





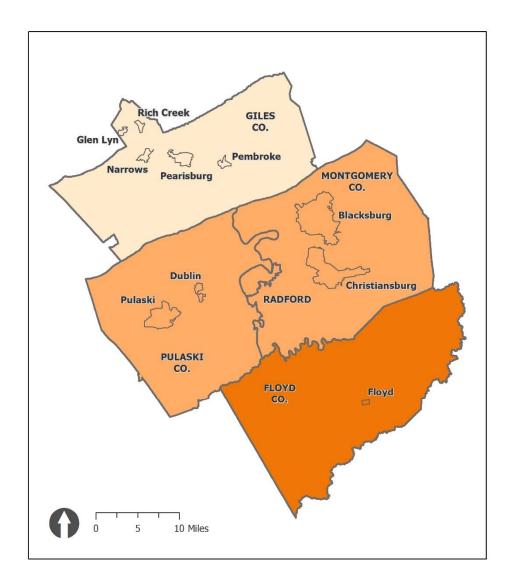






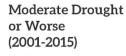
Appendix 6. Maps

Map 1. Average Annual Number of Weeks of Moderate or Worse Drought



Average Annual Number of Weeks of Moderate Drought or Worse

New River Valley



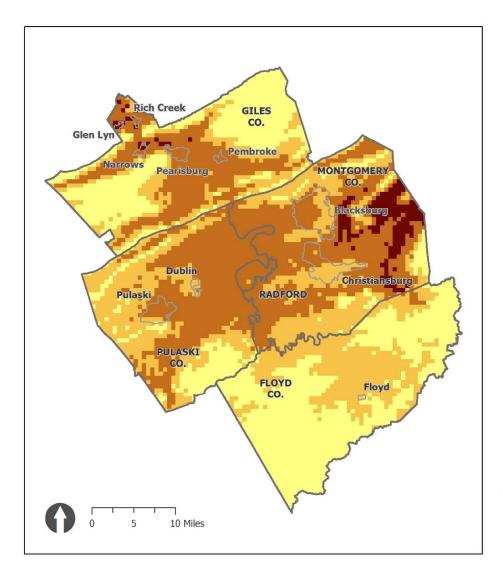




Calculated at a county level. Drought condition determined by a majority of a county's area. Jenks natural breaks distribution.

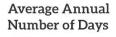
Created by NRVRC, 2017. Sources: National Drought Mitigation Center; National Oceanic and Atmospheric Administration; U.S. Census Bureau; U.S. Department of Agriculture; Virginia Geographic Information Network.

Map 2. Average Annual Days of 90 Degrees or More



Maximum Temperature 90°F or Above (1986-2015)

New River Valley



0 - 4

5 - 9

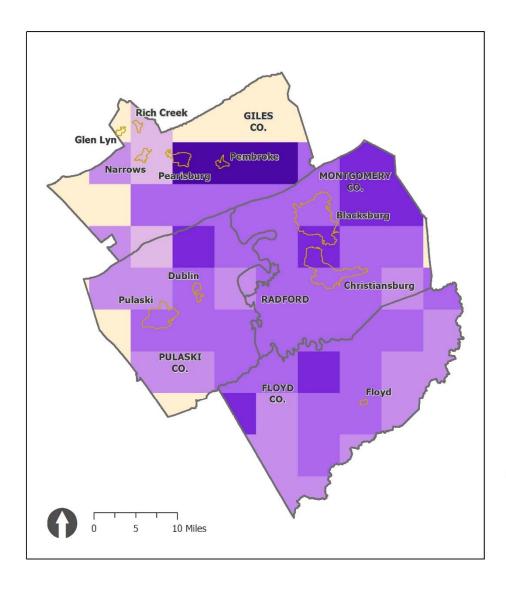
10 - 16

17 - 29

Temperature figures calculated using a logarithmic interpolation based on elevation. Weather stations with less than five years of records were excluded. Jenks natural breaks distribution.

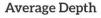
Created by NRVRC, 2017. Sources: National Oceanic and Atmospheric Administration; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

Map 3. NRV Mean Water Well Depths



Mean Water Well Depth

New River Valley



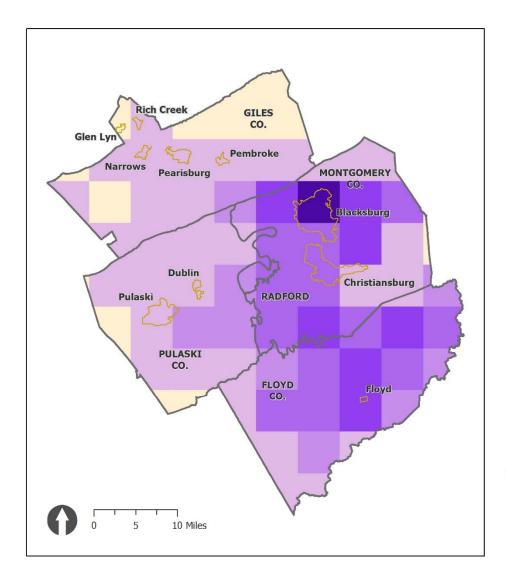


Reflects wells permitted between September 2003 and December 2016. Wells with a null depth value or unrealiable location data were excluded.

1,420 wells included.

Created by NRVRC, 2017. Sources: Google Maps; New River Health Department; U.S. Census Bureau; Virginia Geographic Information Network.

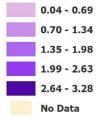
Map 4. NRV Well Density



Well Density

New River Valley

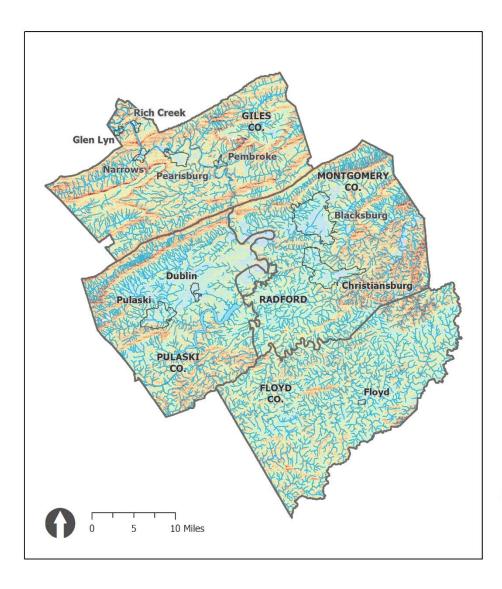
Wells per Square Mile



Reflects new or repaired wells permitted between September 2003 and December 2016. Wells with unrealiable location data were excluded. 1,455 wells included.

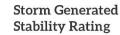
Created by NRVRC, 2017. Sources: Google Maps; New River Health Department; U.S. Census Bureau; Virginia Geographic Information Network.

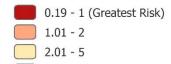
Map 5. Landslide Hazard Rating



Landslide Hazard Rating

New River Valley

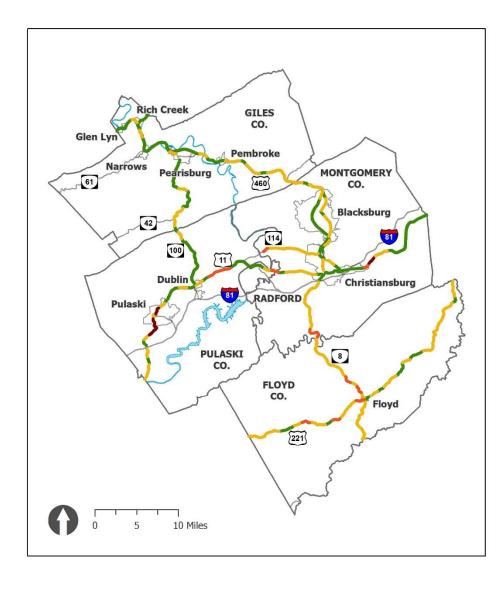






Created by NRVRC, 2017. Sources: Radford University FEMA Research Project Group; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

Map 6. NRV Rockfall Hazard Rating Per Mile



Rockfall Hazard Rating

New River Valley

Rockfall Hazard Rating per Mile

// Low Risk

/// Low-Moderate Risk

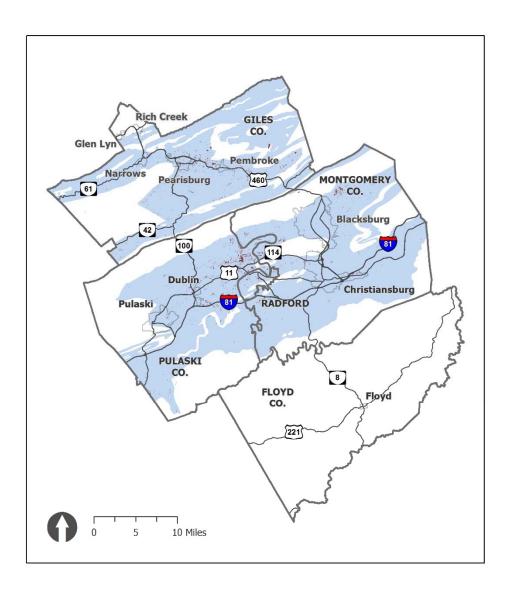
/// Moderate-High Risk

/ Data Not Available

Derived from 2011 Radford University data. Rockfall points joined to road segments within 50 feet. Equal interval distribution.

Created by NRVRC, 2017. Sources: Radford University; U.S. Census Bureau; Virginia Geographic Information Network.

Map 7. NRV Karst Geology



Karst Geology and Sinkholes

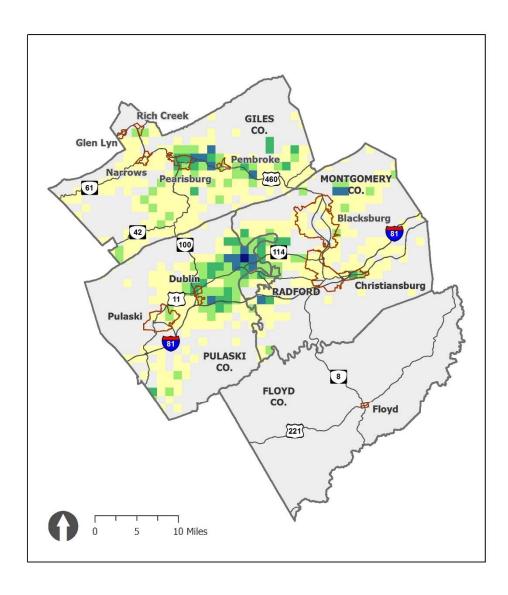
New River Valley

Karst Forming Bedrock

Carbonate Karst
Sinkholes

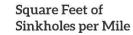
Created by NRVRC, 2017. Sources: U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

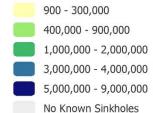
Map 8. Karst Density per Square Feet



Sinkhole Density

New River Valley

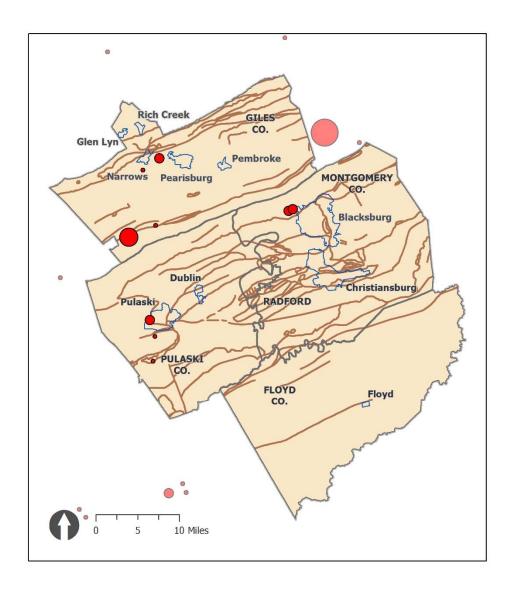




Jenks natural breaks distribution.

Created by NRVRC, 2017. Sources: U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

Map 9. Earthquake History



Earthquakes (1970-2015)

New River Valley

Magnitude

• 2.0 - 2.5

2.6 - 3.0

3.1 - 3.5

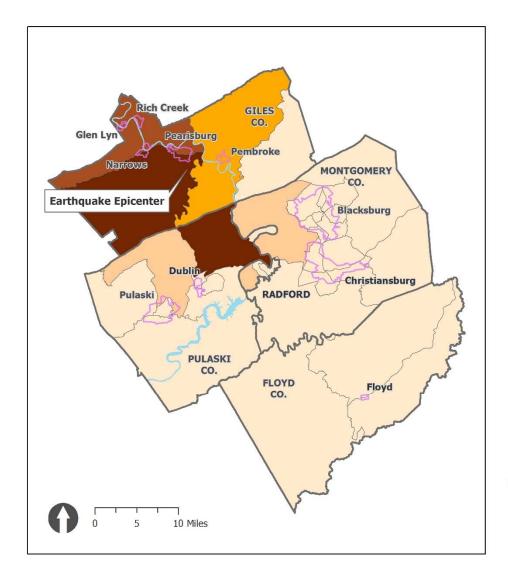
3.6 - 3.8

Faults

Excludes earthquakes with magnitude of less than 2.

Created by NRVRC, 2017. Sources: U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

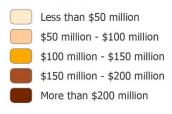
Map 10. NRV 1897 Earthquake Loss Estimates



Major Giles County Earthquake

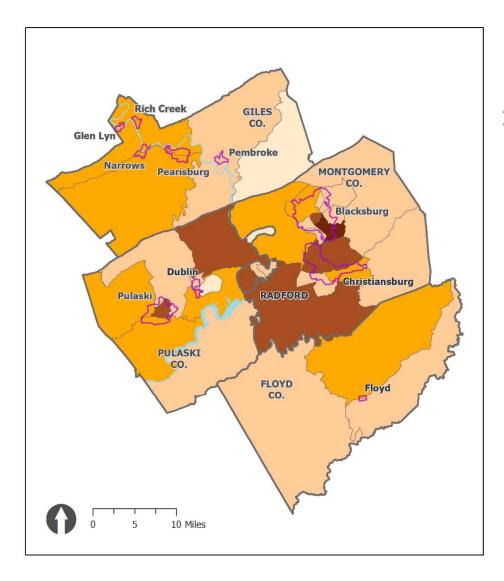
New River Valley

Total Loses in 2010 Dollars



Reflects total estimated direct losses following a geologic event similar to the historic 5.8 magnitude earthquake in Giles County, May 31, 1897. Modeling and loss estimates were calculated using HAZUS MH 3.1.

Map 11. NRV Magnitude 7.0 Earthquake Estimate Annualized Loss



Magnitude 7.0 Earthquake Estimated Annualized Loss

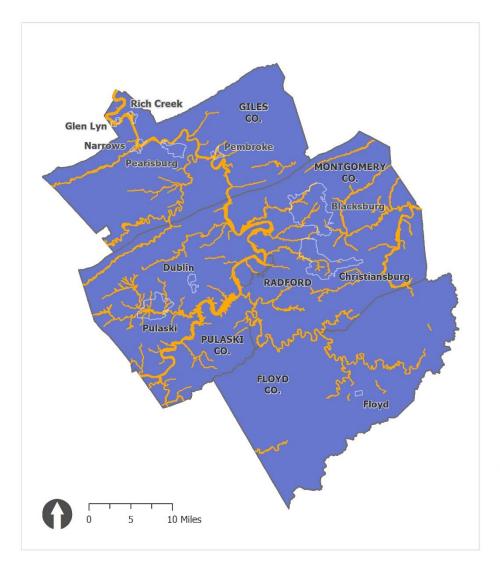
New River Valley

Annualized Loss



Reflects total estimated annualized loss following a probabilistic seismic event. Modeling and loss estimates were calculated using HAZUS MH 3.1.

Map 12. NRV Floodplains



Flood Zones

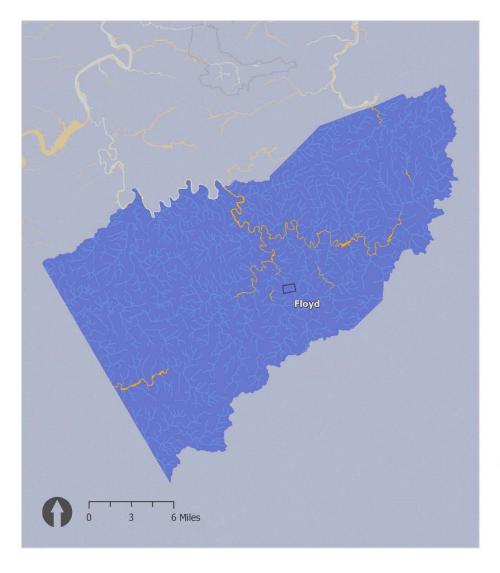
New River Valley

Federal Flood Zones



500-Year or Less Floodplain

Map 13. Floyd County Floodplains



Flood Zones Floyd County

New River Valley



Map 14. Town of Floyd Floodplains



Flood Zones Town of Floyd

New River Valley

Buildings in Flood Zone

Floodway

100-Year Flood Zone

500-Year Flood Zone

----- Hydrology

Map 15. Giles County Floodplains

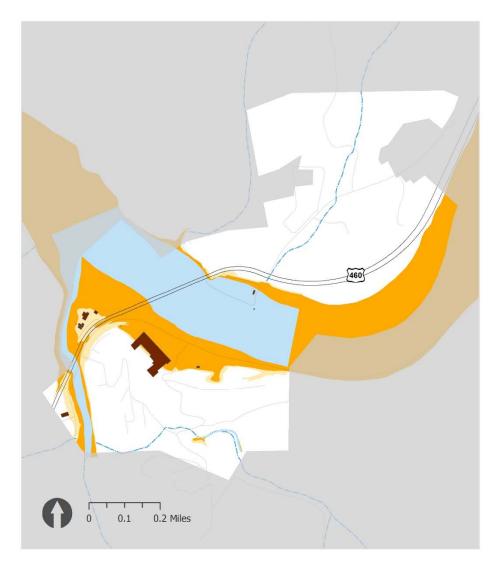


Flood Zones Giles County

New River Valley



Map 16. Town of Glen Lyn Floodplains

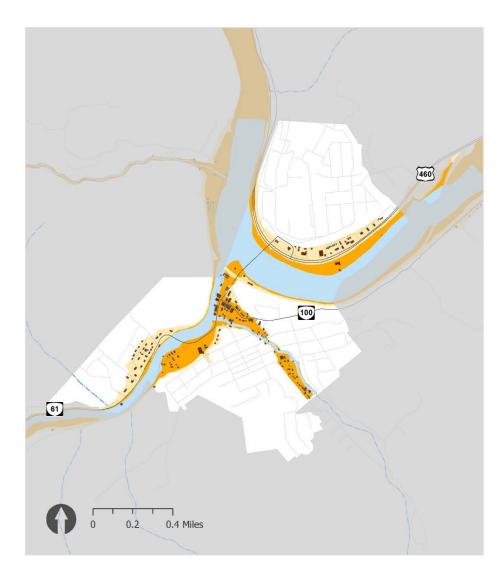


Flood Zones Town of Glen Lyn

New River Valley



Map 17. Town of Narrows Floodplains

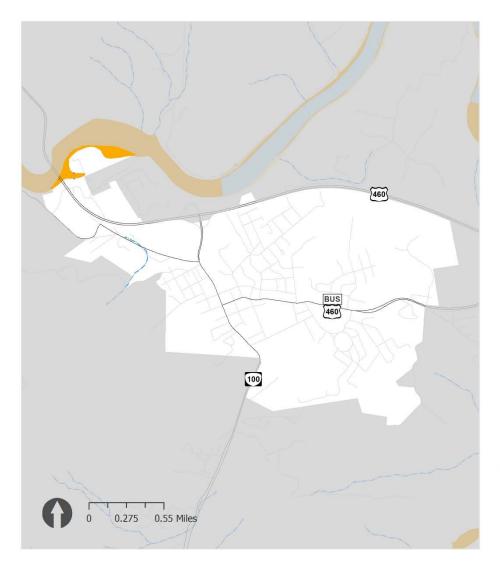


Flood Zones Town of Narrows

New River Valley



Map 18. Town of Pearisburg Floodplains



Flood Zones Town of Pearisburg

New River Valley

Buildings in Flood Zone

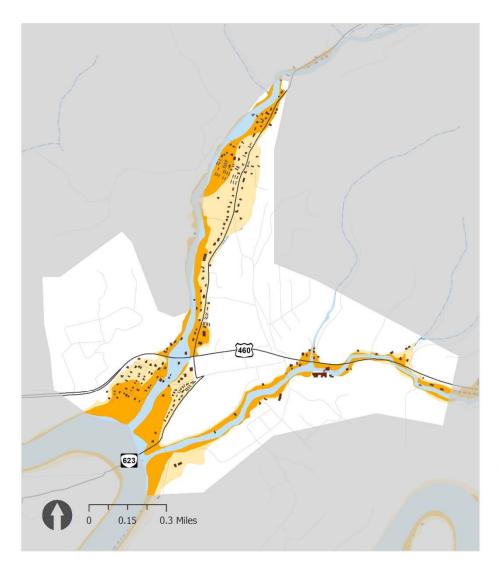
Floodway

100-Year Flood Zone

500-Year Flood Zone

----- Hydrology

Map 19. Town of Pembroke Floodplains

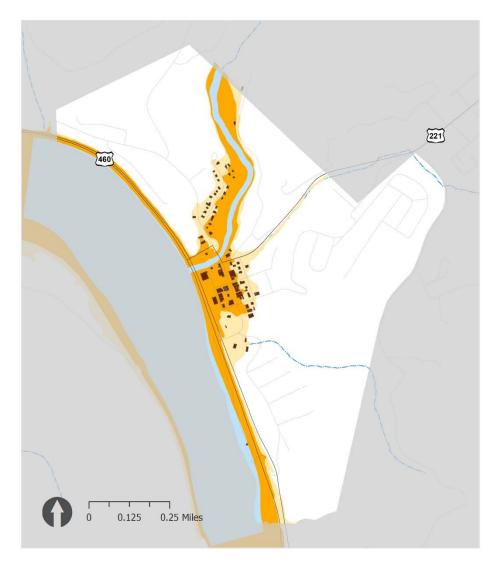


Flood Zones Town of Pembroke

New River Valley



Map 20. Town of Rich Creek Floodplains

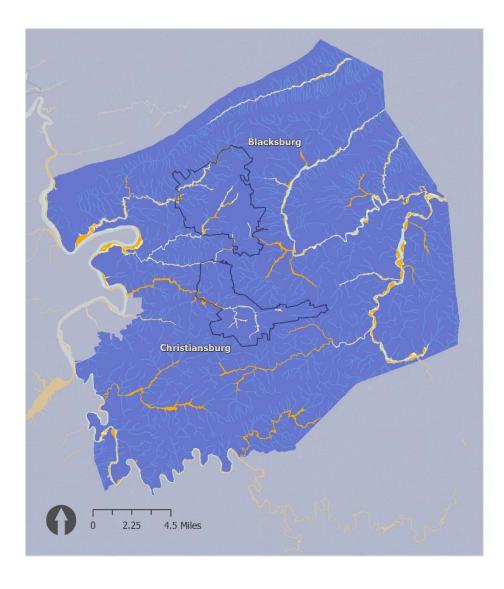


Flood Zones Town of Rich Creek

New River Valley



Map 21. Montgomery County Floodplains

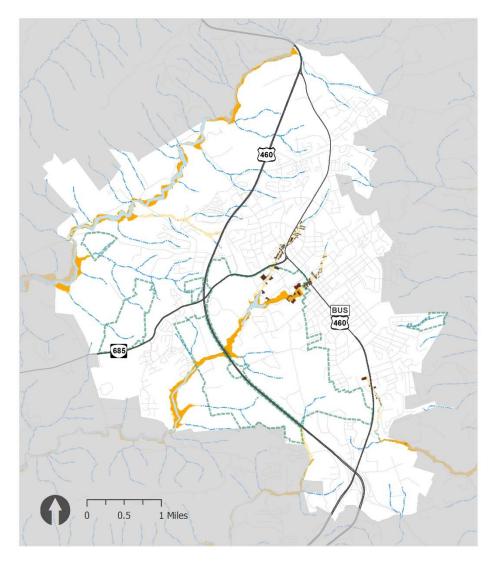


Flood Zones Montgomery County

New River Valley



Map 22. Town of Blacksburg Floodplains



Flood Zones Town of Blacksburg

New River Valley

Buildings in Flood Zone

Floodway

100-Year Flood Zone

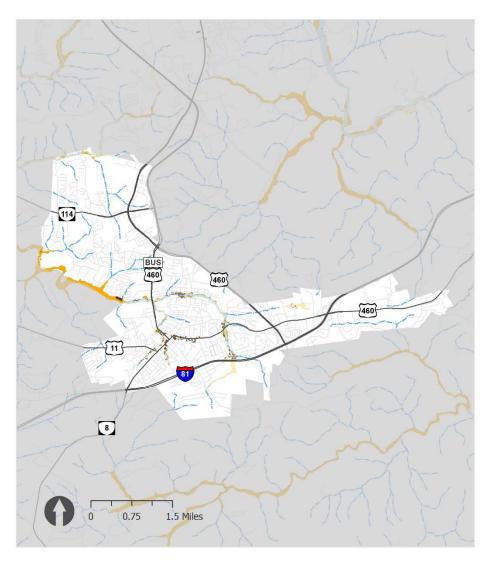
500-Year Flood Zone

----- Hydrology

Virginia Tech

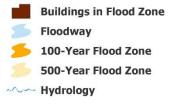
Created by NRVRC, 2017. Sources: Federal Emergency Management Agency; Town of Blacksburg; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network; Virginia Tech.

Map 23. Town of Christiansburg Floodplains

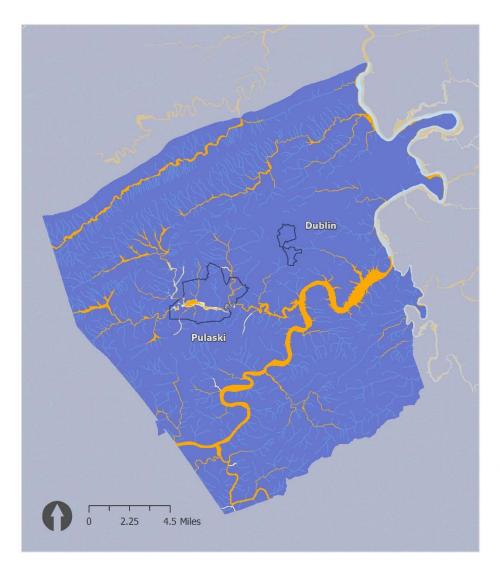


Flood Zones Town of Christiansburg

New River Valley



Map 24. Pulaski County Floodplains

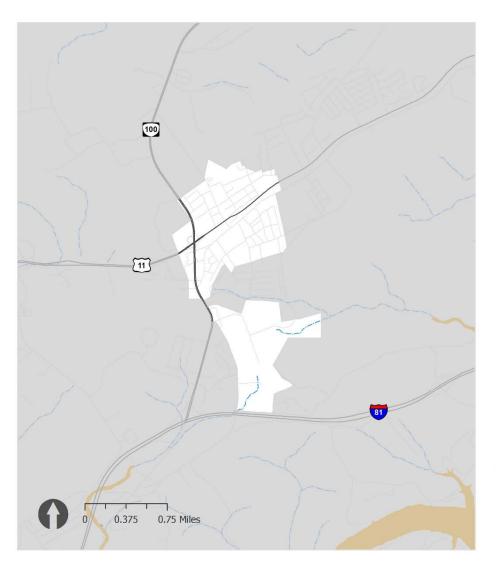


Flood Zones Pulaski County

New River Valley



Map 25. Town of Dublin Floodplains

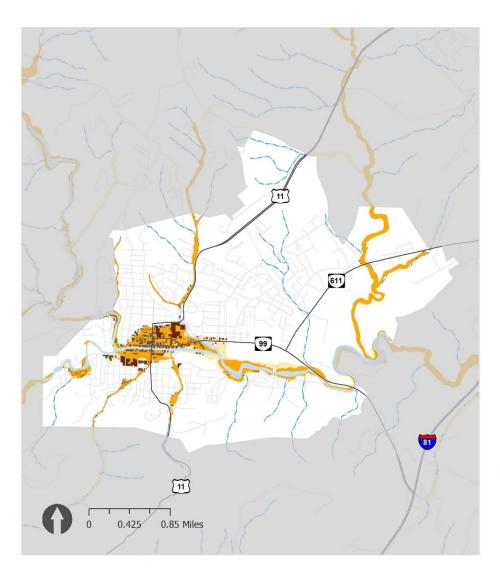


Flood Zones Town of Dublin

New River Valley



Map 26. Town of Pulaski Floodplains

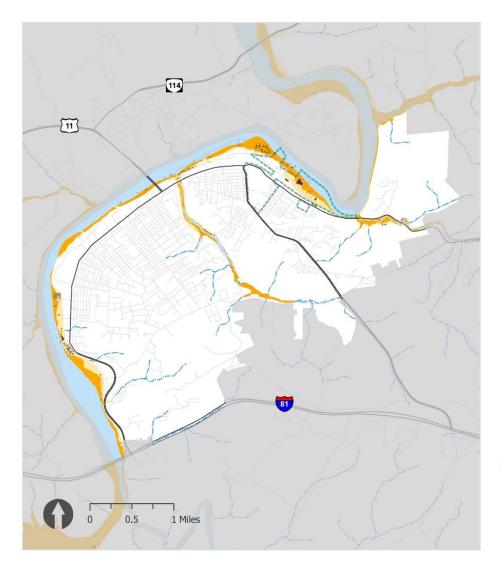


Flood Zones Town of Pulaski

New River Valley



Map 27. City of Radford Floodplains

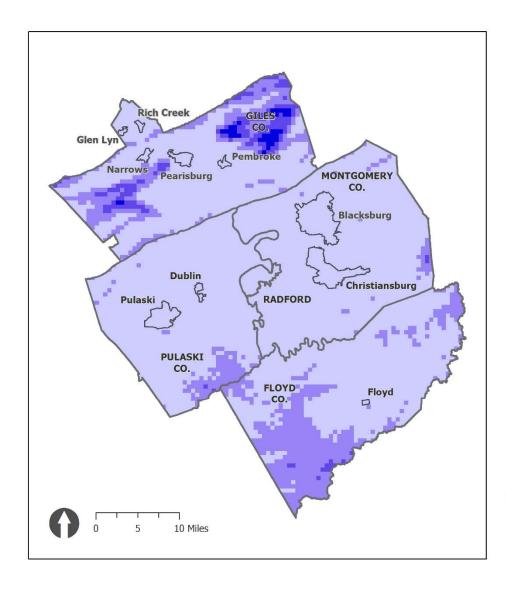


Flood Zones City of Radford

New River Valley



Map 28. NRV Six-inch Snowfalls



Snowfalls of Six Inches or More

New River Valley

Average Annual Number of Days (1986-2015)

0.5 - 1

1.1 - 1.4

1.5 - 1.8

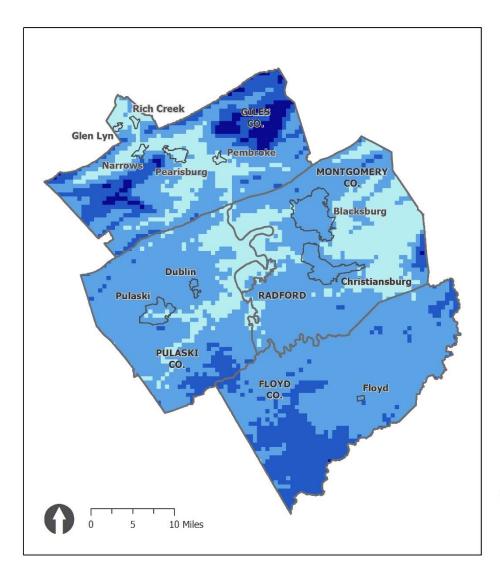
1.9 - 2.2

Snowfall figures calculated using a polynomial interpolation based on elevation classes.

Weather stations with less than five years of records were excluded. Equal interval distribution.

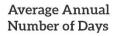
Created by NRVRC, 2017. Sources: National Oceanic and Atmospheric Administration; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

Map 29. NRV Freezing Temperature



Maximum Temperature 32°F or Below (1986-2015)

New River Valley



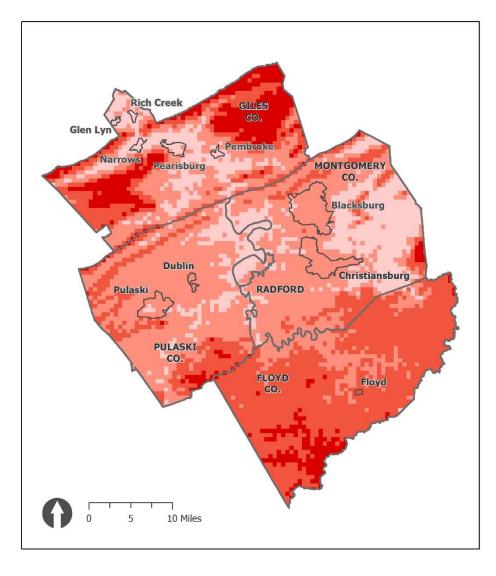


28 - 33

Temperature figures calculated using a linear interpolation based on elevation. Weather stations with less than five years of records were excluded. Equal interval distribution.

Created by NRVRC, 2017. Sources: National Oceanic and Atmospheric Administration; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

Map 30. Warming Winter Weather Trend



Warming Winter Weather: Days with a Maximum Temperature of 32°F or Below

New River Valley

Decrease in Average Annual Number of Days (1960-1987 vs. 1988-2015)

1.1 - 1.7

1.8 - 2

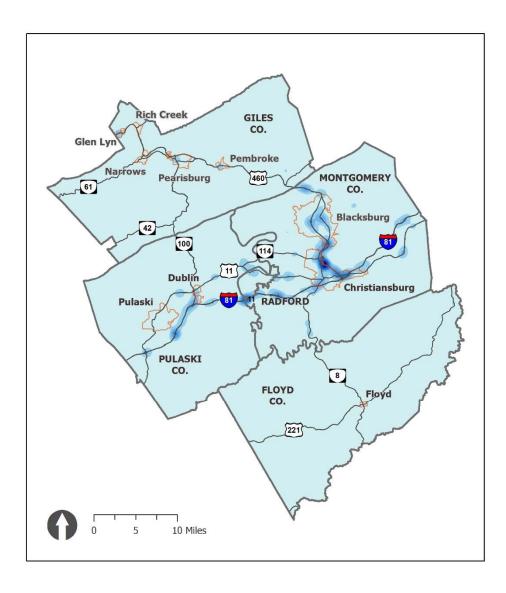
2.1 - 2.5

2.6 - 3.6

Temperature figures calculated using a linear interpolation based on elevation. Weather stations with less than five years of records were excluded. Jenks natural breaks distribution.

Created by NRVRC, 2017. Sources: National Oceanic and Atmospheric Administration; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

Map 31. Winter Weather Crash Density



Winter Weather Crash Density (2010-2014)

New River Valley

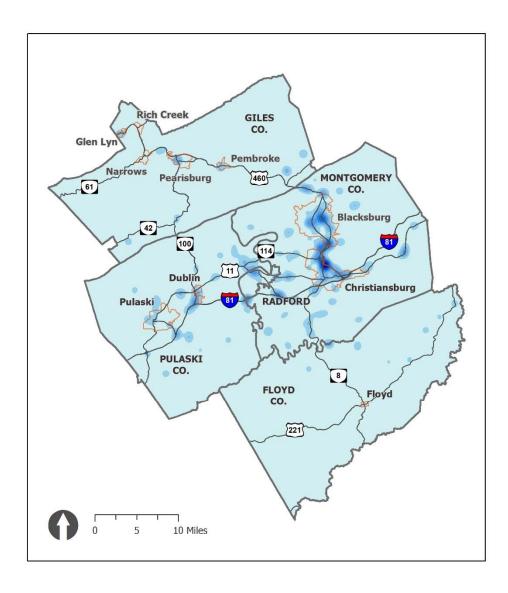
Crash Incident Density



Crash incident occurrence. Kernel density, 1 mile search radius. Equal interval distribution.

Created by NRVRC, 2017. Sources: U.S. Census Bureau; Virginia Department of Transportation; Virginia Geographic Information Network.

Map 32. Winter Weather Crash Density (Normalized)



Winter Weather Crash Density (2010-2014)

New River Valley

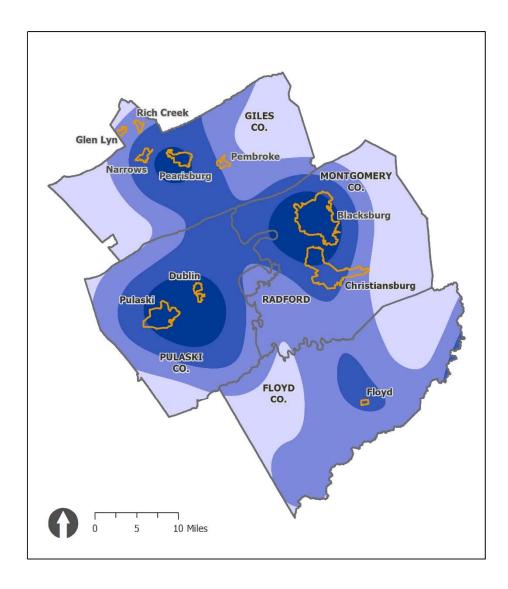
Relative Crash Incident Density



Crash incident occurrence normalized by road functional class. Kernel density, 1 mile search radius. Equal interval distribution.

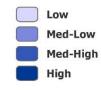
Created by NRVRC, 2017. Sources: U.S. Census Bureau; Virginia Department of Transportation; Virginia Geographic Information Network.

Map 33. Wind Gust Density



Thunderstorm Wind Gust Density (1996-2015)

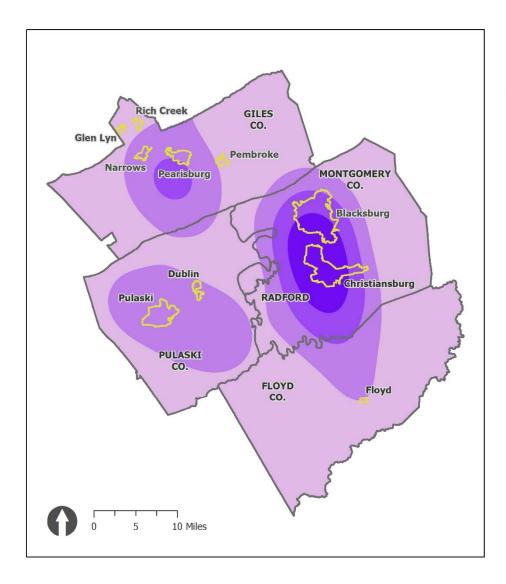
New River Valley



Reflects kernel density of thunderstorm wind gusts within a 10-mile radius of a point. Equal interval distribution.

Created by NRVRC, 2017. Sources: National Oceanic and Atmospheric Administration; U.S. Census Bureau; Virginia Geographic Information Network.

Map 34. Wind Gust Property Damage Density



Thunderstorm Wind Gust Property Damage Density (1996-2015)

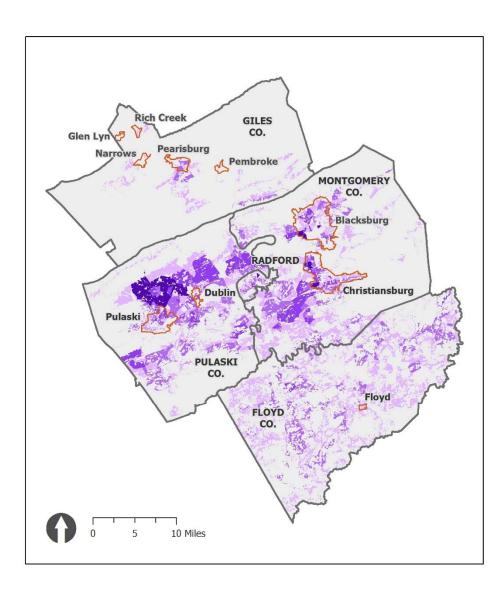
New River Valley



Reflects kernel density of total property damage caused by thunderstorm wind gusts within a 10-mile radius of a point. Equal interval distribution.

Created by NRVRC, 2017. Sources: National Oceanic and Atmospheric Administration; U.S. Census Bureau; Virginia Geographic Information Network.

Map 35. 100-Year Wind Event Annualized Loss



100-Year Wind Event Annualized Loss

New River Valley

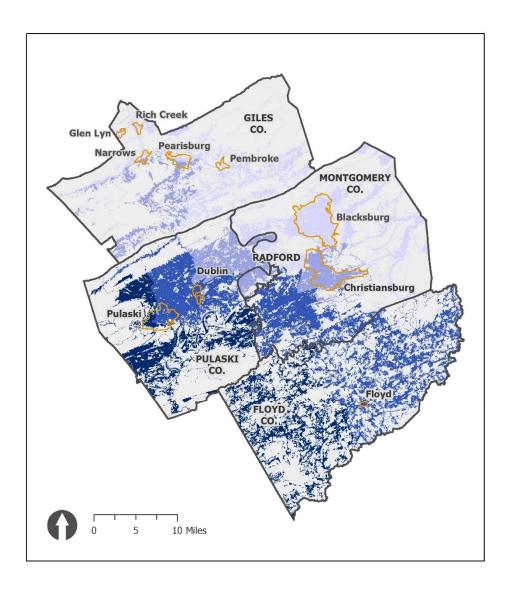




Reflects total direct annualized loss to structures following a 100-year wind event. Modeling and loss estimates were calculated using HAZUS MH 3.1.

Jenks natural breaks distribution.

Map 36. 100-Year Wind Event Peak Gust



100-Year Wind Event Peak Gust

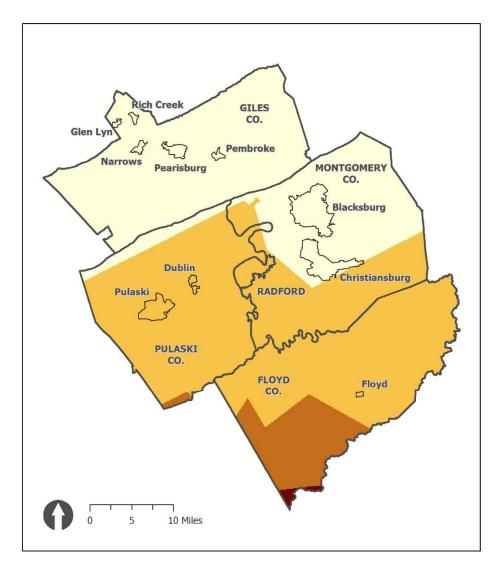
New River Valley



Reflects peak gust wind speeds for a 100-year event. Winds speeds were modeled using HAZUS MH 3.1.

Created by NRVRC, 2017. Sources: Federal Emergency Management Agency; U.S. Census Bureau; Virginia Geographic Information Network.

Map 37. NRV Tornado Hazard



Historical Tornado Hazard Frequency

New River Valley

Annual Tornado Hazard Frequency

Times One Million

13 - 38

39 - 62

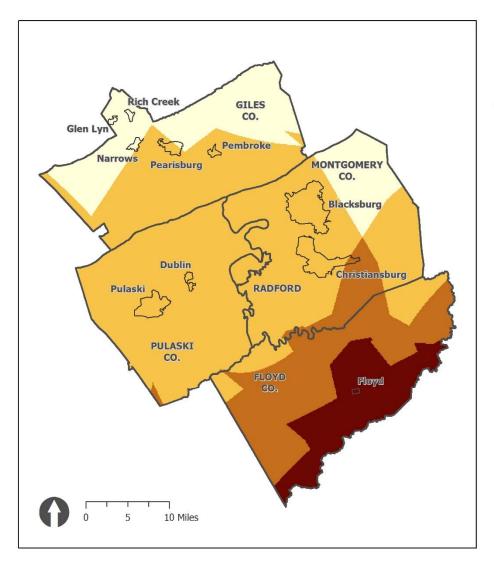
63 - 87

88 - 111

Annual tornado hazard frequency is an estimate of the frequency with which a point will experience a tornado, interpolated from neighboring tornado impact areas during the historical period of record (1950-2015).

Created by NRVRC, 2017. Sources: National Oceanic and Atmospheric Administration; U.S. Census Bureau; Virginia Department of Emergency Management; Virginia Geographic Information Network.

Map 38. NRV Tornado Hazard F2+



Historical Significant Tornado Hazard Frequency

New River Valley

Annual Tornado Hazard Frequency (F2+)

Times One Million

10 - 13

14 - 17

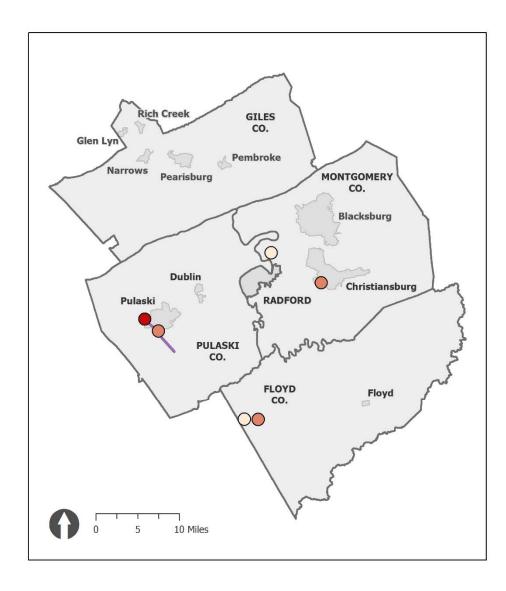
18 - 20

21 - 24

Annual tornado hazard frequency is an estimate of the frequency with which a point will experience a tornado, interpolated from neighboring tornado impact areas during the historical period of record (1950-2015).

Created by NRVRC, 2017. Sources: National Oceanic and Atmospheric Administration; U.S. Census Bureau; Virginia Department of Emergency Management; Virginia Geographic Information Network.

Map 39. NRV Tornado History



Tornados (1950-2015)

New River Valley

Touchdown and Tracks

Magnitude

0

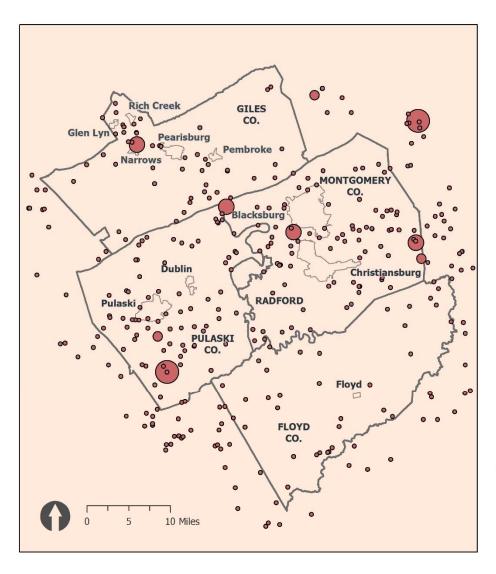
 $\overline{\circ}$

Tornado Corridor



Created by NRVRC, 2017. Sources: National Oceanic and Atmospheric Administration; U.S. Census Bureau; Virginia Department of Emergency Management; Virginia Geographic Information Network.

Map 40. NRV Wildfires



Wildfire Incidents (2002-Spring 2016)

New River Valley

Fire Size (acres)

0 - 100

101 - 200

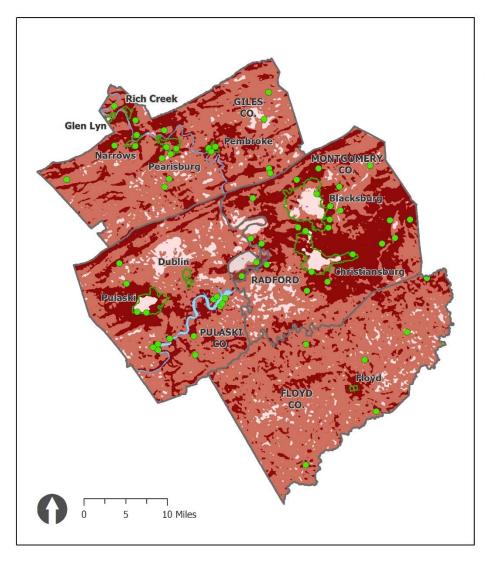
201 - 300

301 - 665

Reported wildfires within five miles of the New River Valley. Data for West Virginia counties not available.

Created by NRVRC, 2017. Sources: U.S. Census Bureau; Virginia Department of Forestry; Virginia Geographic Information Network.

Map 41. NRV Wildfire Risk Assessment



Wildfire Risk and Woodland Homes Communities

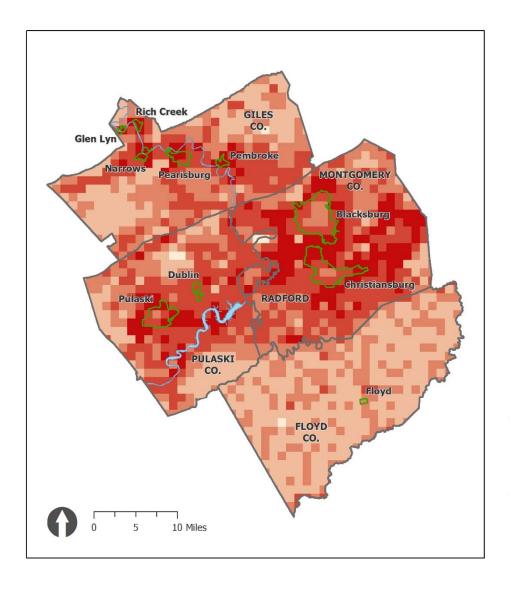
New River Valley



Woodland Homes Communities "are clusters of homes located along forested areas at the wildland-urban interface that could possibly be damaged during a nearby wildfire incident."

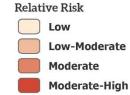
Created by NRVRC, 2016. Sources: U.S. Geological Survey; U.S. Census Bureau; Virginia Department of Forestry; Virginia Geographic Information Network.

Map 42. NRV Wildfire Risk to Structures



Wildfire Risk to Structures

New River Valley

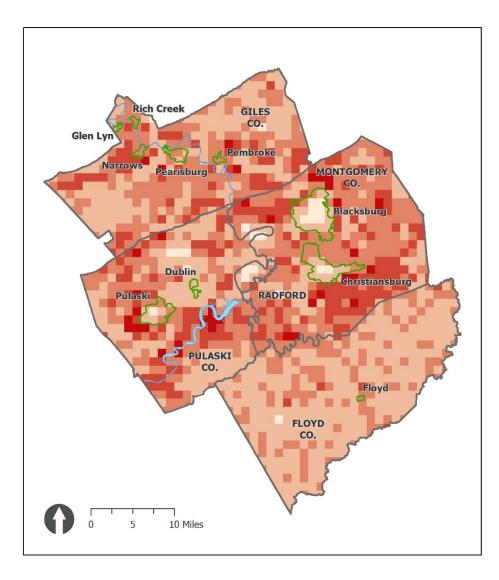


High

Combination ranking of the Department of Forestry's Wildfire Risk Assessment resampled to a 1-mile resolution and the area of buildings per mile.

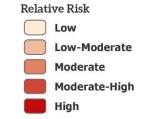
Created by NRVRC, 2017. Sources: Floyd County; U.S. Geological Survey; U.S. Census Bureau; Virginia Department of Forestry; Virginia Geographic Information Network.

Map 43. NRV Wildfire Risk to Exurban Structures



Wildfire Risk to Exurban Structures

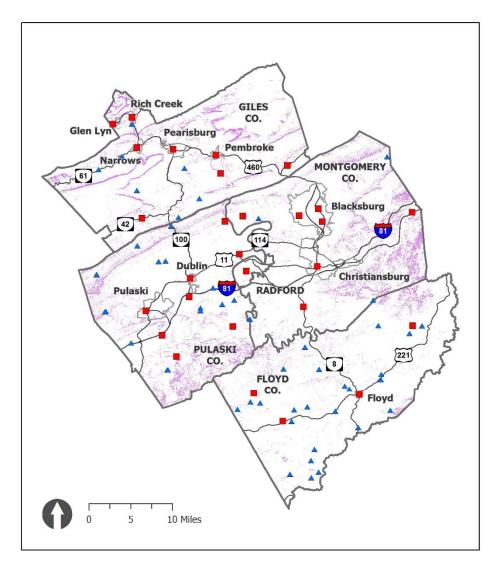
New River Valley



Combination ranking of the Department of Forestry's Wildfire Risk Assessment resampled to a 1-mile resolution and a comparison of total building footprints to levels of development.

Created by NRVRC, 2017. Sources: Floyd County; U.S. Geological Survey; U.S. Census Bureau; Virginia Department of Forestry; Virginia Geographic Information Network.

Map 44. Current Fire Mitigation and Response (with dry hydrants)



Current Fire Mitigation and Response

New River Valley

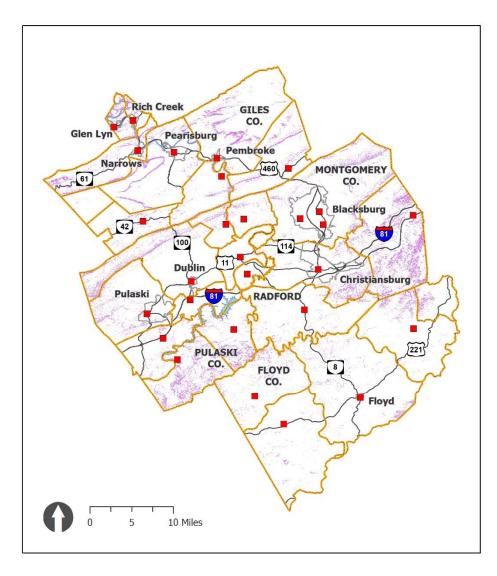
Fire Station

Dry Hydrant

Slope 50% or Greater

Created by NRVRC, 2017. Sources: Federal Emergency Management Agency; Floyd County; Google Maps; Montgomery County; Pulaski County; U.S. Geological Survey; U.S. Census Bureau; Virginia Department of Fire Programs; Virginia Department of Forestry; Virginia Geographic Information Network.

Map 45. Current Fire Mitigation and Response (with fire response districts)



Current Fire Mitigation and Response

New River Valley

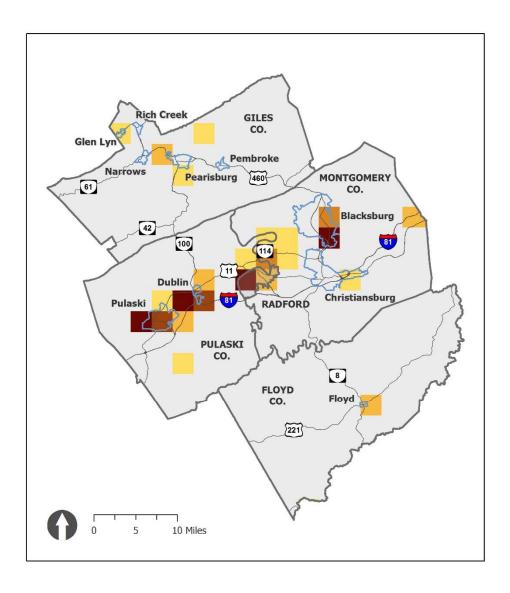
Fire Station

Fire Response District

Slope 50% or Greater

Created by NRVRC, 2017. Sources: Federal Emergency Management Agency; Floyd County; Google Maps; Montgomery County; Pulaski County; U.S. Geological Survey; U.S. Census Bureau; Virginia Department of Fire Programs; Virginia Economic Development Partnership; Virginia Geographic Information Network.

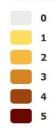
Map 46. Hazardous Materials



Hazardous Material Sites

New River Valley

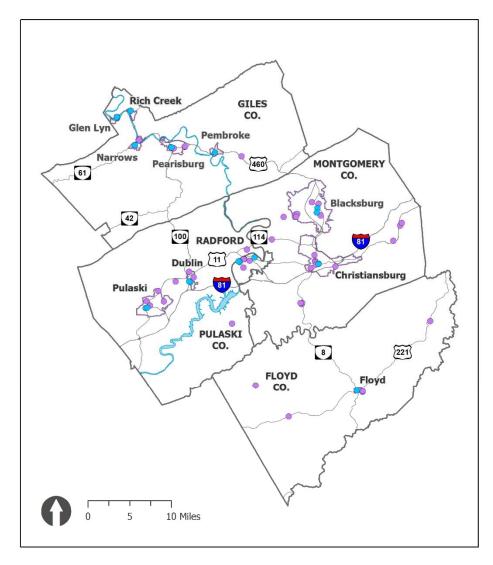
Number of Sites



Source data last updated November 2016. Derived from Facility Registry Service data.

Created by NRVRC, 2017. Sources: Esri; U.S. Environmental Protection Agency; U.S. Census Bureau; Virginia Geographic Information Network.

Map 47. Critical Facilities (law enforcement and schools)



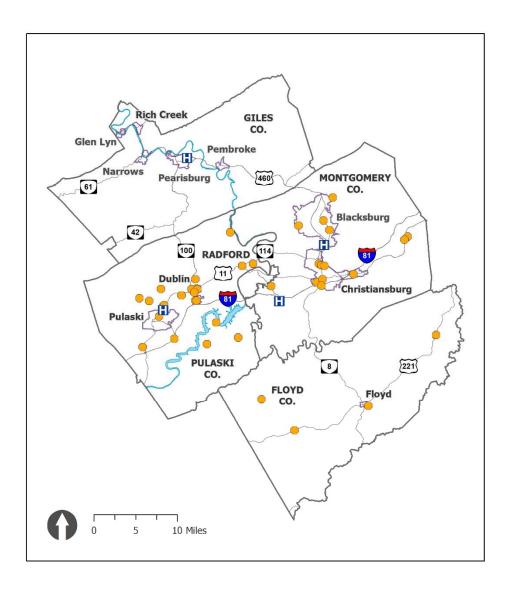
Critical Facilities

New River Valley

- Law Enforcement
- Public School

Created by NRVRC, 2017. Sources: Federal Emergency Management Agency; New River Criminal Justice Training Academy; U.S. Census Bureau; U.S. Geological Survey; Virginia Department of Education; Virginia Geographic Information Network.

Map 48. Critical Facilities (shelters and hospitals)



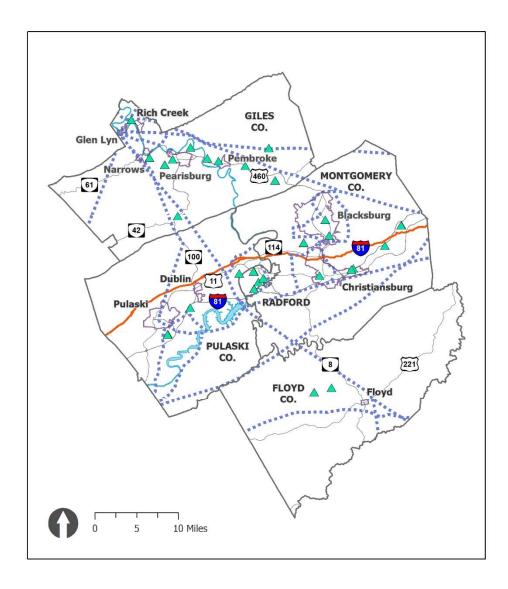
Critical Facilities

New River Valley

- Hospital
- Emergency Shelter

Created by NRVRC, 2017. Sources: Floyd County; Montgomery County; Pulaski County; U.S. Census Bureau; U.S. Geological Survey; Virginia Economic Development Partnership; Virginia Geographic Information Network.

Map 49. Critical Utilities (power and cell towers)



Critical Utilities

New River Valley

▲ Cell Tower

Classification Action

Classification Action

Action

Classification

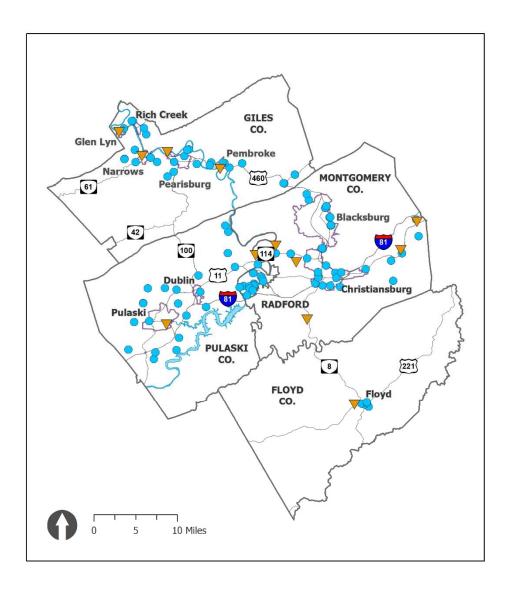
Action

Classification

C

Created by NRVRC, 2017. Sources: City of Radford; Giles County; Esri; U.S. Census Bureau; U.S. Department of Transportation; U.S. Federal Communications Commission; U.S. Geological Survey; Virginia Economic Development Partnership; Virginia Geographic Information Network.

Map 50. Critical Utilities (water and wastewater)



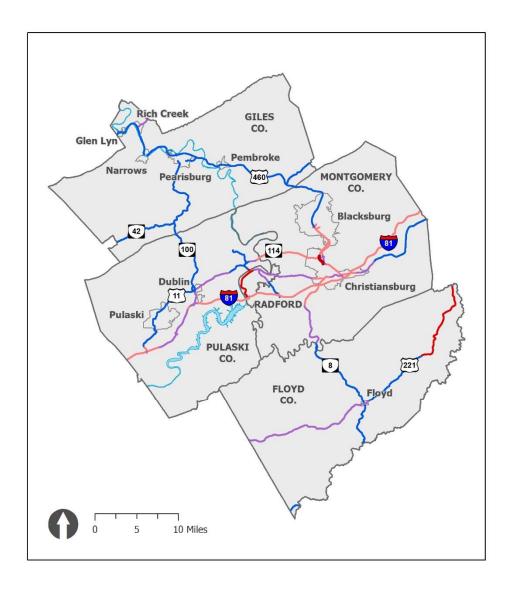
Critical Utilities

New River Valley

- **Wastewater Treatment Facility**
- Potable Water Facility

Created by NRVRC, 2017. Sources: City of Radford; Federal Emergency Management Agency; Giles County; Pulaski County; Town of Christiansburg; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

Map 51. Traffic Volume to Capacity

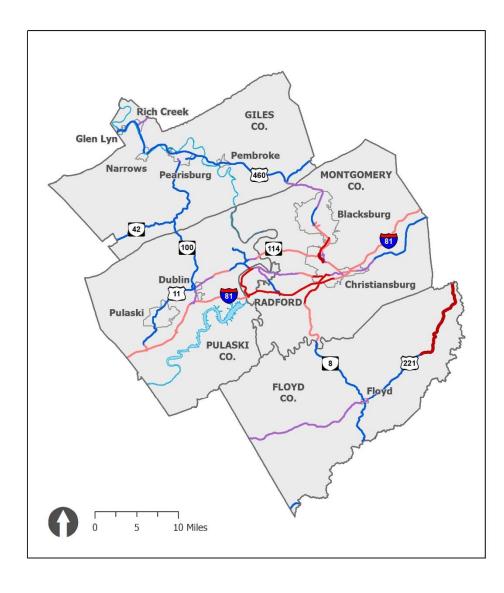


Traffic Volume to Capacity

New River Valley



Map 52. Forecasted Traffic Volume to Capacity



Traffic Volume to Capacity

New River Valley

Forcasted Volume to Capacity for 2025

// Low

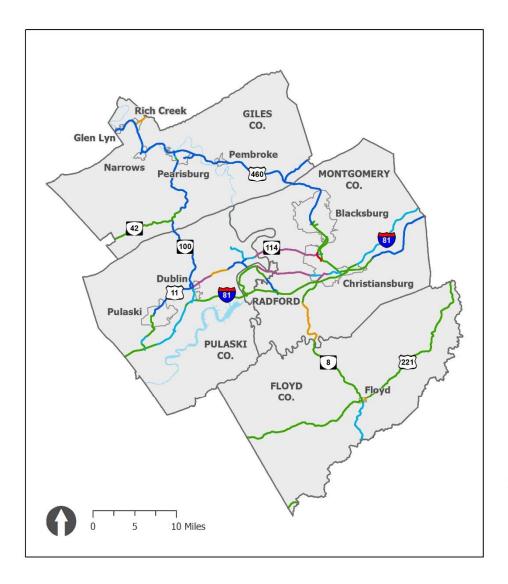
// Low-Moderate

/// Moderate-High

/ High

Over Capacity

Map 53. Level of Service for Principal Travel Corridors

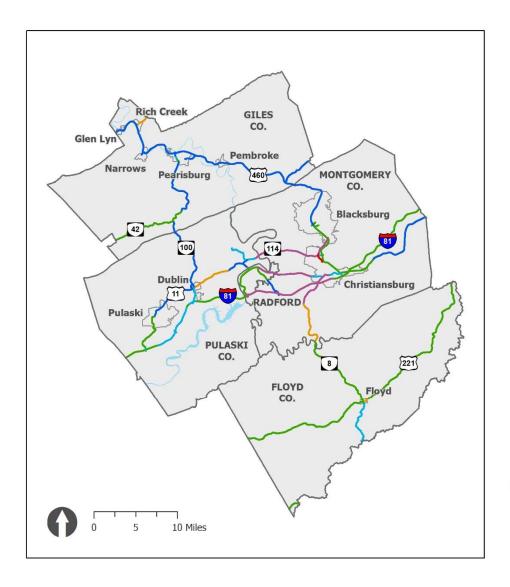


Level of Service

New River Valley



Map 54. Level of Service Forecast for Principal Travel Corridors



Level of Service

New River Valley

Forecasted LOS for 2025

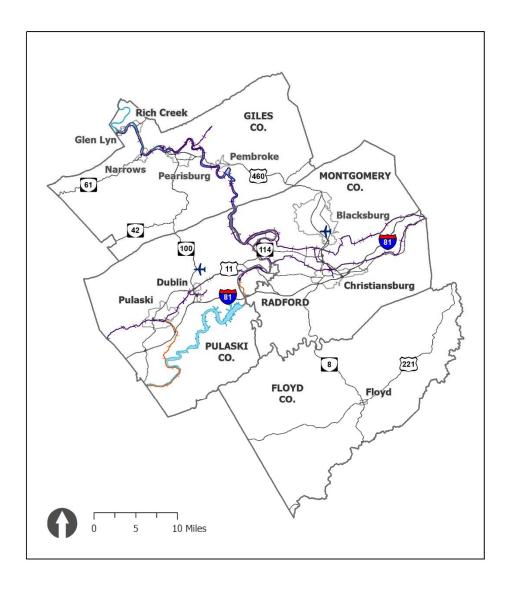
∧ A ∧ B

✓ C

∕✓ D

∨ E **∨** F

Map 55. Transportation Infrastructure



Transportation Infrastructure

New River Valley

→ Primary Road

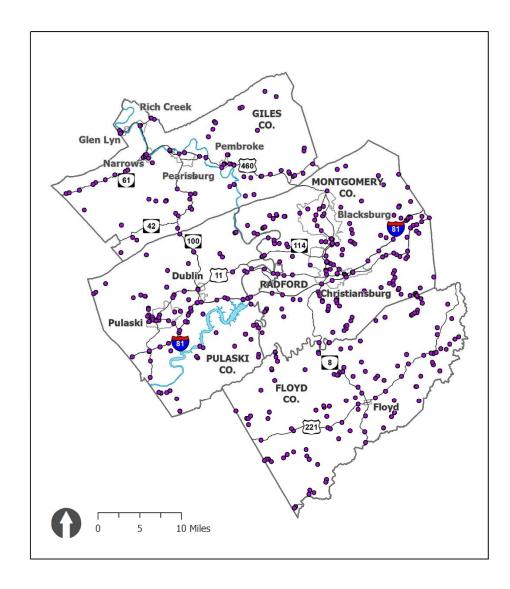
/✓✓ Active Rail

Non-Active Rail

+ Airport

Created by NRVRC, 2017. Sources: Federal Railroad Administration; U.S. Census Bureau; U.S. Geological Survey; Virginia Department of Rail and Public Transportation; Virginia Geographic Information Network.

Map 56. Traffic Bridges in the NRV



Bridges

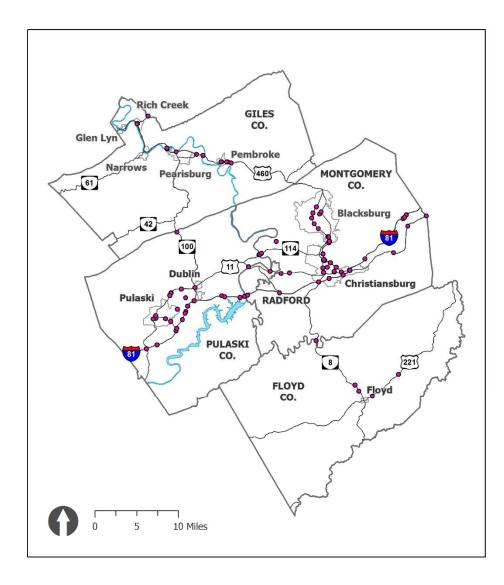
New River Valley

Vehicular Bridge

Only bridges that are at least 20 feet in length are displayed.

Created by NRVRC, 2017. Sources: Federal Highway Administration; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

Map 57. High Volume Traffic Bridges



High Volume Traffic Bridges

New River Valley

Bridges with an Average Daily Traffic of 5,000 or More

Vehicular Bridge

Only bridges that are at least 20 feet in length are displayed.

Created by NRVRC, 2017. Sources: Federal Highway Administration; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.