

## Assessing Vulnerability

The following chart provides information from Region VII County Hazard Mitigation Plans on identified hazards and their scale of severity.

**General Susceptibility Table**

Hazard	Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
Dam Failure	low	nr		high			nr
Drought	low/mod	moderate	moderate	moderate	high	moderate	moderate
Earthquake	low	moderate	low	moderate	low	low	low
Flooding	high	high	high	high	high	high	high
Hailstorm	moderate	moderate	low	moderate	moderate		low
Hazardous Materials Incident	low	moderate	low	moderate	high	low	moderate
Technological Hazards			nr	moderate		low	moderate
Land Subsidence	high	low	high	moderate		low	moderate
Landslide	not rated	low	high	moderate	high		
Terrorism	low	low	low	low	low	low	low
Thunderstorm/Lighting	high	moderate	moderate	nr	nr		moderate
Urban Fire	low	moderate	low	moderate			low
Wind Storm/Tornado	moderate	moderate	nr	high	high	low	moderate
Wildfire	low	moderate	moderate	moderate	low	low	moderate
Winter Storm	moderate	high	moderate	high	high	moderate	high
Epidemic					low		
Infestation					high		
Temperature-Extreme Heat					nr		

\*nr indicates the county plan listed but did not state degree of susceptibility

Events Reported in Region VII								
	Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur	total
Event Type	②	②	②	②	①	②	①	
Thunderstorm	34	50	32	47	65	12	52	292
Snow Related	43	25	24	25	71	76		264
Flood	24	28	31	29	42	17	29	200
Hail	2	43	22	30	47		29	173
Windstorm	47	11	10	9	16		52	145
Hot Weather	33	36	25	26	22			142
Cold Weather	26	26	26	24	33			135
Winter Storm	11	6	4	8	10	2	58	99
Drought	8	8	8	7	13	3	8	55
Rainstorm	4	4	5	11	5			29
Frost	2	3	3	5	5			18
Tornado	1	1	3	3	4	2		14
Infestation	2	2	2	2	1	2	2	13
Utility Failure					0		10+	10
Dam Failure	1	1	0	3			0	5
Lightning	2			1	1			4
Ice Storm	0	2	2	0				4
Earthquake	2	0	0	1			0	3
Landslide	1						2	3
Hazardous Material	1				0	0	0	1
Urban Fire					0		1	1
① Data from County HMPs (2009)								
② Data from RVII Economic Adjustment Strategies (2011)								
NOAA Data - <a href="http://www4.ncdc.noaa.gov/cgi-win/wcgi.dll?wwevent~storms">http://www4.ncdc.noaa.gov/cgi-win/wcgi.dll?wwevent~storms</a>								
Red numbers are known events not reported by county HMPs								

**Unreported Hazard Events in County HMPs**

- Infestations: Gypsy Moth, Asian Lady Beetle.
- Landslide: Tygart's River Junction 2008 Summer Flood. Took out Railroad used to ship coal.
- Hazardous Material: Gas Spill Philippi 1988. Burnt historic covered bridge, site of the first Civil War land battle.

It should be noted different people coded and analyzed the information for the individual counties so there is considerable reporting error inherent in these charts; however it does support trends and is very accurate to specific county hazard issues.

Vulnerability can also be gauged by historical data. The following chart was developed from county level HMPs and a special economic HMP funded by the US Economic Development Administration for five of Region VII counties (see chapter 1 p. 3).

### Vulnerability Analysis

	Flooding	Snow & Ice	Drought	Rain & Wind
Thunderstorm & Wind				292
Flood	200			
Snow Related		264		
Hail				173
Windstorm				145
Hot weather			142	
Winter Storm		99		
Drought			55	
Rainstorm				29
Tornado				14
Lightning				1
Ice Storm		4		
<b>Total</b>	<b>200</b>	<b>367</b>	<b>197</b>	<b>654</b>

Some county HMPs documented individual events but did not provide a total event number. These were supplemented by the NOAA database.

Hazardous events do not always escalate into disasters. The data does give general trends that can be interpreted to point to areas of higher risk and susceptibility. This is useful in determining and directing efforts to mitigate for those hazards.

Rain & Wind are the most common hazard events in the Region VII Planning and Development Hazard Mitigation Area (HMA); however, the overwhelming concerns for disaster causing hazards are Flooding, Snow & Ice, and Drought. It is interesting that the #1 concern, flooding, is actually the outcome of storms that cause two of the other top four hazard concerns. A lineal analysis supports a hierarchy of Rain & Wind – Snow & Ice – Flood – Drought as the hazards that most often lead to damage and loss on a regional basis for this HMA.

## Addressing Repetitive Loss Properties

In Region VII the vast majority of repetitive loss properties are the result of flooding. The jurisdictions have at their disposal the following practices and programs to address repetitive loss. Local

### Acquisition and Demolition

Acquisition and Demolition involves obtaining fee title or a perpetual easement on the land and the removal of the structures that are subject to flooding from the 100-year flood. The acquired property could be converted to a land use activity that would sustain minimal damage when flooding of the area occurs, such as

### Acquisition and Relocation

Acquisition and relocation involves the purchase and physical relocation of a structure from areas subject to flooding during a 100-year flood to a “safe zone” that is not subject to flooding or where incidents of flooding are less than the 100-year flood. For the purpose of this study, the area between the 100-year flood zone and the 500-year flood zone can be considered to be a “safe zone”

### Flood Proofing

Flood proofing generally involves eliminating damage to a structure located in the 100- year floodplain from flooding. Technologies that can be used to flood proof an otherwise structurally sound building (in-place) include reinforcing the structure so its walls can withstand the hydrostatic pressure from floodwater, making the structure walls impervious, installing closure devices in the windows and low

projects may choose to use these tools at their discretion based on the best outcomes for the community.

open space. An adverse effect of acquisition and demolition of structures in the 100-year floodplain is the potential to reduce the tax base of the community. This is undesirable from an economic development perspective if the structure is occupied by an active business.

where the structure would be relatively safe from flooding. This technique would be practical for structures that are structurally sound, that can be readily loaded and transported by commercial building moving equipment, and where an adequate road or travel-way exists.

level entrances to eliminate the entrance of floodwater, and installing one-way drains in storm drain outlets. This technique would be practical for structures that are structurally sound. Since the structure surroundings would still be subjected to flooding, it is not advisable to use this technique where overnight occupancy will occur.

## Elevation

Elevation involves the raising (in-place) of a structure so that it does not flood during a 100-year flooding event. As a rule, this technique can only be applied to buildings that are structurally sound or that can be reinforced in order to be elevated. Since the structure's

## Pre-disaster Construction

Pre-disaster construction – involves the planning, engineering, and installation of preemptive or protective measures to new construction or the rehabilitation of existing structures so that they can withstand the effects of hazard incidents events before they occur. Pre-disaster construction can be used to effectively mitigate for flooding, high winds, large ice and snow loadings, hailstorms and fire.

This technique can work well where the structure may not suffer significant damage during a hazard event, but the structure

surroundings would still be subject to flooding, evacuation of people from the premises, especially at night, presents additional risks.

contents may be damaged or destroyed. Localized dikes and levees, channel restriction removal can also be used to mitigate flood damages.

Other forms of pre-disaster mitigation could include the installation of a back-up power supply source and to provide for alternate water supply sources.

### Talking Points

- A significant hazard may not affect the whole region or an entire County due to the rural nature of the plan’s boundary.
- The geography of Region VII varies 3,000 feet in elevation from the west to the east, the same direction of prevailing winds. This means that climate and climatic hazards are viewed differently across the breath of the Region and,
- Water generally drains east to west, precipitation due to orthographic lifting in the eastern areas of the HMA will still flood low lying communities in the western areas of the plan’s boundary.
- People in the Region are most vulnerable to precipitation events, winter or temporal which cascade into flooding. Drought is an issue in ridge-top and rain-shadow areas that do not have public water.
- The Region could be more vulnerable to some of the listed hazards, such as wildfire, but there are very good response plans and procedures in place that mitigate for their threat.
- A Disaster is a hazard that has escalated to cause significant loss and damage.
- A Catastrophe is a disaster that escalates into widespread significant loss, damage and any loss of human life.

### Hierarchy of Hazard Concerns in Region VII



### Hierarchy of Disaster Concerns in Region VII