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Section I. Executive Summary

Background

Between 2005 and 2006, the West Piedmont Planning District Commission coordinated the development of a regional multi-jurisdictional hazard plan that included the counties of Franklin, Henry, Patrick and Pittsylvania; the cities of Danville and Martinsville; and the towns of Chatham, Boones Mill, Gretna, Hurt, Ridgeway, Rocky Mount and Stuart. This plan is an update, in accordance with federal regulations, of the plan originally adopted in 2006.

Using a process similar to that used for the original plan, the planning district convened a Mitigation Advisory Committee (MAC) comprised of representatives of the participating jurisdictions. The MAC worked with the Dewberry team and provided input at key stages of the process. In addition, the plan was discussed at various public meetings, including a listening session to which over 115 organizations were invited to attend in addition to the general public.

Hazard Identification and Risk Assessment

The Hazard Identification and Risk Assessment consists of three parts:

1. Identify what hazards that could affect the planning area
2. Profile hazard events and determine what areas and community assets are the most vulnerable to damage from these hazards
3. Estimate losses and prioritize the potential risks to the community

Hazards were ranked by the steering committee to determine what hazards they feel have the largest impact on their communities. Certain hazards were not addressed due to the infrequency of occurrence and/or limited impact. Table I-1 summarizes the results of the hazard identification, which is explained fully in Section V of this plan.

Table I-1. West Piedmont Region Planning Consideration Levels

Hazard Type	Planning Consideration Level	Virginia 2010 State Ranking
Natural		
Winter Storms	Significant	Medium-High
Flooding	Significant	High
Wind (including Hurricanes, Thunderstorms)	Moderate	Medium-High
Drought	Moderate	Medium
Wildfire	Moderate	Medium

Table I-1. West Piedmont Region Planning Consideration Levels		
Hazard Type	**Planning Consideration Level**	**Virginia 2010 State Ranking**
Tornado	Limited	Medium
Earthquake	Limited	Medium-Low
Landslide	Limited	Medium-Low
Shoreline Erosion	None	Not ranked; addressed with Flood
Human-Caused		
Dams	Significant	Low
HVT Lines	Moderate	Not ranked addressed in other sections of COVEOP
Organic/Inorganic Spills	Moderate	
Pipelines	Moderate	
Agriterrorism	Limited	

The Hazard Identification and Risk Assessment (HIRA) described each of the hazards in varying levels of detail consistent with each planning consideration level. A variety of hazards, both natural and human-caused, have the potential to impact the West Piedmont region. Data analysis presented in the HIRA and input from the Mitigation Advisory Committee indicate that Winter Storms and Flooding have the most significant and frequent impacts on the planning area and its citizens. In addition to the potential for injury or loss of life and damage to property and crops, these hazards have the potential to cause the disruption of utilities and transportation systems, which can contribute to lost business and decreased productivity. It should be noted that relative to other jurisdictions in the Commonwealth, the West Piedmont Planning District is generally in the middle of the spectrum for vulnerability.

In addition to natural hazards, the West Piedmont Planning District profiled the following human-caused hazards: Dam failure, failure of high voltage transmission lines, organic and inorganic spills, pipeline failures, and agriterrorism. Each of these hazards is described, and past occurrences, if applicable, are identified. In most cases, a methodology has not been identified for conducting vulnerability analyses for human-caused hazards; therefore, although information is provided related to the presence of risk in the Planning District, full vulnerability analyses were not conducted.

Dam failure is ranked as a significant hazard; however, due to Homeland Security concerns, a vulnerability analysis was not conducted. The other human-caused hazards were ranked as moderate or limited.

Capability Assessment

The Capability Assessment evaluates the current capacity of the communities of the West Piedmont Planning District to mitigate the effects of the natural hazards identified in the Hazard Identification and Risk Assessment. By providing a summary of each jurisdiction's existing capabilities, the Capability Assessment serves as the foundation for designing an effective hazard mitigation strategy. Table I-2 summarizes the Capability Self-Assessment provided by the participating jurisdictions.

Table I-2. Capability Self-Assessment

Jurisdiction	*Planning and Regulatory Capability*	*Administrative and Technical Capability*	*Fiscal Capability*	*Political Capability*	*Overall Capability*
City of Danville	M	M	M	M	**M**
Franklin County	M	L	L	M	**M**
Henry County	m	m	L	m	**m**
City of Martinsville	L	L	L	M	**L**
Patrick County	L	M	L	M	**L**
Pittsylvania County	M	M	M	M	**M**

Mitigation Strategy

The West Piedmont committee members used the results of the Hazard Identification and Risk Assessment as well as the Capability Assessment to develop goals and actions for the region and their jurisdictions. The committee members validated the original seven goals (1-7) and two additional goals (8-9):

1. To protect persons and property, and reduce future damage and losses to the community
2. Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to natural hazards
3. Protect new and existing public and private infrastructure and facilities from the effects of hazards
4. Ensure continued functionality of critical services

5. Enhance the capabilities and capacity of local government to lessen the impacts of future disasters
6. Develop and implement education and outreach programs to increase public awareness of risk
7. Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population
8. Increase use of existing and new technology to enhance disaster mitigation, preparedness, response and recovery*
9. Promote regional approaches to emergency management*

In addition, the committee identified and prioritized actions for the region and individual jurisdictions. The priorities differ somewhat from jurisdiction to jurisdiction. Each jurisdiction's priorities were developed based on past damages, existing exposure to risk, community goals, and weaknesses identified in the Capability Assessment.

Plan Maintenance Procedures

The plan outlines a procedure for implementing, maintaining, and updating the plan. The WPPDC will be responsible, with assistance from a regional working group, for monitoring and evaluating the plan annually.

A 5-year written update to be submitted to the state and FEMA Region III, unless disaster or other circumstances (e.g., changing regulations) lead to a different time frame. Efforts will be made to inform the public of the implementation and updating of the mitigation plan throughout the next five years.

Conclusion

This plan symbolizes the continued commitment and dedication of the West Piedmont region's local governments and community members to enhancing the safety of residents and businesses by taking actions before a disaster strikes. While nothing can be done to prevent natural hazard events from occurring, the region is poised to minimize the disruption and devastation that so often accompanies these disasters.

Section II. Introduction

Mitigation

Mitigation is commonly defined as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects. Hazard mitigation focuses attention and resources on community policies and actions that will produce successive benefits over time. A mitigation plan states the aspirations and specific courses of action that a community intends to follow to reduce vulnerability and exposure to future hazard events. These plans are formulated through a systematic process centered on the participation of citizens, businesses, public officials, and other community stakeholders.

A local mitigation plan is the physical representation of a jurisdiction's commitment to reduce risks from natural hazards. Local officials can refer to the plan in their day-to-day activities and in decisions regarding regulations and ordinances, granting permits, and in funding capital improvements and other community initiatives. Additionally, these local plans will serve as the basis for states to prioritize future grant funding as it becomes available.

It is hoped that the West Piedmont Hazard Mitigation Plan will be a useful tool for all community stakeholders by increasing public awareness about local hazards and risks, while at the same time providing information about options and resources available to reduce those risks. Teaching the public about potential hazards will help each of the area's jurisdictions protect themselves against the effects of the hazards, and will enable informed decision making on where to live, purchase property, or locate businesses.

The area covered by this plan includes the counties of Franklin, Henry, Patrick and Pittsylvania; the cities of Danville and Martinsville; and the towns of Chatham, Boones Mill, Gretna, Hurt, Ridgeway, Rocky Mount and Stuart. All of the jurisdictions from the 2006 plan are participating in this plan update.

The Local Mitigation Planning Impetus

On October 30, 2000, President Clinton signed into law the Disaster Mitigation Act of 2000 (DMA 2000), which established a national disaster hazard mitigation grant program that would help to reduce loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters.

DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act and added a new section to the law, Section 322 Mitigation Planning. Section 322 requires local governments to prepare and adopt jurisdiction-wide hazard mitigation

plans for disasters declared after November 1, 2003, (subsequently revised to November 1, 2004) as a condition of receiving Hazard Mitigation Grant Program (HMGP) project grants and other forms of non-emergency disaster assistance. Local governments must review and, if necessary, update the mitigation plan every five years from the original date of the plan to continue program eligibility.

The requirements for local mitigation plans are found in 44 Code of Federal Regulations (CFR) Part 201.6. FEMA's *Local Multi-Hazard Mitigation Planning Guidance* issued in July 2008 provides the official interpretation and explanation of the regulations. In addition, the Virginia Department of Emergency Management and FEMA use the *Local Hazard Mitigation Plan Review Crosswalk* to ensure that a plan meets FEMA's regulatory requirements as well as additional requirements identified by the Commonwealth. This plan has been created with these requirements in mind and meets all of the required elements.

Organization of the Plan

The remaining sections of this document follow the process enumerated in DMA 2000.

Section III – Planning Process defines the processes followed throughout the creation of this plan including a description of the West Piedmont region's stakeholder involvement.

Section IV – Community Profile provides a physical and demographic profile of the area, looking at things such as geography, hydrography, development, people, and land uses.

Section V – Hazard Identification and Risk Assessment evaluates the natural hazards likely to affect the West Piedmont region, and quantifies whom, what, where, and how the region might be affected by natural hazards.

Section VI – Capability Assessment analyzes each of the four local jurisdictions' policies, programs, plans, resources, and capabilities to reduce exposure to hazards in the community.

Section VI – Mitigation Strategy addresses the West Piedmont region's issues and concerns for hazards by establishing a framework for mitigation activities and policies. The strategy includes a mission, statement, goals, objectives, and a range of actions to achieve the goals.

Section VIII – Plan Maintenance Procedures specifies how the plan will be monitored, evaluated, and updated, including a process for continuing stakeholder involvement once the plan is completed.

Section IX – References include a list of reports and data used to develop this plan.

Appendices are included at the end of the plan, and contain supplemental reference materials and more detailed calculations and methodologies used in the planning process.

Section III. Planning Process

The West Piedmont Planning District Commission has seven member localities – Franklin, Henry, Patrick, and Pittsylvania Counties; the Cities of Danville and Martinsville; and the Town of Rocky Mount. The Planning District Commission was formed by these local governments in 1968 under the authority of the Virginia Area Development Act. The Planning District Commission serves to build regional approaches to issues like economic development, transportation, and legislative priorities.

Beginning in 2003, the State of Virginia encouraged the twenty-one planning districts in the state to take the lead on development of local hazard mitigation plans. These plans, which are required by DMA 2000, help local governments determine risks and vulnerabilities and identify projects to reduce these risks. The plan developed under the auspices of the West Piedmont Planning District Commission includes the counties of Franklin, Henry, Patrick and Pittsylvania; the cities of Danville and Martinsville; and the towns of Chatham, Boones Mill, Gretna, Hurt, Ridgeway, Rocky Mount and Stuart.

After receiving funding in 2004, the West Piedmont Planning District Commission contracted with the engineering consulting firm, Dewberry, to develop a multi-hazard mitigation plan including a Hazard Identification and Risk Assessment (HIRA) and mitigation strategies. The Mitigation Advisory Committee worked with the consultants throughout the planning process to ensure that potential stakeholders participated in the planning process and had opportunities for input in the draft and final phases of the plan. The West Piedmont Planning District Commission contracted with Dewberry to update the plan in 2011. A record of changes to the plan is included as Appendix F.

The Mitigation Advisory Committee

The planning district convened a Mitigation Advisory Committee (MAC) comprised of representatives of the participating jurisdictions. The MAC worked with the Dewberry team and provided input at key stages of the process. Efforts to involve city and county departments and community organizations that might have a role in the implementation of the mitigation actions or policies included invitations to attend meetings and serve on the MAC, access to the project website (projects.dewberry.com/WPiedHMPUpdate), e-mails updates, strategy development workshops, plus opportunities for input and comment on all draft deliverables.

The West Piedmont Planning District Commission would like to thank and acknowledge the following persons who served on the MAC and their representative departments and organizations throughout the planning process:

Table III-1. West Piedmont Mitigation Committee Participants		
Name	**Title and/or Department**	**Jurisdiction**
Steve Allen	Director of Public Safety	Patrick County
Buster Brown	Emergency Management Coordinator	City of Danville
Lee Clark	Director of Planning, Zoning, and Inspection	Henry County
Jim Davis	Director of Emergency Management and Communications	Pittsylvania County
James Ervin	Town Manager	Town of Rocky Mount
Lynn Frith	Town Manager	Town of Boones Mill
Lisa Garrett		Henry County
Edmund Giles	Mayor	Town of Chatham
Lillian Gillespie	Mayor	Town of Hurt
Ken Gillie, Jr.	Planning Division Director	City of Danville
Daryl Hatcher	Emergency Management Coordinator	Franklin County
David Lilly	Town Manager	Town of Gretna
Teresa McCormick		Patrick County
Ed Page	Mayor	Town of Ridgeway
Bob Phillips	Emergency Management Coordinator	City of Martinsville
Terry Tilley	Town Manager	Town of Stuart
Dale Wagoner	Director/Public Safety	Henry County
Michael Ward	Director of Regulation & Compliance	Henry County Public Service Authority
West Piedmont Planning District Commission Staff		
Robert W. Dowd	Executive Director (retired)	
Aaron Burdick	Executive Director (current)	
Joan Hullett	Deputy Director	
Leah Manning	Chief Cartographer/Planner	

Between February 2011 and May 2011, the MAC held three meetings (in-person and via conference call/WebEx) and supervised work on the area's mitigation plan. The MAC members coordinated and consulted with other entities and stakeholders to identify and delineate natural hazards within the thirteenseven local jurisdictions and to assess the risks and vulnerability of public and private buildings, facilities, utilities, communications, transportation systems, and other vulnerable infrastructure. In addition, the individual MAC members met with the consultant to review the plan and identify jurisdictional mitigation actions.

In developing the mitigation plan, a majority of necessary communication occurred through telephone calls and emails. The MAC and its consultant chose this avenue to best accommodate budgets and schedules. A project website (http://projects.dewberry.com/WPiedHMPUpdate) was established to facilitate the planning process. Table III-2 documents formal meeting dates and their purposes.

Table III-2. Mitigation Advisory Committee

Date	Summary of Discussions
February 16, 2011	Planning process was described. Commitment to the project and schedule was obtained. List of hazards and rankings from previous plan was validated. Discussion of old plan structure and content was held; decision was made to retain structure and general level of content. Discussion of update process and role of MAC members was held.
March 18, 2011	Results of the HIRA were presented. Goals from previous plan were reviewed and modified. Process for updating previous mitigation actions and developing new actions was discussed. A public meeting followed the committee meeting.
May 5, 2011	Regional and local actions were discussed. Previous plan maintenance procedures were reviewed and validated.
June 10, 2011	Draft plan was discussed. Adoption process discussed.

Public Participation and Citizen Input

As shown in Table III-2 above, the public was afforded several opportunities to provide input and to participate throughout the planning process. An open public meeting was held on March 18, 2011, to allow the general public an opportunity to meet with the planning consultants and MAC members, ask questions, and provide comments and input on the draft mitigation plan. An advertisement was run in newspapers throughout the planning area to inform the public of the public meeting. In addition, representatives from various agencies and organizations were invited to attend the public meeting. Appendix A lists these agencies and organizations.

The stakeholders listed in Appendix A also were invited to participate in an on-line survey. In addition, Henry County distributed the survey link to more than 150 stakeholders. The on-line survey was also advertised on the WPPDC, City of Danville, Franklin, Pittsylvania, and Henry County websites as well as the Pittsylvania County Facebook page. The survey, the results of the survey and screenshots documenting how the survey was advertised are in Appendix A.

The hazard mitigation plan also was discussed at several West Piedmont Planning District Commission meetings, which are advertised and open to the public. A customizable brochure was developed for the jurisdictions to use in their public outreach efforts. This brochure was widely distributed throughout the planning district.

The draft plan was made available on the Planning District Commission's website (http://www.wppdc.org). Hard copies were made available for review at the offices of each participating jurisdiction. An advertisement was run in newspapers throughout the planning area to inform the public that the draft plan was available for review. In addition, a notice was sent to the stakeholders list inviting them to review and comment on the plan.

Neighboring jurisdictions were invited to review and provide input into the plan. These jurisdictions included:

Virginia:

- Mount Rogers PDC
- New River Valley PDC
- Region 2000 Regional Commission
- Roanoke Valley-Alleghany Regional Commission
- Southside PDC

North Carolina:

- Caswell County
- Rockingham County
- Stokes County
- Surry County

The 2006 plan has been used to inform public presentations and public inquiries by the emergency management directors in the participating jurisdictions. The plan is mentioned during presentations at public meetings and used as a reference when preparing new plans. In addition, the Planning District Commission has distributed brochures about the plan throughout the planning area as well as displaying information about the plan in the Planning District Commission's office. The plan has been available on-line throughout the past 5 years.

Incorporation of Existing Plans and Studies

The West Piedmont Hazard Mitigation Plan update incorporates information from a number of other plans, studies and reports that have been previously produced. These documents include:

- 2010 Commonwealth of Virginia Hazard Mitigation Plan, VDEM;
- Landslide Incidence and Susceptibility in the Conterminous United States, USGS;
- Virginia Energy Patterns and Trends;
- Evaluation of Dan River Dams within the City of Danville, October 2010;
- Henry County Emergency Operations Plan, 2010;
- Franklin County Comprehensive Plan, 2007;
- Henry County Comprehensive Plan, 2007;
- Pittsylvania County Comprehensive Plan;
- West Piedmont Planning District Commission Draft Regional Water Supply Plan, 2010;
- Commonwealth of Virginia Emergency Operation Plan 2010; and,
- City of Martinsville Comprehensive Plan, 2009.

Information about these plans and studies is included in Sections II, III, and VI of the plan and full reference information is provided in the References Section.

Section IV. Community Profile

Introduction

The West Piedmont Planning District Commission (WPPDC) is located in the historic and scenic mountains and foothills of southwestern Virginia. The District is comprised of four counties and two independent cities. The region also has seven incorporated towns within its borders. The jurisdictions included in this plan are:

- Franklin County
- Henry County
- Patrick County
- Pittsylvania County
- City of Danville
- City of Martinsville
- Town of Boones Mill
- Town of Chatham
- Town of Gretna
- Town of Hurt
- Town of Ridgeway
- Town of Rocky Mount
- Town of Stuart

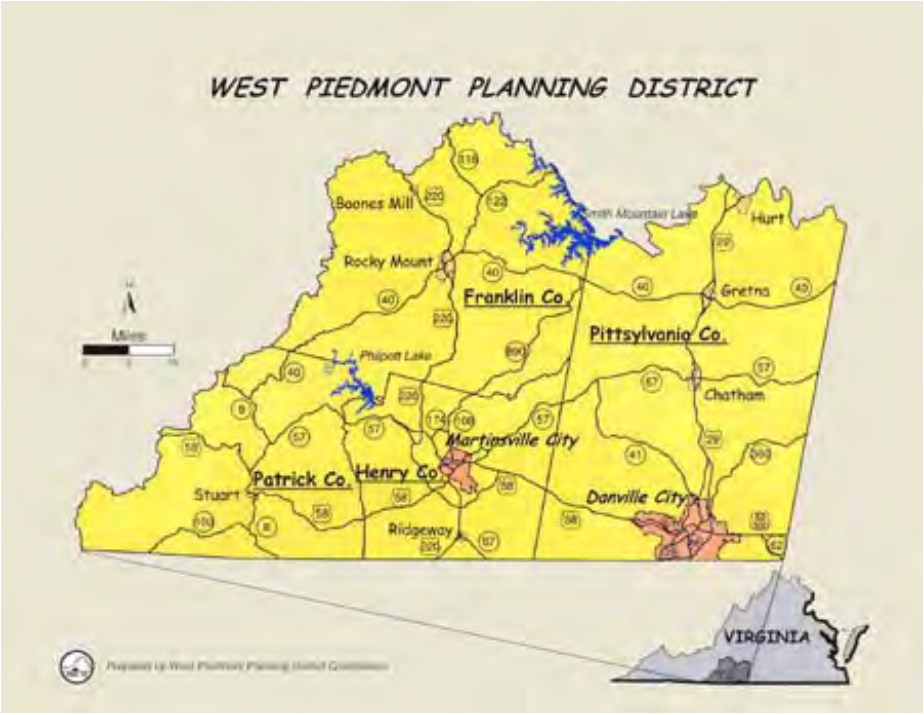


Figure IV-1. Location of the West Piedmont District

The planning area encompasses approximately 2,582.7 square miles and is home to some 246,052 persons, according to the 2005-2009 5-year estimates from the American Community Survey (ACS). This is a 1.7% decrease from the 2000 Census population count of 250,195. The West Piedmont Planning District is bounded on the west by the elevations of the Blue Ridge Mountains and on the east by the foothills of the Piedmont. The State of North Carolina forms the southern border of the study area. The Roanoke (Staunton) River forms the northeast border of the Planning District flowing in a southeastern direction towards the Atlantic Ocean. Portions of the Roanoke River Basin, in which the Planning District lies, are developing into major commercial and industrial concentrations. Recreational development and associated business development within the region also have expanded due to the presence of Smith Mountain and Leesville Lakes, Philpott Lake, Fairy Stone State Park, and the Blue Ridge Parkway.

Of the District's 1.6 million acres of land, approximately 10,712 acres are publicly held and protected by four Wildlife Management Areas and one Natural Area Preserve. The headwaters of the Banister, Blackwater, Dan, Mayo, Pigg, and Smith Rivers are located in the District. Divided by U.S. Highways 58, 220, 29, and 360, the District is located just south of Roanoke, approximately 50 miles north of Greensboro, NC, 140 miles southwest of Richmond, VA, and 200 miles west of the Port of Hampton Roads.

Based on total land mass, Henry County is the smallest county in the planning area with 382 square miles. Pittsylvania County is the largest at 971 square miles. Patrick County contains 483 square miles, while Franklin County encompasses 692 square miles. The City of Danville is 43 square miles and the City of Martinsville covers 11 square miles.

Physiography

The District falls within two subprovinces of the Piedmont of Virginia (see Figure IV-2 for a map of the physiographic provinces and subprovinces. The Foothills Subprovince (F) is characterized by broad rolling hills and moderate slopes. This area subprovince covers the western portion of the District, just east of the Blue Ridge Mountains. Elevations range from 400 to 1,000 feet, with peaks rising from 1,500 to 2,500 feet. The other subprovince, covering the majority of the District, is the Outer Piedmont Subprovince (OP). This subprovince is characterized by broad upland with

low to moderate slopes. Elevations range from 600 to 1,000 feet in the west, gradually diminishing to 250 to 300 in the east.[1]

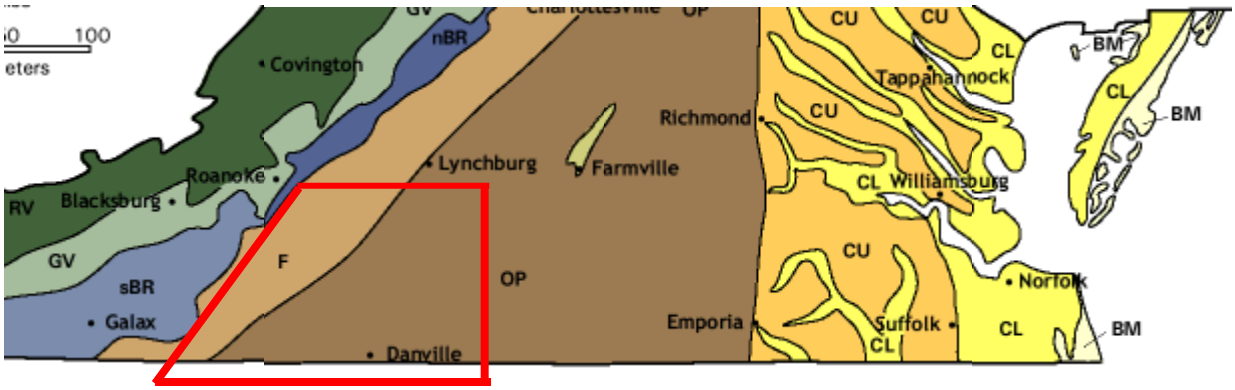


Figure IV-2. Physiographic Provinces of West Piedmont District

Hydrology

The planning area lies within two major watersheds – the Roanoke, and the Yadkin, with 95% of the area in the Roanoke. The Roanoke watershed spans 6,274 square miles, the second largest in Virginia, and is fed mainly by the Roanoke River, the Dan River, the Banister River and the Kerr Reservoir. The Yadkin watershed is fed by the Ararat River and covers about 118 square miles.

The planning area is bound on the north by the Roanoke River and the south by the Dan River, the Sandy River, and the North and South Mayo Rivers. In addition, the Pigg River flows through it and numerous creeks crisscross the planning area.

Land Use and Development Trends

The counties in the planning area are primarily rural while the cities exhibit a more urban/suburban development pattern. There are also seven incorporated towns in the planning area that act as commercial and residential nodes. Appendix B4 includes existing and future land use maps for the region and offer insight into the types of development projected into the future.

[1] Bailey, C. M. *Physiographic Map of Virginia*. 1999. Retrieved from http://www.wm.edu/geology/virginia/phys_regions.html#piedmont

City of Danville

The City of Danville is the primary economic center within Pittsylvania County. The City currently lacks direct access to a federal interstate highway, which has hindered its growth. However, the proposed Interstate 785 is expected to be designated in the future, which will utilize the existing U.S. Route 29/U.S. Route 58 bypass (Danville Expressway). The I-785 initiative would be a spur of Interstate 85 in Greensboro, North Carolina, and streamline travel from North Carolina to Washington, D.C. The City of Danville has developed industrial parks in recent years. Airside Industrial Park is located just off U.S. Route 58 in the vicinity of the Danville Regional Airport. River View Industrial Park, which is adjacent to Airside Industrial Park, has been expanded in conjunction with the development of the Cyberpark, located near the intersection of U.S. Route 58 and 29. The City, in cooperation with Pittsylvania County, has recently completed development of a regional industrial park—the Cane Creek Centre is located off U.S. Route 58 in the Ringgold area of Pittsylvania County. In 2008, Danville and Pittsylvania County announced plans to develop a new 3,500-acre mega-park off Berry Hill Road and U.S. Route 58 near the North Carolina line which will serve a 50-mile radius in Southside Virginia and part of North Carolina. The localities hope the joint project will attract a major auto manufacturer or other large manufacturer to the area that would provide thousands of jobs. The Norfolk Southern Railroad, the Transco natural gas line, and electric lines from the City of Danville cross the site. Danville is home to several manufacturing companies including Goodyear Tire & Rubber Co., Nestle Refrigerated Foods, and Intertape Polymer. Danville has a variety of housing options ranging from early 20th-century Victorians, Georgian Revival, and Edwardian architecture to suburban Colonial-style homes to neighborhoods centered on golf courses. According to the City's Comprehensive Plan, the City's policy of underwriting infrastructure costs for residential subdivisions has encouraged "leapfrog" development.

The City of Danville's Future Land Use Plan emphasizes conserving vulnerable environmental areas while also providing areas for projected development. The plan organizes the city by twelve planning areas and ten entrance corridors. Areas such as large contiguous tracts of sensitive slope, floodplains and wetlands are excluded from the developable parts of each planning areas. Approximately 9,494 acres are available for development according to the Comprehensive Plan. The plan estimates that between 9,000 and 15,000 homes could be built in the City, given the amount of developable land that is available. Almost two million square feet of retail and services uses could be accommodated while the Future Land Use Plan allows for between 20-25 million square feet of employment generating development. Overall,

About 58% of the land would be used for residential, 5% for office or services uses, and about 35% for economic development or industrial uses. The remaining two percent are classified as government, public, or other uses.

Franklin County

As of 1995, almost 40% of the land in Franklin County was used for agriculture. This percentage is likely to have decreased in accordance with the general decline in the number of acres used for farming that was seen between 1964 and 1987. According to the 2007 Census of Agriculture, 37.6% of land in Franklin County was used for agriculture. Tobacco was the leading cash crop in the area, however, is likely not to be true in the future given the national downward trend in tobacco crops. In addition, dairy, eggs, apples, and timber contributed to the farming sector's earnings. Franklin County ranked second out of 78 milk-producing counties in Virginia, according to the 2007 Census of Agriculture. Agriculture is concentrated in the eastern and central portions of the County. According to the 1995 Comprehensive Plan, about 64% of the County was forested (a portion of which was also classified as agriculture). Much of this land is in the northwest, western, and southeastern parts of the County along the mountain slopes.

The Comprehensive Plan describes four general patterns of residential development: rural residential, low-density residential in rural areas, low-density residential focused around Smith Mountain Lake, and medium-density residential associated with towns, Smith Mountain Lake planned communities, and community centers. The first type, rural residential, is characterized by lots of ½ acre to five acres served by private roads and is evenly dispersed throughout the County. The other residential found in rural areas are also typically lots of ½ acre to five acres and front state-maintained roads. Multi-family dwellings are also included in this classification. The third type of development, low-density residential focused around Smith Mountain Lake, is characterized by one acre or smaller lots on the water. Increasingly, these are single-family homes instead of mobile home parks, campgrounds or other more modest accommodations. Medium-density residential typically has access to public water and sewer. It is typically closer to jobs, public services and retail shopping. Most of this type of development is found in Rocky Mount, Boones Mill, and Ferrum.

Most of the commercial centers are near the major towns or community centers. Major transportation nodes also tend to be the location of smaller commercial concentrations. Clusters of stores and services also occur in smaller communities such

as Callaway, Glade Hill, Snow Creek, and Fork Mountain. Strip commercial highway development also is evident along Route 220 North and Route 40.

Manufacturing accounts for a major segment of the Franklin County's industrial base. Most of the plants are located in or near Rocky Mount. About 32% of the County's workers were employed in the manufacturing sector, as of 2000 (only 17.9% in 2009). The types of manufacturing occurring in the County include wood products and modular and mobile homes. The Franklin County-Rocky Mount Industrial Park is located north of Route 40 East inside the Rocky Mount Town Limits. The Rocky Mount Technology Park is located in the northern part of Rocky Mount in close proximity to U.S. Route 220. The Commerce Center is located approximately five miles south of Rocky Mount in the County just off U.S. Route 220. The Ferrum Business Park has property available for development in the Ferrum College vicinity of the County located off Route 40.

The 100-year floodplain, as identified in the FEMA Flood Insurance Rate Maps, covers portions of land along the Roanoke, Pigg, and Blackwater Rivers as well as along the Chestnut, Maggodee, Gills, and Stony Creeks. These areas are regulated and are part of the County's permanent open space system.

The County Comprehensive Plan describes a desired Future Land Use pattern. Incorporated towns or unincorporated Community Centers are meant to be the focus of commercial services and social activity. These services are intended to serve people within a 5-10 mile radius. Surrounding the towns and community centers are rural, low- and medium-density residential development. Designated areas include Rocky Mount, Boones Mill, Ferrum, and Smith Mountain Lake. Rural Village Centers are the second of the desired development types. These areas are to be the focus of rural commercial services, social activities, and community life. Schools, fire stations, churches, and post offices would be at the center surrounded by rural residential development. Other recognized development patterns or locations include Commercial Highway Corridors and Interstate Highway Interchanges. Land use policies are also described for farmlands, forestlands, and residential.

Henry County

Henry County was established in the late 1700s. The County is home to numerous historic resources including the Martinsville Fish Dam. According to the Comprehensive Plan, the County has changed considerably since its founding. Industrial expansion, in the sectors of wood furniture and pre-manufactured homes, brought concurrent residential and commercial development. The early settlement

pattern was typical of early industrial America, where factory workers lived close to their place of employment. These factories often were located near rivers which served as power sources, a pattern seen in Henry County where much of the early industry was located near the Smith River. As automobiles and trucks became more common, development tended to occur along the major traffic routes and became more dispersed resulting in the now familiar sprawl development. Overall, the development in the County can be categorized as either strip development (commercial and residential) or sprawl development (e.g., large lot subdivisions). The Comprehensive Plan recognizes that the dispersed development pattern increases the cost of public service provision.

There are three established industrial parks in Henry County—the Bowles Center, located adjacent to Patrick Henry Community College off Route 174; the Patriot Centre at Beaver Creek, just outside the Martinsville City Limits off Route 174; and the Martinsville Industrial Park east of U.S. Route 220 and south of Martinsville. In the fall of 2007, Henry County purchased two large tracts for future development as regional, revenue-sharing industrial park projects in conjunction with the City of Martinsville. A 622-acre site, known as the Commonwealth Crossing Centre, is located near the North Carolina line, convenient to both U.S. Route 220 and the Norfolk Southern Railroad. The other project is the Bryant property, a 1,206-acre site near Barrows Mill Road in close proximity to both Clearview Business Park in Martinsville and the Patriot Centre.

The County has seen a general trend towards an aging population, as younger people leave the area and other older people retire to the County. Single-family homes account for the majority of the housing stock, though manufactured homes account for 21% of the overall housing stock, according to the 2005-2009 American Community Survey. Double-wide manufactured homes, in particular, are becoming increasingly popular.

The Comprehensive Plan, when looking at future development patterns, classifies land in the County into two categories - growth and rural areas. Growth areas are characterized generally as having (or will have) road networks, public water and sewer, and physical suitability for development (i.e., not a floodplain or steep slope). Growth areas include: Collinsville/Fieldale, Bassett/Stanleytown, Iriswood, Ridgeway, Horsepasture, Laurel Park/Chatmoss, and West Bassett. In addition, the plan explicitly calls for floodplains to be utilized for appropriate uses such as agriculture and recreation. The plan calls for a variety of tools to be used in

implementation including zoning, subdivision ordinances, density bonuses, planned unit development (PUDs), and conditional zoning.

City of Martinsville

Until the opening of the new Henry County Courthouse in 1996, the City of Martinsville served as the Henry County seat since its founding in 1793. In the late 1800s, the City was home to many tobacco factories that processed the crops grown in the surrounding area. Furniture making began to play a major role in the economy during the early 20th century. Martinsville transitioned from an agriculture-based economy to an industrially-based economy during the first half of the 20th century. This fact is illustrated by DuPont building the world's largest nylon manufacturing plant just outside of Martinsville in 1941. Numerous textile manufacturers located in the area as well, but closed in recent years due to the impact of NAFTA (North American Fair Trade Act).

Martinsville's development pattern, in part, follows the typical "mill town" pattern, where residential development is located adjacent to industrial development. Most of the industrial development is located south and southeast of the Central Business District as well as along the major arteries such as East Commonwealth Boulevard, Liberty Street, Route 58 East, and Stultz Road. In 1998, the City developed Clearview Business Park just off Clearview Drive. As stated earlier, Henry County purchased two large tracts for future development as regional, revenue-sharing industrial park projects in conjunction with the City of Martinsville in 2007. A 622-acre site, known as the Commonwealth Crossing Centre, is located near the North Carolina line, convenient to both U.S. Route 220 and the Norfolk Southern Railroad. The other project is the Bryant property, a 1,206-acre site near Barrows Mill Road in close proximity to both Clearview Business Park in Martinsville and the Patriot Centre.

Patrick County

Patrick County is mainly rural in nature, though it does have some industrial and commercial development (some of which is related to agriculture). Much of the undeveloped land in the County is forested. Land use in Patrick County has been strongly influenced by the terrain of the Blue Ridge Mountains. Since colonial times, an important part of Patrick County's economy has been agriculture. In the beginning, the main crops were tobacco, cabbage, and tomatoes, but farming has moved towards cattle and dairy. Apple and peach orchards are among other predominant agricultural products grown in the County. In recent years, a number of wineries have emerged in the area. More people, however, are employed in the

manufacturing sector than in farming. In addition, a number of sawmills operate within Patrick County.

Residential development is dispersed throughout the County, in conjunction with farms. Some concentration of residences can be found in the Town of Stuart and Patrick Springs Community. In addition, concentrations of commercial development can be found in Stuart, Woolwine, and Patrick Springs or along various highway routes. Industrial development is located in the southwestern part of the County near Stuart, along Route 58 near Meadows of Dan and Vesta, and near Woolwine. The County also purchased land for an industrial park in 1994 near Stuart. In recent years, Rich Creek Corporate Park has been developed in the Patrick Springs area of the County. The federal and state governments are the largest landowners in the area; their holdings include areas surrounding Philpott Reservoir, the Blue Ridge Parkway, the Rocky Knob Recreation Area, Fairy Stone State Park, and the Fairystone Farms Wildlife Management Area. In addition, the City of Danville owns a considerable amount of land associated with the Pinnacles hydroelectric project.

Future land use is expected to follow a slow or moderate, rational growth pattern. Expected growth is likely to occur in the eastern portions of the County, centering on the existing towns and communities including Stuart, Patrick Springs, and Critz. This growth is anticipated to be residential in nature with a limited amount of accompanying commercial development along U.S. Route 58. Overall, agricultural and forested lands are expected to remain the same.

Pittsylvania County

Pittsylvania is the largest county by land area in the state. The 2007 Census of Agriculture shows that about 44% of the County is used for farming. Agricultural uses are located in the central, southwestern, and southeastern parts of the County. Growth, however, is anticipated in the south-central and north-central parts of the County, which means the agricultural lands should remain unthreatened by development. The County ranked first out of 34 counties in the state for tobacco crops, according to the 2007 Census of Agriculture. Commercial forests account for the majority of the County's land use.

Two types of residential patterns exist in the County. Residential uses tend to be either dispersed, low-density development along transportation corridors or clustered in and around commercial centers. Much of the first type of residential development is associated with farms. Suburban extensions of commercial and residential growth have spread from the Danville urban area into the neighboring Blairs and Mount

Hermon areas of Pittsylvania County. Other developed areas of the County include the local communities of Cascade, Dry Fork, Motley, Grit, Mount Cross, and Ringgold. Commercial development is associated with highways or the existing population centers of Chatham, Gretna, Hurt, and the City of Danville. Industrial uses can be found near Chatham and Danville.

There are a number of industrial parks in Pittsylvania County. As previously mentioned, the County and the City of Danville have recently developed Cane Creek Centre off U.S. Route 58 in the Ringgold vicinity of the County. Other parks include Ringgold East and Ringgold West off Route 730; the Chatham South and Chatham North Industrial Parks off U.S. Route 29 in the vicinity of the Town of Chatham; and the Gretna Industrial Park off U.S. Route 29 just outside the Town of Gretna. There is industrial property for development at the Key Industrial Park in the Town of Hurt as well. In addition, the County has developed the 80-acre Brosville Business Centre just off U.S. Route 58 approximately five miles east of the Henry County line. As mentioned earlier, in 2008, Danville and Pittsylvania County announced plans to develop a new 3,500-acre mega-park off Berry Hill Road and U.S. Route 58 near the North Carolina line which will serve a 50-mile radius in Southside Virginia and part of North Carolina. The localities hope the joint project will attract a major auto manufacturer or other large manufacturer to the area that would provide thousands of jobs. The Norfolk Southern Railroad, the Transco natural gas line, and electric lines from the City of Danville cross the site.

The County receives an Insurance Rating Organization rating of 9 countywide. This rating affects fire insurance premiums and is based on a number of factors including water supply, fire department, fire communications and fire safety control.

The 2010 Pittsylvania County Comprehensive Plan shows ten designated growth areas within the County. They are located in the Danville area and north along the Route 29 corridor to Hurt. In the southern portion of the County, five of the growth areas coincide with the communities of Brosville, Mount Hermon, Blairs, Kentuck, and Ringgold. In the central portion of the County, the Chatham and Gretna growth areas are inclusive of the two towns and additional County land areas outside the town limits and along the Route 29 corridor. In the northern portion of the County, the three designated growth areas are areas around Hurt and largely residential areas in proximity to Leesville Lake and Smith Mountain Lake. The County anticipates that most of the development within the County over the 20-year period of the plan, will take place in these designated growth areas. The Comprehensive Plan recognizes that the Dan and Sandy Rivers and Cherrystone Creek are susceptible to flooding.

Climate

The present-day climate of Virginia is generally classified as humid subtropical, yet few states have a more diverse climate than that of Virginia.[2] In the planning area, the Blue Ridge Mountains to the west produce blocking and steering effects on storms and air masses from the Great Lakes.

Seasonal temperatures are relatively uniform within the planning area; average temperatures in the planning area are about 76 degrees Fahrenheit in the summer and 38 degrees in the winter.

Annual snowfall totals vary between the jurisdictions from a high of 15.8 inches (Franklin County) to a low of 5.8 inches (Henry County).[3] Average annual rainfall is around 48 inches, with a high of 56 inches (Patrick County) and a low of 43 inches (City of Danville).

Population

The total population of the jurisdictions included in this study is 250,195 (as of the 2000 Census). The growth rates between the four counties vary dramatically, ranging from a high of 19.6% (Franklin County) to a low of 1.7% (Henry County). During this same period (1990-2000), the City of Danville (-8.8%) and the City of Martinsville (-4.6%) both recorded negative growth rates. The growth rate for the State of Virginia was 14.4%. The 2005-2009 population estimates from the 5-year American Community Survey (ACS) shows that all of the jurisdictions except for Franklin County experienced negative growth.

Table IV-1 shows the population breakdown by jurisdiction with the associated growth rate and number of persons per household.

Table IV-1. Population by Jurisdiction

	Franklin County	Henry County	Patrick County	Pittsylvania County	City of Danville	City of Martins-ville

[2] The Natural Communities of Virginia – http://www.dcr.virginia.gov/dnh/ncoverview.htm

[3] National Oceanic & Atmospheric Administration (NOAA) Satellite and Information Service; Climate Services and Monitoring Division, NOAA/National Climatic Data Center, U.S. Department of Commerce; & National Environmental Satellite, Data, and Information Service (NESDIS).

Table IV-1. Population by Jurisdiction						
	Franklin County	Henry County	Patrick County	Pittsylvania County	City of Danville	City of Martins-ville
Population, 2005-2009 ACS 5-year estimates	51,023	55,480	18,755	61,156	44,978	14,660
Population, 2000	47,286	57,930	19,407	61,745	48,411	15,416
Population, percent change, 2000 to 2009	7.90%	-4.23%	-3.36%	-0.95%	-7.09%	-4.90%
Persons per household, 2005-2009	2.33	2.36	2.42	2.33	2.11	2.33
Persons per household, 2000	2.44	2.4	2.36	2.49	2.27	2.27

Source: U.S. Census

According to the 2000 Census, females comprise 51.0% of the population in the Virginia. The female population in the planning area ranges from a high of 54.8% in the City of Martinsville to a low of 50.7% in Franklin County. The 2005-2009 5-year estimates from the American Community Survey (ACS) show that 51.9% of the planning area population is female, with Martinsville still having the highest percentage at 55.2% and Pittsylvania County having the lowest percentage at 50.6%.

The majority of the population in the planning area, according to the Census, is White (74.2%). African-Americans make up 24.9% of the population. Two percent of the population is of Hispanic origin. According to the 2005-2009 ACS, 73.0% of the population is White, 23.9% of the population is African-American, and 3.2% of the planning area population is of Hispanic origin. According to the 2000 Census, very few residents (1.7%) in the planning area were foreign-born and less than 4% of the population reported that they spoke a language other than English at home.

One type of special needs group is characterized by age. According to the 2005-2009 American Community Survey, only 5.7% (13,925) of the population is under the age of five while 21.2% (52,166) is under the age of 18. The percentage of people over the age of 65 is 17.4% (42,776), which is forty-seven percent more than that of the state

average (11.8%). Special consideration for the needs of the younger and older generations should be given when developing mitigation strategies.

The 2005-2009 ACS figures show that significantly fewer people in the planning area graduate from high school when compared to the state as a whole (85.8%); about 75% of residents age 25 years and older are high school graduates. About thirteen percent (13.4%) have obtained bachelor's degrees or higher, compared to the state average of 33.4%. The higher educational attainment rates range from a high of 17.8% in the City of Martinsville, to a low of 10.5% in Patrick County. These numbers, coupled with the population characteristics described in the previous paragraph, are important to keep in mind when developing public outreach programs. The content and delivery of public outreach programs should be consistent with the audiences' needs and ability to understand complex information.

According to the 2005-2009 ACS, the average median household income is approximately $36,625, about 61% of the state average ($60,316). The average per capita household income of $20,238 is about 64% of the state per capita income of $31,606. About 16.9% (40,454) of residents within the West Piedmont planning area live below the poverty line. This rate is higher than that of the national rate of 13.5% and the state rate of 10.1%. These numbers may indicate that a significant portion of the population will not have the resources to undertake mitigation projects that require self-funding.

The income statistics between jurisdictions in the planning area have a fairly wide range. Table IV-2 shows the breakdown by jurisdiction. As the table illustrates, Franklin County's median household income, the highest in the planning area, is almost 55% higher than the City of Danville's, the lowest in the planning area. Similar trends hold true for the per capita money income figures in the area. Again, Franklin County's per capita income is the highest in the planning area, nearly 32% higher than the City of Martinsville, the lowest in the planning region. Percentages of people below the poverty level in the planning area are highest in the cities of Danville and Martinsville, both more than double the percentage (10.1%) of Virginia as a whole. It should be noted that income figures from the 2005-2009 American Community Survey reflect 2009 inflation-adjusted dollars for the last twelve-months of the sample period estimated.

Table IV-2. Income Characteristics by Jurisdiction

	Franklin County	Henry County	Patrick County	Pittsylvania County	City of Danville	City of Martins-ville
Median household income, 2009	$45,578	$34,437	$36,895	$39,765	$29,482	$31,729
Median household income, 1999	$38,056	$31,816	$28,705	$35,153	$26,900	$27,441
Median household income, percent change 1999-2009	19.8%	8.2%	28.5%	13.1%	9.6%	15.6%
Per capita income, 2009	$23,425	$18,945	$18,694	$20,668	$19,074	$17,797
Per capita income, 1999	$19,605	$17,110	$15,574	$16,991	$17,151	$17,251
Per capita income, percent change 1999-2009	19.5%	10.7%	20.0%	21.6%	11.2%	3.2%
Persons below poverty, percent, 2009	12.7%	17.5%	13.6%	15.0%	23.6%	20.8%
Persons below poverty, percent, 1999	9.7%	11.7%	13.4%	11.8%	20.0%	19.2%

Source: U.S. Census Bureau, *2000 U.S. Census and 2005-2009 American Community Survey*. Retrieved from http://www.census.gov

Housing

According to the 2000 Census, there were 116,829 housing units in the planning area. The 2005-2009 5-year estimates from the American Community Survey show that the number of housing units increased to 123,732 in the area. Franklin, Henry, and Pittsylvania Counties, and the City of Danville, each have about 20% of the housing units, while the City of Martinsville and Patrick County contain less than 10% each. Only 11% of the housing units in the planning area are in multi-unit structures, compared to the overall state percentage of 21.4%. Patrick and Pittsylvania Counties only have approximately 4%, while nearly 24% of the housing units in the Cities of Danville and Martinsville are multi-unit structures.

Almost 74% of residents own their own homes. Patrick County has the highest homeownership rate with 81.5% while the City of Danville has the lowest in the

planning area at 54.2%. All of the homeownership rates of the Counties in the planning area are significantly higher than the national average of 66.9% or the state average of 69.2%, while both of the Cities fall below those averages. When considering mitigation options, special attention should be paid to the difference in capabilities between owners and renters. Table IV-3 illustrates the housing characteristics of each jurisdiction.

Table IV-3. Housing Characteristics by Jurisdiction

	Franklin County	Henry County	Patrick County	Pittsylvania County	City of Danville	City of Martinsville
Housing units, 2005-2009 ACS	26,099	26,669	10,458	29,885	23,331	7,290
Housing units, 2000	22,717	25,921	9,823	28,011	23,108	7,249
Housing units, percent change 2000-2009	14.9%	2.9%	6.5%	6.7%	1.0%	0.6%
Multi-unit structures, percent, 2005-2009	7.4%	8.8%	4.8%	4.1%	24.4%	22.9%
Multi-unit structures, percent, 2000	7.3%	8.2%	3.9%	3.6%	24.2%	25.4%
Homeownership rate, 2005-2009	80.0%	76.8%	81.5%	79.4%	54.2%	59.9%
Homeownership rate, 2000	81.1%	76.9%	80.3%	80.1%	58.1%	60.2%
Median value of owner-occupied housing units, 2005-2009	$151,500	$88,100	$99,400	$99,100	$88,800	$80,600
Median value of owner-occupied housing units, 2000	$105,000	$75,500	$75,300	$80,300	$71,900	$69,100
Median value of owner-occupied housing units,	44.3%	16.7%	32.0%	23.4%	23.5%	16.6%

Table IV-3. Housing Characteristics by Jurisdiction						
	Franklin County	Henry County	Patrick County	Pittsylvania County	City of Danville	City of Martinsville
percent change 2000-2009						
Source: U.S. Census Bureau, *2000 U.S. Census and 2005-2009 American Community Survey*. Retrieved from http://www.census.gov						

Business & Labor

Table IV-4 presents information on each jurisdiction's top employment sectors. The five most represented employment sectors are:

- Manufacturing,
- Services
- Retail trade
- Local government, and
- Construction.

Table IV-4. 2009 Employment by Sector by Jurisdiction[4]

Sector	Franklin County	% of Total	Henry County	% of Total	Patrick County	% of Total	Pittsylvania County	% of Total	City of Danville	% of Total	City of Martinsville	% of Total	West Piedmont	% of Total
Agriculture	203	1.6%	70	0.5%	181	3.7%	230	2.1%	D	N/A	D	N/A	692	0.9%
Mining	0	0.0%	0	0.0%	0	0.0%	D	N/A	D	N/A	D	N/A	29	0.0%
Utilities	D	N/A	D	N/A	D	N/A	79	0.7%	155	0.6%	80	0.7%	403	0.5%
Construction	1,187	9.2%	691	4.9%	152	3.1%	1,159	10.4%	572	2.1%	164	1.5%	3,924	4.8%
Manufacturing	2,314	17.9%	4,451	31.5%	1,578	31.9%	2,080	18.7%	4,583	17.1%	1,013	9.1%	16,020	19.8%
Transportation	306	2.4%	959	6.8%	169	3.4%	275	2.5%	463	1.7%	158	1.4%	2,331	2.9%
Wholesale Trade	478	3.7%	599	4.2%	107	2.2%	734	6.6%	645	2.4%	115	1.0%	2,678	3.3%
Retail Trade	1,877	14.5%	1,285	9.1%	544	11.0%	1,116	10.0%	4,093	15.3%	2,478	22.4%	11,392	14.1%
Finance, Insurance, & Real Estate	411	3.2%	403	2.9%	83	1.7%	203	1.8%	1,131	4.2%	409	3.7%	2,639	3.3%
Services	D	N/A	D	N/A	D	N/A	D	N/A	14,056	52.4%	D	N/A	37,481	46.2%
State Government	80	0.6%	86	0.6%	26	0.5%	368	3.3%	279	1.0%	156	1.4%	996	1.2%
Local Government	287	2.2%	327	2.3%	165	3.3%	278	2.5%	771	2.9%	532	4.8%	2,360	2.9%
Federal Government	13	0.1%	3	0.0%	7	0.1%	23	0.2%	51	0.2%	14	0.1%	109	0.1%
Nonclassifiable	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total Employment	**12,956**	**100.0%**	**14,138**	**100.0%**	**4,944**	**100.0%**	**11,129**	**100.0%**	**26,807**	**100.0%**	**11,080**	**100.0%**	**81,054**	**100.0%**

NOTE: "D" indicates disclosure suppression; data is included only in the total. Figures may not always total correctly due to the rounding process. It should be noted that beginning in 2005, the Government and Service employment sectors changed reporting methods as some Public Administrative employment such as teachers may have shifted to the Service sector. Therefore, there may be noticeable differences in these numbers from prior years compared to more recent figures.

[4] *Virginia Workforce Connection, Labor Market Statistics - Covered Employment & Wages Program*, Virginia Employment Commission, Economic Information Services, Richmond, VA. Retrieved from http://www.vawc.virginia.gov/.

Major employers in the jurisdictions include:

- Franklin County
  - Franklin County School Board
  - MW Manufacturers
  - Ferrum College
  - County of Franklin
  - Wal Mart
  - Carilion Franklin Memorial Hospital
- Henry County/ City of Martinsville
  - Memorial Hospital of Martinsville/Henry County
  - Henry County School Board
  - Martinsville City Schools
  - CP Films
  - Hanesbrands, Inc.
  - Advantage Staffing Resources
- Patrick County
  - Patrick County School Board
  - Aerial Machine & Tool Corporation
  - Blue Ridge Nursing Center
  - Wal Mart
  - United Elastic
  - Roto Die Company
- Pittsylvania County
  - Pittsylvania County School Board
  - Unique Industries
  - Pittsylvania County
  - Green Rock Correctional Center
  - Intertape Polymer Corporation
- City of Danville
  - Goodyear Tire & Rubber Company
  - Danville City Public Schools
  - City of Danville
  - Danville Regional Medical Center
  - Wal Mart
  - Nestle Refrigerated Foods

Agriculture

Agriculture is a major economic sector in the West Piedmont Planning District. As can be seen in Table IV-5, the amount of land farmed decreased in all four counties between 2002 and 2007, although the number of farms increased in three of the four localities over the same period. Total agricultural sales were over $143 million, mainly from livestock, poultry, and their products. Major crops include corn, tobacco, fruit (apples), and wheat. Significant quantities of cattle, as well as milk and other dairy products are produced in the planning area.

Table IV-5. Agricultural Sector[5]

Jurisdiction	Number of Farms – 2007 (change from 2002)	Land in farms - 2007 acreage (change from 2002)	Market Value of Agricultural Products Sold		
			Total value of agricultural products sold	Value of crops including nursery and greenhouse	Value of livestock, poultry, and their products
Franklin Co.	1,043 (+3.1%)	166,592 (-3.4%)	$53,968,000	$7,018,000	$46,950,000
Henry Co.	340 (+11.5%)	50,779 (-4.3%)	$10,957,000	$1,208,000	$9,749,000
Patrick Co.	613 (-2.5%)	80,027 (-11.6%)	$15,913,000	$7,523,000	$8,390,000
Pittsylvania Co.	1,356 (+4.0%)	274,289 (-5.0%)	$62,644,000	$23,409,000	$39,235,000

Transportation

The West Piedmont Planning District is at a crossroads of transportation within the south central portion of the state of Virginia. Four federal highways (U.S. Highways 29, 58, 220, and 360) and twenty state primary routes provide the localities of the Planning District with access to each other and the rest of the nation. Two proposed interstate routes, I-73 and I-785 are expected to be constructed in the future. As mentioned earlier, I-785 (U.S. Route 29) would be designated in the City of Danville. The I-73 corridor would be constructed from Roanoke to the North Carolina line and would travel through both Franklin and Henry Counties. Studies continue to be conducted on the proposed route.

[5] United States Department of Agriculture, Virginia Agricultural Statistics Service. *2007 Census of Agriculture. County Profiles.* Retrieved from http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Virginia/index.asp

In addition, the region is served by Norfolk Southern rail lines, numerous truck lines, and air service from the Danville Regional Airport and Blue Ridge Airport (Henry County).

As described before, a number of rivers run through the planning area, but they are not used for commercial shipping. The nearest major commercial ports are in Richmond (150 miles to the northeast) and Norfolk, Newport News, and Portsmouth (200 miles to the east).

Infrastructure

The West Piedmont area is served primarily by Appalachian Power Company. Additional electricity providers in the area include: Dominion Virginia Power, Mecklenburg Electric Cooperative, and Southside Electric Cooperative, as well the Cities of Danville and Martinsville. Natural gas is provided by Columbia Gas of Virginia, Southwestern Virginia Gas Company, and the City of Danville. Telephone service is available from Verizon, Century Link (formerly Sprint/Centel and Embarq), Citizens Telephone Cooperative, and Peoples Mutual Telephone Company.

Public water is available in many of the towns and cities in the planning area, as well as by the Pittsylvania County Service Authority, the Ferrum Water & Sewer Authority, and the Henry County Public Service Authority. Franklin County is developing a utility system as well. In 2005, construction of the first phase of a public water system was completed. The construction included both sides of Smith Mountain Lake in both Franklin and Bedford Counties. Franklin County also connected to the Bedford County Public Service Authority to purchase bulk water; the water line was extended across the Halesford Bridge and over to the Westlake area of Franklin County. Future phases continue to be developed for other service areas in the County. In 2009, Franklin County joined the Western Virginia Water Authority, an incorporated public body independent of local government that provides water and wastewater services to its customers in the City of Roanoke, Roanoke County, and Franklin County. A 12-inch water line was constructed along U.S. Route 220 for a distance of 12.5 miles, from the Suncrest Heights Subdivision in Roanoke County to the Wirtz area in Franklin County. The Western Virginia Water Authority has purchased several private water systems in the County as well as distribution systems that provide water and sewer services to Westlake along Route 122 and Scruggs Road (Route 616), and portions of Routes 666 and 948.

The Pittsylvania County Service Authority (PCSA) consists of five community water systems using groundwater and ten community water systems that purchase water from other public water supply systems. PCSA serves approximately 22% of the County's population, located primarily around the County's three towns and the City

of Danville. There are seven private water systems which use groundwater to serve approximately 500 people. Based on water demand projections, Pittsylvania County maintains a water supply surplus and is expected to maintain a surplus through 2060.

Wastewater treatment is provided by many of the towns, cities, and service authorities that provide potable water. Private well and septic systems serve the remainder of the planning area.

SECTION V. Hazard Identification and Risk Assessment (HIRA)

Introduction

Hazard mitigation is any sustained action taken to reduce or eliminate long term risk to life and property from a hazard event. In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA2K) is the latest legislation to address this planning process. DMA2K was enacted on October 10, 2000, when President Clinton signed the Act (Public Law 106-390). The new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, this Act establishes a pre-disaster hazard mitigation program and new requirements for the national Hazard Mitigation Grant Program (HMGP). States and local governments are required to adopt hazard mitigation plans in order to qualify for pre- and post-disaster federal hazard mitigation funding.

The West Piedmont Planning District Commission, on behalf of the jurisdictions which comprise the planning area, has developed this HIRA to serve as a guide to communities in the West Piedmont planning area when assessing potential vulnerabilities to natural hazards. When developing this plan, every effort was made to gather input from all aspects of the project area communities to assure that the results of this analysis will be as accurate as possible.

The planning area for this study includes two cities, four counties and seven incorporated towns. All jurisdictions located within these counties are included in this portion of the study, as this analysis has been completed on a regional basis. It should be noted, however that a local jurisdiction's inclusion in the full Mitigation Plan is dependent on the community's participation in the remainder of the planning process.

The purpose of the HIRA is to:

- Identify what hazards that could affect the West Piedmont region
- Profile hazard events and determine what areas and community assets are the most vulnerable to damage from these hazards
- Estimate losses and prioritize the potential risks to the community

The first step, identify hazards, describes all the natural and man-made hazards that might affect the planning area. The hazards were ranked to determine what hazards are most likely to impact the communities of the West Piedmont region. The hazards that were determined to have significant impact were analyzed in the greatest detail to determine the magnitude of future events and the vulnerability for the community

and for the critical facilities. Hazards that received a moderate impact ranking were analyzed with available data to determine the risk and vulnerability to the specified hazard. The limited impact hazards were analyzed using the best available data to determine the risk to the community.

Changes from the 2006 Plan

The 2011 update of the hazard mitigation plan re-examines and expands upon the analysis of those hazards addressed in the 2006 plan. The HIRA updates and streamlines content. Significant changes have been made that include:

- standardizing terminology and formatting adjustments;
- new analyses for major hazards which included:
  - refreshing the hazard profile;
  - updating the previous occurrences;
  - updating the assessment of risk by jurisdiction based on new data;
- new maps and imagery.

The Mitigation Advisory Committee also decided to adjust upward the ranking for Flood to Significant and Drought and Wildfire to Moderate. Landslide and Earthquake have been added to the list of hazards considered in the update but analysis of these hazards was kept to a minimum due to lack of incidence and impact. Full details on the hazards identified and analyzed are found in the subsequent sections.

The West Piedmont Planning District Commission (WPPDC) is located in southwest Virginia. The Blue Ridge Mountains border the western portion and the Piedmont foothills border the eastern portion of the Planning District.

Table V-1 and Figure V-1 illustrate the land area of each of the communities in the planning area as well as the populations in the community and number of households. This information will prove to be a key component in determining the risk to communities from natural hazards.

Table V-1. West Piedmont Planning District Demographics (from US Census Bureau)

Name	Land Area (Sq Mile)	1990 Pop	2000 Pop	2010 Pop[1]	2010 Pop per Sq Mile	Median Home Value[2]	Total Housing Units[1]
City of Danville	43.06	53,056	48,411	43,055	1,000	$88,800	22,438
Franklin County	692.08	39,549	47,286	56,159	81	$151,500	29,315
Town of Boones Mill	*0.55*	*239*	*285*	*239*	*435*	$150,000	*127*

Table V-1. West Piedmont Planning District Demographics (from US Census Bureau)							
Name	Land Area (Sq Mile)	1990 Pop	2000 Pop	2010 Pop[1]	2010 Pop per Sq Mile	Median Home Value[2]	Total Housing Units[1]
Town of Rocky Mount	*6.86*	*4,098*	*4,565*	*4,799*	*700*	$116,400	*2,249*
Henry County	382.35	56,942	57,930	54,151	142	$88,100	26,268
Town of Ridgeway	*1.0*	*752*	*825*	*742*	*742*	$110,900	*361*
City of Martinsville	10.96	16,162	15,416	13,821	1,261	$80,600	7,205
Patrick County	483.14	17,473	19,407	18,490	38	$99,400	10,083
Town of Stuart	*3.05*	*965*	*961*	*1,408*	*462*	$107,400	*731*
Pittsylvania County	970.76	55,655	61,745	63,506	65	$99,100	31,307
Town of Chatham	*2.01*	*1,354*	*1,338*	*1,269*	*631*	$130,800	*619*
Town of Gretna	*1.75*	*1,939*	*1,257*	*1,267*	*724*	$112,700	*686*
Town of Hurt	*3.50*	*1,294*	*1,276*	*1,304*	*373*	$96,100	*642*
West Piedmont Planning District	2,582.35	238,837	250,195	249,182	97	$100,500	126,616

[1] 2010 Census Redistricting (PL 94-171) Data
[2] 2005-2009 American Community Survey

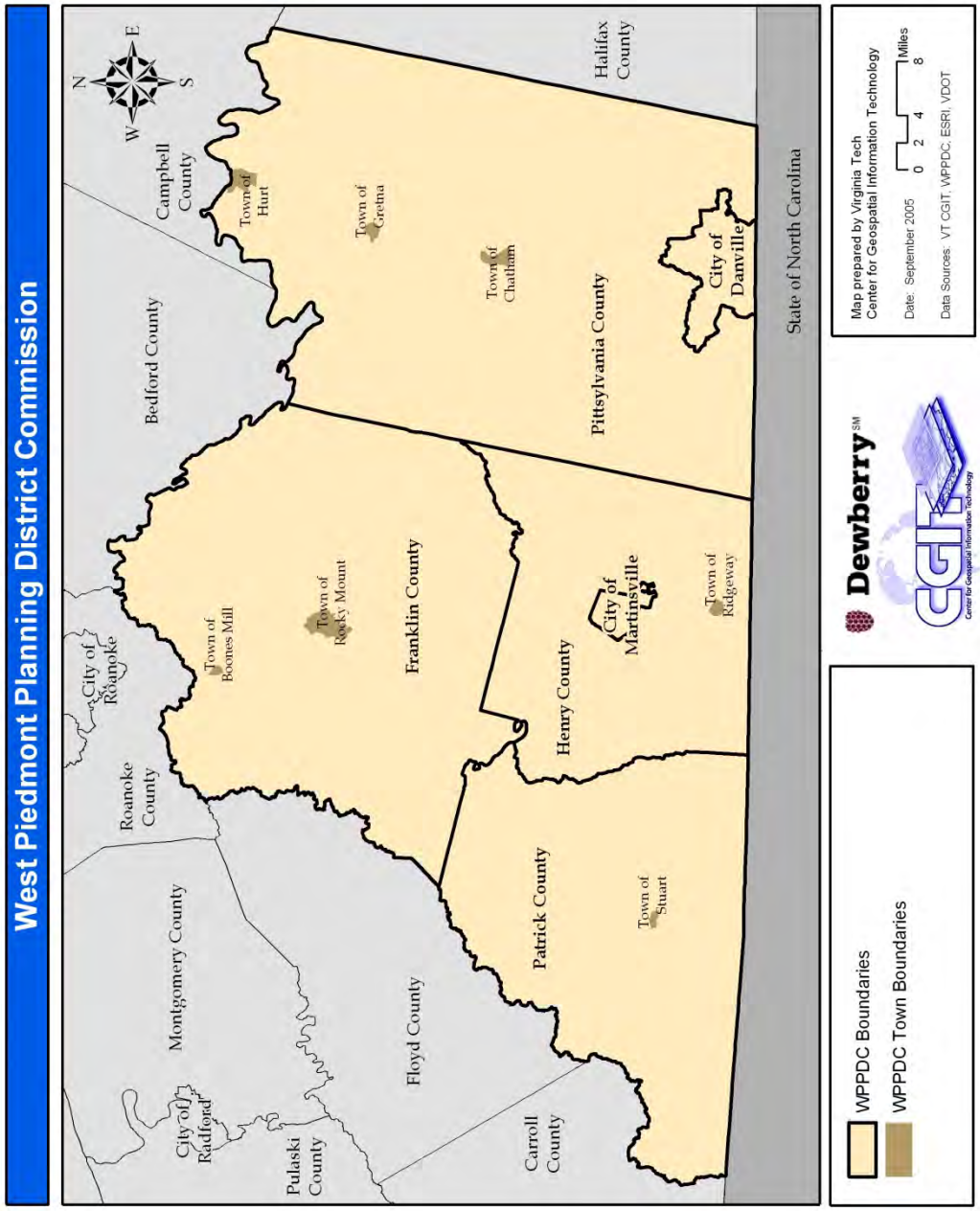


Figure V-1. West Piedmont Region Boundaries

Watersheds

The West Piedmont region is almost entirely within the Roanoke River Basin, with a small portion of Patrick County in the Yadkin River Basin. The western part of the planning area is bordered by the New River Basin. Figure V-2 illustrates the location of the major watershed boundaries for the Planning District.

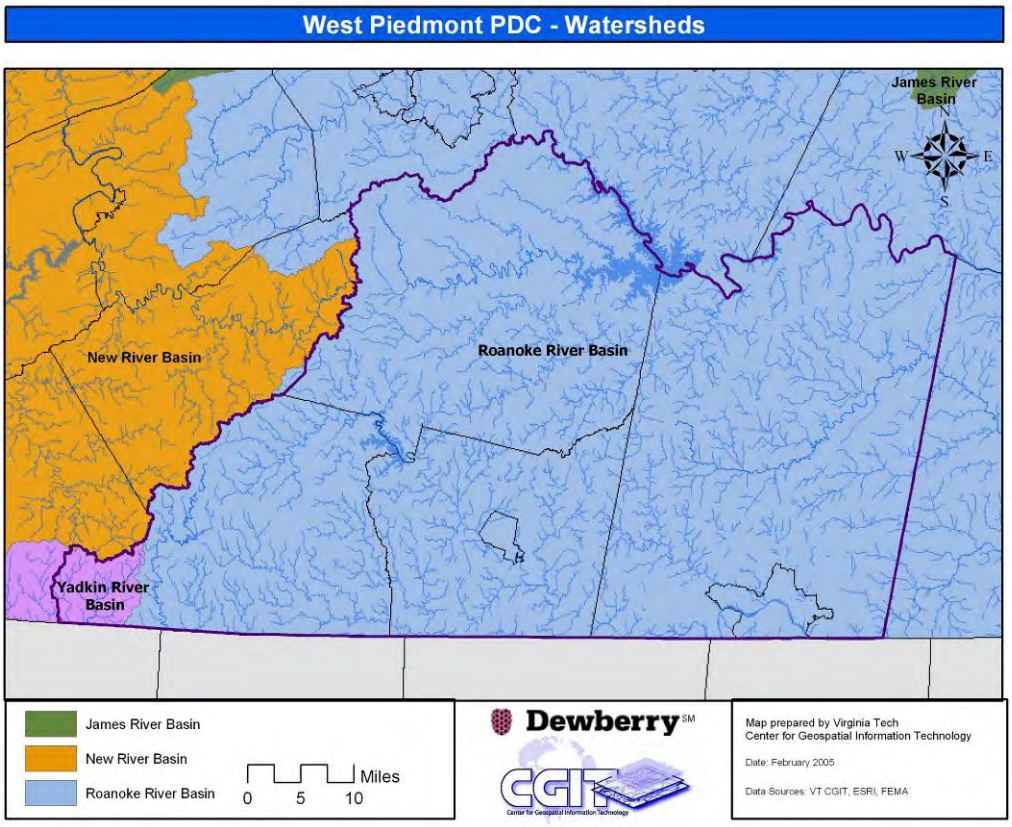


Figure V-2. West Piedmont Region Watersheds (from VA-DCR)

Critical Facilities

According to the FEMA State and Local Plan Interim Criteria, a critical facility is defined as a facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the County, or fulfills important public safety, emergency response, and/or disaster recovery functions. Critical facilities for WPPDC were provided by the PDC and local jurisdictions.

Data Limitations

The FEMA guidelines emphasize using "best available" data for this plan. The impact of these data limitations will be shown through the different vulnerability assessment and loss estimation methods used for hazards. The limiting factor for the data was the hazard mapping precision at only the county or jurisdiction level. The Planning District Commission provided available base map data including water networks, street mapping and land use and zoning information. Other data was derived from existing sources or created by Dewberry or the Virginia Tech Center for Geospatial Information Technology (CGIT).

Inadequate information posed a problem for developing loss estimates for most of the identified hazards. Many of the hazards do not have defined damage estimate criteria. Analysis for the region was completed using the best available data. Critical facilities, tax parcels/building footprints and census blocks within FEMA flood zones were identified for the flood analysis. The HAZUS-MH model was used to estimate damage from hurricane/tropical storm wind in the West Piedmont region. Data from the National Weather Service, the National Climatic Data Center (NCDC), the Virginia Department of Forestry, and other sources where available were used to develop estimates for the remaining hazards.

Hazard Identification

Types of Hazards

While nearly all disasters are possible for any given area in the United States, the most likely hazards that could potentially affect the communities in the West Piedmont Planning District generally include:

- Droughts
- Flooding
- Hurricanes
- Tornadoes
- Wildfires
- Winter Storms
- Landslides
- Earthquakes

The Mitigation Advisory Committee also wanted to include a qualitative assessment of the man-made or human-caused hazards that could affect the planning area. The human-caused hazards included in this plan are:

- Dams
- HVT Lines
- Organic/Inorganic Spills
- Pipelines
- Agriterrorism

Probability of Hazards

Hazards were ranked by the steering committee to determine what hazards they feel have the largest and most frequent impact on their communities. The results are summarized in Table V-2. Certain hazards were not addressed as a result of the infrequency of occurrence and/or limited impact. Earthquake, for example, falls into this category. Analysis level was determined by the type of data available and the scale of data available for the analysis. For comparison, the 2010 Commonwealth of Virginia's hazard ranking results have been included in the table. As shown, the Planning Consideration Level is relative to the planning area and differs in some instances from the hazard ranking included in the Commonwealth's plan. It should be noted that relative to other jurisdictions in the Commonwealth, the West Piedmont Planning District is generally in the middle of the spectrum for vulnerability.

Table V-2. West Piedmont Region Planning Consideration Levels

Hazard Type	Planning Consideration Level	Virginia 2010 State Ranking
Natural		
Winter Storms	Significant	Medium-High
Flooding	Significant	High
Wind (including Hurricanes, Thunderstorms)	Moderate	Medium-High
Drought	Moderate	Medium
Wildfire	Moderate	Medium
Tornado	Limited	Medium
Earthquake	Limited	Medium-Low
Landslide	Limited	Medium-High
Shoreline Erosion	None	Not ranked; addressed with Flood
Human-Caused		
Dams	Significant	Low
High Voltage Transmission (HVT) Lines	Moderate	Not Ranked addressed in other sections of COVEOP
Organic/Inorganic Spills	Moderate	
Pipelines	Moderate	
Agriterrorism	Limited	

Major Disasters

Appendix B1 lists the major disasters that have occurred in the Planning District including Presidentially-declared disasters. It can be seen from the table which hazards have impacted the planning area.

Level of Hazard

Table V-3 provides a breakdown of the natural hazards addressed in this plan. The level of planning consideration given to each hazard was determined by the committee members. Based on the input of committee members at the kick-off meeting, the hazards were separated into four distinct categories which represent the level of consideration they will receive throughout the planning process. For comparison, Table V-2 summarizes the Commonwealth of Virginia's 2010 hazard ranking.

In order to focus on the most critical hazards that may affect the Planning District communities, the hazards assigned a level of *Significant* or *Moderate* received the most extensive attention in the remainder of the planning analysis, while those with a *Limited* planning consideration level were assessed in more general terms. Those hazards with a planning level of *None* are not addressed in this plan. The level of *None* should be interpreted as not being critical enough to warrant further evaluation; however, these hazards should not be interpreted as having zero probability or impact. Additional areas of impact were noted by the committee members through a problem spot worksheet as well as indicating what areas were of concern on paper maps for the region. The areas that the committee members indicated were taken into consideration during the analysis phase.

Table V-3. West Piedmont Region Natural Hazards HIRA Overview

Hazard	Type	Detail Level	Analysis Level	Data Reference
Natural				
Winter Storms	Including Winter Storms, Ice Storms, and Excessive Cold	Significant	Covered by HIRA winter storm analysis	NOAA National Weather Service Records, VirginiaView PRISM, National Climatic Data Center (NCDC)
Flooding	Riverine	Significant	Covered by HIRA flood analysis	FEMA DFIRM; NCDC, Tax parcels, building footprints

Table V-3. West Piedmont Region Natural Hazards HIRA Overview				
Hazard	**Type**	**Detail Level**	**Analysis Level**	**Data Reference**
Wind	Hurricane and thunderstorm winds	Moderate	Covered by HIRA hurricane wind analysis	FEMA HAZUS-MH model, NCDC; ASCE Design Wind Speed Maps; National Hurricane Center
	Tornado	Limited	Description and Regional Maps	NOAA National Weather Service Records, SVRGIS
Wildfire	Wildfire	Moderate	Covered by HIRA wildfire analysis	Virginia Department of Forestry
Drought	Including excessive heat	Limited	Covered by HIRA drought analysis	US Census Bureau 1990 Water Source Data, U.S. Drought Monitor, NCDC
Earthquake	Earthquake	Limited	Description and Regional Maps	VDEM 2010 Hazard Mitigation Plan; HAZUS
Landslide/Land Subsidence/Steep Slopes	Landslide/Land Subsidence/Steep Slopes	None	Description and Regional Maps	USGS Landslide Incidence and Susceptibility in the Conterminous United States
Human-Caused				
Dams	Dam Failure/Terrorism	Significant	Covered by HIRA dam analysis	National Dam Inventory, VA DCR
HVT Lines	HVT Lines	Moderate	Description	FEMA
Organic/Inorganic Spills	Organic/Inorganic Spills	Moderate	Description	FEMA
Pipelines	Pipelines	Moderate	Description	FEMA
Agriterrorism	Agriterrorism	Limited	Descriptions and Regional Maps	US Department of Agriculture

Natural Hazards

The following sections address the impacts of natural hazards on the West Piedmont Planning District. Each section will give a brief overview of the hazard event, historical dates and descriptions of past events, impacts of the events and a community-specific vulnerability analysis.

Winter Storm (Significant Ranking)

Hazard History

Appendix B1 includes descriptions of major winter storm events in the West Piedmont region. Events have been broken down by the date of occurrence and when available, by individual community descriptions. When no community-specific description is available, the general description represents the entire planning area. It is apparent from historical records that winter storms impact the entire West Piedmont region with some regularity. Past events indicate that the frequency of significant ice and snow is slightly higher over the western and northern portions of the region, particularly the higher elevations.

Hazard Profile

Primary Impacts

The impacts of winter storms are minimal in terms of property damage and long-term effects. The most notable impact from winter storms is the damage to power distribution networks and utilities. Severe winter storms have the potential to inhibit normal functions of the community. Governmental costs for this type of event are a result of the needed personnel and equipment for clearing streets. Private sector losses are attributed to lost work when employees are unable to travel. Homes and businesses suffer damage when electric service is interrupted for long periods of time. (see Table V-34. Estimated Losses due to Electricity Outage for Residential Structures) Six utility companies provide service to the region, which can make power restoration complicated.

Health threats can become severe when frozen precipitation makes roadways and walkways very slippery and also due to prolonged power outages and if fuel supplies are jeopardized. Occasionally, buildings may be damaged when snow loads exceed the design capacity of their roofs or when trees fall due to excessive ice accumulation on branches. The water content of snow can vary significantly from one storm to another and can significantly impact the degree to which damage might occur. In snow events that occur at temperatures at or even above freezing, the water content of the snowfall is generally higher. Higher water content translates into a heavier, 'wet' snowfall that more readily adheres to powerlines and trees, increasing the risk for their failure. Roof collapse is also more of a concern with wetter, heavier snowfall. On the other hand, clearing roadways and sidewalks is considerably easier for a drier, more powdery snow. A dry, fluffy snow is less likely to accumulate on power lines and trees. This type of snow generally occurs in temperatures below freezing with water content decreasing with temperature. The primary impact of

excessive cold is increased potential for frostbite, and potentially death as a result of over-exposure to extreme cold.

Secondary Effects

Some of the secondary effects presented by extreme/excessive cold are threats to the health of livestock and pets, and frozen water pipes in homes and businesses.

Predictability and Frequency

Winter storms can be a combination of heavy snowfall, high winds, ice and extreme cold. Winter weather typically impacts the state of Virginia between the months of November and April, with varied intensities.

To determine the geographic distribution and frequency with which major snow or ice events impact the region, National Weather Service warnings and advisories issued between 2005 and January 2011 were examined. (see Table V-4; also see Previous Occurrences in Appendix B1) The NWS criteria for alerts for snow events:

- Blizzard Warning: Issued when sustained winds or frequent gusts to at least 35 mph and falling/blowing snow reduce visibilities to a quarter mile or less for 3 hours or longer.
- Heavy Snow Warning: Issued when snowfall of greater than 4 to 6 inches is expected.
- Winter Storm Warning (for snow): Issued when precipitation might be a significant wintry mix of snow and ice.
- Snow Advisory: Issued when snowfall might cause inconvenience but amounts are expected to be less than that of the other warnings types or visibility not as impaired.

Specifically, the number and types of warnings and advisories issued was analyzed for each County and a weighting system was applied that factored the 'severity' of an event implied by a particular warning or advisory type. *Note: National Weather Service warnings/advisories for winter weather are issued at a county level. The warnings/advisories apply to all towns and cities located within a particular county.* In the case of snowfall for example, issuance of a Blizzard Warning implies a more significant event than that of a Snow Advisory. A higher weight is thereby applied to the Blizzard Warning.

To determine the Significant Snowfall Potential, the total number of each warning or advisory type and its weighting were summed. Weighting was applied as follows: Blizzard Warning = 1.5; Heavy Snow Warning = 1.25; Snow Advisory = 0.5; Winter

Storm Warning (for significant snow) = 1. Using this method, it was determined that Franklin and Patrick Counties have a High significant snowfall potential relative to the entire West Piedmont region, while Henry and Pittsylvania Counties have a Medium potential.

Table V-4. National Weather Service Alerts for Significant Snow Events (2004-2011)

Jurisdiction	Blizzard Warning	Heavy Snow Warning	Snow Advisory	Winter Storm Warning (snow)	Total Warnings/ Advisories due to Significant Snowfall	Weighted Snowfall Ranking*	Ranking Descriptor
Franklin County	0	2		6	8	**8.5**	**High**
Henry County	0	1	1	6	8	**7.75**	**Medium**
Patrick County	0	2		8	10	**10.5**	**High**
Pittsylvania County	0	1	1	6	8	**7.75**	**Medium**
weights	1.5	1.25	0.5	1	34		

*sum of alerts with weights applied
Source: National Weather Service Alerts (2004 – February 2011)

As part of the 2006 analysis, gridded climate data was obtained from the Climate Source and through the VirginiaView program. This data was developed by the Oregon State University Spatial Climate Analysis Service (SCAS) using **PRISM** (**P**arameter-elevation **R**egressions on **I**ndependent **S**lopes **M**odel). This climate mapping system is an analytical tool that uses point weather station observation data, a digital elevation model, and other spatial data sets to generate gridded estimates of monthly, yearly, and event-based climatic parameters. The mean annual days map reveals the 30-year average of the number of days that a location will receive greater than 1 inch of snowfall in a 24-hour period in a given year.

A criterion of greater than 1 inch was selected for winter snowfall severity assessment because this depth will result in complete road coverage that can create extremely dangerous driving conditions and will require removal by the local community. This amount of snowfall in a 24-hour period also can lead to business closure and school delays or cancellation.

Figure V-3 shows the average number of days with snowfall greater than one inch for the state and Figure V-4 shows the same for the West Piedmont region. The analysis shows that the highest frequency of days with greater than 1 inch of snow are found in the higher elevations of Patrick and Franklin Counties where between eight and eleven days annually see a snowfall of greater than an inch. On the flip side, southern

and southeastern portions of Henry and Pittsylvania Counties and the City of Danville typically only experience one to three days annually where snowfall totals greater than an inch. This analysis agrees with that conducted using National Weather Service warnings and advisories and implies that higher elevations and northern and western sections of the West Piedmont Planning District are more likely to experience significant snowfall events. Availability of new data through PRISM is now limited due to that program's limited remaining funding and this prevented a similar or updated analysis for this plan's update. Even so, the previous analysis which is based on long term records is still considered valid.

The Virginia Tech Center for Geospatial Information and Technology's (CGIT) performed analyses of weather station daily snowfall data for the Commonwealth of Virginia's Hazard Mitigation Plan in 2008. Station-specific statistics were used as the basis for a seamless statewide estimate based on multiple linear regressions between the weather statistics (dependent variable) and elevation and latitude (independent variables). Figure V-5 shows that the average number of days with at least 3 inches of snowfall ranges from 3 to 7 days over western portions of the West Piedmont region including far western sections of Franklin and Patrick Counties to 1.5 days or fewer over southeastern sections of the region, including southern portions of Henry and Pittsylvania Counties.

The Northeast Snowfall Impact Scale (NESIS) is an additional winter weather scale, developed by Paul Kocin and Louis Uccellini, which attempts to rank Northeast snowstorms based on the impacts these systems have on society. The scale is broken into 5 categories ranging from Category 1 which is considered a "Notable" event to a Category 5 which is considered "Extreme." The amount of snowfall for a particular storm and the population impacted are the factors used in assigning NESIS values. This scale is mentioned here as another winter weather scale that exists; it is infrequently referenced by the media or the National Weather Service in describing significant snowfall events.

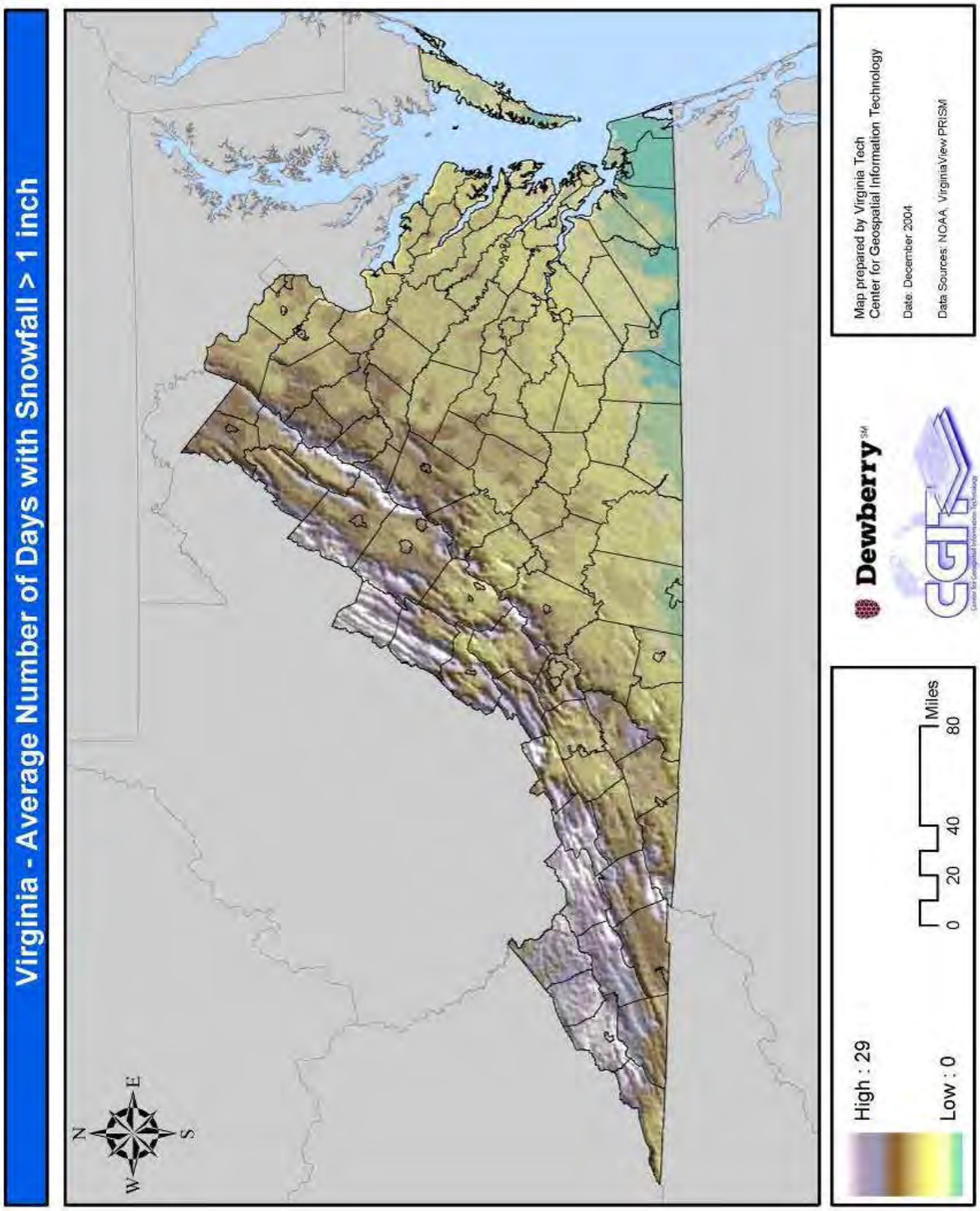
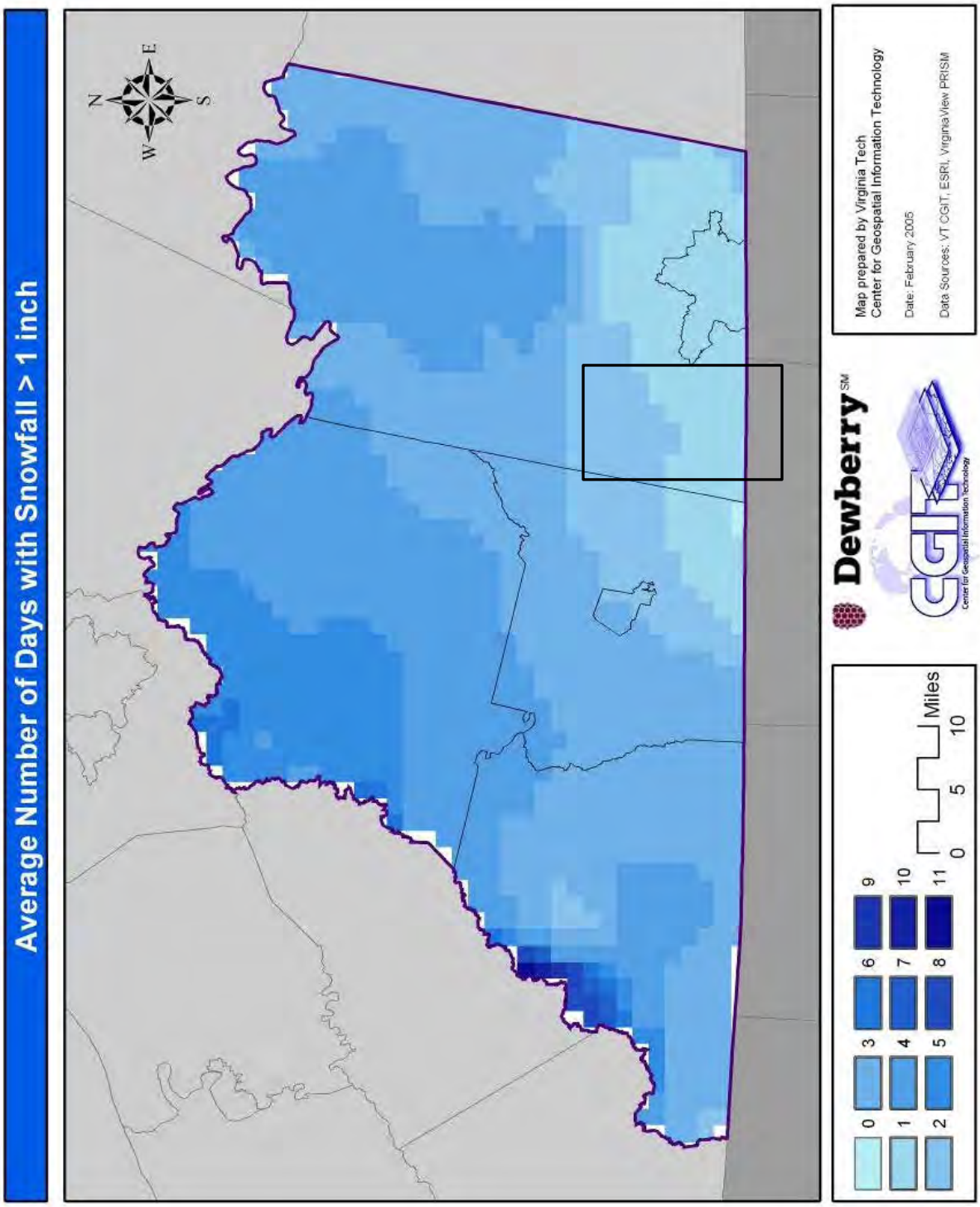


Figure V-3. Virginia Average Number of Days with Snowfall > 1 inch

Figure V-4. West Piedmont Average Number of Days with Snowfall > 1 inch.



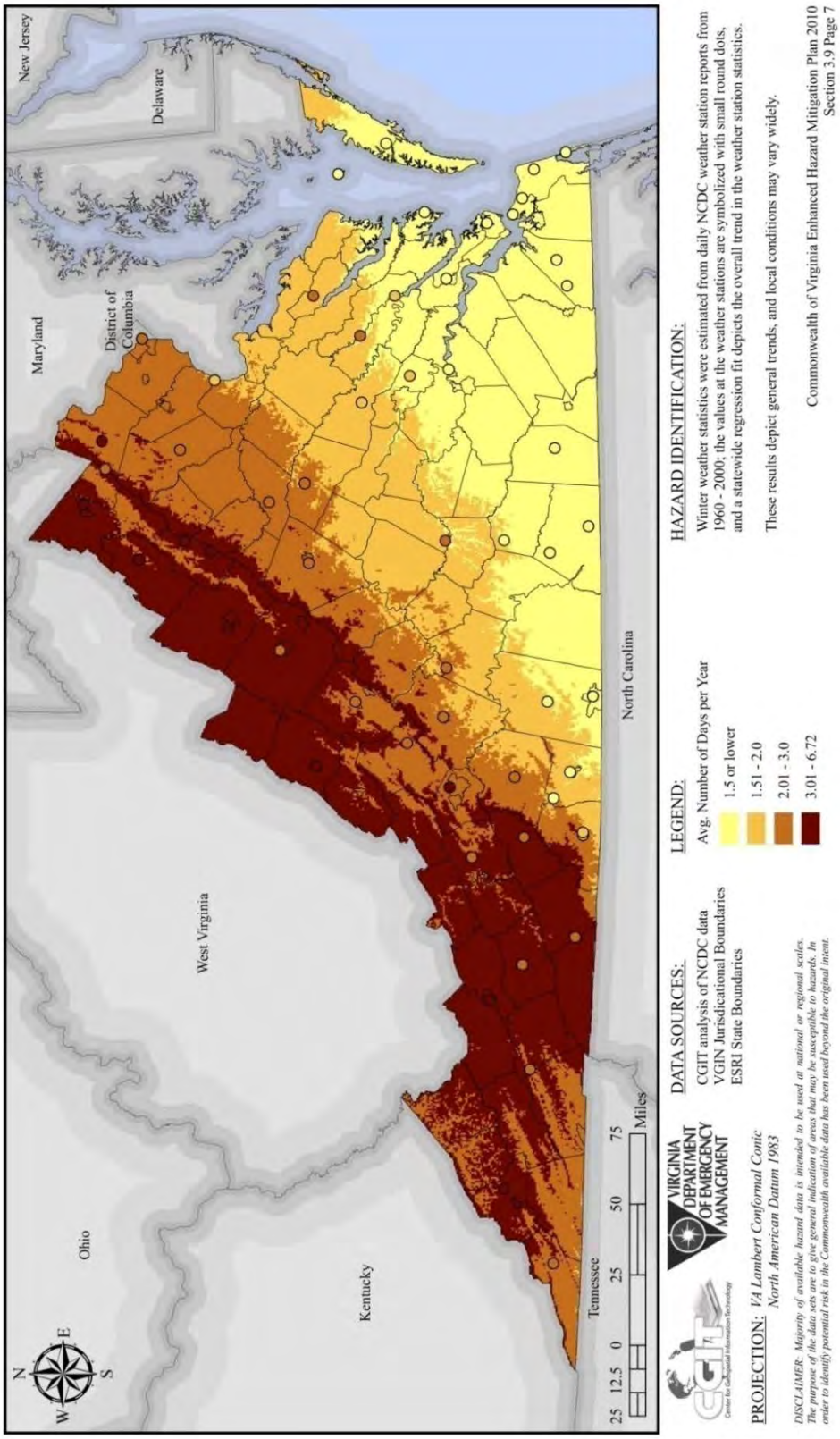


Figure V-5. Average Number of Days with at Least 3 Inches of Snowfall

Ice Potential

Another challenge with winter weather in Virginia and the West Piedmont region is the amount of ice that often comes as part of winter weather. Ice accumulating and trees and powerlines can have a devastating impact on the region, including disruption of utilities and communications. Depending on the extent and severity of these icing events, outages can last for days and even in extreme cases weeks. An analysis of National Weather Service warnings and advisories issued for icing events was performed and a method similar to that described for determining Significant Snowfall Potential was applied (see Table V-5). The NWS criteria for alerts for icing events:

- Ice Storm Warning: Issued when damaging accumulations of ¼ inch or greater are expected.
- Winter Storm Warning (for ice): Issued when precipitation might be a significant wintry mix of snow and ice.
- Freezing Rain Advisory: Issued when freezing rain accumulations are expected to be less than ¼ inch.

To determine the Significant Icing Potential, the total number of each warning or advisory type issued and its weighting were summed. Weighting was applied as follows: Ice Storm Warning = 1.5; Winter Storm Warning (for significant icing) = 1; and Freezing Rain Advisory = 0.5. Using this method, it was determined that Patrick County has a High Significant Icing potential, Franklin County a Medium High potential, and Henry and Pittsylvania Counties have a Medium potential.

Table V-5. National Weather Service Alerts for Significant Ice Events (2005 – February 2011)

Jurisdiction	Ice Storm Warning	Freezing Rain Advisory	Winter Storm Warning (significant ice)	Total Warnings/ Advisories due to Significant Glaze Icing	Weighted Significant Icing Ranking (sum of alerts with weights applied)	Ranking Descriptor
Franklin County	3	6	2	11	**9.5**	**Medium-High**
Henry County	1	3	1	5	**4**	**Medium**
Patrick County	6	2	2	10	**12**	**High**
Pittsylvania County	1	3	1	5	**4**	**Medium**
Weights	1.5	0.5	1	31		

Vulnerability Analysis

Winter storm vulnerability can be thought of in terms of individual, property, and societal elements. For example, the exposure of individuals to extreme cold, falling on ice-covered walkways, and automobile accidents is heightened during winter weather events. According to NCDC records dating back to 1993, at least one fatality was officially recorded as having resulted from winter storms in the planning region. This fatality took place during a severe winter storm on February 2, 1996 in Franklin County.

Property damage due to winter storms includes damage done by and to trees, water pipe breakage, structural failure due to snow loads, and injury to livestock and other animals. A single winter event can cause hundreds of thousands of dollars in property damages as was witnessed by an ice storm that caused an estimated $400,000 in damages across portions of Henry and Pittsylvania Counties (and extending into Charlotte and Halifax Counties) on February 2, 1996. The disruption of utilities and transportation systems, as well as lost business and decreased productivity are vulnerabilities of society as a whole. In terms of critical facility vulnerability, those facilities located in Franklin and Henry Counties are slightly more inclined to experience significant ice and snow as compared to facilities located in Henry and Pittsylvania Counties.

The vulnerability to damages varies in large part due to specific factors; for example, proactive measures such as regular tree maintenance and utility system winterization can minimize property vulnerability. Localities accustomed to winter weather events are typically more prepared to deal with them and therefore less vulnerable than localities that rarely experience winter weather.

Table V-6. Winter Storm Events in NCDC Storm Events Database (1993 – December 2010)

Jurisdiction	Annualized Property Damage
Franklin County	$762.73
Henry County	$10,479.70
Patrick County	$1,012.47
Pittsylvania County	$9,984.47
Total	**$22,239.37**

NOTE: NCDC Storm Events database provides winter storm data only at a county level. It can be assumed that cities and towns located within a particular county share some portion of the annualized winter storm losses.

The impacts of winter storms are primarily quantified in terms of the financial cost associated with preparing for, response during and recovering from them. The primary source of data providing some measurement of winter storm impacts is the NCDC Storm Events database. (See Table V-6) Averaged over the length of available data records dating back to 1993, on an annual basis, property damages due to winter storms are estimated at over $10,000 a year in Henry County, and only slightly lower than that in Pittsylvania County. Damages in the database are much more limited for Patrick County, where approximately $1,000 in loss occurs every year due to winter storms, with Franklin County experiencing just under $800 annually. The substantial differences in dollar amounts across the jurisdictions may be a result of a number of factors including more limited loss estimation data availability for specific winter storm events potentially and/or potentially fewer insured properties (insurance claims are one source of NCDC property loss data) in Franklin and Patrick Counties, despite winter weather events being slightly more frequent (relative to the other West Piedmont counties) in both counties. The database includes winter event data back to 1993, but is not necessarily complete or consistent from event to event and it does not capture costs of snow and ice removal. The cost of keeping roadways clear of ice and snow can be astronomical. For instance, the Virginia Department of Transportation winter 2010-2011 budget for snow removal in Henry and Patrick Counties was $1.7 million.[6] A single major winter storm event in December 2009 that dumped 15 inches of snow on the area cost the Town of Rocky Mount $15,765 to remove snow from roadways and sidewalks.[7]

Although a more comprehensive, labor-intensive analysis consisting of using weather station data, NCDC damages, and other data sources (VDOT and municipal snow/ice removal costs) could possibly produce an intensity-damage relationship between winter weather occurrences and resultant damages, this type of analysis was not performed for the update of this plan.

Figures V-6 and V-7 show the overall snow and ice potential for the West Piedmont region. The planning areas were assigned a relative risk of high, medium-high, medium, medium-low and low based on the levels predicted from previous snow or ice event occurrences. Tables V-7 and V-8 show the populations by jurisdictions that are in each risk level for snow and ice.

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[6] "VDOT has spent 'over $1.5M' on snow removal", Paul Collins, Martinsville Bulletin, January 27, 2011.

[7] "Cold temperatures hamper snow removal", Joel Turner, The Franklin News Post, February 3, 2010.

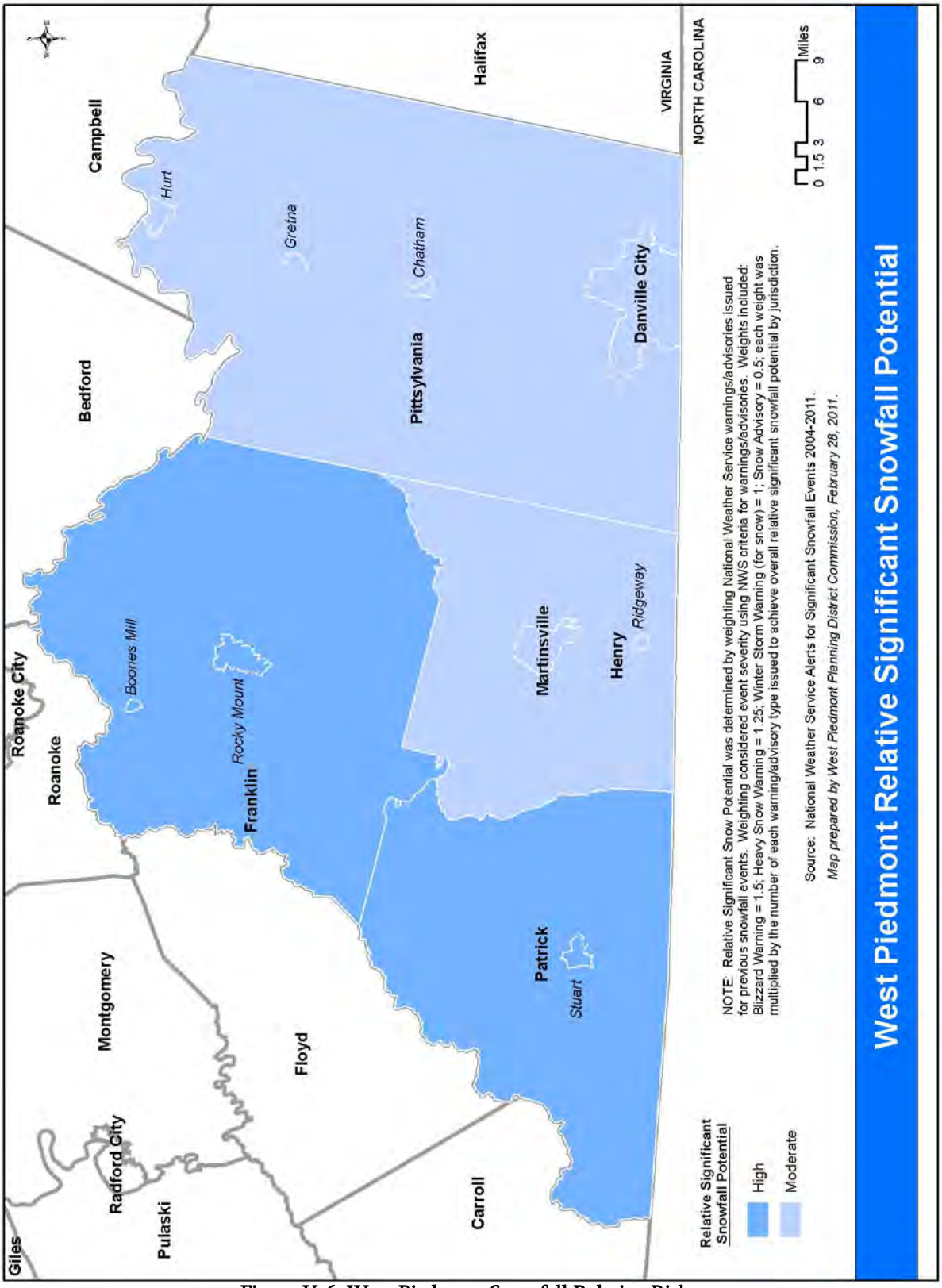

Figure V-6. West Piedmont Snowfall Relative Risk

Table V-7. West Piedmont Population Snowfall Relative Risk (based on 2009 ACS)		
Jurisdiction	**Moderate**	**High**
City of Danville	44,978	0
Franklin County	0	51,023
Town of Boones Mill	0	239
Town of Rocky Mount	0	4,799
Henry County	55,480	0
Town of Ridgeway	742	0
City of Martinsville	14,660	0
Patrick County	0	18,755
Town of Stuart	0	1,408
Pittsylvania County	61,156	0
Town of Chatham	1,269	0
Town of Gretna	1,267	0
Town of Hurt	1,304	0
TOTAL	**180,856**	**76,244***
**Towns are included in County Totals*		

Table V-8. West Piedmont Region Population Ice Relative Risk (based on 2009 ACS)			
Jurisdiction	**Medium**	**Medium-High**	**High**
City of Danville	44,978	0	0
Franklin County	0	51,023	0
Town of Boones Mill	0	239	0
Town of Rocky Mount	0	4,799	0
Henry County	55,480	0	0
Town of Ridgeway	742	0	0
City of Martinsville	14,660	0	0
Patrick County	0	0	18,755

Table V-8. West Piedmont Region Population Ice Relative Risk (based on 2009 ACS)			
Jurisdiction	Medium	Medium-High	High
Town of Stuart	0	0	1,408
Pittsylvania County	61,156	0	0
Town of Chatham	1,269	0	0
Town of Gretna	1,267	0	0
Town of Hurt	1,304	0	0
TOTAL	**180,856**	**56,061**	**20,163**
**Towns are include in County Totals*			

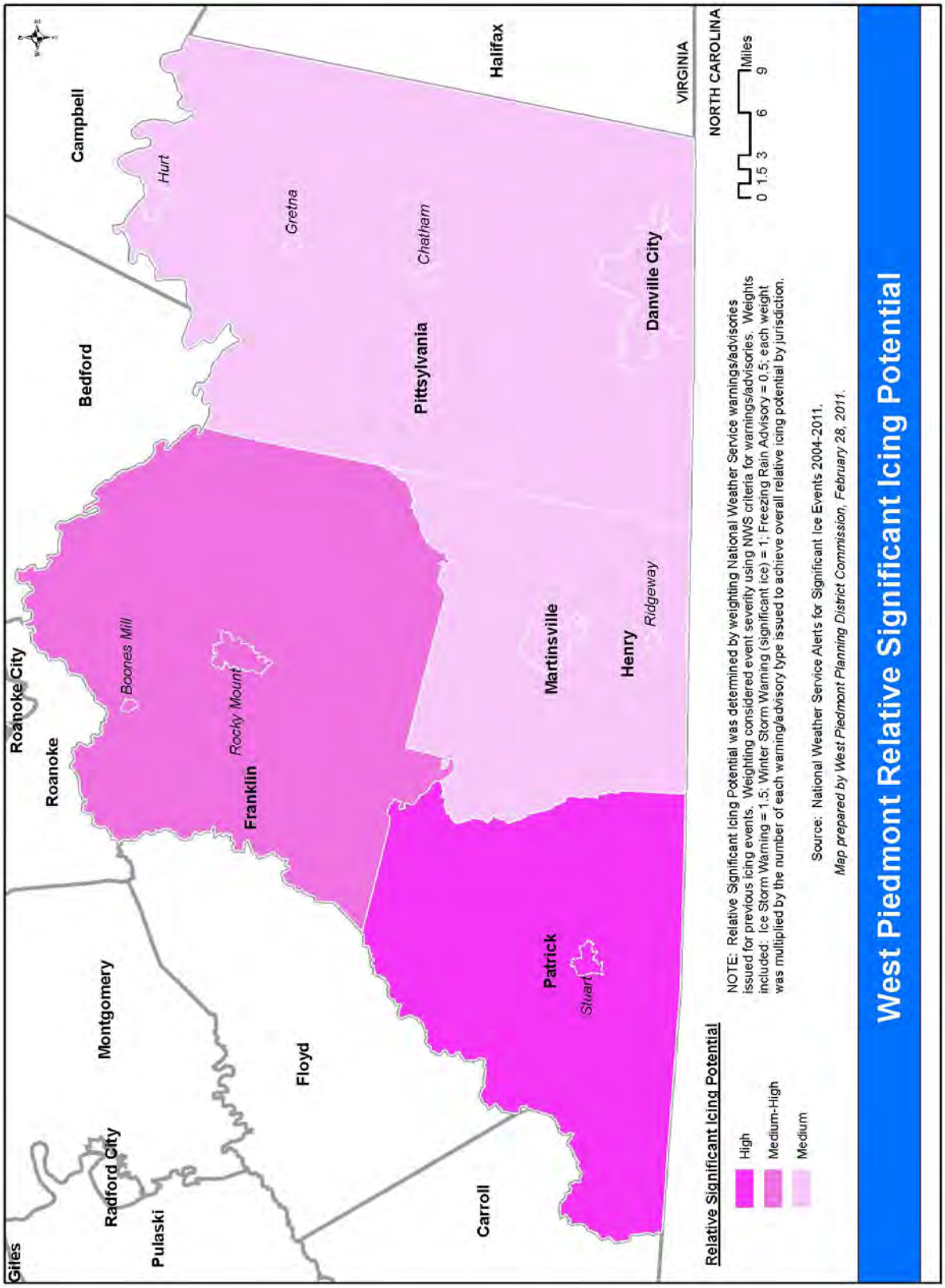

Figure V-7. West Piedmont Region Ice Relative Risk

In summary, winter weather events impact the West Piedmont region on a regular basis and this is considered a significant hazard for the area. Analysis shows that significant icing and snow events are slightly more frequent in Franklin and Patrick Counties, while historical damages for winter weather events have been highest in Pittsylvania and Henry Counties.

Flooding (Significant Ranking)

Hazard History

Appendix B1 includes descriptions of major flood events in the West Piedmont Region. Events have been categorized by the date of occurrence and when available, by individual community descriptions. When no community-specific description is available, the general description represents the entire planning area.

Hazard Profile

A flood occurs when an area that is normally dry becomes inundated with water. Floods may result from the overflow of surface waters, overflow of inland and tidal waters, or mudflows. Flooding can occur at any time of the year, with peak hazards in the late winter and early spring. Snowmelt and ice jam breakaway contribute to winter flooding, while seasonal rain patterns contribute to spring flooding. Torrential rains from hurricanes and tropical systems are more likely in late summer. Development of flood-prone areas tends to increase the frequency and degree of flooding.

Floods typically are characterized by frequency, for example the "1%-annual chance flood," commonly referred to as the "100-year" flood. While more frequent floods do occur, as well as larger events that have lower probabilities of occurrence, for most regulatory and hazard identification purposes, the 1%-percent annual chance flood is used.

Floods pick up chemicals, sewage and toxins from roads, factories, and farms. Property affected by the flood may be contaminated with hazardous materials. Debris from vegetation and man-made structures also may be hazardous following the occurrence of a flood. In addition, floods may threaten water supplies and water quality, as well as initiate power outages.

Secondary Effects

Flooding can pose some significant secondary impacts to the area where the event has taken place. Some of the impacts to consider include infrastructure and utility failure, impacts to roadways, water service and wastewater treatment. These impacts can

affect the entire Planning District, making the area vulnerable to limited emergency services.

Flood Maps

Detailed flood data were available as Digital Flood Insurance Rate Maps (DFIRMs) for jurisdiction's within the FEMA defined floodplain. Figure V-8 and Appendix B illustrate the extent of FEMA-mapped flood zones.

Vulnerability Analysis

Specific areas that are susceptible to flooding were identified during the West Piedmont Mitigation Advisory Committee kick-off meeting and during the planning process for the 2011 update. These areas were taken into account when completing the hazard identification and risk assessment.

Many factors contribute to the relative vulnerabilities of areas within the floodplain. Some of these factors include development or the presence of people and property in the floodplain, flood depth, velocity, elevation, construction type and flood duration.

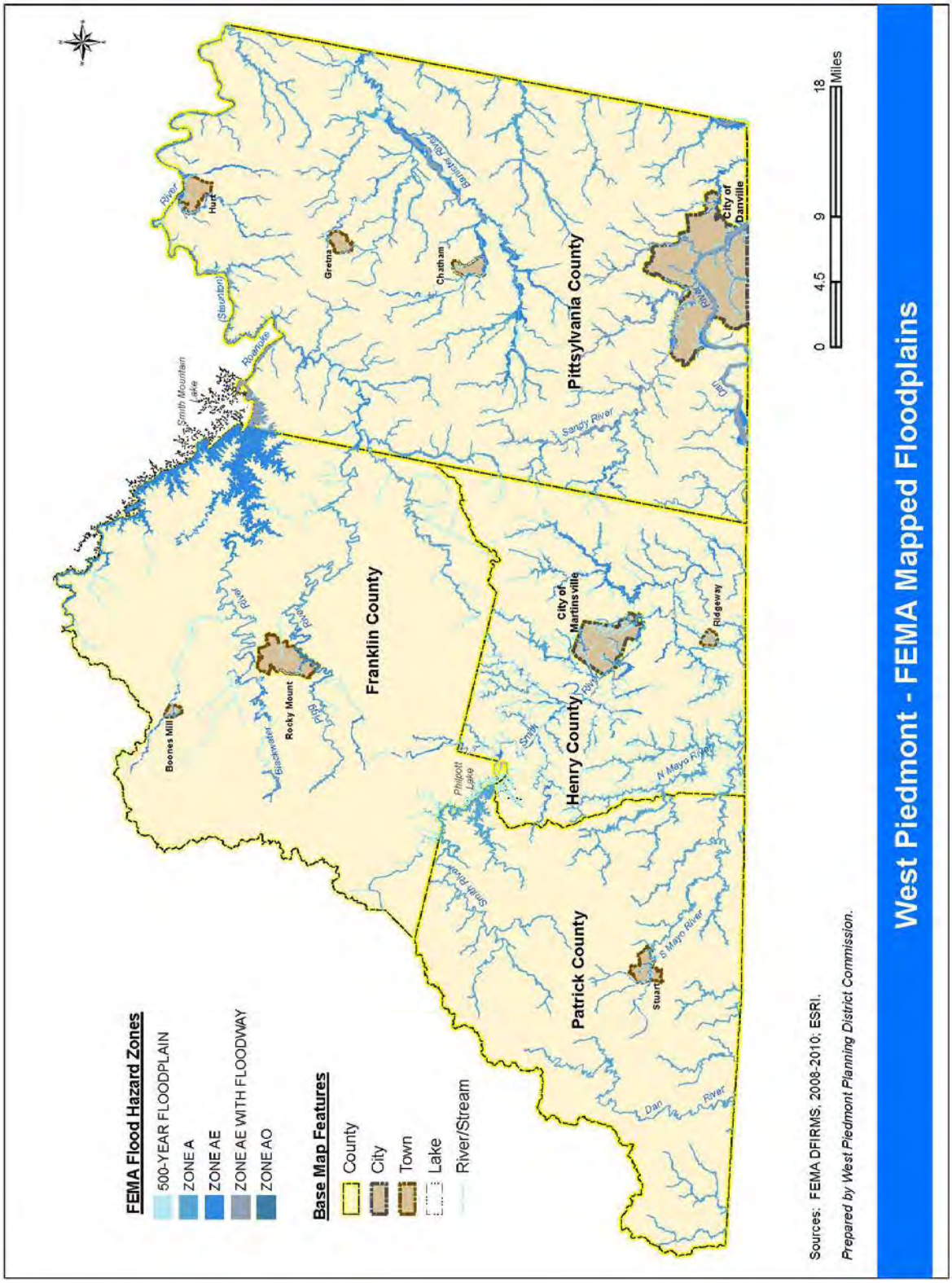

Figure V-8. West Piedmont Region Floodplains

Hazard Areas and Vulnerability Assessment by Jurisdiction

Flooding in the West Piedmont region tends to be riverine in nature along the tributaries of the Roanoke River. Localized flooding also can occur in the narrow valleys throughout the region and because of local drainage areas, particularly in the more urban areas.

Several of the comprehensive plans for the West Piedmont region provided some description of vulnerable areas. In the City of Danville, the Piedmont Drive/Mt. Cross Road Planning Area is impacted by three major waterways: the Dan River, Sandy River and Sandy Creek. According to the Comprehensive Plan, this area has been flooded numerous times. The area along Riverside Drive and Mt. Cross Road in Danville Plaza has been a particular concern. A portion of the planning area in the 100-year floodplain has been identified as a potential park location. The Dan River also significantly impacts the Downtown and the Airport/Industrial Airport Planning Areas, bisecting the latter Planning Area.

Street flooding is also an issue in the City of Danville. For instance, Route 58 Business at Fall Creek is often closed after heavy rainfall. The floodwaters result from runoff from the adjacent neighborhood that comes up through the manholes. If the rainfall amount is large enough, the adjacent river also may flood its banks adding to the floodwaters on the road. Underground culverts run under buildings in downtown Danville are inadequate; these culverts are antiquated and are at risk of collapse.

The City of Danville's Utilities Department has had flooding issue with its water, gas, and electric substation. The parking lot has flooded numerous times (e.g., at least three times per decade). The Utilities Department was not been able to identify a location to move its facilities to so they will rehabilitate the existing building.

According to Pittsylvania County officials, flooding is the County's primary natural hazard concern. Rapid rising creeks, in particular, cause low-lying roads to be flooded. For instance, Highway 29 at Fall Creek has repeatedly flooded in the past during large rainfall events. The cause of the flooding is unclear.

In Martinsville, the Westside and Southside neighborhoods have concerns about stormwater management. After large rains, it is not uncommon for unmarked barrels to float down the river and collect in Smith Lake Road area.. These unmarked barrels may pose a health hazard if their contents are toxic.

Estimating Potential Losses

Risk Methodologies

Several methodologies were utilized to quantify vulnerability due to flooding. The following sections highlight risk and potential losses to structures (tax parcels and building footprints), risk to critical facilities, and jurisdictional risk based on census blocks. Similar risk analyses were completed in the 2006 flooding section. These have been updated and expanded based on best available data (structures and DFIRMs). Appendix B provides a detailed summary of the analysis completed. This should be referenced for specific information on structures and critical facilities at risk and potential mitigation projects.

The Structures at Risk for the 2006 plan were based on 10% greater than the average house value by census block; as a result, the values presented were most likely underestimates of vulnerability due to only residential housing units being accounted for. The PDC and participating jurisdictions were able to provide tax parcels and building footprints as well as housing value/improvement value for the parcels and/or footprints for the 2011 plan update. If building footprints were available with building value, that data was used for the analysis. If building footprints were available without building value, the tax parcel building value was assigned to the footprints located within the parcel, as identified via GIS data identities. In some cases, this may result in overestimating risk. For certain tax parcels where multiple footprints are on a parcel, each footprint is assigned the building value. The benefit of the analysis for the update is that all building occupancy types and more accurate building values, as mapped by the localities, are taken into account.

The Critical Facilities at Risk for the 2006 plan was based on data compiled from the PDC and supplemented with HAZUS-MH, ESRI, and US census data. The 2011 plan update uses only data furnished by the PDC. Data used in the 2006 plan was not maintained and thought to be out of date. The PDC was able to create a critical facility GIS layer, with jurisdictional input, that best represents their critical facilities. The same critical facility risk analysis was performed for the update as in the original plan.

Jurisdictional Risk for the update has been slightly changed to align with the 2010 Commonwealth of Virginia Hazard Mitigation Plan flood analysis, based on census blocks from HAZUS-MH MR4. The 2006 analysis estimated loss for structure and content based on the percent of the census block structure value located within the floodplain, with no differentiation for flood zones. The updated analysis takes into

account the various flood zones and assigns damage based on assumptions summarized in that section below.

As stated above in structures at risk, one limitation of the 2006 analysis method was that it underestimated the loss to higher-valued structures, such as businesses and critical facilities; the maximum amount of damage for individual structures was capped at $400,000. For the update, no cap was placed on the analysis. It should be noted that with some of the multi-million dollar structures, the loss estimates may be unrealistic. Structures in the vicinity of the floodplain may be elevated or have floodproofing measures in place which would reduce damages. Without structure by structure investigation, this remains unknown and as a result the entire potential losses are presented below.

Structures at Risk

The impact of flooding on structures was estimated based on best available data for floodplains and structures for each community. Table V-9 shows the sources for the structure values used for the flood loss analysis. The majority of the localities were able to provide building footprint data and tax parcel information. The average structural value per census block from HAZUS-MH was used for Patrick County and the Town of Stuart because the value information provided by the localities was not in a usable format for this analysis. As discussed above, if building footprints and building value were available they were utilized for analysis. If building footprints were available, without building value, they were used in conjunction with the building values provided in the tax parcels. If this is the case, each building footprint on the parcel was assigned the same building value which may result in overestimating vulnerability and risk.

Table V-9. West Piedmont Region Structural and Property Data Availability

Jurisdiction	Structural and Property Data
City of Danville	GIS building footprints. (Tax parcels used to assign building value)
Franklin County	GIS building footprints. (Tax parcels used to assign building value)
Town of Boones Mill	
Town of Rocky Mount	
Henry County	GIS building footprints. (Tax parcels used to assign building value)
Town of Ridgeway	
City of Martinsville	Henry County GIS building footprints. (Tax parcels used to assign building value)
Patrick County	GIS building footprints. (Average building value per census block from FEMA HAZUS-MH)
Town of Stuart	

Table V-9. West Piedmont Region Structural and Property Data Availability	
Jurisdiction	**Structural and Property Data**
Pittsylvania County	GIS tax parcels with building values.
Town of Chatham	
Town of Gretna	
Town of Hurt	

The flood vulnerability was determined for each locality based on the intersection of floodplain mapping and building footprint/tax parcel mapping. The analysis was able to determine the percent of each building footprint/tax parcel located within each FEMA mapped flood zone. Once the area in the mapped flood zone was determined, the assumptions summarized in the Jurisdiction Risk section (Tables V-12 and 13) were applied.

Potential annualized damages is calculated by taking the building value exposure and multiplying it by the flood probability and assumed building damage.

For the entire West Piedmont region, there are 4,855 parcels/building footprints in flood zones that account for $8.6 million in annualized damages.

Table V-10. Structure Flood Vulnerability & Risk			
Jurisdiction	**Flood Zone**	**Number of Parcels or Building Footprints**	**Potential Annualized Damages**
City of Danville	0.2%	438	$27,295
	A	5	$217
	AE (with floodway)	161	$1,979,251
	AE	429	$5,785,267
	TOTAL	**1,033**	**$7,792,029**
Franklin County	0.2%	76	$7,355
	A	37	$2,082
	AE (with floodway)	46	$18,189
	AE	466	$144,959
	TOTAL	**625**	**$172,584**
Town of Boones Mill	All Zones	**49**	**$11,964**
Town of Rocky Mount	All Zones	**49**	**$20,238**
Henry County	0.2%	817	$36,944
	A	262	$36,412
	AE (with floodway)	396	$50,250

Table V-10. Structure Flood Vulnerability & Risk			
Jurisdiction	Flood Zone	Number of Parcels or Building Footprints	Potential Annualized Damages
	AE	567	$216,039
	TOTAL	**2,042**	**$342,645**
Town of Ridgeway	All Zones	**3**	**$770**
City of Martinsville	0.2%	47	$2,037
	A	2	$2
	AE (with floodway)	14	$1,693
	AE	49	$36,968
	TOTAL	**112**	**$40,700**
Patrick County	0.2%	63	$774
	A	572	$42,577
	AE (with floodway)	40	$4,971
	AE	38	$6,877
	AO	8	$722
	TOTAL	**721**	**$55,922**
Town of Stuart	All Zones	**56**	**$5,138**
Pittsylvania County	0.2%	150	$4,012
	A	22	$16,792
	AE (with floodway)	56	$144,634
	AE	94	$58,716
	TOTAL	**322**	**$224,154**
Town of Chatham	All Zones	**11**	**$1,894**
Town of Gretna	All Zones	**11**	**$1,664**
Town of Hurt	All Zones	**27**	**$6,469**
West Piedmont Totals	All Zones	**4,855**	**$8,628,034**

NOTE: Values for the towns are also rolled up in the county figures in the table above.

Critical Facilities at Risk

Table V-11 (also see map in Appendix B7) lists the 22 critical facilities (excluding dams) that are located within or in close proximity to the FEMA designated floodplains. Using a GIS, the critical facility points were intersected with the FEMA flood zones. The total number of critical facilities located in floodplains has increased since the previous update to this plan. This is likely the result of new DFIRMs having

been released since the previous plan as well as updated critical facility data made available by the participating jurisdictions. A 30-foot buffer on the facilities provided a radial distance from the center of the building that was used to determine the proximity to the floodplain. Table V-11 shows that there is great diversity in the types of facilities ranging from schools and fire/rescue to nursing facilities. There are 12 facilities located within the AE flood zone.

Table V-11. Critical Facilities in Flood Hazard Zones

County/City	Location	Facility Name	Type	Flood Zone
City of Danville	City of Danville	National College - City of Danville Campus	College	AE
City of Danville	City of Danville	1 City of Danville Fire Dept	Fire/Rescue	0.2% ann. chance
Franklin County	Callaway	Callaway Elementary School	School	AE
Franklin County	Callaway	Callaway Fire Dept & Rescue Squad	Fire/Rescue	AE
Franklin County	Rocky Mount	Franklin County Government Office Complex	Govt	0.2% ann. chance
Franklin County	Rocky Mount	Rocky Mount Sewage Pumping Station	W/S	AE
Henry County	Axton	Piedmont Estates Lagoon	PSA	A
Henry County	Axton	Leatherwood Lift Station	PSA	AE
Henry County	Bassett	Bassett Rescue Squad, Inc	Fire/Rescue	0.2% ann. chance
Henry County	Bassett	Philpott Raw Booster Pump	PSA	AE
Henry County	Fieldale	Rangeley Sewage Station	PSA	0.2% ann. chance
Henry County		Carver Estates Lagoon	PSA	AE
Henry County		Carver Booster Pump Station #1	PSA	AE
Henry County		Revco Lift Station	PSA	AE
Henry County		Henry County Public Safety*	Fire/Rescue	AE
Henry County		Villa Heights Sewer Metering	PSA	0.2% ann. chance

Table V-11. Critical Facilities in Flood Hazard Zones				
County/City	Location	Facility Name	Type	Flood Zone
Henry County	Ridgeway	Greenbriar Sewage Lagoon	PSA	0.2% ann. chance
Henry County	Ridgeway	Edgewood Lift Station	PSA	A
Henry County	Stanleytown	Stanleytown Elementary School	School	AE
Pittsylvania County	City of Danville	Riverside Health & Rehab Center	Nursing Home	0.2% ann. chance
Pittsylvania County	Hurt	Hurt Water Treatment	WS	AE
Pittsylvania County	Hurt	Hurt Police Dept / Town Hall	Govt	0.2% ann. chance

*FFE of Public Safety building is 715 feet and the BFE is 705.
A=also known as the 100-year floodplain, these are areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE= similar to the A Zone, these are areas with a 1% annual chance of flooding but base flood elevations are provided.
0.2% ann. chance = also known as the 500-year floodplain, this is the area where there is a 0.2% annual chance of a flood. Also known as the X Zone.

Jurisdictional Risk

Potential flood loss for jurisdictions was determined by intersecting the FEMA DFIRMs and census block data in a method similar to that used for the 2010 Commonwealth of Virginia Hazard Mitigation Plan. To calculate annualized loss, determination of building value per unit area and reasonable flood depths to be used for calculating the percent building damage was required.

Total building exposure in each census block was derived from the HAZUS census data geodatabase (from 2000). Building value (in dollars) per unit area was calculated by dividing the total value of building exposure by the census block area. FEMA flood maps (all jurisdictions in the floodplain now have DFIRMS) were intersected with the census blocks to determine the percentage of each census block in each Special Flood Hazard Area (SFHA). *The 2010 demographic information for census blocks was not yet available when this analysis was performed.*

Building type scenarios (see Table V-12) developed using Federal Insurance Administration (FIA) depth-damage curves for the Benefit-Cost Analysis (BCA)

toolkit[8] were then used to determine probabilities and depths of flooding in order to calculate annualized flood loss. An assumption was made that any building within a SFHA would be subject to 100-year flooding. A one story building without a basement was deemed a good representation for building stock in Virginia in the 2010 Commonwealth of Virginia Hazard Mitigation Plan and this assumption was also applied here. Table V-13 shows the flood depth assumptions that were made as part of this analysis.

Table V-12. Federal Insurance Administration (FIA) Depth-Damage data used in FEMA Benefit Cost Analysis (BCA) tools

Building Type	1 Story w/o Basement	2 Story w/o Basement	Split Level w/o Basement	1 or 2 Story w Basement	Split Level w Basement	Mobile Home	Other
Flood Depth (ft)	Percent Damaged (% of Building Value)						
-2	0	0	0	4	3	0	0
-1	0	0	0	8	5	0	0
0	9	5	3	11	6	8	0
1	14	9	9	15	16	44	0
2	22	13	13	20	19	63	0
3	27	18	25	23	22	73	0
4	29	20	27	28	27	78	0
5	30	22	28	33	32	80	0
6	40	24	33	38	35	81	0
7	43	26	34	44	36	82	0
8	44	29	41	49	44	82	0
>8	45	33	43	51	48	82	0

Table V-13. Annualized Flood Loss Calculation Assumptions (based on one story building without basement)

FEMA Flood Zone	Flood Depth (feet)	Annual Probability	Percent Damaged*
Floodway, VE	6	0.0100	40%
AE	2	0.0100	22%
A, AO, AH	1	0.0100	14%
0.2 percent annual chance	1	0.0020	14%

*Assume one story building without a basement

[8] Benefit Cost Analysis (BCA) Toolkit Technical Flood Manuals. 2006.

Results of this method of flood analysis estimate that on an annual basis, roughly $1.6 million in damage can be attributed to flooding in the West Piedmont region. The potential for loss is greatest in Henry County ($485,522 annually), followed closely by the City of Danville ($439,718 annually). Table V-14 summarizes potential total and annualized losses due to flooding. Figure V-9 indicated annualized flood losses by census blocks. A comparison of the annualized loss values found through using the various methods described in this section may also be found in Appendix B6.

Table V-14. Potential Total and Annual Flood Loss

Jurisdiction	Total Damages	Annual Damages
Franklin County	$26,703,221	$259,728
Town of Boones Mill	*$863,371*	*$8,251*
Town of Rocky Mount	*$4,220,987*	*$37,287*
Henry County	$57,922,474	$485,522
Town of Ridgeway	*$92,962*	*$930*
Patrick County	$8,405,573	$80,836
Town of Stuart	*$4,540,117*	*$42,337*
Pittsylvania County	$29,128,290	$276,088
Town of Chatham	*$388,584*	*$3,751*
Town of Gretna	*$4,156*	*$42*
Town of Hurt	*$454,056*	*$4,285*
City of Danville	$51,935,834	$439,718
City of Martinsville	$7,439,949	$61,314
Grand Total	**$181,535,341**	**$1,603,206**

**County totals include town damages.*

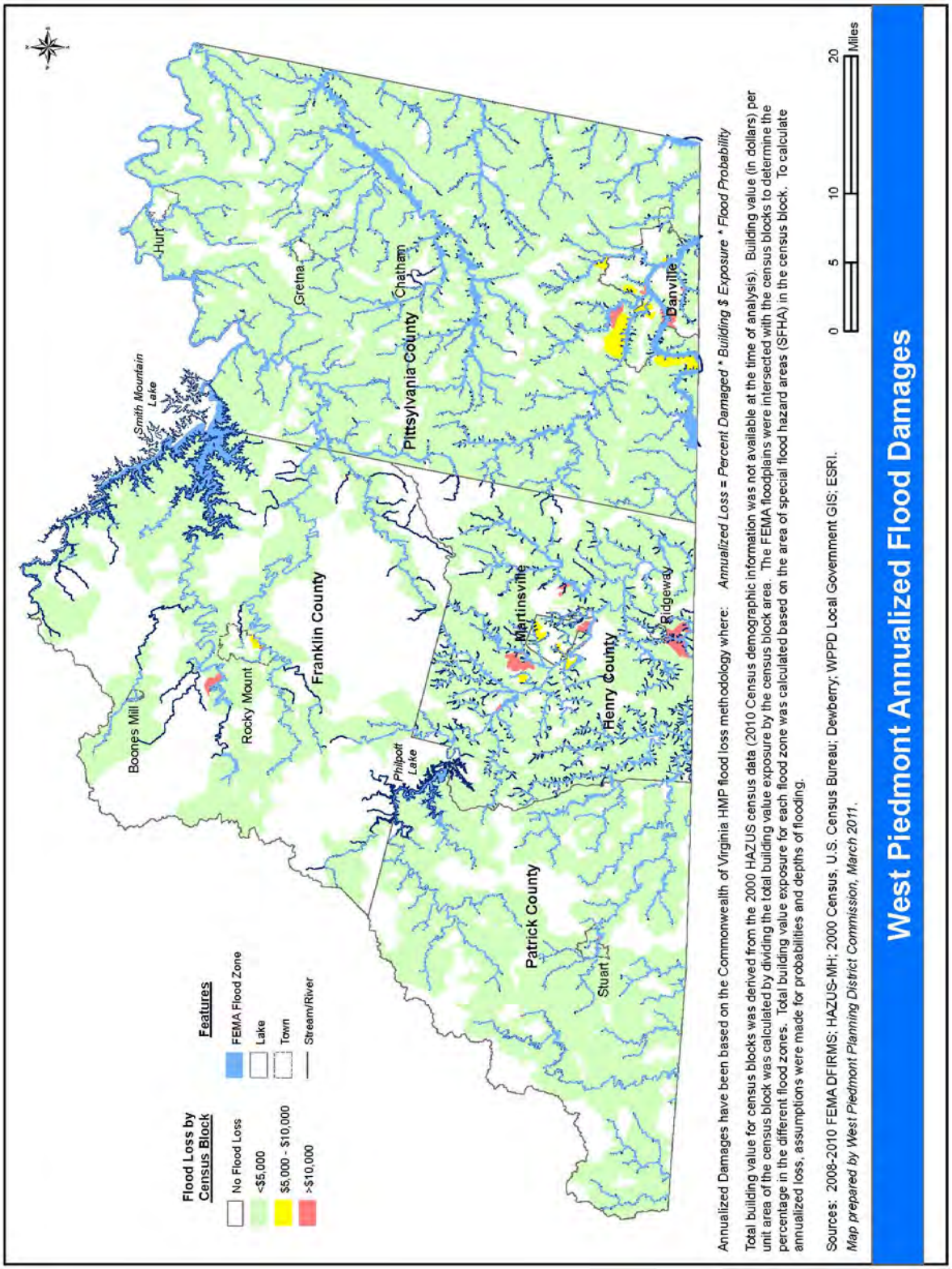

Figure V-9. West Piedmont Region Flood Losses by Census Blocks

Appendix B8 contains the annualized flood damage maps for each of the localities in the region. Each region is unique in their exposure to flooding. The following is a summation of the major trends illustrated on the jurisdictional specific maps:

- Although the City of Danville has the potential for significant annualized flood loss based on this analysis, city officials indicate that a number of structures in the floodplain have been/are elevated. For this reason, potential loss figures may be an overestimate.
- The Counties of Pittsylvania, Franklin, and Henry have the highest annualized structure and content damages for the Planning District. One of the reasons for the high loss values is attributed to the structure value that is potentially vulnerable to flooding.
- The City of Danville, with a total loss estimate of $439,718, acquires most of its damage from the Dan River and Pumpkin Creek.
- Franklin County, with a majority of census blocks along main stream branches, receives the highest potential losses along the Blackwater and Pigg Rivers. Smith Mountain Lake contributes to a large percentage of the annualized damages for the northeastern portion of the County.
- Maggodee Creek runs through the center of Boones Mill and is the primary cause of the Town's flood losses.
- Pigg River forms the southeast border for the Town of Rocky Mount. At least one census block in the southeast portion of the Town receives greater than $10,000 annualized damages per census block.
- Henry County has numerous streams within its borders, accounting for it having the highest potential flood losses in the West Piedmont region ($485,522). The Philpott Reservoir is located to the northwest tip of the County.
- The Town of Ridgeway has very limited sources for flood loss; with small sections of Surry Martin Branch and Tributary of Marrowbone Creek touching the town bounds. Census blocks just south of the Town limits potentially receive greater than $10,000 of damage on an annual basis.
- The City of Martinsville is fortunate to have modest damages due to flooding. Some of the streams within the City are Jones Creek, Smith River, and Mulberry Creek.
- A majority of the census blocks for Patrick County have some degree of flood loss. The Philpott Reservoir is located in the northeast corner of the County. Some of the major stream braches in the County are Smith River, Rock Castle Creek, North and South Mayo Rivers, Dan River, and Poorhouse Creek.
- The Town of Stuart receives a majority of the flood losses around the perimeter of the Town from Poorhouse Creek and South Mayo River.

- In Pittsylvania County, while most census blocks have annualized losses estimated at under $5,000, areas bordering the City of Danville contain blocks with damages ranging from $5,000 to $10,000 and one block northwest of Town with greater than $10,000 in annual losses. Pittsylvania County, as compared to the other counties in the district, has longer floodplain lengths and relatively higher property values, thereby impacting the loss prediction.
- The Town of Chatham receives most of its flood damages from Cherrystone Creek located in the western portion of the Town.
- The Town of Hurt is bordered by the Roanoke River to the north and east and Sycamore Creek to the west. The census blocks with flood losses are located on the north and southeast sides of the Town.

The probability of future flood events has in part been determined through analysis performed for Flood Insurance Studies in preparation of DFIRMs. Flood zones depict areas of potential flooding, including 0.2% annual chance (500-year) and 1% annual chance (100-year; base flood). Local trouble spots associated with storm water runoff can flood more frequently depending on the intensity and the duration of rain or other precipitation events.

FEMA-Designated Repetitive Loss Properties

There are 34 repetitive loss properties in the West Piedmont region, with an average claim of $16,224 (Appendix B2). A majority of the repetitive loss structures for the West Piedmont region are single family homes. Henry County has 14 repetitive loss properties, the highest number in the West Piedmont region. There is one severe repetitive loss property and it is located in Pittsylvania County. Not included in the repetitive loss/severe repetitive loss counts above, nine homes in Danville and five homes in Henry County have been acquired through the Hazard Mitigation Grant Program.

Wind (Moderate Ranking)

The analysis in this plan focuses on hurricane and tropical storm winds as the most likely type of widespread wind hazards to occur in the planning area, though more localized damage from high winds also can be caused by straight line wind events, thunderstorms, and tornadoes. Although thunderstorms are capable of producing multiple hazards including flooding rainfall, hail, cloud-to-ground lightning and damaging wind, the most frequent hazards associated with severe thunderstorms in the West Piedmont region are with flooding (see Flood section) and damaging wind gusts. Appendix B1 indicates general wind historical events for the region.

Hurricane and Extreme Wind

Hazard History

Appendix B1 includes descriptions of major hurricane events in the West Piedmont region. Events have been categorized by the date of occurrence and when available, by individual community descriptions. When no community specific description is available, the general description represents the entire planning area.

Figure V-10 shows how the frequency and strength of extreme windstorms vary across the United States. The map was produced by the Federal Emergency Management Agency (FEMA) and is based on 40 years of tornado history and over 100 years of hurricane history. Zone IV, the darkest area on the map, has experienced both the greatest number of tornadoes and the strongest tornadoes. As shown by the map key, wind speeds in Zone IV can be as high as 250 MPH. The West Piedmont Region is considered to be in Zone III (winds up to 200mph).

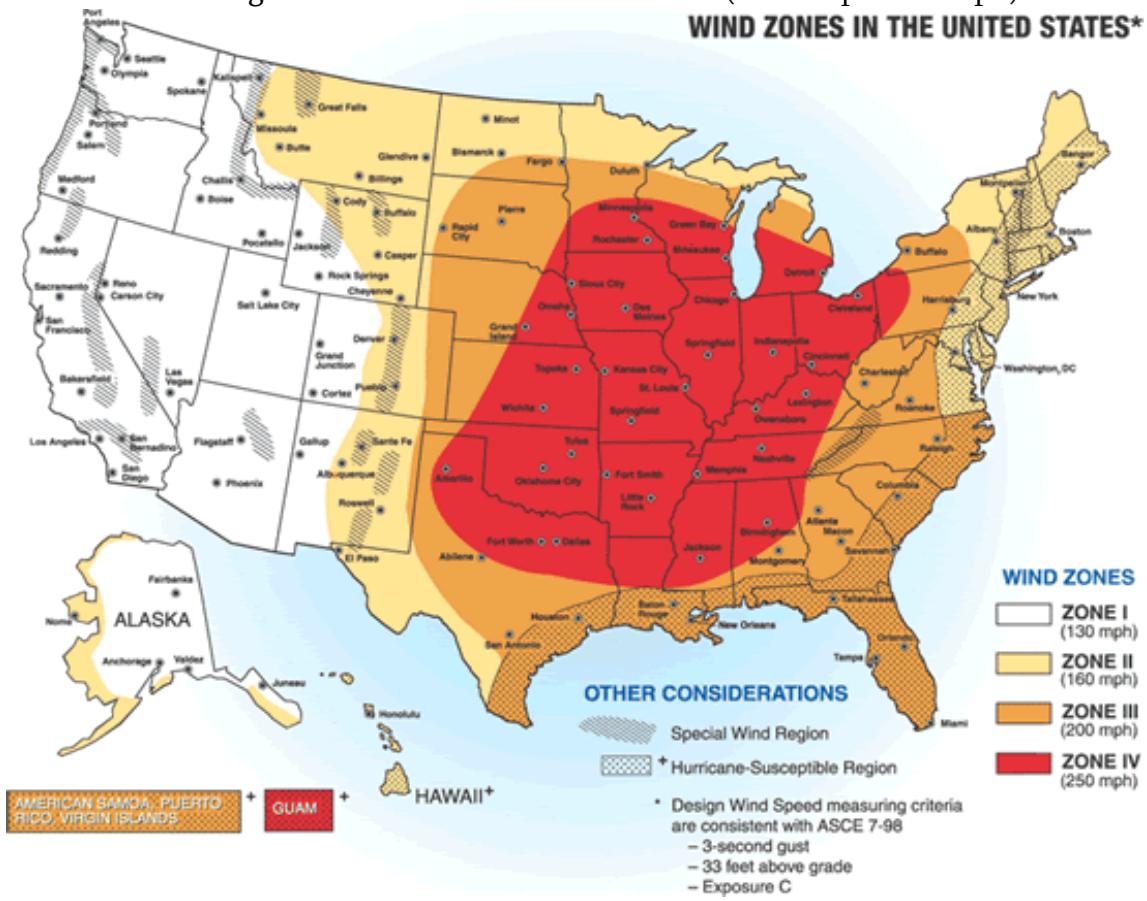

Figure V-10. Wind Zones in the United States (Source: FEMA)

NOAA's Coastal Services Center maintains historical hurricane, tropical storm and tropical depression track data dating back to the mid 1880's. Figure V-11 shows all

tropical system tracks through and near the West Piedmont region between 1859 and 2010. Most of the tropical systems to pass directly over the region have been at either tropical storm (green) or tropical depression (blue) strength; however, at least one unnamed hurricane (yellow) tracked through portions of Henry and Pittsylvania Counties in August 1893. The Commonwealth of Virginia's Standard Hazard Mitigation Plan includes hurricane tracks in Virginia spanning from 1851 to 2008 (Figure V-12). The hurricane track map gives an idea of the historical occurrences throughout Virginia. The highest frequency of storms that are at hurricane strength is found closest to the coast, as storms usually weaken as they make landfall and track further inland.

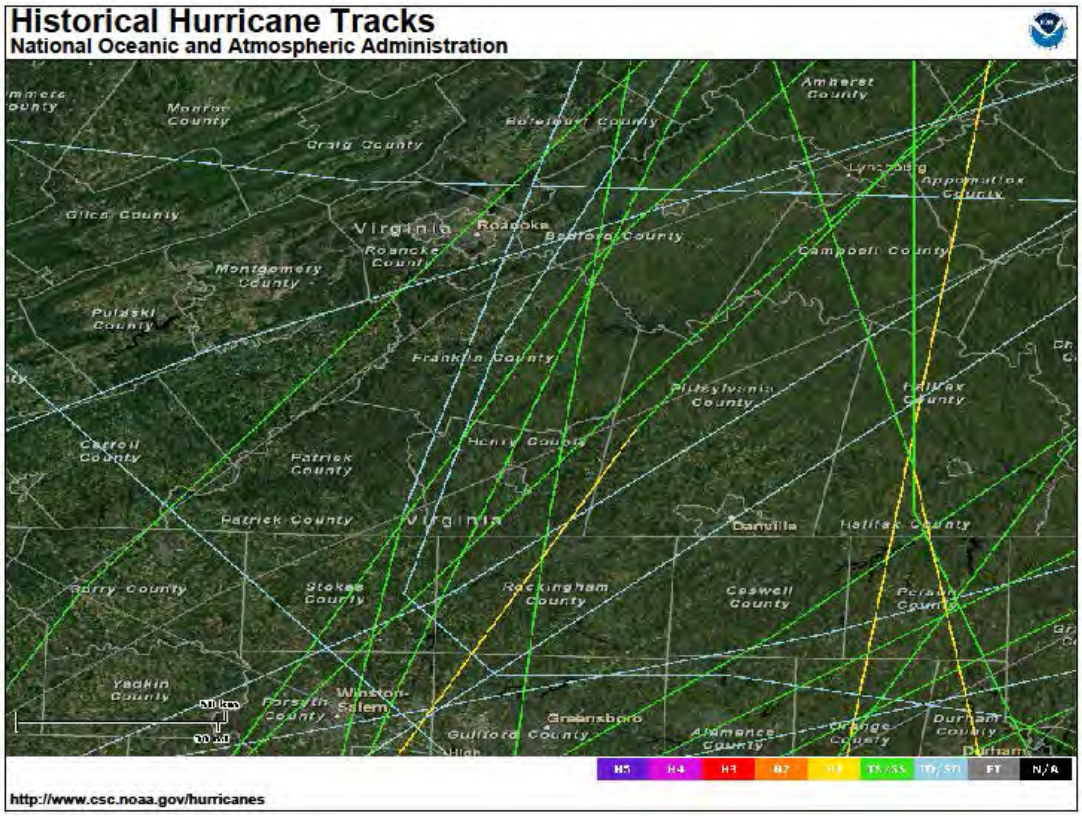

Figure V-11. NOAA Coastal Services Center Historical Hurricane Tracks (1859-2010)

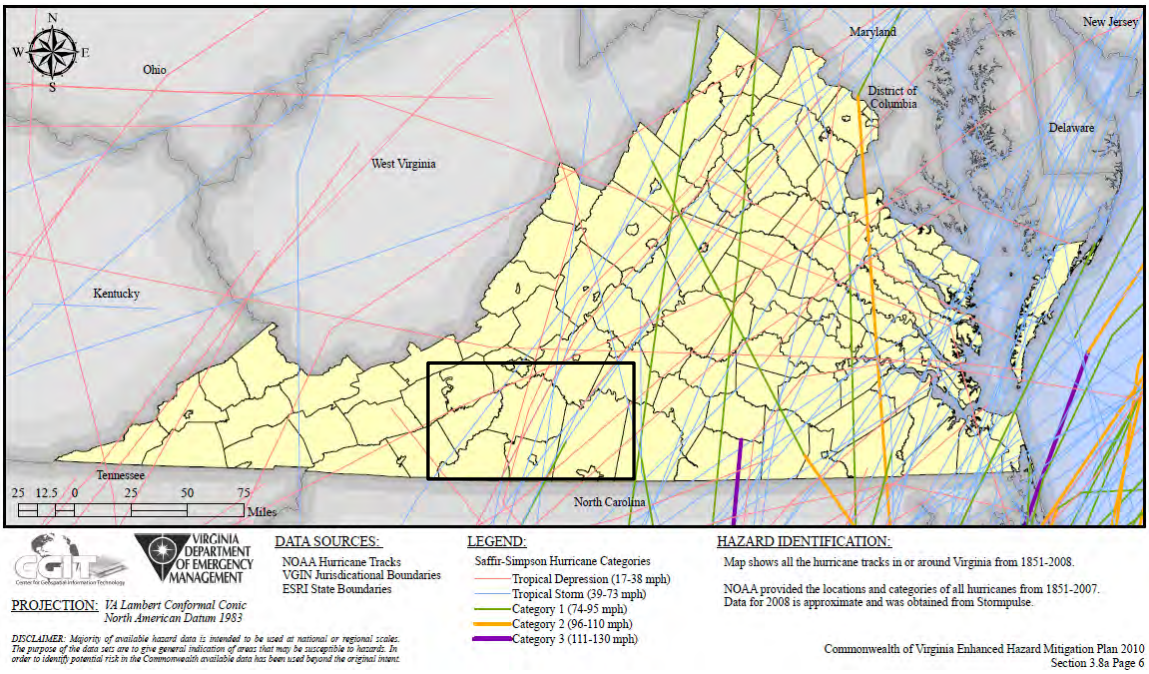

Figure V-12. Virginia Hurricane Tracks 1851-2008 (from VDEM)

Hazard Profile

A tropical cyclone is the generic term for a non-frontal synoptic scale low-pressure system over tropical or sub-tropical waters with organized convection and definite cyclonic surface wind circulation. Depending on strength, these weather systems are classified as hurricanes or tropical storms. Tropical cyclones involve both atmospheric and hydrologic characteristics, such as severe winds, storm, surge flooding, high waves, coastal erosion, extreme rainfall, thunderstorms, lightning, and, in some cases, tornadoes. Storm surge flooding can push inland, and riverine flooding associated with heavy inland rains can be extensive. High winds are associated with hurricanes, with two significant effects: widespread debris due to damaged and downed trees and damaged buildings and power outages.

Secondary Hazards

Secondary hazards from a hurricane event could include high winds, flooding, heavy waves, and tornadoes. Once inland, the hurricane's band of thunderstorms produces torrential rains and may produce tornadoes. A foot or more of rain may fall in less than a day causing flash floods and mudslides. The rain eventually drains into the large rivers which may still be flooding for days after the storm has passed. The storm's driving winds can topple trees, utility poles, and damage buildings. Communication and electricity is lost for days and roads are impassable due to fallen trees and debris.

Hurricane Damage Scale

Hurricanes are categorized by the Safer-Simpson Hurricane Damage Scale. Detailed descriptions of each category and the potential damage are provided in Table V-15.

Table V-15. Saffir-Simpson Hurricane Damage Scale

Hurricane Category	Sustained Winds (mph)	Damage Potential	Description
1	74 - 95	Minimal	Minimal damage to unanchored mobile homes along with shrubbery and trees. There may be pier damage and coastal road flooding, with storm surge 4-5 feet about average.
2	96 - 110	Moderate	Moderate damage potential to mobile homes and piers, as well as significant damage to shrubbery and trees with some damages to roofs, doors and windows. Impacts include flooding 2-4 hours before arrival of the hurricane in coastal and low lying areas. Storm surge can be 6-8 feet above average.
3	111 - 130	Extensive	Extensive damage potential. There will be structural damage to small residences and utility buildings. Extensive damage is to mobile homes and trees and shrubbery. Impacts include flooding 3-5 hours before the arrival of the hurricane cutting off the low lying escape routes. Coastal flooding has the potential to destroy the small structures, with significant damage to larger structures as a result of the floating debris. Land that is lower than 5 feet below mean sea level can be flooded 8 or more miles inland. Storm surge can be 6-12 feet above average.
4	131 - 155	Extreme	Extreme damage potential. Curtain wall failure as well as roof structure failure. Major damage to lower floors near the shoreline. Storm surge generally reaches 13-18 feet above average.
5	> 155	Catastrophic	Severe damage potential. Complete roof failure on residence and industrial structures, with complete destruction of mobile homes. All shrubs, trees and utility lines blown down. Storm surge is generally greater than 18 feet above average.

Vulnerability Analysis

HAZUS-MH was used to complete the wind analysis for vulnerability and loss estimates. The HAZUS software has been developed by FEMA and the National Institute of Building Sciences. Level 1, with default parameters, was used for the analysis done in this plan. For analysis purposes, the U.S. Census tracts are the smallest extent in which the model runs. The results of this analysis are captured in the vulnerability analysis and loss estimation.

HAZUS-MH uses historical hurricane tracks and computer modeling to identify the probable tracks of a range of hurricane events and then assigns potential wind gusts that result. Appendix B9 includes the individual wind speed maps (50-year, 100-year, and 1,000-year events) for the jurisdictions in the region. Widespread extreme thunderstorm wind events, such as those associated with well developed squall lines, may have wind gusts of a similar magnitude to those of the 50- or 100-year hurricane wind event. In a 50-year event, 3-second wind gusts can be over 60 mph over Pittsylvania County, including the City of Danville, with gusts of 54 to 60 mph over the remainder of the West Piedmont region. In a 100-year event, gusts can range from 64 to 70 mph. A 1000-year event is the rough equivalent of a strong Category 1 or low-end Category 2 hurricane (or weak to mid-strength EF-1 tornado) with 3-second wind gusts of up to around 95 mph. Results from the model were used to develop the annualized damage estimates. The impacts of these various events are combined to create a total annualized loss or the expected value of loss in any given year. Figure V-13 illustrates the annualized damages from hurricane winds.

Building Types

Table V-16 illustrates the building stock exposure to hurricane and extreme wind categorized by occupancy type. As seen in Table V-16, 61% of the building stock for the West Piedmont region is considered residential, with approximately 32% of the building stock classified as commercial and industrial.

The HAZUS-MH hurricane model only conducts analysis at the U.S. Census tract level, which is larger than most of the towns in the region. Town exposure in Table V-17 has been estimated based on the percentage of the town falling into a particular tract and then assigning the appropriate value.

Table V-16. Building Stock Exposure by General Occupancy (from HAZUS-MH)								
Jurisdiction	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	AGRICULTURAL	RELIGIOUS	GOVERNMENT	EDUCATION	TOTAL
City of Danville	$2,829,103	$1,554,821	$283,529	$13,096	$193,270	$33,837	$59,437	$4,967,093
Franklin County	$2,870,746	$778,322	$574,143	$41,654	$129,946	$28,845	$55,069	$4,478,725
**Town of Boones Mill*	*$3,083*	*$1,669*	*$461*	*$73*	*$149*	*$16*	*$85*	*$5,535*
**Town of Rocky Mount*	*$101,872*	*$70,725*	*$100,242*	*$588*	*$12,580*	*$3,390*	*$3,214*	*$292,611*
Henry County	$2,949,362	$1,011,360	$930,820	$34,382	$164,282	$46,732	$98,354	$5,235,292
**Town of Ridgeway*	*$13,066*	*$12,202*	*$6,568*	*$73*	*$649*	*$196*	*$358*	*$33,112*
City of Martinsville	$1,002,148	$713,846	$217,053	$3,708	$67,160	$16,014	$20,964	$2,040,893
Patrick County	$1,071,796	$242,480	$117,546	$17,812	$53,168	$23,155	$12,410	$1,538,367
**Town of Stuart*	*$6,867*	*$1,741*	*$696*	*$100*	*$365*	*$138*	*$87*	*$9,993*
Pittsylvania County	$3,181,144	$529,316	$308,453	$54,162	$164,864	$62,131	$64,466	$4,364,536
**Town of Chatham*	*$8,455*	*$2,849*	*$2,041*	*$147*	*$665*	*$446*	*$752*	*$15,355*
**Town of Gretna*	*$7,773*	*$1,221*	*$1,319*	*$141*	*$271*	*$65*	*$173*	*$10,962*
**Town of Hurt*	*$22,653*	*$3,360*	*$1,213*	*$378*	*$1,177*	*$0*	*$473*	*$29,253*
Total	**$13,904,299**	**$4,830,145**	**$2,431,544**	**$164,814**	**$772,690**	**$210,714**	**$310,700**	**$22,624,906**

**Town totals included in County loss estimates*

Critical Facilities

Vulnerability of critical facilities to hurricane winds is fairly uniform throughout the region as a result of winds for the various return periods showing only slight variation in distribution (see Appendix B9). In general, critical facilities in Henry and Pittsylvania Counties will have slightly higher vulnerability compared to the rest of the region due to slightly higher winds estimated in those areas.

Loss Estimation

HAZUS-MH estimates that the total annualized loss (see Table V-17) in the West Piedmont region due to hurricane and extreme wind is roughly $463,930. Much of this loss is due to damage to buildings and contents rather than due to loss of income or wages. Annualized losses are estimated to be highest for Pittsylvania County. This can be explained by the County's higher building exposure values and the orientation of higher winds from tropical storms and hurricanes favoring the eastern portions of the West Piedmont region. Table V-18 shows a breakdown of annualized hurricane wind loss by occupancy type. For comparison, for a 1000-year hurricane wind event, total losses for the region are estimated by HAZUS at approximately $79 million. Residential losses make up approximately 85% of that total in that instance.

Although the wind loss estimates determined by HAZUS-MH are those typically associated with tropical storm/hurricane events, for inland areas such as the West Piedmont region, the estimates are also reasonable approximations of potential loss associated with widespread, extreme thunderstorm events, such as squall lines or a large thunderstorm complex.

Table V-17. Total Annualized Hurricane Wind Loss (from HAZUS-MH MR5)								
Jurisdiction	Buildings	Contents	Inventory	Relocation	Income	Rental	Wages	Total
City of Danville	$107,019	$15,998	$537	$13,044	$1,314	$5,834	$2,170	$145,916
Franklin County	$50,831.12	$4,161.69	$336.39	$3,940.83	$217.56	$1,322.04	$392.60	$61,202.22
**Town of Boones Mill*	$51.15	$3.42	$0.23	$4.15	$0.20	$1.30	$0.38	$60.82
**Town of Rocky Mount*	$2,128.20	$357.66	$66.87	$176.90	$23.39	$75.47	$40.81	$2,869.30
Henry County	$72,933.85	$7,853.12	$409.75	$7,192.48	$518.97	$2,383.92	$954.26	$92,246.34
**Town of Ridgeway*	$428.93	$63.05	$4.84	$46.80	$6.11	$16.68	$7.15	$573.56
City of Martinsville	$30,374.90	$4,887.78	$334.01	$3,376.86	$439.76	$1,541.41	$679.63	$41,634.36
Patrick County	$21,378.10	$1,667.47	$73.37	$2,066.82	$119.59	$655.16	$277.65	$26,238.17
**Town of Stuart*	$139.27	$11.37	$0.48	$13.79	$0.88	$4.46	$1.81	$172.06
Pittsylvania County	$79,505.67	$6,428.34	$206.75	$7,123.27	$385.57	$2,094.85	$948.23	$96,692.67
**Town of Chatham*	$205.84	$18.69	$0.88	$18.86	$1.53	$6.30	$4.38	$256.48
**Town of Gretna*	$167.60	$14.27	$0.69	$14.80	$0.54	$5.41	$0.89	$204.20
**Town of Hurt*	$456.37	$30.32	$0.53	$40.31	$1.42	$11.28	$2.11	$542.34
Total	**$362,043**	**$40,996**	**$1,897**	**$36,745**	**$2,995**	**$13,831**	**$5,423**	**$463,930**

**Town totals are included in County loss estimates*

Table V-18. Total Annualized Hurricane Wind Loss by General Occupancy (HAZUS-MH MR5)								
Jurisdiction	Residential	Commercial	Industrial	Agriculture	Religious	Government	Education	TOTAL
City of Danville	$116,774	$21,989	$3,301	$262	$2,336	$606	$647	$145,916
Franklin County	$53,616	$2,947	$3,474	$261	$556	$168	$180	$61,202
**Town of Boones Mill*	*$52*	*$5*	*$2*	*$0*	*$1*	*$0*	*$0*	*$61*
**Town of Rocky Mount*	*$1,815*	*$276*	*$694*	*$4*	*$55*	*$16*	*$11*	*$2,869*
Henry County	$76,696	$7,075	$6,058	$321	$1,076	$490	$531	$92,246
**Town of Ridgeway*	*$406*	*$105*	*$52*	*$1*	*$5*	*$3*	*$2*	*$574*
City of Martinsville	$31,114	$6,437	$3,052	$58	$623	$184	$166	$41,634
Patrick County	$23,528	$1,260	$749	$145	$301	$203	$53	$26,238
**Town of Stuart*	*$153*	*$9*	*$5*	*$1*	*$2*	*$1*	*$0*	*$172*
Pittsylvania County	$88,217	$3,547	$2,318	$528	$1,077	$693	$312	$96,693
**Town of Chatham*	*$215*	*$17*	*$12*	*$1*	*$4*	*$4*	*$4*	*$256*
**Town of Gretna*	*$185*	*$7*	*$9*	*$1*	*$2*	*$0*	*$1*	*$204*
**Town of Hurt*	*$510*	*$16*	*$5*	*$3*	*$6*	*$0*	*$2*	*$542*
Total	**$389,945**	**$43,255**	**$18,952**	**$1,575**	**$5,969**	**$2,344**	**$1,889**	**$463,929**

**Town totals included in County loss estimates*

Figure V-13 illustrates the total annualized loss due to hurricane (and extreme) winds and Figure V-14 shows total annualized residential loss. Damages were estimated using census blocks where hurricane losses occur. Overall, annualized losses due to hurricane winds are highest for Pittsylvania and Henry Counties and the communities located within each. A comparison of the annualized loss values for the 2011 and 2006 plan updates may also be found in Appendix B6. Advances in HAZUS algorithms and newer building stock data may, in part, explain the significant differences in the calculations of the two plans. As a check, the 2011 annualized loss values were compared against those calculated for the 2010 Commonwealth of Virginia Hazard Mitigation Plan. The results of the calculations of the two plans are very similar.

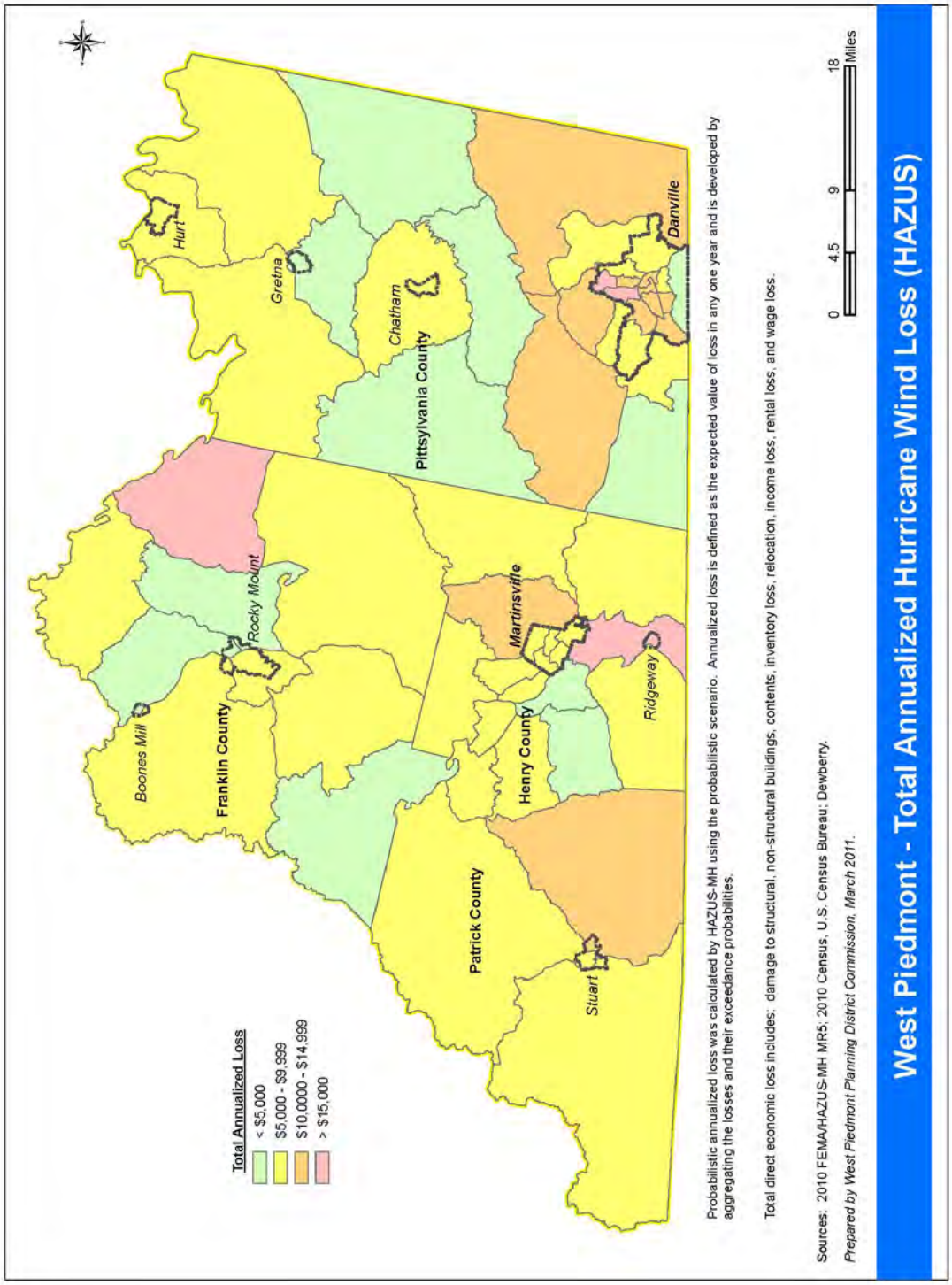

Figure V-13. Total Annualized Hurricane Wind Loss

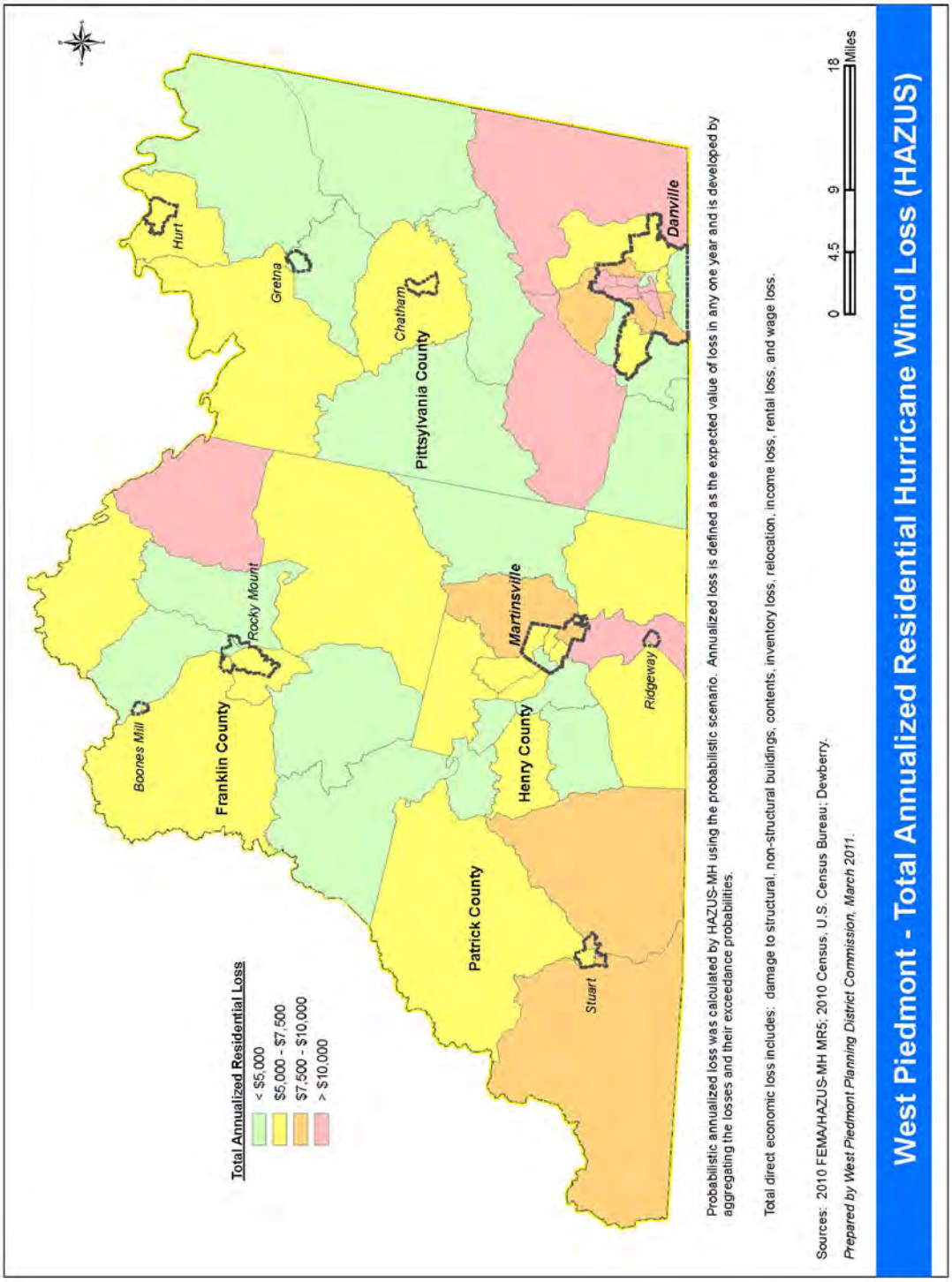

Figure V-14. Total Annualized Residential Hurricane Wind Loss

Tornado (Limited Ranking)

Hazard History

Appendix B1 includes descriptions of major tornado events that have touched down in the West Piedmont region. Events have been broken down by the date of occurrence and when available, by individual community descriptions. When no community-specific description is available, the general description represents the entire planning area.

Hazard Profile

For Virginia and the West Piedmont region, tornadoes are a low probability, but high impact hazard. Damaging winds typically are associated with tornadoes or landfalling hurricanes. Isolated "downburst" or "straight-line" winds associated with thunderstorms also can cause extensive property damage.

Tornadoes are classified a rotating columns of wind that extends between a thunderstorm cloud and the Earth's surface. Winds are typically less than 100 mph, with severe tornado wind speeds exceeding 250 mph. The rotating column of air often resembles a funnel-shaped cloud. The widths of tornadoes are usually several yards across, with infrequent events being over a mile wide. Tornadoes and their resultant damage can be classified into six categories using the Fujita Scale. This scale assigns numerical values for wind speeds inside the tornado according to the type of damage and degree of the tornado. Most tornadoes are F0 and F1, resulting in little widespread damage. Tornado activity normally spans from April through July but tornadoes can occur at any time throughout the year. In Virginia, peak tornado activity is in July. Hot, humid conditions stimulate the tornadoes' growth.

Strong tornadoes may be produced by thunderstorms and can be associated with the passage of tropical storms and hurricanes. On average, about seven tornadoes are reported in Virginia each year. The actual number may be higher as incidents may occur over sparsely populated areas or may not cause any property damage so are not reported or recorded.

A tornado's destructive power is measured using the Fujita Damage Scale (See Table V-19). The Fujita-Pearson Scale for Tornadoes was developed in 1971 to rate tornado intensity based on associated damages. A tornado's intense power often destroys homes, downs power lines, and can cause significant tree damage.

An Enhanced Fujita Scale (EF Scale) was developed and implemented operationally in 2007. The EF Scale was developed to better align tornado wind speeds with associated damages. Table V-20 provides a side-by-side comparison of the F Scale and the EF Scale.

Table V-19: Fujita Damage Scale

Scale	Wind Estimate (mph)	Typical Damage
F0	< 73	Light Damage Some damage to chimneys; branches off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate Damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable Damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe Damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating Damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.

Table V-20: Fujita Scale Vs. Enhanced Fujita Damage Scale				
Fujita Scale			Enhanced Fujita Scale	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85
1	73-112	79-117	1	86-110
2	113-157	118-161	2	111-135
3	158-207	162-209	3	136-165
4	208-260	210-261	4	166-200
5	261-318	262-317	5	Over 200

The classification of the tornado gives an approximate depiction of what the corresponding tornado damage will be. A majority of Virginia's tornadoes are F0 and F1 on the Fujita Scale. HAZUS analysis run for hurricane wind shows that wind speeds with a 1,000-year hurricane event are roughly the same as a weak to mid-range EF1 tornado. These events typically result in minimal extensive damage. Damage that is likely to occur would be damage to trees, shrubbery, signs, antennas, with some damage to roofs and unanchored trailers.

Figure V-15 presents the results of a tornado frequency analysis performed as part of the 2010 Commonwealth of Virginia Hazard Mitigation Plan update. The analysis suggests that relative to the entire Commonwealth of Virginia, the West Piedmont region is considered to be 'Medium-High' in terms of tornado frequency. Even so, annualized tornado frequency is quite low and calculated as being between 0.0000101 and 0.0001 for any particular point in the region with no one particular jurisdiction more likely to see tornadoes than any other.

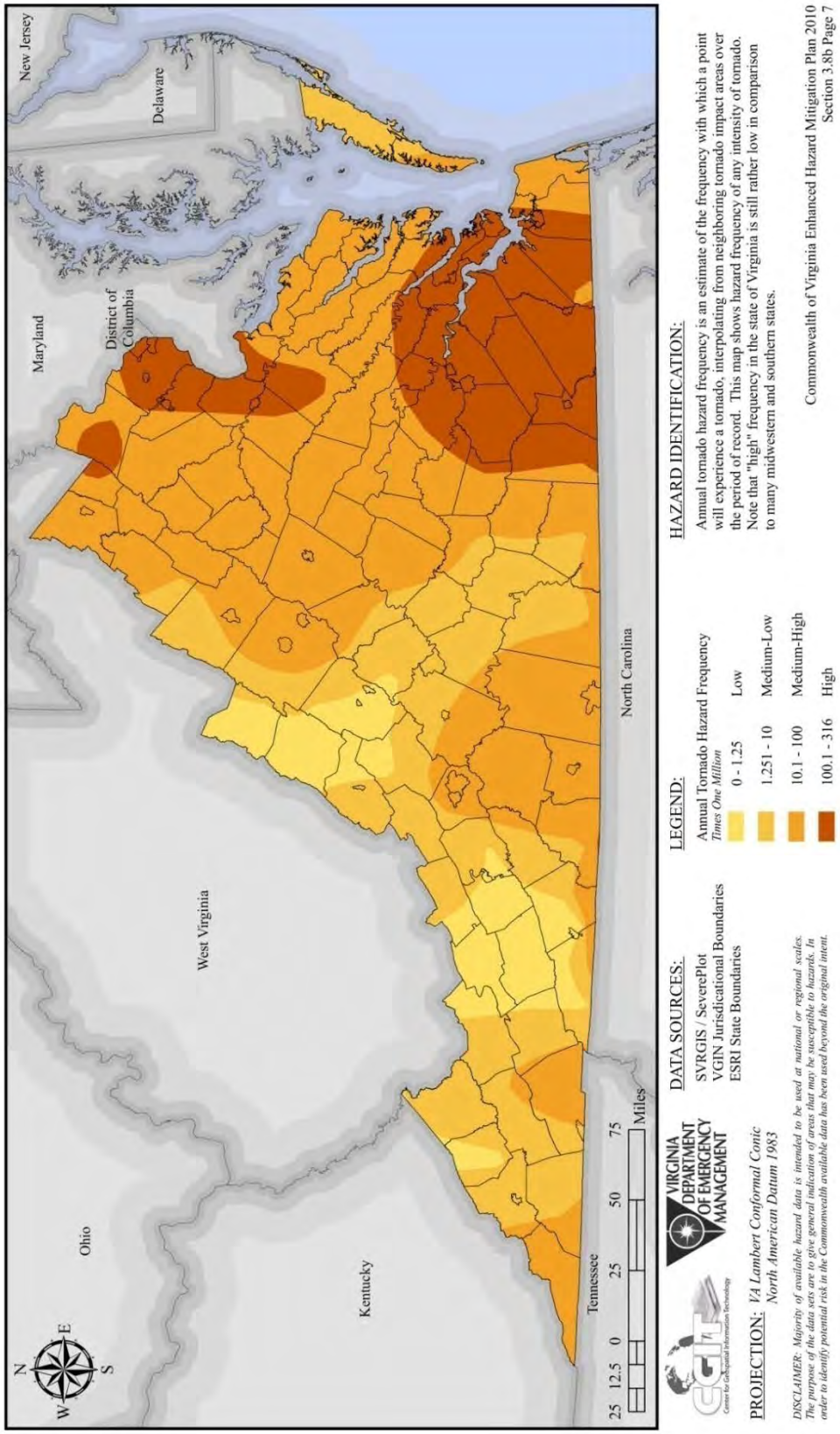

Figure V-15: Tornado Frequency Analysis

Vulnerability Analysis

Table V-21 and Figure V-16 show tornado occurrences in the West Piedmont Region. Table V-22 shows the number of annualized events based on NCDC data. Although the total number of tornadoes is higher for Pittsylvania County as compared to the other jurisdictions, one is cautioned to consider that the square mileage of Pittsylvania County is considerably greater than that of the other jurisdictions. Population for the County is higher than that of the other jurisdictions as well. A larger population usually means a greater likelihood that tornado events that occur will be observed and reported. Both factors likely play a role in the higher number of recorded tornadoes for Pittsylvania County. In general, the probability of future tornadoes at any particular location within the West Piedmont region is considered to be roughly equal.

Table V-21. Tornado Statistics by Fujita Intensity Scale (1950-2010)					
West Piedmont Region Tornado Touchdowns					
Jurisdiction	F0	F1	F2	>=F3	Total
City of Danville	1	1	0	0	2
Franklin County	2	2	1	0	5
Henry County	1	4	3	0	8
Patrick County	0	3	0	0	3
Pittsylvania County	5	11	2	0	18
Total	**9**	**21**	**6**	**0**	**36**

Potential annual loss due to tornadoes is difficult to calculate with any degree of accuracy. Using the NCDC database of historical tornado occurrences, an estimate can be made. (see Table V-22) Based on past history, Henry County and the City of Martinsville have experienced the highest annualized losses due to tornadoes. These figures are largely influenced by two particularly costly tornado events in 1994 and 2004, both of which caused over $50 million in damages. The annualized loss and events calculations illustrate that tornadoes are generally a low probability, high-impact hazard.

Table V-22. Tornado Events in NCDC Storm Events Database		
Jurisdiction	Number of events annually	Annualized Loss
Franklin County	0.07	$32,464
Henry County	0.1	$1,084,086
City of Martinsville	0.02	$1,238,321
Patrick County	0.05	$4,186
Pittsylvania	0.3	$43,374
City of Danville	0.03	$16,671
Total	**0.57**	**$2,419,102**

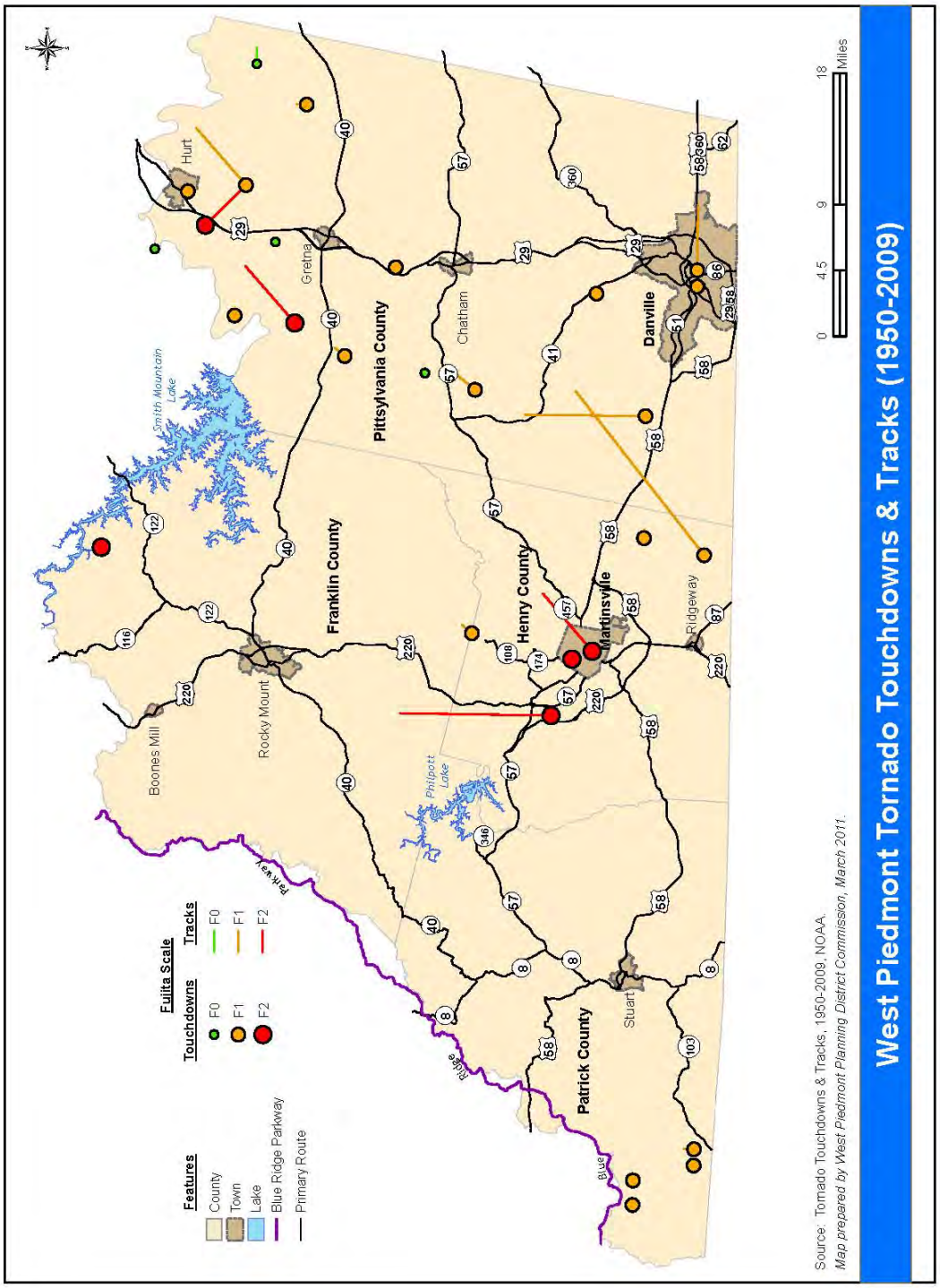

Figure V-16. West Piedmont Region Tornado Touchdowns (1950-2004).

Drought (Moderate)

Hazard History

Appendix B1 includes descriptions of major droughts that have occurred in the West Piedmont region. Events have been categorized by occurrence dates and, when available, by individual community descriptions. When no community-specific description is available, the general description represents the entire planning area.

Hazard Profile

A drought can be characterized in several different ways depending on the impact. The most common drought form is agricultural. Agricultural droughts are characterized by unusually dry conditions during the growing season. Meteorological drought is an extended period of time (6 or more months) with precipitation less than 75 percent of the normal precipitation. Severity of droughts often depends on the community reliance on a specific water source. The probability of a drought is difficult to predict given the number of variables involved. As shown in the table below, drought conditions make an appearance at least once a decade.

Many problems can arise at the onset of a drought, some of which include diminished water supplies and quality, undernourished livestock and wildlife, crop damage, and possible wildfires. Secondary impacts from droughts pose problems to farmers who incur reductions in income, while food prices and lumber prices can drastically increase.

The impact of excessive heat is most prevalent in urban areas, where urban heat island effects prevent inner-city building from releasing heat built up during the daylight hours. Secondary impacts of excessive heat are severe strain on the electrical power system and potential brownouts or blackouts.

Table V-23 provides a summary of drought categories and impacts. As the drought severity increases, it should be noted that voluntary initial water restrictions are changed to mandatory restrictions. For excessive heat, the National Weather Service utilizes heat index thresholds as criteria for the issuance of heat advisories and excessive heat warnings.

Table V-23. Drought Severity Classification		
Category	**Description**	**Possible Impacts**
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low; some water shortages developing or imminent; voluntary water use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions

The Palmer Drought Severity Index (PDSI; see Figure V-17) was developed over 30 years ago and provides some measure of long-term drought based on a formula that takes into account water supply (precipitation), soil moisture, runoff, and water demand (computed from estimates for evaporation and transpiration). The National Drought Mitigation Center published mapped results of an examination of the 100-year record of the PDSI from 1885 to 1995 to determine a percentage of time various regions of the country spent in severe and extreme drought. During this period, the West Piedmont region was shown to have been in severe or extreme drought 5% to 9.99% of the time.

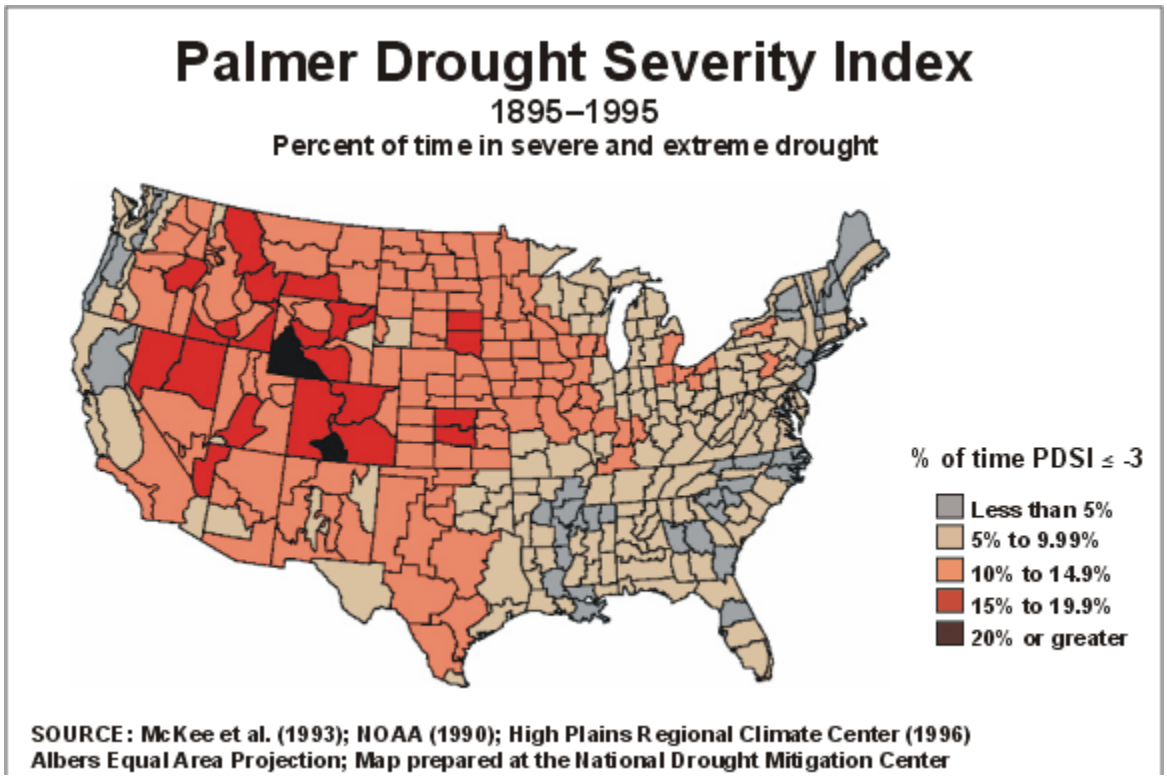

Figure V-17. Historical Palmer Drought Severity Index (1885-1995)

Vulnerability Analysis

For the previous plan update, detailed information about water source per census block group contained in the 1990 Census data was analyzed. *(NOTE: the 2000 and 2010 Census data do not contain this information and an update to this analysis was not possible)*. For purposes of this analysis, it was assumed that areas with populations having less than 25% of public/private water systems had a high vulnerability ranking. When a drought occurs, these areas would likely feel a larger impact since most homes receive their water from wells, which may dry up during a drought. Table V-24 provides a summary of the 1990 population in three categories of drought vulnerability. Figure V-18 shows each of the designated categories for each of the counties. The parts of the planning areas that are more susceptible to droughts are the areas outside of town and city limits. In general, the region has observed a trend toward increased reliance on public water systems for water supply as opposed to well or private systems. With this being the case, the analysis presented in the following table likely conveys a grimmer picture of drought risk than actually currently exists.

Table V-24. West Piedmont Region Population Drought Risk (from 1990 Census)				
% Population with Public/Private Water Systems	< 25%	25% - 50%	> 50%	Total
Franklin County	29,073	1,631	8,845	39,549
Henry County	21,564	2,420	32,958	56,942
Patrick County	16,028	0	1,445	17,473
Pittsylvania County	45,109	3,593	6,953	55,655
City of Danville	0	0	53,056	53,056
City of Martinsville	0	0	16,162	16,162
Total	**111,774**	**7,644**	**119,419**	**238,837**

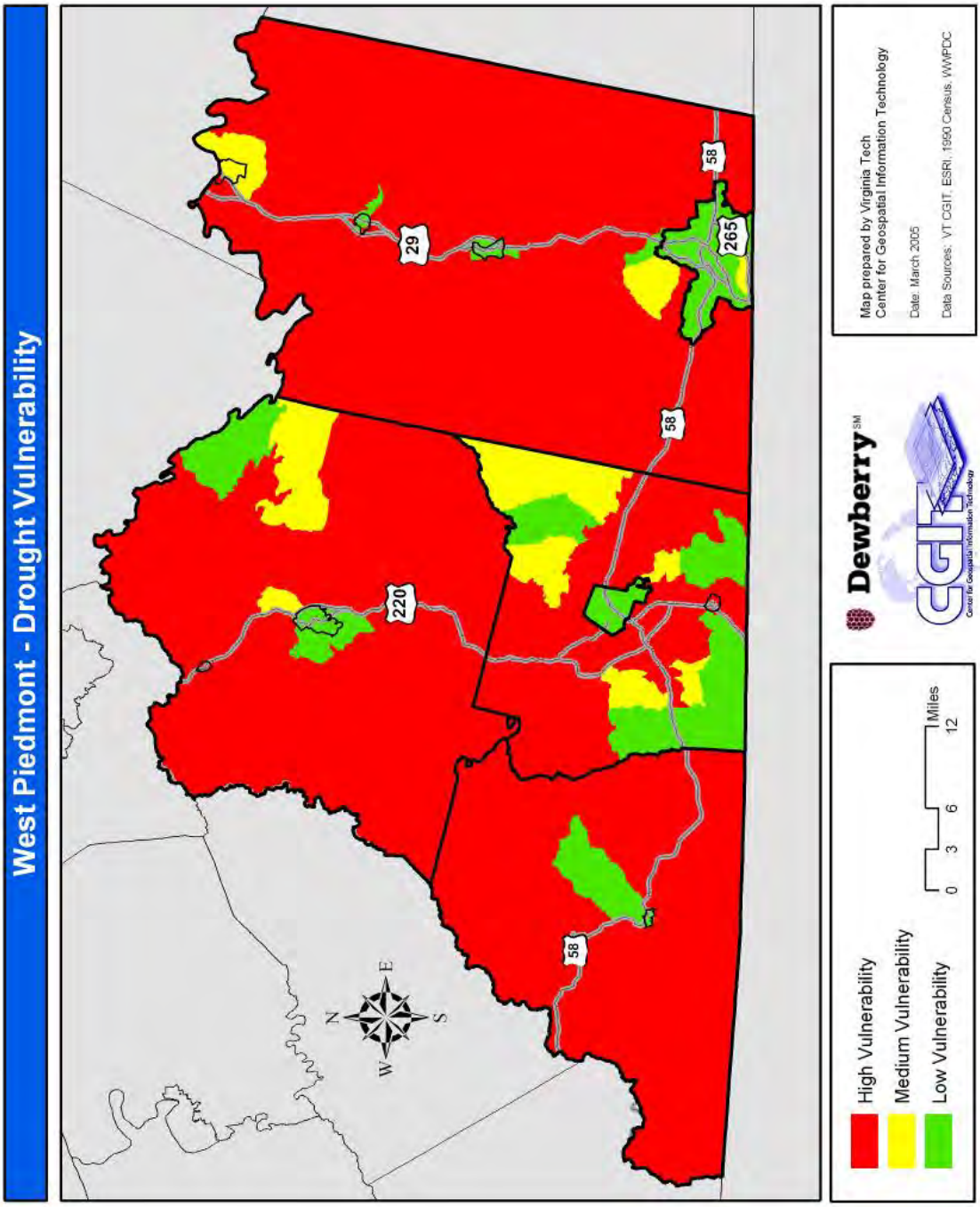

Figure V-18. West Piedmont Region Drought Vulnerability Based on Water Source

The West Piedmont Planning District Commission (WPPDC) has developed a Draft Regional Water Supply Plan (2010) that examines water supply and includes data on current demand as well as projections of future demand and supply. The plan indicates that the WPPDC region is likely to see a water supply surplus of approximately 15.2 MGD by the year 2060. This prediction is based on projected demands and the existing public community water system capacities for each locality. Even so, Henry County and the Town of Gretna are projected to experience a water supply deficit by 2060. In order to address these projected deficits, Henry County is in the process of requesting a permit to increase capacity. The Town of Gretna is working on a new intake on Whitethorn Creek as a supplemental supply.

An examination of the NCDC Storm Events database indicates that much of the West Piedmont region has experienced varying degrees of drought or extended periods of very dry weather between every year to year and a half. (See Table V-25) The past is a reasonable predictor of the future. Future occurrences of drought in the near-term are likely to follow a similar frequency pattern. Drought records in the NCDC database extend back to 1993.

Table V-25. Drought Events in NCDC Storm Events Database (1993 - December 2010)

Jurisdiction	Number of drought events annually
Franklin County	0.778
Henry County	0.944
Patrick County	0.944
Pittsylvania County	0.944

NOTE: NCDC Storm Events database provides drought data only at a county level. It can be assumed that cities and towns located within a particular county share the same number of annual drought events and some portion of the annual crop losses.

The same database also indicates that on an annual basis, crop losses are roughly $218,847 (adjusted for inflation) in the region. The losses for a specific drought event are usually reported in the database as one loss estimate that applies to several counties. Rather than arbitrarily assigning this loss across all counties to provide some sort of jurisdictional loss, a total for the region was preferred.

Wildfire (Moderate)

Hazard History

The Virginia Department of Forestry (VDOF) website provided fire incidence data for fire years 1995-2008. The data provided by VDOF was summarized into the following tables.

Table V-26 provides information on the number of wildfires per county. In total, there were 1,025 wildfires in the West Piedmont region showing up in the VDOF data between 1995 and 2008. During that period, more wildfires took place in Pittsylvania County (359) than other counties in the West Piedmont region. Table V-27 is a summary of the number of acres and total damages of wildfires in the West Piedmont area. A particularly large and damaging wildfire took place between April 14 and April 26, 2006, in Patrick County. The fire was sparked by lightning on Bull Mountain. At least 40 homes had to be evacuated and at least 2 minor injuries occurred as a result of the blaze. Total acreage burned in Patrick County in 2006 approached 3,700 acres, the majority of which took place during that single Bull Mountain event. Dollar damages for the event were estimated at over $3 million. The VDOF records do not show wildfire occurrences for any of the cities in the West Piedmont region during the period 1995 to 2008. It should be noted that all wildfires (including brushfires) may not necessarily get reported to VDOF and would not appear in these statistics. Table V-28 illustrates the cause of fire, broken down by county. The data shows that approximately 35% of wildfires during the period were caused by debris, followed by 14% caused by incendiary devices and 22% caused under miscellaneous conditions.

Table V-26. Wildfire Statistics by Fire Year 1995-2008 (from VDOF)								
Number of Wildfires by Fire Year (1995-2001)								
Jurisdiction	1995	1996	1997	1998	1999	2000	2001	Sub-Total
Franklin County	35	15	24	25	36	15	50	200
Henry County	23	22	15	20	20	6	41	147
Patrick County	13	7	0	9	11	8	24	72
Pittsylvania County	34	14	21	21	38	12	55	195
Total	**105**	**58**	**60**	**75**	**105**	**41**	**170**	**614**
Number of Wildfires by Fire Year (2002-2008)								
Jurisdiction	2002	2003	2004	2005	2006	2007	2008	Total All Years
Franklin County	48	6	10	6	12	7	13	302
Henry County	21	8	12	7	10	12	13	230
Patrick County	16	4	11	9	3	8	11	134
Pittsylvania County	37	9	18	14	35	27	24	359
Total	**122**	**27**	**51**	**36**	**60**	**54**	**61**	**1,025**

Pittsylvania County officials noted in 2006 that Smith Mountain and Jasper Mountain have been the sites of past wildfires. A more recent wildfire event occurred on April 5, 2011, when as many as 100 acres burned in the Horsepasture area in what was described as the largest brushfire in the area in 37 years. No structures were burned and no injuries were reported during the event.[9]

[9] Martinsville Bulletin, April 5, 2011

Table V-27. Wildfire Summary 1995-2008 (from VDOF)								
Fire Year	**1995**		**1996**		**1997**		**1998**	
Jurisdiction	**Total Acres**	**Total Damage**	**Total Acres**	**Total Damage**	**Total Acres**	**Total Damage**	**Total Acres**	**Total Damage**
Franklin County	138.6	$209,425	30.1	$14,175	76.7	$5,000	49.5	$15,071
Henry County	53	$26,150	32.1	$9,450	55	$28,000	63.7	$18,300
Patrick County	150	$30,780	14.3	$375	0	$0	14.1	$100
Pittsylvania County	81	$13,465	48.8	$2,215	63.9	$13,260	46.9	$52,025
Total	**422.6**	**$279,820**	**125.3**	**$26,215**	**195.6**	**$46,260**	**174.2**	**$85,496**
Fire Year	**1999**		**2000**		**2001**		**2002**	
Jurisdiction	**Total Acres**	**Total Damage**	**Total Acres**	**Total Damage**	**Total Acres**	**Total Damage**	**Total Acres**	**Total Damage**
Franklin County	125	$3,500	68.3	$2,000	229	$22,250	75	$1,200
Henry County	74.1	$28,650	91.3	$4,500	173.8	$41,550	70.4	$2,000
Patrick County	129.5	$104,800	26.6	$0	88.6	$41,700	11	$500
Pittsylvania County	555.4	$164,300	49.8	$8,603	348.4	$196,005	119.4	$37,820
Total	**884**	**$301,250**	**236**	**$15,103**	**839.8**	**$301,505**	**275.8**	**$41,520**
Fire Year	**2003**		**2004**		**2005**		**2006**	
Jurisdiction	**Total Acres**	**Total Damage**	**Total Acres**	**Total Damage**	**Total Acres**	**Total Damage**	**Total Acres**	**Total Damage**
Franklin County	19.8	$1,775	19.6	$3,310	30.2	$1,950	11.1	$1,200
Henry County	15	$100	14	$0	48.1	$0	25	$0
Patrick County	2.6	$0	8.5	$0	26	$0	3,697.5	$3,696,000*
Pittsylvania County	21.2	$2,650	32.8	$1,170	33.6	$850	511.8	$13,250
Total	**58.6**	**$4,525**	**74.9**	**$4,480**	**137.9**	**$2,800**	**4,245.4**	**$3,710,450**

Fire Year	2007		2008			Acres Total	Damages Total
Jurisdiction	Total Acres	Total Damage	Total Acres	Total Damage			
Franklin County	249	$150	38	$0		1,159.9	$281,006
Henry County	22.1	$0	75.5	$0		813.1	$158,700
Patrick County	186	$1,000	24.5	$0		4,379.2	$3,875,255
Pittsylvania County	138	$53,550	167.4	$16,050		2,218.4	$575,213
Total	**595.1**	**$54,700**	**305.4**	**$16,050**		**8,570.6**	**$4,890,174**

*This fire was ignited by lightning and burned on Bull Mountain from 4/14/06 to 4/26/06. Firefighters came from neighboring areas to help extinguish it.

Table V-28. Wildfire Causes 1995-2008 (from VDOF)

Jurisdiction	Lightning	Camp Fire	Smoking	Debris	Incendiary	Equip. Use	R&R	Children	Misc.	Total
Franklin County	14	2	5	100	49	34	0	21	77	302
Henry County	3	1	22	89	45	13	3	20	34	230
Patrick County	14	3	5	45	14	12	0	5	36	134
Pittsylvania County	18	4	28	124	36	26	19	24	80	359
Total	**49**	**10**	**60**	**358**	**144**	**85**	**22**	**70**	**227**	**1,025**

Hazard Profile

Wildfire is a unique hazard in that it can be significantly altered based on efforts to control its course during the event. According to VDOF, there are three principle factors that can lead to the formation of wildfire hazards: topography, fuel, and weather. Wildfires in Virginia mostly occur in the spring (March and April) and fall (October and November). The environmental conditions that exist during these seasons exacerbate the hazard. When low relative humidity and high winds are coupled with a dry forest floor (e.g., brush, grasses, leaf litter), wildfires may easily ignite. Years of drought can lead to environmental conditions that promote wildfires. Accidental or intentional setting of fires by humans is the largest contributor to wildfires. Residential areas or "woodland communities" that expand into wildland areas also increase the risk of wildfire.

Secondary Effects

Secondary effects from wildfires can pose a significant threat to the communities surrounding the hazard. During a wildfire, the removal of groundcover that serves to stabilize soil can lead to secondary hazards such as landslides, mudslides, and flooding. In addition, the leftover scorched and barren land may take years to recover; the resulting erosion can be problematic.

Hazard Areas

Figure V-19 shows the wildfire hazard map developed by VDOF. In 2002 and 2003, VDOF examined which factors influence the occurrence and advancement of wildfires and how these factors could be represented in a GIS model. VDOF determined that historical fire incidents, land cover (fuels surrogate), topographic characteristics, population density, and distance to roads were critical variables in a wildfire risk analysis. The resulting high, medium, and low risk category reflect the results of this analysis.

Vulnerability Analysis

VDOF defines "woodland home communities" as "clusters of homes located along forested areas at the wildland-urban interface that could possibly be damaged during a nearby wildfire incident."[10] Tables V-29 and V-30 illustrate the number of woodland communities and the number of homes in these woodland communities, as designated by Virginia Department of Forestry. In the West Piedmont region, 74% of the woodland homes are considered to have high potential for a wildfire, while 78% of woodland communities in the planning area are considered at high risk for wildfire. Local officials on the Mitigation Advisory Committee point out that there has been a trend of increasing development at the wildland-urban interface over the past several years. As a result of this trend, there are potentially an increasing number of structures vulnerable to wildfire and an increased potential for wildfire losses.

Table V-29. Woodland Communities Wildfire Risk					
Number of Woodland Communities by Fire Rank					
Jurisdiction	Low Potential	Medium Potential	High Potential	Grand Total	% High Risk
Franklin County	0	1	37	38	97%
Henry County	2	1	27	30	90%

[10]Virginia Department of Forestry. *Virginia Woodland Homes Communities.* Retrieved from http://www.dof.virginia.gov/gis/dwnld-whc-faq.shtml on May 2, 2005.

Patrick County	0	6	19	25	76%
Pittsylvania County	6	14	26	46	57%
Total	**8**	**22**	**109**	**139**	**78%**

Table V-30. Woodland Homes Wildfire Risk					
Number of Woodland Homes by Fire Rank					
Jurisdiction	Low Potential	Medium Potential	High Potential	Grand Total	% High Risk
Franklin County	0	10	643	653	98%
Henry County	36	12	1,363	1,411	97%
Patrick County	0	92	255	347	73%
Pittsylvania County	445	435	698	1,578	44%
Total	**481**	**549**	**2,959**	**3,989**	**74%**

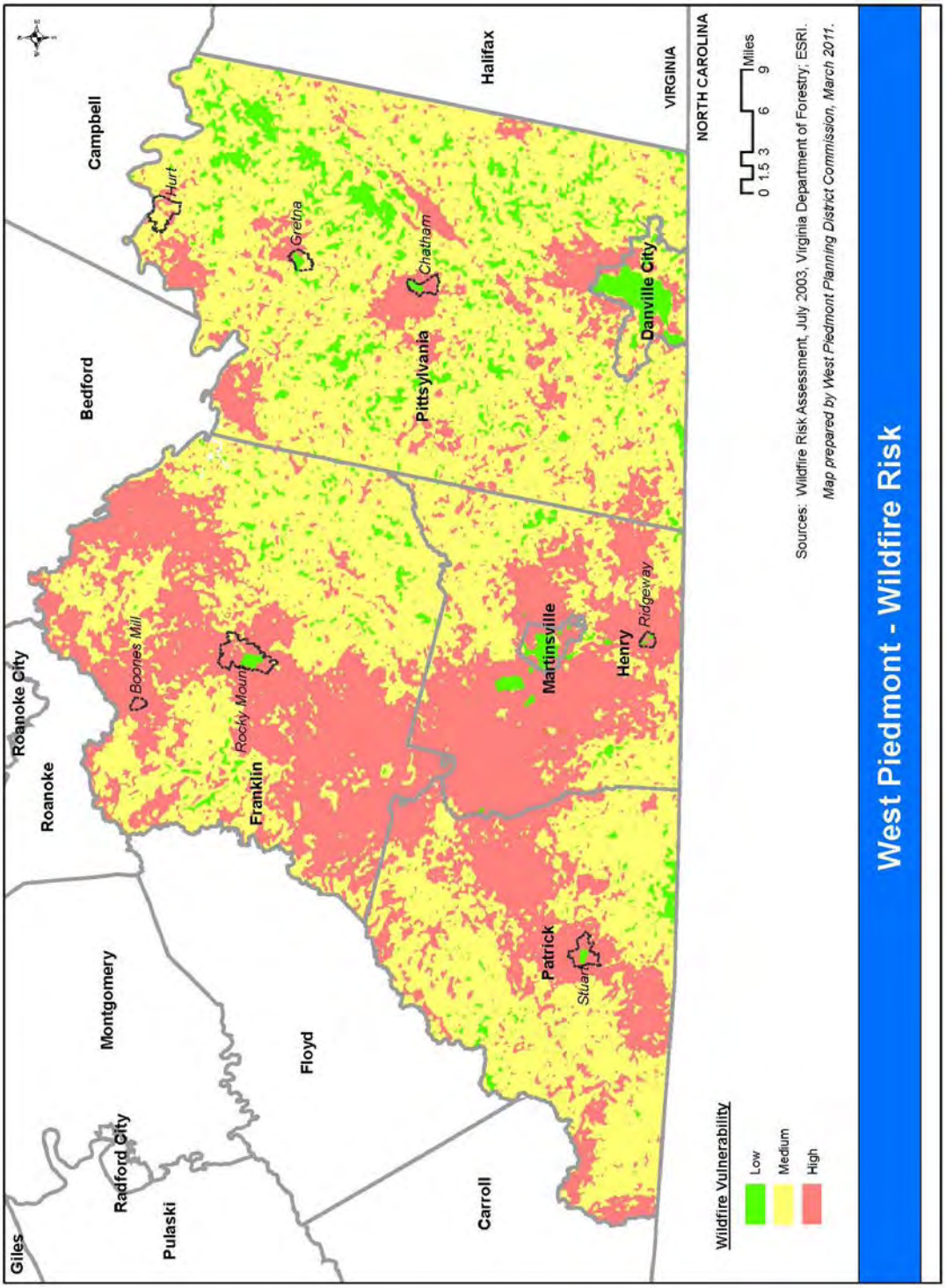

Figure V-19. West Piedmont Region Wildfire Vulnerability

Structures at Risk

Table V-31 shows the percentages of critical facilities in fire risk zones. Approximately 38% of critical facilities in the region are located in a high risk area. Approximately 63% of Henry County's critical facilities are located in a high risk area, the most of any county or city in the West Piedmont region. Figure V-20 shows the locations of critical facilities in relation to fire risk zones.

Table V-31. West Piedmont Region Critical Facilities Wildfire Vulnerability					
Number of Critical Facilities by Fire Rank					
Jurisdiction	Low Potential	Medium Potential	High Potential	Grand Total	% High Risk
City of Danville	48	20	5	73	7%
Franklin County	13	33	59	105	56%
Henry County	12	28	67	107	63%
City of Martinsville	15	0	7	22	32%
Patrick County	6	21	15	42	36%
Pittsylvania County	36	47	23	106	22%
Total	**130**	**149**	**176**	**455**	**39%**

Predicting the probability of future occurrences of wildfire is nearly impossible. However, assuming that the past is a reasonable predictor of the future, projections can be made. Based on VDOF data from 1995 to 2008, the instances of wildfire can be annualized. Table V-32 shows that the historical data indicates that on an annual basis, instances of wildfire range from approximately 81 in Patrick County to approximately 221 in Franklin County or roughly 687 events for the entire West Piedmont region.

Table V- 32. Wildfire Events in VDOF Database		
Jurisdiction	Annualized Property Damage	Annualized Number of Events
Franklin County	$28,266	221.6
Henry County	$15,147	163.4
Patrick County	$305,330	81.6
Pittsylvania County	$51,609	220.6
Total	**$400,352**	**687.2**

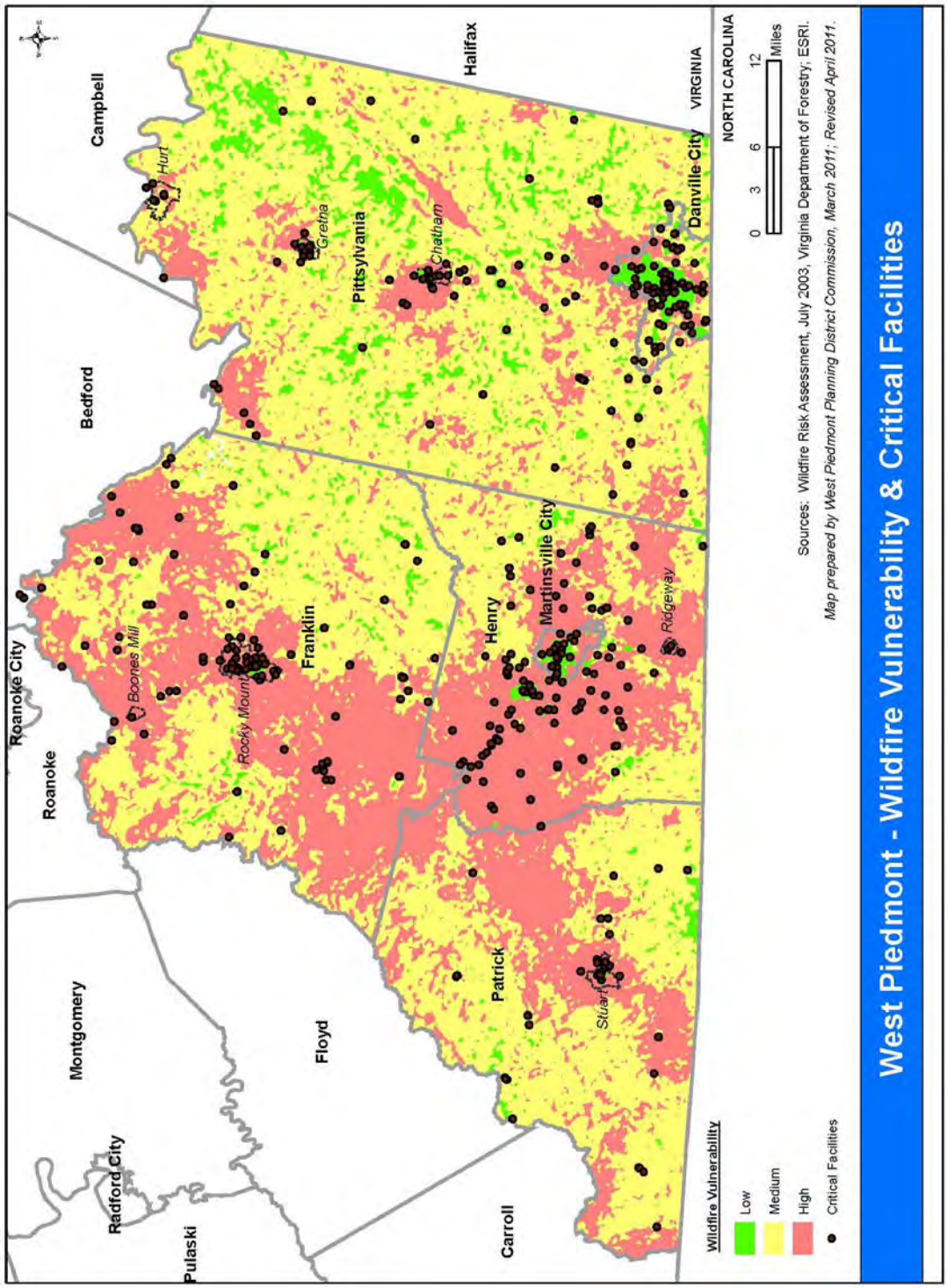

Figure V-20. West Piedmont Region Wildfire Vulnerability and Critical Facilities

Landslide (Limited)

Hazard History

Although landslides are likely to have occurred in the past in the West Piedmont region, the NCDC storm events database and the Virginia Department of Mines, Minerals and Energy, Division of Geology and Mineral Resources online resources do not include mention of previous occurrences. These hazard events often go unreported unless they damage infrastructure or buildings or cause injuries or fatalities.

Hazard Profile

The term "landslide" describes many types of downhill earth movements ranging from rapidly moving catastrophic rock avalanches and debris flows in mountainous regions to more slowly moving earth slides. It encompasses mudflows, mudslides, debris flows, rocks falls, rockslides, debris avalanches, debris slides, and earth flows. Landslides often occur in areas where the soil is over-saturated from heavy rain or snow-melt. Landslides can also occur after earthquakes, changes in groundwater levels, or changes in slope due to man-made construction activities.

Some landslides move slowly and cause gradual damage, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Debris flows (such as mudslides, mudflows, or debris avalanches) are a common type of fast-moving landslide that generally occurs during intense rainfall on saturated soil. They usually start on steep hillsides as soil slumps or slides that liquefy and accelerate to speeds as great as 35 miles per hour or more. Landslides have the potential to cause serious damage to buildings and infrastructure and may result in injuries or even fatalities.

Vulnerability Analysis

A landslide is considered a low-probability, high-impact event. Steep areas with poor surface and/or subsurface drainage are particularly susceptible to landslides. The USGS landslide incidence and susceptibility map does identify a strip extending from Patrick and Henry Counties through far southeastern Franklin County and northwestern Pittsylvania County as having a high susceptibility and moderate incidence of landslide (Figure V-21). Structures, including critical facilities in these areas, particularly those located on or immediately below steep areas may have an elevated risk due to landslide. The historic incidences and impacts of landslides in the region were generally considered by the planning team to be minor.

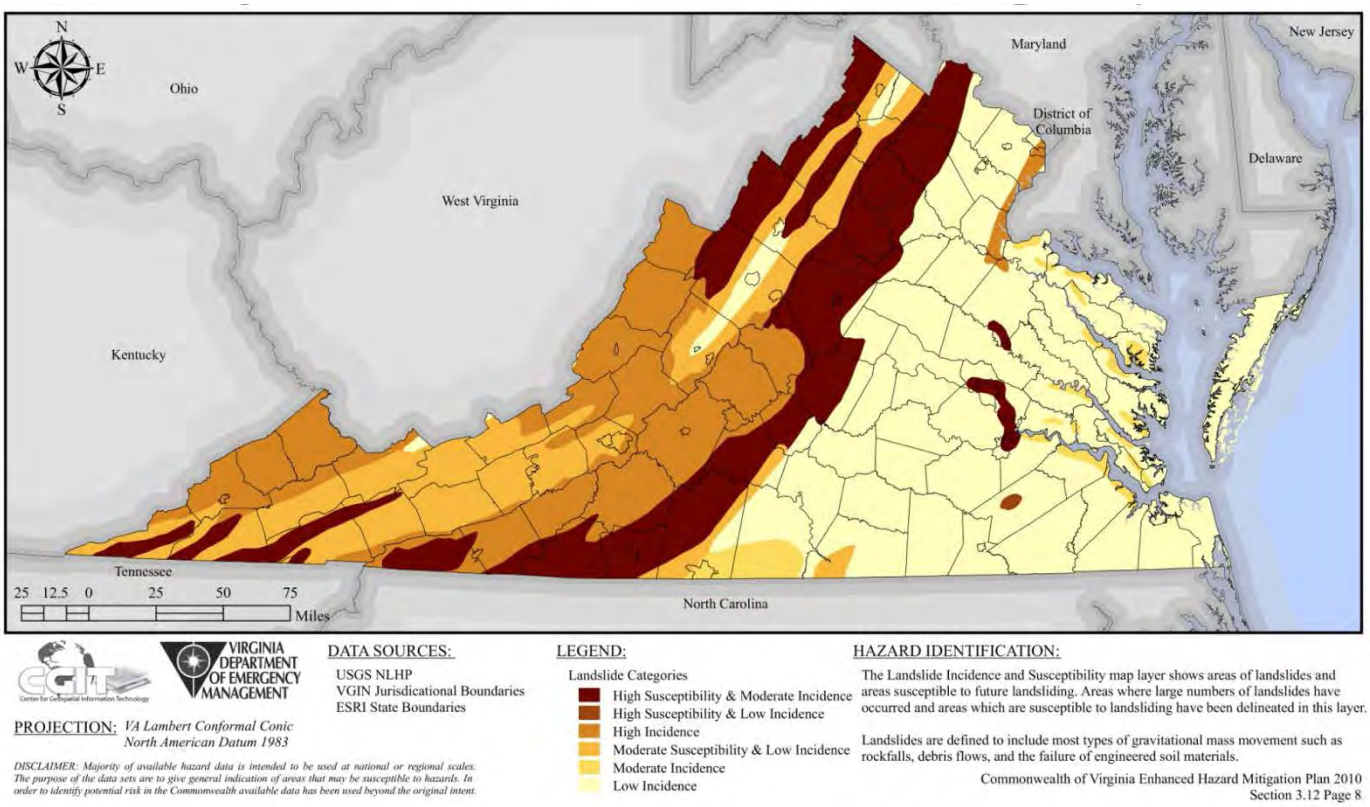

Figure V-21. Landside Incidence and Susceptibility
(Source: 2010 Commonwealth of Virginia Hazard Mitigation Plan)

Earthquake (Limited)

Hazard History

Although no earthquakes of significance have been centered in the West Piedmont region in recent times, several earthquakes have occurred throughout Virginia that may have had some limited impact on the area (Figure V-22). A recent notable event includes a magnitude 4.5 earthquake centered over Powhatan County on December 9, 2003. One of the stronger earthquakes to be centered in Virginia occurred on May 31, 1897. This magnitude 5.8 quake was centered near Pearisburg in Giles County.

Hazard Profile

An earthquake is the shaking of the ground's surface caused by movements of the plates beneath it. Earthquakes occur on faults, the areas where plates meet, within

bedrock, usually located miles below the surface. The severity of an earthquake is expressed in terms of magnitude and intensity. Magnitude is a measure recorded on instruments (seismometers) of the seismic energy released at the center of the earthquake. Intensity is related to observable effects of ground shaking on people, buildings, infrastructure, and natural features. Damage from an earthquake can range from cracks in plaster or on sidewalks to complete building and infrastructure collapse. Major earthquake events can lead to disruption of utilities (e.g., gas, electric, communications) and injuries or even fatalities. Secondary hazards may also result from earthquakes including fires, landslides, flash flooding (including dam breaks), and hazardous materials releases.

Vulnerability Assessment

Earthquakes are generally considered to be low-probability, high-impact events. Loss estimates created using FEMA's HAZUS-MH that were run for the Commonwealth of Virginia Emergency Operation Plan 2010 update show annualized losses for the region at $939,755 (Table V-33). Based on available historical data, this estimate is suspect and appears to be much higher than actual annual losses due to earthquakes. By comparison, annualized losses from flood are approximately $1,603,205. Though there have been historical occurrences of earthquakes that may have affected the region, the probability and impact is low enough for the overall risk to be considered "limited" at a planning level.

Table V-33. HAZUS Earthquake Annualized Loss

Jurisdiction	Annualized Loss
City of Danville	$192,663
Franklin County	$190,496
Henry County	$229,806
City of Martinsville	$102,104
Patrick County	$81,183
Pittsylvania County	$143,503
Total	**$939,755**

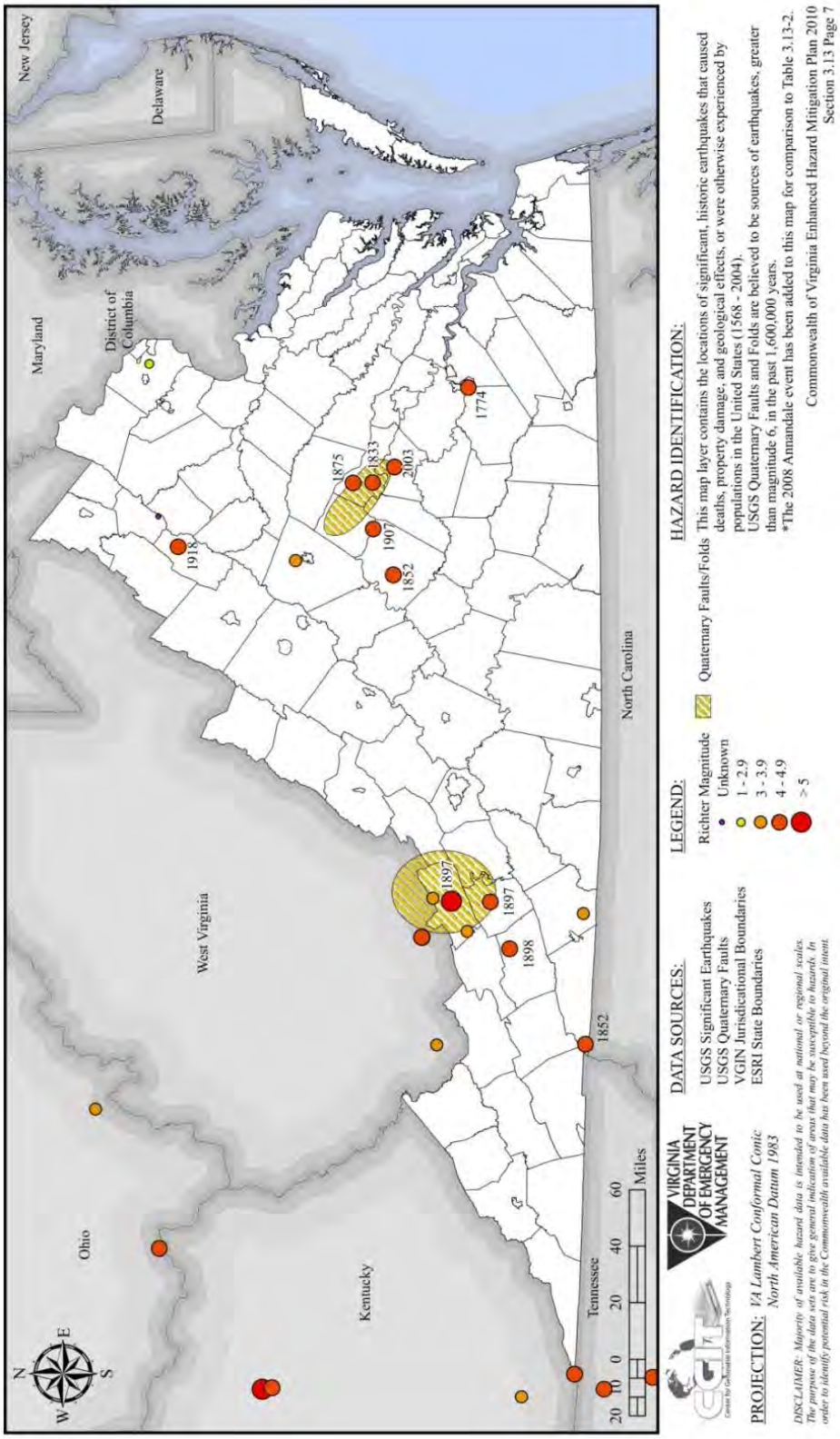

Figure V-22. Significant Earthquakes in Virginia

Human-Caused Hazard Events

The following sections address the impacts of human-caused hazards on the West Piedmont Planning District. Human-caused hazards were included at the request of the communities in the West Piedmont Planning District; these hazards are not required by VDEM or FEMA for the approval of the West Piedmont Regional Hazard Mitigation Plan.

The FEMA risk management series on mitigating potential terrorist attacks against buildings provides information on developing a realistic prioritization of human-caused hazards. The mitigation strategies section in this report should provide projects to address human-caused hazard vulnerability. Future analysis steps to consider include:

- Determine the relative importance of various critical and non-critical facilities and the asset of these systems
- Determine the vulnerability of each facility to a specified hazard
- Determine what human threats are known to exist in the communities

Each section provides a brief overview of the hazard, potential impacts and a general community vulnerability analysis, when applicable. Vulnerability analyses were completed for dams and agriterrorism. Ideally, for the other events, analyses should be included and fully addressed in each community Emergency Operation Plans (EOP).

As of 2011, limited data are available for the region to fully address manmade hazards. The majority of the data presented in this section was originally included in the 2006 plan and has not been updated but new maps have been created. Due to the limited data available for the region and concerns about security and community data confidentiality, the locations of high voltage transmission lines (HVT) or potential inorganic/organic spills are not included in this HIRA.

Dams (Significant Ranking)

Hazard Profile

Even in the era before severe terrorism concerns, dams in the United States faced the potential of failure. Dams can fail in numerous ways. Overtopping, one of the most common causes of dam failure, occurs when the dam's spillway is inadequate for dealing with excess water. During flood events, too much water to be properly handled by the spillway may rush to the dam site, and flow over the top of the dam.

Improper building construction, including using easily eroded construction materials, also frequently leads to the slow structural failure of dams. This failure can be compounded by underlying geological factors such as porous bedrock that loses structural integrity when saturated. Landslides pose two threats to dams, both upstream from the dam and at the dam site itself. At the dam site, a landslide could completely wipe out the dam from its foundation. A landslide upstream has the potential to send a wave of water surging towards the dam, quite possibly causing an overtopping event. Earthquakes also are a major threat to dams, though it is very rare that a dam will be completely destroyed by an earthquake. In the event of total failure, the most common cause is the liquefaction of fill along the dam wall

Following the terrorist attacks of September 11, 2001, concerns for dam safety from terrorist attack came to the forefront. Dams are considered by the Department of Homeland Security (DHS) to be one of the five key national assets, and are considered critical infrastructure. Their significance places them at high risk for terrorist attack. The federal government has developed the National Strategy for the Physical Protection of Critical Infrastructures and Key Assets, which determines how vulnerable dams are and how they can be protected. A major factor in protecting the dams of the United States is that the federal government only has access and control over 5% of the dams whose failure could result in loss of life or significant property damage.

FEMA and the DHS have been continuing efforts to increase security at dam sites and set up emergency management plans to deal with the aftermath of a potential terrorist attack on a critical dam.

No matter what the cause of dam failure, the aftermath of such an event can range from moderate to severe. It is likely that the failure of major dams will cause widespread loss of life downstream to humans and animals, as well as extreme environmental stress along the flood path. Water supplies upstream could be left completely dry, while water supplies downstream are overrun or contaminated with debris from the ensuing flood.

Dams are constructed to serve a number of purposes including recreation, irrigation, flood control, navigation, and to provide drinking water and electricity. The most common purpose for the construction of a dam in the United States is the creation of a reliable and efficient power source. Dams produce electricity by using flowing or falling water from the reservoir behind the dam to spin the blades of turbines. The spinning turbines activate generators, which produce the electricity. Hydroelectric power is the nation's largest renewable energy source. The International Energy Agency estimates, however, that while hydroelectric power accounted for 11.5% of the energy produced in the United States, it declined to 7.7% in 1998.

Although the primary purpose of most dams constructed in the United States is to provide hydroelectric power, a majority of dams built in the Mid-Atlantic region are designed to alleviate flooding or to provide recreation. During heavy rains or snowmelt, dams used for flood control allow excessive water upstream of the dam to collect slowly in the reservoir. The water can then be gradually released from the dam into the river downstream, preventing flooding. Sometimes the water can be stored in the reservoir until a drier period occurs. In this way, flood control dams are used to maintain a relatively steady flow rate in a river or stream.

Dams also can be used as a community water supply. Most dams in Virginia provide a recreational venue for thousands of people, even if their construction purpose was not recreational. The reservoirs created by dams are, in many cases, used for fishing and often local agencies stock the water several times a year. Reservoirs of ample size also provide boating opportunities for many people. Common boating activities include water skiing, jet skiing, tubing, and leisure outings. Recreational reservoirs also provide commercial opportunities near the water, including sporting and boating outfitters, local marinas, and lodging. Also, property near reservoirs often sells at higher rates than those in surrounding areas, providing additional revenue for local taxing entities.

Vulnerability Analysis

There are a number of dams in the West Piedmont region. Due to data restrictions and Homeland Security concerns, dams are no longer specifically identified in this plan. Parties interested in specific information about individual dam locations and vulnerabilities associated with the failure of those dams should contact the appropriate jurisdiction, the Virginia Department of Emergency Management, or the Federal Emergency Management Agency.

HVT Lines (Moderate Ranking)

Hazard Profile

High voltage transmission (HVT) lines are the backbone of the world's electrical system. They are usually constructed in straight lines, to minimize the cost of building very large steel towers. The towers are very sturdy and it is very rare for these structures to become damaged, except for cases of extreme natural phenomena such as lightening strikes, hurricanes, tornadoes, and earthquakes.

High voltage transmission lines are used to distribute power from the generation plant to the different localities using the power source. Power grid failure is largely weather-related, with some occasions of human-related failures. Examples of human-related failures range from human error in controlling and maintaining the system to direct acts of sabotage on the system.

A much larger problem is the vulnerability of the national grid system formed by the high voltage transmission lines. Power from different sources is linked together in a grid system to allow for the rerouting of unused power from far away sources if a local power supplier fails. This setup is very efficient economically. However, history has shown this grid system to be vulnerable to failure in rare circumstances.

HVT lines can be impacted by local or widespread disruption in the power grid service. Disruption can take the form of intentional destruction of the utility poles to automobile accidents taking down service poles. The immediate area surrounding the pole or downed lines should be considered dangerous as long as the lines remain alive. Most HVT lines are located in dedicated right of ways, which have no inhabited structures within them. Sparks from the downed power lines have the potential to start fires. The vast majority (70%) of power outages is weather-related; 11% are caused by animals contacting wires; 4% are due to auto accidents; 4% are pre-arranged by the utility company for maintenance; and 1% is due to human error[11].

Without a power supply, many daily living functions would be impacted. These secondary impacts can be compounded with prolonged failure. Impacts include, but are not limited to, loss of heating and cooling, refrigeration, lack of running water, malfunction or cessation of critical facilities and computer infrastructures. Power grid failure has a potential to negatively impact large numbers of people. The extent of this type of event is not predictable.

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[11] "What Causes Power Outages?" Baltimore Gas and Electric Company. http://www.bge.com/portal/site/bge/menuitem.fe9c7e782b73e84606370f10d66166a0/

In November of 1965, an automatic current flow regulating device in Ontario, Canada failed, allowing a circuit breaker to remain open. This failure allowed the current flow into the northeastern United States to increase rapidly. The northern parts of the Northeast grid responded by shutting down and cutting off local generators to protect them. However, since there was now a power vacuum in the Northeast grid, the southern plants automatically tried to fill the void, but doing so caused them to overload. The result was a blackout in the Northeast that covered 80,000 square miles.

The system still remains open to these types of vulnerabilities, as was witnessed by the blackout that occurred on August 14, 2003. This blackout spread from Detroit to New York City to New England, leaving 50 million people without power.

Vulnerability Analysis

A high-level vulnerability analysis was completed for HVT lines in the planning area using loss of function data from FEMA and structure counts from HAZUS. It is possible to understand the scale of potential damages from a utility outage. The FEMA Benefit Cost Analysis (BCA) software is designed to calculate losses avoided based on hazard events; as such, it indicates default values for loss of function due to outages including electricity outages. The default value for loss of function for electricity outage is $126/person/day.

Using structure counts from HAZUS-MH, it is possible to estimate the direct impacts of these outages on the region. It is not possible to estimate losses to commercial, industrial, and non-residential facilities because the secondary impacts are unknown; therefore, the calculations include residential structures only.

Three representative events can be examined. A small-scale outage might affect approximately 1% of customers and last one day. A mid-scale outage might affect approximately 10% of customers and last two days. A large-scale outage would affect 100% of customers and might last up to a week (7 days). For an electricity outage, the expected losses for each of the three events would be as shown in Table V-35.

Table V-35. Estimated Losses due to Electricity Outage for Residential Structures

Jurisdiction	Residential Facilities	Small Outage	Mid-Size Outage	Large Outage
City of Danville	20,579	$25,930	$518,591	$18,150,678
Franklin County	23,952	$30,180	$603,590	$21,125,664

Table V-35. Estimated Losses due to Electricity Outage for Residential Structures				
Jurisdiction	Residential Facilities	Small Outage	Mid-Size Outage	Large Outage
Henry County	26,420	$33,289	$665,784	$23,302,440
City of Martinsville	6,467	$8,148	$162,968	$5,703,894
Patrick County	10,479	$13,204	$264,071	$9,242,478
Pittsylvania County	29,168	$36,752	$735,034	$25,726,176

The BCA software does not address secondary impacts of an electricity outage. Secondary impacts would be the main concern associated with the failure of high voltage transmission lines. Part of the vulnerability analysis would be to identify where the lines are present, what areas are served by the lines, and the extent and impact (e.g., loss of work time, loss of food, and effect on human health) of the expected outage.

Organic/Inorganic Spills (Moderate Ranking)

Hazard Profile

Hazardous materials can include explosive, flammable, combustible, corrosive, oxidizing, toxic, infectious, and radioactive materials that are involved in an accidental or intentional release causing danger to the general public. However, a spill can still be deemed hazardous if benign materials such as beverages or non-toxic materials cause a hazard to those in the immediate area. Hazardous material events also can be caused by natural hazards such as earthquakes and floods.

A hazard material spill or release may come from either fixed facilities or mobile containers. The duration of the event can last for hours or even days. Chemicals may be corrosive or otherwise damaging over time. Explosion and/or fire may be subsequent. In addition, contamination may be carried out of the incident area by persons, vehicles, water, and wind.

The magnitude of a hazardous material event is directly related to the amount of materials released, and the speed and efficiency of which emergency and cleanup crews respond. Another important factor is what form the spill is in. Solid state spills are typically the easiest to clean up and control, followed by liquid and gaseous state spills. Liquid state spills require rapid response if they are to be contained, and if they

infiltrate a watershed, steps must be taken to monitor the influence downstream. Gaseous state spills are almost impossible to contain, and depending on the volume, usually require evacuations down wind.

According to the United States Department of Transportation, highway incidents were responsible for 87% of the total United States hazardous material spills over the last 10 years[12]. The US Department of Transportation estimates that transportation incidents involving hazardous materials result in over $1 billion in cost[13].

The United States Environmental Protection Agency tracks toxic chemical and other waste management activities for certain industries and federal facilities. Specific toxic release data is available for the West Piedmont communities at http://www.epa.gov/triexplorer/. This information can provide an idea of what types of chemicals are present in the community.

Vulnerability Analysis

A detailed vulnerability analysis was not done for organic/inorganic spills in the planning area as a result of the lack of data available to fully assess the hazard. Table V-36 shows the type of incident by jurisdiction reported to the National Response Center (NRC), that have impacted the region from 1990 through 2010 for a total of 319 incidents. A majority of the spills have involved automotive gasoline, hydraulic and diesel oil.

Table V-36. Organic/Inorganic Spills by Jurisdiction and Type of Spill (1990-2010) (NRC)

Jurisdiction	Aircraft	Continuous	Fixed	Mobile	Pipeline	Railroad	Railroad non-release	Storage tank	Unknown sheen	Vessel	Grand Total
City of Danville	1	2	43	6	6	19	2	2	6		87
Franklin County	2	1	20	10	1	10	1	1	8	5	59
Henry County			28	12		11	2	1	5	1	60
City of Martinsville		2	28	11	4	3		4	6		58

[12] https://hip.phmsa.dot.gov/analytics/saw.dll?Dashboard&NQUser=HazmatWebsiteUser1&NQPassword=HazmatWebsiteUser1&PortalPath=/shared/Public%20Website%20Pages/_portal/10%20Year%20Incident%20Summary%20Reports

[13] http://ops.fhwa.dot.gov/publications/fhwahop08058/20.htm

Table V-36. Organic/Inorganic Spills by Jurisdiction and Type of Spill (1990-2010) (NRC)

Jurisdiction	Aircraft	Continuous	Fixed	Mobile	Pipeline	Railroad	Railroad non-release	Storage tank	Unknown sheen	Vessel	Grand Total
Patrick County			4	3				2			9
Pittsylvania County		1	25	8		4	1	3	4		46
Grand Total	3	6	148	50	11	47	6	13	29	6	319

FEMA has established general methods for human-caused hazards but does not have an established methodology for addressing community vulnerability due to organic/inorganic spills. As with any analysis, general methods to determine vulnerability would be to identify where the hazard could occur and what the impacts on specific assets would be. For organic/inorganic spills, general methods to determine vulnerability would be to determine what facilities use or produce hazardous materials and which high traffic roads and railroads are used to transport organic and inorganic materials in and out of the communities. After the potential contaminants have been identified, the extent, impact, and effects of the contaminant can be determined.

Individuals can obtain information on facilities that may affect their home, workplace or other specific locations from the U.S. Environmental Protection Agency by visiting http://yosemite.epa.gov/oswer/ceppoweb.nsf/frmVZIS?OpenForm.

Pipelines (Moderate Ranking)

Hazard Profile

Pipelines are used primarily to transport natural gas and petroleum, though pipelines may carry other hazardous materials. The material in pipelines can be emitted very quickly, and in large quantities if the pipeline is ruptured. In these situations, the materials may continue to accumulate until the flow is turned off by a valve or at a nearby pumping station. A human-caused pipeline failure can come from improvised explosive devices or arson/incendiary attack. Explosive devices can originate from an individual person, a vehicle, or a projectile. The explosion is typically instantaneous, with secondary fall-out from spilled hazardous material in the immediate areas (see organic/inorganic spills for potential impacts) and loss of service to those dependent on the pipeline infrastructure.

Natural gas production in Virginia occurs in the southwestern portion of the state (Figure V-21), and accounts for about one-tenth of 1 percent of gas consumption in the state. Petroleum production also takes place in southwestern Virginia, in Lee and Wise Counties[14]. Figure V-23 shows the major natural gas pipelines in the West Piedmont Region.

[14] http://www.energy.vt.edu/vept/petroleum/index.asp

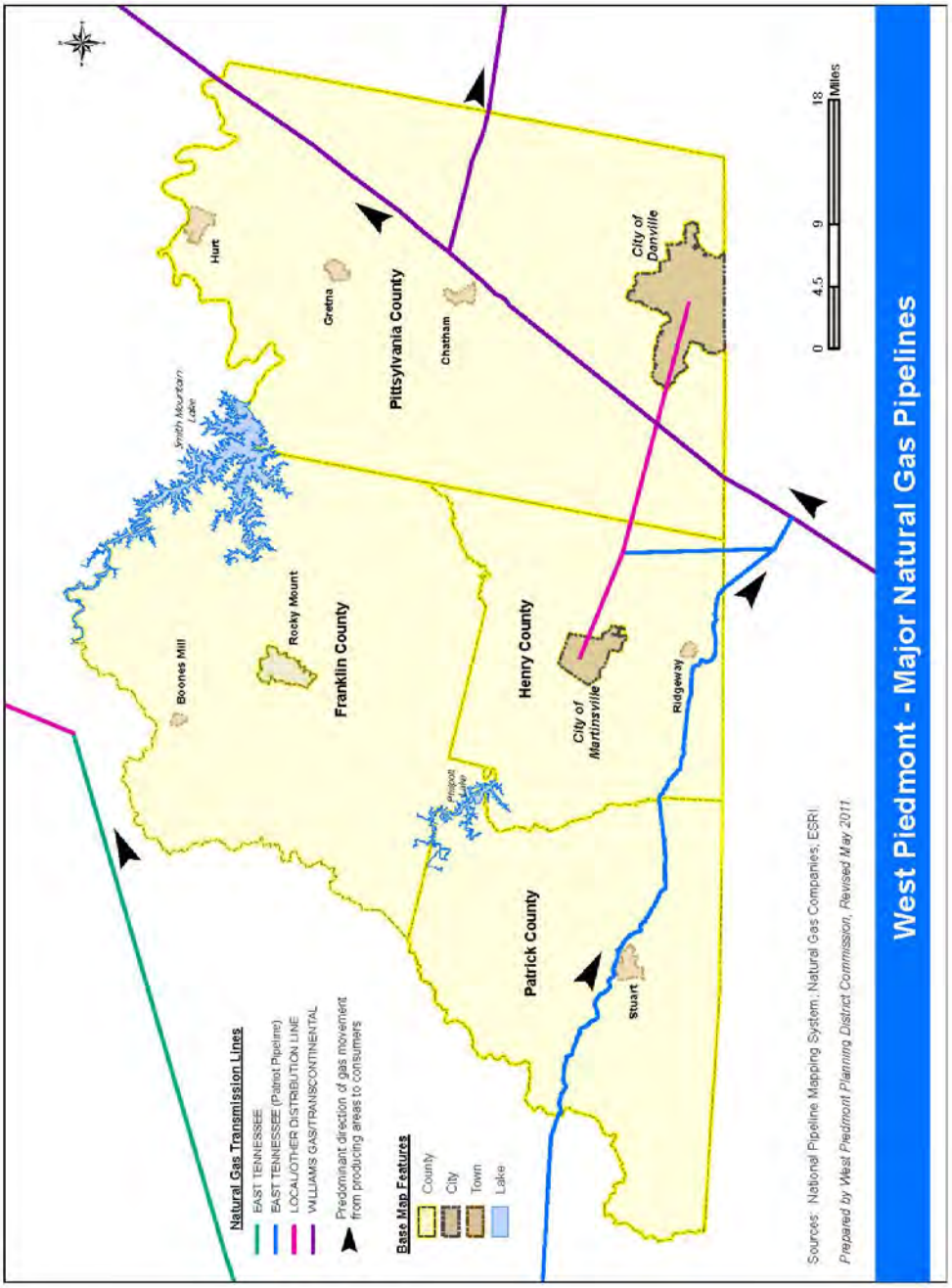

Figure V-23. Major Natural Gas Pipelines in West Piedmont

The majority of Virginia's natural gas is supplied from a network of interstate pipelines that connect the nation's major gas producing areas, including Louisiana, Texas, and the Gulf of Mexico, to northeastern population centers such as New York, Boston, and Washington DC. Because Virginia is located along these pipeline routes, large quantities of gas move through the state. Ships and barges, railroads, pipelines, and trucks are all essential components of the petroleum-product transportation network. Figure V-24 shows the general location of natural gas pipelines in Virginia.

Major Natural Gas Pipelines

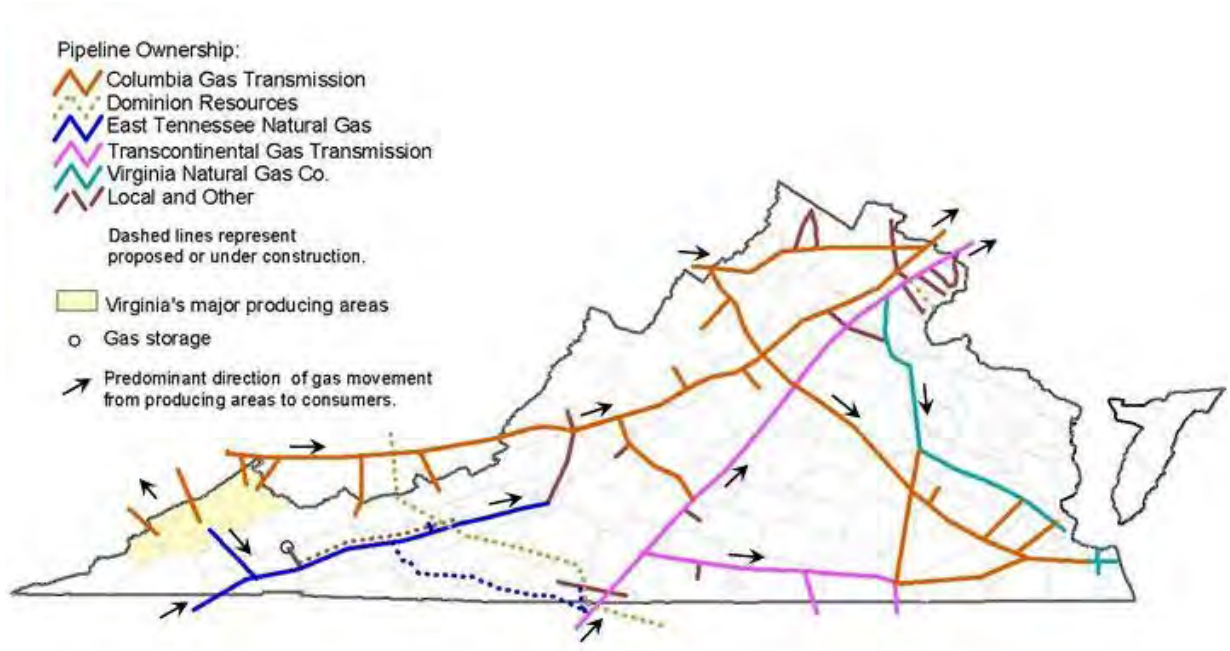

Figure V-24. Major Natural Gas Pipelines in Virginia[15]

A petroleum-product pipeline network serves Virginia and the rest of the nation. Pipelines are the primary means for transporting refined petroleum products over long distances. Petroleum products are shipped through these pipelines to product terminals located throughout the state. Trucks are a common means of transporting products from these terminals to individual distribution points, such as gasoline service stations and fuel oil distributors. Figure V-25 shows the general location of petroleum pipelines in Virginia.

[15] Virginia Department of Mines, Minerals, and Energy. *Major Natural Gas Pipelines*. Retrieved from http://www.energy.vt.edu/vept/naturalgas/NG_pipelines.asp on March 7, 2011.

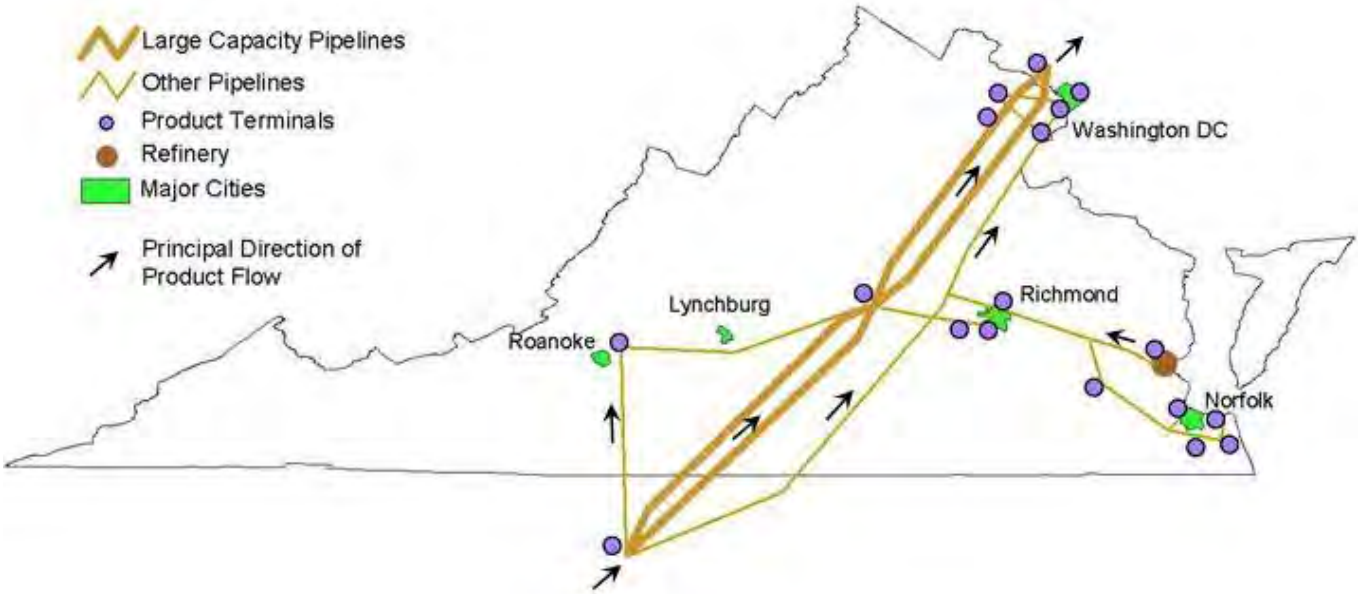

Figure V-25. Map of Major Petroleum Product Pipelines in Virginia [16]

The two main causes of pipeline rupture are puncture and corrosion. Pipelines that run through populated areas use pipes with a greater wall thickness to provide an even higher level of protection. To block corrosion, the pipe is coated with special materials. The welds that join pieces of pipe into a single long line are wrapped with a special protective material before the pipeline is placed in the ground. Since ordinary water and hydrocarbons can cause rapid corrosion, those materials are removed from the natural gas at processing plants where appropriate. Pipelines also are made more resistant to corrosion by cathodic protection. A small electrical current is run around buried pipe in the system to reduce the corrosive effects of the soil. This kind of protection is required by the U.S. Department of Transportation.

If a pipeline ruptures, fires may ignite and should not be put out until official personnel shut off pipeline flow from the nearest pump station. Ruptures can cause large spills or toxic plumes that may have adverse effects on the surrounding environment. The magnitude is quantified by the geographic extent, type of material, and concentration of the plume or spill.

Although there have not been significant pipeline incidents in the West Piedmont region, a number of incidents have occurred throughout the nation in recent years.

[16] Virginia Department of Mines, Minerals, and Energy. *Map of Major Petroleum Product Pipelines.* Retrieved from http://www.energy.vt.edu/vept/petroleum/oil_pipeline.asp on March 7, 2011.

Since 1990, more than 2,800 significant gas line accidents have occurred, more than a third of which caused death and significant injury[17]. Two such incidents include:

- At least 4 people were killed[18] and 20 people were injured when a natural gas line exploded in San Bruno, California on September 10, 2010. Fifty-three homes were completely destroyed and 120 homes were damaged in the event[19].
- Five people were killed when a gas main exploded in a residential neighborhood in Allentown, Pennsylvania on February 10, 2011. Eight homes were completely destroyed, and 39 homes were damaged in the ensuing fire[20].

Vulnerability Analysis

Information on the exact location of pipelines is restricted to local, state and federal officials and pipeline operators. Information on how to access this information can be found on the US Department of Transportation's *National Pipeline Mapping System* website at http://www.npms.phmsa.dot.gov/.

FEMA has established general methods for human-caused hazards but does not have an established methodology for addressing the vulnerability of pipelines. As with any analysis, general methods to determine vulnerability would be to identify where the hazard would occur and what the impacts on specific assets would be. General methods to determine vulnerability to pipelines would be to determine where the major pipelines run through the communities and what they are carrying. With identifying where the pipelines are present, the areas served and the extent and impact of the expected rupture should be identified.

A strategy to improve available data is included in the Mitigation Strategy section of this plan.

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[17] Burke, Garance and Jason Dearen. "Aging gas pipes at risk of explosion nationwide." MSNBC. 14 September 2010. http://www.msnbc.msn.com/id/39159597/ns/us_news-life/ Accessed 3/23/2011

[18] "San Bruno CA Explosion Raises Questions of Gas Pipeline Safety." San Francisco Chronicle. 11 September 2010. http://www.sfgate.com/cgi-bin/blogs/hottopics/detail?entry_id=72042 Accessed 3/23/2011

[19] "San Bruno Fire Levels Neighborhood." San Francisco Chronicle. 10 September 2010. http://articles.sfgate.com/2010-09-10/news/23996646_1_gas-line-explosion-wind-whipped-blaze-smoke-inhalation Accessed 3/23/2011

[20] "5 Dead After Massive Pa. Gas Blast." MSNBC. 10 February 2011. http://www.msnbc.msn.com/id/41503700/ns/us_news-life/ Accessed 3/23/2011

Agriterrorism (Limited Ranking)

Hazard Profile

Agriterrorism is the use of plant or animal pathogens to cause disruption and disease to the agricultural industry. This anthropogenic hazard can be applied through direct and generally covert contamination of food supplies, or introduction of pests and/or disease agents to crop and livestock. Durations of agriterrorism can last anywhere from days to months. Agricultural terrorism is a concern because there is a low physical risk to the perpetrator, and there is limited backlash because many attacks have great similarity to natural outbreaks. There are at least 22 agents that can be used for agriterrorism of which many are not vaccinated against. Once an agent has been introduced into the environment, it can remain there for an extended period of time.

The extent of effects varies by type of incident. Food contamination events may be limited to discrete distribution sites, whereas pests and diseases may be spread widely. Generally, there are no effects on the built environment. Inadequate security can facilitate adulteration of food and introduction of pests and disease agents to crops and livestock. Biochemical or biological agents are organisms or toxins that can be targeted to infect people, livestock, and crops. It is difficult to detect a biochemical event and the effects are usually not immediately realized. Biological agents, depending on the organism type and mode of dispersal, can have minimal to fatal implications. Depending on the biological agent, impacts may spread to and among different populations.

The use of livestock antibiotic and steroid programs in the US has created a high vulnerability to diseases. Agriterrorism on animals poses a significant threat because an agent could be introduced easily via these programs and could spread rapidly among the livestock population. The main cattle diseases would be foot and mouth disease and mad cow disease. Transmission can occur as a result of airborne aerosols, direct and indirect contact, and injection of infected food. Avian diseases include Newcastle disease and avian influenza. Both avian diseases are present world-wide. Transmission can occur through direct contact and airborne aerosols.

In addition, commercial plant hybrids have increased the crop susceptibility to many pathogens. Destruction to crops would be more difficult to obtain because of the time it would take to spread to other crops and the dependence agriculture has on the weather. The primary concern related to crops is that they do not have resistance to foreign strains and the resistance of certain strains to fungicides. Fungus and bacteria can have detrimental affects on crops. Crops that are primarily impacted by these

include cereals (e.g., wheat. barley, rye), corn, rice, and potatoes. Airborne spores and waterborne cells are the two primary modes for transmission.

The Office International des Epizooties (OIE) or World Organization for Animal Health is the international body that is responsible for setting animal health standards. The OIE has designated two lists for disease to animals. From the two lists it has been determined that cattle, denoted on List A, would be in the category for serious and rapid spread of transmissible diseases and have a serious socio-economic or public health consequences. Most of the diseases on List A are concerned with cattle, swine, and birds.

Livestock and crops can be impacted by a slew of diseases. The focus for this analysis was on cattle and crop diseases. The focal point diseases were determined based on the uses of agricultural land and on the potential types of threats to the region. As of March, 2011, the West Piedmont region had 3,352 farms with a total of 571,687 acres in farmland, as shown in Table V-37. *The 2007 Census of Agriculture data was released in December 2009 and is currently the most up-to-date available.*

Table V-37. Farms by Jurisdiction

Jurisdiction	Number of Farms	Land in Farms (Acres)	Crop Farms	Avian Farms	Hooved Cattle Farms	Swine Farms	Hooved Animal Farms
Franklin County	1,043	166,592	387	87	811	41	1,129
Henry County	340	50,779	146	32	254	9	404
Patrick County	613	80,027	226	21	358	12	490
Pittsylvania County	1,356	274,289	544	56	760	22	1,040
Totals	*3,352*	*571,687*	*1,303*	*196*	*2,183*	*84*	*3,063*

Source: 2007 Census of Agriculture, United States Department of Agriculture/National Agricultural Statistics Service

Vulnerability Analysis

The West Piedmont region has a significant amount of farm lands, in both crops and livestock. A vulnerability analysis for the region was completed based on the US Department of Agriculture's 2007 Agriculture Census. Figures V-26 through V-30 illustrate the different portions of the planning area that could potentially be susceptible to agriterrorism, given what type of farmland is located there. Diseases, location, mode of transportation and the primary animals impacted were taken into

account when developing the vulnerability analyses. Crops and cattle were concentrated on as a result of the large number of farms that raise these types of products.

Areas that are more susceptible to bacterial and fungal crop diseases are represented in Figure V-26. Patrick, Franklin, Henry, and Pittsylvania Counties have a large amount of crop farms and, as a result, would be more susceptible to crop-related diseases and terrorism tactics.

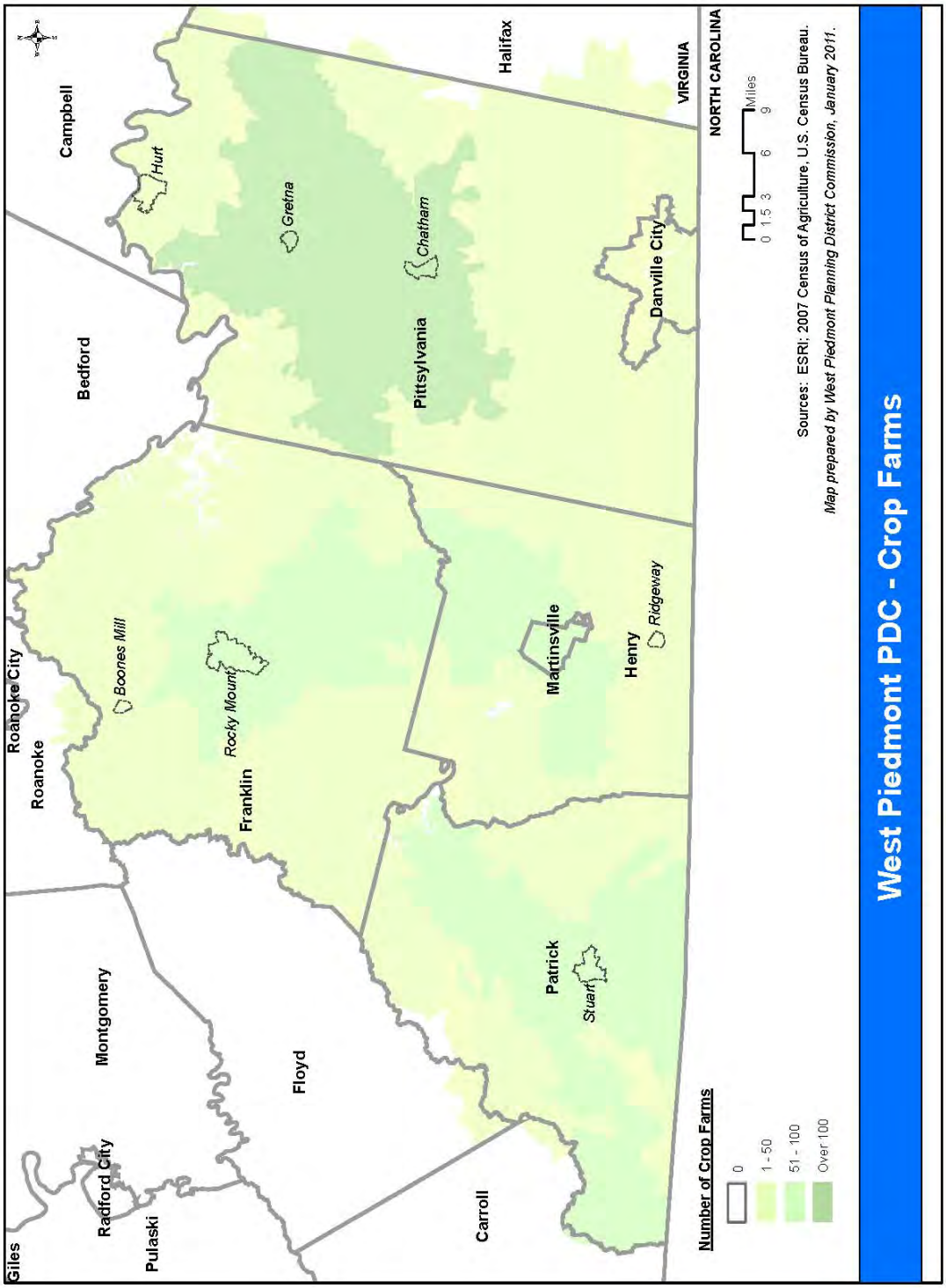

Figure V-26. West Piedmont Region Crop Farm Distribution

Areas that are more susceptible to avian influenza and Newcastle diseases are represented in Figure V-27. All of the communities in the Planning District have a relatively small number of bird farms and as a result should have a lower concern for avian diseases.

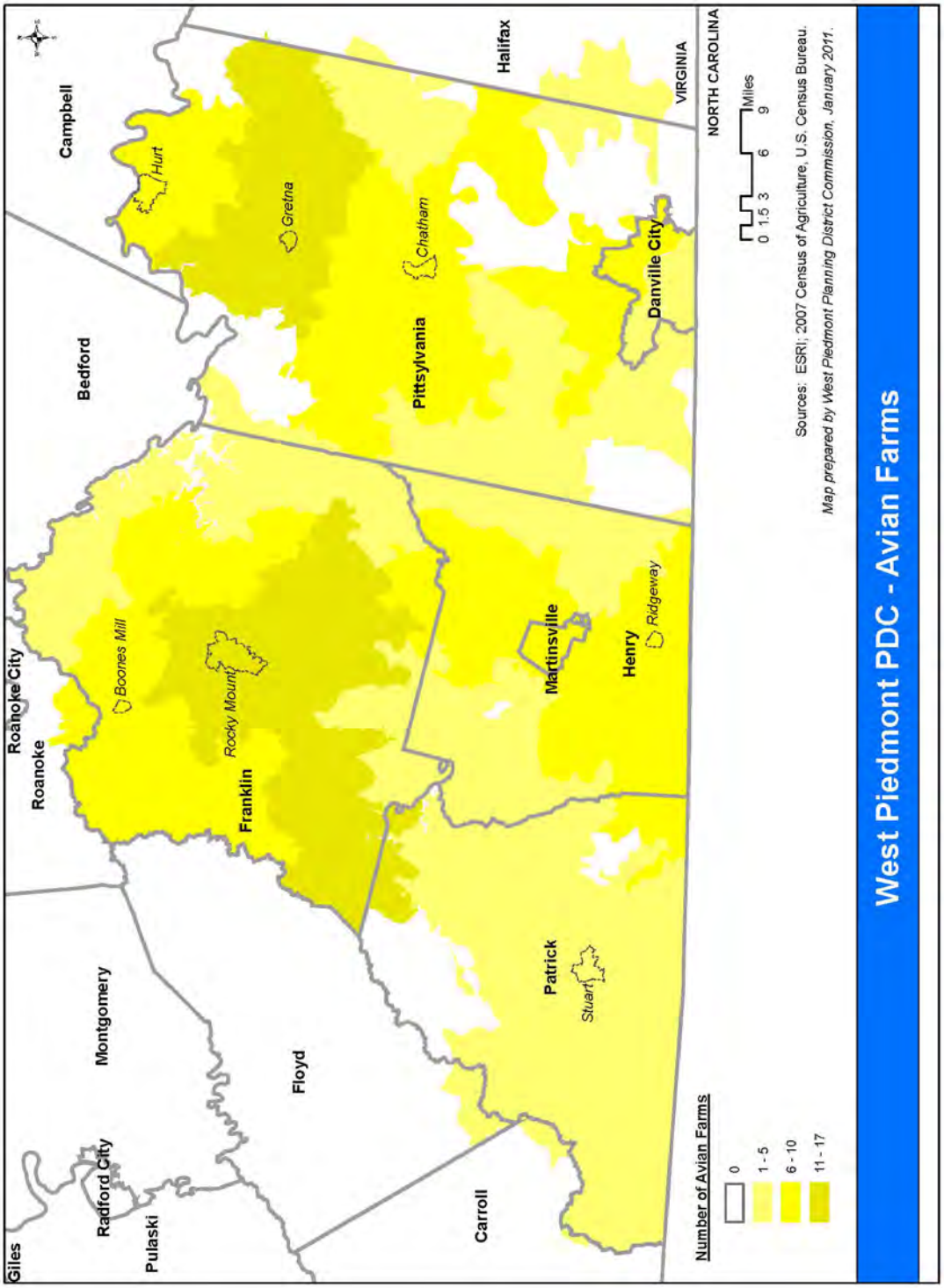

Figure V-27. West Piedmont Region Avian Farm Distribution

Areas that are more susceptible to cattle diseases are represented in Figure V-28. Patrick, Franklin, and Pittsylvania Counties have a large amount of cattle farms and would therefore be more susceptible to cattle-related diseases and terrorism tactics.

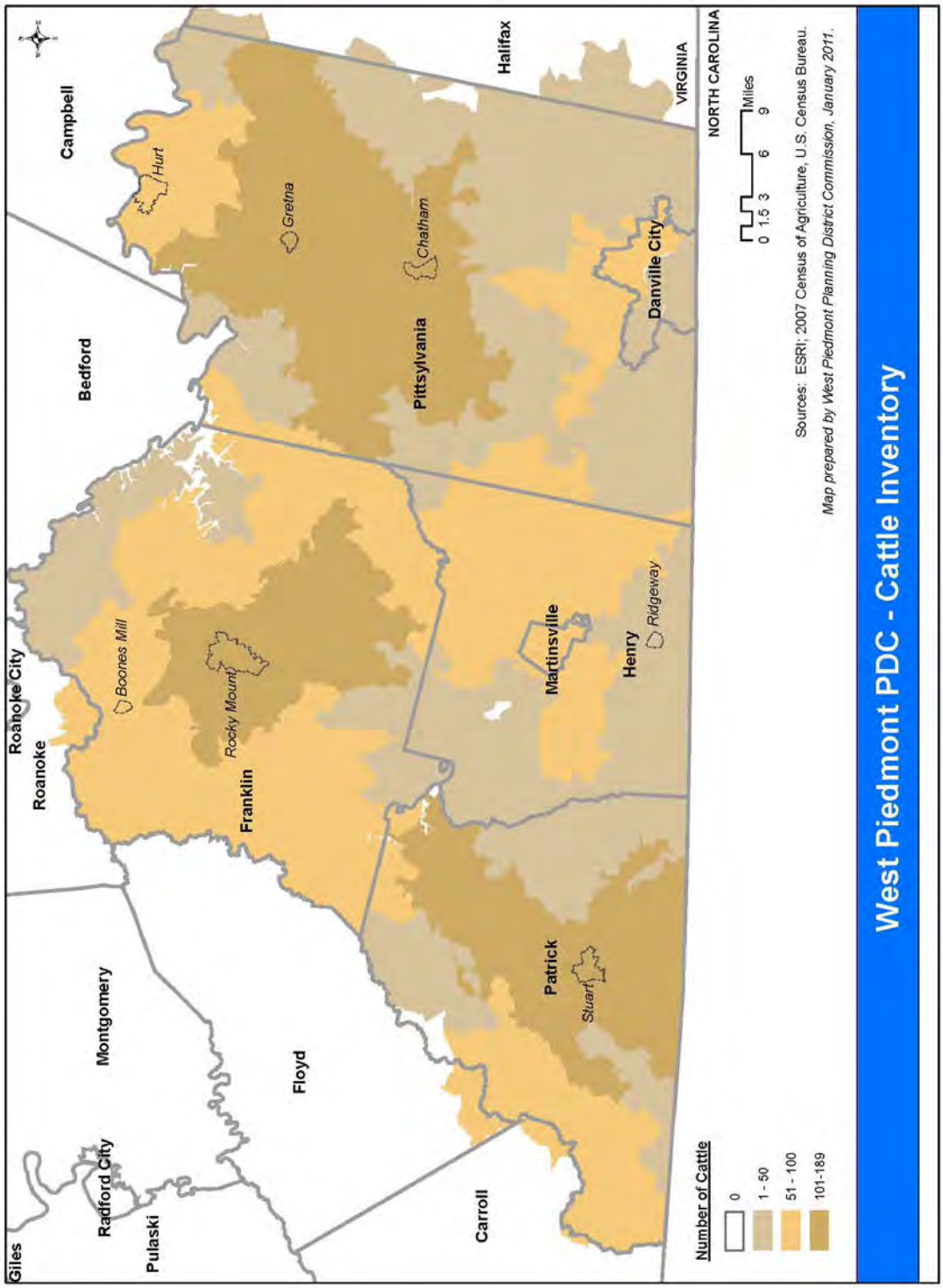

Figure V-28. West Piedmont Region Cattle Farm Distribution

Areas that are more susceptible to swine diseases are represented in Figure V-29. Pittsylvania County, Franklin County, Henry County, and Patrick County have small swine farms. These localized regions would be susceptible to swine related diseases and terrorism tactics.

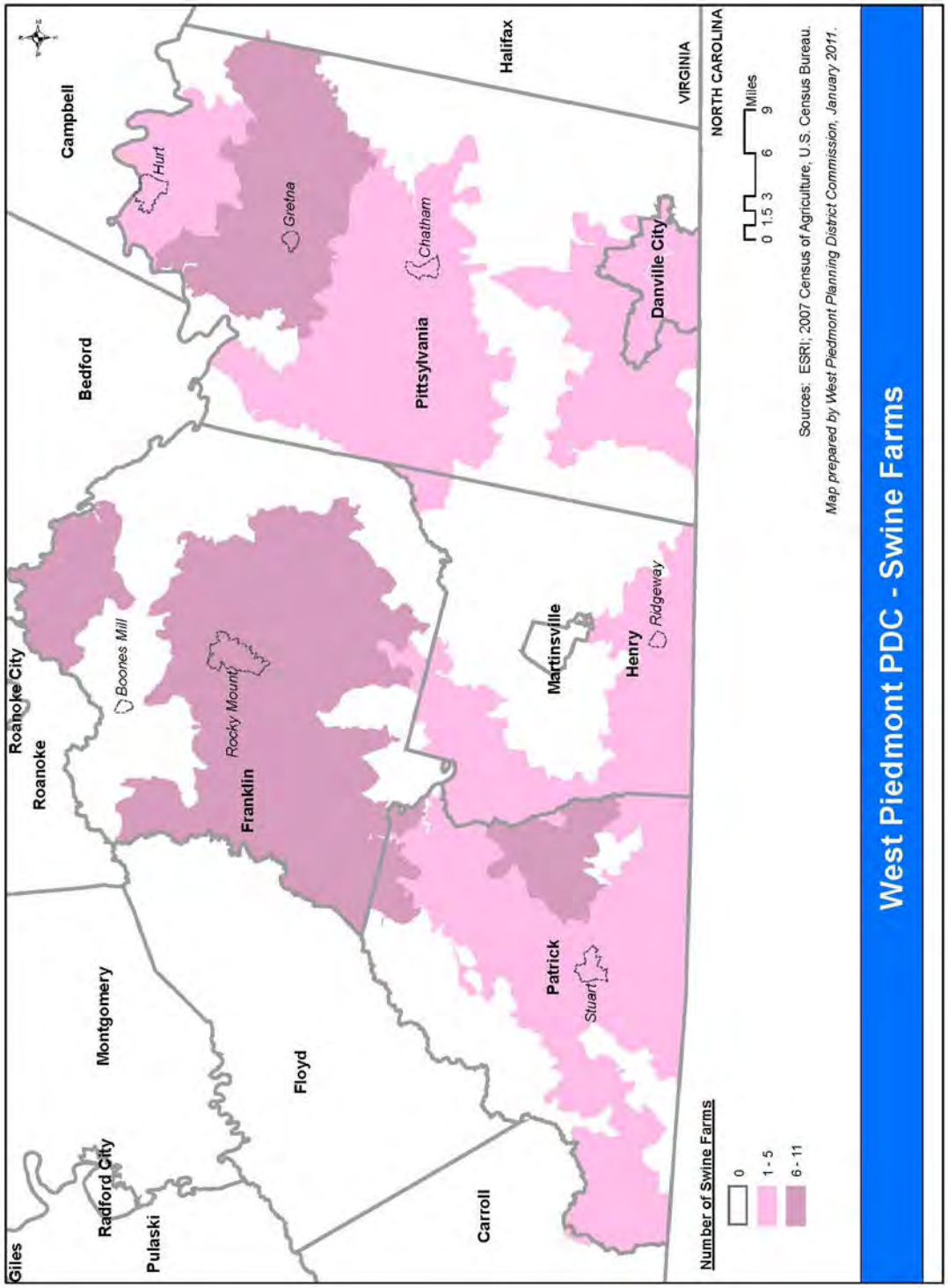

Figure V-29. West Piedmont Region Swine Farm Distribution

Areas that are more susceptible to foot and mouth diseases are represented in Figure V-30. Patrick, Franklin, and Pittsylvania Counties have a large amount of cloven-hoofed animal farms and would therefore be more susceptible to diseases and terrorism tactics on hoofed animals.

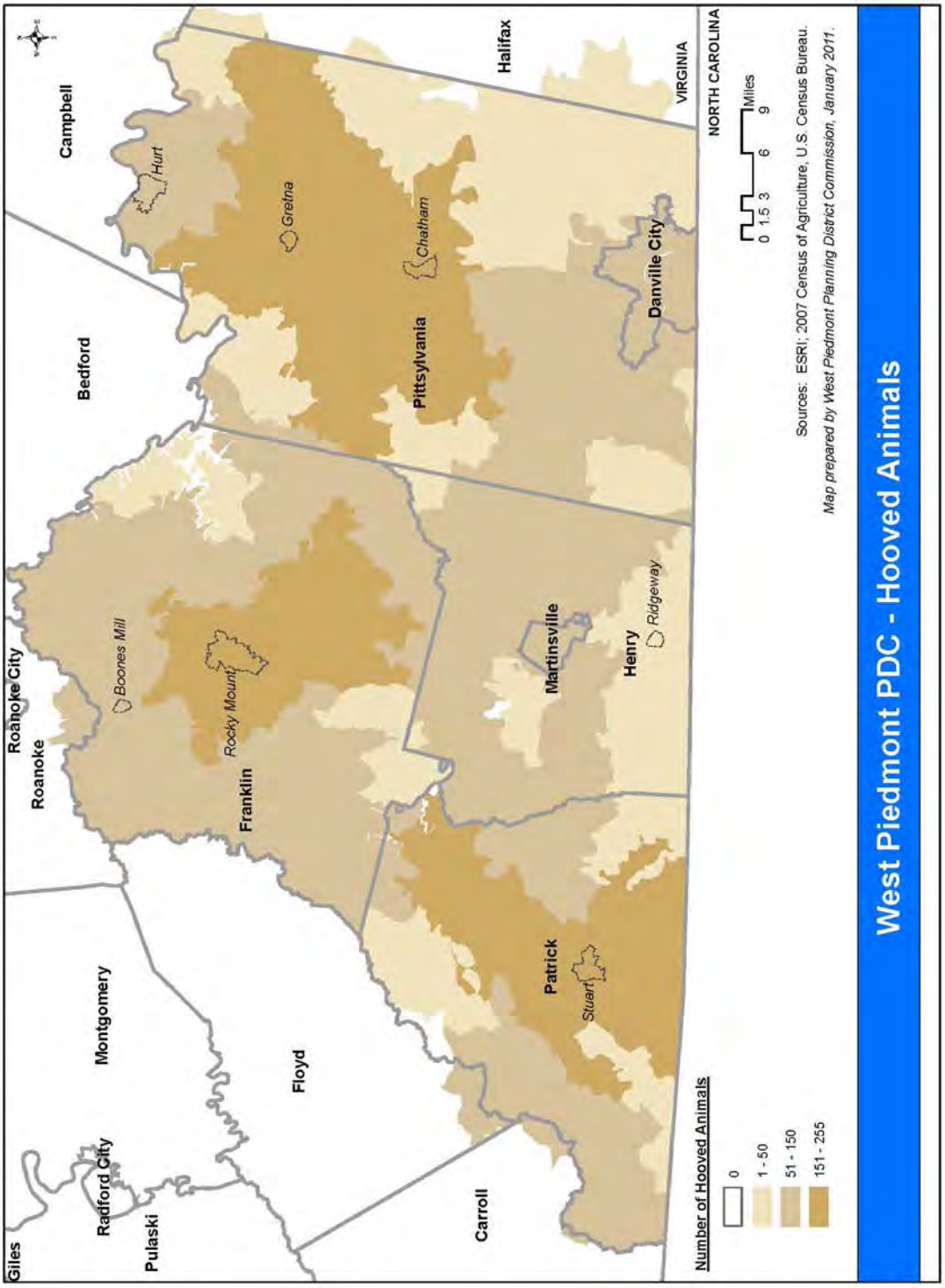

Figure V-30. West Piedmont Region Hoofed Animal Farm Distribution

A strategy to improve available data should be considered for inclusion in the Mitigation Strategy section of this plan.

Future Land Use and Impacts to Hazard Vulnerability

Current and future land use and development trends are described in detail in the Community Profile section and shown in Appendix B4. Predicting how future development might change vulnerability to hazards is a challenging undertaking. In terms of hazards and potential changes to risk and vulnerability of future development, some items worth highlighting and considering include:

- The City of Danville estimates that 9,000 to 15,000 homes could be built and 2 million square feet of retail could be developed in the City in the future. Development plans indicate that development will not occur in tracts of sensitive slope, floodplains, or wetlands. With this being the case, barring changes in the distribution, frequency, or intensity of precipitation into the future, the number of structures vulnerable to flooding or landslides should not increase. An increasing amount of impervious surfaces might have some impact on stormwater runoff.
- Henry County regulates areas within the 100-year floodplain and maintains permanent open space. Future plans call for floodplains to be used for agriculture and recreation. It would appear that if regulations consistent with the NFIP continue, the number of structures vulnerable to flood loss should not increase.
- Double-wide manufactured homes are relatively popular in Henry County but there has been a decrease in interest in single-wide units. Care should be taken to ensure new units have proper foundations, anchoring, and siting and consideration given for tornado shelter.
- Growth expectations for Patrick County are expected to have little impact on the amount of agricultural or forested lands. With this being the case, an increase or decrease in the size of areas vulnerable to drought and wildfires are not likely to change significantly.

Future plan updates might consider these items and others in terms of how future land use and development might impact the region's hazard vulnerability and risk.

Hazard Identification and Risk Assessment Summary

A variety of hazards, both natural and human-caused, have the potential to impact the West Piedmont region. Data analysis presented in the preceding sections and input from the Mitigation Advisory Committee indicate that winter storms and

flooding have the most significant and frequent impacts on the planning area and its citizens.

In addition to the potential for injury or loss of life and damage to property and crops, these hazards have the potential to cause the disruption of utilities and transportation systems, which can contribute to lost business and decreased productivity. Table V-38 provides a summary of potential annualized losses by hazard. The losses in the table are based on available historical data which is often spotty and not comprehensive, and in many cases, only at a county level. Even so, it provides a crude estimate of the potential annual impact resulting from a specific hazard.

It is important to point out that data limitations prevent a full accounting of past or potential future losses. This is particularly true in the case of winter storms, where economic costs involved with lost business as well as snow and ice removal costs are not readily available. The very limited data available suggests that these costs are significant and that the amounts showing in the table are a considerable underrepresentation.

In addition to natural hazards, the West Piedmont Planning District profiled the following human-caused hazards: Dam failure, failure of high voltage transmission lines, organic and inorganic spills, pipeline failures, and agriterrorism. Each of these hazards is described, and past occurrences, if applicable, are identified. In most cases, a methodology has not been identified for conducting vulnerability analyses for human-caused hazards; therefore, although information is provided related to the presence of risk in the Planning District, full vulnerability analyses were not conducted.

Dam failure is ranked as a significant hazard; however, due to homeland security concerns, a vulnerability analysis was not conducted. The other human-caused hazards were ranked as moderate or limited.

Table V-38. Potential Annualized Loss by Hazard							
Jurisdiction	Flood (Floodmap / demographic analysis)	Winter Storm* (NCDC)	Hurricane / Extreme Wind (HAZUS)	Tornado (NCDC)	Wildfire* (VDOF)	Drought* (NCDC)	Earthquake (VDEM HAZUS)
City of Danville	$439,718		$145,916	$16,671			$192,663
Franklin County	$259,728	$763	$61,202	$32,464	$28,266		$190,496
Town of Boones Mill	$8,251		$61				
Town of Rocky Mount	$37,287		$2,869				
Henry County	$485,522	$10,480	$92,246	$1,084,086	$15,147		$229,806
Town of Ridgeway	$930		$574				
City of Martinsville	$61,314		$41,634	$1,238,321			$102,104
Patrick County	$80,836	$1,012	$26,238	$4,186	$305,330		$81,183
Town of Stuart	$42,337		$172				
Pittsylvania County	$276,088	$9,984	$96,693	$43,374	$51,609		$143,503
Town of Chatham	$3,751		$256				
Town of Gretna	$42		$204				
Town of Hurt	$4,285		$542				
Total	**$1,603,205**	**$22,239** [Δ]	**$463,930**	**$2,419,102**[#]	**$400,352**	**$218,847**[Ω]	**$939,755**

NOTES:
**Data for some hazards only available at the city and/or county level*
[Δ] *Winter storm annualized damages only include figures for reported property damages. Costs related to snow/ice removal and lost production, both of which can total into several thousand dollars for a single event and millions of dollars over a winter season are not included due to data availability.*
[#] *Costly tornado events in 1994 and 2004 significantly skewed annualized loss calculations.*
[Ω] *NCDC reports losses for individual drought events by grouping several counties and providing only one loss figure for the grouping. Loss was normalized for the entire region rather than arbitrarily across individual jurisdictions.*

Section VI. Capability Assessment

Introduction

This portion of the Plan assesses the current capacity of the communities of the West Piedmont Planning District to mitigate the effects of the natural hazards identified in Section V of the plan. This assessment includes a comprehensive examination of the following local government capabilities:

- *Staff and Organizational Capability*
- *Technical Capability*
- *Fiscal Capability*
- *Policy and Program Capability*
- *Legal Authority*
- *Political Capability*

The purpose of conducting the capabilities assessment is to identify potential hazard mitigation opportunities available to the West Piedmont Planning District's local governments, specifically the Counties of Franklin, Henry, Patrick, and Pittsylvania and the Cities of Danville and Martinsville. Careful analysis should detect any existing gaps, shortfalls, or weaknesses within existing governmental activities that could exacerbate a community's vulnerability. The assessment also will highlight the positive measures already in place or being done at the local level, which should continue to be supported and enhanced, if possible, through future mitigation efforts.

The capabilities assessment serves as the foundation for designing an effective hazard mitigation strategy. It not only helps establish the goals and objectives for the Planning District to pursue under this Plan, but assures that those goals and objectives are realistically achievable under given local conditions.

Staff and Organizational Capability

As described previously, the planning area is comprised of four counties and two cities. The counties operate under a Board of Supervisors - County Administrator/Manager system. In this form of government, the elected board of supervisors hires a county administrator who oversees daily operations of the county. Patrick has the smallest board with five members on its Board of Supervisors. Franklin and Pittsylvania Counties have seven-member boards. Henry County has six board members and a tiebreaker.

The City of Danville and the City of Martinsville operate under the City Council – City Manager system. The City Councils are elected and have nine and five members, respectively.

In the City of Danville, the City Council appoints a City Manager who acts as the chief administrative officer and oversees daily business operations of the City. All power and authority to set policy rests with an elected governing body, which includes a mayor or chairperson and the members of the council, commission, or board. The governing body in turn hires a non-partisan manager who has very broad authority to run the organization.

Martinsville's chief executive officer is its city manager. The city manager oversees daily operations of the city, with direct supervision over department heads who manage city activities in their areas of expertise. The city manager also serves as the finance director, working with the finance department, to develop and adhere to an annual budget. The city manager also works closely with a variety of agencies, including schools and economic development, to ensure quality of life for the residents of Martinsville.

Under the County Administrator or City Manager, each jurisdiction has numerous departments and boards that are responsible for the various functions of local government. The following table highlights the departments in each jurisdiction that could facilitate the implementation of this hazard mitigation plan.

Table VI-1. Key Departments

Jurisdiction	Departments
City of Danville	• Community Development • ***Emergency Services*** • Fire • Public Works • Utilities
Franklin County	• Building Permits and Inspections • Planning • ***Public Safety***
Henry County	• Code Enforcement and Planning • Engineering and Mapping • ***Public Safety*** • Public Service Authority • Zoning
City of Martinsville	• ***Community Development (includes Planning,***

	Zoning, and Inspections) • ***Fire and EMS*** • Police • Utilities • ***Public Works***
Patrick County	• Building Inspection • ***Emergency Management***
Pittsylvania County	• Building Inspections • Fire and Rescue • ***Planning*** • Zoning

In Table VI-1, the departments that have been assigned specifically delegated responsibilities to carry out mitigation activities or hazard control tasks for a specific jurisdiction are bolded and italicized. Representatives of these departments have been involved in the development of this mitigation plan in order to identify gaps, weaknesses or opportunities for enhancement with existing mitigation programs.

While exact responsibilities differ from jurisdiction to jurisdiction, the general duties of the departments highlighted in Table VI-1 are described below.

The Building Inspections office or department enforces the Virginia Uniform Statewide Building Code (VUSBC). This code includes implications for floodplain management.

The Department of Emergency Management is responsible for the mitigation, preparedness, response and recovery operations that deal with both natural and man-made disaster events. Fire/EMS departments provide medical aid and fire suppression at the scene of accidents and emergencies. These departments are often responsible for responding to hazardous materials incidents. The Department of Public Safety encompasses emergency management and fire safety.

The Planning Department addresses land use planning. This department, depending on the jurisdiction, may enforce the National Flood Insurance Program requirements and other applicable local codes. Zoning also may be managed by the Planning Department or it may be a separate office.

In some jurisdictions, the Public Utilities department oversees community water facilities or natural gas provision. In others, the Public Works Department oversees the maintenance of infrastructure including roadways, sewer and stormwater facilities and the community's water treatment facilities. This department also may

review new development plans, ensure compliance with environmental regulations, and work with VDOT on road issues. Depending on the jurisdiction, the Department of Public Works may enforce the National Flood Insurance Program requirements. Public Service Authorities such as those in Henry and Pittsylvania Counties maintain the utility infrastructure of their respective jurisdictions.

For the most part, it was determined that the departments are adequately staffed, trained, and funded to accomplish their missions.

Technical Capability

Mitigation cuts across many disciplines. For a successful mitigation program, it is necessary to have a broad range of people involved with diverse backgrounds. These people include planners, engineers, building inspectors, emergency managers, floodplain managers, people familiar with Geographic Information Systems (GIS), and grant writers.

GIS systems can best be described as a set of tools (hardware, software and people) used to collect, manage, analyze and display spatially-referenced data. Many local governments are now incorporating GIS systems into their existing planning and management operations. GIS is invaluable in identifying areas vulnerable to hazards. Access to the Internet can facilitate plan development, public outreach, and project implementation.

Table VI-2 summarizes the technical capabilities of the jurisdictions. When provided, the specific department that has the technical capability is identified.

Table VI-2. Technical Capability Matrix

Jurisdiction	*Land Use Planners*	*Civil or Building Engineers*	*Emergency manager*	*Floodplain manager*	*Staff knowledgeable about hazards*	*GIS staff*	*Grant writers*	*Internet access?*
City of Danville	Community Development, Planning	Public Works, Engineering	Emergency Operations	Community Development	Emergency Operations	Information Technology	Community Development, City Administration	✓
Franklin County	Planning	County Engineer	Public Safety	Planning & Zoning	Public Safety, Planning	Information Technology	County Administration, Public Safety	✓
Henry County	Planning	Planning/Inspection	Public Safety	Planning/Inspection	Public Safety	Mapping Dept.	Planning	✓
City of Martinsville	Community Development	Public Works/ Inspections	Fire & EMS	Public Works	Public Works/ Community Development/Fire & EMS	Public Works	Public Works/ Community Development	✓
Patrick County	Planning	Building Inspections	Emergency Management	Building Inspection	Emergency Management	Taxes, Mapping Dept.	County Administration	✓
Pittsylvania County	Planning	Building Inspections/ Code Compliance	Emergency Management	Code Compliance	Planning, Code Compliance, Emergency Management	Information Technology	Grants Administration	✓

As can be seen in the table, most jurisdictions have one or more departments that have technical capability in each category. The staff at all of the jurisdictions have Internet access. All of the jurisdictions have government websites that could be utilized to promote hazard mitigation. Each local government also provides access to on-line GIS mapping.

Henry County uses monitors from the Integrated Flood Observation and Warning System (IFLOWS) and several stream gauges to track potential flood conditions. Warnings can be issued using the Citizens' Emergency Notification System or the Emergency Alert System. Alternatively, officials may chose to drive through potentially impacted neighborhoods and use loudspeakers or go door-to-door to warn people.

Fiscal Capability

For Fiscal Year 2010, the budgets of the participating jurisdictions range from $42 million (Patrick County) to $171 million (Pittsylvania County). Table VI-3 shows the total budget amounts for each jurisdiction in addition to the amount budgeted for public safety.

The counties and cities receive most of their revenue through state and local sales tax, local services, and through restricted intergovernmental contributions (federal and state pass through dollars). It is unlikely that any of the counties or cities could easily afford to provide the local match for the existing hazard mitigation grant programs. Considering the current budget deficits at both the state and local government level, in Virginia, combined with the apparent increased reliance on local accountability by the federal government, this is a significant and growing concern.

Under the Disaster Mitigation Act of 2000, FEMA has made special accommodations for "small and impoverished communities," who will be eligible for a 90% federal share, 10% non-Federal cost share for projects funded through the Pre-Disaster Mitigation (PDM) grant program. The definition is restricted to "communities of 3,000 or fewer individuals that is identified by the State as a rural community." According to the current Interim Final Rule for Section 322 of the Act, none of the jurisdictions in the planning area will qualify as a small and impoverished community.

Table VI-3. Fiscal Capability Matrix				
Jurisdiction	*Overall FY 10-11Budget*	*Public Works*	*Public Safety FY 10-11 Budget*	*Planning*
City of Danville	$255M	$13.4M	$25.6M	$1.5M
Franklin County	$119M	$0	$1.9M	$.5M
Henry County	$109M	N/A	$10.8M	N/A
*City of Martinsville**	N/A	N/A	N/A	N/A
Patrick County	$42M	N/A	$786K	N/A
Pittsylvania County	$171.8M	$2.8M	$12.9M	$140.9M
*Data Not Available				

As can be seen in Table VI-4, the jurisdictions in the planning area are accustomed to using a variety of financial tools. The ability to use these tools for hazard mitigation, however, differs from jurisdiction to jurisdiction.

As the table shows, virtually every jurisdiction uses a capital improvements program to plan for major expenditures and capital investments. Also, all of the jurisdictions have or are using Community Development Block Grant funds. The use of fees for public utilities varies from jurisdiction to jurisdiction, though none currently have a stormwater management fee. Only the City of Martinsville has used a special purpose tax or tax district.

Table VI-4. Financing Mechanisms by Jurisdiction

Jurisdiction	*Develop-ment impact fees*	*Capitol improve-ment program-ming*	*CDBG*	*General obligation, revenue and/or special tax bonds*	*Special purpose taxes or taxing district*	*Gas/electric fees*	*Water/ sewer fees*	*Stormwater utility fees*	*Intergovern-mental agreements*
City of Danville		✓	✓	✓		✓	✓		✓
Franklin County		✓	✓				✓		
Henry County		✓	✓	✓		✓			✓
City of Martins-ville		✓	✓	✓	✓	✓	✓		
Patrick County		✓	✓						
Pittsyl-vania County		✓	✓	✓			✓		

Policy and Program Capability

Current Mitigation Efforts

The City of Martinsville and Henry County, in partnership with Twenty First Century Communications, Inc., have instituted a new system that will send telephone notifications to residents and businesses within the Martinsville-Henry County area, when impacted by, or in danger of being impacted by, an emergency or disaster. This system, called the Martinsville-Henry County Citizen's Alerting System, will be used by emergency response personnel to notify homes and businesses at risk, with information on the event and/or actions to take. The system utilizes the area's 9-1-1 database and is able to contact land-line telephones whether listed or unlisted. It is also TTY/TDD capable. Additionally, citizens can register additional numbers such as cell phone numbers.

Emergency Communications System – Henry County has completed construction and deployment of a new emergency communications system. The new system corrects significant issues with previous antiquated system. The system has multi-level redundancy to ensure continuity of operation during disaster. The system is designed so there is no single point of failure. It also has significant contingencies for loss of power including battery and generator backup with sufficient fuel storage.

Backup Generators at Critical Sewer Facilities – The Henry County PSA received a stimulus grant in 2009 to install 7 standby power generators at the remaining 7 sanitary sewer lift stations that did not have stand-by power. Now all sewer lift stations have stand-by power. Having stand-by power at all of our sanitary sewer lift stations will greatly reduce the risk of sanitary sewer overflows that can potentially be harmful to human health and the environment.

Backup Generator at Critical Water Facilities - The water plant was not built with any secondary or stand-by power and as water production has been increasing, the need for stand-by power has also increased to maintain quality potable water to the PSA customers even during times of power outages. During the past couple of winters, there have been several power failures at the water plant that have almost caused a county wide boil water notice. The Henry County PSA approved funding for FY 2011 to install one 600 kW stand-by power generator at the Upper Smith River (Philpott) Water Filtration Plant (590 Philpott Drive), one 500 kW stand-by power generator att he Upper Smith River (Philpott) Raw Water Pump Station (919 Philpott Drive) and a 50 kW stand-by power generator at the 57 West Booster Pump Station (1220 Trent Hill Drive). This project is expected to be complete near June 2011.

Backup 9-1-1 Center – In 2010, Henry County built an alternate 9-1-1 Call Center at the Public Safety Complex on DuPont Road. This center is fully-functional and capable of taking 911 calls and dispatching appropriate emergency responders. This site is completely self-sufficient and geo-diverse of the primary center. The back-up facility is served by separate infrastructure such as public utilities, its own back-up LP generator, CenturyLink fiber, local fiber, CAD and mapping. It also includes radio communications, capable of reaching Henry County, the City of Martinsville, as well as Pittsylvania County, Franklin County, Patrick County, the City of Danville, and Rockingham County, North Carolina. In the event of catastrophic damage to the primary site, this site can easily be staff to handle emergency calls. Additionally, should a large disaster occur, this site can be used to handle additional volume of 911 calls.

Added Dams and Flood Data to GIS – Working with the Soil and Water Conservation District, high hazard dams and their association flood inundation maps were added to the County's Geographical Informational System. Additionally, the inundation layers were used to create notification groups in the citizens' emergency notification system. Marrowbone Dam Construction - Working with the Soil and Water Conservation District, Henry County has completed construction of $2.7 million Marrowbone Dam. The Dam will prevent downstream flooding and replaces an earthen dam that had been previously classified as one of the most hazardous dams in the Commonwealth.

The County of Franklin, in partnership with GeoComm, have implemented a system that will send telephone notifications to residents and businesses within the Franklin County area, when impacted by, or in danger of being impacted by, an emergency or disaster. This system, called the "Franklin County Citizen's Alerting System", will be used by emergency response personnel to notify homes and businesses at risk, with information on the event and/or actions to take.

Patrick County has started to expand their GIS capabilities and initiated an Emergency Warning system that has the ability to alert Patrick County citizens of flooding, missing persons and weather alerts. The County is also working with Support to Eliminate Poverty, Incorporated (STEP) to provide weatherization services to lower-income residents. This service utilizes infrared and thermal imaging cameras, blower doors, and other equipment to ensure homes are as energy efficient as possible.

The Town of Greta is currently completing a project to withdraw water from Whitethorn Creek. The Town of Chatham has proposed a number of system

improvements what will improve their water distribution system including adding a 12-inch pipeline that has been constructed to interconnect the Henry and Pittsylvania counties water system. This project will also provide increased fire flow for an industrial part in Pittsylvania County.

Emergency Operations Plan

A Comprehensive Emergency Management Plan typically predetermines actions to be taken by government agencies and private organizations in response to an emergency or disaster event. For the most part, the plan describes the jurisdiction's capabilities to respond to emergencies and establishes the responsibilities and procedures for responding effectively to the actual occurrence of a disaster. In addition, some of the plans describe the hazardous materials risk present in the jurisdiction (e.g., Henry, Pittsylvania). A Regional Hazard Materials Team located in the City of Danville covers most of the Planning District area with the exception of Franklin County which falls into the Roanoke region.

Hazard mitigation generally is addressed through an annex to the plan. The annex lays out roles and responsibilities related to hazard mitigation for various agencies and departments. For those counties with Emergency Operations Plans, there are no foreseeable conflicts between that plan and this hazard mitigation plan.

Henry County's Emergency Operations Plan was completely overhauled in 2007 to reflect changes and recommendations in the National Framework and the National Incident Management Systems. An annex has been added to address sheltering of pets during Disasters. The EOP is currently undergoing revisions with adoption expected in 2011.

Floodplain Management

Communities that regulate development in floodplains are able to participate in the National Flood Insurance Program (NFIP). In return, the NFIP makes federally-backed flood insurance policies available for eligible properties in the community. Table VI-5 shows when each of the jurisdictions began participating in NFIP. The table also provides the date of the Flood Insurance Rate Map in effect in each community. These maps were developed by FEMA or its predecessor and show the boundaries of the 100-year and 500-year floods. As the table shows, six of the maps are over twenty years old and two of the maps are almost fifteen years old. Parts of the planning area have experienced dramatic growth over the past decade that is not reflected in the FIRM. This difference may mean that the actual floodplain varies from that depicted on the map.

Table VI-5. NFIP Entry and FIRM Date			
Jurisdiction	*Entry into NFIP*	*Date of Current FIRM*	*Stand alone or part of zoning ordinance?*
City of Danville	03/16/81	09/29/10	Zoning
Franklin County	05/19/81	01/06/10	Stand alone
Henry County	11/05/80	09/26/08	Stand alone
City of Martinsville	04/01/81	09/26/08	Stand alone
Patrick County	05/15/84	08/19/08	Stand alone
Pittsylvania County	11/04/81	09/29/10	Stand alone
Town of Boones Mill	09/01/78	12/16/08	Stand alone
Town of Chatham	02/01/79	09/29/10	Stand alone
Town of Gretna	--	09/29/10	Stand alone
Town of Hurt	04/02/79	09/29/10	Stand alone
Town of Ridgeway	11/06/81	09/26/08	Unknown
Town of Rocky Mount	05/01/80	12/16/08	Zoning
Town of Stuart	09/01/78	08/19/08	Stand alone

Virginia State statutes provide cities and counties the land use authority. In particular, issues such as floodwater control are empowered through §15.2-2223 and §15.2-2280. All of the jurisdictions in the planning area have adopted a local floodplain ordinance as a requirement of participation in the National Flood Insurance Program. Table VI-5 shows if the community has adopted a stand alone ordinance or if it has incorporated floodplain regulations into its zoning ordinance.

The Town of Rocky Mount is the only jurisdiction in the planning area to require that electric water heaters, furnaces and other installations be elevated above the 100-year base flood elevation.

The Town of Gretna did not have a mapped SFHA until September 29, 2010. At that point, the town had a year to officially join the NFIP before it would become a sanctioned community. As of July 2011, the town is cooperating with FEMA in establishing the groundwork to join the NFIP, such adopting the official FEMA ordinance and passing a resolution.

The Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Residents of communities that participate in CRS receive a reduction in the flood insurance premium. There are ten CRS classes:

class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction. None of the jurisdictions in this hazard mitigation plan are members of the CRS.

One of the CRS requirements is a community floodplain management plan. The West Piedmont Multi-Jurisdictional Hazard Mitigation Plan is intended to fulfill the CRS planning requirement should the planning jurisdictions decide to enter the CRS.

Comprehensive Plan

A community's comprehensive plan provides the future vision for the community regarding growth and development. To the extent that hazard mitigation principles are addressed in the West Piedmont's communities' Comprehensive Plans, it generally is in the context of floodplain protection or stormwater management. Henry and Patrick Counties also address the need for emergency communications networks.

City of Danville

The City of Danville's Comprehensive Plan emphasizes the use of "smart growth" performance standards based on land holding capacities. Based on this principle, the plan classifies land into the "Planning Area" which is developable and "Primary Environmentally Sensitive Areas," which are non-developable and comprises contiguous areas of sensitive soils, steep slopes, wetlands and floodplains.

While the plan does not address hazard mitigation specifically, it does note the need to update the zoning ordinance to specifically address floodplains among other sensitive areas. The plan also suggests that a comprehensive stormwater management plan be developed for the City including improved drainage solutions for older neighborhoods that experience flooding. The plan notes that these projects could be supported by CIP.

Franklin County

Floodplain management is prominently featured in Franklin County's Comprehensive Plan. One objective in the plan states, "protect environmentally sensitive areas from development," while the supporting strategies suggest that new construction in flood hazard areas that results in any increase in flood levels of the 100-year storm be prohibited. The Plan also includes strategies related to stormwater management and public outreach regarding environmental regulations.

Another policy in the plan states that the County will use a GIS system that includes floodplain information to improve future land use decision-making.

Henry County

Henry County's Comprehensive Plan recognizes the need to be proactive in land use planning in order to reduce flooding and flood-related problems. Several strategies also address acquisition of land for open space and recreation. Implementation of these strategies could provide an opportunity to acquire flood-prone lands. Henry County's plan also calls for a modern emergency services communication network to be maintained.

City of Martinsville

Stormwater management is the focus of the City of Martinsville's Comprehensive Plan with respect to hazard mitigation. The plan calls for a comprehensive stormwater management plan to be developed. Of particular concern are the neighborhoods of Westside and Southside. Floodplain management is not addressed in the plan.

Patrick County

Like Henry County, Patrick County's Comprehensive Plan addresses the need to maintain a modern emergency services communication network. The plan also includes numerous strategies related to floodplain protection, such as encouraging the use of the floodway fringe areas for recreational uses, open space, and other non-structural uses.

The Plan also suggests that an environmental and good land practices program be developed in association with realtors, developers, builders, and bankers to enhance awareness among the professional community associated with land use and land development.

Pittsylvania County

The Pittsylvania County Comprehensive Plan also addresses floodplain conservation. The plan suggests that floodplains be used as permanent conservation areas and that construction of permanent structures be discouraged. In general, environmental constraints to development should be recognized according to the plan. The Comprehensive Plan also suggests that the County adopt a fire prevention code.

Table VI-6. Availability of Plans and their Support for Hazard Mitigation

Jurisdiction	*CIP*	*Comp. LU Plan*	*Econ. Dev. Plan*	*Emergency Operations Plan*	*Floodplain Management Plan*	*HazMat Plan*	*Historic Pres. Plan*	*Local Hazard Mitigation Plan*	*Open Space Plan*	*Post-Disaster Redev. Plan*	*Rad. Response Plan*	*Storm H_2O Management Plan*
City of Danville	H	H	H	H	H	UR	M	UR	✓			H
Franklin County	H	H	M (UD)	H	H	UR	UD	UD	M	H	H	H
Henry County	M	M		M (UR)	H	UR	M/L (UD)	UD				M
City of Martinsville	✓	M			M	UR		UD	M	M		M (UD)
Patrick County		H	H	M	H	UR	M	UD	M		M	H
Pittsylvania County	M	M (UR)		H	H	UR		UD				

✓ = Plan exists, no assessment of relationship to hazard mitigation
H = Strongly supports = specifically includes hazard mitigation
M = Helps facilitate = elements could be used to support hazard mitigation
L = Hinders = no mention of hazard mitigation and does not contain elements that would support hazard mitigation or includes elements that would hinder hazard mitigation
UD = Under development UR= Under revision

Incorporation of Hazard Mitigation Plan into Other Planning Mechanisms

Electronic copies of the West Piedmont Multi-Jurisdictional Hazard Mitigation Plan adopted in 2006 were made available to all of the participating jurisdictions at the end of the adoption process. The Mitigation Advisory Committee members were encouraged to share the plan within their jurisdictions. In general, the hazard mitigation plan has been used to inform the update of local emergency operations plans and local comprehensive plans, where appropriate and to the extent that these plans have been updated in the past five years. Table VI-7 illustrates which plans have been updated since the 2006 plan.

Table VI-7. Last Update Date

Jurisdiction	*Comp. LU Plan*	*Emergency Operations Plan*
City of Danville	2001	2010
Franklin County	2007	*
Henry County	Prior to 2006	2007
City of Martinsville	2009	*
Patrick County	*	2010
Pittsylvania County	2010	2011

* Not believed to be updated since the 2006 plan.

Other plans that have incorporated the West Piedmont Multi-Jurisdictional Hazard Mitigation Plan include:

- Franklin County Public Safety Strategic Plan (2005)

Legal Authority

Local governments in Virginia have a wide range of tools available to them for implementing mitigation programs, policies and actions. A hazard mitigation program can utilize any or all of the four broad types of government powers granted by the State of Virginia, which are (a) regulation, (b) acquisition, (c) taxation, and (d) spending. The scope of this local authority is subject to constraints; however, as all of Virginia's political subdivisions must not act without proper delegation from the state. All power is vested in the state and can only be exercised by local governments to the extent it is delegated. Thus, this portion of the capabilities assessment will summarize Virginia's enabling legislation which grants the four types of government powers listed above within the context of available hazard mitigation tools and techniques.

Regulation

General Police Power

Virginia's local governments have been granted broad regulatory powers in their jurisdictions. Virginia State Statutes bestow the general police power on local governments, allowing them to enact and enforce ordinances which define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances). Since hazard mitigation can be included under the police power (as protection of public health, safety and welfare), towns, cities, and counties may include requirements for hazard mitigation in local ordinances. Local governments also may use their ordinance-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard.

All of the jurisdictions in the planning area have enacted and enforce regulatory ordinances designed to promote the public health, safety, and general welfare of its citizenry.

Land Use

Regulatory powers granted by the state to local governments are the most basic manner in which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development. All these characteristics of growth can determine the level of vulnerability of the community in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, enact and enforce zoning ordinances, floodplain ordinances, and subdivision controls. Each local community possesses the power to prevent or limit unsuitable development in hazard-prone areas.

According to state statutes, local governments in Virginia may create or designate a planning agency. The planning agency may perform a number of duties, including:

- Make studies of the area;
- Determine objectives;
- Prepare and adopt plans for achieving those objectives;
- Develop and recommend policies, ordinances, and administrative means to implement plans; and
- Perform other related duties.

The importance of the planning powers of local governments is illustrated by the requirement that zoning regulations be made in accordance with a comprehensive plan. While the ordinance itself may provide evidence that zoning is being conducted "in accordance with a plan," the existence of a separate planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the community. All of the jurisdictions within the planning area except Patrick County have planning departments and comprehensive plans. Patrick County does not have a planning department.

Zoning

Zoning is the traditional and most common tool available to local governments to control the use of land. Broad enabling authority is granted for municipalities and counties in Virginia to engage in zoning. Land "uses" controlled by zoning include the type of use (e.g., residential, commercial, and industrial) as well as minimum specifications that control height and bulk such as lot size, building height and set backs, and density of population. Local governments are authorized to divide their territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, and special use or conditional use districts. Zoning ordinances consist of maps and written text.

The Cities of Danville and Martinsville along with Pittsylvania County implement their floodplain regulations via the zoning ordinance. An overlay district is used to impose additional requirements on properties within the designated floodplain area. In addition, Franklin, Henry, and Pittsylvania Counties use a Conservation District to further protect sensitive lands. Patrick County limits zoning to the Goose Point area near Philpott Lake. The regulations are designed to protect the environment and prevent overcrowding.

Subdivision Regulations

Subdivision regulations control the division of land into parcels for the purpose of building development or sale. Flood-related subdivision controls typically require that sub-dividers install adequate drainage facilities and design water and sewer systems to minimize flood damage and contamination. They also may prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures, and they prohibit filling of floodway areas.

All of the cities and counties in the planning area have adopted a subdivision ordinance. Most of the ordinances contain flood-specific provisions. For instance, Franklin, Henry, and Pittsylvania Counties and the City of Martinsville require that flood-prone land be deemed unsuitable for development and is not allowed to be platted as part of a subdivision. The City of Danville requires that subdivisions with only one means of ingress ensure that floodwaters will not block that ingress. The City of Martinsville and Henry and Pittsylvania Counties require that fire hydrants be installed to provide adequate fire protection. Finally, Patrick County may require that drainage easements be given to address storm and floodwater runoff issues.

Floodplain Regulation

All of the communities in the planning area have adopted floodplain regulations. Generally, the regulations adopted by the planning communities meet but do not exceed the minimum standards of the National Flood Insurance Program. The City of Danville, however, requires freeboard for residential and commercial structures. In addition, the Town of Rocky Mount requires that water heaters and other major appliances be elevated. Franklin and Pittsylvania Counties and the City of Danville require, in their floodplain ordinance, that manufactured homes be elevated and anchored if in the floodplain district.

Building Codes and Building Inspection

Many structural mitigation measures involve constructing and retrofitting homes, businesses and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through building codes. All of the jurisdictions have adopted the Uniform Virginia Building Code.

Local governments in Virginia also are empowered to carry out building inspections. It empowers cities and counties to create an inspection department, and enumerates their duties and responsibilities, which include enforcing state and local laws relating to the construction of buildings, installation of plumbing, electrical, and heating systems; building maintenance; and other matters. All of the jurisdictions have established a Building Inspections Office to carry out its building inspections.

Fire Codes

Virginia has a statewide fire code that is enforced by state fire marshals. The code establishes statewide standards to safeguard life and property from the hazards of fire or explosion arising from the improper maintenance of life safety and fire prevention

and protection materials, devices, systems and structures. Localities may choose to adopt stricter standards and/or employ their own fire marshals. There are reciprocal agreements for fire, rescue, and law enforcement.

Other Ordinances

The City of Danville has enacted a hazardous tree ordinance. The ordinance states:

> "Any tree which, by virtue of its condition and location, endangers the life, health, or safety of any person or structure on adjacent or adjoining real property is hereby declared to be a public nuisance and prohibited."

The Director of Public Works is responsible for notifying private property owners if a tree on their property has been identified as a hazardous tree. The director is empowered to remove the tree if it poses an immediate threat.

Table VI-7 summarizes the various ordinances that are in effect in the jurisdictions in the planning area.

Table VI-7. Availability of Ordinances and their Support for Hazard Mitigation

Jurisdiction	*Building Code*	*Fire Code*	*Floodplain Management Ordinance*	*Post-Disaster Reconstruction /Redevelopment Ordinance*	*Subdivision Ordinance*	*Unified Development Ordinance*	*Zoning Ordinance*
City of Danville	H	H	H		H		H
Franklin County	H	M	H	M(UD)	H	UD	H
Henry County	M	M	H		M		M
City of Martinsville	M	M	M		M	M	M
Patrick County	M	✓	H		H		H
Pittsylvania County	H	H	H		M		M

✓ = Ordinance exists, no assessment of relationship to hazard mitigation
H = specifically includes hazard mitigation
M = elements could be used to support hazard mitigation
L = no mention of hazard mitigation and does not contain elements that would support hazard mitigation or includes elements that would hinder hazard mitigation
UD = Under development

Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely "hazard proofing" a particular piece of property or area is to acquire the property (either in fee simple or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Virginia legislation empowers cities, towns, and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain.

Acquisition has been implemented by Henry County to acquire a few private properties within flood-prone areas of the County. The majority of the communities in the planning area have not used acquisition though it has been used successfully in other parts of Virginia.

Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by Virginia law. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the community. Communities have the ability through special legislation to set preferential tax rates for areas that are more suitable for development in order to discourage development in otherwise hazardous areas. Local units of government also have the ability to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood protection works within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development.

Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within municipal or county boundaries. In addition, they are useful in distributing the costs of the infrastructure required by new development to the new property owners.

Localities in Virginia collect a 1% sales tax. In addition, all of the counties and cities in the planning area levy property taxes. As noted in Table VI-4, the City of Martinsville also uses special purpose taxes.

Spending

The fourth major power that has been delegated from the Virginia General Assembly to local governments is the power to make expenditures in the public interest. Hazard mitigation principles should be made a routine part of all spending decisions made by the local government, including the adoption of annual budgets and the Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a community can control growth to some extent, especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive.

In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to services. A CIP that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools also can influence the cost of growth. If the CIP is effective in directing growth away from environmentally sensitive or high hazard areas, for example, it can reduce environmental costs.

All of the jurisdictions in the planning area have some form of a capital improvements program.

Political Capability

The West Piedmont region's history of natural disasters such as the tornadoes of September 2004 makes it likely that the current and future political climates will be favorable towards supporting and advancing future hazard mitigation strategies. Political willpower to implement hazard mitigation programs should be strong.

In general, several obstacles can make hazard mitigation difficult to implement at the local level. Desirable areas for development, such as lake or riverfront properties, are often also hazardous places to build. Local government must balance the economic benefits and demand for building in such places with the public and private costs that future disasters could inflict. In addition, in areas that are already developed, implementing mitigation actions can be costly. Part of this hazard mitigation plan's mission will be to weigh the costs and benefits of such retrofitting projects to ensure that only those that are cost-effective will be chosen.

Hazard mitigation also may not be judged as high a community priority as other projects such as a school building or utility improvement. This makes it particularly

important to demonstrate how hazard mitigation should be integrated into all community decision-making as opposed to a stand-alone issue.

Summary

Much of the information in this capability assessment was provided by the jurisdictions in the planning area via a capability assessment survey. The last portion of the survey asked the jurisdictions to provide a self-assessment of their capabilities. This section of the plan has provided a more detailed analysis of their capabilities. Table VI-8 summarizes the self-reported capability assessment. As the table shows, all of the jurisdictions rate themselves as having medium to low capability in the various categories.

Table VI-8. Capability Self-Assessment

Jurisdiction	*Planning and Regulatory Capability*	*Administrative and Technical Capability*	*Fiscal Capability*	*Political Capability*	*Overall Capability*
City of Danville	M	M	M	M	**M**
Franklin County	M	L	L	M	**M**
Henry County	M	M	L	M	**m**
City of Martinsville	L	L	L	M	**L**
Patrick County	L	M	L	M	**L**
Pittsylvania County	M	M	M	M	**M**

Section VII. Mitigation Strategy

This section of the Hazard Mitigation Plan describes the most challenging part of any such planning effort – the development of a Mitigation Strategy. It is a process of:

1. Setting mitigation goals,
2. Considering mitigation alternatives,
3. Identifying objectives and strategies, and
4. Developing a mitigation action plan.

Setting Mitigation Goals

The hazard mitigation planning process conducted by the Mitigation Advisory Committee (MAC) is a typical problem-solving methodology:

- Describe the problem (Hazard Identification),
- Estimate the impacts the problem could cause (Risk Assessment),
- Assess what safeguards exist that might already or could potentially lessen those impacts (Capability Assessment), and
- Using this information, determine what, if anything, can be done, and select those actions that are appropriate for the community in question (Mitigation Strategy).

When a community decides that certain risks are unacceptable and that certain mitigation actions may be achievable, the development of *goals* and *objectives* takes place. Goals and objectives help to describe what actions should occur, using increasingly narrow descriptors. Initially, long-term and general statements known as broad-based goals, are developed. Goals then are accomplished by meeting objectives, which are specific and achievable in a finite time period. In most cases there is a third level, called *strategies,* which are detailed and specific methods to meet the objectives.

The MAC validated the goals from the 2006 plan at a meeting on March 18, 2011. The seven original goals were found to be still relevant and two new goals were created. These goals are broad and applicable to the region.

Strategies, or actions, were developed as a logical extension of the plan's objectives. Most of these actions are dynamic and can change. These actions have been organized into a Mitigation Action Plan for the Planning District and its member jurisdictions.

The following goals and their associated objectives form the basis for the development of mitigation strategies and individual Action Plans for each jurisdiction and the region. Goals marked with an asterisk (*) were added as part of the 2011 update.

1. To protect persons and property, and reduce future damage and losses to the community
2. Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to natural hazards
3. Protect new and existing public and private infrastructure and facilities from the effects of hazards
4. Ensure continued functionality of critical services
5. Enhance the capabilities and capacity of local government to lessen the impacts of future disasters
6. Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards
7. Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population
8. Increase use of existing and new technology to enhance disaster mitigation, preparedness, response and recovery.*
9. Promote regional approaches to emergency management.*

Considering Mitigation Alternatives

During the March 18, 2011, meeting, the MAC reviewed and commented on the draft HIRA. Discussions held during the meeting resulted in the validation of the 2006 goals and the identification of new goals. A range of actions alternatives were then identified and provided to the MAC for consideration. These alternatives are presented in Appendix D.

Prioritizing Alternatives

The MAC used the STAPLE/E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) Criteria to select and prioritize the most appropriate mitigation alternatives for the Planning District communities. This methodology requires that social, technical, administrative, political, legal, economic, and environmental considerations be taken into account when reviewing potential actions for the area's jurisdictions to undertake. This process was used to help ensure that the most equitable and feasible actions would be undertaken based on a jurisdiction's capabilities. This methodology was retained for the 2011 update.

Table VII-1, below, provides information regarding the review and selection criteria for alternatives.

Table VII-1. STAPLE/E Review and Selection Criteria for Alternatives
Social
• Is the proposed action socially acceptable to the community(s)?
• Are there equity issues involved that would mean that one segment of a community is treated unfairly?
• Will the action cause social disruption?
Technical
• Will the proposed action work?
• Will it create more problems than it solves?
• Does it solve a problem or only a symptom?
• Is it the most useful action in light of other community(s) goals?
Administrative
• Can the community(s) implement the action?
• Is there someone to coordinate and lead the effort?
• Is there sufficient funding, staff, and technical support available?
• Are there On-going administrative requirements that need to be met?
Political
• Is the action politically acceptable?
• Is there public support both to implement and to maintain the project?
Legal
• Is the community(s) authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
• Are there legal side effects? Could the activity be construed as a taking?
• Is the proposed action allowed by a comprehensive plan, or must a comprehensive plan be amended to allow the proposed action?
• Will the community(s) be liable for action or lack of action?
• Will the activity be challenged?
Economic
• What are the costs and benefits of this action?
• Do the benefits exceed the costs?
• Are initial, maintenance, and administrative costs taken into account?
• Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)?
• How will this action affect the fiscal capability of the community(s)?
• What burden will this action place on the tax base or local economy?
• What are the budget and revenue effects of this activity?
• Does the action contribute to other community goals, such as capital improvements or economic development?
• What benefits will the action provide?
Environmental
• How will the action affect the environment?
• Will the action need environmental regulatory approvals?

Table VII-1. STAPLE/E Review and Selection Criteria for Alternatives
• Will it meet local and state regulatory requirements? • Are endangered or threatened species likely to be affected?

Ranking was completed in order of relative priority based on the STAPLE/E criteria.

Identifying Objectives and Strategies

Community officials should consider the goals that follow before making community policies, public investment programs, economic development programs, or community development decisions for their communities. Objectives have been developed for each goal. The objectives state a more specific outcome that the jurisdictions of the West Piedmont region expect to accomplish over the next five years. The objectives provide an overall sense of what exactly is desired. The strategies outline the specific steps necessary to achieve that end.

Goals, objectives, and strategies marked with an asterisk (*) were added as part of the 2011 update.

- Goal 1: To protect persons and property, and reduce future damage and losses to the community
  - Objective 1.1. Improve local warning capabilities.
    - 1.1.1. Increase flood warning capabilities, particularly as they relate to dam failure.
    - 1.1.2. Investigate, develop, or enhance Reverse 911 system or other public notification system. Investigate possible funding sources.
    - 1.1.3. Establish flood level markers along bridges and other structures to indicate the rise of water levels along creeks and rivers in potential flood-prone areas. Work with VDOT and other jurisdictions as needed.
    - 1.1.4. Mitigation projects that will result in protection of public or private property from natural hazards. Eligible projects include, but are not limited to:
      - Acquisition of hazard prone properties
      - Elevation of flood prone structures
      - Minor structural flood control projects
      - Relocation of structures from hazard prone areas
      - Retrofitting of existing buildings and facilities
      - Retrofitting of existing buildings and facilities for shelters
      - Infrastructure protection measures
      - Storm water management improvements

- Advanced warning systems and hazard gauging systems (weather radios, reverse-911,stream gauges, I-flows)
- Targeted hazard education
- Wastewater and storm water management improvements

- 1.1.5. Extend and improve siren warning systems.*
- 1.1.6. Install town emergency warning system.*

o Objective 1.2. Use planning and regulations to reduce risk.

- 1.2.1. Investigate need for regional stormwater management plan.
- 1.2.2. Include an assessment and associated mapping of the jurisdiction's vulnerability to location-specific hazards and make appropriate recommendations for the use of these hazard areas in a future Comprehensive Plan.
- 1.2.3. Incorporate (or continue to incorporate) mitigation principles into local emergency management and recovery plans.
- 1.2.4. Work with the Virginia Department of Forestry to review local zoning and subdivision ordinances to identify areas to include wildfire mitigation principles.
- 1.2.5. Review and revise, if needed, local floodplain ordinances. Work with the state to coordinate a Community Assistance Visit to identify potential improvements or enhancements to existing floodplain management program.
- 1.2.6. Develop a new Zoning Ordinance or investigate revising the existing Zoning Ordinance to include separate zones or districts with appropriate development criteria for known hazard areas.
- 1.2.7. Review and revise, if needed, existing Subdivision Ordinances to include hazard mitigation-related development criteria in order to regulate the location and construction of buildings and other infrastructure in known hazard areas.
- 1.2.8. Investigate using non-conforming or substantial damage provisions to require hazard retrofitting of existing development.
- 1.2.9. Evaluate the potential costs versus benefits of implementing a freeboard requirement for all new structures in the 100-year floodplain.
- 1.2.10. Integrate the jurisdiction's mitigation plan into current capital improvement plans to ensure that development does not encroach on known hazard areas.

- 1.2.11. Continue to enforce zoning and building codes to prevent/control construction within the floodplain.
- 1.2.12. Develop ordinances that regulate the placement of potentially hazardous critical facilities such as pipelines or high voltage transmission lines.
- 1.2.13. Identify a local floodplain manager.*
- 1.2.14. Review locality's compliance with the National Flood Insurance Program with an annual review of the Floodplain Ordinances and any newly permitted activities in the 100-year floodplain.*

o Objective 1.3. Use property acquisition techniques to reduce exposure in the floodplain.

- 1.3.1. Use fee simple and/or permanent easement to prevent development in the highest priority undeveloped floodplain (and/or wetlands) areas. Work with land trusts to purchase the land or conservation easements. Use these areas as public open space for passive recreational uses.
- 1.3.2. Evaluate properties within the floodplain for possible relocation and/or buy-out. In particular, target FEMA's Repetitive Loss Properties throughout the West Piedmont Region for possible relocation and/or buy-out. Work with land trusts to facilitate purchase of land.
- 1.3.3. Support mitigation of priority disaster-prone structures through promotion of acquisition/ demolition, elevation and flood proofing projects where feasible using FEMA HMA programs where appropriate.*

o Objective 1.4: The West Piedmont Planning District Commission communities will support implementation of structural and non structural mitigation activities to reduce exposure to natural and man-made hazards.

- Strategy 1.4.1: Mitigation projects that will result in protection of public or private property from natural hazards. Eligible projects include, but are not limited to:
  - Acquisition of hazard prone properties
  - Elevation of flood prone structures
  - Minor structural flood control projects
  - Relocation of structures from hazard prone areas
  - Retrofitting of existing buildings and facilities
  - Retrofitting of existing buildings and facilities for shelters

- Infrastructure protection measures
- Storm water management improvements
- Advanced warning systems and hazard gauging systems (weather radios, reverse-911,stream gauges, I-flows)
- Targeted hazard education
- Wastewater and storm water management improvements

- Goal 2: Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to natural hazards.
  - Objective 2.1. Use construction practices and other techniques to reduce vulnerability to natural hazards.
    - 2.1.1. Investigate providing technical assistance for property owners to implement mitigation measures (i.e., strengthening building frame connections; elevating appliances, constructing a wind shelter).
    - 2.1.2. Identify existing disaster-prone structures that may benefit from mitigation measures such as, but not limited to, elevation or floodproofing techniques.
    - 2.1.3. Investigate including construction of safe rooms in rehabilitation of County high schools.*
    - 2.1.4. Retrofit meeting room in Stuart Fire Department to be used as Safe Room.*
    - 2.1.5. Consider elevation or acquisition programs for homes near Chatham Water Treatment Plant.*
    - 2.1.6. Develop flood mitigation strategy for 319 Clearview Drive.*
    - 2.1.8. Harden Pittsylvania County 911 Center or construct a new community safe room as part of a new 911 Center.*
    - 2.1.9 Identify shelters and safe rooms near manufactured home parks.*
    - 2.1.10. Retrofit restrooms and stairwells in County Administration Building to be used as safe rooms.*
    - 2.1.11. Retrofit vault room in Clerk's Office to be used as safe room.*
- Goal 3: Protect new and existing public and private infrastructure and facilities from the effects of hazards.

- Objective 3.1. Undertake actions to protect facilities (i.e., buildings) owned by the community.
  - 3.1.1. Incorporate hazard mitigation techniques into new community facilities to minimize damages.
  - 3.1.2. Investigate all primary and secondary schools to evaluate their resistance to all natural hazards. Prioritize the schools that are used as community shelters.
  - 3.1.3. Investigate critical community facilities, such as county administrative offices, shelters (non-school buildings), fire stations and police stations, to evaluate their resistance to flood and wind hazards. Prioritize facilities in known hazard areas (e.g., floodplains).
  - 3.1.4. Identify mitigation strategies for underground culverts.*
- Objective 3.2. Implement measures to protect utility systems from natural hazards.
  - 3.2.1. Investigate all public utility lines to evaluate their resistance to flood, wind, and winter storm hazards.
  - 3.2.2. Initiate discussions with public/private utility companies to discuss incorporating mitigation measures into new and pre-existing development and infrastructure repairs. Options include: anchoring heavy equipment such as electrical transformers mounted on poles using additional straps and braces; reducing camber in overhead transmission lines; and providing cover for exposed utilities.
  - 3.2.3. Implement a program to seal and vent or raise sewer system components (i.e. manhole covers that are located in the 100-year flood plain or other areas identified as highly probable for flooding). Encourage VDOT to implement this strategy if necessary.
- Objective 3.3. Improve natural and manmade drainage systems to reduce flooding.
  - 3.3.1. Evaluate existing stormwater system to determine if it is adequate for existing (or future) flood hazards.
  - 3.3.2. Identify program of corrective actions to improve stormwater systems' capacity to handle major rain events.
  - 3.3.3. Inspect and clear debris from stormwater drainage system. Encourage VDOT to execute this strategy if needed.

- 3.3.4. Investigate, develop and/or implement a channel maintenance program consisting of routine inspections and subsequent debris removal to ensure free flow of water in local streams and watercourses. Identify funding opportunities including partnering with local non-governmental or volunteer organization.
- 3.3.5. Monitor need to improve "culverts" running under structures in downtown area (e.g., shopping plaza at Patrick Avenue and Main Street) and Nevermar.*
- 3.3.6. Evaluate need for replacement of culverts that run beneath buildings in the downtown area. Culverts are antiquated and are in danger of collapse, which could lead to both the collapse of the buildings above them and increased flood risk.*

o Objective 3.4. Identify and implement ways to reduce flooding of roadways.

- 3.4.1. Evaluate at-risk roads and implement mitigation measures (e.g., elevation, re-design.) Work with VDOT as needed.
- 3.4.2. Identify funding opportunities to replace vulnerable or undersized culvert stream crossings with bridges or larger culverts to reduce flood hazards.

• Goal 4: Ensure continued functionality of critical services.

o Objective 4.1. Undertake actions to ensure continued power at critical community facilities.

- 4.1.1. Identify need for backup generators, communications, and/or vehicles at critical public facilities. Develop means to address shortfall identified.
- 4.1.2. Consider providing necessary electrical hook-up, wiring, and switches to allow readily accessible connections to emergency generators at key critical public facilities.
- 4.1.3. Develop contingency plans for utilities.*
- 4.1.4. Purchase a generator for Martinsville Middle School shelter.*
- 4.1.5. Purchase generator and install connections for main shelter.*

o Objective 4.2. Undertake activities to provide continuous water service.

- 4.2.1. Pursue upgrading of water systems to bring additional water sources on-line, to link community systems to provide redundancy, and to provide additional areas with non-well water.

- 4.2.2. Identify and protect critical recharge zones in high risk areas.
- 4.2.3. Complete the ring berm around the Lower Smith River Wastewater Treatment Plant. *
- 4.2.4. Consider including mitigation measures as part of Indoor Plumbing and Rehabilitation program.*
- 4.2.5. Identify localized protection options for water treatment plant. *
- 4.2.6. Secure water tanks and other components of water system from outside influences.*

o Objective 4.3. Reduce amount of time that roads are closed after a natural hazard event.

- 4.3.1. Initiate (or encourage) road clearing efforts early in wind and winter storms. Develop plan for quick deployment of road clearing equipment.
- 4.3.2. Work with VDOT, private utilities, and/or private homeowners to trim or remove trees that could down power lines and block roads.
- 4.3.3. Work with VDOT to identify and prioritize culverts and roads for flood mitigation measures .*
- 4.3.4. Undertake a study to determine causes of flooding on Route 29 and identify potential mitigation strategies.*
- 4.3.5. Consider a stormwater management plan for the area near Cherrystone Road and US 29.*
- 4.3.6. Develop a maintenance strategy for culverts at Tom Fork Creek at Highway 58.*
- 4.3.7. Identify "typical problem areas"—neighborhoods whose roads are regularly flooded and closed.*
- 4.3.8. Install drainage ditches alongside Highway 57 near water treatment plant.*
- 4.3.10. Replace culverts and raise roadway at Diamond Avenue and Highland Hills to prevent flooding.*
- 4.3.11. Continue to provide free monthly debris pickup.*

• Goal 5: Enhance the capabilities and capacity of local government to lessen the impacts of future disasters.

- Objective 5.1. Enhance or develop plans that improve the community's ability to respond to and recover from disaster.
  - 5.1.1 Develop Continuity of Operations plan.
  - 5.1.2. Develop debris management plan.
  - 5.1.3. Enhance the local emergency operations plan to better address emergency response to hazardous material spills.
  - 5.1.4. In the next update of hazard mitigation plan, include more detailed vulnerability assessments for manmade hazards based on FEMA and VDEM guidance.
  - 5.1.5. Consider increasing county's ability to provide first response to hazardous material spills.*
  - 5.1.6. Continue to implement the Community Emergency Response Team (CERT) program.*
  - 5.1.7. Continue to evaluate sheltering plan to assess usefulness to community.*
  - 5.1.8. Develop an evacuation plan/strategy for residents and patients at Chatham Health and Rehabilitation Center.*
  - 5.1.9. Make sure have appropriate equipment, gear, and chemicals for natural disaster response.*
- Objective 5.2. Address training and staffing needs.
  - 5.2.1. Identify training opportunities for staff to enhance their ability to use GIS for emergency management needs.
  - 5.2.2. Provide training opportunities to local zoning and building code enforcement staff. Educate them re: damage assessment, mitigation techniques, and other related topics.
  - 5.2.3. Staff Emergency Management Office, Public Works, Building Inspections Office and/or Zoning Office at adequate levels.
  - 5.2.4. Evaluate the floodplain manager's roles and responsibilities in each local jurisdiction.
- Objective 5.3. Improve data used for emergency management purposes.
  - 5.3.1. Identify means to coordinate, collect and store damage assessment data in GIS format for each natural hazard event that causes death, injury and or property damage.

- 5.3.2. Link structure value data with tax parcel GIS database to increase accuracy of loss estimates.
- 5.3.3. Coordinate with the state to update and digitize community Flood Insurance Rate Maps (FIRMs).

- Goal 6: Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
  - Objective 6.1. Develop and implement programs that address manmade hazards.
    - 6.1.1. Educate landowners about need to maintain earthen and other privately-owned dams.
    - 6.1.2. Conduct emergency preparedness education campaign targeted at residents and business within dam inundation zones.
    - 6.1.3. Conduct public education on the principles of "sheltering in place."
    - 6.1.4. Develop and distribute brochure to residents and business owners regarding need to trim trees near power lines. Encourage cooperation with VDOT and private utility companies.*
    - 6.1.5. Develop public education campaign about risks of living near a pipeline.*
    - 6.1.6. Identify contingency plans for potential hazardous material incident at train tracks at Diamond Avenue.*
    - 6.1.7. Improve signage and warning systems near dams.*
    - 6.1.8. Study low-head dams for removal.*
  - Objective 6.2. Develop and implement programs that educate people about what they can do to make themselves safer from natural hazards.
    - 6.2.1. Distribute information packets to raise awareness regarding the risks present in the West Piedmont region and to provide disaster preparedness information.
    - 6.2.2. Encourage purchase of and training on the use of NOAA radios. Provide NOAA weather radios to public facilities.
    - 6.2.3. Work with local home improvement stores to provide workshops to residents on mitigation techniques.

- 6.2.4. Conduct/support workshop for contractors to help increase their understanding of how to construct buildings to meet and/or exceed current code requirements. Work with homebuilders associations where possible.
- 6.2.5. Educate residents and business owners about reducing possible wind-borne debris (e.g., anchoring storage sheds, moving outdoor furniture indoors, trimming trees).
- 6.2.6. Encourage residents to consider building a wind shelter as part of new construction or to retrofit existing buildings with wind shelters.
- 6.2.7. Target FEMA's Repetitive Loss Properties for specialized outreach and mitigation activities.
- 6.2.8. Encourage public and private water conservation plans, including consideration of rainwater catchment system.
- 6.2.9. Inform the public of and/or encourage the purchase of flood and/or sewer back-up insurance.
- 6.2.10. Educate homeowners about flood insurance and ICC (Increased Cost of Compliance) coverage.
- 6.2.11. Educate elected officials and residents on the importance of the NFIP.*
- 6.2.12. Identify tornado preparedness strategies for hospitals and nursing homes.*
- 6.2.13. Improve tornado preparedness throughout the county.*

o Objectives 6.3. Work with community partners to improve awareness of natural hazards.

- 6.3.1. Partner with Parent Teacher Associations and local schools to implement existing curriculum related to natural hazards (e.g., Masters of Disaster, Risk Watch).
- 6.3.2. Work with mobile home parks to identify and publicize nearby shelters for residents.
- 6.3.3. Consider establishing a local Voluntary Organizations Active in Disaster (VOAD) group.*
- 6.3.4. Work on ways to reduce vulnerability of people with disabilities. County Emergency Management has worked with local service groups, local colleges and City of Danville to provide public to people with disabilities.*

- 6.3.5. Work with the Chamber of Commerce to educate and prepare local business owners for natural disasters.*
- 6.3.6. Strive for education, reach out to local paper to educate people about the risks they have.*

o Objective 6.4. Use the media to increase awareness of natural hazards.

- 6.4.1. Work with local media outlets to increase awareness of natural hazards. Implement seasonal hazard awareness weeks or days (e.g., hurricane preparedness week, winter weather awareness day).
- 6.4.2. Work with the National Weather Service to promote the Turn Around, Don't Drown public education campaign.
- 6.4.3. Identify public information strategies for various hazards.*

• Goal 7: Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population

o Objective 7.1. Undertake activities that recognize the importance of hazard mitigation as crucial to the long-term viability of the community.

- 7.1.1. Obtain official recognition of the Mitigation Advisory Committee (MAC) from the jurisdictions in the Planning District in order to help institutionalize and develop an On-going mitigation program. Use the MAC to review mitigation projects and coordinate multi-jurisdictional grant applications.
- 7.1.2. Consider participating in the *StormReady* program sponsored by the National Weather Service.
- 7.1.3. Consider participating in FEMA's Community Rating System (CRS).
- 7.1.4. Continue to monitor on-going lawsuits related to uranium mining in Pittsylvania County.*
- 7.1.5. Hold annual coordination sessions with the local NFIP coordinator and the local building official to ensure full NFIP building code compliance.*

• Goal 8: Increase use of existing and new technology to enhance disaster mitigation, preparedness, response and recovery.*

o Objective 8.1. Use mapping to improve awareness of potential hazards.*

- 8.1.1. Conduct annual review of repetitive loss and severe repetitive loss property list to ensure accuracy. Review will include verification of the geographic location of each repetitive loss property and determination if that property has been mitigated

and by what means. Provide corrections if needed by filing form FEMA AW-501. List should be requested from VDEM and/or DCR.*

- 8.1.2. Collect and map data on locations and spans of HVT lines.*
- 8.1.3. Use new flood maps to evaluate candidates for residential elevations and acquisitions.*
- 8.1.4. Collect additional information on undocumented, privately-owned dams.*

o Objective 8.2. Use mapping to improve response and recovery after hazards occur.*

- 8.2.1. Implement and utilize smart phone damage assessment application and link to local and regional GIS systems such as VIPER and WebEOC.*
- 8.2.2. Map water points in Patrick County and consider linking to 911 system.*

o Objective 8.3. Continue to expand capabilities of existing technological tools for the purposes of warning and response.*

- 8.3.1. Consider developing telework policies for snowstorms and other hazards.*
- 8.3.2. Expand 911 capabilities to include text messaging, email, and other technologies.*
- 8.3.3. Expand broadband capabilities to improve emergency communications to rural areas.*

• Goal 9: Promote regional approaches to emergency management.*

o Objective 9.1. Develop memoranda of understanding, mutual aid agreements, and other mechanisms for collaborative response to disasters.*

- 9.1.1. Develop Mutual Aid agreements for water source planning for wildfire.*

In formulating a mitigation strategy, a wide range of activities were considered in order to help achieve the goals and to lessen the vulnerability of the West Piedmont Planning District area to the effects of natural hazards.

Strategies were ranked by each community. Ranking was completed in order of relative priority based on the STAPLE/E criteria, as well as the strategy's potential to reduce vulnerability to natural hazards. Actions were given a ranking of high, medium or low, with the following meanings:

• High (H) – implement in the short-term

- Medium (M) – implement in the long-term
- Low (L) – implement only as funding becomes available

When deciding on which strategies should receive priority in implementation, the communities considered:

- Time – Can the strategy be implemented quickly?
- Ease to implement – How easy is the strategy to implement? Will it require many financial or staff resources?
- Effectiveness – Will the strategy be highly effective in reducing risk?
- Lifespan – How long will the effects of the strategy be in place?
- Hazards – Does the strategy address a high priority hazard or does it address multiple hazards?
- Post-disaster implementation – Is this strategy easier to implement in a post-disaster environment?

In addition, the anticipated level of cost effectiveness of each measure was a primary consideration when developing mitigation actions. Because mitigation is an investment to reduce future damages, it is important to select measures for which the reduced damages over the life of the measure are likely to be greater than the project cost. For structural measures, the level of cost effectiveness is primarily based on the likelihood of damages occurring in the future, the severity of the damages when they occur, and the level of effectiveness of the selected measure. Although detailed analysis was not conducted during the mitigation action development process, these factors were of primary concern when selecting measures. For those measures, that do not result in a quantifiable reduction of damages, such as public education an outreach, the relationship of the probable future benefits and the cost of each measure was considered when developing the mitigation actions.

The following matrix shows the mitigation actions that each jurisdiction selected as appropriate for their community in 2006 and current status is noted in parentheses (including if action is a new one). Items with double-stars indicate a joint strategy between a town and county or city and county. "X" marks indicate unranked strategies.

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
1.1.1. Increase flood warning capabilities, particularly as they relate to dam failure.	H (In progress)	H (On-going)	H (Completed)	X (Complete)	H (In progress)	
1.1.2. Investigate, develop, or enhance Reverse 911 system or other public notification system. Investigate possible funding sources.	H (Completed)	H (Completed)	Completed (not original 2006 strategy)	X (On-going)	L (Completed)	H (Completed)
1.1.3. Establish flood level markers along bridges and other structures to indicate the rise of water levels along creeks and rivers in potential flood-prone areas. Work with VDOT and other jurisdictions as needed.		L (In progress)	L (Modified)		H (In progress)	M (Not started)
1.1.4. Mitigation projects that will result in protection of public or private property from natural hazards. Eligible projects include, but are not limited to: • Acquisition of hazard prone properties • Elevation of flood prone structures • Minor structural flood control projects • Relocation of structures from hazard prone areas • Retrofitting of existing buildings and facilities • Retrofitting of existing buildings and facilities for shelters • Infrastructure protection measures • Storm water management improvements • Advanced warning systems and hazard gauging systems (weather radios, reverse-911,stream gauges, I-flows) • Targeted hazard education • Wastewater and storm water management improvements			H (On-going)			

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
1.1.5. Investigate public warning systems for hazard occurrences.				H (New)		
1.2.1. Investigate need for regional stormwater management plan.	H (Not started)				X (Not started)	
1.2.2. Include an assessment and associated mapping of the jurisdiction's vulnerability to location-specific hazards and make appropriate recommendations for the use of these hazard areas in a future Comprehensive Plan.	L (In progress)	M (In progress)	M (Mostly Completed)	X (Complete)	X (In progress)	H (In progress)
1.2.3.Incorporate (or continue to incorporate) mitigation principles into local emergency management and recovery plans.	L (Completed)	M (In progress)	M (On-going)	X (On-going)	X (Completed)	H (In progress)
1.2.4.Work with the Virginia Department of Forestry to review local zoning and subdivision ordinances to identify areas to include wildfire mitigation principles.		H (Not started)			X (In progress)	
1.2.5.Review and revise, if needed, local floodplain ordinances. Work with the state to coordinate a Community Assistance Visit to identify potential improvements or enhancements to existing floodplain management program.		M (In progress)		X (On-going)	X (On-going)	H (In progress)
1.2.6. Develop a new Zoning Ordinance or investigate revising the existing Zoning Ordinance to include separate zones or districts with appropriate development criteria for known hazard areas.		M (In progress)				

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
1.2.7. Review and revise, if needed, existing Subdivision Ordinances to include hazard mitigation-related development criteria in order to regulate the location and construction of buildings and other infrastructure in known hazard areas.		M (In progress)				
1.2.8. Investigate using non-conforming or substantial damage provisions to require hazard retrofitting of existing development.	L* (Completed)					L (Not started)
1.2.9. Evaluate the potential costs versus benefits of implementing a freeboard requirement for all new structures in the 100-year floodplain.		M (In progress)	M (Cancelled)		X (On-going)	
1.2.10. Integrate the jurisdiction's mitigation plan into current capital improvement plans to ensure that development does not encroach on known hazard areas.	M* (Not started)	M (In progress)	H (On-going)	X (Cancelled)	X (On-going)	
1.2.11. Continue to enforce zoning and building codes to prevent/control construction within the floodplain.	L* (On-going)	M (In progress)	H (On-going)	X* (On-going)	X* (On-going)	H* (On-going)
1.2.12. Develop ordinances that regulate the placement of potentially hazardous critical facilities such as pipelines or high voltage transmission lines.		H (New)				
1.2.13. Identify a local floodplain manager.		M (New)				
1.2.14. Review locality's compliance with the National Flood Insurance Program with an annual review of the Floodplain Ordinances and any newly permitted activities in the 100-year floodplain.	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
1.3.3. Support mitigation of priority disaster-prone structures through promotion of acquisition/ demolition, elevation and flood proofing projects where feasible using FEMA HMA programs where appropriate.	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)
1.4.1. Mitigation projects that will result in protection of public or private property from natural hazards. Eligible projects include, but are not limited to: • Acquisition of hazard prone properties • Elevation of flood prone structures • Minor structural flood control projects • Relocation of structures from hazard prone areas • Retrofitting of existing buildings and facilities • Retrofitting of existing buildings and facilities for shelters • Infrastructure protection measures • Storm water management improvements • Advanced warning systems and hazard gauging systems (weather radios, reverse-911,stream gauges, I-flows) • Targeted hazard education • Wastewater and storm water management improvements			H (On-going)			
2.1.1. Investigate providing technical assistance for property owners to implement mitigation measures (i.e., strengthening building frame connections; elevating appliances, constructing a wind shelter).	M (On-going)	L (In progress)	L (On-going)	X (On-going)	X (On-going)	M (Not started)

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
2.1.2. Identify existing disaster-prone structures that may benefit from mitigation measures such as, but not limited to, elevation or floodproofing techniques.	M (Completed)	L (In progress)	H (On-going)			L (In progress)
2.1.3. Investigate including construction of safe rooms in rehabilitation of County high schools.						L (Not started)
2.1.6. Develop flood mitigation strategy for 319 Clearview Drive.				M (New)		
2.1.8.Harden Pittsylvania County 911 Center or construct a new community safe room as part of a new 911 Center						L (New)
2.1.9. Identify shelters and safe rooms near manufactured home parks.					M (New)	
2.1.10. Retrofit restrooms and stairwells in County Admin Building to be used as safe rooms.					M (New)	
2.1.11. Retrofit vault room in Clerk's Office to be used as safe room.					M (New)	
3.1.1. Incorporate hazard mitigation techniques into new community facilities to minimize damages.		L (In progress)	M (On-going)	X (Not started)	X (Not started)	M (Not started)
3.1.2. Investigate all primary and secondary schools to evaluate their resistance to all natural hazards. Prioritize the schools that are used as community shelters.		M (In progress)	M (Started)	H (On-going)	X (In progress)	
3.1.4. Identify mitigation strategies for underground culverts	M (New)					
3.2.1. Investigate all public utility lines to evaluate their resistance to flood, wind, and winter storm hazards.	H (On-going)	L (Not Started)	L (Cancelled)	X (On-going)		

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
3.2.3. Implement a program to seal and vent or raise sewer system components (i.e., manhole covers that are located in the 100-year flood plain or other areas identified as highly probable for flooding).			M (On-going)	X (Not started)		
3.3.1. Evaluate existing stormwater system to determine if it is adequate for existing (or future) flood hazards.	H (On-going)					
3.3.2. Identify program of corrective actions to improve stormwater systems' capacity to handle major rain events.	M (On-going)					
3.3.3. Inspect and clear debris from stormwater drainage system. Encourage VDOT to execute this strategy if needed.	M* (On-going)		M (Cancelled)	H (On-going)		
3.3.4. Investigate, develop and/or implement a channel maintenance program consisting of routine inspections and subsequent debris removal to ensure free flow of water in local streams and watercourses. Identify funding opportunities including partnering with local non-governmental or volunteer organization.		H (In progress)		H (On-going)		
3.3.5. Monitor need to improve "culverts" running under structures in downtown area (e.g., Plaza with Bengels and Tony's Pizza) and Nevermar.					X (On-going)	
3.3.6. Evaluate need for replacement of culverts that run beneath buildings in the downtown area. Culverts are antiquated and are in danger of collapse, which could lead to both the collapse of the buildings above them and increased flood risk.	H (In progress)					

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
3.4.1. Evaluate at-risk roads and implement mitigation measures (e.g., elevation, re-design.) Work with VDOT as needed.	M (On-going)	M (In progress)	L (Cancelled)		X (In progress)	
3.4.2. Identify funding opportunities to replace vulnerable or undersized culvert stream crossings with bridges or larger culverts to reduce flood hazards.	H (Completed)	M (In progress)	L (On-going)			
4.1.1. Identify need for backup generators, communications, and/or vehicles at critical public facilities. Develop means to address shortfall identified.	M (On-going)	H (Completed)	M (Completed and on-going)	H (On-going)	H* (In progress)	H (In progress)
4.1.2. Consider providing necessary electrical hook-up, wiring, and switches to allow readily accessible connections to emergency generators at key critical public facilities.	M (On-going)	X (In progress)	M (Completed)	H (On-going)	X* (In progress)	M (Not started)
4.1.3 Develop contingency plans for utilities.				H (New)		
4.1.4.Purchase a generator for Martinsville Middle School shelter				M (New)		
4.1.5. Purchase and install building generators and install connections at all of fire departments and rescue squads. (SEE 4.1.1)						H (New)
4.1.6. Purchase generator and install connections for main shelter.		M (New)				
4.2.1. Pursue upgrading of water systems to bring additional water sources on-line, to link community systems to provide redundancy, and to provide additional areas with non-well water.		X (In progress)			X (In progress)	M* (In progress)

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
4.2.2. Identify and protect critical recharge zones in high risk areas.		X (Not Started)				L (Not started)
4.2.3.Complete the ring berm around the Lower Smith River Wastewater Treatment Plant			H (New)			
4.2.4. Consider including mitigation measures as part of Indoor Plumbing and Rehabilitation program.		L (Not Started)				
4.2.5.Identify localized protection options for water treatment plant				L (New)		
4.2.6. Secure water tanks and other components of water system from outside influences.		M (Completed)				
4.3.1. Initiate (or encourage) road clearing efforts early in wind and winter storms. Develop plan for quick deployment of road clearing equipment.	L* (On-going)			X* (On-going)		
4.3.2. Work with VDOT, private utilities, and/or private homeowners to trim or remove trees that could down power lines and block roads.	M (On-going)		L (On-going)	X (On-going)	X (On-going)	
4.3.3. Work with VDOT to identify and prioritize culverts and roads for flood mitigation measures.(Low priority)						L (Not started)
4.3.4. Undertake a study to determine causes of flooding on Route 29 and identify potential mitigation strategies. (Medium priority)						M (Completed)
4.3.7. Identify "typical problem areas"—neighborhoods whose roads are regularly flooded and closed.						M (New)
4.3.10. Replace culverts and raise roadway at Diamond Avenue and Highland Hills to prevent flooding.		H (New)				

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
5.1.1. Develop Continuity of Operations plan.	H (New)	H (Completed)	L (Minimally completed)	X (In progress)		
5.1.2. Develop debris management plan.		M (Not started)	M (completed)	H (Not started)	X (In progress)	H (New)
5.1.3. Enhance the local emergency operations plan to better address emergency response to hazardous material spills.	M (Completed)	H (Completed)	L (On-going)	X (On-going)	X* (Completed)	
5.1.4. In the next update of hazard mitigation plan, include more detailed vulnerability assessments for manmade hazards based on FEMA and VDEM guidance.	M (On-going)	H (On-going)	L (On-going)	X (On-going)	X (On-going)	M (On-going)
5.1.5. Consider increasing county's ability to provide first response to hazardous material spills.					X (On-going)	
5.1.6. Consider increasing local capacity to respond to hazardous materials incidents.						H (In progress)
5.1.7. Continue to implement the Community Emergency Response Team (CERT) program.						H (On-going)
5.1.8.Continue to evaluate sheltering plan to assess usefulness to community		H (New)				
5.2.1. Identify training opportunities for staff to enhance their ability to use GIS for emergency management needs.	L (On-going)	H (Completed)	H (On-going)	H (On-going)	X (On-going)	H (In progress)
5.2.2. Provide training opportunities to local zoning and building code enforcement staff. Educate them re: damage assessment, mitigation techniques, and other related topics.	L* (On-going)	H (Completed)	H (Completed, but on-going)	X (On-going)	H (On-going)	M (In progress)

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
5.2.3. Staff Emergency Management Office, Public Works, Building Inspections Office and/or Zoning Office at adequate levels.		H (In progress)	H (On-going)	X	H (On-going)	M (Not started)
5.2.4. Evaluate the floodplain manager's roles and responsibilities.		L (Not Started)	H (On-going)	X (On-going)	X (In progress)	
5.3.1. Identify means to coordinate, collect and store damage assessment data in GIS format for each natural hazard event that causes death, injury and or property damage.	M (On-going)	M (Completed)	M (In process)	X (Complete)	X (In progress)	H* (On-going)
5.3.2. Link structure value data with tax parcel GIS database to increase accuracy of loss estimates.		M (Completed)	H (Completed)		X (On-going)	H (On-going)
5.3.3. Coordinate with the state to update and digitize community Flood Insurance Rate Maps (FIRMs).	L (Completed)	M (Not Started)	L (Completed)	X (Not started)	X (On-going)	H (In progress)
6.1.1. Educate landowners about need to maintain earthen and other privately-owned dams.	L (On-going)	M (In progress)	M (On-going)		X (On-going)	M (Not started)
6.1.2. Conduct emergency preparedness education campaign targeted at residents and business within dam inundation zones.	L (On-going)	M (Not Started)	L (On-going)		X (On-going)	
6.1.3. Conduct public education on the principles of "sheltering in place."	L* (On-going)	M (In progress)	M (On-going)	H (On-going)	X (On-going)	
6.1.4. Develop and distribute brochure to residents and business owners regarding need to trim trees near power lines. Encourage cooperation with VDOT and private utility companies.(Low priority)						L (Not started)
6.1.5.Develop public education campaign about risks of living near a pipeline		M (New)				

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
6.1.6. Identify contingency plans for potential hazardous material incident at train tracks at Diamond Avenue.		M (New)				
6.1.7. Improve signage and warning systems near dams.		H (New)		M (New)		
6.1.8. Study low-head dams for removal.		M (New)				
6.2.1. Distribute information packets to raise awareness regarding the risks present in the West Piedmont region and to provide disaster preparedness information.	L (On-going)	L (On-going)	M (On-going)	H (On-going)	H (On-going)	M (On-going)
6.2.2. Encourage purchase of and training on the use of NOAA radios. Provide NOAA weather radios to public facilities.		H (Completed)	H (On-going)	X (On-going)	H (In progress)	H* (On-going)
6.2.3. Work with local home improvement stores to provide workshops to residents on mitigation techniques.	M (Not started)	L (Not Started)	M (On-going)	X (On-going)	X (On-going)	H (Not started)
6.2.4. Conduct/support workshop for contractors to help increase their understanding of how to construct buildings to meet and/or exceed current code requirements.	L* (On-going)	L (Not Started)			X (On-going)	M (Not started)
6.2.5. Educate residents and business owners about reducing possible wind-borne debris (e.g., anchoring storage sheds, moving outdoor furniture indoors, trimming trees).		L (Not Started)	L (On-going)	X (On-going)	X (On-going)	
6.2.6. Encourage residents to consider building a wind shelter as part of new construction or to retrofit existing buildings with wind shelters.		L (Not Started)	L (Cancelled)		X (On-going)	

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
6.2.7.Target FEMA's Repetitive Loss Properties for specialized outreach and mitigation activities.	M (On-going)	L (In progress)	M (minimally)		X (Not started)	L (Not started)
6.2.8. Encourage public and private water conservation plans, including consideration of rainwater catchment systems.		L (Not Started)			X (On-going)	
6.2.9. Inform the public of and/or encourage the purchase of flood and/or sewer back-up insurance.		M (In progress)	M (On-going)	X	X (On-going)	
6.2.10. Educate homeowners about flood insurance and ICC (Increased Cost of Compliance) coverage.		L (On-going)	L (On-going)		X (Not started)	
6.2.11. Educate elected officials and residents on the importance of the NFIP.	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)
6.2.12. Identify tornado preparedness strategies for hospitals and nursing homes.		L (New)				
6.2.13.Improve tornado preparedness throughout the county		M (New)				
6.3.1. Partner with Parent Teacher Associations and local schools to implement existing curriculum related to natural hazards (e.g., Masters of Disaster, Risk Watch).		M (Completed)	M (Completed, on-going)	X (Not started)	X (Not started)	M* (Not started)
6.3.2. Work with mobile home parks to identify and publicize nearby shelters for residents.		L (Not Started)			X (On-going)	M (Not started)
6.3.3. Consider establishing a local Voluntary Organizations Active in Disaster (VOAD) group.						M (Not started)

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
6.3.4. Work on ways to reduce vulnerability of people with access and functional needs. County Emergency Management has worked with local service groups, local colleges and City of Danville to provide public to people with vulnerability of people with access and functional needs.						H (On-going)
6.3.5. Work with the Chamber of Commerce to educate and prepare local business owners for natural disasters.						H (Not started)
6.4.1. Work with local media outlets to increase awareness of natural hazards. Implement seasonal hazard awareness weeks or days (e.g., hurricane preparedness week, winter weather awareness day).	L* (On-going)	M (In progress)	M (On-going)	X* (On-going)	X (In progress)	H* (On-going)
6.4.2. Work with the National Weather Service to promote the Turn Around, Don't Drown public education campaign.	L (On-going)	M (Completed)	M (On-going)	X (On-going)	X (On-going)	H (On-going)
6.4.3. Identify public information strategies for various hazards .	H (New)					
7.1.1 Obtain official recognition of the mitigation working group/Mitigation Advisory Committee (MAC) from the jurisdictions in the Planning District in order to help institutionalize and develop an On-going mitigation program. Use the MAC to review mitigation projects and coordinate multi-jurisdictional grant applications.						H (On-going)
7.1.2. Consider participating in the StormReady program sponsored by the National Weather Service.		H (Completed)	M (On-going)	X (On-going)	X (In progress)	H (On-going)
7.1.3. Consider participating in FEMA's Community Rating System (CRS).	M (Delayed)	M (Not started)	L (Not-started)	X (New)	X (Not started)	M (Not started)

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
7.1.4. Continue to monitor ongoing lawsuits related to uranium mining in Pittsylvania County.						L (New)
7.1.5. Hold annual coordination sessions with the local NFIP coordinator and the local building official to ensure full NFIP building code compliance.	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)
8.1.1 Conduct annual review of repetitive loss and severe repetitive loss property list to ensure accuracy. Review will include verification of the geographic location of each repetitive loss property and determination if that property has been mitigated and by what means. Provide corrections if needed by filing form FEMA AW-501. List should be requested from VDEM and/or DCR.*	X	X	X	X	X	X
8.1.2.Collect and map data on locations and spans of HVT lines						M (New)
8.1.3. Use new flood maps to evaluate candidates for residential elevations and acquisitions.				M (New)		H (New)
8.1.4. Collect additional information on undocumented, privately-owned dams.	H (New)					
8.2.1. Implement and utilize smart phone damage assessment application and link to local and regional GIS systems such as VIPER and WebEOC.						H (New)
8.2.2. Map water points in Patrick County and consider linking to 911 system.					H (New)	
8.3.2.Expand 911 capabilities to include text messaging, email, and other technologies		M (New)				
8.3.3. Expand broadband capabilities to improve emergency communications to rural areas.		L (New)				

Strategy	City of Danville	Franklin County	Henry County	City of Martinsville	Patrick County	Pittsylvania County
9.1.1.Develop Mutual Aid agreements for water source planning for wildfire						H (New)

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
1.1.1. Increase flood warning capabilities, particularly as they relate to dam failure.	X (Not started)		L (Not started)				X (In progress)
1.1.2. Investigate, develop, or enhance Reverse 911 system or other public notification system. Investigate possible funding sources.			H (On-going)	H (New)	Completed		
1.1.3. Establish flood level markers along bridges and other structures to indicate the rise of water levels along creeks and rivers in potential flood-prone areas. Work with VDOT and other jurisdictions as needed.	X (Not started)			H (In progress)			X (In progress)
1.1.4. Investigate public warning systems for hazard occurrences.				M (New)			
1.1.6 Install town emergency warning system.					H (New)		
1.2.1. Investigate need for regional stormwater management plan.	X (Not started)					M (On-going)	
1.2.10. Integrate the jurisdiction's mitigation plan into current capital improvement plans to ensure that development does not encroach on known hazard areas.	X (Not started)		M (On-going)		H (On-going)	L (On-going)	X (On-going)

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
1.2.11. Continue to enforce zoning and building codes to prevent/control construction within the floodplain.	X (Not started)	H (On-going)	H (On-going)	H (On-going)	H (On-going)	L (On-going)	X (On-going)
1.2.12. Develop ordinances that regulate the placement of potentially hazardous critical facilities such as pipelines or high voltage transmission lines.			M (On-going)				
1.2.13. Identify a local floodplain manager.			L (New)				
1.2.14. Review locality's compliance with the National Flood Insurance Program with an annual review of the Floodplain Ordinances and any newly permitted activities in the 100-year floodplain.	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)
1.2.2. Include an assessment and associated mapping of the jurisdiction's vulnerability to location-specific hazards and make appropriate recommendations for the use of these hazard areas in a future Comprehensive Plan.		L (On-going with county)	H (On-going)	H (On-going)		L (On-going)	

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
1.2.3. Incorporate (or continue to incorporate) mitigation principles into local emergency management and recovery plans.					M** (On-Going)		
1.2.5. Review and revise, if needed, local floodplain ordinances. Work with the state to coordinate a Community Assistance Visit to identify potential improvements or enhancements to existing floodplain management program.	X (Not started)						X (On-going)
1.2.6. Develop a new Zoning Ordinance or investigate revising the existing Zoning Ordinance to include separate zones or districts with appropriate development criteria for known hazard areas.						L (Complete/On-going)	
1.2.7. Review and revise, if needed, existing Subdivision Ordinances to include hazard mitigation-related development criteria in order to regulate the location and construction of buildings and other infrastructure in known hazard areas.						L (On-going)	

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
1.2.9. Evaluate the potential costs versus benefits of implementing a freeboard requirement for all new structures in the 100-year floodplain.	X (Not started)				L (Cancelled)		X (On-going)
1.3.3.Support mitigation of priority disaster-prone structures through promotion of acquisition/ demolition, elevation and flood proofing projects where feasible using FEMA HMA programs where appropriate.	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)
2.1.1. Investigate providing technical assistance for property owners to implement mitigation measures (i.e., strengthening building frame connections; elevating appliances, constructing a wind shelter).	X (Not started)				L (On-going)	H (Deleted)	X (On-going)
2.1.2. Identify existing disaster-prone structures that may benefit from mitigation measures such as, but not limited to, elevation or floodproofing techniques.	X (Not started)					L (On-going)	H (Not started)

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
2.1.4. Retrofit meeting room in Stuart Fire Department to be used as Safe Room							H (New)
2.1.5. Consider elevation or acquisition programs for homes near Chatham Water Treatment Plant.		M (New)					
3.1.1. Incorporate hazard mitigation techniques into new community facilities to minimize damages.	X (Not started)	L (On-going)	M (On-going)	M (Not started)	M (On-going)	M (On-going)	X (On-going)
3.1.2. Investigate all primary and secondary schools to evaluate their resistance to all natural hazards. Prioritize the schools that are used as community shelters.					M (Started)		
3.2.1. Investigate all public utility lines to evaluate their resistance to flood, wind, and winter storm hazards.	X (Not started)		M (On-going)		L (Cancelled)	H (Not Started)	
3.2.3. Implement a program to seal and vent or raise sewer system components (i.e. manhole covers that are located in the 100-year flood plain or other areas identified as highly probable for flooding).	X (Not started)		H (On-going)			M (On-going)	H (On-going)

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
3.3.3. Inspect and clear debris from stormwater drainage system. Encourage VDOT to execute this strategy if needed.					M (Cancelled)		
3.4.1. Evaluate at-risk roads and implement mitigation measures (e.g., elevation, re-design.) Work with VDOT as needed.	X (Not started)				L (Cancelled)		
3.4.2. Identify funding opportunities to replace vulnerable or undersized culvert stream crossings with bridges or larger culverts to reduce flood hazards.	X (Not started)	L (Not started)		M (Deleted)			
4.1.1. Identify need for backup generators, communications, and/or vehicles at critical public facilities. Develop means to address shortfall identified.	X (Not started)	L (On-going)	H (Complete)	H (In progress)	M (Completed and on-going)	M (On-going)	H (On-going)
4.1.2. Consider providing necessary electrical hook-up, wiring, and switches to allow readily accessible connections to emergency generators at key critical public facilities.	X (Not started)	M (On-going with county)	H (Complete)	H (In progress)		M (On-going)	H (On-going)

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
4.2.1. Pursue upgrading of water systems to bring additional water sources on-line, to link community systems to provide redundancy, and to provide additional areas with non-well water.	X (Not started)		H (In progress)		L	H** (On-going)	X (In progress)
4.2.2. Identify and protect critical recharge zones in high risk areas.	X (Not started)		H (Completed but will continued)				
4.3.1. Initiate (or encourage) road clearing efforts early in wind and winter storms. Develop plan for quick deployment of road clearing equipment.						H (On-going)	
4.3.11. Continue to provide free monthly debris pickup.						X (On-going)	
4.3.2. Work with VDOT, private utilities, and/or private homeowners to trim or remove trees that could down power lines and block roads.	X (Not started)				L (On-going)	X (On-going)	X (In progress)
4.3.5. Consider a stormwater management plan for the area near Cherrystone Road and US 29.		M (New)					

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
4.3.6. Develop a maintenance strategy for culverts at Tom Fork Creek at Highway 58.		M (New)					
4.3.8. Install drainage ditches alongside Highway 57 near water treatment plant.		M (New)					
5.1.1. Develop Continuity of Operations plan.	X (Not started)	L (Not started)	H (Complete)			H** (On-going)	
5.1.2. Develop debris management plan.	X (Not started)						
5.1.3. Enhance the local emergency operations plan to better address emergency response to hazardous material spills.					L (On-going)		
5.1.4. In the next update of hazard mitigation plan, include more detailed vulnerability assessments for manmade hazards based on FEMA and VDEM guidance.	X (Not started)	L (Complete)	M (Complete)	X (Complete)	L (On-going)	H (Complete)	X (Completed)
5.1.9. Make sure have appropriate equipment, gear, and chemicals for natural disaster response.		M (New)				X (On-going)	

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
5.2.1. Identify training opportunities for staff to enhance their ability to use GIS for emergency management needs.						H (On-going)	X (On-going)
5.2.2. Provide training opportunities to local zoning and building code enforcement staff. Educate them re: damage assessment, mitigation techniques, and other related topics.					H (Completed, but on-going)	H** (On-going)	X (On-going)
5.2.3. Staff Emergency Management Office, Public Works, Building Inspections Office and/or Zoning Office at adequate levels.					H (On-going)	L (On-going)	X (On-going)
5.2.4. Evaluate the floodplain manager's roles and responsibilities.	X (Not started)		L (On-going)				X (On-going)
5.3.1. Identify means to coordinate, collect and store damage assessment data in GIS format for each natural hazard event that causes death, injury and or property damage.						M (No change)	X (In progress)

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
5.3.2. Link structure value data with tax parcel GIS database to increase accuracy of loss estimates.	X (Not started)					M** (Complete, On-going)	H (In progress)
5.3.3. Coordinate with the state to update and digitize community Flood Insurance Rate Maps (FIRMs).	H (On-going)	L (Not started)		X (Complete)	L (Completed)	M (Complete, On-going)	X (Completed)
6.1.1. Educate landowners about need to maintain earthen and other privately-owned dams.						L (Deleted)	X (On-going)
6.1.2. Conduct emergency preparedness education campaign targeted at residents and business within dam inundation zones.		L (On-going)				H (Deleted)	X (On-going)
6.1.3. Conduct public education on the principles of "sheltering in place."		L (On-going)		X (On-going)	M (On-going)	L (Not Started)	
6.2.1. Distribute information packets to raise awareness regarding the risks present in the West Piedmont region and to provide disaster preparedness information.	X (Not started)	L (Not started)	H (On-going)	X (On-going)	M (On-going)	M (Not Started)	X (On-going)
6.2.2. Encourage purchase of and training on the use of NOAA radios. Provide NOAA weather radios to public facilities.	X (Not started)				H (On-going)	M (Not Started)	X (On-going)

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
6.2.3. Work with local home improvement stores to provide workshops to residents on mitigation techniques.					M (On-going)	H (On-going)	X (On-going)
6.2.4. Conduct/support workshop for contractors to help increase their understanding of how to construct buildings to meet and/or exceed current code requirements.	X (Not started)	On-going)			X	H (Deleted due to lack of relevancy)	
6.2.5. Educate residents and business owners about reducing possible wind-borne debris (e.g., anchoring storage sheds, moving outdoor furniture indoors, trimming trees).		L (On-going)		X (On-going)	L (In progress)	H (On-going)	X (On-going)
6.2.6. Encourage residents to consider building a wind shelter as part of new construction or to retrofit existing buildings with wind shelters.						M (Not Started)	X (On-going)
6.2.7. Target FEMA's Repetitive Loss Properties for specialized outreach and mitigation activities.							X (Not started)
6.2.8. Encourage public and private water conservation plans, including consideration of rainwater catchment systems.	X (Not started)		H (On-going)				X (On-going)

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
6.2.9. Inform the public of and/or encourage the purchase of flood and/or sewer back-up insurance.	X (Not started)		M (On-going)				
6.2.10. Educate homeowners about flood insurance and ICC (Increased Cost of Compliance) coverage.	X (Not started)		L (On-going)			M (On-going)	X (Not started)
6.2.11. Educate elected officials and residents on the importance of the NFIP.	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)
6.3.1. Partner with Parent Teacher Associations and local schools to implement existing curriculum related to natural hazards (e.g., Masters of Disaster, Risk Watch).						M (Deleted)	
6.3.2. Work with mobile home parks to identify and publicize nearby shelters for residents.				M (On-going)	H (On-going)		
6.3.6. Strive for education, reach out to local paper to educate people about the risks they have.						X (On-going)	

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
6.4.1. Work with local media outlets to increase awareness of natural hazards. Implement seasonal hazard awareness weeks or days (e.g., hurricane preparedness week, winter weather awareness day).		M (On-going)		X (On-going)	M (On-going)		X (On-going)
6.4.2. Work with the National Weather Service to promote the Turn Around, Don't Drown public education campaign.	X (Not started)	L (On-going with county)		X (On-going)		L (On-going)	X (On-going)
7.1.1. Obtain official recognition of the mitigation working group/Mitigation Advisory Committee (MAC) from the jurisdictions in the Planning District in order to help institutionalize and develop an On-going mitigation program. Use the MAC to review mitigation projects and coordinate multi-jurisdictional grant applications.			H (Completed)				
7.1.2. Consider participating in the StormReady program sponsored by the National Weather Service.	X (Not started)	L** (On-going with county)	M (On-going)	X** (On-going)			X (In progress)

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
7.1.3. Consider participating in FEMA's Community Rating System (CRS).	X (Not started)	X (New)	X (New)	X (New)	L (Not-started)	X (New)	X (Not started)
7.1.5. Hold annual coordination sessions with the local NFIP coordinator and the local building official to ensure full NFIP building code compliance.	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)	X (New)
7.2.1 Consider participating in the *StormReady* program sponsored by the National Weather Service.				H (In progress)			
8.1.1 Conduct annual review of repetitive loss and severe repetitive loss property list to ensure accuracy. Review will include verification of the geographic location of each repetitive loss property and determination if that property has been mitigated and by what means. Provide corrections if needed by filing form FEMA AW-501. List should be requested from VDEM and/or DCR.*	X (New)	X	X	X	X	X	X

Strategy	Town of Boones Mill	Town of Chatham	Town of Gretna	Town of Hurt	Town of Ridgeway	Town of Rocky Mount	Town of Stuart
8.1.3. Use new flood maps to evaluate candidates for residential elevations and acquisitions.		H (New)					
8.3.1.Consider developing telework policies for snowstorms and other hazards		M (New)					

Developing a Mitigation Action Plan

Mitigation action plans were developed for all of the regional activities and the high priority actions for each jurisdiction. The following action plans were designed to achieve the goals and objectives identified in this multi-jurisdictional all-hazards mitigation plan. Each proposed action includes:

(1) the appropriate category for the mitigation technique (these categories are described in Appendix D),
(2) the hazard it is designed to mitigate,
(3) the objective(s) it is intended to help achieve,
(4) general background information,
(5) the priority level for its implementation (high, moderate, or low),
(6) potential funding sources, if applicable,
(7) the agency/person assigned responsibility for carrying out the strategy, and
(8) a target completion date.

Regional Actions

Regional actions were ranked by the MAC during their May 26, 2005, meeting. The committee used a multi-voting system to prioritize the regional actions. Each member present received six votes to distribute between the proposed actions. The ranking criteria described in the previous section were used in ranking the regional actions. No regional actions were identified for the 2011 plan update.

Regional Strategies

Strategy 2.1.1. Investigate providing technical assistance for property owners to implement mitigation measures (i.e., strengthening building frame connections; elevating appliances, constructing a wind shelter).	
Affected Jurisdictions	All
Category	Property Protection; Public Information and Awareness
Hazard	Flood, Wind, Wildfire
Objective(s) addressed	2.1
Background	A variety of mitigation techniques can be undertaken by homeowners to improve the resistance of their properties to natural hazards. The Mitigation Advisory Committee could develop a program to provide one-on-one technical assistance to homeowners to teach them how to implement mitigation measures in their homes. This program could include working with City and County building departments to distribute copies of existing publications that contain information on how to strengthen and repair homes. Opportunities may exist to share staff and knowledge among jurisdictions.
Priority	Low
Funding sources	HMGP 5%, local funds
Responsible party	Regional Emergency Managers Group; West Piedmont Planning District Commission
Completion date	4th quarter of 2008
Status, 2011 Update	Implemented by individual jurisdictions. Not to be carried over as regional action.

Strategy 5.1.4. In the next update of hazard mitigation plan, include more detailed vulnerability assessments for manmade hazards based on FEMA and VDEM guidance.	
Affected Jurisdictions	All

Category	Local Capacity
Hazard	Manmade
Objective(s) addressed	5.1
Background	While natural hazards are the focus of the Disaster Mitigation Act of 2000, this plan includes a preliminary assessment of the vulnerability West Piedmont region to a range of manmade hazards. The assessment is descriptive in nature, in part because of data constraints and lack of guidance from FEMA on how regional manmade vulnerability assessments should be conducted. In the update to this plan, a more detailed vulnerability assessment for manmade hazards should be included if methodologies have been developed by FEMA and/or the Virginia Department of Emergency Management and supporting data is available.
Priority	Low
Funding sources	VDEM, FEMA, Department of Homeland Security
Responsible party	Regional Emergency Managers Group; West Piedmont Planning District Commission
Completion date	1st quarter of 2010
Status, 2011 Update	Completed. No new methodologies were provided so analysis was done in similar manner.

Strategy 5.2.1. Identify training opportunities for staff to enhance their ability to use GIS for emergency management needs.	
Affected Jurisdictions	All
Category	Emergency Services
Hazard	All hazards
Objective(s) addressed	5.2

Background	Emergency managers collect and manage a vast quantity of data -- before, during and after disasters. Much of this information comes from other departments and agencies and has a spatial component. Geographic Information Systems (GIS) provide a means to manage and share these datasets. Staff should continue to take opportunities to attend training to increase their knowledge of GIS and their application to emergency management.
Priority	High
Funding sources	Departmental funds, FEMA
Responsible party	Regional Emergency Managers Group; West Piedmont Planning District Commission; Planning/Zoning
Completion date	1st quarter of 2007
Status, 2011 Update	Implemented by individual jurisdictions. Not to be carried over as regional action.

Strategy 5.2.2. Provide training opportunities to local zoning and building code enforcement staff. Educate them re: damage assessment, mitigation techniques, and other related topics.	
Affected Jurisdictions	All
Category	Local Capacity
Hazard	All
Objective(s) addressed	5.2
Background	One key to successful enforcement of floodplain and other regulations is to ensure that staff are adequately trained and have the opportunity to learn about new standards and techniques. It is especially important that staff understand how damage assessments are conducted by state and federal officials. In addition, enforcement staff should be comfortable in making substantial damage determinations. The limited number of staff at the county and town level makes it difficult to send people to extended, out-of-town training courses. Short courses (i.e., one day) should be

	identified that could be delivered in the West Piedmont region, potentially at a site identified by the PDC. Potential class topics could include: - Damage assessment - Substantial damage requirements - Floodproofing techniques - Stormwater management
Priority	High
Funding sources	VDEM, FEMA HMGP
Responsible party	Regional Emergency Managers Group; West Piedmont Planning District Commission; Planning/Zoning
Completion date	On-going
Status, 2011 Update	Implemented by individual jurisdictions. Not to be carried over as regional action.

Strategy 5.3.3. Coordinate with the state to update and digitize community Flood Insurance Rate Maps (FIRMs).	
Affected Jurisdictions	All
Category	Public Information and Awareness, Local Capacity
Hazard	Flood
Objective(s) addressed	5.3
Background	Flood Insurance Rate Maps (FIRMs) are developed by FEMA after a detailed flood risk assessment. Maps for the West Piedmont region range from 4 to 27 years old and often no longer reflect the true flood risk to the area. In addition, the maps are not readily available in a digital format, complicating their effective use for planning and education purposes. Since these products are used by private citizens, insurance agents and brokers to locate properties/buildings and identify

	the risk for flood damage, it is crucial that they be accurate and up-to-date. The maps also are used by community officials to administer floodplain management regulations and mitigate flood damage. In addition, lending institutions and federal agencies use the FIRMS to determine when flood insurance is required for loans or grants involving the purchase or construction of buildings. The Mitigation Advisory Committee should work with state floodplain management officials to ensure the communities within the West Piedmont Planning District are prioritized when funds for updating flood maps become available.
Priority	Low
Funding sources	FEMA Map Modernization, CTP
Responsible party	Community floodplain manager, Mitigation Advisory Committee
Completion date	4th quarter of 2008
Status, 2011 Update	Completed

Strategy 6.2.1. Distribute information packets to raise awareness regarding the risks present in the West Piedmont region and provide disaster preparedness information.	
Affected Jurisdictions	All
Category	Public Information and Awareness
Hazard	All hazards
Objective(s) addressed	6.2
Background	The West Piedmont region is prone to winter storms, flooding and high winds. It is imperative that residents are informed of preparedness information on how to prepare for the impacts of natural hazards. In addition, it is important to remind the population of the area that may have become complacent about the

	hazards and how to prepare for them. Key messages include whom to call for information in the event of an impending disaster or after a disaster, what things to include in a disaster preparedness kit and simple hazard specific mitigation measures each resident can take to reduce their risk. Other topics may include: flood insurance (including Increased Cost of Compliance coverage); sewer back-up insurance; potential wind-borne debris; sheltering in place.
Priority	Medium
Funding sources	FEMA/Hazard Mitigation Grant Program (HMGP) 5% funds, business community sponsors
Responsible party	Regional Emergency Managers Group; West Piedmont Planning District Commission; County/City Public Information Officer
Completion date	On-going
Status, 2011 Update	Implemented by individual jurisdictions. Not to be carried over as regional action.

Strategy 6.2.3. Work with local home improvement stores to provide workshops to residents on mitigation techniques.	
Affected Jurisdictions	All
Category	Public Information, Training and Preparedness
Hazard	All Hazards
Objective(s) addressed	6.2
Background	Many home improvement stores (i.e., Home Depot and Lowes) currently offer classes to customers on a variety of topics. Workshops on mitigation techniques for the home are an obvious follow-on to an already successful classroom process. Such mitigation workshops have been held successfully across the United States. Groups like the American Red Cross, Federal Emergency

	Management Agency Region 3, and the Virginia Department of Emergency Management may be available to jointly sponsor such workshops. More information can be found at: http://www.homedepot.com/HDUS/EN_US/corporate/corp_respon/prepare_respond.shtml
Priority	High
Funding sources	N/A
Responsible party	Regional Emergency Managers Group; West Piedmont Planning District Commission; Building Inspections
Completion date	On-going
Status, 2011 Update	Implemented by individual jurisdictions. Not to be carried over as regional action.

Strategy 6.4.1. Work with local media outlets to increase awareness of natural hazards. Implement seasonal hazard awareness weeks or days (e.g., hurricane preparedness week, winter weather awareness day).	
Affected Jurisdictions	All
Category	Public Information and Awareness
Hazard	All hazards
Objective(s) addressed	6.4
Background	A 2004 study sponsored by the American Red Cross and Wirthlin, a survey research firm, found that while Americans recognize the importance of being personally prepared for disaster, fewer than two in ten U.S. adults characterize themselves as very prepared. For people to take the steps to become prepared for disaster, they first must be aware of their risk. Media outlets (e.g., television, radio, print) can play an important role in raising awareness and encouraging personal responsibility to minimize the loss of life and property during a disaster. Public education campaigns can be tied to specific events (e.g., anniversary of a disaster) or to a particular hazard and

	time of year (e.g., tornado preparedness day in the late spring).
Priority	Medium
Funding sources	FEMA/HMGP 5% funds, VDEM, local government operating budgets, private sources
Responsible party	Regional Emergency Managers Group; West Piedmont Planning District Commission; County/City Public Information Officer
Completion date	On-going
Status, 2011 Update	Implemented by individual jurisdictions. Not to be carried over as regional action.

Strategy 6.4.2. Work with the Roanoke office of the National Weather Service to promote the "Turn Around, Don't Drown" public education campaign.	
Affected Jurisdictions	All
Category	Public Information and Awareness
Hazard	Flood
Objective(s) addressed	6.4
Background	Flooding causes more deaths than any other severe weather related hazard. Many of the deaths occur in automobiles as they are swept away by floodwaters. The West Piedmont region has seen its share of driver and passenger fatalities. The National Weather Service has developed a public education campaign, "Turn Around, Don't Drown," to educate drivers about the hazards flood waters pose. A range of public education materials, such as brochures, signs, and Public Service Announcements, already have been developed by the National Weather Service for use by its local office and local government. Local jurisdictions should identify commonly flooded intersections and prioritize signage for these areas to inform drivers of the risks.

Priority	Medium
Funding sources	National Weather Service
Responsible party	Regional Emergency Managers Group; West Piedmont Planning District Commission; County/City Public Information Officer
Completion date	Six months after plan approval
Status, 2011 Update	Implemented by individual jurisdictions. Not to be carried over as regional action.

Individual Actions

Each jurisdiction selected and prioritized mitigation strategies for their jurisdiction. The top five to seven strategies for each jurisdiction are described be more in more detail.

City of Danville

Strategy 1.1.1. Increase flood warning capabilities, particularly as they relate to dam failure.	
Affected Jurisdictions	City of Danville
Category	Emergency Services
Hazard	Flood
Objective(s) addressed	1.1
Background	The City of Danville has six dams within its limits. Three of these dams would have a high impact if they were to fail. In addition, the rivers that flow through Danville are subject to flooding due to high rainfall or other natural events. The Integrated Flood Observation and Warning System (I-FLOWS) is one method to improve flood warning. I-FLOWS relies on radio reporting rain and stream gauges which provide rainfall and stream level data via radio and satellite to counties, the state and the National Weather Service (NWS). Actual rainfall is compared with NWS Flash Flood Guidance (FFG), and alarms are triggered at various preset levels related to the FFG. The I-FLOWS computers at the county and all sites on the satellite network alarm with both an audible and

	a visual signal when rainfall or stream levels reach levels that can lead to flash flooding.
Priority	High
Funding sources	National Resource Conservation Service; FEMA Dam Safety Program; NWS
Responsible party	Public Works; VA DCR; NWS; local watershed organizations
Completion date	On-going
Status, 2011 Update	In progress; dam studies and inundation zones are being mapped

Strategy 1.1.2. Investigate, develop, or enhance Reverse 911 system or other public notification system. Investigate possible funding sources.	
Affected Jurisdictions	City of Danville
Category	Emergency Services, Public Information
Hazard	All hazards
Objective(s) addressed	1.1
Background	Reverse 911 systems have a variety of functions including the ability to provide public warning during emergency events. This information can be targeted to a particular geographic area or to people with common characteristics (e.g., Community Emergency Response Team members). Some systems also allow you to provide text messages to pagers and other wireless devices. This system greatly increases a community's ability to quickly and efficiently provide warnings to its citizens. Information can be delivered in a variety of languages and means. Other mass notification options include low-power FM or AM radio stations, Internet-based warning systems, and on-demand text or voice notification systems.

Priority	High
Funding sources	Homeland Security Grant Program
Responsible party	Public Safety
Completion date	1st quarter of 2007
Status, 2011 Update	Completed

Strategy 1.2.1. Investigate need for regional stormwater management plan.	
Affected Jurisdictions	City of Danville
Category	Prevention
Hazard	Flood
Objective(s) addressed	1.2
Background	The City of Danville's Comprehensive Plan recognizes that stormwater poses a major problem for the city. The problem is particularly acute for older neighborhoods where the drainage system is antiquated. The plan suggests that a comprehensive stormwater management plan be developed including improved drainage solutions for older neighborhoods that experience flooding. Projects could be supported through the Capital Improvements Plan. A regional stormwater management plan addresses stormwater-related water quality and water quantity impacts of new and existing land uses in a drainage area, and is developed on a drainage area basis, and is not limited to on-site stormwater management measures. A regional stormwater management approach would require the City to work with the County on identifying the impacts of development on water quality and quantity and to determine ways to minimize these impacts. VDOT also will need to be involved in the planning effort. The plan also could help meet stormwater pollution control goals under EPA's National Pollutant Discharge Elimination System.

Priority	High
Funding sources	U.S. EPA; USDA/NRCS [Watershed Surveys and Planning]; Army Corps of Engineers/Section 22 Planning Assistance to States (PAS); Army Corps of Engineers/Flood Plain Management Services (FPMS)]
Responsible party	Planning, Public Works
Completion date	On-going
Status, 2011 Update	Not started due to funding and personnel constraints

Strategy 3.2.1. Investigate all public utility lines to evaluate their resistance to flood, wind, and winter storm hazards.	
Affected Jurisdictions	City of Danville
Category	Property Protection
Hazard	Flood, wind, winter storm
Objective(s) addressed	3.2
Background	Public utility lines provide essential services to City residents. Many of the existing lines were installed many years ago and may be vulnerable to natural disasters. A comprehensive survey should be conducted to determine what, if any, portions of the lines and systems are vulnerable to natural disasters. The results of this survey can be used to create a schedule for replacement and/or hardening of the lines
Priority	High
Funding sources	City funds
Responsible party	Public Utilities
Completion date	On-going
Status, 2011 Update	On-going

Strategy 3.3.1. Evaluate existing stormwater system to determine if it is adequate for existing (or future) flood hazards.	
Affected Jurisdictions	City of Danville
Category	Prevention
Hazard	Flood
Objective(s) addressed	3.3
Background	Stormwater systems are used to hold back stormwater runoff to control flooding and settle out pollutants and debris, thereby improving water quality. The systems have many elements including catch basins, manholes, pipes, drywells, and detention systems. A stormwater system is designed for a certain capacity based on the projected runoff. As communities grow, the amount of runoff may increase and eventually exceed the amount that the system was designed to handle. Additional capacity may be needed to handle the increased runoff.
Priority	High
Funding sources	Capital Improvements Program
Responsible party	Public Works
Completion date	On-going
Status, 2011 Update	On-going

Strategy 3.3.6 Evaluate need for replacement of culverts that run beneath buildings in the downtown area. Culverts are antiquated and are in danger of collapse, which could lead to both the collapse of the buildings above them and increased flood risk.	
Affected Jurisdictions	City of Danville
Category	Structural Projects; Property Protection
Hazard	Flood; Subsidence
Objective(s) addressed	3.3.6

Background	Danville was founded in the late 1700s. A great deal of the City's downtown area was built in the mid-1800s. Running underneath these historic buildings are culverts, which are antiquated and in danger of collapse. Collapse of these culverts could lead to both the collapse of the buildings above them and increased flood risk.
Priority	High
Funding sources	PDM; HMGP; CIP
Responsible party	Public Works
Completion date	On-going
Status, 2011 Update	In progress (Unnumbered in 2006 plan on pages VII-42 and VII-59)

Strategy 3.4.2. Identify funding opportunities to replace vulnerable or undersized culvert stream crossings with bridges or larger culverts to reduce flood hazards.	
Affected Jurisdictions	City of Danville
Category	Structural Projects
Hazard	Flood
Objective(s) addressed	3.4
Background	The parts of roads that cross water bodies, such as streams, can be particularly vulnerable to flooding. Numerous roads in the City use culvert-style crossings to span small streams. If these culverts are too small to handle floodwaters or become clogged with debris, flooding of the road can result. Arnett Boulevard along Apple Branch is of particular concern. The drainage culvert makes a turn in this area, reducing its capacity. The culvert often overflows causing flooding in adjacent buildings.
Priority	High
Funding sources	FEMA, VDOT

Responsible party	Public Works
Completion date	On-going
Status, 2011 Update	Completed

Strategy 5.1.1. Develop Continuity of Operations plan.	
Affected Jurisdictions	City of Danville
Category	Emergency Services
Hazard	All Hazards
Objective(s) addressed	5.1
Background	The ability of state and local governments to carry out their executive, legislative and judicial functions effectively and efficiently during or following a disaster or emergency is dependent on sound preparedness and planning. The development and maintenance of a viable Continuity of Operations Plan (COOP) and capability at each level of government is critical to save lives and protect the public health and well-being, protect property and preserve assets, maintain functionality, and maintain essential government operations and services. Danville does not have a Continuity of Operations Plan. This plan can be developed as a stand alone product and integrated into the next rewriting of the City's Emergency Operations Plan. The City may want to consider establishing a steering committee to facilitate development of the plan. Once the plan is written, it should be validated with a series of exercises.
Priority	High
Funding sources	Departmental budget
Responsible party	City of Danville Department of Emergency Services
Completion date	Within 3 years of plan adoption

Status, 2011 Update	New

Strategy 6.4.3. Identify public information strategies for various hazards .	
Affected Jurisdictions	City of Danville
Category	Public Information and Awareness
Hazard	All Hazards
Objective(s) addressed	6.4
Background	In the past, the City of Danville has worked with the local cable access channel to develop television programming related to disaster preparedness and hazard mitigation. The City should consider resuming this practice through public service announcements and dedicated programming.
Priority	High
Funding sources	Departmental budget
Responsible party	City of Danville Planning Division
Completion date	On-going
Status, 2011 Update	New

Strategy 8.1.4. Collect additional information on undocumented, privately-owned dams.	
Affected Jurisdictions	City of Danville
Category	Public Information and Awareness
Hazard	Dam Failure
Objective(s) addressed	8.1
Background	In addition to several low-head dams that were built as part of factories and mills, Danville has several embankment dams that are privately owned. In general, these dams were built prior to the development of dam regulations, therefore

	physical information such as level of protection, structural stability, and maintenance requirements are unknown. The City should continue to use GIS data and aerial imagery to identify the locations of all privately owned dams in Danville. The City should also work with private owners to evaluate the structural stability of the dams and identify any maintenance requirements. The City should also continue to consider hazards related to dam failure in developing and enforcing building permits and zoning requirements.
Priority	High
Funding sources	Departmental budget
Responsible party	City of Danville Planning Division
Completion date	On-going
Status, 2011 Update	New

Franklin County

Strategy: Increase flood warning capabilities, particularly as they relate to dam failure. Improve signage and warning systems near dams (Combination of 1.1.1 and 6.1.7).	
Affected Jurisdictions	Franklin County
Category	Emergency Services
Hazard	Flood
Objective(s) addressed	1.1, 6.1
Background	Franklin County has a number of dams within its limits. A number of low-head dams were installed as part of factories and mills that no longer exist, and when flows are high, recreational kayakers, fishes, and other users may not be able to see those dams. The Integrated Flood Observation and Warning System (I-FLOWS) is one method to improve flood warning. I-FLOWS relies on radio reporting rain and stream gauges which provide rainfall and stream level data via radio and satellite to

	counties, the state and the National Weather Service (NWS). Actual rainfall is compared with NWS Flash Flood Guidance (FFG), and alarms are triggered at various preset levels related to the FFG. The I-FLOWS computers at the county and all sites on the satellite network alarm with both an audible and a visual signal when rainfall or stream levels reach levels that can lead to flash flooding.
Priority	High
Funding sources	National Resource Conservation Service; FEMA Dam Safety Program; NWS
Responsible party	Public Works; VA DCR; NWS; local watershed organizations
Completion date	4th quarter of 2012
Status, 2011 Update	On-going

Strategy 1.1.2. Investigate, develop, or enhance Reverse 911 system or other public notification system. Investigate possible funding sources.	
Affected Jurisdictions	Franklin County
Category	Emergency Services, Public Information
Hazard	All hazards
Objective(s) addressed	1.1
Background	Reverse 911 systems have a variety of functions including the ability to provide public warning during emergency events. This information can be targeted to a particular geographic area or to people with common characteristics (e.g., Community Emergency Response Team members). Some systems also allow you to provide text messages to pagers and other wireless devices. This system greatly increases a community's ability to quickly and efficiently provide warnings to its citizens. Information can be delivered in a variety of languages and means. Other mass notification options include low-power FM or AM radio stations, Internet-based warning systems, and on-

	demand text or voice notification systems.
Priority	High
Funding sources	Homeland Security Grant Program
Responsible party	Public Safety
Completion date	1st quarter of 2007
Status, 2011 Update	Completed

Strategy 1.2.4. Work with the Virginia Department of Forestry (VDOF) to review local zoning and subdivision ordinances to identify areas to include wildfire mitigation principles.	
Affected Jurisdictions	Franklin County
Category	Prevention
Hazard	Wildfire
Objective(s) addressed	1.2
Background	Zoning and subdivision ordinances are some of the most important tools that local governments can use in determining where and what type of development should occur in their community. The Virginia Department of Forestry, as part of the FIREWISE program, has developed model ordinances that communities can adopt to reduce their risk to wildfires. The department will conduct a review of existing local zoning and subdivision ordinances to identify areas where wildfire mitigation principles could be incorporated. The review does not obligate the County to adopt the recommendations but rather gives the County an opportunity to have a wildfire mitigation expert provide feedback on existing regulations.
Priority	High

Funding sources	VDOF
Responsible party	Public Safety, VDOF
Completion date	Spring 2007
Status, 2011 Update	Not started; economic downturn has meant little development in the WUI and therefore little need to implement this action

Strategy 1.2.12. Ensure that building codes reflect historic snow loads.	
Affected Jurisdictions	Franklin County
Category	Property Protection
Hazard	Winter Storms
Objective(s) addressed	1.2
Background	In recent years, Franklin County has experienced a number of roof collapses due to heavy snow loads. The County should work with the buildings department to ensure that the snow provisions in the Virginia Uniform Statewide Building Code (USBC) reflect recent snow loads experienced in the area, and to ensure that those provisions are enforced. If the USBC snow loads do not sufficiently address recent snow loads, the County and the buildings department should work to develop and adopt local provisions that increase snow load requirements for new construction.
Priority	High
Funding sources	Public Safety, Building Department
Responsible party	Public Safety
Completion date	On-going
Status, 2011 Update	New

Strategy 3.3.4. Investigate, develop and/or implement a channel maintenance program consisting of routine inspections and subsequent debris removal to ensure free flow of water in local streams and watercourses. Identify funding opportunities including partnering with local non-governmental or volunteer organization.	
Affected Jurisdictions	Franklin County; Town of Boones Mill
Category	Structural Project
Hazard	Flood
Objective(s) addressed	3.3
Background	Waterways should be cleared of debris to allow for the free flow of water during a flood event. If streams or rivers are clogged with debris, damming could occur. As a result, areas upstream and adjacent to the unintended dam can receive unanticipated higher flood levels. In addition, downstream areas may be vulnerable to higher flooding if and when the dam breaks. Maggodee Creek often floods the Town of Boones Mill and Route 220 (north of the town). Of particular concern is the portion of the creek between the Route 220 bridge and the railroad bridge. In order to reduce the flooding, it may require channel clearing or channel modification. The County and Town will work with Blue Ridge Soil and Water Conservation District to determine the most effective means of reducing the flood.
Priority	High
Funding sources	Grants
Responsible party	Public Safety, Boones Mill town manager, Planning and Zoning and VDOT
Completion date	Estimated start date summer 2006
Status, 2011 Update	In progress

Strategy 4.1.1. Identify need for backup generators, communications, and/or vehicles at critical public facilities. Develop means to address shortfall identified.	
Affected Jurisdictions	Franklin County
Category	Emergency Services
Hazard	All
Objective(s) addressed	4.1
Background	Weather conditions throughout the year can cause unexpected power outages that affect critical public facilities. These outages can happen during thunder storms, hurricanes, winter storms and other events. Generators are essential to providing reliable, immediate and full-strength power when primary power systems fail. Standby power is required by health care facilities, operations centers, food storage, essential building operations, correctional and security systems, water pumping stations, and 911 call centers. Generator hook-ups allow the county to have a supply of mobile generators that can be assigned based on needs (as opposed to buying a generator for each facility). In addition, this ensures that if a generator is sent somewhere it can actually be used because it can be hooked-up.
Priority	High
Funding sources	CIP; FEMA PDM
Responsible party	Public Safety; General Properties
Completion date	July 2007
Status, 2011 Update	Completed

Strategy 4.3.10. Replace culverts and raise roadway at Diamond Avenue and Highland Hills to prevent flooding.	
Affected Jurisdictions	Franklin County

Category	Property Protection
Hazard	Flood
Objective(s) addressed	4.3
Background	Diamond Avenue is the sole point of entry to the Diamond Avenue Extension subdivision. Multiple times per year, the intersection of Diamond Avenue and Highland Hills Road, which is at the entrance to the subdivision, floods due undersized culverts running beneath the road. The ensuing road closures prevent evacuation from the subdivision and prevent emergency services from accessing any of the 150 or more homes in the subdivision. The County should continue to work with VDOT to develop and implement mitigation strategies including replacing the culverts and raising the roadway. The County should also continue to work with private developers to build a secondary access road to the subdivision.
Priority	High
Funding sources	Public Safety, VDOT
Responsible party	Public Safety
Completion date	As funding is available
Status, 2011 Update	New

Strategy 5.1.1. Develop Continuity of Operations plan.	
Affected Jurisdictions	Franklin County
Category	Emergency Services
Hazard	All Hazards
Objective(s) addressed	5.1

Background	The ability of state and local governments to carry out their executive, legislative and judicial functions effectively and efficiently during or following a disaster or emergency is dependent on sound preparedness and planning. The development and maintenance of a viable Continuity of Operations Plan (COOP) and capability at each level of government is critical to save lives and protect the public health and well-being, protect property and preserve assets, maintain functionality, and maintain essential government operations and services. Franklin County does not have a Continuity of Operations Plan. This plan can be developed as a stand alone product and integrated into the next rewriting of the County's Emergency Operations Plan. The County may want to consider establishing a steering committee to facilitate development of the plan. Once the plan is written, it should be validated with a series of exercises.
Priority	High
Funding sources	Departmental budget.
Responsible party	Franklin County Department of Emergency Management
Completion date	2nd quarter of 2006
Status, 2011 Update	Completed

Strategy 5.1.8. Continue to evaluate sheltering plan to assess usefulness to community.	
Affected Jurisdictions	Franklin County
Category	Prevention
Hazard	Flood
Objective(s) addressed	5.1

Background	Franklin County's sheltering plan is under continual review and improvement. Recently, the County made changes to the plan to reflect public feedback received after winter storms led to power outages such as referring to shelters as "Aid Stations". The County should continue to evaluate the plan's usefulness based on public feedback and local response to when shelters are opened.
Priority	High
Funding sources	Public Safety
Responsible party	Public Safety
Completion date	On-going
Status, 2011 Update	New

Strategy 5.2.2. Provide training opportunities to local zoning and building code enforcement staff. Educate them re: damage assessment, mitigation techniques, and other related topics.	
Affected Jurisdictions	Franklin County
Category	Local Capacity
Hazard	All
Objective(s) addressed	5.2
Background	One key to successful enforcement of floodplain and other regulations is to ensure that staff are adequately trained and have the opportunity to learn about new standards and techniques. It is especially important that staff understand how damage assessments are conducted by state and federal officials. In addition, enforcement staff should be comfortable in making substantial damage determinations. Potential class topics could include: - Damage assessment - Substantial damage requirements - Floodproofing techniques

Priority	High
Funding sources	General fund; VDEM (minor funding needed)
Responsible party	Public Safety
Completion date	December 2005
Status, 2011 Update	Completed (Note: this has been done but community plans to continue to do it)

Strategy 5.2.3. Staff Emergency Management Office, Public Works, Building Inspections Office and Zoning Office at adequate levels.	
Affected Jurisdictions	Franklin County
Category	N/A
Hazard	All hazards
Objective(s) addressed	5.2
Background	These offices have limited staff. Existing staff have multiple roles and responsibilities. The limited amount of staff affects ability to fully enforce existing regulations and to implement new programs. Additional staff is required. When an emergency occurs, staff quickly become overextended and may be unable to fulfill all duties from normal roles and emergency roles.
Priority	High
Funding sources	County budget
Responsible party	Board of Supervisors; Department heads
Completion date	4th quarter of 2006 and on-going
Status, 2011 Update	In progress; awaiting funding

Strategy 6.2.2. Encourage purchase of and training on the use of NOAA radios. Provide NOAA weather radios to public facilities.	
Affected Jurisdictions	Franklin County
Category	Public Information and Awareness
Hazard	All
Objective(s) addressed	6.2
Background	NOAA Weather Radio (NWR) continuously broadcasts National Weather Service forecasts, warnings and other crucial weather information. The radios can be programmed to receive information specific to a certain area, using the Specific Area Message Encoder (SAME) feature, and can sound an alarm to alert users of approaching dangerous weather. NWR now broadcasts warning and post-event information for all types of hazards, both natural (such as earthquakes and volcano activity) and technological (such as chemical releases or oil spills). NWR receivers can be purchased at many retail stores that sell electronic merchandise. Prices can vary from $20 to $200, depending on the model. Many receivers have an alarm feature, but some may not. Users should be trained how to use the receivers. In particular, users should learn how to set alerts specific to their area.
Priority	High
Funding sources	National Weather Service (NWS), county budget
Responsible party	Public Safety
Completion date	July 1, 2006
Status, 2011 Update	Completed

Strategy 7.1.2. Consider participating in the *StormReady* program sponsored by the National Weather Service.	
Affected Jurisdictions	Franklin County
Category	Public Information; Emergency Services
Hazard	All
Objective(s) addressed	7.2
Background	*StormReady* is a nationwide community preparedness program that uses a grassroots approach to help communities develop plans to handle all types of severe weather. The program has several requirements based on the size of the participating community. The requirements for a community the size of Franklin County are: • Established 24 hr Warning Point (WP) • Establish Emergency Operations Center (EOC) • Four (4) ways for EOC/WP to receive NWS warning, etc. • Four (4) ways to monitor hydrometerological data • Four (4) ways for EOC/WP to disseminate warnings • Placing NWR-SAME receivers in public facilities • Four (4) annual weather safety talks • Train spotters and dispatchers biennially • Host/co-host annual NWS spotter training • Formal hazardous weather operations plan • Biennial visits by emergency manager to NWS • Annual visits by NWS official to community
Priority	High
Funding sources	N/A
Responsible party	Public Safety
Completion date	July 2006

Status, 2011 Update	Completed

Henry County

Strategy 1.1.1. Increase flood warning capabilities, particularly as they relate to dam failure.	
Affected Jurisdictions	Henry County
Category	Emergency Services
Hazard	Flood
Objective(s) addressed	1.1
Background	The Integrated Flood Observation and Warning System (I-FLOWS) is one method to improve flood warning. I-FLOWS relies on radio reporting rain and stream gauges which provide rainfall and stream level data via radio and satellite to counties, the state and the National Weather Service (NWS). Actual rainfall is compared with NWS Flash Flood Guidance (FFG), and alarms are triggered at various preset levels related to the FFG. The I-FLOWS computers at the county and all sites on the satellite network alarm with both an audible and a visual signal when rainfall or stream levels reach levels that can lead to flash flooding. Henry County has determined that additional I-FLOWS gauges are needed to provide adequate coverage across the county.
Priority	High
Funding sources	National Resource Conservation Service; FEMA Dam Safety Program; NWS
Responsible party	Public Works; VA DCR; NWS; local watershed organizations
Completion date	4th quarter of 2007
Status, 2011 Update	Completed

Strategy 1.1.4. Mitigation projects that will result in protection of public or private property from natural hazards. Eligible projects include, but are not limited to:

- Acquisition of hazard prone properties
- Elevation of flood prone structures
- Minor structural flood control projects
- Relocation of structures from hazard prone areas
- Retrofitting of existing buildings and facilities
- Retrofitting of existing buildings and facilities for shelters
- Infrastructure protection measures
- Storm water management improvements
- Advanced warning systems and hazard gauging systems (weather radios, reverse-911,stream gauges, I-flows)
- Targeted hazard education
- Wastewater and storm water management improvements

Affected Jurisdictions	Henry County
Category	Mitigation, Elevation, Public Health and Safety
Hazard	Flood, Hurricane, Wind, Winter Storms
Objective(s) addressed	The West Piedmont Planning District Commission communities will support implementation of structural and non structural mitigation activities to reduce exposure to natural and man-made hazards.
Background	Numerous county buildings, critical infrastructure, and public facilities have experienced repetitive damage due to flooding and storm events. The structures will be mitigated to reduce or eliminate the potential for damage associated with natural hazards.
Priority	High
Funding sources	Project and structure-dependant; FEMA Hazard Mitigation Grant Program (HMGP) funding through a presidential declared disaster; non-disaster FEMA grant funding such as Pre-disaster Mitigation Program, Repetitive Flood Claims Program, Severe Repetitive Loss Program or Flood Mitigation Assistance Program. In addition, the Increased Cost of Compliance program can support mitigation efforts for properties with flood insurance policies. Housing programs

	and property owners can also provide funding.
Responsible party	Henry County Administrator or department as assigned, West Piedmont Planning District Commission or other appropriate agency (specific to specific project).
Completion date	On-going
Status, 2011 Update	On-going

Strategy 1.2.*. Continue to enforce zoning and building codes and to incorporate hazard mitigation principles into capital improvement plans to prevent/control construction within the floodplain (combination of 1.2.10 and 1.2.11).	
Affected Jurisdictions	Henry County
Category	Prevention
Hazard	Flood
Objective(s) addressed	1.2
Background	Zoning and building codes are powerful tools used to ensure that development does not occur in hazardous areas and that development is built safely. However, these regulations are only as good as they are implemented. Similarly, capital improvement plans can help to ensure that mitigation principles are considered in all new development and construction. A lack of enforcement of zoning regulations and building inspections is believed to have contributed to the extensive destruction caused by Hurricane Andrew in 1992. Enforcement of zoning and building codes is essential to maintain eligibility for future grants and other financial assistance. In addition, enforcement of the building code contributes to the Building Code Effectiveness Grading Schedule, conducted by the Insurance Services Organization. The score received on this schedule ultimately affects the personal insurance rates in a community.
Priority	High

Funding sources	County budget
Responsible party	Planning and Community Development
Completion date	On-going
Status, 2011 Update	On-going

Strategy 2.1.2. Identify existing disaster-prone structures that may benefit from mitigation measures such as, but not limited to, elevation or floodproofing techniques.	
Affected Jurisdictions	Henry County
Category	Prevention
Hazard	Flood
Objective(s) addressed	2.1
Background	Henry County's flood maps were updated and digitized in 2008. The new maps can be overlaid with tax parcel data and other property information and cross referenced with damage information, such as FEMA's Repetitive Loss database, to identify those structures that could most benefit from mitigation techniques such as elevation. New flood maps can also be used to evaluate the vulnerability of critical facilities such as water and wastewater treatment facilities to flooding. Identifying these vulnerabilities and potential mitigation techniques can help to reduce flood losses.
Priority	High
Funding sources	County budget
Responsible party	Planning and Community Development
Completion date	On-going
Status, 2011 Update	New

Strategy 4.2.3. Complete the ring berm around the Lower Smith River Wastewater Treatment Plant.	
Affected Jurisdictions	Henry County
Category	Structural
Hazard	Flood
Objective(s) addressed	4.2
Background	The Lower Smith River Wastewater Treatment Plant is located at a low point near the Smith River and is therefore prone to flooding. After Hurricane Fran, Public Assistance funding was used to construct a partial berm around the facility to protect it from inundation from the river. However, the berm is not complete, so the facility is still subject to river water inundation. The County should identify funding sources and fill the gap in the berm such that it is a complete ring around the facility (see scoping sheet).
Priority	High
Funding sources	FEMA Hazard Mitigation Assistance funding
Responsible party	Public Works
Completion date	On-going
Status, 2011 update	New

Strategy 5.2.3. Staff Emergency Management Office, Public Works, Building Inspections Office and Zoning Office at adequate levels.	
Affected Jurisdictions	Henry County
Category	N/A
Hazard	All hazards
Objective(s) addressed	5.2

Background	These offices have limited staff. Existing staff have multiple roles and responsibilities. The limited amount of staff affects ability to fully enforce existing regulations and to implement new programs. Additional staff is required. When an emergency occurs, staff quickly become overextended and may be unable to fulfill all duties from normal roles and emergency roles.
Priority	High
Funding sources	County budget
Responsible party	Board of Supervisors; Department heads
Completion date	On-going
Status, 2011 Update	On-going. Funding has been decreased, therefore this strategy is more important and more challenging than ever

Strategy 5.2.4. Evaluate the floodplain manager's roles and responsibilities.	
Affected Jurisdictions	Henry County
Category	N/A
Hazard	Flood
Objective(s) addressed	5.2
Background	The primary responsibility of a local floodplain administrator is to interpret, administer and implement the regulatory requirements of a jurisdiction's floodplain management ordinance. A local floodplain ordinance is required to meet the minimum requirements of the National Flood Insurance Program (NFIP) as set forth in 44CFR Part 60. A local floodplain manager's duties can include: • Working with residents and property owners to assure that new development and substantial improvements to existing development are undertaken in a manner that minimizes or eliminates future impacts from floods, • Working with other governmental departments within

	the jurisdiction to assure that activities conducted by their personnel do not violate the provisions of the local floodplain management ordinance, and • Conducting workshops to educate residents, property owners and the public-at-large about the flood risk in the community and how to effectively and legally avoid said risk. A floodplain manager is given the responsibility to protect lives and property through the effective administration of the regulatory requirements in the local ordinance. By doing so, the floodplain manger plays a key role in assuring the long-term sustainability of the community and the natural environment contained therein.
Priority	High
Funding sources	County funds
Responsible party	Planning
Completion date	4th quarter of 2005 (as of 2006 plan)/On-going (2011 plan)
Status, 2011 Update	On-going

Strategy 5.3.2. Link structure value data with tax parcel GIS database to increase accuracy of loss estimates.	
Affected Jurisdictions	Henry County
Category	N/A
Hazard	All
Objective(s) addressed	5.3
Background	Loss estimates in this mitigation plan are based on best available data. Oftentimes, the best available data is based on Census estimates at a county level. While this aggregate data provides the ability to perform a broad loss estimate, data improvements can be made. By linking structure value data (e.g., assessed value, replacement value) to parcel or structure footprint data, it would be possible to increase the accuracy of

	loss estimates. The increased accuracy would provide better information on where to make investments in future mitigation actions.
Priority	High
Funding sources	County funds
Responsible party	Planning; Tax Assessor; Emergency Management
Completion date	4th quarter of 2006
Status, 2011 Update	Completed

Strategy 6.2.2. Encourage purchase of NOAA radios. Provide NOAA weather radios to public facilities.	
Affected Jurisdictions	Henry County
Category	Public Information and Awareness
Hazard	All
Objective(s) addressed	6.2
Background	NOAA Weather Radio (NWR) continuously broadcasts National Weather Service forecasts, warnings and other crucial weather information. The radios can be programmed to receive information specific to a certain area, using the Specific Area Message Encoder (SAME) feature, and can sound an alarm to alert users of approaching dangerous weather. NWR now broadcasts warning and post-event information for all types of hazards, both natural (such as earthquakes and volcano activity) and technological (such as chemical releases or oil spills). NWR receivers can be purchased at many retail stores that sell electronic merchandise. Prices can vary from $20 to $200, depending on the model. Many receivers have an alarm feature, but some may not. Users should be trained how to use the receivers. In particular, users should learn how to set

	alerts specific to their area.
Priority	High
Funding sources	National Weather Service (NWS), county budget
Responsible party	Emergency Management
Completion date	July 1, 2006 and on-going
Status, 2011 update	On-going; weather radios were installed at all schools. The county has implemented an SMS-based alert system for emergency responders.

Strategy 6.4.1. Work with local media outlets to increase awareness of natural hazards. Implement seasonal hazard awareness weeks or days (e.g., hurricane preparedness week, winter weather awareness day).	
Affected Jurisdictions	Henry County
Category	Public Information and Awareness
Hazard	All Hazards
Objective(s) addressed	6.4
Background	A 2004 study sponsored by the American Red Cross and Wirthlin, a survey research firm, found that while Americans recognize the importance of being personally prepared for disaster, fewer than two in ten U.S. adults characterize themselves as very prepared. For people to take the steps to become prepared for disaster, they first must be aware of their risk. Media outlets (e.g., television, radio, print) can play an important role in raising awareness and encouraging personal responsibility to minimize the loss of life and property during a disaster. Public education campaigns can be tied to specific events (e.g., anniversary of a disaster) or to a particular hazard and time of year (e.g., hurricane preparedness week in the early summer).

Priority	High
Funding sources	FEMA/HMGP 5% funds, VDEM, local government operating budgets, private sources
Responsible party	County Public Information Officer; Emergency Management
Completion date	On-going
Status, 2011 update	On-going

City of Martinsville

Strategy 1.1.5: Extend and improve the tornado siren warning system.	
Affected Jurisdictions	City of Martinsville
Category	Emergency Services
Hazard	Tornado and other hazards
Objective(s) addressed	1.1
Background	The City of Martinsville has a tornado warning system in place. Public feedback has indicated that the siren system is a highly effective way to communicate the risk of an impending storm, but that the system is not extensive enough to serve the entire City. The City should conduct an inventory of warning sirens and use the inventory and additional public feedback to install new sirens.
Priority	High
Funding sources	Emergency Management, Planning Department
Responsible party	Emergency Management
Completion date	On-going
Status, 2011 Update	New

Strategy: Protect City's facilities to ensure continued functionality after disaster.

(combination of 3.1.2., 3.1.3., 4.1.1., 4.1.2.)	
Affected Jurisdictions	City of Martinsville
Category	Emergency Services
Hazard	All
Objective(s) addressed	3.1, 4.1
Background	A large generator placed on the City Hall Complex would supply emergency power to critical services such as City Administration, Police, Fire, and the Jail. The Middle School is the city's designated Emergency Shelter and therefore is in need of emergency power. We need to install equipment to easily connect a mobile generator to our Raw Water Pumping Station. As we move from our current contract with Synergy for electricity into the future we will be faced again with issue of peak demand. This in itself makes the idea of emergency generators easier to justify due to the ability to use them for peak shaving. It is estimated that a unit large enough to supply the City Hall Complex could cost $400K - $500K.
Priority	High
Funding sources	Capital Improvements Program, PDM, FEMA HMGP 5% funds
Responsible party	Electric Department
Completion date	Contingent on funds
Status, 2011 Update	On-going

Strategy: Address stormwater drainage issues. Consider increasing capacity of drainage pipes at Bridge Street. (Combination of 3.3.3, 3.3.4 and continue to maintain existing stormwater system and provide adequate capacity to handle stormwater).	
Affected Jurisdictions	City of Martinsville
Category	Structural Projects

Hazard	Flood
Objective(s) addressed	3.3.
Background	The focus of improvements is the area from the Rt. 221 Bridge Street to where Doe Run Creek crosses under Memorial Blvd. near Lavinder St. Some plans are already in motion to correct part of this problem area as local funds allow. As additional funding becomes available additional phases of the project would be addressed.
Priority	High
Funding sources	City CIP
Responsible party	Public Works Department
Completion date	4th quarter of 2009 and on-going
Status, 2011 Update	On-going efforts; limited by funding

Strategy 4.1.3: Develop contingency plans for utility providers.	
Affected Jurisdictions	City of Martinsville
Category	Prevention, Emergency Services
Hazard	All hazards
Objective(s) addressed	4.1
Background	The capacity of electrical providers to respond to power outages has been significantly reduced in recent years. The City should work with the procurement department to get contracts in place in advance to ensure that additional help is available in the event of a natural disaster. Advance contracts with additional providers can help to ensure that sufficient crews are available to respond to outages.
Priority	High

Funding sources	Emergency Management, Planning Department
Responsible party	Emergency Management
Completion date	On-going
Status, 2011 Update	New

Strategy 5.1.2. Develop debris management plan.	
Affected Jurisdictions	City of Martinsville
Category	Emergency Services
Hazard	Wind, winter storm, flood
Objective(s) addressed	5.1
Background	Wind and winter storms can cause tremendous amounts of downed trees or building damage. The debris from these events can be overwhelming to remove and dispose of for a municipality. The quantity and type of debris generated, its location, and the size of the area over which it is dispersed directly impacts the type of collection and disposal methods used to address the debris problem, associated costs incurred, and the speed with which the problem can be addressed. The City may have difficulty in locating staff, equipment, and funds to devote to debris removal, in the short as well as long term. The process for developing a debris management plan includes estimating debris amounts, preparing guidance to local governments on debris removal and disposal, contracting issues, temporary disposal sites, household hazardous waste disposal, contract monitoring, and reduction and disposal strategies. The City of Martinsville is scheduled to close its landfill this year and begin using a transfer station. Debris management will become a critical issue in the near future.
Priority	High

Funding sources	Homeland Security Grant Program
Responsible party	Public Works; Emergency Management
Completion date	As funding allows (critical need after January 2006)
Status, 2011 Update	Not started due to funding constraints and lack of support in other departments

Strategy: Educate the public about "sheltering in place" and other preparedness issues. (combination of 6.2.1. and 6.1.3.)	
Affected Jurisdictions	City of Martinsville
Category	Public Information
Hazard	Inorganic/Organic Spills
Objective(s) addressed	6.1, 6.2
Background	With a railroad passing through Martinsville in close proximity to residential areas, the possibility of a derailment that could require residents to "shelter in place" is high. "Sheltering in place" means to make a shelter out of the place you are in. Depending on the type of material released, leaving the area might take too long or place people in harm's way; in such cases, it may be safer for people to stay indoors than to go outside. The public needs to be educated about the benefits and practice of "sheltering in place." Other key preparedness messages include whom to call for information in the event of an impending disaster or after a disaster, how to develop a family emergency plan, and what things to include in a disaster preparedness kit.
Priority	High
Funding sources	FEMA/Hazard Mitigation Grant Program (HMGP) 5% funds
Responsible party	Emergency Management
Completion date	On-going

Status, 2011 Update	On-going

Patrick County

Strategy 1.1.1. Increase flood warning capabilities, particularly as they relate to dam failure.	
Affected Jurisdictions	Patrick County
Category	Emergency Services
Hazard	Flood
Objective(s) addressed	1.1
Background	The Integrated Flood Observation and Warning System (I-FLOWS) is one method to improve flood warning. I-FLOWS relies on radio reporting rain and stream gauges which provide rainfall and stream level data via radio and satellite to counties, the state and the National Weather Service (NWS). Actual rainfall is compared with NWS Flash Flood Guidance (FFG), and alarms are triggered at various preset levels related to the FFG. The I-FLOWS computers at the county and all sites on the satellite network alarm with both an audible and a visual signal when rainfall or stream levels reach levels that can lead to flash flooding. Patrick County has identified a need for additional rain and stream I-FLOWS gauges, particularly along the ridgeline in western portion of the County. In addition, the County needs the proper equipment to access information automatically (e.g., notification of impending flood conditions). The County has limited staff so it needs to be able to access information in the most efficient manner possible in order to respond efficiently.
Priority	High
Funding sources	United States Geological Survey (USGS); National Resource Conservation Service
Responsible party	Public Works; VA DCR; National Weather Service; USGS; local watershed organizations

Completion date	4th quarter of 2007
Status, 2011 Update	In progress

Strategy 1.1.2. Investigate, develop, or enhance Reverse 911 system or other public notification system. Investigate possible funding sources.	
Affected Jurisdictions	Patrick County
Category	Emergency Services, Public Information
Hazard	All hazards
Objective(s) addressed	1.1
Background	Reverse 911 systems have a variety of functions including the ability to provide public warning during emergency events. This information can be targeted to a particular geographic area or to people with common characteristics (e.g., Community Emergency Response Team members). Some systems also allow you to provide text messages to pagers and other wireless devices. This system greatly increases a community's ability to quickly and efficiently provide warnings to its citizens. Information can be delivered in a variety of languages and means. Other mass notification options include low-power FM or AM radio stations, Internet-based warning systems, and on-demand text or voice notification systems. Of particular concern are the homes near the Talbott Dam. These homes likely will not be able to hear the existing dam alert because of the distance from the alert siren. A Reverse 911 system is essential to reaching residents in a timely fashion.
Priority	High
Funding sources	Homeland Security Grant Program
Responsible party	Public Safety
Completion date	1st quarter of 2007

Status, 2011 Update	Completed

Strategy 1.1.3. Establish flood level markers along bridges and other structures to indicate the rise of water levels along creeks and rivers in potential flood-prone areas. Work with VDOT and other jurisdictions as needed.	
Affected Jurisdictions	Patrick County
Category	Public Awareness and Information
Hazard	Flood
Objective(s) addressed	1.1
Background	Many of the deaths that occur during flood events occur when people attempt to drive through floodwaters. Roads subject to flooding should be clearly marked with a gauge showing flood depths. The gauge should be visible to drivers to alert them to the flood conditions and depth of water on the road. There are several sections of roads in the County that are subject to localized flooding during heavy rains. *Particular areas include:* (to be added by County)
Priority	High
Funding sources	HMGP, VDOT, County funds
Responsible party	Public Works
Completion date	4th quarter of 2006 and on-going
Status, 2011 Update	In progress

Strategy 4.1.1. Identify need for backup generators, communications, and/or vehicles at critical public facilities. Develop means to address shortfall identified.	
Affected Jurisdictions	Patrick County
Category	Extend and improve siren warning system.

Hazard	All hazards
Objective(s) addressed	4.1
Background	The ability to recover quickly after a disaster rests, in part, on the community's ability to maintain critical functions during response and recovery. An important part of maintaining these critical functions is ensuring that the facilities and resources required are available after a disaster. An inventory and assessment should be completed for community critical facilities (e.g., Emergency Operations Center, Emergency Communications Center, public shelters) that examines the need for backup generators, communications and/or vehicles. Needs should be ranked and a plan developed to address the most critical needs first.
Priority	High
Funding sources	Capital Improvements Program, PDM, FEMA HMGP 5% funds
Responsible party	County Administrator
Completion date	2nd quarter of 2006
Status, 2011 Update	In progress; recently purchased several generators for shelters and critical facilities

Strategy 5.2.3. Staff Emergency Management Office, Public Works, Building Inspections Office and Zoning Office at adequate levels.	
Affected Jurisdictions	Patrick County
Category	N/A
Hazard	All hazards
Objective(s) addressed	5.2
Background	These offices have limited staff. Existing staff have multiple roles and responsibilities. The limited amount of staff affects ability to fully enforce existing regulations and to implement

	new programs. Additional staff is required. When an emergency occurs, staff quickly become overextended and may be unable to fulfill all duties from normal roles and emergency roles.
Priority	High
Funding sources	County budget
Responsible party	Board of Supervisors; Department heads
Completion date	4th quarter of 2006 and on-going
Status, 2011 Update	On-going

Strategy 6.2.2. Encourage purchase of NOAA radios. Provide NOAA weather radios to public facilities.	
Affected Jurisdictions	Patrick County
Category	Public Information and Awareness
Hazard	All
Objective(s) addressed	6.2
Background	NOAA Weather Radio (NWR) continuously broadcasts National Weather Service forecasts, warnings and other crucial weather information. The radios can be programmed to receive information specific to a certain area, using the Specific Area Message Encoder (SAME) feature, and can sound an alarm to alert users of approaching dangerous weather. NWR now broadcasts warning and post-event information for all types of hazards, both natural (such as earthquakes and volcano activity) and technological (such as chemical releases or oil spills). NWR receivers can be purchased at many retail stores that sell electronic merchandise. Prices can vary from $20 to $200, depending on the model. Many receivers have an alarm feature, but some may not. Users should be trained how to use the receivers. In particular, users should learn how to set

	alerts specific to their area.
Priority	High
Funding sources	National Weather Service (NWS), county budget
Responsible party	Emergency Management
Completion date	July 1, 2006
Status, 2011 Update	In progress

Strategy 8.2.2. Map water points in Patrick County and consider linking to the 911 System.	
Affected Jurisdictions	Patrick County
Category	Public Information and Awareness
Hazard	Wildfire
Objective(s) addressed	8.2
Background	When firefighters are sent to a wildfire, they are required to find the nearest watering point. The County should locate and map all of the fire hydrants available such that responders can easily identify watering points. The County should also consider linking fire hydrant location information to the 911 system such that the 911 dispatcher can tell responders where the nearest watering points are to the location of the wildfire.
Priority	High
Funding sources	County budget
Responsible party	Emergency Management
Completion date	On-going
Status, 2011 Update	New

Pittsylvania County

Strategy 1.1.2. Investigate, develop, or enhance Reverse 911 system or other public notification system. Investigate possible funding sources.	
Affected Jurisdictions	Pittsylvania County
Category	Emergency Services, Public Information
Hazard	All hazards
Objective(s) addressed	1.1
Background	Reverse 911 systems have a variety of functions including the ability to provide public warning during emergency events. This information can be targeted to a particular geographic area or to people with common characteristics (e.g., Community Emergency Response Team members). Some systems also allow you to provide text messages to pagers and other wireless devices. This system greatly increases a community's ability to quickly and efficiently provide warnings to its citizens. Information can be delivered in a variety of languages and means. Other mass notification options include low-power FM or AM radio stations, Internet-based warning systems, and on-demand text or voice notification systems.
Priority	High
Funding sources	Homeland Security Grant Program
Responsible party	Public Safety
Completion date	1st quarter of 2007
Status, 2011 Update	Completed

Strategy: Include an assessment and associated mapping of the jurisdiction's vulnerability to location-specific hazards and harness existing and new technologies to make appropriate recommendations for the use of these hazard areas in a future Comprehensive Plan (Combination of 1.2.2 and 8.2.1).	
Affected Jurisdictions	Pittsylvania County
Category	Prevention
Hazard	All hazards
Objective(s) addressed	1.2 and 8.2
Background	Situational awareness before, during, and after a disaster event is key to effective response and recovery. Mapping potential hazard areas and other critical information in a Geographic Information Systems (GIS) platform can help to ensure that every aspect of disaster management, from warning systems to incident management to identifying potential mitigation areas, is efficient and effective. Pittsylvania County has a sophisticated GIS program that combines tax parcel data and weather tracking information to provide continual assessments of potentially impacted areas from current storms. Using those capabilities to map vulnerable areas can help to improve emergency preparedness in the most hazard-prone areas of Pittsylvania County. Incorporation of this information into the comprehensive plan can help steer development away from these areas.
Priority	High
Funding sources	N/A
Responsible party	Emergency Management; County Administration
Completion date	On-going
Status, 2011 Update	New

Strategy 1.2.3. Incorporate (or continue to incorporate) mitigation principles into local emergency management and recovery plans.	
Affected Jurisdictions	Pittsylvania County
Category	Prevention
Hazard	All hazards
Objective(s) addressed	1.2.
Background	While mitigation is a phase of the emergency management cycle, it can not be successfully implemented by emergency mangers alone. The departments and agencies involved span planning, public works, economic development, and public safety. For mitigation to be truly successful, it must become part of local planning and decision-making. Mitigation concepts should be (or continue to be) integrated into local emergency management and recovery plans. As goals, objectives, and strategies are identified for these types of plans, efforts should be made to include mitigation explicit and implicitly. This mitigation plan can be adopted as an annex to the existing Emergency Operations Plan. This will help to ensure that mitigation is considered in the post-disaster environment.
Priority	High
Funding sources	N/A
Responsible party	Emergency Management; County Administration
Completion date	On-going
Status, 2011 Update	On-going

Strategy 1.2.5. Review and revise, if needed, local floodplain ordinances. Work with the state to coordinate a Community Assistance Visit to identify potential improvements or enhancements to existing floodplain management program.	
Affected Jurisdictions	Pittsylvania County
Category	Prevention
Hazard	Flood
Objective(s) addressed	1.2.
Background	Pittsylvania County's flood maps were recently updated. Updating the corresponding floodplain ordinances can help to ensure that the enforcement of floodplain management principles is in keeping with the most current data available.
Priority	High
Funding sources	N/A
Responsible party	Emergency Management; County Administration
Completion date	On-going
Status, 2011 Update	New

Strategy 1.2.11. Continue to enforce zoning and building codes to prevent/control construction within the floodplain.	
Affected Jurisdictions	Pittsylvania County
Category	Prevention
Hazard	Flood
Objective(s) addressed	1.2
Background	Zoning and building codes are powerful tools used to ensure that development does not occur in hazardous areas and that development is built safely. However, these regulations are only as good as they are implemented. A lack of enforcement of zoning regulations and building

	inspections is believed to have contributed to the extensive destruction caused by Hurricane Andrew in 1992. Enforcement of zoning and building codes is essential to maintain eligibility for future grants and other financial assistance. In addition, enforcement of the building code contributes to the Building Code Effectiveness Grading Schedule, conducted by the Insurance Services Organization. The score received on this schedule ultimately affects the personal insurance rates in a community.
Priority	High
Funding sources	County budget
Responsible party	Planning and Community Development
Completion date	On-going
Status, 2011 Update	On-going

Strategy 4.1.1. Identify need for backup generators, communications, and/or vehicles at critical public facilities. Develop means to address shortfall identified. Purchase and Install building generators at all of fire departments and rescue squads.	
Affected Jurisdictions	Pittsylvania County
Category	Emergency Services
Hazard	All
Objective(s) addressed	4.1
Background	Weather conditions throughout the year can cause unexpected power outages that affect critical public facilities. These outages can happen during thunder storms, hurricanes, winter storms and other events. Generators are essential to providing reliable, immediate and full-strength power when primary power systems fail. Standby power is required by health care facilities, operations centers, food storage, essential building operations, correctional and security systems, water pumping stations, and 911 call centers.

	Generator hook-ups allow the county to have a supply of mobile generators that can be assigned based on needs (as opposed to buying a generator for each facility). In addition, this ensures that if a generator is sent somewhere it can actually be used because it can be hooked-up.
Priority	High
Funding sources	CIP; FEMA PDM
Responsible party	Public Safety; General Properties
Completion date	On-going
Status, 2011 Update	New

Strategy 5.1.2. Develop a debris management plan.	
Affected Jurisdictions	Pittsylvania County
Category	Emergency Services
Hazard	Wind, winter storm, flood
Objective(s) addressed	5.1
Background	Wind and winter storms can cause tremendous amounts of downed trees or building damage. The debris from these events can be overwhelming to remove and dispose of for a municipality. The quantity and type of debris generated, its location, and the size of the area over which it is dispersed directly impacts the type of collection and disposal methods used to address the debris problem, associated costs incurred, and the speed with which the problem can be addressed. The City may have difficulty in locating staff, equipment, and funds to devote to debris removal, in the short as well as long term. The process for developing a debris management plan includes estimating debris amounts, preparing guidance to local governments on debris removal and disposal, contracting issues, temporary disposal sites, household hazardous waste disposal, contract monitoring, and reduction and disposal

	strategies.
Priority	High
Funding sources	Homeland Security Grant Program
Responsible party	Public Works; Emergency Management
Completion date	On-going
Status, 2011 Update	New

Strategy 5.1.6. Consider increasing local capacity to respond to hazardous materials incidents.	
Affected Jurisdictions	Pittsylvania County
Category	Emergency Services
Hazard	All
Objective(s) addressed	5.1
Background	Hazardous materials incidents can occur nearly anywhere, at any time, on any scale. A critical component of the ability to respond to hazardous materials incidents is proper training for first responders. This training can include education about common hazardous materials, setting quarantine zones or evacuation areas, and proper handling and cleaning of hazardous materials spills. Other actions could include ensuring that fire trucks and other local resources have the necessary equipment and protection to handle hazardous materials incidents; developing evacuation strategies and alternate routes for roadways in the event of a hazardous material incident; and developing memoranda of understanding with other jurisdictions with hazardous materials capabilities.
Priority	High
Funding sources	CIP; FEMA PDM

Responsible party	Public Safety; General Properties
Completion date	On-going
Status, 2011 Update	New

Strategy 5.1.7 Continue to implement the Community Emergency Response Team (CERT) program.	
Affected Jurisdictions	Pittsylvania County
Category	Emergency Services
Hazard	All
Objective(s) addressed	5.1
Background	The Community Emergency Response Team (CERT) Program educates people about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. Using the training learned in the classroom and during exercises, CERT members can assist others in their neighborhood or workplace following an event when professional responders are not immediately available to help. CERT members also are encouraged to support emergency response agencies by taking a more active role in emergency preparedness projects in their community (http://www.citizencorps.gov/cert/).
Priority	High
Funding sources	CIP; FEMA PDM
Responsible party	Public Safety; General Properties
Completion date	On-going
Status, 2011 Update	New

Strategy 5.3.1. Identify means to coordinate, collect and store damage assessment data in GIS format for each natural hazard event that causes death, injury and or property damage.	
Affected Jurisdictions	Pittsylvania County
Category	Emergency Services
Hazard	All hazards
Objective(s) addressed	5.3
Background	Collecting and managing damage assessment information is essential to an effective response and mitigation effort. By determining what happened and what the impacts are, communities are in a better position to respond initially to a disaster and to request additional assistance (e.g., state or federal). GIS systems can be used to effectively manage data and provide maps for emergency response planning and decision-making. This data analysis will help ensure that equipment and personnel can be better used, and assistance can be provided more quickly. This damage assessment information also can be used in future mitigation planning efforts. By capturing locally-specific accurate loss data, future hazard identification and risk assessments can be more detailed and accurate.
Priority	High
Funding sources	Departmental funds, HMGP 5% funds
Responsible party	Emergency Management, Planning Department, Building Department
Completion date	On-going
Status, 2011 Update	On-going; recently contracted to develop a damage assessment smart phone application to connect to existing GIS, VIPER, and WebEOC systems

Strategy 5.3.2. Link structure value data with tax parcel GIS database to increase accuracy of loss estimates.	
Affected Jurisdictions	Pittsylvania County
Category	N/A
Hazard	All
Objective(s) addressed	5.3
Background	Loss estimates in this mitigation plan are based on best available data. Oftentimes, the best available data is based on Census estimates at a county level. While this aggregate data provides the ability to perform a broad loss estimate, data improvements can be made. By linking structure value data (e.g., assessed value, replacement value) to parcel or structure footprint data, it would be possible to increase the accuracy of loss estimates. The increased accuracy would provide better information on where to make investments in future mitigation actions.
Priority	High
Funding sources	County funds
Responsible party	Planning; Tax Assessor; Emergency Management
Completion date	4th quarter of 2006 and on-going
Status, 2011 Update	On-going

Strategy 6.2.2. Encourage purchase of NOAA radios. Provide NOAA weather radios to public facilities.	
Affected Jurisdictions	Pittsylvania County
Category	Public Information and Awareness
Hazard	All

Objective(s) addressed	6.2
Background	NOAA Weather Radio (NWR) continuously broadcasts National Weather Service forecasts, warnings and other crucial weather information. The radios can be programmed to receive information specific to a certain area, using the Specific Area Message Encoder (SAME) feature, and can sound an alarm to alert users of approaching dangerous weather. NWR now broadcasts warning and post-event information for all types of hazards, both natural (such as earthquakes and volcano activity) and technological (such as chemical releases or oil spills). NWR receivers can be purchased at many retail stores that sell electronic merchandise. Prices can vary from $20 to $200, depending on the model. Many receivers have an alarm feature, but some may not. Users should be trained how to use the receivers. In particular, users should learn how to set alerts specific to their area.
Priority	High
Funding sources	National Weather Service (NWS), county budget
Responsible party	Emergency Management
Completion date	1st quarter of 2012
Status, 2011 Update	On-going

Strategy 6.3.4. Work on ways to reduce vulnerability of people with access and functional needs. (formerly 6.2.* in 2006 plan)	
Affected Jurisdictions	Pittsylvania County
Category	Public Information and Awareness
Hazard	All
Objective(s) addressed	6.2

Strategy 6.3.4. Work on ways to reduce vulnerability of people with access and functional needs. (formerly 6.2.* in 2006 plan)	
Background	According to *Saving Lives: Including People with Disabilities in Emergency Planning*, a report developed by the National Council on Disabilities, the concerns of people with disabilities are overlooked during emergencies. According to the Council, the term disability does not apply just to people whose disabilities are noticeable, such as wheelchair users and people who are blind or deaf. The term also applies to people with heart disease, emotional or psychiatric conditions, arthritis, significant allergies, asthma, multiple chemical sensitivities, respiratory conditions, and some visual, hearing, and cognitive disabilities. The report goes on to say that typical disaster preparedness and emergency response systems are designed for people without disabilities. In addition, access to emergency public warnings, as well as preparedness and mitigation information and materials, does not adequately include people who cannot depend on sight and hearing to receive their information. Pittsylvania County Emergency Management has worked with local service groups, local colleges and City of Danville to provide information and assistance to people with disabilities. Working together, the group provided workshops to help people with disabilities prepare for natural disasters and other emergencies. Continued outreach and assistance is needed to ensure that the vulnerability of people with access and functional needs in Pittsylvania County is minimized.
Priority	High
Funding sources	FEMA/Hazard Mitigation Grant Program (HMGP) 5% funds; local funds
Responsible party	Emergency Management

Strategy 6.3.4. Work on ways to reduce vulnerability of people with access and functional needs. (formerly 6.2.* in 2006 plan)	
Completion date	On-going
Status, 2011 Update	On-going

Strategy. Work with local media outlets and other partners to increase awareness of natural hazards. Implement seasonal hazard awareness weeks or days (e.g., hurricane preparedness week, winter weather awareness day) (Combination of 6.4.1, 6.2.3, and 6.3.5).	
Affected Jurisdictions	Pittsylvania County
Category	Public Information and Awareness
Hazard	All Hazards
Objective(s) addressed	6.2, 6.3, and 6.4
Background	A 2004 study sponsored by the American Red Cross and Wirthlin, a survey research firm, found that while Americans recognize the importance of being personally prepared for disaster, fewer than two in ten U.S. adults characterize themselves as very prepared. For people to take the steps to become prepared for disaster, they first must be aware of their risk. Media outlets (e.g., television, radio, print) can play an important role in raising awareness and encouraging personal responsibility to minimize the loss of life and property during a disaster. Partners such as the Chamber of Commerce can help to ensure that local businesses are prepared for natural disasters and can, in turn, help their customers reduce losses. Further, partnering with local home improvement stores can help give residents and local businesses the resources needed to protect property again damage. Public education campaigns can be tied to specific events (e.g., anniversary of a disaster) or to a particular hazard and time of year (e.g., hurricane preparedness week in the early summer).

Priority	High
Funding sources	FEMA/HMGP 5% funds, VDEM, local government operating budgets, private sources
Responsible party	County Public Information Officer; Emergency Management
Completion date	On-going
Status, 2011 Update	On-going

Strategy 7.1.1. Obtain official recognition of the mitigation working group/Mitigation Advisory Committee (MAC) from the jurisdictions in the Planning District in order to help institutionalize and develop an On-going mitigation program. Use the MAC to review mitigation projects and coordinate multi-jurisdictional grant applications.	
Affected Jurisdictions	Pittsylvania County
Category	N/A
Hazard	All Hazards
Objective(s) addressed	7.1
Background	The Disaster Mitigation Act of 2000 (DMA2K) required local governments to develop and to adopt all hazard mitigation plans to be eligible for certain types of future disaster assistance including funds for mitigation activities. The West Piedmont Planning District Commission formed a multi-jurisdictional committee to oversee hazard mitigation planning efforts for the West Piedmont Region. Each of the participating jurisdictions was represented on the committee. One way to increase the effectiveness of such committees and ensure long-term plan implementation is to bestow official status to them. In addition, a formalized committee will allow communities to share the workload when implementing regional activities. The region intends to utilize the Regional Emergency Mangers Group as the core of a working group coordinated by the West Piedmont Planning District Commission (see Section VIII for further details).

Priority	High
Funding sources	N/A
Responsible party	Board of Supervisors
Completion date	Immediately following plan approval/On-going
Status, 2011 Update	On-going

Strategy 7.1.2. Consider participating in the *StormReady* program sponsored by the National Weather Service.	
Affected Jurisdictions	Pittsylvania County
Category	Public Information; Emergency Services
Hazard	All
Objective(s) addressed	7.2
Background	*StormReady* is a nationwide community preparedness program that uses a grassroots approach to help communities develop plans to handle all types of severe weather. The town would be interested in being included as part of Pittsylvania County participation. The program has several requirements based on the size of the participating community. The requirements for a community the size of Pittsylvania County are: • Established 24 hr Warning Point (WP) • Establish Emergency Operations Center (EOC) • Four (4) ways for EOC/WP to receive NWS warning, etc. • Four (4) ways to monitor hydrometerological data • Four (4) ways for EOC/WP to disseminate warnings • Placing NOAA Weather Radio receivers in public facilities • Four (4) annual weather safety talks • Train spotters and dispatchers biennially

	• Host/co-host annual NWS spotter training • Formal hazardous weather operations plan • Biennial visits by emergency manager to NWS • Annual visits by NWS official to community
Priority	High
Funding sources	N/A
Responsible party	Emergency Management
Completion date	3rd quarter of 2006 and On-going
Status, 2011 Update	On-going

Strategy 8.1.3. Use new flood maps to evaluate candidates for residential elevations and acquisitions.	
Affected Jurisdictions	Pittsylvania County
Category	Property Protection
Hazard	Flood
Objective(s) addressed	8.1
Background	The County should work with the State to use newly digitized flood maps, GIS, and past damage information to identify specific properties that may benefit from property protection measures. These measures include relocation or elevation. Dry or wet floodproofing may be options for non-residential structures. Other measures, such as elevation of appliances such as heating/air conditioning units, also may be appropriate.
Priority	High
Funding sources	FEMA HMGP; FEMA PDM; Community Development Block Grant/Virginia Disaster Recovery Program
Responsible party	Emergency Management

Completion date	On-going
Status, 2011 Update	New

Strategy 9.1.1. Develop Mutual Aid agreements for water source planning for wildfire.	
Affected Jurisdictions	Pittsylvania County
Category	Emergency Services
Hazard	All
Objective(s) addressed	9.1
Background	A key consideration for responding to wildfires in ensuring that there is sufficient water supply to suppress flames. The County should work with neighboring jurisdictions to develop Mutual Aid agreements for water source planning for wildfires.
Priority	High
Funding sources	Departmental budget
Responsible party	Public Safety
Completion date	On-going
Status, 2011 Update	New

Town of Boones Mill

Strategy 3.3.4. Investigate, develop and/or implement a channel maintenance program consisting of routine inspections and subsequent debris removal to ensure free flow of water in local streams and watercourses. Identify funding opportunities including partnering with local non-governmental or volunteer organization.	
Affected Jurisdictions	Franklin County; Town of Boones Mill
Category	Structural Project
Hazard	Flood

Objective(s) addressed	3.3
Background	Waterways should be cleared of debris to allow for the free flow of water during a flood event. If streams or rivers are clogged with debris, damming could occur. As a result, areas upstream and adjacent to the unintended dam can receive unanticipated higher flood levels. In addition, downstream areas may be vulnerable to higher flooding if and when the dam breaks. Maggodee Creek often floods the Town of Boones Mill and Route 220 (north of the town). Of particular concern is the portion of the creek between the Route 220 bridge and the railroad bridge. In order to reduce the flooding, it may require channel clearing or channel modification. The County and Town will work with Blue Ridge Soil and Water Conservation District to determine the most effective means of reducing the flood.
Priority	High
Funding sources	Grants
Responsible party	Public Safety, Boones Mill town manager, Planning and Zoning and VDOT
Completion date	Estimated start date summer 2006
Status, 2011 Update	No progress due to lack of funding. The status of the flood issues/channel clearing/channel modifications is unchanged. There have been no detailed studies on what could be done to prevent flooding with channel modifications/channel clearing so far, as the town has no funds to pay for a flood engineering study. If an engineering study is done and completed, then funding would have to be found to pay for the improvements as needed. The town does actively monitor debris/tree blockage along the creek banks and see that property owners remove such debris as required in our Flood Ordinance.

Town of Chatham

Strategy 1.2.11. Continue to enforce zoning and building codes to prevent/control construction within the floodplain.	
Affected Jurisdictions	Town of Chatham
Category	Prevention
Hazard	Flood
Objective(s) addressed	1.2
Background	Zoning and building codes are powerful tools used to ensure that development does not occur in hazardous areas and that development is built safely. However, these regulations are only as good as they are implemented. A lack of enforcement of zoning regulations and building inspections is believed to have contributed to the extensive destruction caused by Hurricane Andrew in 1992. Enforcement of zoning and building codes is essential to maintain eligibility for future grants and other financial assistance. In addition, enforcement of the building code contributes to the Building Code Effectiveness Grading Schedule, conducted by the Insurance Services Organization. The score received on this schedule ultimately affects the personal insurance rates in a community.
Priority	High
Funding sources	Town budget
Responsible party	Planning and Community Development
Completion date	On-going
Status, 2011 Update	On-going

Strategy 8.1.3. Use new flood maps to evaluate candidates for residential elevations and acquisitions.	
Affected Jurisdictions	Chatham

Category	Property Protection
Hazard	Flood
Objective(s) addressed	8.1
Background	The Town should work with the County and the State to use newly digitized flood maps, GIS, and past damage information to identify specific properties that may benefit from property protection measures. These measures include relocation or elevation. Dry or wet floodproofing may be options for non-residential structures. Other measures, such as elevation of appliances such as heating/air conditioning units, also may be appropriate.
Priority	High
Funding sources	FEMA HMGP; FEMA PDM; Community Development Block Grant/Virginia Disaster Recovery Program
Responsible party	Town manager
Completion date	On-going
Status, 2011 Update	New

Town of Gretna

Strategy 1.2.11. Continue to enforce zoning and building codes to prevent/control construction within the floodplain.	
Affected Jurisdictions	Town of Gretna
Category	Prevention
Hazard	Flood
Objective(s) addressed	1.2
Background	Zoning and building codes are powerful tools used to ensure that development does not occur in hazardous areas and that development is built safely. However, these regulations are only as good as they are implemented.

	A lack of enforcement of zoning regulations and building inspections is believed to have contributed to the extensive destruction caused by Hurricane Andrew in 1992. Enforcement of zoning and building codes is essential to maintain eligibility for future grants and other financial assistance. In addition, enforcement of the building code contributes to the Building Code Effectiveness Grading Schedule, conducted by the Insurance Services Organization. The score received on this schedule ultimately affects the personal insurance rates in a community.
Priority	High
Funding sources	Town budget; County budget
Responsible party	Planning and Community Development
Completion date	On-going
Status, 2011 Update	On-going

Strategy 4.1.1. Identify need for backup generators, communications, and/or vehicles at critical public facilities. Develop means to address shortfall identified.	
Affected Jurisdictions	Town of Gretna
Category	Emergency Services
Hazard	All hazards
Objective(s) addressed	4.1
Background	The ability to recover quickly after a disaster rests, in part, on the community's ability to maintain critical functions during response and recovery. An important part of maintaining these critical functions is ensuring that the facilities and resources required are available after a disaster. An inventory and assessment should be completed for community critical facilities (e.g., Emergency Operations Center, Emergency Communications Center, public shelters) that examines the need for backup generators, communications and/or vehicles. Needs should be ranked

	and a plan developed to address the most critical needs first.
Priority	High
Funding sources	Capital Improvements Program, PDM, FEMA HMGP 5% funds
Responsible party	Town Manager
Completion date	2nd quarter of 2006
Status, 2011 Update	Completed; have installed backup generators at water and wastewater treatment facilities

Strategy 4.2.1. Pursue upgrading of water systems to bring additional water sources on-line, to link community systems to provide redundancy, and to provide additional areas with non-well water.	
Affected Jurisdictions	Town of Gretna; Pittsylvania County
Category	Structural Project
Hazard	Drought
Objective(s) addressed	4.2
Background	In order for the town of Gretna to ensure it can continue to meet the water needs of its residents and businesses, especially as the town grows, there is a need to expand the existing water supply system to serve new and existing areas. The current water plant has a capacity of 0.434 million gallons per day (MGD). The reservoir has a capacity of 10 MGD. The town is currently working with Pittsylvania County on an estimated $7 million raw water intake project, partially funded by the U.S. Department of Housing and Urban Development, the Economic Development Administration and the Virginia Tobacco Indemnification and Community Revitalization Commission. The town, along with Pittsylvania County and the other towns in the County, is

	also pursuing implementation of a regional water system between Chatham, Gretna, and Hurt along Route 29 at an estimated cost of $3 million.
Priority	High
Funding sources	CDBG; U.S. EPA/State and Tribal Assistance Grant; EDA; Virginia Tobacco Indemnification and Community Revitalization Commission
Responsible party	Water Department (Town); Public Works (County)
Completion date	4th quarter of 2008
Status, 2011 Update	In progress; obtained permit to draw water from Whitethorn Creek and are currently designing a new intake structure

Strategy 7.1.1. Obtain official recognition of the mitigation working group/Mitigation Advisory Committee (MAC) from the jurisdictions in the Planning District in order to help institutionalize and develop an On-going mitigation program. Use the MAC to review mitigation projects and coordinate multi-jurisdictional grant applications.	
Affected Jurisdictions	Town of Gretna
Category	N/A
Hazard	All Hazards
Objective(s) addressed	7.1
Background	The Disaster Mitigation Act of 2000 (DMA2K) required local governments to develop and to adopt all hazard mitigation plans to be eligible for certain types of future disaster assistance including funds for mitigation activities. The West Piedmont Planning District Commission formed a multi-jurisdictional committee to oversee hazard mitigation planning efforts for the West Piedmont Region. Each of the participating jurisdictions was represented on the committee. One way to increase the effectiveness of such committees and ensure long-term plan implementation is to bestow official status to them. In addition, a formalized committee will allow communities to share the workload when implementing

	regional activities. The town of Gretna should appoint an official Town representative to the committee.
Priority	High
Funding sources	N/A
Responsible party	Town Council
Completion date	Immediately following plan approval
Status, 2011 Update	Completed

Town of Hurt

Strategy 1.1.2. Investigate, develop, or enhance Reverse 911 system or other public notification system. Investigate possible funding sources.	
Affected Jurisdictions	Town of Hurt
Category	Emergency Services, Public Information
Hazard	All hazards
Objective(s) addressed	1.1
Background	Reverse 911 systems have a variety of functions including the ability to provide public warning during emergency events. This information can be targeted to a particular geographic area or to people with common characteristics (e.g., Community Emergency Response Team members). Some systems also allow you to provide text messages to pagers and other wireless devices. This system greatly increases a community's ability to quickly and efficiently provide warnings to its citizens. Information can be delivered in a variety of languages and means. Other mass notification options include low-power FM or AM radio stations, Internet-based warning systems, and on-demand text or voice notification systems.

Priority	High
Funding sources	Homeland Security Grant Program
Responsible party	Public Safety
Completion date	On-going
Status, 2011 Update	New

Strategy 1.1.3. Establish flood level markers along bridges and other structures to indicate the rise of water levels along creeks and rivers in potential flood-prone areas. Work with VDOT and other jurisdictions as needed.	
Affected Jurisdictions	Town of Hurt
Category	Public Information; Emergency Services
Hazard	Flood
Objective(s) addressed	1.1
Background	Many of the deaths that occur during flood events occur when people attempt to drive through floodwaters. Roads subject to flooding should be clearly marked with a gauge showing flood depths. There is a need for a flood marker at Pocket Road (Rt. 924).
Priority	High
Funding sources	HMGP, VDOT, City funds
Responsible party	Public Works
Completion date	4th quarter of 2006
Status, 2011 Update	In progress; have markers on some bridges but not others

Strategy 1.2.11. Continue to enforce zoning and building codes to prevent/control construction within the floodplain.	
Affected Jurisdictions	Town of Hurt

Category	Prevention
Hazard	Flood
Objective(s) addressed	1.2
Background	Zoning and building codes are powerful tools used to ensure that development does not occur in hazardous areas and that development is built safely. However, these regulations are only as good as they are implemented. A lack of enforcement of zoning regulations and building inspections is believed to have contributed to the extensive destruction caused by Hurricane Andrew in 1992. Enforcement of zoning and building codes is essential to maintain eligibility for future grants and other financial assistance. In addition, enforcement of the building code contributes to the Building Code Effectiveness Grading Schedule, conducted by the Insurance Services Organization. The score received on this schedule ultimately affects the personal insurance rates in a community.
Priority	High
Funding sources	Town budget; County budget
Responsible party	Planning and Community Development
Completion date	On-going
Status, 2011 Update	On-going

Strategy: Consider providing backup power and necessary electrical hook-up, wiring, and switches to allow readily accessible connections to emergency generators at key critical public facilities (Combination of 4.1.1 and 4.1.2).	
Affected Jurisdictions	Town of Hurt
Category	Emergency Services
Hazard	All Hazards
Objective(s) addressed	4.1

Background	Weather conditions throughout the year can cause unexpected power outages that affect critical public facilities. These outages can happen during thunderstorms, hurricanes, winter storms and many other events. Generators are needed to provide reliable, immediate and full-strength power when primary power systems fail. Standby power is required for health care facilities, operations centers, food storage, essential building operations, correctional and security systems, water pumping stations, and 911 call centers. Generator hook-ups allow the county to have a supply of mobile generators that can be assigned based on needs (as opposed to buying a generator for each facility). Installing hook-ups ensures that generators can be used quickly wherever they are sent.
Priority	High
Funding sources	Department of Homeland Security (DHS)/Homeland Security Grant Program (HSGP); Capital Improvements Plan; PDM
Responsible party	Department of Emergency Management, Public Works
Completion date	2nd quarter of 2006
Status, 2011 Update	In progress; working on upgrading the pump station and identifying funds to purchase a generator

Strategy 7.1.1. Obtain official recognition of the mitigation working group/Mitigation Advisory Committee (MAC) from the jurisdictions in the Planning District in order to help institutionalize and develop an On-going mitigation program. Use the MAC to review mitigation projects and coordinate multi-jurisdictional grant applications.	
Affected Jurisdictions	Town of Hurt
Category	N/A
Hazard	All Hazards
Objective(s) addressed	7.1

Background	The Disaster Mitigation Act of 2000 (DMA2K) required local governments to develop and to adopt all hazard mitigation plans to be eligible for certain types of future disaster assistance including funds for mitigation activities. The West Piedmont Planning District Commission formed a multi-jurisdictional committee to oversee hazard mitigation planning efforts for the West Piedmont Region. Each of the participating jurisdictions was represented on the committee. One way to increase the effectiveness of such committees and ensure long-term plan implementation is to bestow official status to them. In addition, a formalized committee will allow communities to share the workload when implementing regional activities. The town of Hurt should appoint an official Town representative to the committee.
Priority	High
Funding sources	N/A
Responsible party	Town Council
Completion date	Immediately following plan approval/On-going
Status, 2011 Update	On-going

Strategy 7.2.1 Consider participating in the *StormReady* program sponsored by the National Weather Service.	
Affected Jurisdictions	Town of Hurt
Category	Public Information; Emergency Services
Hazard	All
Objective(s) addressed	7.2
Background	*StormReady* is a nationwide community preparedness program that uses a grassroots approach to help communities develop plans to handle all types of severe weather. The town would be interested in being included as part of Pittsylvania County participation.

	The program has several requirements based on the size of the participating community. The requirements for a community the size of Pittsylvania County are: • Established 24 hr Warning Point (WP) • Establish Emergency Operations Center (EOC) • Four (4) ways for EOC/WP to receive NWS warning, etc. • Four (4) ways to monitor hydrometerological data • Four (4) ways for EOC/WP to disseminate warnings • Placing NOAA Weather Radio receivers in public facilities • Four (4) annual weather safety talks • Train spotters and dispatchers biennially • Host/co-host annual NWS spotter training • Formal hazardous weather operations plan • Biennial visits by emergency manager to NWS • Annual visits by NWS official to community
Priority	High
Funding sources	N/A
Responsible party	Public Safety
Completion date	July 2006
Status, 2011 Update	In progress; working with County

Town of Ridgeway

Strategy 1.1.6. Install town emergency warning system.	
Affected Jurisdictions	Town of Ridgeway
Category	Emergency Services
Hazard	All hazards
Objective(s) addressed	1.1

Background	The Town of Ridgeway wishes to install an emergency warning system.
Priority	High
Funding sources	Grant funds
Responsible party	Town Mayor
Completion date	On-going
Status, 2011 Update	New

Strategy. Continue to enforce zoning and building codes and to incorporate hazard mitigation principles into capital improvement plans to prevent/control construction within the floodplain (combination of 1.2.10 and 1.2.11).	
Affected Jurisdictions	Town of Ridgeway
Category	Prevention
Hazard	All
Objective(s) addressed	1.2
Background	Zoning and building codes are powerful tools used to ensure that development does not occur in hazardous areas and that development is built safely. However, these regulations are only as good as they are implemented. A lack of enforcement of zoning regulations and building inspections is believed to have contributed to the extensive destruction caused by Hurricane Andrew in 1992. Enforcement of zoning and building codes is essential to maintain eligibility for future grants and other financial assistance. In addition, enforcement of the building code contributes to the Building Code Effectiveness Grading Schedule, conducted by the Insurance Services Organization. The score received on this schedule ultimately affects the personal insurance rates in a community.
Priority	High

Funding sources	Town budget
Responsible party	Planning and Community Development
Completion date	On-going
Status, 2011 Update	On-going

Strategy 4.3.2. Work with VDOT, private utilities, and/or private homeowners to trim or remove trees that could down power lines and block roads.	
Affected Jurisdictions	Town of Ridgeway
Category	Prevention; Natural Resource Protection
Hazard	Wind; winter storm
Objective(s) addressed	4.3
Background	Severe wind and heavy ice or snow loads can bring down tree limbs or entire trees. Trees are particularly vulnerable if they have been recently impacted by drought or previous storm events. An aggressive tree trimming and removal program should be undertaken to ensure that power line right of ways are clear of potential hazards. A system to identify trees with structural weaknesses should be developed. In addition, a means to communicate between responsible parties should be established so that potential problem spots can be addressed as they are identified by town and other staff. Because tree trimming may affect the existing tree canopy and resulting community appearance, it may require a public education campaign to explain the need for a tree trimming program.
Priority	High
Funding sources	Public/Private partnerships, Local funds
Responsible party	Town Manager, Dominion Power, Comcast, Verizon, VDOT
Completion date	On-going

Status, 2011 Update	On-going

Strategy 5.2.3. Staff Emergency Management Office, Public Works, Building Inspections Office and Zoning Office at adequate levels.	
Affected Jurisdictions	Town of Ridgeway
Category	N/A
Hazard	All hazards
Objective(s) addressed	5.2
Background	These offices have limited staff. Existing staff have multiple roles and responsibilities. The limited amount of staff affects ability to fully enforce existing regulations and to implement new programs. Additional staff is required. When an emergency occurs, staff quickly become overextended and may be unable to fulfill all duties from normal roles and emergency roles.
Priority	High
Funding sources	Town Budget
Responsible party	Board of Supervisors; Department heads
Completion date	On-going
Status, 2011 Update	On-going; funding has been decreased, therefore this strategy is more important and more challenging than ever

Strategy 6.2.1. Distribute information packets to raise awareness regarding the risks present in the West Piedmont region and to provide disaster preparedness information.	
Affected Jurisdictions	Town of Ridgeway
Category	Public Information and Awareness
Hazard	All Hazards
Objective(s) addressed	6.2

Background	The Town of Ridgeway is prone to wind, winter storms and other severe weather. It is imperative that residents are informed of preparedness information on how to prepare for the impacts of natural hazards. In addition, it is important to remind the population of the area that may have become complacent about the hazards and how to prepare for them. Key messages include whom to call for information in the event of an impending disaster or after a disaster, what things to include in a disaster preparedness kit and simple hazard specific mitigation measures each resident can take to reduce their risk. Other topics may include: flood insurance (including Increased Cost of Compliance coverage); sewer back-up insurance; potential wind-borne debris; sheltering in place.
Priority	High
Funding sources	FEMA/Hazard Mitigation Grant Program (HMGP) 5% funds; business community sponsors
Responsible party	Town manager/mayor
Completion date	On-going
Status, 2011 Update	County takes the lead on this strategy/On-going

Strategy 6.2.2. Encourage purchase of and training on the use of NOAA radios. Provide NOAA weather radios to public facilities.	
Affected Jurisdictions	Town of Ridgeway
Category	Public Information and Awareness
Hazard	All
Objective(s) addressed	6.2
Background	NOAA Weather Radio (NWR) continuously broadcasts National Weather Service forecasts, warnings and other crucial weather information. The radios can be programmed to receive information specific to a certain area, using the

	Specific Area Message Encoder (SAME) feature, and can sound an alarm to alert users of approaching dangerous weather. NWR now broadcasts warning and post-event information for all types of hazards, both natural (such as earthquakes and volcano activity) and technological (such as chemical releases or oil spills). NWR receivers can be purchased at many retail stores that sell electronic merchandise. Prices can vary from $20 to $200, depending on the model. Many receivers have an alarm feature, but some may not. Users should be trained how to use the receivers. In particular, users should learn how to set alerts specific to their area.
Priority	High
Funding sources	National Weather Service (NWS), county budget
Responsible party	Town manager
Completion date	On-going
Status, 2011 Update	County takes the lead on this strategy/On-going

Strategy 6.2.5. Educate residents and business owners about reducing possible wind-borne debris.	
Affected Jurisdictions	Town of Ridgeway
Category	Property Protection
Hazard	Wind
Objective(s) addressed	6.2
Background	Wind-borne debris can cause major damage during a high wind event such as a hurricane or tornado. The steps to reduce such debris can be fairly simple and inexpensive. Such steps may include anchoring storage sheds, moving outdoor furniture indoors, and trimming trees.
Priority	High

Funding sources	HMGP 5% funds; local funds
Responsible party	Town manager
Completion date	4th quarter of 2006
Status, 2011 Update	In progress

Strategy 6.3.2. Work with mobile home parks to identify and publicize nearby shelters for residents.	
Affected Jurisdictions	Town of Ridgeway
Category	Public Information and Awareness
Hazard	Wind
Objective(s) addressed	6.3
Background	Manufactured and mobile homes can be dangerous locations during a natural disaster. These structures can be particularly vulnerable to wind and flood damage. Mobile home parks may provide community shelters, or permanent structures that can be used to provide a safe place to go to for residents during a high wind or other event. The town will work with mobile home owners and residents to ensure that residents know where shelter can be found during a natural disaster. This effort may include identifying county shelters that might be opened.
Priority	High
Funding sources	Local funds
Responsible party	Town Manager
Completion date	2nd quarter of 2006 (2006 plan); As funding is available (2011 plan)
Status, 2011 Update	On-going

Town of Rocky Mount

Strategy 2.1.1. Investigate providing technical assistance for property owners to implement mitigation measures (i.e., strengthening building frame connections; elevating appliances, constructing a wind shelter).	
Affected Jurisdictions	Town of Rocky Mount
Category	Property Protection; Public Information and Awareness
Hazard	Flood
Objective(s) addressed	2.1
Background	A variety of mitigation techniques can be undertaken by homeowners to improve the resistance of their properties to natural hazards. The Town could develop a program to provide one-on-one technical assistance to homeowners to teach them how to implement mitigation measures in their homes. This program could include working with the County building department to distribute copies of existing publications that contain information on how to strengthen and repair homes.
Priority	High
Funding sources	HMGP 5%, local funds
Responsible party	Planning, Public Safety
Completion date	4th quarter of 2008
Status, 2011 Update	This has not been started. The town is not a building code regulator or enforcer. We have encouraged Franklin County to pursue this objective and we pursue it with what educational materials we produce.

Strategy 4.2.1. Pursue upgrading of water systems to bring additional water sources on-line, to link community systems to provide redundancy, and to provide additional areas with non-well water.	
Affected Jurisdictions	Town of Rocky Mount

Category	Structural Project
Hazard	Drought
Objective(s) addressed	4.2
Background	The town currently provides public water to residents within town limits. The existing water treatment plant is a Class II facility with 2.0 MGD capacity with expansion capabilities. The town and Franklin County are interested in working together to expand the reach of the system beyond the town limits. Expansion of the existing system's capacity may be needed if additional areas are brought on-line.
Priority	High
Funding sources	CDBG; U.S. EPA/State and Tribal Assistance Grant; EDA
Responsible party	Water Department (Town); Public Works (County)
Completion date	4th quarter of 2008 (2006 plan); As funding is available (2011 plan)
Status, 2011 Update	On-going. We have identified and are pursuing several options.

Strategy 4.3.1. Initiate (or encourage) road clearing efforts early in wind and winter storms. Develop plan for quick deployment of road clearing equipment.	
Affected Jurisdictions	Town of Rocky Mount
Category	Emergency Services
Hazard	Wind; winter storm
Objective(s) addressed	4.3
Background	Wind and winter storms can create tremendous amounts of debris which can block roads shutting down a community. Blocked roads also make it difficult for emergency vehicles to respond to disaster and to non-disaster related emergencies (e.g., 911 calls). The town should develop a plan for working with VDOT to

	ensure that roads are cleared quickly after an event to minimize the amount of time that the transportation network is shut down.
Priority	High
Funding sources	N/A
Responsible party	Town manager; Public Works
Completion date	On-going
Status, 2011 Update	On-going

Strategy 5.2.1. Identify training opportunities for staff to enhance their ability to use GIS for emergency management needs.	
Affected Jurisdictions	Town of Rocky Mount
Category	Emergency Services
Hazard	All hazards
Objective(s) addressed	5.2
Background	Emergency managers collect and manage a vast quantity of data -- before, during and after disasters. Much of this information comes from other departments and agencies and has a spatial component. Geographic Information Systems (GIS) provide a means to manage and share these datasets.
Priority	High
Funding sources	Departmental funds, FEMA
Responsible party	Planning and Zoning; Public Safety
Completion date	1st quarter of 2007 (2006 plan); on-going (2011 plan)
Status, 2011 Update	On-going. Franklin County handles emergency management in our area, but has developed a rich GIS information store and the town uses it with its public safety forces as well as county staff to prepare for emergency management.

Strategy 5.2.2. Provide training opportunities to local zoning and building code enforcement staff. Educate them re: damage assessment, mitigation techniques, and other related topics.	
Affected Jurisdictions	Town of Rocky Mount
Category	Local Capacity
Hazard	All
Objective(s) addressed	5.2
Background	One key to successful enforcement of floodplain and other regulations is to ensure that staff are adequately trained and have the opportunity to learn about new standards and techniques. It is especially important that staff understand how damage assessments are conducted by state and federal officials. In addition, enforcement staff should be comfortable in making substantial damage determinations. Potential class topics could include: - Damage assessment - Substantial damage requirements - Floodproofing techniques
Priority	High
Funding sources	Town funds; VDEM
Responsible party	Public Safety
Completion date	December 2005 (2006 plan); As funding is available (2011 plan)
Status, 2011 Update	On-going

Town of Stuart

Strategy 2.1.2. Identify existing disaster-prone structures that may benefit from mitigation measures such as, but not limited to, elevation or floodproofing techniques.	
Affected Jurisdictions	Town of Stuart

Category	Property Protection
Hazard	Flood
Objective(s) addressed	2.1, 1.3
Background	Three repetitive loss properties are located within the town limits of Stuart. These are the only repetitive loss properties in Patrick County. The town should work with the County and the State to use GIS and past damage information to identify specific properties that may benefit from property protection measures. These measures include relocation or elevation. Dry or wet floodproofing may be options for non-residential structures. Other measures, such as elevation of appliances such as heating/air conditioning units, also may be appropriate. Of particular concern is the downtown area of Stuart and the Nevermar area. There are numerous culverts under structures. These culverts may be at risk of failure, which could cause the collapse of the buildings above them. The town should monitor the status of the culverts.
Priority	High
Funding sources	FEMA HMGP; FEMA PDM; Community Development Block Grant/Virginia Disaster Recovery Program
Responsible party	Town manager
Completion date	2nd quarter of 2007 (2006 plan); As funding is available (2011 plan)
Status, 2011 Update	Not started – lack of funding

Strategy 3.2.3. Implement a program to seal and vent or raise sewer system components (i.e., manhole covers that are located in the 100-year flood plain or other areas identified as highly probable for flooding).	
Affected Jurisdictions	Town of Stuart
Category	Structural Projects

Hazard	Flood
Objective(s) addressed	3.2
Background	To maximize efficiency, sewer systems should be watertight and designed to minimize infiltration of stormwater. For example, manhole covers should be elevated above the Base Flood Elevation to reduce the risk that floodwaters would breach the manhole and overwhelm the sanitary sewer system. In addition, waste treatment facilities, including pumping stations, lagoons, and treatment plants should be floodproofed.
Priority	High
Funding sources	CDBG; U.S. EPA/State and Tribal Assistance Grant
Responsible party	Town manager; Public Works
Completion date	4th quarter of 2008 (2006 plan); As funding is available (2011 plan)
Status, 2011 Update	On-going

Strategy 4.1.1. Identify need for backup generators, communications, and/or vehicles at critical public facilities. Develop means to address shortfall identified.	
Affected Jurisdictions	Town of Stuart
Category	Emergency Services
Hazard	All hazards
Objective(s) addressed	4.1

Background	The ability to recover quickly after a disaster rests, in part, on the community's ability to maintain critical functions during response and recovery. An important part of maintaining these critical functions is ensuring that the facilities and resources required are available after a disaster. An inventory and assessment should be completed for community critical facilities (e.g., Emergency Operations Center, Emergency Communications Center, public shelters) that examines the need for backup generators, communications and/or vehicles. Needs should be ranked and a plan developed to address the most critical needs first.
Priority	High
Funding sources	Capital Improvements Program, PDM, FEMA HMGP 5% funds
Responsible party	Town Manager
Completion date	2nd quarter of 2006 (2006 plan); As funding is available (2011 plan)
Status, 2011 Update	On-going

Strategy 4.1.2. Consider providing necessary electrical hook-up, wiring, and switches to allow readily accessible connections to emergency generators at key critical public facilities.	
Affected Jurisdictions	Town of Stuart
Category	Emergency Services
Hazard	All Hazards
Objective(s) addressed	4.1
Background	Weather conditions throughout the year can cause unexpected power outages that affect critical public facilities. These outages can happen during thunderstorms, hurricanes, winter storms and many other events.

	Generators are needed to provide reliable, immediate and full-strength power when primary power systems fail. Standby power is required for health care facilities, operations centers, food storage, essential building operations, correctional and security systems, water pumping stations, and 911 call centers. Generator hook-ups allow the county to have a supply of mobile generators that can be assigned based on needs (as opposed to buying a generator for each facility). Installing hook-ups ensures that generators can be used quickly wherever they are sent.
Priority	High
Funding sources	Department of Homeland Security (DHS)/Homeland Security Grant Program (HSGP); Capital Improvements Plan; PDM
Responsible party	Town Manager
Completion date	2nd quarter of 2006 (2006 plan); As funding is available (2011 plan)
Status, 2011 Update	On-going

Section VIII. Plan Maintenance Procedures

The long-term success of the West Piedmont Planning District's mitigation plan depends in large part on routine monitoring, evaluating, and updating of the plan so that it will remain a valid tool for the communities to use.

Formal Plan Adoption

Thirteen local governments in south-central Virginia participated in this planning process and formally adopted this plan by resolution of their governing board. The adoption process itself took several months, as significant coordination by the Mitigation Advisory Committee was necessary in order to 1) place the plan review and adoption on the appropriate meeting agendas in each jurisdiction, 2) produce and provide copies in official meeting packets, 3) facilitate the actual adoption, 4) collect the adoption resolutions, and 5) incorporate the adopted resolutions into the final Hazard Mitigation Plan.

Implementation

Upon adoption, the plan faces the biggest test: ***implementation***. While this plan puts forth many worthwhile and "High" priority recommendations, the decision of which action to undertake first will be the primary issue that the West Piedmont Planning District communities face.

Funding is always an important and critical issue. Therefore, pursuing low or no-cost high-priority recommendations may be one approach that a community chooses to take. An example of a low-cost, high-priority recommendation would be to install flood level markers on bridges to warn of high water levels.

Another implementation approach is to prioritize those actions that can be completed in a relatively short amount of time. Being able to publicize a successful project can build momentum to implement the other parts of the plan. An example of an effective but easy-to-implement strategy is to participate in the National Weather Service's *StormReady* program.

It is important to the long-term implementation of the plan that the underlying principles of this Hazard Mitigation Plan are incorporated into other community plans and mechanisms, such as:

- Comprehensive Planning
- Stormwater Management Plans
- Capital Improvement Program Budgeting

- Emergency Operations Plans
- Disaster Recovery Plans

The capability assessment section of this plan provides insight into the current comprehensive plans for each community. The emergency management coordinator for each jurisdiction will provide a copy of this plan to the planning director and work with them to ensure that the appropriate information from this plan is incorporated into the next update of their comprehensive plan. Information from the hazard identification and risk assessment as well as mitigation goals and strategies may be directly included as a comprehensive plan element or will be included in other elements, as appropriate. Projects that require large investments, such as acquisition or road retrofits, are candidates for inclusion in capital improvement plans.

Mitigation is most successful when it is incorporated within the day-to-day functions and priorities of government and development. This integration is accomplished by a constant effort to network and to identify and highlight the multi-objective, "win-win" benefits to each program, the communities and their constituents. This effort is achieved through monitoring agendas, attending meetings, and sending memos.

Simultaneous to these efforts, it will be important to constantly monitor funding opportunities that can be utilized to implement some of the higher cost recommended actions. This will include creating and maintaining a repository of ideas on how any required local match or participation requirement can be met. Then, when funding does become available, the West Piedmont Planning District communities will be in a position to take advantage of an opportunity. Funding opportunities that can be monitored include special pre- and post-disaster funds, special district budgeted funds, state or federal ear-marked funds, and grant programs, including those that can serve or support multi-objective applications.

With adoption of this plan, the West Piedmont Planning District communities commit to:

- Pursuing the implementation of the high-priority, low/no-cost recommended actions.
- Keeping the concept of mitigation in the forefront of community decision-making by identifying and stressing the recommendations of the Hazard Mitigation Plan when other community goals, plans and activities are discussed and decided upon.

- Maintaining a constant monitoring of multi-objective, cost-share opportunities to assist the participating communities in implementing the recommended actions of this plan for which no current funding or support exists.

In addition, the communities of the West Piedmont region remain committed to the National Flood Insurance Program. They will continue to enforce floodplain regulations and undertake other actions to remain in compliance with the program.

Maintenance

Plan maintenance requires an on-going effort to monitor and evaluate the implementation of the plan, and to update the plan as progress, roadblocks, or changing circumstances are recognized.

The Executive Director of the West Piedmont Planning District Commission will be responsible for monitoring this plan. The county administrator, city manager, or town manager will be responsible for appointing one or more representatives (e.g., emergency coordinator, planning director) to a group convened by the West Piedmont Planning District Commission. It is expected that the group convened by the Planning District Commission will function as an adjunct to the Regional Emergency Managers Group that already meets on a regular basis.

The working group, within 60 days of adoption of the plan, will develop evaluation criteria to judge the progress of implementation of the plan.

The WPPDC will make an annual request to the working group representatives for an annual update to be provided by January 31, on the progress of the implementation of their Mitigation Action Plans. These updates will begin in 2013 and will include corrective action plans if needed based on the evaluation criteria set by the working group. The annual progress reports will be consolidated by WPPDC and shared with the Virginia Department of Emergency Management.

The WPPDC Executive Director with the working group will determine annually if an update of the plan is needed and the mechanism for doing so. At a minimum, the plan update will be initiated by the WPPDC no less than four years after plan adoption; the WPPDC will seek grant funding no less than three years after plan adoption. Factors to consider when determining if an update is necessary include:

- Decreased vulnerability as a result of implementing recommended actions,
- Increased vulnerability as a result of failed or ineffective mitigation actions,
- Increased vulnerability as a result of new development (and/or annexation),
- New state/federal laws, policies, or programs, and/or

- Changes in resource availability.

A major event, such as a Presidentially-declared disaster, may trigger a need to review the plan. If such an event occurs in the West Piedmont region, the working group will coordinate to determine how best to review and update the plan. The updating of the plan will be by written changes and submissions, as the West Piedmont Planning District communities and the working group deem appropriate and necessary. Major changes to the plan will be submitted to the state and to FEMA Region III.

Public notice will be given and public participation will be invited, at a minimum, through available web postings and press releases to the local media outlets, primarily newspapers and radio stations. In addition, the Planning District Commission will keep information about the plan on its website and displayed in its office. The participating jurisdictions will continue to use the plan as a resource in developing new plans and community preparedness information; they will discuss the plan at public presentations and seek input continuously during the next planning cycle.

Evaluation of progress can be achieved by monitoring changes in the vulnerability identified in the plan. Changes in vulnerability can be identified by noting:

- Lessened vulnerability as a result of implementing recommended actions,
- Increased vulnerability as a result of failed or ineffective mitigation actions, and/or,
- Increased vulnerability as a result of new development (and/or annexation).

Updating of the plan will be by written changes and submissions, as the West Piedmont Planning District communities and the working group deem appropriate and necessary.

Section IX. References

Data Sources:

1990 Water Source Data, US Census Bureau

2000 U.S. Census and 2005-2009 American Community Survey, U.S. Census Bureau. http://www.census.gov

2007 Census of Agriculture, United States Department of Agriculture/National Agricultural Statistics Service

2007 Census of Agriculture. County Profiles, United States Department of Agriculture, Virginia Agricultural Statistics Service. http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Virginia/index.asp

ASCE Design Wind Speed Maps

Benefit Cost Analysis (BCA) Toolkit Technical Flood Manuals, FEMA. 2006

Climate Services and Monitoring Division

HAZUS-MH, FEMA

http://ops.fhwa.dot.gov/publications/fhwahop08058/20.htm

http://www.energy.vt.edu/vept/petroleum/index.asp

http://www.epa.gov/triexplorer/

https://hip.phmsa.dot.gov/analytics/saw.dll?Dashboard&NQUser=HazmatWebsiteUser1&NQPassword=HazmatWebsiteUser1&PortalPath=/shared/Public%20Website%20Pages/_portal/10%20Year%20Incident%20Summary%20Reports

National Environmental Satellite, Data, and Information Service (NESDIS)

National Hurricane Center

National Inventory of Dams

National Oceanic & Atmospheric Administration Satellite and Information Service

National Weather Service

National Weather Service Records, NOAA

NCDC

NOAA/National Climatic Data Center

Storm Events database, NCDC

SVRGIS

The Natural Communities of Virginia,
http://www.dcr.virginia.gov/dnh/ncoverview.htm

U.S. Department of Commerce

U.S. Drought Monitor

U.S. Environmental Protection Agency,
http://yosemite.epa.gov/oswer/ceppoweb.nsf/frmVZIS?OpenForm

US Department of Agriculture

Virginia Department of Conservation and Recreation

Virginia Department of Forestry

Referenced Publications:

"5 Dead After Massive Pa. Gas Blast." MSNBC 2/10/2011.
http://www.msnbc.msn.com/id/41503700/ns/us_news-life/.Retrieved on3/23/2011

Bailey, C. M.. Physiographic Map of Virginia. . 6/21/1905.
http://www.wm.edu/geology/virginia/phys_regions.html#piedmont

Burke, Garance and Jason Dearen. "Aging gas pipes at risk of explosion nationwide." MSNBC. 14 September 2010.http://www.msnbc.msn.com/id/39159597/ns/us_news-life/. 3/23/2011

Collins, Paul. "VDOT has spent 'over $1.5M' on snow removal". 1/27/2011.

City of Martinsville Comprehensive Plan, 2009 (http://www.martinsville-va.gov/Comprehensive-Plan.html)

Commonwealth of Virginia Emergency Operations Plan. Virginia Department of Emergency Management. 2010.
http://www.vaemergency.com/library/plans/index.cfm

Commonwealth of Virginia Hazard Mitigation Plan. Virginia Department of Emergency Management. 2010.
http://www.vaemergency.com/library/plans/coveop/mitplan.cfm

Evaluation of Dan River Dams within the City of Danville, October 2010

Franklin County Comprehensive Plan, 2007.
http://www.franklincountyva.gov/planning-comm/downloads/cp-intro

Henry County Emergency Operations Plan, 2010

Henry County Comprehensive Plan, 2007.
http://www.henrycountyva.gov/content/File/comprehensive_plan_2011.pdf

Landslide Incidence and Susceptibility in the Conterminous United States, USGS

Major Natural Gas Pipelines. Virginia Department of Mines, Minerals, and Energy. http://www.energy.vt.edu/vept/naturalgas/NG_pipelines.asp. Retrieved on3/7/2011

Map of Major Petroleum Product Pipelines. Virginia Department of Mines, Minerals, and Energy. http://www.energy.vt.edu/vept/petroleum/oil_pipeline.asp. Retrieved on3/7/2011

Pittsylvania County Comprehensive Plan, 2010

"San Bruno CA Explosion Raises Questions of Gas Pipeline Safety." San Francisco Chronicle 11 September 2010.. http://www.sfgate.com/cgi-bin/blogs/hottopics/detail?entry_id=72042.Retrieved on3/23/2011

"San Bruno Fire Levels Neighborhood." San Francisco Chronicle. 9/10/2010. http://articles.sfgate.com/2010-09-10/news/23996646_1_gas-line-explosion-wind-whipped-blaze-smoke-inhalation.Retrieved on3/23/2011

Turner, Joel. "Cold temperatures hamper snow removal". 2/3/2010.

Virginia Woodland Homes Communities. Virginia Department of Forestry. http://www.dof.virginia.gov/gis/dwnld-whc-faq.shtml. Retrieved on Retrieved on5/2/2005

Virginia Workforce Connection, Labor Market Statistics - Covered Employment & Wages Program. http://www.vawc.virginia.gov/.

West Piedmont Planning District Commission Draft Regional Water Supply Plan, 2010

"What Causes Power Outages?" . http://www.bge.com/portal/site/bge/menuitem.fe9c7e782b73e84606370f10d66166a0/.