

NEW RIVER VALLEY HAZARD MITIGATION PLAN

INTRODUCTION

When a major natural event strikes our built environment, it is deemed a “natural disaster.” Hazard mitigation is simply about preventing natural disasters. The idea of preventing natural disasters at first seems counter-intuitive if not impossible. We certainly cannot prevent natural events, like hurricanes and earthquakes. Yet the impacts of natural events—who and what gets hurt-- are largely determined by what, where and how we build and function. Thus, some impacts of natural hazards on our population and economic, social and physical environment are, in the bigger picture, self-inflicted.

Yet, as citizens and local government entities, we have not inherited a fresh, Garden of Eden. We have, instead, inherited landscapes dotted with homes, businesses, roads and other infrastructure precariously placed or built. Past decision-makers chose these locations and structures based on an array of factors: needs, costs, regulations, and cultural and aesthetic preferences. Today, as heirs of those decisions, local decision-makers are looking afresh to “solve” existing problems while making and encouraging wiser choices for a more “disaster-resistant” future.

This New River Valley Hazard Mitigation Plan is a first big step in that exploration.

First, this plan surveys hazard mitigation terminology and trends from the national and state perspectives. Second, a general profile of the New River Valley leads on to a summary of this planning process, including an assessment of past disasters and identification of highly vulnerable areas. Next, past or present mitigation actions or policies are assessed. Then, additional mitigation opportunities are examined. Lastly, localized plans are presented for each jurisdiction in the New River Valley.

Importantly, various natural hazards have critical beneficial functions, such as heavy rains recharging ground and surface waters. This important link between hazard mitigation and sustainability will also be examined briefly.

Note: Though recent events (including September 11, 2001) have revealed increased non-natural threats, such as man-made and technological threats, the parameters and responsibilities for prevention in this realm is still being sorted out nationally and internationally. As these decisions are made, local governments will need to respond. At this time, however, the NRV Hazard Mitigation Work Group has chosen to focus on natural hazards, as natural hazard planning is inherently local.

HAZARD MITIGATION: WHAT IS IT?

FEMA defines hazard mitigation as “any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.” In essence, mitigation seeks to avoid risks when possible and minimize effects when they cannot be totally avoided.

While federal and state partnerships are essential resources to bring plans to fruition, hazard mitigation actually occurs locally. Mitigation has many forms, many of which are most closely associated historically with flooding or earthquake, which have caused the most catastrophic disasters in the past. Examples of mitigation include building reservoirs, relocating or elevating structures, writing and enforcing building codes and enhanced floodplain management. *For a more complete list, see the sidebar.*

Mitigation examples:

- Promoting sound land use practices based on known hazards (zoning, floodplain management and subdivision ordinances),
- Relocating or elevating structures out of floodplains
- Getting good information to citizens about risks, mitigation, and preparedness
- Developing, adapting and enforcing effective building codes and standards
- Engineering roads and bridges to withstand hurricanes and earthquakes
- Using fire retardant materials in new woodland construction
- Structural projects, such as dams, diversions, storm sewers, elevated roadways, etc.
- Encouraging adequate insurance, including flood insurance, as final protection against financial loss
- Complying with Federal and State regulations to reduce disaster costs and protect critical infrastructure.

Why is Mitigation important?

Hazard mitigation planning is important for the obvious reason of preventing the loss of life and reducing potential property damage. It also offers opportunities to control future public recovery expenditures and protect the environment. On a practical level, an adopted hazard mitigation plan also makes local governments eligible for federal hazard mitigation funds. Moreover, there is opportunity for achieving multiple objectives with a single project, such as recreation, housing and economic development. *For a more complete list of benefits, see sidebar.*

Benefits of implementing Hazard Mitigation:

- ⊖ Saving lives and reducing injuries
- ⊖ Preventing or reducing property damage
- ⊖ Reducing economic losses
- ⊖ Minimizing social dislocation and stress
- ⊖ Minimizing agricultural losses
- ⊖ Maintaining critical facilities in functional order
- ⊖ Protecting infrastructure from damage
- ⊖ Protecting mental health
- ⊖ Limiting legal liability of government and public officials
- ⊖ Achieve multiple objectives (such as economic development, environmental protection, recreation facilities and/or affordable housing)
- ⊖ Providing positive political consequences for government action

Adapted from *Planning for Post-Disaster Recovery and Reconstruction*, FEMA and the American Planning Association, 1998.

Despite its many potential important effects, hazard mitigation planning has not been a priority for most communities in the past. It is receiving much greater emphasis now. The reasons are explored next.



US Hazard Mitigation History

When one thinks of natural disasters, one thinks of the Federal Emergency Management Agency (FEMA) and the American Red Cross (ARCross) providing emergency food, water and shelter to victims. The sky-rocketing costs of these relief efforts have served as a costly reminder of the need to think more about prevention. In a word, “hazard mitigation” is prevention. The case for hazard mitigation rests solidly with the ounce-of-prevention-is-worth-a-pound-of-cure argument.

In the past, prevention resources have successfully been focused on life-saving mechanisms, such as building codes, warning systems and public education. Largely the emphasis was on preparedness rather than land use

regulation (see diagram at right for definitions of areas of emergency management). The one notable exception is the National Flood Insurance Program, which requires floodplain management regulation and includes “rate” maps, which serve to establish risk levels. Now, new effort is being orchestrated nationally to prevent future property damage through improved land use planning and other means. In the range of emergency management activities (see Figure 1), this signals FEMA’s new commitment to focus—not just on preparedness, response and recovery—but increasingly on planning and mitigation.

Though it portends to be that long-range process incorporating multi-disciplines and forestalling future problems, local “land use planning,” has largely failed to give adequate attention to natural hazards. Recent joint efforts by the American Planning Association and FEMA (including books and seminars) are addressing the issue. Theoretically, assessment, planning and mitigation actions could and should intervene in the historic build-flood-rebuild cycle.

FIGURE 1



Emergency Management areas:

- Preparedness: Preparing for possible loss of essential services, developing contingency plans, and practicing scenarios.
- Response: initiated by Emergency Operations as soon as disaster is threatened or realized; involves search and rescue, sheltering, emergency medical services, access control and restoring critical infrastructure functionality.
- Recovery: rebuilding homes, businesses and public facilities, clearing debris, often taking years.
- Assessment/Planning/Mitigation: sustained actions taken to reduce or eliminate long-term risk to life and property; intended to reduce the need for emergency response, not to improve ability to respond.

The turning point nationally was a rapid succession of major disasters with high relief and recovery costs. From 1989 to 1994, there were 294 Presidentially-declared disasters with a cost to the U.S. treasury of over \$34 billion. The total costs (to property owners, insurance companies and governments) of the seven largest events were overwhelming:

TABLE 1
Major US Disasters, 1989-1994

1989	Hurricane Hugo	South Carolina	\$9 billion
	Loma Prieta Earthquake	northern California	\$7 billion
1991	East Bay Hills Wildfire	Oakland/Berkeley, California	1.5 billion
1992	Hurricane Andrew	Florida and Louisiana	\$30 billion
	Hurricane Iniki	Hawaii	\$1.8 billion
1993	Midwest Floods	Upper Mississippi Valley	\$12-16 billion
1994	Northridge Earthquake	southern California	\$28 billion

Source: *Planning for Post-Disaster Recovery and Reconstruction*, APA/FEMA book

The Disaster Mitigation Act of 2000 (DMA 2000) established a national, pre-disaster mitigation program, streamlined disaster relief efforts, and attempts to control the costs of Federal assistance. DMA 2000 places dramatic new emphasis on pre-disaster mitigation, requiring local and state mitigation plans by November 1, 2004. Without these approved plans, local and state governments will be ineligible for most FEMA assistance in the future (an exception may be made for the Hazard Mitigation Program until November 2005 for extremely small and impoverished jurisdictions.) Localities will remain eligible for limited public assistance and debris removal costs, but will be ineligible for individual assistance and mitigation assistance.

Disaster Mitigation Act of 2000

To comply with the Disaster Mitigation Act of 2000, all state and local governments must complete an “all hazards” mitigation plan. Specifically, to be eligible for hazard mitigation funds from FEMA, local governments must adopt a local mitigation plan by November 1, 2004 (extended 1 year from original date) addressing all pertinent natural hazards. The detailed requirements are found in 44 CFR Parts 201 and 206. Essentially, a local mitigation plan must include:

- △ Planning process: documented and public
- △ Risk assessment: types of hazards and vulnerabilities
- △ Mitigation strategy: including goals, analysis of options and action plan, and
- △ Plan maintenance process: method of monitoring, evaluating and updating within 5-year cycle.

An “all natural hazards planning” approach is required by DMA 2000. (Following the September, 2001 terrorist attacks, FEMA strongly encouraged the inclusion of terrorism in the hazard mitigation plan; however, it is not required.) In its Multi-Hazard Identification and Risk Assessment publication (1997), FEMA generally classifies natural hazards based on the conditions that cause the events:

- ✓ *Atmospheric: hurricanes, nor'easters, thunderstorms and lightning, windstorms, severe winter storms, and extreme summer heat;*
- ✓ *Hydrologic: floods, erosion, and drought;*
- ✓ *Geologic: landslides and earthquakes; and*
- ✓ *Other: including wildfires*

VIRGINIA Hazard Mitigation History



Virginia’s current Mitigation Plan (July, 2001), Volume 6 of the overall Emergency Operations Plan, was written before final guidance was available on the requirements of DMA 2000. Often spared by events that have repeatedly devastated neighbors such as North Carolina, Virginia has not yet received the mass infusion of federal mitigation planning assistance that other states have (until Hurricane Isabel).

Though the State’s Mitigation Plan is good, the state is just now beginning to develop databases of information regarding risk assessment and relative risk. Information still lacking includes: detailed hazard event histories, detailed hazard mapping, and risk assessments. (Unfortunately, there are no local databases for these either.) State agencies are developing pieces needed for this in-depth analysis and planning, but most still have not yet been developed. At the State’s request, this plan notes gaps in needed information.

State Plan Summary

Based largely on past Presidential-disaster declaration data and population density data, the Virginia Mitigation Plan

recognizes flooding, winds and winter storms as the highest-risk hazards in the State. The lowest risks statewide are earthquake and landslide. Though this is true on average statewide, variations in hazard histories and risks differ notably even among New River Valley jurisdictions, as will be seen later. Table 2 details other hazards and relative risk levels in Virginia. The Virginia Plan provides some largely qualitative history and generalized maps of state hazards.

Between 1965 and 2000, natural hazards resulted in 24 Presidentially-declared disasters in Virginia (see Figure 2 and Table 3).

TABLE 2

Table 3-4. Virginia's Relative Risks (Detailed).

Relative Risk	Hazard	
HIGH	FLOOD	Flooding, both riverine and coastal, is the most common hazard. In the 35 years of federal disaster programs, 15 of the 23 major disasters in Virginia have been caused by floods (or hurricanes resulting in floods). Given the frequency of flooding throughout the state, and the extent of development in some parts of low-lying Tidewater, flood damage accounts for Virginia's most significant risk. Although coastal erosion is a continual process, it is accelerated by flooding conditions and therefore is considered a sub-category of flood hazards
	WIND	Winds associated with hurricanes and prolonged nor'easters have the potential to adversely affect hundreds of thousands of people and buildings in the coastal areas. While such events typically produce large amounts of debris, they are unlikely to result in substantial damage to large numbers of buildings. This is based on evidence that considerable numbers of buildings have either already experienced high wind events or were built after building codes required certain wind load criteria. Tornadoes and "straightline" winds are included in the general category of wind.
SIGNIFICANT	WINTER STORM	Severe winter storms result in significant debris and cause more damage to the power distribution network than to private property. While winter storms affect more people than other hazards, property damage is low and the long-term effects are relatively minor.
	DROUGHT	Droughts have the potential to adversely affect millions, especially if a major rainfall deficit occurred in the watersheds from which Washington, DC and Northern Virginia obtain potable water. Agricultural droughts may cause multi-year losses for farmers and producers, as well as impact water supplies for many municipalities and individual water wells. While the numbers of people affected may be large, the dollar losses associated with droughts typically are smaller than those associated with large flood and hurricane events.
MODERATE	WILDFIRE	Wildfires may locally threaten the timber industry as well as buildings in the urban-wildland interface, but the overall potential losses are relatively minor when compared to other hazards. Wildfire is the only hazard that can be significantly affected by efforts to fight – or alter – its path during an event.
	DAM BREAK	Dam break floods pose considerable potential threat, given the number of high and significant risk dams located above population centers. Due to on-going efforts to inspect dams, and when compared to other hazards, the overall risk is minor.
	EARTHQUAKE	Earthquakes pose a relatively minor risk in Virginia, as evidenced by FEMA's recent evaluation that ranked the state 34 th in the nation.
LOW	LANDSLIDE	Landslide activity appears to have affected up to 15% of a fairly large area in the south-central region, although active landslides are rare.

Disasters affected every county and jurisdiction in the Commonwealth at least once during the 35-year period. Presidentially-declared disasters are generally declared when the disaster is of such proportions as to outstrip both local and state resources, see box below for detail.

What is a Presidentially-declared disaster?

Excerpt from VA Mitigation Plan, 2001

Major disaster declarations are made when damage is of such severity that it is beyond the combined capabilities of state and local governments to respond to the event. The Robert T. Stafford Disaster Relief and Emergency Assistance Act does not prescribe specific criteria for the declaration of disasters. Many factors are taken into consideration by the State when determining whether to submit a request to FEMA for a major disaster declaration, and those factors are further evaluated by FEMA to determine whether to recommend that the President declare a disaster. Generally, consideration is given to the following factors:

- The nature and severity of the damage;
- Deaths and injuries caused by the event
- The number of homes destroyed or sustaining major damage;
- The extent of insurance coverage and the estimated costs of repair;
- The demographics of the affected area;
- The extent of health and safety problems;

FIGURE 2

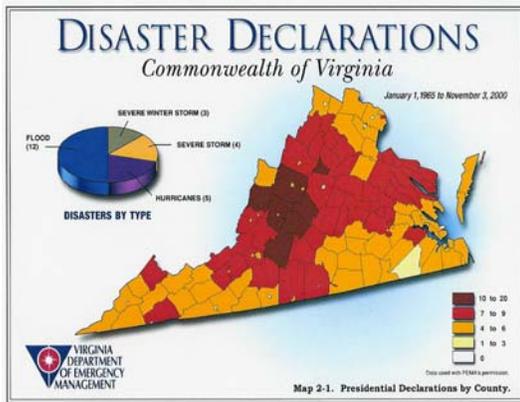


TABLE 3

Presidential Disaster Declarations in Virginia Since 1969 (red estimate NRV region)

Aug.	1969	Hurricane Camille (flooding); 27 jurisdictions declared
June	1972	Hurricane Agnes (flooding); 106 jurisdictions declared
Sept.	1972	Storm/Flood; Hampton, Newport News, & Virginia Beach declared
Oct.	1972	Flood; Western, Central, Southeastern Va.; 31 jurisdictions declared
April	1977	Flash Flood; Southwestern Va.; 16 jurisdictions declared
Nov.	1977	Flood; Southwestern Va.; 8 jurisdictions declared
July	1979	Flood; Buchanan County declared
Sept.	1979	Flood; Patrick County declared
May	1984	Flood; Buchanan, Dickenson & Washington Counties declared
Nov.	1985	Flood; Western, Central Va.; 52 jurisdictions declared
Oct.	1989	Flood; Buchanan County declared
April	1992	Flood; Western Va.; 24 jurisdictions declared
March	1993	Snowstorm; 43 jurisdictions declared
Aug.	1993	Tornado; Petersburg declared
Feb.	1994	Ice Storm; Central, Western Va.; 71 jurisdictions declared
March	1994	Ice Storm; Central, Western Va.; 29 jurisdictions declared
June	1995	Flood; Central & Western Va.; 24 jurisdictions declared
Jan.	1996	Blizzard; All counties and cities in state declared
Jan.	1996	Flood; 27 jurisdictions declared
Sept.	1996	Hurricane Fran (flooding); 88 jurisdictions declared
Aug.	1998	Hurricane Bonnie (flooding); 5 jurisdictions declared
Sept.	1999	Hurricane Dennis; Hampton declared
Sept.	1999	Hurricane Floyd (flooding); 48 jurisdictions declared
Feb.	2000	Winter Storms; 107 jurisdictions declared
July	2001	Flood; Southwestern Va.; 10 jurisdictions declared
Sept.	2001	Pentagon Attack; 1 jurisdiction declared
March	2002	Flood; Southwestern Va.; 10 jurisdictions declared
April/May	2002	Flood; Southwestern Va.; 9 jurisdictions declared

Source: Virginia Department of Emergency Management, 2003

Virginia's Hazard Mitigation Goal

Virginia's stated Hazard Mitigation Goal (July 2001) is simply **“to reduce the impacts of natural hazards on people, property, and communities throughout the state.”**

High priority actions listed include:

- ⇒ Provide program and funding information to local jurisdictions
- ⇒ Foster pre-disaster mitigation planning
- ⇒ Identify potential mitigation projects
- ⇒ Increase public education and awareness
- ⇒ Mitigate losses of local buildings
- ⇒ Reduce power outages during disasters, and
- ⇒ Protect state investments.

Hazard Mitigation: Links to Sustainability

Though hazard mitigation has not gotten great attention in the past, it is compatible with and even essential for “sustainability.” The concept of sustainability has grown out of the heightened environmental consciousness during the past 20 years. Sustainability seeks to balance natural, economic and social needs. According to FEMA (*Planning for a Sustainable Future*, 2000) a “sustainable community,” is one which enhances quality of life while also ensuring that people “live within an eco-system’s carrying capacity.” One example of an important link between hazard mitigation and “sustainable development” is the function and value of forests and wetlands (for water retention and quality). There is also potential for dual purpose, joint actions such as conservation easements to limit future development in critical areas.

Sustainable, or “disaster resistant” communities demonstrate results including saved lives, reduced physical damage and economic loss, and shorter recovery period. They are, thus, much more attractive to individuals and businesses.

Planning and Public Policy Principles for Local Government:

- Limit practice of subsidizing risks in hazard areas
- Build and share a base of knowledge about nature of risks and sustainable ways of living with hazards
- Develop a commitment and capacity to change the way hazardous areas are managed
- Coordinate and integrate policies to manage exposure to hazards with policies to accomplish economic, social and environmental objectives

Source: *Natural Hazards: Land Use Planning for Sustainable Communities*

Virginia's New River Valley Hazard Mitigation History

In 2000, a summary-level hazard assessment was done of the three-state New River watershed by the non-profit, New River Community Partners. That assessment, New River All Hazards Mitigation Plan, was generalized and did not involve assessment of special hazard areas, identification and assessment of key vulnerabilities, nor past, present or future mitigation priorities for local governments. While helpful in providing a snapshot of hazard data, that plan does not meet the Disaster Mitigation Act of 2000 requirements for local governments.

The preparation of the New River Valley Hazard Mitigation Plan is a joint effort of the local governments within the region and the Planning District Commission. While this effort is the first coordinated plan, it is not the first efforts by localities to mitigate the impacts of natural hazards in the region, but rather builds upon past efforts and studies. All NRV localities do long range land-use planning and regulation, which is a mitigation action. Additionally, most New River Valley jurisdictions participate in the National Flood Insurance Program, and thus have requisite floodplain regulations. Some local jurisdictions have also sought federal assistance from the US Army Corps of Engineers for floodplain studies. Additionally, some local governments have partnered with the FEMA, USDA and the State to implement mitigation activities such as housing relocation and stream modification.

Many documents were reviewed in the preparation of this plan. First the comprehensive plans for all jurisdictions were reviewed (see box below). Additionally, all available Flood Insurance Studies and Flood Insurance Rate Maps by FEMA or the U.S. Department of Housing and Urban Development were reviewed. Lastly, all pertinent regional and special studies, such as Army Corps of Engineer Studies and private engineering firm studies provided by local governments were reviewed (**see References**).

Comprehensive Plans

	adopted
Blacksburg, Town	2001
Christiansburg, Town	2003*
Dublin, Town	1999
Floyd-Floyd County	2002
Giles County	1999
Glen Lyn, Town	2001
Montgomery County	2003*
Narrows, Town	2001
Pearisburg, Town	2000
Pembroke, Town	2003
Pulaski County	2000
Pulaski, Town	2003*
Radford City	2001
Rich Creek, Town	2000

**Draft revision*

The next section of this plan provides general background on the New River Valley including its physical, social, and economic characteristics.