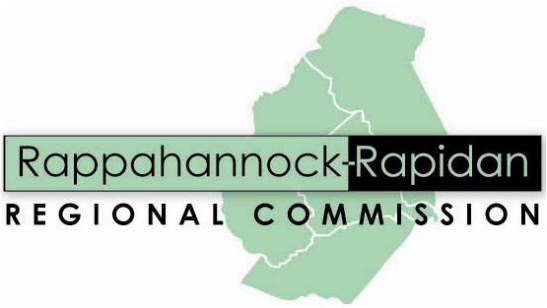
RAPPAHANNOCK-RAPIDAN MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2012 UPDATE



IN COORDINATION WITH:

CULPEPER COUNTY	TOWN OF CULPEPER
FAUQUIER COUNTY	TOWN OF MADISON
MADISON COUNTY	TOWN OF ORANGE
ORANGE COUNTY	TOWN OF REMINGTON
RAPPAHANNOCK COUNTY	TOWN OF WARRENTON

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PREPARED WITH FUNDING FROM THE VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT AND THE FEDERAL EMERGENCY MANAGEMENT AGENCY

INTRODUCTION

BACKGROUND

On October 30, 2000, the Disaster Mitigation Act of 2000, DMA2K, was signed into law. Thus was established the requirement that local and state governments develop and adopt Hazard Mitigation Plans (HMPs) to be eligible for Federal assistance through the Hazard Mitigation Grant Program (HMGP) and the Pre-Disaster Mitigation (PDM) Program. Both programs are administered by the Federal Emergency Management Agency (FEMA) under the U.S. Department of Homeland Security.

The first Rappahannock-Rapidan Region Multi-Jurisdictional All Hazard Mitigation Plan was approved by FEMA in 2005 and subsequently adopted by the five member counties – Culpeper, Fauquier, Madison, Orange and Rappahannock – and the towns of Culpeper, Madison, Orange, Remington and Warrenton. In accordance with DMA2K, the plan has been updated and prepared in coordination with FEMA Region III and the Virginia Department of Emergency Management. A Local Mitigation Plan Crosswalk, found in Appendix B, provides a summary of federal and state minimum standards and notes where each requirement is met within the Plan.



Hazard Mitigation:
Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.

The Rappahannock-Rapidan Regional Hazard Mitigation Plan Update 2011 is a continuation of the planning effort begun in 2004 and is an effort among the participating jurisdictions to mitigate the impacts of natural hazards in the Rappahannock-Rapidan region. In developing the 2011 Plan Update, certain elements of the original plan were retained. Irrelevant and/or outdated information was summarized for reference or removed. The goals, actions, and strategies included in the initial plan have been re-evaluated and their status updated as completed, deleted, deferred or on-going.

Since the adoption of its first hazard mitigation plan in 2005, based on the 2000 census, the Rappahannock-Rapidan region has experienced significant population growth along with associated changes in demographics, service demands, transportation needs, and economic development. This plan provides updated mitigation strategies designed to meet the needs of this changing region.

Rappahannock-Rapidan Region Population: 2000-2010*			
County	**2000**	**2010**	**Population Change (%)**
Culpeper	34,262	46,689	36.27%
Fauquier	55,139	65,203	18.25%
Madison	12,520	13,308	6.30%
Orange	25,881	33,481	29.37%
Rappahannock	6,983	7,373	5.6%
R-R Region	**134,785**	**166,054**	**23.20%**

Source: U.S. Census Bureau *County populations include incorporated town populations.

Hazard mitigation is defined as those actions taken to reduce, or eliminate, the effects of natural hazards on a locality and its population. The purpose of a mitigation plan is to justify the process of determining appropriate hazard mitigation actions. The 2011 Rappahannock-Rapidan Regional HMP update process involved a comprehensive re-evaluation of all sections of the previous plan. This document includes:

- A detailed characterization of natural hazards that historically affect the Rappahannock-Rapidan region;
- A risk assessment analysis that describes potential losses to physical assets, people and operations;
- Goals and objectives developed by each member jurisdiction;
- Strategies and actions that will guide mitigation activities; and
- A detailed procedure for implementing and monitoring the plan.

PURPOSE

As a comprehensive strategy designed to reduce or eliminate the impacts of natural hazards in the region served by the R-RRC, this plan includes specific programs and policies that may be implemented by member localities to assure readiness and resilience in response to disasters. The purpose of this plan is to:

- Protect life and property, as well as natural systems and historic resources, by reducing the potential for damage and economic losses from natural and human-caused hazards;
- Improve community safety;
- Increase public understanding, support and demand for hazard mitigation;
- Speed response, recovery and redevelopment following disaster events;
- Demonstrate a firm commitment to hazard mitigation principles;
- Comply with state and federal requirements for local hazard mitigation planning; and
- Qualify for grant funding in both the pre- and post-disaster environment.

SCOPE

This plan focuses on those hazards determined to be of high and moderate risk as identified by a hazard risk assessment conducted in the five-county region. This approach allows participating jurisdictions to prioritize planning strategies and mitigation actions verified by quantifiable characterizations of hazard risk and vulnerability.

A review of past natural disasters in the Rappahannock-Rapidan region identifies the following natural hazards as posing significant risks to member jurisdictions:

- Floods
- Hurricanes and Tropical Storms
- Severe Thunderstorms and Hail
- Tornadoes
- Wildfire, Urban Interface Fire
- Drought/Extreme Heat
- Winter Storms
- Landslides

In addition to identifying and describing these hazards, the plan analyzes the Rappahannock-Rapidan region's vulnerability to each. The physical characteristics of each hazard, along with its potential impact on the region's population, built and natural environments, and social and economic infrastructure are addressed in the Vulnerability Assessment. Goals and strategies for hazard mitigation and risk reduction are identified, as is a mechanism for plan maintenance.

AUTHORITY

The 2011 Rappahannock-Rapidan Multi-Jurisdictional All Hazard Mitigation Plan was developed in accordance with all current applicable state and federal regulations. Upon approval by FEMA, the participating counties and towns will adopt the plan via resolution in accordance with the authority granted to counties and towns under §15.2-2223 through §15.2-2231 of the Code of the Commonwealth of Virginia. This plan will be monitored routinely and revised to maintain compliance with federal requirements.

This plan was prepared in accordance with the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementation regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002 (44 CFR §201.6) and finalized on October 31, 2007, referred to collectively hereafter as the Disaster Mitigation Act (DMA). While the Act emphasized the need for mitigation plans along with coordinated mitigation planning and implementation efforts, the regulations established requirements that local hazard mitigation plans must meet in order for local jurisdictions to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). In addition, the DMA 2000 specifies those criteria required for the preparation and adoption of multi-jurisdictional, all-hazard mitigation plans. The Rappahannock-Rapidan Region Multi-Jurisdictional Hazard Mitigation Plan 2011 Update, meets all required elements, including:

- Documentation of the plan preparation process, including participants;
- Documentation of public involvement;
- A regional risk assessment that includes:

  - Identification of the hazards likely to affect the area, noting data limitations and providing an explanation for eliminating hazards from further consideration;
  - A discussion of past events and descriptions of their severity and resulting effects;
  - A description of the local vulnerability to the described hazards in terms of the types and numbers of buildings, infrastructure, and critical facilities located in the region;
  - An evaluation of potential losses, in dollars, to identified vulnerable structures and a description of evaluation methods used; and
  - A determination of vulnerability to guide future land-use decisions.
- A hazard mitigation strategy that includes:
  - Goals to reduce or avoid vulnerabilities to the identified hazards;
  - A range of specific mitigation actions and projects to be considered;
  - An action plan detailing prioritization, implementation and administration of proposed actions by local jurisdictions. Prioritization must reflect a cost/benefit analysis.
  - Jurisdiction-specific action items within multi-jurisdictional plans;
- Documented participation in the planning process by all units of government included in the plan.
- Provisions for reviewing, monitoring and evaluating the progress of the plan's implementation, including consideration for the required five-year update and re-approval.
- Documentation of formal adoption by each unit of government included in the plan.

This plan was developed with input and assistance from the Virginia Department of Emergency Management and is consistent with the requirements of that agency.

The following table reflects the jurisdictions that participated in the development of the 2004 plan and the 2011 update:

JURISDICTION	2004 PARTICIPATION	PLAN ADOPTION DATE	2011 PARTICIPATION
Culpeper County	Yes	April 5, 2005	Yes
Fauquier County	Yes	October 14, 2004	Yes
Madison County	Yes	March 8, 2005	Yes
Orange County	Yes	February 22, 2005	Yes
Rappahannock County	Yes	February 7, 2005	Yes
Town of Culpeper	Yes	March 8, 2005	Yes
Town of Gordonsville	No	-	No
Town of Madison	Yes	February 3, 2005	Yes
Town of Orange	Yes	February 28, 2005	Yes
Town of Remington	Yes	January 24, 2005	Yes
Town of The Plains*	No	-	*Through County**
Town of Washington*	No	-	*Through County**
Town of Warrenton	Yes	March 8, 2005	Yes

*The Town of The Plains and the Town of Washington have limited full-time staff and work with Fauquier and Rappahannock counties, respectively, on long-term planning initiatives such as Mitigation planning.

PLAN OUTLINE

The Rappahannock-Rapidan Regional Hazard Mitigation Plan Update 2011 is organized as follows:

- Section 1: Introduction
- Section 2: Planning Process – Plan Requirements, Description of Planning Process, Plan Update participants
- Section 3: Regional Profile – Profile of Rappahannock-Rapidan region
- Section 4: Hazard Identification – Identification and description of Hazards affecting the Rappahannock-Rapidan region
- Section 5: Hazard Analysis – Description of historical hazard occurrences in the Rappahannock-Rapidan region
- Section 6: Vulnerability Assessment – Assessment of potential impacts of hazards in the Rappahannock-Rapidan region
- Section 7: Capability Assessment – Assessment of capability of jurisdiction's to develop and implement mitigation strategies and identify realistic goals and opportunities for jurisdiction response
- Section 8: Mitigation Strategy – Overview of relevant mitigation strategies and projects
- Section 9: Plan Maintenance – Outline of future mitigation planning efforts and plan update procedures
- Appendix A: Local Mitigation Actions
- Appendix B: FEMA Crosswalk
- Appendix C: Supporting Documentation
- Appendix D: Plan Adoption Resolutions
- Appendix E: Hazard Identification (Human Caused Hazards)
- Appendix F: Vulnerability Assessment (Human Caused Hazards)

PLANNING PROCESS

In developing the Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012, certain elements of the original plan were retained. Irrelevant and/or outdated information was summarized for reference or removed. The goals, actions, and strategies included in the initial plan have been re-evaluated and their status updated as completed, deleted, deferred or on-going.

This section describes the planning process undertaken by the Rappahannock-Rapidan Regional Commission and participating jurisdictions in the regional plan update process. Topics include:

- Overview of hazard mitigation planning;
- Planning team participation;
- Explanation of how the Plan was prepared and updated;

HAZARD MITIGATION PLANNING

Hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and determining how to minimize or manage those risks. While this Plan deals primarily with natural hazards, human-caused hazard risk has also been analyzed and discussed in Appendices E and F. Mitigation planning can be described as the means to break the repetitive cycle of disaster loss. A core assumption of hazard mitigation is that pre-disaster investments will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery and reconstruction. The primary objective of the planning process is the identification of specific mitigation actions, which when viewed as a whole, represents a comprehensive strategy to reduce the impact of hazards. Responsibility for each mitigation action is assigned to a specific individual, department or agency along with a schedule for its implementation. *Plan Maintenance Procedures* (located in Section 9 of this Plan) are established to monitor progress, including the regular evaluation and enhancement of the Plan. The maintenance procedures ensure that the Plan remains a dynamic and functional document over time.

Mitigation planning offers many benefits, including:

- Saving lives and property;
- Saving money;
- Speeding recovery following disasters;
- Reducing future vulnerability through wise development and post-disaster recovery and reconstruction;
- Expediting the receipt of pre-disaster and post-disaster grant funding; and
- Demonstrating a firm commitment to improving community health and safety.

As referenced in Section 1, the Disaster Mitigation Act of 2000 (DM2K) requires state and local governments to develop and formally adopt natural hazard mitigation plans in order to be eligible to apply for Federal assistance under the HMGP. The Act authorizes up to seven percent of HMGP funds available to a State after a disaster to be used for the development of State, tribal, and local mitigation plans.

Adoption of this plan and approval from FEMA is required for localities to remain eligible to apply for the five Hazard Mitigation Assistance (HMA) Programs. These HMA programs present a critical opportunity to reduce the risk to individuals and property from natural hazards while simultaneously reducing the reliance on Federal disaster funds. States, Territories, Indian Tribal governments, and communities are encouraged to take advantage of funding provided by HMA programs in both pre- and post-disaster timeframes.

Together, these programs provide significant opportunities to reduce or eliminate potential losses to State, Tribal, and local assets through hazard mitigation planning and project grant funding. Each HMA program was authorized by separate legislative action, and as such, each program differs slightly in scope and intent. The guidance applies to the programs of: Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program (PDM), Flood Mitigation Assistance Program (FMA), Repetitive Flood Claims Program (RFC), and Severe Repetitive Loss Program (SRL). While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to natural hazards.

In general, the local government is a “sub-applicant” that is an eligible entity that submits a sub-application for FEMA assistance to the "Applicant" which would be the Commonwealth of Virginia. If HMA funding is awarded, the sub-applicant becomes the “sub-grantee” and is responsible for managing the sub-grant and complying with program requirements and other applicable Federal, State, Territorial, Tribal, and local laws and regulations. By incorporating the five programs together the HMA consolidates the common requirements for all programs and explains the unique elements of the programs in individual sections. The organization improves the clarity and ease of use of the guidance by presenting information common to all programs in general order of the grant life cycle. The HMA Unified Guidance can be found on FEMA’s website at: http://www.fema.gov/library/viewRecord.do?id=4225.

- **Flood Mitigation Assistance Program (FMA):** To qualify to receive grant funds to implement projects such as acquisition or elevation of flood-prone homes, local jurisdictions must prepare a mitigation plan. The plan must include specific elements and be prepared following the process outlined in the National Flood Insurance Program’s (NFIP) Community Rating System.
- **Hazard Mitigation Grant Program (HMGP):** To qualify for post-disaster mitigation funds, local jurisdictions must have adopted a mitigation Plan that is approved by FEMA.
- **Pre-Disaster Mitigation Grant Program (PDM):** To qualify for pre-disaster mitigation funds, local jurisdictions must adopt a mitigation Plan that is approved by FEMA.
- **FEMA/NFIP Severe Repetitive Loss Program (SRL):** The SRL program was authorized by the Flood Insurance Reform Act of 2004 to provide funding to reduce or eliminate the long-term risk of flood damage to residential structures under the NFIP which have suffered repetitive losses. SRL properties have at least four NFIP claim payments over $5,000, with at least two of the claims within a 10 year period. SRL properties are also residential structures that have at least two separate claim payments made within a 10 year period with the cumulative amount of the building portion of the claims exceeding the value of the property.
- **FEMA/NFIP Repetitive Flood Claim Program (RFC):** The RFC program was authorized by the Flood Insurance Reform Act of 2004 to assist States and communities reduce flood

damages to properties that have at least one NFIP claim payment. Various hazard mitigation activities are eligible including acquisition, elevation, and dry flood-proofing of residential structures.

PLANNING TEAM ORGANIZATION

The Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012 included participation by planning and engineering staff from participating counties and towns, emergency management officials from participating counties and towns, staff members from the Rappahannock-Rapidan Regional Commission, and state agency officials. Participants in the planning process also included: local Police, Fire and Rescue Departments, State Police, regional non-profit organizations, community colleges, utility companies and interested members of the public.

Point of contact information for each participating jurisdiction and supporting agency, along with planning team meeting attendance sheets, can be found in Appendix C. In cases where localities were unable to attend planning team meetings, Rappahannock-Rapidan Regional Commission staff met separately with jurisdiction staff to provide project updates and provide assistance with the planning process.

PLAN PREPARATION

The Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012 is a revision of the 2005 Plan, approved by FEMA in December 2004 and adopted by jurisdictions in 2005.

The 2012 version of the RRRC Regional Hazard Mitigation Plan was developed in accordance with the provisions of the Disaster Mitigation Act of 2000(Public Law 106-390), the Pre-Disaster Mitigation Grant Program, 44 Code of Federal Regulations Part 206, and the planning standards adopted by the Virginia department of Emergency Management. It should also be noted that both the original HMP and the updated HMP were prepared in accordance with the process established in the FEMA 386-series of mitigation planning How-To guides, as well as the requirements of the February 26, 2002 IFR and July 1, 2008 Local Multi-Hazard Mitigation Planning Guidance document.

The 386-series of guides provided the structure for the process that was used to develop and update the Regional Mitigation Plan. Each section of this updated Plan includes specific information regarding how the FEMA Interim Final Rule requirements were met, as well as the process that was used to obtain and interpret data, determine and prioritize goals, strategies and actions, and implement and monitor elements of the Plan.

Development of 2011 Plan Update

The Rappahannock-Rapidan Regional Commission coordinated the updates to the Regional Hazard Mitigation Plan 2012, with assistance from FEMA and the Virginia Department of Emergency Management.

The Rappahannock-Rapidan Regional Hazard Mitigation Plan includes five counties and eight incorporated towns. To satisfy multi-jurisdictional participation requirements, counties and local towns were required to perform the following tasks:

- Participation/Attendance at mitigation planning meetings;
- Completion the Local Capability Assessment Survey;
- Identification of any unique local hazards apart from the identified regional hazards;
- Identification of completed mitigation projects, if applicable; and
- Update and develop additional mitigation actions to be included as addenda to 2005 Mitigation Action Plans.

Three planning team meetings were held in 2010 to kickoff the process of updating the plan. All meetings were held at the Rappahannock-Rapidan Regional Commission offices and were publically advertised and open to the public.

February 23, 2010: RRRC Regional Hazard Mitigation Plan Update Kickoff Meeting

- Hazard Mitigation Overview
- Data Collection Guide Review and Format
- Project Schedule
- Outline of jurisdictional responsibilities

April 20, 2010: RRRC Regional Hazard Mitigation Plan Update Meeting

- Hazard Identification Review
- Unique Hazard Identification Review
- Hazard History Update & Review

July 13, 2010: RRRC Regional Hazard Mitigation Plan Update Meeting

- Critical Facilities/Asset Inventory Review
- Demographic Analysis Update & Review
- Mitigation Action & Strategy Review

Throughout 2011 and 2012, local and regional staff completed updates to the hazard identification and analysis, vulnerability analysis, capability assessment and mitigation action strategies sections of the plan. Regional Commission staff also reviewed the man-made hazard appendices from the 2005 RRRC Regional Hazard Mitigation Plan as part of the update process.

During the plan update process, a publically accessible survey was made available on the Rappahannock-Rapidan Regional Commission's website (http://www.rrregion.org) for interested members of the public to provide feedback on the plan update and specify local and regional hazards and vulnerabilities. A copy of the survey can be found in Appendix C: Supporting Documentation.

Following coordinated reviews with each of the participating jurisdictions, Rappahannock-Rapidan Regional Commission staff developed the draft 2012 RRRC Regional Hazard Mitigation Plan in March 2012. The draft plan was made available for public review and comment for a three week period ending on April 6, 2012 and a review meeting was held on April 13, 2012 with

the Hazard Mitigation planning team. Draft copies of the plan were available via the Regional Commission's website and hard copies were made available at the Rappahannock-Rapidan Regional Commission and public libraries in the county seats of the five counties in the region.

No public comments were received during the public comment period.

Comments received from Hazard Mitigation stakeholders after the release of the draft plan were incorporated, as applicable, into the draft 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan prior to submission to FEMA for conditional approval.

Plan Adoption

Following conditional approval from FEMA, each participating jurisdiction held a public hearing prior to adoption of the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan update. Each county and town held their regularly scheduled board or council meetings at which time the final version of the plan was presented for adoption. These meetings are publicly advertised by law. The meetings provided citizens one final opportunity to comment and suggest possible revisions.

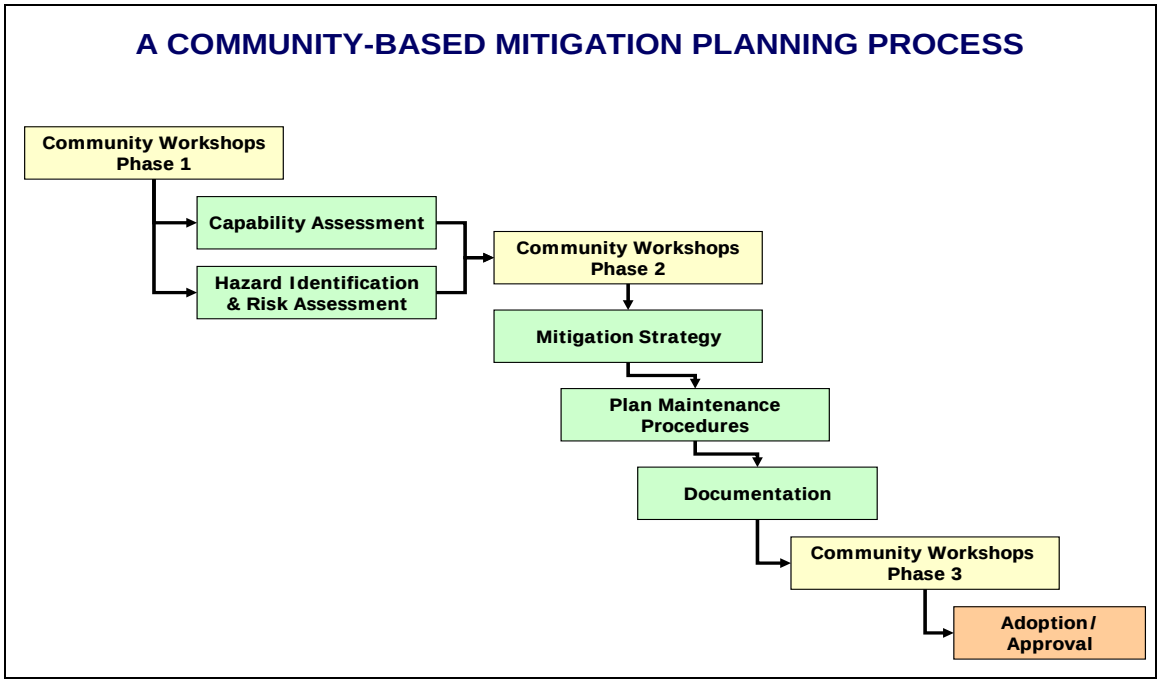
Development of 2005 Plan

The following section, describing the planning process for the development of the 2005 Rappahannock-Rapidan Regional Hazard Mitigation Plan, is included for reference below:

The planning process followed a widely recognized approach that meets the requirements of FEMA and the Virginia Department of Emergency Management. A Local Mitigation Plan Crosswalk, found in Appendix B, provides a summary of federal and state standards of acceptability and notes where each requirement is met within the Plan.

The planning process included nine (9) major steps that were completed over the course of 10 months. The steps are displayed in **Figure 2.1** and discussed below. First, the primary components of the Plan will be discussed, followed by a description of the three community workshops.

Figure 2.1
A Community-Based Mitigation Planning Process



The *Community Profile*, located in Section 3, describes the makeup of participating counties and municipalities, including prevalent geographic, demographic and economic characteristics. In addition, building characteristics and land use patterns are discussed. This baseline information helps to provide a snapshot of the planning area and thereby assist R-RRC and regional officials recognize those factors that ultimately play a role in describing community vulnerability.

The *Risk Assessment*, found in Sections 4 through 6, describes and analyzes the natural and human-caused hazards present within the Rappahannock-Rapidan Region. This analysis utilizes historical data on past hazard occurrences, and establishes hazard profiles and a hazard risk

ranking based on hazard frequency, magnitude and impact. The FEMA HAZUS® loss estimation methodology, combined with the use of existing historical hazard data, was used to conduct the assessment. The findings of the risk assessment enable communities to focus their efforts on those structures or planning areas facing the greatest risk.

The *Capability Assessment*, found in Section 7, provides a comprehensive examination of participating jurisdictions' capacity to implement meaningful mitigation actions and identifies existing opportunities for program enhancement. Capabilities addressed in this section include staff and organizational capability, technical capability, policy and program capability, fiscal capability, legal authority and political willpower. Information was obtained through the use of detailed questionnaires and the analysis of existing plans, ordinances and relevant documents. The purpose of this assessment is to identify any existing gaps, weaknesses or conflicts in programs or activities that may hinder mitigation efforts, or to identify those activities that can further the overall mitigation strategy.

The *Community Profile*, *Risk Assessment* and *Capability Assessment* are considered background studies and form the basis for developing, adopting and implementing the *Mitigation Strategy* found in Section 8. The *Mitigation Strategy* is intended to be both strategic (based on long-term goals) and functional (tied to short-term actions). In order to ensure that the *Mitigation Strategy* is effectively implemented over time, *Plan Maintenance Procedures* have been established and are found in Section 9.

Community Meetings and Workshops

The creation of the Plan required a series of meetings and workshops, designed to collect data, inform counties and local governments of the *Risk Assessment* and *Capability Assessment* findings, develop mitigation actions, and involve the public. The series of meetings and workshops prompted continuous input and feedback from R-RRC officials, local officials and concerned citizens throughout the planning process. The meetings and community workshops are described below.

Initial Project Kickoff Meeting

The project kickoff meeting was held on January 15, 2004 with the staff of the Rappahannock-Rapidan Regional Commission, staff members from project consultants PBS&J and URS and members of the participating counties and municipalities. Discussions focused on the overall project approach, emphasizing the steps necessary to meet the requirements of the Disaster Mitigation Act of 2000. First, a description of the hazard mitigation planning process was presented, explaining each step and the type of data that would be required to develop the plan. Specific tools, including the *Data Acquisition and Categorization Matrix*, used to collect necessary risk assessment information, and the *Capability Assessment Survey* were described. The *Public Participation Survey* was also introduced. Next, the project timeline was presented. Finally, roles and responsibilities were assigned to members of the planning team, including R-RRC officials, municipal governments and project consultants.

Specific roles for the parties involved in the planning process included:

Rappahannock-Rapidan Regional Commission

- Project Management
- Coordination
  - Developing and monitoring inter-local agreements;
  - Meeting and workshop logistics; and
  - Data collection and exchange.
- Communications
  - Group e-mail distribution; and
  - Web site postings.
- Data
  - Providing demographic profiles for the RRRC region;
  - Providing hazard identification and risk assessment data; and
  - Disseminating *Local Capability Assessment Questionnaires* to counties and participating municipalities.
- Documentation

PBS&J & URS

- Technical Assistance
- Data Collection
- Analysis
  - Hazard Identification and Risk Assessment;
  - Capability Assessment; and
  - Mitigation Strategy Development.
- Community Workshops/ Public ParticipationMonthly Progress Reports

County and Municipal Governments

- Coordination
  - Establish single point of contact;
  - Attend community workshops; and
  - Solicit public input/involvement.
- Data
  - Hazard Identification;
  - Capability Assessment; and
  - Completed Hazard Mitigation Programs.
- Mitigation Strategy
  - Develop goals and mitigation actions; and
  - Establish local implementation procedures (responsibility and timeline).
- Plan adoption by governing body

Finally, critical "next steps" were discussed, including the need for ongoing coordination throughout the planning process. Specific issues included the need to gather and analyze additional data, such as information associated with human-caused hazards. Future meetings were discussed, including the first planning workshop with each county and participating municipalities and the second workshop that involved the presentation of the risk and capability assessment findings.

It was decided that immediately following the second planning workshop, separate brainstorming sessions would be conducted in order to assist each county and participating town formulate regional goals and their jurisdiction-specific mitigation actions. It was also decided that evening public meetings would be held following each workshop to invite public comment on the findings of the risk and capability assessments and solicit input regarding hazard concerns and potential mitigation actions that could be added to those identified by participating county and town officials. Once a draft Plan was completed, it would be presented to local officials and the general public for further comment. The comments would be incorporated and a final draft Plan would be prepared for submittal to the state and FEMA for their review and approval.

Second Planning Workshop

The second regional planning workshop was held on April 29, 2004, at the Rappahannock-Rapidan Regional Commission's Board Room. During this meeting, the PBS&J staff presented the preliminary findings of the *Risk Assessment* and *Capability Assessment* to county and municipal officials. Providing officials with a more thorough understanding of hazard risks and the capabilities present to address them set the stage for the next step in the process—the creation of specific mitigation actions designed to reduce future impacts.

Table 2.1
Workshop Information

Meeting	Location	Date
Kickoff Meeting	R-RRC Board Room	January 15, 2004
Mitigation Strategy Workshop	R-RRC Board Room	April 29, 2004

Following the presentation of the risk assessment findings, an interactive session was held to address questions and discuss potential concerns. In addition, each workshop attendee was issued a survey form entitled, "*Identification of Hazards Unique to Individual Jurisdictions*" designed to capture data on hazards not identified in the *Risk Assessment* presentation. Next, the *Capability Assessment* findings were presented. Participating communities that had not submitted surveys to R-RRC prior to the workshop were encouraged to do so as soon as possible.

An interactive brainstorming session was conducted in the afternoon with all workshop attendees. A "cardstorming" technique was used to begin building general countywide consensus on the mitigation goals for the Hazard Mitigation Plan. Attendees were asked to identify specific mitigation actions that their county or town could undertake to help them become less vulnerable to identified hazards. Each jurisdiction was encouraged to keep their existing capabilities in mind, in order to develop feasible mitigation actions and recommend specific improvements in existing programs.

Workshop participants were asked to spend 30 minutes discussing possible mitigation actions, including policies or projects, with other representatives from their jurisdiction. Following these

discussions, individuals were instructed to write down specific mitigation actions on adhesive cards. The cards were then posted on the wall in order for all participants to review and discuss. Community officials were encouraged to elaborate upon each of their proposed mitigation actions. The discussion allowed individuals to clarify their thoughts and recognize similarities and differences across mitigation actions.

Next, the group sought to build consensus on the categorization of each proposed mitigation action. Following a brief review of the index cards placed on the wall, the workshop participants began to arrange the mitigation actions into columns that represented separate mitigation categories. Once categorized, each column was labeled by the group and later transformed into the goal statements found in Section 6. The mitigation actions identified during the cardstorming exercise were grouped into the following categories:

- Improve and update data
- Policy
- Planning
- Structural Projects
- Training
- Education and Outreach
- Evacuation

It was explained to county and municipal officials that following this workshop, they were expected to go back to their respective jurisdictions and convene with appropriate officials to identify additional mitigation actions. These actions, and those identified in the cardstorming exercise, were to be filled out using Mitigation Action Worksheets, provided by R-RRC.[1] Once completed, the worksheets were returned to R-RRC and incorporated into the Plan. Finally, the existing actions were reviewed relative to identified hazard vulnerabilities and local capabilities. Based on this review, additional mitigation actions were suggested by the planning team. Proposed actions were derived from an extensive listing of pre-drafted mitigation measures, referred to as the *Mitigation Policy Matrix*. This approach, emphasizing three distinct phases (cardstorming, in-house mitigation action identification, and expert input via the Mitigation Policy Matrix), was designed to provide each participating jurisdiction with a more comprehensive *Mitigation Strategy*.

In addition to the regional planning workshops, the Rappahannock-Rapidan Regional Commission, in coordination with FEMA, also hosted a HAZUS^{MH} training class in Warrenton, Virginia. The class was held May 13 and 14, 2004 at the Lord Fairfax Community College. HAZUS^{MH} is discussed in greater detail later in this Plan but is essentially a loss estimation modeling software that FEMA encourages to be used in developing hazard mitigation plans. The workshop was attended by various participants including members of academia, employees from other regional planning offices, and FEMA staff, among others.

[1] An example of the Mitigation Action worksheet is located in Section 6, *Mitigation Strategy*.

Involving the Public

An important component of this planning process involved public participation. Individual citizen and community-based input provided the entire planning team with a greater understanding of local concerns and increased the likelihood of successfully implementing mitigation actions by developing community "buy-in" from those directly affected by the decisions of public officials. As citizens become more involved in decisions that affect their safety, they are more likely to gain a greater appreciation of the natural hazards present in their community and take the steps necessary to reduce their impact. Public awareness is a key component of an overall mitigation strategy aimed at making a home, neighborhood, school, business or city safer from the potential effects of natural and human-caused hazards.

Public input was sought using four methods: 1) public meetings; 2) public participation survey; 3) Web site access; and 4) public library posting of the draft Plan. County-level public meetings were held at two stages of the planning process—following the second planning workshop and upon completion of the draft Plan. County-level public meetings were held to present the findings of the risk and capability assessments and garner input regarding hazard concerns and possible mitigation actions that could be included in the Plan. In many cases, citizens provided localized details of problematic hazards, particularly those that directly affected them.

Table 2.2
First Public Meetings[2]

Date	Location
April 28, 2004	Town of Orange
April 29, 2004	Town of Culpeper
April 29, 2004	Town of Warrenton

Citizen concerns were also captured through the use of a *Public Participation Survey*.[3] This tool was distributed to counties and participating municipalities as well as concerned citizens during public meetings. In addition, the survey was posted on the R-RRC public Web site. The survey asked a variety of questions that allowed the public a chance to weigh in on hazard mitigation issues within their communities[4]. A total of four surveys were collected from jurisdictions within the region. Comments were incorporated into the *Risk Assessment* and *Mitigation Strategy* sections of this Plan.

The second round of public meetings was held in conjunction with the adoption of the Plan. Each county and town held their regularly scheduled board or council meetings at which time the final version of the plan was presented for adoption. These meetings are publicly advertised by law. The meetings provided citizens one final opportunity to comment and suggest possible revisions.

[2] Sign-in sheets from the first round of public meetings can be found in Appendix C.
[3] A sample of the Public Participation Survey can be found in Appendix C.
[4] A summary of all the Public Participation Surveys received can be found in Appendix C.

Involving Stakeholders

A range of stakeholders was involved in the mitigation planning process. Stakeholder involvement was encouraged through the use of multiple planning workshops, public meetings, press releases, public notices and the notification of stakeholder groups. *Appendix C* contains information on how the public meetings were advertised. Any potential stakeholders were invited to attend and offer comments.

Multi-Jurisdictional Participation

The Rappahannock-Rapidan Region Multi-Jurisdictional All-Hazard Mitigation Plan includes five counties and eight incorporated towns. To satisfy multi-jurisdictional participation requirements, counties and local towns were required to perform the following tasks:

- Participate in mitigation planning workshops;
- Complete the Local Capability Assessment Survey;
- Identify completed mitigation projects, if applicable; and
- Develop and adopt a local Mitigation Action Plan, including county or town-level goals and mitigation actions.

Each county and town participated in the planning process and has developed local Mitigation Action Plans unique to their jurisdiction. Each county and town will adopt their Mitigation Action Plan separately. This provides the means for jurisdictions to monitor and update their Plan on a regular basis.

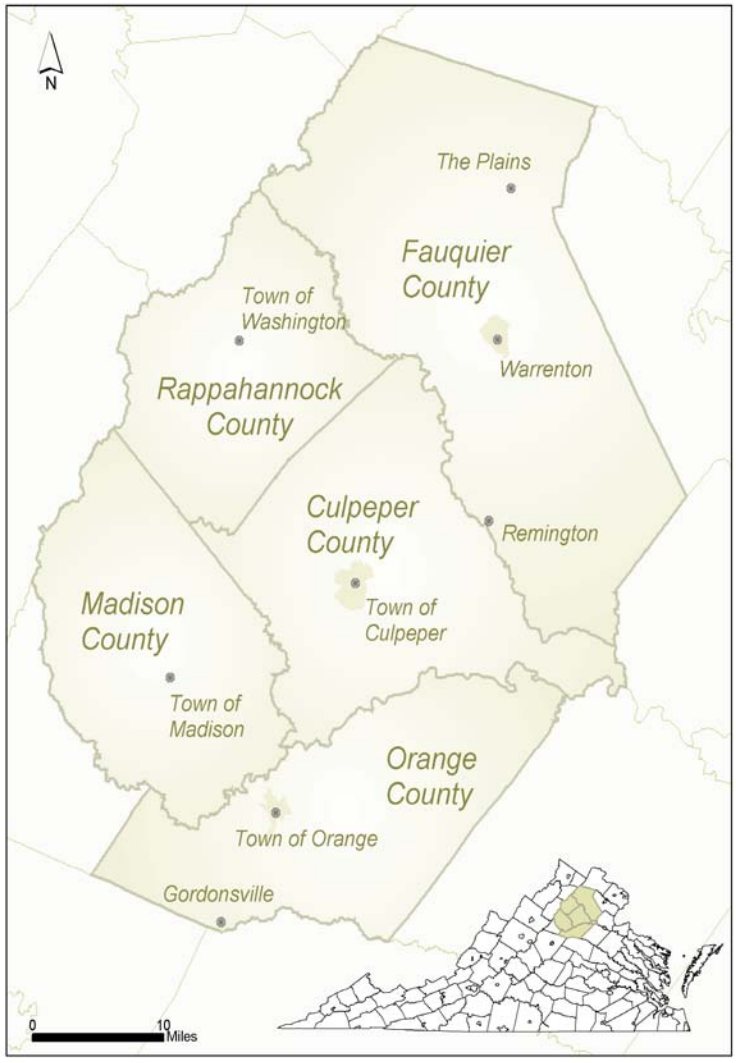
REGIONAL PROFILE

AREA AT A GLANCE

Made up of the counties of Culpeper, Fauquier, Madison, Orange and Rappahannock, and the incorporated towns of Culpeper, Gordonsville, Madison, Orange, Remington, The Plains, Warrenton, and Washington, the Rappahannock-Rapidan region covers 1,965 square miles (1,257,600 acres) and is home to 166,054 persons. Named for two regionally significant rivers, the area is in north-central Virginia in the foothills of the Blue Ridge Mountains. It is served by the Rappahannock-Rapidan Regional Commission (RRRC), Planning District 9 (PD9), which works within these jurisdictions to encourage and facilitate collaborative solutions to area-wide problems and concerns.

With the Town of Culpeper as its approximate geographic center, the region is about seventy miles southwest of Washington D.C., eighty-five miles northwest of Richmond, Virginia, and forty-five miles north-east of Charlottesville, Virginia. As part of the Virginia Piedmont, the area is predominantly rural. It is characterized by thickly forested hillsides, gently rolling farmlands and small towns and villages. Residents enjoy a lifestyle focused on small communities, abundant natural resources, and ready access to outdoor recreation. World class museums, outstanding cultural opportunities and all levels of spectator and participant sports events are available nearby.

Figure 3.1
Overview of the Rappahannock-Rapidan Region



The relative affordability of the area over the past ten years resulted in a significant increase in population. For the most part, families moving into the region came from Northern Virginia, Washington D.C, Fredericksburg and Charlottes-ville. Newcomers' needs for housing and associated development and services increased demands on the region's resources. Residential communities have sprung up along

primary commuter corridors, straining the area's transportation network. Although the area's economy is rooted in agriculture, an increasing number of residents travel daily to jobs in the surrounding region, including Northern Virginia, Washington, D.C. and Charlottesville.

Many of the region's natural hazards reflect its topography and hydrology. From the Blue Ridge Mountains at its western edge, to the rolling farmland of the Piedmont in the east, the region has a varied geology and unique physiographic character. Because of high elevations and steep slopes, Madison and Rappahannock Counties are prone to flash-floods, sometimes accompanied by landslides. Dense forests in these areas add the possibility of forest fires. Overall, flooding is the most common natural hazard that impacts the region. Rainstorms of historic significance occasionally have produced severe localized flooding. The entire region routinely experiences ice storms, significant snowfall, high winds, forest fires, and the effects of tropical storms and hurricanes.

GEOGRAPHY

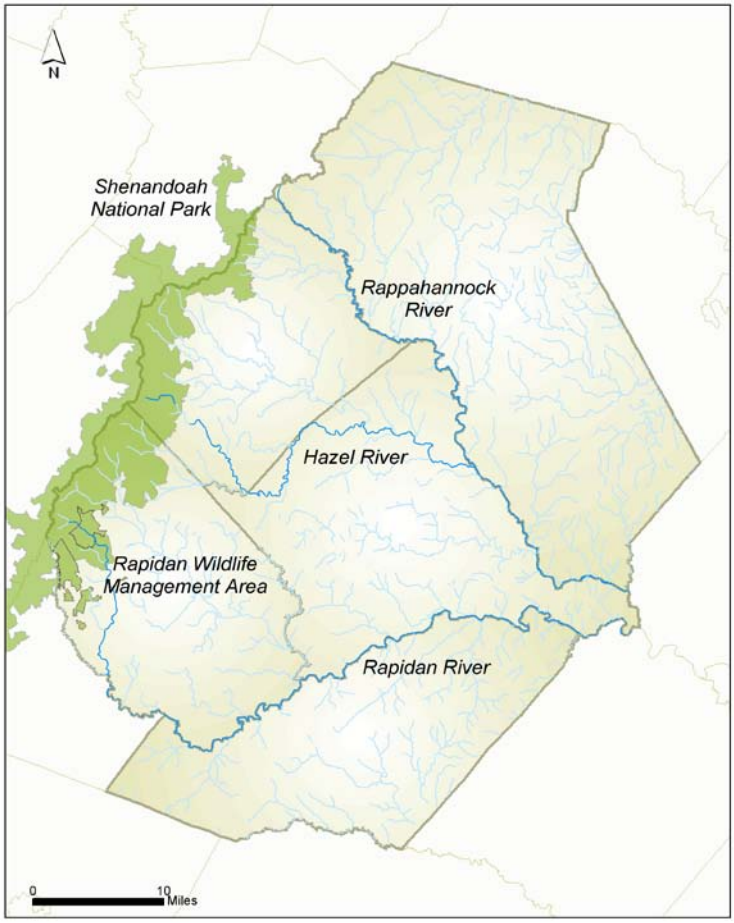
The counties of the Rappahannock-Rapidan region cover approximately 1,965 square miles. Fauquier County, at 660 square miles, is the largest and almost twice the size of the next largest county, Culpeper, at 389 square miles. Due to its size and proximity to the highly urbanized Northern Virginia area and Washington D.C., about 40 percent of the region's residents live in Fauquier County.

Table 3.1
County Populations and Densities

County	Area (square mi./acres)	2010 Population (U.S. Census)	Persons per square mile
Culpeper	389/248,960	46,689	120
Fauquier	660/422,400	65,203	99
Madison	327/209,280	13,308	41
Orange	355/227,200	33,481	94
Rappahannock	271/173,440	7,373	27
R-RRC Region	1,965/1,257,600	166,054	85

Source: Virginia Association of Counties, 2010 U.S. Census Bureau

Figure 3.2
Geography of the Rappahannock-Rapidan Region



With steep, heavily forested slopes, and peaks in excess of 3,000 feet, the Blue Ridge Mountains mark the western edge of the region. Many of the larger federal and state owned properties in the region are located here, including Shenandoah National Park, a section of the Appalachian Trail, Sky Meadow State Park, and the Rapidan and Thompson wildlife management areas.

The Thompson, Weston and Chester Phelps wildlife management areas, as well as the Whitney State Forest, are in the eastern part of the region where the landscape reflects the character of the Virginia Piedmont - rolling farm fields and forests, punctuated by small villages and towns.

The Rappahannock River traverses the region from northwest to southeast. Over 184 miles in length from its headwaters in Shenandoah National Park to its mouth at the Chesapeake Bay, the Rappahannock, along with its tributaries, the Hazel, Hughes, Rush, Thornton, Robinson and Rapidan rivers, drains the greater part of the region. About sixty percent of its watershed is forested, with another seventeen percent devoted to agricultural uses. Lesser portions of the region drain south to the York River and north to the Potomac.

Because of significant changes in elevation from the mountainous headwaters' regions in the west to the flatter, gently rolling topography to the east, many streams are characterized as flashy, exhibiting increasing velocity and turbulence downstream and flooding locally during high rain events. On rare occasions, extreme rainfall in the region has resulted in severe landslides and significant flood damage.

Global scale weather patterns modified by the region's diverse landscape result in variable climate and weather experiences throughout the five county area. Storms and systems tracking from west to east interacting with more tropical coastal air masses produce a variety of outcomes and conditions. The mass of the Blue Ridge Mountains directs, blocks and modifies the impacts of storms and systems while the relative proximity of the Atlantic Ocean influences temperature and humidity.

Overall, the climate is moderate with an average annual temperature of about 56 degrees. Summer temperatures tend to be in the 70s, while winter temperatures are typically in the 30s. The average annual rainfall is about 42", with snowfall throughout the region averaging about 20" per year.

Figure 3.3
Major River Basins



LAND USE

Despite an increase in residential development, much of the land cover in the region remains forested or agricultural.

Table 3.2
Land Cover Percentages

Land Cover Type	Culpeper	Fauquier	Madison	Orange	Rappahannock
Pasture/Hay	40.3	42.9	29.2	32.3	29.2
Row Crops	3.3	1.9	3.4	2.3	0.6
Low Intensity Residential	1.8	2.4	1	1.4	0.7
Transitional	1.1	0.6	0	1.4	0
Deciduous Forest	30.5	33.7	43.1	36.9	44.3
Evergreen Forest	6.7	4	4	7.8	3.4
Mixed Forest	15.4	13.8	18.4	16.4	21.2
Woody Wetlands	0	0	0	0.6	0
Open Water	0	0	0	0.5	0
TOTAL	99.1	99.3	99.1	99.6	99.4

Source: 2008, National Land Cover Dataset, UVA Geostat Center, http://fisher.lib.virginia.edu/collections/gis/nlcd/

TABLE 3.3
FOREST LAND AREA BY COUNTY: *THOUSANDS OF ACRES*

COUNTY	ACCESSIBLE FOREST	NON-FOREST	OTHER	TOTAL
CULPEPER	109.7	120.7	6.4	236.7
FAUQUIER	203.2	218.1	5.5	426.9
MADISON	93.7	101.1	-	194.9
ORANGE	136.2	82.9	7.9	227.0
RAPPAHANNOCK	134.5	62.9	-	197.4
REGION	677.3	585.7	19.8	1,282.9

Source: Virginia Department of Forestry

Table 3.4
Number of Farms and Acres of Farmland
2002 to 2007 Comparison

COUNTY	# FARMS 2002	#FARMS 2007	FARM ACRES 2002	FARM ACRES 2007	% CHANGE IN FARM ACRES 2002-2007
CULPEPER	669	667	125,121	111,370	-11.0%
FAUQUIER	1,344	1,222	238,135	222,486	-6.7%
MADISON	531	564	102,874	102,757	-0.1%
ORANGE	486	518	104,879	104,606	-0.3%
RAPPAHANNOCK	443	416	78,483	65,084	-17.1%
REGION	**3,473**	**3,387**	**649,492**	**606,303**	**-6.6%**

SOURCE: 2007 U.S. CENSUS OF AGRICULTURE

TRANSPORTATION

The Rappahannock-Rapidan region is connected by a strong multi-modal transportation network. U.S. Routes 29 and 15 run north - south through the region, providing a connection with the Northeast Corridor cities of Washington, D.C., Philadelphia, New York and Boston. Interstate 66 and U.S. Routes 17 and 522 connect the region east-west. The major eastern U.S. interstates, I-81 and I-95, are each about 30 miles from the heart of the Rappahannock-Rapidan region. I-81, to the west of the region, runs north-south through the Shenandoah Valley. Thirty miles to the east, I-95, the most heavily travelled interstate in the nation, runs north – south connecting all major eastern cities. Both I-66 and I-95 are used heavily by through-travelers, transport companies and those commuting daily to employment in Northern Virginia and the Washington, D.C. metropolitan area.

There are over 2,500 miles of primary and secondary roads in the region maintained by the Virginia Department of Transportation. Because of its size, population and proximity to the ever-urbanizing Northern Virginia area, Fauquier County has the highest number of miles of primary and secondary roads. Culpeper is second. Many rural areas are served by private roads maintained by homeowners' associations or individuals. Construction standards and maintenance practices on private roads are variable.

Figure 3.4
Major Transportation Routes

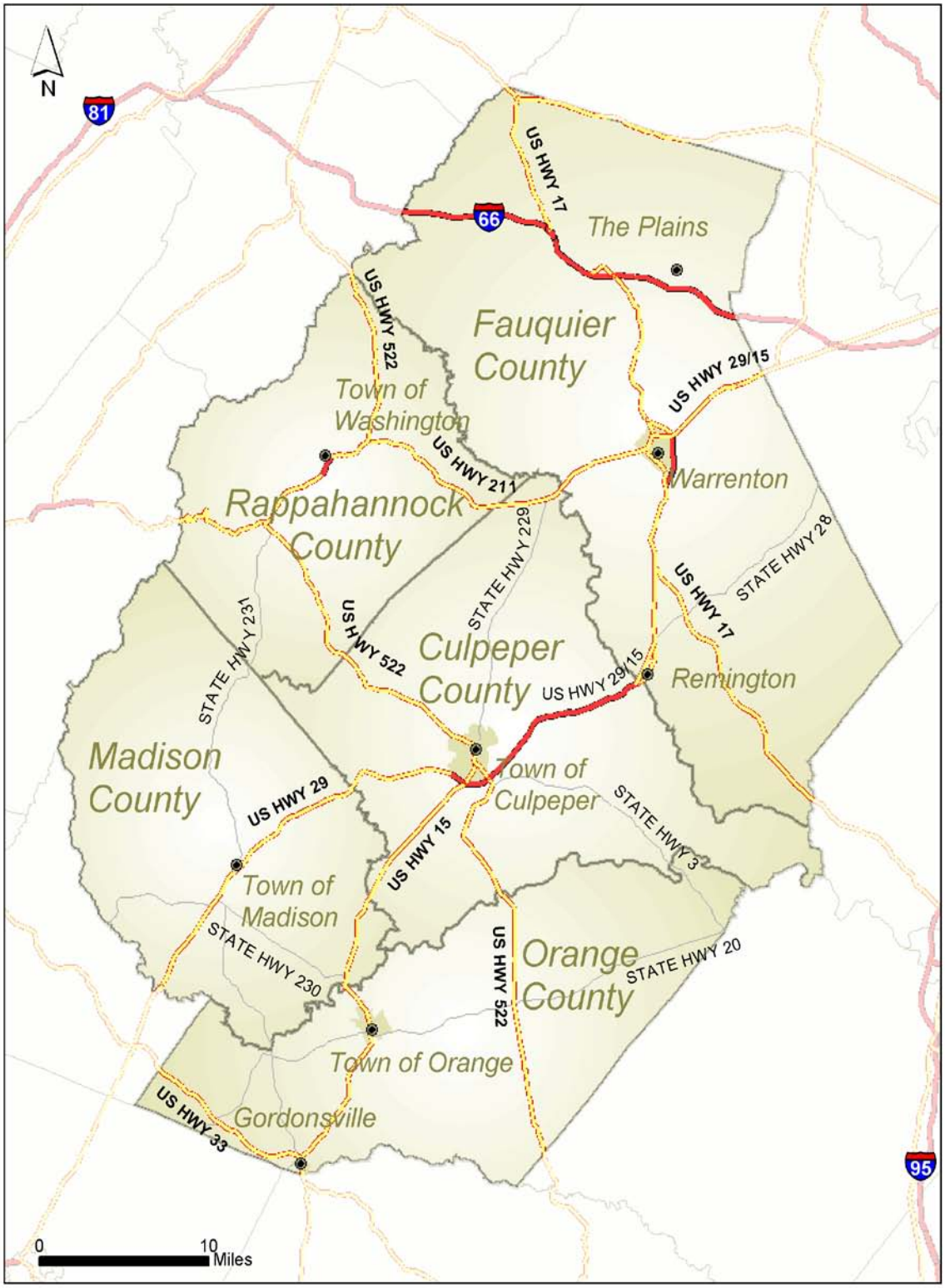


Table 3.5
Primary and Secondary Roadway Miles by County

Locality	Primary Miles	% of Region	Secondary Miles	% of Region	Total Miles
Culpeper	75.13	19.600032	484.68	22.89499	559.81
Fauquier	104.98	27.38775	802.08	37.01389	907.06
Madison	62.75	16.33053	306.23	14.13171	368.98
Orange	82.97	21.64567	355.13	16.38832	438.1
Rappahannock	57.48	14.99570	218.85	10.09936	276.33
Total	**383.31**	**100**	**2,166.97**	**100**	**2,550.28**

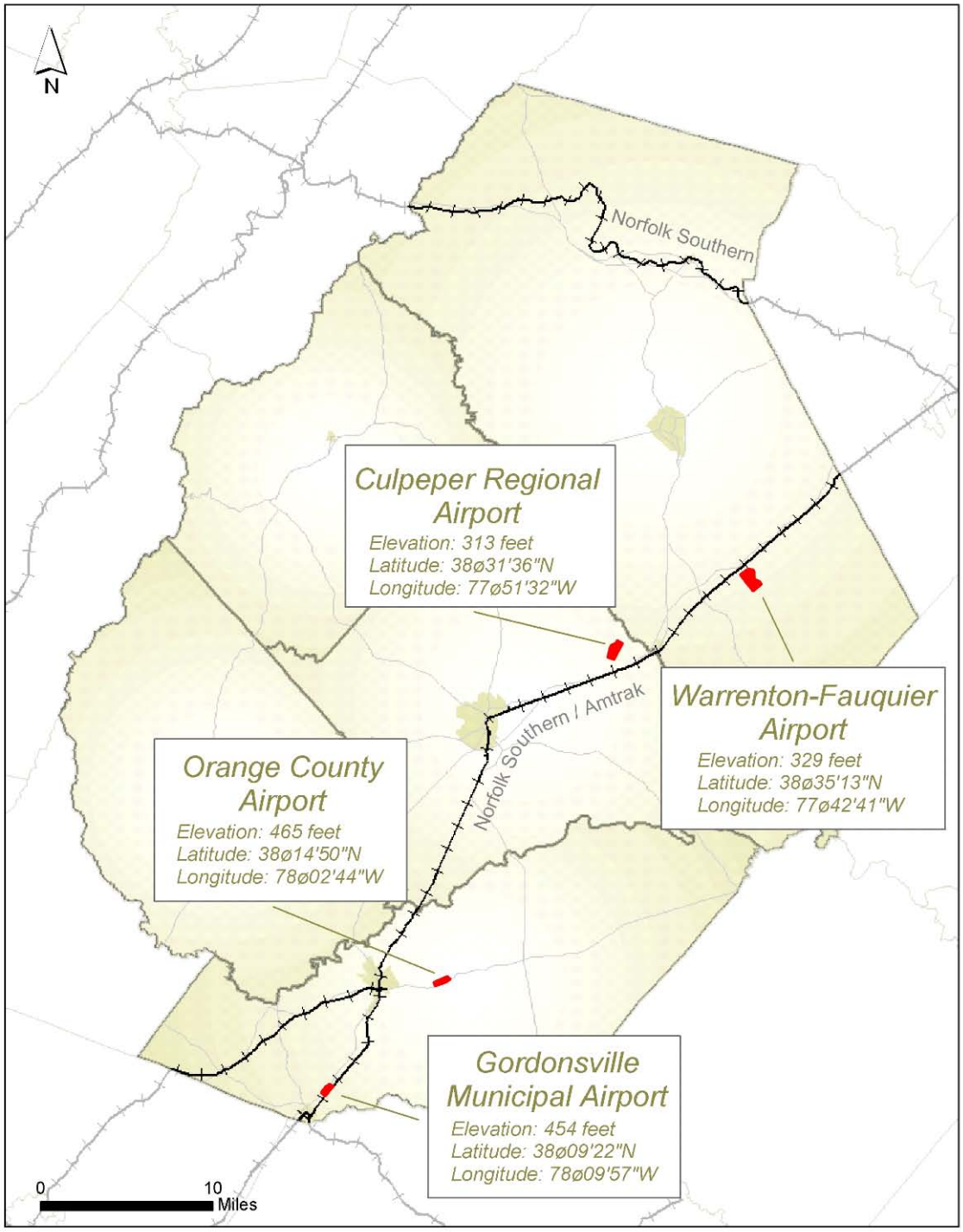
Source: 12/31/07 VDOT Mileage Tables, http://mileagetables.virginiadot.org/default.asp

Over the last decade, the Rappahannock-Rapidan region has experienced significant growth, most of which has occurred along the region's principal travel corridors (Fig. 3.4). These highways, commonly used for commuting and through-traffic, have been identified as primary evacuation routes for use in the event of a natural or man-made disaster. As might be expected, current levels of rush hour congestion suggest the potential for extreme gridlock under evacuation circumstances.

Norfolk Southern and CSX Railroad own and operate freight service rail lines that connect the Southeastern U.S. and central Virginia with Washington, D.C. and the Northeast Corridor. With a daily train from Lynchburg, Virginia to Washington, D.C., Amtrak runs the Cardinal and Crescent routes through the region, providing a stop in Culpeper, Virginia. Plans for expanding commuter rail options include extending VRE service from Manassas to Marshall in northern Fauquier County. In addition, there has been consideration of establishing regular commuter rail service along the Norfolk Southern/ Amtrak line that runs north-south through the region.

Four publicly owned airports provide general aviation services to the region. Culpeper Regional Airport (KCJR) and Warrenton-Fauquier Airport (KHWY) both average over 120 aircraft operations per day, while Orange County Airport (KOMH) and Gordonsville Municipal Airport average fewer than 30 aircraft operations per day.
(Source: www.airnav.com)

Figure 3.5
Alternative Transportation Modes



POPULATION

From 2000 to 2010 the population of the region grew from 134,785 to 166,054, an increase of 23.2% with most newcomers from Washington D.C. and the Northern Virginia metropolitan area. Despite this increase, the region's population density remains rather low at 85 individuals per square mile in 2010, slightly less than the national average of 87 persons per square mile and considerably less than that of the Commonwealth's 203 persons per square mile.

Both Culpeper and Fauquier counties experienced population increases of over 10,000 from 2000 to 2010, while Orange County grew by over 7,500. Fauquier County overwhelmingly remains the most populous county in the region (Table 3.6). Culpeper and Orange counties' growth rates of 36.3 percent and 29.4 percent respectively, are more than double the average growth rate for the Commonwealth.

Table 3.6
Population Growth in the Region

Town	2000 Population	2010 Population	Percent Change	Population Change
Culpeper	9,664	16,379	69.48	6,715
Gordonsville	1,498	1,496	-0.07	-2
Madison	210	229	9.05	19
Orange	4,123	4,721	14.50	598
Remington	624	598	-4.17	-26
The Plains	266	217	-18.42	-49
Warrenton	6,670	9,611	44.09	2,941
Washington	183	135	-26.23	-48
County*	**2000 Population**	**2010 Population**	**Percent Change**	**Population Change**
Culpeper	34,262	46,689	36.27	12,427
Fauquier	55,139	65,203	18.25	10,064
Madison	12,520	13,308	6.29	788
Orange	25,881	33,481	29.36	7,600
Rappahannock	6,983	7,373	5.58	3,390
R-RRC Region	**134,785**	**166,054**	**23.20**	**31,269**
Virginia	7,079,048	8,001,024	13.02	921,976
Nation	281,424,602	308,745,538	9.71	27,320,936

Source: U.S. Census Bureau; * County populations include incorporated towns

Predictions indicate that population growth trends will continue across the region as they have been with most increases occurring in counties that are closest to Northern Virginia and nearby urban areas (**Table 3.7**).

Table 3.7
County Population Projections

County	2010 (U.S. Census)	2020	2030
Culpeper	46,689	61,255	75,221
Fauquier	65,203	83,319	107,168
Madison	13,308	15,624	17,222
Orange	33,481	42,021	50,732
Rappahannock	7,373	8,242	9,066
R-RRC Region	166,054	216,460	259,409

Sources: Virginia Employment Commission

Overall, increases in population generally result in more potential impacts from natural hazards. It should be noted, however, that improved construction standards, new building practices and enhanced response programs often offset perceived vulnerabilities. Recent rapid growth in some of the region's counties requires consideration for the possible increase in potentially vulnerable groups including older residents, those with special needs, individuals living on low or fixed incomes and individuals with no, or limited, access to transportation.

HOUSING

Due to its size and proximity to Northern Virginia and the I-66 and Route 29 commuting corridors, Fauquier County has the greatest number of housing units in the region. Over the past ten years, however, Culpeper and Orange counties have claimed the greatest rate of population growth along with a corresponding growth in number of housing units. It should be noted, however, that the number of building permits issued in the region has declined after spiking in the middle of the past decade.

Table 3.8
Number of Housing Units

County	2000 (U.S. Census)	2010 (U.S. Census)	% Change	Housing Unit Density (sq. mile)
Culpeper County	12,871	17,657	37.18	45.4
Fauquier County	21,046	25,600	21.64	38.8
Madison County	5,239	5,932	13.23	18.1
Orange County	11,354	14,616	28.73	41.2
Rappahannock County	3,303	3,839	16.23	14.2
R-RRC Region	**53,813**	**67,644**	**25.70**	**34.4**

Source: U.S. Census

The steep decline in the number of residential building permits issued (Table 3.9) and the definite drop in the average sales prices of existing homes(Table 3.10) further emphasize the regional repercussions of the world-wide recession.

Table 3.9
Residential Building Permits

County	2000	2004	2009
Culpeper County	334	1,428	57
Fauquier County	533	703	106
Madison County	106	112	42
Orange County	247	526	61
Rappahannock County	44	58	21
R-RRC Region	**1,264**	**2,827**	**287**

Source: 2010 RRRC Data Summary

Table 3.10
Average Residential Real Estate Selling Price

County	2005	2007	2009
Culpeper County	$343,641	$328,619	$196,883
Fauquier County	$507,939	$483,296	$325,500
Madison County	$296,475	$297,072	$217,622
Orange County	$307,256	$319,962	$203,096
Rappahannock County	$498,353	$401,297	$359,122
R-RRC Region	**$400,672**	**$391,517**	**$253,641**

Source: MRIS

EMPLOYMENT AND INCOME

Because of its proximity to Washington, D.C., the Rappahannock-Rapidan region has weathered the current recession better than most areas. Unemployment levels tend to be lower than those in other parts of the state and the nation. Within the region, unemployment historically tends to be higher in the towns than in the counties.

Figure 3.6
Regional Unemployment

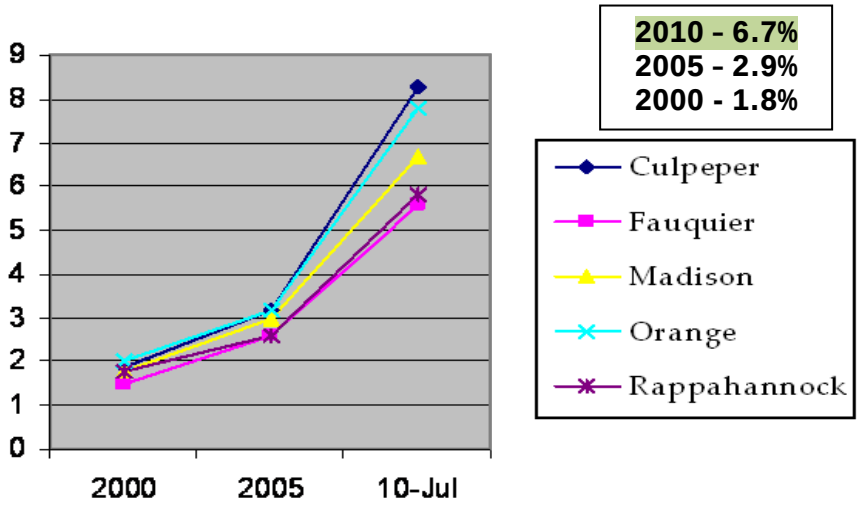


Table 3.11
Unemployment Rate (2002-2009)

	2002	2003	2004	2005	2006	2007	2008	2009
United States	5.8%	6.0%	5.5%	5.1%	4.6%	4.6%	5.8%	9.3%
Virginia	4.2	4.1	3.7	3.5	3.0	3.0	3.9	6.7
Culpeper	3.8	4.0	3.5	3.3	3.2	3.5	4.8	8.1
Fauquier	3.1	3.1	2.7	2.6	2.4	2.5	3.3	5.3
Madison	4.3	3.8	3.0	3.0	2.6	2.6	3.7	6.3
Orange	4.5	4.0	3.3	3.2	3.0	3.2	4.6	7.8
Rappahannock	3.4	3.0	2.6	2.6	2.3	2.5	3.5	5.9

In all jurisdictions in the region, median income increased by more than twenty percent between the years 1999 and 2008. The highest median household incomes can be found in Fauquier County at $81,359, which is significantly higher than the income in any of the other counties in the region.

Table 3.12

Median Household Income (2008)

Locality	1999	2008	Percent change
Culpeper County	$45,290	63,248	39.65%
Fauquier County	$61,999	81,359	31.25%
Madison County	$39,856	51,472	29.14%
Orange County	$42,889	52,158	21.61%
Rappahannock County	$45,943	60,614	31.93%

Source: U.S. Census Bureau American Community Survey 2008

Agriculture-related employment in the region is higher than the national or state average, but currently employs only 2.5 percent of the region's population, significantly less than the 2000 value of 6 percent. The highest percentages of workers are involved in the state and local government sector (20.93 percent), retail trade (14.16 percent), and health care and social assistance (11.3 percent).

DECLARED DISASTERS

Table 3.13
Federally Declared Disasters: Rappahannock-Rapidan Region

1972 - 2010

Locality Affected	Date of Storm	Description
Entire Region	09/08/1972	Tropical Storm Agnes
Culpeper	10/10/1972	Severe Storms and Flooding
Orange	10/10/1972	Severe Storms and Flooding
Madison	10/10/1972	Severe Storms and Flooding
Madison	11/10/1985	Severe Storms and Flooding
Rappahannock	05/19/1992	Severe Storms and Flooding
Entire Region	04/11/1994	Severe Winter Ice Storm
Culpeper	07/03/1995	Severe Storms and Flooding
Orange	07/06/1995	Severe Storms and Flooding
Rappahannock	07/06/1995	Severe Storms and Flooding
Madison	07/01/1995	Severe Storms and Flooding
Entire Region	02/02/1996	Blizzard of 96 (Severe Snow Storm)
Fauquier	02/09/1996	Flooding, High Winds and Wind Driven Rain
Rappahannock	02/02/1996	Flooding, High Winds and Wind Driven Rain
Entire Region	09/16/1996	Hurricane Fran, Associated Severe Storm Conditions
Entire Region	02/28/2000	Severe Winter Storms
Fauquier	03/27/2003	Severe Winter Storm, Record/Near Record Snowfall, Heavy Rain, Flooding, and Mudslide
Orange	03/27/2003	Severe Winter Storm, Record/Near Record Snowfall, Heavy Rain, Flooding, and Mudslide
Rappahannock	03/27/2003	Severe Winter Storm, Record/Near Record Snowfall, Heavy Rain, Flooding, and Mudslide
Entire Region	09/18/2003	Hurricane Isabel
Entire Region	09/12/2005	Hurricane Katrina Evacuation Location
Entire Region	12/18/2009	Severe Snowstorm
Entire Region	02/5/2010	Severe Winter Storm and Snowstorm
Entire Region	02/11/2010	Severe Winter Storms and Snowstorms
Culpeper	08/23/2011	Earthquake
Orange	08/23/2011	Earthquake

Source: FEMA

HAZARD IDENTIFICATION

Requirement §201.6(c) (2) (i): [The risk assessment shall include a description of the type of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.]

Communities throughout the United States are vulnerable to any number of natural hazards that threaten life and property. These include:

Natural Hazards

- **Flood**
- **Hurricanes and Coastal Storms**
- **Severe Thunderstorms and Tornados**
- **Wildfire**
- **Drought/Extreme Heat**
- **Winter Storms and Freezes**
- **Hail**
- **Erosion**
- **Dam/Levee Failure**
- **Earthquakes**
- **Sinkholes**
- **Landslides**

Some hazards are interrelated while others are made up of elements that are not considered separately. For example, flooding and tornados are often associated with hurricanes, and severe thunderstorms can include damaging lightening. In addition, terrorist-related incidents or accidents involving chemical, radiological or biological agents can coincide with natural hazard events such as flooding resulting from the destruction of a dam or an accidental chemical release caused by a tornado.

FLOOD

Flooding is the most frequent and costly natural hazard in the United States. Nationally, about 150 people are killed in floods each year. Nearly ninety percent of presidential disaster declarations result from natural events in which flooding is a major component. Historically, Virginia's most significant floods have been associated with hurricanes and tropical storms. Usually the result of excessive precipitation, floods may be classified as general floods, characterized by prolonged precipitation over a specific watershed, or flash floods, the product of heavy, localized precipitation of short duration. For the most part, the severity of a flooding event is determined by a combination of overall weather patterns, topography, the type and duration of the precipitation event, existing soil moisture and the extent and type of vegetative cover.



Floods are usually long-term events that may last for several days. They include river, flash, coastal, and urban floods, with the first two being Virginia's most significant and most likely to occur within the Rappahannock-Rapidan region. River flooding results from excessive precipitation and high runoff volumes over a large area. In Virginia, river flooding often begins with widespread flash flooding of small streams. This may result from a series of small storms or the impact of larger systems including tropical storms, hurricanes, and northeasters. Snowmelt may also contribute to excessive runoff. Flash floods, as the name suggests, strike quickly. Resulting from intense rainfall rates that quickly exceed surface absorption capacity, flash floods are often associated with slow-moving thunderstorms, hurricanes and

tropical storms. Streams, creeks and drainage-ways quickly become raging torrents. Occurring more frequently along mountain streams, flash floods also affect highly urbanized areas where impervious surfaces offer no opportunity for infiltration. Rapidly moving walls of water and associated debris can uproot trees, roll boulders, destroy buildings, and obliterate bridges and roads. Flash floods also may result from the sudden release of water blocked by a shifting ice jam or the spontaneous failure of a dam or levee. Coastal floods are usually caused by storm surges, wind-driven waves, and heavy rainfall associated with hurricanes, tropical storms, northeasters, and other large coastal storms. Flooding in urban areas occurs when heavy rains or melt-water intercept wide expanses of pavement where reduced permeability, alteration of natural flow regimes, and inadequate, or clogged, storm drains combine to create excessive runoff.



The periodic inundation of floodplains is natural, inevitable and anticipated. Floodplains are designated by the frequency of the event that covers them. This is generally expressed as the statistical probability of flooding in a given year. For example, in any year, the 100-year flood has a 1 percent chance of occurrence.

Above: The Rapidan River near Rapidan, Virginia. (Source: Rappahannock-Rapidan Regional Commission)

Table 4.1
National Flood Losses by Water Year (Oct-Sep)

Unadjusted damage amounts in thousands of dollars are as reported, not adjusted for inflation. The Construction Cost Index is used to adjust for inflation. The adjustment factor was applied to the unadjusted estimates to get the column damages estimates "adjusted" to 2007 dollars. The Construction Cost Index was obtained from McGraw Hill Construction Engineering News-Record.

Year	Unadjusted Damages (K)	CCI	Adjustment Factor	Adjusted Damages (Billions)
1985	$500,000	4182	2.05	$1.025
1986	$6,000,000	4295	2.00	$12.000
1987	$1,444,199	4406	1.95	$2.816
1988	$225,298	4519	1.90	$0.428
1989	$1,080,814	4615	1.86	$2.010
1990	$1,636,431	4732	1.81	$2.962
1991	$1,698,781	4835	1.77	$3.007
1992	$762,762	4985	1.72	$1.312

1993	$16,370,010	5210	1.64	$26.847
1994	$1,120,309	5408	1.58	$1.770
1995	$5,110,829	5471	1.57	$8.024
1996	$6,121,884	5620	1.52	$9.305
1997	$8,730,407	5826	1.47	$12.834
1998	$2,496,960	5920	1.45	$3.621
1999	$5,455,263	6059	1.41	$7.692
2000	$1,338,735	6221	1.38	$1.847
2001	$7,309,308	6334	1.35	$9.868
2002	$1,211,339	6538	1.31	$1.587
2003	$2,482,230	6695	1.28	$3.177
2004	$13,970,646	7115	1.20	$16.765
2005	**$42,010,435***	**7446**	**1.15**	**$48.312**
2006	$3,744,636	7751	1.11	$4.157
2007	$2,609,160	7966	1.08	$2.818
2008	**$6,987,392**	8310	1.03	$7.197
2009	$1,000,026	8570	1.00	$1.000

***The devastation and loss of life associated with Hurricanes Katrina and Rita were extensive and, to date, not yet quantified.

Source: National Oceanic and Atmospheric Administration, Hurricane Research Division

HURRICANES, COASTAL STORMS AND NOR'EASTERS

Hurricanes, tropical storms, nor'easters and typhoons are all cyclonic storms. In the northern hemisphere, these are characterized by counterclockwise rotational air movement around and into a low pressure center. Cyclonic storms are Virginia's weather makers.

Tropical cyclones, as the name suggests, form over tropical waters and carry with them the heat and moisture typical of those regions. Damaging forces associated with these storms are high-level sustained winds, heavy precipitation, and tornados. Wind-driven waves, storm surges and tidal flooding are of particular concern in coastal areas where flooding can be more destructive than cyclonic winds.

The key energy source for a tropical cyclone is the release of latent heat from the condensation of moisture-laden air. Most hurricanes and tropical storms



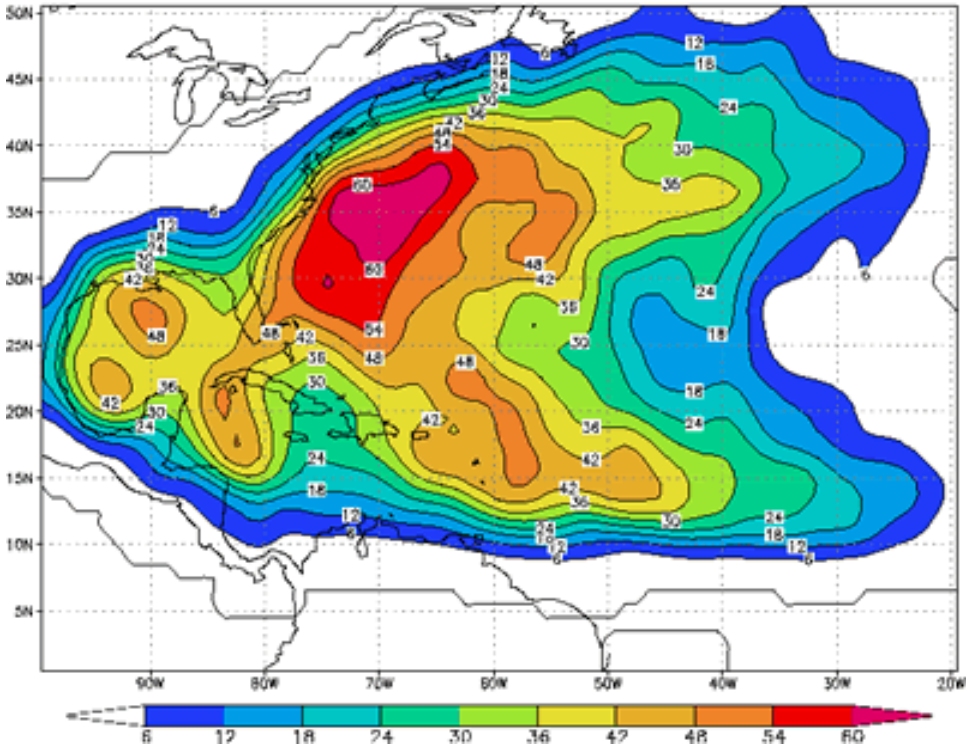
Workers clean up Main Street in the Town of Orange, VA after Hurricane Isabel, September 2003. Photo by Kevin Lamb, The Orange County Review.

form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the Atlantic hurricane season, June through November. The peak of the Atlantic hurricane season is early to mid-September. On average, about six storms per year reach hurricane intensity in this region. As recorded, about 69 tropical cyclones have tracked directly across Virginia. Virginia averages about one storm per year. While some years are storm-free, others may witness multiple storms just days or weeks apart.

Figure 4.1 (below) integrates data from 1944 to 1999 to indicate the probability of a tropical storm occurring during the June to November Atlantic hurricane season.

Figure 4.1
Probability of a Named Storm

(winds≥39 mph)



Source: National Oceanic and Atmospheric Administration, Hurricane Research Division

As a hurricane develops the barometric pressure at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, the storm can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and monitored closely by the National Hurricane Center in Miami, Florida. Once sustained winds reach or exceed 74 miles per hour, the storm is a hurricane. The Saffir-Simpson Scale categorizes hurricane intensity based on maximum sustained winds, barometric pressure, and storm surge potential, which are combined to estimate potential damage. Categories 3, 4, and 5 are "major" hurricanes. While hurricanes within this range represent only 20 percent of the storms that make landfall, they account for over 70 percent of the damage. Damage typically associated with each hurricane category is summarized below.

Table 4.2

Saffir-Simpson Hurricane Wind Scale

Scale Number Category	**Central Pressure** mb inches	**Wind Speeds** mi/hr knots	**Observed Damage**
1	>=980 >=28.94	74-95 64-82	Dangerous winds: Damage to unanchored mobile homes, building roof tops, commercial signage, trees, shrubs, power lines. (Gaston – 2004- Atlantic Coast)
2	965-979 28.50-28.91	96-110 83-95	Extremely dangerous winds: Extensive damage to mobile homes, major roof and siding damage to all structures, trees uprooted, power lines downed, collapse of unreinforced masonry walls. (Isabel – 2003 – Atlantic Coast; Dolly - 2008 - Gulf Coast)
3	945-964 27.91-28.47	111-130 96-113	Devastating damage: Total destruction of all pre-1994 mobile homes, extensive damage to all structures, unreinforced masonry buildings may collapse, high-rise windows blown out, electricity and water service unavailable for several days. (Fran – 1996- Atlantic Coast)
4	920-944 27.17-27.88	131-155 114-135	Catastrophic damage: Extensive damage as noted above, extensive windborne debris damage, high percentage of structural damage to multi-level apartment buildings, power and water outages for months, area uninhabitable. (Charley – 2004 – Florida West Coast)
5	<"920" <"27.17"	>"155" >"135"	Catastrophic damage: area uninhabitable for months, collapse of multi-story and industrial buildings. (Camille – 1969 – Atlantic Coast; Andrew- 1992 – Florida; Katrina – 2005 – Gulf Coast)

Source: National Hurricane Center - 2010

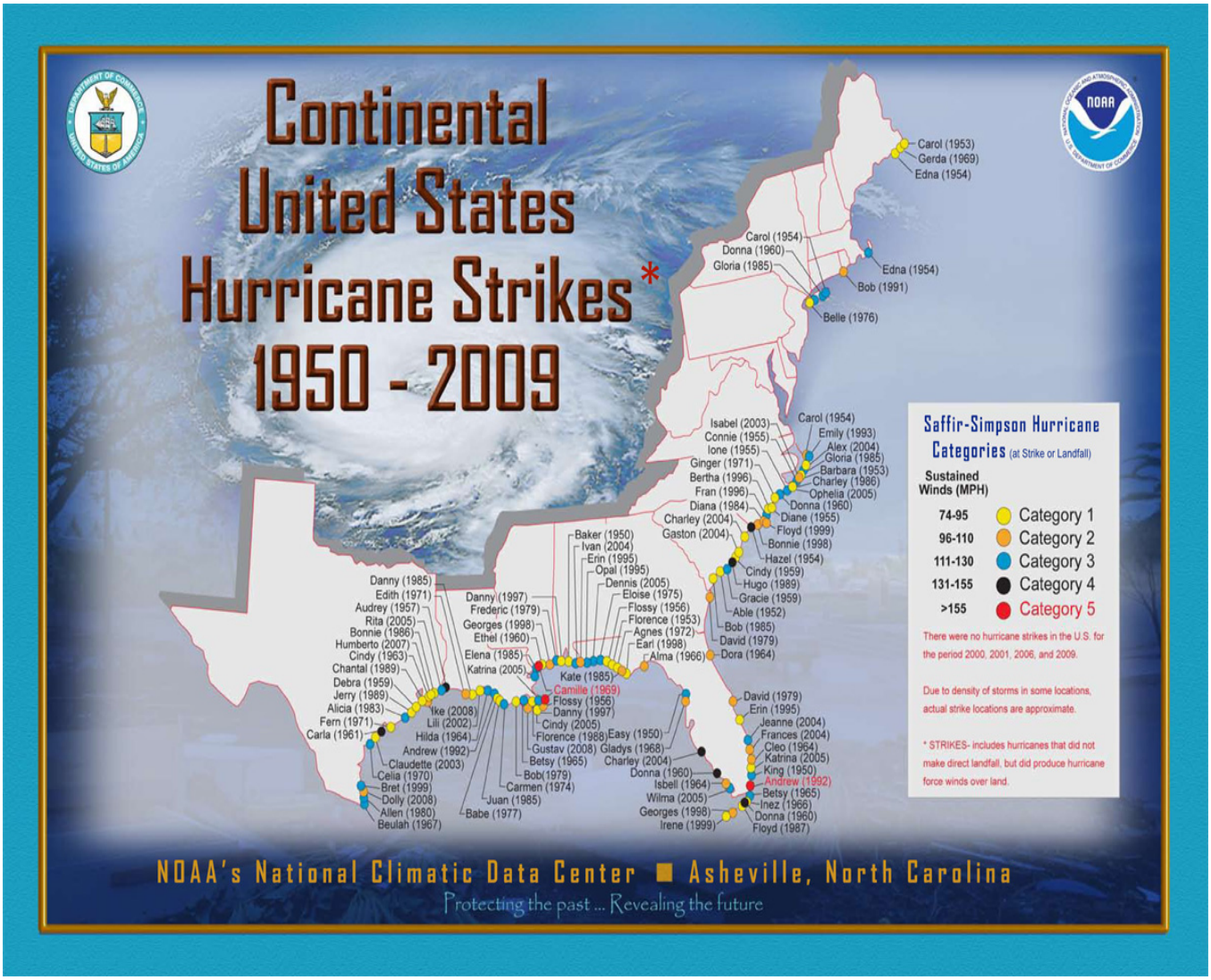


Figure 4.2
Hurricane Strikes 1950 - 2009

Hurricanes often spawn deadly tornados. In addition, flooding frequently results from the heavy rainfall that typically accompanies these storms.

Occasionally more damaging than hurricanes, nor'easters have a deserved reputation as Virginia's worst winter storms. Nor'easters result from the interaction of two pressure systems sitting just offshore over the Atlantic. The counterclockwise rotation of a low pressure system and the clockwise rotation of a high pressure system combine to bring wind and moisture to the East Coast from the northeast, hence the name. The ferocity of the storm depends on the strength, dynamics and interaction of the two systems. Nor'easters can erode low-lying coastal areas with damaging surf, glaze the region with layers of ice and deposit heavy snow across extensive areas. Typically, these storms occur from November through April, but are usually at their worst in January and February.

SEVERE THUNDERSTORMS AND TORNADOS

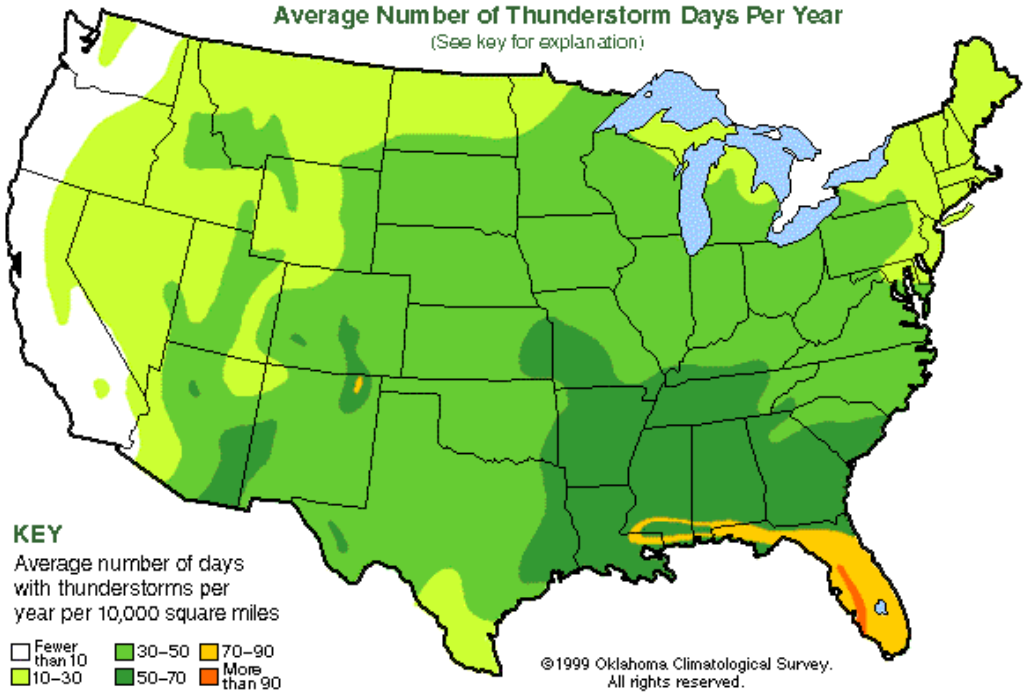


Multiple cloud-to-ground and cloud-to-cloud lightning strokes observed during a nighttime thunderstorm. (Photo courtesy of NOAA Photo Library, NOAA Central Library; OAR/ERL/ National Severe Storms Laboratory)

According to the National Weather Service, more than 100,000 thunderstorms occur each year; however, only about 10 percent are classified as severe. Although thunderstorms generally affect only a small area, the extent of their impact is often enhanced by their ability to generate tornados, hailstorms, strong winds, damaging lightning and flash floods. Thunderstorms occur in all regions of the United States and are very common in the Rappahannock-Rapidan region where topographic and atmospheric conditions combine to create ideal circumstances for generating these powerful storms.

Thunderstorms form when moist, unstable air is lifted vertically into the atmosphere by (1) unequal heating of Earth's surface, (2) orographic lifting due to topographic obstruction of air flow, or (3) dynamic lifting along a front. Rising air cools and condenses forming cumulus clouds. Continued lifting and accompanying instability is needed for storm development. Thunderstorms may occur singly, in lines, or in clusters and may move through an area very quickly or linger in place for several hours.

Figure 4.3



LIGHTNING

Lightning is the discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm. The lightning flash occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder. On average, 89 people are killed each year by lightning strikes in the United States.

Table 4.3

Virginia Lightning Statistics 1959 – 2005		
Location	Deaths	Injuries
Open Space	16	39
Under Trees	17	52
On/Near Water	7	18
Golf Course	3	9
On Phone – land line	0	9
On/Near Heavy Equipment	3	9
Near Door/Window	3	15
Other/Unknown	17	18

VDEM: http://www.vaemergency.com/newsroom/history/stats/lightning/index.cfm

As might be expected, most injuries and deaths associated with lightning strikes occur during those months when thunderstorms are most prevalent, June, July and August.

Table 4.4

Virginia Lightning Statistics by Month							
Month	March	April	May	June	July	August	September
Deaths	0	1	11	14	17	17	3
Injuries	7	3	17	42	91	63	10

VDEM: http://www.vaemergency.com/newsroom/history/stats/lightning/index.cfm

Tornados are violent windstorms characterized by twisting, funnel-shaped clouds extending from a cloud mass to the ground. Usually generated by thunderstorm activity, they may be spawned by hurricanes and other intense low pressure systems. Wind speeds range from 40 to 300 miles per hour. Damage from high winds, flying debris, lightning and hail is often extreme. On Friday September 17, 2004 Tropical Depression Ivan spawned 9 tornados that touched down in Virginia. Around 4:20 P.M. The Meadows neighborhood in Fauquier County, VA (see photo) was hit by a F3 tornado. Twenty-five homes were damaged; however, there were no injuries. Losses county-wide were estimated at more than $1.4 million.

On average, there are about 1,200 tornados with 80 storm-related deaths and 1,500 injuries reported across the United States annually. Tornado season runs from late winter to mid-summer, with the majority of storms in the southeast occurring in the early part of the season. Tornados vary widely in wind speed and surface impact. Most are a few yards wide and touch down only briefly; however, extremely dangerous storms may extend over a mile in width and carve out a path of destruction several miles long. The storm's intensity, size and duration determine its impact. As might be expected, tornados cause the greatest damage to lightly constructed buildings, particularly mobile homes. The Fujita-Pearson Scale for Tornados was developed to characterize tornado strength and associated damages. Although still commonly used, the Fujita Scale was revised in 2007 to reflect research by structural engineers and meteorologists who more precisely matched wind speed estimates with types of damage to 23 types of buildings and objects including trees, towers and poles. Modifications made to the original scale were limited to ensure that the new Enhanced F-scale could continue to support the original tornado database.



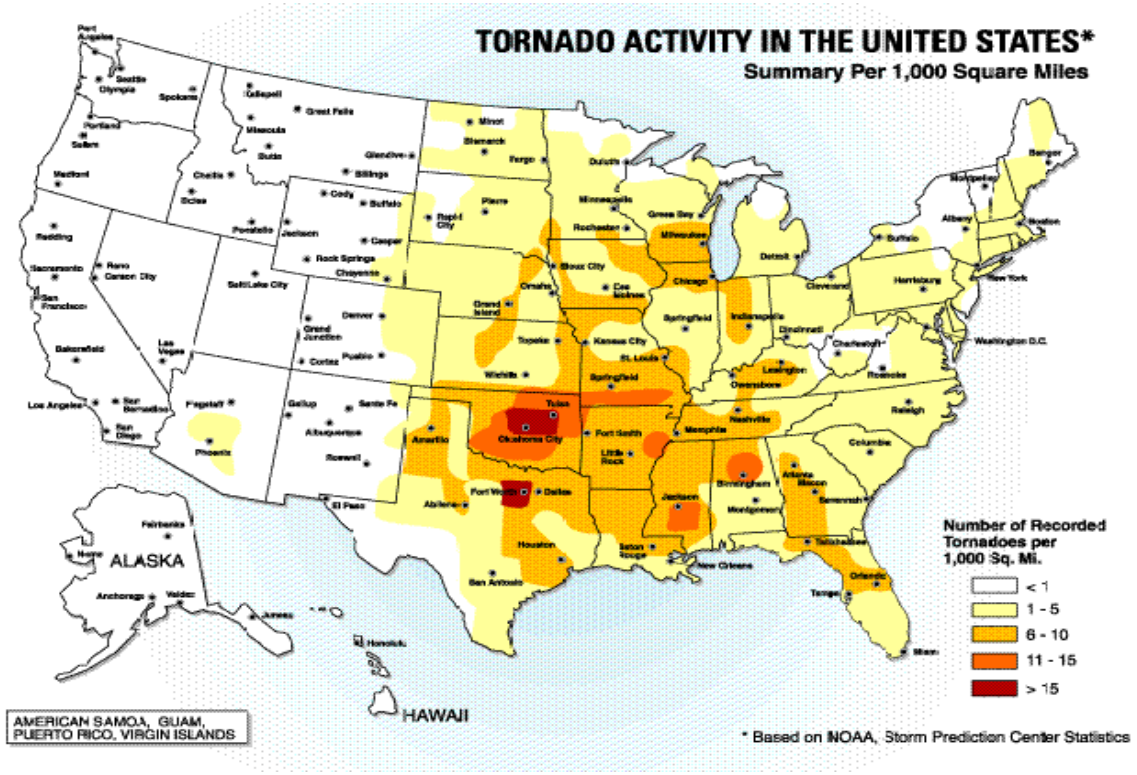
Photo: Vincent Vala, Culpeper Star-Exponent

Table 4.5

Fujita Scale of Tornado Winds and Damage (statistics 1950-2007)						Enhanced Fujita (EF) Scale (2007)				
F Scale	**Class.**	**MPH**	**Damage**	**# in VA**	**%**	**Deaths / Injuries**	**Damage ($ Mil)**	**EF Scale**	**Class.**	**MPH**
F0	Weak	40-72	Light. Tree branches snapped; antennas and signs damaged.	183	34	0 / 0	8.2	**EF0**	Weak	65-85
F1	Moderate	73-112	Moderate. Roofs off; trees snapped; trailers moved or overturned.	253	47	1 / 97	65.5	**EF1**	Moderate	86-110
F2	Strong	113-157	Considerable. Weak structures and trailers demolished; cars blown off road.	80	15	3 / 94	148.2	**EF2**	Strong	111-135
F3	Severe	158-206	Roofs & some walls torn off well constructed buildings; some rural buildings demolished; cars lifted and tumbled.	24	4	19 / 104	140.5	**EF3**	Severe	136-165
F4	Devastating	207-260	Houses leveled leaving piles of debris; cars thrown some distance.	2	0.1	4 / 248	50	**EF4**	Devastating	166-200

Source: http://www.vaemergency.com/newsroom/history/tornado.cfm

Figure 4.4



Source: American Society of Civil Engineers

In Virginia, tornados occur most frequently in July. The hot, humid conditions typical of this month often generate late afternoon or evening thunderstorms which may result in tornadic activity. Despite their frequency, July tornados tend to be weak, with 91% falling into the F0 or F1 category (see chart). While not as many tornados occur in the Spring and Fall, storms occurring during those seasons tend to be stronger with a greater potential to be deadly.

Table 4.6

Virginia Tornados by Month: 1950-2007												
Intensity	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
F/EF0-F/EF1	10	13	16	37	58	47	80	65	73	20	14	2
F/EF2-F/EF4	3	0	3	13	13	12	8	13	25	11	5	0
Total	13	13	19	49	71	59	88	78	97	31	19	2
% weak	77	100	84	73	82	80	91	83	74	65	74	100
% Strong	23	0	16	27	18	20	9	17	26	35	26	0

Source: http://www.vaemergency.com/newsroom/history/tornado.cfm

Figure 4.5 (below) summarizes the frequency and strength of extreme windstorms across the United States. Produced by the Federal Emergency Management Agency, the map represents 40 years of tornado history and over 100 years of hurricane history.

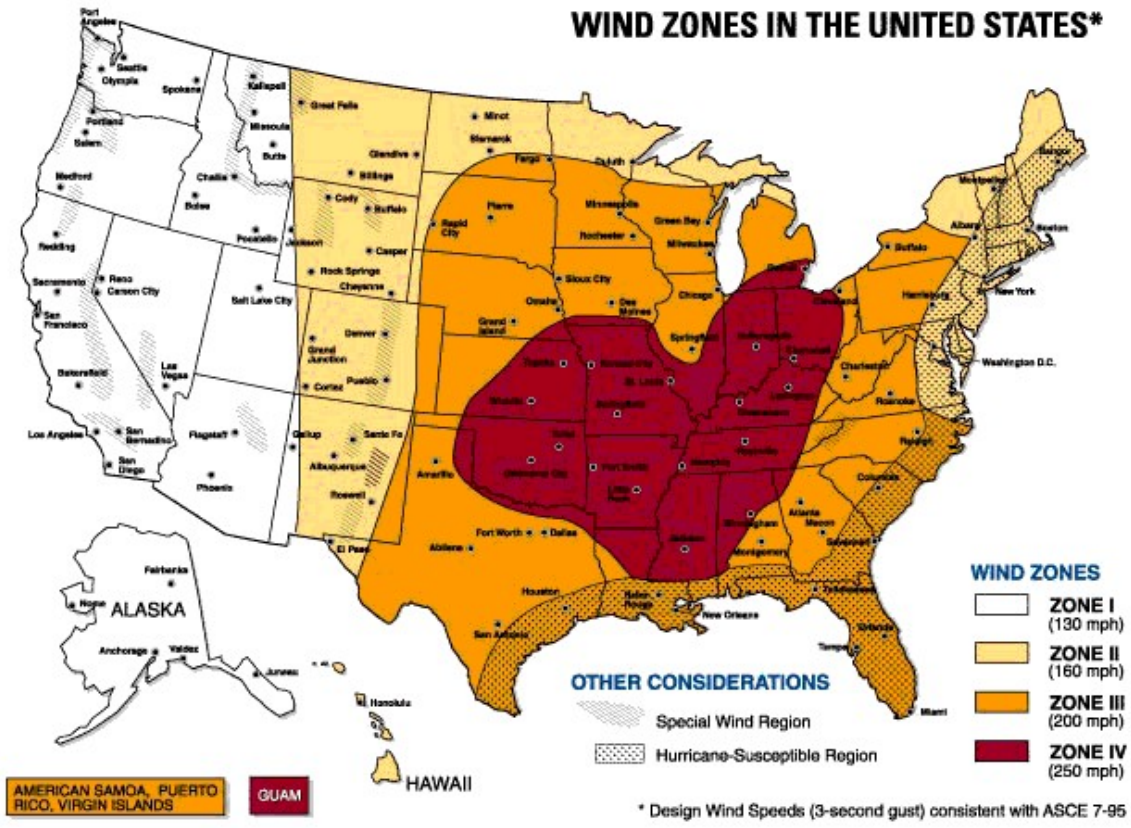
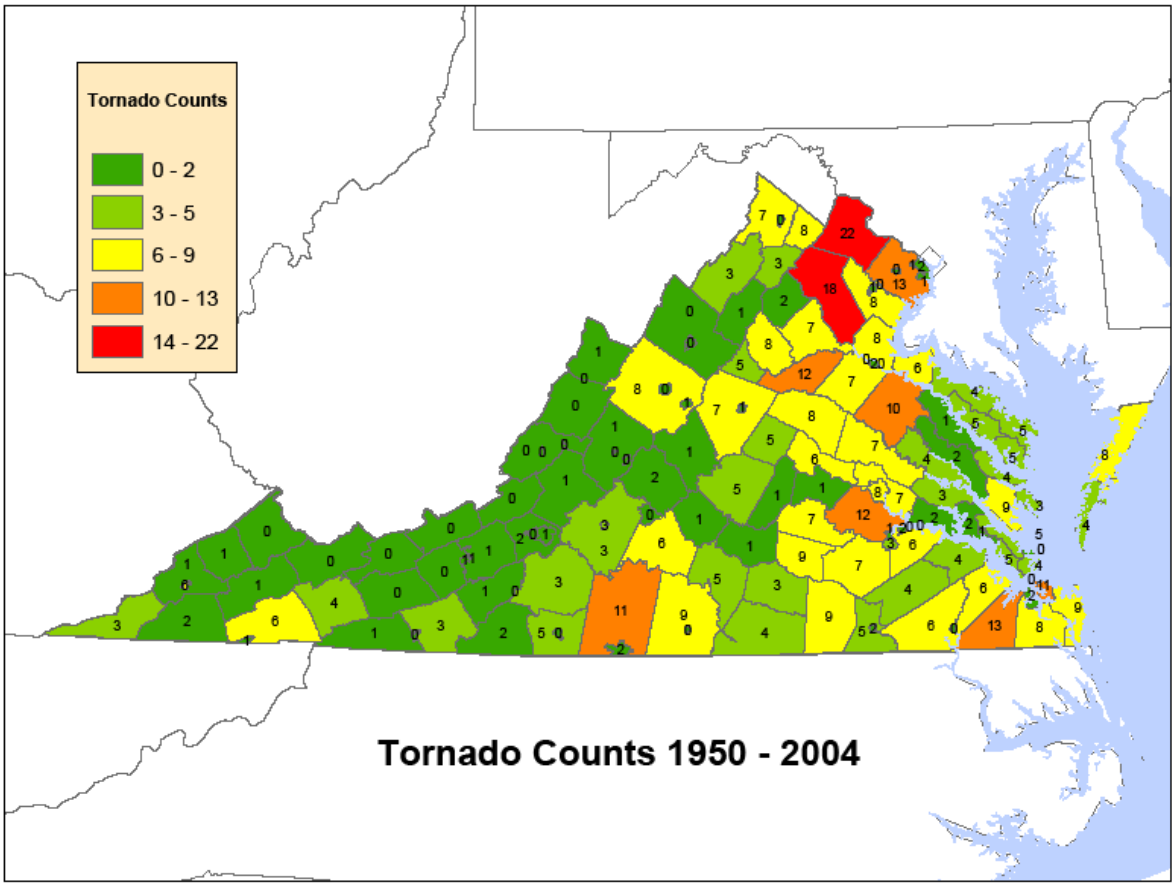


Figure I.2 Wind zones in the United States

Source: Federal Emergency Management Agency

Figure 4.6

Virginia Tornado Counts 1950-2004



Source:
http://www.vaemergency.com/newsroom/history/stats/tornado/tornado_counts2004.pdf

WILDFIRE

A wildfire is any unwanted or unplanned fire burning in forests or wildland areas that threatens to destroy life, property or natural resources. Each year, about 1,600 wildfires consume a total of 8,000-10,000 acres of forest and grassland in Virginia. During the fall drought of 2001, Virginia lost more than 13,000 acres to wildfires. Records indicate that most of Virginia's wildfires are caused by people. As Virginia's population continues to grow, so does the use of forests for recreation and residential development, thereby increasing the risk of wildfires. The wildland/urban interface, defined

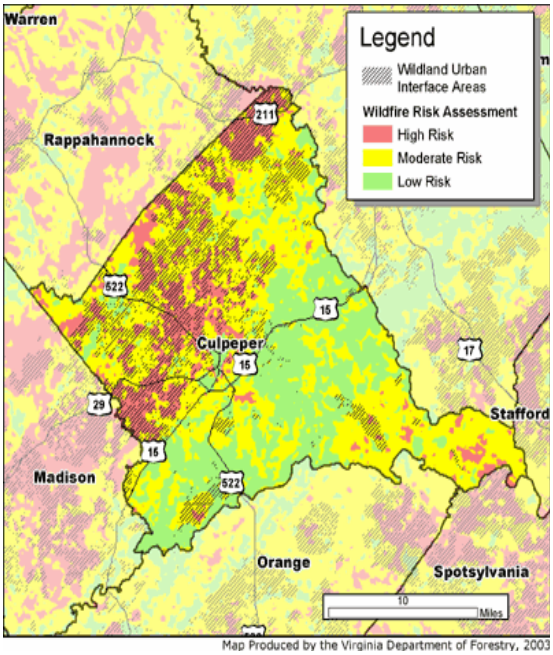


as the line, area or zone where structures and other human development meet or interface with undeveloped wildland or vegetative fuels, is an area of particular concern. Over the past 15 years the number of woodland home developments in Virginia has increased from 524 to 2,914 and the number of dwellings in those developments has gone from 18,203 to 138,111. Effective management of this increasingly fragile zone is essential to the conservation of forest resources and the preservation of the built environment. Three percent of forest fires in Virginia are the result of lightning strikes; ninety-seven percent are caused by humans.

Although possible anytime, wildfires in Virginia occur most often in Spring and Fall when the relative humidity tends to be lower, winds tend to be higher and fuels are cured to the point where they readily ignite. In hardwood stands, trees are bare, allowing sunlight to dry and warm the leaves on the forest floor. Fire activity fluctuates each month and varies from year to year. Adequate precipitation reduces fire potential; however, extended periods of warm, dry, windy weather increases fire occurrence. Drought conditions contribute to fire probability and may limit efforts to suppress wildfires in instances where decreased water supplies are inadequate to quickly contain the fire.

The potential for wildfires exists throughout the Rappahannock-Rapidan region; however, areas at greatest risk include those that are heavily forested or at the interface between forests and other land uses. Land management measures including the development of fire roads, storage of water for emergency use, safety buffers, firebreaks, and fuel management can be developed as part of an overall fire defense system to aid in fire control. Education of those who use forested areas for recreation or build in wild land areas is of primary importance in reducing wildfires.

FIGURE 4.7
Culpeper County
Wild-land/Urban Interface & Wildfire Risk Assessment



DROUGHT / EXTREME HEAT

Drought results from an extended period of limited precipitation affecting a fairly broad geographic area. High temperatures, high winds, and low humidity can exacerbate conditions, increasing the likelihood of wildfire. Human demands and actions can accelerate and intensify drought-related impacts. Droughts are classified as one of following:

- Meteorological,
- Agricultural,
- Hydrological, and
- Socio-economic.



Drought 2002 – Rapidan River intake pump for Town Of Orange: Photo: The Orange County Review.

Meteorological droughts are typically defined in terms of precipitation deficits compared to average, or normal, amounts of precipitation over a given period. Crop and livestock needs, and soil water deficits are primary factors in determining agricultural droughts, while hydrological drought is directly related to the effect of precipitation shortfalls on surface water and groundwater supplies. Socio-economic drought results from precipitation shortages that limit the ability to supply water-dependent products to the marketplace.

Weekly updated drought monitor maps may be viewed online at the National Drought Mitigation Center: http://drought.unl.edu/dm

FIGURE 4.8

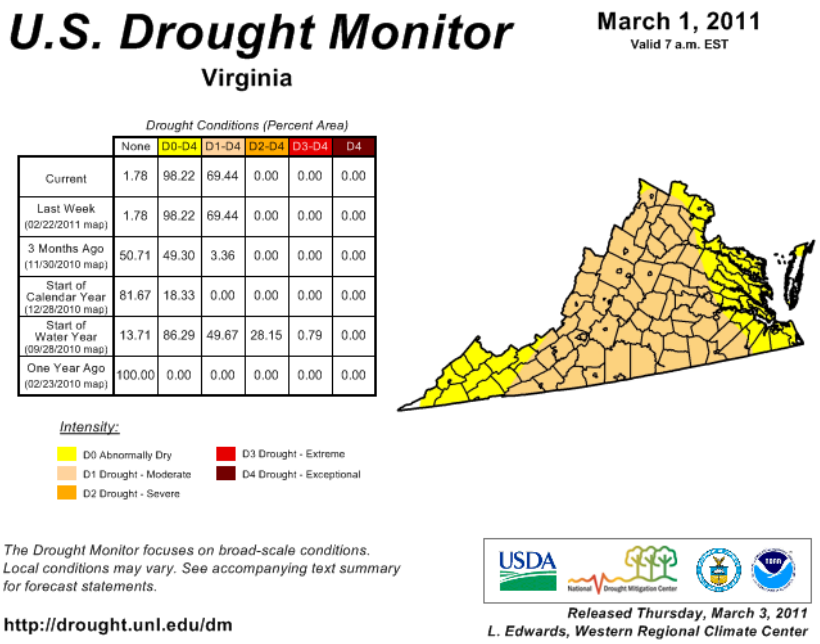


TABLE 4.7
Drought Severity Classification

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

EXTREME HEAT

An extreme heat event is characterized by a prolonged period of temperatures 10 degrees or more above the average high temperature accompanied by high humidity. Under normal conditions, perspiration produced in response to elevated temperatures evaporates, cooling the body. High humidity, however, slows the evaporation process, resulting in discomfort and a greater challenge to the body to maintain normal temperatures. Elderly persons, young children, persons with respiratory difficulties, and those who are sick or overweight are more likely to become victims of extreme heat. Studies indicate that a significant rise in heat-related illness occurs when excessive heat persists for more than two days.

Extreme heat in urban areas can create health concerns when stagnant atmospheric conditions trap pollutants, resulting in overall poor air quality. In addition, the urban heat island effect can produce significantly higher nighttime temperatures than those in surrounding suburbs. Exposure to two hours of air conditioning per day can significantly reduce the probability of heat-related illnesses

Table 4.8

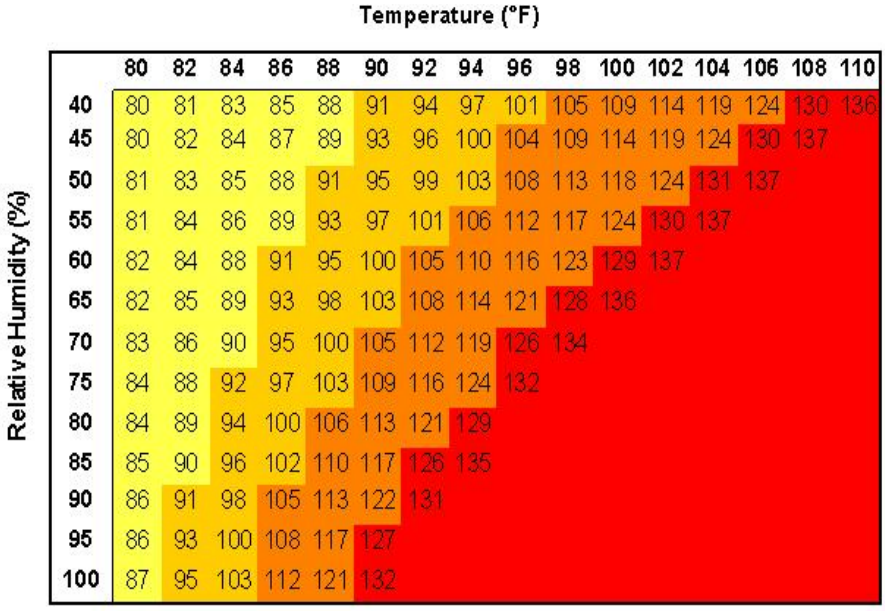


Table 4.9
Annual U.S.

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution Extreme Caution Danger Extreme Danger

Extreme Heat Summary

YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Fatalities	158	166	167	36	6	158	253	105	71	45
Injuries	469	445	378	174	74	298	1,513	1,886	217	204

Source: http://www.economics.noaa.gov/?goal=weather&file=events/temp

HAIL

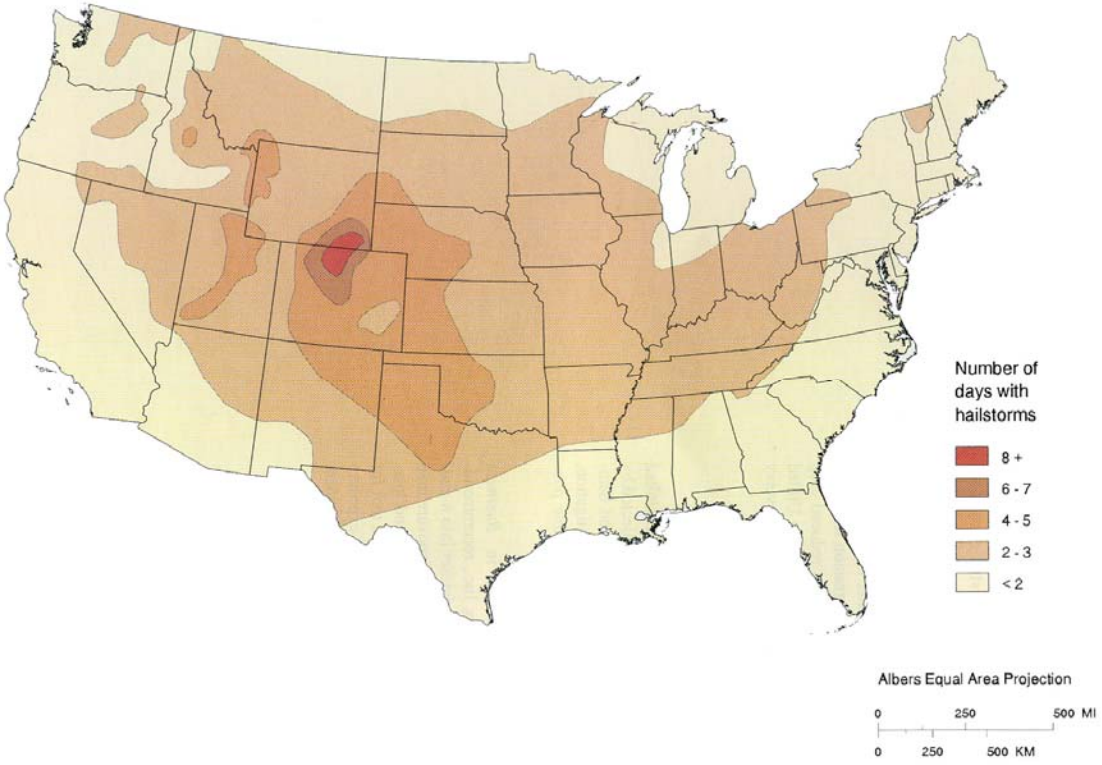
Hailstorms are usually associated with severe thunderstorms. High velocity updrafts within the storm carry ice crystals upward to regions of colder air where moisture precipitates on the crystal and freezes. The added weight causes the crystal to fall. If updrafts are strong enough, the crystal will make several trips up into higher, colder regions, adding a layer of ice each time. Once the weight of the pellet overcomes the force of the updraft, it falls to the ground as part of a hailstorm. Hail size directly reflects the severity of the storm.



Large hail collects on streets and grass during a severe thunderstorm. Larger stones appear to be nearly two to three inches in diameter. (NOAA Photo Library, NOAA Central Library; OAR/ERL/National Severe Storms Laboratory)

Hail dents cars, shatters windows and green houses, damages roofs and damages or destroys crops. Farm animals may be injured. Every year areas of Virginia are impacted by severe thunderstorms producing large hail measuring 0.75-inch (penny size) or larger. Rarely, however, does the hail reach tennis ball size (2.5 inches) or larger. This large hail occurs once or twice per year on average

Figure 4.9
Annual Frequency of Hailstorms in the United States



WINTER STORMS AND FREEZES



Back-to-back snowstorms of historic proportions plagued the Rappahannock-Rapidan region in winter, 2010. Photo by Vincent Vala, Culpeper Star-Exponent.

Winter storms are variable in their extent and duration. They can range from moderate, short-lived snowfalls to full-blown blizzards with blinding, wind-driven snow lasting several days. Some winter storms may be large enough to impact several states, while others may affect only a single community. Winter storms may include a full range of precipitation, from snow, sleet, and freezing rain to a mix of all three. Sleet hits the ground as a frozen solid, accumulating like snow and causing slippery conditions for pedestrians and motorists. Freezing rain, as the term suggests, falls as a liquid and freezes on contact, creating glazed surfaces and extreme hazards for all modes of mobility. Requiring surface temperatures below 32°F, freezing rain often results in multiple impacts. Even a limited accumulation can add significant weight to power lines and tree limbs, causing them to snap and break, disrupting communications and power, blocking roads and damaging structures.

A freeze is characterized by a minimum of several hours of temperatures around 30°F, or lower. Under these conditions, impacts to agriculture are significant, since all but the hardiest herbaceous plants will be affected.

EROSION



Erosion is the transport by water, wind, ice and gravity of weathered materials on Earth's surface. The chemical and/or physical breakdown of rock produces loose particles which may continue to weather in place or be moved to the point at which the weight of the particle overcomes the energy of transport and the particle is deposited. Moving water is the primary agent of transport. Wind energy is second. An increase in velocity of the agent of transport generally increases the size of the particle moved and distance over which it is transported. For example, heavy rainfall adds runoff to a stream. This results in an increase in stream velocity and the amount and particle size of sediment transported. Channel scouring and stream bank destabilization may follow.

Erosion potential is generally determined by a number of factors including surface composition, vegetative cover, topography, weather and climate. Loose, unconsolidated materials on steep slopes with no vegetative cover are far more likely to erode than compacted particles on vegetated plains.

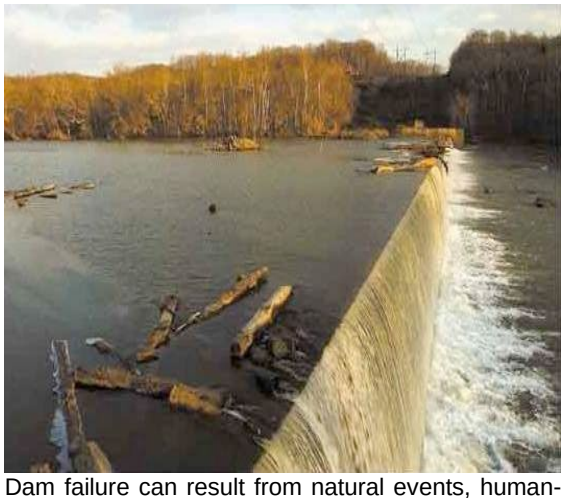
Vegetation plays a key role in controlling erosion. It intercepts the force of falling rain, absorbs runoff, slows the velocity of sheet flow and wind and holds soil particles in place. As might be expected, the topography of an area also influences its susceptibility to erosion. The greater the gradient and slope length, the more prone areas are to erosion. Frequency, intensity and duration of rainfall also influence erosion potential.

Sound land management practices in construction and agriculture minimize the impacts of erosion including soil loss, stream degradation, landscape alteration, and landslides. As the importance of effective erosion control has gained increased attention, so have recognition of the need for regulatory programs and the development of erosion control products, practices and site development methodologies. Preservation and/or restoration of natural vegetation and the implementation of erosion and sediment control regulations are recognized as fundamental to managing erosion.

DAM FAILURE

With growing awareness of problems associated with aging infrastructure and recognition of populations in downstream areas, the concern for dam safety is increasing. As knowledge of hydrology has increased, so has the interest in improved techniques in dam construction, maintenance and general operation.

Currently, there are about 80,000 dams in the United States. Most are privately owned. Other owners include federal, state and local authorities or agencies and public utilities. Dams help manage water for drinking, agriculture and navigation. They impound water to create lakes for recreation, to generate hydroelectric power and to manage floodwaters.



Dam failure can result from natural events, human-induced events, or a combination of the two. Failures due to natural events such as hurricanes, earthquakes or landslides are significant because there is generally little or no advance warning.

Despite their many benefits, if not designed, constructed and maintained properly, dams may pose a significant risk to downstream communities. Failure of even small structures can result in loss of life and significant property damage. The Virginia Department of Conservation and Recreation's Division of Dam Safety has recently (Dec. 2010) updated its safety regulations and is in the process of evaluating the many dams constructed with or without proper permits throughout the Commonwealth. Of particular concern are the many aging impoundments that have not been properly maintained and lie upstream of developed properties.

EARTHQUAKES



The historic Ritz Hi-Hat building in downtown Culpeper, Virginia was destroyed by the August 23, 2011 earthquake. The picture above shows the demolition and removal phase one week after the earthquake. (Source: Rappahannock-Rapidan Regional Commission)

An earthquake is the movement of Earth's surface in response to radiated seismic energy resulting from volcanic or magmatic activity, slippage or buckling along tectonic plates or other sudden adjustments of subsurface stresses. Earthquake hazards include ground shaking, landslides, faulting, ground liquefaction, tectonic deformation and tsunamis. Earthquakes can result in widespread, extensive damage to the built environment, severe injury and loss of life, and the disruption of the social and economic fabric of the affected area.

Most property damage, injuries and deaths result from structural failure and collapse. The amount and type of damage relates directly to the amplitude and duration of motion which vary according to the size of the quake, its depth, location and regional geology.

Earth's areas of greatest instability occur along the perimeters of its tectonic plates. The North American plate is bounded on the east by the mid-Atlantic ridge, located, as the name suggests, in the middle of the Atlantic Ocean between North America and Europe. The western edge of the North American plate abuts the eastern edge of the Pacific plate and marks the west coast of North America. As might be expected, the Pacific coastal area of the United States is far more likely to experience earthquakes than the eastern coastal region of the United States. It should be noted, however, that regions with historically limited seismic activity should not dismiss the possibility of future events. Earthquake prediction is not yet possible and even small quakes can have significant secondary effects.

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is expressed by reference to the Richter Scale, an open-ended logarithmic scale that describes the energy released through a measure of shock wave amplitude (see **Table 4.10**). Each unit increase in magnitude on the scale corresponds to a ten-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale which is based on direct and indirect measurements of seismic effects. A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in **Table 4.11**.

Table 4.10
Richter Scale

Richter Magnitudes	Earthquake Effects
Less than 3.5	Generally not felt, but recorded.
3.5-5.4	Often felt, but rarely causes damage.
Under 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0-7.9	Major earthquake. Can cause serious damage over larger areas.
8 or greater	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

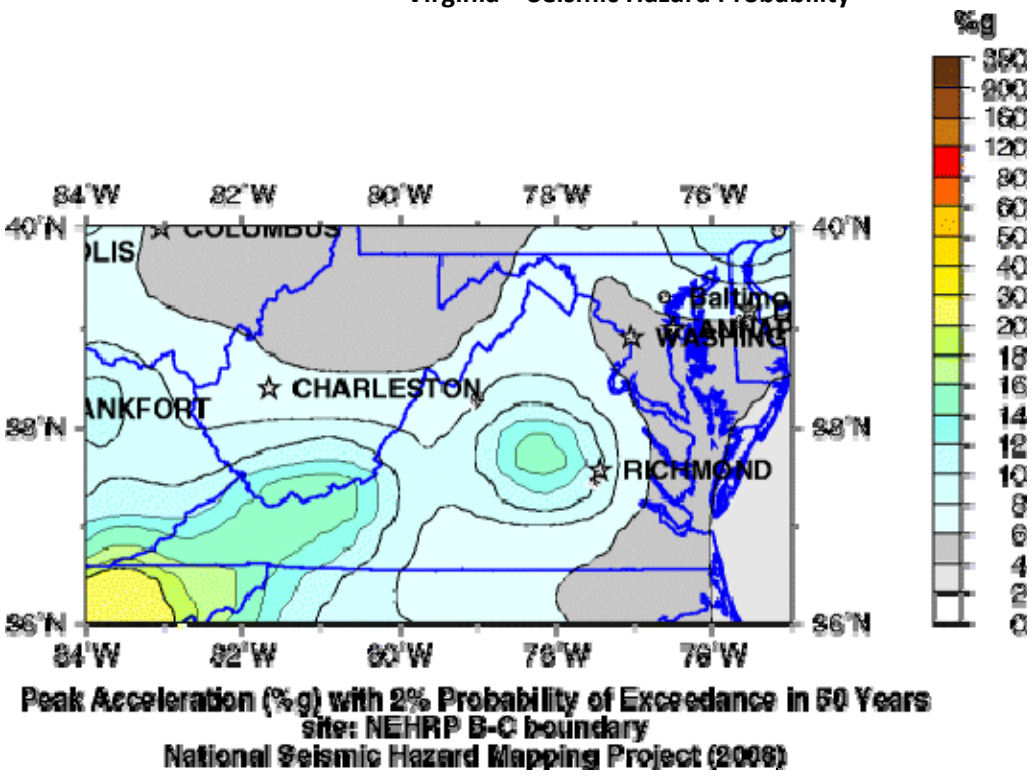
Table 4.11
Modified Mercalli Intensity Scale for Earthquakes

Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs	
II	Feeble	Some people feel it	<4.2
III	Slight	Felt by people resting; like a truck rumbling by	
IV	Moderate	Felt by people walking	
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves	<5.4
VII	Very Strong	Mild Alarm; walls crack; plaster falls	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>8.1

Source: North Carolina Division of Emergency Management

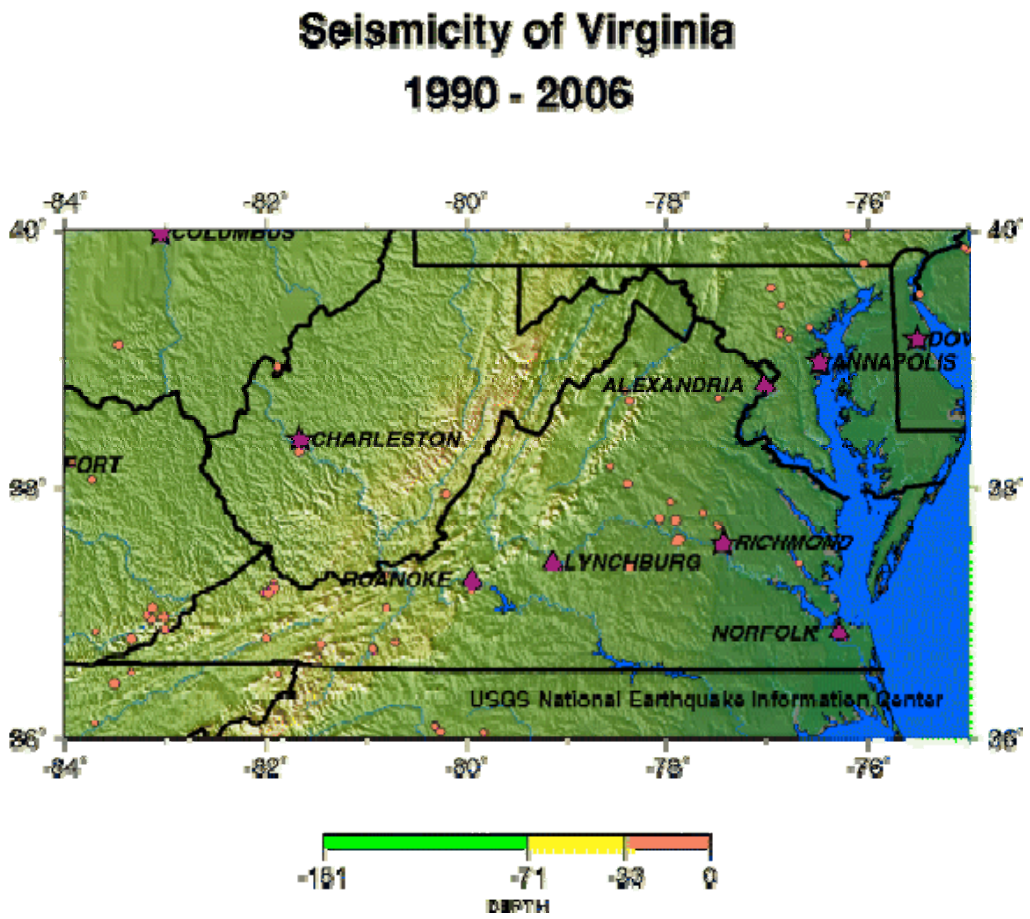
The probability that ground motion will reach a certain level during an earthquake is indicated below (Figure 4.10). The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years.

Figure 4.10
Virginia – Seismic Hazard Probability



Source: United States Geological Survey

Figure 4.11



Depth is in kilometers.
Purple Triangles: Cities
Purple Star: Capital City
Circles: Earthquakes (color represents depth range)

SINKHOLES

Sinkholes are common in areas characterized by soluble bedrock including limestone or other carbonates, salt beds, or any rock that can be dissolved naturally by circulating ground water. As rock dissolves, spaces and caverns develop underground. When the weight of the overlying land mass exceeds subsurface support, a sudden collapse may occur. The degree of susceptibility varies with the extent and character of the soluble rock, its location with regard to the water table and local climate conditions.

Sinkholes vary in size. Under natural conditions, sinkholes form slowly and expand gradually. However, human activities such as dredging, construction of impoundments, diversion of surface water, and groundwater removal can accelerate the rate of sinkhole development, resulting in an abrupt collapse.

Although a sinkhole can form without warning, specific signs can signal potential development:

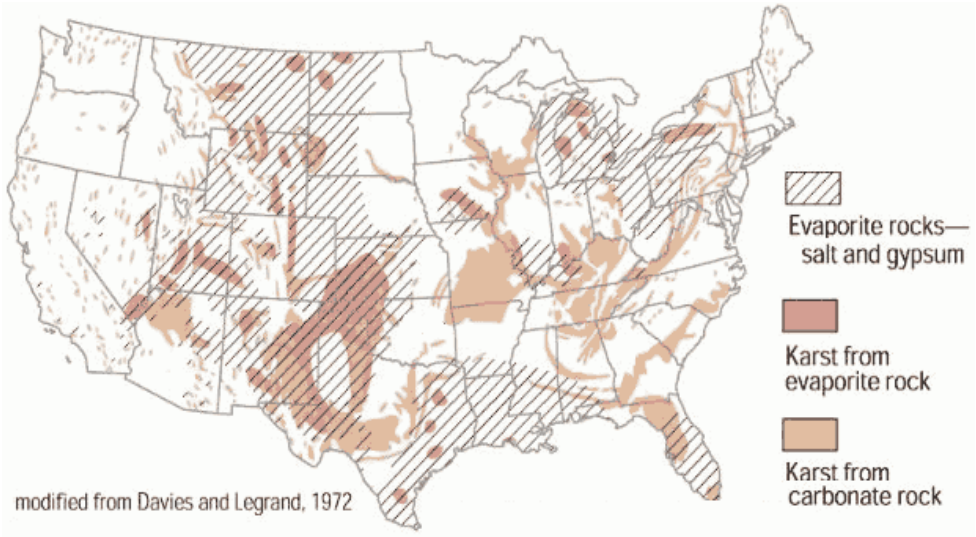
- Slumping or falling fence posts, trees, or foundations;
- Sudden formation of small ponds;
- Wilting vegetation,
- Discoloration of well water; and/or
- Structural cracks in walls, floors.

Sinkhole formation is aggravated and accelerated by urbanization. Development increases water usage, alters natural drainage, overloads surface weight and redistributes surface materials. According to the Federal Emergency Management Agency (FEMA), insurance claims for damage resulting from sinkhole formation have increased 1,200 percent from 1987 to 1991, costing nearly $100 million.



Driver Trapped in Sinkhole Near Lynchburg,VA
(Leonard Harville / January 25, 2010)

Figure 4.12



LANDSLIDES

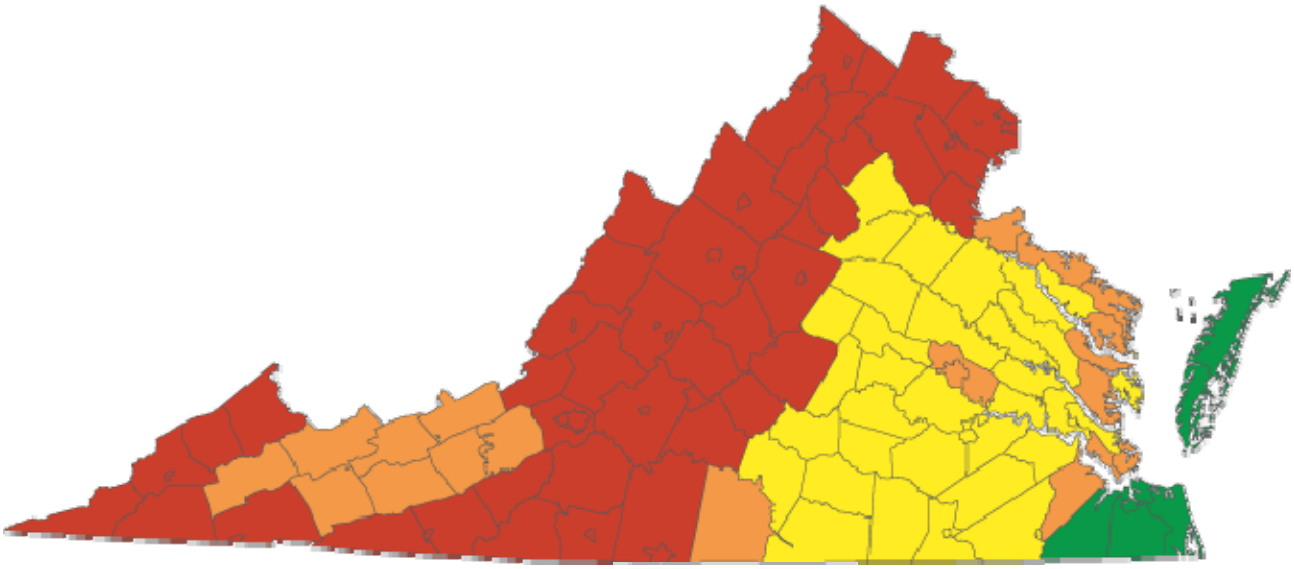
A landslide is the mass movement of earth material down a slope. The process is driven by gravity and may occur instantaneously with a sudden rush of rock and debris or imperceptibly as very slow movement over time. Landslides may be triggered by natural events such as heavy rainfall, rapid snow melt, stream incision, earthquakes and volcanic eruptions. Certain man-made changes to the land, such

as slope modification or drainage alteration, can greatly increase the likelihood of landslides. Landslides are a major geologic hazard. They are widespread, occurring in all 50 states and U.S. territories.

Expansion of urban and recreational development into hillside areas results in increased threat of landslides each year. Landslides may wrecking buildings, rupture gas, water, and sewer mains, disrupt power and communication lines and block transportation routes. Soil creep, slope slump, rock slides and debris flows cause property damage, injuries and death. In the United States, landslides cause up to $2 billion in damages annually and result in twenty-five to fifty fatalities. Areas prone to landslide hazards include those with historic susceptibility, bases of steep slopes, bases of drainage channels and developed hillsides where gravity flow septic systems are installed.

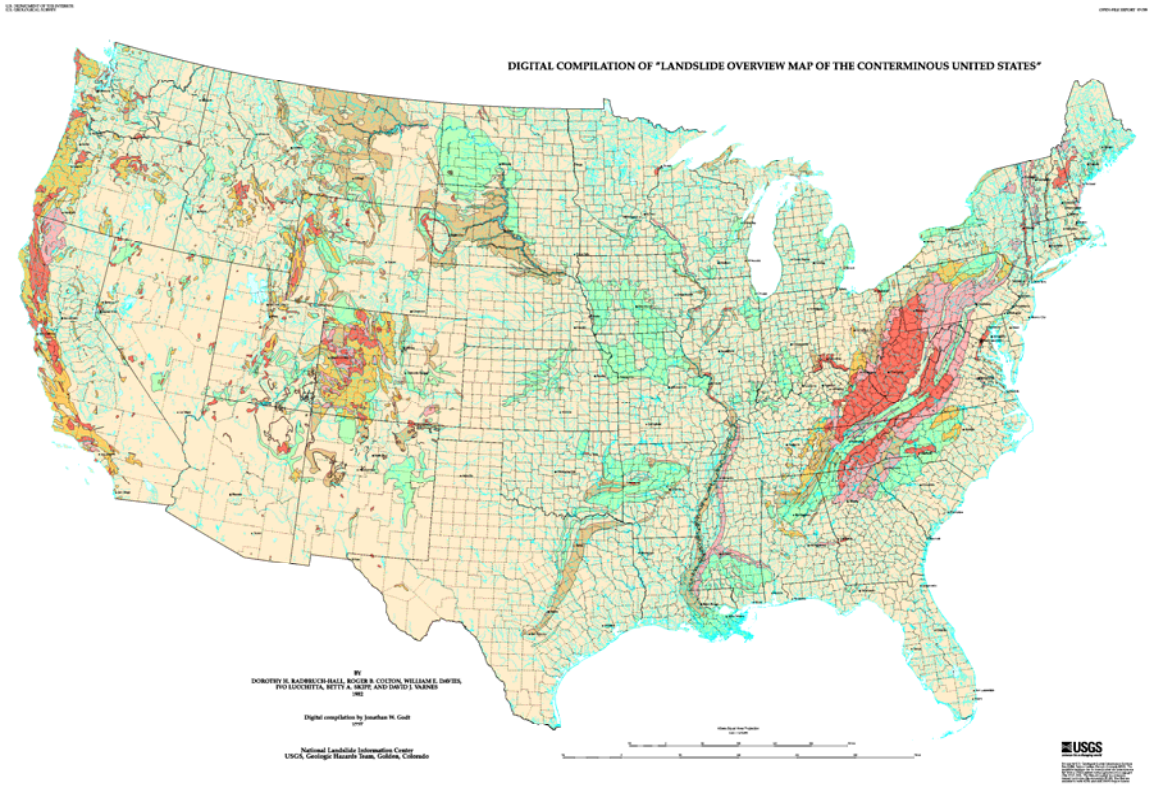


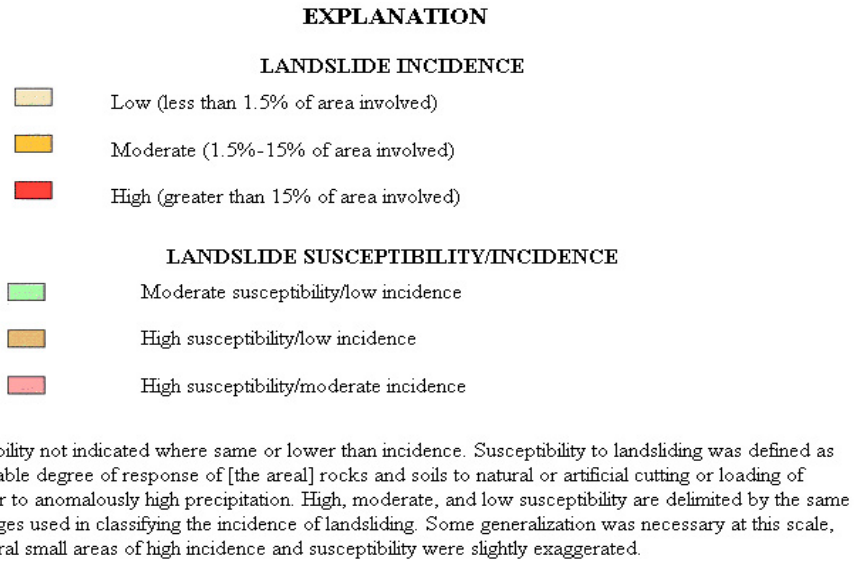
Aerial view of debris flow chutes and flood deposits from the June 27, 1995 flood at Kinsey Run, near Graves Mill in Madison County, Virginia. Photo from The debris Flows of Madison County, Virginia: 34th Annual Virginia Geological Field Conference Guidebook.



Counties in Virginia that are susceptible to landslides. Red = high potential; orange = moderate potential; yellow = moderate to low potential; green = low potential.

Figure 4.13
Landslide Overview Map of the Conterminous United States





Source: United States Geological Surveyhttp://pubs.usgs.gov/pp/p1183/plate1.html

DATA SOURCES

American Society of Civil Engineers (ASCE), "Facts About Windstorms."
Web site: www.windhazards.org/facts.cfm

Bureau of Reclamation, U.S. Department of the Interior
Web site: www.usbr.gov

Federal Emergency Management Agency (FEMA)
Web site: www.fema.gov

National Climatic Data Center (NCDC), U.S. Department of Commerce, National Oceanic and Atmospheric Administration
Web site: http://lwf.ncdc.noaa.gov/oa/ncdc.html

National Drought Mitigation Center, University of Nebraska-Lincoln
Web site: www.drought.unl.edu/index.htm

National Severe Storms Laboratory (NSSL), U.S. Department of Commerce, National Oceanic and Atmospheric Administration
Web site: www.nssl.noaa.gov

National Weather Service (NWS), U.S. Department of Commerce, National Oceanic and Atmospheric Administration
Web site: www.nws.noaa.gov

Storm Prediction Center (SPC), U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service
Web site: www.spc.noaa.gov

The Tornado Project, St. Johnsbury, Vermont
Web site: www.tornadoproject.com

United States Geological Survey (USGS), U.S. Department of the Interior
Web site: www.usgs.gov

HAZARD ANALYSIS

44 CFR Part 201.6(c) (2) (i): The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

The *Hazard Analysis* provides information on historical hazard occurrences in Rappahannock-Rapidan Region for the natural and man-caused hazards listed below. This includes an assessment of the location and spatial extent of the event as well as best available data regarding the impact on the region.

Natural Hazards

- **Flood**
- **Hurricanes, Tropical Storms and Nor'easters**
- **Severe Thunderstorms and Tornadoes**
- **Wildfire**
- **Drought/Extreme Heat**
- **Winter Storms and Freezes**
- **Erosion**
- **Earthquakes**
- **Sinkholes**
- **Landslides**
- **Dam/Levee Failure**

Historical records were used to identify the level of risk within the planning area. This section includes series of maps that illustrate the location and spatial extent of those hazards within the Rappahannock-Rapidan Region that have a recognizable geographic significance, such as 100 year floodplains. For those hazards not confined to a particular geographic area, such as thunderstorms and tornadoes, general information on the applicable intensity of these events across the entire planning area is provided.

FLOOD

The most common hazard identified in the Rappahannock-Rapidan region is flooding. Three major rivers, the York, the Rappahannock and the Potomac, all of which have tributaries of significant size, drain the region to the Chesapeake Bay. Runoff from creeks and streams high in the Blue Ridge contribute to the downstream flow, often resulting in flash floods during periods of heavy rain and/or rapid snow melt. **Figure 5.1** illustrates the flood hazard areas for the entire region.[1]

Table 5.1 lists flood events as reported by the National Climatic Data Center (NCDC) that have occurred in the Rappahannock-Rapidan region from 1/1/1995 until 11/30/2010. Because of the large number of events, details of only a few have been included.[2] Historical evidence clearly illustrates the likelihood of flooding in the region. Floods referenced below resulted in a total of 22 deaths, no reported injuries, approximately $95.179M in reported property damages and approximately $40.215M in crop damage claims.

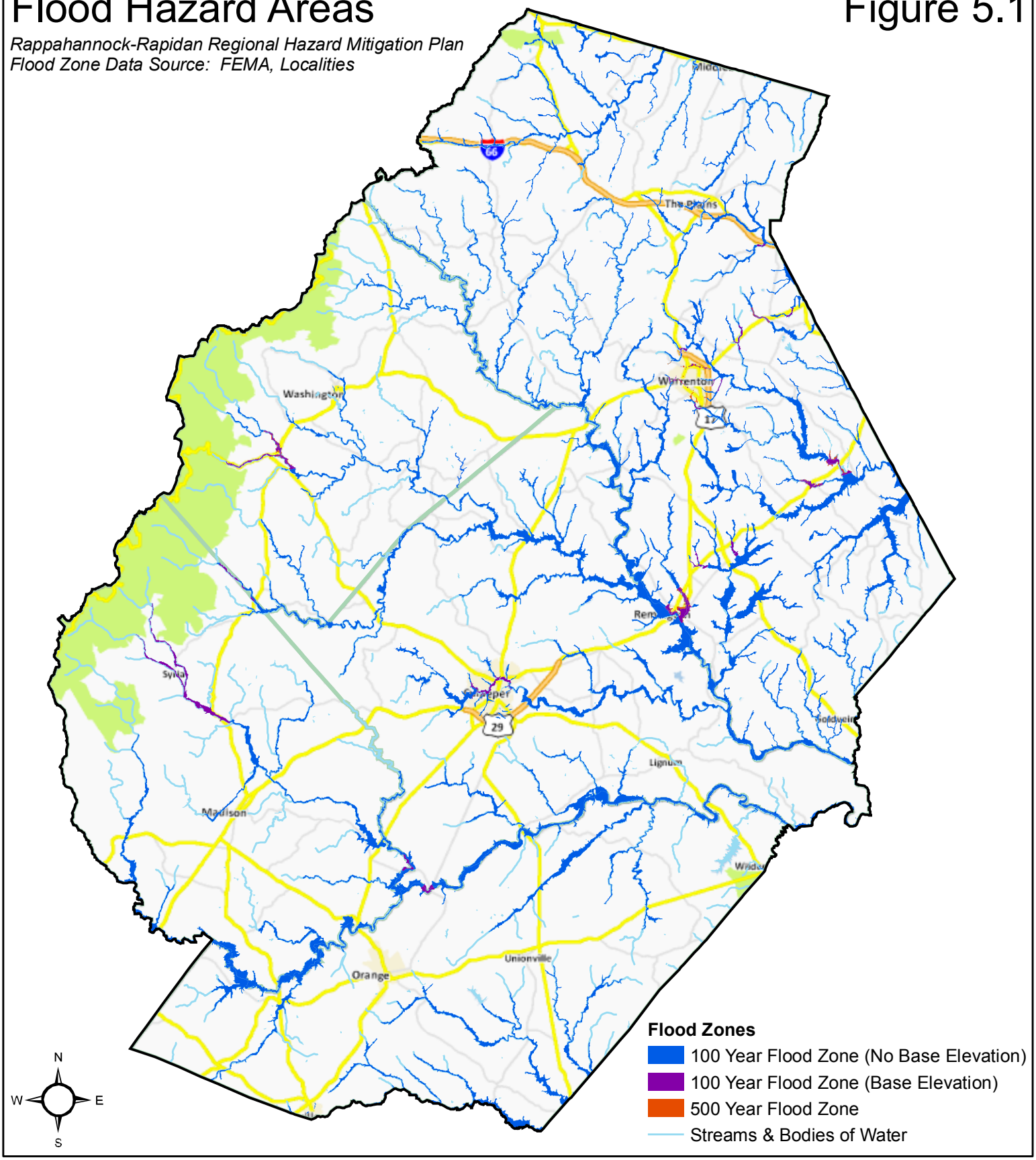
[1] The *Community Profile* section (Section 3 of this Plan) provides additional detail with regard to the region's geographic position within Virginia and other general geographic characteristics.

[2] Details for events recorded in the National Climatic Data Center's database can be obtained by visiting http://www.ncdc.noaa.gov/oa/ncdc.html.

Flood Hazard Areas

Figure 5.1

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: FEMA, Localities

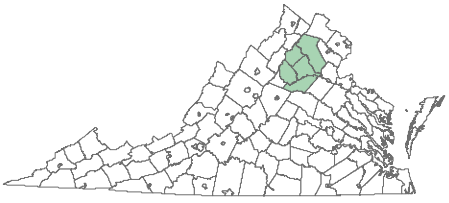


Rappahannock-Rapidan REGIONAL COMMISSION

Miles

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Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/10/2011 File: Flood_Zones_Region.mxd



Figures 5.2 through **5.11** illustrate in greater detail the flood hazard areas within each county and town, as applicable. It should be noted that the towns of Madison and Orange do not have any floodplains within their corporate boundaries.

Table 5.1
Flood Events: Rappahannock-Rapidan Region
(01/01/1995 – 11/30/2010)

Location	Number of Flood Events	Deaths	Injuries	Property Damage*	Crop Damage*
Culpeper County	40	4	0	$20.4 M	$644K
Fauquier County	46	4	0	$20.3M	$136K
Madison County	39	5	0	$19.8M	$36.831M
Orange County	32	4	0	$18.474M	$2.131M
Rappahannock County	29	5	0	$16.209M	$474K
REGIONAL TOTALS:	186**	22	0	$95.179M	$40.215M

Source: National Climatic Data Center
* Approximate numbers based on NCDC records.
** Many of the same events impacted more than one county

Significant Events[3]:

June 27, 1995 – Graves Mill, Madison County
On June 27, 1995, as much as 30 inches of rain fell in a 16-hour period on the steep slopes of Madison County, triggering hundreds of landslides and producing widespread flooding. Structures were inundated or crushed by flowing debris, pastures and crop-fields were obliterated and livestock perished. One fatality occurred near Crigglersville. Seven others lost their lives in different parts of the state as a result of this storm. Culpeper, Madison, Orange and Rappahannock counties were declared a major disaster area (FEMA).

January 19, 1996 – Entire region
Within twelve hours, rising temperatures melted the 20 – 30 inch snow cover. Snowmelt, along with 2 to nearly 5 inches of rain produced extensive regional flooding, the worst in over a decade. The event began with flash floods in the headwaters of all basins. River flooding progressed downstream through January 22nd. Crests ranged from 3 to 21 feet above flood stage. High water caused millions of dollars in damage, closed roads, destroyed homes and businesses, and forced the evacuation of several towns. Although low-water bridges were closed, a driver of a vehicle with 3 passengers dared the high waters of the Hazel River. All four perished as the automobile was swept downstream.

September 6, 1996 – Entire region
Along with significant wind damage, flooding resulted from heavy rains associated with **Hurricane Fran**. A major disaster was declared.

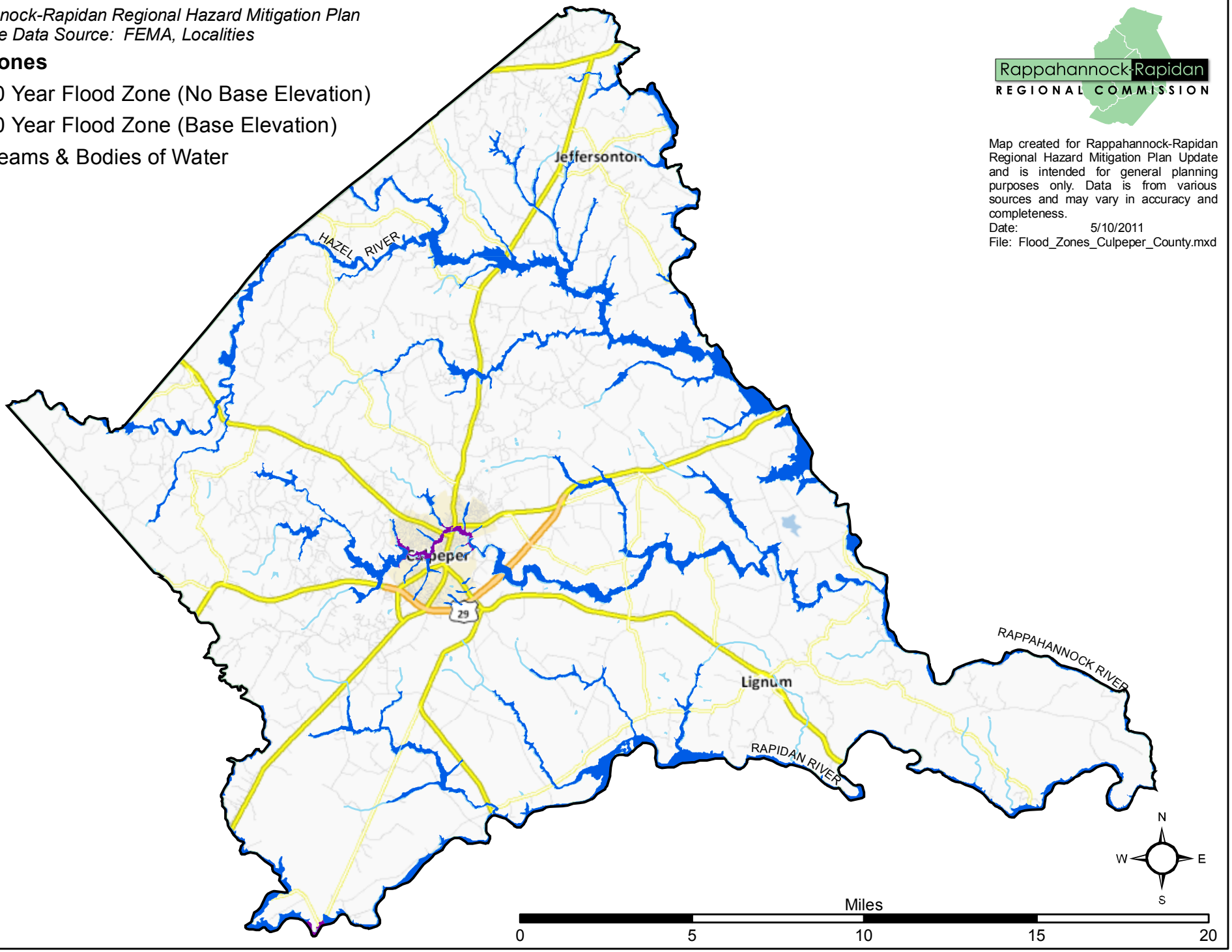
September 18, 2003 – Entire region
The combined effects of **Hurricane Isabel's** high winds and heavy rains and associated flooding, resulted in the declaration of a major disaster for the region and the Commonwealth.

[3] Details from events slightly modified from National Climatic Data Center's storm database.

Flood Hazard Areas: Culpeper County

Figure 5.2

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: FEMA, Localities



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Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.

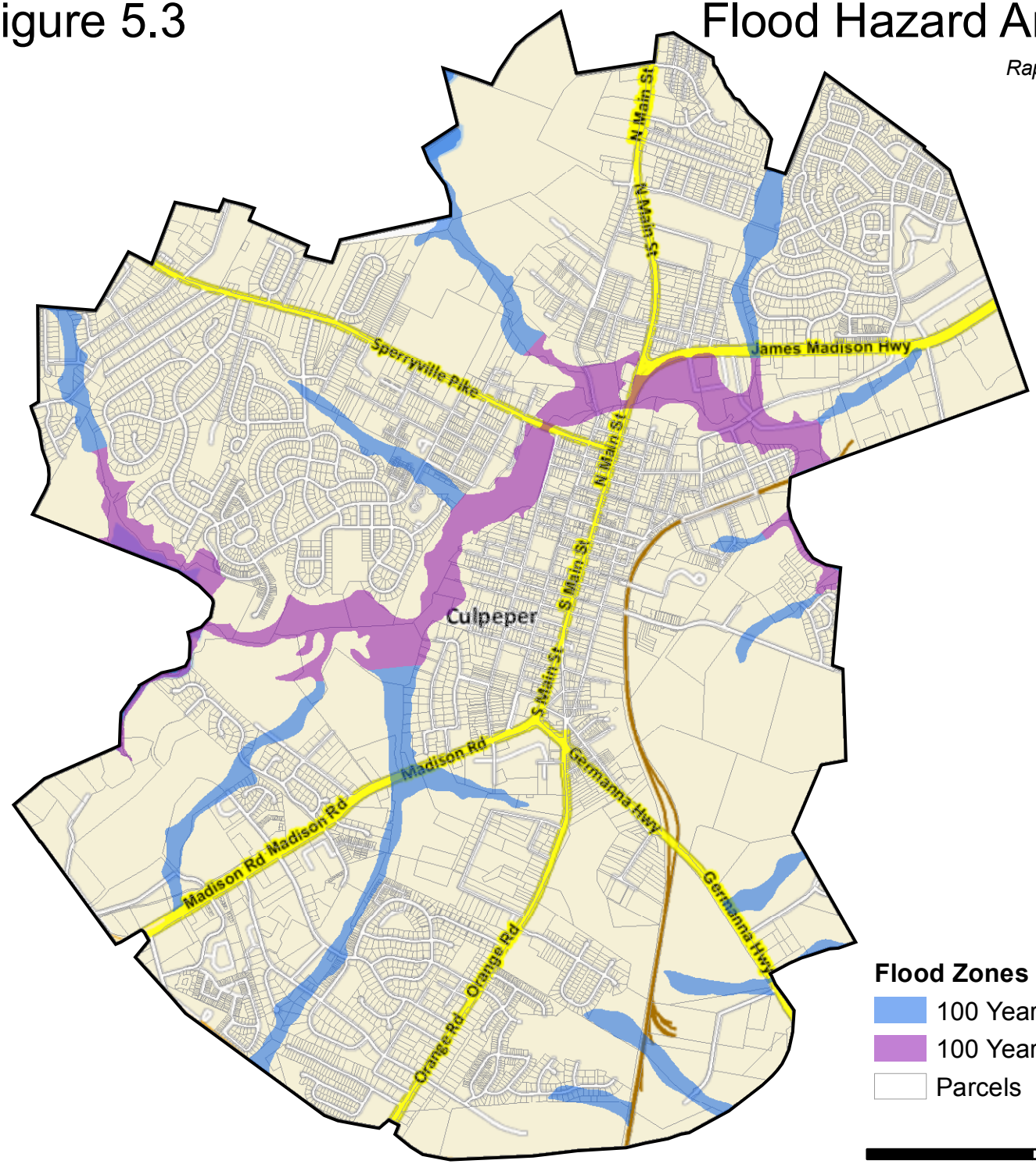
Date: 5/10/2011

File: Flood_Zones_Culpeper_County.mxd

Figure 5.3

Flood Hazard Areas: Town of Culpeper

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: FEMA, Localities



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Date: 5/10/2011
File: Flood_Zones_Culpeper_Town.mxd

Flood Zones

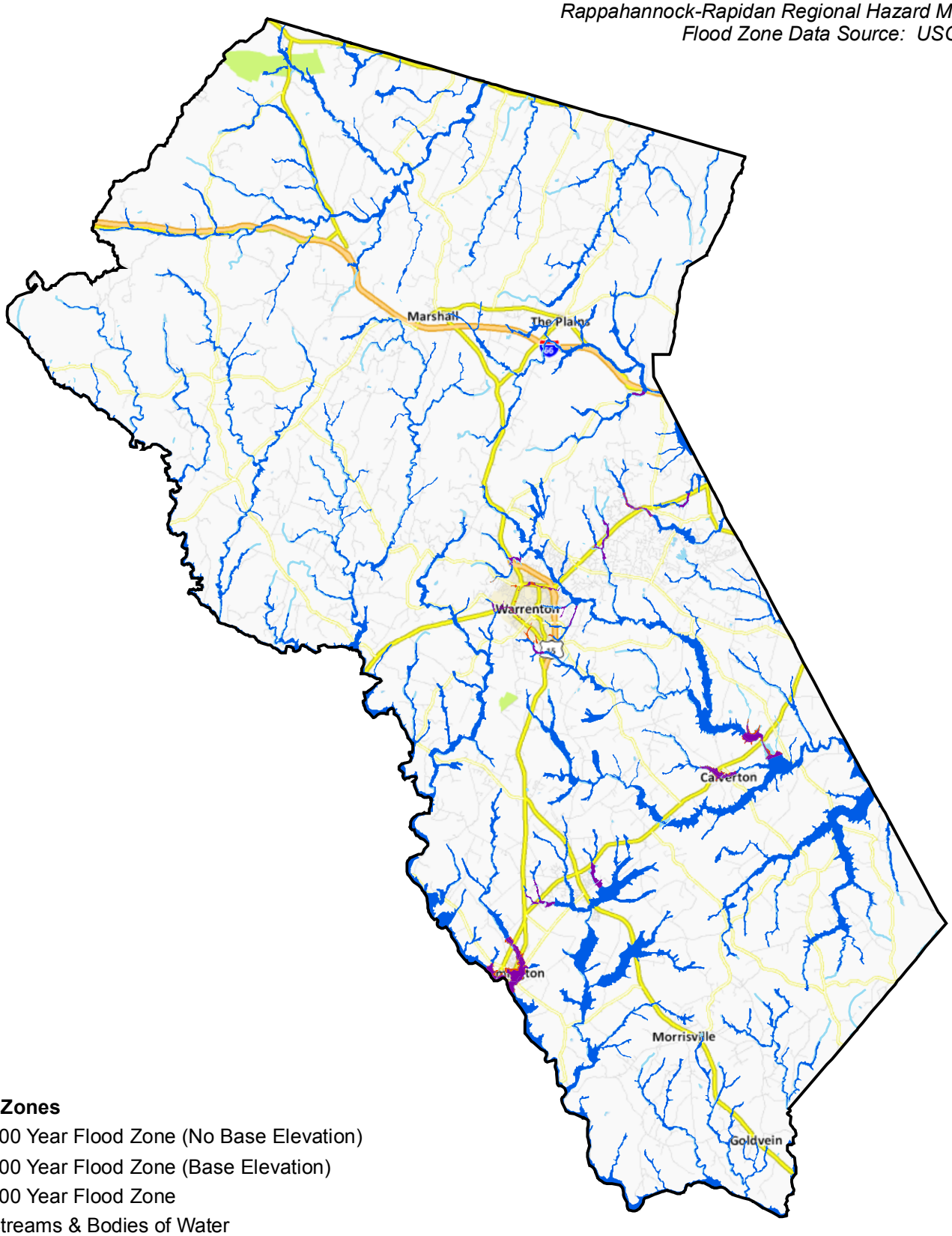
- 100 Year Flood Zone (No Base Elevation)
- 100 Year Flood Zone (Base Elevation)
- Parcels

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0 0.5 1 1.5 2

Figure 5.4 Flood Hazard Areas: Fauquier County

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: USGS, Localities



Flood Zones

- 100 Year Flood Zone (No Base Elevation)
- 100 Year Flood Zone (Base Elevation)
- 500 Year Flood Zone
- Streams & Bodies of Water

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Miles

0 2.5 5 7.5 10

Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/10/2011 File: Flood_Zones_Fauquier.mxd

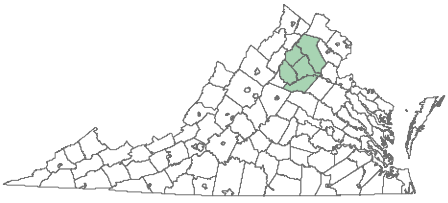
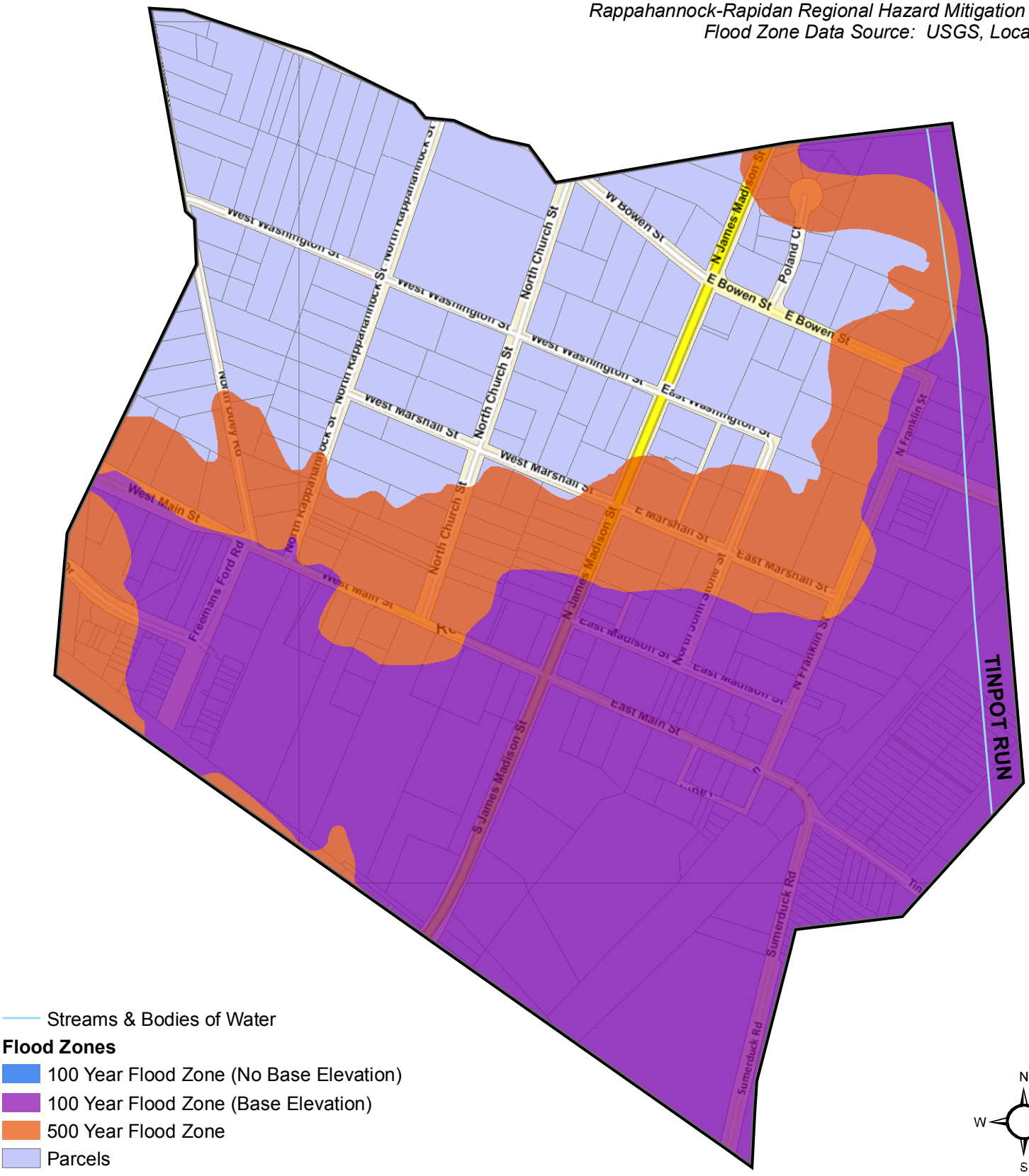


Figure 5.5 Flood Hazard Areas: Town of Remington

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: USGS, Localities



Streams & Bodies of Water

Flood Zones

- 100 Year Flood Zone (No Base Elevation)
- 100 Year Flood Zone (Base Elevation)
- 500 Year Flood Zone
- Parcels

Rappahannock-Rapidan REGIONAL COMMISSION

Miles

0 0.05 0.1 0.15 0.2

Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/10/2011 File: Flood_Zones_Remington.mxd

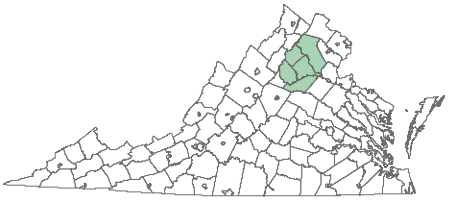
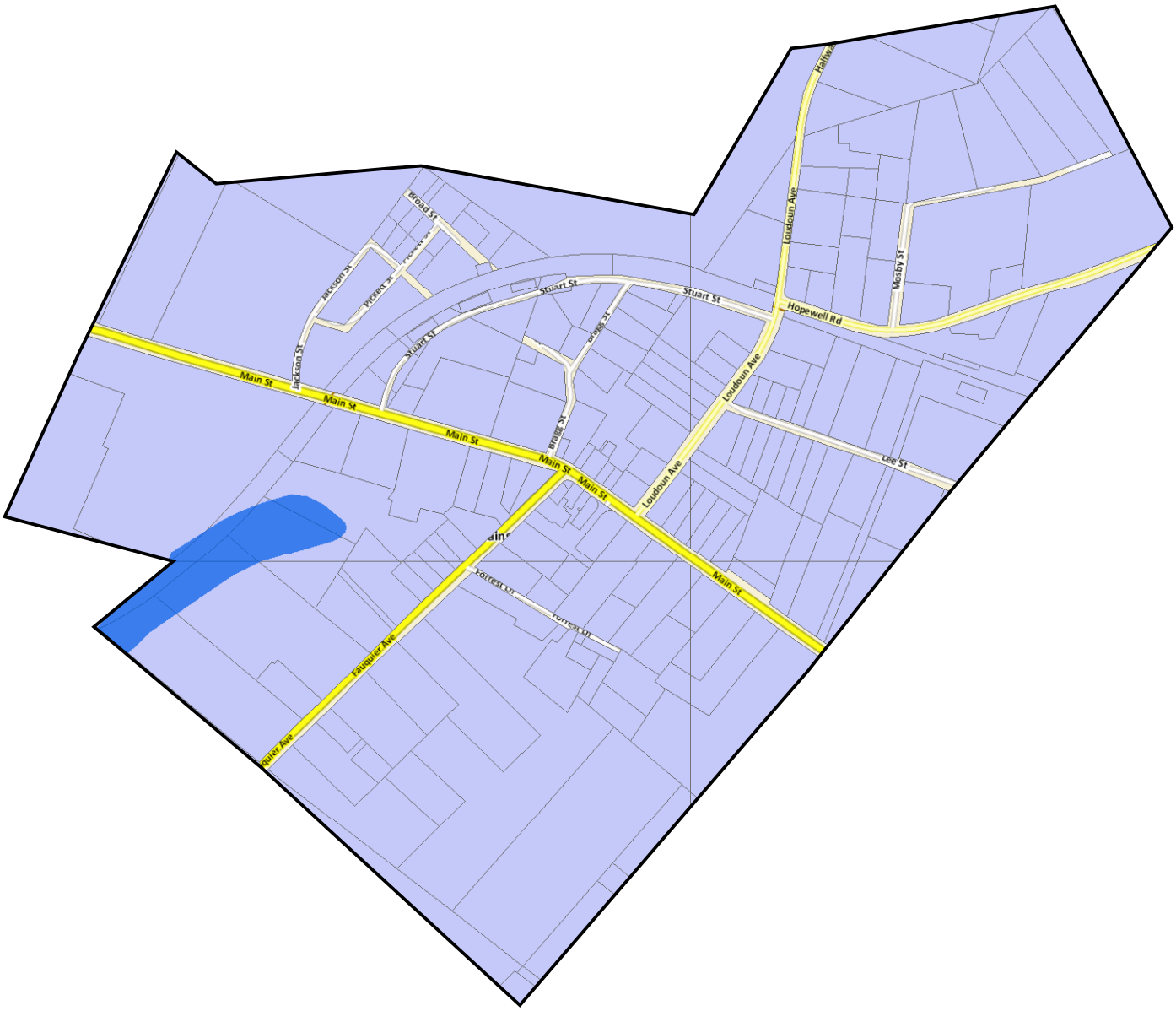


Figure 5.6 Flood Hazard Areas: Town of The Plains

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: USGS, Localities



Streams & Bodies of Water
100 Year Flood Zone (No Base Elevation)
Parcels

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Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 6/1/2011 File: Flood_Zones_ThePlains.mxd

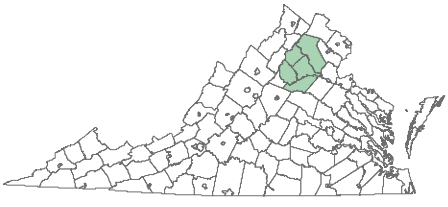
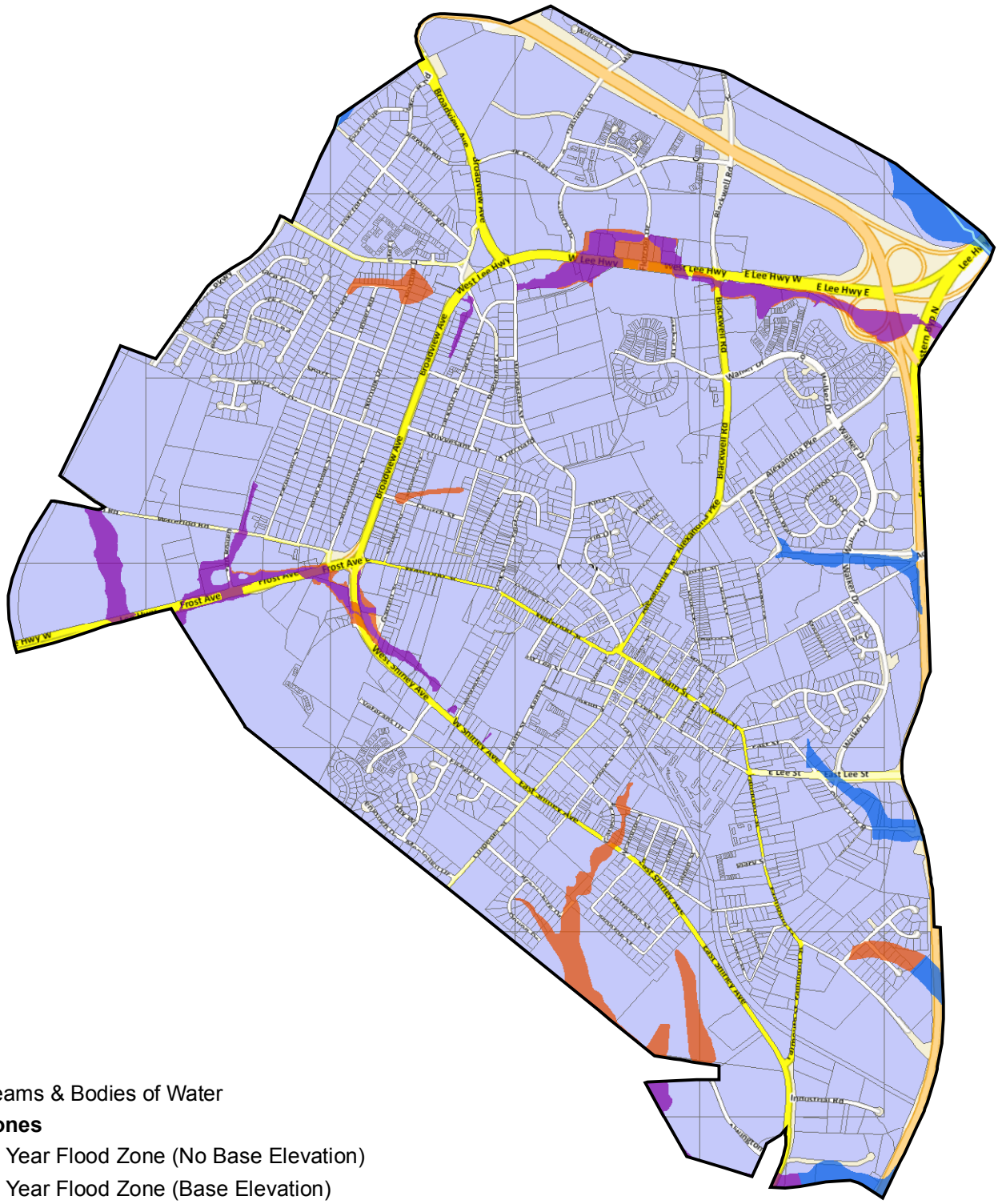


Figure 5.7 Flood Hazard Areas: Town of Warrenton

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: USGS, Localities



Streams & Bodies of Water

Flood Zones

- 100 Year Flood Zone (No Base Elevation)
- 100 Year Flood Zone (Base Elevation)
- 500 Year Flood Zone
- Parcels

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Rappahannock-Rapidan REGIONAL COMMISSION

Miles

0 0.25 0.5 0.75 1

Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 6/1/2011 File: Flood_Zones_Warrenton.mxd

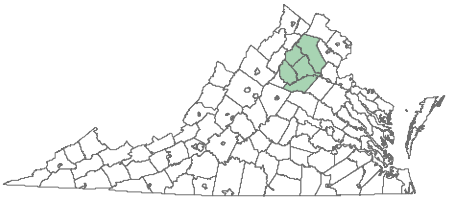
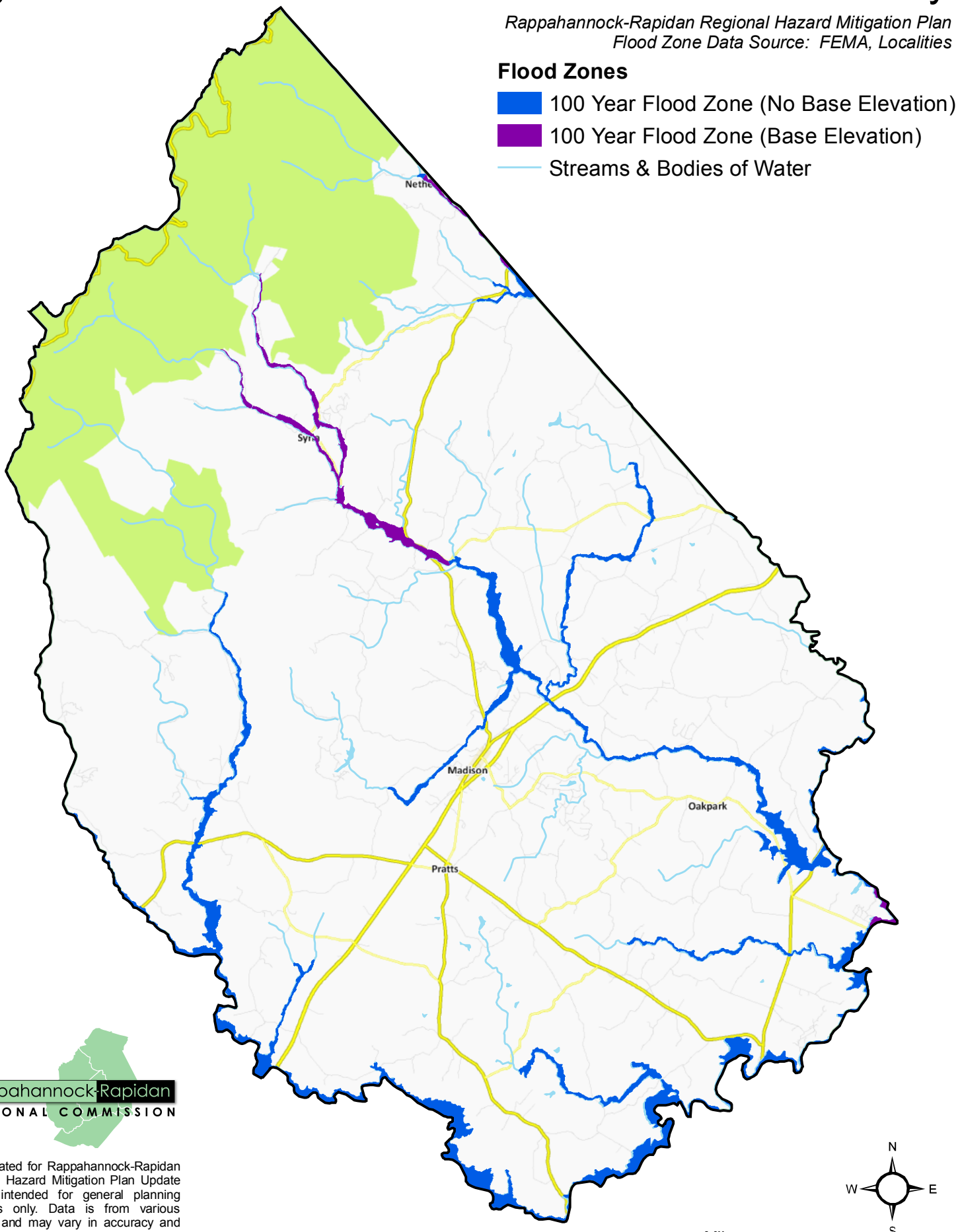


Figure 5.8 Flood Hazard Areas: Madison County

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: FEMA, Localities



Rappahannock-Rapidan
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Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/16/2011
File: Flood_Zones_Madison_County.mxd

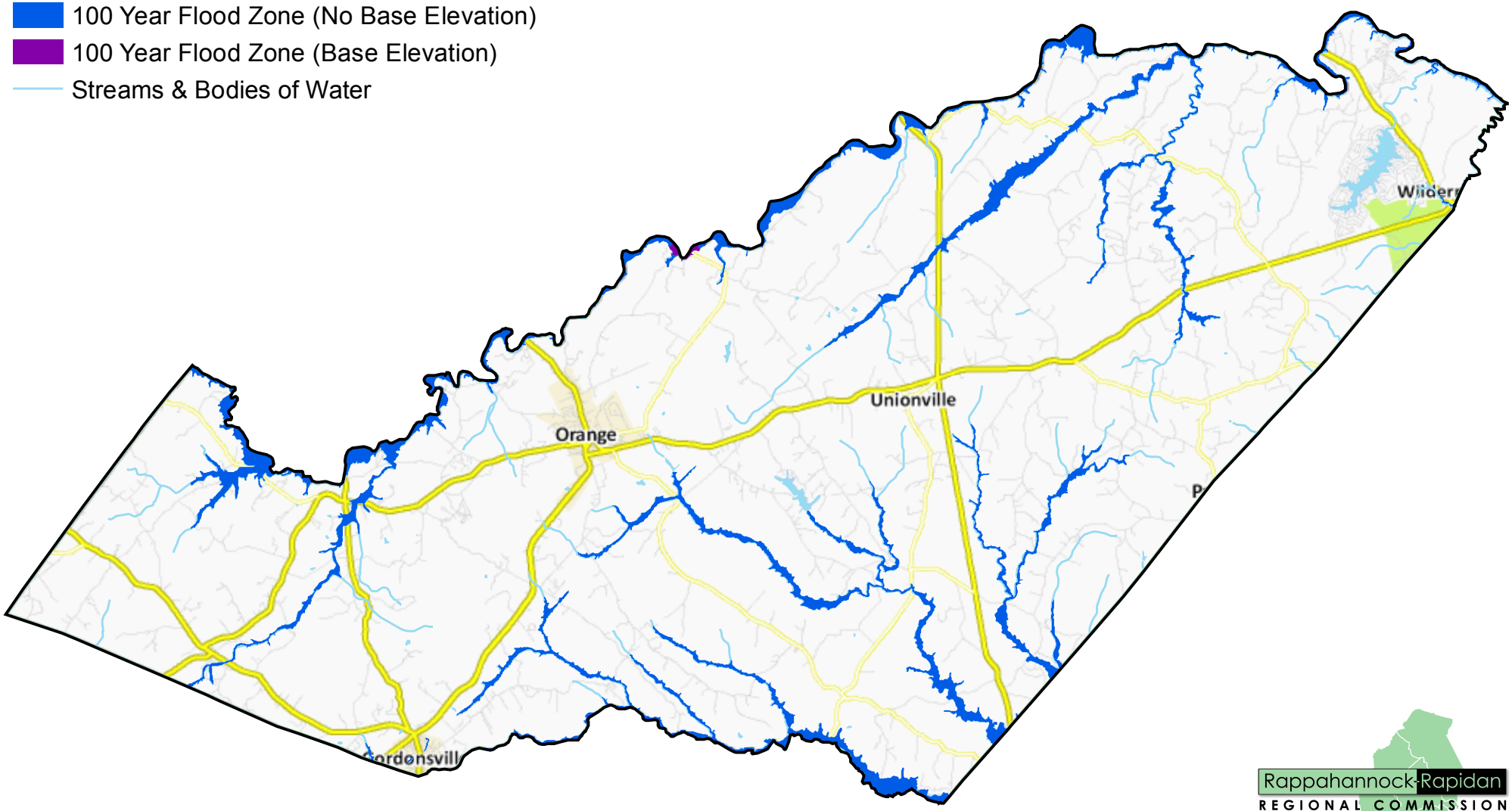
Flood Hazard Areas: Orange County

Figure 5.9

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: FEMA, Localities

Flood Zones

- 100 Year Flood Zone (No Base Elevation)
- 100 Year Flood Zone (Base Elevation)
- Streams & Bodies of Water



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0 5 10 15 20

Rappahannock-Rapidan
REGIONAL COMMISSION

Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/16/2011
File: Flood_Zones_Orange_County.mxd

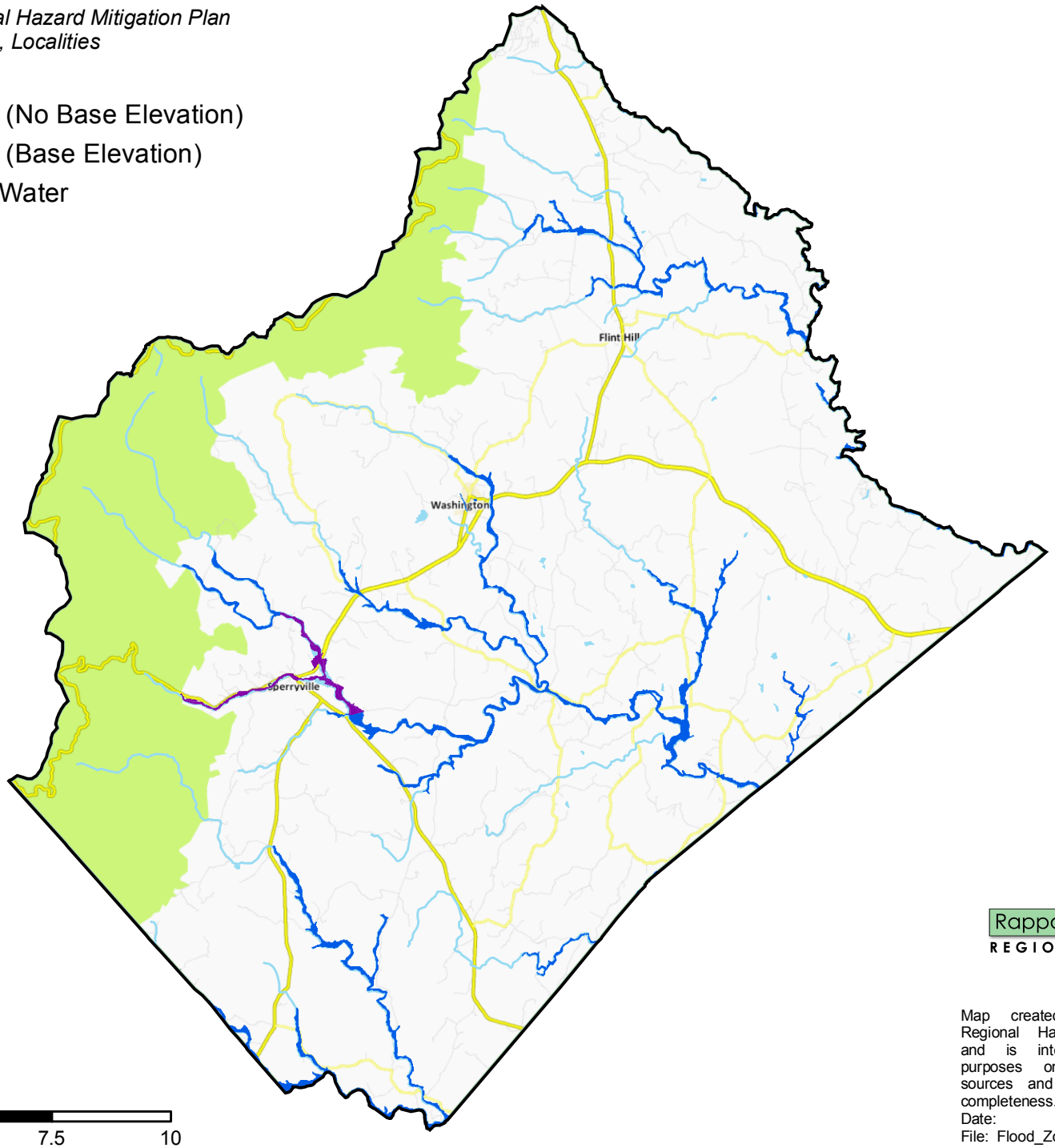
Flood Hazard Areas: Rappahannock County

Figure 5.10

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: FEMA, Localities

Flood Zones

- 100 Year Flood Zone (No Base Elevation)
- 100 Year Flood Zone (Base Elevation)
- Streams & Bodies of Water



N
W E
S

Miles
0 2.5 5 7.5 10

Rappahannock-Rapidan
REGIONAL COMMISSION

Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/16/2011
File: Flood_Zones_Rappahannock_County.mxd

Flood Hazard Areas: Town of Washington

Figure 5.11

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Flood Zone Data Source: FEMA, Localities

Flood Zones

- 100 Year Flood Zone (No Base Elevation)
- 100 Year Flood Zone (Base Elevation)
- Streams & Bodies of Water
- Parcels

Rappahannock-Rapidan REGIONAL COMMISSION

Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/16/2011
File: Flood_Zones_Washington_Town.mxd



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June 2006
Rappahannock County was included with a number of other counties contiguous with the Rappahannock-Rapidan region in the declaration of a major disaster due to severe storms, tornadoes and flooding.

HURRICANES, TROPICAL STORMS AND NOR'EASTERS

HURRICANES AND TROPICAL STORMS

Historically, very few hurricanes have tracked directly through the Rappahannock-Rapidan region. Since 1851, only four hurricanes – three unnamed and Hurricane Hazel in 1954, three tropical storms and four tropical depressions have passed directly through the region (**Figure 5.12 – Historic Hurricane Tracks)**. Additionally, because the region is not located in a coastal zone, most of these hurricanes and tropical storms were weaker than at their peak strength when they passed through the Rappahannock-Rapidan region (Table 5.2).

Table 5.2
Significant Tropical Cyclones: Rappahannock-Rapidan Region
(1851 – 2010)

Name of Storm	Category (in region)	Date
Unnamed Tropical Storm	Tropical Storm	October 1885
Unnamed Hurricane	Tropical Storm	August 1893
Unnamed Hurricane	H1	September 1893
Unnamed Tropical Storm	Tropical Storm	October 1905
Unnamed Hurricane	Tropical Storm	August 1915
Unnamed Hurricane	Extratropical Storm	June 1934
Hurricane Able	Tropical Storm	August 1952
Hurricane Hazel	Extratropical Storm	October 1954
Hurricane Diane	Tropical Storm	August 1955
Tropical Storm Bret	Tropical Depression	June 1981
Tropical Storm Chris	Tropical Depression	August 1988

Source: National Hurricane Center
Note: Category indicates strength of storm in Rappahannock-Rapidan region, rather than highest strength of storm.

NOR'EASTERS

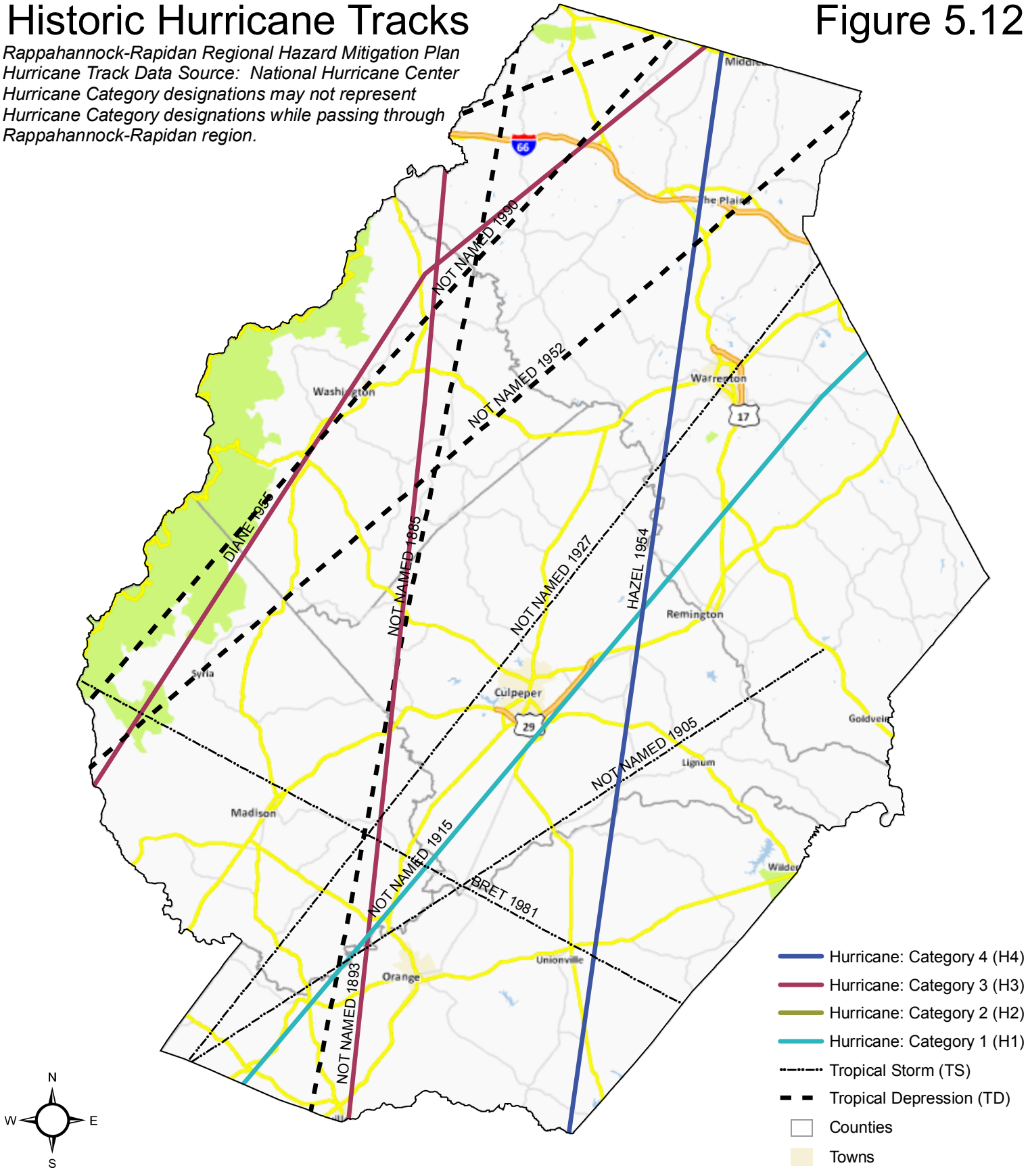
The most powerful storms to impact the Rappahannock-Rapidan region in winter are nor'easters. Unlike hurricanes, which usually move through the region in a 24-hour period, nor'easters may linger for several days delivering singly, or in combination, high winds, driving rain, heavy snow, sleet and ice. Structural damage, massive power outages and widespread travel problems are common products of such storms. Among the more memorable storms to impact the Rappahannock-Rapidan region are the following.

March 9, 1999: An area of low pressure moved from the Ohio Valley eastward, dropping heavy snow across the Appalachians. In the Rappahannock-Rapidan region light snow began around daybreak and intensified by mid-day. A localized band of heavy snow developed that stretched from the Eastern Panhandle of West Virginia, across Winchester, Middleburg and into Fairfax. In the heaviest band, snow fell at a rate of 2 inches an hour, making road clearing

Historic Hurricane Tracks

Figure 5.12

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Hurricane Track Data Source: National Hurricane Center
Hurricane Category designations may not represent Hurricane Category designations while passing through Rappahannock-Rapidan region.

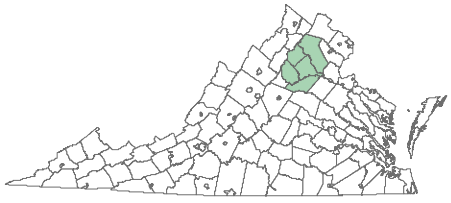


Rappahannock-Rapidan REGIONAL COMMISSION

Miles

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Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/10/2011 File: Historic_Hurricane_Tracks.mxd



impossible. Vehicles, stuck in snow and abandoned, clogged roadways. Both Reagan National and Washington-Dulles International airports were closed for most of the day. At least 200 abandoned, damaged, or stuck vehicles were towed from I-95 and I-66. Traffic accidents and related injuries were common throughout the region.

The back-to-back blizzards of **February, 2010**, paralyzed the region with unprecedented snowfall amounts that closed schools, businesses and government offices, challenged road clearing crews and tested the area's ability to respond to public needs in adverse conditions.

February 5-6, 2010: *"Blizzard One."* Snow began falling during the morning of the 5th. By 10 A.M. visibility was reduced to 1/2 mile. By early evening with moderate to heavy snow falling, visibility dropped to ¼ mile. Around midnight the effects of 35 mile per hour winds further reduced visibility to 1/16 of a mile. Northeasterly winds of 25-30 miles-per-hour persisted throughout much of the following day with visibility remaining extremely poor through 4 P.M. on the afternoon of February 6th. A total accumulation of 32" was recorded at Marshall, Virginia in the northeastern part of the region.

February 9-10, 2010: Just one day after *"Blizzard One"* ended, a winter storm watch was issued. *"Blizzard Two"* followed. Light snow began to fall in the afternoon hours, of February 9. By midnight, conditions degraded rapidly. Visibility was reduced as wind speed increased. The fine, powdery snow blew around easily as wind gusts increased to 40-50 miles-per-hour, at times reducing visibility to less than 100 feet. Snow, strong gusty winds and poor visibility continued into the late afternoon of February 10th. Although totals for this storm were less than the first, deep drifts and high roadside snow banks created region-wide road-clearing problems. Accumulations of 6 to 10 inches were common throughout the region.

Figure 5.13 - Regional Total Accumulations: Blizzard One

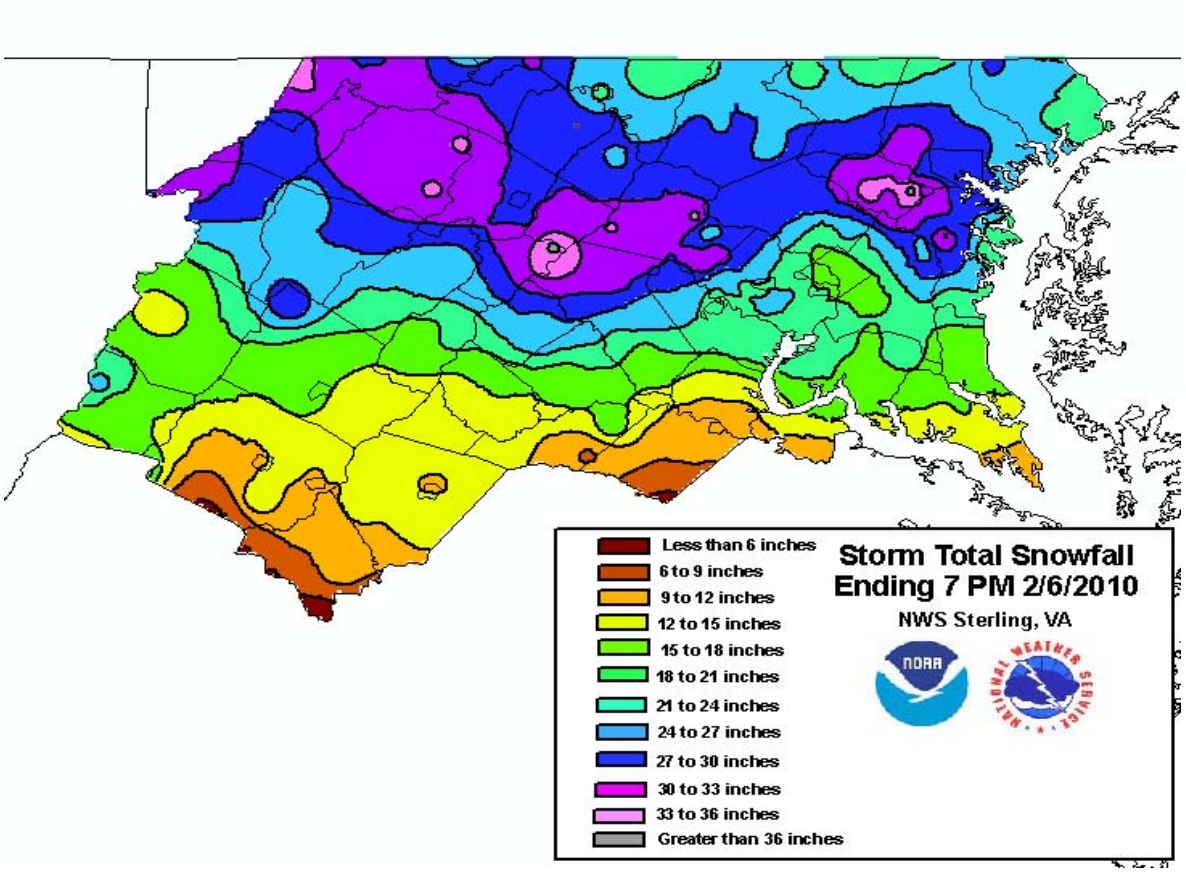


Table 5.3
Significant Winter Storm Events: Rappahannock-Rapidan Region
01/01/1995 – 11/30/2010

Location	Number of Events	Deaths	Injuries	Property Damage*	Crop Damage*
Culpeper County	61	3	52	$9.85 M	$0
Fauquier County	81	4	52	$9.75M	$1.2M
Madison County	71	3	52	$10.73M	$1.275M
Orange County	64	1	1	$9.554M	$0
Rappahannock County	81	2	51	$10.025M	$1.275
REGIONAL TOTALS:	*	**13**	**208**	**$49.905M**	**$3.75M**

Source: National Climatic Data Center *Many of the same events impacted all counties

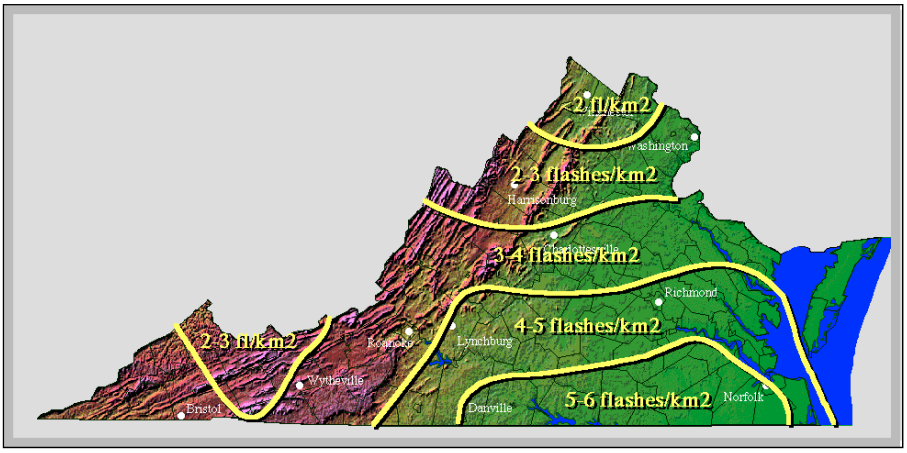
According to FEMA, the Rappahannock-Rapidan region was declared a major disaster area four times between 1995 and 2010 due to severe winter storms and snowstorms. All counties were impacted by these storms which occurred on February 5 – 11(2 storms), 2010; December 18 – 20, 2009; January 25-31, 2000; and January 13, 2006.

SEVERE THUNDERSTORMS AND TORNADOS

Thunderstorms

Thunderstorms are common throughout the Rappahannock-Rapidan region and, although most common in summer months, may occur at any time throughout the year. High winds, hail and dangerous lightning often accompany these events. Thunderstorms with wind gusts in excess of 58 mph (50 knots) and/or hail ¾" or more in diameter are classified as a "severe." Wind damage, flash floods, fires, crop and personal property damage may result from thunderstorms, which also may spawn tornados. **Figure 5.14** summarizes the likelihood of lightning strikes, while **Tables 5.4 and 5.5** provide data on occurrences and impacts of thunderstorms and related phenomena throughout the region.

Figure 5.14
Virginia Lightning Strike Density Map



Source: Virginia State Climatology Office: 2010 Note: Map based on lightning strike data for 1989.

Table 5.4
Significant Lightning Events: Rappahannock-Rapidan Region
01/01/1995 – 11/30/2010

Location	Number of Events	Deaths	Injuries	Property Damage*	Crop Damage*
Culpeper County	4	1	1	$30K	$0
Fauquier County	7	2	0	$56K	$3K
Madison County	2	0	0	$10	$0
Orange County	1	0	0	$1K	$0
Rappahannock County	2	0	0	$10K	$5K
REGIONAL TOTALS:	**16**	**3**	**1**	**$107K**	**$8K**

Source: National Climatic Data Center *** Approximate numbers based on NCDC records. ****

Table 5.5
Severe Thunderstorms and Associated Winds: Rappahannock-Rapidan Region
(01/01/1995- 12/31/2010) *

Location	Number of Events	Deaths	Injuries	Property Damage*	Crop Damage*
Culpeper County	67	0	0	301K	0
Fauquier County	143	0	15	1.43M	2K
Madison County	46	0	0	131K	0
Orange County	60	0	1	484K	5K
Rappahannock County	43	0	1	567K	0
REGIONAL TOTALS:		**0**	**16**	**2.913M**	**7K**

Source: National Climatic Data Center *** Approximate numbers based on NCDC records. ****

Additionally, 138 hail events are known to have occurred in the region since 1995 (NCDC, 2010). The number of events and amount of damage per county are summarized in Table 5.6.



Orange County Review; photo-Sandy James

Table 5.6
Hail Events in the Rappahannock-Rapidan Region
(01/01/1995- 12/31/2010) *

County	Number of Hail Events	Property Damage*	Crop Damage*
Culpeper	29	$90K	$20K
Fauquier	50	$2.001M	$0
Madison	13	$61K	$60K
Orange	27	$3K	$0
Rappahannock	19	$7K	$0
TOTALS:	**138**	**$2.162M**	**$80K**

Source: National Climatic Data Center * Approximate numbers based on NCDC records.

Significant Hail Events:

April 23, 1999 – Upperville
A line of thunderstorms developed in West Virginia during the early afternoon and moved rapidly southeast across Northern Virginia. These storms produced very large hail that damaged cars, roofs, siding, windows and landscaping. Over $1 million in damage was attributed to these fast moving storms.

May 13, 2000 – Warrenton
A band of thunderstorms produced golf ball to tennis ball sized hail in Warrenton. Hundreds of cars, roofs and windows were damaged in an amount exceeding $1 million. Walnut sized hail was reported in the northwest portion of the county where winds gusted to 65 miles per hour.
On June 18, 2008, Orange County experienced a complex and destructive weather event. According to the National Weather Service, a cold front with associated thunderstorms moved across the Appalachians eastward toward Orange County. Heavy rain, severe lightning, and ping-pong ball size hail accompanied the storm. Local crops sustained substantial damage. As a local newspaper noted, "Early-planted corn had trouble standing up to the ping pong ball-sized hail that fell across the area." Sandy James of The Orange County Review documented the damage.

Tornados

Virginia ranks 29th in the nation in the number of tornado events, 25th in tornado deaths, 26th in tornado injuries, and 28thin damages (Storm Prediction Center, 2003). From 1995 through March, 2011, the Rappahannock-Rapidan region experienced 35 tornado events.

Table 5.7
Tornados: Rappahannock-Rapidan Region (1995–2011)

County	Date	F-Scale	Deaths	Injuries	Property Damage	Crop Damage
Culpeper	09/20/2001	F0	0	0	0	0
	09/24/2001	F4	0	2	2M	0
	07/10/2003	F0	0	0	0	0
	09/08/2004	F1	0	0	50K	0
	09/17/2004	F1	0	0	850K	0
	09/17/2004	F1	0	0	150K	0
	08/30/2005	F0	0	0	5K	0
	06/04/2008	F0	0	0	15K	0
Total	**8**		**0**	**0**	**3.070M**	**0**
Fauquier	09/06/1996	F0	0	0	0	0
	09/24/2001	F1	0	0	20K	0
	09/24/2001	F1	0	0	180K	0
	05/07/2003	F1	0	0	12K	0
	09/08/2004	F2	0	0	500K	0
	09/08/2004	F1	0	0	7K	0
	09/08/2004	F0	0	0	2K	0
	09/17/2004	F3	0	2	250K	0
	09/17/2004	F2	0	0	500K	0
	09/17/2004	F2	0	0	750K	0
	08/30/2005	F0	0	0	50K	0
	08/30/2005	F1	0	0	1.5M	0
	06/04/2008	F0	0	0	15K	0
	06/04/2008	F0	0	0	15K	0
	03/13/2011	F1	0	0	0	0
Total	**15**		**0**	**2**	**3.811M**	**0**
Madison	09/17/1997	F1	0	0	15K	5K
	08/09/2000	F1	0	0	15K	0
	05/02/2004	F1	0	0	8K	0
	09/17/2004	F2	0	0	200K	0
	08/30/2005	F0	0	0	10K	5k
Total	**5**		**0**	**0**	**248K**	**5K**
Orange	07/21/1995	F1	0	0	80K	0
	09/10/1997	F0	0	0	0	0
	07/24/1999	F1	0	0	50K	0

County	Date	F-Scale	Deaths	Injuries	Property Damage	Crop Damage
	09/24/2001	F1	0	0	5K	0
	06/06/2002	F1	0	0	10K	0
	09/08/2004	F0	0	0	5K	0
	09/17/2004	F1	0	0	150K	0
	09/17/2004	F2	0	0	75K	0
Total	**8**		**0**	**0**	**375K**	**0**
Rappahannock	08/30/2005	F0	0	0	50K	0
	07/23/2008	F0	0	0	15K	0
Totals	**2**		**0**	**0**	**65K**	**0**
RRRC Total	**35**		**0**	**2**	**7.504M**	**5K**

Source: National Climatic Data Center

Figure 5.15 – Historic Tornado Strikes illustrates where these tornado touched down in the region. The Fujita-Pearson Scale classification of each tornado is indicated for each occurrence and dates are provided for those tornadoes rated F2 or higher.

WILDFIRE

According to the Virginia Department of Forestry (VDOF), there were 354 recorded wildfires in the region from 1995-2010. Almost 50% were caused by debris burning. Other causes include equipment use, unattended campfires, unsupervised children, smoking and lightning. No deaths or injuries were recorded as resulting from these fires. Total property damage was $212,613.00 with 1.4% of all events resulting in damage of $10,000 or more. Of particular interest is the value of property saved over this same time period - $59.3 M. These figures reflect the growing risk of loss due to the intrusion of the built environment into the region's forests – the expansion of the wildland – urban interface.

The VDOF's wildfire risk assessment, conducted on a county-by-county level, examines six variables:

- Historic occurrence of wildfires in the area;
- Population density;
- Slope;
- Aspect;
- Land cover; and
- Distance from roads.

Variables are weighted according to their applicability to the region evaluated. Structures surrounded by or adjacent to wildland fuels, in areas historically prone to wildfires, and on steep slopes are at a greater risk than those in areas with limited fuels, a low fire occurrence rate and relatively flat terrain. Data incorporated into the risk assessment model was used to:

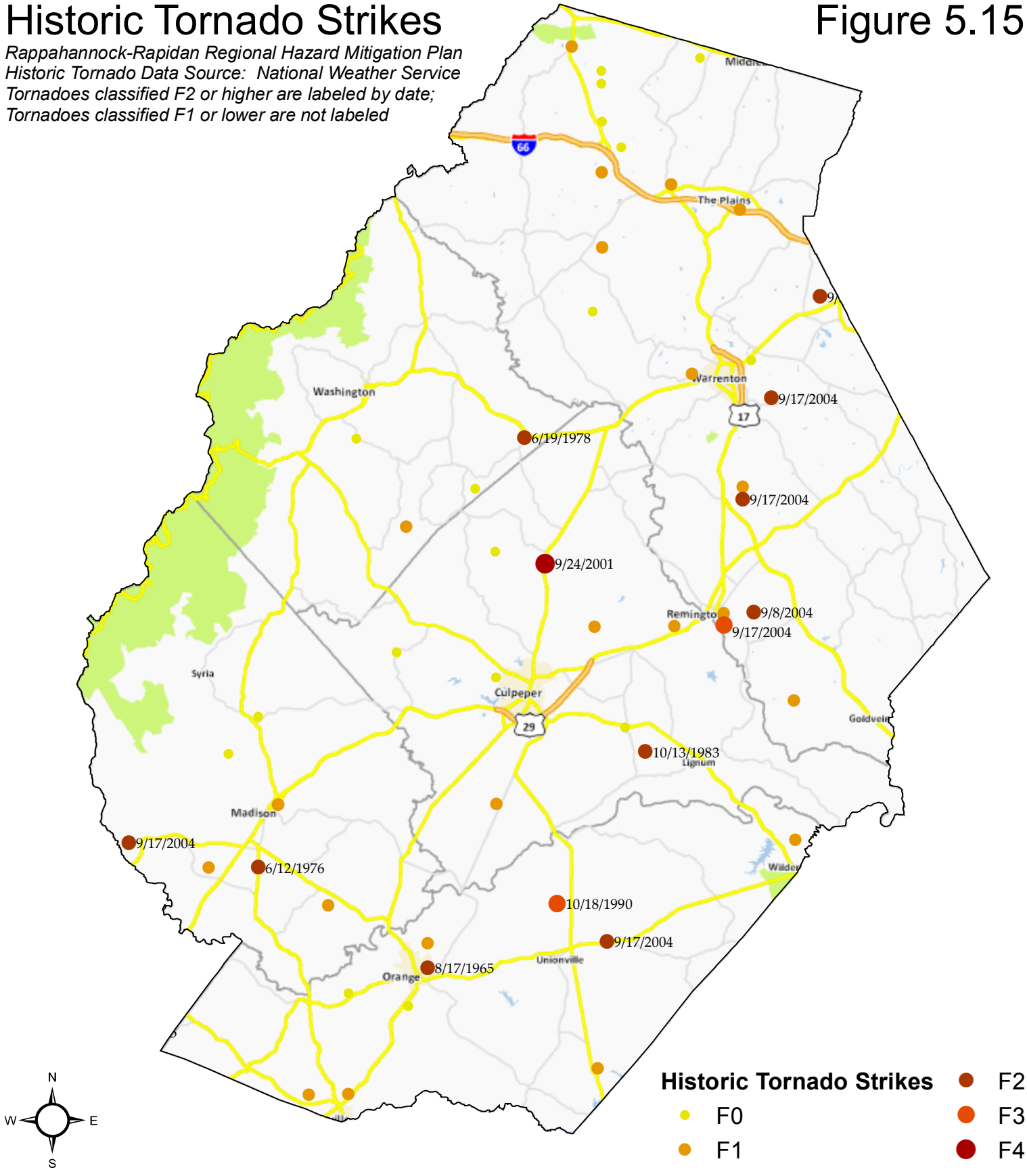
- Identify areas favorable to wildfire development and advancement;
- Examine the spatial relationship between high risk areas and woodland home communities, fire stations and fire hydrants;
- Identify areas requiring more detailed analysis.

Figure 5.16 shows the Wildfire Risk Assessment in the region, according to the Virginia Department of Forestry. Within the Rappahannock-Rapidan region, Rappahannock and Madison counties are at greatest risk for wildfires. With heavily forested slopes marking their western boundaries, their proximity to the forests of Shenandoah National Park and relatively steep terrain, the two

Historic Tornado Strikes

Figure 5.15

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Historic Tornado Data Source: National Weather Service
Tornadoes classified F2 or higher are labeled by date;
Tornadoes classified F1 or lower are not labeled

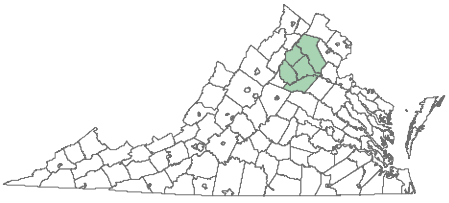


Rappahannock-Rapidan REGIONAL COMMISSION

Miles

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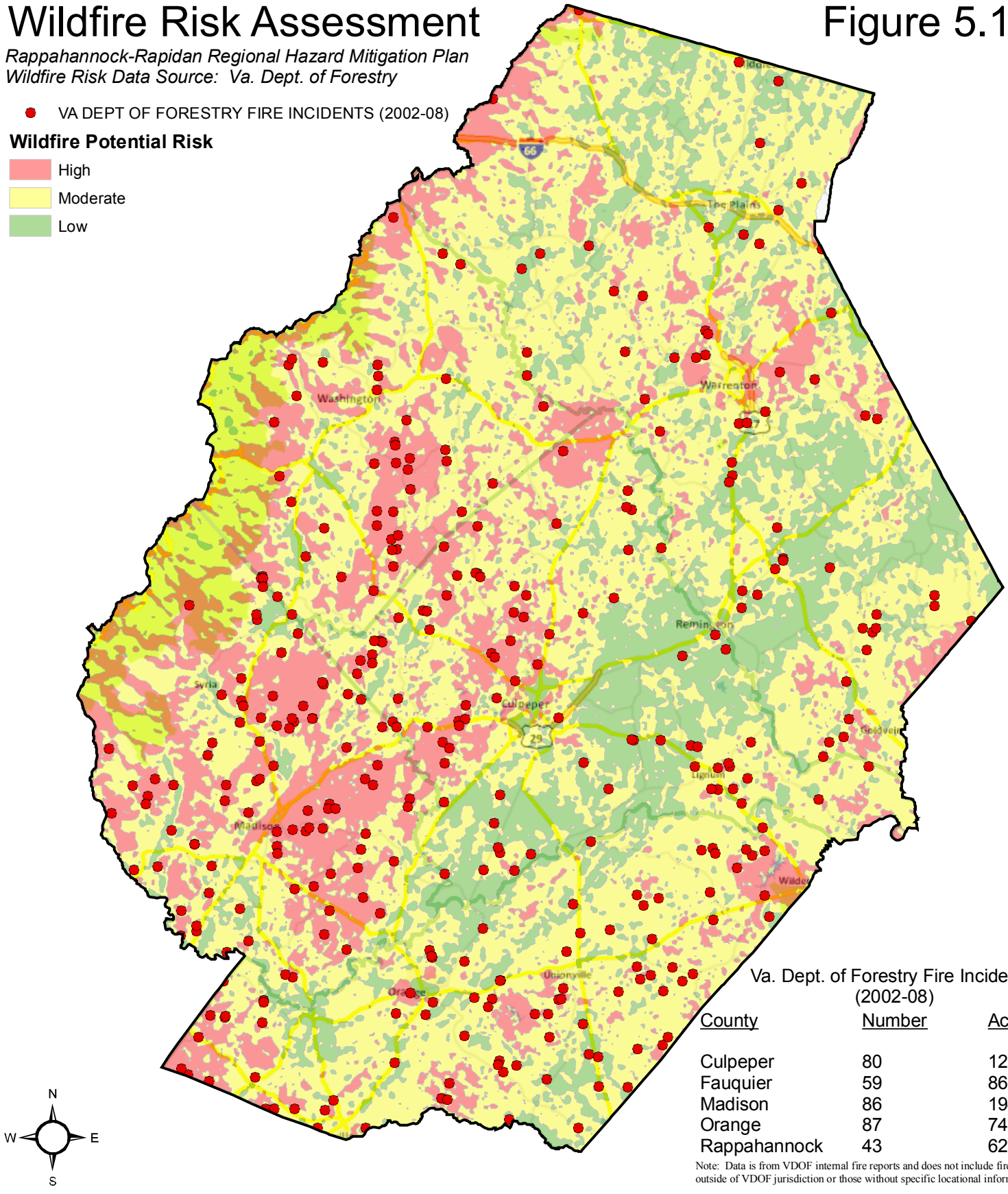
Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 2/21/2011 File: Historic_Tornado_Strikes.mxd



Wildfire Risk Assessment

Figure 5.16

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Wildfire Risk Data Source: Va. Dept. of Forestry



Va. Dept. of Forestry Fire Incidents (2002-08)

County	Number	Acres
Culpeper	80	126.0
Fauquier	59	86.5
Madison	86	194.6
Orange	87	74.2
Rappahannock	43	62.7

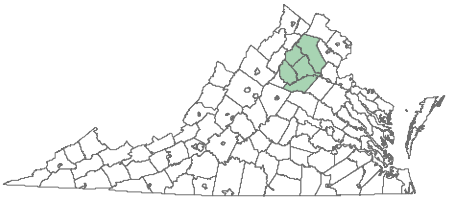
Note: Data is from VDOF internal fire reports and does not include fires outside of VDOF jurisdiction or those without specific locational information.

Rappahannock-Rapidan REGIONAL COMMISSION

Miles

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Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 2/22/2011 File: Wildfire_Risk_Assessment.mxd



counties incorporate a number of factors that make them particularly vulnerable. In 2002, both counties shared the impacts of a huge wildfire, most of which was confined to Shenandoah National Park, that burned over 24,800 acres. Although the damage to forested areas in Rappahannock and Madison was minimal compared with that documented in the park, the conditions that generated the blaze and contributed to its movement were present in both counties. Rapid, efficient and effective response by local firefighters and park personnel limited the movement of the blaze outside of the park.

Table 5.8 summarizes wildfire data for the region for the period 2005 – 2010, as recorded by the VDOF.

Table 5.8
Wildfire: Rappahannock-Rapidan Region
2005 - 2010

County	Events	Acres Impacted	Total Damage*	Value Total Saved*
Culpeper	69	209	$70,970	13.5M
Fauquier	60	171	$11,075	23.9M
Madison	81	110	$68,668	2.4M
Orange	98	169	$30,715	4.9M
Rappahannock	46	133	$31,185	14.6M
REGIONAL TOTALS:	**354**	**792**	**$212,613**	**59.3M**

Source: Virginia Department of Forestry *Estimates

DROUGHT

Since 1995, there have been several periods of drought recorded in the Rappahannock-Rapidan Region. The National Climatic Data Center attributes nearly $140 million in crop loss to these events.

Table 5.9
Drought: Rappahannock-Rapidan Region (1995–2010)

County	Dates Reported								
	8/95	7/97	8/98	11-12/98	5 - 9 /99	7-10/02	7/07	8/07	10/07
Culpeper	x		x	x	x	x			x
Fauquier	x	x	x	x	x	x	x	x	x
Madison	x		x	x	x	x	x	x	x
Orange	x			x	x	x	x	x	x
Rappahannock	x	x	x	x	x	x		x	x

Source: National Climatic Data Center

Significant Drought Event

During the summer of 2002 Virginia experienced a significant drought resulting from the cumulative impacts of three years of precipitation deficits. While this drought did not reach the level of severity of the drought of record (1930-1932), increased water demands, as compared with those of the 1930s, resulted in substantial impacts to the Commonwealth and its economy. The intensity of the drought peaked in late August, 2002. Wildfire indices were at levels previously unrecorded in Virginia, the majority of agricultural counties had applied for Federal drought disaster designation, stream flows were at record lows, and thousands of individual private wells failed. During the third week of August, several public water supply systems across the state were on the brink of failure. Several large municipal systems had fewer than sixty days of water-supply capacity remaining in reservoirs, while some smaller rural systems that rely primarily on withdrawals from free-flowing streams, such as the town of Orange, had only a few days supply available. On August 30, 2002 Governor Warner took the unprecedented action of declaring a drought emergency and issued Executive Order #33, requiring the elimination of non-essential water use in large areas of the Commonwealth and naming the Deputy Secretary of Natural Resources as the Commonwealth Drought Coordinator. Executive Order #39, the Virginia Water Supply Initiative, followed on December 13, 2009. This required the development of the Commonwealth's Drought Response Technical Advisory Committee, charged with the development of a water supply, drought monitoring and response plan (www.deq.virginia.gov).

EXTREME HEAT

Because human response to heat depends on the interaction of multiple meteorological variables including temperature, humidity, cloud cover and regional experience, extreme heat criteria and designation are not absolute. Generally, an extreme heat event is characterized by a prolonged period of temperatures 10 degrees or more above the average high temperature accompanied by high humidity.

Table 5.10

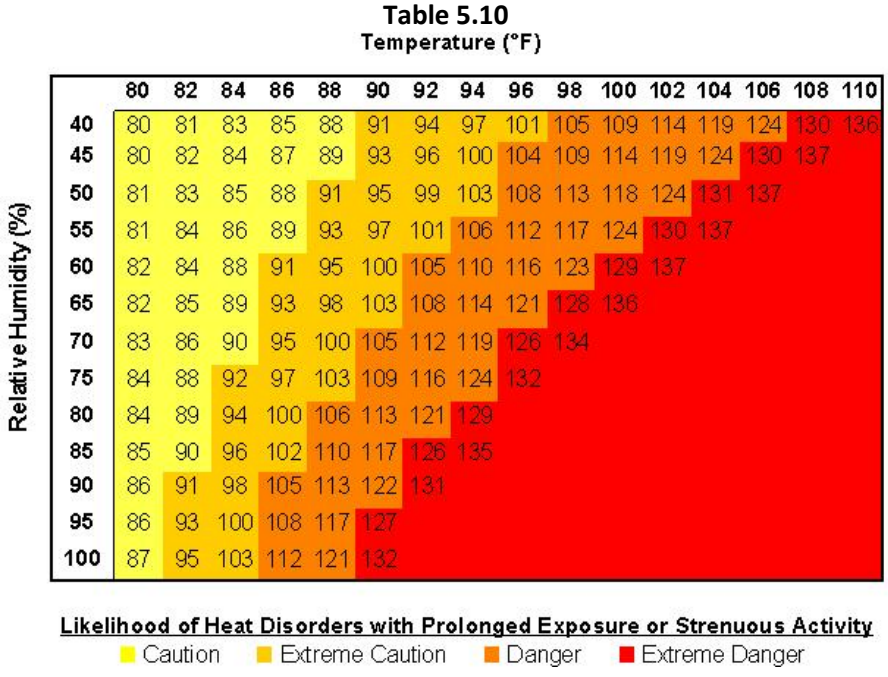


Table 5.11

Extreme Heat Events: Rappahannock-Rapidan Region (1995–2010)

Location	Number of Events
Culpeper County	16
Fauquier County	15
Madison County	14
Orange County	16
Rappahannock County	15
Regional Average:	**15**

Source: National Climatic Data Center

Regionally, 3 deaths and 230 illnesses were attributed to extreme heat during the period 1995 – 2010.

WINTER STORMS AND FREEZES

Most significant winter storms in the Rappahannock-Rapidan region are nor'easters (Section 5, p. 5). From 1995 to 2010 there have been about 72 significant winter storms resulting in 13 deaths and 208 injuries, along with $50 million in property damage and $3.75 million in crop loss.

Table 5.12
Significant Winter Storm Events: Rappahannock-Rapidan Region
01/01/1995 – 11/30/2010

Location	Number of Events	Deaths	Injuries	Property Damage*	Crop Damage*
Culpeper County	61	3	52	$9.85 M	$0
Fauquier County	81	4	52	$9.75M	$1.2M
Madison County	71	3	52	$10.73M	$1.275M
Orange County	64	1	1	$9.554M	$0
Rappahannock County	81	2	51	$10.025M	$1.275
REGIONAL TOTALS:	*	**13**	**208**	**$49.905M**	**$3.75M**

Source: National Climatic Data Center *Many of the same events impacted all counties

From 1995 through 2010, six extreme cold and wind-chill events were recorded. One death was attributed to extreme cold in January, 2007. Although $25, 000 in crop loss was attributed to unseasonably cold temperatures in March, 1998, no losses were directly related to extremely cold temperatures.

EROSION (SEE LANDSLIDES)

Unless one considers landslides to be part of this process, there have been no erosion events of historic magnitude or significance in the Rappahannock-Rapidan region. Erosion is an everyday occurrence, an ongoing process that continually alters Earth's surface. The region's steep slopes, numerous streams, exposed farmland and un-stabilized building sites are areas where erosion commonly occurs;

however, government agencies at the local, state and federal levels, as well as educational institutions, work diligently to inform the citizenry of the importance of erosion control and the management practices that may be implemented to address it.

EARTHQUAKES

According to the Virginia Department of Mines, Minerals and Energy, earthquake activity in Virginia has been low-magnitude but persistent. The first documented earthquake in Virginia took place in 1774 near Petersburg. Many others have occurred since then, including an estimated magnitude 5.9 (VII) event in 1897 centered near Pearisburg in Giles County. This was the second largest earthquake in the eastern U.S. It was felt across twelve states, an area of at least 280,000 square miles. Since 1977, when Virginia Tech expanded its seismograph array, more than 175 quakes have been detected as originating beneath Virginia. Of these, at least twenty-eight were large enough to be felt at the surface. Thus, Virginia averages about six earthquakes per year, of which one is felt at the surface.

Virginia's past seismic activity has been concentrated in two areas: the central Piedmont along the James River, and the New River Valley in Giles County (see Fig. 5.17). Since all parts of the Commonwealth have experienced seismic activity in the past, the entire state should be considered susceptible to earthquakes. The Rappahannock-Rapidan region lies to the north of Virginia's identified seismic belts; however, the effects of earthquakes are often experienced at great distances from their epicenters. The large earthquakes that occurred in New Madrid, Missouri in 1811 and 1812, and the Charleston, S.C. quake of 1886, were all strongly felt in the region.

Most recently, on August 23, 2011, a magnitude 5.8 earthquake centered near Mineral, Virginia (about 15 miles south of the Rappahannock-Rapidan region) caused damage to the Rappahannock-Rapidan region. In the region, damages were most evident in the town of Culpeper, where one building was destroyed and several were condemned. In the Rappahannock-Rapidan region, Culpeper County was designated for Public Assistance (Assistance to State and local governments and certain private non-profit organizations for emergency work and the repair or replacement of disaster-damaged facilities) by FEMA, while Individual Assistance (assistance to individuals and households) designations were provided by FEMA for Culpeper and Orange counties.

FIGURE 5.17– SEISMIC ZONES IN VIRGINIA

GILES COUNTY SEISMIC ZONE - PINK; CENTRAL PIEDMONT SEISMIC ZONE – YELLOW | SOURCE: VIRGINIA DMME

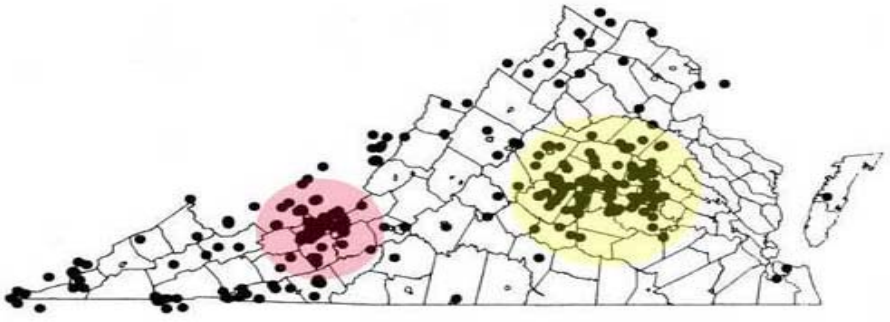


FIGURE 5.18 – SEISMICITY OF VIRGINIA, 1990 - 2006
CIRCLES = EARTHQUAKES (DEPTH IN KM INDICATED BY COLOR) | SOURCE: USGS

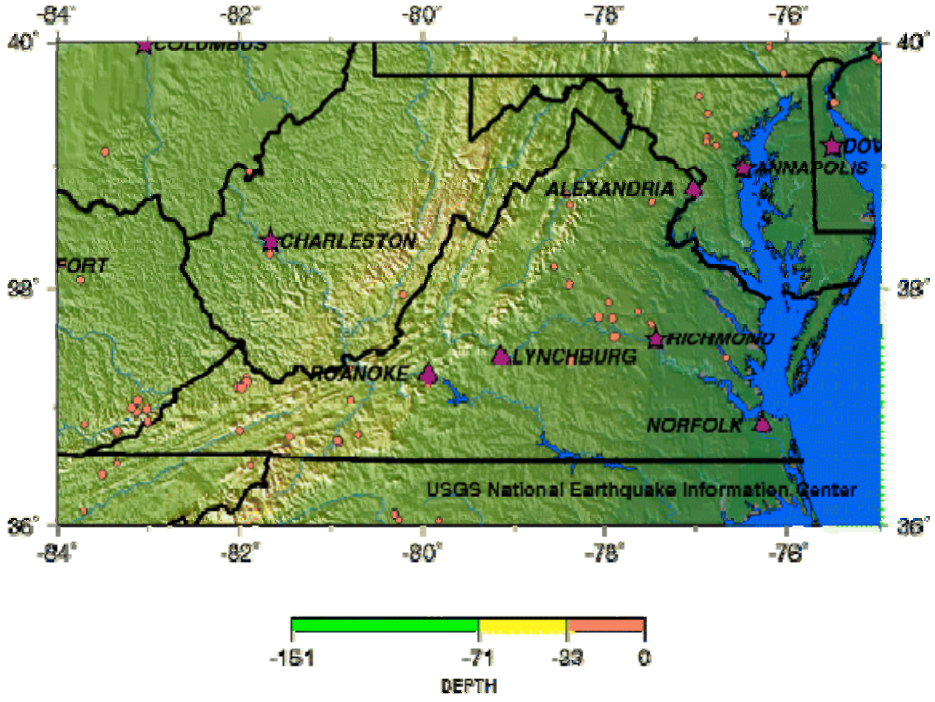
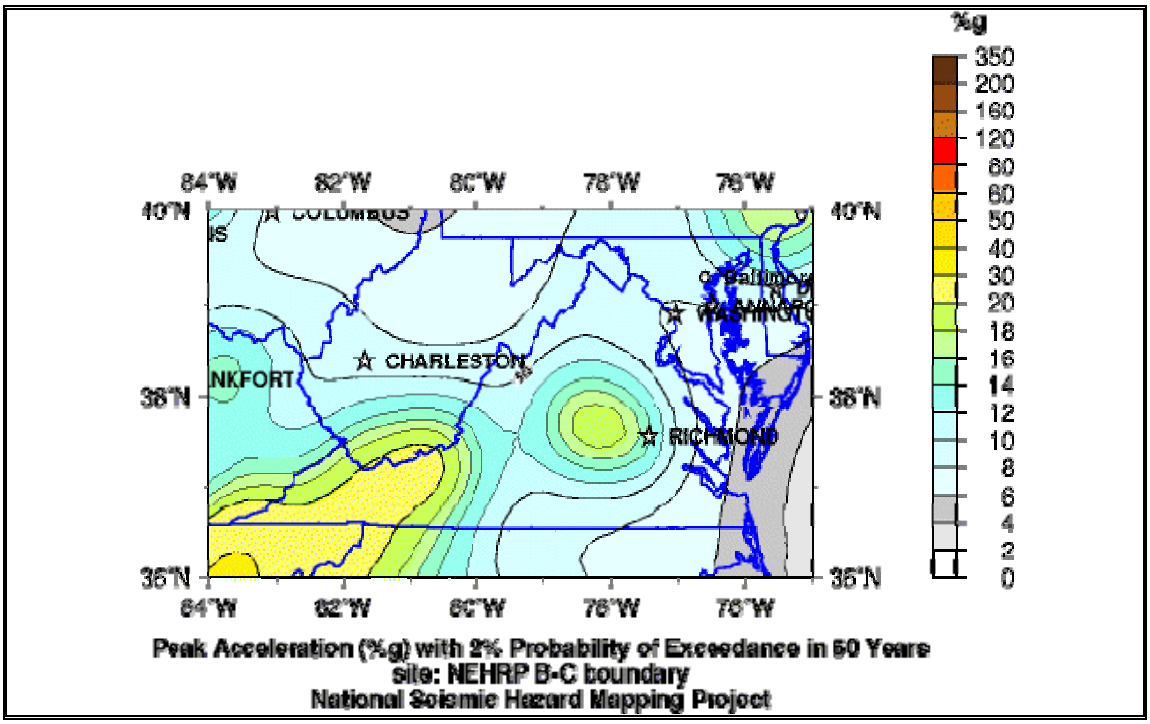


Figure 5.19
Geological and Seismic Information for Virginia



Source: USGS National Seismic Hazard Mapping Project

Figure 5.20 summarizes the expected earthquake intensity levels with 10 percent probability of exceedence in 50 years[4] based on the national U.S. Geological Survey map of peak acceleration. As mapped, the greater part of the region sits within a zone of 3 percent peak ground acceleration with a very small area in a zone of 2 percent peak ground acceleration. Thus the region, as a whole, is in an area of relatively limited seismic risk.

The entire Commonwealth is subject to earthquake activity; however, western and central regions are most vulnerable to potential damage. The following list of earthquake events that have occurred in the Rappahannock-Rapidan region since 1875 has been compiled from National Geophysical Data Center records (**Table 5.13**).

Table 5.13
Significant Seismic Events Impacting the Rappahannock-Rapidan Region

1774 - 1984

Date	Location Recording Occurrence	Distance from Epicenter (Miles)	Modified Mercalli Intensity
1/3/1885	Warrenton	59	Unknown
9/1/1886	Madison	634	Unknown
4/10/1918	Orange	58	Unknown
1/6/1935	Culpeper	924	Unknown
5/311966	Culpeper	101	3.1
11/20/1969	Culpeper	296	4.3
9/5/1972	Montpelier	24	3.3
7/30/1981	Orange	8	1.4
5/6/1982	Montpelier	10	2.0
8/7/1984	Gordonsville	30	4.2

Source: National Geophysical Data Center

SINKHOLES

Sinkholes are common in areas characterized by soluble bedrock including limestone or other carbonates, salt deposits or any rock that can be dissolved naturally by circulating ground water.The geology of the Rappahannock-Rapidan region limits the likelihood of sinkhole development; however, subsidence events associated with the decay of buried construction debris or woody material from land-clearing activities, as well as slumping resulting from leaking underground water lines, do occur. Due to the rarity of true sinkhole development in the region, no data on their occurrence has been compiled, nor maps generated. No information regarding the probability of sinkhole development could be found for the region.

LANDSLIDES

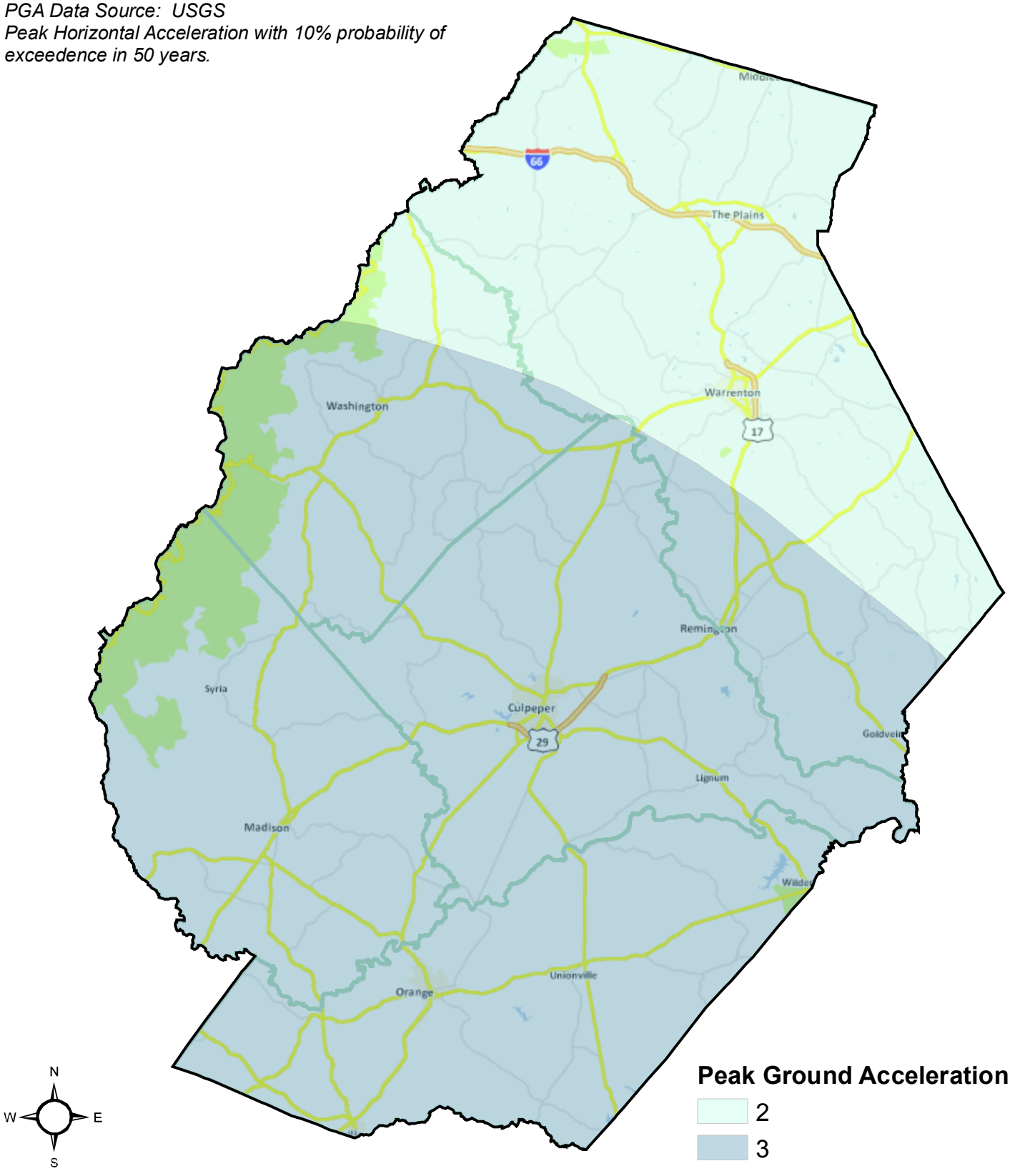
Landslides are Virginia's most widespread geologic hazard. The most disastrous landslide events are associated with heavy rainfall along the steep slopes of the Blue Ridge Mountains and the Appalachians, but slumping, sliding, and creep can occur even on fairly gentle slopes if local conditions exceed the natural stability of the site. Areas that are prone to mass movement include areas of previous landslides; the bases of steep slopes, particularly slopes burned by forest and brush fires; the margins of drainages; and developed hillsides, particularly where septic systems are used. Research has

[4] This national base map is presented and discussed in the *Hazard Identification* section of this Plan. The zones indicated on the regional map are based on the national map.

Earthquake: Peak Ground Acceleration

Figure 5.20

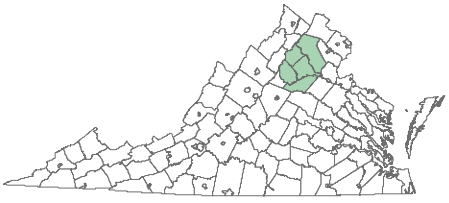
Rappahannock-Rapidan Regional Hazard Mitigation Plan
PGA Data Source: USGS
Peak Horizontal Acceleration with 10% probability of exceedence in 50 years.



Rappahannock-Rapidan REGIONAL COMMISSION

Miles
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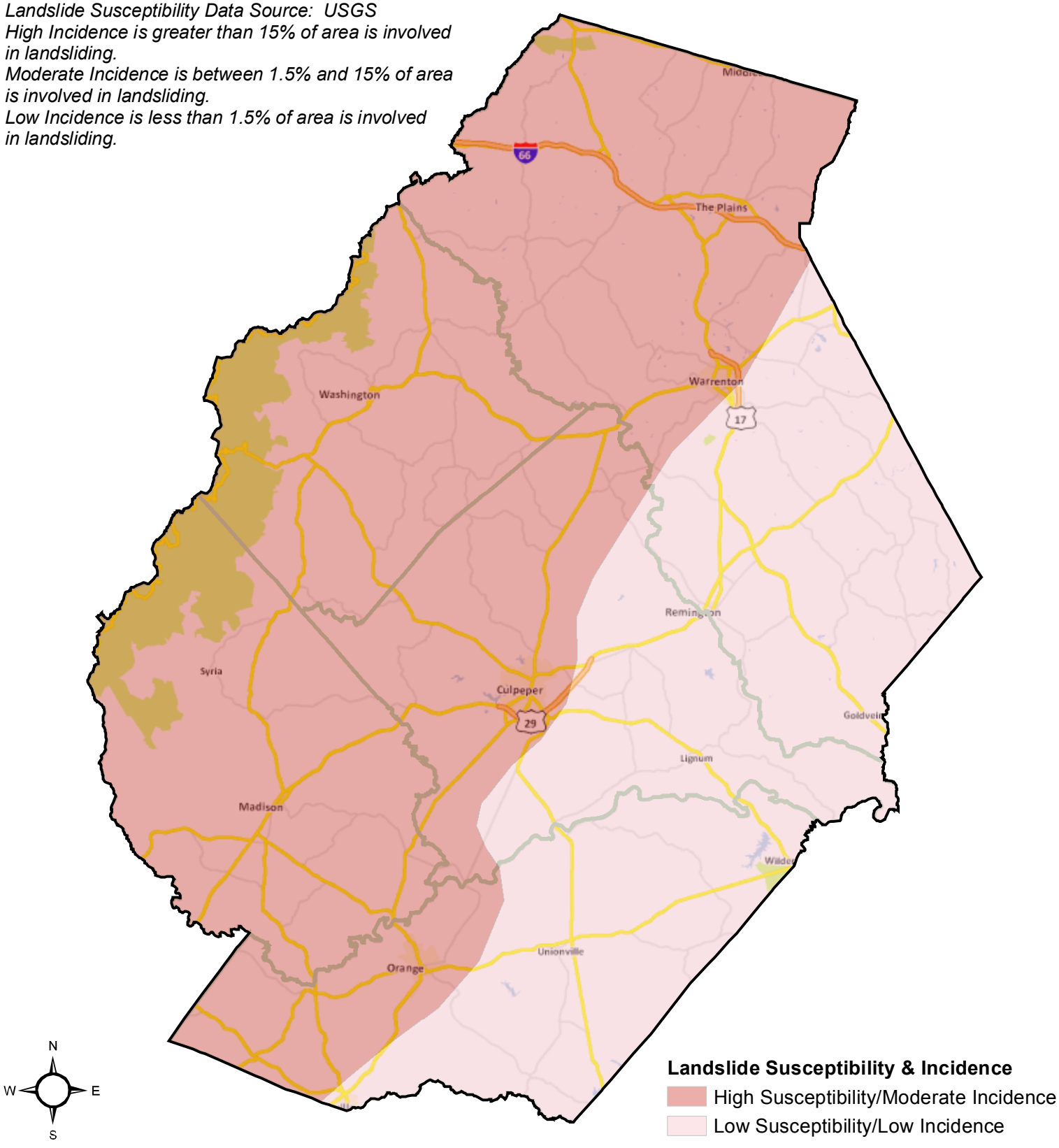
Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/10/2011 File: EQ_Peak_Ground_Acceleration.mxd



Landslide Susceptibility & Incidence

Figure 5.21

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Landslide Susceptibility Data Source: USGS
High Incidence is greater than 15% of area is involved in landsliding.
Moderate Incidence is between 1.5% and 15% of area is involved in landsliding.
Low Incidence is less than 1.5% of area is involved in landsliding.

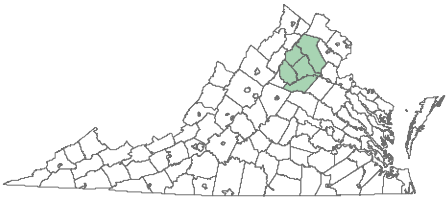


Rappahannock-Rapidan REGIONAL COMMISSION

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Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 5/10/2011 File: Landslide_Susceptibility.mxd



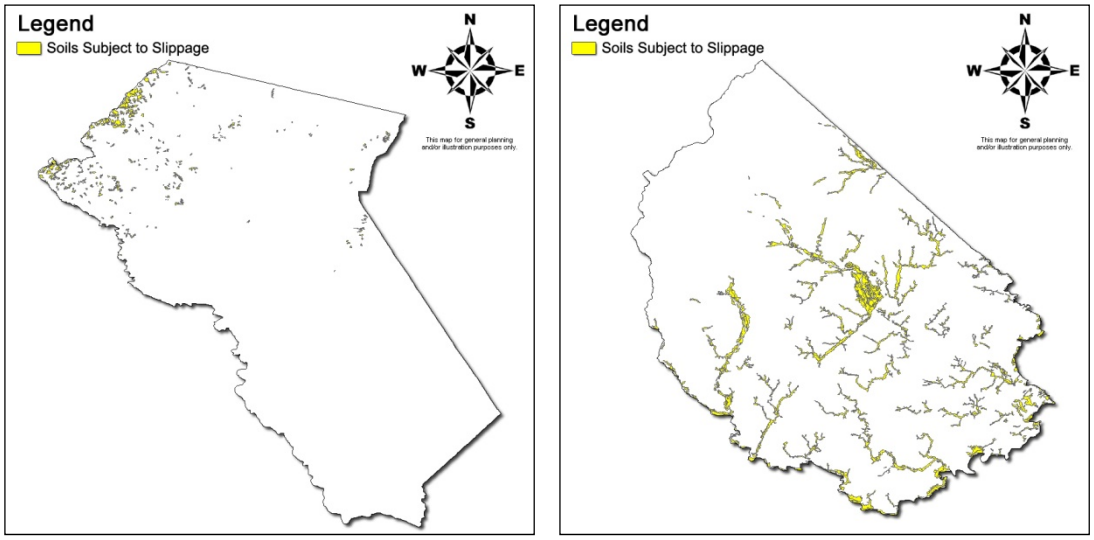
revealed that about fifty-six percent of recent landslides occurred on slopes that had been altered in some way by development.



Because of the prevalence of steep slopes, numerous streams, shallow soils and other contributing factors, the western portions of Fauquier, Rappahannock, and Madison counties are particularly vulnerable to landslides. Overall, according to the U.S. Geological Survey[5], the region is split between a zone of high susceptibility/moderate incidence and low incidence (**Figure 5.21)**.

LEFT: On June 27, 1995, an intense storm dumped approximately 30 inches of rain on Madison County in a period of 16 hours. This resulted in hundreds of debris flows in the Graves Mill area of the county and the area was declared a disaster area by the Federal Emergency Management Agency.

Figure 5.22
Vulnerable Soils for Fauquier and Madison Counties



On June 27, 1995, an intense storm dumped approximately 30 inches of rain on Madison County in a period of 16 hours. This resulted in hundreds of debris flows in the Graves Mill area of the county and the area was declared a disaster area by the Federal Emergency Management Agency. Figure 6.7 (in the *Vulnerability Assessment* section) shows the area impacted by this event.

[5] This national base map is presented and discussed in the *Hazard Identification* section of this risk assessment. The terms used here are more thoroughly defined in that section.

DAM/LEVEE FAILURE

Dam failure includes the collapse, overtopping, breaching or other events that result in the uncontrolled release of water or sludge from an impoundment with subsequent downstream flooding. Dam or levee failures may occur with little warning. They may result from the effects of intense storms, debris jams or sudden snow melt.

Dam failure may result from any one or combination of the following:

- Prolonged periods of rainfall and flooding;
- Inadequate spillway capacity;
- Internal structural erosion;
- Improper maintenance;
- Improper design, material selection; and/or construction;
- Negligent operation;
- Failure of upstream structure(s);
- High winds creating erosion by wave action;
- Intentional criminal acts.

Virginia's recent (2008) revisions to its dam classification and regulatory system bring it into alignment with that used in the National Inventory of Dams maintained by the U.S. Army Corps of Engineers. Hazard potential is directly related to anticipated adverse downstream impacts should the given dam fail.

Table 5.14
Virginia Dam Classification

Hazard Potential	Failure Effects	Inspection
High	Probable loss of human life, serious economic impact (buildings, facilities, major roads, etc.)	Annual, with inspection by professional engineer every 2 years.
Significant	May cause loss of human life or appreciable economic impact (buildings, secondary roads, etc.)	Annual, with inspection by professional engineer every 3 years.
Low	No expected loss of human life, no more than minimal economic impact.	Annual, with inspection by professional engineer every 6 years.

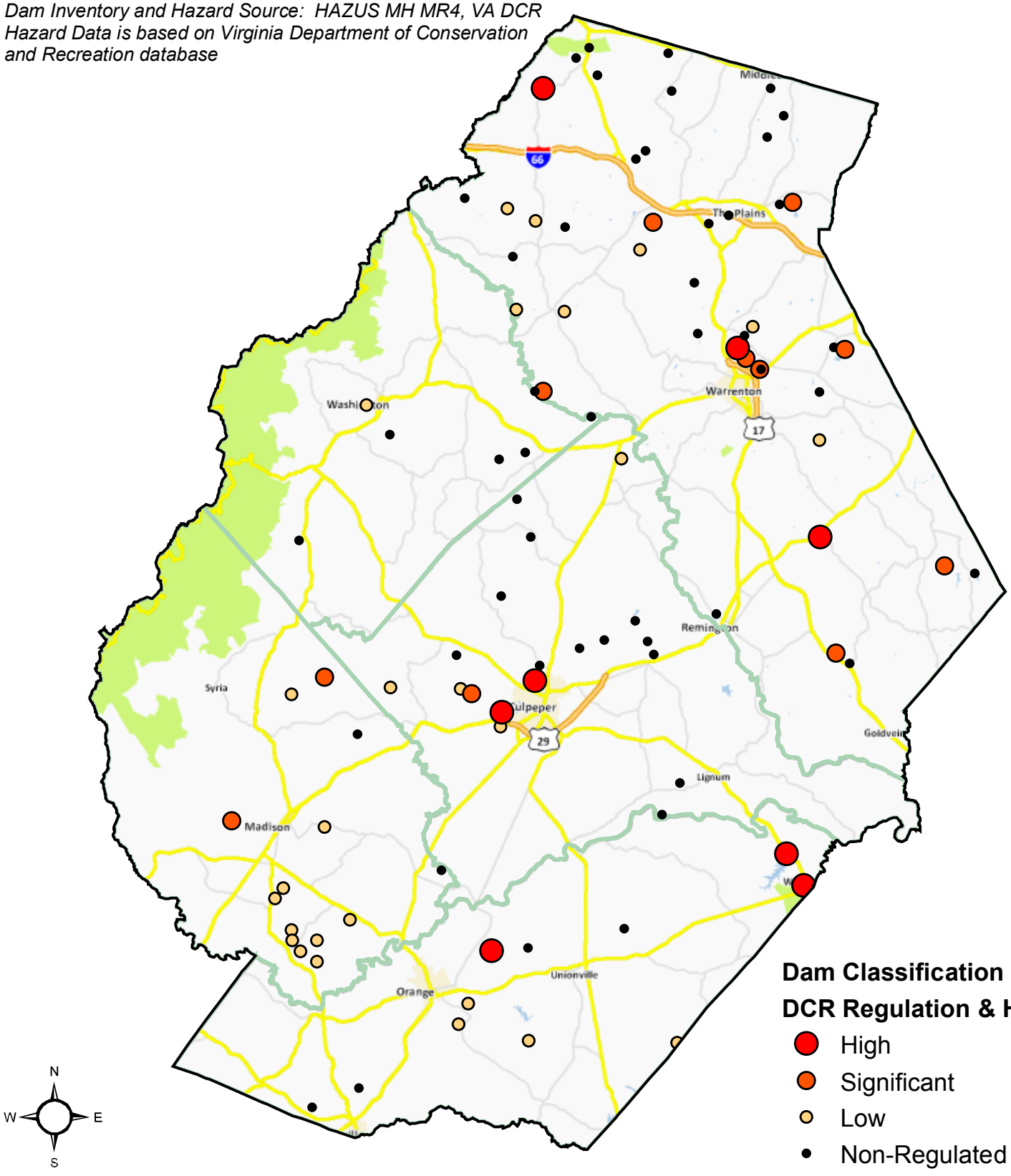
The owner of each regulated dam, whether high, significant or low hazard, is required to obtain an Operation and Maintenance Certificate. This must include an assessment of the dam by a licensed professional and an Emergency Action Plan which must be filed with the appropriate local emergency official and the Virginia Department of Emergency Management. Certification types within the region include MR for regular operation and maintenance and MC indicating conditional certification. OC classification indicates ongoing evaluation for classification status.

There are no comprehensive databases of historical dam failures in Virginia. According to the Virginia Department of Conservation and Recreation there are 48 state regulated dams in the Rappahannock-Rapidan region. Of those, 8 are classified as high hazard potential, 13 are significant and 27 are low (see Figure 5.23 – Dam Classification).

Dam Inventory & Classification

Figure 5.23

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Dam Inventory and Hazard Source: HAZUS MH MR4, VA DCR
Hazard Data is based on Virginia Department of Conservation and Recreation database



Dam Classification

DCR Regulation & Hazard

- High
- Significant
- Low
- Non-Regulated Dam

Rappahannock-Rapidan REGIONAL COMMISSION

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Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 6/2/2011 File: Dam_Classification.mxd

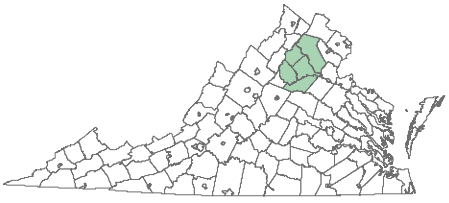


Table 5.15: Regulated Dams – by County

Culpeper	Hazard Potential			Classification		
	High	Significant	Low	MC	MR	OC
Mountain Run 8A			x	x		
Mountain Run 11		x			x	
Mountain Run 50	x				x	
Mountain Run 13			x	x		
Mountain Run 18	x				x	
South Wales			x	x		
Cole 1			x		x	
Troiano		x		x		
TOTALS:	**2**	**2**	**4**	**4**	**4**	
Fauquier						
Warrenton		x			x	
DiGiulian			**x**	x		
Thompson	**x**			x		
Kinloch Farm		**x**			x	
Springhill Farm			**x**	x		
Barr			**x**	x		
Johnson		**x**		x		
Clifton Lower			x	x		
Coventry		x		x		
Mellott		x				x
Lake Brittle		x		x		
Winslow		x			x	
Hideaway Hills			x		x	
Warrenton Lakes - Lower		x		x		
Licking Run	x				x	
Cedar Run 3	x				x	
Willow Pond Farm			x		x	
Volgenau			x		x	
TOTALS:	**3**	**8**	**7**	**9**	**8**	**1**

Madison	Hazard Potential			Classification		
	High	Significant	Low	MC	MR	OC
White Oak		x		x		
Beautiful Run 2A			x		x	
Beautiful Run 4			x		x	
Beautiful Run 5			x	x		
Beautiful Run 6			x		x	
Beautiful Run 7			x		x	
Beautiful Run 10			x		x	
Beautiful Run 11			x	x		
Beautiful Run 1B			x		x	
Hablutzel			x		x	
Malvern			x	x		
Deep Run Farm		x			x	
Totals		**2**	**10**	**4**	**8**	
Orange						
Lake of the Woods	x				x	
Lake Orange			x		x	
Grymes Mill			x	x		
Northrup			x		x	
Keaton's Run	x				x	
James A. Strong			x		x	
Decoursey			x		x	
Spring Vale	x			x		
Orange Raw Water Reservoir		x				
Totals	**3**	**1**	**5**	**2**	**6**	
Rappahannock						
Whippoorwill			x		x	
Totals			**1**		**1**	
REGION TOTALS:	**8**	**13**	**27**	**19**	**27**	**1**

Source: Virginia Department of Conservation and Recreation – Division of Dam Safety, May 2011

DATA SOURCES

American Society of Civil Engineers (ASCE), "Facts About Windstorms."
Web site: www.windhazards.org/facts.cfm

Bureau of Reclamation, U.S. Department of the Interior
Web site: www.usbr.gov

Federal Emergency Management Agency (FEMA), Department of Homeland Security
Web site: www.fema.gov

National Climatic Data Center (NCDC), U.S. Department of Commerce, National Oceanic and Atmospheric Administration
Web site: http://lwf.ncdc.noaa.gov/oa/ncdc.html

National Geophysical Data Center
Web site: http://www.ngdc.noaa.gov/

National Hurricane Center, National Oceanic & Atmospheric Administration (NOAA)
Web site: http://www.nhc.noaa.gov/

National Severe Storms Laboratory (NSSL), U.S. Department of Commerce, National Oceanic and Atmospheric Administration
Web site: www.nssl.noaa.gov

National Weather Service (NWS), U.S. Department of Commerce, National Oceanic and Atmospheric Administration
Web site: www.nws.noaa.gov

Storm Prediction Center (SPC), U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service
Web site: www.spc.noaa.gov

The Tornado Project, St. Johnsbury, Vermont
Web site: www.tornadoproject.com

United States Geological Survey (USGS), U.S. Department of the Interior
Web site: www.usgs.gov

Virginia Department of Conservation and Recreation
Web site: www.dcr.virginia.gov/

VULNERABILITY ASSESSMENT

The Hazard Analysis of the Rappahannock-Rapidan region has identified those hazards listed below as significant threats to the area. The potential impacts of hazards as reviewed in Section 4 and quantified in Section 5 have been assessed and grouped according to potential impact and, where appropriate, relevance to associated events. For example, the category "Winter Storms" now includes events characterized by extreme cold since the sub-category "Freezes" has been determined to be relatively insignificant. All assessments are based on best available data.

Natural Hazards

- **Flood**
- **Hurricanes and Tropical Storms**
- **Severe Thunderstorms and Tornadoes**
- **Wildfire**
- **Drought/Extreme Heat**
- **Winter Storms**
- **Earthquakes**
- **Landslides**
- **Dam/Levee Failure**

44 CFR Requirement

44 CFR Part 201.6(c)(2)(ii): The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. The description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of: (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; (B) An estimate of the potential losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; (C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

ASSESMENT METHODOLOGIES

Assessment tools used include:

- HAZUS®MH MR4;
- GIS (Non-HAZUS) Risk Assessment; and
- Mitigation scorecard

HAZUS®MH, a geographic information loss estimation software tool, available through the Federal Emergency Management Agency, was partnered with regional and local GIS analysis to provide a quantitative assessment of potential hazards. Qualitative information was derived from data provided by members of the Advisory Committee who assigned values to the likelihood of occurrence, spatial extent and potential of each hazard studied.

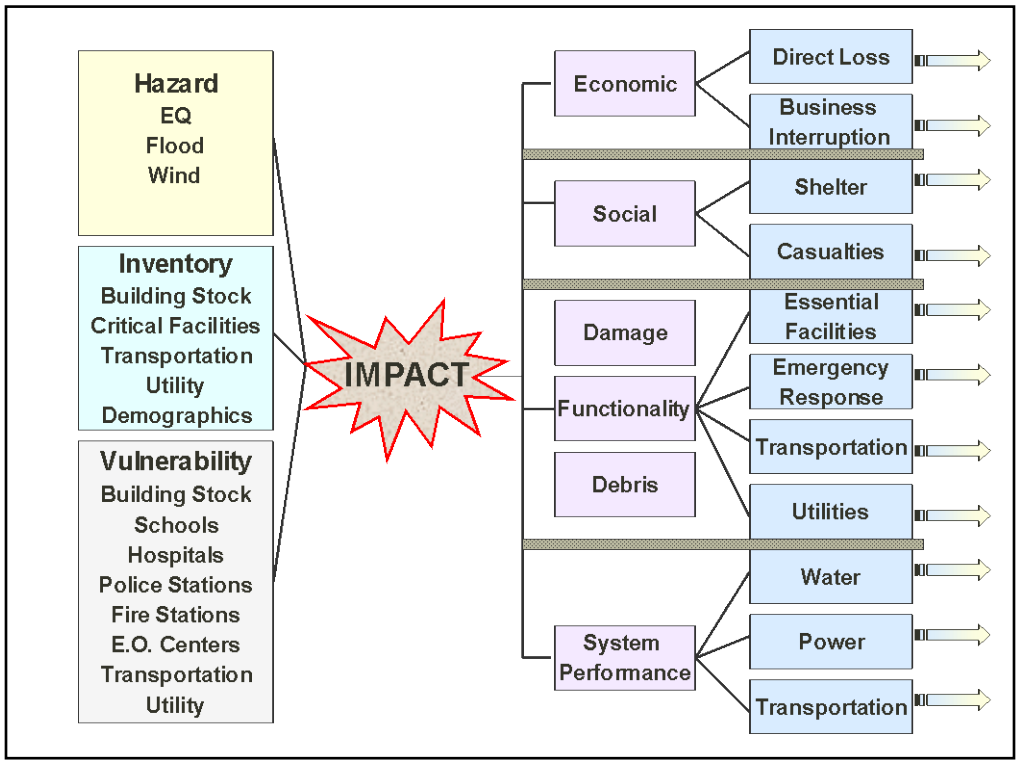
It should be noted that the vulnerability determinations presented in this section are based on best available data and represent an approximation of risk. While useful in understanding relative risk and potential loss, all such analyses include inherent uncertainty reflecting incomplete knowledge and the approximations and simplifications that are an integral part of any loss estimation methodology.

HAZUSMH Risk Assessment Methodology

HAZUSMH is FEMA's nationwide standardized loss estimation software package, built on an integrated GIS platform. In this risk assessment, HAZUSMH MR4 was used to produce regional profiles and estimated losses for three of the hazards addressed in this section: flood, hurricane winds and earthquake.

The HAZUSMH MR4 risk assessment methodology is parametric, in that distinct hazard and inventory parameters—such as wind speed and building type, for example—were modeled using the HAZUSMH software to determine the impact (damages and losses) on the built environment. **Figure 6.1** shows a conceptual model of HAZUSMH methodology.

Figure 6.1
Conceptual Model of HAZUS^{MH} Methodology



It is important to note that for those hazards where HAZUS^{MH} MR4 was used, "worst case scenario" results were produced to show the maximum potential extent of damages for those hazards. It is understood that any smaller events that could occur would likely create lesser losses than those calculated here.

Explanation of GIS-based (Non-HAZUS^{MH}) Risk Assessment Methodology

The general steps used in the GIS-based assessment conducted independently of the HAZUS^{MH} software are summarized below:

- In addition to the HAZUS^{MH} MR4 analysis for the region's flood vulnerability, a spatial analysis utilizing ESRI ArcGIS 9.3.1 was completed. GIS data was collected from local, state and national sources for this analysis. Floodplain data obtained from FEMA was used in combination with local GIS data layers, including tax parcel databases, structure footprints and digital orthophotography. The flood risk was assessed by calculating assessed improvement values of structures and parcels located in identified flood hazard areas. Results are detailed in the flood vulnerability section below.
- For the severe thunderstorm, tornado, winter storm, drought and wildfire hazards, best available data on historical hazard occurrences (limited to NOAA National Climatic Data Center records and Virginia Department of Forestry data for wildfire) was used to produce an annualized loss estimate of potential damages. Using this data, annualized loss estimates were generated by totaling the amount of property damage over the period of time for which records were available, and calculating the average annual loss. GIS was used to show the correlations between potential future events and residential population distribution throughout the county. In instances where multiple counties are affected and the value for property damage reflects the total for the affected area, professional judgment was used in extracting a reasonable share for each county in

the Rappahannock-Rapidan Region to produce an annualized loss estimate of potential damages in the Rappahannock-Rapidan Region.

- For the erosion and dam/levee failure hazards, meaningful historical data (meaning data which would have included property damages and other essential indicators) was virtually non-existent, and therefore annualized potential losses for these hazards is assumed to be negligible.

Explanation of Hybrid Approach

As described in the preceding commentary, the quantitative assessment focuses on potential loss estimates, while the qualitative assessment is comprised of a scoring system built around values assigned by the Mitigation Advisory Committee to the likelihood of occurrence, spatial extent and potential impact of each hazard presented here. For likelihood of occurrence, the following four options were available to members of the Mitigation Advisory Committee: Highly Likely, Likely, Possible or Unlikely. For spatial extent, three options were offered to describe the area which might be expected to be affected: Large, Moderate or Small. For potential impact, the choices consisted of: Catastrophic, Critical, Limited or Minor. **Table 6.1** provides the criteria associated with each label.

Table 6.1
Criteria for Qualitative Assessment

	Assigned Value	Definition
Likelihood of Occurrence		
Highly Likely	3	Near 100% annual probability
Likely	2	Between 10 and 100% annual probability
Possible	1	Between 1 and 10% annual probability
Unlikely	0	Less than 1% annual probability
Spatial Extent		
Large	3	More than 50% of area affected
Moderate	2	Between 10 and 50% of area affected
Small	1	Less than 10% of area affected
Potential Impact		
Catastrophic	4	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of facilities for 30 days or more.
Critical	3	Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than one week.
Limited	2	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than one day.
Minor	1	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.

The values assigned for each option chosen are added together for each hazard to arrive at a total score. For example, in the Rappahannock-Rapidan Region flood is considered Highly Likely (3), with a Moderate reach (2), with a Critical potential impact (3). This gives the flood hazard a total hazard rating of 8 (10

being the highest possible score.) This presents the flood hazard as the highest ranking hazard for the planning area.

All conclusions are presented in "Conclusions on Hazard Risk" at the end of this section. Findings for each hazard are detailed in the hazard-by-hazard vulnerability assessment that follows, beginning with an overview of the planning area.

OVERVIEW OF VULNERABILITY IN THE REGION

According to the U.S. Census Bureau, in 2010 the population of the Rappahannock-Rapidan Region was 166,054, a 23% increase from 2000. Virginia's population in 2010 was 8,001024, having increased by 13.02% since 2000 when it was 7,079,048. The average number of persons per square mile in the Rappahannock-Rapidan region in 2010 was 85 (**Fig. 6.2 – Population Density**), an increase of 12 persons per square mile from 72 per square mile in 2000.

The total dollar exposure of buildings within the Rappahannock-Rapidan Region is estimated to be $15,125,256,000. This is based on HAZUS^{MH} MR4 inventories of 60,407 residential, commercial, industrial and other buildings located within the region.[1] Total dollar exposure accounts for both the building and its contents, which is based on a percentage of the building's value. **Figures 6.3** through **6.5** show the distribution of residential, commercial and industrial property exposure throughout the county by census tract.[2]

Development Trends

A general analysis of current land uses and development trends is essential in formulating mitigation options that influence future land use decisions. As was noted previously (Section 3), although the region remains primarily rural, it has experienced a 23 percent increase in population over the last 10 years. Most of this growth has occurred in localities closest to Washington, D.C. – Fauquier and Culpeper counties – and along major transportation routes.

Critical Facilities

The Rappahannock-Rapidan region's critical facilities are listed below **(Table 6.2)**. Included is information listed in the HAZUS database along with edits provided by representatives of participating localities. **Figure 6.6** is a visual display of the data included in HAZUS^{MH}.

Table 6.2
Critical Facilities in the Rappahannock-Rapidan Region (HAZUS^{MH} Inventory and Local Input)

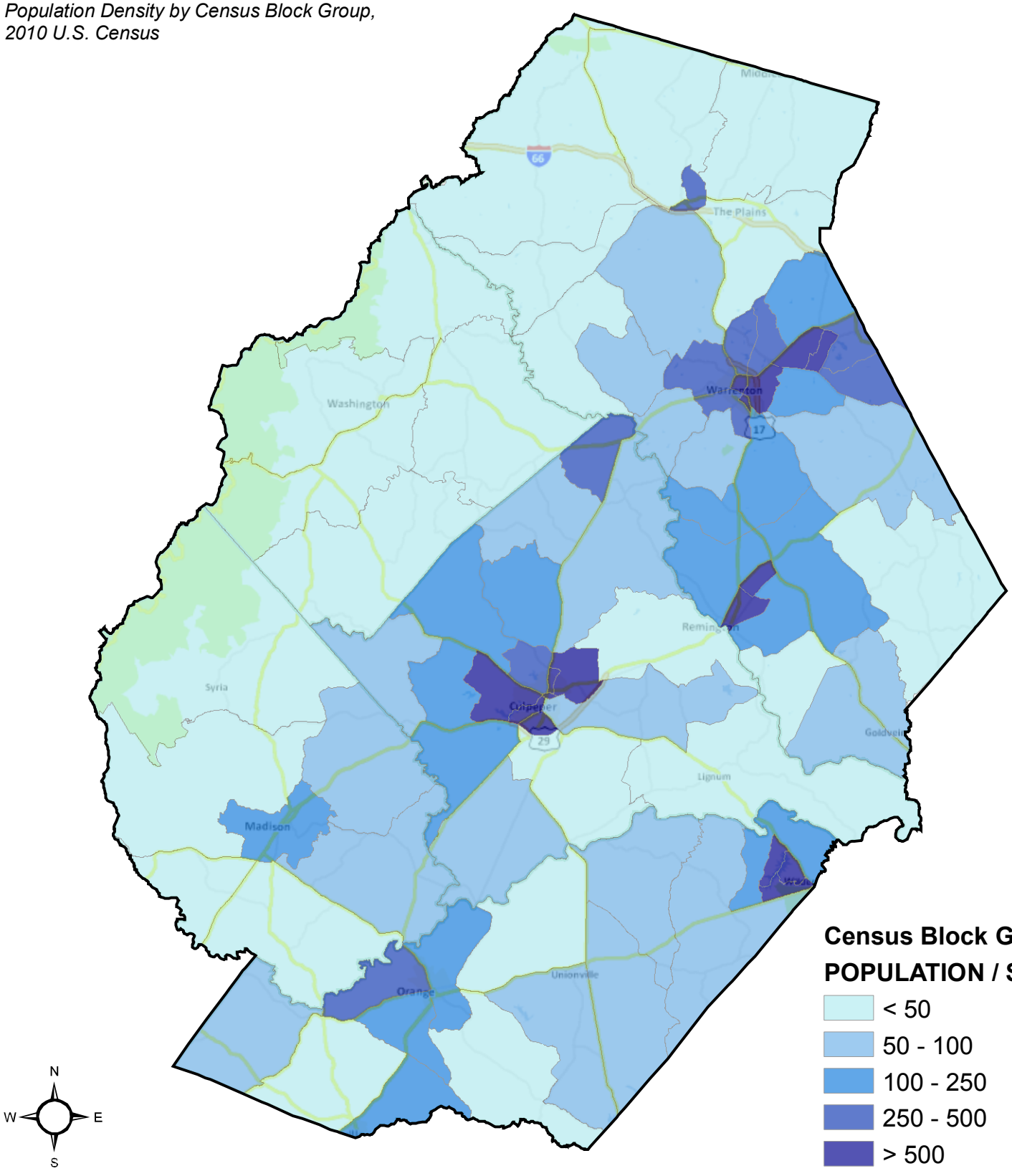
County	Jurisdiction	Facility Name	Facility Type
Culpeper	Culpeper	Culpeper Regional Hospital	Hospital
Culpeper	Elkwood	Culpeper Regional Airport	Airport
Culpeper	Culpeper	Culpeper EMS Building	Emergency Coordination
Culpeper	Culpeper	Culpeper Emergency Operations Center	Emergency Operations
Culpeper	Culpeper	Reva Volunteer Fire & Rescue	Fire Station
Culpeper	Brandy Station	Brandy Volunteer Fire Dept	Fire Station
Culpeper	Culpeper	Salem Volunteer Fire & Rescue	Fire Station

[1] HAZUS^{MH} MR4 uses U.S. Census, Dunn & Bradstreet (2006) and R.S. Means (2006) data for its default inventories. Values not reflected in HAZUS^{MH} MR4 are not reflected.
[2] The remaining 1 percent is classified as "other" and includes agriculture, education, government and religious buildings.

Population Density | 2010 U.S. Census

Figure 6.2

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Population Density by Census Block Group,
2010 U.S. Census

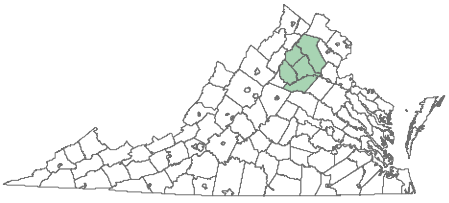


Rappahannock-Rapidan REGIONAL COMMISSION

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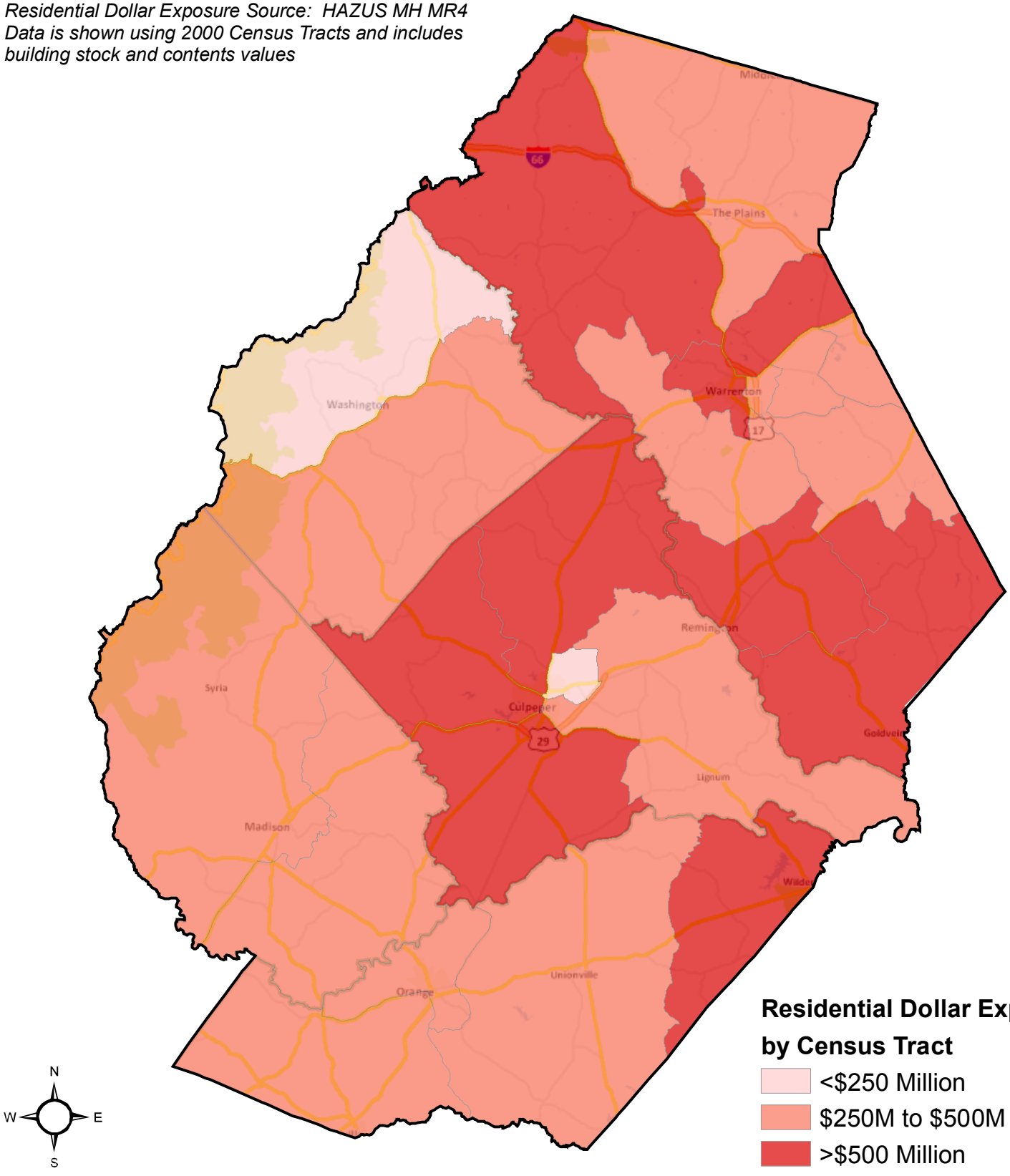
Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 6/1/2011 File: RRRC_Pop_Density.mxd



Residential Exposure by Census Tract

Figure 6.3

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Residential Dollar Exposure Source: HAZUS MH MR4
Data is shown using 2000 Census Tracts and includes building stock and contents values



N
W E
S

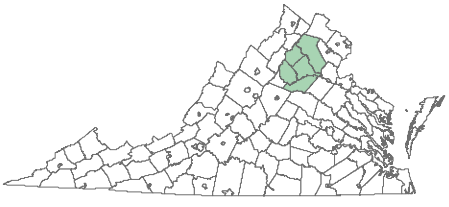
Residential Dollar Exposure by Census Tract

- <$250 Million
- $250M to $500M
- >$500 Million

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0 5 10 15 20

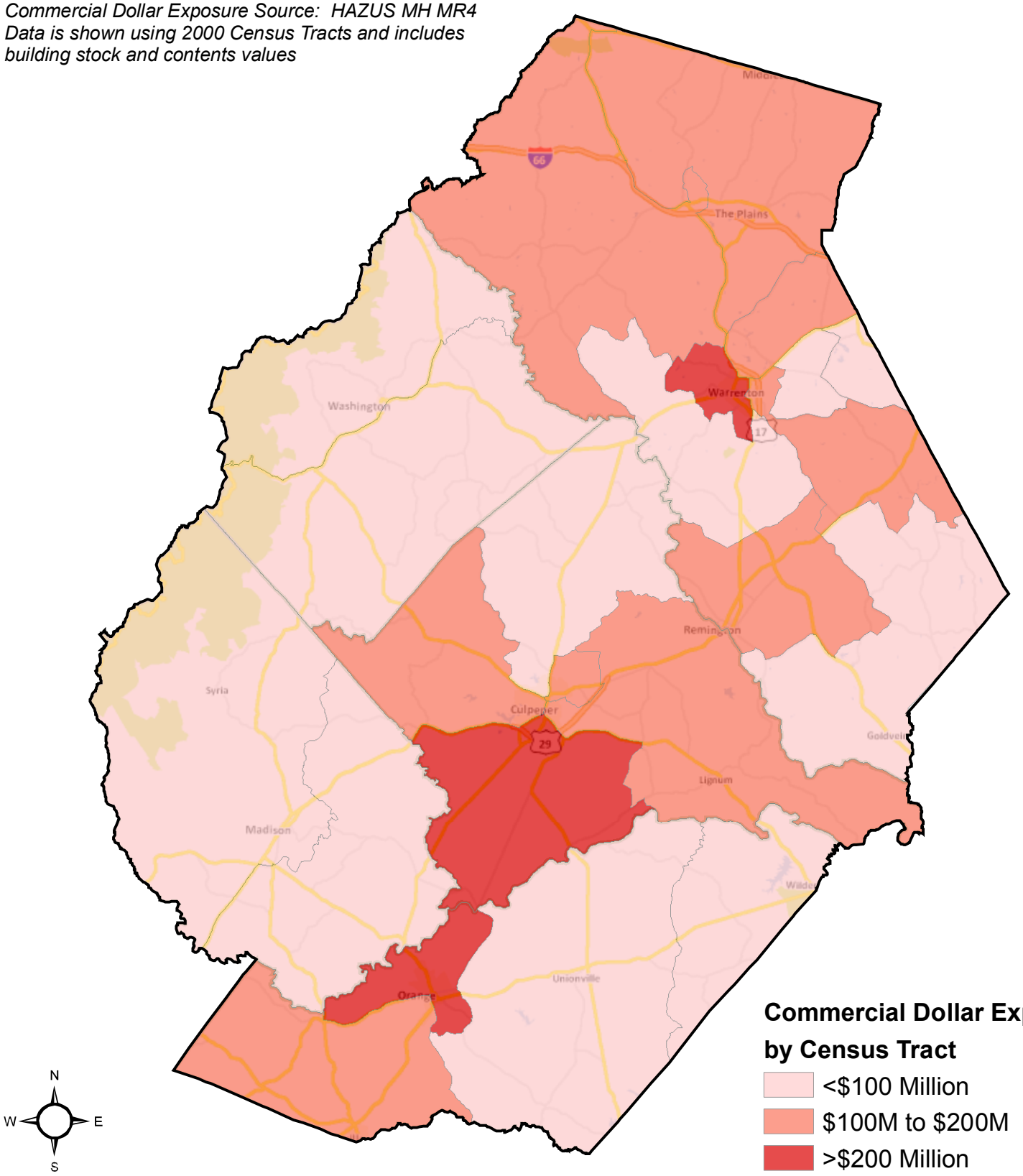
Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 6/2/2011 File: Residential_Exposure.mxd



Commercial Exposure by Census Tract

Figure 6.4

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Commercial Dollar Exposure Source: HAZUS MH MR4
Data is shown using 2000 Census Tracts and includes building stock and contents values



Commercial Dollar Exposure by Census Tract

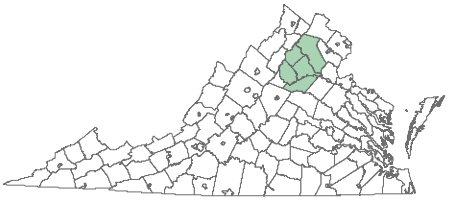
- <$100 Million
- $100M to $200M
- >$200 Million

Rappahannock-Rapidan REGIONAL COMMISSION

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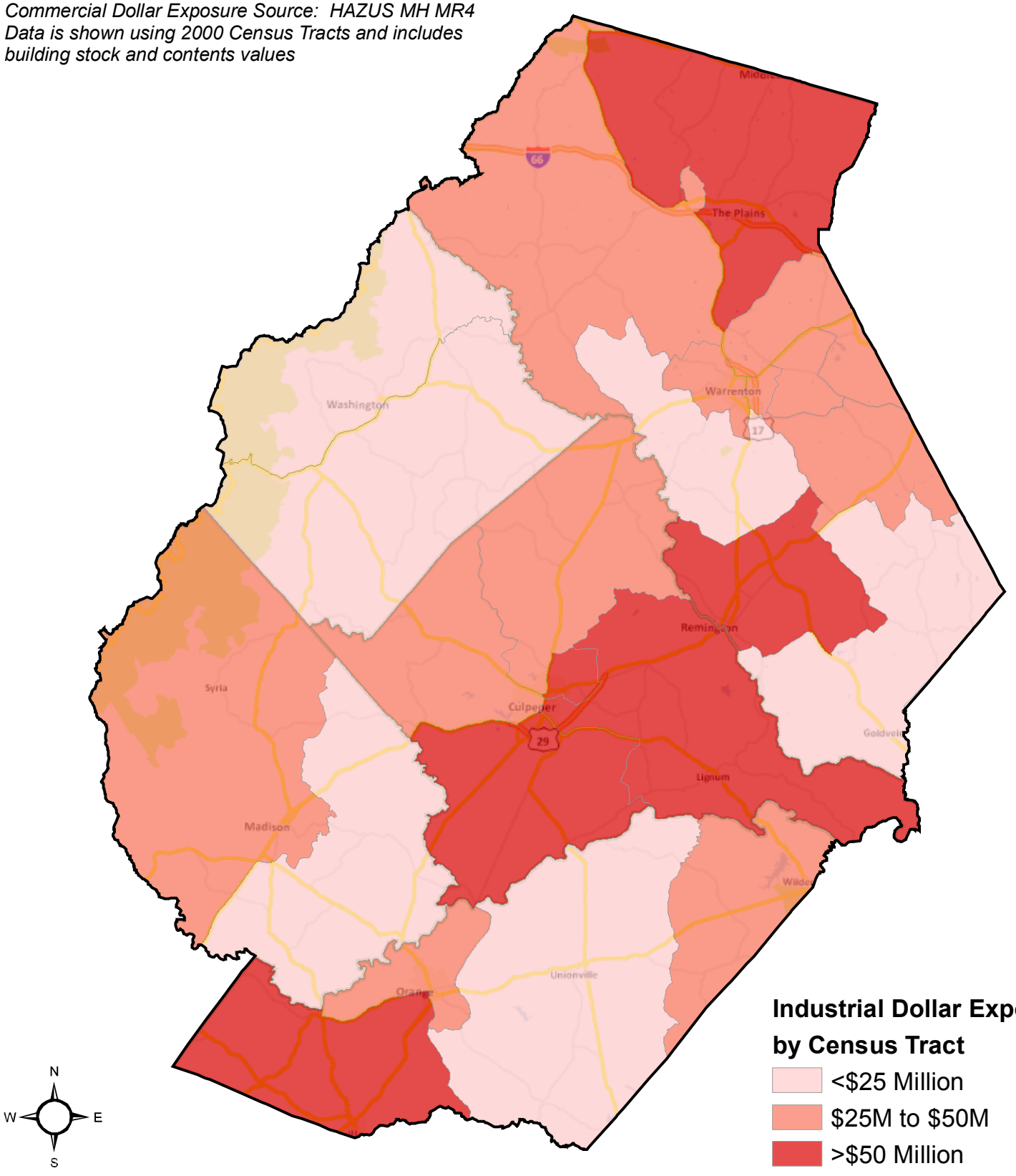
Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 6/2/2011 File: Commercial_Exposure.mxd



Industrial Exposure by Census Tract

Figure 6.5

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Commercial Dollar Exposure Source: HAZUS MH MR4
Data is shown using 2000 Census Tracts and includes building stock and contents values



Industrial Dollar Exposure by Census Tract

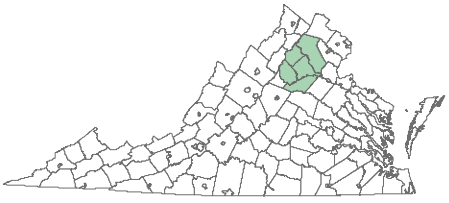
- <$25 Million
- $25M to $50M
- >$50 Million

Rappahannock-Rapidan REGIONAL COMMISSION

Miles

0 5 10 15 20

Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 6/2/2011 File: Industrial_Exposure.mxd

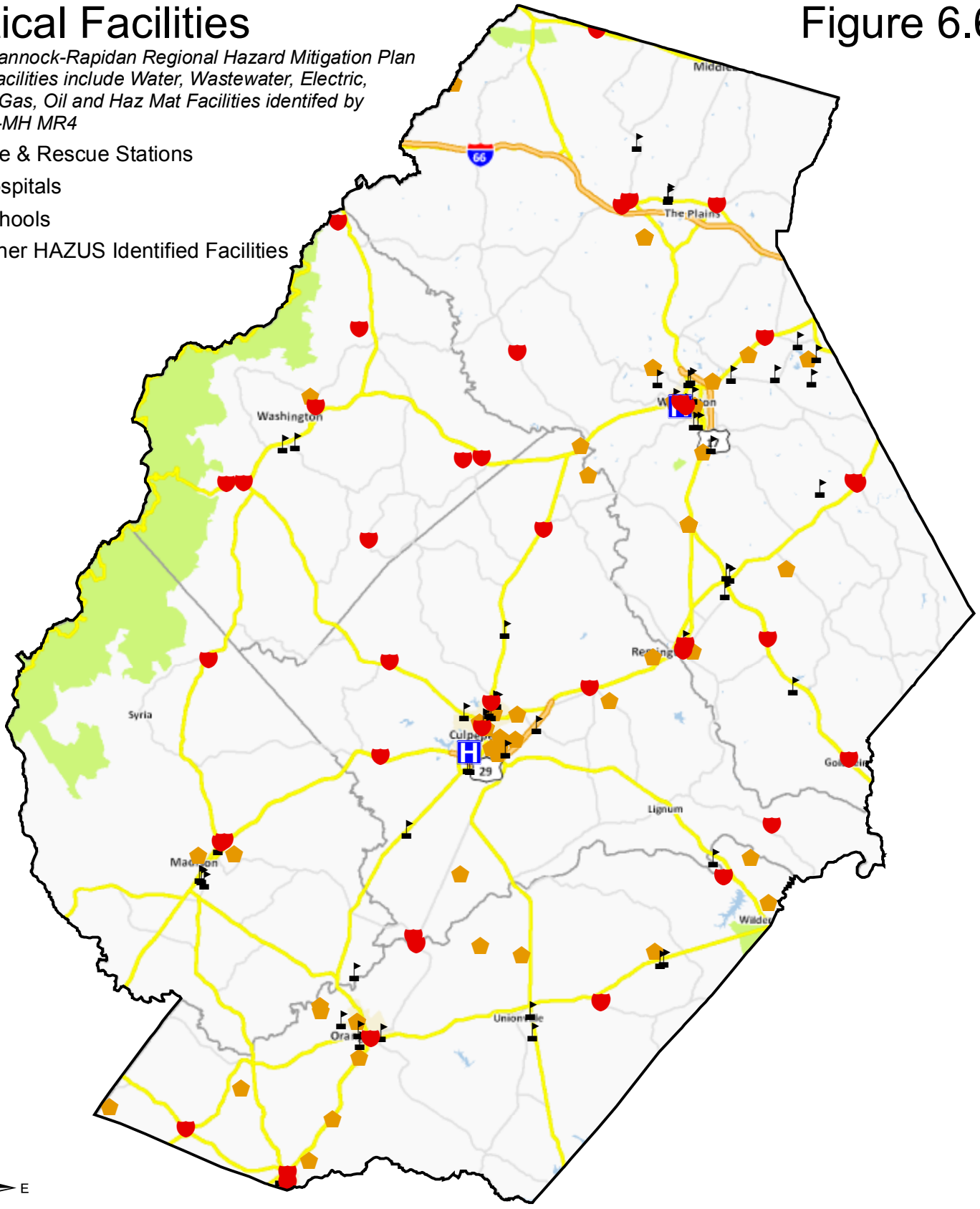


Critical Facilities

Figure 6.6

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Other Facilities include Water, Wastewater, Electric, Natural Gas, Oil and Haz Mat Facilities identifed by HAZUS-MH MR4

- Fire & Rescue Stations
- Hospitals
- Schools
- Other HAZUS Identified Facilities

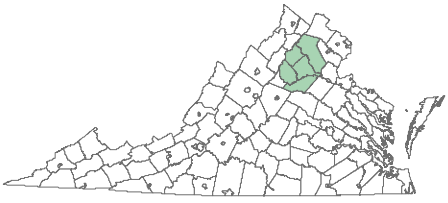


Rappahannock-Rapidan REGIONAL COMMISSION

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Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 2/21/2011 File: Critical_Facilities.mxd



County	Jurisdiction	Facility Name	Facility Type
Culpeper	Culpeper	Culpeper County Sheriff's Office	Police Station
Culpeper	Culpeper	Culpeper Police Dept	Police Station
Culpeper	Culpeper	Culpeper Christian School	School
Culpeper	Culpeper	St. Luke's Lutheran School	School
Culpeper	Lignum	Alice C Tyler Village of Children	School
Culpeper	Culpeper	Epiphany Catholic School	School
Culpeper	Culpeper	G.W. Carver-Pied. Tec Ed Center	School
Culpeper	Culpeper	Central VA Regional Program	School
Culpeper	Culpeper	A. G. Richardson Elementary	School
Culpeper	Culpeper	Culpeper County High	School
Culpeper	Culpeper	Culpeper County Middle	School
Culpeper	Culpeper	Farmington Elementary	School
Culpeper	Culpeper	Pearl Sample Elementary	School
Culpeper	Culpeper	Sycamore Park Elementary	School
Culpeper	Culpeper	Emerald Hill Elementary	School
Culpeper	Culpeper	Eastern View High School	School
Culpeper	Culpeper	Yowell Elementary School	School
Fauquier	Warrenton	Fauquier Hospital	Hospital
Fauquier	Midland	Fauquier-Warrenton Airport	Airport
Fauquier	Warrenton	CFREM Offices	Emergency Management
Fauquier	Bealeton	Lois Volunteer Fire Dept	Fire Department
Fauquier	Orlean	Orlean Volunteer Fire Dept	Fire Department
Fauquier	Goldvein	Goldvein Volunteer Fire Dept	Fire Department
Fauquier	Broad Run	New Baltimore VFC and Rescue	Fire & Rescue
Fauquier	Catlett	Cedar Run Volunteer Rescue Squad	Fire Department

County	Jurisdiction	Facility Name	Facility Type
Fauquier	Warrenton	Warrenton VFC	Fire Department
Fauquier	Remington	Remington VFC and Rescue	Fire & Rescue
Fauquier	Marshall	Marshall VFC	Fire Department
Fauquier	The Plains	The Plains VFC and Rescue	Fire & Rescue
Fauquier	Upperville	Upperville VFC	Fire Department
Fauquier	Warrenton	Warrenton Vol. Rescue Squad	Rescue Station
Fauquier	Catlett	Catlett VFC	Fire Department
Fauquier	Marshall	Marshall Vol. Rescue Squad	Rescue Station
Fauquier	Warrenton	Warrenton Police	Police Station
Fauquier	Warrenton	Sheriff's Dept-Detention Center	Police Station
Fauquier	Warrenton	Criminal Court	Public Safety
Fauquier	Warrenton	Sheriff's-Criminal Investigation	Police Station
Fauquier	Warrenton	Fauquier County Sheriff's Office	Police Station
Fauquier	Warrenton	Adult Detention Facility	Government Building
Fauquier	Warrenton	Fauquier County Courthouse (old)	Government Building
Fauquier	Warrenton	Fauquier County Courthouse (new)	Government Building
Fauquier	Multiple locations	Fauquier County Schools and Government Building	Government Building
Fauquier	Warrenton	Warren Green Administrative Building	Government Building
Fauquier	Warrenton	Parks and Recreation Gym	Government Building
Fauquier	Warreton	Warrenton-Fauquier Joint Communications Center	Government Building
Fauquier	The Plains	Wakefield School	School
Fauquier	Remington	Cornerstone Christian Academy	School
Fauquier	Midland	Midland Christian Academy	School
Fauquier	Warrenton	C. M. Bradley Elementary	School
Fauquier	Bealeton	Cedar Lee Middle	School
Fauquier	Warrenton	Fauquier High	School

County	Jurisdiction	Facility Name	Facility Type
Fauquier	Catlett	H. M. Pearson Elementary	School
Fauquier	Marshall	Marshall Middle	School
Fauquier	Warrenton	P. B. Smith Elementary	School
Fauquier	Remington	Margaret M. Pierce Elementary	School
Fauquier	Warrenton	W. C. Taylor Middle	School
Fauquier	Marshall	W. G. Coleman Elementary	School
Fauquier	Warrenton	Warrenton Middle School	School
Fauquier	Bealeton	Liberty High (Shelter)	School
Fauquier	Bealeton	Mary Walter Elementary	School
Fauquier	Bealeton	Grace Miller Elementary	School
Fauquier	New Baltimore	C. Hunter Ritchie Elementary	School
Fauquier	New Baltimore	Kettle Run High School	School
Fauquier	New Baltimore	Greenville Elementary School	School
Fauquier	New Baltimore	Auburn Middle School (Shelter)	School
Fauquier	Warrenton	Brumfield Elementary	School
Fauquier	Marshall	Claude Thompson Elementary	School
Fauquier	Remington	M.M. Pierce Elementary	School
Fauquier	Midland	Southeastern Alternative School	School
Fauquier	Middleburg	Montessori School of Middleburg	School
Fauquier		Mountainside Montessori	School
Fauquier		Lois Atkins Head Start	School
Fauquier	Multiple locations	Fauquier Community Child Care (9 facilities)	Daycare
Fauquier	Warrenton	Children of America	Daycare
Fauquier	Bealeton	Children of America	Daycare
Fauquier	Warrenton	Jack and Jill	Daycare
Fauquier		Maplewood Childcare Center	Daycare

County	Jurisdiction	Facility Name	Facility Type
Fauquier		Piedmont Child Development Center	Daycare
Fauquier	Bealeton	Southern Fauquier Child Development	Daycare
Fauquier	Multiple locations	Walnut Grove Childcare Facility	Daycare
Fauquier		Walnut Grove Academy	Daycare
Fauquier	Warrenton	Warrenton Baptist Tiny Tot Care Center	Daycare
Fauquier	Warrenton	Fauquier County Garage	Fuel Site
Fauquier		Morgan Oil	Fuel Site
Fauquier	Warrenton	Oak Springs Nursing Home	Nursing Home
Fauquier	Warrenton	Overlook Nursing Home	Nursing Home
Fauquier		America House	Nursing Home
Fauquier		The Oaks	Nursing Home
Fauquier		Moffett Manor	Nursing Home
Fauquier		Blue Ridge Christian Home	Nursing Home
Fauquier	Warrenton	Warrenton Manor	Nursing Home
Fauquier	Warrenton	Waste Water Plant	Waste Water Plant
Fauquier	Marshall	Marshall Water Plant	Water Treatment Plant
Fauquier	Remington	Remington Water Plant	Water Treatment Plant
Fauquier	Vint Hill	Vint Hill Water Plant	Water Treatment Plant
Fauquier	Warrenton	Warrenton Water Treatment Plant	Water Treatment Plant
Fauquier		Marsh Run Generation Facility	Utility
Fauquier	Remington	Remington Combustion Turbine Station	Utility
Fauquier	Bealeton	Marsh Run Mobile Home Park	Residential
Madison	Madison	Madison County Sheriff's Office	Police Station
Madison	Madison	Madison Fire Company	Fire and Rescue
Madison	Madison	Madison Rescue Squad	Fire and Rescue

County	Jurisdiction	Facility Name	Facility Type
Madison	Madison	Madison Emergency Medical Services	Medical Services
Madison	Madison	School Bus Maintenance Shop	Mechanical Services
Madison	Madison	Rapidan Service Authority	Water Treatment Plant
Madison	Madison	School Board Offices	School Offices
Madison	Aroda	Cornerstone Christian School	School
Madison	Woodberry Forest	Woodberry Forest School	School
Madison	Aroda	Oak Grove Menonite School	School
Madison	Madison	Madison County High	School
Madison	Madison	Madison Primary	School
Madison	Madison	Waverly Yowell Elementary	School
Madison	Madison	William H. Wetsel Middle	School
Madison	Criglersville	Criglesrville Elementary	School
Madison	Madison	Early Learning Center	School
Madison	Madison	Skyline CAP	School
Madison	Town of Madison	First Friends Pre-school	School
Madison	Madison	Rainbow Preschool	Day Care
Madison	Pratts	Countryside Rest Home	Nursing Home
Madison	Novum	Meadowbrook Nursing Home at Novum	Nursing Home
Madison	Brightwood	Morgan's Nursing Home	Nursing Home
Madison	Madison	Autumn Care of Madison	Nursing Home
Madison	Aroda	Mountain View Nursing Home	Nursing Home
Madison	Madison	Sevenoaks Pathwork Center	Nursing Home
Orange	Orange	Orange County Airport	Airport
Orange	Gordonsville	Gordonsville Municipal Airport	Airport
Orange	Orange	Orange County E-911 Center	Emergency Operations

County	Jurisdiction	Facility Name	Facility Type
Orange	Gordonsville	Gordonsville VFC	**Fire Station**
Orange	Orange	Orange VFC	**Fire Station**
Orange	Mine Run	Mine Run VFC	**Fire Station**
Orange	Barboursville	Barboursville Volunteer Fire	Fire Station
Orange	Rapidan	Rapidan Volunteer Fire Dept	Fire Station
Orange	Locust Grove	Lake-Woods Fire & Rescue	Fire & Rescue
Orange	Mine Run	Mine Run Volunteer Rescue	**Rescue Squad**
Orange	Barboursville	Barboursville Volunteer Rescue	Rescue Squad
Orange	Gordonsville	Gordonsville Volunteer Rescue	Rescue Squad
Orange	Orange	Orange County Rescue Squad	Rescue Squad
Orange	Orange	Orange County Sheriff's Office	Police Station
Orange	Orange	Orange Police	Police Station
Orange	Gordonsville	Gordonsville Police Dept	Police Station
Orange	Orange	Grymes Memorial School	School
Orange	Unionville	Faith Christian Academy	School
Orange	Unionville	Lightfoot Elementary	School
Orange	Orange	Orange County High	School
Orange	Orange	Orange Elementary	School
Orange	Orange	Prospect Heights Middle	School
Orange	Unionville	Unionville Elementary	School
Orange	Locust Grove	Locust Grove Elementary	School
Orange	Locust Grove	Locust Grove Middle School (old)	School
Orange	Gordonsville	Gordon-Barbour Elementary School	School
Orange	Locust Grove	Locust Grove Middle School (new)	School
Orange	Orange	Town of Orange Public Works Facilities	Government Building
Orange	Orange	Town of Orange Administrative Building	Government Building

County	Jurisdiction	Facility Name	Facility Type
Orange	Orange	Orange County Courthouse	Government Building
Orange	Multiple Locations	County Administrative Buildings	Government Building
Orange	Multiple Locations	County Parks & Recreation Facilities	Government Building
Orange	Multiple Locations	County Waste Facilities	Government Building
Orange	Gordonsville	Gordonsville Town Hall	Government Building
Orange	Orange	Central Virginia Regional Jail	Government Building
Orange	Orange	Orange Train Depot	Other
Orange	Orange	Town of Orange Water Treatment Plant	Water Treatment
Orange	Orange	Rapidan Service Authority Water Treatment Plant	Water Treatment
Orange	Orange	Rapidan Service Authority Wastewater Treatment Plant	Wastewater Treatment
Orange	Orange	Town of Orange Wastewater Treatment Plant	Wastewater Treatment
Orange	Multiple Locations	Power substations (REC, Dominion)	Utility
Orange	Orange	Shining Stars Childcare	Daycare
Orange	Orange	Dogwood Village	Nursing Home
Orange	Orange	President Madison Inn	Nursing Home
Orange	Rapidan	Holiday Home for Adults	Nursing Home
Orange	Gordonsville	Village at Gordon House	Assisted Living
Orange	Orange	AmeriHouse	Assisted Living
Orange	Orange	Belleview Senior Apartments	Assisted Living
Orange	Orange	W.A. Brockman Oil Company	Fueling Station
Rappahannock	Washington	Sheriff's Office	Police Station
Rappahannock	Castleton	Massanova Christian Academy	School
Rappahannock	Flint Hill	Wakefield Country Day School	School
Rappahannock	Washington	Rappahannock County High	School
Rappahannock	Washington	Rappahannock Elementary	School

County	Jurisdiction	Facility Name	Facility Type
Rappahannock	Washington	Rappahannock Office of Emergency Management	Emergency Management Office
Rappahannock	Washington	Rappahannock County Courthouse	Government Building
Rappahannock	Washington	Rappahannock County Administrative Buildings	Government Building
Rappahannock	Washington	Co 1 Fire and Rescue	Fire Department
Rappahannock	Flint Hill	Flint Hill Volunteers Fire	Fire Department
Rappahannock	Sperryville	Co 2 Fire and Rescue	Fire Department
Rappahannock	Amissville	Co 3 Fire and Rescue	Fire Department
Rappahannock		Co 4 Fire and Rescue	Fire Department
Rappahannock	Castleton	Co 5 Fire and Rescue	Fire Department
Rappahannock	Sperryville	Co 7 Fire and Rescue	Fire Department
Rappahannock	Chester Gap	Co 9 Fire and Rescue	Fire Department
Rappahannock	Sperryville	Hearthstone School	School
Rappahannock	Washington	Child Care and Learning Center	Day Care
Rappahannock	Washington	Rappahannock County Co-Op	Co-Op

FLOOD

The vulnerability assessment for the flood hazard in the Rappahannock-Rapidan Region is based on two separate methodologies. The primary methodology utilized the Flood Modeling capabilities of HAZUS^{MH} MR4, using the default data provided with HAZUS^{MH} MR4. The basic analysis used the Flood Hazard Analysis process defined in chapter 3 of the HAZUS^{MH} MR4 User Manual – *Running HAZUS Flood with Default Data*.

Table 6.3 – HAZUS Flood Hazard Analysis Process

Riverine Hazard	Coastal Hazard
User Data	
Define Terrain (Input DEM)	Define Terrain (Input DEM)
Import FIT Projects, User-Defined Depth Grids, HEC-RAS .FLT Grids	Import FIT Projects, User-Defined Depth Grids
Develop Stream Network	No Equivalent
Create New Scenario	
Select Reaches, FIT Projects, User-Defined Depth Grids, HEC-RAS Grids	Select Shorelines, FIT Projects, User-Defined Depth Grids
Hydrology	No Equivalent
No Equivalent	Characterize Shoreline
Delineate Floodplain (Hyrdraulics Analysis) for suite, single return period, specific discharge, annualized return periods	Delineate Floodplain (Frontal dune erosion, WHAFIS, wave runup, zone determination) for suite, single return period, annualized return periods
Develop Floodplain Depth Grid (Completed Base Hazard Analysis)	
Optional Hazard Analysis Perform What If – Levee Assessment Perform What If – Flow Regulation Perform What If – Velocity Grid	Optional Hazard Analysis Perform What If – Long-Term Erosion Perform What If – Shore Protection

For the Rappahannock-Rapidan region, the analysis consisted of a Riverine Hazard assessment only. The HAZUS^{MH} MR4 hydraulics analysis was run for return periods of 10, 50, 100, 200 and 500 years in order to develop an annualized loss estimate for the entire region.

The HAZUS Flood Model analysis returned 130 reaches in the Rappahanock-Rapidan region, which were in turn divided into six scenarios in order to minimize processing time for the hydraulics analysis. The HAZUS analysis returned an annualized loss estimate of $31,250,000 for the Rappahannock-Rapidan study region.

The secondary methodology utilized for the flood hazard vulnerability assessment was a spatial analysis of the structures and floodplains in the Rappahannock-Rapidan region. Using the maps developed in the *Hazard Analysis*,[3] a table was created to capture the number and value of at-risk structures (**Table 6.4)** based on their intersection with known flood hazard boundaries.

At-Risk Structures

A total of 10,141 parcels within the region have been identified through GIS analysis as intersecting with the 100-year floodplain. Of these parcels, 6,044 were identified as having

[3] Maps showing the spatial extent of flooding in the Rappahannock-Rapidan Region including all five counties and the municipalities of Culpeper, Gordonsville, Warrenton, and Remington, based on floodplain data from FEMA and the localities in the region are shown under "Flood" in the *Hazard Analysis* section (Section 5 of this Plan).

improvements on the property. The total improvements on these parcels intersecting the 100-year floodplain amounted to an assessed value of $1,678,275,300.

Where data was available, these parcels were further analyzed to determine if the structures on those parcels were located in the 100-year floodplain. This analysis generated a total of 1,052 structures that are located in the floodplain. These "floodplain structures" amount to an assessed value of $188,472,700.

Table 6.4
Overview of Flood Vulnerability in the Rappahannock-Rapidan Region

Jurisdiction	NFIP Entry Date	Effective FIRM	Parcels Intersecting Floodplain	100-Year Floodplain (Zones AE and A)			
				Parcels with Structures Intersecting Floodplain	Structures Intersecting Floodplain	Assessed Value	Annualized Losses
Culpeper County	7/1/87	6/18/07	1,422	74	108	$56,096,200	$560,962
Culpeper	3/2/89	6/18/07	505	132	154	$47,729,600	$477,296
Fauquier County	11/1/79	2/6/08	5,358	189	210	$39,207,000	$392,070
Remington	3/18/80	2/6/08	278	89	125	$6,595,600	$65,956
The Plains	NP		10	0	0	$0	$0
Warrenton	8/1/79	2/6/08	149	13	29	$2,984,100	$29,841
Madison County	4/3/89	1/5/07	796	118	276	$25,338,600	$253,386
Madison	NSHA	None	0	0	0	$0	$0
Orange County	9/10/84	1/2/08	867	19	36	$4,692,400	$46,924
Gordonsville	NP		28	5	6	$686,300	$6,863
Orange	1/2/08	1/2/08	0	0	0	$0	$0
Rappahannock County[4]	8/24/84	1/5/07	715	71	108	$5,142,900	$51,429
Washington	1/5/07	1/5/07	13	0	0	$0	$0
REGIONWIDE TOTALS			**10,141**	**710**	**1,052**	**$188,472,700**	**$1,884,727**

*Total value of all parcels intersecting the floodplain.

Annualized Losses for Flood

The HAZUS^{MH} MR4 Flood Hazard Riverine Analysis generated an annualized loss estimate of $31,250,000 for the region. **Table 6.5** shows the annualized loss estimates by county, inclusive of capital stock losses (building damage cost, contents damage cost and inventory loss) and income losses (relocation loss, capital related loss, wages losses and rental income loss).

[4] The digital data layers for Rappahannock County do not overlay exactly with each other. The analysis was performed anyway, using this inaccurate data. In order to determine the flood hazard risk more accurately, better data should be developed.

Table 6.5 - HAZUS^{MH} MR4 Flood Hazard Annualized Losses, by County
In Thousands of Dollars

	Capital Stock Losses			Income Losses				
County	Building Damage	Contents Damage	Inventory Loss	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	Total
Culpeper	5,642	4,732	65	1	0	7	0	10,447
Fauquier	6,472	5,441	113	2	1	11	0	12,040
Madison	1,421	1,018	14	0	0	1	0	2,454
Orange	2,140	2,410	82	0	0	7	0	4,639
Rappahannock	922	738	10	0	0	0	0	1,670
R-R Region	16,597	14,339	284	3	1	26	0	31,250

From the non-HAZUS GIS analysis, two annualized loss figures were calculated. The first figure was generated by assuming 100 percent loss to all improvements on parcels intersecting the floodplain during a 100-year flood event. This annualized loss estimate was $16,782,753.

The second annualized estimate was generated by assuming 100 percent loss to all improvements on parcels with structures intersecting the floodplain during a 100-year flood event. This annualized loss estimate was $1,884,727.

National Flood Insurance Program Data

As of February 28, 2011, there were 406 properties enrolled in the National Flood Insurance Program in the Rappahannock-Rapidan Region. These policies amounted to $285,643.00 in total premiums and $10,102,390.00 in total insurance coverage (**Table 6.6).**

Table 6.6
National Flood Insurance Policy Information for the Rappahannock Rapidan Region

Community Name	Policies in force	Insurance in force, whole	Premiums in force
Culpeper County	35	$9,003,100.00	$16,725.00
Culpeper	39	$9,970,500.00	$23,405.00
Fauquier County	123	$30,953,900.00	$94,970.00
Remington	46	$8,745,000.00	$36,671.00
Warrenton	24	$6,355,300.00	$19,566.00
Madison County	43	$9,423,900.00	$27,668.00
Madison	0		
Orange County	51	$14,385,200.00	$23,797.00
Gordonsville	0		
Orange	2	$630,000.00	$738.00
Rappahannock County	43	$11,557,000.00	$42,103.00
Washington	0		
REGION TOTALS:	**406**	**$10,102,390.00**	**$285,643.00**

Data as of 2/28/2011

Repetitive Loss Properties

The identification of repetitive loss properties is an important element to conducting a local flood risk assessment, as the inherent characteristics of properties with multiple flood losses strongly suggest that they will be threatened by continual losses. Repetitive loss properties are also important to the National Flood Insurance Program, since structures that flood frequently put a strain on the National Flood Insurance Fund. Under the NFIP, FEMA defines a repetitive loss property as "any NFIP-insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced: a) four or more paid flood losses; or b) two paid flood losses within a 10-year period that equal or exceed the current value of the insured property; or c) three or more paid losses that equal or exceed the current value of the insured property." A strong goal of FEMA is to reduce the numbers of structures that meet these criteria, whether through elevation, acquisition, relocation or a flood control project that lessens the potential for continual losses.

According to FEMA, there are currently 5 repetitive loss properties within the jurisdictions of the Rappahannock Rapidan Region (**Table 6.7**).[5] However, because of the relatively low amount of claims paid for these properties, none of these properties are on FEMA's national "Target 10,000" list of the most concerning repetitive loss properties in the Nation. Specific addresses of the properties shown in here are deliberately not included in this Plan as required by law.[6]

Table 6.7
NFIP Repetitive Loss Properties in the Rappahannock Rapidan Region

Jurisdiction	Flood Zone	Number of Insured Losses	Total NFIP Claims Paid	Mitigated?
Madison	AE	2	$19,668	No
Madison	AE	2	$38,011	No
Culpeper	A	2	$46,864	No
Orange	A	2	$69,790	No
Warrenton	A	2	$15,795	No
TOTAL		**10**	**$190,131**	

Source: Federal Emergency Management Agency

HURRICANES AND TROPICAL STORMS

Historical evidence shows that the Rappahannock-Rapidan Region is vulnerable to damaging hurricane and tropical storm-force winds.[7] While the Rappahannock-Rapidan region has historically seen several hurricanes pass through the region, the tropical storms generally weaken as they move over land and do not possess the same power as they do when they make landfall in more coastal areas of Virginia and the East Coast of the United States. Loss estimates for wind were developed based on probabilistic scenarios using HAZUS^{MH} (Level 1 analysis).[8] **Table 6.8** shows number of structures damaged and estimated losses for 50, 100 and 500-year return periods. In order to provide a summary of potential wind-related losses, an annualized loss estimate of $139,000 was derived from the HAZUS^{MH} assessment.

[5] Data from FEMA was provided to R-RRC officials by the Virginia Division of Emergency Management.
[6] NFIP repetitive loss data is protected under the federal Privacy Act of 1974 (5 U.S.C. 552a) which prohibits personal identifiers (i.e., owner names, addresses, etc.) from being published in local mitigation plans.

[7] Refer to the *Hazard Analysis* section of this risk assessment for detailed historical information.
[8] According to FEMA's HAZUS Web site, "a Level 1 analysis yields a rough estimate based on the nationwide database and is a great way to begin the risk assessment process and prioritize high-risk communities."

Table 6.8
HAZUS^{MH} Estimates of Potential Losses for Hurricane-force Winds

Level of Event	Approximate Number of Structures Damaged	Estimated Losses
50-year Storm	14	$180,000
100-year Storm	33	$1,586,000
500-year Storm	1,236	$16,132,000

SEVERE THUNDERSTORMS AND TORNADOES

Historical evidence shows that most of the state is vulnerable to thunderstorm and tornado activity. These particular hazards are often associated with one another, as tornadoes often result from severe thunderstorm activity. Tornadoes may also occur during a tropical storm or hurricane. However, because it cannot be predicted where thunderstorm and tornado damage may occur, the total dollar exposure figure of $13,672,365,000 for buildings and facilities within the region is considered to be exposed and could potentially be affected.

For the severe thunderstorm and tornado hazards, best available data on historical hazard occurrences (limited to NOAA National Climatic Data Center records) was used to produce an annualized loss estimate of potential damages for each county. Using this data, annualized loss estimates were generated by totaling the amount of property damage for each county over the period of time for which records were available, and calculating the average annual loss. In instances where multiple counties are affected and the value for property damage reflects the total for the affected area, the average property damage for each county was calculated to produce an annualized loss estimate of potential damages for each county. Damages associated with lightning and hail activity were included in the severe thunderstorm calculations. Based on historic property damages, a regional annualized loss estimate of $351,800 was generated for severe thunderstorms. A regional annualized loss of $500,600 was generated for tornadoes.

WILDFIRE

Based on information obtained from the Virginia Department of Forestry for events reported from 2005-2010 included in the *Hazard Analysis* section of this plan, the annualized loss for the region is $42,523. Fires that occurred on federal lands are not included in this assessment. This will lower the actual expected annualized loss for certain counties, especially those with portions of their county located in Shenandoah National Park.

DROUGHT

The entire Rappahannock-Rapidan Region is vulnerable to drought. Since 1995, the counties in the Rappahannock-Rapidan region have been affected by drought on several occasions, most notably in 1999 and 2002. The National Climatic Data Center attributes nearly $140 million in crop loss to these events. However, it should be noted that those total losses are for all counties included in the NCDC database of the event and often include many counties outside of the Rappahannock-Rapidan region. In the NCDC database, the value associated with each event is not broken down by county so it is difficult to determine separate annualized losses by county. It is assumed that all buildings and facilities are exposed to drought but would experience negligible damage in the occurrence of a drought event, but crop damages would naturally suffer the greatest amount of damage. This is of particular importance to officials in this region,

as farming is a major industry in the region. Additionally, before this period, very little historical data exists on past drought events. Therefore it is very difficult to determine an annualized loss that can be expected for the region for drought. Based upon the events discussed in the *Hazard Analysis* section, the regional annualized loss estimate for the Rappahannock-Rapidan Region is $2,046,333. The majority of that value is for losses to crops and farmlands caused by drought events from 1995 to 2010.

The annualized loss estimate for drought is somewhat inflated because of the unusually high periods of drought that have occurred recently and the lack of historical drought data before 1995 to counterbalance the recent events.

WINTER STORMS

For the winter storm hazard, best available data on historical hazard occurrences (limited to NOAA National Climatic Data Center records) was used to produce an annualized loss estimate of potential damages for each county. Using this data, annualized loss estimates were generated by totaling the amount of property damage for each county over the period of time for which records were available, and calculating the average annual loss. In instances where multiple counties are affected and the value for property damage reflects the total for the affected area, the average property damage for each county was calculated to produce an annualized loss estimate of potential damages for each county.

Unlike hazards such as tornadoes that typically impact a specific location, winter storms most often affect large geographic areas and often impact multiple counties. Based on estimated historical property damages for the Rappahannock-Rapidan Region due to winter storms, an annualized loss estimate of $167,864[9] for this hazard was calculated. Potential losses may be further inflated by additional factors not represented in this estimate, such as costs associated with the removal of snow from roadways, debris clean-up, some indirect losses from power outages, etc.

A qualitative factor in terms of vulnerability to winter storms in the Rappahannock-Rapidan Region is the fact that severe winter storms occur more frequently than in other parts of the state and therefore there is, not surprisingly, a high level of awareness on the part of residents in the region in preparing for and responding to winter storm conditions in a manner that will minimize the danger to themselves and others. This heightened awareness is especially important to cutting down on the number of traffic accidents caused by negligent drivers.

EROSION

Erosion vulnerability for the region is difficult to determine because there are no historical records for previous occurrences of erosion events. Vulnerability is limited to areas along rivers, creeks and streams to areas of steep slopes. Future updates to this Plan will attempt to address erosion vulnerability in greater detail.

EARTHQUAKES

According to the maps in the *Hazard Analysis* section, the region's risk to earthquakes can be considered limited; however, the risk of potential losses should a significant earthquake event occur—for example an earthquake registering 8.5 on the Richter Scale—is considered to be moderate. Still, USGS Earthquake Search reports just five measurable earthquakes in the

[9] The winter storm annualized loss estimate includes damages associated with nor'easters.

region since 1974, all with magnitude less than 3.2 on the Richter Scale. Using HAZUS^{MH} MR4's probabilistic earthquake modeling program, an annualized loss estimate of $240,000 was derived for the Rappahannock-Rapidan region.

The August 23, 2011 earthquake had an epicenter in Mineral, Louisa County, Virginia, located outside of the Rappahannock-Rapidan region. Damages were most severe in Louisa County, but there were significant damages in Culpeper and Orange counties, resulting in FEMA identifying those counties as eligible for Individual Assistance on December 29, 2011.

SINKHOLES

Any damage resulting from a sinkhole or landslide would be localized and, due to the uniform nature of risk to these hazards on a countywide scale, it is not possible to generate maps or tables showing potential loss estimates or particularly at-risk structures or properties.

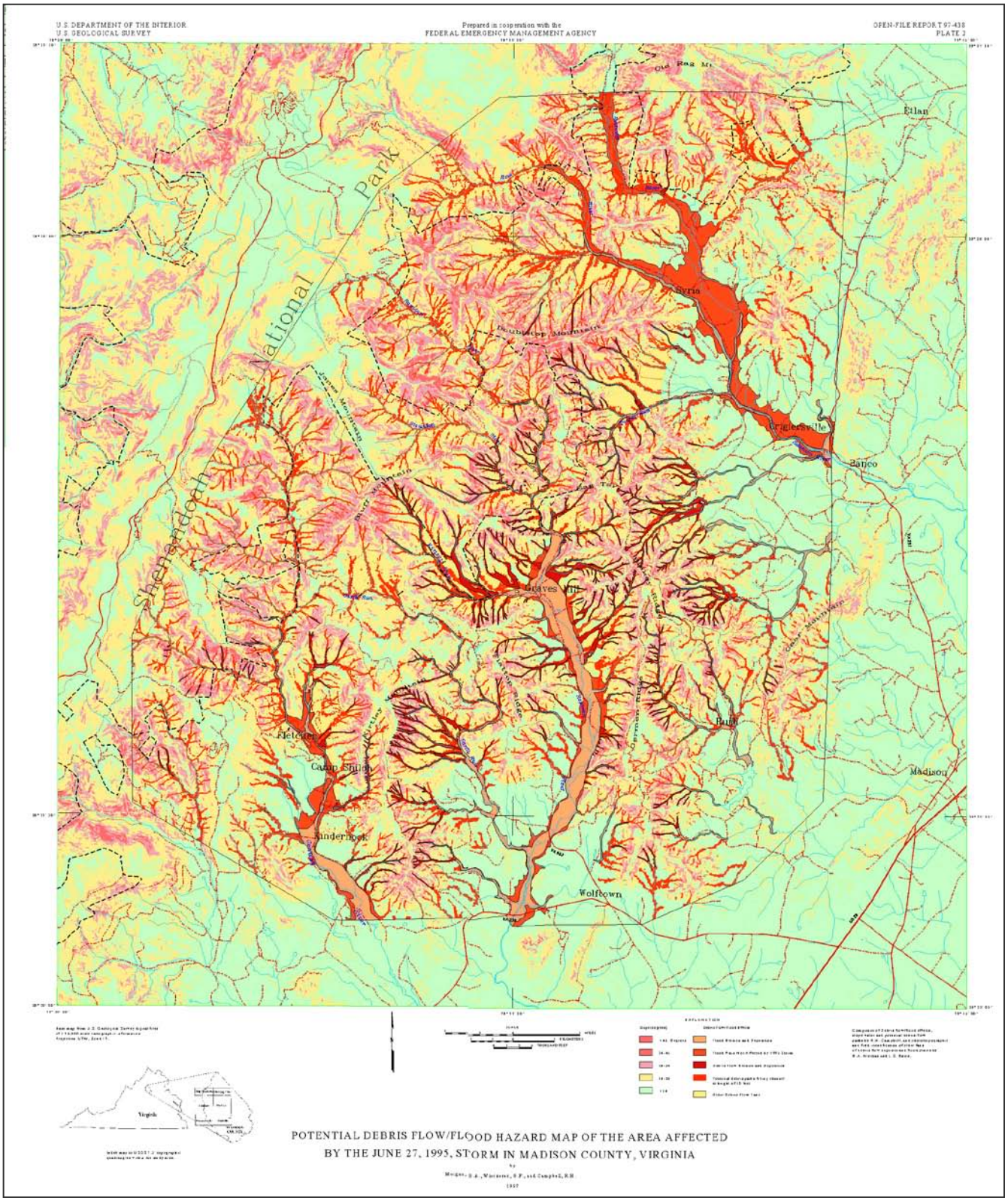
Because sinkholes have occurred in the region in the past, it can be expected that they will occur again in the future, however, vulnerability is considered to be negligible because these events are very random and do not effect a large area.

LANDSLIDES

There is no simple methodology in place for determining the region's vulnerability to landslides. The maps in Section 5 provide a general indication of the areas that could expect to experience a landslide, however, it is extremely difficult to determine the number of buildings and people at risk. Future updates of this Plan will explore this landslide vulnerability is greater detail.

However, as a result of the June 27, 1995 storm that wreaked havoc in Madison County, the United States Geological Survey (USGS) conducted a survey that analyzed the damage caused by that storm and did a limited amount of project areas of potential future damages (See **Figure 6.9**). This report can be obtained from the USGS or online at http://geohazards.cr.usgs.gov/pubs/ofr/97-438/97-438.html.

Figure 6.7
USGS Landslide Study for Madison County



DAM/LEVEE FAILURE

Figure 6.8 shows the location of dams in the Rappahannock-Rapidan Region in relation to population density. Whereas this may not support any conclusive correlation between dam breaches or failures and affected populations, it does aid the planning process by visually placing all known state-regulated dams in direct relationship to population distribution.

Future updates of the Plan may include a detailed analysis of the property directly downstream of the high hazard dams in order to better determine the amount of property vulnerable to a dam breach.

FUTURE VULNERABILITY

Portions of the Rappahannock-Rapidan Region are experiencing rapid development as the Washington, DC metropolitan area continues to move westward. The vulnerability of future buildings, infrastructure and critical facilities is a great concern to community leaders across the region. As discussed in the *Capability Assessment* section of this Plan, many of the day-to-day activities in local governments in the region are designed to deal with these challenges.

Land uses and development trends in the region are briefly discussed in this section and in the *Community Profile*. Future Plan updates will address development trends and future vulnerability (to include the number and types of future buildings, infrastructure, and critical facilities located in the identified hazard areas) in more detail, in particular for hazards with a spatially defined hazard boundary, such as flood.

UNIQUE RISKS FOR LOCAL JURISDICTIONS

Four jurisdictions – the Town of Orange (2005), Rappahannock County (2005), Culpeper County (2012) and the Town of Culpeper (2012) identified unique risks as part of the Hazard Mitigation planning process. These risks are summarized below.

Jurisdiction: Town of Orange

Unique Hazards:

- Railroad goes right through the middle of East Main Street. Various chemicals and hazardous materials are transported by train frequently.
- Natural Gas Plant in Unionville (piped throughout county)
- Proximity to North Anna Nuclear Power Plant
- Interstate corridor (Interstates 64 and 95) increases truck traffic

Populations at Risk: The entire population – dependent on type of chemical or event and wind direction.

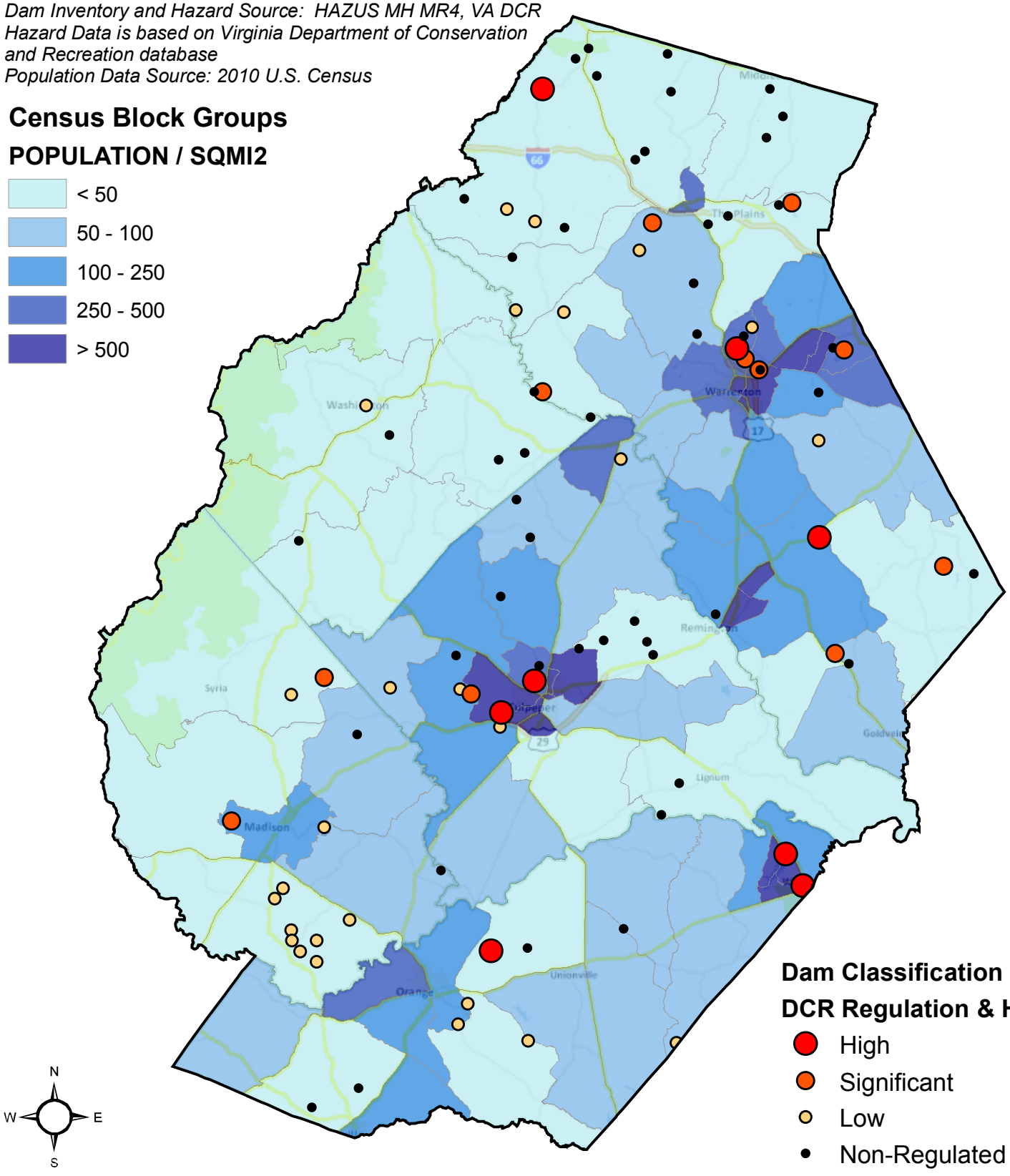
Special Populations at Risk: Nursing residents, senior citizens, mental health assisted facility

Property at Risk: There are approximately thirty businesses in downtown that are vulnerable to the railroad. For all the other hazards, the entire county and all the property within the county are at risk to the listed unique hazards.

Dam Hazard & Vulnerability

Figure 6.8

Rappahannock-Rapidan Regional Hazard Mitigation Plan
Dam Inventory and Hazard Source: HAZUS MH MR4, VA DCR
Hazard Data is based on Virginia Department of Conservation and Recreation database
Population Data Source: 2010 U.S. Census

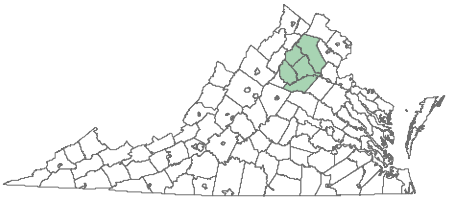


Rappahannock-Rapidan REGIONAL COMMISSION

Miles

0 5 10 15 20

Map created for Rappahannock-Rapidan Regional Hazard Mitigation Plan Update and is intended for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
Date: 6/2/2011 File: Dam_Vulnerability.mxd



Jurisdiction: Rappahannock County
Unique Hazard: The presence of Shenandoah National Park means that wildfire is both a heightened risk as well as an unmanageable one.
Populations at Risk: The entire population (approximately 300-500 people) along the Western border of the County. 1/5 of the County is in the park.
Special Populations at Risk: None
Property at Risk: 125 houses, valued at approximately $16 million, 50 commercial structures valued at approximately $12 million

Officials from Madison and Rappahannock Counties also wished to note an increase of their wildfire hazard risk ranking from "Low" to "High."

Jurisdiction: Culpeper County
Unique Hazards:

- Earthquake

Populations at Risk: The entire population
Special Populations at Risk: All populations are at risk.
Property at Risk: In response to the August 23, 2011 earthquake and associated damage, Culpeper County officials identified the earthquake hazard as a high-risk hazard in the county.

Jurisdiction: Town of Culpeper
Unique Hazards:

- Dams at Lake Pelham and Mountain Run Lake

Populations at Risk: Town of Culpeper, portions of Culpeper County
Special Populations at Risk: Aging population, Assisted Living facilities
Property at Risk: Town estimates commercial and residential structures at risk to be 1,048. Cost would require additional study.
Key Facilities/Infrastructure at Risk: Town of Culpeper Water Treatment and Wastewater Treatment facilities and electric utilites

Table 6.9
Summary of Potential Annualized Losses
(From Quantitative Assessment)

Hazard	Estimated Annualized Losses
Drought	$2,046,333
Flood	$1,884,727*
Tornades	$500,600
Severe Thunderstorms (includes Lightning & Hail)	$351,800
Earthquakes	$240,000
Winter Storms	$167,864
Hurricanes	$139,000
Wildfire	$42,522**
Sinkholes	Unknown
Landslides	Unknown
Erosion	Unknown
Dam/Levee Failure	Unknown

*Table includes flood hazard estimate generated by non-HAZUS GIS analysis (see Section 6, page 13)

**Virginia DOF estimates indicate that over $11,000,000 in property is saved annually as a result of DOF fire response in the Rappahannock-Rapidan region

Based upon the qualitative approach defined in detail under Methodologies Used, the risk from natural hazards in the Rappahannock-Rapidan Region was weighed by the Mitigation Advisory Committee and criteria was used to assign values to the likelihood of occurrence, spatial extent affected, and potential impact of each hazard. These values combined to form a total rating for each hazard (**Table 6.9**). The top three hazards identified through this process are flood, hurricanes and tropical storms and winter storms.

Table 6.10
Hazard Risk Ratings
(From Qualitative Assessment)

Hazard	Likelihood	Spatial Extent	Potential Impact	HAZARD RATING
Flood	Highly Likely (3)	Moderate (2)	Critical (3)	**8**
Hurricanes and Tropical Storms	Possible (1)	Large (3)	Critical (3)	**7**
Winter Storms	Likely (2)	Large (3)	Limited (2)	**7**
Severe Thunderstorms and Tornadoes	Highly Likely (3)	Small (1)	Limited (2)	**6**
Drought	Possible (1)	Large (3)	Limited (2)	**6**
Wildfire	Highly Likely (3)	Moderate (2)	Minor (1)	**6**
Earthquakes	Possible (1)	Large (3)	Minor (1)	**5**
Dam/Levee Failure	Possible (1)	Moderate (2)	Limited (2)	**5**
Landslides	Likely (2)	Small (1)	Minor (1)	**4**
Erosion	Likely (2)	Small (1)	Minor (1)	**4**
Sinkholes	Possible (1)	Small (1)	Minor (1)	**3**

The conclusions drawn from the qualitative and quantitative assessments, combined with final determinations from the Mitigation Advisory Committee, were fitted into three categories for a final summary of hazard risk based on High, Moderate or Low designations (**Table 6.11**). The three high-risk hazards identified through this process are the flood, the hurricane and tropical storm, and the winter storm hazard. The three moderate-risk hazards identified are the drought, severe thunderstorm and tornadoes and wildfire hazards. All other hazards are classified as low risk.[10]

Table 6.11
Estimated Risk Levels for the Rappahannock-Rapidan Region
(Combination of Qualitative and Qualitative Assessments)

HIGH RISK HAZARDS	Flood Hurricanes and Tropical Storms Winter Storms
MODERATE RISK HAZARDS	Drought Severe Thunderstorms and Tornadoes Wildfire
LOW RISK HAZARDS	Earthquakes Sinkholes, Landslides Dam/Levee Failure Erosion

It should be noted that although some hazards may show Moderate or Low risk, hazard occurrence is still possible. Also, any hazard occurrence could potentially cause a sizable impact and losses could be extremely high (i.e., an F5 tornado or a destructive earthquake).

[10] Human caused hazards have been similarly ranked in Appendix E.

CAPABILITY ASSESSMENT

PURPOSE

The Rappahannock-Rapidan region's capability assessment was conducted to determine the ability of participating localities to develop and implement a comprehensive hazard mitigation strategy and to identify opportunities, or needs, to establish or enhance specific policies, programs or projects. The assessment was used to determine the feasibility of achieving proposed goals and objectives based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation.

By inventorying each jurisdiction's relevant ordinances, programs and policies it was possible to determine local capabilities and identify gaps, shortfalls and weaknesses that might compromise effective hazard mitigation. In addition, proven programs of verifiable benefit were identified and targeted for continued support and possible enhancement. The assessment helped determine the practicality of specific mitigation actions and the likelihood of their implementation in consideration of a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources and current political climate.

Coupled with the *Risk Assessment*, the *Capability Assessment* helped identify and refine appropriate mitigation actions for incorporation into the *Mitigation Strategy* section of the Hazard Mitigation Plan and ensured that specific goals and objectives are realistically achievable.

PROCEDURE

For the 2012 plan update, the Hazard Mitigation Committee and RRRC staff reviewed and revised the inventory of local plans, regulations and ordinances developed in the 2005 Hazard Mitigation Plan (table 7.1). A description of the 2005 *Capability Assessment Survey* can be found below:

> *In order to facilitate the inventory and analysis of local government capabilities throughout the Rappahannock-Rapidan Region, a detailed Capability Assessment Survey was distributed to the participating Rappahannock-Rapidan Region local municipal jurisdictions, including five counties and six towns. The survey questionnaire, which was completed by applicable local government officials, requested information on a variety of "capability indicators" such as existing local plans, policies, programs or ordinances that contribute to and/or hinder the community's ability to implement hazard mitigation actions. Other indicators included information related to each jurisdiction's fiscal, administrative and technical capabilities such as access to local budgetary and personnel resources for mitigation purposes.*

Participating jurisdictions were also given the opportunity to provide additional information for the capability assessment through four worksheets developed specifically for the 2012 plan update. These worksheets requested information on each locality's regulatory capabilities,

administrative/technical resources, fiscal resources and additional local capabilities. Copies of the worksheets can be found in Appendix C: Supporting Documentation.

FINDINGS

Findings are summarized as follows. Information is presented based on the five categories of local capability:

- Planning and Regulatory Capability
- Emergency Management
- General Planning
- Floodplain Management
- Administrative/Technical Capability
- Fiscal Capability

Planning and Regulatory Capability

Planning and regulatory capability is demonstrated by the formulation and implementation of plans, ordinances, programs and policies by a jurisdiction that reflects commitment to responsible growth and land management with a clear focus on community safety and welfare. Along with effective land use and transportation planning, capability is expressed by the presence and enforcement of comprehensive zoning and subdivision ordinances and building codes, as well as effective emergency response and mitigation planning. Attention to, and protection of, environmental, historical and cultural resources are additional elements of demonstrated capability.

This assessment provides an overview of the key planning and regulatory tools and programs in place, or under development, in the Rappahannock-Rapidan region. Along with identifying potential effects on loss reduction, this information will help determine opportunities to address existing gaps, weaknesses or conflicts among existing strategies and will facilitate integrating this plan with existing planning mechanisms.

Table 7-1 provides a summary of the relevant tools already adopted or being developed by the Rappahannock-Rapidan region's participating local governments.

Table 7-1
Relevant Plans, Ordinances, and Programs

Jurisdiction	National Flood Insurance Program	NFIP Community Rating System	Hazard Mitigation Plan	Disaster Recovery Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Stormwater Management Plan	Emergency Operations Plan	Continuity of Operations Plan	Radiological Emergency Plan	SARA Title III Plan	Evacuation Plan	Transportation Plan	Capital Improvements Plan	Historic Preservation Plan	Zoning Ordinance	Subdivision Ordinance	Flood Damage Prevention Ordinance	Building Code	Fire Code	Riparian Buffer/ Wetland Preservation	Non-Governmental Organization	Open Space Preservation	Public/Private Partnerships
Culpeper County – xx	x		x	Δ	x			x	x	x	x	x	x	x	x	x	x	x	x					
Town of Culpeper - xx	x		x	Δ	x	x	x	●	●	●		●	x	x	x	x	x	x	●	Δ	x			
Fauquier County - xx	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
Town of Warrenton – xx	x		x		x	x	x	●			x		x	x	x	x	x		x	x	x			
Town of Remington – xx	x		x	x	x	x	Δ	●		●	●	●	●			X	X	X	●	●				x
Madison County - xx	x		x		x	x	x	x			x	x		x	x	x	x		x	x				
Town of Madison - xx			x		x	●	●	●			●	●			x	x	x		●	●				
Orange County - xx	x		x	Δ	x	x	Δ	x	x	x	x	x	x	x	x	x	x	x	x	x				
Town of Orange - xx	x		x		x		Δ	●		●		x		x		x	x		●	●				
Rappahannock County	x		x	x	x	x		x		x	x	x			x	x	x	x	x		x			x

X – in place and being implemented, or being developed
Δ - Use State Plan
● - Use County Plan/Ordinance

Emergency Management

Hazard mitigation is recognized as one of the four primary aspects of emergency management. Others are preparedness, response and recovery. All are interconnected and interdependent, as indicated by **Figure 7-1.** Planning for each aspect is critical to the development of a comprehensive emergency management program and key to the successful implementation of hazard mitigation actions.

Hazard Mitigation Plan – A community's blueprint for reducing the impact of natural and human-caused hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment and mitigation strategy. The Rappahannock-Rapidan region's first All Hazard Mitigation Plan was adopted in 2005. Since

then it has been maintained and implemented by the Rappahannock-Rapidan Regional Commission and each of the participating localities.

Disaster Recovery Plan - guides the physical, social, environmental and economic recovery and reconstruction process following a disaster. Often, hazard mitigation principles and practices are incorporated into local disaster recovery plans to capitalize on opportunities to break the cycle of repetitive disaster losses.

- Survey results indicate that only three of the jurisdictions have their own disaster recovery plan, three reference the state plan and the remaining jurisdictions do not have a disaster recovery plan. All localities should consider whether to develop their own disaster recovery plan that would incorporate mitigation opportunities into the disaster recovery process.

Emergency Operations Plan – Includes detailed responsibilities and procedures to be followed to deploy resources in response to an emergency or disaster. Periodic review and update of emergency operations plans assures improved readiness. Focusing on preparedness and response, rather than hazard mitigation, emergency operations planning has been determined to have a moderate effect on loss reduction.

- Each of the five counties in the Rappahannock-Rapidan Region Emergency Management maintains its own emergency operations plan that also covers their respective jurisdictions.

Continuity of Operation Plan: Establishes a chain of command, line of succession, and plans for backup or alternate emergency response resources in case of an extreme emergency. Developing a continuity of operation plan is an example of hazard mitigation.

- With the development of a continuity of operations plan by Culpeper County since the original plan was written, the region now has three jurisdictions with such a plan in place. Each of the other jurisdictions is encouraged to consider preparing their own continuity of operations plans as a possible mitigation action for inclusion this Plan.

Radiological Emergency Plan: Delineates roles and responsibilities for assigned personnel and the means to deploy resources in the event of a radiological accident.

- Four of the five counties in the Rappahannock-Rapidan Region have a radiological emergency plan. Three towns rely on their respective county plans. One county and two towns do not have a plan.

SARA Title III Emergency Response Plan: Outlines the procedures to be followed in the event of a chemical emergency such as the accidental release of toxic substances. These plans are required by federal law under Title III of the Superfund Amendments and Re-authorization Act (SARA), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

- Culpeper County is now included in the number of jurisdictions within the region that have a SARA Title III Emergency Response Plan, bringing the total to all five. One town has its own plan, one relies on the county and two do not have a plan.

General Planning

The development and implementation of effective hazard mitigation plans and activities routinely involves agencies, organizations and individuals beyond the emergency management profession. Additional stakeholders may include local planners, public works officials, economic development specialists and others. Because concurrent local planning efforts often address hazard mitigation goals, the *Capability Assessment Survey* included questions regarding each jurisdiction's general planning capabilities and the degree to which hazard mitigation is integrated into other ongoing planning efforts.

Comprehensive Land Use Plan: Establishes the overall vision for a community and serves as a guide for future decision making. Typically, a comprehensive plan includes a summary of current and expected demographic conditions, land use patterns, transportation networks and facilities and community resources. The integration of hazard mitigation measures into the comprehensive plan can greatly enhance the likelihood of achieving risk reduction goals, objectives and actions.

- As required by the Commonwealth, all jurisdictions within the region have a comprehensive land use plan.

Capital Improvements Plan: Guides the scheduling of spending for public improvement projects. A capital improvements plan can serve as an important mechanism to guide future development away from identified hazard areas. Limiting public spending in hazardous areas is one of the most effective long-term mitigation actions available to local governments.

- Four of the five counties in the Rappahannock-Rapidan region maintain Capital Improvements Plans. Of the participating towns, the Town of Culpeper and Town of Orange also have adopted Capital Improvements Plans.

Historic Preservation Plan: Guides the impact of community decisions on historic structures or districts within a community. An often overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards to identify the most effective way to reduce future damage.[1] Effective strategies may involve relocation or retrofits to protect buildings that do not meet current standards buildings and/or are within a historic district and cannot be moved.

- All five counties in the Rappahannock-Rapidan region have historic preservation plans and/or ordinances in place. Three of the five participating towns also have such plans in place.

[1] See Protecting the Past from Natural Disasters. 1989. Nelson, Carl. National Trust for Historic Preservation: Washington D.C.

Zoning Ordinance: Protects public health, safety and welfare by regulating the location, type and density of development occurring within a jurisdiction. A powerful planning tool, a zoning ordinance can effectively eliminate development in identified hazard areas.

- All participating jurisdictions have a zoning ordinance.

Subdivision Ordinance: Regulates residential, commercial and industrial development along with associated infrastructure. Subdivision design that accounts for natural hazards can dramatically reduce impacts to development.[2]

- All participating jurisdictions have a subdivision ordinance.

Building Codes, Permitting and Inspections: Regulate construction standards by reviewing plans, issuing permits and inspecting for compliance. Decisions regarding the adoption of building codes that account for hazard risk, the permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community.

- All five counties have a building code, one town has its own building code, and four towns use their respective county's code.

The adoption and enforcement of building codes by local jurisdictions are routinely assessed through the Building Code Effectiveness Grading Schedule (BCEGS) program developed by the Insurance Services Office, Inc. (ISO).[3] Assessment results are provided to ISO's member private insurance companies, which in turn, may offer ratings credits for new buildings constructed in communities with strong BCEGS classifications. Communities with well-enforced, up-to-date codes typically have fewer losses, reflected in lower insurance rates. Personnel qualifications, continuing education opportunities and number of inspections conducted daily are included in the assessment which determines a jurisdiction's grade. Grades range from 1 to 10, with the lower grade preferred. A BCEGS grade of 1 represents exemplary commitment to building code enforcement, and a grade of 10 indicates less than minimum recognized protection. **Table 7.2** lists the BCEGS ratings for the jurisdictions in the region.

[2] For additional information regarding the use of subdivision regulations in reducing flood hazard risk, see Subdivision Design in Flood Hazard Areas. 1997. Morris, Marya. Planning Advisory Service Report Number 473. American Planning Association: Washington D.C.

[3] Participation in BCEGS is voluntary and may be declined by local governments if they do not wish to have their local building codes evaluated.

Table 7.2
BCEGS Ratings in the Region

Jurisdiction	BCEGS Residential Rating	BCEGS Commercial Rating	Year Last Rated
Culpeper County	4	4	2006
Culpeper	Covered by Culpeper County		
Fauquier County	3	3	2000
Remington	Covered by Fauquier County		
Warrenton	4.4	4.4	2006
Orange County	4	4	1998
Orange	Covered by Orange County		
Madison County	4	4	2008
Madison	Covered by Madison County		
Rappahannock County	4	4	1998

Floodplain Management

Flooding is the most significant of all natural hazards facing the nation. Tools available to reduce associated impacts are among the most developed and comprehensive when compared with other hazard-specific mitigation techniques. In addition to education, outreach, and specific training strategies, the *National Flood Insurance Program* (NFIP) enables local governments to determine where and how development occurs relative to identified flood hazards. Although voluntary, participation in the program is strongly encouraged by FEMA. The NFIP maps flood hazard areas and develops Flood Insurance Rate Maps (FIRMs) which are used to assess flood hazard risk, regulate construction practices and set flood insurance rates. Recognized as a key element in the development, implementation and sustainability of an effective hazard mitigation program, affiliation with the NFIP is a measure of local capability.

Participation in the NFIP requires the adoption of a local ordinance establishing minimum standards to prevent impacts to structures from the 100 year flood. Requirements for improvements to existing buildings, special standards for new construction and assurance that new development will not exacerbate existing flood potential must be included.

An additional indicator of floodplain management capability is active participation in the *Community Rating System* (CRS). The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that exceed the minimum requirements of the NFIP. Each of eighteen specific CRS mitigation activities are assigned a range of point values. As points are accumulated and identified thresholds reached, communities may apply for an improved CRS class the designation of which will result in flood insurance premium reductions as shown in **Table 7.3.**

Table 7-3
CRS Premium Discounts, By Class

CRS Class	Premium Reduction
1	45%
2	40%
3	35%
4	30%
5	25%
6	20%
7	15%
8	10%
9	5%
10	0

Source: *FEMA*

Participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10.

- There are currently no CRS communities in the Rappahannock-Rapidan Region.

Floodplain Management Plan: Provides a framework for the development and implementation of corrective and preventative measures to reduce flood-related impacts.

- Several of the participating jurisdictions have Floodplain Management Plans in place, while others have specific references to floodplains within their respective local ordinances.

Stormwater Management Plan: Addresses flooding associated with stormwater runoff and is focused on the design and implementation of construction practices to reduce the impact of urban flooding.

- Two counties and one town have local stormwater management regulations in place, with one other county and two towns governed by state-level stormwater management regulations.

Administrative and Technical Capability

The ability of a locality to develop and implement mitigation projects, policies and programs is related directly to its capacity to dedicate staff time and resources to those purposes. Administrative capability is demonstrated by the identification of sufficient, qualified personnel, effective and efficient assignment of tasks, and comprehensive program oversight. Effective Inter-departmental and intergovernmental communication and cooperation also reflects administrative capability. Technical capacity and capability is determined by evaluating specific knowledge and skills, as well as the assessment of appropriate certifications and licensing requirements.

In general, the counties in the region have a high level of administrative and technical capability, through administrative, emergency management, building and planning/zoning staff. It should be noted that, in the region, only Fauquier County has a dedicated floodplain manager, though the other counties have staff with floodplain management capabilities. In general, the larger towns (Culpeper, Orange, Warrenton) are able to provide administrative and technical oversight via their own staff, but the smaller towns (Madison, Remington, The Plains, Washington) rely heavily on their respective county staffs for technical assistance.

Fiscal Capability

The level of funding available determines a locality's ability to develop and implement policies and projects in all areas of interest and responsibility. Costs associated with hazard mitigation planning and program development vary widely from funds needed to meet staffing requirements to those for the acquisition of costly equipment and, sometimes, flood-prone homes. Often, substantial commitments are needed from local, state and federal sources.

Grant writing and administration is a key component towards implementation of local and regional mitigation strategies. In general, jurisdictions in the Rappahannock-Rapidan region rely on staff to identify, develop and administer grants for identified projects in their localities. Most of these staff members also have other primary job functions, in addition to their grant responsibilities. The Rappahannock-Rapidan Regional Commission offers grant-writing and administrative assistance to its member jurisdictions and also facilitates inter-jurisdictional grant efforts, as applicable.

While most of the counties and larger towns in the Rappahannock-Rapidan region have the technical expertise to carry out large scale grant-funded projects, local matching funds can be difficult to secure. Given the economic climate during the past 5 to 7 years, local matching funds are stretched even further. The smaller towns in the region have limited budgets and limited staff and would be unlikely to meet mitigation grant matching requirements.

MITIGATION STRATEGY

INTRODUCTION

A mitigation strategy provides participating localities with the basis of actions for reducing the impacts of identified hazards. Based on the findings of the *Risk Assessment* and the *Capability Assessment*, the mission statement, goals and actions that follow are intended to guide both the day-to-day operations and the long-term approach taken by counties and towns to reduce the impacts of hazards. Components of the Mitigation Strategy include:

- Mitigation Goals;
- Identification and Analysis of Mitigation Measures; and
- Mitigation Action Plan

The R-RRC Hazard Mitigation Plan, as revised, continues to be both comprehensive and strategic. The plan includes a thorough review of identified hazards and targets policies and projects that will reduce future impacts and assist the region, and its localities, in achieving compatible economic, environmental and social goals. In addition, the plan links policies and project to agencies, departments or individuals responsible for their implementation. When possible, funding sources to be used in project implementation are identified.

The **Mitigation Action Plan (MAP)** lists specific tactics, including descriptions, those responsible for implementation, potential funding sources, and estimated completion dates. This format provides a comprehensive checklist that can be used as a monitoring tool and ready reference of proposed policies and projects.

Planning Approach

The Plan follows a traditional planning approach, beginning with a mission statement that provides the overall guiding principle, goals designed to meet the intent of the mission statement, and mitigation actions which include policies or projects designed to reduce the impacts of future hazard events. Each step provides a clearly defined set of policies and projects based on a rational framework for action. The components of the planning framework are as follows:

Mission Statement:	Provides the guiding principle of the Hazard Mitigation Plan.
Goals:	Provide the framework for achieving the intent of the mission statement.
Hazard Mitigation Policies:	Proposed actions agreed to by members of the Planning Team.
Hazard Mitigation Projects:	Specific actions to address defined vulnerabilities to existing buildings or systems; potential funding sources are included.
Mitigation Action Plan:	Prioritized listing of policies and projects, including mitigation techniques, hazards addressed, individual or organization

responsible for implementation, estimated completion date, and potential funding source(s).

MISSION STATEMENT

Reduce the impacts, both physical and monetary, of natural hazards on the jurisdictions within the Rappahannock-Rapidan Region through effective hazard mitigation techniques.

MITIGATION GOALS

The goals listed below are the result of an inclusive planning process described in *Section 2*. The goals were created as part of a brainstorming session, where county and municipal representatives agreed upon broad mitigation categories that provided the basis for the formulation of regional mitigation goals. Mitigation categories and goal statements are listed below:

Mitigation Categories

The categories developed at the regional Mitigation Strategy Workshop were evaluated, commonalities were identified across counties, and goal statements were developed that encompass the Rappahannock-Rapidan Region. These goal statements are:

Mitigation Goals

Goal #1: Improve and update data needed for hazard mitigation purposes within the Rappahannock-Rapidan Regional Commission and local jurisdiction offices.

Goal #2: Implement policies that incorporate mitigation planning into the framework of local government in the Rappahannock-Rapidan Region.

Goal #3: Implement sound planning techniques throughout the region that compliment the benefits of hazard mitigation.

Goal #4: Implement cost effective structural projects throughout the region to reduce the impact of future disaster events.

Goal #5: Conduct training throughout the region for employees to improve response capabilities of local emergency management officials and to educate local officials of benefits of hazard mitigation techniques.

Goal #6: Implement meaningful education and outreach projects throughout the region to educate the public about the dangers of natural hazards and how they can protect their families and their property.

Goal #7: Improve regional evacuation capabilities and plan for the potential impacts of a potential evacuation of the Washington D.C. area.

IDENTIFICATION AND ANALYSIS OF MITIGATION MEASURES

In formulating this *Mitigation Strategy*, a wide range of activities were considered in order to help achieve the goals of participating jurisdictions. All actions chosen by county and town government officials fell into one of the broad categories of mitigation techniques listed below.

Mitigation Techniques

1. **Prevention**

   Preventative activities are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:

   - Planning and Zoning
   - Hazard Mapping
   - Open Space Preservation
   - Floodplain Regulations
   - Stormwater Management
   - Drainage System Maintenance
   - Capital Improvements Programming
   - Shoreline Management

2. **Property Protection**

   Property protection measures may include improved structural stability, removal of structures from hazard-prone locations, or insurance subscription to cover potential loss. Examples include:

   - Acquisition
   - Relocation
   - Building Elevation
   - Critical Facilities Protection
   - Retrofitting (i.e., wind proofing, flood proofing, etc.)
   - Insurance
   - Safe Room Construction

3. **Natural Resource Protection**

   Natural resource protection not only reduces hazard impacts but preserves and/or restores the function of natural systems. Thus, lives and property are protected, and environmental goals, including improved water quality and protection of wildlife habitat, are enhanced. Examples include:

- Floodplain Protection
- Riparian Buffers
- Fire Resistant Landscaping
- Erosion and Sediment Control
- Wetland Restoration
- Habitat Preservation
- Slope Stabilization

4. Structural Projects

Structural mitigation projects reduce hazard impacts by modifying the environment or hardening structures. Examples include:

- Reservoirs/Dam Stabilization
- Detention and Retention Basins
- Channel Modification/Stabilization
- Storm Sewer Construction/Maintenance

5. Emergency Services

Although not typically considered a mitigation technique, emergency services minimize the impact of a hazard on people and property. Actions taken immediately prior to, during, or in response to a hazard event include:

- Warning Systems
- Search and Rescue
- Evacuation Planning and Management
- Flood Mitigation Techniques

6. Public Information and Awareness

Public Information and awareness activities are used to advise residents, business owners, potential property buyers and visitors about hazards and mitigation techniques they can use to protect themselves and their property. Examples of measures used to educate and inform the public include:

- Outreach and Education
- Training
- Speaker Series, Demonstration Events
- Property Disclosure
- Hazard Expositions

MITIGATION ACTION PLAN

The mitigation actions developed and adopted by participating jurisdictions are listed in Appendix A, *Locally-specific Mitigation Actions*. **Figure 8.1** represents the general format in which each mitigation action was recorded. Each action was designed to achieve the goals identified in the R-RRC *Mitigation Strategy*. Each jurisdiction's mitigation actions form the basis of their Mitigation Action Plan. By identifying specific projects and policies, the Mitigation Action Plans provide the framework for participating localities to engage in distinct actions that will reduce the impacts of future hazard events and disasters.

Figure 8.1
Mitigation Action Worksheet

Mitigation Action	
a. Community Name:	
b. Action Item (Describe):	
c. Hazard(s):	
d. Lead Agency/ Department Responsible:	
e. Estimated Cost:	
f. Funding Method: (General Revenue, Contingency/ Bonds, External Sources, etc.)	
g. Implementation Schedule:	
h. Priority:	

a. **Community Name**
b. **Action Item:** Identify and describe specific actions that, if accomplished, will reduce vulnerability and risk in the impact area. Actions should match mitigation goals.
c. **Hazard(s):** Describe/list hazard(s) the action attempts to mitigate.
d. **Lead Agency/ Department Responsible:** Identify the local agency, department or organization best suited to accomplish this action.
e. **Estimated Cost:** If applicable, estimate the cost to accomplish the mitigation action.
f. **Funding Method:** If applicable, indicate how the action will be funded; funds may be provided from existing operating budgets (General Revenue), a previously established contingency fund (Contingency/ Bonds), or a federal or state grant (External Sources).

g. **Implementation Schedule:** Indicate when the action will begin, and when it is expected to be completed.

h. **Priority:** Indicate whether the action is a 1) High priority – short-term immediate – reducing overall risk to life and property; 2) Moderate priority – an action that should be implemented in the near future due to political or community support or ease of implementation; 3) Low priority – an action that should be implemented over the long term that may depend on the availability of funds. Prioritizing mitigation actions for each jurisdiction was based on the following five (5) factors: (1) effect on overall risk to life and property; (2); ease of implementation; (3) political and community support; (4) a general economic cost/benefit review[1]; and (5) funding availability.

As mentioned above, each action was prioritized by the jurisdiction that identified the action. An overall ranking of High, Moderate or Low was given to each action based on analysis of the action in terms of the five factors listed above.

Mitigation Techniques in the R-RRC Planning Area

County and town officials reviewed the findings of the *Capability Assessment* and *Risk Assessment* in order to determine feasible and effective mitigation techniques. The Disaster Mitigation Act of 2000 specifies that state and local governments should prioritize actions based on the level of risk a hazard poses to the lives and property of a given jurisdiction. The Mitigation Matrix (**Figure 8.2**) served as a general guide; assisting local governments to make sure that they addressed, at a minimum, those hazards posing the greatest threat. Mitigation techniques, including prevention, property protection, natural resource protection, structural projects, emergency services, and public information and awareness were noted in the matrix if adopted by a participating jurisdiction. It is important to note that local and regional Mitigation Action Plans in the R-RRC planning area included an array of actions, not just those addressing high and moderate risk hazards.

Figure 8.2
Mitigation Matrix

MITIGATION TECHNIQUE	HIGH RISK HAZARDS				MODERATE RISK HAZARDS		
	Flood	*Hurricanes and Tropical Storms*	*Severe Thunderstorm and Tornadoes*	*Winter Storms*	*Drought*	*Earthquake*	*Wildfire*
Prevention	X	X	X	X	X	X	X

[1] Only a general economic cost/benefit review was considered through the process of selecting and prioritizing mitigation actions for each jurisdiction. Mitigation actions with "high" priority were determined to be the most cost effective and most compatible with each jurisdiction's unique needs. A more detailed cost/benefit analysis will be applied to particular projects prior to the application for or obligation of funding, as appropriate.

Property Protection	X						
Natural Resource Protection	X						X
Structural Projects	X	X	X	X	X	X	X
Emergency Services	X	X	X	X	X	X	X
Public Information and Awareness	X	X	X	X	X	X	X

The bulk of the mitigation actions identified by local governments in Appendix A address the flood hazard. This is primarily because of two reasons: 1) The flood hazard was identified through the *Risk Assessment* to be one of the high risk hazards that impact the region, and 2) The flood hazard is probably the easiest hazard to plan for and mitigate the impacts of.

There are also mitigation actions to address each of the other high and moderate risk hazards identified in the Risk Assessment, as well as other lower risk hazards, however, this is an element of the Plan that should be improved over time as new mitigation techniques for different hazards are identified. Over time, each jurisdiction should identify at least one mitigation action to address each of the hazards that impact the region.

As part of the 2012 revision to the Rappahannock-Rapidan Regional Hazard Mitigation Plan, participating jurisdictions updated the progress on the proposed mitigation strategies from the 2005 plan. A full listing of the progress to date on the 2005 strategies can be found in Appendix A: Local Mitigation Strategies. In general, most localities have made progress on the 2005 mitigation strategies, through ordinance reviews, floodplain reviews and management and GIS implementation and development. Some of the efforts to date include:

- Orange County addressed several of its mitigation strategies, including a county-wide evacuation plan and the development of a terrorism response plan, as part of its ongoing Emergency Operations plan updates.
- Fauquier County addressed several of its mitigation strategies through updated ordinances, including retaining natural vegetative bed in stormwater channels to reduce erosion, requiring developers to plan for on-site sediment rates and revising and updating the county's regulatory floodplain maps.
- Culpeper County addressed mitigation strategies for stormwater runoff through zoning ordinance policies requiring more trees to be preserved and planted in landscape designs
- Several jurisdictions upgraded and/or installed Reverse 911 systems to improve public safety communication during the period between the 2005 plan and the 2012 update
- The Town of Warrenton completed traffic signal coordination that previously caused significant problems for emergency vehicles trying to enter and exit the Town Police and Fire stations

PLAN MAINTENANCE PROCEDURES

The *Plan Maintenance Procedures* section discusses how identified mitigation strategies will be implemented by participating jurisdictions and how the Plan will be evaluated and updated over time. This section also discusses how the public will continue to be involved in the hazard mitigation planning process. This section was updated as part of the 2012 Hazard Mitigation Plan Update.

ADOPTION

The 2012 revision of the Rappahannock-Rapidan Hazard Mitigation Plan is expected to be adopted by participating jurisdictions in early Fall 2012. All resolutions for adoption of the plan will be included in Appendix D of the Plan. Public comment was solicited during the drafting of the plan revision and prior to adoption by each participating jurisdiction. Local emergency management officials, planners and RRRC staff were available to discuss the project at all public meetings and hearings.

IMPLEMENTATION

Each jurisdiction participating in this Plan is responsible for implementing specific mitigation actions as prescribed in the *Mitigation Strategy* section (Section 8). Each action has been assigned to a specific person or local government office that is responsible for implementing that specific action. Since each jurisdiction has specific mitigation actions that will be implemented, they have adopted their locally specific Mitigation Strategy section of the Plan separately. Consequently, individual jurisdictions may update that specific section of the Plan without meeting with the remainder of the R-RRC Hazard Mitigation Committee. Separate adoption of locally specific actions is required so that each jurisdiction is not responsible for the action(s) of the jurisdiction involved in the planning process. Separate adoption of locally specific actions also allows for each jurisdiction to retain flexibility over its prioritized strategies within the overall plan in between each five-year update of the Plan.

A review of the progress on the 2005 local mitigation strategies is included as part of Appendix A: Local Mitigation Strategies. In general, most localities have made progress on the 2005 mitigation strategies, through ordinance reviews, floodplain reviews and management and GIS implementation and development. Some of the efforts to date include:

- Orange County addressed several of its mitigation strategies, including a county-wide evacuation plan and the development of a terrorism response plan, as part of its ongoing Emergency Operations plan updates.
- Fauquier County addressed several of its mitigation strategies through updated ordinances, including retaining natural vegetative bed in stormwater channels to reduce

erosion, requiring developers to plan for on-site sediment rates and revising and updating the county's regulatory floodplain maps.

- Culpeper County addressed mitigation strategies for stormwater runoff through zoning ordinance policies requiring more trees to be preserved and planted in landscape designs
- Several jurisdictions upgraded and/or installed Reverse 911 systems to improve public safety communication during the period between the 2005 plan and the 2012 update
- The Town of Warrenton completed traffic signal coordination that previously caused significant problems for emergency vehicles trying to enter and exit the Town Police and Fire stations

For each identified action, potential funding sources have also been listed that may be used when the jurisdiction begins seeking funding for implementation of the action. These funding sources are not meant to be the only potential funding sources or strategies, but do provide an initial starting point for new projects, as well as projects already in progress. Participating jurisdictions also identified new strategies as part of the 2012 plan update process, all of which are included in Appendix A.

It will be the responsibility of each participating jurisdiction to determine additional implementation procedures beyond their Mitigation Action Plan. This includes integrating the Plan into other planning documents, processes or mechanisms such as comprehensive or capital improvement plans, where appropriate.

For further integration into existing planning documents, each participating jurisdiction should create a process by which the requirements of this hazard mitigation plan will be incorporated into other local plans. During the planning process for new and updated local planning documents, such as the comprehensive plan, capital improvements plan, or emergency management plan, the local planner or emergency management coordinator should provide a copy of the hazard mitigation plan to each respective advisory committee member. The local planner or emergency management coordinator should recommend to those persons making revisions to the afore noted plans that the goals and strategies of the new or revised planning documents should remain consistent with the goals and strategies of the hazard mitigation plan and not contribute to increasing the effects of natural hazards within the community.

As referenced above, between the 2005 plan adoption and 2012 plan revision, several jurisdictions successfully modified existing plans and ordinances to incorporate previously identified mitigation strategies into other long-term planning and emergency management efforts. Local officials, planners and emergency management personnel should continue to advocate for review and inclusion of identified mitigation strategies into relevant local plans and ordinances, as necessary.

EVALUATION AND ENHANCEMENT

Periodic revisions and updates of the Plan are required to ensure that the goals and objectives of the Plan are kept current, taking into account potential changes in hazards vulnerability and mitigation priorities. More importantly, revisions may be necessary to ensure that the Plan is in

full compliance with federal regulations and state statutes. This portion of the Plan outlines the procedures for completing such revisions and updates.

Five-Year Plan Review

The Plan will be reviewed every five (5) years to determine whether there have been any significant changes in the R-RRC region that might affect the Plan. Increased development, increased exposure to certain hazards, the development of new mitigation capabilities or techniques, and changes to federal or state legislation are examples of changes that may affect the condition of the Plan. This review also gives community officials an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting those losses avoided.

The five-year update will be coordinated by R-RRC through the Regional Hazard Mitigation Planning Committee at which time all local amendments should be incorporated into the Regional Plan. The Plan will also be submitted to the State Hazard Mitigation Office for formal review. Each jurisdiction is encouraged to make yearly reviews and minor changes without approval from the R-RRC (see Local Plan Amendment Process below).

Plan Monitoring

R-RRC will be responsible for the continued coordination of the monitoring of this plan. The Emergency Management Coordinator from each county will make yearly updates to R-RRC on the progress of the implementation of their mitigation actions. The yearly reports should coincide with the anniversary of the approval date of this plan, or other annual benchmark date as identified by the Hazard Mitigation Committee members.

The Emergency Management Coordinator will also be responsible for coordinating the yearly reporting activities of the towns within their respective counties and for coordinating the reconvening of the appropriate Hazard Mitigation Committee members for future meetings.

If any of the counties or towns that participated in this planning effort wish to not participate in future updates of the Plan, they must notify R-RRC staff in writing.

Disaster Declarations

Following a disaster declaration, the Plan will be reviewed by each effected jurisdiction to reflect lessons learned or to address specific circumstances arising from the changing conditions surrounding subsequent disaster events. Following local review, proposed changes to the Mitigation Strategies can be adopted by each jurisdiction, while broader changes to the 2012 Hazard Mitigation Plan will be discussed by the RRRC Board, Hazard Mitigation Committee, Regional Emergency Coordinators and other stakeholders as part of the ongoing maintenance of the Plan in between five-year updates. RRRC will maintain proposed changes to the entire plan document for use in the subsequent five-year Plan update process.

Reporting Procedures

The results of the five-year review should be summarized in a report prepared for the R-RRC Board of Directors. The report will include an evaluation of the effectiveness and appropriateness of the Plan, and will recommend, as appropriate, any required changes or amendments to the Plan. The report will also include an evaluation of implementation progress for each of the proposed mitigation actions, identifying reasons for delays or obstacles to their completion along with recommended strategies to overcome them.

Local Plan Amendment Process

Participating counties and towns can amend their Mitigation Actions at any time. An amendment to the Plan should be initiated only by the local governing body, either on its own initiative or upon the recommendation of the chief elected official, planner, or emergency management officials.

Minor revisions and clarifying changes can be made by the local governing body without going through the public participation and adoption process. Examples of these changes include:

- Minor spelling and grammatical corrections; and
- Minor corrections to statistics, dates and calculations.

The local point of contact for each jurisdiction shall make an annual report to R-RRC documenting any changes made to the Mitigation Actions.

CONTINUED PUBLIC INVOLVEMENT

Public input was an integral part of the completion of both the original R-RRC Regional All-Hazards Mitigation Plan and the 2012 update. As is the case with any officially adopted plan or ordinance, any significant change to this Plan shall require a public hearing and all meetings involving the hazard mitigation committee, including five-year update meetings and interim meetings, will be advertised and accessible to the public.

All relevant project documents, including the 2005 plan and identified mitigation strategies, as well as the 2012 plan update meeting documents and dates and draft plan materials are available via the Rappahannock-Rapidan Regional Commission website.

Other efforts to involve the public in the maintenance, evaluation and revision process will be made as necessary. These efforts may include:

- Advertising meetings of the Hazard Mitigation Planning Committee in the local paper, on public bulletin boards and/or in city and county office buildings;
- Utilizing local media to update the public of any maintenance or periodic review activities taking place;
- Utilizing city and county Web sites to advertise any maintenance or periodic review activities taking place; and
- Keeping copies of the Plan in all public libraries within the county.

The Virginia Department of Emergency Management or members of the R-RRC Planning Team may also provide suggestions.

APPENDIX A:

MITIGATION STRATEGIES

Appendix A contains the locally and regionally identified mitigation strategies for the 2012 RRRC Regional Hazard Mitigation Plan

- Rappahannock-Rapidan Regional Commission Page 2-3
- Culpeper County Page 4
- Town of Culpeper Page 5
- Fauquier County Page 6-7
- Town of Remington Page 8
- Town of Warrenton Page 8
- Madison County Page 9
- Town of Madison Page 9
- Orange County Page 10-11
- Town of Orange Page 12
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2012 Rappahannock-Rapidan Region Mitigation Strategies

Rappahannock-Rapidan Regional Commission Strategies (Region-wide)

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Coordinate inter-regional meetings (with surrounding PDCs) to ensure linkage with evacuation and other emergency planning of adjoining jurisdictions, as well as EOC interoperability within and outside of region	2005	Multiple	High	None other than staff time	None needed	Rappahannock-Rapidan Regional Commission	Completed	RRRC has participated, with member jurisdictions, in meetings with surrounding localities. RRRC staff should also commit to regular attendance/participation in regional emergency coordinating meetings in the future.
2	Update floodplain maps across the region as means of improving floodplain management and ensure each jurisdiction maintains ordinances in compliance with NFIP requirements.	2005	Flood	Moderate	Dependent on extent of changes needed	FEMA	Local Jurisdictions, Rappahannock-Rapidan Regional Commission	Ongoing	Continue to monitor for additional changes; respond to jurisdiction requests for assistance as needed.
3	Conduct NFIP, CRS and Flood Prevention information sessions around the region to improve awareness of flood insurance and how communities can reduce the effects of the flood hazard.	2005	Flood	Moderate	Dependent on number of workshops and attendees	FEMA; VDEM	Local Jurisdictions, Rappahannock-Rapidan Regional Commission	Ongoing	
4	Broaden Hazard Mitigation Committee to include representation from National Parks Service, Soil and Water Conservation Districts, Red Cross, HOAs, employers, schools	2005	All	Moderate	None other than staff time	None needed	Rappahannock-Rapidan Regional Commission	Completed	2012 Plan update included participation by community colleges, employers, National Parks Service
5	Develop Emergency Preparedness manual and distribute across the region to help prepare for all hazards	2005	Multiple	High	Dependent on size and number of copies to be distributed	FEMA	Rappahannock-Rapidan Regional Commission	Ongoing, as Funding allows	Should also work with other agencies in similar efforts, such as VDEM, Virginia Department of Health
6	Facilitate continued sharing of GIS maps/data, impact studies, ordinances, plans, etc. among member jurisdictions	2005	Multiple	High	None other than staff time	None needed	Rappahannock-Rapidan Regional Commission	Completed	
7	Facilitate further review of earthquake hazard and its impacts on the region in order to develop locally relevant mitigation strategies	2012	Earthquake	High	Staff time; VDEM/FEMA assistance	None needed initially	Rappahannock-Rapidan Regional Commission	Within 1 year	To include additional HAZUS analysis
8	Wildfire prevention and training programs, including support of Firewise training for interested localities, support and publication of Virginia Department of Forestry applications and data sets	2012	Wildfire	Moderate	Staff time; Dependent on training and workshop need	None needed initially	Rappahannock-Rapidan Regional Commission	As funding allows	
9	Regional Water Supply Planning support to those jurisdictions without water supply plans in place	2012	Drought	Moderate	Staff time	VDEM; DEQ	Rappahannock-Rapidan Regional Commission	As funding allows	
10	GIS Data Analysis of Virginia Department of Forestry's Wildland-Urban Interface zones with recent imagery and projected growth areas in region	2012	Wildfire	Modearte	Staff time	DOF grants	Rappahannock-Rapidan Regional Commission	As funding allows	
11	Assist local jurisdictions with development of Continuity of Operations Planning, if not currently in place	2012	Multiple	Low	Staff time	Local, State, Federal funds	Local jurisdictions, RRRC	Ongoing	
12	Identify the four missing addresses for repetitive loss properties in the region.	2012	Flood	Moderate	Staff time	None needed	Local Jurisdictions, RRRC	Within 1 year	
13	Improve water monitoring capabilities along major rivers in the region (including additional monitor stations and improved data tracking capabilities)	2012	Flood	Moderate	Unknown	FEMA: HMGP	Local Jurisdictions, RRRC	As funding allows	

14	Mitgation of flood-prone properties including, but not limited to, acquisition, elevation, relocation, and dry & wet flood proofing of flood prone structures, and mitigation reconstruction for NFIP-defined Severe Repetitive Loss properties only	2012	Flood	Moderate	Unknown	FEMA	Local Jurisdictions, RRRC	As funding allows	
15	Consider participation in the Community Rating System as a means to reduce the flood insurance premiums of citizens in the region and to foster better floodplain management practices	2012	Flood	Moderate	Unknown	FEMA	Local Jurisdictions, RRRC	As funding allows	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Culpeper County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Develop a coordinated GIS department and improve GIS usage and capacity across county departments; Improve Emergency Operations Center use of GIS	2005	Multiple	Moderate	Staff Salary, Training	FEMA, Local Funds	Culpeper County Planning; Emergency Management	Ongoing	
2	Enhance current GIS capabilities/data to expand in-house hazard mitigation capabilities	2005	Multiple	Moderate	Staff Salary, Training	FEMA, Local Funds	Culpeper County Planning; Emergency Management	Ongoing	
3	Develop policies for early drought conservation measures	2005	Drought	Moderate	Staff time	None needed initially	Culpeper County Environmental Services	Ongoing	County is currently developing water supply plan in conjunction with Town of Culpeper
4	Develop Public Awareness campaign for flooding, hurricanes and tropical storms	2005	Flood, Hurricane, Tropical Storms	Moderate	$1,000 annually	FEMA, local funds	Culpeper County Emergency Services	Ongoing	
5	Develop county-wide warning and alert system	2005	All Hazards	Moderate	Dependent upon upgrades needed	FEMA, VDEM, ISP	Culpeper County Emergency Services	Ongoing	Reverse 911 system is in place; need to continue to monitor for upgrades and interoperability
6	Participate in ICS scenario exercises in conjunction with other local jurisdictions	2012	Multiple	Moderate	Staff time	None other than staff time	Culpeper County Emergency Services	Ongoing	
7	Implement Town & County Water & Sewer agreement	2012	Multiple	High	Unknown	Local Funds	Culpeper County Administration	Long-term	
8	Retain thick vegetative cover on public lands flanking river to reduce erosion	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
9	Limit the percentage of allowable impervious surface within developed parcels to reduce the impact of erosion and to lessen the impact of flooding	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Completed	In place, reference Culpeper County Code, chapter 11A
10	Design a “natural runoff” or “zero discharge” policy for stormwater subdivision design to reduce the impacts of downstream flooding	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
11	Require more trees be preserved/planted in landscape designs to reduce the amount of stormwater runoff	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Completed	In place, reference article 33 of Zoning Ordinance
12	Require clustering for PUDs in the zoning ordinance that reduce or eliminate development in known hazard areas (generally flood zones)	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Completed	Floodplain ordinance in place, reference article 8A or Zoning Ordinance
13	Ensure zoning ordinance encourages higher densities only outside of known hazard areas	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
14	Increase minimum lot size for development in known hazard areas	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
15	Require setbacks from delineated hazard areas (e.g. wetlands, steep slopes)	2005	Multiple	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
16	Join the Community Rating System program to reduce the flood insurance premiums of citizens in Culpeper County and to foster better floodplain management practices	2005	Flood	Moderate	Staff time	Local Funds	Culpeper County Emergency Services	Deleted	
17	Buy out or elevate repetitive flood risk homes	2005	Flood	Moderate	Dependent on number of homes	FEMA Funds	Culpeper County Planning	Deleted	
18	Install generators in shelter locations for use in times of displacement/evacuations	2005	Multiple	Moderate	$30,000 per generator	FEMA Funds	Culpeper County Emergency Services	Completed	
19	Make sure the new EOC is designed and built in such a way as to be resistant to the effects of natural hazards	2005	Multiple	Moderate	Dependent on EOC design	FEMA Funds	Culpeper County Emergency Services	Completed	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Culpeper

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Status/Schedule	Comments
1	Enhance current GIS capabilities to expand in-house hazard mitigation capacity	2005	Multiple	Moderate	Dependent on level of enhancement	FEMA, Local funds	Town of Culpeper Department of Planning and Community Development	Ongoing	Upgrades included in Capital Improvements Plan
2	Acquire Global Positioning System (GPS) units to locate critical public infrastructure	2005	Multiple	High	$11,000 - $15,000	FEMA	Town of Culpeper	Completed	
3	Technology upgrades to allow the Town to more efficiently respond to disasters	2005	Multiple	High	Dependent upon upgrades identified	Grant funds	Town of Culpeper Administration	Ongoing	Installation of AMR systems ongoing through FY 2014 to improve security of public utility systems
4	Improve security and protection measures for Town's water plant and water supply reservoirs	2005	Multiple	High	Dependent upon level of enhancement	Federal funding	Town of Culpeper Department of Public Works	Ongoing	Installation of AMR systems ongoing through FY 2014; Installation of additional well systems to provide increase in MGD in testing phase
5	Improve security and protection measures for Town's electric utility and distribution system	2005	Multiple	High	Dependent upon level of enhancement	Federal funding	Town of Culpeper Director of Light and Power	Ongoing	Installation of AMR systems ongoing through FY 2014 with remote access, dual port system
6	Improve security and protection measures for Town's wastewater utility	2005	Multiple	High	Dependent upon level of enhancement	Federal funding	Town of Culpeper Department of Public Works	Ongoing	Emergency generators installed at multiple points; additional perimeter fencing installed to date
7	Provide vegetative buffers where appropriate to offset effects of potential flooding	2005	Flooding	Moderate	Staff time	None other than staff time	Town of Culpeper Departments of Planning and Community Development, Public Works	Ongoing	Streambank segments identified on Mountain Run to promote soil retention
8	Employ the use of impervious surfaces, only where practical, to counteract the effects of flooding in developed areas of town	2005	Flooding	Moderate	Staff time	None other than staff time	Town of Culpeper Departments of Planning and Community Development, Public Works	Ongoing	
9	Construct Inner Loop road between route 229 and route 522 to provide additional traffic options during flood events	2012	Flooding, Multiple	Moderate	Estimates at VDOT	VDOT, FHWA	Town of Culpeper, VDOT	2016 Completion Date	
10	Utilize old VDOT Residency property to further streamline maintenance efficiency	2012	Winter Weather, multiple	Moderate	Staff time	None other than staff time	Town of Culpeper Department of Public Works	Ongoing	
11	Complete and implement mitigation planning policies for dams at Lake Pelham and Mountain Run Lake	2012	Flooding	High	Staff time	DCR, staff time	Town of Culpeper Departments of Public Works, Planning and Community Development	Ongoing	
12	Participate in ICS scenario exercises in conjunction with other local jurisdictions	2012	Multiple	Moderate	Staff time	None other than staff time	Town of Culpeper Departments of Public Works, Planning and Community Development	Ongoing	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Fauquier County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Build new Emergency Operations Center and Emergency Communications Center	2005	Multiple	High	Undetermined	FEMA HMGP, EMPG Grants	CFREM	Planning ongoing	Lack of funding
2	Relocation of structures out of the floodplain	2005/2012	Flood	Low	Dependent upon number structures identified	FEMA HMGP, FMA	Fauquier County Community Development	No action taken	Requires study of non-conforming homes in updated FIRM maps; Retain strategy as refined in 2012
3	Join the Community Rating System program to reduce the flood insurance premium of citizens in Fauquier County and to foster better floodplain management practices	2005/2012	Flood	Moderate	Staff time	None needed	Fauquier County Community Development	Ongoing	County now has Certified Floodplain Manager on staff; Retain strategy as refined in 2012 in coordination with Emergency Services
4	Improve generator capacity at shelters/schools	2005	Multiple	High	$35,000 per generator	FEMA HMGP, PDM	CFREM	As funding allows	
5	Develop Code Red System throughout county	2005/2012	Multiple	Moderate	Unknown	Local funds	CFREM	As funding allows	
6	Prohibit or limit floodplain development through regulatory and/or incentive based measures	2005/2012	Flood	Low	Staff time	None needed	Fauquier County Community Development	As necessary	Zoning Ordinance updated in 2007 and 2009 to conform to federal law and updated FIRM maps. Retain strategy as refined in 2012.
7	Establish and manage riparian buffers along rivers and streams to minimize erosion and flooding	2005/2012	Flood	Low	Staff time	None needed	Fauquier County Community Development	As staff time allows	Retain strategy as refined in 2012, given pending stormwater and Chesapeake Bay regulations at state level
8	Incorporate into emergency response plans the procedure for tracking high water marks following a flood	2005/2012	Flood	Low	Staff time	None needed	CFREM	As necessary	
9	Retain thick vegetative cover on public lands flanking river to reduce the potential of erosion	2005/2012	Flood	Low	Staff time	None needed	Fauquier County Community Development	As staff time allows	This is a continuing county coordination effort with special management areas, state and federal agencies. Retain strategy as refined in 2012.
10	Sign a Cooperating Technical Partner (CTP) Agreement with FEMA.	2005/2012	Flood	Moderate	Staff time	FEMA Grants	Fauquier County Community Development	As staff time allows	Requires Floodplain Manager and GIS to work with FEMA to determine county eligibility; and Board of Supervisors authorization to pursue such a designation
11	Determine county's eligibility for Coordinating Cooperative Partner designation	2012	Flood	Moderate	Staff time	Local Funds	Fauquier County Community Development	As staff time allows	
12	Limit the percentage of allowable impervious surface within developed parcels	2005/2012	Flood	Low	Staff time	None needed	Fauquier County Community Development	As necessary	Monitor pending regulations at state and federal level for changes to impervious surface reductions. Retain strategy as refined in 2012.
13	Encourage residents to keep storm drains clear of debris during storms	2005/2012	Flood	Moderate	Staff time	None needed	Fauquier County Community Development	As necessary	Work with HOAs and John Marshall Soil and Water Conservation District to coordinate education and outreach materials
14	Develop Mobile Data Transmission System that is interoperable with Northern Virginia Public Safety agencies	2005/2012	Multiple	High	Unknown	Local, State, Federal funds	CFREM	Ongoing	
15	Require developers to plan for on-site sediment retention.	2005	Flood	High	Staff time	None needed	Fauquier County Community Development	Ongoing	Completed on a regular basis during development review.
16	Develop an open space acquisition, reuse and preservation plan targeting hazard areas.	2005	Flood	Low	$50,000 to develop plan, additional unknown	FEMA HMGP	Fauquier County Community Development	Ongoing	Part of county planning process as necessary
17	Prohibit any development within the floodplain areas	2005	Flood	Low	Staff time	None needed	Fauquier County Community Development	Completed	Incorporated into County Ordinance
18	Revise and update regulatory floodplain maps	2005	Flood	Moderate	--	FEMA: MMP	Fauquier County Community Development	Completed	Updated floodplain maps adopted and monitored.

19	Designate a local floodplain manager/CRS coordinator that achieves Certified Floodplain Manager certification	2005	Flood	Moderate	Staff time	None needed	Fauquier County Community Development	Completed	County has certified Floodplain Manager on staff as of 2010
20	Substitute porous surfaces/pavement for impervious pavement when appropriate to reduce flooding caused by runoff	2005	Flood	Low	Staff time	None needed	Fauquier County Community Development	As necessary	Low priority, handled on case-by-case basis
21	Retain natural vegetative bed in stormwater channels to reduce erosion	2005	Flood	Low	Staff time	None needed	Fauquier County Community Development	Completed	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Remington

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Elevate buildings/buy-out land in floodplain.	2005	Flood	Moderate	Unknown	FEMA, Local Funds	Town of Remington Administration	As needed	
2	The water treatment plant for the Town of Remington on Confederate Boulevard needs a backup generator.	2005	Multiple	High	$35,000 per generator	FEMA, Local Funds	Town of Remington Superintendant	As funding allows	
3	Ensure plans for new water treatment facility at 5th Street include backup power generation	2012	Multiple	High	Dependent upon identified solution	Local funds	Town of Remington Superintendant	Concurrent with facility development	
4	The sewer plant that serves the Town of Remington needs a backup generator	2005	Multiple	High	$30,000 per generator	FEMA Funds	Town of Remington Superintendant	Completed	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Warrenton

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Coordinate all traffic signals in town. Currently the signals are not coordinated and can cause major problems for emergency vehicles trying to enter and exit the police and fire stations	2005	Multiple	Moderate	$50,000	Local Funds, VDOT	Town of Warrenton Department of Public Works and Utilities	Ongoing	Phase I completed. Town is working to interconnect the signals via wireless during phase II.
2	Verify street addresses and ensure compliance with posting requirements.	2005	All Hazards	High	Staff time	None needed	Town of Warrenton Department of Planning and Community Development	Ongoing	
3	Join the Community Rating System program to reduce the flood insurance premiums of citizens in the Town of Warrenton and to foster better floodplain management.	2005	Flood	Moderate	Staff time	None needed	Town of Warrenton Departments of Public Works and Utilities & Planning and Community Development	Ongoing	Town has identified this as a planned effort across departments.
4	Update floodplain map for the Town of Warrenton	2005	Flood	High	$85,000	FEMA Funds	Town of Warrenton Department of Public Works and Utilities	Completed	
5	Improve enforcement of erosion and sediment control measures to reduce erosion and flooding problems caused by sedimentation.	2005	Flood	Low	Staff time	None needed	Town of Warrenton Department of Planning and Community Development	Ongoing	
6	Additional staff training for GIS applications.	2005	Multiple	Moderate	$2,000 to $4,000; Dependent upon software needs; training needs	Local Funds	Town of Warrenton Departments of Public Works and Utilities & Planning and Community Development	Ongoing	
7	Increase snow removal capabilities	2005	Winter Storms	Moderate	Additional staff time and funding for new equipment	Dependent upon need for new equipment	Town of Warrenton Department of Public Works and Utilities	Ongoing	

Note: The Town of Warrenton opted against identifying new strategies during this Plan Update in order to focus on the number of ongoing efforts currently underway at the Town.

2012 Rappahannock-Rapidan Region Mitigation Strategies

Madison County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Identify the two repetitive loss properties in the county.	2005	Flood	Moderate	Staff time	None needed	Madison County Emergency Management	Ongoing	
2	Develop a HAZMAT team to handle possible spills on Route 29	2005	Hazardous Materials	Moderate	Dependent on number of team members and equipment needed	Hazardous Material Emergency Management grant	Madison County Emergency Management	As funding allows	
3	Expand emergency shelter capabilities for natural disasters and large-scale evacuation	2005	Multiple	Moderate	Dependent upon improvements needed	FEMA	Madison County Emergency Management	Ongoing	

Note: Madison County opted against identifying new strategies during this Plan Update due to staffing limitations and the desire to push resources toward previously identified strategies.

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Madison

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Improve stormwater runoff with the implementation of stormwater management techniques	2005	Flood	High	Town staff has estimates	FEMA, USDA, Soil and Water Conservation	Town of Madison Administration	As funding allows	
2	Protect utilities by placing overhead wires and cables underground	2005	High winds, tornadoes, hurricanes, winter storms	Moderate	Town staff has estimates for existing line burial; future line burial would be taken care of via ordinance amendments	CDBG	Town of Madison Administration	As funding allows, long-term	

Note: The Town of Madison opted against identifying new strategies during this Plan Update due to limited staffing and the desire to push resources toward previously identified strategies.

2012 Rappahannock-Rapidan Region Mitigation Strategies

Orange County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Identify and develop additional shelter sites for evacuees from within and outside the region	2005/2012	Multiple	High	Staff time	General fund	Orange County Department of Emergency Management	Ongoing	Modified for 2012 Plan Update.
2	Expand and fully equip Emergency Operations Center	2005	Multiple	High	$75,000	General fund, North Anna funds and grants	Orange County Administration, Emergency Management	Ongoing	
3	Expand and fully equip E-911 Center	2012	Multiple	High	$200,000	Local and grant funding	Orange County Administration, Emergency Management and Emergency Communications	As funding allows	
4	Upgrade Reverse 911 system with a modern multi-notification system	2005/2012	Multiple	High	$40,000	General fund, North Anna funds and grants	Orange County Administration, Emergency Management and Emergency Communications	Ongoing	Modified for 2012 plan.
5	Install a generator at the Orange County Courthouse facility	2012	Multiple	High	$50,000	General fund, FEMA, grants	Orange County Department of Emergency Management	As funding allows	
6	Install and replace generators in County Fire and Rescue station #21	2012	Multiple	High	$58,333	General fund, FEMA, grants	Orange County Department of Emergency Management	As funding allows	
7	Install and replace generators in County Fire and Rescue station #24	2012	Multiple	High	$58,333	General fund, FEMA, grants	Orange County Department of Emergency Management	As funding allows	
8	Install and replace generators in County Fire and Rescue station #29	2012	Multiple	High	$58,333	General fund, FEMA, grants	Orange County Department of Emergency Management	As funding allows	
9	Conduct a detailed needs assessment for the county's emergency response services	2005	Multiple	Moderate	Unknown	Local, ODP	Orange County Department of Emergency Management	Ongoing	
10	Upgrade or replace generators at communications sites throughout Orange County and add surveillance equipment. Monitoring systems should also be added to provide the following information: fuel status, generator status, temperature status, generator output status	2012	Multiple	High	$100,000	General fund, grants	Orange County Department of Emergency Management	As funding allows	
11	Retrofit Locust Grove Middle School as an emergency shelter with the addition of a generator	2012	Multiple	Moderate	$50,000	General fund, grants	Orange County Department of Emergency Management	As funding allows	
12	Retrofit Prospect Heights Middle School as an emergency shelter with the addition of a generator	2012	Multiple	Moderate	$50,000	General fund, grants	Orange County Department of Emergency Management	As funding allows	
13	Retrofit High School Field House as an emergency shelter with the addition of a generator	2012	Multiple	Moderate	$50,000	General fund, grants	Orange County Department of Emergency Management	As funding allows	
14	Apply for and obtain funding for hazard mitigation plan implementation	2005	Multiple	High	Staff time	None needed initially	Orange County Administration, Emergency Management and Emergency Communications	Ongoing	Modified for 2012 plan
15	Identify potential terrorism targets (local) and plan for their protection	2005	Terrorism	High	Staff time	State Homeland Security Grant program	Orange County Emergency Operations Center, Local Police	Ongoing	Partially covered by other existing plans
16	Incorporate Hazard Mitigation plan into Comprehensive Plan and Capital Improvements Plan	2005	Multiple	Moderate	Staff time	None needed	Orange County Administration, Department of Planning and Zoning	Ongoing	
17	Complete a stormwater drainage study/plan for known problem areas	2005	Flood	Moderate	Staff time	General Fund, grants	Orange County Department of Planning and Zoning	As funding allows	Town of Orange study reference
18	Develop and implement a multi-hazard public awareness program	2005	Multiple	Moderate	Staff time	General Fund	Orange County Department of Emergency Management and Emergency Communiciation	Ongoing	
19	Develop an internal GIS that may be used for analysis in times of emergency	2005/2012	Multiple	Moderate	Staff time	FEMA, VGIN, Local Funds	Orange County Department of Planning and Zoning	Ongoing	GIS available for review, not analysis

20	Develop and incorporate database information for GIS use	2005	Multiple	Moderate	Staff time	General fund	Orange County Department of Planning and Zoning	Deleted	Revised in 2012 plan, strategy #19
21	Identify flood inundation zones for all dams regulated through the Virginia Department of Conservation and Recreation Dam Safety program	2005	Flood	Moderate	Staff time	General fund, DCR	Orange County Department of Planning and Zoning	As funding allows	
22	Upgrade or replace outdated storage shed at the Orange County Sheriff's office	2012	Multiple	High	Unknown	General fund, FEMA	Orange County Department of Emergency Management, Sheriff's Office	As funding allows	
23	Install and replace generators in county fire and rescue stations	2005	Multiple	High	$160,650	General fund	Orange County Department of Emergency Communications	Deleted	Revised in 2012 plan, strategies #5 through 8
24	Prepare for loss of electricity at vulnerable facilities	2005	Multiple	High	Staff time	General fund	Orange County EOC	Completed	
25	Create an evacuation plan and clean up scenario in the event of a train derailment resulting in a toxic spill	2005	Hazardous Materials	Moderate	Dependent on location	HMEP grants	Orange County/Town or Orange	Completed	Included in County Emergency Operations Plan
26	Identify/prepare evacuation routes and shelter locations for natural or man-made disasters	2005	Multiple	Moderate	Staff time	General Fund, FEMA grans	Orange County EOC	Completed	Included in County Emergency Operations Plan
27	Develop a terrorism response plan	2005	Terrorism	Moderate	Staff time	General fund	Orange County Administration, EOC, Planning	Completed	Partially covered through other plans
28	Design an early warning system for hazard events	2005	Multiple	Moderate	Staff time	General fund	Orange County EOC, Law enforcement	Completed	
29	In the floodplain ordinance, identify "flooding due to manmade structure" as a concern within the County, also determine ways to regulate development within the flood inundation zones as a function of the floodplain ordinance	2005	Flood	Moderate	Staff time	General fund	Orange County Planning and Zoning	Completed	Floodplain ordinance in place
30	Prepare for radiological problems from North Anna nuclear power station	2005	Hazardous Materials	High	Staff time	HMEP grants	Orange County EOC	Completed	
31	Prevent development between Lake of the Woods Dam and the Rapidan River	2005	Flood	Moderate	Staff time	General fund	Orange County Planning and Zoning	Completed	Addressed through Dam Inundation statute

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Orange

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Plan for derailment of freight trains which pass through center of town (4,000 pop) – Large tank cars, chlorine, anhydrous, etc.	2005	Hazardous Materials	Moderate/High	Dependent upon location and event	Hazardous Materials Emergency Preparedness grant	Town of Orange; Railroad	Ongoing	Also consider short-term safety improvements at rail crossings
2	Implement preferred recommendation of the 2006 Baylor Creek Stream Restoration Study	2012	Flood	Moderate	Dependent upon recommendations implemented	Federal/State level grants	Town of Orange Department of Community Development	As funding allows	
3	Perform floodplain mapping of Town to determine base flood elevations.	2012	Flood	Low	Staff time	None needed initially	Town of Orange Department of Community Development	As staffing allows	
4	Purchase residences in area(s) subject to recurrent flooding	2005	Flood, Hurricane, Tropical Storms	Low	Dependent on number to be acquired	FEMA, local funds	FEMA, Insurance	Dependent on several factors	Modified for 2012 plan
5	Prepare for flow of people during an emergency	2005	Multiple	Moderate	Dependent on planning and implementation	HMEP, PDM	Town of Orange	Deleted	
6	Assist in adoption of ordinance in building in known flood zones	2005	Flood	Low	Staff time	None needed	Town of Orange Community Development	Deleted	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Rappahannock County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Improve GIS data within the county in order to perform more accurate risk assessments.	2005	Multiple	Low	$10,000 to $15,000	Local Funds, Grants	Rappahannock County E-911 Coordination	Ongoing	
2	Develop/revitalize relationship with Red Cross for shelter operations planning.	2005	Multiple	High	None needed initially	None needed initially	Rappahannock County Emergency Coordination	Ongoing	
3	Join the Community Rating System program to reduce the flood insurance premiums of citizens in the Rappahannock County and to foster better floodplain management practices.	2005	Flooding	Low	$1,000 to $3,000	Local Funds	Rappahannock County Administration	Ongoing	
4	Coordinate wildfire planning with Shenandoah National Park.	2005	Wildfire	High	None needed initially	None needed initially	Rappahannock County Administration/Emergency Coordination	Ongoing	
5	Promote “Firewise” fire protection by providing literature/brochures with each building permit issued in County for rural area construction.	2005	Wildfire	Moderate	<$1,000 annually	General Funds	Rappahannock County Administration	Completed	Has been implemented and part of continuing local coordination
6	Design and build a new EOC.	2005	All Hazards	High	Unknown	General Funds, FEMA	Rappahannock County Administration	Deferred	Lack of funding
7	Identify relocation of commercial uses in floodplain	2005	Flooding	Moderate	$1 to 1.5M	FEMA HMP Grants	Rappahannock County Building Official	Deferred	Lack of funding
8	Install emergency generators at county emergency shelters – Amissville Fire Department, Washington Fire Department	2012	All Hazards	Moderate	Unknown	General Funds, FEMA	Rappahannock County Emergency Coordination	As funding allows	
9	Install emergency generators at primary county emergency shelters at Rappahannock Elementary School and Rapppahannock County High School	2012	All Hazards	Moderate	Unknown	General Funds, FEMA	Rappahannock County Emergency Coordination	As funding allows	

APPENDIX A:

MITIGATION STRATEGIES

Appendix A contains the locally and regionally identified mitigation strategies for the 2012 RRRC Regional Hazard Mitigation Plan

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2012 Rappahannock-Rapidan Region Mitigation Strategies

Rappahannock-Rapidan Regional Commission Strategies (Region-wide)

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Coordinate inter-regional meetings (with surrounding PDCs) to ensure linkage with evacuation and other emergency planning of adjoining jurisdictions, as well as EOC interoperability within and outside of region	2005	Multiple	High	None other than staff time	None needed	Rappahannock-Rapidan Regional Commission	Completed	RRRC has participated, with member jurisdictions, in meetings with surrounding localities. RRRC staff should also commit to regular attendance/participation in regional emergency coordinating meetings in the future.
2	Update floodplain maps across the region as means of improving floodplain management and ensure each jurisdiction maintains ordinances in compliance with NFIP requirements.	2005	Flood	Moderate	Dependent on extent of changes needed	FEMA	Local Jurisdictions, Rappahannock-Rapidan Regional Commission	Ongoing	Continue to monitor for additional changes; respond to jurisdiction requests for assistance as needed.
3	Conduct NFIP, CRS and Flood Prevention information sessions around the region to improve awareness of flood insurance and how communities can reduce the effects of the flood hazard.	2005	Flood	Moderate	Dependent on number of workshops and attendees	FEMA; VDEM	Local Jurisdictions, Rappahannock-Rapidan Regional Commission	Ongoing	
4	Broaden Hazard Mitigation Committee to include representation from National Parks Service, Soil and Water Conservation Districts, Red Cross, HOAs, employers, schools	2005	All	Moderate	None other than staff time	None needed	Rappahannock-Rapidan Regional Commission	Completed	2012 Plan update included participation by community colleges, employers, National Parks Service
5	Develop Emergency Preparedness manual and distribute across the region to help prepare for all hazards	2005	Multiple	High	Dependent on size and number of copies to be distributed	FEMA	Rappahannock-Rapidan Regional Commission	Ongoing, as Funding allows	Should also work with other agencies in similar efforts, such as VDEM, Virginia Department of Health
6	Facilitate continued sharing of GIS maps/data, impact studies, ordinances, plans, etc. among member jurisdictions	2005	Multiple	High	None other than staff time	None needed	Rappahannock-Rapidan Regional Commission	Completed	
7	Facilitate further review of earthquake hazard and its impacts on the region in order to develop locally relevant mitigation strategies	2012	Earthquake	High	Staff time; VDEM/FEMA assistance	None needed initially	Rappahannock-Rapidan Regional Commission	Within 1 year	To include additional HAZUS analysis
8	Wildfire prevention and training programs, including support of Firewise training for interested localities, support and publication of Virginia Department of Forestry applications and data sets	2012	Wildfire	Moderate	Staff time; Dependent on training and workshop need	None needed initially	Rappahannock-Rapidan Regional Commission	As funding allows	
9	Regional Water Supply Planning support to those jurisdictions without water supply plans in place	2012	Drought	Moderate	Staff time	VDEM; DEQ	Rappahannock-Rapidan Regional Commission	As funding allows	
10	GIS Data Analysis of Virginia Department of Forestry's Wildland-Urban Interface zones with recent imagery and projected growth areas in region	2012	Wildfire	Modearte	Staff time	DOF grants	Rappahannock-Rapidan Regional Commission	As funding allows	
11	Assist local jurisdictions with development of Continuity of Operations Planning, if not currently in place	2012	Multiple	Low	Staff time	Local, State, Federal funds	Local jurisdictions, RRRC	Ongoing	
12	Identify the four missing addresses for repetitive loss properties in the region.	2012	Flood	Moderate	Staff time	None needed	Local Jurisdictions, RRRC	Within 1 year	
13	Improve water monitoring capabilities along major rivers in the region (including additional monitor stations and improved data tracking capabilities)	2012	Flood	Moderate	Unknown	FEMA: HMGP	Local Jurisdictions, RRRC	As funding allows	

14	Mitgation of flood-prone properties including, but not limited to, acquisition, elevation, relocation, and dry & wet flood proofing of flood prone structures, and mitigation reconstruction for NFIP-defined Severe Repetitive Loss properties only	2012	Flood	Moderate	Unknown	FEMA	Local Jurisdictions, RRRC	As funding allows	
15	Consider participation in the Community Rating System as a means to reduce the flood insurance premiums of citizens in the region and to foster better floodplain management practices	2012	Flood	Moderate	Unknown	FEMA	Local Jurisdictions, RRRC	As funding allows	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Culpeper County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Develop a coordinated GIS department and improve GIS usage and capacity across county departments; Improve Emergency Operations Center use of GIS	2005	Multiple	Moderate	Staff Salary, Training	FEMA, Local Funds	Culpeper County Planning; Emergency Management	Ongoing	
2	Enhance current GIS capabilities/data to expand in-house hazard mitigation capabilities	2005	Multiple	Moderate	Staff Salary, Training	FEMA, Local Funds	Culpeper County Planning; Emergency Management	Ongoing	
3	Develop policies for early drought conservation measures	2005	Drought	Moderate	Staff time	None needed initially	Culpeper County Environmental Services	Ongoing	County is currently developing water supply plan in conjunction with Town of Culpeper
4	Develop Public Awareness campaign for flooding, hurricanes and tropical storms	2005	Flood, Hurricane, Tropical Storms	Moderate	$1,000 annually	FEMA, local funds	Culpeper County Emergency Services	Ongoing	
5	Develop county-wide warning and alert system	2005	All Hazards	Moderate	Dependent upon upgrades needed	FEMA, VDEM, ISP	Culpeper County Emergency Services	Ongoing	Reverse 911 system is in place; need to continue to monitor for upgrades and interoperability
6	Participate in ICS scenario exercises in conjunction with other local jurisdictions	2012	Multiple	Moderate	Staff time	None other than staff time	Culpeper County Emergency Services	Ongoing	
7	Implement Town & County Water & Sewer agreement	2012	Multiple	High	Unknown	Local Funds	Culpeper County Administration	Long-term	
8	Retain thick vegetative cover on public lands flanking river to reduce erosion	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
9	Limit the percentage of allowable impervious surface within developed parcels to reduce the impact of erosion and to lessen the impact of flooding	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Completed	In place, reference Culpeper County Code, chapter 11A
10	Design a “natural runoff” or “zero discharge” policy for stormwater subdivision design to reduce the impacts of downstream flooding	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
11	Require more trees be preserved/planted in landscape designs to reduce the amount of stormwater runoff	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Completed	In place, reference article 33 of Zoning Ordinance
12	Require clustering for PUDs in the zoning ordinance that reduce or eliminate development in known hazard areas (generally flood zones)	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Completed	Floodplain ordinance in place, reference article 8A or Zoning Ordinance
13	Ensure zoning ordinance encourages higher densities only outside of known hazard areas	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
14	Increase minimum lot size for development in known hazard areas	2005	Flood	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
15	Require setbacks from delineated hazard areas (e.g. wetlands, steep slopes)	2005	Multiple	Moderate	Staff time	None needed	Culpeper County Planning	Deleted	
16	Join the Community Rating System program to reduce the flood insurance premiums of citizens in Culpeper County and to foster better floodplain management practices	2005	Flood	Moderate	Staff time	Local Funds	Culpeper County Emergency Services	Deleted	
17	Buy out or elevate repetitive flood risk homes	2005	Flood	Moderate	Dependent on number of homes	FEMA Funds	Culpeper County Planning	Deleted	
18	Install generators in shelter locations for use in times of displacement/evacuations	2005	Multiple	Moderate	$30,000 per generator	FEMA Funds	Culpeper County Emergency Services	Completed	
19	Make sure the new EOC is designed and built in such a way as to be resistant to the effects of natural hazards	2005	Multiple	Moderate	Dependent on EOC design	FEMA Funds	Culpeper County Emergency Services	Completed	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Culpeper

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Status/Schedule	Comments
1	Enhance current GIS capabilities to expand in-house hazard mitigation capacity	2005	Multiple	Moderate	Dependent on level of enhancement	FEMA, Local funds	Town of Culpeper Department of Planning and Community Development	Ongoing	Upgrades included in Capital Improvements Plan
2	Acquire Global Positioning System (GPS) units to locate critical public infrastructure	2005	Multiple	High	$11,000 - $15,000	FEMA	Town of Culpeper	Completed	
3	Technology upgrades to allow the Town to more efficiently respond to disasters	2005	Multiple	High	Dependent upon upgrades identified	Grant funds	Town of Culpeper Administration	Ongoing	Installation of AMR systems ongoing through FY 2014 to improve security of public utility systems
4	Improve security and protection measures for Town's water plant and water supply reservoirs	2005	Multiple	High	Dependent upon level of enhancement	Federal funding	Town of Culpeper Department of Public Works	Ongoing	Installation of AMR systems ongoing through FY 2014; Installation of additional well systems to provide increase in MGD in testing phase
5	Improve security and protection measures for Town's electric utility and distribution system	2005	Multiple	High	Dependent upon level of enhancement	Federal funding	Town of Culpeper Director of Light and Power	Ongoing	Installation of AMR systems ongoing through FY 2014 with remote access, dual port system
6	Improve security and protection measures for Town's wastewater utility	2005	Multiple	High	Dependent upon level of enhancement	Federal funding	Town of Culpeper Department of Public Works	Ongoing	Emergency generators installed at multiple points; additional perimeter fencing installed to date
7	Provide vegetative buffers where appropriate to offset effects of potential flooding	2005	Flooding	Moderate	Staff time	None other than staff time	Town of Culpeper Departments of Planning and Community Development, Public Works	Ongoing	Streambank segments identified on Mountain Run to promote soil retention
8	Employ the use of impervious surfaces, only where practical, to counteract the effects of flooding in developed areas of town	2005	Flooding	Moderate	Staff time	None other than staff time	Town of Culpeper Departments of Planning and Community Development, Public Works	Ongoing	
9	Construct Inner Loop road between route 229 and route 522 to provide additional traffic options during flood events	2012	Flooding, Multiple	Moderate	Estimates at VDOT	VDOT, FHWA	Town of Culpeper, VDOT	2016 Completion Date	
10	Utilize old VDOT Residency property to further streamline maintenance efficiency	2012	Winter Weather, multiple	Moderate	Staff time	None other than staff time	Town of Culpeper Department of Public Works	Ongoing	
11	Complete and implement mitigation planning policies for dams at Lake Pelham and Mountain Run Lake	2012	Flooding	High	Staff time	DCR, staff time	Town of Culpeper Departments of Public Works, Planning and Community Development	Ongoing	
12	Participate in ICS scenario exercises in conjunction with other local jurisdictions	2012	Multiple	Moderate	Staff time	None other than staff time	Town of Culpeper Departments of Public Works, Planning and Community Development	Ongoing	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Fauquier County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Build new Emergency Operations Center and Emergency Communications Center	2005	Multiple	High	Undetermined	FEMA HMGP, EMPG Grants	CFREM	Planning ongoing	Lack of funding
2	Relocation of structures out of the floodplain	2005/2012	Flood	Low	Dependent upon number structures identified	FEMA HMGP, FMA	Fauquier County Community Development	No action taken	Requires study of non-conforming homes in updated FIRM maps; Retain strategy as refined in 2012
3	Join the Community Rating System program to reduce the flood insurance premium of citizens in Fauquier County and to foster better floodplain management practices	2005/2012	Flood	Moderate	Staff time	None needed	Fauquier County Community Development	Ongoing	County now has Certified Floodplain Manager on staff; Retain strategy as refined in 2012 in coordination with Emergency Services
4	Improve generator capacity at shelters/schools	2005	Multiple	High	$35,000 per generator	FEMA HMGP, PDM	CFREM	As funding allows	
5	Develop Code Red System throughout county	2005/2012	Multiple	Moderate	Unknown	Local funds	CFREM	As funding allows	
6	Prohibit or limit floodplain development through regulatory and/or incentive based measures	2005/2012	Flood	Low	Staff time	None needed	Fauquier County Community Development	As necessary	Zoning Ordinance updated in 2007 and 2009 to conform to federal law and updated FIRM maps. Retain strategy as refined in 2012.
7	Establish and manage riparian buffers along rivers and streams to minimize erosion and flooding	2005/2012	Flood	Low	Staff time	None needed	Fauquier County Community Development	As staff time allows	Retain strategy as refined in 2012, given pending stormwater and Chesapeake Bay regulations at state level
8	Incorporate into emergency response plans the procedure for tracking high water marks following a flood	2005/2012	Flood	Low	Staff time	None needed	CFREM	As necessary	
9	Retain thick vegetative cover on public lands flanking river to reduce the potential of erosion	2005/2012	Flood	Low	Staff time	None needed	Fauquier County Community Development	As staff time allows	This is a continuing county coordination effort with special management areas, state and federal agencies. Retain strategy as refined in 2012.
10	Sign a Cooperating Technical Partner (CTP) Agreement with FEMA.	2005/2012	Flood	Moderate	Staff time	FEMA Grants	Fauquier County Community Development	As staff time allows	Requires Floodplain Manager and GIS to work with FEMA to determine county eligibility; and Board of Supervisors authorization to pursue such a designation
11	Determine county's eligibility for Coordinating Cooperative Partner designation	2012	Flood	Moderate	Staff time	Local Funds	Fauquier County Community Development	As staff time allows	
12	Limit the percentage of allowable impervious surface within developed parcels	2005/2012	Flood	Low	Staff time	None needed	Fauquier County Community Development	As necessary	Monitor pending regulations at state and federal level for changes to impervious surface reductions. Retain strategy as refined in 2012.
13	Encourage residents to keep storm drains clear of debris during storms	2005/2012	Flood	Moderate	Staff time	None needed	Fauquier County Community Development	As necessary	Work with HOAs and John Marshall Soil and Water Conservation District to coordinate education and outreach materials
14	Develop Mobile Data Transmission System that is interoperable with Northern Virginia Public Safety agencies	2005/2012	Multiple	High	Unknown	Local, State, Federal funds	CFREM	Ongoing	
15	Require developers to plan for on-site sediment retention.	2005	Flood	High	Staff time	None needed	Fauquier County Community Development	Ongoing	Completed on a regular basis during development review.
16	Develop an open space acquisition, reuse and preservation plan targeting hazard areas.	2005	Flood	Low	$50,000 to develop plan, additional unknown	FEMA HMGP	Fauquier County Community Development	Ongoing	Part of county planning process as necessary
17	Prohibit any development within the floodplain areas	2005	Flood	Low	Staff time	None needed	Fauquier County Community Development	Completed	Incorporated into County Ordinance
18	Revise and update regulatory floodplain maps	2005	Flood	Moderate	--	FEMA: MMP	Fauquier County Community Development	Completed	Updated floodplain maps adopted and monitored.

19	Designate a local floodplain manager/CRS coordinator that achieves Certified Floodplain Manager certification	2005	Flood	Moderate	Staff time	None needed	Fauquier County Community Development	Completed	County has certified Floodplain Manager on staff as of 2010
20	Substitute porous surfaces/pavement for impervious pavement when appropriate to reduce flooding caused by runoff	2005	Flood	Low	Staff time	None needed	Fauquier County Community Development	As necessary	Low priority, handled on case-by-case basis
21	Retain natural vegetative bed in stormwater channels to reduce erosion	2005	Flood	Low	Staff time	None needed	Fauquier County Community Development	Completed	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Remington

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Elevate buildings/buy-out land in floodplain.	2005	Flood	Moderate	Unknown	FEMA, Local Funds	Town of Remington Administration	As needed	
2	The water treatment plant for the Town of Remington on Confederate Boulevard needs a backup generator.	2005	Multiple	High	$35,000 per generator	FEMA, Local Funds	Town of Remington Superintendant	As funding allows	
3	Ensure plans for new water treatment facility at 5th Street include backup power generation	2012	Multiple	High	Dependent upon identified solution	Local funds	Town of Remington Superintendant	Concurrent with facility development	
4	The sewer plant that serves the Town of Remington needs a backup generator	2005	Multiple	High	$30,000 per generator	FEMA Funds	Town of Remington Superintendant	Completed	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Warrenton

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Coordinate all traffic signals in town. Currently the signals are not coordinated and can cause major problems for emergency vehicles trying to enter and exit the police and fire stations	2005	Multiple	Moderate	$50,000	Local Funds, VDOT	Town of Warrenton Department of Public Works and Utilities	Ongoing	Phase I completed. Town is working to interconnect the signals via wireless during phase II.
2	Verify street addresses and ensure compliance with posting requirements.	2005	All Hazards	High	Staff time	None needed	Town of Warrenton Department of Planning and Community Development	Ongoing	
3	Join the Community Rating System program to reduce the flood insurance premiums of citizens in the Town of Warrenton and to foster better floodplain management.	2005	Flood	Moderate	Staff time	None needed	Town of Warrenton Departments of Public Works and Utilities & Planning and Community Development	Ongoing	Town has identified this as a planned effort across departments.
4	Update floodplain map for the Town of Warrenton	2005	Flood	High	$85,000	FEMA Funds	Town of Warrenton Department of Public Works and Utilities	Completed	
5	Improve enforcement of erosion and sediment control measures to reduce erosion and flooding problems caused by sedimentation.	2005	Flood	Low	Staff time	None needed	Town of Warrenton Department of Planning and Community Development	Ongoing	
6	Additional staff training for GIS applications.	2005	Multiple	Moderate	$2,000 to $4,000; Dependent upon software needs; training needs	Local Funds	Town of Warrenton Departments of Public Works and Utilities & Planning and Community Development	Ongoing	
7	Increase snow removal capabilities	2005	Winter Storms	Moderate	Additional staff time and funding for new equipment	Dependent upon need for new equipment	Town of Warrenton Department of Public Works and Utilities	Ongoing	

Note: The Town of Warrenton opted against identifying new strategies during this Plan Update in order to focus on the number of ongoing efforts currently underway at the Town.

2012 Rappahannock-Rapidan Region Mitigation Strategies

Madison County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Identify the two repetitive loss properties in the county.	2005	Flood	Moderate	Staff time	None needed	Madison County Emergency Management	Ongoing	
2	Develop a HAZMAT team to handle possible spills on Route 29	2005	Hazardous Materials	Moderate	Dependent on number of team members and equipment needed	Hazardous Material Emergency Management grant	Madison County Emergency Management	As funding allows	
3	Expand emergency shelter capabilities for natural disasters and large-scale evacuation	2005	Multiple	Moderate	Dependent upon improvements needed	FEMA	Madison County Emergency Management	Ongoing	

Note: Madison County opted against identifying new strategies during this Plan Update due to staffing limitations and the desire to push resources toward previously identified strategies.

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Madison

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Improve stormwater runoff with the implementation of stormwater management techniques	2005	Flood	High	Town staff has estimates	FEMA, USDA, Soil and Water Conservation	Town of Madison Administration	As funding allows	
2	Protect utilities by placing overhead wires and cables underground	2005	High winds, tornadoes, hurricanes, winter storms	Moderate	Town staff has estimates for existing line burial; future line burial would be taken care of via ordinance amendments	CDBG	Town of Madison Administration	As funding allows, long-term	

Note: The Town of Madison opted against identifying new strategies during this Plan Update due to limited staffing and the desire to push resources toward previously identified strategies.

2012 Rappahannock-Rapidan Region Mitigation Strategies

Orange County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Identify and develop additional shelter sites for evacuees from within and outside the region	2005/2012	Multiple	High	Staff time	General fund	Orange County Department of Emergency Management	Ongoing	Modified for 2012 Plan Update.
2	Expand and fully equip Emergency Operations Center	2005	Multiple	High	$75,000	General fund, North Anna funds and grants	Orange County Administration, Emergency Management	Ongoing	
3	Expand and fully equip E-911 Center	2012	Multiple	High	$200,000	Local and grant funding	Orange County Administration, Emergency Management and Emergency Communications	As funding allows	
4	Upgrade Reverse 911 system with a modern multi-notification system	2005/2012	Multiple	High	$40,000	General fund, North Anna funds and grants	Orange County Administration, Emergency Management and Emergency Communications	Ongoing	Modified for 2012 plan.
5	Install a generator at the Orange County Courthouse facility	2012	Multiple	High	$50,000	General fund, FEMA, grants	Orange County Department of Emergency Management	As funding allows	
6	Install and replace generators in County Fire and Rescue station #21	2012	Multiple	High	$58,333	General fund, FEMA, grants	Orange County Department of Emergency Management	As funding allows	
7	Install and replace generators in County Fire and Rescue station #24	2012	Multiple	High	$58,333	General fund, FEMA, grants	Orange County Department of Emergency Management	As funding allows	
8	Install and replace generators in County Fire and Rescue station #29	2012	Multiple	High	$58,333	General fund, FEMA, grants	Orange County Department of Emergency Management	As funding allows	
9	Conduct a detailed needs assessment for the county's emergency response services	2005	Multiple	Moderate	Unknown	Local, ODP	Orange County Department of Emergency Management	Ongoing	
10	Upgrade or replace generators at communications sites throughout Orange County and add surveillance equipment. Monitoring systems should also be added to provide the following information: fuel status, generator status, temperature status, generator output status	2012	Multiple	High	$100,000	General fund, grants	Orange County Department of Emergency Management	As funding allows	
11	Retrofit Locust Grove Middle School as an emergency shelter with the addition of a generator	2012	Multiple	Moderate	$50,000	General fund, grants	Orange County Department of Emergency Management	As funding allows	
12	Retrofit Prospect Heights Middle School as an emergency shelter with the addition of a generator	2012	Multiple	Moderate	$50,000	General fund, grants	Orange County Department of Emergency Management	As funding allows	
13	Retrofit High School Field House as an emergency shelter with the addition of a generator	2012	Multiple	Moderate	$50,000	General fund, grants	Orange County Department of Emergency Management	As funding allows	
14	Apply for and obtain funding for hazard mitigation plan implementation	2005	Multiple	High	Staff time	None needed initially	Orange County Administration, Emergency Management and Emergency Communications	Ongoing	Modified for 2012 plan
15	Identify potential terrorism targets (local) and plan for their protection	2005	Terrorism	High	Staff time	State Homeland Security Grant program	Orange County Emergency Operations Center, Local Police	Ongoing	Partially covered by other existing plans
16	Incorporate Hazard Mitigation plan into Comprehensive Plan and Capital Improvements Plan	2005	Multiple	Moderate	Staff time	None needed	Orange County Administration, Department of Planning and Zoning	Ongoing	
17	Complete a stormwater drainage study/plan for known problem areas	2005	Flood	Moderate	Staff time	General Fund, grants	Orange County Department of Planning and Zoning	As funding allows	Town of Orange study reference
18	Develop and implement a multi-hazard public awareness program	2005	Multiple	Moderate	Staff time	General Fund	Orange County Department of Emergency Management and Emergency Communiciation	Ongoing	
19	Develop an internal GIS that may be used for analysis in times of emergency	2005/2012	Multiple	Moderate	Staff time	FEMA, VGIN, Local Funds	Orange County Department of Planning and Zoning	Ongoing	GIS available for review, not analysis

20	Develop and incorporate database information for GIS use	2005	Multiple	Moderate	Staff time	General fund	Orange County Department of Planning and Zoning	Deleted	Revised in 2012 plan, strategy #19
21	Identify flood inundation zones for all dams regulated through the Virginia Department of Conservation and Recreation Dam Safety program	2005	Flood	Moderate	Staff time	General fund, DCR	Orange County Department of Planning and Zoning	As funding allows	
22	Upgrade or replace outdated storage shed at the Orange County Sheriff's office	2012	Multiple	High	Unknown	General fund, FEMA	Orange County Department of Emergency Management, Sheriff's Office	As funding allows	
23	Install and replace generators in county fire and rescue stations	2005	Multiple	High	$160,650	General fund	Orange County Department of Emergency Communications	Deleted	Revised in 2012 plan, strategies #5 through 8
24	Prepare for loss of electricity at vulnerable facilities	2005	Multiple	High	Staff time	General fund	Orange County EOC	Completed	
25	Create an evacuation plan and clean up scenario in the event of a train derailment resulting in a toxic spill	2005	Hazardous Materials	Moderate	Dependent on location	HMEP grants	Orange County/Town or Orange	Completed	Included in County Emergency Operations Plan
26	Identify/prepare evacuation routes and shelter locations for natural or man-made disasters	2005	Multiple	Moderate	Staff time	General Fund, FEMA grans	Orange County EOC	Completed	Included in County Emergency Operations Plan
27	Develop a terrorism response plan	2005	Terrorism	Moderate	Staff time	General fund	Orange County Administration, EOC, Planning	Completed	Partially covered through other plans
28	Design an early warning system for hazard events	2005	Multiple	Moderate	Staff time	General fund	Orange County EOC, Law enforcement	Completed	
29	In the floodplain ordinance, identify "flooding due to manmade structure" as a concern within the County, also determine ways to regulate development within the flood inundation zones as a function of the floodplain ordinance	2005	Flood	Moderate	Staff time	General fund	Orange County Planning and Zoning	Completed	Floodplain ordinance in place
30	Prepare for radiological problems from North Anna nuclear power station	2005	Hazardous Materials	High	Staff time	HMEP grants	Orange County EOC	Completed	
31	Prevent development between Lake of the Woods Dam and the Rapidan River	2005	Flood	Moderate	Staff time	General fund	Orange County Planning and Zoning	Completed	Addressed through Dam Inundation statute

2012 Rappahannock-Rapidan Region Mitigation Strategies

Town of Orange

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Plan for derailment of freight trains which pass through center of town (4,000 pop) – Large tank cars, chlorine, anhydrous, etc.	2005	Hazardous Materials	Moderate/High	Dependent upon location and event	Hazardous Materials Emergency Preparedness grant	Town of Orange; Railroad	Ongoing	Also consider short-term safety improvements at rail crossings
2	Implement preferred recommendation of the 2006 Baylor Creek Stream Restoration Study	2012	Flood	Moderate	Dependent upon recommendations implemented	Federal/State level grants	Town of Orange Department of Community Development	As funding allows	
3	Perform floodplain mapping of Town to determine base flood elevations.	2012	Flood	Low	Staff time	None needed initially	Town of Orange Department of Community Development	As staffing allows	
4	Purchase residences in area(s) subject to recurrent flooding	2005	Flood, Hurricane, Tropical Storms	Low	Dependent on number to be acquired	FEMA, local funds	FEMA, Insurance	Dependent on several factors	Modified for 2012 plan
5	Prepare for flow of people during an emergency	2005	Multiple	Moderate	Dependent on planning and implementation	HMEP, PDM	Town of Orange	Deleted	
6	Assist in adoption of ordinance in building in known flood zones	2005	Flood	Low	Staff time	None needed	Town of Orange Community Development	Deleted	

2012 Rappahannock-Rapidan Region Mitigation Strategies

Rappahannock County

Project #	Strategy	Year Added	Hazard(s) Addressed	Priority	Estimated Cost	Funding Sources	Lead Agency/Department	Status/Schedule	Comments
1	Improve GIS data within the county in order to perform more accurate risk assessments.	2005	Multiple	Low	$10,000 to $15,000	Local Funds, Grants	Rappahannock County E-911 Coordination	Ongoing	
2	Develop/revitalize relationship with Red Cross for shelter operations planning.	2005	Multiple	High	None needed initially	None needed initially	Rappahannock County Emergency Coordination	Ongoing	
3	Join the Community Rating System program to reduce the flood insurance premiums of citizens in the Rappahannock County and to foster better floodplain management practices.	2005	Flooding	Low	$1,000 to $3,000	Local Funds	Rappahannock County Administration	Ongoing	
4	Coordinate wildfire planning with Shenandoah National Park.	2005	Wildfire	High	None needed initially	None needed initially	Rappahannock County Administration/Emergency Coordination	Ongoing	
5	Promote “Firewise” fire protection by providing literature/brochures with each building permit issued in County for rural area construction.	2005	Wildfire	Moderate	<$1,000 annually	General Funds	Rappahannock County Administration	Completed	Has been implemented and part of continuing local coordination
6	Design and build a new EOC.	2005	All Hazards	High	Unknown	General Funds, FEMA	Rappahannock County Administration	Deferred	Lack of funding
7	Identify relocation of commercial uses in floodplain	2005	Flooding	Moderate	$1 to 1.5M	FEMA HMP Grants	Rappahannock County Building Official	Deferred	Lack of funding
8	Install emergency generators at county emergency shelters – Amissville Fire Department, Washington Fire Department	2012	All Hazards	Moderate	Unknown	General Funds, FEMA	Rappahannock County Emergency Coordination	As funding allows	
9	Install emergency generators at primary county emergency shelters at Rappahannock Elementary School and Rapppahannock County High School	2012	All Hazards	Moderate	Unknown	General Funds, FEMA	Rappahannock County Emergency Coordination	As funding allows	

APPENDIX B:

FEMA CROSSWALK

Appendix B contains a copy of the Local Hazard Mitigation Plan Review Crosswalk for the 2012 RRRC Regional Hazard Mitigation Plan. The plan was submitted to FEMA in May 2012 for review.

Note: The FEMA Crosswalk will be included in the final plan, pending review and comments from FEMA.

INSTRUCTIONS FOR USING THE PLAN REVIEW CROSSWALK FOR REVIEW OF LOCAL MITIGATION PLANS

Attached is a Plan Review Crosswalk based on the ***Local Multi-Hazard Mitigation Planning Guidance***, published by FEMA in July, 2008. This Plan Review Crosswalk is consistent with the *Robert T. Stafford Disaster Relief and Emergency Assistance Act* (Stafford Act), as amended by Section 322 of the *Disaster Mitigation Act of 2000* (P.L. 106-390), the *National Flood Insurance Act of 1968,* as amended by the *National Flood Insurance Reform Act of 2004* (P.L. 108-264) and *44 Code of Federal Regulations (CFR) Part 201 – Mitigation Planning,* inclusive of all amendments through October 31, 2007.

SCORING SYSTEM
N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.
S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Each requirement includes separate elements. All elements of a requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a summary score of "Satisfactory." A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing.

When reviewing single jurisdiction plans, reviewers may want to put an N/A in the boxes for multi-jurisdictional plan requirements. When reviewing multi-jurisdictional plans, however, all elements apply. States that have additional requirements can add them in the appropriate sections of the *Local Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements. Optional matrices for assisting in the review of sections on profiling hazards, assessing vulnerability, and identifying and analyzing mitigation actions are found at the end of the Plan Review Crosswalk.

The example below illustrates how to fill in the Plan Review Crosswalk.:

Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Section II, pp. 4-10	The plan describes the types of assets that are located within geographically defined hazard areas as well as those that would be affected by winter storms.		□
B. Does the **new or updated** plan address the **impact** of each hazard on the jurisdiction?	Section II, pp. 10-20	The plan does not address the impact of two of the five hazards addressed in the plan. **Required Revisions:** • Include a description of the impact of floods and earthquakes on the assets. **Recommended Revisions:** This information can be presented in terms of dollar value or percentages of damage.	□	
		SUMMARY SCORE	□	

LOCAL MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted. Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

Prerequisite(s) (Check Applicable Box)	**NOT MET**	**MET**
1. Adoption by the Local Governing Body: §201.6(c)(5) OR		
2. Multi-Jurisdictional Plan Adoption: §201.6(c)(5) **AND**		
3. Multi-Jurisdictional Planning Participation: §201.6(a)(3)		

Planning Process	**N**	**S**
4. Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)		

Risk Assessment	**N**	**S**
5. Identifying Hazards: §201.6(c)(2)(i)		
6. Profiling Hazards: §201.6(c)(2)(i)		
7. Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		
8. Assessing Vulnerability: Addressing Repetitive Loss Properties. §201.6(c)(2)(ii)		
9. Assessing Vulnerability: Identifying Structures, Infrastructure, and Critical Facilities: §201.6(c)(2)(ii)(B)		
10. Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		
11. Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		
12. Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)		

*States that have additional requirements can add them in the appropriate sections of the *Local Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Mitigation Strategy	**N**	**S**
13. Local Hazard Mitigation Goals: §201.6(c)(3)(i)		
14. Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		
15. Identification and Analysis of Mitigation Actions: NFIP Compliance. §201.6(c)(3)(ii)		
16. Implementation of Mitigation Actions: §201.6(c)(3)(iii)		
17. Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)		

Plan Maintenance Process	**N**	**S**
18. Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(ii)		
19. Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		
20. Continued Public Involvement: §201.6(c)(4)(iii)		

Additional State Requirements*	**N**	**S**
Insert State Requirement		
Insert State Requirement		
Insert State Requirement		

LOCAL MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED	
See Reviewer's Comments	
PLAN APPROVED	

LOCAL MITIGATION PLAN REVIEW CROSSWALK

Local Mitigation Plan Review and Approval Status

Jurisdiction: Rappahannock-Rapidan Region	**Title of Plan:** Rappahannock-Rapidan Regional Hazard Mitigation Plan	**Date of Plan:** 4/20/2012
Local Point of Contact: Patrick Mauney	**Address:** 420 Southridge Parkway, #106 Culpeper, VA 22701	
Title: GIS Program Manager		
Agency: Rappahannock-Rapidan Regional Commission		
Phone Number: 540.829.7450	**E-Mail:** plmauney@rrregion.org	

State Reviewer:	**Title:**	**Date:**

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region [Insert #]		
Plan Not Approved		
Plan Approved		
Date Approved		

Jurisdiction:	**NFIP Status***			
	Y	**N**	**N/A**	**CRS Class**
1. Culpeper County, Virginia	X			
2. Fauquier County, Virginia	X			
3. Madison County, Virginia	X			
4. Orange County, Virginia	X			
5. Rappahannock County, Virginia	X			

*** Notes:** **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

LOCAL MITIGATION PLAN REVIEW CROSSWALK

Local Mitigation Plan Review and Approval Status

Jurisdiction: Rappahannock-Rapidan Region	**Title of Plan:** Rappahannock-Rapidan Regional Hazard Mitigation Plan	**Date of Plan:** 4/20/2012
Local Point of Contact: Patrick Mauney	**Address:** 420 Southridge Parkway, #106 Culpeper, VA 22701	
Title: GIS Program Manager		
Agency: Rappahannock-Rapidan Regional Commission		
Phone Number: 540.829.7450	**E-Mail:** plmauney@rrregion.org	

State Reviewer:	**Title:**	**Date:**

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region [Insert #]		
Plan Not Approved		
Plan Approved		
Date Approved		

Jurisdiction:	**NFIP Status***			
	Y	**N**	**N/A**	**CRS Class**
1. Town of Culpeper, Virginia	X			
2. Town of Madison, Virginia	X			
3. Town of Orange, Virginia	X			
4. Town of Remington, Virginia	X			
5. Town of Warrenton, Virginia	X			

*** Notes:** **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

LOCAL MITIGATION PLAN REVIEW CROSSWALK

PREREQUISITE(S)

1. Adoption by the Local Governing Body

***Requirement §201.6(c)(5)*:** *[The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Has the local governing body adopted **new or updated** plan?	Appendix D, page 1			
B. Is supporting documentation, such as a resolution, included?	Appendix D, pages 2 - 11			
		SUMMARY SCORE		

2. Multi-Jurisdictional Plan Adoption

***Requirement §201.6(c)(5)*:** *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan indicate the specific jurisdictions represented in the plan?	Section 1, page 4			
B. For each jurisdiction, has the local governing body adopted the **new or updated** plan?	Appendix D, pages 2 - 11			
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?	Appendix D, pages 2 - 11			
		SUMMARY SCORE		

3. Multi-Jurisdictional Planning Participation

***Requirement §201.6(a)(3)*:** *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process … Statewide plans will not be accepted as multi-jurisdictional plans.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan describe **how** each jurisdiction participated in the plan's development?	Section 2, pages 3 - 5			
B. Does the updated plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?	Section 1, page 4			
		SUMMARY SCORE		

PLANNING PROCESS: *§201.6(b): An open public involvement process is essential to the development of an effective plan.*

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): *[The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan provide a narrative description of the process followed to prepare the **new or updated** plan?	Section 2, pages 3 – 12			
B. Does the **new or updated** plan indicate who was involved in the **current** planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, *etc*.?)	Section 2, pages 3 – 5; Appendix C, pages 73 - 79			
C. Does the **new or updated** plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	Section 2, pages 4 – 5; Appendix C, pages 96 - 101			
D. **Does the new or updated plan discuss the** opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	Section 2, page 3; Section 9, pages 2 - 4			
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	Section 7, pages 1 - 9			
F. Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?	Section 2, page 4			
		SUMMARY SCORE		

RISK ASSESSMENT: *§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

5. Identifying Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the jurisdiction.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include **a description** of the types of **all natural hazards** that affect the jurisdiction?	Section 4, pages 1 - 29			
		SUMMARY SCORE		

6. Profiling Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the risk assessment identify the **location** (*i.e.*, geographic area affected) of each natural hazard addressed in the **new or updated** plan?	Section 5, pages 1 - 20			
B. Does the risk assessment identify the **extent** (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?	Section 5, pages 1 – 20			
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the **new or updated** plan?	Section 5, pages 1 – 20			
D. Does the plan include the **probability of future events** (*i.e.*, chance of occurrence) for each hazard addressed in the **new or updated** plan?	Section 5, pages 1 - 20			
		SUMMARY SCORE		

LOCAL MITIGATION PLAN REVIEW CROSSWALK

7. Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Section 6, pages 1 – 25			
B. Does the **new or updated** plan address the **impact** of each hazard on the jurisdiction?	Section 6, pages 1 - 25			
		SUMMARY SCORE		

8. Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): *[The risk assessment] **must** also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of *repetitive loss properties* located in the identified hazard areas?	Section 6, page 17	***Note: This requirement becomes effective for all local plans approved after October 1, 2008.***		
		SUMMARY SCORE		

9. Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A): *The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area … .*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 6, pages 1 – 25	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
B. Does the **new or updated** plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 6, pages 1 – 25	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

10. Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): *[The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate … .*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan estimate **potential dollar losses** to vulnerable structures?	Section 6, pages 1 – 25	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
B. Does the **new or updated** plan describe the **methodology** used to prepare the estimate?	Section 6, pages 1 – 25	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

11. Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(2)(ii)(C): *[The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe land uses and development trends?	Section 3, pages 5 – 14	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

12. Multi-Jurisdictional Risk Assessment

Requirement §201.6(c)(2)(iii): *For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	Section 6, pages 22 – 23			
		SUMMARY SCORE		

MITIGATION STRATEGY: *§201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

13. Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new or updated** plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards?	Section 8, page 2			
		SUMMARY SCORE		

14. Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): *[The mitigation strategy **shall** include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?	Section 8, pages 3 – 7; Appendix A, pages 2 – 13			
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	Section 8, pages 2 – 7			
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	Section 8, pages 2 – 7			
		SUMMARY SCORE		

15. Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Requirement: §201.6(c)(3)(ii): *[The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe the jurisdiction (s) participation in the NFIP?	Section 6, page 15	***Note: This requirement becomes effective for all local mitigation plans approved after October 1, 2008.***		
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?	Appendix A, page 2	***Note: This requirement becomes effective for all local mitigation plans approved after October 1, 2008.***		
		SUMMARY SCORE		

16. Implementation of Mitigation Actions

Requirement: §201.6(c)(3)(iii): *[The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	Section 8, page 6			
B. Does the **new or updated** mitigation strategy address how the actions will be implemented and administered, including the responsible department , existing and potential resources and the timeframe to complete each action?	Section 8, pages 5 – 6; Appendix A, pages 2 – 13			
C. Does the **new or updated** prioritization process include an emphasis on the use of a **cost-benefit review** to maximize benefits?	Section 8, page 6			
D. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	Section 8, page 7; Section 9, pages 1 – 2; Appendix A, pages 2 - 13			
		SUMMARY SCORE		

17. Multi-Jurisdictional Mitigation Actions

Requirement §201.6(c)(3)(iv): *For multi-jurisdictional plans, there **must** be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new or updated** plan include identifiable **action items** for each jurisdiction requesting FEMA approval of the plan?	Appendix A, pages 2 – 13			
B. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	Section 8, page 7; Section 9, pages 1 – 2; Appendix A, pages 2 – 13			
		SUMMARY SCORE		

PLAN MAINTENANCE PROCESS

18. Monitoring, Evaluating, and Updating the Plan

Requirement §201.6(c)(4)(i): *[The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe the method and schedule for **monitoring** the plan, including the responsible department?	Section 9, pages 2 - 4			
B. Does the **new or updated** plan describe the method and schedule for **evaluating** the plan, including how, when and by whom (*i.e.* the responsible department)?	Section 9, pages 2 – 4			
C. Does the **new or updated** plan describe the method and schedule for **updating** the plan within the five-year cycle?	Section 9, pages 2 – 4			
		SUMMARY SCORE		

19. Incorporation into Existing Planning Mechanisms

Requirement §201.6(c)(4)(ii): *[The plan **shall** include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?	Section 7, pages 2 – 3; Section 9, page 2			
B. Does the **new or updated** plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	Section 9, page 2			
C. Does the **updated** plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	Section 8, page 7; Section 9, pages 2 - 3; Appendix A, pages 2 - 13			
		SUMMARY SCORE		

Continued Public Involvement

Requirement §201.6(c)(4)(iii): *[The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	Section 9, pages 2 - 4			
		SUMMARY SCORE		

MATRIX A: PROFILING HAZARDS

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each natural hazard that can affect the jurisdiction. **Completing the matrix is not required**.

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each** applicable **hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Location		B. Extent		C. Previous Occurrences		D. Probability of Future Events	
	Yes	N	S	N	S	N	S	N	S
Avalanche	☐	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Erosion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Dam Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drought	☐	☐	☐	☐	☐	☐	☐	☐	☐
Earthquake	☐	☐	☐	☐	☐	☐	☐	☐	☐
Expansive Soils	☐	☐	☐	☐	☐	☐	☐	☐	☐
Levee Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐
Flood	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hailstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hurricane	☐	☐	☐	☐	☐	☐	☐	☐	☐
Land Subsidence	☐	☐	☐	☐	☐	☐	☐	☐	☐
Landslide	☐	☐	☐	☐	☐	☐	☐	☐	☐
Severe Winter Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tornado	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐	☐	☐	☐	☐
Volcano	☐	☐	☐	☐	☐	☐	☐	☐	☐
Wildfire	☐	☐	☐	☐	☐	☐	☐	☐	☐
Windstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐

To check boxes, double click on the box and change the default value to "checked."

Legend:

§201.6(c)(2)(i) Profiling Hazards
A. Does the risk assessment identify the location (*i.e.*, geographic area affected) of each hazard addressed in the **new or updated** plan?
B. Does the risk assessment identify the extent (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?
C. Does the plan provide information on previous occurrences of each natural hazard addressed in the **new or updated** plan?
D. Does the plan include the probability of future events (*i.e.*, chance of occurrence) for each hazard addressed in the plan?

MATRIX B: ASSESSING VULNERABILITY

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that the new or updated plan addresses each requirement. **Completing the matrix is not required**.

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each **applicable** hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk. Note: Receiving an N in the shaded columns will not preclude the plan from passing.*

To check boxes, double click on the box and change the default value to "checked."

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	§201.6(c)(2)(ii) Assessing Vulnerability: Overview					§201.6(c)(2)(ii) Assessing Vulnerability: Identifying Structures					§201.6(c)(2)(ii) Assessing Vulnerability: Estimating Potential Losses					
		A. Overall Summary Description of Vulnerability		B. Hazard Impact			A. Types and Number of Existing Structures in Hazard Area (Estimate)		B. Types and Number of Future Structures in Hazard Area (Estimate)			A. Loss Estimate		B. Methodology			
	Yes	N	S	N	S		N	S	N	S		N	S	N	S		
Avalanche	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Coastal Erosion	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Coastal Storm	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Dam Failure	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Drought	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Earthquake	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Expansive Soils	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Levee Failure	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Flood	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Hailstorm	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Hurricane	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Land Subsidence	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Landslide	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Severe Winter Storm	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Tornado	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Tsunami	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Volcano	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Wildfire	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Windstorm	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Other _____	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Other _____	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		
Other _____	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐		

Legend:

§201.6(c)(2)(ii) Assessing Vulnerability: Overview

A. Does the **new or updated** plan include an overall summary description of the jurisdiction's vulnerability to each hazard?

B. Does the **new or updated** plan address the impact of each hazard on the jurisdiction?

§201.6(c)(2)(ii)(A) Assessing Vulnerability: Identifying Structures

A. Does the **new or updated** plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?

B. Does the **new or updated** plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

§201.6(c)(2)(ii)(B) Assessing Vulnerability: Estimating Potential Losses

A. Does the **new or updated** plan estimate potential dollar losses to vulnerable structures?

B. Does the **new or updated** plan describe the methodology used to prepare the estimate?

MATRIX C: IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure consideration of a range of actions for each hazard. **Completing the matrix is not required.**

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each **applicable** hazard. An "N" for any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Comprehensive Range of Actions and Projects	
	Yes	N	S
Avalanche	☐	☐	☐
Coastal Erosion	☐	☐	☐
Coastal Storm	☐	☐	☐
Dam Failure	☐	☐	☐
Drought	☐	☐	☐
Earthquake	☐	☐	☐
Expansive Soils	☐	☐	☐
Levee Failure	☐	☐	☐
Flood	☐	☐	☐
Hailstorm	☐	☐	☐
Hurricane	☐	☐	☐
Land Subsidence	☐	☐	☐
Landslide	☐	☐	☐
Severe Winter Storm	☐	☐	☐
Tornado	☐	☐	☐
Tsunami	☐	☐	☐
Volcano	☐	☐	☐
Wildfire	☐	☐	☐
Windstorm	☐	☐	☐
Other _____	☐	☐	☐
Other _____	☐	☐	☐
Other _____	☐	☐	☐

To check boxes, double click on the box and change the default value to "checked."

Legend:
§201.6(c)(3)(ii) Identification and Analysis of Mitigation Actions
A. Does the **new or updated** plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?

APPENDIX C:

SUPPORTING DOCUMENTATION

Appendix C contains the following supporting documentation for the 2012 RRRC Regional Hazard Mitigation Plan:

- Meeting Announcements/Press Releases
- Meeting Agendas
- Meeting Summaries
- Steering Committee presentations
- Meeting Sign-in Sheets
- 2012 RRRC Regional Hazard Mitigation Data Collection Guide
- Public Participation Survey form

planinfo

From: Deirdre Clark [dbclark@rrregion.org]
Sent: Monday, January 11, 2010 10:28 AM
To: 'fbossio@culpepercounty.gov'; 'paul.mcculla@fauquiercounty.gov'; 'mcadmin@madisonco.virginia.gov'; 'jjordan@orangecountyva.gov'; 'jwmccarthy@rappahannockcountyva.gov'; 'jmuzzy@culpeper.to'; 'kmclawhon@warrentonva.gov'; 'townofremington@verizon.net'; 'mbkrxcy@yahoo.com'; 'smartyn@gordonsville.org'; 'townmanager@townoforangeva.org'; 'Bob.Gurtler@Aerojet.com'; 'washingtonva@earthlink.net'; 'jegertson@culpepercounty.gov'; 'bgrayson@madisonco.virginia.gov'; 'dkendell@orangecountyva.gov'; 'pmulhern@culpeper.to.'; 'Cmothersead@warrentonva.gov'; 'townplanner@townoforangeva.org'; 'smclearen@culpepercounty.gov'; 'kim.johnson@fauquiercounty.gov'; 'bgrayson@madisonco.virginia.gov'; 'mbrown@culpeper.to'; 'dmcclung@culpeper.to'; 'falderman@culpeper.to'; 'lsimmons364 @earthlink.net'; 'twilliams@culpepercounty.gov'; 'thomas.billington@fauquiercounty.gov'; 'ljenkins@madisonco.virginia.gov'; 'cjohnson@orangecova.com'; 'jclark@orangecountyva.com'; 'rvburke@rappahannockcountyva.gov'; 'cpumphrey@madisonco.virginia.gov'; 'rfinks@madisonco.virginia.gov'; 'sterlingb@ntelos.net'; 'bruce.sterling@vdem.virginia.gov'; 'khildebrand@orangecounty.gov'; 'bdeal@orangecountyva.com'; 'rthornhill@culpeper.to'; 'Cbogert@warrentonva.gov'; 'staff@warrentonva.gov'; 'rbutler@warrentonva.gov'; 'townofremington@verizon.net'; 'vseal@gordonsville.org'; 'j.dodson@townoforangeva.org'; 'jbranch@culpepercounty.gov'; 'sheriff.fox@fauquiercounty.gov'; 'mcso@ns.gemlink.com'; 'mamos@orangecountyva.com'; 'ccsmith@rappahannockcountyva.gov'; 'sbarlow@culpeper.to'; 'cnovak@warrentonva.gov'; 'townofremington@verizon.net'; 'cspare@gordonsville.org'; 'policechief@townoforangeva.org'; 'sfdumas@culpepercounty.gov'; 'rick.carr@fauquiercounty.gov'; 'rjames@germanna.edu'; 'cmjjsnider@aol.com'
Cc: 'Howard, Amy'
Subject: R-R Region All Hazard Mitigation Plan Update - Save the Date!
Attachments: Meeting1.Ltr.1.8.10.doc

Good Morning All,

Please find attached notification of our upcoming kickoff of the revision of the *Rappahannock-Rapidan Region Multi-Jurisdictional All Hazard Mitigation Plan.* A hard copy of this letter will follow by mail. Please plan to join us on Wednesday, February 3rd at the Culpeper Depot (109 South Commerce Street, Culpeper, VA 22701) from 10 AM to noon to initiate the revision process.

Please indicate your availability to attend by January 27, 2010. The names and contact information of any other applicable representatives from your locality or organization are requested by that time, as well.

Hope to see you on the 3rd!

Deirdre

Deirdre B. Clark, Regional Planner
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, Virginia 22701
540.829.7450
dbclark@rrregion.org

Rappahannock-Rapidan REGIONAL COMMISSION

COMMUTER SERVICES creative commuting solutions by RRRC

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TOWN OF GORDONSVILLE
ROBERT COINER

RAPPAHANNOCK COUNTY
JOHN W. McCARTHY
ROGER WELCH

TOWN OF WASHINGTON
JOHN FOX SULLIVAN

As of January 2010

January 11, 2010

RE: *Rappahannock-Rapidan Regional All-Hazards Mitigation Plan* Revision

Dear Stakeholder:

The Rappahannock-Rapidan Regional Commission (RRRC) is pleased to announce the receipt of a grant from the Virginia Department of Emergency Management (VDEM) to help fund the required update of the *Rappahannock-Rapidan Regional All Hazards Mitigation Plan*. Please join us on **February 3, 2010, 10am to noon,** at the **Culpeper Depot** (109 South Commerce Street, Culpeper, VA 22701) for the kick-off of this important initiative. Representatives from VDEM will be in attendance to discuss program requirements and the revision process. The original plan may be accessed at VDEM's website: http://www.vdem.state.va.us/library/plans/mitigation.cfm.

As you know, the purpose of this mandatory planning process is to help ensure region-wide preparedness for natural hazards, and local eligibility for funding under the Pre-Disaster and Hazard Mitigation Grant Programs. Input from all RRRC member jurisdictions is essential to develop a revised plan that accurately reflects local and regional hazard history, vulnerabilities and capabilities, as well as mitigation goals and strategies.

Due to the complexity and specific nature of analysis needed to complete plan requirements, RRRC welcomes your participation as well as that of any additional colleagues and members of your staff as you deem appropriate. The expertise, insight and continued involvement of community development professionals, emergency services coordinators, appointed and elected officials, transportation experts, informed citizens and others will maximize opportunities for efficiency in developing a comprehensive update.

Please call 540.829.7450 or e-mail dbclark@rrregion.org by January 27, 2010 to indicate your availability to attend this meeting. The names and contact information of any other applicable representatives from your locality or organization are requested by that time, as well.

We look forward to working with you on this initiative and appreciate your participation.

Sincerely,

Deirdre B. Clark
Regional Planner

420 Southridge Parkway, Suite 106, Culpeper, Virginia 22701
Phone 540.829.7450 Fax 540.829-7452

Rappahannock-Rapidan Region
All-Hazards Mitigation Plan Update

Concerned about local and regional hazard preparedness? Plan to participate in the update of the region's hazard mitigation plan. Following the recent award of grant funding from the Virginia Department of Emergency Management (VDEM), the Rappahannock-Rapidan Regional Commission (R-RRC) is preparing to initiate the update of the All-Hazard Mitigation Plan for Culpeper, Fauquier, Madison, Orange and Rappahannock counties and their respective municipalities. Updating the plan will help ensure region-wide preparedness for natural hazards, and meet requirements for funding eligibility under the Pre-Disaster and Hazard Mitigation Grant Programs. A revision team made up of representatives from all RRRC member jurisdictions will collaborate to develop a plan that accurately reflects local and regional hazard history, identifies vulnerabilities and capabilities, and determines mitigation strategies. Interested citizens, planning professionals, emergency services coordinators, law enforcement officers, appointed and elected officials, and transportation experts are invited to attend the kick-off of this important initiative. It will be held on **February 3, 2010, 10am to noon,** at the **Culpeper Depot** (109 South Commerce Street, Culpeper, VA 22701). Representatives from RRRC and VDEM will discuss program requirements, the revision process and participation opportunities. The original plan may be accessed at VDEM's website: http://www.vdem.state.va.us/library/plans/mitigation.cfm.



For additional information, please contact Deirdre Clark, RRRC Regional Planner, at 540.829.7450 or dbclark@rrregion.org.

planinfo

From: Deirdre Clark [dbclark@rrregion.org]
Sent: Tuesday, February 02, 2010 2:00 PM
To: 'fbossio@culpepercounty.gov'; 'paul.mcculla@fauquiercounty.gov'; 'mcadmin@madisonco.virginia.gov'; 'jjordan@orangecountyva.gov'; 'jwmccarthy@rappahannockcountyva.gov'; 'jmuzzy@culpeper.to'; 'kmclawhon@warrentonva.gov'; 'townofremington@verizon.net'; 'mbkrxcy@yahoo.com'; 'smartyn@gordonsville.org'; 'townmanager@townoforangeva.org'; 'Bob.Gurtler@Aerojet.com'; 'washingtonva@earthlink.net'; 'Lanny'; 'jegertson@culpepercounty.gov'; 'bgrayson@madisonco.virginia.gov'; 'dkendell@orangecountyva.gov'; 'pmulhern@culpeper.to.'; 'Cmothersead@warrentonva.gov'; 'townplanner@townoforangeva.org'; 'smclearen@culpepercounty.gov'; 'kim.johnson@fauquiercounty.gov'; 'bgrayson@madisonco.virginia.gov'; 'mbrown@culpeper.to'; 'dmcclung@culpeper.to'; 'falderman@culpeper.to'; 'lsimmons364 @earthlink.net'; 'twilliams@culpepercounty.gov'; 'thomas.billington@fauquiercounty.gov'; 'ljenkins@madisonco.virginia.gov'; 'cjohnson@orangecountyva.gov'; 'jclark@orangecountyva.gov'; 'rvburke@rappahannockcountyva.gov'; 'cpumphrey@madisonco.virginia.gov'; 'rfinks@madisonco.virginia.gov'; 'sterlingb@ntelos.net'; 'bruce.sterling@vdem.virginia.gov'; 'khildebrand@orangecountyva.gov'; 'bdeal@orangecountyva.gov'; 'rthornhill@culpeper.to'; 'Cbogert@warrentonva.gov'; 'staff@warrentonva.gov'; 'rbutler@warrentonva.gov'; 'townofremington@verizon.net'; 'vseal@gordonsville.org'; 'j.dodson@townoforangeva.org'; 'jbranch@culpepercounty.gov'; 'sheriff.fox@fauquiercounty.gov'; 'MCSheriff@madisonco.virginia.gov'; 'mamos@orangecountyva.gov'; 'ccsmith@rappahannockcountyva.gov'; 'sbarlow@culpeper.to'; 'cnovak@warrentonva.gov'; 'townofremington@verizon.net'; 'cspare@gordonsville.org'; 'policechief@townoforangeva.org'; 'sfdumas@culpepercounty.gov'; 'rick.carr@fauquiercounty.gov'; 'rjames@germanna.edu'; 'cmjjsnider@aol.com'; 'kathy.hatter@vdh.virginia.gov'; 'mborchers@germanna.edu'
Cc: 'Howard, Amy'
Subject: R-RRC Meeting - Hazard Mitigation Plan Update

Importance: High

Good Afternoon All,

Due to the inclement weather forecast for tomorrow, our meeting has been re-scheduled as follows:

February 23rd, 10 AM-noon
R-RRC Offices
420 Southridge Parkway, Suite 106
Culpeper, VA 22701

Please share this notice with those who might have planned to attend but were not on the original distribution list. Thank you! Looking forward to working with you on the 23rd!

Deirdre

Deirdre B. Clark, Regional Planner
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, Virginia 22701
540.829.7450
dbclark@rrregion.org

Rappahannock-Rapidan Regional Commission

420 Southridge Parkway Suite 106

Culpeper, VA 22701

PRESS RELEASE

FOR IMMEDIATE RELEASE

Date: **February 16, 2010**

Contact: **Deirdre Clark**

Phone: **(540) 829-7450**

Fax: **(540) 829-7452**

Please publish this meeting announcement in your Community Calendar/Events section. Thank you.

The Rappahannock-Rapidan Regional Commission is hosting a kickoff meeting for an update to the Regional Hazard Mitigation Plan on February 23, 2010 from 10am to 12pm at the Regional Commission offices:

420 Southridge Parkway, #106

Culpeper, VA 22701

This meeting was postponed from February 3, 2010 due to inclement weather. Please see below for additional information.

Rappahannock-Rapidan Region
All-Hazards Mitigation Plan Update

Concerned about local and regional hazard preparedness? Plan to participate in the update of the region's hazard mitigation plan. Following the recent award of grant funding from the Virginia Department of Emergency Management (VDEM), the Rappahannock-Rapidan Regional Commission (R-RRC) is preparing to initiate the update of the All-Hazard Mitigation Plan for Culpeper, Fauquier, Madison, Orange and Rappahannock counties and their respective municipalities. Updating the plan will help ensure region-wide preparedness for natural hazards, and meet requirements for funding eligibility under the Pre-Disaster and Hazard Mitigation Grant Programs. A revision team made up of representatives from all RRRC member jurisdictions will collaborate to develop a plan that accurately reflects local and regional hazard history, identifies vulnerabilities and capabilities, and determines mitigation strategies. Interested citizens, planning professionals, emergency services coordinators, law enforcement officers, appointed and elected officials, and transportation experts are invited to attend the kick-off of this important initiative. It will be held on **February 3, 2010, 10am to noon,** at the **Culpeper Depot** (109 South Commerce Street, Culpeper, VA 22701). Representatives from RRRC and VDEM will discuss program requirements, the revision process and participation opportunities. The original plan may be accessed at VDEM's website: http://www.vdem.state.va.us/library/plans/mitigation.cfm.



For additional information, please contact Deirdre Clark, RRRC Regional Planner, at 540.829.7450 or dbclark@rrregion.org.

planinfo

From: Deirdre Clark [dbclark@rrregion.org]
Sent: Wednesday, April 14, 2010 12:26 PM
To: Adrienne Garreau (adrienne@garreau.com); Amy Howard (amy.howard@vdem.virginia.gov); Amy Utley (AUtley@CulpeperHospital.com); Arthur Candenquist; Barbara Roach; Betty Grayson (bgrayson@madisonco.virginia.gov); Bill Deal; Bo Tucker; 'Bob Coiner'; Bruce Sterling; Bruce Sterling (sterlingb@ntelos.net); 'Bryan Hill'; Bryan Wolfe; Carl Pumphrey; 'Charley Banks'; Charlie Ray Fox; Chris Bogert; Chris Jenkins; Christopher Spare (cspare@gordonsville.org); Connie Novak (cnovak@warrentonva.gov); Connie Smith (ccsmith@rappahannockcountyva.gov); 'Craig Johnson'; 'Cynthia Bambara'; Danny McClung; 'David Cubbage'; Debbie Kendall (dkendall@orangecountyva.gov); E. Thomas Williams (twilliams@culpepercounty.gov); Erik Weaver (mcso@ns.gemlink.com); Frank Bossio (fbossio@culpepercounty.gov); Fritz Alderman; Gene Leggett (washingtonva@earthlink.net); 'Graham Grosveror'; James Branch Jr (jbranch@culpepercounty.gov); James Clark; James Fenwick (policechief@townoforangeva.org); James Steward (townofremington@verizon.net); Jeff Dodson (j.dodson@townoforangeva.org); Jeff Koenig; Jeff Muzzy; John Bailey; John Egerston (jegerston@culpepercounty.gov); John Harkness; John McCarthy ; Joshua Bateman (townplanner@townoforangeva.org); 'Julie Jordan'; Karen Beck-Herzog (karen_beck-herzog@nps.gov); 'Kathy Hatter'; Kenneth McLawhon; Kimberley Johnson; Kurt Hildebrand; Lanny Simmons (lsimmons364@earthlink.net); Lewis Jenkins (ljenkins@madisonco.virginia.gov); Lisa Robertson; Lou Battle; Mark Amos; 'Mark Borchers'; Maxie Brown (mbrown@culpeper.to); Maxie Rozell; Neil Drumheller; 'Patrick Mulhern'; Paul McCulla (paul.mcculla@fauquiercounty.gov); Richie Burke (rvburke@rappahannockcountyva.gov); Rick Carr; Robert Butler (rbutler@warrentonva.gov); Robert Finks; 'Robert Gurtler'; Robert Thornhill Jr (rthornhill@culpeper.to); 'Russell James'; Sabrina Martyn (smartyn@gordonsville.org); Sam McLearen (smclearen@culpepercounty.gov); Sara Makely; 'Sarah Sitterle'; Scott Barlow (sbarlow@culpeper.to); Sheila Farmer-Dumas (sfdumas@culpepercounty.gov); terry.lasher@dof.virginia.gov; Thomas Billington; Tracy Turman (TURMANT@fauquierhealth.org); 'Willie Lamar'
Subject: Rappahannock-Rapidan Regional All Hazard Mitigation Plan Update MEETING
Attachments: Agenda-WorkSession1.doc

RE: **Meeting** – April 20, 10 AM, 420 Southridge Parkway, Culpeper

Good Afternoon All,

Please see agenda (attached) for next Tuesday's meeting. We hope you'll be available to join in a discussion of the information collected to date. Please note that Christopher Strong, Warning Coordination Meteorologist, National Weather Service, will be joining us by phone to provide information on new tools that may be of interest to local governments and emergency responders and answer any questions we may have regarding weather characteristics and events in our region.

Please let me know if you plan to attend.

Thank you –

Deirdre

Deirdre B. Clark, Regional Planner
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, Virginia 22701
540.829.7450

Rappahannock-Rapidan Regional Commission

420 Southridge Parkway Suite 106

Culpeper, VA 22701

PRESS RELEASE

FOR IMMEDIATE RELEASE

Date: **April 14, 2010**

Contact: **Deirdre Clark**

Phone: **(540) 829-7450**

Fax: **(540) 829-7452**

Please publish this meeting announcement in your Community Calendar/Events section. Thank you.

The Rappahannock-Rapidan Regional Commission is hosting a steering committee meeting for the 2010 Regional Hazard Mitigation Plan update on April 20, 2010 from 10am to 12pm at the Regional Commission offices:

420 Southridge Parkway, #106

Culpeper, VA 22701

planinfo

From: Deirdre Clark [dbclark@rrregion.org]
Sent: Monday, June 28, 2010 12:00 PM
To: 'Deirdre Clark'; Adrienne Garreau (adrienne@garreau.com); Amy Howard (amy.howard@vdem.virginia.gov); Amy Utley (AUtley@CulpeperHospital.com); Arthur Candenquist; Barbara Roach; Betty Grayson (bgrayson@madisonco.virginia.gov); Bill Deal; Bo Tucker; 'Bob Coiner'; Bruce Sterling; Bruce Sterling (sterlingb@ntelos.net); 'Bryan Hill'; Bryan Wolfe; Carl Pumphrey; 'Charley Banks'; Charlie Ray Fox; Chris Bogert; Chris Jenkins; Christopher Spare (cspare@gordonsville.org); Connie Novak (cnovak@warrentonva.gov); Connie Smith (ccsmith@rappahannockcountyva.gov); 'Craig Johnson'; 'Cynthia Bambara'; Danny McClung; 'David Cubbage'; Debbie Kendall (dkendall@orangecountyva.gov); E. Thomas Williams (twilliams@culpepercounty.gov); Erik Weaver (mcso@ns.gemlink.com); Frank Bossio (fbossio@culpepercounty.gov); Fritz Alderman; Gene Leggett (washingtonva@earthlink.net); 'Graham Grosveror'; James Branch Jr (jbranch@culpepercounty.gov); James Clark; James Fenwick (policechief@townoforangeva.org); James Steward (townofremington@verizon.net); Jeff Dodson (j.dodson@townoforangeva.org); Jeff Koenig; Jeff Muzzy; John Bailey; John Egerston (jegerston@culpepercounty.gov); John Harkness; John McCarthy ; Joshua Bateman (townplanner@townoforangeva.org); 'Julie Jordan'; Karen Beck-Herzog (karen_beck-herzog@nps.gov); 'Kathy Hatter'; Kenneth McLawhon; Kimberley Johnson; Kurt Hildebrand; Lanny Simmons (lsimmons364@earthlink.net); Lewis Jenkins (ljenkins@madisonco.virginia.gov); Lisa Robertson; Lou Battle; Mark Amos; 'Mark Borchers'; Maxie Brown (mbrown@culpeper.to); Maxie Rozell; Neil Drumheller; 'Patrick Mulhern'; Paul McCulla (paul.mcculla@fauquiercounty.gov); Richie Burke (rvburke@rappahannockcountyva.gov); Rick Carr; Robert Butler (rbutler@warrentonva.gov); Robert Finks; 'Robert Gurtler'; Robert Thornhill Jr (rthornhill@culpeper.to); 'Russell James'; Sabrina Martyn (smartyn@gordonsville.org); Sam McLearen (smclearen@culpepercounty.gov); Sara Makely; 'Sarah Sitterle'; Scott Barlow (sbarlow@culpeper.to); Sheila Farmer-Dumas (sfdumas@culpepercounty.gov); terry.lasher@dof.virginia.gov; Thomas Billington; Tracy Turman (TURMANT@fauquierhealth.org); 'Willie Lamar'
Cc: 'Patrick Mauney'
Subject: RRRC Hazard Mitigation Plan Update - Meeting: July 13th

Dear RRRC Hazard Mitigation Plan Update Team,

Just a reminder of our upcoming meeting to be held on **July 13, 9AM to noon**. If you have not yet done so, please complete and return all data sheets by July 1, 2010. As was noted previously, information from all localities is needed to meet participation requirements and to assure that everyone's concerns are included as we move forward in developing mitigation strategies.

The agenda for the meeting on July 13th will focus on a summary and discussion of all data collected to date. This will include:

. An update of critical facilities – see Section 6, p. 5*
. An overview and update of regional vulnerability – see Section 6*
. Relevant plans, ordinances and programs update – see Table 7-1, Section 7, p.4*

*original plan

. Drafts of Section 1 and 3 will be circulated.

Please review Sections 6, 7 and 8 with attention to adequacy of information, changes in vulnerability and conditions since the original plan was completed and consideration for possible additional unique risks (Section 6, p. 20). In order to facilitate discussion, please bring your copy of the original plan to the meeting.

As was noted at our last meeting, the revision process will now need to include input from planning and zoning specialists in each locality.

We look forward to working with you on July 13th – please let us know if you plan to attend.

Thank you!

Deirdre

Deirdre B. Clark, Regional Planner
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, Virginia 22701
540.829.7450
dbclark@rrregion.org

Rappahannock-Rapidan Regional Commission

420 Southridge Parkway Suite 106

Culpeper, VA 22701

PRESS RELEASE

FOR IMMEDIATE RELEASE

Date: **June 28, 2010**

Contact: **Deirdre Clark**

Phone: **(540) 829-7450**

Fax: **(540) 829-7452**

Please publish this meeting announcement in your Community Calendar/Events section. Thank you.

The Rappahannock-Rapidan Regional Commission is hosting a steering committee meeting for the 2010 Regional Hazard Mitigation Plan update on July 13, 2010 from 9am to 12pm at the Regional Commission offices:

420 Southridge Parkway, #106

Culpeper, VA 22701

Subject: Rappahannock-Rapidan Regional Hazard Mitigation Plan - Draft Review Meeting
From: Patrick Mauney <plmauney@rrregion.org>
Date: 03/28/2012 8:42 AM
To: Patrick Mauney <plmauney@rrregion.org>
BCC: Sarah Sitterle <ssitterle@warrentonva.gov>, sara.makely@fauquiercounty.gov, Town of Remington <townofremington@verizon.net>, ewhite@myrec.coop, John Cooley <townplanner@townoforangeva.org>, jharkness@orangecountyva.gov, Gregg Zody <gzody@orangecountyva.gov>, cboies@lfcc.edu, cbambara@lfcc.edu, "Lasher, Terrance J. (DOF)" <Terry.Lasher@dof.virginia.gov>, etucker@warrentonva.gov, "Hatter, Kathryn (VDH)" <Kathy.Hatter@vdh.virginia.gov>, Carl Pumphrey <cpumphrey@madisonco.virginia.gov>, Betty Grayson <bgrayson@madisonco.virginia.gov>, Jim Hoy <jhoy@culpeperva.gov>, hmilans@culpeperva.gov, Arthur Candenquist <ac9725@cs.com>, Richie Burke <rvburke@rappahannockcountyva.gov>, charley.banks@dcr.virginia.gov, ndrumheller@culpepercounty.gov, John Egertson <jegertson@culpepercounty.gov>, TOM WILLIAMS <TWilliams@CULPEPERCOUNTY.GOV>, TONYA HOOSER <THooser@CULPEPERCOUNTY.GOV>, brwolfe@myrec.coop, William Lamar <mbkrxcy@yahoo.com>, Barbara Roach <broach2@verizon.net>, jeff.koenig@nps.gov, "Howard, Amy" <Amy.Howard@vdem.virginia.gov>, scott.hudson@vdem.virginia.gov, cjohnson@orangecountyva.gov, dmmclung@culpeper.to, Rick Carr <rick.carr@fauquiercounty.gov>, Patrick Mulhern <pmulhern@culpeper.to>, Bob Gurtler <bob.gurtler@aerojet.com>, Frank Bossio <fbossio@culpepercounty.gov>, Paul McCulla <paul.mcculla@fauquiercounty.gov>, John McCarthy <jwmccarthy@rappahannockcountyva.gov>, Julie Jordan <jjordan@orangecountyva.gov>, MCAdmin <mcadmin@madisonco.virginia.gov>, Greg Woods <townmanager@townoforangeva.org>, kalexander@culpeper.to, Kenneth McLawhon <kmclawhon@warrentonva.gov>

Good Afternoon,

There will be a meeting to review the draft 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan on:

Friday, April 13, 2012
9:30 AM
RRRC Conference Room
420 Southridge Parkway, #106
Culpeper, VA 22701

The draft 2012 Plan has been posted at http://www.rrregion.org/mitigation. This is an update to the original Rappahannock-Rapidan Regional Hazard Mitigation Plan, adopted by each participating jurisdiction in 2005, and includes updated data, hazard and vulnerability assessments for the region and updated mitigation strategies developed by each participating jurisdiction.

At the draft review meeting, RRRC staff will provide an overview of the Plan Update process, changes from the 2005 plan and review of local and regional mitigation strategies, will review public comments received on the draft plan and discuss the next steps in the Plan Update, including adoption at the local level.

Please feel free to contact me with any questions or comments on the draft plan and I would request that you forward this message on to others in your organization that may be interested in reviewing and/or providing comments on the draft plan.

Thank you,

Patrick Mauney
--
Patrick L. Mauney
GIS Program Manager
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, VA 22701
P: 540.829.7450
http://www.rrregion.org

Attachments:

20120413 Agenda - Draft Review Meeting.pdf 54.0 KB

Rappahannock-Rapidan Regional Commission
420 Southridge Parkway Suite 106
Culpeper, VA 22701

PRESS RELEASE

FOR IMMEDIATE RELEASE

Date: **March 19, 2012**
Contact: **Patrick Mauney**
Phone: **(540) 829-7450**
Fax: **(540) 829-7452**

Please publish this meeting announcement in your Community Calendar/Events section. Thank you.

The Rappahannock-Rapidan Regional Commission is hosting a meeting to review the draft 2012 Regional Hazard Mitigation Plan update on Friday, April 13, 2012 at 9:30 a.m. at the Regional Commission offices:

420 Southridge Parkway, #106
Culpeper, VA 22701

The draft 2012 Regional Hazard Mitigation Plan can be viewed online at http://www.rrregion.org/mitigation. Hard copies of the draft plan are viewable at the following locations:

Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, #106
Culpeper, VA 22701

Culpeper County Public Library
271 Southgate Shopping Center
Culpeper, VA 22701

Fauquier County Public Library (Warrenton Branch)
11 Winchester Street
Warrenton, VA 20186

Madison County Public Library
402 North Main Street
Madison, VA 22727

Orange County Public Library (Main Branch)
146A Madison Road
Orange, VA 22960

Rappahannock County Public Library
4 Library Road
Washington, VA 22747

Public comment on the draft plan will be accepted until 5pm on April 6, 2012. Comments can be submitted to:

Patrick Mauney
Rappahannock-Rapidan Regional Commission

420 Southridge Parkway, Suite 106
Culpeper, VA 22701

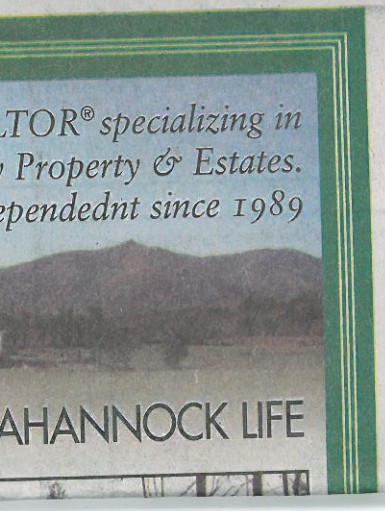
or via email to: planinfo@rrregion.org

* * *

The Rappahannock-Rapidan Regional Commission (RRRC), founded in 1973 under the Regional Cooperation Act, serves the counties of Culpeper, Fauquier, Madison, Orange and Rappahannock, and towns of Culpeper, Gordonsville, Madison, Orange, Remington, The Plains, Warrenton and Washington. One of 21 Regional or Planning District Commissions across the state, the Commission provides cost-effective planning-related technical assistance to member jurisdictions, a concerted approach to inter-jurisdictional cooperation and collaboration, and a forum for the interaction of residents, area elected officials, and agency representatives.

. and Elizabeth Aither.
e held on Tuesday, March 27,
Masonic Cemetery with Rev.
g.
norial contributions may be
hornton Gap Regular Baptist
ville, VA 22740.
d tribute wall are available at

l Chapel of Culpeper is han-



3. Seed cover
4. 15th century North America

32. Autumn color

© 2012 StatePoint Media

Meetings & Notices

Rappahannock County Board of Supervisors meets at 2 p.m. Monday (April 2) at the courthouse on Gay Street. (No 7 p.m. meeting.) Agenda includes: high school HVAC/window replacement project award; community action program update; new polling place for Stonewall-Hawthorne district; meals and lodging revenue collection and reporting; VRA financing for regional jail project; six-year secondary road plan; county employees health insurance renewal; Stormwater Management Program; commendation for RCF&R from Virginia Department of Health; elementary school playground dedication.

Rappahannock County Water and Sewer Authority meets at 5:30 p.m. Thursday (April 5) at the Rappahannock County courthouse on Gay Street.

Rappahannock-Rapidan Regional Commission hosts a meeting to review the draft 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan at 9:30 a.m. Friday, April 13 at the commission offices, 420 Southridge Parkway #106, Culpeper.

Rappahannock Hospitality and Visitors Association presents "Top 5 things you need to know about social media (Facebook, Twitter, Pinterest, YouTube) to grow your business" by Dr. Nancy Daily at 7 p.m. April 18 at the Washington Town Hall. Open to the public.

Registration for new Kindergartners is 9 to 11:30 a.m. at Rappahannock County Elementary School April 17-19 (and 1 to 3 p.m. by appointment) For more information, contact th school at 540-227-0200. All children who will reach age 5 by Sept. 30 may enter Kindergarter this August.

The deadline for the eighth annual **Artists of Rappahannock Studio & Gallery Tour**, sponsored Nov. 3-4 by the Rappahannock Association for the Arts and th Community (RAAC), is March 31 for all new artists and returning open studio hosts a galleries to contact Robert Ballard at 540-675-1411 (or robert@rhballard.com) or Nancy Raines at 540-937-569 (or nanhraines@gmail.com) if you are interested in participa ing. Artists wishing to host an open studio will be scheduled for visits April 2-13.

Rappahannock News, March 29, 2012

Orange County Review, April 5, 2012

CVRJ, capias — probation violation, March 9.

Justin Adam Pittman, 9292 Little Skyline Drive, Orange, litterin

Tyrone Anderson, 1180 Loving Road, Gordonsville, breaking and entering, March 9.

Heather Hughes, 17001 Boogie Lane, Orange, capias — failure to appear and failure to pay fines, March 9.

Michael Joseph Formica, CVRJ, six counts of violation of protection order, March 9.

Stacie Lynn Dowell, 17095 James Madison Highway, Orange, obstruction of justice and possession of alcohol after being interdicted, March 10.

James George Amirez, 340 East Street, Gordonsville, drunk in public, March 10.

Keith H Tyler, 6077 South Seminole Trail, Madison, capias — probation violation, March 10.

Tyrone Damaal Dyer, 2036

firearm during the commission of a felony, March 14.

Cedric Douglas Deberry, 272 Lindsay Drive, Orange,

March 15.

Roger Cody Gibson, 15372 Hesterline Lane, Gordonsville, burglary, robbery, use of a firearm during the commission of a felony, capias — probation violation, March 16.

Monnie Wayne Hensley, 107 Greenwich Court, Charlottesville, practice a profession without a license, March 16.

Richard Brandon Harry, 9920 Avalon Way, Fredericksburg, possession of drugs with intent to distribute, possession of marijuana, possession of oxycontin, possession or distribution of drug paraphernalia, March 17.

Aaron Atkins, 10147 Gordon Avenue, Gordonsville, trespassing, March 17.

Jeanette Elizabeth Hess, 20426 White Oak Drive,

— failure to appear, March 20.

Hunter Edward Breeden, Cranberry Lane, e, capias — grand larceny, March 21.

William James Christian, 30312 Mine Run Road, Locust Grove, unlawfully kill an animal, March 22.

Misty Van Dyke, 29267 Ratliff Lane, Rhoadesville, shoplifting, March 22.

Moore Street, Orange, threatening language over phone and annoying phone calls, March 13.

Kelly Guckert, 146 Park Street, Orange, trespass, March 14.

William H. Gallihugh, 317

Constitution Highway, Orange, capias — two counts of distribute/sell for profit a controlled substance, March 20.

Michael L. Fincham, 281 Berry Street, Orange, drunk in public, March 22.

RRRC seeks hazard mitigation plan input

Meeting on April 13

The Rappahannock-Rapidan Regional Commission is hosting a meeting to review the draft 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan Friday, April 13, at 9:30 a.m. at the Regional Commission office at 420 Southridge Parkway, #106 in Culpeper.

The draft 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan can be viewed online at www.rrregion.org/mitigation.

Hard copies of the draft plan are accessible locally at the Orange County Public Library Main Branch located at 146A Madison Road, Orange.

Public comment on the draft plan will be accepted until April 6 at 5 p.m.

Comments may be submitted to: Patrick Mauney, Rappahannock-Rapidan Regional Commission, 420 Southridge Parkway, Suite 106, Culpeper, VA 22701 or via email to: planinfo@rrregion.org.

Briefly

RVFD spring dinner on April 13

The Rapidan Volunteer Fire Department will host its spring pork tenderloin dinner Friday, April 13, 6 to 8 p.m,. at the department's home at 9729 Locust Dale Road.

The menu will consist of pork tenderloins, baked apples, green beans, mashed potatoes, rolls, beverages and dessert.

The cost is $12 for adults and $6 for children ages 12 and under.

Take outs will be available. Proceeds will go to service the building repair loan.

For more information, call 672-5744.

Check us out online at www.orangenews.com

Renew Your Spirit
WITH US AT
EASTER
THE LAKE OF THE WOODS CHURCH

Maundy Thursday – April 5, 7:00 p.m.
Remember the last supper Jesus shared with His disciples.

Good Friday – April 6, 7:00 p.m.
The sacred moments on Calvary revisited. Darkness and silence will fall over the people.

Easter Vigil – Saturday, April 7
8:00 a.m. – 1:00 p.m.
A "Time Set Apart" for reflection and prayer.

Easter Sunday, April 8

Sunrise Service, 7:00 a.m., is at Clubhouse Point

Traditional Worship Service – 8:30 & 9:45 a.m.
Sanctuary. Choir, Organ, Bells, Brass

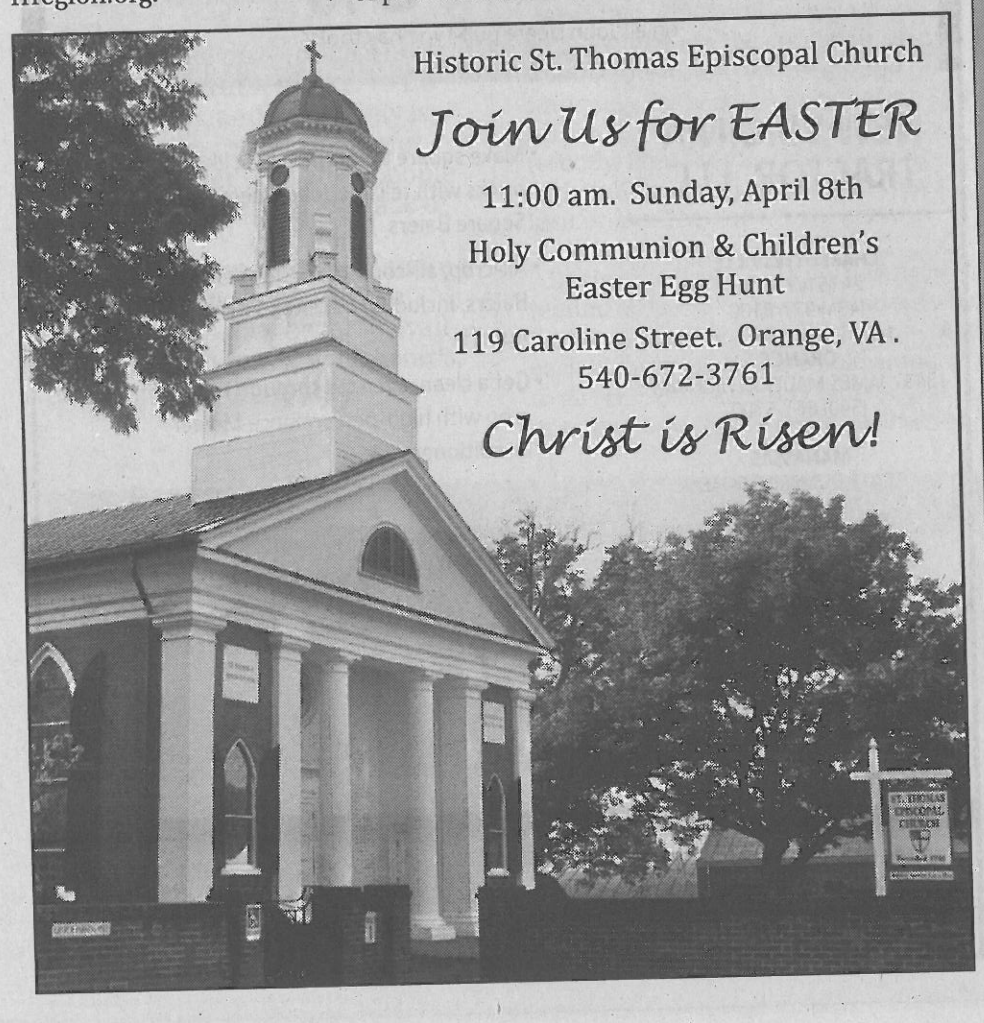
Blended Worship Service – 9:45 a.m.
Worship Center. Hymns and light contemporary praise music.

Contemporary Service – 11:00 a.m.
Worship Center. Passionate praise, music.

The Lake of the Woods security gate is open to those attending these events from outside the community.

For more details, call the Church at (540) 972-9060
Or visit www.lowchurch.org

Find us on Facebook



Historic St. Thomas Episcopal Church
Join Us for EASTER
11:00 am. Sunday, April 8th
Holy Communion & Children's Easter Egg Hunt
119 Caroline Street. Orange, VA .
540-672-3761
Christ is Risen!

Movie Times

The dates and times given below start Friday, March 23, unless stated otherwise. Call theater to verify.

CENTREVILLE

RAVE MOTION PICTURES CENTREVILLE 12
6201 Multiplex Drive, (800) 315-4000

21 JUMP STREET (R) Daily 11:20, 12:20, 1:50, 2:50, 4:40, 5:30, 7:10, 8:00, 9:40, 10:30, 12:10

A THOUSAND WORDS (PG-13) Daily 11:30, 1:45, 4:15, 6:50, 9:05, 11:20

ACT OF VALOR (R) Daily 12:00, 2:30, 5:00, 7:45, 10:15

AGENT VINOD Daily 9:45, 12:55, 4;05, 7:15, 10:25

DR. SEUSS' THE LORAX (PG) Daily 10:40, 12:50, 3:05, 5:15, 7:25, 9:35, 11:45; 3D showtimes 9:55, 12:10, 2:20, 4:30, 6:45, 8:55

JOHN CARTER (PG-13) Daily 4:50, 7:55; 3D showtimes 10:30, 1:30, 10:50

JOURNEY 2: THE MYSTERIOUS ISLAND 3D (PG) Daily showtime 9:35 a.m.

MIRROR MIRROR (PG) Starts Friday, March 30

PROJECT X (R) Daily 11:10 p.m.

THE GODFATHER Starts Thursday, March 29

THE HUNGER GAMES (PG-13) Daily 9:30, 10:00, 11:00, 11:50, 12:40, 1:10, 2:10, 3:00, 3:50, 4:20, 5:20, 6:10, 7:00, 7:30, 8:30, 9:20, 10:10, 10:40, 11:40

WRATH OF THE TITANS (PG-13) Starts Thursday, March 29

CULPEPER

REGAL CULPEPER MOVIES 4
210 S. Main St., (540) 825-7000

Movie times unavailable at press time. Call theater for information.

LEESBURG

TALLY HO THEATRE
19 West Market St., (703) 777-1168

DR. SEUSS' THE LORAX (PG) Daily 3:30 p.m.

THE HUNGER GAMES (PG-13) Daily 4:15, 7:00, 9:45

MANASSAS

MANASSAS CINEMAS
8890 Mathis Ave., (703) 368-4132

21 JUMP STREET (R) Daily 1:45, 4:00, 6:15, 8:30

DR. SEUSS' THE LORAX (PG) Daily 2:25, 4:25, 6:25, 8:15

JOHN CARTER (PG-13) Daily 2:20, 5:00, 7:35

PROJECT X (R) Daily 2:40, 4:40, 6:40, 8:40

REGAL CINEMAS MANASSAS STADIUM 14
11380 Bulloch Drive, (703) 366-2842

21 JUMP STREET (R) Daily 2:00, 2:40, 5:00, 5:40, 7:40, 8:20, 10:10, 10:50

A THOUSAND WORDS (PG-13) Daily 12:20, 4:50, 7:30, 9:50

ACT OF VALOR (R) Daily 12:50, 3:30, 6:10, 8:50

DR. SEUSS' THE LORAX (PG) Daily 1:00, 2:20, 4:40, 7:00, 8:00, 9:20; 3D showtimes 1:40, 4:00, 6:20, 8:40

FRIENDS WITH KIDS (R) Daily 1:10, 3:50, 6:30, 9:10

JOHN CARTER (PG-13) Daily 12:00, 3:00, 6:00, 9:00; 3D showtimes 12:40, 3:40, 6:40, 9:40; IMAX 3D showtimes 1:20, 4:20, 7:20

JOURNEY 2: THE MYSTERIOUS ISLAND 3D (PG) Daily 1:50 p.m.

MIRROR MIRROR (PG) Starts Thursday, March 29

PROJECT X (R) Daily 12:30, 3:10, 5:30, 7:50, 10:00

SAFE HOUSE (R) Daily 4:30, 7:10, 10:40

SILENT HOUSE (R) Daily 2:50, 5:50, 8:10, 11:00

THE HUNGER GAMES (PG-13) Movie times unavailable at press time.

WRATH OF THE TITANS 3D (PG-13) Starts Thursday, March 29

In Brief

Honor Band concert March 24

The 14th Annual Tri-County Honor Band, which includes students from Culpeper, Fauquier and Rappahannock counties, will perform a concert on Saturday, March 24, at 1:30 p.m. at Kettle Run High School.

Fauquier Times-Democrat, March 30, 2012

The 14 middle and high schools in the tri-county area nominate student musicians to participate. This year, the two bands are comprised of 210 musicians from grades six through 12.

Students will rehearse with the directors on Friday and Saturday, March 23 and 24, and conclude with a performance on Saturday afternoon at 1:30 p.m. The program will begin with the middle school band and conclude with the high school band. Admission is free.

Participating high schools and directors are Fauquier, Andrew Paul; Kettle Run, Matt Yonkey, event host; Liberty, Pat Neidich; Rappahannock, David [illegible] and Manassas Park, Lisa Eckstein.

Participating middle schools and directors are Culpeper, Rebecca Roach; Floyd T. Binns, Siobahn Dowen; Rappahannock ES, Rachel Siegfried; Warrenton, Cecile Scott; Taylor, Richard Griffith; Auburn, Lisa Mergen; Cedar Lee, Tara Neidich; and Marshall, Paul Hicks.

RRRC to review hazard plan

The Rappahannock-Rapidan Regional Commission is hosting a meeting to review the draft 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan at 9:30 a.m. Friday, April 13, at the Regional Commission offices: 420 Southridge Parkway, Suite 106, Culpeper.

The plan can be viewed online at www.rrregion.org/mitigation.

Hard copies of the draft plan are accessible at the following locations: RRRC offices; public libraries in Culpeper, Madison, Orange and Rappahannock counties; and the Warrenton branch of Fauquier County Public Library, 11 Winchester St.

Public comment on the draft plan will be accepted until 5 p.m. Friday, April 6. Comments may be submitted to Patrick Mauney, Rappahannock-Rapidan Regional Commission, 420 Southridge Parkway, Suite 106, Culpeper VA 22701. Comments may also be sent via email to planinfo@rrregion.org.

Call (540) 829-7450 or visit www.rrregion.org.

Dr. Thomas Myers
Obstetrics and Gynecology



Specializing in Women's Healthcare

National Endometriosis Awareness Month

What is endometriosis?

Endometriosis is a common health problem in women. It gets its name from the word, endometrium (en-doh-MEE-tree-um), the tissue that lines the uterus or womb. Endometriosis occurs when this tissue grows outside of the uterus on other organs or structures in the body.

Most often, endometriosis is found on the:

· Ovaries · Fallopian tubes · Tissues that hold the uterus in place · Outer surface of the uterus · Lining of the pelvic cavity · Rectovaginal septum and vagina · Cervix · Vulva · Cervix · Bladder · Intestines · In rare cases, endometriosis has been found in other parts of the body, such as the lungs, brain, and skin.

What are the symptoms of endometriosis?

The most common symptom of endometriosis is pain in the lower abdomen or pelvis, or the lower back, mainly during menstrual periods. The amount of pain a woman feels does not always [illegible]

Reaching for a hand and Touching a heart.

Spiritual Care Support Ministries

Lord, I know You created me for a special purpose
to serve You in a unique way.
You have given me talents, a certain something
no one else has.
Help me to be a valuable link in the chain of humanity.
Help me to find peace and meaning in what I do,

Academic Spotlight



CCHS
Tiffany Yowell

Junior, Age 17

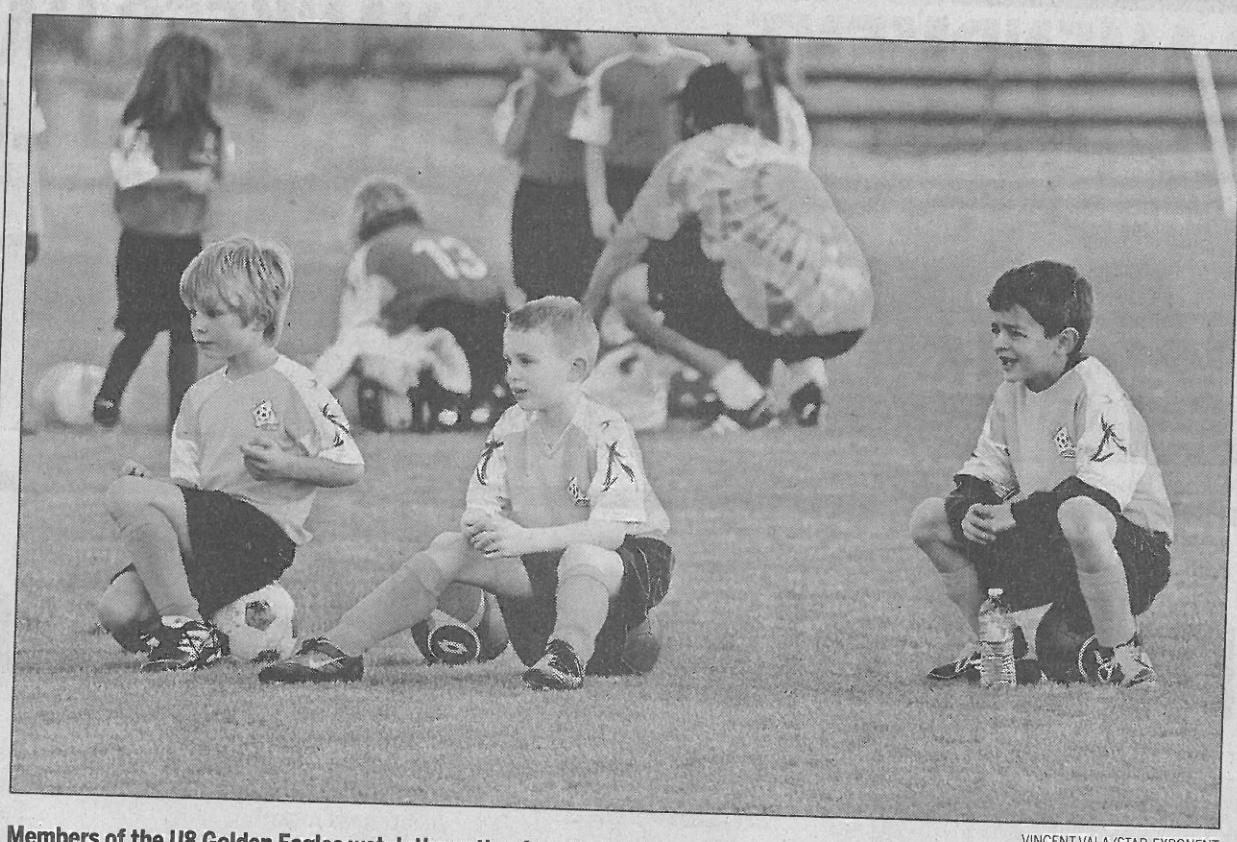
Parents: Mark & Terri Yowell
Subjects currently taking: AP Calculus, AP English, Honors History, Honors Chemistry, Honors Physics, Spanish 4
Honors and awards
9-10: "A" Honor Roll, 4.0 GPA
Extracurricular Activities
9-10: National Junior Honor Society, Girls Athletic Club
11: National Honor Society, Junior Class Club
Sports
9-11: Varsity Soccer Team — Leading Scorer, Offensive Player of the Year, 2nd Team All District (grade 9), Team MVP, 1st Team All District, 2nd Team All Regional (grade 10), Team Captain (grade 11), Travel Soccer Team
Community Service: Volunteer Coach for U6 Soccer Team
Hobbies:
Playing piano, singing, photography
Hopes, dreams, ambitions:
I plan on attending a four-year college and hopefully playing soccer for a Division 1 or Division 2 school. My major will be forensic science with a minor in Spanish. I hope to have a career with a government agency and do photography on the side. I have also thought about being an interpreter for a government agency or court system.



EVHS
Kathryn LaRosa

Junior: Age: 17

Parents: Michael & Lorraine LaRosa
Subjects currently taking: Chemistry Dual Enrollment, Spanish 3, Psychology, Math Analysis Dual Enrollment, English 11 Honors, VA US History Honors, Advanced Physical Conditioning, Computer Information Systems
Honors & awards:
9: Rising Star Math Award
11: People to People Student Ambassador
11: National Honor Society
Extracurricular activities:
9–10: Girl Scouts
9: Recycling Club
10–11: Young Life
Sports:
9, 10 & 11: Varsity Soccer
10: JV Volleyball
11: Varsity Volleyball
Community Service:
10: Monthly food distribution with Culpeper United Method-



Members of the U8 Golden Eagles watch the action from the sideline on Saturday.

VINCENT VALA/STAR-EXPONENT

Bingo events tonight

6:30 p.m. at Reva VFD, 6:45 p.m. at Culpeper Moose Lodge

TODAY

Reva VFD Bingo

Reva Volunteer Fire and Rescue will have bingo at 18230 Birmington Road, Culpeper. Doors open at 5 p.m. Dinner at 5:30 p.m. Early bird starts at 6:30 p.m. Regular bingo at 7 p.m. Smoke-free hall. Progressive pull tab jackpot. There are three progressive jackpots. Call 547-3764.

Day of Prayer

Reformation Lutheran Church, 509 S. Main St., will have an Open Door Day of Prayer from 11:30 a.m. to 12:30 p.m. and 7 to 8 p.m.

Civil Air Patrol meeting

Civil Air Patrol meets in the CAP Building at the Culpeper Airport every Tuesday evening from 7 to 9 p.m. Civil Air Patrol is open to both adults and youth in middle school and high school. Civil Air Patrol is a volunteer organization which trains cadets and senior (adult) cadets in Aerospace Eduction, Emergency Services Operations (first aid, search and rescue), physical fitness and leadership. For more information contact Lt. Col. Peter Acevedo at pacev0927@comcast.net or Lt. Col. Steve Hepperle at CAPMinuteman@gmail.com.

Bedtime storytime

Bedtime storytime at Culpeper County Library at 6:30 p.m. featuring stories, rhymes, songs, and activities. No registration. Call 825-869[illegible]

Moms In Prayer Int'L

Moms In Prayer Int'L prayer groups for moms, grandmas, etc. will have a meeting at City On a Hill Church, 1751 N. Main St., Culpeper near Culpeper High School on Tuesdays from 8 to 9 a.m. The group prays for children in pre-school through college. No child care. Contact Lesley Lezcano at 522 6466 max5896@rcn.com. Wednesdays from 10:30 to 11:30 a.m. Childcare is provided. Contact Carrie Dameron at 359-1133 carrie.dameron@cityonahill.ws

Jobs ministry program

CAN Jobs Ministry program every second and fourth Tuesday of the month from 6:30 to 8:30 p.m. at 309 N. East St. Free. Operated by volunteers. Call (703) 944-8450.

Pen-to-Paper writers meeting

Windmore's Pen-to-Paper writers meet on the first Tuesday of every month at the small conference room in the Culpeper County Library. One meeting is held from 10 a.m. to noon and another is held from 5 to 7 p.m. For beginners and experienced writers. Call 825-2890.

Culpeper Moose bingo

Culpeper Moose Lodge No. 1348 will have bingo at 6:45 p.m. Computers now available. Call 825-4570.

Bible study and prayer

Fresh Oil Christian Fellowship will have Bible study and prayer every Tuesday at 7 p.m. at Fogleman Pavilion, 1211 Grandview Ave., Culpeper.

WEDNESDAY

Spring Fling at Med Spa of Va.

Med Spa of Virginia will have their annual "Spring Fling" Evening of Beauty from 5:30 to 8:30 p.m. Presentations start at 6 p.m. Doctors and technicians will offer free presentations regarding varicose [illegible] liquid facelift with Botox and Juvederm, skin rejuvenation with cosmetic laser, skin peels and products. Door prizes all evening. Space is limited (adults only, please). RSVP at 825-8550.

Manna Ministry

Manna Ministry lunch every Monday, Wednesday and Friday from 11 a.m. until 12:30 p.m. at Culpeper Presbyterian Church. Free meal for anyone in the community.

Culpeper Junior Chess Club

Culpeper Junior Chess Club will meet from 6:30 to 8:30 p.m. at Culpeper County Library in the community room. Lessons available for beginners. Call 825-2675.

CVFD bingo

Culpeper Volunteer Fire Department, 151 W. Davis Street, will have bingo every Wednesday. Doors open at 5 p.m. Dinner at 6 p.m. Early bird starts at 6:30 p.m. Regular bingo at 7 p.m. Smoke-free hall. Two jackpots offered nightly.

THURSDAY

Salem VFD Bingo

Salem Volunteer Fire Department Bingo. Doors open at 5 p.m. Play begins at 6:45 p.m.

Family caregiver training

Family caregiver training will be offered in Madison April 12 from 1 to 4 p.m. Call 829-6405 or email kwalker@agingtogether.org for more information or to register. No fee for this seminar. Individuals caring for a loved one, friend or neighbor are encouraged to attend.

EVHS choir concert

The EVHS Choir will be presenting their second annual A cappella concert April 12 in the EVHS auditorium. The Overtones from James Madison University, including EVHS's own alumni Jeffrey Thelin, will be performing. Aftermath (Men's a cappella) and Velocity (Women's a cappella) from Eastern View and Voices and Men and Pride of Cecila from Culpeper County High School will also be performing. Tickets will be sold at the door.

Free movie

The Packard Campus Theater, 19053 Mount Pony Road, Culpeper, will show "The Southerner" at 7:30 p.m. Free. Reservations recommended. Call 827-1079 ext. 79994 or (202) 707-9994.

Community Clothes Closet

Anyone in the Culpeper community needing assistance with clothing is welcome to stop by the Community Clothes Closet located at Culpeper Baptist Church, 318 S. West St., on the first and third Thursday of each month from 10 a.m. to noon (please, no early arrivals). Call 825-8192.

Chorus seeking members

The Culpeper Minutemen Chorus (A Barbershop Harmony Chorus) has a place for you. Meetings are held every Thursday from 7:30 to 9:30 p.m. in the Chorus Room of the new Eastern View High School at the intersection of Route 29 and Route 666 (Greens Corner Road) in Culpeper. Visit our web site: www.harmonize.com/culpeper or email: earleam@aol.com or alanbret1@gmail.com or call 972-2395 or 937-3710.

FRIDAY

RRRC hosting review meeting

The Rappahannock-Rapidan Regional Commission is hosting a meeting to review the draft 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan April 13 at 9:30 a.m. at the Regional Commission offices, 402 Southridge Parkway No. 106, Culpeper. The draft 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan can be viewed online at http://www.rrregion.org/mitigation.

Calendar

Submitting announcements, news and upcoming events

Have an item you want to include on the community page? Keep it to 50 words for calendar; 100 for news and submit by 5 p.m. Tuesday
Email: events@starexponent.com
Fax: (540) 825-5211, attn: events
Mail or in person:
Culpeper Star-Exponent
471 James Madison Hwy., Suite 201
Culpeper, VA 22701 (attn: events)

News

COMMUNITY
Seedlings available at extension office

Free tree seedlings are available at the Virginia Cooperative Extension Culpeper Office.

Choices are pin oak and white pine.

The seedlings have been provided by the Department of Forestry and will be given on a first- come-first-serve basis until all are gone.

They are bare root, so please bring bags.

The Culpeper Extension Office is located at 101 S. West St.; (540) 727-3435.

COMMUNITY
Jackson to speak at FFRW meeting April 16

Founding Fathers Republican Women is proud to welcome Republican U.S. Senate candidate Bishop E.W. Jackson as their guest speaker at the next meeting on April 16.

The meeting will be held at the St. Stephens Episcopal Church Parrish Hall at 115 NE St., Culpeper, at 7:00 p.m.

As a former Marine, Harvard graduate, lawyer, author and founder of Exodus Faith Ministries, Jackson brings a wealth of education and life experience to the race.

Bishop Jackson and his family have lived in Virginia since 1998 where he has been an active member in his church and community.

A dedicated conservative, Jackson believes in the principles of limited government and individual liberty, and has made the defense of our Constitution and the principles it enshrines the focal point of his candidacy.

COMMUNITY
TJPED to release markets report results

The Thomas Jefferson Partnership for Economic Development (TJPED) will release the findings of a seven-month Comprehensive Target Markets Report as follows:

» April 11 at 10 a.m. at Piedmont Virginia Community College, Main Building Auditorium, Room 229

» April 12 at 10 a.m. at Germanna Community College, Daniel Technology Center, Main Auditorium, Room 104-A.

The comprehensive regional analysis examined the TJPED service territory that includes the City of Charlottesville and eight counties in Central Virginia. The report identifies recommended target industry groups that have the strongest local rationale and the best industry outlook for the region as well as for each of the participating jurisdictions. The report also includes

Culpeper Star-Exponent, April 10, 2012



Rappahannock-Rapidan Region All-Hazard Mitigation Plan Revision
Kick-Off Meeting

420 Southridge Parkway, Suite 106
Culpeper, VA 22701
Tuesday, February 23, 2010
10 A.M.

AGENDA

I. Welcome and Introductions

II. Project Overview

III. Amy Howard, Mitigation Planning Coordinator - Virginia Department of Emergency Management

IV Project Schedule and Tasks

V. Data Collection Guide

VI. Jurisdictional Responsibilities

VII. Steering Committee

VIII. Next Steps



Rappahannock-Rapidan Region All-Hazard Mitigation Plan Revision

Work Session #1

420 Southridge Parkway, Suite 106
Culpeper, VA 22701
540.829.7450
Tuesday, April 20, 2010
10 A.M.

AGENDA

I. Welcome and Introductions

II. Project Update
- Work Sheets 1, 2, & 3 - Data Summary To-Date
- Discussion

III. Christopher Strong, National Weather Service
Warning Coordination Meteorologist
- See links below*
- Questions/Comments

IV. Next Steps
- Worksheets 4 through 9**

V. Timeline Review

VI. Jurisdictional Responsibilities

VII. Steering Committee Update

VIII. Next Meeting

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* New emergency managers web page ... http://www.weather.gov/washington/em.php
* Advanced Hydro Prediction System (AHPS) page ... http://newweb.erh.noaa.gov/ahps2/index.php?wfo=lwx
* Mobile Weather for PDAs and cell phones ... http://mobile.weather.gov
* For Ems - PDA alerting service called iNWS with graphical and text alerts ... http://inws.wrh.noaa.gov/

****Please complete and return Worksheets 4 through 9 by May 25th, 2010 to:**

Deirdre Clark
dbclark@rrregion.org

-OR -

Patrick Mauney
plmauney@rrregion.org

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Revision

Work Session #2

420 Southridge Parkway, Suite 106
Culpeper, VA 22701
540.829.7450
Tuesday, July 13, 2010
9 A.M.

AGENDA

I. Welcome and Introductions

II. Project Update
- Data Summary
- Common Concerns

III. Critical Facilities/Assets Review and Update

IV. Next Steps
- Mitigation Action Review – 2005
- Proposed Mitigation Actions

V. Timeline Review

VI. Jurisdictional Responsibilities

VII. Steering Committee Update

VIII. Next Meeting

Deirdre Clark
dbclark@rrregion.org

Patrick Mauney
plmauney@rrregion.org



Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012

Draft Review Meeting

420 Southridge Parkway, Suite 106
Culpeper, VA 22701
540.829.7450
Friday, April 13, 2012
9:30 A.M.

AGENDA

I. Welcome and Introductions

II. Draft Plan Review
- Planning Process Overview
- Changes from 2005 Hazard Mitigation Plan
- Review of Mitigation Strategies

III. Review of Public Comments

IV. FEMA Hazard Mitigation Assistance Program Review
- Grant Programs
- Fundable Projects

V. Next Steps
- Submission to VDEM, FEMA
- Adoption at local level
- Future Plan Maintenance

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Revision
Kick-Off Meeting
Rappahannock-Rapidan Regional Commission

Meeting Minutes – February 23, 2010

Attendees:

Deirdre Clark	Rappahannock-Rapidan Regional Commission
Amy Howard	Virginia Department of Emergency Management
Charley Banks	Virginia Department of Conservation and Recreation
Bruce Sterling	Virginia Department of Emergency Management
Neil Drumheller	County of Culpeper
Willie Lamar	Town of Madison
Brian Wolfe	Rappahannock Electric Cooperative
Sarah Sitterle	Town of Warrenton
Jeff Koenig	National Park Service/Shennandoah National Park
Danny McClung	Town of Culpeper
Fritz Alderman	Town of Culpeper
Terry Lasher	Virginia Department of Forestry
Chris Jenkins	Town of Culpeper
Scott Roy	Town of Culpeper
Adrienne Garreau	Fauquier County
Lou Battle	Warrenton Police Department
Arthur Candenquist	Rappahannock County
Kathy Hatter	Virginia Department of Health
Sara Makely	Fauquier County
Graham Grosvers	Fauquier County
Bo Tucker	Town of Warrenton
Patrick Mauney	Rappahannock-Rapidan Regional Commission
Jenny Biche'	Rappahannock-Rapidan Regional Commission

Project Overview

Deirdre Clark, Regional Planner
Rappahannock-Rapidan Regional Commission

Ms. Clark provided the attendees with folders that included a timeline for project tasks, a time and travel log, and a data collection guide. Everyone was asked to maintain their time and travel log and return the completed worksheets 1-3 to Mrs. Clark or Patrick Mauney by March 17, 2010 (see contact information listed below). Mrs. Clark reminded those present that each jurisdiction had pledged to participate fully in the plan revision, and that the time and travel log and data collection guide would provide documentation of in-kind services and materials associated with their participation.

The Data Collection Guide contains worksheets that will facilitate the collection of data needed to update the Regional All-Hazard Mitigation Plan. Attendees were asked to review the existing plan at: http://www.vdem.state.va.us/library/plans/mitigation.cfm or email Ms. Clark for a copy of the plan on a CD.

The Disaster Mitigation Act of 2000 requires that state and local governments develop and adopt a hazard mitigation plan in order to be eligible for federal mitigation grant funding. These funds include the Hazard Mitigation Grant Program and the Pre-Disaster Mitigation program, both of which are administered by the Federal Emergency Management Agency under the Department of Homeland Security. Participation in the Regional All-Hazard Mitigation Plan will allow localities to be eligible for either program.

The Regional All-Hazard Mitigation Plan is comprised of the following components:

- **The Risk Assessment Process**-comprised of three components: hazard identification, vulnerability assessment and capability assessment
- **Critical Asset/Vulnerability Assessment**-which will result in a detailed inventory of: essential infrastructure, vulnerable facilities, hazardous materials facilities and natural assets
- **Capability Assessment**-made up of: regulatory tools, administrative/technical resources, fiscal and capabilities narrative

Amy Howard, Mitigation Planning Coordinator
Virginia Department of Emergency Management

Ms. Howard stated that she is also the contact for FEMA projects. Her power-point presentation may be viewed on line at www.rrregion.org. She suggested forming subcommittees based on committee member expertise. An example would be a flood subcommittee or snow subcommittee made up of representatives from each locality that had experience handling those types of disasters. It is also required that the plan include public participation. This can be done through outreach, media, workshops, information on electric bill inserts, etc. Have citizens know what mitigation is and provide measureable strategies in the plan. Ms. Howard encouraged the committee to cooperate and work with other localities outside the region. It was mentioned that evacuees of the Washington Metropolitan area would travel to this region and therefore conversations with representatives from that area would be beneficial.

The Hazard Assessment worksheets that were provided in the folders will first be completed locally, then combined regionally. Localities that have access to relevant maps were asked to forward that information to Patrick Mauney so that he may compile the regional data. Links were provided in the power point presentation to assist each locality in completing their risk assessment. The NCDC website can provide snowfall records and the VDEM website contains local data.

Examples of vulnerability include people with pets (identify hotels or shelters that will allow evacuees to bring their pets), the aging population and families with small children. FEMA's HAZUS software enables users to identify the annual dollar loss for a particular disaster and computes vulnerability indexes. For example, if the roof of a local high school collapsed, HAZUS could be used to determine the annual cost of the loss for that community. HAZUS is available to each locality and training can be provided.

Under Goals & Strategies, focus should be on implementation. Localities should review earlier goals and strategies and determine if they were accomplished - did you do what you said you would

do? If a strategy was eliminated or changed due to staff turn over or lack of funding, state so in the plan. Livestock may be an issue in the event of an evacuation that may need to be addressed in the plan. Should Washington DC evacuate to the region, how will the region accommodate the masses? The plan will be reviewed every five years; however Ms. Clark will work with localities to provide yearly reports. It was suggested that at this time it might be wise to list a department as a contact rather than a particular person in the event of staff turn over.

In the original plan, Human Related Disasters was not the focus, and it was suggested that the committee review and analyze it further and expand the committee to include the local hospitals and community colleges. Ms. Howard stated that if the plan were to include information on terrorism, two editions would need to be created; one for public viewing and one to remain confidential. FEMA will assign a tracking identification number to monitor those who utilize the confidential plan. A comment was made that after 9/11 local maps removed the identification of such buildings as water treatment facility locations and that the committee may want to take that into consideration as they go forward with their planning. Lastly, communication was identified as a key component in the success and accuracy of the plan and the committee will look at how to effectively do that in a rural area.

Project Schedule and Tasks

Each attendee will complete worksheets 1-3 and forward the information to Ms. Clark or Mr. Mauney by March 17, 2010. At that time Ms. Clark will compile the information and the committee will meet in April, 2010 to review the findings. Progress reports will be on-going and will include the information provided on the time and travel log each committee member is maintaining.

Data Collection Guide

Additional forms and worksheets may be accessed at www.rrregion.org. The Data Collection Guide was created based on a template and therefore some information/questions may relate to our region and some may not. The information requested is an update only. The original plan should be reviewed before completing the Guide. Ms. Howard stated that FEMA prefers at least one new strategy per locality in each update of the plan. Once worksheets 1-3 have been completed, the committee can reconvene to look at the remaining worksheets. Worksheet 1 lists the possibility and frequency of each hazard. Worksheet 2 provides the opportunity to comment on specific hazards and provide documentation of each. Ms. Howard suggested that each hazard should be evaluated seasonally when considering its effect. For example, flooding in a local park may not be as disruptive to users in winter as it might be in spring or summer. It was observed that Pandemic Disasters were not included in the worksheets. It will be up to the committee to decide if they wish to add Pandemics and other events. Discussion of all hazards is encouraged to assure full consideration of possible events.

Jurisdictional Responsibilities

Attendees from each locality were asked to complete "team" forms requiring contact information for individuals in specific departments in their town or county. These should be forwarded to Ms. Clark or Mr. Mauney within the next few weeks. It was recognized that not all jurisdictions have staff serving in these specific roles or that one staff member might serve as a point of contact for many types of information. Contact details provided will facilitate requests for information in the future. Absent were representatives from the towns of Gordonsville, Remington, and Orange, as well as The Plains and Orange County.

Steering Committee

Ideally, each locality will be represented on the Steering Committee (see attachment). This representative will be the point of contact for their locality and report back to their community. As planned. the Steering Committee will meet quarterly; however, subcommittees may meet more frequently.

Next Steps

- Each representative will review the original Region All-Hazard Mitigation Plan
- Each representative will complete worksheets 1-3 and return by March 17, 2010 focusing on new data and inter-jurisdictional data from the last five years
- Pay attention to the increase in population and its effects (new schools, new transportation issues, new fire stations, etc.)
- Look ahead—where do we need to improve?
- Focus on tasks we **CAN** do
- Talk to your colleagues and get them involved, discuss with the public
- Provide contact information for local citizens who may want to participate, focusing on aging population and families with young children

NEXT ALL-HAZARD MITIGATION PLAN REVISION MEETING: April XX, 2010

Deirdre Clark
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, VA 22701
dbclark@rrregion.com
(540) 829-7450

Patrick Mauney
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
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plmauney@rrregion.com
(540) 829-7450

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Revision

Rappahannock-Rapidan Regional Commission

Meeting Minutes – April 20, 2010

Attendees:

Fritz Alderman	Town of Culpeper
John S. Bailey	Town of Orange
Charley Banks	Virginia Department of Conservation & Recreation
Jenny Biche'	Rappahannock-Rapidan Regional Commission
Arthur Candequist	Rappahannock County Emergency Management
Deirdre Clark	Rappahannock-Rapidan Regional Commission
Graham Grosvenor	Fauquier County Emergency Management
John Harkness	Orange County
Kathy Hatter	Virginia Department of Health
Amy Howard	Virginia Department of Emergency Management
Debbie Kendall	Orange County
Sarah Makely	Fauquier County Emergency Management
Patrick Mauney	Rappahannock-Rapidan Regional Commission
Carl Pumphrey	Madison County
Sarah Sitterle	Town of Warrenton
Bruce Sterling	Virginia Department of Emergency Management
Bo Tucker	Town of Warrenton

Introductions were made and attendees were asked to sign in and complete the Log Match Sheet*. Each locality had previously signed an agreement stating they will supply match to the grant that may include labor and travel.

Deirdre Clark, Regional Planner
Rappahannock-Rapidan Regional Commission

Planning Process-Where are we?

Stage One should be completed by July, 2010. This includes summary and evaluation of the following aspects:

- Hazard ID & Risk Assessment
- Assets
- Vulnerability
- Capability Assessment

Currently, Stage One is incomplete; we are only at "Hazard ID & Risk Assessment." Stage Five: "Adoption and FEMA Final Approval" will require significant time to complete, so everyone is encouraged to complete their assignments in a timely fashion.

Worksheet #1: Hazards list is **incomplete**. All hazards listed are considered probable except:

- Avalanches
- Landslides due to earthquake
- Military accidents
- Transit-subway
- Volcanic-eruptions and ash

Under Hazards identified as High Intensity, Rappahannock County reported impacts from air transportation as a risk since Dulles Airport's flight paths, as well as those serving local airports, pass directly over Rappahannock and some surrounding areas.

Worksheet #2: Historic Hazard Events

Fauquier County was the only locality that listed the snow storms in December 2009 and February 2010 as historic events. It was noted that both storms were declared disasters by the Commonwealth. The December storm was declared a federal disaster. That determination has not yet been made regarding the February storm. Please review what state disasters have been declared in your locality since 2005 and record on worksheet #2.

Worksheet #3: Unique Hazard Risk

Terry Lasher, Virginia Department of Forestry, Warrenton Office, states that portions of each county in our region within response area are at risk of wildland fires. The USDA Department of Forestry defines Wild Urban Interface as "…zone where structures and other human developments meet, or intermingle with, undeveloped wildlands…where wildfire poses the biggest risk to human lives and structures. Terry provided maps (see Work Session 1 power-point*) identifying structures at risk in Rappahannock and Culpeper counties. As the housing development increases over the next several years, more and more people will build in the rural, mountainous areas of the region, increasing the hazard risk. Identify now what tools will be needed and determine whether or not they are currently available.

Christopher Strong, Warning Coordination Meteorologist
National Weather Service
Teleconference

Mr. Strong stated that our region was at risk for every weather threat except tidal surge from hurricanes. Flooding, tropical storms and flash flooding were identified as the greatest risk for the region. Tornados, thunderstorms with severe winds or hail, snow storms and fog threats should also be considered. Localities should have a warning coordination plan that will provide information to the public quickly and efficiently. Examples include the NOAA radio system that provides text alerts to the general public and Fire Support that enables state emergency staff to receive daily reports that are point specific. NOAA radio alerts can be accessed by PDAs, cell phones and home phones.

Rappahannock County shared information about their "Code Red" system that has had a directly beneficial impact on their response. They have utilized it both for wildland fires and for the recent snow storm. Warning information is sent to citizens who subscribe via email, text messaging, or voice mail. There is no charge to the citizens for this service. Fauquier County is looking at a similar system. It was suggested that IFLOW, a program that uses rain gauges to predict flash flooding, be incorporated into the Code Red or selected warning coordination system. Localities need to be able to identify and locate the threat and communicate the information to its citizens quickly.

Mr. Strong provided links (see Agenda 4/20/10*) that may be helpful when completing the worksheets and researching alert systems. He suggested reviewing "inws", an interactive National Weather Service site that provides timely weather information.

NEXT STEPS: Worksheets 4 through 9

Worksheets 4 & 5: Determining Vulnerability

Inventory Your Assets

- Critical facilities (hospitals, police stations, schools, pet shelters, etc.) & vulnerable populations (low income, people with pets, handicap, elderly, etc.);
- Number of buildings, infrastructure and critical facilities at risk/located in hazard areas (has been built or had a change in structure in the last five years: i.e., school roof replaced due to snow storm damage);
- Indentify repetitive loss properties & severe repetitive loss properties (Amy Howard can provide a list of repetitive losses for your area—includes only those structures that had flood insurance and filed a claim).

Inventory what is available and what is needed: i.e. Transportation options for citizens during an evacuation. How will you reach the elderly/disabled in rural areas and what will they need to be able to evacuate? Local utility companies may assist by furnishing information/surveys in their utility bills to their customers. What options do citizens have for their pets or livestock should they need to evacuate?

Worksheets 6, 7, 8 & 9: Capability Assessment

- What resources are available?
- What are our limitations?
- Regulatory/Administrative/Technical/Fiscal

What's in place now? What do we need? Do you have a warning system? Looking at growth & development, is it effective? Efficient?

Capability Assessment:

- Measures each jurisdiction's competency and ability to implement hazard mitigation activities
- Identifies existing gaps, conflicts, weaknesses in local programs, plans and policies (mitigation opportunities that grants may address)
- Identifies mitigation measures already in place (FEMA requires a blanket statement that evaluates, acquires or mitigates a floodplain strategy)
- Identifies mitigation opportunities (i.e. Fire grant debris clean up/maintenance, NOAA radio/Reverse 911, etc.)

Plan, Policy Program or Ordinance in place? Does it need improvement? Who responds? Each locality is asked to complete "R-RRC All Hazard Mitigation Plan Revision Team worksheets 4-9*. If the locality is listed separately in the grant, then each locality must be represented. The representative may be a citizen, it is not required that the representative be a staff person.

Capability Indicators

- National Flood Insurance Program (NFIP) participation
- Community Rating System (CRS) participation
- Building Code Effectiveness Grading Schedule (BCEGS)
- Fire-wise Community

STAGE TWO—Are we there yet?

- Mitigation Goals and Objectives
- Development of Mitigation Strategies

Risk & Capability Assessment = Foundation for Identification of Mitigation Actions

GOALS AND STRATEGIES

- Review your locality's current goals (on line at www.rrregion.org/mitigation.html) and determine relevance (list may need to be edited as some goals may be unattainable and we will be required to be accountable for them to FEMA)
- Determine progress in terms of existing mitigation strategies
- Develop new strategies that reflect updated risk and capability assessments

The next meeting is **tentatively** scheduled for Tuesday, June 15, 2010 at 10:00am at the Rappahannock Rapidan Regional Commission. Each locality is asked to determine who would be the best participant from their staff to address the issues in the next stage (staff familiar with ordinances, codes, compliances, etc.). Please forward their contact information to Deirdre Clark prior to the next meeting.

NEXT ALL-HAZARD MITIGATION PLAN REVISION MEETING:
Tentatively scheduled for June 15, 2010 @ RRRC

Deirdre Clark
R-RRC
420 Southridge Parkway, Suite 106
Culpeper, VA 22701
dbclark@rrregion.com , 540.829.7450

Patrick Mauney
R-RRC
420 Southridge Parkway, Suite 106
Culpeper, VA 22701
plmauney@rrregion.com, 540.829.7450

* All referenced documents may be accessed at http://www.rrregion.org/mitigation.html.

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Revision
Work Session #2
Rappahannock-Rapidan Regional Commission
Meeting Minutes – July 13, 2010

Attendees:

Fritz Alderman	Town of Culpeper
Cynthia Bambara	Lord Fairfax Community College
Josh Bateman	Town of Orange
Jenny Biche'	Rappahannock-Rapidan Regional Commission
Chris Boies	Lord Fairfax Community College
Deirdre Clark	Rappahannock-Rapidan Regional Commission
John Harkness	Orange County
Debbie Kendall	Orange County
Terry Lasher	Virginia Department of Forestry
Sharon Lee	Town of Remington
Patrick Mauney	Rappahannock-Rapidan Regional Commission
Isabel McLoughlin	Rappahannock-Rapidan Regional Commission
Jimmy Steward	Town of Remington
Eric White	Rappahannock Electric Cooperative

Overview

Following introductions, attendees were asked to sign in and complete the Log Match Sheet* to document time and travel as required by the grant agreement.

Deirdre Clark provided a project update. Discussion focused on the following concerns:

- Stage One: Currently incomplete; requires that all participating localities provide information regarding:
  - Hazard ID & Risk Assessment
  - Assets
  - Vulnerability
  - Capability Assessment
- Mitigation strategies and actions must be specific and linked to gaps and/or needs identified by the locality;
- The development of mitigation strategies and actions will require collaboration among staff and elected officials from each locality;
- All required reviews, approvals and adoption must be completed by the end of October, 2011;
- Public meetings will be held to assure inclusion of all interests and concerns;
- A comprehensive review of all plan sections is required. Each participating locality must provide updated information (MOA:10.08)
- Review of information provided to date (see Mitigation Plan Update, Workshop #2, July 13, 2010: http://www.rrregion.org/mitigation.html).

Next steps - Assets and Critical Facilities Inventory - findings lead to Stage Two:

- Identification of mitigation goals and objectives
  - Review your locality's current goals* and determine relevance
  - Determine progress in terms of existing mitigation strategies
  - Hold meetings with planners, first responders, and other appropriate individuals to analyze, list and discuss opportunities
- Develop new strategies that reflect updated risk and capability assessments
- Risk and capability assessments are the foundation for the identification of mitigation actions
  - Gaps equal opportunities

Patrick Mauney provided information on HAZUS software data that will be used to identify and inventory local resources. He indicated that the HAZUS inventory is not necessarily comprehensive. Each jurisdiction is encouraged to add assets and critical resources to the inventory. Clarification of these categories was provided as follows:

- Asset - any manmade or natural feature that has value, including people; buildings; infrastructure such as bridges, roads, sewer and water systems; lifelines such as electricity and communication resources; and environmental, cultural, or recreational features such as parks, dunes, wetlands, and landmarks
- Critical facility - those that are essential to the health and welfare of the locality and especially important in disaster management and recovery. Critical facilities include transportation systems, lifeline utility systems, high potential loss facilities, and hazardous material facilities. Each locality needs to determine and identify its assets and critical facilities. Examples to consider include:
    - Government Offices
    - Water Supply Systems
    - Water Treatment Facilities
    - Transportation Systems
    - Nursing Homes
    - Electric Company
    - VDOT Maintenance Facilities
    - Public Transportation (school buses for evacuation)

The vulnerability of critical facilities must be carefully considered. Worksheet #4 of the Data Collection Guide might be helpful in making that determination.
It was suggested that in addition to the facilities themselves, thought be given to the infrastructure that serves them.

Mitigation Action Worksheets and Guidelines are provided to assist with the next phase of the revision. Consider partnering with adjacent/regional partners across county/town lines and discuss opportunities. Review findings from 2004, as well as most recent updates provided to VDEM in 2009, and ask:

- Are they still relevant?
- Are they achievable?
- Should they be eliminated/reconsidered/updated/improved?
- Does the technology need to be updated?

In order to allow time for discussion and collaboration, Mitigation Action Worksheets should be completed by late September 2010. R-RRC will be happy to meet to discuss proposed actions and the overall plan. The Steering Committee will meet quarterly to:

- Discuss proposed mitigation actions and review to identify collaborative opportunities
- Schedule and plan public meetings
- Review section drafts
- Plan the review and approval process

Worksheets 1-9 are now due.

If anyone has any questions or needs assistance, please contact:

Deirdre Clark
R-RRC
420 Southridge Parkway, Suite 106
Culpeper, VA 22701
dbclark@rrregion.com , 540.829.7450

Patrick Mauney
R-RRC
420 Southridge Parkway, Suite 106
Culpeper, VA 22701
plmauney@rrregion.com, 540.829.7450

* All referenced documents may be accessed at http://www.rrregion.org/mitigation.html.

Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012

Rappahannock-Rapidan Regional Commission

Meeting Minutes – April 13, 2012

Attendees:

Patrick Mauney	Rappahannock-Rapidan Regional Commission
Gregg Zody	Orange County
John Cooley	Town of Orange
Tom Williams	Culpeper County Emergency Management
Tonya Hooser	Culpeper County Emergency Management
Scott Hudson	Virginia Department of Emergency Management
Arthur Candequist	Rappahannock County Emergency Management
Sara Makely	Fauquier County Emergency Management
Bo Tucker	Town of Warrenton
Hank Milans	Town of Culpeper

P Mauney welcomed meeting participants and thanked them for the continuing participation and support for the Plan Update. Meeting attendees introduced themselves and explained their role in the Hazard Mitigation planning effort.

Patrick Mauney, GIS Program Manager
Rappahannock-Rapidan Regional Commission

Rappahannock-Rapidan Regional Hazard Mitigation Plan Draft Review

P Mauney reviewed the Regional Hazard Mitigation Plan Update process, including discussion of the data collected from the participating jurisdictions and stakeholders:

- Hazard Inventory & Probability
- Historic Hazard Events
- Unique Hazard Identification
- Critical Facilities/Asset Inventory
- Local & Regional Capability Assessment
    - Regulatory
    - Administrative
    - Fiscal
    - Technical
- Mitigation Strategy Updates/Additions

In 2010, three stakeholder meetings were held, offering local and regional stakeholders the opportunity to provide data and gather information to be utilized in completing the plan updates. Several jurisdictions completed the data collection guides during this time frame. Updated GIS mapping, hazard assessment and analysis and vulnerability analyses were completed in late 2010 and early 2011. Also in 2011, the Regional Commission reached out to the other jurisdictions and held individual meetings with these stakeholders in order to complete the data collection process and the draft plan was released in March 2012 for review by the public.

Changes from 2005 Plan

P Mauney reviewed the major changes from the 2005 Regional Hazard Mitigation Plan.

- Complete Data Update: Sections 3 (Regional Profile), 4 (Hazard Identification), 5 (Hazard Analysis) and 6 (Vulnerability Analysis) all were updated to reflect changes in demographics and hazard events since the drafting of the 2005 Plan

- Section 5 (Hazard Analysis) was updated to include references to hazard events that occurred since the 2005 Plan, including the major winter storms of 2009-2010 and the August 2011 Earthquake
- Section 6 (Vulnerability Analysis) was updated to include:
    - Additional unique hazards identified
        - Town of Culpeper: Dam/Levee Failure at Mountain Run Lake and Lake Pelham
        - Culpeper County: Earthquake (higher risk relative to region)
    - Revised Vulnerability Estimates based on HAZUS modeling, floodplain updates
        - HAZUS modeling for Earthquake, Hurricane and Flood
        - GIS-based Flood Analysis using updated parcel and tax-value information and updated DFIRM maps, as applicable
    - Revised Hazard Rankings
        - High Hazards (Same as 2005): Flood, Hurricane/Tropical Storm, Winter Storms
        - Moderate Hazards: Drought, Severe Thunderstorm/Tornado, Wildfire (identified as low-risk in 2005 plan)
- Appendix A: Mitigation Strategy Updates
    - Review of Regional Strategies: Addition of several strategies related to flood, earthquake and wildfire in response to risk rankings in section 6
    - Local Strategies updated to reflect completion, progress and/or deletion

NEXT STEPS: Draft Plan Submission to VDEM & FEMA

No Public Comment was received prior to the April 6, 2012 closing date. Jurisdictions are welcome to send additional changes to P Mauney within 1 week (April 20, 2012) before the Regional Commission will send the draft plan to VDEM for review. The remaining steps will include:

- Late April 2012: Submission to VDEM for review (30 day review)
- May 2012: Incorporation of requested changes from VDEM
- Late May 2012: Submission to FEMA for review
- June 2012: Incorporation of requested changes from FEMA
- Summer 2012: Conditional Approval (pending adoption) expected from FEMA
- Summer 2012: Local Adoption process begins

* All referenced documents may be accessed at http://www.rrregion.org/mitigation.html.

Rappahannock- Rapidan Kick-Off Meeting

February 23, 2010

Culpeper, Virginia



Why does hazard mitigation matter?

Hazard Mitigation

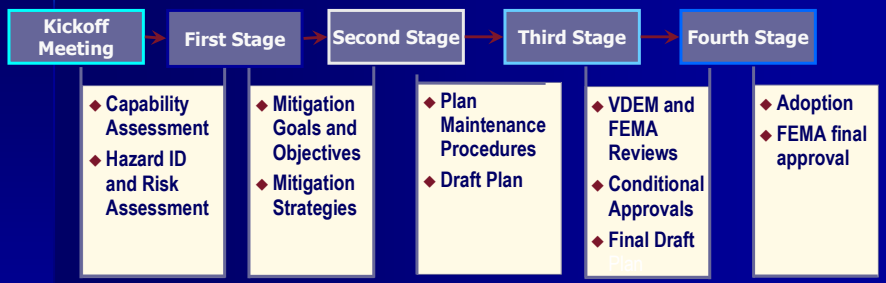
…is a sustainable action that will reduce or eliminate injury to citizens, damages to structures and allow continuity of critical society functions…



Support of Floodplain Mitigation Efforts

- Support the participation of your communities in the NFIP, as needed.
- Support the implementation and enforcement of floodplain ordinances, as needed.
- Work with local officials and real estate professionals to promote flood insurance policies.

Planning Process:



Role of PDCs in Planning Process

- Coordinate the process
- Ensure participation of all jurisdictions
- Manage resources

Build the Planning Team

- Determine necessary resources
- Form subcommittees if necessary
- Organize the team
- Establish responsibilities

Involve the Public

- Invite to Steering Committee meetings
- Use local media
- Distribute literature
- Conduct outreach activities
- Host public workshops
- Encourage public to review plan

Capability Assessment

- How capable is each locality and the region to implement successful mitigation actions?
- What resources are available?
- What are your limitations?

Rappahannock Rapidan Regional Commission Geographical Area

- Includes the counties and Towns of Culpeper, Fauquier, Madison, Orange and Rappahannock, Virginia
- The region stretches from Shenandoah National Park in the west to within forty miles of Washington D.C. to the east
- The North Anna River which flows into Lake Anna, location of the North Anna Nuclear Power Plant, marks the southern most boundary of the region.
- The topography varies from mountainous in the west to rolling piedmont in the east.
- The area is predominately rural, the region is punctuated by increasingly urbanized and growing towns and centers.

Rappahannock Rapidan Overview and Population

Population Change (By County): 2000-2007

	2000 Population	2007 Population (Provisional)	Population Change (+/-)	Population Change (%)	Percent of Regional Population (%)
CULPEPER	34,262	45,723	11,461	33.45%	27.63%
FAUQUIER	55,139	66,328	11,189	20.29%	40.09%
MADISON	12,520	13,719	1,199	9.58%	8.29%
ORANGE	25,881	32,492	6,611	25.54%	19.64%
RAPPAHANNOCK	6,983	7,199	216	3.09%	4.35%
REGION	**134,785**	**165,461**	**30,676**	**22.76%**	**100.00%**

Population: 165,461

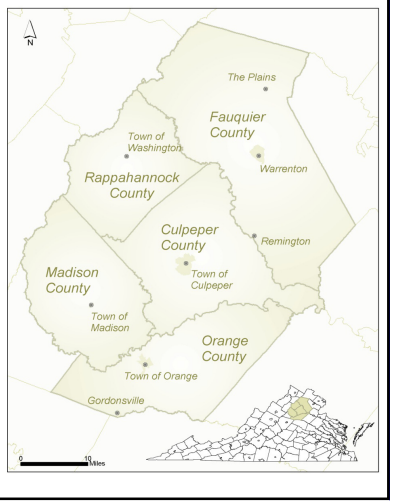
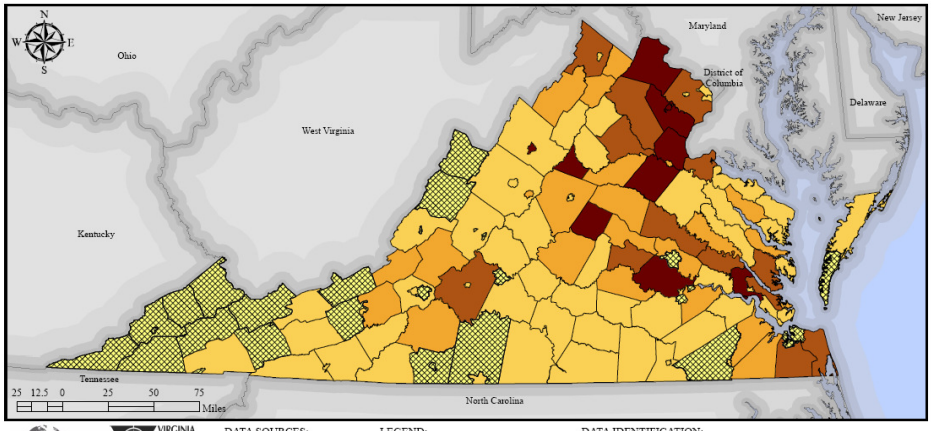


Figure 3.2-6: Population Change 1980 - 2000



VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

DATA SOURCES:
Virginia Workforce Connection/ U.S. Census Data
VGIN Jurisdicational Boundaries
ESRI State Boundaries

LEGEND:
Percent Population Change
Population Decline
1% - 24%
25% - 49%
50% - 74%
> 75%

DATA IDENTIFICATION:
Population change is from the the Virginia Workforce Connection's US Census Bureau estimates for the years 1980 and 2000.

The following jurisdictions have experienced a growth rate of 100% in 20 years: City of Harrisonburg, James City County, Loudoun County, Manassas City, Spotsylvania County, and Stafford County.

PROJECTION: *VA Lambert Conformal Conic North American Datum 1983*

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Commonwealth of Virginia Enhanced Hazard Mitigation Plan 2010
Section 3.2 Page 11

Hazard Assessment

- Flood
- Hurricanes
- Ice Storm
- Tornadoes
- Snow Storm
- Wildfire
- Windstorms
- Dam Failure
- Drought
- Earthquake
- Extreme Cold
- Extreme Heat
- Land Subsidence
- Landslides

Rappahannock-Rapidan RC Regional Hazard Mitigation Plan

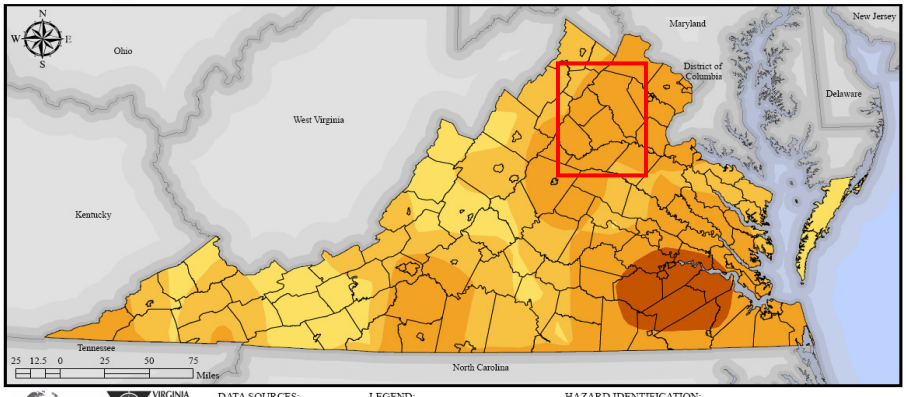
FEMA Approved on May 15, 2005
Hazard Identification Table

Table 6.10
Estimated Risk Levels for the Rappahannock-Rapidan Region
(Combination of Qualitative and Qualitative Assessments)

HIGH RISK HAZARDS	Flood Hurricanes and Tropical Storms Winter Storms
MODERATE RISK HAZARDS	Severe Thunderstorms and Tornadoes Drought
LOW RISK HAZARDS	Earthquakes, Sinkholes, Landslides Wildfire Dam/Levee Failure Erosion

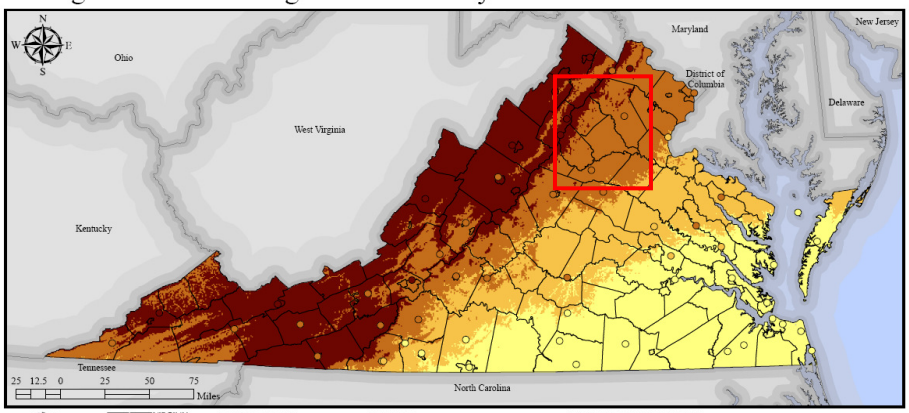
Historical Frequencies (Tornado)

Figure 3.8b-4: Significant Tornado Hazard Frequency (F2+)



Historic Frequencies (Winter Weather)

Figure 3.9-2: Average number of days with at least 3 inches of snow



DATA SOURCES:
CGIT analysis of NCDC data
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:
Avg. Number of Days per Year
1.5 or lower
1.51 - 2.0
2.01 - 3.0
3.01 - 6.72

HAZARD IDENTIFICATION:
Winter weather statistics were estimated from daily NCDC weather station reports from 1960 - 2000; the values at the weather stations are symbolized with small round dots, and a statewide regression fit depicts the overall trend in the weather station statistics.

These results depict general trends, and local conditions may vary widely.

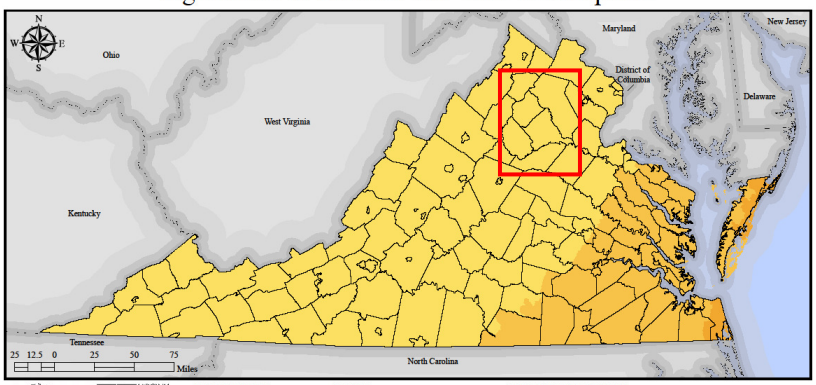
PROJECTION: *VA Lambert Conformal Conic North American Datum 1983*

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Commonwealth of Virginia Enhanced Hazard Mitigation Plan 2010
Section 3.9 Page 7

Probability (Hurricane Wind)

Figure 3.8a-3: HAZUS 100-Year Wind Speeds



DATA SOURCES:
HAZUS-MH MR3 Wind Model
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:
3-Second Peak Gust Wind Speed (mph)
0 - 38 (Tropical Depression)
39 - 73 (Tropical Storm)
74 - 95 (Category 1)
96 - 110 (Category 2)
111 - 130 (Category 3)
131 - 155 (Category 4)
> 156 (Category 5)

HAZARD IDENTIFICATION:
HAZUS-MH Hurricane Wind Model makes use of an existing state-of-the-art windfield model, which has been calibrated and validated using full-scale hurricane data. The model calculates wind speed as a function of central pressure, translation speed, and surface roughness.

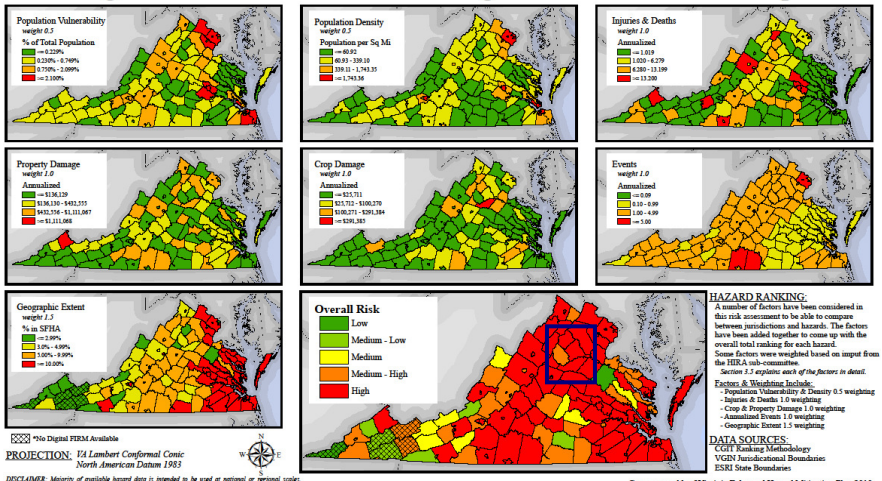
PROJECTION: *VA Lambert Conformal Conic North American Datum 1983*

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Commonwealth of Virginia Enhanced Hazard Mitigation Plan 2010
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Example of Hazard Ranking

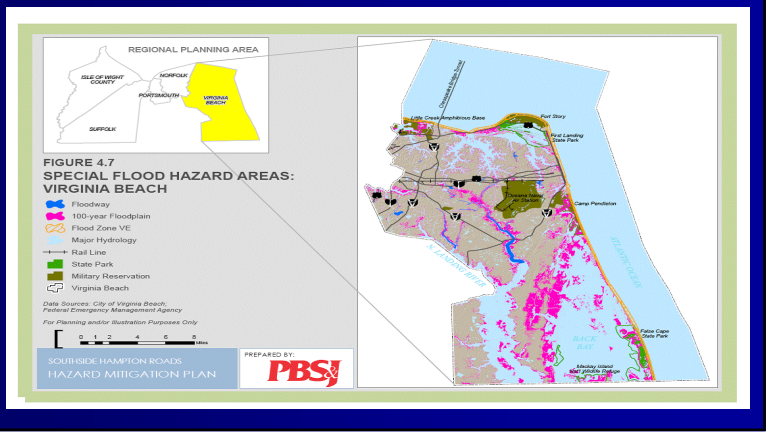
Figure 3.7-5: Flood Hazard Ranking Parameters and Risk Map



Commonwealth of Virginia Enhanced Hazard Mitigation Plan 2010
Section 3.7 Page 24

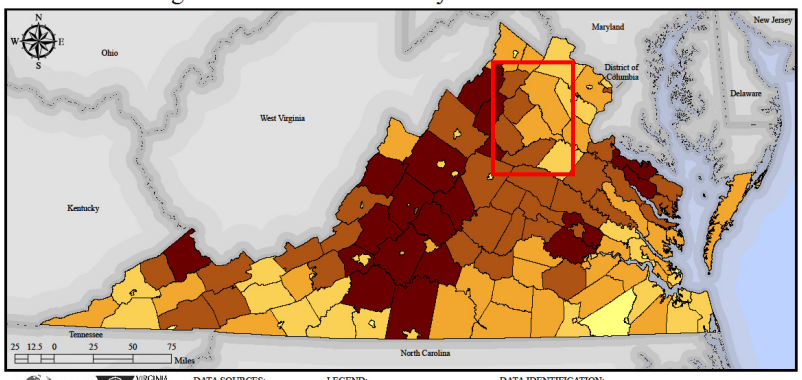
Examples of Mapping

Special Flood Hazard Areas



Presidentially Declared Disasters

Figure 3.3-1: Total Federally Declared Disasters



VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

DATA SOURCES:
FEMA & VDEM Declared Disasters
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:
Number of Declared Disasters (1964-2008)
2 - 5
6 - 8
9 - 10
11 - 12
13 - 16

DATA IDENTIFICATION:
A declared federal disaster is any disaster in which Federal funding was allocated to a jurisdiction in the wake of a disaster incident. The sources and types of funding are not taken into account for this map.

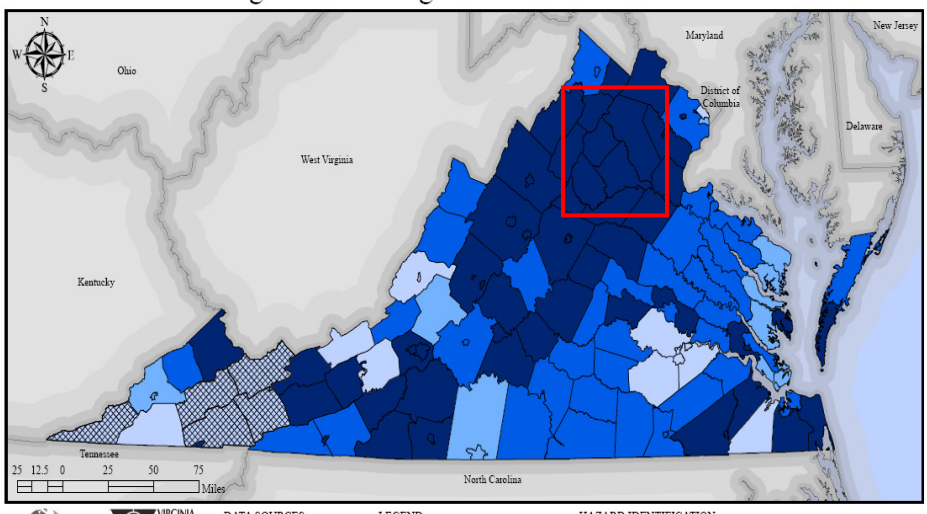
The period of record for this map spans 1964 through 2008. Events were summarized based on FEMA and VDEM records.

PROJECTION: *VA Lambert Conformal Conic North American Datum 1983*

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Commonwealth of Virginia Enhanced Hazard Mitigation Plan 2010
Section 3.3 Page 11

Figure 3.7-1: Digital Flood Data Status



VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

DATA SOURCES:
FEMA FMPU DFIRM Status
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:
Available Flood Data
DFIRM (61 jurisdictions)
PrelimDFIRM (41 jurisdictions)
Q3 (13 jurisdictions)
Digitized (14 jurisdictions)
No Digital FIRMs Available (5 jurisdictions)

Status as of 01/31/2009

HAZARD IDENTIFICATION:
Digital Flood Data Status illustrates the best available data for each jurisdiction. FEMA Region III has provided preliminary data for 41 localities.

The preliminary maps are not final and are to be used for this hazard mitigation plan only.

PROJECTION: *VA Lambert Conformal Conic North American Datum 1983*

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

Commonwealth of Virginia Enhanced Hazard Mitigation Plan 2010
Section 3.7 Page 9

Risk Assessment

- Identify the location of the hazard
- Identify the magnitude or severity of the hazard (How bad can it get?)
- Provide information on previous occurrences of hazards.
- Include probability of future events

Helpful Data Sources

- FEMA Map Service Center
  - http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1
- NCDC Database
  - http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms
- VDEM Historical Hazards
  - http://www.vaemergency.com/threats/index.cfm
- Local Flood Hazard Data – Emergency Reports/Damage Reports

Determining Vulnerability

- Inventory your assets
  - Critical facilities and vulnerable populations
  - Include estimates of the number and types of structures at risk
  - Indentify repetitive loss properties (RFC) and severe repetitive loss properties (SRL)
- FEMA's HAZUS Software
- Estimate annualized Loss

Examples of Mapping

Repetitive Loss Properties

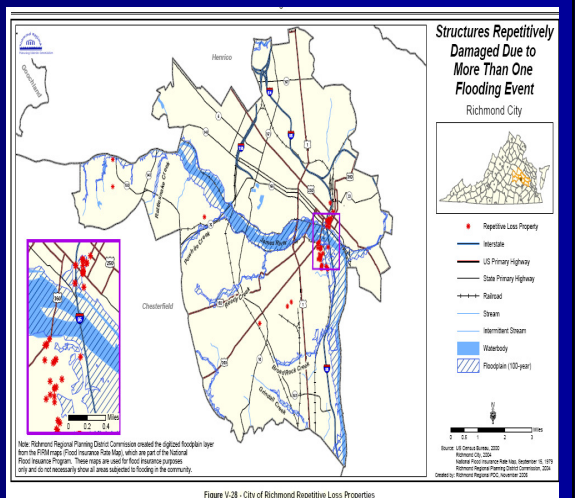


Figure V-28 - City of Richmond Repetitive Loss Properties

Examples of Mapping

Repetitive Loss Properties

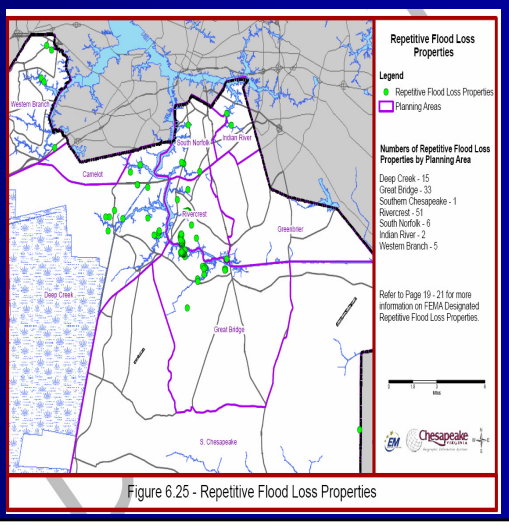


Figure 6.25 - Repetitive Flood Loss Properties

Vulnerability Index

Example Algorithm used:

- **Vulnerability = $$ Loss/Square Footage**
- **$$ = Building Damage + Contents Damage + Loss of Function + Community Impacts**

Goals and Strategies

- Revise goals to see if they are still relevant for plan revision.
- Evaluate mitigation strategies and report on their progress.
- Eliminate strategies that are no longer relevant.
- Include new strategies that result from the updated HIRA.

Original Plans Goals

- **Goal #1: Improve and update data needed for hazard mitigation purposes within the Rappahannock-Rapidan Regional Commission and local jurisdiction offices.**
- **Goal #2: Implement policies that incorporate mitigation planning into the framework of local government in the Rappahannock-Rapidan Region.**
- **Goal #3: Implement sound planning techniques throughout the region that compliment the benefits of hazard mitigation.**
- **Goal #4: Implement cost effective structural projects throughout the region to reduce the impact of future disaster events.**
- **Goal #5: Conduct training throughout the region for employees to improve response capabilities of local emergency management officials and to educate local officials of benefits of hazard mitigation techniques.**
- **Goal #6: Implement meaningful education and outreach projects throughout the region to educate the public about the dangers of natural hazards and how they can protect their families and their property.**
- **Goal #7: Improve regional evacuation capabilities and plan for the potential impacts of a potential evacuation of the Washington D.C. area.**

Plan Maintenance Section

- Establish method for reviewing and reporting annually.
- Determine responsible group(s) for plan review/implementation.

Questions?

RAPPAHANNOCK-RAPIDAN REGION

MULTI-JURISDICTIONAL

ALL-HAZARD MITIGATION PLAN

UPDATE

Workshop #1 – April 20, 2010

Rappahannock-Rapidan REGIONAL COMMISSION

1

Planning Process – Where Are We?

Stage One
- ❑ Hazard ID & Risk Assessment
- ❑ Assets
- ❑ Vulnerability
- ❑ Capability Assessment

Stage Two
- ❑ Mitigation Goals & Objectives
- ❑ Mitigation Strategies

Stage Three
- ❑ Plan Maintenance Procedures
- ❑ Draft Plan

Stage Four
- ❑ VDEM & FEMA Reviews
- ❑ Conditional Approvals
- ❑ Final Draft

Stage Five
- ❑ Adoption
- ❑ FEMA Final Approval



2

STAGE ONE:
Hazard and Risk Assessment: Incomplete

Worksheet #1- Hazards List

ALL HAZARDS LISTED CONSIDERED PROBABLE EXCEPT:

- Avalanches
- Landslides due to earthquake
- Military accidents
- Transit – subway
- Volcanic - eruptions and ash

3

STAGE ONE ….
Hazard and Risk Assessment: Incomplete

Hazards Identified as High Intensity

- Drought*
- Flood*
  - Heavy Rain
  - Rapid Snow Melt
- Utility Interruption*
  - Communication
  - Electricity
- Extreme Heat*
- Hurricane*
- Transportation Incident
  - Air
- Wildland Fire
  - Urban Interface
  - Public Land*
  - Private Land

* High area impact

4

Historic Hazard Events

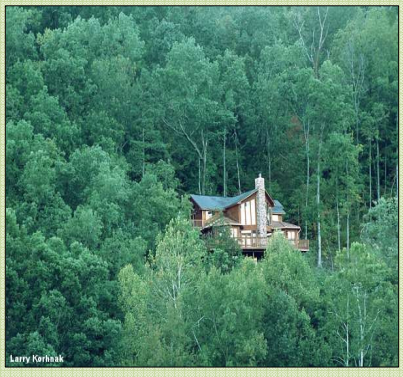
- Snowstorm – December 18-20, 2009
  - 16”-24” snow
  - Presidentially Declared Disaster DR-1874
- Snowstorm – February 5-6, 2010
  - 22”- 35” snow

Others since 2005?



5

Unique Hazard Risk?





6

Wildland Urban Interface

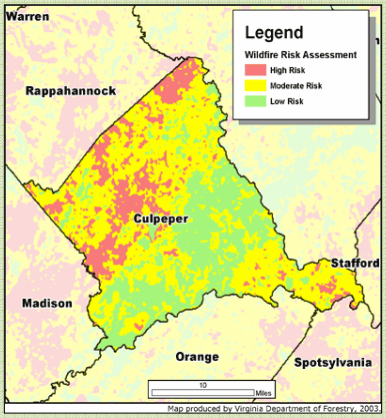
…zone where structures and other human developments meet, or intermingle with, undeveloped wildlands….. where wildfire poses the biggest risk to human lives and structures. USDA Dept. of Forestry

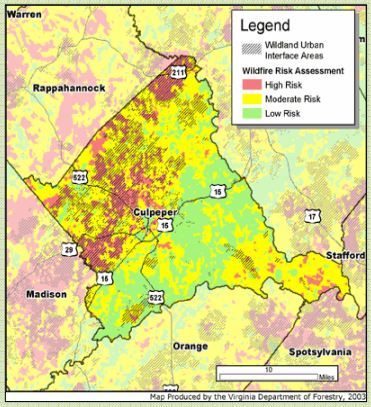
Virginia Department of Forestry – "Portions of each county within response area are at risk."

7

Virginia Department of Forestry
Wildland-Urban Interface: Culpeper

Structures at risk – 128 (2009)



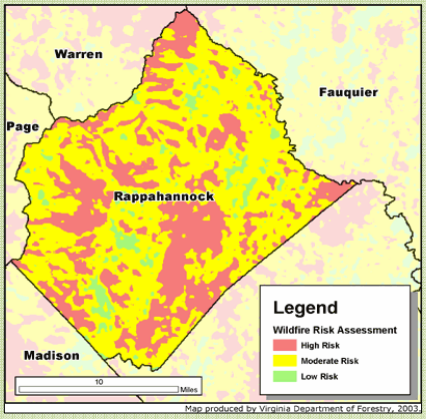


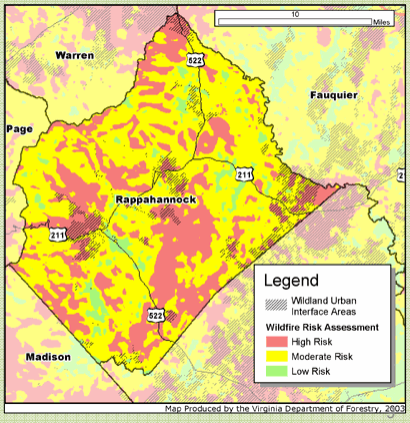
8

Virginia Department of Forestry

Wildland-Urban Interface: Rappahannock

Structures at risk – 64 (2009)





10

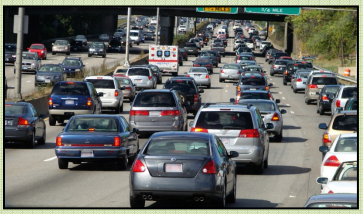
NEXT… **DETERMINING VULNERABILITY**

Worksheets 4 & 5

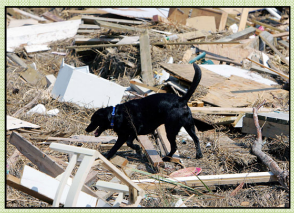
- **Inventory Your ASSETS**
  - ❖Critical facilities & vulnerable populations
  - ❖Number & types of structures at risk
  - ❖Number of buildings, infrastructure and critical facilities located in hazard areas
  - ❖Identify repetitive loss properties & severe repetitive loss properties

11

Consider….



- ❑ Essential infrastructure
- ❑ Special needs
- ❑Hazardous material facilities
- ❑Natural assets
- ❑ Impacts of growth and development
- ❑ Future development trends



12

Capability Assessment …

Worksheets 6,7,8 & 9

- ❑What resources are available?
- ❑ What are our limitations?
- ❑Regulatory/Administrative/Technical/Fiscal



13

Capability Assessment

- ➢Measures each jurisdiction's competency and ability to implement hazard mitigation activities
- ➢Identifies existing gaps, conflicts, weaknesses in local programs, plans, and policies
- ➢Identifies mitigation measures already in place
- ➢Identifies **mitigation opportunities**

14

Capability Assessment

Plan, Policy Program or Ordinance	Status
Hazard Mitigation Plan	
Comprehensive Plan	
Floodplain Ordinance	
Open Space Management Plan	
Stormwater Management Plan	
Emergency Operations Plan	
Hazardous Materials Facility Plan	
Evacuation Plan	
Continuity of Operations Plan	

15

Capability Indicators -

- National Flood Insurance Program (NFIP) Participation
- Community Rating System (CRS) Participation
- Building Code Effectiveness Grading Schedule (BCEGS)
- Firewise Community

16

STAGE TWO – are we there yet?

- ❑ **Mitigation Goals and Objectives**
- ❑ **Development of Mitigation Strategies**

Risk & Capability Assessment = Foundation for Identification of Mitigation Actions

17

Goals and Strategies

- ❑ Review current goals and determine relevance
- ❑ Determine progress in terms of existing mitigation strategies
- ❑ Develop new strategies that reflect updated risk and capability assessments

18

Helpful Data Sources

- FEMA Map Service Center
  - http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1
- NCDC Database
  - http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms
- VDEM Historical Hazards
  - http://www.vaemergency.com/threats/index.cfm
- Local Flood Hazard Data – Emergency Reports/Damage Reports

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www.rrregion.org

Rappahannock-Rapidan
REGIONAL COMMISSION

20

RAPPAHANNOCK-RAPIDAN REGION

MULTI-JURISDICTIONAL

ALL-HAZARD MITIGATION PLAN

UPDATE

Workshop #2 – July 13, 2010

Rappahannock-Rapidan REGIONAL COMMISSION

1

Planning Process – Where Are We?

Stage One - **INCOMPLETE**

- ❑ Hazard ID & Risk Assessment
- ❑ Assets
- ❑ Vulnerability
- ❑ Capability Assessment

Stage Two

- ❑ Mitigation Goals & Objectives
- ❑ Mitigation Strategies

Stage Three

- ❑ Plan Maintenance Procedures
- ❑ Draft Plan

Stage Four

- ❑ VDEM & FEMA Reviews
- ❑ Conditional Approvals
- ❑ Final Draft

Stage Five

- ❑ Adoption
- ❑ FEMA Final Approval



2

VDEM Requirements:

- "A comprehensive review must be done for all plan sections (Planning Process, Risk and Vulnerability Assessment, Capability Assessment, Mitigation Goals/Strategy, and the Plan Maintenance Process)."



3

STAGE ONE: findings continued…..

- **Assets** (worksheet #4)
  - Specific to locality
- **Vulnerability** (worksheet #5)
  - Impact of prolonged power outage
  - Transportation limitations – public and private
  - Development in remote, difficult-to-access locations
  - Significant growth since adoption of previous plan
  - Some localities have implemented improved warning systems

4

➢**Capability Assessment - Regulatory** (worksheet #6)

- Include link/information on how to obtain documents
- Review and update Table 7-1
- Other locality-specific plans/tools
  - o Steep slopes
  - o Wildfire
- Identify gaps = **OPPORTUNITIES!**



5

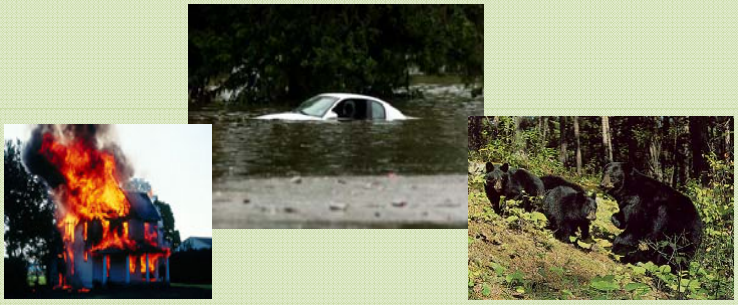
Relevant Plans, Ordinances ,Programs: **(See section 7, p. 4 – 2005 Plan)**

Jurisdiction	National Flood Insurance Program	NFIP Community Rating System	Hazard Mitigation Plan	Disaster Recovery Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Stormwater Management Plan	Emergency Operations Plan	Continuity of Operations Plan	Radiological Emergency Plan	SARA Title III Plan	Evacuation Plan	Transportation Plan	Capital Improvements Plan	Historic Preservation Plan	Zoning Ordinance	Subdivision Ordinance	Flood Damage Prevention Ordinance	Building Code	Fire Code	Riparian Buffer / Wetland Preservation	Non-Governmental Organization	Open Space Preservation	Public/Private Partnerships
Culpeper County																								
Town of Culpeper																								
Fauquier County																								
Town of Warrenton																								
Town of Remington																								
Madison County																								
Town of Madison																								
Orange County																								
Town of Orange																								
Town of Gordonsville																								
Rappahannock County																								

6

➢**Capability Assessment , cont…**

- **Technical** (worksheet 7)
- **Fiscal** (worksheet 8)
- **Narrative** (worksheet 9)



7

Findings of Risk Assessment & Capabilities Assessments -

NEEDED TO PROCEED TO ……

8

Mitigation Goals & Objectives

- Review and determine status of previous mitigation actions – See Section 10
  - ➢ Completed?
  - ➢Relevant?
  - ➢Next Steps?
- Identify potential hazard mitigation actions that your jurisdiction will consider to reduce the effect of natural hazards

9

Mitigation Action Summary

MITIGATION ACTION	
Community Name:	
Action Item (describe):	
Category:	
Hazard(s):	
Lead Agency/Department Responsible:	
Estimated Cost:	
Funding Method:	
Implementation Schedule:	
Priority:	

10

Next Steps…….

11

Rappahannock-Rapidan Regional

Hazard Mitigation Plan

2012 Update

Draft Review Meeting – April 13, 2012

Plan Update Process – Where Are We?

Stage One - **Completed**
- ❑ Hazard ID & Risk Assessment
- ❑ Asset Inventory
- ❑ Vulnerability
- ❑ Capability Assessment

Stage Two - **Completed**
- ❑ Mitigation Goals & Objectives
- ❑ Mitigation Strategies

Stage Three - **Completed**
- ❑ Plan Maintenance Procedures
- ❑ Draft Plan

Stage Four - *Pending*
- ❑ VDEM & FEMA Reviews
- ❑ Conditional Approvals
- ❑ Final Draft

Stage Five - *Pending*
- ❑ Adoption
- ❑ FEMA Final Approval



Rappahannock-Rapidan Regional
Hazard Mitigation Plan 2012

Plan Update Process Review

- February 2010: Kickoff Meeting
  - Data Requested
    - Hazard Inventory & Probability
    - Update of Hazard Events (Since 2004)
    - Identification of Unique Hazards

Rappahannock-Rapidan Regional
Hazard Mitigation Plan 2012

Plan Update Process Review

- April & July 2010: Stakeholder Meetings
  - Data Requested
    - Critical Facilities update (new buildings, assets)
    - Capability Assessment update
      - Regulatory, Technical, Administrative Changes (Ordinance updates, local plans)

Rappahannock-Rapidan Regional
Hazard Mitigation Plan 2012

Plan Update Process Review

- 2010/2011
  - Local Activities
    - Review of 2004 Mitigation Actions
      - Updates on progress
      - Addition of new mitigation actions as necessary
  - RRRC Activities
    - Data collection and revisions for Plan sections 3, 4, 5 & 6
    - GIS & Mapping updates
    - Revision of Plan Sections 1-9

Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012

Plan Update Process Review

- 2012
  - RRRC Activities
    - Hold individual meetings with jurisdictions to complete data updates, mitigation strategy review (as necessary)
    - Finalize Draft Plan
    - Public Comment Period

Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012

Review of Changes from 2004 Plan

- Data Updates
  - Section 3: Demographics, Land Use, Historic Hazards, etc
  - Sections 4 through 6: Hazard Identification, Analysis
- Section 5: Hazard Analysis
  - All Hazards reviewed & updated with relevant additions since 2004 (Winter Storms 2009/10, Earthquake 2011)

Rappahannock-Rapidan Regional
Hazard Mitigation Plan 2012

Review of Changes from 2004 Plan

- Section 6: Vulnerability Analysis
  - Additional Unique Hazards Identified
    - Town of Culpeper: Dam/Levee Failure
    - Culpeper County: Earthquake
  - Data revised for each identified hazard
    - Updated GIS data from jurisdictions
    - HAZUS Estimates for Flood, Hurricane, Earthquake
    - Updated historical loss data
  - Hazard Ranking Changes
    - Flood, Hurricane/Tropical Storm, Winter Storm Rank High
    - Severe Thunderstorm/Tornado, Drought, Wildfire Rank Moderate

Rappahannock-Rapidan Regional
Hazard Mitigation Plan 2012

Mitigation Strategy Updates

- Local Strategies
- Regional Strategies

FEMA Hazard Mitigation Assistance

- FEMA HMA Program: http://www.fema.gov/government/grant/hma/index.shtm
  - Five Grant programs
  - Most applicable to Rappahannock-Rapidan Region are the Pre-Disaster Mitigation (PDM) and Hazard Mitigation Grant Program (HMGP)
  - Other programs are Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC) and Severe Repetitive Loss (SRL) – all flood related
- PDM: Annual Federal appropriations, VDEM administered
- HMGP: Funds awarded post-disaster declaration
  - VDEM will have funds available from DR-4042 and DR-4045 (Earthquake and Tropical Storm Lee remnants declarations)
- Potential Changes for FY2013 at Federal level

Localities are required to have a FEMA-approved and locally adopted Hazard Mitigation Plan in order to qualify for Hazard Mitigation Assistance funds

HMA Eligible Activities

Mitigation Project	HMGP	PDM	FMA	RFC	SRL
Property Acquisition and Structure Demolition or Relocation	✔	✔	✔	✔	✔
Structure Elevation	✔	✔	✔	✔	✔
Mitigation Reconstruction					✔
Dry Floodproofing of Historic Residential Structures	✔	✔	✔	✔	✔
Dry Floodproofing of Non-Residential Structures	✔	✔	✔	✔	
Minor Localized Flood Reduction Projects	✔	✔	✔	✔	✔
Retrofitting of Existing Buildings and Facilities	✔	✔			
Safe Room Construction	✔	✔			
Infrastructure Retrofit	✔	✔			
Soil Stabilization	✔	✔			
Wildfire Mitigation	✔	✔			
Post-Disaster Code Enforcement	✔				
Hazard Mitigation Planning	✔	✔	✔		
Management Costs	✔	✔	✔	✔	✔

Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012

Next Steps

- Additional Jurisdiction Feedback
- Submission to VDEM for Review
  - Incorporation of VDEM Requested Changes
- Submission to FEMA for Review
  - Incorporation of FEMA Requested Changes
  - Conditional Approval
- Local Adoption
  - Public Hearing, Resolution of Adoption
  - Plan is Active upon first adoption (5-year update period)
  - Jurisdictions eligible for HMGP funding after local adoption

Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012

Next Steps

- Plan Maintenance Procedures (2012 through 2017)
  - Annual Updates to RRRC/VDEM
    - Mitigation Strategy progress
    - RRRC coordination through Regional Emergency Managers
  - Plan Review following all declared disasters
  - Next full update likely to begin in 2016
- Interim local changes
  - Mitigation strategies can be added/revised at local level at any time

Rappahannock-Rapidan Regional Hazard Mitigation Plan 2012

http://www.rrregion.org/mitigation

Plan Contact:

Patrick Mauney
GIS Program Manager
RRRC
420 Southridge Parkway, #106
Culpeper, VA 22701

P: 540.829.7450
plmauney@rrregion.org



R-RRC ALL-HAZARD MITIGATION PLAN REVISION

STEERING COMMITTEE

GRANT # PDM-2009-000-002

JURISDICTION	REPRESENTATIVE	E-MAIL	PHONE	ADDRESS
Culpeper County	Tom Williams	tom.williams@culpepercounty.gov	540.727.7161	15166 Richmond Road Culpeper, VA 22701
Town of Culpeper	Fritz Alderman	falderman@culpeper.to	540.829.8260	400 S. Main Street Culpeper, VA 22701
Fauquier County	Sara Makely	sara.makely@fauquiercounty.gov	540.347.6996	78 W. Lee St., Suite 101 Warrenton, VA 20186
Town of Warrenton	Sarah Sitterle	ssitterle@warrenton.gov	540.347.2405	P.O. Drawer 341 Warrenton, VA 20188
Town of Remington	Sharon Lee	townofremington@verizon.net	540.439.3220	P. O. Box 267 Remington, VA 22734
Town of The Plains	--	--	--	--
Madison County	Carl Pumphrey	cpumphrey@madisonco.virginia.gov	540.948.7508	538 South Main Street Madison, VA 22727
Town of Madison	Willie Lamar	mbkrxcy@yahoo.com	540.949.6717	23 Washington Circle Madison, VA 22727
Orange County	John Harkness	jharkness@orangecountyva.gov	540.661.5428	P.O. Box 111 Orange, VA 22960
Town of Orange	John Harkness	jharkness@orangecountyva.gov	540.661.5428	P.O. Box 111 Orange, VA 22960
Town of Gordonsville	--	--	--	--
Rappahannock County	Richie Burke	rvburke@rappahannockcountyva.gov	540.675.5340	P.O. Box 222 Washington, VA 22727
Town of Washington	Richie Burke	rvburke@rappahannockcountyva.gov	540.675.5340	P.O. Box 222 Washington, VA 22727
OTHER				
Shenandoah NP	Jeff Koenig	jeff.koenig@nps.gov	540.999.3500x3441	Shenandoah National Park 3655 U.S. Highway 211 East Luray, VA 22835

VA. Dept. of Forestry	Terry Lasher, DOF	terry.lasher@dof.virginia.gov	540.347.6305	675 Frost Avenue Warrenton, VA 20186
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Va. DCR	Charley Banks, DCR	charley.banks@dcr.virginia.gov	804.371.6135	203 Governor Street, Suite 206 Richmond, VA 23219
Rappahannock Electric	Maxie Rozell			
VDEM	Amy Howard, VDEM	amy.howard@vdem.virginia.gov	804. 897.6500 x 6534	10501 Trade Court Richmond, VA 23236
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Fauquier Hospital	Tracy Turman	turmant@fauquierhealth.org	540.316.3855	500 Hospital Drive Warrenton, VA 20186
Lord Fairfax Community College (Warrenton)	Cindy Bambara	cbambara@lfcc.edu	540.351.1516	6480 College Street Warrenton, VA 20187
Germanna Community College (Culpeper)	Mark Borchers	mborchers@germanna.edu		18121 Technology Drive Culpeper, VA 22701



R-RRC ALL HAZARD MITIGATION PLAN REVISION

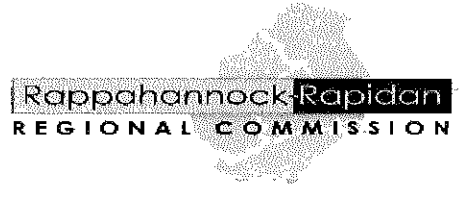
MEETING SIGN-IN

Date: 2/23/10

GRANT # PDM-2009-000-002

NAME	JURISDICTION/ ORGANIZATION	E-MAIL	PHONE
Amy S. Howard	VDEM	amy.howard@vdem.virginia.gov	897-6500
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Willie Lamar	Town of Madison	mblamar@yahoo.com	948-6717
Brian Wolfe	Rappahannock Electric	brwolfe@myrec.coop	540-891-5914
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Chris Jenkins	Town of Culpeper	CJenkins@Culpeper.to	540 829 5509
Scott Roy	Town of Culpeper	sroy@culpeper.to	540-829-5515
Adrienne Garreau	PC Fauquier County	adrienne@garreau.com	540-219-9995
Lou Battle	Warrenton PD	LBattle@WarrentonVA.gov	540 347-1107
ARTHUR CANDENQUIST	RAPPAHANNOCK CO	AC9725@CS.com	540 675-5340
Kathy Hatten	VDH	Kathy.hatten@vdh.virginia.gov	540 718-1851
Sara Makely	DFREM-Fire Co.	sara.makely@fauquiercounty.gov	3476995

LAKE RESCUE + EM



R-RRC ALL HAZARD MITIGATION PLAN REVISION

MEETING SIGN-IN

Date: _____

GRANT # PDM-2009-000-002

NAME	JURISDICTION/ ORGANIZATION	E-MAIL	PHONE
Graham Crosvenor	Fauquier County	Grahamcrosvenor@gmail.com	336 226 3273
D. Tucker	Town of Warrenton	dtucker@warrentonva.gov	347-1858

Rappahannock-Rapidan REGIONAL COMMISSION

R-RRC ALL-HAZARD MITIGATION PLAN REVISION - MATCH

GRANT # PDM-2009-000-002

DATE	NAME	JURISDICTION	ACTIVITY	Travel Cost (total miles @ .50/mi.)	Labor Value (total hrs @ $35/hr)	TOTAL
4/20	Kathy Hatter	All 5 Counties - VDH	Workshop 1	6 miles = $3	2 hrs = $70	$73
4-20	CARL Pumphrey	MADISON	WORKSHOP 1	40 miles = $20.	2 hrs = $70	$90
4-20	John Hodnett	Orange	"	50 miles $25	2 hrs = $70	$95
4/20/10	Debbie Kendall	Orange County	Workshop 1	36 mi. = $18	2 hrs = $70	$88
4/20/10	John S. Bailey	Town of Orange	Workshop #1	25 mi = $12.50	2 hrs $70	$82.50
4/20/10	FRITZ ALDERMAN	TOWN of Culpeper	"	4 mi = 2.00	2 hrs - 70	72.00
4/20/10	Sara Makely	Fauquier Co.	Workshop #1	54 mi = $27	2 hrs = $70	$97.00
4/20/10	Graham Grosvenor	Fauquier Co.	Workshop #1	54 mi = $27	2 hrs = $70	$97.00
4/20/10	ARTHUR CANDENQUIST	Culp. Co.	WORKSHOP No. 1	40 MI = $20	2 x 35 = $70	$90.00
4/20/10	Bo Tucker	Town of Warrenton	"	24 m = $12	2 hrs = 70	$82.00 $70
4/20/10	Jack Sitterle	"	"	0	$70	~~$70~~ $70
			TOTAL			

* Include travel time

R-RRC ALL HAZARD MITIGATION PLAN REVISION

MEETING SIGN-IN

Date: 7/13/2010

GRANT # PDM-2009-000-002

NAME	JURISDICTION/ ORGANIZATION	E-MAIL	PHONE
Erin White	Rappahannock Elec.	E.White@Rec.coop	(540) 903-3619
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Josh BATEMAN	Town of ORANGE	townplanner@townoforangeva.org	(540) 672-6917
Jimmy Stewart	Town of Remington	TownofRemington@verizon.net	540 439-3220
John Hardness	Orange County	jhardness@orangecountyva.gov	406-1489
Chris Boies	LFCC	cboies@lfcc.edu	540-868-7129
Cynthia Bambara	LFCC	cbambara@lfcc.edu	540.351-1516
TERRY LASHER	VDOF	terry.lasher@dof.virginia.gov	540-347-6355
Sharon Lee	Town of Remington	Townofremington@verizon.net	540.439-3220
Bo Tucker	" " WARRENTON	etucker@warrentonva.gov	540-347-1858
DEIRDRE CLARK	R-RRC		
JENNY BICHE	"		
ISABEL MCLAUGHLIN	"		
PATRICK MAHANEY	"		

Rappahannock-Rapidan REGIONAL COMMISSION

RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN REVISION

MEETING SIGN-IN

Date: APRIL 13, 2012 GRANT # PDM-2009-000-002

NAME	JURISDICTION/ ORGANIZATION	E-MAIL	PHONE
PATRICK MAUNEY	RRRC/PDC	pmauney@rrregion.org	540 829 7450
GREGG ZODY	ORANGE COUNTY P+Z	gzody@orangecountyva.gov	540-661-5321
Tom Williams	Culpeper County	twilliams@culpepercounty.gov	540-727-7161
~~Tonya Hooser~~	Culpeper County	thooser@culpepercounty.gov	540-727-7161
SCOTT HUDSON	VDEM	scott.hudson@vdem.virginia.gov	804-201-1116
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JOHN G. COOLEY	TOWN OF ORANGE	townplanner@townoforangeva.org	540-672-6917
SaraMakely	Fauquier County	sara.makely@fauquiercounty.gov	5404226803
ARTHUR CANDELAUST	RAPPAHANNOCK Co.	AC.9725@cs.com	540-937-7444/675-5340
Bo Tucker	Town of Warrenton PW	btucker@warrentonva.gov	5403471858



Rappahannock-Rapidan Region All-Hazard Mitigation Plan Revision - 2010

DATA COLLECTION GUIDE*

Please return all completed worksheets and supporting documentation to:

Deirdre Clark
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, VA 22701
dbclark@rrregion.org

OR

Patrick Mauney
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, VA 22701
plmauney@rrregion.org

* Please complete and return Worksheets 1, 2 and 3 by March 17, 2010.

*Please complete and return Worksheets 4 through 9 by May 25, 2010.

DATA COLLECTION GUIDE

Overview

Hazard mitigation planning is the process by which threats to localities are identified and the likelihood of impacts determined. Goals to mitigate those threats are developed and appropriate strategies to eliminate or reduce impacts are determined, prioritized, and implemented. FEMA approval of the updated all-hazard mitigation plan will qualify participating jurisdictions for federal support for pre- and post-disaster hazard mitigation projects.

The collection and analysis of significant information is needed to assure the development of a useful updated plan that meets the needs of each participating jurisdiction and the requirements of the Disaster Mitigation Act, 2000. Essential data includes general background information from each locality, hazard and risk information, current codes, ordinances, regulations and procedures related to loss minimization as well as an assessment of each locality's technical and organizational abilities to perform hazard mitigation and/or loss prevention functions. The cooperation of each jurisdiction in supplying needed information is critical to the development of a successful plan.

What is Mitigation?

As defined by FEMA, hazard mitigation is "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." As might be expected, savings from mitigation activities are highly cost-effective. On average, in addition to saving lives and preventing injuries, each dollar spent on mitigation saves about $4 in avoided future losses (National Institute of Building Science Multi-Hazard Mitigation Council 2005).

Generally, mitigation means reducing long-term risk from hazards to acceptable levels through predetermined measures accompanying physical development. Examples include strengthening structures to withstand high winds or snow loads, elevating, removing or limiting development in flood-prone areas, clearing defensible space around residences in Wildfire Urban Interface (WUI) areas, and designing development away from areas of geological instability.

Participation

As was acknowledged by a signed letter of intent (September, '08), each participating locality has agreed to "participate fully in the plan revision, acknowledging that such participation shall include, but not be limited to, local attendance/representation at upcoming planning and public meetings, responses to detailed inquiries and data requests, and fulfillment of the local match requirement by providing and tracking in-kind services and materials associated with those activities described above." Opportunities to participate in the revision process include, but are not limited to, the following:

- Participate in region-wide planning meetings;
- Track hours to meet grant match requirements;
- Serve on the steering committee.
- Provide data to be used to complete the hazard profile and vulnerability assessment;
- Develop problem statements, based on the risk assessment and input from the public and each locality;
- Develop a local mitigation strategy to include the identification of projects specific to each jurisdiction;
- Participate in public outreach activities including public meetings;
- Review, edit and approve draft plan documents; and
- Assist in the adoption of the plan through formal resolution.

Data Collection Guide

The attached worksheets were developed to facilitate the collection of data needed to update the Regional All-Hazard Mitigation Plan. In addition to supplying needed information, the completed data sheets will serve as evidence of each locality's participation in the planning process. Locality representatives are reminded to review the existing plan at: http://www.vdem.state.va.us/library/plans/mitigation.cfm and to consult their Mitigation Strategies Update as prepared for VDEM in June, 2009. These may be viewed at http://www.rrregion.org/mitigation.

The Risk Assessment Process

The risk assessment process includes three components: hazard identification, vulnerability assessment, and capability assessment. Data needs and worksheets for each of the risk assessment components are included in this guide. This information will be used to form the basis of your jurisdiction's updated mitigation strategy.

Hazard Identification and Ranking – Worksheets #1, #2, and #3.

Worksheet #1: Inventory and Attributes

This will be used to quantify and compare the characteristics of each hazard, thereby determining which are most significant hazard identification and ranking is a means to quantify and compare the characteristic of each of the hazards, and identify those that are most significant for planning purposes. Use the following to guide the completion of worksheet #1(attached).

Hazard Inventory:

- List all hazards that may occur, researching newspapers, historical records, internet websites and relevant sources.

Hazard Attributes - factors related to the occurrence of each hazard, without any consideration of potential impacts.

- Probability: Based on past experience, how likely is it that an event will occur in the future?
- Frequency: Use recall and documentation to demonstrate how often a hazard has occurred.
- Area Affected: Did/does the event occur in isolated areas, affecting only a single unit of government, a wider area, affecting multiple units of government, or a regional, affecting the entire county or many counties?

Worksheet #2: Historic Hazard Events

List, describe and document significant hazard events. Research historical records, newspapers, websites, agencies and organizations for documentation of location, magnitude, injuries, deaths, extent of damage, etc.

Worksheet #3: Unique Hazard Risks – Local Jurisdictions

List, describe and document specific natural hazard risks that are unique to certain localities.

Critical Asset/Vulnerability Assessment - Worksheets #4 and #5

The completion of this aspect of the assessment will result in a detailed inventory of specific community assets, the damage or destruction of which would compromise public health or safety, or which are particularly vulnerable to identified hazards. These critical facilities are categorized below.

- **Essential Infrastructure:** Includes public and private utility facilities vital to maintaining or restoring normal services before, during, and after a hazard event. Examples are airports, roads, bridges, communications facilities and towers, correctional facilities, electrical generation/distribution facilities, media outlets, military installations, natural gas supply facilities, public safety (911) communications centers, public safety facilities (police, fire, EMS), public works garages, town/village/city halls, wastewater facilities, water utilities.

- **Vulnerable Facilities:** Includes childcare centers, community based residential facilities, special needs housing, community centers, campsites, healthcare facilities, hospitals, nursing homes and long term care facilities, historic properties, manufactured homes, and economic assets.

- **Hazardous Materials Facilities:** Includes structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, and/or water-reactive materials.
- **Natural Assets:** Includes environmentally sensitive areas such as wetlands and floodplains, as well as threatened and endangered species, their habitats and other environmentally significant features.

Capability Assessment – Worksheets #6, #7, #8 and #9

An evaluation of a locality's hazard mitigation programs and policies is essential to determine its ability to reduce vulnerability and/or respond to an event. The capability assessment considers the regulatory, administrative/technical and fiscal aspects of a locality's programs and policies.

- **Regulatory Tools:** Worksheet #6 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. Please indicate which are currently in place in your jurisdiction. If this capability or authority is not in place at the local level, please indicate if a higher level of government assumes that responsibility. Along with your comments, please include information on how to obtain the document/information – web site, via e-mail, fax, etc.
- **Administrative/Technical Resources:** Completion of **Worksheet** #7 requires the identification of the individuals responsible for hazard mitigation/loss prevention within each locality. Smaller jurisdictions lacking local staff are asked to identify any public resources at the next higher level of government that can provide assistance.
- **Fiscal:** Indicate which fiscal resources your jurisdiction has access to, or is eligible to use, on Worksheet #8.
- **Capabilities Narrative:** Worksheet #9 provides each locality the opportunity to comment on specific projects, programs or certifications applicable to their community.

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Update
WORKSHEET #1 – HAZARDS LIST

Jurisdiction: _____ Point of Contact: _____
Phone#: _____ E-mail: _____

Hazard		Probability Yes / No	Frequency: occurrences in the last __ years 5	10	20+	Intensity High / Med / Low	Area affected High / Med / Low
Avalanche							
Civil disorder							
Coastal storm							
Dam failure							
Drought							
Earthquake							
Extreme heat							
Flood							
induced by	coastal						
	heavy rain						
	ice jam						
	rapid snow melt						
Hail							
HAZMAT release							
site	transportation						
	fixed facility						
Hurricane							
Landslide							

Hazard		Probability Yes / No	Frequency: occurrences in the last __ years 5	10	20+	Intensity High / Med / Low	Area affected High / Med / Low
induced by	earthquake						
	Rain						
Lightning							
Military accident							
Utility interruption							
type	communication						
	Electricity						
	natural gas						
	other fuel						
Radiological release							
site	fixed facility						
	transportation						
Subsidence							
	sinkhole						
Thunderstorm							
	microburst						
Tornado							
Terrorist attack							
type	armed / hostage						
	arson						
	biological						

Hazard		Probability Yes / No	Frequency: occurrences in the last __ years 5	10	20+	Intensity High / Med / Low	Area affected High / Med / Low
	chemical						
	explosive						
	nuclear						
	radiological						
Transportation incident							
location / type	air						
	rail						
	primary hwy						
	local road						
	transit - surface						
	transit - subway						
Urban fire							
	conflagration						
	explosion						
Volcanic							
	eruption						
	ash						
Wildland fire							
location	urban interface						
	public land						
	private land						

Hazard		Probability Yes / No	Frequency: occurrences in the last __ years 5	10	20+	Intensity High / Med / Low	Area affected High / Med / Low
Winter storm							
type	extreme cold						
	ice storm						
	snow storm						
Other hazards:							

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Update
Worksheet #2:

Historic Hazard Event

Jurisdiction: _____ Point of Contact: _____
Phone#: _____ E-mail: _____

Please fill out **one sheet for each significant hazard event** with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Opinion on likelihood of occurring again	
Source of information	
Comments	

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Update
Worksheet #3:

UNIQUE Hazard Risks for Local Jurisdictions

Jurisdiction: _____ Point of Contact: _____
Phone#: _____ E-mail: _____

1. Does your jurisdiction have any **unique natural hazard risks** not addressed in the region-wide hazard identification and risk assessment worksheet?
   ___Yes ___No

   If "Yes", please answer the following questions.

2. What is the unique hazard risk that your community faces?

3. Does this unique hazard risk threaten a distinct geographic area? If so, please describe the area and delineate it on a map.

4. Please provide information regarding the potential consequences of this unique hazard threat.

   a. How many people are at risk?

   b. Are any special populations at risk? If so, describe.

   c. Estimate the number of residential structures at risk and provide a gross estimate of the dollar value of those structures.

   d. Estimate the number of commercial structures at risk and provide a gross estimate of the dollar value of those structures.

   e. Estimate the number of key and special facilities at risk and provide a gross estimate of their dollar value.

   f. Identify infrastructure and lifelines at risk from this unique hazard.

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Update
Worksheet #4
ASSET INVENTORY

Jurisdiction: _____ Point of Contact: _____
Phone#: _____ E-mail: _____

Name of Asset	Type*	Replacement value	Occupancy/ capacity	Hazard Specific issues

*EI: Essential Infrastructure; VF: Vulnerable Facilities; HM: Hazardous Materials Facilities; NA: natural assets

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Update
Worksheet #5:

Vulnerability Narrative

Jurisdiction: _____ Point of Contact: _____
Phone#: _____ E-mail: _____

Number of repetitive loss properties (flooding)	
Average depth of 100-year floodplain	
Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, or low-income.	
Describe growth and development trends and future growth areas. How do they relate to hazard areas and vulnerability concerns/issues?	
Describe how vulnerability has changed (or not) as a result of implementing successful mitigation actions proposed in the 2005 Plan.	

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Update
Worksheet #6:

Capability Assessment - Regulatory

Jurisdiction: _____ Point of Contact: _____
Phone#: _____ E-mail: _____

Listed below are the planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. Please indicate which are currently in place in your jurisdiction. If this capability or authority is not in place at the local level, please indicate if a higher level of government assumes that responsibility. Along with your comments, please include information on how to obtain the document/information – web site, via e-mail, fax, etc.

Regulatory Tool (ordinances, codes, plans)	**Yes/No**	**Comments**
General or Comprehensive plan		
Zoning ordinance		
Subdivision ordinance		
Growth management ordinance		
Floodplain ordinance		
Other special purpose ordinance (stormwater, steep slope, wildfire)		
Building code		
Fire department ISO rating		
Erosion or sediment control program		
Stormwater management program		
Site plan review requirements		
Capital improvements plan		
Economic development plan		
Local emergency operations plan		
Other special plans		
Flood insurance study or other engineering study for streams		
Elevation certificates (for floodplain development)		
Other		

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Update
Worksheet #7:

Capability Assessment – Administrative/Technical Resources

Jurisdiction: _____ Point of Contact: _____
Phone#: _____ E-mail:_____

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your jurisdiction. For smaller jurisdictions without local staff resources, indicate public resources at the next higher level of government that can provide technical assistance, if available.

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices			
Engineer/professional trained in construction practices related to buildings and/or infrastructure			
Planner/engineer/scientist with an understanding of natural hazards			
Personnel skilled in GIS			
Full time building official			
Floodplain manager			
Emergency manager			
Grant writer			
Other personnel			
GIS Data Resources (Hazard areas, critical facilities, land use, building footprints, etc.)			
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)			
Other			

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Update
Worksheet #8:

Capability Assessment – Fiscal Resources

Jurisdiction: _____ Point of Contact: _____
Phone#: _____ E-mail: _____

Please indicate whether your jurisdiction has access to or is eligible to use the following financial resources for hazard mitigation.

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants		
Capital improvements project funding		
Authority to levy taxes for specific purposes		
Fees for water, stormwater, sewer, gas, or electric services		
Impact fees for new development		
Incur debt through general obligation bonds		
Incur debt through special tax bonds		
Incur debt through private activities		
Withhold spending in hazard prone areas		
Other		

Rappahannock-Rapidan Region All-Hazard Mitigation Plan Update
Worksheet #9:

Capability Assessment - Narrative

Jurisdiction: _____ Point of Contact: _____
Phone#: _____ E-mail: _____

Additional Capabilities

Does your community have any hazard-related certifications, such as Storm Ready or Firewise Communities certification?	
Describe any past or ongoing public education or information programs, such as for responsible water use, fire safety, household preparedness, or environmental education.	
Describe any other past or ongoing projects or programs designed to reduce disaster losses. These may include projects to protect critical facilities.	
Other	

Attach additional information if available

RRRC Multi-Jurisdictional All Hazard Mitigation Plan Survey

1. Introduction

We need your help!

Our community is currently engaged in a planning process to become less vulnerable to disasters, and your participation is important to us!

Culpeper, Fauquier, Madison, Orange, Rappahannock counties and the towns of Culpeper, Gordonsville, Madison, Orange, Remington, The Plains, Warrenton and Washington are working together to update their Hazard Mitigation Plans. The purpose of these plans is to identify and assess each community's natural hazard risks (such as floods, hurricanes, and ice storms), and determine how to best minimize or manage those risks.

Upon completion, the plan will be presented to each local governing body for adoption and submitted to the Virginia Division of Emergency Management and Federal Emergency Management Agency for review and approval.

This survey questionnaire provides an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impact of future hazard events.

If you have any questions regarding this survey, or would like to learn about more ways you can participate in the development of our Hazard Mitigation Plan, please contact Patrick Mauney at (540) 829-7450 or visit www.rrregion.org.

2. Q1

1. In what town or county do you live?

- ◯ Culpeper County
- ◯ Fauquier County
- ◯ Madison County
- ◯ Orange County
- ◯ Rappahannock County
- ◯ Town of Culpeper
- ◯ Town of Gordonsville
- ◯ Town of Madison
- ◯ Town of Orange
- ◯ Town of Remington
- ◯ Town of The Plains
- ◯ Town of Warrenton
- ◯ Town of Washington
- ◯ Other (please specify)

2. How concerned are you about the possibility of our community being impacted by a disaster?

- ◯ Extremely concerned
- ◯ Somewhat concerned
- ◯ Not concerned

3. Have you ever experienced or been impacted by a disaster?

- ◯ Yes
- ◯ No

RRRC Multi-Jurisdictional All Hazard Mitigation Plan Survey

4. If yes, please indicate the number of occurrences by disaster type below.

	1	2	3	4	5
Flood	◯	◯	◯	◯	◯
Hurricane/Tropical Storm	◯	◯	◯	◯	◯
Tornado	◯	◯	◯	◯	◯
Wildfire	◯	◯	◯	◯	◯
Winter Storm	◯	◯	◯	◯	◯

Other (please specify)

3. Q4

5. Please select the top *three* hazards you think are the *highest threat* to your neighborhood:

- ☐ Drought
- ☐ Earthquake
- ☐ Erosion
- ☐ Extreme Temperatures
- ☐ Flooding
- ☐ Hurricanes/Tropical Storms
- ☐ Landslides
- ☐ Man-made Hazards (terrorism, hazardous chemical spill)
- ☐ Mosquito Borne Disease
- ☐ Sinkholes
- ☐ Severe Thunderstorms
- ☐ Tornadoes
- ☐ Wildfires
- ☐ Winter Storms (Ice, Snow)
- ☐ Other (please specify)

6. Does your street flood?

- ◯ Yes
- ◯ No

7. If yes, please provide the street name or nearest intersection.

8. If yes, how many times did your street flood in the past year?

9. Is your home located in a floodplain?

- ◯ Yes
- ◯ No
- ◯ Not Sure

10. Do you have flood insurance?

- ◯ Yes
- ◯ No
- ◯ Not Sure

11. If you do not have flood insurance, please select the main reason below:

- ◯ Not located in floodplain
- ◯ Too expensive
- ◯ Not necessary because it never floods
- ◯ Not necessary because I'm elevated or otherwise protected
- ◯ Never really considered it

Other (please specify)

4. Q8

12. Have you taken any actions to make your home or neighborhood more resistant to hazards?

- ◯ Yes
- ◯ No

13. If yes, please explain.

14. Are you interested in making your home or neighborhood more resistant to hazards?

- ◯ Yes
- ◯ No

15. Would incentives such as insurance discounts, property tax breaks or low interest rate home loans motivate you to take additional steps to protect your property from natural disasters and flooding?

- ◯ Yes
- ◯ No
- ◯ Not Sure

16. If no, please explain.

5. Q11

17. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?

- ☐ Newspaper
- ☐ Television
- ☐ Radio
- ☐ Direct Mailings
- ☐ Other (please specify)
- ☐ Email
- ☐ Community website
- ☐ Public meetings

18. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?

19. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

6. Q14

20. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.

	Very Important	Somewhat Important	Not Important
Prevention: Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.	☐	☐	☐
Property Protection: Actions that involved the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structure retrofits, and storm shutters.	☐	☐	☐
Natural Resource Protection: Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. Examples include floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.	☐	☐	☐
Structural Projects: Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, detention/retention basins, channel modifications, retaining walls and storm sewers.	☐	☐	☐
Emergency Services: Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning,	☐	☐	☐

emergency response training, and protection or critical emergency facilities or systems.			
Public Education and Awareness: Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials and demonstration events.	☐	☐	☐

7. Wrapup

21. Thank your for your participation!

***This survey may be submitted anonymously. However, if you would like to receive information regarding upcoming public meetings for the hazard mitigation plan update, please provide your name and contact information*:**

Name:	
Address:	
Email Address:	
Phone Number:	



Rappahannock-Rapidan Region All-Hazard Mitigation Plan

2012 RRRC Regional Hazard Mitigation Draft Plan Materials Available

Please complete our Hazard Mitigation Public Survey

Hazard mitigation planning is the process by which threats to localities are identified, the likelihood of impacts determined, goals to mitigate those threats are developed and appropriate strategies to eliminate or reduce impacts are determined, prioritized, and implemented. FEMA approval of the updated all-hazard mitigation plan will qualify participating jurisdictions for federal support for pre- and post-disaster hazard mitigation projects.

The collection and analysis of significant information is needed to assure the development of a useful updated plan that meets the needs of each participating jurisdiction and the requirements of the Disaster Mitigation Act, 2000. Essential data includes general background information from each locality, hazard and risk information, current codes, ordinances, regulations and procedures related to loss minimization as well as an assessment of each locality's technical and organizational abilities to perform hazard mitigation and/or loss prevention functions.

The Rappahannock-Rapidan Regional Commission is working with the Virginia Department of Emergency Management (VDEM) and the Federal Emergency Management Agency (FEMA) on an update to the initial plan, completed in 2004.

The original plan may be accessed at:
http://www.vdem.state.va.us/library/plans/mitigation.cfm or
http://www.rrregion.org/publications.

For additional information, please contact Patrick Mauney at (540) 829.7450 or plmauney@rrregion.org.

Meeting Schedule & Notes

July 13, 2010 | 9am at Regional Commission
Agenda
Minutes
Presentation: Hazard Mitigation Status Report

April 20, 2010 | 10am at Regional Commission
Agenda
Minutes
Data Collection Guide [Updated]
Presentation: Hazard Mitigation Status Report

February 23, 2010 | Kickoff Meeting, 10am at Regional Commission
Agenda
Minutes
Presentation: Plan Update Kickoff [VDEM]

Plan Update Documents

DRAFT Hazard Mitigation Plan Maps [.pdf, 20MB]

DRAFT Section 1: Introduction
DRAFT Section 2: Planning Process
DRAFT Section 3: Regional Profile
DRAFT Section 4: Hazard Identification
DRAFT Section 5: Hazard Analysis
DRAFT Section 6: Vulnerability Analysis
DRAFT Section 7: Capability Assessment
DRAFT Section 8: Mitigation Strategy Overview
DRAFT Section 9: Plan Maintenance
DRAFT Appendix A: Local Mitigation Strategies
DRAFT Appendix B: FEMA Crosswalk
DRAFT Appendix C: Supporting Documentation
DRAFT Appendix D: Plan Adoption Resolutions

Data Collection Guide & Worksheets
Jurisdiction Plan Team Chart
Jurisdiction Match Log
Plan Update Timeline

2004 Plan Strategies

Culpeper County
Fauquier County
Madison County
Orange County
Rappahannock County
Town of Culpeper
Town of Madison
Town of Orange
Town of Remington
Town of Warrenton

Data Source Links

FEMA Map Service Center
NCDC Database
VDEM Historical Hazards

Rappahannock-Rapidan Regional Commission
420 Southridge Parkway • Suite 106 • Culpeper, VA 22701 • Tel: (540) 829-7450 • Fax: (540) 829-7452

E-mail: planinfo@rrregion.org

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www.warrentonva.gov

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town of Warrenton, Virginia

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Friday, March 16, 2012

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Town of Warrenton Website - 3/16/2012

General

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NEWS

News

RRRC Draft All-Hazards Mitigation Plan

The Rappahannock-Rapidan Regional Commission (RRRC) has posted the draft All-Hazards Mitigation Plan on their website for public comment through April 6, 2012. The RRRC serves the Counties of Culpeper, Fauquier, Madison, Orange and Rappahannock, and the towns of Culpeper, Gordonsville, Madison, Orange, Remington, The Plains, Warrenton and Washington.

Click here to be directed to the RRRC website for review of the draft All-Hazards Mitigation Plan.

Welcome

Warrenton is located in the northern region of the Commonwealth of Virginia and is about a forty-five minute drive to Washington D.C. and a 35 minute drive to Dulles airport. It is known for its quality of life and scenic beauty and received many awards for managing growth in such a way that protects its rich heritage, unique architectural features and open spaces. It received the coveted Preserve America Community Award from First Lady Laura Bush. Old Town Warrenton was recently named Prettiest Painted Places in America.

Orange, VA - Official Website - Mozilla Firefox

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Orange, VA - Official Website

www.townoforangeva.org/CivicAlerts.aspx?AID=143

Personalize your online experience to stay up-to-date on news, events and other information you care about. View my dashboard

Sign In

Town of Orange Website - 3/29/2012

ORANGE VIRGINIA

Sweet Living, Steady Progress

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- Town Utility Fees
- Public Works
- Community Development
- Utility & Tax Payments
- Town of Orange Transit

Feedback

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Home

Posted on: March 28, 2012

Rappahannock-Rapidan Region All-Hazard Mitigation Plan

The Rappahannock-Rapidan Regionl Commission is accepting public comment on the DRAFT 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan unitl 5pm on April 6, 2012. For more information please click on the link below.

RRRC All Hazard Mitigation Plan

Next
Spring Clean Up

Other News in Home

Spring Clean Up
Posted on: February 29, 2012

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Regional Commission Website Homepage - 3/19/2012





Rappahannock-Rapidan Region All-Hazard Mitigation Plan

2012 RRRC Regional Hazard Mitigation Draft Plan Materials Available

The Rappahannock-Rapidan Regional Commission is accepting public comment on the DRAFT 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan until 5pm on **April 6, 2012**. A copy of the draft plan can be found below and hard copies are available at the following locations:

Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, VA, 22701.

Culpeper County Public Library
271 Southgate Shopping Center
Culpeper, VA 22701

Fauquier County Public Library (Warrenton Branch)
11 Winchester Street
Warrenton, VA 20186

Madison County Public Library
402 North Main Street
Madison, VA 22727

Orange County Public Library (Main Branch)
146A Madison Road
Orange, VA 22960

Rappahannock County Public Library
4 Library Road
Washington, VA 22747

Comments may be directed to:

Rappahannock-Rapidan Regional Commission
420 Southridge Parkway, Suite 106
Culpeper, VA 22701

or to planinfo@rrregion.org.

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Agenda
Minutes
Presentation: Plan Update Kickoff [VDEM]

2012 RRRC Regional Hazard Mitigation Draft Plan

All files below are in .pdf format and are less than 1MB in size unless otherwise noted.

DRAFT Hazard Mitigation Plan Maps [.pdf, 20MB]

DRAFT Section 1: Introduction
DRAFT Section 2: Planning Process
DRAFT Section 3: Regional Profile
DRAFT Section 4: Hazard Identification [2MB]
DRAFT Section 5: Hazard Analysis [17MB]
DRAFT Section 6: Vulnerability Analysis [5MB]
DRAFT Section 7: Capability Assessment
DRAFT Section 8: Mitigation Strategy Overview
DRAFT Section 9: Plan Maintenance
DRAFT Appendix A: Local Mitigation Strategies
DRAFT Appendix B: FEMA Crosswalk
DRAFT Appendix C: Supporting Documentation [8MB]
DRAFT Appendix D: Plan Adoption Resolutions

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Town of Orange
Town of Remington
Town of Warrenton

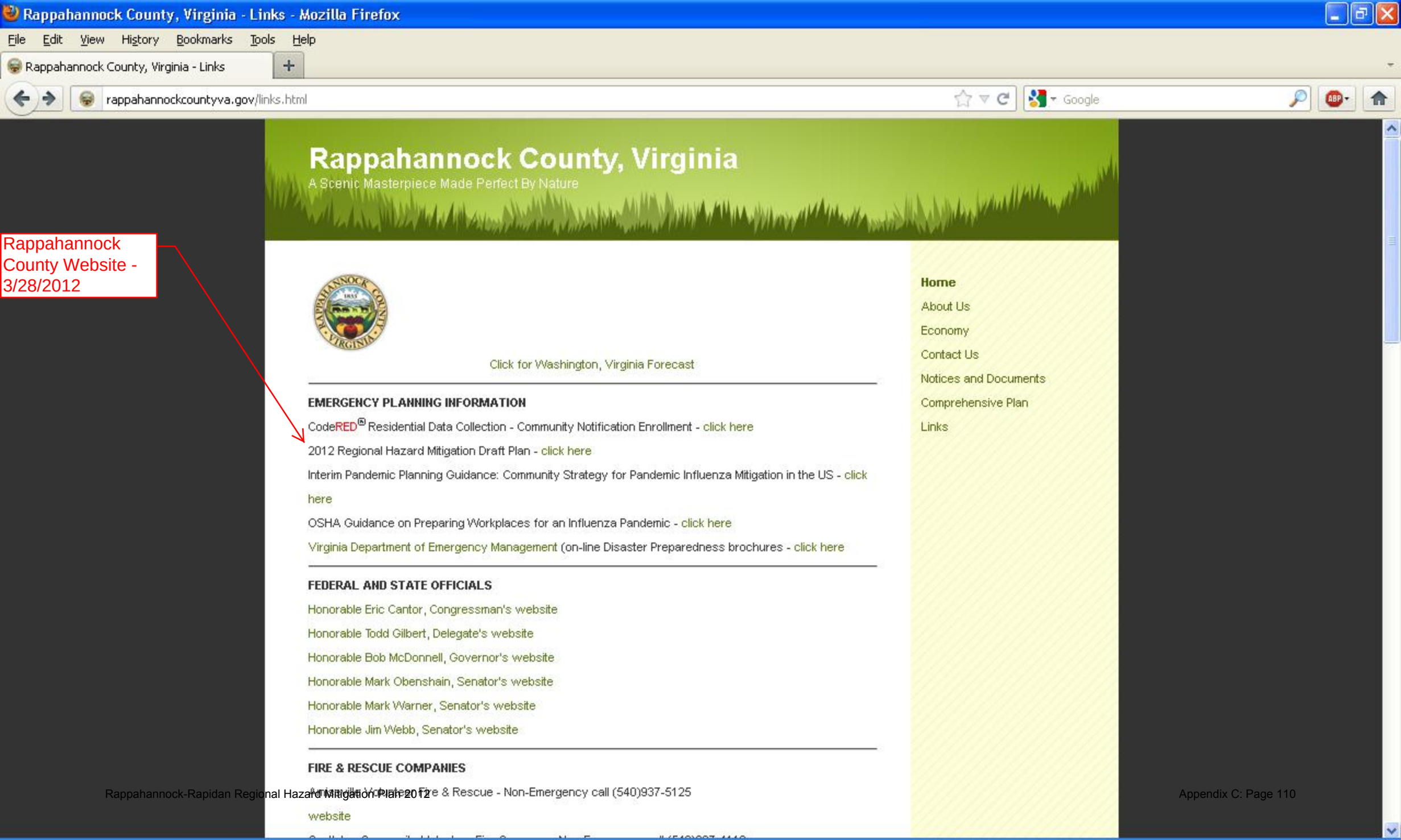
Data Source Links

FEMA Map Service Center
NCDC Database
VDEM Historical Hazards

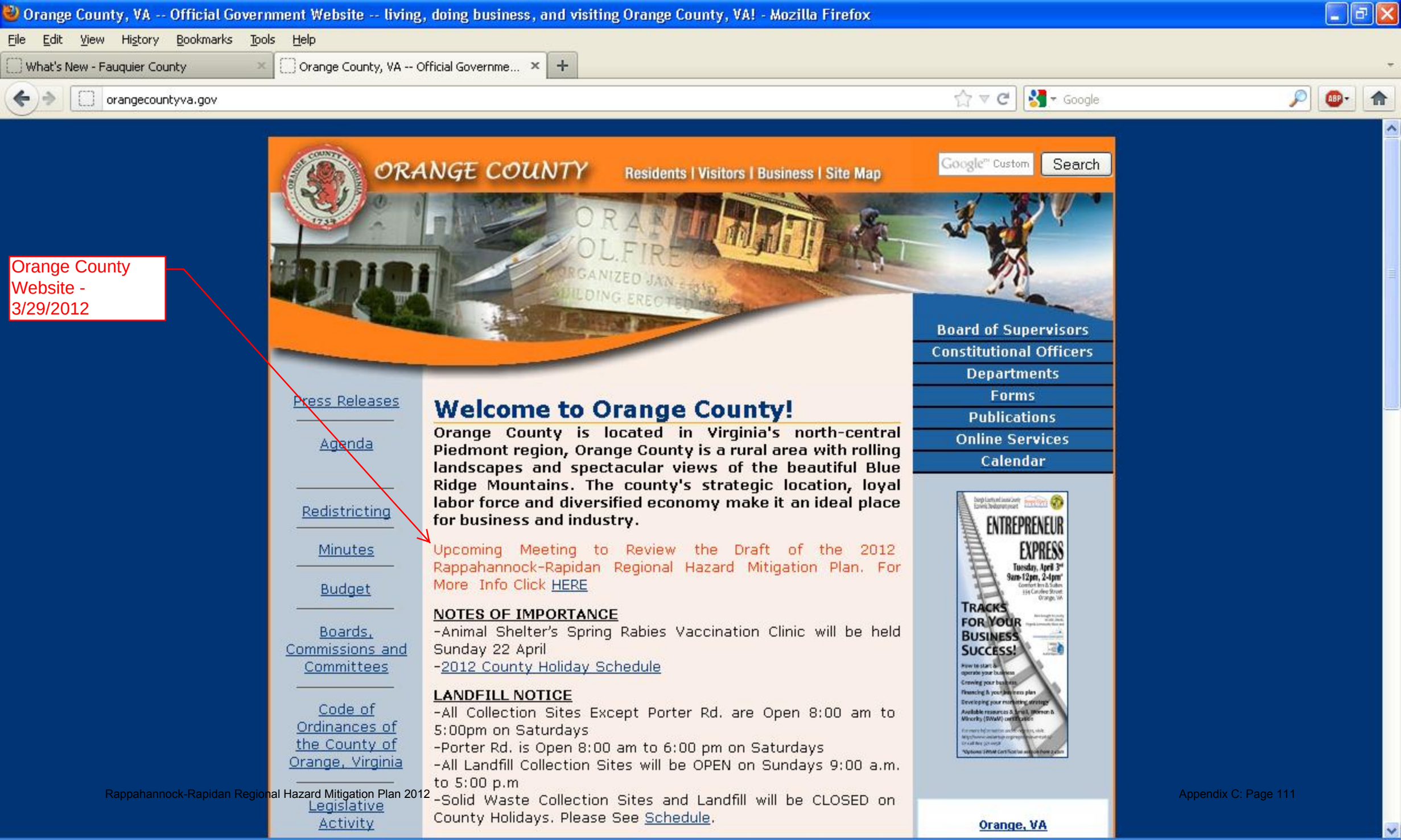
Rappahannock-Rapidan Regional Commission
420 Southridge Parkway • Suite 106 • Culpeper, VA 22701 • Tel: (540) 829-7450 • Fax: (540) 829-7452

E-mail: planinfo@rrregion.org

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Orange County Website - 3/29/2012

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fcfra.camp9.org/Default.aspx?pageId=870791

Google

Fauquier County Emergency Services Webpage Link - 3/29/2012

Rappahannock Rapidan Regional Commission

Helpful Links:

511 Virginia - Virginia Dept. of Transportation

511 Virginia Current Road Conditions

Ready Virginia Winter Weather

Ready Virginia Tornado Preparedness • Make a plan

Baltimore/Washington

Doppler Radar -WUSA9

National Weather Service Forecast Office

Are You Ready?

FEMA

Español

Are You Prepared?

Be informed about disasters

Make a plan, Build a kit

Get Involved

Ready citizen corps

FEMA Blog

SHARE

>© Fauquier County Department of Fire, Rescue & Emergency Management

APPENDIX D:

PLAN ADOPTION RESOLUTIONS

Appendix D contains adoption resolutions from all participating counties and towns for the 2012 RRRC Regional Hazard Mitigation Plan.

Counties

Culpeper County	Adopted: July 3, 2012
Fauquier County	Adopted: July 12, 2012
Madison County	Adopted: July 10, 2012
Orange County	Adopted: July 24, 2012
Rappahannock County	Adopted: August 6, 2012

Towns

Town of Culpeper	Adopted: July 10, 2012
Town of Madison	Adopted: July 5, 2012
Town of Orange	Adopted: August 20, 2012
Town of Remington	Adopted: July 9, 2012
Town of Warrenton	Adopted: August 14, 2012

Rappahannock-Rapidan Regional Commission	Adopted: August 22, 2012

Jurisdiction Points of Contact

Culpeper County
Frank Bossio
County Administrator
302 North Main Street
Culpeper, VA 22701
(540) 727-3427

Fauquier County
Paul McCulla
County Administrator
10 Hotel Street, Suite 204
Warrenton, VA 20186
(540) 422-8001

Madison County
Ernie Hoch
County Administrator
302 Thrift Road
Madison, VA 22727
(540) 948-7500

Orange County
Julie Jordan Summs
County Administrator
P.O. Box 111
Orange, VA 22960
(540) 672-3313

Rappahannock County
John McCarthy
County Administrator
P.O. Box 519
Washington, VA 22747
(540) 675-5330

Town of Culpeper
Kimberly Alexander
Town Manager
400 South Main Street, Suite 101
Culpeper, VA 22701
(540) 829-8250

Town of Madison
William Lamar
Mayor
23 Washington Circle
Madison, VA 22727
(540) 948-6717

Town of Orange
Greg Woods
Town Manager
119 Belleview Avenue
Orange, VA 22960
(540) 672-5005

Town of Remington
Sharon Lee
Town Manager
P.O. Box 278
Remington, VA 22734
(540) 439-3220

Town of Warrenton
Kenneth McLawhon
Town Manager
P.O. Drawer 341
Warrenton, VA 20188-0341
(540) 347-4505

Rappahannock-Rapidan Regional Commission
Jeffrey Walker
Executive Director
420 Southridge Parkway, Suite 106
Culpeper, VA 22701
(540) 829-7450

RESOLUTION TO ADOPT THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

WHEREAS, the County of Culpeper, like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property;

WHEREAS, it is the intent of the Culpeper County Board of Supervisors to protect its citizens and property from the effects of natural and human-caused hazards to the furthest extent possible; and

WHEREAS, the Culpeper Board of Supervisors desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Culpeper Board of Supervisors to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the County of Culpeper; and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed said plan, inclusive of the County of Culpeper section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, IT IS HEREBY RESOLVED that the Culpeper Board of Supervisors hereby:

1. Adopts the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan; and

2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the County of Culpeper section of the Plan.

Adopted in Culpeper, Virginia this 3rd Day of July, 2012.

Culpeper County Board of Supervisors

William C. Chase, Jr., Chairman

ATTEST:

Frank T. Bossio, Clerk of the Board

RESOLUTION

A RESOLUTION TO ADOPT THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

WHEREAS, Fauquier County, like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property; and

WHEREAS, it is the intent of the Fauquier County Board of Supervisors to protect its citizens and property from the effects of natural and human-caused hazards to the furthest extent possible; and

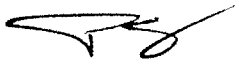
WHEREAS, the Fauquier County Board of Supervisors desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Board of Supervisors to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, to remain eligible to receive state and federal assistance in the event of a declared disaster affecting Fauquier County; and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed the said plan, inclusive of the Fauquier County section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures; now, therefore, be it

RESOLVED by the Fauquier County Board of Supervisors this 12th day of July 2012, that the Board adopts the 2012 Rappahannock-Rapidan Region Hazard Mitigation Plan and agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the Fauquier County section of the Plan, effective this date.

A Copy Teste



Paul S. McCulla
Clerk to the Board of Supervisors

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DFREM

ORANGE COUNTY, VIRGINIA

BOARD OF SUPERVISORS

SHANNON C. ABBS, DISTRICT ONE
JAMES K. WHITE, DISTRICT TWO
S. TEEL GOODWIN, DISTRICT THREE
GROVER C. WILSON, DISTRICT FOUR
LEE H. FRAME, DISTRICT FIVE

JULIE G. SUUMMS
COUNTY ADMINISTRATOR

PHONE: (540) 672-3313
FAX: (540) 672-1679

MAILING ADDRESS:
PO BOX 111
ORANGE, VA 22960

PHYSICAL ADDRESS:
R. LINDSAY GORDON III BUILDING
112 WEST MAIN STREET
P O BOX 111
ORANGE, VIRGINIA 22960

MOTION: **FRAME**

SECOND: **ABBS**

July 24, 2012
Public Hearing
Res. No. 120724-PH

RE: RESOLUTION TO ADOPT THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

WHEREAS, the County of Orange, like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property;

WHEREAS, it is the intent of the Orange County Board of Supervisors to protect its citizens and property from the effects of natural and human-caused hazards to the furthest extent possible; and

WHEREAS, the Orange County Board of Supervisors desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Orange County Board of Supervisors to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the County of Orange; and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed said plan, inclusive of the County of Orange section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, IT IS HEREBY RESOLVED that the Orange County Board of Supervisors hereby:

1. Adopts the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan; and

2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the County of Orange section of the Plan.

Votes:
Ayes: Abbs, White, Goodwin, Wilson, Frame.
Nays: None.
Absent from Vote: None.
Absent from Meeting: None.

For Information: Sharon Pandak, County Attorney
Gregg Zody, Director of Planning and Zoning

CERTIFIED COPY _____
Clerk to the Board



RESOLUTION #2012-10

TO ADOPT THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

WHEREAS, the County/Town of Madison, like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property;

WHEREAS, it is the intent of the Madison County Board of Supervisors/Town Council to protect its citizen and property from the effects of natural and human-caused hazards to the furthest extent possible; and

WHEREAS, the Madison County Board of Supervisors/Town Council desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Madison County Board of Supervisors/Town Council to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town/County of Madison; and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed said plan, inclusive of the County/Town of Madison section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, IT IS HEREBY RESOLVED, that the Madison County Board of Supervisors/Town Council hereby:

1. Adopts the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan; and

2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the County/Town of Madison section of the Plan.

Adopted in Madison, Virginia this 10th day of July, 2012, on motion of Supervisor Lackey, seconded by Supervisor Weakley.

J. Dave Allen, Chairman
Madison County Board of Supervisors

	Aye	Nay	Abstain	Absent
J. Dave Allen	x	____	____	____
Doris G. Lackey	x	____	____	____
Jerry J. Butler	x	____	____	____
Pete J. Elliott	x	____	____	____
Jonathon Weakley	x	____	____	____

Testee:

Jacqueline S. Frye
Clerk to the Board

John W. McCarthy
County Administrator

Roger A. Welch, Chairman
S. Bryant Lee, Vice-Chairman
Ronald L. Frazier
Michael J. Biniek
I. Christopher Parrish

RAPPAHANNOCK COUNTY
BOARD OF SUPERVISORS
290 Gay Street - P.O. Box 519
Washington, Virginia 22747-0519
Phone: (540)675-5330 Fax: (540)675-5331
www.rappahannockcountyva.gov

RESOLUTION TO ADOPT THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

WHEREAS, the County of Rappahannock like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property;

WHEREAS, it is the intent of the Rappahannock Board of Supervisors to protect its citizens and property from the effects of natural and human-caused hazards to the furthest extent possible; and

WHEREAS, the Rappahannock County Board of Supervisors desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Rappahannock County Board of Supervisors to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the County of Rappahannock and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed said plan, inclusive of the County of Rappahannock section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, IT IS HEREBY RESOLVED that the Rappahannock County Board of Supervisors hereby:

1. Adopts the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the County of Rappahannock section of the Plan.

Adopted in Washington, Virginia this 6th Day of August, 2012 .

A TRUE COPY

County Administrator

RESOLUTION

ADOPTING THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

Resolution No. R-2012-020

WHEREAS, the Town of Culpeper, like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property; and

WHEREAS, it is the intent of the Town Council to protect its citizens and property from the effects of natural and human-caused hazards to the furthest extent possible; and

WHEREAS, the Town Council desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Town Council to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Culpeper and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed said plan, inclusive of the Town of Culpeper section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, IT IS HEREBY RESOLVED that the Council of the Town of Culpeper hereby:

1. Adopts the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan; and

2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the Town of Culpeper section of the Plan.

Adopted this 10th day of July 2012.

BY ORDER OF COUNCIL OF THE
TOWN OF CULPEPER, VIRGINIA

Calvin L. Coleman, Jr., Mayor

ATTEST:

Kimberly D. Allen, Town Clerk

TOWN OF MADISON

RESOLUTION TO ADOPT THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

WHEREAS, the Town of Madison, like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property; and

WHEREAS, it is the intent of the Madison Town Council to protect its citizens and property from the effects of natural and human-caused hazards to the furthest extent possible; and

WHEREAS, the Madison Town Council desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Madison Town Council to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Madison; and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed said plan, inclusive of the Town of Madison section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, IT IS HEREBY RESOLVED that the Madison Town Council hereby:

1. Adopts the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan; and

2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the Town of Madison section of the Plan.

Adopted in Madison, Virginia this 5th Day of July, 2012.

William L. Lamar, Mayor

ATTEST: Barbara A. Roach

Barbara A. Roach, Madison Town Clerk



RES2012-15

RESOLUTION TO ADOPT THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

WHEREAS, the Town of Orange, like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property;

WHEREAS, it is the intent of the Orange Town Council to protect its citizens and property from the effects of natural and human-caused hazards to the furthest extent possible; and

WHEREAS, the Orange Town Council desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Orange Town Council to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Orange; and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed said plan, inclusive of the Town of Orange section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, IT IS HEREBY RESOLVED that the Orange Town Council hereby:

1. Adopts the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan; and

2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the Town of Orange section of the Plan.

Adopted in Orange, Virginia this 20th Day of August, 2012.

Harry C. Mason, Jr., Mayor

ATTEST: _____

Wendy J. Chewning, MMC, Town Clerk

RESOLUTION

RESOLUTION TO ADOPT THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

WHEREAS, the County/Town of Remington, like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property;

WHEREAS, it is the intent of the Remington Town Council to protect its citizens and property from the effects of natural and human-caused hazards to the furthest extent possible; and

WHEREAS, the Remington Town Council desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Remington Town Council to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Remington; and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed said plan, inclusive of the Town of Remington section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, IT IS HEREBY RESOLVED that the Remington Town Council hereby:

1. Adopts the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan; and

2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the Town of Remington section of the Plan.

Adopted in Remington, Virginia this 9th Day of July, 2012.

Gerald A. Billingsley

Gerald A. Billingsley, Mayor

ATTEST: Kimberly A. Erwin, Town Clerk

TOWN OF WARRENTON

RESOLUTION TO ADOPT THE 2012 RAPPAHANNOCK-RAPIDAN REGIONAL HAZARD MITIGATION PLAN

WHEREAS, the Town of Warrenton, like any jurisdiction, is vulnerable to an array of natural and human-caused hazards that can result in loss of life and damages to public and private property;

WHEREAS, it is the intent of the Warrenton Town Council to protect its citizens and property from the effects of natural and human-caused hazards to the furthest extent possible; and

WHEREAS, the Warrenton Town Council desires to seek ways to effectively reduce (mitigate) the risk of these natural and human-caused hazards through participation with the Rappahannock-Rapidan Regional Commission and adjoining jurisdictions in the development and implementation of a regional hazard mitigation plan; and

WHEREAS, it is also the intent of the Warrenton Town Council to fulfill its obligation under Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Warrenton; and

WHEREAS, the Federal Emergency Management Agency and the Virginia Department of Emergency Management have reviewed said plan, inclusive of the Town of Warrenton section prepared with input from appropriate local and state officials, and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, IT IS HEREBY RESOLVED that the Warrenton Town Council hereby:

1. Adopts the 2012 Rappahannock-Rapidan Regional Hazard Mitigation Plan; and

2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions included in the Town of Warrenton section of the Plan.

VOTING FOR: Norden, Martella, Duggan, Williams, Lubowsky, Kravetz, Lewis

VOTING AGAINST: _____

ADOPTED: August 14, 2012.

ATTEST:

Evelyn J. Weimer, Town Recorder

HAZARD IDENTIFICATION
HUMAN-CAUSED HAZARDS

The United States and its communities are vulnerable to a wide array of human-caused hazards that threaten life and property. These hazards include:

Human-caused Hazards

- **Terrorism**
- **Hazardous Materials (HAZMAT)**
- **Radiological Event**
- **Energy Pipeline Failures**
- **Communication Disruption**
- **Utility Disruption**
- **Civil Disruption**

The "Introduction" subsection that follows provides summaries of several key documents used in human-caused hazard identification in an effort to better equip the reader of this Plan with the essential background knowledge to fully understand the hazard descriptions provided in this section.

INTRODUCTION

Natural hazard identification and analysis has a long historical statistical basis on which the probability and frequency of the events, damage, and impacts are well documented and upon which future events damage can be predicted. To some degree technological accidents can also be statistically modeled and damage predictions made such as the damage caused by HAZMAT spills, release of radioactive steam, or large blast explosion at chemical or manufacturing plants. The challenge at this time is developing the methodology and analytical models for terrorist threats that have the equivalent veracity and capabilities as natural hazard models and analysis. The federal government focus is now on All Hazards analysis and mitigation. The All Hazards approach addresses natural and human-caused (or manmade) hazards. For the purpose of this Plan, "Human-Caused hazards" are further categorized as "technological hazards" and "acts of terrorism" (*definitions and material as put forth in FEMA Publication 386-7*). The primary differentiation between those hazards classified as natural versus human-caused is that human-caused hazards originate with intentional or accidental human activity as opposed to those events that occur as a normal process of nature such as a hurricane or earthquake.

There are a number of key documents, statutes and directives that have been promulgated in the past two years by the Department of Homeland Security (DHS) that have established parameters upon which a Human-Caused (Manmade) Hazards Assessment and Analysis will be conducted. However, there is still no single DHS directive that definitively states the process of method in which the assessment and analysis shall be conducted.

The hazard identification and analysis developed for this project is an emerging state-of-the-practice approach that requires compliance with the *Homeland Security Act of 2002*, *Homeland Security Presidential Decision Directives*, and the DHS publications presented in this section. In May 2004, DHS issued the policy for the Safeguarding of Sensitive but Unclassified (For Official Use Only) Information. For the purposes of the human-caused risk assessment, the

information contained herein is considered to meet the definitions and standards as defined in the statutes. Throughout the analysis, the direct document cites and/or language are used to explicitly define those areas which have been adopted as state-of-the-practice and this document is considered to be a Sensitive But Unclassified (For Official Use Only) document.

The following subsections provide an overview of the relevant documents and the primary directive or objective of that document. In each subsection, an introduction to the history of the document is provided along with relevant excerpts from the document to provide the reader with a logical flow of the federal to state and state to local requirements. The source document Web site is provided in all cases and specific section or text cites are italicized.

HOMELAND SECURITY ACT OF 2002

Portions of the following material have been taken in whole or in part from The Homeland Security Act of 2002 *(www.dhs.gov)) published by the Department of Homeland Security in July 2002.*

Title I—Department of Homeland Security


One Hundred Seventh Congress
of the
United States of America
AT THE SECOND SESSION
An Act

Sec. 101. Executive Department; Mission.

(a) Establishment.—"There is established a Department of Homeland Security, as an executive department of the United States within the meaning of Title 5, United States Code.

(b) Mission. —
(1) In General. - The primary mission of the Department is to-
(2) (A) prevent terrorist attacks within the United States;
(3) (B) reduce the vulnerability of the United States to terrorism; and
(4) (C) minimize the damage, and assist in the recovery, from terrorist attacks that do occur within the United States."

From H.R. 5005-8 the Homeland Security Act of 2002

THE NATIONAL SECURITY STRATEGY



Portions of the following material have been taken in whole or in part from The National Strategy For Homeland Security *(www.dhs.gov browse to Press Room Library) published by the Department of Homeland Security in July 2002.*

DHS and *The National Security Strategy* provide the top-level framework for human-caused hazards planning and which is stated as:

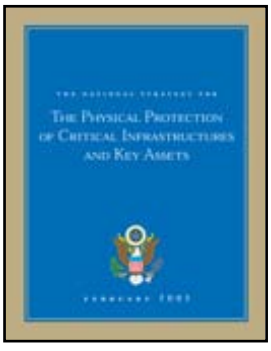
"Today no one single government agency has homeland security as its primary mission. In fact, responsibilities for homeland security are dispersed among more than 100 different government organizations. America needs a single, unified homeland security structure that will improve protection against today's threats and be flexible enough to help meet the unknown threats of the future."

The National Security Strategy also states, "The strategy provides direction to the federal government departments and agencies that have a role in homeland security. It suggests steps that state and local governments, private companies and organizations, and individual Americans can take to improve our security and offers incentives for them to do so. It recommends certain actions to the Congress. In this way, the *Strategy* provides a framework for the contributions that we all can make to secure our homeland."

There are two documents that expand on *The National Security Strategy*: *The National Security Strategy For The Protection of Critical Infrastructure And Key Assets*, and *The National Strategy to Secure Cyberspace*. The documents define the critical infrastructures and systems to be protected. The strategies recognize the need for a systems engineering approach to the analysis and description of infrastructure and cyber systems.

National Strategy for the Physical Protection of Critical Infrastructures and Key Assets

Portions of the following material have been taken in whole or in part from the National Strategy for the Physical Protection of Critical Infrastructures and Key Assets, *(www.dhs.gov browse to Press Room Library) published by Department of Homeland Security in February 2003.*



The *National Strategy for the Physical Protection of Critical Infrastructures and Key Assets* states that the strategy, "identifies a clear set of national goals and objectives and outlines the guiding principles that will underpin our efforts to secure the infrastructures and assets vital to our national security, governance, public health and safety, economy, and public confidence.

The *Strategy* also "provides a unifying organization and identifies specific initiatives to drive our near-term national protection priorities and inform the resource allocation process. Most importantly, it establishes a foundation for building and fostering the cooperative environment in which government, industry, and private citizens can carry out their respective protection responsibilities effectively and efficiently."

The *Strategy* also states, "The facilities, systems, and functions that comprise our critical infrastructures are highly sophisticated and complex. They consist of human capital and physical and cyber systems that work together in processes that are highly interdependent. They each encompass a series of key nodes that are, in turn, essential to the operation of the critical infrastructures in which they function. To complicate matters further, our most critical infrastructures typically interconnect and, therefore, depend on the continued availability and operation of other dynamic systems and functions. For example, e-commerce depends on electricity as well as information and communications. Assuring electric service requires operational transportation and distribution systems to guarantee the delivery of fuel necessary to generate power. Such interdependencies have developed over time and are the product of innovative operational processes that have fueled unprecedented efficiency and productivity. Given the dynamic nature of these interdependent infrastructures and the extent to which our daily lives rely on them, a successful terrorist attack to disrupt or destroy them could have tremendous impact beyond the immediate target and continue to reverberate long after the immediate damage is done."

Critical Infrastructure Sectors Identified in the *National Strategy for the Physical Protection of Critical Infrastructures and Key Assets*

- Agriculture
- Food
- Water
- Public Health
- Emergency Services
- Government
- Defense Industrial Base
- Information and Telecommunications
- Energy
- Transportation
- Banking and Finance
- Chemical Industry and Hazardous Materials
- Postal and Shipping

National Strategy to Secure Cyberspace

Portions of the following material have been taken in whole or in part from the National Strategy To Secure Cyberspace, *(www.dhs.gov browse to Press Room Library) published by the Department of Homeland Security in February 2003.*

"The *National Strategy to Secure Cyberspace* outlines an initial framework for both organizing and prioritizing efforts. It provides direction to the federal government departments and agencies that have roles in cyberspace security. It also identifies steps that state and local governments, private companies and organizations, and individual Americans can take to improve our collective cybersecurity. The Strategy highlights the role of public-private engagement. The document provides a framework for the contributions that we all can make to secure our parts of cyberspace. The dynamics of cyberspace will require adjustments and amendments to the Strategy over time."



Homeland Security Presidential Directive

Portions of the following material have been taken in whole or in part from the Homeland Security Presidential Directive/HSPD-7, *(http://www.whitehouse.gov/news/releases/2003/12/20031217-5.htm) published by the White House December 2003.*

In late 2003 and early 2004, President George W. Bush signed several Homeland Security Presidential Directives (http://www.whitehouse.gov/news/releases/2004/) that defined the role of federal agencies in Homeland Security and Homeland Defense. *Homeland Security Presidential Directive 7* (HSPD-7) defines critical infrastructure protection and the role that local communities will play in the development of assessment and reporting methods.

Subject: Critical Infrastructure Identification, Prioritization and Protection

Purpose

(1) This directive establishes a national policy for federal departments and agencies to identify and prioritize United States critical infrastructure and key resources and to protect them from terrorist attacks.



Background

(2) Terrorists seek to destroy, incapacitate or exploit critical infrastructure and key resources across the United States to threaten national security, cause mass casualties, weaken our economy, and damage public morale and confidence.

(3) America's open and technologically complex society includes a wide array of critical infrastructure and key resources that are potential terrorist targets. The majority of these are owned and operated by the private sector and state or local governments. These critical infrastructures and key resources are both physical and cyber-based and span all sectors of the economy.

(4) Critical infrastructure and key resources provide the essential services that underpin American society. The Nation possesses numerous key resources, whose exploitation or destruction by terrorists could cause catastrophic health effects or mass casualties comparable to those from the use of a weapon of mass destruction, or could profoundly affect our national prestige and morale. In addition, there is critical infrastructure so vital that its incapacitation, exploitation, or destruction, through terrorist attack, could have a debilitating effect on security and economic well-being.

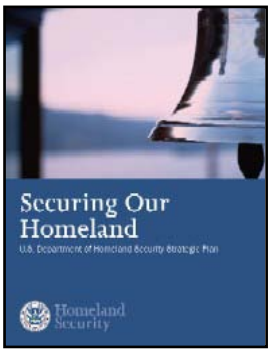
(5) While it is not possible to protect or eliminate the vulnerability of all critical infrastructure and key resources throughout the country, strategic improvements in security can make it more difficult for attacks to succeed and can lessen the impact of attacks that may occur. In addition to strategic security enhancements, tactical security improvements can be rapidly implemented to deter, mitigate, or neutralize potential attacks.

FEMA was renamed the Emergency Preparedness and Response directorate and was given the responsibility to "focus on risk mitigation in advance of emergencies by promoting the concept of disaster-resistant communities, including providing federal support for local governments that promote structures and communities that reduce the chances of being hit by disasters. EP&R will coordinate with private industry, the insurance sector, mortgage lenders, the real estate industry, homebuilding associations, citizens, and others to create model communities in high-risk areas.

The Directorate will also lead the DHS response to any sort of biological or radiological attack, and coordinate the involvement of other federal response teams, such as the Army National Guard, in the event of a major incident. Building upon the successes of FEMA, DHS will lead the Nation's recovery from catastrophes and help minimize the suffering and disruption caused by disasters."

SECURING OUR HOMELAND

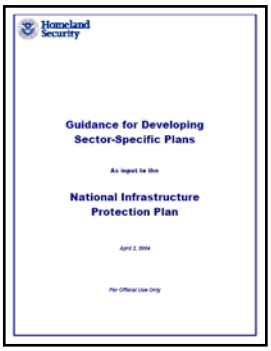
Portions of the following material have been taken in whole or in part from Securing Our Homeland *(www.dhs.gov) published by the Department of Homeland Security in 2004.*



"*The National Strategy for Homeland Security* and the *Homeland Security Act of 2002* served to mobilize and organize our Nation to secure the homeland from terrorist attacks. This exceedingly complex mission requires a focused effort from our entire society if we are to be successful. To this end, one primary reason for the establishment of the Department of Homeland Security was to provide the unifying core for the vast national network of organizations and institutions involved in efforts to secure our Nation. In order to better do this and to provide guidance to the 180,000 DHS men and women who work every day on this important task, the Department developed its own high-level strategic plan. The vision and mission statements, strategic goals and objectives provide the framework guiding the actions that make up the daily operations of the department."

GUIDANCE FOR DEVELOPING SECTOR SPECIFIC PLANS FOR THE NATIONAL INFRASTRUCTURE PROTECTION PLAN

Portions of the following material have been taken in whole or in part from the Guidance For Developing Sector-Specific Plans as Input Into the National Infrastructure Protection Plan, *(For Official Use Only, not publicly available) published by the Department of Homeland Security in April 2004.*



In 2003, the DHS Information Assurance and Infrastructure Protection directorate was established with a focus on Critical Infrastructure Protection and in 2004 released the *Guidance For Developing Sector Specific Plans for the National Infrastructure Protection Plan*.

The guidance states:

"A fundamental goal of the National Critical Infrastructure Protection (CIP) Program is to identify and protect infrastructures that are deemed most 'critical' in terms of national-level public health and safety, governance, economic and national security, and public confidence. The Department of Homeland Security (DHS) recognizes that such protection requires the cooperation and essential collaboration of federal departments and agencies, state and local governments, and the private sector. Accordingly, to achieve the overarching goal of protection, DHS will coordinate the development of consistent, sustainable, effective, and measurable CIP programs across federal, state, and local governments and the private sector.

To guide these efforts, DHS will produce a *National Infrastructure Protection Plan* (NIPP), a key requirement of *Homeland Security Presidential Directive* (HSPD) 7. The NIPP design consists of a unifying planning component, including national infrastructure protection goals and performance objectives, a set of individual Sector-Specific Plans, and a national-level cross-sector integration plan. Together, these elements will comprise a comprehensive National Plan for public and private sectors to work together to protect the infrastructure of the United States.

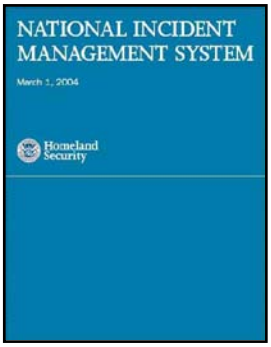
These activities are executed in an integrated fashion across private sector, public sector (e.g., non-governmental, but not privately owned), state and local, and federal infrastructures. Similarly, activities are executed across the physical, people, and cyber components of our CI/KR. The resulting output is the national profile of CI/KR risk, used as the basis for decision-making.

This program is implemented at two levels: in the context of specific threats and in the absence of specific threat information. This two-pronged approach ensures that specific tactical threats are addressed, while allowing the more strategic implementation of protective programs to address future threats.

The NIPP will address activities carried out both within individual CI/KR sectors and nationally across sectors, in coordination with private-sector and state and local stakeholders."

National Incident Management System

Portions of the following material have been taken in whole or in part from the National Incident Management System, *(www.dhs.gov browse to Emergency Preparedness and Response) published by Department of Homeland Security in April 2004.*



In order to address the coordination of federal, state and local response to any hazard as directed by HSPD-5, in 2004 the draft *National Incident Management System* (NIMS) and *National Response Plan* (NRP) were released.

"NIMS establishes standardized incident management processes, protocols, and procedures that all responders—Federal, state, tribal, and local—will use to coordinate and conduct response actions. With responders using the same standardized procedures, they will all share a common focus, and will be able to place full emphasis on incident management when a homeland security incident occurs—whether terrorism or natural disaster. In addition, national preparedness and readiness in responding to and recovering from an incident is enhanced since all of the Nation's emergency teams and authorities are using a common language and set of procedures.

This system provides a consistent nationwide template to enable federal, State, local and tribal governments and private sector and nongovernmental organizations to work together effectively and efficiently to prepare for, prevent, respond to, and recover from domestic incidents, regardless of cause, size, or complexity, including acts of catastrophic terrorism. HSPD-5 requires all federal departments and agencies to adopt the NIMS and to use it for their individual domestic incident management and emergency prevention, preparedness, response, recovery, and mitigation programs and activities, as well as in support of all actions taken to assist State, local or tribal entities."

NIMS Components

- Command and Management
- Preparedness
- Resource Management
- Communications and Information Systems

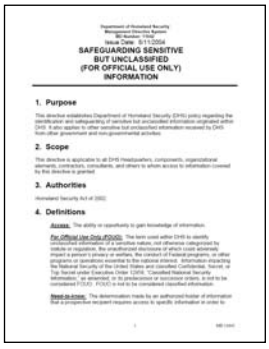
DEPARTMENT OF HOMELAND SECURITY MANAGEMENT DIRECTIVE NUMBER: 11042 SAFEGUARDING SENSITIVE BUT UNCLASSIFIED (FOR OFFICIAL USE ONLY) INFORMATION

Portions of the following material have been taken in whole or in part from the Department of Homeland Security Management Directive System MD Number: 11042 Issue Date: 05/11/2004 *(www.dhs.gov) published by the Department of Homeland Security in May 2004.*

As stated earlier in the "Introduction" portion of this section, the hazard identification and analysis developed for this project is an emerging state-of-the-practice approach that requires compliance with the *Homeland Security Act of 2002*, *Homeland Security Presidential Decision Directives*, and the DHS publications presented in the preceding subsection. In May 2004, DHS issued the policy for the Safeguarding of Sensitive but Unclassified (For Official Use Only) Information. For the purposes of the Human-Caused risk assessment, the information contained herein is considered to meet the definitions and standards as defined in the statutes. Throughout the analysis, the direct document cites and/or language are used to explicitly define those areas which have been adopted as the state-of-the-practice and this document is considered to be a SBU FOUO document.

1. Purpose

This directive establishes Department of Homeland Security (DHS) policy regarding the identification and safeguarding of Sensitive But Unclassified information originated within DHS. It also applies to other Sensitive But Unclassified information received by DHS from other government and non-governmental activities.


SAFEGUARDING SENSITIVE BUT UNCLASSIFIED (FOR OFFICIAL USE ONLY) INFORMATION

1. Purpose

2. Scope

3. Authorities

4. Definitions

2. Scope

This directive is applicable to all DHS Headquarters, components, organizational elements, contractors, consultants, and others to whom access to information covered by this directive is granted.

3. Authorities

Homeland Security Act of 2002.

4. Definitions

Access: The ability or opportunity to gain knowledge of information.

For Official Use Only (FOUO): The term used within DHS to identify unclassified information of a sensitive nature, not otherwise categorized by statute or regulation, the unauthorized disclosure of which could adversely impact a person's privacy or welfare, the conduct of federal programs, or other programs or operations essential to the national interest. Information impacting the national security of the United States and classified Confidential, Secret, or Top Secret under Executive Order 12958, "Classified National Security Information," as amended, or its predecessor or successor orders, is not to be considered FOUO. FOUO is not to be considered classified information.

Need-to-know: The determination made by an authorized holder of information that a prospective recipient requires access to specific information in order to perform or assist in a lawful and authorized governmental function, i.e., access is required for the performance of official duties.

Organizational Element: As used in this directive, organizational element is as defined in DHS MD Number 0010.1, Management Directive System and DHS Announcements.

Protected Critical Infrastructure Information (PCII): Critical infrastructure information (CII) is defined in 6 U.S.C. 131(3) (Section 212(3) of the Homeland Security Act). Critical infrastructure information means information not customarily in the public domain and related to the security of critical infrastructure or protected systems. Protected Critical Infrastructure Information is a subset of CII that is voluntarily submitted to the U.S. Federal Government and for which protection is requested under the PCII program by the requester.

Sensitive Security Information (SSI): Sensitive Security Information (SSI) is defined in 49 CFR Part 1520. SSI is a specific category of information that requires protection against disclosure. 49 USC 40119 limits the disclosure of information obtained or developed in carrying out certain security or research and development activities to the extent that it has been determined that disclosure of the information would be an unwarranted invasion of personal privacy; reveal a trade secret or privileged or confidential commercial or financial information; or be detrimental to the safety of passengers in transportation.

ALL-HAZARDS ANALYSIS

Human-caused (Manmade) hazards vulnerability analysis is a relatively new area to be addressed in mitigation planning. The mission of the Department of Homeland Security includes preparing for natural disasters and terrorist attacks through preventative planning, technology, and coordinated efforts. In the event of a natural or manmade disaster, DHS will be the first federal department to utilize a full range of state, local, and private partnerships to alleviate the effects of a potential disaster. Several elements have been given responsibilities for manmade vulnerability assessments and mitigation: the Office of State and Local Government Coordination, the Office for Domestic Preparedness (ODP), the Information Assurance and Infrastructure Protection Directorate, and the Emergency Response and Planning Directorate.

Figure AE.1 shows the four steps in the risk assessment process as defined and presented by FEMA in the *State and Local Mitigation Planning How-to Guides*.

Figure AE.1
Risk Assessment Planning Process



Sources: FEMA 386-2 and 386-7

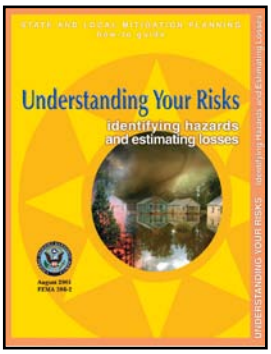
HAZARD IDENTIFICATION
HUMAN-CAUSED HAZARDS

The Office of State and Local Government Coordination was established to serve as a single point of contact for facilitation and coordination of departmental programs that impact state, local, territorial, and tribal governments.

The Office for Domestic Preparedness is the principal component of the Department of Homeland Security responsible for preparing the United States for acts of terrorism. In carrying out its mission, ODP is the primary office responsible for providing training, funds for the purchase of equipment, support for the planning and execution of exercises, technical assistance and other support to assist states and local jurisdictions to prevent, plan for, and respond to acts of terrorism.

The Information Assurance and Infrastructure Protection Directorate focuses primarily on analyzing and securing critical infrastructure and protected systems, developing risk assessments and vulnerabilities and assisting with recovery.

The Emergency Response and Planning Directorate continues FEMA's efforts to reduce the loss of life and property and to protect the nation's institutions from all types of hazards through a comprehensive, risk-based emergency management program of preparedness, prevention, response, and recovery. It furthers the evolution of the emergency management culture from one that reacts to disasters to one that proactively helps communities and citizens avoid becoming victims. In addition, the Directorate will develop and manage a national training and evaluation system to design curriculums, set standards, evaluate, and reward performance in local, state, and federal training efforts.

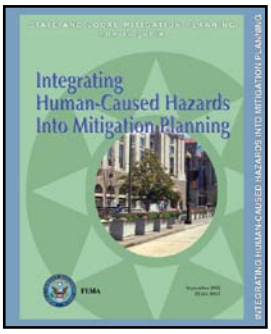


The Department of Homeland Security has embraced the all-hazards approach, which dates back to the August 2001 FEMA Publication 386-2 and was further expanded with the April 2003 FEMA Publication 386-3, *Developing the Mitigation Plan* and FEMA Publication 386-7, *Integrating Human-Caused Hazards Into Mitigation Planning.* FEMA Publication 386-7 broadly defines key terrorism threats as Chemical, Biological, Radiological, Nuclear, and Explosive Blast (CBRNE), Cyber-Attack, and Agriterrorism. While natural hazard analysis using HAZUS^{MH} and other tools based on probability and frequency is well developed, DHS is in the infancy of creating a probability and frequency based analysis for manmade events (currently known as the Comprehensive Analysis and Risk Assessment methodology). The current state-of-the-art is the FEMA Risk Mitigation series publications.

FEMA has released a number of Risk Mitigation series publications to provide guidance on terrorist attack mitigation. Of relevance for this effort are FEMA Publication 386-7, *Integrating Human-Caused Hazards Into Mitigation Planning* and FEMA Publication 426 *Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings*. FEMA Publication 386-7 is written for planners, responders, and building officials. The vulnerability risk assessment for this plan uses these documents in combination with the HAZUS data set.

FEMA Publication 386-7 *Integrating Human-Caused Hazards Into Mitigation Planning*

Portions of the following material have been taken in whole or in part from the Department of Homeland Security Risk Mitigation series publications *(http://www.fema.gov/fima/rmsp.shtm) published by the Department of Homeland Security.*

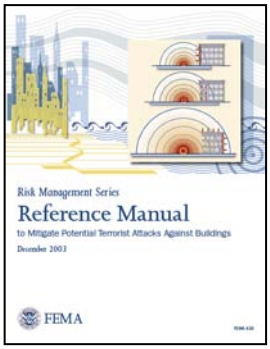


Prior to the events of September 11, 2001, FEMA had released FEMA Publication 386-7, *Integrating Human-Caused Hazards Into Mitigation Planning*.

According to this publication, "The term 'technological hazards' refers to the origins of incidents that can arise from human activities such as the manufacture, transportation, storage, and use of hazardous materials. For the sake of simplicity, this analysis assumes that technological emergencies are accidental and that their consequences are unintended. The term 'terrorism' refers to intentional, criminal, malicious acts. There is no single, universally accepted definition of terrorism, and it can be interpreted in many ways. Officially, terrorism is defined in the Code of Federal Regulations as '...the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.' (28 CFR, Section 0.85).

FEMA Publication 426, *Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings*

Portions of the following material have been taken in whole or in part from the Department of Homeland Security Risk Mitigation series publications *(http://www.fema.gov/fima/rmsp.shtm) published by the Department of Homeland Security.*



The manual states, "This manual provides guidance to the building science community of architects and engineers, to reduce physical damage to buildings, related infrastructure, and people caused by terrorist assaults.

The manual presents incremental approaches that can be implemented over time to decrease the vulnerability of buildings to terrorist threats. Many of the recommendations can be implemented quickly and cost-effectively.

FEMA Publication 426 contains many how-to aspects based upon current information contained in FEMA, Department of Commerce, Department of Defense, Department of Justice, General Services Administration, Department of Veterans Affairs, Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health, and other publications. The manual describes a threat assessment methodology and presents a Building Vulnerability Assessment Checklist to support the assessment process. It also discusses architectural and engineering design considerations, standoff distances, explosive blast, and chemical, biological, and radiological (CBR) information.

The appendices in this manual include a glossary of CBR definitions as well as general definitions of key terminologies used in the building science security area. The appendices also

describe design considerations for electronic security systems and provide a listing of associations and organizations currently working in the building science security area."

FEMA Publication 426 is a compilation of many government assessment, blast and CBR design publications material that has historically been restricted or applied to military facilities but has been revised to address the traditional facilities such as commercial office buildings, schools, retail and public facilities. The audience is meant to be the architects, engineers, building owners and contractors responsible for new construction, renovation and retrofit. FEMA Publication 426 is a master publication with primers for commercial buildings, insurance, and architects.

In late summer 2004, several terrorists were captured and found to have extensive information on key banking and critical government facilities contained on laptops and hard copy documents, along with engineering analysis and damage assessment applications. The process by which they conducted surveillance and information gathering dates back to 2002 and what is commonly know as "Bin Laden's Terrorist Bible," the equivalent of the military manuals for security engineering and antiterrorism force protection. Understanding the methods and techniques of how terrorists collect and analyze information to be used in the identification and targeting of infrastructure, systems and people is essential to developing a mitigation strategy.

MILITARY STUDIES IN THE JIHAD AGAINST THE TYRANTS (BIN LADEN'S TERRORISM BIBLE)

Portions of the following material have been taken in whole or in part from the Military Studies in the Jihad Against the Tyrants (Bin Laden's Terrorism Bible).



The 180-page volume *Military Studies in the Jihad Against the Tyrants* is a how-to terrorism manual that was seized from the home of a bin Laden disciple in Manchester, England. The 18-chapter manual offers jihad members guidance on subjects such as assassination, forging documents, and preparing poisons. The manual is broken into the following sections:

- Title, Opening Pages, And Introduction
- First Lesson: General Introduction
- Second Lesson: Necessary Qualifications and Characteristics for the Organization's Member
- Third Lesson: Counterfeit Currency and Forged Documents
- Fourth Lesson: Organization Military Bases "Apartments-Hiding Places"
- Fifth Lesson: Means of Communication and Transportation
- Sixth Lesson: Training
- Seventh Lesson: Weapons: Measures Related To Buying and Transporting Them
- Eighth Lesson: Member Safety
- Ninth Lesson: Security Plan
- Tenth Lesson: Special Tactical Operations
- Eleventh Lesson: Espionage (1) Information-Gathering Using Open Methods
- Twelfth Lesson: Espionage (2) Information-Gathering Using Covert Methods
- Thirteenth Lesson: Secret Writing and Ciphers and Codes
- Fourteenth Lesson: Kidnapping and Assassinations Using Rifles and Pistols
- Fifteenth Lesson: Explosives
- Sixteenth Lesson: Assassinations Using Poisons and Cold Steel
- Seventeenth Lesson: Interrogation and Investigation
- Eighteenth Lesson: Prisons and Detention Centers

The eleventh lesson has a particularly relevant statement: "Information Sources: Any organization that desires to raise the flag of Islam high and proud, must gather as much information as possible about the enemy. Information has two sources: (1) Public Sources: Using this public source openly and without resorting to illegal means, it is possible to gather at least 80% of information about the enemy. The percentage varies depending upon the government's policy on freedom of the press and information. (2) Secret Sources: It is possible, through these secret and dangerous methods, to obtain the 20% of information that is considered secret. The one gathering information should be a regular person (trained college graduate) who examines primary sources of information published by the enemy (newspapers, magazines, radio, TV, etc.)"

Based on evidence collected in Afghanistan and FEMA distribution records, many terrorist organizations have obtained copies of the FEMA Risk Mitigation series publications and HAZUS^{MH} GIS application. The FEMA data sets coupled with Internet open source searches provide the terrorist organizations with the desired "80%" open source information.

HAZARD IDENTIFICATION
HUMAN-CAUSED HAZARDS

The following subsections now begin to define the human-caused hazards analyzed in this Plan. For this Plan, the definitions provided in FEMA Publication 386-7, *Integrating Human-Caused Hazards Into Mitigation Planning* were used in whole or in part.

TERRORISM

Terrorism is a deliberate strategy with persons' objectives obscured by the fact their acts seem random and indiscriminate. Terrorism is discriminate since it has a definite purpose, but indiscriminate in that the terrorist has neither sympathy nor hate for the randomly selected victim. Communities should use the existing processes and methodologies developed for the successful management of other hazards. Usually, the plans and systems developed for other problems can serve as templates for developing a comprehensive counter-terrorism program. Hazardous material emergency response plans and procedures are helpful in this arena. First responders must remember they are targets and that proactive steps need to be taken to protect the crime scene and the evidence.

The Federal Bureau of Investigation (FBI) further characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization; however, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences.

For the purposes of this Plan, "terrorism" refers to the use of Weapons of Mass Destruction (WMD), including, Chemical, Biological, Radiological, Nuclear and Explosive Blast (CBRNE) weapons; arson, incendiary, and armed attacks; industrial sabotage and intentional hazardous materials releases; and "cyberterrorism." Within these general categories, however, there are many variations. Particularly in the area of biological and chemical weapons, there are a wide variety of agents and ways for them to be disseminated.

High-risk targets include military and civilian government facilities, international airports, large cities and high-profile landmarks. Terrorists might also target large public gatherings, water and food supplies, utilities, and corporate centers. Further, they are capable of spreading fear by sending explosives or chemical, biological and radiological agents through the mail.

The Department of State report *Patterns of Global Terrorism*[1] (2003) provides a synopsis of historical attacks and targets. The global weapon of choice has been explosive blast and the primary targets commercial buildings. Explosives are still the primary threat/hazard, but bombings typically affect a relatively small-scale geographical area (city blocks) and less than 10,000 people.

Chemical, biological and radiological attacks are the emerging threat and of great concern because of the large geographic area contaminated, numbers of people potentially affected, and the high economic cost of response and recovery. The term "Weapons of Mass Destruction" (WMD) has various definitions, however common to all is the assumption that WMDs may consist of any of the agents discussed above: chemical, biological, radiological, nuclear, explosive or incendiary. The purpose of a WMD is to cause death or serious injury to persons or significant damage to property, typically assumed to be of a scale that has the potential to overwhelm the capabilities of many local and state governments.

[1] This report can be found at http://www.state.gov/s/ct/rls/pgtrpt/.

The use of CBR WMD weapons and the stated intent of terrorist groups to acquire and use the weapons increases the target set and the weapons can affect a single building, an entire city, multiple counties or even states.

Like explosive threats, CBR threats may be delivered externally or internally to the building. External ground-based threats may be released at a standoff distance from the building or may be delivered directly through an air intake or other opening. Interior threats may be delivered to accessible areas such as the lobby, mailroom, or loading dock, or they may be released into a secure area such as a primary egress route. There may not be an official or obvious warning prior to a CBR event, the best defense is to be alert to signs of a release occurring.

Communities are vulnerable to terrorist incidents and most have high visibility and vulnerable targets. These critical facilities, sites, systems, and special events in the community are usually located near routes with high transportation access. Examples include:

- Government office buildings, court houses, schools, hospitals, and shopping centers
- Dams, water supplies, power distribution systems
- Military installations
- Railheads, interstate highways, tunnels, airports, ferries, bridges, seaports, pipelines
- Recreational facilities such as sports stadiums, theaters, parks, casinos, concert halls
- Financial institutions and banks
- Sites of historical and symbolic significance
- Scientific research facilities, academic institutions, museums
- Telecommunications, newspapers, radio and television stations
- Chemical, industrial, and petroleum plants; business offices, and convention centers
- Law, fire, emergency medical services and responder facilities, and operations centers
- Special events, parades, religious services, festivals, celebrations
- Planned Parenthood facilities and abortion clinics
- Residential properties

Critical facilities, sites, and special events become more appealing during visits by high profile personalities and dignitaries. Sporting events such as the Olympic Games and World Cup increase the probability of terrorist targeting. Additionally, international meetings and conventions provide terrorists an excellent environment in which to articulate their cause through violence. Terrorists have introduced two new wrinkles, which are of growing concern: targeting first responders with secondary devices and Weapons of Mass Destruction (WMD) hoaxes. Terrorists will go to great lengths to ensure an event produces the intended impact, even if it means destroying an entire structure or killing thousands. Commercially available materials agents can be developed into WMD. Science and the Internet have made information relating to WMD technology available to an ever-widening audience, and terrorists and other would-be criminals are using it for WMD experimentation.

FEMA Publication 426, *Reference Manual to Mitigate Terrorist Attacks Against Buildings* provides a table of the threat spectrum, appendices that list the chemical and biological agents properties, effects and exposure. The DHS has adopted five categories of terrorist incidents: chemical, biological, radiological, nuclear, and explosive blast.

The following sections are a compilation of FEMA Publication 426 Reference Manual *and FEMA Publication E155* Building Security Course *materials, draft FEMA Publication 453,* Multi-hazards Shelter (Safe Haven) *design guide, the CDC-NIOSH guidance documents, and the CDC* Public

Health Assessment of Potential Biological Terrorism Agents *as adopted by DHS (http://www.fema.gov/fima/rmsp.shtm E155 Course and http://www.dhs.gov browse to Science and Technology).*

Chemical

Chemical agents are compounds with unique chemical properties that can produce lethal or damaging effects in humans, animals, and plants. Chemical agents can exist as solids, liquids, or gases depending on temperature and pressure. Most chemical agents are liquid and can be introduced into an unprotected population relatively easily using aerosol generators, explosive devices, breaking containers, or other forms of covert dissemination. Dispersed as an aerosol, chemical agents have their greatest potential for inflicting mass casualties.

There are two categories of chemical agents: lethal and incapacitating. The lethal chemicals are subdivided into industrial and warfare.

Chemical agents can have an immediate effect (a few seconds to a few minutes) or a delayed effect (several hours to several days). While potentially lethal, chemical agents are difficult to deliver in lethal concentrations. Outdoors, the agents often dissipate rapidly. Chemical agents are also difficult to produce. There are six types of agents:

- lung-damaging (pulmonary) agents such as phosgene;
- cyanide;
- vesicants or blister agents such as mustard;
- nerve agents such as GA (tabun), GB (sarin), GD (soman), GF, and VX;
- incapacitating agents such as BZ; and
- riot-control agents (similar to MACE).

Biological

Biological agents pose a serious threat because of their accessible nature and the rapid manner in which they spread. These agents are disseminated by the use of aerosols, contaminated food or water supplies, direct skin contact, or injection. Several biological agents can be adapted for use as weapons by terrorists. These agents include anthrax (sometimes found in sheep and cattle), tularemia (rabbit fever), cholera, the plague (sometimes found in prairie dog colonies), and botulism (found in improperly canned food). A biological incident will most likely be first recognized in the hospital emergency room, medical examiners office, or within the public health community long after the terrorist attack. The consequences of such an attack will present communities with an unprecedented requirement to provide mass protective treatment to exposed populations, mass patient care, mass fatality management, and environmental health clean-up procedures and plans.

Biological agents are organisms or toxins that can kill or incapacitate people, livestock and crops. The three basic groups of biological agents that would likely be used as weapons are bacteria, viruses and toxins.

1. *Bacteria.* Bacteria are small free-living organisms that reproduce by simple division and are easy to grow. The diseases they produce often respond to treatment with antibiotics.
2. *Viruses.* Viruses are organisms that require living cells in which to reproduce and are intimately dependent upon the body they infect. Viruses produce diseases that generally do not respond to antibiotics. However, antiviral drugs are sometimes effective.

3. *Toxins.* Toxins are poisonous substances found in, and extracted from, living plants, animals, or microorganisms; some toxins can be produced or altered by chemical means. Some toxins can be treated with specific antitoxins and selected drugs.

Most biological agents are difficult to grow and maintain. Many break down quickly when exposed to sunlight and other environmental factors, while others such as anthrax spores are very long lived. They can be dispersed by spraying them in the air, or infecting animals that carry the disease to humans as well through food and water contamination.

- Aerosols—Biological agents are dispersed into the air, forming a fine mist that may drift for miles. Inhaling the agent may cause disease in people or animals.
- Animals—Some diseases are spread by insects and animals, such as fleas, mice, flies, and mosquitoes. Deliberately spreading diseases through livestock is also referred to as agriterrorism.
- Food and water contamination—Some pathogenic organisms and toxins may persist in food and water supplies. Most microbes can be killed, and toxins deactivated, by cooking food and boiling water.

CDC Report—*Public Health Assessment of Potential Biological Terrorism Agents*

Portions of the following material has been taken in whole or in part from the Centers for Disease Control Public Health Assessment of Potential Biological Terrorism Agents *(http://www.cdc.gov/ncidod/EID/vol8no2/01-0164.htm) published by CDC February 2002.*

According to the CDC report, "Person-to-person spread of a few infectious agents is also possible. Humans have been the source of infection for smallpox, plague, and the Lassa viruses. The CDC has classified biological agents as one of three priority categories for initial public health preparedness efforts: A, B, or C (**Table AE.1**).

Agents in Category A have the greatest potential for adverse public health impact with mass casualties, and most require broad-based public health preparedness efforts (e.g., improved surveillance and laboratory diagnosis and stockpiling of specific medications). Category A agents also have a moderate to high potential for large-scale dissemination or a heightened general public awareness that could cause mass public fear and civil disruption.

Most Category B agents also have some potential for large-scale dissemination with resultant illness, but generally cause less illness and death and therefore would be expected to have lower medical and public health impact. These agents also have lower general public awareness than Category A agents and require fewer special public health preparedness efforts. Agents in this category require some improvement in public health and medical awareness, surveillance, or laboratory diagnostic capabilities, but presented limited additional requirements for stockpiled therapeutics beyond those identified for Category A agents. Biological agents that have undergone some development for widespread dissemination but do not otherwise meet the criteria for Category A, as well as several biological agents of concern for food and water safety, are included in this category.

Biological agents that are currently not believed to present a high bioterrorism risk to public health but which could emerge as future threats (as scientific understanding of these agents improves) were placed in Category C. These agents will be addressed nonspecifically through overall bioterrorism preparedness efforts to improve the detection of unexplained illnesses and

ongoing public health infrastructure development for detecting and addressing emerging infectious diseases (Source: Centers for Disease Control and Prevention. Preventing emerging infectious diseases: a strategy for the 21st century. Atlanta: U.S. Department of Health and Human Services;1998. p. 1-74.).

Most evaluations of potential risk agents for biological warfare or terrorism have historically been based on military concerns and criteria for troop protection. However, several characteristics of civilian populations differ from those of military populations, including a wider range of age groups and health conditions, so that lists of military biological threats cannot simply be adopted for civilian use. These differences and others may greatly increase the consequences of a biological attack on a civilian population. Civilians may also be more vulnerable to food- or waterborne terrorism, as was seen in the intentional *Salmonella* contamination of salad bars in The Dalles, Oregon, in 1984 (Torok TJ, Tauxe RV, Wise RP, Livengood JR, Sokolow R, Mauvais S, et al. JAMA 1997;278:389-95.). Although food and water systems in the United States are among the safest in the world, the occurrence of nationwide outbreaks due to unintentional food or water contamination demonstrates the ongoing need for vigilance in protecting food and water supplies (Hennessy TW, Hedberg CW, Slutsker L, White KE, Besser-Wiek JM, Moen ME, et al. N Engl J Med 1996;334:1281-6 and Centers for Disease Control and Prevention. Outbreaks of Shigella sonnei infection associated with eating fresh parsley--United States and Canada, July-August 1998. MMWR Morb Mortal Wkly Rep 1999;48:285-9.). Overall, many other factors must be considered in defining and focusing multiagency efforts to protect civilian populations against bioterrorism.

Category A agents are being given the highest priority for preparedness. For Category B, public health preparedness efforts will focus on identified deficiencies, such as improving awareness and enhancing surveillance or laboratory diagnostic capabilities. Category C agents will be further assessed for their potential to threaten large populations as additional information becomes available on the epidemiology and pathogenicity of these agents. In addition, special epidemiologic and laboratory surge capacity will be maintained to assist in the investigation of naturally occurring outbreaks due to Category C "emerging" agents. Linkages established with established programs for food safety, emerging infections diseases, and unexplained illnesses will augment the overall bioterrorism preparedness efforts for many Category B and C agents."

Table AE.1
Critical Biological Agent Categories for Public Health Preparedness

Biological agent(s)	Disease
Category A	
Variola major	Smallpox
Bacillus anthracis	Anthrax
Yersinia pestis	Plague
Clostridium botulinum (botulinum toxins)	Botulism
Francisella tularensis	Tularemia
Filoviruses and Arenaviruses (e.g., *Ebola virus, Lassa virus*)	Viral hemorrhagic fevers
C**ategory B**	
Coxiella burnetii	Q fever
Brucella spp.	Brucellosis
Burkholderia mallei	Glanders
Burkholderia pseudomallei	Melioidosis
Alphaviruses (VEE, EEE, WEE[a])	Encephalitis
Rickettsia prowazekii	Typhus fever
Toxins (e.g., Ricin, Staphylococcal enterotoxin B)	Toxic syndromes
Chlamydia psittaci	Psittacosis
Food safety threats (e.g., *Salmonella spp.*, *Escherichia coli* O157:H7)	
Water safety threats (e.g., *Vibrio cholerae*, Cryptosporidium parvum)	
Category C	
Emerging threat agents (e.g., *Nipah virus*, hantavirus)	

[a]Venezuelan equine (VEE), eastern equine (EEE), and western equine encephalomyelitis (WEE) viruses

Source: CDC Report—*Public Health Assessment of Potential Biological Terrorism Agents*

Nuclear and Radiological Attack

Nuclear threat is the use, threatened use, or threatened detonation of a nuclear bomb or device. At present, there is no known instance in which any non-governmental entity has been able to obtain or produce a nuclear weapon. The most likely scenario is the detonation of a large conventional explosive that incorporates nuclear material or detonation of an explosive in close proximity to nuclear materials in use, storage, or transit. Of concern is the increasing frequency of shipments of radiological materials throughout the world.

Nuclear explosions can cause deadly effects—blinding light, intense heat (thermal radiation), initial nuclear radiation, blast, fires started by the heat pulse, and secondary fires caused by the destruction. They also produce radioactive particles called fallout that can be carried by wind for hundreds of miles.

Terrorist use of a radiological dispersion device (RDD)—often called "dirty nuke" or "dirty bomb"—is considered far more likely than use of a nuclear device. These radiological weapons are a combination of conventional explosives and radioactive material designed to scatter dangerous and sub-lethal amounts of radioactive material over a general area. Such radiological weapons appeal to terrorists because they require very little technical knowledge to build and deploy compared to that of a nuclear device. Also, these radioactive materials, used widely in medicine, agriculture, industry and research, are much more readily available and easy to obtain compared to weapons grade uranium or plutonium.

Terrorist use of a nuclear device would probably be limited to a single smaller "suitcase" weapon. The strength of such a weapon would be in the range of the bombs used during World War II. The nature of the effects would be the same as a weapon delivered by an inter-continental missile, but the area and severity of the effects would be significantly more limited.

There is no way of knowing how much warning time there would be before an attack by a terrorist using a nuclear or radiological weapon. A surprise attack remains a possibility. The danger of a massive strategic nuclear attack on the United States involving many weapons receded with the end of the Cold War. However, some terrorists have been supported by nations that have nuclear weapons programs.

If there were threat of an attack from a hostile nation, people living near potential targets could be advised to evacuate or they could decide on their own to evacuate to an area not considered a likely target. Protection from radioactive fallout would require taking shelter in an underground area, or in the middle of a large building. In general, potential targets include:

- strategic missile sites and military bases;
- centers of government such as Washington, D.C., and state capitals;
- important transportation and communication centers;
- manufacturing, industrial, technology and financial centers;
- petroleum refineries, electrical power plants and chemical plants; and
- major ports and airfields.

Taking shelter during a nuclear attack is absolutely necessary. There are two kinds of shelters—blast and fallout. Blast shelters offer some protection against blast pressure, initial radiation, heat and fire, but even a blast shelter could not withstand a direct hit from a nuclear detonation.

Fallout shelters do not need to be specially constructed for that purpose. They can be any protected space, provided that the walls and roof are thick and dense enough to absorb the radiation given off by fallout particles. The three protective factors of a fallout shelter are *shielding*, *distance*, and *time*.

- *Shielding.* The more heavy, dense materials—thick walls, concrete, bricks, books and earth—between you and the fallout particles, the better.
- *Distance.* The more distance between you and the fallout particles, the better. An underground area, such as a home or office building basement, offers more protection than the first floor of a building. A floor near the middle of a high-rise may be better, depending on what is nearby at that level on which significant fallout particles would collect. Flat roofs collect fallout particles so the top floor is not a good choice, nor is a floor adjacent to a neighboring flat roof.
- *Time.* Fallout radiation loses its intensity fairly rapidly. In time, you will be able to leave the fallout shelter. Radioactive fallout poses the greatest threat to people during the first two weeks, by which time it has declined to about 1% of its initial radiation level.

Any protection, however temporary, is better than none at all, and the more shielding, distance and time, the better.

Electromagnetic Pulse

There are two types of EMP that can be generated; High-Altitude Electromagnetic Pulse (HEMP) and High Power Microwave (HPM) Electromagnetic Pulse. EMP acts like a stroke of lightning but is stronger, faster and briefer. EMP can seriously damage electronic devices connected to power sources or antennas. These include communication systems, computers, electrical appliances, and automobile or aircraft ignition systems. Nuclear EMP can be induced hundreds to a few thousand kilometers from the detonation and is damaging to electronic equipment over a very wide area, and depends on the design of the nuclear device and altitude of the burst. The damage could range from a minor interruption to actual burnout of components. An HMP weapon is a powerful chemical detonation instantly transformed by a special coil device, called a flux compression generator, into a strong electromagnetic field of microwave energy. HPM energy can be focused using an antenna, or emitter, to produce effects similar to HEMP, but only within a very limited range. HPM generates an electromagnetic pulse and intense microwaves that are very damaging to electronics within a small geographic area. Although EMP is unlikely to harm most people, it could harm those with pacemakers or other implanted electronic devices. (Source: CRS Report for Congress)

Explosive Blast

Use of explosives has historically been a favorite tactic of terrorists for a variety of reasons and this is likely to continue into the future. Ingredients for homemade bombs are easily obtained on the open market as are the techniques for making bombs. Also, explosive events are easy and quick to execute. Vehicle bombs have the added advantage of being able to bring a large quantity of explosives to the doorstep of the target undetected. Finally, terrorists often attempt to use the dramatic component of explosions, in terms of the sheer destruction they cause, to generate media coverage in hopes of transmitting their political message to the public.



Destruction caused by the Oklahoma City Bombing. Photo courtesy of FEMA.

From the standpoint of structural design, the vehicle bomb is the most important consideration. Vehicle bombs are able to deliver a sufficiently large quantity of explosives to cause potentially devastating structural damage. For a vehicle bomb, the critical location is taken to be the closet point that a vehicle can approach. This may be a parking area directly beneath the occupied building, the loading dock, the curb directly outside the facility, or at a vehicle-access control gate where inspection takes place.

Another explosive attack threat is the small bomb that is hand delivered. Small weapons can cause the greatest damage when brought into vulnerable, unsecured areas of the building interior, such as the building lobby, mail room and retail spaces. Hand carried explosives are typically on the order of five to ten pounds TNT equivalent. However, larger charge weights, in the 50 to 100 pounds TNT equivalent range, can be readily carried in rolling cases. Mail bombs are typically less than ten pounds TNT equivalent.



Rocket Propelled Grenades (RPG), antitank, mortars, and Man Portable Air-Defense Systems (MANPADS) weapons like Stinger missiles present one type of explosive threat. Photo courtesy of FEMA.

Rocket Propelled Grenades (RPG), antitank, mortars, and Man Portable Air-Defense Systems (MANPADS) weapons like Stinger missiles present a different type of explosive threat. RPG's are line-of-sight weapons that can have a variety of warheads and cause extensive damage to a building, but usually limited to ground facilities, although they have been used successfully against slow flying helicopters. MANPADS are typically infrared or radar guided and employed against aircraft.

Arson and other incendiary attacks refer to the initiation of fire (which can be of an explosive nature) on or near a target. Incendiary devices are either mechanical, electrical, or chemical

devices used to intentionally initiate combustion and start fires. Their purpose is to set fire to other materials or structures. These devices maybe used singularly or in combination. Incendiary devices are firebombs. These devices range from the simple Molotov cocktail (bottle, gasoline, rag, match), to much larger and sophisticated bombs. They may include napalm or any large container filled with flammable fluids and ignited by some sort of fuse. Armor piercing and incendiary tipped ammunition can result in significant damage to almost any structure.

Incendiary attacks can last for minutes or hours, and possibly longer depending on the type and quantity of device or accelerant used and the materials (fuels) present at the location of the attack. This type of attack can also result in cascading failures of structures or systems.

The Virginia Division of Emergency Management has a Web site with a list of many of the attacks, agents, effects and emergency actions at:
http://www.vaemergency.com/prepare/terrorismtoolkit/terrguide/weapons/incendiary.htm

Cyberterrorism

Cyberterroism is a relatively new concept. According to the National Strategy for Homeland Security, terrorists may seek to cause widespread disruption and damage, including casualties, by attacking electronic and computer networks which are linked to critical infrastructures such as energy, financial and securities networks. In addition, terrorist groups are known to exploit information technology and the Internet to plan attacks, raise funds, circulate propaganda, gather information and communicate. In terms of hazard mitigation, cyberterrorism is often explored as a component in business continuity planning.

Cyberterrorism threatens the electronic infrastructure supporting the social, health, and economic well being of citizens. Interlinked computer networks regulate the flow of power, water, financial services, medical care, telecommunication networks, and transportation systems. Of primary concern for facilities and infrastructure is failure of Supervisory Control and Data Acquisition (SCADA) system or other critical infrastructure components, and impacts of worms and viruses on Physical Security Equipment (PSE) such as CCTV, entry access control, biometric scanners and other LAN or wireless enabled devices.

The public and private sectors' unprecedented dependence on information and communications systems, computers, and networks, demonstrate three realities:

Networks are vulnerable to attack from any source, whether it is a foreign intelligence agency or a teenager with a new Macintosh. The result of a youthful hacker could be as devastating as that of a sophisticated terrorist group seeking to intentionally disrupt our way of life. The ability to distinguish a singular hacker-type incident from a cyberterrorist attack may not be readily evident.

The tools for conducting cyberterrorism are widely available, broadly advertised, and easily used. There are entire web sites devoted to the identification and use of hacking tools. Potential attackers only require access to a computer and a telecommunications network. (Source: Department of Homeland Security *National Security Strategy to Secure Cyberspace*)

Agriterrorism

The United States agriculture and food systems are vulnerable to disease, pest and poisonous agents that either occur naturally, are unintentionally introduced, or are intentionally delivered by acts of terrorism. America's agriculture and food system is an extensive, open,

interconnected, diverse, and complex structure providing potential targets for terrorist attacks. The DHS objective is to provide the best protection possible against a successful attack on the United State's agriculture and food system, which could have catastrophic health and economic effects.

In the Homeland Security Presidential Directive (HSPD-9), the President directed the Secretaries of Agriculture, Health and Human Services, and Homeland Security to expand and continue vulnerability assessments of the agriculture and food sectors. These vulnerability assessments should identify requirements of the *National Infrastructure Protection Plan* developed by the Secretary of Homeland Security, as appropriate, and shall be updated every two years. As stated in HSPD-9, "The Secretary of Homeland Security and the Attorney General, working with the Secretaries of Agriculture, Health and Human Services, the Administrator of the Environmental Protection Agency, the Director of Central Intelligence, and the heads of other appropriate Federal departments and agencies shall prioritize, develop, and implement, as appropriate, mitigation strategies to protect vulnerable critical nodes of production or processing from the introduction of diseases, pests, or poisonous agents. The Secretaries of Agriculture, Health and Human Services, and Homeland Security shall build on existing efforts to expand development of common screening and inspection procedures for agriculture and food items entering the United States and to maximize effective domestic inspection activities for food items within the United States."

HAZARDOUS MATERIALS (HAZMAT)

Hazardous materials (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the Nation's highways and on the water. Approximately 6,774 HAZMAT events occur each year, 5,517 of which are highway incidents, 991 are railroad incidents and 266 are due to other causes (FEMA, 1997). In essence, HAZMAT incidents consist of solid, liquid and/or gaseous contaminants that are released from fixed or mobile containers, whether by accident or by design as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind and possibly wildlife as well.



In November of 2002, this diesel tanker overturned in Madison County, VA. Two lanes of Route 29 S, a major regional thoroughfare, had to be closed until cleanup was completed. Photos by Vincent Vala, Culpeper Star-Exponent.

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

RADIOLOGICAL EVENT

Radiological incidents or emergencies may occur as the result of an accident, or an intentional act that involves the release of radioactive materials through a radiological dispersion device, or "dirty bomb." Accidental releases of radiation may occur at hazardous waste sites, fixed nuclear facilities, or as the result of a transportation accident involving radiological materials.

Transportation accidents may occur in the shipment of radioactive materials within the state in support of fixed nuclear facilities and other users of radioactive materials, including Department of Defense facilities. The primary mode of transportation of radioactive materials is by truck, although shipments also occur by rail, ship or aircraft. A survey of State radiological emergency response plans revealed a broad range of potential sources of radiation from **fixed facilities,** including: hospitals, nuclear power plants, nuclear propelled ships, hazardous waste sites, and naval shipyards.

Increasingly, the Department of Homeland Security, the Centers for Disease Control and other federal authorities have publicized the potential hazards and harmful effects associated with the dispersion of radioactive materials by a terrorist. There are three primary scenarios in which radioactive materials could be intentionally dispersed: use of conventional explosives or other means to spread radioactive materials (a dirty bomb), attack on a fixed nuclear facility, and use of a nuclear weapon.

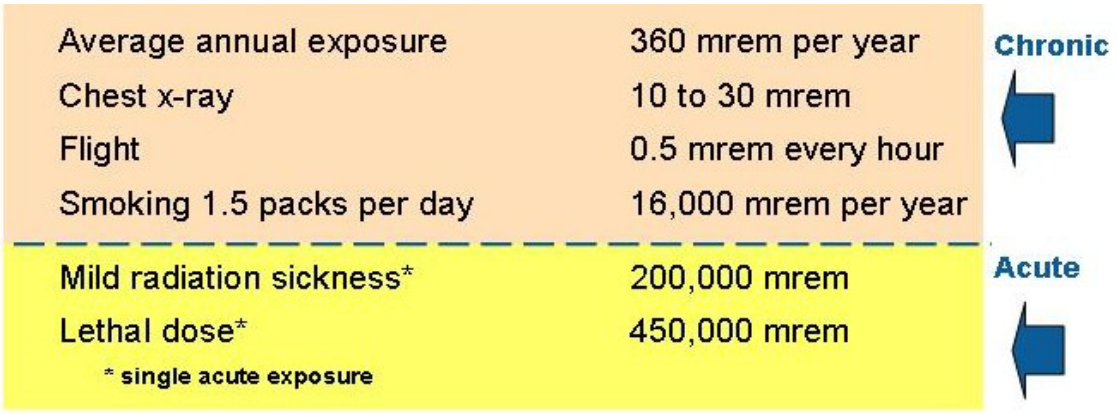
Radioactive contamination and radiation exposure can occur if radioactive materials are released into the environment as the result of an accident, a natural hazard event, or an act of terrorism. Radioactive materials released into the environment can cause air, water, surfaces, soil, plants, buildings, people, or animals to become contaminated.

A radiological hazard is the uncontrolled release of radioactive material that can harm people or damage the environment. Radioactive materials released into the environment may follow two broad pathways:

1) **Plume exposure pathway**, which exposes the body to gamma radiation from deposited material (and inhalation exposure from the passing radioactive plume). The duration of the release leading to potential exposure may range from one-half hour to several days.
2) **Ingestion exposure pathway,** which results from ingestion of contaminated water or foods. The duration of potential exposure may range from hours to several months.

Figure AE-2 reflects naturally-occurring radiation doses (and doses received during normal activities) to provide a point of reference and for comparison. The threshold for any real consequences begins around 200,000 millirems (mrem). Mild radiation sickness (i.e., nausea, vomiting and diarrhea) may onset after receiving a whole body dose of approximately 200,000 mrem in a short amount of time (generally less than 24 hours). The Lethal Dose (LD), known as the LD50/60, is a single, acute, whole body exposure of around 450,000 mrem. The LD50/60 is defined when 50 percent of all people present at an incident receive 450,000 mrem and die after 60 days after receiving no medical treatment.

Figure AE-2
Common Radiation Doses



Source: FEMA E155 Building Security Course

Low level sources are categorized in three major groups: medical, industrial and laboratory. Hospitals, clinics, laboratories, and research facilities routinely use radiation in the diagnosis and treatment of medical and dental patients. Industrial applications include various flow gauges, research and development facilities, and radiography to non-destructive test welds and castings for flaws. Medical, industrial, and research use of radiological materials similarly dictate the need for local emergency planning.

ENERGY PIPELINE FAILURES

The energy infrastructure of the United States is comprised of many components, including the physical network of pipes for oil and natural gas, electricity transmission lines, and other means for transporting energy to the Nation's consumers. This infrastructure also includes facilities that convert raw natural resources into energy products, as well as the rail network, trucking lines and marine transportation. (U.S. Department of Energy, 2003) Much of this infrastructure is aging, and in addition to the challenges of keeping the infrastructure up-to-date with the latest technological advances and consumer needs, the potential for an energy pipeline failure to become a hazard in-and-of-itself must be considered.



Virtually all natural gas in the United States is moved via pipeline. (Photo courtesy of the Department of Energy)

The two million miles of oil pipelines in the United States are the principal mode for transporting oil and petroleum products such as gasoline, and virtually all natural gas in the United States is moved via pipeline as well. (DOE, 2003) Much of this oil pipeline infrastructure is old, requiring regular safety and environmental reviews to ensure its safety and reliability. The potential risk of pipeline accidents is a significant national concern.

The energy infrastructure is vulnerable to physical and cyber disruption, either of which could threaten its integrity and safety. (DOE, 2003) Disruptions could originate with natural events such as geomagnetic storms and earthquakes, or could result from accidents, equipment failures or deliberate interference. In addition, the Nation's transportation and power infrastructures have grown increasingly complex and interdependent—consequently, any disruption could have far-reaching consequences.

Information on hazardous liquid pipeline accidents from 1986 until 2004 can be found at http://ops.dot.gov/stats/lq_sum.htm.

Communication Disruption

The telecommunications sector provides voice and data service to public and private users through a complex and diverse public-network infrastructure encompassing the Public Switched Telecommunications Network (PSTN), the Internet, and private enterprise networks. The PSTN provides switched circuits for telephone, data, and leased point-to-point services. It consists of physical facilities, including over 20,000 switches, access tandems, and other equipment. These components are connected by nearly two billion miles of fiber and copper cable (DHS, 2002). The physical PSTN remains the backbone of the infrastructure, with cellular, microwave, and satellite technologies providing the extended gateways to the wireless network for mobile users.

Because of the growing interdependencies among the various critical infrastructures, a direct or indirect attack or major disruption caused by natural events could result in cascading effects across the others. Such interdependencies increase the need to identify critical assets and secure them against both physical and cyber threats.

Telecommunications and information systems are high-priority targets because of not only the United States' extensive dependence on information infrastructures for its economic and national security, but also the types of information they carry and their central role in supporting NS/EP requirements. Electronic intrusion will remain a serious threat to the Public Network (PN), NS/EP telecommunications and information systems, and interconnected infrastructure systems. Any protracted loss of critical information infrastructure capabilities could severely harm national security and the national welfare.

On a daily basis, the telecommunications sector must contend with a range of potential threats, from traditional natural and human-based threats to its physical infrastructure, such as weather events, unintentional cable cuts, and insider threats (i.e., physical and cyber sabotage). The September 11 attacks revealed the threat terrorism poses to the telecommunications sector's physical infrastructure. While it was not a direct target of the attacks, the telecommunications sector suffered significant collateral damage. The vulnerability of this sector to natural, technological and human-caused hazards needs to be addressed in mitigation plans.

Protecting critical infrastructure and key assets is one of the Department of Homeland Security's critical mission areas. Since private industry owns and operates approximately 85 percent of the critical infrastructures, government and industry must work together in this mission. Established originally with a focus on protecting the Nation's cyber infrastructures, CWIN supports critical infrastructure protection across all sectors. It provides a private, protected and reliable network, offering voice and data connectivity to Government and industry partners.

The increasing reliance on the public switched network, the Internet, and computer applications to support national security, homeland security, emergency preparedness, and public safety places a premium on trusted systems (i.e., systems that are available, secure, reliable, and survivable even in the face of attacks, failures, or accidents). The September 11 terrorist attacks demonstrated the critical importance of networked information systems in supporting national crisis management and response. Ensuring national leaders, first responders, infrastructure owners, and the public receive timely, accurate, and complete information from trusted networked information systems is crucial to both national and homeland security.

Electromagnetic pulse devices that wreak havoc on communications systems are becoming more and more common and more and more portable. There are some that are as small as a grenade. These could also take out a large number of systems relatively easily.

Potential causes of telecommunications disruptions include:

- solar flares impact on satellites;
- Electromagnetic Pulse (EMP) weapons;
- cyberhacking;
- direct assault and equipment damage; and
- extended loss of electrical power.

UTILITY DISRUPTION

For the purposes of this Plan, utility disruptions will refer to water, sewer and electric power. Natural gas is also a utility that can be disrupted, however it is not covered within the Plan at this time.

Water

The water sector consists of two basic and vital components: fresh water supply and wastewater collection and treatment. Water sector infrastructures are diverse, complex and distributed—ranging from systems that serve rural areas to systems that serve major metropolitan areas. On the supply side, the primary focus of critical infrastructure protection efforts are the public water systems that depend on reservoirs, dams, wells, and aquifers, as well as treatment facilities, pumping stations, aqueducts, and transmission pipelines.

As with other critical infrastructure components, the Nation's water system is vulnerable to acts of terrorism. In recognition of potential threats to water systems, the Environmental Protection Agency—in coordination with industry—has developed vulnerability assessment methodologies for both drinking water and waste water treatment facilities. In response to the *Public Health Security and Bioterrorism Preparedness and Response Act of 2002,* the EPA has developed baseline threat information to use in conjunction with vulnerability assessments.

In order to set priorities among a wide range of protective measures that should be taken, the water sector is focusing on the types of infrastructure attacks that could result in significant human casualties and property damage or widespread economic consequences. In general, there are four primary areas of concentration:

- Physical damage or destruction of critical assets, including intentional releases of toxic chemicals;
- Actual or threatened contamination of the water supply;
- Cyber attack on information management systems or other electronic systems; and
- Interruption of services from other infrastructure.

Sewer

The second category of utilities in this Plan is sewer. A primary concern with this utility is the increasing use of Internet enabled devices and valves that can be cyber-attacked and cause a sewage release.

Electric Power

The third category of utilities in this Plan is electric power.

Almost every form of productive activity—whether in businesses, manufacturing plants, schools, hospitals, or homes—requires electricity. The electric system in the United States is an interconnected, multi-modal distribution system that consists of three major parts: generation, transmission and distribution, and control and communications.

Generation assets include fossil fuel plants, hydroelectric dams, and nuclear power plants. Transmission and distribution systems link areas of the grid. Distribution systems manage and control the distribution of electricity into homes and businesses. Control and communications systems operate and monitor critical infrastructure components.

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CIVIL DISRUPTION

Portions of the following material have been taken in whole or in part from www.co.pierce.wa.us/xml/abtus/ourorg/dem/EMDiv/HIVA/civil.pdf

Any incident that disrupts a community where intervention is required to maintain public safety is a civil disturbance or disruption. Examples are demonstrations, riots, strikes, public nuisances, and criminal activities. National organizations can create large public and civil disruptions that have significant economic impact.

In addition to traditional types of civil disruption (in the form or protests, riots, etc.), the threat of CBR warfare presents a new potential civil disruption. If an agent is released in a community, the panic and hysteria that will follow will likely cause civil disruption as citizens rush to local hospitals to receive treatment and/or vaccination.

In the United States, protesters and anarchists tend to practice civil disturbance at large, scheduled peaceful gatherings such as union marches or world and global meetings. They believe all types of governments and global organizations are oppressive and undesirable and should be abolished. Their activities involve disruption of activities, resistance and rejection of all forms of control and authority. Modern anarchists are well-organized, using command centers, tactical communications, and the Internet for planning and operations. Control of anarchists requires police forces trained and experienced in the Incident Command System and riot control. Effects of anarchism include injury to participants and spectators and property damage. The last decade has seen increased rioting and looting, in the United States following sporting events at both professional and college events.

Generally, the cities with populations of more than 100,000 are vulnerable to civil disturbances. Smaller college towns also are subject to civil disturbances. The center of state government faces an increased potential for civil disturbance. Communities with concentrations of ethnic groups and disparate economic status are susceptible to civil disorder. The presence of professional sports teams can be a catalyst for disruptive behavior. Historically, these elements are the most likely to fuel and sustain a disturbance.

Violent prison or jail uprisings are rare, but are a hazard that communities with these facilities should identify and assess. Additionally, most counties and cites have permanent or temporary facilities for housing prisoners. Studies show that overcrowding is one of the major causes of uprisings. Overcrowding requires implementation of tighter internal controls, which are unpopular with the prison population. The Constitutional rights of prisoners are difficult to accommodate with inadequate facilities making it difficult to maintain essential services, personal safety, and preservation of property while maintaining incarceration.

Disruption of service due to terrorist attack refers to the interruption, failure or denial of a service, such as the sabotage or designed breakdown of infrastructure as with an attack on transportation facilities, utilities and other public services. While the Federal Bureau of Investigation found no evidence of terrorism or criminal activity in its investigation of the August 2003 blackout in the Northeast United States, it is clear to see the potential damage and disruption that could be caused by intentional terrorist attack on a nation's power grids.

VULNERABILITY ASSESSMENT HUMAN-CAUSED HAZARDS

This appendix analyzes the impact of the following human-caused hazards on the Rappahannock-Rapidan Region:

Human-caused Hazards

- **Terrorism**
- **Hazardous Materials (HAZMAT)**
- **Radiological Event**
- **Energy Pipeline Failures**
- **Communication Disruption**
- **Utility Disruption**
- **Civil Disruption**

HUMAN-CAUSED (MANMADE) HAZARDS

Human-caused hazards vulnerability analysis is a relatively new area to be addressed in mitigation planning. The mission of the Department of Homeland Security (DHS) includes preparing for natural disasters and terrorist attacks through preventative planning, technology, and coordinated efforts. In the event of a natural or manmade disaster, DHS will be the first federal department to utilize a full range of state, local, and private partnerships to alleviate the effects of a potential disaster.

As described in the Human-Caused Hazards Identification Section, there are a number of federal state and local agencies involved with all hazards analyses and assessments. The most current information can be found at www.dhs.gov. In addition, the United State Department of Agriculture (USDA), Centers for Disease Control (CDC), Environmental Protection Agency (EPA), and Health and Human Services (HHS) are developing similar plans, but have not reached the same state of maturity as DHS. Future updates of this Plan should include the evolving plans and guidance from the other federal agencies.

Several DHS Directorates have been given responsibilities for human-caused vulnerability assessments and mitigation: the Office of State and Local Government Coordination, the Office for Domestic Preparedness (ODP), the Information Assurance and Infrastructure Protection Directorate, and the Emergency Response and Planning Directorate. The following sections are a compilation of the DHS web site, draft DHS publications, and conference discussions intended to provide a relative description of the major initiatives and objectives of the DHS in response to the Homeland Security Presidential Decision Directives, with regard to human-caused hazard assessment.

The most recent DHS organization chart includes the Office of State and Local Government Coordination which was established to serve as a single point of contact for facilitation and coordination of Departmental programs that impact state, local, territorial, and tribal governments.

In addition, the Office for Domestic Preparedness was moved into the State and Local Office. ODP has been the primary agency responsible for preparing the United States for acts of terrorism. In carrying out its mission, ODP is the primary office responsible for providing

training, funds for the purchase of equipment, support for the planning and execution of exercises, technical assistance and other support to assist states and local jurisdictions to prevent, plan for, and respond to acts of terrorism.

The DHS Information Assurance and Infrastructure Protection Directorate focuses primarily on analyzing and securing critical infrastructure and protected systems, developing risk assessments and vulnerabilities and assisting with recovery.

The DHS Emergency Response and Planning (EP&R) Directorate continues FEMA's efforts to reduce the loss of life and property and to protect the nation's institutions from all types of hazards through a comprehensive, risk-based emergency management program of preparedness, prevention, response, and recovery. It furthers the evolution of the emergency management culture from one that reacts to disasters to one that proactively helps communities and citizens avoid becoming victims. In addition, the Directorate will develop and manage a national training and evaluation system to design curriculums, set standards, evaluate, and reward performance in local, state, and federal training efforts.

The Directorate also focuses on risk mitigation in advance of emergencies by promoting the concept of disaster-resistant communities, including providing federal support for local governments that promote structures and communities that reduce the chances of being hit by disasters. EP&R will coordinate with private industry, the insurance sector, mortgage lenders, the real estate industry, homebuilding associations, citizens, and others to create model communities in high-risk areas.

The Directorate leads the DHS response to any sort of biological or radiological attack, and coordinate the involvement of other federal response teams, such as the National Guard, in the event of a major incident. Building upon the successes of FEMA, DHS will lead the Nation's recovery from catastrophes and help minimize the suffering and disruption caused by disasters.

In April 2004, the DHS released the *National Incident Management System* (NIMS), the Nation's first standardized management plan that creates a unified structure for Federal, state, and local lines of government for incident response.

The completion of NIMS follows the October 2003 nationwide deployment of the Initial National Response Plan (INRP) which represented the first step in aligning incident management response and actions between all Federal, state, tribal, local, and private communities. A final National Response Plan is under development and will eventually replace the INRP, while NIMS will continue to provide the Nation's doctrinal guidance for incident management for acts of terrorism, natural disasters, and other emergencies.

NIMS strengthens America's response capabilities by identifying and integrating core elements and best practices for all responders and incident managers. Through a balance between flexibility and standardization, and use of common doctrine, terminology, concepts, principles, and processes, execution during a real incident will be consistent and seamless. Responders will be able to focus more on response, instead of organizing the response, and teamwork and assignments among all authorities will be clearly enhanced.

Within NIMS, several elements require data from the manmade vulnerability assessment. DHS recommends that communities' vulnerability assessments methodologies incorporate evaluation of NIMS capabilities into mitigation planning.

Other key federal agencies and organizations include the Department of Human and Health Services, the Department of Agriculture, the Department of Veterans Affairs, the Environmental Protection Agency, the National Institute of Health and the Centers for Disease Control. Many of these agencies and organizations have facilities (to include alternate operating and/or recovery sites) and staff within the study region or within close proximity.

The Department of Homeland Security has embraced the All Hazards approach and broadly defined key terrorism threats as Chemical, Biological, Radiological, Nuclear, and Explosive Blast (CBRNE); Cyber-Attack, and Agriterrorism. However, while natural hazard analysis using HAZUS-MH and other tools based on probability and frequency is well developed, DHS is in the infancy of creating a probability and frequency based analysis for human-caused events. The current state-of-the-art is the FEMA Risk Mitigation series publications and the vulnerability risk assessment for this Plan uses these documents in combination with the HAZUS dataset.

METHODOLOGIES USED

Portions of the following material have been taken in whole or in part from the Department of Homeland Security Risk Mitigation series publications *(http://www.fema.gov/fima/rmsp.shtm) published by the Department of Homeland Security.*

The Rappahannock-Rapidan Region Human-caused hazards vulnerability risk assessment uses a combination of HAZUS^{MH} geospatial data, the FEMA Publication 386-7, *Integrating Human-Caused Hazards Into Mitigation Planning Guide*, and the FEMA Publication, 426, *Reference Manual to Mitigate Terrorist Attacks Against Buildings*.

FEMA 386-7 provides a screening level assessment at the local or regional level, and FEMA 426 provides a detailed vulnerability risk assessment at the site or building level. Currently, the DHS is in the process of developing a national level methodology for human-caused hazards (similar to that used in HAZUS^{MH} for natural disaster analysis). The human-caused vulnerability risk assessment provided in the following sections is a screening level analysis using default data from HAZUS^{MH} and open source research and literature. (Source: FEMA Publication 386-7, p 2 –1)

Assess Risks

The first step in any risk assessment is to identify the hazards that affect your community or state. Most human-caused hazards fall into two general categories: terrorism (intentional acts) and technological hazards (accidental events). These two categories include the following hazards:

Terrorism

- Conventional bomb
- Biological agent
- Chemical agent
- Nuclear bomb
- Radiological agent

- Arson/incendiary attack
- Armed attack
- Cyberterrorism
- Agriterrorism
- Hazardous material release (intentional)

Technological hazards

- Industrial accident (fixed facility)
- Industrial accident (transportation)
- Failure of Supervisory Control and Data Acquisition (SCADA) system or other critical infrastructure component

Within these various types of incidents, there are many variations, which illustrates one of the fundamental differences between natural and human-caused hazards. The types, frequencies, and locations of many natural hazards are identifiable and even, in some cases, predictable. They are governed by the laws of physics and nature. Malevolence, incompetence, carelessness, and other behaviors, on the other hand, are functions of the human mind and, while they can be assumed to exist, they cannot be forecast with any accuracy. There is, therefore, the potential for most, if not all, types of human-caused hazards to occur anywhere.

In the area of hazard profiling, there are significant differences between natural and human-caused hazards, particularly those related to terrorism. Foremost among these is that terrorists have the ability to choose among targets and tactics, designing their attack to maximize the chances of achieving their objective. Similarly, accidents, system failures, and other mishaps are also largely unforeseeable. This makes it very difficult to identify how and where these hazards may occur. Notwithstanding the difficulty involved with predicting the occurrence of human-caused disasters, the various consequences of these disasters are generally familiar to the sectors of the emergency planning and response community that already specialize in them: injuries and deaths, contamination of and/or damage to buildings and systems, and the like. Numerous authoritative sources exist that can provide detailed information on the nature of all of these hazards; however, more important for the purposes of hazard mitigation than details about the various agents' characteristics are the ways in which they can impact the built environment and what measures can be taken to reduce or eliminate the resulting damage. Whether intentional or accidental, human-caused disasters—as with natural disasters—involve the application of one or more modes of harmful force to the built environment.

VULNERABILITY ASSESSMENT
HUMAN-CAUSED HAZARDS

A full threat and event profile table can be found in FEMA Publication 426 on pages 1-17 through 1-21. This table provides a description of the application mode, duration, extent of effects (static/dynamic) and mitigating and exacerbating conditions of eleven categories of terrorism and technological hazards.

As explained in FEMA Publication 386-7, "The vulnerabilities of a given facility, site, system, or other asset can be identified based on two distinct but complementary approaches. First, any given place in the built environment has a certain level of *inherent vulnerability* that exists independent of any protective or mitigation measures that are applied to it. For example, a football stadium is a setting where thousands of people gather, and a terrorist may find such a target very attractive in that many people would be hurt in an attack. An assessment of such inherent vulnerabilities must be conducted for each asset to determine its weaknesses. Second, the security, design, and other mitigation tools used to protect a place determine its *tactical vulnerability*."

Inherent Vulnerability The planning team can assess the inherent vulnerability of each asset based on:

- *Visibility:* How aware is the public of the existence of the facility, site, system, or location?
- *Utility:* How valuable might the place be in meeting the objective(s) of a potential terrorist or saboteur?
- *Accessibility:* How accessible is the place to the public?
- *Asset mobility:* Is the asset's location fixed or mobile? If mobile, how often is it moved, relocated, or repositioned?
- *Presence of hazardous materials:* Are flammable, explosive, biological, chemical, and/or radiological materials present on site?
- *Potential for collateral damage:* What are the potential consequences for the surrounding area if the asset is attacked or damaged?
- *Occupancy:* What is the potential for mass casualties based on the maximum number of individuals on site at a given time?

Tactical Vulnerability The following list will help the planning team assess the tactical vulnerability of the assets in the community. The tactical vulnerability of each asset is based on:

Site Perimeter

- *Site Planning and Landscape Design*: Is the facility designed with security in mind—both site-specific and with regard to adjacent land uses?
- *Parking Security*: Are vehicle access and parking managed in a way that separates vehicles and structures?

Building Envelope

- *Structural Engineering*: Is the building's envelope designed to be blast-resistant? Does it provide collective protection against chemical, biological, and radiological contaminants?

Facility Interior

- *Architectural and Interior Space Planning*: Does security screening cover all public and private areas? Are public and private activities separated? Are critical building systems and activities separated?
- *Mechanical Engineering*: Are utilities and HVAC systems protected and/or backed up with redundant systems?

Establish Mitigation Priorities

For the purpose of developing a realistic prioritization of human caused hazard mitigation projects, three elements should be considered in concert: the relative importance of the various facilities and systems in the asset inventory, the vulnerabilities of those facilities, and the threats that are known to exist.

Asset criticality The first element, asset criticality, is a measure of the importance of the facility or system to the community. Considerations in determining asset criticality include:

- Is it an element of one of the eight critical infrastructures?
- Does it play a key role in your community's government, economy, or culture?
- What are the consequences of destruction, failure, or loss of function of the asset in terms of fatalities and/or injuries, property losses, and economic impacts?
- What is the likelihood of cascading or subsequent consequences should the asset be destroyed or its function lost?

Vulnerability By identifying the most exploitable weaknesses of each asset, the planning team can identify vulnerabilities in greatest need of attention. This, in effect, gives the planning team a criterion to use in establishing mitigation priorities so that the community can focus its efforts on addressing the most critical issues.

Threat The last element, threat, is fundamental to the prioritization process but very difficult to quantify. It answers the question "what must we mitigate against?"

The frequency of a hazard's occurrence is an important factor in establishing mitigation priorities, but unfortunately it is impossible to determine with any precision in the case of terrorism (for technological hazards, "threat" can be interpreted to mean the likelihood of some type of human-induced unintentional event). Instead of being influenced by predictable, quantifiable natural forces, terrorism—and to some degree, other technological hazards—is the result of human behavior that often lies outside conventional ideals of appropriateness and rationality and is thus difficult to predict. The most useful application of threat information for mitigation planning purposes, then, will be as a guide to the types of incidents that are relatively most likely to occur.

As stated in FEMA Publication 386-7: "*The Facility Inherent Vulnerability Assessment Matrix* (**Figure AF-1**) provides a way to record how vulnerable each asset is and enables the planning team to compare how vulnerable the assets are relative to each other. Each asset or facility is evaluated using the matrix below. The appropriate point value for each criterion based on the description in each row is selected, then point values added to get the total for each asset. The vulnerability matrix compares the total scores for all assets ranked in relation to one another for each asset identified."

Figure AF-1
Facility Inherent Vulnerability Assessment Matrix

Facility _____

Vulnerability Point Values

Criteria	0	1	2	3	4	5	Score
Asset Visibility	–	Existence not well known	–	Existence locally known	–	Existence widely known	
Target Utility	None	Very Low	Low	Medium	High	Very High	
Asset Accessibility	Remote location, secure perimeter, armed guards, tightly controlled access	Fenced, guarded, controlled access	Controlled access, protected entry	Controlled access, unprotected entry	Open access, restricted parking	Open access, unrestricted parking	
Asset Mobility	–	Moves or is relocated frequently	–	Moves or is relocated occasionally	–	Permanent / fixed in place	
Presence of Hazardous Materials	No hazardous materials present	Limited quantities, materials in secure location	Moderate quantities, strict control features	Large quantities, some control features	Large quantities, minimal control features	Large quantities, accessible to non-staff persons	
Collateral Damage Potential	No risk	Low risk / limited to immediate area	Moderate risk / limited to immediate area	Moderate risk within 1-mile radius	High risk within 1-mile radius	High risk beyond 1-mile radius	
Site Population/ Capacity	0	1-250	251-500	501-1000	1001-5000	> 5000	
						TOTAL	

Source: FEMA Publication 386-7

VULNERABILITY ASSESSMENT
HUMAN-CAUSED HAZARDS

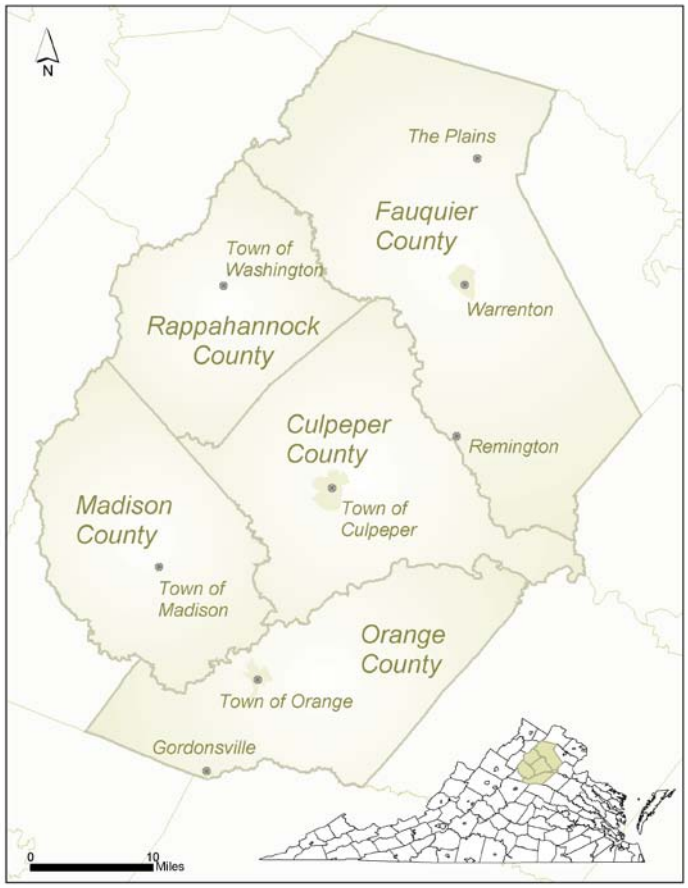
OVERVIEW OF VULNERABILITY IN THE REGION

The preliminary findings indicate the Rappahannock-Rapidan region has a higher exposure to human-caused technological events (HAZMAT spills, accidental explosions, etc.) than to terrorist activities; however, the close proximity to the Washington, D.C. metro area makes the region vulnerable to threats that other parts of the country do not have to deal with. The following information presents some of the general findings of the human-caused vulnerability assessment conducted for the region.

- The "carrying capacity" of the region for a major, unplanned exodus of citizens from Northern Virginia needs to be determined.
- The infrastructure is highly interdependent; most "critical nodes" (i.e., highway bridges and electric power distribution) need to be identified, assessed and factored into a regional vulnerability assessment.
- The medical care and emergency management system and capacity should be evaluated to determine the ability to operate and support in a contaminated environment and with large numbers of casualties.
- Both crop and livestock agriculture industries are susceptible to naturally occurring outbreaks of human transmitted cases of unintentional release of genetically modified seeds, avian flu, foot and mouth disease, and the potential to be a agriterrorism target with the close proximity to the metro D.C. area.

The region and surrounding geographical region is shown in Section 3, *Community Profile*. The study area is generally rural in nature with rolling hills and fields in the eastern sections and larger hills, ridges, and mountains in the western section. Vegetation ranges from agricultural fields to deciduous and evergreen forest.

Figure AF-2
Rappahannock-Rapidan Region



Source: Rappahannock-Rapidan Regional Commission

The rivers that give the Rappahannock-Rapidan Regional Commission (Planning District Number 9) its name also serve as boundaries for its five counties. The Rappahannock River separates Fauquier County from Culpeper and Rappahannock counties, and the Rapidan runs between Orange County and Culpeper and Madison counties. Both rivers originate in the Blue Ridge Mountains at the district's western edge and flow through rolling Piedmont terrain to their confluence at the eastern tip of Culpeper County, twelve miles from Fredericksburg. Altitudes in this district range from 4,000 feet in the mountains of the Shenandoah National Park to about 250 to 600 feet in the Piedmont Plateau.

Located between two growing metropolitan areas, Washington and Charlottesville, the region remains predominantly rural, with one of the lowest population densities in the state. Although it lacks a major population center, the development of the Virginia suburbs of Washington, D.C. exerts a strong influence on the entire area. The town of Warrenton, in

Fauquier County, is less than 50 miles from downtown Washington, D.C. and still closer to points in Northern Virginia. Fauquier and Culpeper counties are included in the Washington, D.C.—Maryland-Virginia-West Virginia Metropolitan Statistical Area (MSA).

Overview of Critical Facilities and Infrastructure

An important element to consider when developing a hazard mitigation plan is critical infrastructure and facilities. These infrastructures and facilities are crucial during times of disaster and it is important for communities to plan for their protection. For this project, the critical facilities that were analyzed were taken from the default data included in the HAZUS^{MH} software. This data was double checked for accuracy with local officials from all participating counties and jurisdictions. For the human-caused vulnerability analysis, the critical infrastructure and facilities were grouped into the following categories:

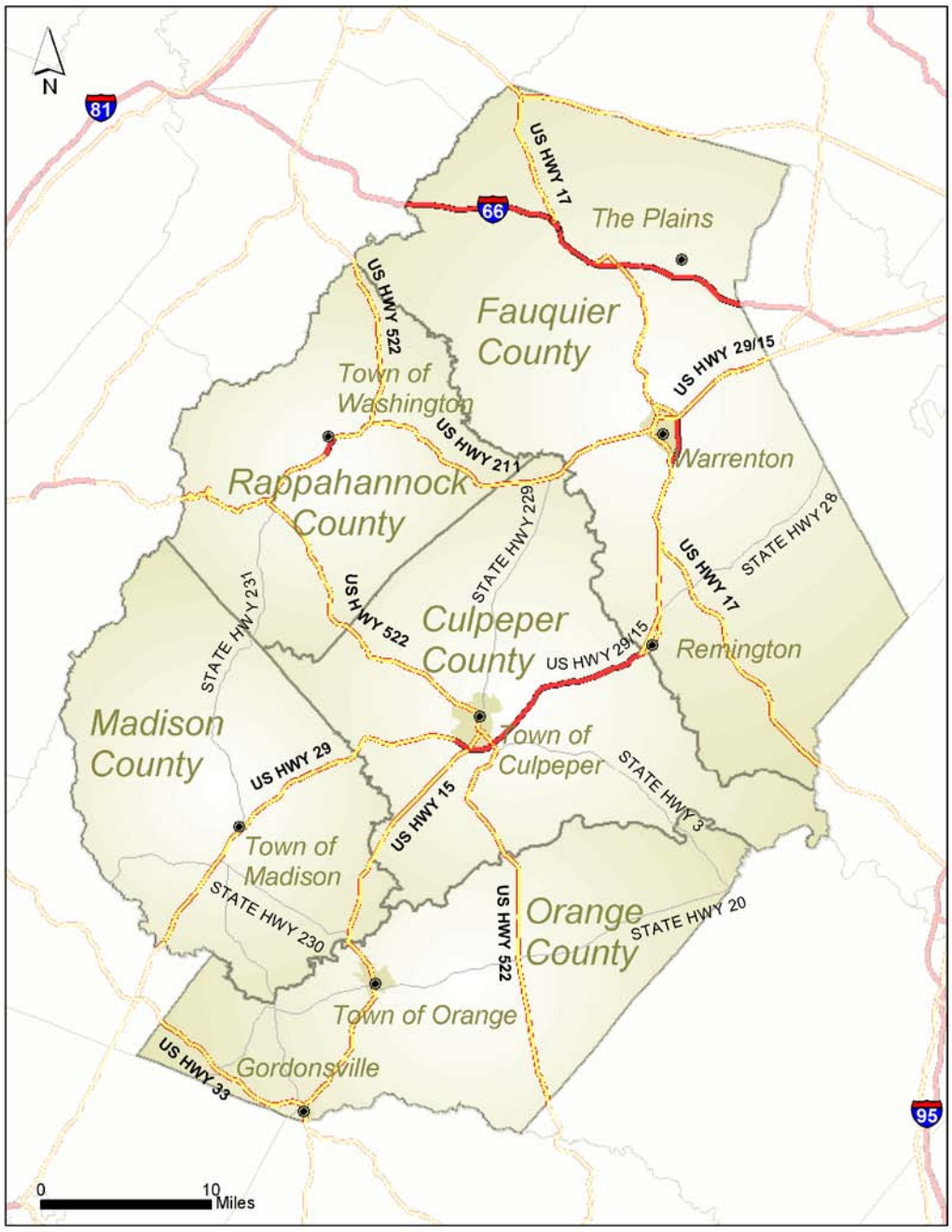
- Transportation
- High Potential Loss
- Essential
- Utility Systems

To supplement the default information found in HAZUS^{MH}, local emergency management officials were asked to fill out a survey tool to collect information on the various equipment, staffing, training and capability of the local emergency management offices to deal with a human caused hazard event.

TRANSPORTATION

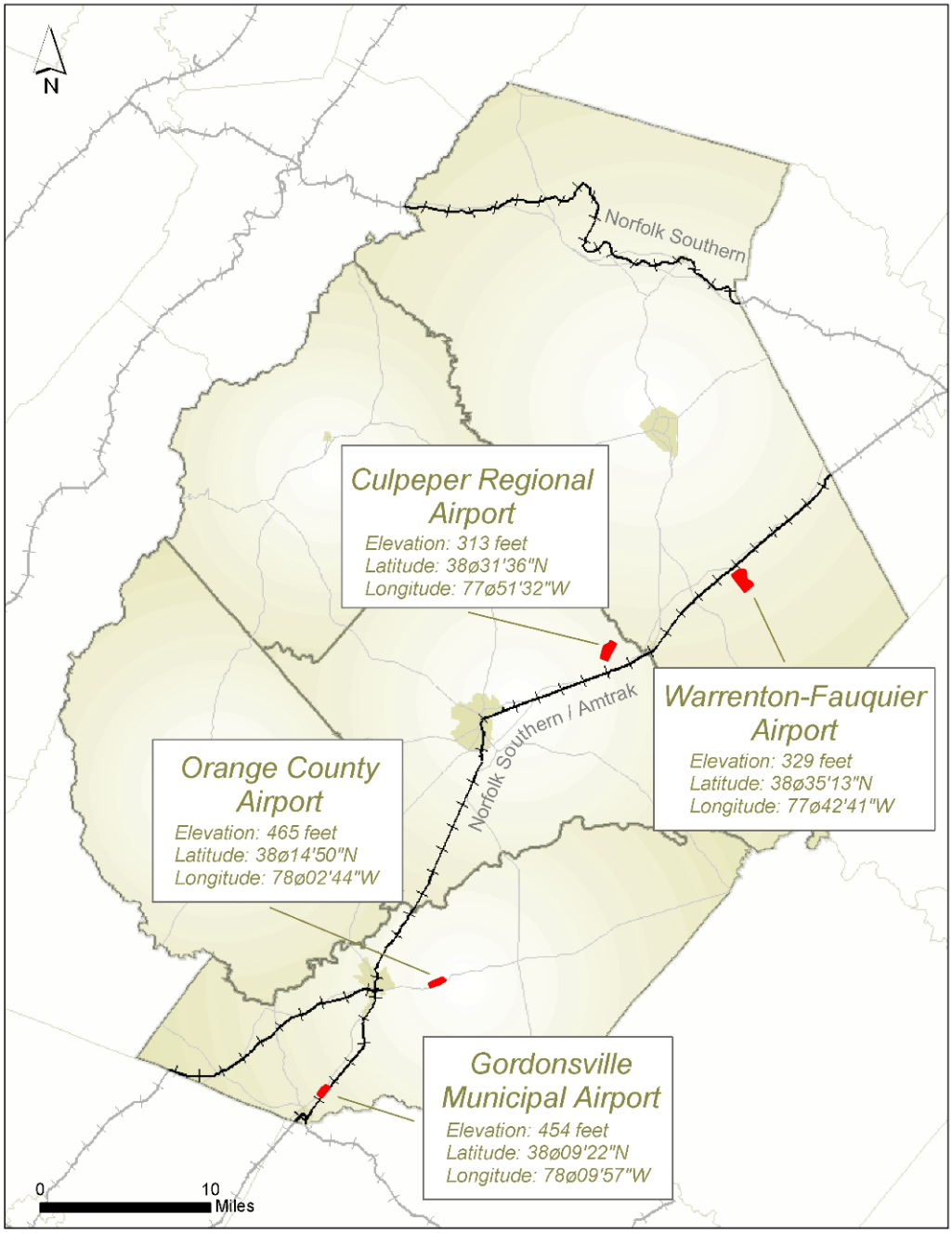
Critical transportation is defined as highway (bridges, tunnels, segments), railway (bridges, tunnels, segments, facilities), light rail (bridges, tunnels, segments, facilities), bus, port, ferry and airport (facilities, runways) facilities and infrastructure. Transportation in the region reflects its connection to the Washington area. Interstate 66 passes east/west through Fauquier County between the Shenandoah Valley and Washington. A major highway, U.S. 29, leads north from Charlottesville through the towns of Madison, Culpeper and Warrenton before winding east through Prince William, Fairfax and Arlington counties. Passenger rail service is available in Culpeper for travel north to New York City and south to New Orleans. The nearest major air service is Washington's Dulles International Airport, in Loudoun County. However, the Charlottesville-Albemarle Airport in Albemarle County is less than ten miles from the southwestern border of the district.

Figure AF-3
Regional Transportation



Source: Rappahannock-Rapidan Regional Commission

Figure AF-4
Alternate Transportation Modes



Source: Rappahannock-Rapidan Regional Commission

Table AF-1
Critical Transportation Facilities and Infrastructure in the Rappahannock-Rapidan Region (Air and Rail)

County	Jurisdiction	Facility Name	Facility Type
Culpeper	Culpeper	Culpeper Amtrak Station	Passenger Rail
Culpeper	Culpeper	Culpeper Regional	Airport
Fauquier	Warrenton	Warrenton-Fauquier	Airport
Orange	Gordonsville	Gordonsville Municipal	Airport
Orange	Orange	Orange County Airport	Airport

Source: HAZUS^{MH}

HIGH POTENTIAL LOSS FACILITIES

High potential loss facilities listed in HAZUS^{MH} are defined as dams and levees, nuclear power production and military installation facilities and infrastructure. The dams included in the HAZUS^{MH} default data have been mapped in the Hazard Analysis Section of this Plan (Figure 5.19). There are no nuclear power production facilities within the boundaries of the Region, although the North Anna nuclear power facility located in Louisa County is located close enough to be considered a risk to the region.

A small portion of Quantico Marine Base is located in Fauquier County. That is the only military installation facility and/or infrastructure in the region.

ESSENTIAL FACILITIES

Essential facilities are defined as medical care, emergency response, and school facilities and infrastructure. **Table AF-2** shows essential facilities in the region by county and jurisdiction. **Figure 6-6** (located in the Vulnerability Assessment section) shows the locations of the essential facilities identified in the HAZUS^{MH} default inventory.

Table AF-2
Critical Essential Facilities and Infrastructure in the Rappahannock-Rapidan Region (HAZUS^{MH} Inventory and Local Input)

County	Location	Facility Name	Facility Type
Culpeper	Brandy Station	Brandy Volunteer Fire Dept	Fire Station
Culpeper	Culpeper	Reva Volunteer Fire & Rescue	Fire Station
Culpeper	Culpeper	Culpeper Regional Hospital	Hospital
Culpeper	Culpeper	Culpeper County Sheriff's Office	Police Station
Culpeper	Culpeper	Culpeper Police Dept	Police Station
Culpeper	Culpeper	St. Luke's Lutheran School	School
Culpeper	Culpeper	Culpeper Christian School	School
Culpeper	Culpeper	Epiphany Catholic School	School

VULNERABILITY ASSESSMENT
HUMAN-CAUSED HAZARDS

County	Location	Facility Name	Facility Type
Culpeper	Culpeper	G.W. Carver-Pied. Tec Ed Center	School
Culpeper	Culpeper	Central VA Regional Program	School
Culpeper	Culpeper	A. G. Richardson Elementary	School
Culpeper	Culpeper	Culpeper County High	School
Culpeper	Culpeper	Culpeper County Middle	School
Culpeper	Culpeper	Farmington Elementary	School
Culpeper	Culpeper	Pearl Sample Elementary	School
Culpeper	Culpeper	Sycamore Park Elementary	School
Culpeper	Culpeper	Emerald Hill Elementary	School
Culpeper	Lignum	Alice C Tyler Village of Children	School
Fauquier	Warrenton	Sunrise Assisted Living	Assisted Living
Fauquier		Fauquier Community Child Care (9 facilities)	Daycare
Fauquier		Jack and Jill	Daycare
Fauquier		Maplewood Childcare Center	Daycare
Fauquier		Southern Fauquier Child Development	Daycare
Fauquier	Bealeton	Walnut Grove Childcare Facility	Daycare
Fauquier	New Baltimore	Walnut Grove Childcare Facility	Daycare
Fauquier	Opal	Walnut Grove Childcare Facility	Daycare
Fauquier	Warrenton	Warrenton Baptist Tiny Tot Care Center	Daycare
Fauquier	Broad Run	New Baltimore VFC and Rescue	Fire Department
Fauquier	Catlett	Cedar Run Volunteer Rescue Squad	Fire Department
Fauquier	Catlett	Catlett VFC	Fire Department
Fauquier	Marshall	Marshall VFC	Fire Department
Fauquier	Marshall	Marshall Vol. Rescue Squad	Fire Department
Fauquier	Remington	Remington VFC and Rescue	Fire Department
Fauquier	The Plains	The Plains VFC and Rescue	Fire Department
Fauquier	Upperville	Upperville VFC	Fire Department
Fauquier	Warrenton	Warrenton VFC	Fire Department
Fauquier	Warrenton	Warrenton Vol. Rescue Squad	Fire Department
Fauquier	Bealeton	Lois Volunteer Fire Dept	Fire Station
Fauquier	Goldvein	Goldvein Volunteer Fire Dept	Fire Station
Fauquier	Orlean	Orlean Volunteer Fire Dept	Fire Station
Fauquier		Fauquier County Garage	Fuel Site
Fauquier		Morgan Oil	Fuel Site
Fauquier	Warrenton	Adult Detention Facility	Government Building
Fauquier	Warrenton	Fauquier County Courthouse	Government Building

VULNERABILITY ASSESSMENT
HUMAN-CAUSED HAZARDS

County	Location	Facility Name	Facility Type
Fauquier	Warrenton	Fauquier County Schools and Government Building	Government Building
Fauquier	Warrenton	Parks and Recreation Gym (High Priority Shelter)	Government Building
Fauquier	Warrenton	Warrenton-Fauquier Joint Communications Center	Government Building
Fauquier	Warrenton	Fauquier Hospital	Hospital
Fauquier		Oak Springs Nursing Home	Nursing Home
Fauquier		Overlook Nursing Home	Nursing Home
Fauquier	Marshall	Marshall Manor Nursing Home	Nursing Home
Fauquier	Warrenton	Warrenton Police	Police Station
Fauquier	Warrenton	Fauquier County Sheriff's Department, Detention Center, Criminal Court, Criminal Investigation	Police Station
Fauquier		Auburn Middle School	School
Fauquier		Southeastern Alternative School	School
Fauquier	Bealeton	Cedar Lee Middle	School
Fauquier	Bealeton	Liberty High	School
Fauquier	Bealeton	Mary Walter Elementary	School
Fauquier	Bealeton	Grace Miller Elementary	School
Fauquier	Catlett	H. M. Pearson Elementary	School
Fauquier	Marshall	Marshall Middle	School
Fauquier	Marshall	Northwestern Elementary	School
Fauquier	Marshall	W. G. Coleman Elementary	School
Fauquier	Marshall	Claude Thompson Elementary	School
Fauquier	Midland	Midland Christian Academy	School
Fauquier	Midland	Alternative Education Center	School
Fauquier	New Baltimore	C. Hunter Ritchie Elementary	School
Fauquier	Remington	Cornerstone Christian Academy	School
Fauquier	Remington	Margaret M. Pierce Elementary	School
Fauquier	Remington	M.M. Pierce Elementary	School
Fauquier	The Plains	Wakefield School	School
Fauquier	Warrenton	C. M. Bradley Elementary	School
Fauquier	Warrenton	Central Elementary	School
Fauquier	Warrenton	Fauquier High	School
Fauquier	Warrenton	P. B. Smith Elementary	School
Fauquier	Warrenton	W. C. Taylor Middle	School
Fauquier	Warrenton	Warrenton Middle	School
Fauquier	Warrenton	Brumfield Elementary	School
Fauquier		Waste Water Plant	Waste Water Plant

VULNERABILITY ASSESSMENT
HUMAN-CAUSED HAZARDS

County	Location	Facility Name	Facility Type
Fauquier	Marshall	Marshall Water Plant	Water Treatment Plant
Fauquier	Remington	Remington Water Plant	Water Treatment Plant
Fauquier	Vint Hill	Vint Hill Water Plant	Water Treatment Plant
Fauquier	Warrenton	Warrenton Water Treatment Plant	Water Treatment Plant
Madison	Madison	The Nest Day Care	Day Care
Madison	Madison	Rainbow Preschool	Day Care
Madison	Aroda	Mountain View Nursing Home	Nursing Home
Madison	Brightwood	Morgan's Nursing Home	Nursing Home
Madison	Madison	Autumn Care of Madison	Nursing Home
Madison	Madison	Sevenoaks Pathwork Center	Nursing Home
Madison	Madison	Madison County Sheriff's Office	Police Station
Madison	Aroda	Oak Grove Menonite School	School
Madison	Criglersville	Criglersville Elementary	School
Madison	Madison	Madison County High	School
Madison	Madison	Madison Primary	School
Madison	Madison	Waverly Yowell Elementary	School
Madison	Madison	William H. Wetsel Middle	School
Madison	Madison	Apple Tree Academy	School
Madison	Madison	Skyline CAP	School
Madison	Woodberry Forest	Woodberry Forest School	School
Orange	Barboursville	Barboursville Volunteer Fire	Fire Station
Orange	Locust Grove	Lake-Woods Fire & Rescue	Fire Station
Orange	Rapidan	Rapidan Volunteer Fire Dept	Fire Station
Orange	Gordonsville	Gordonsville Police Dept	Police Station
Orange	Orange	Orange County Sheriff's Office	Police Station
Orange	Orange	Orange Police	Police Station
Orange		Gordon-Barbour Elementary School	School
Orange	Locust Grove	Locust Grove Middle School	School
Orange	Locust Grove	Locust Grove Elementary	School
Orange	Orange	Grimes Memorial School	School
Orange	Orange	Orange County High	School
Orange	Orange	Orange Elementary	School
Orange	Orange	Prospect Heights Middle	School
Orange	Unionville	Faith Christian Academy	School
Orange	Unionville	Lightfoot Elementary	School
Orange	Unionville	Unionville Elementary	School

County	Location	Facility Name	Facility Type
Orange	Gordonsville	Gordonsville VFC	Volunteer Fire Station
Orange	Mine Run	Mine Run VFC	Volunteer Fire Station
Orange	Orange	Orange VFC	Volunteer Fire Station
Rappahannock		Rappahannock County Co-Op	Co-Op
Rappahannock		Child Care and Learning Center	Day Care
Rappahannock	Washington	Rappahannock Office of Emergency Management	Emergency Management Office
Rappahannock	Amissville	Co 3 Fire and Rescue	Fire Department
Rappahannock	Castleton	Co 5 Fire and Rescue	Fire Department
Rappahannock	Chester Gap	Co 9 Fire and Rescue	Fire Department
Rappahannock	Sperryville	Co 2 Fire and Rescue	Fire Department
Rappahannock	Sperryville	Co 7 Fire and Rescue	Fire Department
Rappahannock	Washington	Co 1 Fire and Rescue	Fire Department
Rappahannock	Flint Hill	Flint Hill Volunteers Fire	Fire Station
Rappahannock	Washington	Sheriff's Office	Police Station
Rappahannock	Castleton	Massanova Christian Academy	School
Rappahannock	Flint Hill	Wakefield Country Day School	School
Rappahannock	Sperryville	Hearthstone School	School
Rappahannock	Washington	Rappahannock County High	School
Rappahannock	Washington	Rappahannock Elementary	School

Source: HAZUS^{MH}

There are two other essential facilities in the region that need to be mentioned in this Plan as they are potential targets. They are the TRACON (Terminal Radar Approach Control) facility in Fauquier County and the SWIFT (Society for Worldwide Financial Telecommunication) facility in Culpeper County.

The TRACON facility provides radar air traffic control services to aircraft flying into and out of the Baltimore/Washington area. The primary function of the TRACON is to provide a variety of air traffic control services to arrival, departure, and transient aircraft within its assigned airspace. These services include aircraft separation, in-flight traffic advisories and navigational assistance. The facility located at Vint Hill Farms in Fauquier County, Virginia, serves as the primary control services facility for the four major airports in the Washington, D.C./Baltimore area.

The SWIFT facility in Culpeper County serves as the U.S. hub for electronic banking activities transferring foreign exchange deposits and loans. It connects 3,049 banks and securities industry members and handles an average of 1.1 million messages per day.

UTILITY SYSTEMS

Utility systems are defined as potable water, wastewater, oil system, natural gas, electric power and communications facilities and infrastructure. **Figure AF-5** shows the utility systems in the region. **Table AF-3** lists the utility system facilities in the region as they are found in HAZUS^{MH}.

Table AF-3
Critical Utility Systems and Infrastructure in the Rappahannock-Rapidan Region
(HAZUS^{MH} Inventory)

County	Location	Facility Name	Facility Type
Culpeper	Mitchells	Coffeewood Correctional Center	Potable Water System Facilities
Culpeper	Culpeper	SWIFT Facility	Private Worldwide Electronic Banking Facility
Culpeper	Culpeper	WCVA 1490	Radio Station
Culpeper	Culpeper	WCUL CH 276	Radio Station
Culpeper	Culpeper	WPER CH 210	Radio Station
Culpeper	Culpeper	WARN CH 218	Radio Station
Culpeper	Brandy Station	Mount Dumplin STP	Waste Water Treatment Facility
Culpeper	Culpeper	Culpeper Water Pollution Control Facility	Waste Water Treatment Facility
Culpeper	Culpeper	Eheart Subdivision	Waste Water Treatment Facility
Culpeper	Culpeper	Ferguson STP	Waste Water Treatment Facility
Culpeper	Elkwood	Elkwood Wastewater Treatment Plant	Waste Water Treatment Facility
Culpeper	Jeffersonton	River Ridge Utility Company	Waste Water Treatment Facility
Culpeper	Jeffersonton	South Wales Utility STP	Waste Water Treatment Facility
Fauquier	Warrenton	Advanced Wastewater Treatment Plant	Potable Water System Facilities
Fauquier	Warrenton	WPRZ 1250	Radio Station
Fauquier	Warrenton	WKCW 1420	Radio Station
Fauquier	Fauquier County	Marshall WWT Fauquier County	Waste Water Treatment Facility
Fauquier	Remington	Remington Regional Wastewater	Waste Water Treatment Facility
Fauquier	Warrenton	Advanced Wastewater Treatment Plant	Waste Water Treatment Facility
Fauquier	Warrenton	Fauquier Water Sewer Authority	Waste Water Treatment Facility
Fauquier	Warrenton	Vint Hill Farms Station	Waste Water Treatment Facility

County	Location	Facility Name	Facility Type
Madison	Madison	Madison WTP-Rapidan Service Authority	Potable Water System Facilities
Madison	Madison	Rapidan Service Authority Madison	Waste Water Treatment Facility
Orange	Gordonsville	Gordonsville Energy LP	Electric Power Facility
Orange	Unionville	Transcontinental Gas Pipeline Corporation	Natural Gas Facility
Orange	Orange	Stanley Petroleum Products	Oil Pipeline Facility
Orange	Orange	Town of Orange Water Treatment Plant	Potable Water System Facilities
Orange	Orange	WVCV 1340	Radio Station
Orange	Orange	WJMA-FM CH 255	Radio Station
Orange	Gordonsville	Liberty Fabrics	Waste Water Treatment Facility
Orange	Locust Grove	Wilderness Shores STP	Waste Water Treatment Facility
Orange	Orange	Locust Grove Elementary School	Waste Water Treatment Facility
Orange	Orange	Town of Orange Sewage	Waste Water Treatment Facility
Rappahannock	Washington	Town of Washington WTP	Potable Water System Facilities
Warrenton	Warrenton	WTOP-FM CH 299	Radio Station
Warrenton	Warrenton	WBPS-FM CH 232	Radio Station

Source: HAZUS^{MH}

VULNERABILITY ASSESSMENT
HUMAN-CAUSED HAZARDS

TERRORISM

The terrorism analysis focused on the primary chemical, biological, radiologic, nuclear and explosives (CBRNE) threats and used the FEMA 386-7 and 426 Reference Manual methodologies to determine the highest potential targets in the region. A common method to evaluate terrorist threats is to analyze five factors: existence, capability, history, intention, and targeting. These five factors are defined in FEMA Publication 426 as:

- **Existence** addresses the questions: Who is hostile to the assets, organization, or community of concern? Are they present or thought to be present? Are they able to enter the country or are they readily identifiable in a local community upon arrival?
- **Capability** addresses the questions: What weapons have been used in carrying out past attacks? Do the aggressors need to bring them into the area or are they available locally?
- **History** addresses the questions: What has the potential threat element done in the past and how many times? When was the most recent incident and where, and against what target? What tactics did they use? Are they supported by another group or individuals? How did they acquire their demonstrated capability?
- **Intention** addresses the questions: What does the potential threat element or aggressor hope to achieve? How do we know this (i.e., published in books or news accounts, speeches, letters to the editor, informant)?
- **Targeting** addresses the questions: Do we know if an aggressor (we may not know which specific one) is performing surveillance on our building, nearby buildings, or buildings that have much in common with our organization? Is this information current and credible, and indicative of preparations for terrorist operations (manmade hazards)? The threat/hazard analysis for any building can range from a general threat/hazard scenario to a very detailed examination of specific groups, individuals, and tactics that the building may need to be designed to repel or defend against.

Figure AF-1, found on page 8 of this appendix, shows the methodology that was used to develop the region's risk screening matrix. **Table AF-4** is a completed risk screening matrix for the region. The data used for this analysis was taken from the HAZUS^{MH} default database for the region. The seven criteria used for this analysis (asset visibility, target value to potential threat, asset accessibility, asset mobility, target threat of CBR hazard, collateral damage potential and site population/capacity) were given a score of 1-5 for each potential target category based on the qualifying characteristics for each of those criteria as listed in Figure AF-1. The sums of those scores were then multiplied by values assigned for asset value of target site (ranked on a scale of 1-5), homeland security threat level (for this analysis, it was assumed that the threat level would be "orange" whose value is 6 on a scale of 2-8) to determine the overall inherent vulnerability score. The higher the overall total of the inherent vulnerability score, the higher the target potential for each element.

Table AF-4
Rappahannock-Rapidan Region Risk Screening Matrix (HAZUS^{MH})

		Asset Visibility	Target Value to Potential Threat	Asset Accessability	Asset Mobility	Target Threat of CBR Hazard	Collateral Damage Potential	Site Population/Capacity	SUM		Asset Value of Target Site		Homeland Security Threat (Orange)		Inherent Vulnerability		Culpeper	Fauquier	Madison	Orange	Rappahannock
																	Approx. Number of Facilities				
Transportation Facilities																					
	Highway Segments	5	5	5	5	3	4	5	**32**	X	**4**	X	**6**	=	**768**		**24**	**63**	**10**	**28**	**23**
	Highway Bridges	5	4	5	5	0	2	1	**22**	X	**4**	X	**6**	=	**528**	:	**72**	**176**	**52**	**49**	**83**
	Highway Tunnels	NA	NA	NA	NA	NA	NA	NA	**NA**		**NA**		**NA**		**NA**		**NA**	**NA**	**NA**	**NA**	**NA**
	Railway Segments	5	5	4	5	3	4	5	**31**	X	**4**	X	**6**	=	**744**		**9**	**9**	**0**	**17**	**0**
	Light Rail	NA	NA	NA	NA	NA	NA	NA	**NA**		**NA**		**NA**		**NA**						
	Buses	NA	NA	NA	NA	NA	NA	NA	**NA**		**NA**		**NA**		**NA**						
	Ferrys	NA	NA	NA	NA	NA	NA	NA	**NA**		**NA**		**NA**		**NA**						
	Ports	NA	NA	NA	NA	NA	NA	NA	**NA**		**NA**		**NA**		**NA**						
	Airports	4	4	3	5	0	1	2	**19**	X	**4**	X	**6**	=	**456**	:	**6**	**17**	**1**	**5**	**1**
High Potential Loss Facilities																					
	Military Installations	3	5	3	5	1	3	1	**21**	X	**0**	X	**6**	=	**0**	:	**0**	**1**	**0**	**0**	**0**
	Dams & Levees	4	5	2	5	1	4	1	**22**	X	**5**	X	**6**	=	**660**	:	**19**	**45**	**14**	**11**	**6**
	Nuclear Power	5	5	5	5	2	3	1	**26**	X	**3**	X	**6**	=	**396**	:	**0**	**0**	**0**	**0**	**0**
Essential Facilities																					
	Medical Care	4	3	4	5	4	2	2	**24**	X	**5**	X	**6**	=	**780**	:	**1**	**1**	**0**	**0**	**0**
	Emergency Response	2	4	1	5	4	3	3	**22**	X	**5**	X	**6**	=	**720**	:	**5**	**19**	**1**	**9**	**9**
	Schools	4	4	4	5	1	1	2	**21**	X	**3**	X	**6**	=	**396**	:	**14**	**20**	**5**	**9**	**3**
Utility System Facilities																					
	Potable Water	3	2	3	5	2	3	1	**19**	X	**3**	X	**6**	=	**396**	:	**1**	**1**	**1**	**1**	**1**
	Waste Water	3	2	3	5	1	2	1	**17**	X	**2**	X	**6**	=	**204**	:	**5**	**6**	**1**	**6**	**0**
	Oil Systems	3	2	3	5	2	3	1	**19**	X	**3**	X	**6**	=	**396**	:	**0**	**0**	**0**	**1**	**0**
	Natural Gas	3	2	3	5	1	2	1	**17**	X	**2**	X	**6**	=	**204**	:	**0**	**0**	**0**	**1**	**0**
	Electric Power	3	2	3	5	2	3	1	**19**	X	**3**	X	**6**	=	**396**	:	**1**	**0**	**0**	**1**	**0**
	Communications	3	2	3	5	1	2	1	**17**	X	**2**	X	**6**	=	**204**	:	**2**	**6**	**0**	**3**	**0**

Source: HAZUS^{MH} and PBS&J Analysis

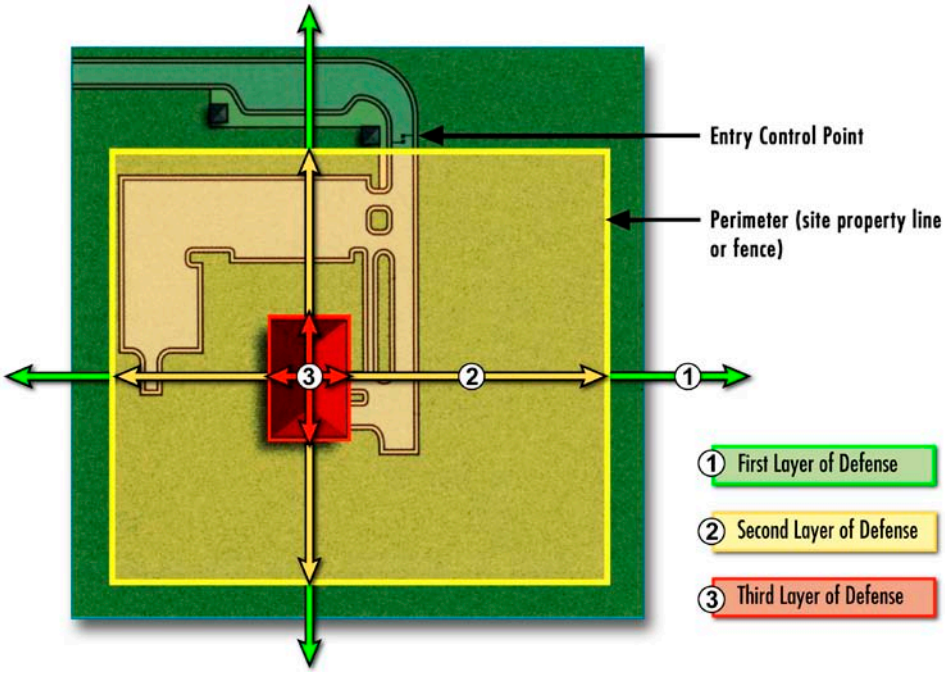
The risk-screening matrix was used to examine specific manmade threats in more detail and provided in the following sections. For terrorist attack, three elements are used to describe a buildings or assets ability to withstand the attack, response and recovery:

- Design Basis Threat
- Level of Protection
- Layers of Defense

The Design Basis Threat for the CBR analysis considered the use of HAZMATs, Sarin, Anthrax, Ricin, and Smallpox and the blast analysis considered car bomb and truck bomb size weapons. For most state and local government buildings, the GSA Interagency Security Committee Criteria provide reasonable guidelines to determine a Level of Protection. Layers of defense are used to detect, deny, delay/deter, and devalue the aggressor against the intended target. Specific buildings and critical infrastructure should have detailed building vulnerability assessments conducted. **Figure AF-6** provides an example of layers of defense.

Figure AF-6

Example of Layers of Defense



Source: FEMA E155 Building Security Course

The analysis considers the combination of the terrorist threat, tactics, weapons, site and building parameters, Level of Protection and Layers of Defense to evaluate the potential vulnerabilities in a qualitative method. FEMA Publication 426 has a more rigorous analysis for a specific building risk assessment and is beyond the scope of this effort. The following pages are taken from FEMA Publication 426 Table 2-1 and provide a correlation of mitigation measures to threats.

Figure AF-7
Correlation of Mitigation Measures To Threats (From FEMA 426)

Table 2-1: Correlation of Mitigation Measures to Threats*

■ The symbols indicate which of the protective measures shown in the left-hand column can be effective in countering the types of threats indicated across the top of the chart.

	Moving Vehicle Bomb	Stationary Vehicle Bomb	Exterior Attack	Stand-off Weapons Attack	Armed Attack	Covert Entry	Mail and Supplies Bombs	Airborne Contamination	Waterborne Contamination
LAND USE CONSIDERATIONS									
Locate high-risk land uses in the interior of the site	■	■	■	■	■				
Consolidate high-risk land uses	■	■	■	■	■				
Include stand-off areas in land area requirements	■	■		■	■				
Consider effects of off-property development	■	■	■		■				
SITE PLANNING									
Maximize distance from perimeter fence and developed areas	■	■	■	■	■			■	
Site critical facilities on higher ground	■	■	■	■	■			■	■
Avoid areas with adjacent high terrain or structures			■	■	■			■	■
Avoid areas with adjacent dense vegetation			■	■	■				
Avoiding low-lying topographic areas			■	■	■			■	■
Provide separation between facilities	■	■	■	■	■		■		
Site facilities within view of other occupied facilities						■			
Cluster facilities with similar threat levels	■	■		■	■				
Create complexes to enhance surveillance opportunities	■	■	■	■	■				
Eliminate vehicle parking from interior of building complexes	■	■							
High surrounding terrain			■	■	■				
Distance from non-building facilities	■	■	■	■	■	■		■	■
Areas that provide concealment		■	■	■	■	■			

Table 2-1: Correlation of Mitigation Measures to Threats* (continued)

	Moving Vehicle Bomb	Stationary Vehicle Bomb	Exterior Attack	Stand-off Weapons Attack	Armed Attack	Covert Entry	Mail and Supplies Bombs	Airborne Contamination	Waterborne Contamination
Earth berms		■	■	■	■				
Bodies of water	■	■	■	■	■	■			
Depressions			■	■	■				
Protect against unwanted surveillance			■	■	■	■			
"Defensible space"		■	■			■			
Vehicle access	■	■							
Dense thorn-bearing vegetation			■			■			
Vegetation screens		■	■	■	■	■			
Location of trash receptacles							■		
STAND-OFF DISTANCE									
Stand-off zone	■	■		■	■	■			
CONTROLLED ACCESS ZONES									
Exclusive zone/Non-exclusive zone	■	■				■			
Clear zone	■	■				■			
Fencing and physical barriers	■	■	■	■	■	■			
Active barriers	■	■	■	■	■	■			
Passive barriers	■	■	■			■			
ENTRY CONTROL AND VEHICULAR ACCESS									
Minimize access roads	■	■				■	■		
Control points	■	■	■	■	■	■			

Table 2-1: Correlation of Mitigation Measures to Threats* (continued)

	Moving Vehicle Bomb	Stationary Vehicle Bomb	Exterior Attack	Stand-off Weapons Attack	Armed Attack	Covert Entry	Mail and Supplies Bombs	Airborne Contamination	Waterborne Contamination
Active monitoring	■	■	■	■	■	■	■	■	■
Provide enhanced protection at property entrances	■	■	■	■	■	■			
Include pull-over lanes at checkpoints to inspect vehicles	■	■	■	■	■	■			
Avoid straight-line vehicular access to high-risk resources	■	■							
Avoid straight-line entry approach roads	■	■							
Locate vehicle parking areas far from high-risk resources	■	■							
Provide separate service and delivery access	■	■							
Route major corridors away from high-risk resources	■	■		■	■				
Locate high-risk resources remote from primary roads	■	■		■	■				
Minimize directional identification signs	■	■	■	■	■	■			
Limit vehicular access to high-risk resources	■	■	■	■	■	■			
SIGNAGE									
Minimize signage	■	■	■	■	■	■	■	■	■
PARKING									
View of parking		■							
Parking under a building		■							
Parking at interior of facility		■							
Parking near high-risk areas		■							

Table 2-1: Correlation of Mitigation Measures to Threats* (continued)

	Moving Vehicle Bomb	Stationary Vehicle Bomb	Exterior Attack	Stand-off Weapons Attack	Armed Attack	Covert Entry	Mail and Supplies Bombs	Airborne Contamination	Waterborne Contamination
Parking in exclusive zone		■							
One-way circulation	■	■	■			■			
LOADING DOCKS AND SERVICE ACCESS									
Loading/unloading docks		■					■		
Driveways under facilities	■	■							
PHYSICAL SECURITY LIGHTING									
Lighting		■	■			■			
SITE UTILITIES									
Provide protection at culverts, sewers, and pipelines					■	■			■
Provide protection at concrete trenches, storm drains, and duct systems					■	■			■
Provide and check locks on manhole covers					■	■			■
Minimize signs identifying utility systems					■	■			■
Provide fencing at critical utility complexes						■			■
Use landscape planting to conceal aboveground systems						■			■
Install utilities underground	■	■	■	■	■	■	■		
Locate fuel/lube storage downslope and away from facilities	■	■	■	■	■	■	■		
Provide redundant utility systems and loop service	■	■	■	■	■	■	■		
Provide utility "quick disconnects" for portable backup systems	■	■	■	■	■	■	■		

Table 2-1: Correlation of Mitigation Measures to Threats* (continued)

	Moving Vehicle Bomb	Stationary Vehicle Bomb	Exterior Attack	Stand-off Weapons Attack	Armed Attack	Covert Entry	Mail and Supplies Bombs	Airborne Contamination	Waterborne Contamination
Decentralize communications resources	■	■	■	■	■	■	■		
Use multiple communications networks	■	■	■	■	■	■	■		
Conceal and protect network control centers	■	■	■	■	■	■	■		
Public address system			■		■			■	■
Underground utilities	■	■	■	■					■
Redundant utilities	■	■	■	■	■				■
Quick disconnects	■	■	■	■	■				
Remote fuel storage	■	■	■	■	■				

* Adapted from U.S. Air Force, *Installation Force Protection Guide.*

Chemical, Biological or Radiological (CBR) Attack

Due to the low population density of the region and minimal number of large public gathering places, the CBR threats are considered to be predominantly HAZMAT materials that can generate plumes and spills of sufficient quantity to impact a significant number of people. However, facilities in the region that may be exposed to Anthrax and Ricin include post office, government, media, and other public spaces. Smallpox would likely be a result of a mass metro area D.C. contamination and flight of the population through the region's geographic area. A terrorist attack using CBR agents will typically target population centers with low dispersion, low winds, and low humidity to maximize effects of the agent. A CBR attack could cause significant damage on a scale from city blocks to square miles and casualties range from several to several thousand. It is assumed that a strategic or tactical nuclear exchange would not be targeted directly at the localities in the Rappahannock-Rapidan Region and is an extremely low likelihood event, but the effects of a high yield nuclear detonation would be catastrophic on the region. The use of a "Dirty Bomb," in the region is assumed to be a more likely radiological attack and is further detailed in the Radiological Event section.

For the purposes of the CBR analysis HAZMAT materials are not included in this section but are discussed later. The CBR agents of concern include Sarin (nerve gas), Anthrax, Ricin, Small Pox, and high level, low quantity radiation sources (i.e., Cessium 137) used as a dirty bomb. These agents would likely be used in primary public gathering locations with intent to inflict both human casualties, property damage and cause economic damage.

Key to defense of this attack is a response and recovery capability with sufficient training and supplies to decontaminate, triage, and evacuate patients to higher order medical care. Multiple jurisdictions and assets may be involved for an extended period of time.

Table AF-5
Potential Impacts of a CBR Event (HAZUS^{MH} Inventory and Local Input)

Facility/Event	Primary CBR Agent
Post Office	Ricin, Anthrax
Malls	Sarin, Small Pox
Medical Care Facilities	Sarin, Small Pox
Emergency Response	Sarin, Small Pox
High Schools	Sarin, Small Pox
Community College	Sarin, Anthrax, Small Pox, Ricin
Central Business Districts	Sarin, Anthrax, Small Pox, Ricin
Commercial, Iconic, State and Federal Facilities	Sarin, Anthrax, Small Pox, Ricin

There may be little to no warning that a CBR attack has occurred. Residents in the region should be aware of the following CBR indicators and report all incidents of suspected CBR attacks to local officials.

Figure AF-8
Indicators That a CBR Attack Has Occurred

Indicator	Chemical	Biological	Radiological
Dead Animals	✓		✓
Lack of Insect life	✓		
Physical Symptoms	✓	✓	✓
Mass Casualties	✓		✓
Unusual Liquids	✓		
Unexplained Odors	✓		
Unusual Metal Debris/Canisters	✓	✓	✓
Heat Emitting or Glowing			✓
Spray Mechanisms	✓	✓	

Source: FEMA E155 *Building Security Course*

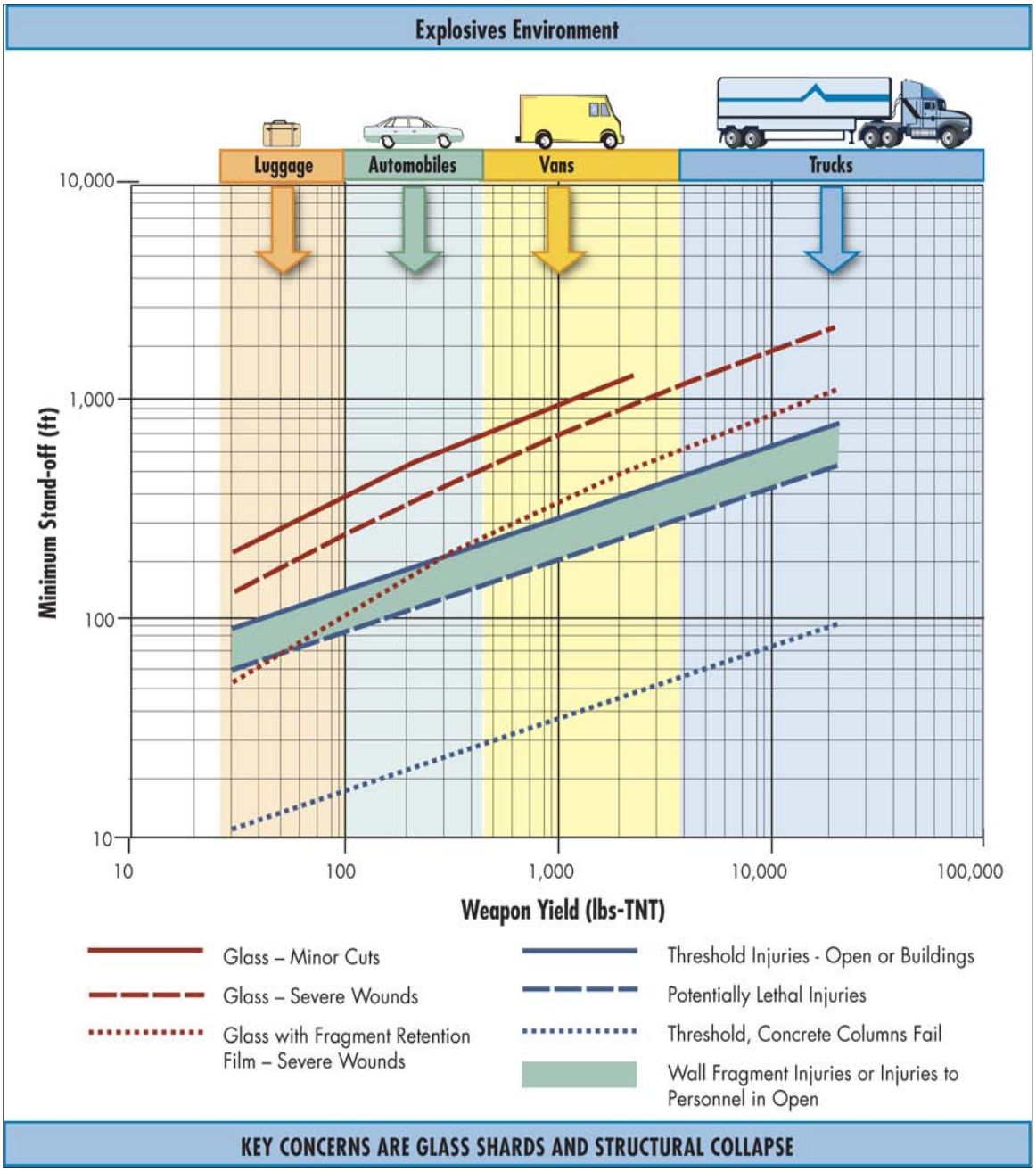
Blast Attack

The Rappahannock-Rapidan Region has a minimal number of potential primary target sites (government, telecommunications, energy, schools, iconic commercial properties, etc.) and most sites have a small resident employee population. Blast effects are typically limited to several city blocks.

Key to defense of this attack is a response and recovery capability with sufficient training and supplies to extract, triage, and evacuate patients to higher order medical care. Multiple jurisdictions and assets may be involved for an extended period of time.

The blast analysis used the methodology presented in FEMA Publication 426. The range to effects chart of weapon size (in TNT equivalent) was graphically overlaid onto imagery of the site.

Figure AF-9
Explosive Environments in Relation to Weapon Yield



Source: FEMA Publication 426

For the blast analyses for the Towns of Culpeper, Madison, Orange, and Warrenton, the following assumptions were made:

- Small van with 800 lbs of TNT equivalent detonated at town center
- Casualties a function of time of day and extent of structural collapse
- Temporary loss of *some* functionality of key services likely to occur.

HAZUS^{MH} was used to determine an estimate of the vulnerable populations and buildings located in the blast areas. The following figures provide an aerial overview of the towns of Culpeper, Madison, Orange and Warrenton.

Figure AF-11
2,000-Foot Blast Radius in Culpeper

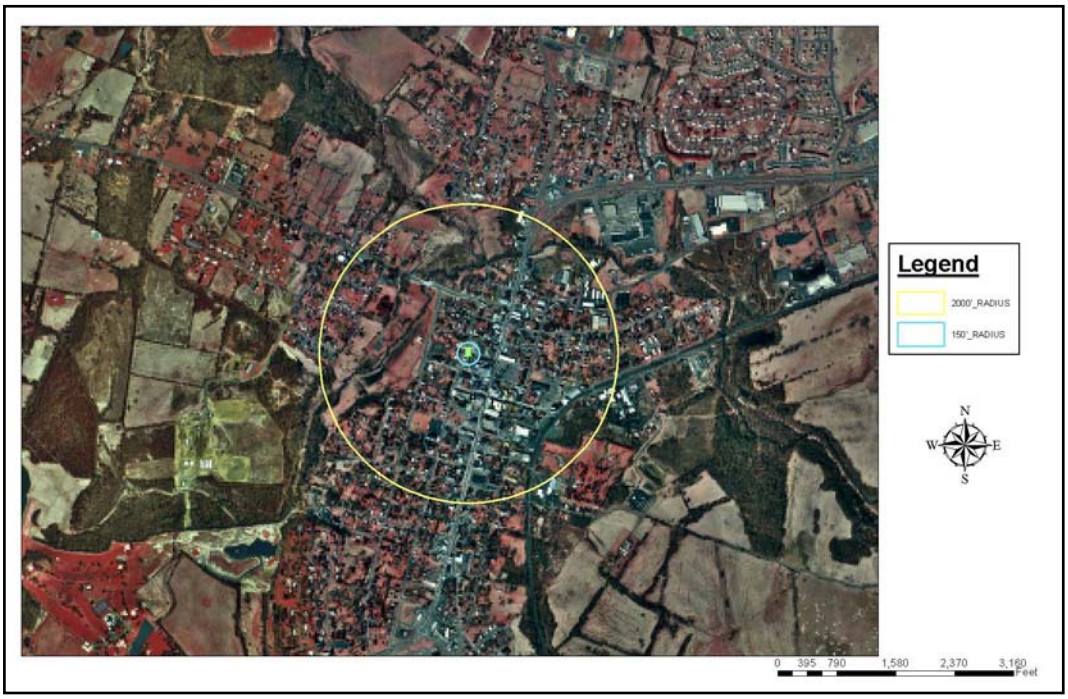


Figure AF-12
2,000-Foot Blast Radius in Madison

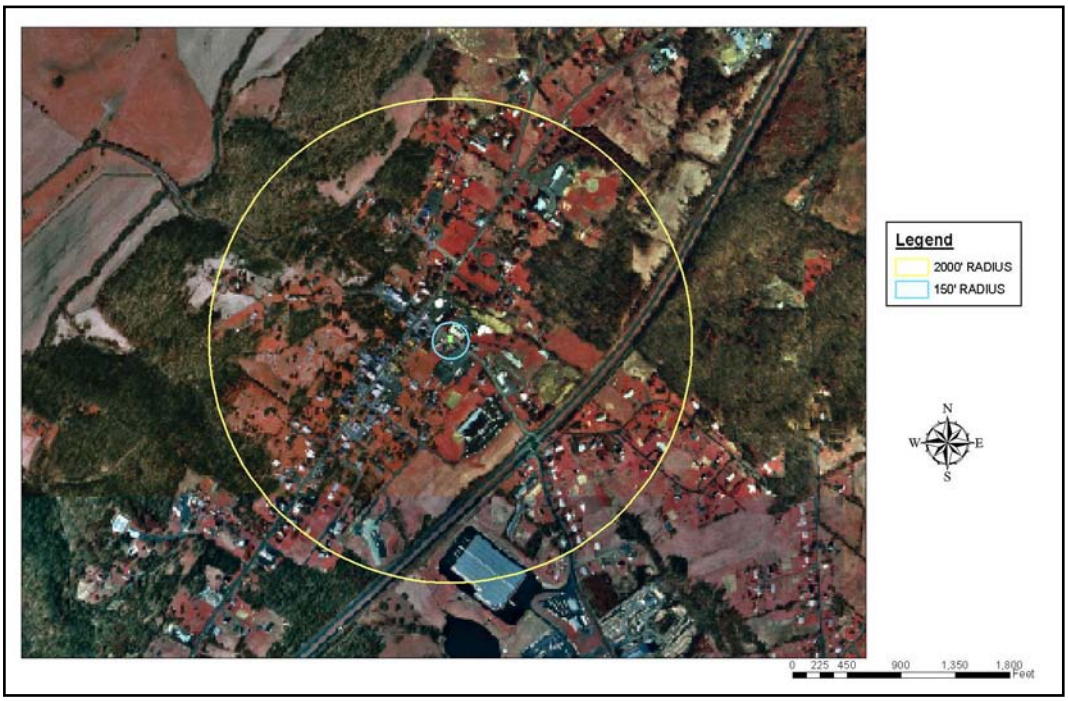


Figure AF-13
2,000-Foot Blast Radius in Orange



Figure AF-14
2,000-Foot Blast Radius in Warrenton

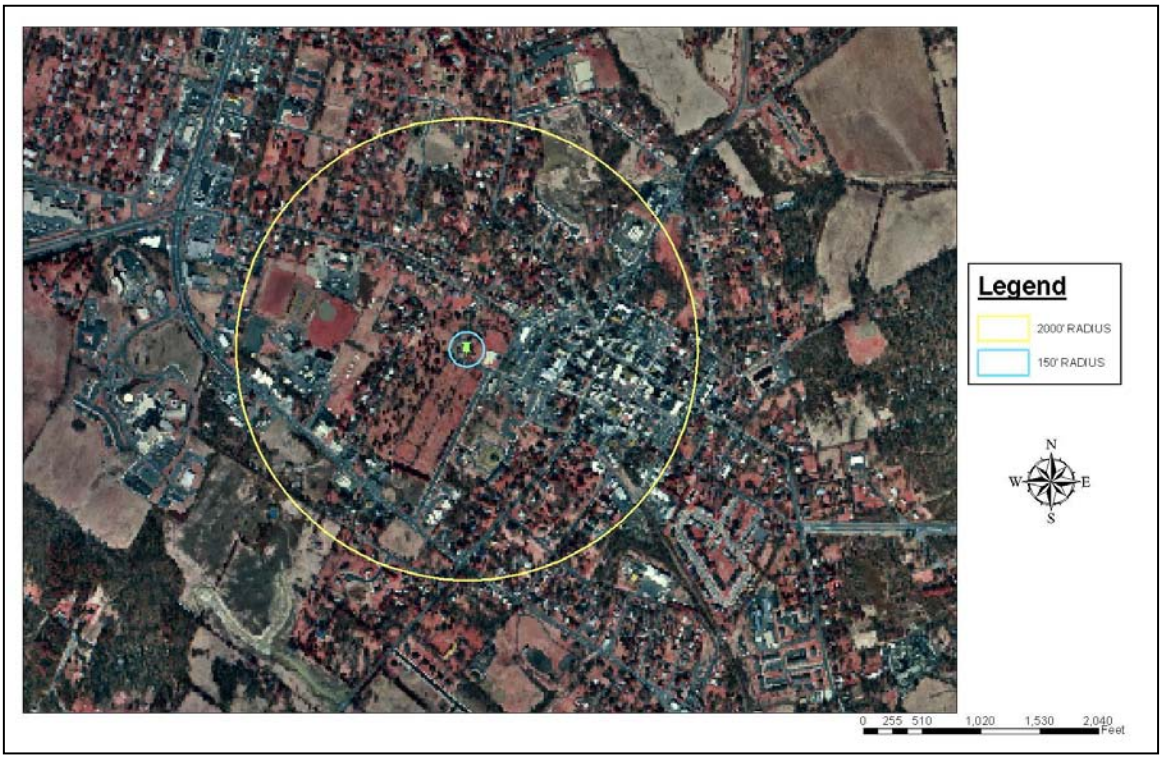


Table AF-6 provides an estimate of the population and buildings within a 150-foot radius of the approximate center of the census block, not counting any buildings outside of the 150-foot radius, which potentially may still be impacted by flying debris. HAZUS does not count government employees in the area, so estimates from local sources were used to determine the total number of government employees vulnerable in each jurisdiction. These estimates are presented in bulleted format following Table AF-6 and Table AF-7.

Table AF-6
Blast Analyses
Vulnerable Population and Exposure in Downtowns (150-Foot Radius—HAZUS^{MH})

Town	Number of Exposed Buildings	Value of Exposed Buildings	Population	Persons Working in Commercial or Industrial Occupancies
Culpeper	21 (57% commercial)	$15,085,000	37—during day 69—at night	325
Madison	14 (100% commercial)	$1,886,000	13—during day 30—at night	0
Orange	3	$490,000	2—during day 5—at night	15

Table AF-7 provides an estimate of the population and buildings within a 2,000-foot radius of approximate center of target census block, not counting any buildings outside of 2,000-foot radius, which potentially may still be impacted by flying debris.

Table AF-7
Blast Analyses
Vulnerable Population and Exposure in Downtowns (2,000-Foot Radius—HAZUS^{MH})

Town	Number of Exposed Buildings	Value of Exposed Buildings	Population	Persons Working in Commercial or Industrial Occupancies
Culpeper	460 (95% residential)	$121,293,000	606—during day 1,337—at night	947
Madison	115 (99% residential)	$23,490,000	115—during day 271—at night	90
Orange	346 (51% residential)	$102,190,000	388—during day 884—at night	607

Regional Planning Commission Estimates of Government Employees

- Culpeper
  - Town of Culpeper—140
  - Culpeper County—450
- Madison
  - Town of Madison—2
  - Madison County—100
- Orange
  - Town of Orange—58
  - Orange County—307
- Fauquier
  - Town of Warrenton—122
  - Fauquier County—518

As with any HAZUS^{MH} use, these numbers are merely estimates based on the values in HAZUS that are derived from U.S. Census 2000 and Dunn and Bradstreet. The distribution of population (residents) shows that more residents are farther out from the target block, so this may impact the potential number of injuries. Of course, depending on the location of the source of the blast, the exposure numbers could change as the radius moves left or right.

The blast analysis illustrates the potential impact of a relatively small weapon that could be easily constructed using readily available materials (TNT, ANFO, detonation cord, oxygen tanks, fuel oils, and other explosives). The first responder's response and recovery capability for a blast event is primarily dependent upon the ability of on-scene staff to conduct a visual structural analysis to determine the risk of victim extraction versus structural collapse. Statistically, every hour that victims remain trapped dramatically decreases the odds of survival.

Table AF-8 provides a detailed summary of the impact of a blast on the downtown area of the town of Warrenton. This analysis was performed using the methods prescribed in FEMA Publication 426. This analysis was also performed using HAZUS^{MH} so it does not account for the estimated 122 Town staff members, most of which would also be effected by a blast in the downtown Warrenton area.

Table AF-8
Effects of a Blast in Downtown Warrenton (HAZUS^{MH})

Blast Analysis: 150-Foot Radius	
Lethal Injuries Daytime:	10—75
Lethal Injuries Nighttime:	<10
Blast Analysis: 2,000-Foot Radius	
Lethal Injuries Daytime:	10—100
Lethal Injuries Nighttime:	<25
Total Population Impacted:	200—400
Disruption/Loss of Functionality	Hospital, Water, Electric Power, Emergency Services, Emergency Shelter

All of the jurisdictions within the region have limited to moderate training and response capability to deal with a blast attack and recovery. Grants are available to jurisdictions that wish to improve their capability. Information on these grants can be found online at:

http://www.ojp.usdoj.gov/odp/grants_goals.htm

HAZARDOUS MATERIALS (HAZMAT)

The HAZMAT analysis determined that the Rappahannock-Rapidan Region is concerned with HAZMAT site storage and transit across the region and the potential for small to medium scale releases. The HAZMAT sites and primary transportation routes are shown in **Figure AF-14**.

A potential HAZMAT spill can be mitigated in several ways to include containment, recovery, and/or volatilization and dispersion. Options to reduce the type and quantity of HAZMATS include rerouting of road and rail cargo to off-peak exposure times and through low-density population areas.

Table AF-9
Past Occurrences of HAZMAT Incidences

Jurisdiction	HAZMAT Incident	Impact
Culpeper County	In the past 10 years, there have been twelve HAZMAT events—all but one involved petroleum products. The other event involved a chlorine leak and the Town of Culpeper's water plant. A regional HAZMAT team from Fredricksburg responded.	No injuries associated with the 12 HAZMAT events. There have been two farming deaths as a result of manure pits.
Fauquier County	Deal with petroleum spills regularly. Actual HAZMAT events have included a chlorine leak, ammonia leak, potassium chlorate and a few others.	No injuries or deaths. Costs were recovered.
Madison County	In the past year, a gasoline tanker spilled 6,000 gallons of gas on Highway 29 and ammonium nitrate blasting truck wrecked on Highway 15.	None
Orange County	There have been somewhere between 200-500 HAZMAT incidences in the past ten years. Most dealt with fuel spills.	None
Rappahannock County	Several small spills including fuel from trucks and vehicles only.	None

Table AF-10 lists the hazardous materials locations and the chemicals found at each facility. Table AF-11

Table AF-10
Hazardous Materials Locations in the Rappahannock-Rapidan Region
(Toxic Release Inventory)

County	Location	Name	Chemicals Present
Fauquier	Warrenton	Quarles Petroleum Inc. Warrenton Bulk Pl	N-Hexane, Toluene, 1,2,4-Trimethylbenz , Xylene (Mixed Isomer), Methyl Tert-Butyl ET
Culpeper	Culpeper	Culpeper Wood Preservers	Copper, chromium, arsenic
Culpeper	Culpeper	Continental Teves	Polychlorinated Alka
Culpeper	Culpeper	Keller MFG. CO. INC.	Xylene (Mixed Isomer)
Culpeper	Culpeper	Rochester Corp.	Copper
Fauquier	Midland	Fiberglass ENG. CORP.	Styrene
Orange	Gordonsville	Von Holtzbrinck Publishing Services	Disocyanates

Table AF-11
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Database

County	Location	Name
Culpeper	Culpeper	Culpeper Wood Preservers
Culpeper	Culpeper	Singleton Drum
Fauquier	Delaplane	Delaplane Landfill
Fauquier	Marshall	Belvoir Station Site
Fauquier	Marshall	Geris Well Site
Fauquier	Warrenton	U.S. Training Center Site B
Fauquier	Warrenton	Vint Hill Farm Station
Fauquier	Warrenton	Warrenton PCE Site
Madison	Pratts	Hawkins Body Shop

Source: Environmental Protection Agency

Table AF-12
Hazardous Materials Sites Listed In County Emergency Operations Plans

County	Location	Name
Fauquier	Bealeton	AmeriGas Propane
Fauquier	Bealeton	Payne's Parking Designs
Fauquier	Catlett	Catlett Storage Facility
Fauquier	Catlett	Southern States
Fauquier	Marshall	Marshall Farmers Co-Op
Fauquier	Marshall	Marshall Wastewater Treatment Plant
Fauquier	Marshall	Morgan Oil Company
Fauquier	Midland	Ross Industries, Inc
Fauquier	New Baltimore	Fast Aquatic Center
Fauquier	Remington	Marsh Run Generation Project
Fauquier	Remington	Remington Combustion Turbine Station
Fauquier	Remington	Remington Farmer's Co-Op
Fauquier	Remington	Remington Sewage Treatment Plant
Fauquier	Remington	Trinity Packaging Corporation
Fauquier	Warrenton	AmeriGas Propane
Fauquier	Warrenton	Blackwell Water Filtration Plant
Fauquier	Warrenton	Clark Brothers Gun Shop
Fauquier	Warrenton	G.E.I.
Fauquier	Warrenton	Payne Pools
Fauquier	Warrenton	Quarles Energy Services
Fauquier	Warrenton	Vint Hill Water and Sewage Facility
Fauquier	Warrenton	Warrenton Farmer's Co-Op
Fauquier	Warrenton	Warrenton Sewage Treatment Plant
Fauquier	Warrenton	Warrenton Sewage Treatment Plant
Madison	Madison	Allegheny Power
Madison	Madison	Madison 7-11 Store
Madison	Madison	Madison Amoco and McDonalds
Madison	Madison	Madison Exxon Service Center
Madison	Madison	Madison Sheetz Store #303
Madison	Madison	Madison Wood Preservers
Madison	Madison	Orange-Madison Co-Op
Madison	Madison	Rapidan Service Authority - Madison Wastewater Plant
Madison	Madison	Rapidan Service Authority - Madison Water Plant
Madison	Madison	Shelby Automotive and Tire
Madison	Madison	Utz and Sheppard Distributors, Inc.
Madison	Madison	VDOT Madison Area Headquarters
Madison	Madison	Verizon Madison RSM (VA57078)
Madison	Radiant	Triple D Sales Company, Inc.
Madison	Wolftown	Wolftown Mercantile Country Store
Madison	Woodberry Forest	Woodberry Forest School
Orange		Orange Madison Co-Op
Rappahannock		Rappahannock County Farmers Co-Op

Source: County Emergency Operations Plans

RADIOLOGICAL EVENT

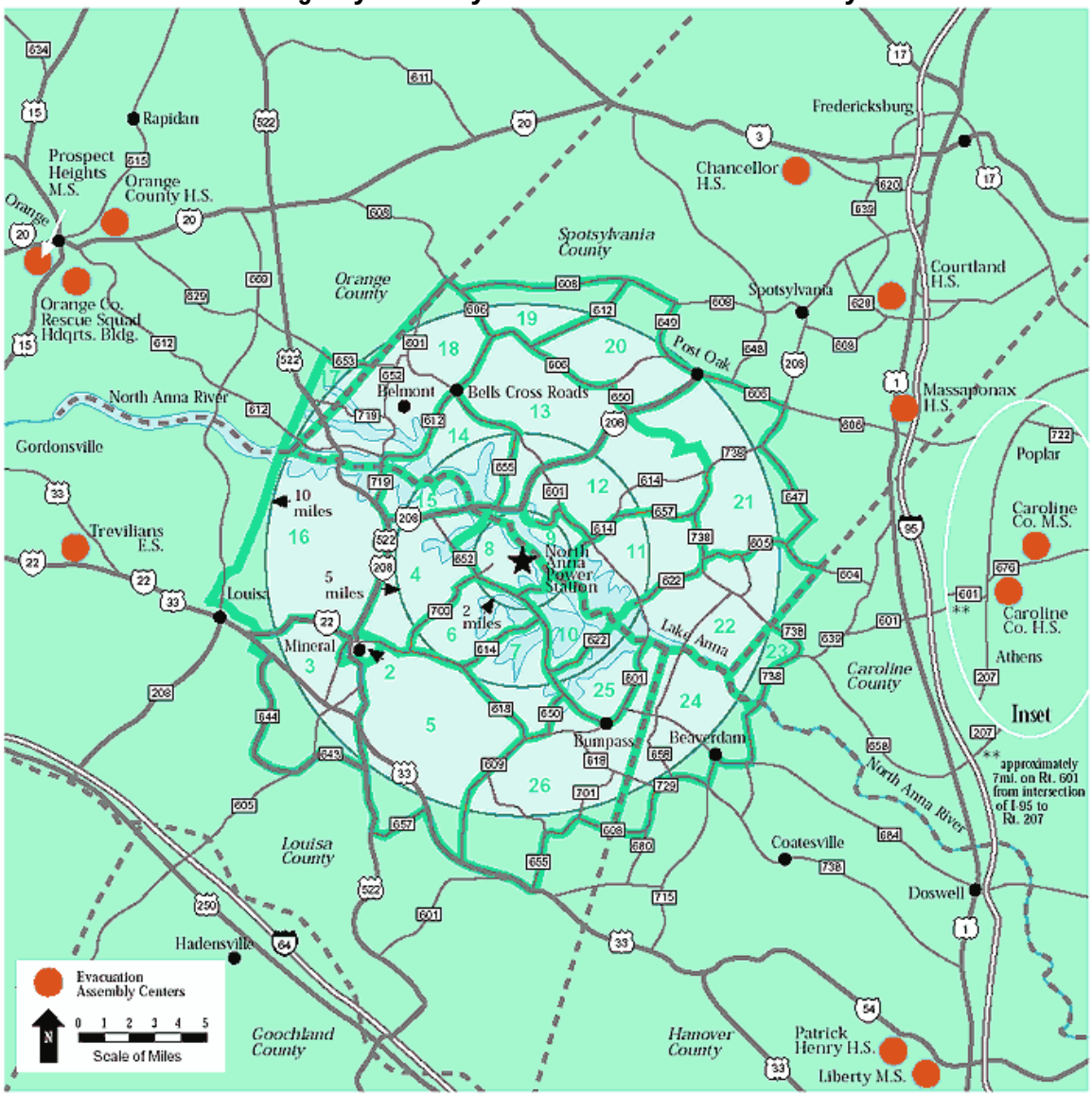
Within the region's geographical area, there are numerous sources of materials that could be used as weapons to include explosives, HAZMATs, and two nuclear energy plants (North Anna and Surry). On the major radiological event scale is the release of a large high-yield strategic ballistic missile or the use of a low to medium yield tactical weapon. While the probability of these types of weapons being used is considered very small, the consequence is very large. There are no known or obvious primary military or political targets located in the region, however, the close proximity to the Washington, D.C. metro area makes collateral damage a significant factor. In the event of the use of high energy weaponized radiological materials for an attack, the resources and capabilities of the federal government would be required to mitigate, respond and recover and is beyond the capability of this analysis.

On the medium radiological event scale, in the geographical area, there are two Virginia nuclear sites; one in North Anna and one in Surry (http://www.dom.com/about/stations/nuclear/northanna/index.jsp). The primary concern from these facilities is radiation release from the Containment Structures and Spent Fuels Storage Pools, similar to the Three Mile Island accident.

North Anna, Dominion 's second nuclear station, generates 1,786 megawatts from its two units. Unit 1 began commercial operation on June, 1978 and Unit 2 followed in December, 1980.

North Anna is located in the thickly wooded hills of central Virginia sixty miles northwest of Richmond. The facility was named after the North Anna River, the river dammed to form the huge lake that supplies cooling water for the station.

Figure AF.15
Emergency Assembly Centers for North Anna Facility



Source: State of Virginia

On the low radiological event scale, the radiological analysis determined that within the region, there are a few low level source materials located primarily in medical facilities. The higher energy materials are generally well secured and components of X-Ray, CT and MRI equipment and therefore pose little to no risk of accidental release or loss. Anyone attempting to steal the materials to create an improvised radiological device or "Dirty Bomb" would have to penetrate medical security and have the tools and knowledge to disassemble the equipment to remove the source materials. There are low level medical wastes to include IV tracer fluids, implants, and other consumables, but these materials are not considered a primary source material of use as a weapon. A "Dirty Bomb" used in the region's geographical area would

result in limited physical damage (scale of buildings to city blocks), but have potentially significant remediation and long-term monitoring/surveillance costs.

An emerging weapon that has the potential to impact the region is the Electromagnetic Pulse (EMP) grenade and artillery shell. These weapons generate an EMP that causes electronic components to become overloaded and short circuit. Depending upon the size of the weapon, distance from the detonation, shielding and type of circuitry and EMP hardening, the impact could be to a single building and equipment, or spread over an area of several city blocks.

Table AF-13
Radiological Sources in the Region

County	Jurisdiction	Radiological Source
Culpeper	Culpeper	Culpeper Regional Hospital
Culpeper	Culpeper	Town of Culpeper Power Plant
Fauquier	Warrenton	Fauquier Hospital
Louisa	Mineral	North Anna Power Station
Rappahannock		Rappahannock Electric Coop.

ENERGY PIPELINE FAILURES

As the war in Iraq and Afghanistan has shown, energy pipelines are extremely vulnerable to sabotage and disruption, and the resulting spills can generate large scale environmental damage and require extensive clean-up and remediation. Pipelines can be targeted and attacked with a variety of weapons and tactics; historical and current methods include high-powered rifles, explosives, heavy equipment destroying/disrupting the lines, mechanical and electrical system sabotage. Since many of the pipelines are located above ground or transit waterways or use bridges as transit support in remote areas, pipelines can be considered relatively vulnerable to intentional acts of destruction.

The Department of Homeland Security identified the energy sector as one of the 14 primary Critical Infrastructures and pipelines in particular must be evaluated to determine the impact of loss or damage.

Table AF-14
Energy Pipelines in the Region

County	Jurisdiction	Facility/Equipment Failure	Owner
Orange	Unionville	Gas Pipeline	Columbia Gas Company of Virginia
Fauquier	Throughout	Natural gas pipelines	Not provided
Madison	Throughout	Gas pipeline	Columbia Gas Company of Virginia
Orange	Throughout	Gas pipelines	Not provided
Orange	Throughout	Oil pipelines	Not provided

COMMUNICATION DISRUPTION

Communications disruption can be categorized into physical infrastructure, wireless and public safety systems, and cyber attack. An overall communications analysis and response plan should be evaluated in conjunction with the new DHS National Incident Management System (NIMS).

Primary concerns with physical infrastructure communication disruption include the impacts of sabotage or destruction of critical infrastructures such as Central Offices, towers, telecommunications vaults, key electrical sub stations, back up generators and transformers. These facilities and equipment are subject to damage by small satchel charges, rocket propelled grenades, and high power rifles. Telecommunications and electrical equipment typically have long lead times for manufacture and are usually low production and storage items, therefore an attack that damages or destroys several key items at one time can seriously degrade the system for an extended period of time.

Wireless disruption can be accomplished by sabotage or destruction of base stations and receivers, interruption of transmission lines by use of mirrors or blocking line of sight, frequency jamming, and deception.

Cyber hacking can compromise both physical infrastructure and control systems such as SCADA, energy and EMS that control critical mechanical and electrical systems, or attack primary internet enabled applications and platforms such as denial of service attacks, viruses, and worms that destroy hardrives and other equipment. The emerging growth of Voice Over Internet Protocol (VoIP) and Instant Messaging services has the potential to suffer significant communications disruption as converged voice and data is transmitted over digital services.

Interoperability of Radios/Communication Systems

One of the growing concerns in the region is the issue of interoperability of the emergency radio systems in the region. Fauquier County indicated that an area of needed improvement within the region is for emergency management to have interoperable communication systems with their neighbors in the Northern Virginia Region (Loudoun, Prince William, and Fairfax Counties). Fauquier County is nearing completion of an upgrade to an 800 MHZ radio system. Culpeper County has just approved and appropriated funding to upgrade their system to an 800 MHz system. Due to their terrain, Rappahannock County is only using a 150 high band system. Madison County is about to switch to a high band system. Orange County also uses a 150 high band system and does not plan to move up to the 800 MHZ system unless it is mandated.

The Northern Virginia Fire Chiefs Association has identified one system for mobile data transmission to share mapping and preplans interjurisdictionally for when crossing single or multiple jurisdictional lines. This system requires typical mobile data terminals in fire rescue units. The system will also support daily response activities, allow law enforcement officers to have direct access to driving and criminal records, reducing the need for 911 dispatchers to relay that information verbally.

Information on radio interoperability from the Department of Homeland Security can be found online at: http://www.dhs.gov/dhspublic/display?theme=63&content=3512

Mitigation options to reduce the impacts of a communications failure include redundant cabling, fiber, transmitting and receiving stations, and monitoring/surveillance of critical infrastructure and key assets.

UTILITY DISRUPTION

Utility disruption can occur by a number of methods. Of primary concern is the loss of water, electrical, natural gas, and sewage key infrastructure assets. Much of the key production equipment is long lead-time and often foreign made and very expensive, making a multiple target attack very effective in overall loss of capability and service. Specific to each utility is the ease of introduction of a CBR agent into the water supply, loss of electrical generation capability by destruction of substations and generators, loss of natural gas pipelines, and release of raw sewage.

Many of the Nation's utilities are aligned with existing rights-of-way and converge in a manhole or vault. These are referred to as Single Point Vulnerabilities.

Mitigation options include loop and redundant service routes and monitoring/surveillance of critical infrastructure and key assets.

Table AF-15
Critical Utility Infrastructure in the Region

County	Location	Facility Name	Facility Type
Culpeper	Brandy Station	Mount Dumplin STP	Waste Water Treatment Facility
Culpeper	Culpeper	S W I F T Facility	Electric Power Facility
Culpeper	Culpeper	Culpeper Water Pollution Control Facility	Waste Water Treatment Facility
Culpeper	Culpeper	Eheart Subdivision.	Waste Water Treatment Facility
Culpeper	Culpeper	Ferguson STP	Waste Water Treatment Facility
Culpeper	Elkwood	Elkwood Wastewater Treatment Plant	Waste Water Treatment Facility
Culpeper	Jeffersonton	River Ridge Utility Company	Waste Water Treatment Facility
Culpeper	Jeffersonton	South Wales Utility STP	Waste Water Treatment Facility
Culpeper	Mitchells	Coffeewood Correctional Center	Potable Water System Facilities
Fauquier	Warrenton	Advanced Wastewater Treatment Plant	Potable Water System Facilities
Fauquier	Warrenton	Advanced Wastewater Treatment Plant	Waste Water Treatment Facility

VULNERABILITY ASSESSMENT
HUMAN-CAUSED HAZARDS

County	Location	Facility Name	Facility Type
Fauquier	Fauquier County	Marshall WWT Fauquier County	Waste Water Treatment Facility
Fauquier	Remington	Remington Regional Wastewater	Waste Water Treatment Facility
Fauquier	Warrenton	Fauquier Water Sewer Authority	Waste Water Treatment Facility
Fauquier	Warrenton	Vint Hill Farms Station	Waste Water Treatment Facility
Madison	Madison	Madison WTP-Rapidan Service Authority	Potable Water System Facilities
Madison	Madison	Rapidan Service Authority Madison	Waste Water Treatment Facility
Orange	Gordonsville	Gordonsville Energy LP	Electric Power Facility
Orange	Locust Grove	Wilderness Shores STP	Waste Water Treatment Facility
Orange	Orange	Stanley Petroleum Products	Oil Pipeline Facility
Orange	Orange	Town of Orange Water Treatment Plant	Potable Water System Facilities
Orange	Orange	Locust Grove Elementary School	Waste Water Treatment Facility
Orange	Orange	Town of Orange Sewage	Waste Water Treatment Facility
Orange	Unionville	Transcontinental Gas Pipeline Corporation	Natural Gas Facility
Rappahannock	Washington	Town of Washington WTP	Potable Water System Facilities

VULNERABILITY ASSESSMENT
HUMAN-CAUSED HAZARDS

CIVIL DISRUPTION

The potential for civil disruption in the region primarily depends on external factors and forces that may create a "regional emergency." The Department of Homeland Security defines civil disruption as:

- Mass protests and demonstrations
- Quarantine
- Mass casualty care
- Release of chemical, biological or radiological agent and spontaneous full-scale evacuation

The main concern within the region in regards to human caused hazards involves the possibility of a "regional emergency" as a result of the evacuation of the Washington, D.C. area. A "regional emergency" is defined as events that have disrupted essential services, mobility, public health or safety on a regional scale. Because a major incident in Northern Virginia (Arlington, Stafford, Prince William, Fairfax, Loudoun) will trigger a flow of vehicles to and thru the five counties, Rappahannock-Rapidan Regional Commission officials have expressed interest in participating in a joint planning effort with the Northern Virginia Regional Commission to address some of the concerns raised by the potential for a "regional emergency."

The metropolitan D.C. area's population is approximately 4.5 million according to the 2000 census. Any type of evacuation out of the metro area would greatly strain the resources of the counties in the Rappahannock-Rapidan Region.

Another technique that is gaining momentum across the nation from local emergency management officials is Shelter-in-Place. Shelter-in-Place is the practice of being prepared to remain safely indoors in case of a hazardous materials release. With Sheltering-in-Place, a person is encouraged to find a small room in the interior of a house or building with no or few windows and having enough supplies to remain there for an extended period of time.

While there are have been no major incidences of civil disruption reported in the region, this is probably the largest hazard of concern for all emergency management officials in the region.

In the event of a WMD attack, the medical care system will likely be overwhelmed and the need for protective services, barricades and law enforcement at medical facilities will be a strain on limited resources.

CONCLUSIONS ON HUMAN-CAUSED HAZARD RISK

Based upon the qualitative approach defined in detail in Section 6 of this Plan, the risk from human-caused hazards in region were weighed criteria was used to assign values to the likelihood of occurrence, spatial extent affected, and potential impact of each hazard. These values combined to form a total rating for each hazard (**Table AF.16**). The highest possible value is a ten.

Table AF.16
Hazard Risk Ratings
(From Qualitative Assessment)

Hazard	Likelihood	Spatial Extent	Potential Impact	Hazard Rating
Biological Attack	Possible (1)	Large (3)	Critical (3)	**7**
Nuclear Attack	Unlikely (0)	Large (3)	Catastrophic (4)	**7**
Communications Disruption	Possible (1)	Large (3)	Critical (3)	**7**
Explosive Blast Attack	Likely (2)	Small (1)	Critical (3)	**6**
Hazardous Materials Release	Likely (2)	Small (1)	Critical (3)	**6**
Chemical Attack	Possible (1)	Small (1)	Critical (3)	**5**
Radiological Attack	Possible (1)	Small (1)	Critical (3)	**5**
Radiological Event	Possible (1)	Small (1)	Critical (3)	**5**
Civil Disruption	Possible (1)	Moderate (2)	Limited (2)	**5**
Energy Pipeline Failures	Possible (1)	Small (1)	Limited (2)	**4**
Utility Disruption	Possible (1)	Moderate (2)	Minor (1)	**4**

The three high-risk hazards identified through this process are the Biological Attack, Nuclear attack and Communications Disruption hazards. The human caused hazards receiving the second highest rating are Explosive Blast and Hazardous Materials Release.

Table AF.17
Estimated Risk Levels for the Rappahannock-Rapidan Region

HIGH RISK HAZARDS	**Biological Attack** **Nuclear Attack** **Communications Disruption**
MODERATE RISK HAZARDS	Explosive Blast Hazardous Materials Release Chemical Attack Radiological Attack Radiological Event Civil Disruption
LOW RISK HAZARDS	Energy Pipeline Failures Utility Disruption