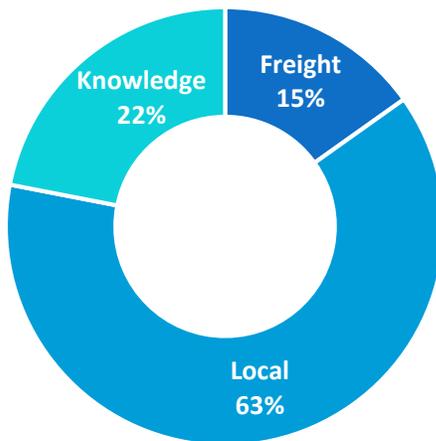


Figure 2: Top Sectors by Output (2012)

Source: IHS Global Insight

The Local Services sector is clearly the strongest in the New River Valley area, making up 63% of the economic output for the region. Conversely, the Knowledge and Freight sectors account for 15 and 22% of economic output, respectively. Each economic sector has different transportation characteristics and needs, as discussed in the Transportation section below.

Top Industries by Employment

Manufacturing, Educational, and Retail Trade sectors generate a large portion of the total employment in the New River Valley area. (Refer to Table 5). Virginia Tech is the largest employer in the area, and Radford University is third (Refer to Table 6). Many of these jobs are classified as Government industry jobs by IHS Global Insight, supporting the ranking of this industry in Table 5 below.

¹ A more thorough explanation of the makeup of these sectors is provided in the separate document on Regional Networks Introduction.

Table 5: Current Top Regional Industries by Employment.

Top Industries	% of Workforce
Government	34%
Manufacturing	14%
Retail	11%
Accom./Food Serv.	10%
Health Care/Social Ass.	8%

Source: IHS Global Insight Data, 2012

Volvo, Moog Components, Moog Components, and Kollmorgen Group are the largest employers in the Manufacturing industry, making vehicles, motion control and electronic components, and motion systems and servos, respectively. They are also some of the largest employers in the region. (Refer to Table 6).

Table 6: Current Top Employers.

Employers	Employees
Virginia Polytechnic Institute & State University	7,448
Volvo Group N. America Inc., (assembly plant)	2,600
Radford University	2,375
Moog Components Group Inc.	1,000+
Kollmorgen Group	600

Source: InfoUSA, supplemented with VEDP, VEC, and local data.

Top Industries by Location Quotient

Location quotient (LQ) is an economic measure, expressed as a ratio, which compares one region to a larger reference region according to some characteristic or asset. It is often used to quantify how concentrated a particular industry, cluster, occupation, or demographic group is in a region, as compared to the nation, and can reveal what makes a particular region unique in comparison to the national average.

Location quotients for 20 different industry categories were calculated for the New River Valley region. The industries expressed in Table 7 have the highest LQ scores in the region. The score for Public Administration, for example, can be inferred to mean that these services are more than two times more concentrated in the region than in the nation as a whole, on average.

Table 7: Current Top Industries by Location Quotient.

Top Industries	Location Quotient
Public Administration	2.12
Professional Services	1.76
Real Estate	1.43
Accom./Food Serv.	1.34
Manufacturing	1.09

Source: IHS Global Insight Data, 2012

Data Comparisons

A number of data sources were used to inform the analysis of industries in New River Valley and other regions. Employment data was largely drawn from IHS Global Insight, and supplemented with data from

the Virginia Employment Commission (VEC); Virginia Economic Development Partnership (VEDP); and the regional Comprehensive Economic Development Strategy (CEDS). Top Employers were identified using InfoUSA point data in GIS, and supplemented with the same statewide data sets. Each of these sources uses a different methodology to collect and categorize data. Some use different geographical analysis areas and, therefore, may arrive at slightly different conclusions about top employers or industries by certain measures. Table 8 shows some of the similarities and differences between these sources in how they determine “top industries” in the region.

Table 8: Comparisons of Employment Data from Sources Used in Developing the New River Valley Regional Economic Profile

CEDS 2012		VEDP 2014		VEC 2014		IHS Global Insight 2012	
Top Industries	Rank	Top Industries	% of total Workforce	Top Industries	Number of Employees	Top Industries	% of total Workforce
Business/Financial	1	Government	27.9%	Government	18,818	Government	34%
Energy	2	Manufacturing	16.8%	Manufacturing	11,308	Manufacturing	14%
Health Care	3	Retail	12.2%	Retail	8,118	Retail Trade	11%
IT Telecom	4	Accom./Food Services	9.9%	Accom./Food Services	6,642	Accom./Food Services	10%
Advanced Materials	5	Health Care	9.7%	Health Care	6,506	Health Care/Social Services	8%

InfoUSA (not included in Table 8) maintains a proprietary database of 14 million businesses, and provided a uniform and geo-located dataset of jobs statewide that was used in the Needs Assessment.² As part of the Needs Assessment, InfoUSA jobs data was mapped and spatially analyzed for the 15 regions in the state of Virginia. This allowed analysts to identify the reported location of all individual work sites, as well as the number of employees that worked there. The shortcoming of this dataset is that many public sector jobs including those at state universities, government offices, and federal employees/contractors, aren’t captured. For this reason, VEC, VEDP, and CEDS data, along with input from local stakeholders, was used to supplement this dataset for the purposes of identifying top employers and activity centers. For the New River Valley, employers such as Virginia Tech and Radford University were identified using these supplemental resources.

IHS Global Insight is a 2012 data set categorized by The North American Industry Classification System (NAICS) codes, and was used to develop an initial regional economic profile for the New River Valley region. This data was collected in a different year than that used in VEDP and VEC, which may have some effect on differences in the reported numbers of employees in each dataset.

Both VEC and VEDP report their figures using the same data source: the Quarterly Census of Employment and Wages (QCEW), and data used in this analysis was taken from the 3rd quarter of 2014. This source includes all workers covered by state unemployment insurance laws, and all workers covered by Federal insurance laws, but excludes self-employed workers and some agricultural workers. The difference between these sources lies in reporting. VEC uses number of employees to rank

² In developing the database 5,200 phone books, annual reports and other business directories are continuously reviewed to find information, public record data from county courthouse filings, SEC and 10k filings, and Secretary of State data are used, and every month the USPOS National Change of Address, ZIP+4 and Delivery Sequence file are matched to standardize and keep addresses current. The database is continuously updated from over 5,000 public sources and more than 20 million phone calls are made per year to verify and collect additional information.

industries, while VEDP computes a percentage of total workforce. The resulting industry rankings, as reflected in Table 8, are the same.

Finally, Comprehensive Economic Development Strategy (CEDs) data is derived from a cluster analysis performed by the Southern Rural Development Center. The CEDs then ranks industries by their estimated number of employees, as reflected in Table 8. Note that retail and university/college jobs were not included in this analysis.

D. Activity Center Analysis

An important part of the Needs Assessment at the regional level was the identification and evaluation of economic activity centers in each region. For the purposes of this analysis, activity centers are defined as areas of regional importance that have a high density of economic and social activity. Activity centers were first defined in draft form using employment location patterns. A GIS-based spatial analysis was conducted to determine which areas have the greatest relative density of jobs. Activity centers were then drawn for these areas using a one-mile radius. Activity centers were revised, refined, or amended after discussing economic conditions with regional stakeholders. In the New River Valley region, centers of high economic or social activity such as the Radford Army Ammunition Plant, or the New River Valley Commerce Park, weren't represented as areas of high job density through the InfoUSA jobs data that was used in the mapping exercise. Centers such as this were instead affirmed by stakeholders who had a knowledge of the regional significance of the activity there, and then mapped accordingly. Figure 3 below shows the InfoUSA job density color scale in shades of yellow, and the activity centers as blue circles.

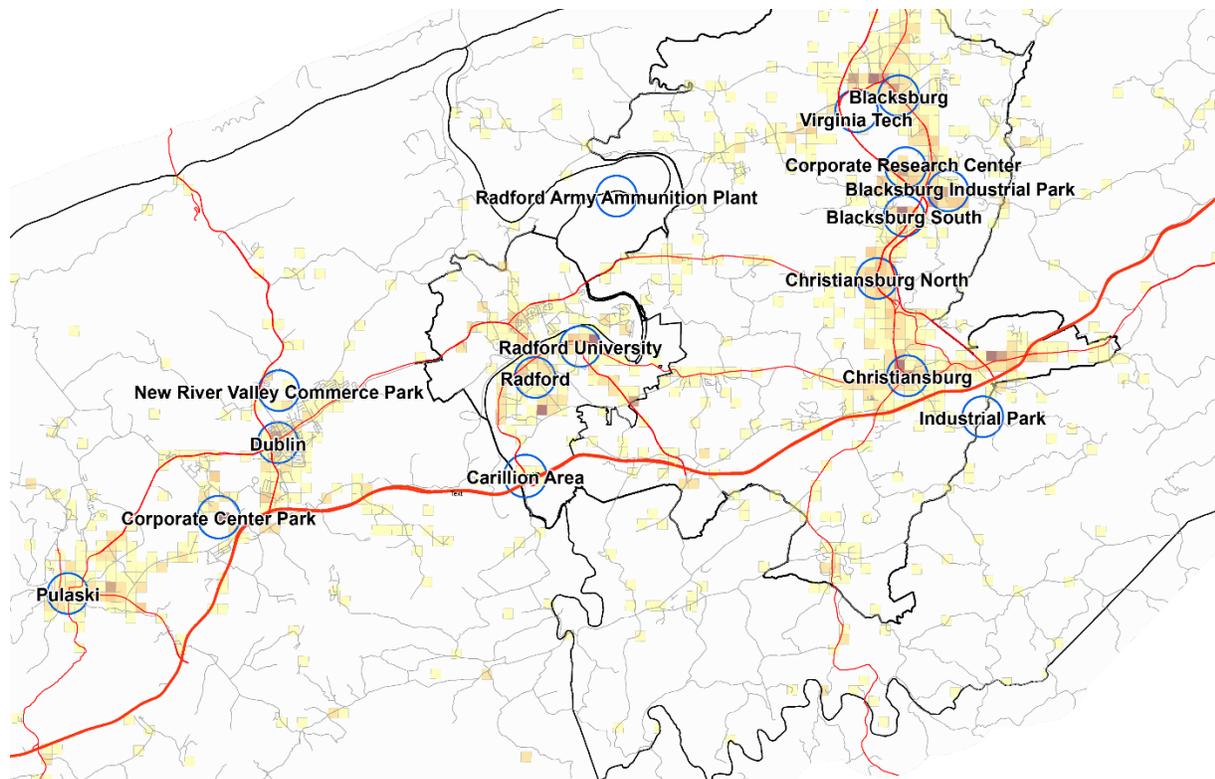


Figure 3: Map of Activity Centers based on Job Density and Stakeholder Input

Once activity centers were identified, the Study Team analyzed the type and scale of economic activity that took place in those locations. Analysts developed pie charts for each activity center that represented the breakdown of employment by industry sector³. Charts were then scaled based on the number of jobs in each center relative to the other centers in the Region.

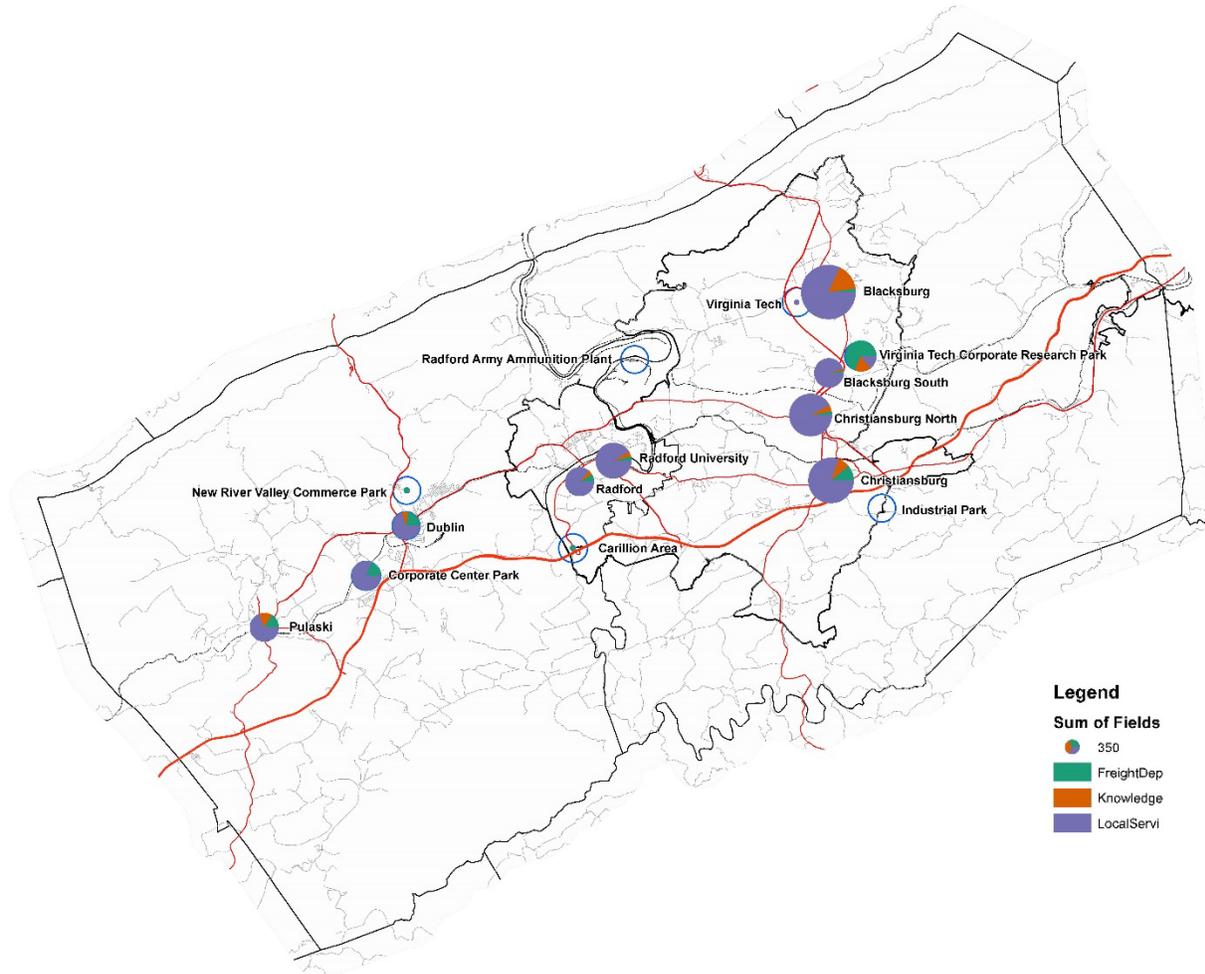


Figure 4: Activity Center Employment by Industry Sector

Figure 4 shows the mapping of each activity center broken down by industry sector, and scaled by relative number of jobs. Due to some of the gaps in InfoUSA jobs data, some activity centers that were identified by local stakeholders (e.g. Radford Army Ammunition Plant) do not have data-driven pie charts associated with them. In these cases, local feedback and data was used to supplement this mapping exercise and characterize the economic profile of activity centers.

E. Forecasted 2025 Industry Strengths

2025 forecasts of key industries by Region and activity center served as the primary data source for the New River Valley future economic profile. The basic economic data that were used include:

³ Industry sectors are based on the categorization of jobs into the three economic clusters of Local, Freight, and Knowledge economies. Refer to separate document, [VMTP 2025 Needs Assessment: Regional Networks Introduction](#).

- Current Top Industries by Workforce, Output and Location Quotient
- 2025 Forecasted Economy by Output, Employment, and Future Growth Industries
- Regional Economic Development Priorities from Stakeholder Input

The intent was not to presuppose the region’s economic future, but to allow input from stakeholders to affirm or modify the basic economic forecast according to regional visions. To supplement economic forecasts for 2025, the Study Team collected input from stakeholders in a series of work sessions, and used this to confirm the basic future economic profile for the region. The future economic profile was then used as the basis for determining future transportation needs in the New River Valley region.

Based on the data collected, substantial growth is expected for the New River Valley region by the year 2025. Manufacturing, Wholesale Trade, and Retail Trade industries are forecasted to see the largest growth for top industries. Combined, they are expected to produce \$3.9 billion dollars more in 2025 than was produced in 2012. (Refer to Figure 5).

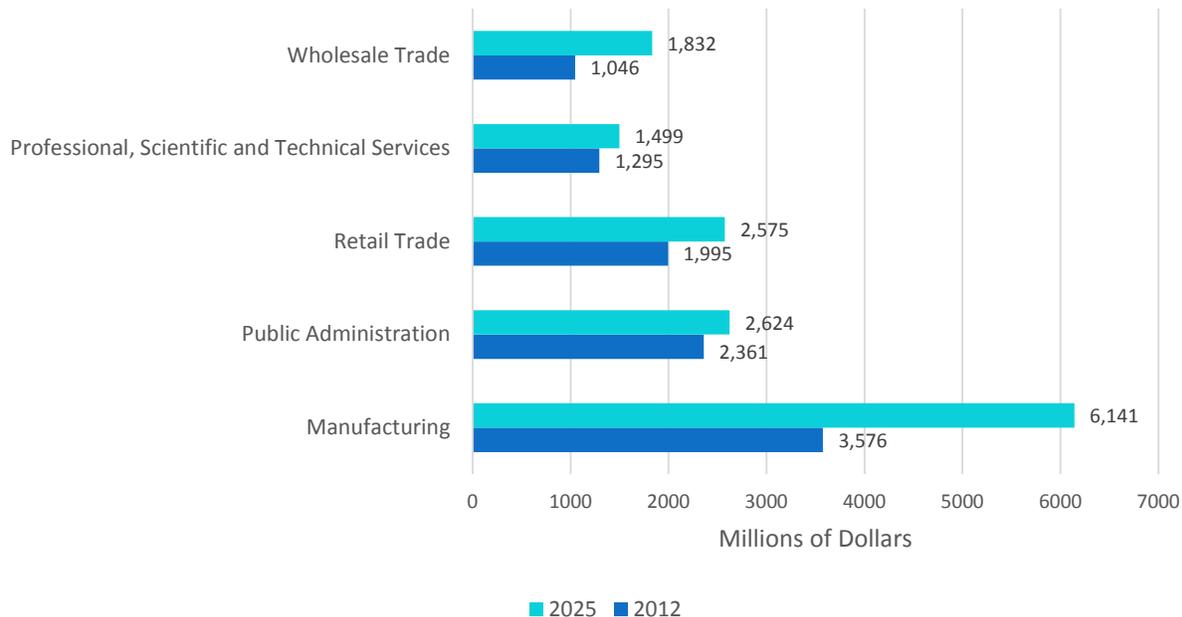


Figure 5: Top Industries by Output

Source: IHS Global Insight, 2012

The only industries projected to produce lower levels of output in 2025 than in 2012 are the Management of Companies and Enterprises, and Mining, Quarrying, Oil and Gas Extraction industries. In all industries combined, economic output in the New River Valley region is expected to increase by \$ 5.6 billion dollars by 2025.

Output by sector, as defined in the separate Introduction document, is not expected to change significantly. Only a small increase in the Freight sector, and a corresponding decrease in the Local sector is projected. (Refer to Figure 6).

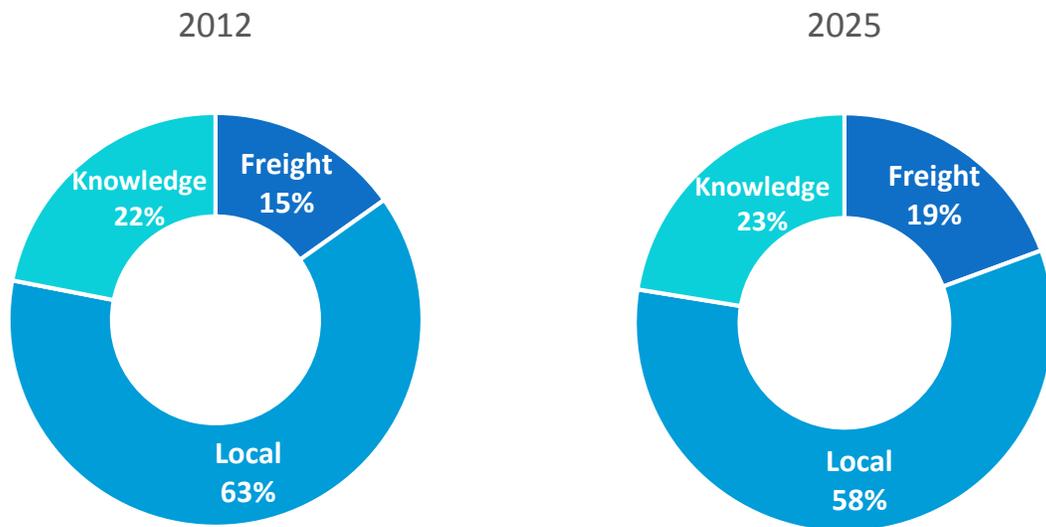


Figure 6: Current and Forecasted Output by Sector
 Source: IHS Global Insight, 2012 & 2025

The most dramatic change in employment among major industries in the New River Valley region is projected for the Government sector, with more than 2,500 additional jobs to be added to the Region by the year 2025. The manufacturing sector is projected to lose 1,250 jobs by, this could be the result of cutting or outsourcing jobs due to further automation in order to increase efficiency while maintaining or growing output. Most other major industries in the region are projected to keep employment numbers relatively steady through 2025. (Refer to Figure 7).

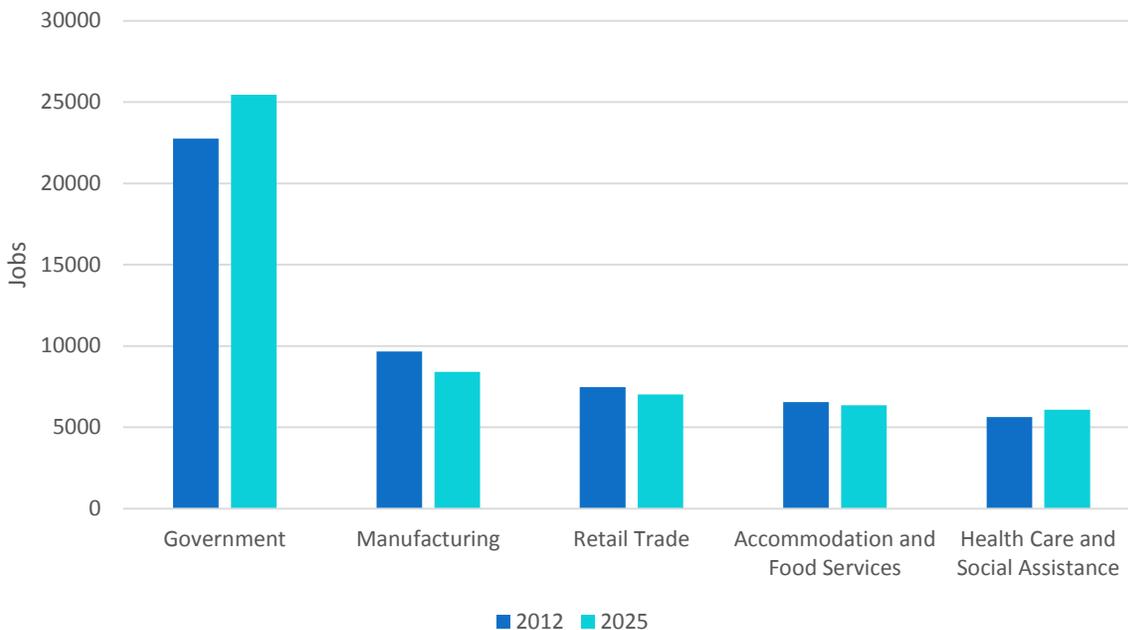


Figure 7: Employment in Major Industries
 Source: IHS Global Insight, 2012

3. TRANSPORTATION PROFILE

A. Introduction

The following section describes the transportation and accessibility measures that were developed to capture the workforce and freight needs at a regional scale. This set of accessibility measures reflects regional transportation characteristics in the New River Valley area such as typical commute times and overall travel reliability. The following are categories of performance metrics that were used to create a regional transportation profile for the New River Valley region:

- Commuting Patterns
- Accessibility to Employment
- Roadway Measures
- Freight Measures

Additional information on the methodology for the transportation profile can be found in the introductory document, [VMTP 2025 Needs Assessment: Regional Networks Introduction](#)

B. Commuting Patterns

Regional Commuting Patterns

Patterns in the New River Valley region show a high level of commuting between localities. Over a third of Pulaski County workers commute to either the City of Radford or Montgomery County, while more than half of all workers in Radford commute to either Montgomery County or Pulaski County. The Roanoke area is the most common destination for commuters from Montgomery County, with over 4,000 trips to the area. Over 3,400 commuters from Pulaski County, and 2,300 from the City of Radford commute to Montgomery County: the most popular destination for both jurisdictions. (Refer to Figure 8).

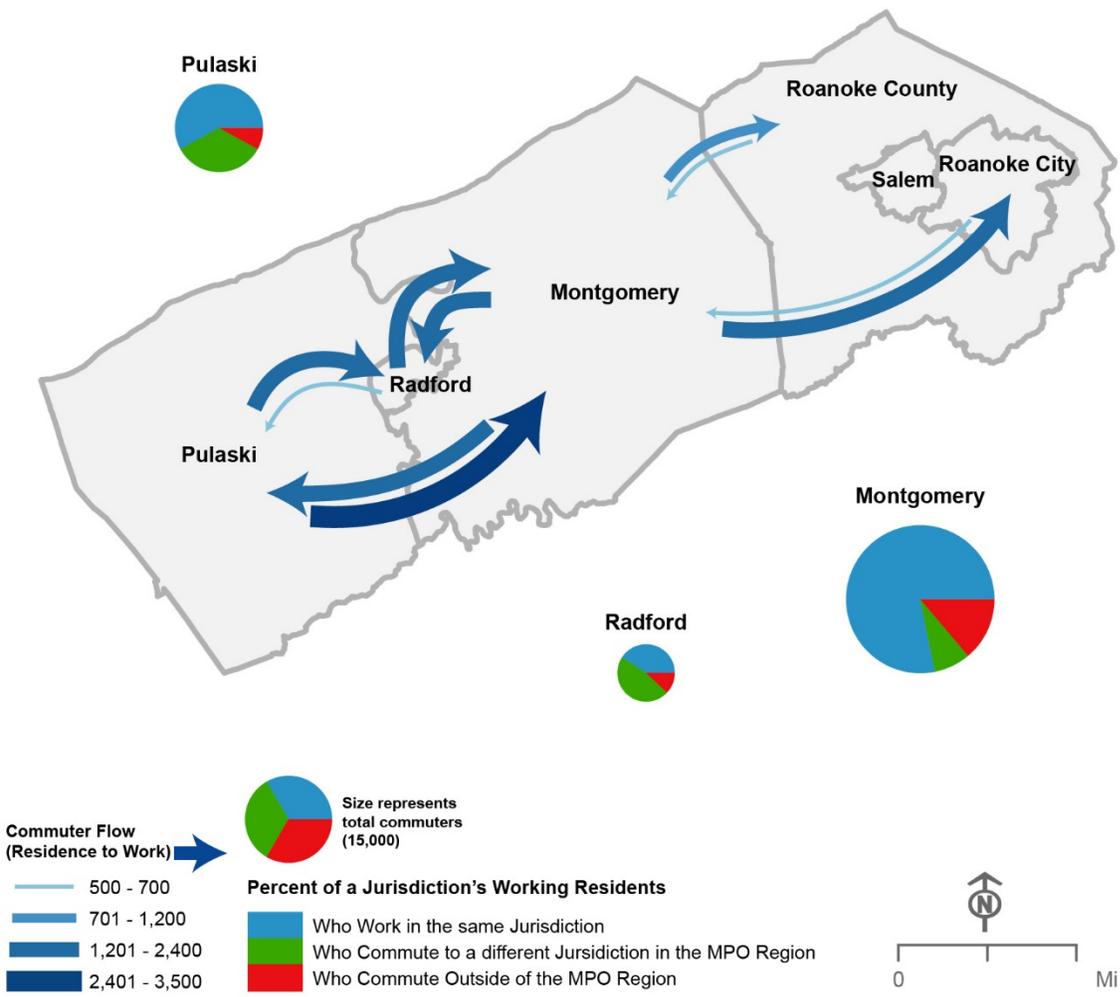


Figure 8: Regional Commuting Patterns

Source: US Census Longitudinal Employer-Household Dynamics (LEHD). 2006-2010. <http://lehd.ces.census.gov/data/>

Activity Center Commuting Patterns

Equally important to the formation of a regional transportation profile for the New River Valley Region was the analysis of commuting patterns between the most significant activity centers. Figures 9 through 12 below provide a summary of typical commuter origins for four of the activity centers in the New River Valley region. Block groups are symbolized on a color scale from dark to light blue, with the darker shades representing the block groups with the largest number of commuters to the respective activity center, as compared to other block groups in the Region.

The Blacksburg activity center attracts a large number of commuters from the surrounding block groups as compared to other activity centers in the region. Virginia Tech and downtown Blacksburg, are major destinations for commuters throughout the region. (Refer to Figure 9).

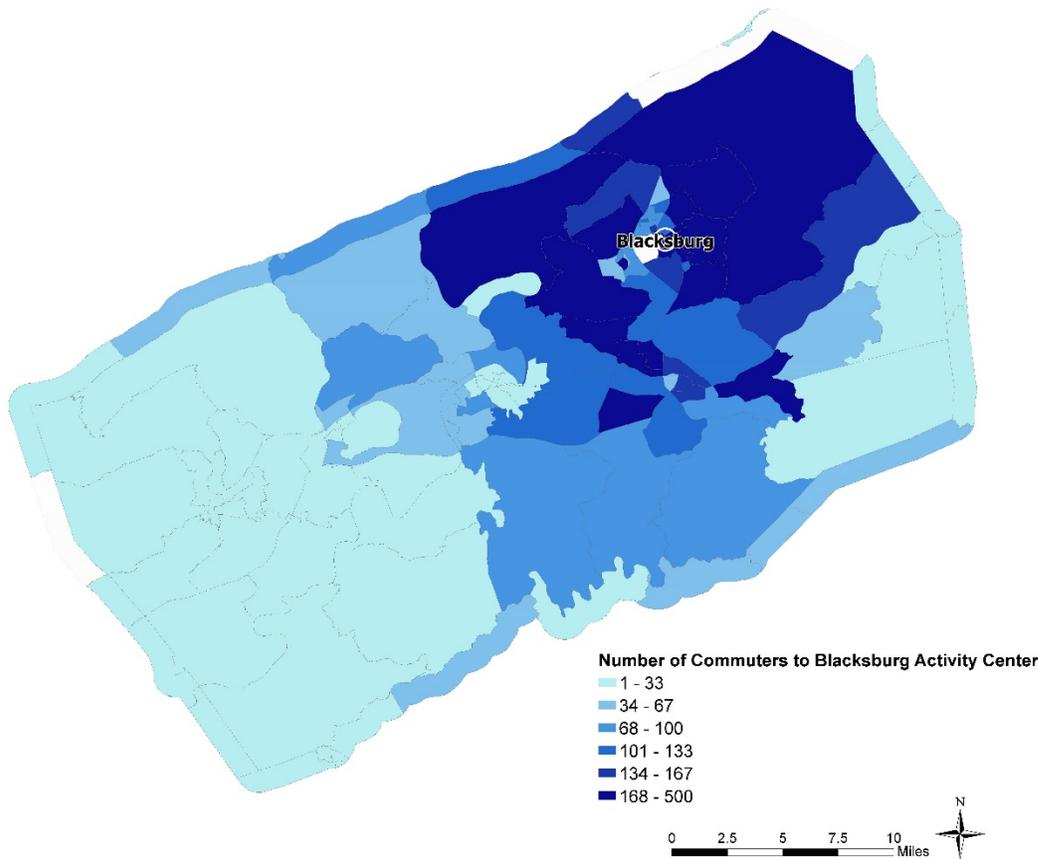


Figure 9: Commuting Patterns to Blacksburg Activity Center.

Source: LEHD

Commuting patterns to the Christiansburg activity center are similar to Blacksburg, though with a slightly lower total number of commuters. Government centers, and retail outlets and other local serving industries attract commuters from around the region. (Refer to Figure 10).

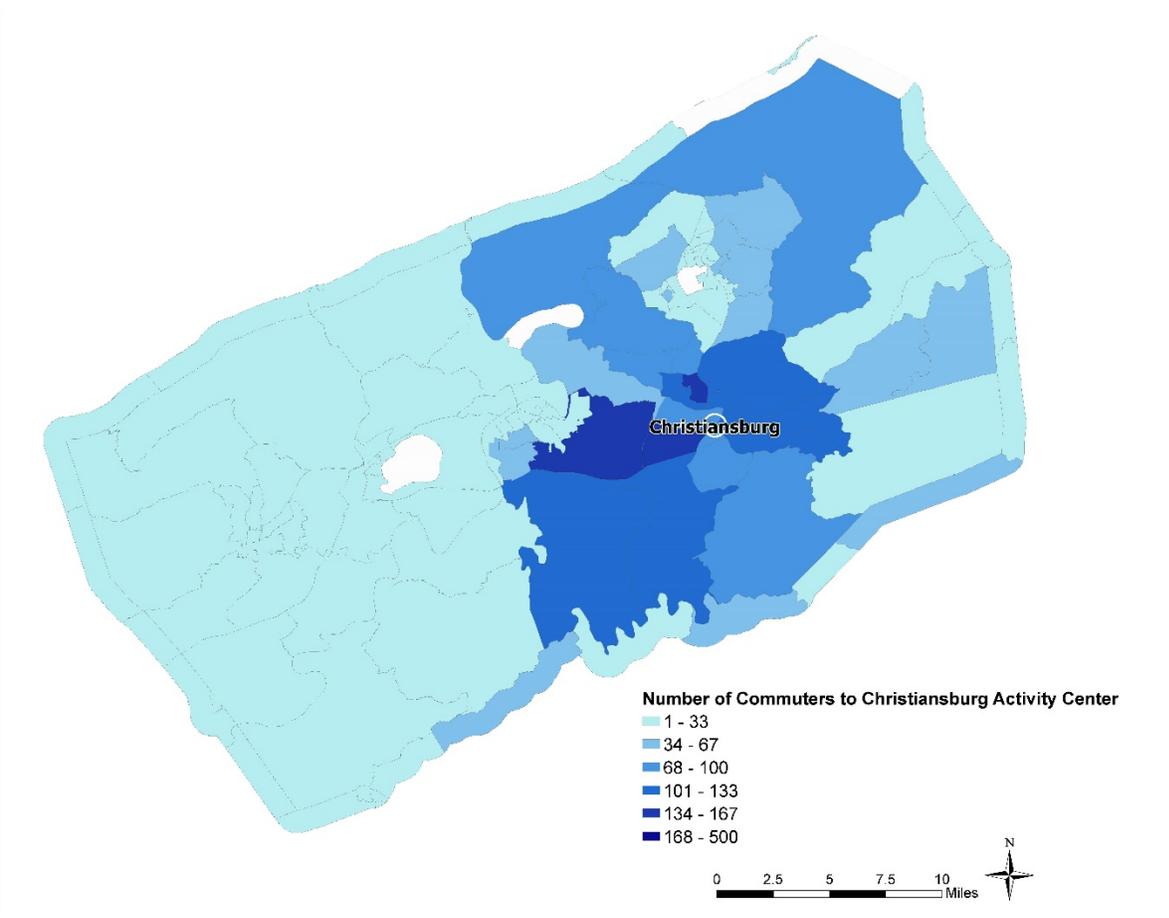


Figure 10: Commuting Patterns to Christiansburg Activity Center.

Source: LEHD

In the Radford area, most commuters originate from block groups that lie directly adjacent to the Radford activity center. This center does not attract many commuters from further distances throughout the region. (Refer to Figure 11).

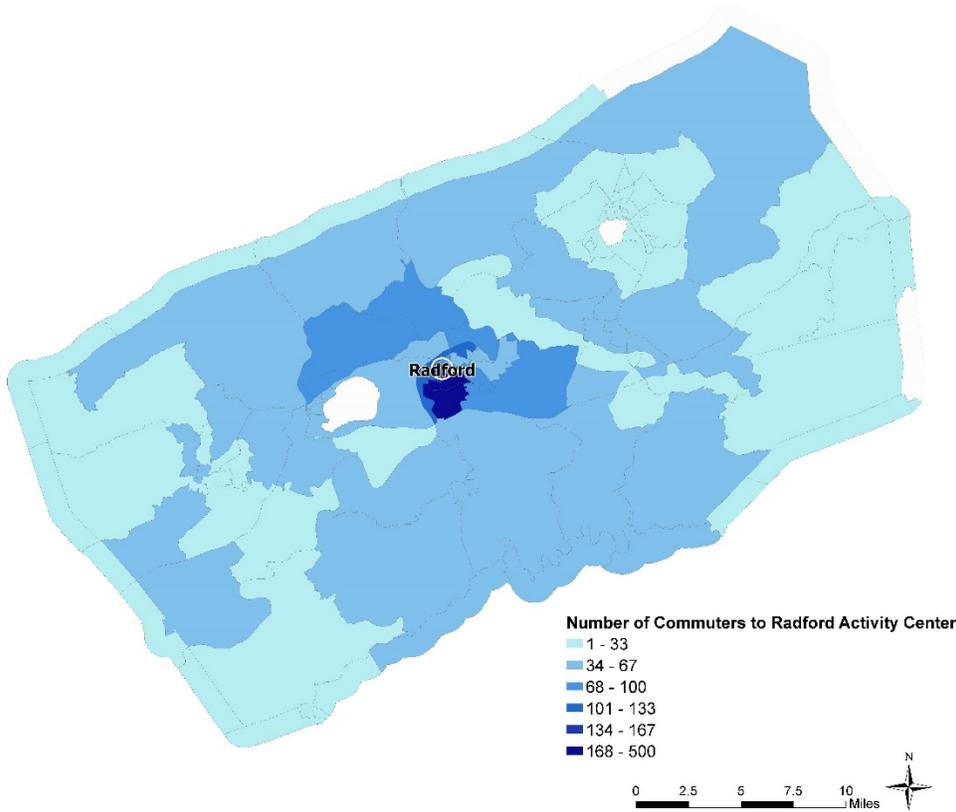


Figure 11: Commuting Patterns to Radford Activity Center.
Source: LEHD

The Pulaski activity center, meanwhile, has the lowest level of commuting of the jurisdictions in the New River Valley area, overall. Most commuters that complete their trips at the Pulaski activity center originate from the town of Pulaski itself, or the surrounding rural areas. (Refer to Figure 12).

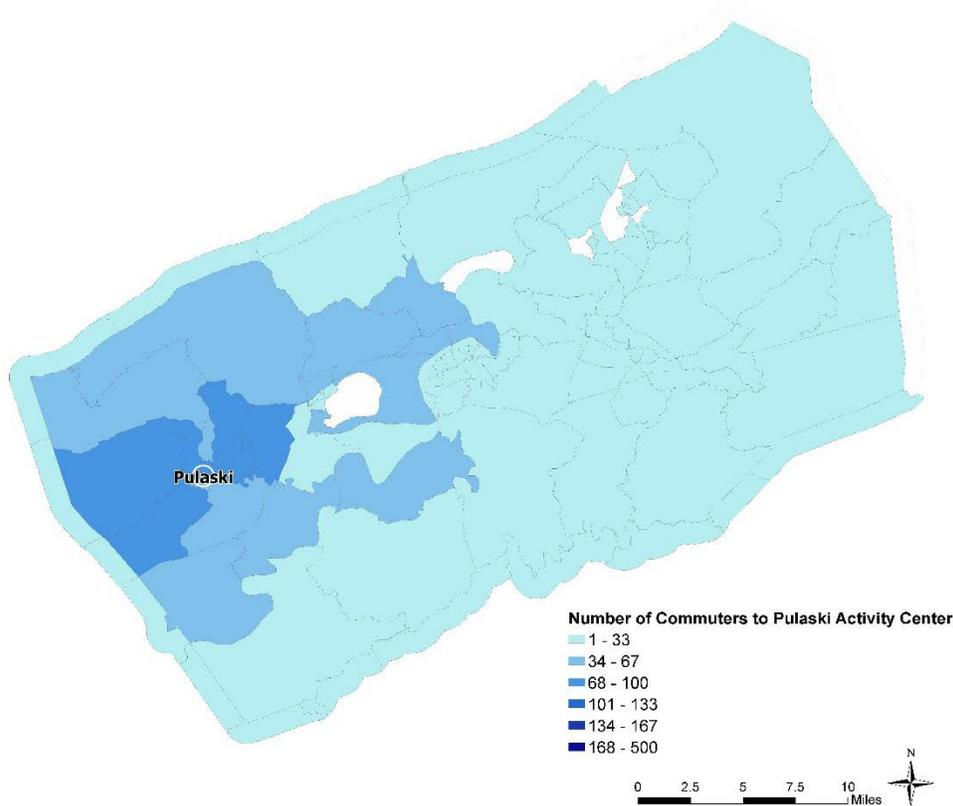


Figure 12: Commuting Patterns to Pulaski Activity Center.

Source: LEHD

Mode Choice

In the New River Valley Region, the majority of commuters drive alone to work. While there is some variation in mode choice among jurisdictions, cars are used between 75% and 83% of the time. For all jurisdictions, carpooling is the second most popular option, accounting for 9% to 11% of the mode share depending on jurisdiction. Use of public transit is, as expected, highest in Montgomery County, which has the most robust transit system in the region. (Refer to Figure 13).

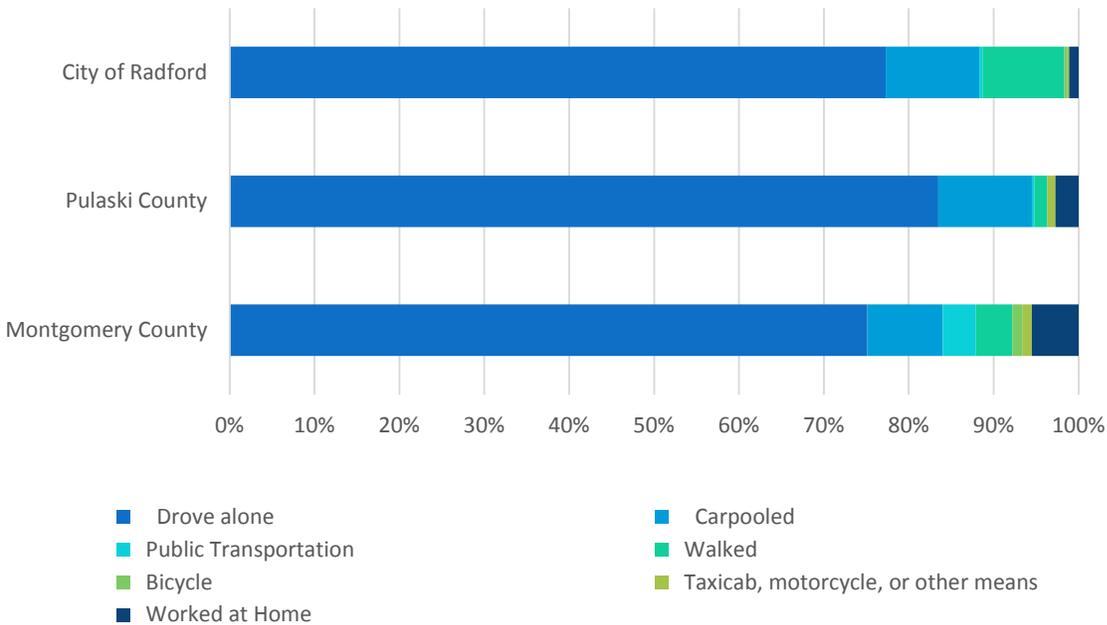


Figure 13: Mode Share Split by Jurisdiction.

Source: ACS 2013 5-Year Estimates

Average Commute Times

In the New River Valley Region, average commute times range from 18 to 23 minutes among the various jurisdictions. (Refer to Table 9). Due to its proximity to employment centers, Montgomery County has the shortest average commute. Conversely, more rural areas, like Pulaski County have longer commutes, on average.

Table 9: Mean Commute Time by Jurisdiction.

Jurisdiction	Mean Commute Time (Minutes)
Montgomery County	17.8
Pulaski County	22.9
City of Radford	18.7

Source: ACS 2013 5-Year Estimates.

Commutes of over 45 minutes are rare in the New River Valley region. Pulaski County has the highest percentage of workers who commute over 45 minutes at nearly 10%. Montgomery County has the lowest level of commutes over 45 minutes at 5.9%. This is due in part to the proximity to major arterial roads that offer easy connection to other destinations in the region, and the high density of employment opportunities within the county. (Refer to Figure 14).

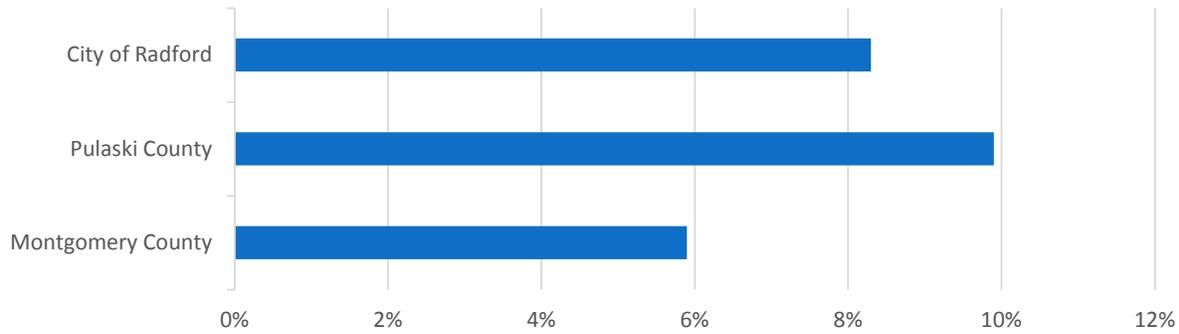


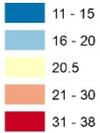
Figure 14: Percent of Commutes Longer than 45 Minutes.
 Source: ACS 2013 5-Year Estimates.

Figure 15 provides a closer look at where the longer commutes in the region originate. Throughout the region there is a correlation between distance from activity centers, and longer commute times. The areas with the longest average commute times, up to 17 minutes longer than the median, are in block groups in rural areas, outside of major activity centers. These areas have fewer jobs in close proximity, and less access to transportation networks than more developed areas.

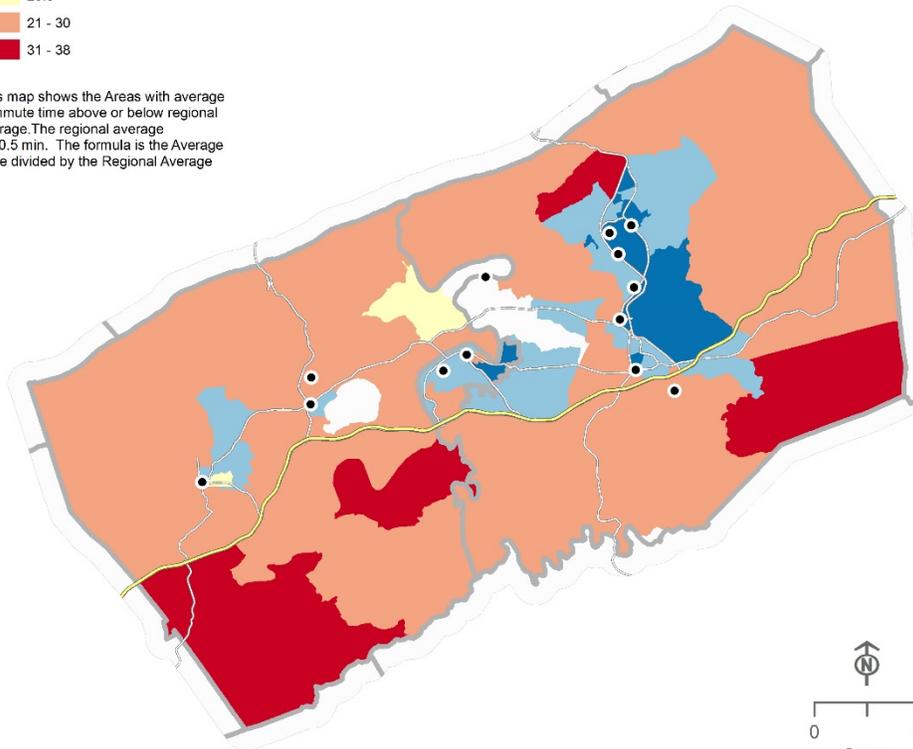
Commute Time

- Activity Centers

Average Commute Time (Minutes)



This map shows the Areas with average commute time above or below regional average. The regional average is 20.5 min. The formula is the Average Time divided by the Regional Average



Source:
American Community Survey
2009-2013 5 Year Estimate,
Table B08303

Figure 15: New River Valley Commute Times.

Source: ACS 2013, 5-Year Estimates.

C. Accessibility to Employment

As part of the transportation conditions assessment, a set of accessibility performance measures and attributes were developed to assess the workforce and freight accessibility at the general regional scale. This set of performance measures reflects regional characteristics such as travel times and the availability of multimodal transportation between activity centers. The Accessibility to employment measure was calculated using an accessibility model developed by the consultant team that measures the number of jobs reachable in a given travel time, using actual travel times on a network, whether highway, transit or pedestrian. The total number of jobs accessible was also “distance decayed,” that is the value of each job was decayed by a factor based on how long it took to travel to it. The distance decay factors were developed from traveler surveys that reflect actual preferences for travel to employment based on the length of the trip.

The accessibility maps show values ranging from highest to lowest in the region by travel mode, with the highest values in bright magenta and the lowest values in light blue color.

Auto Accessibility

Accessibility for auto travel in the region was measured as the number of jobs that can be reached from each census block group within a 45 minute drive, using actual travel speeds derived from FHWA HERE data, and decayed for distance. The areas with the highest level of auto accessibility were found around Christiansburg and Blacksburg. Areas in the region with high accessibility can reach between 79,767 and 101,337 jobs within a 45 minute drive. As expected, auto accessibility scores were lower in the western part of the region, which has fewer employment opportunities. Census block groups closest to New River Valley activity centers and highways, as well as the Roanoke region, had the highest auto accessibility. (Refer to Figure 16).

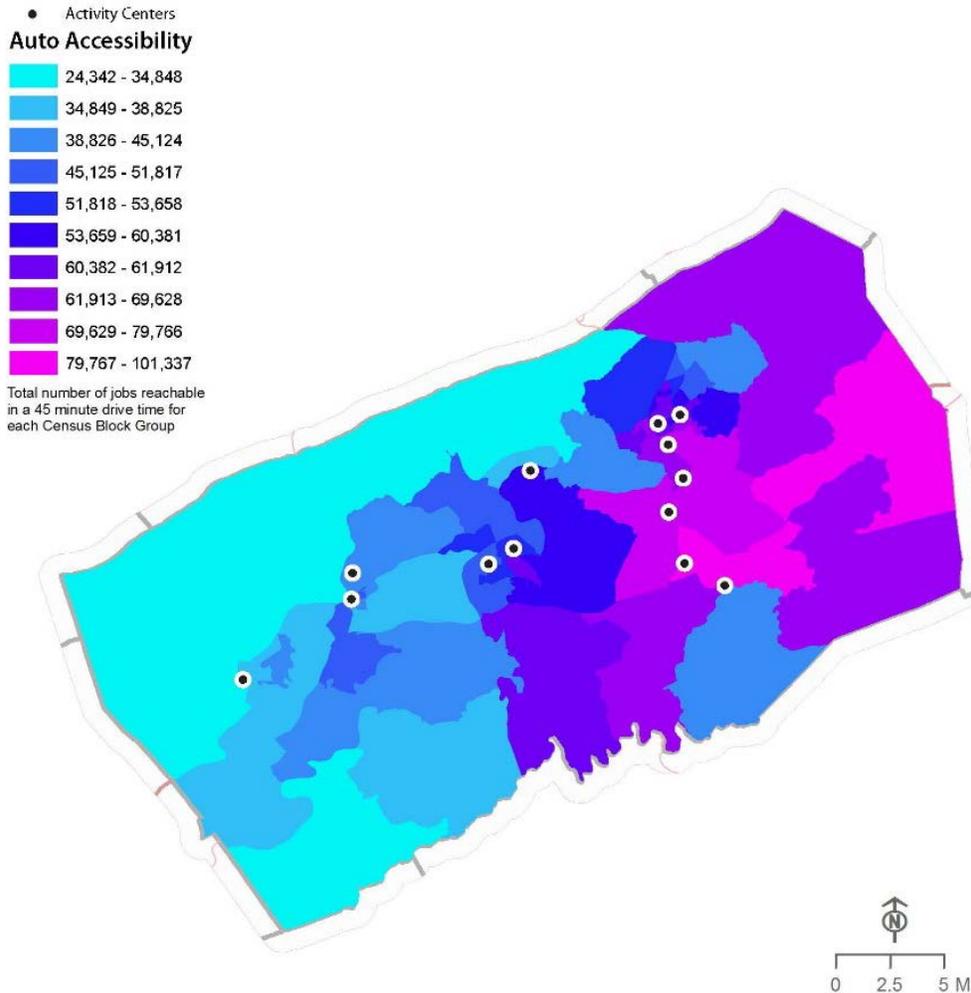


Figure 16: Auto Accessibility

Transit Accessibility

Outside of the Blacksburg and Christiansburg areas activity centers, there are few fixed-route transit options in the New River Valley area. While there is limited service in the City of Radford, many activity centers in the area lack transit service entirely. This is reflected not only in the low transit accessibility scores for large parts of the region, but also the low number of jobs accessible from the high scoring areas. Due to the lack of inter-city transit options in the region (other than demand response services), commuters using transit are restricted in their ability to reach regional jobs. In the highest scoring area for transit accessibility, commuters using transit can reach between 6,933 and 8,400 jobs within a 45 minute travel time. (Refer to Figure 17).

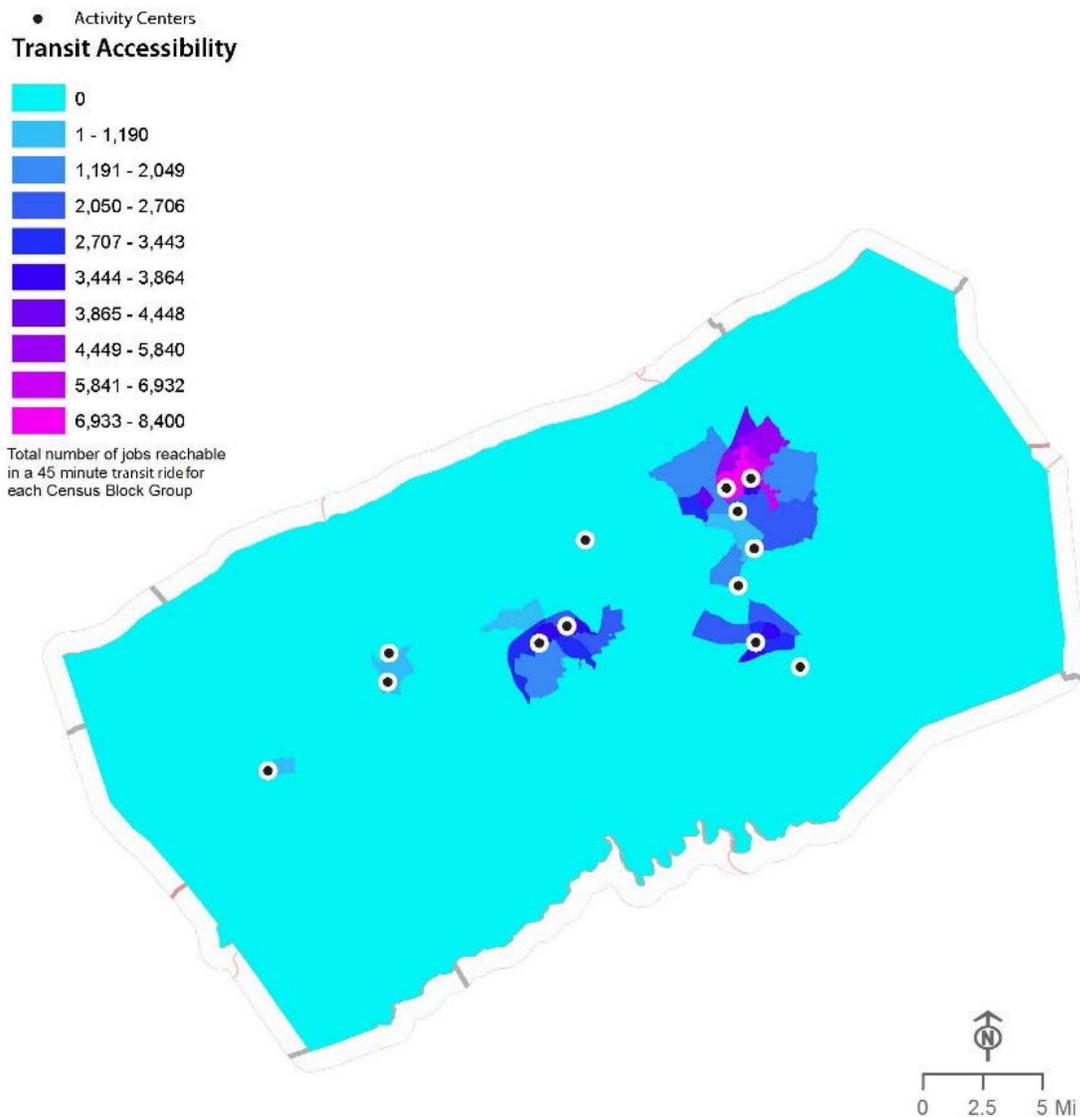


Figure 17: Transit Accessibility

Walk Accessibility

Walk Accessibility in the area is largely determined by the density of employment closely surrounding the origin of each trip. Areas surrounding activity centers, especially the Blacksburg and Christiansburg areas, scored the highest. These areas of high walk accessibility give pedestrians access to between 1,357 and 5,447 jobs. The high variability within even the highest scoring areas reflects the significance of both pedestrian transportation networks and job density in creating higher walk accessibility. (Refer to Figure 18).

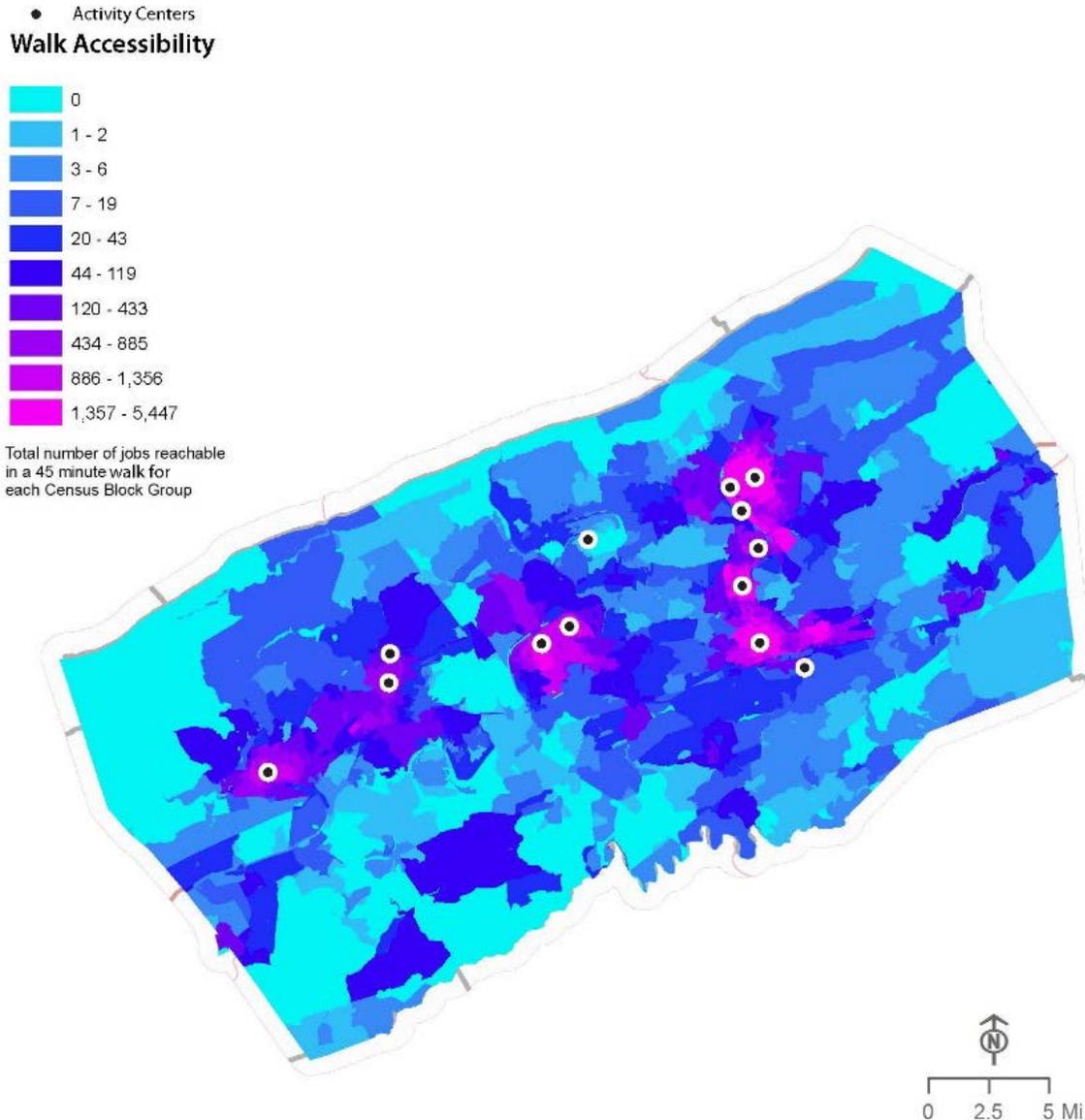


Figure 18: Walk Accessibility

Freight Accessibility

Interstate 81 and US Route 460 are the major corridors for freight movement throughout the region. Accessibility of freight origins to these roadways is dependent partly on the proximity of access to highway access ramps. Most activity centers in the region are within a five minute drive from a major arterial ramp. (Refer to Figure 19).

Blacksburg and Christiansburg Region

Blockgroup to Interstate or Principal Arterial Ramps

Drive Time (Minutes)

- 1.1 - 2.0
- 2.1 - 3.0
- 3.1 - 4.0
- 4.1 - 5.0
- 5.1 - 8.0
- 8.1 - 10.0
- 10.1 - 14.0
- 14.1 - 19.5

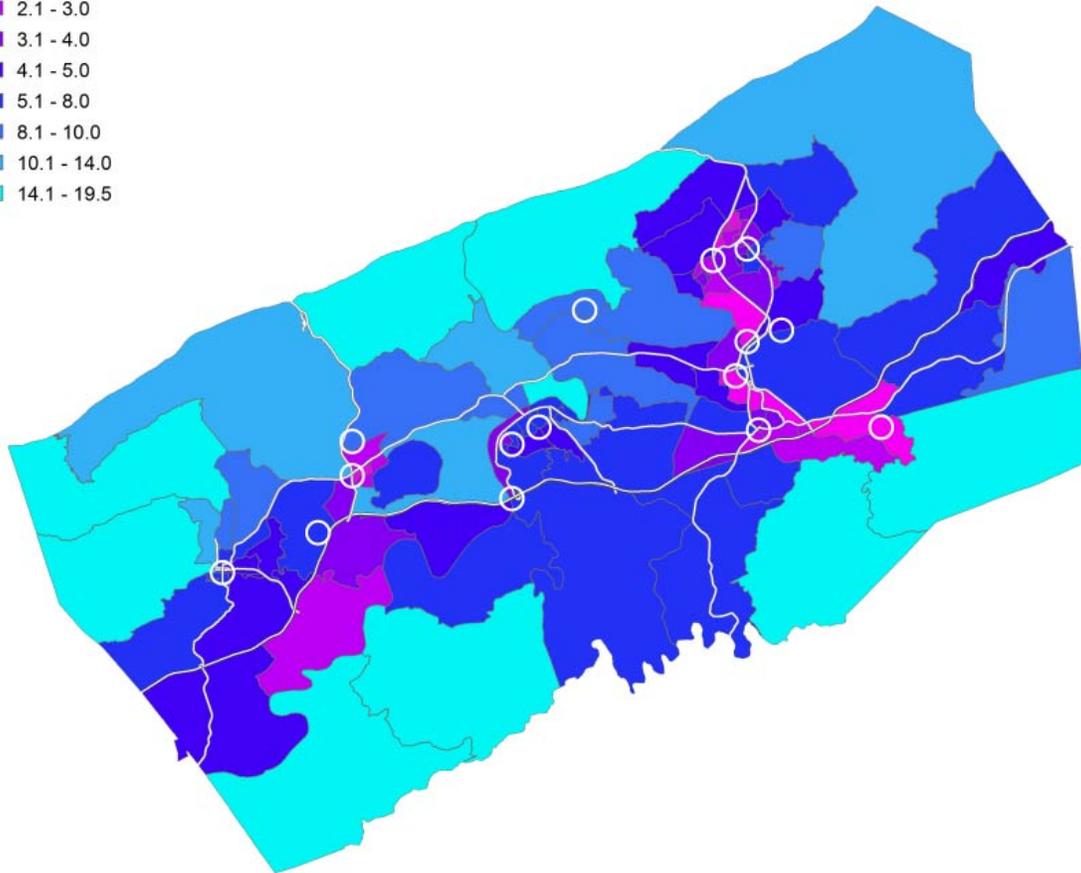


Figure 19: Access to Interstate and Principal Arterial Ramps

The location of warehouses and distribution centers is another important factor in the level of freight accessibility for the region. Most warehouses and distribution centers in the New River Valley area are

located near Interstate 81 or US Route 460. Most urban areas in the region have access to a warehouse or distribution center within an eight minute drive. (Refer to Figure 20).

Blacksburg and Christiansburg Region

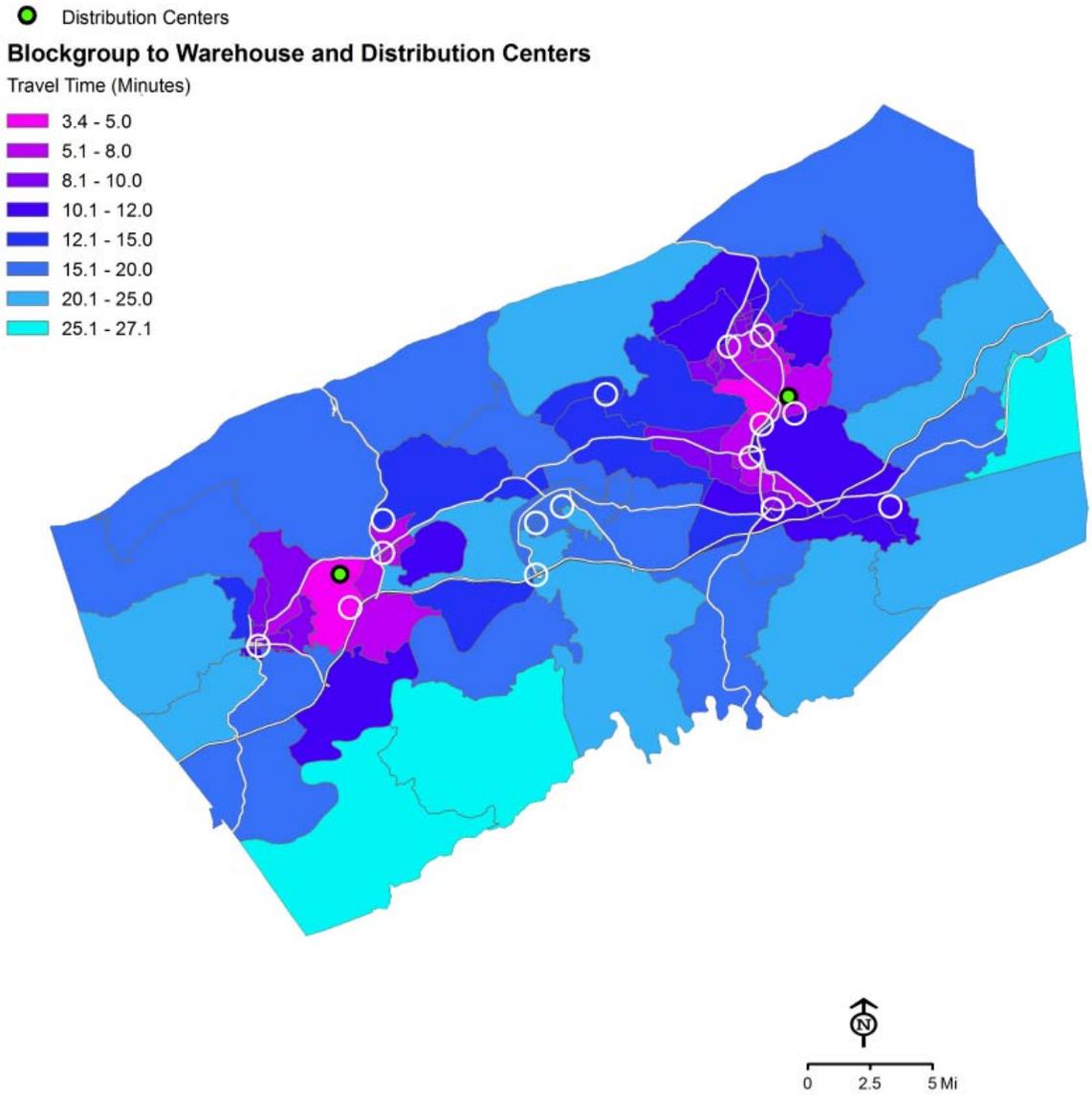


Figure 20: Access to Warehouses & Distribution Centers

Norfolk Southern’s Heartland and Crescent Rail corridors run through the New River Valley area. These rail lines pass through Christiansburg, Radford, and the town of Pulaski. Richmond International Airport is the closest major airport in Virginia that handles large quantities of freight. It is a three and a half hour drive to Richmond International Airport from Blacksburg, and five hours from the Eastern portion of the region. However, Piedmont Triad International Airport in Greensboro is a two hour 15 minute drive from Blacksburg while Charlotte Douglas International Airport is 2 hours 45 minutes. (Refer to Figure 21).

Blacksburg and Christiansburg Region

● Activity Centers

Blockgroup to Airports With Air Cargo Service

Drive Time (Minutes)

- 27.0 - 40.0
- 40.1 - 50.0
- 50.1 - 60.0
- 60.1 - 70.0
- 70.1 - 80.0
- 80.1 - 90.0
- 90.1 - 100.0
- 100.1 - 110.5

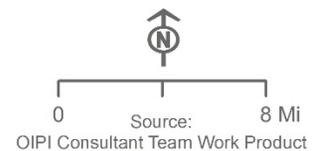
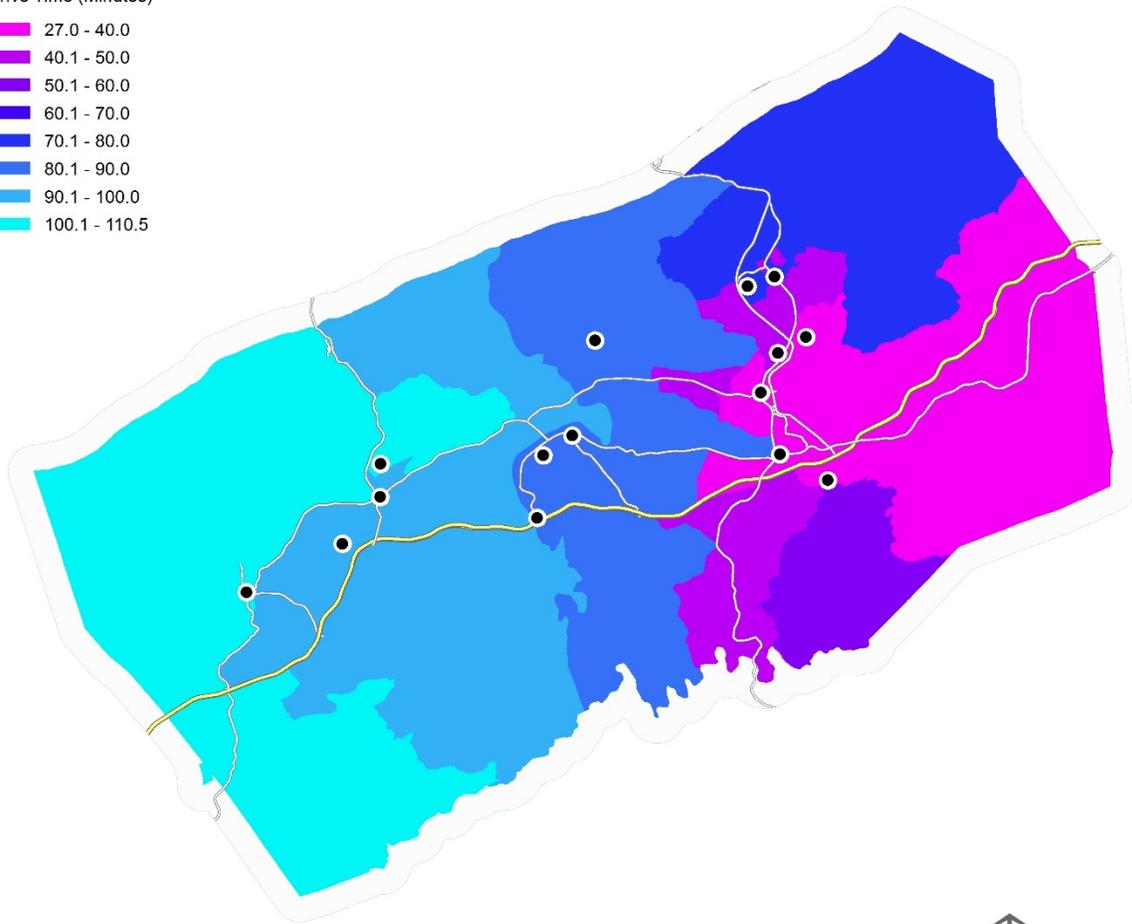


Figure 21: Access to Airports with Major Air Cargo Service

D. Roadway Measures

This assessment identified the transportation conditions in the New River Valley region based on a series of quantitative roadway measures. The findings in this section reflect corridor-level measures that are critical to access and mobility for people and freight.

Travel Time Reliability

Travel Time Reliability measures the frequency by which trips along a specified corridor are significantly delayed. The Reliability Index, as shown in Figure 22 below, is defined as the ratio of the median speed

to the 90th percentile speed. The map below uses data from morning peak times for 2014. Major corridors and arterial roadways with heavy commuter traffic throughout the region were analyzed using INRIX data from VDOT. Overall, scores on the travel time reliability index indicate a high level of travel time reliability for the region. The reliability index scores are higher in several locations along US Route 460 near Blacksburg, representing slightly lower levels of travel time reliability. There are, however, no areas of significant concern in the region. (Refer to Figure 22).

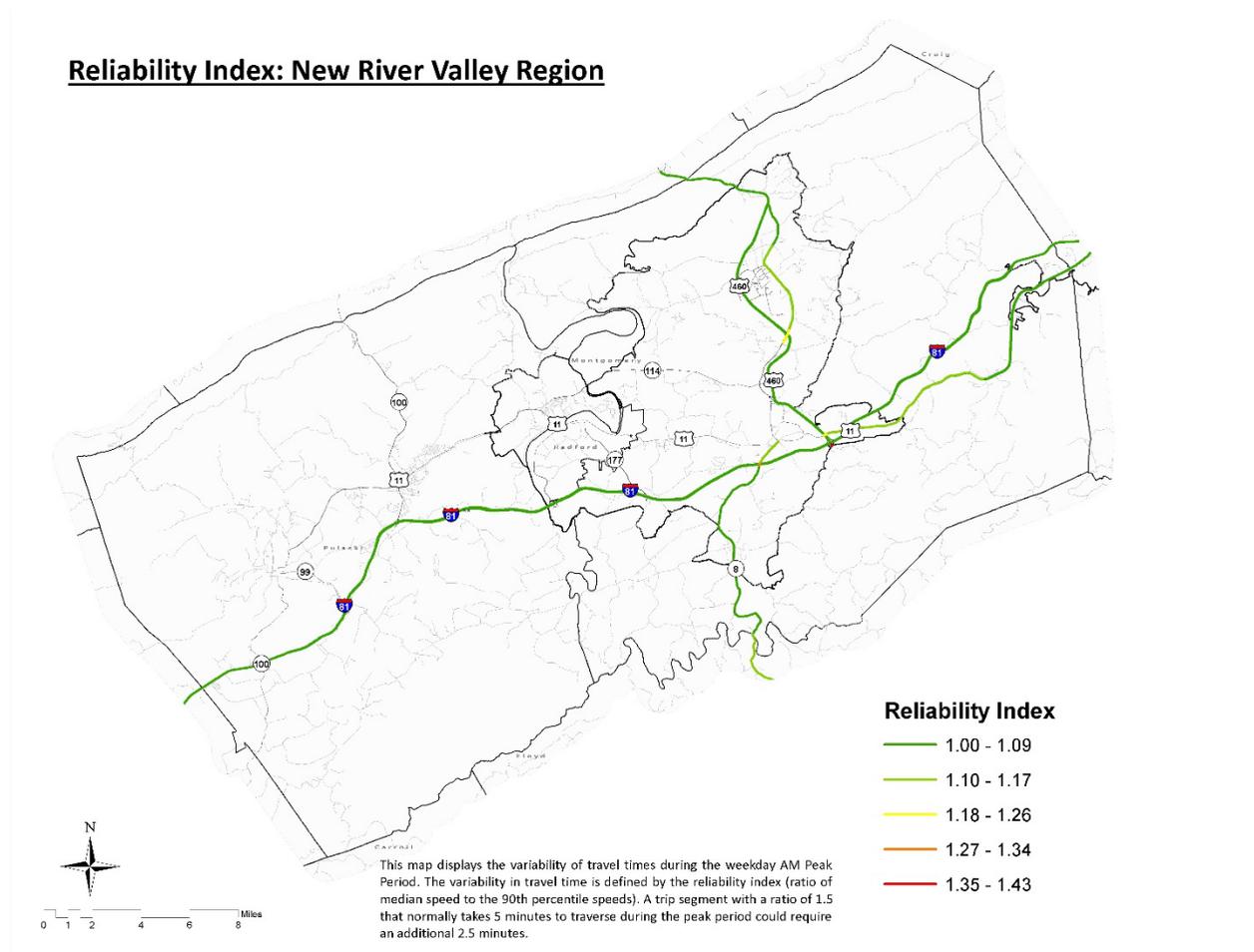


Figure 22: Travel Time Reliability

Percent of Time Congested

Congestion is an important determinant of roadway Level of Service. The percentage of time congested was calculated for morning peak times in 2014 using INRIX data. Roadways were considered significantly congested when they are operating at less than half the free-flow speeds. Free flow speed was defined as the 85th percentile of overnight speeds. According to the analysis, there are no major congestion problems in the New River Valley region during morning peak times. (Refer to Figure 23).

Percent Congested: New River Valley Region

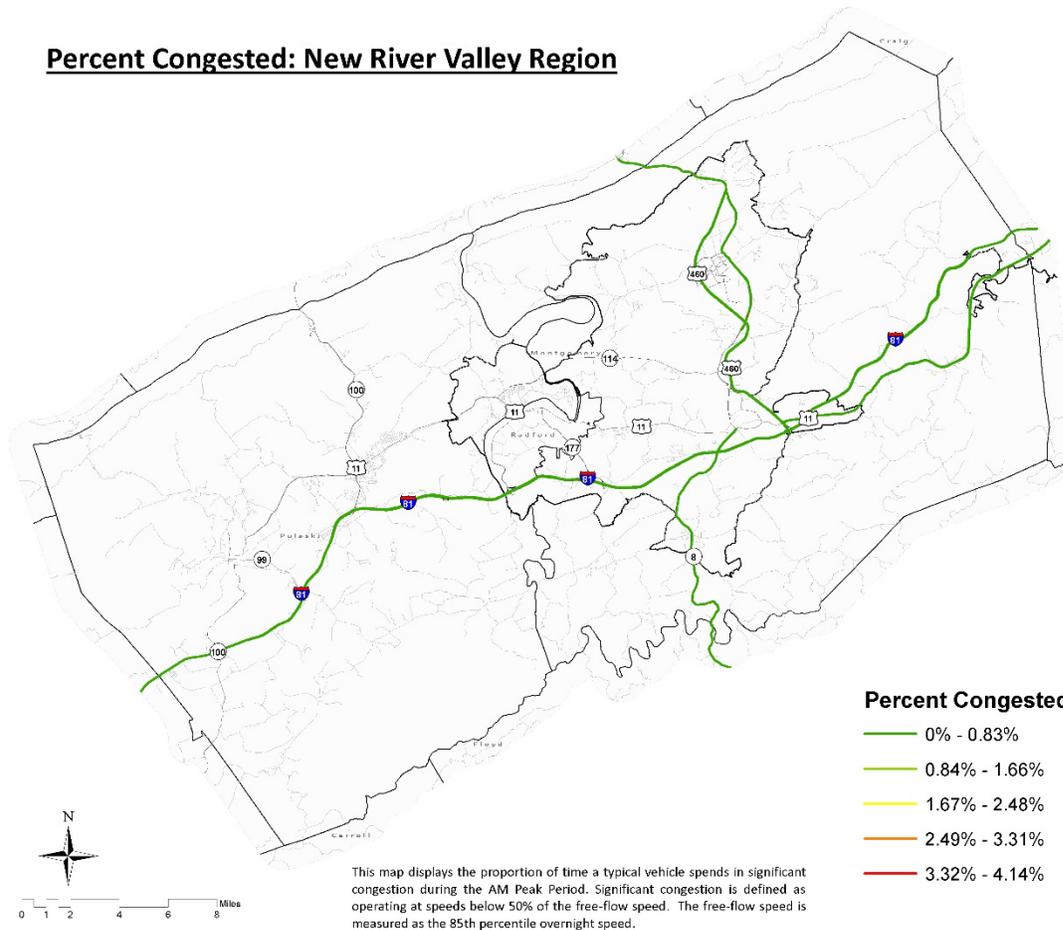


Figure 23: Percent of Time Congested

Travel Time Delay

Travel Time Delay was calculated for major corridors in the region. (Refer to Figure 24). The following map displays the total hours of delay per vehicle experienced during the evening peak period on Tuesdays-Thursdays in 2014. A traveler is considered as experiencing delay when travel speeds fall below the posted speed limit. The areas with the most significant delay in the New River Valley occurred along Interstate 81, and along US Route 460 to the north of Blacksburg.

Delay: New River Valley Region

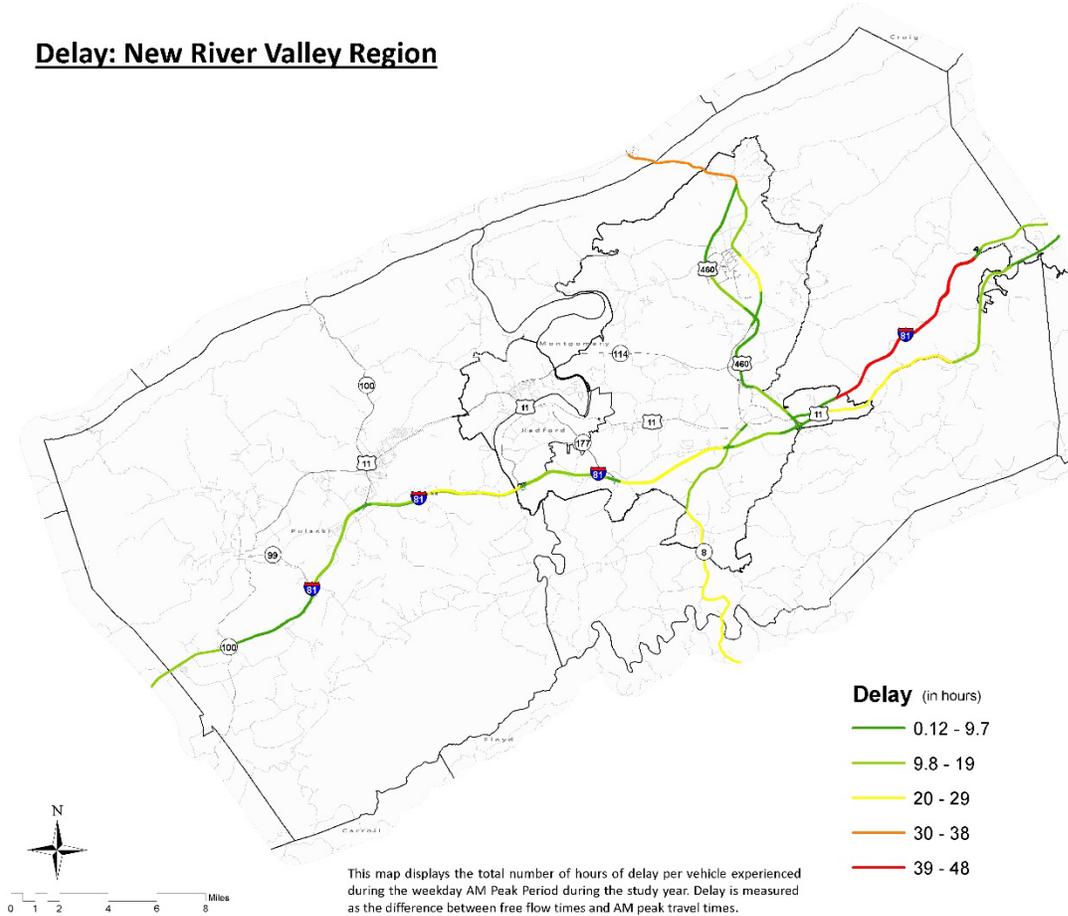


Figure 24: Travel Time Delay

Median Speeds

Median Speeds were calculated for major roadways in the region during afternoon peak hours in 2014. (Refer to Figure 25). The following map displays the ratio of pm peak hour vehicle speeds and the speed limit. Speeds greater than 1.0 indicate travel at speeds higher than the speed limit. Travel speeds fall below the speed limit in areas largely along route 460.

Highway Conditions: PM Peak Median Speed

Ratio of Median Speed and Speed Limit

- 0.00 - 0.50
- 0.51 - 0.85
- 0.86 - 1.00
- 1.01 - 2.24

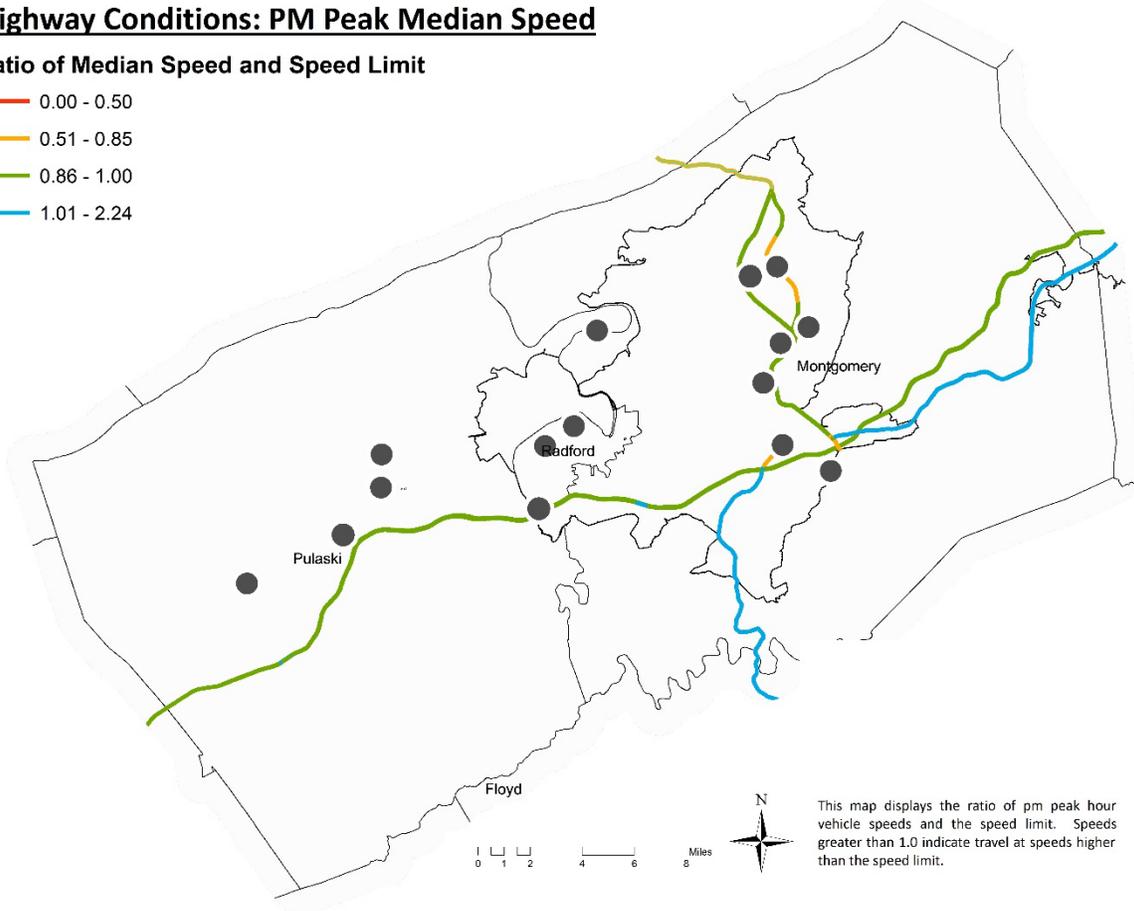


Figure 25: Median Speeds

E. Regional & Local Commodity Flows

Another set of measures vital to the regional transportation profile are the regional and local commodity flows in the region. The measures below discuss modal dependence of freight commodities, as well as the top commodities in the region by monetary value, geographic destination, and tonnage.

Modal Dependence

In the New River Valley Region, an average of 99% of the dollar value of all goods that are moved through the region are moved by truck. Rail is the only other mode routinely used to move freight through the region. The City of Radford uses rail to move freight for 2% of goods, the most of any jurisdiction in the region. But overall throughout all jurisdictions in the region, trucks are the primary means of moving goods. (Refer to Figure 26).

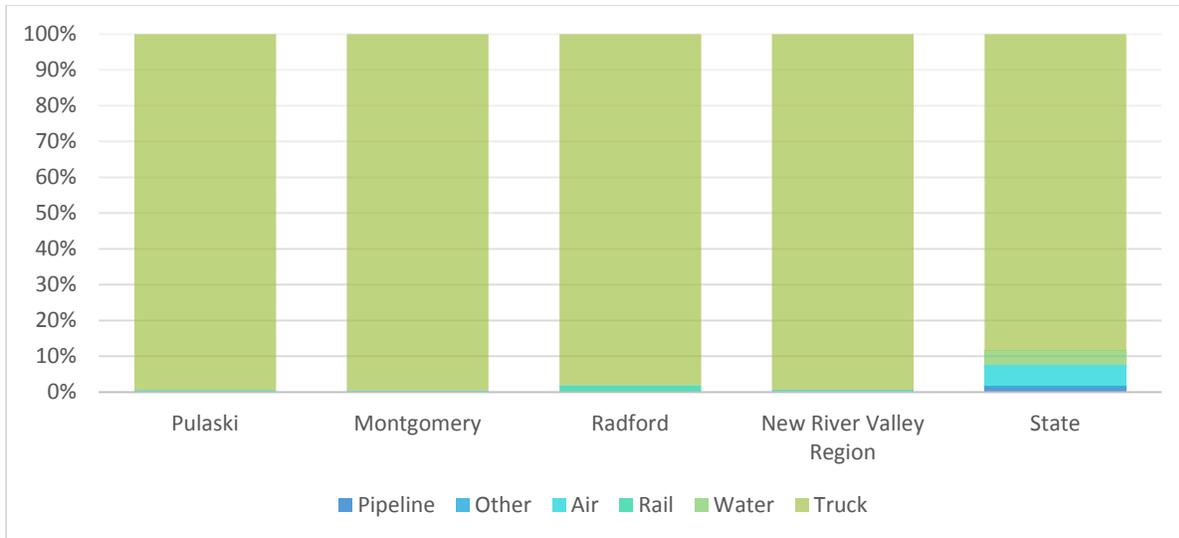


Figure 26: Comparison of Freight Modal Dependence

Location Quotients are used to compare the prominence of freight modes between the New River Valley Region, and the State as a whole. The New River Valley Region relies on trucks for freight movement 1.2 times more than the does the State as a whole. Rail and air transportation for goods is more common for the state on average than it is for the New River Valley Region. This is due in part to the proximity of I-81, allowing for easy truck-based freight movement. It also reflects the relatively large distance from the New River Valley area to major airports with air cargo service. (Refer to Figure 27).

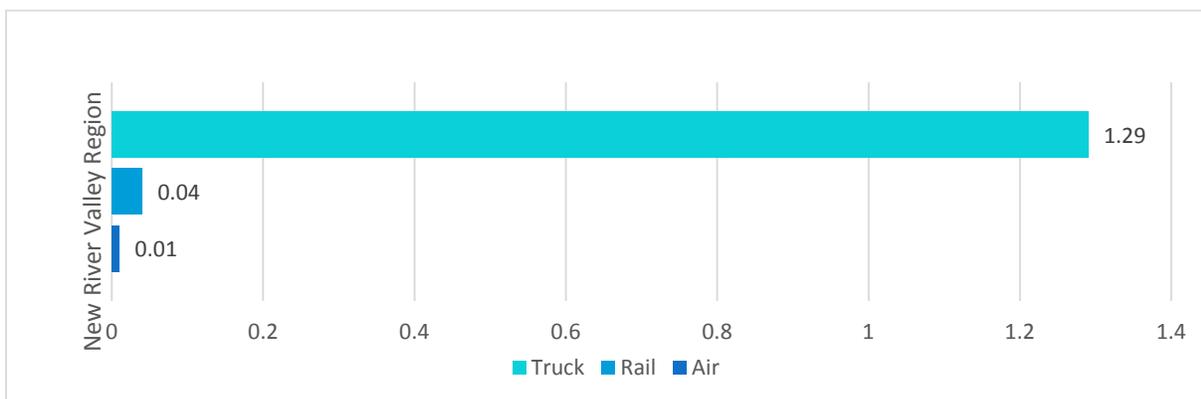


Figure 27: Location Quotient by Mode of Freight Travel

Top Commodities

Transportation equipment (a STCC category, which includes all types of vehicles as well as engine and vehicle) accounts for the most valuable freight moving both to and from the New River Valley Region. Other manufactured goods like electrical equipment, chemical products, and machinery make up the other most important types of freight moving throughout the region. The Region exported \$1.6 billion more transportation equipment products than it imported in 2012. Overall, the New River Valley region

imported \$4.1 billion dollars' worth of goods and exported \$5.23 billion dollars' worth of goods, resulting in \$1.13 billion dollars of net exports in 2012. (Refer to Figure 28).

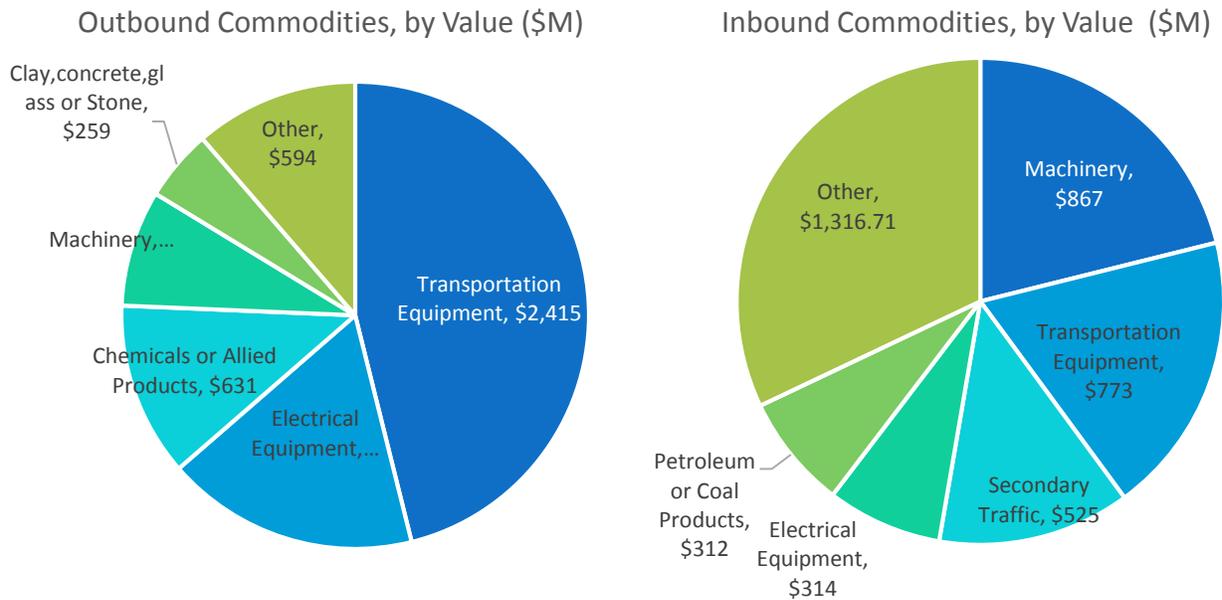


Figure 28: Top Freight Values by Commodities.

Source: TranSearch, 2012

The Southeast region, as defined by the Bureau of Economic analysis, is the most important destination for freight from the New River Valley, and the New River Valley region imports the highest value of goods from the Southeast region. In 2012, \$2 billion dollars of freight was exported to the Southeast, while \$1.8 billion dollars' worth of freight was imported to the New River Valley Region. (Refer to Figure 29).

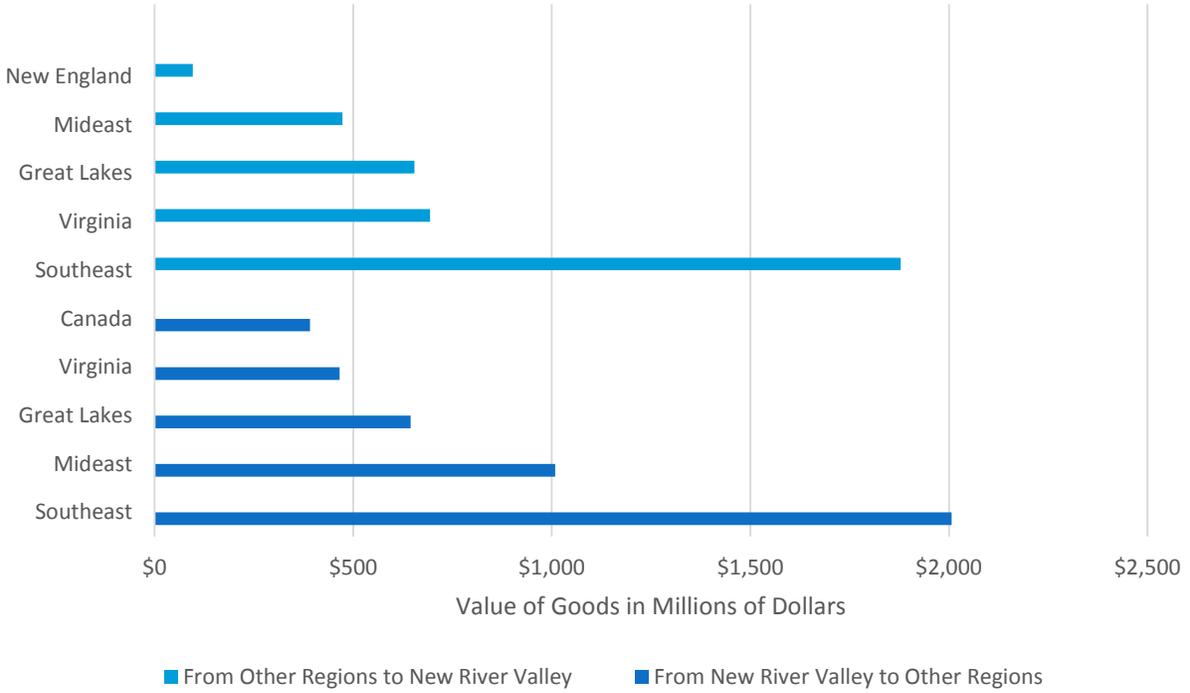


Figure 29: Top Freight Values by Region.
 Source: TranSearch, 2012

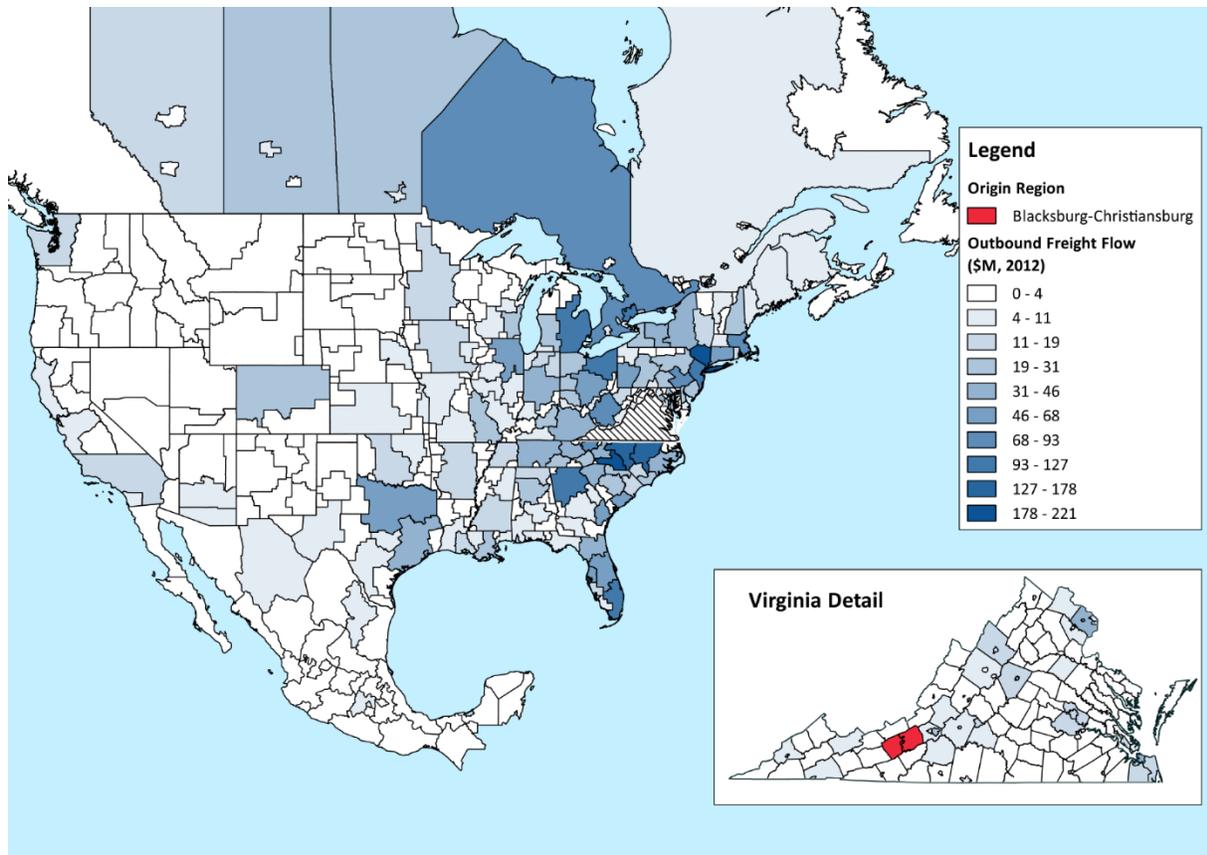


Figure 30: Outbound Freight Destinations

Source: TranSearch, 2012

Nationally, the majority of the freight exported from the New River Valley is shipped throughout the East side of the Mississippi. North Carolina, New York and New Jersey, and Ohio are important trading partners. (Refer to Figure 30.)

4. NEEDS PROFILE

A. Introduction

Based on the overall approach to the VMTP Needs Assessment, Transportation Needs were identified as deficiencies or gaps in the transportation conditions that are most critical to each region's key future industries. Key economic and transportation conditions have been identified in the Economic and Transportation profiles above and key correlations have been described as Economic and Transportation Linkages, which are further discussed below and in the reference document, [VMTP 2025 Needs Assessment: Regional Networks Introduction](#).

The Needs Assessment relates current transportation conditions and deficiencies to key future industries and economic profiles. The Needs Assessment, however, does not propose specific projects to address the Transportation Needs in each region, since this should be done by MPOs, localities and other nominating entities when they put forward projects for potential funding programs, including those subject to HB2 screening. Instead, the VMTP Transportation Needs Assessment is intended to identify a set of broad regional Transportation Needs in order to be able to compare proposed projects to Needs. The Needs Assessment also used a spatial analysis for the Region to provide observations about needs for specific corridors, travel markets, and activity centers.

Needs have been identified based on both stakeholder input and on the analysis of economic and transportation conditions. In the first round of Regional Forums, held in May, 2015, the draft transportation and economic conditions were presented to groups of regional stakeholders. Following this, a discussion was held with the stakeholders to connect the transportation conditions to desired economic futures and begin identifying potential Needs. These Needs were categorized into a series of five very broad types of capacity Needs:

1. Corridor Reliability
2. Network Connectivity
3. Transportation Demand Management
4. Modal Choice
5. Walkable/Bikeable Places

Non-Capacity/Operations Needs (i.e. Safety and State of Good Repair Needs) were also recorded when they were identified from stakeholder input, although these were not the focus of the Regional Networks Needs Assessments. The potential Needs identified in the first Forum were analyzed by the Study Team against the economic and transportation data that was assembled for each region and, where data was found to support the proposed Needs, these Needs were included and documented. In addition, the Study Team analyzed all the overall assembled data for each region in order to identify additional Needs not identified in the Forum, to assemble a more complete picture of potential Transportation Needs in each region, with a particular focus on attracting and retaining the 21st century workforce Needed for each region's 2025 economy.

B. Economic and Transportation Needs Correlation

The Study Team conducted a number of research efforts aimed at identifying key correlations between industries and their transportation needs, as described further in the introductory document, [VMTP 2025 Needs Assessment: Regional Networks Introduction](#). These included national research of industry trends in workforce needs and goods movement needs and a national survey of site selection professionals conducted by the Southeastern Institute of Research. Based on the findings of this research, the following table outlines the key correlations between three broad industry sectors (Local, Knowledge and Freight sectors) and their general transportation needs. It should be noted that the table does not reflect that these industry sectors always have these and only these transportation needs. Individual industry types and individual business needs for transportation will vary and the table only represents where there were apparent correlations between industry sectors and basic categories of transportation needs.

Table 10: Economic and Transportation Correlation.

Economic and Transportation Correlation Table			
	Local Sector	Knowledge Sector	Freight Sector
Highway Access	HIGH	HIGH	HIGH
Passenger Reliability	MED	HIGH	MED
Bottleneck Relief	MED	HIGH	HIGH
Freight Reliability	MED	MED	HIGH
Freight Accessibility	MED	LOW	HIGH
Network Connectivity	HIGH	HIGH	MED
Transportation Demand Management	LOW	MED	MED
Modal Choice	HIGH	HIGH	MED
Transit Access	MED	HIGH	MED
Active Transportation Options	MED	MED	LOW
Walkable Places	MED	HIGH	LOW

Source: Summary correlations based on national research and survey of national Industry Site Selection Professionals conducted by the Study Team.

The above table of correlations was used to identify potential categories of Transportation Needs in the region by linking prominent regional economic sectors with anticipated Needs and comparing these to the general transportation conditions that currently exist, as described below.

C. General Regional Needs

As discussed in the Economic Profile above, when the 2025 Future Economic Profile was estimated for the New River Valley, it showed a strong Local sector equating to 58% of economic activity, and smaller

distributions for both the freight and knowledge sector, at 19% and 23% respectively. However, based on the industries that are forecast to have the greatest growth, the Freight sector is projected to have the greatest relative growth.

In addition, the local input received in the outreach to regional stakeholders and in local plans such as the Comprehensive Economic Development (CEDS) plan for the region indicate a strong desire in the region to continue to support the dominant manufacturing sector, particularly with respect to goods movement needs, but also to support the expected growth of the knowledge sector and its needs for reliable commuting and additional modal travel options. Using the correlation table in Section B, this translates into transportation needs such as freight accessibility and passenger reliability on the region's prime corridors, such as Interstate 81 and US Route 460, and the Crescent and Heartland freight rail corridors. It also indicates the need for addressing any bottlenecks along these prime corridors to further support reliable travel for both commuters and goods movement. In addition, other key corridors that support activity centers in the region, such as US Route 11 are important commuter routes that serve economic growth and connect activity centers in Pulaski, Dublin, Radford, and Christiansburg.

The forecasted growth in the freight economic sector for this region brings the potential for additional transportation needs. The Economic and Transportation correlations for the freight dependent sector particularly point to improving highway access, freight accessibility and reliability, and addressing bottlenecks. The local economic sector also has important correlations with transit accessibility to support workforce access to these kinds of jobs. Therefore, transportation needs in the region should include expanding transit access, both within the region's economic activity centers, and between the centers in rural areas. Fixed route transit exists in the region only in Montgomery County, and the City of Radford. However, the expansion of knowledge-based and local-based sectors would benefit from both additional fixed route transit in the region and additional demand-response rural transit to provide better workforce access. Further support for the knowledge sector, which is driven primarily by educational institutions like Virginia Tech and Radford College, would also come from additional walkable places and modal options for walking and biking in the region.

The above represent general transportation needs for the region based on an analysis of its economic sectors and projected growth. More specific needs from a more detailed spatial analysis of the economic and transportation conditions in the region are described below.

D. Spatial Analysis of Regional Network Needs

Summary of Needs

Potential Needs were also developed by analyzing the economic and transportation data in the region from a spatial standpoint. This analysis included the potential Needs identified by stakeholders in the first Regional Forums, as well as new Needs that emerged from the spatial analysis of the data. These Needs were categorized into a series of very broad types of capacity Needs as described above. The spatial analysis of Needs consists of a Map of Needs, a table of identified Needs, and a Findings of Needs

that summarizes the economic and transportation findings to support each identified Need. Each of these is summarized below.

Map of Needs

The map below summarizes the regional Transportation Needs according to activity centers and corridors. The Needs are summarized and color coded by general category. Each of the Needs is also numbered and keyed to the Finding of Needs table.

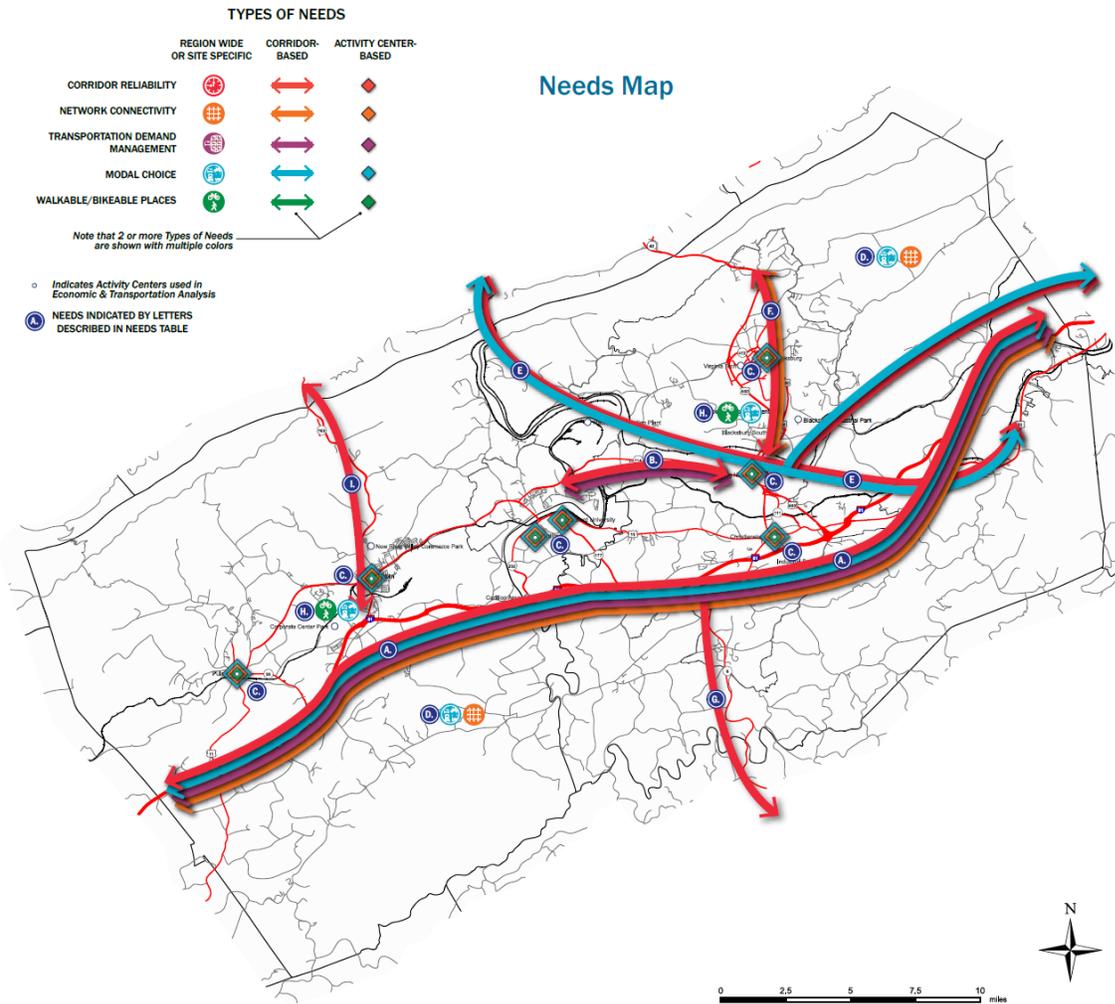


Figure 31: Summary Needs Map for the New River Valley Region

Findings of Needs

The table below lists each of the identified Transportation Needs in the Region, and describes the basis for each Need in terms of economic and transportation findings and data. The analysis of Regional Network Transportation Needs for the region was compiled into a table that identifies the following findings of need:

1. Category of Need

2. General Description of Need
3. Economic findings to support Need
4. Transportation findings to support Need

The findings to support the determination of need generally came from the statewide datasets of economic and transportation conditions summarized above. However, in cases where the statewide data is not of a fine enough grain or level of detail to accurately determine a Need, it was supplemented by locally obtained data from studies or plans. It is important to note that local plans and studies were not used to identify proposed projects as Needs, but only for supporting data to make an objective determination of need.

Table 11: Findings of Needs

A. I-81 Corridor Reliability	
NEED	 <p>Interstate 81 is a vital regional connector within the region and to markets outside the region. Safety and intermittent delay issues due to incidents, as well as bottlenecks created by freight traffic create reliability issues that are also linked to regional needs for parallel connectivity, transportation demand management and modal choices.</p>
ECONOMIC	 <p>The corridor gives inter- and intra-regional access to multiple activity centers and is of vital importance for the regional economy through its role in carrying freight, commuter, tourist and local travel markets to and through the region.</p>
TRANSPORT.	 <p>There are several areas showing delay on the I-81 corridor which is potentially influenced by the proportion of truck traffic (24% truck vehicles from local data sources). Lack of parallel network in the area also contributes to incident delays. Lack of modal choice in the region makes the corridor carry proportionally large commuter volumes.</p>
B. Pepper's Ferry / North Christiansburg Reliability	
NEED	 <p>Regional commuter patterns and roadway measures show a need for a higher level of travel time reliability between Activity Centers in Christiansburg and Radford to encourage local sector growth.</p>
ECONOMIC	 <p>Pepper's Ferry Road is a primary connector between Montgomery and Pulaski Counties, linking activity centers in Radford and Christiansburg. Improving travel time reliability and reducing bottlenecks along the roadway would support local and knowledge sector growth in the area.</p>
TRANSPORT.	 <p>Between 6,000 and 10,000 people commute between Montgomery County, the City of Radford, and Pulaski County every day, with Pepper's Ferry Rd as a major commute corridor. Although statewide data shows few delay or reliability issues, local data indicates bottlenecks due to safety and intermittent congestion issues.</p>

C. Walkability in Activity Centers

NEED	<p>Improved walkable connections serve as placemaking infrastructure that attract the 21st century workforce. Enhance regional walk-ability and bikeability by making last mile connections to regional trails and key activity centers.</p>
ECONOMIC	<p>Enhancing walkable streetscapes has been shown to correlate to attracting workforce and building the economy, especially in knowledge sector. Downtown portions of Blacksburg and Radford are seeing new workforce attracted to placemaking amenities such as walkable streets - enhanced walkability is needed in existing and emerging activity centers regionally</p>
TRANSPORT.	<p>The region has several historic village/town centers (Radford, Dublin, Pulaski, etc.) with good walkable networks - need to connect these to regional trails and need to enhance walkability and bikeability in the emerging employment centers in the region.</p>

D. Regional Modal Choice

NEED	<p>The low level of transit accessibility throughout the region creates a need for expanded transit service in Activity Centers. Developing inter-city bus connections between jurisdictions in the region would foster local and knowledge sector growth.</p>
ECONOMIC	<p>Good bike/ped and transit access and recreational amenities show strong correlation to emerging workforce dynamics nationally. In addition, strong education sector and growing knowledge sector in the region would be supported by improved hiker/biker networks and expanded transit service. Improved access to town and village center shopping also aids the local services sector.</p>
TRANSPORT.	<p>Regional bus service between Roanoke and Blacksburg/Christiansburg has helped serve important commuter travel markets. Additional regional bus service is lacking to connect important commuter, health care and educational centers</p>

E. Rail Reliability and Modal Choice

NEED	<p>Congestion along the Crescent and Heartland corridors require corridor reliability enhancements to ensure freight reliability. Expanding passenger rail service can increase modal choice for knowledge sector workforce</p>
ECONOMIC	<p>Norfolk Southern's Heartland and Crescent rail corridors intersect in the region and provide major freight economic benefits. The growing regional knowledge sector lacks good modal choice for passenger rail to major markets.</p>
TRANSPORT.	<p>According to local studies, 30% of surveyed freight generators use rail as part of their freight movement operations. The region also shows very strong surveyed support for passenger rail connections to major markets. Freight corridor bottleneck improvements could shift a portion of truck shipments from I-81 to these rail corridors</p>

F. Rt. 460 Blacksburg / Christiansburg / Main Street Area Reliability

NEED



Rt. 460 through the Blacksburg/Christiansburg area provide critical 'last mile' linkages from the surrounding region to major employment centers. Preserving reliability and enhancing network connectivity are critical to continued economic strength in the region.

ECONOMIC



An increase in accessibility for the workforce in Northern Christiansburg can support local sector growth. Rt. 460 provides regional accessibility between activity centers and the larger region. Provides access to a major mall, retail centers and other local economic sector businesses. Connects Virginia tech supporting a major employment center and an important part of the Knowledge sector.

TRANSPORT.



Some delay issues were present in the statewide data on Rt. 460 and Main Street, reinforced by local stakeholder input on congestion and need for parallel capacity on these corridors.

G. Floyd County Commuter reliability

NEED



Ensuring good reliability for the local sector workforce in areas to the south of the Christiansburg and Blacksburg employment centers by addressing delay issues on Route 8 as a primary commuter corridor.

ECONOMIC



The local sector workforce in the North Christiansburg and Blacksburg activity centers rely heavily on rural workforces and Route 8 is a prime connector to workforces to the south.

TRANSPORT.



According to local data, a significant segment of the workforce commutes from Floyd County to activity centers in the region and Route 8, the primary commuter corridor shows some delay issues on statewide datasets.

H. Regional Trail Connectivity

NEED



Strengthening the regional trail network by connecting the New River trail to the Huckleberry Trail and regional trail systems would increase network connectivity and offer more modal choices important for the growing knowledge sector

ECONOMIC



National findings show that greenways and walkable networks help attract key sectors of the 21st century workforce, supporting the growing regional knowledge-based economy. A regional greenway network also supports recreation and tourism, generating local sector growth.

TRANSPORT.



Much of the region outside the historic village and town centers, has relatively low walk accessibility. Local information shows strong demand for greater walkability and recreational opportunities in the region.

I. Giles County Freight & Commuter reliability

NEED



Ensuring good reliability for the freight-dependent workforce travelling between Giles County and Dublin by addressing delay issues on Route 100 as a primary commuter corridor.

ECONOMIC



Freight-dependent transactions between Celanese Corporation / the Industrial Park in Giles County and Volvo in Dublin rely heavily on the reliability of commutes along Route 100.

TRANSPORT.



According to local stakeholders, a significant segment of the workforce commutes between Dublin and Giles County, and Route 100, the primary commuter corridor, has reports of reliability issues.