REGION VII PLANNING & DEVELOPMENT COUNCIL

Hazard Mitigation Plan

Updated 2017

REGION VII PLANNING & DEVELOPMENT COUNCIL HAZARD MITIGATION PLAN

RELEASED 2017

FOR THE COUNTIES, CITIES, AND TOWNS REPRESENTED BY THE REGION VII PLANNING & DEVELOPMENT COUNCIL

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1.0 INTRODUCTION

The 2017 *Region VII Hazard Mitigation Plan* is a multi-jurisdictional plan that details natural and human-caused hazards that threaten Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker, and Upshur Counties and their various municipalities. The plan meets requirements set forth by the Disaster Mitigation Act of 2000 which requires jurisdictions to formulate a hazard mitigation plan in order to be eligible for mitigation funds made available by the Federal Emergency Management Agency (FEMA).

Plan Authority

This plan has been completed in accordance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000. The guidelines for the completion of this plan appear in the Code of Federal Regulations under Title 44: Emergency Services, Part 201.6. Specific reference is made to the local Mitigation Planning Handbook (FEMA, 2013).

Plan Scope

The 2017 *Region VII Hazard Mitigation Plan* includes all unincorporated areas of the seven counties as well as all incorporated areas of the six cities and 18 towns within the counties. All hazards that have or can affect any of the Region VII counties have been analyzed. Hazard mitigation objectives, goals, and projects are discussed, as are project lead agencies and potential funding sources.

Changes in 2017

This version of the regional plan represents a significant change in approach from the 2012 plan. The PDC wanted this version to be more accessible to its member governments, so certain sections, especially the projects listing, were revised to be more representative of jurisdictional efforts. This update represents the first time the plan was written *as a regional plan* (it was a consolidation of seven individual plans in 2012). As such, risks are presented in a more integrated way. The PDC wanted its member governments to be more involved in plan development, so its contractor and its own staff invested a substantial amount of time in reaching out to garner this participation.

1.1 THE PLANNING PROCESS

§201.6(b) and 201.6(c)(1)	An open public involvement process is essential to the development of an effective plan. 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. [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.

This plan was developed in accordance with Part 201.6 of Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000. Several resources were used during the development of the plan, including the United States Department of Homeland Security (USDHS or DHS) / Federal Emergency Management Agency's (FEMA) *Local Mitigation Planning Handbook* (USDS/FEMA, 2013) the governing regulations in the Code of Federal Regulations.

1.1.1 Current Update Process

A two-tiered planning committee guided completion of the plan at the local level. A full planning committee which is comprised of executive level representatives from each jurisdiction and a steering committee that is made up of a smaller group that would guide the process. The Region VII Planning and Development Council comprised the *Full Planning Committee*, as it contains membership from all of the governmental jurisdictions in the region and the private sector. Utilizing the full committee thus ensure private sector participation as well as ensured an awareness of the process by each jurisdiction in the region. Private sector members are designated by their respective county commission and are regular members of the council. PDC staff discussed the status of the update with local government representatives at full council meetings throughout this process. The meeting minutes can be found in Appendix 1.

Full planning committee membership is outlined in Table 1.1.1.

TABLE: 1.1.1 FULL PLANNING COMMITTEE	
Jurisdiction	*Representative*
Barbour County Commission	Tim McDaniel, Commissioner
Braxton County Commission	Ron Facemire, Commissioner
Gilmer County Commission	Larry Chapman, Commissioner
Lewis County Commission	Agnes Queen, Commissioner
Randolph County Commission	Mike Taylor, Commissioner
Tucker County Commission	Lowell Moore, Commissioner
Upshur County Commission	Terry Cutright, Commissioner
Town of Belington	Matt Ryan, Mayor
Town of Beverly	Cindy Karelis, Mayor
City of Buckhannon	David McCauley, Mayor
Town of Burnsville	Paul Bragg, Mayor
Town of Coalton	Jim Rossi, Mayor
Town of Davis	Joe Drenning, Mayor
City of Elkins	Van Broughton, Mayor
Town of Flatwoods	Pam Skelly, Mayor
Town of Gassaway	Richard Roach, Mayor
Town of Glenville	Dennis Fitzpatrick, Mayor
Town of Hambleton	Linda Bates, Mayor
Town of Harman	Jerry Teter, Mayor
Town of Hendricks	Solena Roberts, Mayor
Town of Huttonsville	Rodney McAtee, Mayor
Town of Jane Lew	Ruth Straley, Mayor
Town of Junior	Gary “Ally” Miller, Mayor
Town of Mill Creek	Larry Serrett, Mayor
Town of Montrose	Barbara Miller, Mayor
City of Parsons	Dorothy Judy, Mayor
City of Philippi	Phil Bowers, Mayor
Town of Sand Fork	Jim Tatman, Mayor
Town of Sutton	J.L. Campbell, Mayor
City of Thomas	Matt Quattro, Mayor
City of Weston	Julia Spelsberg, Mayor
Private Sector	Dr. Tim Barry
Private Sector	Ben Propst
Private Sector	Mike Cvechko
Private Sector	J.R. Spencer
Private Sector	Evelyn Post
Private Sector	Robert Hardman
Private Sector	Cindy Whetsell
Private Sector	Greg Cunningham
Private Sector	Mike Herron
Private Sector	Robbie Morris
Private Sector	Mike Ross
Private Sector	Chris Wood
Private Sector	Mark Doak
Private Sector	Chris Stadelman
Private Sector	Patrick Darlington
Private Sector	Michael Feola
Private Sector	Robert Gompers
Private Sector	Connie Tenney
Private Sector	A.G. Trusler Jr

The second "tier" of the planning approach involved the use of a steering committee to work directly with the PDC's consultant on specific portions of the update. The Region VII PDC sent invitations to county and municipal emergency managers and floodplain coordinators to participate as part of the steering committee. Using the responses from the invitations, a multi-jurisdictional steering committee was established to guide completion of the plan. The full council passed a resolution naming this group the "steering committee" at its April 24, 2017, meeting. The committee was tasked with making decisions for the plan, attending workshops, completing exercises, and establishing goals and projects for hazard mitigation. The steering committee was the primary body that worked with the consultant. A list of steering committee members who participated in the process through meeting attendance, mail and email correspondence, and/or direct phone contact with the consultant is outlined in Table 1.1.2.

TABLE: 1.1.2 STEERING COMMITTEE

Jurisdiction	*Representative*	*Position*
Barbour County	Ben Propst	Director of Emergency Management
Braxton County	Mike Baker	Director of Emergency Management
Gilmer County	Erick Squires	Director of Emergency Management
Lewis County	Bill Rowan Steve Moneypenny	Director of Emergency Management Floodplain Coordinator
Randolph County	Cindy Hart	Director of Emergency Management
Tucker County	Kevin White	Director of Emergency Management
Upshur County	Brian Shreves	Director of Emergency Management
City of Buckhannon	Jay Hollen	Floodplain Coordinator
City of Elkins	Bob Pingley	Director of Emergency Management
City of Parsons	Jason Myers	Floodplain Coordinator
City of Philippi	Bill Annon	Director of Emergency Management

The PDC provided support for the planning effort, identifying resources needed to update the plan, including serving as the primary point of contact interfacing with the region's consultant working on the project, and re-engaging governmental organizations and other technical expertise available in the region. The PDC also provided a number of venues for its jurisdictions to participate in this update. Jurisdictions participated in one or more of the following ways.

1. Attendance at full regional council meetings (i.e., the full planning committee), where the PDC staff and consultant provided updates on the process and asked for jurisdictional input.
2. Membership on the steering committee.

3. Direct contact from the PDC and the consultant.

The PDC and the consultant reached out to each municipality that was not represented on the steering committee through email, telephone, and/or correspondence sent via U.S.P.S. Each mayor was contacted and given the opportunity to provide input on municipal assets, status of projects from the 2012 plan, and new projects for this current update. Other topics discussed during individual correspondence included hazards that pose the greatest threat to the municipality, consideration of joint projects with other municipalities or the counties, and local historical events that may not be available through regional or national databases.

Additionally, the PDC sought to include input from extended stakeholders throughout the region, even though these agencies did not receive invitations to participate directly on committees. These stakeholders represent special interests in the region's communities and approach risk and vulnerability with different perceptions. Participation from these agencies was via direct outreach from the Region VII Planning and Development Council. Such outreach asked these agencies about their perceptions of various risks facing the region, how those risks could be reduced, and what type of support these agencies could provide to risk reduction efforts.

<u>Governmental</u>

Senator Joe Manchin's Office
Senator Shelly Moore Capito's Office
Federal Bureau of Prisons
Federal Emergency Management Agency
U.S. Army Corps. of Engineers
West Virginia Division of Homeland Security and Emergency Management
West Virginia Division of Corrections
West Virginia Division of Forestry
West Virginia Division of Highways

<u>Other</u>

Quasi-Governmental *(i.e., organizations representing neighboring jurisdictions)*
Mid-Ohio Valley Regional Council
Regional Intergovernmental Council
Region 4 Planning and Development Council

Region VI Planning and Development Council
Region 8 Planning and Development Council

Higher Education
Alderson Broaddus University
Davis & Elkins University
Glenville State College
West Virginia Wesleyan College

Private Sector
Arch Coal
Armstrong Hardwood Flooring Company
Canaan Valley Resort
Cortland Acres
Deepwell Energy Services
Flying W
Glenville Center
Go-Mart Inc.
Good Samaritan Society
Hometown Care LLC
Stonewall Resort
Waco Oil & Gas
Wal-Mart (Buckhannon)
Wal-Mart (Elkins)
Wal-Mart (Sutton)
Wal-Mart (Weston)
JH Consulting, LLC (Consultant utilized for mitigation plan update)

Evidence of participation is as follows (see Appendix 1). Sign-in sheets and agendas (where appropriate) for all steering committee meetings are included. In some cases, the appendix contains follow-up notes from steering committee meetings. Finally, the consultant contacted many jurisdictions directly seeking input on projects.

The PDC submitted email requests to its neighboring regional planning and development councils to ask for input on risks originating in neighboring areas that could

impact Region VII. Conversely, the PDC asked if those planning and development councils had concerns about risks originating in Region VII for which the PDC could provide information. The PDC sent emails to Regions 3, 4, 5, 6, and 8. Appendix 1 contains copies of those letters.

1.1.2 Full Planning Committee Involvement

The consultant attended three Region VII Planning and Development Council meetings during the planning process. Meeting dates included the following:

- April 24, 2017,
- July 24, 2017, and
- October 23, 2017.

FULL PLANNING COMMITTEE MEETING 1

On April 24, 2017, the PDC staff and the council's consultant attended a meeting held at Convention Center at Brushy Fork in Buckhannon, West Virginia, to formally kick-off the project. The consultant explained the use of the dual committee structure (i.e., the use of the council as the full planning committee and a subset of county-level emergency managers as a steering committee more closely involved in the plan composition). The council adopted a resolution formally accepting the steering committee.

FULL PLANNING COMMITTEE MEETING 2

On July 24, 2017, the contractor met with the full council to provide an update on the plan and answer any questions. The contractor also had the opportunity to meet with three new representatives on the council and provide information on the process.

FULL PLANNING COMMITTEE MEETING 3

The third meeting took place on October 23, 2017. During this meeting the consultant provided a project status. The jurisdictional representatives were given the opportunity to ask questions and to provide information for inclusion in the plan.

1.1.3 Steering Committee Involvement

The steering committee had four meetings during the update of the plan. Meeting dates included the following:

- June 1, 2017,
- June 30, 2017,
- July 27, 2017, and
- August 18, 2017.

STEERING COMMITTEE MEETING 1

The first steering committee meeting was held at the Region VII Planning and Development Council's office in Buckhannon, West Virginia. The agenda for the first meeting included a brief overview of the planning process and the committee members' roles and responsibilities, review of hazards in current plan, and a discussion on hazards for this update. Attendees completed a risk assessment matrix and were given copies of the asset and project lists from the current plan to review. The committee then selected dates for future meetings and discussed ideas for public involvement.

STEERING COMMITTEE MEETING 2

The second meeting was held on June 30, 2017 via the www.gotomeeting.com platform. Attendees reviewed the asset inventory and project list from the current plan. The main focus of the meeting was on establishing goals for hazard mitigation. Minutes from the meeting were forwarded to all jurisdictions with a request for comments on the goals established at the meeting.

STEERING COMMITTEE MEETING 3

On July 27, 2017, the steering committee met again via www.gotomeeting.com. The consultant gave an update on the planning process, reviewed mitigation goals and provided a status on the online survey. The attendees were encouraged to reach out to their communities to provide the survey link and reminded that a second public survey would be distributed beginning in August. The consultant emailed all jurisdictions a historical occurrence form requesting information on events that may have occurred that may not be available through online databases. The final agenda item was new projects and how to keep them S.M.A.R.T. (specific, measurable, achievable, realistic, and time sensitive) and related to the mitigation goals.

STEERING COMMITTEE MEETING 4

The fourth meeting was also held on www.gotomeeting.com, on August 18, 2017. Attendees discussed a plan maintenance procedure that is included in Section 4.0 and public involvement. Additionally, attendees had an opportunity to discuss historical events to be included in the hazard profiles. A status was given on both public surveys and attendees were reminded to continue distributing the survey links to their communities.

NON-MEETING ACTIVITIES

At the conclusion of each meeting members of the committee were given tasks which were predominantly comprised of requests to collect jurisdiction-specific data including updated asset lists, statuses on existing projects, and jurisdictional capabilities. The members of the steering committee and the consultant had regular communication via phone calls and email. Topics of discussion included reports on current hazards in the region, reviewing individual jurisdiction's projects, and general comments on the planning process.

1.1.4 Engaging the Public

The PDC coordinated several opportunities for the public to participate in the planning process. The PDC held five public meetings (Buckhannon, Parsons, Philippi, Braxton County and Lewis County). Local media advertised the meetings (see Appendix 2); attendance was minimal. The meeting agendas focused on National Flood Insurance Program, Community Rating System, and benefits of mitigation actions. Three municipalities, Buckhannon, Parsons, and Philippi, participate in the Community Rating System (CRS) and, as such, attempted to engage the public in detailed discussion about flood risks and vulnerabilities. The sign-in sheets and handouts from the meetings are also included in Appendix 2. Meeting dates included the following:

- September 5, 2017, (Parsons),
- September 7, 2017, (Lewis County),
- September 12, 2017, (Buckhannon),
- September 18, 2017, (Braxton County), and
- September 18, 2017, (Philippi).

In an attempt to further public participation in the planning process. The PDC directed the consultant to develop and administer two online surveys for residents of all seven counties.

Both surveys were developed using the "Survey Monkey" platform (www.surveymonkey.com) and distributed through social media. The first survey was available to the public from June 5, 2017, through December 15, 2017, with 249 responses recorded in that time period. Residents of Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker and Upshur Counties replied to various questions regarding historical occurrences, how government agencies responded, and general demographic questions. The second survey was available from August 2, 2017, through December 15, 2017, with 59 responses recorded. Respondents answered a variety of questions regarding mitigation actions. Surveys were advertised at the county level to allow so established resources, such as Nixle, and social media, could be used to reach the public. The three CRS communities also advertised the surveys. The raw data for each survey can be found in Appendix 2.

The Region VII Planning and Development Council, which comprised the full planning committee also included 19 members of the public that are not affiliated with government agencies. The PDC meetings are also open to the public with dates and times posted on their website along with existing HMP for review

1.1.5 Research Conducted

The research conducted for the risk assessment phase of this update included data from federal, state, higher education, and mass media sources. The research aim was primarily to validate and describe the hazards included for consideration in this plan. Specific sources relative to individual hazards are listed in the appropriate hazard profile contained in Section 2.0.

The consultant reviewed a number of existing plans and reports to (a) identify any obvious inconsistencies between other development and mitigation efforts, (b) as baseline information for such sections as Analyzing Development Trends, and (c) to support discussions surrounding mitigation projects. Those documents included the following.

TABLE 1.3 REFERENCED DOCUMENTS

Document type	*Document citation*	*How incorporated into plan*
Plan	West Virginia Statewide Standard Hazard Mitigation Plan Update (2013)	A reference document as well as historical hazard occurrences.
Plan	Buckhannon Making the Future: 2020 Comprehensive Plan (2014)	Used to identify targeted development areas and validate administrative capabilities
Plan	City of Elkins Comprehensive Plan (2015)	Used to identify targeted development areas and validate administrative capabilities
Plan	Lewis County Comprehensive Plan (2013)	Used to identify targeted development areas and validate administrative capabilities

TABLE 1.3 REFERENCED DOCUMENTS		
Document type	*Document citation*	*How incorporated into plan*
Plan	Region VII Planning and Development Council Comprehensive Economic and Development Strategy (2016)	Used to identify targeted development areas and validate administrative capabilities
Plan	Tucker County Comprehensive Plan (Rev. 2014)	Used to identify targeted development areas and validate administrative capabilities
Plan	Weston Comprehensive Plan (2014)	Used to identify targeted development areas and validate administrative capabilities
Report	FEMA Community Status Book	Determining NFIP-compliant communities
Report	FEMA Community Rating System (Communities and Classifications) – Online	Determining presence of CRS participating communities
Report	National Park Service National Register of Historic Places – Online	Determining historical assets
Report	USACE National Inventory of Dams (2016)	Hazard research for the infrastructure decay profile
Report	USDHS FEMA Disaster Declarations for Pennsylvania Online (2017)	Contextualize hazards of priority based on historical occurrences and damages
Technical Information	FEMA Local Mitigation Planning Handbook (2013)	General methodological guidance
Technical Information	FEMA Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials (2013)	General methodological guidance, particularly as examples for integrating existing planning mechanisms into the hazard mitigation plan
Technical Information	FEMA Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (2013)	Guidance for creation of a one-page (two-sided) resource for participating jurisdictions (i.e., creation of a customized list of potential mitigation actions for jurisdictional consideration)

1.1.6 Implementing the Plan and Monitoring Progress

Region VII's stakeholders realized that the plan must remain viable in order to appropriately guide mitigation in the region. To that end, plan implementation (i.e., the mitigation strategy and project prioritization) are presented in Section 3.0: Action Plan. The monitoring process is presented in Section 4.0: Plan Maintenance Process.

1.2 DESCRIPTION OF THE PLANNING AREA

The Region VII Planning and Development Council is comprised of seven counties located in central West Virginia. The counties contained within Region VII are Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker and Upshur. The region covers 3404.6 square miles, of which 3388.3 square miles is land and 16.3 square miles is water.

Region VII is bordered by a number of counties and other regional planning and development councils. These councils consist of Regions 3, 4, 5, 6, and 8. The counties that border the region include Clay, Nicholas, Webster, Pocahontas, Calhoun, Ritchie, Doddridge, Harrison, Taylor, Preston, Grant, and Pendleton.

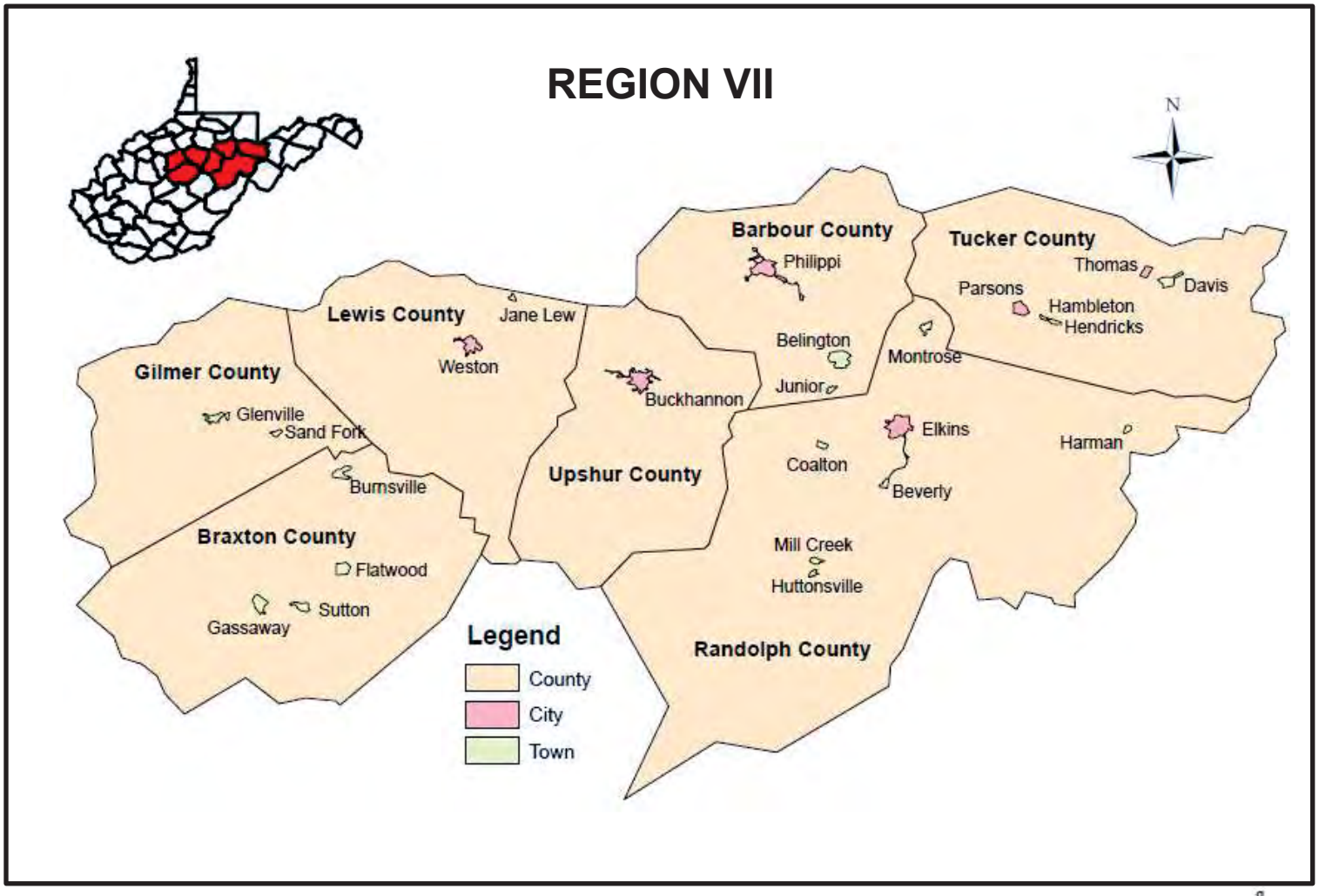
Table 1.1
JURISDICTIONS

NAME	TYPE	COUNTY
Barbour	County	N/A
Braxton	County	N/A
Gilmer	County	N/A
Lewis	County	N/A
Randolph	County	N/A
Tucker	County	N/A
Upshur	County	N/A
Buckhannon	City	Upshur
Elkins	City	Randolph
Parsons	City	Tucker
Philippi	City	Barbour
Thomas	City	Tucker
Weston	City	Lewis
Belington	Town	Barbour
Beverly	Town	Randolph
Burnsville	Town	Braxton
Coalton	Town	Randolph
Davis	Town	Tucker
Flatwoods	Town	Braxton
Gassaway	Town	Braxton
Glenville	Town	Gilmer
Hambleton	Town	Tucker
Harman	Town	Randolph
Hendricks	Town	Tucker
Huttonsville	Town	Randolph
Jane Lew	Town	Lewis
Junior	Town	Barbour
Mill Creek	Town	Randolph
Montrose	Town	Randolph
Sand Fork	Town	Gilmer
Sutton	Town	Braxton

Randolph County is located in the east section of the region and is the largest county in Region VII, in terms of land area and population. The county covers 1039.8 square miles, of which 1039.6 square miles is land and 0.2 square miles is water. Randolph County contains seven municipalities: the City of Elkins, which is the county seat, and the towns of Beverly, Harman, Huttonsville, Mill Creek, Montrose, and Coalton. Tucker County is in the northeast section of Region VII and is comprised of 421 square miles, of which 418.9 square miles is land and 2.1 square miles is water. Tucker County contains five municipalities: the cities of Thomas and Parsons (county seat) and the towns of Davis, Hambleton, and Hendricks. Barbour County is located in the northern area of Region VII; the county covers 341 square miles, of which 339 square miles is land and two square miles is water. Barbour County contains three incorporated areas: the City of Philippi, and the towns of Belington and Junior.

Upshur County is located in the middle of the region. The county is comprised of 354.7 square miles, of which 354.6 square miles is land and 0.1 square miles is water. The City of Buckhannon is the county seat as well as being the sole incorporated area in Upshur County. Lewis County is located the western section of the Region VII. The county is comprised of 392.5 square miles, of which 384.9 square miles is land and 7.6 square miles is water. Lewis County has two municipalities: the City of Weston, which is the county seat, and the town of Jane Lew.

Gilmer County is located in the southwestern area of the Region VII; the county consists of 338.5 square miles, of which 336.9 square miles is land, and 1.6 square miles is water. The Town of Glenville is the county seat. The only other municipality is the Town of Sand Fork. Braxton County is in the southern area of Region VII. The county covers 513.5 square miles, of which, 510.8 square miles is land, and 2.7 square miles is water. Braxton County contains four municipalities: the towns of Burnsville, Flatwoods, Gassaway and Sutton, the county seat.



Climate

Table 1.2

	January Average High Temperature	January Average Low Temperature	July Average High Temperature	July Average Low Temperature	Average Temperature	Average Annual Rainfall	Average Annual Snowfall
Barbour	38º F	18º F	81º F	59º F	49.65º F	48.74"	-
Braxton	40º F	22º F	85º F	62º F	53.1º F	49.22"	-
Gilmer	42º F	22º F	86º F	63º F	53.8º F	45.99"	21"
Lewis	42º F	20º F	87º F	60º F	52.85º F	51.12"	-
Randolph	39º F	19º F	81º F	59º F	50.3º F	45.99"	84"
Tucker	38º F	18º F	82º F	30º F	49.95º F	51.31"	58"
Upshur	40º F	19º F	83º F	60º F	51.4º F	48.27"	45"

It should be noted that some of the higher elevation areas, including the ski areas located within Region VII, may have different climates than the rest of the county. Canaan Valley State Park reports an average of 152 inches of snow annually while the county seat, Parsons, averages 58 inches annually. This can be attributed to Parsons being at an elevation of 1,647 feet above sea level and the Canaan Valley floor being at an elevation 3,200 feet above sea level with the summit of Weiss Knob at 4,450 feet above sea level.

Demographics

Collectively, Region VII has a population of 116,977, according to the 2010 Census. As stated above, the largest county population is found in Randolph County, with a 2010 population of 29,405 (25% of the regional population). The region is overwhelmingly Caucasian, representing 96.5% of the population. African American is the second most noted race in the Census data, with 1.59% of the population. No other single race accounts for more than 1% of the population. About 1% of the population identifies as Hispanic or Latino.

Table 1.3

Municipality	Population
Belington, Town of	2,080
Beverly, Town of	656
Buckhannon, City of	5,650
Burnsville, Town of	511
Coalton, Town of	298
Davis, Town of	683
Elkins, City of	7,224
Flatwood, Town of	312
Gassaway, Town of	913
Glenville, Town of	1,812
Hambleton, Town of	254
Harman, Town of	106
Hendricks, Town of	243
Huttonsville, Town of	260
Jane Lew, Town of	365
Junior, Town of	471
Mill Creek, Town of	745
Montrose, Town of	165
Parsons, City of	1,526
Philippi, City of	3,192
Sand Fork, Town of	182
Sutton, Town of	1,231
Thomas, City of	638
Weston, City of	4,096
Source: US Census Bureau	

Table 1.4	Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
Population	16,831	14,471	8,249	16,309	29,006	6,926	9,093
Male	8,247	7,293	4925	8,089	14,996	3,511	4,501
Female	8,584	7,178	3,324	8,220	14,010	3,415	4,592
Total Housing Units	7,853	7,363	3,482	7,907	14,174	5,359	11,239
Percent High School Diploma or Higher	81.1%	80.4%	78.3%	86.7%	83.9%	87.5%	84.1%
Percent Bachelor's Degree or Higher	11.9%	12%	16.6%	14.1%	19.3%	14.2%	16.3%
Median Household Income	$37,066	$32,750	$37,536	$37,849	$39,457	$40,533	$40,330
Families Below Poverty Level	20.1%	23.7%	25.8%	20.6%	19.8%	17.1%	17.3%
Unemployment Rates	6.7	9.5%	8.9%	8.3%	5.9%	6%	6.8%
Source: US Census Bureau							

Region VII is also home to four colleges and five detention centers that can significantly alter the population of the region and the counties in which the facilities are located. The facilities demographics are listed in the tables below.

Table 1.5

Colleges & Universities Population

School	County	Total Enrollment	Out of State Students	Students from Foreign Country	Enrolled in Distant Learning Only
Alderson Broaddus University	Barbour County	1,052	694	53	0
Davis & Elkins College	Randolph County	805	266	81	40
Glenville State College	Gilmer County	1,641	230	0[1]	49
West Virginia Wesleyan College	Upshur County	1,542	493	108	46

Source: US Department of Education Data & Statistics Fall 2016 Enrollment
[1]Confirmed by direct correspondence with Glenville State College

Table 1.6

Prisons, Jails & Detention Centers

Facility	Type of Facility	County	Average Daily Population
Central Regional Jail	Regional Jail	Braxton County	310
Federal Correctional Institution – Gilmer	Federal Prison	Gilmer County	1517
Huttonsville Correctional Center & Work Camp	State Prison & Work Camp	Randolph County	1183
Kenneth Honey Rubenstein Juvenile Center	Juvenile Detention	Tucker County	46
Tygart Valley Regional Jail	Regional Jail	Randolph County	444
Sources: Annual Reports 2016			

Ski season, annual festivals, and other special events can also create a population influx. Skiers, seasonal employees, and vacationers that are in the region for a week to several months should also be considered in emergency planning.

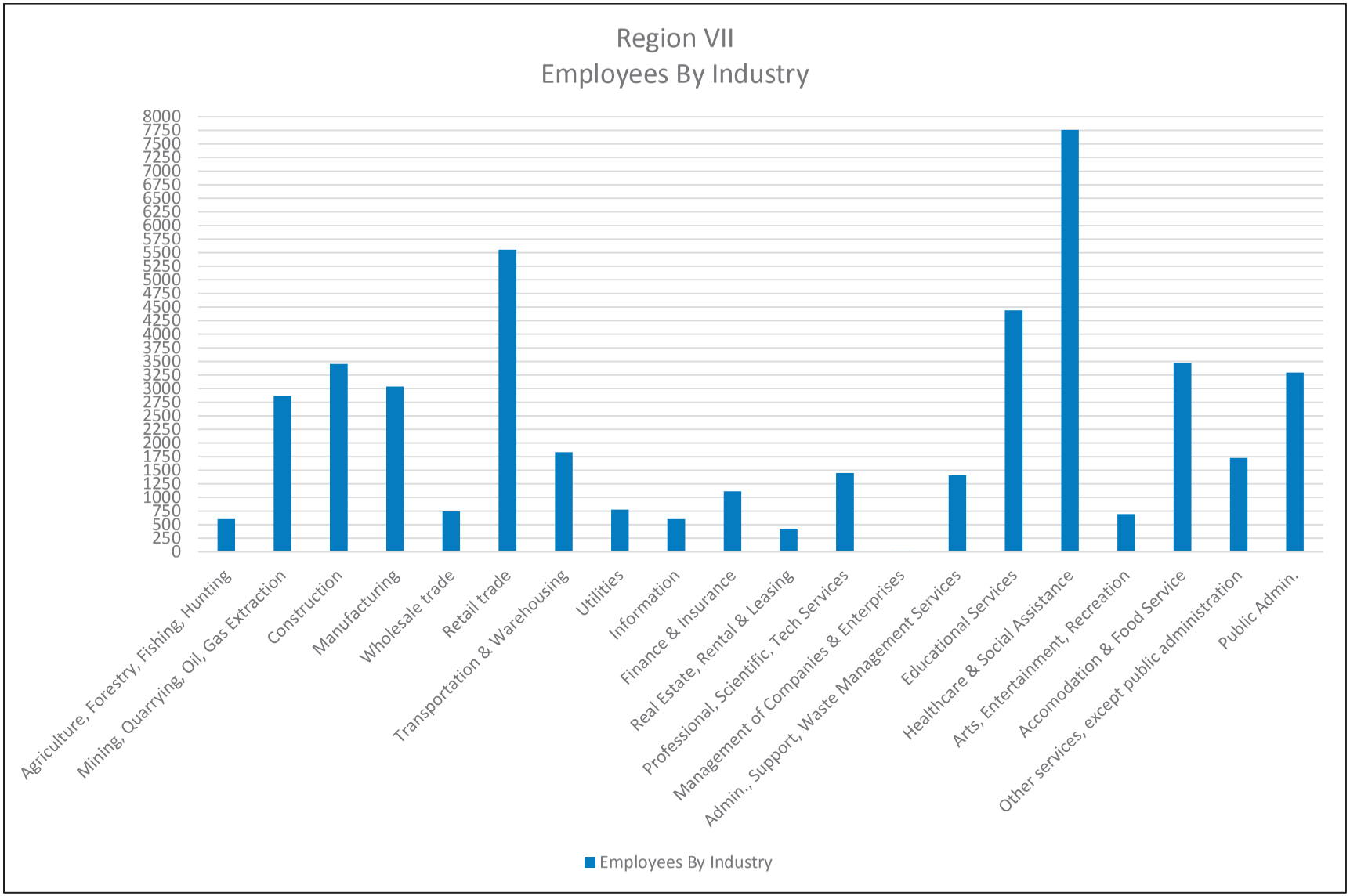
Economy

All seven counties in the region have healthcare and social assistance as a top five industry and six of the seven, all except Braxton, have educational services in the top five. Together they make up over 25% of employment in the region.

Table 1.7

Top 5 Industries By County

Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
Healthcare and Social Assistance	Retail Trade	Educational Services	Healthcare and Social Assistance	Healthcare and Social Assistance	Healthcare and Social Assistance	Healthcare and Social Assistance
Retail Trade	Construction	Healthcare and Social Assistance	Retail Trade	Retail Trade	Construction	Retail Trade
Construction	Healthcare and Social Assistance	Accommodation and Food Service	Mining, Quarrying, Oil, Gas Extraction	Education Services	Educational Services	Educational Services
Educational Services	Accommodation and Food Service	Public Administration	Construction	Public Administration	Public Administration	Mining, Quarrying, Oil, Gas Extraction
Public Administration	Public Administration	Retail Trade	Accommodation and Food Service	Accommodation and Food Services	Accommodation and Food Service	Manufacturing


Region VII
Employees By Industry
8000
7750
7500
7250
7000
6750
6500
6250
6000
5750
5500
5250
5000
4750
4500
4250
4000
3750
3500
3250
3000
2750
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
Agriculture, Forestry, Fishing, Hunting
Mining, Quarrying, Oil, Gas Extraction
Construction
Manufacturing
Wholesale trade
Retail trade
Transportation & Warehousing
Utilities
Information
Finance & Insurance
Real Estate, Rental & Leasing
Professional, Scientific, Tech Services
Management of Companies & Enterprises
Admin., Support, Waste Management Services
Educational Services
Healthcare & Social Assistance
Arts, Entertainment, Recreation
Accomodation & Food Service
Other services, except public administration
Public Admin.
Employees By Industry

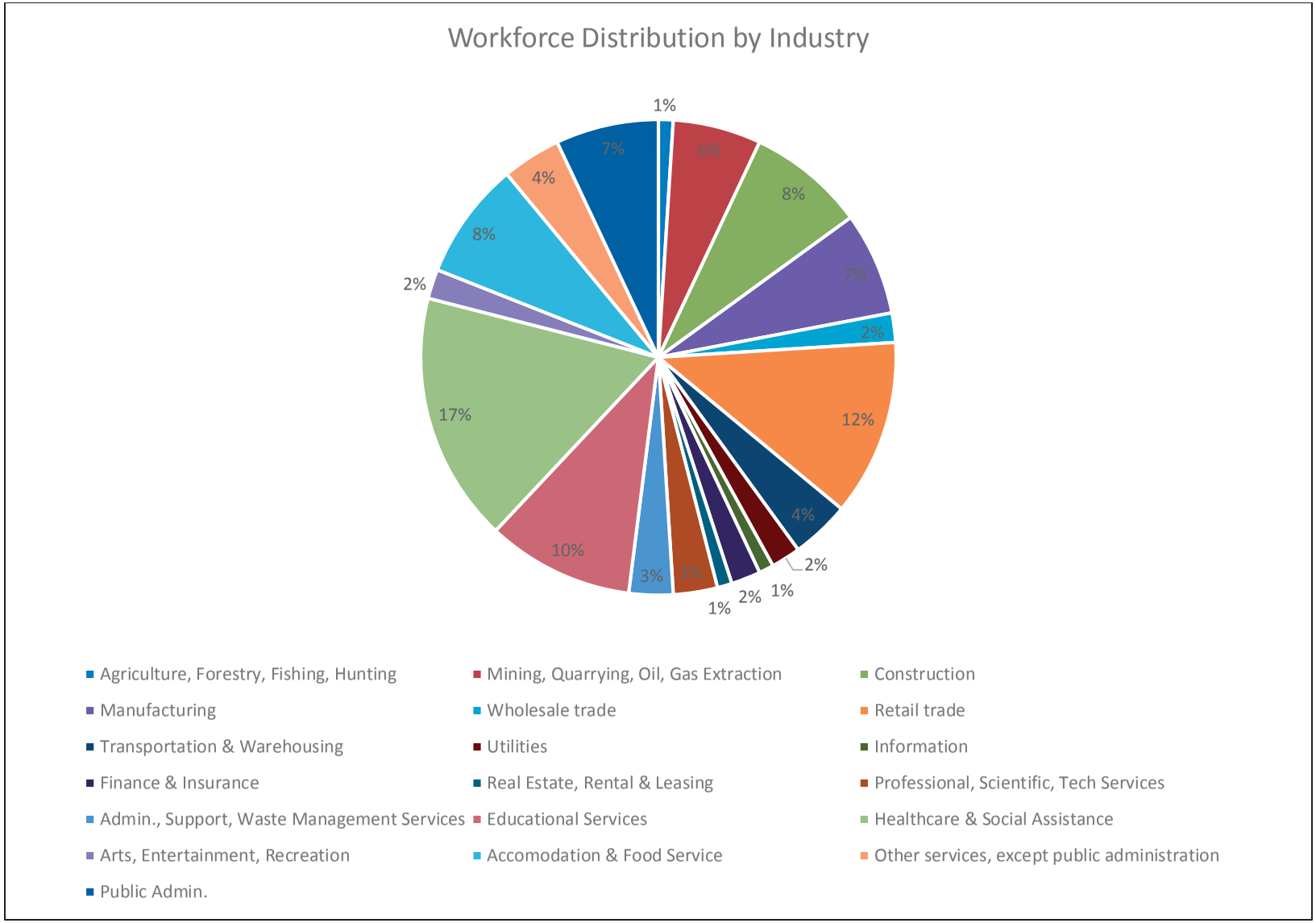

Workforce Distribution by Industry
1%
6%
8%
7%
2%
12%
4%
2%
1%
2%
1%
3%
3%
10%
17%
2%
8%
4%
7%
Agriculture, Forestry, Fishing, Hunting
Mining, Quarrying, Oil, Gas Extraction
Construction
Manufacturing
Wholesale trade
Retail trade
Transportation & Warehousing
Utilities
Information
Finance & Insurance
Real Estate, Rental & Leasing
Professional, Scientific, Tech Services
Admin., Support, Waste Management Services
Educational Services
Healthcare & Social Assistance
Arts, Entertainment, Recreation
Accomodation & Food Service
Other services, except public administration
Public Admin.

Table 1.8

Top 10 Employers By County

Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
Barbour County Board of Education	Braxton County Board of Education	Federal Prison System	Stonewall Jackson Memorial Hospital	Davis Memorial Hospital	Tucker County Board of Education	Upshur County Board of Education
Alderson Broaddus College	Central WV Aging Services	Glenville State College	Lewis County Board of Education	Randolph County Board of Education	Mettiki Coal	St Josephs Hospital
Arch Coal Inc.	Wal-Mart	Gilmer County Board of Education	William R Sharpe Jr Hospital	Armstrong Hardwood Flooring Company	Regency West Virginia Ventures	WV Wesleyan College
Broaddus Hospital Assoc.	Braxton County Memorial Hospital	Flying W Plastics	Deepwell Energy Services	Wal-Mart	Cortland Acres Nursing Home	Wal-Mart
Hometown Care LLC	Weyerhaeuser NR Company	Council of Senior Citizens of Gilmer County	Benchmark Conference Centers of WV	Huttonsville Correctional Center	Kingsford Manufacturing	Weyerhauser NR Company
Barbour County Senior Center	Braxton County Senior Citizens Center	Waco Oil & Gas Co	Wal-Mart	Davis & Elkins College	Timberline Four Seasons Resort	Saint Globain Industrial Ceramics
Good Samaritan Society	Go-Mart	Sunbridge Glenville Health Care	WV Department of Highways	West Virginia's Choice Inc.	Tucker County Senior Center	Res-care
WV Division of Environmental Protection	Mid-State Automotive	Smith Land Surveying	Doss Enterprises	WV Department of Highways	West Virginia Division of Juvenile Services	Lowes Home Dept.
Barbour County Commission	WV Regional Jail & Correctional Facility Authority	Facemire Foods	Dominion Transmission	TRG Customer Solutions Inc.	West Virginia Division of Natural Resources	Holbrook Nursing Home
SDH Education West LLC	Braxton County Commission	United Summit Center	ipacesetters	Select In Home Services	Shop & Save	Home Base Inc.

Transportation

Roads

Interstate 79 is the only interstate in Region VII. Interstate 79 is a north-south route that runs through Braxton, Gilmer and Lewis Counties, although there are no entrance or exit ramps in Gilmer County. In addition to the interstate, six U.S. highways run through the region. U.S. 19 runs north-south through Braxton and Lewis Counties; U.S. 33 is an east-west route through Gilmer, Lewis, Randolph and Upshur Counties. U.S. 48 runs east-west through Lewis, Randolph and Upshur Counties. U.S. 119 runs through Barbour, Gilmer, Lewis and Upshur Counties, U.S. 219 is a north-south route through Randolph and Tucker Counties. U.S. 250 runs north-south through Barbour and Randolph Counties. Finally, there are a large number of state highways that run through the seven counties that make up Region VII.

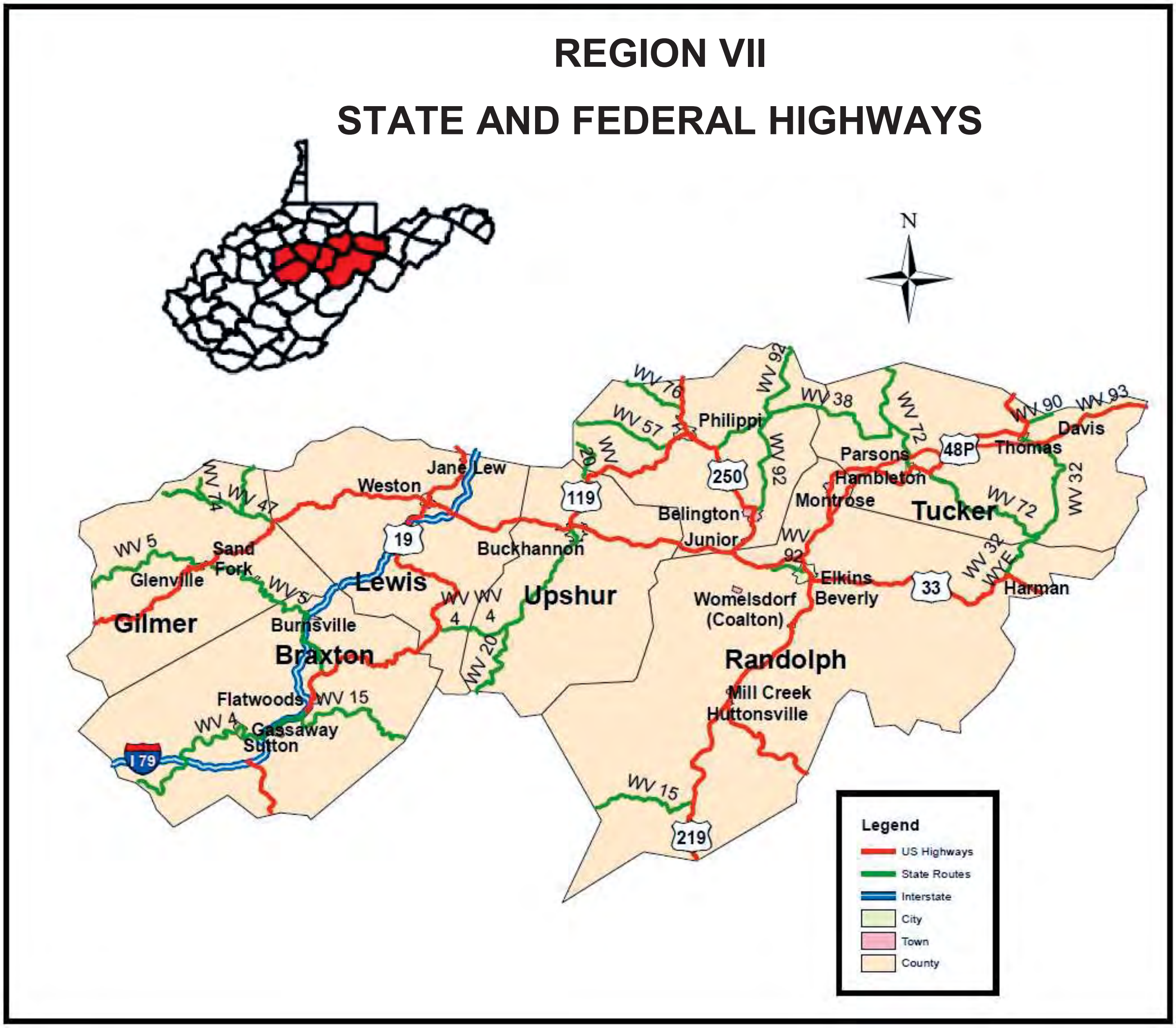

REGION VII
STATE AND FEDERAL HIGHWAYS
N
Philippi
Parsons
Hambleton
Thomas
Davis
Montrose
Tucker
Belington
Junior
Weston
Jane Lew
Buckhannon
Lewis
Upshur
Elkins
Beverly
Harman
Womelsdorf
(Coalton)
Randolph
Mill Creek
Huttonsville
Glenville
Sand
Fork
Gilmer
Burnsville
Braxton
Flatwoods
Gassaway
Sutton
WV 76
WV 57
WV 92
WV 38
WV 72
WV 90
WV 93
WV 32
WV 20
WV 74
WV 47
WV 5
WV 4
WV 15
WV 32
WYE
250
119
19
33
48P
219
I 79
Legend
US Highways
State Routes
Interstate
City
Town
County

Table 1.9

Region VII Major Roadways

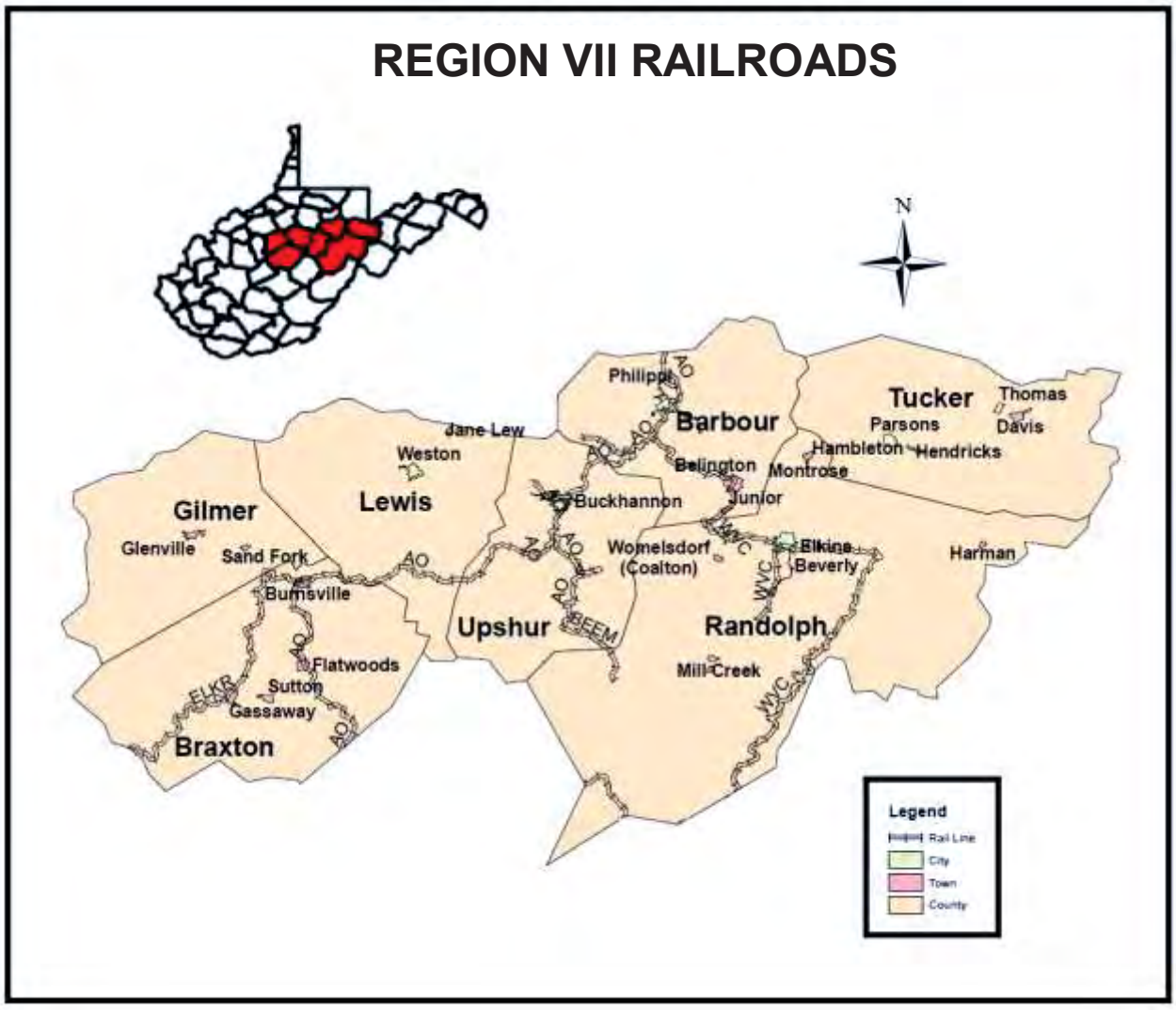
Roadway	Direction	Type of Highway	County
Interstate 79	North-South	4 Lane Divided Highway	Braxton, Gilmer, Lewis
U.S. 19	North-South	Runs concurrent with Interstate 79 in parts of Braxton County. 2 Lane Highway	Braxton, Lewis
U.S. 33	East-West	4 lane highway through Upshur and Randolph counties as part of Corridor H. Joins SR 55 in Elkins as a two lane road except for seven miles crossing Kelly Mountain.	Gilmer, Lewis, Randolph, Upshur
U.S. 48	East-West	Also known as Corridor H, a four lane highway that is still under construction. Sections have opened as phases are completed.	Lewis, Randolph, Tucker, Upshur
U.S. 119	North-South	Mostly a two-lane highway. 119 runs concurrent with Corridor H in parts of Upshur County and with U.S. 250 in Barbour County.	Barbour, Gilmer, Lewis
U.S. 219	North-South	U.S. 219 is a two-lane highway when it enters Randolph County with U.S. 250. 219 and 250 run concurrently and joins with U.S. 33 in Elkins. U.S. 219 splits from U.S. 250 and 33 north of Elkins and becomes a two lane road through Tucker County.	Randolph, Tucker
U.S. 250	North-South	Two land highway through Barbour County into Randolph County. Runs concurrent with Corridor H into Elkins where it becomes a two lane road through the county line.	Barbour, Randolph
WV 4	North-South	WV 4 is concurrent with U.S. 19 in parts of Braxton and Lewis Counties The north end of the highway is in Upshur County at WV 20.	Braxton, Lewis, Upshur
WV 5	East-West	WV 5 parallels the Little Kanawha River through Glenville ending in Heaters, Braxton County.	Braxton, Gilmer
WV 15	East-West	WV 15's west end starts near Sutton, Braxton County. It is a two lane highway with an eastern	Braxton, Randolph

		terminus in Randolph County.	
WV 18	North-South	WV 18 is a two lane highway beginning in Troy, Gilmer County.	Gilmer
WV 20	North-South	WV 20 is a two lane highway with approximately three and one-half miles in Barbour County. WV 20 runs concurrent with U.S. 119 from Hodgesville to Corridor H. The road continues south to the Webster County border.	Barbour, Upshur
WV 32	North-South	WV 32 is a two lane highway connecting Randolph and Tucker Counties with a southern terminus at U.S. 33 in Harman, Randolph County, and a northern terminus at U.S. 219 in Thomas, Tucker County.	Randolph, Tucker
WV 38	East-West	WV 38 is a two land highway connecting Barbour and Tucker Counties. The western terminus is U.S. 250 in Philippi, Barbour County, and the eastern terminus is WV 78, near St. George, Tucker County.	Barbour, Tucker
WV 47	East-West	WV 47 is a two lane highway that runs from Linn, Gilmer County, to the Ritchie County line.	Gilmer
WV 55	East-West	WV 55 runs concurrent with U.S. 33 through Randolph County.	Randolph
WV 57	East-West	WV 57 is a two lane road with an eastern terminus at U.S. 119 neat Philippi, Barbour County and runs west to the Harrison County line.	Barbour
WV 72	North-South	WV 72 is a two lane road with a southern terminus near Red Creek, Tucker County. The road runs concurrent with U.S. 219 from Hendricks, to Parsons. WV 72 then continues south to the Preston County Line.	Tucker
WV 74	North-South	WV 74 is a two lane road that runs from WV 47 in Cox's Mills, Gilmer County, to the Ritchie County line.	Gilmer

WV 76	East-West	WV 76 Is a two lane highway that runs from U.S. 119 and 250 north of Philippi to the Harrison County line.	Barbour
WV 90	North-South	WV 90 is a two lane road that runs parallel to the Maryland State line. The southern terminus is at U.S. 219 north of Thomas, Tucker County and runs north into Grant County.	Tucker
WV 92	North-South	WV 92 changes from a two land to a four lane highway in Randolph County when it merges with Corridor H. The road then follows U.S. 250 into Barbour County south of Junior to the Preston County line.	Barbour, Randolph
WV 93	East-West	WV 93 has a western terminus in Davis, Tucker County and runs concurrent with WV 42. Under current plans for Corridor H, WV 93 would be upgraded to a four lane highway.	Tucker

Rail

There are four services operating in Region VII the Appalachian and Ohio Railroad (A&O), the Beech Mountain Railroad, (BEEM) the Elk River Railroad (ELKR), and the West Virginia Central Railroad (WVC). As with most of West Virginia, the rail lines were originally used for the transport coal and lumber. All four lines are still used to transport some freight. The West Virginia Central Railroad, which is state owned, is also used for scenic excursions (American-Rails.com, n.d.).

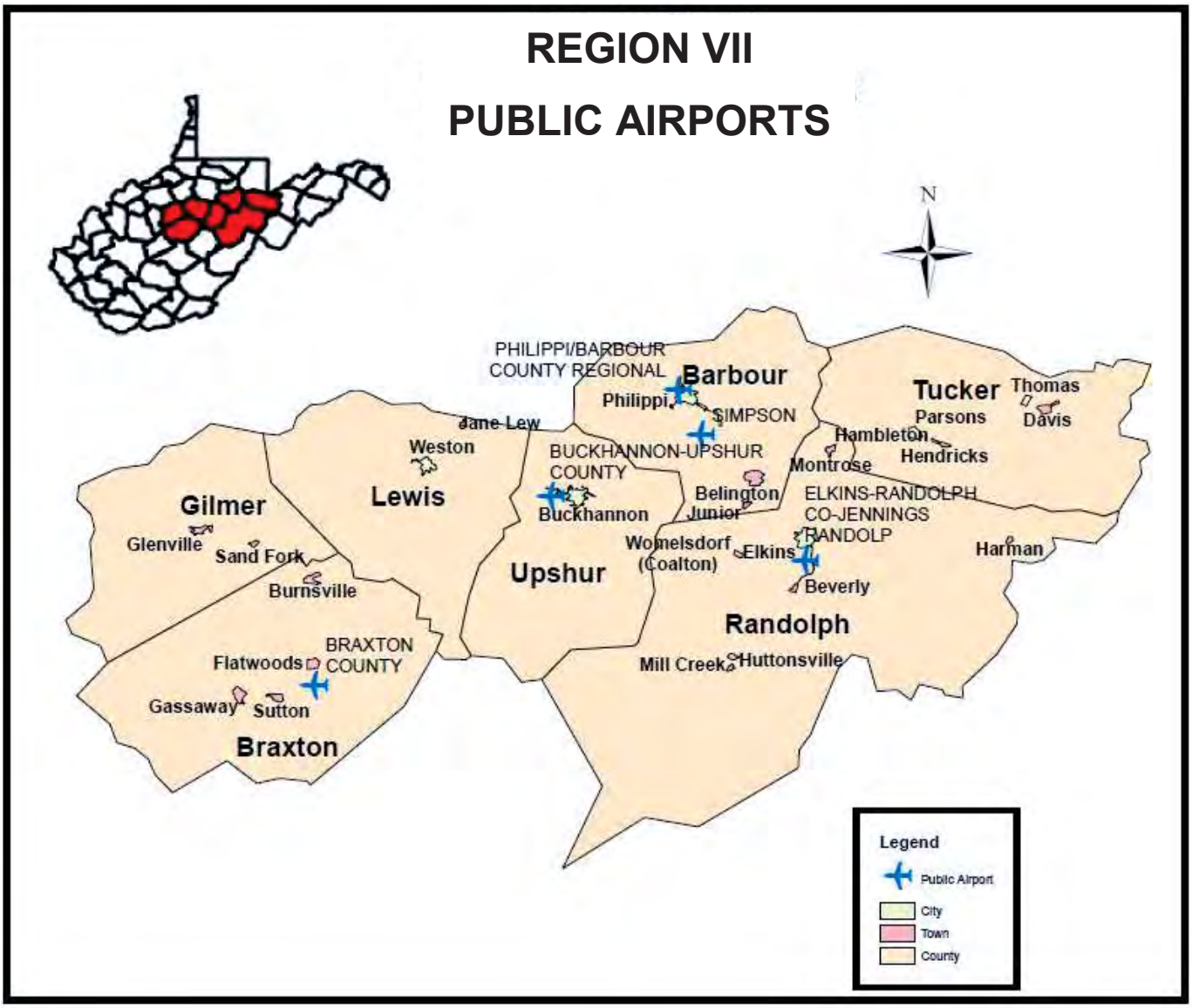


Air

There are multiple public and private use airports in Region VII. Gilmer County is the only county in the region without an airport. There are no international airports in the region.

Table 1.10
Region VII Airports

Airport Name	County	Use
Philippi/Barbour County Regional Airport	Barbour	Public Use
Simpson Airport	Barbour	Public Use
Braxton County Airport	Braxton	Public Use
Louis Bennett Field	Lewis	Private use
Lazy J Aerodrome	Randolph	Private Use
Elkins-Randolph County Airport – Jennings Randolph Field	Randolph	Public Use
Fairview Airport	Randolph	Private Use
Windwood Fly-In Resort	Tucker	Private Use
Upshur County Regional	Upshur	Public Use



Public Transit

Public transit in Region VII, and in West Virginia generally, is organized at the local level. There are a mixture of private and municipal public transportation agencies across the state. Four of the seven counties in the region have public transportation available. Country Roads Transit (CRT) provides public transportation in Randolph and Upshur Counties. CRT was formed in July of 2006 by the Committee on Aging for Randolph County to provide public transit for the citizens of Randolph and Upshur Counties. CRT operates three fixed routes that operate seven days a week (excluding four holidays) from 8:00 a.m. to 4:00 p.m. All CRT vehicles are accessible to persons with disabilities and passengers and modifications to service can be requested.

The Little Kanawha Transit Authority provides public transportation services in Gilmer County (as well as three others not in Region VII). This services operates in Gilmer County on Monday, Wednesday and Friday with daily service available through their demand response program. Little Kanawha buses are wheelchair accessible and offer non-emergency medical transportation.

While Braxton, Lewis, and Tucker counties do not have general public transportation, specialized transportation is offered in these counties as well as Barbour, Gilmer, Randolph, and Upshur counties, by a variety of providers. The following tables shown these providers.

Table 1.11

Public Transportation

Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
Here and There Transit	Braxton County Senior Citizens Center	Little Kanawha Transit Authority	Lewis County Senior Citizens Center	Country Roads Transit	Tucker County Senior Citizens	Country Roads Transit
Mountain State Inc.	Precision Services Inc.	Council of Senior Citizens of Gilmer Co.	Central WV Community Action Assoc.	Mountain State Inc.	Mountain State Inc.	Mountain State Inc.
Youth Health Services Inc.	N/A	N/A	Mountain State Inc.	Youth Health Services Inc.	Youth Health Services Inc.	Youth Health Services Inc.

Medical Access

There are five general care hospitals and one psychiatric facility located within Region VII. Barbour, Braxton, Randolph, and Upshur Counties each have one hospital. Lewis County has one general care and one psychiatric facility. Gilmer and Tucker Counties do not have hospitals within their borders.

Table 1.12

Hospitals

	Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
General Care	Broaddus Hospital	Braxton County Memorial Hospital	N/A	Stonewall Jackson Memorial	Davis Medical Center	N/A	St. Josephs
Specialty	N/A	N/A	N/A	W.R. Sharpe Jr. Hospital	N/A	N/A	N/A

Utilities

Electric Service

According to the Public Service Commission of West Virginia, there are three electric companies in Region VII. Monongahela Power provides service to all seven counties,

Harrison Rural Electrification provides service in three counties and the City of Philippi provides service to parts of Barbour County.

Internet

According to the organization "Broadband Now," Frontier is the only internet service provider that covers all seven counties. In addition, there are three providers that offer service to multiple counties in the region (Shentel, Lumos Network, and Suddenlink) and three that offer service in one county only (City of Philippi, Armstrong, and Atlantic Broadband).

In 2013, the Region VII PDC staff along with a Regional Broadband Planning Team (RBPT) completed the *Region VII Regional Broadband Strategic Plan*. The plan recognized that the internet is a necessary utility to the economic stability and growth of the region and as such should be treated as critical infrastructure. The RBPT used ac survey to engage the public and businesses. The RBPT also identified growth areas in the region and completed a needs assessment. The RBPT created projects and identified potential funding sources to allow for the growth of broadband infrastructure in the region.

Natural Gas

Six natural gas companies operate in the region according to the Public Service Commission. One operates in Barbour and Randolph Counties, two operate in Tucker County, and three operate in Braxton, Gilmer, Lewis and Upshur Counties.

Sewer

Sewer service in Region VII is provided by a network of private and public systems, which includes municipal systems and public service districts. Barbour, Randolph, and Tucker Counties each have three municipal providers; there are two municipal providers in Gilmer County; and Braxton, Lewis, and Upshur Counties each have one municipal provider. There are nine public service districts in the region (one each in Braxton and Lewis and Upshur Counties, four in Randolph County, two in Tucker County and none in Barbour County). Finally, there are two private sewer providers in Tucker County.

Telephone

The Public Service Commission also oversees telecommunications companies, which provide telephone service. Within the region, there are two telecommunication providers. Frontier West Virginia provides service in all counties except for Tucker County and Citizens

Telecommunications Company of WV provides service for all counties except for Gilmer and Upshur Counties.

Water

Like sewer service, water service in Region VII is provided by a network of private companies, municipal systems, and public service districts. There are thirteen municipal water systems according to the Public Service Commission of West Virginia. Braxton, Gilmer and Upshur Counties each have one municipal system. Barbour and Tucker Counties each have three municipal systems and Randolph County has four municipal systems. Tucker and Lewis Counties both have private water systems; Tucker County has two and Lewis County has one. Public service districts provide water to those not covered by municipal or private systems. There are five in Barbour County, three in Braxton and Upshur Counties, one in Gilmer County, two in Lewis and Tucker Counties, and six in Randolph County.

Table: 1.13

REGION VII UTILITIES

County → / Utility ↓	Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
Electric	Harrison Rural Electrification Monongahela Power City of Philippi	Monongahela Power	Monongahela Power	Harrison Rural Electrification Monongahela Power	Monongahela Power	Monongahela Power	Harrison Rural Electrification Monongahela Power
Internet	Frontier City of Philippi	Frontier Shentel Lumos Network	Frontier Shentel Lumos Network	Frontier Shentel Lumos Network Armstrong Sudden Link	Frontier Suddenlink Lumos Network	Frontier Atlantic Broadband	Frontier Suddenlink Lumos Network
Natural Gas	Mountaineer Gas Co	Bazzle Gas Co Hope Gas Inc. Mountaineer Gas Co	Hope Gas Inc. Megan Oil & Gas Co Mountaineer Gas Co	Hope Gas Inc. Mountaineer Gas Co Standard Gas Co	Mountaineer Gas Co	Canaan Valley Gas Co Mountaineer Gas Co	Hope Gas Inc. Mountaineer Gas Co Standard Gas Co
Sewer	City of Belington City of Philippi Town of Junior	Flatwoods-Canoe Run PSD Town of Burnsville	City of Glenville Town of Sand Fork	Jane Lew PSD Weston Sanitary Board	Huttonsville PSD Leadsville PSD Midland PSD Norton-Harding-Jimtown PSD City of Elkins Sewer System Town of Beverly Town of Harman	Hamrick PSD Canaan Valley PSD City of Parsons Town of Davis Sewer City of Thomas WV Resorts LLC Timberline 4 Seasons Utilities	Tennerton PSD Buckhannon Sanitary Board
Telephone	Citizens Telecommunications Frontier	Citizens Telecommunications Frontier	Frontier	Citizens Telecommunications Frontier	Citizens Telecommunications Frontier	Citizens Telecommunications Frontier	Frontier

Water	Central Barbour PSD Century Volga PSD Chestnut Ridge PSD Hodgesville PSD Southwestern Water District City of Belington City of Philippi Town of Junior	Birch River PSD Flatwoods-Canoe Run PSD Sugar Creek PSD Town of Burnsville WV-American Water Co	Gilmer County PSD City of Glenville	Greater Harrison County PSD Jane Lew PSD WV-American Water Co Lewis County Economic Development Authority	Adrian PSD Elkins Road PSD Huttonsville PSD Leadsville PSD Midland PSD Norton-Harding-Jimtown PSD Elkins Municipal Water Mill Creek Municipal Water Town of Beverly Town of Harman	Hamrick PSD Canaan Valley PSD Davis Municipal Water Thomas Municipal Water WV Resorts LLC Timberline 4 Seasons Utilities	Adrian PSD Elkins Road PSD Hodgesville PSD Mount Hope Water Assoc. Buckhannon Municipal Water

Jurisdictional Capabilities

Participating jurisdictions have a number of capabilities that can support (or at least be related to) mitigation efforts. The table below outlines those capabilities. It should be noted that the Town of Flatwoods does not have floodplain regulations as it does not have any special flood hazards area (SFHA).

Table: 1.14

Jurisdiction	Planning Commission	Comprehensive Plans	Floodplain Regulations	Building Codes*	Zoning Ordinances	Capital Budget	Public Works Budget
Barbour County	Yes	Yes	Yes	No	No	No	No
Braxton County	Yes	Yes	Yes	No	No	No	No
Gilmer County	Yes	Yes	Yes	Yes	No	No	No
Lewis County	Yes	Yes	Yes	No	No	No	No
Randolph County	Yes	Yes	Yes	No	No	N/A	N/A
Tucker County	Yes	Yes	Yes	No	Yes	No	In-Kind
Upshur County	Yes	No	Yes	Yes	No	No	No
Town of Belington	Yes	No	Yes	No	Yes	N/A	N/A
Town of Beverly	Yes	Yes	Yes	No	No	N/A	N/A
City of Buckhannon	Yes	Yes	Yes	Yes	Yes	Yes	In-Kind
Town of Burnsville	Yes	No	Yes	No	No	N/A	N/A
Town of Coalton	Yes	No	Yes	No	No	N/A	N/A
Town of Davis	Yes	No	Yes	No	No	N/A	N/A
City of Elkins	Yes	No	Yes	Yes	Yes	No	No
Town of Flatwoods	Yes	No	No	No	No	N/A	N/A
Town of Gassaway	Yes	No	Yes	No	No	N/A	N/A
Town of Glenville	Yes	No	Yes	No	No	N/A	N/A
Town of Hambleton	Yes	No	Yes	No	No	N/A	N/A
Town of Harman	Yes	Yes	Yes	Yes	No	No	No
Town of Hendricks	Yes	No	Yes	No	No	N/A	N/A
Town of Huttonsville	Yes	No	Yes	No	No	N/A	N/A
Town of Jane Lew	Yes	No	Yes	Yes	No	No	No
Town of Junior	Yes	No	Yes	No	No	N/A	N/A
Town of Mill Creek	Yes	No	Yes	No	No	N/A	N/A
Town of Montrose	Yes	No	Yes	No	No	No	No
City of Parsons	Yes	Yes	Yes	Yes	No	Yes	No
City of Philippi	Yes	Yes	Yes	Yes	Yes	No	No

Table: 1.14

Jurisdiction	Planning Commission	Comprehensive Plans	Floodplain Regulations	Building Codes*	Zoning Ordinances	Capital Budget	Public Works Budget
Town of Sand Fork	Yes	No	Yes	No	No	N/A	N/A
Town of Sutton	Yes	No	Yes	No	No	N/A	N/A
City of Thomas	Yes	Yes	Yes	No	No	No	No
City of Weston	Yes	Yes	Yes	Yes	No	No	In-Kind

FEMA Declarations

As of September 2017, there have been 68 FEMA declarations in the State of West Virginia, including emergency declarations, fire management assistance declarations, and major disaster declarations. Emergency declarations and major disaster declarations differ in that major disasters will involve damaged caused by some natural event, with some exceptions, and provide a wide range of federal assistance programs while emergency declarations can be declared for any occasion when the President determines federal assistance is needed. By statute, an emergency declaration may not exceed $5 million in assistance (FEMA, 2011). The incident types and total number of declarations in Region VII are shown in the table below. The hurricane declaration is related to sheltering issues faced during the evacuation of the gulf coast during Katrina. Some evacuees were relocated to the region.

Table: 1.17

FEMA Disaster and Emergency Declarations from 2011 to 2017

Disaster Declaration #	County Impacted	Date	Event
4331	Harrison, Marion, Marshall, Monongalia, Ohio, Taylor, Tucker, Wetzel	August 18, 2017	Severe Storms, Flooding, Landslides, and Mudslides
4273	Kanawha, Greenbrier, Nicholas, Fayette, Wayne, Lincoln, Summers, Monroe, Pocahontas, Clay, Webster, Braxton, Roane, Jackson, Gilmer, Lewis, Upshur, Randolph	June 25, 2016	Severe Storms, Flooding, Landslides and Mudslides

Table: 1.17

FEMA Disaster and Emergency Declarations from 2011 to 2017

Disaster Declaration #	County Impacted	Date	Event
4236	Logan, Lincoln, Wood, Jackson, Roane, Clay, Braxton, Nicholas, Webster	August 7, 2015	Severe Storms, Straight-line Winds, Flooding, Landslides and Mudslides
4220	Braxton, Brooke, Doddridge, Gilmer, Jackson, Lewis, Marshall, Ohio, Pleasants, Ritchie, Tyler, Wetzel	May 18, 2015	Severe Storms, Flooding, Landslides and Mudslides
4210	Marshall, Wetzel, Monongalia, Tucker, Barbour, Harrison, Tyler, Doddridge, Lewis, Upshur, Webster, Braxton, Gilmer, Ritchie, Wood, Wirt, Roane, Jackson, Putnam, Kanawha, Fayette, Summers, Mercer, McDowell, Mingo, Wayne, Cabell, Lincoln, Logan, Wyoming, Raleigh, Boone	March 31, 2015	Severe Winter Storm, Flooding, Landslides, and Mudslides
4093	Preston, Taylor, Tucker, Barbour, Randolph, Pendleton, Upshur, Lewis, Braxton, Webster, Pocahontas, Nicholas, Clay, Kanawha, Fayette, Boone, Raleigh, Wyoming	November 27, 2012	Hurricane Sandy
4071	All counties except Hancock, Brooke, Ohio, Monongalia, Marion, Mineral, Hampshire, Morgan	July 23, 2012	Severe Storms & Straight-Line Winds
3358	Statewide	October 29, 2012	Hurricane Sandy
3345	Statewide	June 30, 2012	Severe Storms

2.0 RISK ASSESSMENT

§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.

Section Overview

A risk assessment analyzes "the potential for damage, loss, or other impacts created by the interaction of hazards with community assets" (FEMA, 2013). The risk assessment section contains information on identified hazards that threaten the region, the vulnerability of the area as it relates to its assets and a list of community assets for Region VII counties.

Changes in 2017

The PDC standardized the hazard list for this update. The 2012 version of the plan considered different hazards based on those included in the original, county-only mitigation plans. The PDC opted to make this change to allow for comparisons, regional collaborations for mitigation and preparedness, etc. See Table 2.1 for a description of the hazard changes. The hazard list included in this update was generated by the steering committee at its first meeting and best captures the priorities that concern the participating jurisdictions.

This section also includes an updated vulnerability assessment (i.e., loss estimate) process to encourage greater acceptance and use of the material at the local level. Previous loss estimates, even back to the county-only versions, were based on impacts to the asset inventory. The revised methodology included in this plan is, in some ways, more general. It looks at a variety of impacts, including structural dollar losses along with social and public health impacts.

2.1 HAZARDS & VULNERABILITY

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

§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.

2.1.1 Hazard Analysis

The goal of the hazard analysis section is to identify those naturally-occurring, technological and human-caused hazards that pose a risk to Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker, and Upshur Counties and their various municipalities. Current conditions within the counties and historical hazard occurrences inform each hazard profile. Each hazard profile includes the following components: a brief overview of the hazard, location and extent, public health impacts and social vulnerability, historical occurrences, loss and damages, probability and severity calculation, and a risk map detailing locations within the counties that are most vulnerable to each hazard.

2.1.2 Hazard Identification

Historically, Region VII has been vulnerable to a number of natural hazards that disrupt lives and damage or destroy property. This mitigation plan takes the following list of natural hazards present in the region into consideration.

- Drought
- Flooding
- Tornados

Non-natural or human-caused hazards are also included in this risk assessment. Non-natural, technological and human-caused hazards analyzed in this risk assessment include:

- Acts of Violence
- Hazardous Materials (HazMat)
- Infrastructure Interruptions

During the first steering committee meeting members reviewed hazards profiled in the Region VII Regional Hazard Mitigation Plan (2012), and discussed the hazards to be eliminated added or combined.

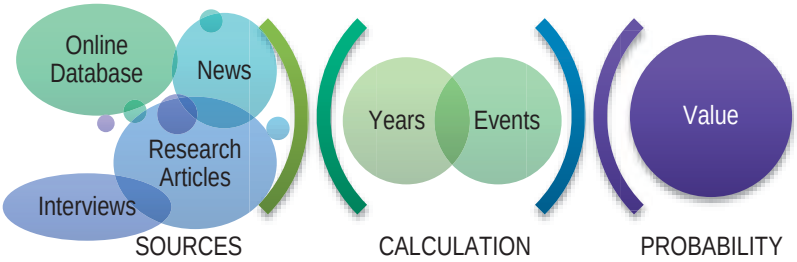
Table 2.1

COMPARISON OF HAZARDS

Region VII Regional Hazard Mitigation Plan (2012)	Counties That profiled Hazard in 2012	Region VII Hazard Mitigation Plan (2017)	Reason for Change (where appropriate)
Dam Failure	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Dam Failure	N/A
Drought	Barbour, Braxton, Lewis, Randolph, Tucker, Upshur	Drought	N/A
Earthquake	Barbour, Braxton, Lewis, Randolph, Upshur	Earthquake	N/A
Flooding	Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker, Upshur	Flooding	N/A
Hailstorm	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Severe Storms	Combined – Hailstorm, Thunder/Lightning, and Windstorm & Tornado
Hazardous Materials Incident	Barbour, Braxton, Lewis, Randolph, Tucker	Hazardous Materials	N/A
Technological Hazards	Gilmer, Lewis, Randolph	N/A	Added to Hazardous Materials
Land Subsidence	Braxton, Gilmer, Lewis, Randolph, Upshur	Land Subsidence	Combined – Land Subsidence and Landslide
Landslide	Braxton, Gilmer, Lewis, Randolph, Upshur	Land Subsidence	Combined – Land Subsidence and Landslide
Terrorism	Braxton, Gilmer, Lewis, Randolph, Upshur	Acts of Violence	Combined – Terrorism from the 2012 plan with, Active Shooters and Civil Unrest.
Thunderstorm/Lightning	Braxton, Gilmer, Lewis, Randolph, Upshur	Severe Storms	Combined – Hailstorm, Thunder/Lightning, and Windstorm & Tornado
Urban fire	Braxton, Gilmer, Lewis, Upshur	Major Fires	Combined - Urban and Wildfires
Windstorm/Tornado	Braxton, Gilmer, Lewis, Randolph, Tucker, Upshur	Severe Storms	Combined – Hailstorm, Thunder/Lightning, and Windstorm & Tornado
Winter Storm	Braxton, Gilmer, Lewis, Randolph, Tucker, Upshur	Winter Storms	N/A
Wildfires	Braxton, Gilmer, Lewis, Randolph, Upshur	Major Fires	Combine - Urban and Wildfires
Epidemic	Randolph	N/A	Committee recommended removing from the current update
Infestation	Randolph	N/A	Committee recommended removing from current update
Temperature – Extreme Heat	Braxton, Randolph	Extreme Temperatures (Heat and Cold)	Added – Extreme Cold
Utility Failure	Braxton, Upshur	Infrastructure Interruption	Combined – Utility Failure from 2012 plan with Source Water Contamination, and Roadway Hazards

2.1.3 Probability vs. Severity

One of the components of the risk assessment is determining both the probability of a hazard occurring and the potential severity of that hazard event. This process helps identify which hazards pose the most significant risk to Region VII and its municipalities. The probability and severity of an event are largely based on historical research. The probability of an event happening is determined based on the number of events that have occurred within a certain timeframe. The timeframe is based on information available from different resources and varies depending on the data.



The probability of occurrence is broken down into five categories as seen in the table below.

TABLE 2.2 PROBABILITY

Value	*Description*	*Definition*
3.1+	Frequent	Likely to occur frequently
1.6 - 3	Probable	Will occur several times in a year
0.7 – 1.5	Occasional	Likely to occur sometime during a year
0.3 – 0.6	Remote	Unlikely to occur in a year
0 – 0.2	Improbable	So unlikely that it can be assumed it will not occur in a year

The chance of occurrence of a hazard within the next year can be quantified based on historical data. This can be expressed in a numerical measure or as a percentage of 0-100 percent. It is calculated by adding the total occurrences of a specific hazard and dividing it by the years of data. For example, if there have been seven earthquakes in a region between 1950 and 2016 (66 years), the quantitative probability would be calculated by dividing seven events by 66 years. The result would be 0.10 or 10% chance of earthquake, roughly one every ten years. The percentage would then indicate an 'improbable' probability of occurrence,

based on the information presented in the table above. This formula for calculating probability will be used when appropriate (i.e. historical data is available).

Number of events		7			
= Probability	OR	= 0.10	OR	1 time every 10 years	
Number of years		66			

Although some hazards have zero recorded occurrences, the risk still exists. Since non-natural hazards generally do not depend on weather patterns to occur, they are not informed by this type of historical data. Non-natural and human-caused hazards are nearly impossible to assign a measurement of probability.

The severity of an event is based on three main factors: 1) the historical deaths, injuries, and property/crop damage; 2) the extent of potential secondary and/or cascading impacts of the hazard and; 3) the potentially impacted geographic area as determined through risk mapping. Generally, the severity estimations will be less exact than probability estimations. The four classifications of severity are shown in the table below.

TABLE 2.3 SEVERITY

Description	*Definition*
Catastrophic	Death or major structural loss
Critical	Severe injury, severe illness, or marginal structural damage
Marginal	Minor injury, minor illness, or structural damage
Negligible	Less than minor injury, illness or structural damage

The combination of hazard probability and hazard severity results are shown in the table below, known as the risk assessment matrix. The matrix is designed to show the hazards that are of most concern to Region VII and its municipalities.

TABLE 2.3 RISK ASSESSMENT MATRIX

		PROBABILITY				
		Frequent	*Probable*	*Occasional*	*Remote*	*Improbable*
SEVERITY	*Catastrophic*	High	High	High	Moderate	Moderate
	Critical	High	High	Moderate	Moderate	Moderate
	Marginal	Moderate	Moderate	Moderate	Moderate	Low
	Negligible	Moderate	Moderate	Low	Low	Low

In the table below, each hazard is located within the risk assessment matrix based on the research and analysis of each hazard. For more detailed information, refer to each hazard profile section.

Table 2.4

HAZARD SEVERITY	HAZARD PROBABILITY				
	Frequent	Probable	Occasional	Remote	Improbable
Catastrophic (4)		Flooding			
Critical (3)	LANDSLIDES WINTER STORMS	Severe Storms Winter Storms	HazMat	Acts of Violence Major Fire ACTS OF VIOLENCE	Dam Failure
Marginal (2)	SEVERE STORMS		Drought Extreme Temperatures Infrastructure Interruption	Earthquake Landslides	
Negligible (1)					

2.1.4 Complicating Variables

Direct consequences of disasters can include fatalities, injuries, and damages to humans, animals or property. However, disasters do not end there; there are a number of indirect effects, both tangible and intangible associated with disasters. Some examples of these include loss of livelihood and income, loss of community and population, mental and psychosocial impacts, costs of rebuilding, repair or replacement, loss of inventory, wages and tax revenue, etc. (Coppola, 2015). All of these also have a cost associated with them but it is much more difficult to assign a specific dollar value and quantify accurately. For the purposes of this analysis, the primary focus of loss estimates will be direct consequences of the given hazard.

A number of situations could occur that would result in a disruption to a number of critical systems throughout the region. Some hazards are complicated by a series of loosely-related variables; these are often considered *cascading hazards*. For example, high winds may cause sporadic damage throughout the county, but often do not become a significant countywide concern until a large number of residents are without power. In addition to weather-related power outages, cascading hazards in Region VII could include (but not be limited to) the following.

- Damage to infrastructure (i.e. roads, bridges, tunnels, pipes, utility poles etc.) and to residences following flooding
- Flooding of downstream areas in the event of a dam failure
- Drinking water supply shortages and contamination following severe and prolonged drought conditions or floods

- Power outages, ruptured gas lines, etc. following earthquakes or severe weather
- Public health concerns following flooding conditions or a HazMat incident
- Road closures resulting from land subsidence

The complicating variables related to each hazard are described within the profiles. The information presented is based on worst-case scenario events; a single event may not always reach all impacts described. However, it is important to understand that the impacts of hazards go beyond what is seen immediately after the event. The effects of one event can last months or even years, especially where public health, social, economic, environmental and infrastructure impacts are concerned.

2.1.5 Hazards and Climate Change

Many natural hazards are related to climate such as droughts, severe weather, floods and wildfires. There is an important distinction between weather and climate. Weather refers to the atmospheric conditions of a geographical region over a short period of time, such as days or weeks. Climate, in contrast, refers to the atmospheric conditions of a geographical area over long periods of time, such as years, or even decades (Keller & Devecchio, 2015, pp. 406-407).

According to the U.S. Global Change Research Program (2016), there are several weather and climate changes that have already been observed in the United States.

- Since recordkeeping began in 1895, the average U.S. temperature has increased by 1.3°F to 1.9°F with most of the increase happening since 1970. In addition, the first decade of the 2000s has been the warmest on record.
- The average precipitation across the U.S. has increased since 1900 with some areas experiencing higher than the national average and some lower. Heavy downpours are increasing, especially over the last 30-50 years.
- Drought events have increased in the west. Changes in precipitation and runoff, combined with changes in consumption and withdrawal, have reduced surface and groundwater supplies in many areas.
- Some types of severe weather events have experienced changes; heat waves are more frequent and intense, and cold waves have become less frequent and intense overall.
- The intensity, frequency, and duration of North Atlantic hurricanes have increased since the early 1980s.

Climate change can have a significant impact on human health and the environment. The changes mentioned above can affect the environment by leading to changes in land-use, ecosystems, infrastructure conditions, geography and agricultural production. Extreme heat, poor air quality, reduced food and water supply and quality, changes in infectious agents and population displacement can lead to public health concerns such as heat-related illnesses, cardiopulmonary illnesses, food, water and vector-borne diseases and have consequences on mental health and stress (USGCRP, 2016).

The National Climate Assessment (NCA) defined climate trends for national U.S. regions in 2014. The major trends are seen to be

- wildfires and heat waves on the west coast,
- rising temperatures and increased severity and frequency of winter storms in the middle of the country,
- more rain and flooding in the Midwest and northeastern parts of the country, and
- an increase in sea levels in the mid-Atlantic with an increase of hurricane activity in the southeastern states.

In West Virginia, the trend will be an increase in precipitation which will lead to more events of hazards such as flooding, mass movements, and possible dam failures. This is detailed in the map below.

2.1.6 Social Vulnerability and Public Health

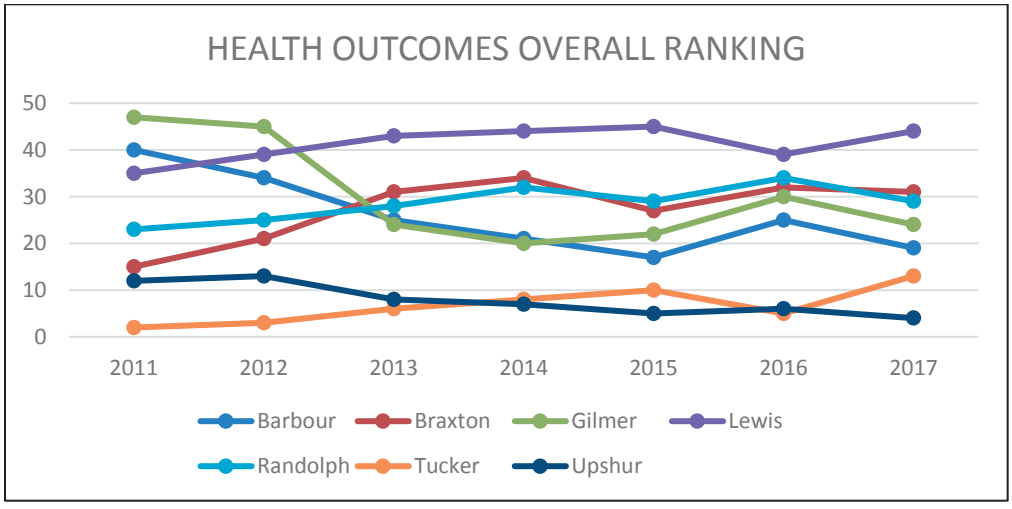
Vulnerable populations, populations of concern, or populations at risk are defined as those individuals or groups of people who are more exposed to the risks of the impacts of a hazard because of their age, gender, income, occupation, disability, physical or mental health, literacy, religion, education, or ethnicity.

Some groups face a number of stressors related to both climate and non-climate factors. For example, people living in impoverished urban or isolated rural areas, floodplains, coastlines, and other at-risk locations are more vulnerable not only to extreme weather and persistent climate change but also to social and economic stressors. Many of these stressors can occur simultaneously or consecutively. Over time, this “accumulation” of multiple, complex stressors is expected to become more evident as climate impacts interact with stressors associated with existing mental and physical health conditions and with other socioeconomic and demographic factors

Some populations of concern demonstrate relatively greater vulnerability to the health impacts of climate change. The definitions of the following key concepts are important to understand how some people or communities are disproportionately affected by climate-related health risks. Definitions are adapted from the Intergovernmental Panel on Climate Change (IPCC) and the National Research Council (NRC) (USGCRP, 2016).

It is important to understand the impacts each hazard could potentially have on different individuals and groups of people. One hazard may affect one group of people differently than another. For example, severe weather conditions may affect children and elderly adults more than women; or the need to evacuate would affect people with disabilities and those who cannot read more than those who are of a certain religion, while acts of violence may be directed at a group of people of a certain religion and not at children.

The annual County Health Rankings reports for West Virginia published by the University of Wisconsin Population Health Institute and the Robert Wood Johnson Foundation include information on public health factors that affect the overall health outcomes for each county in the state. The study considers health factors such as health behaviors (tobacco use, diet and exercise, alcohol and drug use, sexual activity), clinical care (access to care, quality of care), social and economic factors (education, employment, income, family and social support, community safety), and the physical environment (air and water quality, housing and transit). All of these factors are given a certain percentage that influences the overall health outcomes (length of life and quality of life) (UWPHI, 2017). Each county in the state is ranked from 1 to 55, 1 is the highest ranking indicating the best health outcome or health factors. Reports go back to the year 2011; health outcome rankings for Region VII counties since then until 2017 are shown below.



2.1.7 Hazard Snapshots

The following table contains a summary of all the hazards analyzed, presented in alphabetical order. Data within the table includes the following information:

- **Description**: Definition of the hazard.
- **Period of Occurrence**: The typical time of the year events of this type can occur
- **Number of Years**: Actual number of years data is available based on the 'record years'.
- **Number of Events**: The times that event has occurred within the timeframe of the 'number of years' according to the sources.
- **Probability**: The calculation of occurrence of a certain event based on number of years and number of events, as described above (ranging from 0.0 to 7.0, based on the highest probability calculated in this table; probability can be higher if more events take place).
- **Severity**: Based on historical impacts
- **Risk**: Low, medium or high based on the risk assessment matrix
- **Warning Time**: The amount of time that passes from when the event is detected to when it occurs
- **Total Damages to Date**: Amount in dollars of damages to property or cost of repair.
- **Vulnerable Populations**: Lists the type of populations that may be vulnerable to the specific hazard.
- **Impacts**: To include public health, social, economic, environmental and infrastructure impacts of the hazard on the community.
- **Cascading Effects**: primary hazards can have secondary effects; one hazard could give way to other consequences.

For more complete information, refer to each hazard profile for detailed descriptions, historical occurrences, methods of loss and damage estimation as well as the probability and severity calculation, and risk area maps.

TABLE 2.5 HAZARD SNAPSHOTS

Hazard	*Description*	*Period of Occurrence*	*# of Years*	*# of Events*	*Probability*	*Severity*	*Regional Risk*	*Warning Time*	*Total Damages to Date*	*Vulnerable Populations*
Acts of Violence	"An intentional use of force or power, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, psychological harm, mal-development, or deprivation" (WHO).	At any time throughout the year	N/A	N/A	N/A Remote	Critical	Moderate	None Days Weeks	$0	• Everyone surrounding the incident • Targeted populations (varies)
	Public Health Impacts:	Death, injury, illness (depending on type of attack), PTSD, exacerbation of chronic illnesses								<u>Cascading effects:</u> Dam failure HazMat Radiological Fires
	Social Impacts:	Distrust of groups of people, displacement of population, disruption of normal activities, hysteria								
	Economic Impacts:	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up								
	Environmental Impacts:	Water quality (depending on type of attack), air quality (depending on type of attack)								
	Infrastructure Impacts:	Power outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)								
Dam Failure	"The sudden breach of a river water containment wall, known as a dam, which results in a sudden and uncontrolled downstream rush of water and debris." (Haddow, Bullock, & Coppola, 2014, pg.389).	At any time throughout the year	169	2	0.01 Improbable	Critical	Moderate	Days Weeks Months	$0	• People living within the risk area • People who cannot evacuate
	Public Health Impacts:	Death, injury, illness (water-borne), standing water, exacerbation of chronic illnesses								<u>Cascading effects:</u> Flood
	Social Impacts:	Displacement of population, disruption of normal activities, evacuation								
	Economic Impacts:	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up								
	Environmental Impacts:	Erosion, water quality, change in topography, change in natural habitat								
	Infrastructure Impacts:	Power outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)								

TABLE 2.5 HAZARD SNAPSHOTS

Hazard	*Description*	*Period of Occurrence*	*# of Years*	*# of Events*	*Probability*	*Severity*	*Regional Risk*	*Warning Time*	*Total Damages to Date*	*Vulnerable Populations*
Drought	"Extended period of unusually low precipitation that produces a temporary shortage of water for people, animals, and plants (Keller & DeVecchio, 2015).	Summer months or periods of low precipitation	33	22	.66 Occasional	Marginable	Moderate	Weeks Months	$0	• Agricultural workers
	Public Health Impacts:	Illness (water-borne), insect infestations, compromised food, standing water								Cascading effects: Extreme temperatures Mass movements
	Social Impacts:	Disruption of recreational activities								
	Economic Impacts:	Loss of crops and livestock								
	Environmental Impacts:	Erosion, water quality, change in topography, change in natural habitat, air quality								
	Infrastructure Impacts:	Power outages								
Earthquake	"Sudden, rapid shaking of the earth's crust cause by the breaking and shifting of tectonic plates beneath the earth's surface" (Haddow, Bullock, & Coppola, 2014, pg.34).	At any time throughout the year	17	17	1 Occasional	Marginable	Moderate	None	$0	• Everyone
	Public Health Impacts:	Death, injury, PTSD, Exacerbation of chronic illnesses								Cascading effects: Mass movements HazMat Radiological
	Social Impacts:	Displacement of population, disruption of normal activities, hysteria								
	Economic Impacts:	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up								
	Environmental Impacts:	Erosion, air quality, water quality, change in natural habitat								
	Infrastructure Impacts:	Power and water outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)								

TABLE 2.5 HAZARD SNAPSHOTS

Hazard	*Description*	*Period of Occurrence*	*# of Years*	*# of Events*	*Probability*	*Severity*	*Regional Risk*	*Warning Time*	*Total Damages to Date*	*Vulnerable Populations*
Extreme Temperatures	"Major diversions in average seasonal temperatures. Extreme heat occurs when temperatures of ten or more degrees above the average high temperature persist across a geographic region for several days or weeks. There is no standard definition for extreme cold, but generally refers to periods of colder than normal conditions." (Haddow, Bullock, & Coppola, 2014).	Any season, but generally summer and winter	21	71	3.38 Frequent	Marginable	Moderate	Hours Days	$450,000	• Children • Elderly adults • Poor
	Public Health Impacts:	Frostbite, heat stroke, exacerbation of chronic illnesses								<u>Cascading effects:</u> Severe weather
	Social Impacts:	Disruption of recreational activities								
	Economic Impacts:	Disruption of business and income								
	Environmental Impacts:	Air quality, water quality								
	Infrastructure Impacts:	Power outages, damage to structures								
Flood	"An overabundance of water that engulfs land and other property that is normally dry" (Haddow, Bullock, & Coppola, 2014, pg.32.)	At any time throughout the year	21	256	12.19 Frequent	Critical	High	Hours Days	$21.6M	• Homeless • Poor • Children • Elderly Adults • People living within risk area • People who cannot evacuate
	Public Health Impacts:	Death, injury, illness (water-borne), standing water, exacerbation of chronic illnesses								<u>Cascading effects:</u> Dam failure Mass movements
	Social Impacts:	Displacement of population, disruption of normal activities, hysteria, evacuation								
	Economic Impacts:	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up								

TABLE 2.5 HAZARD SNAPSHOTS

Hazard	*Description*	*Period of Occurrence*	*# of Years*	*# of Events*	*Probability*	*Severity*	*Regional Risk*	*Warning Time*	*Total Damages to Date*	*Vulnerable Populations*
	Environmental Impacts:	Erosion, water quality, air quality, change in natural habitats								
	Infrastructure Impacts:	Power and water outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)								
HazMat	"Hazardous materials are chemical substances that if released or misused can pose a threat to environment or personal health" (Haddow, Bullock, & Coppola, 2014, pg.55).	At any time throughout the year	384	35	10.97 Frequent	Critical	High	None	$0	• Everyone surrounding the incident
	Public Health Impacts:	Death, injury, illness, PTSD, compromised food								Cascading effects: Radiological
	Social Impacts:	Displacement of population, disruption of normal activities, hysteria, evacuation								
	Economic Impacts:	Loss or damage to homes, businesses and crops, disruption to businesses and income, cost of clean-up								
	Environmental Impacts:	Air quality, water quality, change of natural habitats								
	Infrastructure Impacts:	Loss or damage to structures and transportation infrastructure (roads, bridges, rail)								
Infrastructure Interruption	"Deteriorating infrastructure, long known to be a public safety issue, has a cascading impact on our nation's economy, impacting business productivity, gross domestic product, employment, personal income, and international competitiveness." (ASCE, 2016)	At any time	N/A	N/A	Frequent	Marginal	Moderate	None	N/A	• People living within risk area • People who cannot evacuate
	Public Health Impacts:	Death, injury, illness, PTSD, compromised food, compromised drinking water								Cascading effects: Hazmat Radiological Flood
	Social Impacts:	Displacement of population, disruption of normal activities, evacuation								
	Economic Impacts:	Loss or damage to homes, businesses and crops, disruption to businesses and income, cost of clean-up								
	Environmental impacts:	Air quality, water quality, change in natural habitats, erosion								

TABLE 2.5 HAZARD SNAPSHOTS

Hazard	*Description*	*Period of Occurrence*	*# of Years*	*# of Events*	*Probability*	*Severity*	*Regional Risk*	*Warning Time*	*Total Damages to Date*	*Vulnerable Populations*
	Infrastructure Impacts:	Short-term and/or long-term or permanent loss of critical infrastructure								
Landslide	Sinking, settling, or other lowering of parts of the crust of the Earth (Keller & DeVecchio, 2015)	At any time throughout the year. Increased chance following long periods of heavy rain, snowmelt, or near construction activity	2	14	7 Frequent	Critical	High	Days Weeks Months	$1.5M	• People living within the risk area • People who cannot evacuate
	Public Health Impacts:	Death, injury								<u>Cascading effects:</u> Earthquakes
	Social Impacts:	Displacement of population, disruption of normal activities, evacuation								
	Economic Impacts:	Loss or damage to homes and businesses, disruption to businesses and income, cost of clean-up								
	Environmental Impacts:	Erosion, change in topography, change of natural habitats								
	Infrastructure Impacts:	Loss or damage to structures and transportation infrastructure (roads, bridges, rail)								
Severe Weather	Severe weather "affects considerable portions of North America and cause significant death and destruction each year" (DeVecchio & Keller, 2015). Includes instances of hail, heavy snow, high wind, lighting, strong wind, thunderstorm wind, winter storms and winter weather.	The various types of severe weather can occur year-round	59	264	4.47 Frequent	Marginal	Moderate	Days Weeks	$3M	• Children • Elderly adults • Poor
	Public Health Impacts:	Exacerbation of chronic illnesses								
	Social Impacts:	Disruption of normal and recreational activities, evacuation								

TABLE 2.5 HAZARD SNAPSHOTS

Hazard	*Description*	*Period of Occurrence*	*# of Years*	*# of Events*	*Probability*	*Severity*	*Regional Risk*	*Warning Time*	*Total Damages to Date*	*Vulnerable Populations*
	Economic Impacts:	Loss or damage to homes and businesses, disruption to businesses and income, cost of clean-up								Cascading effects: Flood Drought
	Environmental Impacts:	Air quality, water quality, change of natural habitats, erosion								
	Infrastructure Impacts:	Power and water outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)								
Major Fires	"A large, often out-of-control burning of trees, fallen wood, detritus, and other debris in uninhabited or sparsely inhabited forest or grasslands" (Haddow, Bullock, Coppola, 2014).	At any time throughout the year. Increased chance following dry weather	10	32	33.2 Frequent	Critical	High	None Hours	$0	• Everyone surrounding the incident
	Public Health Impacts:	Illness (breathing), death, injury (burns), PTSD								Cascading effects: Flood
	Social Impacts:	Disruption of normal activities, displacement of population, evacuation								
	Economic Impacts:	Loss or damage to homes and businesses, disruption to businesses and income, cost of clean-up								
	Environmental Impacts:	Air quality, water quality, change of natural habitats, erosion								
	Infrastructure Impacts:	Power and water outages, loss or damage to structures								

2.2 PROFILE HAZARDS

§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.

Section Overview

Several natural and human-caused hazards affect Region VII, as noted in Section 2.1. This section contains a profile of each hazard considered by this plan, which provides details on how the hazard impacts the area. Within each profile, research and historical data informs the following elements:

- **Hazard Overview**: Defines the hazard.
- **Possible Causes**: Describes a variety of causes that can contribute to the occurrence of a hazard.
- **Location & Extent**: Identifies the physical places in the region that are vulnerable to the hazard and the severity of a hazard in a given location.
- **Historical Occurrences**: Summarizes significant past events related to the hazard.
- **Impact & Social Vulnerability**: Describes impacts on different topics such as health, the environment, or infrastructure that may result from the hazard as well as specific populations that may be vulnerable.
- **Loss & Damages**: Outlines the methods used for loss amounts (of deaths, injury and/or property damage depending on information available) and estimates based on historical information and vulnerable populations, structures, and infrastructure.
- **Probability & Severity Calculations**: Detailed methods of calculating probability and severity of each hazard.
- **Risk Map**: Graphically shows the geographic locations in the counties that are vulnerable to each hazard.

2.2.1 Acts of Violence

"An intentional use of force or power, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation" (WHO).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
At any time throughout the year	None / Days / Weeks	MODERATE

As the nation has seen an upswing in violent acts (ABC, 2017), it is necessary to profile types of violence and the potential impacts they could have in Region VII's counties. Acts of violence, for the purpose of this plan, encompass those acts that law enforcement does not consider routine. This profile will analyze the following topics:

- Terrorism,
- Active assailant (including workplace and school violence), and
- Civil unrest.

"The agreed upon definition of an active shooter by U.S. government agencies - including the White House, U.S. Department of Justice/FBI, U.S. Department of Education, and U.S. Department of Homeland Security/Federal Emergency Management Agency - is an individual actively engaged in killing or attempting to kill people in a confined and populated area" (FBI, 2013). In most cases, active shooters use firearms and there is no pattern or method to their selection of victims (Alice Training Institute, 2017).

Region VII has what could be considered targets for terrorism, government buildings, industrial facilities and mass gathering points (USDHS, 2013). Race, economic diversity and perceived political injustice are leading causes of protests and riots. Due to employment and economic factors, the growing tensions over political ideology and alleged authoritative abuse of power, the possibility of protests and counter-protests becoming violent and individuals looking to disrupt day-to-day operations of local government and businesses poses a significant threat.

The number of hate groups in the United States increased by three percent in 2016. These groups advocate and practice hatred, hostility or violence towards members of particular races, ethnicities, nations, religions, genders, or sexual orientations (Mangino, 2017). The Southern Poverty Law Center reports that the Ku-

Klux-Klan, American Nazi Party and Arian Strikeforce all have active groups in West Virginia (2016).

PUBLIC HEALTH

Survivors of violence will most likely experience common stress reactions lasting several days to a few weeks. These reactions can include the following:

- **Emotional Reactions:** Shock, fear, grief, anger, guilt, shame, helplessness, numbness, sadness.
- **Cognitive Reactions:** Confusion, indecisiveness, worry, shortened attention span, trouble concentrating.
- **Physical Reactions:** Tension, fatigue, edginess, insomnia, body aches, easily startled, tachycardia, nausea, loss of appetite.
- **Interpersonal Reactions:** distrust, conflict, withdrawal, irritability, loss of intimacy, feeling abandoned.

Some individuals may experience severe stress symptoms following a violent incident. Individuals experiencing the following are at a higher risk for posttraumatic stress disorder:

- **Intrusive Re-Experiencing:** Terrifying memories, nightmares, and flashbacks.
- **Extreme Emotional Numbing:** Inability to feel emotions, feeling empty.
- **Extreme Attempts to Avoid Disturbing Memories:** Such as through substance abuse.
- **Hyperarousal:** Panic attacks, rage, extreme irritability, intense agitation, acting out with violence.
- **Severe Anxiety:** Debilitating worry, extreme helplessness, compulsions or obsessions.
- **Severe Depression:** Loss of ability to feel hope, pleasure, or interest; feeling worthless, suicidal ideations or intent.
- **Dissociation:** Fragmented thoughts, spaced out, unaware of surroundings, amnesia (Nation Center for PTSD, 2010).

Treatment and support are critical to recovery. For most, the memories will not go away, but survivors can learn to manage responses to their memories. There

are several methods for that can be used to help survivors cope including, psychotherapy, medication, support groups and self-care (Riggs, 2017).

SOCIAL VULNERABILITY

Deciding which groups are vulnerable is challenging. There will always be variation between groups and the people within them in relation to the risks they face (Brown, 2004). However, the elderly, children, homeless persons, people with disabilities, religious groups and members of the LGBT community experience higher rates of exposure to violence (Phillips, Thomas, Fothergill, Blinn-Pike, 2010).

Between 2003 and 2013, the elderly reported 56% of all violent crimes (USDOJ, 2014). A 2009 study showed that almost 40% of all American children were victims of two or more violent acts (DOJ, 2009). In 2010, there were 113 violent acts against the homeless reported, twenty-four of the attacks were fatal (National Coalition for the Homeless, 2012). An analysis of the 2011 FBI hate-crime statistics show “LGBT people are more than twice as likely to be the target of a violent hate-crime as Jews or black people” (Potok, 2011).

HISTORICAL OCCURRENCES

Barbour County

On August 25, 2015, a fourteen year old student entered a second floor classroom at Philip Barbour High School with a gun and created a “hostage situation.” The rest of the school was evacuated while police negotiated with the teen. After approximately an hour, the teen released the hostages and surrendered to police. No injuries or fatalities were reported.

Tucker County

On November 18, 2013, Tucker County High School was evacuated for the second time in two school days due to a bomb threat. Students and faculty were removed from the school to buses where they remained for four and a half hours while the school was cleared by law enforcement. The first evacuation was the previous Friday when a message was found stored on a graphing calculator. The second incident was due to a handwritten note being found in one of the school’s bathrooms. There were no reported injuries or property damage, however there were costs due to the need for emergency services to respond and stage as well as the

proper law enforcement resources (i.e., bomb dogs) having to respond from Charleston.

Randolph County

On February 14, 2015, a man was booked into Tygart Valley Regional Jail on federal charges related to plotting attacks on the Mountain State Forest Festival and the Jennings Randolph Federal Center in Elkins. Cooperating witnesses testified the male subject acquired C-4 plastic explosives from a juvenile (the juveniles father used it for work) in exchange for marijuana. The subject planned to detonate the explosives at the festival and near the federal building and use snipers to attack first responders as they arrived on scene.

The male subject was also responsible for altering an AK-47 to fire automatically, using C-4 to blow up tree stumps, and placing a fake pipe bomb near the WVSP barracks in Elkins. The initial investigating agency, the Randolph County Sheriff's Department, brought the information to the WVSP and the FBI which led to a joint investigation and subsequent arrest and seizure of a stick and a half of C-4.

Upshur County

In May 2017, a 38 year old male became irate in the magistrates court causing the sheriff's office to be contacted. The male fled prior to sheriff deputies arriving and began calling 911 using profanity and threatening deputies. During one of the calls, the male threatened to load his truck with explosives and drive into the courthouse. The Upshur County Sheriff's Department obtained a warrant and deputies along with the West Virginia State Police arrested the male.

LOCATION & EXTENT

Acts of violence have the ability to affect a small area, such as a single business or government building or an entire city, county, or state. Due to the rise of workplace and school violence, drug manufacturing and use, "homegrown" and "lone-wolf" terrorists, and racially-motivated attacks, the entire region is at risk for acts of violence. The U.S. Department of Labor Statistics shows in 2015, nationwide, there were 417 workplace homicides, with 354 involving a firearm (DOL, 2015). A Centers for Disease Control study on school-associated violent death found between

14 and 34 school-age children are victims of homicide on school grounds annually in the U.S. (CDC, 2010).

Group protests, which have become more frequent in the current political climate, have the ability to become violent, close schools and businesses and block roadways and access to buildings (Callahan, 2017). Not all protests end in violence, the majority of protesting is peaceful. Violence is usually caused by the "crowd psychology," when in a crowd an individual is more likely to act like others, which means a few looking to engage violent behavior can sway a large group to act violently (Sarkis, 2011). If a terrorist is seeking self-glory, executing a preacher, priest, or rabbi will bring more attention that executing an average civilian. Houses of worship including churches and synagogues, are more often than ever before, hiring security forces and/or training their members how to prepare for and survive an attack (Mauro, 2016). Other common targets include airports and /or airplanes, other transportation infrastructure, public gathering spaces, and military installations. Political ideology can also lead to violence. Even the counties that make up Region VII can see political division within their communities. The pictures below are taken from Facebook and are on a page belonging to a group called Upshur County Resistance. The first picture appears to show a post and a comment potentially calling for violence against another group Upshur Indivisible. The second picture is also taken from the Upshur County Resistance page and shows dates, times, and locations of Upshur Indivisible's scheduled events.

[redacted] ▸ **Upshur County Resistance**
July 23 at 5:30pm ·

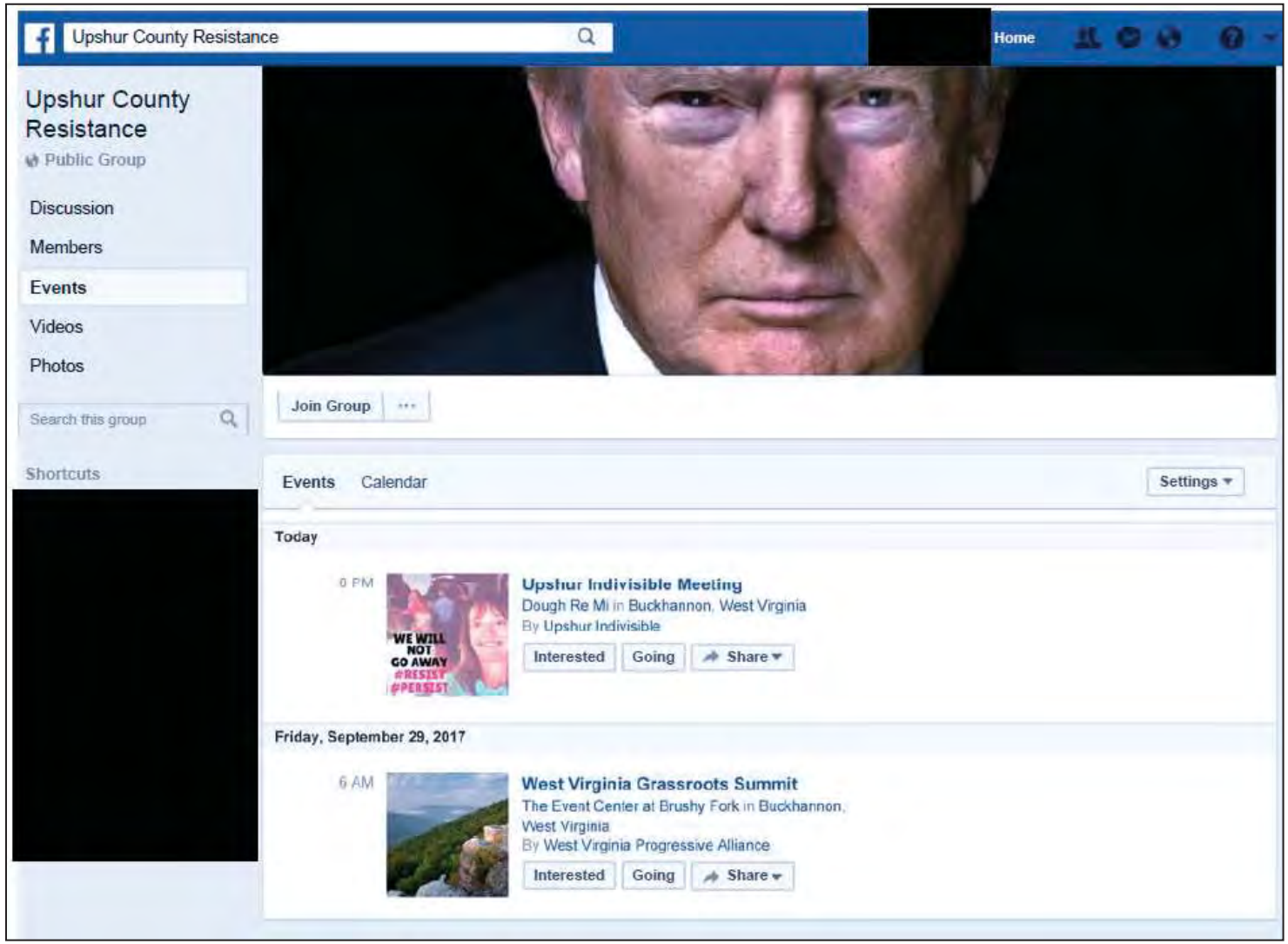
Attention. Our first call to arms. Look up Upshur County Indivisible and like/join. It is the enemy. Let's go.

3 Likes 10 Comments

Like Share

[redacted]

Like · 3 · July 27 at 7:06pm


Upshur County Resistance
Home
Upshur County Resistance
Public Group
Discussion
Members
Events
Videos
Photos
Search this group
Shortcuts
[redacted]
Join Group
Events
Calendar
Settings
Today
6 PM
WE WILL NOT GO AWAY #RESIST #PERSIST
Upshur Indivisible Meeting
Dough Re Mi in Buckhannon, West Virginia
By Upshur Indivisible
Interested
Going
Share
Friday, September 29, 2017
6 AM
West Virginia Grassroots Summit
The Event Center at Brushy Fork in Buckhannon, West Virginia
By West Virginia Progressive Alliance
Interested
Going
Share

According to *The Record Delta*, the FBI warned the event was the possible target of a counter protests of the Aryan Pagan Bikers, a white nationalist hate group. Additional security details were added and West Virginia Wesleyan College pulled their jazz band and choir from participating in the event. After the event local law enforcement reported there was only one counter protester seen at the event.

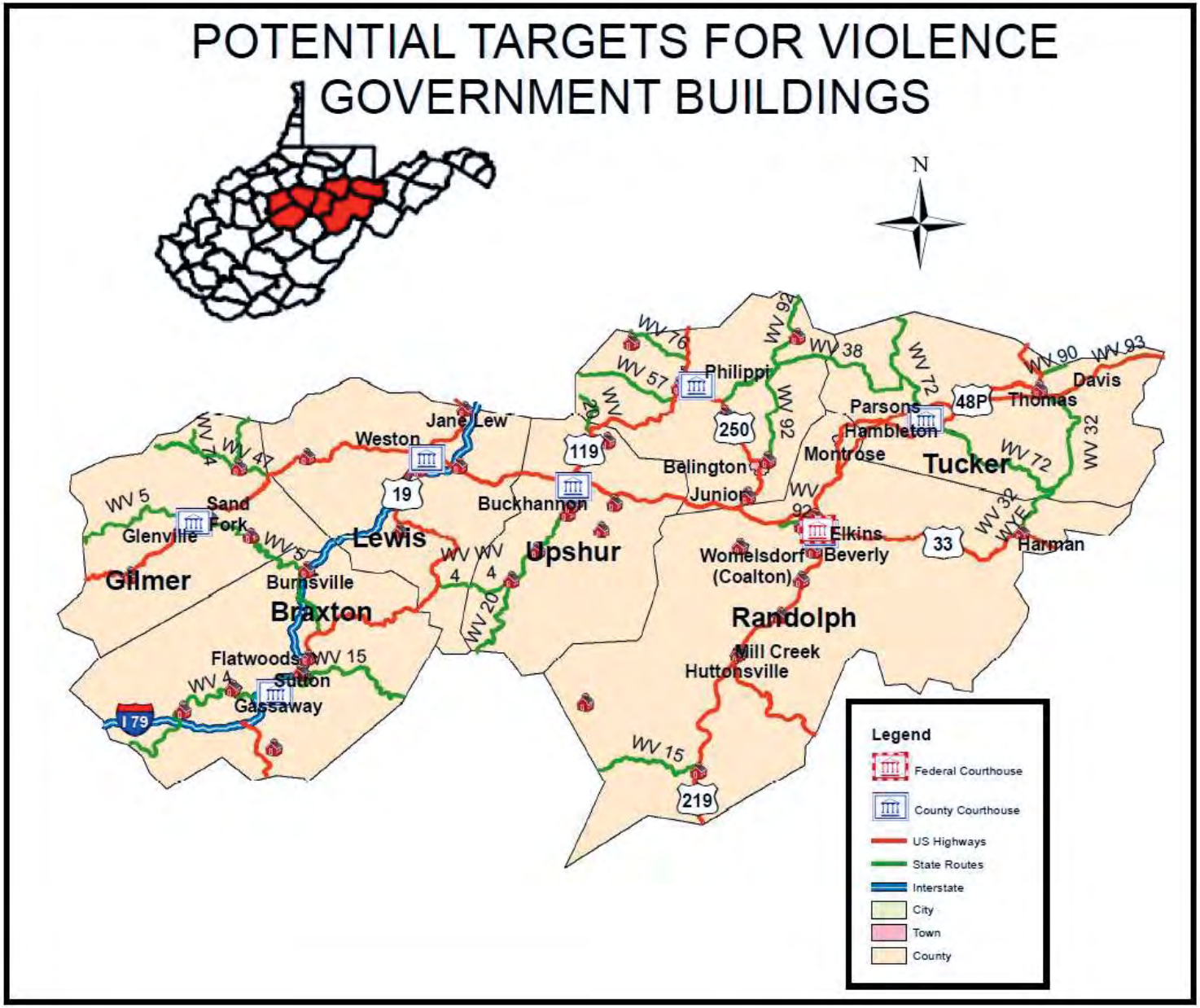
LOSS ESTIMATE

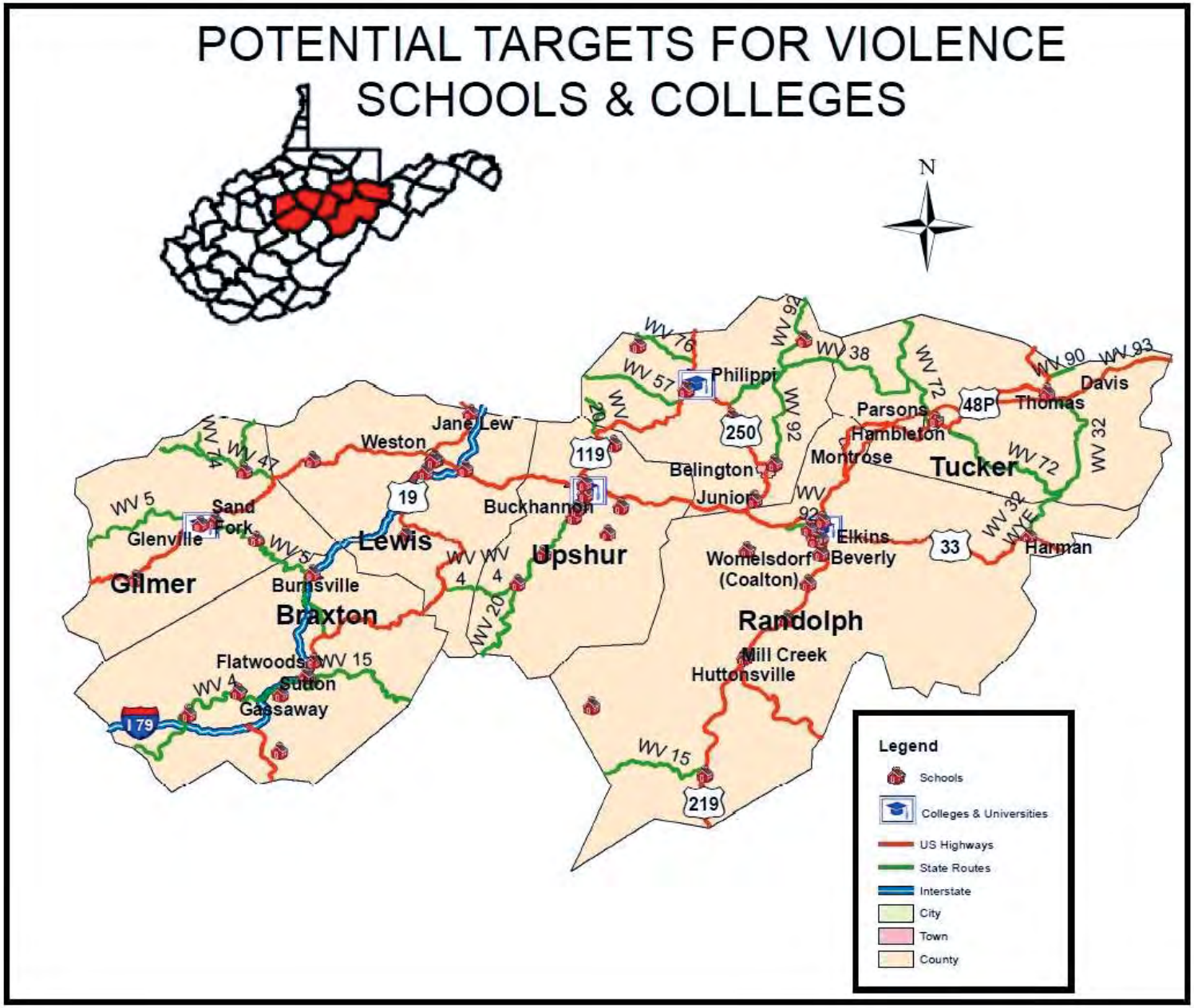
Estimating the economic impact of an act of violence, especially a terrorist attack, is a difficult task. Initial impact can be measured in immediate costs such as response to the event and closed businesses. The full economic impact would include long-term costs.

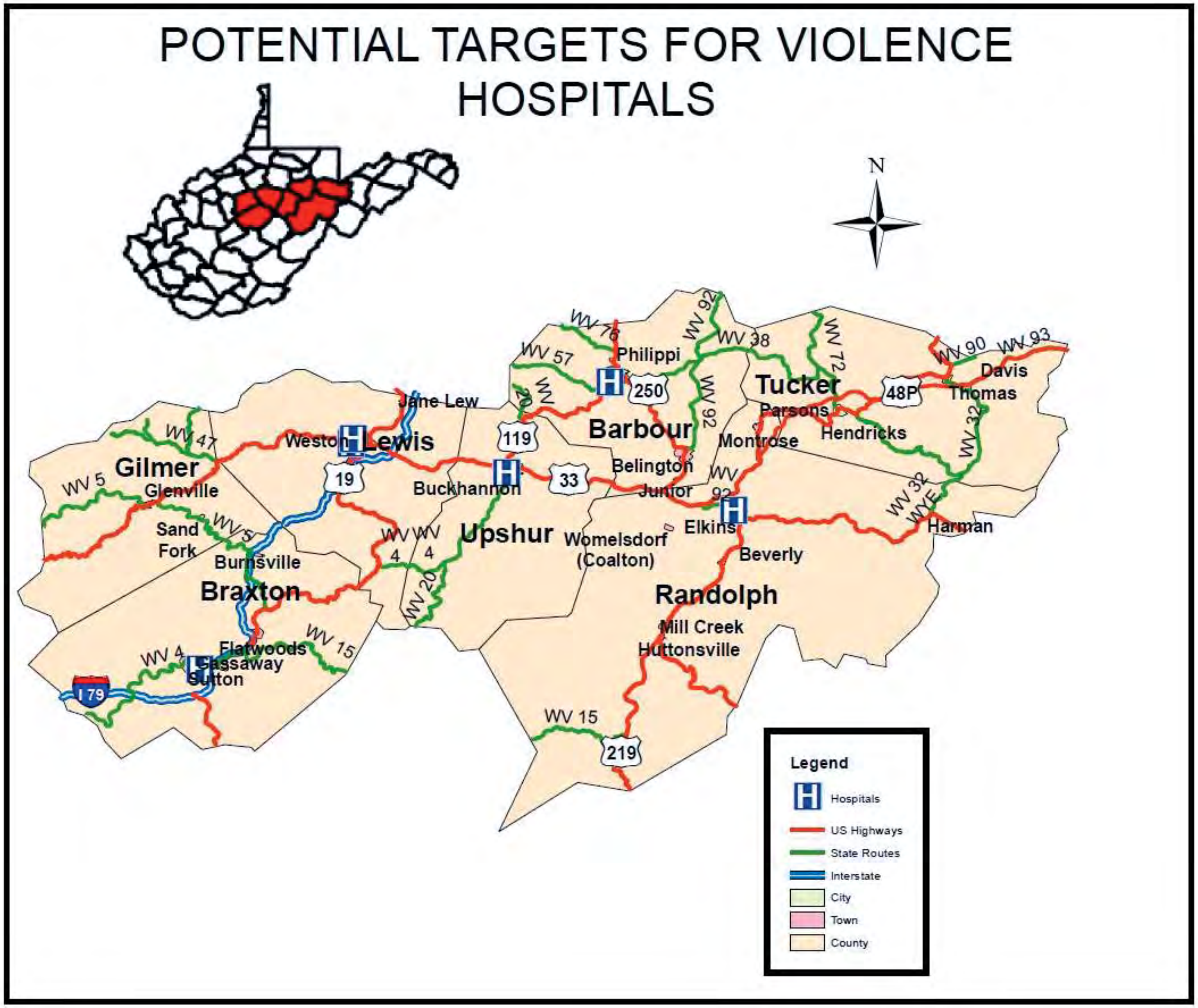
A large-scale event could significantly affect industry and/or government and privately owned infrastructure. An incident involving wastewater, drinking water or chemical facilities could have long term environmental effects. The potential losses due to these variables, makes it difficult to quantify the cost of repair or replacement of infrastructure.

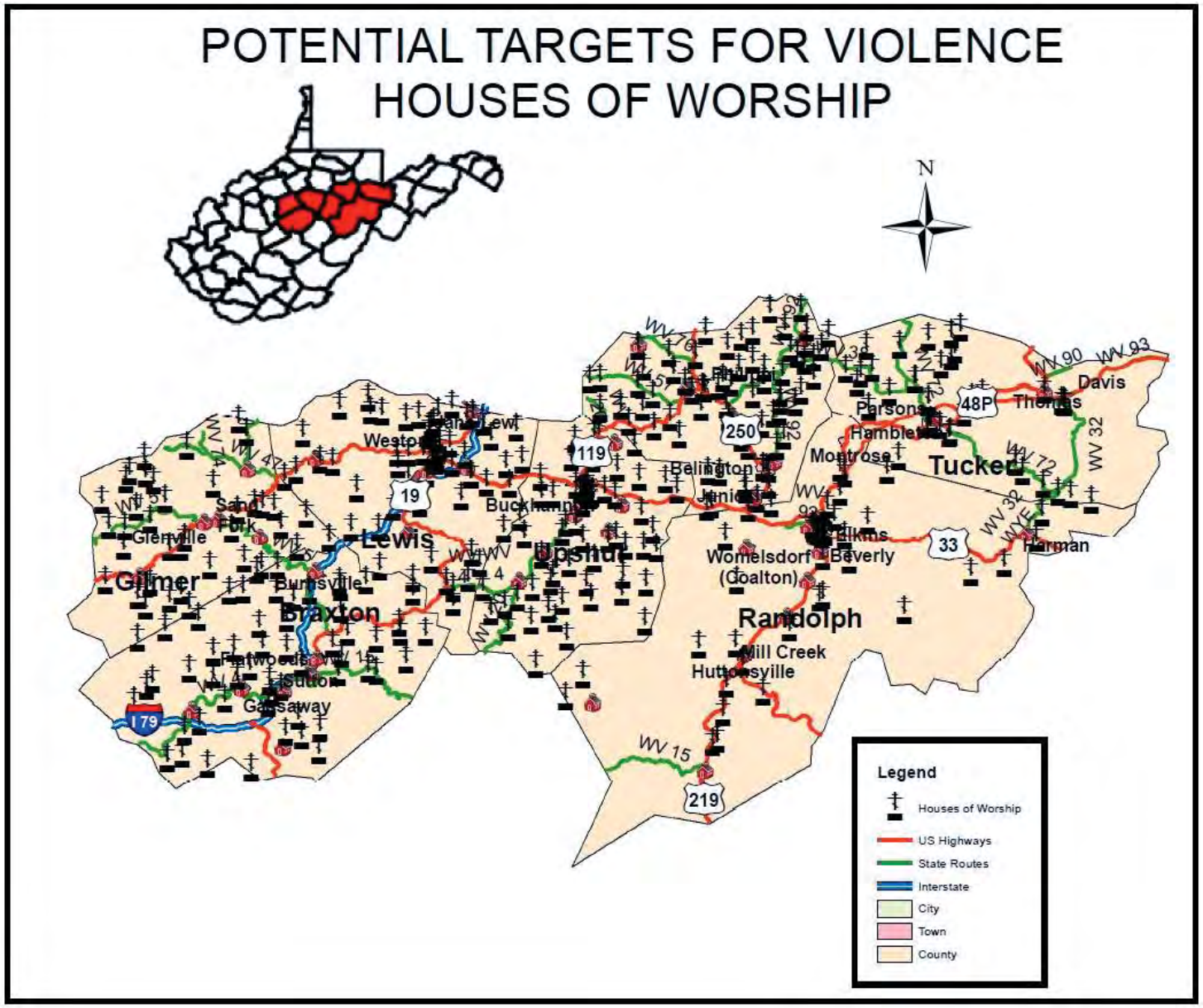
TABLE 2.2.1.1 ACTS OF VIOLENCE RISK CALCULATION

Probability		*Severity*		*Risk*
REMOTE		CRITICAL		MODERATE
The Counties that make up Region VII have had prior violent events, however they have been very infrequent	+	Acts of violence have the potential to cause serious injury and structural damage. Protests can also turn violent causing serious injuries to the participants	=	A combination of remote occurrence and critical level of severity puts this hazard at a moderate risk.


POTENTIAL TARGETS FOR VIOLENCE
GOVERNMENT BUILDINGS
N
Philippi
Jane Lew
Weston
Buckhannon
Belington
Junior
Parsons
Hambleton
Montrose
Tucker
Davis
Thomas
48P
250
119
19
Sand Fork
Glenville
Lewis
Upshur
Gilmer
Burnsville
Braxton
Flatwoods
Sutton
Gassaway
I 79
Elkins
Beverly
Womelsdorf (Coalton)
Randolph
Mill Creek
Huttonsville
Harman
33
219
WV 5
WV 4
WV 15
WV 20
WV 38
WV 72
WV 90
WV 93
WV 32
WV 92
Legend
Federal Courthouse
County Courthouse
US Highways
State Routes
Interstate
City
Town
County


POTENTIAL TARGETS FOR VIOLENCE
SCHOOLS & COLLEGES
N
Philippi
Jane Lew
Weston
Buckhannon
Belington
Junior
Parsons
Hambleton
Montrose
Tucker
Davis
Thomas
Elkins
Beverly
Womelsdorf
(Coalton)
Harman
Lewis
Upshur
Randolph
Gilmer
Braxton
Burnsville
Glenville
Sand
Fork
Flatwoods
Sutton
Gassaway
Mill Creek
Huttonsville
WV 76
WV 38
WV 57
WV 72
WV 90
WV 93
WV 32
WV 92
WV 5
WV 4
WV 20
WV 15
WV 47
WV 74
250
119
19
48P
33
I 79
Legend
Schools
Colleges & Universities
US Highways
State Routes
Interstate
City
Town
County


POTENTIAL TARGETS FOR VIOLENCE
HOSPITALS
N
Gilmer
Glenville
Sand
Fork
WV 5
WV 47
Lewis
Weston
Jane Lew
19
Braxton
Burnsville
Flatwoods
Gassaway
Sutton
WV 4
WV 15
I 79
Upshur
Buckhannon
WV 4
WV 20
119
33
Barbour
Philippi
Belington
Junior
250
WV 57
WV 76
WV 92
WV 38
Tucker
Parsons
Montrose
Hendricks
Thomas
Davis
48P
WV 72
WV 90
WV 93
WV 32
Randolph
Elkins
Beverly
Womelsdorf
(Coalton)
Mill Creek
Huttonsville
Harman
WV 15
219
Legend
Hospitals
US Highways
State Routes
Interstate
City
Town
County


POTENTIAL TARGETS FOR VIOLENCE
HOUSES OF WORSHIP
N
Lewis
Upshur
Randolph
Tucker
Gilmer
Braxton
Davis
Thomas
Parsons
Hambleton
Montrose
Belington
Junior
Buckhannon
Weston
Glenville
Sand Fork
Burnsville
Flatwoods
Gassaway
Womelsdorf (Coalton)
Beverly
Mill Creek
Huttonsville
Harman
48P
250
119
19
33
219
I 79
WV 15
WV 32
WV 72
WV 90
WV 93
WV 32
Legend
Houses of Worship
US Highways
State Routes
Interstate
City
Town
County

2.2.2 Dam Failure

"The sudden breach of a river water containment wall, known as a dam, which results in a sudden and uncontrolled downstream rush of water and debris." (Haddow, Bullock, & Coppola, 2014,).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
At any time throughout the year	Weeks/Days/Months	MODERATE

The West Virginia Department of Environmental Protection (WVDEP) defines a dam as "an artificial barrier or obstruction that impounds, or will impound, water" (WVDEP, 2009). In West Virginia, for a dam to be regulated by the state, it must be equal to or greater than 25 feet in height and contain 15 or more acre feet of water volume or be greater or equal to 6 feet in height and contain 50 or more acre-feet of water volume (WVDEP, 2009). Some federally owned dams, dams that do not normally impound water (such as some culverts), and dams built for agricultural purposes that have been demonstrated to not cause loss of life if the dam were to fail, may be exempted from state regulation (WVDEP, 2009). The full regulation can be found in the Dam Control and Safety Act – W. VA. Code 22-14-3(f), and in the Dam Safety Rule (47CSR34-2.12).

The American Society of Civil Engineers (ASCE) defines three categories of dams, based on the hazard potential of the dam.

- **High Hazard** dams are defined as dams that would cause significant loss of life, and may cause significant economic loss, if the dam were to fail or be mis-operated (ASCE, 2013).
- **Significant Hazard** would be expected to cause significant economic loss in the event of a failure or mis-operation, but would not be expected to cause a loss of life (ASCE, 2013).
- **Low Hazard** dams are generally located in rural or agricultural areas where a failure would cause minor damage to nonresidential structures and rural/agricultural land (ASCE, 2013).

The WVDEP is in charge of conducting inspections of existing dams and those under construction, and reviewing design plans to ensure that they are constructed, maintained, and operated or removed in a safe manner, as well as responding to emergencies (WVDEP, 2016).

The WVDEP classifies dams into four categories, including the following:

- **Class 1 (High Hazard):** Dams located where failure may cause loss of human life or major damage to dwellings, commercial or industrial buildings, main railroads, important public utilities, or where a high risk highway may be affected or damaged. All Class 1 - High Hazard dams must have an Emergency Action Plan as required by the West Virginia Department of Environmental Protection (2016).
- **Class 2 (Significant Hazard):** Dams located where failure may cause minor damage to dwellings, commercial or industrial buildings, important public utilities, main railroads, or cause major damage to unoccupied buildings, or where a low risk highway may be affected or damaged. Loss of human life from a failure of a Class 2 dam is unlikely.
- **Class 3 (Low Hazard):** Dams located in rural or agricultural areas where failure may cause minor damage to non-residential and normally unoccupied buildings, or rural or agricultural land. Failure of a Class 3 dam would cause only a loss of the dam itself and a loss of property use, such as use of related roads, with little additional damage to adjacent property.
- **Class 4 (Negligible Hazard):** Dams where failure is expected to have no potential for loss of human life, no potential for property damage, and no potential for significant harm to the environment.

Dams are used for a variety of purposes (recreation, flood control, water storage, irrigation, mine tailings, electrical generation, debris control or navigation); in Region VII, the 14 dams are used for one of the following, as described by FEMA.

- **Flood Control**: Prevent loss of life and property caused by flooding. They impound floodwaters and either release them under control to the river below or sore or divert the water for other uses.
- **Recreation**: Facilities designed for boating, skiing, camping, picnic areas, and boat launches can all be supported by dams.
- **Navigation:** Provide a stable system of inland river transportation.
- **Mine Tailings**: Allow the mining and processing of coal and other minerals while protecting the environment.

Dam failures are usually the result of poor design, improper construction, improper operation, inadequate maintenance, or a combination of these factors. The

Association of State Dam Safety Officials (ASDSO) divides dam failure events into the following three categories: structural failure, mechanical failure, and hydraulic failure.

- **Structural Failure** includes things such as foundation defects, slope instability or earthquake damage (ASDSO, 2013). Structural failures have caused around 30% of all dam failure events in the United States (ASDSO, 2012).
- **Mechanical Failures** consist of events such as a gate, conduit or valve malfunctioning can cause a dam to fail, or cause flooding both upstream and downstream, (ASDSO, 2012).
- **Hydraulic Failures** account for approximately a third of all dam failures in the U.S. (ASDSO, 2012). These failures include events such as overtopping, which is often a precursor to failure, debris blockage of spillways, and settlement of the dam crest (ASDSO, 2012).

The American Society of Civil Engineers (ASCE) recommends that all high hazard dams have an Emergency Action Plan (EAP) in place, due to the potential impacts a failure would have (ASCE, 2013). Pursuant to the West Virginia Dam Safety Code (47CSR34), “Owners of Class 1 dams shall formulate and submit an emergency action plan to the Secretary for approval” (2009).

PUBLIC HEALTH

The cascading effects that occur after a dam failure are of more concern to public health than the failure itself. The effect on public health is potentially the same as that of a flood event. Sitting water poses multiple health risks including infectious disease, wound infections, injuries, and other health effects. As the water recedes the priority is to disinfect property, dispose of items that cannot be properly disinfected and practice good hygiene. It is important to keep open wounds and rashes from becoming exposed to sitting water to avoid infection (CDC, 2014).

During the initial release fast-flowing water carrying debris, such as boulders and fallen trees leading to injury or death. Death can be caused by drowning, trauma, and hypothermia. Water purification and sewage disposal systems may be disrupted effecting public health.

As with flooding, mold becomes a concern after a dam failure. Mold exposures usually occur during cleanup when it is disturbed and easily transfers from surface to surface. Some items can be cleaned but porous materials (i.e., rugs, composite wood furniture, HVAC filters, etc.) should be disposed (FEMA, 2010).

SOCIAL VULNERABILITY

Dam failures themselves do not pose a threat to public health; the cascading effects that occur after a failure are more concerning. When a dam fails it causes flooding downstream that can cause death, injury, and illnesses relating to water-borne diseases and standing water. The consequences of flooding from a dam can cause damage to buildings and transportation infrastructure and power outages. As a result of flooding, people might have to evacuate and be displaced from their homes. In a large enough event, this can translate into economic loss for the area due to businesses closing and loss of workforce including the cost of clean-up activities after the event.

HISTORICAL OCCURRENCES

Thomas, WV

On January 1, 1996, the Thomas Dam had an inflow flood – hydrologic event. This is the only event reported by the Stanford University National Performance of Dams Program and the United States Army Corps of Engineers in Region VII. There were no injuries, fatalities, or property damage reported for this event.

Thomas, WV

Due to multiple high water incidents over several years, the Thomas Dam has sustained structural damage. Sections of the dam have visible erosion.

LOCATION & EXTENT

Using the U.S. Army Corps of Engineers (USACE) National Inventory of Dams and the National Performance of Dams Program (NPDP) Dams Directory a list of the 51 dams in Region VII is listed below. Gilmer County is the only county in the region that does not have a dam in its geographical boundaries.

Table 2.2.2.1

Region VII Dams

Dam Name	County	Hazard Class	Purpose	Emergency Action Plan
Teter Creek Dam	Barbour County	High	Recreation	Yes
Belington Water Supply Dam	Barbour County	High	Water Supply	Yes
Little Hackers Creek Imp	Barbour County	High	Tailings	Yes
Little Laurel Run	Barbour County	Unknown	-	No
Little Hackers Creek	Barbour County	Unknown	Tailings	No
North Hollow Creek Imp	Barbour County	Unknown	Tailings	No
Sutton Dam	Braxton County	High	Flood Control	Yes
Saltlick Creek #4 Dam	Braxton County	High	Flood Control	Yes
Saltlick Creek #6 Dam	Braxton County	High	Flood Control	Yes
Saltlick Creek #7 Dam	Braxton County	High	Flood Control	Yes
Saltlick Creek #8 Dam	Braxton County	High	Flood Control	Yes
Saltlick Creek #9 Dam	Braxton County	High	Flood Control	Yes
Burnsville Lake Dam	Braxton County	High	Flood Control	Yes
Stonewall Jackson Dam	Lewis County	High	Flood Control	Yes
Polk Creek #1 Dam	Lewis County	High	Flood Control	Yes
Polk Creek #4 Dam	Lewis County	High	Flood Control	Yes
Polk Creek #5 Dam	Lewis County	High	Flood Control	Yes
Polk Creek #6 Dam	Lewis County	High	Flood Control	Yes
Polk Creek #7 Dam	Lewis County	High	Flood Control	Yes
Polk Creek #8 Dam	Lewis County	High	Flood Control	Yes
Polk Creek #9 Dam	Lewis County	High	Flood Control	Yes
Polk Creek #13 Dam	Lewis County	High	Flood Control	Yes
Jackson Mill Dam	Lewis County	Significant	Water Supply	Unknown
Weston Dam	Lewis County	Low	Water Supply	Yes
Bendale Dam	Lewis County	Low	Water Supply	Yes
Lake Riley Dam	Lewis County	Significant	Recreation	Unknown
Stonecoal Creek Dam	Lewis County	High	Water Supply	Yes
Murphy Creek Dam	Lewis County	Significant	Recreation	Unknown
Right Fork Dam	Lewis County	Significant	Recreation	Unknown
Spruce Knob Lake	Randolph County	Low	Fish & Wildlife	Unknown
Sherwan Lake Dam	Randolph County	Significant	Recreation	Unknown
Camp Tygart Dam	Randolph County	High	Water Supply	Unknown
Scott Lake Dam	Randolph County	High	Recreation	Yes
Elkwater Fork Water Supply Dam	Randolph County	Low	Water Supply	Yes
12th Street Intake Dam	Randolph County	Unknown	Water Supply	Yes
Wallace Dam	Randolph County	Unknown	Recreation	No
Parsons Water Supply Dam	Tucker County	Low	Water Supply	Unknown
Pendleton Run Dam	Tucker County	High	Recreation	Yes
Thomas Reservoir Dam	Tucker County	Significant	Water Supply	Yes
Thomas Dam	Tucker County	High	Recreation	Yes
Sand Run Dam	Tucker County	Unknown	Recreation	Yes
Spruce island Lake Dam	Tucker County	Significant	Recreation	Yes
Flat Run Lake Dam	Tucker County	Low	Recreation	Yes
Davis Water Supply Dam	Tucker County	Unknown	Water Supply	Unknown
Elk Run Reservoir	Tucker County	High	-	Yes
Hall's Farm Pond Dam	Upshur County	High	Recreation	Yes

Table 2.2.2.1

Region VII Dams

Dam Name	County	Hazard Class	Purpose	Emergency Action Plan
Willard Miller Dam	Upshur County	High	Recreation	Unknown
101 North Hollow Refuse Disposal Facility	Upshur County	High	Tailings	Yes
Coal Refuse Disposal Facility No. 1	Upshur County	High	-	Yes
Mike Ross #1 Dam	Upshur County	Unknown	-	Yes
Mike Ross #2 Dam	Upshur County	Unknown	-	No
Alton No. 1 Pond Dam	Upshur County	Unknown	-	No

The consequences of flooding from a dam can cause damage to buildings and transportation infrastructure as well as utility outages. As a result of flooding, people might have to evacuate and be displaced from their homes. In a large enough event, this can translate into economic loss for the area due to businesses closing and loss of workforce including the cost of clean-up activities after the event.

A dam failure in Region VII may also affect jurisdictions outside the region. During the planning process the Region 3 PDC expressed concerns that a dam failure at the Sutton Dam in Braxton County would potentially impact both Clay and Kanawha Counties.

LOSS ESTIMATE

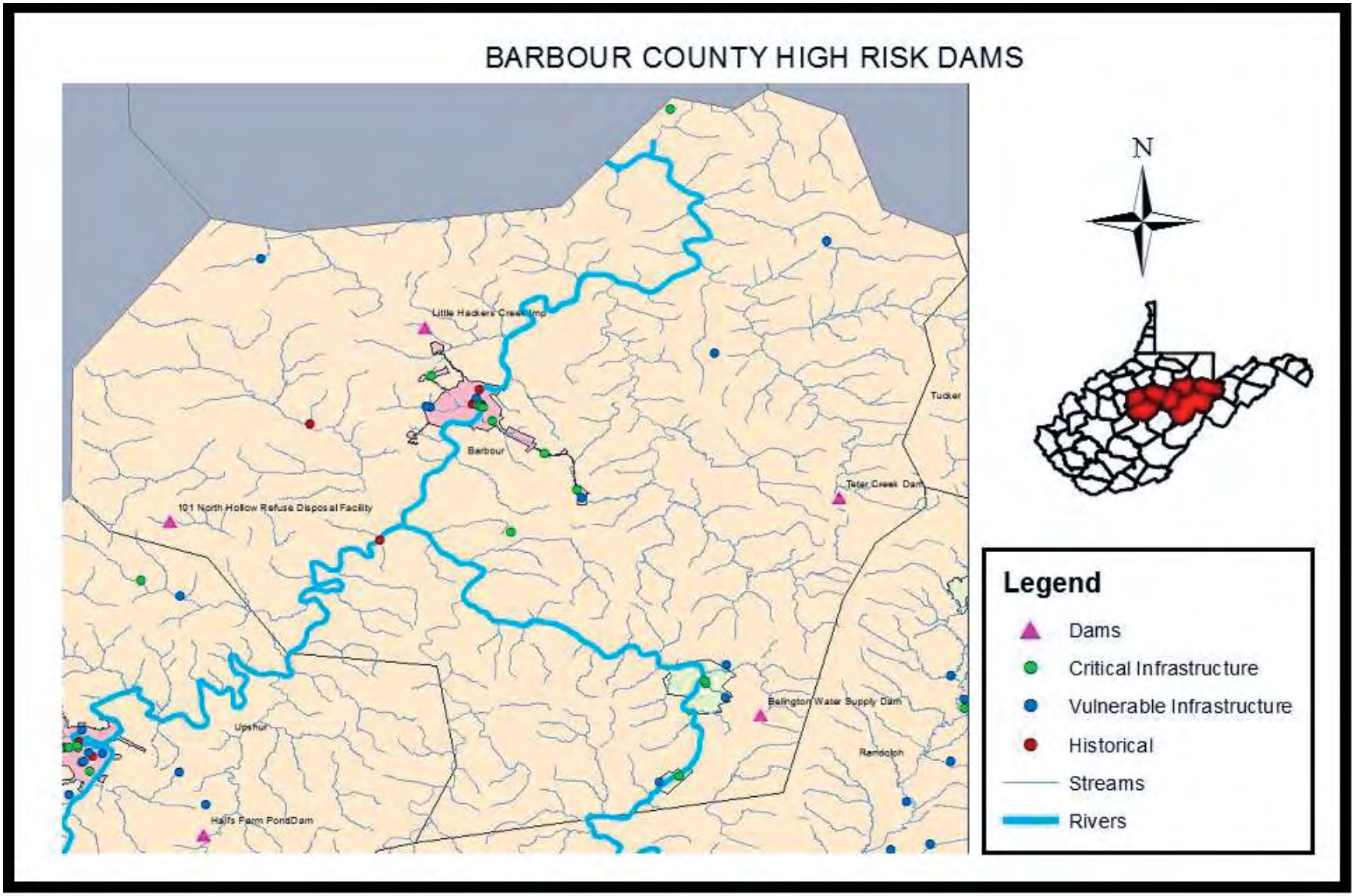
The only event listed in the Stanford University National Performance of Dams Program (NPDP), which records events beginning in 1848, occurred in Thomas, WV. The event at the Thomas Dam had no reported property damage.

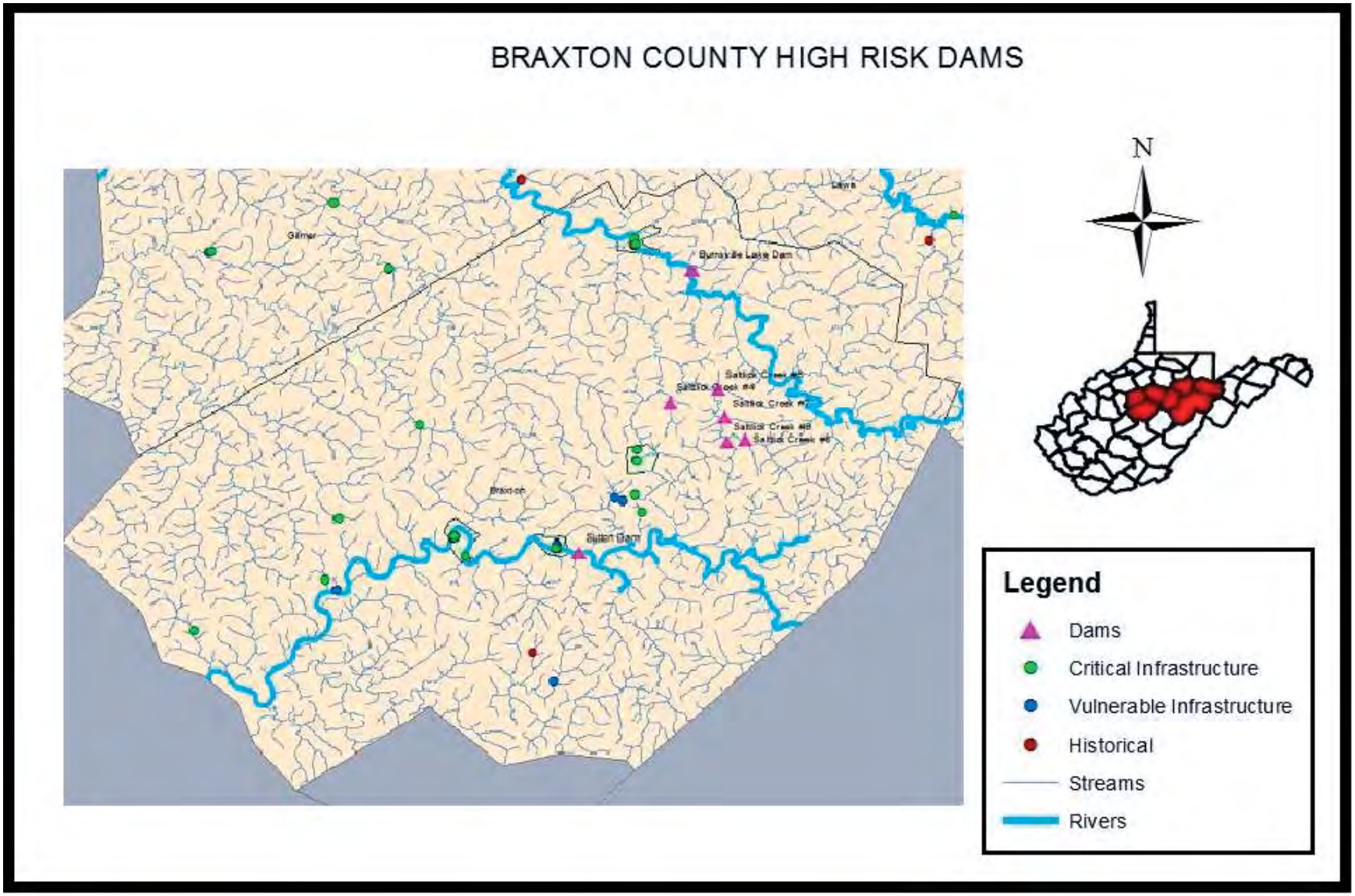
"Dam safety risk assessment is like a stool that stands on three legs. These legs quantify the likelihood that various initiating events (hydrologic, seismic, structural/internal, mechanical, or human error) will occur; the likelihood that the dam would fail given these initiating events; and the likelihood that, given a failure, the resulting flood wave would result in various levels of damage. The meaningful quantification of risk depends on credible estimates of the damages that would result from each significant failure scenario. Loss of human life is generally accepted as the most important consequence so it often dominates dam-safety decisions. Unfortunately, the confidence with which life loss can currently be estimated is low. This high level of uncertainty applies to both statistical confidence limits and to expert opinion. As such, this single limitation is a critical hindrance to the credibility and

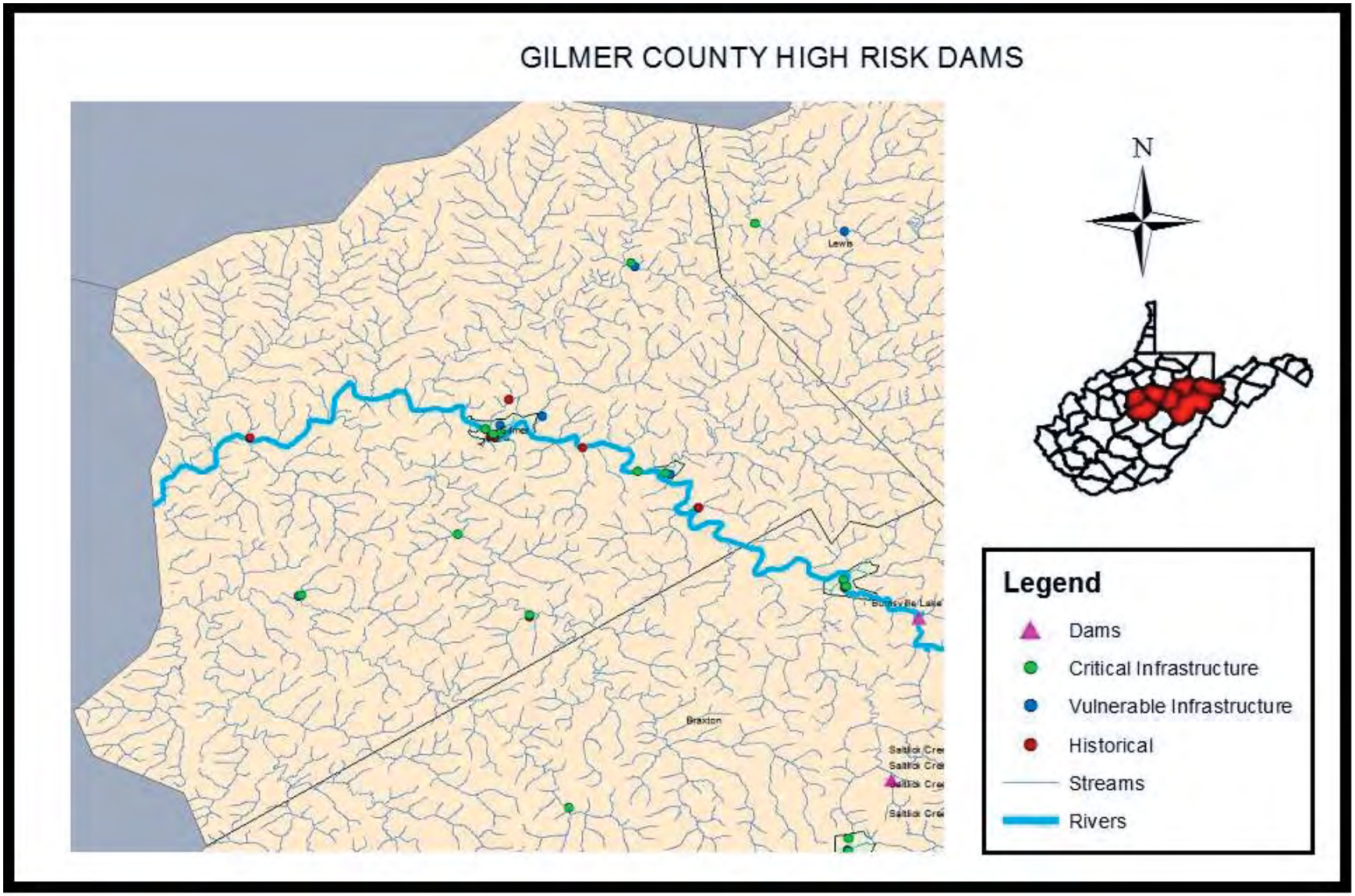
value of dam-safety risk assessment results. Indeed, some would like to push the stool over on its weak leg and abandon probabilistic risk assessment altogether" (USACE, 2002).

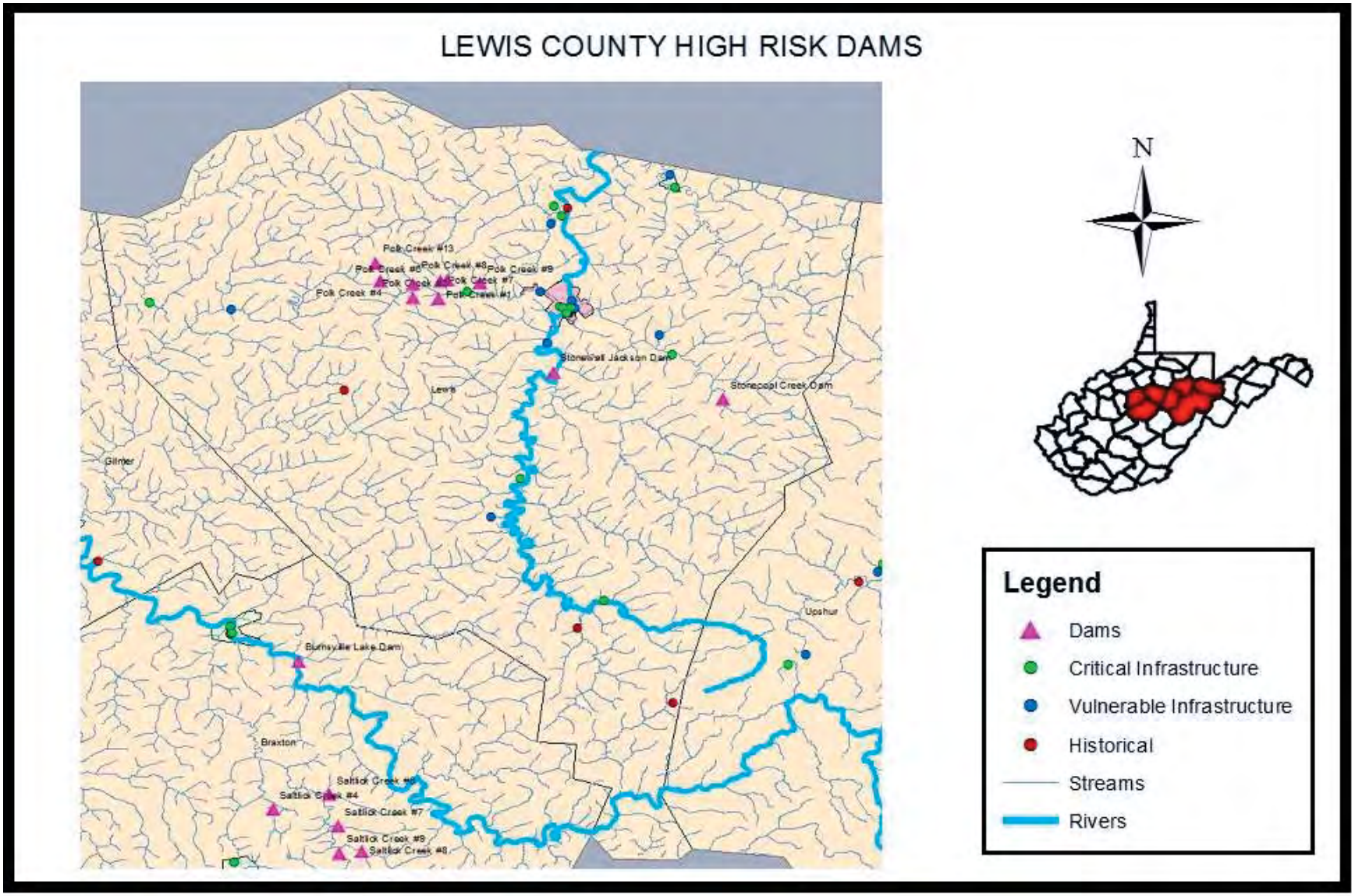
TABLE 2.2.2.2 WINTER STORMS RISK CALCULATION

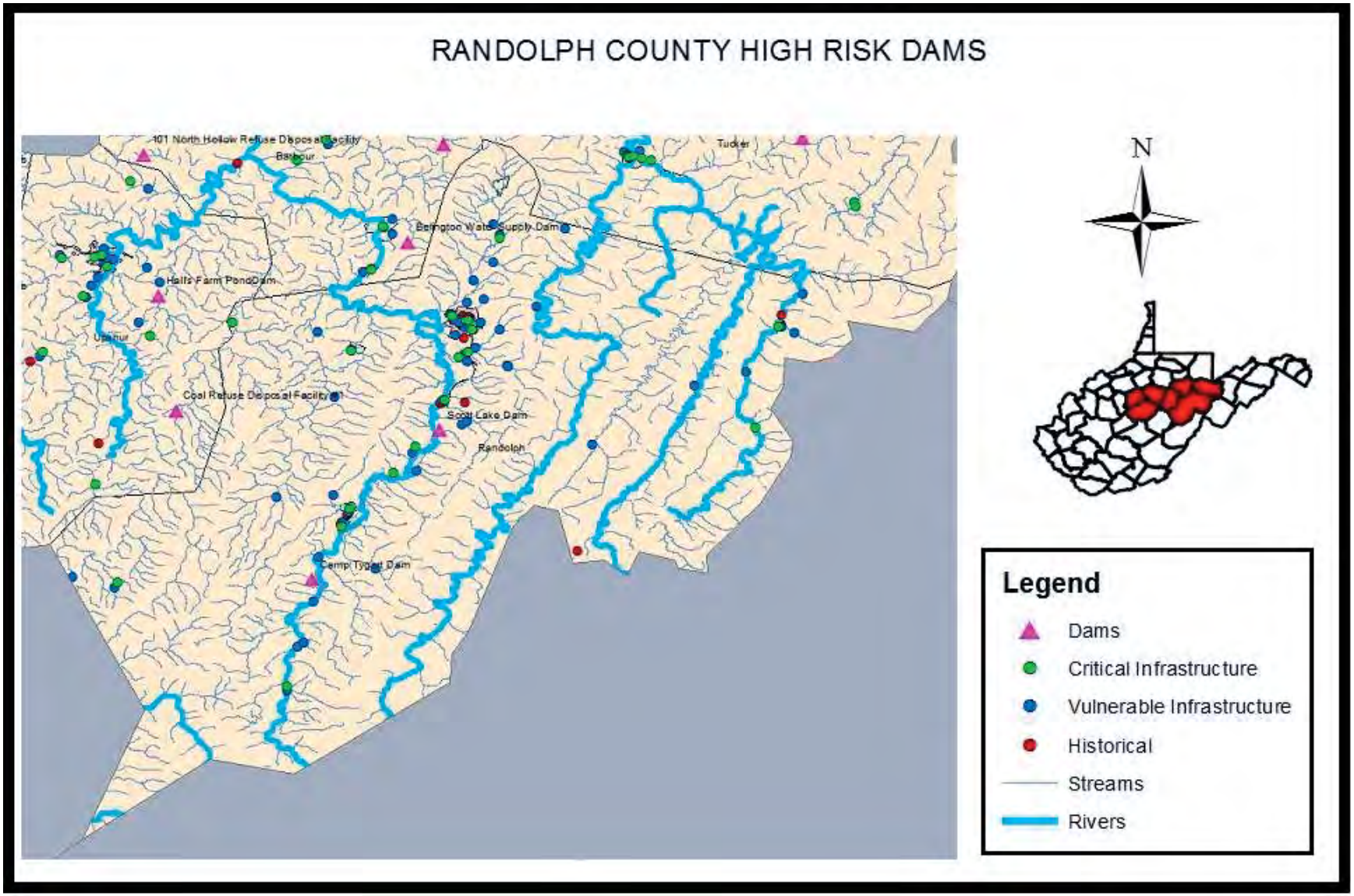
Probability				*Severity*		*Risk*
IMPROBABLE				CRITICAL		MODERATE
Events	2	.01	+	Although there is no prior injuries, fatalities, or property damage, a dam failure much like a flash flood has the potential to cause injuries, death and significant property damage.	=	A combination of improbable occurrence and critical level of severity puts this hazard at moderate risk
Years	169					
Based on historical information it can be assumed that a dam event will not occur during the course of a year.						

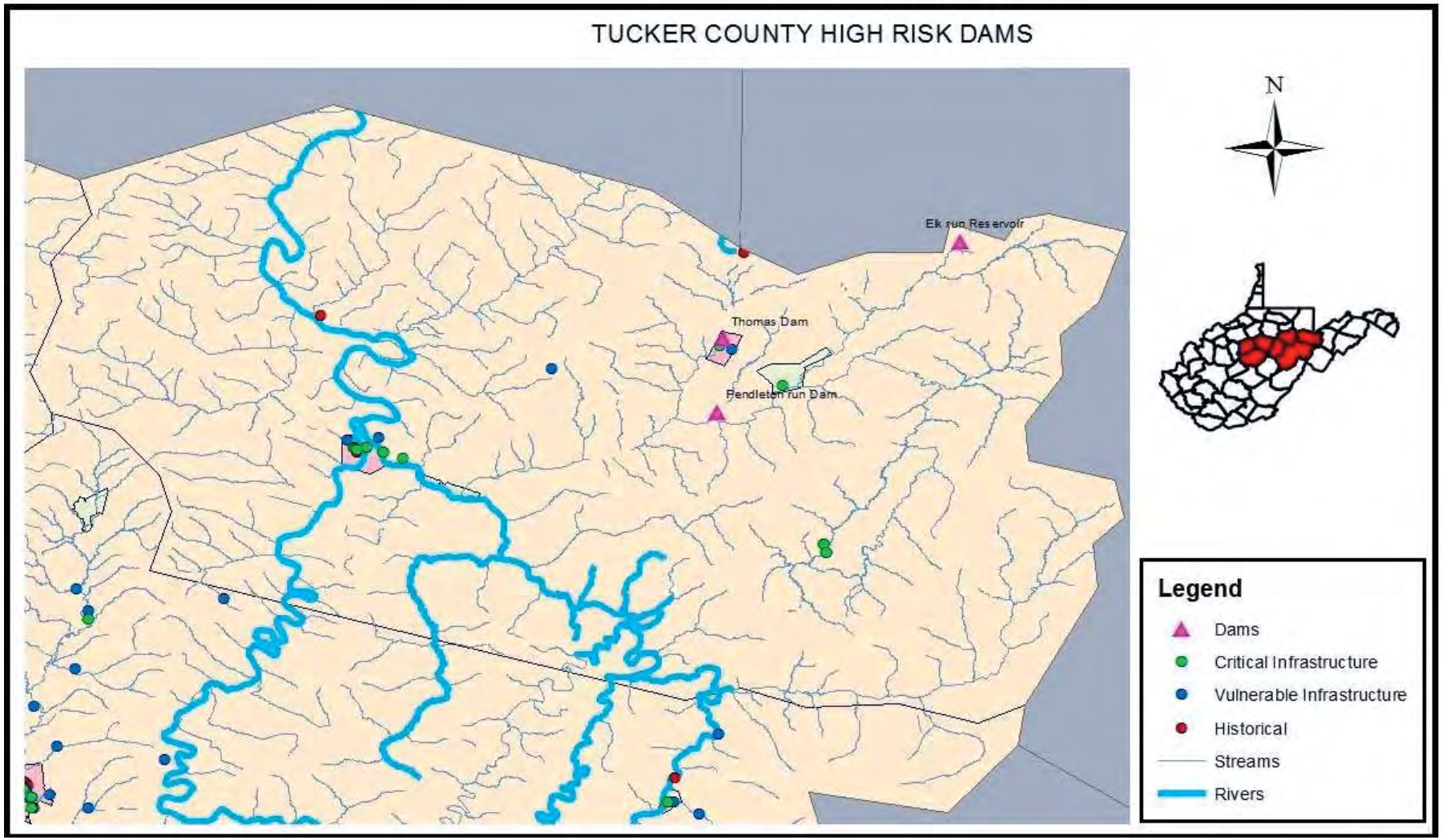

BARBOUR COUNTY HIGH RISK DAMS
N
Little Hackers Creek Imp
Barbour
Tucker
Teter Creek Dam
101 North Hollow Refuse Disposal Facility
Upshur
Belington Water Supply Dam
Randolph
Halls Farm PondDam
Legend
Dams
Critical Infrastructure
Vulnerable Infrastructure
Historical
Streams
Rivers

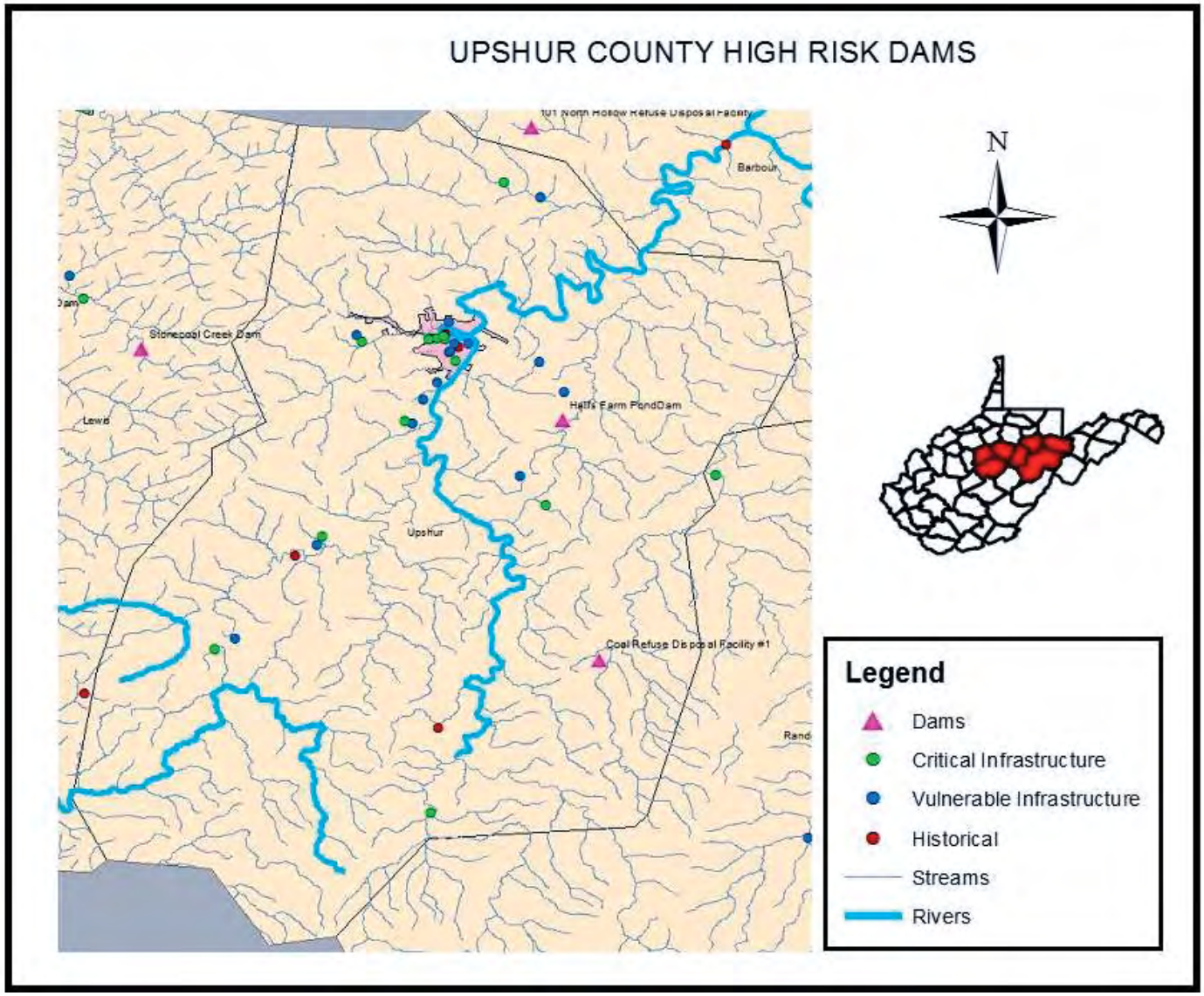

BRAXTON COUNTY HIGH RISK DAMS
N
Gilmer
Burnsville Lake Dam
Sutton Dam
Legend
Dams
Critical Infrastructure
Vulnerable Infrastructure
Historical
Streams
Rivers


GILMER COUNTY HIGH RISK DAMS
N
Lewis
Braxton
Legend
Dams
Critical Infrastructure
Vulnerable Infrastructure
Historical
Streams
Rivers


LEWIS COUNTY HIGH RISK DAMS
N
Legend
Dams
Critical Infrastructure
Vulnerable Infrastructure
Historical
Streams
Rivers
Polk Creek #13
Polk Creek #8
Polk Creek #9
Polk Creek #7
Polk Creek #4
Polk Creek #1
Stonecoal Jackson Dam
Stonecoal Creek Dam
Lewis
Gilmer
Upshur
Burnsville Lake Dam
Braxton
Saltlick Creek #7
Saltlick Creek #9
Saltlick Creek #8


RANDOLPH COUNTY HIGH RISK DAMS
401 North Hollow Refuse Disposal Facility
Barbour
Tucker
Belington Water Supply Dam
Hall's Farm Pond Dam
Upshur
Coal Refuse Disposal Facility
Scott Lake Dam
Randolph
Camp Tygart Dam
N
Legend
Dams
Critical Infrastructure
Vulnerable Infrastructure
Historical
Streams
Rivers


TUCKER COUNTY HIGH RISK DAMS
N
Elk run Reservoir
Thomas Dam
Pendleton run Dam
Legend
Dams
Critical Infrastructure
Vulnerable Infrastructure
Historical
Streams
Rivers


UPSHUR COUNTY HIGH RISK DAMS
N
Barbour
Stonecoal Creek Dam
Hefl's Farm PondDam
Lewis
Upshur
Coal Refuse Disposal Facility #1
Legend
Dams
Critical Infrastructure
Vulnerable Infrastructure
Historical
Streams
Rivers

2.2.3 Drought

"Extended period of unusually low precipitation that produces a temporary shortage of water for people, animals, and plants (Keller & DeVecchio, 2015).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
Summer months or periods of low precipitation	Weeks / Months	MODERATE

According to the National Centers for Environmental Information (NCEI), a drought is a complex event that is difficult to either monitor or clearly define. The National Drought Mitigation Center (NDMC), based at the University of Nebraska – Lincoln, defines four types of droughts based on the work of Wilhite and Glantz. **Meteorological Droughts** are typically defined "on the basis of the degree of dryness (in comparison to some 'normal' or average amount and the duration of the dry period" (2016). A **Hydrological Drought** is associated with the effects of periods of precipitation shortfalls on the water supply of a region, both surface and subterranean (NDMC, 2016). The definition of an **Agricultural Drought** links various characteristics of meteorological or hydrological droughts to agricultural impacts by focusing on precipitation shortfalls, soil water deficits, ground water levels, etc. (NDMC, 2016). Finally, a **Socioeconomic Drought** associates the supply and demand of some economic good with elements of the other three drought types (NDMC, 2016). "A **Socioeconomic Drought** occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply" (NDMC, 2016).

The NDMC classifies drought conditions using five categories: D0 – D4. These levels line up with the Palmer Drought Severity Index (PDSI), which is shown to the right. D0, described as **Abnormally Dry**, corresponds with the PDSI of -1.0 to -1.9. Possible impacts include "short-term dryness slowing planting, growth of crops or pastures" (NDMC, 2016). **Moderate Drought**, level D1, corresponds to a PDSI of -2.0 to -2.9. These conditions can cause some damage to crops and pastures and can cause the

Table 2.2.3.1
PALMER DROUGH SEVERITY SCALE

	< -4.0	Extreme Drought
	-3.99 to -3.0	Severe Drought
	-2.99 to -2.0	Moderate drought
	-1.99 to -1.0	Mild Drought
	-0.99 to -0.5	Incipient Drought
	-0.49 to 0.49	Near Normal
	0.50 to 0.99	Incipient Moist Spell
	1.0 to 1.99	Moist Spell
	2.0 to 2.99	Unusual Moist Spell
	3.0 to 3.99	Very Moist Spell
	> 4.0	Extreme Moist Spell

development of some water shortages (NDMC, 2016). The D2 Level, known as a **Severe Drought**, is a condition where crop or pasture losses are likely and water shortages will be common (NDMC, 2016). This correlates with a PDSI of -3.0 to -3.9. The D3 (PDSI of -4.0 to -4.9), or **Extreme Drought**, level includes impacts such as major crop and pasture losses as well as widespread water shortages and restrictions (NDMC, 2016). The most severe drought category (D4, **Exceptional Drought**), with a PDSI of -5.0 or less, will cause exceptional and widespread crop/pasture loss and will lead to water emergencies as reservoirs, streams, and wells are short of water (NDMC, 2016).

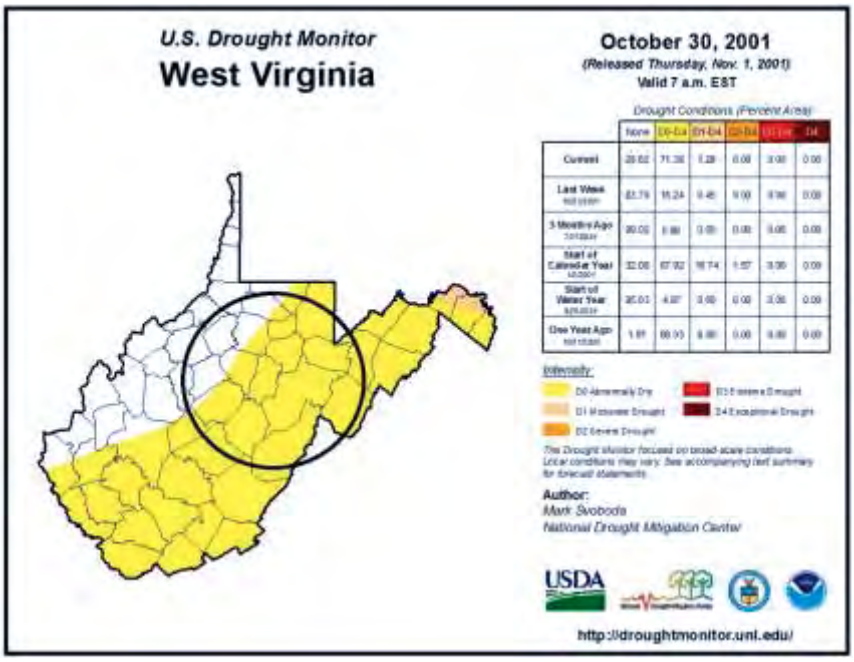
The West Virginia Emergency Operation Plan (2016) lists stages of drought response. These stages are determined by assessing multiple criteria and with the assistance of the National Centers for Environmental Information (NCEI) to determine the severity of the drought which includes: precipitation, ground water, stream flow, reservoir levels, Palmer Z Index (PDSI), Crop Moisture Index (CMI), Standardized Precipitation Index (SPI), and the National Fire Danger Rating System. The stages of drought response in order of increasing severity are:

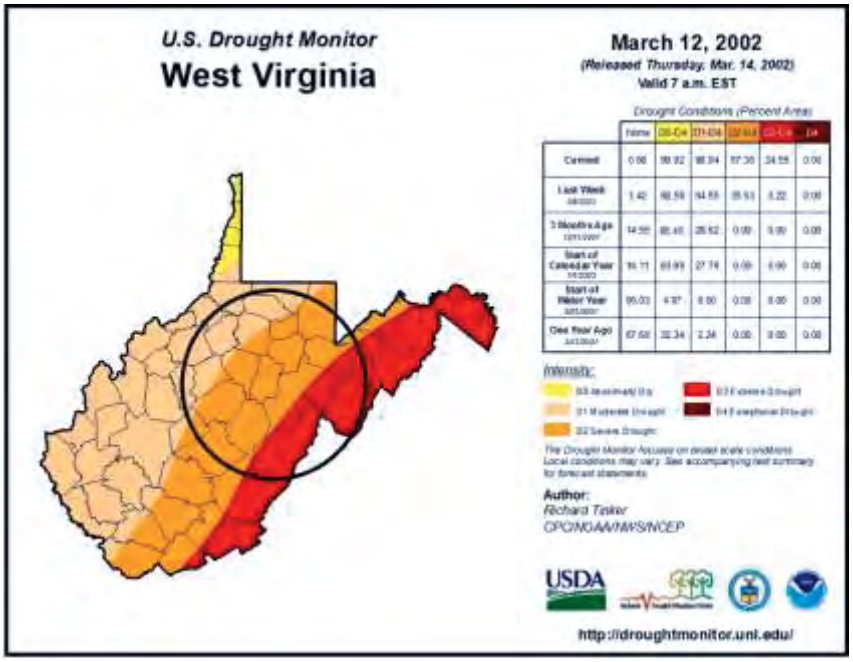
- **Normal:** Refers to conditions that do not negatively impact water supplies, vegetation, or water quality in the state. No action needed.
- **Alert:** When the PDSI reads -2.00 to -2.99 and stream flow, reservoir levels and ground water levels are below normal over a several month period and/or the WVDSHEM Director, in coordination with appropriate state official, determines the Stage II activities are required, the Governor is to be requested to make a Drought Alert Declaration.
- **Conservation:** Activated when the PDSI is between -3.00 to -3.99 and/or when the Director of WVDHSEM, in coordination with appropriate state officials, determines that Stage III activities are required. Stream flow, reservoir levels and ground water levels continue to decline and forecasts indicate an extended period of below normal precipitation.
- **Emergency:** Activated when the PDSI is lower than -4.00 and/or the Director of WVDHSEM, in coordination with appropriate state officials, determines that Stage IV activities are required. The Governor may issue a Drought Emergency Declaration when water supplies are adequate to meet projected demands and extreme measures must be taken. Forecasts are to indicate that precipitation levels, stream flow, reservoir levels, and ground water levels will continue to decline.

HISTORICAL OCCURRENCES

Region VII

Beginning in October of 2001 at least part of all seven counties in the region began a 26 week drought period lasting until May 2001. As shown on the maps the drought which began as a D-0 (abnormally dry) event eventually became a D-3 (extreme drought) event in some areas of the region. The drought began after several dry hot weeks. The lack of precipitation continued to feed the widespread drought conditions. In April a frontal system bisected the Mid-Atlantic States dropping rain from West Virginia to the Maryland coast. The economic impact on the state and the region was not significant as the drought period began near the end of harvesting and ended as planting was set to begin.





The table below provide a list of the drought events that have affected each county in Region VII. As seen in the table, an event that affects one county usually affects all seven counties. The table also show periods where an event progressed from one classification to another as periods without rain continues.

Table: 2.2.3.2

REGION VII HISTORICAL DROUGHTS (1985-2017)

Start Date	End Date	Consecutive Weeks	County	Category
1/11/2000	2/15/2000	6	Barbour County	D0 - Abnormally Dry
4/18/2000	5/16/2000	5	Barbour County	D0 - Abnormally Dry
11/28/2000	2/13/2001	12	Barbour County	D0 - Abnormally Dry
5/8/2001	5/22/2001	3	Barbour County	D0 - Abnormally Dry
10/30/2001	4/23/2002	26	Barbour County	D0 - Abnormally Dry
11/20/2001	12/4/2001	3	Barbour County	D1 - Moderate Drought
2/12/2002	4/16/2002	10	Barbour County	D1 - Moderate Drought
3/5/2002	4/16/2002	7	Barbour County	D2 - Severe Drought
9/3/2002	10/15/2002	7	Barbour County	D0 - Abnormally Dry
9/20/2005	10/18/2005	5	Barbour County	D0 - Abnormally Dry
3/7/2006	4/4/2006	5	Barbour County	D0 - Abnormally Dry
12/19/2006	2/20/2007	10	Barbour County	D0 - Abnormally Dry
6/5/2007	8/14/2007	11	Barbour County	D0 - Abnormally Dry
9/23/2008	12/9/2008	12	Barbour County	D0 - Abnormally Dry
3/24/2009	4/28/2009	6	Barbour County	D0 - Abnormally Dry
9/15/2009	12/1/2009	12	Barbour County	D0 - Abnormally Dry
9/22/2009	10/6/2009	3	Barbour County	D1 - Moderate Drought
4/13/2010	5/11/2010	5	Barbour County	D0 - Abnormally Dry
8/31/2010	11/30/2010	14	Barbour County	D0 - Abnormally Dry
8/31/2010	9/28/2010	5	Barbour County	D1 - Moderate Drought
1/25/2011	3/1/2011	6	Barbour County	D0 - Abnormally Dry
6/19/2012	8/28/2012	11	Barbour County	D0 - Abnormally Dry
4/16/2013	6/25/2013	11	Barbour County	D0 - Abnormally Dry
4/22/2014	5/13/2014	4	Barbour County	D0 - Abnormally Dry
9/8/2015	1/19/2016	20	Barbour County	D0 - Abnormally Dry
3/8/2016	4/26/2016	8	Barbour County	D0 - Abnormally Dry
9/13/2016	10/18/2016	6	Barbour County	D0 - Abnormally Dry
1/4/2000	2/15/2000	7	Braxton County	D0 - Abnormally Dry
4/4/2000	4/18/2000	3	Braxton County	D0 - Abnormally Dry
11/28/2000	5/22/2001	26	Braxton County	D0 - Abnormally Dry
10/30/2001	4/23/2002	26	Braxton County	D0 - Abnormally Dry
11/20/2001	12/4/2001	3	Braxton County	D1 - Moderate Drought
2/12/2002	4/16/2002	10	Braxton County	D1 - Moderate Drought
3/12/2002	3/26/2002	3	Braxton County	D2 - Severe Drought

Table: 2.2.3.2

REGION VII HISTORICAL DROUGHTS (1985-2017)

Start Date	End Date	Consecutive Weeks	County	Category
9/3/2002	10/22/2002	8	Braxton County	D0 - Abnormally Dry
9/27/2005	10/18/2005	4	Braxton County	D0 - Abnormally Dry
2/28/2006	4/4/2006	6	Braxton County	D0 - Abnormally Dry
12/19/2006	2/20/2007	10	Braxton County	D0 - Abnormally Dry
6/5/2007	12/11/2007	28	Braxton County	D0 - Abnormally Dry
6/19/2007	7/3/2007	3	Braxton County	D1 - Moderate Drought
10/2/2007	10/23/2007	4	Braxton County	D1 - Moderate Drought
9/23/2008	1/27/2009	19	Braxton County	D0 - Abnormally Dry
3/24/2009	4/28/2009	6	Braxton County	D0 - Abnormally Dry
9/15/2009	10/6/2009	4	Braxton County	D0 - Abnormally Dry
4/13/2010	5/11/2010	5	Braxton County	D0 - Abnormally Dry
8/31/2010	11/30/2010	14	Braxton County	D0 - Abnormally Dry
1/25/2011	3/1/2011	6	Braxton County	D0 - Abnormally Dry
6/19/2012	7/17/2012	5	Braxton County	D0 - Abnormally Dry
4/30/2013	6/25/2013	9	Braxton County	D0 - Abnormally Dry
5/26/2015	6/16/2015	4	Braxton County	D0 - Abnormally Dry
9/22/2015	11/24/2015	10	Braxton County	D0 - Abnormally Dry
9/27/2016	10/18/2016	4	Braxton County	D0 - Abnormally Dry
1/4/2000	2/15/2000	7	Gilmer County	D0 - Abnormally Dry
11/28/2000	2/13/2001	12	Gilmer County	D0 - Abnormally Dry
3/27/2001	4/17/2001	4	Gilmer County	D0 - Abnormally Dry
5/1/2001	5/22/2001	4	Gilmer County	D0 - Abnormally Dry
10/30/2001	4/23/2002	26	Gilmer County	D0 - Abnormally Dry
2/19/2002	4/16/2002	9	Gilmer County	D1 - Moderate Drought
8/20/2002	10/15/2002	9	Gilmer County	D0 - Abnormally Dry
9/10/2002	9/24/2002	3	Gilmer County	D1 - Moderate Drought
9/20/2005	10/18/2005	5	Gilmer County	D0 - Abnormally Dry
2/28/2006	4/4/2006	6	Gilmer County	D0 - Abnormally Dry
12/19/2006	1/16/2007	5	Gilmer County	D0 - Abnormally Dry
1/30/2007	2/20/2007	4	Gilmer County	D0 - Abnormally Dry
5/15/2007	12/11/2007	31	Gilmer County	D0 - Abnormally Dry
6/19/2007	7/24/2007	6	Gilmer County	D1 - Moderate Drought
10/2/2007	10/23/2007	4	Gilmer County	D1 - Moderate Drought
9/23/2008	12/23/2008	14	Gilmer County	D0 - Abnormally Dry

Table: 2.2.3.2

REGION VII HISTORICAL DROUGHTS (1985-2017)

Start Date	End Date	Consecutive Weeks	County	Category
3/24/2009	4/28/2009	6	Gilmer County	D0 - Abnormally Dry
9/15/2009	10/6/2009	4	Gilmer County	D0 - Abnormally Dry
4/13/2010	5/11/2010	5	Gilmer County	D0 - Abnormally Dry
9/28/2010	11/30/2010	10	Gilmer County	D0 - Abnormally Dry
1/25/2011	3/1/2011	6	Gilmer County	D0 - Abnormally Dry
6/19/2012	7/17/2012	5	Gilmer County	D0 - Abnormally Dry
4/30/2013	7/9/2013	11	Gilmer County	D0 - Abnormally Dry
9/22/2015	11/24/2015	10	Gilmer County	D0 - Abnormally Dry
9/13/2016	10/18/2016	6	Gilmer County	D0 - Abnormally Dry
1/4/2000	2/15/2000	7	Lewis County	D0 - Abnormally Dry
11/28/2000	2/13/2001	12	Lewis County	D0 - Abnormally Dry
3/27/2001	4/17/2001	4	Lewis County	D0 - Abnormally Dry
5/8/2001	5/22/2001	3	Lewis County	D0 - Abnormally Dry
10/30/2001	4/23/2002	26	Lewis County	D0 - Abnormally Dry
11/20/2001	12/4/2001	3	Lewis County	D1 - Moderate Drought
2/12/2002	4/16/2002	10	Lewis County	D1 - Moderate Drought
3/12/2002	3/26/2002	3	Lewis County	D2 - Severe Drought
8/27/2002	10/15/2002	8	Lewis County	D0 - Abnormally Dry
9/10/2002	9/24/2002	3	Lewis County	D1 - Moderate Drought
9/20/2005	10/18/2005	5	Lewis County	D0 - Abnormally Dry
2/28/2006	4/4/2006	6	Lewis County	D0 - Abnormally Dry
12/19/2006	2/20/2007	10	Lewis County	D0 - Abnormally Dry
6/5/2007	12/4/2007	27	Lewis County	D0 - Abnormally Dry
6/19/2007	7/3/2007	3	Lewis County	D1 - Moderate Drought
9/23/2008	12/9/2008	12	Lewis County	D0 - Abnormally Dry
3/24/2009	4/28/2009	6	Lewis County	D0 - Abnormally Dry
9/15/2009	12/1/2009	12	Lewis County	D0 - Abnormally Dry
9/22/2009	10/6/2009	3	Lewis County	D1 - Moderate Drought
4/13/2010	5/11/2010	5	Lewis County	D0 - Abnormally Dry
8/31/2010	11/30/2010	14	Lewis County	D0 - Abnormally Dry
1/25/2011	3/1/2011	6	Lewis County	D0 - Abnormally Dry
6/19/2012	7/24/2012	6	Lewis County	D0 - Abnormally Dry
4/30/2013	7/9/2013	11	Lewis County	D0 - Abnormally Dry
5/26/2015	6/16/2015	4	Lewis County	D0 - Abnormally Dry

Table: 2.2.3.2

REGION VII HISTORICAL DROUGHTS (1985-2017)

Start Date	End Date	Consecutive Weeks	County	Category
9/22/2015	11/24/2015	10	Lewis County	D0 - Abnormally Dry
9/13/2016	10/18/2016	6	Lewis County	D0 - Abnormally Dry
1/4/2000	2/15/2000	7	Randolph County	D0 - Abnormally Dry
3/7/2000	5/23/2000	12	Randolph County	D0 - Abnormally Dry
10/31/2000	11/14/2000	3	Randolph County	D0 - Abnormally Dry
11/28/2000	2/27/2001	14	Randolph County	D0 - Abnormally Dry
3/13/2001	4/3/2001	4	Randolph County	D0 - Abnormally Dry
5/1/2001	5/22/2001	4	Randolph County	D0 - Abnormally Dry
10/30/2001	5/7/2002	28	Randolph County	D0 - Abnormally Dry
11/20/2001	12/11/2001	4	Randolph County	D1 - Moderate Drought
1/1/2002	4/23/2002	17	Randolph County	D1 - Moderate Drought
2/12/2002	4/16/2002	10	Randolph County	D2 - Severe Drought
3/12/2002	3/26/2002	3	Randolph County	D3 - Extreme Drought
7/9/2002	7/23/2002	3	Randolph County	D0 - Abnormally Dry
9/3/2002	11/5/2002	10	Randolph County	D0 - Abnormally Dry
9/10/2002	10/15/2002	6	Randolph County	D1 - Moderate Drought
9/20/2005	11/8/2005	8	Randolph County	D0 - Abnormally Dry
2/28/2006	4/11/2006	7	Randolph County	D0 - Abnormally Dry
5/9/2006	6/20/2006	7	Randolph County	D0 - Abnormally Dry
12/19/2006	2/27/2007	11	Randolph County	D0 - Abnormally Dry
6/12/2007	9/11/2007	14	Randolph County	D0 - Abnormally Dry
10/9/2007	10/23/2007	3	Randolph County	D0 - Abnormally Dry
9/23/2008	4/28/2009	32	Randolph County	D0 - Abnormally Dry
10/28/2008	11/11/2008	3	Randolph County	D1 - Moderate Drought
12/9/2008	12/30/2008	4	Randolph County	D1 - Moderate Drought
9/15/2009	10/20/2009	6	Randolph County	D0 - Abnormally Dry
9/22/2009	10/6/2009	3	Randolph County	D1 - Moderate Drought
4/13/2010	5/11/2010	5	Randolph County	D0 - Abnormally Dry
6/29/2010	3/8/2011	37	Randolph County	D0 - Abnormally Dry
8/31/2010	11/30/2010	14	Randolph County	D1 - Moderate Drought
2/1/2011	3/1/2011	5	Randolph County	D1 - Moderate Drought
8/23/2011	9/6/2011	3	Randolph County	D0 - Abnormally Dry
3/20/2012	5/8/2012	8	Randolph County	D0 - Abnormally Dry
6/19/2012	7/24/2012	6	Randolph County	D0 - Abnormally Dry

Table: 2.2.3.2

REGION VII HISTORICAL DROUGHTS (1985-2017)

Start Date	End Date	Consecutive Weeks	County	Category
11/27/2012	1/29/2013	10	Randolph County	D0 - Abnormally Dry
4/16/2013	6/11/2013	9	Randolph County	D0 - Abnormally Dry
11/12/2013	1/7/2014	9	Randolph County	D0 - Abnormally Dry
4/22/2014	5/13/2014	4	Randolph County	D0 - Abnormally Dry
8/12/2014	10/14/2014	10	Randolph County	D0 - Abnormally Dry
5/26/2015	6/16/2015	4	Randolph County	D0 - Abnormally Dry
9/8/2015	2/16/2016	24	Randolph County	D0 - Abnormally Dry
3/1/2016	5/31/2016	14	Randolph County	D0 - Abnormally Dry
9/13/2016	10/18/2016	6	Randolph County	D0 - Abnormally Dry
11/15/2016	1/17/2017	10	Randolph County	D0 - Abnormally Dry
3/21/2017	5/2/2017	7	Randolph County	D0 - Abnormally Dry
9/26/2017	10/17/2017	4	Randolph County	D0 - Abnormally Dry
1/11/2000	2/15/2000	6	Tucker County	D0 - Abnormally Dry
3/21/2000	5/23/2000	10	Tucker County	D0 - Abnormally Dry
11/28/2000	2/13/2001	12	Tucker County	D0 - Abnormally Dry
5/8/2001	5/22/2001	3	Tucker County	D0 - Abnormally Dry
10/30/2001	5/7/2002	28	Tucker County	D0 - Abnormally Dry
11/20/2001	12/11/2001	4	Tucker County	D1 - Moderate Drought
2/12/2002	4/23/2002	11	Tucker County	D1 - Moderate Drought
2/12/2002	4/16/2002	10	Tucker County	D2 - Severe Drought
3/12/2002	3/26/2002	3	Tucker County	D3 - Extreme Drought
7/9/2002	7/23/2002	3	Tucker County	D0 - Abnormally Dry
9/3/2002	10/22/2002	8	Tucker County	D0 - Abnormally Dry
9/20/2005	11/8/2005	8	Tucker County	D0 - Abnormally Dry
9/20/2005	10/4/2005	3	Tucker County	D1 - Moderate Drought
3/14/2006	4/11/2006	5	Tucker County	D0 - Abnormally Dry
5/9/2006	6/20/2006	7	Tucker County	D0 - Abnormally Dry
12/19/2006	2/27/2007	11	Tucker County	D0 - Abnormally Dry
6/5/2007	8/14/2007	11	Tucker County	D0 - Abnormally Dry
9/23/2008	12/9/2008	12	Tucker County	D0 - Abnormally Dry
3/24/2009	4/28/2009	6	Tucker County	D0 - Abnormally Dry
9/15/2009	10/20/2009	6	Tucker County	D0 - Abnormally Dry
9/22/2009	10/6/2009	3	Tucker County	D1 - Moderate Drought
4/13/2010	5/11/2010	5	Tucker County	D0 - Abnormally Dry

Table: 2.2.3.2

REGION VII HISTORICAL DROUGHTS (1985-2017)

Start Date	End Date	Consecutive Weeks	County	Category
6/29/2010	3/8/2011	37	Tucker County	D0 - Abnormally Dry
8/31/2010	11/2/2010	10	Tucker County	D1 - Moderate Drought
9/7/2010	9/28/2010	4	Tucker County	D2 - Severe Drought
8/23/2011	9/6/2011	3	Tucker County	D0 - Abnormally Dry
3/20/2012	5/8/2012	8	Tucker County	D0 - Abnormally Dry
6/19/2012	8/28/2012	11	Tucker County	D0 - Abnormally Dry
11/27/2012	1/15/2013	8	Tucker County	D0 - Abnormally Dry
4/16/2013	6/11/2013	9	Tucker County	D0 - Abnormally Dry
11/12/2013	12/10/2013	5	Tucker County	D0 - Abnormally Dry
4/22/2014	5/13/2014	4	Tucker County	D0 - Abnormally Dry
9/30/2014	10/14/2014	3	Tucker County	D0 - Abnormally Dry
1/20/2015	3/3/2015	7	Tucker County	D0 - Abnormally Dry
9/8/2015	5/31/2016	39	Tucker County	D0 - Abnormally Dry
9/13/2016	9/27/2016	3	Tucker County	D0 - Abnormally Dry
11/15/2016	1/3/2017	8	Tucker County	D0 - Abnormally Dry
10/3/2017	10/17/2017	3	Tucker County	D0 - Abnormally Dry
1/4/2000	2/15/2000	7	Upshur County	D0 - Abnormally Dry
4/18/2000	5/16/2000	5	Upshur County	D0 - Abnormally Dry
11/28/2000	2/13/2001	12	Upshur County	D0 - Abnormally Dry
5/8/2001	5/22/2001	3	Upshur County	D0 - Abnormally Dry
10/30/2001	4/23/2002	26	Upshur County	D0 - Abnormally Dry
11/20/2001	12/4/2001	3	Upshur County	D1 - Moderate Drought
2/12/2002	4/16/2002	10	Upshur County	D1 - Moderate Drought
2/26/2002	4/9/2002	7	Upshur County	D2 - Severe Drought
9/3/2002	10/15/2002	7	Upshur County	D0 - Abnormally Dry
9/20/2005	10/18/2005	5	Upshur County	D0 - Abnormally Dry
2/28/2006	4/4/2006	6	Upshur County	D0 - Abnormally Dry
12/19/2006	2/20/2007	10	Upshur County	D0 - Abnormally Dry
6/5/2007	9/11/2007	15	Upshur County	D0 - Abnormally Dry
10/9/2007	10/23/2007	3	Upshur County	D0 - Abnormally Dry
9/23/2008	12/9/2008	12	Upshur County	D0 - Abnormally Dry
3/24/2009	4/28/2009	6	Upshur County	D0 - Abnormally Dry
9/15/2009	12/1/2009	12	Upshur County	D0 - Abnormally Dry
9/22/2009	10/6/2009	3	Upshur County	D1 - Moderate Drought

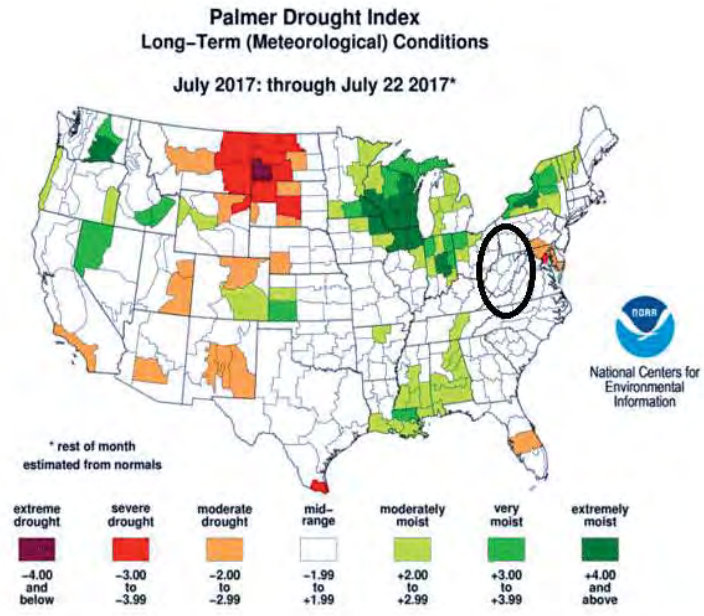
Table: 2.2.3.2

REGION VII HISTORICAL DROUGHTS (1985-2017)

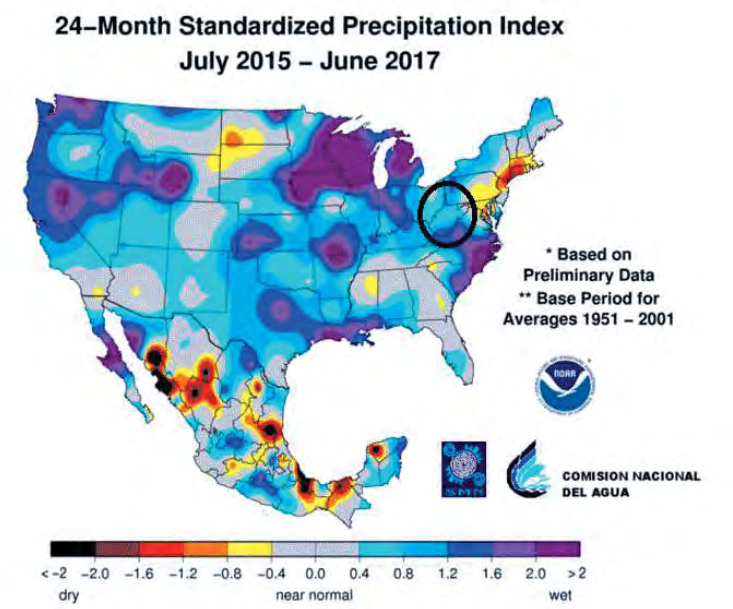
Start Date	End Date	Consecutive Weeks	County	Category
4/13/2010	5/11/2010	5	Upshur County	D0 - Abnormally Dry
8/31/2010	11/30/2010	14	Upshur County	D0 - Abnormally Dry
1/25/2011	3/1/2011	6	Upshur County	D0 - Abnormally Dry
6/19/2012	7/24/2012	6	Upshur County	D0 - Abnormally Dry
4/30/2013	6/25/2013	9	Upshur County	D0 - Abnormally Dry
4/22/2014	5/13/2014	4	Upshur County	D0 - Abnormally Dry
5/26/2015	6/16/2015	4	Upshur County	D0 - Abnormally Dry
9/8/2015	1/19/2016	20	Upshur County	D0 - Abnormally Dry
9/13/2016	10/18/2016	6	Upshur County	D0 - Abnormally Dry
9/26/2017	10/17/2017	4	Upshur County	D0 - Abnormally Dry

LOCATION & EXTENT

Generally, West Virginia does not see wide spread drought conditions on a regular basis. The map seen to the left, from the National Oceanic and Atmospheric Administration (NOAA) shows the PDSI for the month of July 2017, generally one of the hottest months of every year. All of West Virginia is seen as near normal. The 24-Month Standardized Precipitation Index (7/2015 – 6/2017), from NOAA shows a similar pattern over a longer term. All of West Virginia, except the eastern panhandle, is shown as being wetter than average, when compared to base averages from 1951-2001.



This is not to say that droughts cannot occur in the region. Historically there have been droughts of varying severity, as described in the Historical Occurrences section of this profile. Those droughts that do occur will generally encompass whole regions rather than any particular county specifically. This hazard is considered to be region wide, and can affect all areas and jurisdictions within Region VII.



Droughts can, and have, caused significant economic loss across West Virginia and the country. According to the United States Department of Agriculture's (USDA) Census of Agriculture, there were 2,633 farms in Region VII, encompassing over 522,800 acres of land. In total, the region produced over $45 million worth of agricultural products (based on market prices at the time). A drought that reaches the **Moderate** or **Severe** level can cause significant impacts to Region VII's economy. In addition to losses in crop yields and livestock production, reduced income for farmers has a ripple effect. Companies that provide goods and services to farmers have a reduction in business. Fewer crops means fewer jobs for seasonal farm workers. There is also increased credit risk for banks and financial lenders and loss tax revenue for local, state, and federal government. Shortages in crops means increased prices at market and importing goods for outside the region (Jesperson, 2001). The "crop loss study" section below provides an example of an economic impact.

Droughts can also impact the demand and availability of drinking water. As temperatures rise people need to consume more water to maintain health (EPA, 2016). Hydroelectric and nuclear power generation rely heavily on water. As water sources are reduced, local and state officials will need to monitor water usage to ensure enough for critical uses.

LOSS ESTIMATES

Loss estimates for droughts are difficult to quantify, though droughts generally affect crops rather than structures. There is no need for a loss estimate for structural damage. The varying severity levels of droughts makes estimating crop loss difficult, especially considering the numerous possible mitigating factors such as time of year, heartiness of crop, etc.

The worst case scenario would involve the entire agricultural sector being affected for a prolonged and serious drought. Based on 2012 numbers, the last Census of Agriculture published by the USDA, market value of crops sold in the region was $7,324,000.00. Droughts also have an effect on livestock production. Low rainfall causes a drop in available drinking water precluding the effective grazing of pastures. During drought years livestock suffer a lower conception rate due to an incomplete return to peak bodyweight and a higher rate of miscarriage due to high stress levels as the dry season proceeds. Therefore, drought in one year will lead to lower calving rates in the following year. As access to grazing pastures is reduced there will be a decrease in livestock bodyweight reducing the value of livestock sold at market. Female's milk output will also decrease as fodder access is reduces. Once food intake is below a certain level, lactation will cease reducing product for market and affecting the calf's nutrition (Toumlin, 1985).

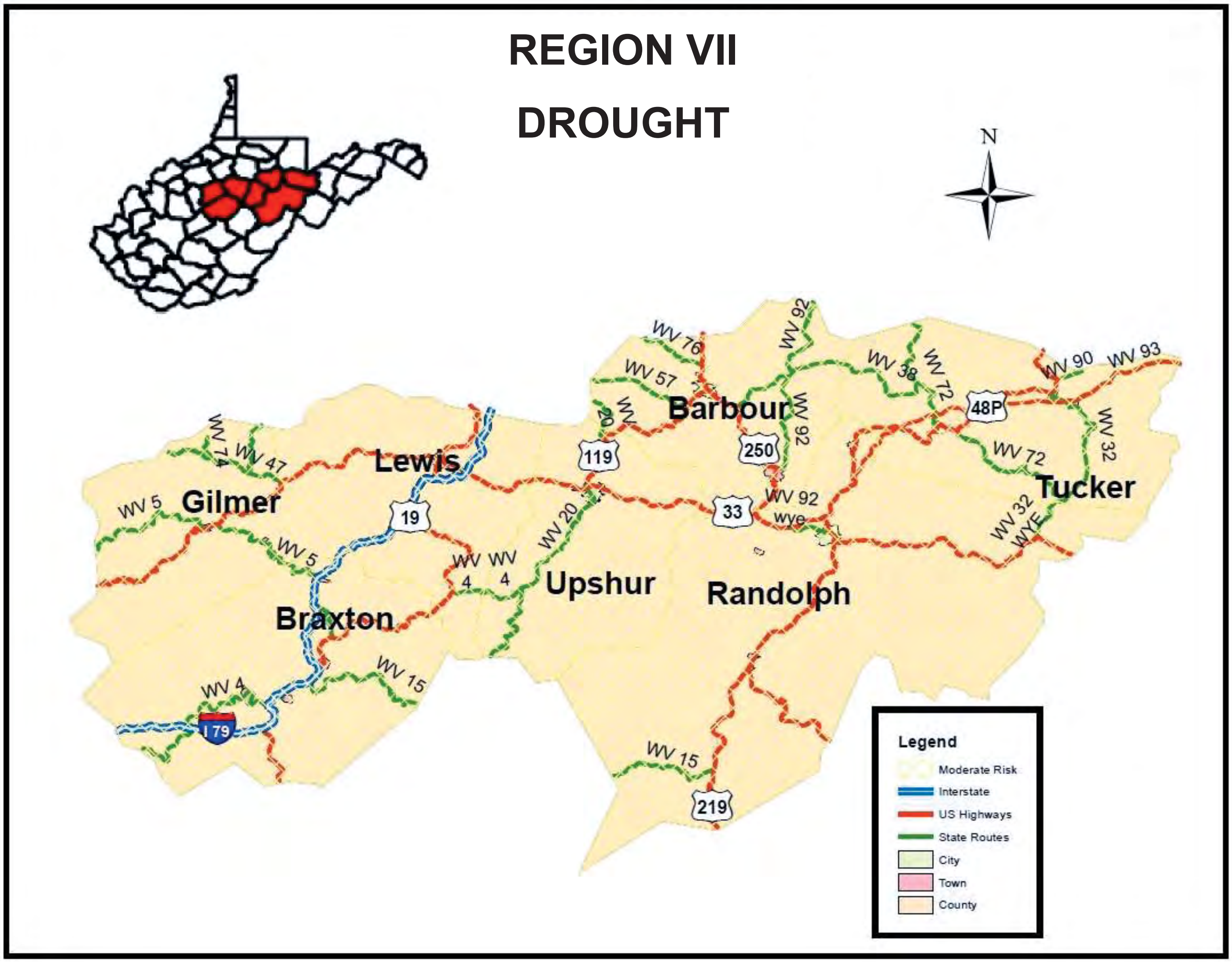
Table 2.2.3.3

CENSUS OF AGRICULTURE (USDA, 2012)

	Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur	Region VII
Number of Farms	513	386	235	476	405	162	456	2633
Land in Farms	84,478 acres	88,911 acres	70,393 acres	82,460 acres	94,151 acres	33,957 acres	68,451 acres	522,801 acres
Average Size of Farm	165 acres	230 acres	300 acres	173 acres	232 acres	210 acres	150 acres	1460 acres
Market Value of Products Sold	$6,634,000	$4,858,000	$8,845,000	$7,014,000	$9,385,000	$2,200,000	$6,807,000	$45,743,000
Crop Sales	$1,163,000	$970,000	$388,000	$985,000	$2,044,000	$497,000	$1,277,000	$7,324,000
Crop Sales Percentage	18%	20%	4%	14%	22%	23%	19%	16%
Livestock Sales	$5,471,000	$3,888,0000	$8,457,000	$6,029,000	$7,341,000	$1,703,000	$5,530,000	$38,419,000
Livestock Sales Percentage	82%	80%	96%	86%	78%	77%	81%	84%
Average Per Farm	$12,930	$12,585	$37,635	$14,736	$23,173	$13,583	$14,926	$17,373

TABLE 2.2.3.4 DROUGHT RISK CALCULATION

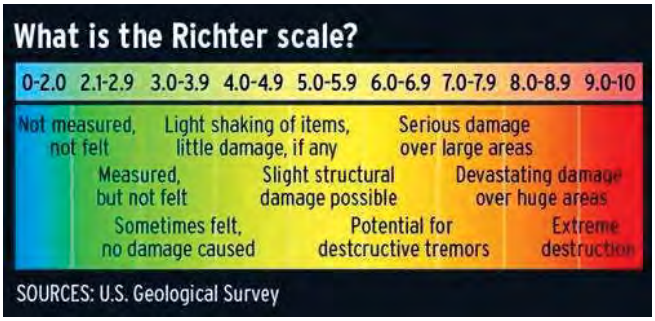
Probability				*Severity*		*Risk*
OCCASIONAL				MARGINAL		MODERATE
Events	22	.66	+	A drought effecting the region over an extended period of time could result in total crop loss for the year, approximately $7.3 million and at least a portion of livestock sales.	=	A combination of occasional occurrence and marginal level of severity puts this hazard at a moderate risk to Region VII.
Years	33					
Since 1985 there have been 22 drought events that affected Region VII.						


REGION VII
DROUGHT
N
Barbour
Lewis
Gilmer
Tucker
Upshur
Randolph
Braxton
Legend
Moderate Risk
Interstate
US Highways
State Routes
City
Town
County

2.2.4 EARTHQUAKES

"Sudden, rapid shaking of the earth's crust cause by the breaking and shifting of tectonic plates beneath the earth's surface" (Haddow, Bullock, & Coppola, 2014).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
At any time throughout the year	None	MODERATE

Earthquakes, both natural and man-made, generally manifest as ground displacement or shaking. Earthquakes are measured through two scales, the Richter scale, and the Modified Mercalli Intensity scale. The magnitude, or strength, of an earthquake is measured by the Richter scale. While the scale runs from 0-10, measurable events will register as a 2.0. Generally, earthquakes will not be felt until they reach a Richter scale measure in the high 2.0s, as shown in the chart to the right. Earthquakes with a magnitude above 3.0 can cause some damage, while those over 5.0 can cause serious damage. The effects of an earthquake can be felt far beyond the immediate area of the event, depending on the magnitude and local geology.



Modified Mercalli Scale		Richter Magnitude Scale
I	Detected only by sensitive instruments	1.5
II	Felt by few persons at rest, especially on upper floors; delicately suspended objects may swing	2
III	Felt noticeably indoors, but not always recognized as earthquake; standing autos rock slightly, vibration like passing truck	2.5
IV	Felt indoors by many, outdoors by few, at night some may awaken; dishes, windows, doors disturbed; autos rock noticeably	3
V	Felt by most people; some breakage of dishes, windows, and plaster; disturbance of tall objects	3.5
VI	Felt by all, many frightened and run outdoors; falling plaster and chimneys, damage small	4
VII	Everybody runs outdoors; damage to buildings varies depending on quality of construction; noticed by drivers of autos	4.5
VIII	Panel walls thrown out of frames; fall of walls, monuments, chimneys; sand and mud ejected; drivers of autos disturbed	5
IX	Buildings shifted off foundations, cracked, thrown out of plumb; ground cracked; underground pipes broken	5.5
X	Most masonry and frame structures destroyed; ground cracked, rails bent, landslides	6
XI	Few structures remain standing; bridges destroyed, fissures in ground, pipes broken, landslides, rails bent	6.5
XII	Damage total; waves seen on ground surface, lines of sight and level distorted, objects thrown up in air	7
		7.5
		8

The U.S. Geological Survey (USGS) estimates that there are 1.3 million earthquakes annually that have a magnitude between 2.0 and 2.9 while there is, on average, one earthquake of a magnitude 8.0 or higher annually (2015). Thus, the frequency and severity have an inverse relationship. The strongest earthquakes are likely to happen the least.

The Modified Mercalli scale is a measure of earthquake intensity at surface level. This scale, shown at left, uses roman numerals to denote

detection and damage levels associated with an earthquake. The image also shows the equivalent Richter scale measurements.

PUBLIC HEALTH

Fatalities from an earthquake can be broken into three categories: instantaneous, rapid, and delayed. Instantaneous fatalities are usually due to head and chest injuries or internal and external bleeding. Rapid deaths occur within hours and include hypovolemic shock, asphyxia, chest compression or environmental exposure such as hypothermia. Delayed fatalities occur within a few days due to wound infections, dehydration, sepsis, environmental exposure or crush syndrome (Naghii, 2005).

A large number of hospitalized patients after an earthquake require non-surgical acute care. These individuals experience myocardial infarctions, exacerbation of chronic illness (i.e., diabetes, hypertension, anxiety, etc.), and respiratory injuries from exposure to building debris including asbestos. Dust from building damage or collapse cause eye injuries and respiratory-tract irritation (Naghii, 2005).

Another concern is damage to chemical storage tanks that may begin to leak. Damaged infrastructure such as drinking water and sewer pipes can lead to the spread of disease and death. Delivery of electricity and natural gas can be disrupted causing individuals to succumb to environmental exposure. Damage to nuclear power plants can lead to widespread contamination of radioactive materials (Naghii, 2005).

SOCIAL VULNERABILITY

Elderly, children, chronically ill and disabled individuals seem to be at an elevated risk for injury or death following an earthquake. Mobility impairment, inability to compensate for trauma, and underlying disease contribute to the vulnerability of these groups. (Naghii, 2005).

Low income population are also at an elevated risk. They often live in the most vulnerable housing and lack the resources to undertake mitigation or evacuation measures. Low income individuals tend to reside in older homes and low or moderate income apartments that are not subject to the most advanced building codes. Those that live in rental units are dependent on landlords for structural loss prevention (Insurance Institute for Business & Home Safety, 2017).

HISTORICAL OCCURRENCES

Braxton County

The State Journal reports a series of earthquakes in in 2010 that were linked to underground wastewater injection. The earthquakes were near the Chesapeake Appalachia injections well. The earthquakes subsided when the company scaled back its injections from the permitted 2,100 pounds per square inch. There were no reported injuries or property damage from the tremors.

Braxton County

The Braxton County 911 Center began receiving calls from residents reporting an earthquake just before 10:00 a.m. on March 31, 2013. Several calls reported hearing an explosion, possibly from a transformer. There were no injuries or property damage reported.

The table below lists earthquakes with epicenters in Region VII. There have been no earthquakes with epicenters in Barbour, Randolph, or Tucker Counties.

Table 2.2.4.1
Region VII Earthquake Epicenters (1824-2016)

Date	County	Magnitude
10/16/2000	Braxton	2.5
4/4/2010	Braxton	3.4
4/29/2010	Braxton	2.6
4/29/2010	Braxton	2.7
4/29/2010	Braxton	2.5
5/7/2010	Braxton	2.6
5/8/2010	Braxton	2.4
7/24/2010	Braxton	2.4
7/25/2010	Braxton	2.2
8/15/2010	Lewis	2.5
8/21/2010	Upshur	2.5
1/10/2012	Braxton	2.8
3/31/2013	Braxton	3.4
7/20/2013	Gilmer	2.7
7/30/2013	Gilmer	2.8
8/16/2013	Gilmer	2.6
10/13/2013	Braxton	2.2

FRACKING EFFECTS

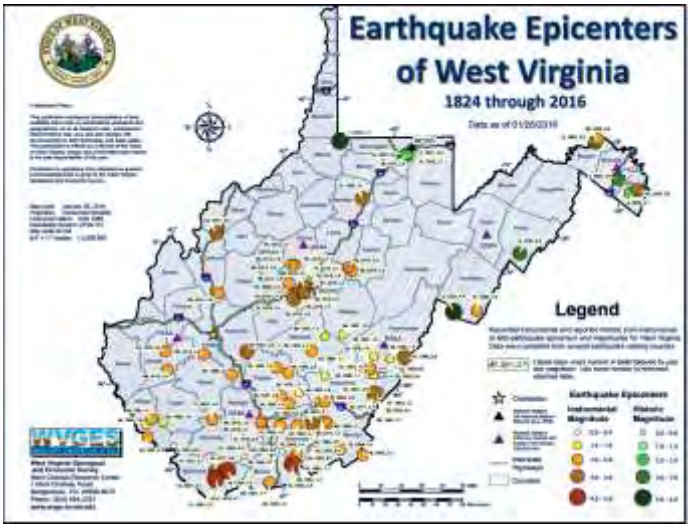
The growth of the practice of hydraulic fracturing, more commonly known as fracking, in the oil industry has led to the occurrences of earthquakes in areas of Ohio according to a

study by a Miami University of Ohio graduate student. Skoumal, Brudzinski and Currie found that a well in Mahoning County, in eastern Ohio, was located near an unknown fault line and the fracking activity triggered "scores of small earthquakes in March 2014, including one large enough to be felt in nearby towns" (2015). A similar event occurred near Youngstown, OH in 2011, but was related to wastewater injection rather than hydraulic fracturing (Skoumal, Brudzinski and Currie, 2015).

According to the USGS, wastewater disposal, rather than fracking, is the cause of the recent increase in earthquakes in the central US (2016). Additionally, the USGS states that "wastewater is produced at all oil wells, not just hydraulic fracturing sites," so these incidents can occur anywhere that the injection of wastewater is occurring (2016).

LOCATION & EXTENT

Large areas of West Virginia have had documented earthquake activity, with the most active areas being in the southeast region of the state as well as a clustering around the central area. The map shown at right, from the West Virginia Geological and Economic Survey, illustrates the various epicenters that have occurred since 1824 (2016). All of the earthquakes shown in the map have a magnitude of 4.9 or less. All of Region VII is located in a mid-level U.S. Seismic Hazard zone, according to the USGS. The effects of large earthquakes are not confined geographically, as the historical event below will outline. Depending on the magnitude and geology, the effects of an event can reach hundreds of miles.



Earthquakes can affect people and structures alike, although older structures may be more susceptible to cracks and damage. "With most earthquakes, trauma caused by the collapse of buildings is the cause of most deaths and injuries. However, a surprisingly large number of patients require acute care for non-surgical problems such as acute myocardial infraction, exacerbation of chronic diseases such as diabetes or hypertension, anxiety and other mental health problems, respiratory disease from exposure to dust and asbestos fibers from rubble, and near-drowning because of flooding from broken dams. An earthquake may

precipitate a major technologic disaster by damaging or destroying nuclear power stations, hospitals with dangerous biologic products, hydrocarbon storage areas, and hazardous chemical plants. As with most natural disasters, the risk of secondary epidemics is minimal, and only mas vaccination campaigns based on results of epidemiological surveillance are appropriate following earthquakes" (Noji, 2000).

Low income population are at an elevated risk. They often live in the most vulnerable housing and lack the resources to undertake mitigation or evacuation measures. Low income individuals tend to reside in older homes and low or moderate income apartments that are not subject to the most advanced building codes. Those that live in rental units are dependent on landlords for structural loss prevention (Insurance Institute for Business & Home Safety, 2017). Clay County has the largest vulnerable population with 27.7% of families living below the poverty level. As seen on the map below, Boone and Clay Counties have higher percentage areas of population living below the poverty line throughout the counties, while Kanawha County has small sections and Putnam County has none.

LOSS ESTIMATE

The effects of a potential earthquake striking each county in Region VII was analyzed using the HAZUS-MH program from the Federal Emergency Management Agency. The scenario depicts a 5.0 earthquake (the lowest possible magnitude to use in the program) located at the county seat of each county.

Table

Barbour County Expected Building Damage by Occupancy (HAZUS)

	None		Slight		Moderate		Extensive		Complete	
	Count	%	Count	%	Count	%	Count	%	Count	%
Agriculture	4	0.11	3	0.12	3	0.17	1	0.18	0	0.22
Commercial	58	1.46	31	1.49	40	2.44	20	3.13	6	3.85
Education	4	0.10	2	0.11	3	0.21	2	0.27	1	0.33
Government	6	0.16	3	0.15	4	0.27	2	0.36	1	0.43
Industrial	15	0.37	6	0.30	8	0.51	4	0.66	1	0.80
Other Residential	1,096	27.61	605	28.95	694	42.43	348	55.31	81	49.93
Religion	12	0.29	5	0.26	5	0.31	2	0.35	1	0.39
Single Family	2,774	69.89	1,435	68.62	878	53.66	250	39.74	71	44.04
TOTAL	3,969		2,091		1,636		629		161	

Table

Barbour County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	0.00	0.30	3.30	0.04	0.49	4.13
	Capital Related	0.00	0.13	2.37	0.03	0.10	2.63
	Rental	1.96	0.99	1.27	0.02	0.22	4.44
	Relocation	7.22	2.09	2.12	0.08	1.59	13.11
	Subtotal	9.18	3.50	9.06	0.16	2.41	24.32
Capital Stock Losses	Structural	9.70	3.21	2.48	0.23	1.28	16.90
	Non Structural	33.08	10.24	7.37	0.77	4.15	55.61
	Content	12.13	2.31	4.08	0.53	2.41	21.45
	Inventory	0.00	0.00	0.11	0.11	0.02	0.24
	Subtotal	54.92	15.76	14.03	1.64	7.87	94.21
TOTAL		64.10	19.26	23.10	1.80	10.27	118.53

Table

Braxton County Expected Building Damage by Occupancy (HAZUS)

	None		Slight		Moderate		Extensive		Complete	
	Count	%	Count	%	Count	%	Count	%	Count	%
Agriculture	4	0.10	2	0.11	2	0.13	1	0.13	0	0.15
Commercial	111	2.83	57	2.93	61	4.00	24	4.56	6	5.32
Education	4	0.11	2	0.11	2	0.16	1	0.17	0	0.21
Government	11	0.28	5	0.28	7	0.43	3	0.50	1	0.58
Industrial	28	0.71	14	0.71	17	1.11	7	1.32	2	1.54
Other Residential	1,026	26.18	619	31.90	756	49.68	316	60.40	58	53.50
Religion	9	0.22	4	0.20	3	0.21	1	0.22	0	0.24
Single Family	2,727	69.58	1,237	63.75	674	44.29	171	32.71	42	38.45
TOTAL	3,920		1,940		1,521		522		108	

Table

Braxton County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	0.00	0.53	2.70	0.15	0.55	3.93
	Capital Related	0.00	0.22	2.13	0.10	0.03	2.48
	Rental	1.37	0.71	1.30	0.05	0.10	3.53
	Relocation	5.07	2.10	2.14	0.22	0.75	10.27
	Subtotal	6.44	3.56	8.26	0.52	1.43	20.21
Capital Stock Losses	Structural	6.44	2.40	2.49	0.66	0.67	12.67
	Non Structural	21.92	7.10	6.72	2.18	2.11	40.03
	Content	8.15	1.45	3.71	1.51	1.24	16.07
	Inventory	0.00	0.00	0.12	0.37	0.00	0.50
	Subtotal	36.51	10.96	13.05	4.72	4.02	69.26
TOTAL		42.95	14.52	21.31	5.24	5.45	89.47

Table

Gilmer County Expected Building Damage by Occupancy (HAZUS)

	None		Slight		Moderate		Extensive		Complete	
	Count	%	Count	%	Count	%	Count	%	Count	%
Agriculture	1	0.07	1	0.09	1	0.13	1	0.13	0	0.16
Commercial	22	1.61	20	1.83	29	3.02	16	3.68	5	4.41
Education	1	0.11	1	0.12	2	0.20	1	0.24	0	0.28
Government	3	0.22	3	0.24	4	0.44	2	0.56	1	0.66
Industrial	8	0.59	7	0.63	11	1.18	7	1.54	2	1.84
Other Residential	299	21.67	289	26.80	410	41.99	236	55.84	57	49.17
Religion	3	0.24	2	0.23	3	0.26	1	0.29	0	0.33
Single Family	1,041	75.49	755	70.07	516	52.80	160	37.71	50	43.15
TOTAL	1,379		1,077		977		423		116	

Table

Gilmer County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	0.00	0.30	1.36	0.06	0.28	2.00
	Capital Related	0.00	0.12	1.23	0.05	0.06	1.46
	Rental	1.21	0.76	0.73	0.03	0.12	2.86
	Relocation	4.44	1.51	1.16	0.16	0.90	8.17
	Subtotal	5.65	2.68	4.49	0.30	1.36	14.49
Capital Stock Losses	Structural	5.56	2.54	1.46	0.44	0.56	10.56
	Non Structural	19.35	8.06	4.12	1.47	2.13	35.13
	Content	7.21	1.84	2.19	1.07	1.26	13.57
	Inventory	0.00	0.00	0.07	0.17	0.00	0.24
	Subtotal	32.11	12.45	7.84	3.15	3.95	59.50
TOTAL		37.77	15.13	12.33	3.45	5.31	73.99

Table

Lewis County Expected Building Damage by Occupancy (HAZUS)

	None		Slight		Moderate		Extensive		Complete	
	Count	%	Count	%	Count	%	Count	%	Count	%
Agriculture	7	.019	5	0.23	6	0.30	2	0.33	1	0.37
Commercial	101	2.58	68	2.91	88	4.77	41	6.29	12	7.45
Education	5	0.12	3	0.14	4	0.24	2	0.31	1	0.37
Government	9	0.22	6	0.24	8	0.45	4	0.62	1	0.74
Industrial	37	0.95	21	0.91	29	1.56	13	2.00	4	2.18
Other Residential	900	22.98	623	26.47	707	38.39	310	47.19	65	39.77
Religion	11	0.28	6	0.28	6	0.33	3	0.41	1	0.46
Single Family	2,847	72.68	1,620	68.84	994	53.95	282	42.85	79	48.66
TOTAL	3,918		2,353		1,842		657		163	

Table

Lewis County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	0.00	0.36	5.04	0.29	0.87	6.56
	Capital Related	0.00	0.15	3.55	0.20	0.16	4.07
	Rental	2.26	1.37	1.98	0.10	0.29	6.01
	Relocation	8.34	2.04	3.69	0.42	2.49	16.97
	Subtotal	10.60	3.92	14.26	1.01	3.81	33.61
Capital Stock Losses	Structural	11.45	3.05	4.25	1.23	2.33	22.33
	Non Structural	39.42	11.04	11.79	4.17	7.14	73.55
	Content	14.65	2.69	6.69	3.02	3.71	30.76
	Inventory	0.00	0.00	0.20	0.73	0.01	0.95
	Subtotal	65.51	16.78	22.93	9.17	13.19	127.58
TOTAL		76.12	20.71	37.19	10.18	17.00	161.19

Table

Randolph County Expected Building Damage by Occupancy (HAZUS)

	None		Slight		Moderate		Extensive		Complete	
	Count	%	Count	%	Count	%	Count	%	Count	%
Agriculture	13	0.15	5	0.16	5	0.22	2	0.26	1	0.29
Commercial	160	1.82	90	2.81	123	5.27	62	7.57	20	9.06
Education	11	0.13	4	0.14	6	0.25	3	0.34	1	0.39
Government	21	0.23	7	0.21	9	0.40	5	0.57	1	0.67
Industrial	42	0.48	19	0.58	28	1.18	15	1.77	5	2.08
Other Residential	2,614	29.76	986	30.87	920	39.53	384	46.71	90	41.34
Religion	26	0.29	12	0.37	12	0.49	5	0.64	2	0.72
Single Family	5,899	67.15	2,072	64.86	1,226	52.66	346	42.13	99	45.45
TOTAL	8,785		3,195		2,329		821		217	

Table

Randolph County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	0.00	2.45	7.41	0.35	1.24	11.45
	Capital Related	0.00	1.02	5.46	0.21	0.16	6.86
	Rental	2.85	2.89	4.09	0.10	0.48	10.42
	Relocation	10.51	2.76	6.36	0.43	3.00	23.05
	Subtotal	13.36	9.13	23.32	1.09	4.88	51.78
Capital Stock Losses	Structural	15.09	5.21	8.36	1.40	2.55	32.60
	Non Structural	51.19	19.61	20.98	4.55	8.04	104.37
	Content	18.72	5.01	11.45	3.15	4.52	42.85
	Inventory	0.00	0.00	0.48	0.87	0.03	1.38
	Subtotal	85.00	29.83	41.29	9396	15.3	181.20
TOTAL		98.36	38.96	64.61	11.05	20.01	232.98

Table

Tucker County Expected Building Damage by Occupancy (HAZUS)

	None		Slight		Moderate		Extensive		Complete	
	Count	%	Count	%	Count	%	Count	%	Count	%
Agriculture	3	0.10	2	0.15	2	0.23	1	0.25	0	0.30
Commercial	48	1.55	23	1.86	28	3.24	14	4.31	4	5.11
Education	4	0.13	2	0.13	2	0.24	1	0.32	0	0.38
Government	6	0.20	3	0.25	5	0.52	2	0.74	1	0.87
Industrial	15	0.48	6	0.52	9	1.02	5	1.42	1	1.66
Other Residential	810	26.37	354	28.83	348	39.60	162	50.64	38	45.90
Religion	9	0.29	4	0.37	4	0.48	2	0.60	1	0.66
Single Family	2,178	70.88	835	67.89	480	54.67	133	41.72	37	45.11
TOTAL	3,072		1,229		879		319		83	

Table

Tucker County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	0.00	0.24	1.81	0.06	0.42	2.53
	Capital Related	0.00	0.10	1.49	0.03	0.04	1.67
	Rental	1.07	0.49	0.64	0.02	0.09	2.31
	Relocation	3.96	.087	1.16	0.11	0.78	6.87
	Subtotal	5.03	1.70	5.10	0.22	1.33	13.38
Capital Stock Losses	Structural	5.48	1.25	1.28	0.35	0.72	9.09
	Non Structural	18.55	4.22	3.97	1.15	2.26	30.16
	Content	6.77	0.98	2.17	0.78	1.28	11.98
	Inventory	0.00	0.00	0.05	0.17	0.01	0.23
	Subtotal	30.81	6.45	7.48	2.45	4.28	51.45
TOTAL		35.84	8.15	12.58	2.67	5.60	64.84

Table

Upshur County Expected Building Damage by Occupancy (HAZUS)

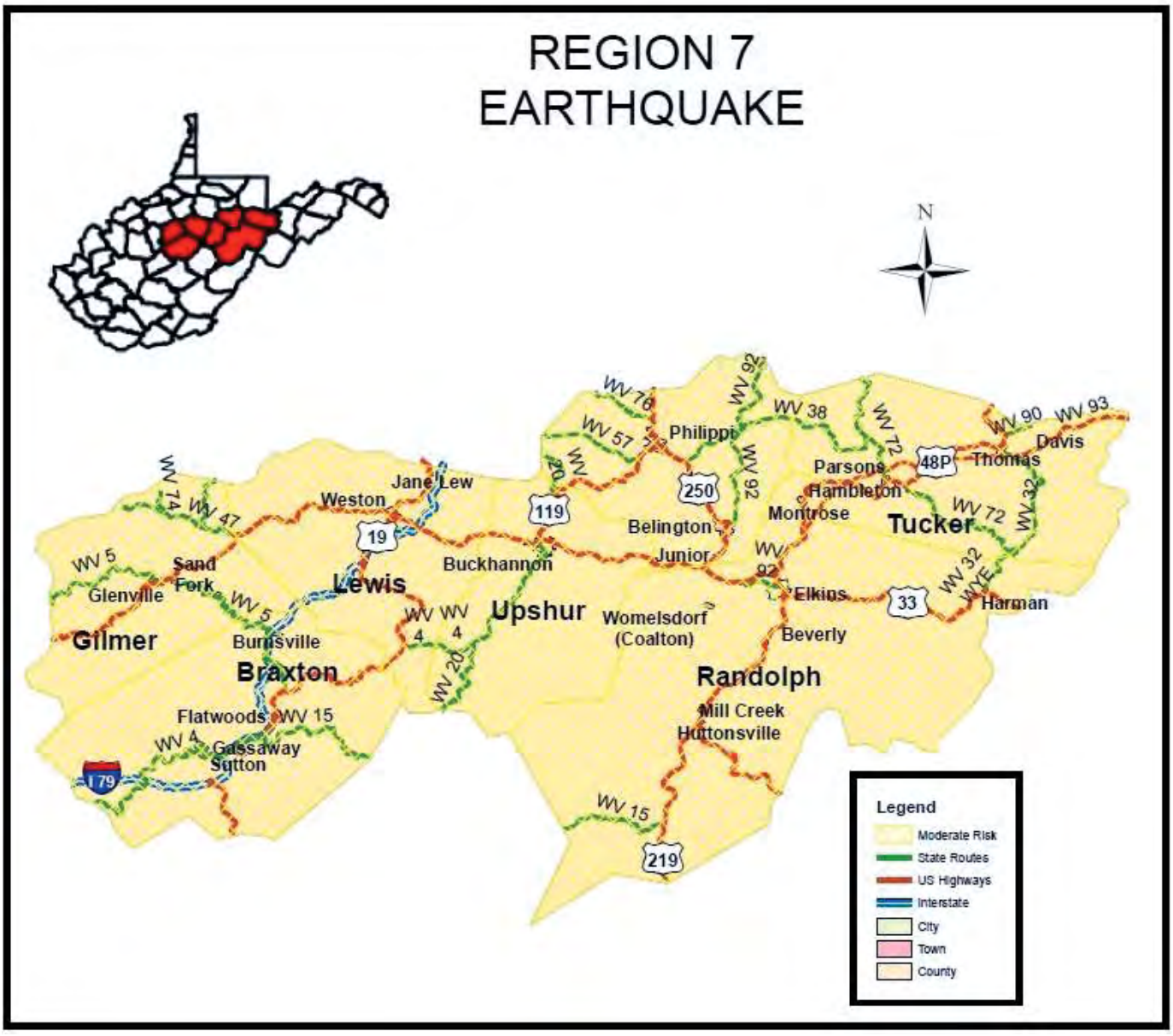
	None		Slight		Moderate		Extensive		Complete	
	Count	%	Count	%	Count	%	Count	%	Count	%
Agriculture	6	0.11	4	0.15	5	0.21	2	0.24	1	0.29
Commercial	109	1.93	80	2.79	113	5.02	58	7.01	19	8.68
Education	6	0.11	3	0.12	5	0.20	2	0.27	1	0.32
Government	10	0.18	5	0.17	7	0.32	4	0.43	1	0.52
Industrial	34	0.60	22	0.75	34	1.50	18	2.18	6	2.66
Other Residential	1,283	22.68	775	27.10	892	39.73	404	48.80	89	41.82
Religion	15	.26	9	0.32	9	0.41	4	0.52	1	0.60
Single Family	4,195	74.13	1,961	68.59	1,181	52.61	335	40.54	96	45.10
TOTAL	5,659		2,858		2,245		827		213	

Table

Upshur County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses	Wage	0.00	2.23	8.75	0.41	0.66	12.05
	Capital Related	0.00	0.93	6.61	0.32	0.11	7.97
	Rental	2.76	2.88	3.25	0.17	0.30	9.36
	Relocation	10.19	3.01	5.75	0.76	1.98	21.69
	Subtotal	12.95	9.05	24.36	1.66	3.05	51.07
Capital Stock Losses	Structural	14.67	6.42	6.94	2.43	1.86	32.32
	Non Structural	50.38	21.96	19.98	8.05	5.60	105.98
	Content	18.65	5.42	11.06	5.81	3.04	43.98
	Inventory	0.00	0.00	0.31	1.13	0.02	1.46
	Subtotal	83.71	33.79	38.29	17.42	10.53	183.74
TOTAL		96.67	42.84	62.65	19.09	13.57	234.81

TABLE 2.2.4.2 EARTHQUAKE RISK CALCULATION					
Probability			*Severity*		*Risk*
OCCASIONAL			MARGINAL		MODERATE
Events 17 Years 17	1	+	Historically there has been no reports of direct injuries, fatalities, or property damage, however earthquakes can cause all of these.	=	The combination of occasional probability and marginal severity put this hazard at moderate risk for Region VII.
Based on historical occurrences, it is likely for the region to experience an earthquake each year.					


REGION 7
EARTHQUAKE
N
WV 76
WV 92
WV 38
WV 72
WV 90
WV 93
WV 57
Philippi
Davis
Parsons
48P
Thomas
WV 74
WV 47
Jane Lew
Weston
WV 20
250
WV 92
Hambleton
WV 32
119
Belington
Monrose
Tucker
WV 72
19
WV 5
Sand
Fork
Buckhannon
Junior
WV 92
Glenville
Lewis
WV 5
WV 4
WV 4
Upshur
Womelsdorf
(Coalton)
Elkins
33
WV 32
WYE
Harman
Gilmer
Burnsville
Beverly
Braxton
WV 20
Randolph
Flatwoods
WV 15
Mill Creek
Huttonsville
WV 4
Gassaway
Sutton
I 79
WV 15
219
Legend
Moderate Risk
State Routes
US Highways
Interstate
City
Town
County

2.2.5 Extreme Temperatures

"Major diversions in average seasonal temperatures. Extreme heat occurs when temperatures of ten or more degrees above the average high temperature persist across a geographic region for several days or weeks. There is no standard definition for extreme cold, but generally refers to periods of colder than normal conditions." (Haddow, Bullock, & Coppola, 2014).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
Any season, but generally summer and winter months.	Hours / Days	MODERATE

Temperatures can vary widely over the course of a year, but each season is associated with general, expected temperature ranges. Summer and winter will generally have the highest and lowest temperature ranges, respectively. When the temperature is consistently higher than normal during summer, meteorologists refer to it as a heat wave. A heat wave is defined as "temperatures of ten or more degrees above the average high temperature that persist across the geographic region for several days or weeks" (Haddow, Bullock, & Coppola, 2014). These conditions can contribute to drought conditions, or can aggravate existing conditions. Excessive heat has a history of being deadly. In the United States "more than 1,500 die from exposure to excessive heat" (Haddow, Bullock, & Coppola, 2014). The National Weather Service (NWS) chart above shows the various temperatures and humidity levels that can be a danger to humans and animals. These conditions can also have serious impacts on crops, causing below average harvests. Repeated years of extreme temperatures can easily cause significant economic impacts on agricultural industries.

Table 2.2.5.1

NOAA'S NATIONAL WEATHER SERVICE HEAT INDEX

Relative Humidity % \ Temperature (°F)	80	82	84	86	88	90	92	94	96	98	10	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										
Likelihood of heat disorders with prolonged exposure or strenuous activity																
	Caution			Extreme Caution			Danger			Extreme Danger						

While there is no widely accepted definition of extremely cold temperatures, periods of colder than average conditions can cause an array of negative consequences depending on their duration (Haddow, Bullock, & Coppola, 2014). Extremely cold temperatures are immediately dangerous to both humans and livestock by causing frostbite and hypothermia, which can lead to permanent injury and death. The chart to the left, from the NWS, shows how quickly frostbite can occur at different temperatures and wind speeds. In unprotected structures cold temperatures can freeze water pipes causing them to burst upon thawing, leading to significant damage. Cold snaps during typically warmer weather during the growing season can damage and destroy some crops, depending on their sensitivity to temperature.

Table 2.2.5.2

NOAA'S NATIONAL WEATHER SERVICE WINDCHILL CHART

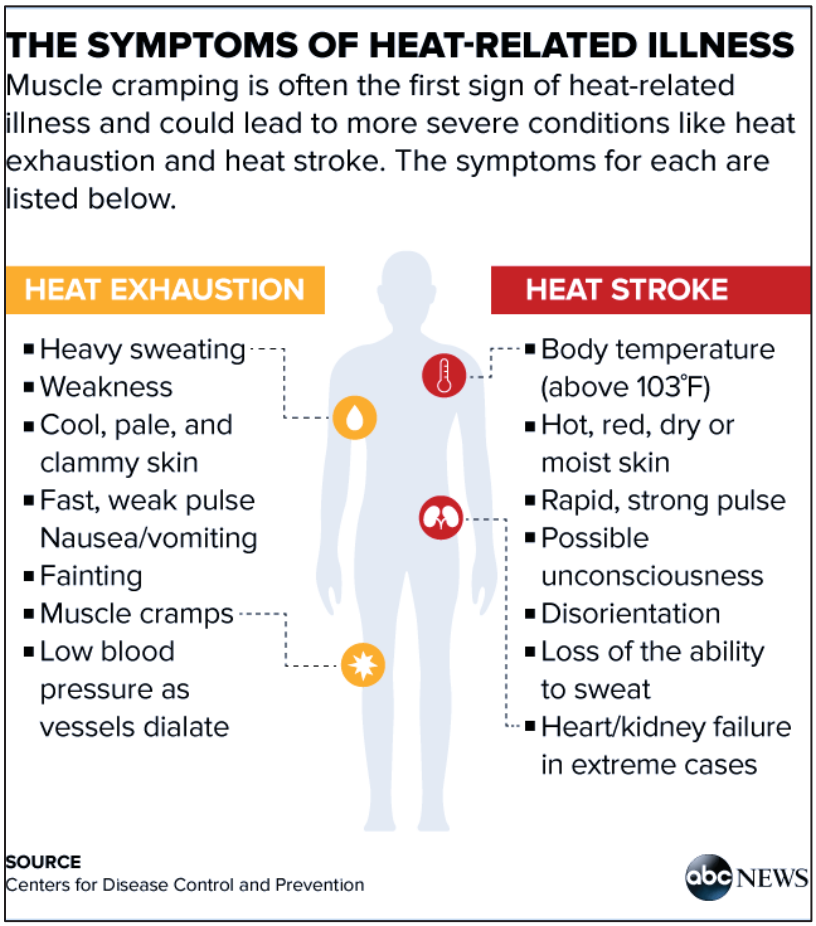
Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-76	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98
Frostbite Times					30 Minutes			10 Minutes			5 Minutes								

For the purposes of data recording and tracking, the National Centers for Environmental Information (NCEI) has defined four types of extreme temperature events, two for heat and two for cold. These definitions come from the National Weather Service Instruction 10-1605, published in 2007. Periods of low temperatures or wind chill temperatures that reach or exceed a locally defined advisory level (which is generally -18F or lower) is categorized as a **Cold/Wind Chill** event. An event may also meet this category if the combination of cold temperatures and low wind chill values result in a fatality. An event becomes an **Extreme Cold/Wind Chill** event when a period of low temperatures or wind chill values reaches the locally defined level for a warning (typically -35F or lower), on a widespread or localized basis. Normally, these conditions should cause significant human and/or economic impact.

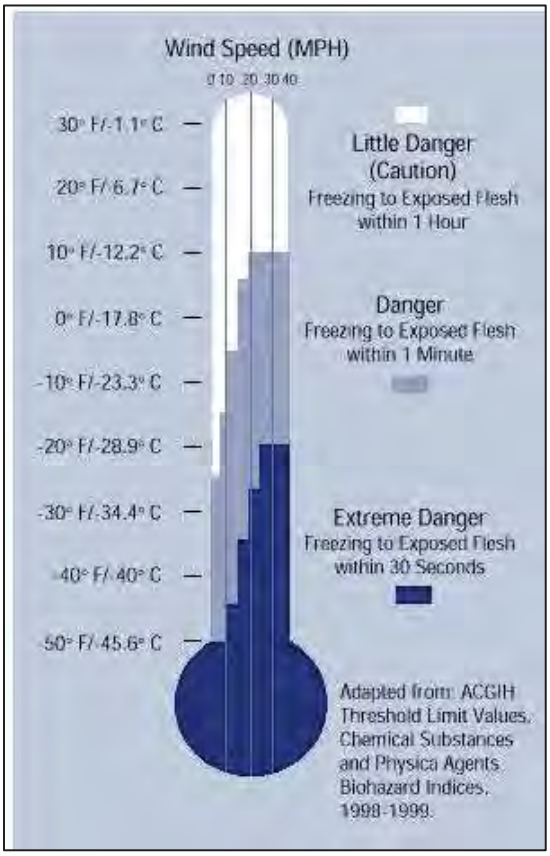
A **Heat** event is a period of heat resulting from a combination of high (above normal) temperatures and relative humidity. An event occurs when heat index values meet local advisory thresholds, or when a directly-related fatality occurs due to the event. **Excessive Heat** events result from a combination of high temperatures that are well above normal, and high relative humidity values. These events are recorded when heat index values meet the locally defined thresholds for an excessive heat warning.

PUBLIC HEALTH

Extreme heat can cause a wide range of health problems or even make existing health problems worse. Some of the more mild symptoms include discomfort, skin eruptions and heat fatigue which can lead to heat cramps. Severe conditions include heat exhaustion and heat stroke. Anyone showing signs or having symptoms of heat related illnesses needs to be removed from the heat immediately. Occasionally some people experiencing mild symptoms and anyone experiencing severe symptoms require medical attention. Prolonged exposure to extreme heat can cause systems to shut down and can even be fatal (CDC).



Problems arising from prolonged exposure to the cold can include hypothermia, frostbite and non-freezing cold injuries such as chilblains and trench/immersion foot. Sunburn is also possible during extreme cold weather events (Army Public Health Center). Hypothermia is the drop in a person's body temperature. A person is considered to be hypothermic beginning at 95°F and includes symptoms of intense shivering, numbness, bluish skin and possibly heart dysrhythmia. A person who is at 90°F or below will always require medical attention as brain function has begun to slow. Breathing and cardiac output cease around 79°F although people have been revived after extended periods of time in a hypothermic cardiac arrest state.



SOCIAL VULNERABILITY

Although extreme temperatures affect everyone in the region, some people may be more vulnerable to their effects. For example, the homeless population could be more at risk simply for being exposed to the elements; children and the elderly population may be more susceptible to changes in temperature as well as the those living on a fixed income, such as the elderly, or those living below the poverty line as they may not be able to afford to keep cool during an extreme heat event or to stay warm during an extreme cold event.

HISTORICAL OCCURRENCES

Multiple Counties

On January 6, 2014, an arctic cold front swept through West Virginia. Wind gusts of 30 to 50 mph were common. Temperatures in the 40s and 50s quickly fell into the 20s by dawn on the 6th. Temperatures continued to fall throughout the day with readings reaching down into the single digits. By dawn on the 7th, temperatures were mostly between two below zero to eight below zero. Wind chill readings were between minus 20 and minus 30. There were many reports of frozen pipes in homes, schools and public utility supply lines

underground. Most county public school systems were closed and some remained closed an extra day due to power outages and water damages. Property damage was estimated at $200,000 in Lewis County, and $20,000 for each of Barbour, Braxton, Gilmer, Randolph, and Upshur Counties.

Table 2.2.5.3
Extreme Temperature Events (NCEI, 1996-2016)

Date	Counties	Type of Event	Property Damage
2/4/1996	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
2/27/1996	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Heat	-
3/10/1996	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
5/13/1996	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
11/15/1996	Randolph	Cold/Wind Chill	-
1/1/1997	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Heat	-
1/16/1997	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
2/21/1997	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Heat	-
4/1/1997	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
5/7/1997	Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
5/22/1997	Randolph, Upshur	Cold/Wind Chill	-
5/23/1997	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
9/4/1997	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
9/22/1997	Randolph	Cold/Wind Chill	-
10/23/1997	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
11/1/1997	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
11/18/1997	Randolph, Upshur	Cold/Wind Chill	-
3/10/1998	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
3/26/1998	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Heat	-
9/14/1998	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Heat	-
11/30/1998	Randolph	Heat	-
12/6/1998	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Heat	-
1/22/1999	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Heat	-

Table 2.2.5.3
Extreme Temperature Events (NCEI, 1996-2016)

Date	Counties	Type of Event	Property Damage
2/11/1999	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Heat	-
3/1/1999	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
10/29/1999	Randolph	Heat	-
1/2/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Excessive Heat	-
1/22/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Extreme Cold/Wind Chill	-
1/28/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Extreme Cold/Wind Chill	-
1/29/2000	Randolph	Extreme Cold/Wind Chill	-
2/25/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Excessive Heat	-
2/26/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Excessive Heat	-
3/8/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Excessive Heat	-
10/8/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
11/21/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Extreme Cold/Wind Chill	-
12/1/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
1/3/2001	Barbour, Randolph, Upshur	Extreme Cold/Wind Chill	-
2/9/2001	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Excessive Heat	-
3/1/2001	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
10/8/2001	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
12/1/2001	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Heat	-
1/2/2002	Barbour, Randolph, Upshur	Extreme Cold/Wind Chill	-
1/28/2002	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Excessive Heat	-
1/31/2002	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Excessive Heat	-
4/7/2002	Randolph	Cold/Wind Chill	-
4/16/2002	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Excessive Heat	-
5/19/2002	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Extreme Cold/Wind Chill	-
1/14/2003	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
8/16/2007	Braxton	Excessive Heat	-
1/16/2009	Barbour, Randolph	Cold/Wind Chill	-
1/16/2009	Tucker	Extreme Cold/Wind Chill	-

Table 2.2.5.3
Extreme Temperature Events (NCEI, 1996-2016)

Date	Counties	Type of Event	Property Damage
12/11/2009	Tucker	Cold/Wind Chill	-
7/20/2011	Barbour, Braxton, Gilmer, Lewis	Heat	-
7/28/2011	Barbour, Braxton, Gilmer, Lewis	Heat	-
1/21/2013	Tucker	Cold/Wind Chill	-
1/22/2013	Randolph	Cold/Wind Chill	-
1/2/2014	Tucker	Cold/Wind Chill	-
1/5/2014	Tucker	Extreme Cold/Wind Chill	-
1/6/2014	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Extreme Cold/Wind Chill	$300,000
1/21/2014	Tucker	Extreme Cold/Wind Chill	-
1/27/2014	Barbour, Braxton, Gilmer, Lewis, Randolph, Tucker, Upshur	Extreme Cold/Wind Chill	$150,000
2/5/2015	Tucker	Cold/Wind Chill	-
2/12/2015	Randolph	Cold/Wind Chill	-
2/14/2015	Barbour, Braxton, Gilmer, Lewis, Upshur	Cold/Wind Chill	-
2/14/2015	Randolph, Tucker	Extreme Cold/Wind Chill	-
2/18/2015	Lewis	Cold/Wind Chill	-
2/18/2015	Barbour, Braxton, Gilmer, Randolph, Upshur	Extreme Cold/Wind Chill	-
2/19/2015	Tucker	Extreme Cold/Wind Chill	-
2/23/2015	Barbour, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-
2/24/2015	Tucker	Extreme Cold/Wind Chill	-
3/6/2015	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur	Cold/Wind Chill	-

LOCATION & EXTENT

This hazard is a regional hazard that can affect all areas and jurisdictions of the region. Generally these types of events will affect various areas of a jurisdiction or the region, rather than being isolated to just one locality. The NCEI event records show that over the last 21 years 1996-2016), there have been 71 recorded extreme temperature events in Region VII. Extreme cold/wind chill events have caused over $450,000 in property damages in the same time frame. All of these property damages were recorded during

Table 2.2.5.4

Type	#	Property Damage
Cold/Wind Chill	33	-
Extreme Cold/Wind Chill	16	$450,000
Heat	13	-
Excessive Heat	9	-
Total	71	$450,000

extreme cold/wind chill events during a 21 day period in January 2014. None of 71 events is reported to have resulted in an injury or fatality in the Region.

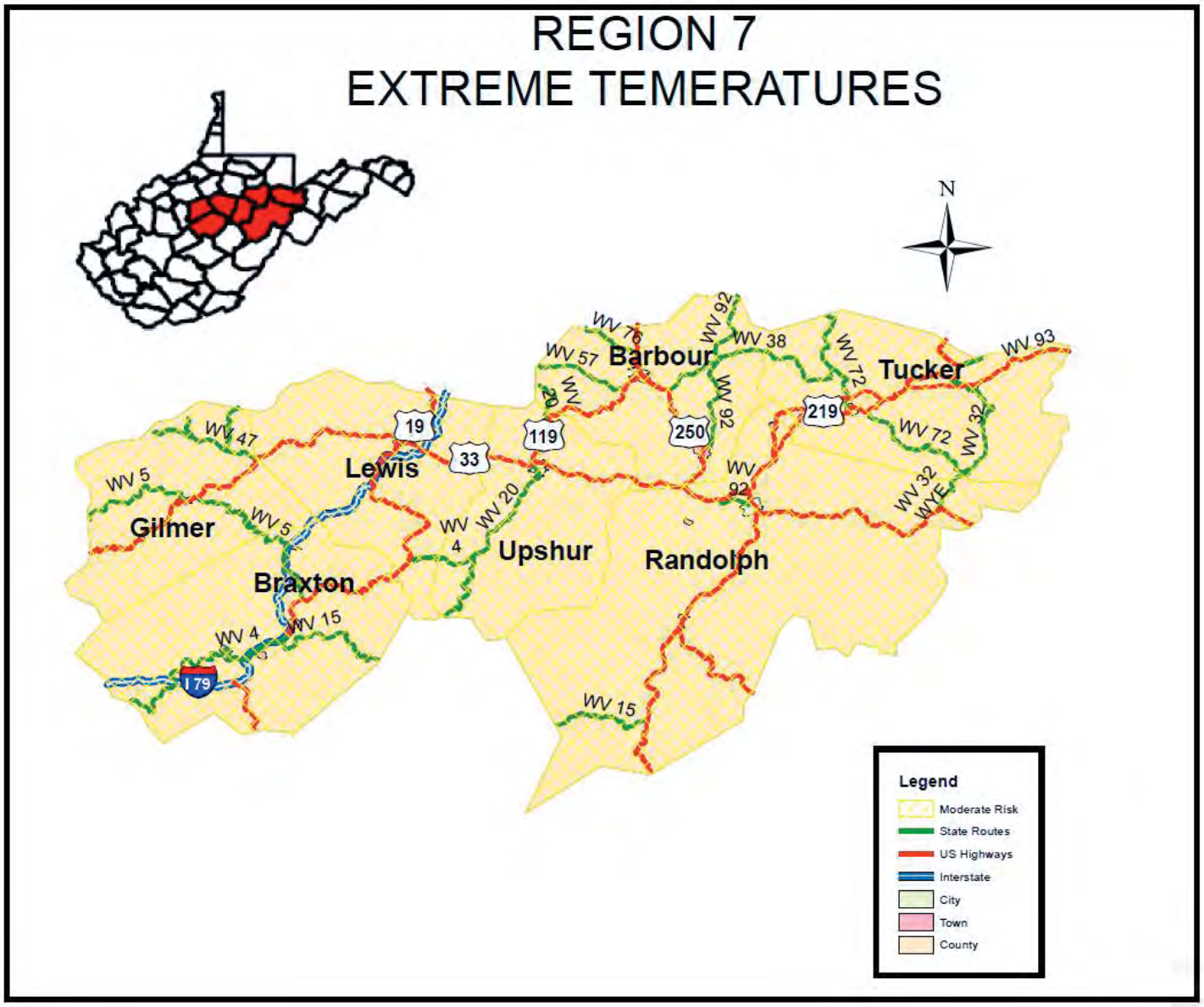
The majority of the impacts of extreme temperatures affect the population's health rather than damage buildings. Some of the effects extreme temperatures could have on structures are minor compared to other hazards. Effects on buildings and infrastructure could include broken pipes, cracks in roads or bridges due to expansion and contraction, and power outages. In addition to impacts on health, extreme temperatures can also cause damages to transportation infrastructure, agriculture, energy, and water resources.

LOSS ESTIMATES

The historical data available shows that all recorded property damage occurred during two events in January 2014. Using the formula used in other the profiles would give a loss amount of $21,422.54 per year. However this number is skewed due to all monetary losses being attributed to two of the 71 events.

TABLE 2.2.5.5 EXTREME TEMPERATURES RISK CALCULATION

Probability			*Severity*		*Risk*
FREQUENT			MARGINAL		MODERATE
Events 71 Years 21	=3.38	+	The severity of the extreme temperature hazard is determine to be very low due to the lack of property damage it causes.	=	A combination of frequent occurrence and marginal severity puts this hazard at moderate risk to Region VII.
There is a likely chance that extreme temperatures will occur several times throughout the year.					


REGION 7
EXTREME TEMERATURES
N
Barbour
Tucker
Lewis
Gilmer
Braxton
Upshur
Randolph
WV 5
WV 47
WV 57
WV 76
WV 92
WV 38
WV 72
WV 93
WV 20
WV 4
WV 15
WV 32
WYE
19
33
119
250
219
I 79
Legend
Moderate Risk
State Routes
US Highways
Interstate
City
Town
County

2.2.6 Flooding

"An overabundance of water that engulfs land and other property that is normally dry" (Haddow, Bullock, & Coppola, 2014, p.32).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
At any time throughout the year	Hours / Days	HIGH

Flooding is the most universally experienced natural hazard and has killed more than 10,000 people since 1900 (Keller & DeVecchio, 2015). Flooding is a natural process that will continue to impact counties as long as people live and work within flood prone areas (Keller & DeVecchio, 2015). Flooding can be caused by a number of factors, many of which can be active concurrently during an event. Generally, floods will occur from large scale weather systems that generate prolonged rainfall or onshore winds, but may also result from locally intense rainfall, dam failure or snow melt (Haddow, Bullock, & Coppola, 2014). In the National Centers for Environmental Information (NCEI) data, floods are placed into two categories: floods and flash floods. The primary difference between these two categories is the speed with which the event develops. Generalized flooding will develop over time while flash floods usually result from intense storms dropping large amounts of rain in a brief time period, can occur with little in the way of warning, and can reach full peak in a matter of minutes (Haddow, Bullock & Coppola, 2014).

PUBLIC HEALTH

Flooding affects mortality, physical health and mental health. Approximately one-third of all deaths during a flood event occur away from floodwaters and are usually a result of dehydration, stroke, lack of medical supplies and exacerbated medical conditions.

Flood waters pose multiple health risks including infectious disease, wound infections, injuries and other health effects. As water recedes, the priorities are to disinfect property, dispose of items that cannot be properly disinfected and practice good hygiene. It is important to keep open wounds and rashes from becoming exposed to flood waters to avoid infection (CDC, 2014).

"Fast-flowing water carrying debris, such as boulders and fallen trees, accounts for the primary flood-related injuries and deaths. Not surprisingly, the main cause of death from floods is drowning, followed by various combinations of trauma, drowning, and hypothermia with or without submersion. From a public health

viewpoint, floods may disrupt water purification and sewage disposal systems, causing toxic waste sites to overflow or dislodge chemicals stored above ground. There is potential for water-borne disease transmission. Despite the potential for communicable diseases that follow floods, mass vaccination programs have been counterproductive for a variety of reasons. They not only distract limited personnel and resources from other critical relief tasks, but also may create a false sense of security and cause persons who have been vaccinated to neglect basic hygiene. The proper approach to the problem of communicable diseases is to set up an epidemiological surveillance system so that an increase in cases of communicable diseases in the flood stricken area can be identified quickly" (Noji, 2000).

One of the more common causes of health issues after flooding is mold. Mold exposure usually occurs during cleanup when it is disturbed and easily transfers from surface to surface. Some items can be cleaned but porous materials (i.e., rugs, composite wood furniture, HVAC filters, etc.) should be disposed (FEMA, 2010).

Psychological effects of flood can be acute, however, the long-term effects are often impacted by conflicts between homeowners and insurance companies, and disruption of commercial, public, health, and government services (Rufat, Tate, Burton, & Maroof, 2015). "The long term effects of flooding on psychological health may perhaps be even more important than illness or injury. For most people the emotional trauma continues long after the water has receded. Making repairs, cleaning up, and dealing with insurance claims can be stressful. If there is a lack of support during the recovery process, stress levels may increase further" (Ohl & Tapsell, 2000).

SOCIAL VULNERABILITY

Age (elderly and young children) is the leading demographic for social vulnerability to floods. Extremes along the age spectrum affect mobility and increase the burden of care following a flood (Rufat, Tate, Burton & Maroof, 2015). Those with low social economic standing are also considered vulnerable as their homes are often dilapidated or need repair prior to an event. More expensive homes are built in areas that are typically safer with better flood barriers (Clements, 2009).

The sick and terminal population of hospitals and nursing facilities are especially vulnerable. A recent report by the US Department of Health and Human Services found that planning at nursing facilities is lacking. Inspections of multiple

facilities found that many were unable to specify how patient medication would be dealt with or how patients on ventilators or feeding tubes would be cared for after a flood (Graham, 2012).

HISTORICAL OCCURRENCES

Multiple Counties, WV

Beginning on June 23, 2016 episodes of heavy rain and flooding leading to Disaster Declaration 4273 for 18 counties including Braxton, Gilmer, Lewis, Randolph, and Upshur Counties in Region VII. Braxton County reported 10 evacuations from two homes. The West Virginia Division of Highways estimated road damages at $207,000 in Braxton County, $229,250 in Gilmer County, $141,000 in Lewis County, $246,000 in Randolph County, and $75,000 in Upshur County. Braxton County also reported another $400,000 in property damage.

Multiple Counties, WV

Tropical Storm Juan slowed along the Gulf of Mexico before moving north leaving high levels of moisture over the southeast at the end of October, 1985. On November 3, 1985, another storm formed in Georgia and pulled moisture from the remnants of Juan. By November 4th, rain was beginning to fall in the southeast section of West Virginia. The storm continued to strengthen as it moved northeast towards Elkins with rainfall rates of three to six inches in 12 hours, severally affecting the Cheat and Tygart Valley Rivers. Severe flooding took place overnight even with rain becoming lighter after midnight. At Parsons the Cheat River crested 10 feet above flood stage, the Little Kanawha flooded at 13 feet above flood stage in Glenville, and the Tygart Valley River crested 15 feet above flood stage in Philippi.

Continuing light rain on November 5th, did not affect the river cresting but did complicate rescue operations. Forty-seven fatalities were directly related to the flooding in West Virginia. Parsons, Philippi, and Glenville were severely damaged by the flooding.

Table 2.2.6.1 lists all flooding and flash flooding events in Region VII between 1996 and 2016 that caused at least $50,000 in property damage. The chart contains 71 of the 256 events reported by NCEI during the time period. These 71 events make up $19.915 million of the total property damage, $21.588 million.

Table: 2.2.6.1 Flood and Flash Flood Events Since 1996 (NCEI, 2017)					
Date	Location	Type	Fatalities	Injuries	Damage
1/19/1996	Randolph	Flash Flood	0	0	$150,000
1/19/1996	Upshur	Flood	0	0	$300,000
1/19/1996	Gilmer	Flood	0	0	$50,000
1/19/1996	Randolph	Flood	0	0	$1,000,000
1/19/1996	Tucker	Flood	0	0	$1,700,000
5/4/1996	Barbour	Flash Flood	0	0	$250,000
5/4/1996	Lewis	Flash Flood	0	0	$50,000
5/4/1996	Gilmer	Flash Flood	0	0	$40,000
5/16/1996	Barbour	Flash Flood	0	0	$1,000,000
5/16/1996	Upshur	Flash Flood	0	0	$400,000
5/16/1996	Randolph	Flash Flood	2	0	$1,500,000
7/31/1996	Barbour	Flash Flood	0	0	$250,000
7/31/1996	Gilmer	Flash Flood	0	0	$250,000
7/31/1996	Braxton	Flash Flood	0	0	$1,500,000
7/31/1996	Upshur	Flash Flood	0	0	$100,000
7/31/1996	Randolph	Flash Flood	0	0	$300,000
9/6/1996	Randolph	Flash Flood	0	0	$250,000
3/1/1997	Gilmer	Flash Flood	0	0	$100,000
3/1/1997	Braxton	Flash Flood	0	0	$50,000
6/19/1998	Lewis	Flash Flood	0	1	$600,000
6/28/1998	Gilmer	Flash Flood	0	0	$100,000
6/28/1998	Lewis	Flash Flood	0	0	$750,000
6/28/1998	Braxton	Flash Flood	0	0	$200,000
2/18/2000	Upshur	Flash Flood	0	0	$150,000
2/18/2000	Gilmer	Flash Flood	0	0	$500,000
2/18/2000	Barbour	Flash Flood	0	0	$200,000
2/18/2000	Braxton	Flash Flood	0	0	$75,000
2/18/2000	Lewis	Flash Flood	0	0	$125,000
2/19/2000	Tucker	Flood	0	0	$100,000
2/19/2000	Gilmer	Flood	0	0	$400,000
2/19/2000	Barbour	Flood	0	0	$100,000
2/19/2000	Upshur	Flood	0	0	$100,000
8/18/2000	Lewis	Flash Flood	0	0	$450,000
8/18/2000	Braxton	Flash Flood	0	0	$200,000
8/18/2000	Upshur	Flash Flood	0	0	$250,000
3/20/2002	Gilmer	Flood	0	0	$50,000
7/10/2002	Randolph	Flash Flood	0	0	$75,000
2/22/2003	Gilmer	Flood	0	0	$75,000
5/10/2003	Randolph	Flood	0	0	$50,000

Table: 2.2.6.1 Flood and Flash Flood Events Since 1996 (NCEI, 2017)					
Date	Location	Type	Fatalities	Injuries	Damage
5/10/2003	Braxton	Flood	0	0	$250,000
5/10/2003	Gilmer	Flood	0	0	$300,000
5/10/2003	Upshur	Flood	0	0	$50,000
9/2/2003	Gilmer	Flood	0	0	$150,000
11/19/2003	Braxton	Flood	0	0	$100,000
11/19/2003	Lewis	Flood	0	0	$75,000
11/19/2003	Gilmer	Flood	0	0	$400,000
11/19/2003	Upshur	Flood	0	0	$50,000
5/27/2004	Braxton	Flash Flood	0	0	$500,000
9/17/2004	Braxton	Flood	0	0	$250,000
6/28/2005	Gilmer	Flash Flood	0	0	$100,000
8/29/2005	Gilmer	Flash Flood	0	0	$200,000
8/29/2005	Lewis	Flash Flood	0	0	$500,000
6/1/2006	Barbour	Flash Flood	0	0	$50,000
6/4/2008	Barbour	Flash Flood	0	0	$300,000
6/4/2008	Gilmer	Flood	0	0	$900,000
5/4/2009	Gilmer	Flood	0	0	$100,000
5/4/2009	Lewis	Flood	0	0	$50,000
1/25/2010	Tucker	Flood	0	0	$50,000
11/22/2011	Gilmer	Flood	0	0	$50,000
7/31/2012	Randolph	Flash Flood	0	0	$150,000
12/6/2013	Upshur	Flood	0	0	$100,000
3/4/2015	Gilmer	Flood	0	0	$100,000
3/4/2015	Barbour	Flood	0	0	$50,000
3/4/2015	Upshur	Flood	0	0	$150,000
3/11/2015	Randolph	Flood	0	0	$50,000
3/11/2015	Barbour	Flood	0	0	$50,000
7/13/2015	Braxton	Flash Flood	0	0	$500,000
7/18/2015	Lewis	Flash Flood	0	0	$50,000
12/25/2015	Braxton	Flash Flood	0	0	$50,000
6/23/2016	Upshur	Flash Flood	0	0	$50,000
6/23/2016	Braxton	Flood	0	0	$400,000

Table 2.2.6.2 lists all flooding events recorded by the University of South Carolina's Spatial Hazard Events and Losses Database for the United States (SHELDUS). SHELDUS reports include state and county affected and directed losses caused by the event (i.e. injuries, crop loss, property damage, e.g.). The full SHELDUS report can be found in Appendix (XX).

TABLE: 2.2.6.2 SHELDUS DOCUMENTED FLOOD EVENTS					
County Name	Month	Year	County Name	Month	Year
Barbour	February	1962	Upshur	June	1997
Braxton	February	1962	Gilmer	July	1997
Gilmer	February	1962	Braxton	March	1998
Lewis	February	1962	Randolph	May	1998
Upshur	February	1962	Barbour	June	1998
Randolph	June	1964	Braxton	June	1998
Gilmer	May	1966	Gilmer	June	1998
Barbour	March	1967	Lewis	June	1998
Braxton	March	1967	Randolph	June	1998
Gilmer	March	1967	Braxton	July	1998
Lewis	March	1967	Lewis	January	1999
Randolph	March	1967	Upshur	January	1999
Tucker	March	1967	Barbour	February	2000
Upshur	March	1967	Braxton	February	2000
Barbour	January	1996	Gilmer	February	2000
Tucker	January	1969	Lewis	February	2000
Barbour	June	1972	Tucker	February	2000
Braxton	June	1972	Upshur	February	2000
Lewis	June	1972	Randolph	July	2000
Randolph	June	1972	Braxton	August	2000
Tucker	June	1972	Lewis	August	2000
Upshur	June	1972	Randolph	August	2000
Randolph	July	1974	Upshur	August	2000
Barbour	August	1975	Tucker	July	2001
Gilmer	August	1975	Gilmer	January	2002
Lewis	August	1975	Lewis	January	2002
Randolph	August	1975	Randolph	January	2002
Tucker	August	1975	Upshur	January	2002
Upshur	August	1975	Barbour	March	2002
Barbour	October	1976	Braxton	March	2002
Randolph	October	1976	Gilmer	March	2002
Tucker	October	1976	Tucker	March	2002
Barbour	January	1978	Upshur	March	2002
Braxton	January	1978	Randolph	April	2002
Gilmer	January	1978	Gilmer	May	2002
Lewis	January	1978	Randolph	July	2002
Randolph	January	1978	Upshur	July	2002
Tucker	January	1978	Braxton	February	2003

TABLE: 2.2.6.2 SHELDUS DOCUMENTED FLOOD EVENTS					
County Name	Month	Year	County Name	Month	Year
Upshur	January	1978	Gilmer	February	2003
Lewis	June	1978	Lewis	February	2003
Barbour	December	1978	Upshur	February	2003
Braxton	December	1978	Braxton	May	2003
Gilmer	December	1978	Gilmer	May	2003
Lewis	December	1978	Randolph	May	2003
Randolph	December	1978	Upshur	May	2003
Tucker	December	1978	Gilmer	June	2003
Upshur	December	1978	Randolph	July	2003
Braxton	May	1980	Lewis	August	2003
Barbour	August	1980	Randolph	August	2003
Braxton	August	1980	Upshur	August	2003
Gilmer	August	1980	Braxton	September	2003
Lewis	August	1980	Gilmer	September	2003
Randolph	August	1980	Randolph	September	2003
Tucker	August	1980	Upshur	September	2003
Upshur	August	1980	Barbour	November	2003
Barbour	June	1981	Braxton	November	2003
Braxton	June	1981	Gilmer	November	2003
Gilmer	June	1981	Lewis	November	2003
Lewis	June	1981	Upshur	November	2003
Randolph	June	1981	Barbour	February	2004
Tucker	June	1981	Braxton	February	2004
Upshur	June	1981	Gilmer	February	2004
Randolph	March	1982	Lewis	February	2004
Tucker	August	1984	Randolph	February	2004
Barbour	November	1985	Upshur	February	2004
Braxton	November	1985	Braxton	April	2004
Gilmer	November	1985	Gilmer	April	2004
Lewis	November	1985	Lewis	April	2004
Randolph	November	1985	Braxton	May	2004
Tucker	November	1985	Gilmer	May	2004
Upshur	November	1985	Upshur	May	2004
Braxton	August	1989	Randolph	July	2004
Braxton	June	1990	Braxton	September	2004
Gilmer	June	1990	Gilmer	June	2005
Barbour	July	1990	Lewis	June	2005
Gilmer	July	1990	Lewis	July	2005

TABLE: 2.2.6.2 SHELDUS DOCUMENTED FLOOD EVENTS					
County Name	Month	Year	County Name	Month	Year
Randolph	July	1991	Braxton	August	2005
Randolph	August	1991	Gilmer	August	2005
Barbour	December	1991	Lewis	August	2005
Braxton	December	1991	Barbour	November	2005
Gilmer	December	1991	Randolph	November	2005
Lewis	December	1991	Upshur	November	2005
Randolph	December	1991	Barbour	June	2006
Tucker	December	1991	Randolph	June	2006
Upshur	December	1991	Tucker	June	2006
Barbour	July	1992	Barbour	April	2007
Braxton	July	1992	Randolph	April	2007
Gilmer	July	1992	Upshur	April	2007
Lewis	July	1992	Tucker	July	2007
Randolph	July	1992	Lewis	December	2007
Tucker	July	1992	Randolph	March	2008
Upshur	July	1992	Barbour	June	2008
Gilmer	March	1993	Braxton	June	2008
Lewis	March	1993	Gilmer	June	2008
Randolph	December	1993	Lewis	June	2008
Barbour	January	1994	Randolph	June	2008
Braxton	January	1994	Upshur	June	2008
Lewis	January	1994	Randolph	August	2008
Randolph	January	1994	Braxton	May	2009
Tucker	January	1994	Gilmer	May	2009
Upshur	January	1994	Lewis	May	2009
Barbour	February	1994	Upshur	May	2009
Braxton	February	1994	Braxton	August	2009
Gilmer	February	1994	Upshur	August	2009
Lewis	February	1994	Randolph	January	2010
Randolph	February	1994	Tucker	January	2010
Tucker	February	1994	Barbour	April	2011
Upshur	February	1994	Randolph	April	2011
Barbour	May	1994	Lewis	May	2011
Braxton	May	1994	Gilmer	June	2011
Gilmer	May	1994	Barbour	July	2011
Lewis	May	1994	Randolph	July	2011
Randolph	May	1994	Tucker	July	2011
Tucker	May	1994	Barbour	September	2011

TABLE: 2.2.6.2 SHELDUS DOCUMENTED FLOOD EVENTS					
County Name	Month	Year	County Name	Month	Year
Upshur	May	1994	Tucker	September	2011
Barbour	July	1994	Braxton	November	2011
Barbour	August	1994	Gilmer	November	2011
Lewis	August	1994	Lewis	November	2011
Randolph	August	1994	Upshur	November	2011
Tucker	August	1994	Randolph	February	2012
Upshur	August	1994	Upshur	February	2012
Barbour	May	1995	Gilmer	May	2012
Gilmer	May	1995	Randolph	July	2012
Lewis	May	1995	Barbour	January	2013
Barbour	June	1995	Randolph	January	2013
Lewis	June	1995	Gilmer	June	2013
Tucker	June	1995	Barbour	August	2013
Upshur	June	1995	Randolph	August	2013
Braxton	January	1996	Upshur	August	2013
Gilmer	January	1996	Barbour	December	2013
Lewis	January	1996	Braxton	December	2013
Randolph	January	1996	Upshur	December	2013
Tucker	January	1996	Barbour	May	2014
Upshur	January	1996	Braxton	May	2014
Barbour	May	1996	Lewis	August	2014
Gilmer	May	1996	Upshur	August	2014
Lewis	May	1996	Barbour	September	2014
Randolph	May	1996	Upshur	September	2014
Tucker	May	1996	Barbour	March	2015
Upshur	May	1996	Gilmer	March	2015
Randolph	June	1996	Lewis	March	2015
Barbour	July	1996	Randolph	March	2015
Braxton	July	1996	Upshur	March	2015
Gilmer	July	1996	Lewis	April	2015
Randolph	July	1996	Barbour	June	2015
Tucker	July	1996	Braxton	July	2015
Upshur	July	1996	Lewis	July	2015
Randolph	August	1996	Upshur	July	2015
Randolph	September	1996	Braxton	December	2015
Tucker	September	1996	Braxton	June	2013
Randolph	November	1996	Braxton	June	2016
Braxton	March	1997	Lewis	June	2016

TABLE: 2.2.6.2 SHELDUS DOCUMENTED FLOOD EVENTS					
County Name	Month	Year	County Name	Month	Year
Gilmer	March	1997	Upshur	June	2016
Barbour	May	1997	Upshur	July	2016
Barbour	June	1997	Gilmer	August	2016
Gilmer	June	1997	Lewis	August	2016
Lewis	June	1997			

LOCATION & EXTENT

Severe flooding can occur along streams, creeks, rivers and lakes throughout Region VII. Additionally flooding can occur due to inadequate storm drain capacity and/or ground saturation. Region VII has multiple creeks, streams and lakes throughout the county. Flooding in the region can lead to property damage, road closures and public health concerns.

The Elk River flows through parts of Randolph and Braxton Counties and into Clay County. The Region 3 PDC expressed concern that flooding beginning in Region VII could ultimately impact Clay County as the river continues to flow west/southwest before joining with the Kanawha River.

REPETITIVE LOSS AND SEVERE REPETITIVE LOSS PROPERTIES

Repetitive loss (RL) and severe repetitive loss (SRL) properties are considered in assessing the risk and vulnerability of a community and inform future planning and development. RL properties are those for which two or more losses of at least $1,000 each have been paid under the NFIP within any 10-year period since 1978. SRL properties are residential properties that have at least four NFIP payments of over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building (FEMA). Chart 2.2.6.2 is a list of RL properties and chart 2.2.6.3 is a list of SRL properties in Region VII.

Table 2.2.6.3

Region VII Repetitive Loss Properties

Community	County	Building Payments	Contents Payments	Total Payments	Average Payments	Losses	Properties
Barbour County	Barbour County	$120,678.23	$16,232.12	$136,910.35	$13,691.04	10	4
Belington, Town of	Barbour County	$216,674.07	$52,058.78	$268,762.85	$12,796.80	21	10
Philippi, City of	Barbour County	$1,217,996.59	$362,619.90	$1,580,616.49	$14,772.12	107	44
Braxton County	Braxton County	$76,841.41	$31,212.41	$108,053.82	$8,311.83	13	5
Burnsville, Town of	Braxton County	$42,079.76	-	$42,079.76	$21,039.88	2	1
Gilmer County	Gilmer County	$508,002.77	$537,907.94	$1,045,910.71	$21,789.81	48	19
Glenville, City of	Gilmer County	$1,228,568.64	$737,841.44	$1,966,410.08	$16,386.75	120	33
Sand Fork, Town of	Gilmer County	$63,587.48	$3,125.10	$66,712.58	$7,412.51	9	3
Lewis County	Lewis County	$161,559.97	$108,831.37	$270,391.34	$15,905.37	17	7
Weston, City of	Lewis County	$120,919.97	$89,908.43	$210,828.40	$8,433.14	25	12
Randolph County	Randolph County	$1,720,091.15	$497,629.50	$2,217,720.65	$12,529.50	177	56
Beverly, Town of	Randolph County	$130,765.79	$35,362.20	$155,127.99	$17,236.44	9	2
Elkins, City of	Randolph County	$595,331.84	$195,786.80	$791,118.64	$9,531.55	83	32
Tucker County	Tucker County	$267,443.05	$66,304.02	$333,747.07	$18,541.50	18	8
Hendricks, Town of	Tucker County	$95,688.96	$40,694.64	$136,383.60	$9,092.24	15	6
Parsons, City of	Tucker County	$1,380,831.62	$2,845,017.91	$4,225,849.53	$49,137.79	86	37
Upshur County	Upshur County	$440,800.30	$84,185.75	$524,986.05	$9,051.48	58	22
Buckhannon, City of	Upshur County	$683,991.19	$175,085.85	$859,077.04	$7,670.33	112	47

Table 2.2.6.4

Region VII Severe Repetitive Loss Properties

Community	County	Building Payments	Contents Payments	Total Payments	Average Payments	Losses	Properties
Glenville, City of	Gilmer County	$78,047.95	$47,202.32	$125,250.27	$9,634.64	13	2
Randolph County	Randolph County	$104,930.32	$2,904.04	$107,834.36	$4,688.45	23	1

LOSS ESTIMATE

Loss estimates for future occurrences can be found using historical data from NCEI. There have been 256 events between 1996 and 2016. By dividing the number of events by the study period (21 years), an estimate of events per year is 12.19. Dividing the total property damage estimate reported by the NCEI, $21,588,000, by the number of events, a per event property damage estimate is $84,328. It is there

for estimated that the region will see $1,027,958 of property damage caused by flooding each year.

The effects of a potential flood was analyzed using the HAZUS-MH program from the Federal Emergency Management Agency. The scenario depicts a 100 year flood for each county in Region VII.

Table: 2.2.6.5 Barbour County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	33.86	14.49	2.50	4.44	55.29
	Content	20.73	35.99	5.38	20.25	82.34
	Inventory	0.00	1.18	0.88	0.24	2.30
	Subtotal	54.59	51.66	8.76	24.92	139.93
Business Interruption	Income	0.01	0.14	0.00	0.04	0.19
	Relocation	0.02	0.04	0.00	0.02	0.08
	Rental Income	0.02	0.02	0.00	0.00	0.04
	Wage	.03	0.17	0.00	0.58	0.78
	Subtotal	0.07	0.38	0.00	0.64	1.10
TOTAL		54.66	52.03	8.76	25.56	141.03

Table: 2.2.6.6 Braxton County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	37.94	13.03	4.96	2.33	58.26
	Content	20.24	24.77	9.58	5.62	60.21
	Inventory	0.00	0.66	1.17	0.04	1.87
	Subtotal	58.18	38.45	15.72	7.99	120.34
Business Interruption	Income	0.00	0.08	0.01	0.01	0.10
	Relocation	0.02	0.01	0.00	0.00	0.04
	Rental Income	0.00	0.01	0.00	0.00	0.01
	Wage	0.00	0.13	0.00	0.21	0.34
	Subtotal	0.03	0.23	0.02	0.22	0.49
TOTAL		58.21	38.68	15.73	8.21	120.83

Table: 2.2.6.7 Gilmer County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)						
Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	26.58	4.91	1.91	1.07	34.48
	Content	15.70	9.94	3.90	3.45	32.99
	Inventory	0.00	0.23	0.62	0.00	0.85
	Subtotal	42.28	15.08	6.43	4.52	68.32
Business Interruption	Income	0.00	0.05	0.00	0.01	0.06
	Relocation	0.01	0.01	0.00	0.00	0.02
	Rental Income	0.01	0.00	0.00	0.00	0.01
	Wage	0.01	0.05	0.00	0.07	0.13
	Subtotal	0.03	0.11	0.00	0.07	0.21
TOTAL		42.32	15.19	6.43	4.59	68.53

Table: 2.2.6.8 Lewis County [1]HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)						
Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	N/A	N/A	N/A	N/A	N/A
	Content	N/A	N/A	N/A	N/A	N/A
	Inventory	N/A	N/A	N/A	N/A	N/A
	Subtotal	N/A	N/A	N/A	N/A	N/A
Business Interruption	Income	N/A	N/A	N/A	N/A	N/A
	Relocation	N/A	N/A	N/A	N/A	N/A
	Rental Income	N/A	N/A	N/A	N/A	N/A
	Wage	N/A	N/A	N/A	N/A	N/A
	Subtotal	N/A	N/A	N/A	N/A	N/A
TOTAL		N/A	N/A	N/A	N/A	N/A

Table: 2.2.6.9 Randolph County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)						
Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	81.09	10.62	5.24	2.30	99.24
	Content	52.54	36.70	13.42	15.40	118.06
	Inventory	0.00	1.14	2.77	0.07	3.97
	Subtotal	133.63	48.46	21.42	17.76	221.27
Business Interruption	Income	0.01	0.12	0.00	0.02	0.15
	Relocation	0.08	0.03	0.00	0.01	0.12
	Rental Income	0.01	0.02	0.00	0.00	0.03
	Wage	0.02	0.20	0.00	0.35	0.56
	Subtotal	0.11	0.36	0.00	0.38	0.86
TOTAL		133.75	48.82	21.42	18.14	222.13

[1] The Lewis County HAZUS run failed multiple times at the hydrology step.

Table: 2.2.6.10 Tucker County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)						
Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	21.52	1.18	2.23	0.50	25.43
	Content	12.37	3.70	6.12	2.89	25.08
	Inventory	0.00	0.12	1.63	0.01	1.77
	Subtotal	33.89	5.00	9.98	3.41	52.27
Business Interruption	Income	0.00	0.01	0.00	0.00	0.01
	Relocation	0.01	0.00	0.00	0.00	0.01
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.01	0.00	0.08	0.09
	Subtotal	0.01	0.01	0.00	0.08	0.10
TOTAL		33.89	5.01	9.98	3.49	52.38

Table: 2.2.6.11 Upshur County HAZUS Building-Related Economic Loss Estimates (Millions of Dollars)						
Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss	Building	58.99	10.47	2.70	1.31	73.47
	Content	44.86	26.28	5.59	6.06	82.78
	Inventory	0.00	0.95	0.73	0.02	1.69
	Subtotal	103.85	37.70	9.02	7.39	157.95
Business Interruption	Income	0.01	0.10	0.00	0.01	0.11
	Relocation	0.04	0.02	0.00	0.00	0.06
	Rental Income	0.02	0.02	0.00	0.00	0.04
	Wage	0.02	0.14	0.00	0.16	0.32
	Subtotal	0.08	0.27	0.00	0.17	0.52
TOTAL		103.93	37.96	9.02	7.56	158.47

NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

The NFIP is based on the voluntary participation of communities of all sizes and provides flood insurance in communities that are members of the program. Membership is contingent on the community adopting and enforcing floodplain management and development regulations. National flood insurance is available only in communities that apply for participation in the NFIP and agree to implement prescribed flood mitigation measures. Newly participating communities are admitted to the NFIP's emergency program. Most of these communities quickly earn "promotion" to the regular program. The emergency program is the initial phase of a community's participation in the NFIP. In return for the local government's agreeing to adopt basic floodplain management standards, the NFIP allow local property owners to buy modest amounts of flood insurance coverage.

In return for agreeing to adopt more comprehensive floodplain management measures, an emergency program community can be "promoted" to the regular program. Local policyholders immediately become eligible to buy greater amounts of flood insurance coverage. All seven counties and 24 municipalities in the region are in the regular program. The minimum floodplain management requirements include:

- review and permit all development in the SFHA;
- elevate new and substantially improved residential structures above the base flood elevation;
- elevate or dry flood proof new and substantially improved non-residential structures;
- limit development in floodways;
- locate or construct all public utilities and facilities so as to minimize or eliminate flood damage; and
- anchor foundation or structure resist floatation, collapse, or lateral movement.

As part of this project, the PDC's consultant distributed a FEMA-sponsored questionnaire to communities asking for more information on the management of the NFIP in their jurisdictions. Several communities responded to the survey. Some responses were quite common. Jurisdictions have copies of flood insurance rate maps (FIRMs) and make those available. In many cases, member governments support requests for map updates and issue permits for development in or near floodplains. Jurisdictions throughout the region have adopted floodplain ordinances; however, knowledge as to if and how those ordinances meet or exceed the requirements suggested by the NFIP varies. ***These responses suggest that additional education on NFIP requirements could be beneficial.***

Additionally, regular program communities are eligible to participate in the NFIP's Community Rating System (CRS). Under the CRS, policyholders can receive premium discounts of 5 to 45 percent as their cities and towns adopt more comprehensive flood mitigation measures. Currently, three municipalities in Region VII participate in CRS.

The table below lists the jurisdictions along with the date if the initial FIRM and the current effective map date.

Table 2.2.6.12

Communities Participating in the NFIP

CID	Name	County	Init FHBM Identified	Init FIRM Identified	Curr Eff Map Date	Reg-Emer Date
540001	Barbour County	Barbour County	11/15/74	7/1/87	5/3/11	7/1/87
540002	Belington, Town of	Barbour County	5/31/74	8/1/79	5/3/11	8/1/79
540003	Junior, Town of	Barbour County	6/28/74	4/17/87	5/3/11(M)	4/17/87
540004	Philippi, City of†	Barbour County	2/1/74	9/4/86	5/3/11	9/4/86
540009	Braxton County	Braxton County	1/24/75	4/19/10	4/19/10	3/18/91
540010	Burnsville, Town of	Braxton County	2/1/74	4/19/10	4/19/10	9/10/84
540235	Flatwoods, Town of	Braxton County	2/18/77	4/19/10	NSFHA	9/29/78
540237	Gassaway, Town of	Braxton County	1/10/75	4/19/10	4/19/10	9/10/84
540236	Sutton, Town of	Braxton County	1/7/75	4/19/10	4/19/10	9/10/84
540035	Gilmer County	Gilmer County	1/3/75	4/16/91	6/16/09	4/16/91
540036	Glenville, City of	Gilmer County	4/5/74	4/16/91	6/19/09	4/16/91
540037	Sandfork, Town of	Gilmer County	8/9/74	4/16/91	6/19/09	4/16/91
540085	Lewis County	Lewis County	2/21/75	7/1/87	4/19/10	7/1/87
540086	Jane Lew, Town of	Lewis County	8/9/74	9/24/84	4/19/10(M)	9/24/84
540274	Weston, City of	Lewis County	4/5/74	4/15/82	4/19/10	4/15/82
540175	Randolph County	Randolph County	4/18/75	9/27/91	9/29/10	9/27/91
540267	Beverly, Town of	Randolph County	11/22/74	12/3/91	9/29/10	12/3/91
540177	Elkins, City of	Randolph County	2/15/74	4/3/87	9/29/10	4/3/87
540178	Harman, Town of	Randolph County	4/1/77	8/24/84	9/29/10(M)	8/24/84
540264	Huttonsville, Town of	Randolph County	11/15/74	8/24/84	9/29/10(M)	8/24/84
540266	Mill Creek, Town of	Randolph County	1/10/75	8/24/84	9/29/10(M)	8/24/84
540265	Montrose, Town of	Randolph County	11/15/74	9/24/84	9/29/10(M)	9/24/84
540176	Coalton, Town of	Randolph County	8/9/74	9/10/84	9/29/10(M)	9/10/84
540191	Tucker County	Tucker County	12/13/74	7/1/87	7/6/10	7/1/87
540260	Davis, Town of	Tucker County	11/22/74	7/20/84	7/6/10	7/20/84
540192	Hambleton, Town of	Tucker County	2/1/74	7/20/84	7/6/10	7/20/84
540193	Hendricks, Town of	Tucker County	12/27/74	8/1/87	7/6/10	8/1/87
540194	Parsons, City of†	Tucker County	2/8/74	8/15/79	7/6/10	8/15/79
540261	Thomas, City of	Tucker County	12/20/74	9/10/84	7/6/10	9/10/84
540198	Upshur County	Upshur County	1/17/75	7/1/87	9/29/10	7/1/87
540199	Buckhannon, City of†	Upshur County	6/28/74	9/4/86	9/29/10	9/4/86

(M) = No Elevation Determined
NSFHA = No Special Flood Hazard Area
Source: FEMA NFIP Community Status Book Report
† = CRS Participant

Table 2.2.6.13

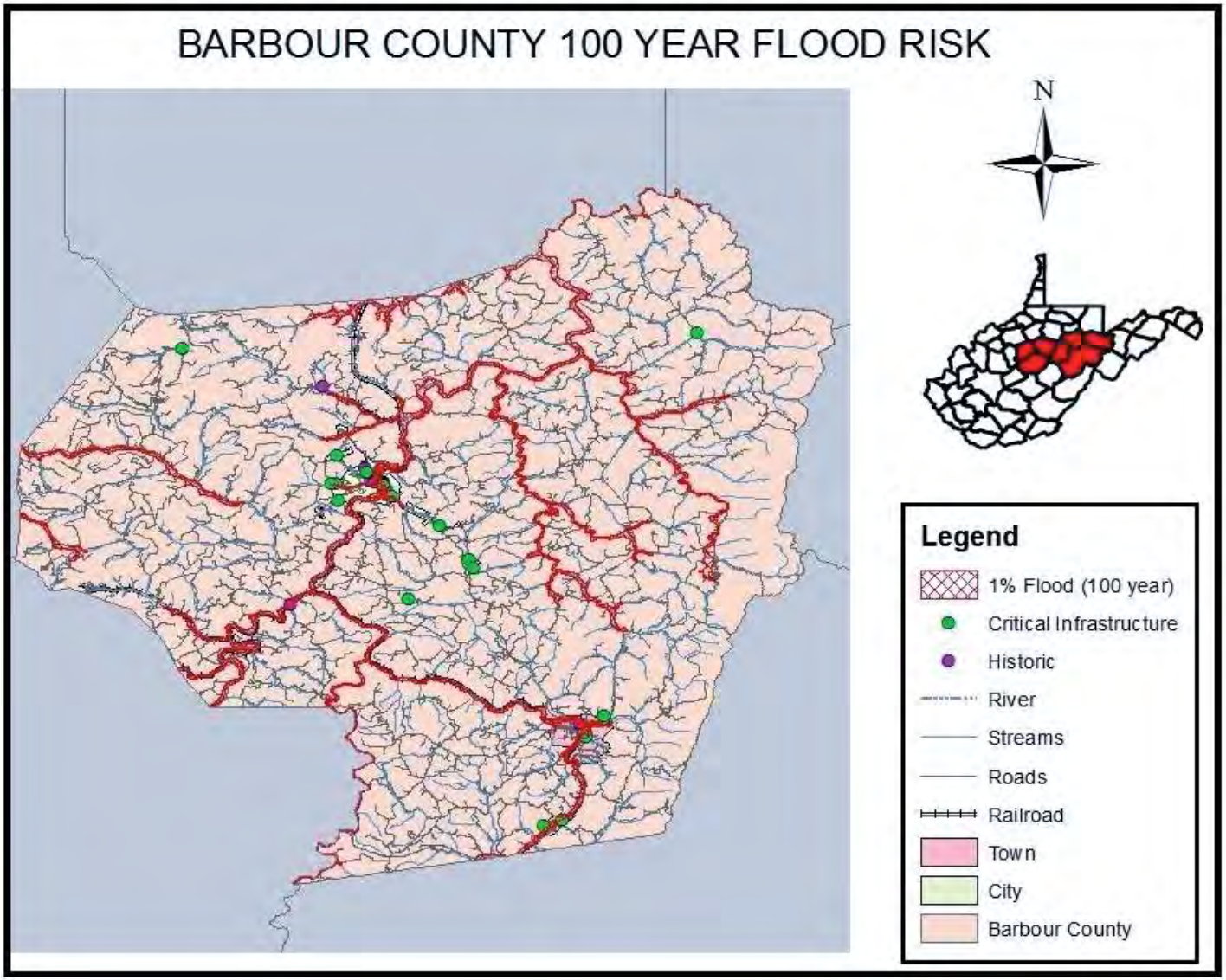
COMMUNITY RATING SYSTEM ELIGIBLE COMMUNITIES

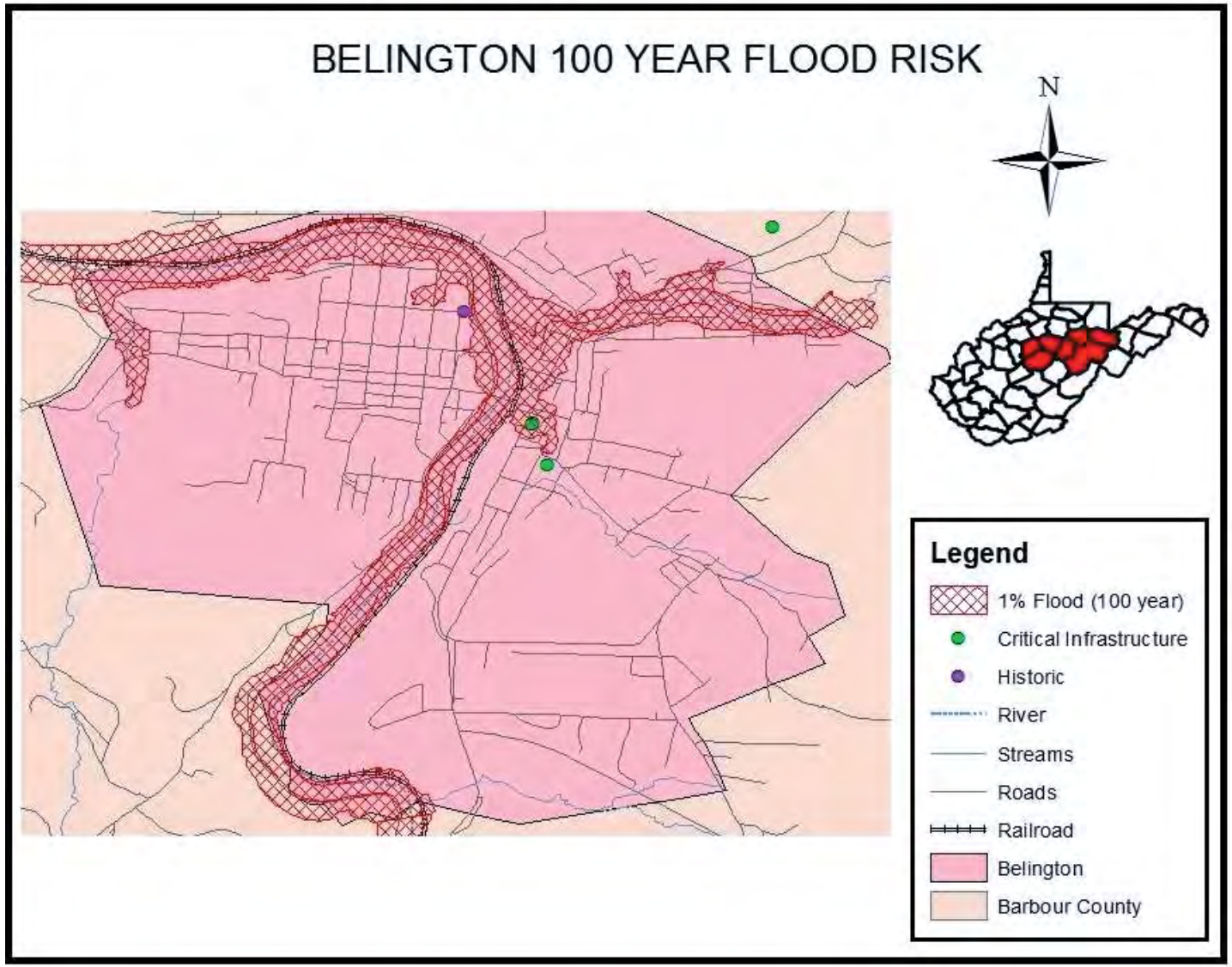
Community Number	*Community Name*	*CRS Entry Date*	*Current Effective Date*	*Current Class*	*Status*
540199	Buckhannon, City of	5/1/07	5/1/07	8	Current
540194	Parsons, City of	5/1/16	5/1/16	8	Current
540004	Philippi, City of	5/1/03	5/1/03	8	Current

Source: FEMA Community Rating System Communities and Their Classes

TABLE 2.2.6.14 FLOODING RISK CALCULATION

Probability			*Severity*		*Risk*
FREQUENT			CRITICAL		HIGH
Events 256 Years 21	12.19	+	The average property damage for historical events in NCEI is $84,328, per event or 1,038,958 per year.	=	A combination of frequent occurrence and critical severity puts this hazard at a high risk to the region.
There is a likely chance that a flood will occur several times throughout the year.					


BARBOUR COUNTY 100 YEAR FLOOD RISK
N
Legend
1% Flood (100 year)
Critical Infrastructure
Historic
River
Streams
Roads
Railroad
Town
City
Barbour County


BELINGTON 100 YEAR FLOOD RISK
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Legend
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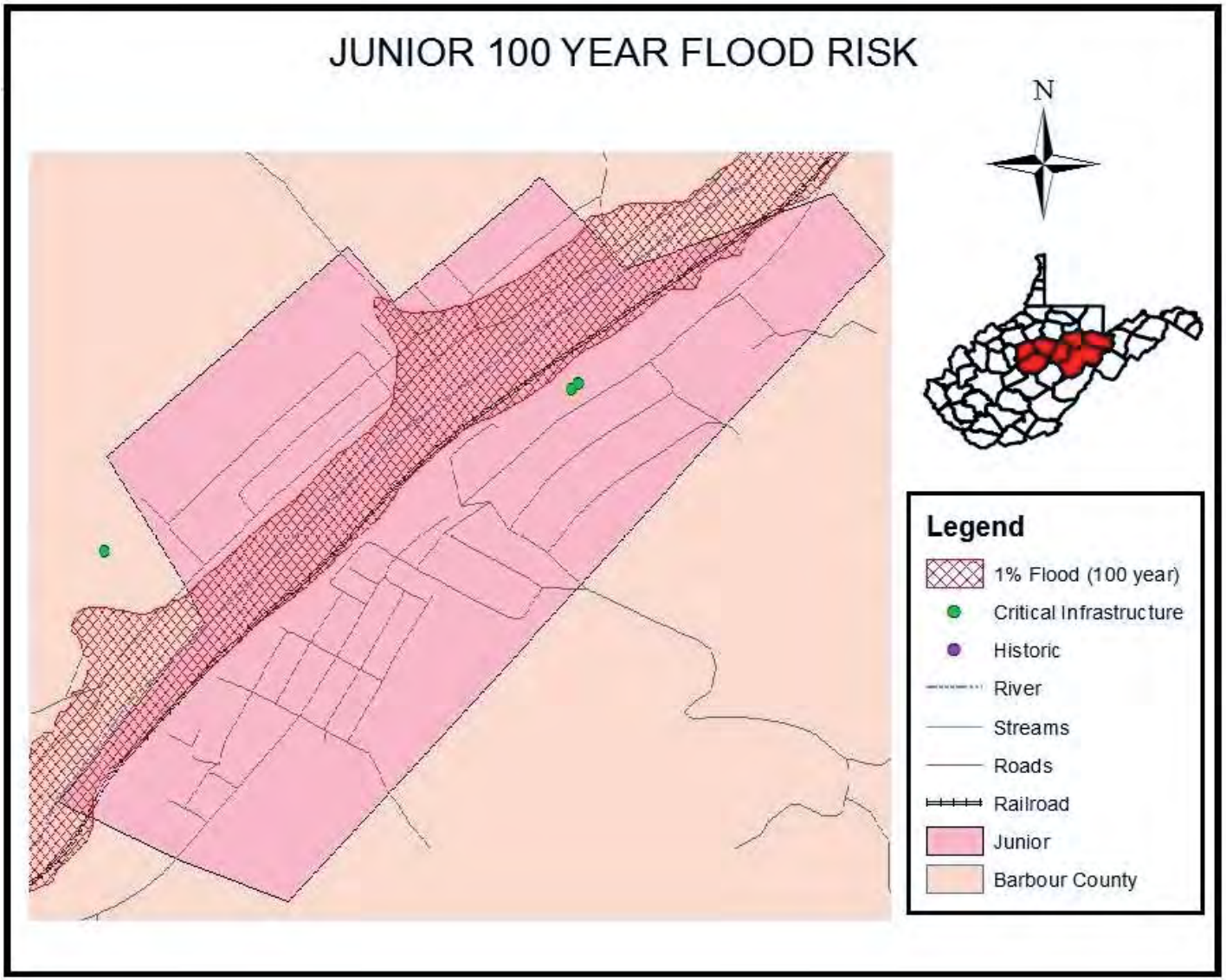
Critical Infrastructure
Historic
River
Streams
Roads
Railroad
Belington
Barbour County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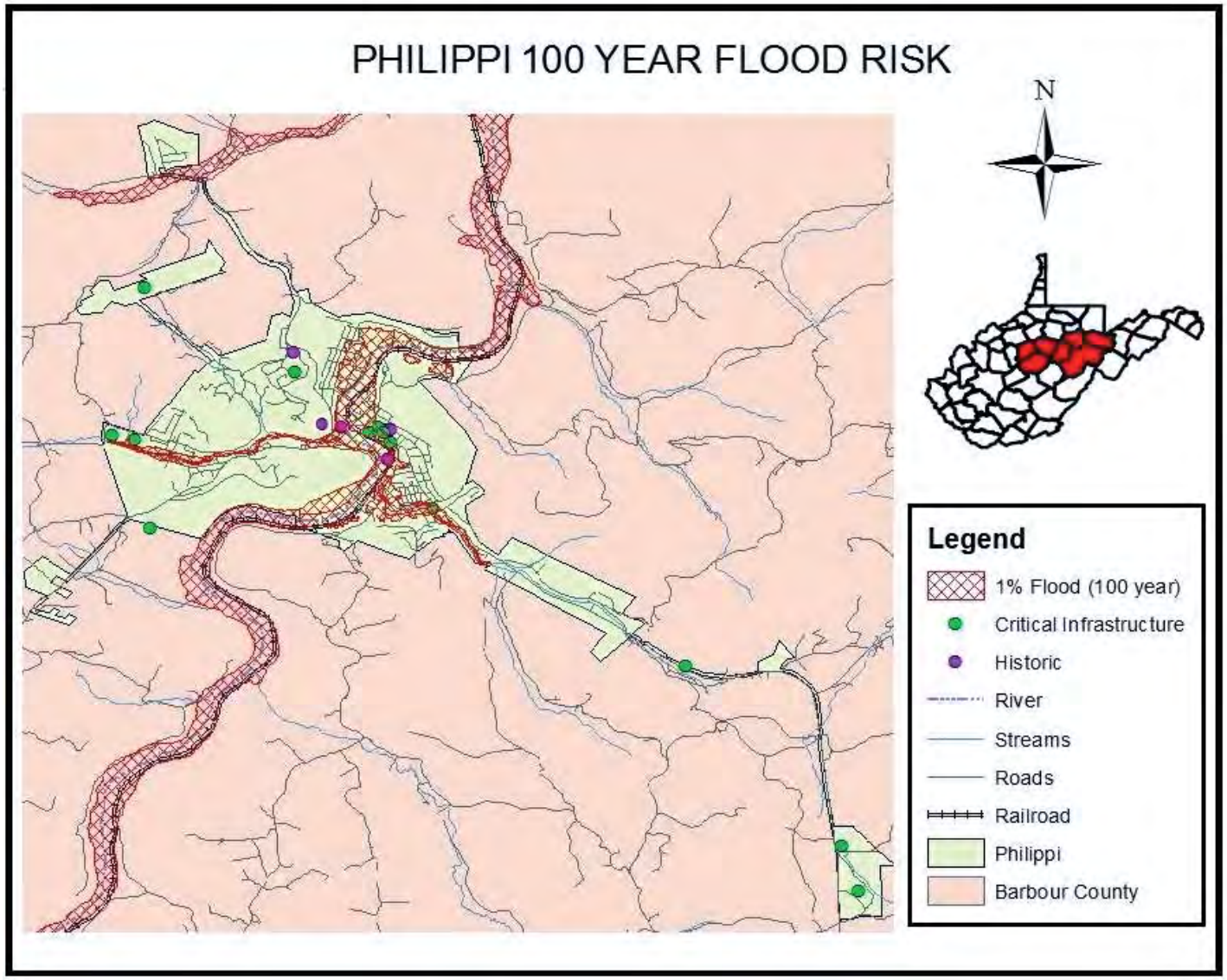
Historic
River
Streams
Roads
Railroad
Junior
Barbour County


PHILIPPI 100 YEAR FLOOD RISK
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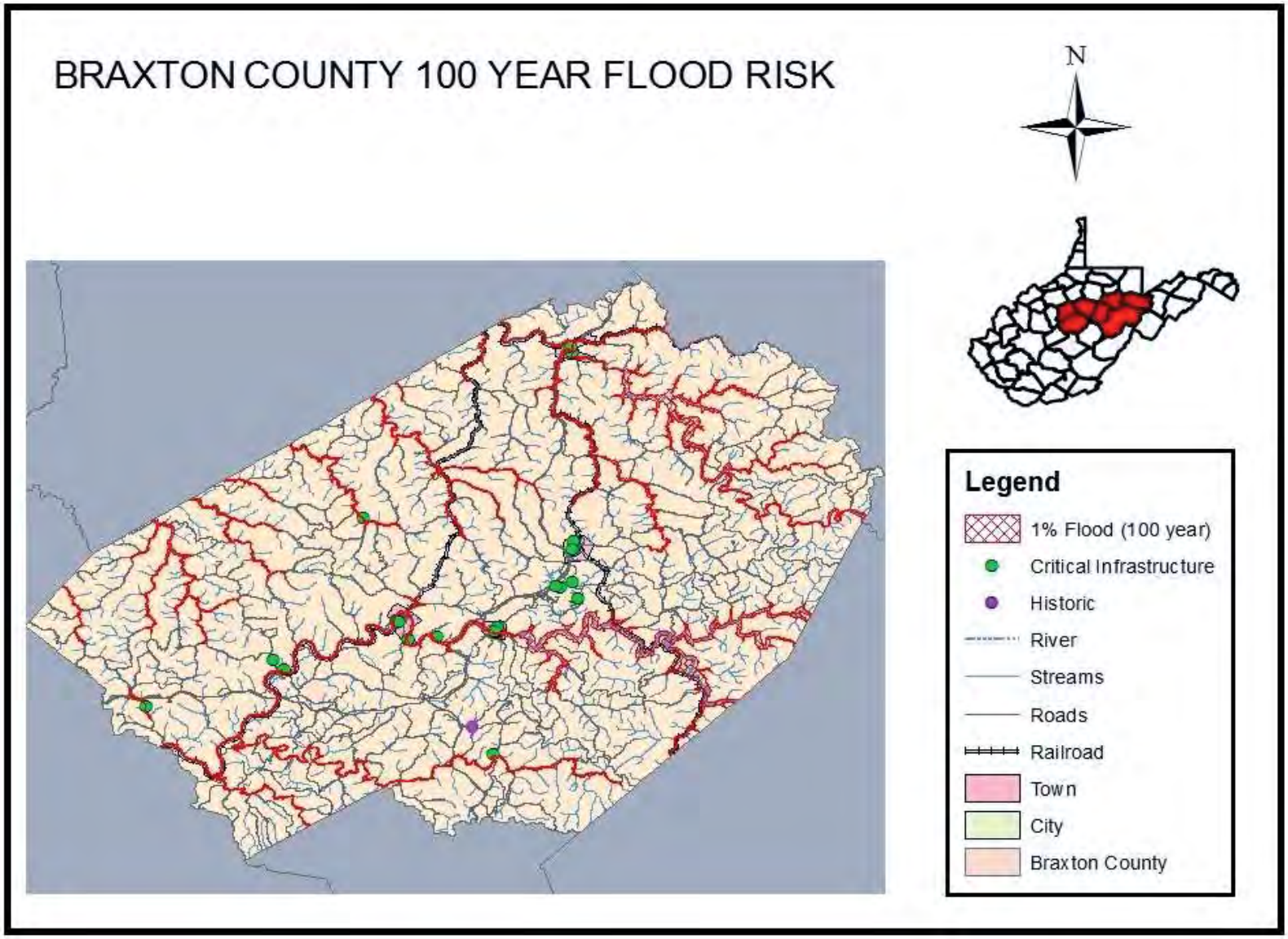
River
Streams
Roads
Railroad
Philippi
Barbour County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N
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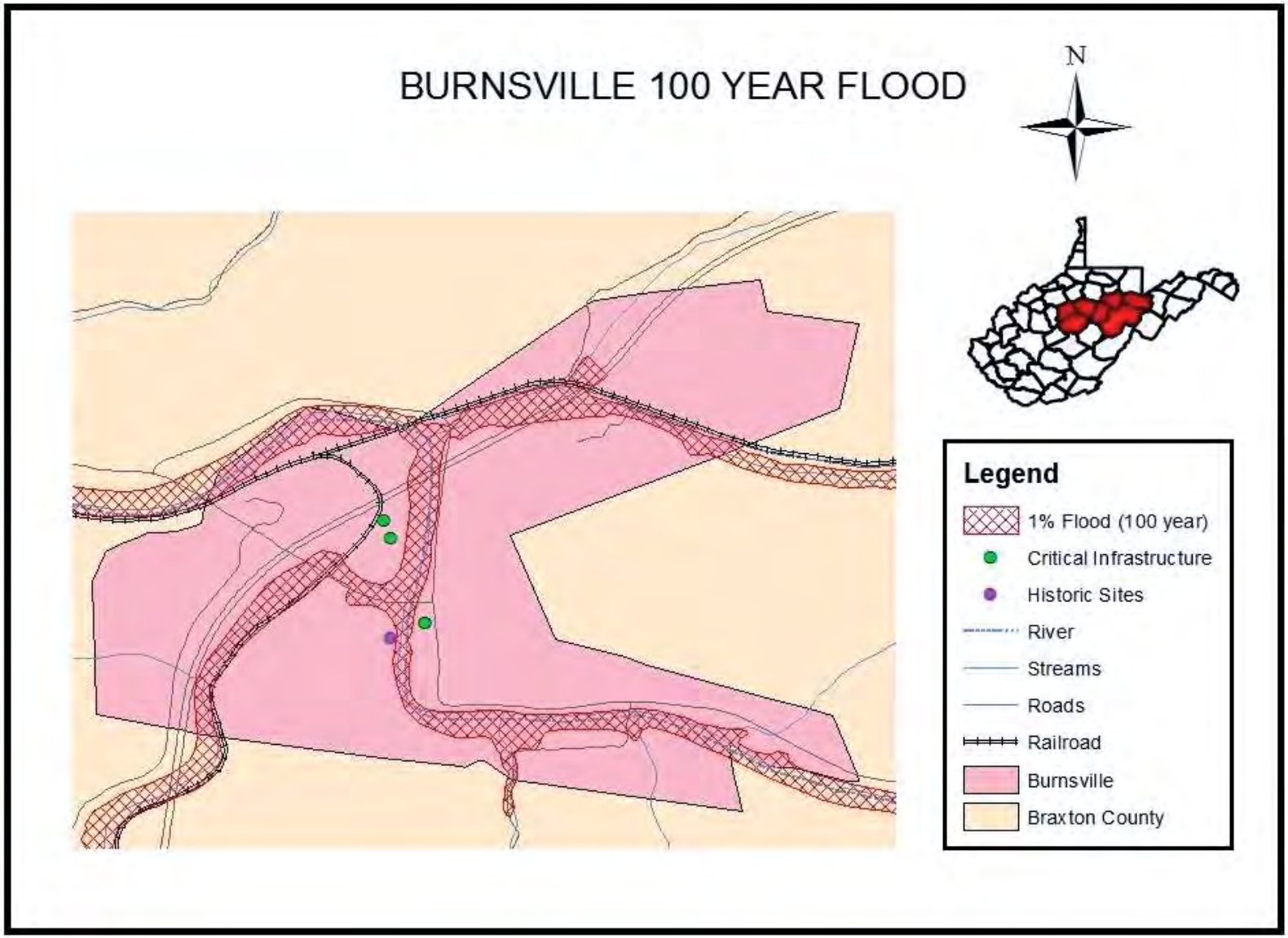
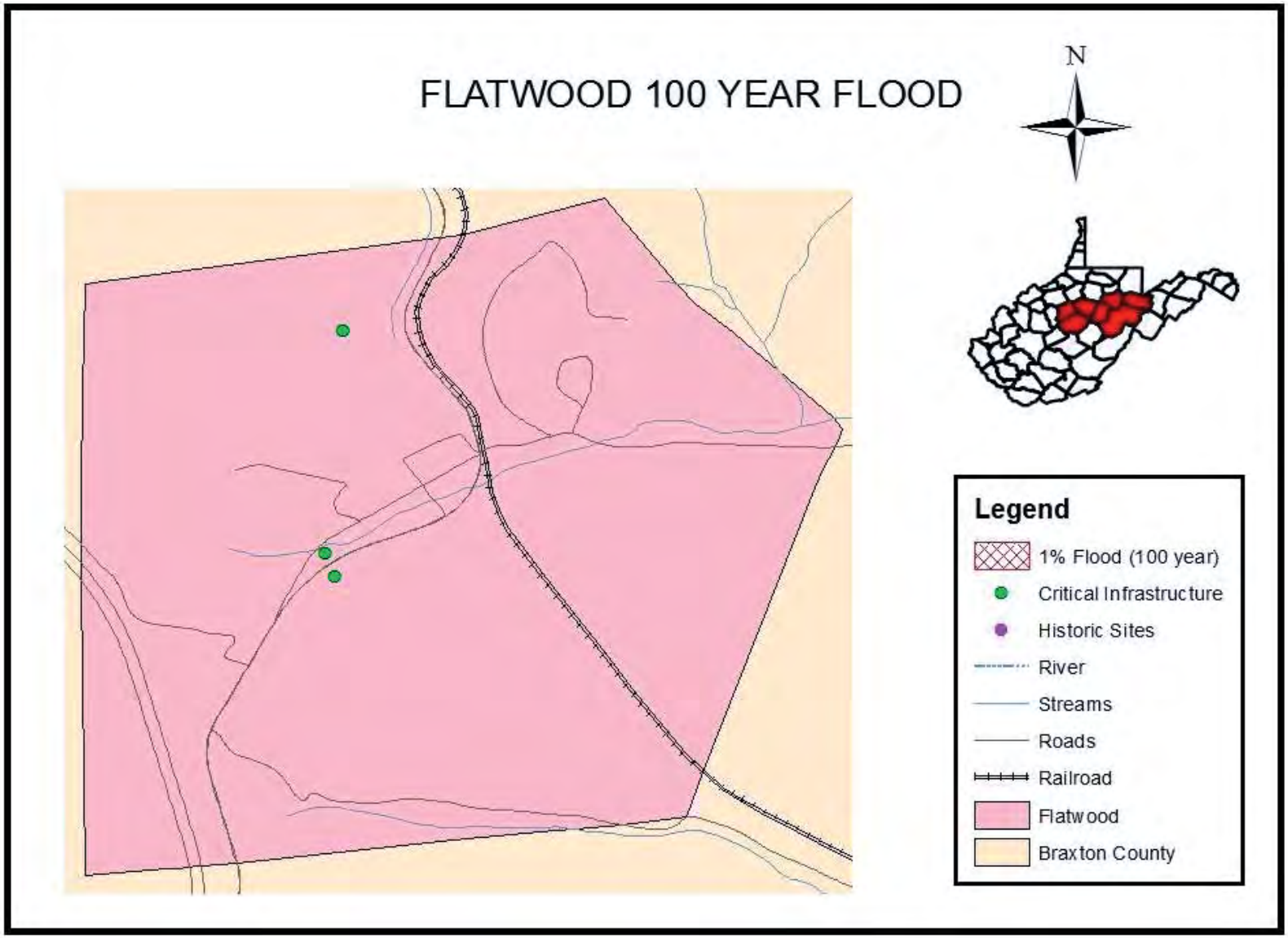
Critical Infrastructure
Historic
River
Streams
Roads
Railroad
Town
City
Braxton County


BURNSVILLE 100 YEAR FLOOD
N
Legend
1% Flood (100 year)
Critical Infrastructure
Historic Sites
River
Streams
Roads
Railroad
Burnsville
Braxton County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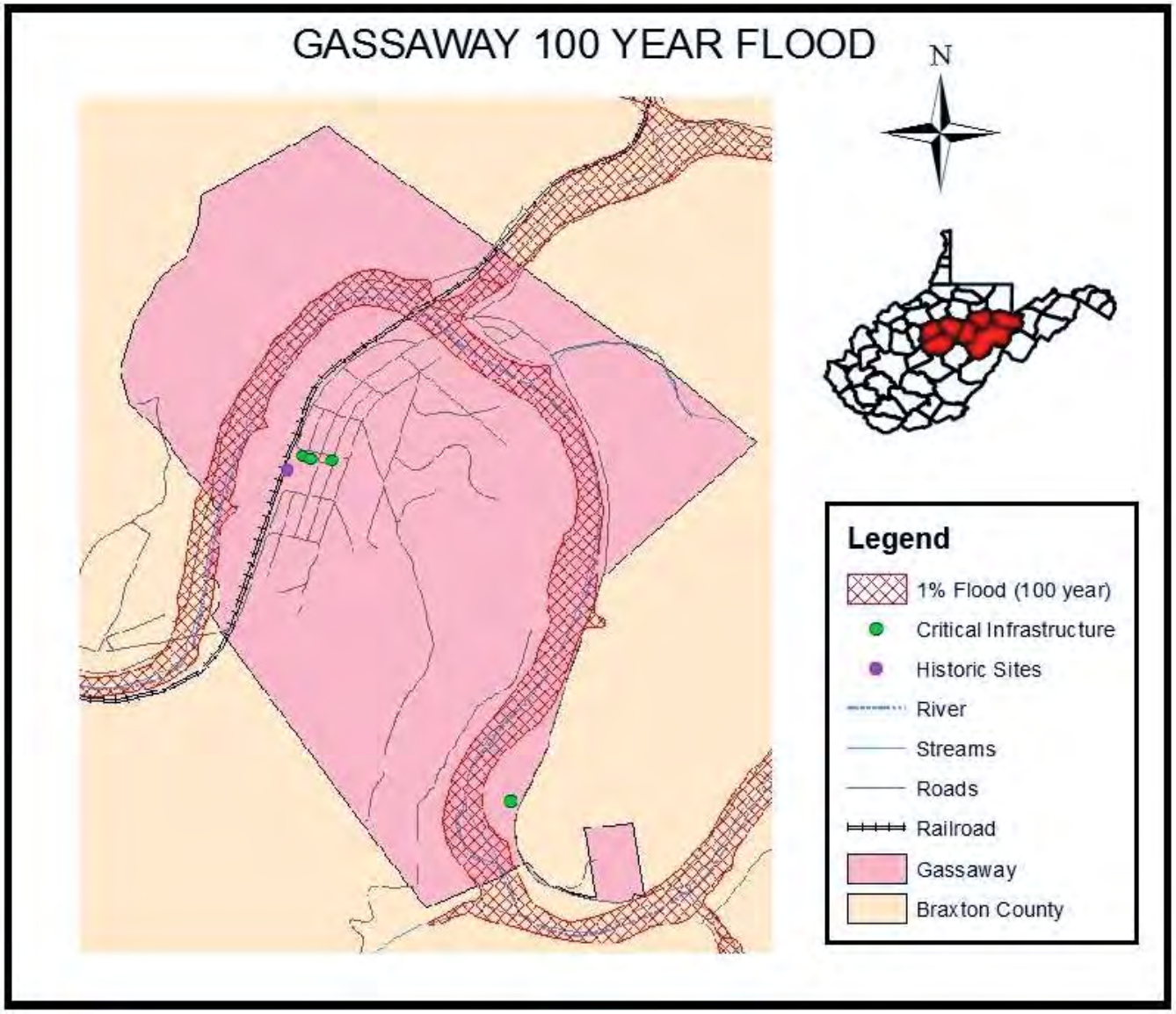
Historic Sites
River
Streams
Roads
Railroad
Flatwood
Braxton County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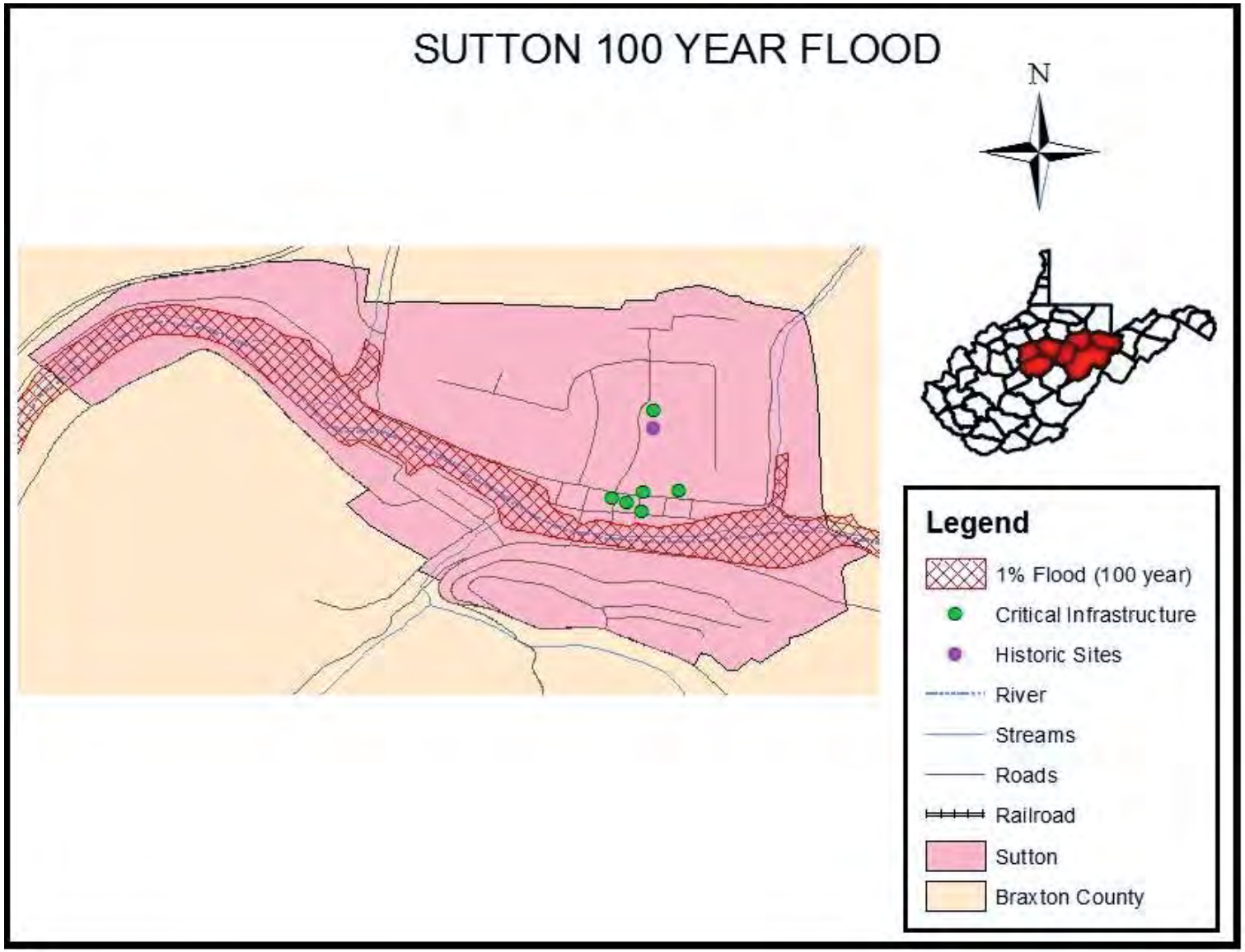
River
Streams
Roads
Railroad
Gassaway
Braxton County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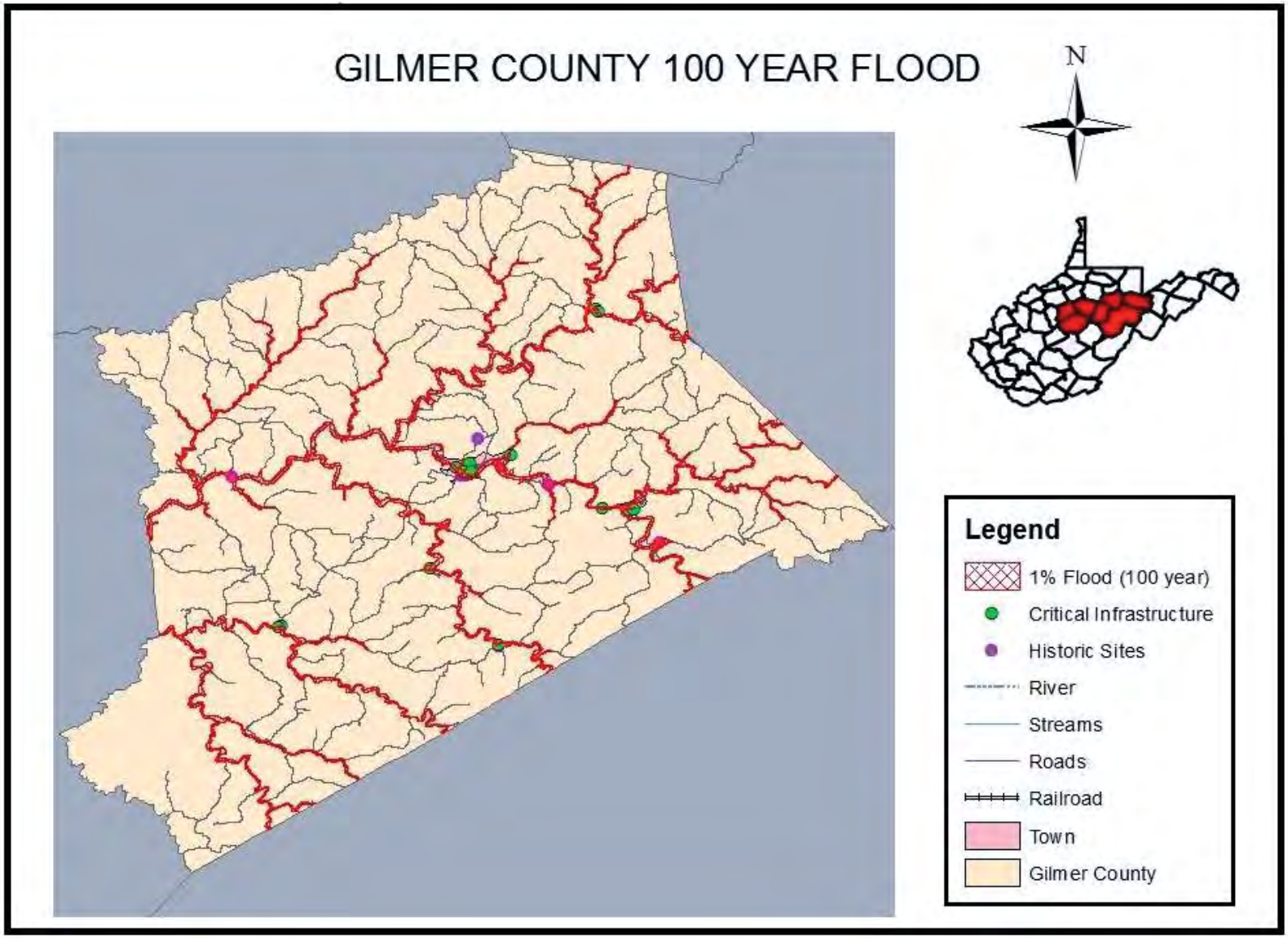
River
Streams
Roads
Railroad
Sutton
Braxton County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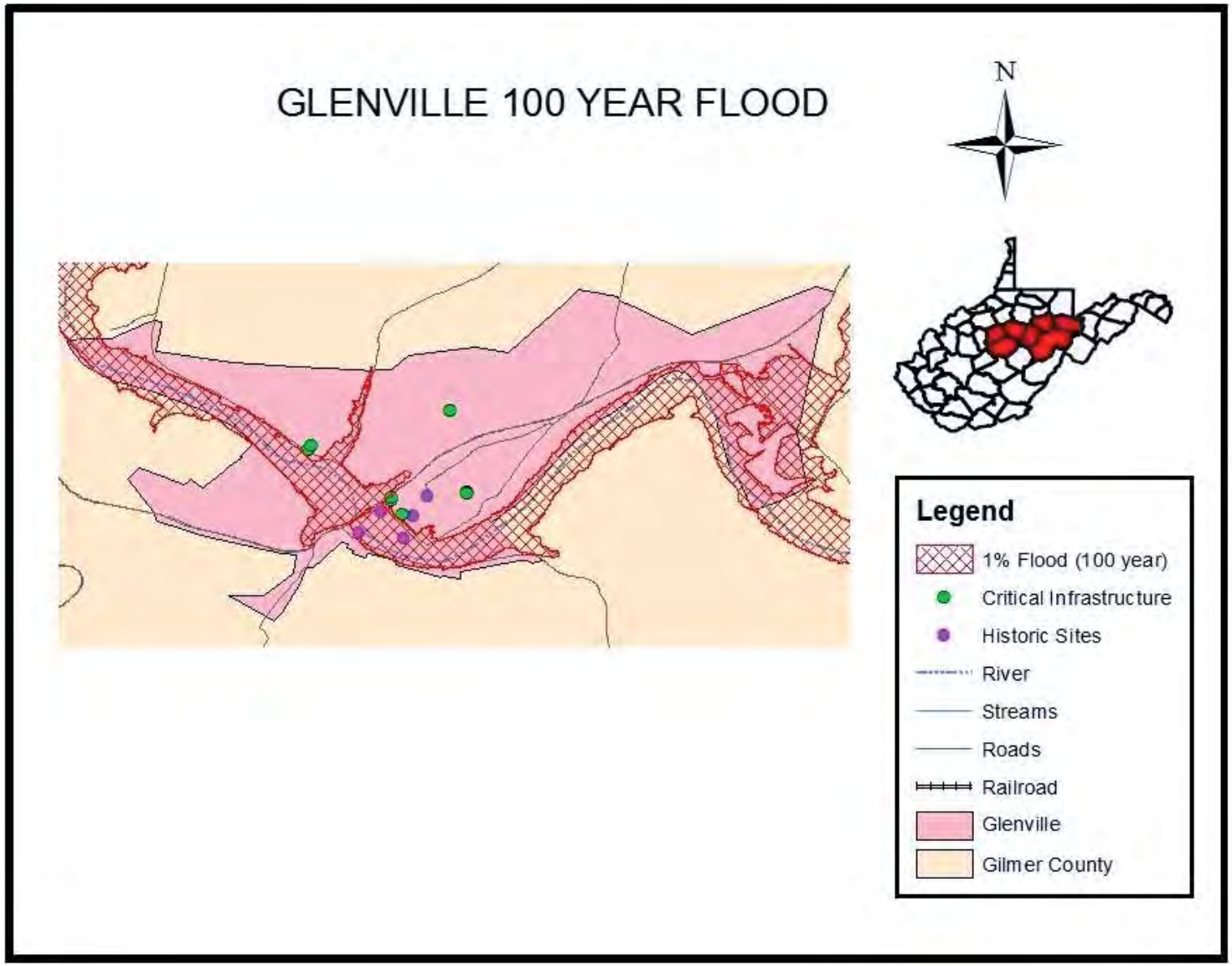
Streams
Roads
Railroad
Town
Gilmer County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Railroad
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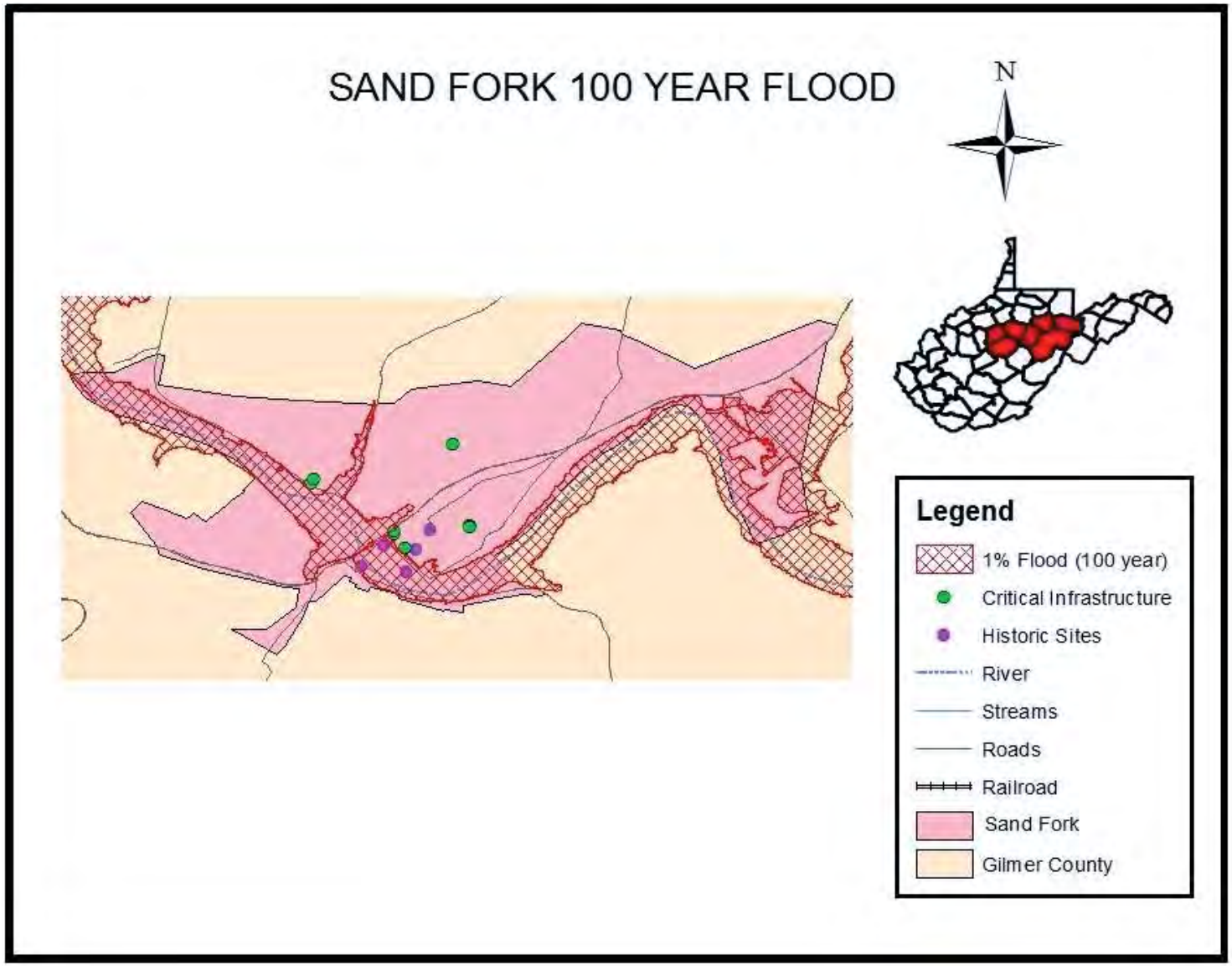
Gilmer County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River
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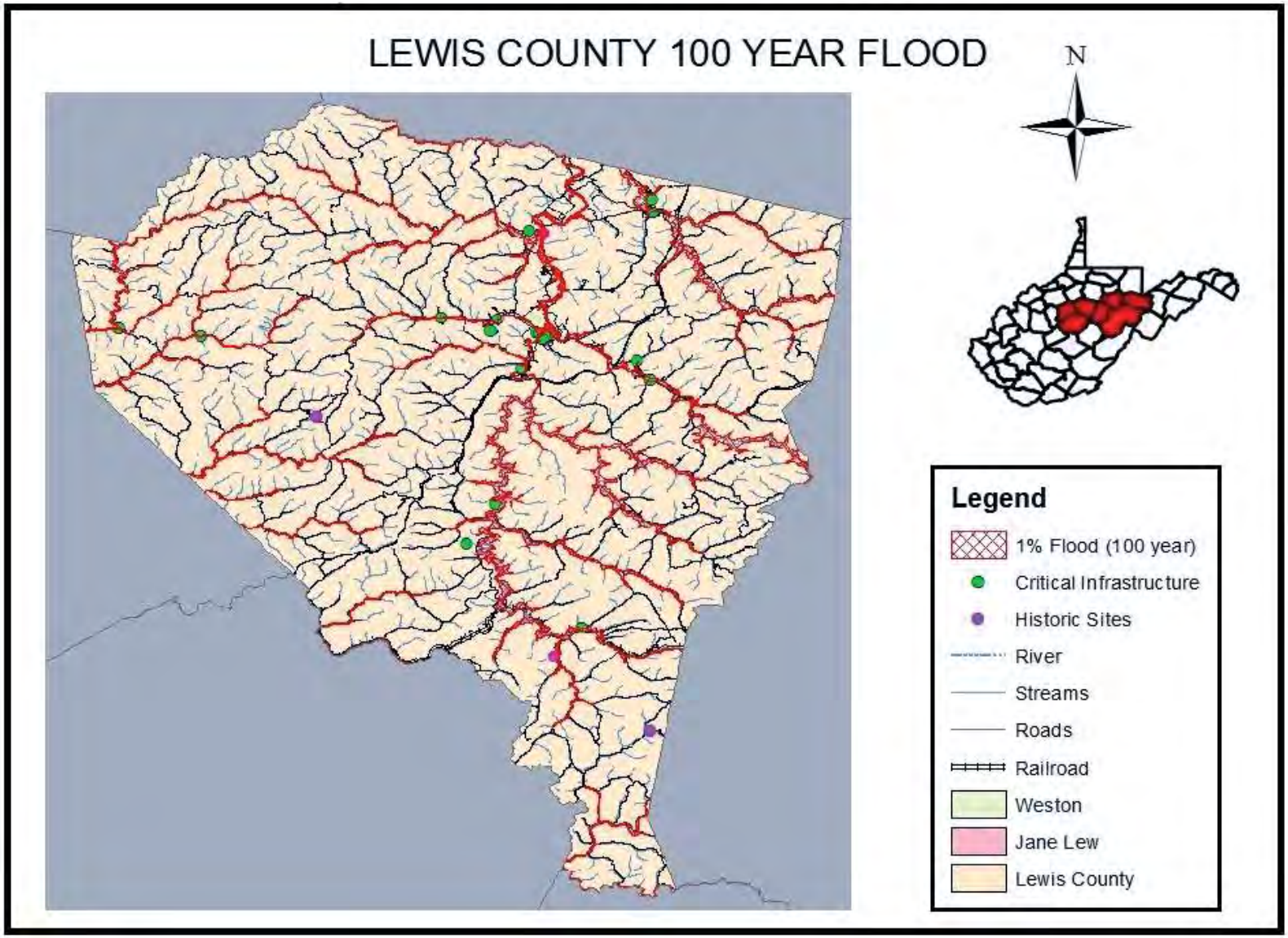
Roads
Railroad
Sand Fork
Gilmer County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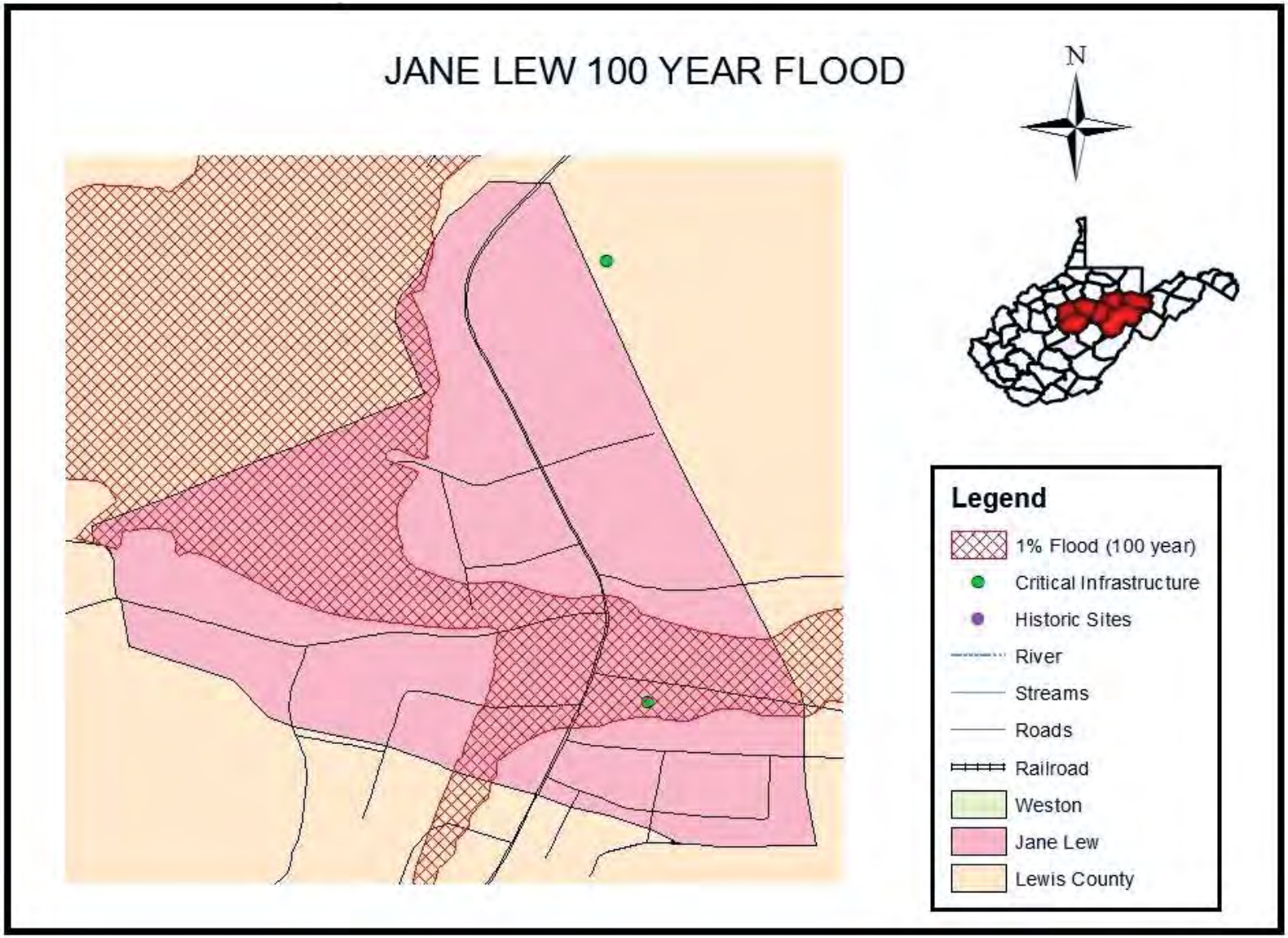
Lewis County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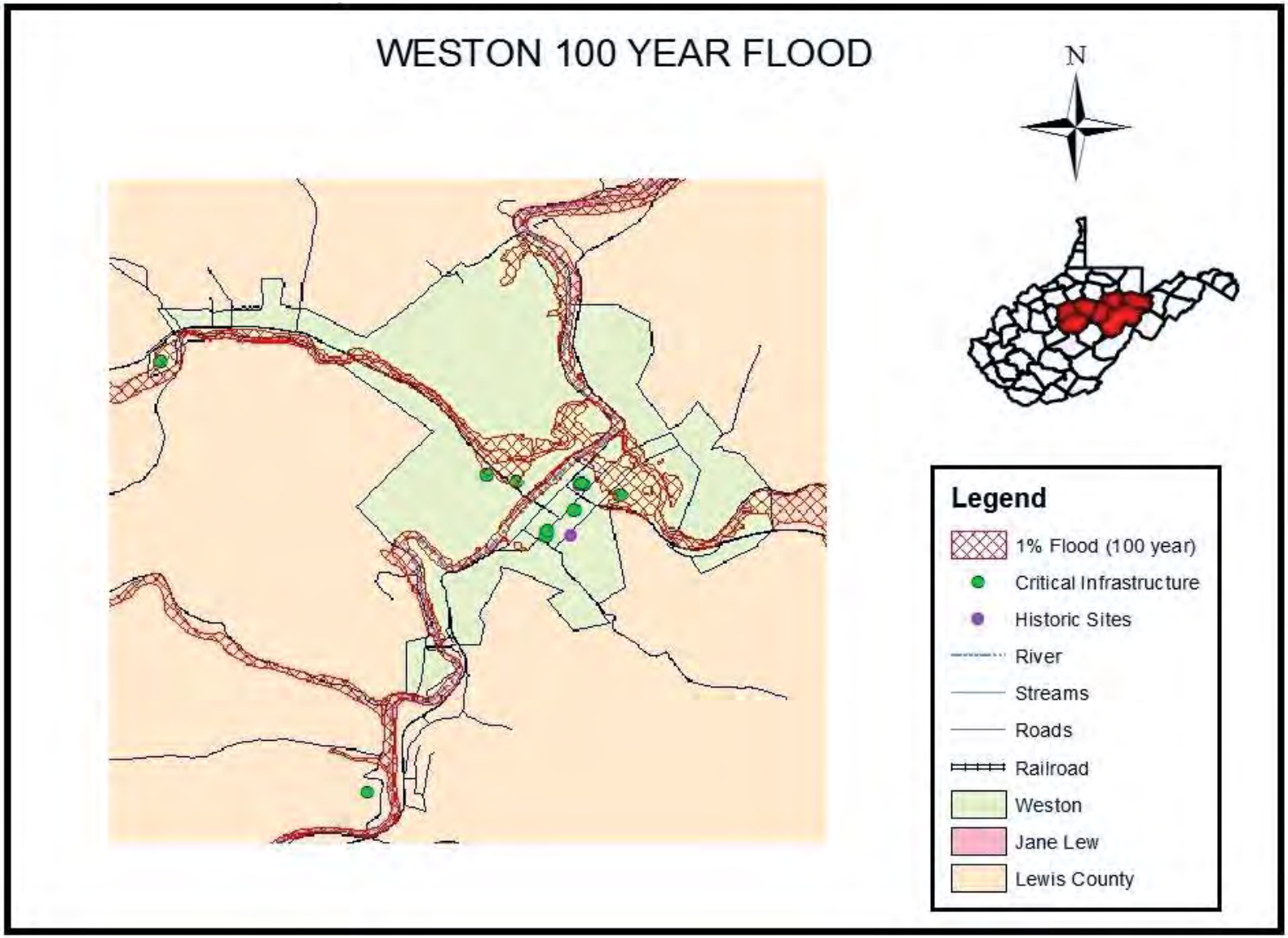
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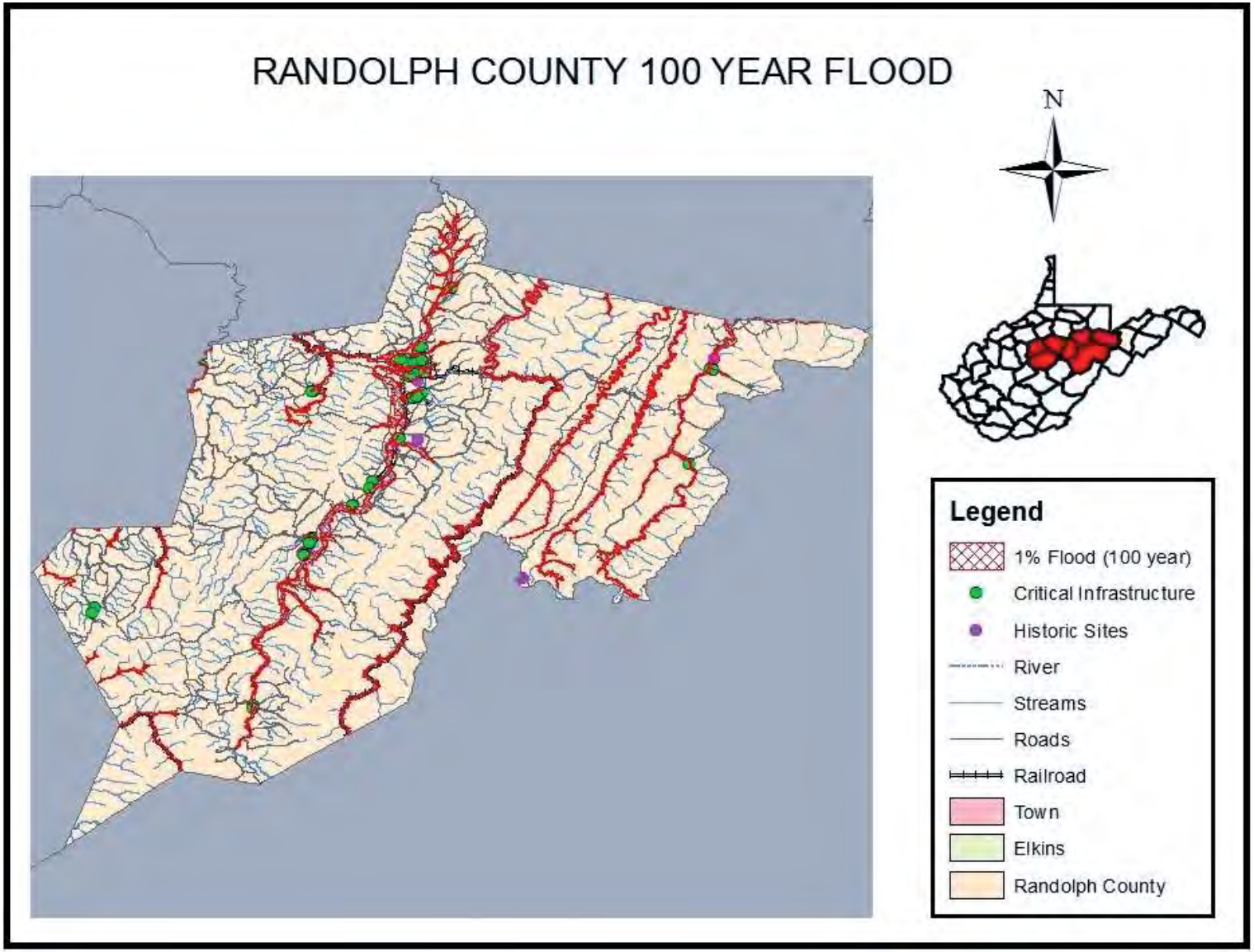
Lewis County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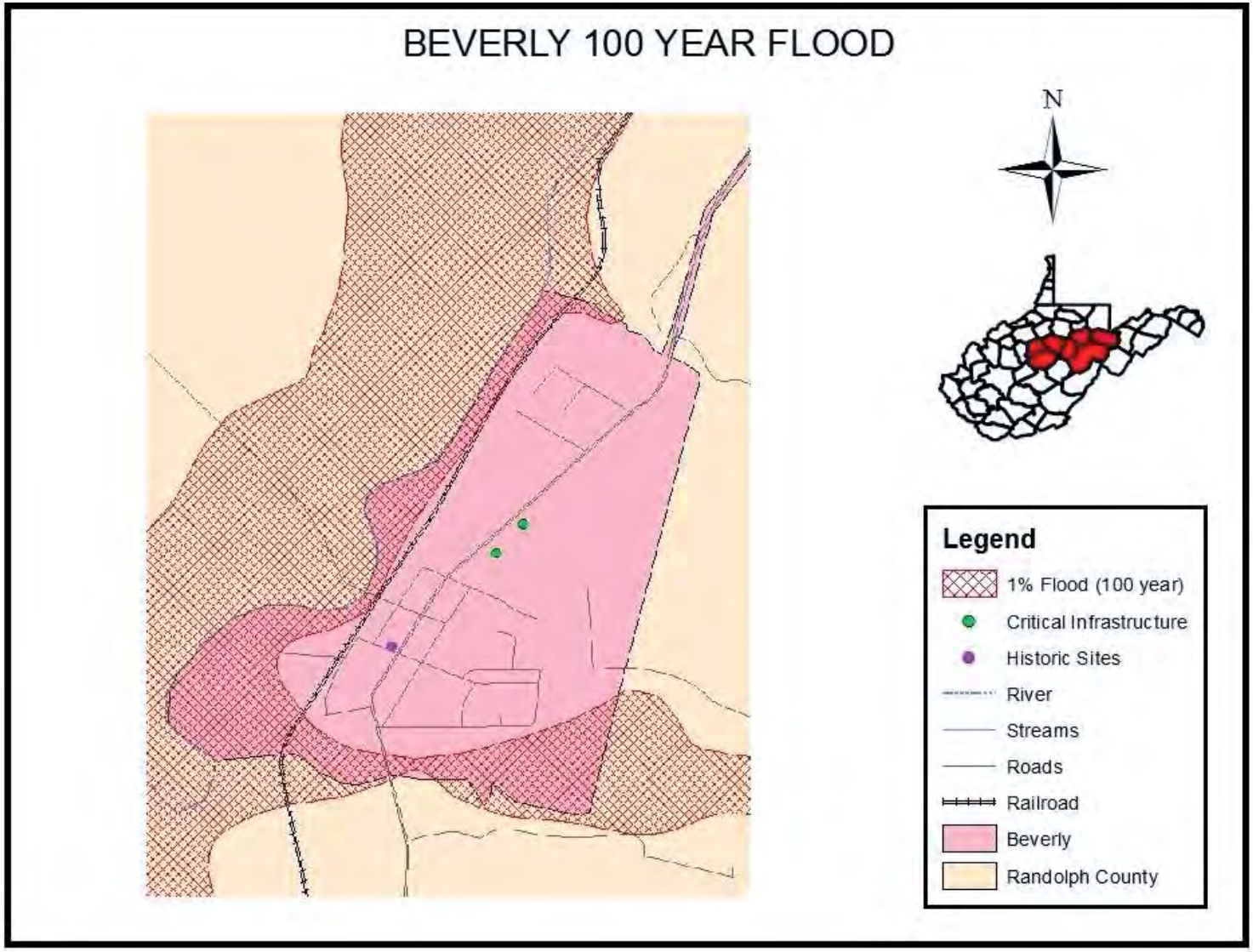
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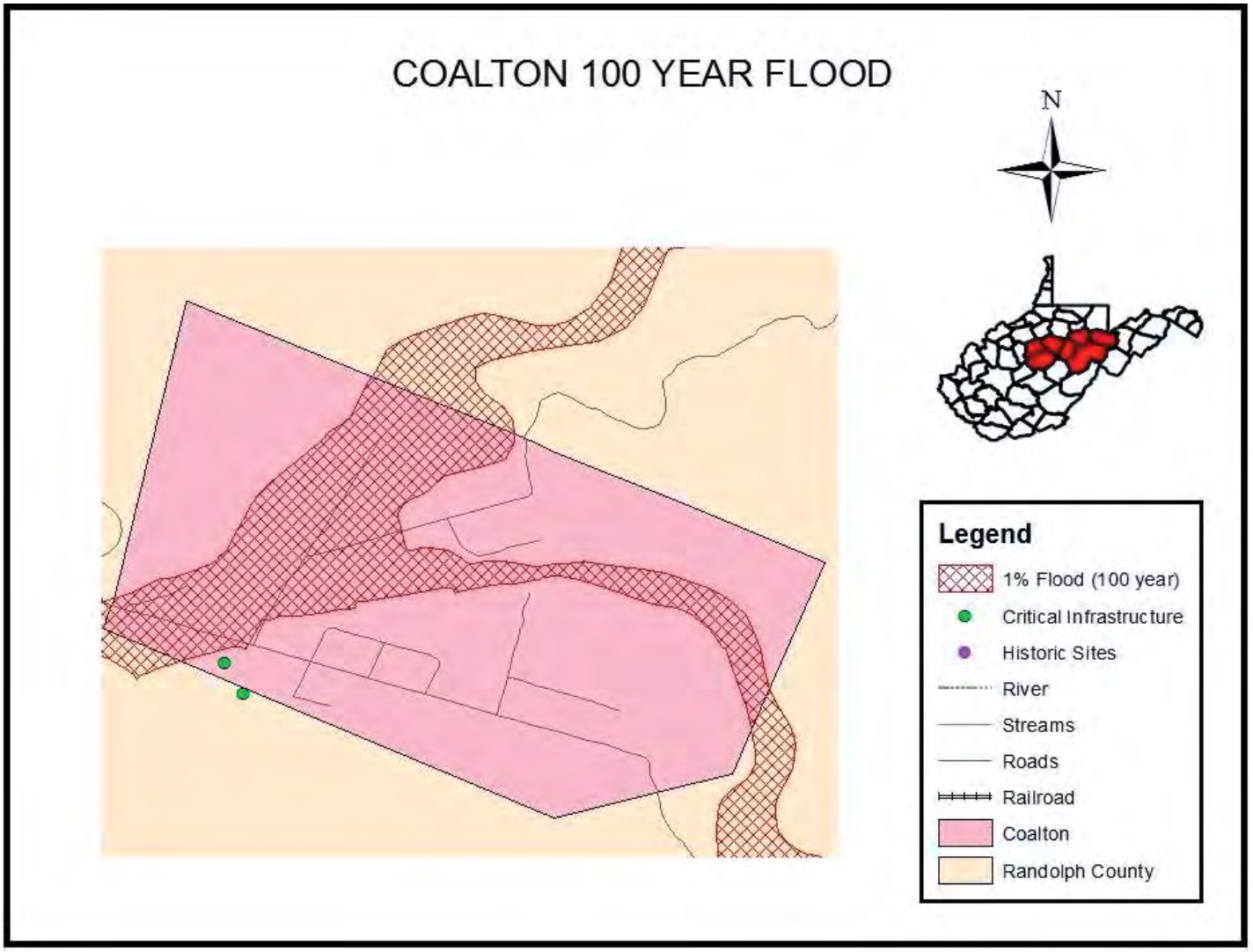
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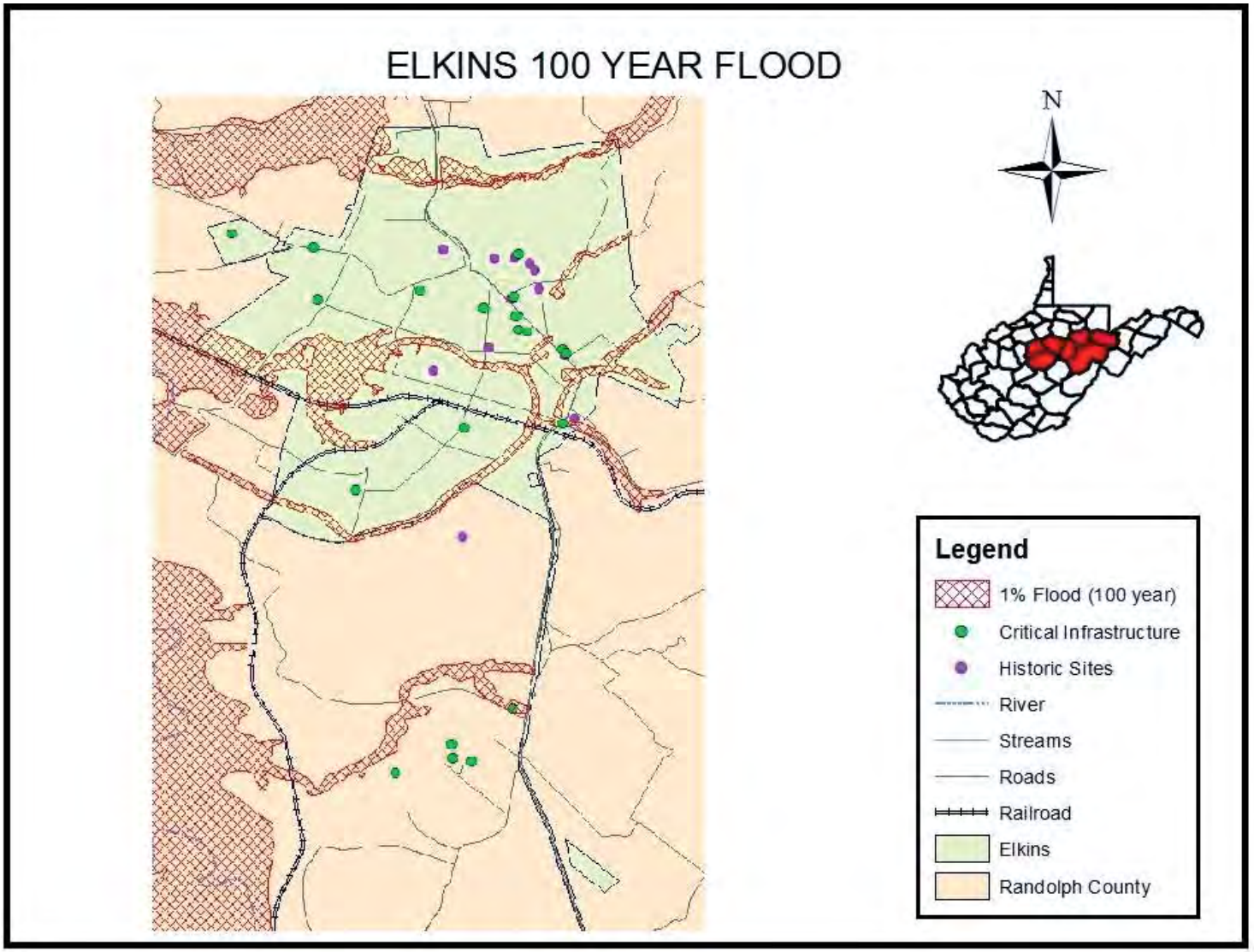
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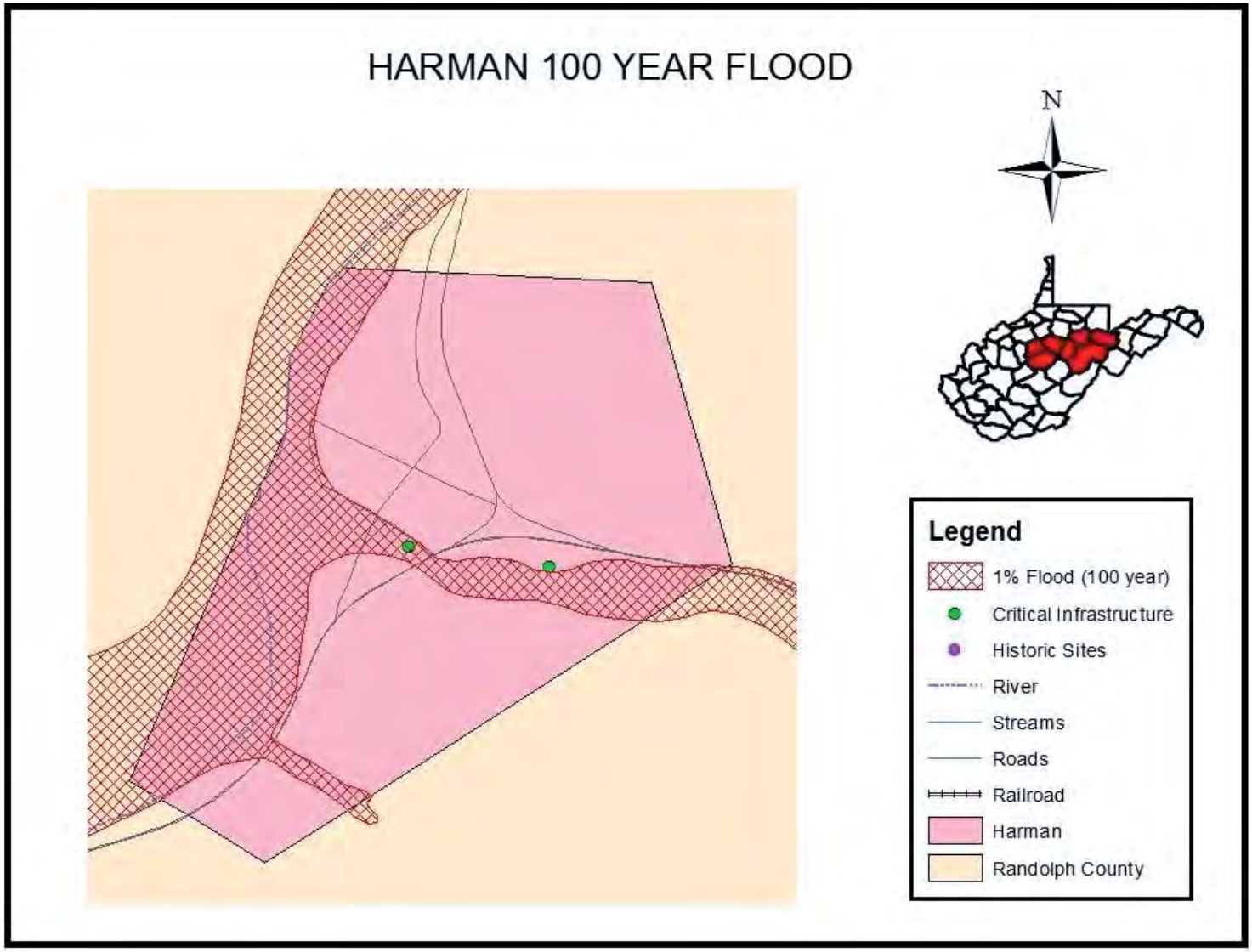
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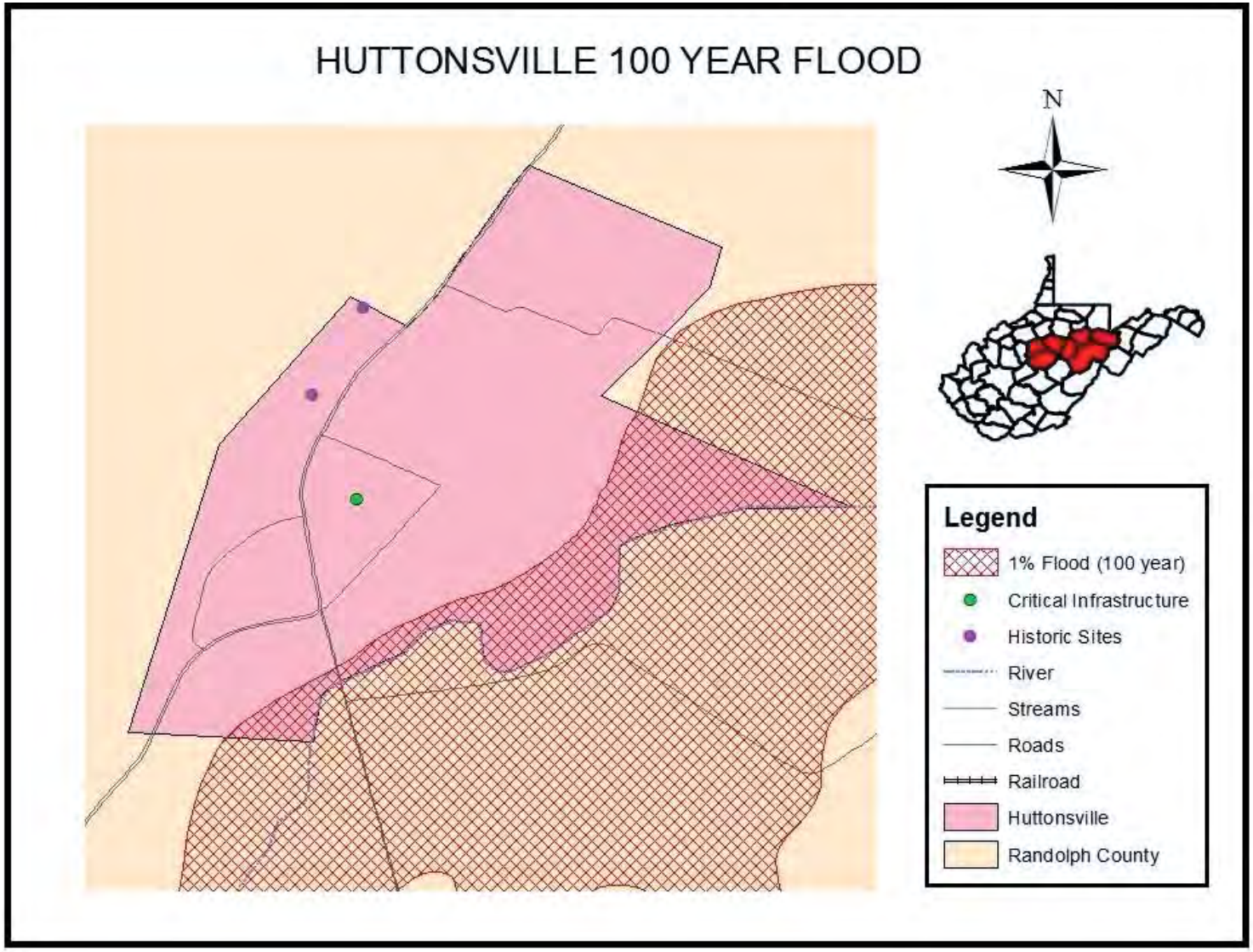
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Streams
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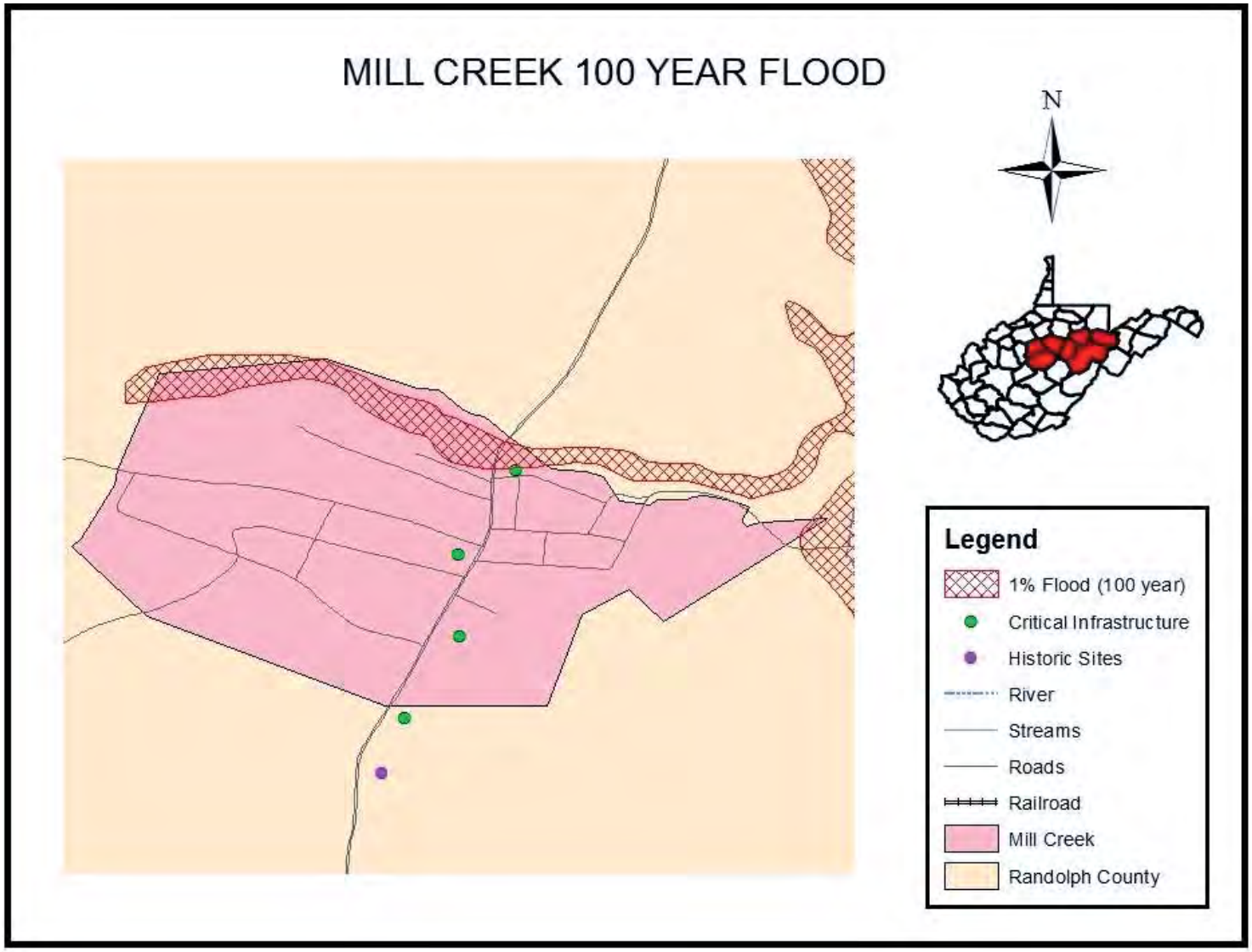
Huttonsville
Randolph County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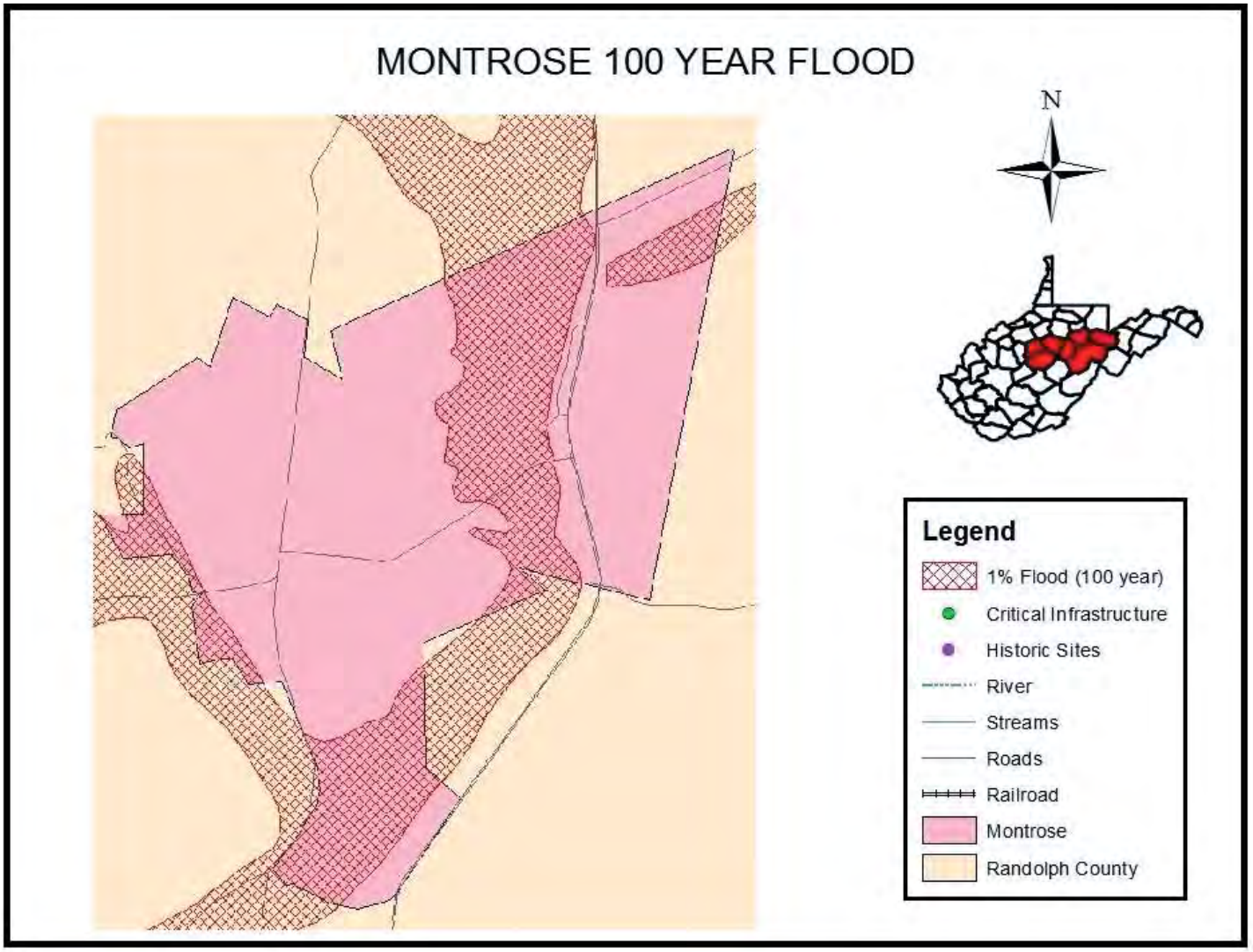
Mill Creek
Randolph County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Montrose
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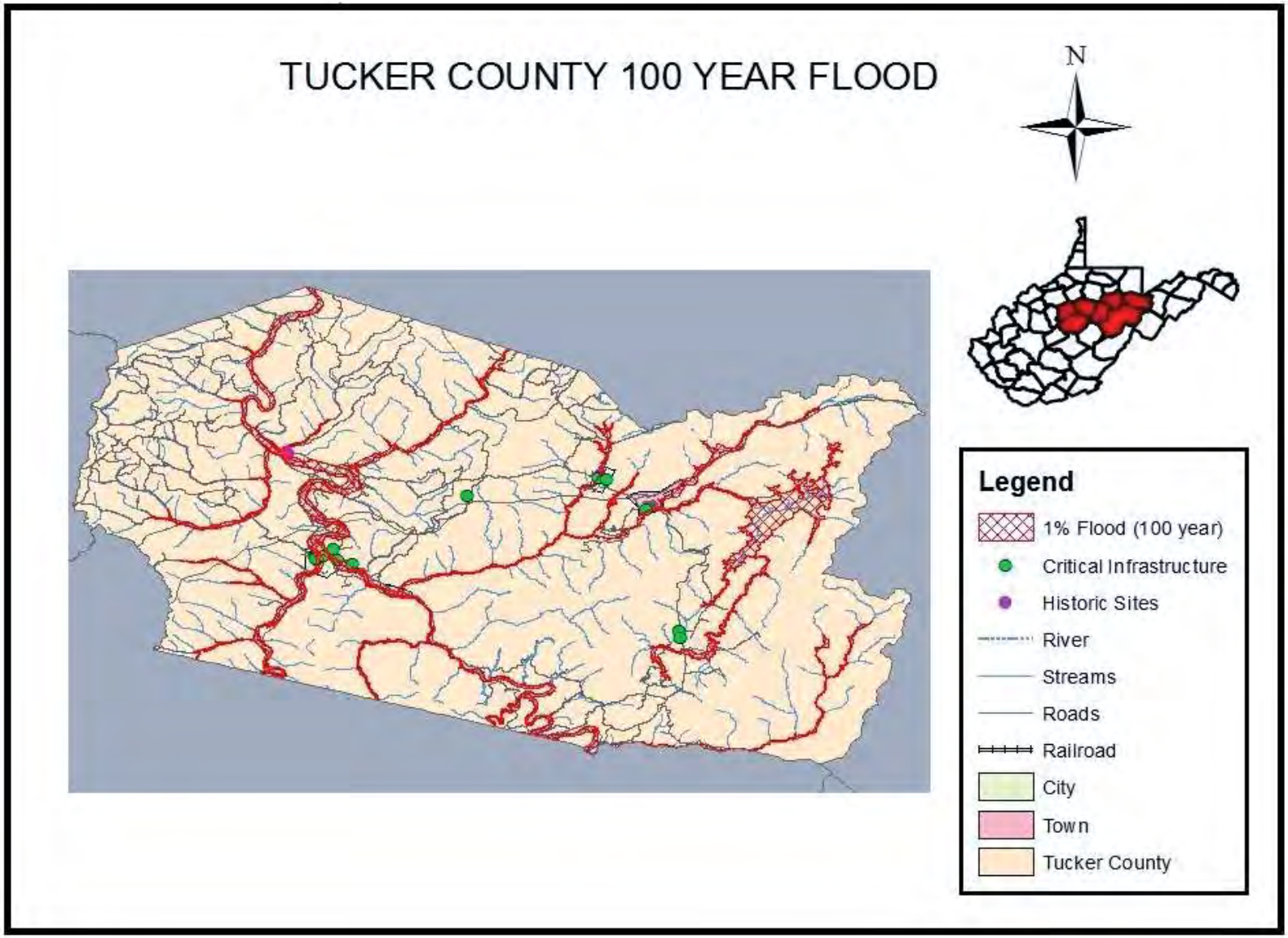
TUCKER COUNTY 100 YEAR FLOOD
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Legend
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Streams
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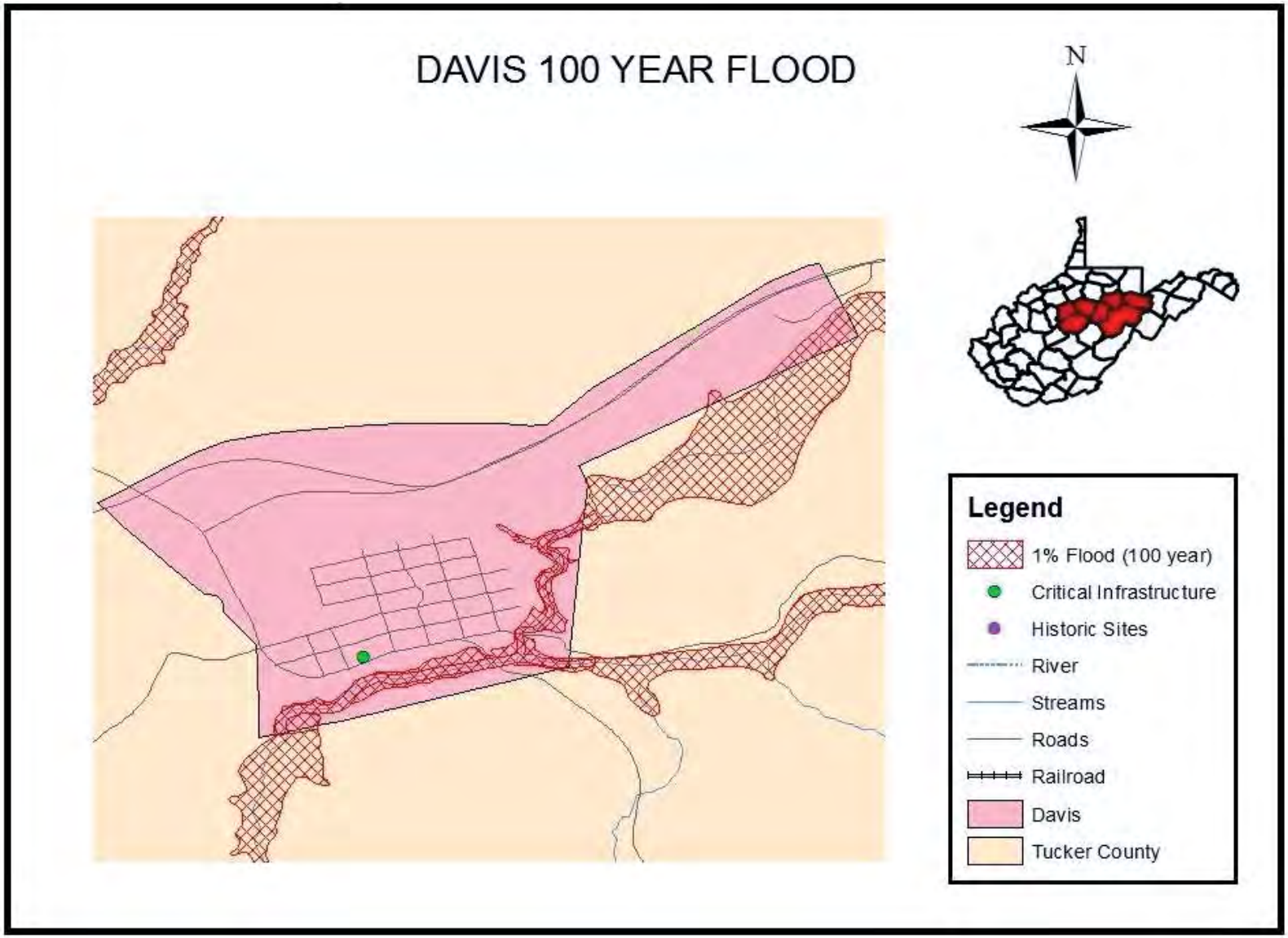
Railroad
City
Town
Tucker County


DAVIS 100 YEAR FLOOD
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Legend
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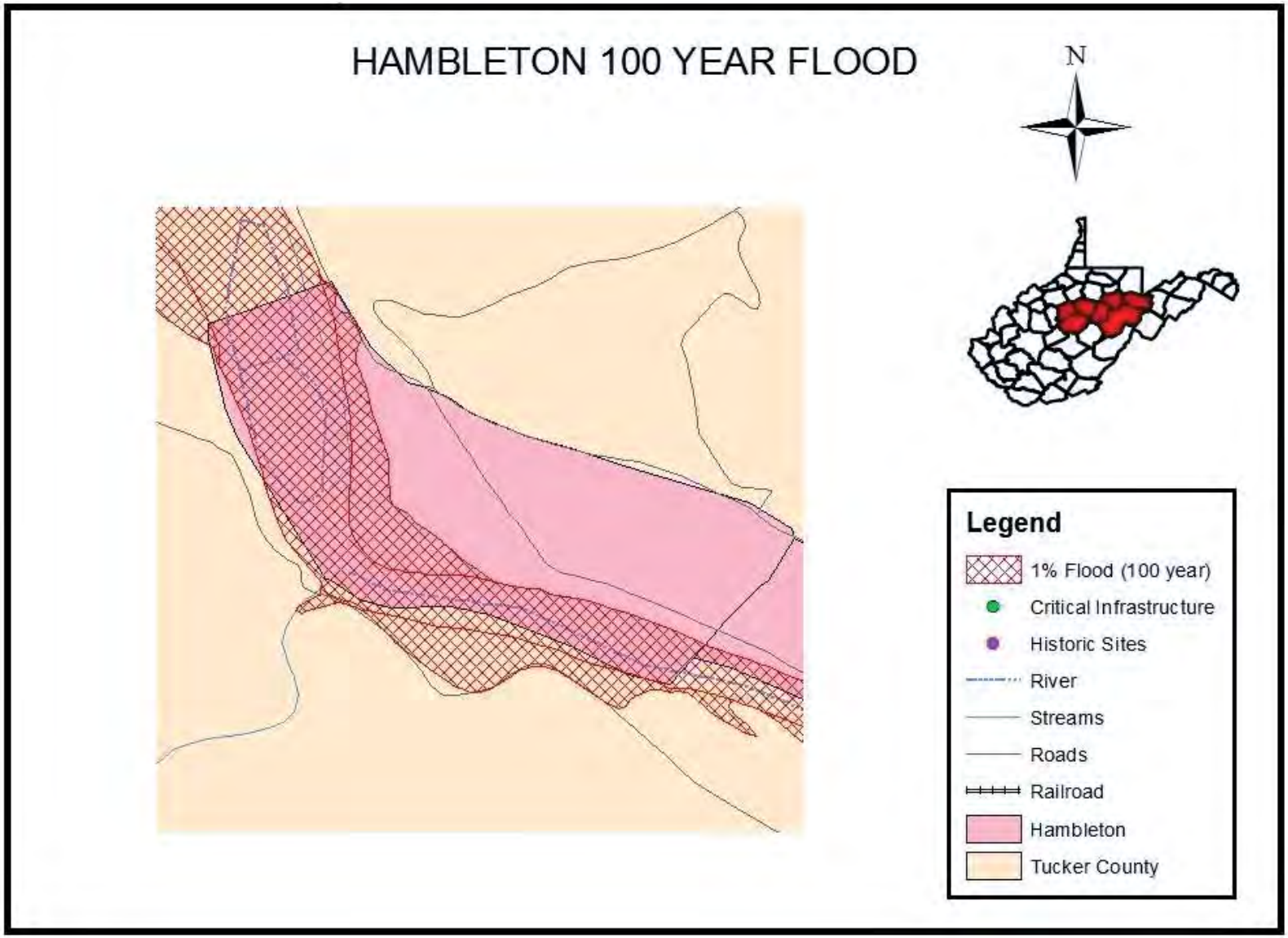
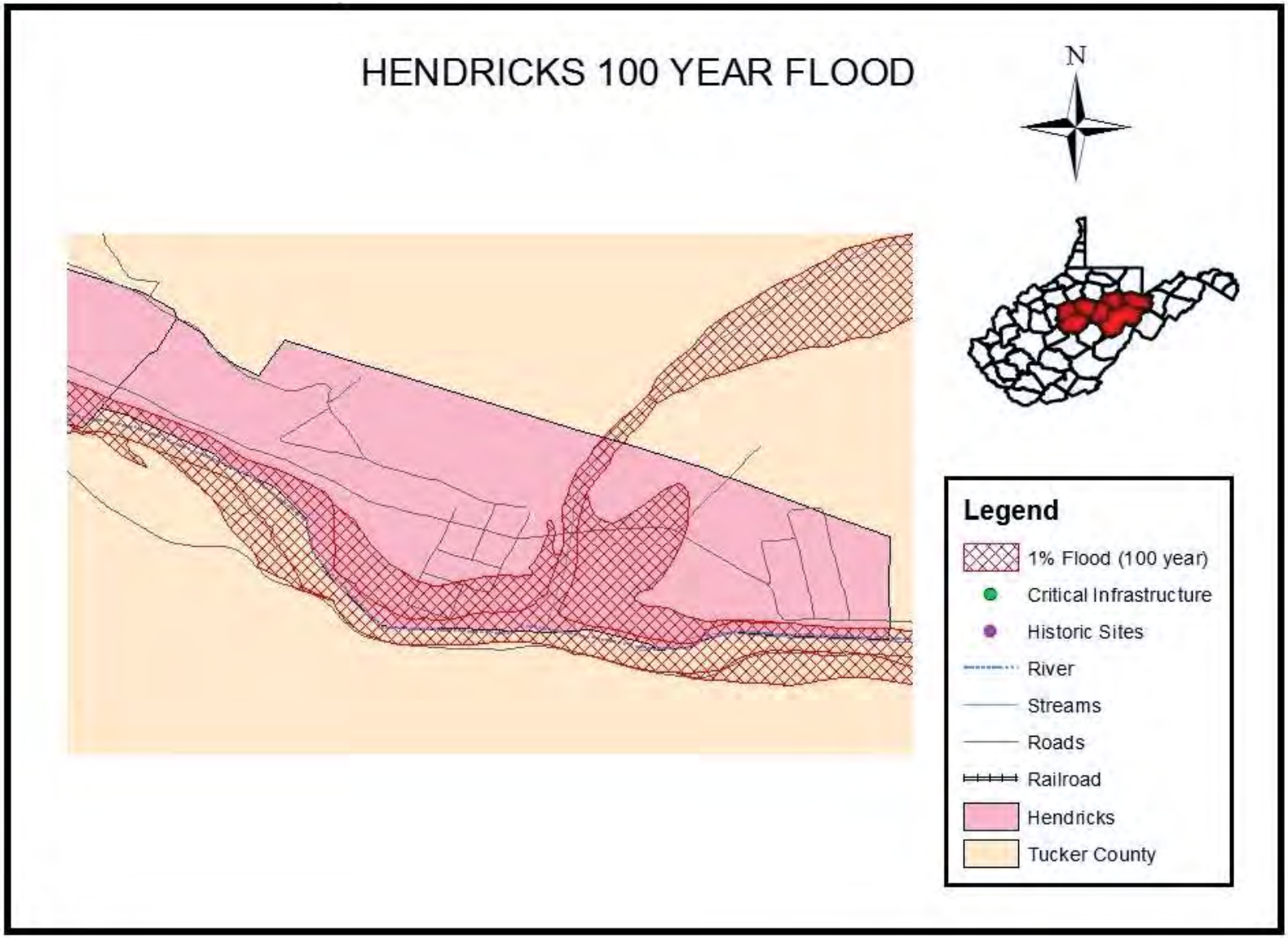
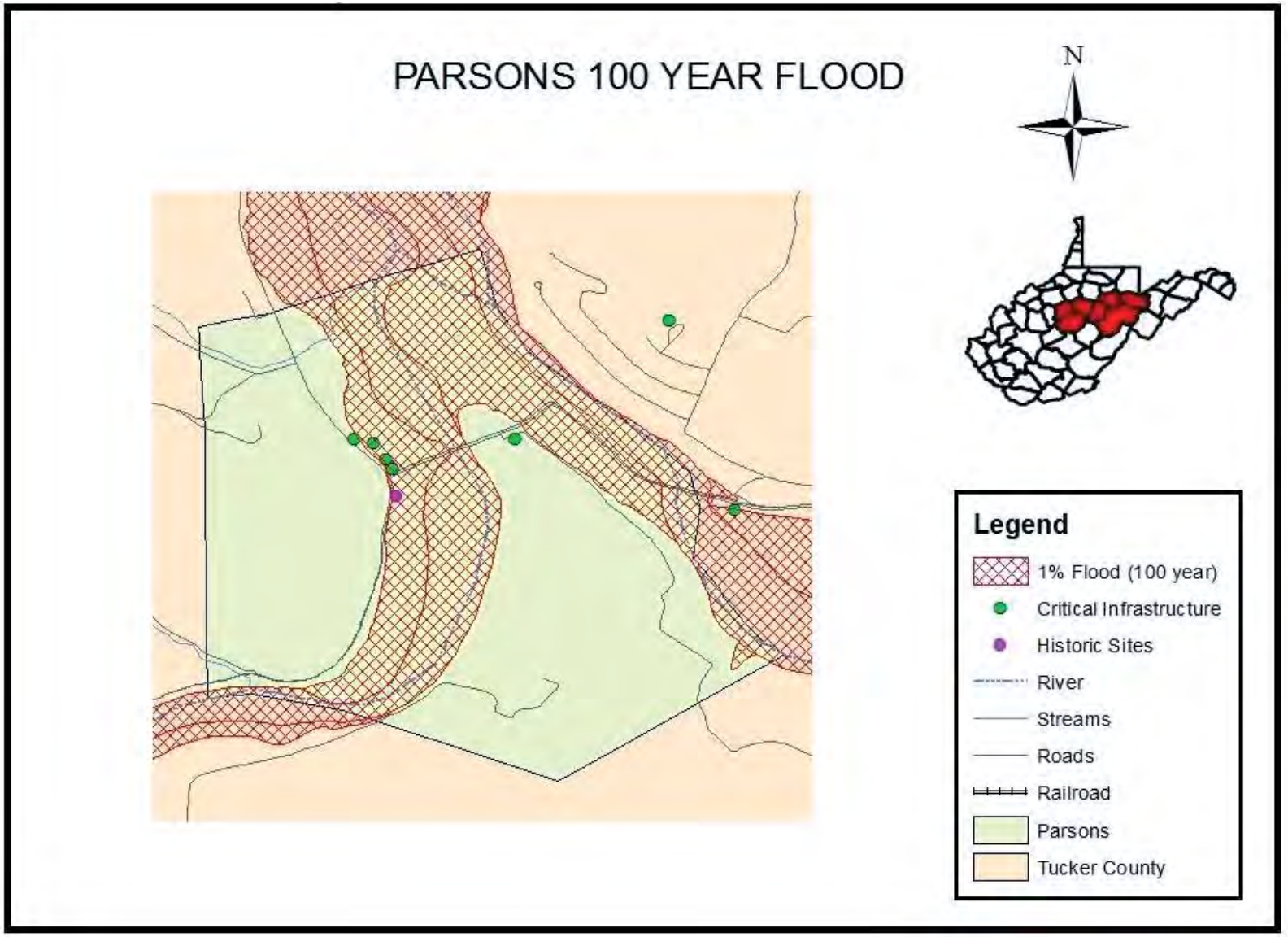
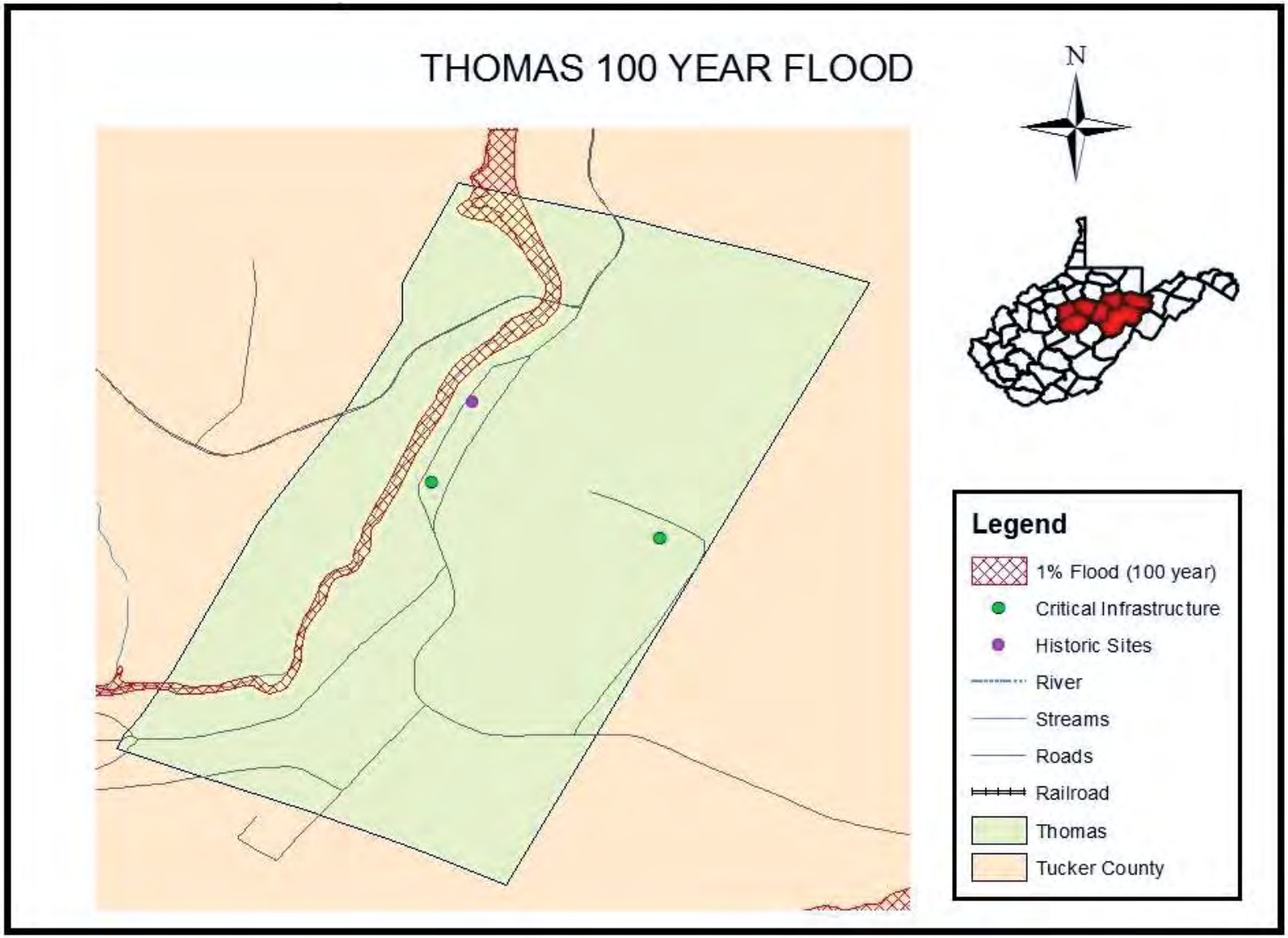
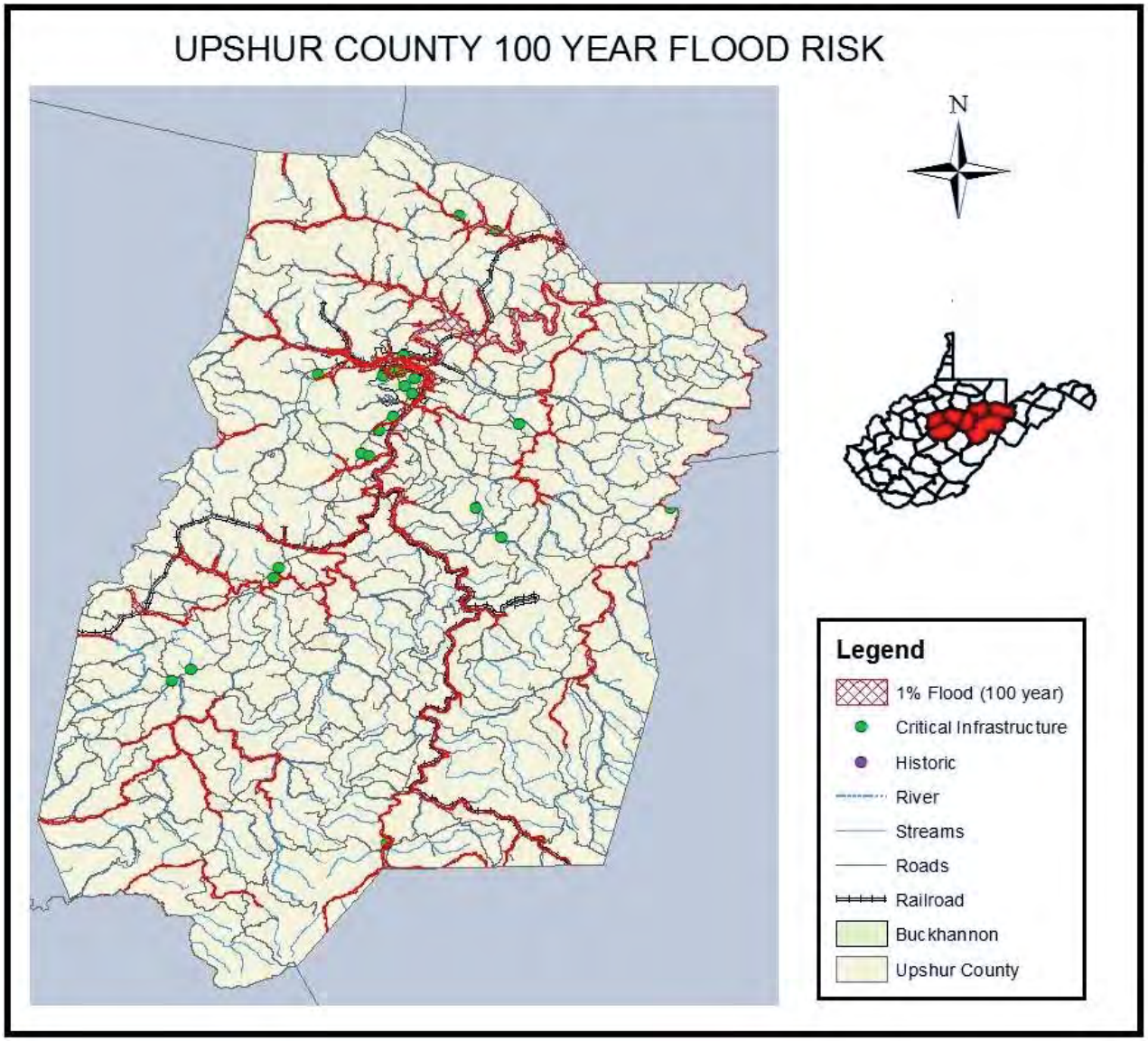
River
Streams
Roads
Railroad
Davis
Tucker County

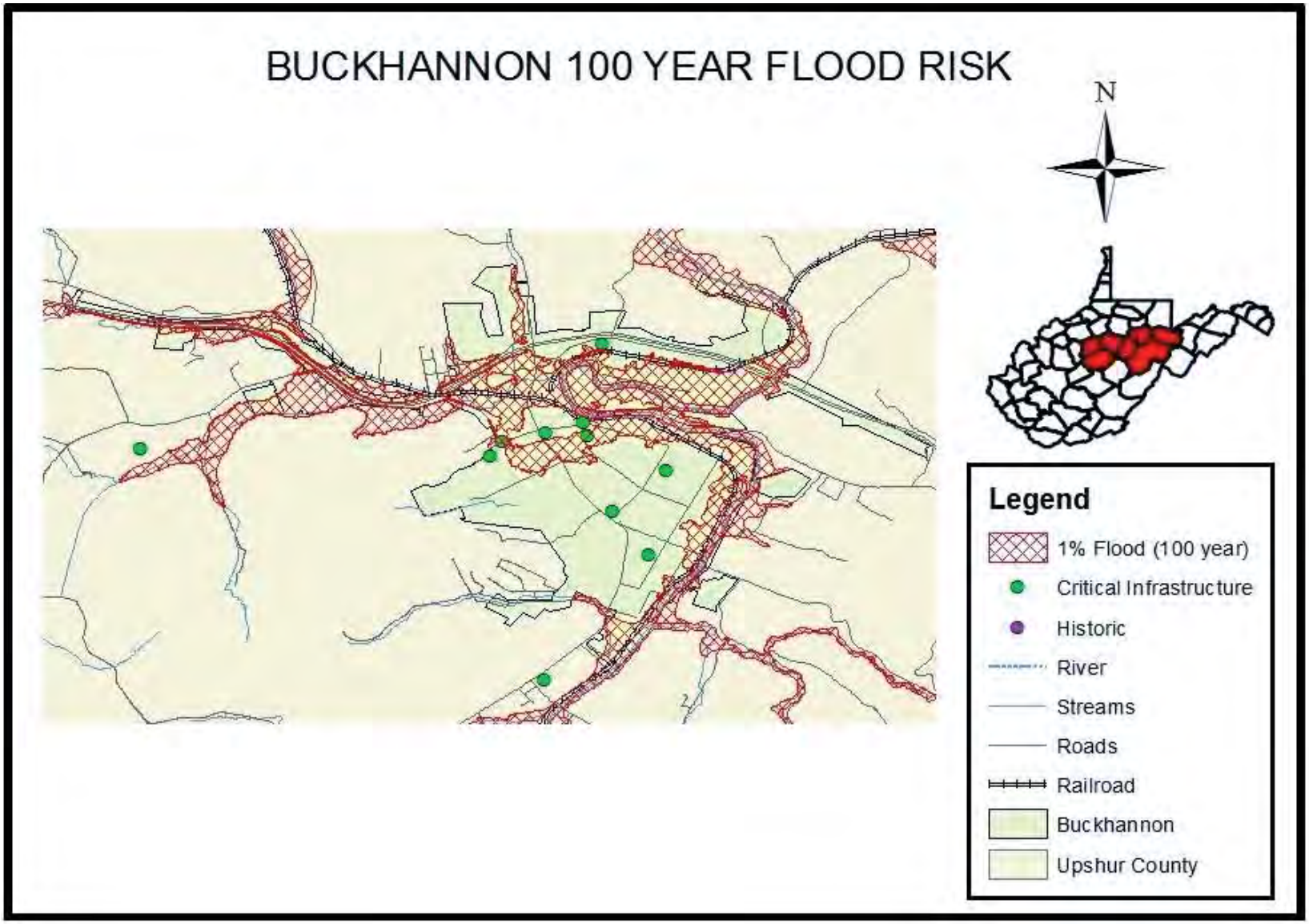

HAMBLETON 100 YEAR FLOOD
N
Legend
1% Flood (100 year)
Critical Infrastructure
Historic Sites
River
Streams
Roads
Railroad
Hambleton
Tucker County


HENDRICKS 100 YEAR FLOOD
N
Legend
1% Flood (100 year)
Critical Infrastructure
Historic Sites
River
Streams
Roads
Railroad
Hendricks
Tucker County


PARSONS 100 YEAR FLOOD
N
Legend
1% Flood (100 year)
Critical Infrastructure
Historic Sites
River
Streams
Roads
Railroad
Parsons
Tucker County


THOMAS 100 YEAR FLOOD
N
Legend
1% Flood (100 year)
Critical Infrastructure
Historic Sites
River
Streams
Roads
Railroad
Thomas
Tucker County


UPSHUR COUNTY 100 YEAR FLOOD RISK
N
Legend
1% Flood (100 year)
Critical Infrastructure
Historic
River
Streams
Roads
Railroad
Buckhannon
Upshur County


BUCKHANNON 100 YEAR FLOOD RISK
N
Legend
1% Flood (100 year)
Critical Infrastructure
Historic
River
Streams
Roads
Railroad
Buckhannon
Upshur County

2.2.7 Hazardous Materials

Hazardous materials are chemical substances that, if released or misused, can pose a threat to the environment or personal health (Haddow, Bullock, & Coppola, 2014, pg.55).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
At any time throughout the year	None / Hours	HIGH

The use of hazardous materials is prevalent in a large number of industries and products, including agriculture, medicine and research (Haddow, Bullock, & Coppola, 2014). The Emergency Planning and Citizens Right to Know Act (EPCRA) of 1984 requires facilities to report what chemicals they have on site and their quantities. The act also requires local governments to have emergency plans in place.

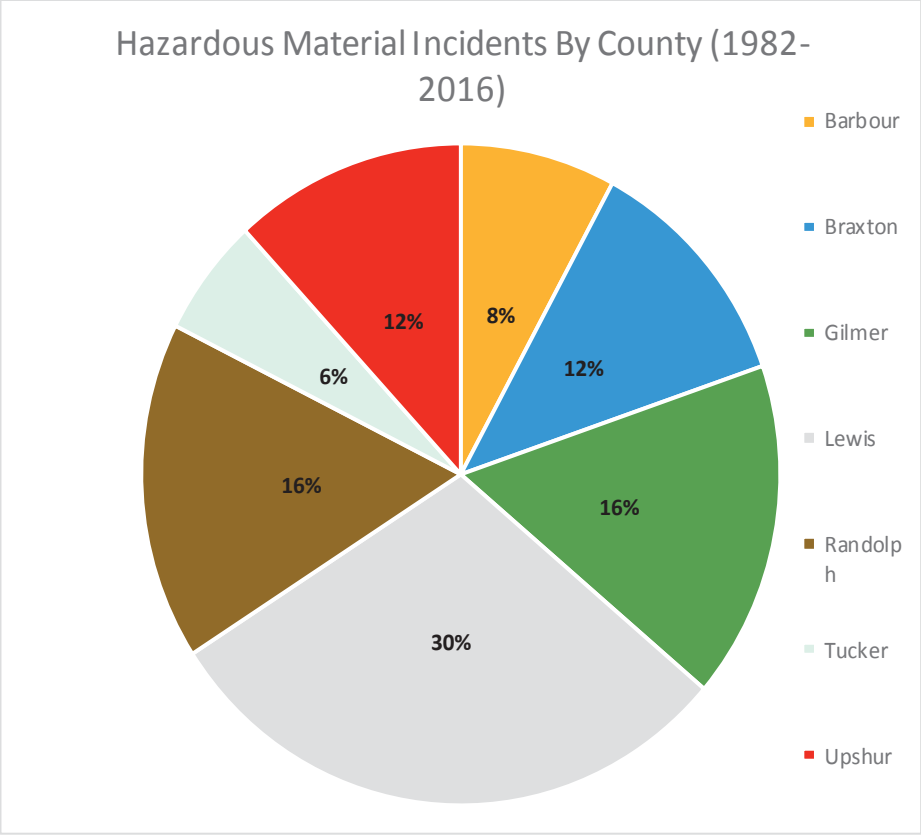
The Pipeline and Hazardous Materials Safety Administration (PHMSA), a division of the U.S. Department of Transportation, tracks hazardous material incidents that occur during transport. Between 2010 and 2016, the PHMSA recorded 15 total hazardous materials incidents during transport in Region VII counties. All occurred on highways. Spills of hazardous materials are most difficult to plan for during transportation. While commodity flow studies give local jurisdictions a snapshot of what materials may travel through the area on any given day, responders will not know what materials, if any, are involved until an incident occurs.

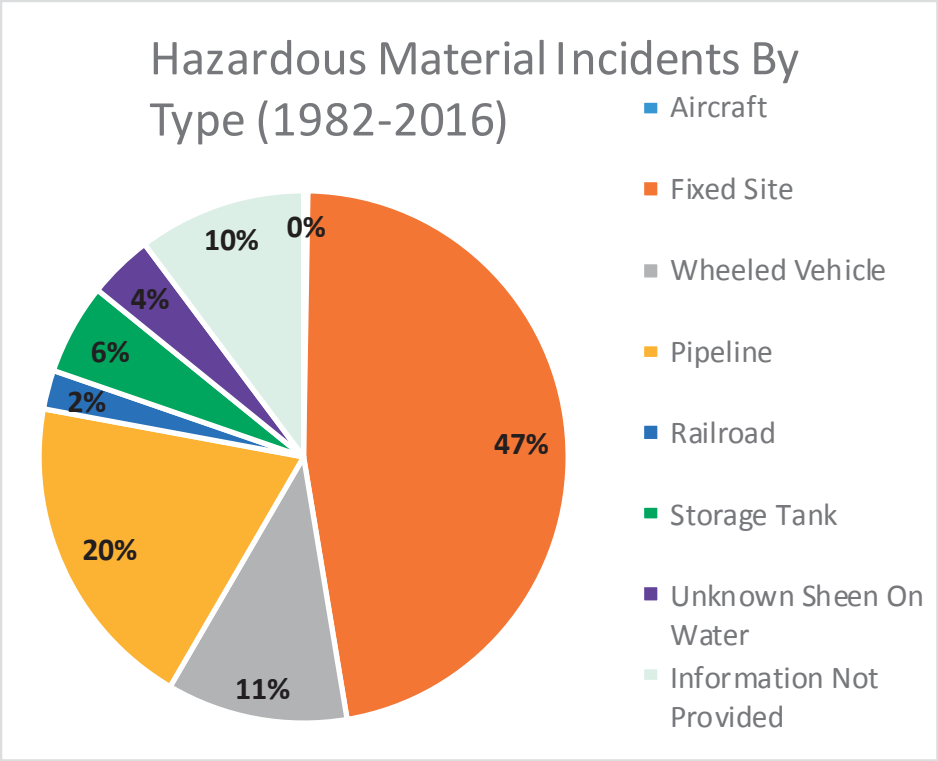
The Right to Know Network (RTK Net) maintains data, based on reports from the Coast Guard's National Response Center, on incidents that involve a hazardous materials release. In Region VII, there were 384 incidents between 1982 and 2016 (the most recent complete year available). These resulted in 8 fatalities, 110 hospitalizations and 125 injuries. It is important to note that 65 injuries with hospitalization resulted from one incident in Randolph County. Fourteen percent of these incidents (52 incidents) involved a mobile vehicle, while 47% (179 incidents) were at fixed sites.

Table: 2.2.7.1 Incident Types By County (RTK NET)

	Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
Aircraft	0	0	0	0	0	1	0
Fixed Site	17	20	26	56	29	14	17
Wheeled Vehicle	1	9	2	11	7	4	8
Pipeline	4	5	20	30	8	1	6
Railroad	4	2	0	0	2	0	1
Storage Tank	1	3	3	6	4	0	4

Table: 2.2.7.1 Incident Types By County (RTK NET)	Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
Unknown Sheen on Water	1	2	2	3	3	1	3
Information Not Provided	2	4	10	7	10	0	6





PUBLIC HEALTH

When looking at public health concerns during and following a hazmat incident, there are four main mechanisms to examine:

- **Fire:** Produces injuries through heat and exposure to toxic substances.
- **Explosion:** Produces traumatic injuries through resulting shockwave, fragments and projectiles.
- **Toxicity:** Results when humans come in contact with a chemical release and can cause harm in a wide array of toxic mechanisms including chemical burns, asphyxiation and neurotoxicity.
- **Mental Health Effects:** Produced by exposure to the event itself not the hazardous material itself (WHO, 2009).

A hazmat release can cause acute or chronic effects. Acute effects shop up immediately or soon after the exposure. The may be minor, such as throat irritation, or they serious, like passing out. Chronic effects may take years to cause symptoms. Often chemicals will have both acute and chronic effects (OSHA).

Spills into the waterways and those that reach the groundwater are of particular concern due to the threat imposed. Public health, through drinking water, the environment and the fauna in an area are all vulnerable.

Depending on the nature of a chemical release, there may not be a clear hazmat incident scene or enough patient surge to indicate an incident has occurred. Public health surveillance and epidemiological investigations often detect and identify that an incident and exposure have occurred.

SOCIAL VULNERABILITY

Children, pregnant women, the elderly, hospital patients, and those with low socioeconomic status should be considered to have a greater inherent risk of suffering adverse health effects from a hazmat incident. These groups may have lower exposure thresholds, reduced mobility hindering evacuation, and/or the inability to protect themselves (WHO, 2009).

First responders are especially vulnerable to hazardous material releases. Police, fire, and EMS personnel, often will not know that there is a chemical present, spilled, leaked, or released, at the scene of a motor vehicle accident, structure fire, or medical call until the first units arrive on scene.

HISTORICAL OCCURRENCES

Barbour County, WV

On May 24, 2017, an explosion occurred at Midland Resource Recovery. Two workers were confirmed dead and one was transported from the scene via HealthNet Helicopter. A Hazmat team, along with law enforcement, fire department and EMS responded. Investigators from the Occupational Safety & Health Administration, West Virginia Department of Environmental Protection and the West Virginia State Fire Marshal's Office were all called to the scene.

On June 20, 2017, there was a second fatal explosion as a crew worked to render the tanks safe following the explosion in May. One person was killed and a second was severely injured in the blast.

Lewis County, WV

On May 16, 2013, 100 gallons of waste oil spilled from a tanker truck. The incident was caused by the tanker being overfilled. One worker sustained multiple injuries and was hospitalized.

Table: 2.2.7.2 PHMSA Reported Incidents				
Date	Location	Identification Number	Hazardous Class	Description of Incident
4/20/2010	Adrian	UN1789	Corrosive Material	Driver reported pressure cap was broken and notified terminal who reported that 2-5 gallons had leaked onto their scale.
7/29/2010	Buckhannon	UN1789	Corrosive Material	Dispatcher noticed vapors coming from an acid transporter. Upon visual inspection, a hole was located in the tanker. The hole was caused by a flaw in the tank liner.
3/14/2011	Sutton	UN1203	Flammable-Combustible Liquid	50-70 gallons were released doe to tanker being overfilled.
4/10/2011	Buckhannon	NA1993	Flammable-Combustible Liquid	During delivery the tank was overfilled causing approximately 100 gallons to spill out. Spill was caused by a faulty gauge.
2/28/2012	Elkins	UN1203	Flammable-Combustible Liquid	During delivery, the connection between the delivery fitting and storage tank was compromised and 5 gallons were released.
11/2/2012	Elkins	UN1263	Flammable-Combustible Liquid	Pails the substance was shipped in were compromised due to heavy freight being placed on top.
10/10/2013	Elkins	UN1993	Flammable-Combustible Liquid	Unloader noticed damage to a package containing combustible liquid. Package was removed by certified personnel.
2/28/2014	Elkins	UN1950	Flammable Gas	Outer seal of package in shipment failed causing an aerosol leak.
9/11/2014	Frametown	UN3295	Flammable-Combustible Liquid	The front wheel blew out on I79 causing the truck to hit a guard rail and go into a ravine separating the truck and tanker. The collision caused damage to the center and rear compartments of the tank causing 500 gallons to leak.
10/1/2014	Davis	UN1203	Flammable-Combustible Liquid	During delivery the driver pulled a second hose off the trailer that landed on the first hoses coupling compromising the connection causing a spill.
1/19/2015	Elkins	UN3265	Corrosive Material	Material found on beltline while loading shipment.
5/9/2015	Flatwood	NA3082	Miscellaneous	Driver noticed a strong odor from the trailer while refueling. Upon inspection it was found the trailer floor was wet and a drum was leaking from a hole.
8/10/2015	Elkins	UN1824	Corrosive Material	Material found on beltline while loading shipment.
11/25/2015	Elkins	UN1789	Corrosive Material	While product was being unloaded it was documented that packaging was wet. When exterior packaging was removed the interior container's lid had come loose.
6/7/2016	Jane Lew	UN1197	Flammable-Combustible Liquid	The driver reported a leak from the trailer while at a truck stop. Leak was caused by container's lid becoming loose during transport.

LOCATION & EXTENT

Hazmat incidents can occur at any location within Region VII. However, there are some areas that are more susceptible to incidents than others. For example, roads, highways, and rails, where hazardous materials are transported will have a higher chance of accidents, spills, or leaks. At the same time, due to the nature of some businesses in the area, certain fixed facilities especially tier II reporting facilities or gas stations have a higher chance of incident occurrence.

In addition to incidents and accidents on roadways, railroads, waterways and industries, another type of fixed facility is oil and gas drilling sites. These sites can be potential locations for incidents due to the materials used and/or extracted at the site.

According to a report by Molly Peterson, it was found that “more than 40 toxic chemicals have been used in dozens of drilling operations, often near homes, schools, and hospitals (2014).

Hazardous material spills, leaks and releases are most difficult to plan for during transportation since they can occur at any time, at any place, and involve a wide variety of materials. While spills, leaks, and releases occur in a specific location, the effects have the potential to affect a large area.

LOSS ESTIMATE

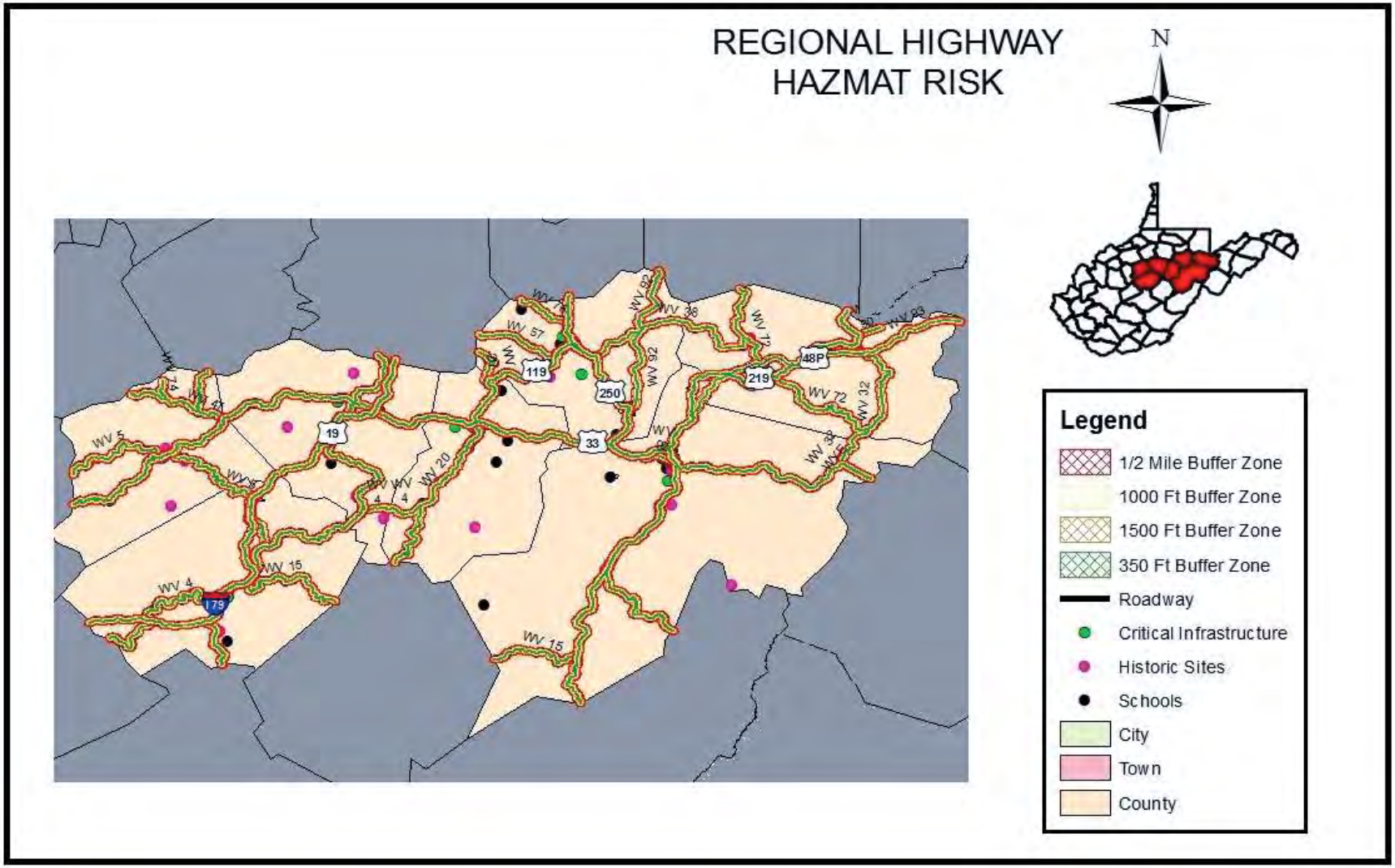
RTK Net and PHMSA both estimate monetary damage. Some incidents, because of their size, have no cost associated with them; these incidents range from spilling a small amount of product while filling a tank to reports of motor vehicle collisions causing large scale spills from tanker cars. Of the 384 incidents recorded by the RTK Network, none had monetary damage associated with them, however this does not mean that no monetary damage occurred. The PHMSA reported 15 incidents that had a total cost of $271,423.

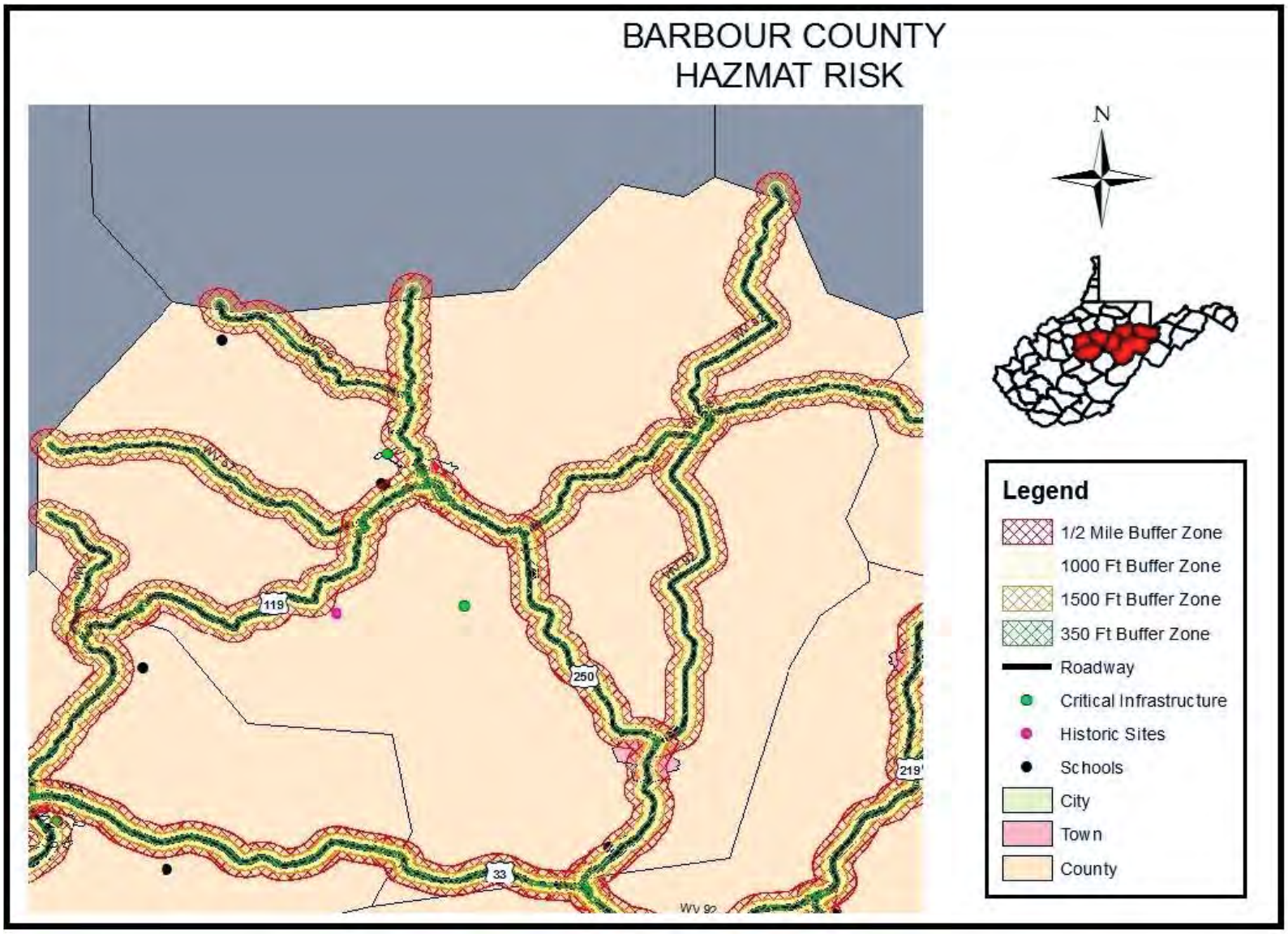
TABLE 2.2.7.3 HAZMAT RISK CALCULATION

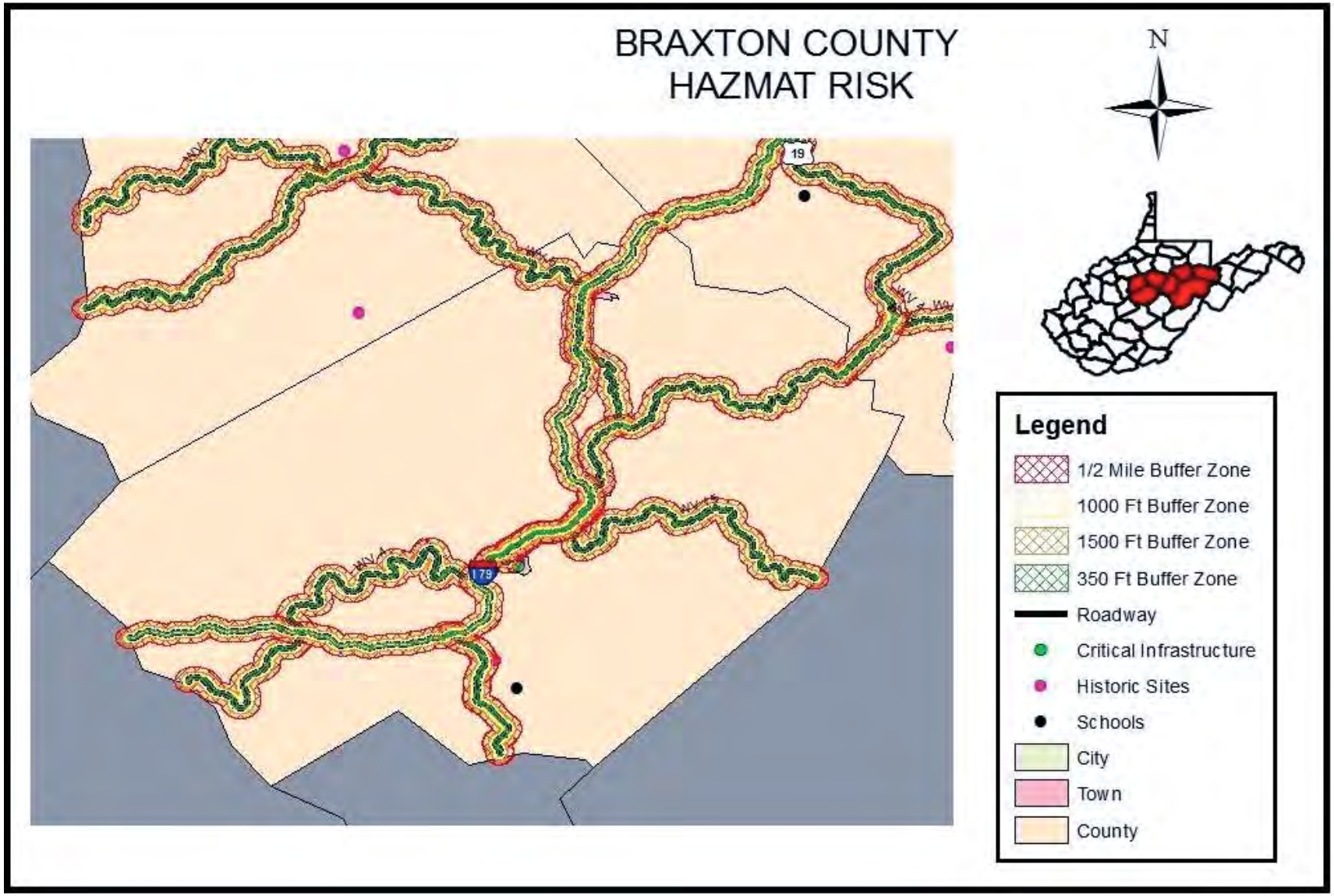
Probability				*Severity*		*Risk*
FREQUENT				CRITICAL		HIGH
Events	384	10.97		There have been 8 fatalities and 125 injuries reported from hazmat incidents. A per event cost is not available as often the shipper/manufacturer incurs the direct costs and are not required to report it. An event during transport could be difficult to contain and cause injury. Death, and harm to the environment.		A combination of frequent probability and critical severity puts this hazard at a high risk.
Years	35					
There is likely a chance that a hazmat incident will occur several times throughout the year.			+		=	

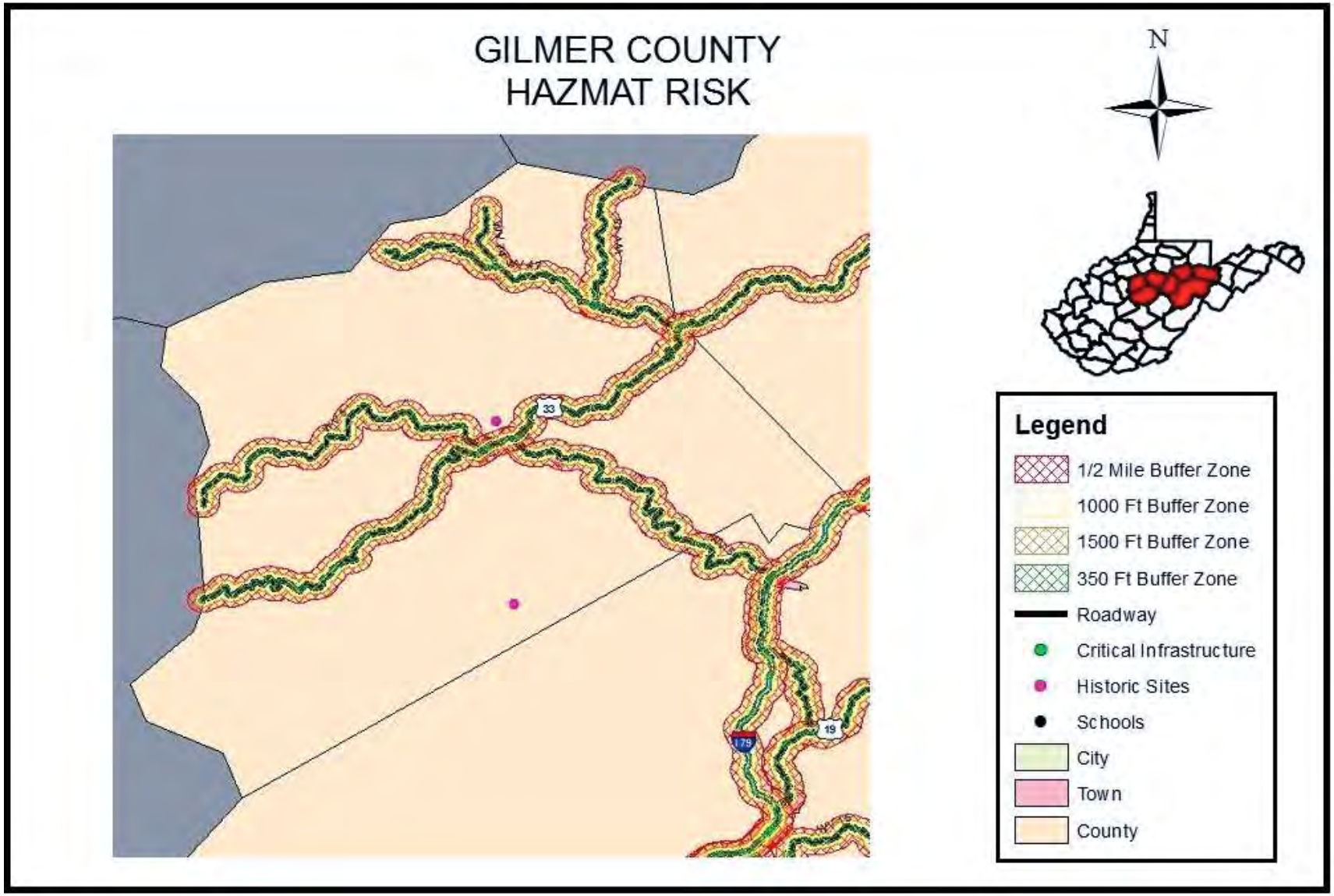
RISK MAPS

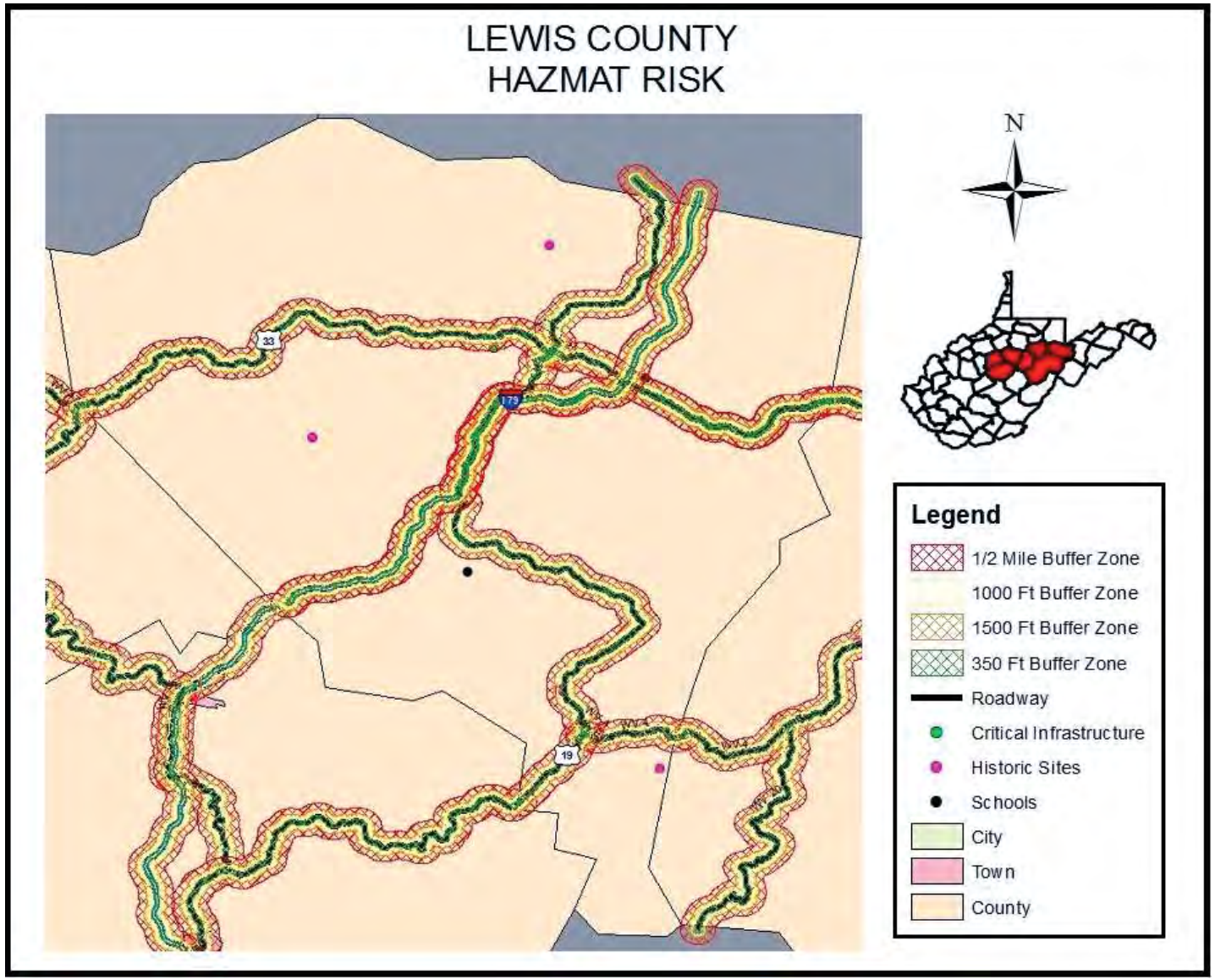
The risk maps below show rail and roadways with buffers of 350 feet, 1,000 feet, 1,500 feet and .5 miles. Along with the regional map there are several additional maps showing areas where there are multiple assets would be affected by a leak or release.

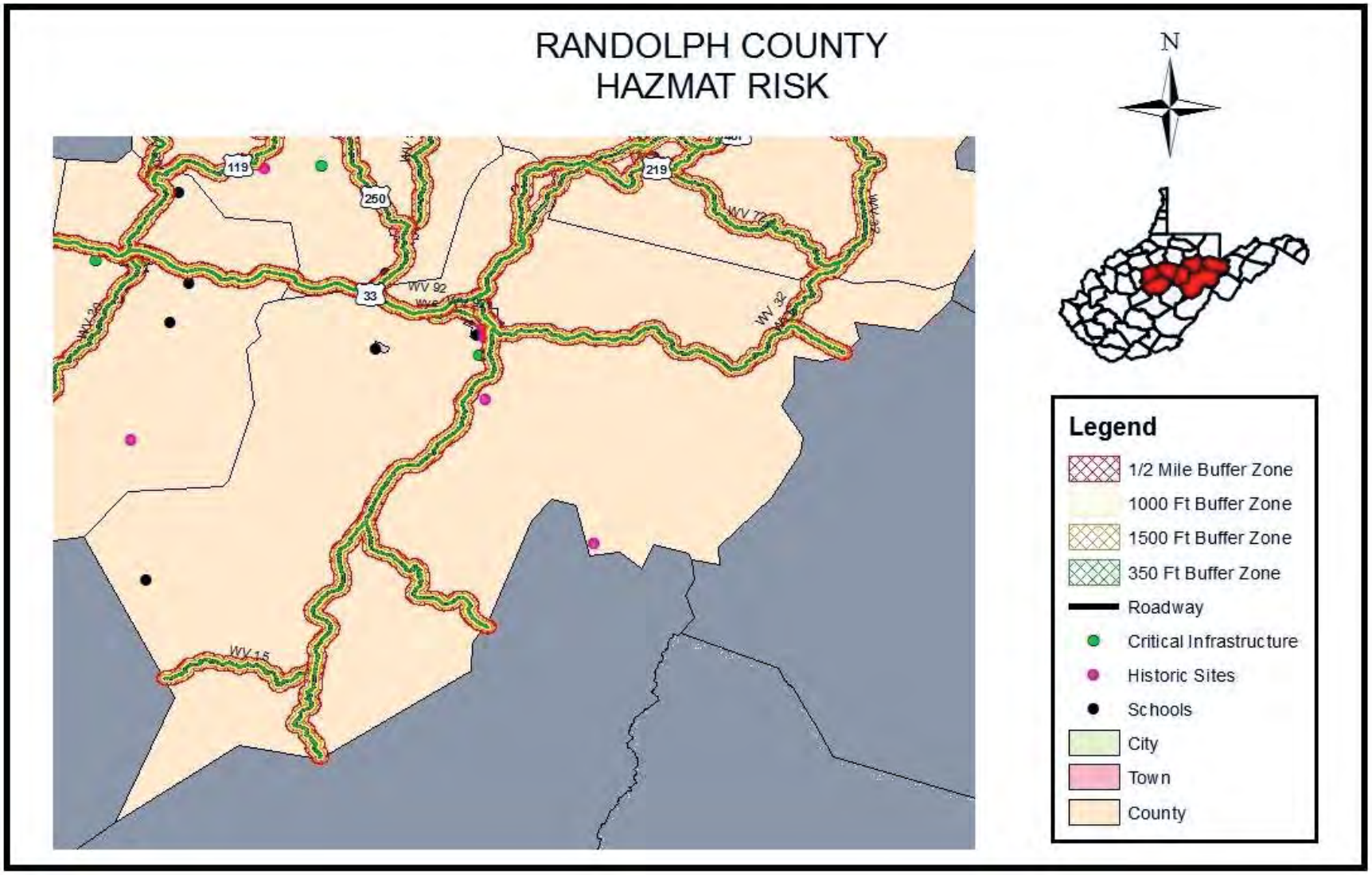

REGIONAL HIGHWAY
HAZMAT RISK
N
Legend
1/2 Mile Buffer Zone
1000 Ft Buffer Zone
1500 Ft Buffer Zone
350 Ft Buffer Zone
Roadway
Critical Infrastructure
Historic Sites
Schools
City
Town
County


BARBOUR COUNTY
HAZMAT RISK
N
Legend
1/2 Mile Buffer Zone
1000 Ft Buffer Zone
1500 Ft Buffer Zone
350 Ft Buffer Zone
Roadway
Critical Infrastructure
Historic Sites
Schools
City
Town
County
119
250
33
WV 92


BRAXTON COUNTY
HAZMAT RISK
N
19
I 79
Legend
1/2 Mile Buffer Zone
1000 Ft Buffer Zone
1500 Ft Buffer Zone
350 Ft Buffer Zone
Roadway
Critical Infrastructure
Historic Sites
Schools
City
Town
County


GILMER COUNTY
HAZMAT RISK
N
33
19
79
Legend
1/2 Mile Buffer Zone
1000 Ft Buffer Zone
1500 Ft Buffer Zone
350 Ft Buffer Zone
Roadway
Critical Infrastructure
Historic Sites
Schools
City
Town
County


LEWIS COUNTY
HAZMAT RISK
N
33
79
19
Legend
1/2 Mile Buffer Zone
1000 Ft Buffer Zone
1500 Ft Buffer Zone
350 Ft Buffer Zone
Roadway
Critical Infrastructure
Historic Sites
Schools
City
Town
County


RANDOLPH COUNTY
HAZMAT RISK
N
119
250
219
33
WV 92
WV 32
WV 15
Legend
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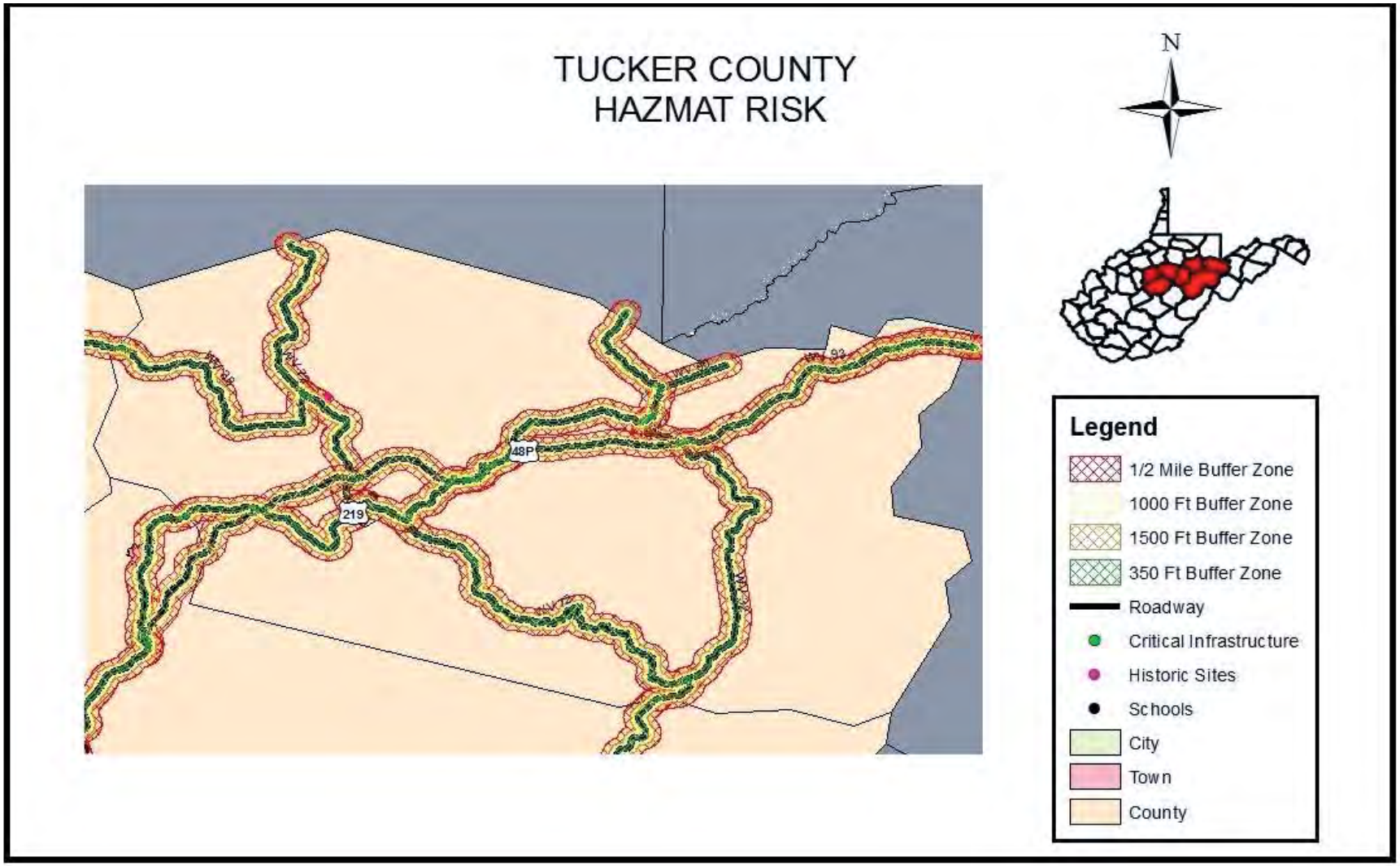
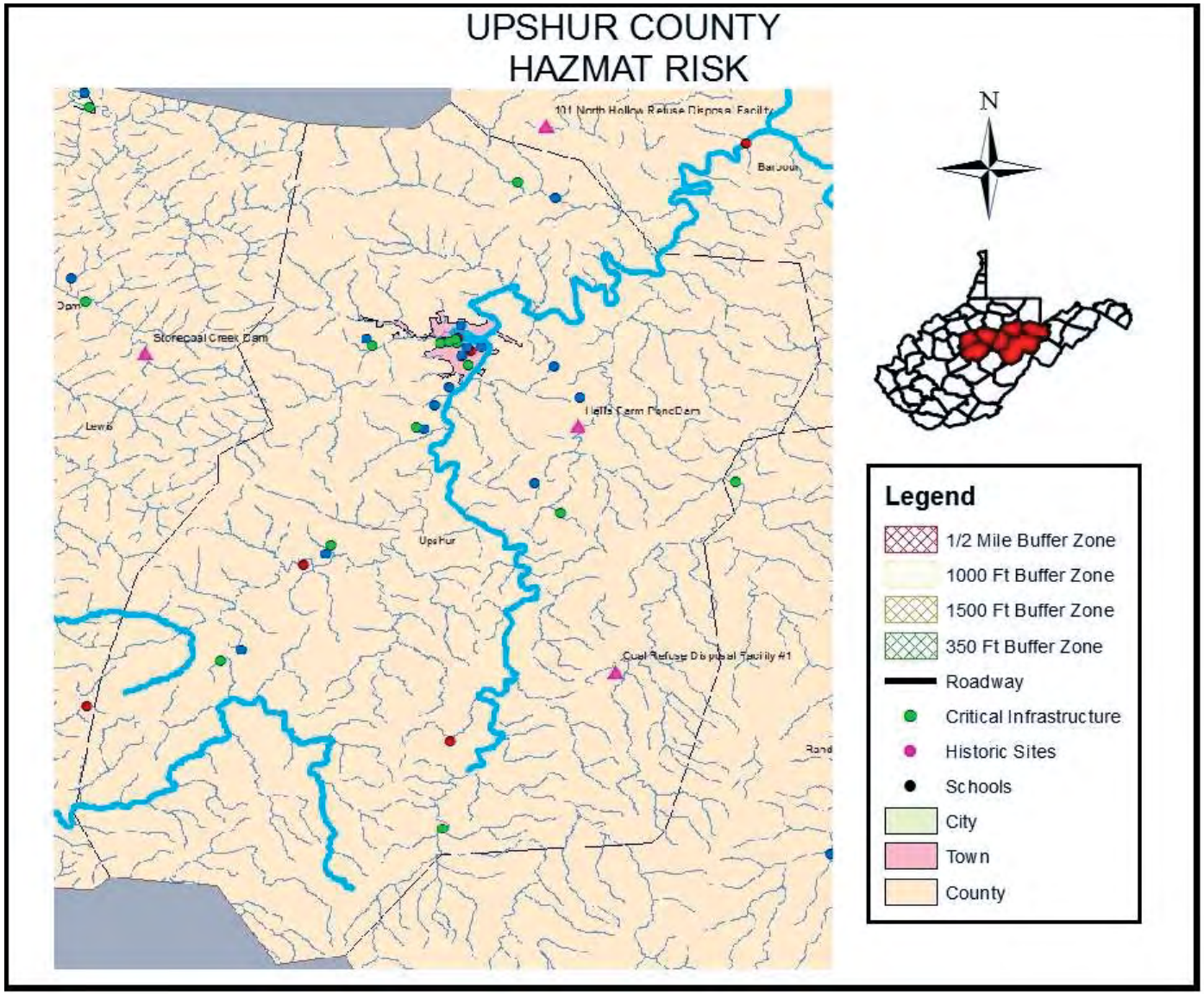
1000 Ft Buffer Zone
1500 Ft Buffer Zone
350 Ft Buffer Zone
Roadway
Critical Infrastructure
Historic Sites
Schools
City
Town
County


TUCKER COUNTY
HAZMAT RISK
N
48P
219
Legend
1/2 Mile Buffer Zone
1000 Ft Buffer Zone
1500 Ft Buffer Zone
350 Ft Buffer Zone
Roadway
Critical Infrastructure
Historic Sites
Schools
City
Town
County


UPSHUR COUNTY
HAZMAT RISK
N
Legend
1/2 Mile Buffer Zone
1000 Ft Buffer Zone
1500 Ft Buffer Zone
350 Ft Buffer Zone
Roadway
Critical Infrastructure
Historic Sites
Schools
City
Town
County

2.2.8 Infrastructure Interruption

"Every family and business needs infrastructure to thrive – from the road you travel to work, to the pipes that deliver clean drinking water, to the inland waterways and rail that move goods from coast to coast" (ASCE).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
At any time throughout the year	Years	MODERATE

Infrastructure encompasses a wide variety of categories including bridges, dams and levees, drinking water, energy, transportation, etc. Every four years, the American Society of Civil Engineers (ASCE) issues a report card for America's infrastructure. The ASCE offers a letter grade in 16 categories. Evaluations are based on capacity, condition, funding, future need, operation and maintenance, public safety, resilience and innovation. The ASCE report for the nation in 2017 had an overall grade of "D".

Infrastructure interruption is a concern to many of the residents of Region VII's counties. In the public survey 40% of the people who took the survey selected they are concerned about this hazard and 28% selected they are very concerned. Furthermore, over 65% of those surveyed selected that they are aware of this hazard occurring within the past ten years.

WASTEWATER

According to the ASCE, West Virginia faces $3.26 billion in wastewater needs over the next twenty years. Public sanitation systems and private septic systems keep untreated wastewater from being released into the environment where it could potentially contaminate drinking water sources. The public systems use a sewer system to transport wastewater to treatment plants where waste and contaminants are removed before releasing the water into the environment. An extend duration without a working wastewater system could lead to untreated water being introduced into the environment causing ecological damage and becoming a public health concern.

DRINKING WATER

According to the ASCE, West Virginia faces $1.16 billion in drinking water needs. The state faces aging, deteriorating, and inadequate systems. The West Virginia Department of Health and Human Resources Environmental Engineering

Division is the primary agency overseeing the federal Safe Drinking Water Act. Ensuring that water is safe for consumption is essential to the economy and development. Many businesses in Region VII, (i.e., restaurants, resorts, etc.) rely on clean water. An extended loss or interruption of clean water could cause economic hardship on these businesses and some residents who would need to find alternatives to the water system they rely on.

ENERGY

Coal mines, oil pipelines, and electrical manufacturing and delivery companies support over 3,000 jobs in Region VII. Reliable, and affordable energy is essential to the region's economic growth and quality of life. The loss of power could lead to the closing of schools, gas stations, and critical infrastructure.

TRANSPORTATION

The transportation system in Region VII consists of federal, state, and local roadways. Barbour, Braxton, Gilmer, Lewis, and Upshur Counties are all part of WV Division of Highways' (DOH) District 7. Randolph and Tucker Counties are part of DOH District 8. Road closures are more than just an inconvenience, they can directly affect the economy of the region.

PUBLIC HEALTH

Although waterborne outbreaks are low, the number of incidents have been on the rise. Poor water infrastructure can result in failure to meet water quality standards which can lead to unsafe drinking water and public health hazards such as disease (ASCE, 2014). The CDC annual survey reported 431 cases of illness causing 102 hospitalizations and 14 deaths may have been linked to crumbling water systems (Nixon, 2015).

There is no national record-keeping of how many deaths, injuries and illnesses are caused by failing and crumbling infrastructure. However, the data that does exist suggests that structures in need of repair do affect public health and safety. The federal DOT estimates poor road conditions are a factor in 14,000 fatalities each year (Nixon, 2015).

Loss of electrical power service can lead to food spoilage in both residents and commercial locations. A power outage lasting just four hours can lead a total

loss of refrigerated food (USDHHS). Consumption of spoiled food, even when cooked to proper temperatures, can lead to food poisoning (Stephens, n.d.). Another concern is for those with home medical devices (i.e., CPAP, oxygen, etc.). Many users of these medical devices are older residents on fixed incomes who may not have the means to acquire an emergency generator. These residents may not reach out to family, neighbors, or emergency responders as they do not want to "bother" them, so their medical needs go unassisted which could be fatal (Cahill, 2009).

SOCIAL VULNERABILITY

Urban populations depend on extensive infrastructure systems, making them more vulnerable to energy, water, wastewater, transportation, and public health failure. Many of the infrastructure systems are reliant on each other, such as electricity failure can effect water treatment and transportation services (NCA, 2014).

Thousands of people in the U.S. rely on electrically powered durable medical equipment (DME). During power outages, these DME's, including medical grade oxygen generators, power mobility devices, hospital beds, patient lifts, etc., require either a continuous alternate source of energy, such as a backup generator, or to be recharged after extended use. Without a way to keep these devices operational, a power outage can become deadly. Communities have begun to create registries for those that rely on devices and to assist in addressing their needs so hospitals do not become overwhelmed during a power outage (Lurie, 2014).

HISTORICAL OCCURENCES

UPSHUR COUNTY

Following the derecho in 2012, many residents of Upshur County reported being without electricity. While local resources and resources from other states were used to assist with restoring power, some residents report they were without power for up to fourteen days. Businesses without emergency generators were unable to open making it difficult for residents to purchase necessities such as gasoline.

BRAXTON COUNTY

On July 14, 2015 a water main break led to a boil water advisory being issued for all Sutton customers. West Virginia American Water stationed a water tanker on CR 4 for residential customers to fill bottles at.

LOCATION & EXTENT

Infrastructure decay is a region wide issue as it occurs anywhere there are bridges, rails, roads, schools, etc. Infrastructure is the backbone of the economy and a necessary input to every economic output. It is critical to prosperity and the public's health and welfare. Deteriorating infrastructure, long known to be a public safety issue, has a cascading impact on the economy, impacting business productivity and competitiveness, employment, and personal income (ASCE, 2016).

In urban settings, climate related disruption of one infrastructure system, will almost always result in cascading disruptions of one or more other systems. A loss of electrical service can affect water treatment, transportation and public health services.

LOSS ESTIMATE

The ASCE report card on infrastructure reports on a national level that only half of the required financial commitment needed to maintain the nation's infrastructure is being met. By not fully meeting these requirements, the U.S. will have $3.9 trillion in losses to the GDP, $7 trillion in lost business sales and $2.5 million lot American jobs by 2025.

Failing to maintain infrastructure has an impact on individual families as well. Poor roads and airports along with aging electric grid and water infrastructure translate to higher costs for businesses to manufacture and distribute goods and provide services. These higher cost get passed along costing the average family $3,400 per year.

Interruptions of electric, water, and sewer services can lead to economic impacts for both residents and businesses. These impacts often exceed the value of the damage to the infrastructure system itself. Businesses may be forced to closed due to a loss of water pressure as they would be unable provide running water in sinks, toilets, and drains.

With no historical property loss data, estimating a loss estimate for infrastructure decay is difficult. Events can range from a water main break causing loss of water pressure for a small community, to a large dam failing that can cause significant loss of life and property damage.

TABLE 2.2.8.1 INFRASTRUCTURE INTERRUPTION RISK CALCULATION				
Probability		*Severity*		*Risk*
FREQUENT		MARGINAL		MODERATE
It is inevitable that infrastructure will get older and begin to decay. The cost to maintain and repair infrastructure is much lower than replacing it	+	As long as the infrastructure is maintained and/or repaired as required interruptions can be minimalized	=	A combination of frequent occurrence and marginal level of severity puts this hazard at moderate risk

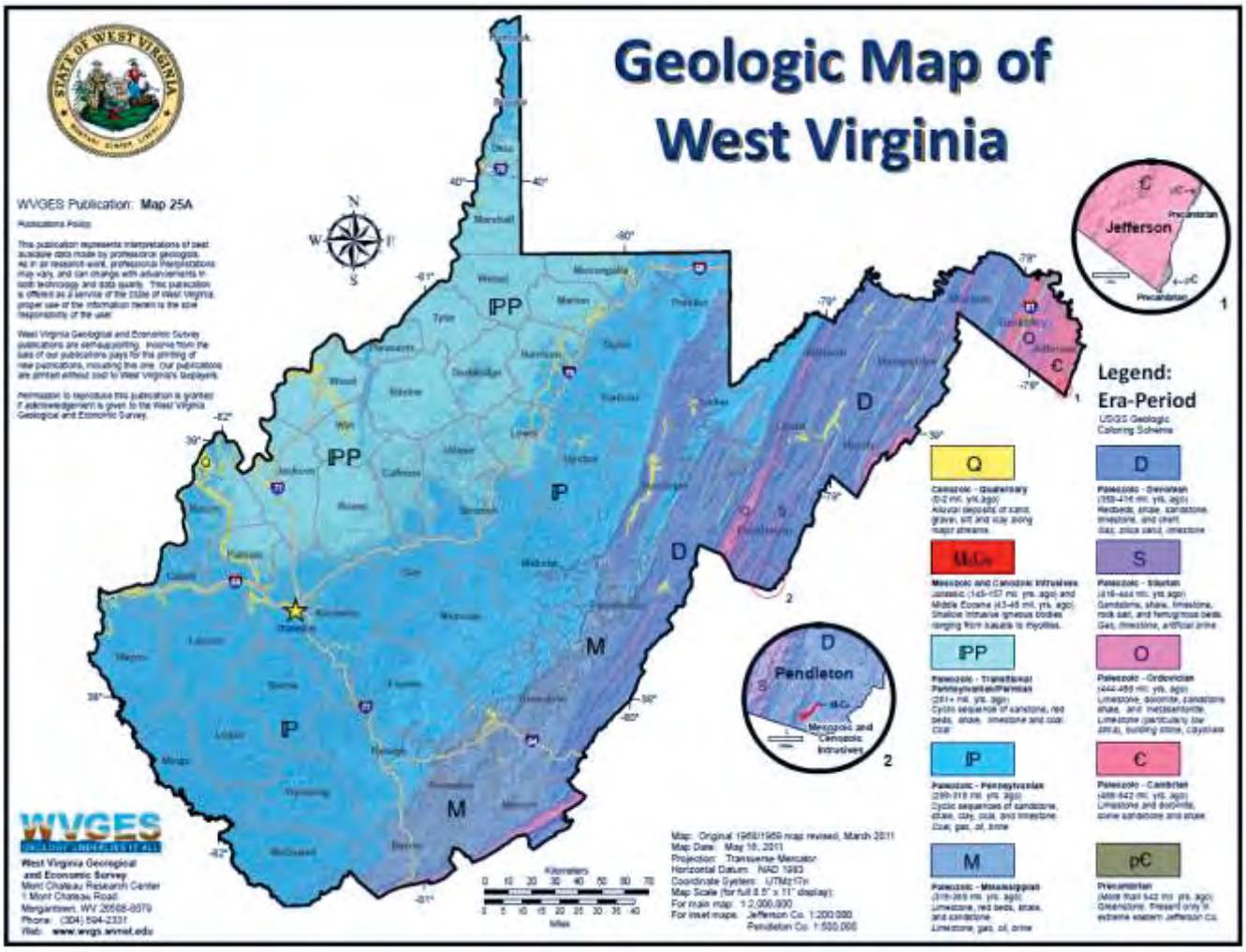
2.2.9 Land Subsidence

Sinking, settling, or other lowering of parts of the crust of the Earth (Keller, DeVecchio, 2015)		
Period of Occurrence	*Warning Time*	*Risk Assessment*
At any time throughout the year. Increased chance following long periods of heavy rain, snowmelt or construction activity.	Days / Weeks / Months	HIGH

Landslides cause damage and loss of life through several processes including pushing, crushing or burying objects in their path and the damming of rivers and waterways (Haddow, Bullock, & Coppola, 2014, pg.46.)This section will profile the following: landslides, mudflows, rock falls, land subsidence and expansive soils.

- **Landslides:** Landslides occur when areas of relatively dry rock, soil or debris move uncontrollably down a slope. Landsides may be localized or massive in size and can move at high rates of speed.
- **Mudflows:** Mudflows are water saturated rivers of earth, rock and debris. Mudflows develop when water rapidly accumulates in the material, such as during heavy rainfall or rapid snowmelt. Mudflows can develop and move quickly, giving little to no warning.
- **Rockfalls:** Rockfalls occur when rocks or other materials detach from a slope or cliff and descend in a freefall, rolling or bouncing manner. Rockfalls can occur naturally, through faults and seismic activity, or as a product of human activity, such as blasting.
- **Land Subsidence:** Land subsidence is the loss of elevation caused by the removal of support below the surface. These events can range in size from large regional lowering to severe localized collapses, such as sinkholes. The primary cause of land subsidence is human activity such as mining and the extraction of groundwater or petroleum.
- **Expansive Soils:** Expansive soils are soils or soft rocks that will swell or shrink depending on their moisture content. The swelling and shrinking action can cause extensive damage to transportation routes, such as highways and rail lines, and structures that are built over these areas.

As seen on the map below, West Virginia has a variety of types of soil. The soil in Region VII counties is some of the most diverse in the state. Soil ranges from Cenozoic Quaternary (0-2 million years ago), composed of alluvial deposits of sand, gravel, silt, and clay along major streams, to Paleozoic Devonian (359-416 million years ago) composed of redbeds, shale, sandstone, limestone, and chert (WVGES, 2011). This type of soil composition makes the land susceptible to mass movements.



PUBLIC HEALTH

Direct impact of landslides include trauma and suffocation by entrapment. Landslides usually have high mortality and few injuries. Short and long-term mental health effects are also not uncommon (WHO, 2017). Landslide morbidity is associated with untreated wounds, traumatic injuries, and disruption of water, sanitation shelter and food supply. Those with chronic medical conditions are also of

concern as loss of healthcare infrastructure, in the path of the slide, means patients will go untreated (Luber & Lemery, 2015).

SOCIAL VULNERABILITY

Although there have not been any instances of large, catastrophic landslides in Region VII, the potential for damage is present. Landslides can cause death, injuries, trauma and suffocation from entrapment. Short and long-term mental health have been observed. Depending on the location, these events could cause loss or damage to homes, infrastructure and critical facilities and block whole communities off. There is a potential for loss of property value, livestock and crops (WHO).

HISTORICAL OCCURRENCES

Barbour, Braxton, Gilmer, Lewis, and Upshur Counties are part of the West Virginia Department of Transportation District 7, while Randolph and Tucker Counties are part of District 8. District 7 provided information on fourteen slides they are scheduled to repair or have repaired over the last two years.

Table: 2.2.9.1

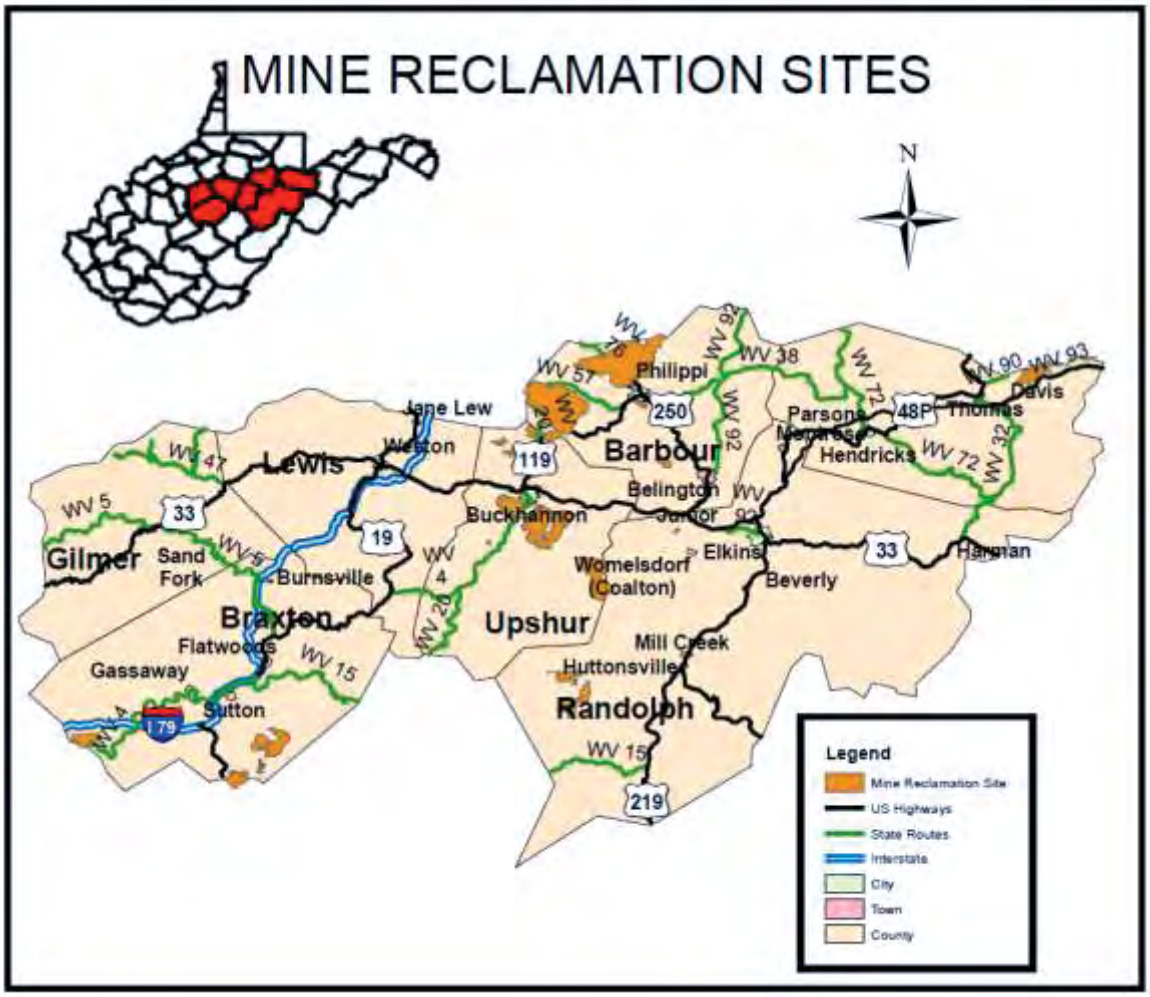
WVDOT DISTRIC 7 LANDSLIDES (2016 & 2017)

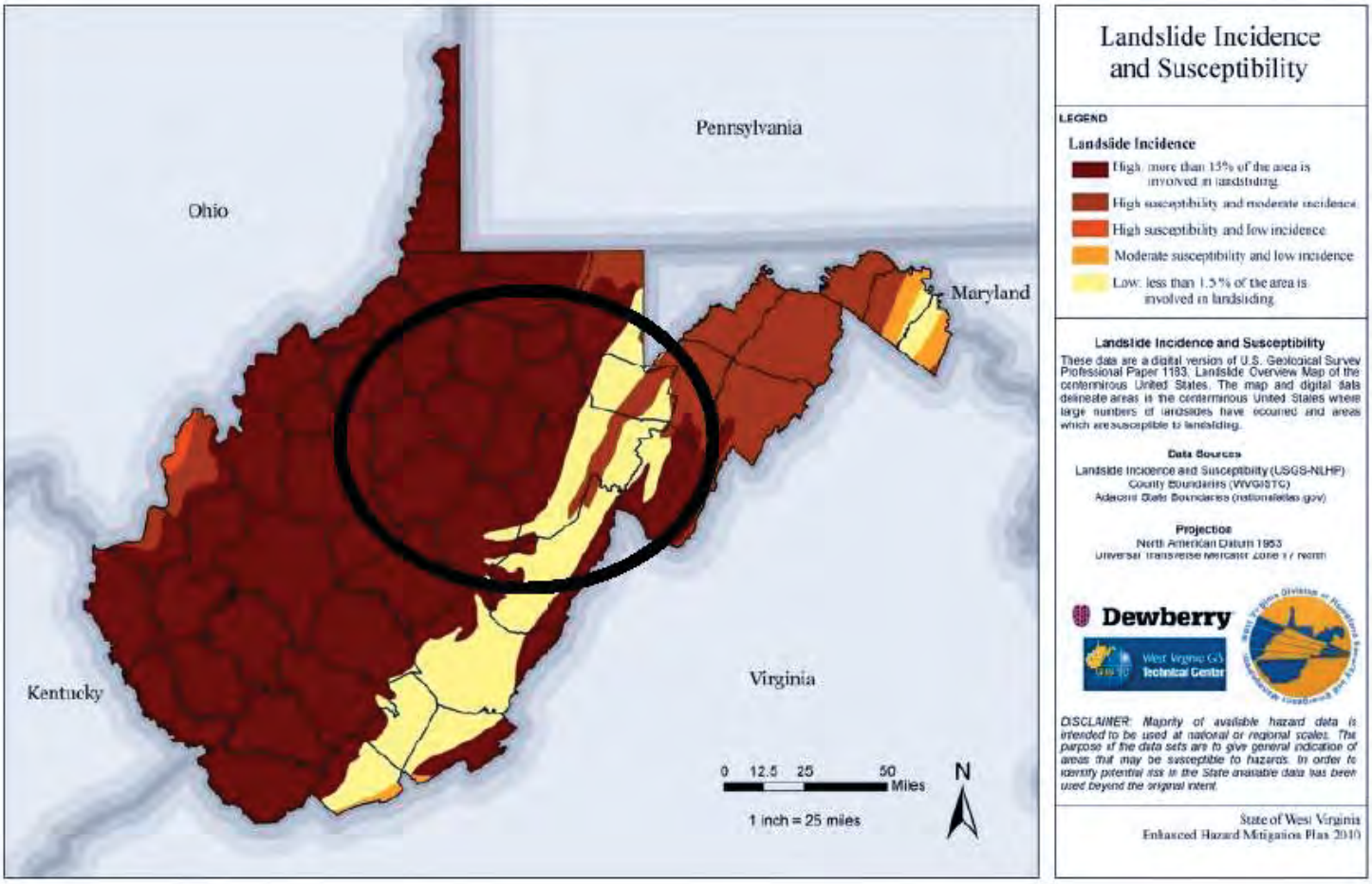
Project Name	County/Route	Length (Ft)	Status	Cost
Glenville –Weston Road	Gilmer US 33	172 (Piling Wall)	Completed	$160,000
Grantsville – Glenville Road	Gilmer WV 5	46 (Soil Nails)	Not Started	$85,000
Stewarts Run Road	Barbour CR 18	94 (Soil Nails)	Not Started	$128,000
Hackers Creek Road	Lewis CR 7	88 (Piling Wall)	Completed	$85,000
Lake Lane Road	Braxton CR 24/1	72 (Piling Wall)	Completed	$80,000
Spruce Fork Road	Upshur CR 14	132 (Piling Wall)	Completed	$178,000
Big Run Road	Lewis CR 19/17	120 (Piling Wall)	Completed	$90,000
Rowgh Lane	Lewis CR 119/8	92 (Piling Wall)	Completed	$80,000
Sycamore Lick Road	Lewis CR 10	100 (Piling Wall)	Completed	$100,000
Old Turnpike Road	Braxton CR 19/40	196 (Piling Wall)	Completed	$220,000
Buckhannon-Clarksburg Road	Barbour WV 20	172 (Soil Nail)	Completed	$187,500
Clemtown Road	Barbour CR 10	120 (Soil Nail)	Completed	$107,000
Coxs Mills-Linn Road	Gilmer WV 47	132 (Piling Wall)	Completed	$120,000
Exchange Road	Braxton CR 19/26	82 (Soil Nails)	Completed	$80,000

LOCATION & EXTENT

The entire state of West Virginia contains many steep slopes that have retaining walls or experience rock falls and road slips. Steve Kite, the chair of West Virginia University's Department of Geology and Geography says that "a lot of the costs of a land slide is the prevention of landslides through things like retaining walls and structures that prevent fatalities and injuries and damage." Kite has been working on a Light Imaging and Detecting Radar (LIDAR) that are laser beams attached to fixed-wind planes or helicopters that map the ground area below. This technology allows the detecting of landslides and to determine the causes (Board, 2014).

Mine subsidence events, a type of land subsidence, is caused by human activity. The West Virginia Geological and Economic Survey reports that mine subsidence occurs when the land over an underground mine settles after the collapse of a mine roof.



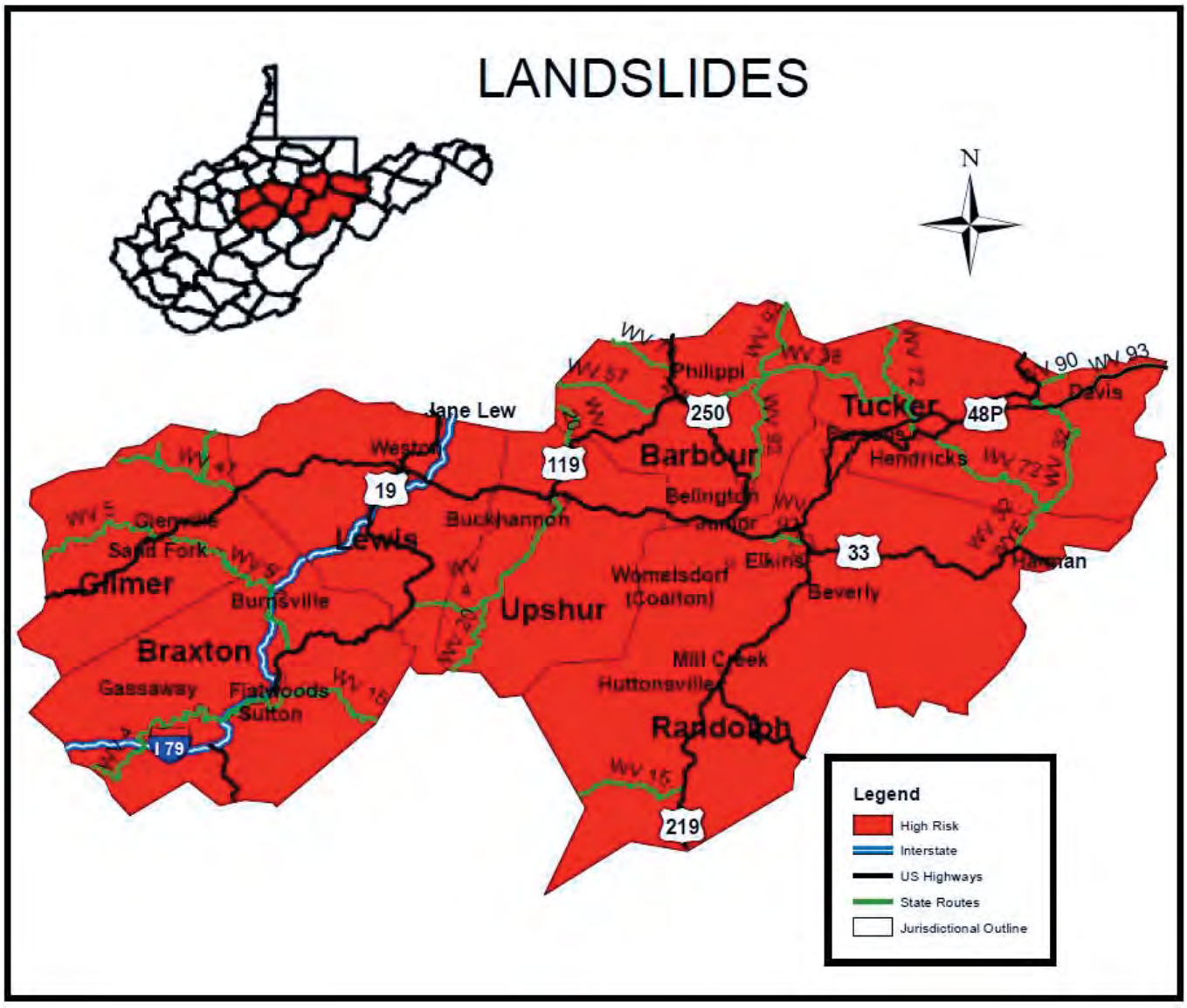


Landslides can cause damage to infrastructure including transportation, buildings, utilities, dams, etc. Fatalities and injuries due to landslides are rare in Pennsylvania. Almost all occurred along highways and involved vehicles (Delano & Wilshusen, 2000).

LOSS ESTIMATES

The project costs provided by WVDOT District 7 show a construction cost of $1,540,500 over a two year period. Therefore Region VII can expect to see $770,250 per year.

TABLE 2.2.9.2 LANDSLIDE RISK CALCULATION					
Probability			*Severity*		*Risk*
FREQUENT			CRITICAL		HIGH
Events 14 Years 2	7	+	The potential property damage, injury and death puts this hazard at	=	A combination of frequent occurrence and critical level of severity puts this hazard at high risk
There is a likely chance that a landslide will occur multiple times throughout the year					



2.2.10 Major Fires

Urban fires occur primarily in cities or towns and have the potential to spread rapidly to adjoining structures (City of Eugene, OR, 2017). An explosion is a violent and destructive shattering or blowing apart of something (Merriam-Webster, 2017).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
Can occur at any time	At any time	HIGH

Wildfires are classified into three categories, depending on how they interact with the environment. **Surface fires** are the most common type, burning along the floor of a forest and moving slowly. **Ground fires**, which are generally sparked by lightning strikes, burn on or just above the forest floor. **Crown fires** burn through the forest canopy far above the ground, and can move quickly through a forest quickly due to wind and direct contact between trees (Haddow, Bullock, & Coppola, 2014). The risk that wildfires pose continues to grow annually as development continues to spread into previously undeveloped areas. This is known as the wildland-urban interface. Protecting those structures located in or near wild land poses special problems and stretches firefighting resources beyond what is generally available locally (Haddow, Bullock, & Coppola, 2014).

Like many natural hazards, wildfires cause cascading events that can also have significant impacts. For example, when heavy rains follow a wildfire event, landslides and mudflows can strike in the newly unanchored soil (Haddow, Bullock, & Coppola, 2014). While the annual number of wildfire nationally has been falling since the 1960s, according to the National Interagency Fire Center, the annual average acreage burned has risen. Fewer fires on average are occurring, but these fires are larger and more destructive on average.

Generally, the largest and most destructive wildfires occur in the western United States, where drought conditions combine with heavy fire loads to produce large scale events. However, this does not mean that these types of fire cannot occur in other areas of the country. In late 2016, for example, large fires spread across the southeast (North Carolina, South Carolina, Georgia, Virginia, Tennessee, Kentucky, etc), as shown in the image from the National Interagency Fire Center.

According to the U.S. Fire Administration (USFA), structure fires comprise 39.2% of all fires in the United States with residential structures making up 78.5% of structure fires. Residential fires are also the leading property type for fire fatalities (75%), fire injuries (78%) and financial loss (52%) (USFA, 2014). According to the National Fire Protection Association,

due to increased synthetic fuel loads and new construction materials, failure time has decreased which can speed the rate of fire growth (2016).

There is also an increase in terrorists using fire as a weapon. The potential for causing large-scale damage with little to no cost or technical expertise makes arson particularly appealing (Department of Homeland Security, 2012). An explosion is a complex process with many variables. The type of delivery, device used, amount and type of explosive materials, is it intentional or accidental, and whether it occurs indoors or outside are just a few of the major factors.

PUBLIC HEALTH

Aside from the obvious effects on humans such as burns and injuries, the smoke from fires is of great concern. “The smoke produced by wildfires can produce effects ranging from airway and eye irritation to death, especially among individuals with conditions that make them more susceptible to inhalational exposures” (Clements, 2009, p.283).

A structure fire may involve the destruction of plastics, foams, fabrics, carpets, wood, and asbestos containing materials. Soot in smoke usually contain what is burned by may also contain byproducts of items burned (i.e., hydrogen cyanide is a byproduct of burning wool). The Phoenix Fire Department studied the exposure of soot on firefighters after a fire was extinguished. Their findings indicated that chlorinated products become attached to soot and can enter the lungs (Bolstad-Johnson, 2010). Breathing in this soot can cause acute issues such as coronary artery disease, asthma, bronchitis, and many other respiratory illnesses (Keefe, 2013).

Blast injuries, from explosions, are categorized into four categories primary, secondary, tertiary and quaternary injuries. Primary injuries result from the shockwave produced by an explosion and can cause severe damage to air-filled organs such as the lungs, the sinuses, the middle ear, and the digestive system. Secondary injuries consist of penetrating wounds caused by fragments flying from blast. There are two categories of fragments primary, which are built into an explosive as part of a weapon, and secondary, which is debris generated by the explosion. Tertiary injuries are wounds sustained by an individual thrown by the blast winds. These injuries usually include blunt traumatic injuries and fractures. Quaternary injuries are composed of any injury that does not meet the criteria of the other three categories. These injuries usually consist of burns, crush injuries and breathing problems from smoke and dust inhalation (Clements, 2009).

SOCIAL VULNERABILITY

Research indicates that the risk of a fire in the home is not the same for everyone. Studies of socioeconomic characteristics have shown that lower levels of income are either directly or indirectly tied to an increase risk of fire (FEMA 1997). Other considerations in urban areas are the growing number of older adults and people with disabilities (NFPA, 2017).

First responders are vulnerable at scenes of intentional explosions. As responders arrive at scene of an initial explosion, a secondary device targeting emergency personnel will detonate in an attempt to maximize responder injury and damage emergency infrastructure (Thompson, Rehn, Lossius, & Lockey, 2014).

HISTORICAL OCCURRENCES

Thomas, WV

On November 12, 1901, at approximately 3:00 am, a fire broke out in the center of Thomas. Within an hour and twenty minutes the fire destroyed 83 buildings including a hotel, the opera house, stores, a church, bars, and residences. The fire occurring in late fall as winter weather was just beginning caused great hardship on many residents who lost their homes.

Barbour County, WV

Several fire departments responded to a report of a fire near Volga at the Carrolton Covered Bridge around 11:00 p.m. August 12, 2017. When responders arrived they found the bridge which is on the National Registry of Historic Places, and an adjacent building engulfed in flames. The fire was believed to be arson and was investigated by the state fire marshal's office, the ATF, state police and the sheriff's department. The bridge was temporarily shut down until the division of highways could certify it for use.

Tucker County, WV

On January 26, 2016 a fire broke out at a Talheim Condominiums unit on Cortland Road in Canaan Valley. All four Tucker County fire agencies along with fire

departments from Randolph, Grant, Pendleton and Pocahontas Counties in West Virginia and Garrett County Maryland responded. Personnel were able to save the adjacent buildings however the 12 unit building in which the fire started was a total loss. Red Cross responded to assist with residents.

Braxton County, WV

On November 11, 2016, there was a report of a fire at the Weyerhaeuser Lumber Plant. Ten fire departments responded to assist with the blaze which was "mostly contained" after 13 hours. The fire posed significant challenges due to the amount of flammable products on sight. There was one minor injury reported. The plant which employs 163 people was closed for several weeks after the fire.

A list of wildfires between 2008 and 2017 is shown in the table below. The table includes both forest acres and non-forest acres destroyed by wildfires. Information was provided by West Virginia Division of Forestry.

REGION VII WILDFIRES (2008-2017)

County	Year	Season	Fires	Forest Acres	Non Forest Acres	Total Acres
Barbour	2008	S	6	5.0	4.3	9.3
Barbour	2008	F	2	0.1	0.1	0.2
Braxton	2008	S	5	10.6	0.6	11.2
Braxton	2008	F	2	0.9	0.2	1.1
Gilmer	2008	F	2	3.0	7.1	10.1
Lewis	2008	S	4	3.2	8.5	11.7
Randolph	2008	S	2	85.2	0	85.2
Randolph	2008	F	1	0.0	0.1	0.1
Tucker	2008	S	1	13.0	6.0	19.0
Upshur	2008	S	4	2.0	2.7	4.7
Upshur	2008	F	10	2.4	2.2	4.6
Barbour	2009	S	5	18.0	2.0	20.0
Barbour	2009	F	2	5.1	0	5.1
Gilmer	2009	S	2	0.2	0.1	0.3
Lewis	2009	S	12	40.7	3.5	44.2
Lewis	2009	F	2	5.0	1.0	6.0
Randolph	2009	S	11	154.7	4.0	158.7
Randolph	2009	F	1	2.0	0	2.0

REGION VII WILDFIRES (2008-2017)

County	Year	Season	Fires	Forest Acres	Non Forest Acres	Total Acres
Upshur	2009	S	11	4.8	3.2	8.0
Upshur	2009	F	1	0	1.0	1.0
Barbour	2010	S	4	52.0	0	52.0
Barbour	2010	F	2	0.2	0	0.2
Braxton	2010	S	5	103.5	1.0	104.5
Braxton	2010	F	1	0.5	0	0.5
Gilmer	2010	S	3	141.1	0	141.1
Gilmer	2010	F	1	3.0	0	3.0
Lewis	2010	S	4	10.0	4.0	14.0
Lewis	2010	F	1	15.0	5.0	20.0
Randolph	2010	S	2	6.0	0	6.0
Randolph	2010	F	4	19.5	4.0	23.5
Upshur	2010	S	8	17.0	9.0	26.0
Upshur	2010	F	2	10.0	0	10.0
Barbour	2011	S	2	1.0	2.0	3.0
Braxton	2011	S	2		4.1	4.1
Braxton	2011	F	2	6.0	0.0	6.0
Gilmer	2011	S	4	2.5	1.5	4.0
Gilmer	2011	F	1		0.5	0.5
Lewis	2011	S	3	1.0	1.3	2.3
Lewis	2011	F	1		5.0	5.0
Randolph	2011	S	2	1.0	2.5	3.5
Upshur	2011	F	2	4.0	3.0	7.0
Barbour	2012	S	1		0.2	0.2
Barbour	2012	F	2	2.0	0.3	2.3
Braxton	2012	S	3	6.1	3.0	9.1
Gilmer	2012	S	1	10.0	0	10.0
Gilmer	2012	F	2	14.0	0	14.0
Lewis	2012	S	1		2.0	2.0
Randolph	2012	S	3	6.1	0.1	6.2
Randolph	2012	F	1	45.0	0	45.0
Upshur	2012	S	4	0.0	3.0	3.0
Barbour	2013	S	8	2.8	11.5	14.3
Barbour	2013	F	6	15.4	2.0	17.4
Gilmer	2013	S	1		1.0	1.0
Gilmer	2013	F	2	3.5	1.0	4.5
Randolph	2013	S	3	10.0	0.5	10.5
Tucker	2013	S	1	0	1.0	1.0

REGION VII WILDFIRES (2008-2017)						
County	Year	Season	Fires	Forest Acres	Non Forest Acres	Total Acres
Tucker	2013	F	1	10.0	0	10.0
Upshur	2013	S	7	7.0	4.5	11.5
Barbour	2014	S	4	0.7	1.1	1.8
Barbour	2014	F	1		0.3	0.3
Braxton	2014	S	4	54.0	25.1	79.1
Gilmer	2014	S	7	15.0	10.5	25.5
Lewis	2014	S	6	5.5	1.6	7.1
Lewis	2014	F	1	12.0	0	12.0
Randolph	2014	S	3	3.5	5.0	8.5
Randolph	2014	F	1	7.0	0	7.0
Tucker	2014	S	2	0.9	0	0.9
Upshur	2014	S	8	36.7	2.5	39.2
Upshur	2014	F	2	0.4	0	0.4
Barbour	2015	S	8	1.1	2.5	3.6
Barbour	2015	F	5	19.8	0.3	20.1
Braxton	2015	S	7	144.0	2.0	146.0
Braxton	2015	F	2	15.3	0	15.3
Gilmer	2015	S	4	4.5	0.5	5.0
Gilmer	2015	F	2	40.0	0.1	40.1
Lewis	2015	F	1	5.0	0	5.0
Randolph	2015	F	2	50.0	0	50.0
Tucker	2015	S	2	0.1	0.2	0.3
Upshur	2015	S	3	11.0	0	11.0
Upshur	2015	F	6	18.1	7.2	25.3
Barbour	2016	S	9	6.6	0	6.6
Braxton	2016	S	7	93.5	0	93.5
Braxton	2016	F	6	3.8	1.1	4.9
Gilmer	2016	S	11	17.5	0.7	18.2
Gilmer	2016	F	1	0.4	0	0.4
Lewis	2016	S	2	5.5	0	5.5
Randolph	2016	S	2	20.0	0.1	20.1
Tucker	2016	S	1	0	2.0	2.0
Upshur	2016	S	4	10.8	1.0	11.8
Upshur	2016	F	2	2.1	0	2.1
Barbour	2017	S	2	0.3	0.0	0.3
Braxton	2017	S	3	4.0	3.0	7.0
Gilmer	2017	S	3	9.0	7.3	16.3
Lewis	2017	S	1	2.0	0	2.0

REGION VII WILDFIRES (2008-2017)						
County	Year	Season	Fires	Forest Acres	Non Forest Acres	Total Acres
Randolph	2017	S	2	0	6.0	6.0
Upshur	2017	S	6	7.3	0	7.3
Totals			332	1,508.5	199.7	1,708.3

LOCATION & EXTENT

West Virginia is a heavily forested state, and every county within Region VII has forested areas within their borders. This hazard is a region wide hazard, and can impact every county and jurisdiction in the region. The risk that wildfires pose in the region increases as suburban sprawl continues, increasing the number of structures that are in the wildland-urban interface.

On average there are 853 wildfires in West Virginia, according to the West Virginia Division of Forestry, that burn 18,551 acres (21.8 acres per fire). There is significant variation between years that can be contributed to favorable and unfavorable fire conditions (droughts, weather patterns, etc.). According to the WV Division of Forestry, the majority of wildfires are caused by human activity. In the spring of 2016, 32% of all reported fires were the result of escaped fire debris, followed by equipment use at 27% and incendiary at 20%. .

Wildfires cause more than just the direct damage to structures, vegetation or air quality; when a fire removes much or all of the vegetation in a watershed, subsequent rains will have much greater erosive potential, which in turn produces large quantities of sediment and plant debris that affect the water quality of streams and lakes (Keller & Devecchio, 2015, p.459).

However, wildfires can also have benefits to the soil; they “tend to leave an accumulation of carbon on the surface in the form of ash and increase the nutrient content of a soil. Under the right conditions, when erosion does not remove the ash from the environment, a nutrient reservoir may form that is beneficial to local plants” (Keller, Devecchio, 2015, p 159).

Fire and explosions can occur anywhere there are structures within the region. In heavily populated areas, where buildings are closer together, the potential for greater loss of life and property is present. Areas with lower socioeconomic characteristics have an increase fire risk. Crowded dwellings also cause an increased vulnerability to fire. These crowded units may also contain room partitions which can impede firefighter movement leading to injury or death. Mobile homes are not held to the same standard as homes built on-site. Residents of

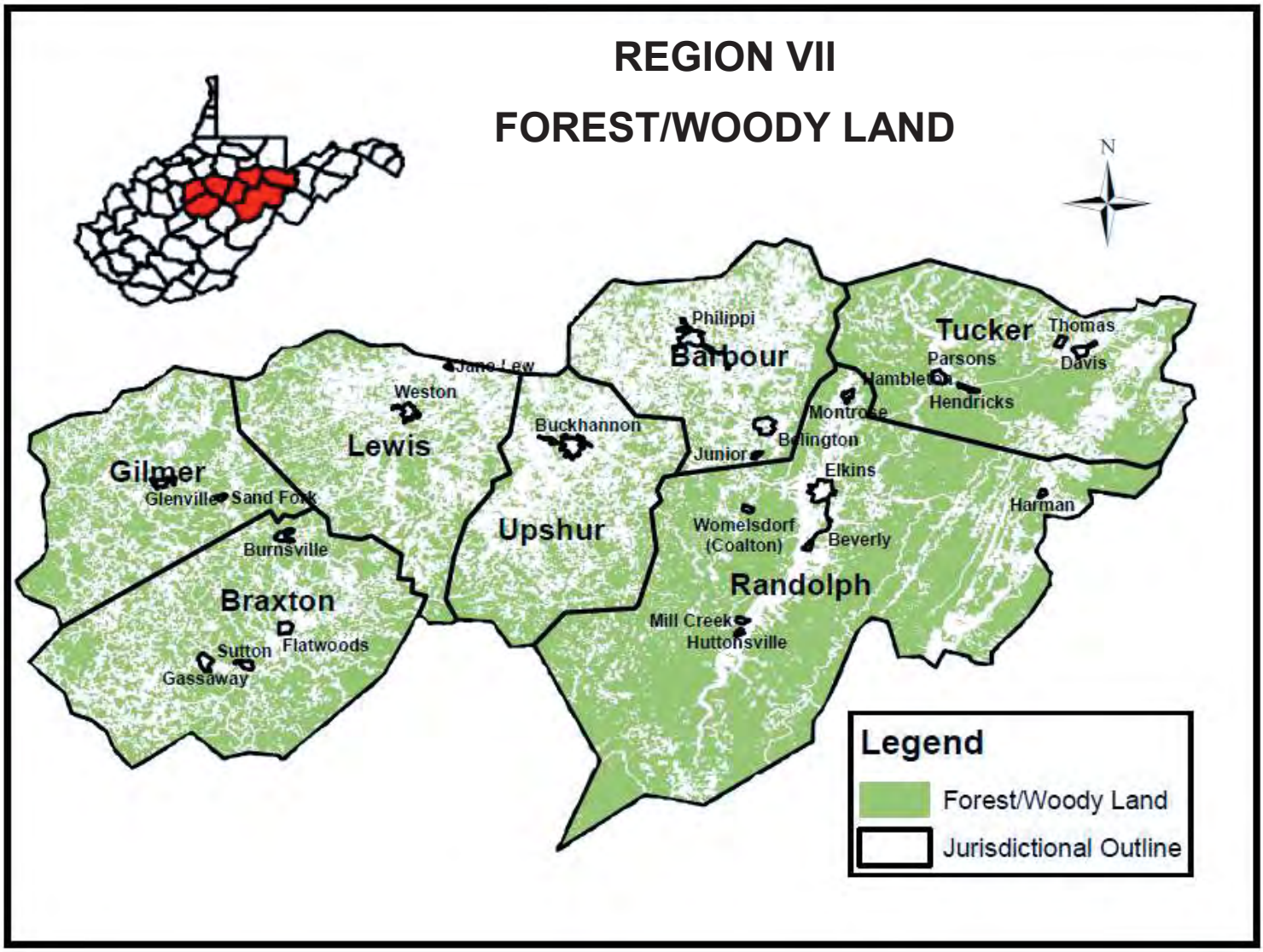
mobile homes often store flammable liquids such as gasoline or propane in the space beneath the home and in mobile home parks, the structures are in very close proximity of each other. As such a mobile home fire can become catastrophic very quickly. The map below shows areas of increased overcrowded dwellings along with mobile homes (Lowry, 2002).

The National Fire Protection Association's (NFPA) *A Few Facts at the Household Level* (2009) provides information on personal risk of a fire during an average lifetime. The information presented in the report states that the average house has a life expectancy of 78 years and will be involved in five fires during that time period. The average person has a one in four chance of having a reported fire in their home and a one in ten chance of sustaining an injury in a home fire. The report also focused on how advances in building materials, construction code, fire alerting systems and fire suppression systems the fatality rate has significantly dropped.

LOSS ESTIMATES

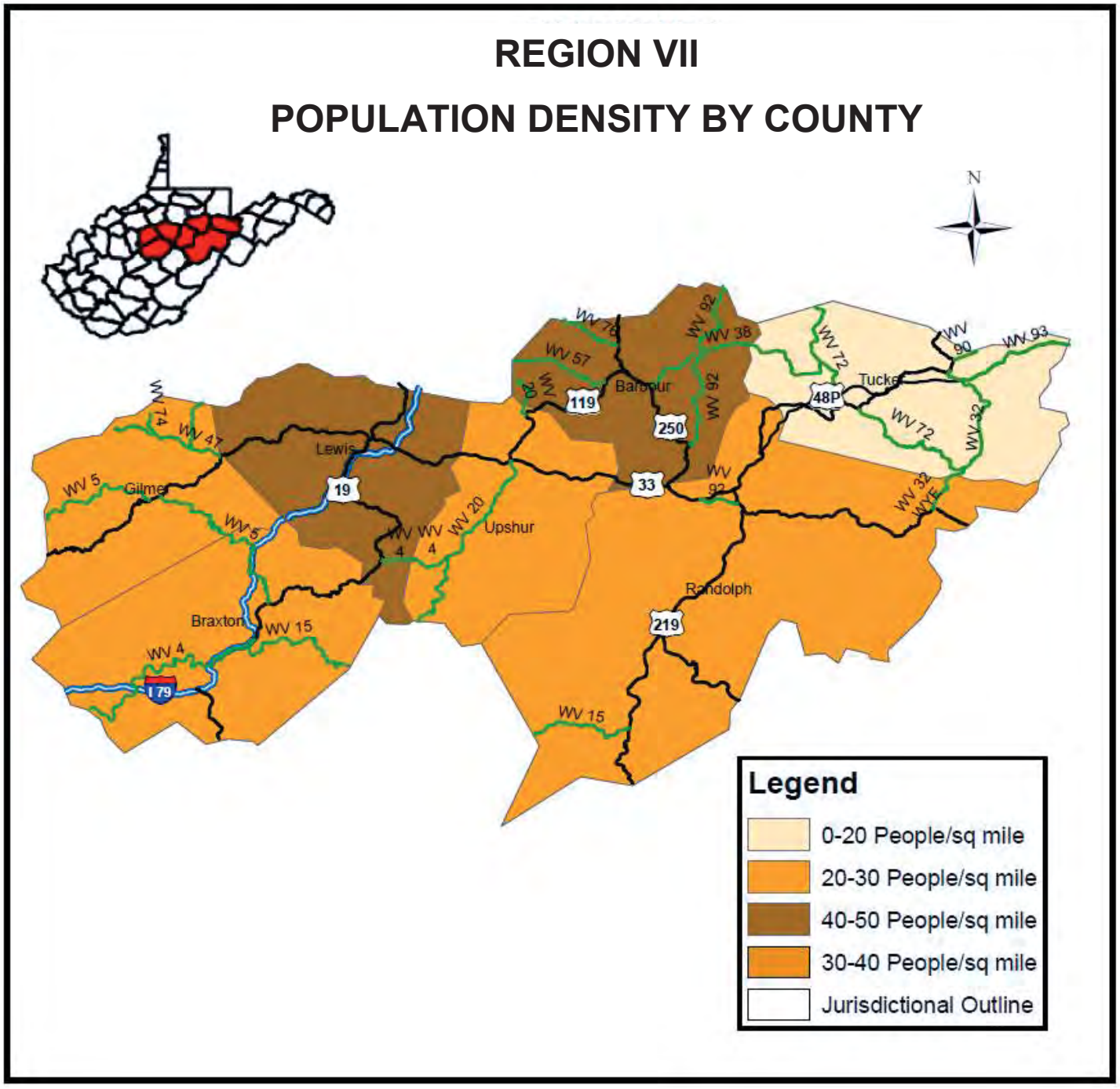
TABLE X MAJOR FIRE RISK CALCULATION

Probability		*Severity*		*Risk*
FREQUENT		CRITICAL		HIGH
Fires in structure, although usually minor, occur more frequently in older structures. There were 332 wildfires recorded over the last ten years in the region.	+	The potential for loss of life and property damage from a structure fire, especially in older buildings like those found in Thomas, along with the loss of over 1,700 acres of wildland over a ten year period puts this hazard at critical severity.	=	With a frequent probability and critical severity there is a high risk for this hazard.


REGION VII
FOREST/WOODY LAND
N
Philippi
Barbour
Tucker
Thomas
Parsons
Davis
Hambleton
Hendricks
Montrose
Junior
Bellington
Elkins
Harman
Womelsdorf
(Coalton)
Beverly
Randolph
Mill Creek
Huttonsville
Buckhannon
Upshur
Weston
Lewis
Jane Lew
Gilmer
Glenville
Sand Fork
Burnsville
Braxton
Sutton
Flatwoods
Gassaway
Legend
Forest/Woody Land
Jurisdictional Outline

REGION VII

POPULATION DENSITY BY COUNTY



2.2.11 Severe Storms

"A rapidly rotating vortex or funnel of air extending groundward from a cumulo-nimbus cloud, exhibiting wind speeds of up to 300 mph" (Haddow, Bullock, & Coppola, 2014). A severe wind event is a storm marked by high wind with little or no precipitation (Merriam-Webster, 2017).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
Anytime, though primarily in summer months	Minutes to Days	MODERATE

Tornadoes are typically associated with the strongest thunderstorms and are capable of causing tremendous damage. Since 2007, in the

U.S. tornadoes are measured on the Enhanced Fujita Scale (EF Scale) which categorizes these events based on wind speed. There are six categories in the EF Scale, from EF0 through EF5. An EF0 tornado will cause some minor damage, while an EF5 can cause massive destruction. Prior to the introduction of the Enhance Fujita scale the Fujita Scale was used. The EF scale has the same basic principles as the Fujita Scale but expanded the degrees of damage and better accounts for variables such as differences in construction quality of structures (tornadofacts.net, 2017).

Tornadoes are historically very difficult to predict. The storms that may produce a tornado can be forecasted, but not every storm with that potential will spawn a tornado and predicting where and when that will happen is incredibly difficult. Historical trends show that some areas of the country, such as the Midwest plain states, have a higher probability of tornado occurrence. However, they can and have struck in many other areas.

TABLE 2.2.11.1
FUJITA AND ENHANCED FUJITA SCALES

Fujita Scale		*Examples of Possible Damage*	*Enhanced Fujita Scale*	
#	*3-Second Gust (mph)*		#	*3-Second Gust (mph)*
0	45-78	**Light Damage.** Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage to sign boards.	0	65-85
1	79-117	**Moderate Damage.** Surface peeled off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads.	1	86-110

2	118-161	**Considerable Damage**. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.	2	111-135
3	162-209	**Severe Damage**. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.	3	163-165
4	210-261	**Devastating Damage**. Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	4	166-200
5	262-317	**Incredible Damage**. Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100-yards; trees debarked; incredible phenomena will occur.	5	Over 200

Windstorms may or may not be accompanied by precipitation and typically have wind speed exceeding 34 miles per hour. Wind damage can be attributed to gusts or longer periods of stronger sustained winds (Pielke, 2012). These storms include straight-line winds, downdrafts, downbursts, microbursts, gust fronts, and derechos.

Table 2.2.11.2

BEAUFORT SCALE OF WIND FORCE

Beaufort Force	Description	When You See or Feel This Effect	Wind (mph)	Wind (km/h)
0	Calm	Smoke goes straight up	Less than 1	Less than 2
1	Light Air	Wind direction is shown by smoke drift but not by wind vane	1-3	2-5
2	Light Breeze	Wind is felt on face; leaves rustle; wind vanes move	4-7	6-11
3	Gentle Breeze	Leaves and small twigs move steadily; wind extends small flags straight out	8-12	12-19
4	Moderate Breeze	Wind raises dust and loose paper; small branches move	13-18	20-29
5	Fresh Breeze	Small trees sway; waves form on lake	19-24	30-39
6	Strong Breeze	Large branches move; wires whistle; umbrellas are difficult to use	25-31	40-50
7	Moderate Gale	Whole trees are in motion; walking against the wind is difficult	32-38	51-61
8	Fresh Gale	Twigs break from trees; walking against wind is very difficult	39-46	62-74
9	Strong Gale	Buildings suffer minimal damage; roof shingles are removed	47-54	75-87
10	Whole Gale	Trees are uprooted	55-63	88-101
11	Violent Storm	Widespread damage	64-72	102-116
12	Hurricane	Widespread destruction	73+	117+

Straight-line winds are damaging winds typically 60 mph or greater. They travel in a uniform direction as they spread across the area. Straight-line winds have the potential to be so destructive, they have been mistaken for tornadoes. Straight-line winds inflict damage on a large area, unlike tornadoes that are usually localized. Straight-line winds account for approximately 50% of all severe reports during a given year (Trambley, 2017).

The Beaufort Scale of Wind Force is used to measure wind speed related to observed conditions. The scale ranges from zero to twelve with twelve being the strongest winds. There are two versions of the scale, one for use on land (pictured to the right) and one for use at sea. Due to the scale being based on observed conditions, it is considered to be subjective (NWS, 2017).

The National Severe Storms Laboratory (NSSL), a division of NOAA, defines hail as "a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into balls of ice" ("Severe Weather 101.) Hail can damage aircraft, homes, cars, and can even injure or be deadly to livestock. Obviously, the larger the size of the hail the more potential it has to cause damage or injury. The NSSL considers a severe hailstorm to contain hail that is one inch or more in diameter. This is approximately the size of a quarter.

Table 2.2.11.3

Combine NOAA/TORRO Hailstorm Intensity Scale

Size Code	Intensity Category	Typical Hail Diameter (Inches)	Approximate Size	Typical Damage Impacts
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33-0.60	Marble or Mothball	Slight damage to plants, crops
H2	Potentially Damaging	0.60-0.80	Dime or Grape	Significant damage to fruit crops, vegetation
H3	Severe	0.80-1.20	Nickle to Quarter	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	1.20-1.60	Half Dollar to Ping Pong Ball	Widespread glass damage, vehicle body damage
H5	Destructive	1.60-2.00	Silver Dollar to Golf Ball	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	2.00-2.40	Lime or Egg	Aircraft bodywork dented, brick walls pitted
H7	Very Destructive	2.40-3.00	Tennis Ball	Severe roof damage, risk of serious injury
H8	Very Destructive	3.00-3.50	Baseball to Orange	Severe damage to aircraft bodywork
H9	Super Hailstorm	3.50-4.00	Grapefruit	Extensive structural damage. Risk of severe injury or even fatal injuries to persons caught in the open
H10	Super Hailstorm	4.00+	Softball and up	Extensive structural damage. Risk of severe injury or even fatal injuries to persons caught in the open

The wind gusts and lightning associated with thunderstorms can pose a threat to life and property. Thunderstorms also have the potential to produce hail and tornados, which are discussed elsewhere in this risk assessment. Thunderstorms are typically associated with cold fronts and can move in "lines," meaning that a location can possibly be struck by several storms in the course of minutes or hours. The heavy rainfall associated with one or multiple storms has been known to create flash floods in the presence of oversaturated soils. A major secondary threat associated with thunderstorms is lightning. Individual lightning strikes occur with no warning and kill between 75 and 100 Americans every year (Haddow, Bullock, & Coppola, 2014, pg.51.) Lightning can reach a significant distance from a storm, up to 25 miles according to the National Severe Storms Library (NSSL). While lightning is a common occurrence and can be seen in most thunderstorms, only about 20% of the lightning observed in a storm will strike the ground.

The ability to recognize categories of thunderstorms, as with hurricanes, may help people have a better perception of the risk at hand and how they may be affected. Meteorologist Henry Margusity developed what he calls the "TS Scale" which is similar to the Enhanced Fujita Scale used for classifying tornadoes or the Saffir-Simpson Scale used for classifying hurricanes. The table below, used by Accu-Weather, gives an idea of the types of thunderstorms that can strike.

Table 2.2.11.4

TS Scale

Thunderstorm Types	Rainfall Rate/hr	Max Wind gusts	Hail Size	Peak Tornado Possibility	Lightning Frequency	Darkness Factor	Storm Impact
T-1: Weak thunderstorms or thundershowers	.03" to .10"	<25 MPH	None	None	Only a few strikes during the storm	Slightly dark. Sunlight may be seen under the storm.	1. No damage. 2. Gusty winds at times.
T-2: Moderate thunderstorms	.10" to .25"	25-40 MPH	None	None	Occasional 1-10	Moderately dark. Heavy downpours may cause the need for car lights.	1. Heavy downpours. 2. Occasional lightning. 3. Gusty winds. 4. Very little damage. 5. Small tree branches may break. 6. Lawn furniture moved around.
T-3: Heavy thunderstorms 1. Singular or lines of storms	.25" to .55"	40-57 MPH	.25" to .75"	EF0	Occasional to frequent 10-20	Dark. Car lights used. Visibility low in heavy rains. Cars may pull off the road.	1. Minor damage. 2. Downpours that produce some flooding on streets. 3. Frequent lightning could cause house fires. 4. Hail occurs with the downpours. 5. Small branches are broken. 6. Shingles are blown off roof.
T-4: Intense thunderstorms 1. Weaker supercells 2. Bow Echos or lines of storms	.55" to 1.25"	58-70 MPH	1" to 1.5"	EF0 to EF2	Frequent 20-30	Very dark. Car lights used. Some street lights come on.	1. Moderate damage. 2. Heavy rains can cause flooding to streams and creeks. Roadway flooding. 3. Hail can cause dents on cars and cause crop damage. 4. Wind damage to trees and buildings. 5. Tornado damage. 6. Power outages.
T-5: Extreme thunderstorms 1. Supercells with family of tornadoes 2. Derecho windstorms	Over 1.25"	Over 70 MPH	Over 1.5"	EF3 to EF5	Frequent to continuous >30	Pitch black. Street lights come on. House lights may be used.	1. Severe damage trees and property. Damage is widespread. 2. Flooding rains. 3. Damaging hail. 4. Damaging wind gusts to trees and buildings. 5. Tornadoes F3-F5 or family of tornadoes can occur. Tornadoes can cause total devastation. 6. Widespread power outages.

PUBLIC HEALTH

Most injuries and fatalities during a tornado occur due to the victim or a solid object become airborne or a structure collapses. The most common injuries are contaminated lacerations, fractures, blunt trauma and head injuries. Most fatalities occur at the scene and result from trauma such as head, spine or crushing injuries (Weir, 2000).

Individuals are most frequently injured by flying debris during windstorms, much like tornadoes. Falling trees and motor vehicle accidents are also common dangers during windstorms. Post-event injuries and fatalities can be due to power outages leading to electrocution, fires and burns and carbon monoxide poisoning from gasoline powered generators. Exacerbation of chronic illnesses is a risk for both tornadoes and wind storms.

Many injuries and illnesses can occur during cleanup after the disaster. Inexperienced people using equipment such as chainsaws and the use of electrical tools in standing water can lead to serious injury. Standing water also attracts insects that can sting or bite and carry diseases as well as stray animals looking for water to drink (CDC, 2014). Injuries also occur when residents re-enter their damaged homes before inspections have been completed. Homeowners also fail to wear proper safety equipment such as goggles and work gloves (CDC, 2014).

SOCIAL VULNERABILITY

Anyone living in thunderstorm-prone areas are considered at risk since thunderstorms produce straight-line winds. Those living in mobile homes are especially at risk for injury and death as even an anchored mobile home can be seriously damaged when wind gusts reach 80 mph (NOAA, 2017).

Individuals who lack shelter during a tornado or wind event are highly vulnerable. The homeless population and those who may be traveling by vehicle or on foot when an event occurs are at greater risk for injury or death. Those in vehicles are at risk of flying debris, other vehicles being pushed into lanes of traffic, falling trees and utility poles and vehicle such as SUV's, and vehicles pulling trailers are at a high risk of being pushed or flipped over by winds (defensivedriving.com, 2014).

The homeless population are at risk as notification methods used for other populations such as, radio, television, and service providers, may not be applicable.

They also face a lack of transportation and the inability to evacuate an area without assistance (Edgington, 2009).

HISTORICAL OCCURRENCES

Upshur County

On June 1, 2015, a strong east to west front was positioned near the Route 50 corridor. Thunderstorms formed during the mid and late afternoon and moved east through central West Virginia. Downpours were most common, with localized amounts of a half inch in 15 minutes. One storm pulsed to strong levels as it moved out of Ritchie County into Gilmer County. The same thunderstorm cluster also produced an EF1 tornado in Upshur County. Multiple trees were snapped, twisted, and broken along the path near Queens. Several buildings sustained roof and property damage. The National Weather Service survey team estimated the strongest wind gusts around 100 mph. $300,000 in property damages

Barbour County

On June 1, 2016, scattered thunderstorms formed during the late morning and early afternoon across extreme southern Ohio, northern Kentucky, and central and southern West Virginia. This was in the muggy summer air, south of a slow moving cold front. The thunderstorms formed into a broken line by 1500E. A few cells pulsed to severe limits. A tornado even occurred over the mountainous terrain in eastern Nicholas County. Downpours were common. Closer to the surface front, a few additional cells formed in northern West Virginia during the evening hours. One of those storms even had a brief tornado in Barbour County. The tornado began near the intersection of Old Route 38 and Route 38, just east of the

Sugar Creek Bridge. Several trees were snapped at the trunk and uprooted along the damage path. One home sustained significant siding damage. The siding was torn off the west side of the house and thrown about 100 feet into a field to the north. A few flatbed single axle trailers were flipped in the front yard of another residence. Eight utility poles were down by falling trees and wind. Near the end of the path, a 4 inch diameter branch penetrated the roof of a home. The end of the damage path was along Route 38, about a quarter mile past Reger Road.

Region VII

During the afternoon hours on June 29, 2012, an intense line of thunderstorms moved eastward from the Midwest at 60 mph. The winds in front of the storm began to move southeast across West Virginia. Some strong wind gusts lasted over ten minutes. There were widespread wind gusts of up to 80 mph that threw dirt, dust and debris. The storm only produced half inch of rain, with some areas seeing even less. The winds caused trees and large branches to fall, and pulled shingles and siding off of buildings,

The fallen trees and branches pulled down utility lines and blocked roadways. Damage to the electric grid and power lines, caused prolonged outages as a summer heatwave continued. One electric company reported they replaced 1000 poles, 575 transformers, and 172 miles of line. Due to the power outage, everyday items such as drinking water, ice, and gasoline were in high demand. Cellphone providers had to use emergency generators to power towers so communications would not be disrupted for an extended period of time.

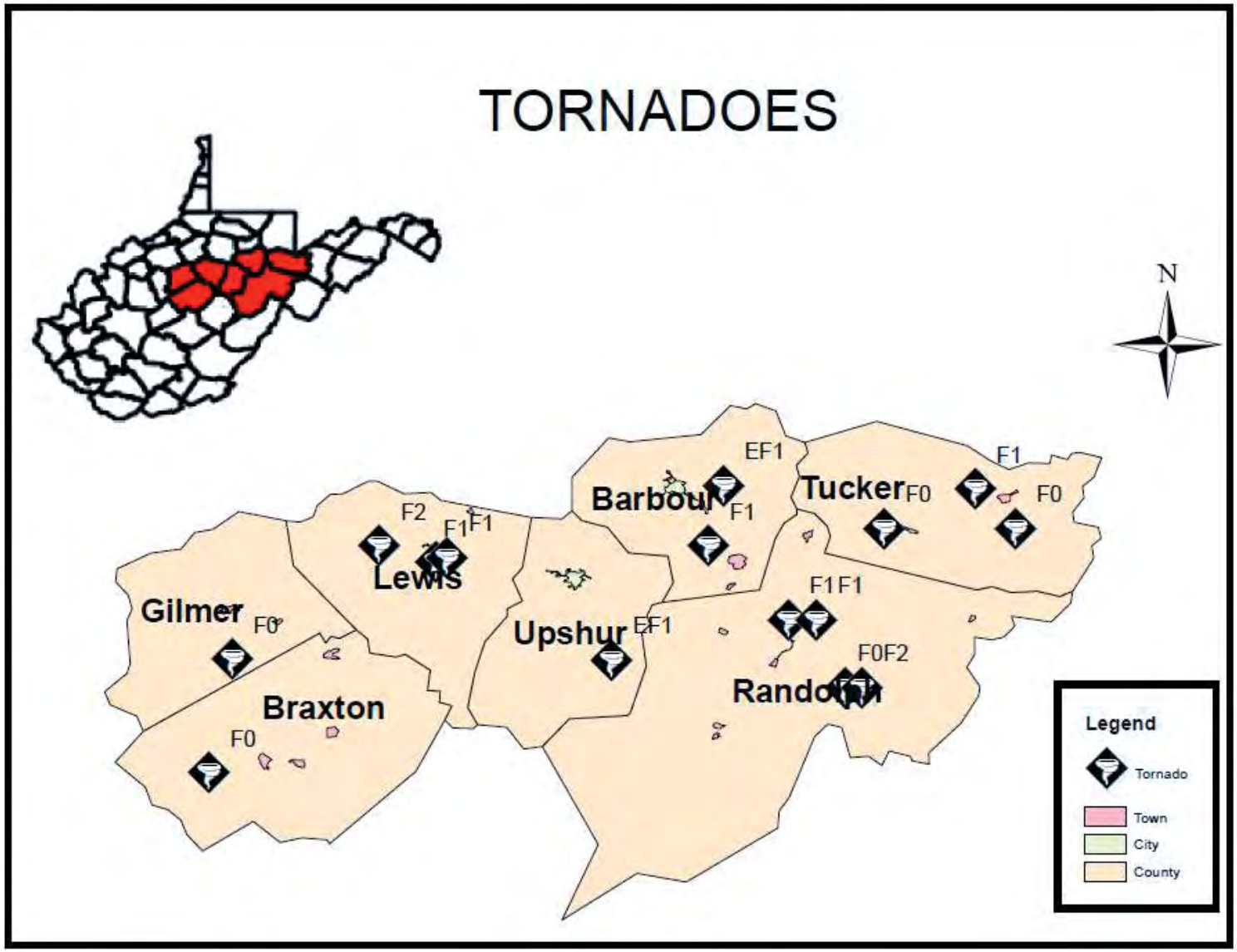
The state activated around 600 National Guard troops to perform welfare checks, deliver food and water, and assist in clearing downed trees. Over 11,000 residents lost electricity and infrastructure damage was estimated at $268,000. This event, a derecho, received a federal disaster declaration.

A list of tornado events that have occurred in Region VII between 1950 and 2016 is shown in the table below with an associated Fujita Tornado Scale magnitude for events prior to 2007 and an associated Enhanced Fujita Tornado Scale magnitude for events beginning in 2007. There have been a total of 15 tornado events in this time period in the region.

Table 2.2.11.5

Previous Tornado Events Between 1950 and 2016 (NCEI, 2017)

Date	Location	Magnitude	Width	Fatalities	Injuries	Damage
8/16/1954	Tucker County	F0	33 yards	0	0	-
3/7/1956	Lewis County	F2	60 yards	0	1	$250,000
6/29/1957	Randolph County	F1	33 yards	0	0	$250,000
5/21/1967	Randolph County	F0	300 yards	0	3	$2,500
4/4/1974	Barbour County	F1	33 yards	0	0	-
6/19/1975	Gilmer County	F0	33 yards	0	0	$25,000
6/27/1978	Lewis County	F1	40 yards	0	0	$250,000
7/9/1980	Randolph County	F1	30 yards	0	0	$250
7/9/1980	Randolph County	F2	20 yards	0	0	$25,000
7/8/1985	Tucker County	F1	100 yards	0	0	-
6/5/1989	Lewis County	F1	10 yards	0	0	-
4/9/1991	Braxton County	F0	40 yards	0	0	$2,500
7/5/1992	Tucker County	F0	30 yards	0	0	-
6/17/2015	Upshur County	EF1	150 yards	0	0	$300,000
6/21/2016	Barbour County	EF1	200 yards	0	0	$20,000


TORNADOES
N
Barbour
EF1
F1
Tucker
F0
F1
F0
Lewis
F2
F1
F1
Gilmer
F0
Upshur
EF1
F1
F1
Randolph
F0
F2
Braxton
F0
Legend
Tornado
Town
City
County

A list of windstorm events greater than 50 knots that have occurred in Region VII between 1950 and 2016 is shown in the table below. There have been a total of 28 days with 78 windstorm events reported in this time period in the region. There have been no reported injuries or fatalities from windstorms.

Table 2.2.11.6

Previous Wind Storm Events Between 1996 and 2016 (NCEI, 2017)

Date	Location	Magnitude in Knots	Fatalities	Injuries	Damage
10/30/1996	Tucker County	52	0	0	$5,000
1/18/1999	Tucker County	60	0	0	$5,000
1/10/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur Counties	-	0	0	-
1/11/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur Counties	-	0	0	-
11/9/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur Counties	-	0	0	-
12/11/2000	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur Counties	51	0	0	-
12/12/2000	Tucker County	57	0	0	$10,000
12/17/2000	Tucker County	52	0	0	$2,000
2/9/2001	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur Counties	-	0	0	-
2/10/2001	Tucker County	-	0	0	$5,000
2/25/2001	Tucker County	-	0	0	$5,000
2/25/2001	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur Counties	-	0	0	-
3/13/2001	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur Counties	-	0	0	-
5/24/2001	Upshur County	-	0	0	$2,000
12/14/2001	Barbour, Braxton, Gilmer, Lewis, Randolph, Upshur Counties	-	0	0	-
3/9/2001	Barbour County	-	0	0	$1,000
3/9/2001	Braxton County	-	0	0	$1,000
3/9/2001	Lewis County	-	0	0	$1,000
3/9/2001	Tucker County	-	0	0	$10,000

Table 2.2.11.6

Previous Wind Storm Events Between 1996 and 2016 (NCEI, 2017)

Date	Location	Magnitude in Knots	Fatalities	Injuries	Damage
3/9/2001	Upshur County	-	0	0	$1,000
9/18/2003	Tucker County	52	0	0	$2,000
11/13/2003	Tucker County	55	0	0	$2,000
11/18/2003	Tucker County	55	0	0	$5,000
12/1/2004	Tucker County	50	0	0	$6,000
12/23/2004	Tucker County	50	0	0	$3,000
12/1/2006	Barbour, Lewis, Randolph, Upshur Counties	50	0	0	-
12/1/2006	Tucker County	55	0	0	$30,000
12/16/2001	Tucker County	50	0	0	$15,000
2/11/2009	Tucker County	50	0	0	$100,000
12/9/2009	Randolph County	52	0	0	$20,000
12/9/2009	Tucker County	50	0	0	-
12/25/2009	Randolph County	50	0	0	$5,000
4/16/2011	Tucker County	50	0	0	$100,000
2/24/2012	Tucker County	50	0	0	$5,000
4/2/2016	Randolph County	52	0	0	$20,000

A list of hail storm events greater with recorded property damage that have occurred in Region VII between 1996 and 2016 is shown in the table below. There have been of 27 hail storm events with property damage and a total of 195 hail storm events reported in this time period in the region. There has been $3.915 million in property damage. There have been no reported injuries or fatalities from hail storms.

Table 2.2.11.7

Hail Storms (1996-2016)

Date	Locations	Size of Hail (in inches)	Property Damage
6/4/1996	Rosedale, Braxton County	0.75	$3,000
6/16/1998	Sutton, Braxton County	1	$10,000
6/16/1998	Gassaway, Braxton County	1.75	$800,000
6/16/1998	Sutton, Braxton County	1.75	$500,000
6/16/1998	Frametown, Braxton County	2	$250,000

Table 2.2.11.7

Hail Storms (1996-2016)

Date	Locations	Size of Hail (in inches)	Property Damage
6/16/1998	Weston, Lewis County	0.75	$50,000
4/23/1999	Philippi, Barbour County	1.5	$2,000,000
7/28/2000	Linn, Gilmer County	0.75	$3,000
4/10/2001	Rock Cave, Upshur County	1	$3,000
4/28/2002	Weston, Lewis County	2	$10,000
4/28/2002	Weston, Lewis County	1.25	$10,000
4/28/2002	Junior, Barbour County	1	$10,000
4/28/2002	Buckhannon, Upshur County	1	$5,000
4/28/2002	Gilmer, Gilmer County	1.5	$5,000
4/28/2002	Burnsville, Braxton County	1.5	$5,000
4/28/2002	Roanoke, Lewis County	1.75	$10,000
6/10/2008	Norton, Randolph County	1.25	$10,000
7/3/2011	Weston, Lewis County	1.25	$30,000
9/14/2011	Alum Bridge, Lewis County	1	$5,000
9/15/2011	Weston, Lewis County	1	$5,000
9/15/2011	Weston, Lewis County	1.5	$100,000
9/15/2011	Jane Lew, Lewis County	1	$10,000
3/28/2012	Ellis, Gilmer County	2	$10,000
3/28/2012	Ellis, Gilmer County	2	$10,000
3/28/2012	Rock Cave, Upshur County	1	$25,000
3/28/2012	French Creek, Upshur County	1	$10,000
5/27/2012	Huttonsville, Randolph County	1.25	$1,000
4/28/2016	Beverly, Randolph County	1.25	$5,000
4/28/2016	Dailey, Randolph County	1	$5,000
4/28/2016	Beverly, Randolph County	1	$5,000
4/28/2016	Beverly, Randolph County	1.25	$10,000

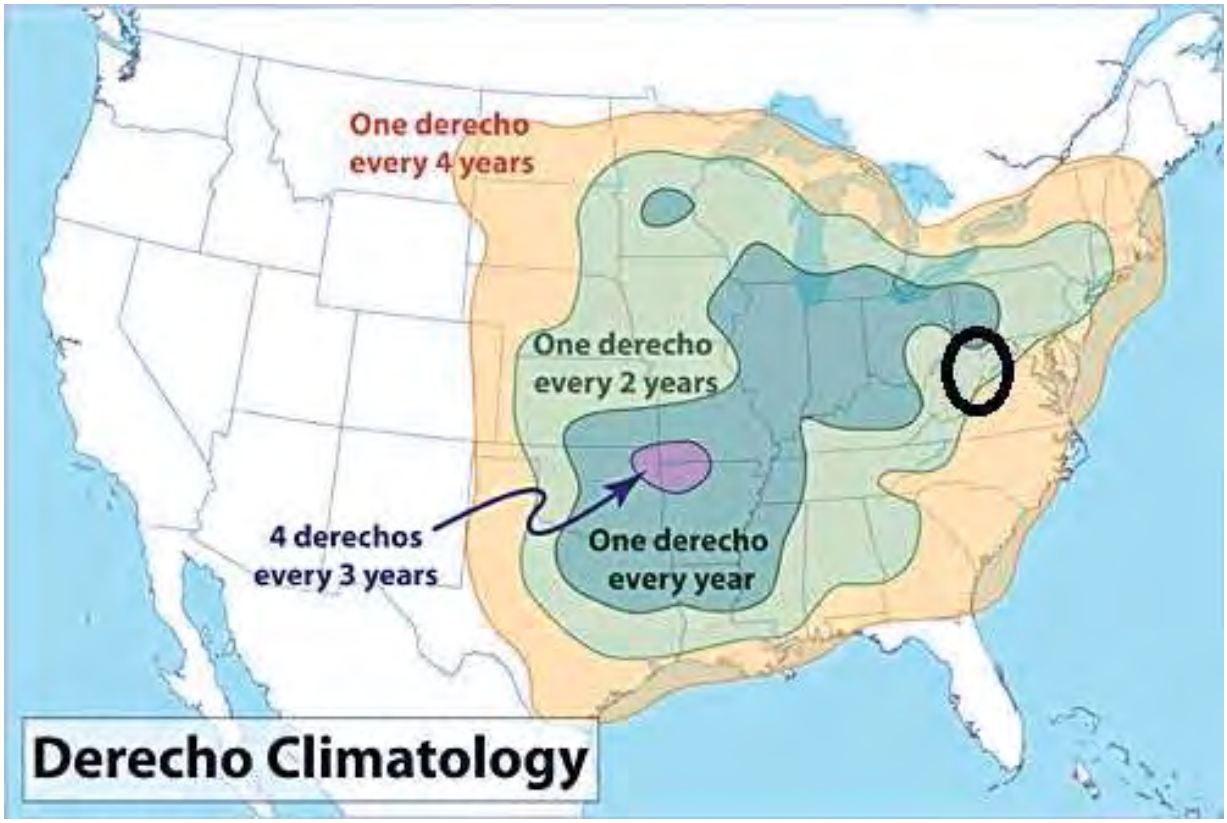
LOCATION & EXTENT

Tornadoes can occur in any area, depending on the storm from which they are spawned. Generally, however, tornadoes tend to be more common in flat areas. Tornadoes are highly localized events, with damage being limited to the path of the tornado.

According to the NCDC there have been 15 tornadoes in Region VII since 1950. There have been no fatalities and four injuries caused by tornadoes in the region. It should be noted three of the four injuries are attributed to one event in

Randolph County. In total, tornadoes have caused an estimated $1.125 million in property damage in Region VII.

As discussed in historical occurrences, Region VII was effected by a derecho in 2012. According to the National Weather Service a derecho is "a complex line of thunderstorms that travels a minimum of 240 miles and produces a nearly continuous and widespread swath of damaging winds over that distance, with concentrated area of wind speeds over 58 mph." As shown in the NWS picture below, Region VII is in an area that can expect to see a derecho once every two years.



LOSS ESTIMATES

Loss estimates for tornado events can be calculated using the historical data available from the NCEI. There have been 15 events recorded in the region between 1950 and 2016. By dividing the number of events by the study period (66 years), an estimate of events per year is .23. It is estimated that one tornado will touch down approximately every four years. Dividing the total property damage reported in the NCEI by the number of events, a per event property damage estimate is $75,016. It

is therefore estimated that every four years the region will see this amount of property damage caused by a tornado event.

Loss estimates for windstorms can be calculated using the historical data available from the NCEI. There have been 78 events recorded in the region between 1996 and 2016. By dividing the number of events by the study period (21 years), an estimate of events per year is 3.71. It is estimated that there will be approximately four windstorms every year. Dividing the total property damage reported in the NCEI by the number of events, a per event property damage estimate is $4,628. It is therefore estimated that the region will see $18,512 of property damage by windstorms every year.

Loss estimates for hail storms can be calculated using the historical data available from the NCEI. There have been 195 events recorded in the region between 1996 and 2016. By dividing the number of events by the study period (21 years), an estimate of events per year is 9.28. It is estimated that there will be approximately nine hail storms every year. Dividing the total property damage reported in the NCEI by the number of events, a per event property damage estimate is $20,077. It is therefore estimated that the region will see $186,314 of property damage by hail storm events every year.

TABLE 2.2.11.8 TORNADO RISK CALCULATION

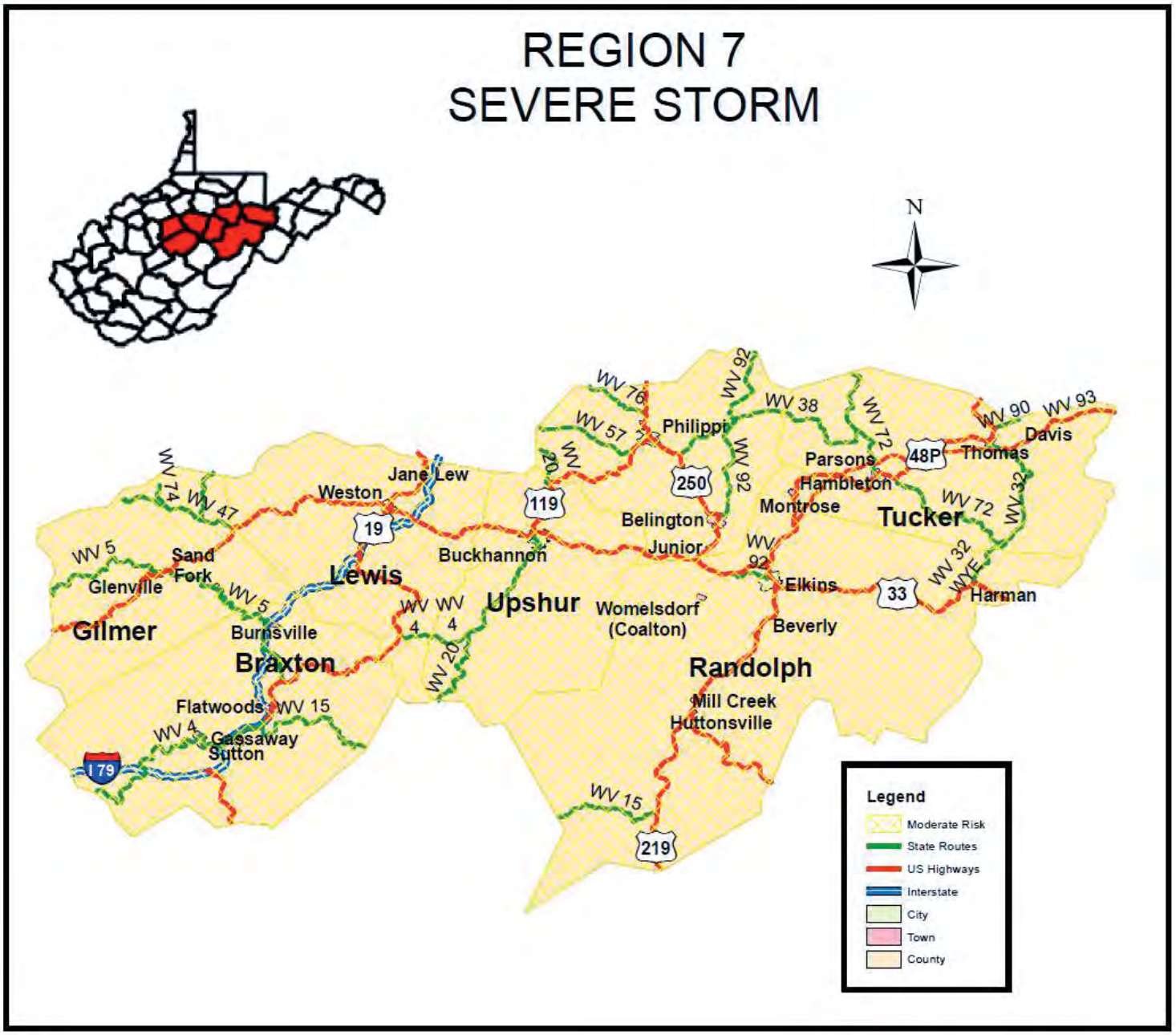
Probability			*Severity*		*Risk*
IMPROBABLE			MARGINAL		MODERATE
Events 15 Years 67	.22	+	The average property damage for historical events in NCEI is $75,016 with no records of fatalities.	=	A combination of improbable occurrence and marginal severity puts this hazard at a moderate risk to the region.
Due to the lack of historical events in the region it can be assumed that a tornado event will not occur during the average year.					

TABLE 2.2.11.9 WIND STORM RISK CALCULATION

Probability			*Severity*		*Risk*
FREQUENT			MARGINAL		MODERATE
Events 78 Years 21	3.71	+	The average property damage for historical events in NCEI is $4,628 with no records of fatalities.	=	A combination of frequent occurrence and marginal severity puts this hazard at a moderate risk to the region.
There is likely a chance that a wind storm will occur several times throughout the year.					

TABLE 2.2.11.10 HAIL STORM RISK CALCULATION					
Probability			*Severity*		*Risk*
FREQUENT			MARGINAL		MODERATE
Events 195 Years 21	9.29	+	The average property damage for historical events in NCEI is $20,077 with no records of fatalities.	=	A combination of frequent occurrence and marginal severity puts this hazard at a moderate risk to the region.
There is likely a chance that a hail storm will occur multiple times throughout the year.					

TABLE 2.2.11.11 SEVERE STORMS RISK CALCULATION					
Probability			*Severity*		*Risk*
FREQUENT			MARGINAL		MODERATE
Events 275 Years 21	13.09	+	The average property damage for historical events in NCEI is $16,712 with no records of fatalities.	=	A combination of frequent occurrence and marginal severity puts this hazard at a moderate risk to the region.
Using data for all three type of events over the 21 year period (1996-2016), the data shows there is a likely chance that multiple events will occur each year.					


REGION 7
SEVERE STORM
N
WV 92
WV 76
WV 38
WV 72
WV 90
WV 93
WV 57
Philippi
Davis
Parsons
48P
Thomas
WV 74
WV 47
Jane Lew
Weston
250
WV 92
Hambleton
WV 32
119
Montrose
Tucker
WV 72
19
Belington
WV 5
Junior
WV 92
Sand Fork
Buckhannon
Lewis
WV 32 WYE
Glenville
Elkins
33
Harman
WV 5
WV 4
WV 4
Upshur
Womelsdorf (Coalton)
Gilmer
Burnsville
Beverly
Braxton
WV 20
Randolph
Flatwoods
WV 15
Mill Creek
WV 4
Huttonsville
Gassaway
Sutton
I 79
WV 15
219
Legend
Moderate Risk
State Routes
US Highways
Interstate
City
Town
County

2.2.12 Winter Storms

Winter storms "occur when extremely cold atmospheric conditions coincide with high airborne moisture content, resulting in rapid and heavy precipitation of snow and/or ice." (Haddow, Bullock, & Coppola, 2014).		
Period of Occurrence	*Warning Time*	*Risk Assessment*
Winter months. Most common between November and March.	Days / Weeks	HIGH

The National Centers for Environmental Information (NCEI) compiles data on a five different types of winter weather events. **Blizzards** are defined as a winter storm which produces sustained winds or frequent gusts 30 knots (35 mph) or greater and falling or blowing snow reducing visibility frequently to less than ¼ mile, in a widespread or localized basis. **Heavy snow** is snow accumulation meeting or exceeding locally/regionally defined 12 and/or 24 hour warning criteria, on a widespread or localized basis (values meeting or exceeding four, six or eight inches in a 12 hour period or six, eight or 10 inches in 24 hours). **Ice storms** are characterized by ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is ¼ or ½ in or more), on a widespread or localized basis. **Winter storm** is an event that has more than one significant hazard (i.e., heavy snow and blowing snow; snow and ice; snow and sleet, sleet and ice; or snow, sleet and ice) and meets or exceeds regionally defined 12 and/or 24 hour warning criteria for at least one of the precipitation elements on a widespread or localized basis. **Winter weather** is a winter precipitation event that causes a death injury or a significant impact to commerce or transportation but does not meet locally/regionally defined warning criteria.

Table 4.3.8.1

THE SPERRY-PILTZ ICE ACCUMULATION INDEX	
Ice Damage Index	Damage and Impact Descriptions
0	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1-5 days.

4	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5-10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

PUBLIC HEALTH

Direct exposure to cold temperatures and wet conditions can cause hypothermia and frostbite. Winter weather is also associated with increased rates of respiratory illnesses and heart disease, with a concomitant increase in mortality (McGeehin & Mirabelli, 2001). Winter storms also bring indirect public health concerns such as injuries and/or fatalities from automobile accidents on icy roads or heart attacks while shoveling snow. Carbon monoxide poisoning is also a concern. Whether due to a power failure or a heating system being inadequate to warm a structure the need to use a generator and/or fireplace increases the risk of CO poisoning and structure fires (CDC, 2015).

The potential risk of injury from chainsaw use increases after natural disasters and storms. Chainsaws are widely used to remove fallen or partially fallen trees and limbs. Each year over 36,000 people are treated for chainsaw injuries in emergency departments across the nation. Many of these injuries come from not wearing appropriate protective equipment, cutting trees and limbs touching powerlines, and cutting limbs that have tension in them that will snap back as the tension is released by being cut (CDC, 2014).

SOCIAL VULNERABILITY

Infants and the elderly are the most susceptible to the cold and wet conditions of a winter storm. Conditions that may be uncomfortable or inconvenient to the general population can easily become life-threatening to them (NOAA, 2017). The homeless have a much higher risk than the general population of developing exposure-related conditions (nationalhomeless.org, 2010). The inability to provide adequate, dry clothing, shelter and heat accompanied by malnutrition, decreased body fat, underlying infection, lack of fitness and fatigue make homeless individuals much more vulnerable to winter storms (O'Connell, 2004).

Low-income individuals are more vulnerable as they are more likely to live in poorly insulated hones and be unable to afford sufficient heating. These individuals

may need to make tradeoffs between proper nutrition, medication, and proper heating expenditures (USGCRP, 2016).

HISTORICAL EVENTS

Barbour, Braxton, Randolph, Tucker and Upshur Counties, West Virginia

Beginning on October 29, 2012, and lasting through the early morning of October 31, 2012, remnants of Hurricane Sandy brought a variety of weather into the region. Higher elevations experienced blizzard conditions, while some areas had heavy winds and rain that downed trees and utility lines. Barbour County had one direct fatality from the event when a 71 year old male was struck by a falling tree. There were also four indirect fatalities attributed to the storm: A 40 year old female in Tucker County involved in a motor vehicle collision, a 62 year old male in Barbour County collapsed shoveling snow, and a 51 year old male and an 86 year old male due to carbon monoxide poisoning. Property damage was estimated at $8.5 million.

Table 2.2.12.2

Date	Location	Type	Property Damage
1/27/1998	Randolph County	Heavy Snow	$100,000
1/2/1999	Tucker County	Winter Storm	$5,000
1/8/1999	Tucker County	Winter Storm	$5,000
1/13/1999	Tucker County	Winter Storm	$5,000
3/3/1999	Tucker County	Winter Storm	$25,000
2/14/2003	Randolph County	Heavy Snow	$25,000
2/14/2003	Lewis County	Heavy Snow	$50,000
2/14/2003	Barbour County	Heavy Snow	$50,000
2/16/2003	Tucker County	Heavy Snow	$10,000
1/22/2005	Tucker County	Winter Storm	$6,000
10/25/2005	Tucker County	Heavy Snow	$100,000
12/18/2009	Randolph County	Heavy Snow	$200,000
12/18/2009	Lewis County	Heavy Snow	$50,000
12/18/2009	Upshur County	Heavy Snow	$100,000
12/18/2009	Barbour County	Heavy Snow	$75,000
12/18/2009	Braxton County	Heavy Snow	$50,000
12/18/2009	Gilmer County	Heavy Snow	$20,000

Table 2.2.12.2

Date	Location	Type	Property Damage
1/26/2011	Randolph County	Heavy Snow	$15,000
1/26/2011	Barbour County	Heavy Snow	$20,000
1/26/2011	Upshur County	Heavy Snow	$25,000
10/29/2012	Upshur County	Blizzard	$3,000,000
10/29/2012	Randolph County	Blizzard	$3,750,000
10/29/2012	Barbour County	Heavy Snow	$750,000
10/29/2012	Braxton County	Heavy Snow	$1,000,000
11/26/2014	Randolph County	Heavy Snow	$5,000
1/22/2016	Lewis County	Heavy Snow	$150,000

LOCATION & EXTENT

Between 1996 and 2016, the NCEI storm events database has 74 events listed for Barbour County, 44 events listed for Braxton County, 36 events listed for Gilmer County, 46 events listed for Lewis County, 134 events listed for Randolph County, 150 events listed for Tucker County, and 93 events listed for Upshur County. Of the 577 events listed in the NCEI, 59% of them were considered heavy snow events and only 5.7% had recorded property damage. The table below show the number of winter weather events for each county.

Table 2.2.12.3

Winter Weather Events By County

	Barbour	Braxton	Gilmer	Lewis	Randolph	Tucker	Upshur
Blizzard	0	0	0	0	1	2	1
Heavy Snow	44	25	19	24	85	94	51
Ice Storm	0	1	1	0	1	14	1
Winter Storm	5	7	6	6	8	27	6
Winter Weather	25	11	10	16	39	13	35
Number of Events with Property Damage	4	3	2	3	9	7	5

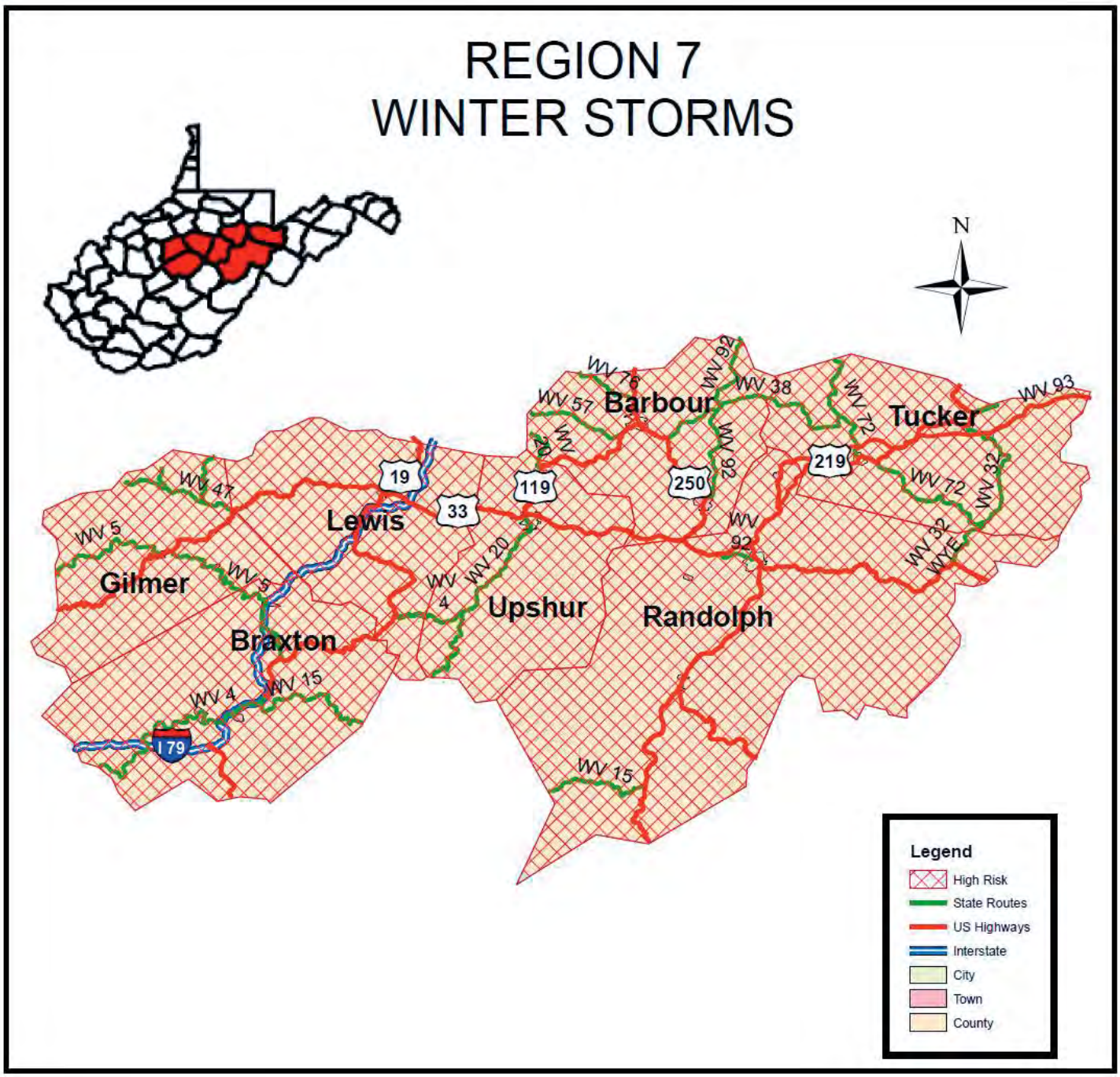
Winter weather is an annual, common occurrence in Region VII, as in the rest of West Virginia. According to the *2013 West Virginia Statewide Hazard Mitigation Plan*, Barbour, Braxton, Lewis, Randolph, Tucker and Upshur Counties are considered High Risk for winter weather events, while Gilmer County is considered a Medium-High Risk (Dewberry, 2013). Small winter events that accumulate no more than a few inches can cause problems and cascading events throughout the region, especially on transportation, but are generally considered nuisance events. Events that produce large amounts of snow have a significant impact.

LOSS ESTIMATES

Loss estimates for future occurrences can be found using historical data from the NCEI. There have been 577 events recorded between 1996 and 2016. By dividing the number of events by the study period (21 years), an estimate of events per year is 27.5. Dividing the total property damage reported by the NCEI by the number of events, a per event property damage estimate is $18,918.54. It is therefore estimated that the region will see $520,259.97 of property damage caused by winter storms each year.

TABLE 2.2.12.4 WINTER STORMS RISK CALCULATION

Probability			*Severity*		*Risk*
FREQUENT			CRITICAL		HIGH
Events 577 Years 21	27.5	+	The potential property damage, injury and death puts this hazard at	=	A combination of frequent occurrence and critical level of severity puts this hazard at high risk
There is a likely chance that a winter storm will occur multiple times throughout the year					


REGION 7
WINTER STORMS
N
Barbour
Tucker
Lewis
Gilmer
Braxton
Upshur
Randolph
WV 76
WV 92
WV 38
WV 93
WV 57
WV 72
WV 47
WV 5
WV 20
WV 32
WV 4
WV 15
19
33
119
250
219
I 79
Legend
High Risk
State Routes
US Highways
Interstate
City
Town
County

2.3 INVENTORY ASSETS

§201.6(c)(2)(ii)	[The risk assessment shall include a] description of the jurisdiction's vulnerability of 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.
§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 areas.

This risk assessment identifies potentially-vulnerable community assets such as critical facilities, critical infrastructure, historical properties, commercial/industrial facilities, etc. *Assets* contribute directly to the quality of life in the community as well as ensure its continued operation. As such, government facilities are often listed, as are water/wastewater and transportation infrastructure. Assets can also be irreplaceable items within the community, such as historical structures or even vulnerable populations (including the elderly or youths).

Inventorying assets first involves determining what in the community can be affected by a hazard event. The hazard profiles above contain generalized loss estimates that, in some cases identify the types of facilities that could be impacted by the hazards considered in this plan. Additionally, the steering committee used its meetings during the update process to significantly revise the original asset list that was included in this plan. In the following lists, assets are grouped into the following categories.

- **Critical Facilities:** Governmental facilities, water/wastewater facilities, emergency services facilities, medical facilities (hospitals/clinics), and transportation infrastructure.
- **Vulnerable Populations:** Schools, nursing homes, and senior centers.
- **Economic Assets:** Large commercial/industrial facilities or large employers (not covered in other categories).
- **Special Considerations:** Residences, community outreach facilities, post offices, and libraries.
- **Historical Considerations:** Areas/structures listed on the National Register of Historic Places.

These asset lists allow participating jurisdictions to consider risks in alternate ways. Mitigation projects (see Section 3.0: Action Plan) do not have to be grand endeavors that equally apply to all communities. Rather, than can be considerably smaller, and reduce risk at a single critical facility. The presence of the following lists helps community leaders think in

these ways. Also, each of these assets include an address. The PDC's consultant utilized the address to geocode these locations in a GIS-based map. Where applicable (e.g., on the mapping in the flooding profile), these assets are shown with respect to risk and vulnerability areas, again to assist in decision-making.

TABLE 2.3.1: BARBOUR COUNTY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Adaland Mansion	Historic	Historic	324 Mansion Drive	Philippi	Barbour County
Anker Mining Co – Sentinel Coal	Economic	Economic	Rd 3 Box 149	Philippi	Barbour County
Barbour County Good Samaritan	Nursing Facility	Vulnerable	Old Route 250	Belington	Barbour County
Belington Elementary School	School	Vulnerable	471 Morgantown Pike	Belington	Barbour County
Belington Middle School	School	Vulnerable	523 Morgantown Pike	Belington	Barbour County
Carrolton Covered Bridge	Historic	Historic	Carrolton Road	Volga	Barbour County
Kasson Elementary & Middle School	School	Vulnerable	19 Kasson Road	Moatsville	Barbour County
Junior Elementary School	School	Vulnerable	415 West 1st Street	Junior	Barbour County
WQAB 91.3 FM	Media	Special Consideration	Barbour County Highway	Philippi	Barbour County

TABLE: 2.3.2 BELINGTON ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Belington Town Hall	Government Facility	Critical	505 Crim Avenue	Belington	Belington
Belington Civic Center	Community Building	Vulnerable	Howard Avenue	Belington	Belington
Belington EMS	Emergency Services	Critical	44 Elliot Avenue	Belington	Belington
Belington Head Start	School	Vulnerable	109 Howard Avenue	Belington	Belington
Belington Police Department	Emergency Services	Critical	45 Crim avenue	Belington	Belington
Belington Volunteer Fire Department	Emergency Services	Critical	301 Watkins Street	Belington	Belington
Bernard E Wilmoth House	Historic	Historic	303 Dayton Boulevard	Belington	Belington
Dingess Lumber	Economic	Economic	6151 Barbour County Highway	Belington	Belington
Hoover Treated Wood Products	Economic	Economic	CR 250/15	Belington	Belington
Mountain Hospice Inc.	Medical Facility	Critical	1002 South Crim Avenue	Belington	Belington
U.S. Post Office	Post Office	Special Consideration	801 Crim Avenue	Belington	Belington

TABLE: 2.3.3 JUNIOR ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Junior Town Hall	Government Facility	Critical	2321 Barbour County Highway	Junior	Junior
Junior Volunteer Fire Department	Emergency Services	Critical	US 250	Junior	Junior
U.S. Post Office	Post Office	Special Consideration	204 Beach Avenue	Junior	Junior

TABLE: 2.3.4 PHILIPPI ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Alderson Broadus University	Higher Education Economic	Vulnerable Economic	101 College Hill Road	Philippi	Philippi
Barbour County Board of Education	Government Facility	Critical	105 River Street	Philippi	Philippi
Barbour County Courthouse & Barbour County Sheriff's Office	Historic	Historic	8 North Main Street	Philippi	Philippi
Barbour County Emergency Squad	Emergency Services	Critical	26416 US 250	Philippi	Philippi
Barbour County Family Court	Government Facility	Critical	3 North High Street	Philippi	Philippi
Barbour County Health Department	Government Facility	Critical	23 Wabash Avenue	Philippi	Philippi
Barbour County Senior Center	Senior Center	Vulnerable	47 Church Street	Philippi	Philippi
Peck-Crim-Chesser House	Historic	Historic	14 North Walnut Street	Philippi	Philippi
Philip Barbour High School	School	Vulnerable	99 Horseshoe Drive	Philippi	Philippi
Philippi B&O Railroad Station	Historic	Historic	146 North Main Street	Philippi	Philippi
Philippi City Hall Philippi Police Department	Government Facility Emergency Services	Critical	108 North Main Street	Philippi	Philippi
Philippi Covered Bridge	Historic	Historic	North Main Street	Philippi	Philippi
Philippi Elementary School	School	Vulnerable	547 Cherry Hill Road	Philippi	Philippi
Philippi Head Start	School	Vulnerable	Chestnut Street	Philippi	Philippi
Philippi Historic District	Historic	Historic	Main Street Area	Philippi	Philippi
Philippi Public Library	Library	Vulnerable	102 South Main Street	Philippi	Philippi
Philippi Volunteer Fire Department	Emergency Services	Critical	317 South Main Street	Philippi	Philippi
West Virginia Department of Health and Senior Services	Government Facility	Critical	49 Mattaliano Drive	Philippi	Philippi
West Virginia Department of Health and Senior Services – Child Services	Government Facility	Critical	271 Mattaliano Drive	Philippi	Philippi
West Virginia State Police	Emergency Services	Critical	17 Bear Run Road	Philippi	Philippi
Whitescarver Hall	Historic	Historic	Circle Drive West	Philippi	Philippi

TABLE: 2.3.5 BRAXTON COUNTY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Braxton County Airport	Transportation	Critical	25 Airport Road	Sutton	Braxton County
Braxton County Board of Education	Government Facility	Critical	98 Carter Braxton Drive	Sutton	Braxton County
Braxton County High School	School	Vulnerable	200 Jerry Burton drive	Sutton	Braxton County
Braxton County Middle School	School	Vulnerable	100 Carter Braxton Drive	Sutton	Braxton County
Braxton County Senior Center	Senior Center	Vulnerable	33 Senior Center Drive	Sutton	Braxton County
Braxton Memorial Hospital	Hospitals	Critical	100 Hoylman Drive	Gassaway	Braxton County
Central Regional Jail	Jail/Prison	Critical	300 Days Drive	Sutton	Braxton County
Chapel Volunteer Fire Department	Emergency Services	Critical	5846 Chapel Road	Gassaway	Braxton County
Cunningham House and Outbuildings	Historic	Historic	Millstone Run Road	Sutton	Braxton County
Frametown Elementary School	School	Vulnerable	96 Jeanie Ellis Drive	Frametown	Braxton County
Frametown Volunteer Fire Department	Emergency Services	Critical	485 Wilsie Road	Frametown	Braxton County
Little Birch Elementary School	School	Vulnerable	55 Little Birch Road	Sutton	Braxton County
Mountain Cap of WV	Community Facility	Vulnerable	541 Enterprise Drive	Gassaway	Braxton County
Servia Fire Department	Emergency Services	Critical	Servia Road	Gassaway	Braxton County
Union Civil War Fortification	Historic	Historic	Burnsville Lake Wildlife Management Area	Burnsville	Braxton County
Weston & Gauley Bridge Turnpike	Historic	Historic	N/A	Burnsville	Braxton County
Weyerhaeuser Company	Economic	Economic	US 19N	Heaters	Braxton County
Windy Run Grade School	Historic	Historic	Tesla Road	Tesla	Braxton County

TABLE: 2.3.6 BURNSVILLE ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Burnsville Bridge	Historic	Historic	Old Bridge Street	Burnsville	Burnsville
Burnsville Community Center	Community Facility	Vulnerable	237A Kanawha Ave	Burnsville	Burnsville
Burnsville Elementary School	School	Vulnerable	228 Kanawha Ave	Burnsville	Burnsville
Burnsville Medical Center	Medical Center	Critical	110 Municipal St	Burnsville	Burnsville
Burnsville Mayor's Office Burnsville Police Department	Government Facility Emergency Services	Critical	106 Municipal St	Burnsville	Burnsville
Burnsville Public Library	Library	Special Consideration	229 Kanawha St	Burnsville	Burnsville
Burnsville Pubic Utilities	Utilities	Critical	54 Buckeye Alley	Burnsville	Burnsville
Burnsville Volunteer Fire Department	Emergency Services	Critical	237B Kanawha Ave	Burnsville	Burnsville
EQT Corporations	Economic	Economic	243 West Main Street	Burnsville	Burnsville
Go-Mart	Economic	Economic	318 Wabash Ave	Burnsville	Burnsville
Little General	Economic	Economic	153 5th St	Burnsville	Burnsville
Old Iron Bridge	Economic	Economic	Bridge St	Burnsville	Burnsville
Premier Bank	Economic	Economic	316 Wabash Ave	Burnsville	Burnsville
Riverview Elderly/Disabled Apartments	Senior Living	Vulnerable	210 S Main St	Burnsville	Burnsville
Saw Mill Campground	Temporary Population	Special Consideration	Front St	Burnsville	Burnsville
U.S. Post Office	Post Office	Special Consideration	126 S Main St	Burnsville	Burnsville

TABLE: 2.3.7 FLATWOODS ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Flatwood Community Center	Community Facility	Special Consideration	220 Flatwoods Corner Road	Flatwoods	Flatwoods
Flatwoods Elementary School	School	Vulnerable	142 Flatwoods Corner Road	Flatwoods	Flatwoods
Flatwood Municipal Building & Flatwoods Police Department	Government Facility Emergency Services	Critical	29 Doctors Lane	Flatwoods	Flatwoods
U.S. Post Office	Post Office	Special Consideration	308 Flatwoods Corner Road	Flatwoods	Flatwoods

TABLE: 2.3.8 GASSAWAY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Davis Elementary School	School	Vulnerable	113 5th Street	Gassaway	Gassaway
Gassaway Depot	Historic	Historic	4th Street	Gassaway	Gassaway
Gassaway Fire Department	Emergency Services	Critical	105 5th Street	Gassaway	Gassaway
Gassaway Town Hall	Government Facility	Critical	416 Elk Street	Gassaway	Gassaway
U.S. Post Office	Post Office	Special Consideration	400 Elk Street	Gassaway	Gassaway
West Virginia American Water	Utility	Critical	1060 Riverside Drive	Gassaway	Gassaway

TABLE: 2.3.9 SUTTON ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Braxton Citizen's News	Media	Special Consideration	501 Main Street	Sutton	Sutton
Braxton County Courthouse & Sheriff's Department	Government Facility Emergency Services	Critical	300 Main Street	Sutton	Sutton
Braxton County Health Department	Government Facility	Critical	495 Old Turnpike Road	Sutton	Sutton
Braxton County Magistrate Court	Government Facility	Critical	307 Main Street	Sutton	Sutton
Braxton County Swimming Pool	Community Facility	Vulnerable	100 1st Street	Sutton	Sutton
Braxton Democrat Central	Media	Special Consideration	203 2nd Street	Sutton	Sutton
Central West Virginia Aging Services	Government Facility	Critical	101 2nd Street	Sutton	Sutton
Old Sutton High School	Historic	Historic	North Hill Road	Sutton	Sutton
Sutton Downtown Historic District	Historic	Historic	Main Street Area	Sutton	Sutton
Sutton Elementary School	School	Vulnerable	288 North Hill Road	Sutton	Sutton
Sutton Municipal Building	Government Facility	Critical	450 4th Street	Sutton	Sutton
Sutton Public Library	Library	Vulnerable	500 Main Street	Sutton	Sutton
Sutton Volunteer Fire Department	Emergency Services	Critical	403 Main Street	Sutton	Sutton
U.S. Post Office	Post Office	Special Consideration	306 River View Drive	Sutton	Sutton
William Edgar Haymand House	Historic	Historic	110 South Stonewall Street	Sutton	Sutton
WSGB	Media	Special Consideration	180 Main Street	Sutton	Sutton

TABLE: 2.3.10 GILMER COUNTY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Cedar Creek State Park	Special Consideration	Special Consideration	2947 Cedar Creek Road	Glenville	Gilmer County
Gilmer County Volunteer Fire Department (Cedarville)	Emergency Service	Critical		Cedarville	Gilmer County
Gilmer County Volunteer Fire Department (Normantown)	Emergency Service	Critical		Normantown	Gilmer County
Gilmer County Volunteer Fire Department (Sand Fork)	Emergency Service	Critical		Sand Fork	Gilmer County
Gilmer County Volunteer Fire Department (Troy)	Emergency Service	Critical		Troy	Gilmer County
Cedarville School	Historic	Historic	Smith Avenue	Cedarville	Gilmer County
Duck Run Cable Suspension Bridge	Historic	Historic	WV-5 & WV-30	Truebada	Gilmer County
Federal Correctional Institute – Gilmer	Jail/Prison	Critical	200 FCI Lane	Glenville	Gilmer County
Flying W Plastics	Economic	Economic	487 Vanhorn Drive	Glenville	Gilmer County
Gilmer County Ambulance Service	Emergency Service	Critical	230 West Main Street	Glenville	Gilmer County
Gilmer County Poor Farm Infirmary	Historic	Historic	Recreation Road	Glenville	Gilmer County
Glenville Elementary School	School	Vulnerable	454 Vanhorn Drive	Glenville	Gilmer County
Job's Temple	Historic	Historic	Little Kanawha Parkway	Glenville	Gilmer County
Lignetics of WV	Economic	Economic	228 Economic Park Road	Sand Fork	Gilmer County
Stouts Mill Bridge	Historic	Historic	County Route 40	Glenville	Gilmer County
Waco Oil & Gas	Economic	Economic	1595 U.S. 33	Glenville	Gilmer County

TABLE: 2.3.11 GLENVILLE ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Gilmer County Board of Education	Government Facility	Critical	201 North Court Street	Glenville	Glenville
Gilmer County Courthouse & Sheriff's Department	Government Facility Emergency Services	Critical	10 Howard Street	Glenville	Glenville
Gilmer County Elementary School	School	Vulnerable	99 Fairground Road	Glenville	Glenville
Gilmer County Public High School	School	Vulnerable	300 Pine Street	Glenville	Glenville
Gilmer County Public Library	Library	Special Consideration	214 Walnut Street	Glenville	Glenville
Gilmer County Senior Center	Senior Center	Special Consideration	720 North Lewis Street	Glenville	Glenville
Gilmer County Volunteer Fire Station #1	Emergency Services	Critical	606 West Main Street	Glenville	Glenville
Glenville Center	Nursing Facility	Vulnerable	111 Fairground Road	Glenville	Glenville
Glenville State College	Higher Education Economic	Vulnerable, Economic,	200 High Street	Glenville	Glenville
Glenville Truss Bridge	Historic	Historic	Conrad Court	Glenville	Glenville
John E. Arbuckle house	Historic	Historic	213 Court Street	Glenville	Glenville
Little Kanawha Valley Bank	Historic	Historic	5 Howard Street	Glenville	Glenville
Ruddell General Store	Historic	Historic	6 North Court Street	Glenville	Glenville
Stalnaker Energy Corporation	Economic	Economic	220 West Main Street	Glenville	Glenville
The Glenville Democrat	Media	Special Consideration	108 North Court Street	Glenville	Glenville
U.S. Post Office	Post Office	Special Consideration	201 East Main Street	Glenville	Glenville
West Virginia DMAPS Professional Development Center	Government Facility	Critical	103 Academy Street	Glenville	Glenville
Whiting House	Historic	Historic	301 East Main Street	Glenville	Glenville

TABLE: 2.3.12 SAND FORK ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Continental Petroleum	Economic	Economic	161 Sand Fork Road	Sand Fork	Sand Fork
U.S. Post Office	Post Office	Special Consideration	5383 WV-5A	Sand Fork	Sand Fork

TABLE: 2.3.13 LEWIS COUNTY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Annamede	Historic	Historic	286 Annamede Drive	Crawford	Lewis County
Crestview Manor Nursing Home	Nursing Home	Vulnerable	199 CR 7/7	Jane Lew	Lewis County
Hackers Creek Pioneers	Historic	Historic	44 Abbotts Run Road	Horner	Lewis County
Jacksons Mill State 4H Camp Historic District	Historic	Historic	Jackson Mill Road	Weston	Lewis County
Jacksons Mill Volunteer Fire Department	Emergency Services	Critical	3000 Jackson Mill Road	Weston	Lewis County
Lewis County High School	School	Vulnerable	205 Minuteman Drive	Weston	Lewis County
Midway Volunteer Fire Department	Emergency Services	Critical	40 Gilmer County Fink Road	Alum Bridge	Lewis County
Peterson-Central Elementary School	School	Vulnerable	509 Berlin Road	Weston	Lewis County
Pricetown Volunteer Fire Department	Emergency Services	Critical	1667 US 33	Weston	Lewis County
Roanoke Elementary School	School	Vulnerable	1176 Oil Creek Road	Roanoke	Lewis County
Robert L. Bland Middle School	School	Vulnerable	358 Court Avenue	Weston	Lewis County
St. Bernard Church and Cemetary	Historic	Historic	1932 Loveberry Ridge Road	Weston	Lewis County
Upper Gladys School	Historic	Historic	South Side Road	Crawford	Lewis County
U.S. Post Office	Post Office	Special Population	14 Moody Lane	Alum Bridge	Lewis County
U.S. Post Office	Post Office	Special Population	4354 US 33	Camden	Lewis County
U.S. Post Office	Post Office	Special Population	234 Wildcat Road	Ireland	Lewis County
Walkersville Covered Bridge	Historic	Historic	Covered Bridge Road	Walkersville	Lewis County
Walkersville Volunteer Fire Department	Emergency Services	Critical	16629 US 19S	Roanoke	Lewis County

TABLE: 2.3.14 JANE LEW ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Jane Lew Elementary School	School	Vulnerable	6536 Main Street	Jane Lew	Jane Lew
Jane Lew Fire Department	Emergency Services	Critical	52 Hackers Creek Road	Jane Lew	Jane Lew
Jane Lew Town Hall	Government Facility	Critical	6197 Main Street	Jane Lew	Jane Lew

TABLE: 2.3.15 WESTON ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Lewis County Animal Control	Government Facility	Critical	201 Orchard Street	Weston	Weston
Lewis County Board of Education	Government Facility	Critical	239 Court Avenue	Weston	Weston
Lewis County Courthouse	Government Facility	Critical	110 Center Avenue	Weston	Weston
Lewis County E-911	Emergency Services	Critical	201 Orchard Street	Weston	Weston
Lewis County Emergency Squad	Emergency Services	Critical	155 2nd Street	Weston	Weston
Lewis County Senior Center	Senior Center	Vulnerable	171 West 2nd Street	Weston	Weston
Louis Bennett Public Library	Library	Special Consideration	148 Court Avenue	Weston	Weston
Stonewall Jackson Memorial Hospital	Hospital	Critical	230 Hospital Plaza	Weston	Weston
U.S. Post Office	Post Office	Special Consideration	119 Center Avenue	Weston	Weston
Weston Colored School	Historic	Historic	345 Center Street	Weston	Weston
Weston Downtown Historic District	Historic	Historic	Main Street Area	Weston	Weston
Weston Downtown Residential Historic District	Historic	Historic	Main Street Area	Weston	Weston
Weston Fire Department	Emergency Services	Critical	321 Center Street	Weston	Weston
Weston State Hospital	Historic	Historic	71 Asylum Drive	Weston	Weston
WVDOH District 7 Headquarters	Government Facility	Critical	255 Depot Street	Weston	Weston

TABLE: 2.3.16 RANDOLPH COUNTY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Butcher Hill Historic District	Historic	Historic	Dodson Run Road	Beverly	Randolph County
Day-Vandevander Mill	Historic	Historic	Rich Mountain Road	Harman	Randolph County
Fort Marrow	Historic	Historic	Seneca Trail	Huttonsville	Randolph County
Gladys Presbyterian Church and Manse	Historic	Historic	Bemis Road	Gladys	Randolph County
Leading Creek Volunteer Fire Department	Emergency Service	Critical	100 Tripler Road	Kerens	Randolph County
Middle Mountain Cabins	Historic	Historic	Middle Mountain Road	Wymer	Randolph County
Pickens Volunteer Fire Department	Emergency Service	Critical	Main Street	Pickens	Randolph County
Rich Mountain Battlefield	Historic	Historic	Rich Mountain Road	Beverly	Randolph County
See-Ward House	Historic	Historic	Seneca Trail	Mill Creek	Randolph County
Taylor Condry House	Historic	Historic	1700 Taylor Avenue	Elkins	Randolph County
Tygart Valley Homestead Historic District	Historic	Historic	Randolph Drive	Dailey	Randolph County
Tygart Valley Volunteer Fire Department	Emergency Service	Critical	U.S. 219 & U.S. 250	Dailey	Randolph County
U.S. Post Office	Post Office	Special Consideration	3391 Seneca Trail	Dailey	Randolph County
U.S. Post Office	Post Office	Special Consideration	4514 Appalachian Highway	Dryfork	Randolph County
U.S. Post Office	Post Office	Special Consideration	4916 Pickens Road	Helvatia	Randolph County
U.S. Post Office	Post Office	Special Consideration	5173 Parsons Road	Kerens	Randolph County
U.S. Post Office	Post Office	Special Consideration	1010 Mabie Cassity Road	Mabie	Randolph County
U.S. Post Office	Post Office	Special Consideration	8 Pickens Road	Pickens	Randolph County
U.S. Post Office	Post Office	Special Consideration	5934 Seneca Trail	Valley Bend	Randolph County
U.S. Post Office	Post Office	Special Consideration	25232 Seneca Trail	Valley Head	Randolph County
Valley Head Volunteer Fire Department	Emergency Service	Critical	U.S. 219 South	Valley Head	Randolph County
Whitmer Volunteer Fire Department	Emergency Service	Critical	CR 29	Harman	Randolph County

TABLE: 2.3.17 BEVERLY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Beverly Elementary School	School	Vulnerable	505 Main Street	Beverly	Beverly
Beverly Family Research	Historic	Historic	Main Street	Beverly	Beverly
Beverly Heritage Center	Historic	Historic	Court Street	Beverly	Beverly
Beverly Town Hall	Government Facility	Critical	5 Walnut Street	Beverly	Beverly
Beverly Volunteer Fire Department	Emergency Services	Critical	429 Main Street	Beverly	Beverly
Beverly Wastewater Treatment Plant Beverly Water Treatment Plant	Utility	Critical	5 Walnut Avenue	Beverly	Beverly
U.S. Post Office	Post Office	Special Consideration	290 Court Street	Beverly	Beverly

TABLE: 2.3.18 COALTON ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Coalton Community Building	Community Facility	Special Consideration	10 2nd Street	Coalton	Coalton
Coalton Elementary School	School	Vulnerable	278 Broadway Avenue	Coalton	Coalton
Coalton Volunteer Fire Department	Emergency Service	Critical	10 Broadway Avenue	Coalton	Coalton
U.S. Post Office	Post Office	Special Consideration	11 South 2nd Street	Coalton	Coalton

TABLE: 2.3.19 ELKINS ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Albert and Liberal Arts Halls	Historic	Historic	Campus Drive	Elkins	Elkins
Baldwin Chandlee Supply Company	Historic	Historic	1018 South Railroad Avenue	Elkins	Elkins
Davis & Elkins Historic District	Historic	Historic	Davis & Elkins Campus	Elkins	Elkins
Davis Medical Center	Hospital	Critical	812 Gorman Avenue	Elkins	Elkins
Davis Memorial Presbyterian Church	Historic	Historic	450 Randolph Avenue	Elkins	Elkins
Doctor John C. Irons House	Historic	Historic	Seneca Trail	Elkins	Elkins
Downtown Elkins Historic District	Historic	Historic	Railroad Avenue area	Elkins	Elkins
Elkins City Hall & Police Department	Government Facility Emergency Service	Critical Critical	401 Davis Avenue	Elkins	Elkins
Elkins Fire Department	Emergency Service	Critical	216 4th Street	Elkins	Elkins
Elkins High School	School	Vulnerable	100 Kennedy Drive	Elkins	Elkins
Elkins Middle School	School	Vulnerable	308 Robert E. Lee Avenue	Elkins	Elkins
Elkins Milling Company	Historic	Historic	2 ½ Railroad Avenue	Elkins	Elkins
Elkins Randolph County Senior Center	Senior Center	Vulnerable	Railroad Avenue	Elkins	Elkins
Elkins Randolph County Public Library	Library	Vulnerable	416 Davis Avenue	Elkins	Elkins
Elkins Rehabilitation & Care Center	Nursing Facility	Vulnerable	1175 Beverly Pike	Elkins	Elkins
First Ward School	Historic	Historic	South Davis Avenue	Elkins	Elkins
Governor H. Guy Kump House	Historic	Historic	Seneca Trail	Elkins	Elkins
Graceland	Historic	Historic	Davis & Elkins Campus	Elkins	Elkins
Jennings Randolph Federal Center	Government Facility	Critical	300 3rd Street	Elkins	Elkins
North Elementary School	School	Vulnerable	310 Boundary Avenue	Elkins	Elkins
Pinecrest	Historic	Historic	Kerens Hill	Elkins	Elkins
Randolph County Circuit Clerk	Government Facility	Critical	2 Randolph Avenue	Elkins	Elkins

TABLE: 2.3.19 ELKINS ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Randolph County Clerk	Government Facility	Critical	11 Randolph Avenue	Elkins	Elkins
Randolph County Courthouse Annex	Government Facility	Critical	4 Randolph Avenue	Elkins	Elkins
Randolph County EMS	Emergency Service	Critical	2 11th Street	Elkins	Elkins
Randolph County Magistrate	Government Facility	Critical	11 Randolph Avenue	Elkins	Elkins
Riverside School	Historic	Historic	River Street	Elkins	Elkins
Scott Hill	Historic	Historic	2000 Livingston Extension Avenue	Elkins	Elkins
Senator Stephen Benton Elkins House	Historic	Historic	Davis and Elkins Campus	Elkins	Elkins
U.S. Fish and Wildlife Service	Government Facility	Critical	694 Beverly Pike	Elkins	Elkins
U.S. Post Office	Post Office	Special Consideration	300 3rd Street	Elkins	Elkins
WDNE & WELK Radio	Media	Special Consideration	Washington Avenue	Elkins	Elkins
West Virginia Children's Home	Historic	Historic	230 Heavner Avenue	Elkins	Elkins
West Virginia Department of Health and Human Resources	Government Facility	Critical	1023 North Randolph Avenue	Elkins	Elkins
West Virginia Division of Highways	Government Facility	Critical	1123 North Randolph Avenue	Elkins	Elkins
West Virginia Division of Highways – District 8 Headquarters	Government Facility	Critical	U.S. 219	Elkins	Elkins

TABLE: 2.3.20 HARMAN ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Harman Elementary / High School	School	Vulnerable	US-33	Harman	Harman
Harman Town Hall	Government Facility	Critical	Water Street	Harman	Harman
Harman Volunteer Fire Department	Emergency Services	Critical	Water Street	Harman	Harman
Pioneer Memorial Library	Library	Special Consideration	22526 Alleghany Highway	Harman	Harman
Randolph County Public Safety Building (EMS)	Emergency Services	Critical	Main Street	Harman	Harman
U.S. Post Office	Post Office	Special Consideration	62 Mott Street	Harman	Harman
West Virginia Division of Highways Facilities	Government Facility	Critical	US-33	Harman	Harman

TABLE: 2.3.21 HUTTONSVILLE ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Huttonsville Town Hall & Volunteer Fire Department	Government Facility Emergency Service	Critical	62 Gawthorpe Street	Huttonsville	Huttonsville
U.S. Post Office	Post Office	Special Consideration	10054 Seneca Trail	Huttonsville	Huttonsville

TABLE: 2.3.22 MILL CREEK ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
George Ward Elementary School	School	Vulnerable	10007 Seneca Trail	Mill Creek	Mill Creek
Mill Creek Town Hall	Government Facility	Critical	High Street	Mill Creek	Mill Creek
U.S. Post Office	Post Office	Special Consideration	10054 Seneca Trail	Mill Creek	Mill Creek

TABLE: 2.3.23 MONTROSE ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Montrose Town Hall	Government Facility	Critical	175 Oak Street	Montrose	Montrose
U.S. Post Office	Post Office	Special Consideration	9152 Parsons Road	Montrose	Montrose

TABLE: 2.3.24 TUCKER COUNTY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Adkins Home Center	Economic	Economic	250 Cheat Valley Hwy	Parsons	Tucker County
Baptist Church of Canaan Valley	Special Consideration	Special Consideration	722 Cortland Rd	Davis	Tucker County
Blackwater Falls State Park	Temporary Population	Special Consideration	1584 Blackwater Lodge Rd	Davis	Tucker County
Camp Horseshoe Camp	Temporary Population	Special Consideration	3309 Horseshoe Run Rd	Parsons	Tucker County
Camp Kidd	Temporary Population	Special Consideration	1155 County Farm Rd	Parsons	Tucker County
Canaan Valley State Park	Economic	Economic	230 Main Lodge Rd	Davis	Tucker County
Canaan Valley Volunteer Fire Department	Emergency Services	Critical	6563 Appalachian Hwy	Davis	Tucker County
Cortland Acres Nursing Home & Pine View	Nursing Home	Vulnerable	39 Cortland Acres Ln	Thomas	Tucker County
Davis Coal & Coke	Historic	Historic	570 Douglas Road	Thomas	Tucker County
Davis Thomas Elementary School	School	Vulnerable	100 Quail Ridge Rd	Thomas	Tucker County
Davis Water and Wastewater Plant	Utility	Critical	134 Headquarters Rd	Davis	Tucker County
Department of Health and Human Resources	Government Facility	Critical	9346 Seneca Trail	Parsons	Tucker County
Division of Highways Parsons	Government Facility	Critical	9209 Seneca Trail	Parsons	Tucker County
Division of Highways Thomas	Government Facility	Critical	15951 Appalachian Hwy	Thomas	Tucker County
Hamrick PSD	Utility	Critical	76 2nd St	Hendricks	Tucker County
Hinchcliff Lumber	Economic	Economic	Route 72 South and Hinchcliff Road	Hendricks	Tucker County
Kingsford Manufacturing	Economic	Economic	180 Kingsford Ln	Parsons	Tucker County
Mt. Top Clinic	Medical Facility	Critical Facilities	30 Cortland Acres Ln	Thomas	Tucker County
Ricottilli Lumber Company	Economic	Economic	227 S Haddix Rd	Montrose	Tucker County
Rubenstein Center	Prison/Jail	Critical Facility	141 Forestry Camp Rd	Davis	Tucker County
St. George Academy	Historic	Historic	Holly Meadows Road	Parsons	Tucker County
St. George Medical Clinic	Medical Facility	Critical	8591 Holly Meadow Rd	Parsons	Tucker County

TABLE: 2.3.24 TUCKER COUNTY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
St. George Medical Clinic School Based Clinic	Medical Facility	Critical	81 Tucker Valley School Rd	Hambleton	Tucker County
Thomas Water Plant	Utility	Critical	21904 Seneca Trail	Thomas	Tucker County
Thomas Wastewater Treatment Plant	Utility	Critical	340 Francis Grade	Thomas	Tucker County
Tucker County E911	Emergency Services	Critical	9060 Seneca Trail	Parsons	Tucker County
Tucker County High School	School	Vulnerable	116 Mountain Lion Way	Hambleton	Tucker County
West Virginia State Police	Emergency Services	Critical	9105 Seneca Trail	Parsons	Tucker County
Windwood Fly-In Resort	Airport	Critical	43 Amelia Drive	Davis	Tucker County

TABLE: 2.3.25 DAVIS ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Davis Town Hall	Government Facility	Critical	505 William Avenue	Davis	Davis
Davis Volunteer Fire Department	Emergency services	Critical	610 William Avenue	Davis	Davis
Herman August Meyer House	Historic	Historic	287 Thomas Avenue	Davis	Davis
Tucker County Chamber of Commerce	Special Consideration	Special Consideration	410 William Avenue	Davis	Davis
U.S. Post Office	Post Office	Special Consideration	421 William Avenue	Davis	Davis

TABLE: 2.3.26 HAMBLETON ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Hambleton Town Hall	Government Facility	Critical	105 5th Street	Hambleton	Hambleton
U.S. Post Office	Post Office	Special Consideration	197 Center Street	Hambleton	Hambleton

TABLE: 2.3.27 HENDRICKS ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Hendricks Town Hall	Government Facility	Critical	Main Street	Hendricks	Hendricks
Historic Hendricks Swinging Bridge	Historic	Historic	Poplar Street	Hendricks	Hendricks
U.S. Post Office	Post Office	Special Consideration	43 2nd Street	Hendricks	Hendricks

TABLE: 2.3.28 PARSONS ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Citizens Bank of West Virginia	Special Consideration	Special Consideration	226 Walnut St	Parsons	Parsons
Community Care Pharmacy	Healthcare	Vulnerable	149 Ivy Ln	Parsons	Parsons
D&W Truck Lines	Economic	Economic	325 D&W Lane	Parsons	Parsons
Dollar General Store	Special Consideration	Special Consideration	515 First St	Parsons	Parsons
Family Dollar Store	Special Consideration	Special Consideration	148 Main St	Parsons	Parsons
First Baptist Church	Special Consideration	Special Consideration	101 First St	Parsons	Parsons
Five Rivers Public Library	Library	Special Consideration	301 Walnut St	Parsons	Parsons
Hostetler Funeral Home	Special Consideration	Special Consideration	225 Walnut St	Parsons	Parsons
Kidwell Auto Parts Inc	Special Consideration	Special Consideration	413 First St	Parsons	Parsons
Lohr & Barb Funeral Home	Special Consideration	Special Consideration	312 Main St	Parsons	Parsons
Mountain Valley Bank	Special Consideration	Special Consideration	401 First St	Parsons	Parsons
Parsons Church of God	Special Consideration	Special Consideration	507 Central Ave	Parsons	Parsons
Parsons City Cemetery	Government Property	Special Consideration	100 Cemetery Dr	Parsons	Parsons
Parsons City Hall	Government Building	Critical	341 Second St	Parsons	Parsons
Parson Coin Laundry	Special Consideration	Special Consideration	427 Second St	Parsons	Parsons
Parsons Presbyterian Church	Special Consideration	Special Consideration	304 Walnut St	Parsons	Parsons
Parsons Pressure Station	Utility	Critical	Brooklyn Heights Rd	Parsons	Parsons
Parsons Railroad Depot	Historic	Historic	105 Davis St	Parsons	Parsons
Parsons Raw Water Station	Utility	Critical	Allegheny Highland Trl	Parsons	Parsons
Parsons Shop & Save	Economic	Economic	156 Main St	Parsons	Parsons
Parsons Volunteer Fire Department	Emergency Service	Critical	216 Main St	Parsons	Parsons
Parsons Wastewater Lift Station	Utility	Critical	140 Dawn Dr	Parsons	Parsons
Parsons Wastewater Lift Station	Utility	Critical	792 Walnut St	Parsons	Parsons

TABLE: 2.3.28 PARSONS ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Parsons Wastewater Treatment Plant	Utility	Critical	450 D&W Lane	Parsons	Parsons
Parsons Water Booster Station	Utility	Critical	Billings Ave	Parsons	Parsons
Parsons Water Storage Tank (Fork Mountain)	Utility	Critical	Brooklyn Heights Rd	Parsons	Parsons
Parsons Water Storage Tank (Main)	Utility	Critical	Water Plant Rd	Parsons	Parsons
Parsons Water Treatment Plant (Filtration Building)	Utility	Critical	644 Water Plant Rd	Parsons	Parsons
Parsons Water Treatment Plant (Sedimentation Building)	Utility	Critical	612 Water Plant Rd	Parsons	Parsons
Parsons Woodworking LLC	Economic	Economic	214 Davis St	Parsons	Parsons
Performance Auto Body & Economic Powder Coating	Economic	Economic	125 Poplar St	Parsons	Parsons
Rite Aid	Economic	Economic	150 Main St	Parsons	Parsons
Sheetz	Economic	Economic	200 First St	Parsons	Parsons
St. John's United Methodist Church	Special Consideration	Special Consideration	107 River St	Parsons	Parsons
St. Paul's United Methodist Church	Special Consideration	Special Consideration	203 Central Ave	Parsons	Parsons
Tucker County Administration Building	Historic Government Building	Historic Critical	213 First St	Parsons	Parsons
Tucker County Animal Shelter	Government Building	Critical	586 Brooklyn Heights Rd	Parsons	Parsons
Tucker County Bank Building	Historical	Historical	303 First St		Parsons
Tucker County Board of Education Annex	Government Building	Critical	100 Education Lane	Parsons	Parsons
Tucker County CBOC (Veterans Clinic)	Healthcare	Vulnerable	260 Spruce St	Parsons	Parsons
Tucker County Courthouse	Historic Government Building	Historic Critical	215 First St	Parsons	Parsons
Tucker County Courthouse Annex	Government Building	Critical	211 First St	Parsons	Parsons
Tucker County EMS/OEM	Emergency Service	Critical	215 Main St	Parsons	Parsons

TABLE: 2.3.28 PARSONS ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Tucker County Health Department	Government Building	Critical	206 Senior Ln	Parsons	Parsons
Tucker County Senior Citizens Center	Special Consideration	Special Consideration	217 Sunnyside Ln	Parsons	Parsons
United States Post Office	Post Office	Special Consideration	235 Walnut St	Parsons	Parsons

TABLE: 2.3.29 THOMAS ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Cottril Opera House	Historic	Historic	264 East Avenue	Thomas	Thomas
Mountain Top Senior Citizens Center	Senior Center	Special Population	Appalachian Highway	Thomas	Thomas
Thomas City Hall	Government Facility	Critical	307 Spruce Street	Thomas	Thomas
Thomas Commercial Historic District	Historic	Historic	East Avenue (Appalachian Highway)	Thomas	Thomas

TABLE: 2.3.30 UPSHUR COUNTY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
A F Wendling Food Service	Economic	Economic	100 Wendling Plaza	Buckhannon	Upshur County
Adrian Volunteer Fire Department	Emergency Service	Critical	6933 Route 20 South	Adrian	Upshur County
Banks District Volunteer Fire Department	Emergency Service	Critical	260 Rock Cave Road	Rock Cave	Upshur County
Buckhannon Upshur High School	School	Vulnerable	270 B U Drive	Buckhannon	Upshur County
Buckhannon Upshur Middle School	School	Vulnerable	553 Route 20 South Road	Buckhannon	Upshur County
Ellamore Volunteer Fire Department	Emergency Service	Critical	9797 Old Elkins Road	Ellamore	Upshur County
Fiddlers Mill	Historic	Historic	Heaston Ridge Road	Arlington	Upshur County
French Creek Elementary School	School	Vulnerable	7619 Route 20 South Road	French Creek	Upshur County
French Creek Presbyterian Church	Historic	Historic	CR 2	French Creek	Upshur County
Hodgesville Elementary	School	Vulnerable	918 Teter Road	Buckhannon	Upshur County
James W Curry Library	Library	Special Consideration	1721 Brook Hill Road	French Creek	Upshur County
Rock Cave Elementary School	School	Vulnerable	12292 Route 20 South	Rock Cave	Upshur County
Saint Gobain dba Corhart Refractories	Economic	Economic	87 Corhart	Buckhannon	Upshur County
Selbyville Volunteer Fire Department	Emergency Service	Critical	264 Brooks Hill Road	Selbyville	Upshur County
Tennerton Elementary School	School	Vulnerable	167 Gawthrop Road	Buckhannon	Upshur County
Union Elementary School	School	Vulnerable	401 Heavner Grove Road	Buckhannon	Upshur County
Upshur County Public Library	Library	Special Consideration	1150 Route 20 South	Buckhannon	Upshur County
Warren District Volunteer Fire Department	Emergency Service	Critical	5678 Clarksburg Road	Buckhannon	Upshur County
Washington District Elementary School	School	Vulnerable	5078 Tallmansville Road	Buckhannon	Upshur County
Washington District Volunteer Fire Department	School	Vulnerable	Tallmansville Road	Buckhannon	Upshur County

TABLE: 2.3.30 UPSHUR COUNTY ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
West Virginia State Wildlife Center	Government Facility	Critical	163 Wildlide Road	French Creek	Upshur County

TABLE: 2.3.31 BUCKHANNON ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Buckhannon Airport Booster Station	Utility	Critical	166 Airport Road	Buckhannon	Buckhannon
Buckhannon Brooke Street Lift Station	Utility	Critical	adjacent to 95 Brooke Street	Buckhannon	Buckhannon
Buckhannon Brushy Fork Lift Station	Utility	Critical	adjacent to 156 Cinema Drive	Buckhannon	Buckhannon
Buckhannon Charles Gibson Library	Library	Special Consideration	105 E. Main Street	Buckhannon	Buckhannon
Buckhannon City Hall	Government Facility	Critical	70 E. Main Street	Buckhannon	Buckhannon
Buckhannon Clow WST	Utility	Critical	271 Aurora Trail	Buckhannon	Buckhannon
Buckhannon Colonial Theatre	Utility	Critical	48 Main Street	Buckhannon	Buckhannon
Buckhannon Deanville Lift Station	Utility	Critical	near 33 Tahoe Street	Buckhannon	Buckhannon
Buckhannon Deer Creek Booster Station	Utility	Critical	Deer Creek Lane	Buckhannon	Buckhannon
Buckhannon Deer Creek WST	Utility	Critical	653 Jarrett Drive	Buckhannon	Buckhannon
Buckhannon East Main Street Lift Station	Utility	Critical	near 90 E. Main Street	Buckhannon	Buckhannon
Buckhannon Elias Street Lift Station	Utility	Critical	on Alder Lane off Elias St.	Buckhannon	Buckhannon
Buckhannon Fire Department	Emergency Services	Critical	22 S. Florida Street	Buckhannon	Buckhannon
Buckhannon Economic Park Lift Station	Utility	Critical	end of Development Lane	Buckhannon	Buckhannon
Buckhannon Island Avenue Lift Station	Utility	Critical	near 71 Old Elkins Road	Buckhannon	Buckhannon
Buckhannon Landfill Lift Station	Utility	Critical	near 2391 Mud Lick Road	Buckhannon	Buckhannon
Buckhannon Madison Street Lift Station	Utility	Critical	adj. to 46 Walk Trail Lane	Buckhannon	Buckhannon
Buckhannon Medical Care	Healthcare	Critical	11 N. Locust Street	Buckhannon	Buckhannon
Buckhannon Monongalia Street Lift Station	Utility	Critical	opposite 195 Wood Street	Buckhannon	Buckhannon
Buckhannon North Buckhannon WST	Utility	Critical	497 Hall Road	Buckhannon	Buckhannon

TABLE: 2.3.31 BUCKHANNON ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Buckhannon Police Department	Emergency Services	Critical	24 S. Florida Street	Buckhannon	Buckhannon
Buckhannon Public Safety Complex	Government Facility	Critical	24 S. Florida Street	Buckhannon	Buckhannon
Buckhannon Raw Water Intake	Utility	Critical	opposite 213 Wood Street	Buckhannon	Buckhannon
Buckhannon Route 20 Lift Station	Utility	Critical	adjacent to 40 Clarksburg Rd.	Buckhannon	Buckhannon
Buckhannon Route 20 South Booster Station	Utility	Critical	204 Garden Fresh Plaza Dr.	Buckhannon	Buckhannon
Buckhannon Senior Housing	Senior Facility	Vulnerable	10 Nona Street	Buckhannon	Buckhannon
Buckhannon Solid Waste Disposal Complex	Utility	Critical	44 Mud Lick Road	Buckhannon	Buckhannon
Buckhannon St. Josephs WST	Utility	Critical	127 Pallottine Drive	Buckhannon	Buckhannon
Buckhannon Stockert Youth Center	Community Facility	Special Consideration	79 E. Main Street	Buckhannon	Buckhannon
Buckhannon Street Department	Government Facility	Critical	85 Factory Street	Buckhannon	Buckhannon
Buckhannon Tennerton WST	Utility	Critical	2214 Rt. 20 South Road	Buckhannon	Buckhannon
Buckhannon TJM Lift Station	Utility	Critical	behind 1370 Hall Road	Buckhannon	Buckhannon
Buckhannon Vicksburg Lift Station	Utility	Critical	adjacent to 82 Wimer Avenue	Buckhannon	Buckhannon
Buckhannon Victoria Hill WST #1	Utility	Critical	20 Beech Street	Buckhannon	Buckhannon
Buckhannon Victoria Hill WST #2	Utility	Critical	adjacent to 20 Beech Street	Buckhannon	Buckhannon
Buckhannon Wastewater Treatment Plant	Utility	Critical	1 Sewer Plant Road	Buckhannon	Buckhannon
Buckhannon Water Treatment Plant	Utility	Critical	173 Wood Street	Buckhannon	Buckhannon
Buckhannon WBUC Lift Station	Utility	Critical	adj. to 4 Commerce Drive	Buckhannon	Buckhannon
Buckhannon Weston Road Lift Station	Utility	Critical	adj. to 931 Old Weston Road	Buckhannon	Buckhannon
Buckhannon Wood - Ritchie Street Lift Station	Utility	Critical	adjacent to 37 Ritchie Street	Buckhannon	Buckhannon
Chase Bank	Economic	Economic	32 E. Main Street	Buckhannon	Buckhannon

TABLE: 2.3.31 BUCKHANNON ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Child Development Center	Education	Special Consideration	60 Camden Avenue	Buckhannon	Buckhannon
Citizens Bank of West Virginia	Economic	Economic	10 E. Main Street	Buckhannon	Buckhannon
Cleveland Avenue Bridge	Transportation	Critical		Buckhannon	Buckhannon
CSX / A&O Railroad	Transportation	Critical		Buckhannon	Buckhannon
First Community Bank	Economic	Economic	2 W. Main Street	Buckhannon	Buckhannon
Fred W. Eberle Technical Center	School	Vulnerable	372 Morton Avenue	Buckhannon	Buckhannon
Hinkle Drive Head Start	School	Vulnerable	80 Sycamore Drive	Buckhannon	Buckhannon
Holbrook Nursing Home	Nursing Facility	Vulnerable	183 Holbrook Road	Buckhannon	Buckhannon
Island Nursery Kindergarten	School	Vulnerable	26 Island Avenue	Buckhannon	Buckhannon
J D Hinkle Memorial Bridge	Transportation	Critical		Buckhannon	Buckhannon
Kids R Kids	Education	Vulnerable	9 West Main Street	Buckhannon	Buckhannon
Little Ones Place Christ. Child Care Ctr.	Education	Vulnerable	619 Clarksburg Road	Buckhannon	Buckhannon
Lowe's	Economic	Economic	40 Clarksburg Road	Buckhannon	Buckhannon
Mountain Cap of WV Child Develop.	Education	Vulnerable	10 Tennerton Drive	Buckhannon	Buckhannon
Pearson Family Medical	Medical Facility	Critical	21 Auction Lane	Buckhannon	Buckhannon
Poe Bridge	Transportation	Critical	Poe Road	Buckhannon	Buckhannon
Post Mansion Inn	Historic	Historic	8 Island Avenue	Buckhannon	Buckhannon
Premier Bank	Economic	Economic	14 N. Locust Street	Buckhannon	Buckhannon
Progressive Bank	Economic	Economic	10 S. Locust Street	Buckhannon	Buckhannon
Stonewall Jackson Physician Services	Medical Facility	Critical	132 Cinema Drive	Buckhannon	Buckhannon
UCBOE - Buckhannon-Academy ES	School	Vulnerable	16 College Avenue	Buckhannon	Buckhannon
United States Post Office	Post Office	Special Consideration	56 S. Spring Street	Buckhannon	Buckhannon
Upshur County Board of Education	Government Facility	Critical	102 Smithfield Street	Buckhannon	Buckhannon
Upshur County Christian Academy	School	Vulnerable	176 South Kanawha Street	Buckhannon	Buckhannon

TABLE: 2.3.31 BUCKHANNON ASSET INVENTORY					
Asset Name	Type	Category	Address	City	Jurisdiction
Upshur County Courthouse	Government Facility	Critical	38 West Main Street	Buckhannon	Buckhannon
Upshur County EMS	Emergency Services	Critical	164 Preston Street	Buckhannon	Buckhannon
Upshur County Health Department	Government Facility	Critical	15 N. Locust Street	Buckhannon	Buckhannon
Upshur County Historical Society	Special Consideration	Special Consideration	29 W. Main Street	Buckhannon	Buckhannon
Upshur County Senior Center	Senior Center	Vulnerable	28 N. Kanawha Street	Buckhannon	Buckhannon
Upshur Head Start	Education	Vulnerable	8 Cleveland Avenue	Buckhannon	Buckhannon
Upshur Human Resources Head Start	Education	Vulnerable	80 Kelson Drive	Buckhannon	Buckhannon
USPFO - WVANG	Government Facility	Critical	184 Armory Road	Buckhannon	Buckhannon
Wal-Mart	Economic	Economic	100 Buckhannon Crossroads	Buckhannon	Buckhannon
West Virginia Division of Highways Equipment Division	Government Building	Critical	83 Brushy Fork Road	Buckhannon	Buckhannon
West Virginia Home Health	Medical Facility	Critical	12 Hartman Plaza	Buckhannon	Buckhannon
West Virginia Hospice	Medical Facility	Critical	6 Hartman Plaza	Buckhannon	Buckhannon
West Virginia Wesleyan College	Higher Education Economic	Vulnerable Economic	59 College Avenue	Buckhannon	Buckhannon
WV Army National Guard / Event Ctr.	Government Facility	Critical	929 Brushy Fork Road	Buckhannon	Buckhannon
WV Split Rail	Economic	Economic	16 Lumber Street	Buckhannon	Buckhannon
WVU Medicine - Physician Office Center.	Medical Facility	Critical	1 Amalia Drive	Buckhannon	Buckhannon
WVU Medicine - St. Joseph's Hospital	Medical Facility	Critical	1 Amalia Drive	Buckhannon	Buckhannon
WVU Medicine - Women's Health	Medical Facility	Critical	100 West Main Street	Buckhannon	Buckhannon
WVWC - Agnes Howard Hall	Historic	Historic	60 Meade Street	Buckhannon	Buckhannon

2.4 DEVELOPMENT TRENDS

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

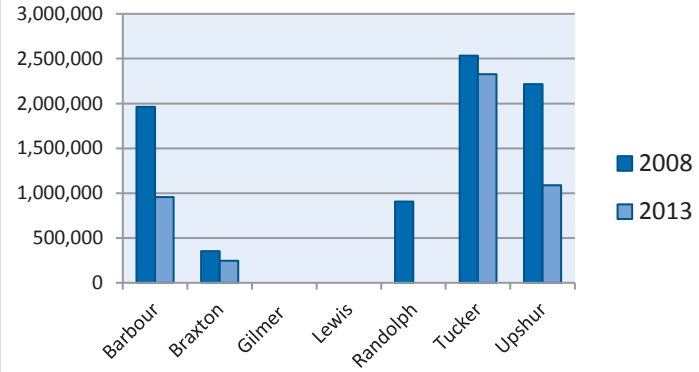
The following development information was taken directly from the *Region VII Comprehensive Economic Development Strategy* (CEDS) 2016-2020 (pages 6-17).

Catalog of Major Economic Events

At the forefront of the region's major economic events are the slumping coal industry and how its downturn has affected residents locally. According to statewide data from the West Virginia Coal Association, 3,500 coal jobs have been lost since 2012, and coal production has been steadily declining over the past five years from 165,750,817 tons in 2008 to 117,518,229 tons in 2013. Unseasonably warm winters, the comparatively lower price of natural gas, and the U.S. Environmental Protection Agency's push to significantly reduce carbon emissions have all contributed to this situation, which is evident in each of Region VII's five coal-producing counties: Barbour, Braxton, Randolph, Tucker and Upshur.

Data from the West Virginia Office of Miners' Health, Safety and Training, shows that significantly smaller amounts of coal were produced in each of these five counties in 2013 than in 2008, five years prior. The most drastic reductions in production occurred in Upshur County, which produced 1,127,833 fewer tons of coal in 2013 than in 2008, and in Randolph County, which produced 907,580 tons of coal in 2008, but was no long considered a coal-producing county by the West Virginia Coal Association in 2013. In addition, the number of operating mines in three of the five counties dropped between 2008 and 2013 by 10 in Barbour County, by three in Randolph County and by one in Upshur County. Braxton County's number of operating mines held steady at two; only Tucker County gained in the number of operating mines, moving from one operating

Table 1: Tonnage of Coal Mined in 2008 vs. 2013



As coal mines continue to close throughout the region, hazards such as water contamination, and land subsidence become more prevalent and need to be properly addressed

mine in 2008 to three operating mines in 2013. In general, mines in the region employed fewer workers in 2013 than they did in 2008, with only Tucker County's coal industry showing signs of a growing workforce that increased by 53 workers between 2008 and 2013.

This downward trend is unlikely to reverse because of problems with supply and end-user demand, according to a study conducted by West Virginia University's Bureau of Business and Economic Research. In fact, overall production is predicted to fall by an average annual rate of 1.2 percent in the next five years, with employment numbers also decreasing, but at a slower rate. Experts believe employment will drop by an annual average of 0.3 percent, or 300 jobs per year. The WVU study forecasts that coal's portion of electricity generation will dip from 42 percent in 2011 to just 38 percent in 2025. Perhaps the most daunting long-term obstacle the coal industry faces is the EPA's proposal to implement laws that would limit the amount of carbon dioxide that can be emitted by coal-fired power plants by 30 percent by the year 2030.

This law poses a threat to the socioeconomic well-being of many West Virginians, as coal industry jobs, which carried an average annual wage of $68,500 in 2013, have functioned as a reliable source of income for many Mountain State families. In numerous cases, these well-paying jobs have also provided individuals who cannot afford to attend college with productive livelihoods and have enabled them to climb out of the depths of poverty. In addition, members of the Region VII CEDS Committee, and particularly those who are governmental officials, expressed concerns about decreases in the coal severance tax distributed to their counties or municipalities on a quarterly basis, which is a byproduct of the declining coal industry. Indeed, local data shows that the amount of coal severance tax disbursed to Region VII's four coal-producing counties has been steadily declining over the past three years. In 2011, those counties altogether received approximately $1,685,368 in coal severance tax; however, in 2013, they only garnered a collective $747,513 – a difference of nearly $1 million. This region-wide decrease in coal severance tax has limited the ability of county and municipal governments to work for the betterment of the people they serve by expending funds on community development and infrastructure-related projects.

Conversely, the burgeoning natural gas industry has become a major economic player across the state and within the region. The industry began its ascent in the Mountain State in 2010 with the introduction of hydraulic fracturing techniques, which enabled horizontal well drilling. Horizontal well drilling gave natural gas companies access to previously untapped reserves of shale gas hidden deep within the Marcellus and Utica shales.

The loss of employment and/or lower wages for residents of Region VII means there will be less opportunity for them to implement mitigation activities around their own property as the funds will not be available.

In fact, 2012 was an especially profitable year for the industry when statewide production spiked to 539 billion cubic feet, marking an almost 40 percent increase from 2011. Then, in 2013, statewide production rose another 33 percent. Employment in the oil and natural gas mining and support services for the industry notably grew by more than 3,200 jobs between 2002 and 2012, a gain of 7.3 percent on an average annual basis.

This statewide trend is apparent in Region VII counties, which produced the largest combined amount of natural gas in 2012 – 52,970,011 mcf (thousand cubic feet) – since 2000. Additionally, the number of natural gas-producing wells in five of the region's seven counties peaked in 2011 and 2012, although the number of wells had generally been on the rise since 2000. The number of total active wells in Region VII reached an apex of 13,023 in 2012. Specifically, the most notable growth in the industry has occurred in Lewis, Upshur, Barbour and Gilmer counties, according to data from the West Virginia Geological and Economic Survey and the West Virginia State Treasurer's office. In fact, based on the previous year's production amounts, Lewis County received nearly $270,000 in oil and gas severance tax in 2012, and Upshur County raked in approximately $265,000 in oil and gas severance tax in 2013, the highest amounts distributed to any counties in the region since the advent of the severance tax in 2010. This money is a relatively new revenue stream to be used for the benefit of counties and the municipalities therein; it is disbursed to county and municipal governments based primarily on oil and natural gas production and secondarily on population.

Despite the overall growth of the industry in West Virginia in 2013, there was a slight decline in the amount of natural gas produced in Region VII in 2013. According to industry experts, growth that year was limited to West Virginia's northwestern counties, where the practice of hydraulic fracturing and horizontal drilling was relatively new. In fact, Barbour County is the sole Region VII county that experienced growth in its natural gas sector in 2013. Nevertheless, economic experts predict that as a whole, the industry will continue to grow across the state, rising to record highs through 2019, with production jumping from about 800 billion cubic feet in 2013 to 1,600 billion cubic feet in 2019. Employment is likely to grow at a

There is a belief the hydraulic fracturing increases the threat of earthquake hazards. There were several earthquakes in 2010 that were appeared to be linked to the injection wells. The earthquakes subsided once the company lessened the injection pressure used to access the shale gas.

rate of 3 percent on an average annual basis between 2014 and 2019. Signs of a second "boom" are already evident in Region VII, particularly in Lewis and Barbour counties, according to members of Region VII's CEDS Committee and other local stakeholders. One local energy company based in Lewis County has unveiled plans to develop approximately 70 horizontal wells, while also adding pipeline and waterline infrastructure. Additionally, pending the success and price of natural gas, the company could establish as many as 400 natural gas wells over the next decade.

Furthermore, the pending installation of a new 550-mile long natural gas pipeline that will originate in Harrison County and run through three Region VII counties – Lewis, Upshur and Randolph – before traveling into nearby Pocahontas County and then into Virginia and North Carolina is evidence that the industry is on the rise. A joint venture of Dominion Resources, Duke Energy, Piedmont Natural Gas and AGL Resources, the proposed Atlantic Coast Pipeline will stretch from Harrison County, West Virginia to Greensville County, Virginia, and then wind south into eastern North Carolina. Route planning is expected to be complete by June 2015, and construction will likely take place from 2016-2018. The 42-inch pipeline is expected to be in service by late 2018, and its projected capacity is 1.5 billion cubic feet per day. In order to ensure that gas flows steadily, three compressor stations are being erected along the route: one in Lewis County, West Virginia, one in central Virginia and a third near the Virginia-North Carolina border. Dominion Resources has emphasized that the pipeline will serve only customers in West Virginia, Virginia and North Carolina and that the natural gas it transports will not be shipped overseas. Every county along the pipeline's route is expected to benefit; the Atlantic Coast Pipeline is expected to support over 17,200 new jobs, stabilize the cost of electricity and home heating, improve air quality, and generate significant state and local tax revenue. These are major advantages for the communities in Region VII, and especially those within Lewis, Upshur and Randolph counties.

The addition of a natural gas pipeline running through Region VII counties is an additional hazardous materials risk and would need to be considered during the

The Atlantic Coast Pipeline is not the only underground system likely to create jobs in Region VII counties. The Stonewall Gathering System, a 50-mile natural gas pipeline that will run from Harrison County south into Braxton County, could generate as many as 700-800 new construction jobs in north central West Virginia. Workers may begin building the 36-inch-diameter pipeline as early as March 2015. Steel pipe is already being stockpiled near the intersection of U.S. Route 33 (Corridor H) and Brushy Fork Road in Buckhannon. The Stonewall Gathering System will begin collecting gas in Harrison County and then transmit it south to Braxton County, where it will link up with a Columbia Gas Transmission line that serves the Mid-Atlantic region of the United States. In addition to new construction jobs, another benefit the Stonewall Gathering System brings with it is access to new takeaway pipelines and markets, according to officials with Stonewall Gas Gathering LLC, the company that will be overseeing the project.

The timber/wood products industry is another bright spot in the region's economy. The West Virginia Hardwood Alliance Zone is a major hardwood producing region that feeds timber into a cluster of manufacturing, processing and other wood product-related businesses/operations. It is comprised of nine "core" counties, five of which are Region VII counties: Barbour, Lewis, Randolph, Tucker and Upshur. West Virginia's wood products industry is currently rebounding after a major slump connected to the 2007-2009 recession and the collapse of the housing market. Due to the housing industry's comeback and an increase in home-building activity, wood products operations were able to add jobs at a rate of almost 5 percent during 2013. Employment within the West Virginia Hardwood Alliance Zone—which in addition to its nine "core" counties, encompasses 24 additional counties in West Virginia, Virginia and Pennsylvania—reflects this trend. HAZ's aggregate civilian labor force has been steadily ascending from 524,867 in 2008 to 538,182 in May of 2013.

Notably, timber/wood products companies were among the top 10 employers in four Region VII counties, highlighting the importance of the industry's continued success to the economy of Region VII. Armstrong Hardwood Flooring in Randolph County is the county's third largest employer, while Northwest Hardwoods, Inc. is its tenth largest employer. Weyerhaeuser is Braxton County's fourth largest employer and Upshur County's fifth. Additionally, T.K. Stanley, an employer in both the natural gas sector and wood products

The timber/wood products industry brings employment opportunities and revenue to the region however, it also brings increased vulnerability to flooding. Trees, as with all plant-life, help reduce flooding by:

1. reducing rain impact which causes less erosion,
2. absorbing water from the soil through roots, and
3. roots holding soil in place reducing movement of sediment that can shrink river channels.

sector, is Lewis County's sixth largest employer. The economic outlook for the wood products industry through 2019 is good news for a region that relies heavily on the availability of jobs in this particular cluster. West Virginia's manufacturing sector is predicted to grow by 0.9 percent per year over the next five years, and the wood products industry is expected to be the fastest growing segment within the sector.

One factor sure to serve as a catalyst for the continued expansion not only of the timber/wood products industry, but also of economic development in Region VII is the completion of Corridor H. Authorized by the 1965 Appalachian Regional Development Act, Corridor H is part of the Appalachian Corridor System, which was developed to connect Appalachia with the rest of the nation and world.

When completed, Corridor H will span 130 miles in West Virginia from the Interstate 79 interchange in Weston (Lewis County) to Wardensville (Hardy County), where the West Virginia/Virginia border is located. Corridor H then stretches 13 additional miles in Virginia, ending at the Interstate 66/Interstate 81 junction near Front Royal, Virginia. The advantages of completing Corridor H are numerous; however, the chief one is that Corridor H will enable billions of dollars of exported goods from West Virginia to be shipped around the world. Corridor H facilitates that access by providing manufacturers and producers with a direct, drivable route to the Virginia Inland Port in Front Royal. From there, double-stacked rail containers transport goods to Norfolk, Virginia, where the deepest port on the Eastern Seaboard is located. Having access to the Norfolk International Terminals (NIT) is critical because it would mean West Virginia goods – such as timber and wood products – could be sent to 125 ports around the world.

Exporting West Virginia's wares is a much more complicated and delicate process currently. Usually, goods are driven to the Port of Baltimore in Baltimore, Maryland, one of the largest and busiest ports on the East Coast. Lines are long, and the extensive wait time

can be detrimental to some products, specifically timber and wood products. Once these products are fumigated to comply with international regulations, they must ship out within a certain time frame. If too much time passes, the fumigation process must begin again, significantly delaying companies' ability to transfer their goods in a timely manner and resulting in a loss of profit. The wood product industry is not the only sector that would significantly benefit from the completion of Corridor H, and consequently, expedited international shipping. Lewis County officials have identified the area as having great potential for warehouse distribution activity; Corridor H would enhance the prospects of this developing sector by linking the county with the Virginia Inland Port and the Norfolk International Terminals, and hence, with the rest of the world.

In addition to opening West Virginia up to international markets, Corridor H would allow West Virginians to more easily access the East Coast and the Washington, D.C. area. Likewise, people from the eastern states of Virginia, Maryland and Delaware who are interested in exploring the Mountain State for the first time would be able to enjoy a significantly smoother and more direct route to West Virginia. The completed four-lane highway will prove to be an indisputable boon to the state's and region's tourism industry. Former West Virginia Senator Jay Rockefeller once said Corridor H had the potential to turn the state into "an economic powerhouse." And indeed, an October 2013 study conducted by the RQA group for the Corridor H Authority, a group advocating for the highway to be finished by 2020, highlighted the numerous benefits of finishing the highway sooner rather than later. The study found that completing the four-lane highway by 2020 instead of 2036, the original completion date, would generate $1.25 billion in new revenue for the state of West Virginia, while construction costs would add another $800 million to the state's economy. Once the corridor is complete, it is expected to spawn 800,000 jobs throughout the Appalachian Corridor System. Fittingly, the Corridor H Authority, which is based in Upshur County, developed and is marketing quicker construction of the road with the slogan "It's about jobs. It's about time."

Recently, the Corridor H Authority and other West Virginians eagerly looking forward to traversing the state via Corridor H received some positive news: construction of the four-lane highway appears to be progressing three years ahead of the scheduled 2036 completion date, according to local officials. That can be credited in part to the 2012 Surface Transportation Bill, which forced states within the Appalachian Corridor System to disclose plans for unfinished roads in the system within one year. In late 2013, the State of Virginia released its highway construction schedule, which promisingly contained a construction

completion date of 2025-2026 for its 13-mile-long portion of the highway. Seventy-five percent of West Virginia's section of the road was officially finished or under construction in October 2012, when a major 8-mile section linking Knobley Road to Scherr in Grant County opened, and 87 percent of the road is expected to be done by 2018. Most recently, a one-mile section of the project in the Mount Storm area of Grant County was opened to traffic in late November 2014, and another four-mile stretch is expected to be unveiled in spring of 2015.

As will be discussed throughout this CEDS, the completion of Corridor H is the most important development occurring in the region because this project is critical to the long term economic growth and sustainability of local economies within the area. Corridor H runs through five of the seven Region VII counties, and the ones to the west of its origin – Gilmer and Braxton – will also reap the benefits of the highway's completion. Corridor H provides a direct link to Interstate 79, which travels through both Gilmer and Braxton counties and is likely to bring in more people, more products and more jobs. Moreover, Corridor H's completion will enable the people, businesses and communities within Region VII counties to increase their volume of imports and exports, broadening north central West Virginians' ability to buy and sell goods in international markets. In addition, once complete, Corridor H will boost the region's tourism industry and attract people and businesses of all kinds to the region, which will, in turn, diversify local economies and enhance the quality of life for Region VII residents.

One surefire way to strengthen a region's viability over time is to test, analyze and strengthen its economic resilience. Two major economic events recently prompted local officials to examine and improve economic resiliency in communities throughout region. Natural disasters pounded the Mountain State in 2012, first in June and then exactly four months later in October. With little warning, a June 29 derecho comprised of violent storms and tree-snapping straight-line winds swept across the state. Widespread power outages, lost wages and shortages of basic supplies such as gasoline, ice and food resulted. President Barack Obama declared June 29-July 1 a major disaster, which made public assistance requested by Governor Earl Ray Tomblin accessible to state governments, qualifying local governments and some private nonprofit organizations in 45 counties. All seven Region VII counties received assistance; however, some were more adversely affected by the derecho than were others, as is evident by the per capita impact the storm had in each area. The storm had the most severe impact in Lewis County, which had a per capita impact of $40.52, followed by Gilmer County ($24.21), Braxton County ($16.27), Barbour County ($14.72), Upshur County ($11.03), Tucker County ($7.28) and Randolph County ($4.95).

Exactly four months later on October 29, 2012, Hurricane Sandy – which had by then morphed into Superstorm Sandy – blasted the region with heavy, wet snow, blizzard-like conditions, and flooding in some areas. Residents endured the loss of heat, electricity and access to communication systems. In late November, the president declared a major disaster, again making public assistance requested by the governor available to the state government, eligible local governments and some nonprofit organizations. Six of Region VII's counties were among 18 counties that qualified for assistance. Tucker County, which had a per capita impact of $140.04, was the hardest hit county, following by Randolph ($41.91), Barbour ($41.59), Upshur ($34.16), Braxton (33.74) and Lewis ($5.19). These back-to-back natural disasters highlighted gaps in emergency planning and communications systems across the region. In the wake of each event, local officials discussed ways in which to bolster economic resiliency, or the ability to bounce back in the face of a crisis. For example, in Randolph County, following a series of public forums, county commissioners oversaw the purchase and installation of backup generators for all fire departments in the county, which often serve as emergency shelters for people without power or other critical resources.

These historical events have caused the counties and municipalities to take steps to become more resilient as a community and encourage their residents to do the same.

Key Industries and Clusters

Expected to account for one third of West Virginia's energy sector employment by 2019, natural gas is one of Region VII's chief emerging industries/clusters. While production in the region slowed slightly in 2013, it is expected to rise quickly statewide through 2019. The Jane Lew Industrial Park, located just off Interstate 79 in Lewis County, is home to a slew of companies that focus on the production or development of natural gas reserves that lie within the Marcellus Shale, including Consolidated Energy, which could develop as many as 400 wells in the Lewis County area over the next 10 years. In Upshur County, companies that belong to the natural gas sector are stationed along the Industrial Park Road in Buckhannon; along Route 151 just west of Buckhannon; and within or near the Upshur County Business Center on Mud Lick Road. There are a wide range of employment opportunities available in Region VII's natural gas sector. These include, but are not limited to: drilling and production jobs; administrative and human resources-related jobs; professional jobs, including GIS (Geographic Information Systems) specialists, geologists, financial professionals and engineers; equipment manufacturing jobs; skilled trades jobs, such as those for electricians, plumbers and mechanics; landman jobs; research and development jobs; truck driving jobs; and other manual labor positions.

In addition, its potential for long-term growth positions the natural gas industry as a key cluster in Region VII. As discussed in the previous section, the Atlantic Coast Pipeline and Stonewall Gathering System pipelines are expected to generate significant economic benefits in every county through which they pass. The likelihood of the pipelines leading to the creation of both temporary and permanent jobs in Randolph County, Braxton County, Upshur County, and especially Lewis County – where one of three natural gas compressor stations for the ACP is set to be built – is high. Local industry officials have reported that contracts are already in place with natural gas-producing companies to fill 92 percent of the Atlantic Coast Pipeline with gas for 20 years. Officials say 150 new wells must be drilled in the area to produce enough natural gas to fill the ACP for 20 years. In addition, the heavy metal pipe that will be used to construct the Stonewall Gathering System pipeline is being stored in Upshur County directly across from the major intersection of Corridor H (locally known as U.S. Route 33) and Brushy Fork Road. Moreover, positions related to oil and natural gas extraction pay extremely well in West Virginia, given the low cost of living. According to WorkForce West Virginia, employees working in oil and gas extraction made an average weekly wage of $1,858.69 per week, or approximately $96,561.88 per year, in the first quarter of 2014. Natural gas jobs also generate revenue for counties and municipalities via the oil and gas severance tax, which is based on production levels and population.

Finally, the natural gas industry produces not only energy, but also spillover advantages for many other industries. For example, energy companies based in other states that wish to conduct exploration activities of the Marcellus Shale in West Virginia often send workers into the region to fill temporary positions. This influx of temporary employees eat in local restaurants and stay in local hotels throughout the region, thus generating business for the hospitality and tourism industry, particularly in counties in which the natural gas industry is thriving. The natural gas industry's second "boom" also carries the potential to revive and strengthen the manufacturing industry in the state through the development of cracker plants. These plants use intense heat to "crack" the ethane present in natural gas into ethylene, which is the base product for many plastics, resins, adhesives and countless synthetic products used every day in modern life. Already, plans have been announced to construct a cracker plant in Wood County, and many economists forecast that more cracker plants need to be established to handle the large output of natural gas expected over the next decade.

A second key regional industry is the rebounding wood products industry. Of all manufacturing sectors in the state, timber/wood products is predicted to grow at the most rapid rate over the next five years, largely due to the revival of the once-ailing housing market.

As was discussed in the prior section, five of the region's seven counties have been classified as core counties within the West Virginia Hardwood Alliance Zone, a major hardwood producing region that funnels timber into a cluster of manufacturing, processing and other wood product-related businesses/operations. Approximately 65 hardwood companies do business in the HAZ region of Barbour, Lewis, Randolph, Tucker and Upshur counties. The hardwoods cluster in Region VII includes logging/log yards, lumber mills, dry kilns, flooring manufacturers, pellet mills, furniture manufacturers, Rustic/Split Rail Fencing producers, log home builders, moulding manufacturers, charcoal manufacturers and joist manufacturers.

In addition to the sheer variety and number of hardwoods businesses operating in Region VII, its capacity for growth makes the hardwoods sector an important industry in the area. When finished, Corridor H will enable wood products manufacturers to drive their wares to the Virginia Inland Port in Front Royal, Virginia. From there, they will be taken via double-stacked rail containers swiftly to the Norfolk International Terminals, in Norfolk, Virginia, where the deepest port on the Eastern Seaboard is located. This port has the capacity to ship goods to 125 ports across the world. Hardwoods manufacturers in north central West Virginia will therefore have a more efficient, effective and convenient way to ship their wood products to new and existing international markets, which will likely spur a greater demand for those products and enable the region's hardwood businesses to be more competitive on a global scale.

Another emerging cluster in Region VII's economy is retail trade. Pockets of retail stores and food and beverage businesses bundled together along major roadways are becoming an increasingly commonplace sight in the region. Some of these strip malls include the Flatwoods Factory Outlet Stores, located off Exit 67 on Interstate 79 in Braxton County; the Market Place Plaza at the interchange of U.S. Route 33 (Corridor H) and Interstate 79 in Lewis County; the Northridge Development and the Buckhannon Crossroads/Walmart shopping areas, located just off State Route 20 in Upshur County; and multiple clusters of retail stores and restaurants scattered along the Beverly Five-lane just outside Elkins in Randolph County. The stores that comprise these "strip malls" sell a wide assortment of wares, including women's and men's clothing, shoes, local and imported wine, books, bulk foods, candles, mattresses, primitive décor, hunting and fishing equipment,

women's pajamas and intimate apparel, household goods and much, much more. Many, if not all, of the pockets of retail stores are in the midst of expansion.

For example, the Flatwoods Factory Outlet Stores support about 250 jobs through 25 enterprises. Approximately 400 acres make up this site; 100 will be developed within the next decade and another 150 will be developed following that. Indeed, construction is well underway on a new Walmart store near the factory outlet stores area. Walmart has invested approximately $10 million to open the facility, which is predicted to create 300 new jobs. Sales are expected to range between $60 million to $75 million during the store's first year in business. Meanwhile, to the north in Buckhannon, the new Northridge Development recently opened a wine shop in addition to a Buffalo Wild Wings restaurant that serves as the development's anchor business. An expanded AT&T store has opened in the plaza, as has an insurance agency.

It should be noted that there are no large indoor shopping malls within the seven-county region. The prevalence of these pockets of retail stores and restaurants reflects the reality that despite the lack of malls, people still want to be able to purchase a wide variety of goods at a central location. Simply put, "strip malls" cater to that desire. Indeed, retail stores make up a large portion of the region's economy. In four of the seven counties, including Barbour, Braxton, Randolph and Upshur, retail trade is the largest of 20 major sectors. However, jobs in the retail trade sector pay comparatively low wages. Statistics show that in 2013, an average annual salary for an employee working in retail trade in the region ranged from $20,450 in Barbour County to $27,430 in Braxton County. This salary range highlights a chief dilemma in the region, if not across the state, and that is how to attract large numbers of better-paying jobs to the area.

From a plethora of outdoor recreational opportunities afforded by the rural, rugged landscape to famous sites steeped in Civil War-era history to well-known Appalachian fairs and folk festivals, the region's tourism and hospitality industry stands poised to emerge as a key cluster within the next several years. In fact, as Corridor H winds its ways to completion, more and more visitors are likely to make their way to the Mountain State to enjoy the five state parks, picturesque hiking and biking trails, peaceful rivers and lakes, scenic railroad adventures, quaint antique and specialty shops and family-friendly ski resorts that lie within the bounds of Region VII.

The tourism and hospitality industry continues to flourish both on the state level and within the region. According to an October 2013 study conducted for the West Virginia Division of Tourism in South Charleston, travel spending in the Mountain State increased by

3.3 percent per year between 2000 and 2012, adjusted for inflation. The study found that during the 2012 calendar year, visitor spending in West Virginia supported approximately 46,400 jobs with earnings of $1.1 billion. Since 2004, the tourism/hospitality industry has expanded in some way in each of Region VII's seven counties – be it through direct spending on travel/tourism-related activities, employee earnings, the number of hospitality and tourism jobs available and/or the amount of local government revenue generated through hotel/motel occupancy tax. Based on the amount of direct travel-related spending and the percentage of individuals employed in the sector, the hospitality/tourism industry has the greatest impact on the economies of Randolph, Lewis, Tucker and Braxton counties.

During the 2012 calendar year, day and overnight visitors to Region VII counties spent more than $237 million on items directly related to travel and tourism. The largest amount of direct spending – about $48.3 million – took place in Region VII's largest county, Randolph County, which has a county Convention and Visitors Bureau that actively promotes the area. Between 2004 and 2012, approximately 90 travel-related jobs were added in the county, and local government revenue garnered through hotel/motel occupancy tax dramatically increased from $117,000 to $612,000.

Perhaps, this growth can be credited to the winning combination of a CVB that aggressively markets the area, along with the diversity in tourist attractions that Randolph County offers. Some of those include the Branson, Missouri-style American Mountain Theater that features music and comedy variety shows; the Durbin & Greenbrier Valley Railroad system, which has a depot in Elkins and offers a handful of breathtaking rail excursions; and the abundant hiking and biking opportunities available in the Monongahela National Forest, Kumbrabow State Forest, Otter Creek and Laurel Fork Wilderness Areas and Dolly Sods Scenic Area. In addition, Randolph County is home to a multitude of fairs, festivals and distinctive events, including the Mountain State Forest Festival, one of the oldest and largest festivals in the state; the Augusta Heritage Festival, which celebrates a host of Appalachian musical and artistic traditions; the Civil War Battle of Rich Mountain Re-enactment and much, much more. Additional development to support a thriving tourism industry is also underway. Currently, the historic 1863 Grille is being developed into an expanded restaurant and new hotel, known as the Isaac Jackson Hotel and Conference Center. In August of 2014, the owner of the hotel and conference center received a $5 million loan from the U.S. Small Business Administration – the largest the West Virginia District Office of the SBA has ever disbursed – to pay for additions and renovations to the property, which the owners hope to transform into a resort destination.

The tourism industry has the potential to increase revenue including tax revenue as well as create new jobs. However, the influx of visitors can create a strain on the aging infrastructure of the area including highways, water, and wastewater. Some of the revenue should be invested in the strengthening of local critical infrastructure.

Following Randolph, Lewis County raked in a total of $47.3 million in direct travel and tourism spending in 2012. Local government revenue increased from $202,000 in 2004 to $747,000 in 2012, and the number of jobs in the travel/tourism sector increased by 70 within the same time period. Key attractions include the infamous Trans-Allegheny Lunatic Asylum, which closed in the early 1990s, but is still open for historical tours, ghost hunts and more. Located in downtown Weston, TALA is the largest hand-cut stone masonry building in North America. Lewis County is also home to Lambert's Vintage Wines winery, which features tours and tastings and also hosts special events year-round. Perhaps, the biggest draw to Lewis County is Stonewall Resort, which is located on Stonewall Jackson Lake in Stonewall Jackson Lake State Park. Visitors to the park and resort will discover ample boating opportunities, an 18-hole Arnold Palmer Signature Golf Course, a full-service spa, three restaurants, hiking and biking trails and a new Roanoke Activity Plaza. The activity plaza, geared toward children and young adults, offers arcade games, Frisbee golf, an indoor rock climbing wall, nine-hole mini-golf, guided Segway tours and more.

Visitors to Tucker County spent $41.1 million in 2012. Although visitor spending has increased in general over the period between 2004 and 2012, it is down from the 2008 level of $43 million. Moreover, employment has dropped gradually from 750 jobs in 2004 to just 640 jobs in 2012 – a difference of 110. This decline should be a concern for a county that heavily relies upon tourism-related jobs to employ its people. More than 18 percent of the people who make up

Table 3. Estimates of Direct Travel Spending in WV.

	2004	2012
Barbour	$11.3 mil.	$17.2 mil.
Braxton	$25.8 mil.	$40.2 mil.
Gilmer	$5.9 mil.	$8.7 mil.
Lewis	$30 mil.	$47.3 mil.
Randolph	$30.7 mil.	$48.3 mil.
Tucker	$38.8 mil.	$41.1 mil.
Upshur	$21.7 mil.	$34.3 mil.

Source: "Economic Impact of Travel on WV, 2013"

Tucker County's workforce depend on the tourism and hospitality industry for employment, according to the 2013 study. In comparison, only 5.5 percent of Lewis Countians and just 4.2 percent of people who live in Randolph County are employed in the tourism and travel sector.

The Tucker County tourism industry is able to employ such a large percentage of the local workforce because visitors from within and without the state flock to its state parks and ski resorts. At the center of Blackwater Falls State Park lies one of the most often photographed waterfalls in West Virginia. In addition to a 54-room lodge, Blackwater Falls boasts a recently constructed conference center and indoor/outdoor pool, as well as a brand new sled run and people mover. Located

in Canaan Valley State Park, Canaan Valley Resort is a four-seasons resort with a recently renovated 160-room lodge, more than two dozen cabins, a campground and a full-service ski area, as well as fine dining, a conference center and hiking, biking and cross-country ski trails. In addition to its state parks, resorts and downhill and cross-country skiing areas, Tucker County is known for its eclectic shops, galleries, eateries and live music venues. In addition, Corricks Ford Battlefield, where the Confederate General Robert S. Garnett was fatally shot on July 13, 1861, can be found near Parsons, Tucker County's county seat. Garnett was the first general officer to die in the Civil War.

Close behind Tucker County, Braxton County, located in the center of the state, benefitted from $40.2 million in visitor spending in 2012. About 6 percent of the county's workforce is employed in the tourism and hospitality sector, and there has been a steady increase in direct spending on travel from $25.8 million in 2004 to $40.2 million in 2012. The number of direct travel-generated jobs remained stable within the same time frame, hovering between 320 and 330. The Flatwoods Factory Outlet stores and the Days Hotel and Conference Center, which are conveniently located directly off Interstate 79, are major pulls to the area, as is Café Cimino Country Inn in Sutton, Sutton Lake and marina and Burnsville

Lake. In addition, Civil War buffs can enjoy traditional Civil War re-enactments of the October 13, 1863 Battle of Bulltown weekly at the Bulltown Historic Area.

Aside from these four key counties, the tourism industry is also showing potential for growth in Upshur County, which, like Randolph County, has a very active Convention and Visitors Bureau. Since its reorganization several years ago, the Upshur CVB has been busy promoting downtown Buckhannon, the county seat, as a quaint, but busy small town, where local eateries and Appalachian art abound. Other attractions include various Civil War-era sites, the historic Fidler's Mill and the West Virginia Wildlife Center, where visitors can observe West Virginia wildlife in their natural habitats. These efforts have literally been paying off, as direct spending on travel and tourism-related activities has generally increased over the past decade from $21.7 million in 2004 to $34.4 million in 2012. Perhaps most significantly, the tourism industry has been able to add about 80 new jobs within the same time period. Now that construction of the brand new Event Center at Brushy Fork is complete, the travel industry is poised to continue flourishing; the Event Center has the capacity to seat approximately 350 people for meetings, conferences, banquets and other events. Once Corridor H construction is finished, visitors from eastern states will likely be more inclined to visit the region for both business and pleasure, and the hospitality/tourism cluster will consequently be cemented as a key component not only of Upshur County's economy, but of the entire region's economy.

Yet another emerging cluster that has captured much attention throughout the region lately is the farm-to-table movement. Also known as "farm-to-fork," this concept refers to efforts to supply local restaurants, stores and individual consumers with food that is grown locally at a specific farm or farms. The farm-to-table movement encourages a direct relationship between the grower of the food and the buyer or consumer. For instance, the Market Bistro restaurant, located in downtown Buckhannon in Upshur County, proudly uses fresh, local ingredients it purchases from area farmers, and its motto – "from the field to the feast" – reflects that business practice. A recent West Virginia Food and Farm Coalition study found that despite the overall decline in farming nationwide, a "buy local" trend is growing among both individual consumers and large volume purchasers in the state. The expansion of the farm-to-table movement in the region could create more farming jobs as well as the potential for businesses that collect, process and distribute local food.

Within Region VII counties, indoor and outdoor farmers markets have become increasingly popular, and their managers often successfully utilize social media platforms to promote the local produce, meat, eggs, baked goods and other handmade items they sell. The Buckhannon-Upshur Farmers Market in Upshur County, which recently benefitted from the construction of new shelters in Jawbone Park; the Elkins Farmers Market, which sells its wares in an indoor marketplace in Beverly during the winter months; and the Community Garden Market in downtown Philippi are among the farmers markets currently thriving in the region. According to USDA Census of Agriculture data, the value of products sold directly by growers – be it at farmers markets, to individual consumers, or to local stores and restaurants – within Region VII totals approximately $2.9 million annually. The region contains about 78 fresh market farms, or farms that produce goods commonly found at farmers markets. These farms are comprised of a total of approximately 152 acres. However, a 2012 collaborative study of West Virginia's food economy found that there is significant room for vegetable and fruit production to expand and fill the shortage, or difference, that exists in the state between consumption of fresh produce and local production of it. The study revealed that each Region VII county has at least 20,000 additional acres of farmland on which vegetables and fruit could be grown if cattle were managed meticulously. For example, Randolph County has

The use of local farms to supply residents and businesses helps preserve the agricultural industry of Region VII. Preserving farm helps reduce the threat of flooding by maintaining vegetation and soil that can soak up rain water. Local delivery of goods using pickup trucks and/or small box trucks helps prevent wear on state and county roadways that is caused by large tractor trailers.

between 70,000-100,000 acres available, and Braxton County growers could take advantage of more than 100,000 additional acres. Region VII's farm-to-table cluster, then, has considerable room to grow in the coming years.

3.0 ACTION PLAN

Section Overview

The action plan contains information on goals that the steering committee decided upon and projects that the jurisdictions updated or created. This section explains in further detail the process by which goals were established and how existing and new projects were prioritized.

Changes in 2017

Most generally, this section includes an updated list of projects for each jurisdiction. The project lists in Section 3.2 are *current lists*; projects listed as completed, deleted, or deferred were moved to Appendix 4. The PDC opted to generate project lists for all municipalities during this update, rather than only include regional goals (as it did in 2012). Doing so encourages ownership of the plan at the local level, plus it supports the National Preparedness Goal and National Incident Management System (NIMS) constructs of coordinating preparedness at the lowest governmental levels possible. The goals list also reflects changes in perspectives on community resilience, opting to focus on building resilience rather than a reliance on government agencies.

3.1 LOCAL HAZARD MITIGATION GOALS

§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.

The steering committee determined the goals and objectives for mitigating the risks identified in this document. The steering committee also outlined a series of objectives designed to support achieving goals. Goals and objectives are listed in this section as a quick reference for users of the plan. Goals state the intentions of the steering committee with respect to hazard mitigation and objectives generally categorize more specific strategies related to hazard mitigation. Strategies – which are specific mitigation projects – are organized both by hazard and jurisdiction and are listed in Section 3.2.

The steering committee recognized the benefits of the Federal Emergency Management Agency's (FEMA) "whole community approach to emergency management" and the importance of involving everyone, down to the individual citizen, in general emergency preparedness. This type of preparedness includes mitigation. Committee members noted that governmental organizations can only go so far in supporting mitigation; there is a point at which the citizen will bear the responsibility – even if that responsibility is as simple as deciding to participate. Engagement at all levels, as noted in several recent U.S. Department of Homeland Security publications (e.g., the 2015 National Preparedness Goal, the whole community definition and doctrine, the *National Response Framework,* and the *National Disaster Recovery Framework*), supports community resilience. As such, the steering committee set forth Goal 1 as follows.

Support the efforts of Region VII's communities in citizenry in become more resilient in the face of disasters.

The steering committee also discussed a need for not only building resilience, but also lessening the number of structures potentially exposed to the direct effects of hazards. The capability survey distributed the PDC's consultant (see Section 4.0: Plan Maintenance Process for results) also indicated a general desire to lessen exposure in hazard-prone areas. In many cases, the mechanisms are already in place to work toward a decrease in exposure (e.g., floodplain ordinances). The steering committee thus noted Goal 2 as follows.

Responsibly guide development away from hazard-prone areas.

The PDC's consultant then worked individually with each of the participating jurisdictions in the region to determine specific local projects (i.e., mitigation strategies) to support the incremental achievement of these goals. To assist jurisdictions in generating projects, Table 3.1 below lists a series of objectives that operationalize the goals. These objectives are somewhat more tangible than the goal statements, yet not as specific as individual projects. They were designed to categorize actions and to make sure that the majority of the jurisdictional projects in Section 3.2 below do work toward achievement of the goals. The consultant and steering committee jointly generated the list of objectives.

TABLE 3.1: REGION VII MITIGATION OBJECTIVES

Supporting Goal	*Objectives*
1. Support the efforts of Region VII's communities in citizenry in become more resilient in the face of disasters.	Objective 1.1: Support infrastructure upgrades to allow for more abundant and reliable communications, water, sewer, etc. services. Objective 1.2: Support emergency response planning to enable more efficient incident assessment, stabilization, and remediation. Objective 1.3: Educate the public as to its role in hazard mitigation and disaster preparedness.
2. Responsibly guide development away from hazard-prone areas.	Objective 2.1: Consider traditional mitigation projects, including acquisition and relocation, elevation, etc. Objective 2.2: Educate local officials throughout the region about the benefits and limitations of various development regulations.

3.2 PROJECT IMPLEMENTATION

§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.

§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.

This portion of the plan builds on the goals presented in Section 3.1. Each strategy below is listed with a timeframe, primary coordinator, potential support agencies, resources relevant to the strategy (including potential funding sources and cost estimates), and its current status. Strategies are identified as being one (or more) of four mitigation actions, as defined in the FEMA *Local Mitigation Planning Handbook*.

1. Local Plans and Regulations
2. Structural and Infrastructure Improvements
3. Natural System Protection
4. Education and Awareness Programs
5. Emergency Services

It is important to note that the cost estimates are tentative and meant as a starting point for research on project feasibility and were only included where they were available. More specifically, these cost estimates are only ranges of probable project costs; all figures are approximations. At the time the implementation of any strategy is considered, a full cost estimate should be sought prior to securing funding. While this is not an exhaustive list, potential funding sources include:

- Community Development Block Grant (CDBG),
- Flood Mitigation Assistance Grant,
- Hazard Mitigation Grant Program (HMGP),
- Pre-Disaster Mitigation Grant (PDM),
- State funds, and
- Local funds.

The steering committee emphasized a benefit-cost comparison in the prioritization process. Committee members encouraged evaluation of mitigation actions by their pros and cons, which were represented as costs and benefits. Prioritization criteria included the following. A higher score on all of the measures would indicate situations where benefits outweighed costs.

MITIGATION PROJECT PRIORITIZATION CRITERIA	
Criterion	*Definitions & Notes on Scoring*
Ease of Implementation	Project can be implemented with little burden on personnel or, for those projects with heavy administrative requirements, positions and technical skills are in place to manage the project. HIGHER SCORE = When administrative requirements are minimal and/or capabilities are in place
Cost Effectiveness	Sufficient funding is available (or can be obtained) that allows for project implementation at a cost that is manageable by a local government. HIGHER SCORE = Lower cost projects
Social Impacts	Impacts that could adversely affect a segment of the population. For example, projects that result in displacement could adversely affect the population. HIGHER SCORE = Fewer potential social impacts
Political Impacts	Negative perceptions of the project; the perception that a project is not in the best interest of the common good. HIGHER SCORE = Projects with positive perceptions (i.e., generally considered a prudent, well-received action)
Economic Impacts	Impacts to future economic development. HIGHER SCORE = Projects that will not harm the future economy or those that will stimulate the economy
Overall Positive Impact	Summary score; qualitative conclusion as to the overall benefit of a project. HIGHER SCORE = Projects whose benefits have been proven in the region's communities or elsewhere around the country

The PDC's consultant, as directed by the steering committee, compiled a matrix by which projects were scored and prioritized. Each criterion listed above received a rating from one to five. The highest score that a proposed project could attain was 30 and the lowest was six.

Table 3.2.1: REGION VII: BARBOUR COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Barbour 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	4	5 years	On-Going	Unknown	HMGP	Barbour County Commission	Region VII PDC WVDHSEM
		Status Narrative: Project #1.2.2 in 2012 plan.							
Barbour 2	Flooding	Continue to enforce and update the county and municipal flood ordinances.	2	5 years	On-Going	N/A	Local	Barbour County Floodplain Coordinator	Barbour County Assessor's Office Barbour County OEM
		Status Narrative: Project #1.1.1 in 2012 plan.							
Barbour 3	Drought & Infrastructure Interruption	Create Little Laurel Reservoir through construction of a dam to provide additional water supply to Philippi's water system	4	5 years	New	$5,000,000	USDA IJDC Local Private	City of Philippi	Barbour County Commission Region VII PDC
		Status Narrative: This is a new project for the 2017 update							
Barbour 4	Drought & Hazardous Materials	Link PSD's systems together to use as back up supply during emergency situations	3	5 years	New	Unknown	SCGB	Belington Water, Philippi Water, Century Volga PSD, Chestnut Ridge PSD, Jimtown Water	Barbour County Commission City of Philippi Region VII PDC
		Status Narrative: This is a new project for the 2017 update							
Barbour 5	Flooding & Infrastructure Interruption	Construct a sewer collection and treatment system for the community of Century	8	5 years	New	$2,838,000	SRF	Century Volga PSD	Barbour County Commission
		Status Narrative: Type							
Barbour 6	Multiple Hazards	Develop public and private partnerships to foster hazard mitigation program coordination and collaboration within Barbour County	1	5 years	On-Going	N/A	N/A	Barbour County Commission	Barbour County
		Status Narrative: Project #4.1.5 in 2012 plan.							
Barbour 7	Multiple Hazards	Construct an emergency evacuation shelter with an emergency generator at the county fairgrounds	6	5 years	New	Unknown	HMGP SCGB Local Private	Barbour County Commission	Barbour County OEM Region VII PDC WVDHSEM

Table 3.2.1: REGION VII: BARBOUR COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
		Status Narrative: This is a new project for the 2017 update							
Barbour 8	Infrastructure Interruption	Extend water service and replace failed lines in Chestnut Ridge PSD	6	5 years	New	$2,500,000	SCBG, UDC, USDA	Chestnut Ridge PSD	Barbour County Commission
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.2: REGION VII: BELINGTON PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Belington 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMPG	Town of Belington	Barbour County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Belington 2	Flooding & Infrastructure Interruption	Make improvements to the city's sewer system	1	5 years	New	Unknown	SRF SCBG USDA IJDC	City of Belington	Region VII PDC
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.3: REGION VII: JUNIOR PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Junior 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-going	Unknown	HMPG	Town of Junior	Barbour County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Junior 2	Flooding	Work with the county floodplain coordinator to review and revise current ordinances.	1	5 years	New	N/A	Local	Town of Junior	Barbour County Floodplain Coordinator
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.4: REGION VII: PHILIPPI PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Philippi 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	4	5 years	On-Going	Unknown	HMGP	City of Philippi	Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Philippi 2	Drought & Infrastructure Interruption	Create Little Laurel Reservoir through construction of a dam to provide additional water supply to Philippi's water system	3	5 years	New	$5,000,000	USDA IJDC Local Private	City of Philippi	Barbour County Commission Region VII PDC
		Status Narrative: This is a new project for the 2017 update							
Philippi 3	Drought & Infrastructure Interruption	Replace old, failing water storage tanks	2	2 years	New	$2,670,000	USDA	City of Philippi	Barbour County Commission Region VII PDC
		Status Narrative: This is a new project for the 2017 update							
Philippi 4	Flooding & Infrastructure Interruption	Make necessary improvements to sewer collection system	1	3 years	New	Unknown	USDA IJDC SRF	City of Philippi	Region VII PDC
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.5: REGION VII: BRAXTON COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Braxton 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	9	5 years	On-going	Unknown	HMGP	Braxton County Commission	Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Braxton 2	Drought & Infrastructure Interruption	Extend water to Keeners Ridge area of Braxton County	6	5 years	New	$4,000,000	IDJC DWTRF USDA	Sugar Creek PSD	Braxton County Commission
		Status Narrative: This is a new project for the 2017 update							
Braxton 3	Flooding	Continue to make informational pamphlets available to Braxton County residents that promote buying flood insurance	3	On-going	On-going	Unknown	NFIP Local	Braxton County OES	Braxton County Commission WVDHSEM
		Status Narrative: Project #1.3.3 in 2012 plan							
Braxton 4	Flooding	Continue to make permitting necessary before any new construction is allowed. Permitting should be made to	8	On-going	On-going	N/A	Local	Braxton County Assessor's Office	Braxton County Commission

Table 3.2.5: REGION VII: BRAXTON COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
		work with any/all floodplain ordinances.							Braxton County OES
		Status Narrative: Project #1.4.1 in 2012 plan							
Braxton 5	Severe Storms	Develop and implement a program to coordinate maintenance and mitigation activates to reduce risk to public infrastructure from severe storms.	3	On-going	On-going	Unknown	Local	Braxton County OES	Braxton County Commission
		Status Narrative: Project #2.1.2 in 2012 plan							
Braxton 6	Severe Storms	Develop and distribute an informational brochure describing the proper safety procedures to carry out during a severe thunderstorm	3	On-going	On-going	Unknown	Local	Braxton County OES	Braxton County Commission
		Status Narrative: Project #3.1.1 in 2012 plan							
Braxton 7	Severe Storms	Continue to coordinate with Charleston Weather Service on a daily basis to improve readiness for imminent severe weather	2	On-going	On-going	N/A	Local	Braxton County OES	Braxton County Commission
		Status Narrative: Project #3.1.3 in 2012 plan							
Braxton 8	Severe Storms	Coordinate warning systems with the board of education to enhance protection of students and faculty under threat of severe weather	1	On-going	On-going	N/A	Local	Braxton County OES	Braxton County Board of Education
		Status Narrative: Project #3.1.4 in 2012 plan							
Braxton 9	Multiple Hazards	Provide opportunities for leaders in Braxton County to participate in FEMA and other agency programs	6	5 years	On-Going	N/A	Local	Braxton County OES	Braxton County Commission
		Status Narrative: Project #1.5.1 in 2012 plan							

Table 3.2.6: REGION VII: BURNSVILLE PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Burnsville 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	New	Unknown	HMGP	City of Burnsville	Braxton County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Burnsville 2	Flooding	Make improvements to the town's sewer collection system	1	5 years	New	$2,839,000	HMGP USDA SCBG IJDC	Town of Burnsville	Region VII PDC WVDHSEM
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.7: REGION VII: FLATWOODS PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Flatwoods 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Town of Flatwoods	Braxton County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Flatwoods 2	Hazmat	Make the public aware of hazardous materials, what they should do in the event of a spill or release, and evacuation plans.	1	5 years	On-going	Unknown	Local	Town of Flatwoods	Braxton County Commission Braxton County OES Braxton County LEPC
		Status Narrative: Project #11.1.1 in 2012 plan							

Table 3.2.8: REGION VII: GASSAWAY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Gassaway 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Town of Gassaway	Braxton County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Gassaway 2	Flooding	Continue to work with county floodplain coordinator to update municipal floodplain ordinance.	1	5 years	New	N/A	NFIP Local	Town of Gassaway	Braxton County OES WVDHSEM
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.9: REGION VII: SUTTON PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Sutton 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Town of Sutton	Braxton County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Sutton 2	Flooding & Infrastructure Interruption	Make necessary improvements to the town's storm sewer collection system along North Hill Road	1	5 years	New	$500,000	SCBG	Town of Sutton	Region VII PDC
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.10: REGION VII: GILMER COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Gilmer 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Gilmer County Commission	Region VII PDC WVDHSEM
		Status Narrative: Project #1.1.3 in 2012 plan.							
Gilmer 2	Drought & Infrastructure Interruption	Extend water service to the areas of Tanner and Newberne.	1	2 years	New	$8,700,000	SCBG DWTRF IJDC	Gilmer County PSD	Gilmer County Commission Region VII PDC
		Status Narrative: This is a new project for the 2017 update							
Gilmer 3	Flooding	Continue to inform the general public on the requirement and benefits of flood insurance.	3	5 years	On-Going	Unknown	NFIP Local Private	Gilmer County OES	Gilmer County Commission Gilmer County Assessor's Office WVDHSEM
		Status Narrative: Project #3.1.2 in 2012 plan.							

Table 3.2.11: REGION VII: GLENVILLE PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Glenville 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	City of Glenville	Gilmer County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Glenville 2	Flooding	Continue to review, revise and enforce floodplain ordinances.	1	5 years	On-Going	N/A	Local	City of Glenville	Gilmer County Assessor's Office
		Status Narrative: Project # 1.2.4 from 2012 plan.							

Table 3.2.12: REGION VII: SAND FORK PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Sand Fork 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Town of Sand Fork	Gilmer County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Sand Fork 2	Flooding & Infrastructure Interruption	Make improvements to the Town's sewer collection treatment system	1	5 years	New	$2,500,000	HMGP SCBG	Town of Sand Fork	Region VII PDC WVDHSEM
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.13: REGION VII: LEWIS COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Lewis 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	4	5 years	On-Going	Unknown	HMGP	Lewis County Commission	Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Lewis 2	Flooding	Revise the county's floodplain ordinance to include updated floodplain development regulations. Be sure to include NFIP recommendations such as the model ordinance, FIRM-designated floodplain areas, etc.	3	5 years	On-Going	N/A	NFIP Local	Lewis County Floodplain Administration	Lewis County Commission WVDHSEM
		Status Narrative: Project #1.3.4 in 2012 plan. Reviewing and revising the floodplain is a continuous process to ensure the most up-to-date information is available.							
Lewis 3	Drought & Infrastructure Interruption	Extend water to underserved rural areas of Lewis County	1	2 years	New	$9,000,000	SCBG IJDC WVAWC	Lewis County EDA	Lewis County Commission
		Status Narrative: This is a new project for the 2017 update							
Lewis 4	Flooding	Promote buying flood insurance to homeowners and business owners	2	5 years	On-Going	Unknown	NFIP Local Private	Lewis County Floodplain Administration	Lewis County Commission Lewis County OEM WVDHSEM

Table 3.2.13: REGION VII: LEWIS COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
		Status Narrative: Project 1.3.2 in 2012 plan.							

Table 3.2.14: REGION VII: JANE LEW PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Jane Lew 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-going	Unknown	HMGP	Town of Jane Lew	Lewis County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Jane Lew 2	Flooding	Install adequate stormwater system components (i.e., water drains, road sloping, etc.) during business district streetscape project	1	5 years	New	Unknown	HMGP SCBG Local Private	Town of Jane Lew	Region VII PDC WVDHSEM
		Status Narrative: This is a new project for the 2017 update							
Jane Lew 3	Landslide	Build a retention wall along Main Street	3	5 years	New	Unknown	SCBG Local Private	Town of Jane Lew	Region VII PDC WVDOH
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.15: REGION VII: WESTON PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Weston 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	City of Weston	Lewis County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Weston 2	Winter Weather	Work with partners to create a city-wide winter weather response plan.	1	1 year	New	$10,000	Local Private	City of Weston	Lewis County OEM
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.16: REGION VII: RANDOLPH COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Randolph 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	4	5 years	On-Going	Unknown	HMGP	Randolph County Commission	Region VII PDC WVDHSEM
		Status Narrative: Project #4.2.3 in 2012 plan.							
Randolph 2	Flooding	Preserve open space areas as a means of eliminating structures that could sustain flood damage	1	5 years	On-Going	Unknown	HMPG	Randolph County Commission	Region VII PDC
		Status Narrative: Project #4.2.2 in 2012 plan. Continue to designate public property as open space that may not be sold or built on.							
Randolph 3	Hazardous Materials	Determine the risk and hazard area associated with the use of chemicals currently used, stored, or transported through the county.	2	2 years	On-going	N/A	HMEP SERC Local	Randolph County LEPC	Randolph County OEM
		Status Narrative: Project 11.1.1 in 2012 plan. OEM in cooperation with the LEPC maintain a list of Toer II facilities and continue to perform regular CFSs to be able to provide information on hazardous materials to first responders during an event.							
Randolph 4	Drought	Consider and identify alternate water sources	2	5 years	On-Going	N/A	SCBG Local	Local PDCs	Randolph County Commission Region VII PDC
		Status Narrative: Project #1.1.1 in 2012 plan. Local PSD's continue to research alternate sources of water for short-term events (i.e., chemical spill), as well as long-term events such as droughts.							

Table 3.2.17: REGION VII: BEVERLY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Beverly 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	4	5 years	On-Going	Unknown	HMGP	Town of Beverly	Randolph County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Beverly 2	Flooding	Develop zoning regulations and floodplain management regulations that will establish	4	5 years	On-going	N/A	NFIP Local	Town of Beverly	Randolph County Assessor's Office

Table 3.2.17: REGION VII: BEVERLY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
		criteria for property construction in a floodplain.							WVDHSEM
		Status Narrative: (2012 Project #4.1.1) Working to develop an IPMC ordinance with assistance from the municipal attorney and WVU Law School							
Beverly 3	Landslide	Evaluate building codes to see if any revisions can be made to protect residents from landslide or subsidence damage.	1	2 years	On-going	N/A	Local	Town of Beverly	
		Status Narrative: (2012 Project #6.2.2) Working to develop an IPMC ordinance with assistance from the municipal attorney and WVU Law School							
Beverly 4	Multiple Hazards	Continue to utilize existing advance warning systems	1	5 years	On-going	N/A	Local	Town of Beverly	Randolph County OEM
		Status Narrative: (2012 Project #7.1.2)							
Beverly 5	Severe Storms	Coordinate with the NWS in Charleston, WV, to warn residents of impending severe wind or possible tornado conditions.	1	5 years	On-going	N/A	Local	Town of Beverly	Randolph County OEM
		Status Narrative: (2012 Project #8.1.1)							

Table 3.2.18: REGION VII: COALTON PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Coalton 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Town of Coalton	Randolph County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Coalton 2	Flooding	Coordinate with the county floodplain manager to review and revise floodplain ordinances.	1	2 years	New	N/A	NFIP Local	Town of Coalton	Randolph County OEM WVDHSEM
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.19: REGION VII: ELKINS PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Elkins 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	3	5 years	On-Going	Unknown	HMGP	City of Elkins	Randolph County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Elkins 2	Multiple Hazards	Review and update the city's zoning code	1	1 year	On-Going	N/A	Local	Elkins Building Department	City of Elkins
		Status Narrative: Project 6.2.2. in 20120 plan							
Elkins 3	Multiple Hazards	Design and make available a digital interactive zoning and hazard map.	2	1 year	New	$20,000	Local Private	Elkins Building Department	City of Elkins
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.20: REGION VII: HARMAN PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Harman 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	9	5 years	On-going	Unknown	HMGP	Town of Haman	Randolph County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Harman 2	Misc.	Publish public service announcements through local media (newspaper, radio, television) concerning an epidemic and what steps to take to eliminate it	1	5 years	On-going	N/A	Local	Town of Harman	
		Status Narrative: Project #3.1.1 in 2012 plan							
Harman 3	Misc.	Coordinate with county and state health officials to store necessary medications and supplies for either a naturally-spread epidemic or a deliberately-spread epidemic	12	5 years	On-going	N/A	N/A	Town of Harman	Randolph County Health Department

Table 3.2.20: REGION VII: HARMAN PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
									West Virginia DHHR
		Status Narrative: Project # 3.2.1 in 2012 plan							
Harman 4	Flooding	Develop zoning regulations and floodplain management regulations that will establish criteria for property construction in a floodplain	13	2 years	On-going	N/A	NFIP Local	Town of Harman	Randolph County OEM WVDHSEM
		Status Narrative: Project #4.1.1 in 2012 plan							
Harman 5	Flooding	Enforce ordinances that are already in place	9	5 years	On-going	N/A	Local	Town of Harman	
		Status Narrative: Project #4.1.2 in 2012 plan							
Harman 6	Flooding	Coordinate county efforts to meet the requirements of becoming a participant in the CRS	7	5 years	On-going	Unknown	Local	Town of Harman	Randolph County OEM
		Status Narrative: Project #4.4.1 in 2012 plan							
Harman 7	Flooding	Enforce existing building codes that are currently in place	7	5 years	On-going	N/A	Local	Town of Harman	
		Status Narrative: Project #6.2.1 in 2012 plan							
Harman 8	Landslide	Evaluate building codes to see if any revisions can be made to protect residents from landslide or subsidence damage	9	5 years	On-going	N/A	Local	Town of Harman	
		Status Narrative: Project #6.2.2 in 2012 plan							
Harman 9	Severe Storms	Coordinate with the National Weather Service in Charleston, West Virginia to warn residents of impending thunderstorm conditions	1	5 years	On-going	N/A	Local	Town of Harman	Randolph County OEM NWS
		Status Narrative: Project #7.1.1 in 2012 plan							
Harman 10	Multiple Hazards	Continue to utilize existing advance warning systems throughout the county	1	5 years	On-going	N/A	Local	Town of Harman	Local response agencies Randolph County OEM
		Status Narrative: Project # 7.1.2 in 2012 plan							
Harman 11	Severe Storms	Coordinate with the National Weather Service in Charleston, West Virginia to warn residents of	1	5 years	On-going	N/A	Local	Town of Harman	Randolph County OEM

Table 3.2.20: REGION VII: HARMAN PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
		impending severe wind or possible tornado conditions							NWS
		Status Narrative: Project #8.1.1 in 2012 plan							
Harman 12	Severe Storms	Monitor NOAA Weather Radios for tornado watches and warnings, particularly in the spring and summer months	1	5 years	On-going	N/A	Local	Town of Harman	Randolph County OEM
		Status Narrative: Project #8.1.2 in 2012 plan							
Harman 13	Multiple Hazards	Encourage residents and businesses to create "safety zones" around their structures by mowing grass regularly, removing combustible materials, and removing dead branches that extend over roofs	1	5 years	On-going	N/A	Local	Town of Harman	
		Status Narrative: Project #10.1.1 in 2012 plan							

Table 3.2.21: REGION VII: HUTTONSVILLE PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Huttonsville 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Town of Huttonsville	Randolph County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Huttonsville 2	Flooding	Continue to work with Randolph County to coordinate floodplain management,	1	5 years	On-going	N/A	NFIP Local	Town of Huttonsville	Randolph County OEM WVDHSEM
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.22: REGION VII: MILL CREEK PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Mill Creek 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-going	Unknown	HMGP	Town of Mill Creek	Randolph County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Mill Creek 2	Flooding	Coordinate with the county floodplain manager to review and revise floodplain ordinances.	1	3 years	New	N/A	NFIP Local	Town of Mill Creek	Randolph County OEM WVDHSEM
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.23: REGION VII: MONTROSE PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Montrose 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-going	Unknown	HMGP	Town of Montrose	Randolph County Commission Region VIII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Montrose 2	Flooding	Coordinate with the county floodplain manager to review and revise floodplain ordinances.	1	2 years	New	N/A	NFIP Local	Town of Montrose	Randolph County OEM WVDHSEM
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.24: REGION VII: TUCKER COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Tucker 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	3	5 years	On-Going	Unknown	HMGP	Tucker County Commission	Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Tucker 2	Flooding	Support construction of a stormwater management system in the Pulp Mill Bottom Area	2	1 year	New	$500,000	HMGP	City of Parsons	Tucker County Commission Region VII PDC WVDHSEM
		Status Narrative: This is a new project for the 2017 update							
Tucker 3	Drought	Work with PSDs to extend public water to outlying areas of the county.	1	2 years	New	$10,000,000	SCBG IJDC	Local PDCs	Tucker County Commission Region VII PDC
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.25: REGION VII: DAVIS PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Davis 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Town of Davis	Tucker County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Davis 2	Flooding	Work with county floodplain coordinator to review and update current floodplain regulations	1	2 years	New	N/A	NFIP Local	Town of Davis	Tucker County Assessor's Office WVDHSEM
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.26: REGION VII: HAMBLETON PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Hambleton 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Town of Hambleton	Tucker County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Hambleton 2	Drought, Infrastructure Interruption & Hazardous Material	Construct an emergency interconnection between the City of Parsons Water System and Hamrick PSD's water system		2 years	New	$575,000	SCBG	City of Parsons, Hamrick PSD	Town of Hambleton, Town of Hendricks
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.27: REGION VII: HENDRICKS PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Hendricks 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	Town of Hendricks	Tucker County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Hendricks 2	Drought, Infrastructure Interruption & Hazardous Material	Construct an emergency interconnection between the City of Parsons Water System and Hamrick PSD's water system	1	2 years	New	$575,000	SCBG	City of Parsons, Hamrick PSD	Town of Hambleton, Town of Hendricks
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.28: REGION VII: PARSONS PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Parsons 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	5	5 years	On-Going	Unknown	HMGP	City of Parsons	Tucker County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Parsons 2	Flooding	Construct a stormwater management system in the Pulp Mill Bottom Area	4	1 year	New	$500,000	HMGP	City of Parsons	Tucker County Commission Region VII PDC WVDHSEM
		Status Narrative: This is a new project for the 2017 update							
Parsons 3	Flooding	Elevate four structures located within the SFHA (Pulp Mill Bottom)	4	2 years	New	Unknown	HMGP	City of Parsons	Tucker County Commission WVDHSEM
		Status Narrative: This is a new project for the 2017 update							
Parsons 4	Drought, Infrastructure Interruption & Hazardous Material	Construct an emergency interconnection between the City of Parsons Water System and Hamrick PSD's water system	1	2 years	New	$575,000	SCBG	City of Parsons, Hamrick PSD	Town of Hambleton, Town of Hendricks
		Status Narrative: This is a new project for the 2017 update							
Parsons 5	Flooding & Infrastructure Interruption	Locate and map all components within the city's water, sewer, storm drain systems and other infrastructure systems	3	3 years	New	$75,000	Local	City of Parsons	Region VII PDC
		Status Narrative: This is a new project for the 2017 update							
Parsons 6	Flooding	Repair damaged areas of the Parsons Diversion Wall	1	2 years	New	$50,000	SCBG HMGP Local	City of Parsons	Tucker County Commission Region VII PDC
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.29: REGION VII: THOMAS PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Thomas 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	2	5 years	On-Going	Unknown	HMGP	City of Thomas	Tucker County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Thomas 2	Dam Failure	Perform necessary repairs to the Thomas Dam due to high water eroding sections of the structure	1	5 years	New	Unknown	SCBG HMGP USACE	City of Thomas	Region VII PDC
		Status Narrative: This is a new project for the 2017 update							

Table 3.2.30: REGION VII: UPSHUR COUNTY PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Upshur 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	3	5 years	On-Going	Unknown	HMGP	Upshur County Commission	Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Upshur 2	Dam Failure	Determine how and if dam failures in neighboring counties will affect Upshur County communities	1	5 years	On-Going	$5,000	Local	Upshur County OEM	Upshur County Commission
		Status Narrative: Project #7.1.2 in 2012 plan. Continue to use Region VII's HMP planning process and surrounding regions stakeholder's involvement process to address dam failure.							
Upshur 3	Drought	Extend public water service into communities currently without service	2	5 years	On-Going	$4,500,000	USDA ARC	Adrian PSD	Upshur County Commission Region VII PDC
		Status Narrative: Project #9.1.1 in 2012 plan. Continue to work with public water services to increase the population with access to public drinking water.							
Upshur 4	Flooding	Perform streambank restoration to remove debris and other materials to prevent water backing up and possibly flooding.	4	5 years	On-Going	$50,000	Local PDM	Upshur County Commission	City of Buckhannon Region VII PDC
		Status Narrative: Project #1.8.1 in 2012 plan							

Table 3.2.31: REGION VII: BUCKHANNON PROJECTS									
Project #	*Hazard*	*Projects*	*Priority*	*Timeframe*	*Status*	*Cost Estimate*	*Funding Source*	*Coordinating Agency*	*Support Agencies*
Buckhannon 1	Flooding	Participate in acquisition and demolition, relocation, mitigation reconstruction and elevation	3	5 years	On-Going	Unknown	HMGP	City of Buckhannon	Upshur County Commission Region VII PDC WVDHSEM
		Status Narrative: This is an on-Going strategy for the region							
Buckhannon 2	Multiple Hazards	Consider the installation of backup emergency power generators at City-designated public relief buildings (I.e. city hall, Stockert Youth Center, Colonial Theatre, etc.) for the purpose of providing heating, cooling, and electronic charging areas in times of emergency	1	3 years	New	$50,000	HMGP SCBG PDM	City of Buckhannon	Region VII PDC HMGP
		Status Narrative: City officials will officially designate city hall, Stockert Youth Center, and Colonial Theatre as public relief buildings via resolution to comply with the requirements of DHS, FEMA, and the National Response Framework							
Buckhannon 3	Flooding	Installation of new storm sewer collection systems in FEMA-designated floodplains	2	4 years	New	Unknown	HMGP SCBG USDA	City of Buckhannon	Region VII PDC WVDHSEM
		Status Narrative: City has plans to install new storm sewer collection systems and their associated components (i.e., drop inlets, green spaces, curb cuts, collection pipes, etc.) to collect and discharge storm sewer in strategically-located areas that are prone to repeated high-water and/or flooding events within FEMA-designated floodplains							

4.0 PLAN MAINTENANCE PROCESS

§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.
§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.
§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.

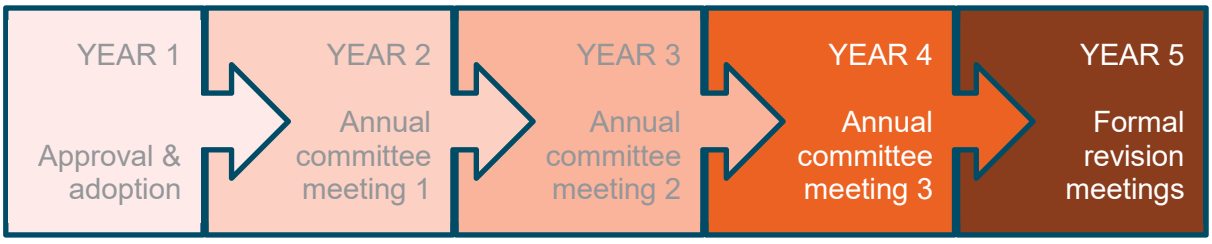
Changes in 2017

This section now includes a structured, annual review process to ensure that the plan is maintained throughout the five-year cycle (rather than at its end). The "Implementation through Existing Programs" section was also significantly revised to reflect the addition of a capabilities assessment. The PDC felt it important to understand the foundations of the capabilities at the jurisdictional level so as to better encourage integration of mitigation into those efforts. This section also includes a revised process for involving the public during the five-year cycle.

4.1 Monitoring, Evaluating, and Updating the Plan

The Region VII Planning and Development Council and the steering committee have established a method for the systematic and periodic review of this document. The PDC, as the custodial agency, assumes responsibility for scheduling committee meetings and also serves as the point of contact for the committee and WVDHSEM during the 5-year period.

The formal updating process will consist of a series of meetings to review mitigation projects, the risk assessment, and to compare the two. Region VII will convene the steering committee annually (for a total of three meetings between formal updating processes).



The PDC feels it is most beneficial to link the annual mitigation review with other recurring planning efforts. The council must also update its comprehensive economic development

strategy (CEDS) document annually. As such, the PDC will ensure completion of the CEDS and mitigation annual reviews simultaneously. The CEDS meetings are scheduled quarterly and hazard mitigation plan updates will be added to the meeting agenda every summer quarter.

Topics for discussion at annual meetings include determining the effectiveness of any implemented mitigation strategies as well as evaluating the on-going performance of the plan based on several criteria. Within the risk assessment, the committee will evaluate how accurately the hazard profile and development trends sections predicted impact areas and losses (contingent on hazard occurrences).

Additionally, the steering committee will update one another on any completed or underway mitigation projects. Each project listed in this plan includes resources that may aid in implementation; such resources may include potential funding sources. Many of these funding sources require stringent project administration tasks (including performance measures and close-out procedures), all of which would be followed by the jurisdiction implementing a project. Adherence to these requirements will ensure the successful implementation of projects funded by such programs. For projects funded locally, existing purchasing policies will be followed, including competitive bidding, maintenance of invoice copies, regular departmental budget reviews, etc. All files associated with purchasing at the local level are maintained. This procedure has been successful while implementing mitigation projects since the original development of this plan and will continue to be followed.

4.2 Implementation through Existing Programs / Capabilities Assessment

The members of the committee are leaders within the communities and agencies that they represent. They are often involved in the overall community, economic development, and capital improvements planning efforts of their jurisdictions. As members of the mitigation planning team, these individuals will carry mitigation concepts into other planning areas.

To date, local policies have not hindered hazard mitigation efforts. The jurisdictions participating in this planning process have used a variety of funding to complete mitigation projects in the past, including the hazard mitigation grant program (HMGP), state homeland security grant program (SHSP), emergency management performance grant (EMPG), community development block grant (CDBG), and local funding. Local government policies and programs have supported the use of this funding and, thus, the implementation of mitigation projects. Further, all participating government jurisdictions have demonstrated a capability to successfully implement and administer mitigation projects.

Additionally, as local officials consider more creative approaches to hazard mitigation, other potential funding sources may emerge. In particular, many jurisdictions are looking at stormwater management upgrades, which often have the added benefit of mitigating site-specific, nuisance flooding where stormwater backs up and impacts small areas. The Clean Water State Revolving Fund (CWSRF) and Section 319 grants (nonpoint source management program) through the U.S. Environmental Protection Agency, watershed protection funding and support from agencies such as the WV Department of Environmental Protection, etc. may thus support local mitigation. To enable full integration of these approaches, future updates to this plan may necessitate engaging other partners, such as watershed groups.

Opportunities for hazard mitigation plan integration with other plans and ordinances within Region VII can include the plans outlined in Table 4.1. The method or opportunity for each type of plan's integration with the hazard mitigation plan is described in the second column.

TABLE 4.1: OTHER PLAN INTEGRATION WITH HAZARD MITIGATION

Plan	*Integration with HMP*
Comprehensive Plans	• Hazard mapping comparison with maps of targeted development areas • Hazard profiles inform risks at development areas • Plan development outside high risk hazard areas and redirect to low hazard areas • Support mitigation strategies for assets and events
Emergency Operations Plans	• Identify and plan for operations in hazard areas • Hazard mapping informs high risk areas
Transportation Planning	• Identification of high risk hazard areas that affect transportation • Encourage sustainable and resilient construction
Floodplain Management	• Identification of floodplains and at-risk buildings • Directing development to non-flood hazard areas • Encouraging protection of green spaces • Minimize impacts of flooding from rivers and streams
Infrastructure Development Plans	• Guide development away from hazard areas • Improve infrastructure affected by hazards • Encourage sustainable and resilient construction
Commercial and Economic Development	• Identify suitable development or redevelopment areas • Encourage responsible land use according to area hazards
Storm Water Management	• Identify hazards relating to storm water management • Minimize impacts of flooding due to storm water

Table 1.14 lists the various plans maintained by jurisdictions throughout Region VII. In particular, several jurisdictions (again, noted on Table 1.14, Page 31), maintain

comprehensive plans and floodplain regulations, thus presenting opportunities for accomplishing the tasks noted above. Each of the region's seven counties maintain emergency operations plans. Additionally, each of the counties employ economic development authorities that may coordinate with partners to note the locations of areas suitable for development and serve as conduits for information sharing with prospective developers.

Certain regional projects offer opportunities for incorporating mitigation elements. For instance, the PDC's efforts to support broadband development in the area reinforce connectivity for the continuance of critical operations. As such, identifying those critical facilities and key resources in the region that are underserved by Internet connectivity and including them in the broadband project could reduce functional losses. Additionally, the PDC seeks funding for and administers large infrastructure (i.e., water and sewer) development projects. Hazard mitigation benefits could be added to the prioritization criteria used in-house at the PDC as those projects are considered for funding. Those projects that support mitigation (e.g., by minimizing water shortages and other public health concerns associated with hazards such as drought and extreme temperatures) can potentially receive "bonus points" when prioritized amongst other projects. Additionally, benefits to hazard mitigation can be written into the project narrative in funding requests, potentially strengthening the justification for funding.

As a part of this project, the PDC issued a "capabilities assessment survey" online to gauge, in a general sense, the capabilities for both implementing hazard mitigation initiatives and for integrating such efforts into local operations. The PDC's consultant distributed the survey to its member governments via a Survey Monkey collector. Sixteen jurisdictions (52%) responded to the survey. Table 4.2 lists the results of a self-assessment designed to gauge the level to which primary local planning initiatives are available in Region VII, thus further refining opportunities for plan integration.

TABLE 4.2: PLAN INTEGRATION SELF-ASSESSMENT RESULTS		
Planning Effort	*Affirmative Survey Responses*	*Implications*
Comprehensive Plans	68.75%	• Most jurisdictions engage in a strategic process to guide growth in their jurisdictions. • Comprehensive planning often includes activities meant to focus discussions about particular land uses in certain areas; risk information can supplement those activities. • Comprehensive plans often identify risks and opportunities hindering or supporting development. Natural hazard risks, as noted in this document, can be included as additional risks in these analyses.
Building Codes	53.33%	• Approximately half of the respondents indicated their jurisdictions regulate building activities. These codes offer a regulatory foundation from which to support mitigation. • Local officials can review existing building codes with information from this plan in mind; for example, severe weather data in the appropriate hazard profiles may inform a need to strengthen a design wind speed or snow weight requirement in a building code. • Even with these opportunities, education about the benefits and effectiveness of building codes could be helpful and encourage additional jurisdictions to look at these types of regulations.
NFIP Regulations	93.75%	• Most jurisdictions have floodplain regulations in place, thus providing a regulatory foundation from which to promote mitigation.
Subdivision & Land Use Ordinances (SALDOs)	6.25%	• A relatively low percentage of jurisdictions appear to have SALDOs. • With the lack of SALDOs, integrating mitigation into development conversations may be more effective through the comprehensive planning process.
Zoning Ordinances	31.25%	• A minority of jurisdictions have zoning ordinances in place. • It is particularly challenging to implement strict zoning in unincorporated areas. The presence of minimal regulations serves as a motivator for moving to unincorporated areas. • Education and outreach as to the potential benefits of zoning, to include how to implement it for the purposes of mitigation without it seeming too restrictive, could be helpful.

The survey asked respondents about barriers to full implementation of planning and regulatory capabilities at the local level. Given the capability, the survey noted barriers such as a lack of personnel to enforce existing regulations, a reluctance on the part of the public to participate in planning, etc. The survey then asked respondents, given the combination of these barriers with the presence of plans and regulatory elements within their jurisdiction, how they would label their jurisdictions ability to fully meet the capability. The majority of respondents felt their capability was limited (62.50%), with 31.25% responding "moderate" and 6.25% as "high." ***These results suggest that education is necessary to strengthen***

planning and regulatory capabilities before mitigation can be integrated into existing planning efforts in a meaningful way.

The next capability included in the survey was "administrative and technical." The administrative capability was defined by an adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability related to an adequacy of knowledge and technical experience of local government employees *or the ability to contract outside resources* for this expertise. Common examples of skill sets and technical personnel needed for hazard mitigation include:

- planners with knowledge of land development/management practices,
- engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g., building inspectors),
- planners or engineers with an understanding of natural and/or human-caused hazards,
- emergency managers,
- floodplain managers,
- land surveyors,
- scientists familiar with hazards in the community,
- staff with education or expertise to assess vulnerability to hazards, and
- personnel skills in geographic information systems (GIS).

Given these examples and respondents' knowledge of their jurisdictions' paid staff and contracting capabilities, 50.00% rated their administrative and technical capability as "limited," 43.75% rated their capability as "moderate," and 6.25% rated it as "high." ***It thus appears that resources are available in the region to support mitigation, but approximately half of the respondents would need information on where they could find assistance.*** None of the respondents indicated that their jurisdictions had a grants specialist on payroll (though the City of Buckhannon recently added that position at its city hall). Of the respondents, 73% felt that their jurisdiction's fiscal capabilities to support hazard mitigation were limited. The remaining respondents only classified their fiscal capabilities as "moderate"; no respondents rated their fiscal capability as "high."

The final general capability included in the survey was the "political" capability. It can be the most difficult to evaluate due to the strong feelings it can elicit. Respondents ranked their jurisdiction's political capabilities, where a "high" capability refers to situations where

there is significant political will to implement hazard mitigation policies and priorities. Three respondents (20%) rated their political capability as "high," 33.33% as "moderate," and 46.67% as "limited." Approximately half of the respondents felt their jurisdiction held some level of capability for implementing mitigation, ***which suggests that the education efforts noted above may be successful***.

The survey closed by querying agreeableness to specific types of mitigation strategies. The following table present these results.

TABLE 4.3 SELF-ASSSESSMENT PROJECT CONSIDERATIONS

Sample Mitigation Strategy	*Very Much Unwilling*	*Unwilling*	*Neutral*	*Willing*	*Very Willing*
XYZ community guides development away from known hazard areas.	0	0	7	5	3
XYZ community restricts public investments or capital improvements within hazard areas.	0	0	8	4	3
XYZ community enforces local development standards (e.g., building codes, floodplain management ordinances, etc.) that go beyond minimum state or federal requirements.	0	0	9	3	3
XYZ community offers financial incentives (e.g., through property tax credits) to individuals and businesses that employ resilient construction techniques (e.g., voluntarily elevate structures, employ landscape designs that establish buffers, install green infrastructure elements, etc.).	1	1	13	0	0

Survey respondents generally support regulatory mitigation efforts, to include limiting development in particularly hazard-prone areas. However, respondents were more unwilling to support financial incentives for hazard mitigation. Such a response was expected given the fiscal challenges noted earlier in the survey. Such a response was also consistent with the apparent desire to guide development away from hazard-prone areas (as evidenced by responses to the first three project types) rather than reward developers/individuals for building in those areas, albeit in resilient ways. Guiding development away from hazard-prone areas, though, is not without its own challenges. Local officials will likely need to commit to outreach and education to explain the benefits of avoiding certain areas. Other plans, such as comprehensive and land use plans, can include risk area overlays as part of the mapping sections to help convey this type of information.

4.3 Continued Public Involvement

The Region VII committee understands that the general public must be involved in the initial planning process, as well as the updates to the completed plan. As such, the PDC and the committee will invite the public to participate as the plan is updated through a variety of formats including:

- commission and other pre-planned public meetings,
- social media update posts,
- jurisdictions' websites,
- CEDS, and
- online surveys.

As the updated plan is adopted, the public will be given the chance to comment on the updated plan prior to its adoption by passage resolution or ordinance. The PDC, at a minimum, will maintain file copies of the hazard mitigation plan that are available for review and inspection during routine business hours. The PDC intends to log all comments received regarding the mitigation plan. Members of the public are invited to contact the PDC with comments regarding hazard events, etc. Local officials are also invited to review the plan's effectiveness at determining hazard susceptibility based on data from hazard events as they occur.

As noted above, the Region VII PDC recognizes the benefits of linking updates to the hazard mitigation plan with other projects, in part to reduce the burden of managing entirely separate efforts. The same approach can support continued public involvement. For many of the PDC's projects, particularly infrastructure upgrades funded by community development block grants (CDBG), the PDC must solicit public comment. Though the focus of those efforts can (and should) be on the project at hand, infrastructure upgrades (particularly water, sewer, and stormwater projects) often address risk reduction in some way. As PDC staff moderate these public meetings, they can include questions probing for the nature of this risk reduction.