Mount Rogers Planning District's

Pre-Disaster Hazard Mitigation Plan

MOUNT ROGERS
SOUTHWEST VIRGINIA

Prepared by the Mount Rogers Planning District Commission for the Counties of Bland, Carroll, Grayson, Smyth, Washington, and Wythe, the Cities of Bristol and Galax, and the Towns of Abingdon, Chilhowie, Damascus, Fries, Glade Spring, Hillsville, Independence, Marion, Rural Retreat, Saltville, Troutdale, and Wytheville.

Funding through the Virginia Department of Emergency Management and the Federal Emergency Management Agency.

SW VA *A different side of Virginia*

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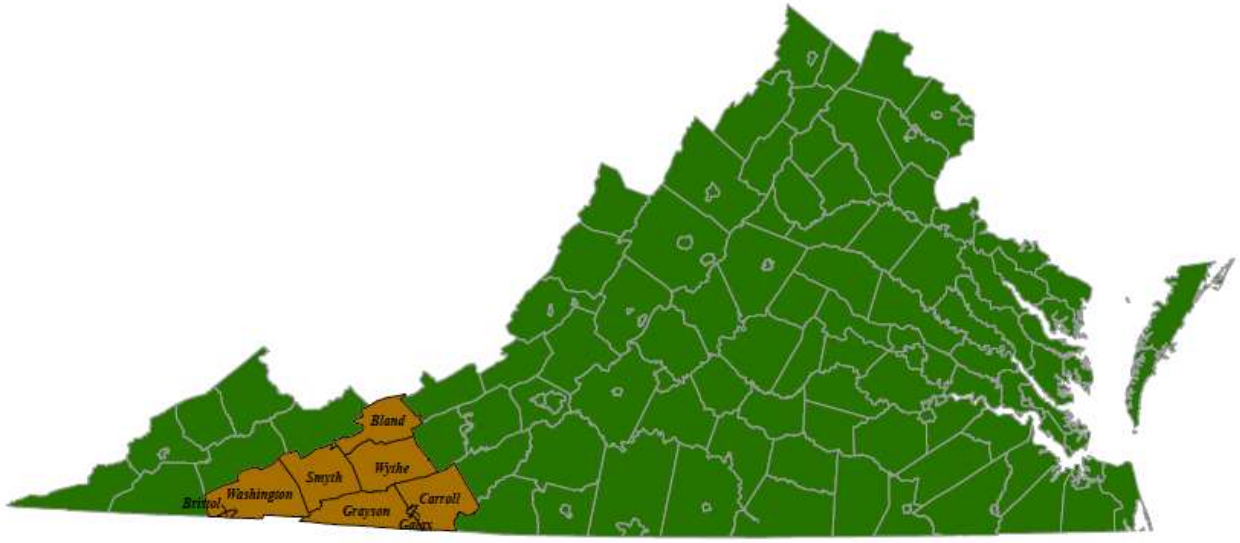
INTRODUCTION

The Mount Rogers Hazard Mitigation Plan 2023 update is a revision to the region's original plan, adopted and approved by FEMA in December 2005. In this updated plan, new data and analysis has improved the hazard identification and risk assessment used to determine mitigation strategies. All sections of this plan have been updated to include the newest information and data available. In the past five years, the participating local governments (Bland, Carroll, Grayson, Smyth, Washington, and Wythe Counties, the Cities of Bristol and Galax, and the Towns of Abingdon, Chilhowie, Damascus, Fries, Glade Spring, Hillsville, Independence, Marion, Rural Retreat, Saltville, Troutdale, and Wytheville), have participated in a yearly overview and update of the strategies and goals set forth in the original plan.



The Pre-Disaster Hazard Mitigation Update is meant to describe natural hazards and their impacts to people and property; recommend mitigations to reduce or eliminate those hazards; and outline the strategy for maintaining and updating the Plan.

This Plan addresses natural hazards of importance to the Mount Rogers Planning District region of southwest Virginia. This is a rural, mountainous region covering 2,770 square miles that stands within both the Ridge & Valley and Blue Ridge geologic provinces. This plan will focus primarily on natural hazards: dam safety, drought, earthquakes, flooding, karst & sinkholes, landslides, severe winter storms/ice, thunderstorms/lightning, tornadoes/hurricanes, wildfires, and windstorms.

HAZARD MITIGATION PLANNING

The purpose of this plan is to meet the requirements set forth in the Disaster Mitigation Act 2000 (DMA 2000). The DMA 2000 requires state and local government to identify hazards, assess their risks and community vulnerability, and to describe actions to mitigate those risks and vulnerabilities. The plan is meant to be a framework for decreasing needs for post disaster funds for recovery and reconstruction through pre-disaster actions.

Adoption of the Hazard Mitigation Plan and approval from FEMA is required for localities to remain eligible to apply for the six Hazard Mitigation Assistance (HMA) Programs. They include:

- Building Resilient Infrastructure and Communities (BRIC)
- Flood Mitigation Assistance (FMA)
- Hazard Mitigation Grant Program (HMGP)
- Fire Management Assistance Grant (FMAG)
- Pre-Disaster Mitigation (PDM)
- Safeguarding Tomorrow through Ongoing Risk Mitigation (STORM)

Adoption of this plan is also required to receive a declaration of a federal major disaster or emergency from FEMA.

There are four basic phases of emergency management: mitigation, preparedness, response, and recovery. Preparedness and mitigation measures occur prior to a disaster event. Preparedness refers to plans and strategies for efficiently handling disasters as they occur. Response and recovery occur during and after a disaster event, respectively, to return the community to normal operations as quickly as possible. Mitigation includes the long-term strategies determined to reduce risk to life and property from a disaster event.

The benefits of planning to mitigate for natural hazards include a systematic approach for identifying hazards, their risks, and strategies for minimizing those risks. In planning prior to a disaster, the high emotions and rushed environment are absent allowing a diverse group of stakeholders to collaborate to develop strategies from which the community derives the most benefits. The opportunities offered by approaching mitigation planning proactively allow local communities to shape not only post-disaster recovery, but also achieve additional community objectives, such as recreation and housing and economic development.

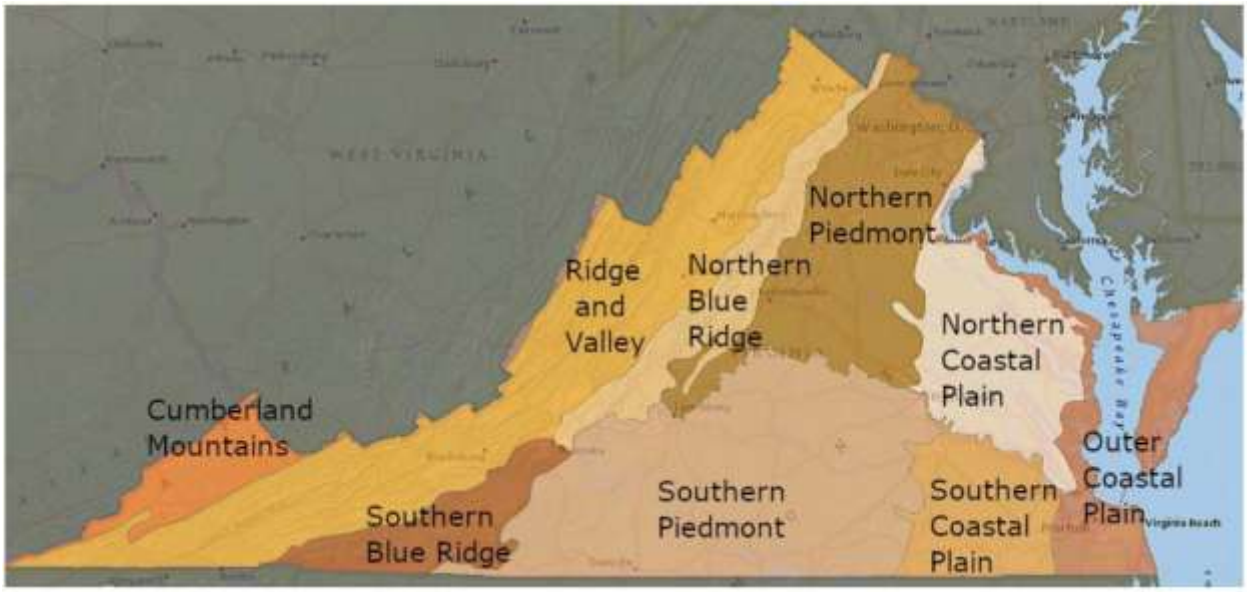
Implementation of mitigation strategies is the final step of these planning efforts. Mitigation strategies can take many forms, most commonly directed towards flooding, hurricanes, and

earthquakes, three historically catastrophic events. The true community benefits of mitigation planning are not realized until the construction or installation of these projects is completed.

Community Profile

Natural Features

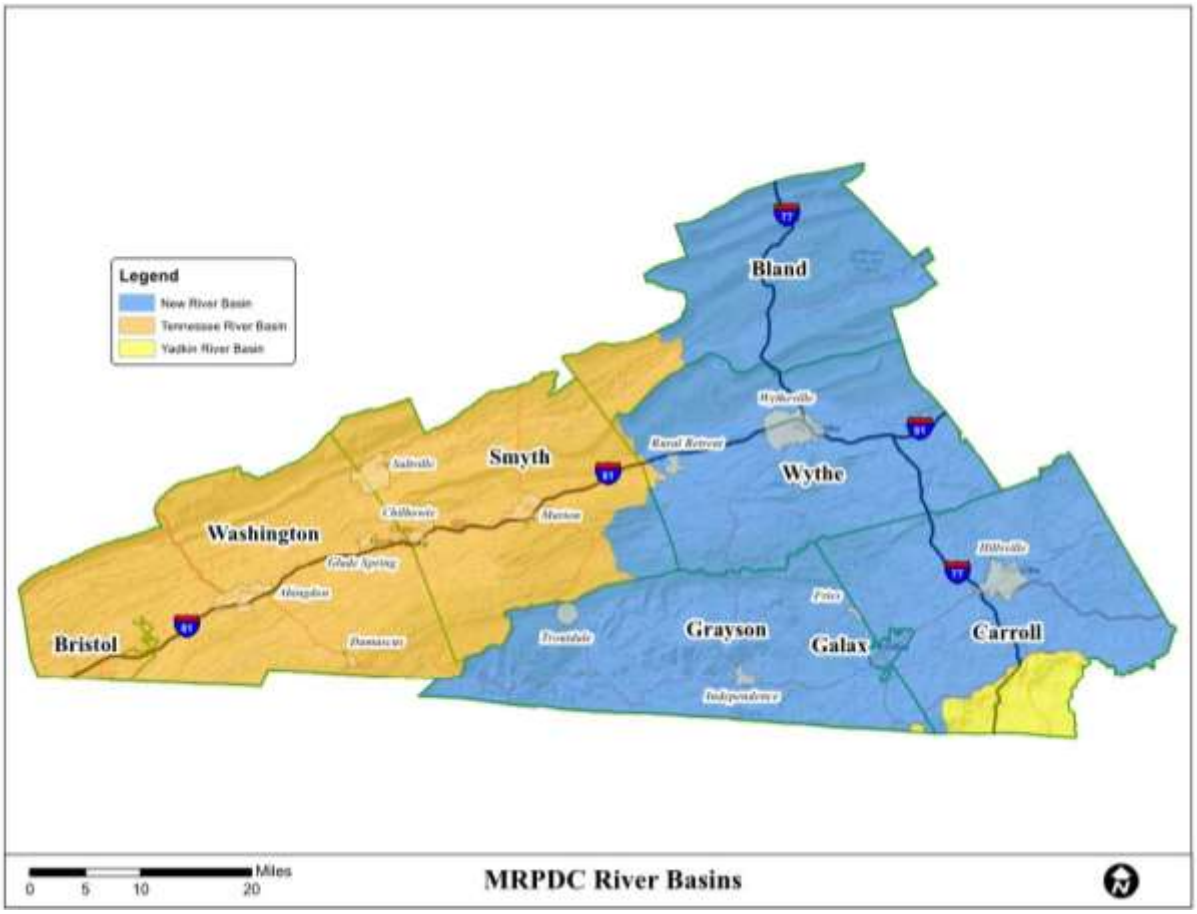
The region covers 2,777 square miles and stands within both the Ridge & Valley and the Blue Ridge geologic provinces of Virginia. An image (Physiographic Regions of Southwest Virginia) is shown below.



In the Ridge & Valley section, the land is characterized by valleys with low to moderate slopes underlain by carbonate rocks; this area starts in Bristol and runs in a northeasterly direction through Washington, Smyth and Wythe counties in a track toward Roanoke. Elevations generally range between 1,200 and 2,300 feet. The Blue Ridge portion generally includes Grayson and Carroll counties. The land appears as a broad upland plateau with moderate slopes. The elevations are higher, generally ranging from 2,400 to 3,000 feet, and sometimes much higher. Mount Rogers itself, located near the junction of Grayson, Smyth and Washington counties, stands at more than 5,729 feet.

Natural Resources

The principal watersheds that drain the region include the Holston River system (including the North, South and Middle Forks), the New River, and a small portion of the Upper Yadkin River drainage as shown on the map below.



The Holston River Basin flows in a southwesterly direction to join with the Tennessee River system. The New River flows in a northerly direction into West Virginia, while the Upper Yadkin flows south into North Carolina. Much of the Mount Rogers region contains state and national forest, including the Mount Rogers National Recreation Area. The mountainous terrain generally precludes intensive development other than in the limited valley regions of the district.

Mineral resources of the region include limestone, sandstone, granite, gravel, sand, shale, iron oxide, quartzite and salt. All are actively mined, according to the state Department of Mines, Minerals and Energy. Historically important minerals in the region included coal, iron, lead, zinc, salt, gold, and gypsum. The richer mineral resources of the west have long since replaced much of the local mining activity in the Mount Rogers region.

Temperatures and Climate

The local region stands within a temperate climate zone influenced by the mountainous nature of southwest Virginia. Temperatures range from average lows of 15^0 F-25^0 F (in January) to average highs of 80^0 F-86^0 F (in July). The differing elevations and lay of the land account for the range of differences in local weather. The MRPDC ranges in elevation from 5,729 feet at its

highest point on Mount Rogers in western Grayson County, to 1,110 feet along Lovills Creek on the Carroll Surry County line. Local annual precipitation also is highly variable. It ranges from 62" annually in the highest mountains (Mount Rogers and surrounding area in the Blue Ridge) to 45" annually in other parts of the district. Weather patterns and climate are influenced by the Appalachian and Blue Ridge Mountain ranges, the direction of airflow and the effects of the major river valleys. Weather systems typically move from west to east. Cloud systems may pass up and over the mountains. As clouds rise, their moisture content condenses and falls as rain or snow; that often results in heavy precipitation on the western slopes of the mountains and little or no precipitation on the eastern (or rain shadowed) slopes of the mountains. Weather systems and storms also may follow the river valleys, running parallel to the mountain ranges.

Political Boundaries

The Mount Rogers region, as designated by the Virginia General Assembly, includes six counties Bland, Carroll, Grayson, Smyth, Washington, and Wythe, two cities Bristol and Galax, twelve towns Abingdon, Chilhowie, Damascus, Fries, Glade Spring, Hillsville, Independence, Marion, Rural Retreat, Saltville, Troutdale, and Wytheville.

Key transportation systems within the region include the interstate highways (I-81 and I-77), U.S. Route 58 and U.S. Route 11, several local airports, some limited public transit service, and service from local taxicabs and Greyhound Bus Lines. The Norfolk Southern Railway is an important private hauler of freight. Passenger rail service presently is lacking in the region.

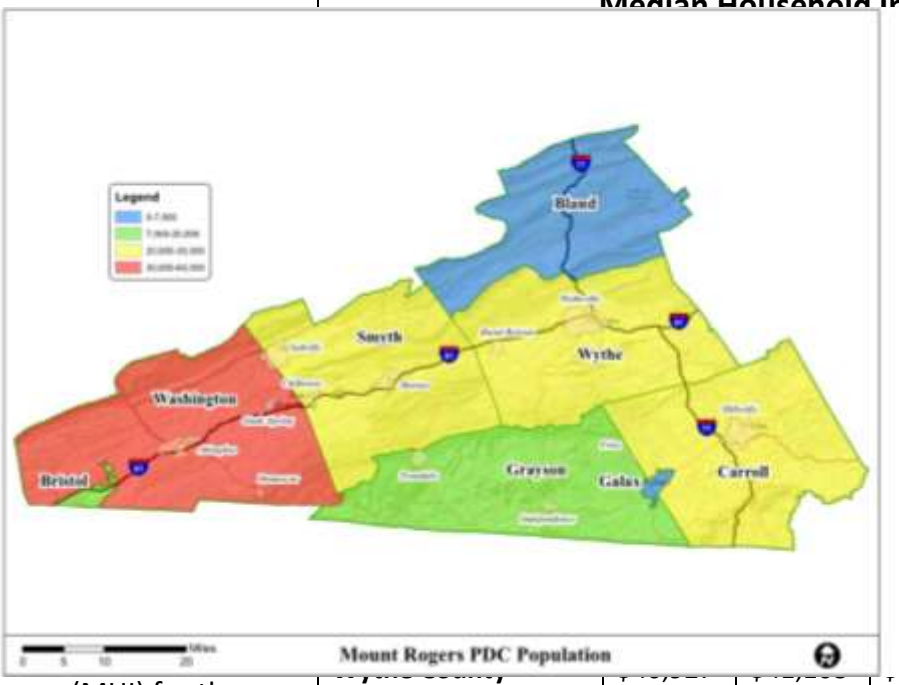
The region is variable in nature. It ranges from the very rural character of Bland County, with a population of 6,270 (a decrease of 3.7% since the last plan update) to the rapidly urbanizing character of the largest county, Washington, with a growing population of 53,935 (an increase of 0.2% since the last plan update). Grayson and Carroll counties are known as places for second home development, especially in areas with views of the New River. The two mid-size counties, Smyth and Wythe, with populations of roughly 30,000 each, serve as centers of commerce and manufacturing. The three largest towns, each with populations greater than 6,000, are Abingdon, Marion, and Wytheville.

Locality	2018	2023	% Population Change
Bland County	6,511	6,270	-3.7%
Carroll County	29,212	29,155	-0.2%
Grayson County	15,669	15,333	-2.1%
Smyth County	30,686	29,800	-2.9%
Washington County	53,789	53,935	0.2%
Wythe County	28,723	28,920	0.7%

Population

City of Bristol	17,160	17,219	0.3%
City of Galax	6,748	6,720	-0.4%
Mount Rogers Planning District	188,498	187,385	-0.6%
Source: Weldon Cooper Center for Public Service, 2018 and 2023 Population Estimates			

As of 2023, the region-wide population numbered 187,385, according to the Weldon Cooper Center for Public Service at the University of Virginia. The population of the Mount Rogers Region was 188,498 in 2018. This shows a decrease in population of 0.6% from the previous Hazard Mitigation update. The decline is distributed unevenly within the region. The City of Bristol, Washington County, and Wythe County saw slight increases in population. Bland County, Carroll County, Grayson County, Smyth County, and the City of Galax, saw a slight decrease in population in the past five years since the last update of the Hazard Mitigation Plan.



Median Household Income*

	018	2022	% Change 2009 to 2022
	61,937	$74,755	49%
	72,600	$85,838	45%
	47,681	$55,722	41%
	36,903	$43,123	41%
	41,517	$51,111	49%
	36,571	$44,706	38%
	37,550	$45,414	38%
	40,972	$45,484	28%
	45,510	$61,686	52%
	46,345	$47,257	15%

Source: U.S. Census Bureau, Small Area Income and Poverty Estimates

Median household income (MHI) for the region as of 2022 ranged from $43,123 in the City of Bristol to $61,686[1], which lags far behind the statewide level of $85,838[1], as reported by the U.S. Census Bureau. Incomes in the Mount Rogers region have traditionally lagged behind statewide averages, but the percentage change in MHI from 2009 to 2022 shows how badly the median income in some areas in the region has fallen behind the national average. Throughout the Commonwealth, MHI increased by 45% from 2009 to 2022, while in Wythe County, the increase was only 15%, causing Wythe County to fall to only 55%

[1] U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates

($47,257) of Virginia's MHI ($85,838). At the same time, unemployment generally runs higher than the statewide average, reflecting disparities between the high job growth rates in northern Virginia compared with job growth rates in southwest Virginia. In 2022, the region had an unemployment rate of 3.1%, while the state had a rate of 2.9%.

Economy

Manufacturing stands as one of the key employment sectors for the Mount Rogers region, though foreign competition is undermining the sector. From 2000 through 2017, the region lost over 10,000 manufacturing jobs, with the total going from 24,274, to 13,477, a decrease of 44%. By end of the 2022, the number of manufacturing jobs had stabilized at 12,974, a decrease of only 3.7% over the 6-year period. The sector includes production of refrigeration and heating equipment, clothing, truck trailers and motor vehicle parts, glass products, furniture, wood products, hardware, sporting and athletic goods, and mining equipment.

The next largest employment sector falls in the government category, with 13,907 jobs in second quarter 2023, 9,796 in local government, 3,605 in state government, and 506 in federal government. The next highest employments by industry are manufacturing (13,131), retail trade (9,599), and health care and social assistance (8,559).

Agriculture and forestry offer relatively few jobs but remain an important industry to the Mount Rogers region. Chief products include livestock, poultry, with a growing sector raising produce. Christmas trees, raised in the higher elevations, are also important to the region.

Planning Process

Planning Team

Since 2022 the Mount Rogers Planning District staff has been working with its localities to update the Pre-Disaster Hazard Mitigation Plan that was approved by FEMA in 2019. The staff at Mount Rogers has facilitated a yearly update of the Hazard Mitigation Plan since 2020. The hazard mitigation planning committee was composed of county administrators, town managers, emergency management personnel, local and state personnel, regional governmental employees, Mount Rogers Health District, members of the business community, and any interested stakeholders from the public. The planning committee oversaw the plan update process as well as coordinated with local fire, rescue, and police personnel.

Planning Committee Member	Representing	Title/Department
Tim Estes	Abingdon	Fire Chief
Jenna Dunn	Bland County	911 Emergency Services Coordinator
Mike Armstrong Anna Lester	Bristol	Emergency Management Deputy Emergency Management
Gary Bergeron	Carroll County	Emergency Services Fire & Rescue
John Clark Dave Haynes	Chilhowie	Town Manager EMS Chief
Gavin Blevins	Damascus	Town Manager, Planner
Brian Reed	Fries	Town Manager, Planner
James Cox	Galax	Emergency Services Coordinator
Cecile Rosenbaum	Glade Spring	Town Manager
Paul Hoyle	Grayson County	Emergency Services Coordinator
Retta Jackson	Hillsville	Town Manager
Paul Hoyle	Independence	Emergency Services Coordinator
Bill Rush	Marion	Town Manager
Jason Childers	Rural Retreat	Town Manager
Brian Martin	Saltville	Town Manager, Planner
Curtis Crawford Marty Lewis	Smyth County	Emergency Services Coordinator Dep. Emergency Services Coordinator
Aaron Sizemore	Troutdale	Town Manager, Planner
Theresa Kingsley	Washington County	Emergency Management Coordinator
Jimmy McCabe Chuck Parnell	Wythe County	Emergency Management Coordinator Emergency Management Coordinator
Brian Freeman	Wytheville	Director of Public Safety
Michael Whiteaker	Virginia Dept. of Health	Public Health Emergency Coordinator
Phil Hysell	NOAA	Warning Coordination Meteorologist
Sara Harrington	VDEM	Planner Region 4
Anna Lester	VDEM	All Hazards Planner
Steven Bricker	DCR	Regional Dam Safety Manager
James Dillon	MRPDC	GIS Director

The steering committee is composed of stakeholders throughout the region who use the Hazard Mitigation plan to support projects within their localities, regional organizations, school systems, and the health department.

Representing	Steering Committee Members
Smyth County	Shawn Utt
Smyth County	Clegg Williams
Wythe County	Stephen Bear
Mount Rogers Planning District Commission	Jimmy Moss
Mount Rogers Planning District Commission	Rocky Warren
Bland County	Cameron Burton
Bland County	Rodney Ratliff

Bland County	Eric Workman
Wythe County	Matt Hankins
Town of Wytheville	Chris Slimp
Mount Rogers Planning District Commission	Mason Gragg
Town of Marion	Jamie Hall
Town of Wytheville	John Woods
Town of Abingdon	Mayana Rice
City of Bristol	Michael Pollard
Town of Abingdon	Michael Surrett
Carroll County	Ronald Newman
Town of Saltville	Todd Young
Washington County	Tom Taylor
City of Galax	Trevor Hutchens
Grayson County	Mitch Smith
Public Schools	Gary Roberts
Bristol Metropolitan Planning Organization (MPO)	Micah Bray
Bristol Metropolitan Planning Organization (MPO)	Tyler Gillenwater
City of Bristol (Tennessee)	Tony Jemes
Virginia Department of Transportation Division of Locally Administered Projects	John Dew
Virginia Department of Transportation Division of Locally Administered Projects	Roger Musser
Virginia Department of Transportation Division of Locally Administered Projects	Reggie Plummer
Virginia Department of Transportation Division of Planning	Blake Ailor
New River Valley Regional Commission	Hannah Schelthoff
New River Valley Regional Commission	Christy Straight
Virginia Department of Transportation Division of Planning	Samantha Farmer
Virginia Department of Conservation and Recreation	Sidney Huffman

Plan Participation

The tables below outline the localities and agencies that had input in developing the Hazard Mitigation Plan update. Some participated in the planning committee that met at the Mount Rogers PDC offices. Others participated by personal visits, phone calls, or through email. There is also a list of localities that participated in the plan update, as well as the original drafting of the Hazard Mitigation Plan.

Locality Participation 2005, 2011, 2017, & 2023

Locality	2005 Participation	2011 Participation	2017 Participation	2023 Participation
Abingdon	X	X	X	X
Bland County	X	X	X	X
Bristol	X	X	X	X
Carroll County	X	X	X	X

Chilhowie	X	X	X	X
Damascus	X	X	X	X
Fries	X	X	X	X
Galax	X	X	X	X
Glade Spring	X	X	X	X
Grayson County	X	X	X	X
Hillsville	X	X	X	X
Independence	X	X	X	X
Marion	X	X	X	X
Rural Retreat	X	X	X	X
Saltville	X	X	X	X
Smyth County	X	X	X	X
Troutdale	X	X	X	X
Washington County	X	X	X	X
Wythe County	X	X	X	X
Wytheville	X	X	X	X

Planning Process

The Mount Rogers Planning District Commission initiated the plan update process in the summer of 2022. A regional kick-off meeting was held at the offices of the Mount Rogers Planning District Commission in Marion, Virginia on October 19th, 2022. At this meeting, the MRPDC and the stakeholders from the various localities reviewed the process for updating the plan, as well as outlining how the old plan would be improved upon.

The Mount Rogers staff met with the steering committee members weekly or monthly in small groups or on a one-on-one basis over the next year. All members were also contacted through telephone conversations or emails. A second meeting at the Mount Rogers PDC was called on January 25th, 2023. A third meeting was held at the Mount Rogers PDC on April 26th, 2023. A fourth meeting was held with mostly transportation officials and other members of the community outside of local government on July 26th, 2023. Please see the table below for a listing of meetings and conversations with stakeholders.

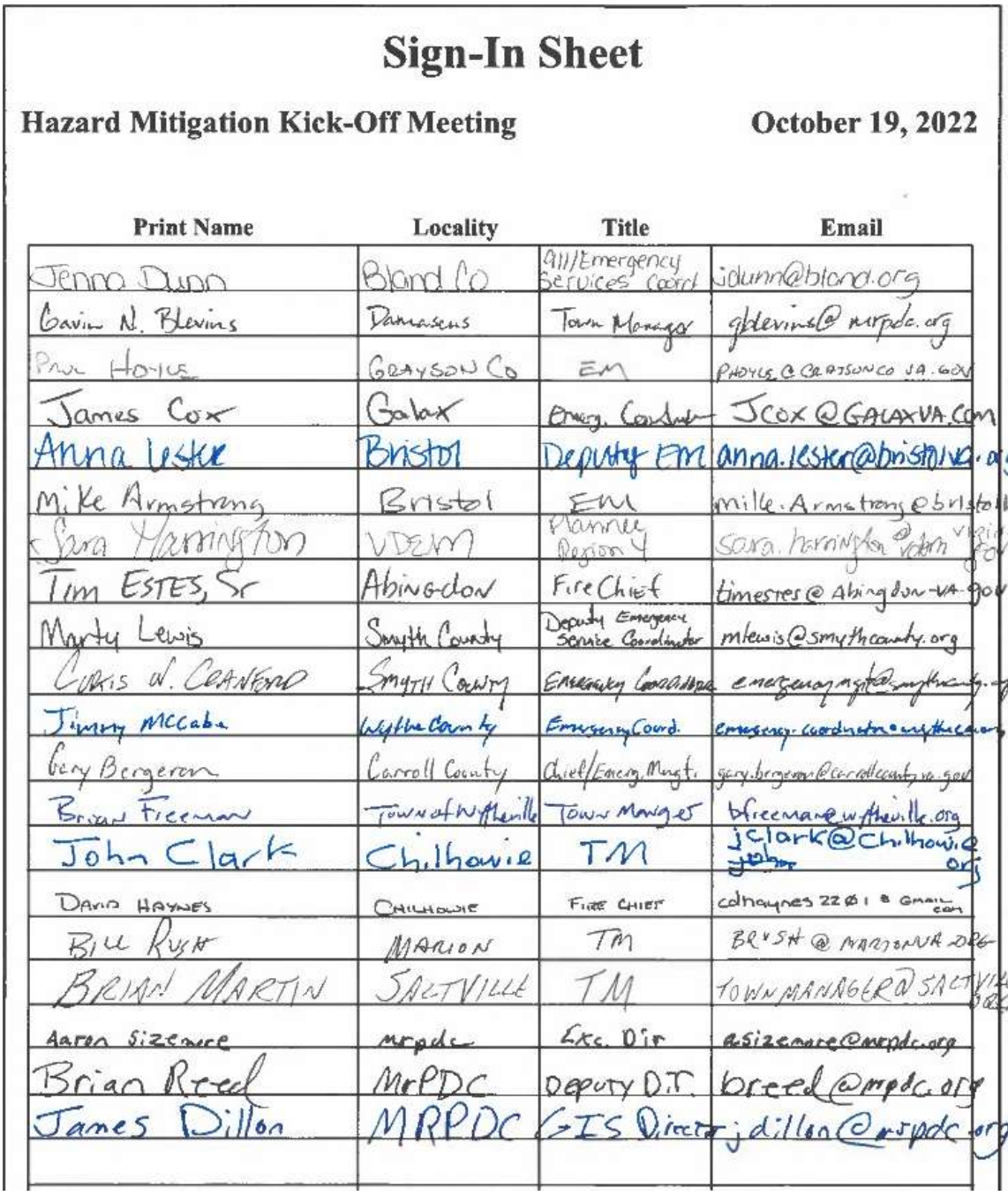
Meetings/Conversations with Stakeholders	
Month	**Stakeholder (Day of Month)**
October 2022	Kickoff Meeting (19) All Localities, VDEM, MRPDC
November 2022	City of Bristol (15)
December 2022	Marion (5), Abingdon (16), Glade Spring (16), Washington County (19), Chilhowie (22), Damascus (22) Fries (29), Independence (29), Troutdale (29)
January 2023	Bland County (4), Carroll County (17), Smyth County (20), All Localities, MRPDC (25)
February 2023	Wytheville (9), Saltville (25), Hillsville (23), Wythe County (28), Wytheville (28)

April 2023	All Localities, MRPDC (26)
May 2023	Galax (17)
July 2023	Local Government, VDOT, Other Public Members, MRPDC (26)
August 2023	Wytheville (14), Wythe County (14)
October 2023	VDEM, MRPDC (27)

The committee members first reviewed the existing data that was included in the last Hazard Mitigation Plan update. Throughout the 2024 Hazard Mitigation Plan Update process the materials from each section of the original plan as well as any new changes were looked over. Several changes were made to almost every locality in the Mount Rogers Planning District. Focus and discussion were placed on each hazard identified to be a potential threat to the district. The committee brought in their own knowledge of any disasters that had happened in their districts within the past five years since the plan's original adoption. The committee took these ideas back to their localities and met with their local representatives in the emergency services field and gathered any additional information they could find concerning how natural disasters are dealt with, as well as any areas where the localities had vulnerabilities or difficulties in responding to disasters. All meetings were open to the public.

Following any reviews of the data gathered, the group then brainstormed mitigation objectives and strategies to include in the plan update. The final component of the committee meetings was a capabilities and vulnerability assessment. Each member of the committee was encouraged to discuss with any person or group, or with an agency or the public that may have valuable input to add to the plan update. This cast a wider net enabling the steering committee members to consult with many people outside of local government.

The following tables show attendance at periodically called in-person meetings at the Planning District Commission office throughout the planning process.



Sign-In Sheet

Hazard Mitigation Kick-Off Meeting **October 19, 2022**

Print Name	Locality	Title	Email
Jenna Dunn	Bland Co	911/Emergency Services Coord	jdunn@bland.org
Gavin N. Blevins	Damascus	Town Manager	gblevins@mrpdc.org
Paul Hoyle	Grayson Co	EM	PHOYLE@GRAYSONCOVA.GOV
James Cox	Galax	Emerg. Coordinator	JCOX@GALAXVA.COM
Anna Lester	Bristol	Deputy EM	anna.lester@bristolva.org
Mike Armstrong	Bristol	EM	mike.Armstrong@bristolva
Sara Harrington	VDEM	Planner Region 4	sara.harrington@vdem.virginia.gov
Tim ESTES, Sr	Abingdon	Fire Chief	timestes@Abingdon-VA.gov
Marty Lewis	Smyth County	Deputy Emergency Service Coordinator	mlewis@smythcounty.org
Curtis W. Crawford	Smyth County	Emergency Coordinator	emergencymgt@smythcounty.org
Jimmy McCabe	Wythe County	Emergency Coord.	emergency.coordinator@wythecounty
Gary Bergeron	Carroll County	Chief/Emerg. Mngt.	gary.bergeron@carrollcountyva.gov
Brian Freeman	Town of Wytheville	Town Manager	bfreeman@wytheville.org
John Clark	Chilhowie	TM	jclark@Chilhowie.org
David Haynes	Chilhowie	Fire Chief	cdhaynes2201@gmail.com
Bill Rush	Marion	TM	BRUSH@MARIONVA.ORG
Brian Martin	Saltville	TM	TOWNMANAGER@SALTVILLEVA.GOV
Aaron Sizemore	mrpdc	Exc. Dir	asizemore@mrpdc.org
Brian Reed	MrPDC	Deputy D.T.	breed@mrpdc.org
James Dillon	MRPDC	GIS Director	jdillon@mrpdc.org

Kick Off Meeting October 19, 2022	
Attendee	**Representing**
Jenna Dunn	Bland County
Gavin Blevins	Damascus
Paul Hoyle	Grayson County
James Cox	City of Galax
Anna Lester	City of Bristol

Mike Armstrong	City of Bristol
Sara Harrington	VDEM
Tim Estes	Abingdon
Marty Lewis	Smyth County
Curtis Crawford	Smyth County
Jimmy McCabe	Wythe County
Gary Bergeron	Carroll County
Brian Freeman	Wytheville
John Clark	Chilhowie
David Haynes	Chilhowie
Bill Rush	Marion
Brian Martin	Saltville
Aron Sizemore	Troutdale
Brian Reed	MRPDC
James Dillon	MRPDC

Stakeholders Meeting January 25, 2023	
Attendee	**Representing**
Mitch Smith	Grayson County
Shawn Utt	Smyth County
Stephen Bear	Wythe County
John Clark	Chilhowie
Gavin Blevins	Damascus
Jason Childress	Rural Retreat
Todd Young	Saltville
Brian Freeman	Wytheville
Aaron Sizemore	MRPDC
Rocky Warren	MRPDC
James Dillon	MRPDC
Jimmy Moss	MRPDC

Stakeholders Meeting April 25, 2023	
Attendee	**Representing**
John Clark	Town of Chilhowie
Bill rush	Town of Marion
Steven bear	Wythe County
Mitch Smith	Grayson County
Cameron Burton	Bland county
Rodney Ratliff	Bland County

Shawn Utt	Smyth County
Gavin Blevins	City of Galax
Brian Martin	Town of Saltville
Brian Freeman	Town of Wytheville
MRPDC	Aaron Sizemore
MRPDC	Brian Reed

Transportation Stakeholders Meeting July 26, 2023	
Attendee	**Representing**
Cameron Burton	Bland County
Clegg Williams	Smyth County
Jamie Hall	Town of Marion
John Woods	Town of Wytheville
Mayana Rice	Town of Abingdon
Michael Pollard	City of Bristol
Michael Surrett	Town of Abingdon
Ronald Newman	Carroll County
Todd Young	Town of Saltville
Tom Taylor	Washington County
Trevor Hutchens	City of Galax
Gavin Blevins	City of Galax
Mitch Smith	Grayson County
Micah Bray	Bristol MPO
Tyler Gillenwater	Bristol MPO
Tony Jemes	City of Bristol (Tennessee)
John Dew	VDOT LAP
Roger Musser	VDOT LAP
Reggie Plummer	VDOT LAP
Blake Ailor	VDOT Planning
Samantha Farmer	VDOT Planning
James Dillon	MRPDC
Mason Gragg	MRPDC

Meeting Notes

2022 Hazard Mitigation Plan – Kickoff Meeting

Aaron Sizemore, Executive Director starts welcoming everyone, initiates introductions, then hands the planning process over to James Dillon.

Process is undertaken every five years – current plan expires February 2024, but has to be approved by VDEM, FEMA, and each locality.

Everyone has Recommended Mitigations (attached) list from their localities previously provided – this list needs to be updated. Projects for funding need to be included in this list, otherwise plan updates would be required.

1. Strategy & Mitigations List
    a. Needs to be updated by each locality
    b. Add town strategies separately listed
2. Hazard Mitigation Matrix & Risk Assessment
    a. Needs to be updated by each locality
    b. FEMA wants additional emphasis on this matrix section of plan
    c. Earthquake damage to independence school issue due to origin of earthquake out of state; didn't meet threshold for insurance claim (foundation cracks)
    d. Dam Safety Program funding; need to expand on the dam section of plan; DCR would be the contact; unregulated dams are significant safety hazard; leaning towards regulated dams…
    e. More is better related to the potential projects/risks/mitigation measures/hazards
    f. …once was referred to as "wish list"
    g. FEMA now wants points on a map for each project; specify projects
    h. *Repetitive Loss* – now in FEMA's hands, taken away from VDEM; DCR holding information
    i. Mine subsidence areas should be included on the list (man-made mines or natural)
    j. Now require a *Man-made Hazards* section in the Plan
    k. Saltville landslide affecting elementary school is an issue
    l. Wytheville failures in stormwater retention basins as a result of karst – EPA declared that they would have to register them as injection wells if unmitigated
    m. Information requested for location of abandoned mines
    n. Chemical spill areas: hazard areas in roads or rails that could/commonly cause these…
    o. Leave out hazmat concerns
    p. Now FEMA wants to see *Cyber-Security* in Plan under Man-made (system failures and intrusions)
    q. Need to have a section related to *pandemics*
    r. Contact Health Dept. emergency coordinator for related pandemic information
3. Capabilities Assessment
    a. Number of staff at each locality that can be dedicated to hazard mitigation
    b. Need to expand based on LCAR survey from localities
    c. LCAR doesn't explain coverage of towns within counties
    d. LCAR responses in Plan as appendix and referenced
    e. Should the towns even be listed? They can apply separately…. So yes
4. Local Hazard Events (since 2018)
    a. Update any events with adverse effects annually

b. Now includes cyber security events/outages
c. *Fusion Center* reports for cyber security events/intrusions

5. Other
    a. FEMA wants this Plan used daily, so incorporation with other plans key
    b. Should be referenced in Comp Plans
    c. Can we get the towns in a room to facilitate? Yes, MRPDC will come to locality
    d. Need more updated damage cost numbers
    e. Numerous earthquakes are occurring in Grayson County from Faultline in North Carolina; 8-9 earthquakes have occurred in the last 6 months
    f. Fault line in Giles County earthquake occurrence
    g. 2019 Plan was most recent full adoption recirculate to group

2022 Hazard Mitigation Plan – FEMA Visit

Attendees:

FEMA: Mari Radford

MRPDC: Aaron Sizemore, James Dillon, Gavin Blevins

VDEM: Sara Harrington, Joseph Moore

Continue collecting disaster information for pre-disaster funding

Plan expires Feb 2024, MRPDC has already applied for HMGP funding 10 months ago.

Timeline - want to turn draft plan into VDEM by Aug 2023, this gives 6 months to review.

Regulation changes:

- now requires loss and repetitive loss data (only way to get is through the PIVOT system (Angela Davis has access)) – community has to send letter asking for the data.
    - Mari has a sample request letter to go with the protocol.
    - All land use authorities (localities) need to send letter – around 20 total
    - Submit letter to Sara and then to Angela (copy Bill Bradfield)
    - No CRS communities
    - Flash floods: Galax and Chilhowie, Fries school (2020)
    - Fries school damaged by earthquake – seismologist contact in Blacksburg
    - Fries school would most likely not be replaced due to lack of capacity, but perhaps would be combined if that school was to have catastrophic failure
    - Olsen Group HMGP grant hopefully can be extended to March 2023
    - All the states seem to be asking for HMGD funding extension
    - 8 localities with a total of 25 repetitive loss properties in most recent plan
    - What have localities spent ARPA funds on?
    - Integrate information from updated Comprehensive Plans
    - Oldest population in region 3
    - What has changed in terms of hazards/risks
    - Changes in demographics (population loss/ aging population)
    - Changes in development/land use patterns

- Equity
- Deloit Company hired to due equity study during COVID – get study!
- 41 communities identified as "vulnerable", 17 of which are here in VDEM region
- We participated in PIGD workshop prior to Kick-off (this was when Shannon was here)
- Technical assistance project to figure out what mitigation solution is – *Advance Assistance competitive grant*
- Go through *Congressman* for assistance with projects related to state agencies (earmark projects)
- Minimum of 3 outreach points in the Plan to see what general public is reporting
- Make sure draft Plan goes out for feedback
- Show & Tell in the Plan
- Plenty of pictures of areas, potentially hazard areas
- High hazard dams: HHPD grant – a lot of data in the DCR state plan (funding is rising)
- No-Pho that comes out each year for HHPD grant, new plan review tool has these requirements
- Consider evaluating other sources of funding, CDBG can be used as match
- 10% can be set aside for "Management Costs"

RESOURCES:

- Community Capability Worksheet (Appendix in back of plan and results included)
- Fact Sheet Procedure for asking for NFIP data
- NFIP Data Request Letter template
- Local Hazard Mitigation Planning Tool
- Mitigation Ideas
- Local Mitigation Planning Policy Guide
- Scope of Work Development Job Aid
- Run a level 2 HAZUS report (profiles: flood, wind, earthquake)
- NFIP Worksheet

Getting a new FEMA POC

Contact through Alex

BRIC funds: Question relates to communications toward with propane generator, the round needs to be reconstructed for access – is this acceptable use? It's a dirt road in Wytheville…

Federal EDA is looking for projects, mostly related to communications

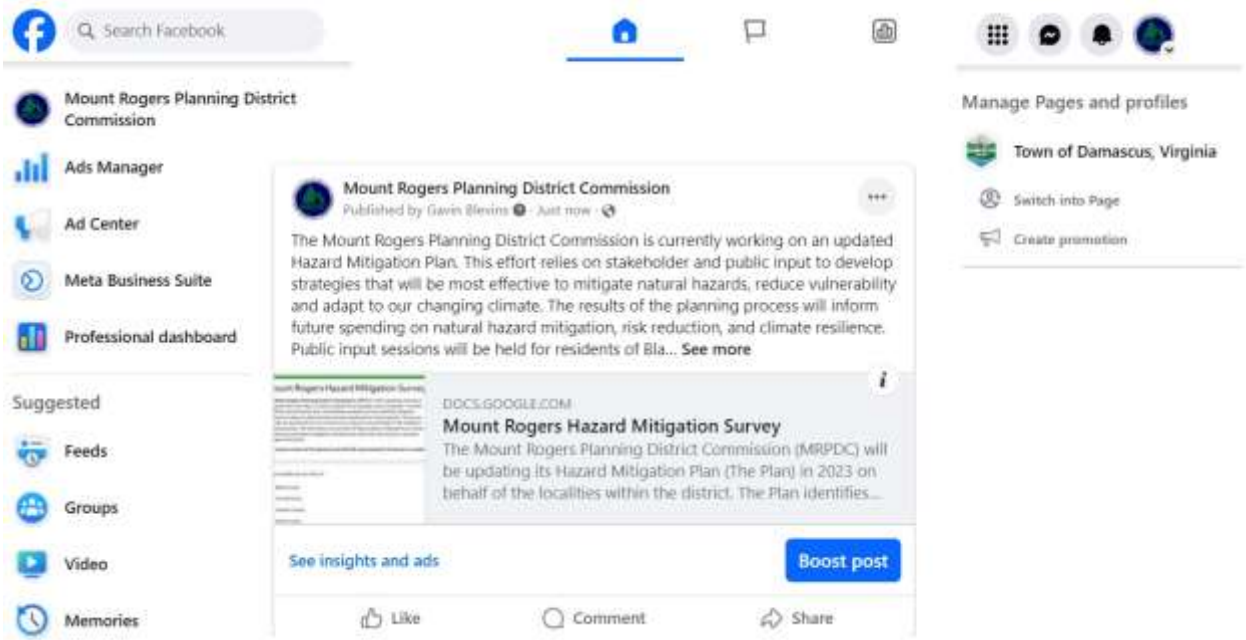
Plan Update

For the five-year update for the Mount Rogers Hazard Mitigation Plan, the planning team and steering committee reviewed and updated each chapter of the plan. Each of the Hazard Identification and Risk Assessment (HIRA) sections were revised based on current information and the updated analysis conducted by the Mount Rogers Staff. The committee discussed both

historical information focused on each hazard as well as brainstorming new mitigation objectives and strategies. These new strategies are included in each hazard section and in the mitigation strategy chapter. The Community Summaries chapter was updated through discussions with each community's representative to the steering committee. Information was also gathered by the staff from emergency management personnel as well as interested individuals in the public. Through these discussions, new information was added where necessary and specific mitigation projects identified by the localities were included. The planning team reviewed numerous local documents to include in various sections of the updated plan, including, but not limited to, local comprehensive plans, emergency operations plans, and capital improvement plans. In some cases, the 2005 original Hazard Mitigation plan was included in discussions and updates of these plans. For example, in the 2011 update process for the Town of Marion comprehensive plan, the Mount Rogers Hazard Mitigation Plan was referred to specifically in reference to the developed floodplain along the Middle Fork of the Holston River. The 2017 Plan was referenced in the updates of the comprehensive plans of Town of Saltville, Grayson, County, and the Town of Chilhowie. The 2024 Hazard Mitigation Plan was included in the Comprehensive Plan updates of Grayson County, the City of Galax, and the Town of Damascus. The information gathered from these sources was included as data in the Hazard Identification and Risk Assessment (HIRA) chapter, as well as providing some of the basis of the capabilities assessment section.

Public Involvement

Public input was solicited throughout the planning process. All committee members were asked to go to their localities and solicit input from their citizens. We also utilized the localities' common complaints that they received from citizens about specific hazards. Most citizen complaints related to transportation/accessibility issues, which prompted the region to add a section to the plan specifically relating to these types of issues. All meetings at the Mount Rogers PDC were open to the public as well. A project website was created so the public could review the original Hazard Mitigation plan and provide input toward sections of the plan update they were interested in. The MRPDC website allowed the public to view the plan and share input if they could not attend the called meetings. Additionally, a survey was accessible from the PDC's website and was shared on social media. The plan was also advertised on social media to make it easier for the public to be involved. Two public input sessions were held across the district during the writing of the plan in November of 2023.



Text of Advertisements Posted at Government Buildings

MOUNT ROGERS REGIONAL HAZARD MITIGATION PLAN

Public Info and Input Session

MONDAY, NOVEMBER 20, 2023, FROM 9:00 AM – 5:30 PM.

On behalf of the City of Galax, Carroll and Grayson County's, the Mount Rogers Planning District Commission is hosting a Hazard Mitigation Planning Public Info and Input Session from 9:00 AM to 5:30 PM on Monday, November 20th, 2023, at the Galax Municipal Building at 111 E Grayson Street, Galax, VA 24333. Residents are asked to come any time between those hours.


A4 THE GAZETTE Friday, October 20, 2023

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The Mount Rogers Planning District Commission is currently working on an updated Hazard Mitigation Plan. This public info and input session will specifically serve the residents of Carroll and Grayson County's, and the City of Galax.

This effort relies on stakeholder and public input to develop strategies that will be most effective to mitigate natural hazards, reduce vulnerability and adapt to our changing climate. The results of the planning process will inform future spending on natural hazard mitigation, risk reduction, and climate resilience.

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Please go to the front office and have them dial 1233.

MOUNT ROGERS REGIONAL HAZARD MITIGATION PLAN
Sesión de información pública y aportes
LUNES 20 DE NOVIEMBRE DE 2023, DE 9:00 A. M. – 5:30 P. M.

En nombre de la ciudad de Galax, Carroll y el condado de Grayson, la Comisión del Distrito de Planificación de Mount Rogers está organizando una sesión de información pública y aportes sobre planificación de mitigación de riesgos de 9:00 a. m. a 5:30 p. m. el lunes 20 de noviembre de 2023, en el Edificio Municipal de Galax en 111 E Grayson Street, Galax, VA 24333. Se solicita a los residentes que vengan en cualquier momento entre esas horas.


MOUNT ROGERS REGIONAL HAZARD MITIGATION PLAN

Public Info and Input Session

TUESDAY, NOVEMBER 21, 2023, FROM 7:00 AM - 7:00 PM.

On behalf of the City of Bristol, Bland, Smyth, Washington, and Wythe County's, the Mount Rogers Planning District Commission is hosting a Hazard Mitigation Planning Public Info and Input Session from 7:00 AM to 7:00 PM on Tuesday, November 21st, 2023, at the Mount Rogers Planning District Commission, 1021 Terrace drive, Marion, VA 24354. Residents are asked to come any time between those hours.

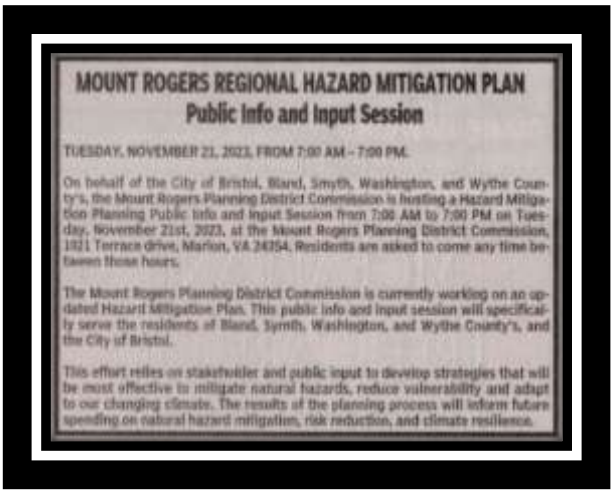
The Mount Rogers Planning District Commission is currently working on an updated Hazard Mitigation Plan. This public info and input session will specifically serve the residents of Bland, Smyth, Washington, and Wythe County's, and the City of Bristol.

This effort relies on stakeholder and public input to develop strategies that will be most effective to mitigate natural hazards, reduce vulnerability and adapt to our changing climate. The results of the planning process will inform future spending on natural hazard mitigation, risk reduction, and climate resilience.

La Comisión del Distrito de Planificación de Mount Rogers está trabajando actualmente en un Plan de Mitigación de Riesgos actualizado. Esta sesión de información pública y aportes servirá específicamente a los residentes de los condados de Carroll y Grayson, y a la ciudad de Galax.

Este esfuerzo depende de los aportes de las partes interesadas y del público para desarrollar estrategias que sean más efectivas para mitigar los peligros naturales, reducir la vulnerabilidad y adaptarse a nuestro clima cambiante. Los resultados del proceso de planificación informarán el gasto futuro en mitigación de peligros naturales, reducción de riesgos y resiliencia climática.

Vaya a la oficina principal y pídales que marquen 1233.



Other Involvement

Mount Rogers also discussed update ideas with our neighboring regional government offices Cumberland Plateau, and the LENWISCO Planning District Commissions. Emory and Henry College, Appalachian Power, the Department of Conservation and Recreation, County Public School Systems, the National Weather Service, and the Virginia Department of Transportation, and the Mount Rogers Health District also gave their input into the plan update. In our meetings with our local officials, we stressed not to limit data gathering and input to local governments, fire, and rescue. We asked them to talk to anyone in their community as well as local business owners and landowners to make the fact-finding process as thorough as possible.

HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

Introduction

The Mount Rogers Region is susceptible to a wide range of natural hazards. Fortunately, the inland and mountainous setting of the Mount Rogers region protects it from most coastal phenomena such as hurricanes and tropical storms. This also shelters us from the brunt of most tornadoes; however, we have had a few tornadoes in the past thirty years. The mountains, steep slopes, forests, and other geographic factors subject the region to many kinds of other natural hazards. These include:

- Dam Safety
- Drought
- Earthquakes
- Flooding
- Hazardous Material Spills (HAZMAT)
- Karst & Sinkholes
- Landslides
- Severe Winter Storms/Ice
- Thunderstorms/Lightning
- Tornadoes/Hurricanes
- Wildfires
- Windstorms
- Other Hazards
    - Climate Change
    - Pandemic
    - Animal-related Damage
- Public Feedback

This section discusses each of the natural hazards possible in the region, including history, risk assessment and vulnerability, and past or existing mitigation. The hazard risk assessment and vulnerability looks specifically at two criteria: locations where the hazard is most likely to have negative impacts and the probability and severity of the hazard should it occur. When information is available, the specific impacts of a hazard is discussed, sometimes based on the usual impact in the region.

Risk Assessment and Vulnerability

Risk assessment seeks to define the probability of events and the likely consequences of events. In the past five years, the Mount Rogers Planning District has experienced population declines, which will also decrease our risk of potential disaster. Also, as our population declines the probability of loss of life and injuries will decrease.

The risk assessment and vulnerability presented herein is a result of an extensive analysis of historic event data, scholarly research and field work.

Mitigation

Many times, mitigation seeks to prevent the impacts of hazards on life and property. The primary goal of mitigation is to learn to live within the natural environment. This plan reviews past mitigation efforts in the Mount Rogers Region and identifies both strategies and specific projects that could further mitigate these impacts.

Mitigation options fall generally into six categories: prevention, property protection, natural resource protection, emergency services, structural projects and public information. Prevention projects are those activities that keep hazard areas from getting worse through effective regulatory planning efforts, such as comprehensive planning, building code update and enforcement, burying utility lines and water source planning. Property protection activities are usually undertaken on individual properties or parcels with coordination of the property owner, such as elevation, relocation and acquisition of frequently flooded or damaged structures, eliminating fuel sources surrounding the property, installing rain catchment systems and purchasing additional insurance. Natural resource protection activities seek to preserve or restore natural areas or natural functions of floodplain and watershed areas. They are often implemented by parks, recreation, or conservation agencies or organizations. Emergency services measures are taken during a hazard event to minimize its impact. These measures can include response planning, regional coordination and collaboration and critical facilities protection. Structural projects include activities associated with building new or additional infrastructure or features to minimize impacts from a hazard. The final category of public information is possibly the most important, empowering residents to take action to protect themselves and their property in the event of a hazard event. This category can include additional information available to the public, such as maps, brochures, and workshops.

Overview of Assessments

The following section describes each of these hazards, their history, severity and impact, and likelihood of causing damage. Describing the hazards separately is problematic because natural hazards often combine. Flooding often follows severe winter storms. Thunderstorms contain lightning, high winds, and, rarely, tornadoes. Heavy rain can cause flooding and landslides. These descriptions, however, will provide detailed information and a basis for further analysis.

Dam Safety

Description

Dams exist to serve various functions within the Mount Rogers region. These include farm use, recreation, hydroelectric power generation, flood and stormwater control, navigation, water supply, fish or wildlife ponds, debris control, and tailings (from mining operations). In some cases, a single dam structure can serve multiple functions, such as generating hydroelectric power and providing recreational opportunities to boaters and fishermen.

State and federal governments regulate dam construction, maintenance, and repair. On the state level, the Virginia Dam Safety Act of 1982 serves as the guiding legislation. With certain exceptions, dams that must abide by this statute fall under one of two categories:

- Dams 25 feet tall or higher, with a maximum storage capacity of 15 acre-feet or more.
- Dams 6 feet tall or higher, with a maximum storage capacity of 50 acre-feet or more.

Dams not regulated by the state include those with an agricultural exemption (95 statewide), a federal license (114 statewide), a mining exemption (20 statewide), or a size exemption (879 in the state). Spillways are channels designed to keep water from overflowing the top of the dam and to prevent erosion at the bottom, or toe, of the dam. State law regulates spillway construction based on the dam's hazard classification and site classification. The federal government maintains an inventory of dams through the National Dam Inspection Act of 1972 and, more recently, the Water Resources Development Act of 1996. Maintained by the U.S. Army Corps of Engineers, the inventory has been available on-line since January 1999. It is called the National Inventory of Dams, and its database covers roughly 77,000 dams, including several in the Mount Rogers region. A map showing the location of all High Hazard dams in the Mount Rogers Region is located in this Section.

Dam Hazard Classification

The state and federal governments have adopted slightly different methods of classifying dam hazard potential. For the federal national inventory, dams are grouped into one of three categories, based on two criteria: the potential for loss of human life and the potential to cause economic, environmental and lifeline losses, in the event of a dam failure.

Virginia's dam classification system varies in that it classifies the state-regulated dams into one of four categories. 1.) Loss of human life probable with excessive economic impact, 2.) loss of human life possible with appreciable economic impact, 3.) no loss of human life expected with minimal economic impact, and 4.) no loss of human life expected with no economic impact.

Under the state system, dam operation and maintenance plans, as well as inventory reports, must be completed every six years. Re-inspection reports, performed by professional engineers, must be made at 2-year intervals for Class I dams and 3-year intervals for Class II dams. In addition, dam owners must inspect their own dams and submit annual reports in years when professional inspections are not required.

Dam Hazard History

In the Mount Rogers region there has been some history of dam failures over the years, although obtaining a complete record has proven difficult for the purposes of this Hazard Mitigation report. Regulatory agencies at the state and federal governments are reluctant to release full information on dams, inspection histories, and known hazards. Hazard classifications, in and of themselves, serve as a bureaucratic indicator of potential hazard in the event of dam failure, but the classification does not reflect the present physical condition or status of any given dam.

In Bland County, a failure in the Crab Orchard Creek Dam at about noon on January 29, 1957 flooded the community of Bland as a result of three days and nights of continuous rains. The water went through a crack that opened when a slate hillside on one side gave way. While no one was hurt, the flooding destroyed or severely damaged many homes and also swept away outbuildings, cars, fences, machinery, livestock, and household equipment. The flooding also damaged several downtown businesses. One house floated a mile downstream and came to rest against a bridge and other wreckage. One home was tilted on edge and carried 200 yards downstream to come to rest against a concrete bridge in the community. Estimated damages came to $500,000. The local unit of the American Red Cross provided $30,363 in emergency aid, with nearly $22,395 going for structural repairs. This photo shows the tilted home (see far right of image) that was swept 200 yards downstream during the Crab Orchard dam failure and flood of 1957.

Some now believe that Interstate 77, which passes between the dam and the community, will protect Bland from a similar occurrence in the event the dam should fail again. However, the state's hazard rating on the dam was upgraded in 2004 from significant hazard (Class II) to high-hazard status (Class I). The dam owner hired an engineer as part of an effort to show why the Crab Orchard Creek Dam does not deserve a Class I rating. Another locally known dam failure occurred on Christmas Eve in 1924, when the muck dam at Saltville broke and flooded the community of Palmertown, killing 19 people and dislodging several homes from their foundations. According to at least one news account at the time, the dam failure occurred due to human intervention; police accused a 27-year-old man named Roy Patrick of using dynamite to blow up the dam.

Risk Assessment and Vulnerability

For the purposes of hazard mitigation, this report takes note of dams classified with a potential for high or significant hazard in the event of failure, as defined under the Virginia Department of Conservation and Recreation. Those dams classified with a low hazard potential were not considered.

High-hazard dams (13 total) in the Mount Rogers region primarily consist of earthen structures built for recreational use. Some of the dams are used to generate hydroelectric power, although they are also offer recreational uses. Several of the dams combine recreational uses with flood or stormwater control.

Emergency Action Plans. EAPs, contained in county emergency operations plans to govern emergency response for natural and man-made disasters, define roles by dam owners and emergency services personnel for monitoring of dams' physical condition and notification of

downstream communities in the event of flooding or potential dam failure. Details on all the region's dams classified as High Hazard, can be found later in this section.

There is no way to predict the likelihood of a dam failure, since failures relate to the structure, condition, age, maintenance, and natural forces (and storm events) that can affect the integrity of the dam. A well-maintained dam classified as a High Hazard structure may in fact pose little risk to downstream community.

Dam regulation first began in this country due to failures of poorly built dams in the early part of the 20th century. More regulations came following a series of dam failures in the 1970s. Legally, dam owners hold the responsibility for the safety, upkeep, and maintenance of dam structures. Of the 75,000 dams listed by the National Inventory of Dams, 95% fall to the regulation of state governments.

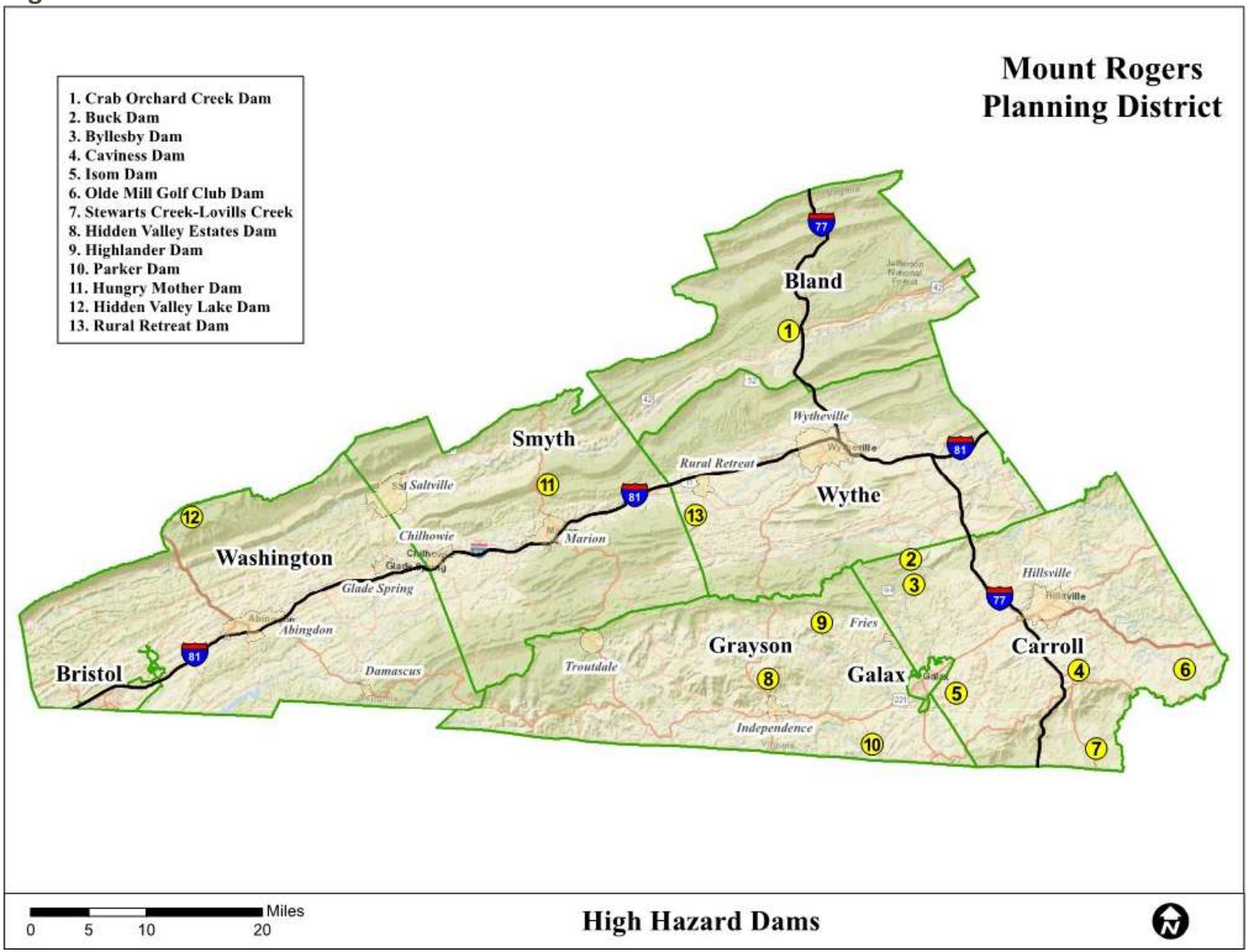
The possibility of failure generally increases with age, with many dams designed for an effective life of 50 years. Nine of the 13 high-hazard and significant-hazard dams in the Mount Rogers region are at least 50 years old. Dams with known structural problems can be given conditional operating permits, which points to the need to make improvements.

Property Exposure Data for Downstream Communities

Legally dam owners must properly monitor and maintain their dams, while state and federal regulators act as overseers and enforcers. But the Association of State Dam Safety Officials and others point out that the effectiveness of regulation varies among states and dam owners often lack the financial resources necessary to undertake costly repairs.

Events that can lead to dam failures include the following: overtopping, structural failure, loss of stability in the dam's foundation, cracking in the dam structure from natural settling, poor upkeep, and piping (resulting from improper filtration in the dam structure, allowing seepage and passing of soil particles to gradually create sinkholes in the dam). The vulnerability of structures and homes at risk of dam failure has not changed since the drafting of the original Hazard Mitigation Plan, and no dam failures have occurred in that time.

High Hazard Dams



Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Crab Orchard Creek Dam

Inventory Number: 021002

Hazard Classification: High

City/County: Bland County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1953

Size Classification: Medium (>= 1000 - <50,000 ac. ft., >=40' <100')

Certificate Type: Regular Operation and Maintenance Certificate

Certificate Expiration: 03/31/2024

Days Since Last Inspection: 311

Inundation Report: Unknown

Type of Dam
Earth (Primary)

Reservoir Purpose
Recreation (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: 1.00 Miles

River or Stream: CRAB ORCHARD CREEK

Technical Basics

Normal Pool Area: 17.50 Acres

Top Surface Area: 28.00 Acres

Normal Pool Capacity: 355.00 Acre-Feet

Top Capacity: 550.00 Acre-Feet

Normal Pool Elevation: 100.00 Feet

Top Elevation: 108.00 Feet

Normal Pool Height: 42.00 Feet

Top Height: 50.40 Feet

Technical Hydrology/Hydraulics

Controlling PMP: Unknown

Drainage Area: 4.98 Sq. Mi.

6 Hour PMP: 0.00

Time of Concentration:

12 Hour PMP: 0.00

Weighted Curve Number:

24 Hour PMP: 0.00

IDA Spillway Reduction:

Available Spillway Design Flow: .13 PMF **Required Spillway Design Flow**: .90 PMP

Inspections (Last 3 Max)

Date	Type	Condition
6/16/2023	Engineer	Satisfactory
7/25/2022	Engineer	Satisfactory
6/12/2020	Engineer	Satisfactory

EAP Quick Reference

Approval Date: 08/14/2014
Expiration Date: 08/14/2020

Dam Location

Dam Address:
529 CRAB ORCHARD DR
Bland VA, 24315

E911 Direction to Dam:
From Wythville, travel north on I-77 for 11 miles. Take exit 52. Take State Rte F-048 ~1 mile to your destination.

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center:

Local Government Emergency Services:Tom Roseberry
(primary)(276) 669-6151(Office)
(primary)na@na.com
P.O. Box 449
Bland VA, 24315

Owner's Engineer: David A. Krisnitski, P.E.
(540) 251-5134(Office); (primary)(540) 632-7435(Office)
(primary)DKrisnitski@amtengineering.com
105 Arbor Drive
Sutie 200
Christiansburg VA, 24073

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:Jeffrey R. Watson
(primary)(276) 228-2153(Office); (276) 669-6151(Office)
(primary)bristolinfo@vdot.virginia.gov
870 Bonham Road
Bristol VA, 24201

National Weather Service:Phil Hysell
(540) 552-1324(Office); (primary)(540) 552-1613(Office); (800) 221-2856(Office)
(primary)phil.hysell@noaa.gov
1750 Forecast Drive
Blacksburg VA, 24060

Potential Impacts

Roadways Impacted:

- Interstate 77 - 0.19 miles downstream

Potential Impact Structures (count):

- 100 Homes
- 15 Businesses

- South Scenic Hwy (US 52) - 0.75 miles downstream
- Jackson Street (VA 1001) - 1.29 miles downstream
- Main Street (VA 1003) - 1.34 miles downstream
- Fairground St (VA 1002) - 1.5 miles downstream
- Main St (US 98) - 1.66 miles downstream
- Main St (VA 605) - 2.99 miles downstream
- Main St (VA 605) - 3.61 miles downstream
- Walkers Creek Rd (VA 604) - 7.11 miles downstream

- Schools
- Hospitals
- Critical Infrastructure
- Railroads
- Utilities
- Parks
- Golf Courses

Dams Downstream:

Dam Number: **021002**
Dam Name: **Crab Orchard Creek Dam**
VAHU6: NE66
Municipalities: Bland County
Region: 4
SWCD: BIG WALKER
VA Senate: 38
HUC 12: 050500020101
VA House: 3
Watershed Name: Walker Creek-Crab Orchard Creek
Congressional: 5109
USGS Topo: BIG BEND

Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Buck Dam

Inventory Number: 035002

Hazard Classification: High

City/County: Carroll County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1912

Size Classification: Small (>=50 - <1000 ac. ft., >=25' and <40')

Certificate Type:

Certificate Expiration:

Days Since Last Inspection:

Inundation Report: Unknown

Type of Dam	**Reservoir Purpose**
Gravity (Primary)	Hydro-electric (Primary)
Concrete (Secondary)	Recreation (Secondary)

Type of Spillway

Type	Width	Outlet Gates
Controlled	937.00	Tainter (radial)
None (Auxiliary)	.00	None

Watershed

Nearest City:

Nearest City Distance: 4.00 Miles

River or Stream: NEW RIVER

Technical Basics

Normal Pool Area: 0.00 Acres

Top Surface Area: 68.00 Acres

Normal Pool Capacity: 640.00 Acre-Feet

Top Capacity: 640.00 Acre-Feet

Normal Pool Elevation: 0.00 Feet

Top Elevation: 0.00 Feet

Normal Pool Height: 0.00 Feet

Top Height: 44.00 Feet

Technical Hydrology/Hydraulics

Controlling PMP: Unknown

Drainage Area: 1320.00 Sq. Mi.

6 Hour PMP: 0.00

Time of Concentration:

12 Hour PMP: 0.00

24 Hour PMP: 0.00

Available Spillway Design Flow: .00 PMF

Weighted Curve Number:

IDA Spillway Reduction:

Required Spillway Design Flow: .00 PMF

Inspections (Last 3 Max)

Date	Type	Condition

EAP Quick Reference

Approval Date: 09/19/2001
Expiration Date: 09/19/2007

Dam Location

Dam Address:	E911 Direction to Dam: TBD

EAP Contacts

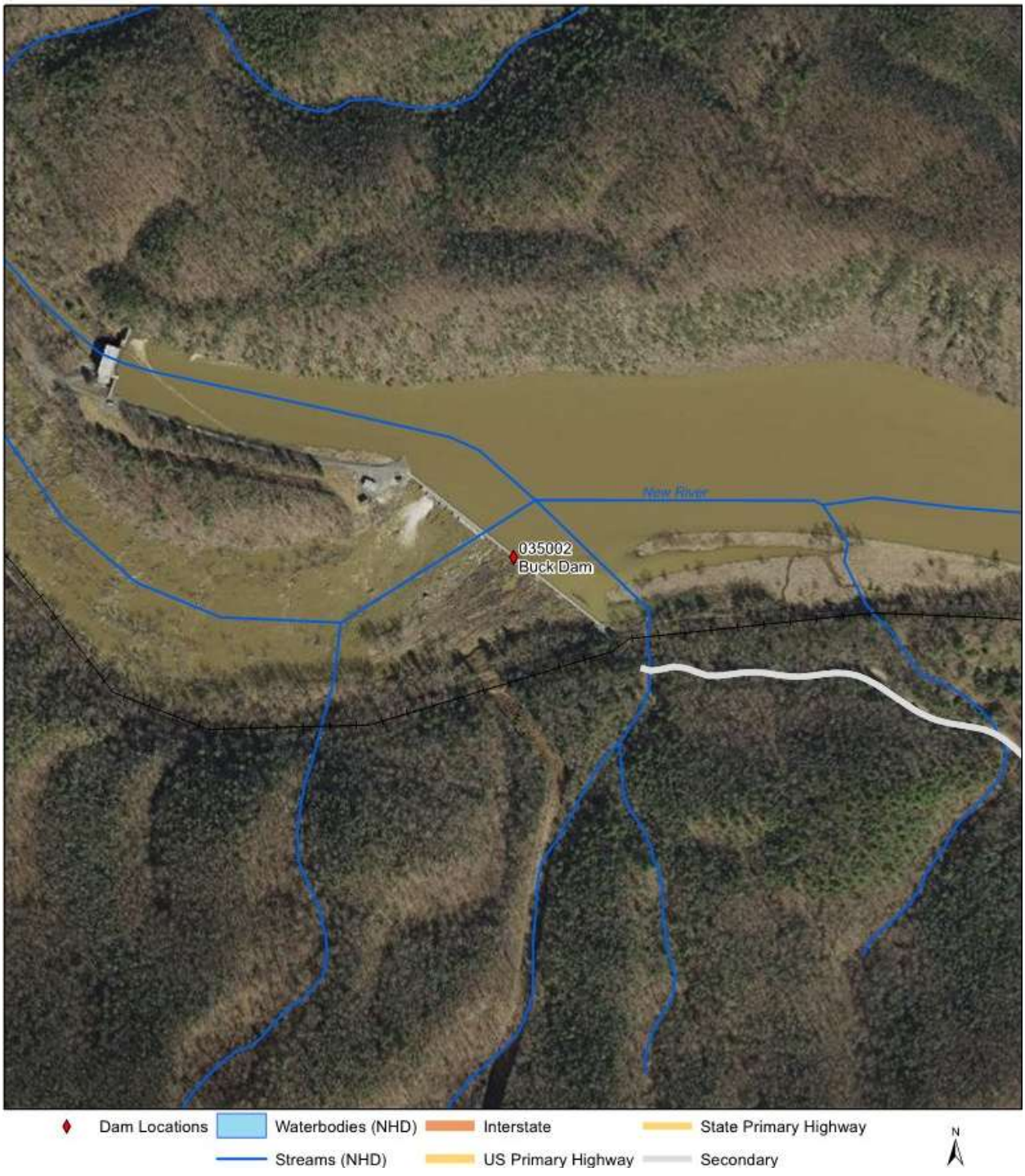
Dam Operator:	**Dam Alternate Operator**:
Rain Gauge Observer:	**Alternate Rain Gauge Observer**:
24-Hour Dispatch Center:	**Local Government Emergency Services**:
Owner's Engineer:	**DCR Regional Engineer**: Steven Bricker 804-363-0992 steven.bricker@dcr.virginia.gov 8 Radford St., Suite 102A Christiansburg VA, 24073
Transportation Administrator:	**National Weather Service**:

Potential Impacts

Roadways Impacted:	**Potential Impact Structures (count)**: • Homes • Businesses • Schools • Hospitals • Critical Infrastructure • Railroads • Utilities • Parks • Golf Courses
Dams Downstream:	

Dam Number: **035002**
VAHU6: NE21
Region: 4
VA Senate: 19
VA House: 6
Congressional: 5109

Dam Name: **Buck Dam**
Municipalities: Carroll County
SWCD: NEW RIVER
HUC 12: 050500010704
Watershed Name: New River-Poor Branch
USGS Topo: AUSTINVILLE



Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Byllesby Dam

Inventory Number: 035001

Hazard Classification: High

City/County: Carroll County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1912

Size Classification: Medium (>= 1000 - <50,000 ac. ft., >=40' <100')

Certificate Type:

Certificate Expiration:

Days Since Last Inspection:

Inundation Report: Unknown

Type of Dam	Reservoir Purpose
Gravity (Primary)	Hydro-electric (Primary)
Concrete (Secondary)	Recreation (Secondary)

Type of Spillway

Type	Width	Outlet Gates
Controlled	656.00	Tainter (radial)
None (Auxiliary)	.00	None

Watershed

Nearest City:

Nearest City Distance: 7.00 Miles

River or Stream: NEW RIVER

Technical Basics

Normal Pool Area: 0.00 Acres

Top Surface Area: 242.00 Acres

Normal Pool Capacity: 2060.00 Acre-Feet

Top Capacity: 3540.00 Acre-Feet

Normal Pool Elevation: 0.00 Feet

Top Elevation: 0.00 Feet

Normal Pool Height: 0.00 Feet

Top Height: 66.00 Feet

Technical Hydrology/Hydraulics

Controlling PMP: Unknown

Drainage Area: 1310.00 Sq. Mi.

6 Hour PMP: 0.00

Time of Concentration:

EAP Quick Reference

Approval Date: 11/01/2012
Expiration Date: 11/01/2019

Dam Location

Dam Address:
Byllesby Road
Buck Dam Road
Sulphur Springs VA, 24350

E911 Direction to Dam:
Dam located on New River at intersection of Byllesby Road and Buck Dam Road

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Rain Gauge Observer:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center:

Local Government Emergency Services:

Owner's Engineer:

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

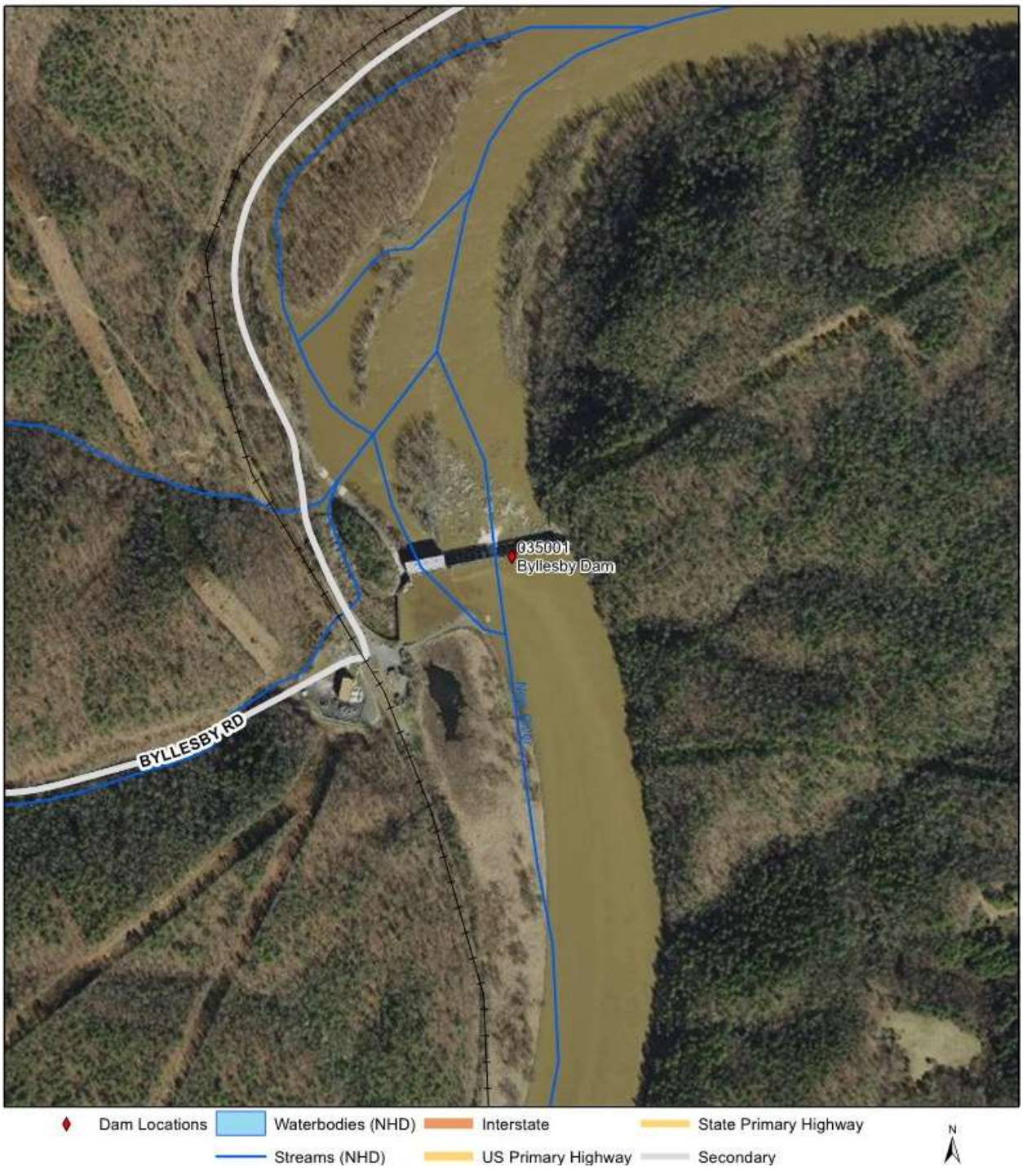
Dams Downstream:

Potential Impact Structures (count):

- Homes
- Businesses
- Schools
- Hospitals
- Critical Infrastructure
- Railroads
- Utilities
- Parks
- Golf Courses

Dam Number: **035001**
VAHU6: NE21
Region: 4
VA Senate: 19
VA House: 6
Congressional: 5109

Dam Name: **Byllesby Dam**
Municipalities: Carroll County
SWCD: NEW RIVER
HUC 12: 050500010704
Watershed Name: New River-Poor Branch
USGS Topo: AUSTINVILLE



Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Caviness Dam

Inventory Number: 035013

Hazard Classification: High, Prelim

City/County: Carroll County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 08/01/2023

Size Classification: Small (>=50 - <1000 ac. ft., >=25' and <40')

Certificate Type:

Certificate Expiration:

Days Since Last Inspection:

Inundation Report: Unknown

Type of Dam
Unknown (Primary)

Reservoir Purpose
Other (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: Miles

River or Stream:

Technical Basics

Normal Pool Area: 3.20 Acres

Top Surface Area: 4.10 Acres

Normal Pool Capacity: 31.20 Acre-Feet

Top Capacity: 46.44 Acre-Feet

Normal Pool Elevation: 2597.00 Feet

Top Elevation: 2601.00 Feet

Normal Pool Height: 24.40 Feet

Top Height: 28.80 Feet

Technical Hydrology/Hydraulics

Controlling PMP:

Drainage Area: 0.00 Sq. Mi.

6 Hour PMP:

Time of Concentration:

12 Hour PMP:

Weighted Curve Number:

24 Hour PMP:

IDA Spillway Reduction:

EAP Quick Reference

Approval Date:
Expiration Date:

Dam Location

Dam Address:

E911 Direction to Dam:

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Rain Gauge Observer:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center:

Local Government Emergency Services:

Owner's Engineer:

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

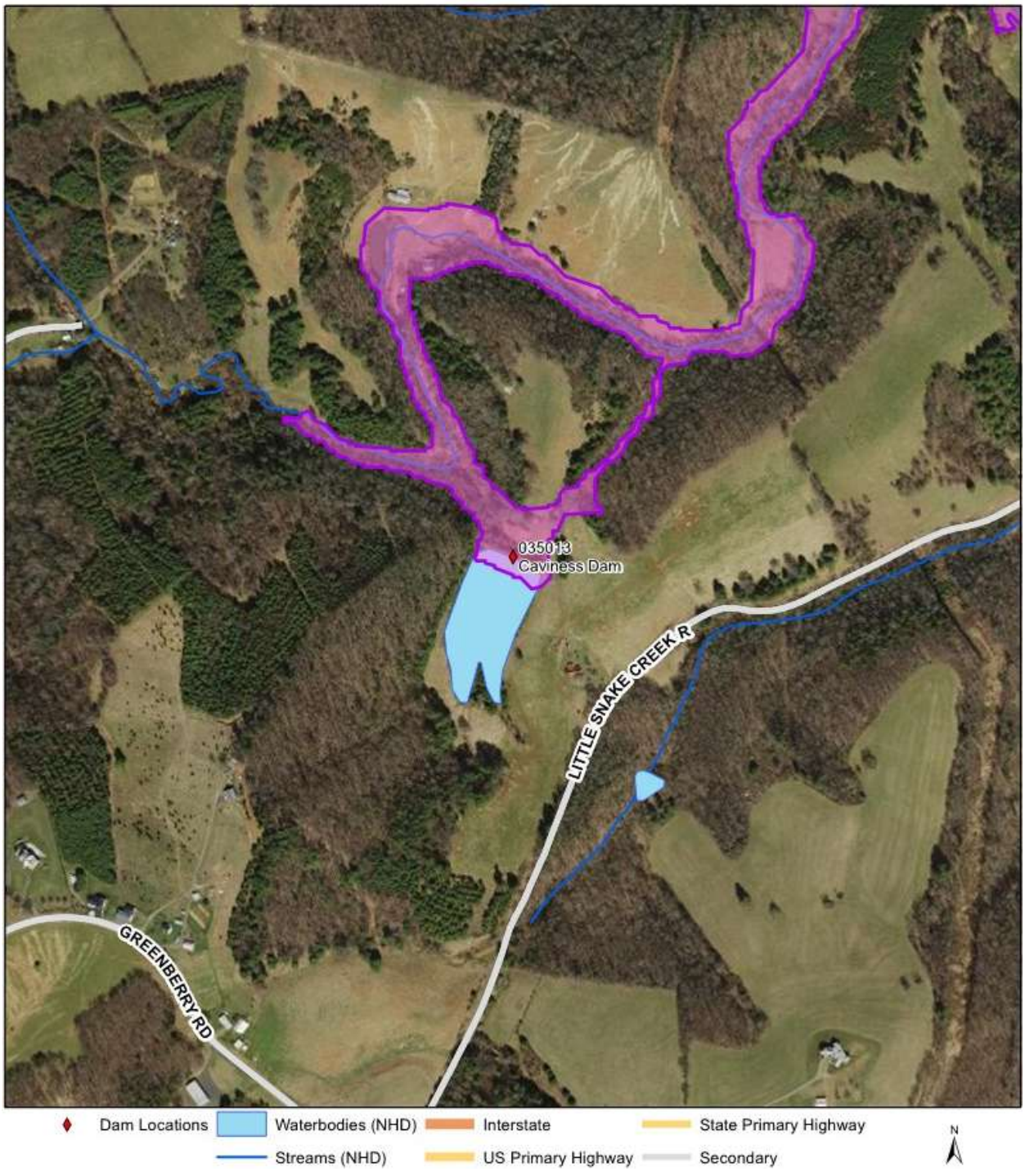
Potential Impact Structures (count):

- Homes
- Businesses
- Schools
- Hospitals
- Critical Infrastructure
- Railroads
- Utilities
- Parks
- Golf Courses

Dams Downstream:

Dam Number: **035013**
VAHU6: NE37
Region: 4
VA Senate: 20
VA House: 6
Congressional: 5109

Dam Name: **Caviness Dam**
Municipalities: Carroll County
SWCD: NEW RIVER
HUC 12: 050500011303
Watershed Name: Snake Creek
USGS Topo: FANCY GAP



Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Isom Dam

Inventory Number: 035016

Hazard Classification: High

City/County: Carroll County

Designed By: Franklin B. Isom

Constructed By: Franklin B. Isom

Regional Engineer: Steven Bricker

Year Constructed: 01/01/2012

Size Classification: Small (>=50 - <1000 ac. ft., >=25' and <40')

Certificate Type:

Certificate Expiration:

Days Since Last Inspection:

Inundation Report: Unknown

Type of Dam
Earth (Primary)

Reservoir Purpose
Recreation (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: Miles

River or Stream:

Technical Basics

Normal Pool Area: Acres

Top Surface Area: Acres

Normal Pool Capacity: Acre-Feet

Top Capacity: Acre-Feet

Normal Pool Elevation: Feet

Top Elevation: Feet

Normal Pool Height: Feet

Top Height: Feet

Technical Hydrology/Hydraulics

Controlling PMP:

Drainage Area: Sq. Mi.

6 Hour PMP:

Time of Concentration:

12 Hour PMP:

Weighted Curve Number:

24 Hour PMP:

IDA Spillway Reduction:

EAP Quick Reference

Approval Date:
Expiration Date:

Dam Location

Dam Address:

E911 Direction to Dam:

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Rain Gauge Observer:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center:

Local Government Emergency Services:

Owner's Engineer:

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

Potential Impact Structures (count):

- Homes
- Businesses
- Schools
- Hospitals
- Critical Infrastructure
- Railroads
- Utilities
- Parks
- Golf Courses

Dams Downstream:

Dam Number: **035016**
VAHU6: NE17
Region: 4
VA Senate: 20
VA House: 6
Congressional: 5109

Dam Name: **Isom Dam**
Municipalities: Carroll County
SWCD: NEW RIVER
HUC 12: 050500010603
Watershed Name: Chestnut Creek
USGS Topo: GALAX

Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Olde Mill Golf Club Dam

Inventory Number: 035004

Hazard Classification: High, Prelim

City/County: Carroll County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1972

Size Classification: Small (>=50 - <1000 ac. ft., >=25' and <40')

Certificate Type: Conditional 1 Year Certificate

Certificate Expiration: 07/31/2009

Days Since Last Inspection: 6535

Inundation Report: 03/15/2024

Type of Dam
Earth (Primary)

Reservoir Purpose
Recreation (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: 3.00 Miles

River or Stream: STONE MOUNTAIN CREEK

Technical Basics

Normal Pool Area: 32.00 Acres

Top Surface Area: 50.00 Acres

Normal Pool Capacity: 393.00 Acre-Feet

Top Capacity: 605.00 Acre-Feet

Normal Pool Elevation: 0.00 Feet

Top Elevation: 0.00 Feet

Normal Pool Height: 0.00 Feet

Top Height: 30.00 Feet

Technical Hydrology/Hydraulics

Controlling PMP: Unknown

Drainage Area: 6.70 Sq. Mi.

6 Hour PMP: 0.00

Time of Concentration:

12 Hour PMP: 0.00

Weighted Curve Number:

24 Hour PMP: 0.00

IDA Spillway Reduction:

Available Spillway Design Flow: 50.00 YR **Required Spillway Design Flow**: 100.00 YR

Inspections (Last 3 Max)

Date	Type	Condition
6/1/2006	Engineer	Fair
3/16/2000	Engineer	
12/22/1999	Owner	Not Rated

EAP Quick Reference

Approval Date: 10/18/2006
Expiration Date: 10/18/2012

Dam Location

Dam Address:
,
,
W LA, 55555

E911 Direction to Dam:
TBD

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Rain Gauge Observer:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center:

Local Government Emergency Services:

Owner's Engineer:

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

Dams Downstream:

Potential Impact Structures (count):

- Homes
- Businesses
- Schools
- Hospitals
- Critical Infrastructure
- Railroads
- Utilities
- Parks
- Golf Courses

Dam Number: **035004**
VAHU6: NE36
Region: 4
VA Senate: 20
VA House: 6
Congressional: 5109

Dam Name: **Olde Mill Golf Club Dam**
Municipalities: Carroll County
SWCD: NEW RIVER
HUC 12: 050500011302
Watershed Name: Big Reed Island Creek-Stone Mountain Creek
USGS Topo: LAUREL FORK

Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Stewarts Creek - Lovills Creek Dam #9

Inventory Number: 035007

Hazard Classification: High

City/County: Carroll County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1990

Size Classification: Medium (>= 1000 - <50,000 ac. ft., >=40' <100')

Certificate Type: Conditional 2 Year Certificate

Certificate Expiration: 08/30/2024

Days Since Last Inspection: 265

Inundation Report: Unknown

Type of Dam
Earth (Primary)

Reservoir Purpose
Recreation (Primary)
Flood Control or storm water management (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: 5.00 Miles

River or Stream: LOVILLS CREEK

Technical Basics

Normal Pool Area: 55.00 Acres

Top Surface Area: 260.00 Acres

Normal Pool Capacity: 664.00 Acre-Feet

Top Capacity: 7415.00 Acre-Feet

Normal Pool Elevation: 0.00 Feet

Top Elevation: 0.00 Feet

Normal Pool Height: 0.00 Feet

Top Height: 88.00 Feet

Technical Hydrology/Hydraulics

Controlling PMP: 6-HR PMP

Drainage Area: 20.72 Sq. Mi.

6 Hour PMP: 21.70

Time of Concentration:

12 Hour PMP: 23.50

24 Hour PMP: 25.40

Available Spillway Design Flow: 1.00 PMF

Weighted Curve Number:

IDA Spillway Reduction:

Required Spillway Design Flow: .90 PMP

Inspections (Last 3 Max)

Date	Type	Condition
8/1/2023	Engineer	Fair
3/17/2020	DCR Site Visit	Satisfactory
6/1/2017	Owner	Satisfactory

EAP Quick Reference

Approval Date: 07/05/2006
Expiration Date: 07/05/2012

Dam Location

Dam Address:
758 Speas Mill Rd
Cana VA, 24317

E911 Direction to Dam:
From Mt. Airy, take US 52 North ~ 6 miles. Turn right at fork onto S.R. 884 (Speas Mill Rd). Follow for 3/4 mile. Dam visible on left along with access road to boat ramp.

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center: na na
(primary)(540) 728-4146(Office)
(primary)na@na.com
P.O. Box 575
Hillsville VA, 24343

Local Government Emergency Services:

Owner's Engineer: Michael D. Wilson
(434) 522-7665(Office); (434) 546-6156(Mobile);
(primary)(434) 847-7796(Office)
mdw@handp.com;
(primary)mwilson@handp.com
2524 Langhorne Road
Lynchburg VA, 24501

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

- VA 686 - 0.4 miles downstream
- VA 687 - 1.2 miles downstream

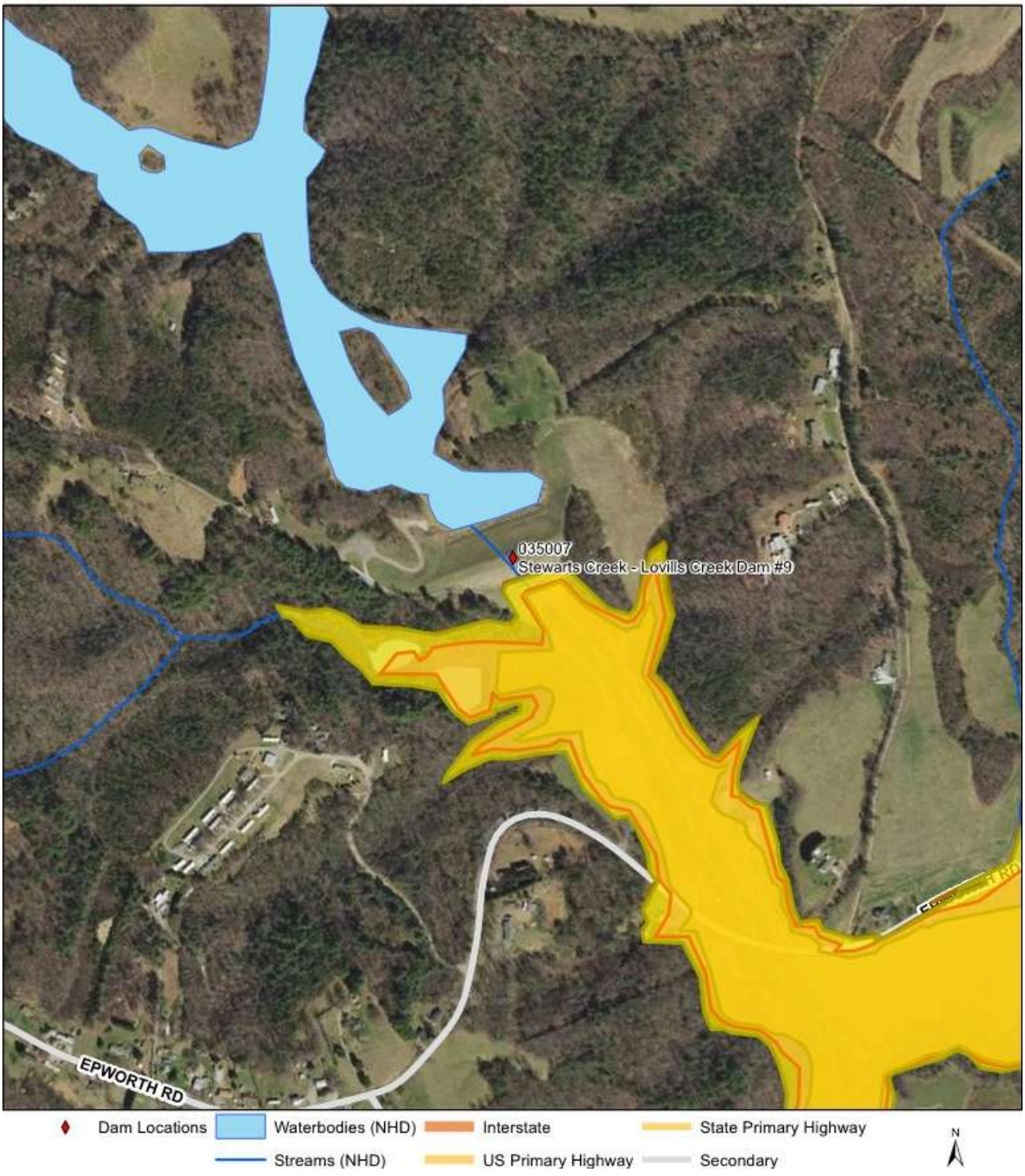
Potential Impact Structures (count):

- 6 Homes
- Businesses
- Schools
- Hospitals
- Critical Infrastructure

Dams Downstream:

- Railroads
- 1 Utilities
- Parks
- Golf Courses

Dam Number: **035007**
Dam Name: **Stewarts Creek - Lovills Creek Dam #9**
VAHU6: YA05
Municipalities: Carroll County
Region: 4
SWCD: NEW RIVER
VA Senate: 20
HUC 12: 030401010803
VA House: 6
Watershed Name: Lovills Creek
Congressional: 5109
USGS Topo: CANA



Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Hidden Valley Estates Dam

Inventory Number: 077006

Hazard Classification: High

City/County: Grayson County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1989

Size Classification: Small (>=50 - <1000 ac. ft., >=25' and <40')

Certificate Type: Regular Operation and Maintenance Certificate

Certificate Expiration: 06/06/2027

Days Since Last Inspection: 340

Inundation Report: Unknown

Type of Dam
Earth (Primary)

Reservoir Purpose
Recreation (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: Miles

River or Stream: Trib.- Peach Bottom Creek

Technical Basics

Normal Pool Area: 9.85 Acres

Top Surface Area: 12.80 Acres

Normal Pool Capacity: 86.70 Acre-Feet

Top Capacity: 116.90 Acre-Feet

Normal Pool Elevation: 3194.00 Feet

Top Elevation: 3199.00 Feet

Normal Pool Height: 24.00 Feet

Top Height: 27.00 Feet

Technical Hydrology/Hydraulics

Controlling PMP: 6-HR PMP

Drainage Area: 0.20 Sq. Mi.

6 Hour PMP: 0.00

Time of Concentration: 0.48

12 Hour PMP: 0.00

Weighted Curve Number:

24 Hour PMP: 0.00

IDA Spillway Reduction: .90 PMP

Available Spillway Design Flow: .88 PMP **Required Spillway Design Flow**: .90 PMP

Inspections (Last 3 Max)

Date	Type	Condition
5/18/2023	Engineer	Satisfactory
5/31/2022	Owner	Satisfactory
8/12/2021	Engineer	Satisfactory

EAP Quick Reference

Approval Date: 04/20/2018
Expiration Date: 04/20/2024

Dam Location

Dam Address:
683 Hidden Valley Ln
Independence VA, 24348

E911 Direction to Dam:
Dam adjacent to address

EAP Contacts

Dam Alternate Operator:

Alternate Rain Gauge Observer:

Local Government Emergency Services:

Owner's Engineer: David A. Krisnitski
(primary)(540) 632-7435(Mobile)
(primary)dkrisnitski@amtengineering.com
105 Arbor Drive NE
Suite 101
Christiansburg VA, 24073

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

- Hidden Valley Lane (Route 831) - 0.53 miles downstream
- Elk Creek Parkway (US 21) - 0.63 miles downstream

Potential Impact Structures (count):

- 14 Homes
- 2 Businesses
- 0 Schools
- 0 Hospitals

- Forest Trail - 2.81 miles downstream
- Lakewood Lane - 3.11 miles downstream
- Parkgate Lane - 3.36 miles downstream
- Cassellbrook Lane - 3.66 miles downstream
- N. Independence Ave (US 21) - 4.35 miles downstream
- Beaver Dam Roud (VA 697) - 9.77 miles downstream

- 0 Critical Infrastructure
- 0 Railroads
- 0 Utilities
- 0 Parks
- 0 Golf Courses

Dams Downstream:

Dam Number: **077006**
VAHU6: NE09
Region: 4
VA Senate: 40
VA House: 5
Congressional: 5109

Dam Name: **Hidden Valley Estates Dam**
Municipalities: Grayson County
SWCD: NEW RIVER
HUC 12: 050500010402
Watershed Name: Peach Bottom Creek
USGS Topo: ELK CREEK

Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Highlander Dam

Inventory Number: 077018

Hazard Classification: High, Prelim

City/County: Grayson County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1960

Size Classification: Small (>=50 - <1000 ac. ft., >=25' and <40')

Certificate Type: AgExempt

Certificate Expiration: 04/30/2030

Days Since Last Inspection:

Inundation Report: 01/12/2024

Type of Dam
Earth (Primary)

Reservoir Purpose
Recreation (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: Miles

River or Stream:

Technical Basics

Normal Pool Area: 2.60 Acres

Top Surface Area: 3.50 Acres

Normal Pool Capacity: 21.80 Acre-Feet

Top Capacity: 42.70 Acre-Feet

Normal Pool Elevation: 2633.00 Feet

Top Elevation: 2642.50 Feet

Normal Pool Height: 21.00 Feet

Top Height: 30.50 Feet

Technical Hydrology/Hydraulics

Controlling PMP: Unknown

Drainage Area: 0.00 Sq. Mi.

6 Hour PMP: 0.00

Time of Concentration:

12 Hour PMP: 0.00

Weighted Curve Number:

24 Hour PMP: 0.00

IDA Spillway Reduction:

EAP Quick Reference

Approval Date:

Expiration Date:

Dam Location

Dam Address:

E911 Direction to Dam:

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Rain Gauge Observer:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center:

Local Government Emergency Services:

Owner's Engineer:

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

Dams Downstream:

Potential Impact Structures (count):

- Homes
- Businesses
- Schools
- Hospitals
- Critical Infrastructure
- Railroads
- Utilities
- Parks
- Golf Courses

Dam Number: **077018**
VAHU6: NE14
Region: 4
VA Senate: 40
VA House: 5
Congressional: 5109

Dam Name: **Highlander Dam**
Municipalities: Grayson County
SWCD: NEW RIVER
HUC 12: 050500010503
Watershed Name: Elk Creek-Turkey Fork
USGS Topo: BRIERPATCH MOUNTAIN

Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Parker Dam

Inventory Number: 077008

Hazard Classification: High, Prelim

City/County: Grayson County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 08/03/2020

Size Classification: Small (>=50 - <1000 ac. ft., >=25' and <40')

Certificate Type: AgExempt

Certificate Expiration:

Days Since Last Inspection:

Inundation Report: Unknown

Type of Dam
Other (Primary)

Reservoir Purpose
Other (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: Miles

River or Stream:

Technical Basics

Normal Pool Area: 1.65 Acres

Top Surface Area: 1.70 Acres

Normal Pool Capacity: 22.40 Acre-Feet

Top Capacity: 24.80 Acre-Feet

Normal Pool Elevation: 2749.00 Feet

Top Elevation: 2751.20 Feet

Normal Pool Height: 34.00 Feet

Top Height: 36.20 Feet

Technical Hydrology/Hydraulics

Controlling PMP: Unknown

Drainage Area: 0.03 Sq. Mi.

6 Hour PMP: 0.00

Time of Concentration:

12 Hour PMP: 0.00

Weighted Curve Number:

24 Hour PMP: 0.00

IDA Spillway Reduction:

EAP Quick Reference

Approval Date:

Expiration Date:

Dam Location

Dam Address:

E911 Direction to Dam:

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Rain Gauge Observer:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center:

Local Government Emergency Services:

Owner's Engineer:

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

Dams Downstream:

Potential Impact Structures (count):

- Homes
- Businesses
- Schools
- Hospitals
- Critical Infrastructure
- Railroads
- Utilities
- Parks
- Golf Courses

Dam Number: **077008**
VAHU6: NE11
Region: 4
VA Senate: 40
VA House: 5
Congressional: 5109

Dam Name: **Parker Dam**
Municipalities: Grayson County
SWCD: NEW RIVER
HUC 12: 050500010407
Watershed Name: Little River-Crab Creek
USGS Topo: CUMBERLAND KNOB

Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Hungry Mother Dam

Inventory Number: 173001

Hazard Classification: High

City/County: Smyth County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1934

Size Classification: Medium (>= 1000 - <50,000 ac. ft., >=40' <100')

Certificate Type: Conditional 1 Year Certificate

Certificate Expiration: 09/30/2017

Days Since Last Inspection: 1463

Inundation Report: Unknown

Type of Dam
Earth (Primary)

Reservoir Purpose
Recreation (Primary)

Type of Spillway

Type	Width	Outlet Gates
Uncontrolled	145.00	Concrete Spillway - Rectangular
Controlled	11.00	Riser Structure - Gated
None (Auxiliary)	.00	None

Watershed

Nearest City: Marion

Nearest City Distance: 2.00 Miles

River or Stream: HUNGRY MOTHER CREEK

Technical Basics

Normal Pool Area: 124.00 Acres

Top Surface Area: 133.40 Acres

Normal Pool Capacity: 1350.00 Acre-Feet

Top Capacity: 2500.00 Acre-Feet

Normal Pool Elevation: 2198.00 Feet

Top Elevation: 2206.00 Feet

Normal Pool Height: 37.00 Feet

Top Height: 45.00 Feet

Technical Hydrology/Hydraulics

Controlling PMP: 6-HR PMP

Drainage Area: 12.93 Sq. Mi.

6 Hour PMP: 17.40

Time of Concentration: 0.60

12 Hour PMP: 19.40

24 Hour PMP: 19.60

Available Spillway Design Flow: .90 PMP

Weighted Curve Number: 72

IDA Spillway Reduction:

Required Spillway Design Flow: .90 PMP

Inspections (Last 3 Max)

Date	Type	Condition
4/20/2020	Owner	Satisfactory
2/12/2019	Engineer	Satisfactory
8/8/2016	Engineer	Satisfactory

EAP Quick Reference

Approval Date: 05/26/2005
Expiration Date: 05/26/2011

Dam Location

Dam Address:
2245 PARK BLVD
Marion VA, 24354

E911 Direction to Dam:
Dam spillway is on right side of Park Blvd (Rte. 16) traveling north 1/4 mile past E911 address.

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Rain Gauge Observer:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center:

Local Government Emergency Services:

Owner's Engineer: Charles T. Wilson, P.E.
(primary)(804) 371-6233(Office)
(primary)charles.wilson@dcr.virginia.gov
600 E. Main St.
Richmond VA, 23220

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

- 16 - 0.5 miles downstream
- 700 - 1 miles downstream
- 617 - 1.5 miles downstream

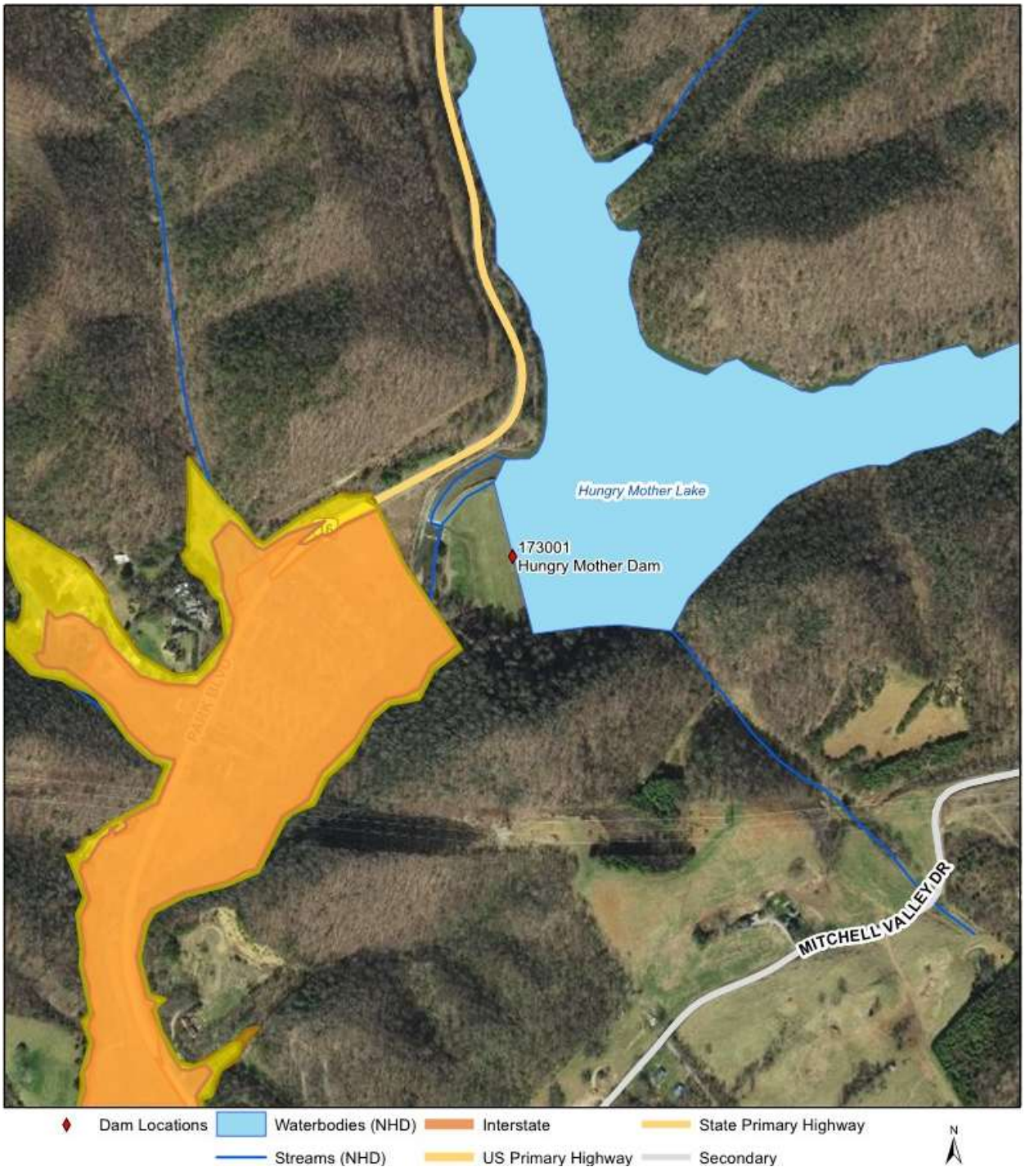
Dams Downstream:

Potential Impact Structures (count):

- 36 Homes
- 3 Businesses
- Schools
- Hospitals
- Critical Infrastructure
- Railroads
- Utilities
- Parks
- Golf Courses

Dam Number: **173001**
VAHU6: TH11
Region: 4
VA Senate: 40
VA House: 6
Congressional: 5109

Dam Name: **Hungry Mother Dam**
Municipalities: Smyth County
SWCD: EVERGREEN
HUC 12: 060101020304
Watershed Name: Hungry Mother Creek
USGS Topo: MARION



Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Hidden Valley Lake Dam

Inventory Number: 191004

Hazard Classification: High

City/County: Washington County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1960

Size Classification: Small (>=50 - <1000 ac. ft., >=25' and <40')

Certificate Type: Conditional 2 Year Certificate

Certificate Expiration: 11/30/2025

Days Since Last Inspection: 285

Inundation Report: Unknown

Type of Dam
Earth (Primary)

Reservoir Purpose
Recreation (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: 5.00 Miles

River or Stream: BRUMLEY CREEK

Technical Basics

Normal Pool Area: 59.70 Acres

Top Surface Area: 105.00 Acres

Normal Pool Capacity: 1350.00 Acre-Feet

Top Capacity: 1975.00 Acre-Feet

Normal Pool Elevation: 3600.00 Feet

Top Elevation: 3607.00 Feet

Normal Pool Height: 26.00 Feet

Top Height: 32.30 Feet

Technical Hydrology/Hydraulics

Controlling PMP: 6-HR PMP

Drainage Area: 1.70 Sq. Mi.

6 Hour PMP: 18.50

Time of Concentration:

12 Hour PMP: 20.60

Weighted Curve Number:

24 Hour PMP: 20.80

IDA Spillway Reduction:

Available Spillway Design Flow: 1.00 PMF **Required Spillway Design Flow**: .90 PMP

Inspections (Last 3 Max)

Date	Type	Condition
7/12/2023	Engineer	Fair
7/12/2023	Owner	Fair
2/11/2021	Engineer	Fair

EAP Quick Reference

Approval Date: 08/18/2023
Expiration Date: 08/18/2029

Dam Location

Dam Address:
5925 Hidden Valley Road
Abingdon VA, 24210

E911 Direction to Dam:
Hidden Valley Rd (VA 690) circumvents perimeter of impoundment. From EAP: "From Abingdon, north on US 19 turn right on Rte 690, follow Rte 690 to Wildlife Management Area at top of mountain. Bear left around lake to dam at the end of the road.

EAP Contacts

Dam Operator: Jeff Williams
(primary)(276) 378-4860(Mobile)
(primary)Jeff.Williams@dwr.virginia.gov
1796 Highway Sixteen
Marion VA, 24354

Dam Alternate Operator:Justin Heflin
(primary)(276) 378-4046(Mobile)
(primary)Justin.Heflin@dwr.virginia.gov
1796 Highway Sixteen
Marion VA, 24354

Rain Gauge Observer: Corey Gardner
(primary)(804) 367-5415(Office)
(primary)Corey.Gardner@dwr.virginia.gov
1796 Highway Sixteen
Marion VA, 24354

Alternate Rain Gauge Observer:Tyler Sheets
(primary)(804) 367-5415(Office)
(primary)Tyler.Sheets@dwr.virginia.gov
1796 Highway Sixteen
Marion VA, 24354

24-Hour Dispatch Center: Blake Andis
(primary)(276) 676-6000(Office)
(primary)sheriff@washso.org
20281 Rustic Lane
Abingdon VA, 24210

Local Government Emergency Services:Theresa Kingsley
(primary)(276) 525-1330(Mobile)
(primary)tkingsley@washcova.com
Government Center Building 1 Government Center Place, Suite A
Abingdon VA, 24210

Owner's Engineer: Mike Wilson
(434) 546-6156(Mobile); (primary)(434) 847-7796(Office)
(primary)mwilson@handp.com
2524 Langhorne Rd
Lynchburg VA, 24501

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:Allan D. Sumpter
(primary)(276) 676-5503(Mobile)
(primary)Allan.Sumpter@vdot.virginia.gov
700 E. Main St.
Abingdon VA, 24210

National Weather Service:Glenn Carrin
(primary)(423) 586-3771(Office)
(primary)glenn.carrin@noaa.gov
5974 Commerce Boulevard
Morristown TN, 37814

Potential Impacts

Roadways Impacted:

- Brumley Gap Rd (VA 689) - 6.8 miles downstream
- Brumley Gap Rd (VA 689) - 9.1 miles downstream

Dams Downstream:

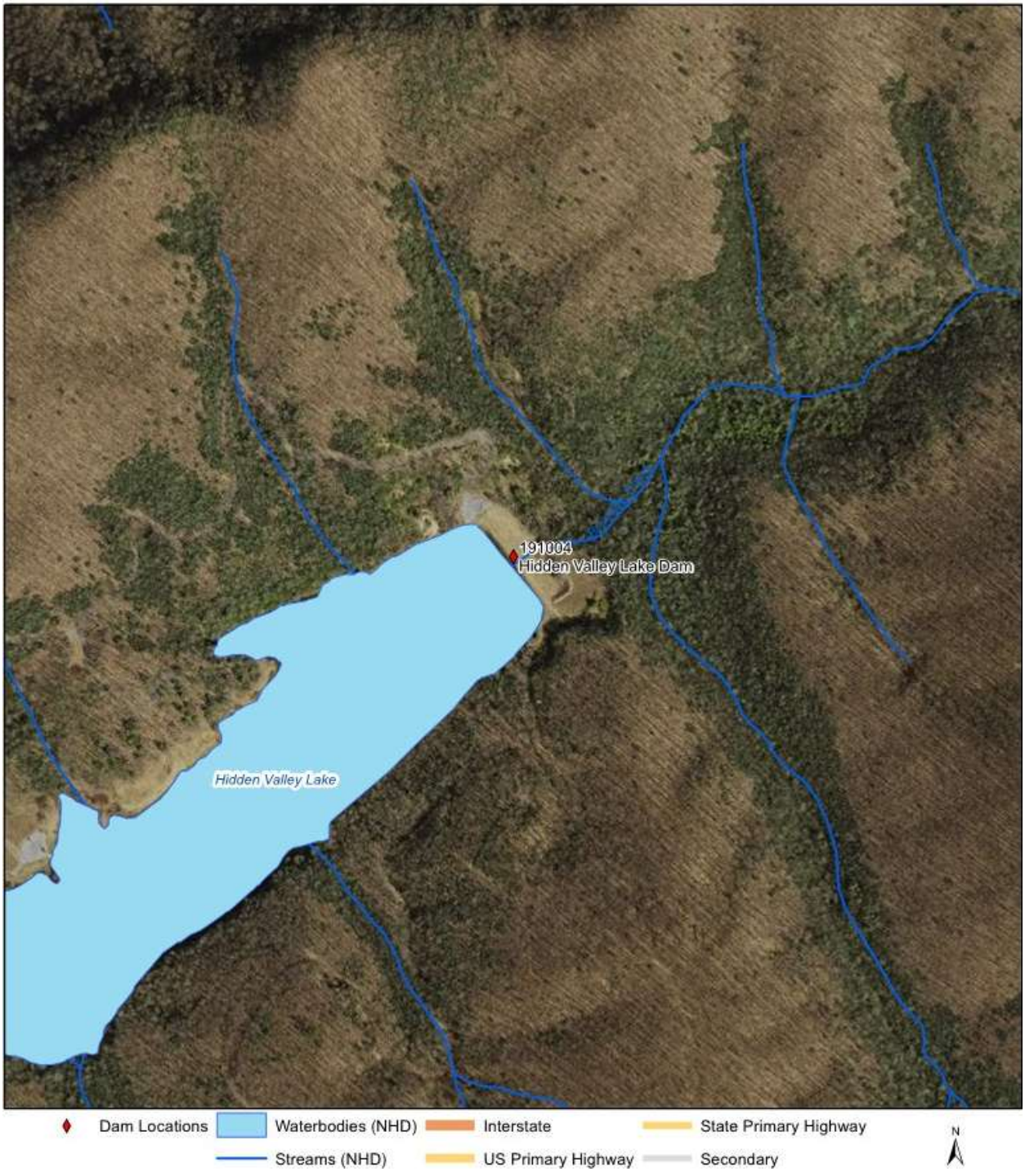
- 000000

Potential Impact Structures (count):

- 20 Homes
- 2 Businesses
- 0 Schools
- 0 Hospitals
- 0 Critical Infrastructure
- 0 Railroads
- 0 Utilities
- 0 Parks
- 0 Golf Courses

Dam Number: **191004**
VAHU6: TH34
Region: 4
VA Senate: 40
VA House: 4,5
Congressional: 5109

Dam Name: **Hidden Valley Lake Dam**
Municipalities: Washington County
SWCD: HOLSTON RIVER
HUC 12: 060101010206
Watershed Name: Brumley Creek
USGS Topo: BRUMLEY



Dam Safety Data Sheet

Department of Conservation and Recreation
Division of Dam Safety and Flood Plain Management
600 E Main St, Richmond, VA 23219

General

Name of Dam: Rural Retreat Dam

Inventory Number: 197001

Hazard Classification: High

City/County: Wythe County

Designed By:

Constructed By:

Regional Engineer: Steven Bricker

Year Constructed: 01/01/1967

Size Classification: Medium (>= 1000 - <50,000 ac. ft., >=40' <100')

Certificate Type: Conditional 2 Year Certificate

Certificate Expiration: 08/31/2023

Days Since Last Inspection: 285

Inundation Report: Unknown

Type of Dam
Earth (Primary)

Reservoir Purpose
Recreation (Primary)

Type of Spillway

Type	Width	Outlet Gates

Watershed

Nearest City:

Nearest City Distance: 0.10 Miles

River or Stream: SOUTH FORK REED CREEK

Technical Basics

Normal Pool Area: 79.50 Acres

Top Surface Area: 146.00 Acres

Normal Pool Capacity: 1250.00 Acre-Feet

Top Capacity: 2440.00 Acre-Feet

Normal Pool Elevation: 2509.00 Feet

Top Elevation: 2521.00 Feet

Normal Pool Height: 32.00 Feet

Top Height: 44.30 Feet

Technical Hydrology/Hydraulics

Controlling PMP: Unknown

Drainage Area: 3.34 Sq. Mi.

6 Hour PMP: 0.00

Time of Concentration:

12 Hour PMP: 0.00

Weighted Curve Number:

24 Hour PMP: 0.00

IDA Spillway Reduction:

Available Spillway Design Flow: 1.00 PMF **Required Spillway Design Flow**: 1.00 PMF

Inspections (Last 3 Max)

Date	Type	Condition
7/12/2023	Engineer	Fair
7/12/2023	Owner	Fair
2/17/2021	Engineer	Fair

EAP Quick Reference

Approval Date: 07/08/2014
Expiration Date: 07/08/2020

Dam Location

Dam Address:
Cedar Springs Road
State Road 749
Rural Retreat VA, 24368

E911 Direction to Dam:
Cedar Springs Raod,
2 miles south of Rural Retreat

EAP Contacts

Dam Operator:

Dam Alternate Operator:

Rain Gauge Observer:

Alternate Rain Gauge Observer:

24-Hour Dispatch Center:

Local Government Emergency Services:

Owner's Engineer: Mike Wilson
(434) 546-6156(Mobile); (primary)(434) 847-7796(Office)
(primary)mwilson@handp.com
2524 Langhorne Rd
Lynchburg VA, 24501

DCR Regional Engineer:
Steven Bricker
804-363-0992
steven.bricker@dcr.virginia.gov
8 Radford St., Suite 102A
Christiansburg VA, 24073

Transportation Administrator:

National Weather Service:

Potential Impacts

Roadways Impacted:

Dams Downstream:

Potential Impact Structures (count):

- Homes
- Businesses
- Schools
- Hospitals
- Critical Infrastructure
- Railroads
- Utilities
- Parks
- Golf Courses

Dam Number: **197001**
VAHU6: NE28
Region: 4
VA Senate: 40
VA House: 6
Congressional: 5109

Dam Name: **Rural Retreat Dam**
Municipalities: Wythe County
SWCD: BIG WALKER
HUC 12: 050500010903
Watershed Name: Reed Creek-South Fork Reed Creek
USGS Topo: CEDAR SPRINGS

List of All Known Dams in Mount Rogers Region

County	Name Dam
Bland County	Hunting Camp Dam
Bland County	Crab Orchard Creek Dam
Bland County	Bland County Farm Dam
Carroll County	Russell Dam
Carroll County	Byllesby Dam
Carroll County	Buck Dam
Carroll County	Olde Mill Golf Club Dam
Carroll County	Patch Inc. Dam
Carroll County	West Dam
Carroll County	Stewarts Creek - Lovills Creek Dam #9
Carroll County	Ernest Golding Dam
Carroll County	Carol Cox Dam
Carroll County	Richard Webb Dam
Carroll County	Lakeside POA Dam
Carroll County	Grassy Creek Farm LLC Dam
Carroll County	Caviness Dam
Carroll County	Vannoy Family Farms LLC Dan
Carroll County	Bruce Bryant Dam
Grayson County	Parker Dam
Grayson County	Hale Dam
Grayson County	Fries Mill Dam
Grayson County	Fields Dam
Grayson County	Hidden Valley Estates Dam
Grayson County	Laurel Creek Dam
Grayson County	Roberts Dam
Grayson County	JoAnn Arey Dam
Grayson County	Cassell Dam
Grayson County	Bolt Dam
Grayson County	Chicago Heritage Farms LLC Dam
Grayson County	Bottomley Evergreen & Farms Inc. Dam
Grayson County	John Hart Dam
Grayson County	Henry Jones Dam
Grayson County	Highlander Dam
Grayson County	Shateley Dam
Smyth County	Glade Mtn Washer Site 3 Dam
Smyth County	Umberger No. 1 Dam
Smyth County	Brushy Mtn No 2 Dam

County	Name Dam
Smyth County	Glade Mtn Washer Site No. 1 Dam
Smyth County	Billings Dam
Smyth County	Johnson Dam
Smyth County	Waddle Dam
Smyth County	Hungry Mother Dam
Smyth County	Smyth County Dam #1
Smyth County	Smyth County Dam #2
Smyth County	Smyth County Dam #3
Washington County	Clear Creek Dam
Washington County	Straight Branch Dam
Washington County	Hidden Valley Lake Dam
Washington County	Beaver Creek Dam
Washington County	Thomas Nichols Dam
Washington County	Kenneth Nicewonder Dam
Washington County	Olde Farm Dam
Washington County	Glenrochie Dam
Washington County	Texas Brine Dam
Wythe County	No. 1 Tailings Pond Dam
Wythe County	Impoundment 173 Dam
Wythe County	Rural Retreat Dam
Wythe County	Butt Dam #1
Wythe County	Harold Leedy Dam
Wythe County	Harold Leedy Horseshoe Pond
Wythe County	Reed Creek Dam
Wythe County	Paul Riefenberg Dam
Wythe County	Talley Farms Dam
Wythe County	ALC Acquisition Dam
Wythe County	Crowder Dam
Wythe County	Wythe County Dam #1
Wythe County	Harold Leedy Dam #1
Wythe County	Harold Leedy Dam #2
Wythe County	Kenneth Tibbs Dam
Wythe County	Butt Dam #2
Wythe County	Sharon Ball Dam
Wythe County	Windy Acres Dam

Drought

Description

In simple terms, drought can be defined as "a condition of moisture deficit sufficient to have an adverse effect on vegetation, animals, and man over a sizeable area." Drought can also be defined in terms of its effects and divided into categories, as suggested by FEMA:

- **Meteorological drought:** Defined solely on the degree of dryness, expressed as departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
- **Hydrologic drought**: Related to the effects of precipitation shortfalls on streamflows and reservoir, lake, and groundwater levels.
- **Agricultural drought**: Defined mainly in terms of soil moisture deficiencies relative to water demands of plant life, usually crops.
- **Socioeconomic drought**: This occurs when the demand for water exceeds the supply as a result of a weather-related supply shortfall.

Drought occurs as part of the regular climatic regime in virtually all climates and can occur throughout the entire Mount Rogers Region. Its causes are complex, and not readily predictable, especially in variable climates. Compared to storm events such as hurricanes and floods, drought has a slow onset and can last for months, years or even decades. Estimated dollar losses caused by drought can far exceed those of major storm events.

Some measures of drought, also known as drought indices, include:

- **Percent of Normal**: Calculated by dividing actual precipitation by normal precipitation (usually defined as the 30-year average) and multiplying by 100%. Effective for a single region or a single season. A disadvantage is the average precipitation is often not the same as the median precipitation.
- **Standardized Precipitation Index**: Index based on the probability of precipitation for any time scale. This is used by the National Drought Mitigation Center. It can provide early warning of drought, can assess drought severity and is less complex than some indices.
- **Palmer Drought Severity Index**: This is a measure of soil moisture and was the first comprehensive drought index created in the country, in 1965. It works best in areas of even topography but is less suitable for mountainous areas or places with frequent climatic extremes. Palmer values may lag emerging droughts by several months.
- **Crop Moisture Index**: A derivative of the Palmer Index. It reflects moisture supply across major crop-producing regions. It is not intended to assess long-term droughts.

- **Deciles**: This approach groups monthly precipitation events into deciles so that, by definition, "much lower than normal" weather cannot occur more than 20% of the time. This provides an accurate statistical measurement of precipitation, but its accuracy relies on a long climatic data record.

History

The U.S. Geological Survey has noted four major droughts statewide since the early 1900s. These occurred in 1930-1932 (one of the most severe droughts on record for the state), 1938-1942, 1962-1971 and 1980-1982 (the least severe). Other sources suggest the record is somewhat different for the Mount Rogers region. The table below gives a brief review of the some of the major droughts that have affected southwest Virginia.

Droughts in Southwest Virginia

Date	Location	Details	Impact
September 2007	Carroll, Grayson, Smyth, and Wythe Counties	Primary disaster for Carroll, Grayson, Smyth, and Wythe Counties	$8.0 million in crop damage
2-12-03	Carroll, Grayson, Smyth, large parts of SW VA	**USDA disaster declaration** due to severe drought for 46 counties. Primary disaster for Carroll, Grayson, Smyth Counties. Contiguous declaration for Galax and Washington County.	Low-interest emergency loans for farmers.
July and August 2002	Statewide	**State emergency drought declaration** for July and August. USDA disaster declarations for Bland, Carroll, Grayson, Smyth, Wythe Counties.	Significant crop damage. Reduced streamflow and groundwater levels.
9-1-99 (NCDC)	Bland, Carroll, Galax, Grayson, Smyth, Wythe, large parts of SWVA	Dry conditions began in July 1998, subsided for several months, then returned in June 1999 and through early Sept. Drought largely ended due to heavy rain from remnants of Hurricane Dennis on Sept. 4-5, 1999.	$8.25 million in crop damage. Very low water levels in creeks, streams and rivers.
July to October 1998 (NCDC)	Bland, Carroll, Galax, Grayson, Smyth, Wythe, large parts of SW VA	Dryness began in July, subsided in August, resumed in September. Low water levels in creeks, streams, rivers, lakes and some shallow wells.	Water levels low. $7.7 million crop damage.
9-1-95 (NCDC)	Bland, Carroll, Galax, Grayson, Smyth, Wythe, large parts of SW VA.	A drought that started earlier in the summer peaked in many sections of the state during the first two weeks of Sept. **State of emergency** declared. Widespread rainfall on Sept. 17 helped to alleviate the dryness.	Crops damaged. Many lakes and rivers with well-below normal water levels.

Date	Location	Details	Impact
1988	Mount Rogers region	Drought based on the Palmer Drought Severity Index, with the region in severe drought up to nearly 50% of the time. One of the worst droughts on record for the nation (1988-1989).	
1954-1956	Mount Rogers region	Drought based on the Palmer Drought Severity Index. Region in severe drought up to nearly 40% of the time.	
1928-1934	Mount Rogers region	Drought based on the Palmer Drought Severity Index. Region in severe drought up to nearly 20% of the time.	

For the Mount Rogers region, the worst period came in 1988, with the region in severe drought 40%-49.99% of the time. Over the long-term severe drought conditions in the Mount Rogers region occurred only up to 10% of the time.

Risk Assessment and Vulnerability

In recent years, major agricultural droughts have occurred several times from 1995 through 2023. The historical record is not as well developed for the years prior to 1995, though major droughts are known to have occurred in 1928-1934, 1954-1956 and in 1988.

Over the past 100 years, the region has been estimated to experience drought less than 10% of the time. In the timespan since the original Hazard Mitigation Plan was written, the region's vulnerability to drought has not changed.

History shows drought conditions reaching disaster proportions can affect the entire Mount Rogers region. For some parts of the region, especially in Carroll County, well development is difficult and often produces a dry hole.

The impacts appear to have the greatest impact for the farming community. In these cases, the U.S. Department of Agriculture makes damage assessments and provides financial aid to qualifying farmers through the local farm service agencies.

Water issues also are a concern for the general public, local governments, business and industry. Several engineering studies from the mid- to late-1990s, as well as a 1996 health department survey, identified issues regarding water quantity, water quality and reliability of supply. In the unincorporated areas, most parts of the region depend upon groundwater supplies. The reported problems include low quantity, poor quality (due to mineral or bacterial content), turbidity, petroleum contamination and dry holes. Limited quantities restrict fire-fighting capabilities. Inadequate or limited water supplies also restrict future growth potential

for business and industry. The table on the following page describes in more detail water related problems in the Mount Rogers District.

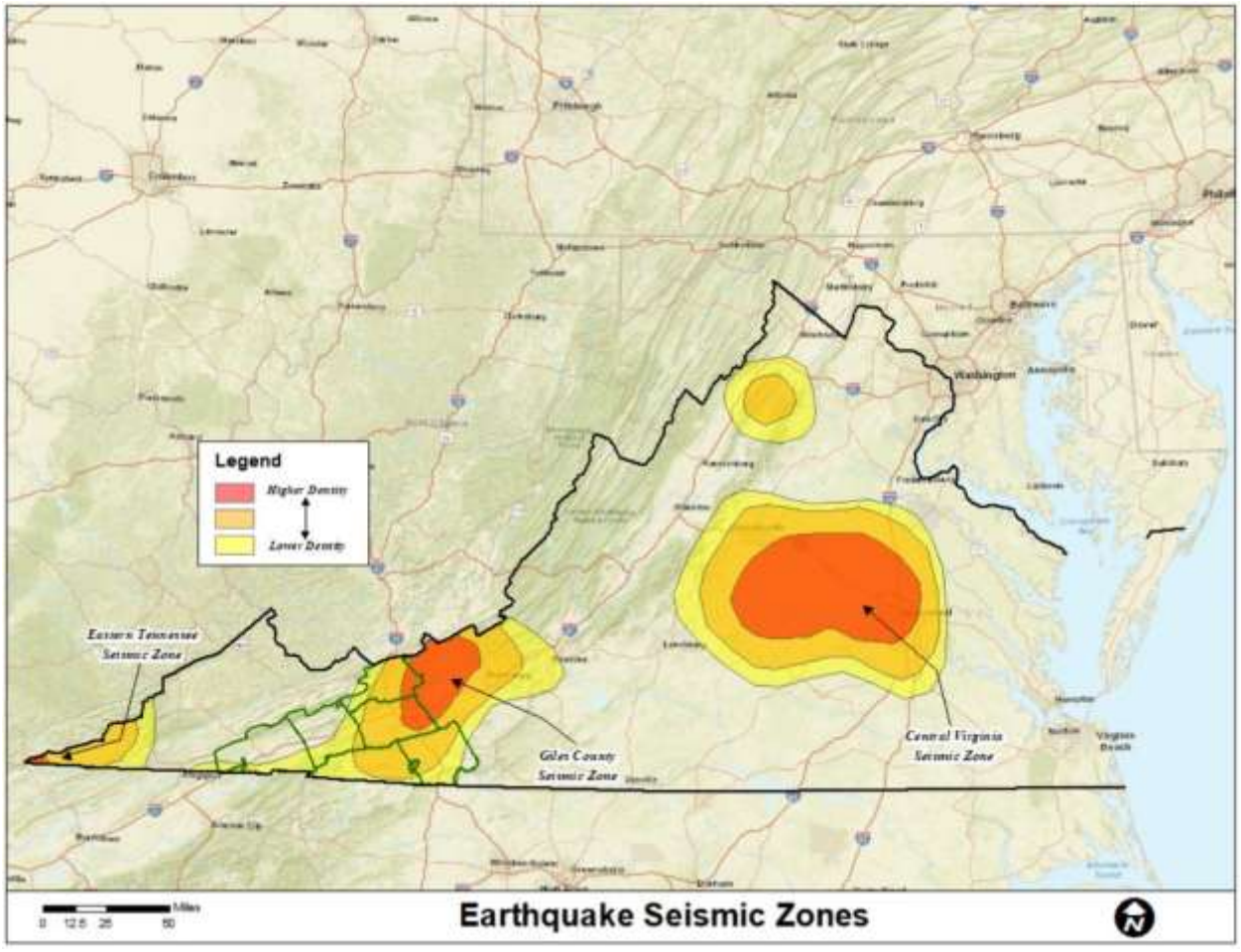
Water Problems Reported to the Mount Rogers Health District	
Bland County	**Complaints**
Little Creek area	Bacteria in recently drilled wells.
Hollybrook	Mineral quality/iron bacteria. Cisterns used for some supplies.
Seddon	Appearance of dry wells. Cisterns used for some supplies. Mineral quality.
Waddletown	
Laurel Creek/Dry Fork	Poor quality with some wells and springs. Cisterns used for some supplies.
Ceres	Poor quality in some springs and wells.
	Poor quality in springs and iron bacteria in wells.
Bastian/Hicksville Crandon/Mechanicsburg	Mineral quality/iron bacteria concerns.
Carroll County	**Complaints**
Paul's Creek (Cana area) Dugspur (Rt. 753) Star (Rt. 1105) Woodlawn Piper's Gap Fancy Gap (Rt. 683) Chestnut Yard Rt. 645 (below Laurel Fork) Short Creek (Rt. 640/I-77)	Iron, turbidity, low-yield wells.
Grayson County	**Complaints**
Old Town – Fries Hill	High iron levels.
Flatwood Community	Many wells are drilled deep. Many dry holes found.
Helton/Cabin Creek Area	Well construction difficult due to rock formations.
Fairview Community	
Nuckols Curve Area	
Other Comments:	Many springs used as private water supplies, especially in western areas of the county. Many springs have bacteria contamination.
Smyth County	**Complaints**
Walker Mountain area	High iron/sulphur content.
Washington County	**Complaints**
Mendota (Rt. 802 area)	High iron/sulphur content in private water supplies.
Rt. 91 (S.F. Holston to Rhea Valley)	Low-yield wells and bacteria contamination.
Wythe County	**Complaints**
Poplar Camp, Crockett, Gateway Trailer Park (Grahams Forge), Rosenbaum Chapel area	Petroleum contamination.
Sand Mountain area	Dry holes and low-yield wells.
Stony Fork area	High iron/sulphur levels.

Earthquakes

Description

An earthquake can be defined as a sudden motion or trembling caused by an abrupt release of accumulated strain on the tectonic plates that comprise the earth's crust. The theory of plate tectonics has been described since 1967 and is based on the idea the earth's crust is composed of several major plates that move slowly and continuously, at times bumping and grinding against each other and at other times creating separations.

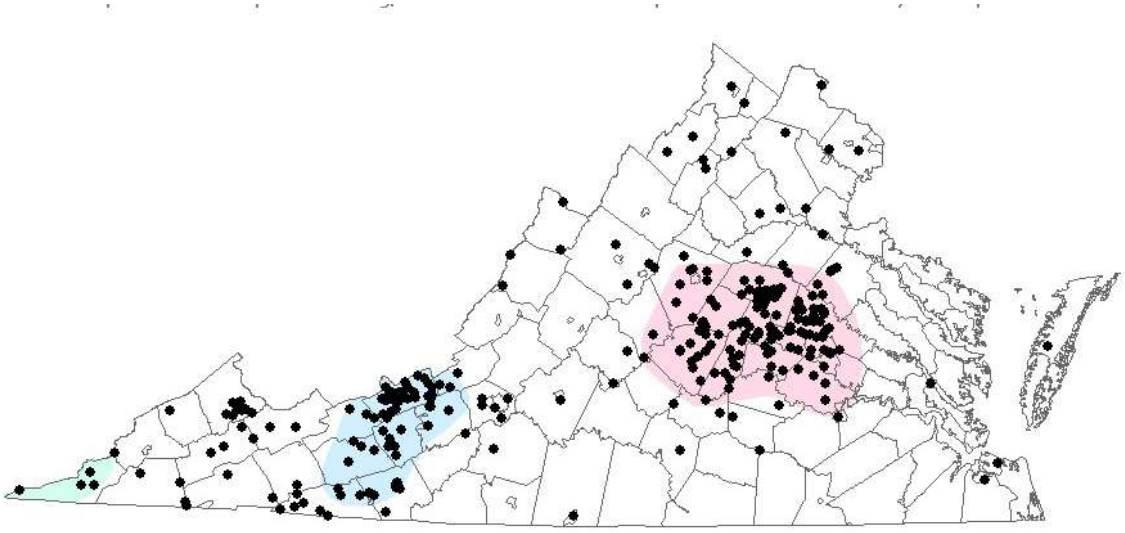
The tectonic plates are thought to bump, slide, catch or hold as they move together. An earthquake happens when faults located near plate boundaries slip when the stress against the rock formations becomes too great. This sudden movement results in surface faulting, ground failure and tsunamis.



Surface faults are thought to occur in various forms, including strike-slip faults, normal faults (with strong vertical movement), and reverse (thrust) faults (mainly horizontal movement). Ground failure is expressed through liquefaction, when coarse soils lose their strength and act like fluids flowing over the landscape. Ground failure created by liquefaction includes lateral

spreads, flow failures (the most catastrophic form), and loss of bearing strength (causing buildings to settle and tip). Tsunamis are phenomena associated with the west coast and are not considered further in this report.

Earthquakes are described in various fashions, including by intensity and magnitude. Intensity is defined as a measure of earthquake effects at a particular place on humans, structures or the land. Magnitude is a measure of the strength of an earthquake or the strain energy released by it (originally defined by Charles Richter in 1935).



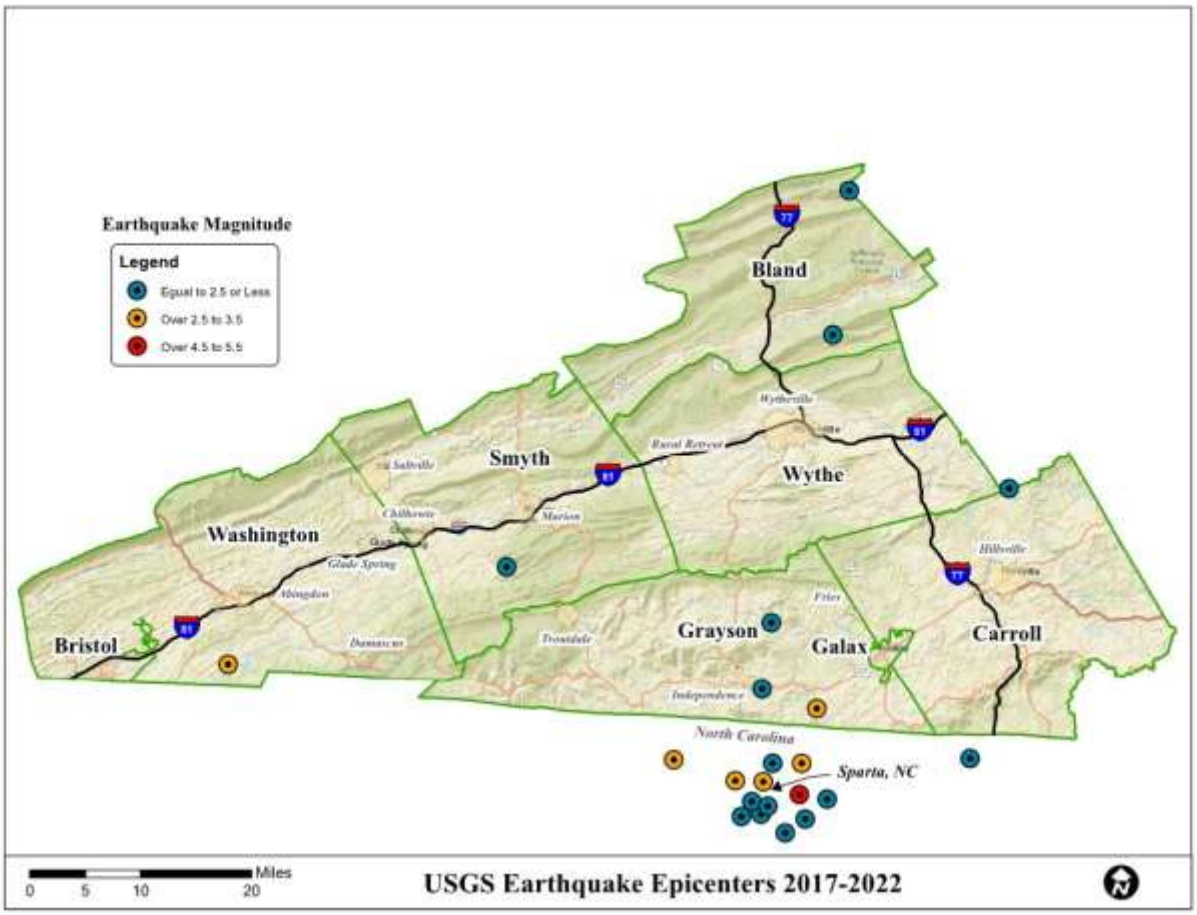
This map shows the locations of known earthquake epicenters in Virginia. The Eastern Tennessee Seismic Zone is shown in green, the Giles County seismic zone is shown in blue and the Central Virginia seismic zone is shown in pink.

History

Sources such as the Virginia Department of Mines, Minerals and Energy describe the statewide risk of earthquakes as moderate, in keeping with most other states in the eastern seaboard of the United States.

Earthquake activity in Virginia has generally been, with a few exceptions, low-magnitude but persistent. The first documented earthquake in Virginia took place in 1774 near Petersburg, and many others have occurred since then, including an estimated magnitude 5.5 (VII) event in 1897 centered near Pearisburg in Giles County. A Roanoke attorney who was in Pearisburg said that for nearly fifty miles from that place he “saw hardly a sound chimney standing.” In his opinion, “If the buildings throughout Giles had been largely of brick, the damage would have been very great, and serious loss of life would have occurred.” The largest recorded earthquake in Virginia occurred in Louisa County on August 23, 2011 and had a magnitude of 5.8 (VII). It

was felt all along the eastern seaboard by millions of people, causing light to moderate damage in central Virginia, Washington, D.C. and into southern Maryland. Since 1977, more than 200 quakes have been detected as originating beneath Virginia. Of these, at least twenty-nine were large enough to be felt at the Earth's surface. This averages out to about six earthquakes per year, of which one is felt.



Much of Virginia's earthquake activity has been in the southwest and eastern parts of the state. Counties and cities that have experienced earthquakes of intensity VI and higher include Smyth, Washington and Wythe in the local region. Local earthquake history is described by Stover and Coffman and also by the U.S. Geological Survey, through its Earthquake Hazards Program. The tables on the following page describe in more detail major recorded earthquakes in the Mount Rogers Region.

Modified Mercalli Scale

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest,especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Earthquakes in The Mount Rogers Region by Date/Location, Intensity, and Description

Date/Location	Intensity	Description
March 9, 1828 Southwest VA	V (MM)	Felt over 218,000 sq. miles, from Pennsylvania to South Carolina and the Atlantic coastal plain to Ohio. Doors and windows rattled.
April 29, 1852 Wytheville	VI (MM)	Severe earthquake shook down a chimney near Wytheville and shook down tops of chimneys at Buckingham Courthouse. Homes shook in Staunton. A brick fell from a chimney in Davie County, N.C.
Aug. 31, 1861 Southwest VA	VI (MM)	Epicenter in extreme southwest Virginia or western North Carolina. Bricks fell from chimneys at Wilkesboro, NC. Felt from Washington, D.C. to the Midwest and south to Columbus, GA.
Sept. 1, 1886 South Carolina	V (MM)	Epicenter in Charleston, S.C., with estimated intensity of X. Caused minor structural damages in various parts of Virginia (fallen plaster and chimneys, cracked walls, broken windows).
May 3, 1897 Giles County	VII (MM)	Greatest severity at Radford, where some chimneys were destroyed and plaster fell from walls. Felt in most of southwest Virginia and in a region of 89,500 sq. miles.
May 31, 1897 Giles County	VIII (MM)	Largest known earthquake originating in Virginia in history. Felt over 280,000 sq. miles. Largest effects felt from Lynchburg to Bluefield, W. Va. and from Giles County south to Bristol, Tenn. Many downed chimneys, changes in flow springs and appearance of some earth fissures.
Feb. 5, 1898 Wytheville or Pulaski	VI (MM)	Earthquake felt over 34,000 sq. miles. Bricks fell from chimneys and furniture shifted in a few houses. Effect felt throughout southwest Virginia and south to Raleigh, N.C.
April 23, 1959 Giles County	VI (MM)	Several chimneys were damaged, plaster cracked and pictures fell from walls in Eggleston and Pembroke. Felt over 2,900 sq. miles in Southwest Virginia.

Date/Location	Intensity	Description
Nov. 11, 1975 Giles County	VI (MM)	Windows were broken in Blacksburg and plaster cracked at Poplar Hill (south of Pearisburg, Giles County). Also felt in Pulaski County.
Sept. 13, 1976 Carroll County	VI (MM)	One of the most persistent areas of activity in recent years, with five small earthquakes felt near Hillsville. Effects felt in the Carolinas and West Virginia.
Aug. 23, 2011 Mineral, VA	VIII (MM)	The earthquake was felt in some of the eastern parts of the Mount Rogers Region, but no damage was reported.
Aug. 11, 2020 Sparta, NC	VI (MM)	A magnitude 5.1 earthquake shook the region that was centered in Sparta, North Carolina. It was the strongest earthquake in North Carolina since 1916. While the quake was felt all across the district, the only damage reported was in Grayson County. The high school gymnasium stage suffered a crack. There were also some cracks in the brick of some of the elementary schools in the county, but the damage there was mostly cosmetic.

One notable earthquake occurred in May 1897 and was based in Giles County. It was the largest Virginia-based earthquake in recorded history. Chimneys were shaken down throughout southwest Virginia, including in Wytheville and as far west as Knoxville, Tenn. Effects of the earthquake were felt from Georgia to Pennsylvania and from the Atlantic Coast to Indiana and Kentucky. The effects were strong at Pearisburg, where brick walls cracked and some earth fissures appeared. The magnitude of this quake has been estimated at VII and VIII on the Modified Mercalli intensity scale. This event, felt over 11 states, is described as the third largest earthquake in the eastern part of the country in the past 200 years.

Risk Assessment and Vulnerability

For the Mount Rogers region, the likelihood of earthquakes appears to be moderate, based on measurements related to maximum ground acceleration and as described by FEMA. This data is incorporated into probabilistic ground motion maps published in the 2015 edition of the National Earthquake Hazards Reduction Program's *NEHRP Recommended Provisions*.

The southwest Virginia region faces a moderate chance of experiencing earthquakes. While recent history shows some part of the region experiences earthquakes roughly once every 18 years, the resulting damage has been relatively minor.

The entire Mount Rogers region is subject to the effects of an earthquake, as shown by the historical record from larger events such as the Giles quake from May 1897.

The Mount Rogers region in total covers 2,786 square miles, with over 67,000 households and a population of 187,385. The region includes 71,000 buildings with an estimated structural replacement value of $7.3 billion. An estimated 98% of the buildings and 78% of the building value is in residential housing.

While earthquakes can create widespread destruction and death, the damages experienced in southwest Virginia are more moderate, based on the historical record. It should be noted that earthquake analysis is tricky, given that the historical record covers a period of less than 175 years. A much better record for earthquakes would cover hundreds, even thousands, of years. The risk assessment in this report is based upon this limited range of data. In the time span since the original Hazard Mitigation Plan was written, the region's vulnerability to earthquakes has not changed.

For the Mount Rogers region, the worst of the earthquakes experienced historically appear to correspond to an intensity of VI on the Modified Mercalli Scale. For purposes of analysis, a Hazus analysis has been completed for earthquakes in the vulnerable areas within the Mount Rogers Region. The reports in the Hazus section provide more detailed information.

Flooding

Description

Flooding is regarded as the most damaging natural hazard in Virginia. Average annual flood damages statewide amount to $100 million. Nationwide, between 1983 and 1997, Virginia ranked 14th with flood damages of $1,507 million.

In the Mount Rogers region, flood damages can cost millions of dollars. In November 1977, flood damages to business and industry in Smyth County was estimated at up to $8.6 million. In the previous flood of April 1977, damages were estimated at $7.8 million for 16 jurisdictions.

Flood-Related Definitions

Base Flood: Flood with a 1% chance of being equaled or exceeded in any given year. The Base Flood is the standard used by the National Flood Insurance Program.

Base Flood Elevation: The elevation of the water surface resulting from a flood that has a 1% chance of occurring in any given year.

Floodplains: Lowlands, adjacent to rivers, lakes and oceans, subject to recurring floods.

Floodway: The stream channel and that part of the adjacent floodplain that must remain open to permit passage of the Base Flood without raising the water surface elevation by more than one foot. Flooding is the most intense and poses the greatest risk in the floodway area.

More recently, in March 2002, Smyth County alone sustained an estimated $2 million in flood damages, compared to $100,000 in Wythe County and $360,000 in Washington County. Preliminary estimates from the November 2003 flooding came to $485,000 for Bland County, $251,000 for Carroll County and $878,000 for Smyth County.

Flood hazards in the local region include *riverine flooding* and the *flash floods* that result from sudden, violent storms that produce large amounts of rainfall in short amounts of time. *Riverine flooding* involves overflows from rivers and streams. The form of flooding is often more gradual in nature and may allow more time for advance warning. *Flash flooding* – such as occurred in November 2003, resulting in federal disaster declarations for several localities may occur with little warning and yet cause significant damage.

History

The Mount Rogers region of Virginia has a long history of flooding. The floods typically result from heavy rains or from melting following a severe winter storm. Heavy rains during thunderstorms can cause flash flooding in localized areas. The data in the chart below only relates to major flood events through fall of 2023 and does not reflect the full range of flood events that have affected the region over the years.

Major Flooding Events in Mount Rogers Planning District		
Date	**Affected Localities**	**Description**
5-21-20	Carroll County	This flood caused $150,000 in damage
4-13-20	Smyth County	This flood caused $47,000 in damage
4-13-20	Grayson County	This flood caused $186,000 in damage
4-13-20	Wythe County	This flood caused $160,000 in damage
10-11-18	Galax	This flood caused $455,000 in damage
9-18-18	Galax	This flood caused $2,000,000 in damage
5-24-17	Carroll County	This flood caused $75,000 in damage
5-24-17	Grayson County	This flood caused $150,000 in damage
4-23-17	Smyth County	This flood caused $75,000 in damage
6-27-16	Bland County	This flash flood caused $75,000 in damage
4-19-15	Wythe County	This flood caused $50,000 in damage
6-29-14	Smyth County	This flash flood caused $250,000 in damage
6-9-11	Bland County	This flood cause $250,000 in damage
5-13-11	Grayson County	This flash flood caused $85,000 in damage
2-28-11	Bristol	Severe storms and flooding caused $40,000 in damage
3-4-08	Smyth County	Severe storms and flooding caused $500,000 in damage
6-12-04	Washington County	This flood caused $250,000 in damage
11-18-03	Bland, Smyth, Galax; 12 counties and two cities in SW VA and NE TN	Heavy rains of 1.88” to more than 5” caused heavy flooding Nov. 18-19. Federal disaster declaration for Bland, Smyth, Galax in local region. $12 million damage across entire 12-county region.
2-15-03	Southwest Virginia (Wythe County declared a disaster)	State of emergency declared on 2-17-03 due to snow & ice in northwest VA and more than 4” of rain in southwest VA that caused flooding and mudslides. Federal disaster declared 4-28-03.
2-14-03	Washington, Bristol	Flooding from 4-day rainfall of 2-6” across southwest VA. See state of emergency declaration above.
4-17-02	Smyth, Washington, Wythe	Severe storms and flooding
3-17-02	All counties in Mount Rogers Planning District	State of emergency declared on 3-18-02 due to heavy rainfall and flash flooding.
8-20-01	Washington	Severe storms and flooding
8-9-01	Smyth	Severe storms and flooding
7-26-01	Smyth, Washington	State of emergency declared on 7-29-01 and $4.4 million in state and federal aid. This was part of the same weather pattern causing flooding on 7-8-01.
2-2-96	Bland, Grayson, Washington, Wythe	Flooding (resulting from Blizzard of 1996)
5-17-94	Galax	Severe ice storms and flooding
3-28-94	Bristol	Severe ice storms and flooding

Major Flooding Events in Mount Rogers Planning District		
Date	**Affected Localities**	**Description**
3-10-94	Bland, Carroll, Grayson, Smyth, Washington, Wythe	Severe ice storms and flooding
5-19-92	Carroll	Severe storms and flooding
5-29-84	Washington	Severe storms and flooding
5-07-84	Town of Damascus	Flooding on Beaverdam Creek. Town declared a federal disaster area for damage to sewer system, Virginia Creeper Trail and private homes.
11-17-77	Carroll	Severe storms and flooding
11-12-77	Grayson, Smyth, Washington	Severe storms and flooding
10-02-77	Bristol	This 20-year flood caused $3 million in damage in 1977 dollars.
4-21-77	Carroll	Severe storms and flooding
4-7-77	Bland, Grayson, Smyth, Washington, Wythe	Severe storms and flooding
9-8-72	Smyth, Galax	Tropical Storm Agnes (flooding)
March 1867	Bristol	Flood of record for Beaver Creek in Bristol, TN and Bristol, VA. This was a 250-year flood.

For Bristol the flood of record occurred in March 1867. This 250-year flood on Beaver Creek and its tributaries caused $1 million worth of damages (in 1867 dollars). More recently, in October 1977, a 20-year flood caused $3 million worth of damages (in 1977 dollars) on the Bristol, Virginia side alone. The worst and most costly of flood damages on an annual basis occurs along the main stem of Beaver Creek.

For the Mount Rogers region as a whole, the worst flooding within the past 50 years occurred in April and November of 1977. The floods of 1977 later led to engineering reports that encouraged people to move out of the floodplain.

Engineering Studies

Town of Chilhowie

An engineering study in 1978 on flooding in Smyth County eventually led to a special project in Chilhowie that relocated 67 families and created the Chilhowie Recreation Park.

The Middle Fork Holston River Flood Control Improvements Study, completed in March 1978, studied flooding issues in Smyth County, with special focus on the Town of Chilhowie/Seven Mile Ford community and the Town of Marion/Atkins community.

Initial recommendations from that 1978 study carried a total implementation cost of $18 million. Later the study was reduced to three sub-projects, but the price tag still proved very high. The recommendations included channelizing parts of the Middle Fork Holston River, with

rip rap or concrete reinforcement, flood-proofing for selected businesses and industries, rebuilding several bridges to accommodate the widened river channel, relocations out of the floodplain, and installing some levees and pump stations. Of all the proposals discussed in the 1978 study, channelizing the river was deemed as a top priority with the potential for making the greatest impact on future flood levels.

The recommendations also included removing obstructions from the Middle Fork (including the breached dam at the old Marion Ice Plant), development of six flood storage reservoirs along six tributaries, and implementation of floodplain ordinances to limit future development in the floodplain area.

Although the 1977 floods had serious impacts for several industries located in the Middle Fork Holston floodplain, the industries declined to implement the recommendations due to the high cost. The local communities felt equally intimidated by the proposed mitigation costs, and there was little hope of major help from among a range of federal agencies to provide the 100% grant funding needed to carry out any of the proposed projects. The Planning District Commission finally decided to try to get the most for the funds available by demolishing the most flood-prone structures in Chilhowie and relocating families out of the floodplain.

The project that eventually emerged was a $2.8 million multi-part proposal to relocate families out of the Middle Fork Holston floodplain in Chilhowie, build replacement housing in a new subdivision created for the relocation, and to provide water treatment improvements for the town of Chilhowie. The project area included 72 homes, three churches, three businesses and one lodge. To succeed at all, the effort had to overcome numerous complications created by the funding agencies, the attitudes of local residents, and the feelings of the town council, which observers felt cared more about the water treatment project than the flood mitigation project.

In the end, 67 families moved out of the floodplain. Of those, 53 families had help from the Tennessee Valley Authority and 14 had help through the Department of Housing and Urban Development. Due to the time it took to form the Chilhowie Redevelopment and Housing Authority (created in July 1979) and the new subdivision, most families relocated elsewhere. Only six families opted to relocate to the subdivision as planned. The town had the abandoned property demolished and built a community recreation park in the floodplain area (between Holston Street and Railroad Avenue). The project took seven years to complete.

Town of Damascus

Building on flood study work begun by the Tennessee Valley Authority in the late 1950s, the Town of Damascus also undertook projects to relocate 34 homes (88 residents) and three businesses out of the floodplain following the 1977 flooding. Historically a flood-prone community due to development along Beaverdam and Laurel Creeks, along with obstructions in the creeks, Damascus suffered three major floods in 1977 (in April, October, and November). Twice in 1977 the community qualified as a federal disaster area. The 1977 flood events 1977 led to a comprehensive flood mitigation study completed in 1979. An initial cost estimate of more than $3.2 million would have built a levee emergency access route, relocated flood-prone homes out of the floodplain, flood-proofed some homes and businesses, removed two abandoned dams from Laurel Creek, installed storm drainage collection systems, and required more control of floodplain development by the town. In 1981, a follow-up flood mitigation program proposed by the town was estimated at $4.3 million.

Image 1: 2003 Flooding in Damascus

Successful efforts by Damascus to mitigate its flooding problems over the years have included the following:

- A $559,000 grant from the HUD in 1981 to install storm sewers along Mock, Surber, and Haney Hollows (finished in 1983).
- State and federal disaster assistance following another major flood in May 1984 helped make repairs to nearly $86,000 worth of damage to the community.

Image 2: Flooding in Marion, VA
View of flooding at Baughman Street Bridge in Marion. The bridge itself becomes a barrier during times of high water

- Grant funding in 1984 ($700,000 from the state CDBG program and $190,000 from the Tennessee Valley Authority) to relocate 34 families (88 people) and three local businesses out of the floodplain (1985 through 1988).

- The town also converted the old Damascus Elementary School for housing under a project funded by the state CDBG program.

Recent Flood Events

The more recent flood events from 2001-2023 were less drastic in extent and damages compared to the floods of 1977. Nonetheless the floods disrupted the lives of those who had to endure them, including the first major flood in several decades for the City of Galax.

The events of 2001 occurred in late July and early August. Heavy rainstorms caused flooding that forced more than 100 Smyth County residents from their homes, according to news accounts. Smyth and Washington counties became federal disaster areas. In all the flooding affected nine counties in southwest Virginia and led to at least $4.4 million in state and federal aid.

The next round of disaster-level flooding occurred March 17-20, 2002. Three to six inches of rain fell in a 36-hour period and led to federal disaster declarations for Smyth, Washington and Wythe counties.

The event affected numerous homes and businesses, with residential evacuations along the North Fork Holston River in Smyth County near the Town of Saltville and in remote parts of eastern Washington County near the Smyth County line. The floods also created overflows for water and sewer plants in the Towns of Saltville, Chilhowie, and Rural Retreat and in Washington County. Additionally, floods ruined some businesses and temporarily stranded some communities, such as Downtown Chilhowie. FEMA disaster aid came to more than $500,000 in the local region as of June 2002, with an estimated $2.5 million total in damages. For the entire southwest Virginia region, state and federal disaster assistance had reached $8 million.

The 2002 flooding led Chilhowie to undergo a preliminary $100,000 study by the U.S. Army Corps of Engineers on causes of the flooding and potential solutions, including river dredging and use of levees. In March 2004, the Chilhowie Town Manager recommended buy-outs of the 15 properties that flood most often and the decision was made to buy out six homeowners located on River Bottom Circle along the North Fork Holston River.

The flood disasters continued into 2003, with a federal declaration resulting from two back-to-back snowstorms February 15-28, affecting all localities in the Mount Rogers Planning District. In total, the storm cost $37 million in snow removal costs and $71 million in damages to homes, businesses, public facilities, roads and other property. In the local region, Bland and Wythe counties sought federal aid for flood damages to public and private property.

On November 18-19, 2003, heavy rains caused severe flooding across 10 counties in northeast Tennessee and southwest Virginia. In Bland County damages were estimated at $485,000, with $878,000 in damage in Smyth County and $251,000 in damage in Carroll County. This included major damage or destruction of numerous homes, flooded roadways, damage to public and private property, some evacuations and temporary closure of area schools.

The City of Galax suffered its first major flooding since 1940; initial reports to FEMA included damage to 10 businesses and 70 homes in an area that included the city's main business district along Chestnut Creek. Some sinkholes appeared, and there was flooding in several nearby residential communities. Total damages amounted to $100,000, with about half consumed by the cost of cleanup by the city, according to city officials. Because Galax does not participate in the National Flood Insurance Program, the designated floodplain area was not eligible for federal disaster assistance. The city so far has resisted suggestions it consider re-joining the flood insurance program. Damaged properties located out of the designated floodplain were eligible for disaster assistance. City officials have said many flooding problems are caused by undersized and deteriorated stormwater drainage systems.

In May of 2011 a flash flood caused minor flooding at the elementary school, damaged approximately 20 vehicles, and caused some minor damage at an RV park. This flood also caused a manure spill that caused some localized water contamination. The town residents were asked by officials at the water treatment plant to conserve water. The town had enough water in reserve until the spill was cleaned.

National Flood Insurance Program

Most communities with flooding issues in the local region participate in the National Flood Insurance program (NFIP). Participation in NFIP allows homeowners and commercial businesses

to obtain flood damage protection. For single-family homes, the insurance provides up to $250,000 for structural damages and up to $100,000 for contents damages. Commercial businesses can be covered for up to $500,000 in structural damages and up to $500,000 in contents damages.

Flood insurance helps cover flood damages during minor and major flood events. Insurance coverage through NFIP also covers a larger amount for losses than typically would be available during a federal disaster. Emergency aid that is available following declaration of a federal disaster most often comes in the form of a low-interest loan. FEMA promotes participation in NFIP for all qualifying communities.

Community Participation in NFIP Mount Rogers Region, Virginia					
Jurisdiction	NFIP Status	CRS Class	Administration/Implementation/Enforcement		
			Administrator	CFM	Implementation/ Enforcement
Bland County	Y	N/A	Building Official	N	Building permits system
Carroll County	Y	N/A	County Administrator	N	Building permits system
Grayson County	Y	N/A	Zoning Administrator	N	Zoning permits system
Smyth County	Y	N/A	Deputy Administrator/ Zoning Administrator	N	Zoning Permits system
Washington County	Y	N/A	Zoning Administrator	N	Zoning Permits system
Wythe County	Y	N/A	County Engineer	N	Building permits system
City of Bristol	Y	N/A	Director of Community Development & Planning	N	Zoning permits system
City of Galax	N	N/A	N/A	N/A	N/A
Town of Abingdon	Y	N/A	Assistant Town Manager	N	Zoning permits system
Town of Chilhowie	Y	N/A	Town Manager/Zoning Administrator	N	Zoning permits system
Town of Damascus	Y	N/A	Zoning Administrator	N	Zoning permits system
Town of Fries	Y	N/A	Mayor	N	Zoning permits system
Town of Glade Spring	Y	N/A	Town Manager/ Zoning Administrator	N	Zoning permits system
Town of Hillsville	Y	N/A	Building Official/Engineer	N	Building permits system
Town of Independence	Y	N/A	Town Manager	N	Zoning permits system
Town of Marion	Y	N/A	Town Manager	N	Zoning permits system
Town of Rural Retreat	Y	N/A	Town Manager/ Zoning Administrator	N	Zoning permits system
Town of Saltville	Y	N/A	Town Manager/ Zoning Administrator	N	Zoning permits system
Town of Troutdale	N	N/A	N/A	N/A	N/A
Town of Wytheville	Y	N/A	Assistant Town Manager/ Zoning Administrator	Y	Zoning Permits system

As shown in table above, most of the localities participate in floodplain management and make NFIP coverage available to property owners. The City of Galax, with Chestnut Creek flowing through the city's downtown industrial district, participated in NFIP for a few years before

dropping out. As a result of the November 2003 flood disaster, the City met with state and federal flood program officials. The City has opted to remain a non-participant. Galax recently submitted a request to the US Army Corps of Engineers to look at possible projects upstream of Chestnut Creek through the Flood Damage Reduction Program (Section 205 of the 1948 Flood Control Act). The end result would be a project that would reduce the 100-year flood plain to the Chestnut Creek channel. The Town of Troutdale due to its small size and the fact that relatively little water runs through the town does not find it feasible to participate in the NFIP.

The FEMA floodplain maps available for communities participating in the National Flood Insurance Program (NFIP) depict 100-year floodplains for flood-prone areas. That means, in any given year, the floodplain area faces a 1% chance of having a flood.

One major drawback for the floodplain maps in effect for the Mount Rogers region, as well as for many communities nationwide, is the age and relative inaccuracy of the maps. Although a fine effort has been made by FEMA to update the existing maps digitally, there are still existing accuracy issues, however, FEMA is in the process of rectifying these errors. We expect new data for much of the Mount Rogers Region in the next two years.

In addition, most local floodplains have not been subject to hydrological studies to determine the Base Flood Elevations; the floodplain extent in such cases has been estimated based on the local topography.

Risk Assessment and Vulnerability

The Mount Rogers region has experienced 18 presidential disaster declarations or state-level emergencies related to flooding over 30 years. That does not account for the more minor flooding that may occur from time-to-time due to a brief but severe rainstorm or thunderstorm causing small stream flooding in localized areas.

As shown in the table below, Smyth County has received a relatively large share of payments under the National Flood Insurance Program, due to the frequency and severity of flooding in that county.

NFIP Claims Data as of March 2023

Community Name	Losses	Total Payments	Average Payments
Bland County	19	177,105	9,321.32
Carroll County	19	136,910	7,205.79
Grayson County	6	14,563	2,427.17
Smyth County	89	841,130	9,450.90

Town of Chilhowie	40	222,697	5,567.43
Town of Marion	32	192,960	6,030.00
Town of Saltville	1	1,271	1,271.00
Washington County	46	505,058	10,979.54
Town of Abingdon	11	158,112	14,373.80
Town of Damascus	10	6,311	631.10
Town of Glade Spring	1	4,347	4,347.00
Wythe County	15	66,077	4,405.13
Town of Wytheville	1	35,472	35,472.00
City of Bristol	20	86,551	4,327.55
City of Galax	2	3,227.00	1,613.50

The NFIP defines Repetitive Loss Properties as those with 2 or more claims of at least $1,000 over a 10-year rolling period. There are 28 such properties in the Mount Rogers Region. The breakdown by locality follows in the table:

Repetitive Loss Properties for Mount Rogers Planning District, as of 2023	
Locality	**Number of Properties**
Town of Abingdon	1
Bland County	6
City of Bristol	2
Carroll County	2
Town of Chilhowie	4
Smyth County	7
Washington County	5
Wythe County	1

The Hazard Mitigation Assistance program defines Repetitive Loss as having incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and, at the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

Flooding causes damages ranging from blocked roadways and flooded basements to severe damage and destruction of homes and businesses. People sometimes die when they attempt to cross flood-swollen creeks that under normal circumstances appear fairly harmless. Severe flooding can take out bridges and sections of roadway. Flooding can also force people out of their homes into emergency shelters as a way to save lives and prevent people in flood-prone areas from becoming stranded. Fortunately, despite the constant threat of flooding for much of the Mount Rogers region, few people have died. Many more have sustained property damage, and some have been relocated out of the floodplain through government-sponsored programs.

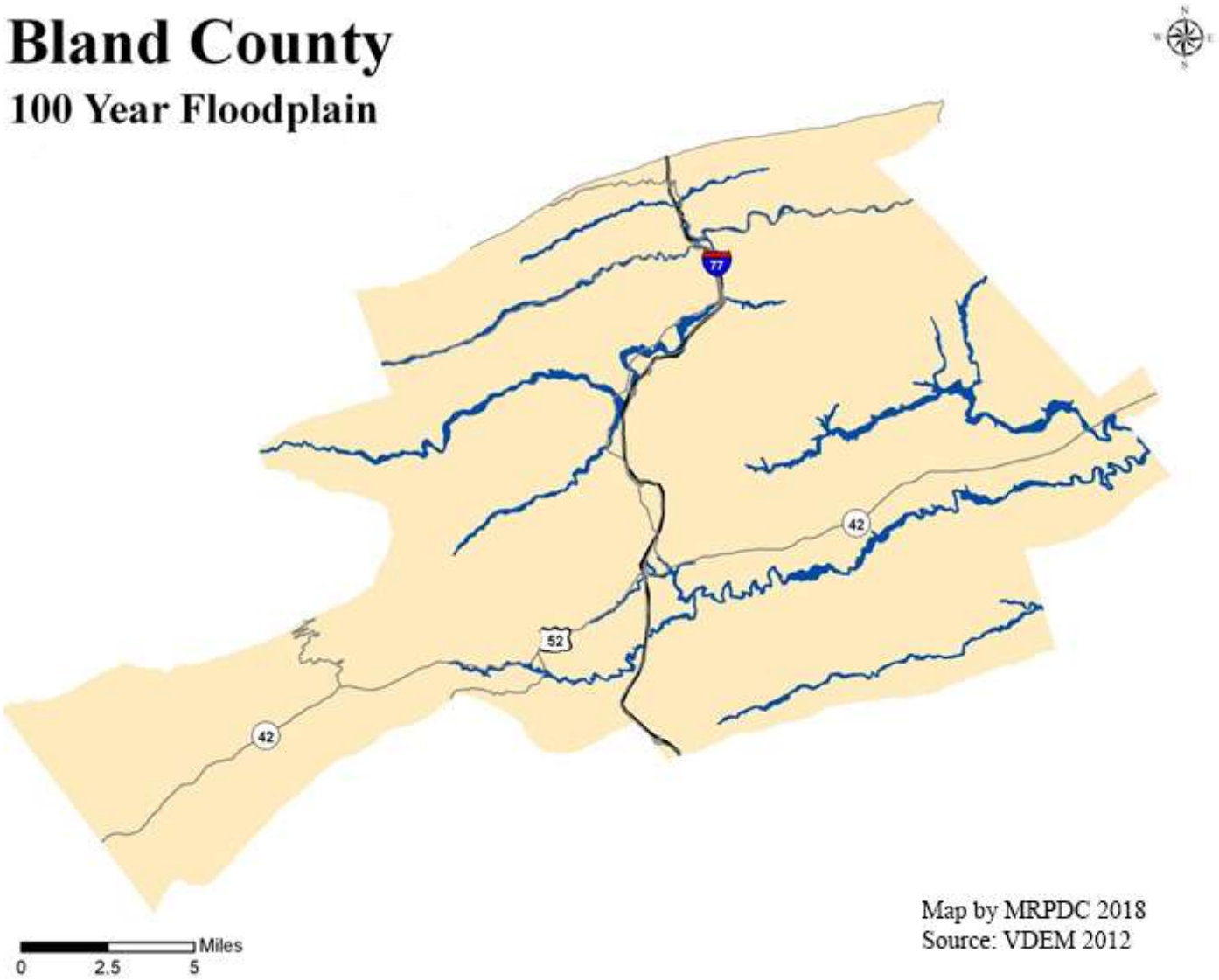
The localities in the Mount Rogers Region do not allow construction inside the floodplain unless the structure is elevated above the 100-year floodplain elevation. For this reason, the vulnerability of structures inside the floodplain have either not changed or become less vulnerable since the original writing of the 2005 Hazard Mitigation Plan.

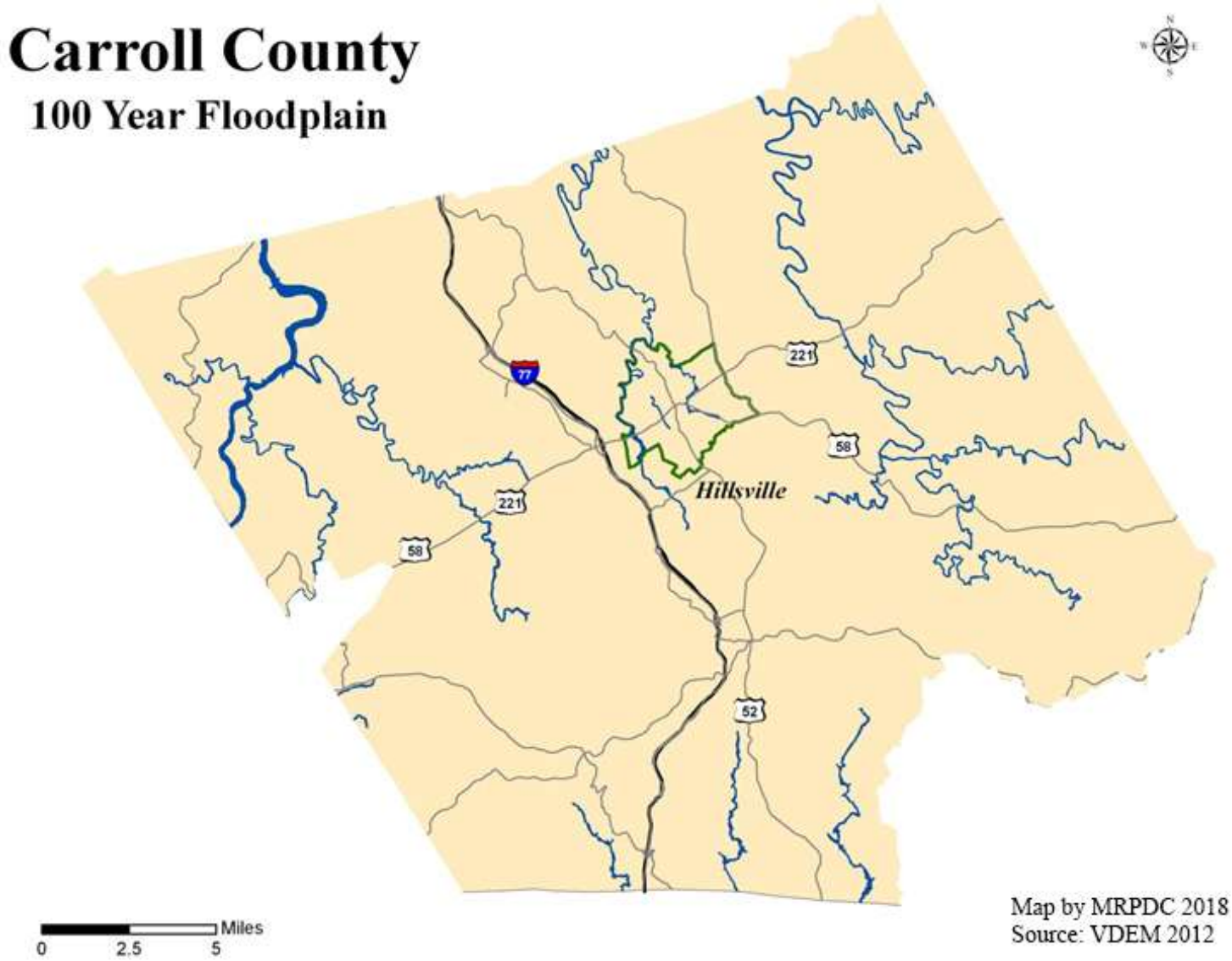
Floodplain Maps

The following pages include floodplain maps for all localities within the Mount Rogers Planning District.

Bland County

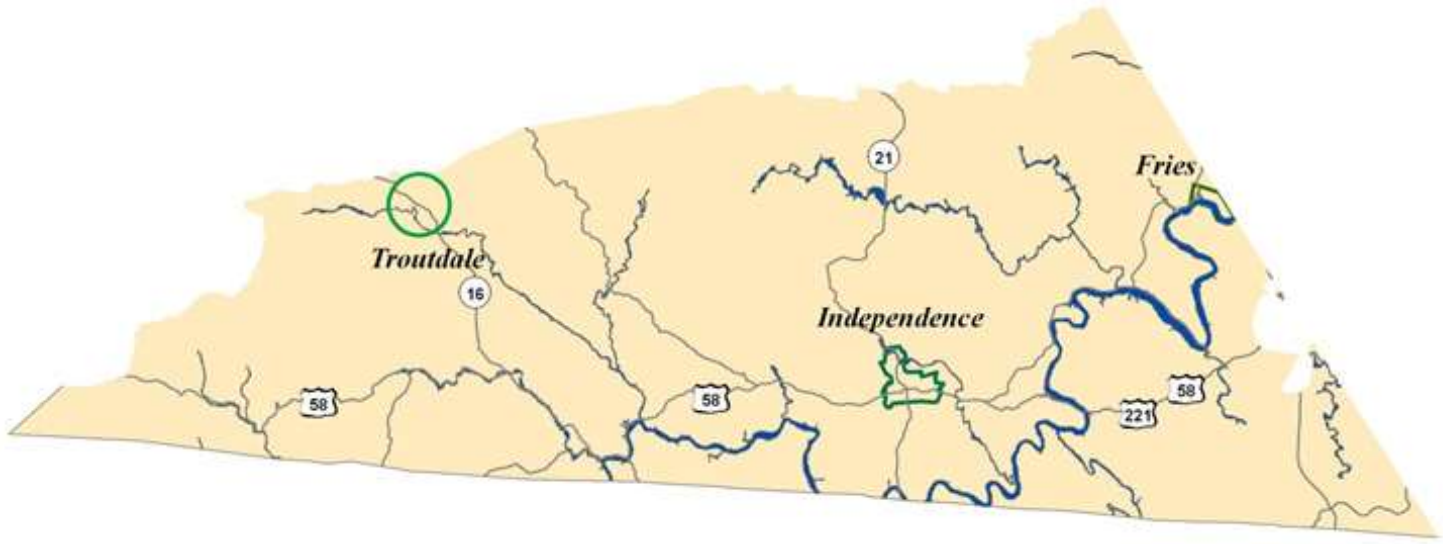
100 Year Floodplain




Carroll County
100 Year Floodplain
77
221
58
Hillsville
221
58
52
Miles
0
2.5
5
Map by MRPDC 2018
Source: VDEM 2012

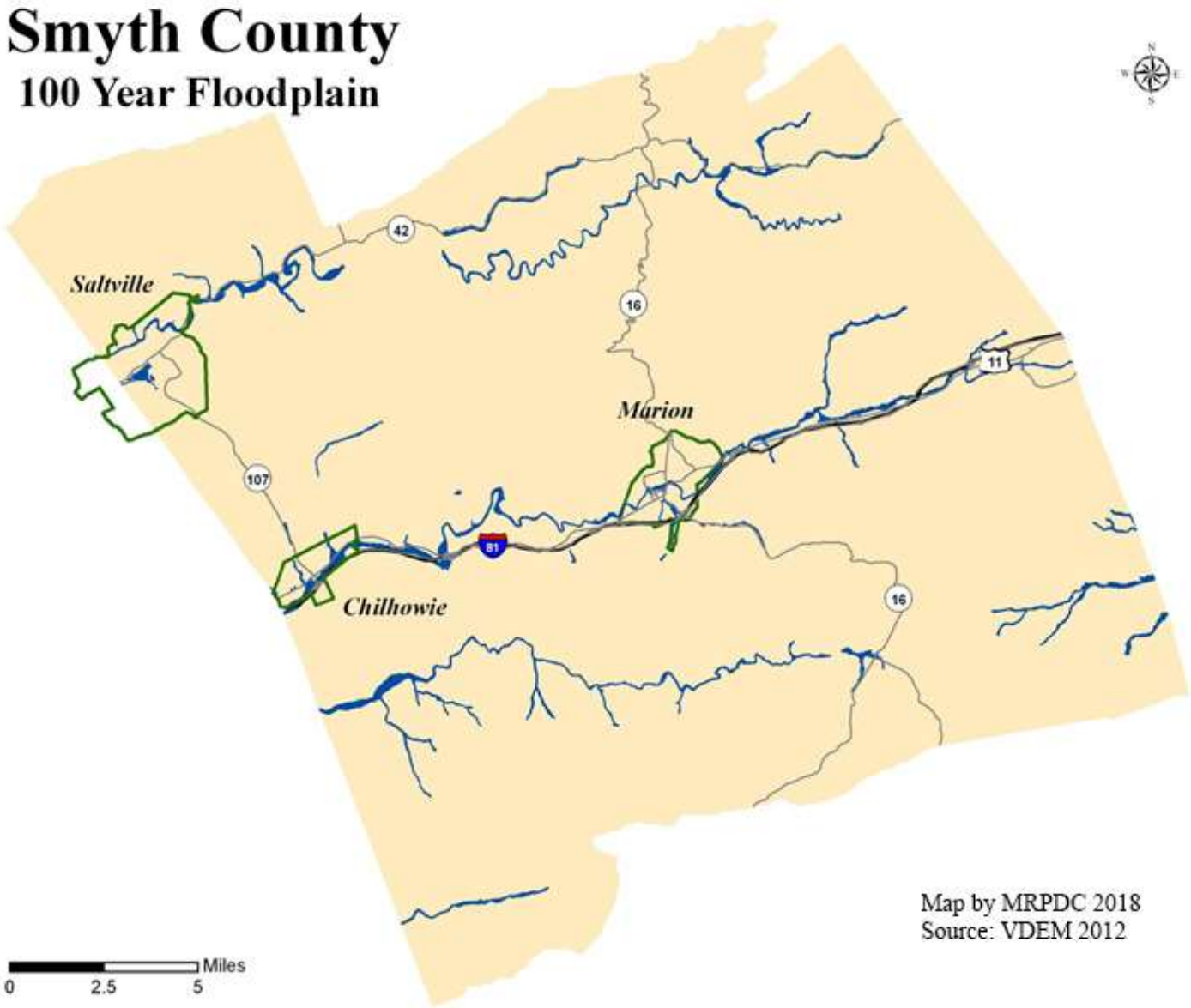
Grayson County

100 Year Floodplain



Map by MRPDC 2018
Source: VDEM 2012

Miles
0 2.5 5


Smyth County
100 Year Floodplain
Saltville
Marion
Chilhowie
42
16
11
107
81
16
Map by MRPDC 2018
Source: VDEM 2012
Miles
0
2.5
5

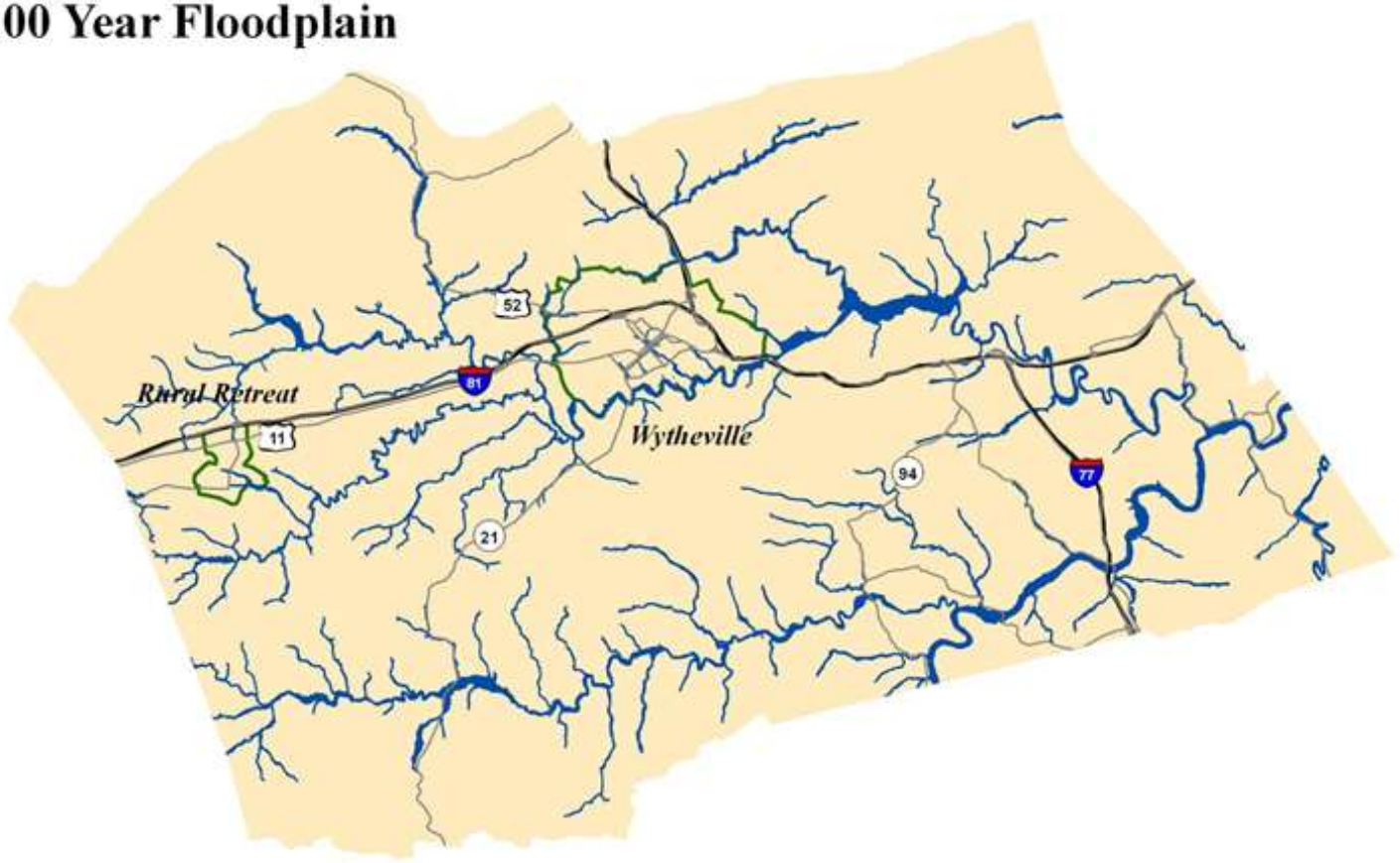
Washington County
100 Year Floodplain

Map by MRPDC 2018
Source: VDEM 2012

Miles
0 2.5 5

Wythe County

100 Year Floodplain



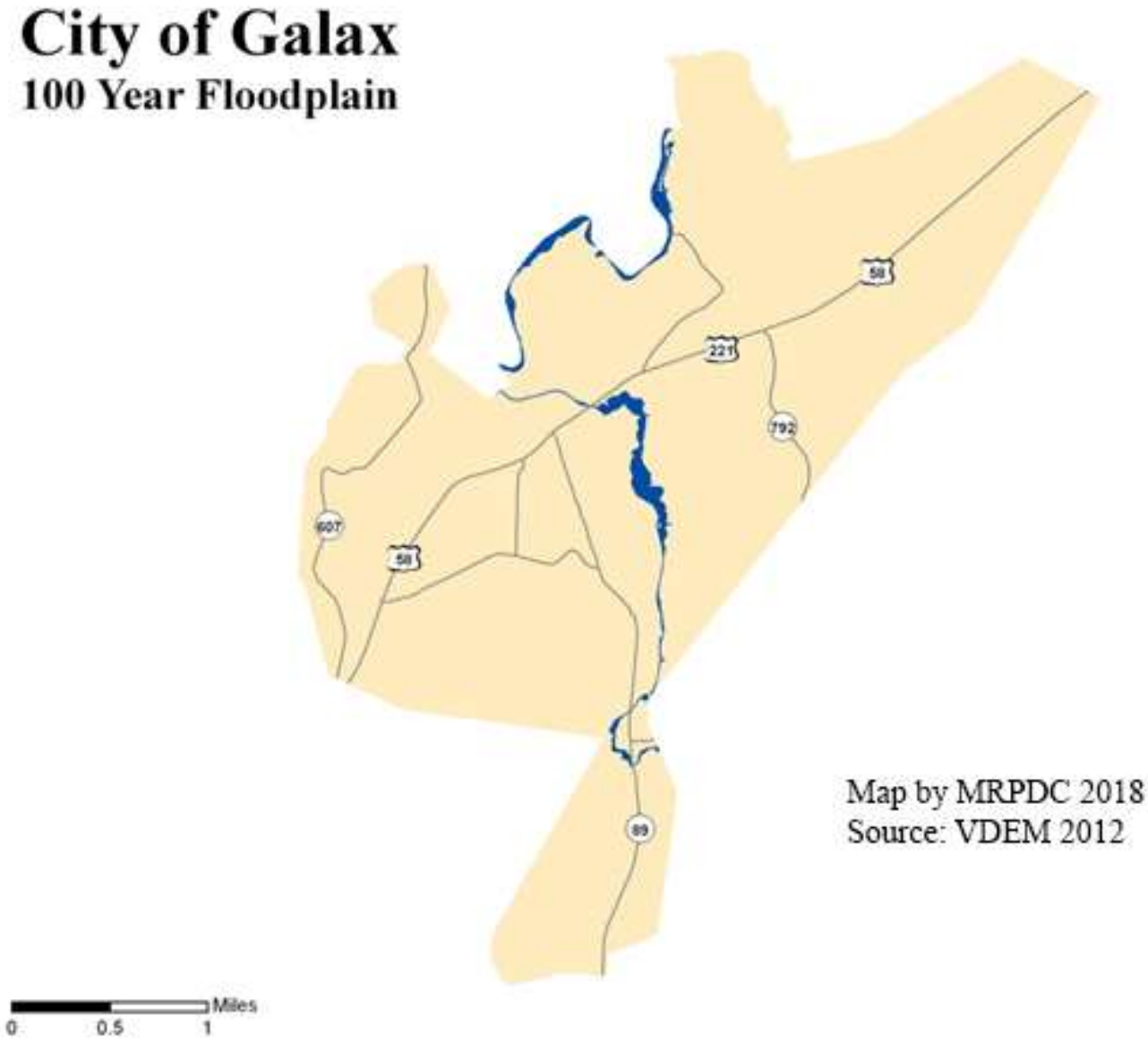
Map by MRPDC 2018
Source: VDEM 2012

Miles
0 2.5 5

City of Bristol
100 Year Floodplain

Map by MRPDC 2018
Source: VDEM 2012

Miles
0 0.5 1


City of Galax
100 Year Floodplain
58
221
792
607
58
89
Map by MRPDC 2018
Source: VDEM 2012
Miles
0
0.5
1

Hazardous Material Spills

Description

Hazardous materials can be found in many forms and quantities that can potentially cause death; serious injury; long-lasting health effects; and damage to buildings, homes, and other property in varying degrees. Such materials are routinely used and stored in many homes and businesses and are also shipped daily on the nation's highways, railroads, waterways, and pipelines. This subsection on the hazardous material hazard is intended to provide a general overview of the hazard, and the threshold for identifying fixed and mobile sources of hazardous materials is limited to general information on rail, highway, and FEMA-identified fixed HAZMAT sites determined to be of greatest significance as appropriate for the purposes of this plan.

Hazardous material (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways, and on the water. Approximately 6,774 HAZMAT events occur each year, 5,517 of which are highway incidents, 991 are railroad incidents, and 266 are due to other causes. In essence, HAZMAT incidents consist of solid, liquid, and/or gaseous contaminants that are released from fixed or mobile containers, whether by accident or by design as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind, and possibly wildlife as well.

HAZMAT incidents can also occur as a result of, or in tandem with, natural hazard events, such as floods, hurricanes, tornadoes, and earthquakes, which in addition to causing incidents can also hinder response efforts. In the case of Hurricane Floyd in September 1999, communities along the Eastern United States were faced with flooded junkyards, disturbed cemeteries, deceased livestock, floating propane tanks, uncontrolled fertilizer spills, and a variety of other environmental pollutants that caused widespread toxicological concern.

Hazardous material incidents can include the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous material, but exclude:

1) any release which results in exposure to poisons solely within the workplace with respect to claims which such persons may assert against the employer of such persons;
2) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel or pipeline pumping station engine;
3) release of source, byproduct, or special nuclear material from a nuclear incident; and

4) the normal application of fertilizer.

History

Hazmat-Industrial

11-29-2018 An industrial oven that bakes/cures varnish on a transformer exploded, blowing the door off the oven, and injuring four workers. Transformers that were inside the oven caught on fire.

2-17-2018 An industrial oven that bakes/cures the varnish onto transformers that caught on fire and also the insulation above the oven. Six containers of foam were utilized to put out the fire.

Hazmat-Tractor-trailer

11-6-2019 On Interstate 77 in the Rocky Gap area of Bland County (south of East River Mountain Tunnel) units responded to a tractor-trailer accident that had flipped on its side. It was determined that the tanker was hauling Glycolic acid. The product came out of the vents on top of the tanker. I-77 NB & SB were shut down for approximately 16 hours. The extensive on-scene time and shutdown were due to poor relationships with the company's sister company and clean-up crews. DEQ agreed to cover the costs due to the prolonged interstate shutdown time and the inability to get a clean-up crew to respond that did not have an ETA of 4 plus hours. Coordinating partners on this incident included: VSP, VDOT, DEQ, VDEM, the companies involved, and local officials.

12-19-2019 Tractor-trailer fire with Class 8 Corrosive on board. The fire was in the middle of the trailer that spread from the brakes. VDEM hazmat officer responded, and the Regional Hazmat team. A clean-up crew responded with a wrecker service to remove the hazard.

7-14-2020 Tractor-trailer went through the guardrail and down an embankment, landing near a creek and large concrete culverts. The diesel fuel from the tractor-trailer saddle tanks went into the ground and the nearby creek. The contracted clean-up crew was called out to remove hazards. Boons were placed down the creek to catch runoff. Approximately 120 gallons were dropped.

08-06-2021 A tractor-trailer hauling 3,500 of grape juice concentrate in barrels wrecked at the Kimberling Rd. bridge over Interstate 77. The barrels busted in the accident, along with the release of diesel fuel from the saddle tanks. Clean up in coordination with Region 4 Hazmat Officer, DEQ, and clean-up contractor.

Risk Assessment and Vulnerability

The majority of Hazardous events in the Mount Rogers Region are due to fuel/oil releases from motor vehicle crashes. Typically range from a few ounces up to over one hundred gallons of diesel and oil from overturned tractor trailers.

The easiest way to mitigate against these events is early notification and have the appropriate agency (typically the fire department) to perform Hazardous Materials Operations level job functions such as, damming, diking, plugging, placing absorbent pads and/or booms down. Of course, this is for the small fuel spills. If the region has a larger event, then a large-scale HAZMAT team response would be necessary.

Karst and Sinkholes

Description

Sinkholes are bowl-shaped, funnel-shaped, or vertical-sided depressions in the land surface that form over underground voids. These depressions, which can range in size from a few feet to several hundred feet in diameter, usually result from the natural collapse of the roofs of caves eroded in soluble bedrock, but they can also result from man-made activity such as mining, groundwater pumping, or the failure of sewer and storm water drains. Subsidence of the ground is usually gradual, but on occasions it can be sudden and dramatic.

In regions of carbonate bedrock such as limestone or dolomite, slightly acidic rainwater percolating though organic soil dissolves the carbonate minerals as it comes into contact with the bedrock. Over time, this persistent process can create extensive systems of underground fissures and caves. The surface of such a region is often pocked with depressions. This type of topography is called karst terrain. In well-developed karst terrain, chains of sinkholes form what are known as solution valleys and streams frequently disappear underground.

Sinkhole collapse, either slow or dramatic, regularly causes considerable damage to buildings, highways, rails, bridges, pipelines, storm drains, and sewers. In addition, sinkholes provide a pathway for surface water to directly enter groundwater aquifers. The increasing potential for pollution is particularly high due to the minimal filtering of surface water.

A poor understanding of Karst terrain has led to land-use practices that pose significant economic and environmental impacts to households and communities. Sinkhole formation is closely related to local hydrological conditions, and human-induced changes to the local hydrology commonly accelerate the process. Diverting surface water, pumping groundwater, and constructing reservoirs all contribute to sinkhole collapse. An extreme example occurred in Florida on February 25, 1998, when, during the flushing of a newly drilled irrigation well, hundreds of sinkholes up to a hundred and fifty feet across formed over a twenty-acre area within a few hours. Runaway urbanization and development dramatically increases water usage, alters drainage pathways, and overloads the ground surface. According to the Federal Emergency Management Agency, the number of human-induced sinkholes has doubled since 1930, while insurance claims for related damages have increased 1,000% in the past 30 years, costing hundreds of millions of dollars. Subsidence is not covered by standard homeowners' insurance.

In Virginia, the principal area affected by sinkholes is the Valley and Ridge province, an extensive karst terrain underlain by limestone and dolomite, but the narrow marble belts in the

Piedmont and some shelly beds in the Coastal Plain are also pocked with sinkholes. Dramatic collapses that swallow homes or persons have happened in Virginia but are rare. The most notable incidents occurred in the City of Staunton: on August 11, 1910, parts of several homes and the firehouse were lost in a series of sinkholes on Baldwin Street and Central Avenue, and on October 28, 2001, a 45-feet deep chasm opened up on Lewis Street. In April of 2000, thirty-two sinkholes were reported in the upper Shenandoah Valley after seven inches of rain fell after a long dry spell.

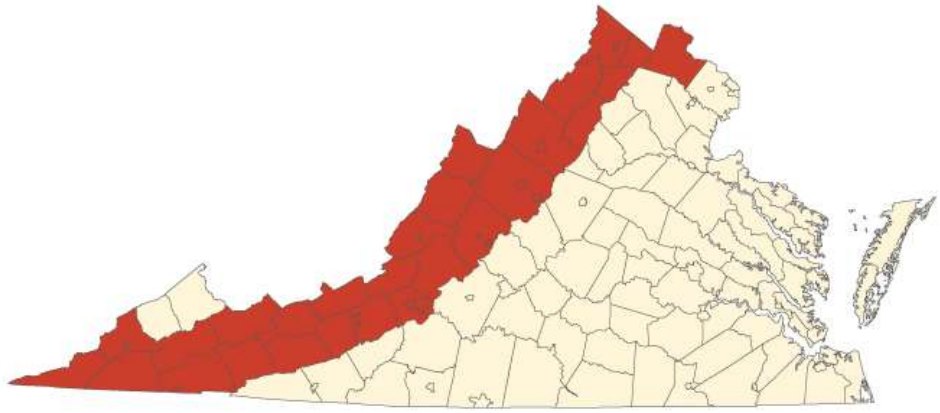
Sinkholes regularly cause problems for transportation infrastructure in the Commonwealth. During the past thirty years, VDOT has recorded approximately 500 sinkholes that have damaged roads throughout the state. In March 2001, a nine-mile stretch of Interstate 81 in Augusta County was closed after the sudden appearance of three sinkholes, the largest measuring 20 feet long, 11 feet wide and 22 feet deep. On October 5, 2004, the right southbound lane of I-81 just north of the Exit 118C ramp in Montgomery County collapsed. Due to the potential for damage to infrastructure and danger to the travelling public, VDOT maintains an emergency contract for sinkhole repair. In general, sinkhole occurrence is unpredictable, and the size of a sinkhole cannot be estimated from the surface collapse, so repair costs range from the tens of thousands to the hundreds of thousands of dollars per sinkhole. Research into sinkhole distribution and early prediction is ongoing; however, a true method of early prediction remains elusive.

Groundwater contamination is a common problem in populated areas overlying karst terrain. Karst aquifer contaminants in Virginia have included petroleum products, herbicides, solvents, fertilizers, sheep and cattle dip, sewage, dead livestock, and household garbage. In the late 1800s, a Shenandoah County community was subjected to a cholera outbreak due to the pollution of the local karst aquifer. A significant concern is the vulnerability of karst aquifers to contamination along the I-81 corridor, where hazardous materials are regularly transported and accidents can occur. For some chemicals that do not readily mix with water, contamination can be widespread and remain in the groundwater for many years. Most of Virginia's karst region follows Interstate 81, and twenty-seven of Virginia's counties lie in this zone, where hundreds of thousands of people get their drinking water from wells and springs.

State law prohibits the dumping of waste into sinkholes, and some Virginia counties have implemented ordinances about sinkhole dumping and outfalls. Meanwhile, the Virginia Health Department discourages the use of karst springs as public water supplies and requires periodic testing of those karst springs that are used. The Virginia Department of Conservation and Recreation's Natural Heritage Karst Program is responsible for groundwater and habitat

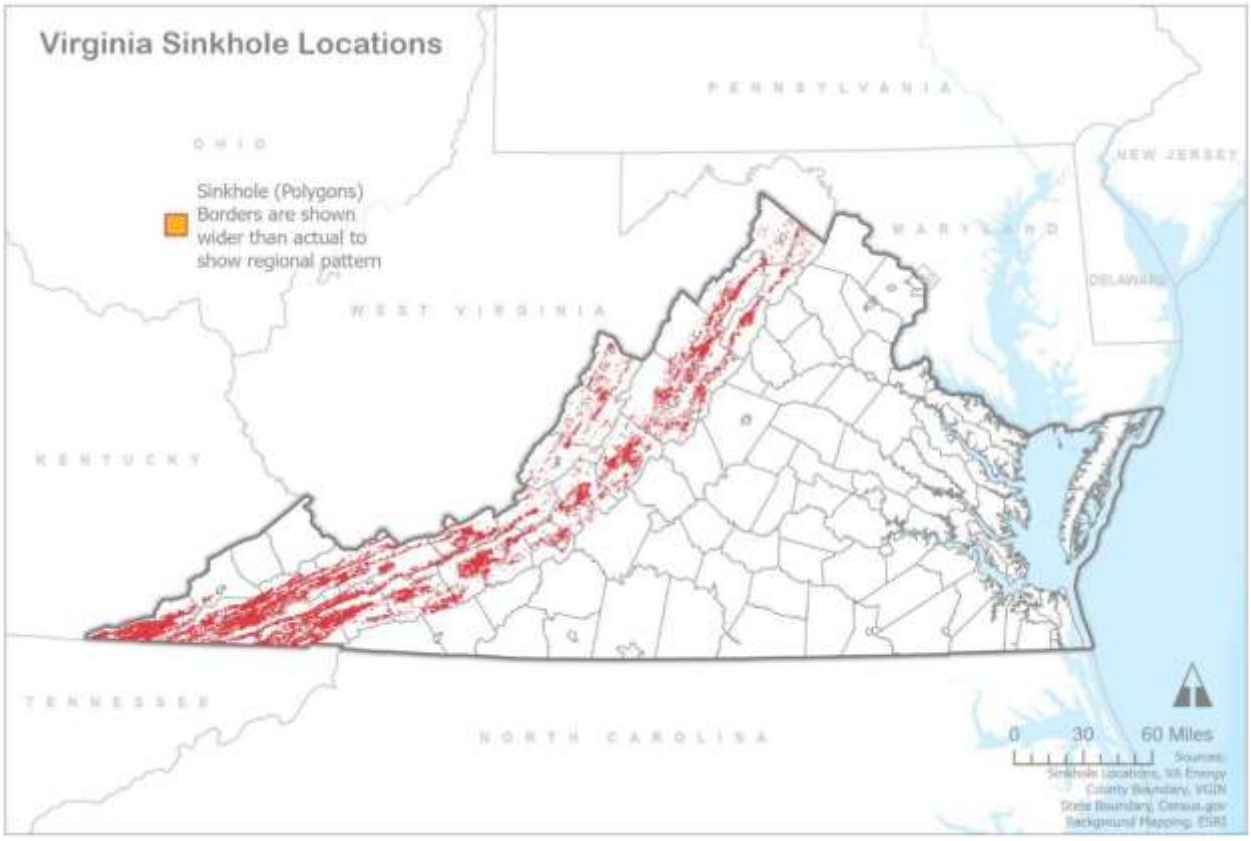
protection in karst areas, supported by EPA Section 319 Clean Water Act Program. The USGS, working with various state agencies, has developed a National Karst Map.

Areas over underground mine workings are also susceptible to subsidence. Mine collapses have resulted in losses of homes, roadways, utilities and other infrastructure. Subsidence is often exacerbated by the extensive pumping of groundwater associated with underground mining. Abandoned coal mines occur in Buchanan, Dickenson, Lee, Scott, Russell, Tazewell, Wise, Montgomery, and Pulaski counties in southwest Virginia, and Henrico, Chesterfield and Goochland counties in the Richmond coal basin. Other abandoned underground mines occur throughout the state. Information of past mining activity can be obtained from the Virginia Division of Mineral Mining and Division of Mined Land Reclamation.



Virginia counties containing significant karst terrain. Modified from Virginia Natural Heritage Karst Program.

Source: Department of Mines, Minerals, and Energy



History

In the local region, sinkholes suddenly appear from time to time on Interstate 81, which passes through the karst region of Virginia. One recent incident occurred in October 2003, when a sinkhole appeared on I-81 about one mile past the junction with I-77 in Wythe County. Both the Virginia Department of Transportation and Duke Energy said the sinkhole appeared in connection with drilling under the highway in connection with installation of a 24-inch natural gas pipeline. The incident blocked a northbound lane of I-81 for a few days before VDOT completed the needed repairs and reopened the lane to regular use.

Subsidence has also been a problem for Saltville due to mining for salt and gypsum. Salt mining first began in 1782 and continued until 1972 with the shutdown of Olin Industries, once a major employer in Saltville. Commercial production of salt resumed in 2000 with completion of an evaporator plant by Virginia Gas Company, which was removing brine from the underground caverns to make room for natural gas storage.

Gypsum mining began in 1815 and continued under the U.S. Gypsum Company, starting in the early 1900s. U.S. Gypsum, which has since moved to production of artificial gypsum, closed its Saltville area facilities in 2000.

In 1960 a major collapse occurred in a section of the high-pressure brine field located just southwest of Saltville. The collapse involved four wells spaced closely together and considered shallow, ranging from 450 to 800 feet deep, according to expert testimony. Over time the bottom cavities of the wells appeared to have merged together. The underground collapse moved upwards through the relatively thin rock "roof" layers (themselves 200-316 feet thick) to the surface. This resulted in a crater 400 feet wide and 250 feet deep.

More recently, a section of State Rt. 91 collapsed into a 50-foot-wide sinkhole in front of the offices of U.S. Gypsum. In the past gypsum mining had occurred under the collapse site and may have been a contributing factor. Blame was also placed on a leaking water line that had apparently dissolved the underlying limestone, thereby weakening the underground support structure and leading to the collapse. It should be noted these incidents have resulted from human-induced activities, while the focus of this study has been on hazards created by nature.

In the Wythe County community of Ivanhoe an underlying sinkhole eventually caused the floor of the local post office to fall through. A new post office has since been established for Ivanhoe. Karst terrain also is a factor in the Town of Chilhowie, which is investigating why the town water system loses 16 million gallons a month; some is thought to leak into the underlying terrain. Construction workers for Duke Energy Gas Transmission also encountered karst terrain during the recent installation of the Patriot Extension natural gas pipeline near New River Trail State Park (near Foster Falls in Wythe County).

Risk Assessment and Vulnerability

There is no known way to predict when sinkholes might open up or when subsidence might occur. There is only limited data available on karst terrain, its extent, and its importance from an ecological standpoint and as a natural hazard.

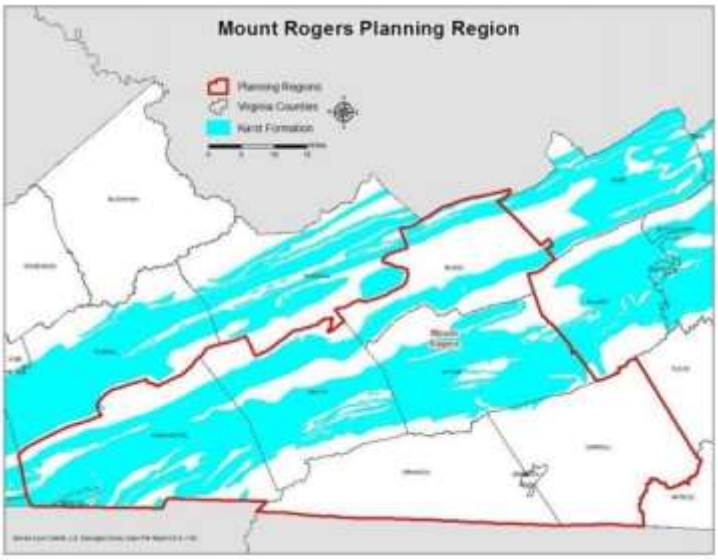
The ecological importance of this landform is only beginning to be understood through the efforts of various state and federal agencies and by groups such as the Karst Waters Institute, Cave Conservancy of the Virginias, The Nature Conservancy, and others.

As noted in the section on landslides, detailed basic geology maps are still under development in the state and local region. It is not possible to make any risk assessment other than in a generalized fashion. This task may become possible in the future under a new program on karst and subsidence hazards proposed for the National Cooperative Geologic Mapping Program. The NCGMP is a digitized mapping effort by the U.S. Geological Survey in coordination with the Association of American State Geologists. The Geologic Mapping Act of 1992 mandated the creation of a national geologic database.

The Karst and Subsidence Hazards program has been planned to develop better understanding of groundwater contamination, sinkhole formation, new techniques for karst analysis through remote sensing and geophysics, regional karst issues in the Appalachians, and understanding of karst issues on a national scale through development of a new National Atlas karst map.

Karst terrain is a special concern for Bland, Wythe, Smyth, and Washington counties as a feature of the Valley and Ridge geological province. In the time span since the original Hazard Mitigation Plan was written, the region's vulnerability to karst and sinkholes have not changed.

Karst as a natural hazard can be a costly matter for the community. There are the long-term costs associated with environmental pollution and contamination of the groundwater supply. There also are costs associated with damage created by subsidence, such as the collapse of State Rt. 91 into a sinkhole near Saltville in 1977. In 2004 VDOT was nearing completion on relocating 0.5 miles of Rt. 91 at an estimated cost of $2 million.



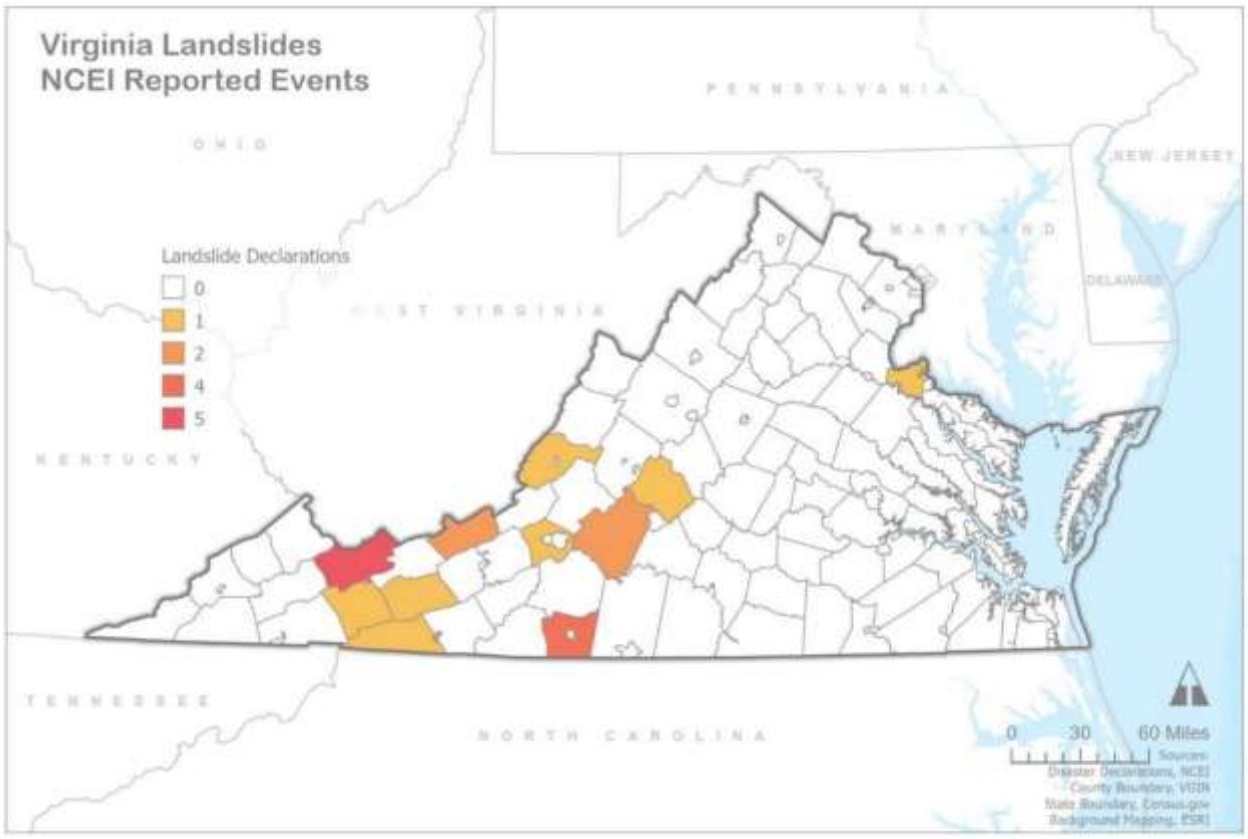
Due to the lack of mapping of significant karst terrain, incidents involving the sudden appearance of sinkholes and leakage often come as a surprise to local governments. No historical events have occurred since 2005.

Landslides

Description

Landslides can be defined as the downward and outward movement of soils and slope-forming materials reacting under the force of gravity. These movements can be triggered by floods, earthquakes, volcanic eruptions and excessive rain. The three important natural factors include topography, geology and precipitation. Human-caused factors include cut-and-fill highway construction, mining and construction of buildings and railroads.

Types of landslides include slides, flows, falls and topples (which occur rapidly), and lateral spreads (which occur much more slowly).



The Appalachian Highlands, along with other mountainous regions of the United States, are known to be highly susceptible to landslides. These come in the form of earth flows, debris flows and debris avalanches, mainly in areas of weathered bedrock and colluvium. Debris avalanches can occur during period of continual steady rainfall followed by a sudden heavy downpour. Areas prone to landslides include the plateau of the western Appalachian Highlands (especially in Tennessee and Kentucky) and southeast of the Appalachian Plateau, in the flanks

of the Appalachian Ridge and the Blue Ridge (which includes the Mount Rogers region). For the most part these movements are comprised of slowly moving debris slides.

On a generalized scale, hazard-prone areas have been mapped by the U.S. Geological Survey. However, this information needs to be evaluated at ground level to more clearly identify the landslide-prone areas of the Mount Rogers region. A map showing landslide incidence and susceptibility in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

History

Information is limited regarding landslides and debris flows for the Mount Rogers region. While generalized statewide geology maps have been published, detailed maps for the local region are still in development. These will become the basic geology maps that in the future can be used in landslide risk assessment.

The record is scant concerning landslide incidents in the Mount Rogers region. A staff review of a comprehensive, nationwide database giving locations of debris flows, debris avalanches, and mud flows revealed no information pertaining to the local region.

Small-scale landslides are known to occur on steep slopes and can sometimes block roadways. The Virginia Department of Transportation makes emergency repairs as needed. On occasion, a major landslide can block a roadway. Heavy rains and the annual freeze-thaw cycle can trigger these landslides.

In March of 2011, a rockslide occurred in Carroll County. The event happened on Interstate 77 at mile marker 3.8 in the left northbound lane. A boulder roughly the size of a car fell onto the highway. A man struck the boulder with his car killing him instantly. VDOT officials surveyed the cliff above and determined that no other rocks were in danger of falling.

Since the year 2020, a landslide has occurred at the same location at various times in the town of Saltville. Excess rain runoff from the Saltville Elementary School parking lot undermined the hillside. The school and parking lot are located on top of a hill and once the ground gave way, it slid out into a town owned road (Government Plant Road) blocking one lane completely for over a year as we worked toward a solution. Adding to the complexity of the solution, the slide occurred on Smyth County School Board property, which slid into Town of Saltville property, and for cleanup/repair to occur the contractor had to traverse a small adjoining parcel of land owned by American Apartment Management Company, Incorporated, DBA North Fork Manor. This small parcel owned by AAMCI presented a substantial delay to the cleanup as they operate

Federally subsidized housing and, therefore, have Deeds of Trust held by the Federal Government (HUD). So obtaining a temporary construction easement was a long process.

Once all construction easements were obtained, cleanup of the slide began. It was determined by the Smyth County School Board's engineering consultants that the ultimate reason for the slide was the inferior quality of the fill dirt place on the site when the school was built in the early 1960s. Once all the slide material was removed from the site, a series of heavy stone abutments were laid up the hillside with a concrete "funnel" constructed at the top of the hill to divert much of the parking lot runoff in another direction.

To date, the repair has held up but there is a good possibility over time and years of runoff, this could definitely pose a problem again.

Risk Assessment and Vulnerability

The Mount Rogers region is mountainous in nature, and its steep slopes make parts of the region susceptible to landslides. The hazard-prone areas have been generally mapped by the U.S. Geological Survey, as shown below.

The USGS divides landslide risk into six categories. These six categories were grouped into three, broader categories to be used for the risk analysis and ranking; geographic extent is based off of these groupings. These categories include:

High Risk

1. High susceptibility to landsliding and moderate incidence.
2. High susceptibility to landsliding and low incidence.
3. High landslide incidence (more than 15% of the area is involved in landsliding).

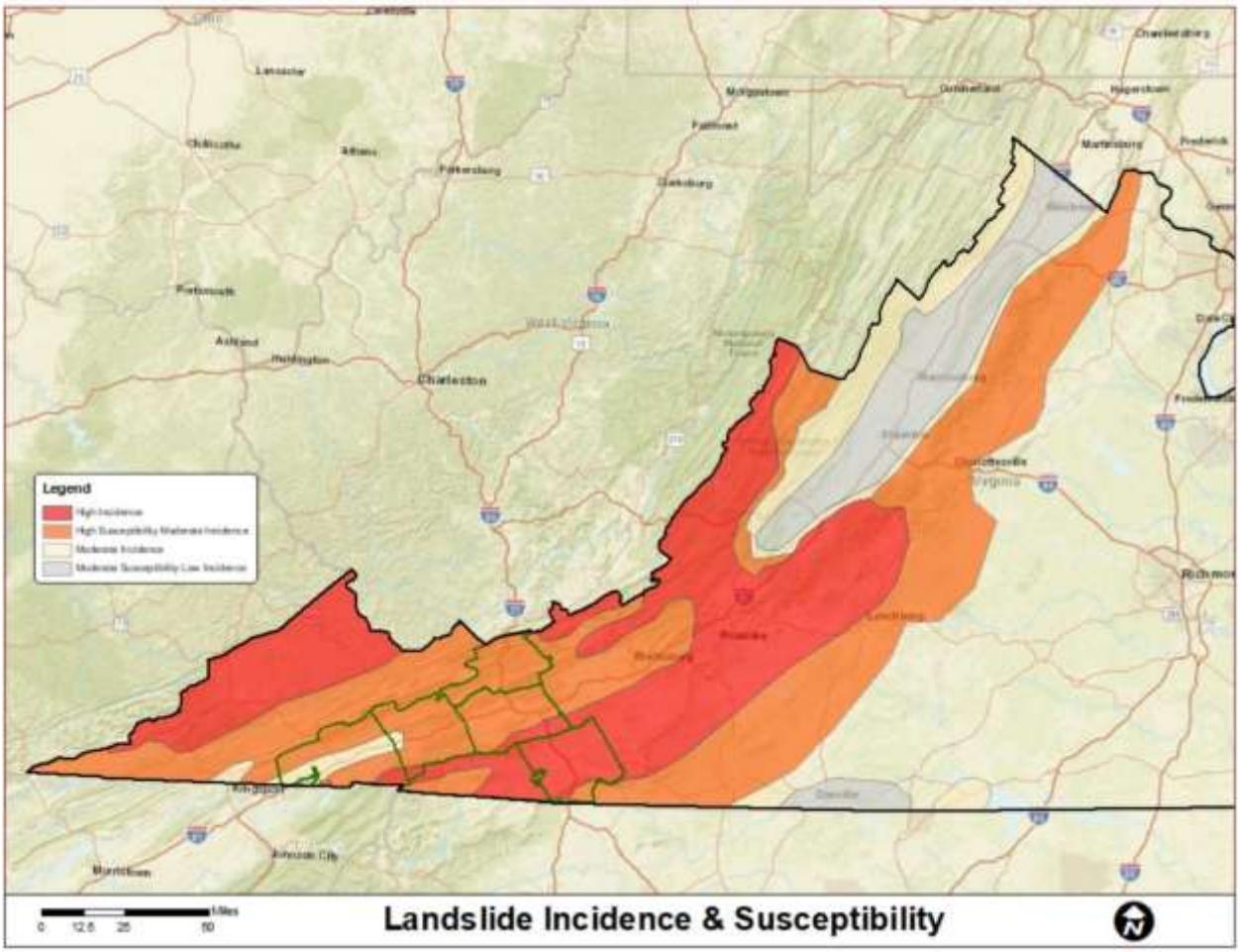
Moderate Risk

4. Moderate susceptibility to landsliding and low incidence.
5. Moderate landslide incidence (1.5 - 15% of the area is involved in landsliding).

Low Risk

6. Low landslide incidence (less than 1.5 % of the area is involved in landsliding).

The six categories were grouped into High (categories 1-3), Medium (categories 4 –5), and Low (category 6) to assess the risk to state faculties, critical facilities and jurisdictions.



Certain types of rocks and geologic conditions, when they occur on slopes, make an area prone to landsliding. These types include fine-grained clastic rocks (those consisting mainly of silt and clay-sized particles), highly sheared rocks and loose slope accumulations of fine-grained surface debris, which give way during times of intense or sustained rainfall. Steep slopes also can add to the likelihood of landslides. Debris flows, for instance, are known to occur mainly on slopes steeper than 25°.

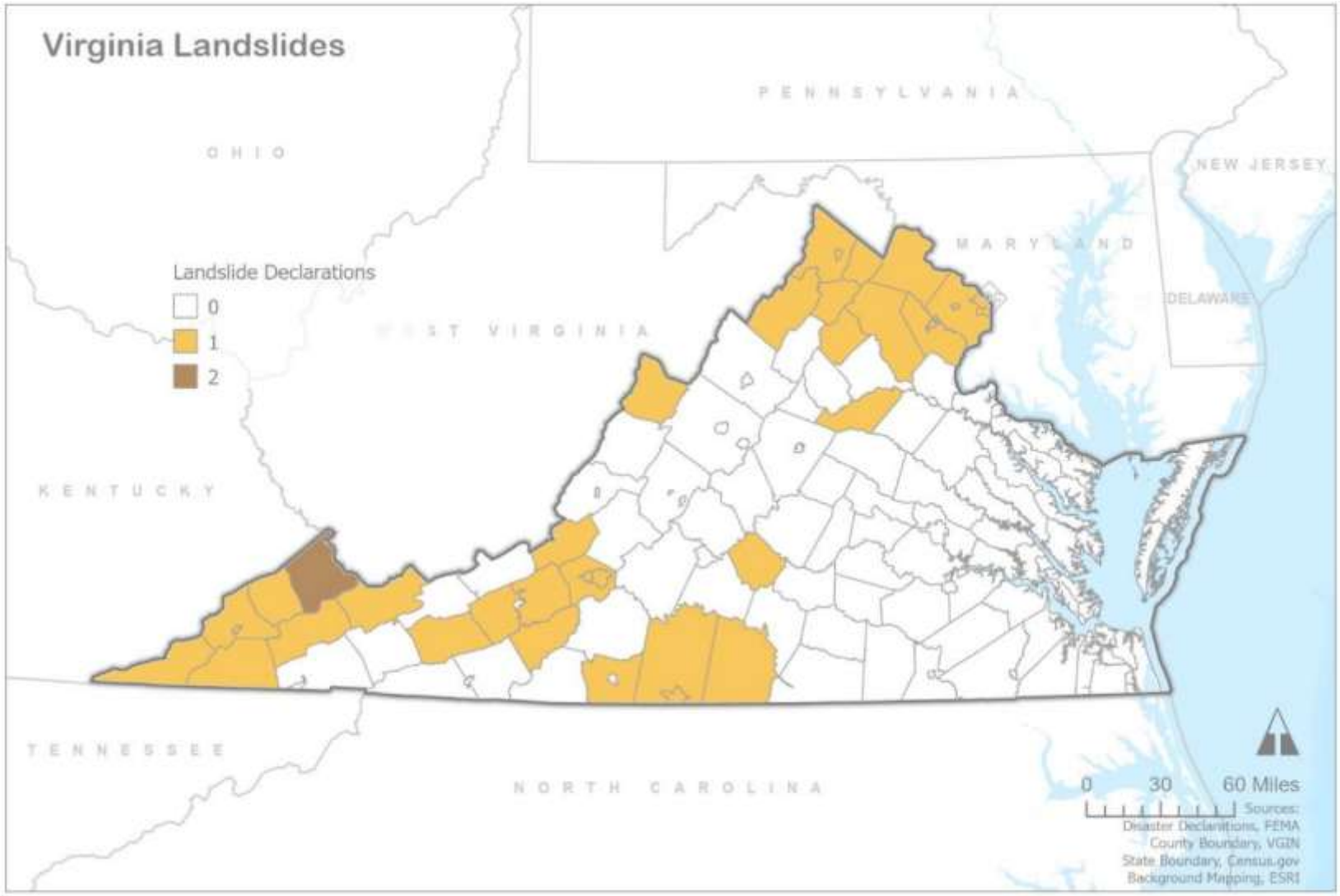
There is no accepted method for determining the likelihood of a landslide in the Mount Rogers region. Given the relative lack of historical data on catastrophic landslides affecting the region, our best guess is a major landslide incident appears to be unlikely. Please see the image above (Generalized Landslide Image of Southwest Virginia) for a visual depiction of potential landslide risk areas in the local region.

Landslides are not well understood in the Mount Rogers region. Most geologic studies have been focused on mineral resources (especially coal) of economic importance. Basic geologic

mapping is only beginning to get underway in the region. More information will be needed before any detailed risk assessment can be made for localities in the Mount Rogers region.

Generally speaking, the areas posing the greatest landslide risk include the pink and red regions. The pink regions include parts of Washington, Smyth and Grayson counties and a corner of Carroll County. The red regions include much of Carroll County and the border area between Washington, Smyth and Grayson counties.

Landslides can damage or destroy roads, railroads, pipelines, utilities and infrastructure, forests, fisheries, parks and farms. Damages can include economic losses to local, state and federal agencies – because of the impacts to public infrastructure – and to the private sector for impacts to land and buildings. When located near communities, sudden landslides also can cause death. In the time span since the original Hazard Mitigation Plan was written, the region's vulnerability to Landslides have not changed.


Virginia Landslides
PENNSYLVANIA
OHIO
NEW JERSEY
MARYLAND
DELAWARE
WEST VIRGINIA
KENTUCKY
TENNESSEE
NORTH CAROLINA
Landslide Declarations
0
1
2
0 30 60 Miles
Sources:
Disaster Declarations, FEMA
County Boundary, VGIN
State Boundary, Census.gov
Background Mapping, ESRI

Severe Winter Storms and Ice

Description

Blizzards represent the worst of the winter season, combining heavy snowfall, high winds, extreme cold and ice storms. Severe winter storms can be characterized by heavy snowfall but lacking the severity usually associated with blizzards. They often begin as mid-latitude depressions or cyclonic weather systems and sometimes follow the jet stream.

For the Mount Rogers region storm systems travel in from the Midwest and Tennessee Valley, from the Gulf Coast region and sometimes as a result of a major coastal storm that passes inland. On the northern side, extreme cold weather and Arctic cold fronts move in from Canada and are known to sweep into the Mid-Atlantic region. The severity of these storms may result from high snowfall accumulations that lead to major snowdrifts and blizzard conditions or that later melt and cause flooding. Wetter storms may have only limited amounts of snow but are severe due to accumulations of ice. A light covering of ice can easily create numerous traffic accidents. Both ice and heavy snow can tear down tree limbs, trees, power lines and telephone lines, creating major disruptions that sometimes cannot be cleared up for weeks. A map showing the heaviest average snow accumulations in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

History

The historical record for snowstorms and blizzards in the Mount Rogers regions gives numerous examples of how bad these storms can get. major winter events in the region resulted in seven federal disaster declarations and at least four state emergency declarations. The chart below contains inconsistencies in monetary values and locations of damage due to poor recordkeeping within localities.

Major Winter Storms, Cold and Ice
Mount Rogers Region, Virginia 1993-2023

Date	Localities	Description
12-23-22	Mount Rogers PDC	An extreme cold snap saw temperatures drop to as low as eight below zero in parts of the Mount Rogers Region. This caused numerous pipes to burst in residential, business, and government Buildings.
12-8-18	Mount Rogers PDC	A snowstorm dumped 8 to 24 inches of snow across the region causing power outages, traffic accidents, and road closures across the district. At one point according to Appalachian Power 25,000 customers were without power across the region. In Washington County traffic was stalled for 18 hours on a 20 mile stretch of Interstate 81 due to multiple accidents.
3-26-18	Mount Rogers PDC	A Spring snowstorm dumped over a foot of snow across parts of the Mount Rogers Region. Bland County received 16 inches, while Grayson, Carroll, and Wythe Counties received 10 to 14 inches of snow. At one point during the storm 88% of Bland County and 28% of Wythe County were without power. Many temporary road closures were common across the district due to heavy snow and multiple accidents. An emergency shelter was opened in Bland County and had taken in 78 people at the height of the event.
01-17-13	Bland, Carroll, Grayson, Smyth, Wythe, Galax	The region was hit by a winter storm that brought heavy snow fall ranging from 12 inches in Rocky Gap (Bland County) to 6.0 inches in Ceres (Bland County). This winter storm brought the interstate to a standstill with accidents and heavy snow fall.
12-18 09	Grayson, Carroll, Smyth, Washington.	Grayson County received federal assistance. A total of $600,000 of damage was reported
4-28-03	Wythe County	Severe winter storm, near record snowfall, heavy rain, flooding, and mudslide. 39 jurisdictions had disaster declarations. Wythe qualified in April for public assistance as result of the March storm.
3-30-03	Bland, Carroll, Grayson, Smyth, Wythe, Galax	Winter storm with heavy snow that began during the predawn hours of the 30th and continued through the early afternoon. Snow accumulated 6-12”, brought down numerous tree limbs and power lines, resulting in more than 50,000 power outages.
2-15-03	Bland, Grayson, Wythe	State emergency declaration due to severe winter storm, impassable roads and flooding. SW Virginia got more than 4” of rain. Evacuations from homes in Bland and Wythe counties.
12-11-02	Carroll, Galax	State emergency declaration due to icy conditions creating massive power outages. Accretions of ¼” of ice. An icy winter storm followed on Dec. 13.

Date	Localities	Description
12-04-02	Bland, Carroll, Grayson, Smyth, Washington, Wythe, Galax.	Winter storm affected a wide area of SW Virginia. Snowfall amounted to 5-10" and ice of 1" or more in Carroll and Floyd counties. Numerous traffic accidents.
5-22-02	Bland, Carroll, Wythe, Bristol, Galax	Freeze damage affected Christmas tree growers.
2-28-00	Bland, Carroll, Grayson, Smyth, Washington, Wythe	Severe winter storm. 107 jurisdictions had disaster declarations for winter storm from Jan. 25-30, 2000.
1-25-00	Bland, Carroll, Grayson, Wythe, Galax	State emergency declaration due to winter storm with high winds that dumped up to 18" of snow across much of the state, with drifting and blizzard conditions. Local storm occurred on Jan. 29. Snow mixed with sleet amounting to 4-8" inches, 11" in higher elevations.
3-15-99	Bland, Carroll, Smyth, Wythe, Galax	Winter storm developed with rain and sleet changed to a wet snow early in the morning. Snow amounts of 4-8", with up to 10" in the higher elevations. The snow downed power lines and small trees, resulting in power outages.
3-03-99	Bland, Carroll, Grayson, Smyth, Wythe, Galax	Winter storm resulted from rain changing to sleet and then snow, with accumulations of 6-12". Numerous motor vehicle accidents. Motorists stranded for 5-6 hours on I-77.
12-23-98	Bland, Carroll, Grayson, Smyth, Wythe, Galax	Ice storm created ice accretions of ½" and sometimes as much as 1". Ice downed tree limbs and power lines and created numerous power outages. Many traffic accidents and some injuries due to ice-covered roads and bridges.
1-28-98	Bland, Carroll, Grayson, Smyth, Wythe, Galax	**State emergency declaration** for severe winter storm with heavy snowfall in the western part of the state causing riverine flooding. Snowfall of 15-32" closed schools, businesses & church services & stranded people in vehicles & homes. Numerous traffic accidents. A charter bus overturned on I-81 near Marion, injuring 20 people. I-81 was closed for several hours during the height of the storm. Power lines, tree limbs and trees were knocked down.
12-29-97	Bland, Carroll, Grayson, Smyth, Wythe, Galax	Heavy winter snowstorm produced accumulations of 5-10", with 4-7" in Bland County. Bad road conditions resulted in numerous traffic accidents.
3-28-96	Bland, Carroll, Wythe, Galax (Bath County hardest hit)	Ice storm with freezing rain all day created significant ice cover above 1900 feet. Ice downed tree limbs, power lines, telephone lines. Numerous power outages and some traffic accidents.

Date	Localities	Description
2-02-96	Bland, Carroll, Grayson, Smyth, Washington, Wythe, Bristol, Galax	**State emergency declaration** for a winter storm with heavy snow, followed by extreme cold Feb. 3rd -6th. Burkes Garden in Bland County recorded 22° below zero. Most locations had morning lows on the 5th of zero to 12° below zero. Emergency declaration based on an Arctic air mass moving across state Feb. 1-4, with potential to cause widespread power outages.
1-06-96	Bland, Carroll, Grayson, Smyth, Wythe, Galax	**Blizzard of 1996**. **State emergency declaration** for a predicted winter storm with blizzard conditions and snowfall of 12-24" expected. **Statewide disaster declaration**. Occurred Jan. 6-13.
Winter of 1995-96	VDEM "Virginia Winters" account	Unusually heavy snowfall for the winter. Burkes Garden had 97", while Bland had 62". Some schools lost up to 15 days due to snow.
3-28-94	Bristol	Severe ice storms, flooding
3-10-94	Bland, Carroll, Grayson, Smyth, Washington, Wythe	Severe ice storms, flooding. May be related to the **state emergency declaration** of March 2, 1994.
3-12-93 to 3-13-93	Bland, Carroll, Grayson, Smyth, Wythe, Galax (affected a region from Florida to New England)	**Blizzard of 1993**. 43 jurisdictions received disaster declarations statewide. Extreme cold and heavy snowfall, along with high winds, sleet and freezing rain left many motorists stranded. $5 million property damage. It was the biggest storm in a decade in Virginia. SW VA got 24-42" of snow. Interstate highways were closed and emergency shelters were opened to house up to 4,000 motorists.

Source: Virginia Department of Emergency Management and National Climatic Data Center.
Note: Items with dates appearing in boldface and shading resulted in presidential disaster declarations.

Major storms such as the Blizzard of 1993 closed down interstate highways, stranded motorists in their vehicles and trapped people in their homes. The event also brought high winds, sleet and freezing rain, adding to the disruptions created by the snowfall. In southwest Virginia, snowfall ranged from 24 to 42 inches in what was the largest snowstorm in a decade for the state. The Blizzard of 1996 (January 6-13) began in the southeastern states and moved into the northeastern states to cover the entire eastern seaboard. Snowfall amounted to one to four feet, with the greatest impacts for Virginia and West Virginia. On a statewide level, Virginia had 48 inches of snow, followed by West Virginia with 43 inches of snow. Much of the same region experienced two more snowstorms that dumped up to 12 inches more within the next 10 days. The National Climatic Data Center listed the storm of December 2009 as the only winter storm since the writing of the original plan that caused major monetary damage.

Below is the Northeast Snowfall Impact Scale (NESIS) that characterizes and ranks high impact winter storms.

Category	NESIS Value	Description
1	1—2.499	Notable
2	2.5—3.99	Significant
3	4—5.99	Major
4	6—9.99	Crippling
5	10.0+	Extreme

Locality	Avg. Annual Total Snowfall
Abingdon	16.3"
Bland	25.5"
Burkes Garden	46.3"
Byllesby	11.4"
Chilhowie	19.2"
Damascus	22.0"
Galax Radio	19.1"
Hillsville	18.9"
Independence	20.2"
Mendota	15.6"
Saltville	13.4"
Troutdale	20.2"
Wytheville	19.9"

Snowstorms pose a threat not only because of dangerous driving conditions and downed power lines, but also due to the melting that can lead to flooding. During the 2002-2003 winter season, severe winter storms later created flooding problems in Bland, Grayson and Wythe counties, with Wythe declared eligible for federal disaster assistance.

Due to variable topography and other factors, average annual snowfall amounts vary greatly throughout the Mount Rogers region, based on available weather records shown in the accompanying table shown at left. The data covers time periods as long as 81 years.

Risk Assessment and Vulnerability

Winter storms are a regular part of the weather regime for the Mount Rogers region. The severity of the season varies from year-to-year and can be highly variable among the localities for any given storm event. The variability can be due to differences in elevation, differences in temperature and the track of given storm systems.

In recent years there have been at least seven federal disaster declarations and four state emergency declarations due to severe winter storms over a 10-year period, as shown in the table on Major Winter Storms, Cold and Ice. Based on this brief time period, it is likely localities in the Mount Rogers region will experience at least one major snow and/or ice storm per year with the potential to become a federal disaster. The winter season typically runs from November to April of each year.

The average winter season in the Mount Rogers region can create annual snowfall amounts ranging from 8 to 46 inches. The average snow season in Roanoke produces 23 inches per year. The average winter season in the Mount Rogers region can create annual snowfall amounts

ranging from 8 to 46 inches. The average snow season in Roanoke produces 23 inches per year (over 49 years) and in the Bristol-Johnson City-Kingsport, Tenn. area produces 15.6 inches per year (over 59 years).

Any major winter storm or blizzard is likely to affect the entire Mount Rogers region, with the most direct impacts affecting highways and power lines. Most snow-related deaths result from traffic accidents, overexertion, and exposure. Sometimes also there is damage to buildings from collapsed roofs and other structural damage. In the time span since the original Hazard Mitigation Plan was written, the region's vulnerability to winter storms have not changed. There is no way that we know of to calculate the likely costs of a major winter snow or ice storm. The available data, through the National Climatic Data Center, reports damages by storm event, but this is not broken down by locality.

Severe winter storms and ice can cause death and injury on the highways and trap people in their motor vehicles or in their homes due to impassable roads. Snowstorms also regularly result in the closing of schools; in some years, the local schools have been closed as much as 15 days due to winter conditions. Forecasts of impending snowstorms also regularly result in early school closings to reduce the risk from bus and traffic accidents. Likewise, winter conditions can result in temporary disruptions of business activity, with workers advised to remain home until driving conditions improve.

The Virginia Department of Transportation deals directly with the effects of snowstorms. On average VDOT has spent $83 million annually on snow removal. As a general rule, the first priority is to plow interstate highways, major primary roads and secondary roads. Plowing in subdivision and residential areas is the second priority during winter storms. VDOT seeks to get ahead of snow conditions on the roadways through pre-treatments with liquid chloride and close monitoring of storm conditions and incoming storms.

For American Electric Power the main concern is icing, which can tear down overhead power lines. AEP is sometimes hampered in its efforts to restore power during major snowstorms due to the poor condition of the roads. The state's system of highway maintenance, carried out by several private contractors, at times creates uneven results during snow clearing.

Thunderstorms and Lightning

Description

Thunderstorms arise from atmospheric turbulence caused by unstable warm air rising rapidly into the atmosphere, enough moisture to form clouds and rain and an upward lift of air currents caused by colliding warm and cold weather fronts, sea breezes or mountains. Thunderstorms are always accompanied by lightning, but they may also be associated with heavy rains, hail, and violent thunderstorm winds.

Thunderstorms occur most often during the spring and summer months and can occur throughout the entire Mount Rogers Region. Nationwide the average storm is 15 miles wide and generally last less than 30 minutes at any given location. Some storm systems have been known to travel more than 600 miles. A map showing the favored high wind areas in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

History

Storm events reported to the National Climatic Data Center reflect the kind of activity and damages resulting from high winds and thunderstorm winds. Describing the data can be problematic, since storms often travel over wide regions. The reported damages represent those for the entire storm event and are not usually limited to a given locality. The data given in the table below offers a guide to thunderstorm history in the Mount Rogers region.

Storm Event History for Thunderstorm Winds, as of November 2023

Location	Time Period	No. Of Years	No. Of Events	Avg. Per Year	Reported Damages
Bland County	May 1989-April 2023	34	45	1.3	$394,000
Carroll County	June 1960-April 2023	63	108	1.7	$1,568,000
Grayson County	May 1962-April 2023	61	70	1.1	$689,000
Smyth County	April 1972-April 2023	51	87	1.7	$4,055,000
Washington County	June 1995-April 2023	28	136	4.8	$1,573,000
Wythe County	July 1962-April 2023	61	68	1.1	$878,000
City of Bristol	July 1980-April 2023	43	47	1.1	$255,000
City of Galax	Jan. 1998-April 2023	25	18	0.7	$104,000

Another event, on July 4, 1997, captured in the NCDC data involved a **supercell thunderstorm** and associated severe thunderstorms affecting a region stretching from Tazewell to Pittsylvania counties. Thunderstorm winds estimated at 60-80 mph and hail the size of golf balls damaged at least 29 homes, 16 mobile homes, five outbuildings, four businesses and a church in a two-

mile path near Wytheville. There was also widespread damage to vehicles, roofs, sidings, satellite dishes, trees and a large sign knocked down by the winds. Wytheville Community College sustained 100 broken windows. Hail drifts amounted to six to eight inches deep in several locations. The event caused an estimated $300,000 in property damage.

A **supercell thunderstorm**, while rare, is the often the most violent known form of thunderstorm and is associated with tornadoes, damaging straight-line winds and large hail. These events are defined as long-lived thunderstorms with a persistent rotating updraft. They often contain a mesocyclone, or storm-scale regions of rotation typically two to six miles in diameter that may produce tornadoes.

Lightning

Thunderstorms are always accompanied by lightning, which can cause fires, injury and death. Florida is known for having the greatest number of thunderstorms and the highest density lightning strikes in the contiguous United States.

Lightning becomes a problem when the discharge of a lightning bolt connects with an object or surface on the ground. Lightning will be considered together with thunderstorms in judging the importance of this hazard for the Mount Rogers region.

Risk Assessment and vulnerability

Southwest Virginia experiences 60-80 thunderstorms on average per year. Most of these occur during the summer months, extending from May through September, with July the peak month for thunderstorms statewide, according to the state climatology office. This is moderate compared to other parts of the country with more than 130 thunderstorms annually. During the peak of the thunderstorm season in the local region, storms may roll through at the rate of three or four per week, which is relatively frequent.

People and property throughout the Mount Rogers region are subject to damages and injuries created by lightning and thunderstorms. But any individual storm is likely to affect only a very limited area. In the time span since the original Hazard Mitigation Plan was written, the region's vulnerability to thunderstorms and lightning has not changed.

Virginia experiences a moderate number of thunderstorms and lightning strikes compared to other parts of the country, according to research cited by FEMA. Thunderstorms in the Mount Rogers region typically last 70-80 minutes in any given location, which falls in the mid-range for storm duration nationwide. In some areas thunderstorms last 130 minutes or more, based on findings by the National Weather Service for the years 1949-1977.

These storms can cause serious structural damage to buildings, start forest fires and wildfires, blow down trees and power lines, and cause death. On rare occasions, events such as the supercell thunderstorm from July 1997 can cause widespread damage, as previously discussed on the history section.

Nationally, Virginia falls in the mid-range for lightning fatalities, based on the cited research through the National Oceanic and Atmospheric Administration. States such as Florida, North Carolina, New York and Tennessee rank far ahead of Virginia. The lightning that accompanies thunderstorms in the Mount Rogers region averages 4-6 strikes per square kilometer, which is relatively low.

It is not possible based on available data to quantify the impacts of thunderstorms and lightning for localities in the Mount Rogers region. Available data from the National Climatic Data Center, which tracks incidents of thunderstorms and thunderstorm wind damage, is reported on a regionalized basis often covering numerous localities as a storm system moves through. Data resources will have to improve in the future to be able to make these calculations on the local level.

Tornadoes and Hurricanes

Description

A tornado appears as a rapidly spinning vortex or funnel of air extending to the ground from an overhead storm system (usually a thunderstorm). Tornadoes come in many sizes, ranging from several yards to more than a mile wide. The severest tornadoes can achieve wind speeds of more than 300 mph, though most are 100 mph or less. The weakest tornadoes may last only about a minute, while the stronger ones may continue for 30 minutes at a time and travel miles before dissipating. Virginia is said to have an average of seven reported tornadoes per year (1950 through 2006), though the actual number of tornadoes may be higher.

Statistically the peak month for tornadoes in Virginia is July, though the tornado season goes from spring through fall. Tornadoes spring from an estimated 1% of all thunderstorms; of the group that produces tornadoes, only about 2% are considered violent with winds over 200 mph (categories F3, F4 and F5 on the Fujita scale). Tornadoes also can be associated with hurricanes, though hurricanes are not a significant factor in southwest Virginia.

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	**EF Number**	**3 Second Gust (mph)**
0	40-72	45-78	0	65-85	**0**	**65-85**
1	73-112	79-117	1	86-109	**1**	**86-110**
2	113-157	118-161	2	110-137	**2**	**111-135**
3	158-207	162-209	3	138-167	**3**	**136-165**
4	208-260	210-261	4	168-199	**4**	**166-200**
5	261-318	262-317	5	200-234	**5**	**Over 200**

As seen in table shown above, tornadoes are measured on the Enhanced Fujita Scale, with categories ranging from F0 to F5. The categories are defined according to wind speed and the types and severity of damage caused. Parts of southwest Virginia show some tendency toward tornadoes in an area that extends from Tennessee into Bristol and Washington County due to the lay of the land and its influence on storm systems. Maps showing tropical cyclone tracts and tornado hazard frequency in the Mount Rogers Region are located in the section titled Appendix I at the end of the document.

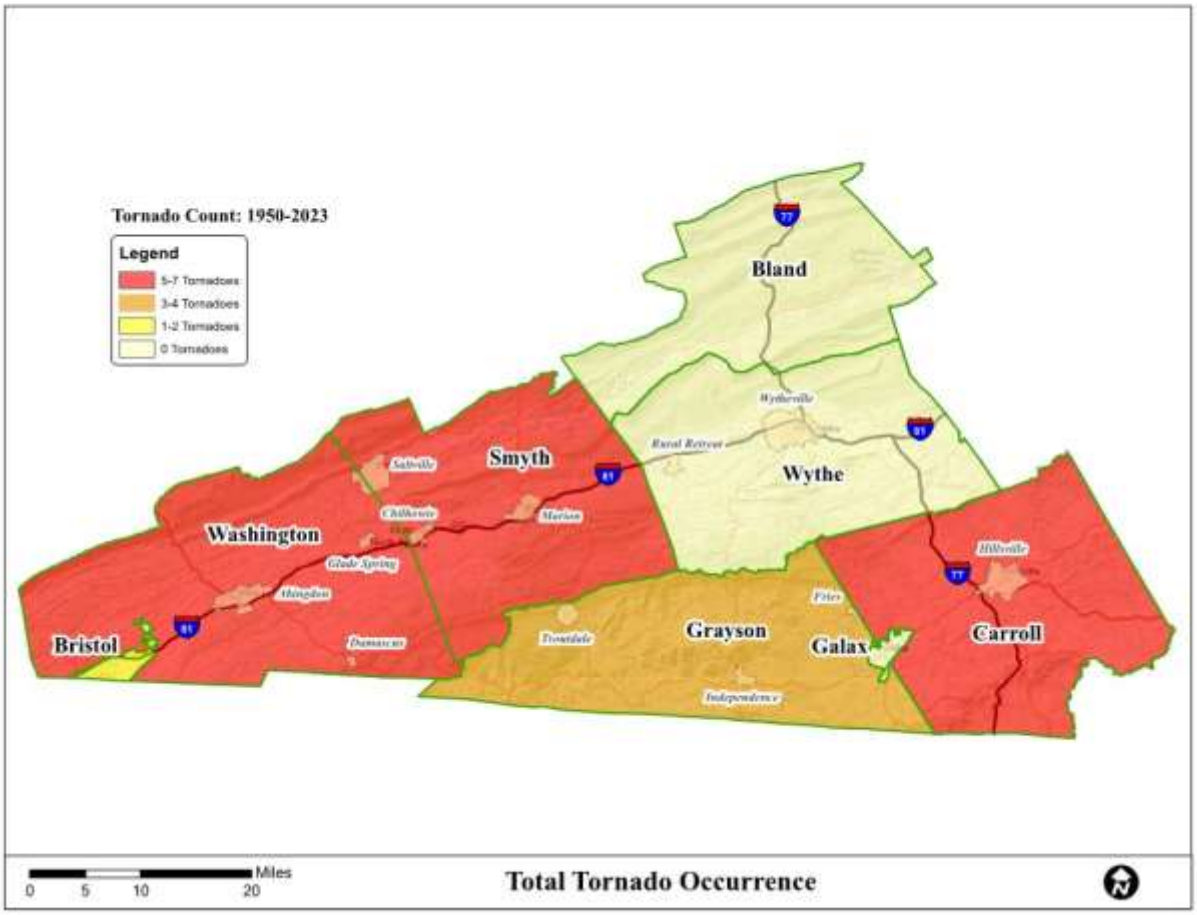
History

Between 1950 and 2005, Virginia experienced six tornadoes per year or 1.6 tornadoes annually per 10,000 square miles. Two storms per year on average were rated as strong or violent (F2-F5), with 0.5 such storms per 10,000 square miles per year.

Tornado History: Mount Rogers Region1950 through 2023

Locality	Date	Time	Dead	Hurt	F Scale
Bland Co.	-	-	-	-	-
Carroll Co.	Aug. 1, 1965	0230	0	5	F1
	Aug. 21, 1977	1700	0	0	F2
	July 4, 1979	1620	0	0	F1
	May, 6 2009	2126	0	0	F0
	March 23, 2022	1500	0	0	F2
Grayson Co.	July 10, 1959	1500	0	0	F1
	May, 6 2009	2125	0	0	F0
	October 23, 2017	1747	0	0	F1
	July 5, 2022	1850	0	0	F1
Smyth Co.	April 4, 1974	0405	0	3	F3
	Jan. 25, 1975	2335	0	2	F2
	June 5, 1975	1815	0	0	F0
	July 13, 1975	1900	0	0	F1
	April 28, 2011	0200	0	1	F2
	April 28,2011	0015	0	0	F2
Washington Co.	April 30, 1953	1845	0	0	F0
	June 10, 1953	1500	0	0	F1
	June 3, 1962	1600	0	0	F2
	April 4, 1974	0400	1	1	F3
	Jan. 25, 1975	2330	0	0	F2
	April 30, 1990	1725	0	0	F0
	April 28, 2011	0100	4	50	F3
Wythe Co.	-	-	-	-	-
City of Bristol	April 4, 1974	0300	0	0	F0
City of Galax	-	-	-	-	-
Totals:	**23 events**		**5**	**62**	

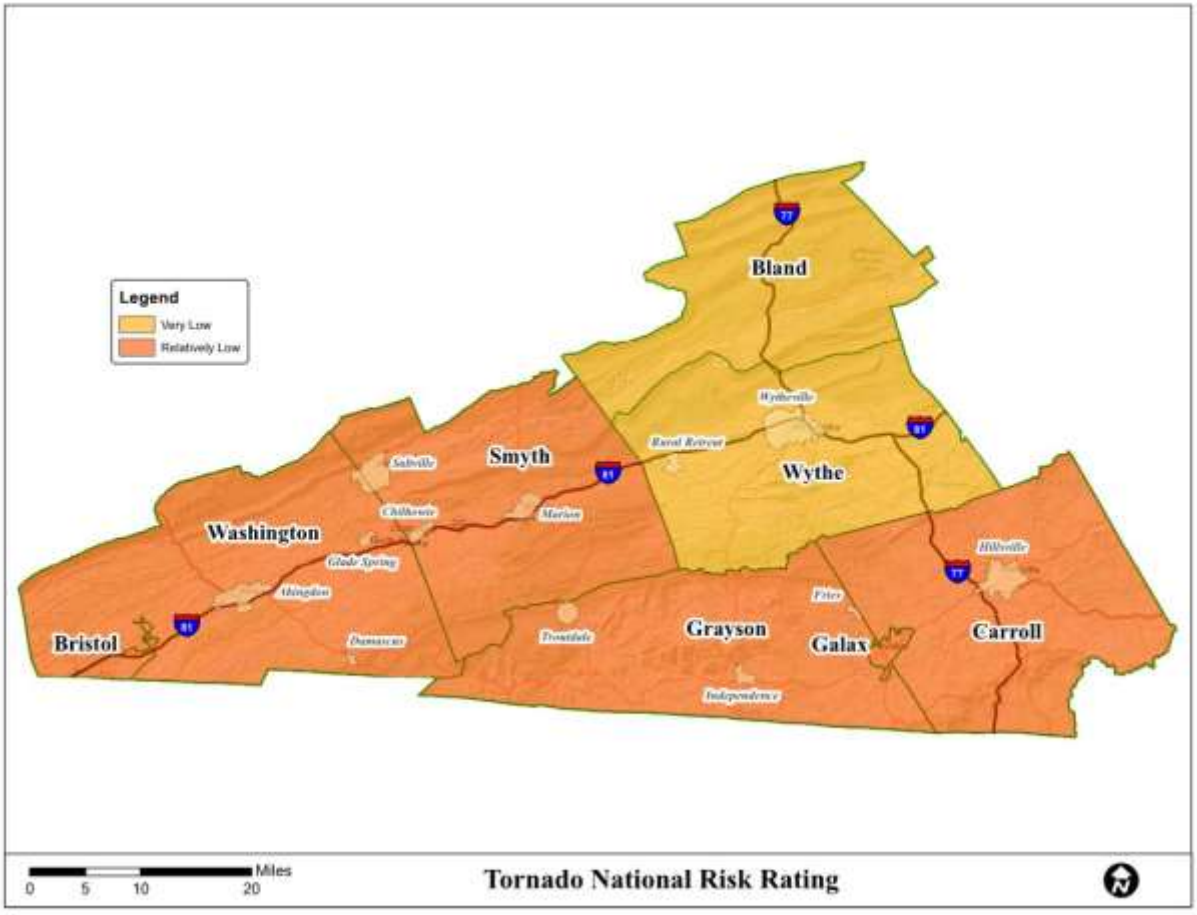
For the Mount Rogers region there have been 23 reported tornadoes from 1950 through 2023, with 5 people killed and 62 people injured. The highest intensity ever recorded for these storms was F3. See the table above for more details.



On the Fujita scale, an F3 category tornado is considered severe, with winds up to 206 mph. This fits with the FEMA Wind Zone III designation for the region. By definition, Zone III communities are known to experience winds of 160-200 mph.

The tornadoes of April 4, 1974 were part of what is known as the "Super Outbreak," when severe thunderstorms at the leading edge of a cold front moved into southwest Virginia. Eight tornadoes struck statewide, killing one person and hurting 15. The destruction affected more than 200 homes and barns and more than 40 mobile homes and trailers. The storm event in total spawned 148 tornadoes killed 315 people and injured 5,484. "Super Outbreak" created the most tornadoes ever recorded in a 24-hour period and the worst tornado outbreak since Feb. 19, 1884. This was true until the tornado outbreak of April 25-28 of 2011. This outbreak produced at least 336 tornados in 21 states from Texas to New York and even created isolated tornadoes in Canada. The storms caused $10 billion worth of damage and tragically resulted in 346 deaths. In the Mount Rogers Planning District, the storms resulted in 4 fatalities and caused $38.5 million in damages.

One of the tornadoes, rated at F0 to F1, struck near Bristol, demolishing several mobile homes and hurting four people. A stronger F3 tornado hit the Saltville area, traveling up the valley of the North Fork Holston River from Washington County, then following Tumbling Creek into Poor Valley and traveling up the Poor Valley to Cardwell Town. The storms resulted in one dead, one injured and destruction of two houses, two mobile homes, a church and three barns. There was also damage to 42 homes, two mobile homes and the roof of a high school. Wind damage was reported in Bland and Wythe counties.



Hurricanes

Generally speaking, the Mount Rogers region does not have hurricanes and is not considered hurricane-susceptible like communities all along the east coast. Hurricanes become a factor on those rare occasions when the storm systems take an inland route as they pass over the Mid-Atlantic region. Two of the most significant hurricanes in recent decades affecting the Mount Rogers region were *Hurricane Agnes* (June 1972) and *Hurricane Hugo* (September 1989).

Hurricane Agnes, originating off the coast of the Yucatan Peninsula in Mexico, became a tropical storm on June 16, 1972 and then a hurricane in June 19, 1972. It crossed the Florida panhandle on June 19 and passed through Georgia, South Carolina and North Carolina before returning to the Atlantic Ocean to regain strength. The storm made landfall a second time on June 22, 1972 in southeastern New York and moved west across the southern tier of New York and into north-central Pennsylvania, where the $3.1 billion hurricane made its greatest impact.

Though the local record is scanty for this storm, 106 jurisdictions in Virginia qualified for a presidential disaster declaration due to widespread flooding. Those included Smyth County and the City of Galax. Most notable for damage caused by flooding, Agnes dropped an average of 6-10 inches of rain over the Mid-Atlantic region from June 20-25, 1972. The storm in Virginia created an estimated $126 million in damages and resulted in 13 deaths.

Hurricane Hugo began as a cluster of thunderstorms moving west off the coast of Africa. As the storm system passed over the Atlantic Ocean, it gained strength to become a tropical depression and then a hurricane, on Sept. 13, 1989. Once classified as a Category 5 storm (highest intensity hurricane) on the Saffir-Simpson Scale, Hugo did great damage in the Caribbean and Puerto Rico. By Sept. 19 the storm had weakened and moved back over the Atlantic, where Hugo regained strength and became a Category 4 hurricane with winds up to 135 mph when it made landfall near Charleston, S.C. on Sept. 22, 1989. By the time Hugo passed west of Charlotte, N.C., it had weakened to a tropical storm with peak winds of 87 mph. The storm continued tracking north over southwest Virginia and West Virginia; the Appalachian Mountains helped weaken the storm further as it continued into western New York and passed out of the country. In the end, six Virginians died as a result of Hugo. As the storm passed over the Appalachians, orographic effects were thought to cause locally heavy rainfalls of more than six inches over western North Carolina and southwest Virginia, causing small stream flooding. Orographic effects are defined as those caused by the presence of mountains; most commonly, this occurs when air rises over the mountains and then cools, creating condensation and rainfall. In total Hugo was estimated as a $9 billion storm in damages and economic losses, with $7 billion of that total occurring on the mainland, particularly in the Carolinas.

Risk Assessment and Vulnerability

The Mount Rogers region appears to face a low risk of tornadoes and hurricanes. FEMA classifies the region under Wind Zone III, meaning winds can reach speeds ranging from 160 mph to 200 mph. The region also, based on historical information, experiences less than one tornado per 1,000 square miles. Tornadoes are rare for the Mount Rogers region.

FEMA High Wind Matrix
Tornado and Hurricane Risk

		Wind Zone			
		I	II	III	IV
No. of Tornadoes per 1,000 sq. miles	< 1	Low Risk	Low Risk ✹	Low Risk✹	Moderate Risk
	1-5	Low Risk	Moderate Risk✹	High Risk	High Risk
	6-10	Low Risk	Moderate Risk✹	High Risk	High Risk
	11-15	High Risk	High Risk	High Risk	High Risk
	> 15	High Risk	High Risk	High Risk	High Risk

Saffir-Simpson Scale

Category	Winds	Effects
One	**74-95 mph**	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal road flooding and minor pier damage
Two	**96-110 mph**	Some roofing material, door, and window damage to buildings. Considerable damage to vegetation, mobile homes, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of center. Small craft in unprotected anchorages break moorings.
Three	**111-130 mph**	Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain continuously lower than 5 feet ASL may be flooded inland 8 miles or more.
Four	**131-155 mph**	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach. Major damage to lower floors of structures near the shore. Terrain continuously lower than 10 feet ASL may be flooded requiring massive evacuation of residential areas inland as far as 6 miles.
Five	**greater than 155 mph**	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Major damage to lower floors of all structures located less than 15 feet ASL and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5 to 10 miles of the shoreline may be required.

A tool to judge damage potential from tornadoes and hurricanes can be found in a FEMA publication called *Taking Shelter from the Storm: Building a Safe Room Inside Your House*. The tool appears in the table above.

The matrix and the wind zone assignments are based on 40 years of tornado history and more than 100 years of hurricane history in the United States, as well as research by the Wind Engineering Research Center at Texas Tech University. This serves as the basis for a low risk rating for the Mount Rogers region.

Tornadoes, though rare for the Mount Rogers region, have been known to achieve an F3 intensity rating, based on the Fujita scale. These most severe known tornado incidents have occurred in Smyth and Washington counties. An F3 intensity tornado contains sufficient power to tear roofs and walls from well-built homes, uproot most trees, and lift objects such as automobiles off the ground and send them flying through the air. These storms can generate wind speeds of 158-206 mph.

As for hurricanes, the Mount Rogers region stands far inland and is not part of the coastal zone region where hurricanes cause most of their damage. Generally speaking, the local region experiences the outer effects of hurricanes; this can include high winds and heavy rainfall. Since heavy rainfall mainly results in flooding, hurricane impacts in this plan are covered in the section on flooding. In the time span since the original Hazard Mitigation Plan was written, the region's vulnerability to tornadoes and hurricanes has not changed.

Wildfires

Description

Wildfires occur as a regular part of the natural environment and are fueled by trees, brush, and grasses. The three primary factors that influence these fires are topography, fuel, and weather. Nationwide, the most frequent and worst of the wildfires occur in the western states, due to the dry climate and the prevalence of conifer and brush fuel types.

Wildfires also occur as a result of human actions, with increasing numbers of people choosing to live in wooded and wildland settings (described as the wildland urban interface), a factor that is also an issue for the eastern states, including the Mount Rogers region.

It is possible to group wildfires into four categories, as follows:

- **Wildland fires** occur in national forests and parks and are fueled by natural vegetation. Federal agencies typically hold the lead role for fire management and suppression for this group of fires.
- **Interface or intermix** fires happen at or near the junction between natural vegetation and the built environment.
- **Firestorms** are high-intensity fire events that are impossible to control or suppress until conditions change or the available fuel is gone. Firestorms have been a particular problem in the western states.

Prescribed fires and prescribed natural fires include those that are intentionally set and those that are allowed to burn as part of a fire management program to help clear out excessive accumulations of vegetative fuels.

A map showing wildfire risk in the Mount Rogers Region is located in the section titled Appendix I at the end of the document.

History

Wildfires in the Mount Rogers region are not as prevalent or as damaging as the massive fire events that occur every year in the western states. But the risks still exist due to the amount of forested land in the region, presence of contributing factors (steep slopes, pine woods, wildfire history), and residential development in remote, wooded areas throughout the region.

From 1995 through 2011 the Mount Rogers region had roughly 505 fires causing an estimated $730,000 in damages. Total property saved from destruction was estimated at more than $23 million, according to data by the Virginia Department of Forestry (VDOF). The greatest number

of fires occurred in Carroll County. Though it had fewer fires during the seven-year period, Washington County sustained fire damage to the largest total land mass.

VDOF data also points to debris burning and incendiary (arson) sources as the most common cause of fires in the Mount Rogers region. Those two sources accounted for 370, or 73%, of the 505 fires occurring between 1995 and 2011. Less frequent fire causes included equipment use, miscellaneous, smoking and children.

On the federal level, catastrophic fire losses in the western states have led to the development of the National Fire Plan and the Healthy Forests Initiative.

The National Fire Plan has resulted in more spending by state and federal agencies for improved prevention of wildfires. In the George Washington and Jefferson National Forests, which include the Mount Rogers region, the added funding supported efforts to reduce levels of fire-prone fuels and to establish a Type I firefighting crew. The National Fire Plan aims to provide sufficient resources for firefighting, rehabilitate fire-damaged ecosystems, reduce levels of fire-prone fuels found in the forests, and reduce fire risk faced by woodland property owners.

The Healthy Forests Initiative is a long-term plan promoted by federal agencies to improve management of federal lands and expedite forest and rangeland restoration projects. This effort is focused on communities near the wildland urban interface, in high-risk municipal watersheds, in watersheds containing habitat for threatened and endangered species, and where ecosystems are being destroyed by insect and disease epidemics and face increased threat of catastrophic wildfire. The wildland urban interface, particularly where rural housing development intermingles with the forest, is a concern for the Mount Rogers region.

Risk Assessment and Vulnerability

The Mount Rogers region covers an estimated 1.77 million acres of land. Of that total, an estimated 1 million acres of land (roughly 58%) is classified as forestland, with nearly all used as timberland. Areas subject to fire risk include the forestlands and places where people are building homes and residential subdivisions in wooded settings.

Virginia Department of Forestry (VDOF) criteria for determining areas of highest risk take into account factors such as density of historical wildfires, nature of the land cover (pines are more flammable than hardwoods), steepness and orientation of slope, population density, distance to roads, road density and developed areas, and presence of railroads. VDOF is incorporating its

data into a GIS-based mapping system to help make wildfire risk assessments and to identify woodlands home communities.

VDOF statistics for the state show most fires occur during the spring fire season (February-May) and on a lesser level during the fall fire season (October-December). More fires occur during these periods due to drier weather conditions, higher winds and the presence of cured fuels that can easily ignite. Causes of fires statewide include: open burning (30%), arson (20%), smokers (14%), miscellaneous (11%), children (9%), equipment use (7%), railroads (5%), lightning (3%), and campfires (1%).

In any given year on average, the Mount Rogers region may experience 70 wildfires, based on the state forestry data over the past 15 years.

Information on wildfire risk was being developed through VDOF and its GIS-based program, which mapped areas of risk into categories of low, moderate and high, based on criteria described above. The VDOF data did not include information on wildfires occurring on federal lands (which would include the national forests and the Mount Rogers National Recreation Area).

The VDOF wildfire risk data shows the following estimated data:

- **Carroll** and **Washington** counties contained the largest amount of land subject to high risk of wildfire (more than 100,000 acres for each county).
- **Washington County** appeared to have the highest number of woodland homes subject to high risk of wildfire, followed by Carroll County.
- Substantial regions of high wildfire risk were also apparent for **Smyth County** (in its midsection and far northwestern corner, roughly 70,000 acres) and **Grayson County** (all along its eastern border and generally along the U.S. Rt. 58 corridor, roughly 60,000 acres).
- Areas with lesser acreages subject to high risk of wildfire included **Bland** (approximately 27,000 acres) and **Wythe** counties (roughly 20,000 acres).

Loss estimates have been based on the preliminary data (for housing counts) and estimates (for housing values) as applied by the MRPDC.

The Mount Rogers Planning District contains just over an estimated 3,000 woodland homes and in any given wildfire, only a portion of this housing stock would be at risk of destruction. However, any given woodland home that catches on fire faces a high risk of substantial or total destruction in some of the more remote parts of the local region. We have no way of

estimating the potential loss for any given wildfire event, however, our best estimates show that the total value of homes at high-wildfire risk is approximately $550 million.

People with homes in woodland communities can face a substantial risk of wildfire and catastrophic loss. These homes generally cannot be insured against loss, which places the entire financial burden on the homeowners. In some cases, private housing developments in wooded settings contain narrow, poorly designed roads that cannot accommodate fire-fighting equipment. Other potentially serious issues include lack of access to a water supply, remote location, unidentified roads, and presence of vegetation (pines, broom sage) that is more prone to catch on fire. Wildfire can result in loss of property, injury, and loss of life. In the time span since the original Hazard Mitigation Plan was written, the region's vulnerability to wildfires has not changed. This is due to a lack of development in this short time span, and or lack of historical events.

The table on the following page shows a detailed breakdown of the land cover in the Counties of the Mount Rogers Region.

Land Cover Information: Mount Rogers Region

County	All Land (Acres)	Forest Land				Non-forest Land
		Total	Timberland	Woodland	Reserved	
Bland	229,545	172,214	166,519	na	5,695	57,331
Carroll	308,115	162,291	160,499	na	1,792	144,141
Grayson	285,304	173,873	161,883	na	11,991	111,431
Smyth	289,337	183,428	178,103	na	5,325	105,909
Washington	368,481	192,734	191,190	na	1,544	174,119
Wythe	296,480	153,942	153,610	na	332	142,538
Total	**1,777,262**	**1,038,482**	**1,011,804**	**na**	**26,679**	**735,469**

Windstorms

Description

Wind can be defined as the motion of air relative to the earth's surface. Extreme wind events may come in the form of cyclones, severe thunderstorms, tornadoes, downbursts and microbursts.

Wind speeds may vary from 0 at ground level to 200 mph in the upper atmosphere. Nationwide the mean annual wind speed falls in the 8-12 mph range. Frequently, wind speeds reach 50 mph and sometimes exceed 70 mph. Coastal areas from Texas to Maine may experience tropical cyclone winds with speeds of greater than 100 mph. The Mount Rogers region is located in Wind Zone III, with winds reaching up to 200 mph. A *special wind region* is known to occur in an area reaching from northeast Tennessee into southwest Virginia.

History

High winds in the Mount Rogers region blow down trees and power lines and cause varying amounts of property damage. A wind tunnel effect observed in a *special wind region* reaching from northeast Tennessee into southwest Virginia sometimes blows tractor trailers off I-77 in Carroll County. Some winds have lifted trucks off the highway and deposited them some distance away, like the effects of tornadoes. The image below is of such a storm that occurred in January 2003.

Since the writing of the original Hazard Mitigation Plan in 2005, Virginia Department of Transportation has installed a highway warning system, (overhead signs) designed to alert truck drivers to wind and fog incidents in the Fancy Gap area as well as other areas along the interstate system. The system is intended to help drivers avoid these hazards to the extent possible. In the Mount Rogers region, high winds have been known to tear down trees and power lines, blow in parts of buildings, and cause other kinds of property damage. An accounting of several recent high-wind incidents in the region is shown in the table below.

High Wind Incidents as of 2018

Date	Location	Description	Damages
10-5-95	Entire Mount Rogers region, plus much of SW VA	No description available.	$20,000 property
11-11-95	Bland, Carroll, Galax	Two windstorms occurred on same day.	$8,000 property
1-19-96	Carroll, Galax	No description available.	None reported
9-6-96	Carroll, Galax, Floyd, Franklin, Patrick	No description available.	$175,000 property, $200,000 crops
4-1-97	Carroll, Galax	Tractor-trailer blown over on I-77.	$7,000 property
2-4-98	Carroll, Galax, Patrick	Winds downed trees and damaged some mobile homes.	$15,000 property
3-3-99	Bland, along with Floyd, Giles, Montgomery, Pulaski	Winds downed trees and power lines.	$11,000 property
4-12-99	Carroll, Galax, Franklin, Patrick	High winds blew over a tractor-trailer on Rte. 58 and a mobile home (Patrick County). Winds blew over two tractor-trailers 5 miles south of Fancy Gap on I-77.	$14,000 property
1-13-00	Entire Mount Rogers region, plus much of SW VA	Winds downed large trees and power lines, caused minor property damage in all counties. Winds at 68 knots in Bland County.	$180,000 property
3-20-00	Smyth, Wythe	Winds downed trees and power lines.	$6,000 property

Date	Location	Description	Damages
1-10-01	Carroll, Galax, Bedford	Winds of 65 knots blew over 3 tractor-trailers on I-77. Much damage in Bedford County with shingles and siding stripped off more than 90 homes. Winds also downed power lines, power poles and numerous trees.	$410,000 property
3-6-01	Carroll, Galax, Grayson, Patrick	Winds associated with a snowstorm downed trees and power lines. Winds blew in a wall and partly collapsed a roof on an auto repair shop in Carroll County.	$80,000 property
3-10-02	Carroll, Galax, Grayson	High winds downed trees across Grayson and Carroll counties.	None reported
12-25-02	All of Mount Rogers region, plus wide area of SW VA	Winds downed numerous trees and power lines. A tree fell on a house in Roanoke, damaging the roof and crushing the front porch.	$20,000 property
1-8-03	Carroll, Galax, Grayson, other parts of SW VA	Winds of 50 knots downed trees and power lines. Many downed trees in Grayson County damaged several homes.	$80,000 property
1-9-03	Carroll, Galax, Wythe, plus 6 other SW VA counties	Winds of 60 knots downed trees and power lines.	None reported
1-23-03	Carroll, Galax, Wythe, other parts of SW VA	Winds of 100 knots blew over 6 tractor-trailers on I-77, near Fancy Gap. Trees and power lines downed throughout region.	$50,000 property
2-22-03	All of Mount Rogers region, plus wide reaches of SW VA	Winds of 80 knots downed numerous trees and power lines. Many people lost power across the region. Roof blown off an outbuilding in Tazewell County.	$3,000 property
5-11-03	Bland County	Winds of 70 knots downed several trees and power lines.	None reported
7-15-05	Grayson County	A small microburst causing winds of 70 knots blew the roof off a vacant hotel, and damaged 10 trees.	None reported
3-06-11	Carroll County	High winds overturned 2 tractor trailers on Interstate 77 at the 2.8 mile marker.	$200,000 property
4-17-14	Carroll County	High winds overturned 2 tractor trailers on Interstate 77 at the between the 2.7 and 2.8 mile marker.	$300,000 property
1-18-18	Carroll County	Three tractor trailers and one “dually” pickup were blown over by high winds on Interstate 77 in Carroll County. This occurred in the north bound lane at mile marker two.	None reported.

Date	Location	Description	Damages
2-25-19	Mount Rogers PDC	Heavy rain combined with prolonged high winds caused widespread power outages, downed trees, and large amounts of debris cleanup across the region. The windstorm which caused so much debris caused multiple road closures in several localities	$200,000 property
1-13-20	Smyth County	Officials in Smyth County say straight line winds of up to 80 mph were responsible for storm damage over the weekend. The Smyth County Office of Emergency Management, meteorologists from the National Weather Service in Blacksburg, and representatives from the Region 4 Virginia Dept. of Emergency Management conducted a damage assessment Monday. Some homes and barns were damaged, but no injuries were reported.	$100,000 property
6-2-21	Carroll County	One tractor trailer blew over from high winds on Interstate 77 in Carroll County. No injuries were reported.	None reported

The details for these high wind events were drawn from the National Climatic Data Center's database, as well as from news reports and emergency management personnel. For some incidents, even when damages are reported, an accompanying description of the event is not always available.

Risk Assessment and Vulnerability

Of the high wind events reported to the National Climatic Data Center, some part of the Mount Rogers region experienced damaging winds at least 15 times in eight years. That amounts to an average of roughly twice a year when winds are known to cause at least some damage.

Though the entire region is subject to high winds, Carroll County and the City of Galax appear to be hit the most often. Given the regionalized nature of the available data, it is not possible to quantify what a typical wind incident might consist of and how much cost it may create for the community or to private individuals.

Damage estimates through the National Climatic Data Center are reported by incident rather than by locality, unless the damages are confined to a small geographic area. Based on the reported incidents, damages may range from zero to up to more than $400,000

The reported damages include downed trees, tree limbs and power lines; shingles, siding and roofs torn away from homes; damage and uprooting of mobile homes; tractor-trailers blown

over and sometimes lifted off the highway, particularly near the Fancy Gap area of Interstate 77; and loss of electrical power. High wind events, while they occur frequently, appear to cause only scattered property damage. This hazard does not appear to pose a disaster-level hazard to the Mount Rogers region as a whole, although some localities regularly sustain high winds. In the time span since the original Hazard Mitigation Plan was written, the region's vulnerability to windstorms has not changed.

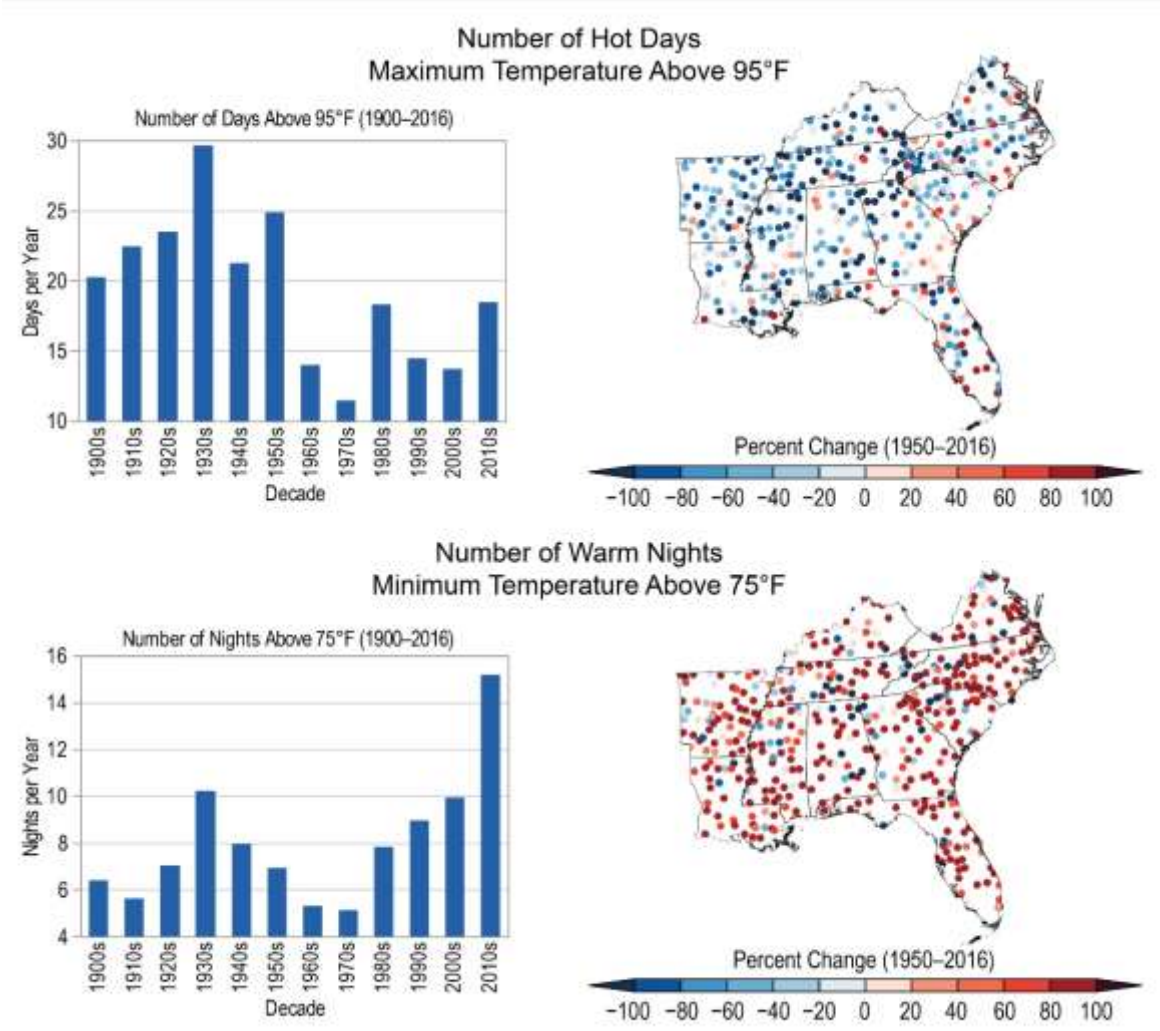
Other Hazards

Climate Change

The National Climate Assessment delivered to Congress every four years by the U.S. Global Change Research Program outlines threats to people, animals, crops, and infrastructure. Throughout the southeastern United States, the impacts of sea level rise, increasing temperatures, extreme heat events, heavy precipitation, and decreased water availability continue to have numerous consequences for human health, the built environment, and the natural world. This assessment builds on the concerns described in the Third National Climate Assessment (NCA3) and includes impacts to urban and rural landscapes as well as natural systems. The impacts from these changes are becoming visible as 1) flooding increases stress on infrastructure, ecosystems, and populations; 2) warming temperatures affect human health and bring about temporal and geographic shifts in the natural environment and landscapes; and 3) wildfires and growing wildfire risk create challenges for natural resource managers and impacted communities.

The Southeast includes vast expanses of coastal and inland low-lying areas, the southern (and highest) portion of the Appalachian Mountains in which the Mount Rogers Planning District is located, numerous high-growth metropolitan areas, and large rural expanses. Embedded in these land- and seascapes is a rich cultural history developed over generations by the many communities that call this region home. However, these beaches and bayous, fields and forests, and cities and small towns are all at risk from a changing climate. These risks vary in type and magnitude from place to place, and while some climate change impacts, such as sea level rise and extreme downpours, are being acutely felt now, others, like increasing exposure to dangerously high temperatures—often accompanied by high humidity—and new local diseases, are expected to become more significant in the coming decades. While all regional residents and communities are potentially at risk for some impacts, some communities or populations are at greater risk due to their locations, services available, and economic situations. In fact, a recent economic study using a higher scenario suggests that the southern and midwestern populations are likely to suffer the largest losses from projected climate changes in the United States. This is due to the fact that losses are largest in regions that are already poorer on average, climate change tends to increase preexisting inequality in the United States. The Mount Rogers PDC would certainly fall into this category. Understanding the demographic and socioeconomic composition of racial and ethnic groups in the region is important, because these characteristics are associated with health risk factors, disease prevalence, and access to care, which in turn may influence the degree of impact from climate-related threats.

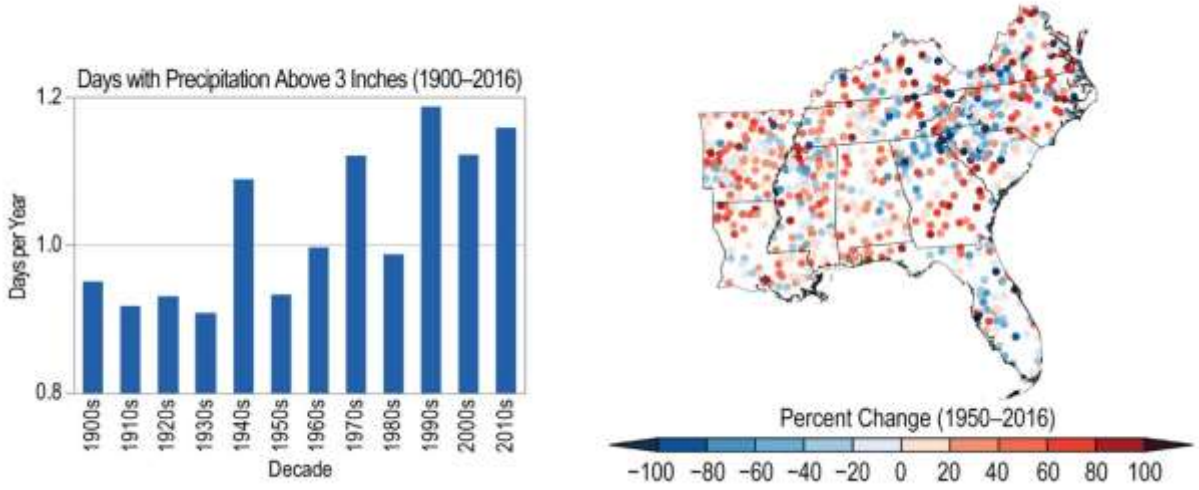
The Southeast region experienced high annual average temperatures in the 1920s and 1930s, followed by cooler temperatures until the 1970s. Since then, annual average temperatures have warmed to levels above the 1930s; the decade of the 2010s through 2017 has been warmer than any previous decade both for average daily maximum and average daily minimum temperature. Seasonal warming has varied. The decade of the 2010s through 2017 is the warmest in all seasons for average daily minimum temperature and in winter and spring for average daily maximum temperature. However, for average daily maximum temperature, the summers of the 1930s and 1950s and the falls of the 1930s were warmer on average. The southeastern United States is one of the few regions in the world that has experienced little overall warming of daily maximum temperatures since 1900. However, since the early 1960s, the Southeast has been warming at a similar rate as the rest of the United States. During the 2010s, the number of nights with minimum temperatures greater than 75°F was nearly double the long-term average for 1901–1960, while the length of the freeze-free season was nearly 1.5 weeks greater than any other period in the historical record. These increases were widespread across the region and can have important effects on both humans and the natural environment. By contrast, the number of days above 95°F has been lower since 1960 compared to the pre-1960 period, with the highest numbers occurring in the 1930s and 1950s, both periods of severe drought. The differing trends in hot days and warm nights reflect the seasonal differences in average daily maximum and average daily minimum temperature trends.



The chart above shows sixty-one percent of major Southeast cities are exhibiting some aspects of worsening heat waves, which is a higher percentage than any other region of the country. Hot days and warm nights together impact human comfort and health and result in the need for increased cooling efforts. Agriculture is also impacted by a lack of nighttime cooling. Variability and change in the annual number of hot days and warm nights are shown. The bar charts show averages over the region by decade for 1900–2016, while the maps show the trends for 1950–2016 for individual weather stations. Average summer temperatures during the most recent 10 years have been the warmest on record, with very large increases in nighttime temperatures and more modest increases in daytime temperatures, as indicated by contrasting changes in hot days and warm nights. The annual number of hot days (maximum temperature above 95°F) has been lower since 1960 than the average during the first half of the 20th century; trends in hot days since 1950 are generally downward except along the south Atlantic coast and in Florida due to high numbers during the 1950s but have been slightly

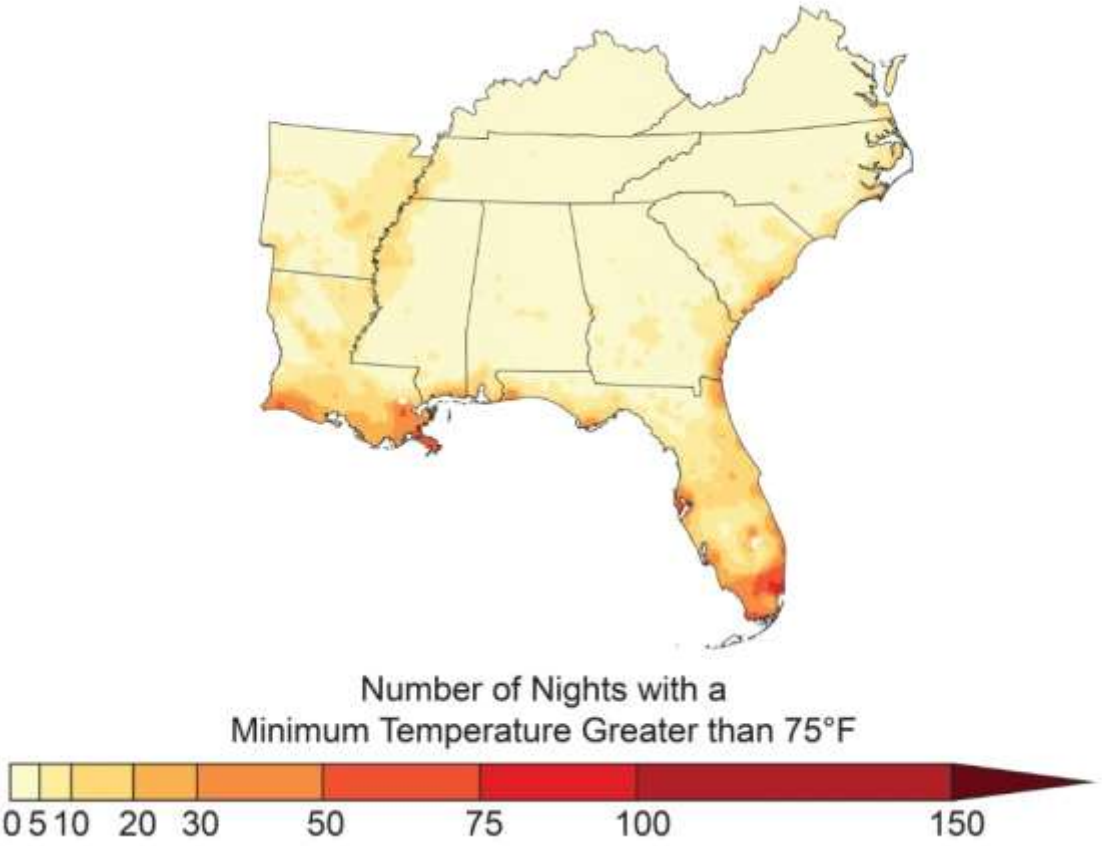
upward since 1960, following a gradual increase in average daytime maximum temperatures during that time. Conversely, the number of warm nights (minimum temperature above 75°F) has doubled on average compared to the first half of the 20th century and locally has increased at most stations. Sources: NOAA NCEI and CICS-NC.

The number of extreme rainfall events is increasing. For example, the number of days with 3 or more inches of precipitation has been historically high over the past 25 years, with the 1990s, 2000s, and 2010s ranking as the decades with the 1st, 3rd, and 2nd highest number of events, respectively. More than 70% of precipitation recording locations show upward trends since 1950, although there are downward trends at many stations along and southeast of the Appalachian Mountains and in Florida.

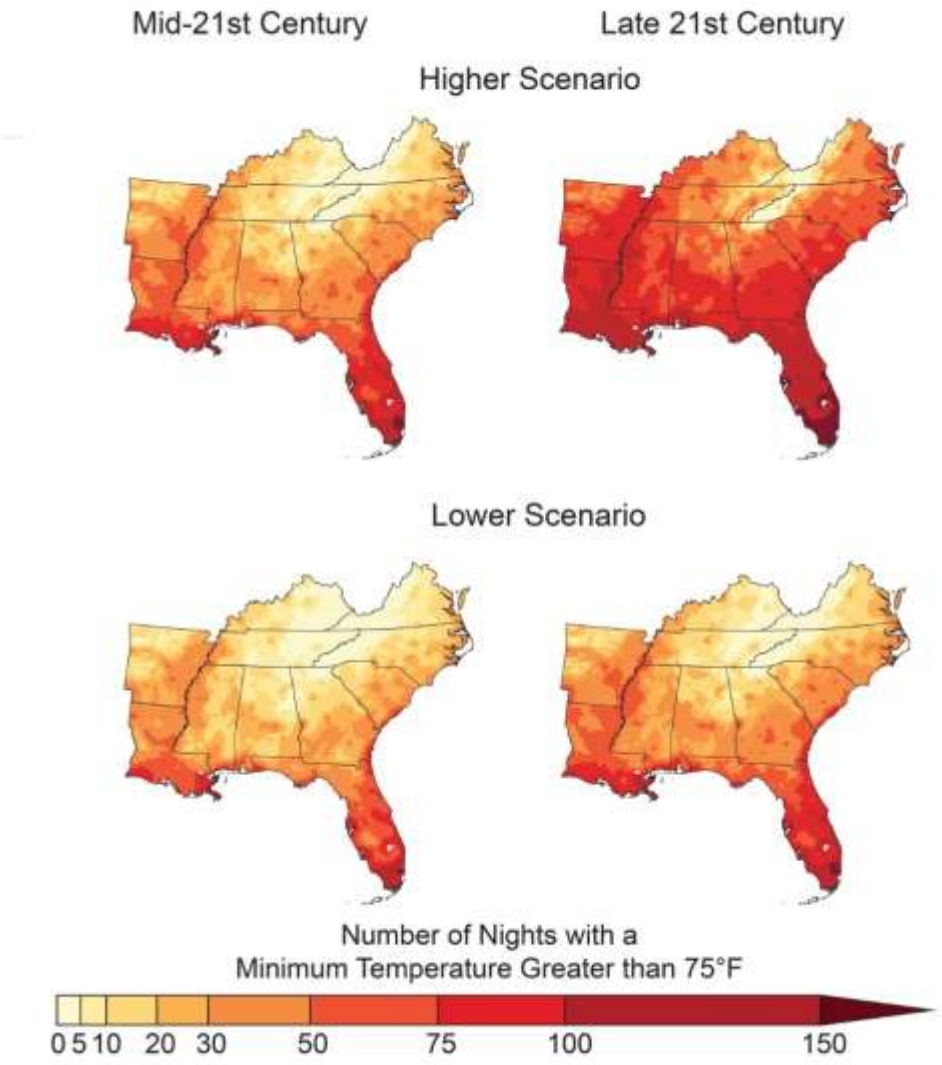


The chart above shows variability and change in the annual number of days with precipitation greater than 3 inches (1900–2016) averaged over the Southeast by decade and individual station trends (1950–2016). The number of days with heavy precipitation has increased at most stations, particularly since the 1980s. Sources: NOAA NCEI and CICS-NC.

The number of warm nights in the southeast as well as the United States as a whole is expected to increase over the next 100 years. However, as you can see from the following maps below the Mount Rogers Region is expected to suffer the least from such rises in temperature. This is due to the low amount of urban development, the high number acres of trees in our region, and our high elevation above sea level as compared to the rest of the state and the southeast region.



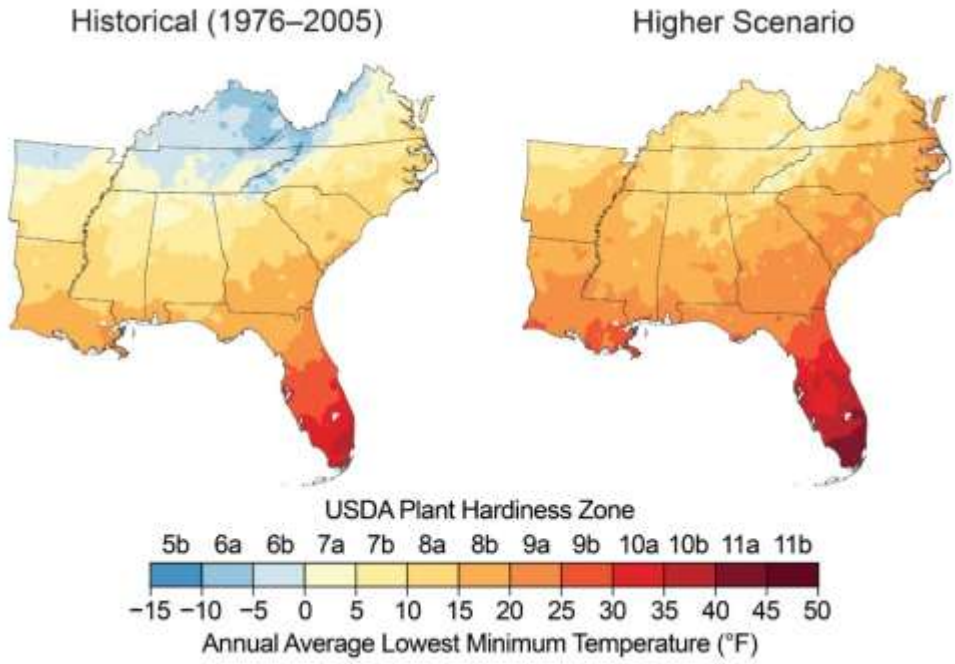
Changes in winter air temperature patterns are one aspect of climate change that will play an especially important role in the Southeast. By the late 21st century under the higher scenario the freeze-free season is expected to lengthen by more than a month. Winter air temperature extremes (for example, freezing and chilling events) constrain the northern limit of many tropical and subtropical species. Certain ecosystems in the region are located near thresholds where small changes in winter air temperature regimes can trigger comparatively large and abrupt landscape-scale ecological changes. Reductions in the frequency and intensity of cold winter air temperature extremes can allow tropical and subtropical species to move northward and replace more temperate species. Where climatic thresholds are crossed, certain ecosystems and landscapes will be transformed by changing winter air temperatures.



Plant hardiness zone maps help convey the importance of winter air temperature extremes for species and natural systems in the Southeast. To help gardeners and farmers, the U.S. Department of Agriculture has produced plant hardiness zone maps that can be used to determine which species are most likely to survive and thrive in a given location. The plant hardiness zones are reflective of the frequency and intensity of winter air temperature extremes in a specific region. Already, in response to climate change, plant hardiness zones in certain areas are moving northward and are expected to continue their northward and upslope progression. Continued reductions in the frequency and intensity of winter air temperature

extremes are expected to change which species are able to survive and thrive in a given location.

In addition to plants, warmer winter air temperatures will also affect the movement and interactions between many different kinds of organisms. For example, certain insect species, including mosquitoes and tree-damaging beetles, are expected to move northward in response to climate change, which could affect human health and timber supplies. And some bird species, including certain ducks, are not expected to migrate as far south in response to milder winters, which could affect birding and hunting recreational opportunities. In the future, warmer winter temperatures are expected to facilitate the northward movement of these problematic invasive species, which would transform natural systems north of their current distribution. The map below shows the worst case scenario of a possible change in plant hardiness zones which would greatly impact animal and plant life.



Agriculture, livestock rearing, and forestry activities are widespread and varied through the Mount Rogers Region. Climate change is expected to have an overall negative impact on agricultural productivity in the United States, although some crops could also become newly viable alternatives. Increases in temperatures, water stress, freeze-free days, drought, and wildfire risks, together with changing conditions for invasive species and the movement of diseases, create a number of potential risks for existing agricultural systems. In particular, precipitation trends for the Southeast region show an inclination towards slightly drier

summers, which could reduce productivity, and wetter fall seasons, which can make it difficult to harvest the full crop.

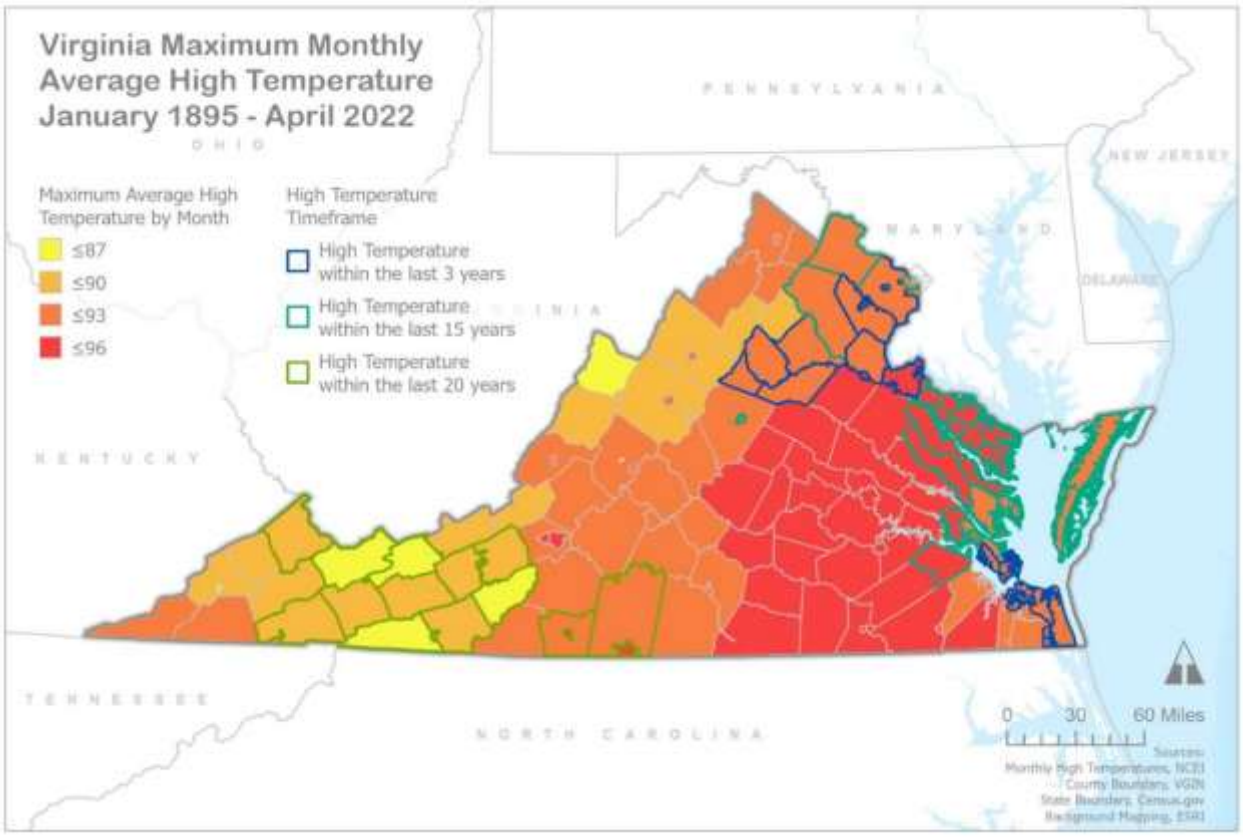
The conditions for raising and harvesting crops and livestock are projected to change. Higher temperatures can result in decreasing productivity of some cultivated crops, including cotton, corn, soybeans, and rice. Livestock, which includes hogs and pigs, horses, ponies, mules, burros, and donkeys as well as poultry and processed poultry for consumption (for example, chicken nuggets), is a large component of the agricultural sector for these states and the Nation. Livestock are all vulnerable to heat stress, and their care under projected future conditions would require new or enhanced adaptive strategies.

Recent changes in seasonal temperatures that are critical for plant development will continue to impact regionally important crops. Plants collected from the wild may become less available as the ideal conditions for their growth shift to other areas. Ramps are a type of wild allium that are related to spring onions and leeks and are abundant in the Mount Rogers region as well as throughout the southern Appalachians. Ramps are threatened by two major processes: overharvesting pressures and a changing climate that could expose these plants to higher temperatures and lower soil moisture conditions during sensitive growth periods. Although ramps are found all along the Appalachian Mountain range, Climate change increases the vulnerability of this plant to the existing stressors.

Peaches—an important crop in the Southeast and the Mount Rogers region require an adequate period of cool temperatures, called the chill period, to produce yields that are economically viable. Peaches also require warm temperatures at specific times during their development. If the warm temperatures come too early, the chill periods could be too short, or the peach blossoms can flower too soon and be in danger of late-freeze impacts. A late freeze in March 2017 caused over a billion dollars of damages to peaches and other fruit crops. To assist peach growers in adapting to such changes, researchers are working to develop peach varieties that can produce quality fruits in warmer winters and are developing winter chill models that can assist in adaptation planning efforts.

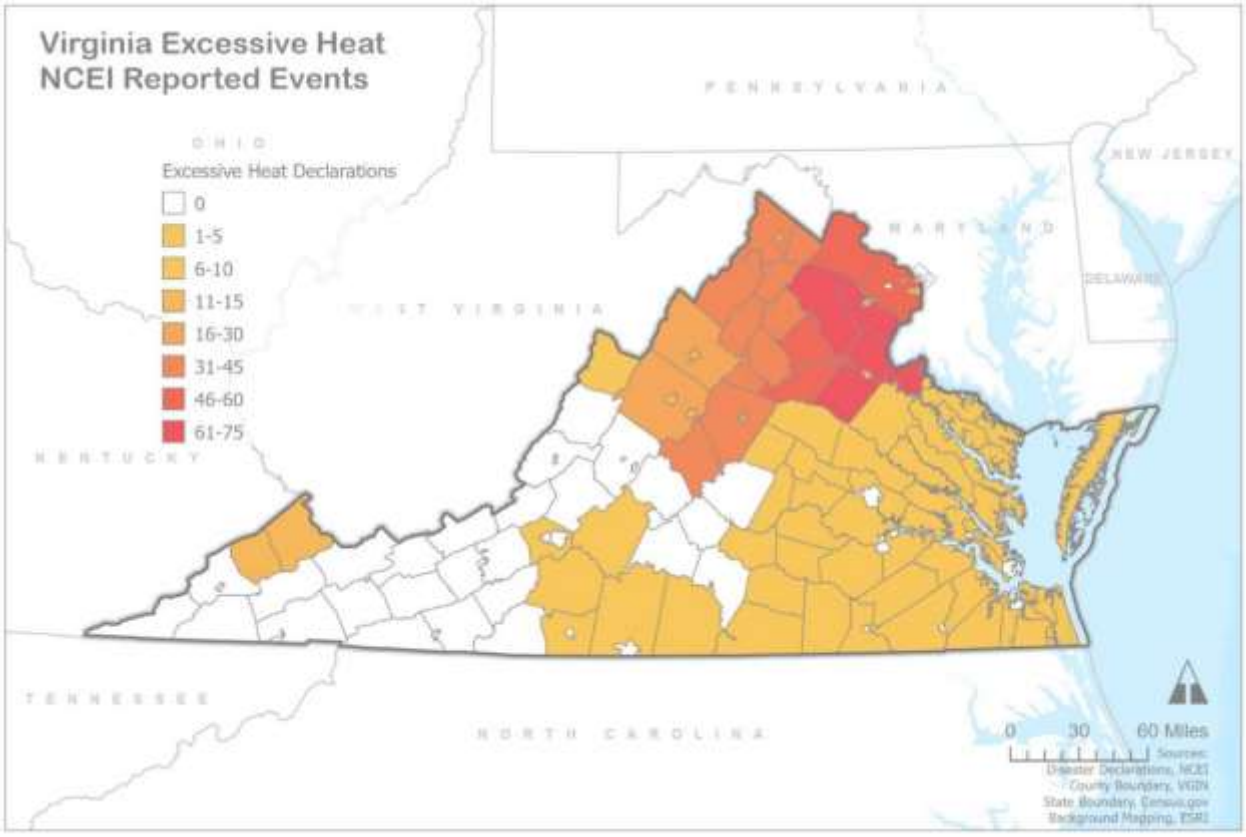
Forests, both natural and plantation, in the Southeast are vulnerable to climate variability and change. Southeastern forests represent almost 27% of the U.S. total and are the highest-valued crop in the region. The vast majority of forest is held in private hands, primarily corporate. This is also true in the Mount Rogers Planning District. However, Mount Rogers does have a higher percentage than much of the southeast timber on its national forest lands. (15% or 273,220 acres). Forest cover ranges from almost 50% to 80% in the southeast, creating large areas of

interface between populations and forests. Jobs in timber, logging, and support for agriculture and forestry totaled approximately 458,000.



The people of the rural Southeast confront a number of social stresses likely to add to the challenges posed by increases in climate stresses. The Mount Rogers region is especially vulnerable to the plight of poor rural areas. Rural communities tend to be more vulnerable due to factors such as demography, occupations, earnings, literacy, poverty incidence, and community capacities. Reducing stress associated with these factors can increase household and community resilience. Rural areas across the nation as well as the Mount Rogers Region are experiencing higher levels of population loss which leads to a elderly population that is higher than the national average. The region is expected to experience the highest cost associated with meeting increased energy demands and cost. Energy poverty is a situation where individuals or households are not able to adequately heat or provide other required energy services in their homes at affordable cost. Although heating costs are expected to decrease as the climate warms in the region, the number of cooling degree days is expected to increase and the length of the cooling season expected to expand, increasing energy demand and exacerbating rural energy poverty.

Climate equity is but one component of environmental justice, which is defined by the EPA as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income…"; however, several factors are missing from even this definition. It's important when thinking about equity to remember that climate change is very much a factor of the natural environment beyond the social and/or cultural aspects of our social environment. To this point, it's critical – especially in rural areas – to consider geography as a major contributor to the socioeconomic distress of populations.



Vulnerable populations in the region are not isolated so much by race/ethnicity, but more by socioeconomic status, which can be traced more specifically in this case to geography than ethnicity. Geographic isolation is a term most commonly utilized in relation to genetic populations whereby the term is used to describe the physical separation of populations from each other due to geographical barriers; however, it can still be applied to society. In this case, isolation could be measured by population density, generally caused by steep, mountainous terrain within the district. This low population density results in increased infrastructure costs relative to population, which only further exacerbates the socioeconomic factor. Due to the geographic terrain, often times critical infrastructure cannot be provided to isolated areas of the wider communities, and when present, isn't often maintained at the same capacity as more

urbanized, more highly populated communities. Due to the long-range dispersal, and often compression of infrastructure into narrow geographic bands within high-to-low elevation corridors, such infrastructure is incredibly vulnerable to hazards created by climate change. Such vulnerability often creates increased design and construction costs or altogether makes modern infrastructure projects infeasible.

Pandemic

Pandemic Timeline

During the early weeks of 2020, the United States began to get reports of a "flu-like" illness/outbreak in mainland China. By early February, United States public health officials were carefully monitoring the growth of this illness/outbreak, known as SARS-CoV-2 or more commonly COVID-19. Beginning in late February, the Virginia Department of Health was making preparations for disease surveillance, contact tracing / case investigation and ultimately containment efforts for SARS-CoV-2 across the Commonwealth of Virginia.

March 7, 2020 First case of COVID-19 in Virginia

March 12, 2020 Governor Ralph Northam declared a "State of Emergency" in the Commonwealth of Virginia

March 13, 2020 Following the World Health Organization's declaration of a COVID-19 pandemic, President Donald Trump declared a "National Emergency."

March 17, 2020 Executive order 53 was issued by the Governor, closing non-essential businesses, banning gatherings of more than ten (10) people, and closing all K-12 schools for the remainder of the academic school year. Additional executive actions were announced for food establishments and businesses.

March 18, 2020 Mount Rogers Health Districts requests volunteer support from the Southwest Virginia Medical Reserve Corps (SWVA MRC) to coordinate with primary care physicians regarding their need for Personal Protective Equipment (PPE)

March 19, 2020 First confirmed COVID-19 case in Southwest Virginia identified in the Roanoke/Allegheny Health District

March 19, 2020	SWVA MRC Coordinator develops a "Resiliency Team" compromised of Mental Health practitioners to develop weekly tip sheets and ensure the health and well-being of volunteers supporting operations
March 20, 2020	First confirmed COVID-19 case identified in the Lenowisco Health District (Lee County)
March 23, 2020	First Confirmed COVID-19 case identified in the Mount Rogers Health District (Smyth County)
March 23, 2020	SWVA MRC volunteers requested to support with large volume of phone calls in the Cumberland Plateau and Lenowisco Health Districts and to support a temperature screening station at the Washington County Community Services Building
March 25, 2020	Governor Ralph Northam and State Health Commissioner M. Norman Oliver, MD directed all hospitals to stop preforming elective surgeries to conserve supplies of PPE (Personal Protective Equipment)
March 28, 2020	First confirmed case of COVID-19 identified in the Cumberland Plateau Health District (Tazewell County)
March 30, 2020	Executive Order 55 issued mandating a "Stay-at-Home" Order and further reinforcing executive actions identified in Executive Order 53
March 31, 2020	VDH reported widespread community transmission of COVID-19 across the Commonwealth
April 2020	All three Far Southwest Health Districts began providing COVID "Drive-Thru" testing services. The locations of these events varied across the region with a primary focus of taking testing services into the community, at locations where people are already gathered, such as grocery stores.
May 15, 2020	Executive order 61 and Order of Public Health Emergency Three were issued by Governor Northam. These orders established Phase One of what was labeled as the "Forward Virginia" plan, a framework to slowly ease restrictions due to COVID-19
May 19, 2020	SWVA MRC provides support to election officials by serving as Infection Prevention Ambassadors at polling sites across Far Southwestern Virginia

	in an effort to limit disease transmission by promoting the use of hand sanitizers, wearing of face coverings, maintaining social distancing and cleaning of high-touch surfaces.
May 29, 2020	Executive Order 63 required all persons to wear a face covering when in public spaces
June 5, 2020	Executive order 65 was issued allowing Virginia to enter Phase Two, further increasing easement of COVID-19 restriction's, while maintaining the face covering requirement
July 1, 2020	Executive Order 67 and Order of Public Health Emergency Seven were issued, allowing Virginia to enter Phase Three of the "Forward Virginia Plan". These two orders, amended on November 15, 2020, reduced the size of public gatherings, expanded the masking requirements, strengthened enforcement of violations and added an alcohol curfew.
November 3, 2020	SWVA MRC provides support to election officials by serving as Infection Prevention Ambassadors at polling sites across Far Southwestern Virginia in an effort to limit disease transmission by promoting the use of hand sanitizers, wearing of face coverings, maintaining social distancing and cleaning of high-touch surfaces.
December 2020	Dr. Eleanor Sue Cantrell retires from the Cumberland Plateau and Lenowisco Health District's with Dr. Karen Shelton assuming Acting Director role for those districts in addition to her duties as the Mount Rogers Health District Director. This brought all three Far Southwest health districts under one unified Health Director.
December 10, 2020	Vaccine Administration and Management System (VAMS) becomes live for health districts to begin scheduling COVID-19 vaccine appointments and documenting individuals receiving immunizations.
December 11, 2020	State Health Commissioner Norman Oliver sends a letter requesting support for the COVID vaccine campaign to healthcare practitioners across the state. This letter requested that individuals interested in supporting Point of Dispensing (POD) Operations submit an application to become a member of their local Medical Reserve Corps.

December 11, 2020	Pfizer receives an Emergency Use Authorization (EUA) for their vaccine to help prevent the spread of COVID-19.
December 15, 2020	First COVID vaccines administered with a priority focus on healthcare workers who provide direct care to COVID-19 patients in area hospitals. Initial doses were limited and required prioritization. As vaccine volume increased and an additional manufacturer received an Emergency Use Authorization, a population grouping strategy was implemented, based upon vulnerabilities and likelihood of severe illness, to afford accessible vaccine to the entire population.
December 18, 2020	Moderna receives and Emergency Use Authorization (EUA) for their vaccine to help prevent the spread of COVID-19.
December 23, 2020	First COVID vaccine Point of Dispensing (POD) event held in the Cumberland Plateau Health District (Russell County)
December 23, 2020	First COVID vaccine Point of Dispensing (POD) event held in the Lenowisco Health District (Wise County)
December 23, 2020	First COVID vaccine Point of Dispensing (POD) event held in the Mount Rogers Health District (Wythe County)
January 25, 2021	VAMS system is retired and all health districts transition to the PrepMod vaccine management system.
February 27, 2021	Johnson and Johnson receives an Emergency Use Authorization (EUA) for their vaccine to help prevent the spread of COVID-19.
March 1, 2021	Virginia National Guard (VANG) support provided to Far Southwest Virginia Health Districts. A platoon of 33 VANG members was divided into teams and shared across the three health districts in support of community testing and vaccination events.
May 13, 2021	Emergency Use Authorization issued by the Food and Drug Administration (FDA) to provide COVID vaccines to individuals ages 12 – 17. Far Southwestern Health Districts began working with local public school systems to conduct school-based vaccination clinics.

May 15, 2021	Executive Order 72 (amended), in effect. This executive order eased surge restrictions due to COVID-19 after the CDC provided updated masking guidance outlining circumstances where masking was not required.
August 2021	SWVA MRC provides Infection Prevention packets to local school systems across the Mount Rogers Health District. Over 4,800 packets including facemasks, hand sanitizer and infection prevention materials were distributed to school aged children.
August 2021	Dr. Karen Shelton resigns from the Virginia Department of Health and Dr. Noelle Bissell assumes the role of Acting District Director for the Far Southwest Health Districts.
September 2021	PrepMod system retired and all health districts transition to the Vase+ vaccine management system.
October 29, 2021	Pfizer COVID vaccine approved for children ages 5 – 11. All three Far Southwest Health Districts coordinated with local school systems to implement school based vaccine clinics.
November 11, 2021	First Mobile COVID vaccine clinic conducted in the Lenowisco Health District (City of Norton) utilizing the VDH contracted COVID vaccine vendor (mobile health).
Present	Continued efforts to offer COVID testing, vaccines, and boosters to the community, schools and others as updated guidance becomes available.

Pandemic Response

The following pages outlines key strengths and identified areas for improvement associated with the response and ongoing recovery effort in Far Southwestern Virginia due to the emergence of SARS-CoV-2

Reflections in this section are the result of both internal and external After Action Review (AAR) conferences and operations that were guided by the following documents:

- VDH Emergency Response Plan, Annex D: Emergency Medical Countermeasure Distribution/Dispensing Plan, VDH Disease Control Manual (DCM);
- Mount Rogers Health District Emergency Operations Plan (EOP);
- Cumberland Plateau Health District Emergency Operations Plan (EOP);

- Lenowisco Health District Emergency Operations Plan (EOP); ? And any supporting agencies standard operating procedures and/or protocols (SOP)

Participating agencies and organizations contributing to the pandemic response for the Mount Rogers Hazard Mitigation Plan are: Virginia Department of Health: Mount Rogers Health District, Cumberland Plateau Health District and Lenowisco Health District, Community and Faith Based Partners, local government officials, local emergency managers, local first responders, healthcare and pharmacy partners, Far Southwest Virginia Healthcare Coalition, local public and private school systems, Virginia National Guard, Medical Reserve Corps.

Prevention, Protection, Mitigation, Response and Recovery

Community Preparedness, Emergency Operations Coordination, Emergency Public Information and Warning, Information Sharing, Medical Countermeasure Dispensing and Administration, Medical Material Management and Distribution, Medical Surge, Public Health Laboratory Testing, Public Health Surveillance and Epidemiological Investigation, Responder Safety and Health and Volunteer Management

1. Conduct a systematic process engaging the whole community to develop executable strategic, operational and tactical level approaches (External)

2. Ensure the delivery of actionable, accurate and timely information to the whole community through the use of clear, consistent, accessible and culturally / linguistically appropriate methods

3. Establish and maintain a unified and coordinated operational structure that integrates critical stakeholders across Far Southwestern Virginia to support the execution of identified core capabilities (Internal)

4. Provide lifesaving medical interventions to limit additional disease transmission, injury or death with a focus on identified vulnerable population groups

Governor Ralph Northam declared a State of Emergency in the Commonwealth of Virginia on March 12, 2020 due to the emergence of a novel coronavirus, SARS-CoV-2. More commonly known as COVID-19, this highly transmissible respiratory disease first appeared in Southwest Virginia on March 20, 2020, in the Lenowisco Health District. Disease transmission became apparent with additional cases quickly appearing in both the Cumberland Plateau and Mount Rogers Health Districts. Initial mitigation efforts focused on testing, education and limiting community transmission. In December 2020, both the Pfizer and Moderna vaccines became available under an Emergency Use Authorization (EUA) in an effort to protect the public from COVID-19 and limit the presence of severe illness. Immediately the Far Southwest Virginia

Health Districts implemented a plan to provide vaccines to our communities, utilizing available pharmacy and healthcare partners, with a focus on our most vulnerable populations. As of the writing of this report, the Far Southwest Virginia health districts have administered 110, 707 COVID vaccines across our 13 county, 3-city coverage area.

Strengths

The full capability level can be attributed to the following strengths:

Strength 1: EMERGENCY PREPAREDNESS AND RESPONSE PROGRAM

The Far Southwest Health Districts have seasoned Emergency Preparedness and Response Programs, built on an All-Hazards, capability-based approach, reflective of the whole community. Purposely designed to be flexible, these programs have the versatility to operate as "stand alone" units or quickly integrate into existing local emergency response structures as support mechanisms.

All three Far Southwest Health Districts have received recognition from the National Association of County and City

Health Officials (NACCHO) for meeting the Project Public Health Ready (PPHR) recognition criteria and routinely conduct training and exercise events with both internal and external stakeholders to ensure a continual improvement process.

Upon learning of the emerging threat of COVID-19, Local Public Health Emergency Coordinators (LHECs) began sharing information about the knowns / unknowns of disease transmission, coordinating with internal / external stakeholders to develop a common operating picture, updating emergency planning documents and ensuring that appropriate Personal Protective Equipment (PPE) was available to support clinical operations.

Local Health Emergency Coordinators and Health Department staff had performed functional exercises utilizing Influenza vaccines to conduct community Point of Dispensing exercises, utilizing both indoor and "Drive-Thru" models to ensure staff were trained and understood their roles/responsibilities during a mass vaccination/dispensing clinic. During these functional exercises, staff were trained in specific storage and handling requirements for vaccine which proved beneficial during the COVID mass vaccination events, identifying logistical needs and account for cold weather operations, social distancing, and masking requirements.

Strength 2: COMMUNITY PARTNERSHIP

The dynamic nature of the COVID-19 response effort quickly overwhelmed the capabilities of local health districts in Far Southwest Virginia. Historically, when large incidents occur, the

phrase “complex problems require complex solutions” becomes the topic of conversation and that could not be a truer statement to reflect upon in terms of operations of local health districts and community partners to ensure the successful response, mitigation and recovery of COVID-19 in Far Southwest Virginia.

Far Southwest Health Districts received a tremendous amount of support from Community and Faith Based Organizations, local Non-Governmental Organizations, local Government and First Response Entities, Public and Private School Systems, local Business and Industry leaders, local pharmacy and healthcare facilities, Urgent Care Centers, Community Services Boards, Appalachian Agency for Senior Citizens, volunteers through the Southwest Virginia Medical Reserve Corps, and local Institutes of Higher Education.

These partnerships proved essential to ensure the sharing of public information, incorporation of policies / procedures to safeguard members of the community, establishment of community-based testing / vaccination sites with a focus on health equity, continuity of services for vulnerable populations and access to support mechanisms such as mental health services, transportation and other barriers of care.

Areas for Improvement

The following areas require improvement to maintain the full capability level:

Area for Improvement 1: MEMORANDUM OF AGREEMENT (MOA)
Reference: Comments captured from Local Health District Staff as the result of After Action Meetings / Conversations.

Analysis: Local health districts have primarily focused their Point of Dispensing (POD) efforts around a process of utilizing local school system facilities during an emergency. The COVID environment has demanded a shift in focus as these initial through processes were around a short- term operation and the theory that schools would be closed due to the emergency.

Incorporating community partners and outside the box thinking has led to creative strategies in terms of facilities available to provide community testing and vaccination events. Local Health Districts should capitalize on these newly formed relationships and develop Memorandum of Agreements (MOAs) with critical partners, expanding their ability to quickly meet the needs of their communities during an emergency.

Area for Improvement 2: EMERGENCY PLANNING
Reference: Comments captured from Local Health District Staff as the result of After Action Meetings / Conversations.

Analysis: Historically, planning efforts in local health districts have focused on a specific threat rather than on an "All-Hazards" approach. At the start of COVID response, local health districts received instructions to ensure applicable medical countermeasure dispensing plans were up to date and included relevant information on the current "knowns," including the unique cold chain management requirements for potential vaccines and safety precautions such as masking and social distancing, which were necessary to ensure the well-being of staff members.

Implementing a planning strategy that focuses on core capabilities rather than a specific threat would enhance the ability of staff to understand operational needs during an emergency. For example, a Standard Operating Guide (SOG) outlining the process for establishing a community Point of Dispensing site within a local health district could provide a framework for implementing best practices and as a specific threat emerges, an incident annex would outline the current "knowns" and pertinent information to that threat.

These SOGs, built out on specific capability elements / processes, come alongside the local health district training and exercise program, enhancing the ability of staff to fulfill critical roles during an emergency and ultimately building resiliency at the local level.

Additionally, the COVID environment has highlighted the need for regional planning efforts, focusing on critical operations such as Joint Information Center / System (JIC/ JIS), Call Center Operations, Volunteer Management, and developing Public / Private Partnerships, across the Far Southwest region. Focusing planning efforts on a regional scale, by incorporating local jurisdictional resources and appropriate community partners could significantly enhance the ability of Far Southwestern Virginia to prepare for, respond to, and recover from large-scale emergency or disaster events.

Area for Improvement 3: TECHNOLOGY BASED APPROACH TO VACCINE ADMINISTRATION
Reference: Comments captured from Local Health District Staff as the result of After Action Meetings / Conversations and observations during the COVID response efforts.

Analysis: In an effort to streamline processes, given the widespread testing and vaccination needs across the Commonwealth, the Virginia Department of Health implemented an internet-based vaccine administration process. The intent was to make it more efficient to schedule vaccine appointments, track doses given, and notify the public of updates / pertinent information.

Initially, the Virginia Department of Health utilized the Vaccine Administration and Management System (VAMS) however this quickly proved problematic for local health districts.

VAMS required a local point of contact at an organization to serve as the "site administrator," ultimately responsible for uploading their employees' emails into the system, thus allowing the ability to schedule an appointment to receive a COVID vaccination. Individuals receiving the "links" generated by VAMS received instructions not to share the links because they were specific to pre- identified locations and targeted population groups. Upon rollout, the links quickly made their way to individuals in the community who did not fall within the current vaccination grouping or individuals utilized the link to schedule an appointment for vaccination outside their designated health district, thus creating challenges for staff operating at community Points of Dispensing locations. Additionally, VAMS required internet access, many of the elderly do not have internet access and were unable to schedule their vaccination. They would show up at the clinic and our staff would have to enter their information into the computer and get them registered.

In January 2021, VDH transitioned from the VAMS system to a system believed to be a more "user friendly" option known as PrepMod. This transition occurred quickly and without much training / familiarity time for local health district staff. A major challenge identified during this transition was that appointments or information already stored in VAMS did not carry over to the PrepMod system, thus requiring multiple communications with local community partners and individuals to ensure previously made appointments continued as originally scheduled and the new process for scheduling an appointment was properly communicated to stakeholders across Far Southwestern Virginia.

Once again in September of 2021, VDH transitioned to a third system known as VASE+ thus retiring the PrepMod system and again placing a burden on staff and the public with learning a new system for vaccine administration and management. Further compounding the challenges posed with utilizing multiple electronic management systems during such a large-scale incident was the realization that not everyone within the Far Southwestern Virginia region had access to the internet or utilized email on a regular basis. Given the diverse geography across the region, internet connectivity is not possible in some communities, utilizing an internet-based system made it extremely challenging for these individuals to schedule appointments, added additional stress on an already overtaxed workforce and frankly, led to barriers to vaccination as individuals became frustrated with the process. Lack of internet access also caused a burden and individuals relied on our already overtaxed workforce to assist with getting them registered sometimes staff were receiving calls at 1:30 – 2:30 a.m. and assisting clients with getting registered for a clinic the next day. Staff were tired and getting no rest.

The following section will define both the strengths and areas for improvement based upon this incident objective and the associated PHEP capabilities.

Strengths

The full capability level can be attributed to the following strengths:

Strength 1: DIVERSITY OF MESSAGE DISTRIBUTION

LHD's across Far Southwestern Virginia utilize multiple platforms to distribute emergency public health information to our communities. Some of these platforms include agency press releases, social media postings, local television and radio stations, local public school systems, local emergency alert and warning systems, and local newspaper outlets. Utilizing multiple platforms afforded the ability to maximize messaging efforts and relay critical information to diverse populations across the region.

Additionally, given the fact that many of our staff members are born and raised within the region, have familiarity with community partners and individuals / organizations representing identified vulnerable populations, the ability to communicate critical prevention, protection and mitigation messages across the Far Southwestern Virginia region was enhanced, affording a personal touch.

Strength 2: COMMUNITY HEALTH WORKERS

Each LHD in Far Southwestern Virginia is fortunate to have a team of individuals dedicated to health education and population health management. Early in the response, the Far Southwestern region implemented a Community Health Worker (CHW) strategy to ensure the message was reaching the intended target.

A primary strength was the ability to organize teams to go out "into the field" and share information about testing, masking, social distancing, and vaccination. The CHW strategy led to partnerships with local Community and Faith Based Organizations, the development of a locally driven media campaign, and the widespread distribution of emergency public health information on posters, billboards, handouts, and door hangers.

Additionally, as funding became more widespread, LHD's across the Far Southwestern region were able to expand their network of CHW's ultimately maximizing the ability to distribute COVID test kits, build relationships with local Community and Faith Based Partners to host community Points of Dispensing sites, and combat widespread misinformation circulating within the community.

Areas for Improvement

The following areas require improvement to maintain the full capability level:

Area for Improvement 1: PUBLIC INFORMATION OFFICER

Reference: Observation of the tremendous amount of information management required during an emergency with public health implications and at the result of comments received during After Action discussions.

Analysis: The demand for information from both the general public and local community partners quickly became overwhelming for many of the LHD's. Unfortunately, the Far Southwestern LHD's received limited support from both our regional and state level Public Information Officers (PIO).

Traditionally, the role of the PIO is a dual duty function of a staff member within a local health district, realistically making it "another duty as assigned" instead of a primary job function. The dynamic nature of the COVID response and the demand for accurate, timely, and actionable information from LHD's highlights the need for a dedicated and trained PIO in each of the Far Southwest health districts.

Having a dedicated PIO in each LHD would expand the ability of the Far Southwestern region to network with public information officials across the region, with other state agencies and ultimately foster the development of a Joint Information System (JIS) that does not currently exist in the region.

Area for Improvement 1: SUSTAINED FUNDING TO MAINTAIN CAPACITY

Reference: Observation of the tremendous amount of information management required during an emergency with public health implications and tracking the comments received during After Action discussions.

Analysis: The CHW initiative has proven to be a force multiplier for not only the Far Southwestern region but for LHD's across the Commonwealth. Currently, many of the CHWs salaries receive funding through a grant program that will expire within the coming years.

The COVID response has highlighted the need for a whole community approach to public health emergency preparedness. Developing and maintaining relationships with Community Partners and Faith Based Organizations are essential to ensuring the successful mitigation of emergencies across the Commonwealth. A primary mechanism for this development and sustainment is the CHW program and without proper funding to sustain these critical positions,

the ability of LHDs to dedicate staff members to this initiative will be limited, ultimately reducing the resiliency of our communities.

The following section will define both the strengths and areas for improvement based upon this incident objective and the associated PHEP capabilities.

Strengths

The partial capability level can be attributed to the following strengths:

Strength 1: UNITY OF COMMAND

Traditionally, the Cumberland Plateau, Lenowisco, and Mount Rogers Health Districts have operated independently, each having their own unique command structure and geographical area of responsibility. The rapid transmission of COVID-19 throughout the region, coupled with the need to share situational awareness information across health districts quickly established a foundation for enhanced coordination efforts.

The retirement of Cumberland Plateau / Lenowisco Health District Director, Eleanor S. Cantrell, M.D., further compounded this need in December 2020, prompting all three Far Southwest Health Districts to align under the command of Mount Rogers Health District Director, Karen Shelton, M.D. This organizational realignment proved to be extremely efficient for the Far Southwest Health Districts, fostering a spirit of collaboration among staff members actively engaged in response efforts, ensuring a unified message to the public and setting a unified operational tempo across the region. In fact, with the unforeseen resignation of Dr. Karen Shelton that would take place in August 2021, the Virginia Department of Health Central Office appointed Noelle Bissell, M.D., as the covering Health District Director for all three Far Southwest Health Districts to ensure continuity of established operations.

Strength 2: MEDICAL RESERVE CORPS AND VIRGINIA NATIONAL GUARD

The demands placed upon the local health districts during the COVID-19 response were unprecedented and quickly overwhelmed staffing capabilities across the region. Realizing the depth of the response, the Southwest Virginia Medical Reserve Corps repeatedly stepped up to the challenge, offering support in any way possible. Understanding the necessity for a large complement of volunteer staff to support response and recovery efforts, the Southwest Virginia Medical Reserve Corps internally developed an administrative support division that could help with onboarding, scheduling, and record keeping for volunteer service hours throughout the incident. Additionally, with support from the United Way of Southwest Virginia and the Virginia Department of Emergency Management (VDEM), a Volunteer Liaison and two contract

employees from the Olson Group joined the unit to help provide accountability for the approximately 120 volunteers supporting operations daily across Far Southwestern Virginia.

Throughout the response, Southwest Virginia Medical Reserve Corps volunteers fulfilled critical roles, including phone operations, administrative and logistical support, and the administration of COVID-19 testing and vaccination at community Points of Dispensing (PODS). Volunteers also sought out new ways to assist the community through programs such as the Infection Prevention Ambassadors program that worked to ensure safe polling spaces during local, state and National elections.

As of the time of this report, volunteers have supported 324 community PODS, 93 mobile PODS and 17 pediatric PODS providing 13,025 staff hours, equating to a monetary value of more than $377,725.

Strength 3: INCIDENT COMMAND SYSTEM (ICS)

Each local health district maintains an Incident Command System (ICS) structure to ensure accountability for defined incident objectives during response and recovery operations. These ICS structures are routinely the focus of training and exercise events, ensuring all assigned staff members understand their role during Health Department Emergency Operations Center (HDOC) activations.

The COVID-19 response necessitated the need to expand existing ICS structures within the Far Southwest Health Districts to include critical roles such as POD Site Managers, Contact Tracing / Case Investigation Team Leads, Logistics Support, Volunteer Management, and Community Health Worker program areas.

Staff consistently stepped up to the challenge, with Senior Nursing staff serving as POD Site Managers, Environmental Health staff assisting with logistical activities, MRC volunteers creating internal administrative teams, and contract personnel fulfilling critical voids in the ability to conduct Contact Tracing / Case Investigating and Public Information campaigns.

Under the direction of Acting Far Southwest Health District Director Noelle Bissell, M.D., weekly planning meetings helped to ensure that everyone understood the identified incident objectives and their responsibility to support the implementation of such objectives within not only their respective district but across the Far Southwest region.

Strength 4: USE OF TECHNOLOGY

Given the unknowns around transmissibility of COVID-19 early in the response and the highly infectious nature of the disease, the decision to limit in-person meetings / interactions of staff

members was necessary to ensure a workforce that could respond to the needs of their community. Understanding that information sharing was critical to a successful incident response, all three Far Southwest Health Districts leveraged technology to ensure a coordinated response effort. This included utilizing available meeting platforms such as Google Meet, Microsoft Teams, Zoom, and WebEx to allow for continuity of communications among critical staff members. Additionally, realizing that multiple staff members needed access to similar information, guidance documents, shared via editable folders on Google Drive, afforded the ability to both read and edit pertinent information across the Far Southwest Region.

As operations transitioned towards community testing and vaccination events, in-person work became a necessity. Social distancing and the use of face coverings quickly became the best options to limit disease transmission. While not practical for POD operations, the need to safeguard our workforce was apparent. To minimize potential exposures, all three Far Southwest Health Districts purchased electronic tablets that could capture client information in an efficient manner and improve the overall "interaction time" between staff members and clients. Tablets were utilized in all COVID clinics by clerical and nursing staff.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 1: ORGANIZATIONAL ALIGNMENT OF EMERGENCY PREPAREDNESS
Reference: Staff observations during the COVID response and current organizational structure of the Virginia Department of Health (VDH), Virginia Department of Emergency Management (VDEM) and the Virginia Emergency Support Team (VEST).

Analysis: The current operational structure of the Emergency Preparedness and Response program within the Virginia Department of Health creates a silo effect in terms of operational coordination. The current reporting structure provides a mechanism for central office staff to communicate critical information to regional coordinators, however, does not allow for widespread sharing of situational awareness information to the Local Health Emergency Coordinators (LHECs).

Daily, in each of the Commonwealth's 35-health district, LHECS are tasked with fostering relationships and developing actionable, all-hazards emergency operations plans. The COVID response, however, highlighted that the role of the LHEC is not widely known throughout the agency, to critical partner agencies and is not considered a valuable part of the incident command structure.

Consistently, information flowed from the central office to regional coordinators, nursing staff, or district directors, completely leaving the LHECs in the dark. Regional coordinators were tasked with filling key roles on working groups or taskforces around operations, when these operations were actually being implemented locally, without any representation from the LPHECs.

Further exacerbating this challenge was the rapid onboarding of contract staff members, unfamiliar with agency operations, to key roles in the central office. These contract staff members did not understand the role of the LPHECs or the need to share situational awareness information with these key positions, thus leading to the lack of a defined common operating picture and duplication of efforts at the local level.

Additionally, the Virginia Emergency Support Team (VEST) exists to share situational awareness information and develop a common operating picture across agencies. The LPHEC was not included on the email distribution lists or conference calls conducted by the VEST and thus had to spend time tracking down sources of information or processes when receiving questions from local partnering agencies.

The COVID response has highlighted the need for integration of public health and emergency management, operating under a unified set of core capabilities. In order for this to be successful however, the value of the LPHEC must be communicated and integrated into the emergency preparedness and response structure, not only across the agency but throughout the Commonwealth's response strategy.

Area for Improvement 2: PROGRAMMATIC COORDINATION WITH CENTRAL OFFICE
Reference: Comments captured from Local Health District Staff as the result of After Action Meetings / Conversations.

Analysis: The fast pace of the response, coupled with a dynamic incident, quickly overwhelmed local resources. The Far Southwest Health Districts communicated dire needs to central office on many occasions; however, the response did not seem to present the same urgency. In certain instances, staff members did not get a clear answer to the questions presented or the solutions offered were not feasible and proved to be extremely time-consuming.

Given the fact that the Virginia Department of Health operates under a "Centralized" structure, many of the operations implemented for the COVID response were directed by the central office with the expectation of application by the local health districts. This proved problematic on many occasions, as a "one size fits all" approach does not align with the unique population,

geographical and socio-economic factors compromising each of these local health districts. Additionally, operations that would work well for urban areas may not be efficient for suburban or rural districts. Moving forward, VDH would be prudent to utilize a regional approach, having "boots on the ground" drive the response with guidance and support provided from a liaison to each region from the central office. There is regional staff in place and can provide Central Office input, if the Central Office will take time to listen to the needs of the region. After Action Reports for large- scale emergency and disaster events have repeatedly revealed that response efforts are most efficiently mitigated when a "locally executed, state managed, federally supported" approach is adopted. This does not imply that the state should dictate operations at the local level but rather manage the consequences of the overall response.

An example of this would be the looking at a vaccine allocation process that is reflective of the whole of the Commonwealth. Throughout the COVID response, the Far Southwestern Virginia region experienced some of the highest transmission rates and fatality rates of any region in the Commonwealth. This could be a consequence of numerous factors to include access to care, misinformation/trust issues, or lack of available vaccine.

Unfortunately, VDH central office implemented a vaccine allocation strategy based on population, instead of transmission and fatality rates. This strategy negatively influenced the LHD's ability to provide life-saving prophylaxis to our communities, as the Far Southwestern Virginia region only received a 1% allocation in each of its LHD's, necessitating sharing of available vaccine across the LHD's and with regional pharmacy partners.

Even as vaccine availability increased, central office implemented a partnership with the Federal Emergency Management Agency (FEMA) to operate "fixed vaccination" sites in regions across the Commonwealth. Again, a "population based" strategy, Far Southwest Virginia was unable to benefit from a "fixed vaccination site" due to disperse geography and lower population rates, further compounding the ability of LHD's to limit disease transmission and protect our populations. It was not until much later in the vaccine campaign that a contract to operate "mobile vaccination sites" in rural communities began to provide much needed support to the LHD's and the people in Far Southwestern Virginia.

The following section will define both the strengths and areas for improvement based upon this incident objective and the associated PHEP capabilities.

Strengths

The partial capability level can be attributed to the following strengths:

Strength 1: COMMUNITY POINTS OF DISPENSING (PODs)

As the vaccination campaign began to formalize across the Commonwealth, the operational structure of the Far Southwest region necessitated a unified strategy. Realizing the diverse geographical area that would require coverage by the campaign and having familiarity with the social determinants of health across the region, the Far Southwest LHDs implemented a "Fixed" Community Point of Dispensing methodology.

Essentially, a LHD operated COVID vaccination POD, operating on designated days of the week at designated locations (established through critical community partnerships), took shape across the region. This strategy ensured a vaccination approach based upon equity and afforded the opportunity to maximize reach across the region assuring every community within the 13-county, 3-city region had access to a dedicated Community Point of Dispensing location.

Staff members received extensive training in POD operations and further define their training through participation in annual exercises. This approach afforded LHDs in the Far Southwestern region the ability to continually evaluate processes and ensure a best practices approach during public health emergencies.

Senior nursing staff members, serving as POD Site Managers, were instrumental in overseeing operations and monitoring / maximizing throughput times. This proved invaluable in the ability of LHDs to maximize available vaccine administration and mitigate the effects of COVID upon our communities.

Strength 2: PERSONAL PROTECTIVE EQUIPMENT (PPE)

As the COVID pandemic spread across the region, the Commonwealth and the nation, the need for Personal Protective Equipment that would safeguard the public health workforce became a dire necessity. The Far Southwest LHDs were fortunate that each LHD did have some "stockpiled" equipment available to staff members serving on the "frontline" of the response efforts. Community partner organizations recognizing the dire need for critical equipment like N95 or KN95 masks within the public health sector donated available items to LHDs to ensure the health and well-being of our workforce. The stockpile of N-95 masks, gowns, gloves, and face shields would prove invaluable as these items were on back order for months.

Additionally, LHDs across the Far Southwestern region immediately began seeking opportunities to procure PPE from available vendors to ensure a constant flow of necessary supplies coming into the region.

As the response expanded, VDH ultimately collaborated with the Virginia Department of Emergency Management (VDEM) to ensure a sufficient supply of PPE was available to local health districts, appropriate healthcare, and emergency response partners. A tracking system that monitored "burn rates" for pre-identified PPE items helped to quickly identify needs within districts and ensure a sufficient supply of critical items coming into the districts. This was a blessing and a curse tracking the burn rate for PPE items such as gloves across the districts.

Finally, the Far Southwest LHDs developed policies and procedures that aligned with the latest Centers for Disease Control and Prevention (CDC) guidance to ensure that staff members were utilizing the most appropriate PPE items and taking appropriate precautions to ensure a public health workforce that could remain healthy and ready to meet the needs of our communities.

Strength 3: DISTRICT AND REGIONAL EPIDEMIOLOGY TEAM

The team workforce demonstrated by LHD and Western region Epidemiology staff was nothing short of amazing. As the transmission rates of COVID increased across the region, staff members continually stepped up to provide assistance to LHD teams experiencing large cases counts to ensure prompt contact tracing and case investigation efforts.

As lab capacities quickly became overwhelmed, western region epidemiology staff were able to work with community partners such as Virginia Tech to enhance analysis processes and turnaround times for potentially ill individuals within the region. This without a doubt led to the prompt identification of outbreaks and the relaying of critical public health information to keep our communities safe and limit the further transmission of disease. The Virginia Tech lab had a turnaround time of approximately 24-48 hours and was vital in slowing the progression of outbreaks. Once the response efforts expanded and funding support mechanisms became available, Far Southwestern LHDs were able to leverage staffing support for epidemiology teams to help enhance contact tracing and case investigation services. This funding led to the development of dedicated contract support teams that solely focused on these initiatives and provided direct support to communities across the region.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 1: DEFINING THE SCOPE OF HEALTH EQUITY

Reference: Comments captured from Local Health District Staff as the result of After Action Meetings / Conversations and observations during the COVID response efforts.

Analysis: The Commonwealth of Virginia has boasted its work throughout the COVID pandemic in terms of prioritizing health equity. Unfortunately, the focus of this effort was "centrally" driven and not "regionally" applied.

Health equity presents itself in a very different light in Far Southwestern Virginia than as compared to other areas of Virginia. While a strong focus statewide is on data around racial / ethnic disparities, there has been a lack of focus on socio-economic disparities, which unfortunately are widespread within the Far Southwestern region. Several actions throughout the response contributed to a lack of health equity across the Far Southwestern region, to include:

- Implementation of a population-based vaccine allocation strategy
- Use of an internet-based vaccine management system
- Lack of state resources such as public information campaigns, fixed or mobile community vaccination centers and community health workers
- Delayed response to requests for foreign language interpreters to assist with case investigation / contact tracing, as well as vaccination efforts, during an outbreak
- Limited interaction between state health equity taskforce and regional stakeholders such as denominational associations

In order to move this effort forward, a recommendation would be to discuss equity on a regional level, incorporating local representatives on focus groups to understand the needs of the Far Southwestern region and to foster a spirit of collaboration, collectively addressing barriers instead of defining "centralized" strategies. Elderly populations are often the most vulnerable demographic when discussing pandemics and epidemics. This demographic is often more economically distressed, more reliant on interpersonal support, and of course often more susceptible due to weakened immune systems. In the more modern age, even younger demographics may show higher susceptibility due to immunosuppressants prescribed by the healthcare system to combat an increasing occurrence of disease and transmittable and/or genetic disorders in the global population.

Area for Improvement 2: GRANTS MANAGEMENT

Reference: Comments captured from Local Health District Staff as the result of After Action Meetings / Conversations and observations during the COVID response efforts.

Analysis: As the impacts of COVID-19 became more widespread, the federal government recognized the need to provide financial support to state, local, tribal and territorial entities in order to ensure the provision of necessary resources to adequately respond to and recover from this unprecedented event.

On March 13, 2020, a National Emergency declaration paved the way for the usage of federal funding mechanisms to implement strategies around testing, staffing, and vaccine administration. The Commonwealth of Virginia was fortunate to capitalize on this much needed funding, investing millions of dollars towards enhancing the capacities of local health districts.

Unfortunately, due to the fast pace of the response, these funding mechanisms were handed down to localities with little guidance and very quick turnaround times. This demand unfortunately did not afford LHDs the ability to collaborate on needed purchases and ultimately implement strategies or procure resources that lead to long-term sustainability.

Area for Improvement 3: TRAINING NEEDS ASSESSMENT
Reference: Comments captured from Local Health District Staff as the result of After Action Meetings / Conversations and observations during the COVID response efforts.

Analysis: The COVID response quickly overwhelmed the capabilities of local health districts and necessitated the incorporation of community partners to ensure the provision of services to our communities. A critical component to augmenting staffing needs at LHDs within the Far Southwestern region was the Southwest Virginia Medical Reserve Corps (SW VA MRC), a volunteer regiment of trained individuals that can augment full-time staff members during an emergency with public health implications to ensure the implementation of incident objectives.

Continuously throughout the response, SWVA MRC volunteers fulfilled critical roles to ensure the timely delivery of essential public health services. Unfortunately, as the VDH central office implemented new initiatives such as the internet-based vaccine management systems, SWVA MRC volunteers did not have access to these systems nor received training on the intent of their application “in the field.” This proved problematic as these individuals were fulfilling critical roles at community PODs across the region and placed an unnecessary burden on staff members to conduct “Just-In-Time” training to ensure continuity of operations as SWVA MRC were receiving assignments to support POD operations.

The COVID response also highlighted the need for volunteer management training for staff members across, not only the Far Southwestern region, but also the agency as a whole. Managing volunteers requires a unique skillset to understand the capability of the volunteer, their desire to feel included in the overall incident management strategy, and their unique ability to both augment and provide relief to full time staff members.

A final observation in terms of Training Needs Assessment is the desire for the Commonwealth of Virginia to evaluate opportunities to capitalize on trained responders during large-scale

emergencies. LHDs in the Far Southwestern region received limited support from the VDH central office throughout the response and limited staffing made incident objective implementation challenging.

The Far Southwest region is fortunate to have a large complement of volunteer Fire and Emergency Medical Services organizations that provide daily support services to our communities. During the COVID vaccination campaign, these entities / individuals expressed a desire to come alongside LHDs to maximize vaccination efforts however due to the cumbersome and sometime duplicative training requirements placed on these pre-hospital providers, many did not complete the defined requirements to be able to provide support to LHDs in the Far Southwestern Region.

It would be prudent for VDH to recognize and acknowledge the scope of practice of these providers, their annual training requirements and the provisions afforded to them under their Operational Medical Director, in order to build a “strike team” approach. This approach could afford LHD’s the ability to quickly activate these essential providers during public health emergencies and incorporate them into district level emergency preparedness planning, training, exercising, and response initiatives.

Additionally, the Virginia National Guard was activated and assisted in staffing the COVID clinics. The Guard members were not medical and could not provide vaccinations, but they could use the tablets and register patients as well as documenting the vaccinations. The activation of the Virginia National Guard to the region proved to be invaluable.

The COVID Pandemic without a doubt revealed some vulnerabilities within the public health system. Particularly in the Mount Rogers Health district these vulnerabilities included ensuring equitable access to vaccines (greatly limited due to a population-based state allocation strategy in the beginning), ensuring the delivery of accurate, actionable and timely information, administrative preparedness to include grants management, MOA development and execution, volunteer management, public / private partnerships and supply chain access to include lab capacities.

The Far SW Health Districts (Mount Rogers, Lenowisco and Cumberland Plateau) were fortunate to operate under a unified command structure, all reporting to one health director. This helped to facilitate a Common Operating Picture and ensure a coordinated approach to response efforts across the region.

Animal-related Damage

Appalachian Power have had a problem in the past 5 years with bears scratching power poles rendering them structurally weakened to the point they need to be replaced. Bears have also been known to climb the poles and electrocute themselves to death causing a localized power outage. This problem has been reported in Washington and Grayson counties in the Mount Rogers District.

Public Feedback

Mount Rogers PDC, as well as all involved parties, were asked to reach out to their citizens and determine areas that have recurring weather-related issues. These citizens' common complaints about specific hazards often related to transportation/accessibility issues.

Washington County

Transportation Issues

Highway 11 Emory to Abingdon Potholes fill up and drainage issues with ditch line causes standing water in the roadway and leaves to fill the road which makes driving conditions dangerous.

Town of Wytheville

Stormwater Flooding Issues

- The intersection of Marshall Street and 1st Street in the Town of Wytheville. This intersection is subject to frequent flooding in flash flood storm events. This is probably the most serious flooding hazard on the Town of Wytheville roadways, with some potential for stormwater to reach a level that could wash a vehicle away. Water will overflow onto the intersection several times each year. When this occurs, it is the Town's practice to close the intersection. Marshall Street is a designated collector street in our comprehensive plan. Flooding generally occurs at this location two to three or more times each year, but serious flooding that would be life threatening is rare.

- East Main Street at Seven Sisters Brewery (355 E Main). This low point is subject to periodic flooding in flash flood events. The road generally remains passable, but at least one business can experience minor flooding. Flooding generally occurs at this location two to three times each year. Frequently, the ponding will rise above the front entrance door of Dutch Boy Furniture located at 345 East Main Street.
- The intersection of Spring Street and 5th Street. It can experience street flooding in flash flood storm events. The intersection generally remains passable, but there are no drain inlets so ponding remains for a long time after a storm event causing pavement deterioration. Flooding generally occurs at this location one to two times each year.
- Tazewell Street between Pine Street and Spiller Street near Spiller Elementary School. There is a storm culvert at this location that has reoccurring wash-out and subsidence issues. The culvert pipe needs to be reconstructed.
- The drainage culvert under Tazewell Street near Valley Street. Stormwater is slow to enter the culvert and can flood Sunset Street for short periods. Flooding at this location generally occurs one to two times per year.
- Valley Street, which acts as a stormwater conduit between Fisher Road and Tazewell Street. A drainage channel empties into the street at the intersection of Valley Street and Fisher Road. The street generally remains passable, but stormwater flow is significant. Street flooding occurs during most heavy rain events.
- Spiller Street between N 4th Street and Tazewell Street. Stormwater from Cedar Run repeatedly floods the roadway at this location. Flooding generally occurs at this location one to two times each year. Stormwater travels in a culvert from a point near the intersection of N 4th Street and W Reservoir Street to an area in front of Skyline National Bank (420 N 4th Street). Occasionally water will back up at the culvert that flows below Spiller Street and Withers Park. When this occurs, ponding to a depth of up to 2 feet is possible. Ther's a possibility that a heavy flow would carry a vehicle away.
- Love Park is a location that can experience flooding to a depth of 3 feet or more. The parking area at this lot is adjacent to Monroe Street and the flooding has occasionally been high enough to flow over Monroe Street to a storm drain located in the parking lot across the street. The flooding hazard is primarily located in the parking lot which can see flood depths of three feet or more about once every two years. We are not aware of any time when it was necessary to close Monroe Street.
- The intersection of Industry Road and Chapman Road. Flooding along an unnamed creek in this area occasionally overtops Industry Road.

- A section of Chapman Road that is occasionally inundated by floodwater from the unnamed creek that flows along the north side of the road. This is the same unnamed creek that can affect the nearby Industry Road crossing.
- A section of Atkins Mill Road just north of the Wytheville Wastewater Plant, is prone to occasional flooding from two stream crossings of Cedar Run in the area shown on the plans. This is predominantly an issue during intense thunderstorms with a long duration.
- The short section of West Railroad Avenue near the intersection of Atkins Mill Road is subject to occasional flooding during longer duration thunderstorms that generate flash flooding.
- Two sections of Old Stage Road just south of the Wytheville Golf Club that are low lying and have experienced infrequent flooding issues. These two low areas are adjacent to the railroad corridor and will experience backup of stormwater when the flow exceeds the capacity of the culver that flows under the railroad tracks. These areas have been known to flood twice in the collective memory of our current Public Works Department staff.

Snow and Ice Problems

- The area on Peppers Ferry Road near the intersection of Granite Acres Road, which is prone to developing black ice on cold foggy mornings.
- A section of Fairview Road just north of the 4th street intersection which is prone to blowing snow and drifting, which can cause hazardous packed ice conditions in extreme cold weather. Wind blowing across the adjacent farm fields at this natural high point makes drifting snow difficult to control and the adjoining land owners have resisted placement of snow fencing.
- At the intersection of Holston Road and Asbury Lane, which is prone to blowing snow and drifting, which can cause hazardous packed ice conditions in extreme cold weather. Wind blowing across the adjacent fields at this natural high point makes drifting snow difficult to control. Future development plans may eventually correct the situation.
- West Lee Highway near the intersection of South Petunia Road is prone to developing black ice on cold foggy mornings.
- Commonwealth Drive near North 4th Street is prone to packed ice development. The street has a significant uphill grade moving away from 4th Street in both directions. Due to the heavy traffic into the adjacent shopping areas, it is difficult to clear snow or treat the roadway before traffic creates packed ice conditions. The gradient can make icy conditions particularly hazardous for traffic trying to stop for the signal at the bottom of the grade and similarly difficult for traffic trying to climb the hill away from 4th Street.

Grayson County

Flooding Issues

- Flooding of the Cox's Chapel and Little River bridges during several significant rains. These are repetitive events.
- There have been isolated flooding events on Hwy 21 and Carsonville Rd. in the Elk Creek area (once in 4 years), and Grinder's Mill Rd. in Baywood (twice in 4 years).

Hazard Identification and Risk Assessment: Conclusions

Hazard Risk Matrix

The risk assessment analysis has been used to create the Hazard Risk Matrix shown below to provide a guideline on the relative importance of natural hazards across the entire Mount Rogers region. The rankings for individual localities will differ from the regional matrix due to differences in terrain, impacts from flooding, potential for wildfire, and so on. This plan rates natural disasters as an average over time. It was the view of the steering committee that our risk to various natural hazards in the Mount Rogers Region had changed little since the plan update five years ago. The risk ratings went down slightly for dams and earthquakes. Our rankings do not necessarily reflect the rankings shown the Hazard Rankings Maps in the Appendix, however, we feel confident that these rankings are consistent with the priorities of our region.

Hazard Risk Matrix

Hazard	Frequency	Geographic Extent	Impact	Hazard Risk Index Rating
Dam Safety	2	1	3	6
Drought	2	4	1	7
Earthquakes	1	2	1	4
Flooding	4	2	3	9
Karst and Sinkholes	2	1	1	4
Landslides	1	1	2	4
Snow/Ice	4	4	1	9
Thunderstorms/Lightning	4	1	1	6
Tornadoes/Hurricanes	4	1	1	6
Wildfires	4	1	2	7
Winds	4	2	1	7
***Note**: Highest numbers mean highest risk or impact.*				
The **frequency column** is based on likelihood of occurrence: 4=More than once in 10 years 3=More than once in 10-100 years 2=More than once in 100-1,000 years 1=Less than once in 1,000 years		The **geographic extent column** relates to the extent any given hazard affects the jurisdiction: 4=More than 50% of jurisdiction affected 3=Estimated 25-50% of jurisdiction affected 2=Estimated 10-25% of jurisdiction affected 1=Less than 10% of jurisdiction affected		

Hazard	Frequency	Geographic Extent	Impact	Hazard Risk Index Rating
The impact column relates to the amount of death, injury, destruction and inconvenience created for the affected area, as shown below: 4=Many deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more. 3=Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities more than one week. 2=Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities more than one day. 1=Very few injuries, if any. Only minor property damage and minimal disruption of quality of life. Temporary shutdown of critical facilities.				

Natural hazards on a regional basis can then be ranked as shown in the table below. As already noted, there will be some variances for some localities.

Hazard Risk Categories

High Risk Hazards (score 8 or higher) ➡	Flooding Severe Winter Storms/Ice
Moderate Risk Hazards (score of 7) ➡	Drought Earthquakes Wildfires Winds
Low Risk Hazards (score of 6 or less) ➡	Dam Safety Karst and Sinkholes Landslides Thunderstorms/Lightning Tornadoes/Hurricanes Hazardous Material Spills

Hazard Risk Assessment By Jurisdiction

The main natural hazards faced by the 20 local jurisdictions in the Mount Rogers region are displayed in the matrix shown below. This data has been drawn from the descriptions given in the preceding pages of this section. The table below was reviewed and updated by the steering committee in the Hazard Mitigation Plan Update.

Identified Natural Hazards, By Locality
Mount Rogers Region, Virginia (6 counties, 2 cities, and 12 towns)

Hazard Type	Ha	Individual Localities

		Bland County	Carroll County	Grayson County	Smyth County	Wash. County	Wythe County	City Bristol	City Galax	Abingdon	Chilhowie	Damascus	Fries	Glade Spring	Hillsville	Independence	Marion	Rural Retreat	Saltville	Troutdale	Wytheville
Avalanche																					
Climate Change	X	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Coastal Erosion																					
Coastal Storm																					
Dam Safety	X	X	X	X	X	X	X	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Drought	X	M	M	M	M	M	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Earthquake	X	M	L	M	L	L	L	L	L	L	L	L	M	L	L	M	L	L	L	L	L
Expansive Soils																					
Extreme Heat																					
Flood	X	H	L	H	H	H	H	H	H	H	H	H	H	H	L	L	H	L	H	L	M
Hailstorm	X	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Hazardous Material Spills	X	L	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L
Hurricane (see Tornadoes)																					
Karst and Sinkholes	X	X	na	na	M	X	X	X	na	na	X	X	na	X	na	na	X	X	H	na	X
Landslide	X	L	H	H	H	H	L	na	na	na	na	na	na	na	na	na	na	na	H	na	na
Pandemic	X	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Severe Winter Storm/Ice	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Tornadoes/Hurricanes	X	L	M	L	M	M	L	L	L	M	M	L	L	M	L	L	L	L	L	L	L
Tsunami																					
Volcano																					
Wildfire	X	M	H	M	H	H	H	na	M	M	na	na	na	na	na	na	na	na	na	na	na
Windstorm	X	M	H	M	M	M	M	M	H	M	M	M	M	M	H	M	M	M	M	M	M
Thunderstorms/Lightning	X	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L

Notes:
The term "na" means the hazard data is not available.
The H, M, and L symbols refer to the relative likelihood and/or relative severity of given hazards, comparing one locality to another. H = highest likelihood, M = moderate likelihood, and L = low likelihood. X indicates the hazard was identified, but further hazard assessment data was lacking.

MITIGATION STRATEGY

Defining Hazard Mitigation

FEMA defines hazard mitigation as "sustained actions taken to reduce or eliminate long-term risk from hazards and their effects."

These sustained actions can come in the form of physical projects (enlargement of drainage culverts, streambank stabilization and restoration, vegetation removal, installation of advance warning systems, etc.) or educational programs designed to help local officials and property

owners understand and reduce hazard risk (media campaigns, special mailings, special events, self-help guides, etc.).

For some hazards, these actions could involve simply getting out of the way – such as not building in the floodplain or removing structures from the floodplain, when feasible. For other hazards, such as major weather events that cover large areas of landscape, the mitigations could involve more indirect methods, such as improved building codes to strengthen structures and reduce damages from violent windstorms or major blizzards. Some hazards – such as an F4 or F5 tornado – carry such force that a direct hit means destruction is assured, although properly built "safe rooms" can reduce loss of life.

In the previous section of this study, we have identified and ranked the main natural hazards that can afflict communities in the Mount Rogers region of southwest Virginia. We are now moving on in this next section to describe the following:

- Planning process used to develop the hazard mitigation strategy.
- Goals and objectives for the overall hazard mitigation strategy for the region.
- Recommended hazard mitigations on a locality-by-locality basis.

Process Used to Develop Mitigation Strategy

MRPDC staff, the Hazard Mitigation Advisory Team, and representatives from the local jurisdictions worked together to develop the Hazard Mitigation Strategy for the Mount Rogers region.

Following the guidance found in the FEMA Local Multi-Hazard Mitigation Planning Guidance, MRPDC staff identified the at-risk hazards that affect the region and its 20 local jurisdictions. This was done based on available data. With the basic data assembled, the MRPDC organized a Hazard Mitigation Steering Committee to review and make comments on the hazard vulnerability assessments. Some of the recommended mitigations emerged from those discussions, such as a suggestion by a representative from Appalachian Power to work to improve coordination among emergency response organizations to improve snow-removal and accelerate restoration of electric power following major snow and ice storms. In addition, the MRPDC mailed out draft copies of the hazard vulnerability assessments to the 20 local jurisdictions and invited comments from local planners, emergency services personnel, and the public.

MRPDC staff moved on to develop the specifics for both the Hazard Mitigation Strategy and proposed mitigations. In some cases, we have followed the advice of experts, such as the applications of Firewise methods to reduce wildfire risks. In other cases, we have proposed

mitigation strategies based on limitations of the available data and on long-understood shortcomings, such as the lack of accurate floodplain mapping (as determined by hydrological engineering studies) and the lack of floodplain mapping in some areas known to be flood-prone but passed over by previous mapping efforts.

For flood hazards, which affect much of the population of the Mount Rogers region, MRPDC staff applied the principles of FRED (i.e., Fix and Repair, Elevate, Relocate or Demolish). Staff developed generalized cost estimates based on the experience of the staff and others in the region that had past experience in such matters.

All participants in the process have always recognized that any major undertakings will only be possible with outside funding support (i.e., state and federal grants), since most localities in the Mount Rogers region are sparsely populated, sparsely staffed, and lack the financial means to provide little other than basic government programs and services.

Regional Hazard Mitigation Strategy

The following outline consists of goals and objections for the natural hazard mitigation strategy to be applied in the Mount Rogers region of Virginia. These goals were reviewed by the members of the steering committee as well as other stakeholders during the update process. They were reviewed in our meetings throughout the summer months of 2011, as well as reviewed by participants on an individual basis.

Goal: Create an addendum to the plan within 18 months of adoption to include a chapter specifically addressing climate change.

Objective: Increase resilience to hazards resulting directly or indirectly from the predictable impacts of both natural and man-made climate change.

Strategy(s):

- Collaborate with localities to adopt the plan addendum within 18 months of the original plan adoption.
- Define climate change and the impacts of climate change.
- Support and encourage inclusion of climate change information into existing and new plans developed for localities within the planning district.
- Stress the need for advanced or long-range planning efforts to mitigate the continuous impact of environmental and climate change.

Cost Benefit: Knowledge of climate change and its impacts on potential hazards plays a key role in the prevention of loss of life and property. Understanding climate change is critical to developing effective hazard mitigation strategies and resilience plans and policies.

Responsible Office: Mount Rogers Planning District Commission; VDEM; FEMA; localities

Goal: Secure additional grant opportunities concerning public health emergencies

Objective: Seek additional grants to support public health emergencies.

Strategy:

- Collaborate with localities on needed purchases and ultimately implement strategies or procure resources that lead to long-term sustainability.

Cost Benefit: Lower health care costs during and after health emergencies

Responsible Office: Mount Rogers Health District and localities.

Goal: Addition of a Nexedge System or the RIOS-Comlinc system (radio communications system) for each locality in the Mount Rogers District

Objective: Make communications better across different localities.

Strategy:

- Link counties together for a better coverage of communications and reduce response time in times of natural disasters.

Cost Benefit: Better communications will help reduce the loss of live and property

Responsible Office: Police; Fire; and Rescue.

Goal: Protect Lives and Property from Flooding

Objective: Increase Public Awareness

Strategy:

- Promote and make the public aware of the need for mitigation
- Promote planning as well as membership in the National Flood Insurance Program

Objective: Improve data resources to improve the regional Hazard Mitigation opportunities.

Strategy:

- Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.
- Update FEMA flood plain maps throughout the Mount Rogers region. (FEMA/DCR responsible for updating floodplain maps).
- Develop new FEMA floodplain maps for areas not previously mapped.

Objective: Provide opportunities for property owners of flood prone and/or repetitive loss properties to acquire and relocate from the flood plain, elevate structures, acquire and demolish, flood proof their property, or apply for funds to construct minor localized flood control projects.

Strategy:

- Pursue funding for such projects from federal and state agencies such as FEMA, VDEM, as well community development block grants.

Cost Benefit: The benefits of flood protection are ongoing. Money should be invested wisely to protect existing structures, as well as to prevent future losses to new structures. This will be a savings to the localities, as well as to the property owners in the form of repair and insurance cost. $100,000 spent today, could save millions of dollars in damage over long periods of time, as well as save lives.

Responsible Office: MRPDC; local Board of Supervisors; Local Emergency Management

Goal: Encourage Public Safety in the Event of Snowstorms, Ice and High Winds, Earthquakes, Landslides, Tornadoes, Hurricanes, and/or Drought

Objective: Increase public awareness of actions before, during, and after such events.

Strategy:

- Educate public on the methods recommended by the American Red Cross to prepare for these events.
- Inform motorist of high wind potential along selected highways.

Cost Benefit: Public awareness is crucial to prevent losses due to natural hazards. Not only prevention, but a large savings of time and money could be seen during and after such adverse weather. $100,000-$500,000 spent on increased road advisories will save money on working traffic accidents, as well as work hours lost in Traffic.

Responsible Office: VDOT; Local Board of Supervisors; Red Cross; VDEM

Goal: Increase Dam Safety for the Mount Rogers Region

Strategy:

- Improve the availability of data resources for dam safety to save lives and property coordinated through agencies such as FEMA and the Department of Conservation and Recreation.

Cost Benefit: Knowledge and being aware of potential hazards plays a key role in their prevention. Due to many recent events, information on dams in the region is hard to come by. Property owners in a high-risk area could benefit from greater knowledge of possible dangers. For a minimal cost, this could save property as well as lives.

Responsible Office: Department of Conservation and Recreation; Corps of Engineers

Goal: Minimize the Impact of Wildfires on Woodland Communities.

Objective: Increase public awareness.

Strategy:

- Educate homeowners on Firewise and Department of Forestry programs on methods to cope with drought.
- Support and encourage the existing education efforts of the American Red Cross in ways homeowners can reduce the risk of wildfires by property maintenance and cleanup.
- Projects creating perimeters around homes, structures, and critical facilities through the removal of reduction of flammable vegetation.
- Projects that apply ignition resistant techniques and/or non-combustible materials on new and existing homes, structures, and critical facilities.
- Projects that remove vegetative fuels proximate to the at-risk structure that, if ignited, pose significant threat to human life and property, epically critical facilities.

Cost Benefit: Education is invaluable to prevent Wildfires. For a minimal cost, educational programs for homeowners in woodland communities will help minimize fire damage to property, and natural resources.

Responsible Office: USDA; VA Dept. of Forestry; American Red Cross; FireWise; Local Fire and Rescue

Goal: Encourage Citizens to Prepare for Possible Damage from Sinkholes and Karst

Objective: Increase public awareness

Strategy:

- Make sure local building codes and zoning ordinances address placement of structures in such areas.
- Educate the public on karst safety through educational efforts such as agencies like the Virginia Cave Board.
- Map areas that are in danger of karst and sinkholes with the state division of mineral resources, and the Virginia Cave Board.

Cost Benefit: Having and making available good data where land is susceptible to karst and sinkholes can pay dividends in the future. Accurate mapping of such areas made available to local officials can greatly reduce the risk of structures and roads being damaged by these hazards.

Responsible Office: Local Building inspector; VDOT, Department of Conservation and Recreation

Goal: Minimize Damage due to Thunderstorms as well as Tornadoes/Hurricanes

Strategy:

- Support and encourage existing efforts by the American Red Cross to educate homeowners on retrofitting and mitigation.
- Educate citizens on tornado and severe storm safety.

Cost Benefit: Public awareness is crucial to prevent losses due to natural hazards. Not only prevention, but a large savings of time and money could be seen during and after such adverse weather.

Responsible Office: Local emergency management departments

Goal: Reduce the risk of hazards on new buildings and infrastructure

Objective: Encourage continued practice of proper building site construction.

Strategy:

- Incorporate the hazard mitigation plan into comprehensive planning.
- Use the hazard mitigation plan in the permit process for new construction in floodplain or high hazard areas.

Cost Benefit: Proper planning in new construction will result in a large savings after natural disasters.

Responsible Office: Local building inspectors.

Regional Strategic Priorities

This section outlines the top regional priorities for Pre-Disaster Hazard Mitigation in the Mount Rogers region. These have been determined through discussions among MRPDC staff and the members of the Hazard Mitigation Steering Committee. The priorities presented in this section correspond to the objectives listed under the six goal statements given for the regional

strategic plan described above. MRPDC staff initially developed the goals-and-objectives outline, and then presented it to the Hazard Mitigation Advisory Team for comment.

The Steering Committee ranked individual objectives as follows, high priority, mid-level priority, and lowest priorities. More than one objective could be assigned to any given priority level. Each marker carried a value of one point, with the highest point scores indicating the objectives of highest importance.

Prioritized Listing of Hazard Mitigation Objectives

Objective	Points
Further develop local capacity to document the number, size, age, and value of the approximately 1,400 (PDC total) structures located in the floodplain.	12
Promote need for pre-disaster mitigation to prevent future losses.	12
Update FEMA floodplain maps as applicable throughout the Mount Rogers Region.	12
Promote prevention methods homeowners can undertake.	12
Implement in-the-ground projects to reduce natural hazard risks.	9
Provide copies of the Pre-Disaster Hazard Mitigation Plan to the 20 local jurisdictions in the Mount Rogers region.	8
Support projects offering the best benefit/cost ratio.	6
Support state/federal efforts to improve data resources for dam safety, drought, karst and sinkholes, landslides, thunderstorms, and windstorms.	5
Publicize successful mitigation projects.	5
Support guidelines for flood mitigation:	5
A property is a candidate for relocation if the first-floor floods twice (or more) in 50 years.	5
A property is a candidate for elevation or flood-proofing if flooding occurs below the first floor twice (or more) in 50 years.	5
Meet requirements of the Uniform Relocation Act.	5
The top priorities for federal relocation assistance should be based on need, frequency of flooding, and a favorable benefit/cost ratio.	5
Create project serving multiple objectives (social, community, economic, mitigation).	4
Support educational efforts of existing organizations, such as the American Red Cross.	4
Develop new FEMA floodplain maps for flood-prone areas not previously mapped.	3
Promote useful programs, such as the National Flood Insurance Program.	1

Capabilities Assessment

Most localities in the Mount Rogers region are for the most part limited by financial issues and staff size. The capabilities of the localities are largely defined through staff and organizational capacity, technical capacity, and fiscal capacity. Most of our localities, especially the towns, require assistance due to the size of budgets, and number of personnel. Many of the strategies from previous plans have not been completed due to the lack of existing resources.

Existing Locality Staffing, as of 2023	
Locality	**Number of Staff**
Bland County	1
Carroll County	2
Grayson County	1
Smyth County	2
Washington County	2
Wythe County	1
City of Galax	1
City of Bristol	2
Hillsville	1
Independence	0
Fries	0
Troutdale	0
Marion	1
Chilhowie	1
Saltville	0
Abingdon	2
Damascus	0
Glade Spring	0
Wytheville	1
Rural Retreat	1

All localities in the Mount Rogers Planning District have little to no staff dedicated to work on natural hazards and mitigation planning. For the counties, cities and larger towns, other departments are available to assist on special projects and in times of emergency. For the six smallest towns, there is no staff dedicated to all hazards planning; in fact, for two of the six smallest towns, MRPDC staff provides town management, due to small populations and lack of funding for full-time staff. The Mount Rogers PDC is the agency that fills this role in almost 100% capacity. The PDC also assists all 20 localities in hazard mitigation planning. Contact information for these departments is listed in the multi-jurisdiction summary sheet in the appendix.

Community Summaries & Recommended Mitigations

The following section provides descriptions, by jurisdiction, of high- and moderate-risk natural hazards, past or ongoing mitigations (if any), and recommended mitigations resulting from this study. For the hazards of floods, wildfire, dam safety, snowstorms/ice, high winds, landslides, sinkholes/karst, drought, hurricanes/tornados, and earthquake mitigation strategies for each locality are included in the recommended mitigations section. The hazard of

thunderstorm/lightening did not warrant a local mitigation action due to its low risk. The section is organized in alphabetical order by county and the towns contained within that county, followed by the cities. This includes:

- Bland County
- Carroll County and the Town of Hillsville
- Grayson County and the towns of Fries, Independence, and Troutdale
- Smyth County and the towns of Chilhowie, Marion, and Saltville
- Washington County and the towns of Abingdon, Damascus, and Glade Spring
- Wythe County and the towns of Rural Retreat and Wytheville
- The City of Bristol
- The City of Galax

Regionwide Weather Events in the Past Five Years, As Reported by Localities

Below is a listing of major weather events within the region, for a more detailed list of all weather events see the community hazard profile for each locality. Within the community hazards profiles, there may or may not be more weather events officially recorded, some were omitted due to redundancy in geographic distance or the weather event being too insignificant to list.

Carroll County 1-18-18

Three tractor trailers and one “dually” pickup were blown over by high winds on Interstate 77 in Carroll County. This occurred in the north bound lane at mile marker two. See Figure 1.

Figure 1: Interstate 77 High Winds Accident, 2018

Figure 2: Snowstorm, March 2018

Mount Rogers PDC 3-26-18

A Spring snowstorm dumped over a foot of snow across parts of the Mount Rogers Region. Bland County received 16 inches, while Grayson, Carroll, and Wythe Counties received 10 to 14 inches of snow. At one point during the storm 88% of Bland County and 28% of Wythe County were without power. Many temporary road closures were common across the district due to heavy snow and multiple accidents. An emergency shelter was opened in Bland County and had taken in 78 people at the height of the event. See Figure 2.

Carroll County 8-30-18

Flash flooding caused a 40-foot-high dam to be on the verge of failure in the Pipers Gap area of the county. Emergency officials began draining the lake began a little before 9pm the night of the storm. Authorities dug an emergency spillway and brought in a massive pump to try and prevent a catastrophic collapse. Half a dozen houses below the dam along the small stream had to be evacuated. It was possible that a 15-foot-high wall of water could destroy the homes. The pumping and work on the dam worked, and the catastrophic failure was avoided. See Figure 3.

Figure 3: Carroll County Flooding, 2018

The City of Bristol 8-18-18

Flooding conditions due to a heavy rainfall event occurred on August 18. A small un-named stream that flows from the north side of Interstate 81 through the Briarwood Subdivision (located just south of the interstate) overflowed and flooded basements of several homes specifically along Brookdale Circle, in addition to the parking lot of a neighboring business located on Lee Highway (Rt. 11). In addition, Mumpower Creek which is a small tributary to Beaver Creek overflowed its banks with the same event on the 18th, affecting several homes located in the floodplain. See Figure 4.

Figure 4: Galax Flooding, 2018

The City of Galax 9-8-18

Six inches of rain fell overnight in Galax causing flooding and damage to some downtown businesses and a few homes. A trail of debris was left in some roadways. Blevins Building Supply was flooded when approximately five inches of rain fell in less than two hours. The Waddell Nursing and Rehab facility had to be partially evacuated. Galax city manager, Keith Barker said the water overflowed the stormwater system, affecting several businesses in the downtown area. There were no injuries reported.

Carroll and Grayson Counites 9-15-18

Hurricane Florence caused some localized flooding and a few trees were blown over, both of which caused some road closures in the two counties. Storm shelters were setup in both localities but luckily were not utilized in in major way. See Figure 5.

Figure 5: Carroll County Hurricane Damage, 2018

Carroll County 10-7-18

A single engine plane crashed on Fancy Gap Mountain in Carroll County killing the pilot. There were no other passengers on board. Heavy fog contributed to the accident. See Figure 6.

Figure 6: Carroll County Plane Crash, 2018

Carroll County, Galax, and Grayson County 10-10-18

Hurricane Michael caused flooding and mud slides in the Twin County Region after nearly 24 hours of rain. Fire and Rescue agencies used boats to evacuate residents from homes in Galax, Carroll, and Grayson. A massive mudslide covered all four lanes of Rt. 58 in Galax. Another mudslide on Stockyard Road took out a utility pole. The power lines fell onto a veterinary clinic and the animals were evacuated to the Galax Firehouse. Both Galax and Carroll County declared states of emergency during the storm.

Mount Rogers PDC 12-8-18

A snowstorm dumped 8 to 24 inches of snow across the region causing power outages, traffic accidents, and road closures across the district. At one point according to Appalachian Power

Figure 7: Snow Storm in Washington County, 2018

25,000 customers were without power across the region. In Washington County traffic was stalled for 18 hours on a 20 mile stretch of Interstate 81 due to multiple accidents. See Figure 7.

Figure 8: Regional Flooding, Town of Chilhowie, February 2019

Mount Rogers PDC 2-25-19

Heavy rain combined with prolonged high winds caused widespread power outages, downed trees, and large amounts of debris cleanup across the region. The windstorm which caused so much debris caused multiple road closures in several localities. See Figure 8 and Figure 9.

Figure 10:Smyth County Wind Damage, June 2019

Smyth County 6-17-19

Strong thunderstorms caused damages to homes and outbuildings across Smyth County. Tilley's Bridge Road was closed until due to the fact the bridge crossing the South Fork of the Holston River failed an inspection.

Smyth County 1-13-20

Officials in Smyth County say straight line winds of up to 80 mph were responsible for storm damage over the weekend. The Smyth County Office of Emergency Management, meteorologists from the National Weather Service in Blacksburg, and representatives from the Region 4 Virginia Dept. of Emergency Management conducted a

Figure 11: Straight Line Winds, Smyth County, January 2020

damage assessment Monday. Some homes and barns were damaged, but no injuries were reported.

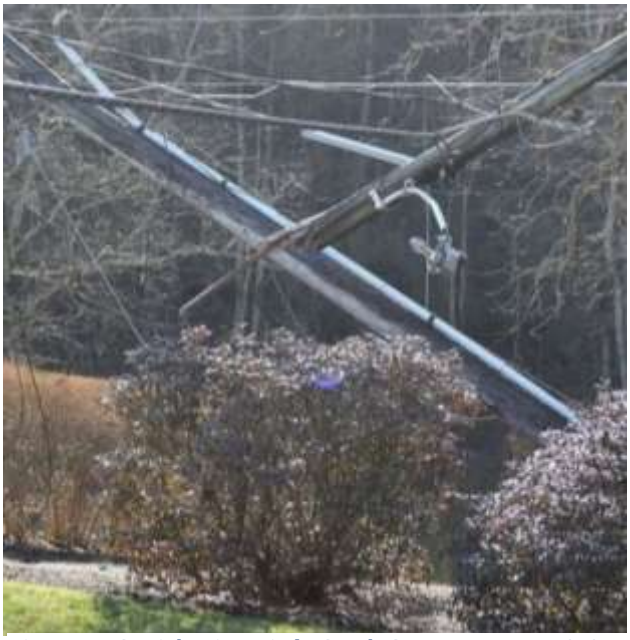


Figure 12: Straight Line Winds, Smyth County, January 2020

Bristol, Smyth County, and Washington County 2-6-20

Heavy rains in excess of six inches fell across the three localities and caused widespread flooding in the region. Several secondary roads were closed, as well as major arteries including Rt. 91 and Whitetop Road. The high water forced the Town of Chilhowie to temporarily close down the sewer treatment plant.

Wythe County and Bland County 4-6-20

Flash flooding resulting from 2-3 inches of rain caused road closures and two homes sustained damage and the families had to be temporarily relocated. A tree fell across Highway 21 but was quickly taken care of. Millers Creek Rd. sustained considerable asphalt damage and had to be closed until repairs could take place. There was also localized flooding in the downtown area of Bland.

Figure 13: Flooding in Abingdon, April 2020

Figure 14: Flood Damage in Saltville, April 2020

Smyth County and Washington County 4-12-20

Four families in Saltville were evacuated from their homes due to flooding. Parts of Allison Gap Rd. and Highway 91 had considerable amounts of asphalt damage when water runoff cut underneath the roadway. At one point approximately 4,700 customers were without power. Residents of Henderson Court in the Town of Abingdon had to be evacuated as high water flooded some apartments and homes. See Figure 13 and Figure 14.

Grayson County 7-28-20

Significant flooding occurred in the Town of Fries due to heavy rain. Streets in the town were blocked and the Fries Elementary School sustained flooding damage.

Mount Rogers PDC 8-9-20

A magnitude 5.1 earthquake shook the region that was centered in Sparta, North Carolina. It was the strongest earthquake in North Carolina since 1916. While the quake was felt all across the district, the only damage reported was in Grayson County. The high school gymnasium stage suffered a crack. There were also some cracks in the brick of some of the elementary schools in the county, but the damage there was mostly cosmetic.

Grayson County 8-15-20

Heavy rains caused flooding in the Town of Fries. Destruction of some outside steps of the Elementary School along with large sinkholes were left behind. The lower level of the school was also flooded causing damage to the to the AC/R pumps, and the boiler equipment.

Smyth County 10-8-20

Erosion over time has caused the bank behind Saltville Elementary School to partially collapse in the fall of 2020. This caused the temporary closure of Government Plant Rd. The Town has tried several options to clean up and mitigate the situation. See Figure 15.

Figure 15: Saltville Flooding, October 2020

Grayson County 11-13-20

Heavy rain caused a large chunk of the roadway to fail due to a landslide on Riverside Drive one mile west of Carsonville Road. It took several days for the Virginia Department of Transportation to build back and repave the damaged area of the road.

Figure 16:Grayson County Landslide, November 2020

Carroll County 3-31-21

Severe thunderstorms produced golf-ball sized hail as large as two inches in diameter fell on Hillsville, Woodlawn, and other parts of Carroll County. Many Vehicles and other property were damaged in the area because of the storm. See Figure 17.

Figure 17: Carroll County Hail, March 2021

Washington County 4-7-21

Heavy thunderstorms caused the flooding of Town Creek in Abingdon. The creek rose to the point it flooded across East Main St. This shut down the 300 block of East Main St. for 24 hours causing motorist to detour. See Figure 18 and Figure 19.

Figure 18: Abingdon Flooding, April 2021

Figure 19: Abingdon Flooding, April 2021

Carroll County 6-2-21

One tractor trailer blew over from high winds on Interstate 77 in Carroll County. No injuries were reported.

MRPDC 12-1-21

A fire on Pilot Mountain North Carolina which burned over 1,050 acres caused smoke in the atmosphere over the entire Mount Rogers District. It was most problematic along the Blue Ridge Parkway in Grayson and Carroll County and the City of Galax causing visibility issues for aircraft and air quality concerns.

Figure 20: Pilot Mountain Fire, December 2021

Carroll County 2-22-22

Excessive fog caused a major traffic incident on Interstate 77. Three vehicles (two tractor-trailers and a passenger vehicle) were involved in the accident. This accident occurred in the north bound lanes at mile

marker 12.2. Both lanes of traffic were blocked for an extended period. This caused VDOT to institute its traffic diversion plan at Exit 8/Fancy Gap area.

Carroll County 3-23-22

An EF-2 Tornado touched down in the Community of Laurel Fork with an estimated peak windspeed of 122 miles per Hour. The tornado had a path of 375 feet wide and nearly two miles long. Although there were no injuries reported, numerous trees were blown over and two homes and a few out buildings were impacted causing $400,000 worth of damage. See Figure 21 and Figure 22.

Figure 22: Carroll County Tornado Damage, March 2022

Wythe County 5-6-22

Thunderstorms producing heavy wind and hail up to 1.5 inches in diameter moved through Wytheville and other parts of the county. Straight line winds downed trees and caused some structure damage.

Smyth County 5-6-22

Strong thunderstorms producing severe weather moved through parts of Smyth County. The Marion-based free clinic had to be closed and the Chilhowie Elementary School as well as area businesses received some damage. Roofs on three buildings in Chilhowie were torn off during the storm and had to be replaced. Numerous residents filed insurance claims for damage to houses and vehicles from golf-ball sized hail. The storms caused approximately $3 million in hail and wind damage. See Figure 23.

Figure 23: Smyth County Storm Damage, May 2022

Wythe County 5-21-22

Strong thunderstorms destroyed a home on Kiser Road in between Wytheville and Rural Retreat. No injuries were reported. The storm also blew over trees and caused damage to outbuildings and vehicles. See Figure 24.

Figure 24: Wythe County Wind Damage, May 2022

Grayson County 7-5-22

The National Weather Service in Blacksburg confirmed a tornado rated an EF-1 with maximum winds of 95mph touched down in the Baywood area of Grayson County. No one was killed or injured, but approximately $20,000 of damage was reported. See Figure 25.

MRPDC 12-23-22

An extreme cold snap saw temperatures drop to as low as eight below zero in parts of the Mount Rogers Region. This caused numerous pipes to burst in residential, business, and government Buildings.

Carroll County 2-27-23

Weather was a factor in an airplane crash that left the Twin County Airport. On the return trip from North Carolina, the pilot encountered a squall line with wind, rain, and fog. The deceased pilot and the Cessna 150G aircraft were found the following day after a two-day search by the Virginia State Police and Virginia Department of Emergency Management. The wreckage was located in a heavily wooded area near a large, vacant field at approximately 11:55 a.m. The crash area was off the 600 block of Little Bit Road near the Blue Ridge Parkway in Carroll County, near the Patrick County line.

Figure 26: Bland County Flooding, May 2023

Bland County & Wythe County 5-28-23

Heavy rain of up to 5 inches in a 60-hour period caused flooding in Bland and Wythe Counties. Parts of Bland County in the Rocky Gap area received damage to homes and other Property. Some vehicles were a total loss due to the high water. The Bland County Sheriff's Office said there were no reports of injuries.

Figure 27: Bland County Flooding, May 2023

Mitigation Actions Completed Since Last Update

Smyth County

The Town of Marion Installed a natural gas-powered backup generator for the Prater pump station, which is critical to the hydraulics of the water system. During adverse weather events if the town suffers a power outage this generator is needed to keep water service to the community.

Wythe County

The Communities of Max Meadows and Speedwell have had some issues with repetitive flooding. Reed Creek and Milers Creek in Max Meadows has severe road flooding which cuts off parts of the community. Speedwell has repetitive flooding that along Cripple Creek and Dry Run that causes erosion which damages homes and roadways. In both instances first responders have difficulty accessing these areas during high water. Work is currently being done to address these issues.

Grayson County

The Town of Fries is trying to secure funding to mitigate against flooding issues at the Fries School. This repetitive flooding has caused damage to sidewalks, stairs, the building foundation, and to AC/R pumps, and boiler equipment. It has also exposed high voltage conduit and washed out property resulting in reduced access to the school property to the staff and students.

City of Galax

The city is in the process of mitigating repetitive flood issues in the downtown area that has caused damage to business and infrastructure. The city has lowered the central elevation of South Main Street about 11 inches giving the water a channel out of the area. The city is also has determined they have insufficient sized culverts to handle the amount of runoff after a heavy rain. The city is in the process of installing larger drainage infrastructure.

Regionally Recommended Mitigations

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Addition of a Nexedge System or the RIOS-Comlinc system for each locality in the Mount Rogers District.	All hazards	All Localities, MRPDC, VITA	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	All localities, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Provide public outreach and start an educational campaign to inform citizens of actions to take before, during, and after an earthquake strikes.	Earthquake	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Make sure local building codes and zoning ordinances address placement of structures in areas susceptible to karst and sinkholes, and map areas that are in danger of such hazards.	Karst/Sinkholes	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Make sure local building codes and zoning ordinances address placement of structures in areas susceptible to landslides, and map areas that are in danger of such hazards.	Landslides	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Provide public outreach and start an educational campaign to inform citizens of actions to take before, during, and after a tornado or hurricane event strikes.	Tornados/ Hurricanes	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Provide public outreach and start an educational campaign to inform citizens of actions to take during a severe drought if water supplies are depleted.	Drought	All Localities, MRPDC	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Bland County

Community Hazard Profile

Bland County is a rural, lightly populated community of 6,270 (which is a decrease of 3.7% since the last plan update) with Interstate 77 bisecting the county as the highway travels in a north-south direction. There are no incorporated towns, though county administrative functions are centered in the community of Bland, located at the junction of I-77 and State Rt. 42. The Appalachian Trail crosses through parts of the county.

The main natural hazards faced in Bland County are flooding, severe snow and ice storms, wildfire, and potential dam failure. Due to its mountainous terrain, communities are subject to flash flooding caused by heavy rainfalls and snowmelt; this is especially true for Rocky Gap, a small, unincorporated community located almost entirely in the floodplain. Bland County also experiences its share of high-wind conditions, though these have not been known to create natural disasters.

In January 1957, the community of Bland sustained substantial damage from a failure in the Crab Orchard Creek Dam, which had been under development as a privately-owned recreation attraction. The dam break occurred following three days and nights of continuous rain, and the resulting flood caused $500,000 worth of damage to the small community. There is now some thought that, with construction of I-77 (which passes between the dam and the community), a similar event would not happen again, since I-77 and its drainage systems would redirect the flood flows.[2]

Past or Ongoing Mitigations

Bland County centralizes its emergency response system through its E-911 and emergency services coordinator (one individual). Emergency responders include a system of local volunteer fire departments and rescue squads, as well as the sheriff's department and state police. The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2018.

Bland County has not engaged in pre-disaster mitigation efforts in the past.

In November of 2022 the process of verifying the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what

[2] This information was given to us by an engineer at a hazard mitigation meeting in the early 2000s.

means. For flood hazards, Bland County contains six repetitive loss properties, including four in the community of Rocky Gap.

Severe Weather Events

Severe Cold Weather

1/27-2021 Freeze/Flood Event at Bland County Courthouse Brown out (one leg of power went down) and then complete power loss. This occurred due to a snow event. Due to the fluctuations in power; The boiler's hot water circulation pump needed to be reset. Over the course of 1/27-1/29, the multiple sprinkler heads froze and burst, damaging the upstairs and downstairs courthouse offices once they began to thaw. The NWS Blacksburg office briefing stated the wind chill would be 0-5 below zero in the mountains during this time. In addition, 1-3"" of snowfall.

12/24/2022 Sprinkler Event at Bland County Courthouse A Brownout and generator activation between 12- 3 am. At the time of generator activation, the temperature outside was -10 degrees. Sprinklers in the courthouse had frozen and busted.20 sprinkler heads and one burst fitting. The Sprinkler system was shut down and drained. The contractor contacted for sprinklers. The power was restored at approximately 10:53 am.

Hazmat-Industrial

11-29-2018 An industrial oven that bakes/cures varnish on a transformer exploded, blowing the door off the oven and injuring four workers. Transformers that were inside the oven caught on fire.

2-17-2018 An industrial oven that bakes/cures the varnish onto transformers that caught on fire and also the insulation above the oven. Six containers of foam were utilized to put out the fire.

Hazmat-Tractor-trailer

11-6-2019 On Interstate 77 in the Rocky Gap area of Bland County (south of East River Mountain Tunnel) units responded to a tractor-trailer accident that had flipped on its side. It was determined that the tanker was hauling Glycolic acid. The product came out of the vents on top of the tanker. I-77 NB & SB were shut down for approximately 16 hours. The extensive on-scene time and shutdown were due to poor relationships with the company's sister company and clean-up crews. DEQ agreed to cover the costs due to the prolonged interstate shutdown time and the inability to get a clean-up crew to respond that did not have an ETA of 4 plus hours. Coordinating partners on this incident included: VSP, VDOT, DEQ, VDEM, the companies involved, and local officials.

12-19-2019 Tractor-trailer fire with Class 8 Corrosive on board. The fire was in the middle of the trailer that spread from the brakes. VDEM hazmat officer responded, and the Regional Hazmat team. A clean-up crew responded with a wrecker service to remove the hazard.

7-14-2020 Tractor-trailer went through the guardrail and down an embankment, landing near a creek and large concrete culverts. The diesel fuel from the tractor-trailer saddle tanks went into the ground and the nearby creek. The contracted clean-up crew was called out to remove hazards. Boons were placed down the creek to catch runoff. Approximately 120 gallons were dropped.

08-06-2021 A tractor-trailer hauling 3,500 of grape juice concentrate in barrels wrecked at the Kimberling Rd. bridge over Interstate 77. The barrels busted in the accident, along with the release of diesel fuel from the saddle tanks. Clean up in coordination with Region 4 Hazmat Officer, DEQ, and clean-up contractor.

Brush/Wildland Fires

5/3/2018 Wildland fire. Utilized National Forestry units on approximately 150 acres and three of private land.

4/14/2021 Fire at Appalachian Trail Mark 566.3 turned over to National Forest. Unknown total acreage burned.

Spring 2022 Wildland Fire-National Forest Three fires were set adjacent to each other at different times during the spring of 2022 near the Appalachian Trail. Approximately 20 acres in total were burned. Volunteer departments managed firelines until National Forest units assumed command and control of the fire.

5/2/2022 Brush/Wildland fire. Burkes Garden Rd/Railroad Trail fire-burned approximately 16 acres. Was fully extinguished on the 3rd. Received assistance from Virginia Forestry and US Forestry.

5/11/2022 Brush/Wildland fire. A male subject was performing a controlled burn in a wooded area. Burned approximately 14 acres. Assistance received from Virginia Forestry and the US Forestry.

Location	County/Zone	St.	Date	Type	Mag	PrD
Totals:						115.50K
BLAND (ZONE)	BLAND (ZONE)	VA	03/01/2018	High Wind	52 kts. EG	6.00K
BLAND (ZONE)	BLAND (ZONE)	VA	03/12/2018	Heavy Snow		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	03/24/2018	Winter Storm		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	12/09/2018	Winter Storm		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	01/12/2019	Winter Storm		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	02/19/2019	Winter Storm		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	02/24/2019	High Wind	55 kts. EG	15.00K
NORTH GAP	BLAND CO.	VA	05/26/2019	Thunderstorm Wind	50 kts. EG	0.50K
HICKSVILLE	BLAND CO.	VA	05/26/2019	Thunderstorm Wind	50 kts. EG	0.50K
POINT PLEASANT	BLAND CO.	VA	05/26/2019	Thunderstorm Wind	50 kts. EG	10.00K
MECHANICSBURG	BLAND CO.	VA	05/26/2019	Thunderstorm Wind	50 kts. EG	0.50K
BLAND (ZONE)	BLAND (ZONE)	VA	10/01/2019	Drought		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	11/27/2019	High Wind	50 kts. EG	4.00K
BLAND	BLAND CO.	VA	01/11/2020	Thunderstorm Wind	55 kts. EG	7.00K
BASTIAN	BLAND CO.	VA	02/06/2020	Flood		0.00K
BLAND	BLAND CO.	VA	04/12/2020	Heavy Rain		18.50K
PUMPKIN CENTER	BLAND CO.	VA	08/06/2020	Thunderstorm Wind	50 kts. EG	0.50K
GRAPEFIELD	BLAND CO.	VA	08/06/2020	Thunderstorm Wind	50 kts. EG	0.50K
BLAND (ZONE)	BLAND (ZONE)	VA	01/27/2021	Winter Storm		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	01/30/2021	Winter Storm		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	02/18/2021	Winter Storm		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	01/03/2022	Winter Storm		0.00K
BLAND (ZONE)	BLAND (ZONE)	VA	01/16/2022	Winter Storm		3.00K
HICKSVILLE	BLAND CO.	VA	06/13/2022	Thunderstorm Wind	50 kts. EG	0.50K
CERES	BLAND CO.	VA	06/13/2022	Thunderstorm Wind	50 kts. EG	0.50K
MECHANICSBURG	BLAND CO.	VA	06/17/2022	Thunderstorm Wind	50 kts. EG	0.50K
STOWERSVILLE	BLAND CO.	VA	06/17/2022	Thunderstorm Wind	55 kts. EG	5.00K
HOLLY BROOK	BLAND CO.	VA	07/23/2022	Thunderstorm Wind	50 kts. EG	0.50K
BASTIAN	BLAND CO.	VA	07/23/2022	Thunderstorm Wind	55 kts. EG	4.00K
LONG SPUR	BLAND CO.	VA	07/23/2022	Thunderstorm Wind	55 kts. EG	2.50K
CARNOT	BLAND CO.	VA	08/04/2022	Thunderstorm Wind	50 kts. EG	1.00K
BLAND (ZONE)	BLAND (ZONE)	VA	04/01/2023	High Wind	50 kts. EG	10.00K
BLAND	BLAND CO.	VA	05/28/2023	Heavy Rain		0.00K
CLEAR FORK	BLAND CO.	VA	05/29/2023	Flash Flood		25.00K
Totals:						115.50K

Recommended Mitigations

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Critical facilities, such as Fire and Rescue buildings, water plants, wastewater plants, pump stations, shelter locations, and donation management facilities need backup generators; and consider battery storage and energy generation and/or fuel storage for critical infrastructure and public safety.	All	Bland County, MRPDC, VDEM	1 -3 Years/ Not Started	Funding needed from VDEM/ FEMA
High	Support the continued development of the countywide radio communications system to improve emergency response and coordination during major disasters and other emergencies.	All	Bland County, MRPDC,VDEM	1-3 years/Ongoing	Funding needed from VDEM/FEMA
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Bland County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct hydrological/engineering studies to properly determine Base Flood Elevations in those watersheds with estimated floodplains.	Floods	Bland County, MRPDC, DCR, VDEM	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct detailed studies to determine the most cost-effective mitigations for communities with flooding issues, which include Bland, Bastian, and Rocky Gap.	Floods	Bland County, MRPDC, DCR, VDEM	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Use the flood analysis as a basis for consideration of future relocation/demolition and flood-proofing projects.	Floods	Bland County, MRPDC, DCR, VDEM	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Mitigate against future flood losses, with highest priority given to repetitive loss properties.	Floods	Bland County, MRPDC, DCR, VDEM	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Bland County, MRPDC, DCR, VDEM	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Done through compliance with NFIP
Medium	Increase first responder training involving Hazardous materials response.	Hazmat	Bland County, VDFP, VDEM	1-3 years	Funding needed from VDEM/FEMA Will start coordinating this year
Medium	Promote the Firewise program for people who live in woodland communities. An estimated 265 homes fall into this category in various parts of Bland County.	Wildfire	Bland County, MRPDC, RC&D, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA. Early work has begun, Fall 2022 but coordination is still needed.
Medium	Work with the New River-Highlands RC&D Council a wildfire strategic plan for Bland County.	Wildfire	Bland County, MRPDC, RC&D, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Bland County, MRPDC, DCR, VDEM, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
Low	Continue inspection and enforcement as necessary on the Crab Orchard Creek Dam, rated Class I for hazard potential.	Dam Safety	Bland County, MRPDC, DCR	1-3 Years/ Ongoing/	Funding needed from VDEM/FEMA Done through Federal State and local codes
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Bland County, MRPDC, DCR, VDEM	1-3 Years/ Not Started	Funding needed from VDEM/FEMA Started in November 2022 and is ongoing. Locations have been obtained.

Carroll County and Hillsville

Community Hazard Profile

Carroll County abuts the northern border of North Carolina and includes a section of the Blue Ridge Parkway and the New River Trail State Park. A community of 29,155 (decrease of 0.2% since the last plan update), the county includes the incorporated Town of Hillsville, which serves as the county seat, and abuts the City of Galax to the west. Elevations vary from 3,570 feet above sea level at Fisher Peak to 1,110 feet above sea level at Cana. The county also is notable for the Blue Ridge Escarpment (steep slope) that separates the piedmont of North Carolina from the Blue Ridge Plateau. More than half of the land area has slopes greater than 20%, which precludes most development.

Carroll County is bisected by Interstate 77 in a north-south direction and by U.S. Rt. 58 in an east-west direction. The county is known for high wind conditions at Fancy Gap, where tractor trailers sometimes get blown over or even lifted away from the highway altogether and dumped into a field some distance away. Carroll County is part of a Special Wind Region, with potential wind speeds up to 200 mph.

Other natural hazards experienced in Carroll County include severe winter storms and ice, wildfires, drought, and undefined risk potential for landslides and impacts from karst terrain. Flood hazards are limited (two repetitive loss properties in the county). There are two federally regulated hydroelectric dams and one state-regulated dam in Carroll County.

Past or Ongoing Mitigations

A special project by the New River-Highlands RC&D Council has produced a draft strategic plan for wildfire hazard reduction in Carroll County. For emergency response, the area is served by the Twin County E-911 system, volunteer fire departments and rescue squads, a paid Fire/Rescue Department, and the sheriff's department and state police.

VDOT has installed a warning system to help truckers get off I-77 and find alternate routes during high-wind conditions and other potentially dangerous conditions, such as fog, another ongoing problem in the Fancy Gap area. Members of the Hazard Mitigation Advisory Team have said the warning system has limited usefulness since there are few exits from the highway.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2018.

Severe Weather Events

Multicar Pileup Due to Dense Fog

On March 31, 2013, at least three people were killed and at least 25 were taken to the hospital after a pile-up involving dozens of cars today on a Virginia interstate. Virginia State Police said "excessive fog" in the Fancy Gap Mountain area, near the North Carolina border, caused at least 75 vehicles to crash in the southbound lanes of the I-77.

The first emergency calls began coming in at 1:15 p.m. ET, authorities said. The northbound lanes were closed to allow emergency vehicles to quickly reach people needing assistance at the scene, according to a statement from the Virginia State Police. While the cause of the initial crash remains under investigation, Virginia State Police spokeswoman Corinne Geller said it was a classic pile up.

"[There were] 17 separate traffic crashes, but they all occurred as a chain reaction in that one mile stretch of Interstate 77," Geller said. "The initial crash, the very first one, we're still investigating obviously what caused that one exactly, that's still under investigation."

After the first crash, she said, other vehicles on the highway were traveling too fast to stop by the time they saw the accidents ahead of them in the thick fog. "People were traveling too fast for the road conditions and you had the initial crash and then you had a chain reaction, a series of crashes because the fog was so thick, people could not see what was up ahead," she said. Traffic was re-directed in both directions as authorities worked to clear the scene and investigate the crashes, the Virginia State Police said. The highway was expected to reopen at around 9 p.m. ET. Authorities advised travelers, many of whom may be traveling for the Easter holiday, to make alternate travel plans or to expect significant delays.

Severe Cold Weather

A severe cold weather event on December 24, 2022, caused the water pipes to burst in the Carroll County Government building. This resulted in water damage that caused considerable cost and time to fix. Water lines also burst in residential and commercial structures. This led to numerous sprinkler flow and fire alarms responses. In Carroll County approximately 2,000 county residents were without power for a 24+ hour period.

Location	County/Zone	St.	Date	Type	Mag	Dth	Inj	PrD
Totals:						0	1	2.640M
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/18/2018	High Wind	50 kts. MG	0	0	75.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/01/2018	High Wind	52 kts. EG	0	0	150.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/12/2018	Heavy Snow		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/15/2018	Strong Wind	48 kts. EG	0	0	250.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/24/2018	Winter Storm		0	0	0.00K
FANCY GAP	CARROLL CO.	VA	04/15/2018	Hail	2.50 in.	0	0	0.00K
HILLSVILLE	CARROLL CO.	VA	04/15/2018	Hail	2.50 in.	0	0	0.00K
LAUREL FORK	CARROLL CO.	VA	04/15/2018	Thunderstorm Wind	50 kts. EG	0	0	1.50K
WOODLAWN	CARROLL CO.	VA	05/10/2018	Hail	1.00 in.	0	0	0.00K
CANA	CARROLL CO.	VA	05/11/2018	Hail	0.88 in.	0	0	0.00K
CANA	CARROLL CO.	VA	05/18/2018	Flash Flood		0	0	20.00K
DUGSPUR	CARROLL CO.	VA	05/18/2018	Flash Flood		0	0	0.00K
WOODLAWN	CARROLL CO.	VA	06/03/2018	Thunderstorm Wind	50 kts. EG	0	0	2.00K
GALAX CITY	CARROLL CO.	VA	06/10/2018	Thunderstorm Wind	50 kts. EG	0	0	1.00K
WOODLAWN	CARROLL CO.	VA	09/08/2018	Flash Flood		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	09/14/2018	Strong Wind	35 kts. EG	0	0	10.00K
GRAYSON	CARROLL CO.	VA	09/17/2018	Flood		0	0	0.00K
GALAX CITY	CARROLL CO.	VA	10/10/2018	Flash Flood		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	10/11/2018	Strong Wind	38 kts. MG	0	0	40.00K
HEBRON	CARROLL CO.	VA	10/11/2018	Flash Flood		0	0	50.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	11/14/2018	Ice Storm		0	0	15.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/08/2018	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/09/2019	High Wind	54 kts. MG	0	0	4.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/12/2019	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/20/2019	High Wind	55 kts. MG	0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/19/2019	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/24/2019	High Wind	55 kts. EG	0	0	50.00K
CANA	CARROLL CO.	VA	04/14/2019	Thunderstorm Wind	50 kts. EG	0	0	4.00K
GLADESBORO	CARROLL CO.	VA	04/14/2019	Thunderstorm Wind	50 kts. EG	0	0	5.00K
LAUREL FORK	CARROLL CO.	VA	04/14/2019	Thunderstorm Wind	50 kts. EG	0	0	2.50K
WOODLAWN	CARROLL CO.	VA	04/14/2019	Thunderstorm Wind	50 kts. EG	0	0	0.50K
PIPERS GAP	CARROLL CO.	VA	04/14/2019	Thunderstorm Wind	50 kts. EG	0	0	0.50K
LAUREL FORK	CARROLL CO.	VA	05/03/2019	Thunderstorm Wind	50 kts. EG	0	0	5.00K
DUGSPUR	CARROLL CO.	VA	05/29/2019	Thunderstorm Wind	50 kts. EG	0	0	1.00K
DUGSPUR	CARROLL CO.	VA	07/22/2019	Thunderstorm Wind	50 kts. EG	0	0	2.00K
BYLLESBY	CARROLL CO.	VA	08/13/2019	Thunderstorm Wind	51 kts. MG	0	0	0.00K
LAUREL FORK	CARROLL CO.	VA	08/21/2019	Thunderstorm Wind	50 kts. EG	0	0	0.50K
HEBRON	CARROLL CO.	VA	08/22/2019	Thunderstorm Wind	50 kts. EG	0	0	5.00K
WOODLAWN	CARROLL CO.	VA	08/22/2019	Thunderstorm Wind	50 kts. EG	0	0	0.50K
PIPERS GAP	CARROLL CO.	VA	09/29/2019	Thunderstorm Wind	50 kts. EG	0	0	0.50K
CARROLL (ZONE)	CARROLL (ZONE)	VA	10/31/2019	High Wind	55 kts. EG	0	0	50.00K
POPLAR CAMP	CARROLL CO.	VA	10/31/2019	Thunderstorm Wind	60 kts. EG	0	0	50.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/11/2020	High Wind	50 kts. MG	0	0	0.00K
GLADESBORO	CARROLL CO.	VA	04/13/2020	Thunderstorm Wind	50 kts. EG	0	0	0.50K
LAUREL FORK	CARROLL CO.	VA	04/13/2020	Thunderstorm Wind	50 kts. EG	0	0	1.00K
GLADESBORO	CARROLL CO.	VA	04/13/2020	Flash Flood		0	0	33.00K
CHESTNUT YARD	CARROLL CO.	VA	05/21/2020	Flood		0	0	150.00K
POPLAR CAMP	CARROLL CO.	VA	08/06/2020	Thunderstorm Wind	50 kts. EG	0	0	1.00K
LONGDALE FURNACE	CARROLL CO.	VA	10/29/2020	Heavy Rain		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	10/29/2020	Tropical Storm		0	0	5.00K
CANA	CARROLL CO.	VA	10/29/2020	Flash Flood		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/16/2020	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/24/2020	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/08/2021	Winter Storm		0	0	0.00K

CARROLL (ZONE)	CARROLL (ZONE)	VA	02/02/2021	High Wind	56 kts. MG	0	1	100.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/02/2021	High Wind	50 kts. MG	0	0	5.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/13/2021	Winter Weather		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/18/2021	Winter Storm		0	0	0.00K
HILLTOWN	CARROLL CO.	VA	03/27/2021	Hail	2.00 in.	0	0	0.00K
CHESTNUT YARD	CARROLL CO.	VA	03/27/2021	Hail	1.00 in.	0	0	0.00K
BYLLESBY	CARROLL CO.	VA	03/27/2021	Hail	0.88 in.	0	0	0.00K
HILLSVILLE	CARROLL CO.	VA	03/27/2021	Hail	2.00 in.	0	0	1.000M
EONA	CARROLL CO.	VA	03/27/2021	Hail	1.00 in.	0	0	0.00K
WOODLAWN	CARROLL CO.	VA	07/11/2021	Flood		0	0	0.00K
LAUREL FORK	CARROLL CO.	VA	07/17/2021	Lightning		0	0	25.00K
DUGSPUR	CARROLL CO.	VA	08/10/2021	Hail	1.00 in.	0	0	0.00K
EONA	CARROLL CO.	VA	08/17/2021	Thunderstorm Wind	50 kts. EG	0	0	1.00K
FANCY GAP	CARROLL CO.	VA	08/17/2021	Thunderstorm Wind	50 kts. EG	0	0	0.50K
FANCY GAP	CARROLL CO.	VA	08/17/2021	Thunderstorm Wind	50 kts. EG	0	0	0.50K
RICHARDSON	CARROLL CO.	VA	08/17/2021	Thunderstorm Wind	50 kts. EG	0	0	1.50K
WOODLAWN	CARROLL CO.	VA	08/17/2021	Thunderstorm Wind	50 kts. EG	0	0	0.50K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/03/2022	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/16/2022	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/17/2022	High Wind	50 kts. EG	0	0	15.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/17/2022	High Wind	56 kts. MG	0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/12/2022	High Wind	50 kts. MG	0	0	0.00K
CLIFFVIEW	CARROLL CO.	VA	03/23/2022	Heavy Rain		0	0	0.00K
CLIFFVIEW	CARROLL CO.	VA	03/23/2022	Flood		0	0	3.00K
GLADESBORO	CARROLL CO.	VA	03/23/2022	Tornado	EF2	0	0	400.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/31/2022	High Wind	50 kts. EG	0	0	1.00K
FANCY GAP	CARROLL CO.	VA	05/06/2022	Thunderstorm Wind	60 kts. EG	0	0	10.00K
CANA	CARROLL CO.	VA	05/06/2022	Thunderstorm Wind	60 kts. EG	0	0	10.00K
FANCY GAP	CARROLL CO.	VA	05/26/2022	Thunderstorm Wind	55 kts. EG	0	0	3.00K
GLADESBORO	CARROLL CO.	VA	06/02/2022	Thunderstorm Wind	50 kts. EG	0	0	1.00K
CLIFFVIEW	CARROLL CO.	VA	06/08/2022	Thunderstorm Wind	55 kts. EG	0	0	1.50K
WOODLAWN	CARROLL CO.	VA	06/08/2022	Thunderstorm Wind	50 kts. EG	0	0	0.50K
WOODLAWN	CARROLL CO.	VA	06/17/2022	Thunderstorm Wind	50 kts. MG	0	0	0.00K
WOODLAWN	CARROLL CO.	VA	06/17/2022	Thunderstorm Wind	50 kts. EG	0	0	0.50K
GLADEVILLE	CARROLL CO.	VA	06/17/2022	Thunderstorm Wind	50 kts. EG	0	0	0.50K
WOODLAWN	CARROLL CO.	VA	07/05/2022	Thunderstorm Wind	55 kts. EG	0	0	2.50K
GALAX CITY	CARROLL CO.	VA	07/05/2022	Thunderstorm Wind	55 kts. EG	0	0	2.50K
WOODLAWN	CARROLL CO.	VA	07/05/2022	Thunderstorm Wind	50 kts. EG	0	0	0.50K
HEBRON	CARROLL CO.	VA	07/12/2022	Thunderstorm Wind	60 kts. EG	0	0	5.00K
PIPERS GAP	CARROLL CO.	VA	08/06/2022	Thunderstorm Wind	50 kts. EG	0	0	1.00K
GLADESBORO	CARROLL CO.	VA	08/21/2022	Heavy Rain		0	0	0.00K
HILLSVILLE	CARROLL CO.	VA	08/21/2022	Heavy Rain		0	0	0.00K
HILLSVILLE	CARROLL CO.	VA	08/21/2022	Flash Flood		0	0	0.00K
FANCY GAP	CARROLL CO.	VA	08/21/2022	Flash Flood		0	0	0.00K
GLADESBORO	CARROLL CO.	VA	08/21/2022	Flash Flood		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	09/30/2022	High Wind	52 kts. MG	0	0	5.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/23/2022	Strong Wind	41 kts. MG	0	0	10.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/23/2022	Extreme Cold/wind Chill		0	0	0.00K
LAUREL FORK	CARROLL CO.	VA	03/03/2023	Thunderstorm Wind	50 kts. EG	0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	04/01/2023	High Wind	51 kts. MG	0	0	10.00K
FANCY GAP	CARROLL CO.	VA	04/06/2023	Hail	1.00 in.	0	0	0.00K
GLADESBORO	CARROLL CO.	VA	04/06/2023	Hail	1.00 in.	0	0	0.00K
GLADESBORO	CARROLL CO.	VA	04/06/2023	Thunderstorm Wind	55 kts. EG	0	0	1.00K
HEBRON	CARROLL CO.	VA	05/16/2023	Thunderstorm Wind	60 kts. EG	0	0	2.00K
CANA	CARROLL CO.	VA	07/13/2023	Thunderstorm Wind	65 kts. EG	0	0	10.00K
FANCY GAP	CARROLL CO.	VA	07/15/2023	Flash Flood		0	0	25.00K
Totals:						0	1	2.640M

Recommended Mitigations: Carroll County and Hillsville

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Upgrade public safety communication infrastructure from analog to digital, for Twin County Region (counties of Carroll and Grayson and the City of Galax).	All hazards	Carroll County, MRPDC, VDEM, DCR	1 Year/ In Progress	Funding needed from VDEM/FEMA
High	Promote the Firewise program for people who live in woodland communities. An estimated 712 homes fall into this category in various parts of Carroll County. This represents one of the worst natural hazard threats in the region.	Wildfire	Carroll County RC&D, Firewise, MRPDC, DOF	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Carroll County, MRPDC, VDEM, DCR, American Red Cross	1 Year/ In progress	Funding needed from VDEM/FEMA
High	Create sheltering locations for residents in the case of a disaster hardship.	All hazards	Carroll County, Town of Hillsville, VDEM	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Critical facilities, such as Fire and Rescue buildings, water plants, wastewater plants, and pump stations need backup generators; and consider battery storage and energy generation and/or fuel storage for critical infrastructure and public safety.	All	Carroll County, Town of Hillsville, VDEM, MRPDC	1 -3 Years/ Not Started	Funding needed from VDEM/ FEMA
Medium	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Carroll County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Carroll County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Done through compliance with NFIP Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
Low	Consider flood-proofing or relocation/demolition for the repetitive loss property near Hillsville.	Floods	Town of Hillsville, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams.	Dam Safety	Carroll County, MRPDC, DCR	1-3 Years/ Ongoing	Done through Federal, State, and Local codes. Funding needed from VDEM/FEMA
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Carroll County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA Will be looked at next year

Grayson County and Fries, Independence, and Troutdale

Community Hazard Profile

Grayson County is a remote, rural area with a population of 15,333 (a decrease of 2.1% since 2018). The county is traversed east-west by U.S. Rt. 58, north-south by State Rt. 16 (passing through the Town of Troutdale), and north-south by U.S. Rt. 21 (passing through the Town of Independence). The three incorporated towns include Fries, Independence, and Troutdale. Parts of the county border the independent City of Galax at the county's eastern border. Grayson's mountainous terrain includes Grayson Highlands State Park in the western end and parts of the Mount Rogers National Recreation Area running roughly along the county's northern border.

Chief natural hazards occurring in Grayson County include flooding, severe snow and ice storms, high winds, and risk of wildfire. Flooding affects relatively few properties, and there is no FEMA record of repetitive loss properties. Substantial parts of Grayson, encompassing roughly 60,000 acres, are subject to wildfire risk. Grayson also contains four dams rated for significant hazard potential and has a risk of potential for landslides, especially in the northern part of the county.

Past or Ongoing Mitigations

A special project by the New River-Highlands RC&D Council has produced a draft strategic plan for wildfire hazard reduction in Grayson County. The emergency services system includes the Twin County E-911 center, several volunteer fire departments and rescue squads, the sheriff's department and the state police.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2018.

The Town of Fries has secured funding to mitigate against flooding issues at the Fries School. This repetitive flooding has caused damage to sidewalks, stairs, the building foundation, and to AC/R pumps, and boiler equipment. It has also exposed high voltage conduit and washed-out property resulting in reduced access to the school property for the staff and students.

Severe Weather Events

Flash Flooding

Local flash flooding on July 22, 2020 and August 15, 2020 resulted in $41,053 in damages to Fries Middle School, Fries, VA. They events happened so close together that they hadn't completed recovery from the July event before the August event occurred.

Infrastructure Failure

Due to impact on infrastructure and cost burden to jurisdiction, The Casuals well (a supplier of water to the Town of Troutdale) had to be repaired in 2014. This required $19,000 for engineering, repair, and testing of water system facilities and equipment.

Other Adverse Event/Cyber Failure:

Grayson County had a major failure of our internal and external communications at the County level in the fall of 2022 that took several weeks to recover from. The failure took down our phone system, internet access and websites, financial system reporting and billing and other associated systems. Pretty much everything except cellular.

This crash began with the failure of our primary router which did not have an installed back-up. Due to the age of the router and associated systems, replacing the router with newer equipment did not fix the problem. Over a period of several weeks, our entire network, with almost all of the associated equipment, was redesigned and replaced with redundant systems integrated into the recovery design. Expenditures for the recovery were in the area of $13,000.

Do to impacts on our financial systems, courts and internal government processes, we came within four hours of declaring a local emergency at one point.

This casualty was complicated by the recent turnover of our IT department head. Outside assistance was contracted short-term to assist with the recovery.

Location	County/Zone	St.	Date	Type	Mag	Dth	Inj	PrD
Totals:						0	0	542.84K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	03/01/2018	High Wind	52 kts. EG	0	0	16.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	03/12/2018	Heavy Snow		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	03/24/2018	Winter Storm		0	0	0.00K
CLITO MILL	GRAYSON CO.	VA	04/15/2018	Thunderstorm Wind	50 kts. EG	0	0	0.00K
SPRING VLY	GRAYSON CO.	VA	05/15/2018	Flash Flood		0	0	0.00K
FALLVILLE	GRAYSON CO.	VA	08/31/2018	Thunderstorm Wind	50 kts. EG	0	0	0.20K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	09/15/2018	Strong Wind	35 kts. EG	0	0	2.50K
INDEPENDENCE	GRAYSON CO.	VA	09/16/2018	Flash Flood		0	0	34.04K
RIVERSIDE	GRAYSON CO.	VA	09/17/2018	Flood		0	0	0.00K
REAVISTOWN	GRAYSON CO.	VA	10/10/2018	Heavy Rain		0	0	0.00K
REAVISTOWN	GRAYSON CO.	VA	10/10/2018	Flash Flood		0	0	0.00K
OLDTOWN	GRAYSON CO.	VA	10/11/2018	Flash Flood		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	10/11/2018	Strong Wind	35 kts. EG	0	0	25.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	10/20/2018	High Wind	50 kts. EG	0	0	15.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	11/14/2018	Ice Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	12/08/2018	Winter Storm		0	0	0.00K
REAVISTOWN	GRAYSON CO.	VA	12/21/2018	Flood		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	01/08/2019	High Wind	51 kts. MG	0	0	1.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	01/12/2019	Winter Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	01/20/2019	High Wind	50 kts. EG	0	0	1.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	02/12/2019	High Wind	50 kts. EG	0	0	1.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	02/19/2019	Winter Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	02/24/2019	High Wind	59 kts. MG	0	0	0.00K
TROUTDALE	GRAYSON CO.	VA	04/19/2019	Thunderstorm Wind	50 kts. EG	0	0	1.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	04/26/2019	High Wind	53 kts. MG	0	0	0.00K
VOLNEY	GRAYSON CO.	VA	07/06/2019	Flash Flood		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	10/31/2019	High Wind	51 kts. MG	0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	11/27/2019	High Wind	56 kts. MG	0	0	10.00K
ELK CREEK	GRAYSON CO.	VA	04/12/2020	Heavy Rain		0	0	0.00K
FRIES	GRAYSON CO.	VA	04/13/2020	Flood		0	0	186.20K
PEACHY BOTTOM	GRAYSON CO.	VA	05/21/2020	Flood		0	0	25.00K
CARSONVILLE	GRAYSON CO.	VA	07/21/2020	Thunderstorm Wind	50 kts. EG	0	0	1.00K
FRIES	GRAYSON CO.	VA	07/22/2020	Hail	1.00 in.	0	0	0.00K
FRIES	GRAYSON CO.	VA	07/22/2020	Thunderstorm Wind	50 kts. EG	0	0	1.50K
FRIES	GRAYSON CO.	VA	07/22/2020	Flood		0	0	25.00K
FRIES	GRAYSON CO.	VA	08/06/2020	Thunderstorm Wind	50 kts. EG	0	0	0.40K
FRIES	GRAYSON CO.	VA	08/15/2020	Flood		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	12/16/2020	Winter Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	12/24/2020	Winter Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	01/08/2021	Winter Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	01/27/2021	Winter Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	01/30/2021	Winter Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	02/01/2021	Winter Storm		0	0	10.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	02/18/2021	Winter Storm		0	0	0.00K
VOLNEY	GRAYSON CO.	VA	03/27/2021	Hail	1.25 in.	0	0	0.00K
ELK CREEK	GRAYSON CO.	VA	03/27/2021	Hail	1.75 in.	0	0	0.00K
INDEPENDENCE	GRAYSON CO.	VA	03/27/2021	Hail	1.00 in.	0	0	0.00K
SPRING VLY	GRAYSON CO.	VA	03/27/2021	Hail	1.25 in.	0	0	0.00K
FRIES	GRAYSON CO.	VA	03/27/2021	Hail	1.00 in.	0	0	0.00K
CARSONVILLE	GRAYSON CO.	VA	06/09/2021	Flood		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	01/03/2022	Winter Storm		0	0	0.00K

GRAYSON (ZONE)	GRAYSON (ZONE)	VA	01/16/2022	Winter Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	01/17/2022	High Wind	50 kts. EG	0	0	2.50K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	02/18/2022	High Wind	52 kts. MG	0	0	0.00K
RIVERSIDE	GRAYSON CO.	VA	06/08/2022	Thunderstorm Wind	50 kts. EG	0	0	1.00K
BAYWOOD	GRAYSON CO.	VA	07/05/2022	Tornado	EF1	0	0	20.00K
DELHART	GRAYSON CO.	VA	07/05/2022	Thunderstorm Wind	60 kts. EG	0	0	5.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	09/30/2022	Strong Wind	43 kts. MG	0	0	1.50K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	12/23/2022	Extreme Cold/wind Chill		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	02/12/2023	Winter Storm		0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	02/28/2023	High Wind	51 kts. EG	0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	03/04/2023	High Wind	56 kts. MG	0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	03/25/2023	High Wind	53 kts. MG	0	0	0.00K
GRAYSON (ZONE)	GRAYSON (ZONE)	VA	04/01/2023	High Wind	56 kts. MG	0	0	150.00K
OAK HILL	GRAYSON CO.	VA	07/13/2023	Thunderstorm Wind	50 kts. EG	0	0	2.00K
BRIDLE CREEK	GRAYSON CO.	VA	07/13/2023	Thunderstorm Wind	55 kts. EG	0	0	5.00K
Totals:						0	0	542.84K

Recommended Mitigations: Grayson County and Fries, Independence, and Troutdale

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Secure funding to mitigate repetitive losses due to drainage and runoff issues caused by flash flooding at the Fries School.	Floods	Town of Fries, MRPDC, VDEM, DCR	1-2 Years/ Ongoing	Funding secured from VDEM/FEMA
High	Upgrade public safety communication infrastructure from analog to digital, for Twin County Region (counties of Carroll and Grayson and the City of Galax).	All hazards	Grayson County, MRPDC, VDEM, DCR	1 Year/ In Progress	Funding needed from VDEM/FEMA
High	Pursue federal certification of the Base Flood Elevation of the Grayson Highlands Combined School floodwall, as well as funds for possible repairs or additions, as needed, to the floodwall	Floods	Grayson County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Support implementation of the strategic plan for wildfire hazard reduction in Grayson County.	Wildfire	Grayson County RC&D MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Support educational programs to promote Firewise methods to affected residents of woodland communities. An estimated 258 homes are part of woodland communities in Grayson County.	Wildfire	Grayson County RC&D Firewise, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Grayson County, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Critical facilities, such as Fire and Rescue buildings, water plants, wastewater plants, and pump stations need backup generators; and consider battery storage and energy generation and/or fuel storage for critical infrastructure and public safety.	All	Grayson County, Town of Fries, Town of Troutdale, Town of Independence, MRPDC, VDEM	1 -3 Years/ Not Started	Funding needed from VDEM/ FEMA
Medium	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Grayson County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Conduct hydrological/ engineering studies to properly determine Base Flood Elevations in those watersheds with estimated floodplains.	Floods	Grayson County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Conduct hydrological/ engineering studies to determine Base Flood Elevations within the Town of Troutdale, which presently lacks a recognized floodplain.	Floods	Grayson County, MRPDC, VDEM, DCR	Project Complete	Funding needed from VDEM/FEMA Flood mapping has been provided
Medium	Identify flood prone properties for potential acquisition/ demolition, elevation, flood proofing, and minor localized flood control projects.	Floods	Grayson County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
Medium	Conduct hydrological/ engineering studies to determine Base Flood Elevations within the Towns of Fries and Independence.	Floods	Town of Independence, Town of Fries, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Grayson County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Done through compliance with the NFIP
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams.	Dam Safety	Grayson County, MRPDC, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Done though local and state codes

Smyth County and Chilhowie, Marion, and Saltville

Community Hazard Profile

Smyth County, with a population of 29,800 (decrease of 2.9% since 2018), stands along the east-west path of I-81 and is part of the Mount Rogers National Recreation Area. Population growth is stagnant, due in part to loss of the traditional industrial base and limited housing development. Despite those drawbacks, the county is traversed by the Appalachian Trail, offers appealing country vistas, and stands within easy reach of many natural resource attractions.

Smyth County is located in the heart of the Southwest region in the Commonwealth of Virginia. Smyth County was formed on February 23, 1932 from Washington and Wythe Counties. Named after General Alexander Smyth; Smyth County shares its boarders with Tazewell County to the direct North, Bland County to the Northeast, Wythe County to the East, Grayson County to the South, Washington County to the West, and Russell County to the Northwest. Smyth County has a total area of 452 square miles with 30 to 35% of the County belonging to National Forest. Smyth County is home to Jefferson National Forest and Clinch Mountain Wildlife Management Area on the North of the County and Mount Rogers National Recreation Area to the South. Three large mountain chains traverse the County forming three major valleys in which the three forks of the Holston River flow. The Iron Mountain range, at the northern edge of the Blue Ridge Geological Province, forms the southern boundary, the Clinch Mountain range forms the northern boundary, and the Walker Mountain range gently rolls through the center of the County north of the 81 corridor. Elevations in Smyth County rage from a high of 5,729 feet at Mount Rogers to a low of approximately 1,740 feet where the North Fork of the Holston leaves Smyth County North of Saltville. Smyth County is home to the head waters of the Holston River with the North, Middle, and South Fork originating within, the most Eastern rivers of the Tennessee Valley Watershed. With an estimated 73 people per square mile, Smyth County is a rural area.

The main natural hazards affecting Smyth County include flooding along the North, Middle, and South Forks of the Holston River, as well as several tributaries; severe winter storms and ice; some potential for dam failure; drought; and undetermined risk from landslides and karst terrain, which appears in an estimated 30% of the county's territory. The county is also part of a Special Wind Region (with wind speed potential of 200 mph), but this problem rarely causes enough damage to be considered a major hazard. Smyth County contains eleven repetitive loss properties, the most of any locality in the planning district. Seven of these properties are located in the Chilhowie area. The county has the most flood-prone properties in the Mount Rogers Region (see At-risk Structures in the 100-year Flood Plain table in the Flood Risk Assessment and Vulnerability Section). While not a frequent event as defined by our hazard

matrix, Smyth and Washington Counties suffered a severe tornado in April of 2011 that resulted in 4 deaths (all in Washington County), and over 50 injuries throughout the two counties. The Saltville area in the northwest section of the county is the most susceptible to karst and sinkholes due to natural factors and historic underground mining that has taken place in the area.

Through the THIRA (Threat Hazard Identification and Risk Assessment) process, Smyth County has numerous hazards, whether it is Natural, Technological, or Human-Caused, that it works to mitigate, prepare, and plan for in its emergency management processes. Those hazards including:

- Severe Weather;
  - Flooding;
  - Hurricane or Tropical Storms;
  - Winter Storms (Snow, Ice, Nor'easters);
  - Storms (Thunderstorms, Tornadoes, Derechos, and Lightning); and
  - Temperature Extremes (Heat or Cold).
- Hazardous Material Incidents;
  - Fixed Facility; and
  - Transported Materials
- Pandemic;
- Critical Infrastructure Failure; and
- Active Threat Attack.

The Smyth County THIRA expands on previously developed risk assessments to further guide the county in a risk-based approach to preventing, protecting against, responding to, and recovering from disasters that may threaten the County's citizens, infrastructure, and economy. It documents historical disasters, where possible, for each hazard to inform capabilities requirements. In this section, each threat/hazard is evaluated in the following areas:

- Definition: A general definition of the threat or hazard with context as to why it is of significance to Smyth County;
- Previous Occurrences: A description of historical occurrences with associated deaths, injuries, and damage estimates when available;
- Future Probability: An estimation based on previous occurrences and unique community characteristics; and
- Potential Impact: An estimation of impacts in terms of injuries and deaths, damage to infrastructure, and operation of essential services.

Response

Smyth County is served by multiple emergency service agencies. All departments of Smyth County are serviced and dispatched by a central Smyth County Emergency Communications Center that is located in Marion. This is the Public Safety Answering Point (PSAP) for the County and is the location all 911/emergency calls are routed. The PSAP then will dispatch the appropriate agencies.

Emergency Communications: Smyth County has an Enhanced 911 System which includes a Public Safety Answering Point (PSAP) equipped with computers that display the caller's address and a map providing the exact location of the structure along with other information such as photos and information accessibility. Establishment of the system required mapping of the entire county, naming of all roads, assigning of street addresses, and the installation of road signs. Each habitable structure (residential, public, commercial, etc.) is required to have a 911 address, even if it is not the mailing address. Rural route and box addresses are no longer assigned. The Smyth County Geospatial Information System office provides addresses of all new structures in cooperation with SCPS and the Department of Building and Zoning. Smyth County is also able to accept 911 calls by cellular phones as well as text-to-911. The PSAP is in the progress of upgrading to the Next Generation (NextGen) which is a mandate from the Commonwealth of Virginia. Smyth County should make the transition to NextGen by the 2023/2024 timeframe. A projected move of the PSAP from the current location in the Sheriffs' Department on Matson Drive should occur during the 2023 year.

Land/Mobile Radio: Radio communications are essential to the operation of emergency services within the County. In 2010, Smyth County invested in four communication towers strategically located in the County to provide enhanced communication coverage for public service agencies throughout the County. In 2022, Smyth County established the Public Safety Communications Improvement Project. This project has placed a new emphasis on the build out and improvement of the Land/Mobile Radio (LMR) to increase connectivity of responders to the PSAP. A study was preformed to show the gaps in the system and a roadmap to increase and better the system. In August, a Request for Proposal (RFP) was published and the progress is ongoing to improve the system. The RFP encompasses the LMR system, PSAP backhaul, and infrastructure for the system.

At this time, the County system includes 4 County maintained towers that include:

- Walker Mountain (control);
- Whitetop Mountain;
- Flattop Mountain; and
- Iron Mountain.

At this time, the County works with smaller systems within the main LMR system to extend the coverage. These systems include:

- Town of Marion;
- Town of Chilhowie;
- Town of Saltville; and
- Smyth County Sheriffs' Officer Digital System, Tower include:
  - Edgewood (Saltville);
  - Flattop (County);
  - Chilhowie Water Tower (Chilhowie);
  - Prater Lane (Marion);
  - Technical School (Atkins);
  - Smyth County Community Hospital (SCCH);
  - Walker Mountain (control)(County);
  - Iron Mountain (County)
  - Whitetop Mountain (County).

Law Enforcement: Law Enforcement is covered by the County as well as each locality within Smyth County. The Smyth County Sheriffs' Department, located at 819 Matson Drive, Marion, Virginia, is under the direction of the Sheriff and provides law enforcement to all areas in the County. Each town has a Police Department that primarily covers the areas within the town limits, but assists in the County as needed. These departments include:

- Marion Police Department, 307 South Park Street, Marion, VA
- Chilhowie Police Department, 325 East Lee Highway, Chilhowie, VA
- Saltville Police Department 217 Palmer Avenue, Saltville, VA

Animal Services: The County also provides Animal Control services that serves the County as a whole. The department is located in the Seven Mile Ford area of the County, 287 Fox Valley Road, Marion, VA, and provides a shelter as well as response operations.

Fire and Emergency Medical Services (EMS): Fire and EMS in Smyth County is accomplished by a combination of departments. Each town provides Fire and EMS services for the towns as well as the communities surrounding. Five other agencies exist outside of the towns to provide fire and EMS services to the County. Smyth County does provide a County agency to assist in the call load of fire and EMS and is located at Atkins. The County also dispatches and works with Tannersville Fire and Tannersville Rescue to provide services to the citizens of that community. The Stations for Fire and EMS are as follows:

- Town of Marion Fire and EMS Station 1/2 MFD

- 1 - 231 West Main Street, Marion, VA
- 2 - 230 South Park Street, Marion, VA

- Town of Chilhowie Fire and EMS Station 3 CFD
  - 3 - 315 East Lee Highway, Chilhowie, VA
- Saltville Fire Department Station 4 SFD
  - 4 - 312 Palmer Avenue, Saltville, VA
- Sugar Grove Fire Department Station 5 FDSG
  - 5 - 178 Flat Ridge Road, Sugar Grove, VA
- Sugar Grove Lifesaving Crew Station 5 SGLSC
  - 5 - 178 Flat Ridge Road, Sugar Grove, VA
- Atkins Fire Department Station 6 AFD
  - 6 - 5758 Lee Highway, Atkins, VA
- Smyth County Fire/Rescue Station 6 SCFR
  - 6 - 5758 Lee Highway, Atkins, VA
- Nebo Fire and Rescue Station 7/8 NFR
  - 7 - 422 Old Wilderness Road, Saltville, VA
  - 8 - 6212 Bluegrass Trail, Saltville, VA
- Adwolfe Fire Department Station 9 AFD
  - 9 - 104 Thomas Bridge Road, Marion, VA
- Town of Saltville EMS Station 10 TOSEMS
  - 10 - 126 Battleground Avenue, Saltville, VA

Smyth County Fire Departments work under an automatic aid agreement to provide increased services to the communities of Smyth County. This agreement gives additional apparatus and personnel from the closest neighboring companies to any working structure fire in the jurisdiction. At this time, Marion is the only local that has not agreed to the guidelines, but should be on board by 2023. This helps the county to provide National Fire Protection Association 1710 and 1720 personnel numbers for the safe operations on a fire scene.

Training: Smyth County Fire and Rescue Academy (SCFRA) located in Chilhowie is provided to the citizens of Smyth County to gain training and knowledge towards emergency services career paths. SCFRA provides initial training in fire and EMS as well as continuing and advanced training on site. SCFRA contains a classroom building, live burn building, flashover simulator, drafting pit, as well as other props used in the education of public safety personnel.

Emergency Management: Smyth County Department of Public Safety is the lead organizations for the Emergency Management of the County. SCPS maintains and executes all the emergency plans as well as works on projects that met the 5 phases of emergency management:

- Preparedness
- Prevention
- Mitigation
- Response
- Recovery

SCPS provides officials and the community with communications for the phases of an incident and is the official department that request resources for events that exceed the resources of the County.

Past or Ongoing Mitigations

MINE Collapse

Weather related events have long plagued the area of Smyth County with flooding being the most prevalent. Smyth County has established and completed multiple mitigation projects that have pertained to flooding throughout the County. Floods in the years of 1977 led to a mitigation engineering study for the Middle Fork of the Holston River in Atkins through to Marion as well as the stretch from Seven Mile Ford through to Chilhowie. The study resulting project was the acquisition and relocation of 67 families and the creation of the Chilhowie Recreation Park.

In 2001 and 2002, the North Fork of the Holston River then became the focus for a mitigation project. Five homes were relocated out of the floodplain in the North Holston/McCready's Gap area of Saltville.

Multiple other studies have been conducted but have been opted out of due to funding or support from residence and local officials. More recently the Town of Chilhowie participated in a preliminary flood reduction study by the U.S. Army Corps of Engineers. About 12-15 properties continue to sustain flood damage within town borders. The town has opted against pursuing a more detailed study due to the high cost and instead is advocating for mitigating the most flood-prone structures in the town.

Emergency response is coordinated through Smyth County's centralized E-911 system. The county also creating a modernized countywide communications system for emergency response and direct radio communications among police, fire departments, and rescue squad organizations.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2018.

In May of 2023 a culvert was replaced on Highway 11 in the community of Atkins. This was to mitigate against flooding issues onto highway.

A culvert was replaced in July of 2023 on Rt. 16 in the Town of Marion to stop a sink hole from flooding.

The Town of Marion Installed a natural gas-powered backup generator for the Prater pump station, which is critical to the hydraulics of the water system. During adverse weather events if the town suffers a power outage this generator is needed to keep water service to the community.

Two locations in the Town of Marion are currently being upgraded with generators, Town Hall building and Fire/EMS Station I. Town officials expect to have these units operational in the near future.

The Marion EDA has acquired six properties within the Town of Marion. These six properties are listed in the floodway with existing structures and are scheduled to be demolished in 2023 and 2024.

Severe Weather Events

In the North Holston community (formerly Plasterburg) four miles east of Saltville, in October 1947 mines operated by Southern Gypsum and its successors collapsed emptying the North Fork of the Holston into its caverns. The mines were on the south side of present Saltville Highway (Route 91) and the plant on the north side. The plant and mines had several hundred employees. Because the mines had been abandoned, no humans or animals were killed. The North Fork of the Holston River went dry for three days. Today the “lakes” created encompass about 10-15 acres. Further to the east about a mile, near the intersection of Saltville Highway and Possum Hollow Road (Route 633), mines also collapsed about that time causing lesser damage, though creating about five small “ponds.”

In 1975 near that intersection and on Possum Hollow Road, just east of the “ponds” the road collapsed closing both lanes and creating a 12- 15-foot-deep subsidence. Water did not fill the void. It was said that that was the remains of an old air shaft. In 2011 another “pond,” just west of the existing ponds and near the North Fork of the Holston in a farm field, fell in and filled with water. After lengthy negotiations, the property owner sold a seven-acre area of the “ponds” to Olin Corporation, who ended up buying the operation from Southern Gypsum’s successors.

It is believed there is a high possibility that more mines under the Saltville area could collapse in the future, causing great hardship to this area of Smyth County. If is for these reasons Karst and Sinkholes have been elevated to a higher degree of probability in this plan update.

In April of 2017, the Holston Hills Country Club bridge was critically damaged in a massive flood event, rendering the bridge impassable. Since that time the bridge has been rebuilt and reopened to through traffic.

A landslide occurred at various times in the past three years in the town of Saltville. Excess rain runoff from the Saltville Elementary School parking lot undermined the hillside. The school and parking lot are located on top of a hill and once the ground gave way, it slid out into a town owned road (Government Plant Road) blocking one lane completely for over a year as we worked toward a solution. Adding to the complexity of the solution, the slide occurred on Smyth County School Board property, which slid into Town of Saltville property, and for cleanup/repair to occur the contractor had to traverse a small adjoining parcel of land owned by American Apartment Management Company, Incorporated, DBA North Fork Manor. This small parcel owned by AAMCI presented a substantial delay to the cleanup as they operate Federally subsidized housing and, therefore, have Deeds of Trust held by the Federal Government (HUD). So obtaining a temporary construction easement was a long process.

Once all construction easements were obtained, cleanup of the slide began. It was determined by the Smyth County School Board's engineering consultants that the ultimate reason for the slide was the inferior quality of the fill dirt place on the site when the school was built in the early 1960s. Once all the slide material was removed from the site, a series of heavy stone abutments were laid up the hillside with a concrete "funnel" constructed at the top of the hill to divert much of the parking lot runoff in another direction.

To date, the repair has held up but there is a good possibility over time and years of runoff, this could definitely pose a problem again.

Location	County/Zone	St.	Date	Type	Mag	Dth	Inj	PrD
Totals:						0	0	3.365M
SMYTH (ZONE)	SMYTH (ZONE)	VA	03/01/2018	High Wind	53 kts. MG	0	0	6.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	03/24/2018	Winter Storm		0	0	0.00K
MARION	SMYTH CO.	VA	04/04/2018	Thunderstorm Wind	50 kts. EG	0	0	2.50K
SEVENMILE FORD	SMYTH CO.	VA	07/06/2018	Thunderstorm Wind	50 kts. EG	0	0	0.50K
ADWOLF	SMYTH CO.	VA	07/06/2018	Thunderstorm Wind	50 kts. EG	0	0	0.50K
CHILHOWIE	SMYTH CO.	VA	07/06/2018	Thunderstorm Wind	50 kts. EG	0	0	0.50K
MC MULLIN	SMYTH CO.	VA	08/08/2018	Thunderstorm Wind	50 kts. EG	0	0	0.50K
SMYTH (ZONE)	SMYTH (ZONE)	VA	12/08/2018	Winter Storm		0	0	0.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	01/12/2019	Winter Storm		0	0	0.00K
MC CRADY	SMYTH CO.	VA	01/19/2019	Heavy Rain		0	0	0.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	01/23/2019	High Wind	50 kts. EG	0	0	2.50K
CHILHOWIE	SMYTH CO.	VA	02/21/2019	Heavy Rain		0	0	0.00K
MC MULLIN	SMYTH CO.	VA	02/23/2019	Flood		0	0	0.00K
ADWOLF	SMYTH CO.	VA	02/23/2019	Flood		0	0	0.00K
ADWOLF	SMYTH CO.	VA	02/23/2019	Flood		0	0	0.00K
MT CARMEL	SMYTH CO.	VA	02/23/2019	Flood		0	0	0.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	02/24/2019	High Wind	50 kts. MG	0	0	0.00K
SALTVILLE	SMYTH CO.	VA	05/29/2019	Thunderstorm Wind	60 kts. EG	0	0	50.00K
THOMAS BRIDGE	SMYTH CO.	VA	06/17/2019	Thunderstorm Wind	50 kts. EG	0	0	0.50K
ADWOLF	SMYTH CO.	VA	06/17/2019	Thunderstorm Wind	50 kts. EG	0	0	0.50K
ADWOLF	SMYTH CO.	VA	06/18/2019	Thunderstorm Wind	50 kts. EG	0	0	0.80K
SALTVILLE	SMYTH CO.	VA	01/11/2020	Thunderstorm Wind	70 kts. EG	0	0	100.00K
SALTVILLE	SMYTH CO.	VA	02/05/2020	Heavy Rain		0	0	0.00K
ALLISON GAP	SMYTH CO.	VA	02/06/2020	Flood		0	0	0.00K
ALLISON GAP	SMYTH CO.	VA	02/06/2020	Flood		0	0	0.00K
MARION	SMYTH CO.	VA	04/08/2020	Thunderstorm Wind	55 kts. EG	0	0	5.00K
SALTVILLE	SMYTH CO.	VA	04/08/2020	Thunderstorm Wind	55 kts. EG	0	0	5.00K
MARION	SMYTH CO.	VA	04/08/2020	Hail	0.88 in.	0	0	0.00K
ALLISON GAP	SMYTH CO.	VA	04/12/2020	Heavy Rain		0	0	0.00K
BROADFORD	SMYTH CO.	VA	04/13/2020	Flood		0	0	47.00K
MC MULLIN	SMYTH CO.	VA	06/04/2020	Thunderstorm Wind	55 kts. EG	0	0	3.00K
BROADFORD	SMYTH CO.	VA	06/30/2020	Flash Flood		0	0	0.00K
CHILHOWIE	SMYTH CO.	VA	08/15/2020	Debris Flow		0	0	2.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	12/24/2020	High Wind	50 kts. EG	0	0	1.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	12/24/2020	Winter Storm		0	0	0.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	02/18/2021	Winter Storm		0	0	0.00K
THOMAS BRIDGE	SMYTH CO.	VA	03/27/2021	Thunderstorm Wind	50 kts. EG	0	0	0.50K
TEAS	SMYTH CO.	VA	03/27/2021	Thunderstorm Wind	50 kts. EG	0	0	0.50K
SUMMIT	SMYTH CO.	VA	07/11/2021	Flash Flood		0	0	0.00K
ADWOLF	SMYTH CO.	VA	12/11/2021	Thunderstorm Wind	50 kts. EG	0	0	5.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	01/03/2022	Winter Weather		0	0	0.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	01/16/2022	Winter Storm		0	0	0.00K
NORTH HOLSTON	SMYTH CO.	VA	02/22/2022	Heavy Rain		0	0	0.00K
NORTH HOLSTON	SMYTH CO.	VA	02/22/2022	Heavy Rain		0	0	0.00K

ALLISON GAP	SMYTH CO.	VA	02/22/2022	Heavy Rain		0	0	0.00K
ALLISON GAP	SMYTH CO.	VA	02/24/2022	Flood		0	0	0.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	03/30/2022	High Wind	52 kts. EG	0	0	25.00K
CHILHOWIE	SMYTH CO.	VA	05/06/2022	Thunderstorm Wind	70 kts. EG	0	0	3.000M
CHILHOWIE	SMYTH CO.	VA	05/06/2022	Hail	1.75 in.	0	0	0.00K
CHILHOWIE	SMYTH CO.	VA	06/02/2022	Thunderstorm Wind	50 kts. EG	0	0	0.20K
MC MULLIN	SMYTH CO.	VA	06/14/2022	Thunderstorm Wind	55 kts. EG	0	0	5.00K
CHILHOWIE	SMYTH CO.	VA	06/14/2022	Thunderstorm Wind	50 kts. EG	0	0	1.00K
NORTH HOLSTON	SMYTH CO.	VA	06/17/2022	Thunderstorm Wind	55 kts. EG	0	0	10.00K
ATTOWAY	SMYTH CO.	VA	07/06/2022	Thunderstorm Wind	50 kts. EG	0	0	2.00K
TEAS	SMYTH CO.	VA	07/18/2022	Thunderstorm Wind	50 kts. EG	0	0	0.50K
MT CARMEL	SMYTH CO.	VA	08/04/2022	Thunderstorm Wind	50 kts. EG	0	0	25.00K
MC CRADY	SMYTH CO.	VA	08/10/2022	Thunderstorm Wind	55 kts. EG	0	0	5.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	12/23/2022	Strong Wind	47 kts. MG	0	0	10.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	12/23/2022	Extreme Cold/wind Chill		0	0	0.00K
SALTVILLE	SMYTH CO.	VA	01/03/2023	Thunderstorm Wind	50 kts. EG	0	0	3.00K
ST CLAIR BOTTOM	SMYTH CO.	VA	01/12/2023	Thunderstorm Wind	50 kts. EG	0	0	2.00K
MC MULLIN	SMYTH CO.	VA	01/12/2023	Thunderstorm Wind	50 kts. EG	0	0	0.50K
SMYTH (ZONE)	SMYTH (ZONE)	VA	02/12/2023	Strong Wind	26 kts. EG	0	0	1.00K
CHILHOWIE	SMYTH CO.	VA	03/03/2023	Thunderstorm Wind	55 kts. EG	0	0	0.00K
SALTVILLE	SMYTH CO.	VA	03/03/2023	Thunderstorm Wind	55 kts. EG	0	0	5.00K
SUGAR GROVE	SMYTH CO.	VA	03/03/2023	Thunderstorm Wind	55 kts. EG	0	0	0.00K
SMYTH (ZONE)	SMYTH (ZONE)	VA	04/01/2023	High Wind	50 kts. EG	0	0	30.00K
SALTVILLE	SMYTH CO.	VA	05/16/2023	Thunderstorm Wind	50 kts. EG	0	0	1.00K
MARION	SMYTH CO.	VA	05/16/2023	Thunderstorm Wind	60 kts. EG	0	0	4.00K
MARION	SMYTH CO.	VA	07/29/2023	Thunderstorm Wind	50 kts. EG	0	0	0.50K
ADWOLF	SMYTH CO.	VA	07/29/2023	Thunderstorm Wind	50 kts. EG	0	0	0.50K
Totals:						0	0	3.365M

Recommended Mitigations: Smyth County and Chilhowie, Marion, and Saltville

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Critical facilities, such as Fire and Rescue buildings, water plants, wastewater plants, and pump stations need backup generators; and consider battery storage and energy generation and/or fuel storage for critical infrastructure and public safety.	All	Smyth County, Town of Chilhowie, Town of Marion, Town of Saltville, MRPDC	1 -3 Years/ Not Started	Funding needed from VDEM/ FEMA
High	Secure funding to mitigate landslide near the Saltville Elementary School in the Town of Saltville.	Landslide	Smyth County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Smyth County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Mitigate against future flood losses, with highest priority given to the repetitive loss properties.	Floods	Smyth County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct hydrological/engineering studies to determine Base Flood Elevations in watersheds containing estimated floodplains.	Floods	Smyth County, MRPDC, VDEM, DCR	3 -5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Smyth County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Done through compliance with NFIP
High	Use the flood analysis as a basis for consideration of future relocation/demolition and flood-proofing projects.	Floods	Smyth County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA When this issue arises, flood analysis is used
High	Identify flood prone properties for potential acquisition/demolition, elevation, flood proofing, and minor localized flood control projects.	Floods	Smyth County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Support the continued development of the improved countywide radio communications system to improve emergency response and coordination during major disasters and other emergencies.	All	Smyth County, MRPDC, VDEM	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Worked on when possible
Medium	Support educational programs to promote Firewise methods to affected residents of woodland communities. An estimated 475	Wildfire	Smyth County RC&D Firewise MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
	homes are located in wooded settings and subject to risk of wildfire.				
Low	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Smyth County, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams. Presently Hungry Mother Dam is regulated as a high-risk potential dam in the county.	Dam Safety	Smyth County, MRPDC, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Done though federal, state, and local codes
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Smyth County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA Will be looked at next year
High	Install a natural gas-powered backup generator for the Prater pump station, which is critical to the hydraulics of the water system.	All	Marion	1-3 Years/ Not Started	Project complete.

Washington County and Abingdon, Damascus, and Glade Spring

Community Hazard Profile

Washington County is a rapidly developing area located on the west end of the Mount Rogers region and is bisected by Interstate 81 in an east-west direction. Within the past decade the most change and growth has been occurring along the I-81 corridor between the Town of Abingdon and the City of Bristol, with much housing development, as well as burgeoning commercial development at the Exit 7 area. Former communities consisting largely of open space and farming are being converted into residential subdivisions to accommodate the population of 53,935 (an increase of 0.2% since 2018).

The chief natural hazards of concern to Washington County and its localities include flooding, wildfires, severe winter storms and ice, drought, undetermined risk for impacts from landslides and karst terrain (which occurs in 50% of the county's territory), and high winds. While not a frequent event as defined by our hazard matrix, Smyth and Washington Counties suffered a severe tornado in April of 2011 that resulted in 4 deaths (all in Washington County), and over 50 injuries throughout the two counties.

Flooding results from sustained heavy rainfalls, violent thunderstorms, or as the aftermath of a major snowstorm. FEMA records show six repetitive loss properties in the county. Wildfire risks derive from being located in a rural, forested region and development of woodland home communities (encompassing more than 100,000 acres in the county). Severe winter storms and/or ice have been known to lead to disaster declarations, while drought is only an occasional hazard with impacts mainly for the farming community.

Washington County also contains four dams rated for high- or significant-hazard in the event of failure. Two are flood control structures owned by the Tennessee Valley Authority and one is a hydroelectric dam that has been breached and is no longer active. A fourth dam, owned by the state Department of Game and Inland Fisheries, is a recreational area regulated by the state.

Past or Ongoing Mitigations

Washington County operates its own E-911 system for emergency response from among an array of volunteer fire departments and rescue squads, the sheriff's department, and the state police.

A long history of disaster-level flooding led to a comprehensive flood mitigation study for the Town of Damascus completed in 1979. In time, with support from outside grant funding, the town relocated 34 families (88 people) and three local businesses out of the floodplain. The town also was able to install storm drainage systems along flood-prone areas in Mock, Surber,

and Haney Hollows. Damascus continues to face a serious flood threat due to its location at the confluence of Beaverdam and Laurel creeks and the lack of developable land outside of the floodplain.

As with the flood mitigation studies done for Smyth County, Damascus could not afford the high cost of the comprehensive approach. In addition, some mitigations considered in the 1970s and 1980s – including stream channelization and installation of levees – would not be allowed under modern state and federal regulations.

The Town of Glade Spring obtained funding to install a culvert underneath Grace Street and the Town Square intersection as part of a downtown revitalization effort.

The Town of Abingdon has recently updated some of its floodplain maps but has not been involved in mitigation efforts such as elevations or relocations and demolitions. Abingdon has completed a project to mitigate against losses associated with flooding in the Country Club Estates and surrounding areas. This area is in the southern portion of the town. Over the past 25 years there have been several rainfall events that have caused localized flooding to several homes in the drainage swale that conveys stormwater from east to west, crossing Fairway Drive, Bogey Drive, and Birdie Drive. After a flooding event in 1992, the Town Council commissioned the "Preliminary Engineering Report, Country Club Estates, Storm Drainage Improvements, Abingdon, Virginia." This study resulted in solution alternatives with associated cost estimates. Very few, if any, of the recommendations in that report were implemented. There have been other flood events in this area, most recently in July of 2009. During that storm, stormwater encroached nearby and even into several of the residences along the drainage path. Another Preliminary Engineering Report has since been commissioned by the Town Council to update the previous study discussed above. Currently, similar mitigation efforts are ongoing to ease flooding issues on East Main Street in Abingdon. East/West Main Street is the only detour route for Interstate 81 from Exit 14 to Exit 19 when severe weather events. Valley View Drive also experiences localized flooding of houses and streets, as well as drainage issues.

The Town of Abingdon identifies as an ongoing need for the immediate future the review of all streams and creeks within the Town's corporate limits, which includes the Town Creek and Wolf Creek drainage basins and their tributaries and a drainage swale paralleling Hillman Highway that contributes floodwaters to Fifteen Mile Creek.

Flooding issues affecting private and public property specifically identified within the Town Creek Basin are:

1) Tributary #1 to Town Creek – This tributary is in FEMA Special Flood Hazard Zone A from Hillside Drive downstream to Railroad Street
2) Tributary #2 to Town Creek- This tributary is in FEMA Special Flood Hazard Zone A from Thompson Drive downstream to Tanner Street
3) Tributary #3 to Town Creek – This tributary is in FEMA Special Flood Hazard Zone A from Washington County along Whites Mill Road downstream to Town Creek and
4) Town Creek – In FEMA Special Flood Hazard Zones AE and X and experiences localized flooding from Branch Street to Interstate 81.

Flooding issues specifically identified within the Wolf Creek Basin occur within Tributary #2 to Wolf Creek. Portions of this tributary are in FEMA Special Flood Hazard Zone A and flooding affects private and public property along the drainage path from Hill Street to Wolf Creek.

Although not specifically identified on the Town of Abingdon Flood Insurance Rate Map, private properties located within the drainage swale paralleling Hillman Highway experience damage from floodwaters of the drainage basin. The headwaters of this swale begin near East Main Street and discharge into Fifteen Mile Creek. Continued development within the watershed areas, which includes portions of Washington County, has created additional impervious surfaces, such as roofs and pavements that increase storm water runoff. Portions of all of the aforementioned sections within the Town are prone to flooding, property damage, loss and possible harm to residents.

In order to mitigate the conditions as described briefly above, the Town must perform hydrologic and hydraulic analyses of the watershed areas that specifically identify the problem areas and develop solutions and plans that address the problems. The aforementioned practices including analysis, planning, establishing priorities and application for available funds will help enable project work to progress so that all concerned can be protected from flooding.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2018.

Severe Weather Events

Flooding in Town of Abingdon

The Town recently had to intercede and perform emergency repairs on a property at 341 East Main Street, Abingdon, VA (Tax # 013-1-79) to allow Town Creek to flow properly and eliminate a blockage that was ponding water in East Main Street and became a potential flood hazard for neighboring properties. The Town would like to purchase the property to perform improvements to help alleviate the potential for high water at the intersection of East Main

Street and Town Creek and the potential flooding of adjacent properties. The building on the property dates from the 1930s and it would not be cost effective to attempt to renovate or flood proof. Our intent will be to demolish the existing building and pavement, reestablish the stream bank on both sides of Town Creek, and to create a floodplain on the rest of the property for future storm events. This will be a precursor to a larger project to improve the existing drainage under East Main Street and improve pedestrian movement.

Flooding in the Town of Damascus

September 2018: High water in Beaver Dam Creek and Gabien baskets collapse into stream bed downstream of Water Street bridge.

June-July 2019: Heavy rainstorms caused flooding along main street due to storm water system insufficiency.

July-August 2020: Heavy rainstorms caused flooding along main street due to storm water system insufficiency.

July -August 2021: Heavy rainstorms caused flooding along main street due to storm water system insufficiency.

December 2022: High waters in Beaver Dam Creek cause Gabien baskets to collapse into stream channel upstream of Water Street bridge.

Flooding in Washington County

A flooding event in April of 2020, Washington County had several citizens with many thousands of dollars loss due to having single access point access bridges washed away, etc. We also had several residences in the King Mill Pike/White Oak Rd area with several cars lost, several homes with 3 ft and higher water into the home and ruining heat pumps. We also had a water rescue team from a neighboring jurisdiction come in to remove residents from this same area due to the high-water level.

Severe Cold

A severe cold weather event on December 24, 2022, caused the water pipes to burst in the Washington County Government building. This resulted in water damage that caused considerable cost and time to fix. Water lines also burst in residential and commercial structures.

Location	County/Zone	St.	Date	Type	Mag	Dth	Inj	PrD
Totals:						0	0	4.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	03/12/2018	Heavy Snow		0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	03/20/2018	Heavy Snow		0	0	0.00K
ABINGDON	WASHINGTON CO.	VA	04/04/2018	Thunderstorm Wind	50 kts. EG	0	0	0.00K
WATAUGA	WASHINGTON CO.	VA	05/10/2018	Hail	1.00 in.	0	0	0.00K
ABINGDON	WASHINGTON CO.	VA	05/27/2018	Flash Flood		0	0	0.00K
HAYTERS GAP	WASHINGTON CO.	VA	06/25/2018	Thunderstorm Wind	50 kts. EG	0	0	0.00K
ABINGDON ARPT	WASHINGTON CO.	VA	08/18/2018	Flash Flood		0	0	0.00K
ABINGDON	WASHINGTON CO.	VA	08/18/2018	Flash Flood		0	0	1.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	09/15/2018	High Wind	50 kts. EG	0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K
ABINGDON	WASHINGTON CO.	VA	02/23/2019	Flood		0	0	0.00K
GLADE SPG	WASHINGTON CO.	VA	07/31/2019	Thunderstorm Wind	50 kts. EG	0	0	0.00K
GLADE SPG	WASHINGTON CO.	VA	07/31/2019	Thunderstorm Wind	50 kts. EG	0	0	0.00K
BOOKER	WASHINGTON CO.	VA	01/11/2020	Thunderstorm Wind	52 kts. MG	0	0	0.00K
WATAUGA	WASHINGTON CO.	VA	04/08/2020	Thunderstorm Wind	50 kts. EG	0	0	0.00K
ABINGDON	WASHINGTON CO.	VA	04/13/2020	Flash Flood		0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	04/29/2020	Strong Wind	30 kts. EG	0	0	3.00K
GREEN SPGS	WASHINGTON CO.	VA	07/18/2020	Thunderstorm Wind	50 kts. EG	0	0	0.00K
KETRON	WASHINGTON CO.	VA	07/24/2020	Thunderstorm Wind	50 kts. EG	0	0	0.00K
VANCE	WASHINGTON CO.	VA	08/28/2020	Thunderstorm Wind	50 kts. EG	0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/24/2020	Heavy Snow		0	0	0.00K
GLADE SPG	WASHINGTON CO.	VA	03/27/2021	Hail	1.00 in.	0	0	0.00K
HASKELL	WASHINGTON CO.	VA	03/28/2021	Hail	1.00 in.	0	0	0.00K
BURSON PLACE	WASHINGTON CO.	VA	03/28/2021	Hail	1.00 in.	0	0	0.00K
ABINGDON	WASHINGTON CO.	VA	03/28/2021	Hail	1.00 in.	0	0	0.00K
GLADE SPG	WASHINGTON CO.	VA	03/28/2021	Thunderstorm Wind	52 kts. EG	0	0	0.00K
GLADE SPG	WASHINGTON CO.	VA	03/28/2021	Thunderstorm Wind	52 kts. EG	0	0	0.00K
WALLACE	WASHINGTON CO.	VA	06/07/2021	Thunderstorm Wind	52 kts. EG	0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	03/12/2022	Heavy Snow		0	0	0.00K
BURSON PLACE	WASHINGTON CO.	VA	05/06/2022	Hail	1.25 in.	0	0	0.00K
KETRON	WASHINGTON CO.	VA	05/06/2022	Thunderstorm Wind	52 kts. EG	0	0	0.00K
KREGERS STORE	WASHINGTON CO.	VA	05/06/2022	Thunderstorm Wind	52 kts. EG	0	0	0.00K
EMORY	WASHINGTON CO.	VA	06/02/2022	Thunderstorm Wind	52 kts. EG	0	0	0.00K
WYNDALE	WASHINGTON CO.	VA	07/18/2022	Thunderstorm Wind	52 kts. EG	0	0	0.00K
MASADA	WASHINGTON CO.	VA	07/18/2022	Thunderstorm Wind	52 kts. EG	0	0	0.00K
OAK GROVE	WASHINGTON CO.	VA	08/05/2022	Thunderstorm Wind	52 kts. EG	0	0	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/23/2022	Cold/wind Chill		0	0	0.00K
ABINGDON	WASHINGTON CO.	VA	01/12/2023	Thunderstorm Wind	52 kts. EG	0	0	0.00K
ABINGDON	WASHINGTON CO.	VA	02/17/2023	Flood		0	0	0.00K
OAK GROVE	WASHINGTON CO.	VA	07/01/2023	Thunderstorm Wind	52 kts. EG	0	0	0.00K
THREE SPGS	WASHINGTON CO.	VA	07/15/2023	Flood		0	0	0.00K
ABINGDON	WASHINGTON CO.	VA	07/29/2023	Thunderstorm Wind	52 kts. EG	0	0	0.00K
Totals:						0	0	4.00K

Recommended Mitigations: Washington County and Abingdon, Damascus, and Glade Spring

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Make flood improvements to Valley View Drive Area	Floods	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements to Valley View Drive Area. Funding needed from VDEM/ FEMA.
High	Make Flood improvements to Stone Mill Road area along Wolf Creek	Floods	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements to Stone Mill Road Area. Funding needed from VDEM/ FEMA.
High	Make Flood improvements to Deadmore Street area along Town Creek	Floods	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements to Deadmore Street Area. Funding needed from VDEM/ FEMA.
High	Stream restoration and capacity for Town Creek	Floods/Severe weather	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Stream restoration and capacity for Town Creek. Funding needed from VDEM/ FEMA.
High	Make Flood improvements to Preston Street	Floods/Severe weather	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements to Preston Street. Funding needed from VDEM/ FEMA.
High	Make Flood improvements to Mink Place	Floods/Severe weather	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements to Mink Place. Funding needed from VDEM/ FEMA.

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Make Flood improvements to Sutton Street	Floods/Severe weather	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements to Sutton Street. Funding needed from VDEM/ FEMA.
High	Make Flood improvements to Tunnel Street	Floods/Severe weather	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements to Tunnel Street. Funding needed from VDEM/ FEMA.
High	Make Flood improvements to Hillman Highway	Floods/Severe weather	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements to Hillman Highway. Funding needed from VDEM/ FEMA.
High	Fifteen Mile Creek Stream Restoration and Capacity	Flood/Severe Weather	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements to Fifteen Mile Creek. Funding needed from VDEM/ FEMA.
High	Make Flood improvements to Walden and Valley Street	Flood/Severe Weather	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Make Flood improvements for Walden and Valley St. Funding needed from VDEM/ FEMA.
High	Emergency Power needs for Critical Infrastructures Town Hall, Harry L. Coomes Recreation Center (future shelter), Public Safety Communications Towers, Public Works Admin Building and Town Shop	Severe weather/ Loss of power	Town of Abingdon, Washington County, MRPDC	1- 5 years / Initiated	Funding needed from VDEM/ FEMA.
High	Aging Sewer infrastructure repair and replacement	Floods/Severe weather	Town of Abingdon, MRPDC	1- 5 years / Ongoing	Funding needed from VDEM/ FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Make storm water system improvements focused on Rt. 58/Laurel Avenue in Damascus; create retention where possible.	Floods	VDOT, Town of Damascus, MRPDC	3- 5 Years/ Not Started	Funding needed from VDOT, FHSA, FEMA, DHCD
High	Extensive stream bank stabilization improvements and reestablishment of stream along Beaver Dam Creek upstream on Rt. 58 bridge and along Laurel Creek upstream of confluence dredging on Laurel Creek	Floods	Town of Damascus, MRPDC, DCR	1- 3 Years/Not started	Funding needed from DCR, FEMA, FWS, DGIF, CDBG, VDEM
High	Further develop local capacity to document the number, size, age, and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Washington County, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct hydrological/engineering studies to determine Base Flood Elevations in watersheds containing estimated floodplains.	Floods	Washington County, MRPDC, VDEM, DCR	3- 5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Encourage more property owners to insure their homes through the National Flood Insurance Program.	Floods	Washington County, MRPDC, VDEM, DCR	1 - 3 Years/ Ongoing	Residents are encouraged to do so. Funding needed from VDEM/ FEMA
High	Consider and implement migration projects for repetitive loss and substantial damaged properties. Create greenspace in flood prone areas whenever possible.	Floods	Damascus, Washington County, MRPDC, VDEM, DCR	1- 3 Years/ Not Started	Funding needed from VDEM/FEMA, DCR
High	Conduct hydrological/ engineering studies to determine Base Flood Elevations and create new floodplain map for Cedar Creek in the Meadowview community.	Floods	Washington County, MRPDC, VDEM, DCR	3- 5 Years/ Not Started	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Use best available data as a basis for decision-making and work to implement relocation/demolition	Floods	Damascus, Washington County, MRPDC, VDEM, DCR	1 - 3 Years/ Ongoing	When this issue arises flood analysis is used; funding needed from FEMA, VDEM, DCR
High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Washington County, MRPDC, VDEM, DCR	1- 3 Years/ Ongoing	Done through compliance with the NFIP. Funding needed from VDEM/ FEMA
High	Critical facilities, such as Fire and Rescue buildings, water plants, wastewater plants, and pump stations need backup generators; and consider battery storage and energy generation and/or fuel storage for critical infrastructure and public safety.	All	Washington County, Town of Glade Spring, Town of Abingdon, Town of Damascus, MRPDC, VDEM	1 -3 Years/ Not Started	Funding needed from VDEM/ FEMA
High	Make flood improvements at the intersection of E. Main St. and Town Creek; reestablish the stream bankand create a floodplain.	Floods	Town of Abingdon, MRPDC, VDEM, DCR	1- 3 Years/ Complete	Funded through ARPA funds and funding needed from VDEM/ FEMA
High	Create an evacuation and communications plan; identify shelters/routes, emergency transport, provisions, and supply logistics.	Floods, Wildfire	Town of Damascus, Washington County, VDEM	1 - 3 Years/ Not Started	Done with Washington County Emergency Management, VDEM. Funding needed from VDEM/ FEMA
High	Create access to communications service along VA Creeper Trail, Mendota Trail, and Salt Trail corridors in case of need for emergency response	Emergency Response	VDOT, Town of Damascus, MRPDC, Town of Abingdon, Washington County USFS	3- 4 Years/ Initiated Study	VDOT, FHSA, DHCD, ARC, VDEM

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Mass communication for emergency notification to public	Emergency Response	Town of Abingdon, MRPDC	1- 3 Years/ Not Started	VDEM
Medium	Support educational programs to promote FIREWISE methods to affected residents of woodland communities. Numerous residential structures in and near wildland urban interface.	Wildfire	Washington County, RC&D, Firewise, MRPDC, DOF	1- 5 Years/ Not Started	Funding needed from VDEM/FEMA, other state and federal avenues
Medium	Educate residents on methods recommended to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Washington County, MRPDC, VDEM, DCR, American Red Cross	1- 5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant- hazard dams. There are four such dams in Washington County, one of which has been breached.	Dam Safety	Washington County, MRPDC, DCR	1 - 3 Years/ Ongoing	Done though federal, state, and local codes Funding needed from VDEM/ FEMA.
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Washington County, MRPDC, VDEM, DCR	1 - 3 Years/ Not Started	Will be looked at next year. Funding needed from VDEM/ FEMA

Wythe County and Rural Retreat and Wytheville

Community Hazard Profile

Wythe County is a community of 28,920 (an increase of 0.7% since 2018) that is traversed north-south by Interstate 77 and east-west by Interstate 81, as well as routes 21, 52, and 94. The county includes the incorporated towns of Rural Retreat and Wytheville, which serves as the county seat. The county caters to the trucking industry and also facilitated the construction of a major new Pepsi bottling plant along the I-81 corridor. More than 50% of the county contains slopes of more than 20%, which hinders development in those steep areas.

Chief natural hazards experienced in Wythe County and its localities include flooding, severe winter storms and ice, high winds, drought, and undetermined hazards from karst terrain (which appears in roughly 30% of the county's landscape). There is one high-hazard potential dam (Rural Retreat Dam) owned as a recreational attraction by the Virginia Department of Game and Inland Fisheries.

The flooding results from sustained heavy rainfalls, violent thunderstorms, and melting as the aftermath of a major snowstorm. Flood hazards have been identified for the Town of Wytheville and the community of Max Meadows east of Wytheville. There is one repetitive loss property in Wythe County.

Past or Ongoing Mitigations

Emergency response is based around the county's E-911 system, the sheriff's department, the state police, and several fire departments and rescue squads, including both paid and volunteer units.

The county's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2018. These modern codes help protect against hazard damages, such as those from high winds.

The access road to our Sand Mountain Radio Tower Site. The road is in dire need of maintenance and is nearly impassable at this time due to major washouts throughout the entire road. The road is about a mile long and Wythe County has our radio communication atop the mountain we are having major access problems all year round not to mention the site has a propane generator for when the power goes out and as of now the gas company can not make it up the mountain to maintain the propane levels.

The Communities of Max Meadows and Speedwell have had some issues with repetitive flooding. Reed Creek and Milers Creek in Max Meadows have severe road flooding that cuts off

parts of the community. Speedwell has repetitive flooding along Cripple Creek and Dry Run that causes erosion which damages homes and roadways. In both instances first responders have difficulty accessing these areas during high water. Work is currently being done to address these issues.

Severe Weather Events

Location	County/Zone	St.	Date	Type	Mag	Dth	Inj	PrD
Totals:						0	0	428.70K
WYTHE (ZONE)	WYTHE (ZONE)	VA	03/01/2018	High Wind	52 kts. EG	0	0	25.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	03/12/2018	Heavy Snow		0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	03/24/2018	Winter Storm		0	0	0.00K
JACKSONS FERRY	WYTHE CO.	VA	07/06/2018	Thunderstorm Wind	50 kts. EG	0	0	2.00K
KENT	WYTHE CO.	VA	08/08/2018	Thunderstorm Wind	50 kts. EG	0	0	6.00K
SIMMERMAN	WYTHE CO.	VA	08/31/2018	Hail	1.00 in.	0	0	0.00K
WYTHEVILLE	WYTHE CO.	VA	08/31/2018	Thunderstorm Wind	50 kts. EG	0	0	0.50K
WYTHEVILLE	WYTHE CO.	VA	08/31/2018	Lightning		0	0	0.20K
LONE ASH	WYTHE CO.	VA	08/31/2018	Thunderstorm Wind	50 kts. EG	0	0	1.50K
IVANHOE	WYTHE CO.	VA	09/17/2018	Flood		0	0	0.00K
IVANHOE	WYTHE CO.	VA	10/10/2018	Flash Flood		0	0	0.00K
HAVEN	WYTHE CO.	VA	10/11/2018	Flash Flood		0	0	0.00K
IVANHOE	WYTHE CO.	VA	10/11/2018	Flood		0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	10/21/2018	High Wind	50 kts. EG	0	0	8.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	11/15/2018	Ice Storm		0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	12/09/2018	Winter Storm		0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	01/12/2019	Winter Storm		0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	02/19/2019	Winter Storm		0	0	0.00K
FT CHISWELL	WYTHE CO.	VA	02/22/2019	Flood		0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	02/24/2019	High Wind	55 kts. EG	0	0	10.00K
RURAL RETREAT	WYTHE CO.	VA	05/29/2019	Thunderstorm Wind	55 kts. EG	0	0	5.00K
CEDAR SPGS	WYTHE CO.	VA	08/13/2019	Thunderstorm Wind	50 kts. EG	0	0	1.00K
IVANHOE	WYTHE CO.	VA	08/13/2019	Thunderstorm Wind	50 kts. EG	0	0	0.50K
AUSTINVILLE	WYTHE CO.	VA	08/13/2019	Thunderstorm Wind	50 kts. EG	0	0	0.50K
AUSTINVILLE	WYTHE CO.	VA	08/19/2019	Hail	0.75 in.	0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	10/01/2019	Drought		0	0	0.00K
KENT	WYTHE CO.	VA	02/06/2020	Flood		0	0	0.00K
FAVONIA	WYTHE CO.	VA	02/06/2020	Flood		0	0	0.00K
HAVEN	WYTHE CO.	VA	04/08/2020	Thunderstorm Wind	55 kts. EG	0	0	12.00K
LOTS GAP	WYTHE CO.	VA	04/08/2020	Hail	1.00 in.	0	0	0.00K
WYTHEVILLE	WYTHE CO.	VA	04/12/2020	Heavy Rain		0	0	0.00K
RURAL RETREAT	WYTHE CO.	VA	04/13/2020	Flash Flood		0	0	160.50K
KENT	WYTHE CO.	VA	04/13/2020	Flood		0	0	0.00K
IVANHOE	WYTHE CO.	VA	05/21/2020	Flood		0	0	16.50K
GRAHAMS FORGE	WYTHE CO.	VA	05/24/2020	Thunderstorm Wind	50 kts. EG	0	0	1.00K
MAX MEADOWS	WYTHE CO.	VA	06/19/2020	Flash Flood		0	0	25.00K
IVANHOE	WYTHE CO.	VA	08/06/2020	Hail	1.00 in.	0	0	0.00K
PORTERS XRDS	WYTHE CO.	VA	08/15/2020	Debris Flow		0	0	8.00K

WYTHE (ZONE)	WYTHE (ZONE)	VA	01/30/2021	Winter Storm		0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	02/13/2021	Winter Weather		0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	02/18/2021	Winter Storm		0	0	0.00K
IVANHOE	WYTHE CO.	VA	04/09/2021	Hail	0.88 in.	0	0	0.00K
IVANHOE	WYTHE CO.	VA	08/14/2021	Thunderstorm Wind	50 kts. EG	0	0	0.50K
LITTLE WYTHE FURNACE	WYTHE CO.	VA	08/14/2021	Thunderstorm Wind	50 kts. EG	0	0	0.50K
SPEEDWELL	WYTHE CO.	VA	12/11/2021	Thunderstorm Wind	50 kts. EG	0	0	1.50K
WYTHE (ZONE)	WYTHE (ZONE)	VA	01/03/2022	Winter Weather		0	0	0.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	01/16/2022	Winter Storm		0	0	0.00K
KENT	WYTHE CO.	VA	05/03/2022	Hail	1.00 in.	0	0	0.00K
WYTHEVILLE	WYTHE CO.	VA	05/06/2022	Hail	0.75 in.	0	0	0.00K
FT CHISWELL	WYTHE CO.	VA	05/06/2022	Hail	1.00 in.	0	0	0.00K
MAX MEADOWS	WYTHE CO.	VA	05/06/2022	Hail	1.00 in.	0	0	0.00K
SPEEDWELL	WYTHE CO.	VA	05/21/2022	Thunderstorm Wind	65 kts. EG	0	0	100.00K
MAX MEADOWS	WYTHE CO.	VA	06/17/2022	Thunderstorm Wind	55 kts. EG	0	0	15.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	12/23/2022	Extreme Cold/wind Chill		0	0	0.00K
RURAL RETREAT	WYTHE CO.	VA	01/12/2023	Thunderstorm Wind	55 kts. EG	0	0	4.00K
WYTHE (ZONE)	WYTHE (ZONE)	VA	04/01/2023	High Wind	55 kts. MG	0	0	0.00K
GUNTON PARK	WYTHE CO.	VA	05/16/2023	Thunderstorm Wind	50 kts. EG	0	0	1.00K
LOTS GAP	WYTHE CO.	VA	05/16/2023	Thunderstorm Wind	55 kts. EG	0	0	2.50K
KENT	WYTHE CO.	VA	07/23/2023	Thunderstorm Wind	55 kts. EG	0	0	2.50K
KENT	WYTHE CO.	VA	07/23/2023	Thunderstorm Wind	50 kts. EG	0	0	8.00K
WYTHEVILLE	WYTHE CO.	VA	07/29/2023	Thunderstorm Wind	60 kts. EG	0	0	10.00K
Totals:						0	0	428.70K

Recommended Mitigations: Wythe County and Rural Retreat and Wytheville

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Upgrade the six pipes along Mule Hell Road that will be able to accommodate a 100-year storm	Flood	Wythe County, MRPDC	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA
High	Access to the Sand Mountain Radio Tower Site. The road is currently impassable for necessary fuel vehicles.	All hazards	Wythe County, Town of Wytheville, MRPDC	1-3 Years/ Not started	Funding needed from VDEM/FEMA and DOF.

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Critical facilities, such as Town of Wytheville, Town of Rural Retreat & Wythe County Fire and Rescue buildings and water plants, wastewater plants and pump stations need backup generators; and consider battery storage and energy generation and/or fuel storage for critical infrastructure and public safety.	All hazards	Wythe County, Town of Wytheville, Town of Rural Retreat, VDEM, MRPDC	1-3 Years/ Not started	Funding needed from VDEM/FEMA
High	Planning and construction for floodproofing at water treatment plants and wastewater treatment plants.	Floods	Wythe County, Town of Wytheville, MRPDC, DCR, FEMA	1-3 Years/ Not Started	Increased compliance with NFIP; critical infrastructure
High	Planning and construction of stormwater storage for Town Branch creek. Explore stormwater mitigation, including upsize culverts, LID and nature-based strategies, and/or acquisition of flood prone properties.	Floods	Town of Wytheville, MRPDC, DCR, VDEM, FEMA	1-3 Years/ Not Started	Funding needed from VDEM/FEMA or DCR
High	Mitigate against repetitive flooding of main transportation infrastructure in Max Meadows along Reed Creek and Millers Creek. Mitigate against erosion and damage to homes and transportation infrastructure caused by repetitive flooding in Speedwell along Cripple Creek and Dry Run Creek.	Flooding	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA
High	Apply for funding to purchase and install generators at Wythe County's main pumping station.	All hazards	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Further develop local capacity to document the number, size, age, and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Conduct hydrological/ engineering studies to determine Base Flood Elevations in watersheds containing estimated floodplains.	Floods	Wythe County, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Done through compliance with the NFIP
High	Use the flood analysis as a basis for consideration of future relocation/demolition and flood-proofing projects.	Floods	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Used when these projects are looked at
Medium	Support development of strategic wildfire risk reduction plans such as being promoted by the New River-Highlands RC&D Council.	Wildfire	Wythe County, RC&D, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Support educational programs to promote Firewise methods to affected residents of woodland communities. An estimated 20,000 acres of land (unknown number of woodland homes) are subject to wildfire risk in Wythe County.	Wildfire	Wythe County, RC&D, Firewise, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Establish emergency supply of critical supplies	All Hazards	Town of Wytheville, MRPDC, VDEM	1-3 Years/Not Started	Funding needed from VDEM/FEMA or other

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
Low	Install public warning system for imminent threats to public safety	All Hazards	Town of Wytheville, MRPDC, VDEM	1-3 Years/Not Started	Funding needed from VDEM/FEMA or other
Low	Establish a local radio communication system for town personnel to use during emergency response	All Hazards	Town of Wytheville, MRPDC, VDEM	1-3 years Not started	Funding needed from VDEM/FEMA or other
Low	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	Wythe County, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams. Rural Retreat Dam falls into the high-hazard potential category in Wythe County.	Dam Safety	Wythe County, MRPDC, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Done through Federal, State, and local codes
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	Wythe County, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA Will start next year

City of Bristol

Community Hazard Profile

The City of Bristol, Virginia is a community of 17,219 (an increase of 0.3% since 2018) located along Interstate 81 and abutting the far southwestern reach of Washington County. The city has experienced some transition in some traditional residential areas being converted to commercial uses and some shift toward high-tech industry. Bristol stands in the lowlands of the Valley and Ridge physiographic province, and this area is characterized by karst terrain.

Chief natural hazards experienced in the City of Bristol include flooding, which in the past has caused damages in the millions of dollars according to a study by the U.S. Army Corps of Engineers. Other natural hazards faced in Bristol include severe winter storms and ice, high winds, and undetermined hazard risks from karst terrain and landslides. Two high-hazard potential dams affecting Bristol include Clear Creek Dam and Beaver Creek Dam, both located upstream in Washington County. The City of Bristol contains two repetitive loss properties.

Past or Ongoing Mitigations

Emergency response is based around the city's E-911 system, the Washington County Sheriff's Department, the City of Bristol Police Department, the state police, and fire department and rescue squads.

In the spring of 2015, the City of Bristol installed a new water management device at Sugar Hollow Dam. The 1.1 million Dollar phase was part of a larger $6.9 million project by the U.S. Army Corps of Engineers. The project addresses flood events along Beaver Creek by replacing a water control structure on the upstream side of the dam.

The City of Bristol, Virginia teamed up with the City of Bristol, Tennessee to work with the U.S. Army Corps of Engineers to conduct the "Flood Damage Reduction Feasibility Study" of 2003 to identify ways to reduce continuing flood damage, especially along the main stem of Beaver Creek, which passes through the center of the adjacent cities. The Corps of Engineers recommended the following flood mitigations in July 2003:

- Widening the Beaver Creek channel near 6th Street (in Bristol, Tennessee)
- Replacing a pedestrian bridge and removing the 8th Street Bridge (in Bristol, Tennessee)
- Removing the old Sears commercial building near State Street (in Bristol, Tennessee)
- Replacing the existing outlet structure (a 48-inch diameter pipe) on Beaver Creek Dam with a larger reinforced concrete structure to more effectively hold back flood flows.

The Corps of Engineers estimated the proposed mitigations will reduce total average annual flood damages by 20% and reduce flood levels by nearly one foot in the central business districts of both Bristol, Virginia and Bristol, Tennessee.

The city's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2018. These modern building codes help offset damages caused by natural hazards, such as high winds, for new construction.

Severe Weather Events

Flooding Events

The City of Bristol, VA experienced flooding conditions due to a heavy rainfall event on August 18, 2018. A small un-named stream that flows from the north side of Interstate 81 through the Briarwood Subdivision (located just south of the interstate) overflowed and flooded basements of several homes specifically along Brookdale Circle, in addition to the parking lot of a neighboring business located on Lee Highway (Rt. 11). The FIRM panel map (510022-0008 D) shows no Special Flood Hazard Area for this area. The City would like to do a flood risk analysis of this area and a mitigation plan for measures that could be done to address future flood events. In addition, Mumpower Creek which is a small tributary to Beaver Creek overflowed its banks with the same event on the 18th, affecting several homes located in the floodplain. If resources are available, the City would like to also do a flood study of this area between Valley Drive and Beaver Creek to address mitigation. The anticipated cost of the study would be $60,000. The City would provide the required 25% match with in-kind staff time (valued at $15,000 – salary and fringes) from our Engineering staff.

Snow Event

On December 9, 2018, Heavy snow event caused Interstate 81 to shut down due to multiple vehicle crashes. This caused multiple traffic backups in the surface streets in and around the city.

Due to the severity of the heavy snow impact on the City of Bristol, the City of Bristol Emergency Management staff has created two goals to communicate to citizens better about severe weather events and traffic incidents:

- Goal 1: Utilize social media to better inform citizens of severe weather in the area and of any incidents on Interstate 81 within Bristol city limits.
- Goal 2: Utilize Everbridge Alerting Program and IPAWS to better inform Bristol citizens and I-81 travelers of severe weather in area and of any incidents on Interstate 81 within Bristol city limits.

These two goals are active and ongoing through July 2024. Currently the Everbridge/IPAWS community alerting programs are funded through July 2024 and the City of Bristol will seek a future funding source to pay for Everbridge/IPAWS community alerting programs after the current funding is no longer available.

Location	County/Zone	St.	Date	Type	Mag	Dth	Inj	PrD	CrD
Totals:						0	0	3.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	03/12/2018	Heavy Snow		0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	03/20/2018	Heavy Snow		0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	09/15/2018	High Wind	50 kts. EG	0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/09/2018	Heavy Snow		0	0	0.00K	0.00K
BRISTOL	BRISTOL (C) CO.	VA	08/20/2019	Hail	1.00 in.	0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	04/29/2020	Strong Wind	30 kts. EG	0	0	3.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/24/2020	Heavy Snow		0	0	0.00K	0.00K
BRISTOL	BRISTOL (C) CO.	VA	03/27/2021	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	03/12/2022	Heavy Snow		0	0	0.00K	0.00K
WASHINGTON (ZONE)	WASHINGTON (ZONE)	VA	12/23/2022	Cold/wind Chill		0	0	0.00K	0.00K
Totals:						0	0	3.00K	0.00K

Recommended Mitigations: City of Bristol

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Utilize Everbridge Alerting Program and IPAWS to better inform Bristol citizens and I-81 travelers of severe weather in area and also of any incidents on Interstate 81 within Bristol city limits.	All hazards	City of Bristol	1 year / ongoing	Currently funded through July 2024. Will seek future funding from FEMA/VDEM to pay for programs.
High	Perform flood studies at Briarwood Subdivision along Brookdale Circle and along Lee Hwy; also at Mumpower Creek between Valley Drive and Beaver Creek.	Floods	City of Bristol, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funded by Bristol, TN/VA
High	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	City of Bristol, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
High	Support implementation of the remedies outlined by the U.S. Army Corps of Engineers for the cities of Bristol in Virginia and Tennessee.	Floods	City of Bristol, MRPDC, VDEM, DCR	3-5 Years/ Ongoing	Funded by Bristol, TN/VA
High	Identify flood prone properties for potential acquisition/demolition, elevation, flood proofing, and minor localized flood control projects.	Floods	City of Bristol, MRPDC, VDEM, DCR	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
High	Comply with NFIP for floodplain identification and mapping, responsible floodplain management, and the promotion of flood insurance.	Floods	City of Bristol, MRPDC, VDEM, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Done through compliance with the NFIP

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Critical facilities, such as Fire and Rescue buildings, water plants, wastewater plants, and pump stations need backup generators; and consider battery storage and energy generation and/or fuel storage for critical infrastructure and public safety.	All	City of Bristol, MRPDC, VDEM	1 -3 Years/ Not Started	Funding needed from VDEM/ FEMA
Medium	Support educational programs to promote Firewise methods, as appropriate to residents of woodland communities. More specific data for the city was not available at the time this report was written.	Wildfire	City of Bristol, Firewise, MRPDC, VDEM, DCR, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Educate residents on methods recommended by the American Red Cross to prepare for various types of natural disaster.	Floods Snowstorms/Ice High Winds	City of Bristol, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Low	Properly inspect and enforce applicable state and federal dam regulations for high- and significant-hazard dams. These include Clear Creek Dam and Beaver Creek Dam.	Dam Safety	City of Bristol, MRPDC, DCR	1-3 Years/ Ongoing	Funding needed from VDEM/FEMA Done through Federal, State, and Local codes
Low	Verify the geographic location of all NFIP repetitive losses and make inquiries as to whether the properties have been mitigated, and if so, by what means.	Floods	City of Bristol, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA Will start next year

City of Galax

Community Hazard Profile

The City of Galax, a community of 6,720 (decrease of 0.4% since 2018), is located in a hilly area with above-sea elevations ranging from 2,340 feet to 2,980 feet at Ward Knob.

While the City of Galax contains a defined floodplain along Chestnut Creek, which flows north-south through the city core, Galax does not participate in the National Flood Insurance Program and has resisted suggestions it rejoin the program, despite disaster-level flooding in November 2003 and repeat flooding problems in 2004. For communities that refuse to participate in NFIP, disaster help from FEMA is not available in the defined floodplains. Flooding problems also have been evident recently along the tributary of Mill Creek, which is not part of a recognized FEMA floodplain. Flooding on the tributaries occurs because the city's storm drainage system is aging (50 years old), with parts of the piping collapsing; these problems block storm water drainage and worsen flooding problems in some residential neighborhoods.

Other natural hazards faced by the City of Galax include wildfires and high winds. The city, along with much of the Mount Rogers region, is part of a Special Wind Zone (winds up to 200 mph), although the problems created do not appear to be of disaster level and the city does enforce current building codes.

In 2019 a study entitled The West Galax Stormwater System Evaluation Study was completed.

Based upon the investigations completed and conclusions reached the following recommendations were made:

1. City Staff should review the Study findings and recommendations and concur with the Study, if applicable.
2. City Staff should contact and discuss potential availability and eligibility of funding sources to implement the proposed improvements. Agencies to be considered include the Virginia Department of Transportation (VDOT), Virginia Department of Housing and Community Development (DHCD), Appalachian Regional Commission (ARC), USDA-Rural Development (USDA), and others as appropriate.
3. City Staff should evaluate the recommended areas of improvements and determine if other City infrastructure needs (streets, sidewalks, water, sewer, etc.) exist in those locations in an effort to combine projects.
4. City Staff should implement as many of the identified short-term stormwater improvements as practical.

5. City Staff should evaluate and prioritize the order in which the identified areas should be addressed. Based upon the nature of the problems identified, scope and cost of the improvements, the initial priority could be argued to be:
    i. Basin A (Swanson Street, Parkwood Drive, Calhoun Street, etc.)
    ii. Basin B (Oldtown Street)
    iii. Basin C (Webster & Washington Streets)
6. Upon completion of steps 1-5, the City should request and secure funding, then implement the recommended improvements using a phased approach.

Past or Ongoing Mitigations

The City of Galax grew up around its industrial district along Chestnut Creek in the core of the city. Due to disastrous flooding problems along Chestnut Creek (especially in 1940), the U.S. Army Corps of Engineers in 1950 channelized the creek through the downtown area and flood-proofed the industrial buildings located there. Following the flood disaster from November 2003, Galax city officials said they had developed a P.E.R. to improve the drainage system to help alleviate flooding problems. The City has completed Bottom Area Project Phase I and is currently underway with the next phase of projects. A new P.E.R. was done after 3 events in 2018. The city is considering methods of grants, financing, or fees to address those identified problems that affect the downtown area. In 2018, the City submitted a request to the US Army Corps of Engineers to look at possible projects upstream of Chestnut Creek through the Flood Damage Reduction Program (Section 205 of the 1948 Flood Control Act). The end result would be a project that would reduce the 100-year flood plain to the Chestnut Creek channel. It is their understanding that Galax is under consideration for this study, and it may be approved in 2019.

The city's building codes are in line with the most recent statewide revisions known as the Uniform Statewide Building Code, which took effect in 2018. These modern codes help to offset the impacts of natural hazards such as winds for new construction. For emergency response, the City of Galax participates in the Twin County E-911 system, which covers the entire city, along with the adjoining counties of Carroll and Grayson. Responders include fire departments and rescue squads, local police and sheriff's departments, and the state police.

The city is in the process of mitigating repetitive flood issues in the downtown area that has caused damage to business and infrastructure. The city has lowered the central elevation of South Main Street about 11 inches giving the water a channel out of the area. The city has also determined they have insufficient sized culverts to handle the amount of runoff after a heavy rain. The city is in the process of installing larger drainage infrastructure.

The City of Galax is bolstering its stormwater revenues with VDOT Revenue Sharing grants to revitalize aging infrastructure. The City has been awarded two grants to date: $1,839,000 with a 50/50 match, and $5,589,000 with a 50/50 match. The $1.8M project is underway. The $5.6M project is expected to begin in 2024. The goal is to target a $2M improvement projects every other year.

Severe Weather Events

Location	County/Zone	St.	Date	Type	Mag	Dth	Inj	PrD
Totals:						0	1	3.277M
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/18/2018	High Wind	50 kts. MG	0	0	75.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/01/2018	High Wind	52 kts. EG	0	0	150.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/12/2018	Heavy Snow		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/15/2018	Strong Wind	48 kts. EG	0	0	250.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/24/2018	Winter Storm		0	0	0.00K
GALAX	GALAX (C) CO.	VA	09/08/2018	Heavy Rain		0	0	0.00K
GALAX	GALAX (C) CO.	VA	09/08/2018	Flash Flood		0	0	2.000M
CARROLL (ZONE)	CARROLL (ZONE)	VA	09/14/2018	Strong Wind	35 kts. EG	0	0	10.00K
GALAX	GALAX (C) CO.	VA	09/16/2018	Flood		0	0	0.00K
GALAX	GALAX (C) CO.	VA	10/10/2018	Heavy Rain		0	0	0.00K
GALAX	GALAX (C) CO.	VA	10/10/2018	Flash Flood		0	0	0.00K
GALAX	GALAX (C) CO.	VA	10/10/2018	Flood		0	0	0.00K
GALAX	GALAX (C) CO.	VA	10/11/2018	Flash Flood		0	0	455.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	10/11/2018	Strong Wind	38 kts. MG	0	0	40.00K
GALAX	GALAX (C) CO.	VA	10/11/2018	Debris Flow		0	0	2.00K
GALAX	GALAX (C) CO.	VA	10/11/2018	Debris Flow		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	11/14/2018	Ice Storm		0	0	15.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/08/2018	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/09/2019	High Wind	54 kts. MG	0	0	4.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/12/2019	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/20/2019	High Wind	55 kts. MG	0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/19/2019	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/24/2019	High Wind	55 kts. EG	0	0	50.00K
GALAX	GALAX (C) CO.	VA	04/19/2019	Flash Flood		0	0	0.00K
GALAX	GALAX (C) CO.	VA	04/19/2019	Thunderstorm Wind	55 kts. EG	0	0	15.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	10/31/2019	High Wind	55 kts. EG	0	0	50.00K
GALAX	GALAX (C) CO.	VA	01/11/2020	Thunderstorm Wind	55 kts. EG	0	0	5.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/11/2020	High Wind	50 kts. MG	0	0	0.00K
GALAX	GALAX (C) CO.	VA	02/06/2020	Heavy Rain		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	10/29/2020	Tropical Storm		0	0	5.00K
GALAX	GALAX (C) CO.	VA	11/10/2020	Heavy Rain		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/16/2020	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/24/2020	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/08/2021	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/02/2021	High Wind	56 kts. MG	0	1	100.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/02/2021	High Wind	50 kts. MG	0	0	5.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/13/2021	Winter Weather		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/18/2021	Winter Storm		0	0	0.00K
GALAX	GALAX (C) CO.	VA	03/27/2021	Hail	1.50 in.	0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/03/2022	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/16/2022	Winter Storm		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	01/17/2022	High Wind	50 kts. EG	0	0	15.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	02/17/2022	High Wind	56 kts. MG	0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/12/2022	High Wind	50 kts. MG	0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	03/31/2022	High Wind	50 kts. EG	0	0	1.00K
GALAX	GALAX (C) CO.	VA	06/08/2022	Hail	1.00 in.	0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	09/30/2022	High Wind	52 kts. MG	0	0	5.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/23/2022	Strong Wind	41 kts. MG	0	0	10.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	12/23/2022	Extreme Cold/wind Chill		0	0	0.00K
CARROLL (ZONE)	CARROLL (ZONE)	VA	04/01/2023	High Wind	51 kts. MG	0	0	10.00K
GALAX	GALAX (C) CO.	VA	07/29/2023	Thunderstorm Wind	55 kts. EG	0	0	5.00K
Totals:						0	1	3.277M

Recommended Mitigations: City of Galax

Rank	Activity	Hazard Addressed	Responsible Party	Timeline/ Status	Comments
High	Install back-up generators/ redundant power at critical facilities, including the water treatment plant, wastewater treatment plant, emergency shelter (Rec Center), and Galax-Grayson EMS, etc.	All hazards	City of Galax, Grayson County, MRPDC	1-3 years/ Not Started	Funding needed from FEMA, VDEM, DCR
High	Upgrade public safety communication infrastructure from analog to digital, for Twin County Region (counties of Carroll and Grayson and the City of Galax).	All hazards	City of Galax, MRPDC, VDEM, DCR	1 Year/ In Progress	Funding needed from VDEM/FEMA
High	Educate residents on methods recommended by the American Red Cross to prepare for all types of natural disaster.	All hazards	City of Galax, MRPDC, VDEM, DCR, American Red Cross	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Communications software and public outreach to encourage citizen sign-ups for community notifications (emergency) and non-emergency preemptive mitigation.	All hazard	City of Galax, VDEM	1-3 years/ Not Started	Funding and staff resources needed
Medium	Further develop local capacity to document the number, size, age and value of the approximately 1,400 (PDC total) structures located in the floodplain.	Floods	City of Galax, MRPDC, VDEM, DCR	1-3 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Support development of strategic wildfire risk reduction plans such as being promoted by the New River-Highlands RC&D Council.	Wildfire	City of Galax, RC&D, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA
Medium	Support educational programs to promote Firewise methods to affected residents of woodland communities. An estimated 67 homes in Galax are in wooded settings and at risk of wildfire.	Wildfire	City of Galax Firewise, RC&D, MRPDC, DOF	3-5 Years/ Not Started	Funding needed from VDEM/FEMA

PLAN MAINTENANCE

Plan Adoption

It is anticipated that the 2024 revision of the Mount Rogers Hazard Mitigation Plan will be adopted in the summer of 2024. All resolutions for adoption of the plan by participating localities will be included in the final document. The plan was available for public comment throughout the update process. The Public will also have an opportunity to view the plan during the final adoption phase by the localities. The MRPDC will assist any locality in guiding the plan through the adoption process with all necessary public hearings and provide the adoption resolutions.

Plan Implementation

The Mount Rogers Hazard Mitigation Plan will be implemented as follows:

1) policy changes that avoid development in hazard areas or that protect buildings from future impacts, and
2) implementation projects that physically change the environment to reduce impacts or educate landowners and residents on how to protect themselves and their property in the case of an event.

The goal of implementing the identified strategies is to reduce the loss of life and/or property due to natural hazard events. Policy changes are an ongoing way to implement the hazard mitigation plan. As local plans are updated, such as comprehensive plans, zoning and subdivision ordinances, or capital improvement plans, strategies for mitigating hazard impacts can be included. Changes to these plans do require some foresight and public involvement but can be a way for localities to make significant progress with little capital investment. The MRPDC works regularly with its member localities as they update these plans and is willing to provide technical assistance for including hazard mitigation specific strategies and language when requested.

Implementing projects require more work and investment from the locality or lead agency. Many of the identified projects are contingent on finding grant funding and partnering with other agencies and organizations to complete the project. Grant funding is especially critical in the current economic situation.

Plan Maintenance

The Mount Rogers Hazard Mitigation Plan will be reviewed annually by the staff of the Mount Rogers Planning District Commission with local government staffs to ensure that the project list stays up-to-date (and completed projects are noted). If necessary, the plan will be reviewed and revised after significant hazard events impacting the region. Cost-effective projects may be added to the locality project list each year, with that local government's approval. This review and potential update may be conducted electronically or through an annual meeting of the Hazard Mitigation Steering Committee. The PDC will ensure that each locality section of the mitigation plan is integrated into the comprehensive plans as updates occur. The method of review will depend on the events of the previous year and the extent of potential revisions to be made. An annual report of the status of mitigation actions will be reviewed and sent to VDEM to reduce the burden of evaluating strategies for the required five-year revision.

In five years, the Mount Rogers PDC will work to find funding from VDEM and/or FEMA to update the Mount Rogers Hazard Mitigation Plan. Any update of the plan will include a public input session or strategy to engage the community in this planning effort. At the time of the next update, the effectiveness of the mitigation strategies will be evaluated by determining any reduction in vulnerability to a particular hazard. New vulnerabilities will be identified by looking at event history in the past five years, as well as development that may have occurred in hazard areas. During the interceding five years, the Mount Rogers PDC will maintain the hazard mitigation website and will update it periodically with grant funding availability and project updates from localities, if available. This will also allow for continued public input throughout the plan implementation phase.

Strengthen public participation by providing more avenues for the public to comment on and ask questions about the Hazard Mitigation Plan and its development. The PDC recommends holding at least two regional public input sessions, one to be held in Galax for the City of Galax and the counties of Grayson and Carroll and one to be held in Marion for the Smyth, Washington, Wythe, Bland, and Bristol areas. The PDC will also stress to the localities the importance of educating the public on the Mitigation Plan and the need for community support. This outreach can be done via websites and social media.

Emergency Management Personnel Contact Information

Jurisdiction Name	Plan POC	Mailing Address	Email	Phone
Bland County	Jenna Dunn	612 Main St. Bland VA24315	jdunn@bland.org	276-688-4641
Carroll County	Gary Bergeron	605-1 Pine St, Hillsville, VA 24343	gary.bergeron@carrollcountyva.org	276-730-3012
Grayson County	Paul Hoyle	129 Davis St. Independence VA 24348	phoyle@graysoncountyva.gov	276-773-2471
Smyth County	Curtis Crawford	121 Bagley Circle Suite 100. Marion VA 24354	emergencymgt@smythcounty.org	276-783-3381
Washington County	Theresa Kingsley	20281 Rustic Ln, Abingdon VA 24210	tkingsley@washcova.com	276-525-1330
Wythe County	Chuck Parnell	340 6th Street, Wytheville VA 24382	csparnell@wytheco.org	276-724-6000
City of Galax	James Cox	300 West Grayson St., Galax VA, 24333	jcox@galaxva.com	276-235-9580
City of Bristol	Mike Armstrong	211 Lee St. Bristol VA 24201	mike.armstrong@bristolva.org	276-645-7303
Town of Abingdon	Tim Estes	P.O. Box 789, Abingdon VA 24212	timestes@abingdon-va.gov	276-628-5563
Town of Chilhowie	John Clark	325 East Lee Highway, PO Box 5012, Chilhowie, VA 24319	chilhowie.townmgr@chilhowie.org	276-646-3232
Town of Damascus	Gavin Blevins	1021 Terrace Drive, Marion, VA 24354	gblevins@mrpdc.org	276-783-5103
Town of Fries	Paul Hoyle	129 Davis St. Independence VA 24348	phoyle@graysoncountyva.gov	276-773-2471
Town of Glade Spring	Cecile Rosenbaum	P.O. Box 98 Glade Spring, Virginia 24340	cecile@gladespringva.org	276-429-5134
Town of Hillsville	Retta Jackson	410 N. Main St., P.O. Box 545, Hillsville, VA 24343	hillsville@townofhillsville.com	276-728-2128
Town of Independence	Paul Hoyle	129 Davis St. Independence VA 24348	phoyle@graysoncountyva.gov	276-773-2471
Town of Marion	Bill Rush	138 W. Main Street, Marion VA 24354	brush@marionva.org	276-783-4113
Town of Rural Retreat	Jason Childers	PO Box 130, Rural Retreat, VA 24368	jasonc@townofruralretreat.com	276-686-4221
Town of Saltville	Brian Martin	217 Palmer Ave. Saltville VA 24370	townmanager@saltville.org	276-496-5342
Town of Troutdale	Aaron Sizemore	1021 Terrace Drive, Marion, VA 24354	asizemore@mrpdc.org	276-783-5103
Town of Wytheville	Brain Freeman	150 E. Monroe St, Wytheville, VA 24382	bfreeman@wytheville.org	276-223-3302

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