

Regional Natural Hazard Mitigation Plan

Summary: Albemarle County and Town of Scottsville



Prepared By the:
Thomas Jefferson Planning
District Commission

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2017 Update
DRAFT

 *Thomas
Jefferson*
Planning District Commission

Natural Hazard Mitigation Plan: Introduction

► Hazard Mitigation Planning

The purpose of the Regional Natural Hazard Mitigation Plan is to prepare for natural disasters before they occur, thus reducing loss of life, property damage, and disruption of commerce.

The Federal Emergency Management Agency (FEMA) requires such a plan as a condition for eligibility in certain mitigation grant programs. The plan applies to all jurisdictions in the Thomas Jefferson Planning District – Albemarle County, the City of Charlottesville, Greene County, Louisa County, Fluvanna County, Nelson County, and the Towns of Stanardsville, Louisa, Mineral & Scottsville. The original plan was adopted by all jurisdictions in 2006, and the plan was further updated in 2012.

The Following sections are included in the plan:

1. **Introduction** – an overview of hazard mitigation generally and an outline of the plan
2. **Planning Process** – the process through which the plan was developed, including public input
3. **Community Profile** – general information about communities in the planning district
4. **Hazard Identification and Analysis** – general information about potential hazards in the planning district, the historic record of hazard events, and the probability of future events
5. **Vulnerability Assessment** – analysis of the human impact hazards could cause, with estimated potential losses for various hazard scenarios
6. **Capabilities Assessment** – a survey of current local capacity to mitigate natural hazards
7. **Mitigation Strategy** – goals, objectives, and action items selected to mitigate hazards identified in the region



► Planning Process

The lead agency in the preparation of this plan is the Thomas Jefferson Planning District Commission (PDC). The PDC provides resources that ensure the plan takes an efficient regional approach and is supported by a Hazard Mitigation Working Group, consisting of representatives from local planning departments, emergency managers, and local administrators to help guide updates to the plan. Once adopted the Working Group members will help monitor and implement the plan.

Regional Natural Hazard Mitigation Plan

2012 UPDATE - Approved by FEMA, July 30, 2012



Prepared by the:
Thomas Jefferson Planning District Commission

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extreme-heat/cold
Wildfire
Flooding
Tornado
High-Wind
Earthquake
Winter-weather
Lightning
Dam

► Hazard Identification and Analysis Process

The purpose of the hazard identification process is to describe all natural hazards that affect the Thomas Jefferson Planning district and provide an analysis on their location, extent, severity, and probability of occurrence. Each individual hazard was identified, including a description of the hazard in general written from a national perspective, followed by an in-depth analysis based on the particular impact the hazard has on the Thomas Jefferson Planning District.

The Hazard Assessment Tool was used to evaluate each identified hazard according to the probability of occurrence and the severity in terms of impact to human life, property, and business operations. Results of the 2016 assessment are outlined in the hazard vulnerability assessment matrix below.

► Hazard Vulnerability Assessment

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
	Likelihood this will occur	Possibility of death or injury	Physical losses and damages	Interruption of services	Relative threat*
SCORE	0=N/A 1=low 2=Moderate 3=High	0=N/A 1=low 2=Moderate 3=High	0=N/A 1=low 2=Moderate 3=High	0=N/A 1=low 2=Moderate 3=High	0 - 100%
Hurricane/high wind/windstorms	3	3	3	3	100%
Flooding	3	1	3	2	67%
Winter storms/ weather	3	1	1	3	56%
Wildfire	2	1	1	1	22%
Lightning	2	1	1	1	22%
Drought and extreme heat	2	1	1	1	22%
Dam failure	1	2	2	2	22%
Tornado	1	1	2	2	19%
Earthquake	1	1	2	2	19%
Landslide	1	1	1	1	11%
AVERAGE SCORE	1.19	0.81	1.06	1.13	7%

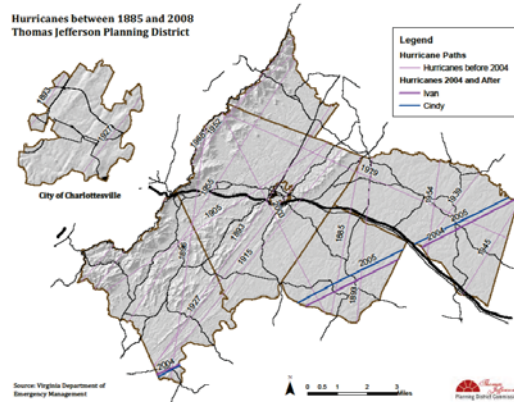
HIRA: Hurricanes, High Wind, Wind Storms & Lightning

Hurricanes, High Wind, Wind Storm

Wind associated with hurricanes, thunderstorms and other weather phenomena poses the most significant risk to area residents. Wind related weather has caused in excess of \$8.2 million in property and crop damage. These events have resulted in 85 injuries and 2 deaths since 1995. Significant past wind events include the 2012 Derecho, which caused significant regional damage and was a Federally declared disaster.

Wind events caused by thunderstorms can be especially dangerous because they develop quickly. Hurricane related winds tend to have a greater impact in the eastern part of Virginia. Few hurricanes have made a direct hit on the region. Note: Tornadoes are addressed on a separate poster.

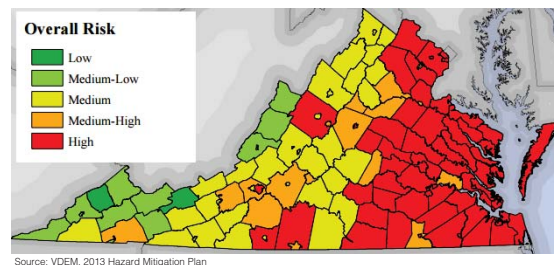
Historic Hurricane Tracks 1885-2008



Hurricane/Tropical Storms 1995-2015

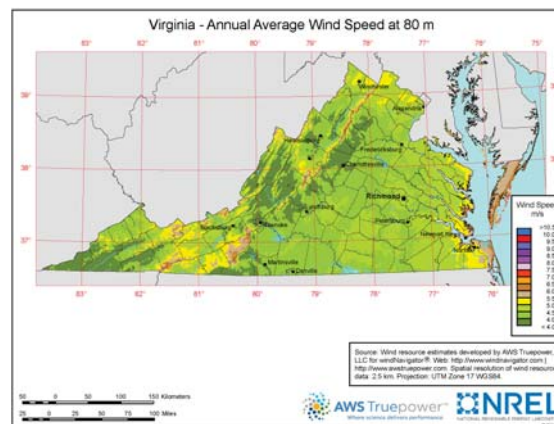
Locality	#	Death	Injuries	Property Loss	Crop Damage
Albemarle	2			\$5,000	
Charlottesville					
Fluvanna	1			\$36,000	
Greene	1			\$1,000	
Louisa	1				
Nelson	2			\$1,000	
Region	7	0	0	\$43,000	0

Hurricane Risk



High/Strong Wind Events 1995-2015

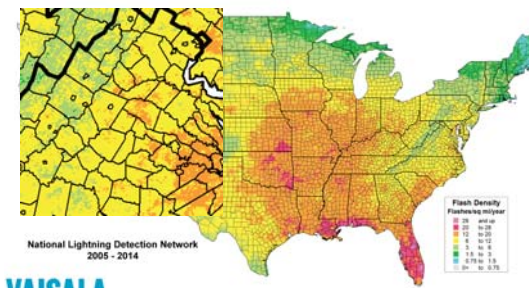
Locality	#	Death	Injuries	Property Loss	Crop Damage
Albemarle	26		66	\$2,163,100	\$900,000
Charlottesville					
Fluvanna	1			\$2,000	
Greene	15			\$573,100	\$250,000
Louisa	4			\$8,000	
Nelson	24			\$226,600	\$370,000
Region	70	0	66	\$2,972,800	\$1,520,000



Lightning Thunderstorms/Wind 1995-2015

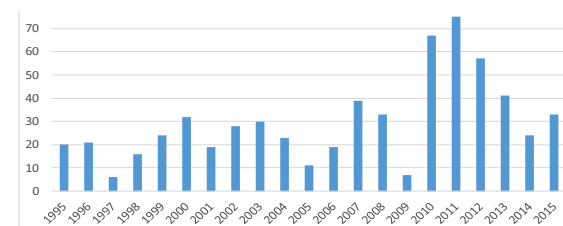
Locality	#	Death	Injuries	Property Loss	Crop Damage
Albemarle	233	2	15	\$1,128,800	\$24,250
Charlottesville	39		4	284,500	
Fluvanna	58			\$650,000	
Greene	47			\$170,500	\$7,000
Louisa	100			\$871,000	
Nelson	93			\$585,100	\$18,250
Region	570	2	19	\$3,689,900	\$49,500

VAISLA Lightning Flash Density/Mile 2005-2014



VAISALA

Number of Wind Events by Year 1995-2015



EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
	Likelihood this will occur	Possibility of death or injury	Physical losses and damages	Interruption of services	Relative threat*
SCORE	0-3 NA-High	0-3 NA-High	0-3 NA-High	0-3 NA-High	0 - 100%
Hurricane/high wind/windstorms	3	3	3	3	100%

Hazard Mitigation Plan

HIRA: Flooding and Dam Failure

Flooding and Dams

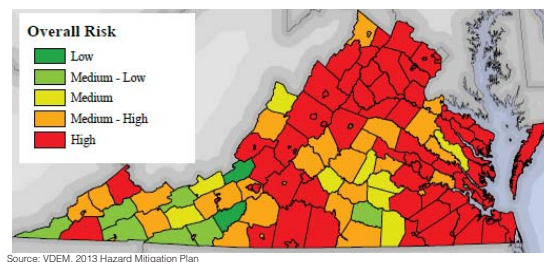
Flooding is considered one of the most significant risks to people and property statewide. Flooding is associated with heavy or extended rain events and may be locally constrained or occur far downstream from a weather event. Riverine flooding occurs along the regions larger river systems like the James or Rivanna Rivers. In the case of riverine flooding the storm event takes place upstream and causes floodwaters to travel downstream. Examples of this kind of flooding can be found in the towns of Scottsville and Columbia. All of which have suffered devastating floods.

Dam failure risk is evaluated based on a dam's hazard potential in terms of its threats to flooding people and property downstream. Dams are categorized into three risk classes low, significant and high. These categories factor in the dam size and the number of people in the floodway. It does not focus on the quality of the structure.

100 Year Floodplain (1% Chance of Flood)



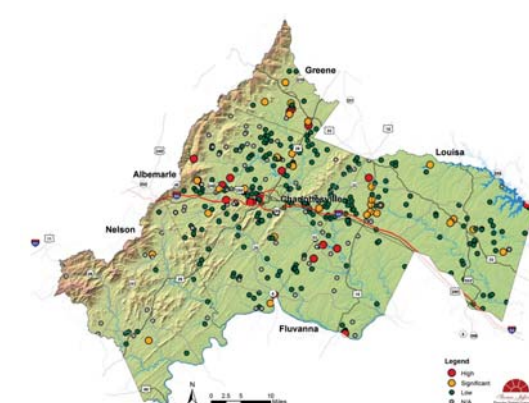
Flooding Risk



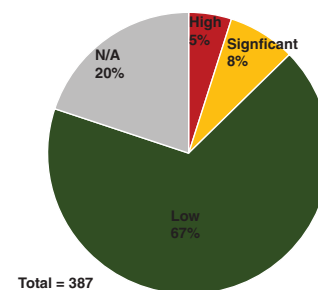
Number of Dams by Hazard Level

County	High	Significant	Low	N/A	Total
Albemarle County	10	12	166	47	235
Fluvanna County	5		19	13	37
Greene County	3	5	9	1	18
Louisa County	1	11	58	5	75
Nelson County		2	9	11	22
Total	19	30	261	77	387

Hazard Dams



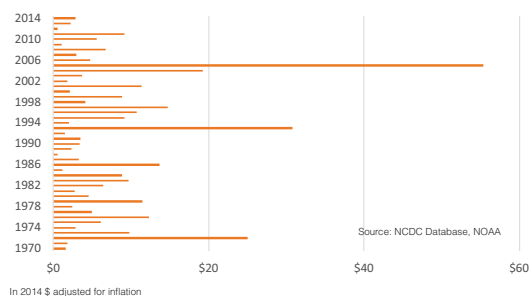
Percentage of Area Dams by Hazard Level



HIRA Assessment

EVENT	PROBABILITY Likelihood this will occur	HUMAN IMPACT Possibility of death or injury	PROPERTY IMPACT Physical losses and damages	BUSINESS IMPACT Interruption of services	RISK Relative threat*
SCORE	0-3 NA-High	0-3 NA-High	0-3 NA-High	0-3 NA-High	0 - 100%
Flooding	3	1	3	2	67%
Dam failure	1	2	2	2	22%

National Annual Flood Loss



Floods 1995-2015

Locality	#	Death	Injuries	Property Loss	Crop Damage
Albemarle	89	1		\$240,000	\$900,000
Charlottesville	9			\$5,000	
Fluvanna	3				
Greene	44		1	\$435,500	\$80,000
Louisa	8				
Nelson	46			\$1,135,000	\$50,000
Region	199	1	1	\$1,815,500	\$1,030,000

Hazard Mitigation Plan

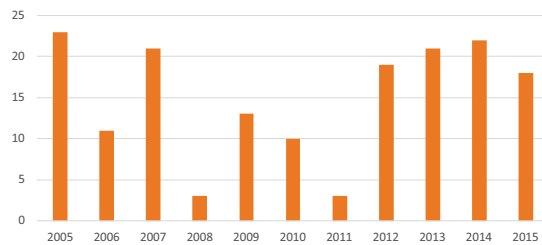
HIRA: Winter Weather

Winter Weather

Winter weather and storms are frequent occurrences in the region. Winter storms frequently cause power outages and disrupt travel in the region. Storms like nor'easter can cause significant snow accumulations, especially in areas at higher elevations. Winter storms frequently cause school closings and interruptions to transit services such as CAT and JAUNT.



Total Number of Winter Events by Year



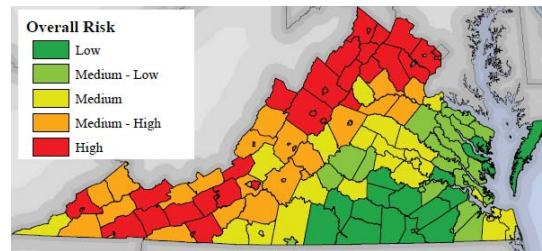
Winter Weather 1995-2015

Locality	#	Death	Injuries	Property Loss	Crop Damage
Albemarle	111			\$35,000	\$55,000
Charlottesville					
Fluvanna	78			\$35,000	
Greene	110			\$26,250	\$50,000
Louisa	86			\$35,000	
Nelson	90			\$40,000	\$150,000
Region	475	0	0	\$171,250	\$255,000

100 Year Floodplain (1% Chance of Flood)

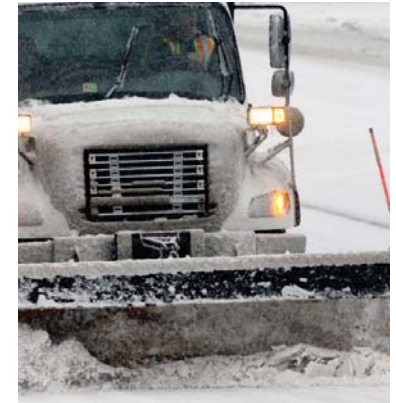
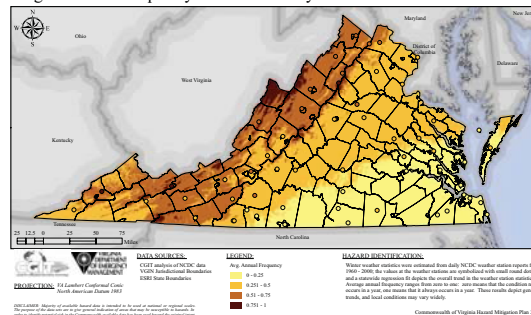
Locality	Blizzard	Cold/Wind Chill	Freezing Fog	Heavy Snow	Ice Storm	Winter Storm	Winter Weather	Frost/Freeze
Albemarle	2	1	1	5	6	30	65	21
Charlottesville								
Fluvanna				1	2	41	34	1
Greene	2	2		7	6	33	60	19
Louisa				1	2	44	39	1
Nelson	2	2		5	6	29	46	18
Region	6	5	1	19	22	177	244	60

Winter Weather Risk



Frequency of Snowfall Events

Figure 3.9-3: Frequency of 3 or more days with at least 3 inches of snow



HIRA Assessment

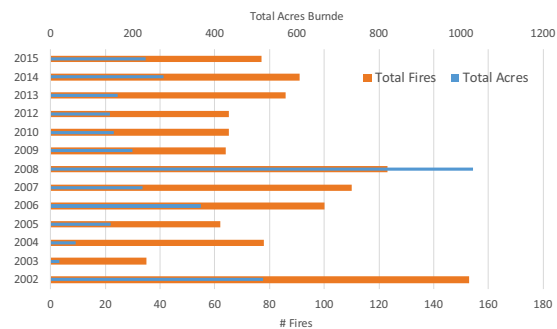
EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
	Likelihood this will occur	Possibility of death or injury	Physical losses and damages	Interruption of services	Relative threat*
SCORE	0-3 NA-High	0-3 NA-High	0-3 NA-High	0-3 NA-High	0 - 100%
Winter storms/ weather	3	1	1	3	56%

HIRA: Wildfire

Wildfire

Wildfires are a relatively common occurrence in the rural portions of the PDC. Since 2002 there have been 5,840 fires that have burned a total of 1,191 acres of land. Most wildfires are small and are quickly brought under control by local firefighters and state Department of Forestry. Frequent causes of blazes are discarded cigarette butts and out-of-control brush pile burning. There have been a number of large notable fires but these have been mostly constrained to Federal Lands. For example, the Rocky Mountain Fire burned portions of Shenandoah National Park in Greene County. People and property are at increased fire risk as more people move into rural areas and extend the urban wildland fringe.

Wildfire Acreage and Number of Events

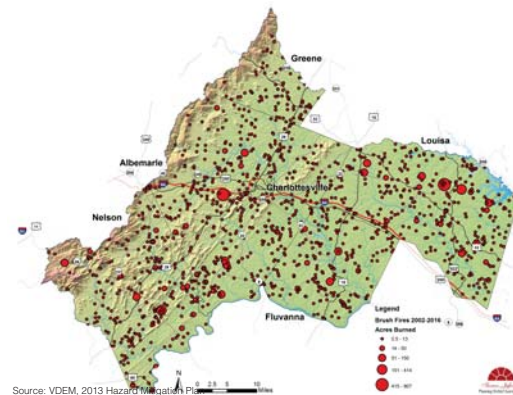


Wildfires 2002-2015

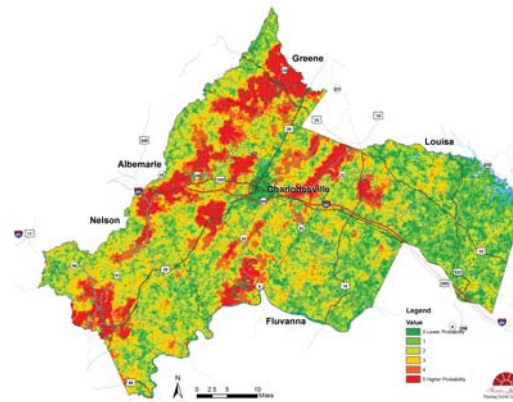
Locality	#	Acres Burned
Albemarle	1,665	387.0
Charlottesville	0	1.0
Fluvanna	436	175.0
Greene	89	74.0
Louisa	2,383	319.0
Nelson	1,267	235.0
Region	5,840.9	1,191.0



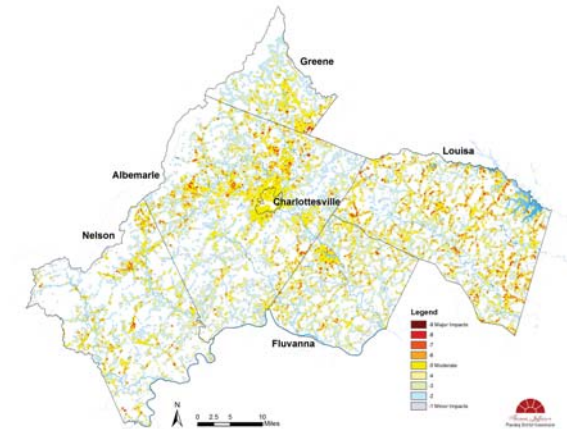
Wildfire Location and Acreage Burned



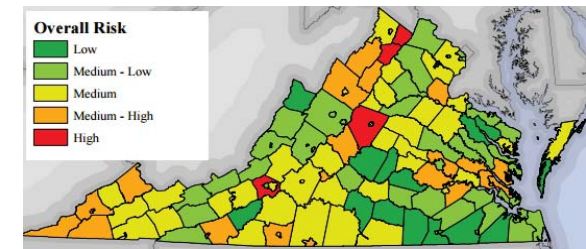
Burn Probability



Wildfire Risk Index



Relative Fire Risk



HIRA Assessment

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
	Likelihood this will occur	Possibility of death or injury	Physical losses and damages	Interruption of services	Relative threat*
SCORE	0-3 NA-High	0-3 NA-High	0-3 NA-High	0-3 NA-High	0 - 100%
Wildfire	2	1	1	1	22%

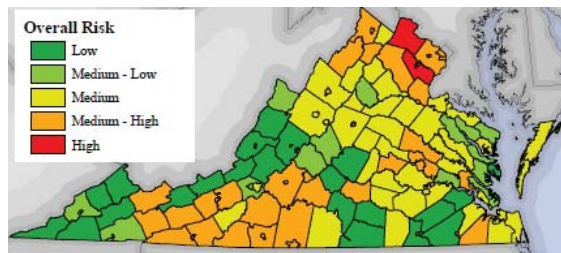
HIRA: Temperature Extremes, Drought & Landslides

Temperature Extremes and Drought

Temperature extremes are considered to be those temperatures which are 10° above or below a baseline normal temperature. Both extreme cold and heat present hazards to vulnerable populations. The regions lowest recorded temperature was -1° (February, 2015) and the highest was 105° (July 2012). Drought is a natural climatic condition caused by extended periods of limited precipitation. Factors that influence drought severity include a prolonged lack of rainfall, human demands (water withdrawals), high winds and low relative humidity (which increases evaporation). Prolonged droughts pose risks to people, agriculture and natural resources. Drought forecasts are produced by the U.S Drought Monitor.

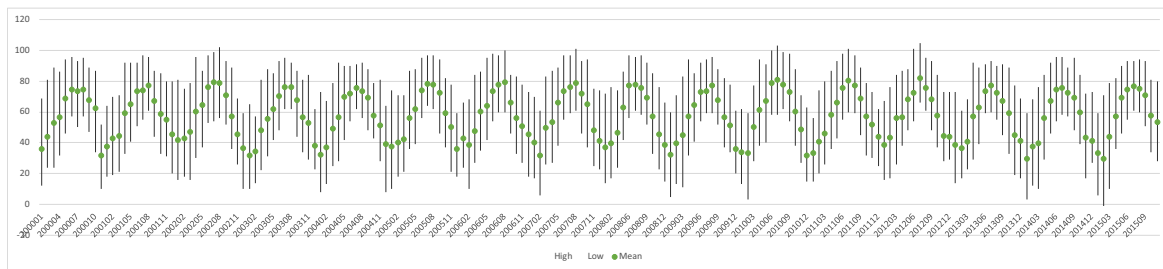
According to the USGS the eastern slopes of the Blue Ridge are characterized as having high susceptibility and a low incidence of landslide. Deforestation and the removal of vegetation greatly increase the chance of landslides.

Overall Drought Risk

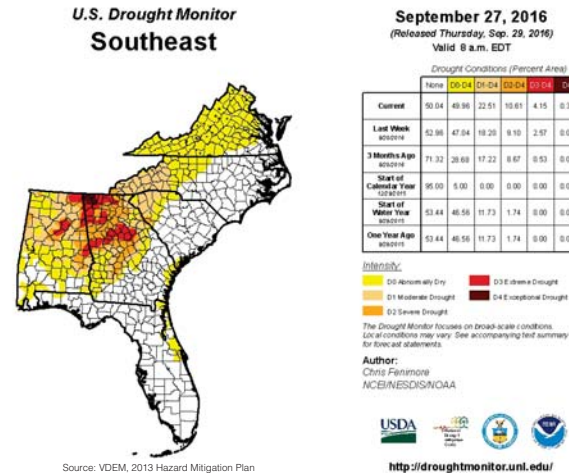


Source: VDEM, 2013 Hazard Mitigation Plan

Monthly High, Low and Average Temperatures



US Drought Monitor (USGS) Snapshot

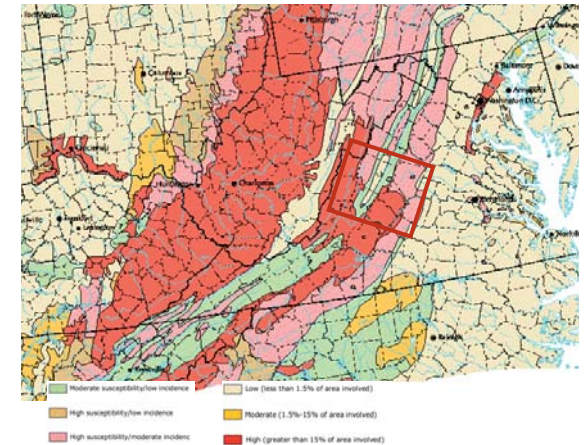


Source: VDEM, 2013 Hazard Mitigation Plan

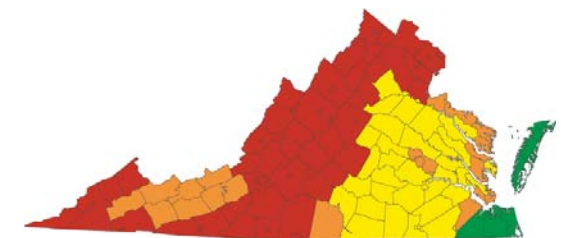
Virginia Historic Drought based on Percent Area



USGS Landslide Overview Map



Landslide potential



Red = high potential; orange = moderate potential; yellow = moderate to low potential; green = low potential.

HIRA Assessment

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
	Likelihood this will occur	Possibility of death or injury	Physical losses and damages	Interruption of services	Relative threat*
SCORE	0-3 NA-High	0-3 NA-High	0-3 NA-High	0-3 NA-High	0 - 100%
Drought and extreme heat	2	1	1	1	22%
Landslide	1	1	1	1	11%

Hazard Mitigation Plan

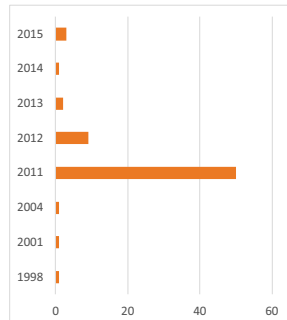
HIRA: Tornado and Earthquake

Tornado and Earthquake

The Region averages about 1 tornado a year. Most tornadoes experienced in the region are EF0 or EF1 events. However, the exception was a major tornado produced by Tropical Storm Ivy (EF2) which touched down in Fluvanna County. July is the most active month for tornadoes as it has the most number of thunderstorms. Most storms spawned by these afternoon thunderstorms tend to be weak events (EF0-EF1)

Earthquakes are a relatively rare event in the region with most quakes that do occur being a magnitude 2.5 or less. These quakes are rarely detectable to people and pose little risk to life and property. However, the region has experienced a few major quakes like the August 28, 2011 Mineral earthquake which reached 5.8 magnitude and caused damage to structures throughout the region. Most tremors since the August quake have been small aftershocks which have continued into 2016.

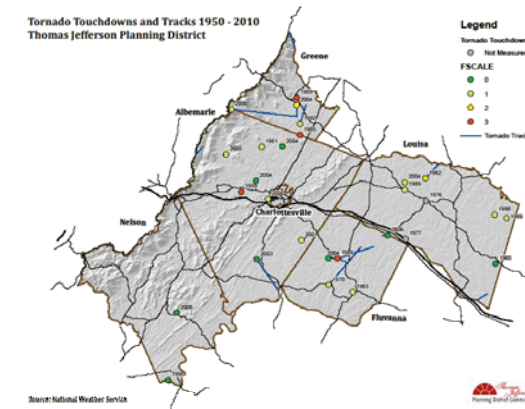
Total Number of Earthquakes



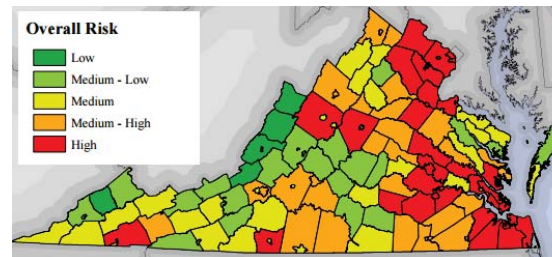
Tornadoes 1995-2015

Locality	#	Death	Injuries	Property Loss	Crop Damage
Albemarle	6			\$513,500	
Charlottesville	1		1	\$500,000	
Fluvanna	4			\$33,000	
Greene	2		3	\$3,001,000	
Louisa	5			\$206,000	
Nelson	2			\$58,000	
Region	20	0	4	\$4,311,500	

Regional Tornado Tracks



Overall Tornado Risk

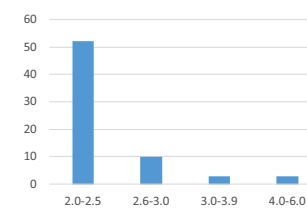


Source: VDEM, 2013 Hazard Mitigation Plan

Number of Quakes

Locality	#
Albemarle	2
Charlottesville	
Fluvanna	
Greene	
Louisa	66
Nelson	
Region	68

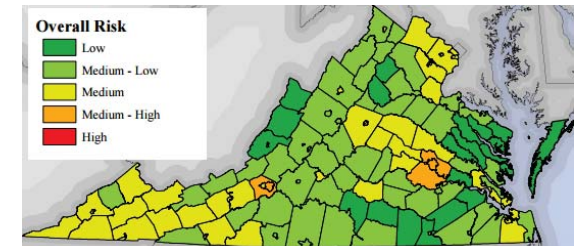
Quake Intensity



Earthquake Epicenters and Magnitudes



Overall Earthquake Risk



Source: VDEM, 2013 Hazard Mitigation Plan

HIRA Assessment

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
	Likelihood this will occur	Possibility of death or injury	Physical losses and damages	Interruption of services	Relative threat*
SCORE	0-3 NA-High	0-3 NA-High	0-3 NA-High	0-3 NA-High	0 - 100%
Tornado	1	1	2	2	19%
Earthquake	1	1	2	2	19%

Hazard Identification and Analysis/Vulnerability Assessment

All hazards in the region are ranked by this plan according to overall relative threat, which combines the probability of occurrence with the impact of an event. The Working Group reviewed the HIRA data and assigned values for each hazard at their meeting on October 5, 2016.

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
	<i>Likelihood this will occur</i>	<i>Possibility of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of services</i>	<i>Relative threat*</i>
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 - 100%
Hurricane/high wind/windstorms	3	3	3	3	100%
Flooding	3	1	3	2	67%
Winter storms/weather	3	1	1	3	56%
Wildfire	2	1	1	1	22%
Lightning	2	1	1	1	22%
Drought and extreme heat	2	1	1	1	22%
Dam failure	1	2	2	2	22%
Tornado	1	1	2	2	19%
Earthquake	1	1	2	2	19%
Landslide	1	1	1	1	11%
AVERAGE SCORE	1.90	1.30	1.70	1.80	34%

*Threat increases with percentage.

RISK = PROBABILITY * SEVERITY		
0.34	0.63	0.53

Mitigation Strategy

The following goals and objectives, grouped into five broad categories, are recommended by the plan:

Education and Outreach (E)

- GOAL: Increase awareness of hazards and encourage action to mitigate the impacts
 - OBJECTIVE: Educate families and individuals on disaster mitigation and preparedness
 - OBJECTIVE: Train key agency staff and volunteer groups in disaster mitigation and preparedness
 - OBJECTIVE: Train staff at schools and residential facilities in disaster mitigation and preparedness
 - OBJECTIVE: Encourage and equip employers to develop emergency action plans
 - OBJECTIVE: Protect sensitive areas through conservation practices

Infrastructure and Buildings (I)

- GOAL: Reduce the short and long-term impact of hazard events on buildings and infrastructure
 - OBJECTIVE: Diversify the energy system to provide multiple power source and fuel supply options
 - OBJECTIVE: Diversify the communications system to provide alternative lines for use during loss of capacity
 - OBJECTIVE: Diversify the transportation system by increasing connectivity and providing modal options
 - OBJECTIVE: Elevate, retrofit and relocate existing structures and facilities in vulnerable locations
 - OBJECTIVE: Construct or upgrade drainage, retention, and diversion elements to lessen the impact of a hazard

Whole Community (C)

- GOAL: Prepare to meet the immediate needs of the population during natural hazards
 - OBJECTIVE: Train staff to effectively communicate with and transport people regardless of their language proficiency and physical needs.
 - OBJECTIVE: Ensure that the population can access emergency shelters in a timely manner and have functional needs met, in the event of a natural hazard

Mitigation Capacity (M)

- GOAL: Increase mitigation capacity through planning and project implementation
 - OBJECTIVE: Reduce property risks through planning, zoning, ordinances and regulations
 - OBJECTIVE: Incorporate mitigation planning concepts into local plans and ordinances
 - OBJECTIVE: Pursue funding to implement identified mitigation strategies

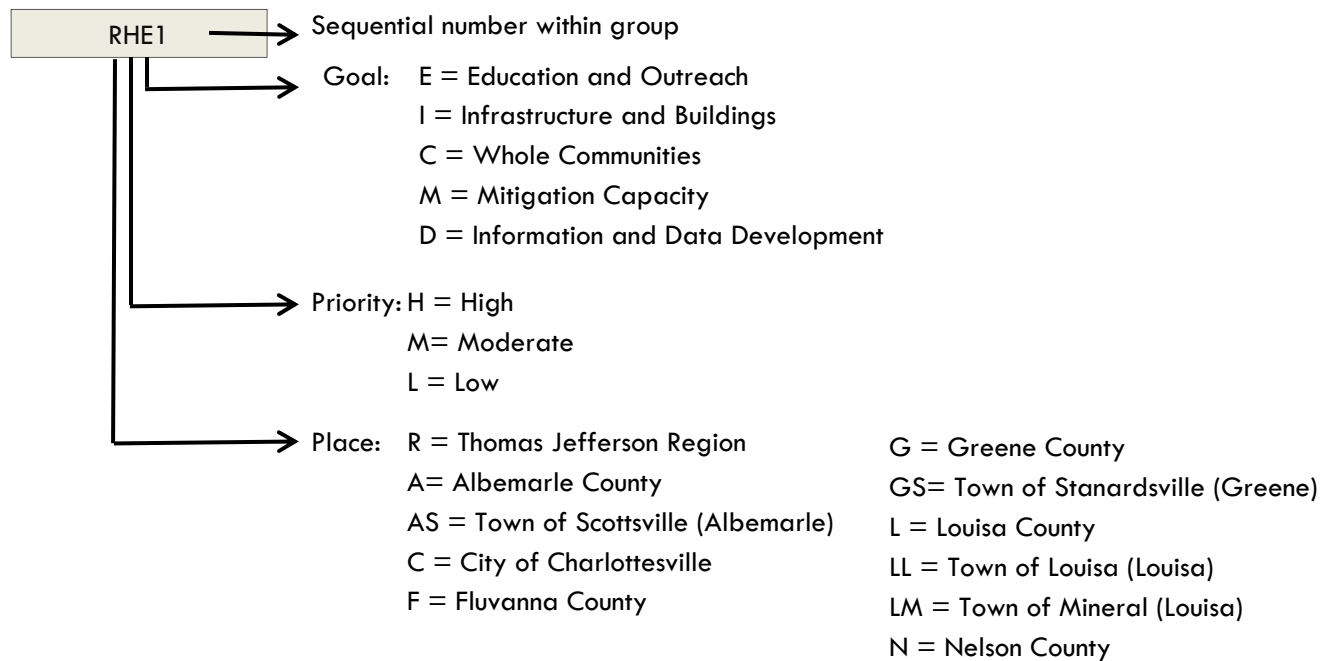
Information and Data Development (D)

- GOAL: Build capacity with information and data development to refine hazard identification and assessment, mitigation targeting and funding identification
 - OBJECTIVE: Identify data and information needs and develop methods to meet these needs
 - OBJECTIVE: Ensure that each critical facility has a disaster plan in place

Mitigation Action Items

A set of mitigation action items are designated for each locality to substantively further the objectives of the plan. The detailed list of action items includes the supporting goal, hazard to be mitigation, party responsible for implementation, timeframe of implementation, estimated cost, and potential funding sources. Furthermore, all action items are prioritized and listed in order from high, moderate, to low priority.

Activity Code Key



2017 Action Items for Regional Hazard Mitigation Plan

Activity Code Activity Description

Thomas Jefferson Region	
RHE1	Provide a copy of the Regional Hazard Mitigation Plan to each library in the Jefferson-Madison Regional Library system
RME1	Conduct a public education program on disaster preparedness, leveraging existing materials and sharing resources regionally
RMD1	Identify locations for deposit of debris after a hazard

Albemarle County	
AHE1	Develop a Comprehensive fire safety communications/education strategy, addressing open space protection, the burn permit process, and “Ready, Set, Go Program” (Fire Wise workshops), and residential and business preparedness
AHE2	Increase the number of trained emergency responders, both staff and volunteers
AHI1	Implement recommendations from the Community Water Supply Plan, including water demand management/conservation and drought monitoring and management
AHI2	Develop an integrated regional security and monitoring system, including access control and intrusion detection
AHM1	Incorporate this Regional Hazard Mitigation Plan into local comprehensive plans and Emergency Operations Plans
AHM2	Install fire mitigation measures, including dry hydrants, fire breaks, and fire rings.
AHD1	Assess resistance of existing critical facilities to natural hazards
AHD2	Mitigate Water and Wastewater System Failure or Contamination through community coordination and information/equipment sharing. Provide planning support for operational and integrated security management (including communications plan and continuity plan, emergency exercises, coordinated committee)
AHC1	Continue and expand the use of citizen alert systems
AME1	Ensure that all schools have regular disaster response drills
AME2	Continue to pursue conservation practices in sensitive areas, including flood-prone areas.
AMI1	Build or repair bridges so as not to impede floodways
AMI2	Upgrade bridges to support emergency vehicles
AMI3	Carry out physical security improvements to water and wastewater systems, which may include fencing, door hardening, window hardening, locks, bollards, cameras, signage, lighting, access control and intrusion detection.
AMI4	Procure technology equipment for Water/Wastewater system component inspections.
AMI5	Improve the maintenance of stormwater conveyance system.
AMM1	Implement recommendations from Drought Management Plan
AMM2	Through the development process, discourage or disallow development in flood-prone areas
AMM3	Provide planning support for water and wastewater systems operational and integrated security management

AMM4	Seek financial support for an integrated regional camera and monitoring system, including research, planning, procurement, implementation, management and maintenance.
AMD1	Expand GIS data for use in mitigation planning, preparedness planning, and response activities
ALE1	Encourage property owners and residents to clear creek beds, storm drain inlets, ditches and channels, and to remove debris where flooding has increased.
ALE2	Ensure all houses and businesses have clear address signs that are visible during snowstorms and other emergencies
ALE3	Continue educational campaign about the benefits of open space and sensitive area protection.
ALC1	Increase the capacity to shelter in place in public buildings.
ALI1	Implement Stormwater Management Plan to reduce floodwater and pollution discharge via stormwater systems.
ALI2	Maintain and Retrofit stormwater management basins/facilities including dam maintenance and upgrades
ALI3	Partner with utility companies to keep power lines free of vegetation
ALI4	Reduce pollution discharge via stormwater systems

Town of Scottsville

ASMM1	Ensure all houses and businesses have clear address signs that are visible during snowstorms and other emergencies
ASMM2	Enforce removal of debris from the bank of the James River on a periodic basis, to comply with flood zone ordinance
ASLM1	Install a camera to gauge the level of the creek at the pump station.
ASLM2	Incorporate hazard mitigation plan into community plans

AHE1 Mitigation Action: Albemarle County	
Goal:	Education and Outreach
Action Item Description:	Develop a Comprehensive fire safety communications/education strategy, addressing open space protection, the burn permit process, and "Ready, Set, Go Program" (Fire Wise workshops), and residential and business preparedness
Hazard (s):	Multiple
Lead Party Responsible:	Fire Rescue Dept., Dept. of Community Development
Estimated Cost:	\$10,000
Funding Method:	Hazard Mitigation Grant Program, General Revenue/Dept funding
Implementation Schedule:	Ongoing/new initiatives 1-3 years
Priority:	High

AHE2 Mitigation Action: Albemarle County	
Goal:	Mitigation Capacity
Action Item Description:	Increase the number of trained emergency responders, both staff and volunteers
Hazard (s):	Multiple
Lead Party Responsible:	Community Development Dept., Police Dept., Fire Rescue Dept., Emergency Communications Center/Charlottesville-Albemarle-UVA Emergency Mgt. Coordinator
Estimated Cost:	unknown
Funding Method:	N/A
Implementation Schedule:	1-3 years
Priority:	High

AHI1 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Implement recommendations from the Community Water Supply Plan, including water demand management/conservation and drought monitoring and management
Hazard (s):	Drought, Flood, adequate potable water
Lead Party Responsible:	RWSA, Dept. of Community Development, other County agencies
Estimated Cost:	Variable
Funding Method:	RWSA, flood control and dam safety programs/funds
Implementation Schedule:	3-5 years
Priority:	High

AHI2 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Develop an integrated regional security and monitoring system, including access control and intrusion detection
Hazard (s):	Multiple (including outsider physical threat and terrorism)
Lead Party Responsible:	Albemarle County Service Authority, RWSA, Security lead for County
Estimated Cost:	\$4 Million
Funding Method:	Hazard Mitigation Grant Program, Utility Revenue, General Revenue
Implementation Schedule:	1-3 years
Priority:	High

AHM1 Mitigation Action: Albemarle County	
Goal:	Mitigation Capacity
Action Item Description:	Incorporate this Regional Hazard Mitigation Plan into local comprehensive plans and Emergency Operations Plans
Hazard (s):	Multiple
Lead Party Responsible:	Community Development Dept., Thomas Jefferson Planning District Comm.
Estimated Cost:	None (other than staff costs)
Funding Method:	County operational budget (for staff time)
Implementation Schedule:	3-5 years
Priority:	moderate

AHM2 Mitigation Action: Albemarle County	
Goal:	Mitigation Capacity
Action Item Description:	Install fire mitigation measures, including dry hydrants, fire breaks, and fire rings.
Hazard (s):	Wildfire
Lead Party Responsible:	Fire Rescue Dept., Community Development Dept., Building Official, Dept. of Forestry
Estimated Cost:	Unknown; based on need
Funding Method:	Grant programs (Va. dry hydrant grant program)
Implementation Schedule:	Ongoing
Priority:	High

AHD1 Mitigation Action: Albemarle County	
Goal:	Information and Data Development
Action Item Description:	Continue to assess new and existing critical facilities for resistance to/preparedness for natural hazards
Hazard (s):	Multiple
Lead Party Responsible:	Emergency Services Coordinator; Dept. of Facilities and Environ. Services, Community Development Dept.
Estimated Cost:	Varies
Funding Method:	General Revenue; possible grant sources
Implementation Schedule:	Ongoing
Priority:	High

AHD2 Mitigation Action: Albemarle County	
Goal:	Information and Data Development
Action Item Description:	Mitigate Water and Wastewater System Failure or Contamination through community coordination and information/equipment sharing. Provide planning support for operational and integrated security management (including communications plan and continuity plan, emergency exercises, coordinated committee)
Hazard (s):	All
Lead Party Responsible:	Albemarle County Service Authority and Rivanna Water and Sewer Authority
Estimated Cost:	\$500,000
Funding Method:	Hazard Mitigation Grant Program, Utility Revenue
Implementation Schedule:	1-2 years
Priority:	High

AHC1 Mitigation Action: Albemarle County	
Goal:	Whole Community
Action Item Description:	Continue to expand use of citizen alert system.
Hazard (s):	Multiple
Lead Party Responsible:	Emergency Services Coordinator
Estimated Cost:	\$5,000
Funding Method:	General Revenue
Implementation Schedule:	Ongoing
Priority:	High

AME1 Mitigation Action: Albemarle County	
Goal:	Education and Outreach
Action Item Description:	Ensure that all schools have regular disaster response drills
Hazard (s):	Multiple
Lead Party Responsible:	Dept. of Schools and Education; independent private school
Estimated Cost:	N/A
Funding Method:	N/A
Implementation Schedule:	Ongoing
Priority:	Moderate

AME2 Mitigation Action: Albemarle County	
Goal:	Mitigation Capacity
Action Item Description:	Continue to pursue conservation practices in sensitive areas, including flood-prone areas.
Hazard (s):	Multiple
Lead Party Responsible:	Virginia Outdoors Foundation, Nature Conservancy, Thomas Jefferson Soil and Water Conservation District, Albemarle Co Public Recreational Facilities Authority, Albemarle Co Gov't, Community Development Dept.
Estimated Cost:	Based on individual property assessments and/or practices implemented
Funding Method:	Various
Implementation Schedule:	Ongoing
Priority:	Moderate

AMI1 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Build or repair bridges and culverts so as not to impede floodways
Hazard (s):	Flood
Lead Party Responsible:	Virginia Dept. of Transportation
Estimated Cost:	Unknown-based on individual projects
Funding Method:	State transportation funding; federal bridge funds/highway funds, Hazard Mitigation Grant Program, 406 Public Assistance Program (after disaster), private foundation funding
Implementation Schedule:	Ongoing (as bridges and culverts are maintained, repaired, replaced or newly built)
Priority:	Moderate

AMI2 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Upgrade bridges to support emergency vehicles
Hazard (s):	Multiple
Lead Party Responsible:	VDOT, Railroads
Estimated Cost:	Unknown-based on individual projects
Funding Method:	State transportation funding; federal bridge funds/highway funds, Hazard Mitigation Grant Program, 406 Public Assistance Program (after disaster)
Implementation Schedule:	Ongoing (as bridges are maintained, repaired, replaced or newly built)
Priority:	Moderate

AMI3 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Carry out physical security improvements to water and wastewater systems, which may include fencing, door hardening, window hardening, locks, bollards, cameras, signage, lighting, access control and intrusion detection.
Hazard (s):	Multiple (including outsider physical threat)
Lead Party Responsible:	Albemarle County Service Authority and Rivanna Water and Sewer Authority
Estimated Cost:	\$2 Million
Funding Method:	Hazard Mitigation Grant Program, Utility Revenue
Implementation Schedule:	1-3 years
Priority:	Moderate

AMI4 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Procure technology equipment for Water/Wastewater system component inspections.
Hazard (s):	Multiple (including natural disasters and contamination)
Lead Party Responsible:	Albemarle County Service Authority and Rivanna Water and Sewer Authority
Estimated Cost:	\$100,000
Funding Method:	Hazard Mitigation Grant Program, Utility Revenue
Implementation Schedule:	1-2 years
Priority:	Moderate

AMI5 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Improve the maintenance of stormwater conveyance system: pipes, road culverts, discharge structures
Hazard (s):	Flood
Lead Party Responsible:	Facilities and Environmental Services Dept., VDOT
Estimated Cost:	Unknown
Funding Method:	EPA – Water Quality Cooperative Agreements, EPA-Nonpoint Source Grant Program, 406 Public Assistance (following a federally declared disaster), USDA-Watershed Protection and Flood Prevention Program, USDA-Environmental Quality Incentives Program, Stormwater Utility Fee, County funding (CIP); Hazard Mitigation Grant Program
Implementation Schedule:	Ongoing
Priority:	Moderate

AMM1 Mitigation Action: Albemarle County	
Goal:	Mitigation Capacity
Action Item Description:	Implement recommendations from Drought Management Plan
Hazard (s):	Drought
Lead Party Responsible:	RWSA
Estimated Cost:	Variable – linked to Water Supply projects
Funding Method:	RWSA
Implementation Schedule:	Ongoing
Priority:	Moderate

AMM2 Mitigation Action: Albemarle County	
Goal:	Mitigation Capacity
Action Item Description:	Through the development process, discourage or disallow development in flood-prone areas
Hazard (s):	Flood
Lead Party Responsible:	Community Development Dept.
Estimated Cost:	None
Funding Method:	N/A
Implementation Schedule:	Ongoing
Priority:	Moderate

AMM3 Mitigation Action: Albemarle County	
Goal:	Mitigation Capacity
Action Item Description:	Provide planning support for water and wastewater systems operational and integrated security management.
Hazard (s):	Multiple
Lead Party Responsible:	RWSA, ACSA, Community Development Dept.
Estimated Cost:	none
Funding Method:	N/A
Implementation Schedule:	Ongoing
Priority:	Moderate

AMM4 Mitigation Action: Albemarle County	
Goal:	Mitigation Capacity
Action Item Description:	Seek financial support for an integrated regional camera and monitoring system, including research, planning, procurement, implementation, management and maintenance.
Hazard (s):	Multiple
Lead Party Responsible:	
Estimated Cost:	
Funding Method:	
Implementation Schedule:	
Priority:	Moderate

AMD1 Mitigation Action: Albemarle County	
Goal:	Information and Data Development
Action Item Description:	Expand GIS data for use in mitigation planning, preparedness planning, and response activities
Hazard (s):	Multiple
Lead Party Responsible:	Community Development Dept., TJPDC., Emergency Communications Center/Charlottesville-Albemarle-UVA Emergency Mgt. Coordinator
Estimated Cost:	\$70,000
Funding Method:	General Revenue, Hazard Mitigation Grant Program, ESRI, Pre-Disaster Mitigation Grant, Dept. of Interior Geologic Mapping Program
Implementation Schedule:	2-5 years
Priority:	Moderate

ALE1 Mitigation Action: Albemarle County	
Goal:	Education and Outreach
Action Item Description:	Encourage property owners and residents to clear creek beds, storm drain inlets, ditches and channels, and to remove debris where flooding has increased.
Hazard (s):	Flood
Lead Party Responsible:	Facilities and Environmental Services Dept., Forestry Dept.
Estimated Cost:	Unknown, based on need
Funding Method:	General Revenue
Implementation Schedule:	Ongoing
Priority:	Low

ALE2 Mitigation Action: Albemarle County	
Goal:	Education and Outreach
Action Item Description:	Ensure all houses and businesses have clear address signs that are visible during snowstorms and other emergencies
Hazard (s):	Multiple
Lead Party Responsible:	Community Development Dept, Fire-Rescue Dept., County Executive's Office
Estimated Cost:	\$4,000
Funding Method:	General Revenues
Implementation Schedule:	Ongoing
Priority:	Low

ALE3 Mitigation Action: Albemarle County	
Goal:	Education and Outreach
Action Item Description:	Continue educational campaign about the benefits of open space and sensitive area protection.
Hazard (s):	Multiple
Lead Party Responsible:	Virginia Outdoors Foundation, Nature Conservancy, Thomas Jefferson Soil and Water Conservation District, Albemarle Co Public Recreational Facilities Authority, Community Development Dept.
Estimated Cost:	Variable
Funding Method:	County funding, State funds for farmland and open space preservation (VDACS Farmland Preservation)
Implementation Schedule:	Ongoing
Priority:	Low

ALC1 Mitigation Action: Albemarle County	
Goal:	Whole Community
Action Item Description:	Increase the capacity to shelter in place in public buildings
Hazard (s):	Multiple
Lead Party Responsible:	Emergency Communications Center/Charlottesville-Albemarle-UVA Emergency Mgt. Coordinator
Estimated Cost:	Unknown
Funding Method:	General Revenue, FEMA funds/grants
Implementation Schedule:	Ongoing
Priority:	Low

ALI1 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Implement Stormwater Management Plan to reduce floodwater and pollution discharge via stormwater systems.
Hazard (s):	Flood
Lead Party Responsible:	Facilities and Environmental Services Dept.
Estimated Cost:	Unknown, based on need
Funding Method:	EPA – Water Quality Cooperative Agreements, EPA-Nonpoint Source Grant Program, 406 Public Assistance (after a federally declared disaster), USDA-Watershed Protection and Flood Prevention Program, USDA-Environmental Quality Incentives Program, Stormwater Utility Fee, County funding (CIP)
Implementation Schedule:	Ongoing
Priority:	Low

ALI2 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Maintain and Retrofit stormwater management basins/facilities including dam maintenance and upgrades
Hazard (s):	Flood
Lead Party Responsible:	Facilities and Environmental Services Dept.
Estimated Cost:	Unknown, based on individual projects
Funding Method:	EPA – Water Quality Cooperative Agreements, EPA-Nonpoint Source Grant Program, 406 Public Assistance (after a federally declared disaster), USDA-Watershed Protection and Flood Prevention Program, USDA-Environmental Quality Incentives Program, Stormwater Utility Fee, County funding (CIP)
Implementation Schedule:	Ongoing
Priority:	Low

ALI3 Mitigation Action: Albemarle County	
Goal:	Infrastructure and Buildings
Action Item Description:	Partner with utility companies to keep power lines free of vegetation
Hazard (s):	Multiple
Lead Party Responsible:	County Executive's Office, Community Development
Estimated Cost:	Unknown
Funding Method:	N/A
Implementation Schedule:	Ongoing
Priority:	Low

ALI4 Mitigation Action: Albemarle County	
Goal:	Education and Outreach
Action Item Description:	Reduce pollution discharge via stormwater systems
Hazard (s):	Flood, contamination
Lead Party Responsible:	Community Development Dept., Facilities and Environmental Services
Estimated Cost:	Unknown, based on need
Funding Method:	EPA – Water Quality Cooperative Agreements, EPA-Nonpoint Source Grant Program, 406 Public Assistance (following a federally declared disaster), USDA-Watershed Protection and Flood Prevention Program, USDA-Environmental Quality Incentives Program, Stormwater Utility Fee
Implementation Schedule:	Ongoing
Priority:	Low

ASMM1 Mitigation Action: Town of Scottsville	
Goal:	Mitigation Capacity
Action Item Description:	Ensure all houses and businesses have clear address signs that are visible during snowstorms and other emergencies
Hazard (s):	Winter Storms, Multiple
Lead Party Responsible:	Town Manager
Estimated Cost:	None
Funding Method:	N/A
Implementation Schedule:	Ongoing
Priority:	Moderate

ASMM2 Mitigation Action: Town of Scottsville	
Goal:	Mitigation Capacity
Action Item Description:	Enforce removal of debris from the bank of the James River on a periodic basis, to comply with flood zone ordinance
Hazard (s):	Floods, Multiple
Lead Party Responsible:	Town Manager
Estimated Cost:	Staff and Council action only
Funding Method:	Unknown
Implementation Schedule:	1 year initially and then periodically as needed
Priority:	Moderate

ASLM1 Mitigation Action: Town of Scottsville	
Goal:	Mitigation Capacity
Action Item Description:	Install a camera to gauge the level of the creek at the pump station
Hazard (s):	Floods, Multiple
Lead Party Responsible:	Town Manager
Estimated Cost:	Unknown
Funding Method:	Unknown
Implementation Schedule:	3-5 years
Priority:	Low

ASLM2 Mitigation Action: Town of Scottsville	
Goal:	Mitigation Capacity
Action Item Description:	Incorporate hazard mitigation plan into community plans
Hazard (s):	Multiple
Lead Party Responsible:	Town Planning Commission
Estimated Cost:	None
Funding Method:	N/A
Implementation Schedule:	1-5 years
Priority:	Low