Regional Freight Plan

For Virginia's New River Valley

Approved: May 3, 2018

New River Valley MPO

NRVRC new river valley regional commission

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INTRODUCTION

The New River Valley Metropolitan Planning Organization (MPO) and New River Valley Regional Commission (Commission) partnered on the 2018 Regional Freight Study to inform local, regional, statewide, and federal partners about mobility goals that continually improve Virginia's and the New River Valley's competitive economic position. This Freight Plan identifies the region's multimodal critical freight network and incorporates both urbanized and rural areas of the region.

In the United States, trucks continue to dominate the bulk of freight shipments, moving nearly 70% of all tonnage. Rail comes in a distant second, moving slightly less than 10%. Interestingly, pipeline and multiple modes tie for third, moving just under 8% of all tonnage shipments in the US.[1] Freight is anticipated to grow across all transportation modes to meet the future needs of a growing population. The growth in freight will represent a growing economy while also placing increased pressure on infrastructure throughout the country.

In 2012, the NRV region exported more than $6 billion in freight value.

The movement of freight (raw materials, intermediate products, and finished goods) contributes over $350 billion of Virginia's Gross State Product, or about 28% of the total statewide economy.[2] In the New River Valley, the value of goods exported is about $6.4 billion.[3] While bottlenecks can be found during peak-hour traffic, Virginia and the New River Valley generally have adequate infrastructure capacity. The NRV Freight Plan identifies a critical regional freight network and anticipated needs through 2045.

From a regional perspective, 80-95% of all exports are generated by the top ten industries in each NRV county/city. The commodities exported are different based on value, trips, and tonnage, but there are similar industries consistently ranking in the top ten. More than $6 billion in value, 40,000 trips, and nearly 4 million tons were exported in 2012.

Scope and Method

The purpose of this plan is to comprehensively review and update the 2009 Freight Study. In addition to examining the existing freight transportation system (rail, air, and trucking) particular emphasis was placed on proactively addressing future goods movement. The 2018 Freight Plan specifically accomplishes the following:

- Reviews internal and external factors contributing to the regional freight profile
- Identifies the primary/critical freight network
- Analyzes the largest freight generators by volume, value, and trips
- Documents ideas, insights, and barriers of local freight connections

[1] National Freight Strategic Plan. 2016. US Department of Transportation, 1200 New Jersey Ave., Washington, DC 20590.
[2] Virginia Multimodal Freight Plan. 2015. Cambridge Systematics, Inc.
[3] 2012 Transearch Data. May 28, 2014. IHS Global Inc., 24 Hartwell Avenue, Lexington, MA 02421.

KEY FINDINGS AND RECOMMENDATIONS

This section provides an overview of the key findings and recommendations identified through the planning process. Overarching regional strategies include:

1. Invest in new technologies that optimize infrastructure capacity.
2. Bring critical regional freight network intersections with Corridors of Statewide Significance up to current design standards.
3. Anticipate significant growth in freight truck and rail tonnage. Partner with the Virginia Department of Transportation and Department of Rail and Public Transportation to increase Virginia's global economic competitiveness.
4. Improve coordination between public and private sectors to address freight system needs. Identify strategies that minimize costs and address key challenges.
5. Increase data collection and levels of accuracy to better understand regional freight trends.

Recommended Performance Measures

23 Code of Federal Regulations Part 490 describes the performance period, reporting requirements, and timeline for establishing performance measures. The role of the New River Valley Metropolitan Planning Organization (NRVMPO) is to support national goals in the planning process and consider measures and targets to incorporate in to long range plans and programs. The United States Department of Transportation and the Virginia Office of Intermodal Planning and Investment recommended performance categories include: 1) safety; 2) maintenance and preservation; 3) mobility, reliability, and congestion; 4) accessibility and connectivity; 5) environment; 6) economic vitality; and 7) coordination of freight transportation and land use.

At the time of this plan, performance measures had only been established statewide for safety. November 2, 2017, the NRVMPO accepted the statewide annual targets for fatality reduction (2.0%), serious injury reduction (5.0%), VMT percent increase (1.5%), and bike/ped reduction (4.0%). Once additional targets and methods for evaluation are established by the Virginia Department of Transportation, the NRVMPO will choose to support statewide targets and/or establish its own. Table 1 (below) provides the implementation schedule.

In general, truck accidents per miles traveled tends to be relatively low. However, significant safety concerns remain due to differences in size and maneuverability compared to an automobile. More than 19,000 accidents occurred in the New River Valley between 2011 and 2017, of which slightly more than 5% involved trucks. 314 accidents involving a truck resulted in an injury and 12 fatalities involved a truck.

Subpart F of the code identifies the freight measure regarding truck travel time reliability. Frequent causes of truck delay (bottleneck) include: steep grades, substandard vertical/horizontal clearances, weight restrictions, border crossings or terminals, and operating restrictions. Nation-wide additional bottlenecks are also frequently caused by non-recurring circumstances including: traffic incidents, bad weather, and work zones.

Bottlenecking conditions in the New River Valley are primarily the result of speed-based delays due to topography, highway weaving areas, and lane width. Other parts of Virginia experience capacity-based bottlenecks related to excess traffic volumes. In general, the region's freight network is very reliable. However, truck traffic can drop well below 60% of the posted speed limit on Interstate 81 and US Route 460. In addition, the lack of a parallel network causes substantial delays when accidents occur on either Corridor of Statewide Significance.

Statewide bottlenecks are also projected to occur on rail. According to the *Virginia State Rail Plan,* capacity at the intersection of Norfolk Southern's Heartland and Crescent Corridors will be insufficient to accommodate future growth.[4] The intersection occurs where the jurisdictional boundaries of Montgomery County and the City of Radford converge with the New River.

While the New River Valley Airport is still designated as a US Port of Entry, no on-site Customs Clearance personnel exists southwest of Richmond. In addition, neither the New River Valley nor Roanoke-Blacksburg airports have cargo warehouse storage for distributors. 2040 projections appear encouraging for air cargo, and could necessitate both regions to explore potential staff and capital needs.

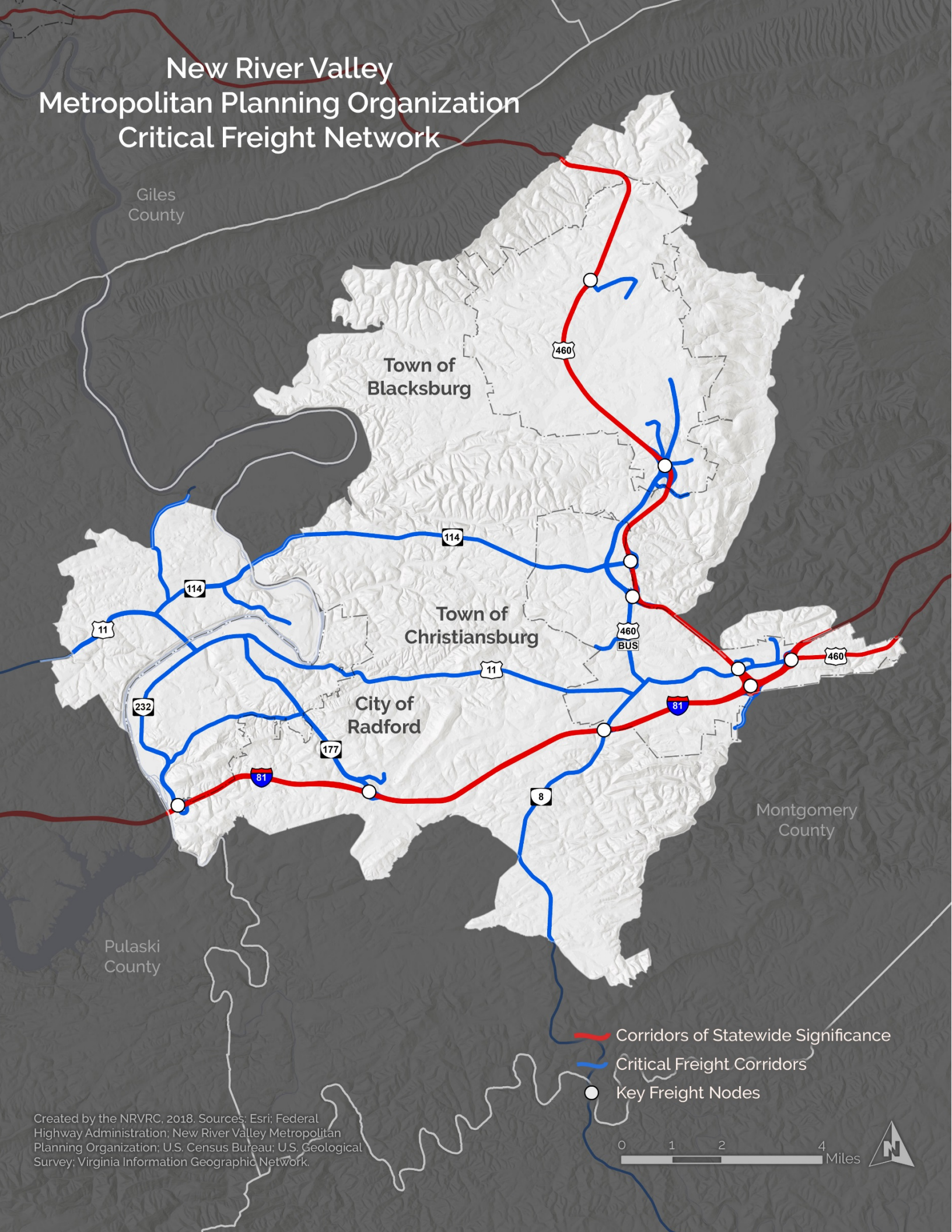
The MPO's Transportation Improvement Plan (TIP) shall, to the maximum extent practicable, describe how the investments make progress towards achieving performance targets. However, the MPO is not required to be project specific for this initial round. The Federal Highway Administration is aware that each MPO is unique and may need flexibility in establishing performance measures.

Table 1: Performance Measure Implementation Schedule

Measure	Effective Date	State Target Date	MPO Target Date	Planning Inclusion
Safety (PM1)	14 April 2016	Complete	Complete	27 May 2018
Pavement/Bridge (PM2)	20 May 2017	20 May 2018	17 October 2018	20 May 2019
System (PM3)	20 May 2017	20 May 2018	17 October 2018	20 May 2019

Overall, freight export value in the New River Valley is expected to grow more than 70%, from $6.3B to $10.9B, by 2040. This plan identified clusters of the region's largest freight generators to identify a regional multimodal critical freight network, for both the urban and rural areas. The map shown on the next page illustrates the urban roadway network.

[4] Virginia Statewide Rail Plan, September 19, 2017 draft. Appendix J, Rail Bottlenecks, Figure J-1. Virginia Department of Rail and Public Transportation.


New River Valley
Metropolitan Planning Organization
Critical Freight Network
Giles
County
Town of
Blacksburg
460
114
114
11
Town of
Christiansburg
460
BUS
460
11
232
City of
Radford
81
81
177
8
Montgomery
County
Pulaski
County
Corridors of Statewide Significance
Critical Freight Corridors
Key Freight Nodes
Created by the NRVRC, 2018. Sources: Esri; Federal Highway Administration; New River Valley Metropolitan Planning Organization; U.S. Census Bureau; U.S. Geological Survey; Virginia Information Geographic Network.
0
1
2
4
Miles
N

PLAN IMPLEMENTATION & RATIONALE FOR INVESTMENT

The New River Valley Metropolitan Planning Organization (MPO) met on April 19, 2018 to establish an action plan. Each action plan identifies policy goals, impacts, anticipated completion, and estimated cost.

Action Plan

Table 2: Action Plan

ID	Project/Goal	Impacts	Complete	Cost
01	I-81: North bound bridge replacement and Route 232 bridge replacement. UPC: 56899	Virginia, Montgomery County, and City of Radford.	2024	$69M
02	I-81: Approaches and bridges over Route 8. UPC: 93074	Montgomery and Floyd Counties, and Town of Christiansburg	2024	$24M
03	I-81: Route 8 approaches to interstate. UPC: 93075	Montgomery and Floyd Counties, and Town of Christiansburg	2024	$11M
04	Route 100: Bridges over Route 11 rehabilitation/replacement. UPC: 104183	Virginia's First, Pulaski and Giles Counties, and Town of Dublin	2024	$8M
05	Route 100: Safety improvements within 2-lane segment. UPC: 107051	Pulaski and Giles Counties, and Town of Dublin	2024	$4M
06	Route 460: North Main intersection improvements at Route 460 Bypass. UPC: 108900	Montgomery County, and Town of Blacksburg	2024	$3M
07	I-81: Exit 98 diverging diamond intersection improvement. New approaches and signals.	Virginia's First, Pulaski and Giles Counties, and Town of Dublin	2026	$8M
08	Norfolk Southern: intermodal facility	Virginia, Montgomery and Roanoke Counties	2026	$71M
09	Virginia Tech/Montgomery County executive Airport runway extension.	Montgomery County, Town of Blacksburg, and Virginia Tech	2019	$7M
10	Work with Onward NRV to evaluate potential regional warehouse and logistic needs for air cargo freight distribution.	Current and future industries moving high-value & perishable goods	2020	$50K
11	Work with statewide partners to evaluate potential improvements that address increased truck freight on Route 8.	Montgomery and Floyd Counties.	2019	$75k
12	Work with statewide partners to evaluate potential improvements that address increased truck freight on Route 100.	Pulaski and Giles Counties.	2021	$75k

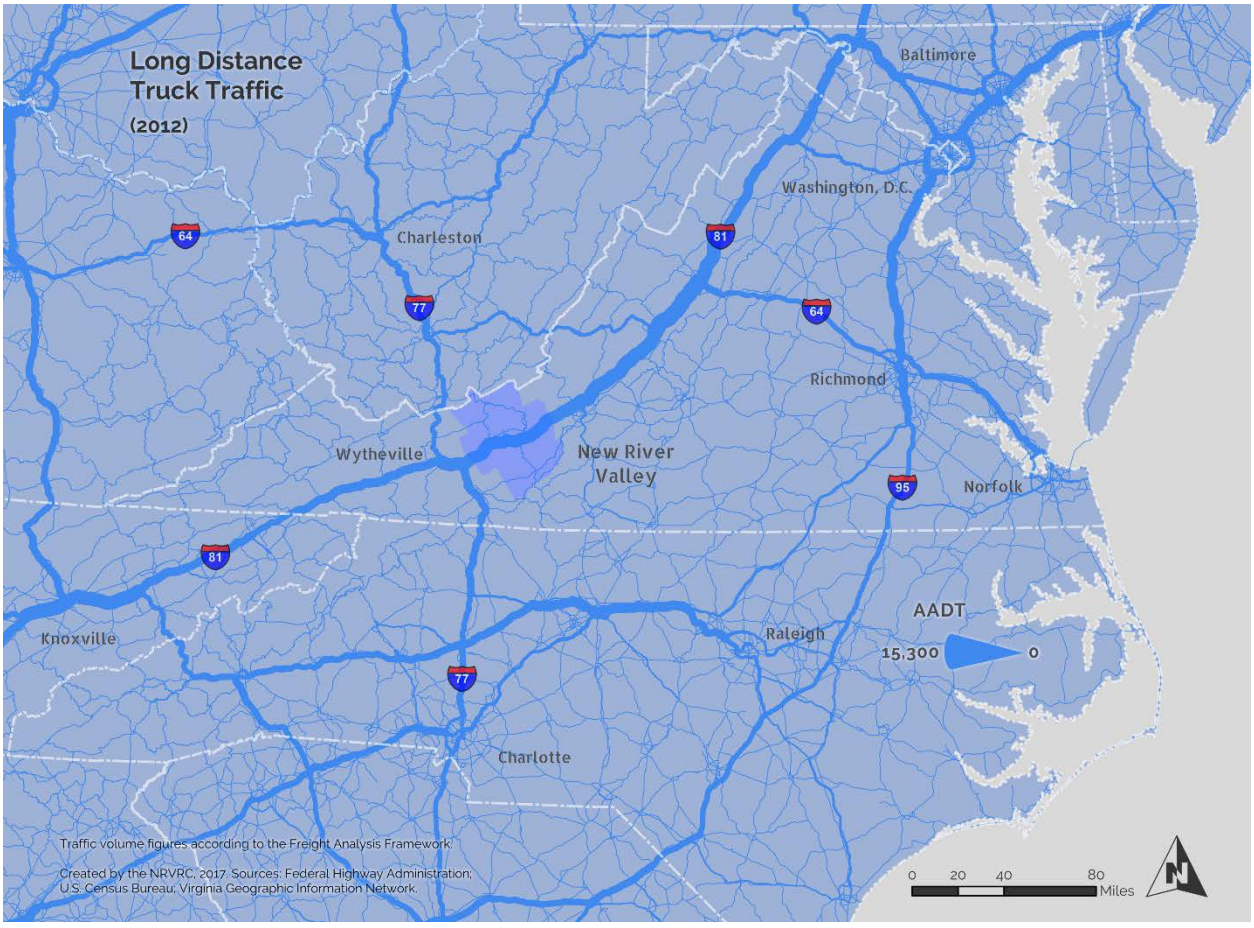
NRV REGIONAL FREIGHT PROFILE

In general, the region benefits from the presence of two Virginia Corridors of Statewide Significance (CoSS). Interstate 81, which has one of the nation's highest volumes of long-haul truck traffic, and US Route 460, are gateway corridors for Virginia. The corridors are also known statewide as the Crescent Corridor (I-81) and the Heartland Corridor (US Route 460). The majority of freight movement in the New River Valley is performed by trucks; however, some of the region's largest employers do utilize rail and air services. Interstate 495 has the most daily traffic volume; however, Interstate 81 has both the highest truck count and percentage of daily truck traffic in Virginia. Map 1 (shown below) illustrates long-distance truck volume at the State level.

Statewide Freight Perspective

From a statewide and even national perspective, Interstate 81 serves as a major long distance truck route. In Virginia, I-81 has the highest truck volume and hauls more tonnage than any other corridor in the Commonwealth. According to the *2015 Virginia Multimodal Freight Plan*, the annual hours of truck delay is 456,645[5] along the segment of I-81 through Montgomery County. The delay is ranked number one in the Commonwealth and accounts for more than 27% of all delays statewide.

Map 2: Long Distance Truck Traffic, Virginia



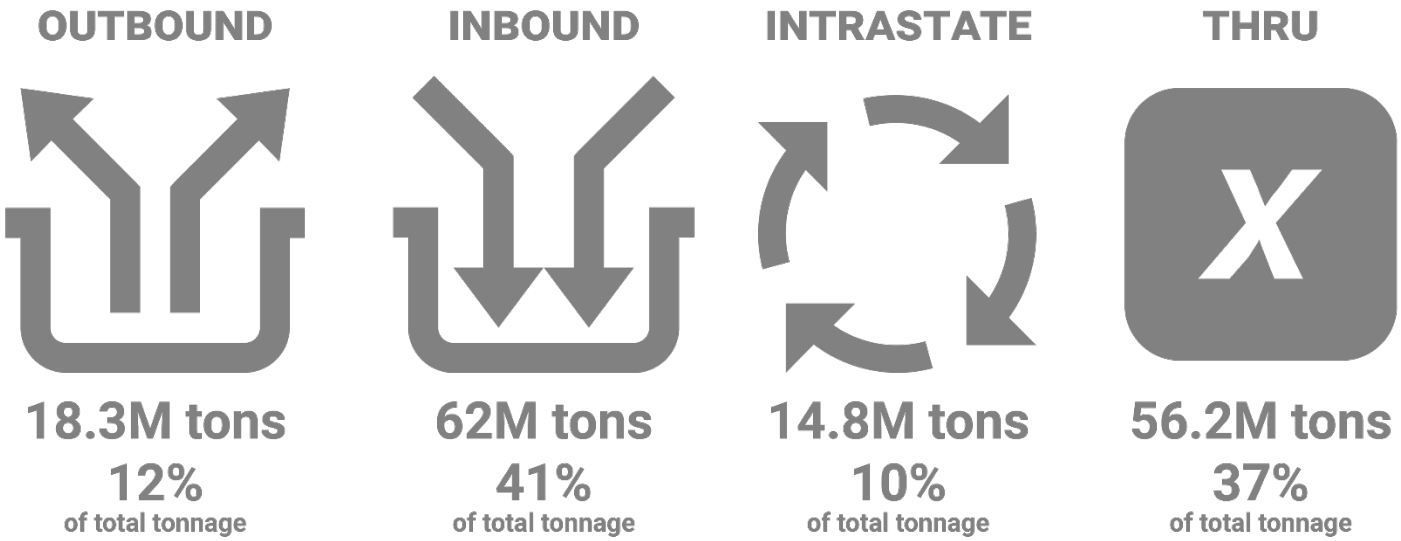
[5] Virginia Multimodal Freight Plan, Appendix C, Table C.21. 2015. Cambridge Systematics, Inc.

Norfolk Southern and CSX Transportation are the Commonwealth's existing Class I railroads. There are currently nine Class III (shortline) railroads, including: Bay Coast Railroad, Buckingham Branch Railroad, Chesapeake & Albemarle Railroad, Chesapeake Western Railway, Commonwealth Railway, Norfolk & Portsmouth Belt Line Railroad, North Carolina & Virginia Railroad, Shenandoah Valley Railroad, and Winchester & Western Railroad.

Coal accounted for more than 50% of freight tonnage statewide in 2012

Each day, hundreds of thousands of goods and products move across more than 3,000 miles of rail throughout the Commonwealth. Rail will continue to play a strong role in Virginia's economy. The September 2017 draft of the *Virginia State Rail Plan* anticipates a 19% growth in total freight movements by 2040.

In 2012, Virginia's major rail outbound commodities[6] included: coal, nonmetallic minerals, miscellaneous mixed shipments, chemicals or allied products, and petroleum or coal products. Coal accounted for more than 50% of all commodity movements statewide. Slightly more than 150 million tons of outbound, inbound, intrastate, and through freight rail tonnage is estimated statewide by utilizing IHS Transearch data (visualized below).



[6] Virginia Statewide Rail Plan, September 19, 2017 draft. Appendix I, Rail Outbound Total, Figure I-4. Virginia Department of Rail and Public Transportation.

Virginia has 57 general aviation airports, nine of which provide commercial services. Business/personal travel is certainly the primary use of airports in the Commonwealth; however, large and small companies rely on air transport for higher value goods and materials. In 2010, airports in Virginia contributed to 259,000 jobs, $11.1 billion in payroll, and $28.8 billion in economic activity.[7]

According to the *Virginia Multimodal Freight Plan,* air transports slightly more than 15% of the Commonwealth's critical commodity value and less than 1% of tonnage. Machinery accounts for the largest air cargo user in Virginia. Other popular commodities handled by air include: mail, optical/photo equipment, and electrical equipment. Statewide, the top three commodities shipped internationally include: secondary traffic, transportation equipment, and chemicals or allied products. Compared to world averages, Virginia utilizes air less for international shipments.

Air transports 15% of Virginia's critical commodity value, but less than 1% of total freight tonnage.

World air cargo is projected to grow 4.2% per year through 2035.[8] Markets connected to Asia are projected to see the highest growth, 4.6% in North America. While air cargo accounts for less than 1% of the world's trade tonnage, 35% of the world trade value is carried by air. Goods transported by air serve markets that demand speed and reliability. In addition, air transport is often a preferred method for shipping perishable items.

Air cargo moving through North America accounts for 13.8% of the world's air cargo.[9] Breaking down the North America numbers, the United States accounts for more than 96% of air cargo, with slightly less than 4% transported to/from Canada. Canada and the United States also trade regularly, a trend that is anticipated to continue well beyond 2035.

By comparison, containership pricing is 10 to 20 times less expensive than air cargo per unit weight. Other variables, including fuel prices and behaviors of shippers are additional factors that directly influence air transport. Similar to other modes of freight transport, air cargo relies on trucks to complete shipments.

Virginia's freight system is currently performing at a high level, but will face pressure as demand continues to increase across the nation. 40% of freight tonnage simply passes through Virginia's highways in route to another state.[10] Statewide trucks move approximately 95% of all freight value. Although freight demand will grow across all modes, trucking will continue to serve most shippers.

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[7] Commonwealth of Virginia Statewide Economic Impact Study – Technical Report. 2011. Virginia Department of Aviation.
[8] World Air Cargo Forecast. 2016-2017. Boeing World Air Cargo Forecast Team. PO Box 3707, MC 21-33, Seattle, Washington 98124-2207.
[9] World Air Cargo Forecast. 2016-2017. Boeing World Air Cargo Forecast Team. PO Box 3707, MC 21-33, Seattle, Washington 98124-2207.
[10] Virginia Multimodal Freight Plan. 2015. Section 1.2.

New River Valley Freight: Domestic Truck Traffic (2012)

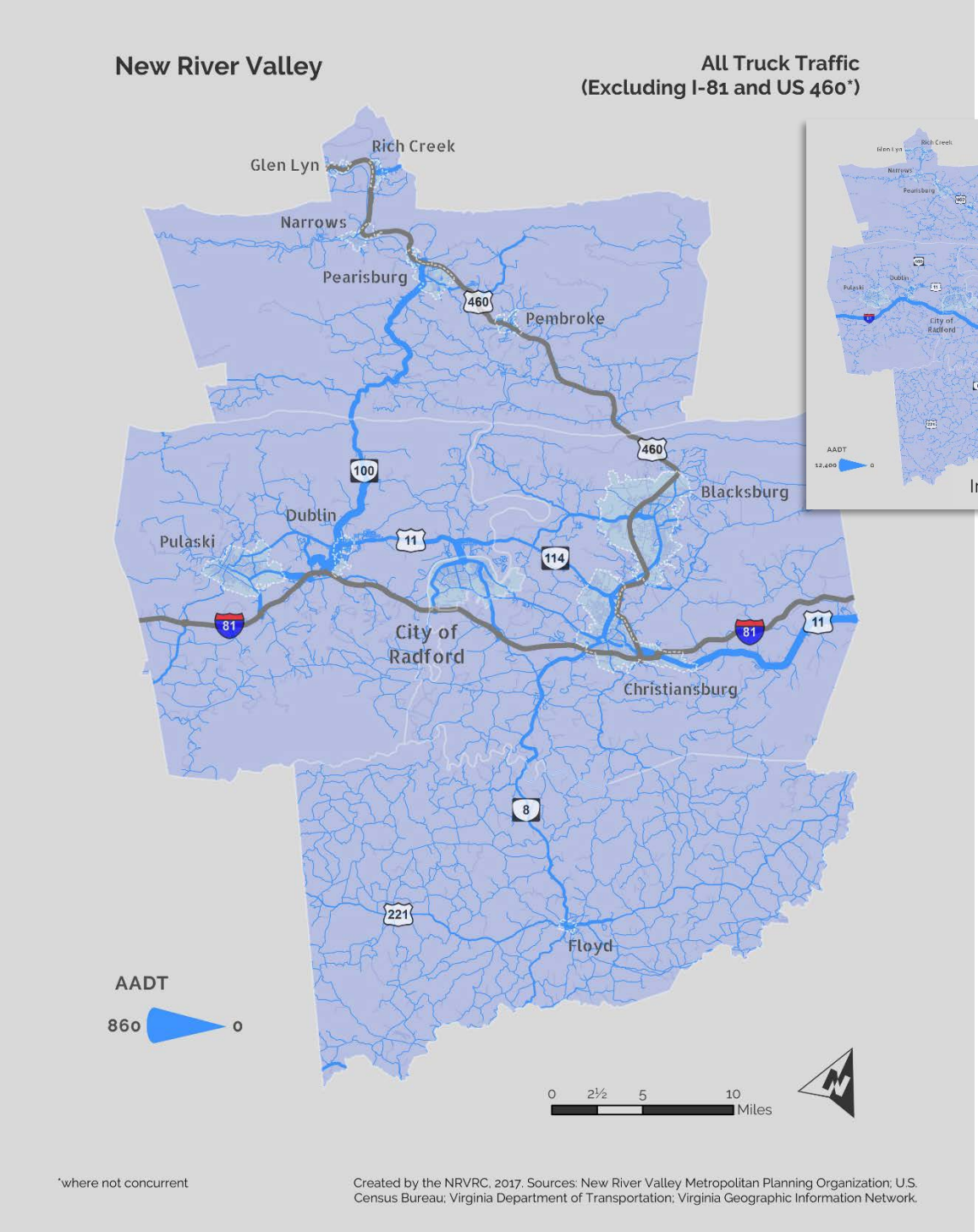
Reflects all truck traffic originating or ending in the New River Valley. Lines indicate the quickest routes between the NRV and corresponding BEA Economic Areas. Brighter lines represent routes of higher truck traffic volume.

Created by the New River Valley Regional Commission, 2017. Sources: Esri; IHS Markit; National Historical Geographic Information System; U.S. Census Bureau.

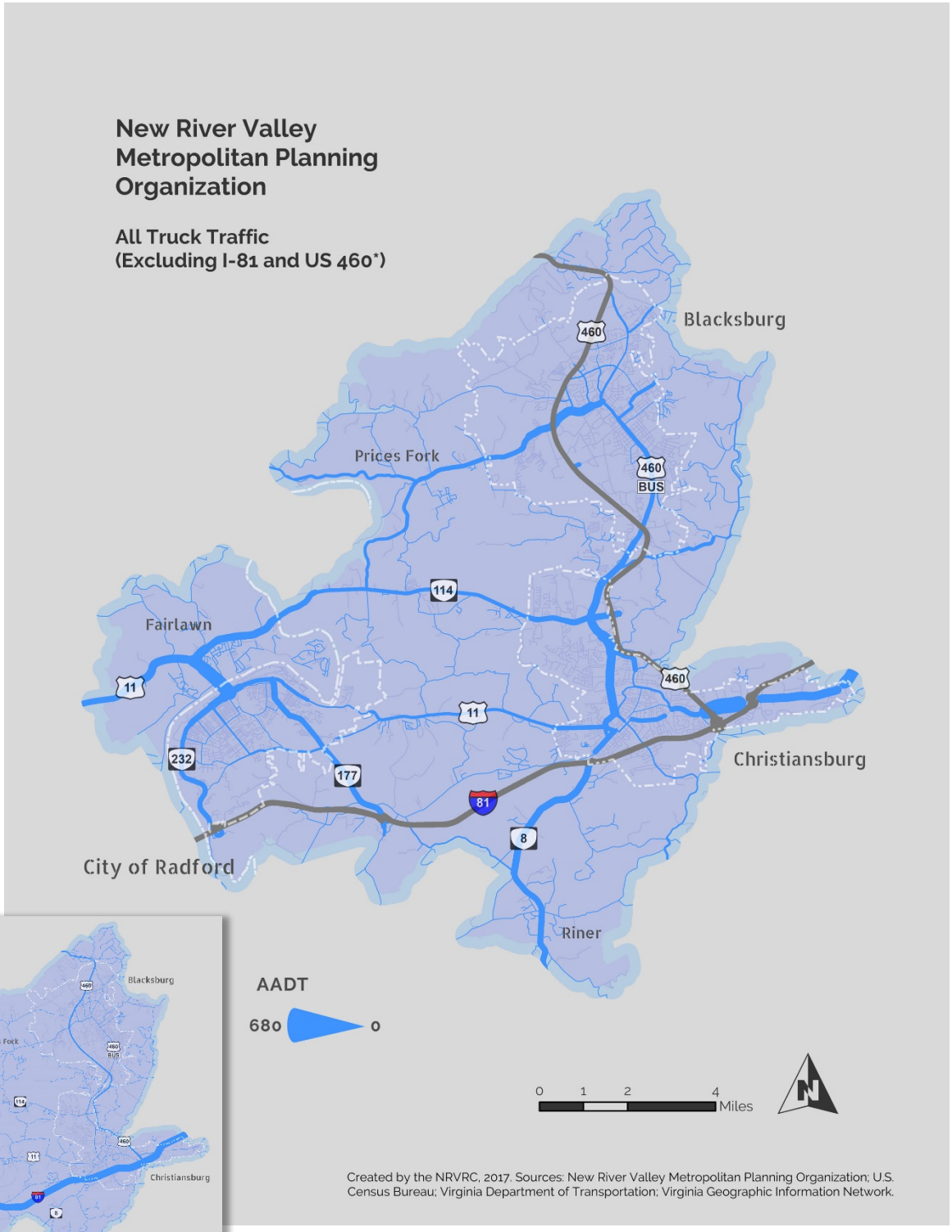
Existing New River Valley Regional Freight Trends

From a regional perspective, local truck volume is dwarfed by north/south running Interstate 81. In addition to I-81, US Route 460 serves as more of an east/west connector. Both I-81 and US Route 460 are Corridors of Statewide Significance (CoSS). Maps 2 and 3 (shown below) illustrate key local routes supporting the regional economy more accurately by excluding CoSS data.

Map 4: New River Valley Annual Average Daily Traffic, Excluding I-81 and US 460

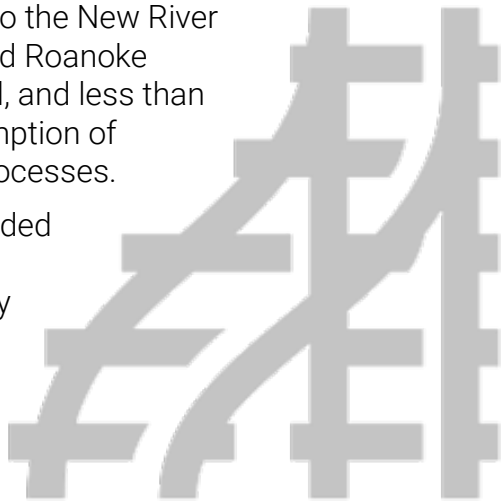


Map 5: NRV Urban Area Annual Average Daily Traffic, Excluding I-81 and US 460



Norfolk Southern (NS) is the only Class 1 freight railroad that operates in the New River Valley. Few spur tracks exist for the generation or consumption of quarry/mined products by local businesses and transport of solid waste by local governments. The Heartland Corridor (main east/west route) intersects with the Crescent Corridor (main north/south route), the second most heavily used NS corridor, just outside of Radford.

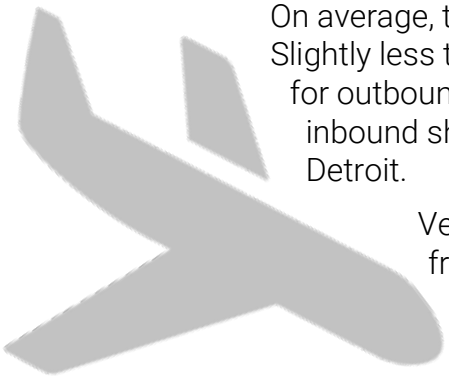
Most commodities transported by rail are inbound to the New River Valley. Total rail shipments between Blacksburg and Roanoke combine to $1.6B, with 69% inbound, 30% outbound, and less than 2% internal.[11] Shipments are mostly for the consumption of finished goods or for use in other manufacturing processes.



According to the 2017 *Virginia State Rail Plan* expanded economic analysis developed in 2017, East/West freight tonnage is expected to see far less growth by 2040. Growth projections correlate with the statewide fall in coal mining. However, Norfolk Southern's Crescent (north/south) Corridor is expected to see up to 4% growth in parts of the New River Valley.

There are currently two airports in the region, the New River Valley Airport in Dublin, and the Virginia Tech Montgomery Executive Airport in Blacksburg. Both airports accommodate business and personal travel via private charter. The nearest commercial airport is located in Roanoke. Of the two local airports, only the Dublin location receives freight transport.

In 2012, the New River Valley Airport received slightly more than 77,000 pounds of freight. On average, the airport has around 250 business jet aircraft annually. Slightly less than 20% of the aircrafts carry freight. Popular destinations for outbound freight include Windsor, Canada and Detroit. Typical inbound shipments are received from Mexico, Texas, Atlanta, and Detroit.



Vehicle manufacturers are currently the largest users of air freight transport in the region. Truck freight forwarding companies have an active role in transport to and from the NRV airport.

[11] VTrans 2040, Virginia Freight Element – Appendix C. Corridor 4: I-81 Roanoke and Blacksburg Highway Commodity Profile. Retrieved from:

Top Freight Generators

The top industry sectors for each county/city within the region were tabulated based on value, trips, and tonnage. The Virginia Department of Transportation and Department of Rail and Public Transportation allowed regional partners to analyze 2012 IHS Global Incorporated data to develop this plan update. From a regional perspective, 80-95% of all exports are generated by the top ten industries in each NRV county/city.

The commodities exported are different based on value, trips, and tonnage, but there are similar industries consistently ranking in the top ten. More than $6 billion in value, 40,000 trips, and nearly 4 million tons were exported in 2012.

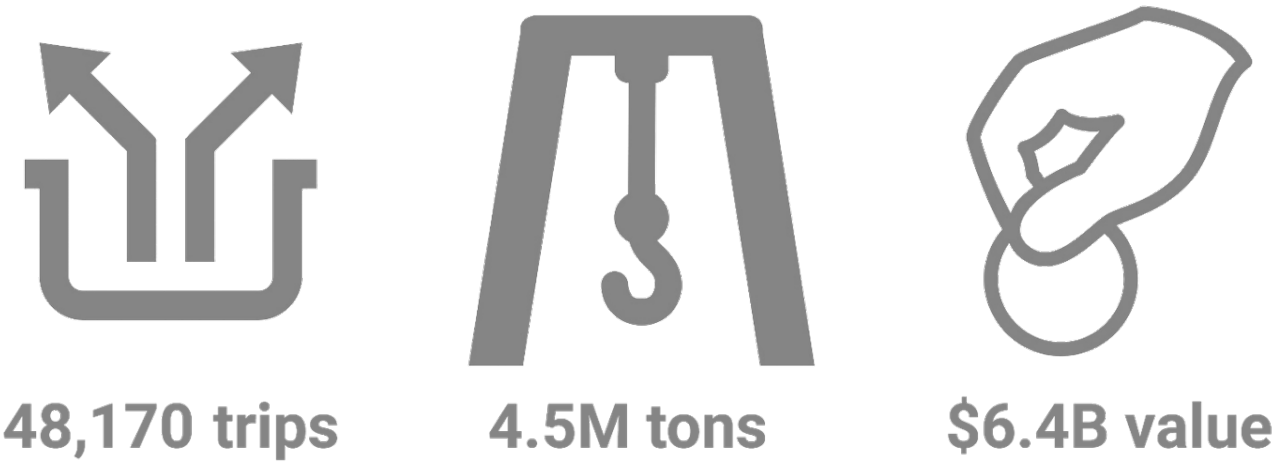


Table 3: Top Regional Freight Export Generators

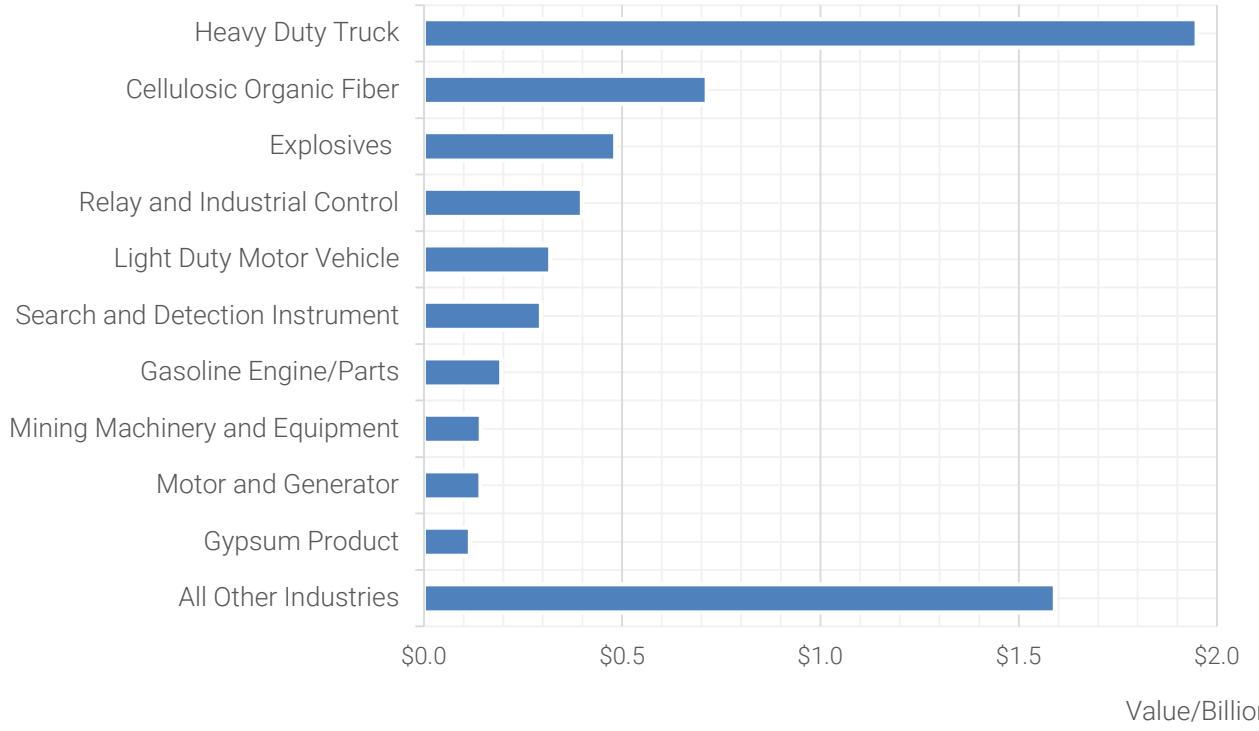
Top Regional Freight Export Generators		
trips	**tonnage**	**value**
RAAP	James Hardie	Volvo
Agriculture (hay/cattle)	Salem Stone	Celanese
James Hardie	RAAP	RAAP
Federal Mogul	Agriculture (hay/cattle)	Kollmorgen/Aspen Motion
Lhoist	Volvo	Moog
Corning	Lhoist	Federal Mogul
Volvo	Corning	James Hardie
Kollmorgen/Aspen Motion	Celanese	Rowe

Source: New River Valley Regional Commission. Local economic development meetings, 2017.
Note: Radford Army Ammunition Plant (RAAP)

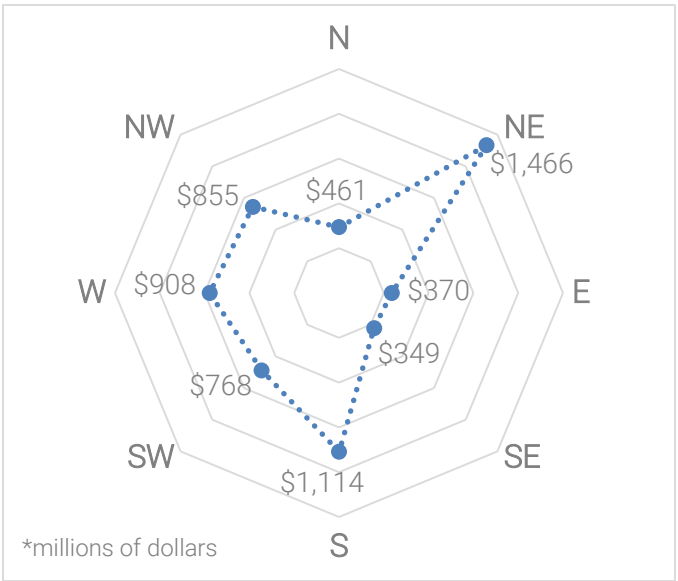
2012 Export Value Snapshot

Heavy duty truck manufacturing, cellulosic organic fiber manufacturing, and explosives manufacturing account for more than half of the region's total exported value (see table below for details). Volvo, Celanese, and the Radford Army Ammunition Plant are the largest employment centers representing these industry sectors. Kollmorgen/Aspen Motion, Moog, Federal Mogul, James Hardie, and Rowe also contribute a substantial portion of the region's total freight export value.

Table 4: Top 10 Base-Year Exports by Value



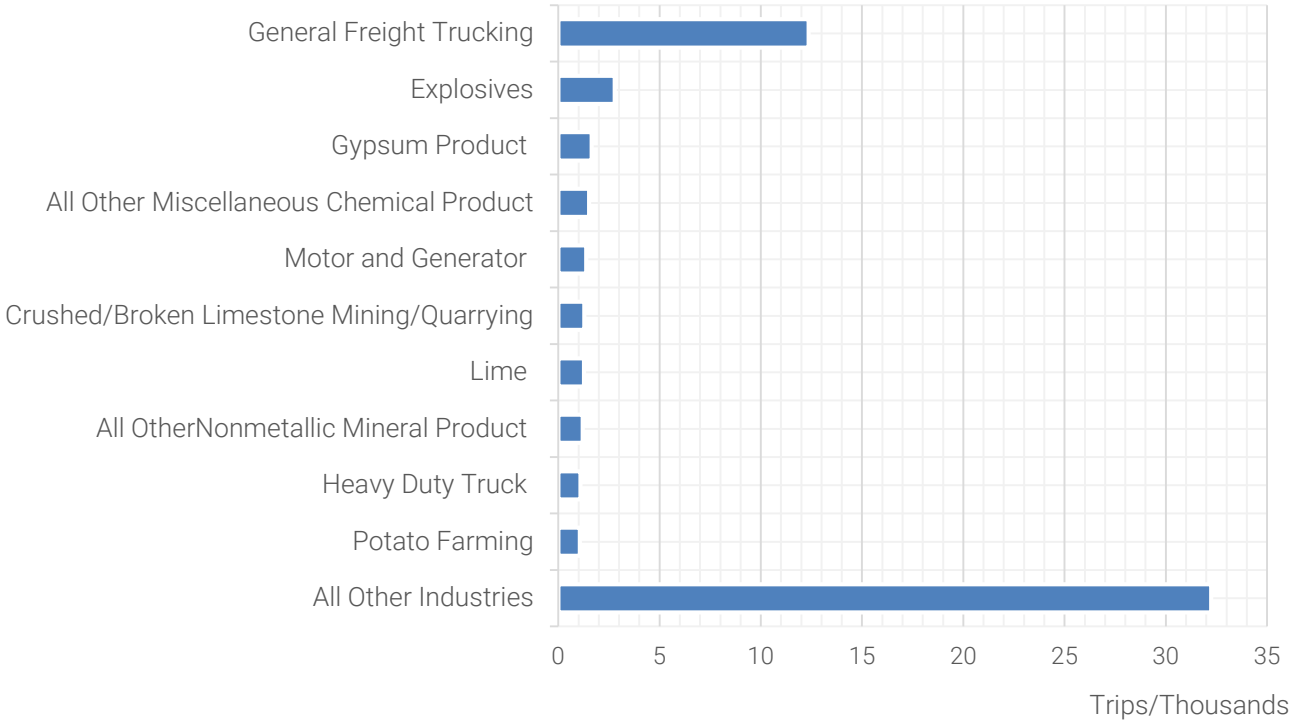
The highest total values are exported to the north-east and south of the region, as shown below. A diagram (shown below) illustrates the total directional export value. IHS Market data shows that the highest average *individual trip* values of $246,000 are exported due south. Due north and south-east rank second and third at $221,000 and $200,000 respectively.



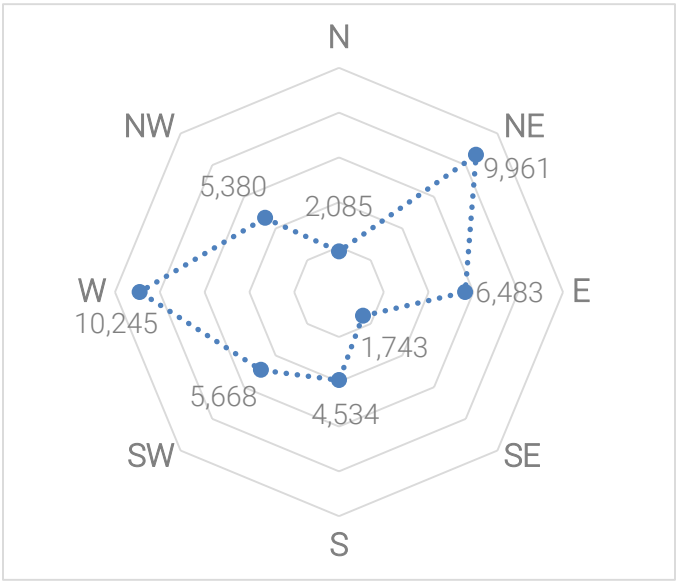
2012 Export Trips Snapshot

The New River Valley generates nearly 50,000 trips annually, a quarter of which is generated by general freight trucking. Explosives manufacturing and gypsum product manufacturing round out the top three trip generator industries. The Radford Army Ammunition Plant and James Hardie are the largest employment centers representing the two specific industry sectors. Federal Mogul, Lhoist, Corning, Volvo, Kollmorgen, and agriculture also contribute significantly to the region's total freight export trips.

Table 5: Top 10 Base-Year Exports by Trips



The highest number of exports is due west and north-east of the region, as shown below.

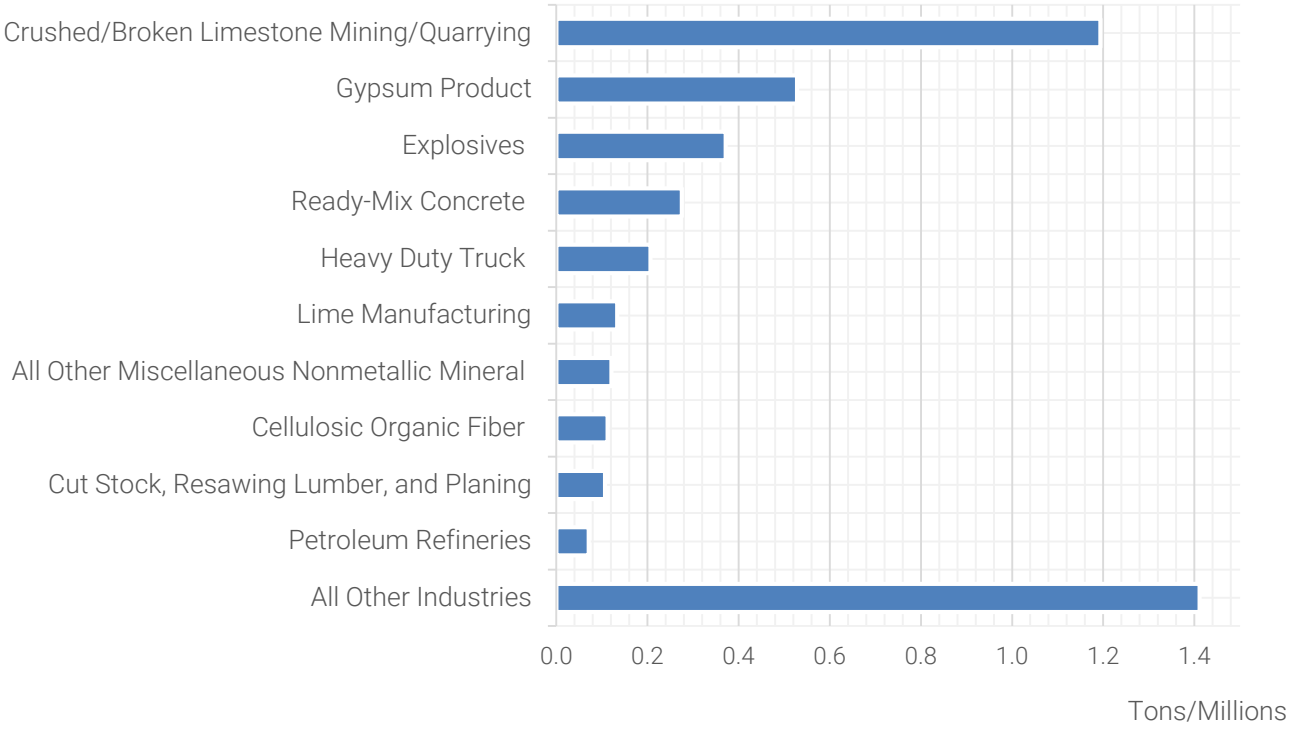


A diagram (shown below) illustrates the total directional export trips. IHS Market data shows that the average distance for *each trip* west is two to three times the distance in any other direction. The average trip dues west is slightly more than 920 miles, compared to 405 miles due south, and 360 miles north-east.

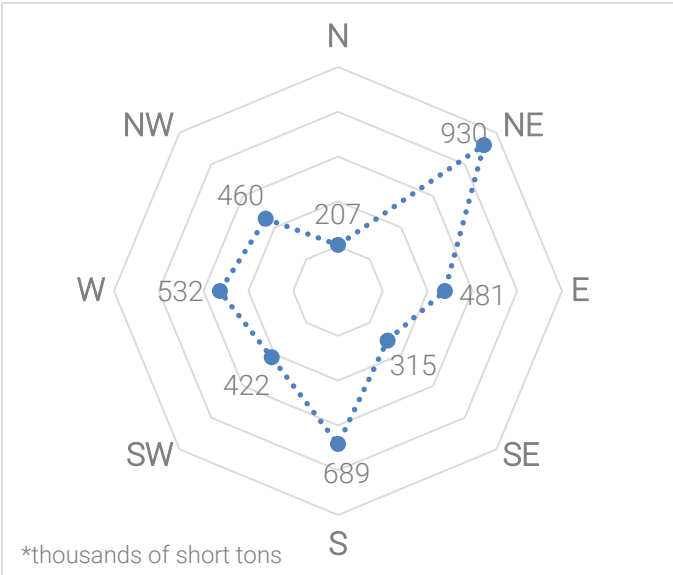
2012 Export Tonnage Snapshot

Crushed and broken limestone mining and quarrying, gypsum product manufacturing, and explosives manufacturing account for almost half of the region's total exported tonnage. James Hardie, Salem Stone, and the Radford Army Ammunition Plant are the largest employment centers representing these industry sectors. Volvo, Lhoist, Corning, Celanese, and agriculture round out the region's top freight export tonnage generators.

Table 6: Top 10 Base-Year Exports by Tonnage



The highest total tonnage exports closely mirror the directional value data. Most of the tonnage is exported to the north-east and due south, as shown below in the directional diagram. IHS Market data shows that the *average trip* tonnage of exports to the south-east are typically the largest at 181 tons, despite having a lower annual total. Due south typically has the second largest loads at 152 tons, while the typical load due west is only 52 tons.



2012 Import Value Snapshot

Vehicle manufacturing and warehouse storage account for more than $1.6B and slightly more than 35% of all import value in the New River Valley. When expanding the list to incorporate the top ten industries, nearly 65% of all value movements are accounted for.

Table 7: Top 5 Base-Year Imports by Value

Rank	Description	NAICS	Value (thousands)	Primary Destination
1	Warehousing & Storage	493000	$634,586	Montgomery
2	Petroleum Refineries	324110	$389,556	Pulaski
3	Gasoline Engine & Engine Parts Manufacturing	336312	$234,051	Pulaski
4	Other Engine Equipment Manufacturing	333618	$221,762	Pulaski
5	All Other Motor Vehicle Parts Manufacturing	336399	$169,530	Pulaski

2012 Import Trips Snapshot

A variety of industries contribute nearly 16,400 trips and more than 25% of total (64,228 trips) imported trips in the New River Valley. When expanding the list to incorporate the top ten industries, more than 50% of all trip movements are accounted for.

Table 8: Top 5 Base-Year Imports by Trips

Rank	Description	NAICS	Trips (total)	Primary Destination
1	General Freight Trucking	484100	9,692	Pulaski
2	Recyclable Material Merchant Wholesalers	423930	1,831	Pulaski
3	Construction Sand & Gravel Mining	212321	1,829	Pulaski
4	Petroleum Refineries	324110	1,612	Pulaski
5	Warehousing and Storage	493000	1,414	Montgomery

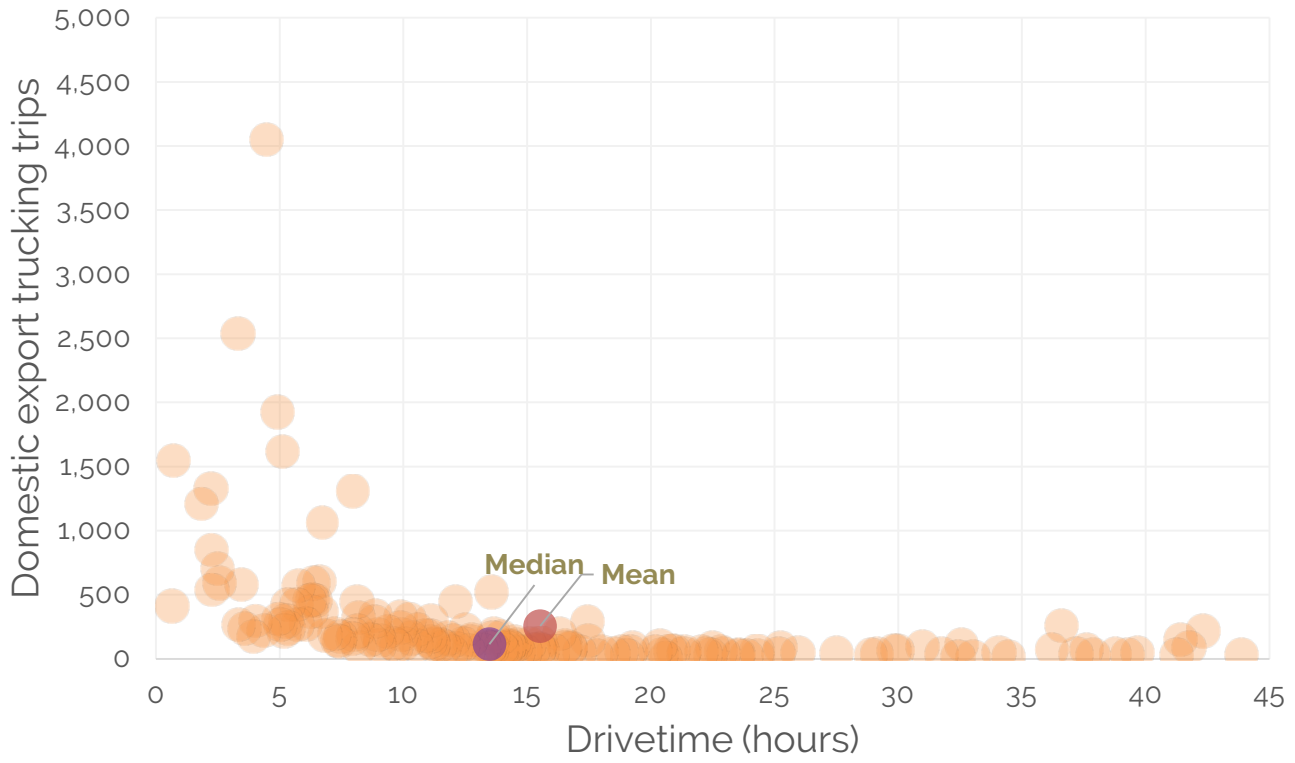
2012 Import Tonnage Snapshot

Mining and warehouse storage account for nearly 4M tons and over 60% of the total imported tonnage in the New River Valley. When expanding the list to incorporate the top ten industries, nearly 85% of all tonnage movements are accounted for.

Table 9: Top 5 Base-Year Imports by Tonnage

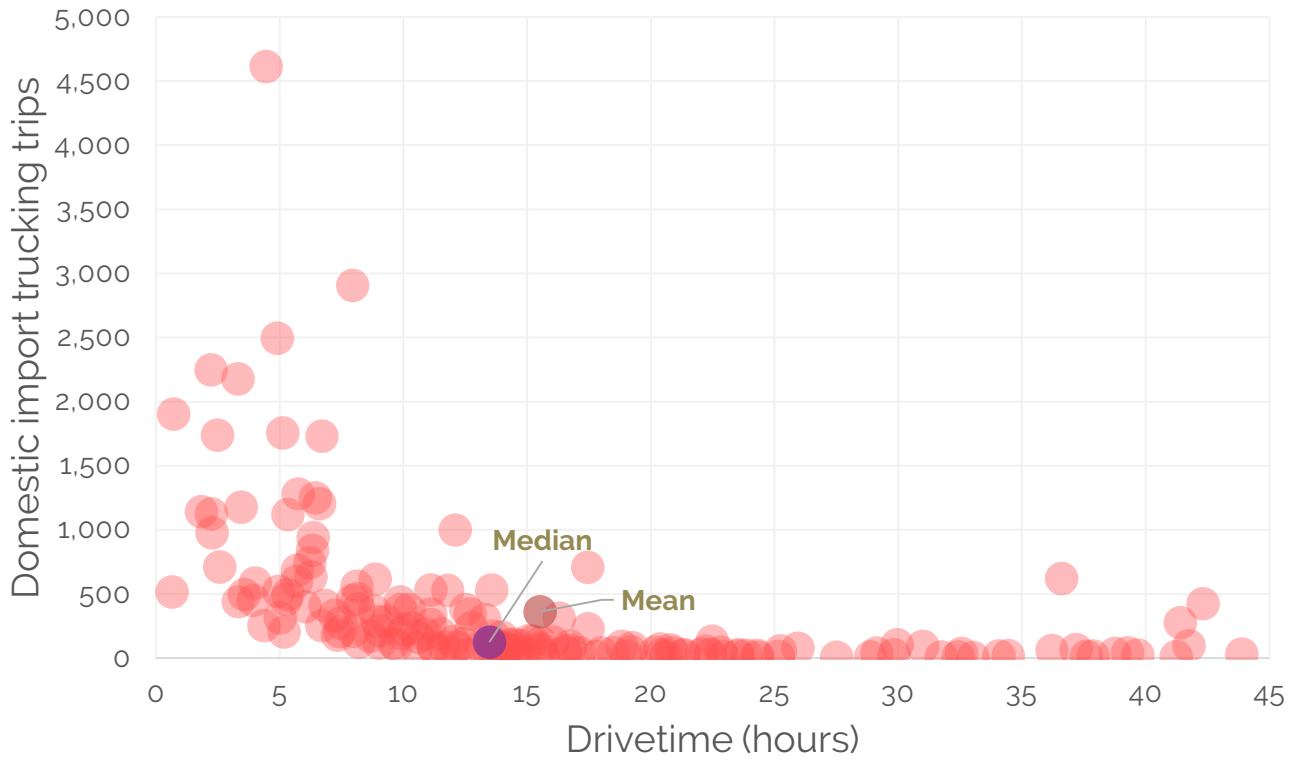
Rank	Description	NAICS	Tonnage (thousands)	Primary Destination
1	Crushed & Broken Limestone Mining & Quarrying	212312	1,371	Pulaski
2	Crushed & Broken Granite Mining and Quarrying	212313	909	Pulaski
3	Construction Sand & Gravel Mining	212321	653	Pulaski
4	Warehousing & Storage	49300	523	Montgomery
5	Other Crushed & Broken Stone Mining and Quarrying	212319	406	Pulaski

Table 10: Domestic Export Trucking Trips, 2012



Created by NRVRC, 2017. Sources: Esri; IHS Markit; U.S. Geological Survey.

Table 11: Domestic Import Trucking Trips, 2012



Created by NRVRC, 2017. Sources: Esri; IHS Markit; U.S. Geological Survey.

Freight-Related Industries

Production clusters, which generate the region's higher concentrations of critical mass freight transportation needs, are predominately situated along the Interstate 81 corridor. More specifically, the highest concentrations of manufacturing, warehousing, and distribution facilities are located at Exits 118 (Christiansburg) and 98 (Dublin). Exit 118 industries include nonmetallic mineral product manufacturing, electrical equipment, textiles, and miscellaneous manufacturers. Exit 98 industries include transportation equipment manufacturing, plastics and rubber products, couriers and messengers, and agriculture crop production. Based on a freight survey conducted in 2017, the existing status of the freight network is currently meeting industry needs.

There are several external factors that could drive future freight system performance, including: growing pass-through traffic on Interstate 81, and Norfolk Southern's Heartland and Crescent Corridors. In addition, a number of industrial development sites are available throughout the region. Many of the remaining parcels are located within formalized industrial parks which have good access to energy, public utilities, and broadband. Transportation costs can typically account for a significant portion of commercial businesses, so retaining and increasing access to Corridors of Statewide Significance will be an increasing priority.

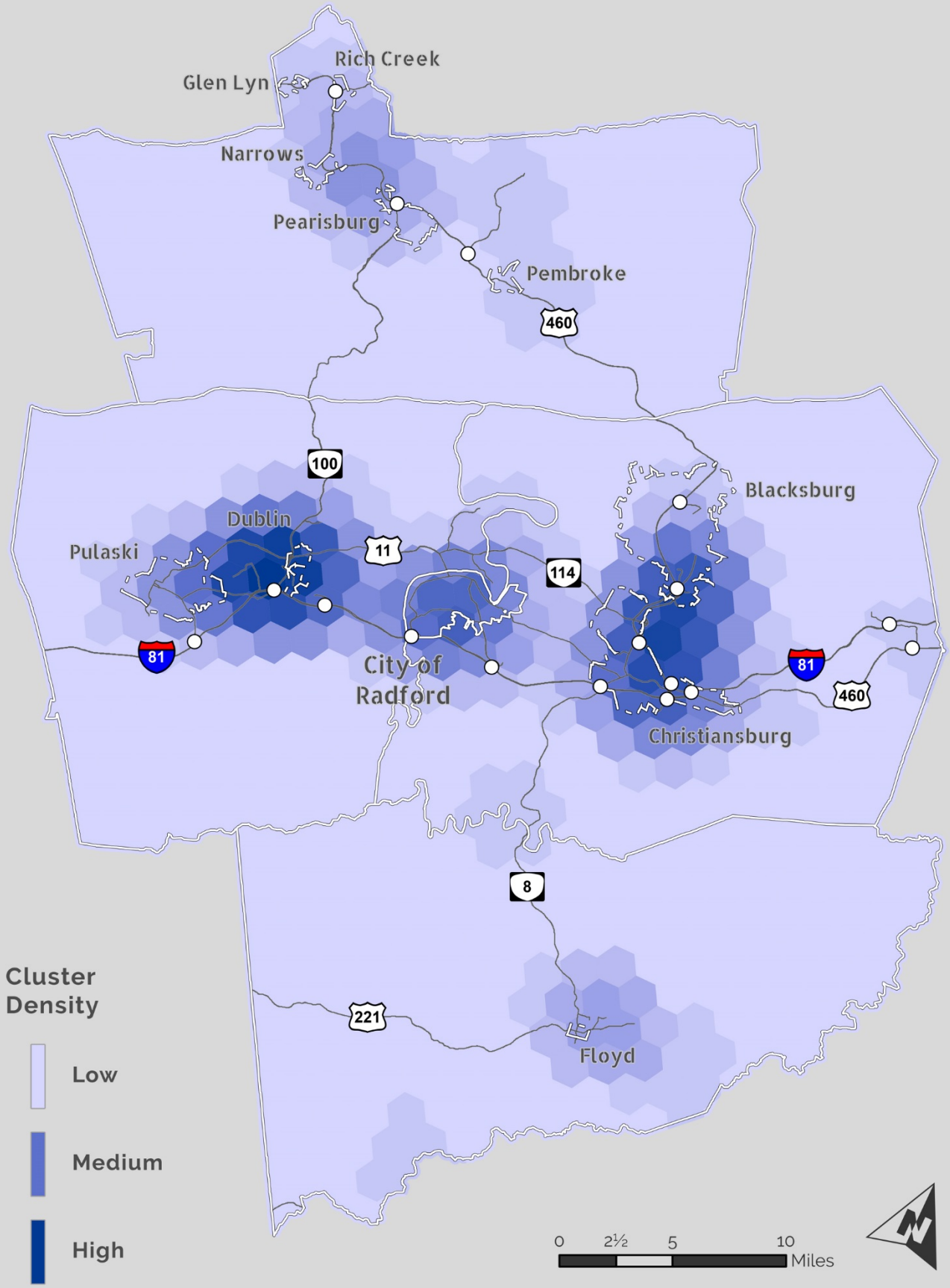
Existing Modal Profile Summary

The New River Valley is situated within the greater Appalachian region. The mountainous territory creates challenges for larger and heavier modes of freight movement. Trucks experience challenges maintaining speeds over steep vertical grades. Rail corridors often follow prominent tributaries located at the base of mountains, creating limited space to provide longer and smoother horizontal curves that allow trains to move faster. In general, rail and air transport offer the most untapped potential in the region.

Around 45% of all regional exports and imports are bound to or from points west.

Approximately 90% of all freight tonnage in the Salem District is attributed to trucks, 10% rail, and less than 1% air. Empty truck movements between payload origins accounts for a significant portion of local freight activity. In the New River Valley, General Freight (or empty movements) account for nearly 15% of all import trips and more than 25% of all export trips. On average, the region exports freight around 400-miles or less to the north, south, and eastern parts of the United States. Western exports average significantly longer haul distances, between 700 and 900-miles. Surprisingly, around 45% of all NRV exports and imports are bound to or from points west. While the New River Valley attracts/imports more freight trips and tonnage, the region exports freight of higher value.

Major Freight Clusters



Created by the NRVRC, 2018. Sources: City of Radford; Floyd County; Giles County; Google Maps; Montgomery County; Pulaski County; U.S. Census Bureau; Virginia Geographic Information Network.

FUTURE MODAL PROFILES

Each day, approximately 13,500 miles of the US highway system slows below the posted speed limit and an additional 8,700 miles experience stop-and-go conditions.[12] By 2040, nearly 30,000 miles of the nation's busiest highways could be clogged on a daily basis. As freight demand grows across all modes, more opportunities for mode interaction is needed to reduce daily bottlenecks.

Statewide there are a number of capital and social issues that directly affect the delivery of goods movement throughout the Commonwealth. The 2014 *Virginia Multimodal Freight Plan* identified the following freight issues:

- In the off-peak periods, much of Virginia's highway system has excess capacity, apart from work-zone related delays.
- The trucking industry faces challenges associated with driver shortages, difficulty meeting driver hour of service requirements, and adequate truck parking in urban areas.
- Making sure that Virginia's freight rail system is modern and has sufficient capacity to meet demand is critical to maintaining a balanced freight transportation system.
- Maintaining and improving rail connections facilitates the movement of international shipping containers between the marine terminals and inland destinations and are critical to port accessibility.
- Continued investment in rail facilities, including short-line connections and terminals, can expand options for shippers and help shift freight to other modes.
- Coordinated land use and transportation system investments can also improve the efficiency and connectivity of the freight network.
- The Commonwealth must continue to exercise all available programs and leverage public-private partnerships opportunities to meet the backlog of needs and growing freight demand.

Improvements to the freight network are typically expensive. Therefore, identifying new dedicated funding resources will be critical at both national and state levels. In addition to infrastructure needs, the *National Freight Plan* projects that annual job openings are 68% larger than the number of students who are completing educational programs for selected transportation occupations.

[12] National Freight Strategic Plan. 2016. US Department of Transportation, 1200 New Jersey Ave., Washington, DC 20590.

Base and Forecast Year Comparisons

Overall, freight export value in the New River Valley is expected to grow more than 70%, from $6.3B to $10.9B, by 2040. While there is no guaranteed way to predict future freight generators, growth is not anticipated across all sectors. IHS Transearch data is intended to be a planning tool to help strategic transportation planning initiatives to analyze freight flows by origin, destination, commodity, and transport mode.

Transearch provides forecast of freight movement over a 30-year horizon utilizing economic, trade, and industry modeling. Primary shipment data is obtained from many of the nation's largest freight carriers to develop base-year information. Several industries are expected to grow, and a few new industries are projected to enter the top five list (shown below).

Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing (NAICS 334511) is projected to have the highest growth in export value. Semiconductor and Related Device Manufacturing (NAICS 334413) and Pharmaceutical Preparation Manufacturing (NAICS 325412) are both new top imports.

Table 12: Export Value – Base and Forecast Year Comparison

Rank	2012 Industry Description	Change (%)	Change (%)	2040 Industry Description
1	Heavy Duty Truck Manufacturing	-83%	+1,365%	Search, Detection, Navigation System Manufacturing
2	Cellulosic Organic Fiber Manufacturing	-59%	+73%	Explosives Manufacturing
3	Explosives Manufacturing	+73%	+102%	Auto & Light Duty Motor Vehicle Manufacturing
4	Relay and Industrial Control Manufacturing	-64%	+318%	Gypsum Product Manufacturing
5	Automobile and Light Duty Motor Vehicle Manufacturing	+102%	-83%	Heavy Duty Truck Manufacturing

Table 13: Import Value – Base and Forecast Year Comparison

Rank	2012 Industry Description	Change (%)	Change (%)	2040 Industry Description
1	Warehousing & Storage	+67%	+67%	Warehousing & Storage
2	Petroleum Refineries	+48%	+48%	Petroleum Refineries
3	Gasoline Engine & Engine Parts Manufacturing	-81%	new	Semiconductor & Related Device Manufacturing
4	Other Engine Equipment Manufacturing	-52%	+11%	Other Basic Organic Chemical Manufacturing
5	Other Basic Chemical Manufacturing	+11%	new	Pharmaceutical Preparation Manufacturing

There are some prominent overage gaps in truck shipments of non-manufactured goods that are not filled in the Transearch dataset. Gaps include: raw forestry and fisheries products, household goods, and haulage of waste and scrap. In addition, empty truck movements between payload origins accounts for a significant portion of local freight activity. Empties are accounted for separately in Transearch data, and documented as General Freight Trucking. In the New River Valley, General Freight (or empty movements) account for nearly 30% of all export trips.

In general, Transearch quantifies freight movement differently than the Freight Analysis Framework (FAF). FAF utilizes a Commodity Flow Survey as the foundation for calculating individual truck movements. Transearch builds base-year freight data annually, starting from county and industry specific levels. In general, Transearch calculates up to two freight movements (production to warehouse and warehouse to final destination).

Lime Manufacturing (NAICS 327410) is projected to have the highest growth in total export trips. No substantial differences are anticipated regarding total import trips.

Table 14: Export Trips – Base and Forecast Year Comparison

Rank	2012 Industry Description	Change (%)	Change (%)	2040 Industry Description
1	General Freight Trucking	+20%	+20%	General Freight Trucking
2	Explosives Manufacturing	0%	0%	Explosives Manufacturing
3	Gypsum Product Manufacturing	0%	+104%	Lime Manufacturing
4	Misc. Chemical Product & Preparation Manufacturing	+26%	0%	Gypsum Product Manufacturing
5	Motor & Generator Manufacturing	+2%	+26%	Misc. Chemical Product & Preparation Manufacturing

Table 15: Import Trips – Base and Forecast Year Comparison

Rank	2012 Industry Description	Change (%)	Change (%)	2040 Industry Description
1	General Freight Trucking	0%	0%	General Freight Trucking
2	Recyclable Material Merchant Wholesalers	+1%	+3%	Construction Sand & Gravel Mining
3	Construction Sand & Gravel Manufacturing	+3%	+1%	Recyclable Material Merchant Wholesalers
4	Petroleum Refineries	+1%	+1%	Petroleum Refineries
5	Warehousing & Storage	0%	0%	Warehousing & Storage

National freight flows remain complex to estimate due to a lack of a unified data source. Transearch supplements proprietary data with samples provided by cooperating carriers. Transearch and FAF report similar ton-mileage; however, construction, retail, services and household goods, and business sectors are excluded in Transearch calculations. As a result, higher tonnages are potentially reported in mining, quarrying, products, agriculture, and scrap.

The Regional Commission met one-on-one with local economic development professionals to improve data accuracies. Adjustments included reassigning industries to appropriate local origin (i.e. Radford Army Ammunition Plant moved from Radford to Pulaski) and removing high estimates in agriculture (i.e. removing Hay Farming from the top freight generator lists).

Gypsum Product Manufacturing (NAICS 327420) and Lime Manufacturing (NAICS 327410) are projected to grow substantially in export tonnage. Multiple raw aggregate materials are projected to have the highest import tonnage growth.

Table 16: Export Tonnage – Base and Forecast Year Comparison

Rank	2012 Industry Description	Change (%)	Change (%)	2040 Industry Description
1	Crushed & Broken Limestone Mining and Quarrying	-98%	+321%	Gypsum Product Manufacturing
2	Gypsum Product Manufacturing	+321%	+72%	Explosives Manufacturing
3	Explosives Manufacturing	+72%	+35%	Crushed & Broken Granite Mining and Quarrying
4	Ready-Mix Concrete Manufacturing	-3%	+1,365%	Search, Detection, Navigation System Manufacturing
5	Heavy Duty Truck Manufacturing	-82%	+226%	Lime Manufacturing

Table 17: Import Tonnage – Base and Forecast Year Comparison

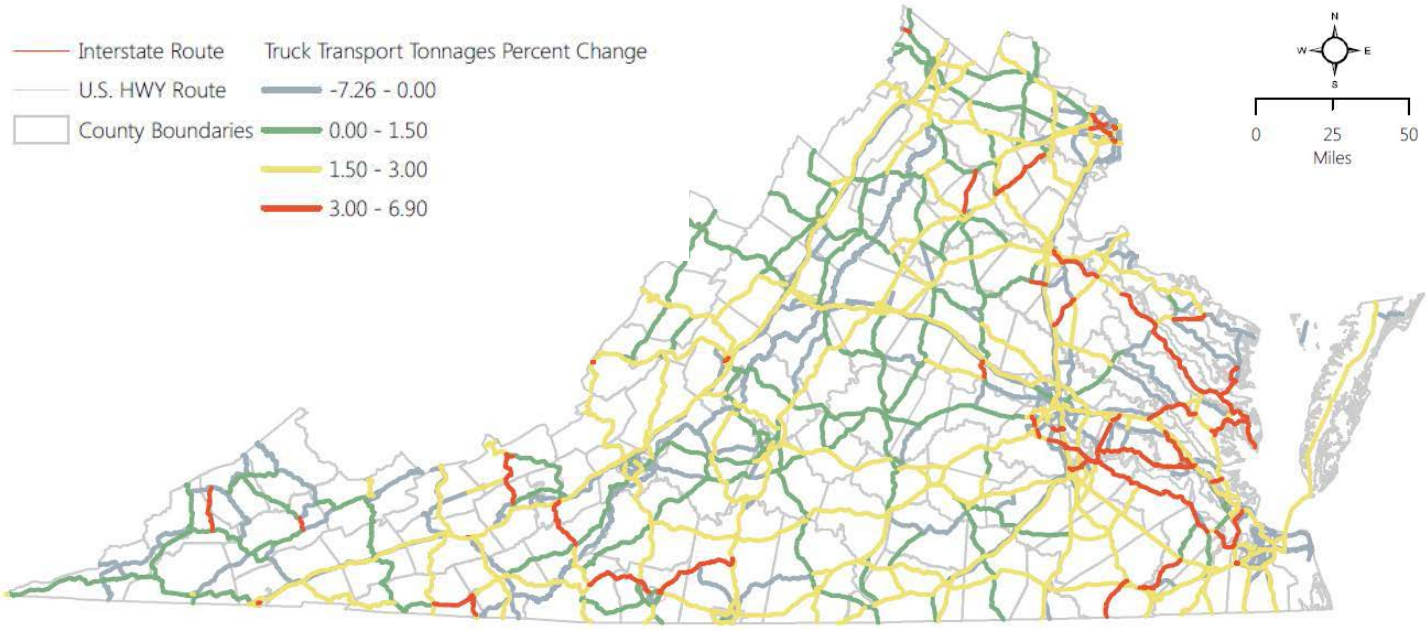
Rank	2012 Industry Description	Change (%)	Change (%)	2040 Industry Description
1	Crushed & Broken Limestone Mining and Quarrying	+202%	+202%	Crushed & Broken Limestone Mining & Quarrying
2	Crushed & Broken Granite Mining & Quarrying	+194%	+194%	Crushed & Broken Granite Mining & Quarrying
3	Construction Sand & Gravel Mining	+182%	+182%	Construction Sand & Gravel Mining
4	Warehousing & Storage	+69%	+208%	Other Crushed & Broken Stone Mining & Quarrying
5	Other Crushed & Broken Stone Mining & Quarrying	+208%	+69%	Warehousing & Storage

Projected Truck Freight

Truck freight will remain the most essential mode for moving freight in the New River Valley. Nationally, the number of vehicle miles traveled per serious injury or fatality incident (that involves a truck) remains low. Less than 2% of the New River Valley's fatal accidents between 2011 and 2017 involved a truck.

Bottlenecking conditions in the New River Valley relate to speed-based delays due to topography, highway weaving areas, and lane width. Other parts of Virginia experience capacity-based bottlenecks related to excess traffic volumes. Nation-wide additional bottlenecks are also frequently caused by non-recurring circumstances including: traffic incidents, bad weather, and work zones. In general, the region's freight network is very reliable. However, truck traffic can drop well below 60% of the posted speed limit on Interstate 81 and US Route 460 in certain segments. In addition, the lack of a parallel network causes substantial delays when accidents occur on either CoSS.

According to the *Virginia Statewide Rail Plan*, truck increased tonnage percentages are projected to be highest along VA Primary Route 100 (in Giles and Pulaski counties) and VA Primary Route 8 (in Montgomery and Floyd counties). The map below illustrates the anticipated change between 2012 and 2040.



Map 7: Truck Tonnage Change 2012 – 2040. Source: 2017 Virginia Statewide Rail Plan

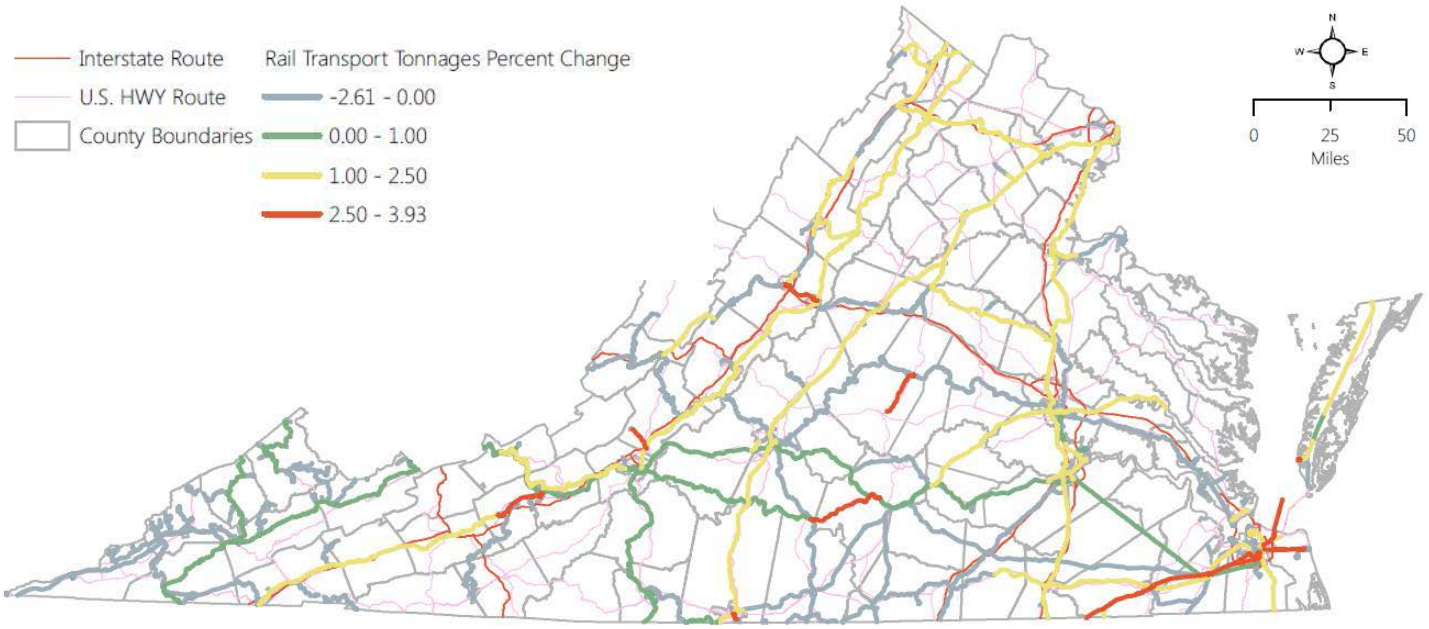
While both VA Primary Route 8 and VA Primary Route 100 are likely capable of accommodating additional freight capacity, the intersections with Interstate 81 will likely need evaluation. Interchanges at Exit 98 and Exit 114 may need reconfigured to meet growing freight traffic demand. Other key trucking freight nodes include: Interstate 81 Exits 109 and 118; and US Route 460 Exits 2 and 5AB.

Projected Rail Freight

Rail freight access continues to be an opportunity for several existing businesses and developable industrial manufacturing parcels in the region. Nationally, about one-third of all rail-related fatalities involved highway-rail conflict point crashes.[13] The majority remain due to trespassing pedestrians and railroad workers.

Many segments across the U.S. are also facing difficulties accommodating speed increases and maximizing freight volume. While Virginia's largest freight tonnage generator, coal, has drastically declined, rail freight is projected to double nation-wide. Maintaining system reliability will be a national priority so that rail remains a viable option for large volume, longer-haul distribution.

According to the *Virginia Statewide Rail Plan*, rail increased tonnage percentages are projected to be highest along Norfolk Southern's Crescent Corridor, between the Town of Pulaski and the City of Radford. The map below illustrates the anticipated change between 2012 and 2040.



Map 8: Rail Tonnage Change 2012 – 2040. Source: 2017 Virginia Statewide Rail Plan

Norfolk Southern's north/south Crescent Corridor is well equipped to handle additional capacity, with the potential exception of single track segments. Despite the decline of coal shipments from deep Southwest Virginia counties, the corridor is anticipated to see about a 4% growth in parts of the region. In order to retain reliability, Norfolk Southern may need to partner with statewide and regional stakeholders to explore options for track redundancy and/or highway intersection improvements. The community should also re-evaluate the potential of an intermodal facility somewhere in the region.

[13] National Cooperative Freight Research Program, NCFRP. 2011. *NCFRP Report 10, Performance Measures for Freight Transportation.*

Projected Freight Alternatives

As freight traffic continues to increase on America's highways and rail corridors, other modes and technologies may have greater influence on meeting demand forecasts. Air, pipeline, rail intermodal facilities, and autonomous vehicles are some concepts that could impact the New River Valley.

Air Cargo

According to the 2011 *Virginia Airport System Economic Impacts Study*, the New River Valley's airports directly or indirectly impact about 140 jobs, more than $3.5 million in payroll, and more than $15 million economic activity. Air cargo currently is used most by machine parts industries; however, a few emerging sectors currently utilize air transport in Europe. Additional sectors include precision instruments (61% value by air) and pharmaceuticals (36% value by air).[14] In addition, Red Sun Farms, the largest greenhouse company in North America, may utilize the airport for perishable product distribution.

The United States Bureau of Transportation Statistics estimates that domestic and international air cargo tonnage will grow from 10 million tons in 2012 to 37 million tons by 2045. Over the same time period, total value of air cargo will grow more than 300%.[15] While the region may not move a significant portion of the Commonwealth's air cargo, both volume and value should increase through the 2040 planning horizon. Regional partners may want to reassess the potential benefit of a US Customs Officer.

Pipelines

Pipelines are currently utilized to transport oil, natural gas, and petroleum products. According to the US Department of Transportation, pipelines moved an estimated 1.9 billion tons of oil and natural gas in 2011. Pipelines are also utilized locally to transport water and sewer, and also serve as conduit for underground utilities and other communications.

Currently, there are a limited number of larger (natural gas) pipelines in the New River Valley. One of the region's largest employers, Celanese, has a dedicated natural gas line to fuel production boilers from West Virginia. The improvement converted the previously coal-fired technology to fuel the factory. A proposed 303-mile system from northwest West Virginia to southern Virginia, will begin construction in the Spring of 2018. Known as the Mountain Valley Pipeline, the 42-inch diameter natural gas pipeline alignment will encroach parts of Giles and Montgomery counties.

According to the US Department of Transportation, gas is distributed through more than 1.2 million miles of pipeline in America. Slightly more than 50% of all pipeline was installed after 1990. Gas demand has grown about 10% since 2005.

[14] IATA, Developing Trade Consultants. Value of Air Cargo: Air Transport and Global Value Chains, Table 2a, Proportion of EU imports by value coming by air, 2014, case study sectors. 2016.
[15] US Department of Transportation, Bureau of Transportation Statistics. 2017. Retrieved from: https://www.bts.gov/bts-publications/freight-facts-and-figures/freight-facts-figures-2017-chapter-2-freight-moved

Intermodal Facilities

Ninety percent of the world's freight is transported by sea. Tankers and bulk carriers are designed to haul the most freight tonnage and container ships carry higher-value goods. Container ships carry twenty-foot equivalent units (TEUs) that can be transported double-stacked on rail or individually by truck. In the late 1980s, 4,500 TEU ships were common. In 2013, the first 18,000 TEU container ship was put into service.[16] Increasing volumes of containers arriving at the Port of Virginia (POV) will necessitate diversity in freight mode distribution. Containers transported from coastal ports to rail can help to address trucking bottlenecks.

Intermodalism will become an important component of the supply chain, to support growing freight demand, low cost container shipments, and maintain system reliability. Intermodal transportation creates options for integrating multiple modes of freight movement, and provides a flexible response to the changing supply chain.[17] Rail is an extremely efficient component of intermodal transport. In 2008, the Virginia Department of Rail and Public Transportation identified a potential intermodal facility in Montgomery County.

Freight can travel 200 miles more per day than a single-driver truck service.

A potential Western Virginia Intermodal Facility, located in the village of Elliston, would operate 4,000 to 15,000 annual lifts and directly impact 330 jobs.[18] The facility would likely be used by local firms to access a larger domestic region. The project once estimated to cost $35.5 million has now increased to $71 million.

Trains are typically used for long-haul shipments; however, it is becoming more common for trains to haul as short as 500 miles. Railroads have increased spending to upgrade infrastructure and technology. The investments have improved travel speed and now a rail service can travel more than 200 more miles per day than a single-driver truck service.[19] Due to the close proximity of a potential intermodal facility in Elliston and the POV, the facility may not be used to transfer high volumes of international freight.

Situated on nearly 1,600 acres, the Port of Virginia is the deepest water harbor on the East Coast. The port can accommodate up to 50-foot deep berths and offers 173,595 linear feet of on-dock rail. The port currently provides connections to 200+ countries around the world.[20] Growing populations will continue to increase cargo demand, beyond what the current port facilities can support.

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[16] Citylab. A Complete Guide to the Future of US Freight Movement. Dan Glass. 2014. Retrieved from: https://www.citylab.com/life/2014/10/a-complete-guide-to-the-future-of-us-freight-movement/381012/

[17] Committee on Intermodal Freight Transport. Intermodal Freight Transportation. Retrieved from: http://onlinepubs.trb.org/onlinepubs/millennium/00061.pdf

[18] AECOM, Roanoke Valley, Alleghany Regional Commission. Western Virginia Intermodal Facility: Economic and Transportation Impacts Study, Final Report. 2015.

[19] LoadDelivered. All Aboard: Intermodal is the Mode of the Future. 2014. Retrieved from: https://www.loaddelivered.com/blog/all-aboard-intermodal-is-the-mode-of-the-future/

[20] The Port of Virginia. 2065 Master Plan, Executive Summary. 2016.

Autonomous Vehicles

According to the World Economic Forum, autonomous vehicles will have an unprecedented economic, social and environmental change and will bring about a transformative impact on the automotive industry.[21] This new trend of transportation will alter land use, roadway patterns and infrastructure (signage, sensors, and tolls facilities).

Some car manufactures have already started selling cars with some level of self-driving capabilities such as adaptive cruise control, automatic emergency braking, automated parking and active lane control.[22] The National Highway Safety Administration (NHTSA) adopted the SAE International definitions for levels of automation. SAE International is a global association of more than 128,000 engineers and related technical experts in the aerospace, automotive and commercial-vehicle industries. The association was formerly also known as the Society of Automotive Engineers. Their definition for terms related to automated vehicles range in levels from no driving automation (level 0) to full driving automation (level 5).[23]

Virginia promotes autonomous vehicle innovation by reducing regulatory roadblock.

In Virginia, there are currently no state regulations that have been adopted to regulate procedures and conditions for testing of autonomous vehicles. Virginia's position to not add additional regulation is considered advantageous as it reduces regulatory roadblock for companies testing autonomous vehicles and promotes innovation.[24] The State, in cooperation with the Virginia Tech Transportation Institute, has turned 78 miles of express lanes along I-495 and I-95, and segments of I-66, U.S. 29, and U.S. 234 into what is called the Virginia Automated Corridors.

Seven companies announced that their respective autonomous model will be ready for market by 2020.[25] In March of 2017, Volvo Trucks and their partners, University of California, Berkley and California Department of Transportation, conducted a demonstration of partially automated truck platooning. In this case two trucks drove semi-autonomously, within close distance and controlled by a skilled professional driver. The trucks had forward looking sensors and vehicle to vehicle wireless communications that helped maintain the speed and spacing without driver intervention.[26]

[21] The Driverless Car Revolution. World Economic Forum.

[22] Autonomous Vehicles: Are You Ready for the New Ride? - MIT Technology Review.

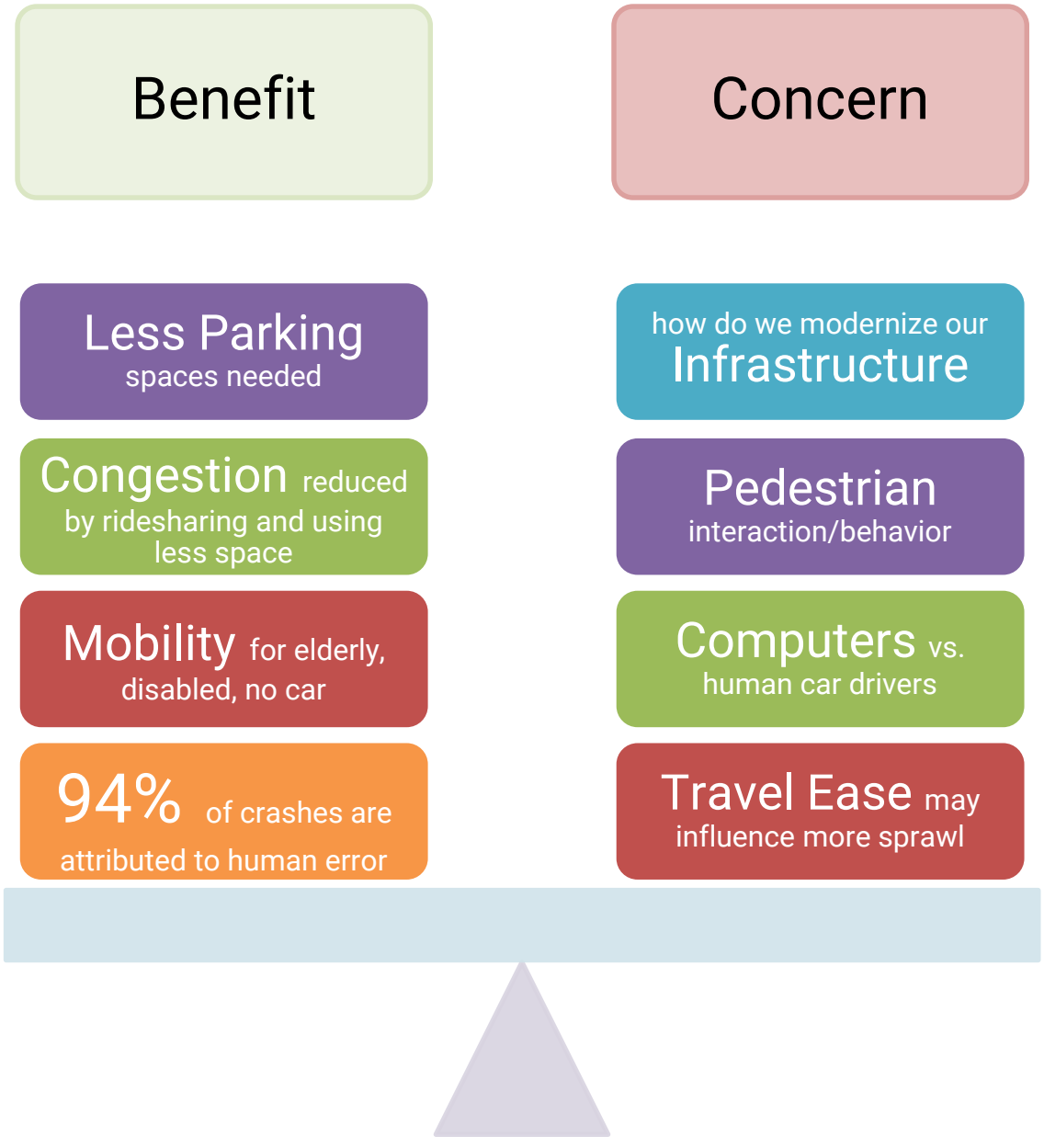
[23] Federal Automated Vehicles Policy. US Department of Transportation and National Highway Traffic Safety Administration.

[24] The Washington Post. This state wants to usurp California as the capital of driverless cars. Michael Laris.

[25] City of the Future. Technology and Mobility – National League of Cities.

[26] Volvo Trucks USA. 2017. Retrieved from: https://www.volvotrucks.us/news-and-stories/press-releases/2017/march/volvo-trucks-successfully-demonstrates-on-highway-truck-platooning-in-california/

Planning for the future is imperative to the successful integration of autonomous vehicles in every community. Beginning with transportation and land use plans, communities should anticipate potential impacts and examine ways to incorporate new technology into existing infrastructure. Autonomous vehicles may reduce surface parking and traffic signal needs, potentially reduce travel lane widths, and create more space for businesses and alternative transportation enhancements. The table (below) illustrates some additional benefits and concerns of future autonomous vehicle integration.



FREIGHT TRANSPORTATION SYSTEM REVIEW

The regional freight system offers capacity to accommodate a growing population and increased demand for goods. However, the need to remain competitive in a growing economy is hindered by aging infrastructure and increasing through-traffic volume. Capacity challenges already exist on Interstate 81 and Norfolk Southern has several segments of rail that lack a parallel line.

The U.S. economy is projected to double in size over the next 30 years.[27] The United States Department of Transportation (USDOT) estimates that all modes of freight will grow roughly 42% by year 2040. By mode, freight tonnage is anticipated to grow 35% (truck), 49% (rail), 32% (waterborne), and 263% (air). For this reason, States and MPOs are urged to take the initial steps in freight planning, by selecting the most appropriate freight performance measures. USDOT and the Virginia Office of Intermodal Planning and Investment recommended performance categories include:

1. Safety
2. Maintenance and preservation
3. Mobility, reliability, and congestion
4. Accessibility and connectivity
5. Environment
6. Economic vitality
7. Coordination of freight transportation and land use

23 Code of Federal Regulations Part 490 describes the performance period, reporting requirements, and timeline for establishing performance measures. The role of the New River Valley Metropolitan Planning Organization (NRVMPO) is to support national goals in the planning process and consider measures and targets to incorporate in to long range plans and programs.

Table 1: Performance Measure Implementation Schedule

Measure	Effective Date	State Target Date	MPO Target Date	Planning Inclusion
Safety (PM1)	14 April 2016	Complete	Complete	27 May 2018
Pavement/Bridge (PM2)	20 May 2017	20 May 2018	17 October 2018	20 May 2019
System (PM3)	20 May 2017	20 May 2018	17 October 2018	20 May 2019

[27] National Freight Strategic Plan, 2017 Draft for Public Comment. US Department of Transportation.

New River Valley Critical Freight Network

The New River Valley's critical freight network includes highways identified as Corridors of Statewide Significance (CoSS) and regional significance, key intersections of regional networks to CoSS (labeled as nodes), Norfolk Southern's Crescent and Heartland corridors, and the New River Valley Airport. Combined, the region's critical network comprises a multimodal freight system that moves goods within the New River Valley and across the nation.

Undoubtedly, more freight passes thru the region in route to other parts of the country each day via truck, rail, and air. Statewide, almost 80% of Virginia's freight tonnage has an origin or destination in another state. Virginia's multimodal freight system handled around 385 million tons of freight (excludes 41% pass-through). The New River Valley accounts for slightly more than 1% of Virginia's freight tonnage movement, with an origination or destination in Virginia.

The New River Valley's critical freight network includes highways, rail, and air.

More than 20% of Virginia's rail network is located in the New River Valley. Around 99 million tons of rail freight tonnage (excluding pass-through) was generated in 2004 by Virginia. Due to insufficient data, the NRV share of rail tonnage and/or value is unknown. In general, the full potential of rail is underutilized in the region. The presence of two significant Class 1 corridors presents future opportunities for the region.

Nearly 60% of all air cargo tonnage is shipped to Dulles International Airport and 80% when combined with Richmond International Airport. The New River Valley accounts for less than a half-percent of statewide air cargo tonnage. By comparison, the Roanoke-Blacksburg Regional Airport accounts for slightly less than 8% of air cargo. While the New River Valley Airport is still designated as a US Port of Entry, no on-site Customs Clearance personnel exists southwest of Richmond. In addition, neither the New River Valley nor Roanoke-Blacksburg airports have cargo warehouse storage for distributors. 2040 projections appear encouraging for air cargo, and could necessitate both regions to explore potential staff and capital needs.

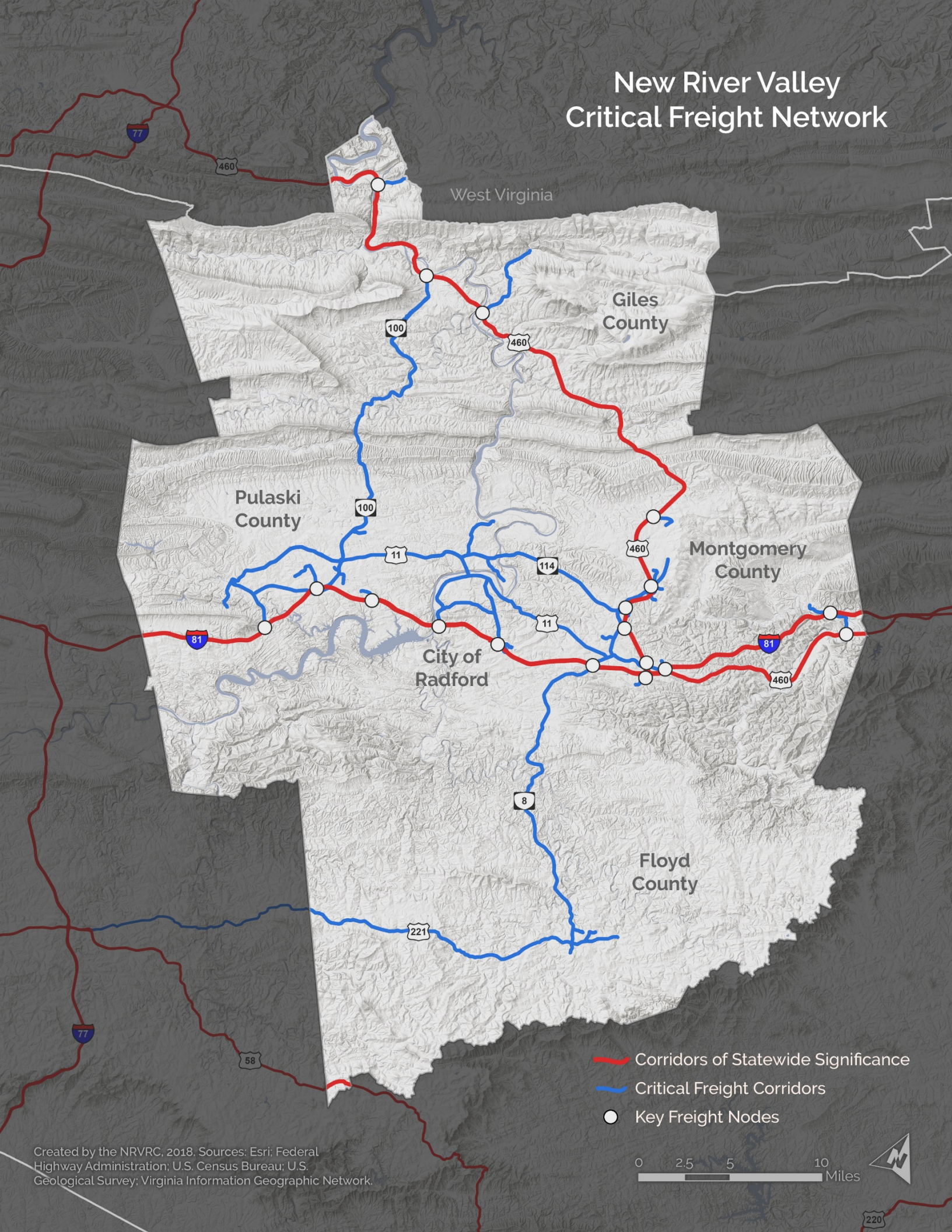
This section provides an inventory of the region's critical freight network, observations from the MPO's Technical Advisory Committee (ideas, insights, and barriers), and recommendations for the National Highway Freight Network.

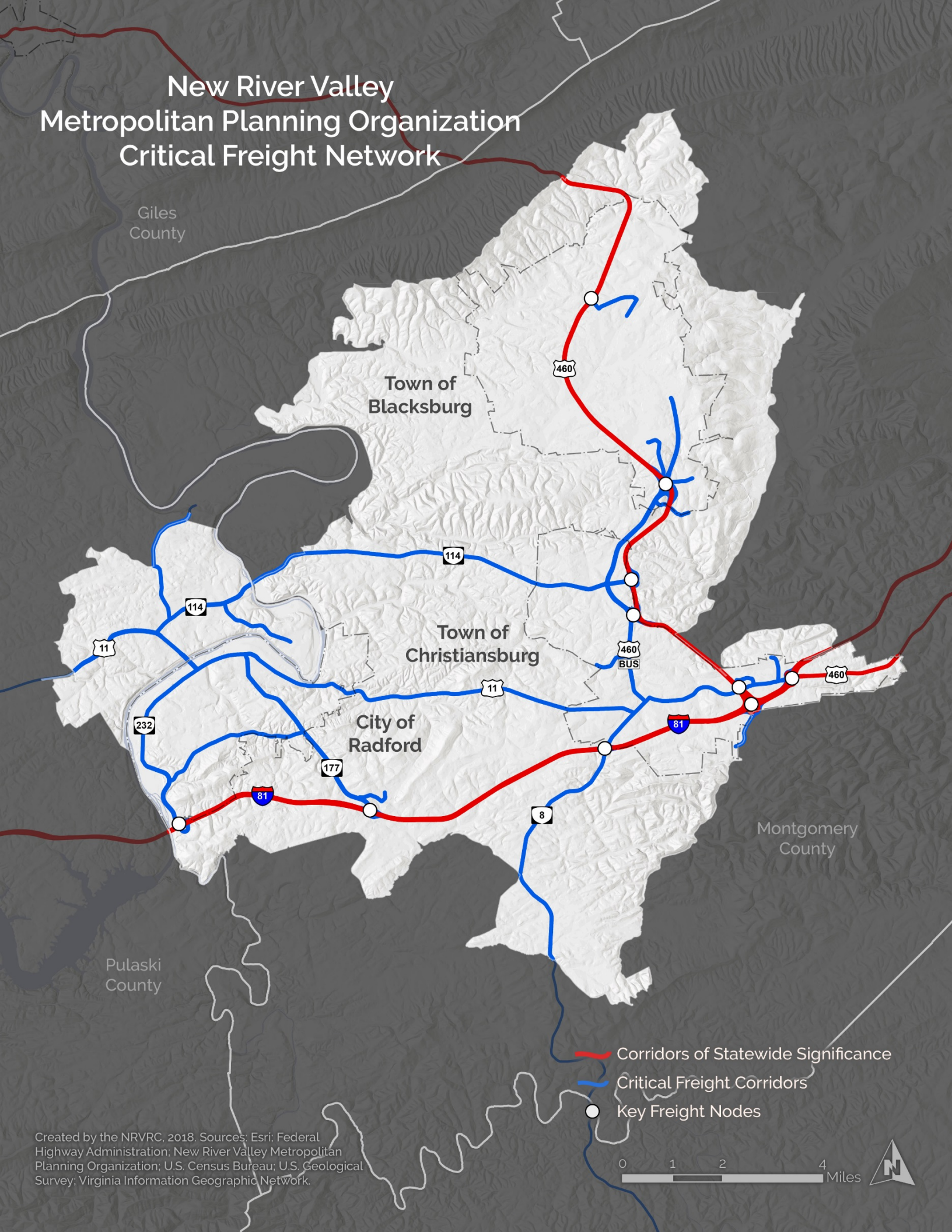
Table 18: New River Valley Critical Freight Network, Segments1-Mile or More

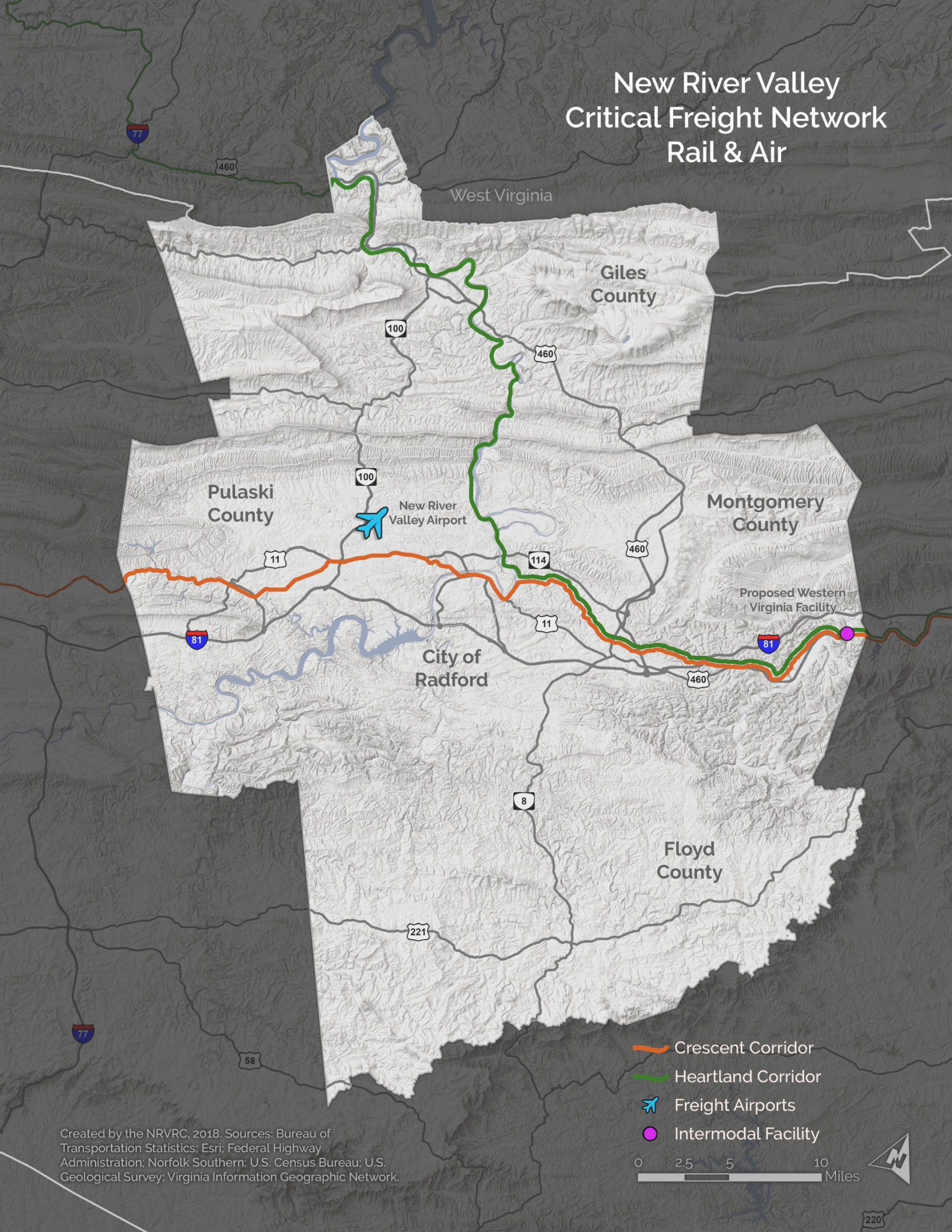
Route Number	Segment Name	Primary Jurisdictions	Start	End	Length (miles)
460	U.S. Route 460	Giles County, Montgomery County	West Virginia-Giles County Line	I-81 (Christiansburg)	44.2
81	U.S. Interstate Route 81	Montgomery County, Pulaski County, Radford	Wythe County-Pulaski County Line	Montgomery County-Roanoke County Line	43.0
11/460	U.S. Route 11	Montgomery County, Pulaski County, Radford City	Pulaski Army National Guard (Pulaski County)	Montgomery County-Roanoke County Line	42.2
100/ 460 BUS	State Route 100	Giles County, Pulaski County	I-81 Exit 98 (Pulaski County)	N Main St-Virginia Ave (Pearisburg)	22.0
8	State Route 8	Montgomery County, Floyd County	Rt 11 (Christiansburg)	Storkers Knob Rd (Floyd County)	21.0
221	U.S. Route 221	Floyd County	Carroll County-Floyd County Line	Shooting Creek Rd SE (Floyd County)	18.6
114	State Route 114	Montgomery County, Pulaski County	Rt 11 (Pulaski County)	Rt 460 (Montgomery County)	10.2
460 BUS	U.S. Route 460 Business	Montgomery County	Ellett Road and Hubbard St (Blacksburg)	Route 11 (Christiansurg)	6.8
635	Big Stony Creek Rd	Giles County	Lhoist North American-Kimballton (Giles County)	Rt 460 (Giles County)	5.3
177	State Route 177	Montgomery County, Radford	Rt 11 (Radford City)	I-81 Exit 109 (Montgomery County)	4.2
232	State Route 232	Montgomery County, Radford	Rt 11 (Radford City)	I-81 Exit 105 (Montgomery County)	4.0
99	State Route 99	Pulaski County	W Main St/Third St NW (Pulaski)	I-81 Exit 94 (Pulaski County)	3.6
603	N Fork Rd	Montgomery County	Northside of the railline (Montgomery County)	Rt 11/460 (Giles County)	3.3
4652	Rock Rd	Radford	Rt 232 (Radford City)	Rt 177 (Radford City)	3.1
611	Bobwhite Blvd	Pulaski	Rt 99 (Pulaski)	Newbern Rd (Pulaski County)	2.1
219	U.S. Route 219	Giles County	Rt 460 (Rich Creek)	Giles County-West Virginia Line	1.7
643	Cougar Trail Rd	Pulaski County	Pepperell Way (Pulaski County)	Newbern Rd (Pulaski County)	1.7
623	Gate Ten Rd	Pulaski County	RAAP (Pulaski County)	Belspring Rd (Pulaski County)	1.7
679	Viscoe Rd	Pulaski County	Rt 114 (Pulaski County)	End of the road (Pulaski County)	1.6
58	U.S. Route 58	Floyd County	Carroll County-Floyd County Line	Floyd County-Patrick County Line	1.6
611	Newbern Rd	Pulaski County	Bobwhite Blvd (Pulaski)	Cleburne Blvd (Pulaski County)	1.5
600	Belspring Rd	Pulaski County	Gate Ten Rd (Pulaski County)	Rt 114 (Pulaski County)	1.2
812	Pepperell Way	Pulaski County	End of the road (Pulaski County)	Cougar Trail Rd (Pulaski County)	1.1
1416	Parkway Dr	Montgomery County	I-81 (Christiansburg)	Technology Dr (Christiansburg)	1.0
314	Research Center Dr	Blacksburg	Kraft Dr SW (Blacksburg)	Rt 460 (Blacksburg)	1.0

Table 19: New River Valley Critical Freight Network, Segments Less Than 1-mile

Route Number	Segment Name	Primary Jurisdictions	Start	End	Length (miles)
165	Patrick Henry Dr NW	Blacksburg	Toms Creek Rd (Blacksburg)	N Main St (Blacksburg)	0.8
790	International Blvd	Pulaski County	Rt 100 (Pulaski County)	End of the road (Pulaski County)	0.8
	Scattergood Dr NW	Christiansburg	End of the road (Christiansburg)	Rt 460 BUS (Christiansburg)	0.8
FR47	Cleburne Blvd	Pulaski County	Newbern Rd (Pulaski County)	I-81 Exit 98 (Pulaski County)	0.7
1097	Dublin Park Rd	Dublin	Rt 100 (Dublin)	Reserve Way (Pulaski County)	0.7
600	Mud Pike	Montgomery County	Rt 177 (Montgomery County)	Turman Lumber Company (Montgomery County)	0.7
748	Parkview Rd	Floyd County	Rt 8 (Floyd County)	Needmore Ln NE (Floyd County)	0.7
643	Yellow Sulphur Rd	Montgomery County	Rt 460 BUS (Blacksburg)	Jennelle Rd (Montgomery County)	0.6
615	Christiansburg Pike	Floyd County	Commerce Center Dr NE	Rt 221 (Floyd County)	0.6
	Industrial Dr NE	Christiansburg	End of the road (Christiansburg)	Rt 11 (Christiansburg)	0.5
	Industiral Park Rd	Blacksburg	Rt 460 BUS (Blacksburg)	Commerce St (Blacksburg)	0.5
611	Wilderness Rd	Pulaski County	Holston River Quarries (Pulaski County)	State Park Rd (Pulaski County)	0.5
660	State Park Rd	Pulaski County	Wilderness Rd (Pulaski County)	I-81 Exit 101 (Pulaski County)	0.4
460 BUS	N Main St	Blacksburg	Giles Rd (Blacksburg)	Patrick Henry Dr (Blacksburg)	0.4
460 BUS	N Main St-Virginia Ave	Pearisburg	N Main St-Virginia Ave (Pearisburg)	Rt 460 (Giles County)	0.4
806	Commerce Center Dr NE	Floyd County	Christiansburg Pike (Floyd County)	End of road (Floyd County)	0.3
	Electric Way NE	Christiansburg	Bell Rd NE (Christiansburg)	Simmons Rd NE (Christiansburg)	0.3
	Industiral Park Rd	Pearisburg	Rt 100 (Giles County)	End of the road (Pearisburg)	0.3
824	Shaedawn Park Way	Pulaski County	End of the road (Pulaski County)	Rt 100 (Dublin)	0.3
	Toms Creek Rd	Blacksburg	Rt 460 (Blacksburg)	Patrick Henry Dr (Blacksburg)	0.3
642	Jennelle Rd	Montgomery County	Yellow Sulphur Rd (Montgomery County)	Acco Stone (Montgomery County)	0.2
	Simmons Rd	Christiansburg	Electric Way NE	Rt 11 (Christiansburg)	0.1


New River Valley
Critical Freight Network
West Virginia
Giles
County
Pulaski
County
Montgomery
County
City of
Radford
Floyd
County
77
460
100
11
114
81
8
221
58
220
Corridors of Statewide Significance
Critical Freight Corridors
Key Freight Nodes
0
2.5
5
10
Miles
Created by the NRVRC, 2018. Sources: Esri; Federal Highway Administration; U.S. Census Bureau; U.S. Geological Survey; Virginia Information Geographic Network.


New River Valley
Metropolitan Planning Organization
Critical Freight Network
Giles
County
Town of
Blacksburg
460
114
114
11
Town of
Christiansburg
460
BUS
460
11
232
City of
Radford
81
81
177
8
Montgomery
County
Pulaski
County
Corridors of Statewide Significance
Critical Freight Corridors
Key Freight Nodes
Created by the NRVRC, 2018. Sources: Esri; Federal Highway Administration; New River Valley Metropolitan Planning Organization; U.S. Census Bureau; U.S. Geological Survey; Virginia Information Geographic Network.
0
1
2
4
Miles
N


New River Valley
Critical Freight Network
Rail & Air
West Virginia
Giles
County
Pulaski
County
New River
Valley Airport
Montgomery
County
Proposed Western
Virginia Facility
City of
Radford
Floyd
County
77
460
100
460
100
11
114
460
81
11
81
460
8
221
77
58
220
Crescent Corridor
Heartland Corridor
Freight Airports
Intermodal Facility
0
2.5
5
10
Miles
Created by the NRVRC, 2018. Sources: Bureau of Transportation Statistics; Esri; Federal Highway Administration; Norfolk Southern; U.S. Census Bureau; U.S. Geological Survey; Virginia Information Geographic Network.

FREIGHT SYSTEM IDEAS, INSIGHTS, AND BARRIERS

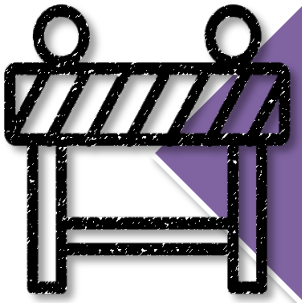
A general overview of infrastructure condition, capacity, and accessibility performance measures.

Ideas

planned intermodal facility ● accomodate more traffic volume on I-81 ● decrease adverse impacts to business corridors that also serve as a detour route ● decrease demand for locality emergency services related to truck breakdowns ● increase job opportunities for local truck drivers● grow technology and agriculture industries

Insights

good access to underutilized rail ● undeveloped land adjacent to primary roadway and rail corridors ● lack of bulk manufacturing decreases importance of rail



Barriers

lack of east-west interstate in the region ● lack of passenger rail ● ensure cohesion on regional economic development efforts

NATIONAL HIGHWAY FREIGHT NETWORK RECOMMENDATIONS

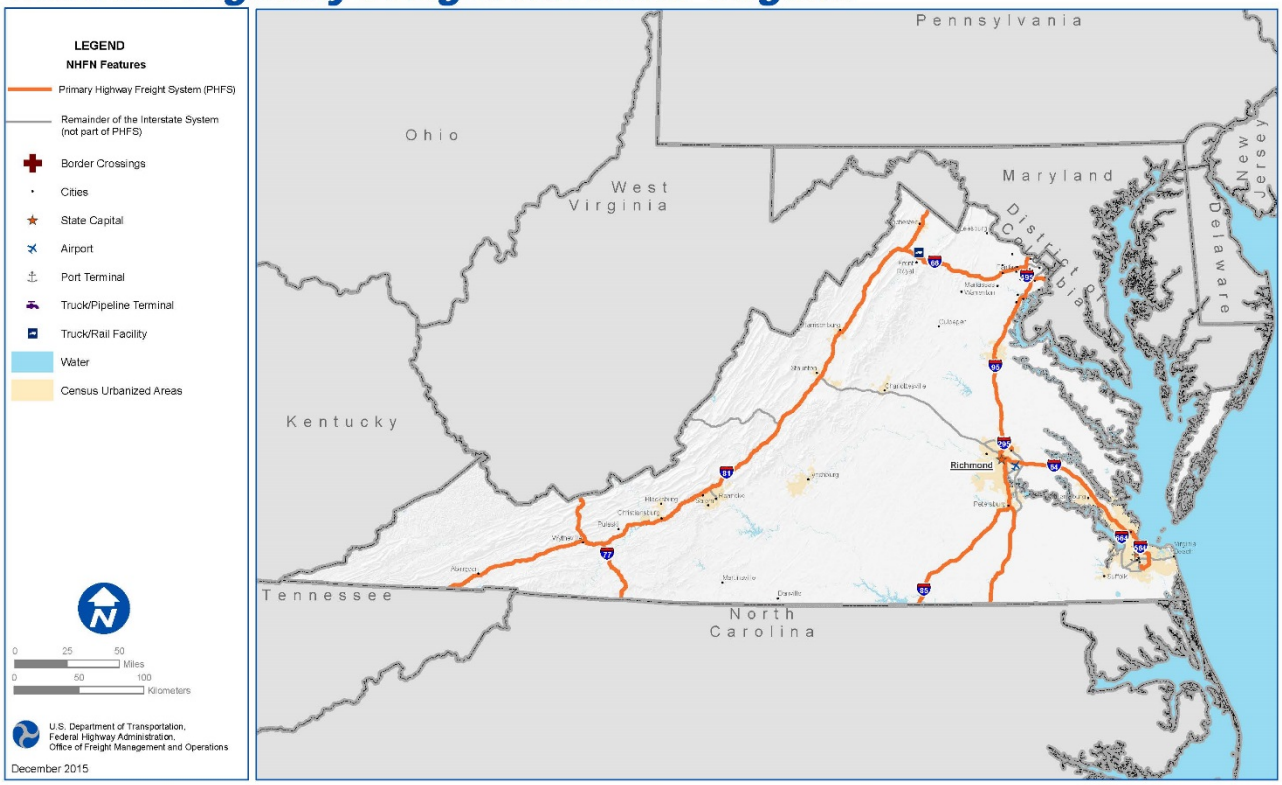
The Fixing America's Surface Transportation Act (FAST Act) repealed the Moving Ahead for Progress in the 21st Century Act (MAP-21), and directed the Federal Highways Administration to establish a National Highway Freight Network.[28] The four key components of the network are: 1) primary highway freight system, 2) other interstate portions excluded from the primary system, 3) critical rural freight corridors, and 4) critical urban corridors. The new network would strategically direct federal resources and policies towards the improved performance of the nation's freight transportation system.

While the New River Valley Freight Plan identifies a regional critical freight network, not all routes are eligible for National Highway Freight Network inclusion. Recommendations are to be formally approved by the Virginia Department of Transportation.

Primary Highway Freight System

The Primary Highway Freight System is a network of highways identified as the most critical highway portions of the United States transportation system. The network consists of 41,518 centerline miles that are determined by measurable and objective data. The Primary Highway Freight System in the New River Valley only includes 43-miles of Interstate 81.

National Highway Freight Network: Virginia



Source: https://ops.fhwa.dot.gov/freight/infrastructure/ismt/state_maps/states/virginia.htm

[28] US Department of Transportation, Federal Highway Administration. Retrieved from: https://ops.fhwa.dot.gov/freight/infrastructure/nfn/index.htm

Recommended Critical Rural Freight Corridors

Virginia may designate a public road as a critical rural freight corridor, if the roadway is located outside of the urbanized area and meets one or more of the following criteria:

- A rural principal arterial roadway and a minimum of 25% of the annual average daily traffic is trucks (vehicle class 8-13).
- Provides access to energy exploration, development, installation, or production areas.
- Connects the primary highway freight system or the interstate system to facilities that handle more than 50,000 20-foot equivalent units or 500,000 tons of bulk commodities annually.
- Provides access to an agricultural facility, grain elevator, mining facility, forestry facility, or an intermodal facility.
- Connects to an international port of entry.
- Provides access to significant air, rail, water, or other freight facilities in the state.
- The State determines the corridor is vital to improving the efficient movement of freight to the economy.

New River Valley's Critical Rural Freight Corridors include the non-urbanized portions of: US Route 11 (Pulaski County, significant freight access), State Route 100 (Pulaski and Giles Counties, significant freight, agriculture facility, and international port of entry), and local Routes 600/Newbern Road (Pulaski County, significant freight) and Route 635/Big Stony Creek Road (Giles County, mining facility).

Recommended Critical Urban Freight Corridors

The National Highway Freight Program provides funding to states that target improving freight movement. On average, Virginia receives $28 million each year in new federal freight formula funds. Roadways designated as a critical urban freight corridor must be located within the urbanized area and meet one or more of the following criteria:

- Connects an intermodal facility to the Primary Highway Freight System, interstate system, or an intermodal freight facility.
- Provides an alternative highway option important to goods movement for a Primary Highway Freight System corridor.
- Serves a major freight generator, logistic center, or manufacturing and warehouse industrial land.
- Important to the movement of freight within the region, as determined by the MPO or State.

New River Valley's Critical Urban Freight Corridors include the urbanized portions of: US Routes 460, 11/460, and US Route 460 Business; State Routes 8, 114, 177, 232. All routes shown on the New River Valley Metropolitan Planning Organization Critical Freight Network Route Map are recommended for inclusion as part of the National Highway Freight Network.