



## **NRV Hazard Mitigation Plan 2016/2017 Update Working Group: Flooding Hazard**

February 2, 2017, 10:30 am - 12:00 pm

New River Room, New River Valley Business Center  
Fairlawn, VA

### **Agenda**

1. Welcome
2. Presentation: NRV Mapping of Vulnerable Roadways and Outreach Campaign by Elijah Sharp, NRVRC
3. Flooding Mitigation Resources
4. Data Review
5. Regional Mitigation Strategy Review
6. Wrap Up
  - a. Question and answer
  - b. Next steps – steering committee work, plan draft, public outreach
  - c. Next meeting – March 2, 2017 – Steering Committee

# NRV Hazard Mitigation Plan - 2016/17 Plan Update

February 2, 2017 - 10:30 am

	Name	Organization/Representing	Email (if new)
1	Kristin Owen	VA DCR Floodplains	Kristin.owen@dcv.virginia.gov
2	Charley Banks	VA DCR Floodplains	charley.banks@dcv.virginia.gov
3	PHIL HYSSELL	NWS Blacksburg	PHIL.HYSSELL@NOAA.GOV
4	Peter Corrigan	NWS Blacksburg	peter.corrigan@NOAA.GOV
5	ELIJAH SHARP	NRVRC	
6	MIKE WILSON	APCO	MKWILSON@AEP.ORG
7	Robbie Kiser	Town of Pulaski	rkiser@pulaski-town.org
8	Jay Eric	City of Radford	
9	Jennifer White's	City of Radford	Jennifer.White's@radford.va.gov
10	Kati Howard	Town of Blacksburg	
11	Emily Gibson	Mont Co	
12	DAR JENKINS	MONTGOMERY CO	jenkinsds@montgomerycountyva.gov
13	Justin Haga	VDEM	<del>justin.haga@vdm.virginia.gov</del>
14	James Kast	Town of Narrows	JKast@townofnarrows.org
15	Sara Morgan	Town of Christiansburg	
16	Will Drake	Town of C'burg	
17	John Burke	CHRISTIANSBURG	jburke@christiansburg.org
18	Anamaria Bukvic	VT	ana.bukvic@vt.edu
19	John Ross	Giles Co.	jross@gilescounty.org
20	Jared Linkous	Pulaski County	jlinkous@pulaskicounty.org
21	Sosh Tolbert	Pulaski County	stolbert@pulaskicounty.org
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**NRV Hazard Mitigation Plan 2016/2017 Update Working Group:  
Flooding Hazards**

Meeting Notes

February 2<sup>t</sup>, 2017

**Attending:** <see list>

**Notes**

1. Welcome and Introductions
2. Presentation of NRV Mapping of Vulnerable Roadways and Outreach Campaign by Elijah Sharp
  - a. Mr. Sharp agreed to accept new photos of inundated or vulnerable areas for the mapping tool.
  - b. The NRVRC agreed to upload the mapping tool to the NRV Hazard Mitigation website. This is the link to the project page - <http://nrvrc.org/floodmaps/> . Clicking on the map next to Goal 1 will take you to the ARC GIS online mapping.
  - c. Mr. Sharp was asked about the VDOT standard designating an area for flooding. Mr. Sharp responded it was 10 years.
3. Data Review by Zach Swick
  - a. Flooding hazards in the New River Valley.
    - i. Mr. Swick was asked to provide a link to the TEIF information from the Virginia Department of Emergency Management.
4. Flooding Mitigation Resources
  - a. Ms. Straight included a few links for flooding resources. These included FEMA grants, High Water Mark Initiative, and a FEMA-commissioned report on flood mitigation benefits (see presentation for links).
5. Regional Mitigation Hazards Discussion and Strategy Review
  - a. Flooding update
    - i. The group was broken up into groups to address different objectives. After several minutes, the group gathered and discussed any suggested changes (see attached, updated mitigation strategies).
6. Wrap-up
  - a. This meeting concluded the working group meetings for the regional hazard mitigation plan.
  - b. Next meeting: Steering Committee, March 2, 2017.



# Regional Hazard Mitigation Plan Update

Working Group – Flooding

February 2, 2017



# Definition

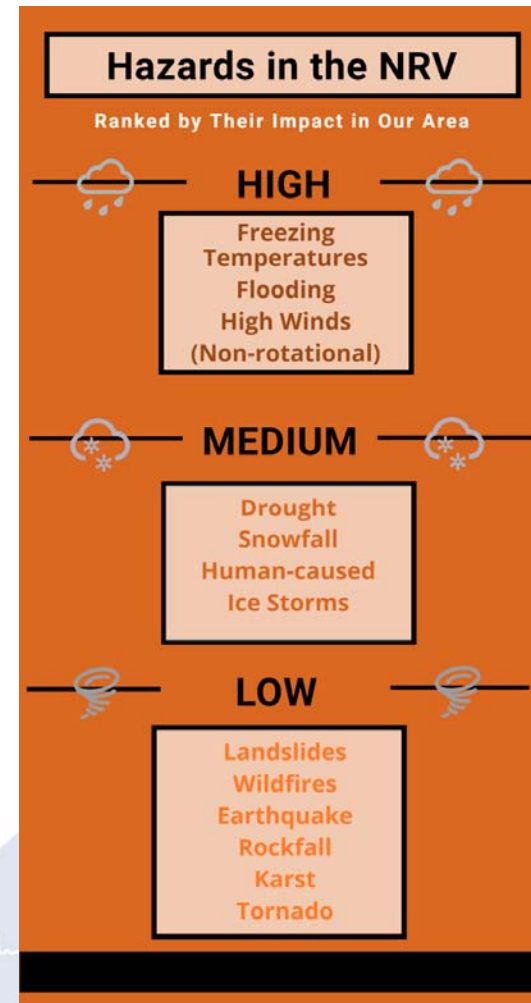
- Hazard Mitigation

...is a sustainable action that will reduce or eliminate injury to citizens, damages to structures and allow continuity of critical society functions...

This is different from response and recovery.

# Project overview

- Update every 5 years
- Must be FEMA-approved
  - Maintains participants' eligibility for mitigation funds
- Covers natural hazards with potential impact in NRV
  - Floods, drought, wildfire, geologic hazards, severe weather, etc.
  - And considers human-caused hazards
- Project website - <http://nrvc.org/hazardmitigation/>





# Working groups

- Steering committee and staff will
  - Invite stakeholders with technical expertise
  - Invite community representatives to participate
- Participants will
  - Provide input on hazard issues and impacts
  - Develop mitigation goals and regional strategies
  - Further identification and input on
    - Mitigation options
    - Resources



# Working groups

- High Wind and Tornado Hazards | October 6, 2016
- Winter Hazards | November 10, 2016
- Geologic Hazards | December 1, 2016
- Human-caused, Wildfire, & Drought Hazards | January 5, 2017
- **Flooding Hazards | February 2, 2017**



# Today we will

- Hear presentation from Eli Sharp
- Review a few flooding resources
- Review latest available data
- Review and update mitigation strategies



# Presentation

NRV Mapping of Vulnerable Roadways and Outreach Campaign (<http://nrvrc.org/floodmaps/>)

Elijah Sharp, NRVRC

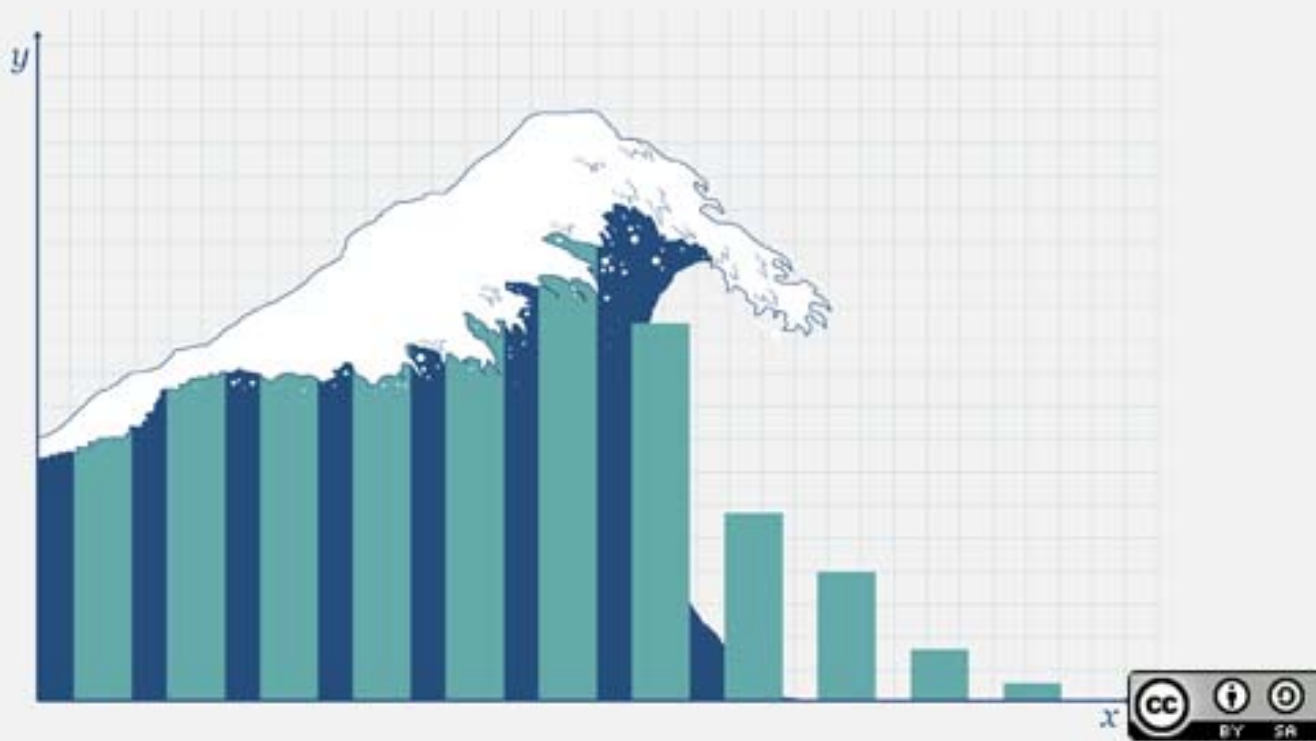


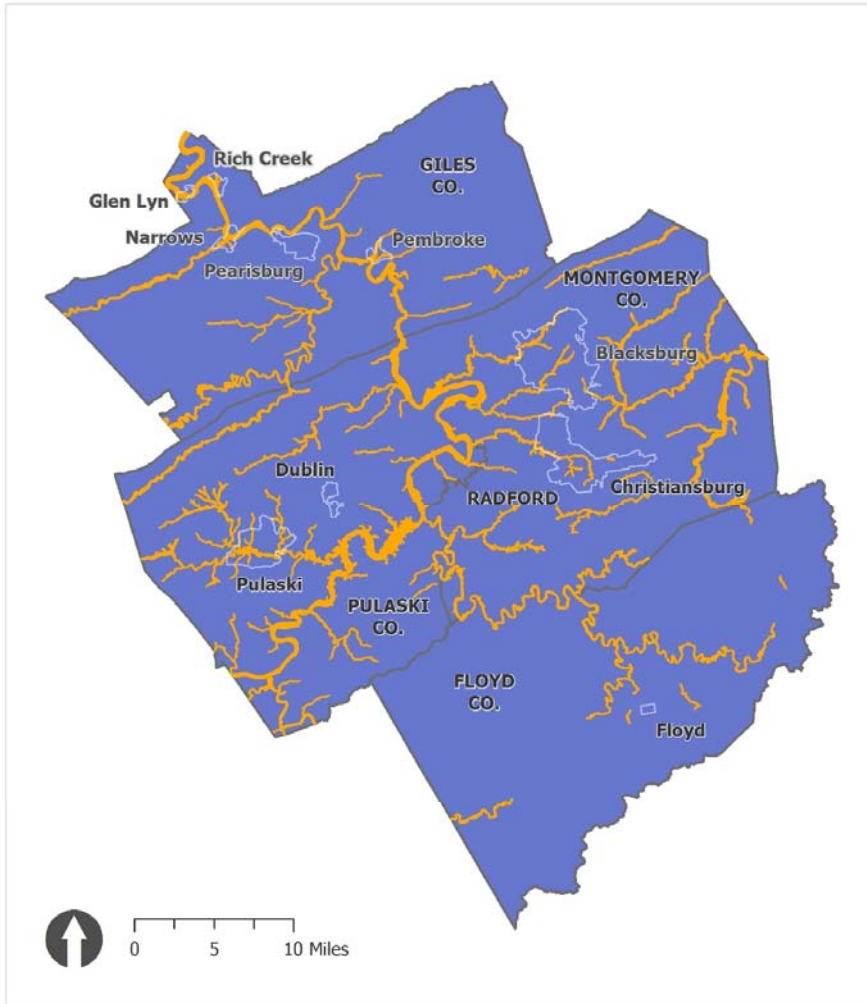
# Resources on Flooding Mitigation

- Grant funding available - <https://www.fema.gov/hazard-mitigation-assistance>
  - HMGP - Following a Presidentially-declared major disaster in Virginia
  - Pre-disaster Mitigation (an annual funding program)
  - Flood Mitigation Assistance (annual, only for NFIP-insured structures)
- High Water Mark Initiative (FEMA & NWS)
  - <http://silverjackets.nfrmp.us/State-Teams/Virginia>
  - <https://www.fema.gov/how-high-water-mark-projects-work>
- FEMA - commissioned to evaluate benefits of flood mitigation
  - <http://www.floodeconomics.com/the-US-takes-action>



# Data






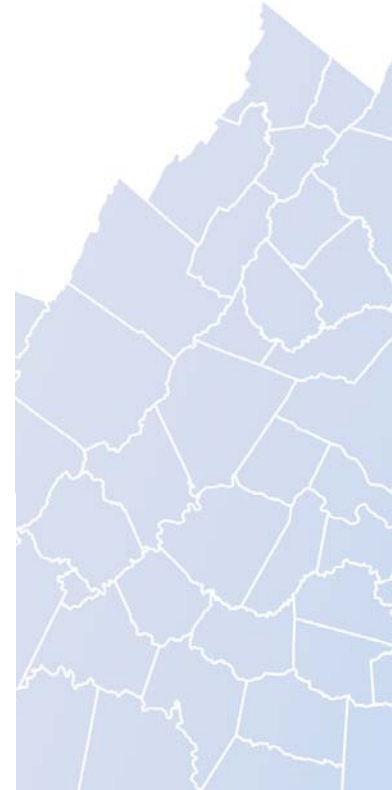
## Flood Zones

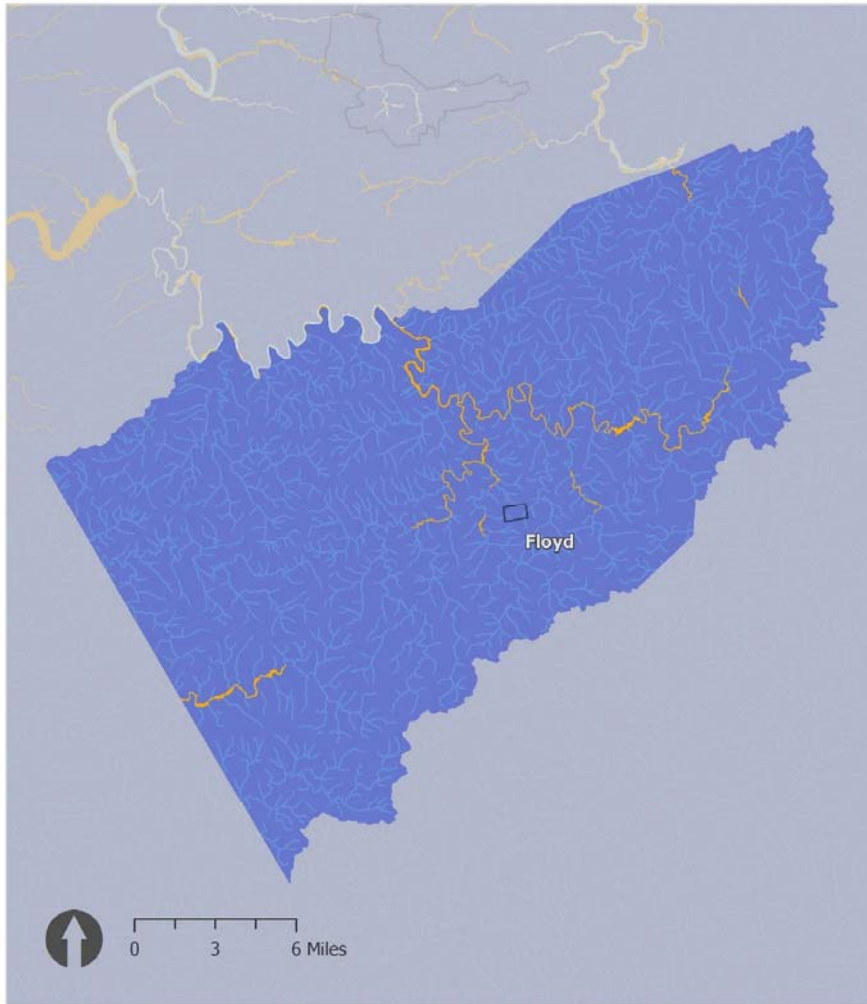
New River Valley

### Federal Flood Zones

 500-Year or Less Floodplain

Created by NRVC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; Virginia Geographic Information Network.

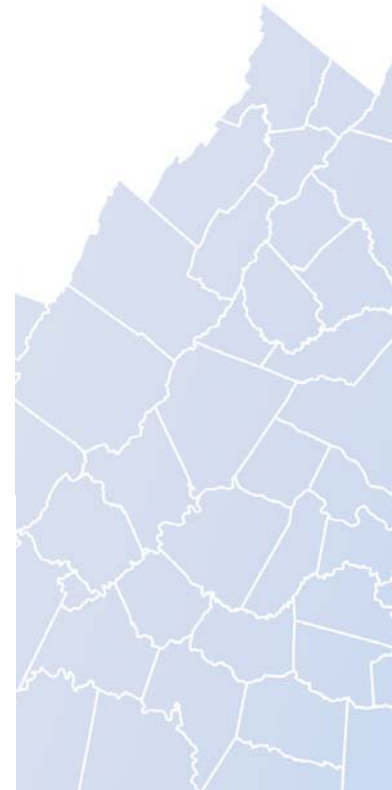




## Flood Zones Floyd County New River Valley

-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

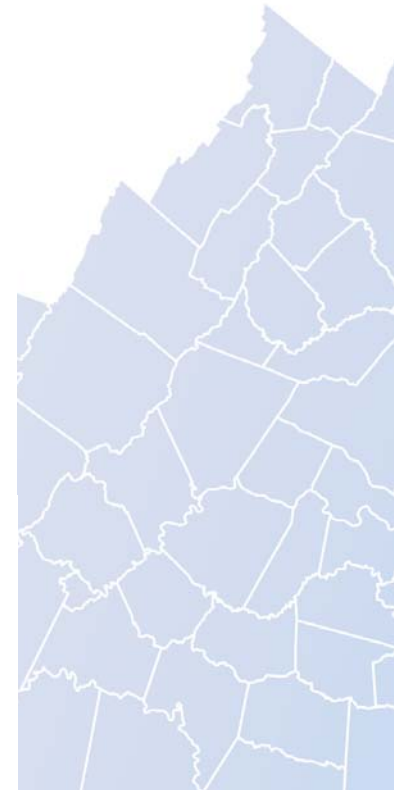




## Flood Zones Town of Floyd New River Valley

-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

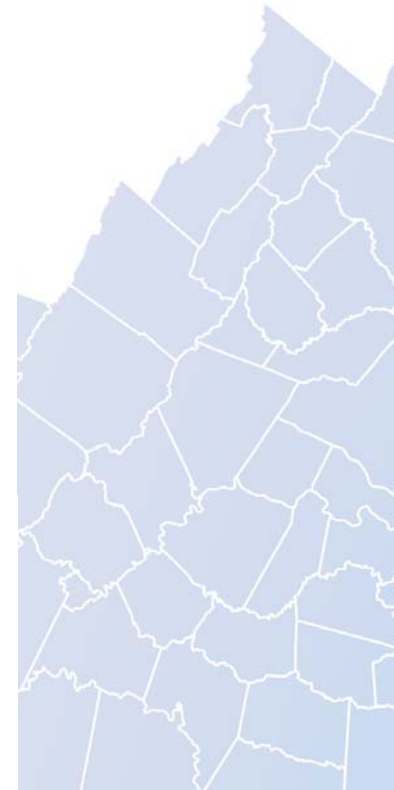




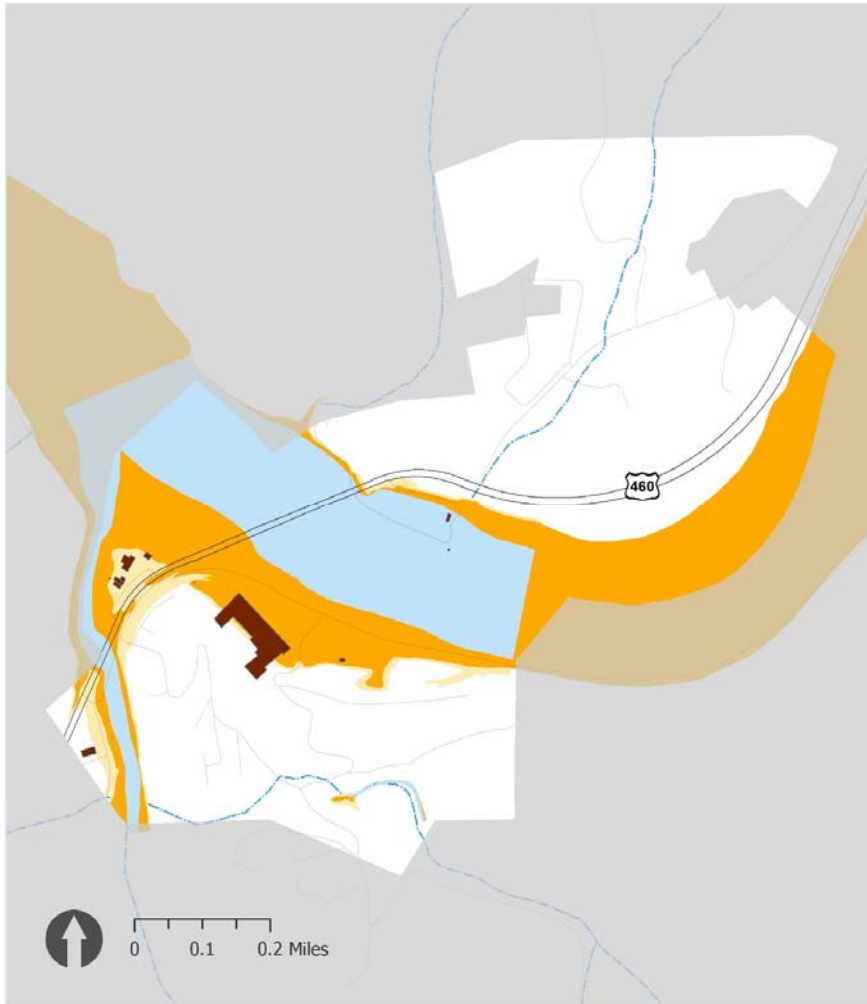
## Flood Zones Giles County New River Valley

-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.



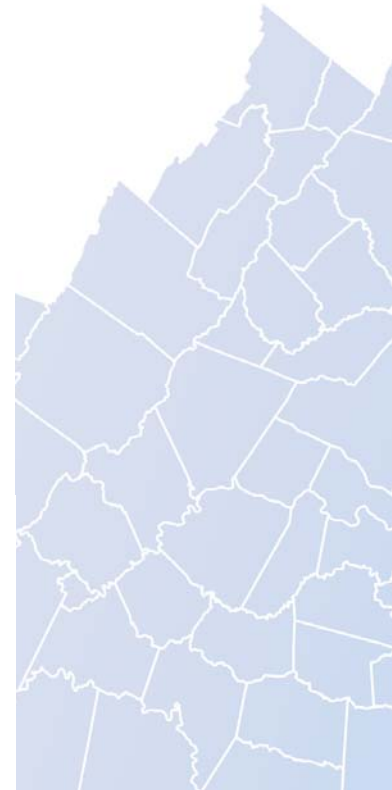


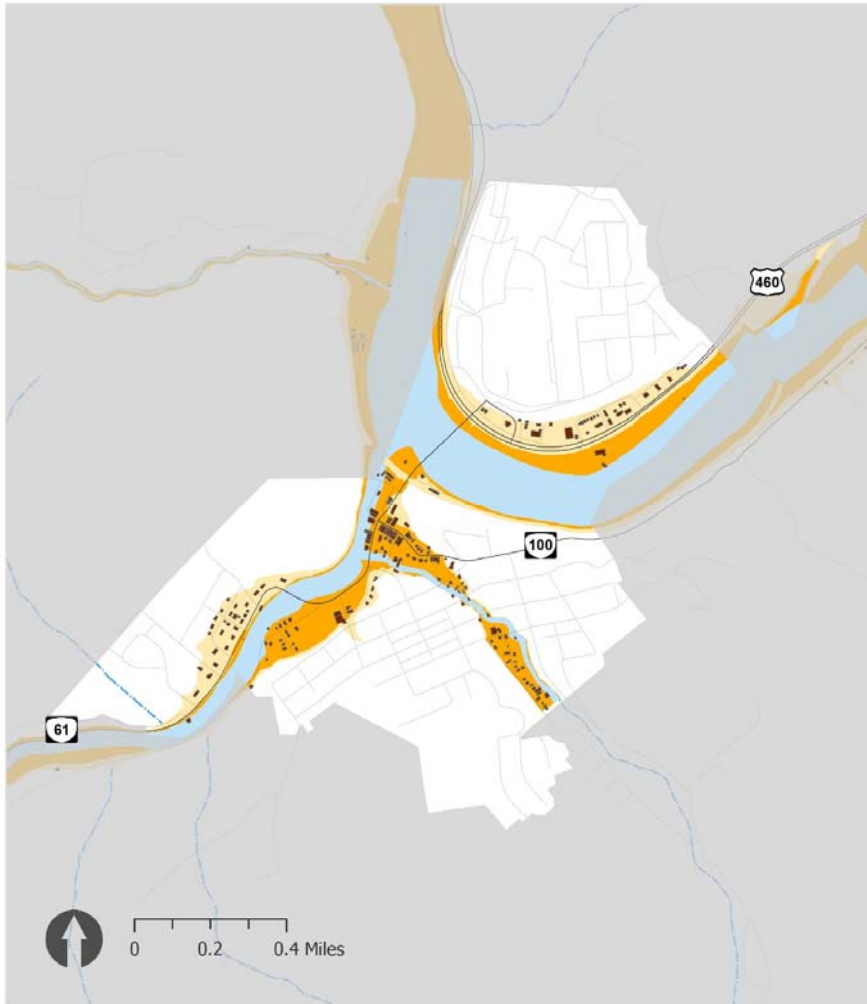


## Flood Zones Town of Glen Lyn New River Valley

-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

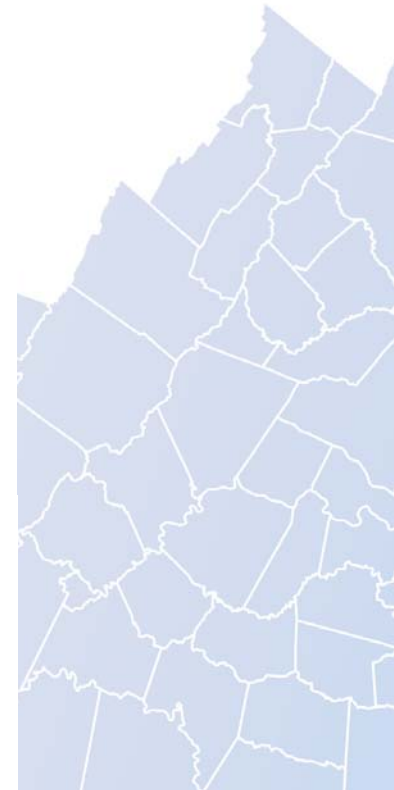


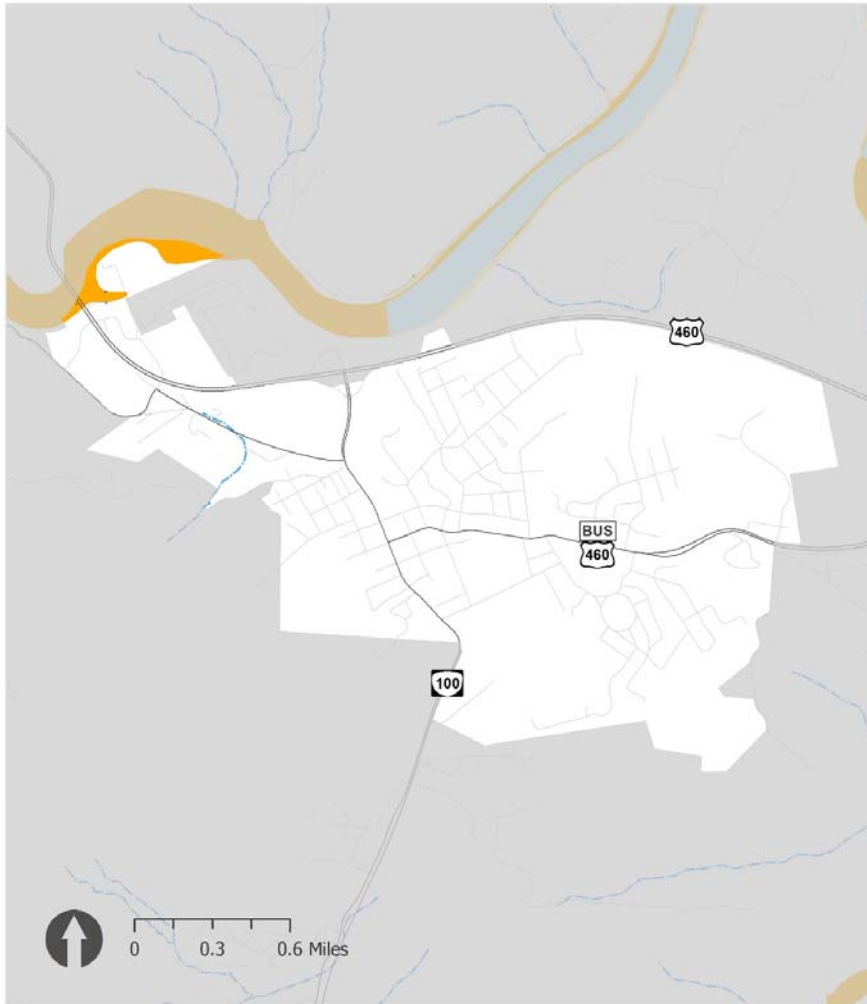


## Flood Zones Town of Narrows New River Valley

-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

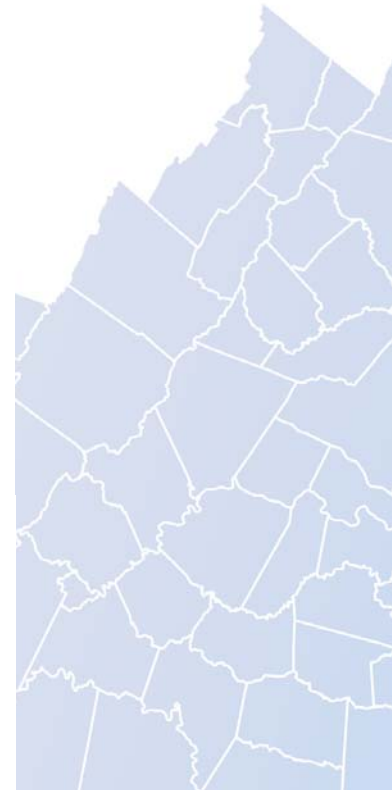


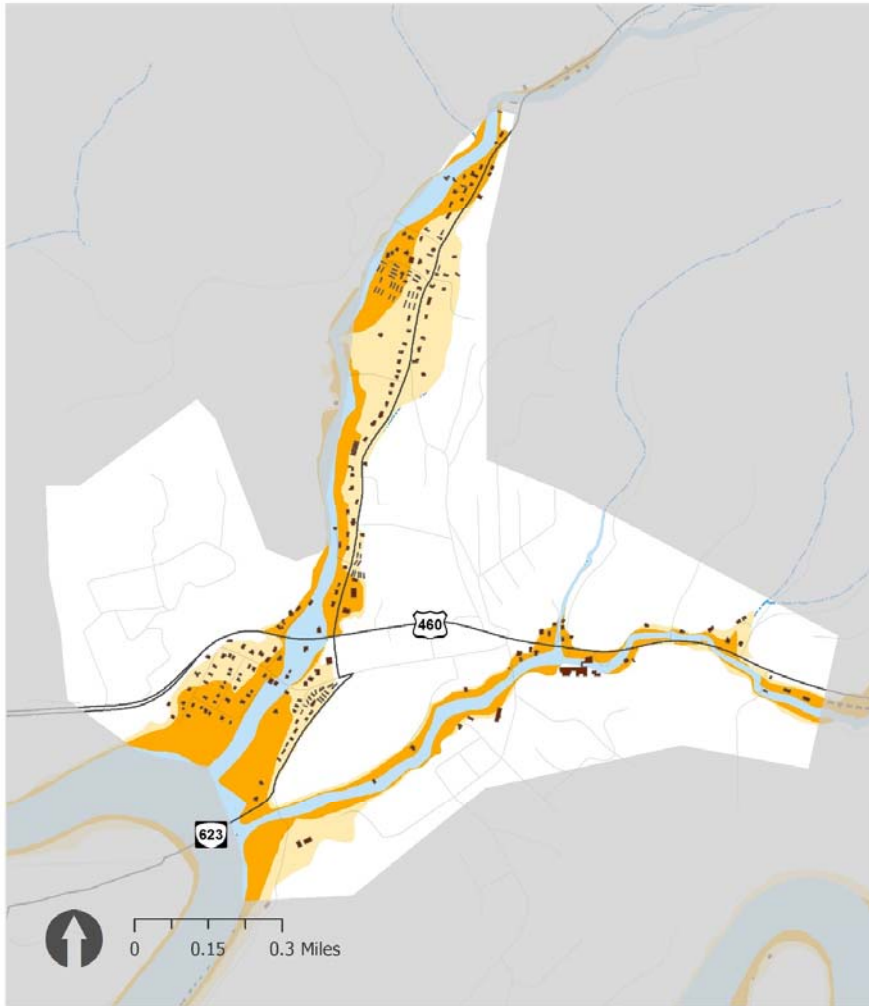


## Flood Zones Town of Pearisburg New River Valley


-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

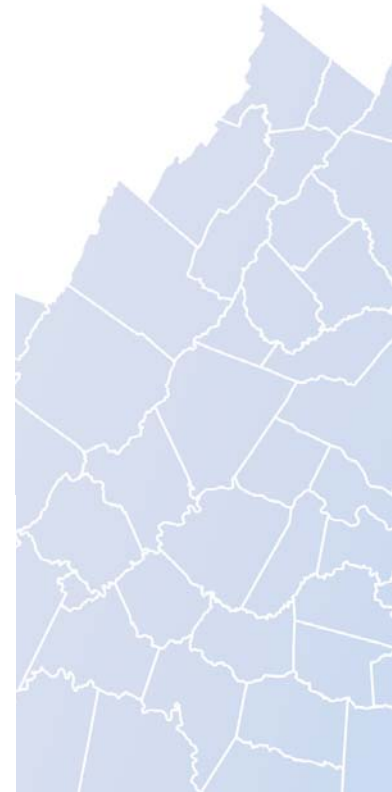


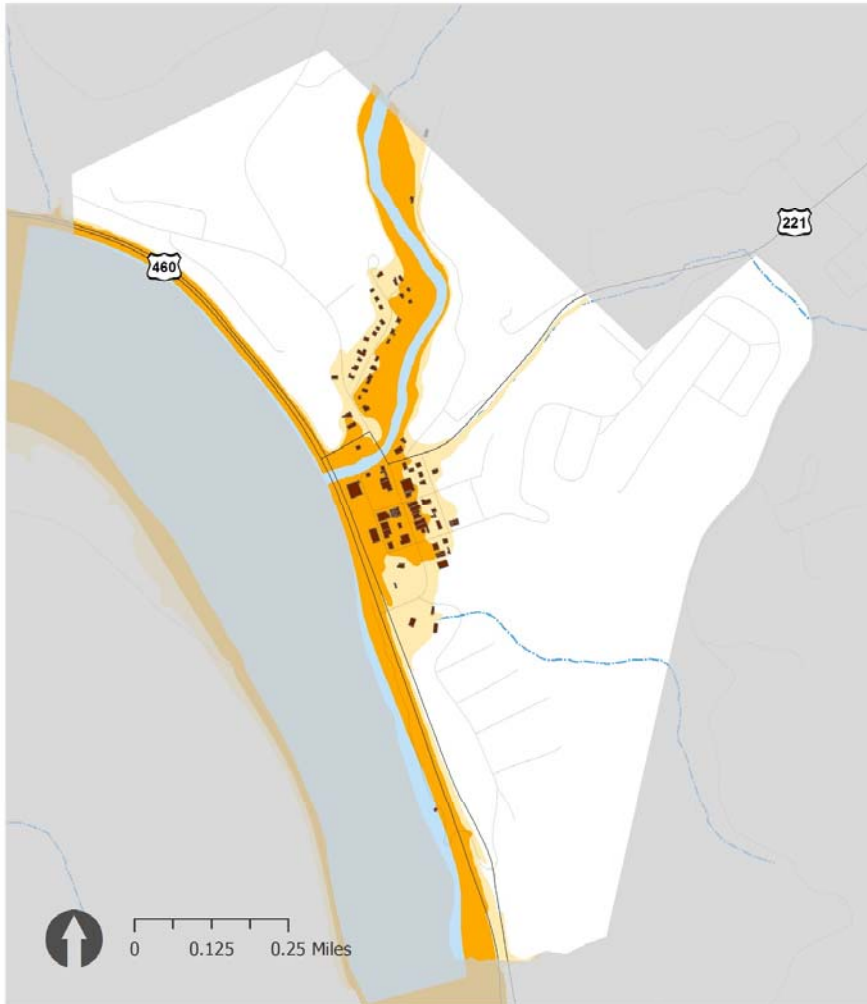


## Flood Zones Town of Pembroke New River Valley

-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

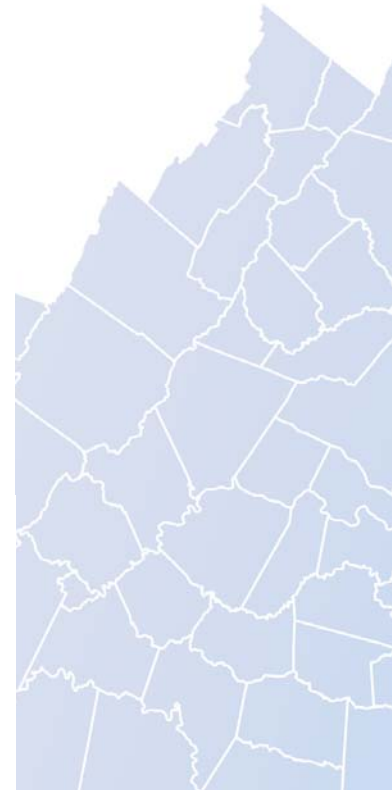


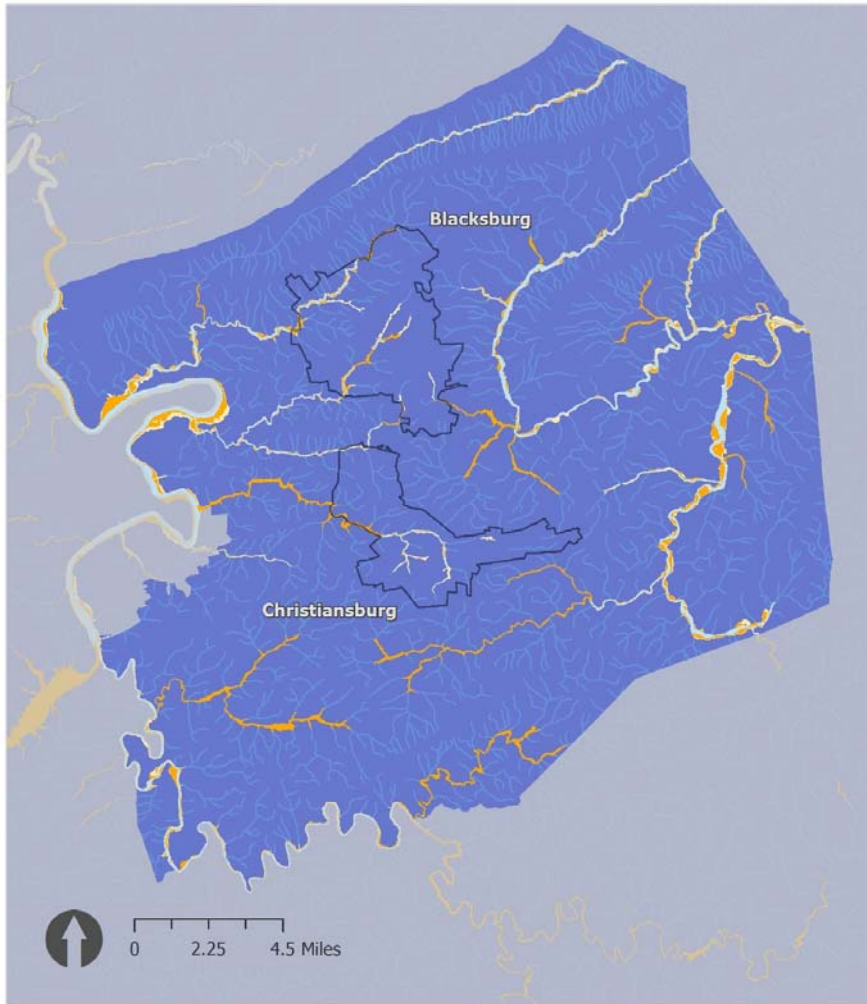


## Flood Zones Town of Rich Creek New River Valley

-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

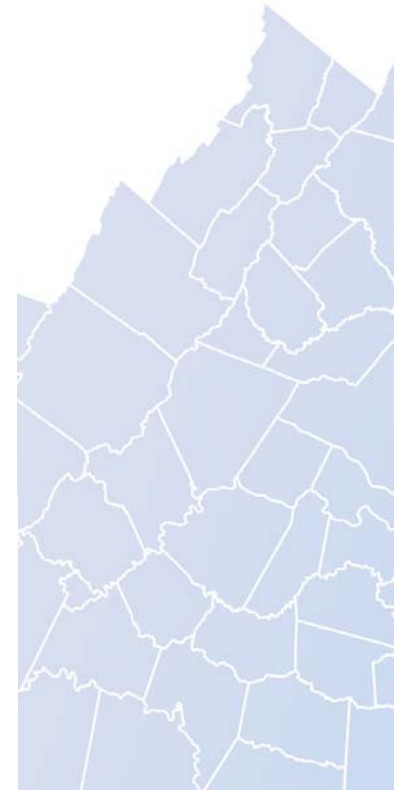


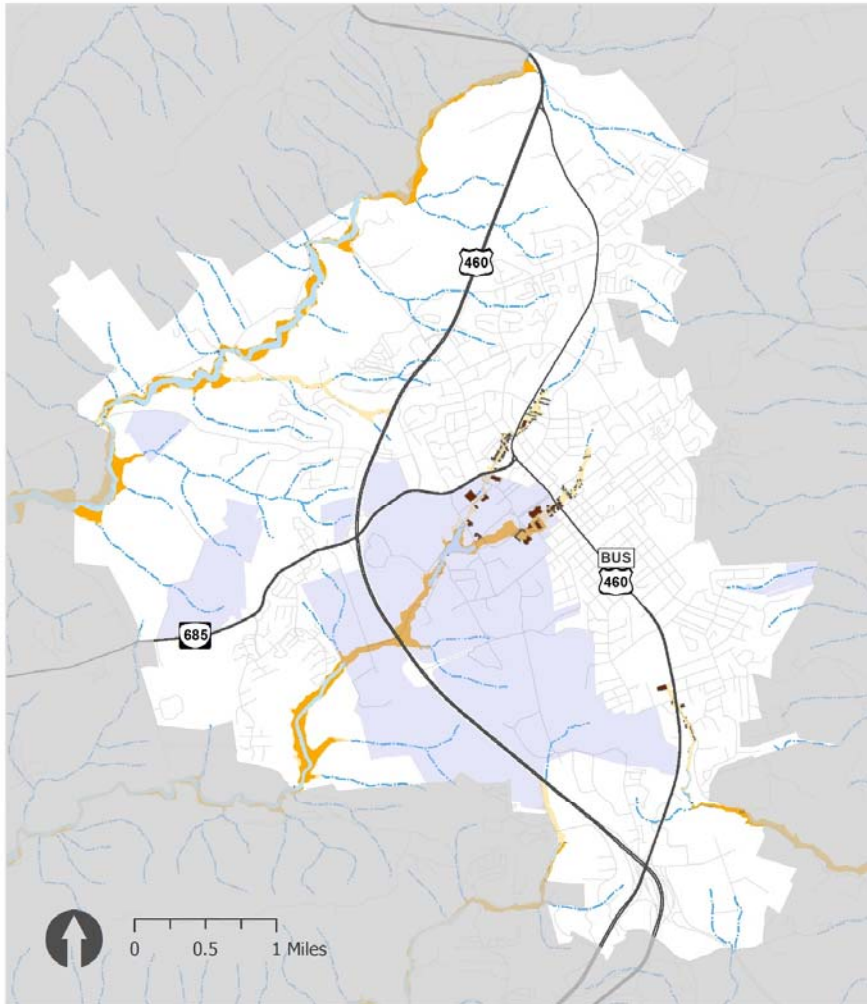


## Flood Zones Montgomery County New River Valley

-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

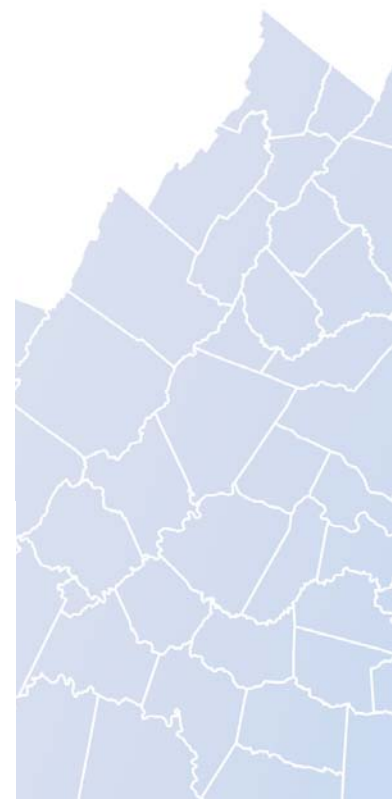


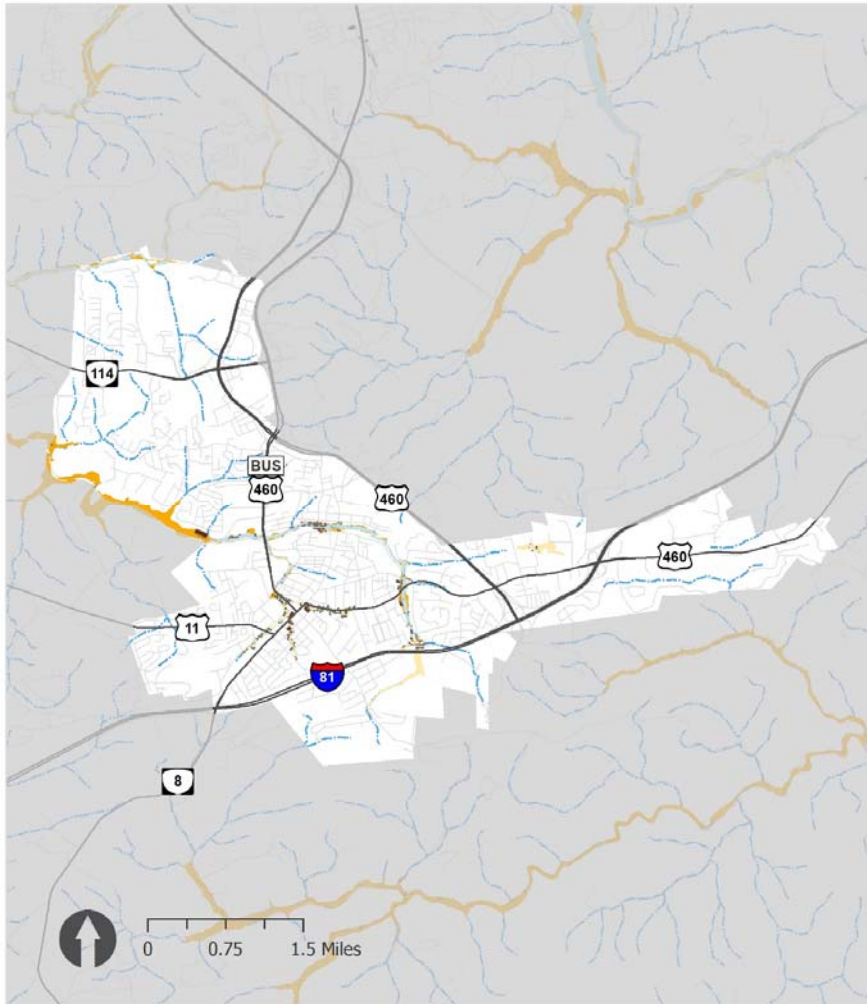


## Flood Zones Town of Blacksburg New River Valley

-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology
-  Virginia Tech

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; Town of Blacksburg; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network; Virginia Tech.

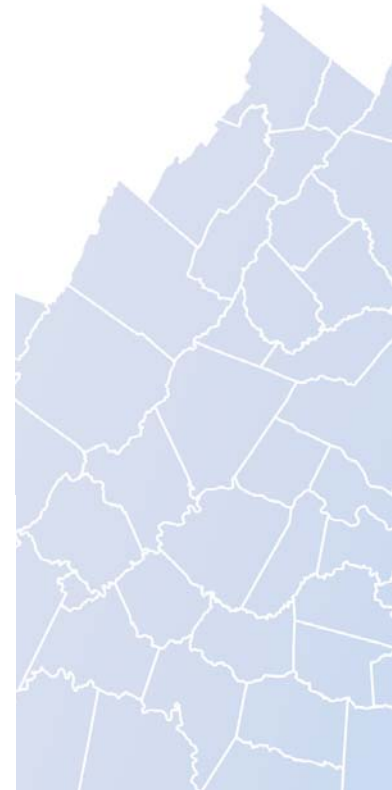




## Flood Zones Town of Christiansburg New River Valley

-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.





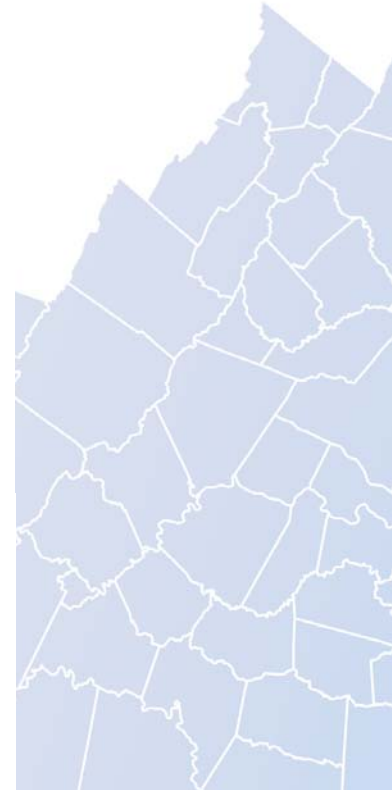


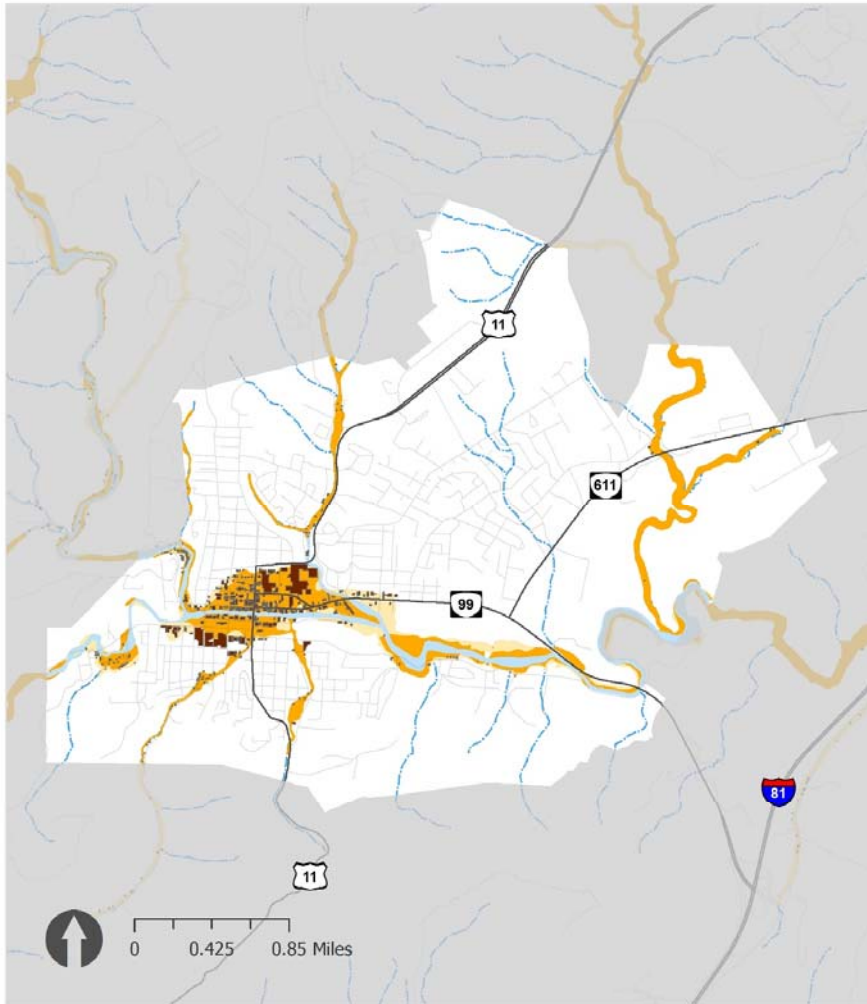
## Flood Zones Pulaski County

New River Valley

-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

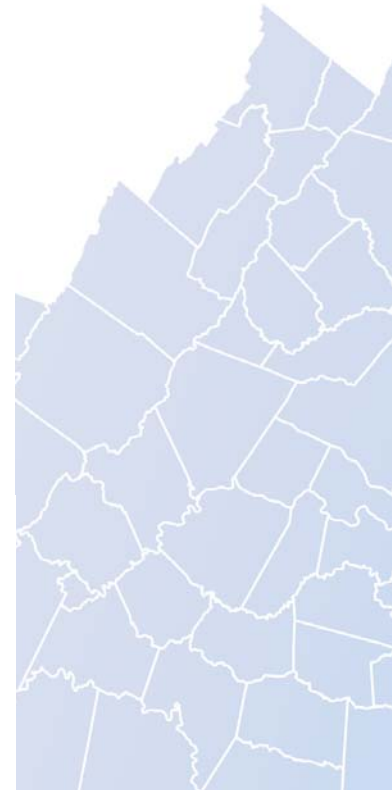


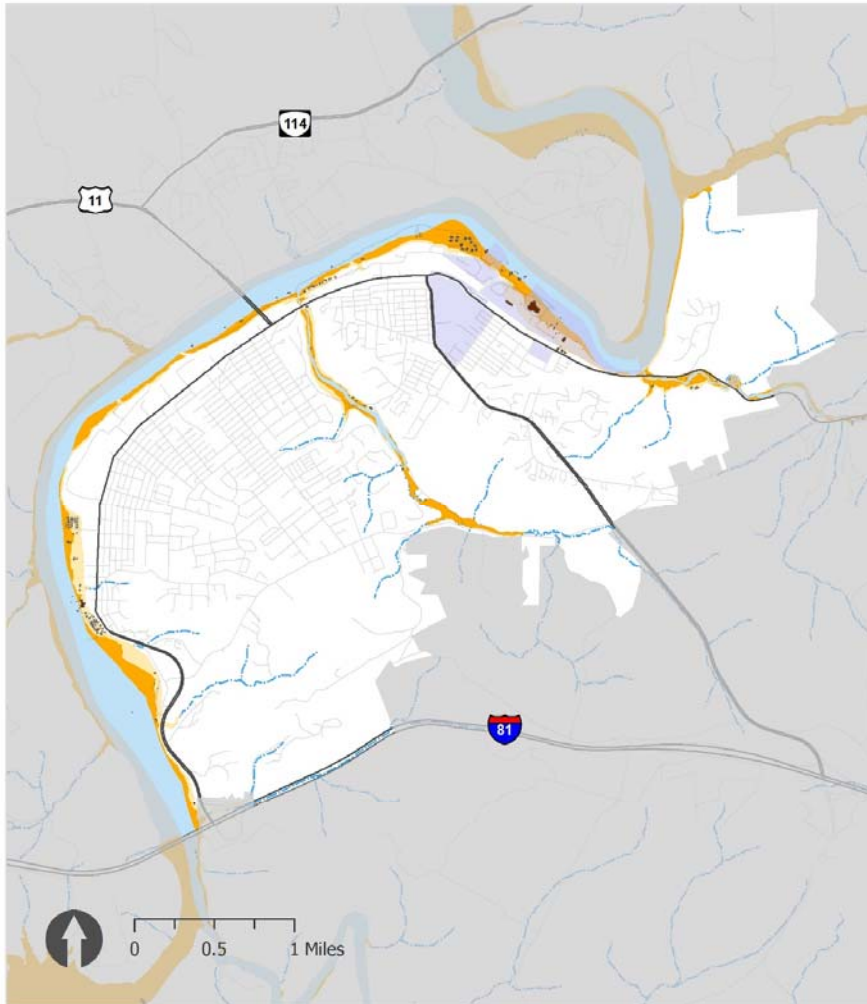


## Flood Zones Town of Pulaski New River Valley

-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.

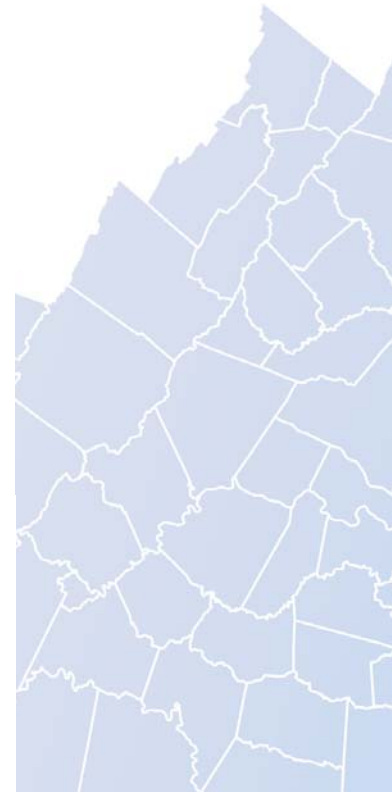




## Flood Zones City of Radford New River Valley

-  Buildings in Flood Zone
-  Floodway
-  100-Year Flood Zone
-  500-Year Flood Zone
-  Hydrology
-  Radford University

Created by NRVRC, 2016. Sources: Federal Emergency Management Agency; Radford University; U.S. Census Bureau; U.S. Geological Survey; Virginia Geographic Information Network.





# Total Exposure in Floodplain (TEIF)

	Special Flood Hazard Area (SFHA) (acres)	% of Total Jurisdiction Area	Total Potential Building Exposure to Flooding in SFHA*	% of Total Potential Building Exposure
Floyd County	2,351	1.0%	\$5,172,000	0.4%
Giles County	7,711	3.3%	\$113,386,000	6.5%
Montgomery County	10,278	4.1%	\$180,285,000	1.8%
Pulaski County	12,265	5.8%	\$250,041,000	6.7%
Radford City	766	11.9%	\$28,521,000	1.8%
Blacksburg	348	2.8%	\$31,650,000	0.7%
Christiansburg	175	2.0%	\$16,575,000	0.6%
Floyd	0	0.0%	\$0	0.0%
Glen Lyn	153	35.4%	\$1,568,000	12.5%
Narrows	190	22.7%	\$21,821,000	9.4%
Pearisburg	19	0.9%	\$0	0.0%
Pembroke	126	18.1%	\$17,750,000	19.0%
Pulaski	431	8.5%	\$189,973,000	18.3%
Rich Creek	74	14.7%	\$14,359,000	14.5%

County figures are inclusive of municipalities. Color reflects relative value compared to other cities/towns or counties.

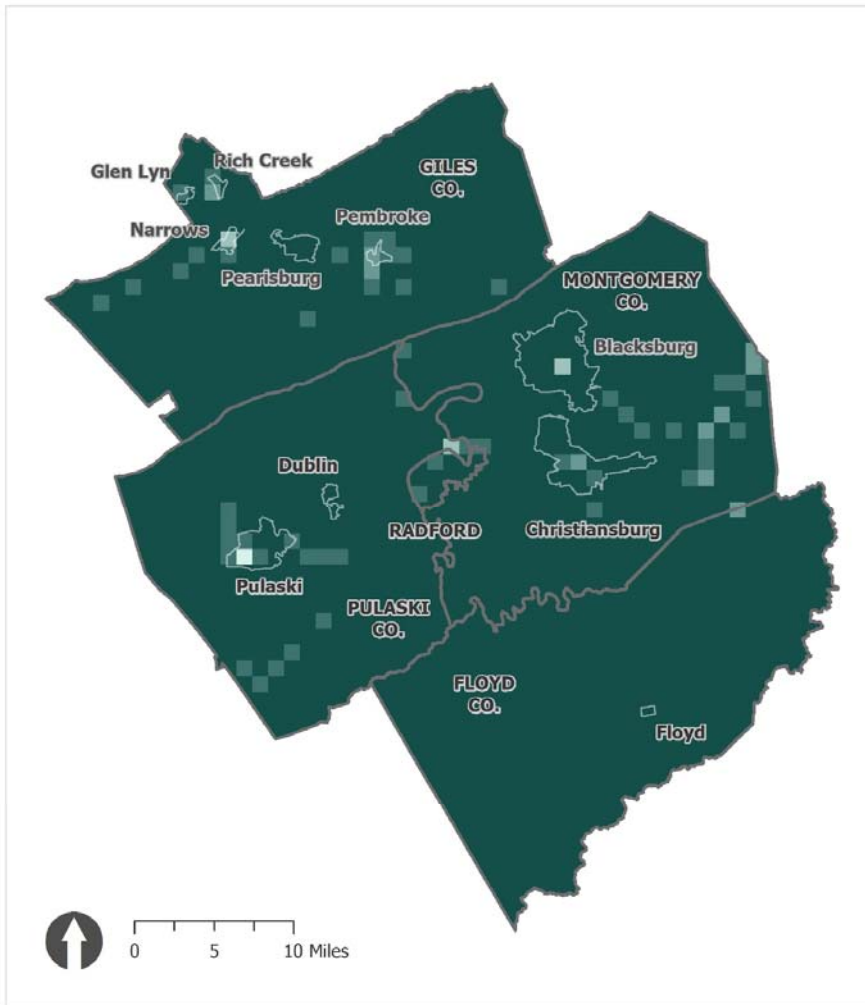
\*figures rounded to thousands

Source FEMA TEIF v. 2.0

# Total Exposure in Floodplain (TEIF)

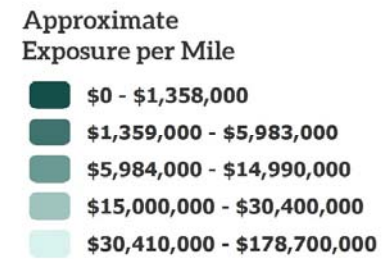
	SFHA (acres)	z-score	Population in SFHA**	z-score	Exposure per Acre of SFHA	z-score	Persons per Acre of SFHA	z-score
Floyd County	2,351		83		\$2,200		0.0	
Giles County	7,711		839		\$14,704		0.1	
Montgomery County	10,278		2,732		\$17,541		0.3	
Pulaski County	12,265		1,226		\$20,387		0.1	
Radford City	766	2.35	528	1.06	\$37,225	-0.69	0.7	-0.44
Blacksburg	348	0.43	726	1.88	\$90,956	-0.27	2.1	1.69
Christiansburg	175	-0.36	248	-0.09	\$94,936	-0.24	1.4	0.68
Floyd	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Glen Lyn	153	-0.46	9	-0.88	\$10,268	-0.91	0.1	-1.40
Narrows	190	-0.29	128	-0.38	\$115,143	-0.08	0.7	-0.46
Pearisburg	19	-1.08	0	-1.02	\$0	-0.99	0.0	-1.49
Pembroke	126	-0.58	205	-0.08	\$141,011	0.13	1.6	0.99
Pulaski	431	0.81	503	1.25	\$441,276	2.50	1.2	0.29
Rich Creek	74	-0.82	79	-0.64	\$194,270	0.55	1.1	0.14

\*\*Calculated using 2010 Census blocks, not building footprints.



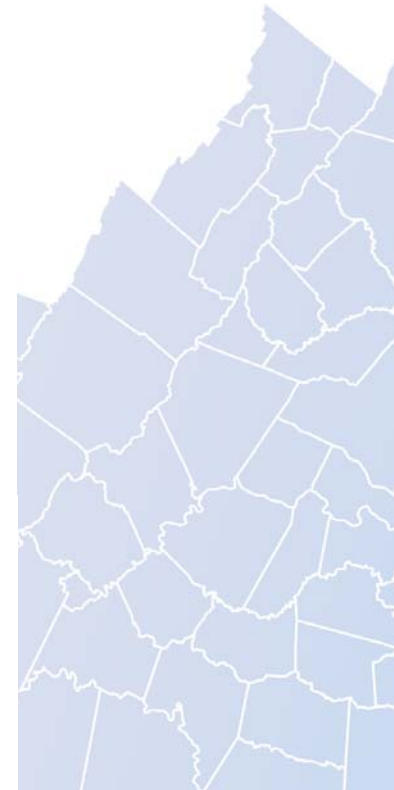
## Building Exposure in the 100-Year Flood Zone

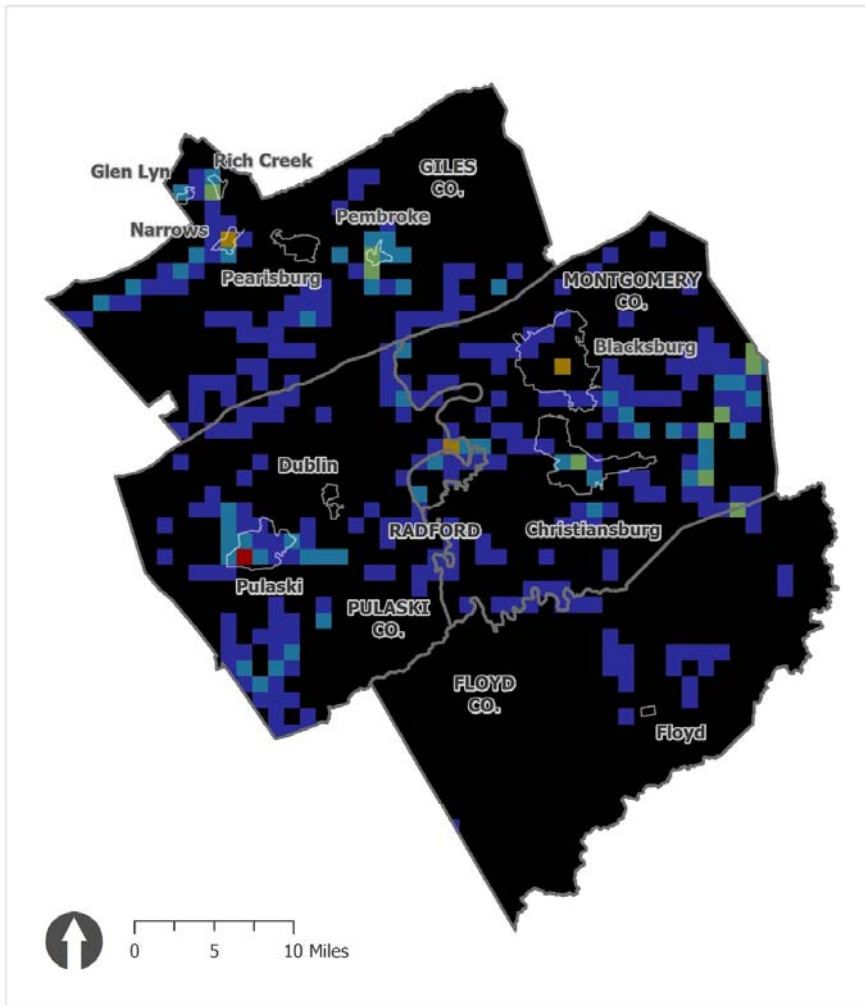
### New River Valley



Based on Total Exposure in Floodplain (TEIF v.2 ) estimates. Building centroids spatially joined to 1-mile grid cells. Jenks natural breaks distribution.

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





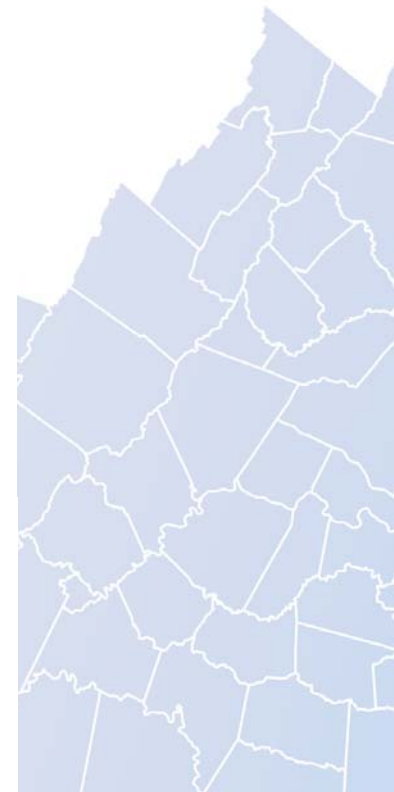
## Building Exposure in the 100-Year Flood Zone

### New River Valley



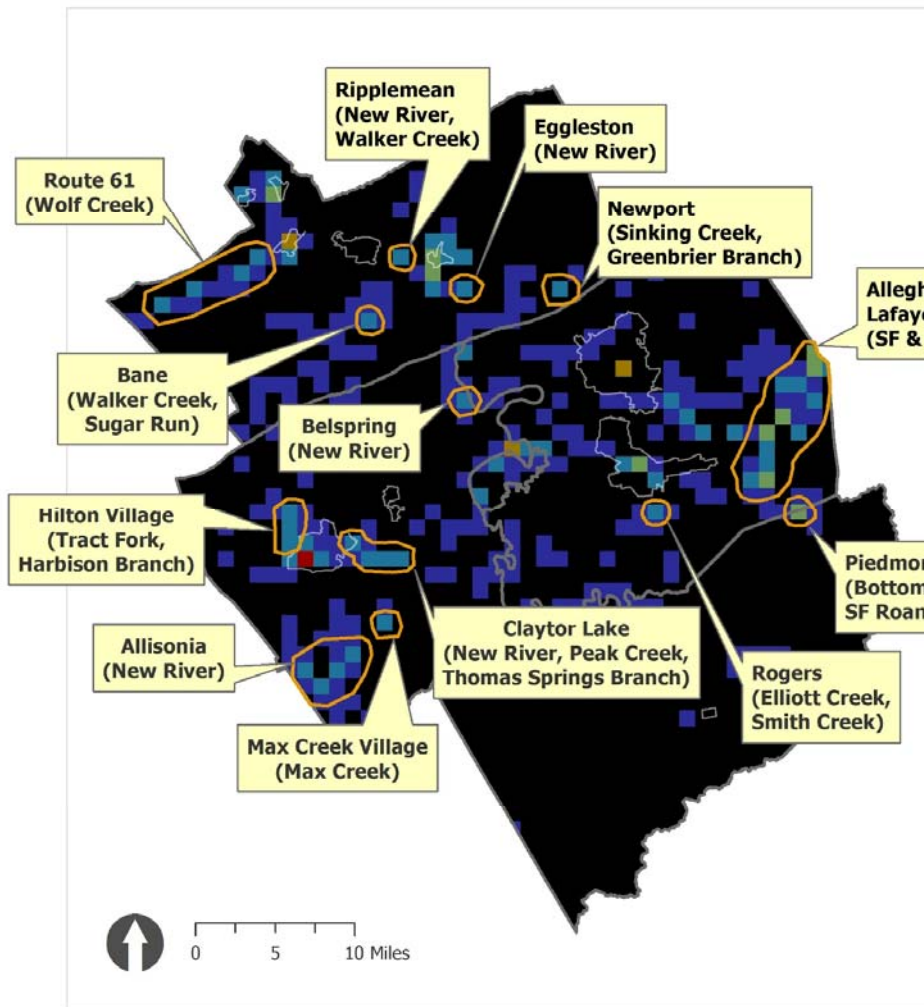
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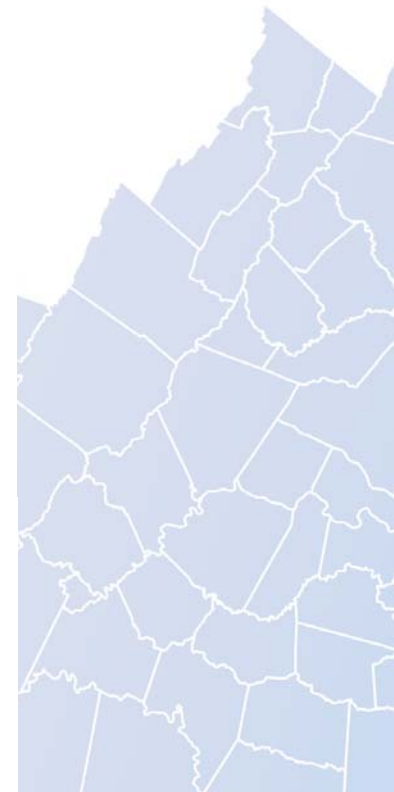
## Building Exposure in the 100-Year Flood Zone

New River Valley



Based on Total Exposure in Floodplain (TEIF v.2 ) estimates. Building centroids spatially joined to 1-mile grid cells. Jenks natural breaks distribution.

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







# Goals & Strategies

- **Mission:** Minimize the loss of life and property to natural hazards by focusing on likely events, high-risks areas, and cost-effective mitigation opportunities.
- Regional and local strategies in support of goals
- Strategies can include
  - Education
  - Regional Cooperation
  - Capital improvement projects
  - Development and planning guidelines



# Wrap up

- Questions?
- Next steps for the plan
- Next meeting – Steering Committee, March 2, 10:30 am
- Contact information for NRVRC
  - Christy Straight ([cstraight@nrvrc.org](mailto:cstraight@nrvrc.org))
  - Michael Gottfredson ([michaelg@nrvrc.org](mailto:michaelg@nrvrc.org))
  - Zach Swick ([zswick@nrvrc.org](mailto:zswick@nrvrc.org))
  - 540.639.9313

Thank you for coming!