

NATURAL HAZARD MITIGATION PLAN UPDATE 2023



Prepared By:
Thomas Jefferson Planning
District Commission

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2023 Update



NATURAL HAZARD MITIGATION PLAN BACKGROUND

- Purpose: Prepare for natural disasters before they occur, thus reducing loss of life, property damage, and disruption of commerce
- Plan is a data driven document based on past historical hazard events and the potential for future events based on historical data
- Plan assesses risks from Natural Hazards
- Incentive: The Federal Emergency Management Agency (FEMA) requires Natural HMPs as a condition for **eligibility** to receive certain mitigation grant program funds and grants.
- Virginia Department of Emergency Management encourages regional Natural Hazard Mitigation Plans to help jurisdictions address issues regionally
- VDEM Maintains a Statewide Hazard Mitigation Plan

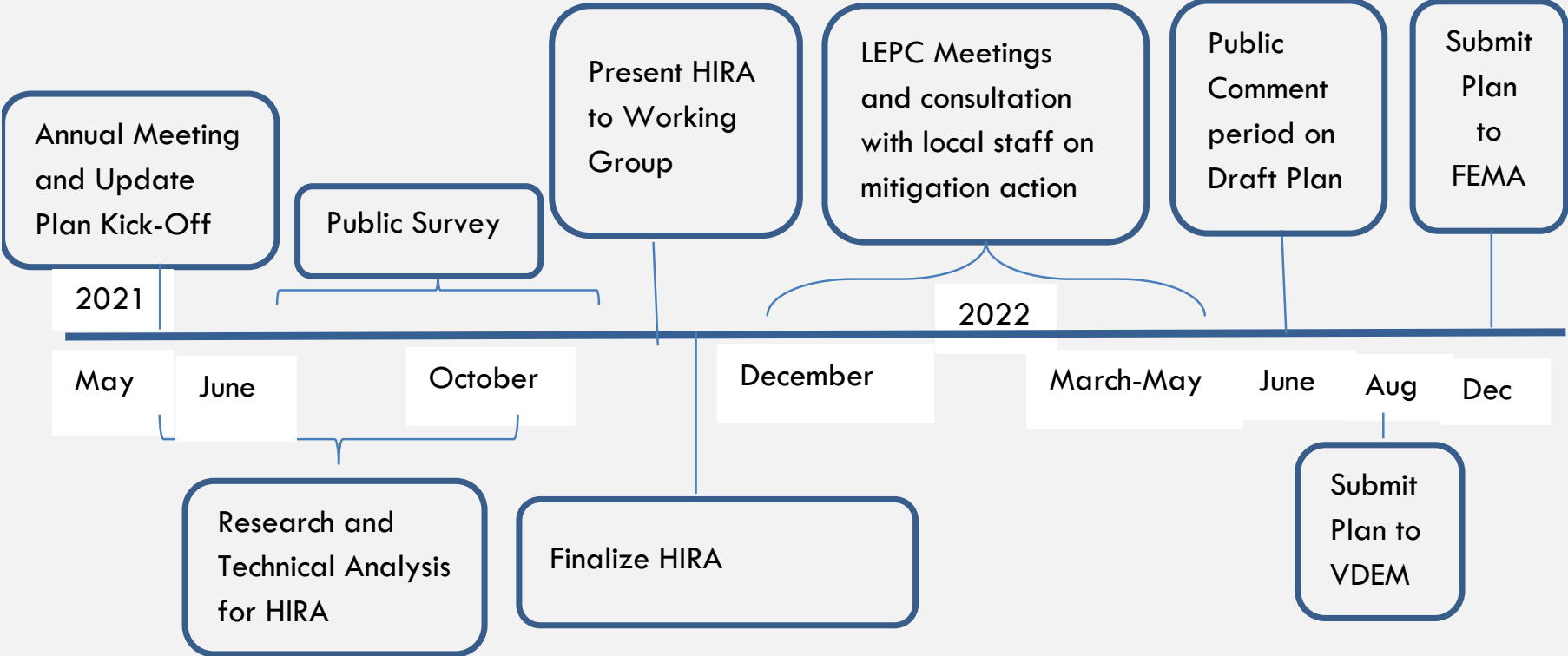
NATURAL HAZARD MITIGATION PLAN DOCUMENT

- **Required Sections:**

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

TIMELINE

The following timeline depicts the major points along the process of the plan update:



HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

- Describes all natural hazards that affect the Planning District and provide an analysis on location, extent, severity, and probability of occurrence
- General descriptions of events
- Data on events such as frequency, duration, severity and financial impact
- Hazards are presented in order of the relative risk they pose to the region
- Hazards are rated based on a risk matrix developed by Kaiser Permanente

HIRA

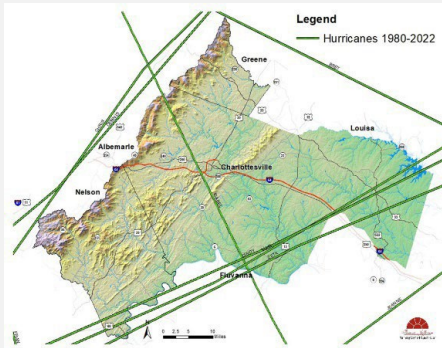
EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
	<i>Likelihood this will occur</i>	<i>Possibility of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of services</i>	<i>Relative threat*</i>
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 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	2	2	2	74%
Flooding	3	1	2	2	65%
Winter storms/weather	3	1	1	2	56%
Communicable Disease/Pandemic	2	2	1	2	30%
Lightning	2	1	1	1	22%
Wildfire	2	1	1	1	22%
Drought / Extreme Heat	2	1	1	1	22%
Dam Failure	1	2	2	2	22%
Tornado	2	1	1	1	22%
Earthquake	1	1	2	2	19%
Landslide	1	1	1	1	11%
AVERAGE SCORE	1.88	1.37	1.5	1.58	33%

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 more than \$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. Most are downgraded to tropical storms before they reach the planning district. Note: Tornadoes are addressed on a separate poster.

Historic Hurricane Tracks 1980-2008



Hurricane/Tropical Storms 2010-2020

Hurricane and Tropical Storm Record 2010-2020

Locality	#	Deaths	Injuries	Property Loss	Crop Damage
Albemarle/Cville (reported with Nelson)	2	0	0	\$ 5,000.00	\$ -
Fluvanna (reported with Louisa)	1	0	0	\$ 36,000.00	\$ -
Greene	1	0	0	\$ 1,000.00	\$ -
Louisa (reported with Fluvanna)	1	0	0	\$ -	\$ -
Nelson (reported with Albemarle)	2		0	\$ 1,000.00	\$ -

Source: National Climate Data Center

Notable Hurricanes in the Planning District

Hurricane	Specific Area	Damage	Year	Cat.
Zeta	All	Heavy rain, localized flooding	Oct. 20, 2020	3
Mathew	All	\$30+ million in private + public structure damage, 2 deaths, evacuations, flooding/power outages	De. 18, 2018	5
Florence	All TJPDC localities	\$200 million in damage, heavy rain/flooding/high winds/spawned tornadoes, 3 deaths	Oct. 15, 2018	4
Joaquin	All	Rain, localized flooding	Oct 2, 2015	2
Arthur	Fluvanna, Louisa, Albemarle	Power outages, rain, flooding	July 4, 2014	2
Sandy	Nelson, Greene	Power outages, rain, flooding	Oct 29, 2012	3
Cindy	Fluvanna and Louisa Counties	3 deaths in U.S.	July 7, 2005	1
Ivan	Fluvanna and Louisa Counties	Estimated \$18 billion in U.S. damages and 25 deaths	Sept. 18, 2004	5
Isabel	All	Preliminary estimate of over \$4 billion in damages/costs; at least 40 deaths	Sept 18, 2003	5
Floyd	All	Flooding rains and high winds. 4 deaths; over 280,000 customers without electricity, 5,000 homes damaged.	Sep-99	4
Fran	Northwest Greene Co.	\$5.8 billion damage, 37 deaths, loss of electricity was hardest hit.	August-September 1996	3
Agnes	Scottsville (34 feet), Howardsville, and Columbia	More than 210,000 people were forced to flee for their lives and 122 were killed.	June 19-24, 1972	1
Camille	Massie Mill, Davis Creek, Scottsville, Howardsville, Schuyler, Columbia, Piney River	114 deaths in Nelson Co alone. Flooding & landslides. \$1.42 billion (unadjusted).	August 1969	5
Hazel	All	Flooding, barns leveled, roofs pulled off.	Oct 14-15, 1954	4

High/Strong Wind Events and Thunderstorms with Wind 2010-2020

High Wind 2010-2020

Locality	#	Death	Injuries	Property Loss	Crop Damage
Albemarle	10	0	0	\$ -	\$ -
Charlottesville	5	0	0	\$ 1,000.00	\$ 50,000.00
Fluvanna	0	0	0	\$ -	\$ -
Greene	6	0	0	\$ -	\$ -
Louisa	2	0	0	\$ 50,000.00	\$ -
Nelson	19	0	0	\$ -	\$ 20,000.00
Region	42	0	0	\$ 51,000	\$ 70,000

Source: National Climate Data Center (NOAA)

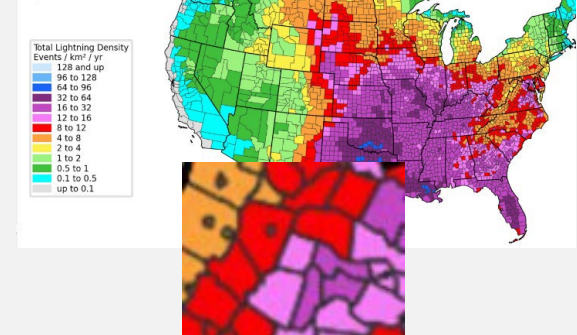
Thunderstorms with Wind 2010-2020

Locality	#	Death	Injuries	Property Loss	Crop Damage
Albemarle	298	0	0	\$ 528,300.00	\$ 24,250.00
Charlottesville	14	0	0	\$ 75,500.00	\$ -
Fluvanna	40	0	0	\$ 390,000.00	\$ -
Greene	59	0	0	\$ 49,500.00	\$ 7,000.00
Louisa	79	0	0	\$ 597,000.00	\$ -
Nelson	103	0	0	\$ 133,500.00	\$ 18,250.00
Region	593	0	0	\$ 1,773,800	\$ 49,500

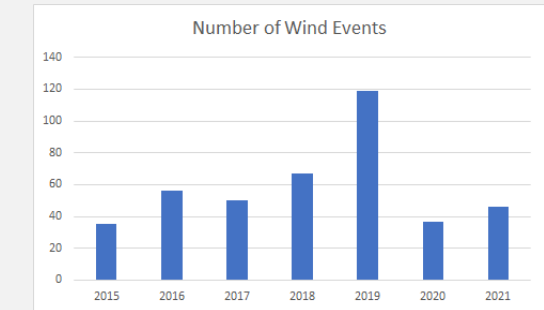
Source: NCDC, Albemarle Historical Society archived newspapers, HMP working Group

VAISLA Lightning Flash Density/Mile 2015-2019

NLDN average total lightning density April-June 2015-2019



Number of Wind Events by Year 2015-2021

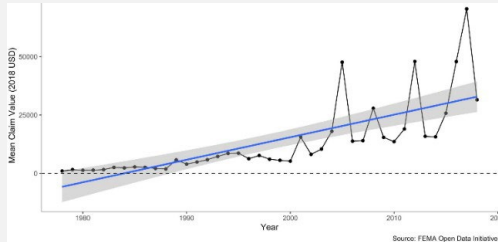


HIRA: FLOODING AND DAM FAILURE

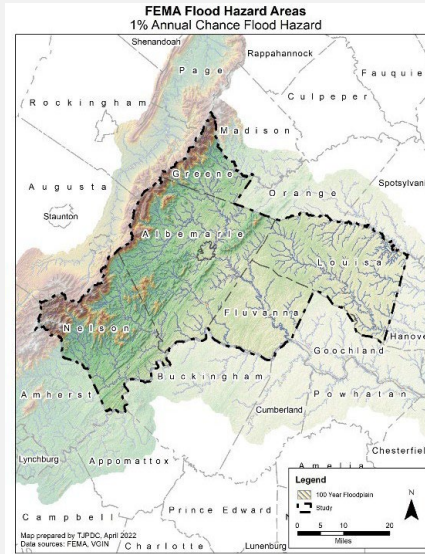
Flooding and Dams

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 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.

National Annual Flood Loss (mean claim value of flood insurance)



100 Year Floodplain (1% Chance of Flood)



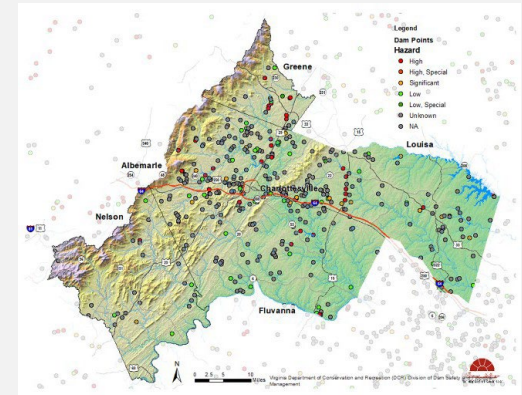
Floods 2010-2021

Summary of Floods, Flood Record 2010-2021

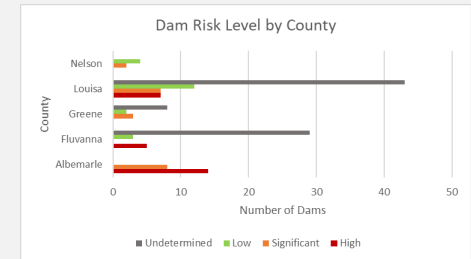
Locality	#	Death	Injuries	Property Loss	Crop Damage
Albemarle	136	1	0	\$50,000.00	\$
Charlottesville	5	0	0	\$	\$
Fluvanna	6	0	0	\$	\$
Greene	79	0	0	\$4,777,000.00	\$312,000.00
Louisa	9	0	0	\$	\$
Nelson	65	0	0	\$30,000.00	\$
Region	300	1	0	\$4,857,000.00	\$312,000.00

Source: National Climate Data Center (NOAA)

Dam Points Across Region



Dam Risk Level by County



HIRA Assessment

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
SCORE	0-3 NA-High	0-3 NA-High	0-3 NA-High	0-3 NA-High	0 - 100%
Flooding	3	1	2	2	65%
Dam Failure	1	2	2	2	22%

HIRA: WINTER WEATHER

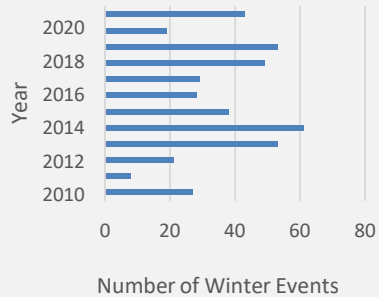
Winter Weather

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 Events in TJPDC Region by Year (2010-2021)



Winter Weather Events by Type 2000-2020

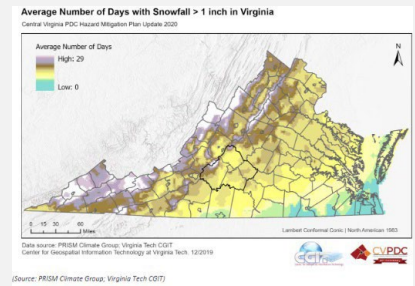
Locality	Blizzard	Cold/Wind Chill	Freezing Fog	Heavy Snow	Ice Storm	Winter Storm	Winter Weather	Frost/Freeze
Albemarle	2	1	1	5	6	37	83	33
Fluvanna				1	3	48	40	3
Greene	2	4		7	7	39	79	34
Louisa				1	3	55	46	3
Nelson	2	2		5	7	34	65	33
Region	6	7	1	19	26	213	313	106

Winter Storm Events 2010-2020

Locality	#	Death	Injuries	Property Damage
Albemarle	10	0	0	\$5,000.00
Charlottesville	17	0		\$-
Fluvanna	15	0	0	\$110,000.00
Greene	32	0	0	\$-
Louisa	21	0	0	\$160,000.00
Nelson	25	0	0	\$5,000.00
Region	120	0	0	\$280,000.00



Frequency of Snowfall Events



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 Weather	3	1	1	2	56%

HIRA: COMMUNICABLE DISEASE/PANDEMIC

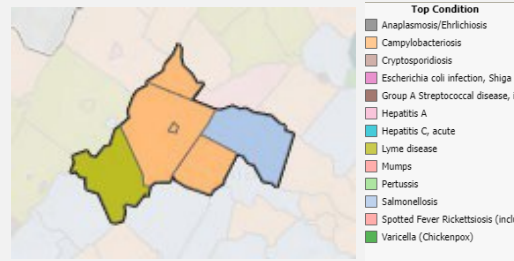
The most common infectious diseases impacting the region prior to

Communicable Disease/Pandemic

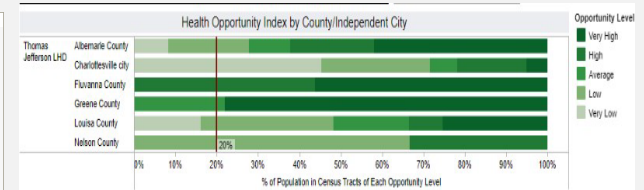
Coronavirus were Campylobacteriosis and Salmonella. Both live in the intensities of birds and are spread to humans through consumption of contaminated foods, contact with infected animals, or by drinking contaminated water. Lyme disease is commonly spread through vectors such as ticks.

The Covid-19 pandemic is the leading infectious disease in each locality, surpassing historical data from 2018 on the top reported cases of other contagious diseases. Rather than case rates ranging from 20-60 per 100,000 people, Coronavirus cases have reached 9,000-14,000 cases per 100,000 people in the Thomas Jefferson Planning District Region.

Top Communicable Diseases in TJPD (Excluding Chronic Hepatitis)

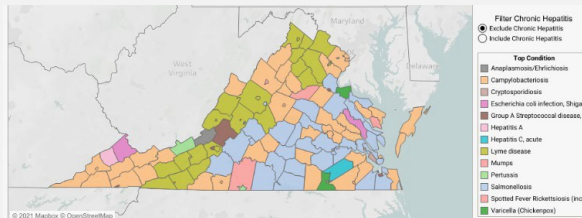


TJPD Health Opportunity Index

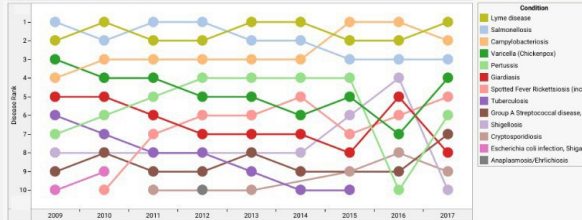


COVID-19 Case Information from 2019-January 2022

Top Communicable Diseases in Virginia (Excluding Chronic Hepatitis)



Top 10 Communicable Diseases *



County	Top Condition
Albemarle	Campylobacteriosis was the most frequently reported disease with 25 cases. This equates to a rate of 23.2 cases per 100,000 population.
Fluvanna	Campylobacteriosis was the most frequently reported disease with 11 cases. This equates to a rate of 41.6 cases per 100,000 population
Louisa	Salmonellosis was the most frequently reported disease with 9 cases. This equates to a rate of 25.1 cases per 100,000 population.
Greene	Campylobacteriosis was the most frequently reported disease with 10 cases. This equates to a rate of 51.0 cases per 100,000 population.
Nelson	Lyme disease was the most frequently reported disease with 8 cases. This equates to a rate of 53.5 cases per 100,000 population.
Charlottesville (city)	Campylobacteriosis was the most frequently reported disease with 15 cases. This equates to a rate of 31.2 cases per 100,000 population.

Locality	Total Cases	Cases per 100,000	Hospitalizations	Deaths
Albemarle	10,219	9,400	376	118
Charlottesville	6,518	13,546	162	64
Fluvanna	3,415	12,751	133	32
Greene	2,758	13,994	162	47
Louisa	4,410	11,991	175	54
Nelson	1,836	12,375	64	24

HIRA Assessment

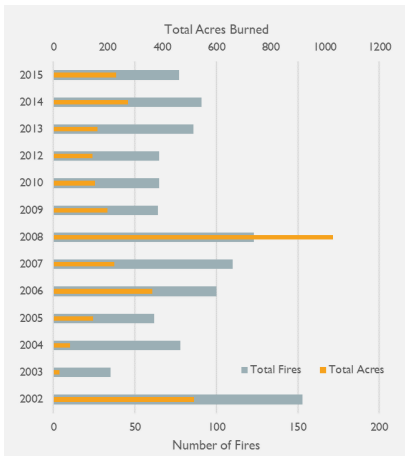
EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
	Likelihood this will occur	Possibility of death or injury	Physical losses and damages	Interruption of services	Relative threat*
SCORE	0-3 NA-High	0-3 NA-High	0-3 NA-High	0-3 NA-High	0 - 100%
Communicable Disease/Pandemic	2	2	1	2	30%

HIRA: WILDFIRE

Wildfire

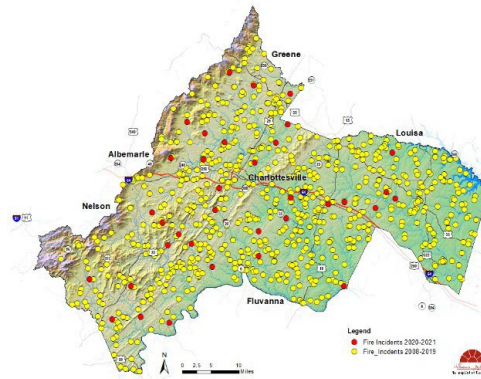
Wildfires are a relatively common occurrence in the rural portions of the PDC. Since 2017 there have been 466 fires that have burned a total of 3,276 acres of land. Most wildfires are small and are quickly brought under control by local firefighters and state Department of Forestry. Frequent causes of 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



Hazard Mitigation Plan

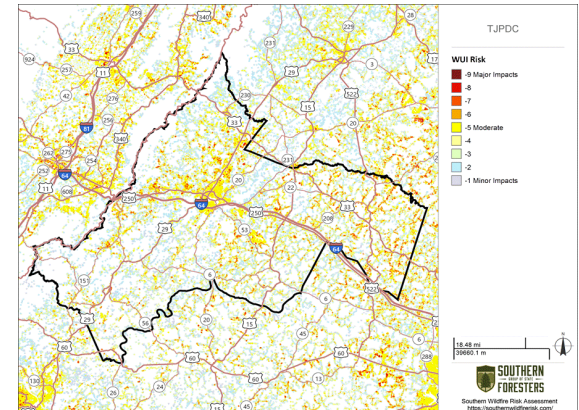
Wildfire Location and Acreage Burned



Wildfire Events 2017-2021

Locality	# Of Fires	Acres
Albemarle	136	1215.9
Fluvanna	98	319.1
Greene	29	31.1
Louisa	130	1298.4
Nelson	63	412.1
TJPDC	466	3276.6

Wildfire Risk Index



Causes of Wildfires 2017-2021



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	2	22%

HIRA: Temperature Extremes, Drought & Landslides

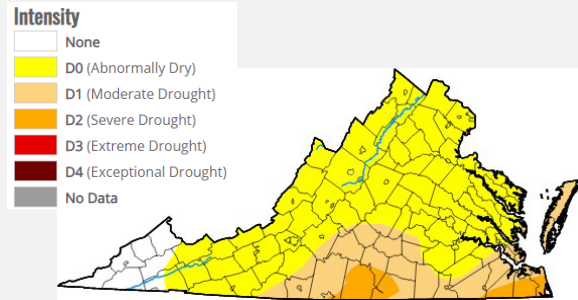
Temperature Extremes and Drought

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).

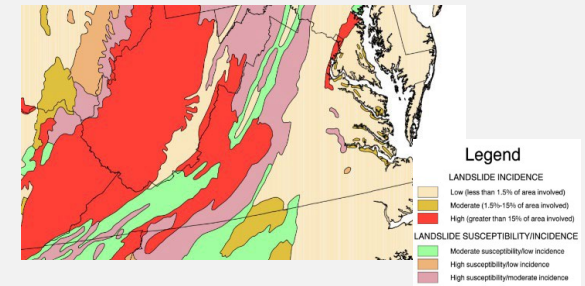
Drought is a natural climatic condition caused by extended periods of limited precipitation. Factors that influence drought severity include a prolonged lack of rainfall, human demands (water withdraws), high winds and low relative humidity (which increases evaporation). Prolonged droughts pose risks 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.

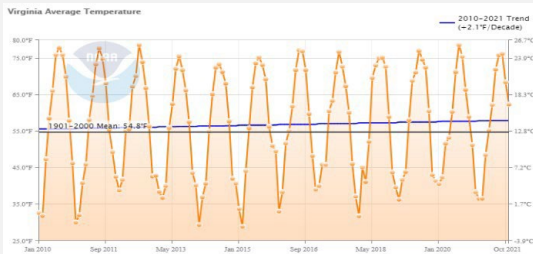
US Drought Monitor (USGS) Snapshot (Dec 20, 2021)



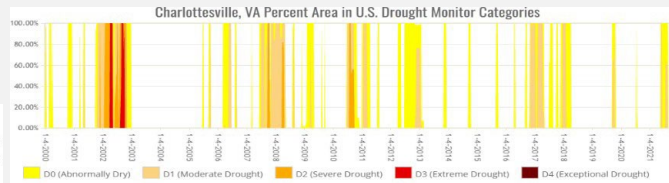
USGS Landslide Overview Map



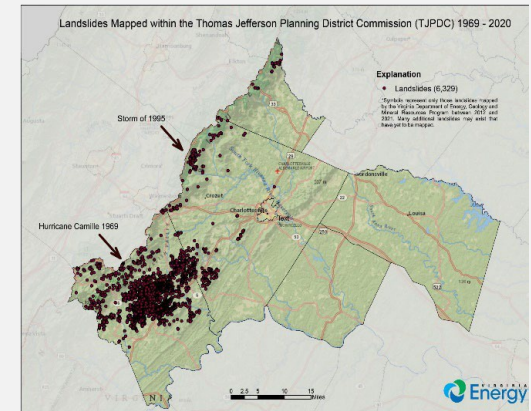
Virginia Monthly High, Low and Average Temperatures



Region Historic Drought based on Percent Area



Landslides in Region from 1969-2020



HIRA Assessment

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	RISK
SCORE	0-3 NA-High	0-3 NA-High	0-3 NA-High	0-3 NA-High	0 - 100%
Drought/Extreme Heat	2	1	1	2	22%
Landslide	1	1	1	1	11%

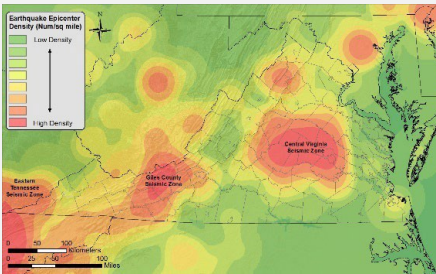
HIRA: TORNADO AND EARTHQUAKE

Tornado and Earthquake

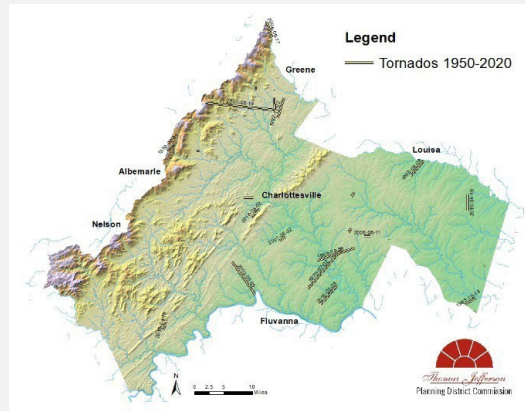
The Region averages about 1 tornado a year. Most tornados experienced in the region are EF0 or EF1 events. However, the exception was a major tornado produced by Tropical Storm Ivy (EF2) which touched down in Fluvanna County. July is the most active month for tornados as it has the most number of thunderstorms.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

Virginia Earthquake Epicenter Density Tornados 1950-2020



Regional Tornado Tracks



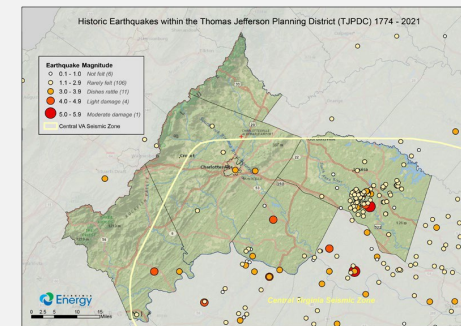
Tornado Record 1920-2020

Class	Property Damage	Date
EF2	\$200,000	4/19/2019
EF0	\$325,000	2/24/2016
EF1	Historic homes damaged in Louisa County	10/9/2011
F1	\$500,000	8/30/2005
F2	\$3,000,000	9/17/2004
F1	\$500,000	5/13/2000
F1	\$250,000	5/5/1989
F3	\$250,000	7/25/1985
F1	\$250,000	10/13/1983
F2	\$250,000	8/9/1962
N/A	11 people died and 4 were injured in Ivy/Mechum's River	1959
N/A	Leveled trees, tore off roofs, smashed buildings in Ivy	1922

2011 Mineral Earthquake Epicenters and Magnitudes



Historic Earthquakes in the TJPCD



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	2	1	1	2	22%
Earthquake	1	1	2	2	19%

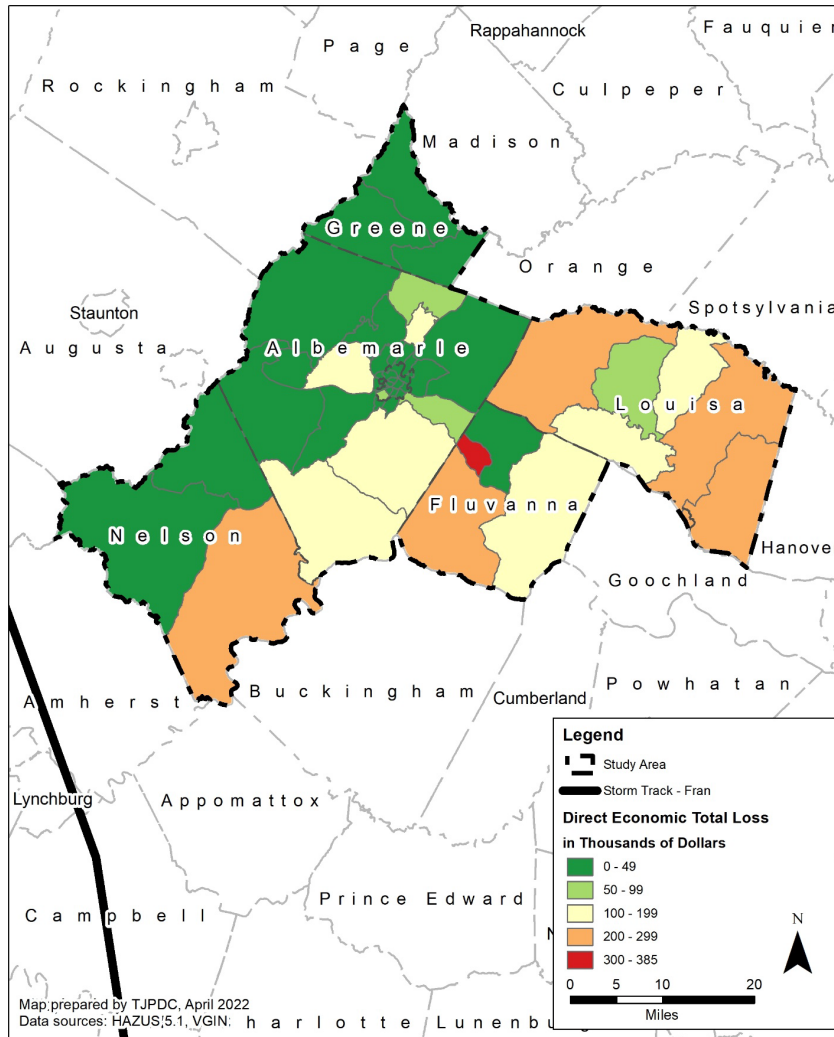
HAZARD VULNERABILITY ASSESSMENT DATA SOURCES

- National Climactic Data Center
- VA Department of Forestry
- VA Department of Health
- VA Department of Emergency Management
- VA Department of Conservation and Recreation
- VA Department of Environmental Quality
- VA Department of Energy
- VA Department of Energy
- UVA
- Center for Disease Control
- American Society of Civil Engineers
- National Weather Service
- United States Geological Survey
- NASA
- Locality Staff
- Local news
- Published Research Papers

HAZARD VULNERABILITY ASSESSMENT

- Provides an overview and analysis of vulnerability in the Thomas Jefferson Planning District using factors including the HIRA, projected population growth and settlement patterns and the location of existing people and infrastructure
- Utilize Planning tools including FEMA's HAZUS models for Hurricanes, earthquakes and flood and the Wildfire Risk Assessment for wildfires.
- Presents information on expected losses \$\$
- Understand risk based on location

Hurricane Event Historic Hurricane Fran Model

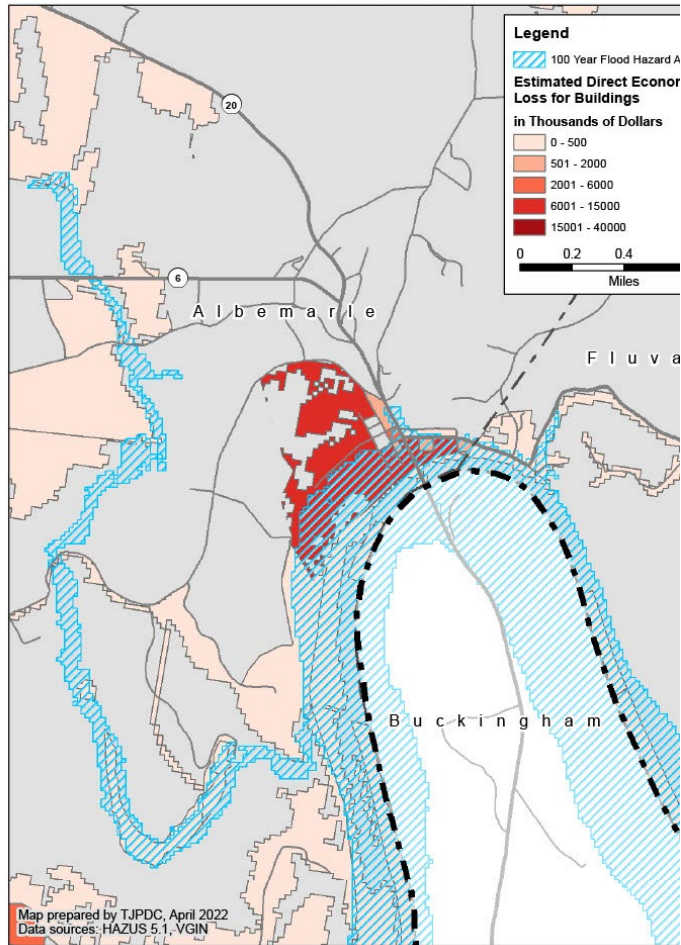


MODELED HURRICANE LOSSES

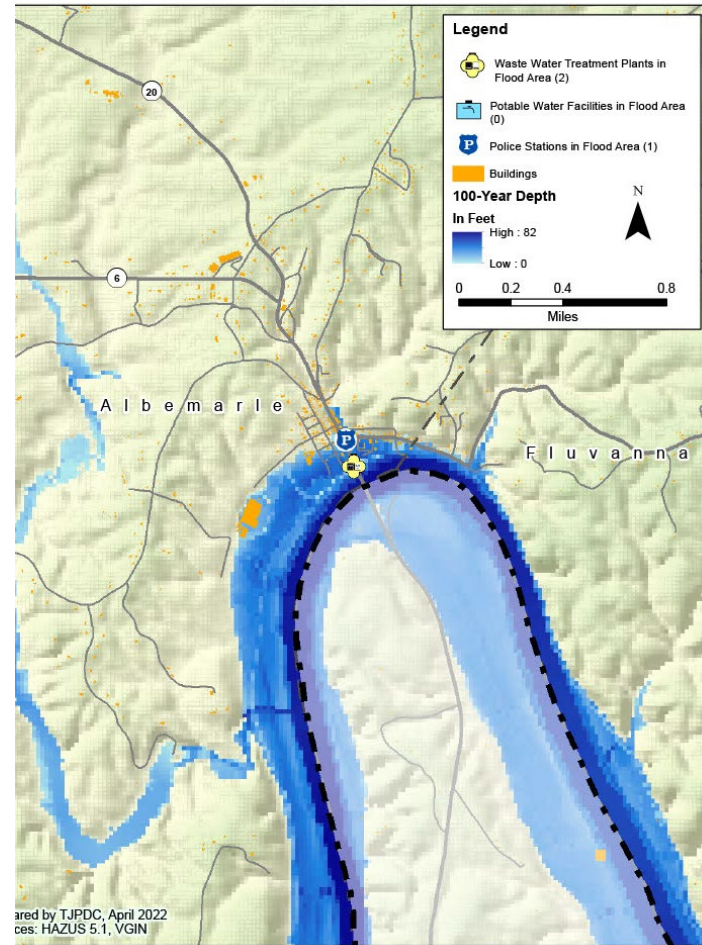
- Expected Economic Losses from Historic Hurricane Event Scenario: Fran (1996)
- Equivalent of an Approximate 200-Year Event

MODELED FLOOD LOSSES – 100 YEAR EVENT (SCOTTSVILLE)

100 Year Flood Event
Scottsville



100 Year Flood Event
Scottsville



WILDFIRE

MITIGATION ACTIONS

[Activity Code] Mitigation Action: [Jurisdiction]

Category:	One of the goal categories listed above that is supported by the action
Action Item (Describe):	Brief description of action item
Hazard (s):	The hazard(s) the action is intended to mitigate
Lead Agency/Department Responsible:	Identify the local agency, department, or organization that is best suited to accomplish the action.
Estimated Cost:	An estimate of the costs required to complete the project or continue the project for the course of 5-years; this amount should be estimated until a final dollar amount can be determined.
Funding Method: (General Revenue, Contingency/Bonds, External Sources, etc.)	Potential sources of funds to complete the action, when applicable
Implementation Schedule:	Timeframe for which the action is expected to be completed
Priority	Placement in the order of importance and urgency

NEXT STEPS

- Public Comment
- Submit to VDEM and FEMA
- Work towards formal adoption by all localities