Central Virginia Planning District Commission Flood Resilience Plan

2024

CVPDC
Central Virginia Planning District Commission

Berkley Group

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Executive Summary

Purpose and Introduction

This CVPDC Flood Resilience Plan seeks to increase resiliency across the CVPDC region by addressing threats to human life and property from flooding, as well as extreme heat. While the main purpose of this plan focuses on flood resilience, the CVPDC localities wanted to add resilience to Heat as well, which is an important climatic condition to consider. The CVPDC Flood Resilience meets the nine (9) criteria for resilience plans identified as part of the Virginia Department of Conservation and Recreation's Community Flood Preparedness Fund (CFPF) grant program:

> *It is project-based with projects focused on flood control and resilience.*

The Potential Projects and Solutions section of this Plan (Appendix A) describes specific flood and/or heat mitigation projects related to issues developed through conversations with locality staff and mitigation strategies from the CVPDC Hazard Mitigation Plan.

> *It incorporates nature-based infrastructure to the maximum extent possible.*

The solutions and planning principles outlined in this Resilience Plan incorporate nature-based strategies as much as possible. Additionally, each locality contains a section in the plan highlighting existing protected areas and ecological cores, overlaid on floodplains and intermittent streams. This information can be used to prioritize land acquisition for flood mitigation.

> *It includes considerations of all parts of a locality regardless of socioeconomics or race and addresses flood resilience needs of underserved populations within the community.*

This Plan understands that flooding anywhere in the CVPDC region affects everyone. It considers solutions that involve every member of the community at every step of the process and seeks to identify and target the County's most vulnerable communities. See the Community Assets section of each plan for more information.

> *It identifies and includes all flooding occurring in all areas of the community, not just within the SFHAs, and provides the number and location of repetitive loss and severe repetitive loss properties. Repetitive loss and/or severe repetitive loss often occurs outside of the SFHA and to properties not captured in NFIP reporting. All flooding should be tracked and addressed by the community.*

The flooding issues expounded upon in this resilience plan are not restricted to FEMA special flood hazard areas. This Plan seeks to address all forms of flooding (including but not limited to riverine, pluvial, stormwater, nuisance, infrastructure-related, residential, commercial, etc.) Building upon the 2020 CVPDC Hazard Mitigation Plan and through community interviews localized flooding events were captured and included in a map for each locality. As of 2023, all the CVPDC localities are enrolled in NFIP; and have been since the 1970's. There are a total of 27 repetitive loss properties in the region, with 19 of those within the City of Lynchburg. There are a total of 11 severe repetitive loss properties in the region, with 7 being in the City of Lynchburg.

If property acquisition and/or relocation guidelines are included, the guidelines include equitable relocation strategies for all affected and where land is acquired. Property acquisitions must remain undeveloped, as permanent open space and under ownership or easement by the locality in perpetuity, except that flood control structures may be built on the property.

This plan does not specifically address property acquisition and/or relocation guidelines, however several community's prioritized resilience strategies include a study and/or further efforts to do so.

It includes a strategy for debris management.

Debris management was specifically discussed with each locality and determined to be either a part of their Emergency Operations Plan, another local plan, or a part of day-to-day operations. If not memorialized in a written plan, a strategy is included to do so.

It includes administrative procedures for substantial development/substantial improvement of structures within the SFHA.

See Appendix D, which lists each locality's ordinance section for detailed administrative procedures for development and improvement of structures within the "Floodplain Management Overlay District" which encompasses the special flood hazard area.

It includes coordination with other local and inter-jurisdictional projects, plans, and activities and has a clearly articulated timeline or phasing for plan implementation.

This Plan relies on and synergizes with other regional plans, especially the 2020 CVPDC Hazard Mitigation Plan Update, as well as other locally based plans. See Appendix C of this Plan for other regionally important plans and sources of information. See the Project Implementation Sheets section of this Plan for timelines for project implementation.

Is based on the best available science, and incorporates climate change, sea level rise, storm surge (where appropriate), and current flood maps.

This plan seeks to recognize climate change impacts using the best available data and science.

Definition of Resilience

Flood resilience generally refers to the ability of communities, infrastructure, and ecosystems to withstand, adapt to, and quickly recover from floods while minimizing damage and disruption.

According to FEMA, resilience is "the ability of individuals, businesses, communities, institutions, and governments to adapt to changing conditions and to prepare for, withstand, and rapidly recover from disruptions to everyday life, such as hazard events."

The State of Virginia defines resilience as "the capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, health, the economy, and the environment."

Community Input and Participation

A key aspect of the CVPDC Flood Resilience Plan is local input. Throughout the plan process, locality staff were engaged at multiple points. Specifically, virtual interviews were conducted at the beginning of the project, at the mid-point of the project, and at the end to get feedback on the final plan and prioritized actions. Discussions with local staff enriched the planning process by providing diverse perspectives, local knowledge, ownership, support, priority identification, and innovation. See Appendix D for the notes from the community staff interviews. Through the 2020 CVPDC HMP update, input from the general public was solicited and used to guide the overall document and mitigation strategies. This CVPDC Flood Resilience Plan relied on the recent public engagement efforts associated with the HMP update.

Resilience Action Prioritization Matrix

A key output of the CVPDC Flood Resilience Plan is the prioritized flood and heat actions matrix. This table contains flood and heat mitigation strategies that were identified as part of the 2020 CVPDC HMP update. These were further prioritized for each locality as well as the overall CVPDC region. For more information on the prioritization strategy and the prioritization matrix table please see Appendix A.

The Central Virginia Planning District Commission

The Central Virginia Planning District Commission (CVPDC) is an organization that plays a vital role in coordinating collaborative efforts relating to development and planning across the region's member localities. The CVPDC is one of twenty-one regional planning districts within the Commonwealth of Virginia and encompasses a region of over 2,000 square miles. This region, located in the heart of Virginia, is situated 115 miles west of Richmond, Virginia and roughly 180 miles south of Washington, DC. Defining geographic features of the region include the James River, Staunton River, Smith Mountain Lake, and the Blue Ridge Mountains. Climate wise, the Central Virginia Region is referred to as a humid subtropical region. This area of Virginia is generally humid and typically experiences very warm summers and mildly cold winters.

The Central Virginia Planning District Commission is made up of ten (10) member localities. These local governments include the Counties of Amherst, Appomattox, Bedford, and Campbell, and the Towns of Amherst, Appomattox, Altavista, Bedford, Brookneal, and the City of Lynchburg. Together, these localities have worked towards planning for a more resilient region through their efforts associated with the CVPDC Resilience Plan development process.

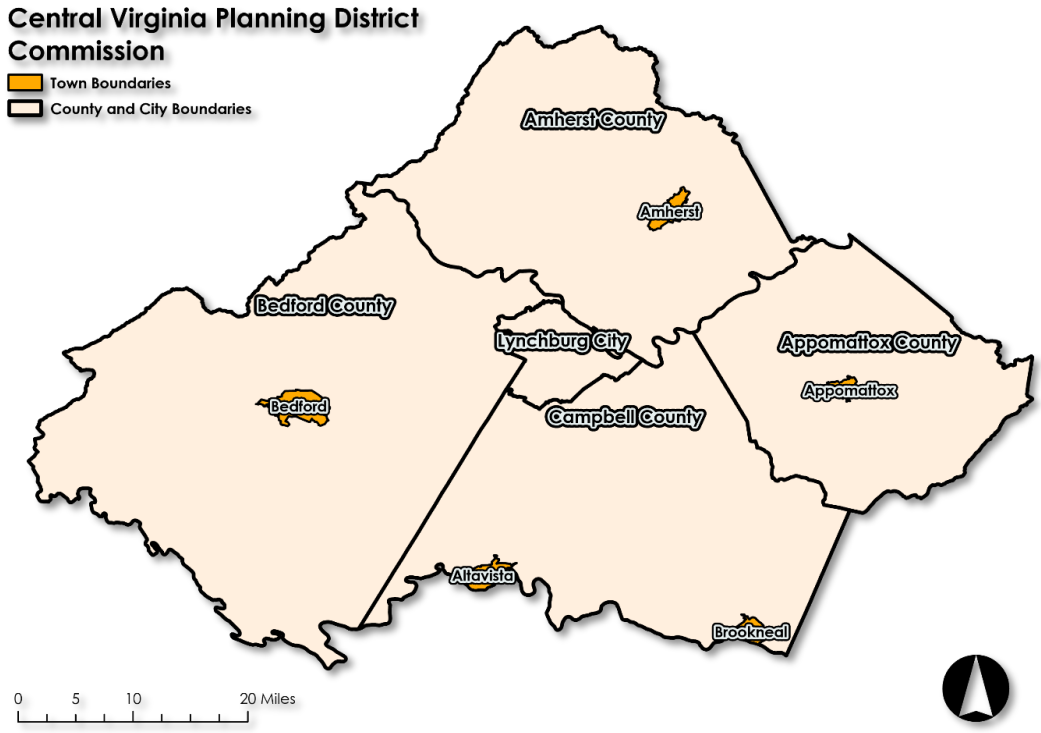


Figure 1 The Central Virginia Planning Commission District

These ten (10) members localities have varying populations and demographics. It is important that the unique makeup and needs of each be considered in a successful effort to provide resiliency from flood and heat related threats. This effort also builds upon the CVPDC 2020 Hazard Mitigation Plan update, which contains detailed demographic information for each locality. Please see Table 1 below for more information.

Locality	Approx. Population	2020 HMP Hazard Mitigation Plan Profile Reference
Amherst County	31,307	Page 2-2
Appomattox County	16,119	Page 2-3
Bedford County	79,462	Page 2-3, 2-4
Campbell County	55,696	Page 2-4
Town of Amherst	2,504 (Data USA)	Page 2-5
Town of Appomattox	1,919	Page 2-6
Town of Altavista	3,378	Page 2-5
Town of Bedford	6,657 (ACS)	Page 2-6
Town of Brookneal	1,090	Page 2-7
City of Lynchburg	79,009	Page 2-4
Comparison		
United States	331,449,281	
Virginia	8,631,393	

Table 1 Demographics for CVPDC communities, 2020 US Census data

Vulnerable Populations

According to ADAPT VA's Social Vulnerability Index[1], social vulnerability is the ability of an individual or group to anticipate, cope with, and resist and recover from natural or human-caused hazards. Vulnerable populations tend to be groups of people who are at a higher risk of poor physical and social health status. This CVPDC Flood Resilience Plan considers vulnerability and provides specific examples to align with the Virginia Department of Conservation and Recreation's Community Flood Preparedness Fund criteria. The plan will also identify areas of economic stress by the low to moderate income designation metrics.[2] The chart below summarizes the annual median income as well as the areas that are considered vulnerable based on their designation as a low-income geographic area.

[1] ADAPT VA's Social Vulnerability Index Score (http://cmap2.vims.edu/SocialVulnerability/SocioVul_SS.html) (VA, n.d.)
[2] LMI 2020 US Census Data

Locality	Annual Median Income (AMI)	80% AMI ≤	Low-Income Geographic Areas	2020 HMP Hazard Mitigation Vulnerable Communities Reference
Amherst County	$60,876	$48,700.80	Yes	Page 4-36
Appomattox County	$55,268	$44,214.40	Yes	Page 4-48
Bedford County	$71,751	$57,400.80	Yes	Page 4-58
Campbell County	$53,918	$43,134.40	Yes	Page 4-76
Town of Amherst	$46,316 (Data USA)	$37,052.80	Yes	Page 4-36
Town of Appomattox	$35,083	$28,066.40	Yes	Page 4-48
Town of Altavista	$35,438	$28,350.40	Yes	Page4-31
Town of Bedford	$36,971 (ACS)	$29,576.80	Yes	Page 4-58
Town of Brookneal	$50,313	$40,250.40	Yes	Page 4-76
City of Lynchburg	$49,076	$39,260.80	Yes	Page 4-90

Table 2 Income Information for CVPDC communities, 2020 US Census

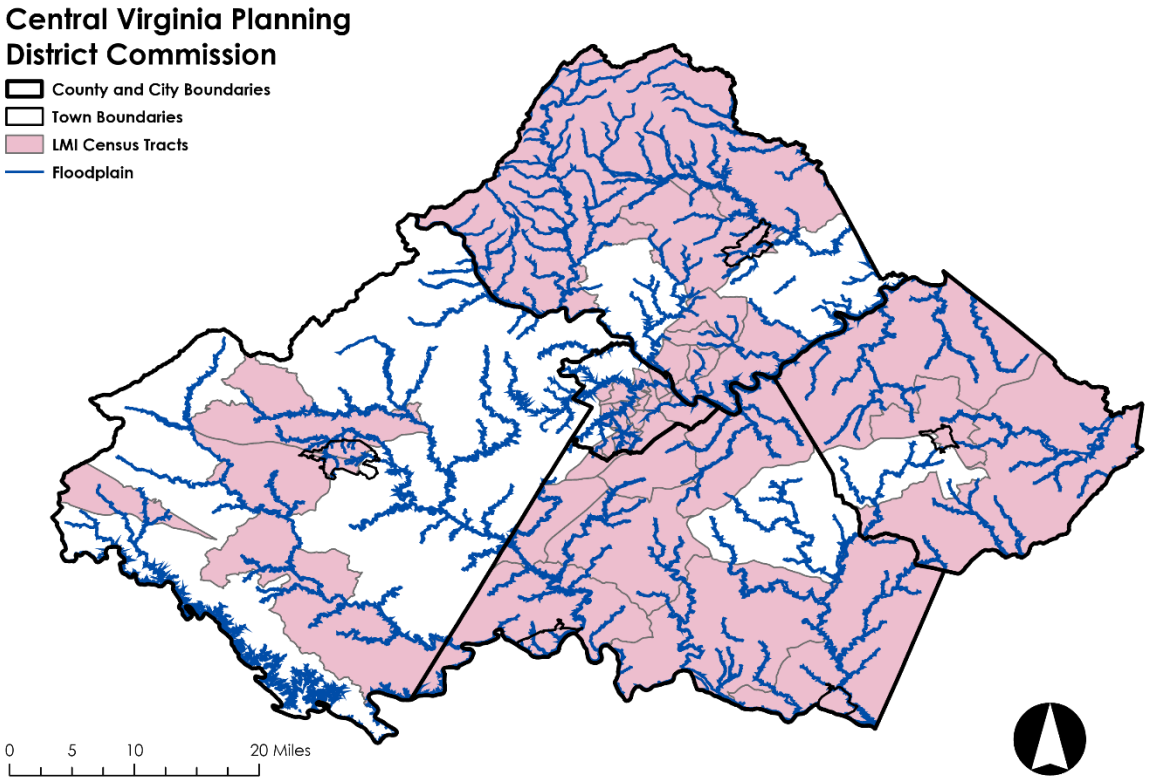


Figure 2 Low to Moderate Income Census Tracts with designated income levels at or below 80% of Area Median Income Levels.

Regional Plans

CVPDC 2020 Hazard Mitigation Plan (HMP)

The 2020 CVPDC Hazard Mitigation Plan,[3] (HMP) adopted in October 2020, defines the hazards relevant to the region and identifies vulnerabilities to such hazards. The identified hazards range from natural, technological, and human-caused concerns. Drought, flooding, and urban fire hazards were ranked as the highest hazard risks in the CVPDC region. The purpose of the HMP is to better prepare the region, including its citizens, visitors, communities, local governments, and businesses, for hazards and the risks associated with them. The HMP is a vital tool for these groups to lessen their vulnerability to hazards through strategies such as hazard risk assessments, floodplain management, additional grant program applications, and mitigation policy embedded in local and regional planning activities. The Federal Emergency Management Agency (FEMA) requires local governments to update their HMP every five years in order to maintain eligibility for pre- and post-disaster planning, mitigation, and recovery funding.

[3] https://www.cvhmp.com/static/pdf-viewer/web/viewer.html?file=/static/files/Central-Virginia-Planning-District-Hazard-Mitigation-Plan-2020.pdf

Brownfields Assessment Program

The Central Virginia Planning District Commission was awarded a $500,000 Brownfields Assessment Grant from the United States Environmental Protection Agency (USEPA) Region 3. The 3-year grant has EPA funding committed to September 2025. This grant will be used by the CVPDC and its member partners to conduct Phase I and Phase II Environmental Site Assessments (ESAs), to support property reuse and remediation planning and economic development and revitalization in the region.
EPA's Brownfields Program empowers communities and property owners to work together to assess, characterize and develop a foundation with which to plan redevelopment and reuse of properties that may have a complicated condition or history preventing use. Any property owners in the CVPDC planning area that own underutilized parcels with environmental concerns are eligible for funding Phase I and II evaluation.

Regional Programs

Watershed Implementation Plan (WIP)

The State of Virginia developed a Watershed Implementation Plan in ongoing phases (2010, 2012, and 2019) to incorporate strategies to reduce nutrient pollution in our waterways. The Chesapeake Bay Total Maximum Daily Load (TMDL) is designed to ensure that all pollution control measures needed to fully restore the Bay and its tidal rivers are in place by 2025. Specifically in Virginia, TMDL calls for a 20.5% reduction in Sediment delivered to the Bay. This will be achieved through stormwater Best Management Practice (BMPs). CVPDC and other communities across Virginia, in cooperation with the Virginia Department of Environmental Quality (DEQ), have been developing strategies to reduce nutrient pollution in our waterways through the Chesapeake Bay TMDL Phase III WIPs

Regional Assets

Natural Assets

Conservation Areas

Photo 1 Ivy Creek Greenway, Lynchburg, VA; photo credit: Lynchburg Tourism

The CVPDC contains numerous greenways that traverse the region. A greenway is a natural linear corridor that can play a vital role in water quality protection, minimizing stormwater impact, and mitigating stormwater flood damage in low lying areas. Comprised of natural habitats or landscaped areas, greenways located along a river corridor and other ecologically valuable land systems filter runoff from adjacent land uses, thus assisting in the removal of sediment, nutrients and chemicals that negatively impact water systems and organisms. Additionally, greenways can serve as approved best management practice for controlling and mitigating stormwater quality and quantity thus assisting CVPDC localities in meeting new stormwater control requirements. Further, these green systems provide storage of the water and allow natural recharge of groundwater systems.

In addition to greenways, conservation areas are protected lands that are owned, managed, and generally held for purposes of safeguarding ecological richness, and in most cases, offering recreational opportunities for the general public. In addition to protecting wildlife and plant species, these areas offer benefits related to flooding and heat mitigation. Intact forests are a part of the natural water cycle, and function to absorb, filter, and recharge groundwater. They also prevent sediment, nutrients, and chemicals from getting into streams and rivers, which can negatively affect communities downstream. In addition to proper management of these areas, it is imperative to understand what intact or ecologically rich lands are still unprotected and take action to protect them for perpetuity. These lands stretch across County lines, generally. Regional Conservation Areas include, the Federally owned Priest National Forest Wilderness Area, George Washington National Forest, James River Face National Forest Wilderness Area, and Thunder Ridge National and Forest Wilderness Area. Numerous State Forest Areas, State Parks and State Wildlife Management Areas also dot the region. Another method for protecting land is through conservation easements on privately held land. As seen in the map below, there are conservation easements in the region, many adjacent to waterways offering various flood related benefits while keeping further built infrastructure out of the floodway. These areas can also protect biodiversity and offer linkages and corridors for wildlife. Lastly, these areas allow for public access and recreational opportunities for hiking, biking, boating, and fishing.

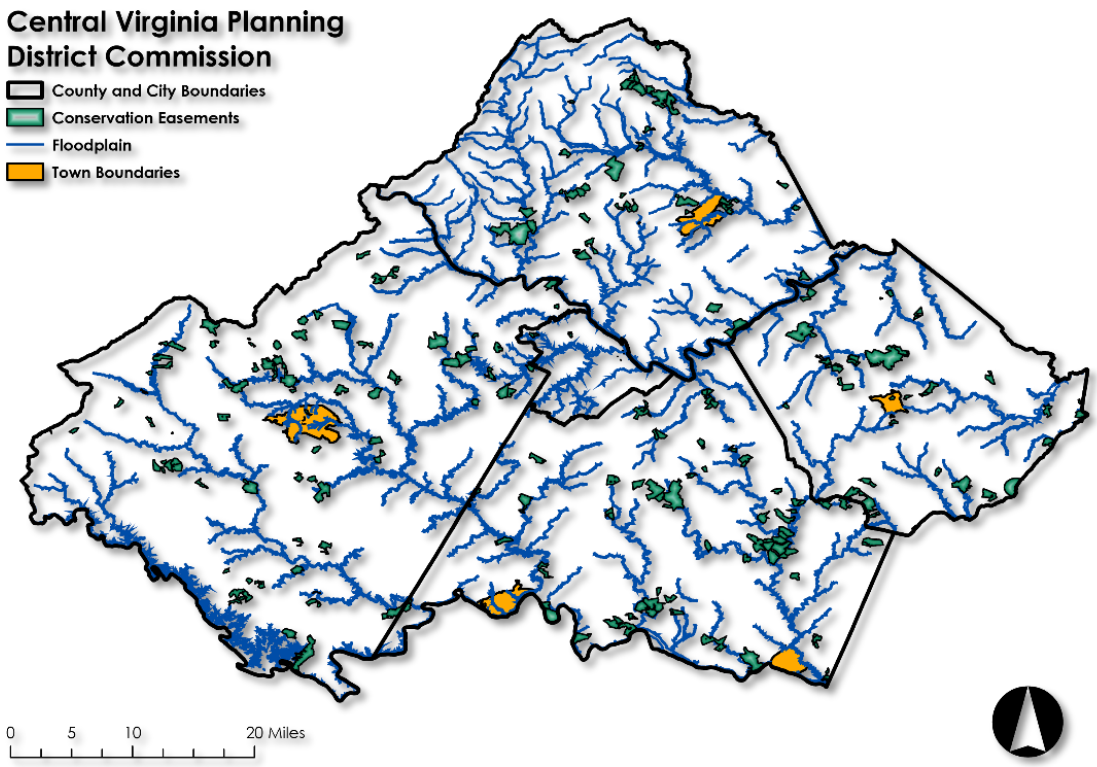


Figure 3 Conservation Lands overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

Ecological Cores

Ecological cores are patches of natural land with at least 100 acres of interior cover which provide habitat for a large variety of species, including forest, marsh, and maritime dependent species. Using satellite data, the Virginia Natural Landscape Assessment (VaNLA) provides an analysis that has identified, prioritized, and linked the important land networks throughout Virginia. The CVPDC region should have strategies to preserve ecological cores, such as using them as park lands for low-impact recreation (hiking, bird watching, etc.) and other conservation efforts.

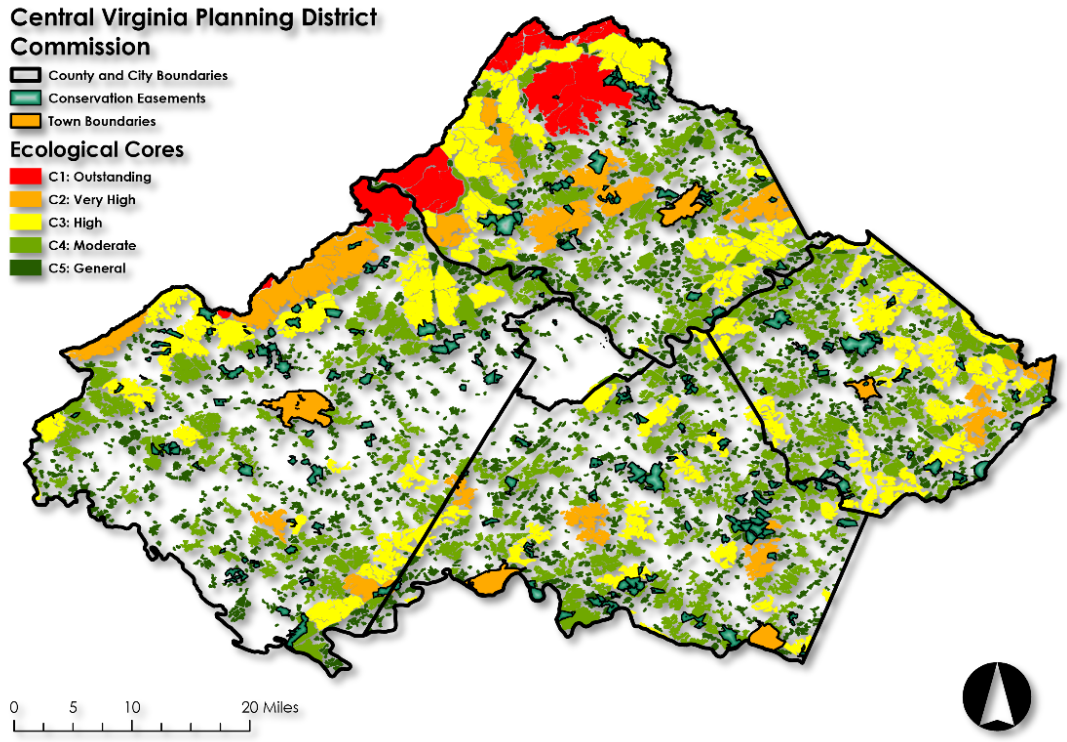


Figure 4 Ecological Cores overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

Built Assets

Most of the built infrastructure in the region consists of roadways and bridges maintained by the Virginia Department of Transportation (VDOT). While the CVPDC 2020 Hazard Mitigation Plan contains detailed lists of vulnerable roads and bridges within the 1% and 2% Annual Chance Flood Area, it was also noted in community interviews that there are flood events that occur region wide that may not be in a designated flood hazard area and are associated with standing water from precipitation events. There may also be complications to addressing infrastructure improvements as many of the localities do not own or operate the roads and associated stormwater infrastructure.

Figure 5, below, provides an inventory of the Virginia Department of Transportation (VDOT) identified bridges and culvert conditions. The VDOT assessment ranking is helpful for prioritization of infrastructure

needs. The CVPDC can work closely with VDOT to advance projects in the region and focus on the specific infrastructure needs in poor condition. This will be discussed in more detail for each locality.

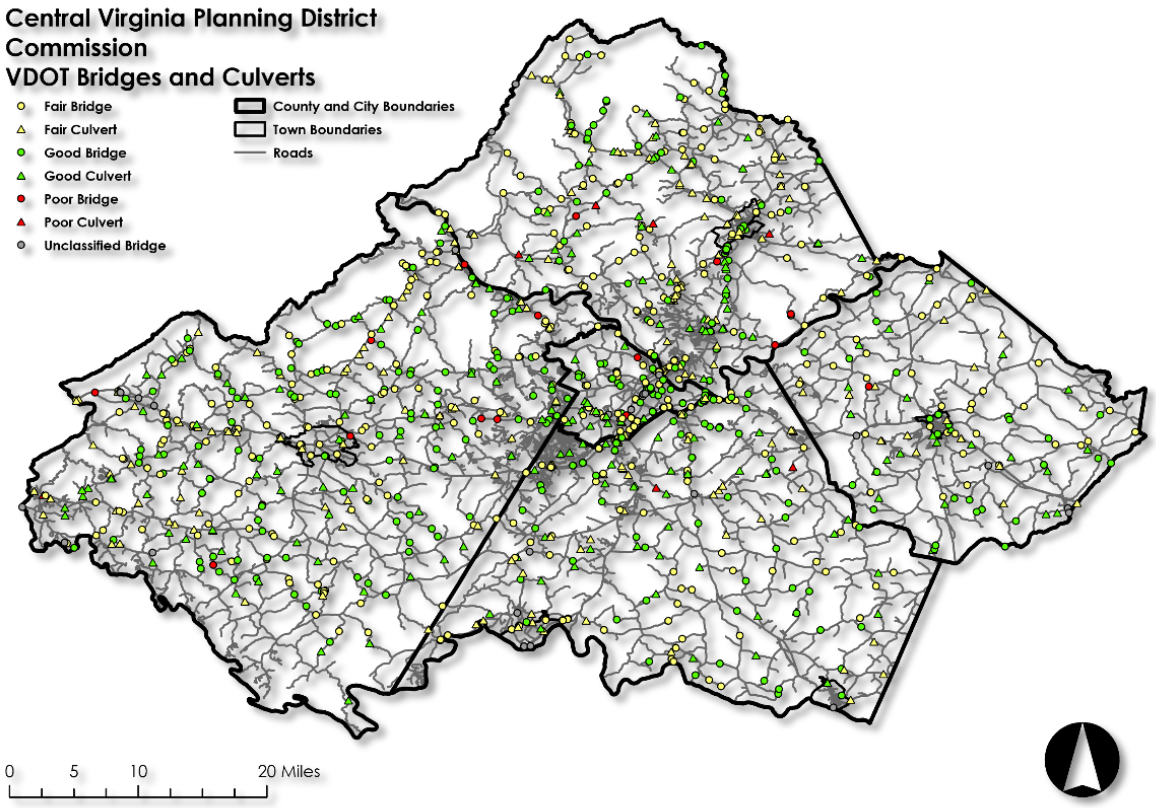


Figure 5 Bridge and culvert condition assessment within the CVPDC (VDOT).

Regional Hazards

Flooding and Related Hazards

Precipitation Flooding

The most frequent and most costly natural hazard throughout the United States is flooding. Excess water from snowmelt, rainfall, or riverbank flow accumulates and overflows onto adjacent floodplains. There are four basic types of floods that affect Virginia's communities, depending on the region of the state examined: coastal flooding, urban flooding, flash flooding, and riverine flooding. The CVPDC region is most susceptible to **riverine flooding** and **flash flooding**. A riverine flood occurs when water levels overtop the banks of a river. Low-lying areas adjacent to rivers, streams, or creeks are susceptible to riverine flooding, and such flooding occurs as result of excessive rainfall and/or snowmelt. A flash flood usually contains

two important elements; rainfall intensity and duration. These factors, combined with geophysical conditions, such as soils, topography, and ground cover, affect the direction and intensity of water flow. Flash floods are distinguished from regular floods by having a timescale of less than six hours between rainfall and onset of flooding.

Storm events

Hurricanes and tropical storms, as well as tropical depressions, are all tropical cyclones. Hurricanes and tropical storms bring heavy rainfall, tornados, and high winds, all of which can cause significant damage. These storms can last for several days, and therefore have the potential to cause sustained flooding and high wind conditions. Numerous hurricanes and tropical storms occur along the eastern seaboard each year, with direct landfall occurring somewhere along the eastern United States approximately once every three years. While the region is protected from the full strength of a hurricane, its expansive nature makes the region vulnerable to high winds, flooding, and tornadoes that often accompany these other extreme weather events. VDEM rates Virginia's overall wind risk as high and the CVPDC communities are no exception. Historical occurrences of high winds generated by hurricanes and tropical storms are a strong indication of future events.

Thunderstorms are defined as localized storms, always accompanied by lightning, and often having strong wind gusts, heavy rain and sometimes hail or tornadoes. Thunderstorms can produce a strong out-rush of wind known as a downburst or microburst, or straight-line winds which may exceed 120mph. The entire CVPDC region is at risk of thunderstorm damage. There have been seven people injured and well over $100,000 in property damage caused by lightning strikes in the CVPDC since 1993.

Dam Inundation

Dam inundation refers to the process in which an area or land located downstream from a dam is submerged or flooded due to the release of water from the dam. This process can occur naturally after periods of heavy rainfall or snowmelt, or it can result from human-related actions such as the deliberate release of water from a dam to prevent dam failure or dam infrastructure damage. Dam inundation can have major consequences for the communities located downstream including flooding of property, agricultural land, and infrastructure. There are several mapped Dam Break Inundation Zones (DBIZs) located within the CVPDC region associated with the College Lake Dam, Reusens Dam, Ivy Lake Dam, and the Lake Summit Dam, among others.

Extreme Heat

According to FEMA, extreme heat often results in the highest number of weather-related deaths in the United States each year. Extreme heat is characterized as a period of time in which temperatures and humidity are higher than the average temperatures for that time of year in a specific area. These periods of time are also often referenced to as heat waves. Extreme heat can be severely damaging to the human body and can result in many heat-related illnesses such as heat exhaustion or heat stroke. Extreme heat also has negative consequences on infrastructure and built assets within communities. Specifically, extreme heat directly impacts infrastructure such as roads and bridges that were not built to withstand such high temperatures. Additionally, extreme heat can have consequences on the agricultural industry including the health of workers and crops.

Regional Future Conditions

One of the guiding principles of the CFPF program is to acknowledge climate change and its consequences, and base decision making on the best available science.[4] Considering this, the CVPDC region will endeavor to incorporate climate change data where appropriate, into proposed initiatives.

When considering a changing climate, it is important to understand the modelling variability that exists based on future conditions of emissions that affect the warming of the atmosphere. Generally, scientists must also make assumptions about future greenhouse gas emissions, which include a variety of gases, including; Carbon dioxide, Methane, Nitrous oxide, and Fluorinated gases. Worldwide, net emissions of greenhouse gases from human activities increased by 43 percent from 1990 to 2015. Emissions of carbon dioxide, which account for about three-fourths of total emissions, increased by 51 percent over this period. As with the United States, the majority of the world's emissions result from transportation, electricity generation, and other forms of energy production and use.[5]

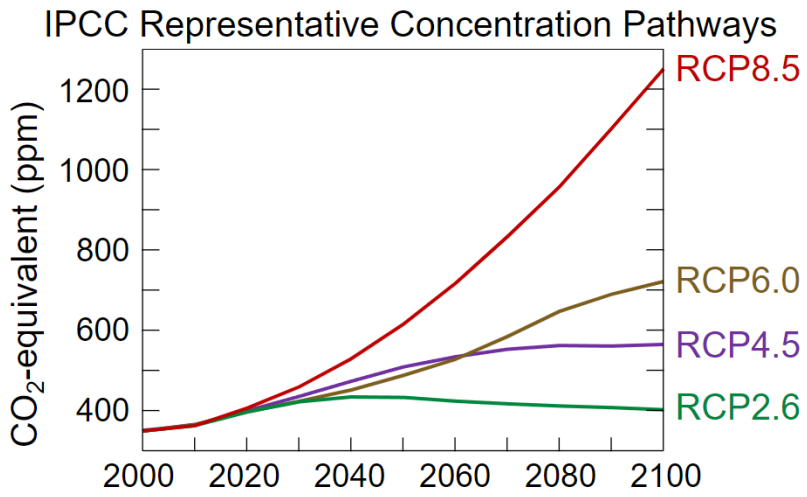


Figure 6 Representative Concentration Pathways, or RCPs, are greenhouse gas concentration trajectories adopted by the IPCC. (Source: IPPC)

Looking to the future, if emissions continue to rise, the earth will warm more quickly, and climate change impacts will be more severe. If emissions fall, the earth may not warm as much. Thus, evaluating a range of climate scenarios may assist in understanding how the climate may change in the future. For the purposes of this plan, the scenarios will generally refer to the RCP 2.6 scenario, which represents the lowest amounts of future greenhouse gas emissions; the RCP 4.5 scenario which accounts for a moderate level of greenhouse gas emissions reductions; and the RCP 8.5 steady state scenario. The RCP 8.5 steady state scenario represents a scenario wherein little effort is made to reduce emissions, resulting in large atmospheric greenhouse gas concentrations[6]. Figure 4 shows a representation of the concentration of Carbon dioxide in the atmosphere, based on various levels of emissions in the future.

Precipitation Flooding

In general, future precipitation projections in the region are expected to increase. By midcentury, (2041-2060) annual average precipitation is projected to increase from 41-47 inches to 44-53 inches statewide.[7] In order to provide a quantifiable amount of impact, the National Oceanographic and Atmospheric Administration's (NOAA) Mid Atlantic Regional Integrated Sciences and Assessments (MARISA) tool can

[4] VA Community Flood Preparedness Fund
[5] US EPA Climate Indicators
[6] Fourth National Climate Assessment, Chapter 19, Southeast
[7] US EPA

be used to predict rainfall for future design storms. The design storms can predict rainfall based on two planning horizons, year 2070 or 2100, and two climate change action scenarios, RCP 8.5 and RCP 4.5.

Rainfall Duration	Current Rainfall	Projected 2070		Projected 2100	
		Rainfall (in.)	Change from Current (in.)	Rainfall (in.)	Change from Current (in.)
10 Year Return Period (10 Year Storm)					
10 min	0.83	0.93	0.1	0.98	0.09
1 hour	1.98	2.22	0.24	2.34	0.36
24 hours	4.97	5.57	0.6	5.86	0.89
25 Year Return Period (25 Year Storm)					
10 min	0.93	1.03	0.1	1.14	0.21
1 hour	2.33	2.59	0.26	2.87	0.54
24 hours	6.1	6.77	0.67	7.5	1.4

Table 3: Rainfall duration and projected totals, MARISA [8]

While this data is now available, it is still difficult to predict the impacts of changes in rainfall patterns to infrastructure. This is largely due to the variety of factors that comprise the relationship between rainfall and runoff and that this relationship is generally non-linear. For example, a 5% increase in rainfall does not equal a 5% increase in runoff. The complexity leads to the necessity for additional study, and the incorporation of new information into updated standards in the design and construction of stormwater and flood infrastructure. With this in mind, a best practice to begin now, in order to plan for increases in precipitation and intensity, includes adaptation actions. An example of this is instead of building flood walls and levees, create or protect a riparian buffer with native vegetation and open spaces which will not be subject to costly damages, and which allows for passive recreation. This concept will be discussed more throughout the community sections of this plan.

Even though most of the climate models suggest rainfall increase, there is a possibility that climate change will result in less rainfall. Such a decline, particularly during the spring or summer months, could impact agriculture production and the amount of water available in rivers and streams. This could stress the agricultural industry and negatively impact natural waterways in the region.

Storm Events

Since the 1980s, the hurricane record has shown a more active period in the North Atlantic Ocean. On average, there have been more storms, stronger hurricanes, and an increase in hurricanes that rapidly intensify. Thus far, most of these increases are from natural climate variations. However, a recent study in the journal, Nature Communications, suggests that the latest increase in the proportion of North Atlantic hurricanes undergoing rapid intensification cannot be explained by natural variability alone. This could be the beginning of detecting the impact of climate change on hurricanes. In contrast, the frequency of hurricanes making U.S. landfall (a subset of North Atlantic hurricanes) has not increased since 1900, despite significant global warming and the heating of the tropical Atlantic Ocean.

[8] Mid-Atlantic Regional Integrated Sciences and Assessments (MARISA)

In the future, warming ocean temperatures are expected, and this will likely play a role in the continuation of rapid intensification of hurricanes that may bring heavy rainfall and wind to the region, while providing less advance notice of a life-threatening flood and wind situation.

Dam Inundation

Dam inundation zones are likely to be impacted by both climate change and future development trends. As rainfall increases, the likelihood of hydrologic failure (water overtopping the dam) increases; dams, in general, are built to withstand a certain annual percent chance rainfall event depending on how many human lives would be affected downstream in the event of a failure. For instance, a high hazard dam would be constructed to withstand a rainfall event larger than any previously seen or predicted, whereas a significant hazard dam may be constructed to withstand an event that is predicted to occur only once every 1,000 years (a 0.1% annual chance). Likewise, less rainfall or prolonged drought could lead to lower (and thus safer) dam levels or even complete removal of a dam.

Development downstream of a dam triggers a review per § 10.1-606.3 of the Code of Virginia, requiring that DCR examine whether the extra structures and inhabitants would require a new classification for the dam which would impact them. Although development upstream of a dam would rarely require a review of any sort unless the characteristics of the watercourse were changed enough to warrant informing FEMA for floodplain review; it should be noted in general that creating new impervious surface and development in general may impact the characteristics of impounded lakes and reservoirs. Strategies to minimize runoff such as incentivizing stormwater management on site via green infrastructure or working with localities to develop local regulations to require the management of stormwater runoff onsite are viable options.

Extreme Heat

Even though climate models project different changes in temperature in the future, they all agree that temperatures will increase. The amount of warming depends on the simulated emissions scenario, and it is important to note that future warming will not be uniform across the entire year. However, more hot days are coming to Virginia. The first decade of this century was the warmest on record, and an increasing number of summer days are expected to exceed 95°F (Third National Climate Assessment for the SE and Caribbean).

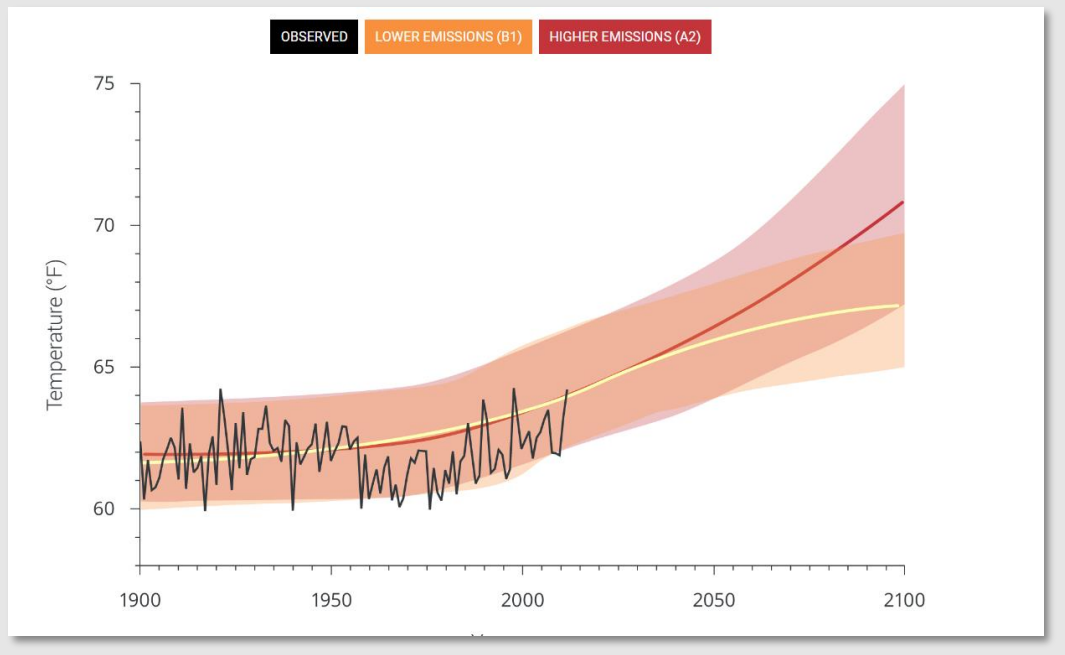


Figure 7 Observed annual temperature for the SE USA and Projected, Kunkel et al 2013

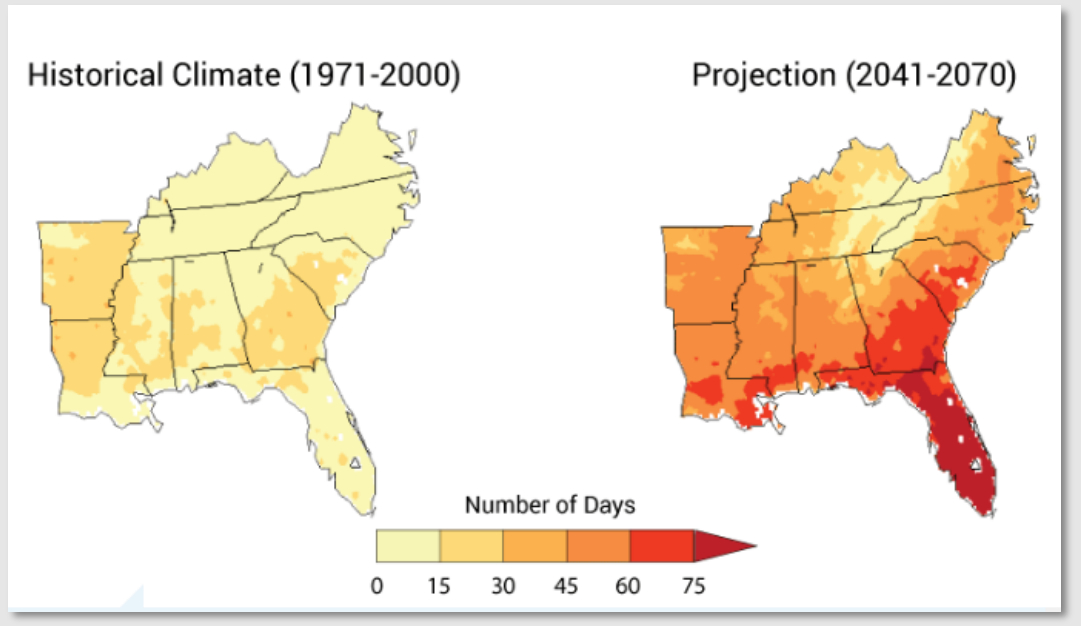


Figure 8 Projected Change in Number of Days Over 95 degrees F, assuming higher emissions (Figure source: NOAA NCDC / CICS-NC)

Potential Regional Resilience Policies

To prepare for future conditions, the CVPDC can function as a catalyst for the region, keeping communication lines open, coordinating regional initiatives and projects, and assisting localities with identification of funding for mitigation projects.

1. Create a Resiliency Advisory Committee, representative of the communities being served, to provide community engagement and input on current and future initiatives and projects.
2. Identification of ecosystems, wetlands, and floodplains that are suitable for permanent protection or acquisition.
3. Partnering with other agencies to incentivize agricultural best management practices.
4. Coordination with VDOT on maintaining and improving stormwater infrastructure on State roads.
5. Targeted community outreach for predominately minority, low-income, or other vulnerable communities or communities that are not always included in the planning process.
6. Increased education on residential and private property green infrastructure projects.

Prioritized Strategy

- ❖ Create a regional watershed hydraulic and hydrologic model to better understand flooding issues, stormwater system capacity, and stream conditions under future climate projections. Using the model, create a priority action plan of flood mitigation actions. (Score 65)

For a full explanation of the Prioritized Resilience Strategy Matrix, see Page 36, Prioritizing Resilience Projects. For the full suite of resilience strategies and rankings by locality, see Appendix A.

Regional Action

65 Action Score

Regional Watershed Model

Action Description

Create a regional watershed hydraulic and hydrologic model to better understand flooding issues, stormwater system capacity, and stream conditions under future climate projections. Using the model, create a priority action plan of flood mitigation actions..

Key Steps for Implementation

1. Conduct outreach to localities in the watershed to collect data on past flood events and impacts.
2. Develop hyraulic and hydrologic model.
3. Use model outputs to inform flood mitigation plan.

Action Lead

DPW Directors and Staff

Supporting Partners

- Virginia Lakes and Watersheds Association
- CVPDC
- VA DEQ Watershed Roundtables

Ease of Implementation

- ☐ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☑ Requires hiring a technical consultant.

Measures of Success

- Meaningful input from localities on past flood events for model input.
- Consensus on priority actions in the flood mitigation plan.
- Robust outreach campaign demonstrating model results and future climate projections.

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe	Cost*		
Short: 0-2 years	$: less than 10k	$$$$: 500k-2mill	
Medium: 3-6 years	$$: 10-50k	$$$$$: 2 mill+	
Long: 7+ years	$$$: 50-500k		

**Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.*

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

A regional watershed model helps determine the areas with the highest likelihood of impacts in the region. Localities can use the shared model to make joint decision on projects that will reduce flooding not only in one locality but in multiple/the region.

The model helps identify upstream interventions to reduce downstream flooding.

Co-Benefits & Equity Considerations

There are economic efficiencies in developing a regional model because the cost of development is shared amongst localities.

Cost

$$$$

1. Development of Hydraulic and Hydrologic Model: 250,000-500,000
2. Community Engagement: 30,000-75,000
3. Development of Flood Mitigation Plan: 100,000-200,000

Possible Funding Sources

VA DCR Community Flood Preparedness Fund, VA DEQ

Central Virginia Planning District Commission, VA

The Town of Amherst and Amherst County, VA

Introduction

Amherst County encompasses a land area of 474.0 square miles and is located in the northern most portion of the CVPDC region. This diamond-shaped County is bounded to the northwest by Rockbridge County, to the northeast by Nelson County, to the southwest by Bedford County and the City of Lynchburg, and to the southeast by Appomattox County and Campbell County. Notable geographic features include the James River which borders the County to the south and east as well as the Blue Ridge Mountains along the western boundary. There is a higher education institution, Sweet Briar College, located in the southern region of the County; this is an all-female college, enrolling close to 500 students per year. Top employment sectors among Amherst County residents include Health Care and Social Assistance, Manufacturing, and the Educational Services sector. [9]

Community Profile and Social Assets

Amherst County, Virginia, is home to a population that reflects a mix of rural and suburban demographics. The County's population includes a combination of individuals residing in small towns and rural areas, contributing to a unique blend of lifestyles. The demographic composition encompasses various age groups, from young families to retirees, creating a rich tapestry of experiences and perspectives. The County's economic landscape involves a mix of agriculture, local businesses, and, to some extent, commuting professionals. The racial makeup is as follows: 77.67% White, 19.79% Black or African American, 0.81% Native American, 0.35% Asian, 0.02% Pacific Islander, 0.41% from other races, and 0.94% from two or more races.[10]

Vulnerable Populations

While resilience is important throughout the County and region, there are several census tracts in Amherst County that qualify as Low to Moderate Income based on 2020 census data. The definition of Low-to-Moderate Income (LMI) means any census tract (or equivalent geographic area defined by the Bureau of the Census) in which at least 50% of households have an income less than 60 percent of the Area Median Gross Income (AMGI), or which has a poverty rate of at least 25%. Amherst County contains multiple LMI census tracts which can be seen in Figure X below.

As defined in the 2023 CFPF Manual, "Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. These areas are eligible to apply for CFPF funding with as little as 10% matching funds.

Another factor in measuring vulnerability is the Social Vulnerability Index. SVI indicates the relative vulnerability of every U.S. Census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. SVI ranks the tracts on 15 social factors, including unemployment, minority

[9] https://datausa.io/profile/geo/amherst-county-va

[10] U.S. Census Bureau, Population Estimates Program (PEP), updated annually. Population and Housing Unit Estimates

status, and disability, and further groups them into four related themes. Thus, each tract receives a ranking for each Census variable and for each of the four themes, as well as an overall ranking. Projects and studies in areas with a higher SVI will receive prioritized rankings for CFPF funding. SVI Maps can be found in Appendix E.

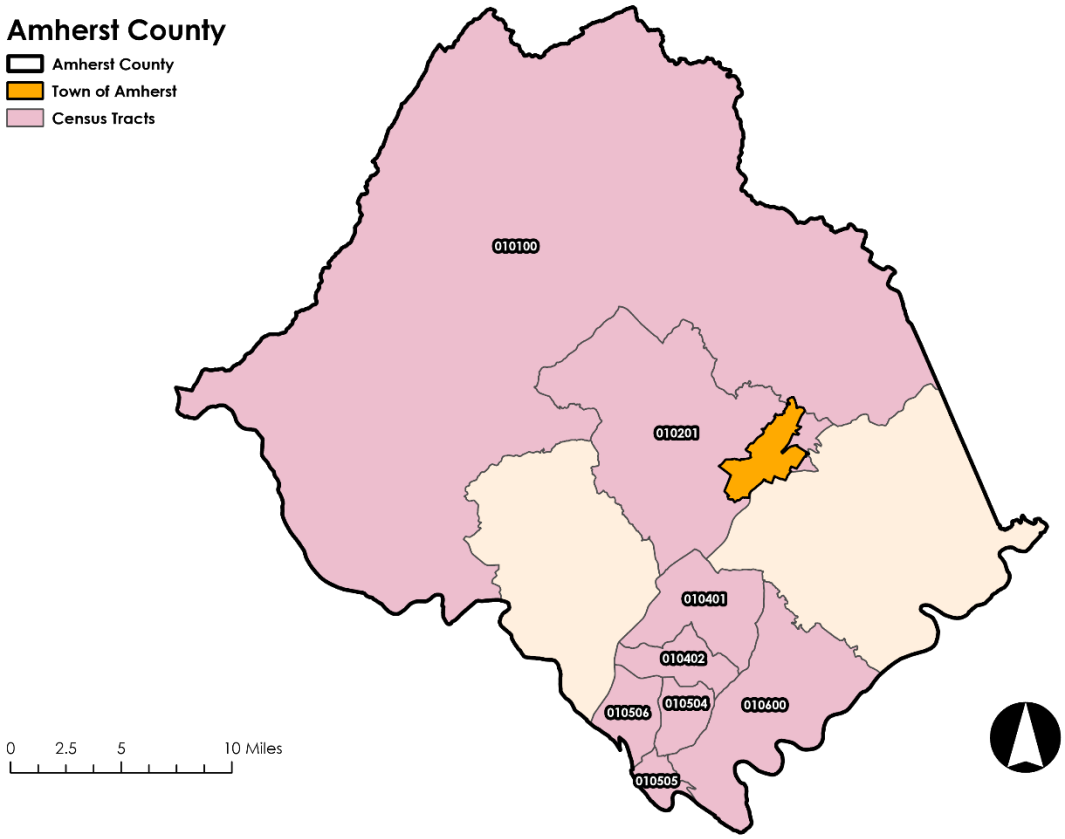


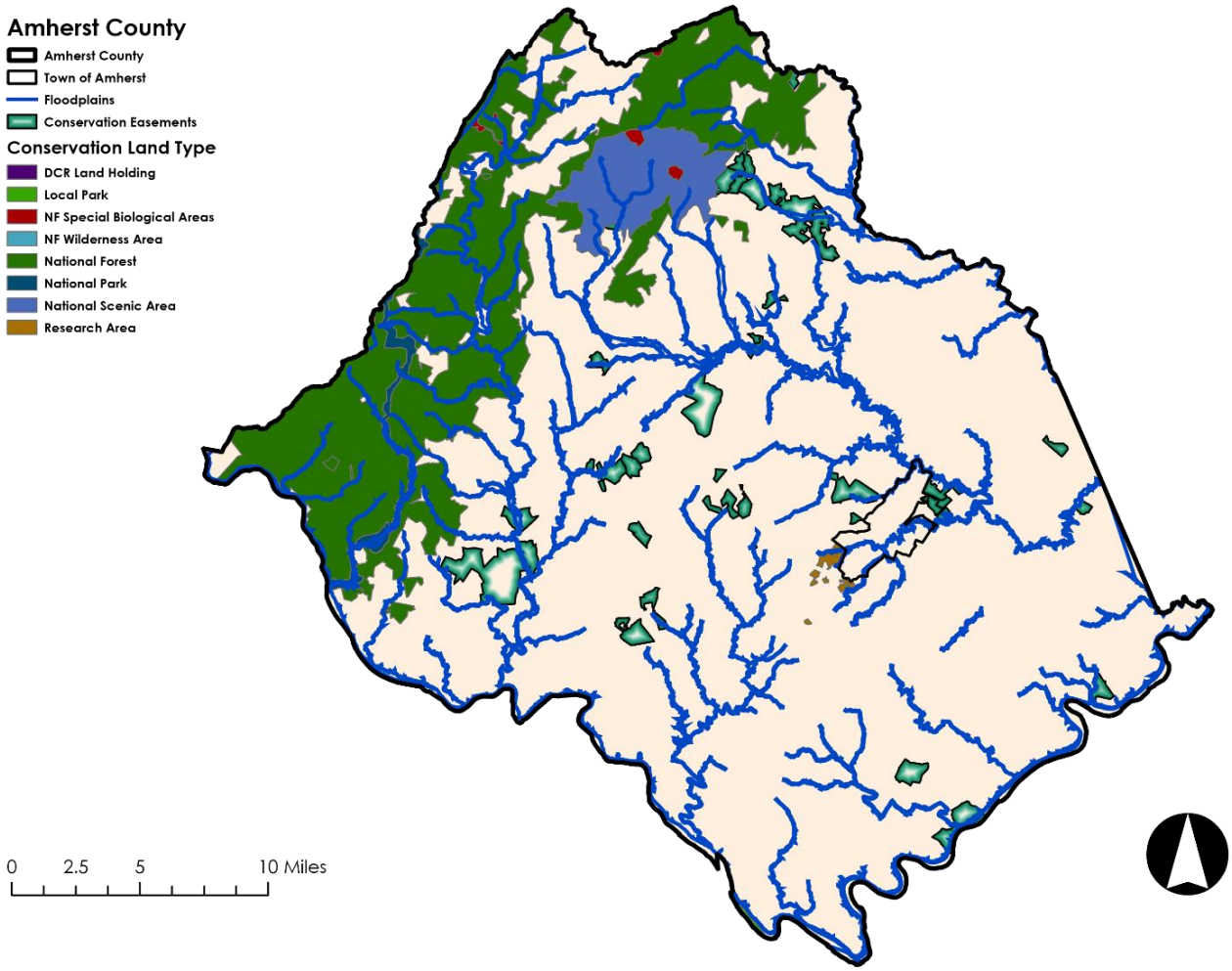
Figure 9 Low to Moderate Income Census Tracts with designated income levels at or below 80% of Area Median Income Levels. All but two Census tracts are considered Low to Moderate Income according to DCR: 010300 and 010202, Census Data, 2020.

Natural Assets

Conservation Lands:

Amherst County contains numerous trails and greenways including portions of the Appalachian Trail, the James River Heritage Trail, and the Virginia Blue Ridge Railway Trail, a seven-mile, crushed gravel recreation trail used for biking, hiking, and horseback riding that traverses Amherst and Nelson counties along the Piney and Tye rivers. The Piney and Tye Rivers represent a valuable resource protection greenway corridor initiative, as this portion of the County drains into the James River and is a component of the Chesapeake Bay watershed.

The largest percentage of land in conservation lies within the George Washington National Forest in the western portion of the County. There are numerous other smaller parks and conservation easements in the County. Some of these easements are riparian easements, which are specifically identified in the Amherst County Comprehensive Plan as being a tool to direct development away from flood prone areas. Recognizing this as an important step, there are several ways to do this; to purchase the land outright and use it as open space or purchase a conservation easement. There may be opportunities to collaborate



with landowners to expand conservation easements in the floodplain and further this valuable strategy for flood protection in the County.

Figure 10 Conservation Lands overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory

Ecological Cores:

Ecological cores are patches of natural land with at least 100 acres of interior cover which provide habitat for a large variety of species, including forest, marsh, and maritime dependent species. Using satellite data, the Virginia Natural Landscape Assessment (VaNLA) provides an analysis that has identified, prioritized, and linked the important land networks throughout Virginia. Preserving and maintaining these landscapes can help ensure they continue to provide ecosystem services such as cleaner air and water filtration. Ecological cores can also provide recreational opportunities and open space resources. The following map shows which areas of the counties and cities within Amherst County contain ecological cores. A higher rating (with red being the highest) indicates the amount of ecosystem services that ecological core provides. Examples of ecological services that cores provide include wildlife and plant habitat, biodiversity conservation, water resource protection, erosion control, and carbon sequestration. Amherst County should have strategies to preserve ecological cores, such as using them as park lands for low-impact recreation (hiking, bird watching, etc.) and other conservation efforts.

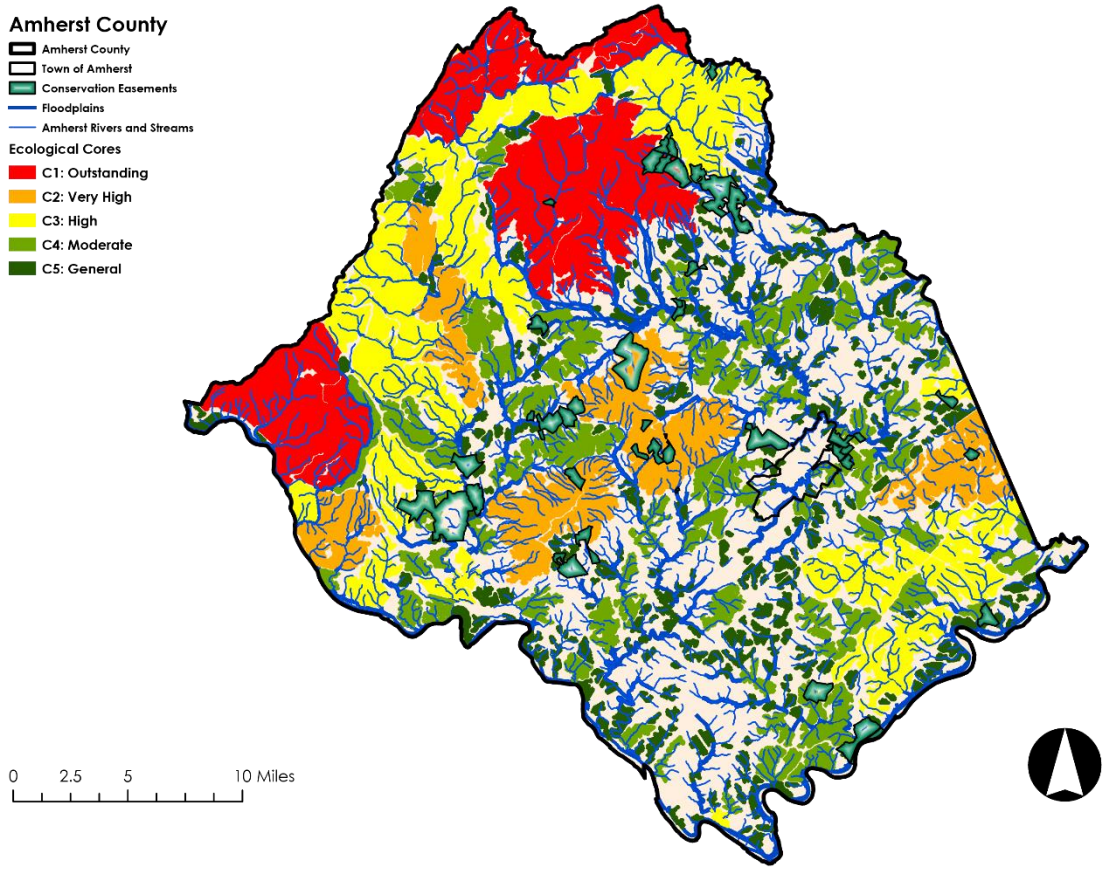


Figure 11 Ecological Cores overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory

Flooding and Built Assets - Critical Facilities and Infrastructure

Section 4.3, Flooding, of the 2020 CVPDC Hazard Mitigation Plan, contains a thorough evaluation of FEMA floodplains, critical infrastructure, roads and bridges in the floodplain, repetitive loss properties and severe repetitive loss properties for each locality in the CVPDC region. For specific lists, maps, and related information for Amherst County, see Appendix B, 2020 CVPDC HMP Maps and Data.

There are numerous critical pieces of infrastructure that are in the floodplain and susceptible to flooding. According to the local staff, there are numerous high priority critical pieces of infrastructure that need to be upgraded, including the Rutledge Creek Wastewater Treatment Plant, and the sewer pump station

along the Buffalo River. It is also known that the headworks of the wastewater treatment plant is not in a high elevation area. Further, the Town of Amherst's raw water intake is in the flood zone.

There have been recent projects and grant funds to address some of the infrastructure along the James River. Overall, master planning and prioritizing these critical components of the County is a logical next step to move from reactive management to proactive management in the future. Below is a list of infrastructure and landmarks that are currently in the floodplain.

Facility Name	Address	Facility Type	Coordinates	Flood Zone *
Monacan Ancestral Museum	2009 Kenmore Rd, Amherst	Attractions	37.5729, -79.1270	1%; 0.2%
Oronoco Campground	Jordan Rd, Vesuvius	Campground	37.7488, -79.2653	1%; 0.2%
Otter Creek Campground	60851 Blue Ridge Pkwy, Monroe	Campground	37.5760, -79.3379	1%; 0.2%
Cushaw Hydro Power Plant	Mt Grove Cr-01 600 N., Warm Springs	Energy Facility	37.5929, -79.3813	1%; 0.2%
Snowden Hydro Power Plant	7443 Elon Road, Big Island	Energy Facility	37.5736, -79.3715	1%; 0.2%
Pedlar Volunteer Fire and Rescue	4893 Lexington Turnpike, Amherst	Fire Stations	37.6725, -79.2171	1%; 0.2%
Lynchburg Steel & Specialty Co Inc	275 Francis Avenue, Monroe	HazMat Facility	37.5075, -79.1230	1%; 0.2%
Sewer Pump Station	Route 718 / Buffalo River, Amherst	Sewer Pump Station	37.6091, -79.0384	1%; 0.2%
Rutledge Creek WWTP **	731 Industrial Dr, Amherst	Wastewater Treatment Plant	37.5844, -79.0304	1%; 0.2%
ACSA Henry L. Lanum Water Filtration Plant	1355 Elon Road, Madison Heights	Water Treatment	37.4846, -79.166	1%; 0.2%
ACSA Williams Run Sewage Station	101 Carolina Avenue, Madison Heights	Sewage Pump Station	37.4053, -79.1004	1%; 0.2%
ACSA Madison Heights Trunk Sanitary Sewer	North bank, James River	Sanitary Sewer	37.3992, -791157	1%; 0.2%

Table 4 Critical facility and infrastructure in the floodplain of Amherst County, 2020 CVPDC HMP

The top five most susceptible roads to flooding are all US or State of Virginia primary roads, including the Blue Ridge Pkwy, Lexington Tpke, N. Fork Rd, Galts Mill Rd, and Woodson Rd. Stormwater infrastructure maintenance and repair should be a priority for these roads and can be prioritized for future funding and coordination with the Virginia Department of Transportation. *For a complete list of roads and bridges most susceptible to flooding see CVPDC Hazard Mitigation Plan 2020 Update Flooding; Page 4-39 – 3-40.* The map below illustrates real time data from the Virginia Department of Transportation on the condition of bridges and culverts. Amherst County, CVPDC and VDOT can work together to upgrade the "Poor" infrastructure first to avoid flood related damage and impacts to the surrounding areas.

Top Poor Rated Bridges	Top 5 Poor Rated Culverts
SC-642 Eastbound and Meadow Hollow Road	SC-647 Eastbound and Maple Creek Road
SC-661 Northbound and Old Stage Road	SC-754 Southbound and Pryors Creek Road
SC-624 Westbound and Earley Farm Road	SC-615 Northbound and Peter's Hollow Road
SC-622 Eastbound and Galts Mill Road	SC-606 Northbound and Fox Hill Drive
	SC-648 Southbound and Beck Creek Road

Table 5 Top 5 poor rated culverts and bridges.

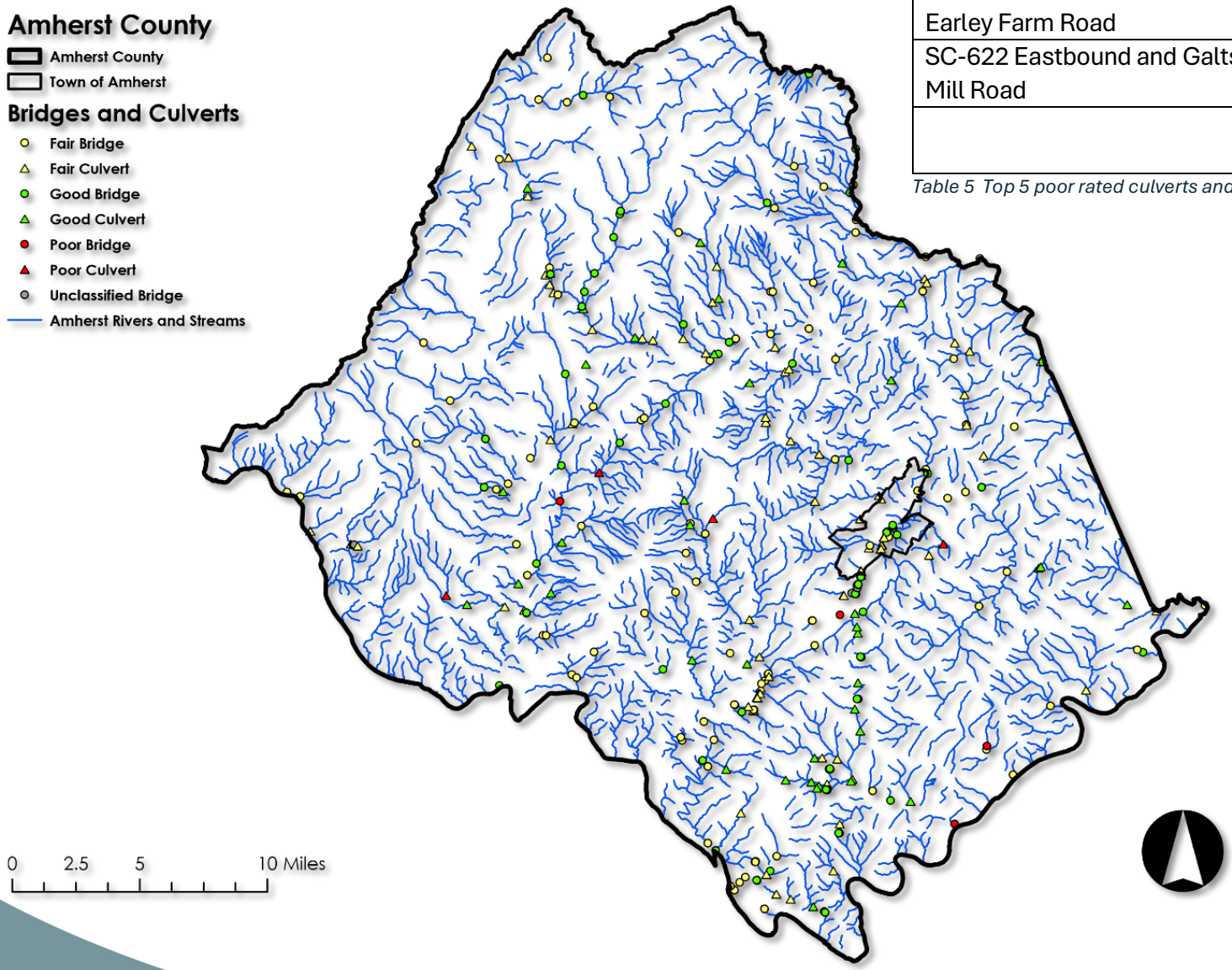


Figure 12 Bridge and culvert condition assessment within Bedford County (VDOT)

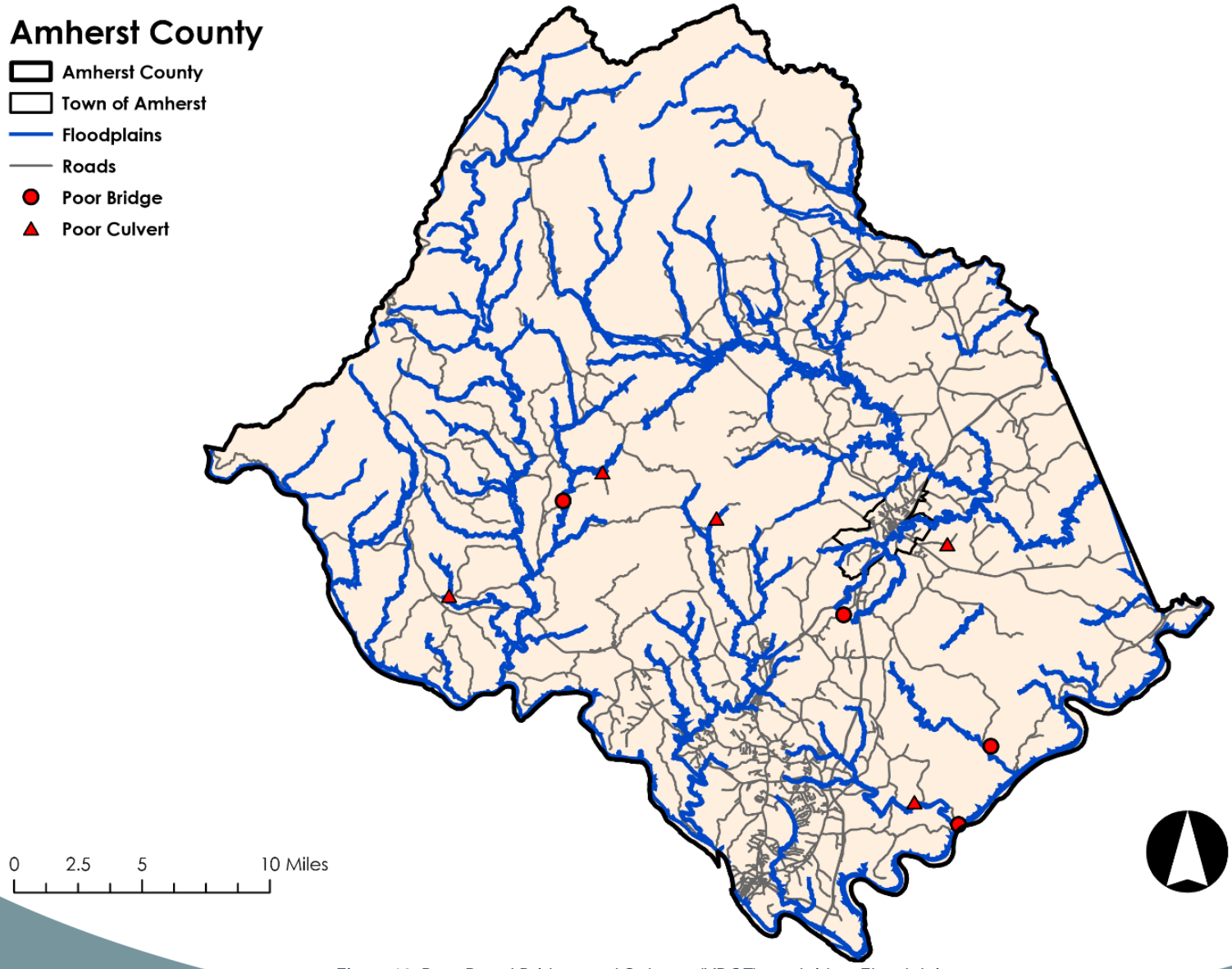


Figure 13 Poor Rated Bridges and Culverts (VDOT) overlaid on Floodplains

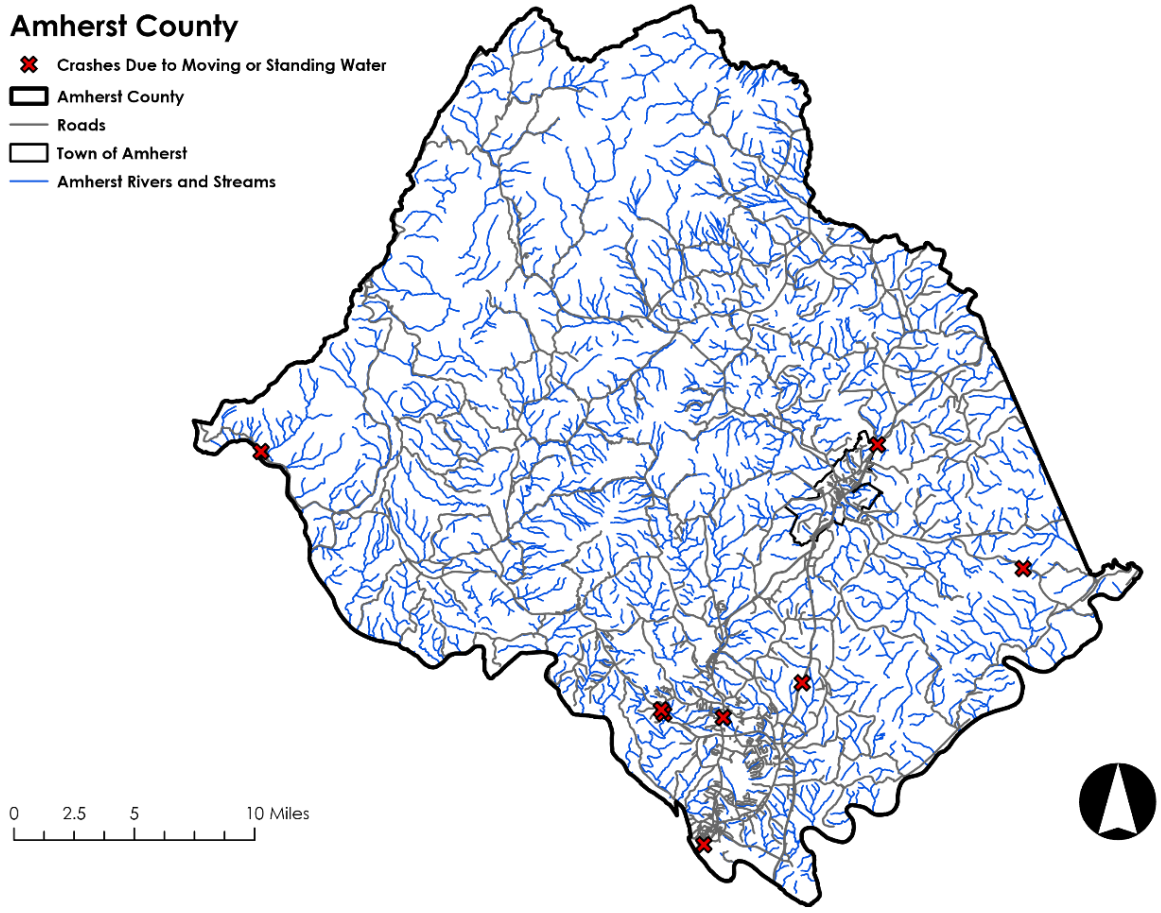


Figure 14 Vehicle crashes due to standing water on roadways (VDOT)

Crashes Due to Standing Water	Roads or Location	Date
1	3824-3860 South Amherst Highway	1/3/2017
2	Route 29 South	9/1/2017
3	Route 501	5/5/2017
4	Route 130	7/4/2019
5	Route 130 and Elon Road	11/30/2020
6	1225 Riverville Road	4/13/2020
7	29 Bypass	4/28/2023
8	29 Business	4/28/2023

Table 6 Recent vehicle crashes due to standing water, VDOT

Amherst County is generally affected most by precipitation that results in streams and rivers overtopping banks (riverine flooding) and rainfall events that leave standing water in areas that are dangerous. The map above illustrates where standing water is a problem and has resulted in a motor vehicle accident. Four of these incidents appear in the Madison Heights area, one just outside the Town of Amherst, and one in the

Eastern portion of the County. Upgrading roads and stormwater infrastructure should be prioritized in these areas to lessen the potential for further accidents.

Flooding and Related Hazards

Areas of Known Flooding

The CVPDC Flood Resilience Plan builds on the flood risk assessment performed in the 2020 CVPDC HMP update and adds more localized information mainly heard through community interviews and available data sets. Repetitive loss properties and severe repetitive loss properties as stated in the HMP, *"The identification of repetitive loss properties is an important element to conducting a local flood risk assessment, as the inherent characteristics of properties with multiple flood losses strongly suggest that they will be threatened by continual losses. Repetitive loss properties are also important to the NFIP, since structures that flood frequently put a strain on the National Flood Insurance Fund."*[11] Amherst County currently has one repetitive loss property and one severe repetitive loss property. The Community Flood Preparedness Fund also requests that this analysis be considered in the overall flood resilience plan.

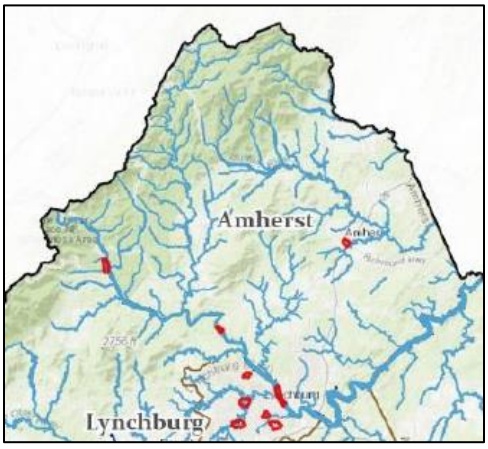


Figure 15 Amherst County repetitive loss areas (2020 CVPDC HMP)

Amherst County contains several areas that are known to have flooding and standing water issues. Most of these areas were identified during community interviews with County staff. The Williams Run Area was identified as problematic. This area sees standing water on roads and residential yards after rainstorms. The increased development in this area is changing watershed parameters and could cause more severe flooding in the future (FEMA, 2019). Another area identified in community interviews is the nearby Sycamore Lane and Shady Oak Drive, in the Stratford Place subdivision. This is part of a natural drainage channel which can flood private property, and eventually drain into Williams run creek. The homeowner's association (HOA) may hold an easement and could be a partner in a potential stormwater management project for homeowners who would allow access. The Shady Oak Drive area and nearby streets were built prior to stormwater regulations (2004). While some drainage easements exist, generally they are not adequate and are not able to manage a 10-year storm, which is the commonly designed storm when sizing stormwater infrastructure. The Fernwood and Stratford Place subdivisions behind Wal-Mart are also in a similar situation. Further studies can be initiated in these areas to understand the underlying hydrology and identify potential solutions to recurrent flooding. To summarize, the following areas see flooding issues frequently and are shown in Figure 16 below:

- Williams Run Area
- Sycamore Lane
- Shady Oak Drive
- Fernwood Subdivision
- Stratford Place Subdivision

[11] The 2020 CVPDC Hazard Mitigation Plan Update

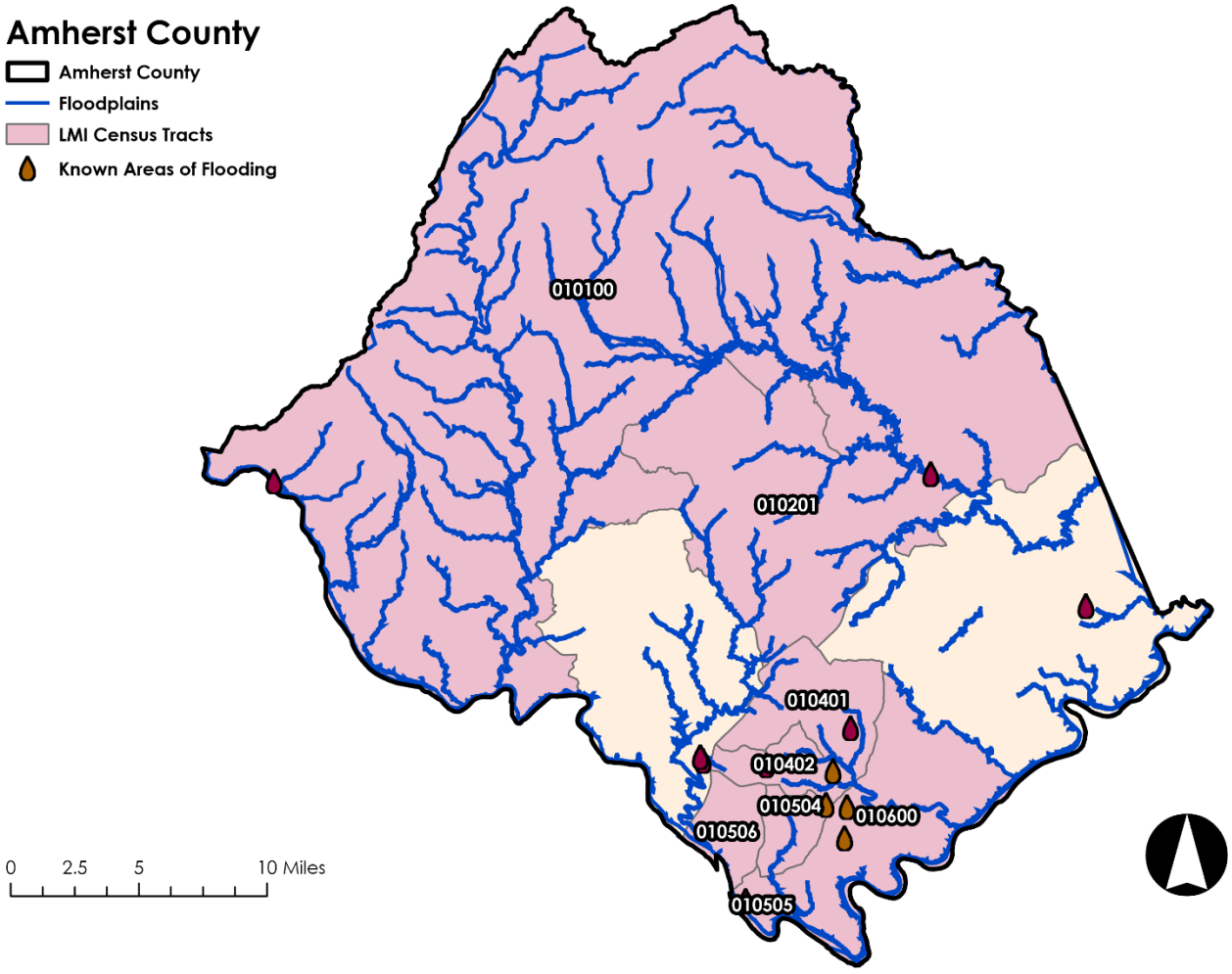


Figure 16 Areas of known flooding overlaid on Low Income Geographic Areas with up to 80% of Area Mean Income levels. (Qualified tracts for 10% match CFPF)

Dam Inundation

The largest concern with the several dams in Amherst County (46 total, with 5 high-hazard and 23 of unknown hazard potential) are the homes, businesses, important thoroughfares and other transportation assets, and critical infrastructure assets in the Dam Break Inundation Zone (DBIZ). These include impacts to the pump station on Rt. 718, the Henry L. Lanum Water Treatment Plant, an electric substation, some portions of the Norfolk Southern Railroad, and numerous roads and road-stream crossings such as bridges and culverts. In addition, not all DBIZs are mapped for

significant-hazard dams. The Thrasher and Stonehouse Dams would impact flows downstream on the Buffalo River, Graham Creek Reservoir Dam the Graham Creek tributary to the James, the Pedlar River Dam would impact the Pedlar River as well as drinking water supplies for the City of Lynchburg, and the Reusens Dam would impact the James River. In addition to other flooding problems caused by the hypothetical historical rain event that would cause hydrologic failure of these dams, several buildings would be inundated, and numerous roads would need to be closed. While not predicted as likely, as shown by the 2018 hydrologic failure of College Lake Dam in Lynchburg, a mere 4-6 inches of rain over a short enough time span could cause an overtopping necessitating evacuation.

Extreme Heat

Using an existing weather station along the Tye River just over the County Line (TYE River 1SE), it is possible to view observed temperature averages from 1950 – 2013 for Amherst County. Years when bars extend above the line were higher than the long-term average; years with bars that extend below the line were lower than average. While the range of exceedance events is variable, you can see a trend, especially from the year 2000 onwards, where observed temperatures clearly exceeded the average.

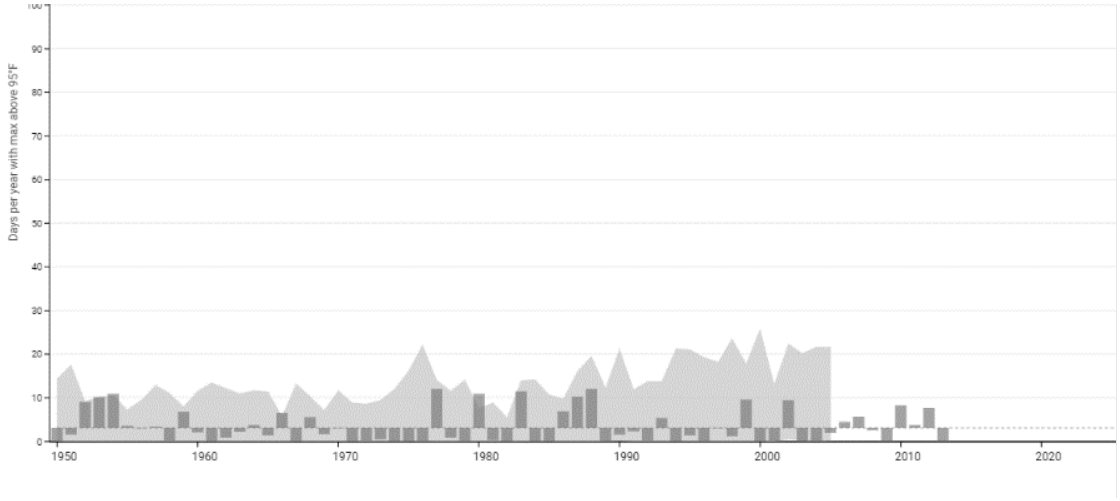


Figure 17 Days per year with temperature > 95 degree F observed average, US Climate Resilience Toolkit[12]

Future Community Conditions

Flood

The potential risks of climate change can have broad effects on communities in Amherst County, including on its public health, infrastructure, agriculture, tourism, and emergency services. The County (and the CVPDC region in general) should expect the following in the future:

- More frequent, and more intense, precipitation events punctuated by deeper episodes of drought.

[12] https://toolkit.climate.gov/#climate-explorer

- Drier winter and summer seasons, which could deplete reservoirs and challenge drinking water supplies and agricultural production.
- Stronger storms at a greater frequency, which may threaten lives, damage infrastructure, and cause significant power outages.
- Increasing summer heat waves could threaten public health.

According to the NOAA Mid-Atlantic RISA projections,[13] Amherst County can expect to see some more extreme variability in precipitation over the next 50 years, with some months seeing 15% less and other months seeing up to 30% more compared to the average from the years 1991-2020. In general, the entire Appalachian and Piedmont regions can expect mild 1-2% average increases in rainfall compared to the past 40 years' average.[14] While it is difficult to know exactly how the County will be impacted, it is strongly encouraged to build in redundancy and extra capacity for stormwater and other water infrastructure to account for higher precipitation scenarios.

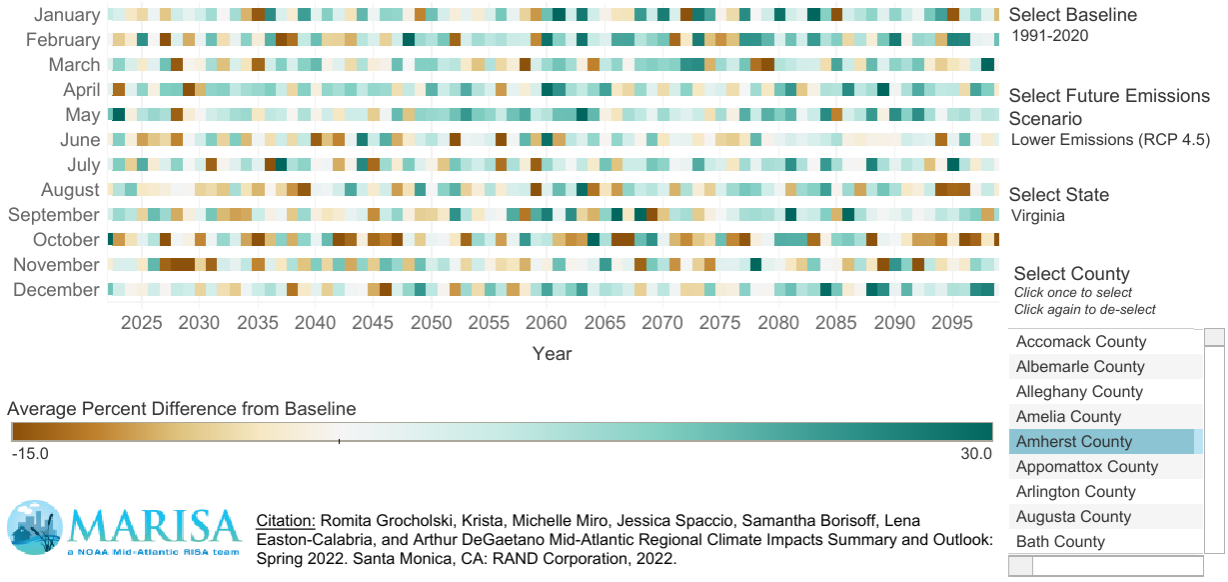


Figure 18 Projected percent difference in total monthly precipitation compared to 1991-2020 Baseline, MARISA

[13] https://www.midatlanticrisa.org/data-tools/climate-data-tools/projected-changes-in-total-monthly-precipitation.html

[14] https://www.midatlanticrisa.org/data-tools/climate-data-tools/difference-from-normal-total-annual-precipitation.html

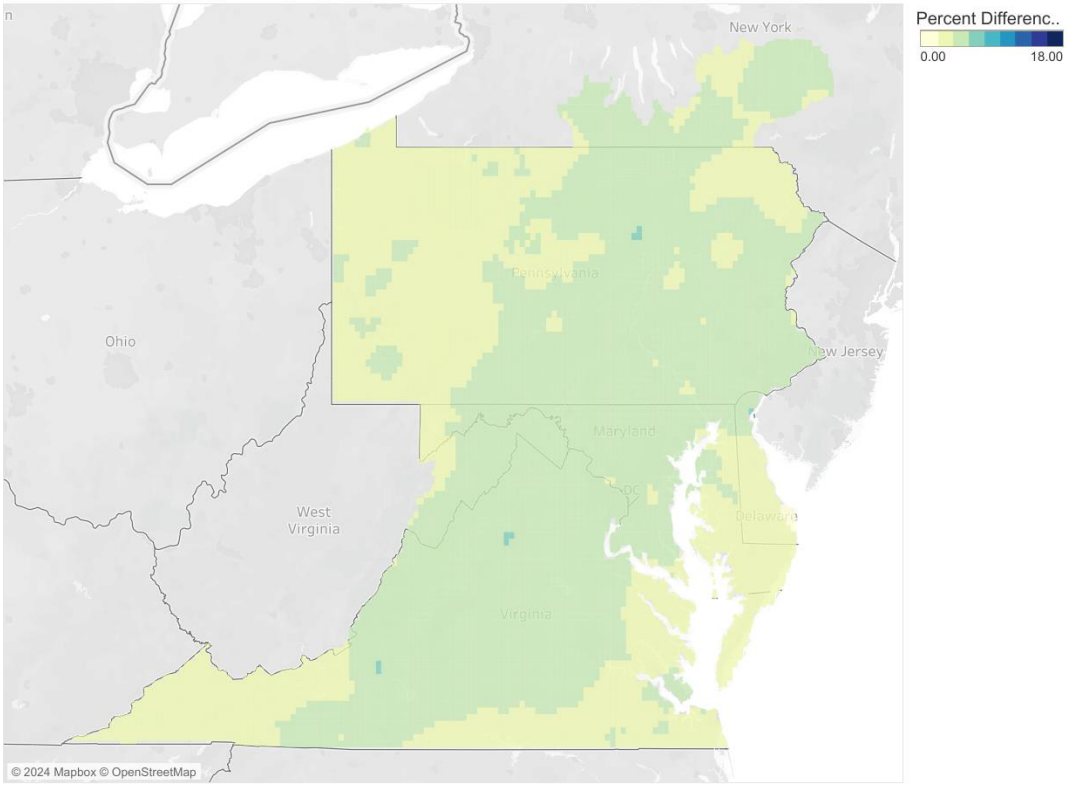


Figure 19 1981-2010 "Normal" Total Annual Precipitation, MARISA

Heat

In Amherst County, the average daily temperature is expected to increase, as well as extreme temperatures on the hottest days of the year. This excess heat for longer periods may stress critical infrastructure such as roads and bridges. More hot days may also stress the electrical grid and the use of potable water may increase as people may need more irrigation for crops and landscaping. This type of heat may affect public health and may lead to economic impacts through disruptions in agriculture and manufacturing. Human health, stream and river health, and infrastructure are all threatened by higher temperatures.

At 95°F, it is hard to keep indoor areas and our bodies cool. Amherst County's summers are getting hotter. On average, Amherst County sees 4 days per year in excess of 95°F.1 Within the next 50 years (by 2070), Amherst County can expect a yearly average of 25 to 47 days above 95°F, with associated increases in cooling costs, reduced air quality, and heat-related illnesses. It is imperative that the County begin planning for more days of extreme heat and look for ways to lessen the public health effects, especially on vulnerable populations.

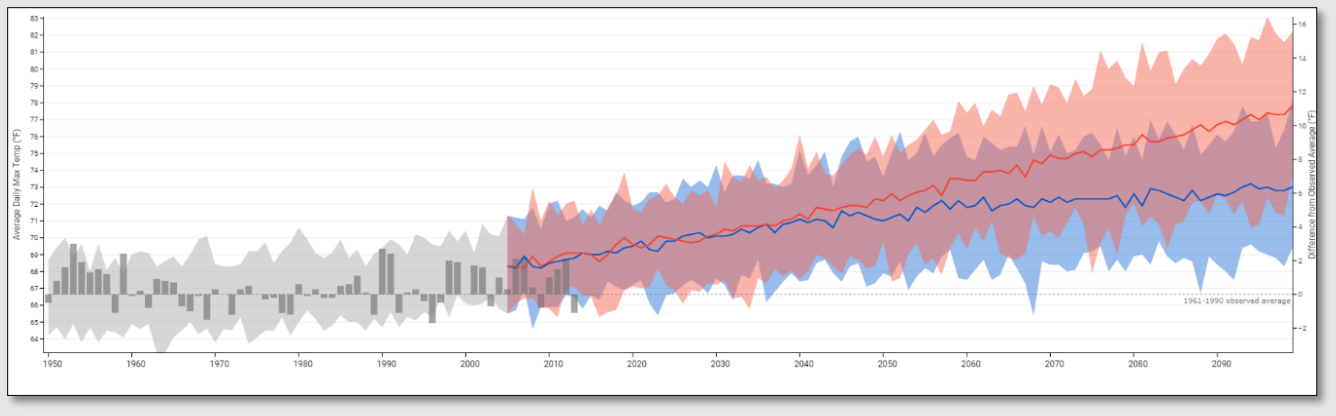


Figure 20 Days w/ maximum temp > 95°F (U.S. Climate Resilience Toolkit Climate Explorer)

General Flood and Heat Resilience Policies and Actions

1. Prioritize vacant tracts of land for conservation and recreational open space in the James River floodplain and apply for grant funding to acquire these properties. (See Appendix A for more detail on grant funding)
2. Create stormwater management incentives for new subdivisions and single-family residences.
3. Develop targeted outreach in flood prone areas before and after a flood event that identify options for mitigation and grant funding to assist.
4. Continue County wide tree planting initiatives; especially in the Madison Heights area.
5. Develop targeted outreach before and during the summer months to inform the public of anticipated heat waves and ways to stay safe.

Town of Amherst Prioritized Flood Resilience Strategy

- Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts. (Score 65)

Amherst County Prioritized Flood Resilience Strategy

- Evaluate stream conditions and implement streambank stabilization and green infrastructure to promote natural function and mitigate riverine flooding, impacts of dam failure, and stormwater at the following locations: Lowesville, Monacan Park, Peddlar River at Buffalo Spring, Ware's Gap Road near Puppy Creek. (Score 75)

Town of Amherst

65 Action Score

Adapt Repetitve Loss Properties

Action Description

Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitve loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.

Key Steps for Implementation

1. Determine number of local repetitive loss properties and conduct outreach to property owners to better understand their concerns.
2. Develop a Town-VDEM partnership program/or coordinate with VDEM to streamline applications for home elevations or buyouts.
3. Prepare applications to FEMA for funding to support elevation or buyouts.
4. Support property owners as they elevate their homes or relocate by providing technical, financial, or relocation assistance.

Action Lead

Community Development Department

Supporting Partners

- Private property owners
- Virginia Department of Emergency Management (VDEM)
- CVPDC
- Amherst County

Ease of Implementation

- ☑ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☐ Requires hiring a technical consultant.

Measures of Success

- Number of property owners the Town engages.
- Successful coordination or establishment of working relationship with VDEM staff who support FEMA application development.
- Number of funded applications by FEMA
- Positive resident feedback regarding options for adaptation (without feelings of displacement or pressure).

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe
Short: 0-2 years
Medium: 3-6 years
Long: 7+ years

Cost*
$: less than 10k
$$: 10-50k
$$$: 50-500k
$$$$: 500k-2mill
$$$$$: 2 mill+

**Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.*

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

Home elevations can mitigate flood impacts, reducing damage to private property or loss of life.

Buyouts can permanently remove structures from vulnerable areas and create opportunities to restore properties to areas of ecological function and open space.

Co-Benefits & Equity Considerations

Matters related to home elevation or potetial buyouts and relocation can be very sensitive topics. The Town should aim to engage with residents in a way that is respectful and empowering to provide property owners with options.

The Town should provide technical or financial assistance when possible to support residents while they temporarily relocate (during home elevation construction) or permanently relocate

Cost

$$$$

1. Property owner outreach: 5,000-10,000 (dependent on number of properties)
2. VDEM CoordWination or Program Development: 30,000-150,000
3. Help Prepare FEMA Applications 35,000-100,000 (dependent on number of applications)
4. (Optional) Technical and Financial Assistance for Property Owners Pursuing Home Elevations or Buyouts: 250,000-1,000,000 (dependent on number of applications, not a requirement of FEMA)

Possible Funding Sources

Virginia Department of Emergency Management
Federal Emergency Management Agency

Amherst, VA

Amherst County

75 Action Score

Stream Restoration and Nature-Based Solutions

Action Description

Evaluate stream conditions and implement streambank stabilization and green infrastructure to promote natural function and mitigate riverine flooding, impacts of dam failure, and stormwater at the following locations: Williams Run, Lowesville, Monacan Park, Peddlar river at Buffalo Spring, Ware's Gap Road near Puppy Creek.

Key Steps for Implementation

1. Field investigation of current stream conditions
2. Assessment of stream and riverine capacity and flooding under future climate conditions.
3. Identification of priority project areas and coordination with private owners.
4. Implementation of restoration and green infrastructure solutions along stream and areas of known flooding

Action Lead

Department of Public Works

Supporting Partners

- Private property owners abutting waterways
- CVPDC
- Amherst Watershed Coordinator for the Robert E. Lee Soil and Water Conservation District

Ease of Implementation

- ☐ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☑ Requires hiring a technical consultant.

Measures of Success

- Reduction of stormwater and riverine flooding
- Monitored and improved water quality and stream health
- Restoration of riverine vegetative buffer zones
- More agreements with private property owners to create conservation easements

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe	Cost*		*Cost*
Short: 0-2 years	$: less than 10k	$$$$: 500k-2mill	*Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.*
Medium: 3-6 years	$$: 10-50k	$$$$$: 2 mill+	
Long: 7+ years	$$$: 50-500k		

Action Initiation Timeframe

Short | Medium | Long

Resilience Considerations

Stream restoration and nature-based solutions will be located and implemented based on information from a hydraulic and hydrologic model that shows impact on reducing flooding.

Nature-based solutions can also help reduce urban heat island impacts.

Co-Benefits & Equity Considerations

Cost-sharing with private property owners to help improve their properties and reduce flooding through conservation measures.

Prioritized flood-prone areas in which socially vulnerable populations also live.

Cost

$$$-$$$$

1. Field Investigations: 30,000 - 100,000 (dependent on total acreage investigated)
2. Hydraulic and Hydrologic Modeling: 50,000-150,000 (dependent on total acreage investigated)
3. Identify Priority Projects: 50,000-100,000 (dependent on number of projects)
4. Design of Nature-Based Solutions: 150,000-250,000 (dependent on number of designs)
5. Construction and Implementation: 250,000-1,000,000 (dependent on scope of projects)

Possible Funding Sources

Virginia Department of Environmental Quality Local Stormwater Assistance Fund, Virginia Community Flood Preparedness Fund

Amherst County, VA

The Town of Appomattox and Appomattox County, VA

Introduction

Appomattox County is roughly 334 square miles and is situated on the eastern side of the CVPDC region, in the piedmont region. This County is bounded to the north by Nelson County, to the northwest by Amherst County, to the northeast by Buckingham County, to the southeast by Prince Edward County and Charlotte County, and to the southwest by Campbell County. The County is known for and takes pride in its rural charm and sense of place. The Town of Appomattox is the county seat of Appomattox County. Major transportation routes through and around this town include Highway 460, Confederate Boulevard, Church Street, and Court Street. A major attraction includes the Appomattox Court House National Historical Park. This site signifies the end of the Civil War and marks Appomattox as a culturally and historically significant place in the United States. The largest employment sectors for those living in the County are Office and Administrative Support Occupations, Management Occupations, and Sales and Related Occupations sector. [15]

Community Profile and Social Assets

As of the 2020 census, the population of Appomattox County was 16,119, and the population within the Town of Appomattox limits was 2,157. [16] The median age was 48.1 years. The racial and ethnic makeup of the County was 78.4% White, 18.3% Black or African American, 0.4% Native American, 0.4% Asian, 0.0% Pacific Islander, 0.9% from other races, and 1.6% from two or more races. Hispanic or Latino of any race were 2.4% of the population. The median household income in the County was $49,924, and the per capita income was $27,057. About 13.7% of the population was below the poverty line. The 2020 CVPDC HMP specifically mentions lower income population located in the floodplain as a concern and this will be explored further in the flooding sections below.

Vulnerable Populations

While resilience is important throughout the County and region, there are several census tracts in Appomattox County that qualify as Low to Moderate Income based on 2020 census data. The definition of Low-to-Moderate Income (LMI) means any census tract (or equivalent geographic area defined by the Bureau of the Census) in which at least 50% of households have an income less than 60 percent of the Area Median Gross Income (AMGI), or which has a poverty rate of at least 25%. Appomattox County contains multiple LMI census tracts which can be seen in Figure 21 below.

As defined in the 2023 CFPF Manual, "Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. These areas are eligible to apply for CFPF funding with as little as 10% matching funds.

Another factor in measuring vulnerability is the Social Vulnerability Index. SVI indicates the relative vulnerability of every U.S. Census tract. Census tracts are subdivisions of counties for which the Census

[15] https://datausa.io/profile/geo/appomattox-county-va
[16] 2020 Census Data

collects statistical data. SVI ranks the tracts on 15 social factors, including unemployment, minority status, and disability, and further groups them into four related themes. Thus, each tract receives a ranking for each Census variable and for each of the four themes, as well as an overall ranking. Projects and studies in areas with a higher SVI will receive prioritized rankings for CFPF funding. SVI and related maps can be found in Appendix E.

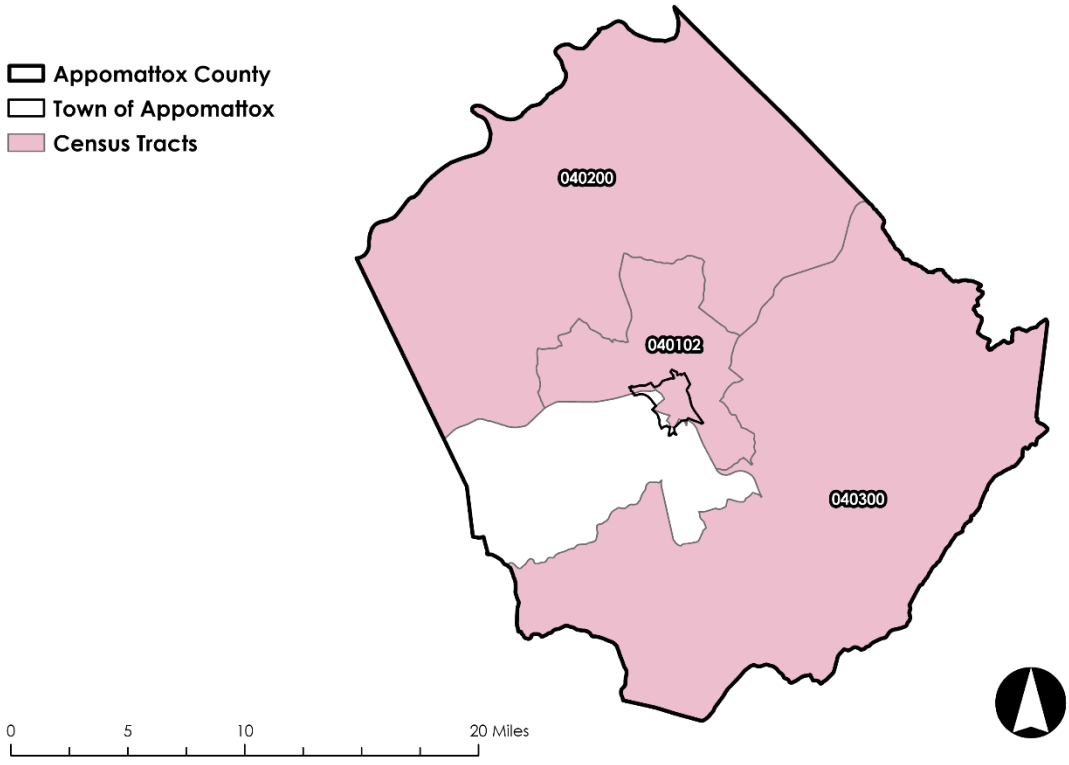


Figure 21 Low to Moderate Income Census Tracts with designated income levels at or below 80% of Area Median Income Levels.

Natural Assets

Conservation Lands:

Appomattox County contains numerous notable geographic features including the James River, which borders the County to the north, and the Appomattox-Buckingham State Forest positioned within the northeast portion of the County. Various other state forest and natural areas exist in the County along with private conservation easements. Some of these easements are riparian easements, which are a practical tool to direct development away from flood prone areas. Recognizing this as an important step, there are several ways to do this; to purchase the land outright and use it as open space or purchase a conservation easement. There may be opportunities to collaborate with landowners to expand conservation easements in the floodplain and further this valuable strategy for flood.

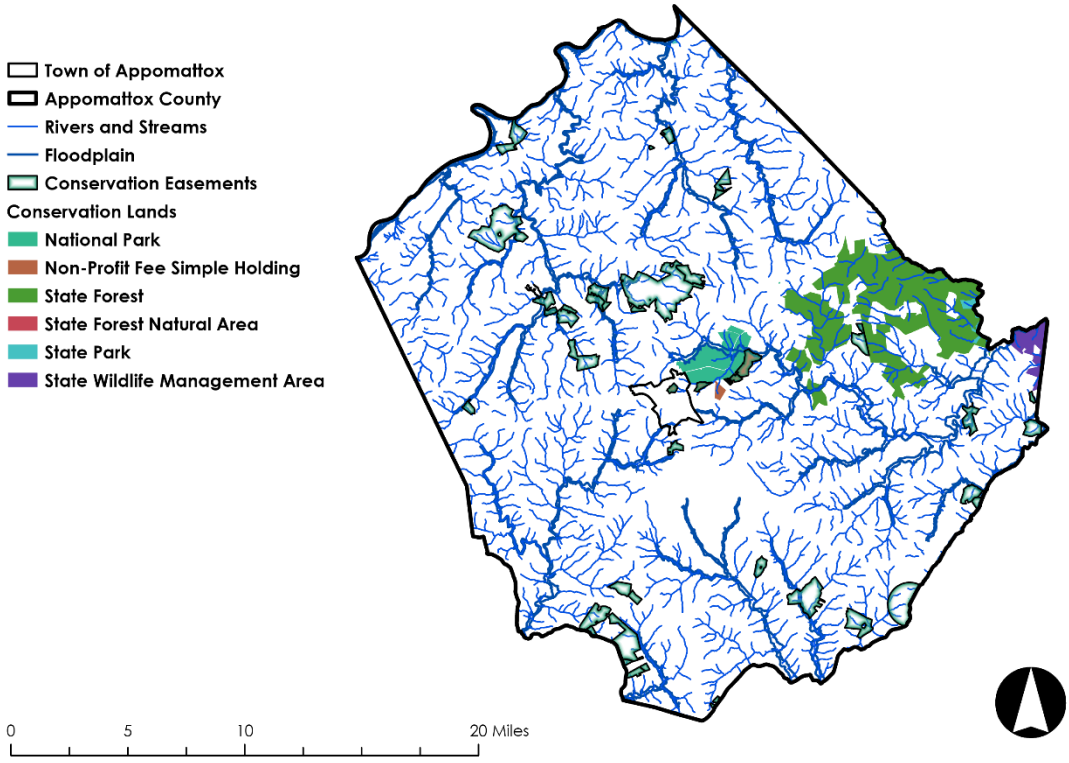


Figure 22 Conservation Lands overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

Ecological Cores

Ecological cores are patches of natural land with at least 100 acres of interior cover which provide habitat for a large variety of species, including forest, marsh, and maritime dependent species. Utilizing satellite data, the Virginia Natural Landscape Assessment (VaNLA) provides an analysis that has identified, prioritized, and linked the important land networks throughout Virginia. Preserving and maintaining these landscapes can help ensure they continue to provide ecosystem services such as cleaner air and water filtration. Ecological cores can also provide recreational opportunities and open space resources. The following map shows which areas of the County and Town contain ecological cores. A higher rating (with red being the highest) indicates the amount of ecosystem services that ecological core provides. Examples of ecological services that cores provide include wildlife and plant habitat, biodiversity conservation, water resource protection, erosion control, and carbon sequestration. Appomattox County should have strategies to preserve ecological cores, such as using them as park lands for low-impact recreation (hiking, bird watching, etc.) and other conservation efforts.

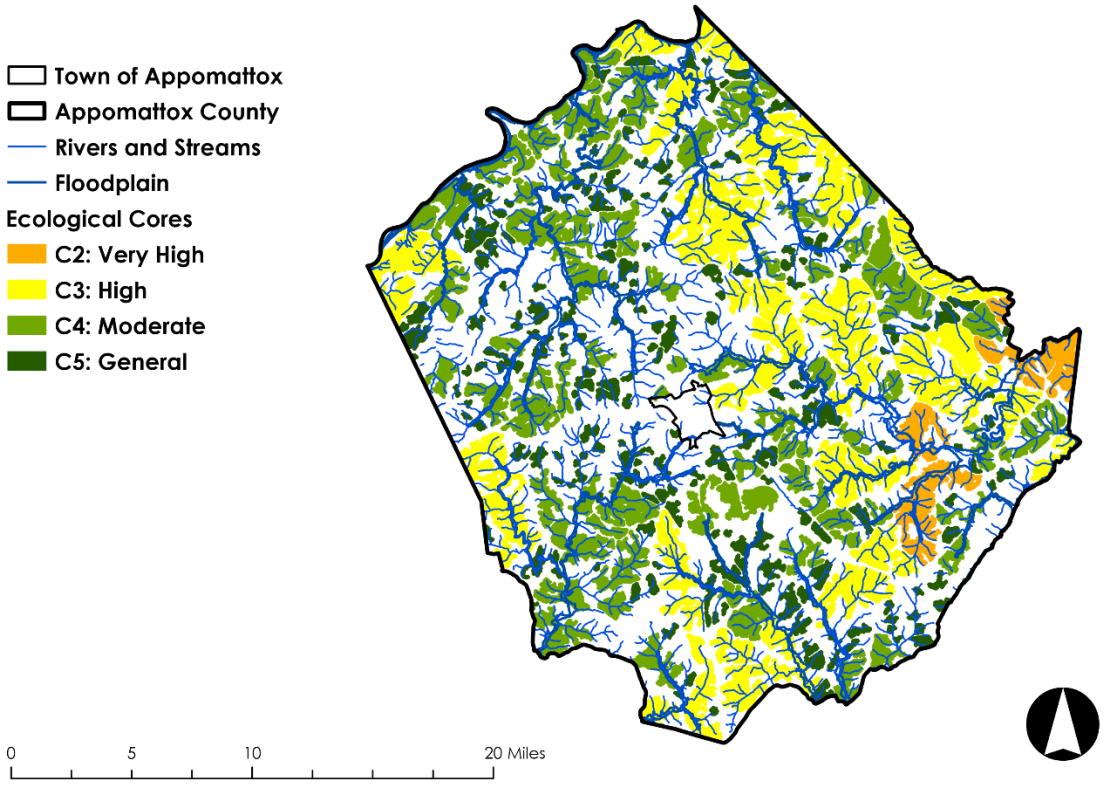


Figure 23 Ecological Cores overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory

Flooding and Built Assets - Critical Facilities and Infrastructure

Section 4.3, Flooding, of the 2020 CVPDC Hazard Mitigation Plan, contains a thorough evaluation of FEMA floodplains, critical infrastructure, roads and bridges in the floodplain, repetitive loss properties and severe repetitive loss properties for each locality in the CVPDC region. For specific lists, maps and related information for the County and Town of Appomattox, see Appendix B, 2020 CVPDC HMP Maps and Data. There are critical pieces of infrastructure that are in the floodplain and susceptible to flooding, namely a natural gas line, a sewer pump station located on the southern end of the Town of Appomattox, and roads and bridges. The top five most susceptible roads to flooding are all US or State of Virginia primary roads; these are roads located along the James River, Chase Trail Ln, Dreaming Creek Rd, Stone Ridge Rd, Oakville Rd, Riverside Dr, and Mill Pond Rd.[17] Stormwater infrastructure maintenance and repair should be a priority for these roads and can be prioritized for future funding and coordination with

[17] 2020 CVPDC Hazard Mitigation Plan

the Virginia Department of Transportation. For a complete list of roads and bridges most susceptible to flooding see CVPDC Hazard Mitigation Plan 2020 Update Flooding; Page 4-50 – 4-51. Figure 24 below illustrates real time data from the Virginia Department of Transportation on the condition of bridges and culverts. Overlaid on the rivers and streams, Appomattox County, CVPDC and VDOT can work together to upgrade the "Poor" infrastructure first to avoid flood related damages and impacts to the surrounding areas.

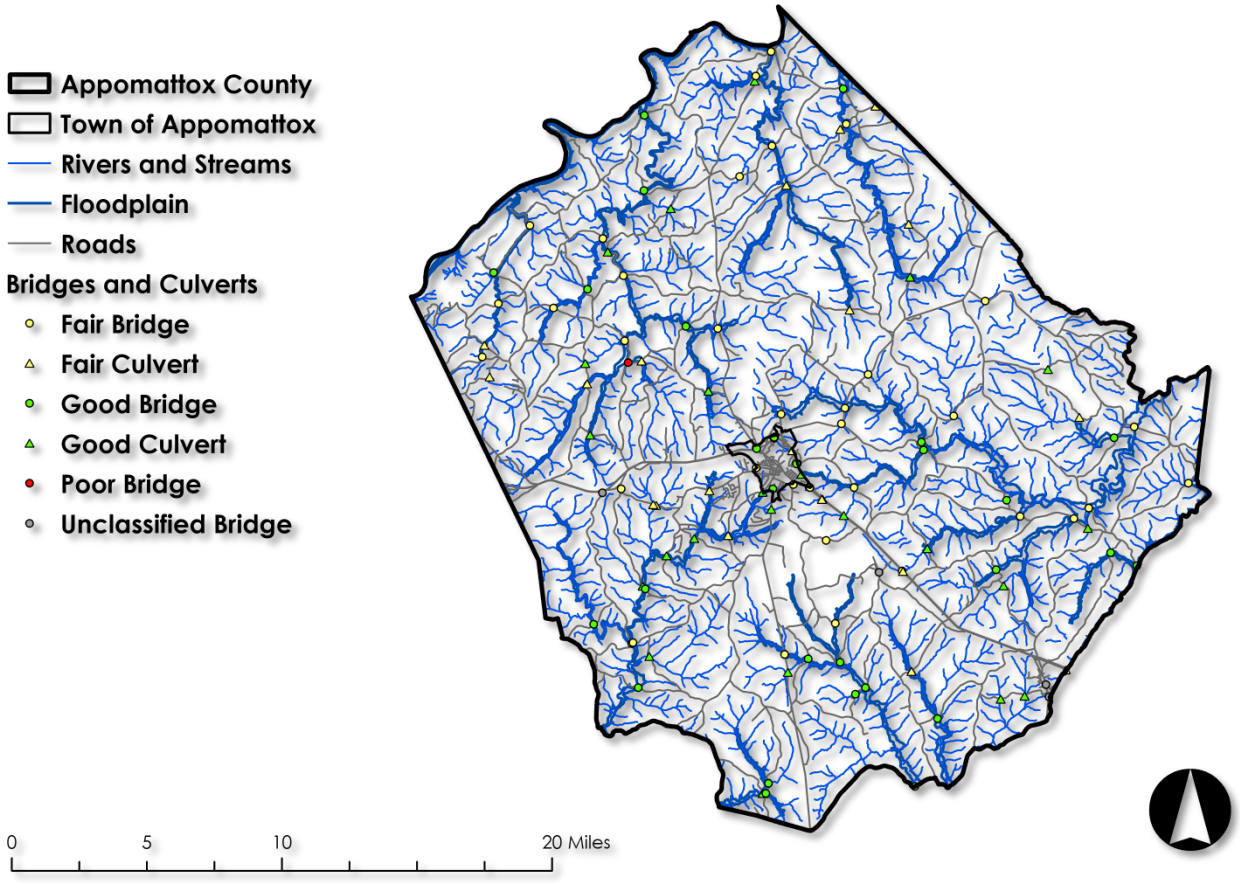


Figure 24 VDOT Bridges and Culverts Condition Assessment

Poor Rated Bridge
SC-613 E/W and Spring Grove Road

Table 7 Bridge Condition Assessment (VDOT)

Flooding and Related Hazards

Areas of Known Flooding

Appomattox County contains several areas that are known to have flooding and standing water issues. Most of these areas were identified during community interviews with County staff, in addition to information in the CVPDC 2020 HMP. Specifically identified were low areas near the James River, Bent Creek, Appomattox River, ("washout gap" in central Appomattox), Blackberry Lane near the intersection with the Appomattox River, and Wreck Island Creek (west Appomattox) flood often. Mill Pond Rd (parallel to the creek) also commonly floods. In addition, lower ground along smaller streams is sometimes damaged by flooding of crops, deposition of silt on crops, and by channels silting up and preventing proper drainage. Many of the identified flood areas are located in low to moderate income census tracts. (See Figure 25) Further studies can be initiated in the area to understand the underlying hydrology and identify potential solutions to recurrent flooding.

Figure 25 Repetitive Loss Area in red for Appomattox County, 2020 CVPDC HMP

The County has only 2 repetitive loss properties and 1 severe repetitive loss property. These are located in the Northern portion of the County in the James River floodplain. The Town of Appomattox does not contain any repetitive loss properties.

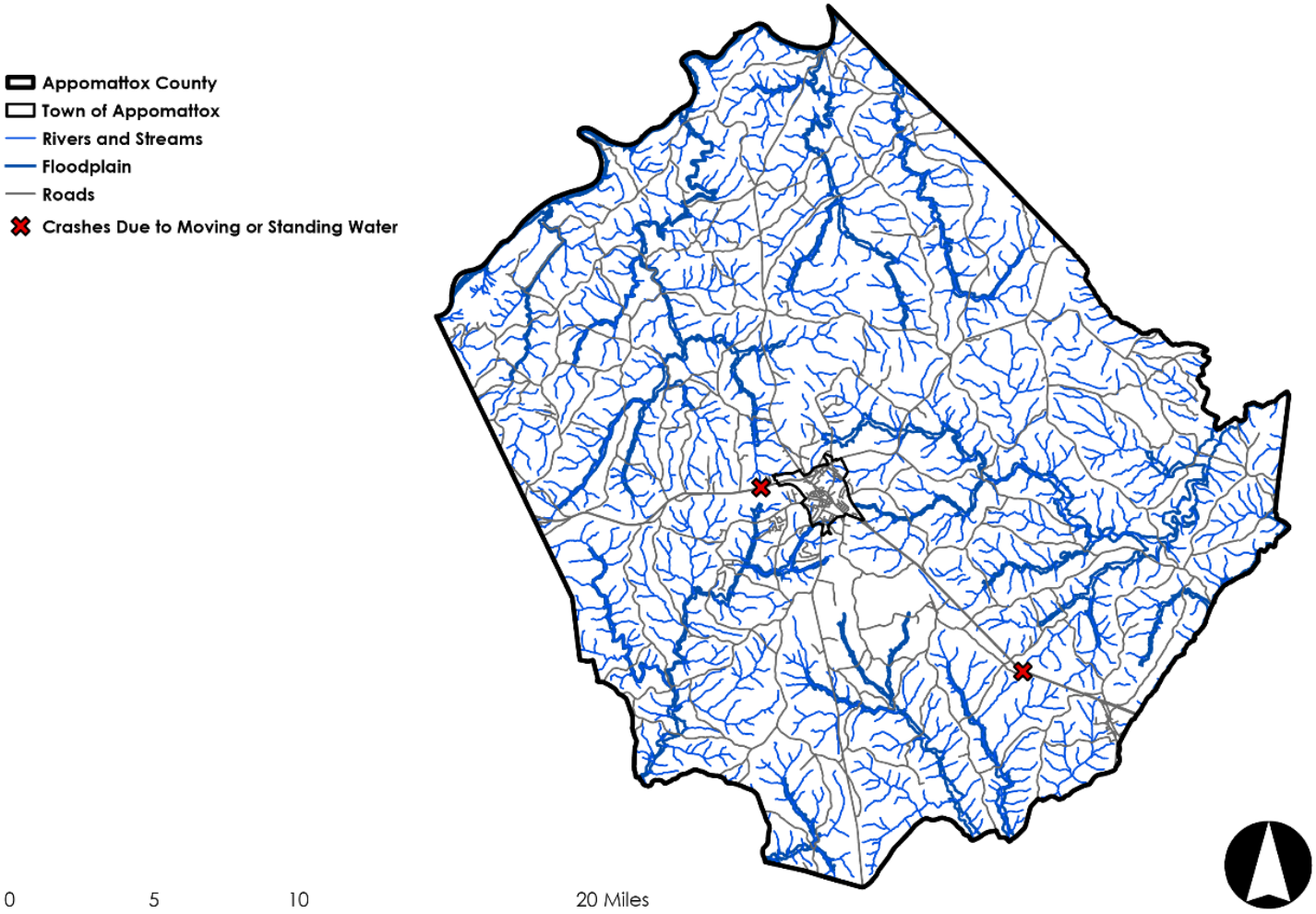


Figure 26 Motor Vehicle Crashes due to Standing Water, VDOT

Crashes Due to Standing Water	Roads or Location	Date
1	Route 460E	6/6/2015
2	Route 460W	6/19/2023

Table 8 Recent vehicle crashes due to standing water

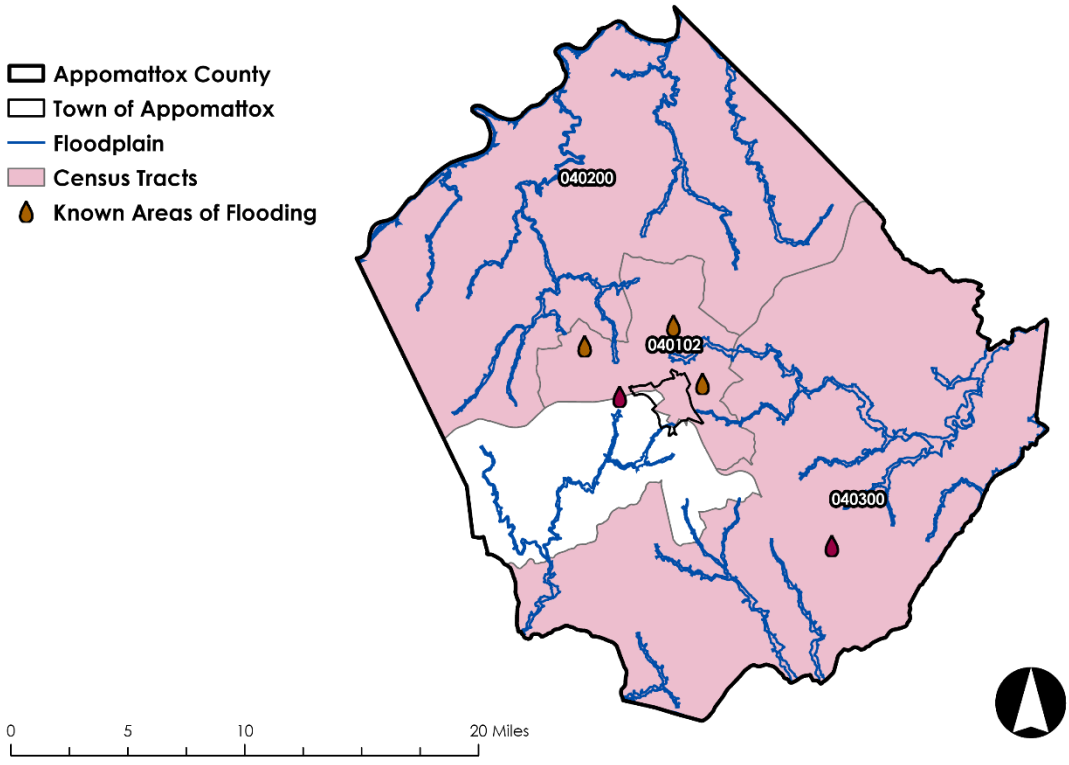


Figure 27 Area of Known Flooding identified in community interviews, overlaid on Low to Moderate Income Census Tracts, Census Data 2020

Dam Inundation

The largest concern with the few dams in Appomattox County (17 total, with none classified as high or high-special hazard potential and 11 unknown) are the homes, businesses, important thoroughfares and other transportation assets, and critical infrastructure assets in the Dam Break Inundation Zone (DBIZ). The main potential impacts are those to bridges, culverts, and other transportation infrastructure, as well as flooding caused by Caldwell Lake Dam (a significant hazard dam) which has overtopped and caused flooding in the past. There are no dams in the Town of Appomattox, although it could see minor issues downstream of some unknown-hazard dams.

It is unknown whether significant vulnerable and minority populations would be affected by dam spillovers in Appomattox County, but many critical roads would need to be closed or might be

washed away entirely, impeding travel and egress. The map of dams of known and unknown hazard potential are shown in the map below.

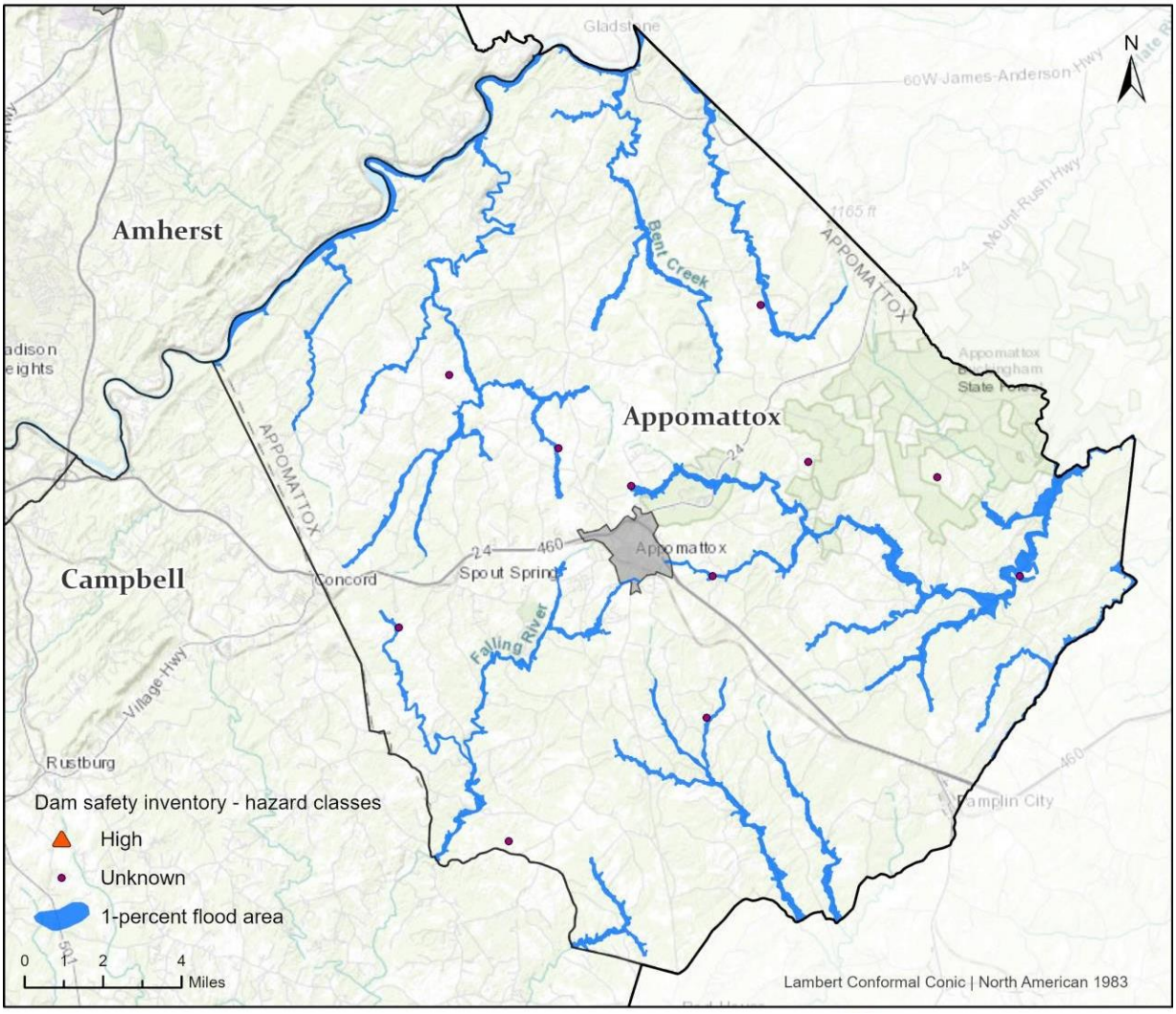


Figure 28 High and Unknown Hazard Dams in Appomattox County, VA, VA Dam Safety Inventory System, VA Tech, 2020, CVPDC 2020 HMP

Extreme Heat

Using an existing weather station located in Appomattox County (APPOMATTOX), it is possible to view observed days per year exceeding 95 degrees Fahrenheit from 1950 – 2013 for Appomattox County. In the graph below, the bars are representative of the observed days, either a positive or negative number, above 95 degrees. Generally, while the range of exceedance events is variable, a trend can be seen, especially from the year 2000 onwards where average temperatures clearly exceeded the average.

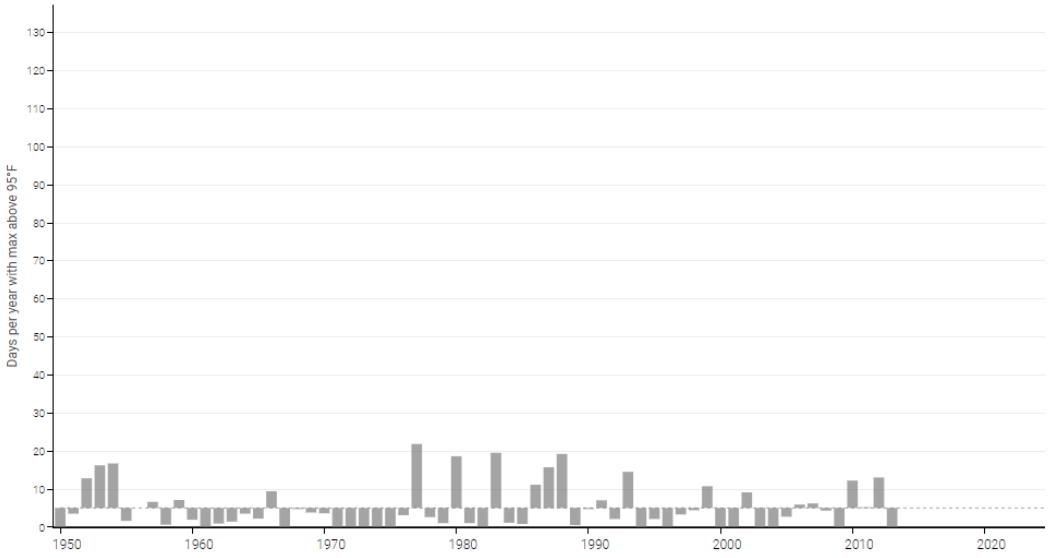


Figure 29, 1961-2013 days per year with temperature > 95 degree F observed average, US Climate Explorer Toolkit

Future Community Conditions

Flood

The potential risks of climate change can have broad effects on communities in Appomattox County, including on its public health, infrastructure, agriculture, tourism, and emergency services. Appomattox County (and the CVPDC region in general) should expect the following in the future:

- More frequent and more intense precipitation events punctuated by deeper episodes of drought.
- Drier winter and summer seasons, which could deplete reservoirs and challenge drinking water supplies and agricultural production.
- Stronger storms at a greater frequency, which may threaten lives, damage infrastructure, and cause significant power outages.
- Increasing summer heat waves could threaten public health.

According to the NOAA Mid-Atlantic RISA projections,[18] Appomattox County can expect to see some more extreme variability in precipitation over the next 50 years, with some months seeing 15% less and other months seeing up to 30% more compared to the average from the years 1991-2020. In general, the entire Appalachian and Piedmont regions can expect mild 1-2% average increases in rainfall compared to the past 30 years' average.[19] While it is difficult to know exactly how the County will be impacted, it is strongly encouraged to build in redundancy and extra capacity for stormwater and other water infrastructure to account for higher precipitation scenarios.

[18] https://www.midatlanticrisa.org/data-tools/climate-data-tools/projected-changes-in-total-monthly-precipitation.html, MARISA

[19] https://www.midatlanticrisa.org/data-tools/climate-data-tools/difference-from-normal-total-annual-precipitation.html, MARISA

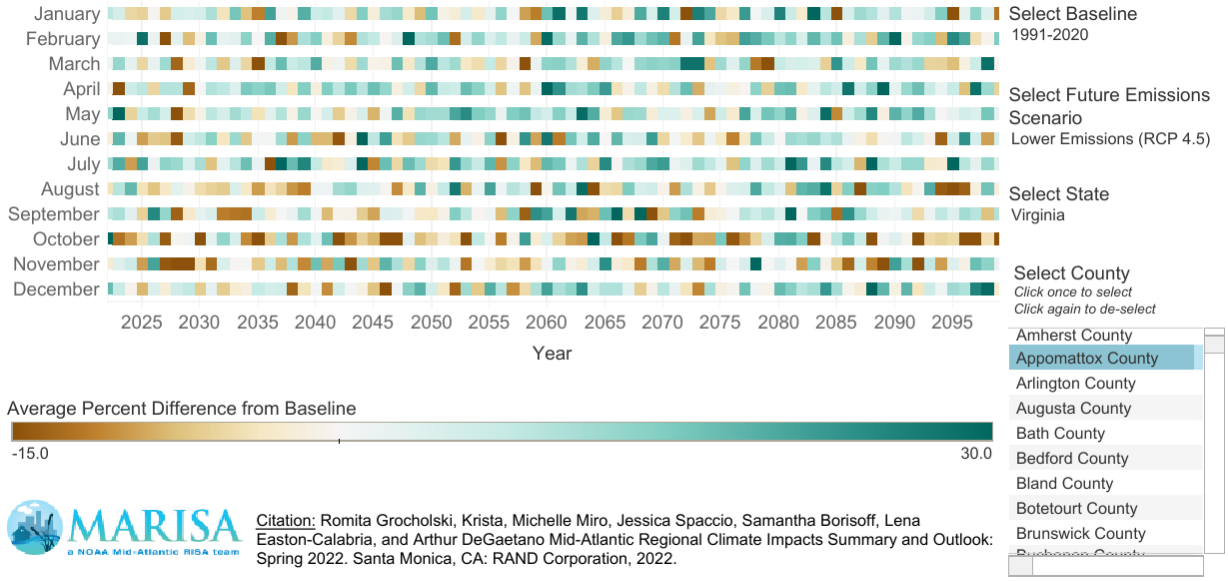


Figure 30 Projected percent difference in total monthly precipitation compared to 1991-2020 Baseline, MARISA

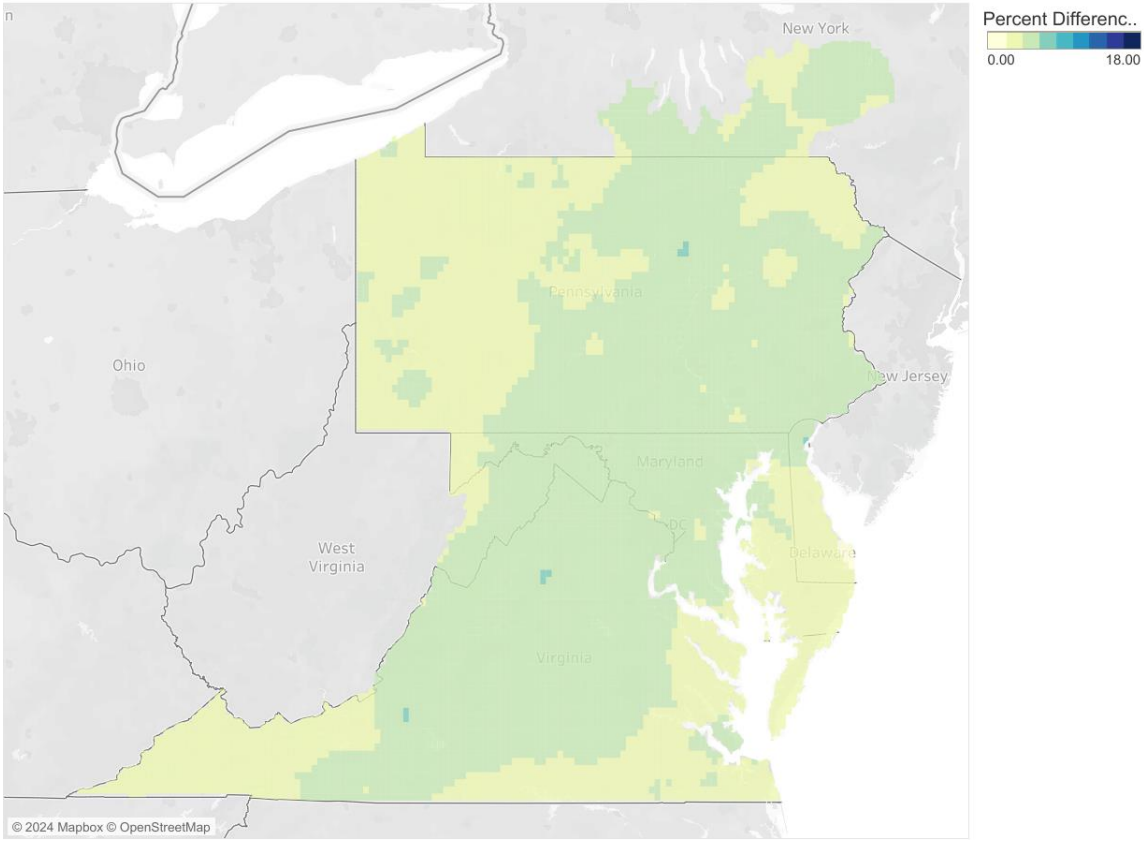


Figure 31 1981-2010 "Normal" Total Annual Precipitation and Projected Percent Difference, MARISA

Heat

In Appomattox County, the average daily temperature is expected to increase, as well as extreme temperatures on the hottest days of the year. This excess heat for longer periods may stress critical infrastructure such as roads and bridges. More hot days may also stress the electrical grid and the use of potable water may increase as people may need more irrigation for crops and landscaping. This type of heat may affect public health and may lead to economic impacts through disruptions in agriculture and manufacturing. Human health, stream and river health, and infrastructure are all threatened by higher temperatures.

At 95°F, it is hard to keep indoor areas and our bodies cool. Appomattox County's summers are getting hotter. On average, Appomattox County sees 4 days per year in excess of 95°F.1 Within the next 50 years (by 2070), Appomattox County can expect a yearly average of 34 to 60 days above 95°F, with associated increases in cooling costs, reduced air quality, and heat-related illnesses. It is imperative that the County begin planning for more days of extreme heat and look for ways to lessen the public health effects, especially on vulnerable populations.

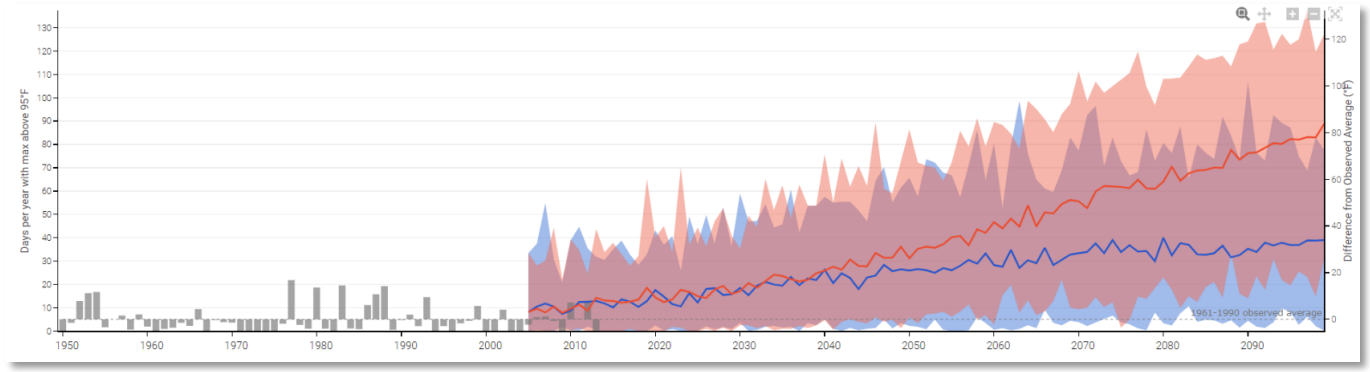


Figure 32 Days w/ maximum temp > 95°F Appomattox County (U.S. Climate Resilience Toolkit Climate Explorer)

General Flood and Heat Resilience Policies and Actions

1. Prioritize vacant tracts of land for conservation and recreational open space in floodplains and apply for grant funding to acquire these properties. (See Appendix A for more detail on grant funding)
2. Create stormwater management incentives for new subdivisions and single-family residences. (Town)
3. Develop a debris management strategy or management plan.
4. Incentivize the use of green infrastructure for commercial and residential projects.
5. Work with County extension agents to promote agricultural best management practices.
6. Develop targeted outreach before and during the summer months to inform the public of anticipated heat waves and ways to stay safe.

Prioritized Flood Resilience Strategy Appomattox County

- Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.

Prioritized Flood Resilience Strategy Town of Appomattox

- Evaluate and implement stream restoration, through green infrastructure, streambank stabilization or other appropriate practices, along the stream in the Sunnydale, South Church Street area to address stormwater impacts.

For a full explanation of the Prioritized Resilience Strategy Matrix, see Page 36, Prioritizing Resilience Projects. For the full suite of resilience strategies and rankings by locality, see Appendix A.

Appomattox County

65 Action Score

Adapt Repetitve Loss Properties

Action Description

Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitve loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.

Key Steps for Implementation

1. Determine number of local repetitive loss properties and conduct outreach to property owners to better understand their concerns.
2. Develop a County-VDEM partnership program/or coordinate with VDEM to streamline applications for home elevations or buyouts.
3. Prepare applications to FEMA for funding to support elevation or buyouts.
4. Support property owners as they elevate their homes or relocate by providing technical, financial, or relocation assistance.

Action Lead

Community Development Department

Supporting Partners

- Private property owners
- Virginia Department of Emergency Management (VDEM)
- CVPDC
-

Ease of Implementation

- ☑ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☐ Requires hiring a technical consultant.

Measures of Success

- Number of property owners the County engages.
- Successful coordination or establishment of working relationship with VDEM staff who support FEMA application development.
- Number of funded applications by FEMA
- Positive resident feedback regarding options for adaptation (without feelings of displacement or pressure).

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe	Cost*		*Cost*
Short: 0-2 years	$: less than 10k	$$$$: 500k-2mill	*Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.*
Medium: 3-6 years	$$: 10-50k	$$$$$: 2 mill+	
Long: 7+ years	$$$: 50-500k		

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

Home elevations can mitigate flood impacts, reducing damage to private property or loss of life.

Buyouts can permanently remove structures from vulnerable areas and create opportunities to restore properties to areas of ecological function and open space.

Co-Benefits & Equity Considerations

Matters related to home elevation or potetial buyouts and relocation can be very sensitive topics. The County should aim to engage with residents in a way that is respectful and empowering to provide property owners with options.

The County should provide technical or financial assistance when possible to support residents while they temporarily relocate (during home elevation construction) or permanently relocate

Cost

$$$$

1. Property owner outreach: 5,000-10,000 (dependent on number of properties)
2. VDEM CoordWination or Program Development: 30,000-150,000
3. Help Prepare FEMA Applications 35,000-100,000 (dependent on number of applications)
4. (Optional) Technical and Financial Assistance for Property Owners Pursuing Home Elevations or Buyouts: 250,000-1,000,000 (dependent on number of applications, not a requirement of FEMA)

Possible Funding Sources

Virginia Department of Emergency Management
Federal Emergency Management Agency

Appomattox County, VA

Town of Appomattox

63 Action Score

Stream Restoration and Nature-Based Solutions

Action Description

Evaluate and implement stream restoration, through green infrastructure, streambank stabilization or other appropriate practices, along the stream in the Sunnydale, South Church Street area to address stormwater impacts.

Key Steps for Implementation

1. Field investigation of current stream conditions
2. Assessment of stream and riverine capacity and flooding under future climate conditions.
3. Identification of priority project areas and coordination with private owners.
4. Implementation of restoration and green infrastructure solutions along stream and areas of known flooding

Action Lead

Department of Public Works

Supporting Partners

- Private property owners abutting waterways
- CVPDC
- Appomattox County

Ease of Implementation

- ☐ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☑ Requires hiring a technical consultant.

Measures of Success

- Reduction of stormwater and riverine flooding
- Monitored and improved water quality and stream health
- Restoration of riverine vegetative buffer zones
- More agreements with private property owners to create conservation easements

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe
Short: 0-2 years
Medium: 3-6 years
Long: 7+ years

Cost*
$: less than 10k
$$: 10-50k
$$$: 50-500k
$$$$: 500k-2mill
$$$$$: 2 mill+

**Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.*

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

Stream restoration and nature-based solutions will be located and implemented based on information from a hydraulic and hydrologic model that shows impact on reducing flooding.

Nature-based solutions can also help reduce urban heat island impacts.

Co-Benefits & Equity Considerations

Cost-sharing with private property owners to help improve their properties and reduce flooding through conservation measures.

Prioritized flood-prone areas in which socially vulnerable populations also live.

Cost

$$$$

1. Field Investigations: 30,000 - 100,000 (dependent on total acreage investigated)
2. Hydraulic and Hydrologic Modeling: 50,000-150,000 (dependent on total acreage investigated)
3. Identify Priority Projects: 50,000-100,000 (dependent on number of projects)
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5. Construction and Implementation: 250,000-1,000,000 (dependent on scope of projects)

Possible Funding Sources

Virginia Department of Environmental Quality Local Stormwater Assistance Fund, Virginia Community Flood Preparedness Fund

Appomattox, VA

`Town of Altavista, VA

The Town of Altavista is nestled in the scenic landscapes of Campbell County, offering a unique blend of historical charm and natural beauty. Founded in the late 19th century as a company town by the Lane Company, a prominent furniture manufacturer, Altavista retains remnants of its industrial past, providing a glimpse into its rich history. The Town's small-town atmosphere fosters a powerful sense of community, with residents enjoying the benefits of a close-knit environment and a more relaxed pace of life. Surrounded by picturesque vistas, Altavista boasts opportunities for outdoor activities, from hiking to fishing, allowing residents and visitors alike to connect with the beauty of the natural surroundings.

Community Profile and Social Assets

The Town of Altavista is a relatively new town, incorporated in 1905, and built as a stop on the railroad network. The Town has a somewhat diverse demographic profile with racial makeup: 83.24% White, 14.71% Black or African American, 0.19% Native American, 0.62% Asian, 0.01% Pacific Islander, 0.33% from other races, and 0.90% from two or more race.[20] There may also be a significant portion of elderly or mobility limited persons in the Town. While resilience is important throughout the Town and region, there are several census tracts in the Town that qualify as Low to Moderate Income based upon 2020 census data. The definition of Low-to-Moderate Income (LMI) means any census tract (or equivalent geographic area defined by the Bureau of the Census) in which at least 50% of households have an income less than 60 percent of the Area Median Gross Income (AMGI), or which has a poverty rate of at least 25%. The entirety of the incorporated Town of Altavista is designated as LMI census tracts, which can be seen in Figure X below.

Vulnerable Populations

As defined in the 2023 CFPF Manual, "Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. These areas are eligible to apply for CFPF funding with as little as 10% matching funds.

Another factor in measuring vulnerability is the Social Vulnerability Index. SVI indicates the relative vulnerability of every U.S. Census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. SVI ranks the tracts on 15 social factors, including unemployment, minority status, and disability, and further groups them into four related themes. Thus, each tract receives a ranking for each Census variable and for each of the four themes, as well as an overall ranking. Projects and studies in areas with a higher SVI will receive prioritized rankings for CFPF funding. The SVI maps can be found in Appendix E.

[20] 2020 US Census Data

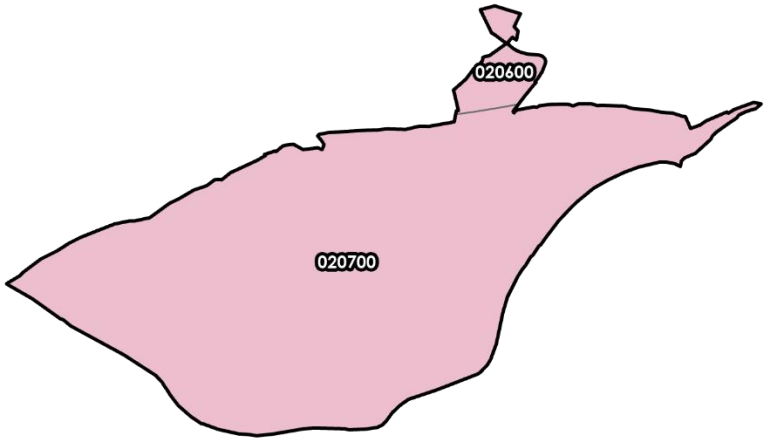

Figure 33 Census tracts with designated income levels at or below 80% of Area Median Income Levels, 2020 US Census Data.

Natural Assets

Conservation Lands

English Park is situated along the Roanoke/Staunton River within the Town of Altavista and includes roughly 160 acres of protected and public space. Overall, English Park serves as a valuable community asset in Altavista, offering a range of recreational opportunities, natural beauty, and spaces for community

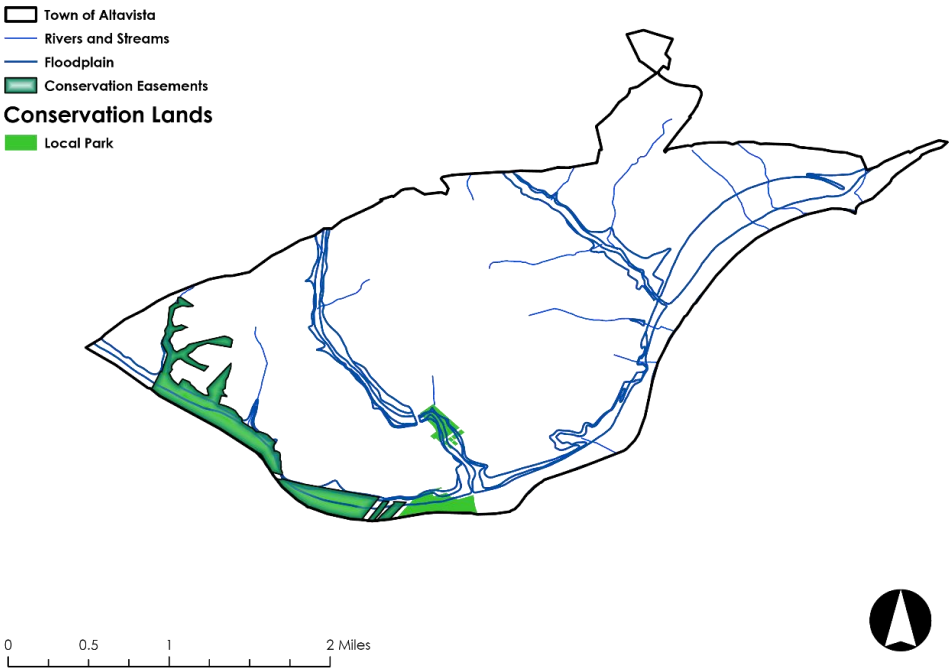

Figure 34 Conservation Lands overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

engagement and enjoyment. Its location along the Staunton River and its diverse amenities makes it a popular destination for outdoor enthusiasts of all ages.

Ecological Cores

Ecological cores are patches of natural land with at least 100 acres of interior cover which provide habitat for a large variety of species, including forest, marsh, and maritime dependent species. The Virginia Natural Landscape Assessment (VaNLA) provides an analysis that has identified, prioritized, and linked, using satellite data, the important land networks throughout Virginia. Preserving and maintaining these landscapes can help ensure they continue to provide ecosystem services such as cleaner air and water filtration. Ecological cores can also provide recreational opportunities and open space resources. The following map shows which areas of the Town contain ecological cores. A higher rating (with red being the highest) indicates the amount of ecosystem services that ecological core provides. Examples of ecological services that cores provide include wildlife and plant habitat, biodiversity conservation, water resource protection, erosion control, and carbon sequestration. The Town of Altavista should have strategies to preserve ecological cores, such as using them as park lands for low-impact recreation (hiking, bird watching, etc.) and other conservation efforts.

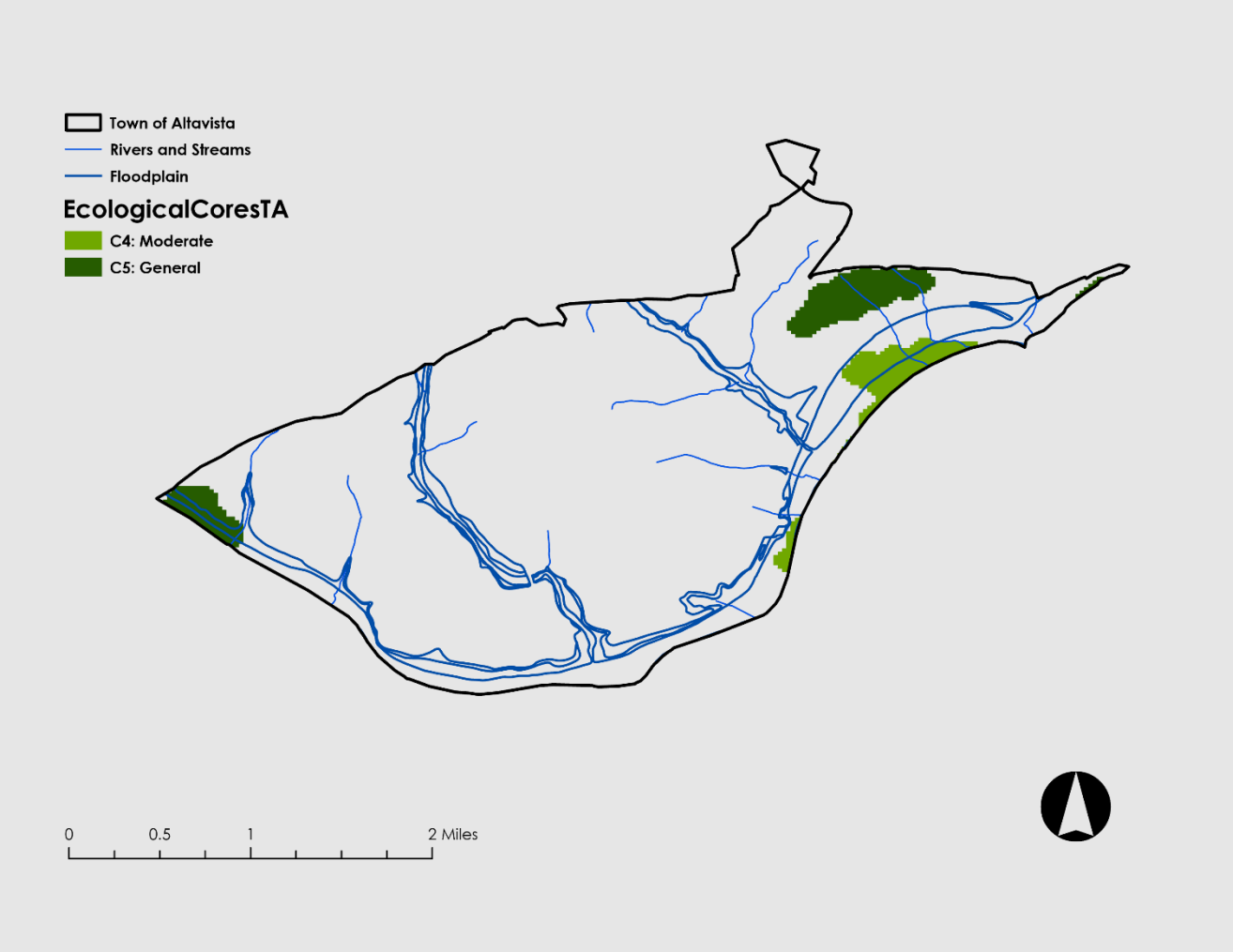

Figure 35 Ecological Cores overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory

Flooding and Related Hazards

Precipitation Flooding

The Town of Altavista contains several areas that are known to have flooding and standing water issues. Most of these areas were identified during community interviews with Town staff, in addition to information in the 2020 HMP. Areas along Pittsylvania (changes name) Ave have standing water issues. Additionally, Reed Creek overflows onto Grit Rd quite frequently. Areas along Franklin Ave experience flooding, specifically at the YMCA near Pittsylvania Avenue; Lynch Creek traverses this area and causes flooding. Another area that floods is 7th Street. There are also streambank erosion issues at Lynch Creek and Goose Creek, which both flow into the Staunton River. The increase in sedimentation has a negative effect on water quality and water infrastructure in the area.

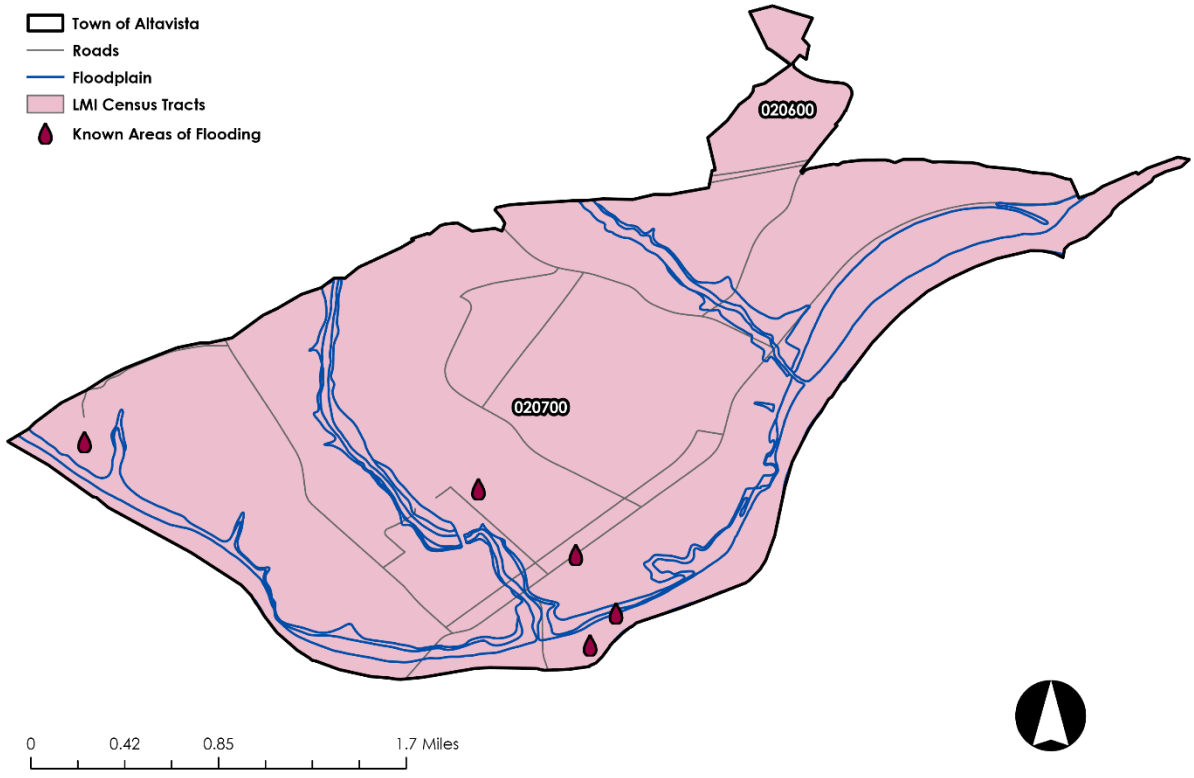

Figure 36 Areas of known flooding overlaid on Low Income Geographic Areas with up to 80% of Area Mean Income levels (Qualified tracts for 10% match CFPF)

Dam Inundation

The largest concern with the few dams near the Town of Altavista (34 total, with 3 classified as high or high-special hazard potential and 22 unknown) are the homes, businesses, important thoroughfares and other transportation assets, and critical infrastructure assets in the Dam Break Inundation Zone (DBIZ). In

the Town of Altavista potential impacts include the Altavista Power Station, Altavista Fire Company, Altavista Area YMCA Family Center, Altavista Wastewater Plant, Altavista Water Treatment Plant, and several hazmat facilities.

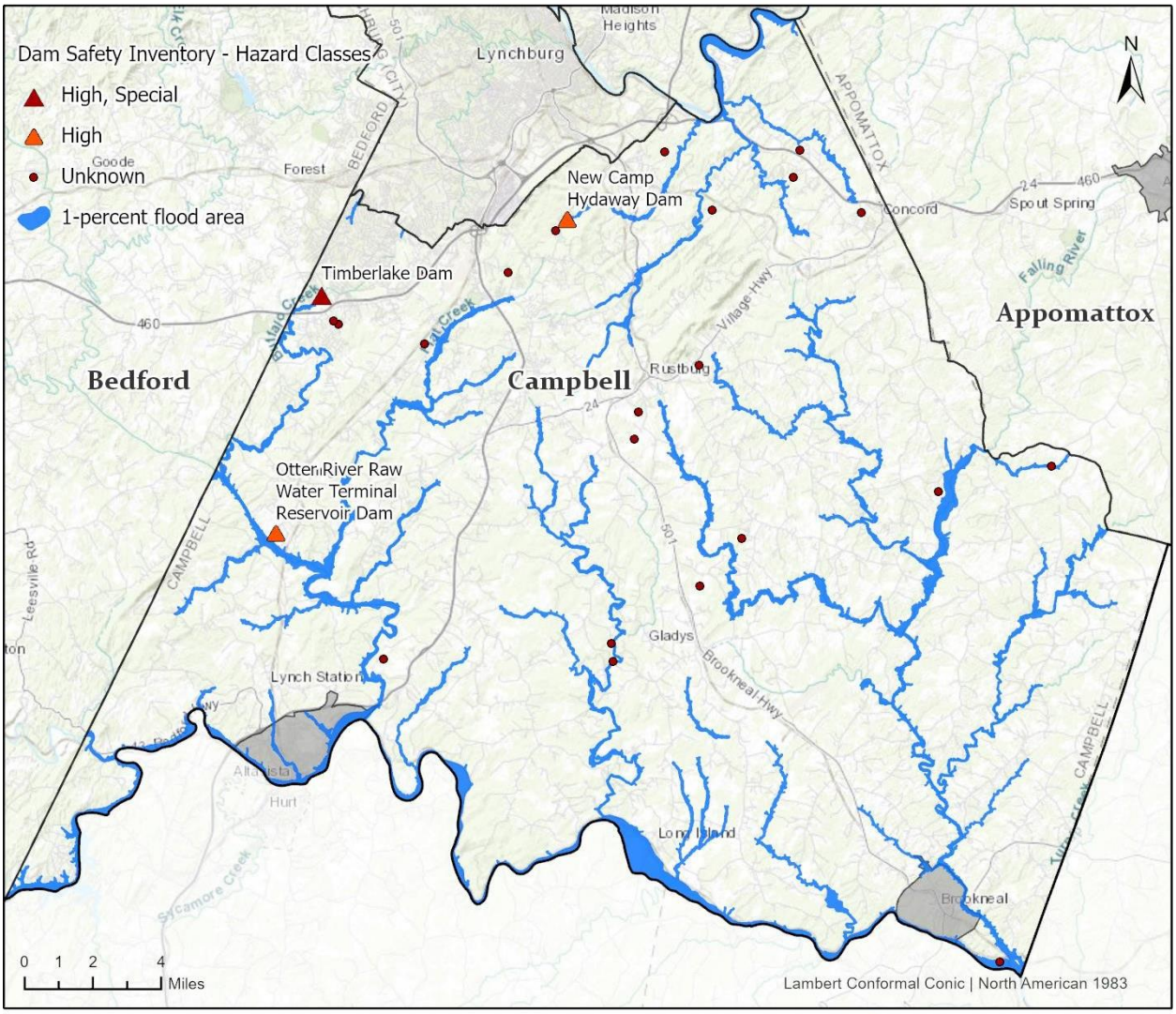

Figure 37 Dams in Campbell County, VA, VA Dam Safety Inventory System, Center For Geospatial Technology at Virginia Tech, CVPDC HMP 2020

Extreme Heat

Using an existing weather station at the Lynchburg Regional Airport (LYNCHBURG REG AP), it is possible to view observed temperature averages from 1950 – 2013 for the area. In the graph below, it is possible to view observed days per year exceeding 95 degrees Fahrenheit from 1950 – 2013 for Campbell County. In the graph below, the bars are representative of the observed days, either a positive or negative number, above 95 degrees. Generally, while the range of exceedance events is variable, a trend can be seen, especially from the year 2000 onwards where average temperatures clearly exceeded the average.

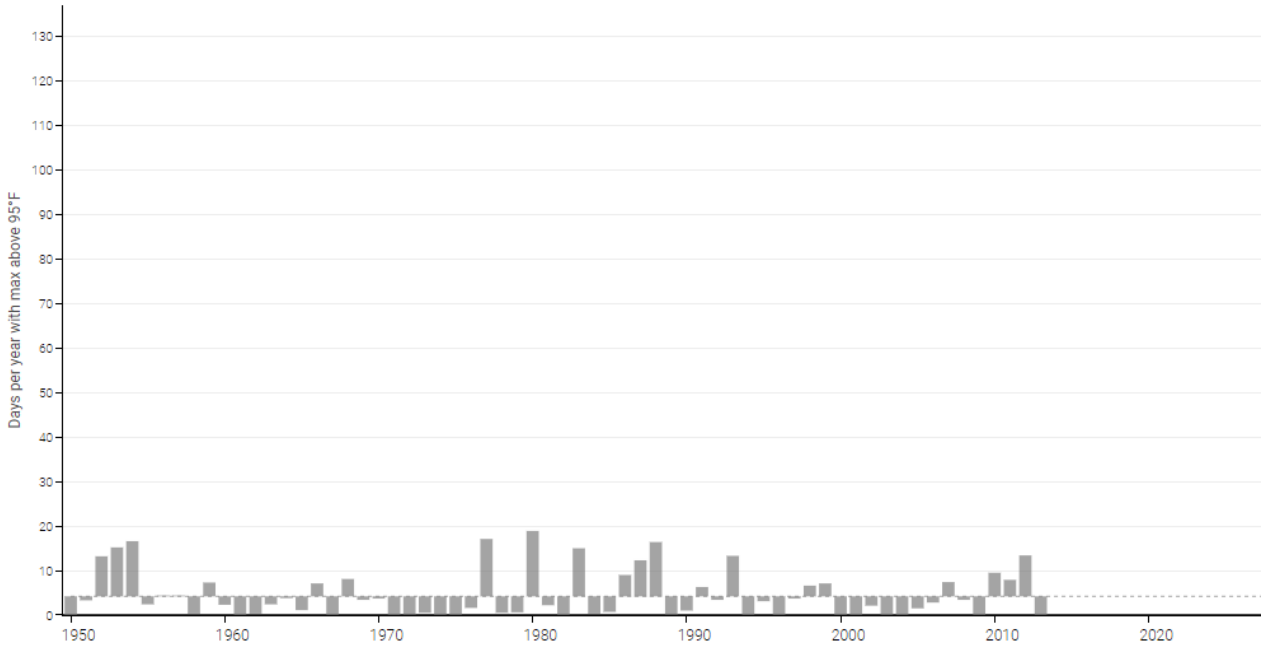

Figure 38 Days per year with maximum temperature above 95 degrees Fahrenheit, Observed Temperatures 1950 - 2013 , The Climate Explorer, US Climate Toolkit. [21]

Future Community Conditions

Flood

The potential risks of climate change can have broad effects on communities in the Town, including on its public health, infrastructure, agriculture, tourism, and emergency services. The Town of Altavista (and the CVPDC region in general) should expect the following in the future:

- More frequent, and more intense, precipitation events punctuated by deeper episodes of drought.
- Drier winter and summer seasons, which could deplete reservoirs and challenge drinking water supplies and agricultural production.
- Stronger storms at a greater frequency, which may threaten lives, damage infrastructure, and cause significant power outages.
- Increasing summer heat waves could threaten public health.

According to the NOAA Mid-Atlantic RISA projections,[22] The Town of Altavista can expect to see some more extreme variability in precipitation over the next 50 years, with some months seeing 15% less and other months seeing up to 40% more compared to the average from the years 1950-2000. In general, the entire Appalachian and Piedmont regions can expect mild 1-2% average increases in rainfall compared to

[21] U.S. Federal Government, 2023: U.S. Climate Resilience Toolkit Climate Explorer. [Online] https://crt-climate-explorer.nemac.org/ Accessed {April 15, 2024}.

[22] https://www.midatlanticrisa.org/data-tools/climate-data-tools/projected-changes-in-total-monthly-precipitation.html

the past 30 years' average.[23] While it is difficult to know exactly how the Town will be impacted, it is strongly encouraged to build in redundancy and extra capacity for stormwater and other water infrastructure to account for higher precipitation scenarios.

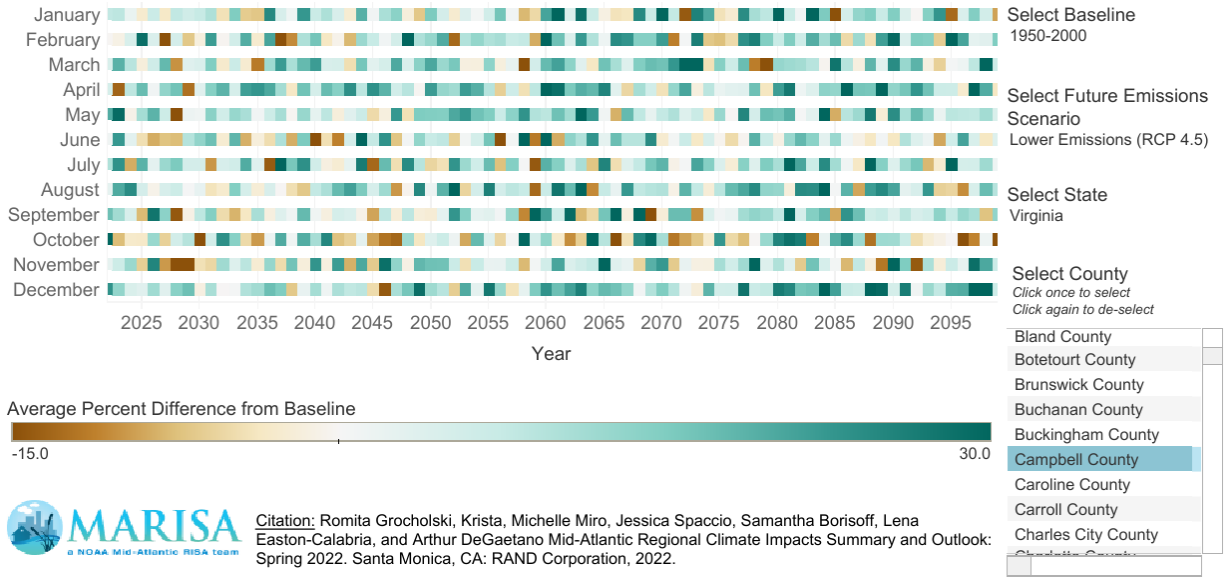

Figure 39 Projected percent difference in total monthly precipitation compared to 1991-2020 Baseline, MARISA

[23] https://www.midatlanticrisa.org/data-tools/climate-data-tools/difference-from-normal-total-annual-precipitation.html

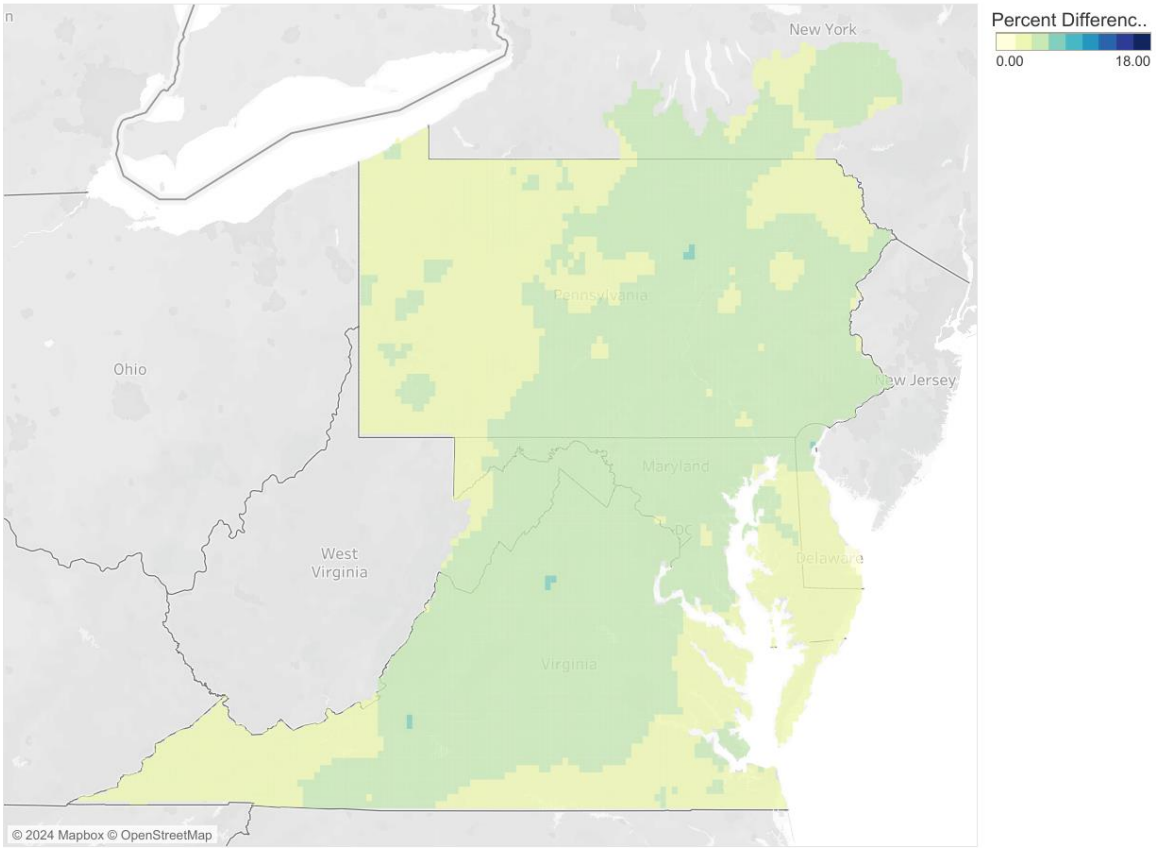

Figure 40 1981-2010 "Normal" Total Annual Precipitation, MARISA

Heat

In the Town of Altavista the average daily temperature is expected to increase, as well as extreme temperatures on the hottest days of the year. This excess heat for longer periods may stress critical infrastructure such as roads and bridges. More hot days may also stress the electrical grid and the use of potable water may increase as people may need more irrigation for crops and landscaping. This type of heat may affect public health and may lead to economic impacts through disruptions in agriculture and manufacturing. Human health, stream and river health, and infrastructure are all threatened by higher temperatures.

At 95°F, it is hard to keep indoor areas and our bodies cool. Altavista's summers are getting hotter. On average, the Town sees 4 days per year in excess of 95°F. Within the next 50 years (by 2070), the Town can expect a yearly average of 25 to 47 days above 95°F, with associated increases in cooling costs, reduced air quality, and heat-related illnesses. It is imperative that the Town begin planning for more days of extreme heat and look for ways to lessen the public health effects, especially on vulnerable populations.

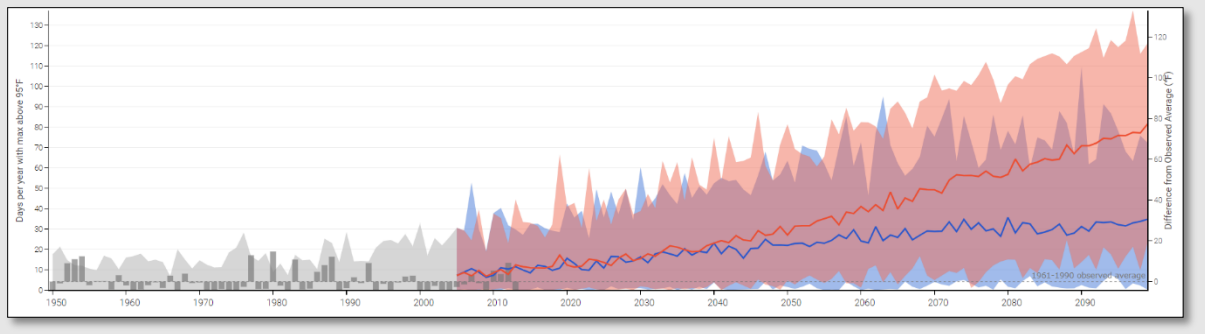

Figure 41 Table 3. Days w/ maximum temp > 95°F (U.S. Climate Resilience Toolkit Climate Explorer)

General Flood and Heat Resilience Policies and Actions

1. Prioritize vacant tracts of land for conservation and recreational open space in floodplains and apply for grant funding to acquire these properties or work with partners who can acquire them. (See Appendix A for more detail on grant funding)
2. Work with VDOT, CVPDC and others to develop a debris management strategy for the Town.
3. Work with VDOT and CVPDC to identify stormwater infrastructure priorities on state roads.
4. Develop targeted outreach before and during the summer months to inform the public of anticipated heat waves and ways to stay safe.

Prioritized Flood Resilience Strategy

- ❖ Create a watershed management plan that includes the following: Assess streambank conditions and restore stream beds along the Staunton River and its tributaries to mitigate flood impacts on the town's sewer system. Restoration and mitigation measures may include green infrastructure, erosion controls, cleaning debris from streams, and bank stabilization. (Score 68)

For a full explanation of the Prioritized Resilience Strategy Matrix, see Page 36, Prioritizing Resilience Projects. For the full suite of resilience strategies and rankings by locality, see Appendix A.

Town of Altavista

68 Action Score

Create a Watershed Management Plan

Action Description

Create a watershed management plan that includes the following: Assess streambank conditions and restore stream beds along the Staunton River and its tributaries to mitigate flood impacts on the town's sewer system. Restoration and mitigation measures may include green infrastructure, erosion controls, cleaning debris from steams, and bank stabilization.

Key Steps for Implementation

1. Field investigation of current stream conditions.
2. Develop a watershed scale hydraulic and hydrologic model to assess stream and riverine capacity and flooding under future climate conditions.
3. Identification of priority project areas and coordination with private owners.
4. Implementation of restoration and green infrastructure solutions along stream and areas of known flooding.

Action Lead

Department of Public Services

Supporting Partners

- Private property owners abutting waterways
- CVPDC
- Campbell County
- VA DEQ

Ease of Implementation

- ☐ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☑ Requires hiring a technical consultant.

Measures of Success

- Reduction of stormwater and riverine flooding in watershed
- Monitored and improved water quality and stream health
- Restoration of riverine vegetative buffer zones
- More agreements with private property owners to create conservation easements

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe	Cost*	
Short: 0-2 years	$: less than 10k	$$$$: 500k-2mill
Medium: 3-6 years	$$: 10-50k	$$$$$: 2 mill+
Long: 7+ years	$$$: 50-500k	

**Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.*

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

Stream restoration and nature-based solutions will be located and implemented based on information from a hydraulic and hydrologic model that shows impact on reducing flooding throughout the watershed.

Nature-based solutions can also help reduce urban heat island impacts.

Co-Benefits & Equity Considerations

Cost-sharing with private property owners to help improve their properties and reduce flooding through conservation measures.

Prioritized flood-prone areas in which socially vulnerable populations also live.

Coordination with County to maximize benefits throughout watershed.

Cost

$$$$

1. Field Investigations: 30,000 - 100,000 (dependent on total acreage investigated)
2. Hydraulic and Hydrologic Modeling: 50,000-150,000 (dependent on total acreage investigated)
3. Identify Priority Projects: 50,000-100,000 (dependent on number of projects)
4. Design of Nature-Based Solutions: 150,000-250,000 (dependent on number of designs)
5. Construction and Implementation: 250,000-1,000,000 (dependent on scope of projects)

Possible Funding Sources

Virginia Department of Environmental Quality Local Stormwater Assistance Fund, Virginia Community Flood Preparedness Fund

Altavista, VA

The Town of Bedford and Bedford County, VA

Bedford County is located on the western side of the CVPDC region and consists of 764 square miles of land area. The County is home to the Town of Bedford, which is situated in the center of the County and serves as the county seat. In 2013, the Town of Bedford abandoned its status as an independent city and became a town; this reversion added approximately 6,222 residents (2010 Census) and nearly seven square miles to Bedford County. Additionally, it increased the Town's boundaries by 1.5 square miles. The reversion brought changes to the tax structure, utility provision, public safety, schools, representation, election districts, etc.

Bedford County is bounded to the west by Franklin, Roanoke, and Botetourt Counties, to the north by Rockbridge County, to the east by Campbell County and the City of Lynchburg, and to the south by Pittsylvania County. Bedford County is well-known for having great access to the Blue Ridge Mountains which are located along the County's western border. Other geographic features in the County include the Peaks of Otter, Smith Mountain Lake, and the James River. Additional recreational features include the Appalachian Trail and the Blue Ridge Parkway, both of which run along the northwest border of the County.

The most common job groups among those living in Bedford County include the Management Occupations, Office and Administrative Support Occupations, and Sales and Related Occupations sectors (source).

Community Background and Social Assets

The Town of Bedford and Bedford County are characterized by a community that values its rich history and natural beauty. Nestled in the scenic Blue Ridge Mountains of Virginia, the community fosters a sense of camaraderie and neighborly support. Residents often participate in local events, community gatherings, and civic activities, contributing to a strong sense of unity. The County's commitment to preserving its rural heritage, coupled with a focus on economic development and education, reflects the community's dedication to ensuring a high quality of life for its residents. As of the 2020 census, there are 86.8% White (Non-Hispanic), 6.18% Black or African American (Non-Hispanic), 2.85% Two+ (Non-Hispanic), 1.34% White (Hispanic), and 1.18% Asian (Non-Hispanic). About 5.20% of families and 7.10% of the population were below the poverty line, including 8.30% of those under age 18 and 10.50% of those age 65 or over .[24]

Vulnerable Populations

While resilience is important throughout the County and region, there are several census tracts in Bedford County that qualify as Low to Moderate Income based on 2020 census data. The definition of Low-to-Moderate Income (LMI) means any census tract (or equivalent geographic area defined by the Bureau of the Census) in which at least 50% of households have an income less than 60 percent of the Area Median Gross Income (AMGI), or which has a poverty rate of at least 25%. Bedford County contains multiple LMI census tracts which can be seen in Figure 1 below.

[24] *United States Census Bureau. Retrieved 2011-05-14*

As defined in the 2023 CFPF Manual, "Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. These areas are eligible to apply for CFPF funding with as little as 10% matching funds.

Another factor in measuring vulnerability is the Social Vulnerability Index. SVI indicates the relative vulnerability of every U.S. Census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. SVI ranks the tracts on 15 social factors, including unemployment, minority status, and disability, and further groups them into four related themes. Thus, each tract receives a ranking for each Census variable and for each of the four themes, as well as an overall ranking. Projects and studies in areas with a higher SVI will receive prioritized rankings for CFPF funding. Please see Appendix E for the social vulnerability and other information and related data.

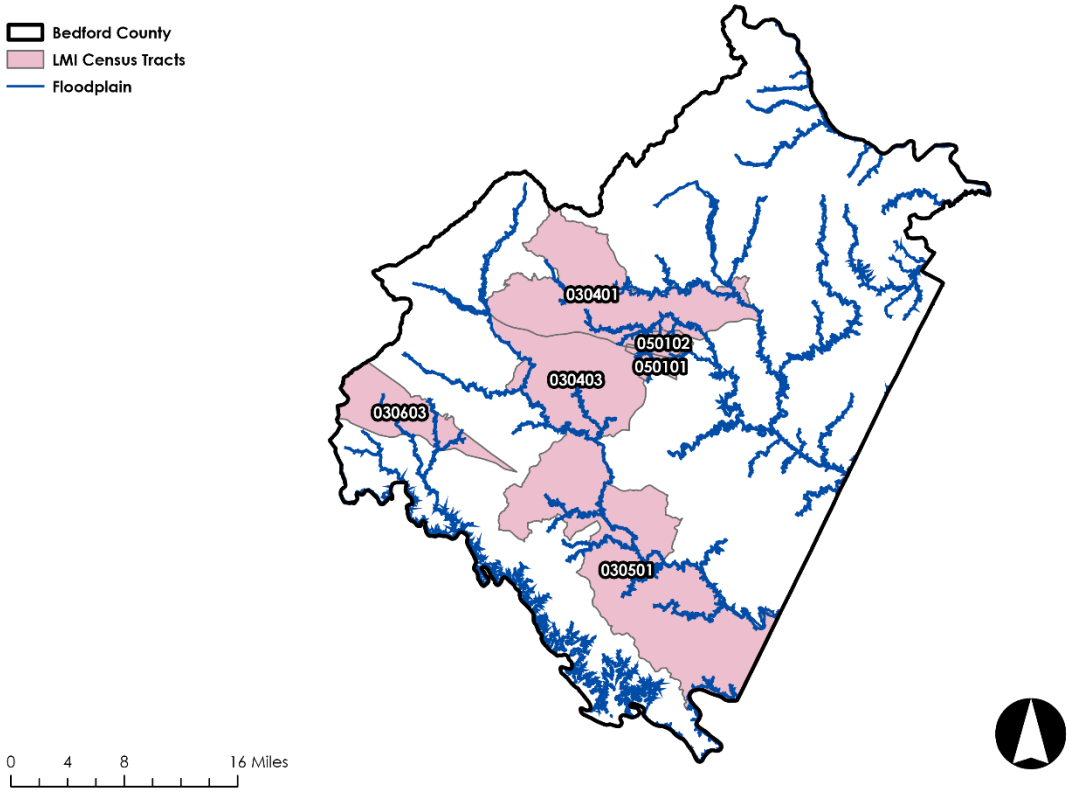

Figure 42 Bedford County Low to Moderate Income Census tracts with designated income levels at or below 80% of Area Median Income Levels, 2020 US Census Data.

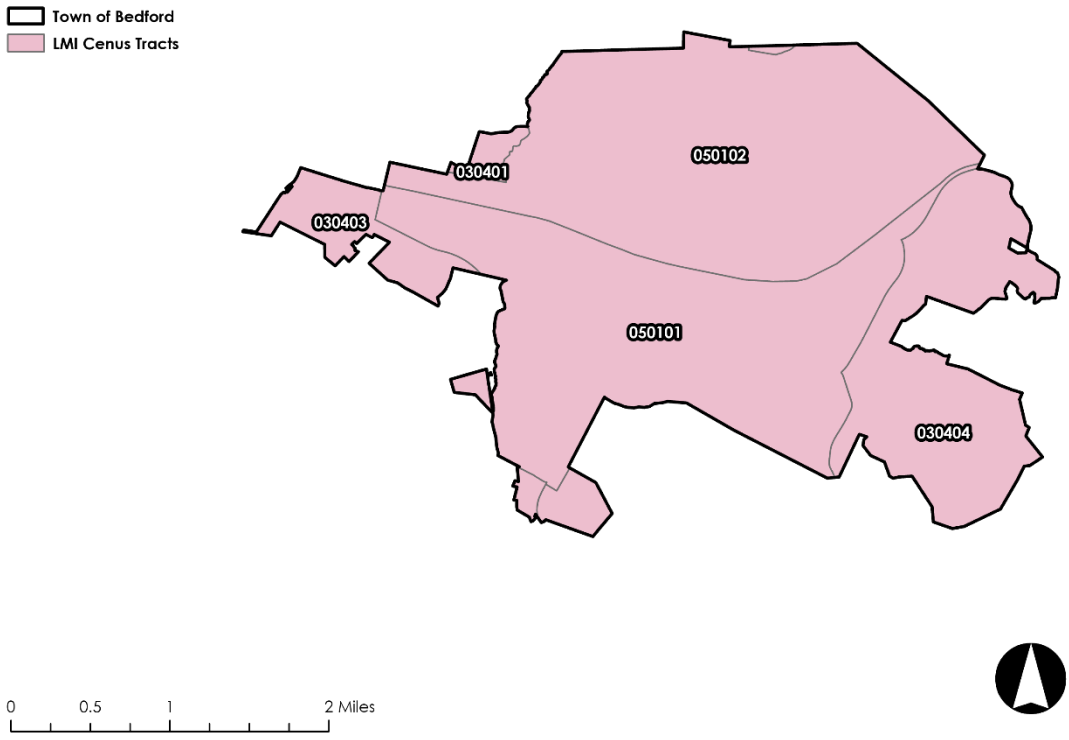

Figure 43 Town of Bedford Low to Moderate Income Census tracts with designated income levels at or below 80% of Area Median Income Levels (2020 US Census Data)

Natural Assets

Conservation Lands

There are four regional parks located in Bedford County. These parks include Falling Creek Park, Moneta Park, Montvale Park, and New London Park. Falling Creek Park is located just outside of the Town of Bedford and contains roughly 10 miles of trails suitable for hikers, trail runners, and mountain bikers. Other local parks include Bike Park, Independence Park, and Liberty Lake Park.

Bedford County is known for its scenic landscapes and outdoor recreational opportunities. The County boasts several parks and open spaces that cater to the diverse interests of residents and visitors alike. One notable park is the Smith Mountain Lake State Park, situated along the shores of the picturesque Smith Mountain Lake. This park offers various amenities, including hiking trails, picnic areas, and water-based activities like boating and fishing.

Another noteworthy outdoor destination is the Peaks of Otter, part of the Blue Ridge Parkway. This area encompasses Sharp Top and Flat Top mountains, providing hiking trails with breathtaking views of the

surrounding mountains and valleys. Residents and visitors can enjoy outdoor activities like hiking, bird watching, and photography. Bedford County also values its agricultural heritage, and there are areas with open spaces and farmlands that contribute to the rural charm of the County.

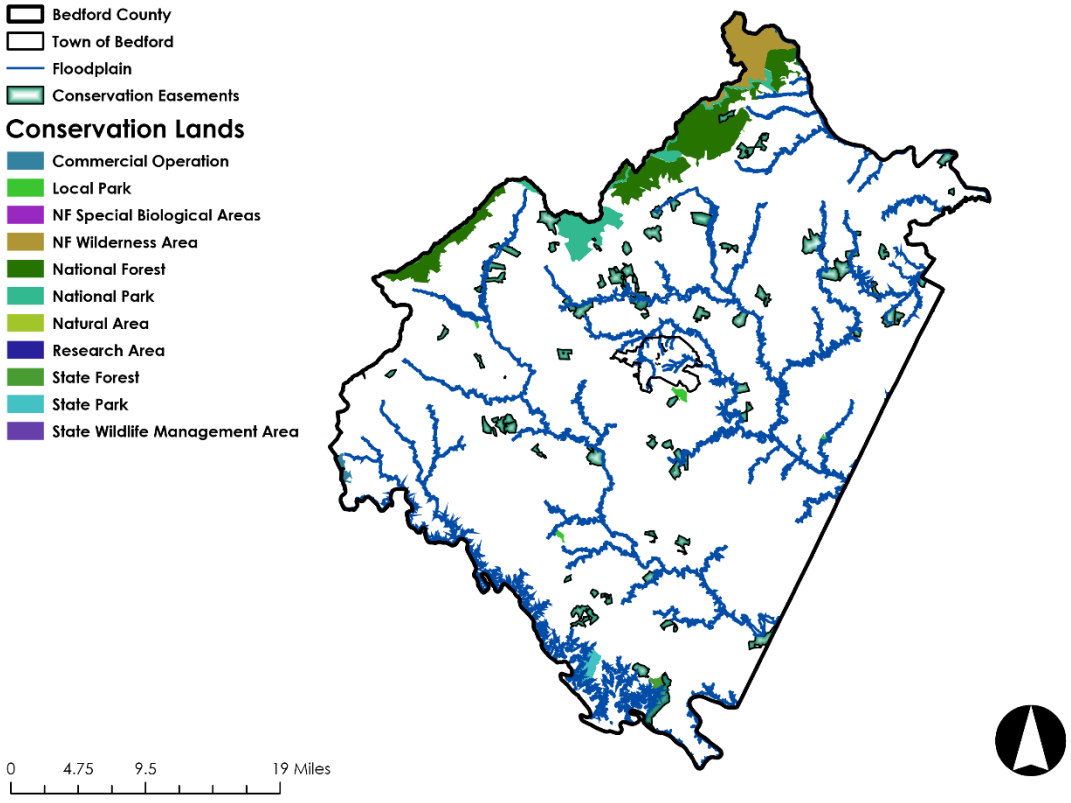

Figure 44 Bedford County Conservation Lands overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

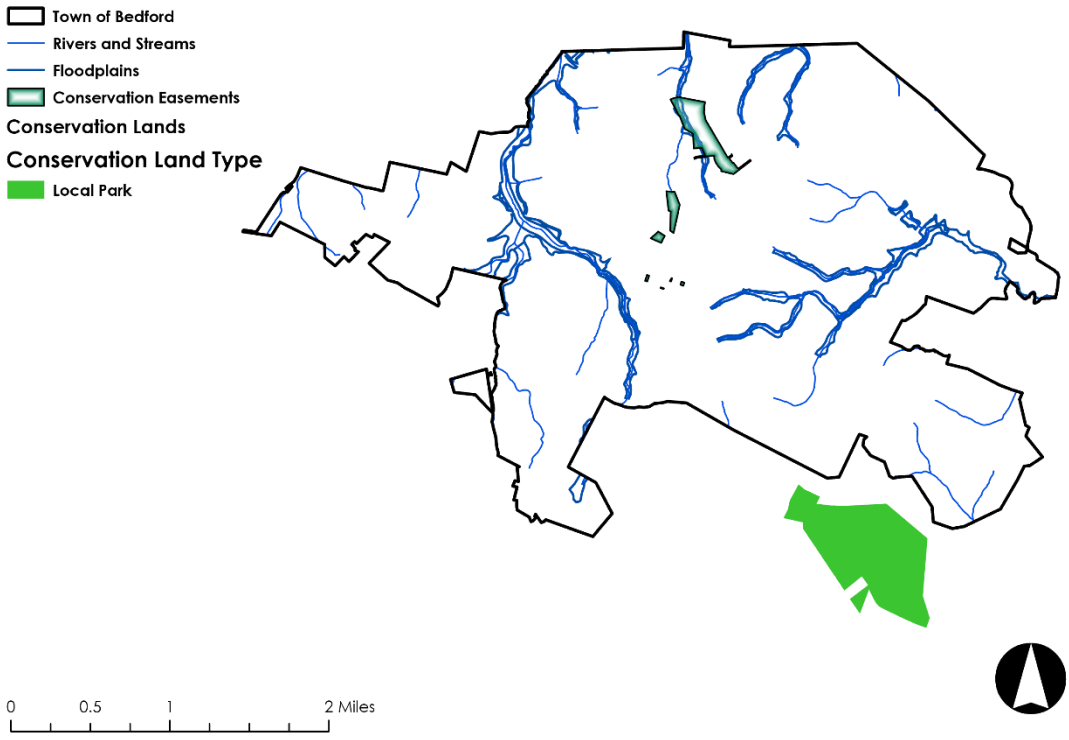

Figure 45 Town of Bedford Conservation Lands overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

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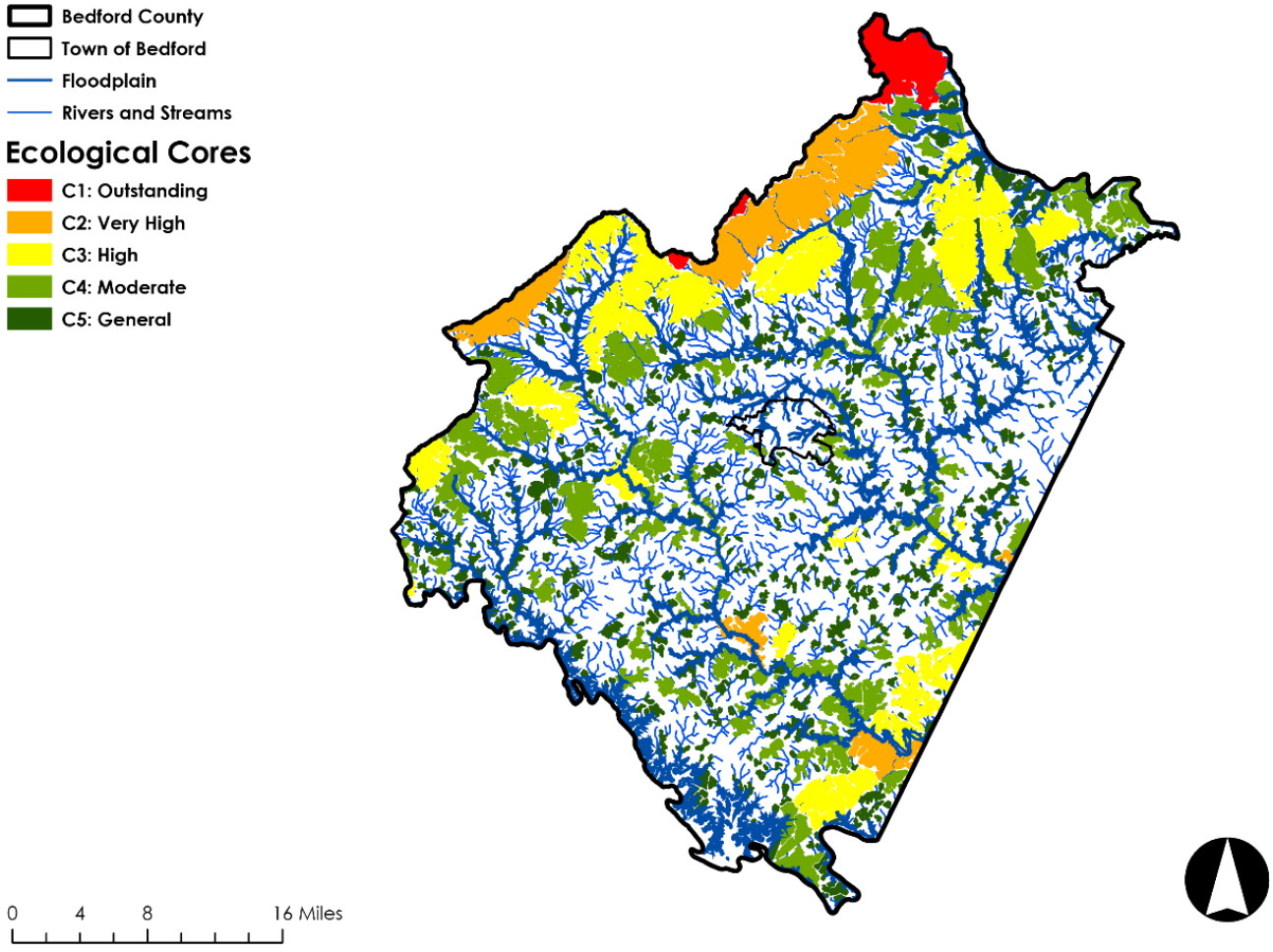


Figure 46 Bedford County Ecological Cores overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory

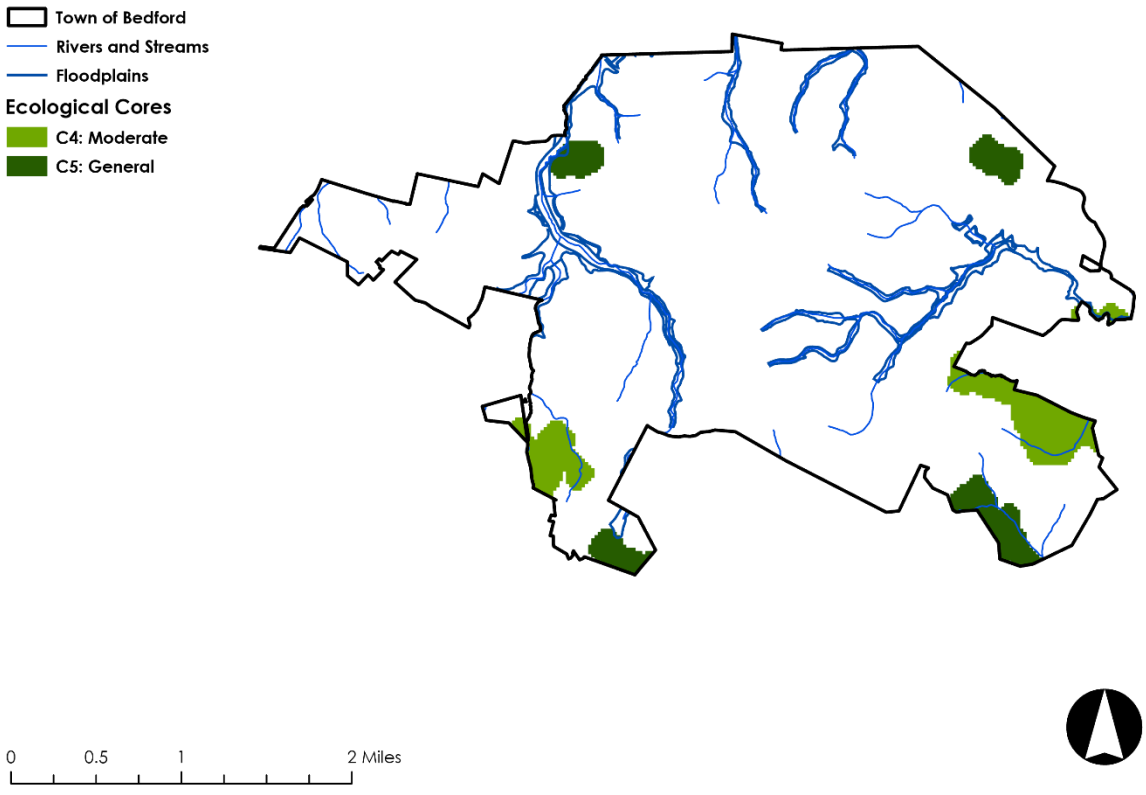


Figure 47 Town of Bedford Ecological Cores overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory

Flooding and Built Assets – Critical Facilities and Infrastructure

Section 4.3, Flooding, of the 2020 CVPDC Hazard Mitigation Plan Section 4.3 Flooding, contains a thorough evaluation of FEMA floodplains, critical infrastructure, roads and bridges in the floodplain, repetitive loss properties and severe repetitive loss properties for each locality in the CVPDC region. For specific lists, maps, and related information for Bedford County, see Appendix B, 2020 CVPDC HMP Maps and Data.

Taken from the HMP, the table below provides the vulnerable critical facilities and infrastructures of Bedford County and the Town. Within the Bedford County unincorporated areas, there are 6 campgrounds, 2 electrical substations, 4 energy facilities, 6 sewer pump stations, 1 water booster pumpstation, and 2 wastewater treatment plants situated in the floodplain. The Town of Bedford contains two Electrical substations.

Facility Name	Address	Facility Type	Coordinates	Flood Zone*
Halesford Harbour Rv Park Resort	1336 Campers Paradise Trl, Moneta	Campground	37.1583, -79.6617	1%; 0.2%
Hannabass-Crouch Campground	1241 Hannabass Dr, Goodview	Campground	37.1548, -79.6994	1%; 0.2%
Mitchell'S Point Marina & Campground	3553 Trading Post Rd, Huddleston	Campground	37.0622, -79.5601	1%; 0.2%
Moorman Marina	1510 Moorman Rd, Goodview	Campground	37.2232, -79.7753	1%; 0.2%
Tri-County Marina	1261 Sunrise Loop, Lynch Station	Campground	37.0595, -79.4468	1%; 0.2%
Waterfront Park Campground	1000 Waterfront Dr, Moneta	Campground	37.1397, -79.6464	1%; 0.2%
Electrical Substation **	678 Orange St, Bedford	Electrical Substation	37.3334, -79.5123	1%; 0.2%
Electrical Substation **	Macon St, Bedford	Electrical Substation	37.3393, -79.5414	1%; 0.2%
Electrical Substation	Big Island Hwy / North Otter Creek	Electrical Substation	37.4599, -79.4651	1%; 0.2%
Electrical Substation	1026 Churchill Rd, Big Island	Electrical Substation	37.5411, -79.3978	1%; 0.2%
Coleman Falls Dam Hydro	6007 Lee Jackson Hwy,	Energy	37.5021,	1%; 0.2%

Table 9 Critical facility and infrastructure in the floodplain of Bedford County and Town (2020 CVPDC HMP)

Bedford County has 339 (or 749) primary structures and 19 (or 22) critical facilities and infrastructures identified in the 1-percent (or 0.2-percent) floodplain (shown in Figure 4-24. Most vulnerable structures are located in the following areas.[25]

- Smith Mountain Lake / Roanoke River
- Major / Powells Store area
- Forest area
- Montvale area

[25] 2020 CVPDC Hazard Mitigation Plan Update

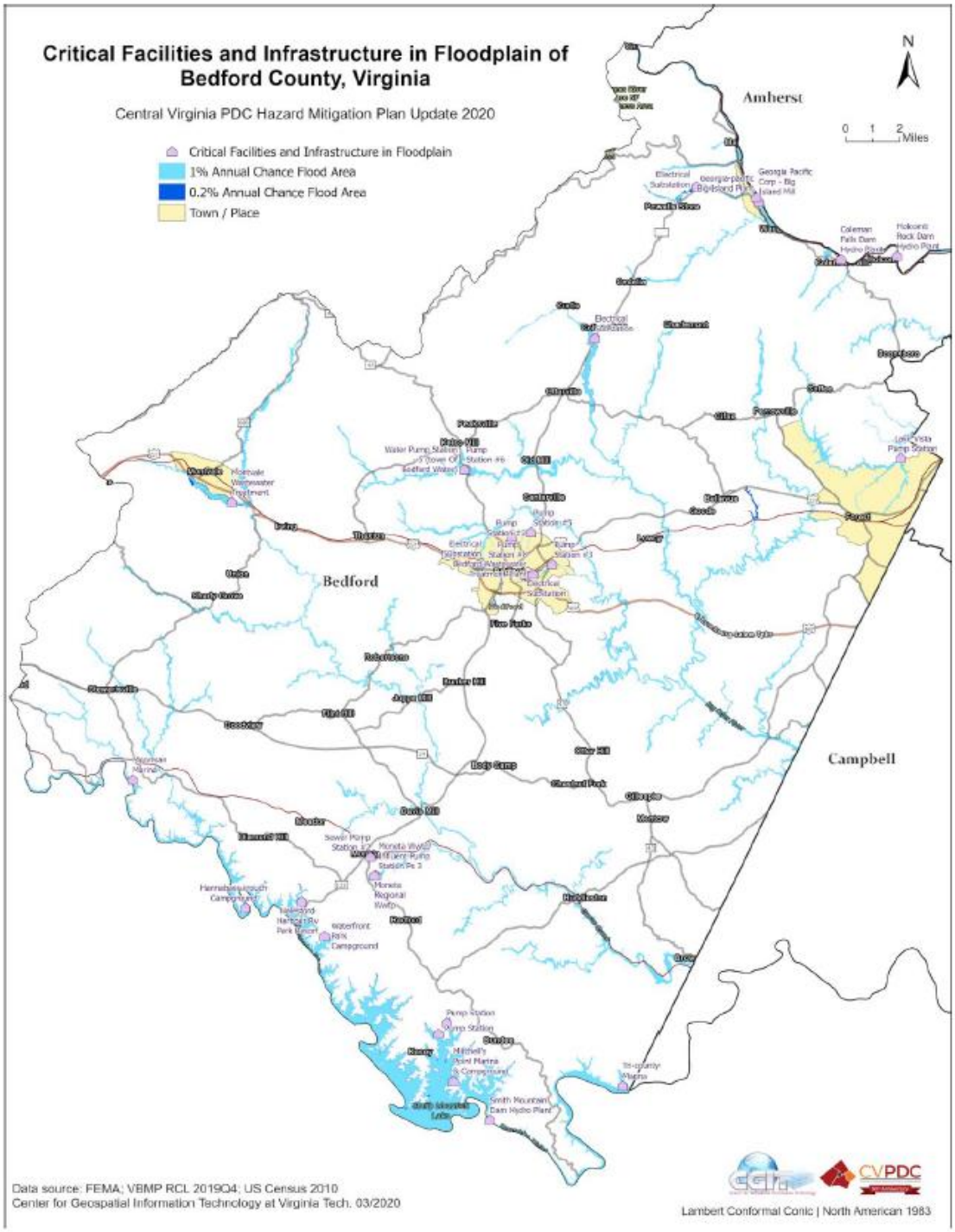


Figure 48 Critical Facilities and Infrastructure in the Floodplain, CVPDC HMP 2020

The five most susceptible roads to flooding are all US or State of Virginia primary roads:
Rt 706 Bells Mill Rd at Elk Creek, Rt 643 Otterville Rd at North Otter Creek, Rt 644 at North Otter Creek (due to a bridge barely above water level), Rt 221 at Grant Rd due to a stream, and Rt 811 Thomas Jefferson Rd between Rt 643 Bellevue Rd and 6007 Thomas Jefferson Rd due to natural channel from the hayfield.

Figure 32 below illustrates real time data from the Virginia Department of Transportation on the condition of bridges and culverts. Overlaid on the rivers and streams, Bedford County, CVPDC and VDOT can work together to upgrade the "Poor" infrastructure first to avoid flood related damages and impacts to the surrounding areas.

Top Poor Rated Bridges	**Top Poor Rated Culverts**
SC-698E and Villamont Road	SC-635N Eastbound and Beagle Club Road
SC-639S and Hurricane Drive	SC-635N Southbound and Falling Creek
SC-666E and Elkton Farm Road	SC-1460E and Village Drive
SC-666E and Elkton Farm Road	SC-1460W and Village Drive
Sc-691E and Shepherds Street	

Table 10 Bedford County Bridge and Culvert Condition, VDOT

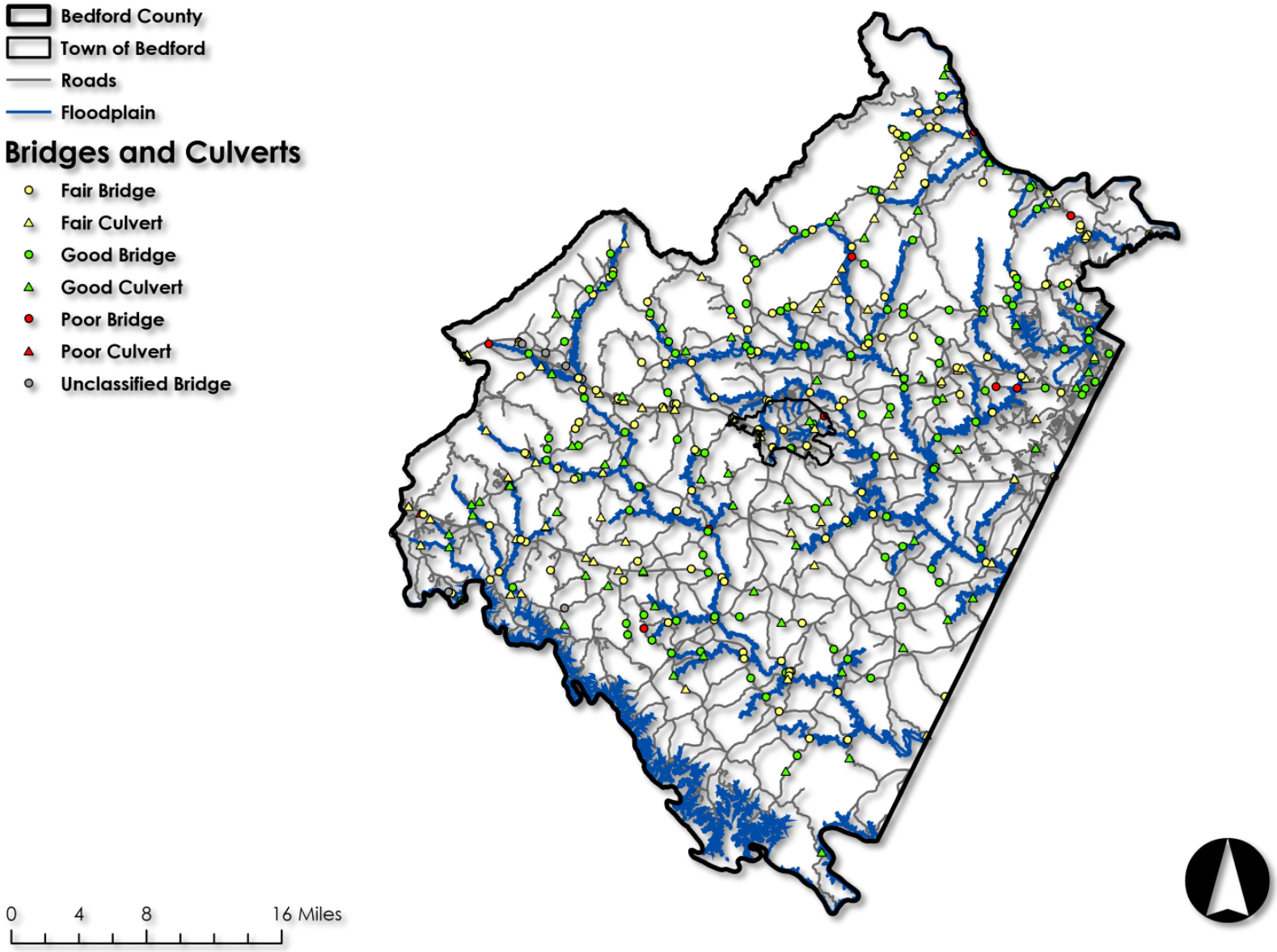


Figure 49 Bridge and culvert condition assessment within Bedford County (VDOT)

Looking at recent data and information from VDOT on vehicle crashes due to standing water on roadways, with the floodplain areas and waterways, it is possible to see the most common areas of known flooding heard from community interviews and standing water where vehicle crashes have occurred to due to standing water on the road.

Crashes Due to Standing Water	Roads or Location	Date
1	Route 460	7/25/2018
2	Route 460 W	4/14/2019
3	Route 460 W	4/13/2020
4	Route 460 W	6/19/2020
5	Route 626	6/22/2021
6	Route 460 E	5/28/2021
7	Tolers Ferry	8/20/2021

Table 11 Vehicle Crashes Due to Standing Water, VDOT April 2024

Flooding and Related Hazards

Areas of Known Flooding

Flooding is most often associated with storm events that bring large amounts of rainfall to the area, swelling rivers and tributaries beyond their banks. Topographical features, soils, and development patterns also play a part in flooding; and the interaction between these geophysical elements can affect how water moves through the landscape. This flood resilience plan builds on the flood risk assessment performed in the 2020 CVPDC HMP update and adds more localized information mainly heard through community interviews and available data sets. Repetitive loss properties and severe repetitive loss properties as stated in the CVPDC 2020 HMP, *"The identification of repetitive loss properties is an important element to conducting a local flood risk assessment, as the inherent characteristics of properties with multiple flood losses strongly suggest that they will be threatened by continual losses. Repetitive loss properties are also important to the NFIP, since structures that flood frequently put a strain on the National Flood Insurance Fund."*[26] Bedford County currently has three repetitive loss properties and one severe repetitive loss property.

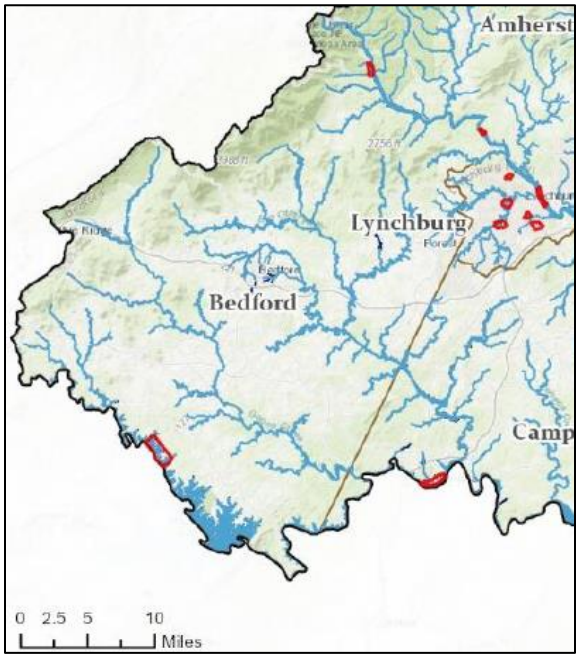


Figure 50 Bedford County repetitive loss areas (2020 CVPDC HMP)

In addition to repetitive loss area data, Figures 51 and 52 draw on additional data sets to identify known areas of flooding and potential flooding. Figure 51 (below) represents vehicle crashes due to standing water on roadways from VDOT. Additionally, Figure 52 shows the NFIP floodplain areas, and the census tracts identified as low to moderate income. These areas should be considered for future studies and projects to understand the underlying hydrology and identify potential solutions to recurrent flooding.

[26] The 2020 CVPDC Hazard Mitigation Plan Update

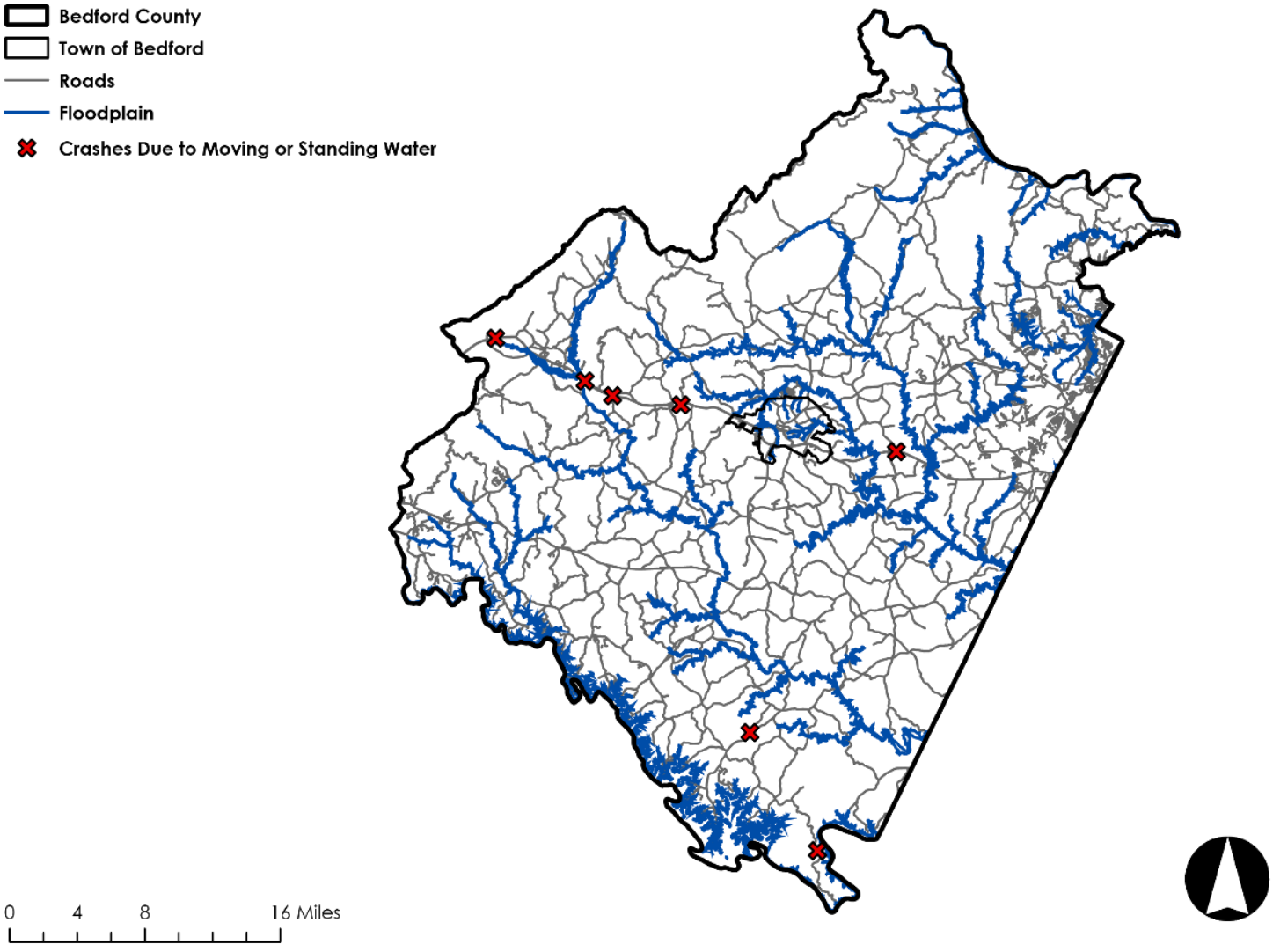


Figure 51 Vehicle crashes due to standing water on roadways, VDOT April 2024

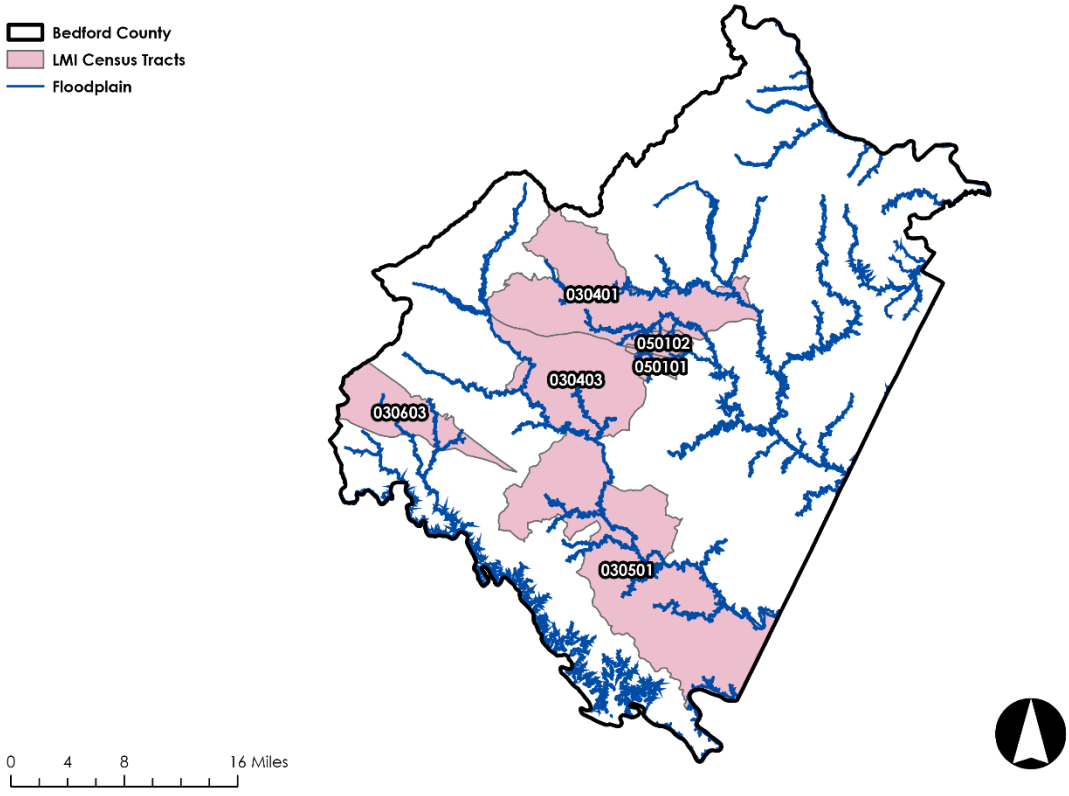


Figure 52 LMI Census Tracts Overlaid on FEMA Floodplains, NFIP and Census Data 2020

Dam Inundation

The largest concern with the number of dams in Bedford County (152 total, with 12 classified as high or high-special hazard potential and 129 unknown) are the homes, businesses, important thoroughfares and other transportation assets, and critical infrastructure assets in the Dam Break Inundation Zone (DBIZ). These include potential impacts to electric substations, two pump stations and two water storage facilities, CSX and Norfolk Southern Railroad, major highways such as Rt.

122 and Lee Jackson Highway, several residences and businesses within the maximum inundation area, and many roads and road-stream crossings such as bridges and culverts. Some of these facilities are listed in the table below.[27]

Facility Name	Facility Type	Address	Coordinates	Floodplain	Inundation Zone
Tri-County Marina	Campground	1261 Sunrise Loop, Lynch Station	37.0595, -79.4468	1%, 0.2%	Smith Mountain Dam
Tuck-A-Way Campground	Campground	1312 Sunrise Loop, Lynch Station	37.0605, -79.4484	No	Smith Mountain Dam
Electrical Substation	Electrical Substation	Big Island Hwy / North Otter Creek	37.4599, -79.4651	1%, 0.2%	Bedford Lake Dam
Smith Mountain Dam Hydro Plant	Energy Facility	Route 1, Penhook	37.0413, -79.5356	1%, 0.2%	Smith Mountain Dam
Coleman Falls Dam Hydro Plant	Energy Facility	6007 Lee Jackson Hwy, Coleman Falls	37.5021, -79.3006	1%, 0.2%	Pedlar River Dam
Holcomb Rock Dam Hydro Plant	Energy Facility	4839 Holcomb Rock Road	37.5036, -79.2628	1%, 0.2%	Pedlar River Dam
Mineral Springs Christian School	Schools	1030 Bible Ln, Vinton	37.2865, -79.8352	No	Falling Creek Reservoir Dam
Pump Station #6	Sewer Pump Station	Peaks Rd / Woods Rd, Bedford	37.3894, -79.5516	1%, 0.2%	Stoney Creek Reservoir Dam
Lake Vista Pump Station	Sewer Pump Station	2474 Cottontown Rd, Forest	37.3953, -79.2606	1%, 0.2%	Ivy Lake Dam
Farmington Pump Station	Sewer Pump Station	1715 Helmsdale Dr, Forest	37.3845, -79.3008	No	Ivy Lake Dam
Water Pump Station - 5 (Town Of Bedford Water)	Water Booster Pump Station	4690 Peaks Rd, Bedford	37.3897, -79.5531	1%, 0.2%	Stoney Creek Reservoir Dam
Well Lot Ridgeview Sc 1	Water Storage Facility	Ridgeview Dr, Lynchburg	37.3976, -79.2588	No	Ivy Lake Dam

Table 12 Bedford County and Town Critical Infrastructure in the Dam Inundation Zone, CVPDC 2020 HMP

Not all DBIZs are mapped for the high hazard dams or are not in GIS format (*digitization of these maps would be a helpful tool*). It is unknown whether significant vulnerable and minority populations would be affected by dam spillovers in Bedford County, but many critical roads would

[27] Source: CVPDC 2020 HMP

need to be closed or might be washed away entirely, impeding travel and egress. The map of dams of known and unknown hazard potential are shown in the map below.

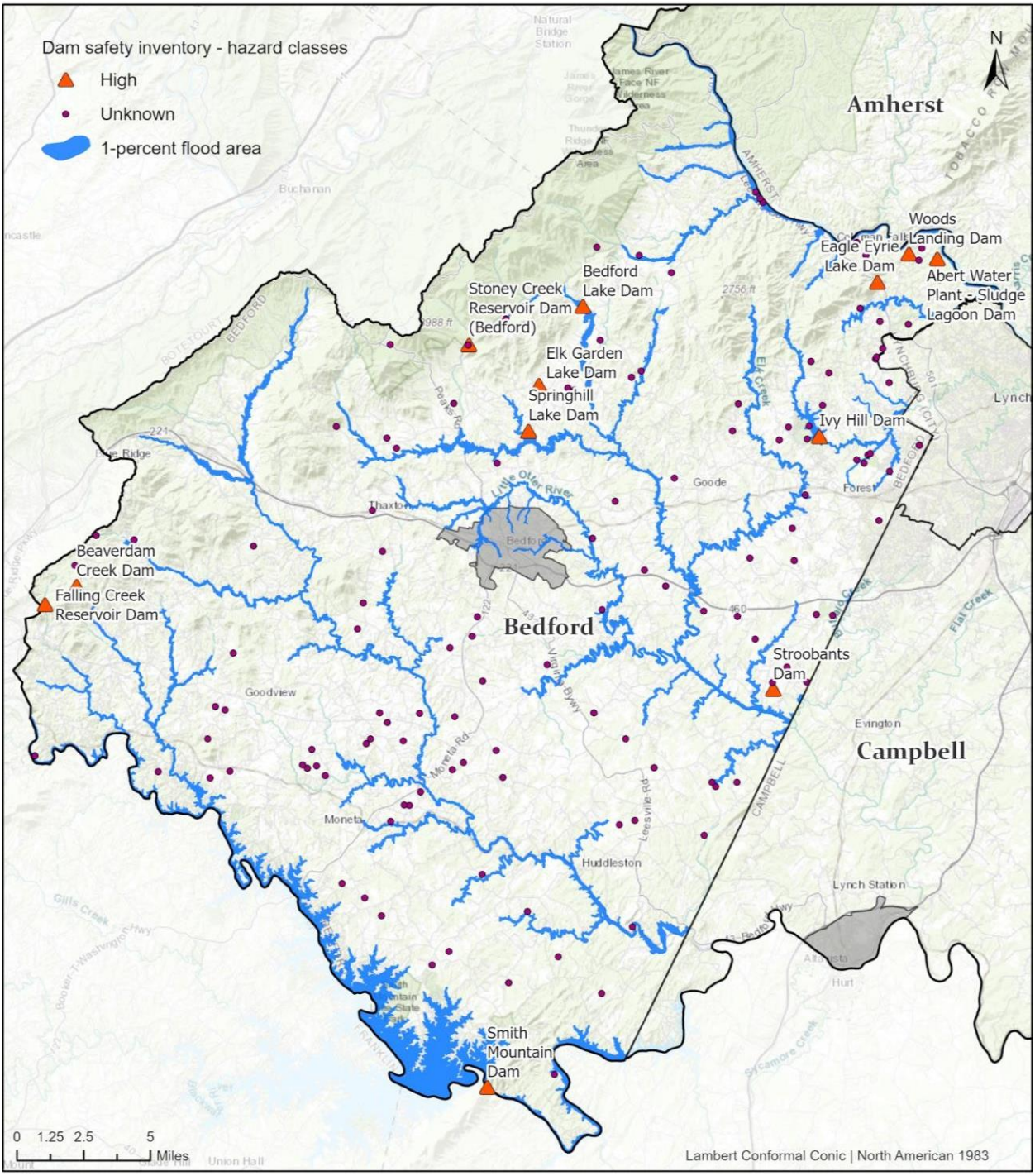


Figure 53 Virginia Dam Safety Inventory System (as of 2/7/2020), Center for Geospatial Technology, Virginia Tech, CVPDC 2020 HMP.

For a more thorough evaluation of the impacted geographies, structures, and critical assets in Bedford County and the Town of Bedford, and for the dam inundation zone maps for the referenced dams, refer to pp. 4-158 – 4-167 of the CVPDC 2020 Hazard Mitigation Plan Update.

Extreme Heat

Using an existing weather station at Lynchburg Airport it is possible to view observed temperature averages from 1950 – 2013 for Bedford County. In the graph below, the horizontal line from which the bars extend up or down is the long-term average of days per year that exceed 95 degrees Fahrenheit. Years when bars extend above the line were higher than the long-term average; years with bars that extend below the line were lower than average. While the range of exceedance events is variable, you can see a trend, especially from the year 2000 onwards, where average temperatures clearly exceeded the average.

Figure 549 Days per year with temperature > 95 degree F observed average, US National Climate Toolkit[28]

[28] U.S. Federal Government, 2023: U.S. Climate Resilience Toolkit Climate Explorer. [Online] https://crt-climate-explorer.nemac.org/ Accessed {April 15, 2024}.

Future Community Conditions

Flood

The potential risks of climate change can have broad effects on communities in Bedford County, including on its public health, infrastructure, agriculture, tourism, and emergency services. Bedford County (and the CVPDC region in general) should expect the following in the future:

- More frequent, and more intense, precipitation events punctuated by deeper episodes of drought.
- Drier winter and summer seasons, which could deplete reservoirs and challenge drinking water supplies and agricultural production.
- Stronger storms at a greater frequency, which may threaten lives, damage infrastructure, and cause significant power outages.
- Increasing summer heat waves, which could threaten public health.

According to the NOAA Mid-Atlantic RISA projections,[29] Bedford County can expect to see some more extreme variability in precipitation over the next 50 years, with some months seeing 15% less and some months seeing up to 40% more compared to the average from the years 1950-2000. In general, the entire Appalachian and Piedmont regions can expect mild 1-2% average increases in rainfall compared to the past 30 years' average.[30] While it is difficult to know exactly how the County will be impacted, it is strongly encouraged to build in redundancy and extra capacity for stormwater and other water infrastructure to account for higher precipitation scenarios.

[29]Mid Atlantic Regional Integrative Assessment, https://www.midatlanticrisa.org/data-tools/climate-data-tools/projected-changes-in-total-monthly-precipitation.html

[30] Mid Atlantic Regional Integrative Assessment, https://www.midatlanticrisa.org/data-tools/climate-data-tools/difference-from-normal-total-annual-precipitation.html

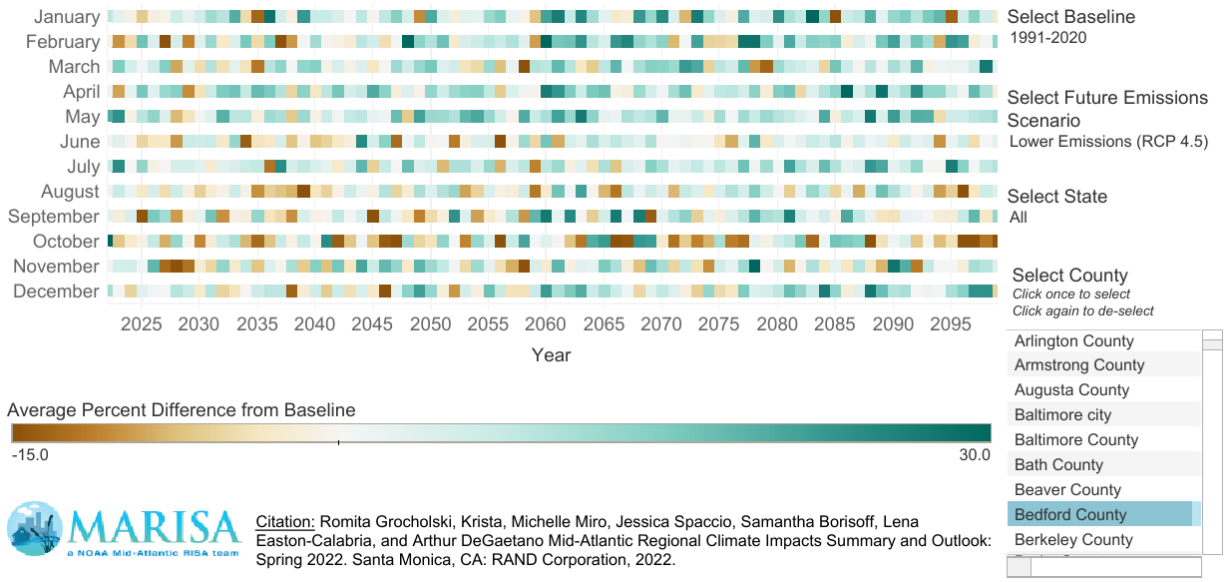


Figure 5510 Projected percent difference in total monthly precipitation compared to 1991-2020 Baseline, MARISA

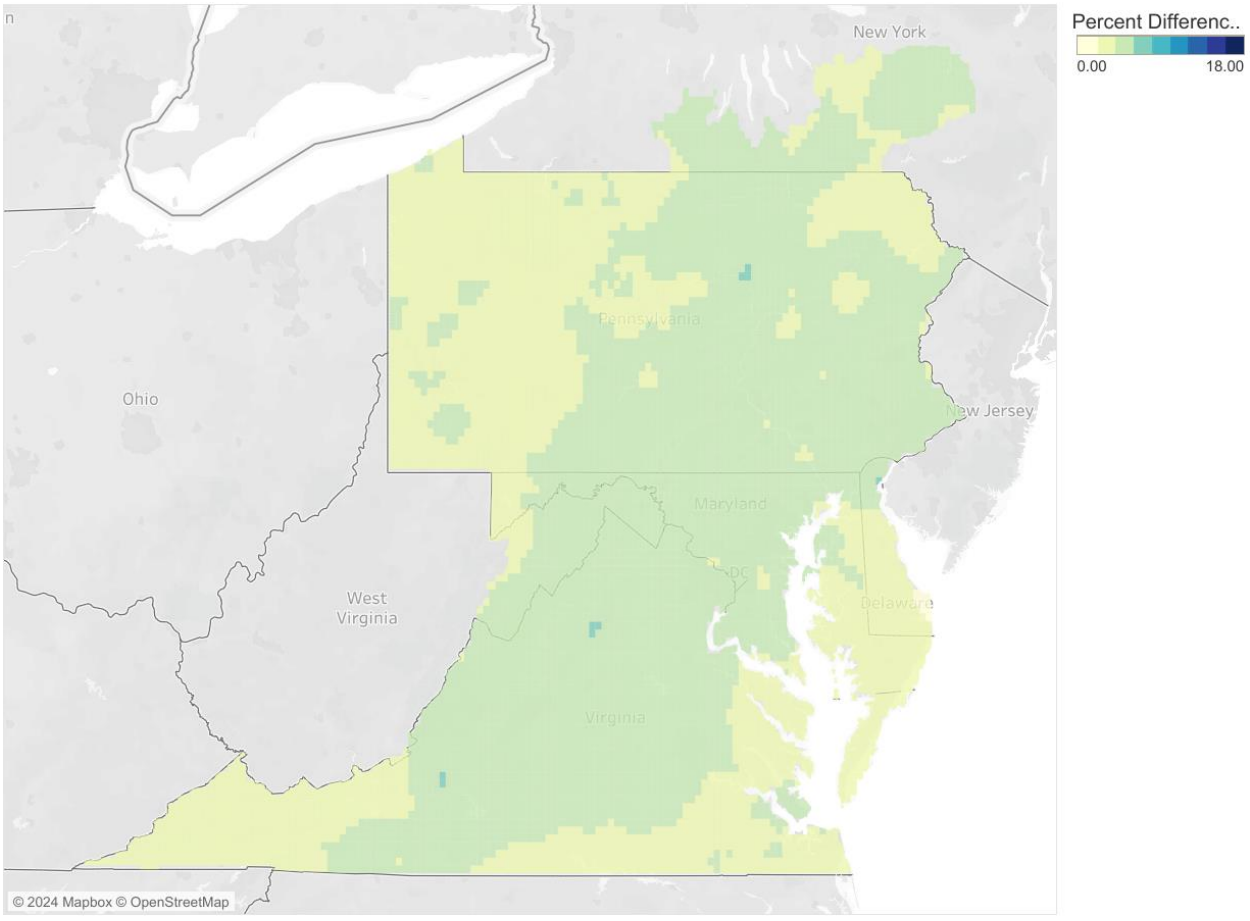


Figure 56 1981-2010 "Normal" Total Annual Precipitation, MARISA

Heat

In Bedford County, the average daily temperature is expected to increase, as well as extreme temperatures on the hottest days of the year. This excess heat for longer periods may stress critical infrastructure such as roads and bridges. More hot days may also stress the electrical grid and the use of potable water may increase as people may need more irrigation for crops and landscaping. This type of heat may affect public health and may lead to economic impacts through disruptions in agriculture and manufacturing. Human health, stream and river health, and infrastructure are all threatened by higher temperatures.

At 95°F, it is hard to keep indoor areas and our bodies cool. Bedford County's summers are getting hotter. On average, Bedford County sees 4 days per year in excess of 95°F.1 Within the next 50 years (by 2070), Bedford County can expect a yearly average of 25 to 47 days above 95°F, with associated increases in cooling costs, reduced air quality, and heat-related illnesses. It is imperative that the County begin

planning for more days of extreme heat and look for ways to lessen the public health effects, especially on vulnerable populations.

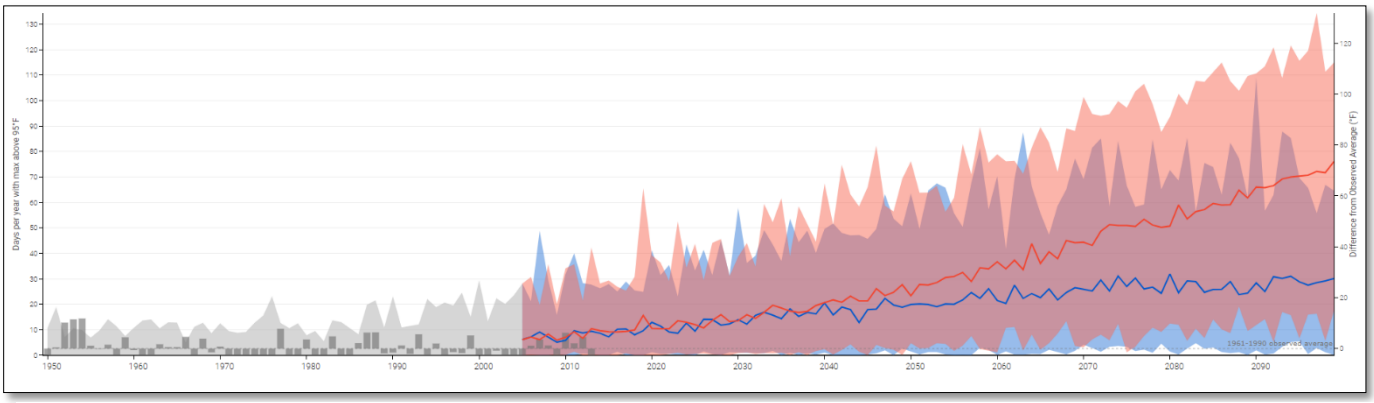


Figure 57 Table 3. Days w/ maximum temp > 95°F (U.S. Climate Resilience Toolkit Climate Explorer)

General Flood and Heat Resilience Policies and Actions

1. Prioritize vacant tracts of land for recreational open space in floodplains and apply for grant funding to acquire these properties (See Appendix A for more detail on grant funding);
2. Incentivize and/or develop stormwater regulations and the use of green infrastructure in residential areas;
3. Work with VDOT, CVPDC and others to develop a debris management for the county;
4. Work with VDOT and CVPDC to identify stormwater infrastructure priorities on state roads;
5. Develop targeted outreach before and during the summer months to inform the public of anticipated heat waves and ways to stay safe; and
6. Develop a debris management strategy or plan.

Prioritized Flood Resilience Strategy for Bedford County

- Assess the vulnerability of roadways and identify priority projects to improve drainage through grey and green infrastructure upgrades. Upgrades will help continuity of access to critical facilities and to physically isolated residents. (Score 70)

For a full explanation of the Prioritized Resilience Strategy Matrix, see Page 36, Prioritizing Resilience Projects. For the full suite of resilience strategies and rankings by locality, see Appendix A.

Bedford County

70 Action Score

Roadway Vulnerability Assessment and Improvements

Action Description

Assess the vulnerability of roadways and identifiy priority projects to improve drainage through grey and green infrasructure upgrades. Upgrades will help continuity of access to critical facilities and to physically isolated residents.

Key Steps for Implementation

1. Assess the vulnerability of roadways with stakeholder input on flood problem areas and using climate projections to understand potential future impacts.
2. Determine priority areas for roadways upgrades to enhance drainage.
3. Evaluate whether grey or green infrastructure projects are most appropriate or effective for each priority location.
4. Design and construct drainage improvements.

Action Lead

Department of Public Works, VDOT

Supporting Partners

- VDOT
- CVPDC
- Town of Bedford

Ease of Implementation

- ☐ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☑ Requires hiring a technical consultant.

Measures of Success

- Reduction of stormwater and riverine flooding
- Monitored and improved water quality and stream health
- Restoration of riverine vegetative buffer zones
- More agreements with private property owners to create conservation easements

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe	Cost*		
Short: 0-2 years	$: less than 10k	$$$$: 500k-2mill	
Medium: 3-6 years	$$: 10-50k	$$$$$: 2 mill+	
Long: 7+ years	$$$: 50-500k		

**Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.*

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

Enhancing drainage to reduce flood impacts will help with emergency response and access.

Driving through flooded roadways in a primary cause of injury or loss of life.

Green infrastructure solutions can also help improve water quality and reduce heat impacts.

Co-Benefits & Equity Considerations

Prioritize flood-prone areas in which socially vulnerable populations also live, or where critical assets are located and continuous access if necessary.

Cost

$$$$

1. Roadway Vulnerability Assessment: 100,000-125,000 (dependent on total footage assessed)
2. Determine Priority Areas: 20,000-35,000
3. Identify Priority Projects: 50,000-100,000 (dependent on number of projects)
4. Design of Drainage Solutions: 150,000-250,000 (dependent on number of designs)
5. Construction and Implementation: 250,000-1,000,000 (dependent on scope of projects)

Possible Funding Sources

FEMA BRIC, Inflation Reduction Act, DEQ Stormwater Assistance Fund

Bedford County, VA

Prioritized Flood Resilience Strategy for the Town of Bedford

- Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.

For a full explanation of the Prioritized Resilience Strategy Matrix, see Page 36, Prioritizing Resilience Projects. For the full suite of resilience strategies and rankings by locality, see Appendix A.

Town of Bedford

65 Action Score

Adapt Repetitve Loss Properties

Action Description

Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitve loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.

Key Steps for Implementation

1. Determine number of local repetitive loss properties and conduct outreach to property owners to better understand their concerns.
2. Develop a Town-VDEM partnership program/or coordinate with VDEM to streamline applications for home elevations or buyouts.
3. Prepare applications to FEMA for funding to support elevation or buyouts.
4. Support property owners as they elevate their homes or relocate by providing technical, financial, or relocation assistance.

Action Lead

Community Development Department

Supporting Partners

- Private property owners
- Virginia Department of Emergency Management (VDEM)
- CVPDC
- Bedford County

Ease of Implementation

- ☑ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☐ Requires hiring a technical consultant.

Measures of Success

- Number of property owners the Town engages.
- Successful coordination or establishment of working relationship with VDEM staff who support FEMA application development.
- Number of funded applications by FEMA
- Positive resident feedback regarding options for adaptation (without feelings of displacement or pressure).

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe
Short: 0-2 years
Medium: 3-6 years
Long: 7+ years

Cost*
$: less than 10k
$$: 10-50k
$$$: 50-500k
$$$$: 500k-2mill
$$$$$: 2 mill+

**Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.*

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

Home elevations can mitigate flood impacts, reducing damage to private property or loss of life.

Buyouts can permanently remove structures from vulnerable areas and create opportunities to restore properties to areas of ecological function and open space.

Co-Benefits & Equity Considerations

Matters related to home elevation or potetial buyouts and relocation can be very sensitive topics. The Town should aim to engage with residents in a way that is respectful and empowering to provide property owners with options.

The Town should provide technical or financial assistance when possible to support residents while they temporarily relocate (during home elevation construction) or permanently relocate

Cost

$$$$

1. Property owner outreach: 5,000-10,000 (dependent on number of properties)
2. VDEM CoordWination or Program Development: 30,000-150,000
3. Help Prepare FEMA Applications 35,000-100,000 (dependent on number of applications)
4. (Optional) Technical and Financial Assistance for Property Owners Pursuing Home Elevations or Buyouts: 250,000-1,000,000 (dependent on number of applications, not a requirement of FEMA)

Possible Funding Sources

Virginia Department of Emergency Management
Federal Emergency Management Agency

Bedford, VA

Town of Brookneal, VA

The Town of Brookneal is nestled in the scenic landscapes of Campbell County, The Town was incorporated, and a charter issued in 1908. Later to become the smallest incorporated town in the Central Virginia region, Brookneal served as the closest center of commerce for portions of Campbell, Charlotte, and Halifax counties. As transportation modes developed, Brookneal's location offered proximity to waterways, roads, and railroads. Founded amidst the verdant valleys and rolling hills, the Town's inception is intertwined with the pioneering spirit of its early settlers, who sought to carve out a community in the heart of Virginia's rural landscape.

Community and Social Assets

The Town of Brookneal is situated in the southwest portion of Campbell County. The Town has a somewhat diverse demographic profile; with racial makeup: 63.7% White, 34.71%, African American, 0.56% from other races, and 0.95% from two or more races.[31] There is a significant portion of elderly or mobility limited persons in the Town.

Vulnerable Populations

While resilience is important throughout the Town and region, the entirety of the Town of Brookneal qualifies as Low to Moderate Income based on 2020 census data. The definition of Low-to-Moderate Income (LMI) means any census tract (or equivalent geographic area defined by the Bureau of the Census) in which at least 50% of households have an income less than 60 percent of the Area Median Gross Income (AMGI), or which has a poverty rate of at least 25%. The Town of Brookneal contains multiple LMI census tracts which can be seen in Figure 1 below.

As defined in the 2023 CFPF Manual, "Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. These areas are eligible to apply for CFPF funding with as little as 10% matching funds.

Another factor in measuring vulnerability is the Social Vulnerability Index. SVI indicates the relative vulnerability of every U.S. Census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. SVI ranks the tracts on 15 social factors, including unemployment, minority

[31] 2020 US Census Data

status, and disability, and further groups them into four related themes. Thus, each tract receives a ranking for each Census variable and for each of the four themes, as well as an overall ranking. Projects and studies in areas with a higher SVI will receive prioritized rankings for CFPF funding. See Appendix X for more information on vulnerable communities.

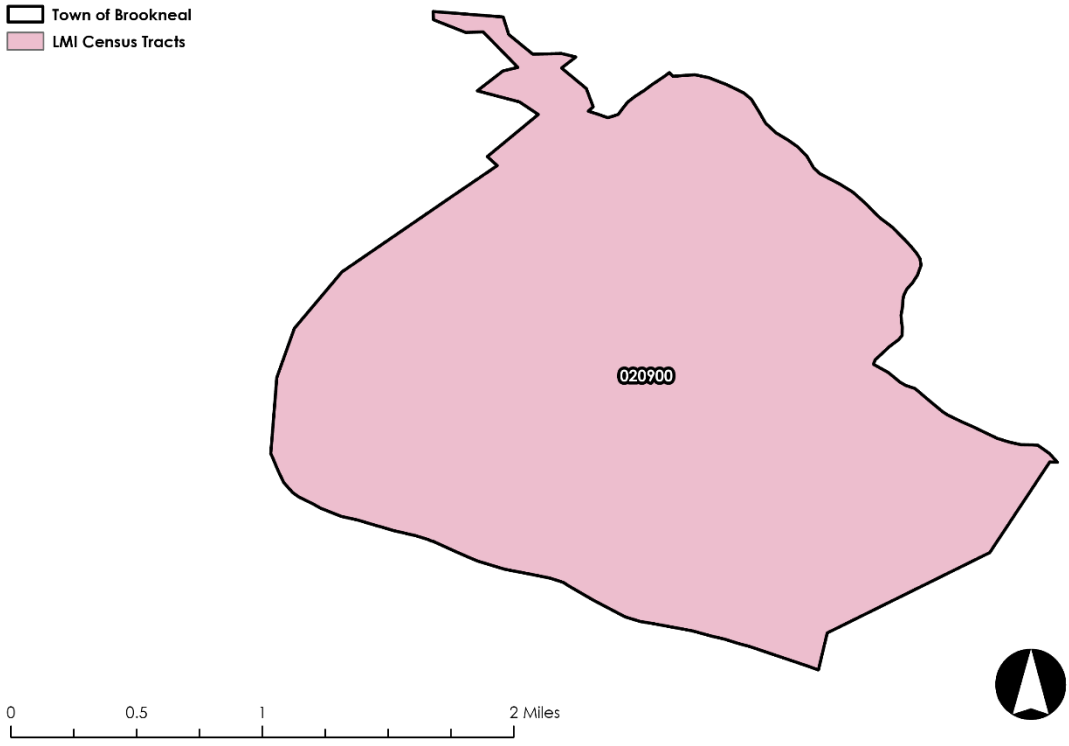


Figure 58 Town of Brookneal Census tracts with designated income levels at or below 80% of Area Median Income Levels (2020 US Census Data)

Natural Assets

Conservation Lands

The Town of Brookneal contains two major protected areas, the Brookneal Recreation Park, offering softball and baseball fields, tennis courts, and hiking trails, and the Vic Thomas Striped Bass Hatchery Wildlife Conservation Site. These areas are both in or near rivers and creeks and are a great example of passive flood mitigation. The areas are kept generally free of development and if and when a flood occurs, the low areas of the site are able to hold water and naturally drain back into the soil.

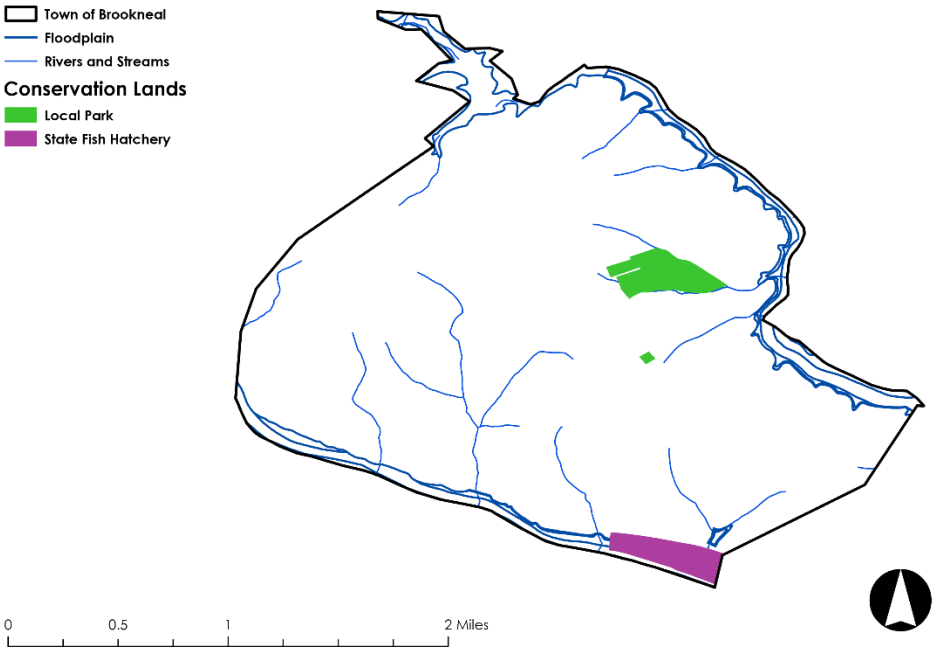
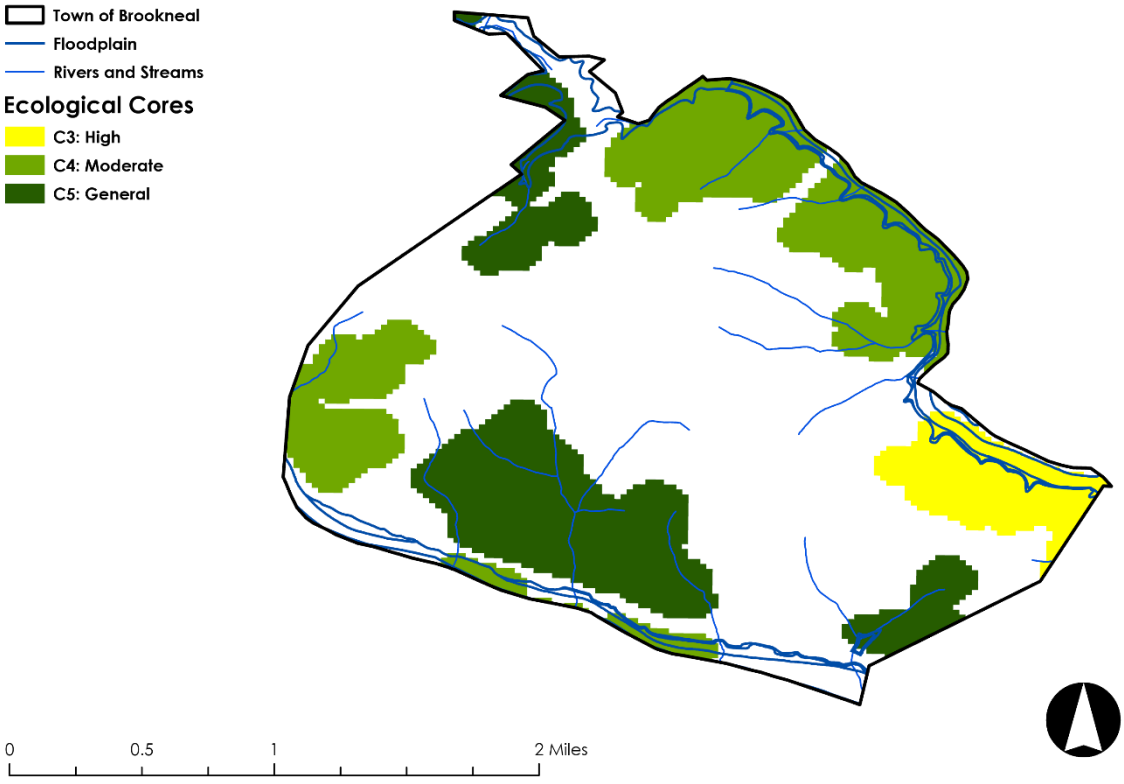


Figure 59 Conservation Lands overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

Ecological Cores

Ecological cores are patches of natural land with at least 100 acres of interior cover which provide habitat for a large variety of species, including forest, marsh, and maritime dependent species. The Virginia Natural Landscape Assessment (VaNLA) provides an analysis that has identified, prioritized, and linked, using satellite data, the important land networks throughout Virginia. Preserving and maintaining these landscapes can help ensure they continue to provide ecosystem services such as cleaner air and water filtration. Ecological cores can also provide recreational opportunities and open space resources. The following map shows which areas of the Town contain ecological cores. A higher rating (with red being the

highest) indicates the amount of ecosystem services that ecological core provides. Examples of ecological services that cores provide include wildlife and plant habitat, biodiversity conservation, water



resource protection, erosion control, and carbon sequestration. The Town of Brookneal should have strategies to preserve ecological cores, such as using them as park lands for low-impact recreation (hiking, bird watching, etc.) and other conservation efforts.

Figure 60 Ecological Cores overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory

Flooding and Built Assets – Critical Facilities and Infrastructure

The Town of Brookneal contains several areas that are known to have flooding and standing water issues. Most of these areas were identified during community interviews with Town staff, in addition to

information in the 2020 HMP. The total length of road segments in the floodplain within the Town is 0.9 miles; these include Dog Creek Rd, Radio Rd, Wickliffe Ave, Lusardi Dr, and Juniper Cliff Rd. No high-risk bridges are identified in the Town.[32] Standing water on roads can result in hazardous travel conditions and damage to infrastructure. It is important that the town prioritizes upgrading and maintaining stormwater infrastructure in these areas, which would all qualify for reduced match for grant funding from the Community Flood Preparedness Fund.

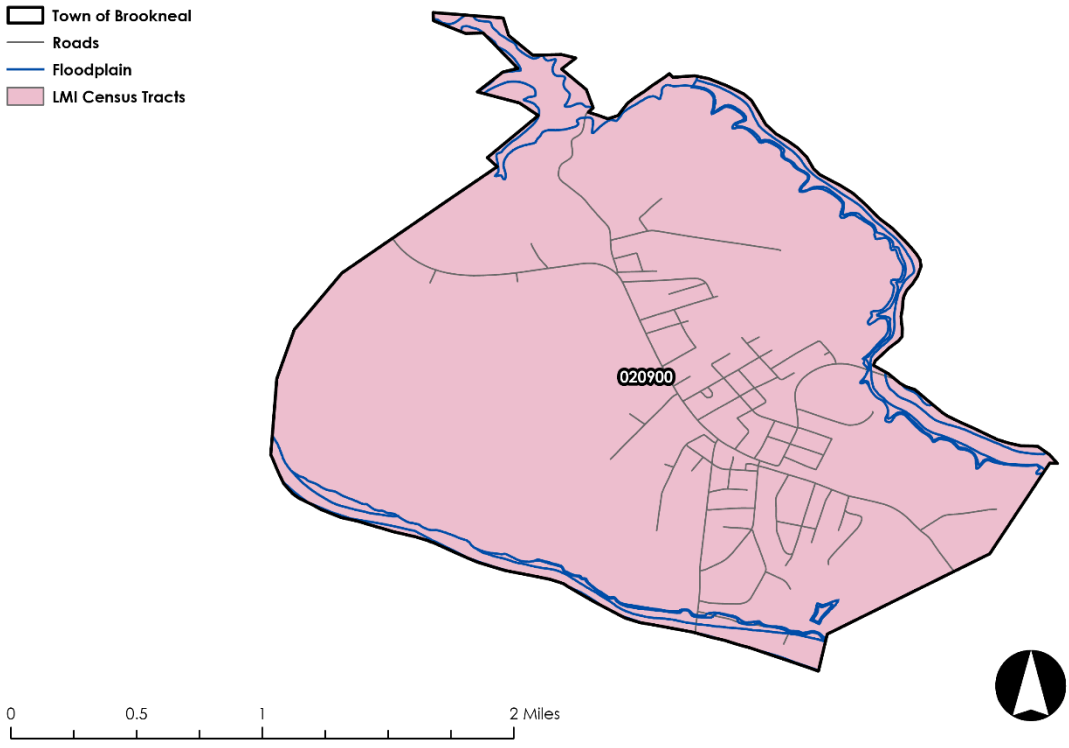


Figure 61 Floodplain areas overlaid on Low Income Geographic Areas with up to 80% of Area Mean Income levels. (Qualified tracts for 10% match CFPF)

For a complete list of roads and bridges most susceptible to flooding see CVPDC Hazard Mitigation Plan 2020 Update Flooding; Page 4-39 – 3-40. The map below illustrates real time data from the Virginia Department of Transportation on the condition of bridges and culverts. The Town of

[32] 2020 CVPDC HMP Update

Brookneal does not currently have any poor or fairly rated roads or bridges, only those classified in good condition. However, the Town should continue to monitor the status and can do so through VDOT online road conditions portal. [33] There are currently no repetitive loss or severe repetitive loss properties within the Town of Brookneal.

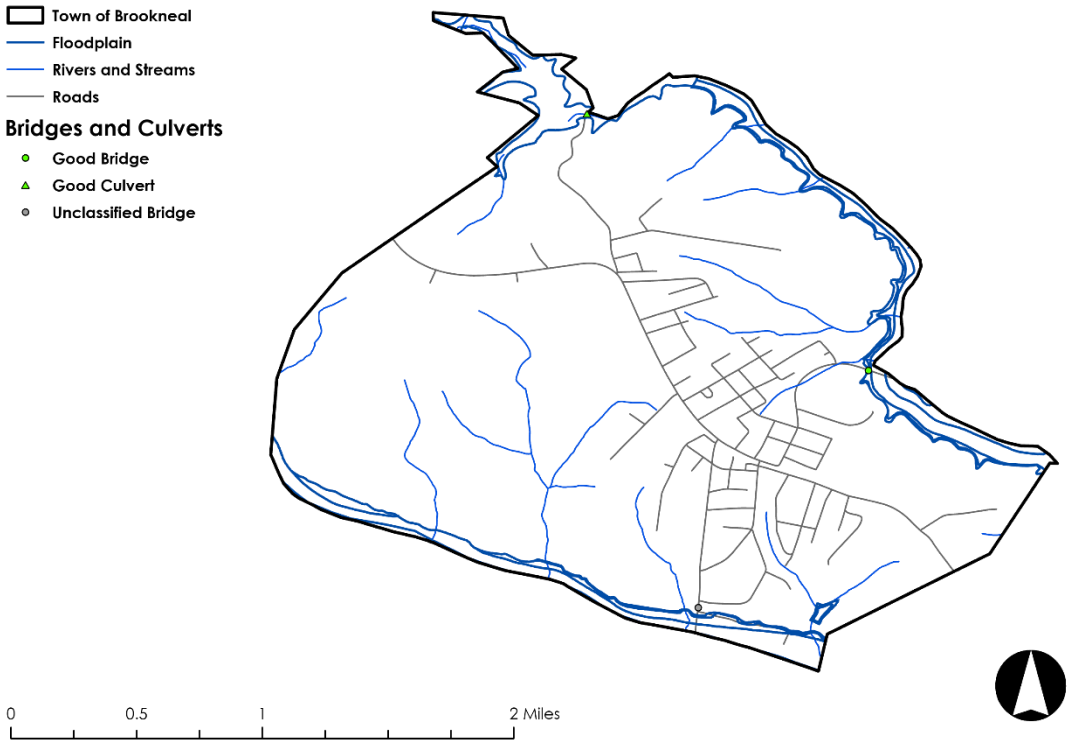


Figure 62 Town of Bedford Culvert and Bridge Assessment (VDOT)

Dam Inundation

The largest concern with the few dams near the Town of Brookneal (34 total, with 3 classified as high or high-special hazard potential and 22 unknown) are the homes, businesses, important thoroughfares and other transportation assets, and critical infrastructure assets in the Dam Break Inundation Zone (DBIZ).

[33] VDOT Condition Portal Data

These include potential impacts to several historic sites, water treatment plants with associated pump stations in the Town's incorporated area, nuclear facility property in dam breach maximum inundation area, several residences and businesses within the maximum inundation area, and many roads and road-stream crossings such as bridges and culverts. In the Town of Brookneal, potential impacts include two historical sites, a communications facility, and water treatment plants with associated pump stations. Some of these facilities are listed in the table below.[34]

Facility Name	Address	Facility Type	Flood Zone
WODI - AM - The Rain Broadcasting, Inc.	1230 Radio Road Brookneal	Communication Facility	1%; 0.2%
Cat Rock Sluice	General Location, Brookneal	Historic Site	1%; 0.2%
Brookneal Town - Falling River	Wickliffe Ave, Brookneal	Wastewater Treatment Plant	1%; 0.2%
Brookneal Town - Staunton River ***	Radio Rd, Brookneal	Wastewater Treatment Plant	1%; 0.2%

Table 13 Critical facility and infrastructure in floodplain of Brookneal CVPDC HMP Update

[34] Source: CVPDC 2020 HMP

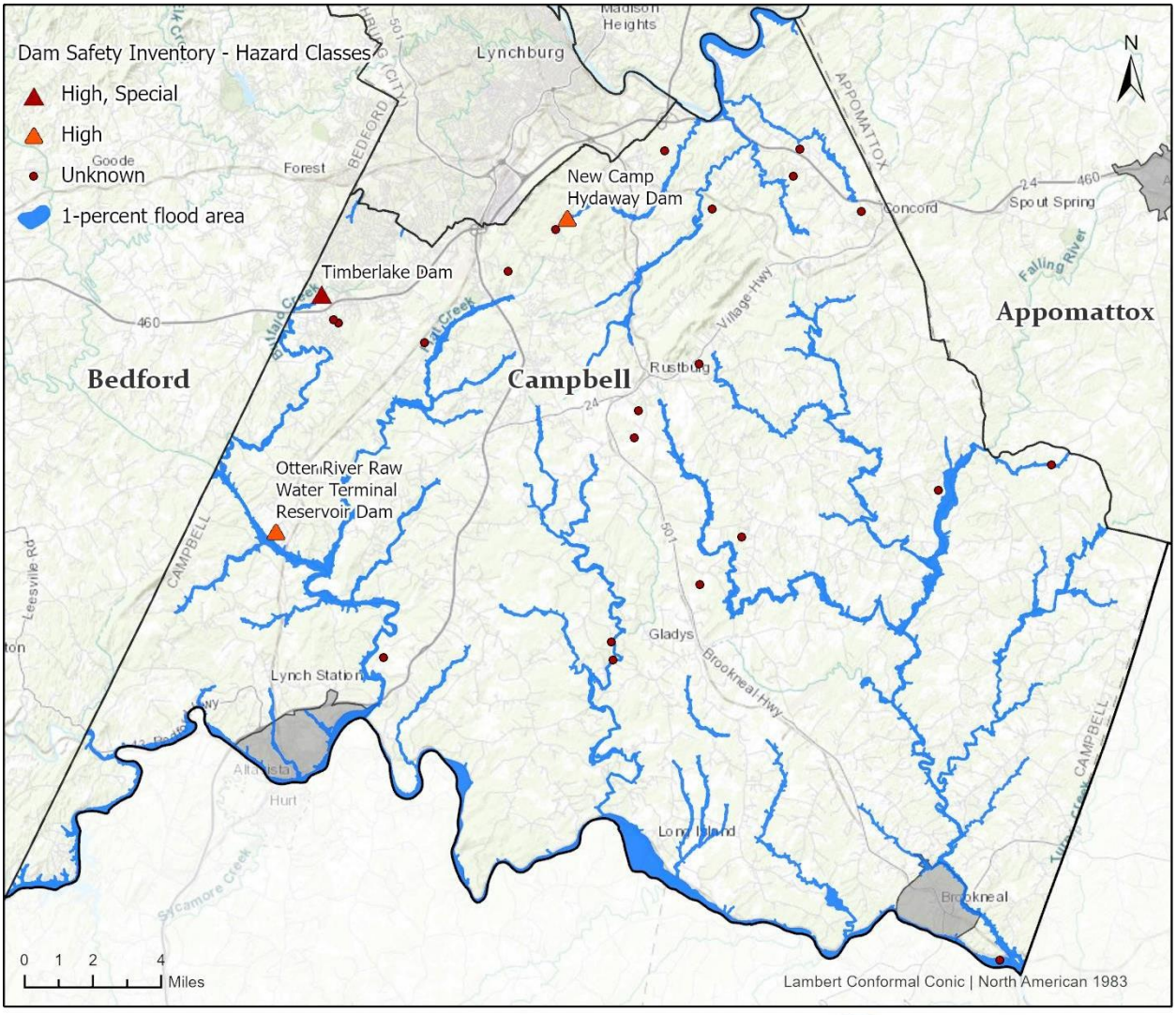


Figure 63 Dams in Campbell County, VA, VA Dam Safety Inventory System, Center For Geospatial Technology at Virginia Tech, CVPDC HMP 2020

Extreme Heat

Using an existing weather station at the Lynchburg Regional Airport (LYNCHBURG REG AP), it is possible to view observed temperature averages from 1950 – 2013 for the area.

In the graph below, it is possible to view observed days per year exceeding 95 degrees Fahrenheit from 1950 – 2013 for Campbell County. The bars are representative of the observed days, either a positive or negative number, above 95 degrees. Generally, while the range of exceedance events is variable, a trend can be seen, especially from the year 2000 onwards where average temperatures clearly exceeded the average.

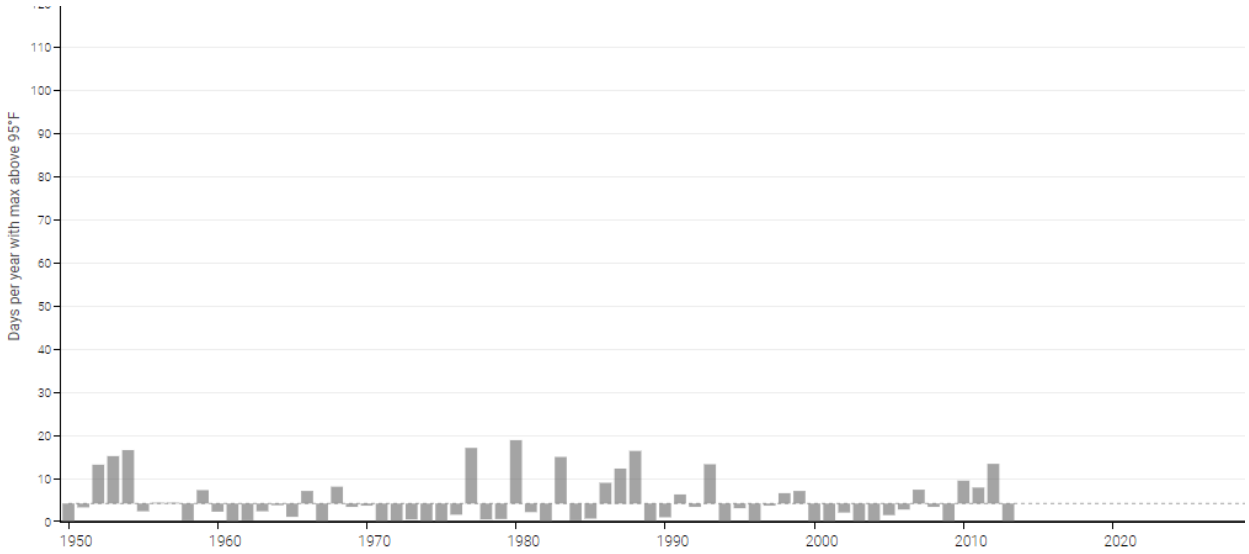


Figure 64 Campbell County Days per year with temperature > 95 degree F observed average, US National Climate Toolkit

Future Community Conditions

Flood

The potential risks of climate change can have broad effects on communities in Community, including on its public health, infrastructure, agriculture, tourism, and emergency services. The Town of Brookneal (and the CVPDC region in general) should expect the following in the future:

- More frequent, and more intense, precipitation events punctuated by deeper episodes of drought.
- Drier winter and summer seasons, which could deplete reservoirs and challenge drinking water supplies and agricultural production.
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According to the NOAA Mid-Atlantic RISA projections,[35] The Town of Brookneal can expect to see some more extreme variability in precipitation over the next 50 years, with some months seeing 15% less and some months seeing up to 40% more compared to the average from the years 1950-2000. In general, the entire Appalachian and Piedmont regions can expect mild 1-2% average increases in rainfall compared to the past 30 years' average.[36]

[35] Mid Atlantic Regional Assessment, https://www.midatlanticrisa.org/data-tools/climate-data-tools/projected-changes-in-total-monthly-precipitation.html
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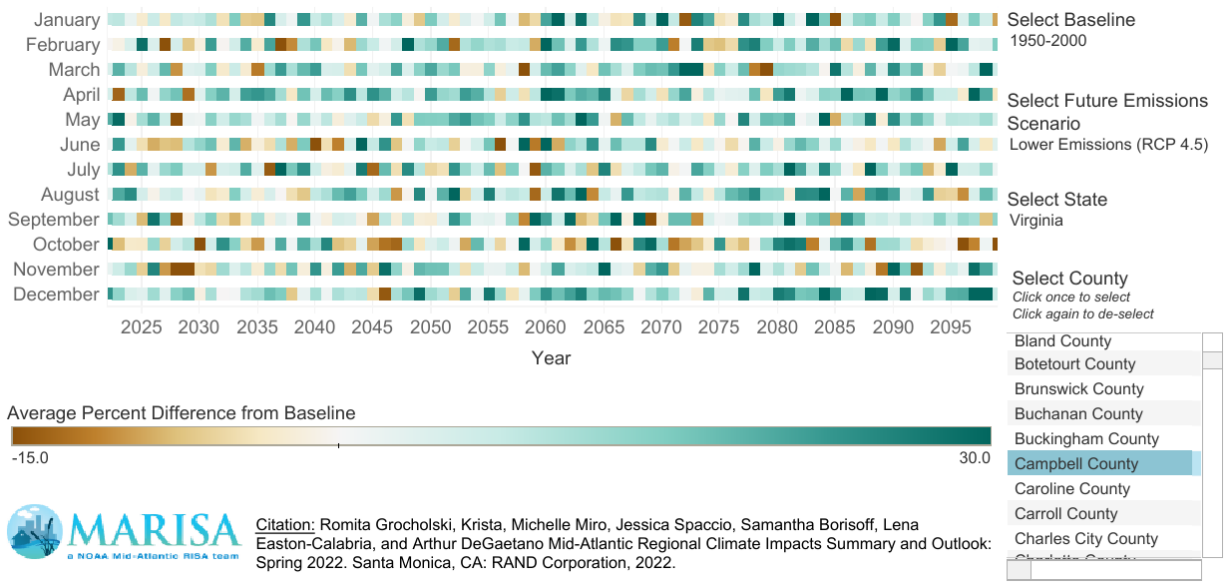


Figure 65 Projected percent difference in total monthly precipitation compared to 1991-2020 Baseline, MARISA

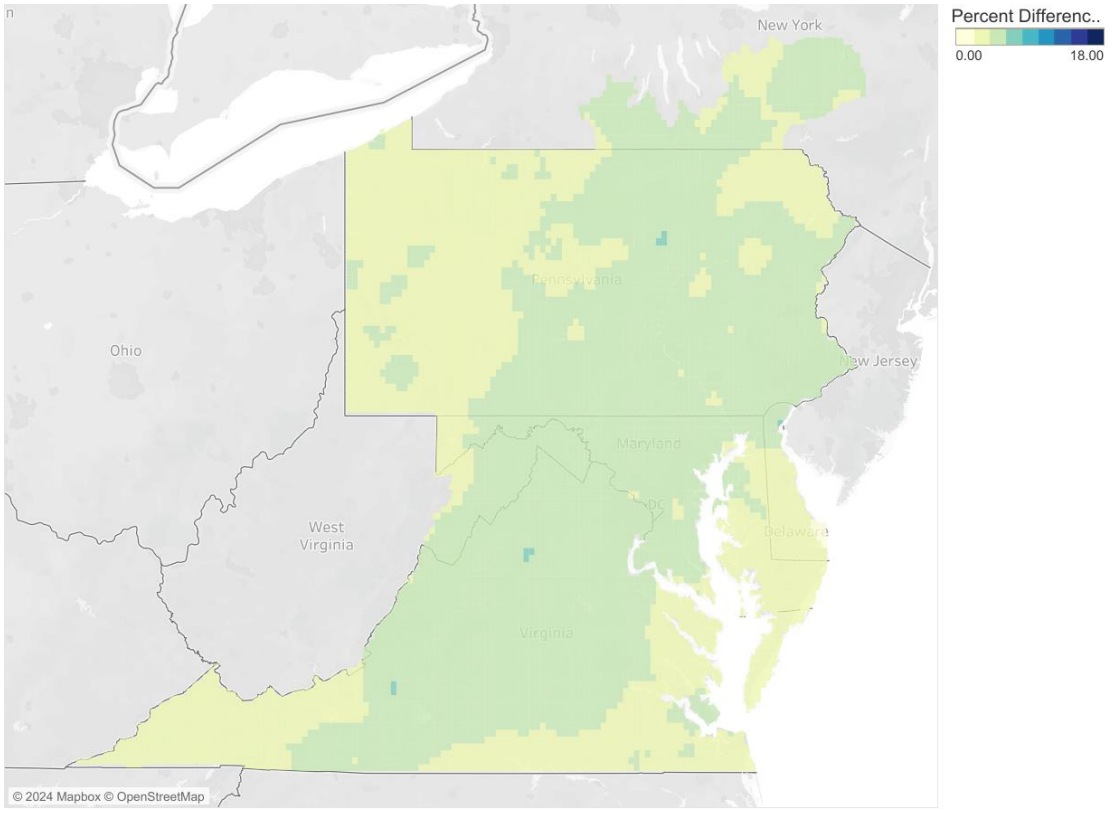


Figure 66 1981-2010 "Normal" Total Annual Precipitation, MARISA

Heat

In The Town of Brookneal , the average daily temperature is expected to increase, as well as extreme temperatures on the hottest days of the year. This excess heat for longer periods may stress critical infrastructure such as roads and bridges. More hot days may also stress the electrical grid and the use of potable water may increase as people may need more irrigation for crops and landscaping. This type of heat may affect public health and may lead to economic impacts through disruptions in agriculture and manufacturing. Human health, stream and river health, and infrastructure are all threatened by higher temperatures.

At 95°F, it is hard to keep indoor areas and our bodies cool. Altavista's summers are getting hotter. On average, the Town sees 4 days per year in excess of 95°F.1 Within the next 50 years (by 2070), the Town of Brookneal can expect a yearly average of 25 to 47 days above 95°F, with associated increases in cooling costs, reduced air quality, and heat-related illnesses. It is imperative that the Town begin planning for more days of extreme heat and look for ways to lessen the public health effects, especially on vulnerable populations.

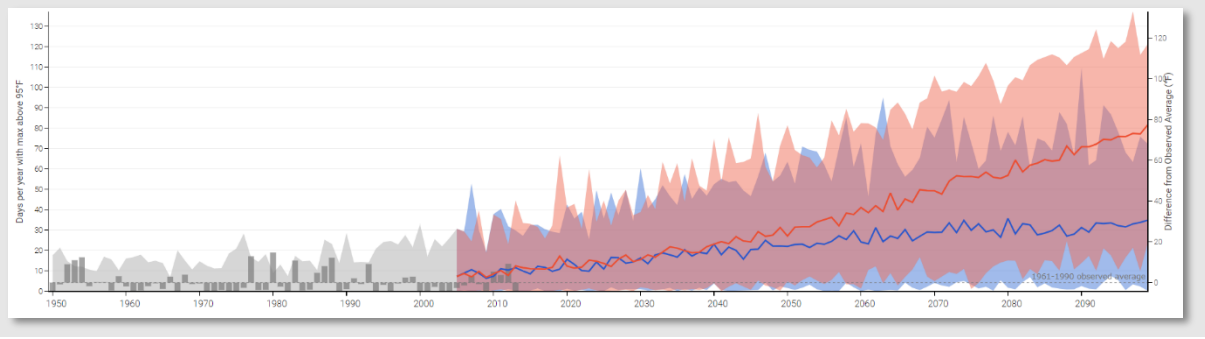


Figure 67 Days w/ maximum temp > 95°F (U.S. Climate Resilience Toolkit Climate Explorer)

General Flood and Heat Resilience Policies and Actions

1. Prioritize vacant tracts of land for conservation and recreational open space in floodplains and apply for grant funding to acquire these properties or work with partners who can acquire them. (See Appendix A for more detail on grant funding)
2. Incentivize and/or develop stormwater regulations and the use of green infrastructure in residential areas.
3. Work with VDOT, CVPDC and others to develop a debris management strategy for the Town.
4. Work with VDOT and CVPDC to identify stormwater infrastructure priorities on state roads.
5. Develop targeted outreach before and during the summer months to inform the public of anticipated heat waves and ways to stay safe.
6. Develop a debris management strategy or plan with Campbell County.

Prioritized Flood Resilience Strategy

- ❖ Evaluate and execute retrofit measures to reduce service disruption and facility damage to the Town's water and sanitary sewage systems (Score 65)

For a full explanation of the Prioritized Resilience Strategy Matrix, see Page 36, Prioritizing Resilience Projects. For the full suite of resilience strategies and rankings by locality, see Appendix A.

Town of Brookneal

65 Action Score

Retrofit water and sanitary sewage facilities

Action Description

Evaluate and execute retrofit measures to reduce service disruption and facility damage to the Town's water and sanitary sewage systems.

Key Steps for Implementation

1. Conduct a site scale vulnerability assessment of water and sewer facilities and systems.
2. Determine priority needs for facility and infrastructure upgrades to enhance resilience.
3. Design adaptation measures to retrofit facilities.
4. Construct and implement adaptation measures.

Action Lead

Town of Brookneal Water and Sewer

Supporting Partners

- Virginia Department of Emergency Management (VDEM)
- CVPDC

Ease of Implementation

- ☑ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☐ Requires hiring a technical consultant.

Measures of Success

- Minimize utility service disruptions during and after climate-related events.
- Minimize damage at facilities due to climate-related impacts.
- Support continuity of services including operations and maintenance planning and power (back-up generator) at facilities.

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe	Cost*		*Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.
Short: 0-2 years	$: less than 10k	$$$$: 500k-2mill	
Medium: 3-6 years	$$: 10-50k	$$$$$: 2 mill+	
Long: 7+ years	$$$: 50-500k		

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

Resilience considerations for vertical infrastructure (facilities, buildings, above-ground assets) will differ from horizontal infrastructure (utility lines, sewer and water mains, sub-surface assets)

Co-Benefits & Equity Considerations

Considerations for continuity of services should include helping low-income residents keep their utilities on during the winter months or duing heat waves if they have difficulty paying utility bills.

Cost

$$$$$

1. Vulnerability Assessment:75,000-200,000 (dependent on number of assets)
2. Development of retrofit and adaptation measures: 100,000-200,000 (dependent on number of assets)
3. Design of retrofit or adaptation measures: 175,000-300,000 (dependent on scope of designs)
4. Construction of adaptation measures: 1,000,000-2,000,000 (dependent on extent of construction)

Possible Funding Sources

VA DCR, Dam Safety and Flood Prevention and Protection Assistance
Federal Emergency Management Agency

Brookneal, VA

Campbell County, VA

Cambell County sits at the foothills of the Blue Ridge Mountains and is located within the southern portion of the CVPDC region. This county, which is just over 500 square miles in size, is bounded to the north by the City of Lynchburg, to the east by Appomattox and Charlotte Counties, to the south by Pittsylvania and Halifax Counties, and to the west by Bedford County. Within Campbell County are the Towns of Altavista and Brookneal, which are included as separate sections in the CVPD Flood Resilience Plan. Besides the Blue Ridge Mountain foothills, other notable geographic features of the County include the James River and the Roanoke (Staunton) River.

The most common job sectors worked by residents of Campbell County include Production Occupations, Office and Administrative Support Occupations, and Management Occupations (source).

Community and Social Assets

Campbell County, situated in the central part of the state, encompasses a mix of rural and suburban areas. Historically, agriculture has played a significant role in the local economy, but over the years, there has been a gradual shift towards a more diversified economic landscape. The county seat is the town of Rustburg, which serves as a hub for local government and administrative functions. The County has a somewhat diverse demographic profile; with racial makeup: 83.24% White, 14.71% Black or African American, 0.19% Native American, 0.62% Asian, 0.01% Pacific Islander, 0.33% from other races, and 0.90% from two or more race.[37]

Vulnerable Populations

While resilience is important throughout the County and region, there are several census tracts in Campbell County that qualify as Low to Moderate Income based on 2020 census data. The definition of Low-to-Moderate Income (LMI) means any census tract (or equivalent geographic area defined by the Bureau of the Census) in which at least 50% of households have an income less than 60 percent of the Area Median Gross Income (AMGI), or which has a poverty rate of at least 25%. Campbell County contains multiple LMI census tracts which can be seen in Figure X below. There may also be a significant portion of elderly or mobility limited persons in the County, especially in the more rural area.

As defined in the 2023 CFPF Manual, "Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. These areas are eligible to apply for CFPF funding with as little as 10% matching funds.

[37] 2020 US Census Data

Another factor in measuring vulnerability is the Social Vulnerability Index. SVI indicates the relative vulnerability of every U.S. Census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. SVI ranks the tracts on 15 social factors, including unemployment, minority status, and disability, and further groups them into four related themes. Thus, each tract receives a ranking for each Census variable and for each of the four themes, as well as an overall ranking. Projects and studies in areas with a higher SVI will receive prioritized rankings for CFPF funding. See Appendix E for more information on the Social Vulnerability Index and other information related to vulnerable communities.

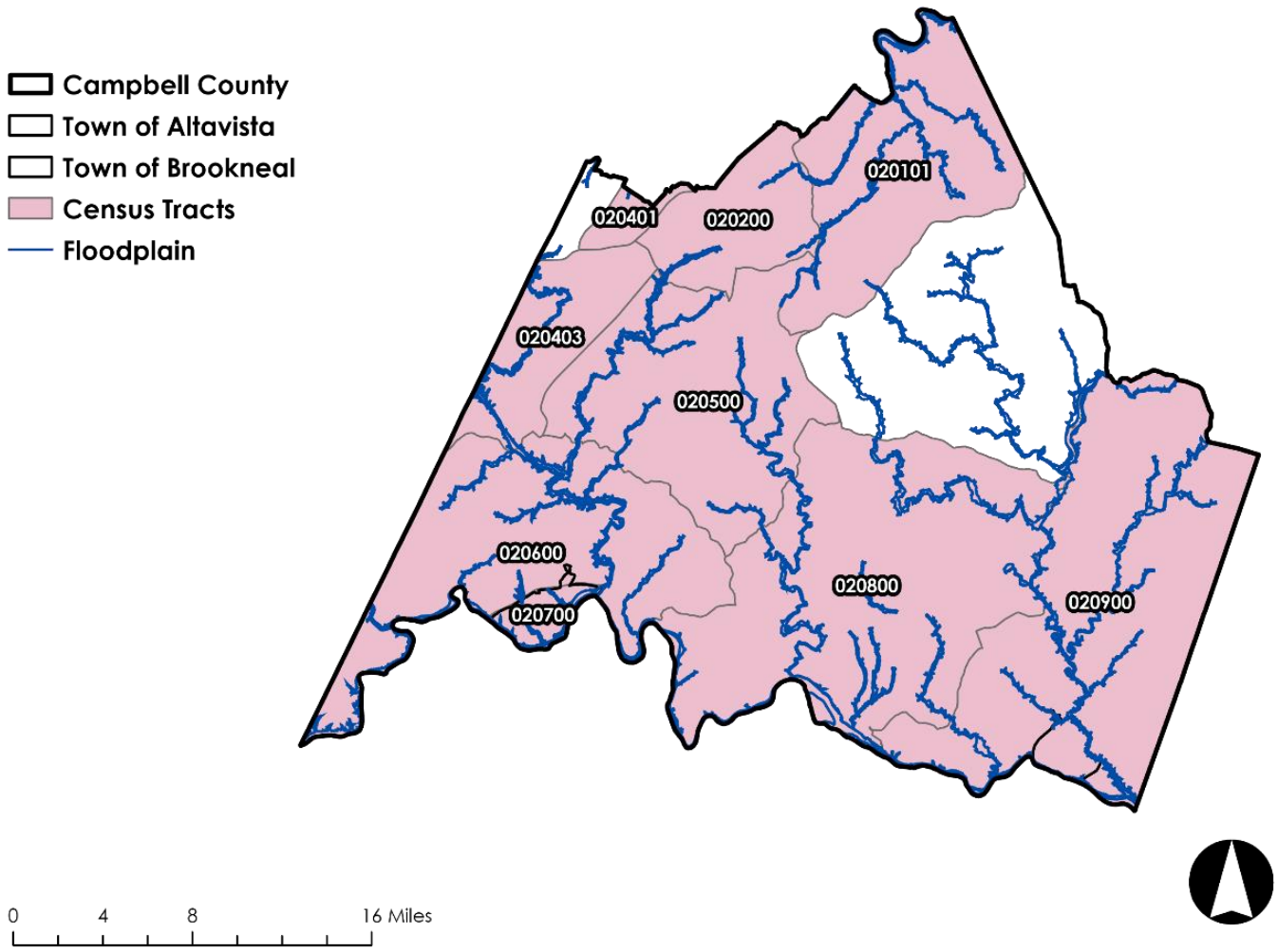


Figure 68 Census tracts with designated income levels at or below 80% of Area Median Income Levels (2020 US Census Data)

Natural Assets

Conservation Lands

Campbell County is home to several conservation and park areas that showcase the region's environmental diversity and offer a variety of outdoor experiences. English Park is situated along the Roanoke River within the Town of Altavista and includes roughly 160 acres of protected and public space. Other notable parks and protected lands include the Abbott Duncan Recreation Fields, Countywide Park, Long Island Park, Long Mountain Park, S.R. Bryant Memorial Greenway, and Timbrook Park. These conservation efforts reflect Campbell County's commitment to maintaining a delicate balance between recreation, education, and environmental preservation.

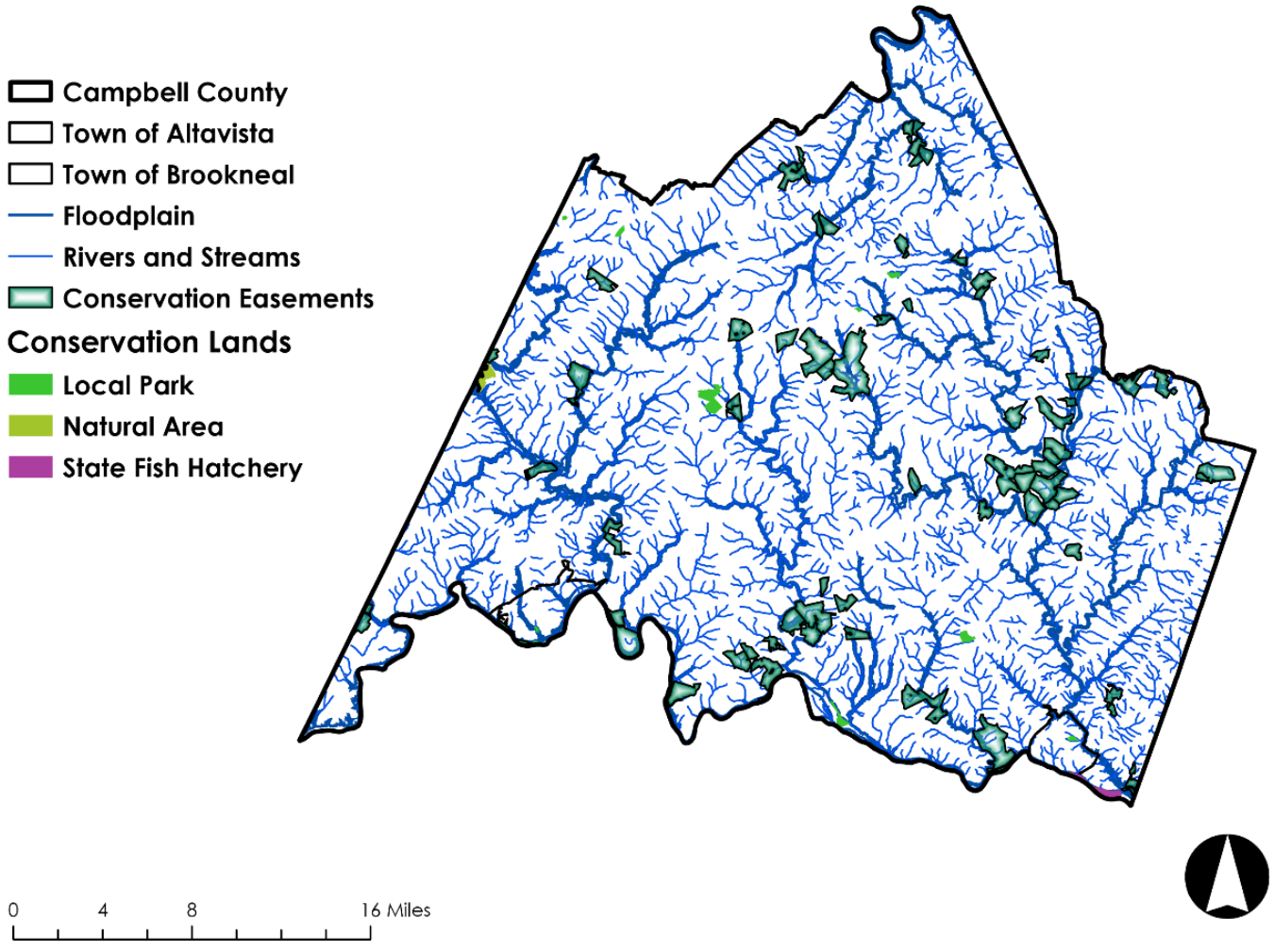


Figure 69 Conservation Lands overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

Ecological Cores

Ecological cores are patches of natural land with at least 100 acres of interior cover which provide habitat for a large variety of species, including forest, marsh, and maritime dependent species. The Virginia Natural Landscape Assessment (VaNLA) provides an analysis that has identified, prioritized, and linked, using satellite data, the important land networks throughout Virginia. Preserving and maintaining these landscapes can help ensure they continue to provide ecosystem services such as cleaner air and water filtration. Ecological cores can also provide recreational opportunities and open space resources. The following map shows which areas of the counties and cities within Campbell County contain ecological cores. A higher rating (with red being the highest) indicates the amount of ecosystem services that ecological core provides. Examples of ecological services that cores provide include wildlife and plant habitat, biodiversity conservation, water resource protection, erosion control, and carbon sequestration. Campbell County should have strategies to preserve ecological cores, such as using them as park lands for low-impact recreation (hiking, bird watching, etc.) and other conservation efforts. These areas have been overlaid on the Campbell County floodplain to understand where conservation lands may also offer flood reduction benefits. The acquisition of these areas should be a priority for flood reduction.

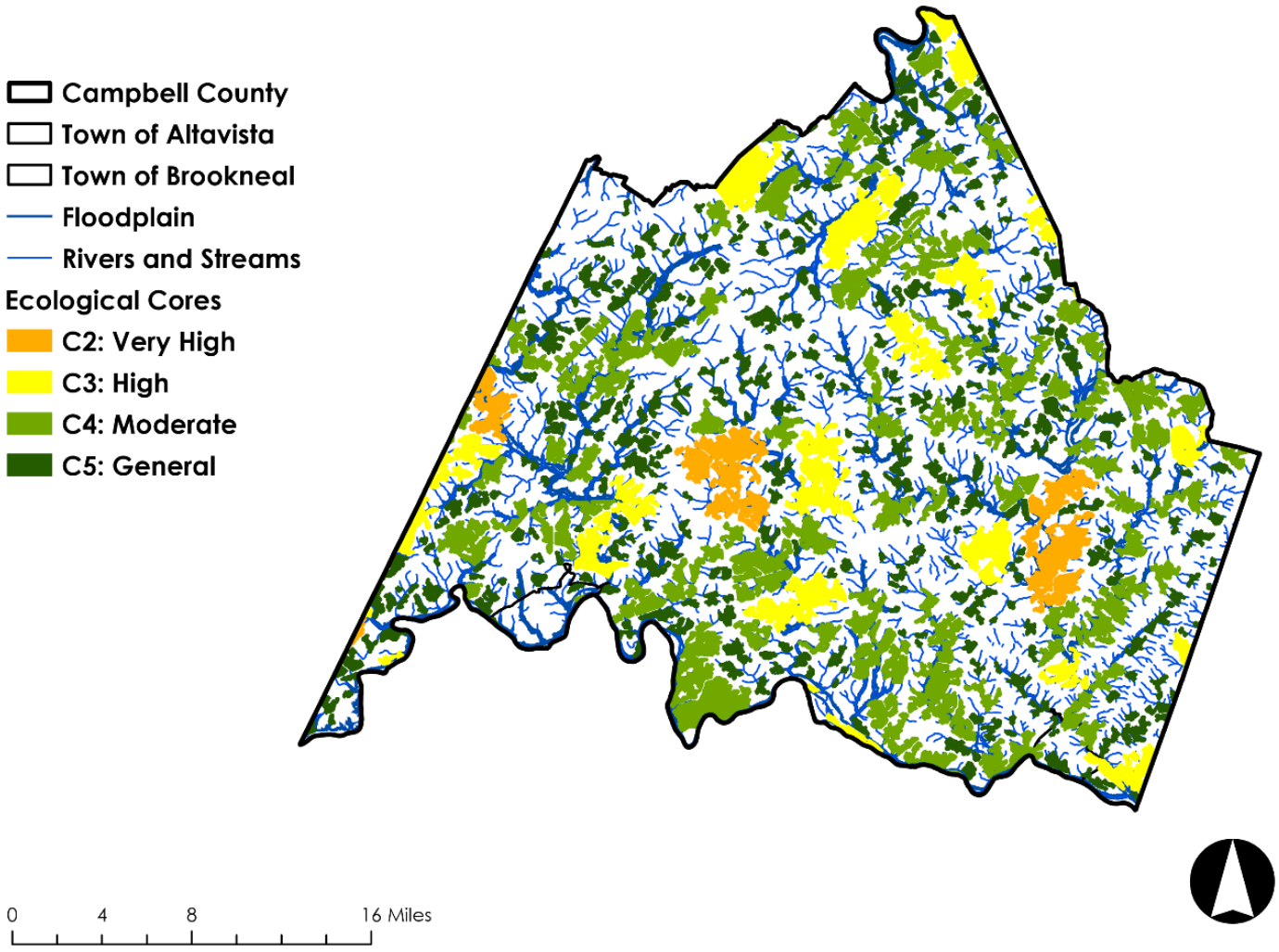


Figure 70 Ecological Cores overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

Flooding and Built Assets - Critical Facilities and Infrastructure

Critical facilities encompass a range of infrastructure components that are essential for the functioning of a society, economy, or community. These facilities are vital for maintaining public health, safety, and well-being. Some types of infrastructure that occur in Campbell County and are commonly considered critical include energy Infrastructure, transportation Infrastructure, water, and wastewater Infrastructure, hospitals and healthcare facilities, police stations, fire stations, and emergency response centers.
The 2020 CVPDC Hazard Mitigation Plan Section 4.3 Flooding, contains a thorough evaluation of FEMA floodplains, critical infrastructure, roads, and bridges in the floodplain for each locality in the CVPDC region. For specific lists, maps, and related information for Campbell County, see *Appendix B, 2020 CVPDC HMP Maps and Data*.

Building on the information generated, and through locality interviews, there are numerous critical pieces of infrastructure that are in the floodplain and therefore susceptible to flooding. The following critical facilities are located in the floodplain and were specifically mentioned in the 2020 CVPDC HMP

Facility Name	Address	Facility Type	Coordinates	Flood Zone
Leesville Hydro Plant	Rt. 754, Hurt	Energy Facility	37.0931, -79.4022	1%; 0.2%
Lynchburg Casting Industries	1132 Mt Athos Rd, Lynchburg	HazMat Facility	37.4027, -79.0595	1%
Harpers Mill	General Location, Brookneal	Historic Site	37.0436, -78.9599	1%; 0.2%
Six Mile Bridge	Mount Athos Rd & James River, Lynchburg	Historic Site	37.3932, -79.0612	1%; 0.2%
Campbell Co Util And Serv Auth/Sewer Pump Station	9625 Leesville Rd, Evington	Sewer Pump Station		1%; 0.2%
Flat Creek Pump Station	13238 Wards Rd N, Lynchburg	Sewer Pump Station	37.3096, -79.1831	1%; 0.2%

Table 14 Critical facility and infrastructure in the floodplain of Campbell County (2020 CVPDC HMP)

The Campbell County Utility and Service Authority and Flat Creek Pump Station were specially mentioned in community interviews. According to the locality staff, the most critical piece of infrastructure located in the floodplain, the Campbell County Utility and Service Authority Plant (Rustburg Wastewater Treatment Plant), is the most vulnerable to flood events. The plant is associated with several retention ponds which lie in close proximity to the creek. During intense rainfall, the creek will overflow its banks, fill the ponds, and potentially contaminate the creek, and cause excess water treatment. This is also the main plant operated in the County and serves the entire village of Rustburg.

Transportation infrastructure is composed of Virginia Department of Transportation managed roads and bridges, a major railroad traversing North/South, and the Lynchburg International Airport. The 2020 HMP contains a thorough list of roads and bridges most susceptible to flooding. *For a complete list of roads and bridges most susceptible to flooding see CVPDC Hazard Mitigation Plan 2020 Update Flooding; Page 4-39 – 3-40*. Stormwater infrastructure maintenance and repair should be a priority for these roads and can be prioritized for future funding and coordination with the Virginia Department of Transportation. The map below illustrates real time data from the Virginia Department of Transportation. on the condition of bridges and culverts. Overlaid on the floodplain, rivers and streams, Campbell County, CVPDC and VDOT can work together to upgrade the “Poor” infrastructure first to avoid flood related damages and impacts to the surrounding areas.

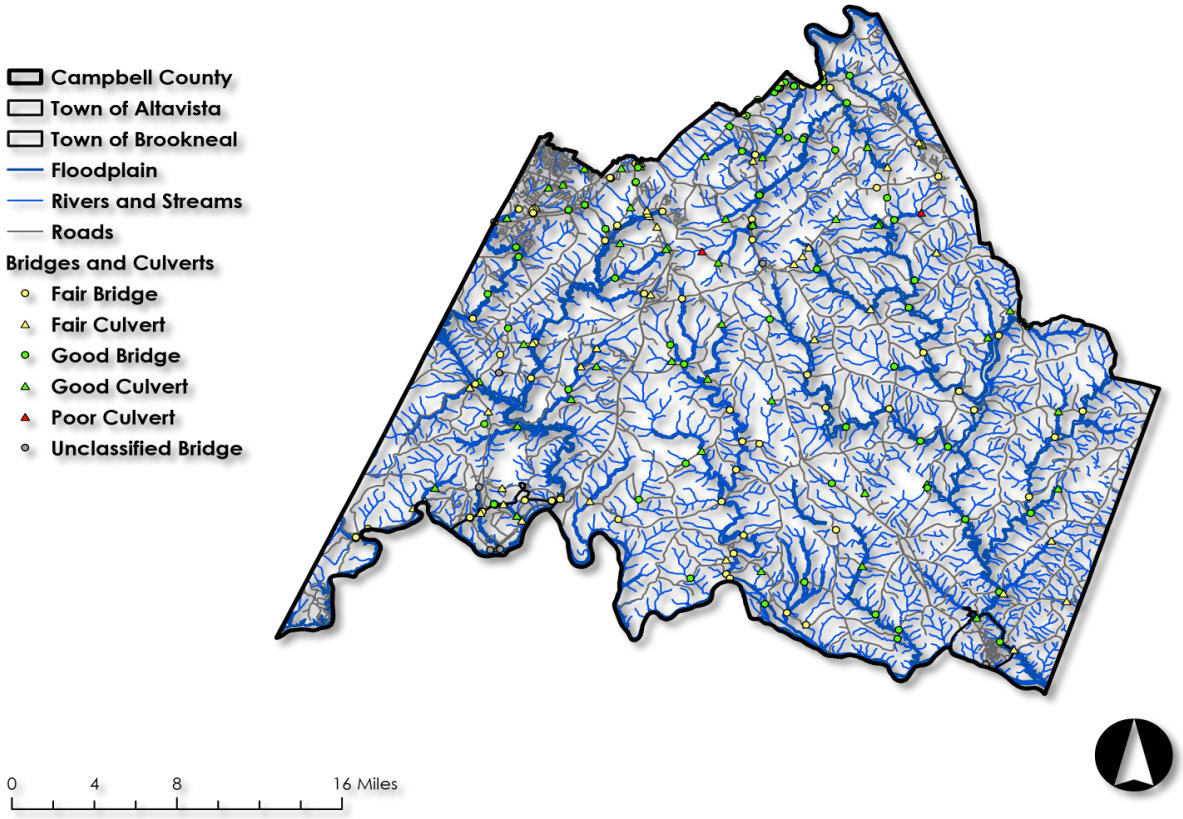


Figure 71 Bridge and culvert condition assessment (VADOT) as of March 2024

Top Poor Rated Bridges	Top Poor Rated Culverts
N/A	SC-622E/W and Depot Road
	SC-658N/S and Toll Gate Road

Table 15 Top Poor Rated Culverts in Campbell County

Campbell County is generally affected most by precipitation that results in streams and rivers overtopping banks (riverine flooding) and rainfall events that leave standing water in areas that are dangerous. The map above illustrates where standing water is a problem and has resulted in a motor vehicle accident. Upgrading roads and stormwater infrastructure should be prioritized in these areas to prevent further accidents.

Flooding and Related Hazards

Areas of Known Flooding

Repetitive loss properties and severe repetitive loss properties are important to understand as part of a community's overall flood resilience. As stated in the HMP, *"The identification of repetitive loss properties is an important element to conducting a local flood risk assessment, as the inherent characteristics of properties with multiple flood losses strongly suggest that they will be threatened by continual losses. Repetitive loss properties are also important to the NFIP, since structures that flood frequently put a strain on the National Flood Insurance Fund."*[38] Campbell County unincorporated does not have any repetitive loss properties as they are identified in the Town of Altavista.

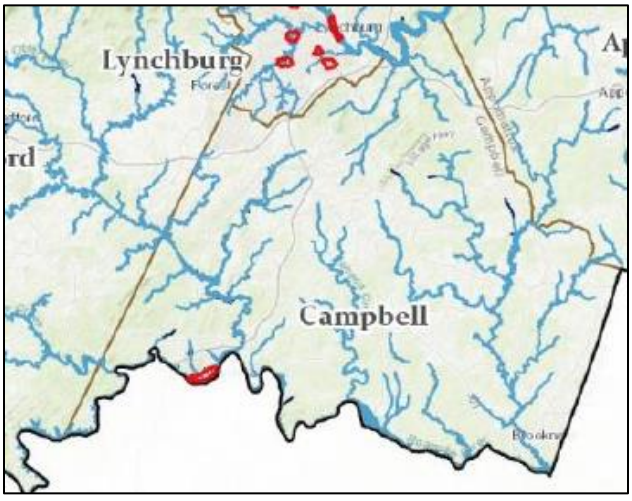
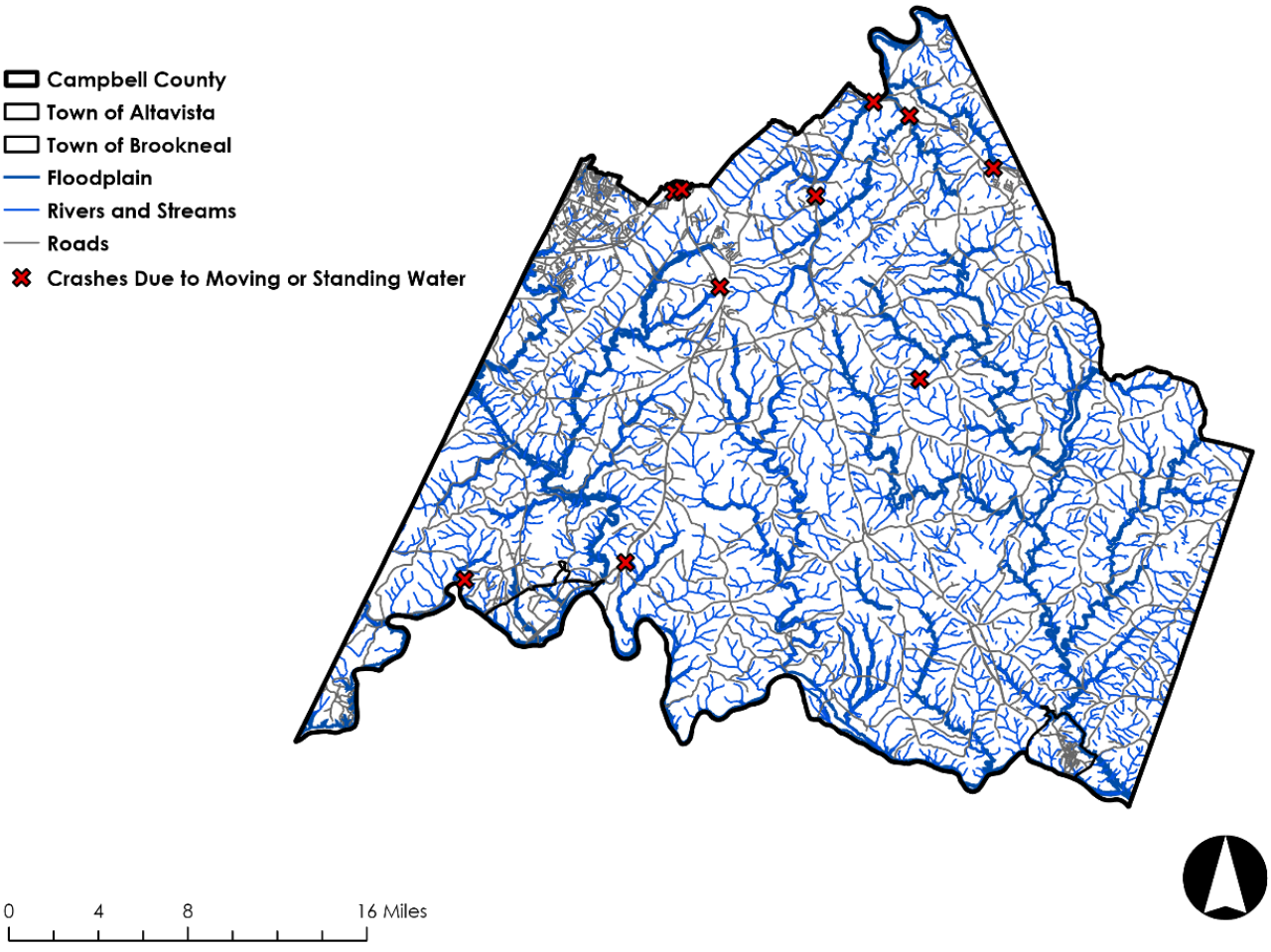


Figure 72 Campbell County repetitive loss areas (2020 CVPDC HMP)

This flood resilience plan builds on the flood risk assessment performed in the CVPDC HMP update and adds more localized information mainly heard through community interviews and available public data sets. Flooding is most often associated with storm events that bring large amounts of rainfall to the area, swelling rivers and tributaries beyond their banks. Topographical features, soils, and development patterns also play a part in flooding; and the interaction between these geophysical elements can affect how water moves through the landscape.

Figure 73 (below) represents vehicle crashes due to standing water on roadways reported from VDOT. Figure 74 combines this crash data with information received through community interviews about known

[38] The 2020 CVPDC Hazard Mitigation Plan Update



locations of flooding in the community. Specifically, there are areas off Waterlick Road in the neighborhood containing Brooklawn Drive and Woodlawn Circle, that flood frequently. The increased development in this area is changing watershed parameters and could cause more severe flooding in the future [39]. Further studies can be initiated in the area to understand the underlying hydrology and identify potential solutions to recurrent flooding.

Figure 73 Vehicle crashes on roadways with standing water, VDOT as of March 2024

[39] FEMA, 2019

5 Most Recent Crashes Due to Standing Water	Roads or Location	Date
1	Route 460	12/17/2015
2	Route 460	10/11/2018
3	Route 43	11/15/2018
4	Route 460 Richmond Highway	4/13/2020
5	Route 29	8/10/2021

Table 16 Most recent vehicle crashed due to standing water, VDOT, April 2024

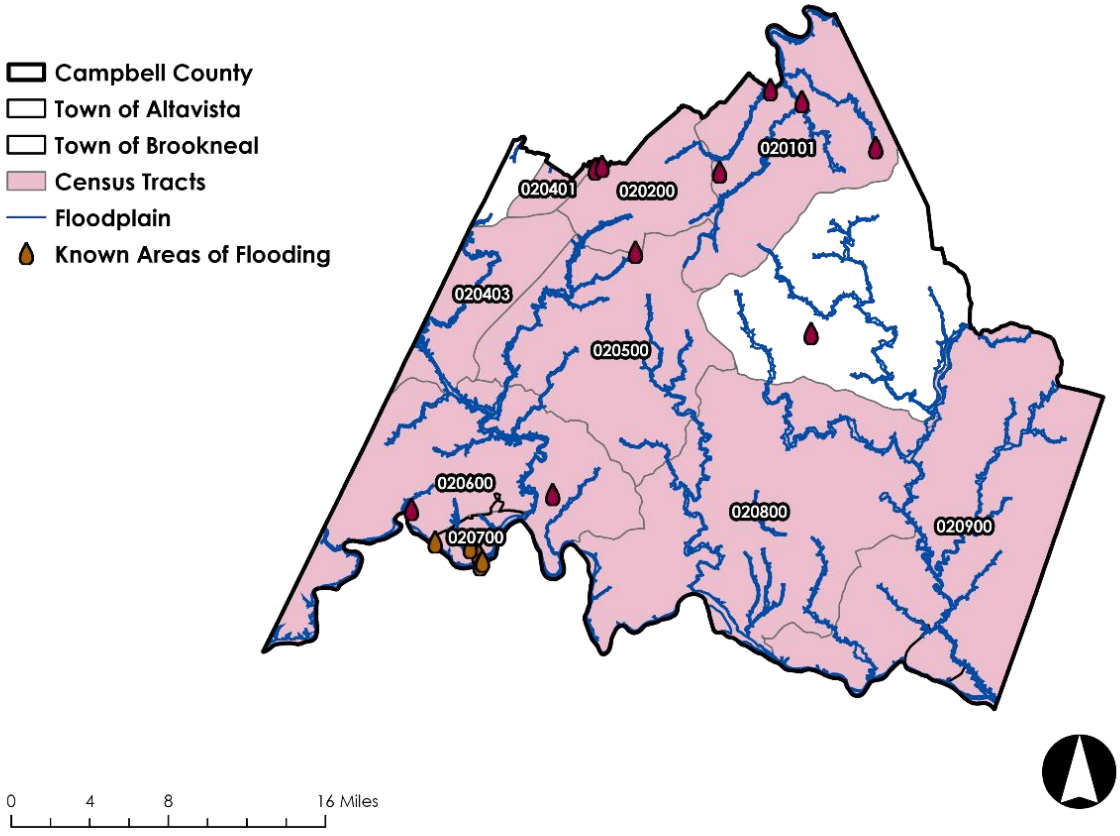


Figure 74 Areas of known flooding as heard through community interviews, March 2024.overlaid on Low to Moderate Income census tracts, Census data 2020.

Dam Inundation

The largest concern with the dams in Campbell County (34 total, with 3 classified as high or high-special hazard potential and 22 unknown) are the homes, businesses, important thoroughfares and other transportation assets, and critical infrastructure assets in the Dam Break Inundation Zone (DBIZ). These include potential impacts to several historic sites, water treatment plants with associated pump stations in the county's incorporated area, nuclear facility property in dam breach maximum inundation area, several residences and businesses within the maximum inundation area, and many roads and road-stream crossings such as bridges and culverts. Many of the County's assets are located In the Town of Altavista and the Town of Brookneal. While these are discussed in more detail in those sections associated with the Towns, it is relevant to include them here. Potential impacts include the Altavista Power Station, Altavista Fire Company, Altavista Area YMCA Family Center, Altavista Wastewater Plant, the Altavista Power Station, and several hazmat facilities. In the Town of Brookneal, potential impacts include two historical sites, a communications facility, and water treatment plants with associated pump stations. Some of these facilities are listed in the table below.[40]

Facility Name	Facility Type	Address	Coordinates	Floodplain	Inundation Zone
Avoca Museum	Attractions	1514 Main St, Altavista	37.1300, -79.2697	No	Smith Mountain Dam
WODI - AM - The Rain Broadcasting, Inc.	Communication Facility	1230 Radio Road Brookneal, VA 24528	37.0384, -78.9420	1%, 0.2%	Smith Mountain Dam
Altavista Power Station	Energy Facility	104 Wood Lane, Altavista	37.1188, -79.2735	No	Smith Mountain Dam
Leesville Hydro Plant	Energy Facility	Rt. 754, Hurt	37.0931, -79.4022	1%, 0.2%	Smith Mountain Dam
Altavista Fire Company	Fire Stations	1280 Main Street, Altavista	37.1199, -79.2755	No	Smith Mountain Dam
Lane Home Furnishings	HazMat Facility	701 5Th St, Altavista	37.1097, -79.2855	1%, 0.2%	Smith Mountain Dam
Abbott Laboratories - Ross Products Division	HazMat Facility	1516 Main St, Altavista	37.1333, -79.2658	No	Smith Mountain Dam
BGF Industries	HazMat Facility	401 Amherst Avenue, Altavista	37.1122, -79.2782	1%, 0.2%	Smith Mountain Dam

[40] Source: CVPDC 2020 HMP

Dominion - Altavista Power Station	HazMat Facility	104 Wood Lane, Altavista	37.1187, -79.2734	No	Smith Mountain Dam

Table 17 Critical facilities in the floodplain of Campbell County, VA, CVPDC 2020 HMP

The DBIZs are mapped for the high-hazard dams: New Camp Hydaway Dam, the Otter River Dam, and the Timberlake Dam. It is unknown whether significant vulnerable and minority populations would be affected by dam spillovers in Campbell County, but many critical roads would need to be closed or might be washed away entirely, impeding travel and egress. The map of dams of known and unknown hazard potential are shown in the map below.

Importantly, the New Camp Hydaway Dam is now operational. During the development of this resilience plan, in August 2023, the Timberlake Dam went into stage 2 and was flowing at 24" above the dam for approximately 24 hours. At 16" above dam level, VDOT closes Route 460, rerouting must then occur which has impacts on the community. There are other relevant downstream issues related to the Timberlake Dam that need to be addressed and coordinated. Some of them are:

- Sediment flows into Timberlake via the 460 Timberlake Rd Interchange;
- Clogging and failure of stormwater infrastructure; especially the box culvert under Old Plantation Road;
- Streambank erosion downstream from the 460 Timberlake Road interchange, taking down trees and adding sediment loads in the stream and also to Timberlake.

On the ground projects that address ongoing flooding, erosion and sedimentation issues near Timberlake and the 460 interchange need to be identified and funded for construction.

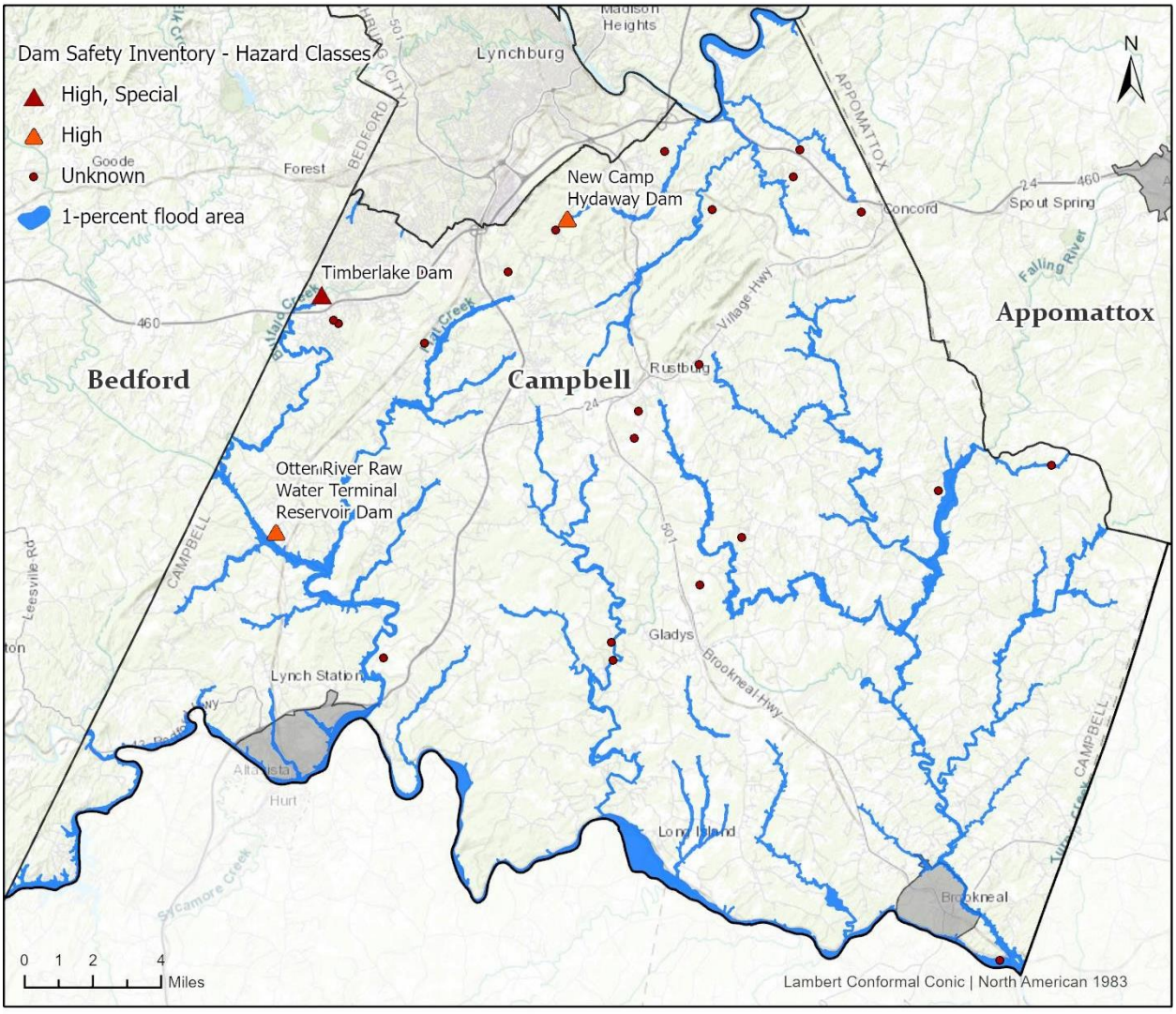


Figure 75 High and Unknown Hazard Dams in Campbell County, VA Dam Safety Inventory System, Va Tech Center for Geospatial Information Technology 2/2020

For a more thorough evaluation of the impacted geographies, structures, and critical assets in the Campbell County, and for the dam inundation zone maps for the referenced dams, refer to pp. 4-158 – 4-167 of the Central Virginia PDC 2020 Hazard Mitigation Plan Update.

Extreme Heat

Using an existing weather station at the Lynchburg Regional Airport (LYNCHBURG REG AP), it is possible to view observed temperature averages from 1950 – 2013 for the area. In the graph below, the horizontal line from which the bars extend up or down is the average observed temperature from 1961-

1990. Years when bars extend above the line were higher than the long-term average; years with bars that extend below the line were lower than average. While the range of exceedance events is variable, you can see a trend, especially from the year 2000 onwards, where average temperatures clearly exceeded the average.

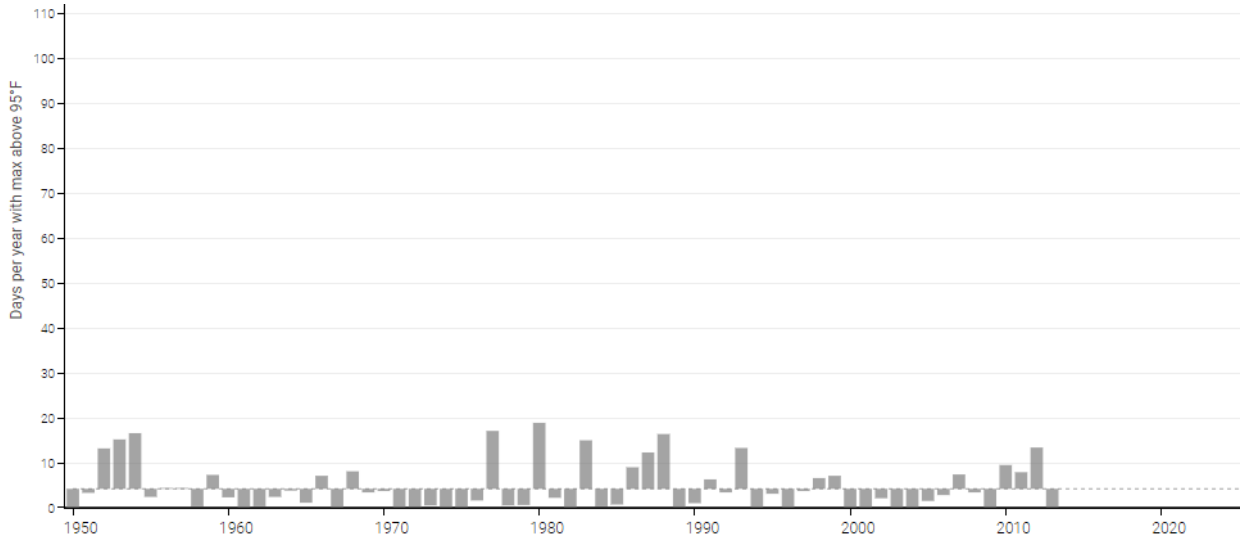


Figure 76 Days per year with temperature > 95 degree F observed average 1950- 2013, US National Climate Toolkit

Future Community Conditions

Flood

The potential risks of climate change can have broad effects on communities in Community, including on its public health, infrastructure, agriculture, tourism, and emergency services. Campbell County (and the CVPDC region in general) should expect the following in the future:

- More frequent, and more intense, precipitation events punctuated by deeper episodes of drought.
- Drier winter and summer seasons, which could deplete reservoirs and challenge drinking water supplies and agricultural production.
- Stronger storms at a greater frequency, which may threaten lives, damage infrastructure, and cause significant power outages.
- Increasing summer heat waves, which could threaten public health.

According to the NOAA Mid-Atlantic RISA projections,[41] Campbell County can expect to see some more extreme variability in precipitation over the next 50 years, with some months seeing 15% less and some months seeing up to 40% more compared to the average from the years 1950-2000. In general, the entire Appalachian and Piedmont regions can expect mild 1-2% average increases in rainfall compared to the past 30 years' average.[42] While it is difficult to know exactly how the County will be impacted, it is strongly encouraged to build in redundancy and extra capacity for stormwater and other water infrastructure to account for higher precipitation scenarios.

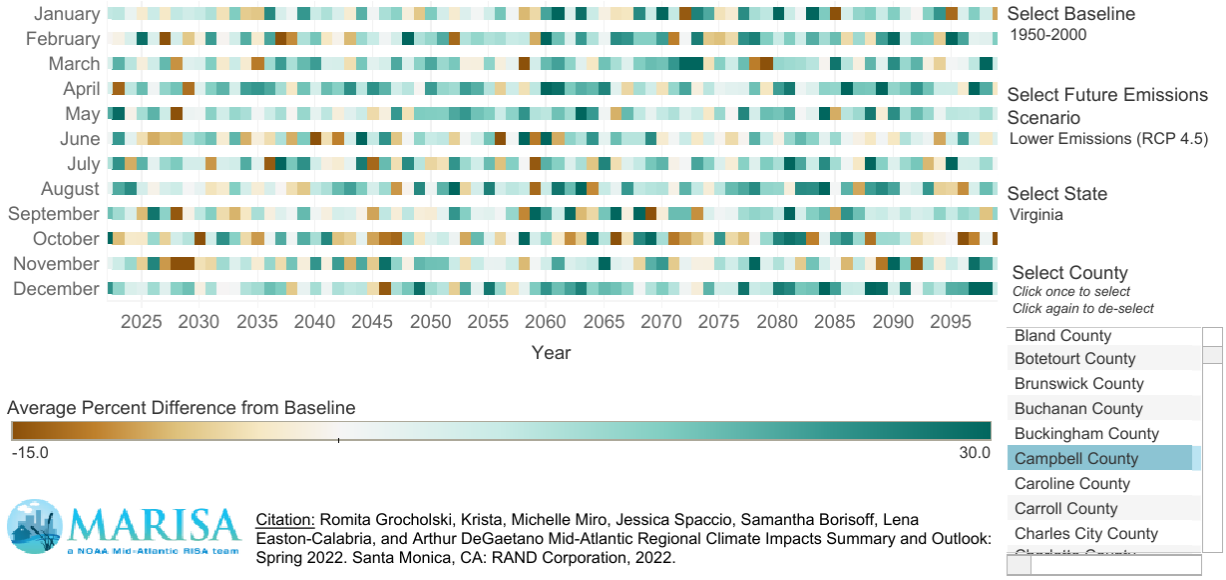


Figure 77 Projected changes in monthly precipitation compared to 1991-2020 Baseline, MARISA

[41] Mid Atlantic Regional Integrated Science Assessment, https://www.midatlanticrisa.org/data-tools/climate-data-tools/projected-changes-in-total-monthly-precipitation.html

[42] Mid Atlantic Regional Integrated Science Assessment, https://www.midatlanticrisa.org/data-tools/climate-data-tools/difference-from-normal-total-annual-precipitation.html

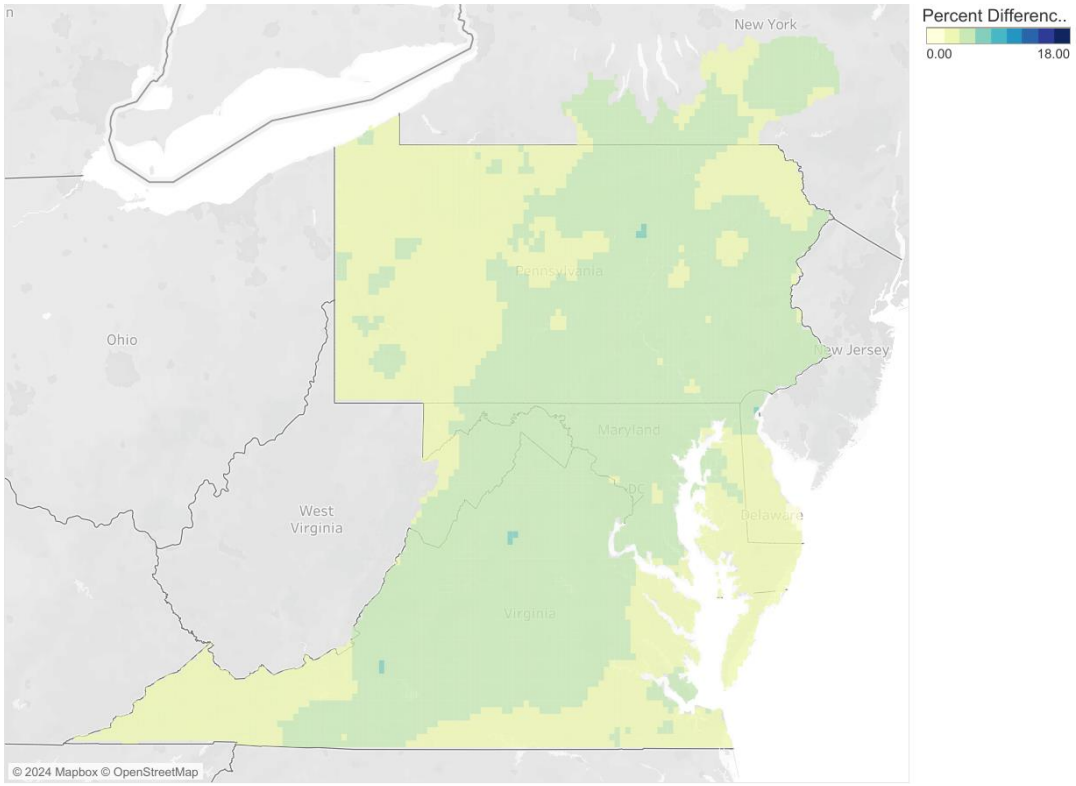


Figure 78 Projected percent difference in total monthly precipitation compared to 1991-2020 Baseline, MARISA

Heat

In Campbell County the average daily temperature is expected to increase, as well as extreme temperatures on the hottest days of the year. This excess heat for longer periods may stress critical infrastructure such as roads and bridges. More hot days may also stress the electrical grid and the use of potable water may increase as people may need more irrigation for crops and landscaping. This type of heat may affect public health and may lead to economic impacts through disruptions in agriculture and manufacturing. Human health, stream and river health, and infrastructure are all threatened by higher temperatures.

At 95°F, it is hard to keep indoor areas and our bodies cool. Campbell County's summers are getting hotter. On average, Campbell County sees 4 days per year in excess of 95°F (observed average . Within the next 50 years (by 2070), Cambell County can expect a yearly average of 30 to 54 days above 95°F, with associated increases in cooling costs, reduced air quality, and heat-related illnesses. It is imperative that the County begin planning for more days of extreme heat and look for ways to lessen the public health effects, especially on vulnerable populations.

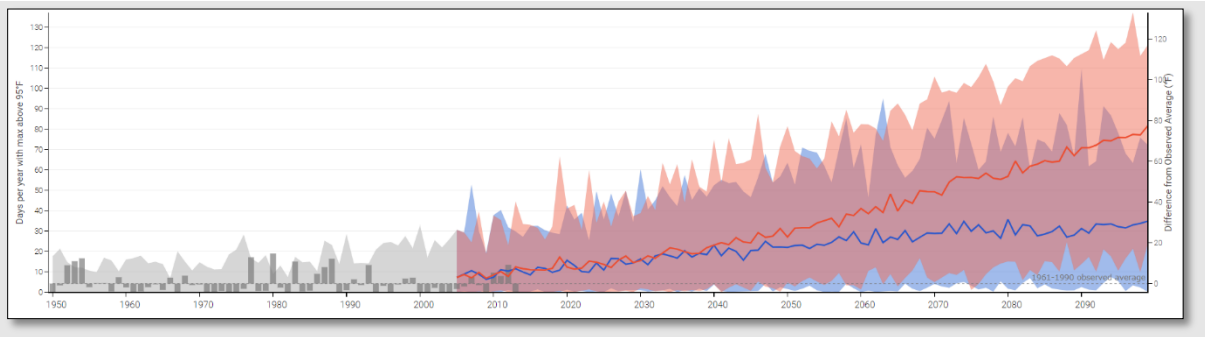


Figure 79 Days w/ maximum temp > 95°F (U.S. Climate Resilience Toolkit Climate Explorer)

Observations | Modeled History | Lower Emissions | Higher Emissions

Recommended General Flood and Heat Resilience Policies and Actions

1. Prioritize vacant tracts of land for conservation and recreational open space in floodplains and apply for grant funding to acquire these properties or work with partners who can acquire them; (See Appendix A for more detail on grant funding);
2. Incentivize and/or develop stormwater regulations and the use of green infrastructure in residential areas;
3. Work with VDOT, CVPDC and others to develop a debris management strategy for the county;
4. Work with VDOT and CVPDC to identify stormwater infrastructure priorities on state roads; and
5. Develop targeted outreach before and during the summer months to inform the public of anticipated heat waves and ways to stay safe.
6. Seek opportunities to reduce sedimentation into the Timberlake Dam and reduce flood impacts secure safety and access onto Route 460 as well as Old Plantation Rd.

Prioritized Flood Resilience Strategy

- ❖ Assess the vulnerability of critical assets, facilities, and private property in the high hazard dam inundation area. Determine needed improvements and adaptations to make these assets more resilient to flooding and in the case of dam overtopping. (Score 70)

For a full explanation of the Prioritized Resilience Strategy Matrix, see Page 36, Prioritizing Resilience Projects. For the full suite of resilience strategies and rankings by locality, see Appendix A.

Campbell County

70 Action Score

Vulnerability Assessment and Adaptation Measures

Action Description

Assess the vulnerability of critical assets, facilitites, and private property in the high hazard dam inundation area and known areas of impact that may be in proximity. Determine needed improvements and adaptations to make these assets more resilient to flooding and in the case of dam overtopping.

Key Steps for Implementation

1. Conduct a local-level vulnerability assessment of properties and assets in the high hazard dam inundation area.
2. Determine priority assets or properties to adapt to potential flood impacts.
3. Conduct outreach to key stakeholders
4. Construct and implement adaptation measures.

Action Lead

Multi-Departmental

Supporting Partners

- Virginia Department of Emergency Management (VDEM)
- CVPDC

Ease of Implementation

- ☐ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☑ Requires hiring a technical consultant.

Measures of Success

- Minimize utility service disruptions during and after climate-related events.
- Minimize damage to private properties and facilities due to climate-related impacts and dam inundation.
- Help protect lives and livelihoods by mitigating flood impacts.

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe
Short: 0-2 years
Medium: 3-6 years
Long: 7+ years

Cost*
$: less than 10k
$$: 10-50k
$$$: 50-500k
$$$$: 500k-2mill
$$$$$: 2 mill+

**Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for*

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

Resilience considerations for vertical infrastructure (facilities, buildings, above-ground assets) will differ from horizontal infrastructure (utility lines, sewer and water mains, sub-surface assets)
Actions should not be limited to adaptation strategies but also include emergency response protocols and communication warning systems if the chance of inundation is high.

Co-Benefits & Equity Considerations

Residents should be engaged throughout the vulnerability assessment and during the identification of potential actions. Residents concerns and life safety is paramount.

Cost

$$$$$

1. Vulnerability Assessment:75,000-200,000 (dependent on number of assets)
2. Development of retrofit and adaptation measures: 100,000-200,000 (dependent on number of assets)
3. Design of retrofit or adaptation measures: 175,000-300,000 (dependent on scope of designs)
4. Construction of adaptation measures: 1,000,000-2,000,000 (dependent on extent of construction)

Possible Funding Sources

Virginia Department of Emergency Management
Federal Emergency Management Agency

Campbell County, VA

City of Lynchburg, VA

The City of Lynchburg, which is recognized as an independent city in the Commonwealth of Virginia, is located in the middle of the CVPDC region. Lynchburg is home to nearly 80,000 residents and is just under 50 square miles in size. Lynchburg is a riverfront community located on the James River and is bounded to the northeast by Amherst County, to the southeast by Campbell County, and to the west by Bedford County. Lynchburg is positioned 115 miles west of Richmond, the state capital; 52 miles east of Roanoke; 180 miles southwest of Washington, D.C.; and 200 miles west of the Port of Hampton Roads. Home to Liberty University, a private coeducational Christian institution, the university hosts over 7,000 residential students and a substantial number engaged in distance learning. Established in 1971, the university spans 4,400 acres nestled in the foothills of the Blue Ridge Mountains and south of the James River. The city is also home to the University of Lynchburg, Randolph College, and Virginia University of Lynchburg, making the city well-known across the state as an educational hub.

Community Background and Social Assets

Lynchburg, Virginia, is home to a diverse population, comprising a mix of students, professionals, and long-time residents. The presence of two prominent universities, Liberty University, and the University of Lynchburg, contributes to a significant student population, infusing the city with youthful energy and cultural diversity. Beyond the academic community, Lynchburg attracts professionals from various fields, thanks to its growing job market and business opportunities. The City also hosts a community of long-time residents who take pride in the area's history and traditions, contributing to a sense of continuity and stability. Additionally, Lynchburg is known for its welcoming atmosphere, making it a popular choice for families looking for a friendly and supportive community to raise children. This blend of students, professionals, and long-standing residents creates a unique and vibrant tapestry that defines Lynchburg's community spirit. The City's African American community, in particular, has played a vital role in shaping its cultural landscape, contributing to the vibrant set of traditions, arts, and history. Lynchburg has witnessed efforts to promote inclusivity and celebrate diversity, with various cultural events, festivals, and organizations fostering connections among different ethnic and racial groups. Additionally, the city's Hispanic and Latino population has been growing, adding to the cultural richness of Lynchburg.

Vulnerable Populations

Lynchburg, like many communities, has its share of disadvantaged populations facing economic challenges and social disparities. While resilience to flood and heat events is important throughout the City, there are several areas that qualify as Low to Moderate Income based on 2020 census data. Moreover, as defined in the 2023 CFPF Manual, "Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service.

These areas are eligible to apply for CFPF funding with as little as 10% matching funds. The City of Lynchburg contains multiple Low-income geographic areas via census tracts which can be seen in Figure1 below.

Another factor in measuring vulnerability is the Social Vulnerability Index. SVI indicates the relative vulnerability of every U.S. Census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. SVI ranks the tracts on 15 social factors, including unemployment, minority status, and disability, and further groups them into four related themes. Thus, each tract receives a ranking for each Census variable and for each of the four themes, as well as an overall ranking. Please see Appendix E for more information on vulnerable populations, including SVI data.

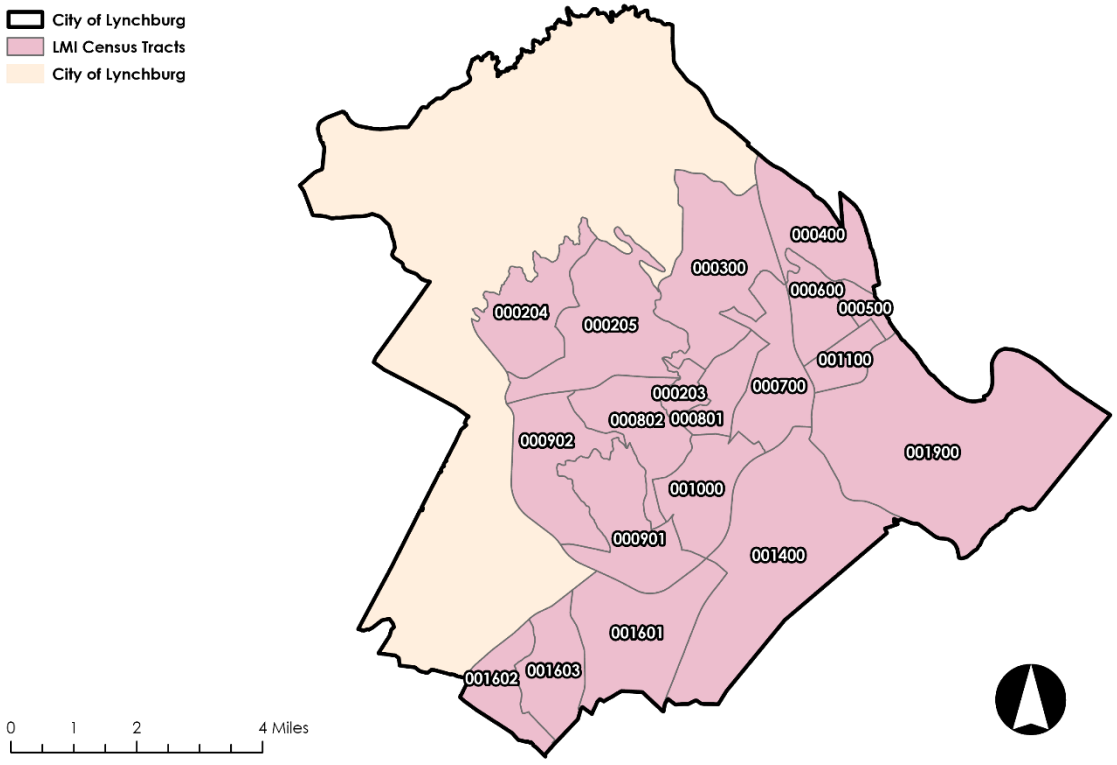


Figure 80 Census tracts with designated income levels at or below 80% of Area Median Income Levels (2020 US Census Data)

Natural Assets

Conservation Areas

Because Lynchburg is situated within the foothills of the Blueridge Mountains, it is well known for the seven hills surrounding the City. The seven hills also provide Lynchburg with its nicknames of the City of Seven Hills or Hill City. The city takes advantage of its picturesque location in the foothills of the Blue Ridge Mountains, providing residents and visitors with many opportunities to explore the great outdoors. The Blackwater Creek Natural Area features a well-maintained trail system that winds alongside the Blackwater Creek and James River, offering breathtaking views of waterfalls, lush forests, and historic landmarks. Ivy Creek Park, which provides a tranquil retreat with hiking trails, fishing spots, and open spaces for picnics. These parks not only serve as recreational havens but also contribute to the community's well-being by fostering a sense of connection with nature.

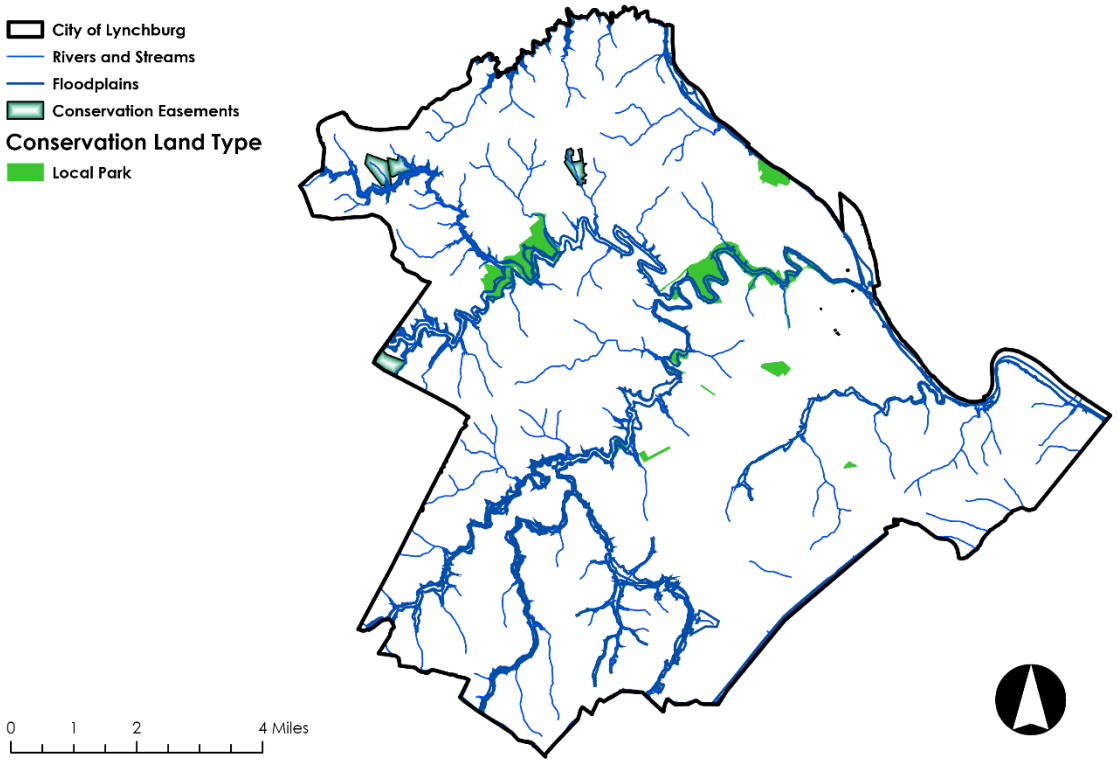


Figure 81 11 Conservation Lands overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory.

Ecological Cores

Ecological cores are patches of natural land with at least 100 acres of interior cover which provide habitat for a large variety of species, including forest, marsh, and maritime dependent species. The Virginia Natural Landscape Assessment (VaNLA) provides an analysis that has identified, prioritized, and linked, using satellite data, the important land networks throughout Virginia. Preserving and maintaining these landscapes can help ensure they continue to provide ecosystem services such as cleaner air and water filtration. Ecological cores can also provide recreational opportunities and open space resources. The following map shows which areas of the City consist of ecological cores. A higher rating (with red being the highest) indicates the amount of ecosystem services that ecological core provides. Examples of ecological services that cores provide include wildlife and plant habitat, biodiversity conservation, water

resource protection, erosion control, and carbon sequestration. The City of Lynchburg should have strategies to preserve ecological cores, such as using them as park lands for low-impact recreation (hiking, bird watching, etc.) and other conservation efforts. The City of Lynchburg's comprehensive plan and parks and recreation master plan illustrate the dedication the city has to providing open space in the City. See Appendix C for links to the plans where more information can be found.

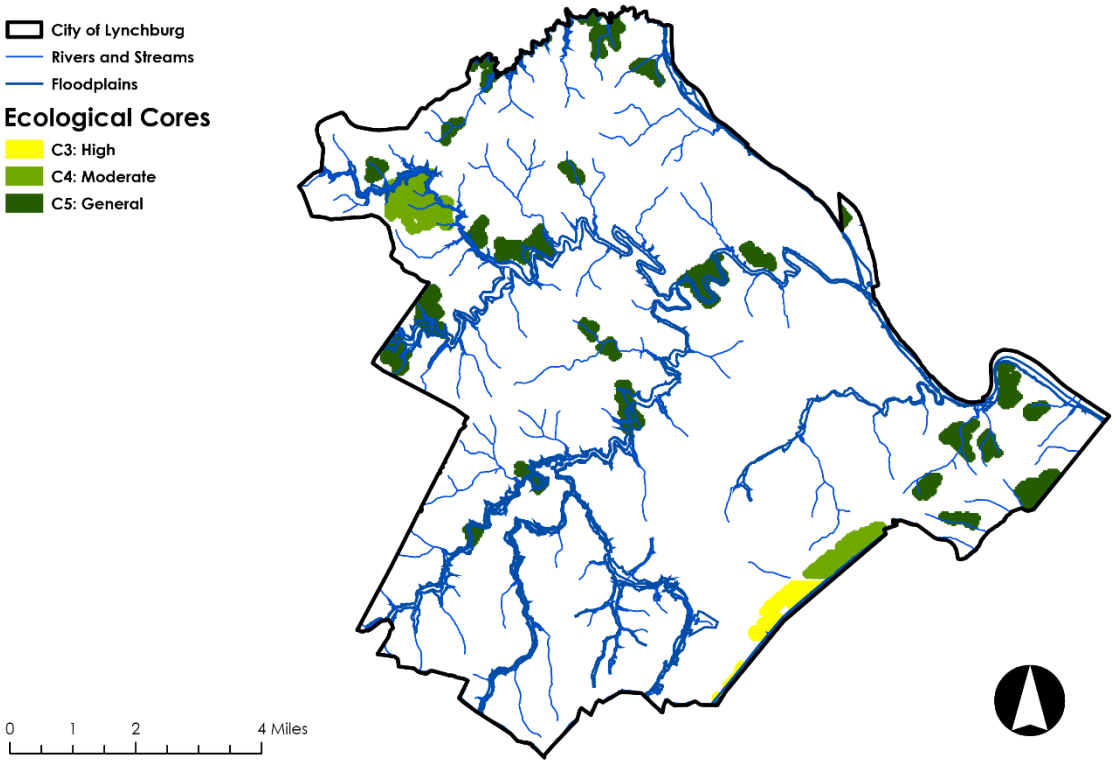


Figure 82 Ecological Cores overlaid on the regulatory floodplain, and intermittent streams, VADCR Natural Areas Inventory

Built Assets - Critical Facilities and Infrastructure

Critical infrastructure refers to the essential systems, services, and assets that are vital for the functioning of a community. These elements play a crucial role in maintaining public safety, national security, and overall well-being. Critical infrastructure can be found in various sectors, including energy, transportation, water supply, telecommunications, healthcare, and financial services. The City of Lynchburg contains numerous critical facilities and infrastructure that are a part of the day-to-day function of the City. For the

purposes of this flood resilience plan, the focus will be on infrastructure susceptible to flood related hazards. Section 4.3, Flooding, of the 2020 CVPDC Hazard Mitigation Plan, contains a thorough evaluation of FEMA floodplains, critical infrastructure, roads, and bridges in the floodplain, for each locality in the CVPDC region.

The floodplains of the James River near Lynchburg contain commercial development, including warehouses, factories, businesses, and the necessary rail, highway, and utility services for the City. As seen in Figure 4 below, other numerous critical pieces of infrastructure lie in other floodplains throughout the City. The Reusens area contains flood prone facilities and train warehouses of CSX Railroad. Two facilities, the Reusens Dam Hydro Plant, and an electrical substation, are also located here.

Facility Name	Address	Facility Type	Coordinates	Flood Zone*
Amazement Square Child Museum	27 9Th St, Lynchburg	Attractions	37.4162, -79.1403	1%; 0.2%
Electrical Substation		Electrical Substation	37.4622, -79.1872	1%; 0.2%
Reusens Dam Hydro Plant	4300 Hydro Street, Lynchburg	Energy Facility	37.4630, -79.1867	1%; 0.2%
U.S. Pipe (former Griffin Pipe Products Co Llc)	10 Adams Street, Lynchburg	HazMat Facility	37.4208, -79.1413	1%; 0.2%
Lynchburg Foundry Co Lower Basin Plant	Garnet Street And Concord Turnpike, Lynchburg	HazMat Facility	37.4071, -79.1318	1%; 0.2%
Westrock Converting Company	1801 Concord Turnpike, Lynchburg	HazMat Facility	37.4034, -79.1281	1%; 0.2%
Lynchburg City Sewage Treatment	2301 Concord Tpke, Lynchburg	Wastewater Treatment Plant	37.3968, -79.1141	1%; 0.2%

Note: 1% (or 0.2%) indicates 1-percent (or 0.2-percent) annual chance flood zone

Table 18 Critical facilities and infrastructure in the floodplain of Lynchburg, CVPDC 2020 HMP Update

Roads and Bridges are also critical pieces of transportation infrastructure. The top 5 identified roads prone to flooding are Blackwater Creek Trail, Concord Turnpike, Wards Road, 5th Street, and Hydro Street. [43] All these roads together with Lynchburg Expressway, Evergreen Road, and Graves Mill Road have multiple flood-prone locations along their route. Stormwater infrastructure maintenance and repair should be a priority for these roads and can be prioritized for future funding.

The map below illustrates real time data from the Virginia Department of Transportation on the condition of bridges and culverts. Overlaid on the rivers and streams, City of Lynchburg, CVPDC and VDOT can work

[43] 2020 CVPDC HMP Update;4-93

together to upgrade the “Poor” infrastructure first to avoid flood related damages and impacts to the surrounding areas.

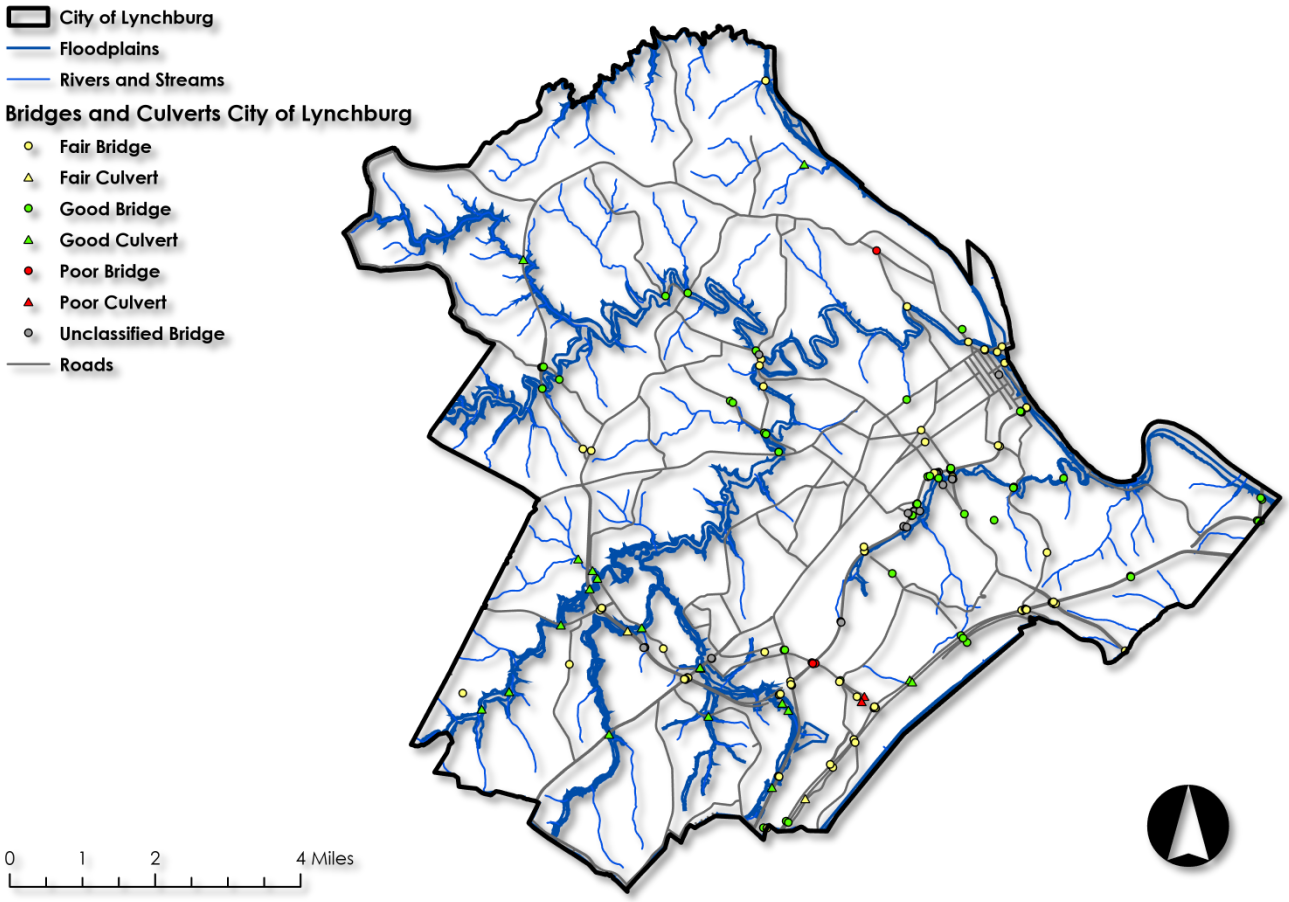


Figure 83 Bridge and culvert condition assessment within the City of Lynchburg

Top Poor Rated Bridges	Top Poor Rated Culverts
VA-128E and Candlers Mtn Rd	US-501N and Candlers Mtn. Road
BUS US 29NCandlers Mtn Rd	US-501S Ramp 71A
Bedford Avenue	

US-501N and Candlers Mtn Rd	
Bedford Avenue	
BUS US 29S and Candlers Mtn Rd	

Table 19 Rated Bridges and Culvert, VDOT, March 2024

Flooding and Related Hazards

Areas of Known Flooding

Repetitive loss properties and severe repetitive loss properties as stated in the HMP, *"The identification of repetitive loss properties is an important element to conducting a local flood risk assessment, as the inherent characteristics of properties with multiple flood losses strongly suggest that they will be threatened by continual losses. Repetitive loss properties are also important to the NFIP, since structures that flood frequently put a strain on the National Flood Insurance Fund."*[44] The City of Lynchburg contains 19 repetitive loss properties and 7 severe repetitive loss properties, more than any other locality in the CVPDC region. Figure 84 (left) shows the general areas of these properties as mapped for the HMP update. While the exact locations are not displayed due to privacy concerns, the areas are useful to identify for prioritizing mitigation actions.

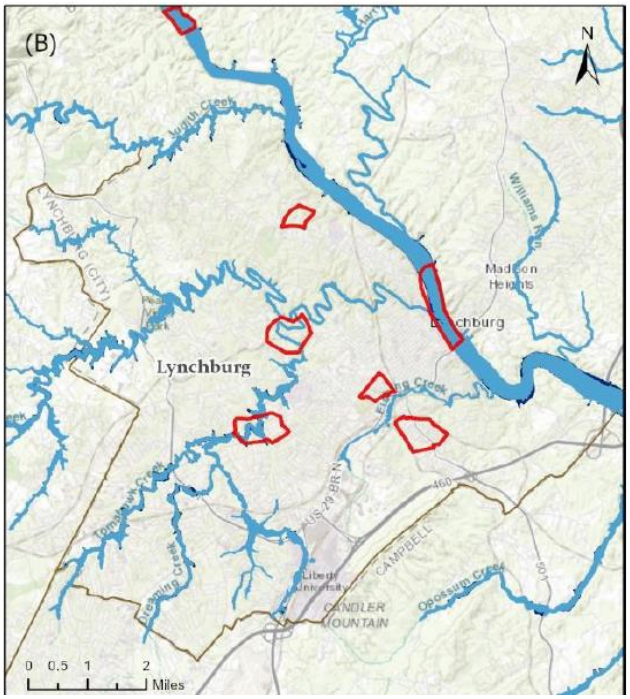


Figure 84 Repetitive Loss Areas in the City of Lynchburg Area (2020 CVPDC HMP)

Flooding is most often associated with storm events that bring large amounts of rainfall to the area, swelling rivers and tributaries beyond their banks. Topographical features, soils, and development patterns also play a part in flooding; and the interaction between these geophysical elements can affect how water moves through the landscape. This CVPDC Flood Resilience Plan builds on the flood risk assessment performed in the 2020 CVPDC HMP update and adds more localized information mainly heard through community interviews and available data

[44] The 2020 CVPDC Hazard Mitigation Plan Update

sets. Figure 85 (below) shows information from VDOT on locations of vehicle crashes due to standing water on roadways.

In Figure 86, (Pg. 126), areas of known flooding heard from community interviews are combined with the DOT vehicle crashes are overlaid on census tracts designated as low to moderate income. These areas can be prioritized for studies and projects to potentially alleviate standing water issues,

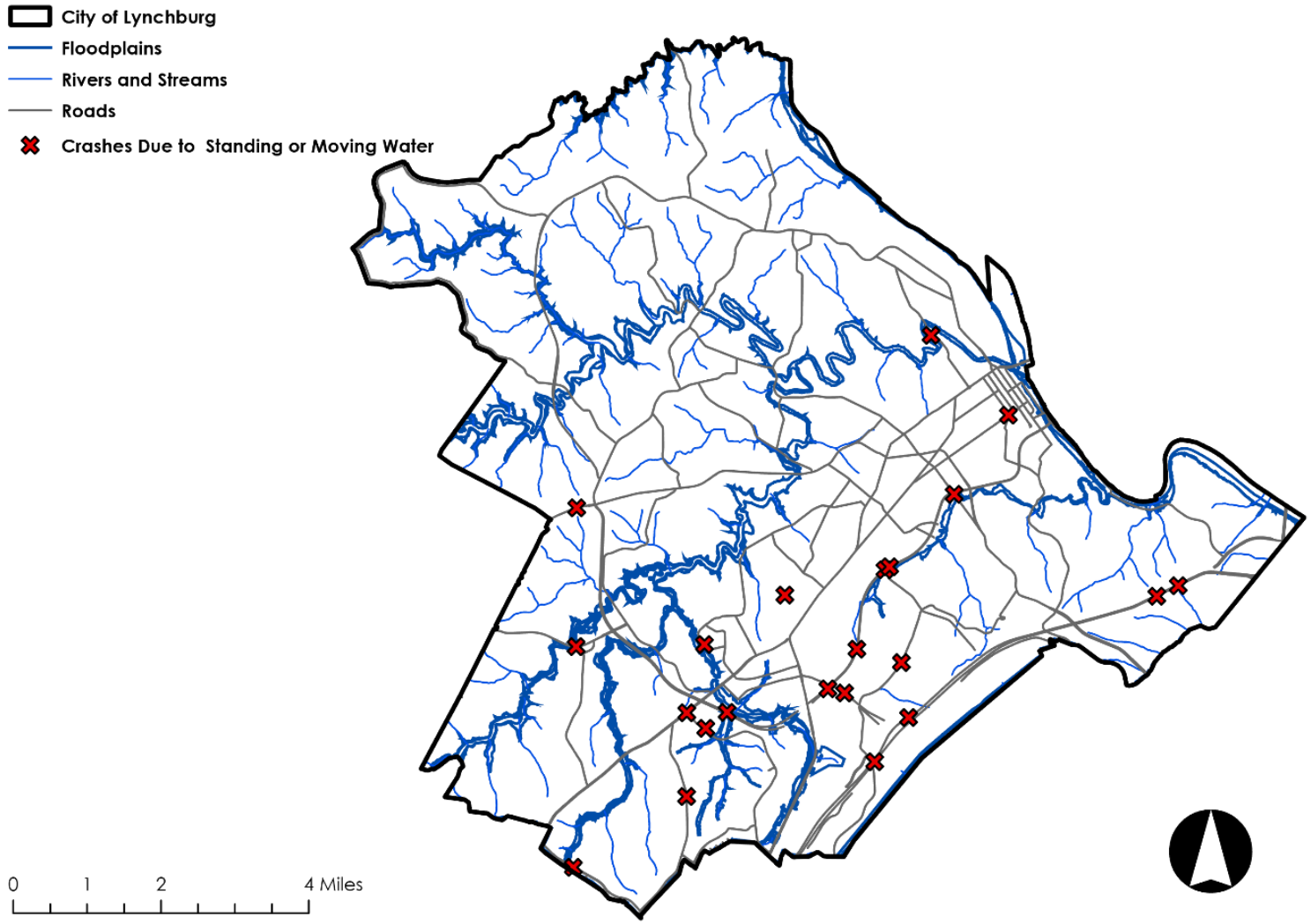


Figure 85 12 Vehicle crashes due to standing water on roadways (VDOT)

5 Most Recent Crashes Due to Standing Water	Roads or Location	Date
1	29 South	8/6/2020
2	29 South	8/19/2020
3	460 Byway	12/14/2020
4	Mayflower Drive	12/31/2022
5	Pawnee Drive	7/11/2023

Table 20 The most recent vehicle crashes as of March 2024

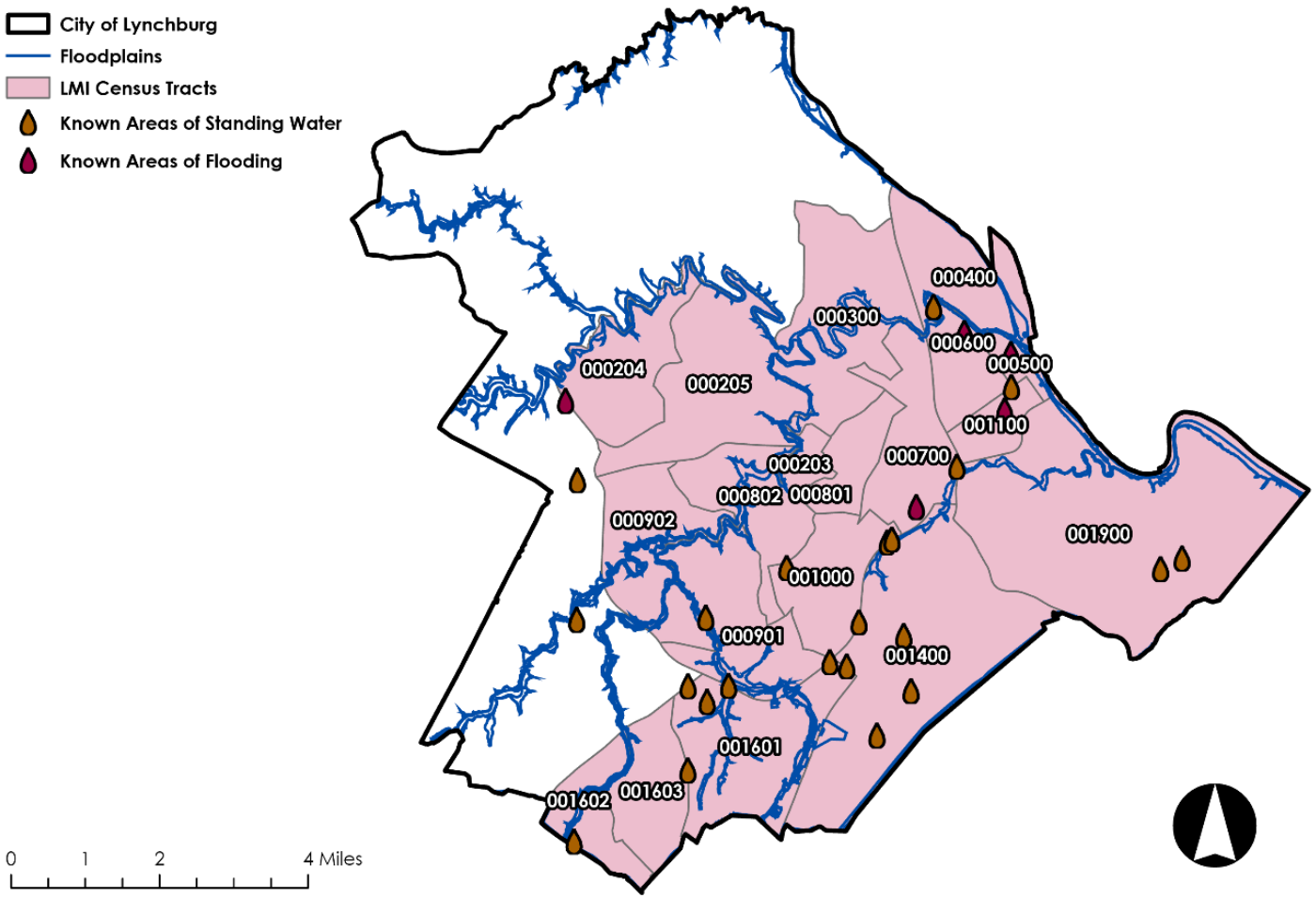


Figure 86 Areas of known flooding documented in community interviews and roadways with standing water (VDOT)

Dam Inundation

The largest concern with the few dams in the City of Lynchburg's jurisdiction (6 total, with 3 classified as high hazard potential and 2 unknown) are the homes, businesses, important thoroughfares and other transportation assets, and critical infrastructure assets in the Dam Break Inundation Zone (DBIZ). These include potential impacts to four electrical substations, a water treatment plant, the Children's Museum, several roads including the Lynchburg Expressway, Lakeside Drive, and Timberlake Rd, the CSX Transportation Railroad and Norfolk Southern Railroad, several residences and businesses within the maximum inundation area (some of which are outside the 100-year SFHA), and many roads and road-stream crossings such as bridges and culverts.

College Lake Dam was breached in the summer of 2018, threatening around 120 homes with flooding, and causing the need for evacuation, with a fear of imminent collapse which would put many areas in its inundation zone under 15 feet of water. The dam is currently scheduled to be drained and removed for safety reasons. The DBIZs are mapped for the other high-hazard dam. The City is also threatened by dams near the border, including Ivy Lake Dam and Reusens Dam. Significant vulnerable and minority populations would be affected by dam spillovers in Lynchburg, including impacts to specific neighborhoods. The map of dams of known and unknown hazard potential are shown in the map below.

High and Unknown Hazard Dams in Lynchburg City, Virginia

Central Virginia PDC Hazard Mitigation Plan Update 2020

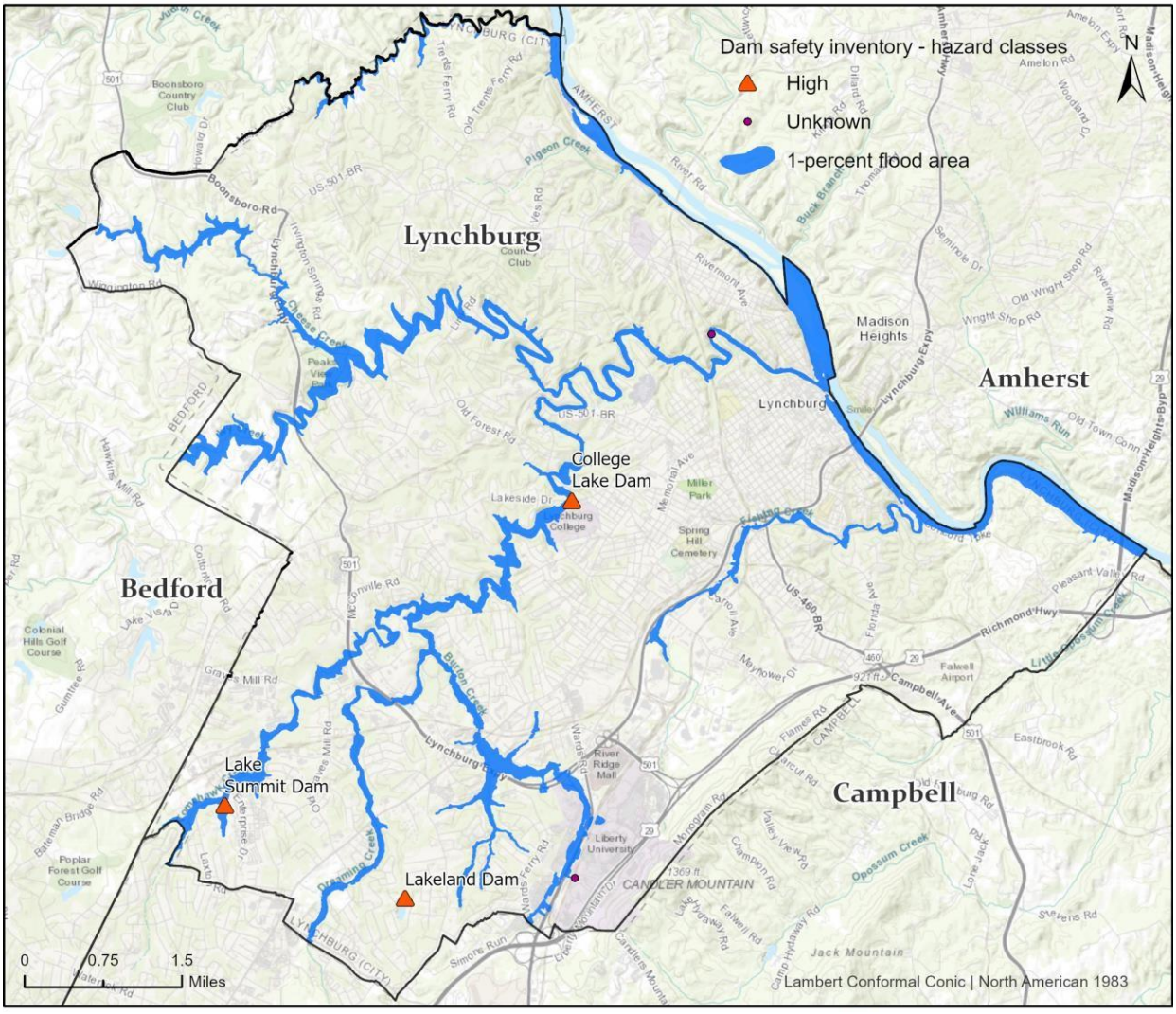


Figure 87 Virginia Dam Safety Inventory System (as of 2/7/2020), Center for GeoSpatial Technology, Virginia Tech, CVPDC 2020 HMP

For a more thorough evaluation of the impacted geographies, structures, and critical assets in the City of Lynchburg, and for the dam inundation zone maps for the referenced dams, refer to pp. 4-168 – 4-186 of the Central Virginia PDC 2020 Hazard Mitigation Plan Update.

Extreme Heat

Using an existing weather station located at the Lynchburg International Airport (LYNCHBURG REG AP), it is possible to view observed temperature averages from 1950 – 2013 for the City of Lynchburg. Years when bars extend above the line were higher than the long-term average; years with bars that extend below the line were lower than average. While the range of exceedance events is variable, you can see a trend, especially from the year 2000 onwards, where the average number of days per year that exceed 95 degrees increases.

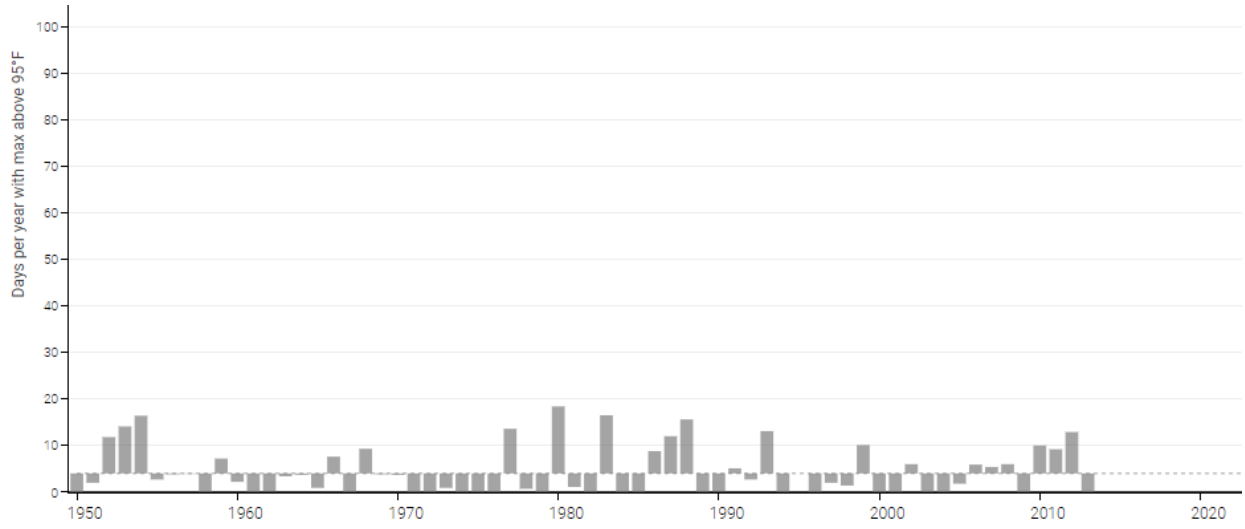


Figure 88 Days per year with temperature > 95 degree F observed average 1950 – 2013; US Climate Resilience Toolkit, The Climate Explorer

Future Community Conditions

Flood

The potential risks of climate change can have broad effects on communities in Community, including on its public health, infrastructure, agriculture, tourism, and emergency services. The City of Lynchburg (and the CVPDC region in general) should expect the following in the future:

- More frequent, and more intense, precipitation events punctuated by deeper episodes of drought;
- Drier winter and summer seasons, which could deplete reservoirs and challenge drinking water supplies and agricultural production;
- Stronger storms at a greater frequency, which may threaten lives, damage infrastructure, and cause significant power outages; and
- Increasing summer heat waves could threaten public health.

According to the NOAA Mid-Atlantic RISA projections,[45] the City of Lynchburg can expect to see some more extreme variability in precipitation over the next 50 years, with some months seeing 15% less and some months seeing up to 40% more compared to the average from the years 1950-2000. In general, the entire Appalachian region can expect mild 1-2% average increases in rainfall compared to the past 30 years' average.[46]

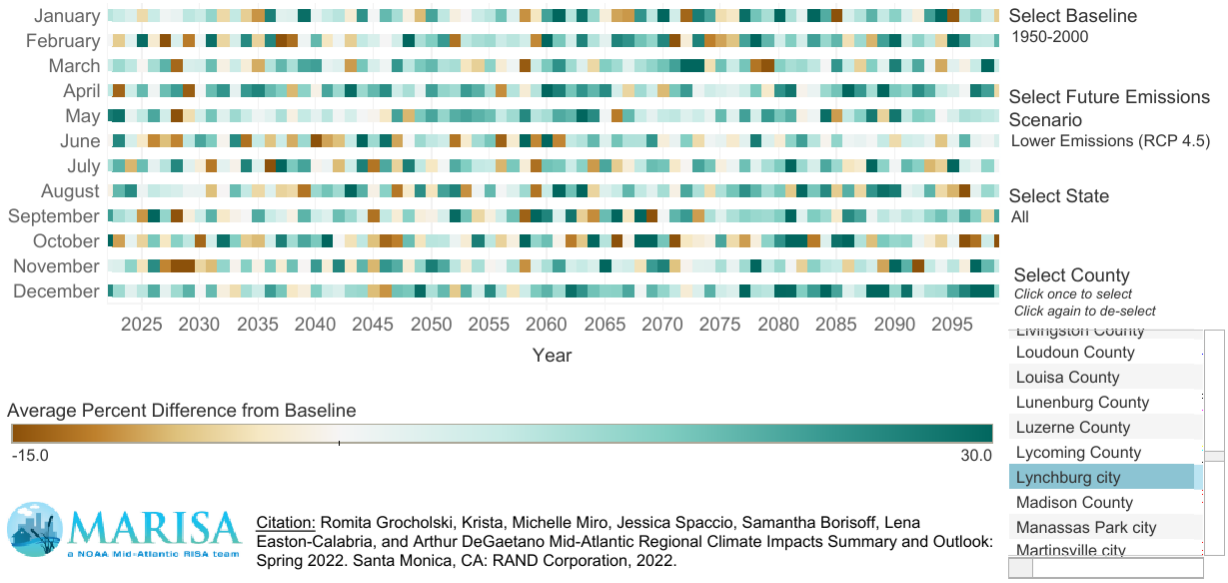


Figure 89 Projected Percent Difference in Total Monthly Precipitation, MARISA

[45] https://www.midatlanticrisa.org/data-tools/climate-data-tools/projected-changes-in-total-monthly-precipitation.html

[46] https://www.midatlanticrisa.org/data-tools/climate-data-tools/difference-from-normal-total-annual-precipitation.html

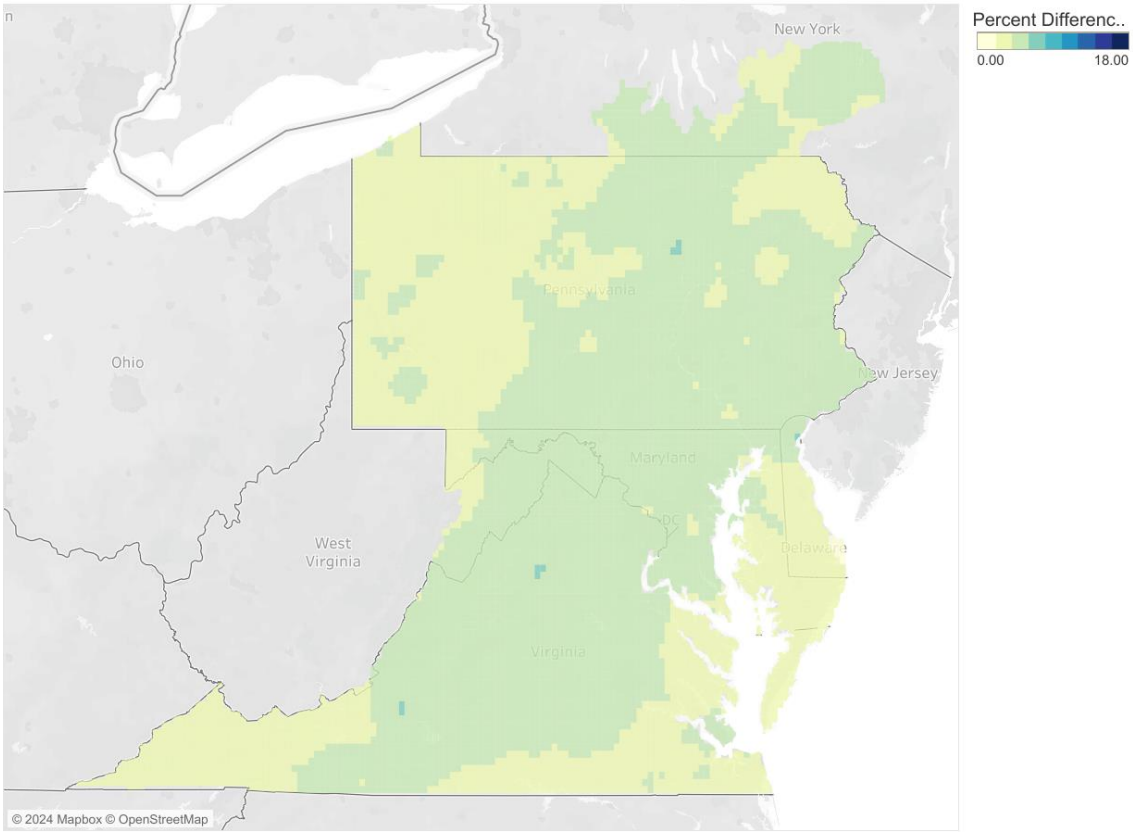


Figure 90 1981-2010 "Normal" Total Annual Precipitation with Percentage Differerence Anticipated, MARISA

Heat

In the City of Lynchburg, the average daily temperature is expected to increase, as well as extreme temperatures on the hottest days of the year. This excess heat for longer periods may stress critical infrastructure such as roads and bridges. More hot days may also stress the electrical grid and the use of potable water may increase as people may need more irrigation for crops and landscaping. This type of heat may affect public health and may lead to economic impacts through disruptions in agriculture and manufacturing. Human health, stream and river health, and infrastructure are all threatened by higher temperatures.

At 95°F, it is hard to keep indoor areas and our bodies cool. The City of Lynchburg's summers are getting hotter. On average, City of Lynchburg sees 4 days per year in excess of 95°F.1 Within the next 50 years (by 2070), City of Lynchburg can expect a yearly average of 25 to 47 days above 95°F, with associated

increases in cooling costs, reduced air quality, and heat-related illnesses.[47] It is imperative that the County begin planning for more days of extreme heat and look for ways to lessen the public health effects, especially on vulnerable populations.

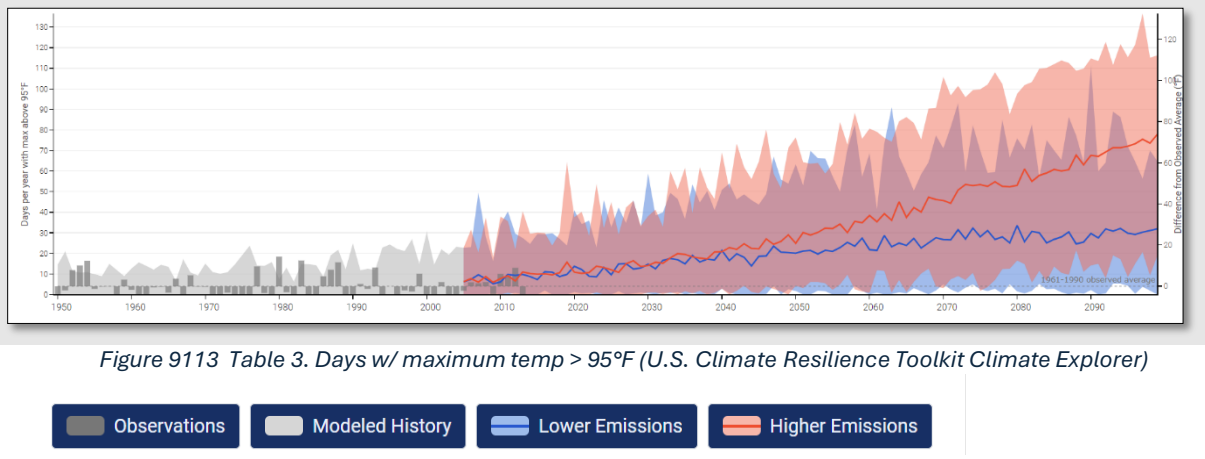


Figure 9113 Table 3. Days w/ maximum temp > 95°F (U.S. Climate Resilience Toolkit Climate Explorer)

General Flood and Heat Resilience Policies and Actions

1. Prioritize vacant tracts of land for conservation and recreational open space in floodplains and apply for grant funding to acquire these properties; (See Appendix A for more detail on grant funding);
2. Identify outcomes of the Diamond Hill Neighborhood plan with concurrent flood related benefits and prioritize these actions;
3. Incentivize the use of green infrastructure for commercial and residential development projects;
4. Continue city wide tree planting initiatives; especially in identified low to moderate income areas; and
5. Develop targeted outreach before and during the summer months to inform the public of anticipated heat waves and ways to stay safe;

[47] US Climate Resilience Toolkit Climate Explorer

Prioritized Flood Resilience Strategy

- Create a resilient riverfront plan that promotes and supports sustainable and resilient development of the City's riverfront. (Score 70)

For a full explanation of the Prioritized Resilience Strategy Matrix, See Appendix E, Prioritizing Resilience Projects. For the full suite of resilience strategies and rankings by locality, see Appendix A.

City of Lynchburg

70 Action Score

Resilient Riverfront Plan

Action Description

Create a resilient riverfront plan along the James River that creates a flood mitigation system while also promoting climate adapted development or redevelopment. Integrate recreational activities and resilient open spaces that can be enjoyed by residents.

Key Steps for Implementation

1. Complete an existing conditions and climate vulnerability assessment of parcels or lands abutting the riverfront.
2. Complete a programming and development study to determine potential future uses.
3. Engage with residents, property owners, businesses, and agencies.
4. Develop site plans and schematic sections of flood mitigation system and tie-in locations.

Action Lead

City of Lynchburg Community Development Department, and Public Services Departments

Supporting Partners

- City of Lynchburg Economic Development Authority
- James River Arts and Cultural District
- CVPDC

Ease of Implementation

- ☐ Locality can complete in-house.
- ☐ Requires locality to hire a staff person.
- ☑ Requires hiring a technical consultant.

Measures of Success

- Development of a plan that is celebrated by residents and has buy-in from property owners abutting the river.
- Successful analysis of where a flood mitigation system might tie-in given constraints such as topography, utility lines, property ownership.
- Alignment of a resilient riverfront plan with the goals of the Economic Development Department, Arts and Cultural District, and zoning.

This Project Implementation Sheet is apart of a Flood Resilience Plan funded by the Virginia Community Flood Preparedness Fund (CFPF) on behalf of the Central Virginia Planning District Commission (CVPDC). For more detailed information please see the complete flood resilience report and its appendices.

Legend

Action Initiation Timeframe	Cost*		
Short: 0-2 years	$: less than 10k	$$$$: 500k-2mill	**Cost associated with the actions refers to how much it is expected to cost the Town to implement. This does not include costs for ongoing maintenance.*
Medium: 3-6 years	$$: 10-50k	$$$$$: 2 mill+	
Long: 7+ years	$$$: 50-500k		

Action Initiation Timeframe

Short — Medium — Long

Resilience Considerations

Creation of a resilient riverfront plan should not only include strategies and visions related to riverine flooding, but also stormwater flooding, extreme heat, and impacts from winter storms.

Resilient Riverfront plan should include measures to enhance community resilience - this aligns with the City's riverfront park design already in progress.

Co-Benefits & Equity Considerations

Residents should be engaged throughout the vulnerability assessment and during the development of the resilient riverfront vision.

The plan should include ways that small businesses can prosper from development of such a plan.

Cost

$$$

1. Vulnerability and Existing Conditions Assessment:50,000-75,000
2. Programming and Development Study: 50,000-100,000
3. Community Engagement: 30,000-75,000
4. Development of Resilient Riverfront Plan - including vision, site plan, and sections: 125,000-200,000

Possible Funding Sources

FEMA BRIC, VA DCR Community Flood Preparedness Fund

Lynchburg, VA

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APPENDIX A Project Prioritization Matrix

					Action is in a FEMA Flood zone			Location in Flood Problem Areas	Effectiveness in Mitigating Climate Impacts				Action Provides Co-Benefits		Feasibility				
		Lead Department	Opinion of Probable Cost	Potential Funding	No	Somewhat *see definition sheet	Yes in a 1% Annual Chance Zones (A/AE)	Action is in Flooding Problem Area (As ID by locality)	Effectiveness in Mitigating Flood Impacts	Effectiveness in Mitigating Windstorm	Effectiveness in Mitigating Winter Storm Impacts	Effectiveness in Mitigating UHI	Action Supports Socially Vulnerable Populations	Action is a Nature-Based Solution or Promotes NBS	Properties Implicated Public (10), PROW (5), Easement (3), Private (0)	Maintenance Required Minimal (10) Some (5) Frequent (0)	Current Priority (2023), Identified in Interview	Total Score	Action Source
			$ - Up to $50,000 $$ - $50,000 up to $150,000 $$$ - $150,000 up to $500,000 $$$$ - $500,000 up to $1,000,000 $$$$$ - $1,000,000 and greater		0	5	10	0,5,10	0,5,10	0,5,10	0,5,10	0,5,10	0,5,10	0,5,10	0,3,5,10	0,5,10	0,10		
	Town of Altavista																		
1	Create dam release early warning systems and standard operating procedures related to dam release.	Public Safety - Emergency Preparedness (Campbell County)	$	DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	5	0	0	0	5	0	0	5	0	35	Locality Kick-off Meeting
2	Join the County's public information system and create a specific hazard communication protocol.	Public Safety - Emergency Preparedness (Campbell County)	$	VA DEM, DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	0	0	0	0	0	0	5	0	0	5	0	10	HMP High Priority
3	Conduct a vulnerability assessment of the Town's critical facilities, infrastructure, and utility systems and create emergency response, security, and flood operations plans for vulnerable assets.	Department of Public Works / Wastewater	$$$	FEMA, VA DCR CFPF	0	5	0	5	5	5	5	5	0	0	10	5	10	55	HMP High Priority
4	Design a berm or other flood mitigation system at the water and waste water facilities to protect these critical facilities from flooding or dam failure impacts.	Department of Public Works / Wastewater	$$$	FEMA/ DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	5	0	10	10	0	5	0	0	5	10	10	10	65	HMP High Priority
5	Create a watershed management plan that includes the following: Assess streambank conditions and restore stream beds along the Staunton River and its tributaries to mitigate flood impacts on the town's sewer system. Restoration and mitigation measures may include green infrastructure, erosion controls, cleaning debris from streams, and bank stabilization.	Department of Public Works	$$$	Capital Improvement Plan, VDEM Streambank Restoration, or VA DEQ Stormwater Local Assistance Fund	0	0	10	5	10	0	5	5	5	10	3	5	10	68	HMP High Priority
6	Elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties to understand their potential interest in relocation via buyouts.	Community Development Department	$$$$$	FEMA/ DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	0	55	HMP High Priority
7	Advocate and coordinate with FEMA to update Flood Insurance Rate Maps to include up-to-date data on special flood hazard areas to expand flood insurance coverage to include areas of known flooding and the dam inundation zone.	Community Development Department	$$$	FEMA	0	0	0	10	5	0	0	0	5	0	0	0	10	30	HMP Priority Action Discussed in Stakeholder Interview
	Town of Amherst																		
1	Conduct a vulnerability assessment of the wastewater treatment plan and determine adaptation options to either retrofit the building or design and implement site strategies to mitigate flooding.	DPW / Waste Water	$$$	DCR Community Flood Preparedness Fund (CFPF)	0	0	10	10	10	5	5	0	0	0	0	5	10	55	Locality Kick-off Meeting
2	Use Code Red system to communicate hazard information, including warnings and announcements to the public.	Public Safety (Amherst County)	$$	FEMA	0	0	0	0	5	5	5	0	5	0	10	5	0	35	HMP High Priority
3	Conduct a vulnerability assessment of the Town's critical facilities, infrastructure, and utility systems and create emergency response and flood operations plans for vulnerable assets.	DPW / Waste Water	$$$	FEMA, VA DCR CFPF	0	5	0	5	5	5	5	5	0	0	10	5	0	45	HMP High Priority
4	Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.	Community Development Department	$$$$$	FEMA/ DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	10	65	HMP Priority Action Discussed in Stakeholder Interview
5	Reduce service disruptions to the water and sanitary sewage systems by upgrading facilities, such as the Rutledge Creek WWTP and utilities to secure raw water intake, backup generators for continuous power, and identify backup supply (eg: Quick Connect).	DPW / Waste Water	$$$	AWIA	0	5	0	5	5	5	5	0	0	0	5	5	10	45	HMP Priority Action Discussed in Stakeholder Interview
6	Assess the vulnerability of roadways and identify priority projects to improve drainage through grey and green infrastructure upgrades. Upgrades will help continuity of access to critical facilities and to residents.	VDOT /DPW	$$$	FEMA, VA DCR CFPF	0	5	0	5	10	0	10	0	5	5	5	5	10	60	HMP Priority Action Discussed in Stakeholder Interview
7	Expand outreach and education about the National Flood Insurance Program (NFIP). Include information on the county website.	Public Safety (Amherst County)	$	FEMA, VA DCR CFPF	0	0	10	5	5	0	0	0	5	0	0	5	0	30	HMP High Priority
8	Restore streambanks, design and construct green infrastructure, and implement other mitigation practices to mitigate flooding.	DPW	$$	VA DCR CFPF	0	5	0	10	10	0	0	5	5	5	5	0	0	45	HMP High Priority
9	Create response protocols for prolonged drought and high temperatures to address public health issues and community needs as well as potential strain on water resources	Public Safety (Amherst County)	$$	VDEM	0	0	0	0	0	0	0	10	10	0	10	5	0	35	HMP High Priority
	Amherst County																		
1	Expand the county's public announcement system (Everbridge) to include notices regarding emergency events, preparedness measures, and shelter-in-place orders.	Public Safety	$	VDEM	0	0	0	0	5	5	5	0	5	0	10	10	0	40	HMP Priority Action Discussed in Stakeholder Interview
2	Update the county's website to include informational pages on home elevation, wildfire/brush fire management, hazardous materials storage, hurricane preparedness - including anchors for mobile homes and storm kits.	Public Safety	$	Local Funding	0	0	0	0	5	5	5	0	5	0	10	10	0	40	HMP Priority Action Discussed in Stakeholder Interview
3	Conduct a vulnerability assessment of the county's critical facilities, develop emergency response plans, adapt utilitiy systems to natural and human hazards that could hinder continuity of services.	Community Development Department/DPW	$$$	DCR Community Flood Preparedness Fund (CFPF) or FEMA HMPG	0	5	0	5	10	5	5	5	0	0	5	5	0	45	HMP Priority Action Discussed in Stakeholder Interview
4	Evaluate stream conditions and implement streambank stabilization along the James River at Madison Heights to protect ACSA trunk sanitary sewer line and provide sediment reduction and environmental protection to the James River.	Public Works	$$$	VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	5	10	5	5	10	75	HMP Priority Action Discussed in Stakeholder Interview
5	Evaluate stream conditions and implement streambank stabilization and green infrastructure to promote natural function and mitigate riverine flooding, impacts of dam failure, and stormwater at the following locations: Lowesville, Monacan Park, Peddlar river at Buffalo Spring, Ware's Gap Road near Puppy Creek.	Public Works	$$$	VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	5	10	5	5	10	75	HMP Priority Action Discussed in Stakeholder Interview

6	Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.	Community Development Department	$$$$$	FEMA/ DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	10	65	HMP Priority Action Discussed in Stakeholder Interview
7	Create program with funding and resources to adapt private property in flood zones and the high hazard dam inundation zone to help mitigate impacts from stormwater and dam failure. Focus program on areas with socially vulnerable residents and historical areas such as the Monacan Ancestral Museum.	Community Development Department	$$$$$	FEMA, VDEM	0	0	10	10	10	5	5	0	10	5	0	5	10	70	HMP Priority Action Discussed in Stakeholder Interview
8	Create program to expand preparedness resources, especially for property in remote areas such as Lowesville/Woodson, Oronoco and Otter Creek campgrounds, and Monacan Ancestral Museum	Community Development Department	$$	FEMA, VDEM	0	5	0	10	10	5	5	5	5	5	0	5	10	65	HMP Priority Action Discussed in Stakeholder Interview
9	Develop educational outreach materials on safety protocols for driving when there is highwater on roadways.	Public Works	$	VDOT, VDEM	0	5	0	5	5	0	5	0	0	0	5	10	0	35	HMP Priority Action
9	Find funding and coordinate with agricultural producers to respond to drought, high temperatures, or other environmental factors that may impact crop or livestock production and harvest.	Agricultural Committee	$$$$	VDEM	0	0	0	0	0	0	0	10	5	10	0	5	0	30	HMP Priority Action
9	Evaluate drainage capacity and improve conditions along roadways to support emergency access to critical facilities and residents who are more isolated.	VDOT, Public Works	$$$$	VDOT, VDEM	0	0	10	10	10	0	5	0	10	5	5	5	0	60	HMP Priority Action
10	Study conditions of dam and flood mitigation structures and make improvements and maintain Amherst managed dams to meet federal and state maximum precipitation load requirements and high hazard dam regulations. Address Graham Creek primary spillway.	VA DCR, Public Works	$$$$$	DCR Dam Safety and Flood Prevention and Protection Assistance Fund	0	0	10	10	10	0	10	0	0	0	10	5	0	55	HMP Priority Action
	Amherst County																		
1	Join the NFIP Community Rating System and complete strategies to reduce NFIP premiums. Update the county website with readily available information on NFIP enrollment and coverage.	Public Safety	$$$	FEMA	0	0	10	5	5	0	0	0	5	5	10	5	0	45	HMP High Priority
2	Execute a campaign to enroll more residents in the county's public information system so that more resident receive emergency updates about events and hazards.	Public Safety	$	Local Funding	0	0	0	0	5	5	5	5	5	0	10	10	0	45	HMP High Priority
3	Coordinate with VDOT to install high water warning systems and signage along roadways informing that driving through standing water poses significant danger.	VDOT/Public Safety	$$	VDOT	0	5	0	10	5	0	5	0	0	0	5	5	0	35	HMP High Priority
4	Upgrade critical facilities to include back-up generators so that the county's communication network has continuity of service during emergency events.	Public Safety	$$	DOE	0	5	0	5	5	5	5	5	0	0	5	5	0	40	HMP High Priority
5	Identify drainage improvement opportunities along the following roadways: Bent Creek at Route 608 and North Creek, Route 611 near Route 666 (Wreck Island Creek),and Blackberry Lane (Wolfcreek).	VDOT/DPW	$$$	VA DEQ Stormwater Local Assistance Fund	0	5	0	10	10	0	5	0	0	5	5	0	0	40	HMP High Priority

6	Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.	Community Development Department	$$$$$	FEMA/ DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	10	65	HMP Priority Action Discussed in Stakeholder Interview
7	Conduct outreach to property owners to secure easement to create secondary emergency access along Blackberry Lane during flood or other emergency events.	Public Safety	$$$	FEMA HMGP	0	0	10	10	5	5	5	0	0	0	3	5	10	53	HMP Priority Action Discussed in Stakeholder Interview
8	Coordinate with VDOT to implement flood mitigation measures at Route 460/Moore County Store to support emergency access.	VDOT/DPW	$$$$	VDEM/VDOT	0	0	10	10	10	0	5	0	0	0	5	5	0	45	HMP High Priority
9	Develop procedural emergency response for extreme heat events with a special focus on water resources during drought and public health concerns.	Public Safety	$$$	VDEM	0	0	0	0	0	0	0	10	10	0	10	5	0	35	HMP High Priority
10	Find funding and coordinate with agricultural producers to respond to drought, high temperatures, or other environmental factors that may impact crop or livestock production and harvest.	Agricultural Committee	$$$$	VDEM	0	0	0	0	0	0	0	10	5	10	0	5	0	30	HMP High Priority
	Town of Appomattox																		
1	Conduct a Risk and Resilience Assessment of the Town's drinking water supply. Evaluate volumetric needs based on population size for emergency storage. Identify secondary water sources or coordinate with adjacent communities to secure interconnection or supply agreements for emergency situations.	Community Development Department	$$	AWIA	0	0	0	0	0	0	0	5	5	0	5	5	10	30	HMP Priority Action Discussed in Stakeholder Interview
2	Create a public outreach campaign with specific hazard preparedness toolkits for businesses, residents, and organizations and information on the NFIP.	Public Safety (Appomattox County)	$	Local Funding	0	0	0	0	5	5	5	5	5	0	10	10	0	45	HMP High Priority
3	Assess the vulnerability of the Town's water and sanitary sewage systems. Develop measures to adapt utilities to withstand climate-related events, to minimize service disruptions. Create emergency response plans for facilities including back-up power, such as	DPW	$$$	FEMA HMGP, VA DCR CFPF	0	5	0	5	5	5	5	0	0	5	3	5	0	38	HMP High Priority
4	Evaluate and implement stream restoration, through green infrastructure, streambank stabilization or other appropriate practices, along the stream in the Sunnydale, South Church Street area to address stormwater impacts.	Department of Public Works	$$$	VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	5	10	3	5	0	63	HMP High Priority
5	Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.	Community Development Department	$$$$$	FEMA/ DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	0	55	HMP High Priority
6	Conduct a vulnerability assessment of the Town's critical facilities with consideration of natural, climate, and cyber-security hazards. Create emergency response plans for facilities including back-up power, such as generators, and contigency plans for service continuity	DPW / Community Development Deparment	$$$	FEMA, VA DCR CFPF	0	5	0	5	5	5	5	5	0	0	10	5	0	45	HMP High Priority
7	Work with the Town's essential departments to understand vulnerability to disruptions such as pandemic or natural disaster. Develop contigency plans for staff and services. Seek necessary funding for equipment or technological upgrades to enhance the	Multi-Departmental Action	$$	FEMA, DOE	0	0	0	0	5	5	5	0	0	5	10	10	0	40	HMP High Priority
8	Join the NFIP Community Rating System and complete strategies to reduce NFIP premiums. Update the town website with readily available information on NFIP enrollment and coverage.	Public Safety (Appomattox County)	$$$	FEMA	0	0	10	5	5	0	0	0	5	5	10	5	0	45	HMP High Priority

	Bedford County																		
1	Expand the county's public announcement system to include notices regarding emergency events, preparedness measures, and shelter-in-place orders.	Public Safety	$	Local Funding	0	0	0	0	5	5	5	5	5	0	10	10	0	45	HMP High Priority
2	Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation areas to understand their potential interest in relocation via buyouts.	Community Development Department	$$$$$	FEMA/DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	0	55	HMP High Priority
3	Assess the vulnerability of the Woodfield Pump Station, Mantuvale Treatment Plan, and electrical substations. Determine needed improvements and adaptations to make these assets more resilient to natural and climate hazards as well as human-made hazards such as cybersecurity, hazardous waste, etc.	DPW	$$$	FEMA, VA DCR CFPF	0	5	0	5	10	5	5	5	0	0	5	10	0	50	HMP High Priority
4	Assess the vulnerability of roadways and identify priority projects to improve drainage through grey and green infrastructure upgrades. Upgrades will help continuity of access to critical facilities and to physically isolated residents.	VDOT/DPW	$$$	VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	0	10	5	5	10	70	HMP Priority Action Discussed in Stakeholder Interview
5	Develop procedural emergency response for extreme heat events with a special focus on water resources during drought and public health concerns.	Public Safety	$$$	VDEM	0	0	0	0	0	0	0	10	10	0	10	5	0	35	HMP High Priority
6	Coordinate with AEP to develop communication protocols and emergency response measures for flooding and dam inundation/failure events.	Public Safety	$$	VDEM, DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	0	5	0	5	0	0	5	0	45	HMP High Priority
7	Implement facility improvements to adopt County public schools to provide for continuous operation. Evaluation and improvements considerations include secondary generator needs; secondary public water source for Mantvale; address electrical service capabilities/interruptions at Big Island; stormwater/flood retrofits to Huddleston and Staunton River to protect wells and campus buildings.	Multi-Departmental Action	$$$$	FEMA, VDEM	0	0	10	10	10	10	10	10	10	5	10	5	0	90	HMP High Priority
8	Study and implement flood & dam structural improvements at existing Bedford, BRWA managed dams to meet all federal and state maximum precipitation rules and high hazard dam regulations.	BRWA	$$$$$	VA DCR Dam Safety	0	0	10	10	10	0	5	0	0	0	10	0	0	45	HMP High Priority
9	Find funding and coordinate with agricultural producers to respond to drought, high temperatures, or other environmental factors that may impact crop or livestock production and harvest.	Agricultural Committee	$$$$	VDEM	0	0	0	0	0	0	0	10	5	10	0	5	0	30	HMP High Priority
10	Join the NFIP Community Rating System and complete strategies to reduce NFIP premiums. Update the county website with readily available	Public Safety	$$$	FEMA	0	0	10	5	5	0	0	0	5	5	10	5	0	45	

	Town of Bedford																		
1	Conduct a site-level assessment of the Bedford Memorial Hospital. Identify upgrades, climate adaptations, and emergency response measures and protocols to support service continuity. Install back-up power, such as a generator system.	Bedford Memorial Hospital	$$$	FEMA BRIC	0	0	0	0	5	5	5	5	10	5	0	5	0	40	HMP High Priority
	Evaluate Town emergency response system, identify and make repairs, or install new system if necessary.	Public Safety (Bedford County)	$$	Local Funding or FEMA	0	0	0	0	5	5	5	5	5	0	10	10	0	45	HMP High Priority
2	Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation areas to understand their potential interest in relocation via buyouts.	Community Development Department/DPW	$$$$$	FEMA/DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	10	65	HMP Priority Action Discussed in Stakeholder Interview
3	Develop emergency response plans and service continuity contingency strategies for public utilities.	DPW	$$	FEMA	0	0	0	0	5	5	5	5	5	0	5	10	0	40	HMP High Priority
4	Assess the vulnerability of critical assets and facilities. Determine needed improvements and adaptations to make these assets more resilient to natural and climate hazards as well as human-made hazards such as cybersecurity, hazardous waste, etc.	DPW / Community Development Department	$$$	FEMA, VA DCR CFPF, DOE	0	5	0	5	5	5	5	5	0	0	10	5	0	45	HMP High Priority
5	Develop and maintain emergency response protocols related to public health and extreme heat. Explore options for cooling centers and programs to subsidize air conditioning units. Identify nature-based solutions for hotspots.	Public Safety (Bedford County)	$$	DOE/NOAA	0	0	0	0	0	0	0	10	10	10	10	10	10	60	HMP Priority Action Discussed in Stakeholder Interview
6	Create a public outreach campaign with specific hazard preparedness toolkits for businesses, residents, and organizations and information on the NFIP.	Public Safety (Bedford County)	$	Local Funding	0	0	0	0	5	5	5	5	5	0	10	10	0	45	HMP High Priority
7	Evaluate and improve drainage along roadways to ensure emergency access and safe movement; target areas of Town with re-curring flooding: South Bridge St., West Gate/Blue Ridge Ave., Summit & 4th St/Train Trestle. Develop high water driving safety education.	VDOT/DPW	$$$	VDOT, VDEM, VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	0	10	5	5	0	60	HMP High Priority
8	Evaluate and implement stream bank restoration, through green infrastructure, stream bank stabilization or other appropriate practices, to lessen stormwater impact to BRWA Woodfield Pump Station, other water and sanitary facilities. (Natural resources/watershed plan).	DPW	$$$$	VA DCR CFPF, VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	5	10	3	5	0	63	HMP High Priority
9	Evaluate need to adapt or relocate Town's electrical substations from flood and high hazard dam failure zones.	Electrical Department	$$$$	DOE, VDEM	0	0	10	10	10	0	5	0	0	0	10	5	0	50	HMP High Priority
10	Expand outreach about NFIP coverage. Join the NFIP Community Rating System and complete strategies to reduce NFIP premiums. Update the Town website with readily available information on NFIP enrollment and coverage.	Public Safety	$$$	FEMA	0	0	10	5	5	0	0	0	5	5	10	5	0	45	HMP High Priority

	Town of Brookneal																		
1	Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.	Community Development Department/DPW	$$$$$	FEMA/DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	0	55	HMP High Priority
2	Conduct a vulnerability assessment of critical facilities. Identify and implement measures that support back-up power, such as generators. Adapt buildings and/or to include climate adaptation measures to minimize adverse impacts during storms or other events.	DPW / Community Development Department	$$$	FEMA, VA DCR CFPF	0	5	0	5	5	5	5	5	0	0	10	5	0	45	HMP High Priority
3	Expand outreach about NFIP coverage. Join the NFIP Community Rating System and complete strategies to reduce NFIP premiums. Update the Town website with readily available information on NFIP enrollment and coverage.	Public Safety	$$$	FEMA	0	0	10	5	5	0	0	0	5	5	10	5	0	45	HMP High Priority
4	Evaluate and execute retrofit measures to reduce service disruption and facility damage to the Town's water and sanitary sewage systems	DPW	$$$$$	FEMA, VDEM	0	5	0	10	10	5	5	5	5	0	10	10	0	65	HMP High Priority
5	Coordinate with AEP to develop communication protocols and emergency response measures for flooding and dam inundation/release and river turbidity.	Public Safety	$$	VDEM, DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	0	5	0	5	0	0	5	0	45	HMP High Priority
6	Evaluate and implement stream-bank stabilization or channelization along the Staunton River and tributaries to lessen stormwater, flooding, and high hazard dam failure impacts to Town's water and sanitary sewer system.	DPW	$$$$	VA DCR CFPF, VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	5	10	3	5	0	63	HMP High Priority
7	Develop procedural emergency response for extreme heat events with a special focus on water resources during drought and public health concerns.	Public Safety	$$$	VDEM	0	0	0	0	0	0	0	10	10	0	10	5	0	35	HMP High Priority
8	Join the county's public announcement system to include notices regarding emergency events, preparedness measures, and shelter in place orders	Public Safety	$	Local Funding	0	0	0	0	5	5	5	5	5	0	10	10	0	45	HMP High Priority

	Campbell County																		
1	Expand the county's public announcement system to include notices regarding emergency events, preparedness measures, and shelter-in-place orders.	Public Safety	$	Locality Funding, FEMA	0	0	0	0	5	5	5	5	5	0	10	10	0	45	HMP High Priority
2	Assess the vulnerability of critical assets and facilities. Determine needed improvements and adaptations to make these assets more resilient to natural and climate hazards as well as human-made hazards such as cybersecurity, hazardous waste, etc.	Public Safety	$$	FEMA, DCR Community Flood Preparedness Fund (CFPF)	0	5	0	0	5	5	5	0	0	0	10	10	0	40	HMP High Priority
3	Conduct an assessment of the water flow capacity along Route 29 adjacent to Flat Creek Pump Station. Consider measures to increase water pressure.	DPW/ Waste Water	$$	AWIA	0	0	0	0	0	0	0	0	0	0	10	5	0	15	HMP High Priority
4	Evaluate the vulnerability of the water and waste water treatment plant and systems. Identify adaptation measures to help mitigate impacts and	DPW	$$	DCR Community Flood Preparedness Fund (CFPF)	0	0	0	5	10	5	5	5	0	5	10	5	10	60	HMP Priority Action Discussed in Stakeholder Interview
5	Assess the vulnerability of critical assets, facilities, and private property in the high hazard dam inundation area. Determine needed improvements and adaptations to make these assets more resilient to flooding and in the case of dam overtopping.	DPW	$$	FEMA/DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	0	0	10	10	10	70	HMP Priority Action Discussed in Stakeholder Interview
6	Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties and owners within the dam hazard inundation area to understand their potential interest in relocation via buyouts.	Community Development Department/DPW	$$$$$	FEMA/DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	0	55	HMP High Priority
7	Develop procedural emergency response for extreme heat events with a special focus on water resources during drought and public health concerns.	Public Safety	$$$	VDEM	0	0	0	0	0	0	0	10	10	0	10	5	0	35	HMP High Priority
8	Assess ability to bury utility lines and implement these changes at critical facilities.	Multi-Departmental Action	$$$$	DOE, VDEM	0	5	0	10	0	10	10	0	0	0	5	10	0	50	HMP High Priority
9	Seek opportunities to evaluate and improve drainage along roadways to reduce stormwater and flood impacts (emergency access, dangerous driving conditions) including: Timberlake, Brookville High School, Rainbow Forest, Creekhaven/460 area.	VDOT/DPW	$$$	VDOT, VDEM, VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	0	10	5	5	0	60	HMP High Priority
10	Evaluate and implement stream-bank restoration, through green infrastructure, stream-bank stabilization or other appropriate practice, along the Staunton River and tributaries to lessen stormwater impacts to County infrastructure, critical facilities, and public access.	DPW	$$$$	VA DCR CFPF, VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	5	10	3	5	10	73	HMP Priority Action Discussed in Stakeholder Interview

	City of Lynchburg																		
1	Introduce regulatory requirements to reduce impervious area in new development. Encourage pervious area, vegetation, and stormwater controls (best management practices) to mitigate stormwater, erosion, and heat impacts.	Community Development Department	$$	DCR Community Flood Preparedness Fund (CFPF)	0	5	0	10	10	0	0	10	0	10	0	5	10	60	Locality Kick-off Meeting
2	Update the city's floodplain zoning ordinance based on FEMA updated NFIP maps. Include standards that support flood mitigation and resilience through site and building strategies.	Community Development Department	$$	DCR Community Flood Preparedness Fund (CFPF), FEMA	0	0	10	10	5	0	5	5	0	5	0	10	10	60	Locality Kick-off Meeting
3	Create a retrofit program with funding opportunities and incentives for private property owners to adapt their buildings to better withstand flooding or storm events.	Community Development Department	$$$-$$$$	FEMA BRIC	0	5	0	5	10	0	5	0	0	0	0	5	10	40	Locality Kick-off Meeting
4	Assess the current conditions of culverts and flow-through pipes, and replace undersized or aged infrastructure to better accommodate increased stream flow during storm events.	DPW/VDOT	$$$$$	VA DEQ Stormwater Local Assistance Fund	0	5	0	10	10	0	5	0	0	0	5	5	10	50	Locality Kick-off Meeting
5	Assess opportunities to elevate or acquire repetitive loss properties to mitigate flood impacts including loss of life, property, and financial damage. Conduct outreach to homeowners of repetitive loss properties to understand their potential interest in relocation via buyouts.	Community Development Department/DPW	$$$$$	FEMA/DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	10	5	5	0	10	0	0	5	10	65	Locality Kick-off Meeting
6	Assess the vulnerability of utility system and retrofit to make system resilient during storm or flood events.	DPW	$$$	DOE	0	5	0	0	10	5	5	5	0	0	10	5	10	55	Locality Kick-off Meeting
7	Implement green infrastructure and plant trees in urban heat island that exist where low-to-moderate income populations live. Historic were identified through the University of Lynchburg's mapping study.	Community Development Department	$$	Department of Forestry	0	0	0	0	5	0	0	10	10	10	5	5	10	55	Locality Kick-off Meeting
8	Assess the conditions of stream banks and implement stream bank stabilization measures to mitigate erosion and scour.	DPW/Watershed	$$	VA DEQ Stormwater Local Assistance Fund	0	5	0	5	10	0	5	0	0	10	5	5	10	55	Locality Kick-off Meeting
9	Enroll in the Community Rating System (CRS). Complete strategies to reduce NFIP premiums through the CRS. Update the town website with readily available information on NFIP enrollment and coverage. Create a public outreach campaign with specific hazard preparedness toolkits for businesses, residents, and organizations.	Public Safety/Community Development Department	$$	Locality Funding, FEMA HMPG	0	0	10	0	5	0	0	0	5	0	10	10	0	40	HMP High Priority
10	Promote sustainable and resilient development of the City's riverfront.	Community Development Department	$$$	FEMA BRIC, DCR Community Flood Preparedness Fund (CFPF)	0	0	10	10	10	0	5	5	5	10	10	5	0	70	HMP High Priority
11	Create a public outreach campaign with specific hazard preparedness toolkits for businesses, residents, and organizations. Educational information will focus on how to prepare for flood events, what to do when high water is on roadways, or when there is dam overtopping and inundation.	Community Development Department/ Public Safety	$	FEMA/DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	5	0	0	5	0	0	0	0	0	10	10	0	30	HMP High Priority
12	Install a back-up power generator for DWR facilities, at emergency shelters, and at city buildings.	Public Safety / Community Development Department	$$$$	Capital Improvement Plan (CIP)	0	0	10	0	5	5	5	0	0	0	10	10	0	45	HMP High Priority
13	Develop an emergency response plan for the high hazard dam inundation area. Complete a high hazard dam breach evaluation and studies to determine worst case inundation area of multiple high hazard dams breaching at once.	Public Safety	$$	FEMA/DCR (Dam Safety, Flood Prevention and Protection Assistance Fund)	0	0	10	10	5	0	0	0	5	0	10	10	10	60	HMP Priority Action Discussed in Stakeholder Interview
14	Initiate tree canopy analysis or condition study; selectively remove dead or diseased trees that have the potential to impact structures or block ROW during weather events	DPW	$$$$	Department of Forestry	0	0	0	0	5	5	5	5	5	10	5	5	0	45	HMP High Priority
15	Create a resilient stormwater master plan. Assess the current and future conditions of the stormwater system under climate change. Identify priority green and grey infrastructure projects. Design and implement stormwater best management practices to help mitigate flood impacts and contribute to better water quality.	DPW	$$	VA DEQ Stormwater Local Assistance Fund	0	0	10	10	10	0	5	5	0	5	5	5	10	65	HMP Priority Action Discussed in Stakeholder Interview
16	Develop and publicize heat response plan which includes the use of cooling centers and public health considerations	Community Development Department/ Public Safety	$$$	VDEM	0	0	0	0	0	0	0	10	10	10	10	5	10	55	HMP Priority Action Discussed in Stakeholder Interview
17	Study land use/land cover in the sensitive areas (i.e., floodplain, high hazard dam inundation zones, streams, and steep slopes) to identify areas for conservation/open space.	Community Development Department	$$	VA CFPF	0	0	10	10	5	0	0	5	0	10	0	10	0	50	HMP High Priority
	Regional																		
1	Implement nature-based solutions in historically redlined areas that also suffer from urban heat island and stormwater flooding. Target NBS along transportation corridors	VDOT, CVPDC, Locality DPWs	$$$	DCR Community Flood Preparedness Fund (CFPF)	0	5	0	5	5	0	5	10	10	10	5	5		60	Locality Kick-off Meeting
2	Develop a regional emergency response plan that involves town, city, and county public safety officer.	Community Development Department	$$	FEMA	0	0	0	5	5	5	5	0	5	0	10	0	10	45	Locality Kick-off Meeting
3	Create a regional watershed hydraulic and hydrologic model to better understand flooding issues, stormwater system capacity, and stream conditions under future climate projections. Using the model, create a priority action plan of flood mitigation actions.	CVPDC, Locality DPWs/Planning Departments	$$$	DCR Community Flood Preparedness Fund (CFPF)	0	0	10	10	10	0	5	5	10	5	5	5	10	65	Wortan & Sampson
4	Apply for funding and update the HMP in November 2024.	Community Development Department	$$	FEMA, VDEM	0	0	10	5	5	5	5	5	10	5	10	5	10	75	Locality Kick-off Meeting
5	Conduct a regional water supply study. Evaluate risks, resources and redundancy opportunities. Execute interconnection resource agreements between communities. Create conservation strategies and drought management plans.	Regional Multi-Departmental Action	$$	AWIA, Locality Cost-Share	0	0	0	0	0	0	0	0	0	0	5	5	10	20	Locality Kick-off Meeting
6	Evaluate risks associated with sewage pipes crossing streams and flood impacts (e.g. spillage risks).	DPW	$	Stormwater Local Assistance Fund	0	0	0		5	0	0	0	0	0	5	10	10	30	Locality Kick-off Meeting
7	Develop an educational program for private property owners with septic systems on water quality, conservation, and flood mitigation.	Community Development Department	$$	VDEM	0	0	0	5	5	0	5	0	5	0	0	10	10	30	Locality Kick-off Meeting
8	Develop a VDOT regional vulnerability assessment of the road and highway network.	VDOT	$$$	VDOT	0	5	0	10	5	5	5	5	0	0	5	5	10	55	Berkley Group asked localities their 10 million dollar "wish list"
9	Establish HMP Technical Advisory Committee, include locality, citizen, business, agency representation, that meets at least twice per year to review HMP mitigation strategy progress, evaluate changes, review regional projects.	CVPDC, Emergency Management/Public Safety, Multi-Departmental Action	$$	FEMA, VDEM	0	0	0	0	0	0	0	0	0	0	10	5	0	15	HMP High Priority
10	Purchase equipment and execute agreement for regional Public Safety Answering Point (PSAP) generator(s) to facilitate rapid and efficient emergency communication and response capabilities between the region's emergency response departments.	Public Safety Departments	$$	VDEM	0	0	0	0	5	5	5	5	5	0	10	10	0	45	HMP High Priority

Scoring Criteria Definitions for Action Prioritization Matrix

This document provides the basis for the action prioritization scoring criteria for the Central Virginia Regional Resilience Plan. These criteria were developed to guide which actions the localities within the planning district commission geographic area prioritize moving forward.

Implementation Details

Each action includes implementation details. While this information is not included in the scoring criteria, it does impact how the action will be implemented, who will implement it, and with what funding.

Lead Department - Department that could be the champion of planning and implementing the action, maintaining the action, or coordinating with other departments to implement or maintain the action.

Opinion of Probable Cost – The opinion of probable cost is an order of magnitude estimate of the cost of completing the action. Potential order of magnitude costs associated with the proposed actions are provided for planning studies, assessments, engineering or other design projects, and programs. Costs are not included for ongoing maintenance, but this should be a consideration when choosing which actions to implement. Operations and maintenance are key factors in the success of an action.

$ - Up to $50,000
$$- $50,000 up to $150,000
$$$ - $150,000 up to $500,000
$$$$ - $500,000 up to $1,000,000
$$$$$ - $1,000,000 and greater

Potential Funding –Potential eligibility for funding the action based on existing grant programs (such as the DCR Community Flood Preparedness Fund) or local programs or funds (such a stormwater utility).

Location of Actions in Flood-Problem Areas

Each action is scored based on its location or proximity to a flood problem area. Criteria that relate to this category of scoring include FEMA Flood Zones and flood problem areas that were identified by localities during stakeholder interviews conducted by the Berkley Group in September 2023.

Actions that pertain to the whole locality, such as locality wide plan or a local ordinance, should receive a "5" – a proxy intermediate score – because the action may apply to FEMA Zones, flood-prone areas, non-identified flood prone areas, or areas not currently vulnerable to flooding.

Criteria	Points	Definitions
Action is in a FEMA designated flood zone	**0**	This action is not in any FEMA designated flood zones (such as a location specific project that is in a flood-problem area that *has not* been designated a FEMA flood zone).
	5	This action is not specifically within a FEMA designated flood zone; however, it pertains to areas within flood zones (such as locality-wide ordinances, plans, programs, or policies).
	10	This action is in a FEMA designated 1% annual chance flood zone.
Action is in a flooding problem area (As ID by locality)	**0**	This action is not in a flooding problem area as ID by locality.
	5	This action partially pertains to flooding problem areas as ID by locality (such as locality-wide ordinances, plans, programs, or policies).
	10	This action is in a flooding problem area as ID by locality.

Effectiveness in Mitigating Flooding or Other Climate Impacts

Each action is scored based on its effectiveness in mitigating flood or other climate impacts. Effectiveness is determined based on knowledge of best practices, local understanding of what has worked in the past, or the scale of the action.

The consultant team realizes that "effectiveness" may vary based on the physical conditions of the action location, the unique climate vulnerabilities of that geographic location, and the standards by which the action is planned, designed, implemented, and maintained. This criterium is based on a planning level expert opinion.

- **Effectiveness in Mitigating Flooding** - Potential risk reduction from proposed alternative, either through reducing likelihood or consequence of flooding. This may be related to extreme precipitation flooding, riverine flooding, or erosion.
- **Effectiveness in Mitigating Other Climate Impacts -** Potential risk reduction from proposed alternative, either through reducing likelihood or consequence of climate impacts such as windstorm, urban heat island, or winter weather.

Section	Points	Definitions
Action Mitigates Flooding Impacts	**0**	This action has limited risk reduction.
	5	This action has some risk reduction.
	10	This action substantially reduces risk.
Action helps mitigate windstorm impacts	**0**	This action will not help mitigate windstorm impacts.
	5	This action will somewhat help mitigate windstorm impacts.
	10	This action will help mitigate windstorm impacts.
Action helps mitigate the urban heat island (UHI) effect	**0**	This action will not help mitigate the UHI effect.
	5	This action will somewhat help mitigate the UHI effect.
	10	This action will help mitigate the UHI effect.
Action helps mitigate winter storm impacts (snow or ice)	**0**	This action will not help mitigate windstorm impacts.
	5	This action will somewhat help mitigate windstorm impacts.
	10	This action will help mitigate windstorm impacts.

Action Provides Co-Benefits

Each action is scored based on the co-benefits it may provide residents and community members. For the purposes of this Resilience Strategy, co-benefits include support for priority populations (defined below) or inclusion of nature-based solutions.

- **Supports Socially Vulnerable Populations (as identified in the AdaptVA Tool)**– Action supports socially vulnerable populations: "Social vulnerability refers to the characteristics of an individual or group that impacts their ability to anticipate, cope with, resist and recover from a physical hazard. The level of social vulnerability is dependent on physical, social, economic, and environmental factors." These can include low-income residents, older adults, individuals with limited English proficiency, individuals with limited educational attainment (less than a high school degree), individuals with self-identified disabilities, minority populations, and residents who are undocumented.
- **Nature-based solutions** – Nature-based solutions are a priority project type in the Virginia Community Flood Preparedness Program, meaning that they are more likely to be funded. Additionally, nature-based solutions can improve air and water quality, green the public realm, provide shade and reduce urban heat islands, and help mitigate erosion. Nature-based solutions can also improve public spaces and provide aesthetic value.

Section	Points	Definitions
Action is in Area with Socially Vulnerable Populations	**0**	This action will not impact priority populations.
	5	This action will somewhat impact priority populations.
	10	This action will impact priority populations.
Action is a Nature-Based Solution	**0**	This action is not a nature-based solution.
	5	This action promotes or facilities the creation of nature-based solutions (such as a plan, policy, ordinance, or program).
	10	This action is a nature-based solution or site-scale open space project (such as bioswales, tree box filters, green roofs, green facades, bioretention ponds, rain gardens, buffers to waterways, park spaces).

Feasibility of Implementation

Each action is scored based on the feasibility of implementing the action. Feasibility is evaluated using several criteria.

- **Action was Identified in the FEMA Hazard Mitigation Plan -** The HMP was recently updated and included engagement with the localities to develop a comprehensive set of actions. Therefore, actions have already been approved and adopted by the localities that relate to hazard mitigation and resilience. While this Resilience Plan is a distinct effort from the HMP, actions that are included in both plans should be recognized as being a high priority.
- **Properties Implicated –** Property ownership directly impacts the feasibility of implementing an action. Actions that are located on public property will be more easily implemented by the localities than actions that are specific to private property. Some actions are located on public rights of ways or locality easements, which may require coordination with private property owners, but are within the domain of the local government.
- **Maintenance Required** – The success of an action is dependent on how well it is upkept and maintained. Therefore, when planning and implementing priority actions, localities should consider their capacity for operations and maintenance in the future. Although maintenance needs should not be a deterrent to implementing effective flood mitigation actions, low-maintenance actions receive a higher score since they are more feasible to *successfully* implement, maximizing their effectiveness.
- **Action was Identified in Stakeholder Interviews (2023)** – Actions that were specifically mentioned or identified by locality stakeholders during interviews with the Berkley Group, receive a higher score, as they are considered actions most relevant to localities today (at the time of resilience plan development).

Section	Points	Definitions
Action was ID in Hazard Mitigation Plan (HMP)	**0**	This action was not identified in the HMP.
	5	This action may have some of the components identified in the HMP.
	10	This action is directly identified in the HMP.
Action Aligns with Community Flood Preparedness Fund (CFPF) Principles	**0**	This action does not align with any CFPF Principles.
	5	This action aligns with 1-3 CFPF Principle.
	10	This action aligns with 3 or more CFPF Principles.
Properties Implicated (Public, PROW, Easement, Private)	**0**	This action will take place on public property.
	3	This action will take place on public right-of-way (PROW).
	5	This action will take place on an easement.
	10	This action will take place on private property.
Maintenance Required	**0**	This action will require frequent maintenance once implemented.
	5	This action will require some on-going maintenance once implemented.
	10	This action will not require on-going maintenance once implemented.
Action was Identified in a Stakeholder Interview (2023) as a Priority Action	**0**	This action was not mentioned in the Resilience Plan stakeholder engagement.
	10	This action was mentioned in the Resilience Plan stakeholder engagement.

APPENDIX B – 2020 CVPDC HMP Data and Maps

*same link/document for all

Community	Page Numbers	Topic	Downloadable	Link:
CVPDC	4-20,21	Existing Floodplains	Yes	https://www.cvhmp.com/static/files/flooding.pdf*
CVPDC	4-20,4-21	Existing Floodplains	Yes	
CVPDC	4-24,4-25	Repetitive Loss Properties	Yes	
CVPDC	*4-26*	Repetitive Loss Areas	Yes	
Amherst County	4-20,4-21	Existing Floodplains	Yes	
Amherst County	4-24,4-25	Repetitive Loss Properties	Yes	
Amherst County	*4-26*	Repetitive Loss Areas	Yes	
Amherst County	4-34, 4-35	NFIP Dashboard	Yes	
Amherst County	4-35, 4-36	Principal Flood Problems	Yes	
Amherst County	4-36-41	Vulnerable Populations and Structures	Yes	
Amherst County	4-42-45	Map of Vulnerable Structures in the Floodplain	Yes	
Amherst County	4-46	Map of Community Growth Areas	Yes	
Appomattox County	4-20,4-21	Existing Floodplains	Yes	
Appomattox County	4-24,4-25	Repetitive Loss Properties	Yes	
Appomattox County	*4-26*	Repetitive Loss Areas	Yes	

Community	Page Numbers	Topic	Downloadable	Link:
Appomattox County	4-34, 4-35	NFIP Dashboard	Yes	
Appomattox County	4-35, 4-36	Principal Flood Problems	Yes	
Appomattox County	4-36-41	Vulnerable Populations and Structures	Yes	
Appomattox County	4-42-45	Map of Vulnerable Structures in the Floodplain	Yes	
Appomattox County	4-46	Map of Community Growth Areas	Yes	
Town of Appomattox	4-20,4-21	Existing Floodplains	Yes	
Town of Appomattox	4-24,4-25	Repetitive Loss Properties	Yes	
Town of Appomattox	*4-26*	Repetitive Loss Areas	Yes	
Town of Appomattox	4-34, 4-35	NFIP Dashboard	Yes	
Town of Appomattox	4-35, 4-36	Principal Flood Problems	Yes	
Town of Appomattox	4-36-41	Vulnerable Populations and Structures	Yes	
Town of Appomattox	4-42-45	Map of Vulnerable Structures in the Floodplain	Yes	
Town of Appomattox	4-46	Map of Community Growth Areas	Yes	
Bedford County	4-20,4-21	Existing Floodplains	Yes	

Community	Page Numbers	Topic	Downloadable	Link:
Bedford County	4-24,4-25	Repetitive Loss Properties	Yes	
Bedford County	*4-26*	Repetitive Loss Areas	Yes	
Bedford County	4-34, 4-35	NFIP Dashboard	Yes	
Bedford County	4-35, 4-36	Principal Flood Problems	Yes	
Bedford County	4-36-41	Vulnerable Populations and Structures	Yes	
Bedford County	4-42-45	Map of Vulnerable Structures in the Floodplain	Yes	
Bedford County	4-46	Map of Community Growth Areas	Yes	
Town of Bedford	4-20,4-21	Existing Floodplains	Yes	
Town of Bedford	4-24,4-25	Repetitive Loss Properties	Yes	
Town of Bedford	*4-26*	Repetitive Loss Areas	Yes	
Town of Bedford	4-34, 4-35	NFIP Dashboard	Yes	
Town of Bedford	4-35, 4-36	Principal Flood Problems	Yes	
Town of Bedford	4-36-41	Vulnerable Populations and Structures	Yes	
Town of Bedford	4-42-45	Map of Vulnerable Structures in the Floodplain	Yes	
Town of Bedford	4-46	Map of Community Growth Areas	Yes	
Campbell County	4-20,4-21	Existing Floodplains	Yes	
Campbell County	4-24,4-25	Repetitive Loss Properties	Yes	
Campbell County	*4-26*	Repetitive Loss Areas	Yes	

Community	Page Numbers	Topic	Downloadable	Link:
Campbell County	4-34, 4-35	NFIP Dashboard	Yes	
Campbell County	4-35, 4-36	Principal Flood Problems	Yes	
Campbell County	4-36-41	Vulnerable Populations and Structures	Yes	
Campbell County	4-42-45	Map of Vulnerable Structures in the Floodplain	Yes	
Campbell County	4-46	Map of Community Growth Areas	Yes	
City of Lynchburg	4-20,4-21	Existing Floodplains	Yes	
City of Lynchburg	4-24,4-25	Repetitive Loss Properties	Yes	
City of Lynchburg	*4-26*	Repetitive Loss Areas	Yes	
City of Lynchburg	4-34, 4-35	NFIP Dashboard	Yes	
City of Lynchburg	4-35, 4-36	Principal Flood Problems	Yes	
City of Lynchburg	4-36-41	Vulnerable Populations and Structures	Yes	
City of Lynchburg	4-42-45	Map of Vulnerable Structures in the Floodplain	Yes	
City of Lynchburg	4-46	Map of Community Growth Areas	Yes	
Town of Altavista	4-20,4-21	Existing Floodplains	Yes	
Town of Altavista	4-24,4-25	Repetitive Loss Properties	Yes	
Town of Altavista	*4-26*	Repetitive Loss Areas	Yes	
Town of Altavista	4-34, 4-35	NFIP Dashboard	Yes	
Town of Altavista	4-35, 4-36	Principal Flood Problems	Yes	

Community	Page Numbers	Topic	Downloadable	Link:
Town of Altavista	4-36-41	Vulnerable Populations and Structures	Yes	
Town of Altavista	4-42-45	Map of Vulnerable Structures in the Floodplain	Yes	
Town of Altavista	4-46	Map of Community Growth Areas	Yes	
Town of Brookneal	4-20,4-21	Existing Floodplains	Yes	
Town of Brookneal	4-24,4-25	Repetitive Loss Properties	Yes	
Town of Brookneal	*4-26*	Repetitive Loss Areas	Yes	
Town of Brookneal	4-34, 4-35	NFIP Dashboard	Yes	
Town of Brookneal	4-35, 4-36	Principal Flood Problems	Yes	
Town of Brookneal	4-36-41	Vulnerable Populations and Structures	Yes	
Town of Brookneal	4-42-45	Map of Vulnerable Structures in the Floodplain	Yes	
Town of Brookneal	4-46	Map of Community Growth Areas	Yes	

APPENDIX C – Community Plan/Project Criteria Matrix

Community	Plan Name	Purpose	Downloadable	Link
CVPDC	2020 Hazard Mitigation Plan Update	A plan that examines the risk and impact of natural disasters and establishes strategies to mitigate, or lessen, human and property impacts.	Yes	Link
CVPDC	Brownfields Assessment Program	Phase I and Phase II Environmental Site Assessments (ESAs), to support property reuse and remediation planning and economic development and revitalization in the region.	Yes	Link
CVPDC	Housing Study	A compilation of data, maps, and visualizations describing local demographics and measures of housing affordability, housing stock and characteristics.	No	
CVPDC	Transportation Plan	A long-range vision of anticipated transportation needs and regional goals and objectives over a 30-year timeframe.	No	
CVPDC	Comprehensive Economic Development Strategy	Tool to diversify and strengthen the region's economic vitality	Yes	Link
Amherst County	Comprehensive Plan	The County's plan regarding growth, development, and future change for the next five (5) years.	Yes	Link
Amherst County	Madison Heights Master Plan	A masterplan for the Madison Heights area that will provide a guide for growth and development, and what the area could look like in the future.	No	

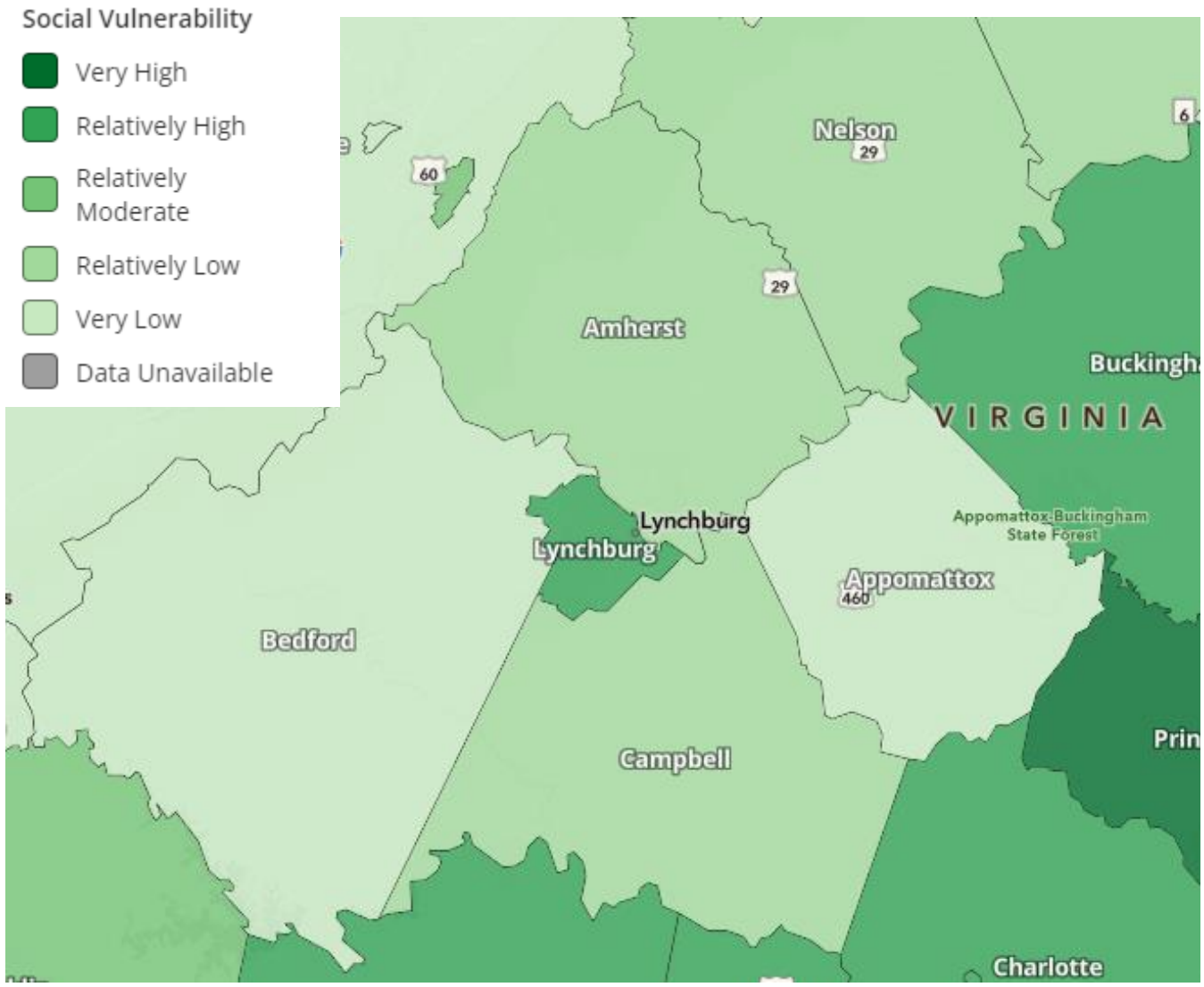
Community	Plan Name	Purpose	Downloadable	Link
Appomattox County	Comprehensive Plan	The County's plan on future growth and development that local leaders and citizens envision for their community.	Yes	Link
Town of Appomattox	Comprehensive Plan	A plan that guides Town Council members in assessing the strengths and weaknesses as well as the potential opportunities for their community.	Yes	Link
Bedford County	Comprehensive Plan	The plan provides a general basis for assisting the County in optimal economic development, land use, and a plan to achieve what citizens of the community.	Yes	Link
Town of Bedford	Comprehensive Plan	A plan where local government officials and citizens express their voices on issues and what they envision for the Town.	Yes	Link
Town of Bedford	Bike/Walk Plan	Prioritized guide for improving bicycling and walking in the Town.	Yes	Link
Campbell County	Comprehensive Plan	The plan that examines the past trends of economic development, citizen input of issues of the County, and guides development that suites the wants or needs of the County.	Yes	Link
City of Lynchburg	Comprehensive Plan	The City's plan for future development and policy guidance that includes several smaller plans including the Parks and Recreation Master Plan, Downtown 2040 Master Plan, and the Diamond Hill Neighborhood Plan.	Yes	Link
City of Lynchburg	Parks and Recreation Master Plan	The City's current and future plan for the development of parks and recreational areas.	Yes	Link

Community	Plan Name	Purpose	Downloadable	Link
City of Lynchburg	Downtown 2040 Master Plan	Address the future growth and development of Downtown.	Yes	Link
Town of Altavista	Comprehensive Plan	A plan that serves as a policy guide for the Town's vision of redevelopment and creating an economic resurgence for its community.	Yes	Link

APPENDIX D – Administrative procedures for regulating the development and substantial improvement of structures in the floodplain by Locality.

Locality	Floodplain Ordinance	Link
Amherst County	Floodplain Overlay District	Article VII, Section 714, Flood Hazard Overlay District (FH)
Town of Altavista	Flood Control	Flood Control Regulations
Appomattox County	Floodplain Overlay District	Section 11 Floodplain Overlay FPO
Town of Appomattox	Floodplain District	Article XIV Floodplain District
Town of Brookneal	Floodplain Regulations	Chapter 154: Floodplain Regulations
Town of Bedford	Flood Hazard District	Sec. 611. Flood Hazard District (FH)
Bedford County	Floodplain Regulations	Article II. – Floodplain Management
Campbell County	Floodplain Management	Chapter 11 Floodplain Management
City of Lynchburg	Floodplain Management	Section 16.2-22 Floodplain Management

APPENDIX E – Social Vulnerability Index and Related Maps



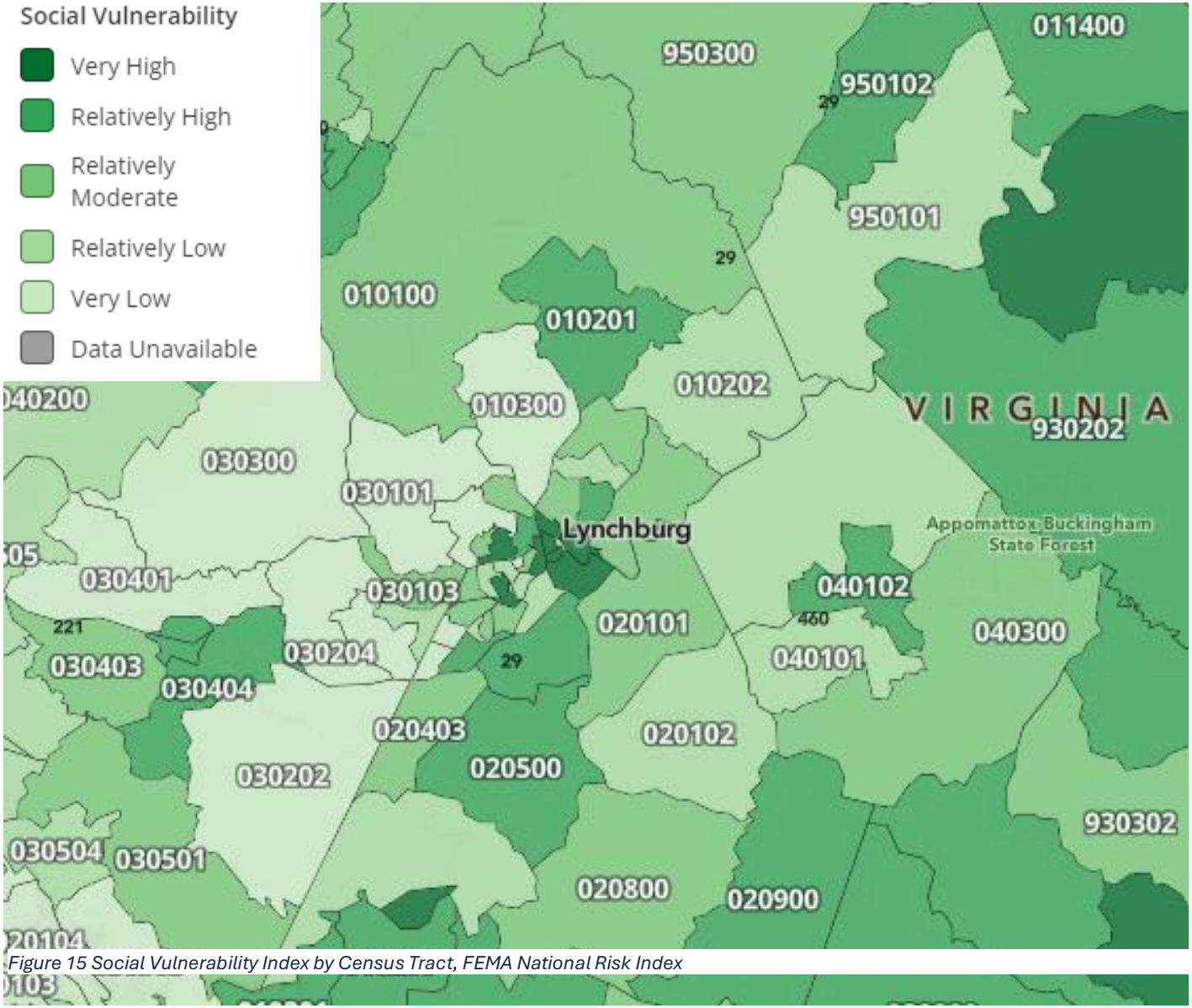


Figure 15 Social Vulnerability Index by Census Tract, FEMA National Risk Index

APPENDIX F – Community Interview Notes

CVPDC Resilience Plan Request for Information

July 31, 2023

Amherst County

Primary Hazards – *Please share any first-hand information concerning the events that have impacted your community, and the infrastructure that helps manage and recover from an event.*	
1.	Known areas of flooding and/or photos of past flood events; • Big concern – fernwood, stratford palce subdivisions behind wal-mart. Went through stormwater mgmt, but shady oak dr. and others were built prior to regulations (2004). Drainage easement aren't adequate, can't handle 10-year storms. Inspected yesterday, channel inadequate, easement isn't dedicated, so it's on the property owner. • Business – cooper steel in floodzone on corner of 5 forks. Pond/lake upstream – if levee breaks, entire area floods. • James River bank.
2.	Stormwater system inventory and/or assessments (and whether there are GIS files available); • Ditches & culverts, too. Not readily available – each new development has BMPs written in permit. Most BMPs assct. With subdivisions over acre/10,000sqft. • After 2018 these are digitized. • GIS site is great – available for download for public use? Public site we send them an email and they can give us shapefiles.
3.	Resident or community focused information or programs on emergency response and preparedness for extreme weather events. • Beyond HMP? Public safety has system where if there's an issue or hazard they can send out signal/message reverse 911 to given radius. • Primary hazard ID'd is flooding. • Ob Howard was looking into stabilization on the James for sewer • EPA plans required for water utilities. Authority plan submitted to EPA – we'd love to have that.
Demographics/Community Info – *Please share information about your community and the populations that are most vulnerable/less able to recover from hazards.*	
1.	Plans, reports, or programs that specifically support priority and/or underserved populations(there may be elements of this in disparate sources, such as housing or transportation plans); • Comp Plan best source – breaks down different districts and can look at LMI districts that way. Broken down by voting districts – average house and incomes. • Emergency plan might too, but for specific communities? • Monacan Nation

2.	Zoning, housing, land use data sets for your locality if not publicly available; • GIS downloadable. Ahead of a lot of other communities about having their data online.
3.	Names of neighborhoods in your community commonly used by residents that you would like used in this plan (such as voting districts) and any GIS maps that delineate these boundaries (if available). •
Funding – *How does your community fund services and/or projects that contribute to hazard preparedness and recovery?*	
1.	Does your community have a Capital Improvement Plan? If so, please provide the sections that related to stormwater, flooding, or heat mitigation; • Do not maintain their own roads – VDOT or private properties • Not an MS4 – DEQ maintains stormwater • Wastewater treatment plant – partially in floodzone. Tim found 331 page document ID'ing all resiliency and threats for plant. • $2MM to stabilize James – threatening to encroach on sewer trunk. • Last week submitted joint work application to protect sewer gravity main. • $2MM to improve emergency spillway on anne french (?) reservoir. • They need to do some master planning – these are more reactive projects. #1 project right now.
2.	Other sources of funding for stormwater, flooding or heat mitigation activities or projects; • CVPDC block grant. • James River Assc. VCAP funding.
3.	Beyond what is in the HMP (2020), specific information on staff capacity or staffing needs to support flood mitigation and preparedness; • Enough manpower for inspections? Nate has data showing what workload of inspectors should be, well over that. • Jarred in EM doesn't have staffing to deal with flood mitigation. • DEQ deals with stormwater, so they inspect plans throughout the course of the project but they don't have their own staff to do that.
4.	Beyond what is in the HMP (2020), needs for critical facility upgrades and continuity of essential services. • Cooper Steel, Ferwood and woodland • Fire department might be in floodplain – area along seminole Dr. is lower income area, private utility system there that ties into County's faces storm and sewer issues. • Dixie Girls softball field of lakeview drive floods frequently and affects nonprofit.
FEMA NFIP CRS Program – *Many of the actions for hazard preparedness your community undertakes may be considered a credit for the CRS program and can save residents money on their NFIP flood insurance policies.*	

1.	What barriers exist for entry in the NFIP CRS program? • Gravel in roadway covered plant.
Conservation/Recreation – *Recreation and open space areas can have multiple benefits, including flood and heat mitigation.*	
1.	Areas/parcels currently being protected as open space, and especially those owned by your locality; • Seminole area; PDC already doing some work in that area. (Peddler fire station)
2.	Current or planned recreation areas, greenways and parks (and GIS data if it exists); • Procurement process to hire 3rd party to do parks master plan. Pull up GIS for layer for trails. • Any with flooding or erosion issues? Tyler: "oh yeah" **get back to them** ○ Coordination – send to Sara
3.	Tree protection plans and/or tree inventories.

- ~~*Roads?*~~ *Coordination between this plan and VDOT between flooding roads would be good.*
- *Other resilience? Code enforcement aspects – resilience in model building codes. Building closer to model codes the more resilient that communities become.*
- *[need to think about policy and regulations and ordinances]*
  - *Public safety – installing two new rain gauges with NWS*
    - *Monitoring is important*
    - *Thrasher's, Buffalo Springs Turnpike*

Amherst County
Interview Follow up: October 11, 2023

Evaluate and implement streambank stabilization along the James River at Madison Heights to protect ACSA trunk sanitary sewer line and provide sediment reduction and environmental protection to the James River.	Amherst County	Flood	N/A	High	Interview Discussion - looking for funding	Received grant funding/ Federal funding requested*
Initiate program and studies to execute elevation, relocation, or acquisition measures, especially in area of repetitive flooding, to reduce or eliminate flooding and high hazard dam failure impacts to lives, property and financial impacts to families and communities.	Amherst County	Flood	N/A	High	Interview Discussion - looking for funding	Private Dams
Provide hardening or preparedness best practices to private property owners, especially if in the flood zone, high hazard dam inundation zone, or known for repetitive stormwater impacts, to reduce or eliminate flooding and dam failure impacts; include information on roadway highwater safety. Target communication with historical areas (e.g. Monacan Ancestral Museum), isolated and vulnerable communities.	Amherst County	Flood	N/A	Medium	Interview Discussion - looking for funding	Most issues are on Private property associated with subdivisions

Meeting Notes: Amherst Resilience Plan Review

Wednesday, February 21, 2024, 10:00AM – 11:00AM

EST Prepared by Luke Peters

In attendance (#):

First	Last	Organization/Affiliation	Position
Luke	Peters	Berkley Group	Planner II
Kate	Jones	Berkley Group	Principal Planner
Nate	Young	Amherst	
Tyler	Creasy	Amherst	
Kelly	Hitchcock	CVPDC	

Meeting Notes

Preview of individual locality sections of the CVPDC Resilience Plan.

Debris Management Plan:

- *EOP is on the website, otherwise reach out to Brad.*

Critical infrastructure:

- *Public safety might be interested in the VDOT crash data.*

Dams:

- *Tyler interested in developing DBIZ maps, using plan for that (definitely mention this).*

Future Conditions:!

Recommended Policies:

- *DEQ handles commercial development over a certain size – over an acre, and they account for quantity and quality.*
    - *Smaller lot sizes in subdivisions and future development could be looked at, though.*
- *Might not control the land in Madison Heights needed for increased tree planting – try for incentives for private property owners.*

Project Prioritization:

- *How'd they get to "action lead" on which department should take it on?*
    - *Probably just from HMP – okay if so.*

Prioritized Flood Resilience Strategy:

Other Notes:

- *Amherst is interested in having the data from the maps, packaged easy.*
- *Tyler wanted to make sure County admin knows what's going on, but they should be set.*

Subdivision behind Madison Heights Walmart (Shadey Oaks Dr)

Cooper Steel (in a flood zone) – privately own dam

James River bank along county

Trunk line for the public sewer serving half of **Madison Heights**, also a vulnerable area, the County's commercial hub and largest town, is on the north bank of James River and threatened by river bank erosion. Some of
the water lines and many of the sewer lines follow the streams. A pump station is also in the base loodplain and other pump stations are inaccessible during flood events.

Sycamore Ln (In Madison heights)

- Area of existing private sewer line
- Manholes take in water during floods: runs into sewer systems
- Sewar systems become backed up during floods
- Runs into resident properties

Trying to public/private project – funding with DEQ? Underserved area? Lower income area. Facilities are not up to current authority standards. Current owner has to pay up. Older neighborhood.
May be opportunities.

Williams Run – precip flooding
Sewer lines and water lines through there, pp or non profit. A portion of that. Main drainage area, in the floodway.
180 acre development starting upstream. Stormwater will increase. All SW is private.
Madison Heights conceptual master plan
Multiple census tracks, 80% of LMI

Disadvantaged Communities –

Old Town Madisson Heights

29 B, everything E of 29, LMI/Disadvantaged.

Stormwater scenario – Shady Oak drive, near stratford Place, Natural drainage channel, floods all the backyards, and goes into Williams run. HOA holds the easement.
Yes, the owners would provide access.
James river association.
Debris Management Plan – N0. Raw water
intake. Debris Management Plan,
Public owned dams, study at Winton farms, dam inspection studies and further analysis.
VDEM – private roads in the county, NW area, topographiy is steep, all private owned bridges, for access purposes.Study funded by FEMA. District roads.

Appomattox County

- *Johnnie*

Primary Hazards – *Please share any first-hand information concerning the events that have impacted your community, and the infrastructure that helps manage and recover from an event.*	
1.	Known areas of flooding and/or photos of past flood events; • [missed this]
2.	Stormwater system inventory and/or assessments (and whether there are GIS files available); • Might have contact with the town to see if there's an inventory. Town public works guy holds GIS close to the vest.
3.	Resident or community focused information or programs on emergency response and preparedness for extreme weather events. • They have severe weather alert code red system. Town has a siren.
Demographics/Community Info – *Please share information about your community and the populations that are most vulnerable/less able to recover from hazards.*	
1.	Plans, reports, or programs that specifically support priority and/or underserved populations(there may be elements of this in disparate sources, such as housing or transportation plans); • LMIs and neighborhoods aren't in distinct places – there's little strips. Town of Pamphlin is the most distressed, but doesn't flood. Town of Appomattox has a couple neighborhoods. Metalark/Steven's street has some, but also not very susceptible to flooding.
2.	Zoning, housing, land use data sets for your locality if not publicly available; • They have town and county zoning. Send Johnnie an email to download it – send it to Timmons guy.
3.	Names of neighborhoods in your community commonly used by residents that you would like used in this plan (such as voting districts) and any GIS maps that delineate these boundaries (if available). • Just use historical crossroads – like Oakville. Used to have old schools (use school districts). Promiseland, Aveera. Stonewall, etc.
Funding – *How does your community fund services and/or projects that contribute to hazard preparedness and recovery?*	
1.	Does your community have a Capital Improvement Plan? If so, please provide the sections that related to stormwater, flooding, or heat mitigation; • They have one, but getting a stormwater project on there is highly difficult. Nothing on the list right now – dealing with schools and old courthouse buildings. Community center on police tire rd. $1.8MM project for industrial park has been on list for 4-5 years now.
2.	Other sources of funding for stormwater, flooding or heat mitigation activities or projects; • Nope. No flooding projects ever.

3.	Beyond what is in the HMP (2020), specific information on staff capacity or staffing needs to support flood mitigation and preparedness; • Interested in training? Johnnie is a floodplain manager but doesn't have a ton of knowledge or official CFM. Inspector in the field doesn't have too much training either.
4.	Beyond what is in the HMP (2020), needs for critical facility upgrades and continuity of essential services. • Get their water from Campbell County, source is CCUSA hooked into Town system.
FEMA NFIP CRS Program – *Many of the actions for hazard preparedness your community undertakes may be considered a credit for the CRS program and can save residents money on their NFIP flood insurance policies.*	
1.	What barriers exist for entry in the NFIP CRS program? • Nope
Conservation/Recreation – *Recreation and open space areas can have multiple benefits, including flood and heat mitigation.*	
1.	Areas/parcels currently being protected as open space, and especially those owned by your locality; • 100 acres on police **tower** rd (recreation park). Phil's branch runs along the border and there's a walking trail across the stream, goes into industrial park a little. There are some issues right at the bridge. On the industrial park side there's wetlands, they did permitting to get 100' of trail there. When it floods though it wipes the trail out.
2.	Current or planned recreation areas, greenways and parks (and GIS data if it exists);
3.	Tree protection plans and/or tree inventories.

- *No other real resilience concerns. Maybe tornadoes?*

- *Roads? They're all VDOT. They have some that flood but VDOT handles it. Done a good job in recent years replacing lower bridges and adding box culverts. They don't do anything with roads.*

CVPDC Regional Resilience Plan – Bedford County/Town Data & Interview Session

Thursday, August 17th, 2023

Atendees

- Luke Peters - Berkley Group Environmental Planner
- Kate Jones - Berkley Group Principal Planner
- Kelly Hitchcock - CVPDC Deputy Director of Planning
- Sara Oakley - CVPDC Regional Planner
- Jordan Mitchell – Director of Community Development
- Kevin Leamy – Natural Resources Engineer
- Mary Zirkle – Economic Development Coordinator
- Kent Robey – Director of Emergency Management
- Jared Thompson – Project Administrator

Primary Hazards

1. **Known areas of flooding and/or photos of past flood events.**
    - Just created emergency operation plan – addresses flooding
    - VDOT is making list of areas prone to flooding (will be emailed to us)
2. **Stormwater system inventory and/or assessments (and whether there are GIS files available);**
    - Town uses VDOT funding?
3. **Resident or community focused information or programs on emergency response and preparedness for extreme weather events.**
    - Social media, local news,

radio Demographics/ Community Info

1. **Plans, reports, or programs that specifically support priority and/or underserved populations (there may be elements of this in disparate sources, such as housing or transportation plans);**
    - Use census tract data
    - Hilltop community low/moderate income**,** Town: south of Main St., trailer parks in county
2. **Zoning, housing, land use data sets for your locality if not publicly available**
    -
3. **Names of neighborhoods in your community commonly used by residents that you would like used in this plan (such as voting districts) and any GIS maps that delineate these boundaries (if available).**

Funding

1. **Does your community have a Capital Improvement Plan? If so, please provide the sections that are related to stormwater, flooding, or heat mitigation.**
    -
2. **Other sources of funding for stormwater, flooding or heat mitigation activities or projects.**
    -
3. **Beyond what is in the 2020 HMP specific information on staff capacity or staffing needs to support flood mitigation and preparedness.**
    - County is interested in more training
4. **Beyond what is in the 2020 HMP, needs for critical facility upgrades and continuity of essential services.**
    - None

FEMA NFIP CRS

Program

1. **What barriers exist for entry in the NFIP CRS program?**
    - Haven't seen a real need (flooding related)
    - May want to particpate as a town (HMP has number of flood insurance

policies) Conservation/Recreation

- GIS layer of town park
- Green infrastructure project from UVA
- Updating parks masterplan

- *Kent Robey, new director of EM*
- *Jared Thompson, project admin from town of bedford*
- *Kevin*
- *Jordan Mitchell, dir. Commdev (with two others from nat. res.) Bedford County*
- *Mary, Town of Bedford*

Primary Hazards – *Please share any first-hand information concerning the events that have impacted your community, and the infrastructure that helps manage and recover from an event.*	
1.	Known areas of flooding and/or photos of past flood events; • Kent: Brand new plan being voted on in 28th meeting addresses flooding. VDOT working on rds that flood often (not a lot of them); mostly concerned about flooding that traps residents, have ID'd a few places. Kent will try and find a way for them to escape when flash floods occur. • Couple bridges and roads have been wiped out in the past. • They'll email us the list.
2.	Stormwater system inventory and/or assessments (and whether there are GIS files available); • Don't have extra data from what you'd get from the state. • Town – not sure where drain inlet layer comes from but they have it. VDOT maintains town streets.
3.	Resident or community focused information or programs on emergency response and preparedness for extreme weather events. • Algae blooms? Went on social media, went to HOAs down there, signage at boat ramps, heavily publicized Town Hall on local news and radio, + real estate agents. Some residents canceled vacations because of algae blooms. 7 people got sick (gastral stuff) who took transit down there. Have EM website up and running.
Demographics/Community Info – *Please share information about your community and the populations that are most vulnerable/less able to recover from hazards.*	
1.	Plans, reports, or programs that specifically support priority and/or underserved populations(there may be elements of this in disparate sources, such as housing or transportation plans); • Town – just uses Census tract data. Very clear where LMI areas are, see where they coincide with flood plain • County – census is the same thing. They have generalized areas (can email to us). •
2.	Zoning, housing, land use data sets for your locality if not publicly available; • Trailer parks (generally R-3) are on maps they can email us.

3.	Names of neighborhoods in your community commonly used by residents that you would like used in this plan (such as voting districts) and any GIS maps that delineate these boundaries (if available). • Town – hilltop area CBDG funds for housing. • Also look specifically at mobile home parks. (High ridge trailer park).
Funding – *How does your community fund services and/or projects that contribute to hazard preparedness and recovery?*	
1.	Does your community have a Capital Improvement Plan? If so, please provide the sections that related to stormwater, flooding, or heat mitigation; •
2.	Other sources of funding for stormwater, flooding or heat mitigation activities or projects; • Fining folks for stormwater control ordinance – can dedicate the funds to improving stormwater measures. • Town – VDOT funding earmarked for stormdrain projects. • Town – wants to map existing stormwater structures (wasn't aware there even was a GIS overlay).
3.	Beyond what is in the HMP (2020), specific information on staff capacity or staffing needs to support flood mitigation and preparedness; • County and Town both looking to get CFMs
4.	Beyond what is in the HMP (2020), needs for critical facility upgrades and continuity of essential services. • Heat mitigation/cooling stations; come out of general fund when they need to open them up, generally done at churches (set up by red cross). o Had 100 degree heat and power knocked out for a long time from derecho. State steps in with water and ice. •
FEMA NFIP CRS Program – *Many of the actions for hazard preparedness your community undertakes may be considered a credit for the CRS program and can save residents money on their NFIP flood insurance policies.*	
1.	What barriers exist for entry in the NFIP CRS program? • Not a huge flooding need in Town. •
Conservation/Recreation – *Recreation and open space areas can have multiple benefits, including flood and heat mitigation.*	
1.	Areas/parcels currently being protected as open space, and especially those owned by your locality; • Town has isolated the park layers. In county comp plan as well. • County GIS open data portal probably has it.

2.	Current or planned recreation areas, greenways and parks (and GIS data if it exists); • Greenway plan for trail going through little otter bottom.
3.	Tree protection plans and/or tree inventories. • 2021 UVA from green infrastructure center did canopy assessemnt in Town.

Campbell County

Jeff Wells, director, Campbell utilities,

Josh Gribel, [pribble, operations superintendent] Sean Fitzgibbons,
Austin Mitchell,

Primary Hazards – *Please share any first-hand information concerning the events that have impacted your community, and the infrastructure that helps manage and recover from an event.*	
1.	Known areas of flooding and/or photos of past flood events; • Wastewater treatment plant in Rustberg behind cit. services – raw water lagoons have creek running beside it, and creek during intense rainfall will fill lagoons which they then have to treat along with sewage. Main plant operated in the County. Serves entire village of rustberg. •
2.	Stormwater system inventory and/or assessments (and whether there are GIS files available); • Austin: they have dataset but it's not exhaustive, has 30-40 points. 5 years ago there was push to map inventory. Stormwater features mapped in GIS and linked to original plans for post-construction BMP inspection. •
3.	Resident or community focused information or programs on emergency response and preparedness for extreme weather events. • HMP is the guiding document.
Demographics/Community Info – *Please share information about your community and the populations that are most vulnerable/less able to recover from hazards.*	
1.	Plans, reports, or programs that specifically support priority and/or underserved populations(there may be elements of this in disparate sources, such as housing or transportation plans); • Nothing specific to certain areas, but broad statements in Comprehensive plan.
2.	Zoning, housing, land use data sets for your locality if not publicly available; • Zoning is on the publicly available site. Future land use. Can be downloaded – two separate sites.
3.	Names of neighborhoods in your community commonly used by residents that you would like used in this plan (such as voting districts) and any GIS maps that delineate these boundaries (if available). • Voting districts. Just redone in the past couple years – available on GIS download site.
Funding – *How does your community fund services and/or projects that contribute to hazard preparedness and recovery?*	
1.	Does your community have a Capital Improvement Plan? If so, please provide the sections that related to stormwater, flooding, or heat mitigation; • They have CIP but nothing in next 5 years related to stormwater.
2.	Other sources of funding for stormwater, flooding or heat mitigation activities or projects; •

a

3.	Beyond what is in the HMP (2020), specific information on staff capacity or staffing needs to support flood mitigation and preparedness; • Have CFM – public works director. Also the environmental manager. Bryan Stokes
4.	Beyond what is in the HMP (2020), needs for critical facility upgrades and continuity of essential services. • Raw water pump station on big otter river – flooded once in past 20-30 years (1995) hurricane and dam breach. • About to spend $40MM refitting school. Sean working on it now. Brookneal High School. Gym flooded from overflow. • Waterlick Rd brookline drive/woodlawn cricle neighborhood, get flooding complaints pretty frequently. • 460 just flooded near Moore's country store (ID'd in HMP) • Sunnymead Rd closed currently, Town Fork rd •
FEMA NFIP CRS Program – *Many of the actions for hazard preparedness your community undertakes may be considered a credit for the CRS program and can save residents money on their NFIP flood insurance policies.*	
1.	What barriers exist for entry in the NFIP CRS program? • Not a lot of policies in town, but have they ever thought about it?
Conservation/Recreation – *Recreation and open space areas can have multiple benefits, including flood and heat mitigation.*	
1.	Areas/parcels currently being protected as open space, and especially those owned by your locality; • County-owned parcels? They have a layer with park facilities. • Conservation easements are private.
2.	Current or planned recreation areas, greenways and parks (and GIS data if it exists);
3.	Tree protection plans and/or tree inventories.

- *Right around treatment plant is a mixed-use village*
- *Immediate vicinity is primarily wooded.*
- *Trail? Rustberg trail along creek.*
- *Sidewalks being built – underserved communities – plant trees to prevent flood.*

Campbell County
Interview Follow up: October 12, 2023

1. *Wastewater treatment plant in Rustberg behind cit. services – raw water lagoons have creek running beside it, and creek during intense rainfall will fill lagoons which they then have to treat along with sewage. Main plant operated in the County. Serves entire village of rustberg.*

   Any further progress on this we should know about? Any more incidents since we last spoke?

   No more events. Prolonged rainfall events cause it to come out of the banks. Once that water gets in the basin, must be treated. Concrete barriers put up.

   Funding to be able to evaluate solutions that may be appropriate. Conceptual design studies.

   Picnic table across from county public works buildings. Wooded area maybe a park County land.

2. *Sidewalks being built – underserved communities – plant trees to prevent flood. What is the status of this project? Where are the sidewalks being planned and built? Altavista Town.*

3. Is stormwater inventory completed? Have some GIS layers

   Need for stormwater modelling/analysis to determine potential needs and project areas?

   Modelling not needed. Not at this ime.

4. Private Property Flooding:

   Waterlick Rd brookline drive/woodlawn cricle neighborhood, get flooding complaints pretty f requently.

   Old neighborhood, headwaters of a creek, possibly stream restoration here? Private property.

   Are there opportunities for projects here? Are there drainage easements in place if private property? BMPS.

5. Repetitive Loss Area is Alta Vista Town –
   HMP High priority : Initiate program and studies to execute elevation, relocation, or acquisition measures, especially in area of repetitive flooding, to reduce or eliminate flooding and high hazard dam failure impacts to lives, property and financial impacts to families and communities. Also a low income community.

6. 34 Dams in Campbell County – any known projects of interest? HMP identified 3 dams as high hazard. Timberlake, New Camp Hydaway and Otter River Reservoir. More are unknown status. Further studies needed?

DCR Dams management – inspection reports. Second part of the question, unknown not at this time.

City of Lynchburg

- *Erin Hawkins, MS4 manager*
- *Kevin Henry*
- *Epiphany Vandebogart*
- *Timothy Mitchell*

Primary Hazards – *Please share any first-hand information concerning the events that have impacted your community, and the infrastructure that helps manage and recover from an event.*	
1.	Known areas of flooding and/or photos of past flood events; • Basement flooding (Kevin) • Riverine flooding – issues with that throughout the year. Increased storm events (two 100yr in the past 4-5 years). • Current FEMA mapping is awaiting upgrade. Haven't gotten the official determination, but they have access to preliminary data. • Particular persistent issue on __wood Dr. • Few more overland flooding areas have become worse over the years – Wythe Rd, Fort Avenue block, old toyota dealership on woodge (words?) rd on Rt 29 business (river and stormwater issue; floodplain at bottom and floodplain at top).
2.	Stormwater system inventory and/or assessments (and whether there are GIS files available); • In past 5 years have updated inventory from as-built plans. In 2013 they started inventory for MS4, can all be requested through water resources, city-wide or particular areas. Kathleen Feinen can request it. • Public culverts and railroad culverts are also listed on there.
3.	Resident or community focused information or programs on emergency response and preparedness for extreme weather events. • Emergency Action Plan for 3 high hazard dams, 1 which will be removed. Aber water plant lagoon (technically in bedford), peddler reservoir (amherst in the national forest). • [should be available on open portal] there's some inundation maps for privately owned lakes. • Also have "know your zone" mapping available to public. Add Melissa and Amy to conversations. • Situations with last dam flood events – EM services didn't have copy of EAP that dam owners were activating.
Demographics/Community Info – *Please share information about your community and the populations that are most vulnerable/less able to recover from hazards.*	

1.	Plans, reports, or programs that specifically support priority and/or underserved populations(there may be elements of this in disparate sources, such as housing or transportation plans); • Look in the Housing White Paper from 3-4 years ago. BG is doing Lynchburg's Comp Plan but there might not be anything too useful in there. • Neigborhoods are laid out on their GIS(!) • Any specific areas or neighborhoods that are particularly susceptible? College Hill Timber Park Diamond Hill (might be worst one) • Census info available on open portal too. • Not all areas of the city are considered in neighborhoods. Don't exclude anyone.
2.	Zoning, housing, land use data sets for your locality if not publicly available;
3.	Names of neighborhoods in your community commonly used by residents that you would like used in this plan (such as voting districts) and any GIS maps that delineate these boundaries (if available).
Funding – *How does your community fund services and/or projects that contribute to hazard preparedness and recovery?*	
1.	Does your community have a Capital Improvement Plan? If so, please provide the sections that related to stormwater, flooding, or heat mitigation; • CIP is online, but specific flood actions? • Looking at outfall rehab • Gravity sewers located near streams – they're eroding and meandering more. • Fort Avenue event in July caused them to look into capacity.
2.	Other sources of funding for stormwater, flooding or heat mitigation activities or projects; • Three enterprise funds – water, wastewater, stormwater. Applied for SLAF and VRA laons. Want to be open for CFPF.
3.	Beyond what is in the HMP (2020), specific information on staff capacity or staffing needs to support flood mitigation and preparedness;
4.	Beyond what is in the HMP (2020), needs for critical facility upgrades and continuity of essential services.
FEMA NFIP CRS Program – *Many of the actions for hazard preparedness your community undertakes may be considered a credit for the CRS program and can save residents money on their NFIP flood insurance policies.*	
1.	What barriers exist for entry in the NFIP CRS program? • Looking into it.

Conservation/Recreation – *Recreation and open space areas can have multiple benefits, including flood and heat mitigation.*	
1.	Areas/parcels currently being protected as open space, and especially those owned by your locality; • Have to sort by ownership (Lynchburg).
2.	Current or planned recreation areas, greenways and parks (and GIS data if it exists);
3.	Tree protection plans and/or tree inventories.

- *Lynchburg handles all their own roads*

Lynchburg City

Follow up Interview.

10/11/23

- Are there FY 2024 CIP projects related to flooding or extreme heat that went unfunded?

  CIP - *Ford Ave* looking to upsize SW infras. but there are adjacent areas, Studies tdml purposes but could correlate, need areas studied.

- Are there opportunities to expand FY2024 CIP projects to improve flood and/or extreme heat resilience? Perhaps Phase II?
- Neighborhoods close to downtown were discussed as being underserved : College Hill, Diamond Hill area. We would like to ask a few more questions about these areas and their needs.

Diamond Hill neighborhood plan – greenway trail system and street trees. Charlotte Lester

- Potential projects along the James River waterfront – two; first project is public works nearing construction, Jefferson park project off the ground. Park infrastructure, no green yet.

  Along the james – funded by water resources, bank stabilization, sanitary sewer projects, gets uncovered and bank needs stabilization.

  Two projects in river bank stabilization design: Norfolk southern crosses the, WWTP discharges.

  Walk sanitary sewer line along the James.

  Sanitary Sewer Fund. Funding the design, what about construction-yes.

  Center of Lynchburg, issues with

  Blackwater Creek bank stabilization -

From HMP:

- Reusens area. Over 30 homes and train warehouses of CSX Railroad sit in this floodplain. Two facili□es, the Reusens Dam Hydro Plant and an electrical substa□on, are located here (Figure446,panel B).
  ● Forest Hill / Blue Ridge Farms area. Some homes and buildings of Peak View Park are in the floodplain (Figure 4-47, Panel C).
  ● Lynchburg Expressway (Route 460) / Timberlake Rd (Route 501) interchange. Several clusters of townhouses, single family houses, and duplexes are in the floodplain near this interchange along

- Burton Creek (Figure 4-48, Panel

D). Incorporate

Stormwater analysis studies – neighborhood level?

CSO project there or around there.

Ongoing Sewer projects – piggy backing on top of with stormwater.

Public works projects – add SW. O[illegible]en would like to add green infrastructure,

Na[illegible]onwide drive, city road, office park, no sidewalks no$ for stormwater, can we

Neighborhood needs but need further analysis, needs direc[illegible]on

Modelling of stormwater

Data driven inventory already done. Rough idea of sizes.

Mee□ng Notes: Altavista Resilience Plan Review

Thursday, February 22, 2024, 10:00AM – 11:00AM EST

Prepared by Luke Peters

In attendance (#):

First	Last	Organiza□on/Affilia□on	Posi□on
Luke	Peters	Berkley Group	Planner II
Kate	Jones	Berkley Group	Principal Planner
Gary		Altavista	
Mathew	Perkins	Altavista	
Tom	Fore	Altavista	

Mee□ng Notes

Preview of individual locality sec□ons of the CVPDC Resilience Plan.

Debris Management Plan:

- *Town calls in all staff needed when trees fall – knuckleboom trucks that go out, haul to wwtf (stockpile of debris), then bring in a firm to chip it all.*
    - *Also assist VDOT with areas immediately around Town for debris that might end up on bypass, etc.*
    - *EOP is being worked on currently, not complete, but will include this.*
    - *WWT has their own EOPs (these aren't publicly released). VDEM wants these on file, especially the drinking water facility, and want it by 2025. (can mention this in the Plan as well).*

Ecological Cores/Natural Assets:

- *There are some incorrect assets (like Abbot-Duncan recreation field)*

Cri□cal infrastructure:

Town of Altavista

- *Gary Shanaberger, town manager altasvista*
- *Tom Fore, public services director (sharon williams was there too)*
- *Mathew perkins, asst. town manager*

Primary Hazards – *Please share any first-hand information concerning the events that have impacted your community, and the infrastructure that helps manage and recover from an event.*	
1.	Known areas of flooding and/or photos of past flood events; • Pittsylvania ave (primary business 29 main st corridor) is a downward incline when first make the turn, water level has been up to the bottom of the railroad bridge that you go under. Stops all ingress/egress. Assistance at water plant is cut off. Stream behidn water plant floods Grit Rd (continuation of ricky abys-shelton). If the water isn't in the plant, you can't get to it. • Same thing occurring at wastewater treatment plant. • Release from leesvile and smith mt lake – can't control flow coming down. Have to release controls on reservoir dams. If dams overflowed altavista would be gone. • Altavista flooding pictures on google. Had 37-year flood which created problem with treatment (halicidics and trilomethanes, lot of organixs) had to violate standard •
2.	Stormwater system inventory and/or assessments (and whether there are GIS files available); • (incl. ditches and culverts). No Inv. Of drop inlets. There *should* be an inventory of easements. Tom would like to inventory every asset. Would like funding to get that done. •
3.	Resident or community focused information or programs on emergency response and preparedness for extreme weather events. •
Demographics/Community Info – *Please share information about your community and the populations that are most vulnerable/less able to recover from hazards.*	
1.	Plans, reports, or programs that specifically support priority and/or underserved populations(there may be elements of this in disparate sources, such as housing or transportation plans); • Mosely heights community – were trying to improve quality of life, pretty much on Franklin Ave up to Eudora semicircle. From 10th to 16th, and ties back into Avendale. Beginning of community is YMCA family center in flood area. • Not a lot of asst. living senior places, but there's a nursing home. • Large hispanic community, playing soccer in english park. • Derelict homes inventory - %-wise are 5-10%. Look at housing. • Look to comprehensive plan and **transit dev**. **elopment plan**

2.	Zoning, housing, land use data sets for your locality if not publicly available; • Campbell County GIS has their info. If you look at it on CC site – go to planning layer; uncheck zoning districts for county they'll show just altavista.
3.	Names of neighborhoods in your community commonly used by residents that you would like used in this plan (such as voting districts) and any GIS maps that delineate these boundaries (if available).
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1.	Does your community have a Capital Improvement Plan? If so, please provide the sections that related to stormwater, flooding, or heat mitigation; • Recently Sharon reapplied with DCR about stream bank restoration. Town owns large portion of bank that's in the Town from WWTP to area owned by Isaac Grotto (couple miles). • Creek coming down from Pittsylvania Ave (Lynch Creek) has been targeted for imporvement for bank restoration. • Raw water line supplying to water plant going under bridge need to be bored under river and upgraded in size. • In English park, working at edge of the river trying to create trail. • Can't raise water or sewer plant up, but can protect them. • Some streambank restoration has already been done on Franklin behind YMCA. Stream was flooding play area behind the building. Creek is TMDL on DEQ's list for improvement. • Asked DEQ to look at Gose Creek that dumps into Staunton river – when it rains there's runoff and erosion coming off it it affects the quality of water.
2.	Other sources of funding for stormwater, flooding or heat mitigation activities or projects; • Utility fee? Town has agreement with VDOT to maintain roadways throughout the town (all except alleyways and Main St and Bedford) – mowing grass, guardrails, stormwater (drop inlet on Pittsylvania Ave, e.g.). • Washout on Lynch creek tree fell off and is going to cause $90k • Prioritize redoing asphalt on highways every 2 years, but otherwise Tom sends Kelly **water assessment plan** broken down over 25 year period (last done 2017-2018). • Rainfall coming through private property (town easement) got 55 gallon drums to act as culvert that drops under Frasier Rd. Barrels deteriorated and sinkholes through property – Town's responsibility. Can use VDOT highway fund to fix, but then takes away from paving.
3.	Beyond what is in the HMP (2020), specific information on staff capacity or staffing needs to support flood mitigation and preparedness; • Can get CFM certified.

4.	Beyond what is in the HMP (2020), needs for critical facility upgrades and continuity of essential services. • Public works facility – houses salt for roads, staff, etc. Equipment. • YMCA daycare belongs to Altavista, just used by YMCA • Just redid raw water intake facility – put it above 500-year floodplain and added generator. That's taken care of. ID'd in HMP and completed through FEMA grant.
FEMA NFIP CRS Program – *Many of the actions for hazard preparedness your community undertakes may be considered a credit for the CRS program and can save residents money on their NFIP flood insurance policies.*	
1.	What barriers exist for entry in the NFIP CRS program? • Would like to learn more about it. Gary slightly familiar from Appomattox. Would like to know their responsibility in administrating it.
Conservation/Recreation – *Recreation and open space areas can have multiple benefits, including flood and heat mitigation.*	
1.	Areas/parcels currently being protected as open space, and especially those owned by your locality; • Create public zoning district in Altavista just to distinguish between public facilities like English Park and High School – currently in R-1 district.
2.	Current or planned recreation areas, greenways and parks (and GIS data if it exists); • They've got more parks than Lynchburg. Off 7th treet they have war emmorial ball field and tree park with picnic tables and grist mill and parking lot folks use for car shows and farmers markets, etc. o Mosely Heights park (Leonard Coleman) o Bedford ave. park (tennis/basketball) o Also own industrial area down by walmart – 120 acres. o Railroad with caboose, etc. • They do have parks and recs plan (2018) • Booker Building in English park – looking into BRIC grant for getting air conditioning.
3.	Tree protection plans and/or tree inventories.

- *Roads?*
- *Other Resilience? Heat. When it's really hot folks ride the bus just to get out of the heat.*
  - *Comp Plan talks about 7th st is used a lot but there are no trees.*
- *Monitoring?*
-

Type text here

-

Repe��ve Loss Proper�es:

-

Motor Vehicle Crashes Due to Standing Water:

- *They do manage some roads in the town, and we don't have condition data for their owned culverts.*
    - *Throw Franklin Ave into the mix – at the YMCA near Penn. Ave. Lynch Creek comes down through their and causes flooding.*
    - *Include 7th St as well.*
    - *[Road] doesn't change names until you get to Grit Rd (and has 3 names)*

Dams:

- *Leesville and Smith Mt. Lake dam getting more attention because App. Power gives them annual EAP report – Altavista is responsible for evacuation. If Leesville breaks they have 54 minutes.*
- *Spoke with Tracey Fairchild (County EMS coord.) to have sit-down; don't really have evacuation plan, especially for people without cellphones.*
    - *Tornado/dam break warning alarm.*

Extreme Heat:

-

Future Condi�ons:

-

Recommended Policies:

-

Project Priori�za�on:

-

Priori�zed Flood Resilience Strategy:

- *Everything up to Leesville Dam needs a watershed management plan. Doesn't preclude anyone from using water for agriculture but do need to stop erosion + sediment.*
    - *Staunton + Roanoke river are one in the same in the area around Altavista.*
    - *Have 4 points in key steps, then cost has 5 points, though 4 and 5 are going to be together.*
    - *Discuss drinking water reservoir for droughts?*
        - *Or in flood event, if extra water is too muddy to treat, still have good water from reservoir.*

Other Notes:

-

Follow-up/To-do/Future Mee&#xFFFD;ngs/Links:

-

Town of Amherst

- *Sara McGuffin*

Primary Hazards – *Please share any first-hand information concerning the events that have impacted your community, and the infrastructure that helps manage and recover from an event.*	
1.	Known areas of flooding and/or photos of past flood events; • Significant portion of wastewater plant is in the floodplain, but haven't had an issue for several years. Pipes going along streams might not get undermined, but a tree falling might impact it. How do you secure and stabilize sewer lines open to the outside? • Bypass gets flooded when it rains, and people are going fast. Not exactly in Town. • Old Mill Trapezium brewing
2.	Stormwater system inventory and/or assessments (and whether there are GIS files available); • Don't have a stormwater plan, and between County and DEQ don't want anything to do with it.
3.	Resident or community focused information or programs on emergency response and preparedness for extreme weather events. • Social media, code red system
Demographics/Community Info – *Please share information about your community and the populations that are most vulnerable/less able to recover from hazards.*	
1.	Plans, reports, or programs that specifically support priority and/or underserved populations(there may be elements of this in disparate sources, such as housing or transportation plans); • Have some low-income and historically black neighborhoods – but it's very itnermingled. Hot housing market has flipped some houses in old neighborhoods and brought values back up. They don't have any plans that speak specifically to it or any special neighborhood delineations.
2.	Zoning, housing, land use data sets for your locality if not publicly available; • PDC has most recent map.
3.	Names of neighborhoods in your community commonly used by residents that you would like used in this plan (such as voting districts) and any GIS maps that delineate these boundaries (if available).
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1.	Does your community have a Capital Improvement Plan? If so, please provide the sections that related to stormwater, flooding, or heat mitigation; • Have CIP, but probably not flood hazards.
2.	Other sources of funding for stormwater, flooding or heat mitigation activities or projects;

3.	Beyond what is in the HMP (2020), specific information on staff capacity or staffing needs to support flood mitigation and preparedness; • Not aware of staff issues.
4.	Beyond what is in the HMP (2020), needs for critical facility upgrades and continuity of essential services. • Hardening projects down at wastewater, esp. the headworks. Upper and lower plant, everything from lower plant has to get pumped up to upper, all wastewater through headworks gets pumped up, and it's in the floodplain. Two digesters in the floodplain. Hasn't been flooded in many years, but if they were, all the sludge would be in rutledge creek. • Operate a water plant as well. Raw water pump station is right on edge of floodplain.
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Conservation/Recreation – *Recreation and open space areas can have multiple benefits, including flood and heat mitigation.*	
1.	Areas/parcels currently being protected as open space, and especially those owned by your locality; • Park with couple creeks that go through that floods and is flood plain. Park master plan resides in mcguffin's brain.
2.	Current or planned recreation areas, greenways and parks (and GIS data if it exists); • No separate layer
3.	Tree protection plans and/or tree inventories.

- *All roads are VDOT*
- *Other resilience? Can't think of anything.*

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