



# Region 3 Hazard Mitigation Plan

Updated 2017

# **REGION 3 HAZARD MITIGATION PLAN**

**RELEASED 2017**

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# MEMORANDUM

Date: June 5, 2017

Re: Region 3 Hazard Mitigation Plan

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This document serves as an amendment to the *Region 3 Hazard Mitigation Plan*, which was approved pending adoption in May 2017.

Section 3.2: Project Implementation has been revised as per a request from the West Virginia Division of Homeland Security and Emergency Management (WVDHSEM). The WVDHSEM State Hazard Mitigation Planner requested that all mitigation projects advocating for acquisition of flood-prone properties be revised to read “acquisition and demolition.”

The change affects Pages 211 through 269 only.

The change updates the following projects:

- Boone 3 (p. 211),
- Danville 3 (p. 215),
- Madison 7 (p. 217),
- Sylvester 4 (p. 221),
- Whitesville 4 (p. 222),
- Clay 12 (p. 225),
- Town of Clay 5 (p. 226),
- Kanawha 23 (p. 231),
- Belle 7 (p. 235),
- Cedar Grove 6 (p. 237),
- Charleston 19 (p. 241),
- Charleston 20 (p. 241),
- Chesapeake 17 (p. 246),
- Clendenin 2 (p. 247),
- Dunbar 5 (p. 248),
- East Bank 5 (p. 249),
- Glasgow 5 (p. 250),
- Handley 4 (p. 251),
- Marmet 4 (p. 252),
- Pratt 4 (p. 253),
- South Charleston 5 (p. 254),
- St. Albans 6 (p. 255),
- Putnam 3 (p. 256),
- Bancroft 3 (p. 263),
- Buffalo 3 (p. 264),
- Eleanor 4 (p. 265),
- Hurricane 5 (p. 266),
- Poca 3 (p. 268), and
- Winfield 4 (p. 269).

## INTRODUCTION

This section will present an introduction to the hazard mitigation plan as well as define the authority, scope and purpose of the plan.

### Plan Introduction

The *Region 3 Hazard Mitigation Plan* is a multi-jurisdictional plan that details natural hazards that threaten Region 3 and its various municipalities. The plan fulfills the requirements set forth by the Disaster Mitigation Act of 2000 (DMA, 2000). This Act requires counties 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 multi-jurisdictional hazard mitigation 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 (USDHS/FEMA, 2013). The West Virginia Division of Homeland Security and Emergency Management (WVDHSEM) further monitored the original planning as well as subsequent updating processes. The Regional Intergovernmental Council (RIC/Region 3) acted as the coordinating agency for the completion of this plan at the local level.

### Plan Scope

The *Region 3 Hazard Mitigation Plan* includes all unincorporated areas of Region 3 as well as the incorporated areas of all municipalities within the Region. The plan addresses natural and human-caused hazards identified by FEMA, WVDHSEM and the Region 3 hazard mitigation planning team. All hazards that have or can affect the residents of Region 3 have been considered. Hazard mitigation objectives, goals and projects are discussed, as are project lead agencies and potential funding sources.

### Plan Purpose

The purpose of the *Region 3 Hazard Mitigation Plan* is to identify and evaluate all hazards that can, and may, affect Region 3 and to describe mitigation strategies to address these hazards.



## 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.

The communities served by West Virginia's Region 3 Planning and Development Council 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 contributed to the development of the plan, including the United States Department of Homeland Security / Federal Emergency Management Agency's (FEMA) *Local Mitigation Planning Handbook* (USDHS/FEMA, 2013), the governing regulations in the Code of Federal Regulations, and documents provided by the Regional Intergovernmental Council.

A two-tiered planning committee guided completion of the plan at the local level. The Region 3 Planning and Development Council comprised the *Full Planning Committee*, as it contains membership from all of the governmental jurisdictions in the region. The full council, though, is large. As such, a smaller *Steering Committee* interacted frequently with a consultant hired to write the plan. The following table lists the members of the full planning committee (serving at the time this plan was updated).



Table 1.1

JURISDICTION	REPRESENTATIVE
Boone County Commission	Mickey Brown, Commissioner
Clay County Commission	Jerry Linkinogor, Commissioner
Kanawha County Commission	Henry Shores, Commissioner
Putnam County Commission	Andy Skidmore, Commissioner
Town of Bancroft	George Woodrum, Mayor
Town of Belle	Glen Chestnut, Mayor
Town of Buffalo	Bill Matthews, Mayor
Town of Cedar Grove	James Hudnall, Mayor
City of Charleston	Danny Jones, Mayor
City of Chesapeake	Janet Armentrout, Mayor
Town of Clay	Beverly Whaling, Mayor
Town of Clendenin	Gary Bledsoe, Mayor
Town of Danville	Mark McClure, Mayor
City of Dunbar	Terry Greenlee, Mayor
Town of East Bank	Charles Blair, II, Mayor
Town of Eleanor	Walter Halstead, Mayor
Town of Glasgow	Wayne Armstrong, Mayor
Town of Handley	Essie Ford, Jr., Mayor
City of Hurricane	Scott Edwards, Mayor
City of Madison	Sonny Howell, Mayor
City of Marmet	Dave Fontalbert, Mayor
City of Nitro	Dave Casebolt, Mayor
Town of Poca	Jane Caruthers, Mayor
Town of Pratt	Eric Holcomb, Mayor
City of St. Albans	Dick Callaway, Mayor
City of South Charleston	Frank Mullens, Mayor
Town of Sylvester	Manual Arvon, Mayor
Town of Whitesville	Fred Harless, Jr., Mayor
Town of Winfield	Randy Barrett, Mayor
Minority Group Representative	Oree Banks
Minority Group Representative	Coston Davis, Jr.
Boone County Citizen Representative	Kris Mitchell
Clay County Citizen Representative	David Pierson, Jr.
Kanawha County Citizen Representative	John Luoni
Putnam County Citizen Representative	Joe Tyree
City of Charleston Citizen Representative	Dennis Strawn
Citizen Representative	Damron Bradshaw, Kanawha County 4-H Foundation
Citizen Representative	Joy Underwood, Coal River Inn
Citizen Representative	S. K. Miller, Workforce Investment Board
Citizen Representative	Jeri Adkins, Charleston Area Alliance
Citizen Representative	Todd Mullins, KVLC, AFL-CIO
Citizen Representative	Eric Sharp, Labor Employees Cooperative Trust
Citizen Representative	Rebecca Prokity, Bridgemont CTC
Citizen Representative	Trina Sweeney, West Virginia State University
Citizen Representative	Doug Hartley, KVRTA
Citizen Representative	C. Elwood Penn, IV, WVDOT
Citizen Representative	Lee Roberts, Tornado Products





The following table lists the members of the steering committee.

Table 1.2

ORGANIZATION	REPRESENTATIVE
Regional Intergovernmental Council (RIC)	Kara Greathouse, Transportation Project Manager
Boone County Emergency Management	Greg Lay, Director
Clay County Commission	Greg Fitzwater, County Commissioner
Kanawha County Emergency Management	C.W. Sigman, Director
Kanawha County	Chuck Grishaber, Floodplain Manager
Putnam County Office of Planning & Infrastructure	Tim Keaton, Planner
City of Charleston Homeland Security & Emergency Management	Grant Gunnoe, Director
City of Charleston	Mark, Snuffer, Floodplain Manager
City of Madison Emergency Management	Steve Byus, Coordinator
General Public (Resident of the City of Charleston)	Karen Allen

### 1.1.1 Current Update Process

As noted in the introduction, the Regional Intergovernmental Council (RIC/Region3) served as the coordinating agency for this update. To that end, the RIC sought support for the planning effort, identifying resources needed to update the plan (including serving as the primary point of contact interfacing with the county’s consultant working on the project), and re-engaging governmental organizations and other technical expertise available in the county.

RIC 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 RIC staff provided updates on the process and asked for jurisdictional input.
2. Membership on the steering committee.
3. Direct contact from the PDC’s consultant.
4. Cross participation through RIC’s regional transportation plan update, where participants discussed hazard risk and transportation-related vulnerabilities.



The following table lists all jurisdictions in Region 3 and identifies, by superscript, which of the ways they participated. The superscript corresponds to the numbered list above.

Table 1.3	
JURISDICTION	JURISDICTION
Bancroft <sup>1, 3</sup>	Belle <sup>1, 3</sup>
Boone County <sup>1, 2, 3</sup>	Buffalo <sup>1, 3</sup>
Cedar Grove <sup>1, 3</sup>	Charleston <sup>1, 2, 3, 4</sup>
Chesapeake <sup>1, 3</sup>	Clay County <sup>1, 2, 3</sup>
Clay (Town of) <sup>1, 3</sup>	Clendenin <sup>1, 3</sup>
Danville <sup>1, 3</sup>	Dunbar <sup>1, 3</sup>
East Bank <sup>1, 3</sup>	Eleanor <sup>1, 3</sup>
Glasgow <sup>1, 3</sup>	Handley <sup>1, 3</sup>
Hurricane <sup>1, 3, 4</sup>	Kanawha County <sup>1, 2, 3, 4</sup>
Madison <sup>1, 2, 3</sup>	Marmet <sup>1, 3</sup>
Nitro <sup>1, 3, 4</sup>	Poca <sup>1, 3</sup>
Pratt <sup>1, 3</sup>	Putnam County <sup>1, 2, 3, 4</sup>
St. Albans <sup>1, 3</sup>	South Charleston <sup>1, 3, 4</sup>
Sylvester <sup>1, 3</sup>	Whitesville <sup>1, 3</sup>
Winfield <sup>1, 3</sup>	

Additionally, RIC 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 Regional Intergovernmental Council staff.

Governmental

- Charleston Area Alliance
- Charleston Convention and Visitors Bureau
- Clay County Development Corp.
- Dunbar Convention and Visitors Bureau
- Family Resource Networks
  - Boone, Kanawha, and Putnam Counties (Consolidated agency)
  - Clay County
- Federal Emergency Management Agency
- Hurricane Convention and Visitors Bureau
- Putnam County Convention and Visitors Bureau
- Putnam County Development Authority
- Putnam County Office of Emergency Management



South Charleston Convention and Visitors Bureau  
Upper Kanawha Valley Economic Development Corporation  
West Virginia Division of Homeland Security and Emergency Management

Other

**Higher Education:** University of Charleston

**Higher Education:** West Virginia State University

**Private Sector:** Charleston Area Medical Center

**Private Sector:** Toyota (Buffalo)

**Private Sector:** Marfolk Coal Company

**Private Sector:** Kimley-Horn (Consultant utilized for transportation plan update)

**Private Sector:** 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. Appendix 1 also contains updates to project and asset lists, as provided by steering committee members. In some cases, the appendix contains follow-up notes from steering committee meetings. The appendix also contains the chat log from the web conference, though its content was minimal compared to the discussion. (Audio of the meeting is available upon request.) For the transportation plan update, the RIC conducted a number of interviews; relevant interview transcripts appear in Appendix 1. Finally, the consultant contacted many jurisdictions directly seeking input on projects. Appendix 1 includes a call log detailing that process.

The RIC 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 3. Conversely, RIC asked if those PDCs had concerns about risks originating in Region 3 for which RIC could provide information. RIC sent emails to Regions 1, 2, 5, and 7; it received responses from Regions 1 and 5. Appendix 1 contains those responses.

The RIC's 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 1.4

DOCUMENT TYPE	DOCUMENT CITATION	HOW INCORPORATED INTO PLAN
Plan	B-C-K-P Regional Intergovernmental Council. (2012) <i>All-Hazards Mitigation Plan</i> . Online	Used as a basis for past plans, HIRA, vulnerability analysis and mitigation strategy.
Plan	City of Charleston. (2013). <i>Imagine Charleston Comprehensive Plan and Downtown Redevelopment Plan</i> . Online.	Used to identify targeted development areas, validate city administrative capabilities
Plan	Kanawha County. (2014) <i>Twenty-twenty Vision. Kanawha County Comprehensive Plan</i> . Online.	Used to identify targeted development areas, validate county administrative capabilities
Plan	Dougherty, M.J; and Eades, D. (2013) <i>Nitro: A Plan for Moving the City Forward</i> . Online	Used to identify targeted development areas.
Plan	(2015) <i>St. Albans Comprehensive Plan</i> . Online	Used to identify targeted development areas, validate city administrative capabilities
Plan	Butterworth, J. (2014) <i>Putnam County Community Plan 2014. Bridging to the Future</i> . Online	Used to identify targeted development areas, validate county administrative capabilities
Plan	Regional Intergovernmental Council. (2016) <i>The Comprehensive Economic Development Strategy FY 2016 Update</i> . Online	Used to identify targeted development areas
Plan	Regional Intergovernmental Council. (2015). <i>FY 2015 Update Regional Development Plan Region III</i> . Online	Used to identify targeted development areas
Plan	Dewberry. (2013). <i>2013 West Virginia Statewide Standard Hazard Mitigation Plan Update</i> . Online.	Referenced for HIRA and mitigation strategy guidance.
Report	USDHS FEMA. (2016). <i>Disaster Declarations for West Virginia</i> . Online.	Used as data on types of significant hazards incidents to have occurred in Region 3
Technical Information	USACE. (2014). <i>National inventory of dams</i> . Online.	Used to validate list of names and locations of dams in Region 3
Technical Information	USDHS FEMA Region III. (July, 2015). <i>Plan Integration: Linking Local Planning Efforts</i> . Federal Government: Washington, D.C.	Used as guidance on incorporating local planning efforts/plans into the planning process.
Technical Information	USDHS FEMA. (June, 2016). <i>National Mitigation Framework</i> . Federal Government: Washington, DC	Used as general guidance on mitigation planning.
Technical Information	USDHS FEMA. (May, 2005). <i>Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning</i> . Federal Government: Washington, D.C.	Used as general guidance for incorporating historic property and cultural protection.
Technical Information	USDHS FEMA. (March, 2013). <i>Local mitigation planning handbook</i> . Federal Government: Washington, D.C.	Used as general guidance on revised mitigation planning process

### 1.1.2 Committee Involvement

On July 15, 2016, RIC staff the council’s consultant attended a meeting held at the Regional Intergovernmental Council Offices to formally kick-off the project. Representatives from FEMA Region 3 and the West Virginia Division of Homeland Security and Emergency Management attended to discuss mitigation reconstruction. 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 steering committee had four meetings during the update of the plan. Three meetings occurred at the RIC office and one was via a [www.gotomeeting.com](http://www.gotomeeting.com) video conference. Meeting dates included the following:

- September 7, 2016,
- October 13, 2016 (Video Conference),
- November 17, 2016, and
- December 15, 2016.

The agenda for the first meeting included an introduction to the mitigation planning process, a discussion of hazards that threaten the counties including those that should be included in the plan, a review of municipalities that make up Region 3 and a discussion on mitigation reconstruction amendments to the existing plan. During the second steering committee meeting, members reviewed draft materials and discussed on-going projects. The consultant provided instructions for updating existing project lists and asked that steering committee members bring updated lists with them to the November meeting. The third meeting focused on mitigation projects. Steering committee members provided an overview of their updates, asked any questions related to finishing the updated list, and informed the consultant of any new projects that should be included. The fourth meeting served as time for steering committee members to complete project prioritization matrices and to provide any final insight as to data to include for their jurisdictions. Sign-in sheets for all meetings are included in Appendix 1.

Steering committee membership involved more than just meeting attendance. Members were given tasks at the conclusion of each meeting, which were predominantly comprised of requests to collect jurisdiction-specific data. For instance, the consultant provided members with copies of asset inventory sheets for the four counties within the region and asked them to check the lists for accuracy. Members added additional assets that had been built since the last plan update and deleted defunct ones (a process similar to how the committee updated the project list). Significantly, the consultant utilized steering committee members as liaisons for the many municipalities in the region. Members reached out to municipalities and engaged them in updates to municipal asset lists, educated them as to the definition of ‘mitigation projects,’ and provided an overview of the upcoming adoption process.



### 1.1.3 Engaging the Public

The public participated in one of the following ways: (a) attendance at public meetings, (b) participation in an online survey, (c) through the Kanawha Putnam Emergency Planning Committee, (d) through representation on the full planning committee, and (e) through direct steering committee membership.

The RIC coordinated several opportunities for the public to participate in the planning process. The PDC held public meetings in Kanawha and Putnam Counties. Local media advertised the meetings (see Appendix 1); attendance was minimal. The meeting agendas focused on flooding. The City of Charleston and Putnam County participate in the Community Rating System (CRS) and, as such, attempted to engage the public in detailed discussion about flood risks and vulnerabilities. The slide deck used at the public meetings as well as sign-in sheets from the meetings are also included in Appendix 1.

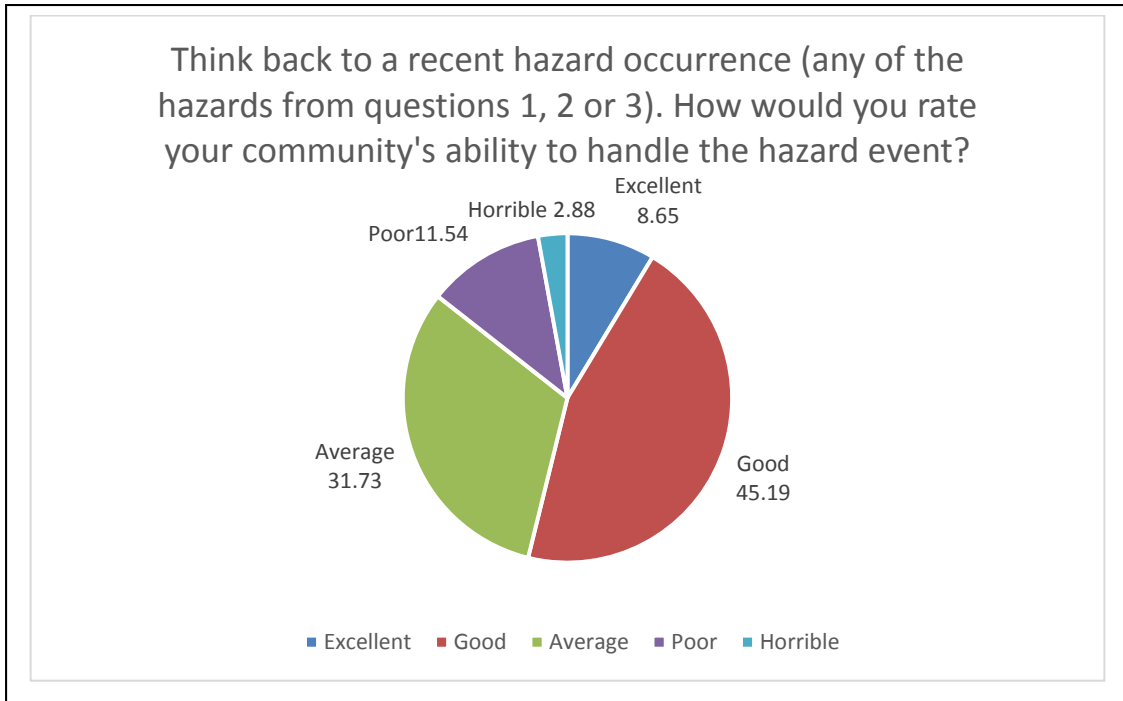
The RIC made the existing HMP available for public review on its website. The consultant also attended the January 2017 meeting of the Kanawha Putnam Emergency Planning Committee (KPEPC) to discuss the plan and solicit comments from members of that committee. The KPEPC serves as a multi-jurisdictional, multi-disciplined emergency preparedness planning committee comprised of emergency responders, other public agencies, and private industry.

In an attempt to further public participation in the planning process, the RIC directed the consultant to develop and administer an online survey for residents of all four counties. This survey was developed using the “Survey Monkey” platform ([www.surveymonkey.com](http://www.surveymonkey.com)) and distributed through social media. The survey was available to the public from September 9, 2016 to February 13, 2017. One-hundred four (104) responses were recorded in that time period. Residents of Boone, Clay, Kanawha and Putnam Counties replied to various questions regarding their opinions and general demographic questions. The raw data for the questions asked can be found in Appendix 2.

Respondents answered a variety of questions regarding their perceptions of hazards that threaten their community. When asked what hazard they believed existed in their community, the most common answer was ‘severe weather’ with 92% of respondents choosing this hazard. Respondents were also asked to choose the hazard they felt posed the greatest risk to their community; the most common answer was flooding, chosen by over 56% of respondents. Severe storms followed at 23%. The findings of the risk assessment in Section 2.0 of this document reinforce these findings; severe storms are highly frequent events; however, flooding will typically cause more damage.



Respondents also rated how they felt their community handled recent hazard events. The below chart shows these responses, where over half of respondents considered the ability of the community to handle such an event to be either 'Excellent' or 'Good'. Few residents thought that the ability of the community was 'Poor' or 'Horrible'.



The planning committees overseeing this project included public representation. The RIC included a resident of the City of Charleston on the steering committee. This individual could not attend the four meetings, but participated via email with RIC staff (see Appendix 1) and via direct contact with the City of Charleston Planning Department. Additionally, the full planning committee included members of the public. The council is comprised of 47 total members. Two of those members are minority group representatives, five are designated citizen representatives (one each for the four counties and the City of Charleston), and 11 others are at-large citizen representatives. RIC staff provided these individuals, along with other council members, regular updates on the planning process and sought input at regularly-scheduled council meetings.



#### **1.1.4 Research Conducted**

##### Assessing Risk

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.

##### Mitigation Plan Development and Update

As noted above, the steering committee participated extensively in updating the mitigation plan. The primary purpose of the first committee meeting was to review the existing hazard list; the second meeting compared the applicability of the project list with updated risk data and to change the project list accordingly. The third and fourth meetings provided opportunities for project discussion and prioritization. (The project list under consideration was the list from the previous federally-approved version of this plan [2012].)

The PDC's consultant guided steering committee members through the process of re-prioritizing mitigation projects. The prioritized list was then presented as an overall mitigation strategy for Region 3 (i.e., each project is listed with a timeframe, potential cost and funding source, and coordinating agency).

#### **1.1.5 Implementing the Plan and Monitoring Progress**

Region 3'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 Regional Intergovernmental Council (RIC), alternatively known as the Region 3 Planning and Development Council, is comprised of four counties located in southwest central West Virginia. The counties contained within Region 3 are Boone, Clay, Kanawha, and Putnam. The region covers 2,108 square miles, of which 2,092 square miles is land and 17.6 square miles is water. Large parts of the region are located in the Kanawha Valley, also colloquially known as “Chemical Valley.”

Region 3 is bordered by a number of counties and other regional planning and development councils. These councils consist of Regions 1, 2, 4, 5, and 7. The counties that border the region include Raleigh, Wyoming, Logan, Lincoln, Cabell, Mason, Fayette, Nicholas, Jackson, Roane, Calhoun, and Braxton.

Boone County is the southernmost county in Region 3; the county covers 503 square miles, of which 502 square miles is land and 1.7 square miles is water. Boone County contains four municipalities: The City of Madison, which is the county seat, and the towns of Danville, Sylvester, and Whitesville.

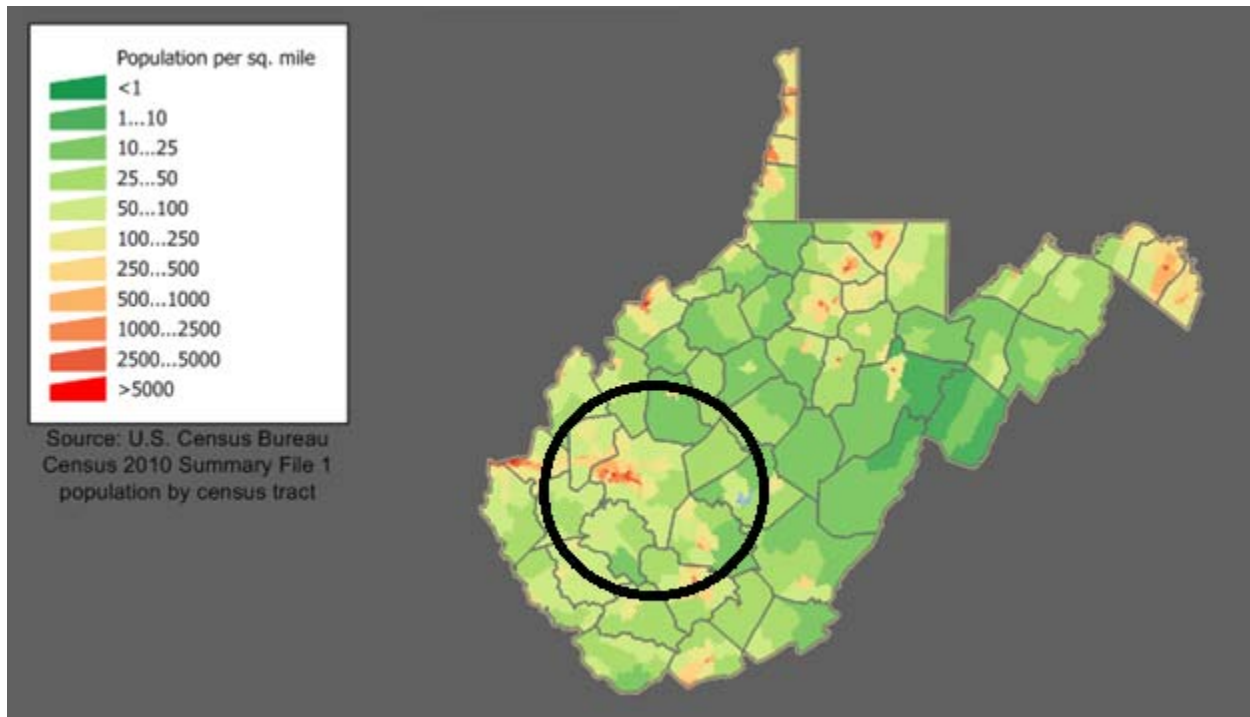
Clay County is the northernmost county in Region 3; the county is comprised of 344 square miles, of which 342 square miles is land and 1.9 square miles is water. The Town of Clay is the county seat as well as being the sole incorporated area in Clay County.

Kanawha County is located in the center of Region 3 and is the largest county in the region, both in terms of land area and population (described below). The county covers 911 square miles, of which 902 square miles is land and 9.3 square miles is water. The City of Charleston is both the county seat and the capital of West Virginia. Kanawha County contains thirteen other incorporated areas: the cities of Dunbar, Marmet, Nitro, South Charleston, and St. Albans, and the towns of Belle, Cedar Grove, Chesapeake, Clendenin, East Bank, Glasgow, Handley, and Pratt. The region is home to some of the densest areas of the state, as shown in the image below.

Table 1.5

NAME	TYPE
Charleston	City
Dunbar	City
Hurricane	City
Madison	City
Marmet	City
Nitro	City
South Charleston	City
St. Albans	City
Bancroft	Town
Belle	Town
Buffalo	Town
Cedar Grove	Town
Chesapeake	Town
Clay	Town
Clendenin	Town
Danville	Town
East Bank	Town
Eleanor	Town
Glasgow	Town
Handley	Town
Poca	Town
Pratt	Town
Sylvester	Town
Whitesville	Town
Winfield	Town





## Climate

West Virginia generally has a humid subtropical climate, except at higher elevations (such as those found in the eastern portion of the state). Region 3 is located in this humid subtropical climate, with warm to hot summers, significant summer humidity, and chilly winters. Charleston, located in the center of the region, has an annual average temperature of 55.7 degrees Fahrenheit, average rainfall of 44.02 inches, and average annual snowfall of 36 inches, according to U.S. Climate Data (2016). On average, temperatures range from highs in the 40s in the winter to 80s in the summer. Low temperatures reach into the 20s.

## Climate Change

Climate change, as defined by the United States Environmental Protection Agency (USEPA), refers to any significant change in the measures of climate lasting for an extended period of time. Generally speaking, this means large changes in temperature, precipitation, or wind patterns, among others, that occur over at least several decades. The current climate changes indicate an increase in average temperature, which has risen by 1.5°F over the past century. The average temperature is projected to rise by another 0.5°F to 8.6°F over the next century according to the USEPA. The United Nations considers climate change to be an emerging threat around the globe (Medina, 2016).



This ongoing warming will lead to increased risks from some hazards within Region 3. “Climate change has the potential to increase both frequency and severity of the threats and hazards that may produce a significant impact” (Trask, 2015). For example, precipitation levels are expected to rise in the northeast, increasing flood risks in low lying river valleys (Horton et al., 2014). The City of Cambridge, MA released a study in 2015 that analyzed the future impacts of climate change on the city and its planning process. Two of the challenges identified note that the past is no longer a reliable indicator of future conditions; and that current design criteria are based on past events (Trask, 2015). Both of these challenges will have to be faces in communities across in the country in the coming years and decades. Changes in risk associated with natural hazards will be discussed in more detail the hazard profiles to follow.

Many communities are incorporating sustainable development into their development plans to better manage increased rainfall potentially associated with climate change. According to the US Environmental Protection Agency, green infrastructure “is a cost-effective, resilient approach to managing wet weather impacts” (2016). These projects increase naturalized areas in (particularly) urban environments, where large swaths of pavement contribute to runoff. These areas better manage water resources, slowing the water that ultimately reaches waterways, allowing water to more readily soak into the ground rather than gather additional pollutants as it flows along pavement, etc. Later sections in this document discuss potential programs where green infrastructure/low-impact development considerations may strengthen climate-resilient hazard mitigation.



## Demographics

Collectively, Region 3 has a population of 282,564 according to the 2010 Census. As stated above, the largest county population is found in Kanawha County, with a 2010 population of 192,063 (68% of the regional population). The population of the region is fairly evenly dispersed across age ranges, with a median age of 41.

The region is overwhelmingly Caucasian, representing 92% of the population. African American is the second most noted race in the Census data, with 5.21% 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 1.6

Demographics by Municipality		
	Population	Total Housing Units
City of Charleston	49,736	26,205
City of Dunbar	7,659	4,175
City of Hurricane	6,493	2,627
City of Madison	2,993	1,394
City of Marmet	1,503	742
City of Nitro	3,076	1,394
City of South Charleston	13,450	6,658
City of St. Albans	11,044	5,408
Town of Bancroft	587	331
Town of Belle	1,260	615
Town of Buffalo	1,236	557
Town of Cedar Grove	997	393
Town of Chesapeake	1,554	814
Town of Clay	491	332
Town of Clendenin	1,033	490
Town of Danville	688	320
Town of East Bank	729	354
Town of Eleanor	1,807	783
Town of Glasgow	688	320
Town of Handley	301	119
Town of Poca	1,071	460
Town of Pratt	527	245
Town of Sylvester	133	62
Town of Whitesville	548	323
Town of Winfield	2,256	993

Table 1.7

Demographics by County						
	Population	Total Housing Units	Percent High School Diploma or Higher	Percent Bachelor's Degree or Higher	Median Household Income	Families Below Poverty Level
Boone County	22,816	11,012	78.5%	8.8%	\$38,958	23.4%
Clay County	8,859	4,570	73.7%	9.8%	\$31,325	27.7%
Kanawha County	186,241	92,949	88.2%	25.1%	\$45,882	16.5%
Putnam County	59,941	23,883	91.3%	25.4%	\$56,774	10.4%

## Economy

The region has a highly diverse economy, ranging from industrial/technological firms located primarily along the Kanawha River to natural resource driven industry in the more rural areas. According to the U.S. Census Bureau, the median household income in the region was \$44,548.75 in 2014. Just over half of the civilian workforce over the age of 16 is employed, working for a total of 6,675 individual establishments. Between 2013 and



2014, total employment decreased by just over 3%. This decline was mainly spurred by an 18% decrease in Boone County. Clay and Putnam counties saw a more modest decline, while Kanawha County saw growth in employment of nearly 8%. Regionally, the unemployment rate in March of 2015 was 9.1%, though county rates vary significantly.

Of the 6,675 individual establishments in the region, retail trade makes up the largest number, accounting for 15% (980) of the total. The remaining top five industries include health care and social assistance, other services (except public administration), professional, scientific, and technical services, and accommodation and food services. As an industry, coal has been declining in the region since the mid to late 1990s, according to the RIC's *Regional Development Plan*. Boone County is a top five county in the US for coal mining job losses. The top ten employers in each county are shown in the table below.

Table 1.8

<b>TOP TEN EMPLOYERS BY COUNTY</b>			
<i>Boone County</i>	<i>Clay County</i>	<i>Kanawha County</i>	<i>Putnam County</i>
Boone County Board of Educations	Clay County Board of Educations	Charleston Area Medical Center	Putnam County Board of Education
Elk Run Coal Company	Clay County Development Corporation	Kanawha County Board of Education	Toyota Motor Manufacturing, WV, Inc
Hobert Mining, Inc.	Diversicare Leasing Corp.	Herbert J. Thomas Memorial Hospital	Charleston Area Medical Center
Gateway Eagle Coal Co, LLC	Oasis Outsourcing V, Inc.	Wal-Mart Associates, Inc.	Diamond Electric Manufacturing Corporation
Maxximum	Community Care of WV, Inc.	WV Department of Highways	Appalachian Electric Power
Independence Coal Company	Clay County Commission	The Kroger Company	Rite Aid of WV, Inc.
Eastern Associated Coal Corporation	Mountaineer Investigation	City of Charleston	Wal-Mart Associates, Inc.
Boone Memorial Hospital	Advantage Home Care, LLC	US Postal Service	Workforce WV
Black Castle Mining Co, Inc.	Clay Trucking, Inc.	WV Department of Health and Human Resources	Brand Energy Solutions, LLC.
Boone County Commission	Gino's Distributing, Inc.	WV Department of Administration	American Electric Power Service Corporation

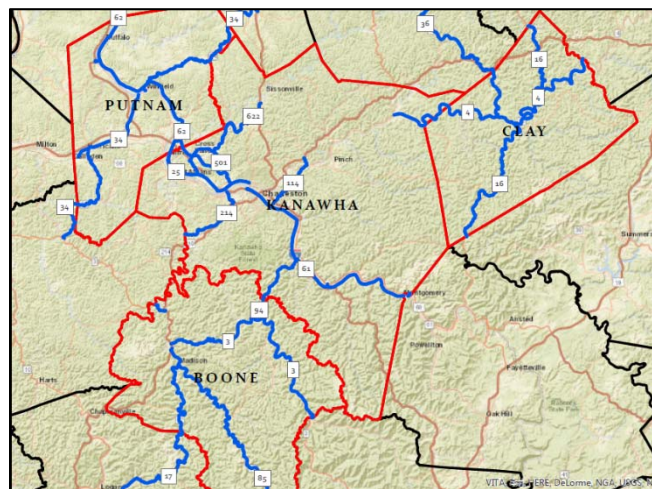
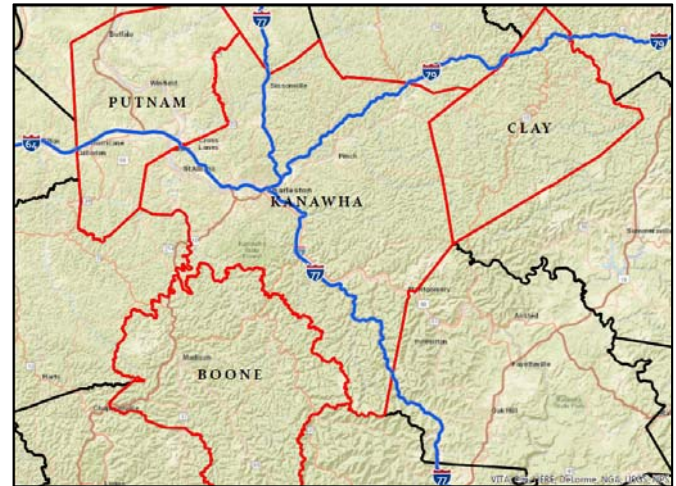
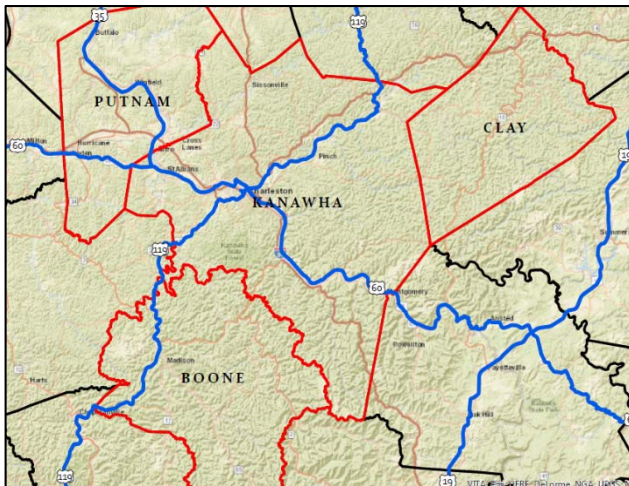
## Transportation

Due to the location of the region, and the dense industrial district in the Kanawha Valley, the transportation network of the region is particularly robust. All four of the major transportation methods (road, rail, water, and air) are present in the region, as described below.



## Roads

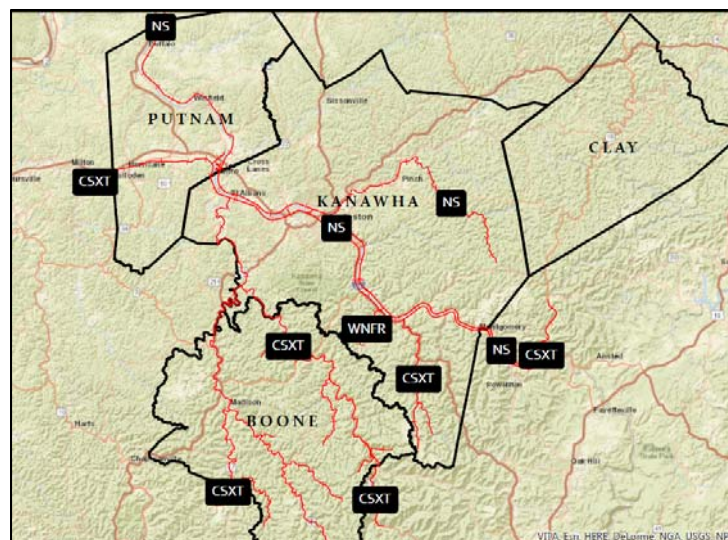
There are three interstates found in Region 3, two that transverse the area and one that terminates/begins in Charleston. Interstates 77 and 64 run concurrently from the Kanawha/Fayette County border to the city of Charleston, where 64 continues east-west and 77 continues north/south. Interstate 79 is a north/south route that terminates/begins in Charleston. In addition to the interstates discussed above, three U.S. Highways also run through the region. U.S. 60 runs east/west through Kanawha and Putnam Counties. U.S. 119 is a north/south route that runs through Kanawha and Boone Counties. Finally, U.S. 35 runs north/south from its origin/termination in western Kanawha County through Putnam County. Finally, there are a large number of State Highways that run through all four counties that make up Region 3. The three maps below show the locations and routes of the various highways within Region 3. The map for State Highways has been clipped to only those roads that are in the Region, to reduce clutter on the map.





## Rail

Railroads have played an important role in the development of many West Virginia communities and this remains true for the Kanawha Valley and Region 3. Major rail transport companies, including CSX, Norfolk-Southern and Conrail, operate rail lines within Region 3. Amtrak also runs service through the Kanawha Valley. The Cardinal Route runs from New York to Chicago, through Washington D.C., three times a week, making a stop in Charleston ([www.amtrak.com/cardinal-train](http://www.amtrak.com/cardinal-train)). The various rail lines are shown in the map below.

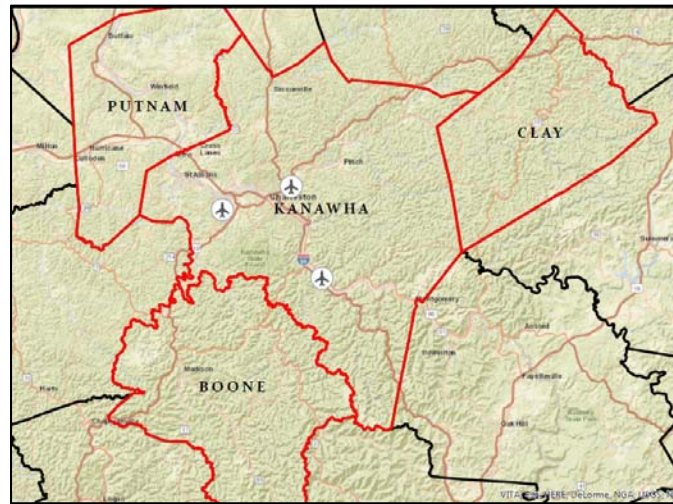


## Air

There is one commercial airport located in Region 3, in Kanawha County. Yeager Airport, located just north of Charleston, provides flights connecting through major hubs such as Atlanta, Charlotte, Chicago, Dulles, and Regan-National. The airport also has direct flights to vacation destinations available. The airport is served by American Eagle, Delta Airlines, Delta Connection, Spirit Airlines, and United Express.

There are also two private airfields located in Kanawha County, according to The National Map data from the USGS (<http://nationalmap.gov/>). Mallory Flight School is located in western Kanawha County, while the Island Airport is located on an island in the Kanawha River near Chesapeake in eastern Kanawha County. Both these and Yeager Airport are shown in the map below. According to the data there are no airports/airfields in the other three counties in Region 3.





### Public Transit

Public transit in Region 3, and in West Virginia generally, is organized at the local level, if at all. There are a mixture of private and municipal public transportation agencies across the state. According to the RIC, two of the four counties in the region have public transportation available. In Kanawha County (including the City of Charleston) public transportation is provided by the Kanawha Valley Regional Transportation Authority (KVRTA). The KVRTA was formed in 1971 by the Kanawha County Commission and Charleston City Council to provide public transit in Kanawha County, with some (limited) additional service in Putnam and Fayette counties. The service area spans approximately 913 square miles, and it is estimated that 88% of the residents in Kanawha County live within three quarters of a mile of a route. The KVRTA operates twenty fixed routes that operate seven days a week (excluding four holidays) from 4:25 a.m. to 12:55 a.m. The authority also operates complimentary paratransit service, known as Kanawha Alternate Transit (KAT) (KVTRA, 2016).

The Tri River Transit Authority provides public transportation services in Boone County (as well as three others not in Region 3). This services operates 13 buses that provide service 5:50 a.m. to 6:00 p.m. Monday – Saturday. There is no service offered on Sunday. According to the Tri River Transit Authority website, its buses and vans are equipped with wheelchair lifts or ramps to enable those confined to wheelchairs or who cannot navigate steps to ride the bus (2016).

While Clay and Putnam counties do not have general public transportation, specialized transportation is offered in both counties as well as Kanawha and Boone





counties, by a variety of providers, according to the RIC. These providers are shown in the following table.

Table 1.9

PUBLIC TRANSIT BY COUNTY			
<i>Boone</i>	<i>Clay</i>	<i>Kanawha</i>	<i>Putnam</i>
Boone County Community Organization	Clay County Development Corporation	Appalachian Center for Independent Living	Putnam County Aging Program, Inc.
Appalachian Center for Independent Living	Appalachian Center for Independent Living	United Way of Central WV Retired and Senior Volunteer Program	Winfield Senior Citizens
		Non-Emergency Medical Transportation (NEMT)	Appalachian Center for Independent Living
		Hansford Senior Services	Teays Valley Taxi
		Kanawha Valley Senior Services, Inc. (KVSS)	Express Cab Company
		Kanawha County Emergency Ambulance Authority	
		C & H Taxi	

Water (i.e., River Transportation)

According to the Waterways Council Inc., hereafter WCI, (waterwayscouncil.org), there are five commercially navigable river systems in West Virginia. One of these rivers is the Kanawha River, which is the largest river in Region 3. The Kanawha River is formed by the confluence of the New and Gauley Rivers in Gauley Bridge, WV and is itself a tributary of the Ohio River. The Kanawha is also fed by the Elk River, converging in Charleston. According to the WCI, the entire Kanawha River (91 miles) is navigable. The canalization (building lock and dam facilities to allow for barge traffic) of the Kanawha was completed in 1898, after which commodities such as coal, salt, timber and chemicals were transported. By the 1920s coal became the dominant commodity moving via the Kanawha River system. The lock and dam system was replaced by the Army Corps of Engineers in the 1930s.

In 2013, there were 62 million tons of material shipped to, from, and within West Virginia by waterways, worth \$10.7 billion dollars. Just over 22 million tons of that material passed through one of the three lock and dam facilities on the Kanawha River. Two coal powered power plants located along the Kanawha River use the river as the main method to receive their coal supply. The map below illustrates the path of the Kanawha River from its origin in Fayette County to its termination in the Ohio River.





## Medical Access

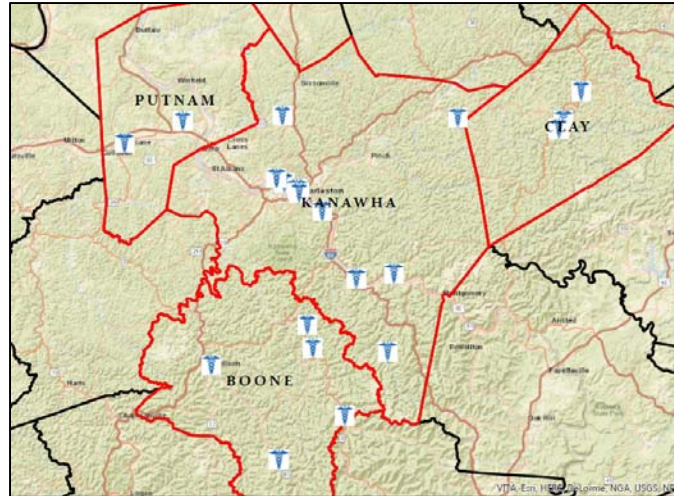
### Hospitals

There are seven general care hospitals located within Region 3 (not counting those hospitals listed as specialty or psychiatric). Five of these hospitals are located in Kanawha County, with four of those five being in the City of Charleston itself. One hospital is located Putnam County and one is located in Boone County. Clay County does not have a hospital within its borders. For most of Clay County, the nearest hospital is located in Braxton County, the next county north on Interstate 79.

### Community Health Centers

Community health centers also play an important role in maintaining a healthy population. Community health centers are defined by the John Hopkins Primary Care Policy Center as “private, nonprofit organizations that directly or indirectly provide primary health services and related services to residents of a defined geographic area that is medically underserved” (<http://www.jhsph.edu>). There are 22 (twenty-two) community health providers in Region 3. Their dispersion is shown in the map below.





## Utilities

### Electric Service

According to the Public Service Commission of West Virginia, there are three electric companies in Region 3, all of them private. Appalachian Power provides service in all four counties in the region, while Monongahela Power and Black Diamond Power provide service in only Clay County.

### Internet

According to the organization "Broadband Now," there are two primary internet service providers in the Charleston area: Suddenlink and Frontier. In addition to the two primary providers, there are three other providers that offer service to small areas: Lumos, Comcast (Xfinity), and Armstrong.

### Natural Gas

Five natural gas companies operate in the region according to the Public Service Commission. Three operate in Boone County, two operate in Clay County, three operate in Kanawha County, and four operate in Putnam County.

### Sewer

Sewer service in the region is provided by a network of private and public systems, which includes municipal systems and public service districts. There is one municipal sewer system in Clay County, fourteen municipal providers in Kanawha County, and five in Putnam County. There are no municipal sewer providers in Boone County according to the



Public Service Commission. There are twelve public sewer districts in the region (two in Boone County, seven in Kanawha County, and three in Putnam County). Finally, there are three private sewer providers: two in Kanawha and one in Putnam.

Telephone

The Public Service Commission also oversees telecommunications companies, which provide telephone service. Within Region 3, there are three telecommunications providers. Frontier West Virginia provides service in all four counties in the region, while Citizens Telecommunications provides service in Clay County and Armstrong provides service in Putnam County.

Water

Like sewer service, water service in the region is provided by a network of private companies, municipal systems, and public service districts. There are seven municipal water systems according to the Public Service Commission. Putnam and Clay counties each have one municipal system, and Kanawha County has the remaining five. One company, West Virginia-American Water, provides water service in all four counties. Public service districts provide water to those not covered by municipal or private systems. There are two in Boone County, four in Clay County, two in Kanawha County, and two in Putnam County.

Table 1.10

<b>UTILITY SERVICES</b>				
<i>County →</i>	<i>Boone County</i>	<i>Clay County</i>	<i>Kanawha County</i>	<i>Putnam County</i>
<i>Utility ↓</i>				
Electric	Appalachian Power	Appalachian Power Monongahela Power Black Diamond Power	Appalachian Power	Appalachian Power
Internet	Frontier Suddenlink Shentel Lumos	Frontier Suddenlink	Frontier Suddenlink	Frontier Xfinity Suddenlink
Natural Gas	Hope Gas Mountaineer Gas Company Southern Public Service Company	Hope Gas Mountaineer Gas	Mountaineer Gas Company Southern Public Service Company Union Oil & Gas, Inc	Consumers Gas Utility Company Mountaineer Gas Company Southern Public Service Company Union Oil & Gas, Inc



Table 1.10

<b>UTILITY SERVICES</b>				
<i>County</i> →	<i>Boone County</i>	<i>Clay County</i>	<i>Kanawha County</i>	<i>Putnam County</i>
<i>Utility</i> ↓				
Sewer	Boone-Raleigh PSD Boone County PSD	Town of Clay	Armstron PSD Lincoln PSD Town of Belle Town of Cedar Grove City of Charleston Sanitary Board Town of Chesapeake Sanitary Board Dunbar Sanitary Board Town of East Bank Sanitary Board Town of Glasgow Town of Handley Town of Marmet Sanitary Board City of Montgomery Nitro Sanitary Board Town of Pratt South Charleston Sanitary Board St. Albans Municipal Utility Commission Big Bend Sewer Association, Inc. Chestnut Point Property Owners Association	Culloden PSD Putnam PSD Mason County PSD Eastwood Systems, Inc Town of Buffalo Sanitary Board Town of Eleanor Sewer System City of Hurricane Sanitary Board Nitro Sanitary Board Town of Winfield
Telephone	Frontier West Virginia, Inc.	Citizens Telecommunications Company of WV	Frontier West Virginia, Inc.	Armstrong Telephone Company Frontier West Virginia, Inc.
Water	West Virginia American Water Boone-Raleigh PSD Boone County PSD	West Virginia American Clay Municipal Water Works Birch River PSD Clay County PSD Clay-Roane PSD Gauley River PSD Queen Shoals PSD	West Virginia American Water Cedar Grove Municipal Water Department Town of East Bank Glasgow Municipal Water Department Town of Pratt St. Albans Municipal Water Commission Armstrong PSD Lincoln PSD	West Virginia American Water Hurricane Municipal Water Board Putnam PSD Mason County PSD

### 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. As a note, the columns for “Capital budget” and “Public works budget” represent funds communities may be able to commit to mitigation projects. Where the table indicates an inability to do so, the column serves as a regular reminder to participating jurisdictions that they should consider the benefits of investments in hazard mitigation projects.



Table 1.11

<b>JURISDICTIONAL CAPABILITIES</b>							
<i>Community</i>	<i>Planning Commission</i>	<i>Comprehensive plans</i>	<i>Flood-plain regulations</i>	<i>Building Department</i>	<i>Zoning Ordinances</i>	<i>Capital budget<sup>1</sup></i>	<i>Public works budget<sup>1</sup></i>
Charleston	YES <sup>2</sup>	YES(Local)/YES <sup>2</sup>	YES	YES	YES	(none)	Limited in-kind wages only
Dunbar	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	YES	YES	(none)	Limited in-kind wages only
Hurricane	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	YES	YES	(none)	Limited in-kind wages only
Madison	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	YES	NO	(none)	Limited in-kind wages only
Marmet	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Nitro	YES <sup>2</sup>	YES (Local)/YES <sup>2</sup>	YES	YES	NO	(none)	Limited in-kind wages only
South Charleston	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	YES	YES	(none)	Limited in-kind wages only
St. Albans	YES <sup>2</sup>	YES (Local)/YES <sup>2</sup>	YES	YES	YES	(none)	Limited in-kind wages only
Bancroft	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Belle	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	YES	YES	(none)	Limited in-kind wages only
Buffalo	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Cedar Grove	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Chesapeake	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Clay	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Clendenin	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Danville	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
East Bank	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Eleanor	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	YES	NO	(none)	Limited in-kind wages only
Glasgow	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Handley	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Poca	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Pratt	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Sylvester	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Whitesville	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	NO	NO	(none)	Limited in-kind wages only
Winfield	YES <sup>2</sup>	NO (Local)/YES <sup>2</sup>	YES	YES	YES	(none)	Limited in-kind wages only

1. Budget that would allow the jurisdiction to devote financial resources towards hazard mitigation activities.
2. Covered by a regional or otherwise multi-jurisdictional document.



## National Flood Insurance Program Participation

According to FEMA, the National Flood Insurance Program (NFIP) aims to reduce the impact of flooding events on private and public structures (2016). The program does this by providing affordable insurance to property owners and by encouraging floodplain management regulations at the local level.

The Community Rating System (CRS) is an additional program run by the NFIP to encourage additional community activities that exceed minimum NFIP requirements, with the goal of reducing flood risk. By participating in the CRS, a community can receive discounted flood insurance premiums. All 29 jurisdictions in Region 3 are listed as participating in the NFIP, while the City of Charleston and Putnam County are the only CRS communities. Kanawha County is currently exploring participation in the CRS.

Table 1.12

COMMUNITY	STATUS	DATE ENTERED	EFFECTIVE DATE OF MOST RECENT MAP	CRS
Bancroft, Town Of	Participating	01-Jul-75	02-Feb-12	N
Belle, Town Of	Participating	16-Jul-75	06-Feb-08	N
Boone County *	Participating	25-Apr-75	16-May-13	N
Buffalo, Town Of	Participating	16-Jul-75	02-Feb-12	N
Cedar Grove, Town Of	Participating	26-Jun-75	06-Feb-08	N
Charleston, City Of	Participating	24-Mar-75	06-Feb-08	Y
Chesapeake, Town Of	Participating	22-May-75	06-Feb-08	N
Clay County *	Participating	24-Jul-75	06-Feb-13	N
Clay, Town Of	Participating	25-Mar-75	06-Feb-13	N
Clendenin, Town Of	Participating	07-Jul-75	06-Feb-08	N
Danville, Town Of	Participating	01-Jul-75	16-May-13	N
Dunbar, City Of	Participating	06-Aug-74	06-Feb-08	N
East Bank, Town Of	Participating	29-May-75	06-Feb-08	N
Eleanor, Town Of	Participating	23-Jun-75	02-Feb-12	N
Glasgow, Town Of	Participating	09-Jun-75	06-Feb-08	N
Handley, Town Of	Participating	03-Dec-75	06-Feb-08	N
Hurricane, City Of	Participating	11-Jul-75	02-Feb-12	N
Kanawha County *	Participating	02-Apr-76	06-Jun-08	N
Madison, Town Of	Participating	09-Jun-75	16-May-13	N
Marmet, Town Of	Participating	12-Jun-75	06-Feb-08	N
Nitro, City Of	Participating	21-Apr-75	06-Feb-08	N
Poca, Town Of	Participating	17-Apr-75	02-Feb-12	N
Pratt, Town Of	Participating	18-Apr-75	06-Feb-08	N
Putnam County*	Participating	11-May-76	02-Feb-12	Y
South Charleston, City Of	Participating	05-Jun-74	06-Feb-08	N
St. Albans, City Of	Participating	16-Jul-75	06-Feb-08	N
Sylvester, Town Of	Participating	08-Jul-75	16-May-13	N
Whitesville, Town Of	Participating	12-Jun-75	16-May-13	N



Table 1.12

COMMUNITY	STATUS	DATE ENTERED	EFFECTIVE DATE OF MOST RECENT MAP	CRS
Winfield, Town Of	Participating	10-Jun-75	02-Feb-12	N

### FEMA Declarations

As of July 2016, there have been 67 FEMA declarations in the state of West Virginia, including emergency declarations, fire management assistance declarations, and major disaster declarations. Thirty four of these declarations have included one or more counties within Region 3, and 13 have included all four counties. Emergency declarations and major disaster declarations differ in that major disasters will involve damaged caused by some natural event, with some exceptions, and provides 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 3 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 1.13

INCIDENT TYPE	NUMBER
Chemical	1
Fire	1
Flood	10
Hurricane	1
Severe Storm(s)	16
Snow	5
Total	34





## FEMA Disaster and Emergency Declarations from 2011 to 2016 in Region 3 PDC Area

Table 1.14

DISASTER DECLARATION #	COUNTY IMPACTED	DATE	EVENT
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
4236	Logan, Lincoln, Wood, Jackson, Roane, Clay, Braxton, Nicholas, Webster	August 7, 2015	Severe Storms, Straight-line Winds, Flooding, Landslides and Mudslides
4219	Cabell, Lincoln, Boone, Logan, Mingo, Wayne	May 14, 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



## 1.3 VULNERABLE POPULATIONS

Vulnerable populations are considered to be individuals or groups of people who are vulnerable to a risk due to their income disparity, class, race, or ethnicity, gender, age, disability, health, literacy or household (Fothergill, Lovekamp, Phillips, Thomas, 2013). This section will address these aspects and describe the characteristics of each one.

### Homeless

According to the US Department of Housing and Urban Affairs (HUD), homeless is defined as, “An individual who lacks a fixed, regular, and adequate nighttime residence; as well an individual who has a primary nighttime residence that is a supervised publicly or privately operated shelter designed to provide temporary living accommodations, an institution that provides a temporary residence for individuals intended to be institutionalized; or a public or private place not designed for, or ordinarily used as, a regular sleeping accommodation for human beings” (2016). Those who are homeless, whether chronically or temporarily, can be at increased risk due to their circumstances. The Kanawha Valley Collective (KVC), a collaborative network dedicated to preventing and ending homelessness, provides services and gathers statistics on the homeless population in the region. The homeless population in the region has been fairly consistent over the last 5 years, ranging from a low of 312 in 2015 to a high of 416 in 2012 according to the annual point in time data collected each January by the KVC.

The population is classified into one of three categories by the type of housing they are in: emergency shelters, transitional shelters, and unsheltered. At the time that the data is collected, the majority of the population are in emergency shelters, defined as, “any facilities whose primary purpose is to provide temporary or transitional shelter for the homeless in general or for specific populations of the homeless” (HUD, 2016). Slightly more than a quarter, on average, are in transitional housing, defined by HUD as, “A project that has as its purpose facilitating the movement of homeless individuals and families to permanent housing within a reasonable amount of time (usually 24 months)” (2016). The unsheltered population reported in the point-in-time data, is the most wide ranging, from a low of 4% in 2014 to highs of 14% seen a number of times in the past five years. The unsheltered are those with the most vulnerability to hazardous events, as they have the least support systems in place. This percentage likely rises during the warmer months, as those in emergency shelters choose to leave (or shelters are closed).



## Social Vulnerability

The Agency for Toxic Substances and Disease Registry (ATSDR), a division of the Centers for Disease Control and Prevention (CDC) has developed a “Social Vulnerability Index” (SVI) that measures and compares social vulnerability among census tracts. The ATSDR defines social vulnerability as the degree to which certain social conditions in a community, including poverty, car ownership or the number of people in a household, may affect the community’s ability to prevent human suffering and financial loss in the event of a disaster (2015). The dataset includes numerous variables (see Appendix 3) informed by data collected and developed by the Census Bureau; data sources include the American Community Survey (ACS) administered between 2006 and 2010, and the 2010 Census. Due to the timeframe limitations of the data, the maps included in this section do not represent current data but are useful for generalized planning for vulnerable populations.

There are four groups of variables which include socioeconomic, household composition, minority status/language and housing/transportation variables. To better describe the planning area and explore the unique hazards related to its population, this section discusses eleven of the variables from the SVI. This data is also included in relevant hazard profiles. The data is measured in census tracts.

### *Socioeconomic Variables*

The SVI includes a variable that measures the estimated number of persons who live below the poverty level. Flanagan, Gregory, Hallisey, Heitgerd, and Lewis, researchers at the CDC, who authored *A Social Vulnerability Index for Disaster Management*, explain that, “economically disadvantaged populations are disproportionately affected by disasters” (2011).

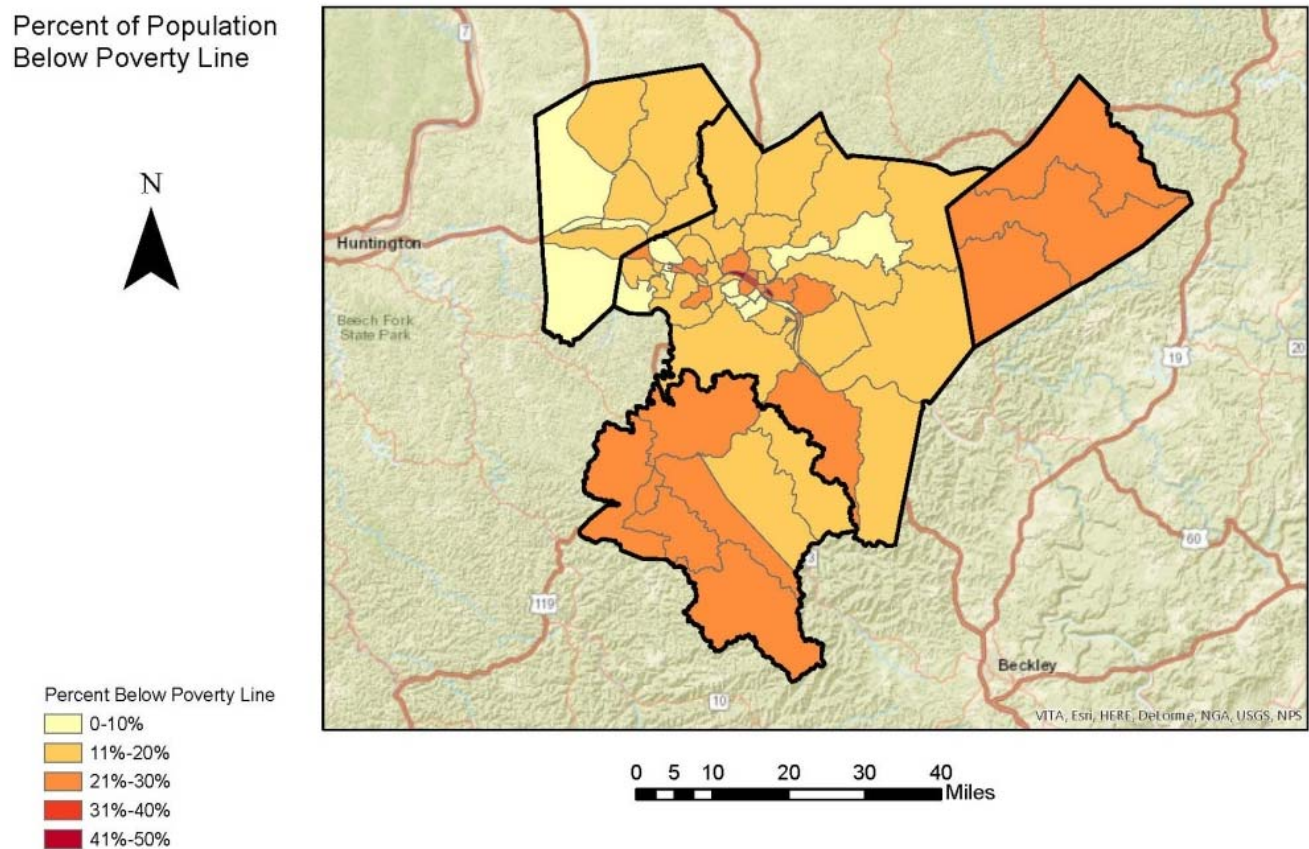
The poor are less likely to have the income or assets needed to properly prepare for a possible disaster or to recover after a disaster occurs (Cutter et al. 2003). These areas will need significant support during recovery activities, and could greatly benefit from targeted mitigation. Closely associated with the poverty level is the unemployment rate, visible to the left.

Education is included as a socioeconomic variable, though the relationship between education and vulnerability is not absolutely understood (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). Education is, however, associated with both income and poverty. Many people without a high school diploma will struggle to find steady, well-paying jobs.

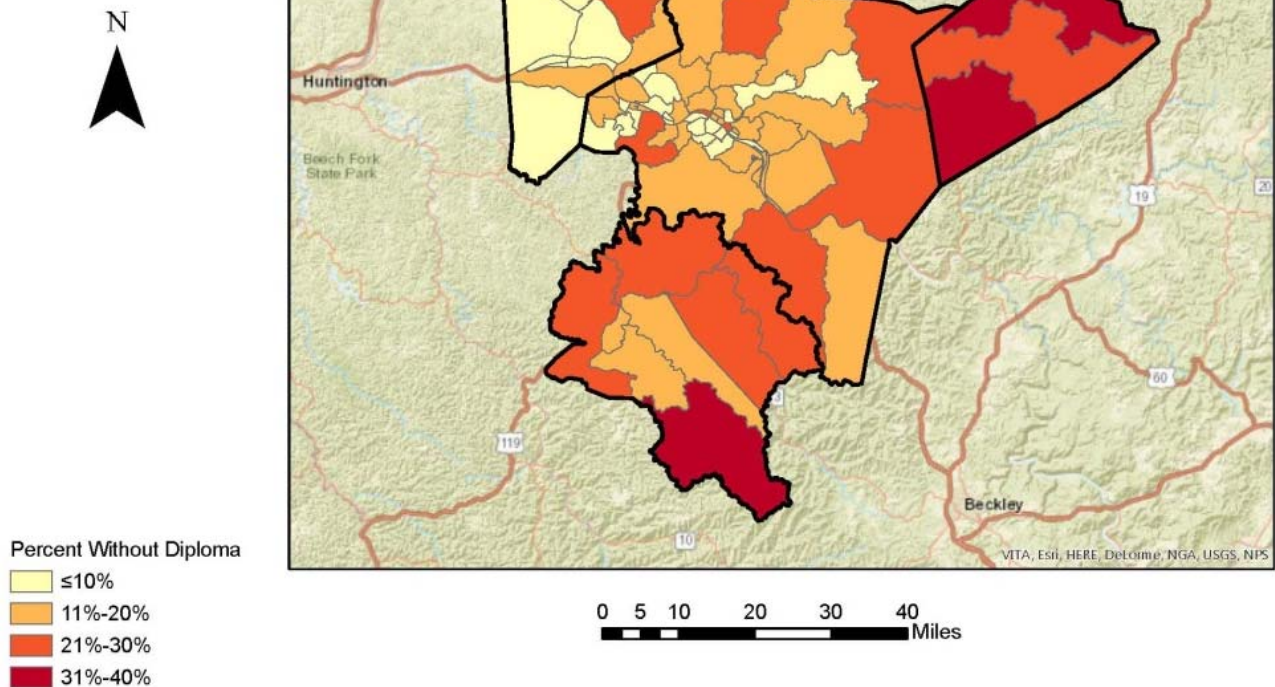


This is especially true within the boom and bust cycles associated with natural resource industries. During boom times, these residents can earn decent wages, but when the industry enters a bust cycle there is little to fall back on. Applying for federal aid and other recovery activities requires the proper completion of complex paperwork. For people with less education, the practical and bureaucratic hurdles to cope with and recover from disaster prove increasingly difficult to surmount (Morrow, 1999).

Percent of Population Below Poverty Line



Percent of Population Aged 25+ Without a High School Diploma



### Household Composition

The household composition section of the SVI includes variables measuring vulnerable ages and vulnerable households (single parent households with children under 18). Vulnerable ages include those under the age of 18 and those over the age of 65. Multiple researchers have concluded that children and elders are the most vulnerable groups in disaster events (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). Nearly 75% of the victims of Hurricane Katrina were elderly (Phillips, Thomas, Fothergill, & Blinn-Pike, 2010).

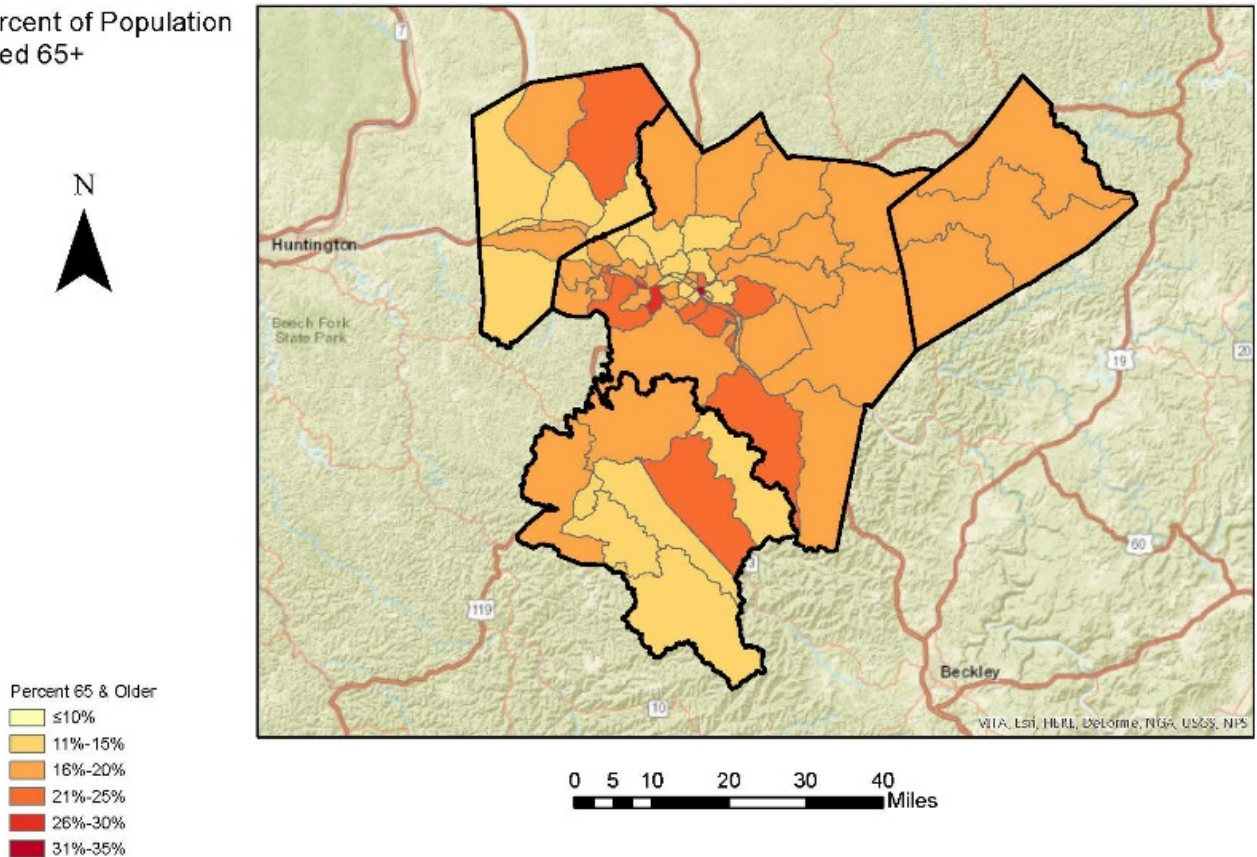
Many elderly citizens have special needs or medical issues that require the assistance of either machines (oxygen concentrators, for example) or other, more able-bodied people (difficulty walking for example). As Flanagan, Gregory, Hallisey, Heitgerd, and Lewis point out, the family members or neighbors who can typically be counted on to assist the elderly may be either overwhelmed by the disaster or be physically unable to gain





access to the elderly. Extended power outages will disproportionality effect elderly populations.

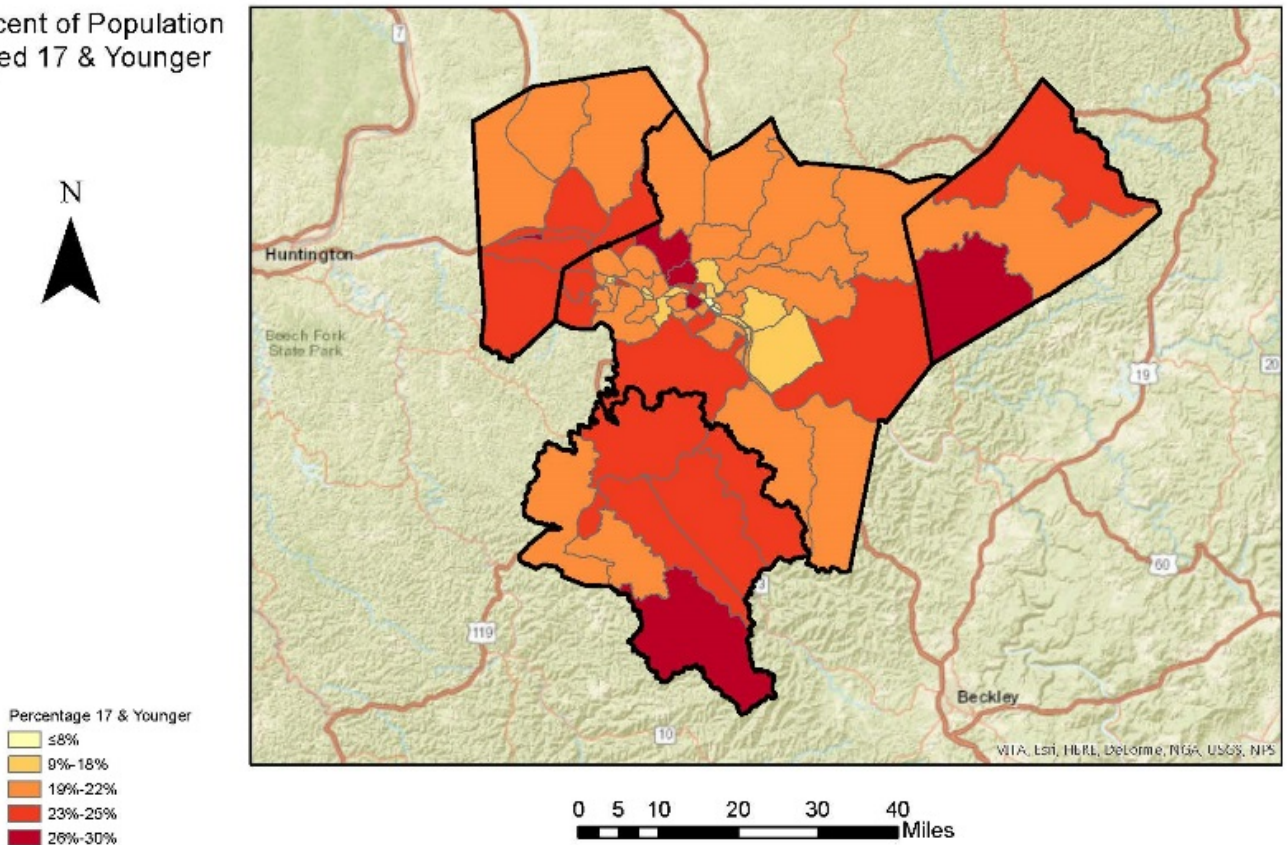
Percent of Population Aged 65+



Children, and especially the very young, generally cannot protect themselves and are heavily reliant on their care takers for protection and care. Martin et al. determined that children are rarely incorporated into disaster planning and scenario exercises due to the assumption of parental responsibility (2006). By not including this population in the planning process, responders are not adequately prepared or equipped to deal with children.



Percent of Population  
Aged 17 & Younger

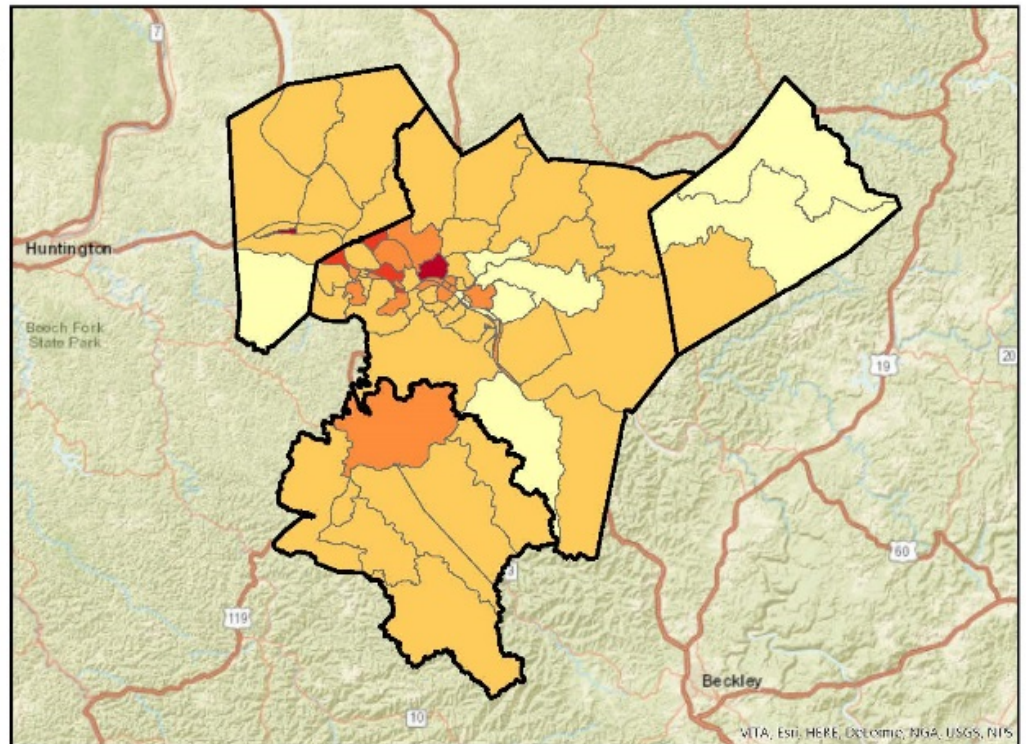
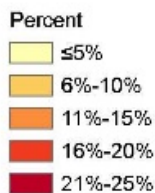


The final variable among the housing composition grouping is the percent of households that are single-parent households with children who are under the age of 18, similarly to the previous variables; children are among the most vulnerable of populations while single-parent households are among the lower socioeconomic status households (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). These households are especially vulnerable during a disaster because all the caretaker duties fall to one parent, who must also deal with the disaster event and recovery from that event (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011).





Percent of Single Parent Households With Children Under 18



### Minority Status/Language

A number of studies have found that the overall marginalization of racial and ethnic minority groups has made these populations more vulnerable during all stages of a disaster (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). Specifically, studies have shown that populations of African American, Native Americans, Asian, Pacific Islander and Hispanic origin are correlated with higher vulnerability rate (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). A specific quality among minorities that will greatly increase their vulnerability during a disaster is an inability to speak or read English well or at all. While small in comparison to the overall population of the region, this population is exceedingly vulnerable. Without accurate translations, these populations may not understand impending disasters, preparedness warnings, or evacuation notices. Research has shown that immigrant populations are more likely to rely on relatives, friends and neighbors for information, rather than official sources (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011).

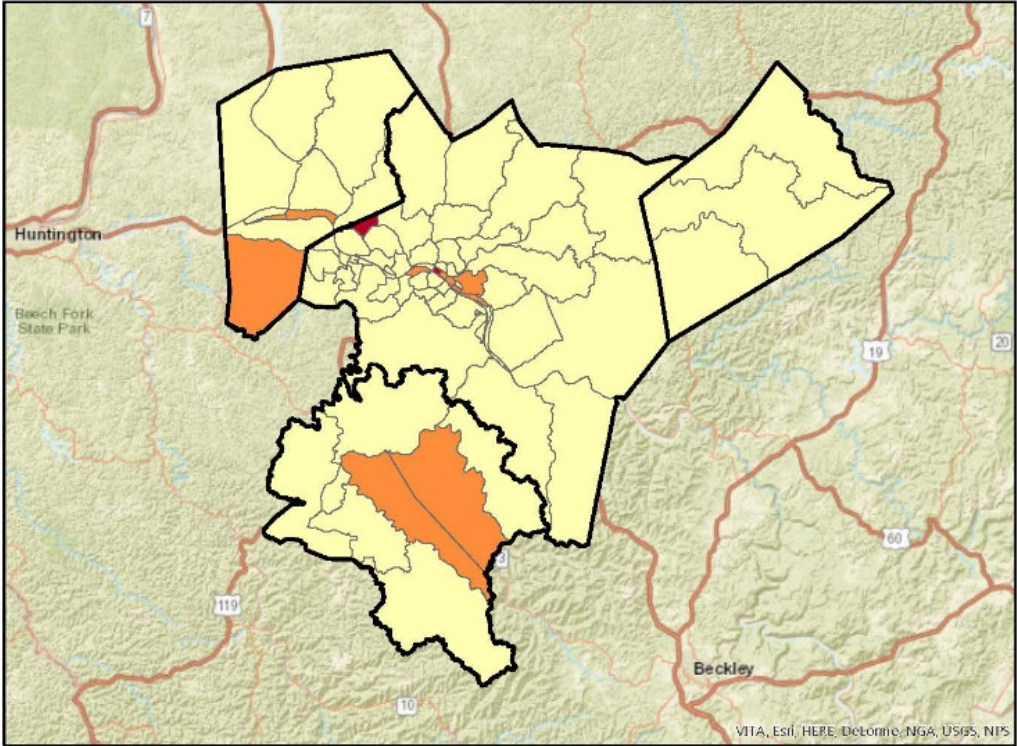




Percent of Population  
That Speaks Limited English



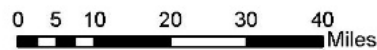
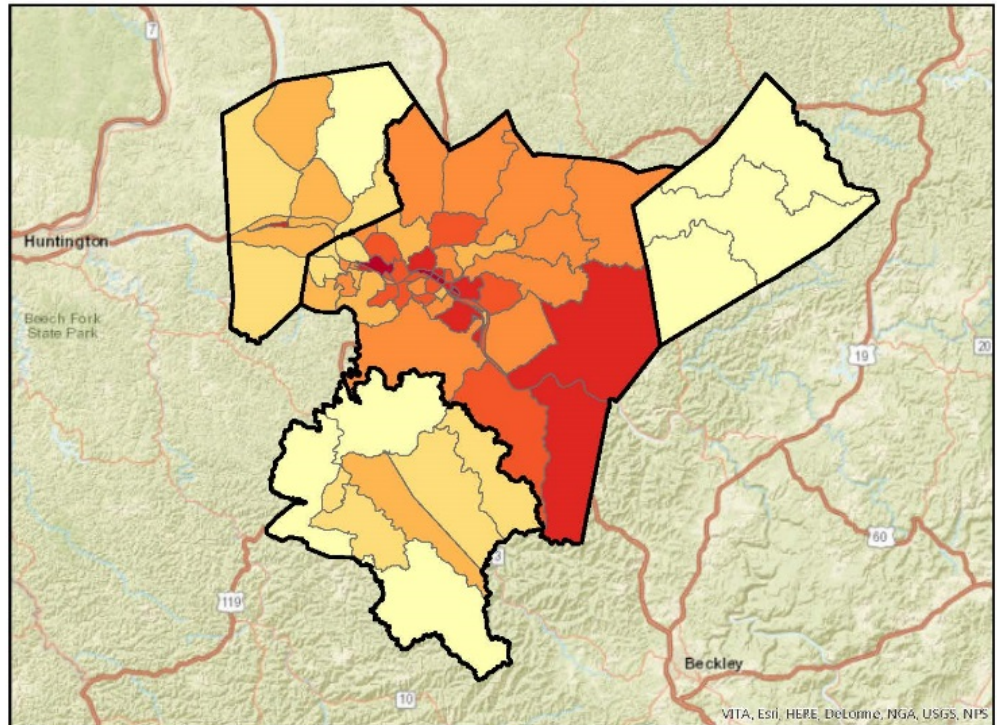
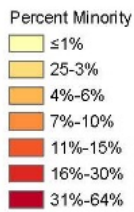
- Percent
- ≤0%
  - ≤1%
  - ≤3%



0 5 10 20 30 40 Miles



Minority Percentage  
of the Population

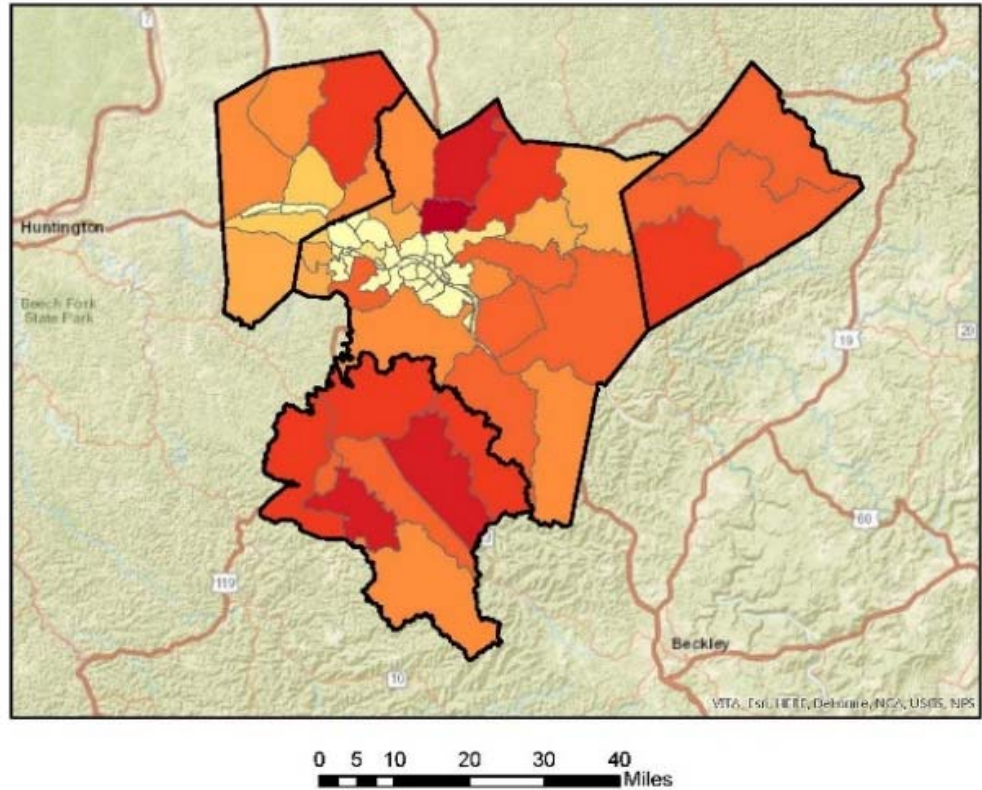
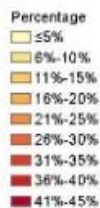


### *Housing/Transportation*

The SVI includes a number of variables that describe housing and transportation. Three variables will be explored: mobile homes, vehicle ownership/access, and institutionalized housing. Housing quality is an important factor in evaluating vulnerability and is closely tied with socioeconomic status and personal wealth (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). Mobile homes, which typically are inhabited by those of lower socioeconomic status, are not designed to withstand severe weather and flooding.



Percent of Housing Units That Are Mobile Homes



Mobile homes are frequently found outside of metropolitan areas, making access difficult in regular conditions and more so during and immediately after a disaster (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). Mobile homes are often clustered in communities, which increases the overall vulnerability of mobile homes (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011).

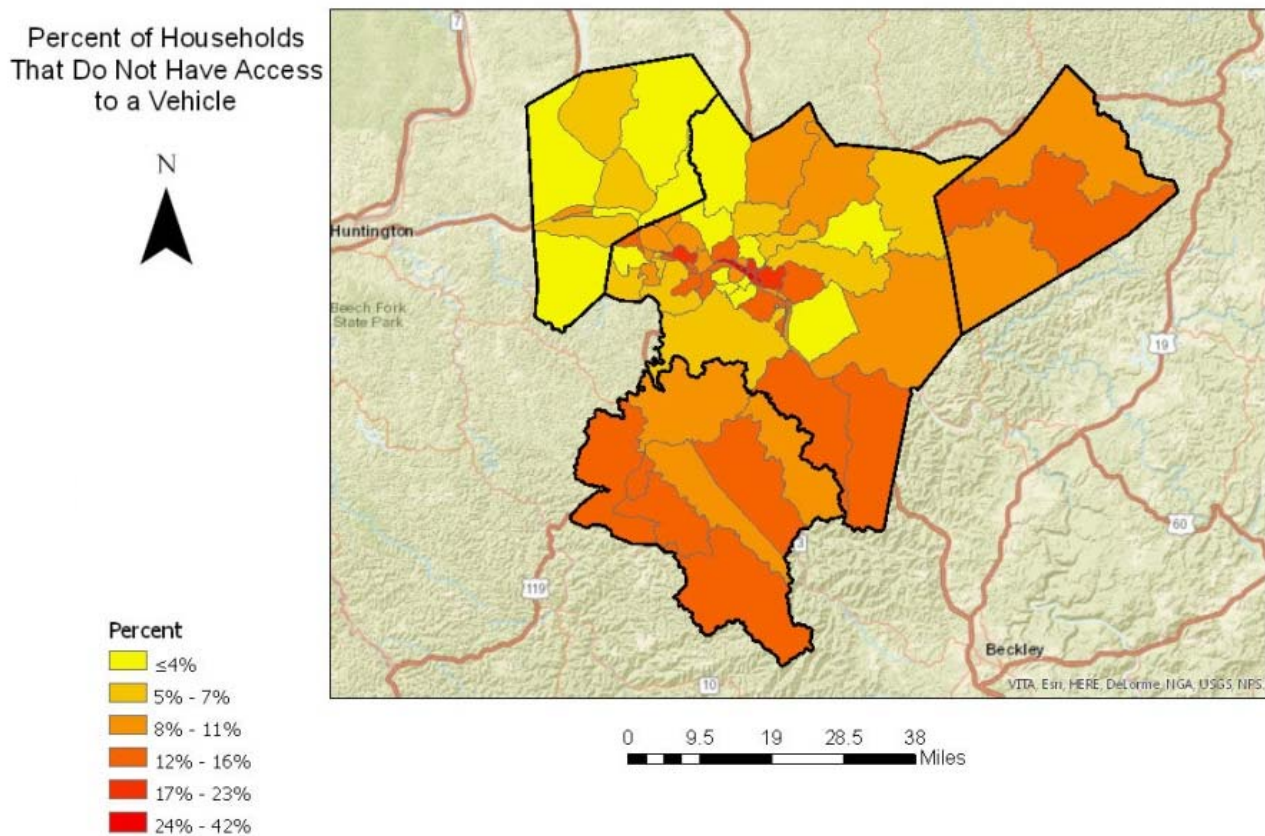
Vehicle ownership or access is crucial to being prepared as well as evacuating, when needed. Those who do not possess or have access to a vehicle will have difficulty going to stores in order to obtain preparedness supplies and will have less capacity to bring those supplies back to their home. This is even more pronounced in rural areas, which typically lack robust public transportation networks. As discussed in the planning area description, two of the counties in the region have general public transportation infrastructure. Kanawha County has the robust public transit in the region, with a county wide municipal service while Boone County is served by the Tri River Transit Authority.

There are taxi services and other by-appointment services in the region, including those that offer specialized service such as wheelchair vans, which would likely be





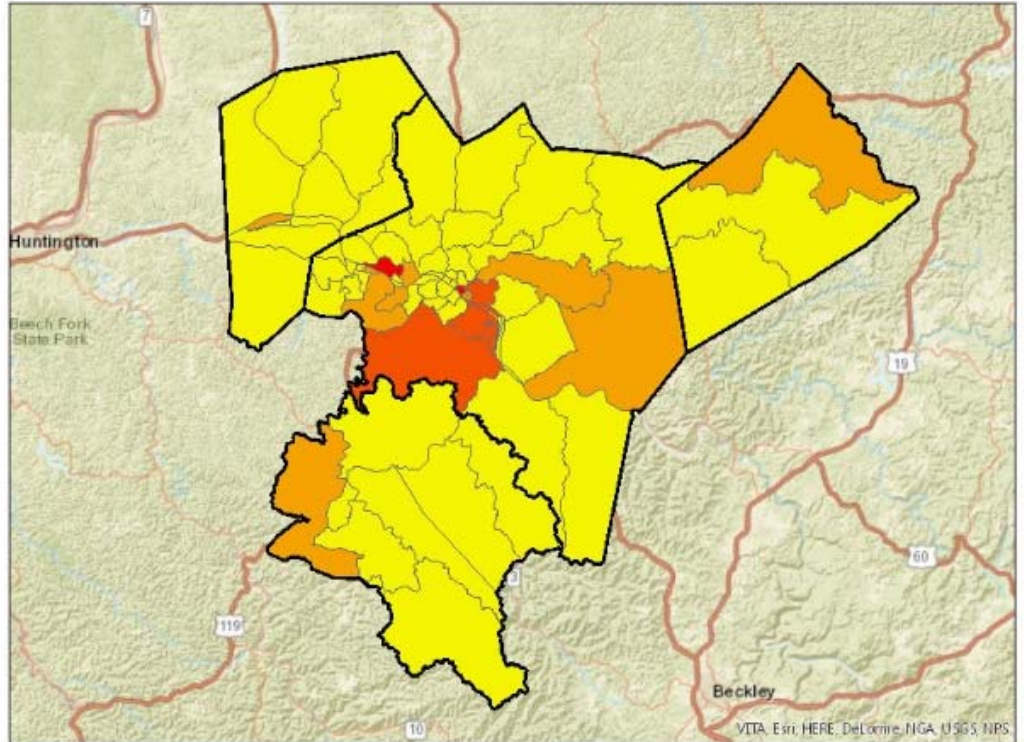
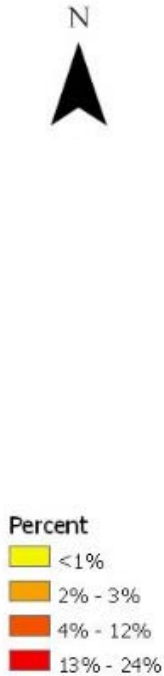
overwhelmed prior to an impending disaster such as a snow storm and would likely not operate immediately following an event.



The final housing vulnerability variable to discuss is those who live in institutional settings. These include college dorms, farm worker’s dormitories, health institutions, and prisons, which present special concerns for evacuations (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). Nursing homes and other residential medical facilities are particularly vulnerable. The increased vulnerability is due to the special and timely needs of the residents, and because of understaffing in these institutions in emergencies (Flanagan, Gregory, Hallisey, Heitgerd, & Lewis, 2011). Evacuating these facilities is a time and resource consuming operation, requiring numerous specialty vehicles and staff such as advanced life support ambulances. While these facilities will have backup generators for vital machines, in an extended power outage these generators will need additional fuel deliveries. Data from the West Virginia GIS Technical Center shows that there were 32 nursing homes in the region as of 2010.



Percent of Population  
Living in Institutional  
Group Quarters



As the previous sections have described, there are areas within the Kanawha Valley region that may be more vulnerable. The previous maps illustrate these areas of vulnerability based on the variables described above. These areas of increased vulnerability are incorporated into the risk assessment to document where hazard vulnerability and social vulnerability overlap. This information can help inform the decision making process when considering mitigation and preparedness activities to undertake in the region.



## 2.1 HAZARD & 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 of the risk assessment is to identify those naturally occurring hazards that pose a risk to Region 3 and its various municipalities. This identification is based on current conditions within the county and historical hazard occurrences. Each hazard will be profiled and these profiles will include five components: hazard definition, location and extent (including loss estimates where possible), history, and vulnerability analysis.

### 2.1.2 Hazard Identification

Region 3 is vulnerable to a number of hazards that disrupt lives and damage or destroy property. The region has identified eight natural hazards and two human-caused hazards that can or have occurred within the four counties that constitute the region. Those hazards included in this risk assessment are below.

- Dam Failure
- Drought
- Earthquakes
- Extreme Temperatures
- Flooding
- Hazardous Materials Incidents
- Mass Movements
- Severe Storms
- Tornadoes
- Wildfire

During the first steering committee meeting committee members reviewed hazards profiled in the *B-C-K-P Regional Intergovernmental Council All Hazards Mitigation Plan*



(2012), and discussed the hazards to be eliminated, added, or combined. The committee decided to add extreme temperatures and hazardous materials as hazards to be profiled. The committee also combined the landslides/mudslides/land subsidence to mass movements which also includes rock falls and expansive soils, for this update.

Table 2.1

COMPARISON OF HAZARDS		
B-C-K-P Regional Intergovernmental Council All Hazards Mitigation Plan 2012	Regional Intergovernmental Council All Hazards Mitigation Plan 2017	Reason for Change (where appropriate)
Dam Failure	Dam Failure	N/A
Drought	Drought	N/A
Earthquake	Earthquake	N/A
N/A	Extreme Temperatures (Added Hazard)	Impacts to population caused by 2014 and 2015 "polar vortex" incidents
Flooding	Flooding	N/A
N/A	Hazardous Materials (Added Hazard)	Presence of hazmat facilities and data indicating significant shipments of hazmats via roadways and railways
Landslides/Mudslides/Land Subsidence	Mass Movement (Combined Hazard)	For efficiency
Severe Storms	Severe Storms	N/A
Tornadoes	Tornadoes	N/A
Wildfire	Wildfire	N/A

Each of these hazards may affect the region as a whole and its various municipalities in varying degrees of severity and with varying frequency. Each hazard profile includes a description of the hazard information on location and extent of each hazard, and vulnerability mapping based on the risk assessment showing which areas of the region are most susceptible to a given hazard.

The risk assessment identified numerous other natural hazards that are not applicable to Region 3. These hazards include: avalanche, coastal erosion, coastal storms, hurricanes, infestation, tsunamis, and volcanoes. There will be no further consideration or analysis of these hazards.



### 2.1.3 Probability vs. Severity

Part of the risk assessment is to assess 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 3 and its municipalities. The probability of an event and its severity are largely based on historical research. The National Climatic Data Center (NCDC), a division of the National Oceanic and Atmospheric Administration (NOAA), archives records of various hazard events. These records include the date the event occurred, where it occurred, how many fatalities and injuries were reported, and how much property and crop damage the event caused.

LABEL	SPECIFIC HAZARD EVENT
Frequent	Likely to occur frequently
Probable	Will occur several times in a year
Occasional	Likely to occur sometime during a year
Remote	Unlikely to occur in a year
Improbable	So unlikely that it can be assumed it will not occur in a year

For this section, the probability of an event happening is determined based on the number of events that have occurred within a certain time frame. The committee determined events and timeframes using historical data available to them including localized events that may not be available through recognized sources such as The National Centers for Environmental Information and the U.S. Geological Survey. Further, steering committee possess a substantial amount of anecdotal, qualitative-style data related to hazard occurrences in their areas of responsibility. Utilizing only historical incidents across set time periods could not account for that knowledge. For example, committee members are aware of flooding instances that affect only two or three homes or a single street (resulting from storm water runoff, culvert backups, etc.). These small incidents likely do not appear in databases tracking major incidents and would not otherwise be included in this risk assessment analysis. Members thus completed the probability versus severity table to include that knowledge; the operationalized that knowledge via the definitions listed in Tables 2.2 and 2.3. The probability of occurrence is broken down into five categories as seen in the table to the above.

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

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

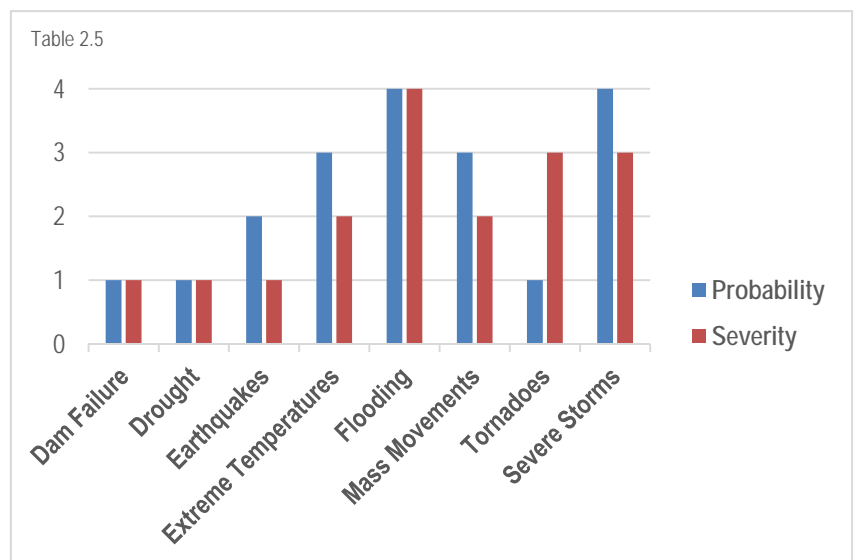
The combination of hazard probability and hazard severity results are shown in the table below, known as the risk assessment matrix. The matrix is designed to show the hazards that are of most concern to Region 3 and its municipalities.

Table 2.4

HAZARD SEVERITY	HAZARD PROBABILITY				
	Frequent	Probable	Occasional	Remote	Improbable
Catastrophic (4)	Flooding				
Critical (3)	Severe Storms			Tornado	
Marginal (2)		Extreme Temperature, Mass Movement			
Negligible (1)			Earthquake	Dam Failure, Drought	

Another presentation of the data can be seen below in the chart below. The probability and severity of each hazard was assigned a numerical representation (0-4 for probability, 1-4 for severity) used to chart each hazard, resulting in the bar graph.

For each hazard profiled in Section 2.2 below, a snapshot section contains the probability of a hazard event based only on historical data. Planners determined probability by the number of historical events divided by a fixed number of years (i.e., the number of years corresponds to the date range for which data was available).



## 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.

### 2.2.1 Section Overview

There are several natural and manmade hazards that can, and have, affected the municipalities that make up Region 3, as discussed in Section 2.1 above. These hazards will typically affect different areas of the region in different ways, and with varying severity. How a hazard affect areas may be significantly different than how planners and residents typically think it will. To better define how these hazards affect the community, and where these hazards are most likely to occur, this section contains detailed profiles of each hazard considered by this plan. Each profile will attempt to quantify the risk the region faces as a whole from the hazard, identify those areas that are most at risk from the hazard, then asses what kind/amount of damage the hazard may inflict. Additionally, this section discusses a number of complicating variables that could either result in impacts of their own, or compound the impacts of a given hazard. These findings are based on historical data, and as such it is important for planners to remember that these are estimates, not solid predictions.



## DAM FAILURE

<b><i>Dam Failure Snapshot</i></b>	
"Dam failures pose the most extreme flood risk due to the sudden and severe impacts that can result" (Haddow, Bullock, & Coppola, 2014).	
Period of Occurrence	At any time
Number of Events (1996-2015)	3
Probability of Event In Any Given Year	0.15 per year Dams that fail typically have some deficiency which should be detected by regular inspections and appropriate repair. Heavy rains or moderate earthquakes may also trigger a dam failure.
Warning time	Minimal: Depends on frequency of inspection and repair.
Potential Impacts	Potential for loss of life, economic loss, environmental damage and distribution of life
Cause Injury or Death	Risk of multiple injuries and deaths.
Potential Facility Shutdown	30 days or more
Loss Estimate	\$262,385,754.39/event

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<sup>ii</sup> or be greater or equal to 6 feet in height and contain 50 or more acre-feet of water volume<sup>iii</sup> (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). A dam that is classified as a **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). West Virginia code defines High Hazard dams as Class 1, Significant Hazard dams as Class 2, and Low Hazard dams as Class 3 (47CSR34, 2009).

Dam failure events fall into three general categories, as defined by the Association of State Dam Safety Officials (ASDSO). A dam may suffer a **Structural Failure**, which can include 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). Finally, **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).

## LOCATION

There are 57 dams in Region 3 according to the U.S. Army Corps of Engineers (USACE) GIS shapefile from 2000. Kanwaha County has the most dams, totaling 24, among the four counties. The table below lists the dams found in the USACE database, divided by county.

DAM NAME	HAZARD	COUNTY	CITY	EAP
Beth St. No.79	H	Boone	Danville	N
Big Mountain Prep Plant	H	Boone	Prenter	N
Chess Processing Co.	H	Boone	Keith	N
Chesterfield Plant	H	Boone	Uneededa	N
Eagle Nest	H	Boone	Van	N
Hampton No.4 Prep Plant	H	Boone	Stark	N
Hamton No.3 Prep	H	Boone	N/A	N
Indian Creek No.2	H	Boone	Peytona	N
Mae-West Plant	H	Boone	Quinland	N



Table 2.6

DAM NAME	HAZARD	COUNTY	CITY	EAP
Mae-West Plant	H	Boone	Madison	N
Pinnacle Plant	H	Boone	Lanta	N
Pond Fork Prep	H	Boone	Bob White	N
Robin Hood Prep Plant	H	Boone	Twilight	N
Rock Lick Prep	H	Boone	Bald Knob	N
Wells Prep Plant	H	Boone	Wharton	N
Taylor Fork Dam	H	Clay	Widen	N
Henderson Dam	S	Clay	Indore	Y
Union Carbide H & F Club #1	S	Clay	Sanderson	N
Union Carbide No. 2 Dam	S	Clay	Sanderson	N
Anderson Dam	H	Kanawha	Dunbar	Y
Blake's Creek Site No.7	H	Kanawha	Nitro	N
Donnaldson Prep Plant	H	Kanawha	Cedar Grove	N
Elk-Two Mile No.12	H	Kanawha	Charleston	N
Elk-Two Mile No.13	H	Kanawha	Charleston	N
Finney Branch Embankment	H	Kanawha	Dunbar	N
Fmc Waste Retension Basin	H	Kanawha	So. Charleston	Y
Holz Dam	H	Kanawha	So. Charleston	N
Lady Dunn Prep	H	Kanawha	London	N
Lake Chaweva Dam	H	Kanawha	Cross Lanes	N
Poffenbarger Dam No.1	H	Kanawha	Cross Lanes	N
Poffenbarger Dam No.2	H	Kanawha	Cross Lanes	Y
Scott's Run Cinder Barrier	H	Kanawha	Belle	N
Teroc Fishing Impoundment	H	Kanawha	Tornado	N
Three Mile Fork Pond	H	Kanawha	Three Mile Fork Com.	N
Wevaco Prep Plant	H	Kanawha	Carbon	Y
Winifrede Cent. Clean Plant	H	Kanawha	Winifrede	N
Winifrede Cent. Clean Plant	H	Kanawha	Winifrede	N
Cunningham Flyash Pond	S	Kanawha	Dunbar	N
London L & D	S	Kanawha	London	N
Marmet L & D	S	Kanawha	Rand	N
Poffenbarger Farm Lake No. 3	S	Kanawha	Cross Lanes	N
Union Carbide H & F Club #3	S	Kanawha	Sanderson	N
Ward Pond	S	Kanawha	So. Charleston	N



Table 2.6

DAM NAME	HAZARD	COUNTY	CITY	EAP
Arrow Head Lake #1	H	Putnam	Bills Creek	N
Arrow Head Lake #3	H	Putnam	Bills Creek	N
Big Guano Creek Flyash Dam	H	Putnam	Plymouth	N
Foxtrot Lake Dam	H	Putnam	Teays Valley	N
Hurricane Water Supply Reservoir	H	Putnam	Hurricane	N
John Amos Flyash Dam	H	Putnam	Nitro	N
Lake Washington	H	Putnam	Hurricane	N
Long Branch Reservoir	H	Putnam	Frazier's Bottom	N
Ranch Lakes Estates	H	Putnam	Winfield	N
Poplar Fork Dam	S	Putnam	Black Lick School	N
Teay's Recreation Club Dam	S	Putnam	Frazier's Bottom	N
Westvaco Sportsman Club No. 2	S	Putnam	Black Lick School	N
Winfield L & D	S	Putnam	Midway	N
Winfield Water Supply Dam	S	Putnam	Winfield	N

## EXTENT

Table 2.7

IMPACT OF DAM FAILURE	
Public Health	Death, injury, illness (water-borne), standing water, exacerbation of chronic illnesses
Social	Displacement of population, disruption of normal activities, evacuation
Economic	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up
Environmental	Erosion, water quality, change in topography, change in natural habitat
Infrastructure	Power outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)

The map below shows the location of all the dams in the USACE database that are in Region 3. As the map shows, there are no Low Hazard (I.E. Class 3) dams within the region. Of the 57 dams, 43 are classified as High Hazard (Class 1) and 14 are classified as Significant Hazard (Class 2) structures. Three of the dams in Region 3 are part of the lock and dam system on the Kanawha River, while the rest are impoundments.

Impoundments that contain a substance other than water, such as coal ash slurry confinements that may be at coal powered power plants, represent additional hazards. In 2008 a coal fly ash slurry impoundment at the Kingston Fossil Plant in Roane County, Tennessee suffered a failure. According to the New York Times, upwards of 5.4 million cubic yards of coal fly ash slurry was released (December 28, 2008). The slurry spilled into the neighboring waterways, and the mudflow wave caused damage to more than 40 residential



properties, covering at least 12. Testing revealed “significantly elevated levels of toxic metals” in the water and there were reports of large fish kills (New York Times, January 9, 2009). This event caused significant environmental damage, and is estimated to cost between \$675 and \$975 million to clean up, according to the Tennessee Valley Authority (TVA), the operator of the plant (Chattanooga Times Free Press, June 6, 2009).

Impoundment failures have occurred in West Virginia in the past. The most serious of these events occurred in Logan County on February 26, 1972, along the Buffalo Creek. The Buffalo Mining Company, a division of the Pittston Coal Company, had, over 11 years, constructed three impoundment dams along the middle fork of the Buffalo Creek where the company dumped “gob”, which is mine waste consisting of dust, shale, clay, low-quality coal and other impurities (WV Division of Culture and History, 2015). After large amounts of rain fell in the days prior, the highest dam (#3) failed at 8:05 in the morning, destroying the two impoundments below it, releasing an estimated 132 million gallons of water and waste products into the Buffalo Creek (WV Division of Culture and History, 2015). The resulting flood impacted sixteen towns along the Buffalo creek, killing 126, injuring 1,121, and destroying 581 structures and damaging nearly 1,000 more (WV Division of Culture and History, 2015). According to the West Virginia Division of Culture and History the public received no warning from company officials, and company officials sent away two Sherriff’s deputies who had been sent to assist in evacuations (2015).

The West Virginia Statewide Hazard Mitigation Plan lists one historical dam failure event within Region 3 that impacted three different areas of the region. The dam failure occurred on August 9, 1916, at an unnamed dam. Between 60 and 75 residents were killed in a flood between Kanawha and Boone counties (though the plan states that it is unknown if the flood is related to the dam failure). The areas of Kayford and Acme in Kanawha County, and Jarrolds Valley in Boone County did not incur any damages from the flooding. The Cabin Creek Valley, in Kanawha County, is reported to have suffered over \$600,000 in damages, especially to rail, telephone and a local coal company.

The potential impact of dams outside the boundaries of Region 3 must also be taken into consideration. Uncontrolled releases of water from dams upstream can cause cascading effects on dams within Region 3, leading to failures. This can also potentially happen with heavy upstream rain events. The Kanawha County Evacuation Plan references these dams, stating that “The Kanawha Valley is protected by three flood-control dams: Bluestone, Summersville, and Sutton. A failure of any one of these three facilities could affect Kanawha County. Together, these three facilities control 57% of the total water drainage in the Kanawha



Valley” (2011). The Bluestone Dam is located along the New River, in Summers County. According to the USACE, water released as a result of a failure at the Bluestone Dam could reach Charleston in as little as 24 hours. The Sutton Dam is built along the Elk River which flows through northern Kanawha County on its way to its confluence with the Kanawha River in Charleston. The USACE states that the Summersville Dam, constructed along the Gauley River, provides flood protection for the heavily-industrialized Kanawha Valley.

Even the potential of a dam failure event can lead to wide spread concern and panic among



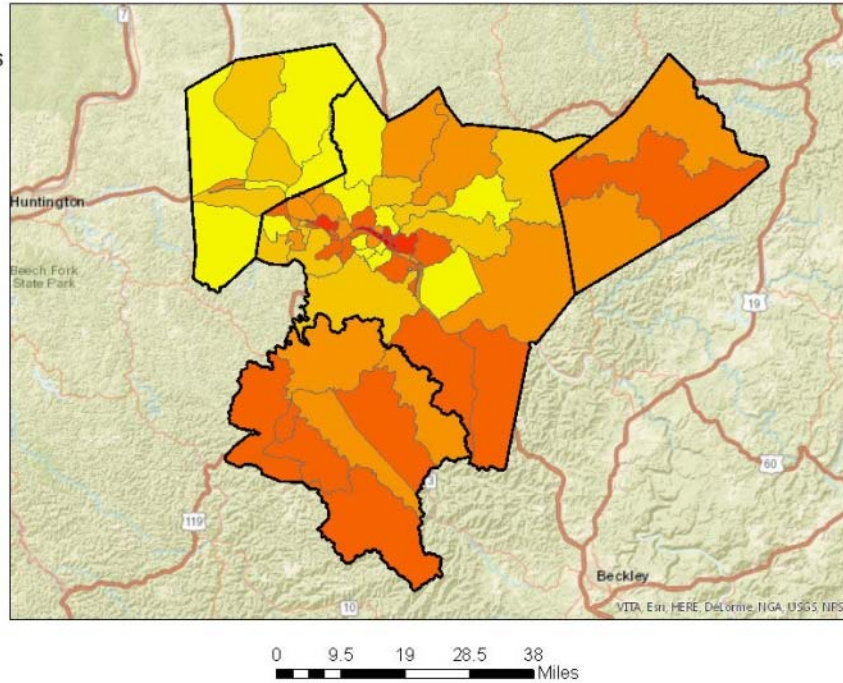
the citizens that may be affected. In the 2016 West Virginia floods it was widely reported via social media that the Summit Lake Dam in eastern Nicholas County was overtopping and in eminent danger of failing. At least one clip posted on the video sharing site YouTube is titled “Dam Breaks,” as seen to the right. The report was picked up by some news outlets, after the National Weather Service (NWS) reported that the dam had been breached. When the story was updated it was reported that the dam and dike system had overflowed from the heavy rainfall, and that the overflow had stopped (WVAlways.com, 2016). Similar rumors were circulating about the Sutton Dam, located in Braxton County, claiming that the dam was releasing water because of a crack in the structure (Morris, June 24, 2016). The USACE released a statement that they “do not have any issues with either Summersville, or Sutton or any of our other dams in the district” (Morris, June 24, 2016).

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 which makes those without transportation available more vulnerable to the risk. As seen in the map below, residents of all four counties are vulnerable by not having transportation, with Boone County having the smallest vulnerable population in the region and the urban area of Kanawha having the highest percentage of an area’s population. 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.





Percent of Households  
That Do Not Have Access  
to a Vehicle



## HISTORICAL OCCURRENCES

The Stanford National Performance of Dams Program (NPDP) tracks dam incidents that occur around the world and collects data related to these incidents. According to the NPDP, since 1996 there have been three dam related incidents within Region 3. None of these incidents resulted in any reported damage.

### Kanawha County

On February 21, 1997, an incident occurred at the Lake Chaweva Dam, located in the census designated place of Cross Lanes, in Kanawha County. The earth rock fill type dam suffered a seepage/piping incident. There was no uncontrolled release, and no damage was reported. The following narrative is from a prior update to the Kanawha County HMP.

Several sinkholes were observed on the downstream face of the embankment which were later determined to have a depth of up to 2.5'. These sinkholes were not observed during previous inspections. The concrete chute spillway exhibits open construction joints, leaning side walls, evidence of undermining and washout of foundation materials along with left spillway wall. The slumping of embankment materials exists in close proximity to the spillway



channel. The drain pipe is rusted complete through at the outlet. The integrity of the drain pipe through the interior of the dam is suspect. A downstream valve maintains the interior pipe under constant reservoir pressure creating the potential for interior embankment saturation and erosion. These conditions represent a serious problem as defined in the Dam Safety Regulations of West Virginia. An order was issued requiring the owners of the dam to begin draining the reservoir, submit an EAP, and to submit plans for repair of the dam. After the lake drawdown began, a landslide developed within the reservoir area. Dam Safety officials agreed to a reduced rate of drawdown. Plans for repair of the dam are currently being prepared by the owner's engineer. It is not known whether the drawdown or a subsequent rainfall event reactivated the slide.

### **Putnam County**

On January 29, 1996, there was a reported incident at the Ranch Lake Estates Dam. The 7.6 meter tall earthen dam, located on the Little Hurricane Creek northeast of Teays Valley, Putnam County, suffered a piping incident. There was no uncontrolled release, and no damage was reported.

On March 3, 1997, an incident occurred at the Lake Washington Dam, located on the Hurricane Creek, south of the city of Hurricane in Putnam County. The 7.3 meter tall concrete buttress dam suffered an inflow flood – hydrologic event that did not cause any reported damage, and did not cause an uncontrolled release of the reservoir.

### **LOSS ESTIMATE**

With no historical property loss data, estimating a loss estimate for a dam failure is difficult. These events can range from the failure of a small local dam that does not threaten anything more than fields or forests, to dams that can cause significant loss of life and property damage. For the purposes of this estimation, the total exposure in the 100 year flood plain, as determined by the HAZUS-MH software was used as a starting point. This figure was divided by the number of high and significant dams located in the region (57) to calculate an estimate of \$262,385,754.39 in property damage from one dam failure event.





**DROUGHT**

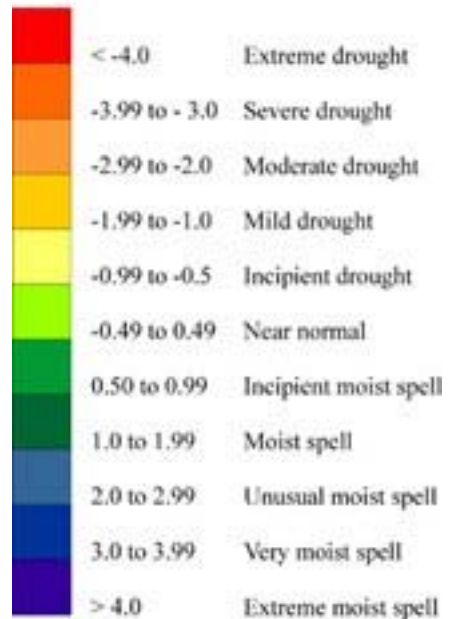
<i>Drought Snapshot</i>	
"A prolonged shortage of available water, primarily due to insufficient rain and other precipitation or because exceptionally high temperatures and low humidity cause a drying of agriculture and a loss of stored water resources" (Haddow, Bullock, & Coppola, 2014).	
Period of Occurrence	Warm weather months or periods of low to no precipitation
Number of Events (1997-2015)	50 <sup>i</sup>
Probability of Event In Any Given Year	2.63 per year
Warning time	Weeks
Potential Impacts	Industries that rely heavily on water usage will be disproportionately affected. These industries primarily include tourism and agriculture. The impact will spread as droughts extend and increase in severity.
Cause Injury or Death	None
Potential Facility Shutdown	None
Climate Change Impact	Significant
Extent	Countywide
Loss Estimates	Little to no structural damage. Crop damage can vary.

A drought, according to the National Climatic Data Center (NCDC), 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).

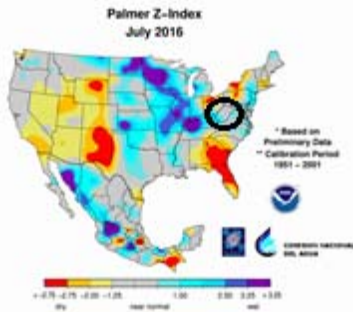


The NDMC classifies drought conditions using five categories: D0 – D4. These levels line up with the Palmer Drought Severity Index (PDSI), which is shown to the right. D0, described as **Abnormally Dry**, corresponds with the PDSI of -1.0 to -1.9. Possible impacts include “short-term dryness slowing 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 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).

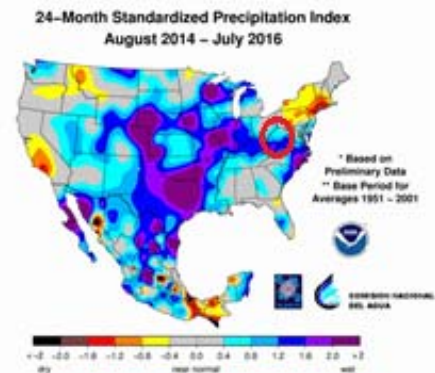
Palmer Drought Severity Index



LOCATION



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 2016, generally one of the hottest months of every year. Most of West Virginia is seen as near normal, while the southern area, where Region 3 is located, is slightly wetter than average. The 24-Month Standardized Precipitation Index (8/2014 – 7/2016), shown at right, from NOAA shows a similar pattern over a longer term. All of West Virginia 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 will be described later in 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 3.

## EXTENT

Table 2.8	
IMPACT OF DROUGHT	
Public Health	Illness (water-borne), insect infestation, compromised food, standing water
Social	Disruption of recreational activities
Economic	Loss of crops and livestock
Environmental	Erosion, water quality, change in topography, change in natural habitat, air quality
Infrastructure	Power outages

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 887 farms in Region 3, encompassing over 98,000 acres of land. In total, the region produced over \$12 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 3’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 (Jespersion, 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.

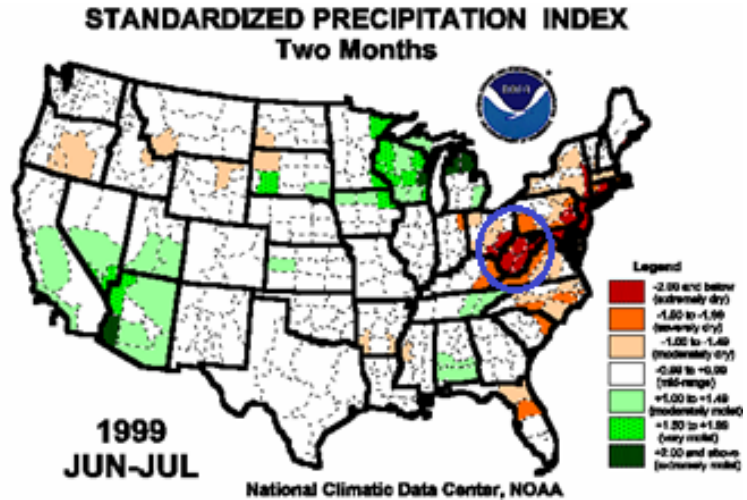




HISTORICAL OCCURRENCES

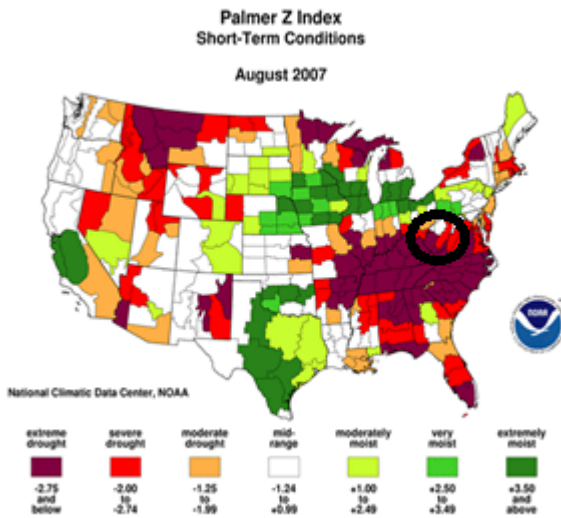
**Region 3, West Virginia**

In 1999 drought conditions were present across much of the mid-Atlantic region, including the four counties in Region 3. The Standard Precipitation Index from the height of the drought (June-July, 1999), seen at right, shows the magnitude of this drought event. All of West Virginia was classified as “Extremely Dry” during this time period. In addition to the lack of rain, which was reported to be only 1-2 inches according to the NCDC event record, the area saw a heat wave of temperatures in the 90s for 8 consecutive days in June (2016). An agricultural state of emergency was declared on the 28<sup>th</sup> of June (NCDC, 2016).



**Region 3, West Virginia**

In 2007, the four counties that make up Region 3 were in drought conditions for much of the latter half of the year according to National Climatic Data Center (NCDC) records (2016). The region was on the northern fringe of a significant drought affecting the southeast region of the country, as the Palmer Index from August, 2007 (at left) shows. According to the NCDC records, by September small streams, ponds and small impoundments were being depleted while the area saw only 1-2 inches of rain during the month (2016). The drought peaked in early



October with an off season heat wave, where Charleston saw 5 consecutive days of temperatures in the 90s (NCDC). By late October / early November the drought conditions had eased considerably (NCDC, 2016).



Table 2.9

<b>REGION 3 DROUGHT INCIDENTS (NCDL, 2017)</b>		
<b>Date</b>	<b>Counties</b>	<b>Description of Event</b>
2/1/1997	Boone, Clay, Kanawha, Putnam	Temperatures in the region were five to seven degrees warmer than average and it was the warmest winter in Charleston on record in 25 years. The three winter months were dry with many counties having only five to eight inches of total precipitation.
5/1/1999	Boone, Clay, Kanawha, Putnam	After being alleviated during the winter months, a dry April brought about drought conditions in May. Rainfall in May was less than half of the normal monthly average with totals in the region not exceeding two inches.
6/1/1999	Boone, Clay, Kanawha, Putnam	The governor started voluntary water conservation program for both residents and businesses and on June 28 <sup>th</sup> , he declared an agricultural state of emergency.
7/1/1999	Boone, Clay, Kanawha, Putnam	Rain showers became more common during the last two weeks of the month causing soil moisture and stream flow to improve. However, the extreme heat dried the surface and ground water continued to be depleted. At the beginning of the month some counties had water points of distribution set up residents with dry wells. By the end of the month the state had purchased 500 portable water storage tanks and 24 water pumps to bring water to livestock. Some PSD's began imposing mandatory water rationing to customers.
8/1/1999	Boone, Clay, Kanawha, Putnam	With cooler temperatures and two to four inches of rain, drought conditions began to ease but continued through the month. President Clinton declared a federal drought disaster on May 2 <sup>nd</sup> . The national guard and department of highways station tankers in several communities to supplement residential supply. Farmers were supplied with 300 gallon tanks to haul water to livestock.
9/1/1999	Boone, Clay, Kanawha, Putnam	The drought severity increased for areas west of Interstate 79 with less than average rainfall for September.
10/1/1999	Boone, Clay, Kanawha, Putnam	Rainfall for October was an inch over average and the drought severity began to ease. Rainfall totaled three to four inches and was evenly distributed throughout the month. Surface flow in streams increased. However, groundwater remained low and water continued to be hauled in for livestock and available in tankers throughout the area to supplement residential water.
9/1/2002	Boone, Clay, Kanawha, Putnam	Hot and dry weather patterns throughout August and most of September had drought conditions surfacing during the second and third weeks of September. However, rainfall on the 26 <sup>th</sup> and 27 <sup>th</sup> combined with cooler temperatures increased surface water flow and reduced stress on seasonal vegetation.
6/8/2007	Kanawha, Putnam	An unusually dry May followed by a hot and dry June caused drought conditions to develop and intensify. Crops were struggling to mature. However, The area did receive some rain during the last week of the month.
7/1/2007	Kanawha, Putnam	Drought conditions did continue but improved due to above average rainfall.
8/1/2007	Boone, Kanawha, Putnam	Drought conditions became more severe in August with hot dry temperatures for most of the month. The affected area expanded in the southern coalfield counties.





Table 2.9

REGION 3 DROUGHT INCIDENTS (NCDC, 2017)		
Date	Counties	Description of Event
9/1/2007	Boone, Clay, Kanawha, Putnam	With below average rainfall and higher temperatures than average, the drought continued and spread further north and east. Surface water was being depleted.
10/1/2007	Boone, Clay, Kanawha, Putnam	A heat wave during the first two weeks of October caused more severe drought conditions. During the third week, the governor issued a no burning declaration. However, on rain arrived on the 23 <sup>rd</sup> and continued through the 25 <sup>th</sup> bringing two to three inches throughout the regions and easing drought conditions.
11/1/2007	Boone, Kanawha, Putnam	Drought conditions continued to ease throughout the month with rainfall totals reaching three to four inches. By month's end, most counties were out of the moderate drought classification.

## LOSS ESTIMATES

Structures are rarely affected by this type of hazard. Droughts usually affect people, animals, and crops.

### Crop Loss Study

While the NCDC does not list any crop damage in these records, comparing a drought year with a non-drought year in the USDA's Census of Agriculture shows significant differences. The drought year of 2007 saw an overall market value of crops of just over \$9 million, with over 112,000 acres in farms. The next census five years later, in 2012, found less acreage in farms (just over 98,000), but a higher market value of crops (a little over \$12 million).

The table below shows crop production totals (tracked in either tons or bushels) from the USDA's Census of Agriculture for 2007 and 2012. The data shows decreases in reported production of corn and haylage (a grass crop for feeding farm animals), while also showing growth in hay and "hay & haylage" production. Some data has been redacted from the publically available data by the USDA, to "avoid disclosing data for individual operations" (USDA, 2014). The data shown is fairly inconclusive. There are reductions in some types of agriculture, but growth in others. With five years separating the data, the effect of the drought in 2007 is not clear.



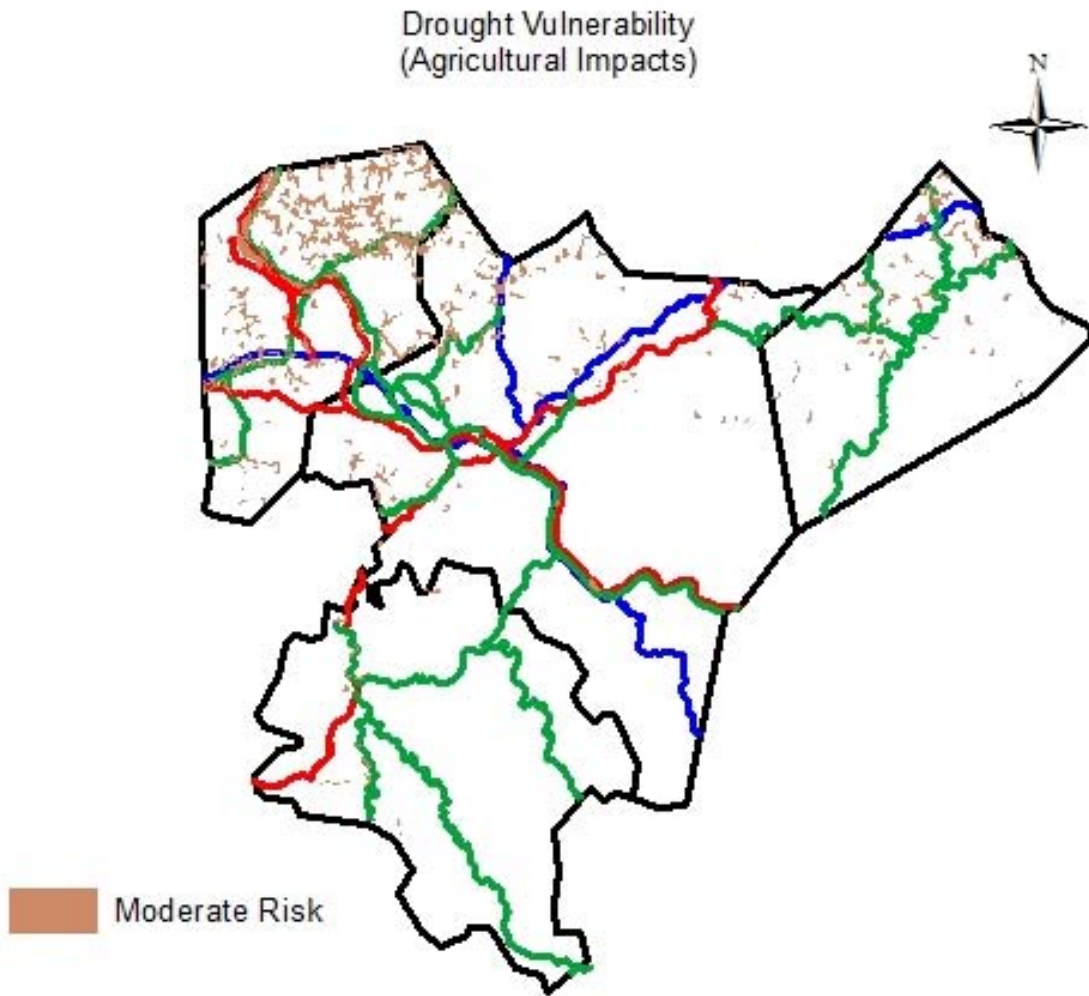
Product	2007	2012	Difference	%Δ
Corn	12,796	10,564	-2,232	-17%
Hay	31,972	38,133	6,161	19%
Hay & Haylage	18,329	20,280	1,951	11%
Haylage	3,036	2,654	-382	-13%
Total	66,133	71,631	5,498	8%

Additional survey data from the USDA, which is less collected annually but is less specific than the census data, can show a trend for drought vs. non-drought years. The table below shows the total hay production in Clay, Kanawha, and Putnam counties for 2006, 2007, and 2008. Both 2006 and 2008 were non-drought years, while 2007 saw a significant drought in the southeast and affecting portions of southern West Virginia. During 2007, there were 8,800 tons less hay produced in Region 3 than in 2006. This was not the result of a trend in the region. Production rebounded in 2008, growing by 6,100 tons over the 2007 production.

Commodity	2006	2007	2008
Hay	26,200	17,400	23,500



RISK MAP



<sup>i</sup> Droughts will generally affect large areas, but the NCDC data includes an event for each county affected.

Research Sources:

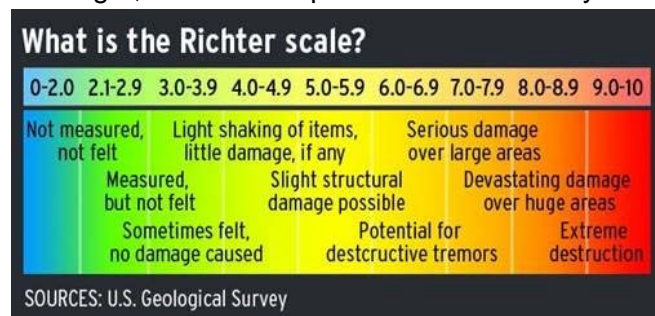
- NOAA National Climactic Data Center (NCDC) Storm Events Database
- USDA National Agriculture Statistics Service
- Environmental Protection Agency (EPA)



## EARTHQUAKES

<i>Earthquake Snapshot</i>	
"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	At any time
Number of Events (1990-2015)	3
Probability of Event In Any Given Year	0.19 per year
Warning Time	None to Limited
Potential Impacts	Little damage
Cause Injury or Death	Minor risk of injury
Potential Facility Shutdown	Hours
Extent	Southwestern Kanawha County, Northwestern Boone County. The whole region is susceptible to effects from large epicenters outside its borders
Loss Estimate	HAZUS: \$878,234,224.11

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.



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



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

earthquake of a magnitude 8.0 or higher annually (2015)<sup>i</sup>. 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.

#### LOCATION

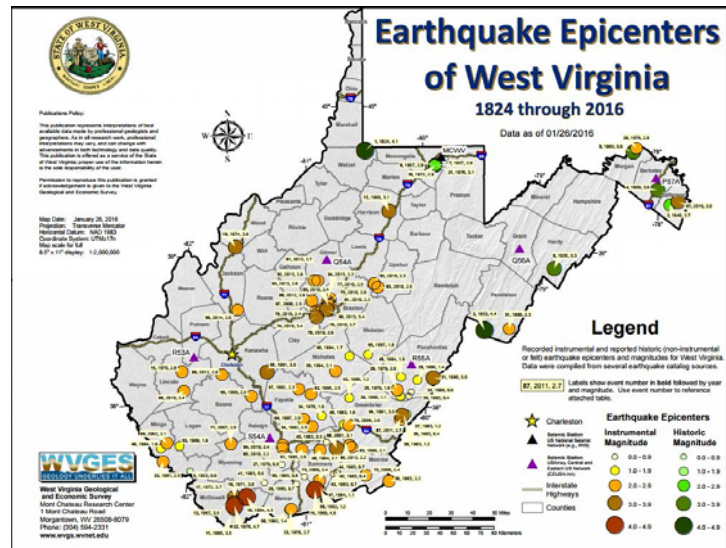
There have been three events within the region since 1990, with the strongest being a 3.0 magnitude that occurred in Kanawha County in 1991. The most recent event occurred in 2012 in northern Boone County. The locations of these epicenters are shown in the risk map below. There have not been any reported epicenters in Clay or Putnam Counties.

#### EXTENT

Impact of Earthquakes	
Public Health	Death, injury, PTSD, exacerbation of chronic illnesses
Social	Displacement of population, disruption of normal activities, evacuation, hysteria
Economic	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up
Environmental	Erosion, water quality, change in natural habitat
Infrastructure	Power outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)



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).<sup>ii</sup> All of the earthquakes shown in the map have a magnitude



of 4.9 or less. All of Region 3 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).

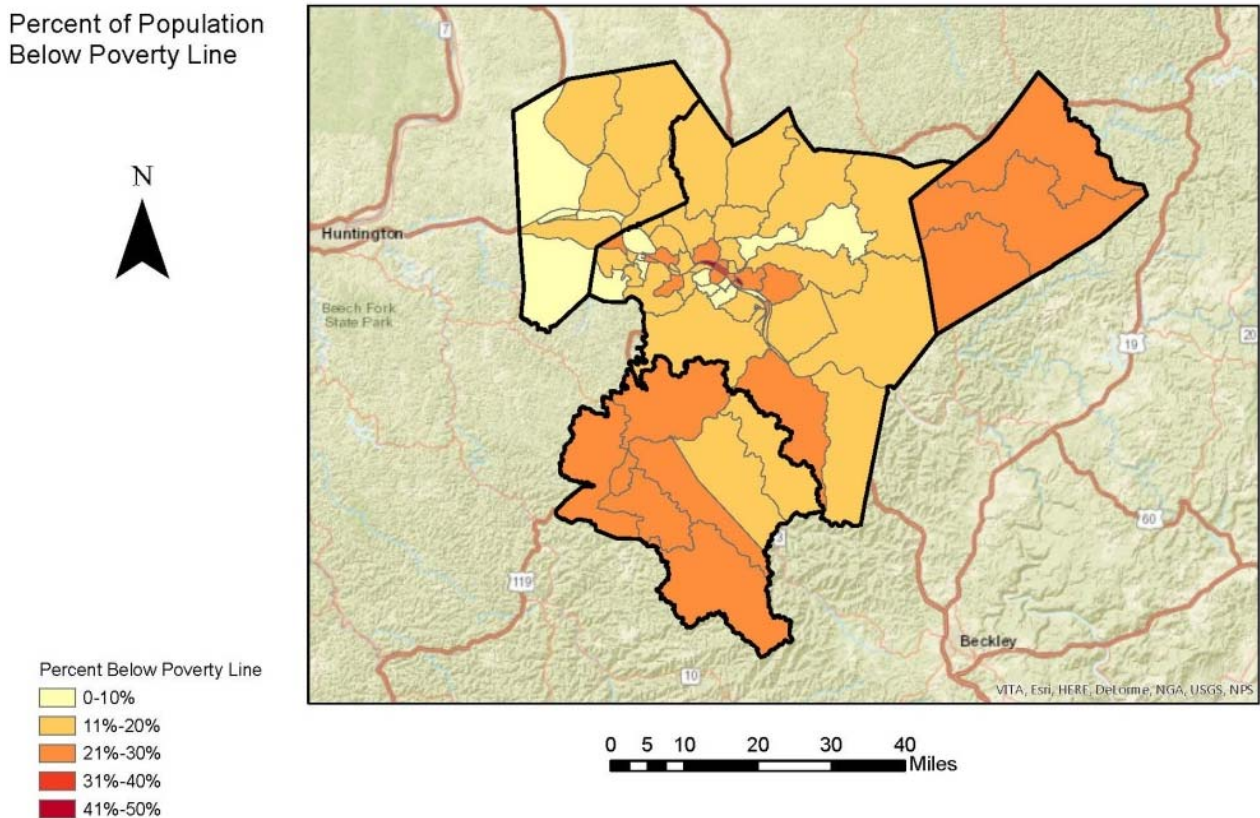
Low income population are at an elevated risk. They often live in the most vulnerable housing and lack the resources to undertake mitigation or evacuation measures. Low income individuals tend to reside in older homes and low or moderate income apartments that are not subject to the most advanced building 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.

Percent of Population Below Poverty Line



## HISTORICAL OCCURRENCES

### Kanawha County

The largest magnitude earthquake to occur in Region 3 occurred on June 28, 1991. The 3.0 magnitude event occurred approximately 4 miles northeast of Hugheston, which is in south western Kanawha County, at a depth of approximately 8 kilometers.

### Kanawha County

The next earthquake to occur in Region 3 also occurred in Kanawha County, a little more than 7 years later. This 2.5 magnitude event occurred in the southwest portion of the county, about a mile east of the unincorporated area of Leewood. The location of the event is near a mine, which appears to be in operation from Google Maps overhead views (2016).



### **Louisa County, Virginia**

A little before 2 p.m. on August 23, 2011, a 5.8 magnitude earthquake occurred in Louisa County, VA. The event was located approximately 38 miles northwest of Richmond and was reported to have a perceived intensity of VI (very strong) on the Mercalli Intensity Scale. The effects of this event were far reaching along the east coast, with the USGS finding that the earthquake caused landslides as far as 150 miles from the epicenter (2012).

In West Virginia this event caused damage and concern in the southern end of the state, stretching as far north as Philippi according to reports from Charleston Gazette and Register Herald (2011). They also reported that, in Region 3, the Kanawha County Courthouse, the State Capitol and several downtown businesses were evacuated following the event (2011).

### **Boone County**

The most recent earthquake event to occur in Region 3 was recorded on March 6, 2012. The event was in far northwestern Boone County, near the Kanawha County line, approximately 2 miles north of the unincorporated community of Ashford. The event was recorded to be a 2.8 magnitude event that occurred at a depth of 5.1 kilometers.

### **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). While there have been no proven incidents of either fracking or wastewater injection causing earthquakes within





Region 3, the area is home to over 400 oil and gas wells both completed and permitted, according to the West Virginia Geological & Economic Survey.

The region included the discussion on earthquakes resulting from disposal wells because there are wells near the region. There are a number of injection wells in neighboring Fayette County. Also, minor earthquakes have been reported associated with injection wells north of the region in Braxton County. As such, portions of the region may feel minor, disposal-related earthquakes.

## LOSS ESTIMATE

The effects of a potential earthquake striking Region 3 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 site of the highest magnitude earthquake that has occurred in Region 3, in southwestern Kanawha County. The data output was then input into a HAZUS loss estimation workbook to find the results in the table below.

Table 2.13

Structure Type	Number	Loss Estimate
Residential	2,602	\$557,838,487.60
Non-Residential	2,390	\$312,421,791.20
Critical Facilities	61	\$7,973,945.30
<b>TOTALS</b>	<b>5,053</b>	<b>\$878,234,224.11</b>

RISK MAP: The entire region is equally susceptible to earthquakes.

<sup>i</sup> These averages are based on observations since 1999.

<sup>ii</sup> Map is current through 1/26/2016

### Research Sources:

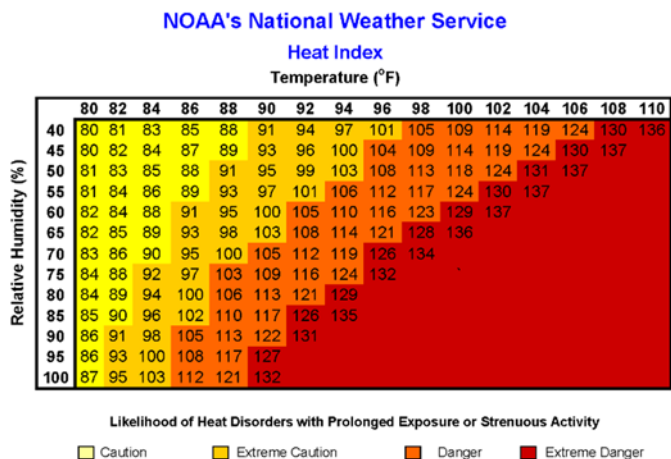
- US Geological Survey (USGS)
- Skournal, Brudzinski, and Currie (Miami University)
- Ohio Emergency Management Agency (i.e., HAZUS Loss Estimation Workbook)



**EXTREME TEMPERATURES**

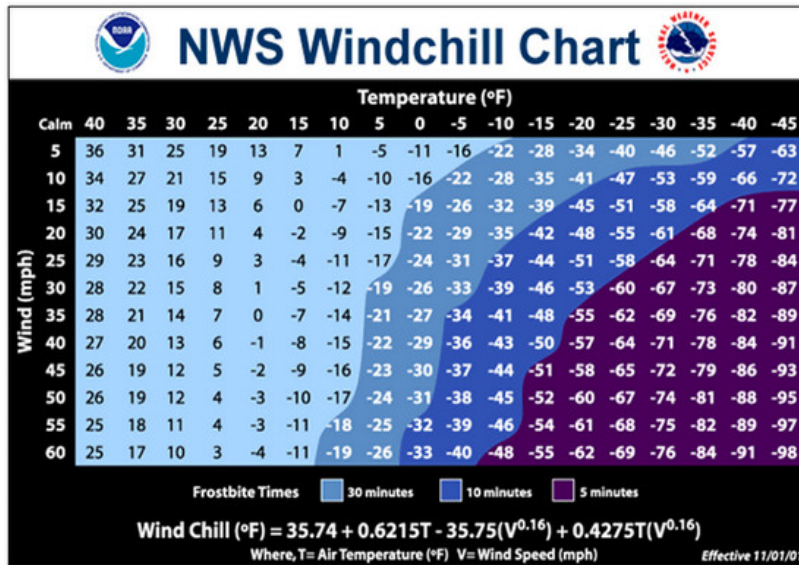
<i>Extreme Temperatures Snapshot</i>	
"Major diversions in average seasonal temperatures can cause injuries, fatalities, and major economic impacts when they are prolonged or coincide with other natural or technological events" (Haddow, Bullock, & Coppola, 2014).	
Period of Occurrence	Any season, but generally summer and winter
Number of Events (1996-2015)	95 Cold Events 81 Heat Events
Probability of Event In Any given Year	4.75 Cold Events per year 4 Heat Events per year
Warning time	Days
Potential Impacts	Economic impacts. Overloaded utility grids
Cause Injury or Death	Injury and potential deaths
Potential Facility Shutdown	Days to weeks
Extent	Region wide
Loss Estimate	Yearly: \$61,500 (Property damage from cold events)

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.

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.

For the purposes of data recording and tracking, the National Climatic Data Center (NCDC) 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.

## LOCATION

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.

## EXTENT

Impact of Extreme Temperatures	
Public Health	Death, illness, frostbite, heat stroke, exacerbation of chronic illnesses
Social	Disruption of recreational activities
Economic	Disruption of business and income
Environmental	Air quality, water quality
Infrastructure	Power outages, damage to structures

The NCDC event records show that over the last 19 years (1996-2015), there have been 176 recorded extreme temperature events in Region 3. Extreme temperature events have caused over \$1 million in property damages in the same time frame. All of these property damages have been recorded during cold events, as shown in the table to the right. None of 176 events is reported to have resulted in an injury or fatality in the Region.

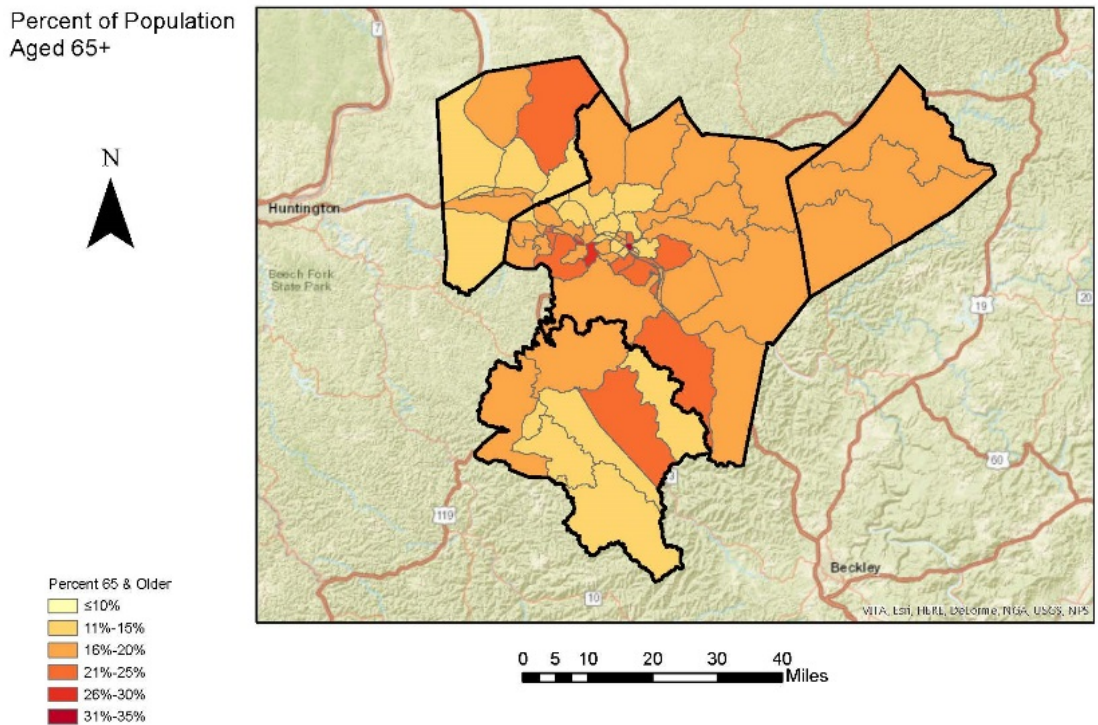
Type	#	Property Damage
Cold/Wind Chill	71	\$ 40,000.00
Extreme Cold/Wind Chill	24	\$ 1,190,000.00
Heat	45	\$ -
Excessive Heat	36	\$ -
Total	176	\$ 1,230,000.00

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.



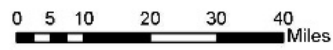
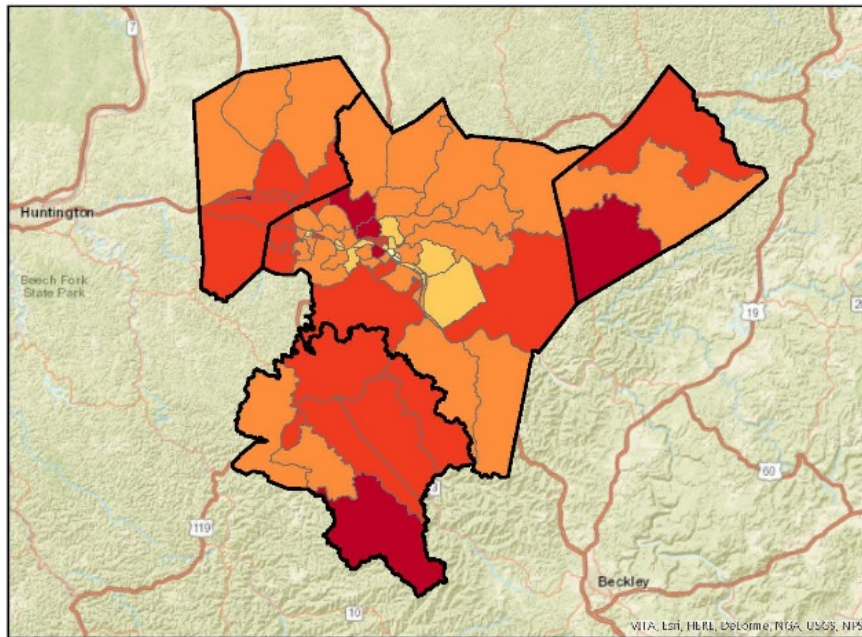
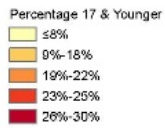
Extreme heat can cause a wide range of health problems or even make existing health problems worse. Some of the more mild symptoms include discomfort, skin eruptions and heat fatigue which can lead to heat cramps, heat exhaustion and heat stroke. Occasionally some people may require medical attention. Prolonged exposure to extreme heat can even cause death (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).

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 poor if they cannot afford to keep cool during an extreme heat event or to stay warm during an extreme cold event. As shown in the maps below, all counties in the region have vulnerable population present with Kanawha County having areas of the highest percentage of each vulnerable population.

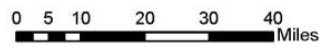
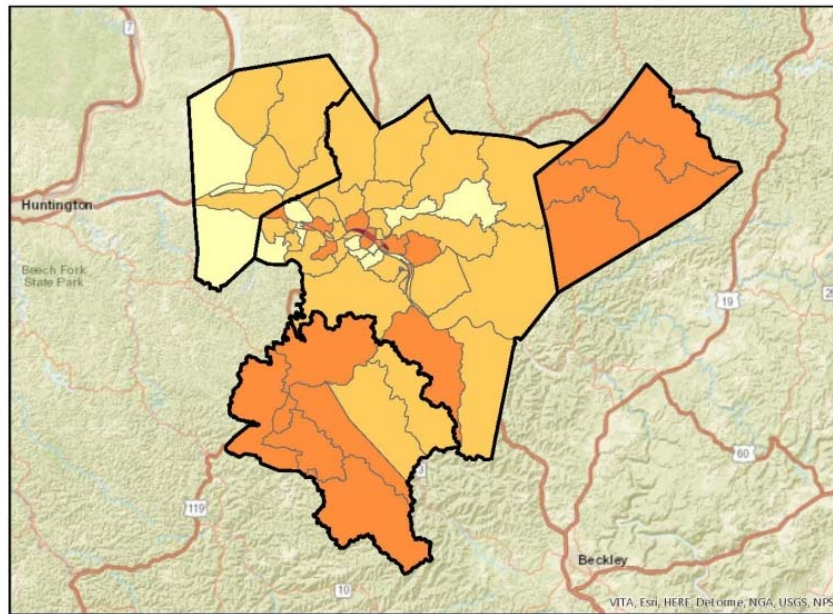
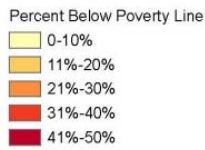




Percent of Population  
Aged 17 & Younger



Percent of Population  
Below Poverty Line



## HISTORICAL OCCURRENCES

### **Kanawha & Putnam Counties**

Fresh snow cover combined with an arctic cold wave dropped temperatures to well below zero on the mornings of February 4 and February 5, 1996. Readings of 10 degrees below zero were common along the Kanawha River and the City of Charleston saw temperatures of -12 degrees. The NCDC records show property damage of \$15,000 in Kanawha County and \$20,000 in Putnam County.

### **Kanawha & Putnam Counties**

An arctic cold front swept through the area between midnight and 4 a.m. on January 6, 2014, with wind gusts up to 50 mph. During the day of the 6 temperatures continued to drop. Readings reached the single digits by sunset, and were mostly 2 to 8 degrees below zero by dawn. Wind chill readings in the morning hours bottomed out in the -20 to -30 degree range. There were reports of frozen pipes, power outages, furnace difficulties, and vehicle engine problems. The NCDC reports \$300,000 in property damage in both Kanawha and Putnam Counties (2016).

### **Kanawha & Boone Counties**

The second arctic front in less than a week swept through West Virginia during the early afternoon hours on February 18, 2015. Temperatures dropped into the single digits overnight, and reached 0 to -5 degrees after dawn on the 19. Daytime temperatures remained in the single digits throughout the day time hours, with wind chills reaching minus 10 to minus 20 across the lowland counties. By dawn on Friday the 20 temperatures were well below zero. The official temperature in Sissonville, in Kanawha County, was recorded as -21 degrees. In Kanawha County there were approximately 10,000 customers without power near dawn on the 20<sup>th</sup>, necessitating that warming shelters be set up by churches and towns. Broken water lines were reported across the region, including under a street in the East End of Charleston. Broken pipes in the Boone County Courthouse resulted in 1 to 2 feet of water collecting in the basement, damaging the floors. Finally, a local water utility lost the water stored in their tanks due to broken pipes, leading to water service being cut off for thousands in Charleston and Boone County. Service was not restored for several days. The NCDC data reports property damage of \$250,000 in Kanawha County and \$150,000 in Boone County (2016).



Table 2.16  
**COLD EVENTS WITH PROPERTY DAMAGE 1996-2015 (NCDC, 2017)**

Date	County	Type of Event	Property Damage
2/4/1996	Kanawha	Cold/Wind Chill	\$15,000
2/4/1996	Putnam	Cold/Wind Chill	\$20,000
1/16/1997	Kanawha	Cold/Wind Chill	\$5,000
1/6/2014	Boone	Extreme Cold/Wind Chill	\$20,000
1/6/2014	Clay	Extreme Cold/Wind Chill	\$20,000
1/6/2014	Kanawha	Extreme Cold/Wind Chill	\$300,000
1/6/2014	Putnam	Extreme Cold/Wind Chill	\$300,000
1/27/2014	Boone	Extreme Cold/Wind Chill	\$25,000
1/27/2014	Clay	Extreme Cold/Wind Chill	\$25,000
1/27/2014	Kanawha	Extreme Cold/Wind Chill	\$50,000
1/27/2014	Putnam	Extreme Cold/Wind Chill	\$50,000
2/18/2015	Boone	Extreme Cold/Wind Chill	\$150,000
2/18/2015	Kanawha	Extreme Cold/Wind Chill	\$250,000

Table 2.17  
**EXTREME HEAT EVENTS 1996-2015 (NCDC, 2017)**

Date	Counties	Description of Event
1/2/2000	Boone, Clay Kanawha, Putnam	Temperatures for the region ranged from the upper 60s to low 70s in the lowlands and in the 60s in higher elevations.
2/25/2000	Boone, Clay Kanawha, Putnam	Temperatures were mostly in the 70s with a few locations reaching 80 degrees.
2/26/2000	Boone, Clay Kanawha, Putnam	Temperatures in the region rose to almost 80 degrees with Charleston having a high of 79 degrees.
3/8/2000	Boone, Clay Kanawha, Putnam	Urban areas saw temperatures in the low to mid 80s, while other parts of the region had temperatures in the high 70s.
2/9/2001	Boone, Clay Kanawha, Putnam	During the afternoon hours, the region saw temperatures ranging from the upper 60s to the mid 70s.
1/28/2002	Boone, Clay Kanawha, Putnam	Throughout the region temperatures peaked in the 60s and 70s.
1/31/2002	Boone, Clay Kanawha, Putnam	Regional temperatures were in the 70s and low 80s, Madison had a high of 81 degrees. The mild pattern helped the monthly average temperature to end-up at six degrees above normal levels in some areas.
4/16/2002	Boone, Clay Kanawha, Putnam	Temperatures reached into the 80s and lower 90s. Charleston set a new record for the date at 89 degrees.
8/16/2007	Boone, Clay Kanawha, Putnam	Afternoon temperatures were in the 100 to 105 degree range in lowlands and mid 90s in the higher elevations. For many areas it was the hottest day since July of 1988.

## LOSS ESTIMATES

The historical data available allows for the calculation of yearly property damage loss estimates. Since only cold events have historically caused damage, only cold events will be





used in the calculation. There have been a total of 95 events over the 20 year study period, equaling an average of 4.75 events per year. In total, these events have caused \$1.23 million in property damage which is an average of \$12,947.37 per a recorded event. By multiplying the average cost of an event by the average number of events per year, a yearly loss estimate of \$61,500 is found.

RISK MAP: The entire region is equally susceptible to extreme temperatures.

Research Sources:

- NOAA National Climatic Data Center
- West Virginia Department of Homeland Security and Emergency Management



**FLOODING**

<i>Flooding Snapshot</i>	
"An overabundance of water that engulfs land and other property that is normally dry" (Haddow, Bullock, & Coppola, 2014)	
Period of Occurrence	Flooding has historically occurred any time of the year.
Number of Events (1996-2015)	54 (Floods) 112 (Flash Floods)
Probability of Event In Any Given Year	2.7 (Floods) per year 5.6 (Flash Floods) per year
Warning time	Minutes to hours to days depending on the type of flood and situation
Potential Impacts	Impacts to all aspects of life: safety, health and economic. Utility damage and outages, structural and infrastructure damage, fire, loss of critical facilities.
Cause Injury or Death	Injury and moderate risk of death.
Potential Facility Shutdown	Days to weeks
Extent	Region-wide
Loss Estimate	\$857,750.01 (Floods) per year \$1,891,850.02 (Flash Floods) per year

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 NCDC data, flood events 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).

**LOCATION**

Historically flooding is among the most frequent hazard event to occur within Region 3, second only to thunderstorm activity. Every county within the region has experienced



flooding within the last 20 years, including a historic flood that occurred in June of 2016, which is discussed below.

**EXTENT**

Table 2.18 Impact of Flooding	
Public Health	Death, injury, illness (water-borne), standing water, exacerbation of chronic illnesses
Social	Displacement of population, disruption of normal activities, hysteria, evacuation
Economic	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up
Environmental	Erosion, water quality, change in natural habitat
Infrastructure	Power and water outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)

The various counties and municipalities within Region 3 are, historically, highly susceptible to flooding events. Two major rivers run through the region, the Kanawha and the Elk. In addition to these major waterways, the region has a multitude of creeks and streams. The mountainous geography of the region encourages the development of these systems, funneling water down into the valleys. The members of the steering committee indicated that flooding is of major concern. When asked to rank the various hazards based on both severity (amount of damage, loss of life, and/or economic impacts) and probability, flooding received an average score of 7.7 out of a scale of 8.

Flooding routinely causes significant road damage as well, as seen in a number of recent floods. Inadequate or damaged culverts can fail, causing the roadway they support to collapse. Due to the geography of the region, numerous roads run along the sides of hills and mountains, where water undermining the edge can cause slope failure.

Areas that provide natural floodplain functions include lakes, ponds, wetlands and swamps. As shown on the National Wetlands Inventory – V2 Mapper, Region 3 has minimal wetland areas. Local officials would consider green infrastructure and low impact development.

“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).

“People affected by floods are often apprehensive about the potential, long term adverse effects of exposure to contaminants, mold, and toxic substances that may be present in their homes after clean up. Unfortunately there is no data that address these concerns. 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).

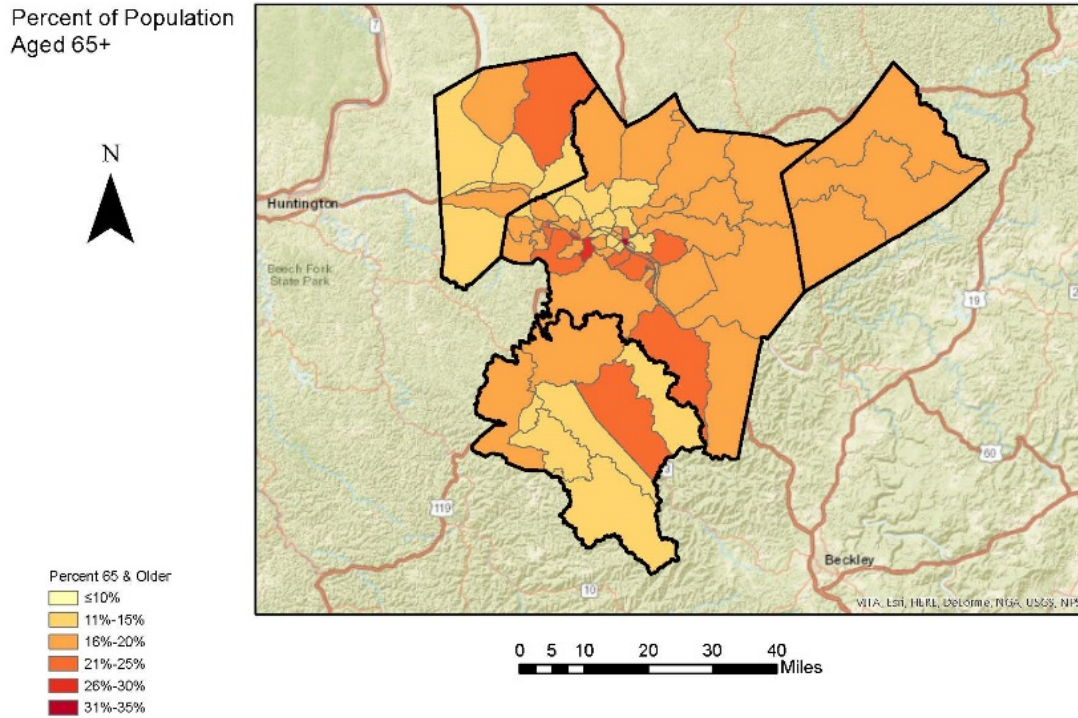
“Floods may indirectly lead to an increase in vector-borne diseases through the expansion in the number and range of vector habitats. Standing water caused by heavy rainfall or overflow of rivers can act as breeding sites for mosquitoes, and therefore enhance the potential for exposure of the disaster-affected population and emergency workers to infections such as dengue, malaria and West Nile fever. Flooding may initially flush out mosquito breeding, but it comes back when the waters recede. The lag time is usually around 6-8 weeks before the onset of a malaria epidemic. Contrary to common belief, there is no evidence that corpses pose a risk of disease "epidemics" after natural disasters. Most agents do not survive long in the human body after death (with the exception of HIV -which can be up to 6 days) and the source of acute infections is more likely to be the survivors. Human remains only pose health risks in a few special cases requiring specific precautions, such as deaths from cholera or hemorrhagic fevers. Power cuts related to floods may disrupt water treatment and supply plants thereby increasing the risk of water-borne diseases as described above but may also affect proper functioning of health facilities, including cold chain” (WHO).

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

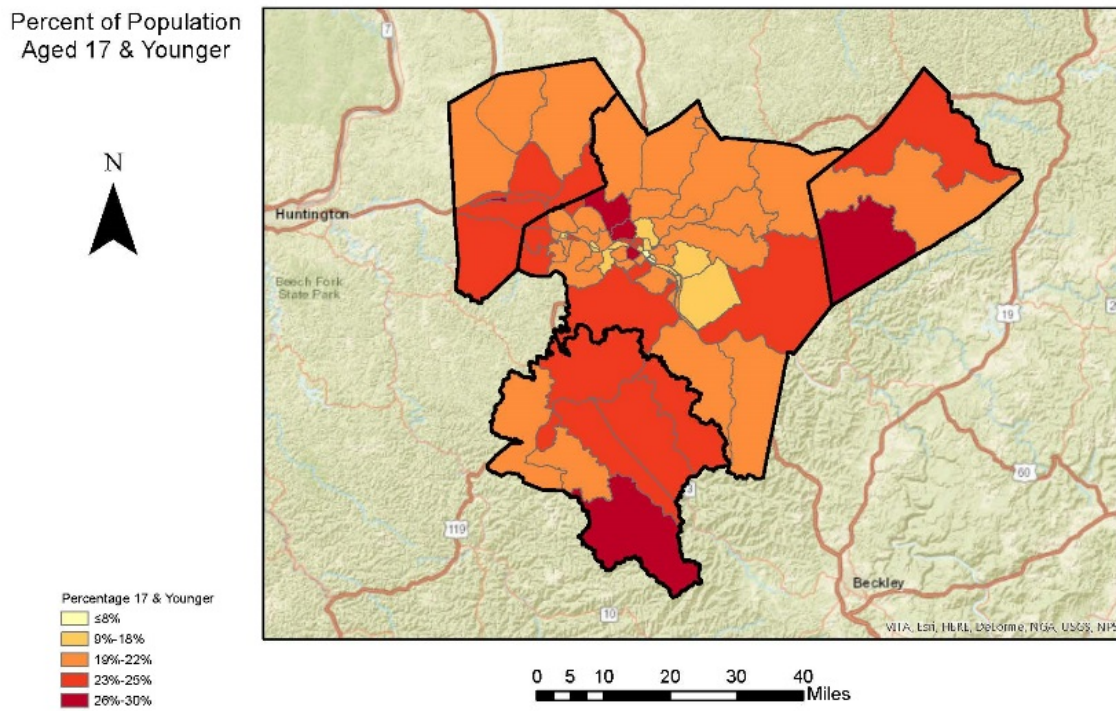


flood barriers (Clements, 2009). Each county has these vulnerable populations as shown in the maps below.

Percent of Population Aged 65+

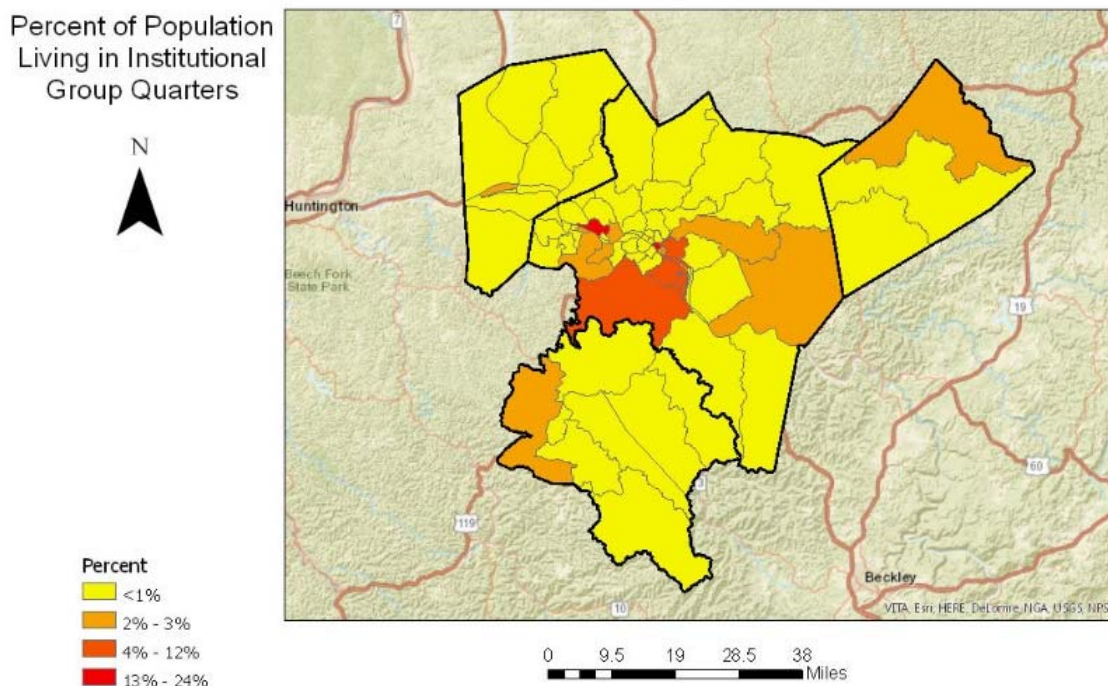


Percent of Population Aged 17 & Younger





The sick and terminally-ill 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). As shown in the map below, Kanawha County has the largest population in nursing facilities, hospitals and other institutional quarters.



## JUNE 2016, FLOODING

On June 23, 2016, heavy rains swept through the Mid-Ohio Valley and into southern West Virginia, dropping large amounts of rain on the region. Over the span of the afternoon, Nicholas County saw between 3 and 4 inches of rain, with some areas seeing up to five inches according to the National Weather Service. The flooding resulted in states of emergency being declared by the Governor in 44 of the 55 counties in the state, with 22 deaths and millions of dollars in damages. Large portions of the town of Richwood, in Nicholas County, were under water and public safety personnel from around the state were assisting with rescuing those trapped by the rapid flooding (Desrochers & Beck, 2016).

These scenes repeated themselves around much of the southern areas of West Virginia. Multiple water rescue teams were activated in Kanawha County, with 37 active



rescues being recorded by 7 p.m. that day, mostly in the Clendenin area. Also near the Clendenin area, Interstate 79 was closed in both directions after a mudslide covered the highway. A culvert at the entrance to the Crossing Mall in Elkview was destroyed by the flooding, stranding workers and customers in the mall. The Greenbrier Resort, in Greenbrier County, was cut off from the rest of the county with the closing of U.S. 60, stranding employees and guests. By the evening of the 24<sup>th</sup>, Appalachian Power was reporting more than 34,000 customers without power. In addition to the large rain totals, the storm line produced wind gusts in excess of 60 mph according to the National Weather Service (Desrochers & Beck, 2016).

The speed of the flooding was demonstrated in White Sulfur Springs, in Greenbrier County. In less than an hour of heavy rains, Howard's Creek overflowed its banks and engulfed whole neighborhoods. Dozens of homes in the area were destroyed, forcing 150 people into a shelter set up at the Charleston Civic Center on the night of 24<sup>th</sup>. There were 15 confirmed deaths in Greenbrier County (Gutman, 2016).

There were twelve water rescues performed in Webster County overnight on the 24<sup>th</sup> according to Webster County Emergency Manager, Richard Rose. "Everything from vehicles to campers to boats to homes knocked off the foundation and numerous propane tanks floating down the river" (Beck & Kersey, 2016). The economic damage from these storms, including both the flooding and strong winds, will take weeks, if not months or years, to fully quantify.

## HISTORICAL OCCURRENCES

### **Boone & Kanawha Counties, West Virginia**

After several days of heavy rain in mid-May, 2010, showers and thunderstorms moved through the region, producing upwards of 2-3 inches within an hour. The ground was already more saturated than is normal, leading to flash flooding along creeks and streams in the region from rainwater runoff. A number of structures were flooded, including multiple homes, outbuildings, and an elementary school. According to WV Gazette Mail multiple rescues had to be made by rescue teams in the Sissonville area of Kanawha County (2010). Parts of Interstate 77 were reported to have water up to three feet deep standing on them, while a mudslide closed an exit ramp off of Interstate 64 (WV Gazette Mail, 2010). According to the NOAA records, this flash flood event caused \$15K in property damage in Boone County and \$1.2 Million in property damage in Kanawha County (NCDC, 2016).



### Boone, Clay, Kanawha, & Putnam Counties, West Virginia

In early March, 2015, temperatures across the region rose well above average (into the 50s and 60s in some areas) with increased wind. This combination accelerated the melting



of the snow pack, which was between 10 and 20 inches (2-3 inches when liquefied). This melting, combined with rain falls between 1 to 1.5 inches, caused streams to begin flooding. The rising level of the Kanawha River contributed to this through back water flooding, though the river itself did not reach flood stage. In total there was a

reported \$975,000 in property damage across the region (NCDC, 2016).

### Clay, Kanawha, & Putnam Counties, West Virginia

On Christmas morning, 2015, a weather system swept across West Virginia out of Kentucky, bringing significant rain fall to the region. Areas along the Elk River and I79 corridor in Clay County saw rainfall between 1.5 and 2 inches in a four hour period. Rainfalls over 2 inches were reported in numerous areas, including 2.7 inches in western Putnam County and 2.24 inches in Clay County. According to WV Metro News, the Kanawha County 911 center sent water rescue crews to 31 rescues in a 4.5 hour period, with numerous water rescues occurring in Sissonville, Cross Lanes, and Clendenin (2015).



Photo courtesy David Armstrong  
This outbuilding was no match for this small stream on Lotus Drive near Sissonville on Christmas Day.

### 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). The following is a list of these properties in Region 3.

Table 2.19

Jurisdiction	Repetitive Losses	Total Payments	Average Payment	Severe Repetitive Losses	Total Payments	Average Payment
Boone County	33	\$723,699.09	\$9,779.72	0	-	-
Danville, Town of	9	\$562,138.08	\$16,533.47	0	-	-
Madison, Town of	10	\$310,637.87	\$9,136.41	0	-	-
Sylvester, Town of	3	\$50,583.19	\$8,430.53	0	-	-
Whitesville, Town of	1	\$5,884.64	\$2,942.32	0	-	-
Clay County	6	\$354,917.00	\$27,301.31	0	-	-
Kanawha County	187	\$9,664,264.21	\$18,912.45	2	\$413,117.67	\$51,639.71
Charleston, City of	22	\$498,189.88	\$7,435.67	1	\$63,682.36	\$10,613.73
Chesapeake, Town of	1	\$16,844.86	\$8,422.43	0	-	-
Clendenin, Town of	6	\$302,522.27	\$20,168.15	0	-	-
Dunbar, City of	5	\$73,155.24	\$6,096.27	0	-	-
Marmet, Town of	2	\$16,045.67	\$4,011.42	0	-	-
Nitro, City of	4	\$97,840.57	\$8,894.60	0	-	-
Pratt, Town of	5	\$94,100.14	\$7,238.47	0	-	-
South Charleston, City of	6	\$1,188,793.93	\$59,439.70	1	\$49,208.15	\$8,201.36
St. Albans, City of	1	\$170,300.00	\$56,766.67	0	-	-
Putnam County	29	\$889,444.37	\$9,362.57	3	\$232,750.32	\$13,691.20
Hurricane, City of	3	\$221,112.74	\$31,587.53	0	-	-
Poca, Town of	1	\$16,597.20	\$8,298.60	0	-	-

Participating communities throughout Region 3 periodically undertake flood mitigation projects (as funding is available). Though participation in mitigation projects is often a voluntary effort on the part of the property owner, floodplain managers and other officials in the region target RL and SRL properties for mitigation when appropriate. As of the publication of this version of the plan, the City of Charleston had a Hazard Mitigation Grant Program (HMGP) application submitted to FEMA to mitigate RL properties on Rose Hill Drive. The Town of Clendenin has purchased RL properties with past mitigation dollars (though steering committee members were not aware of specific numbers). Kanawha County has mitigated approximately three properties in the Cross Lanes area, two in the Elkview area, and one (each) in the Paint Creek and Malden areas. Both Clendenin and Kanawha County signed up 15 property owners (each) for mitigation reconstruction/elevation projects following June 2016 flooding (these properties are not all RL or SRL properties, though). Putnam County also had



a mitigation project awaiting approval under DR-4210 at the time of adoption. The project, at a cost of nearly \$1,000,000, would include seven total structures, two of which are SRL and one of which is RL.

## LOSS ESTIMATES

FEMA’s risk assessment software, HAZUS-MH, was used to determine the number of structures that are vulnerable to flooding events in the region. The data output was then input into a HAZUS loss estimation workbook to find the results in the table below.

### 100 YEAR FLOOD

Building Type	Number of Buildings	Exposure
Residential	60,763	\$11,373,798,000
Non-Residential	14,783	\$2,774,216,000
Critical Facilities	4,389	\$807,974,000
Total	79,935	\$14,955,988,000

### 50 YEAR FLOOD

Building Type	Number of Buildings	Exposure
Residential	59,553	\$11,147,244,000
Non-Residential	13,754	\$2,581,546,000
Critical Facilities	4,155	\$764,792,000
Total	77,462	\$14,493,582,000

### 25 YEAR FLOOD

Building Type	Number of Buildings	Exposure
Residential	58,559	\$10,968,704,000
Non-Residential	12,598	\$2,364,943,000
Critical Facilities	3,720	\$684,948,000
Total	74,877	\$14,018,595,000

In addition to the loss estimates listed above, which are based on a flood return period, loss estimates can be calculated using historical data from the NCDC database. The table below details this analysis. Since 1999, the region has experienced 54 flooding events and 112 flash flood events. Flooding events have caused \$17,155,000 in property damage in that

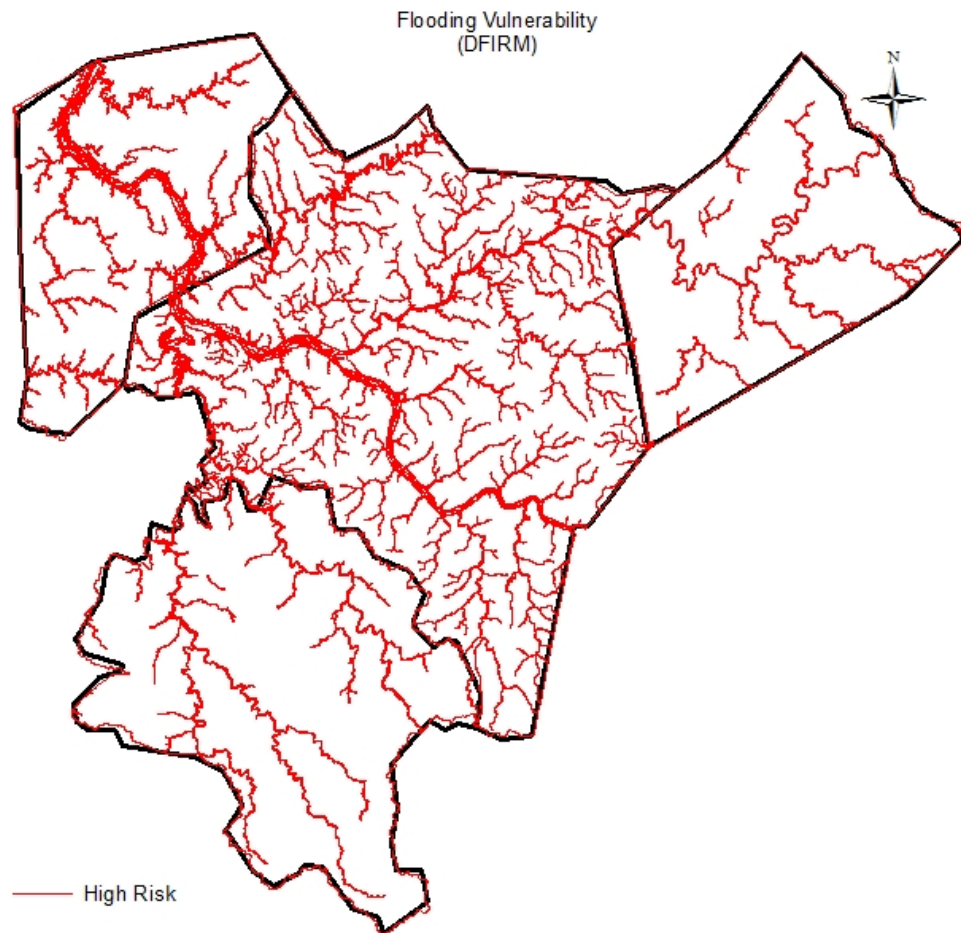


time frame, while flash floods have caused \$37,837,000. By dividing the total property damage by the number of events, it is possible to find an average cost per event, shown below. Multiplying this by the number of events per year (total number of events divided by number of years in the study) results in an estimate of property loss per a year, shown in the table.

Type	Total Occurrences	Property Damage (\$)/Event	Events/Year	Property Damage/Year
Flood	54	\$317,685.19	2.7	\$857,750.01
Flash Flood	112	\$337,830.36	5.6	\$1,891,850.02



## RISK MAP



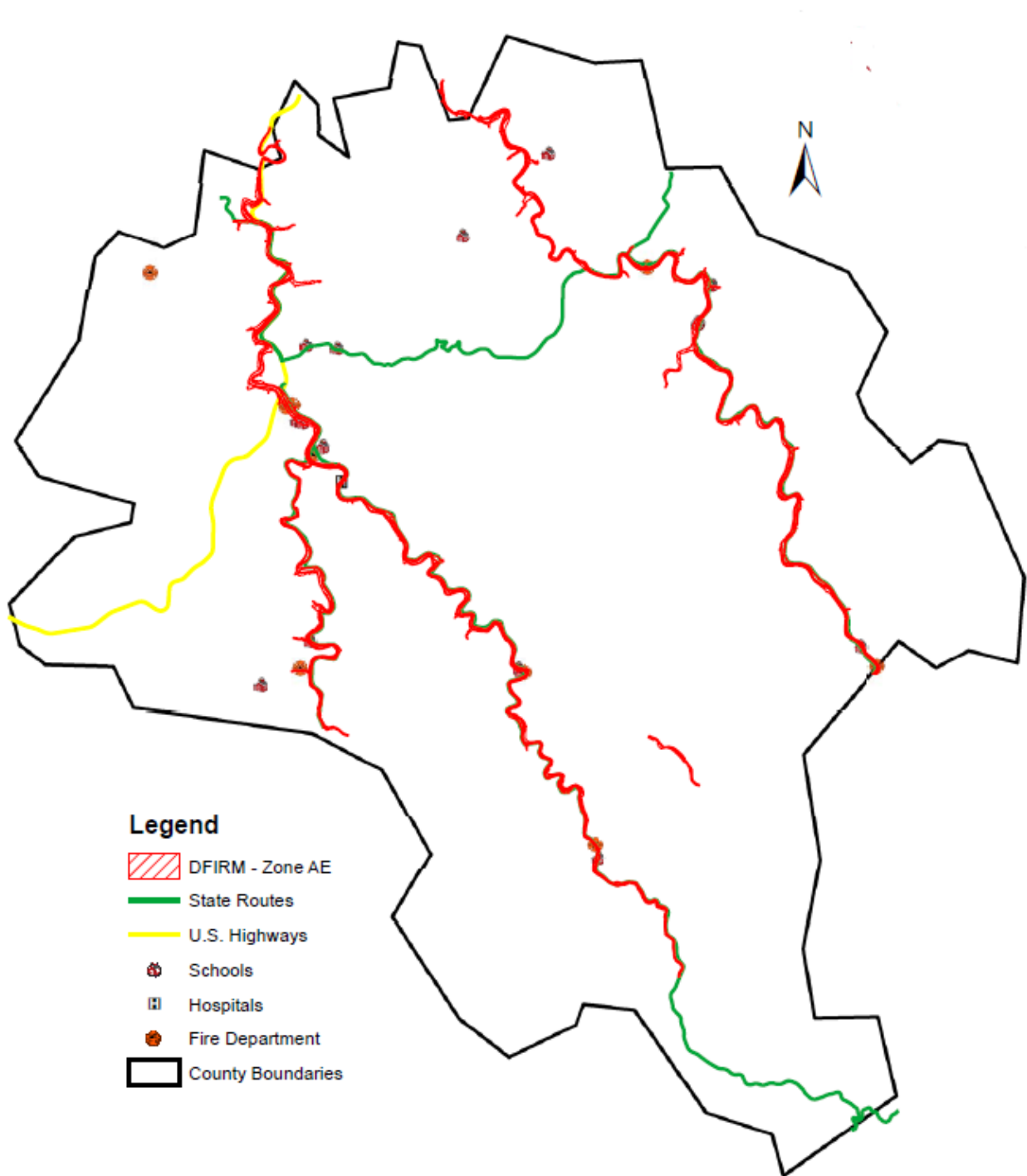
High risk area correspond to the SARA (100 yr. floodplain) as presented in Digital Flood Insurance Rate Maps.

### Research Sources:

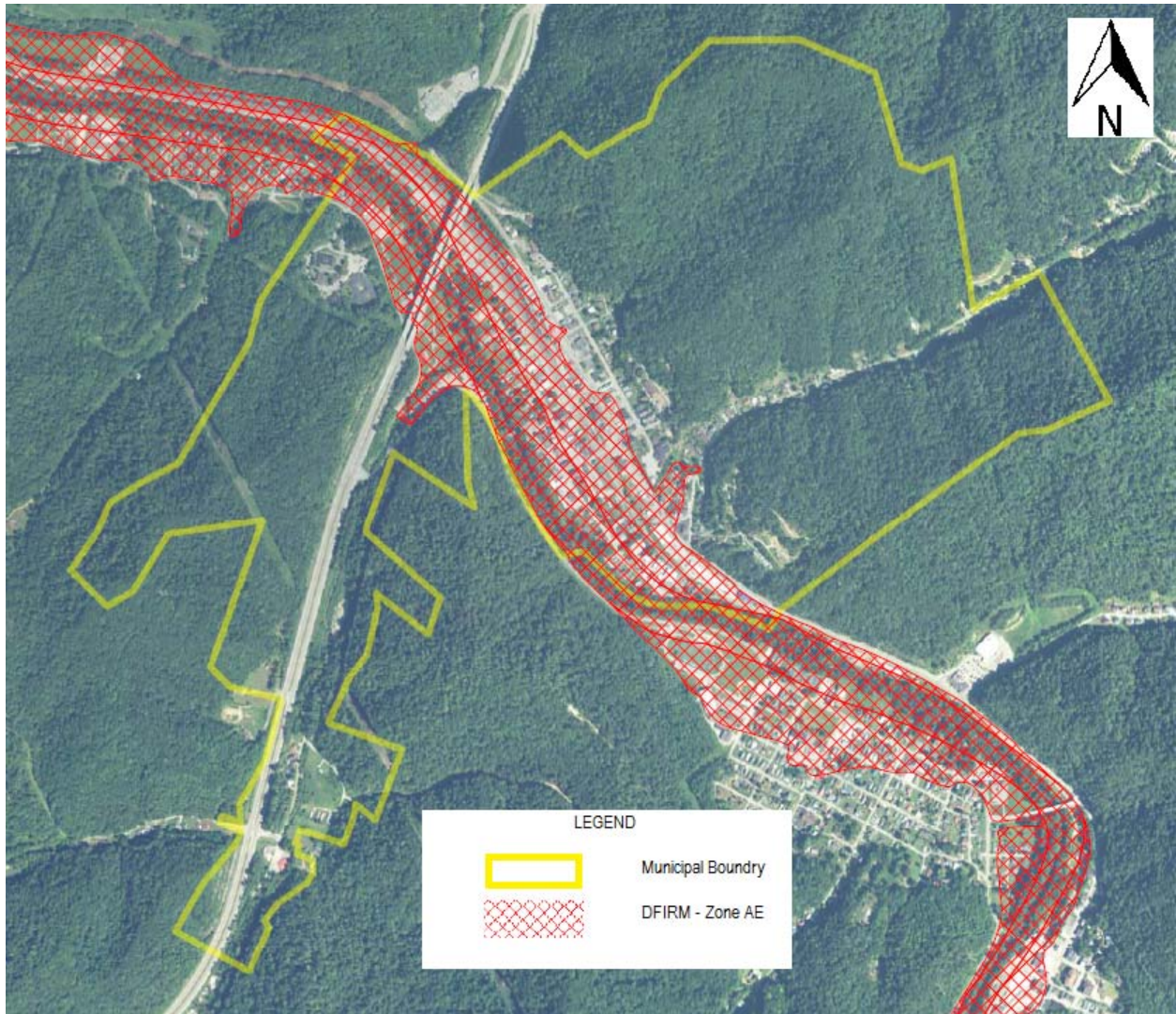
- NOAA National Climatic Data Center (NCDC)
- National Flood Insurance Program (NFIP)
- FEMA's HAZUS MH
- ESRI Data
- Ohio Emergency Management Agency (i.e., HAZUS Loss Estimation Workbook)
- Center For Disease Control and Prevention
- Federal Emergency Management Agency
- U.S. Fish & Wildlife Service, National Wetlands Inventory



**BOONE COUNTY**

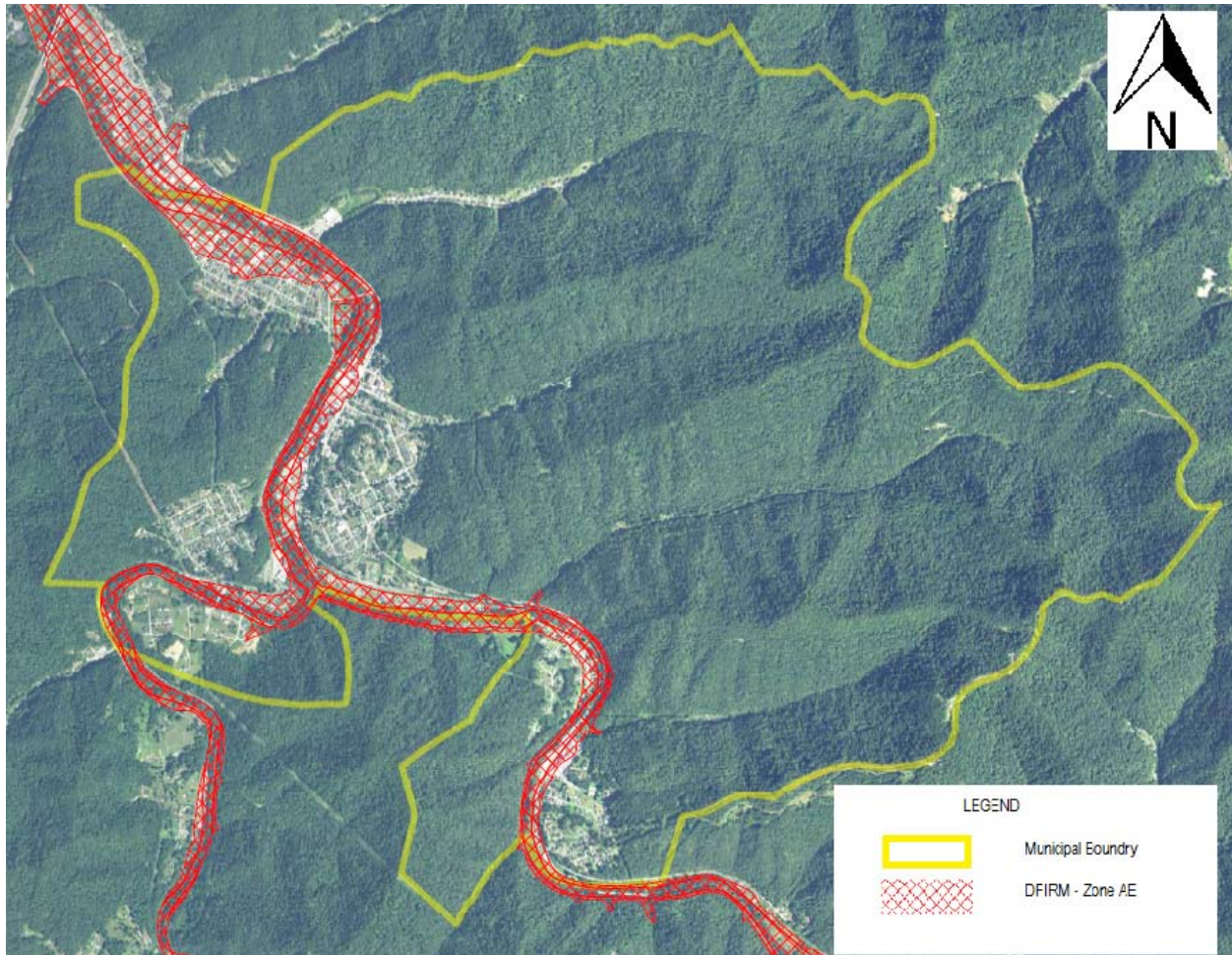


Danville

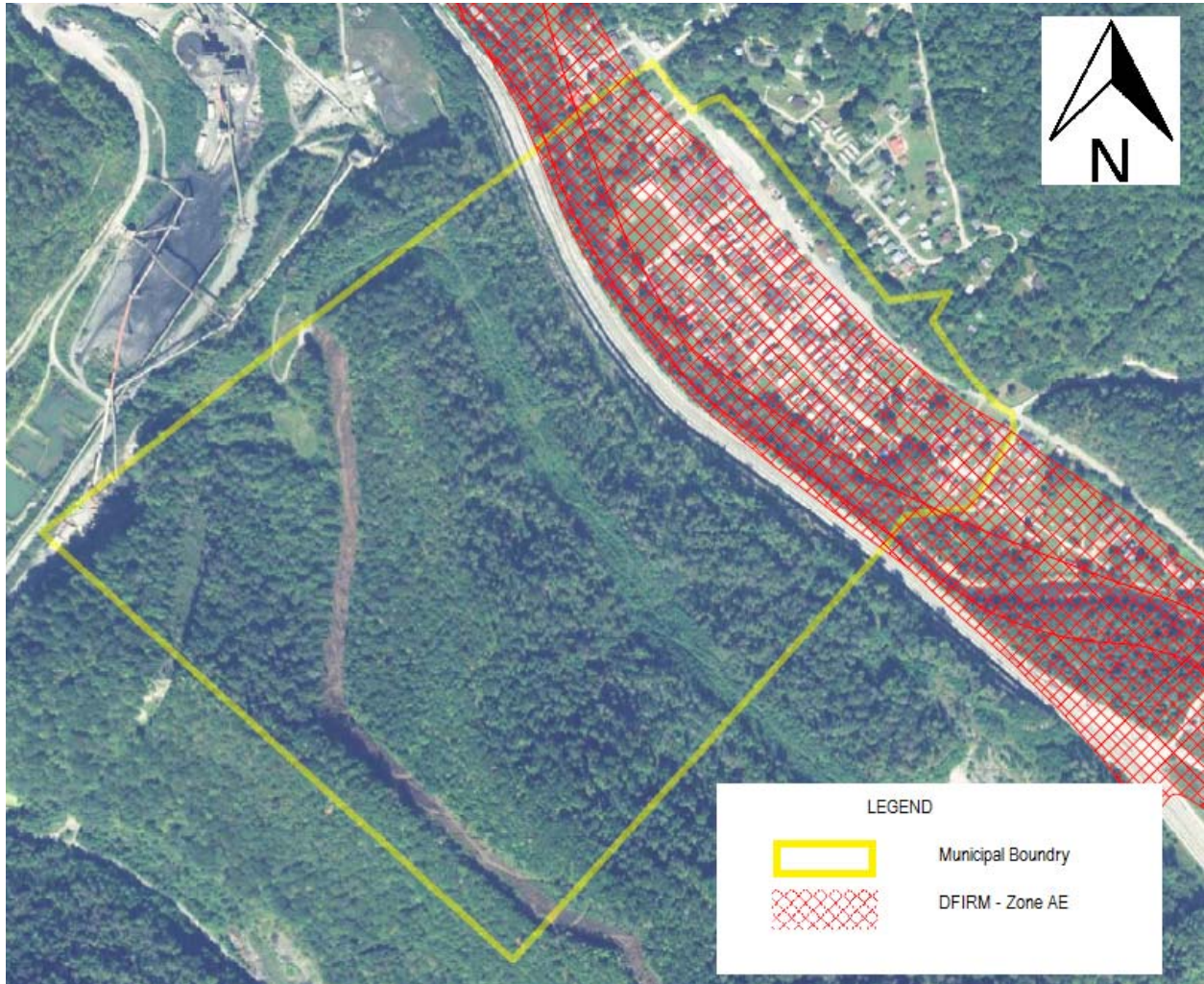




MADISON

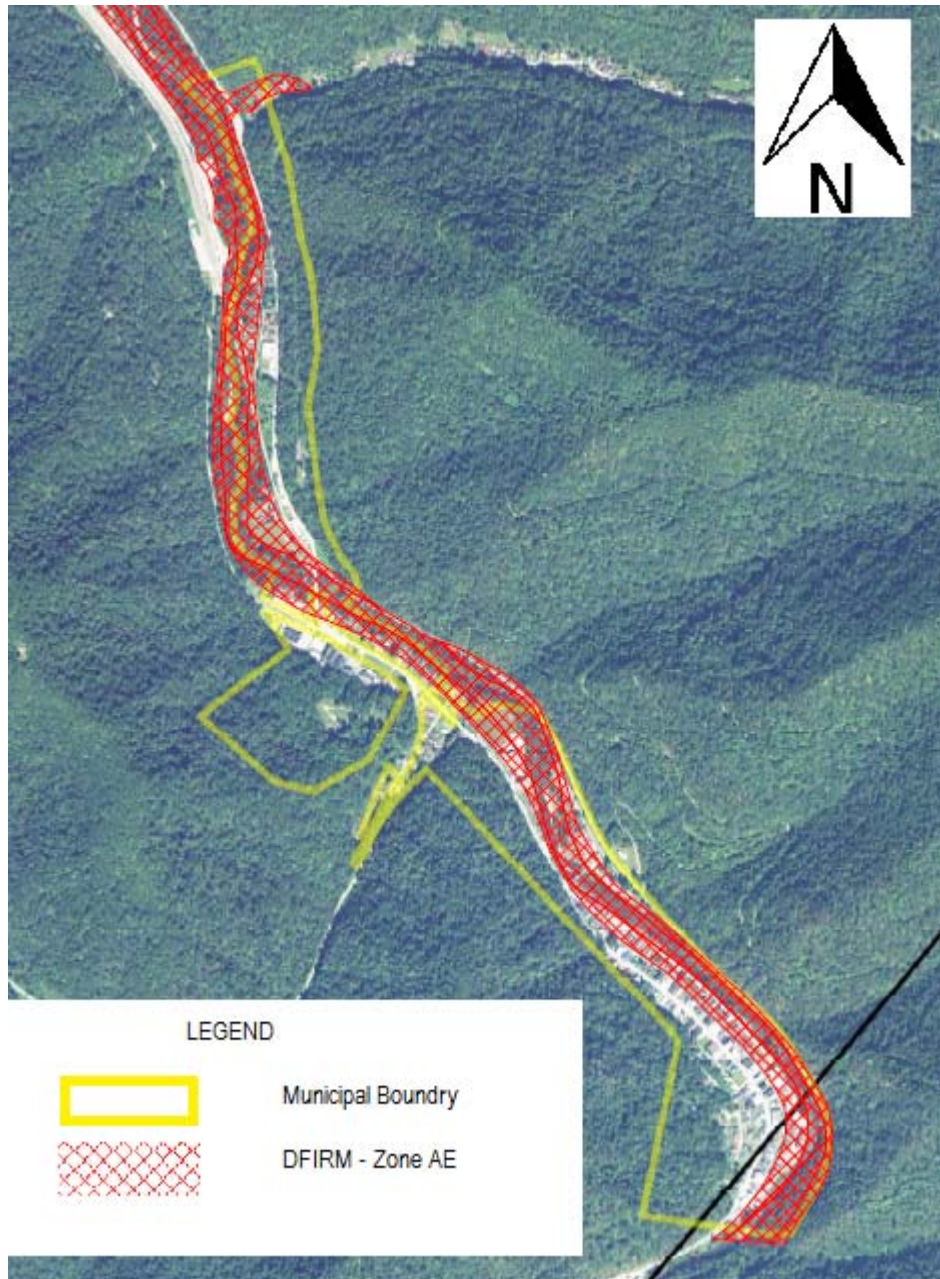


**SYLVESTER**

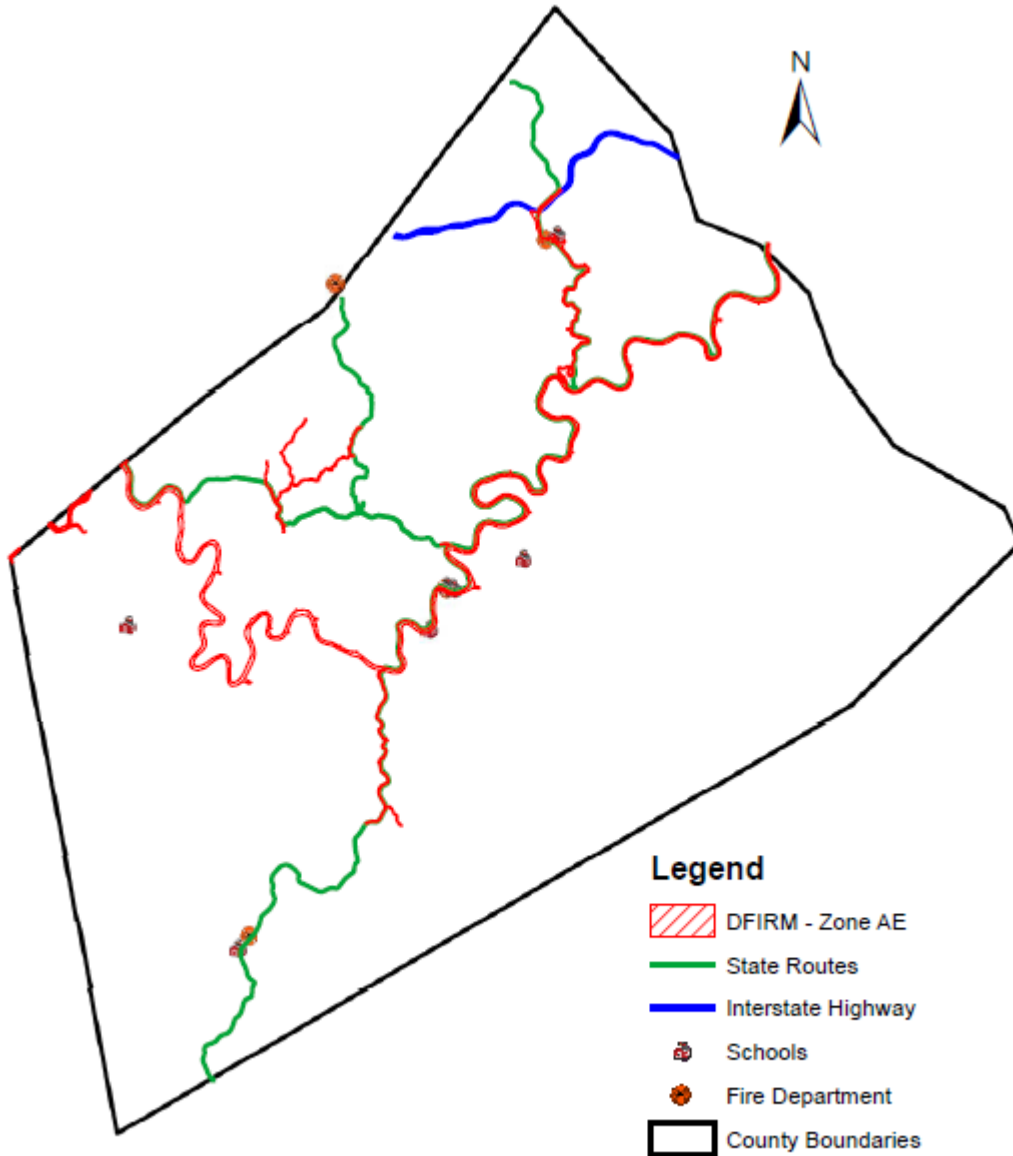




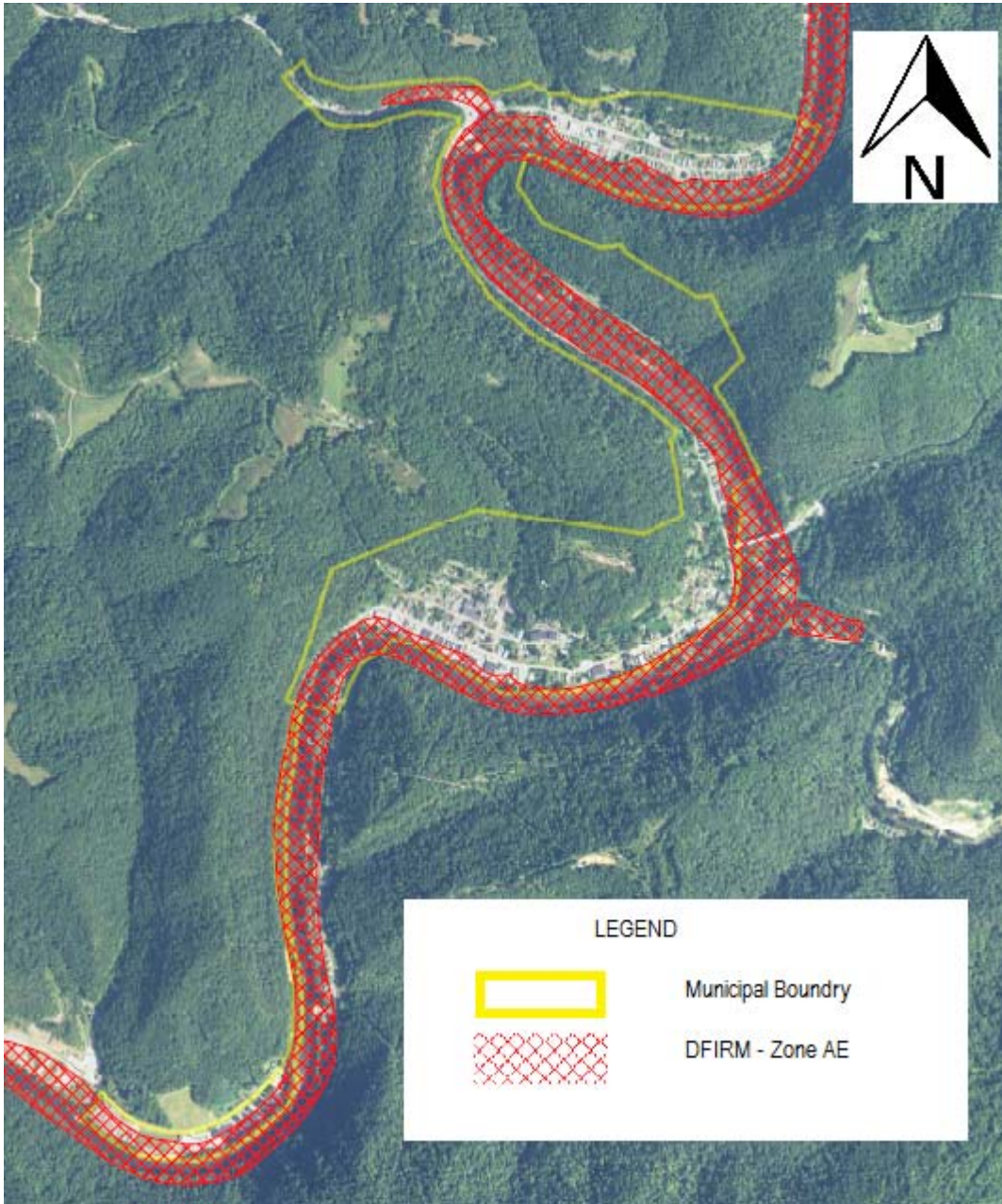
WHITESVILLE



CLAY COUNTY

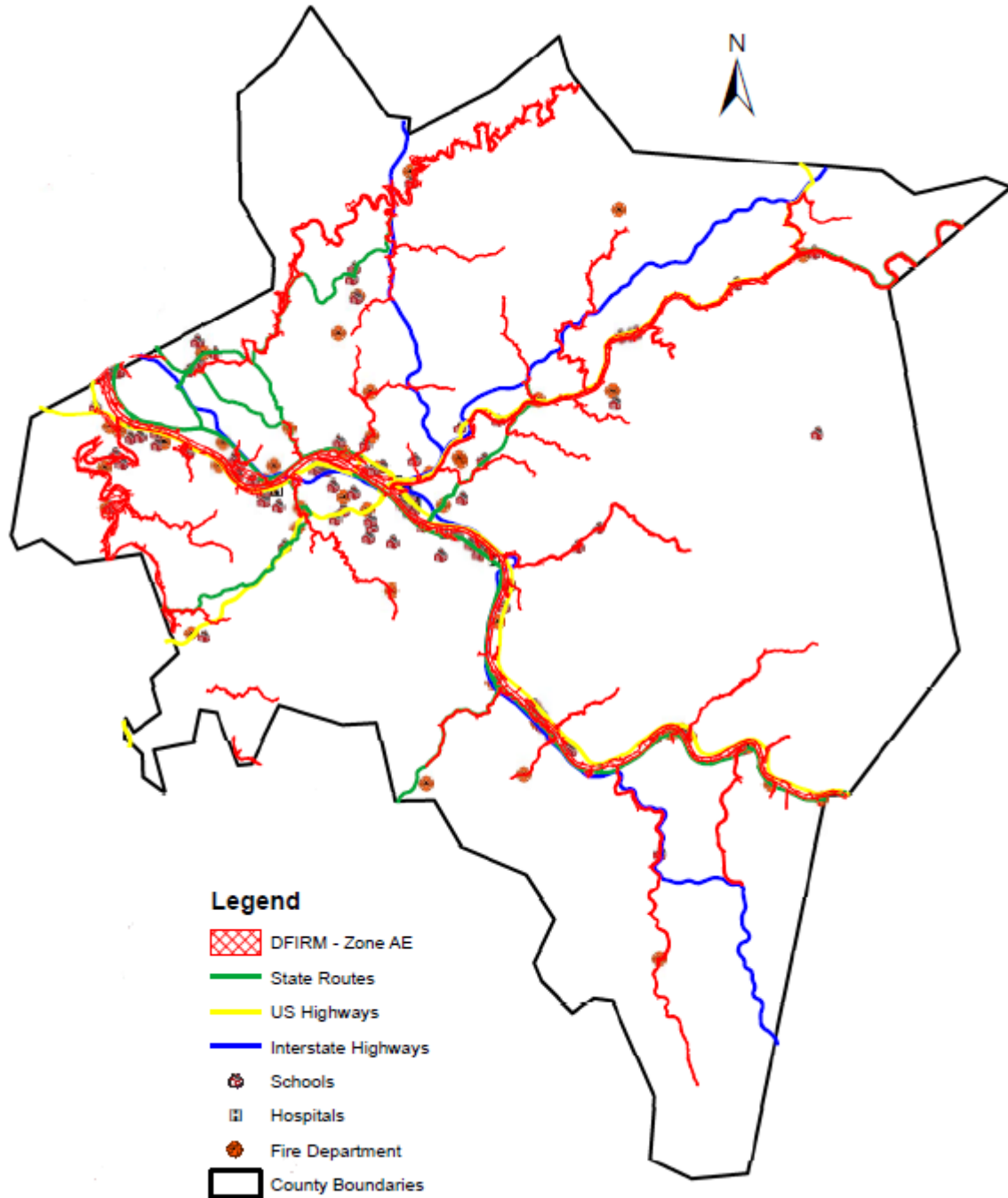


CLAY

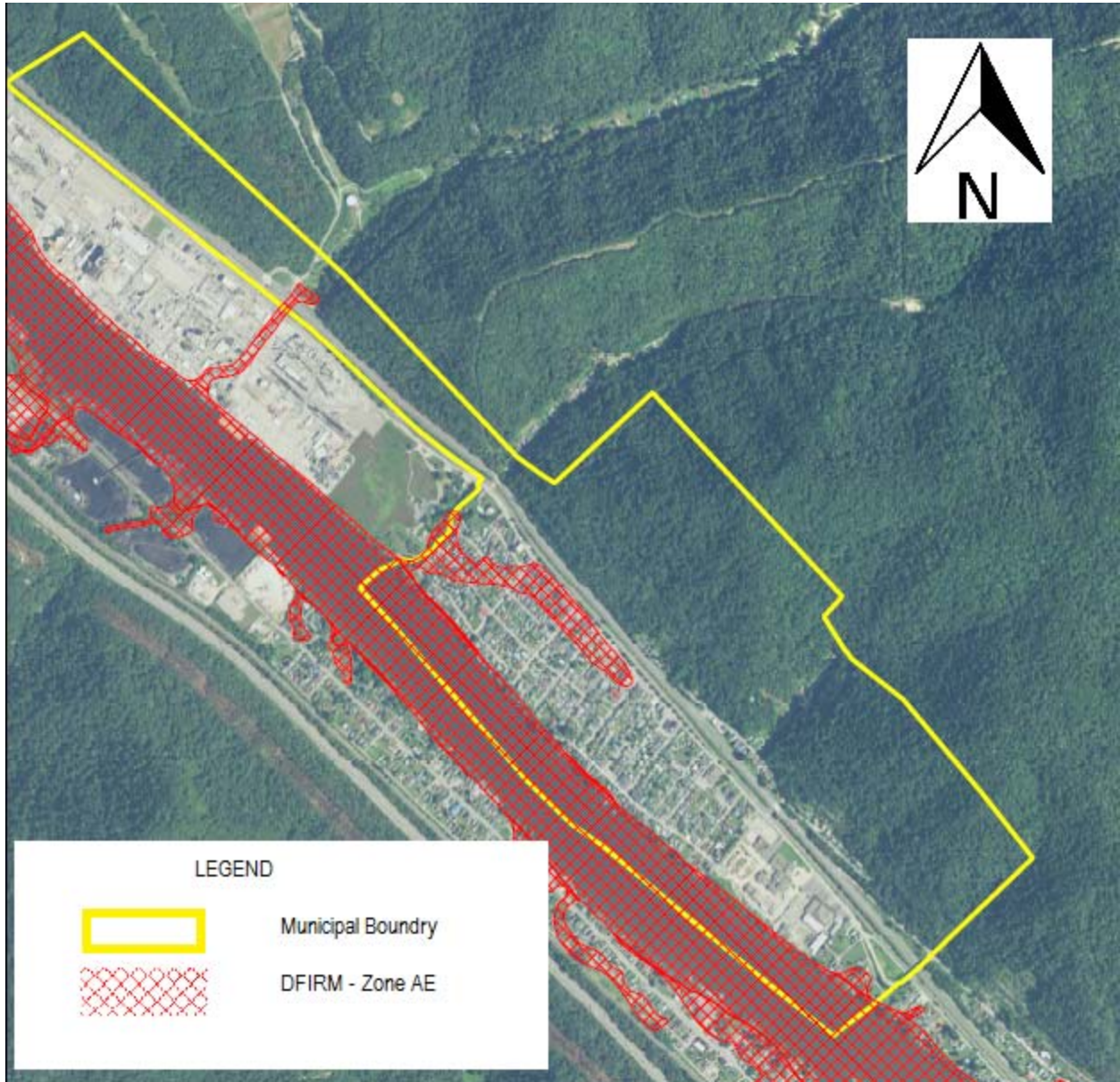




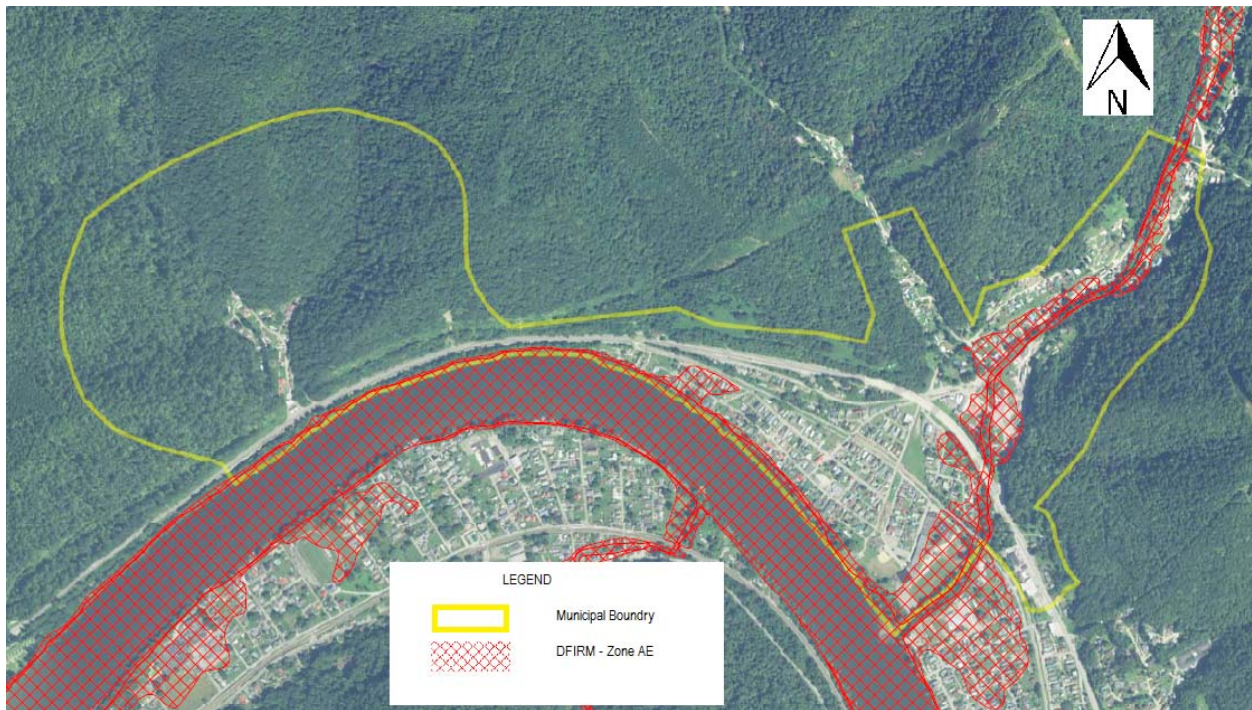
KANAWHA COUNTY



**BELLE**

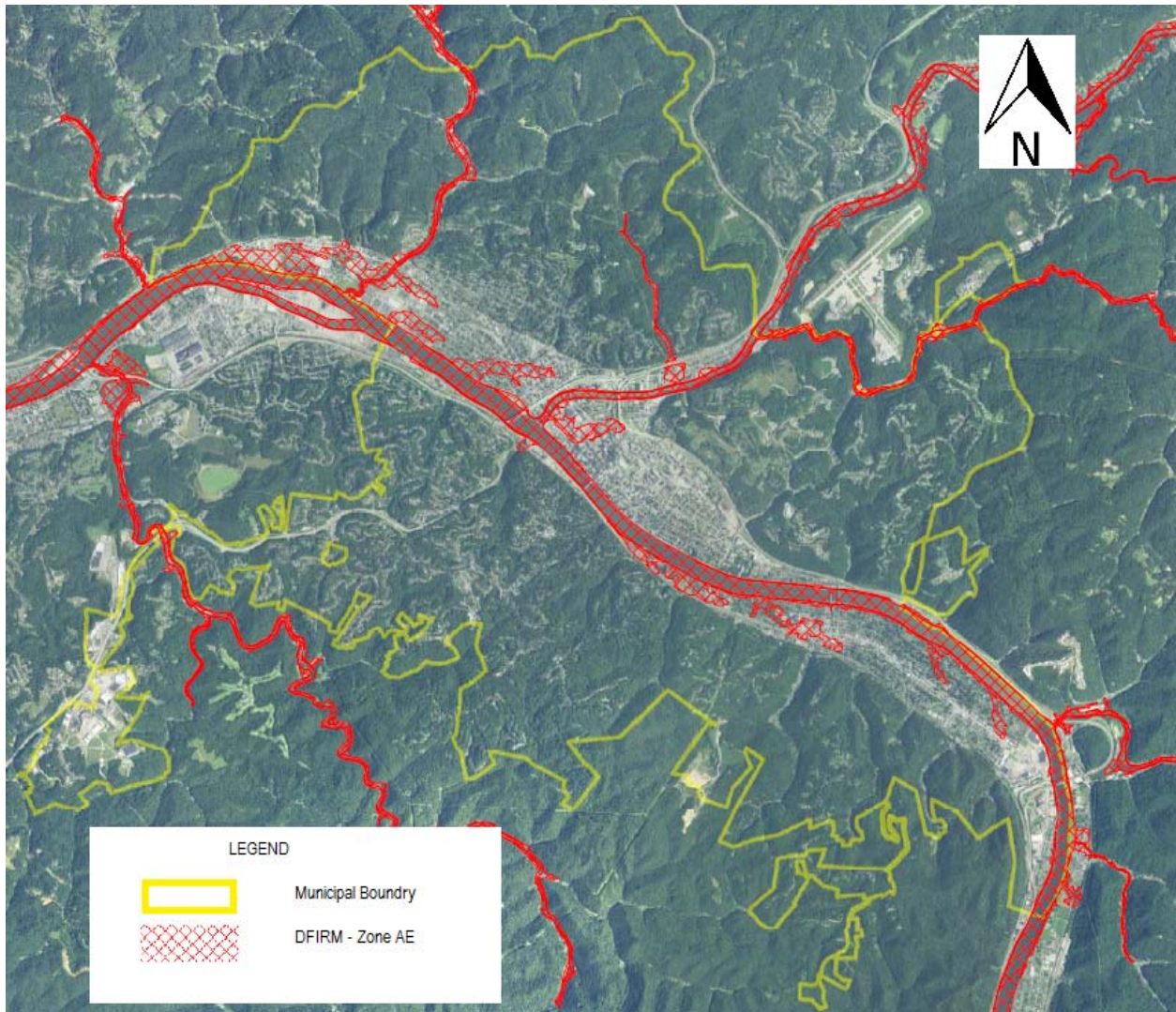


**CEDAR GROVE**



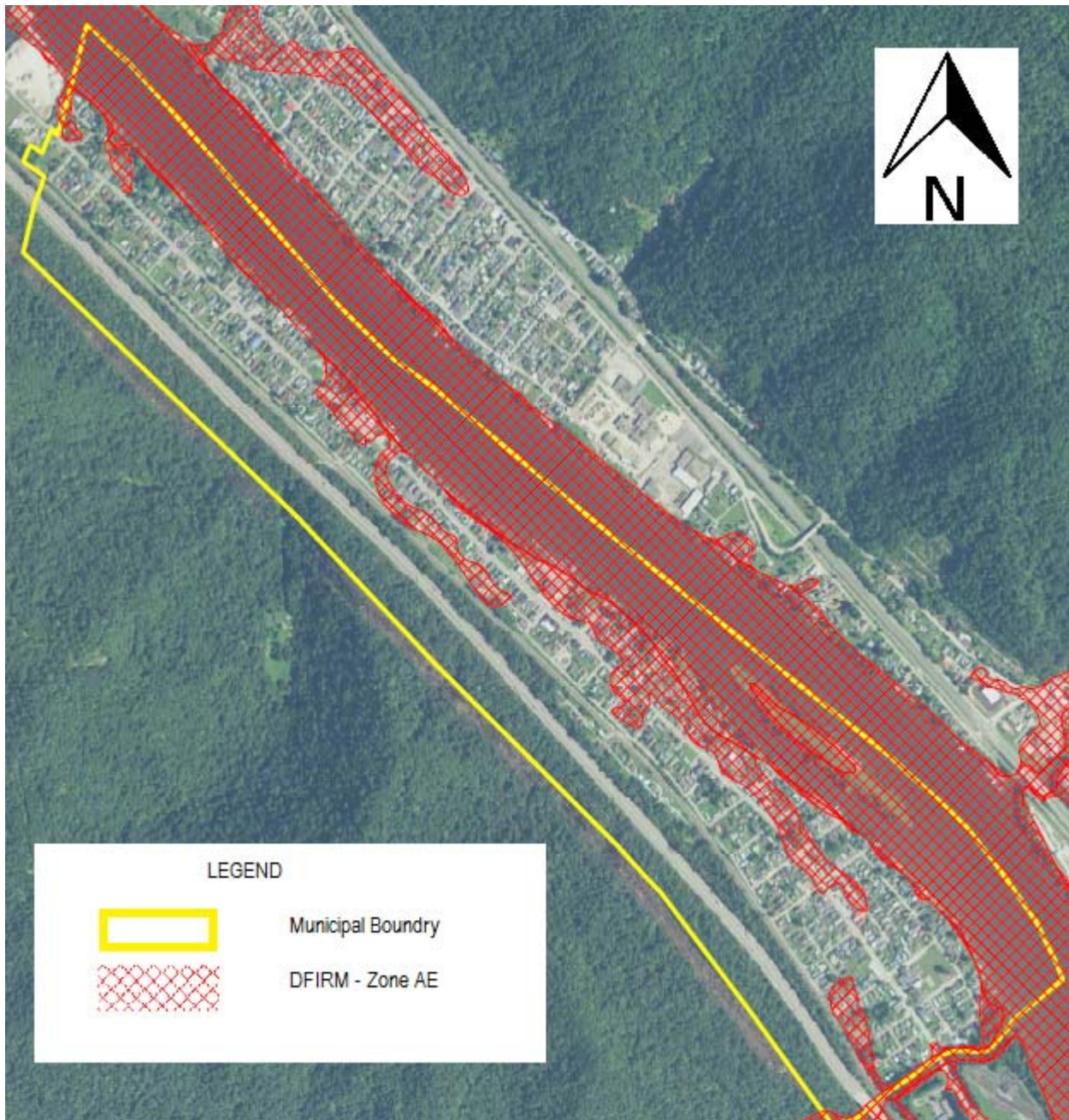


CHARLESTON

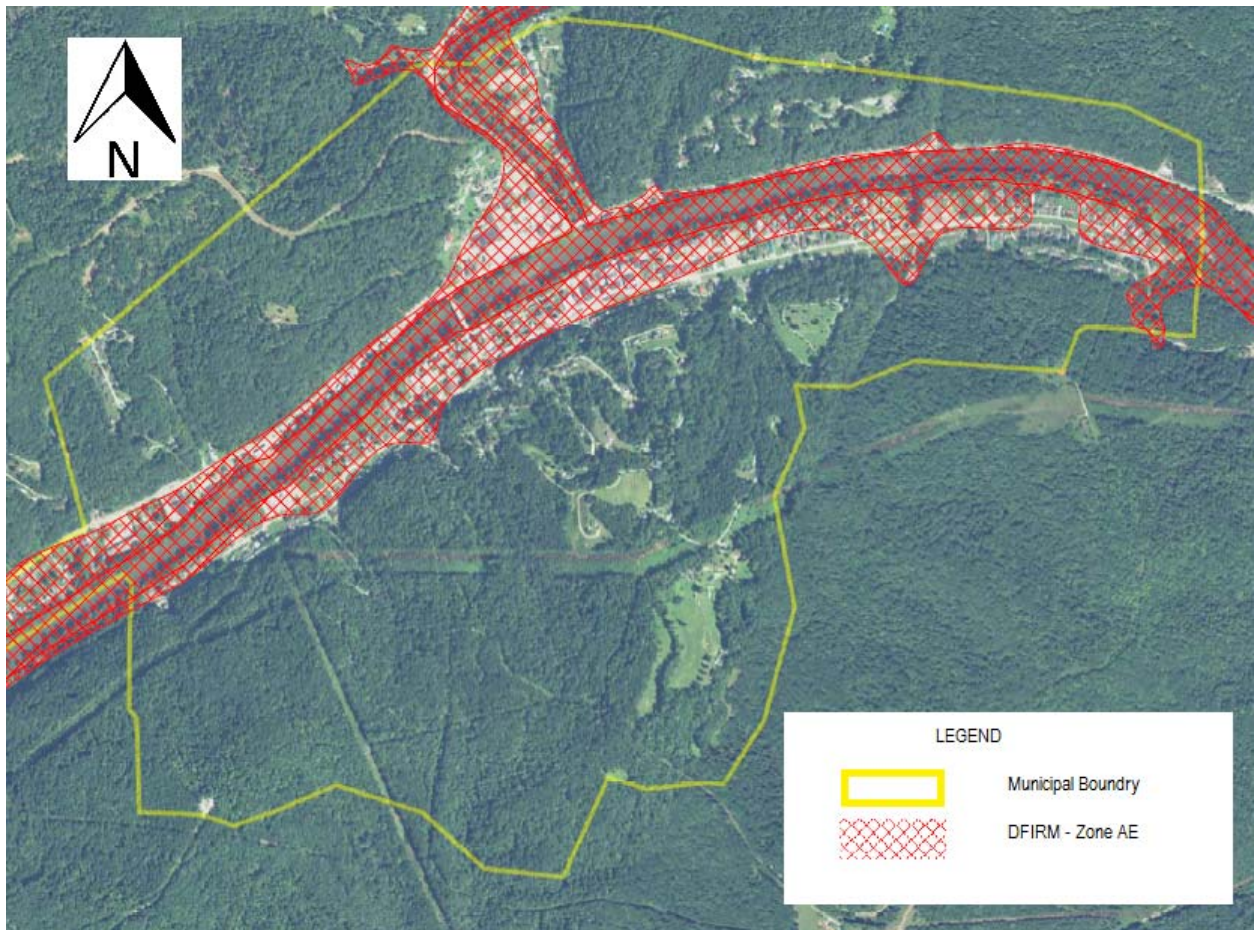




CHESAPEAKE

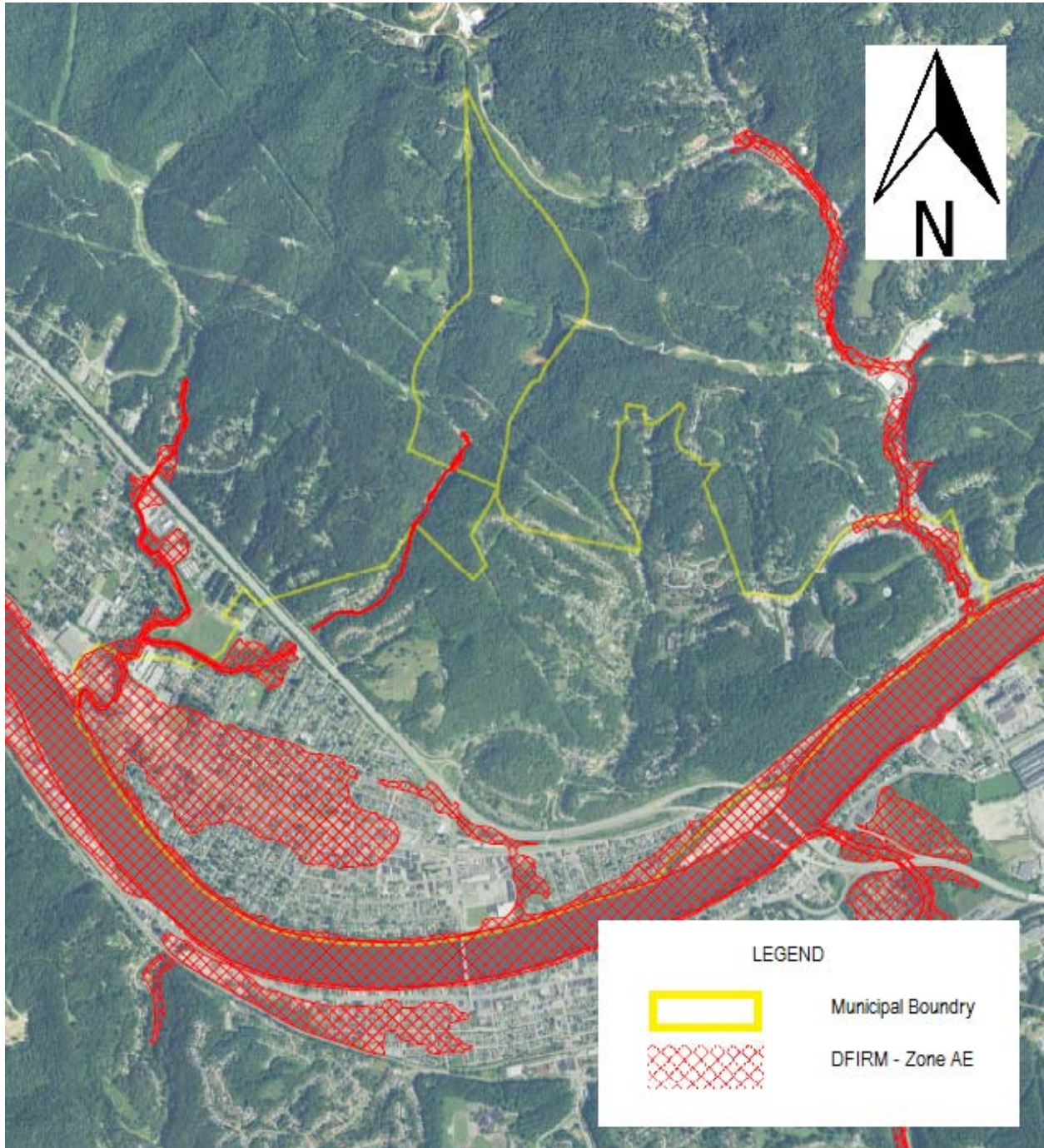


CLENDENIN

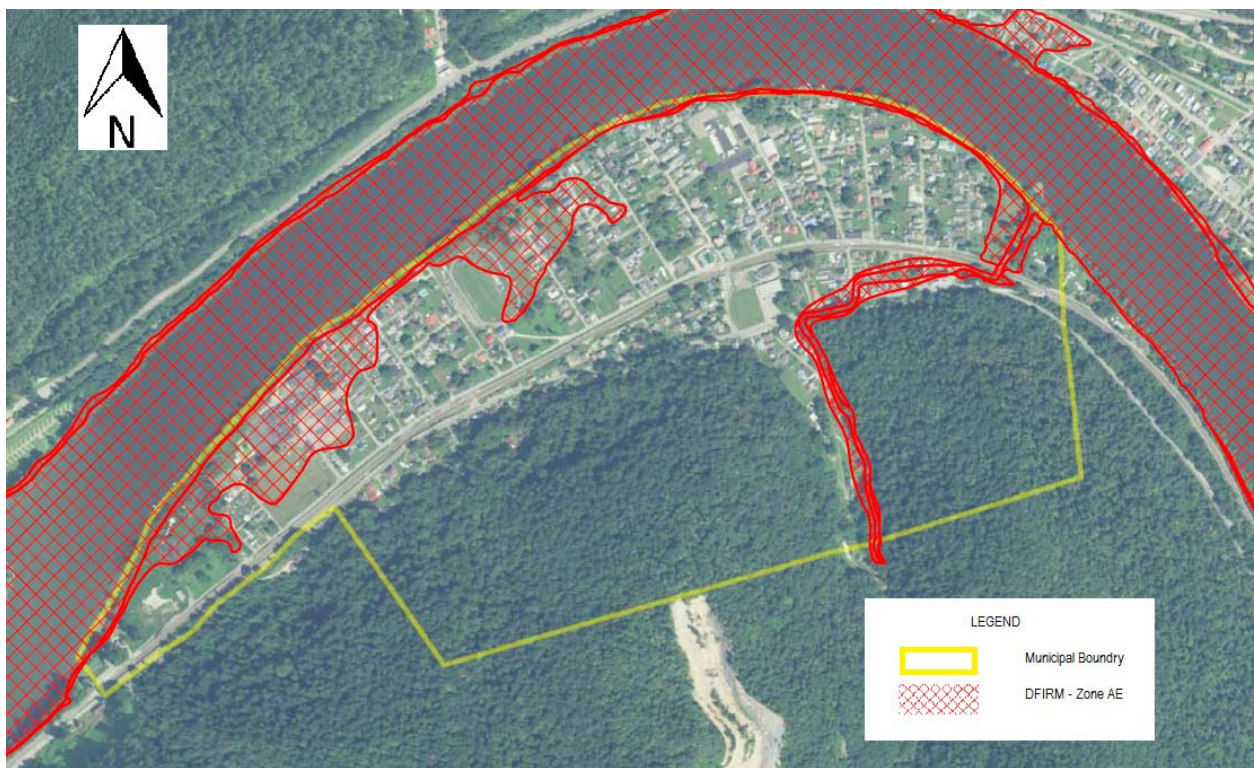




DUNBAR

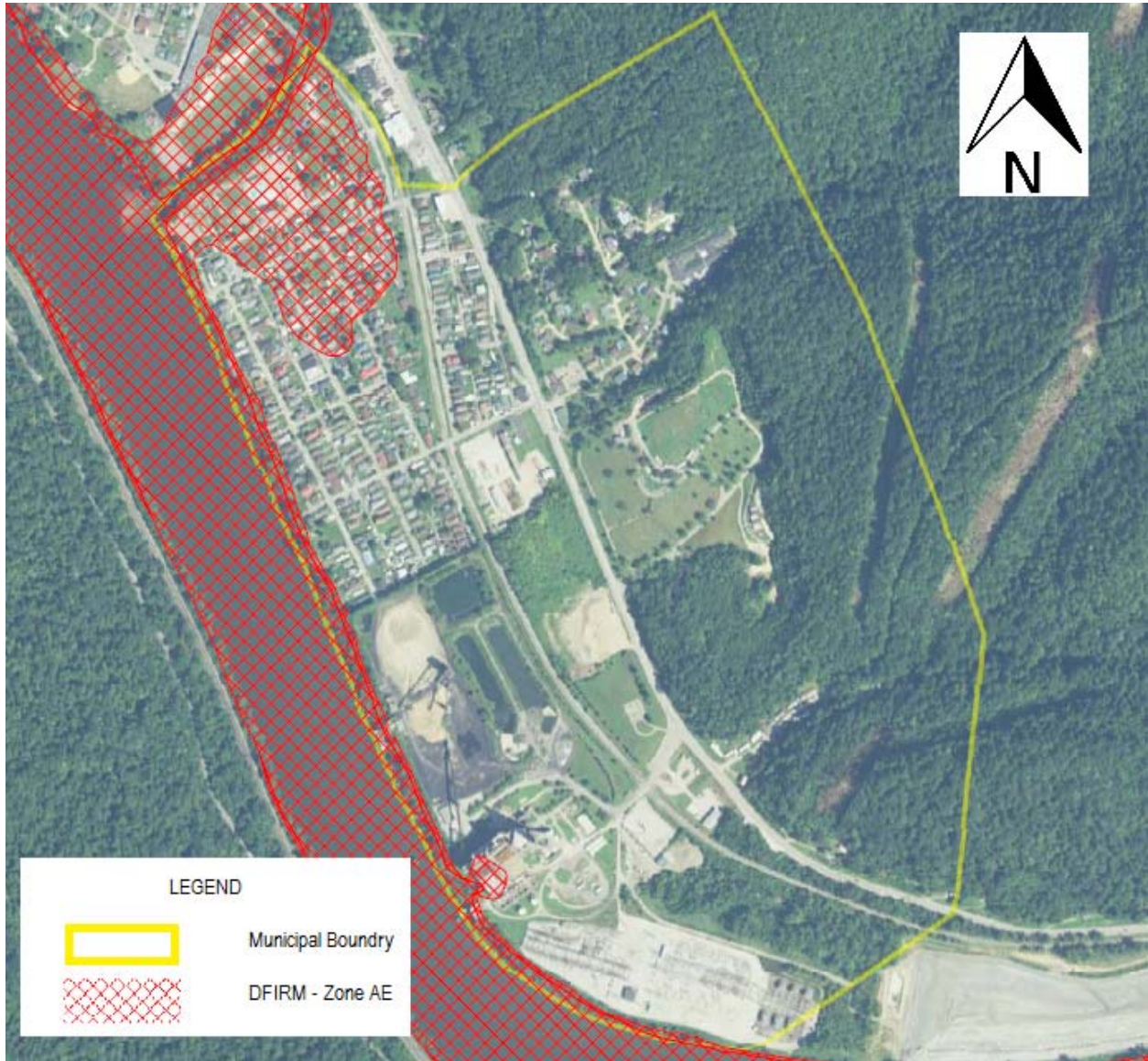


EAST BANK



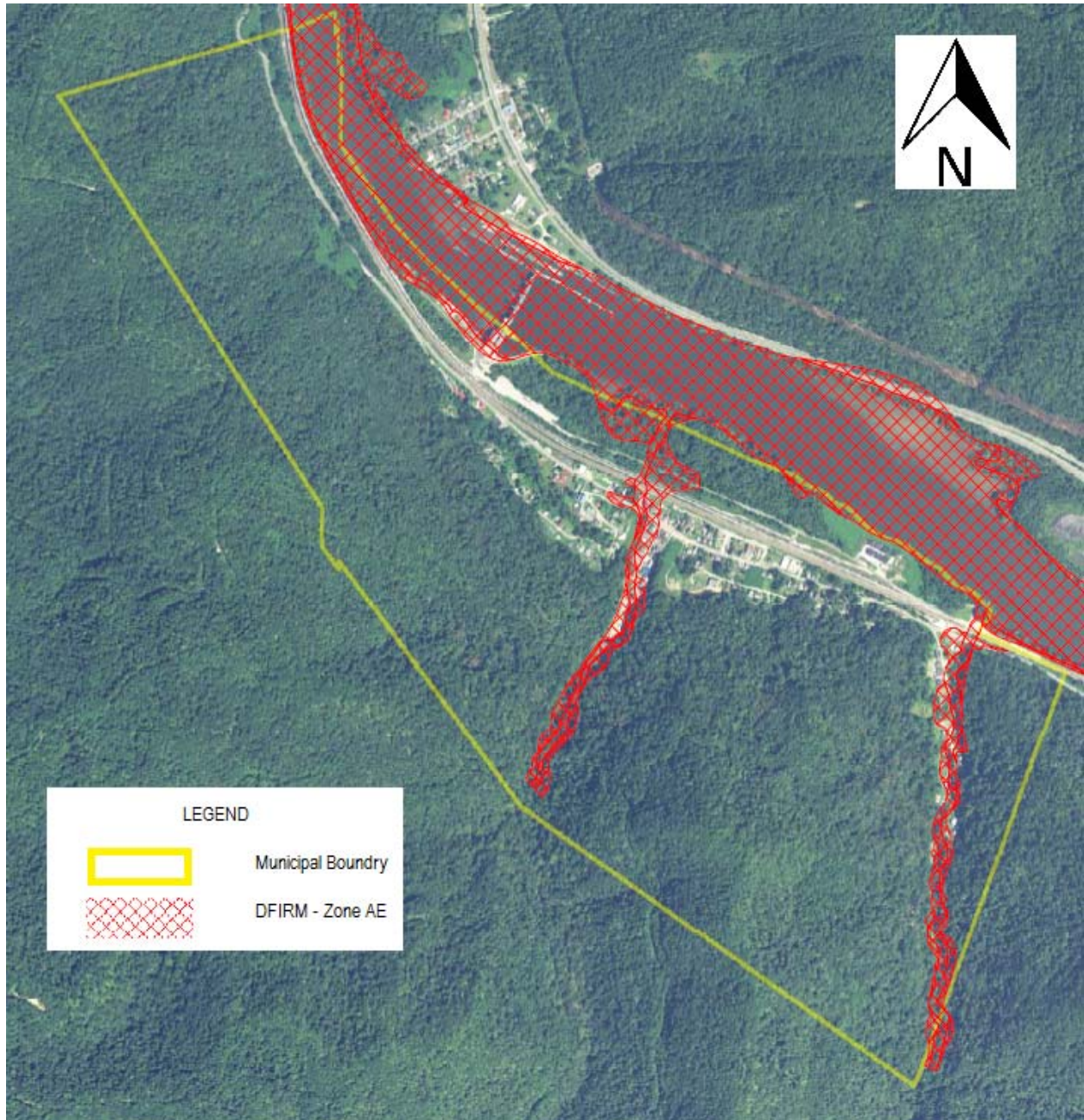


GLASGOW



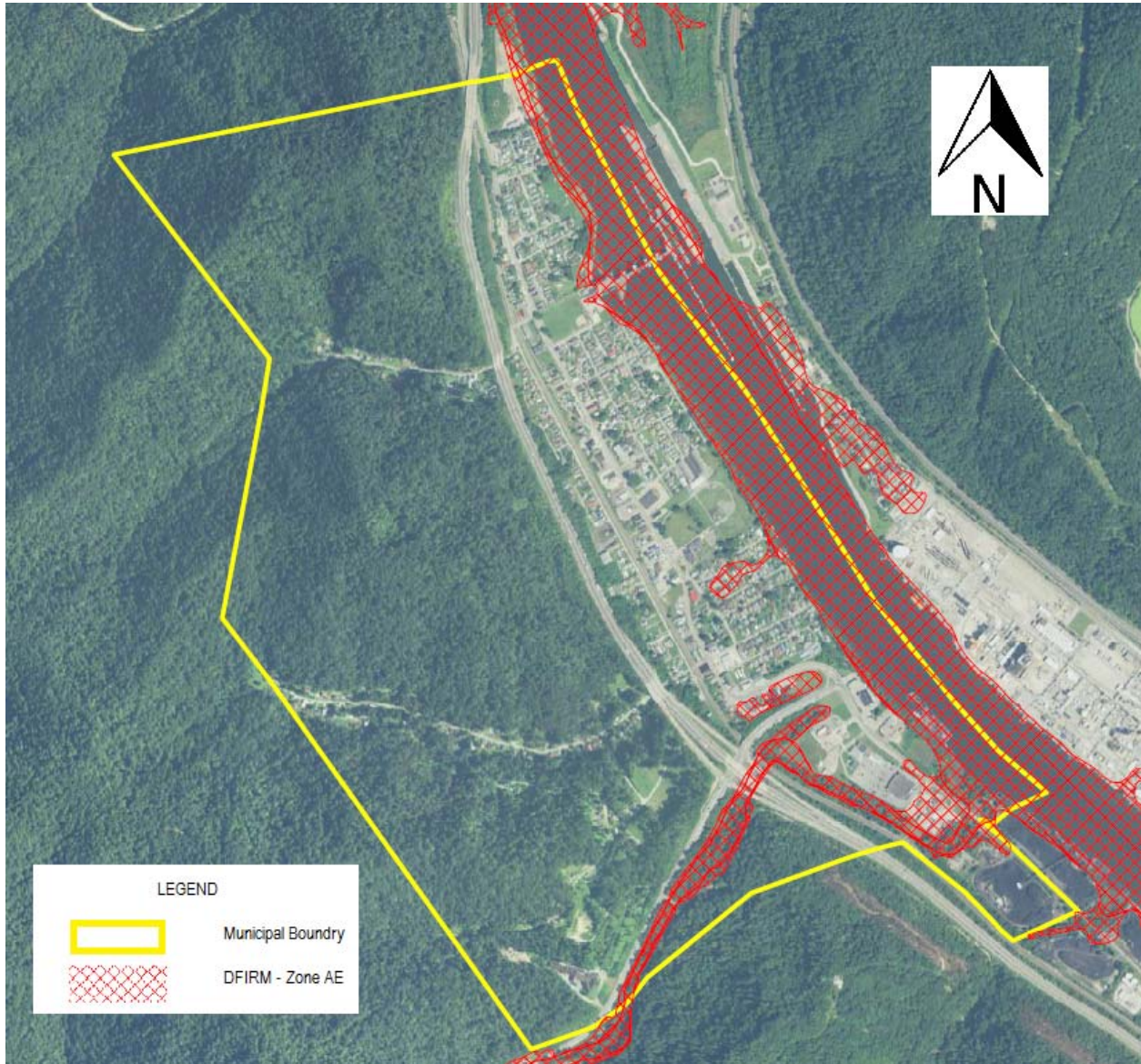


HANDLEY



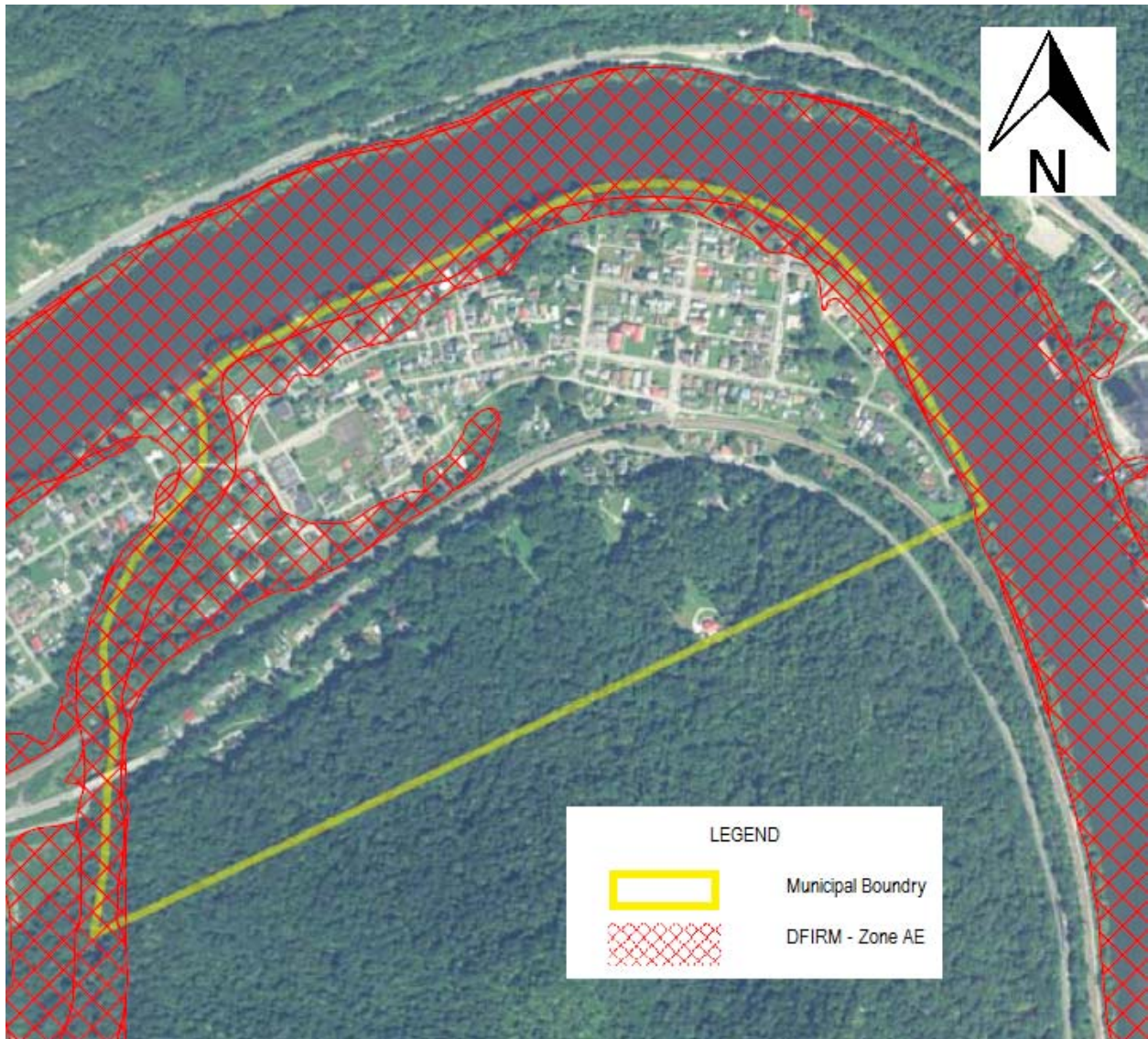


MARMET

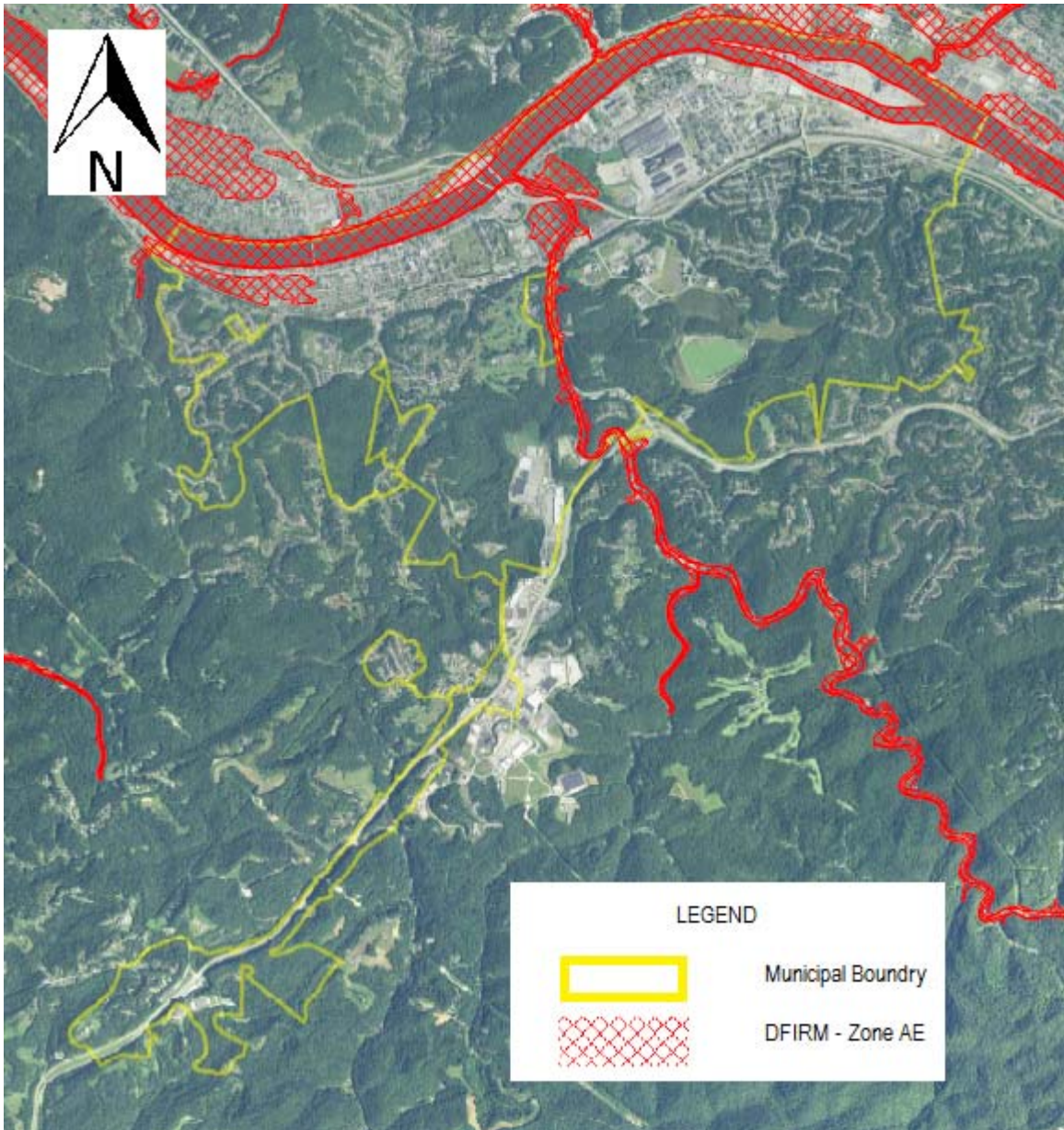




PRATT

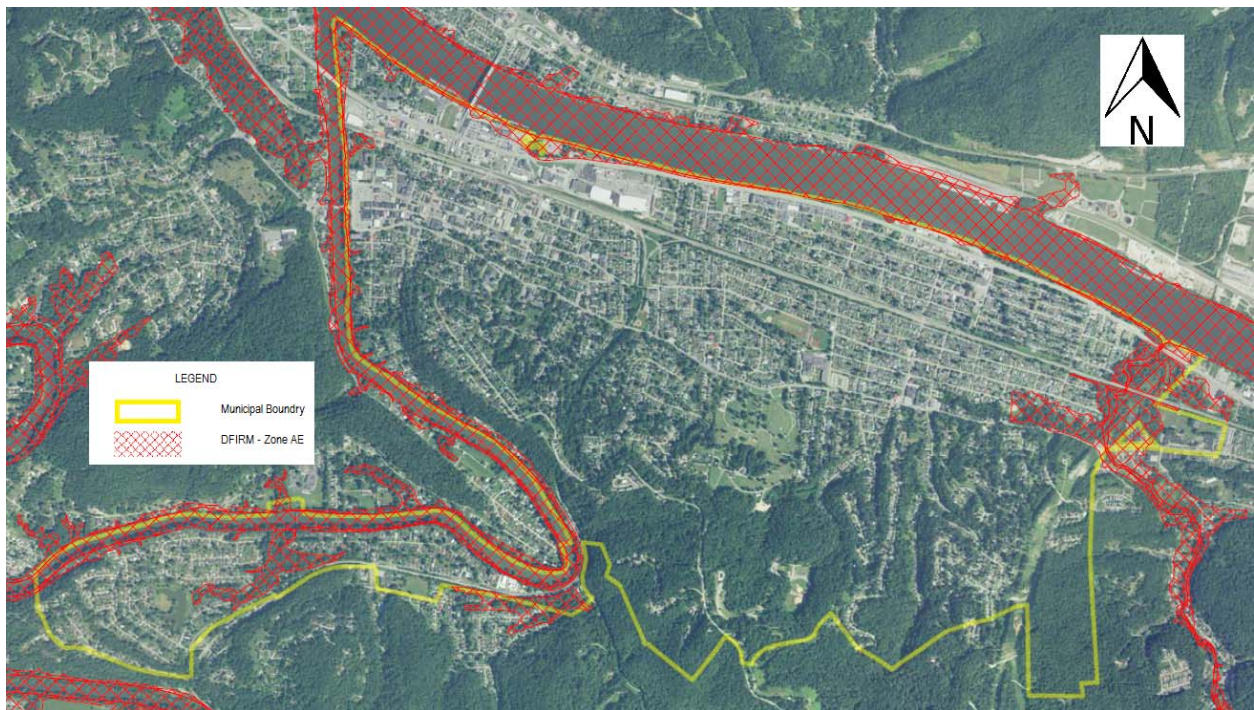


SOUTH CHARLESTON

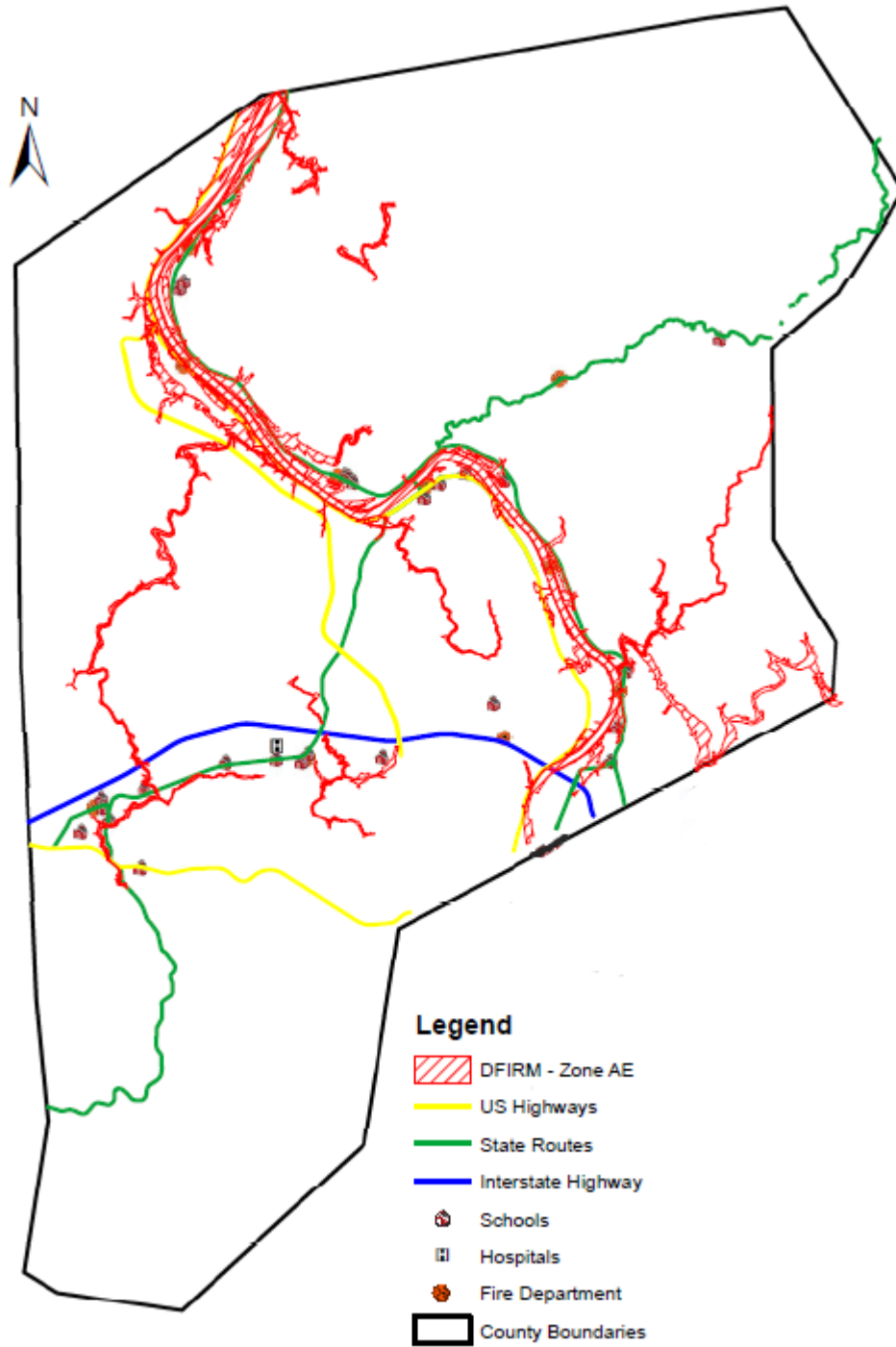




**ST. ALBANS**

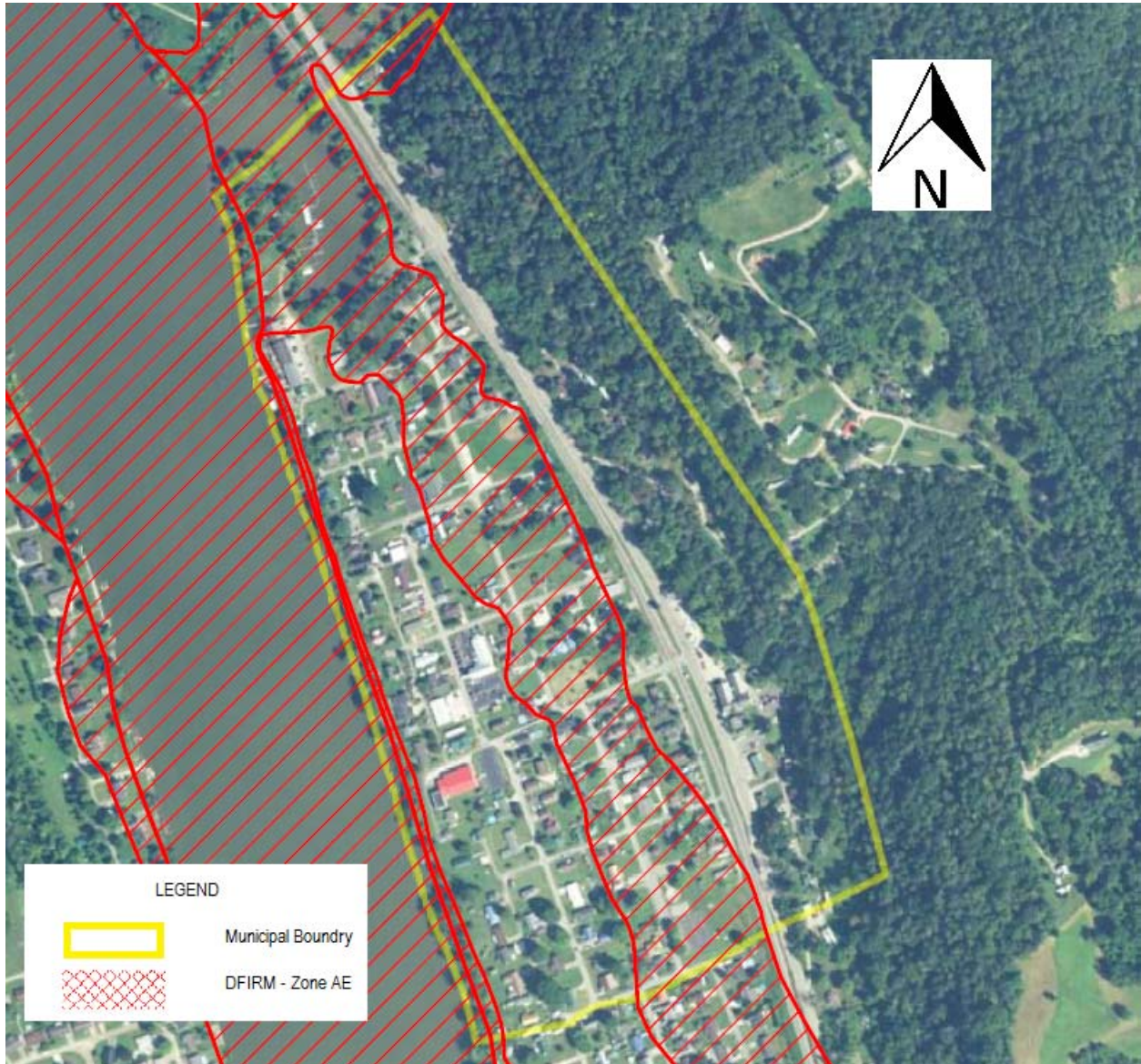


PUTNAM COUNTY



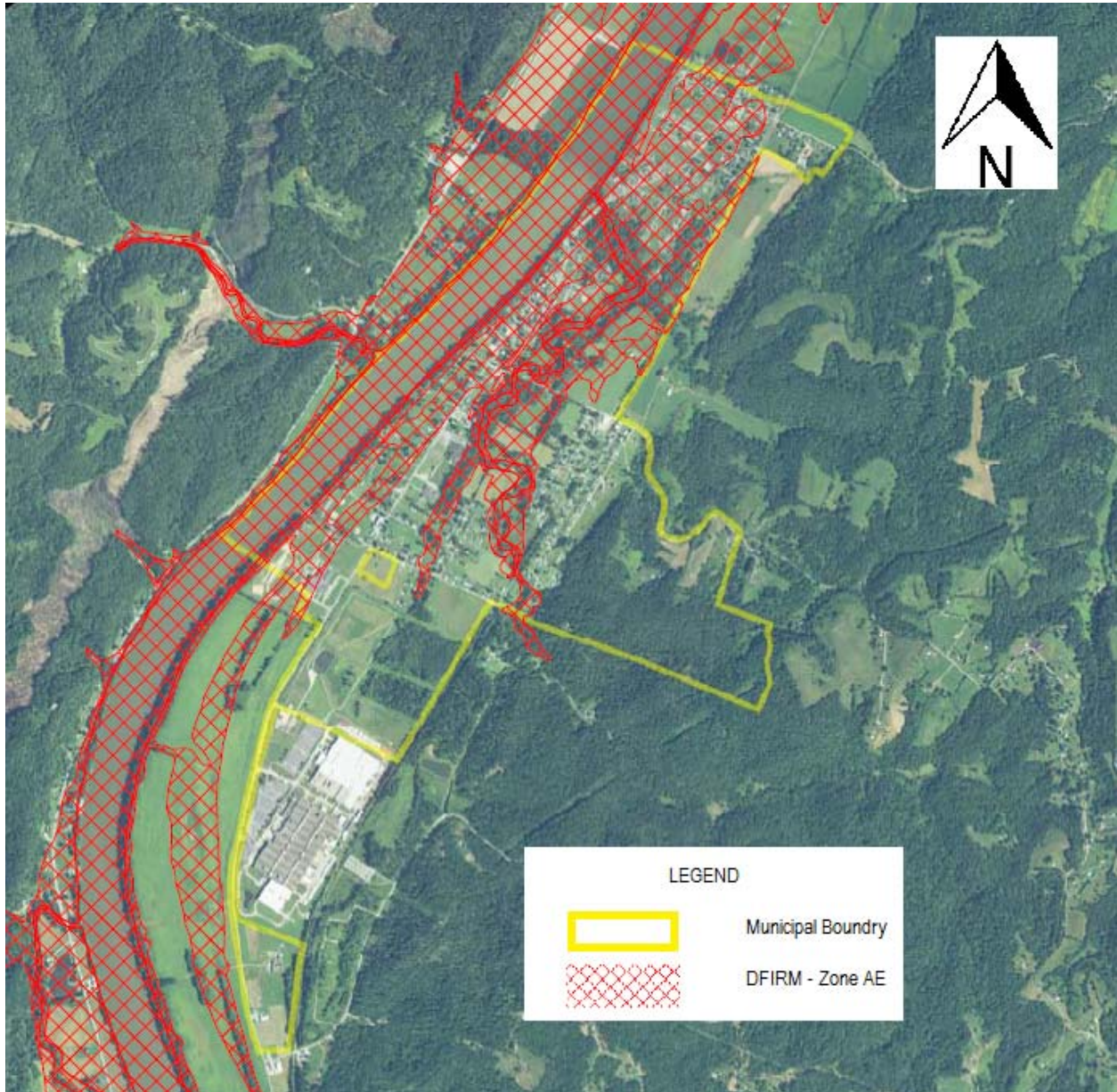


**BANCROFT**



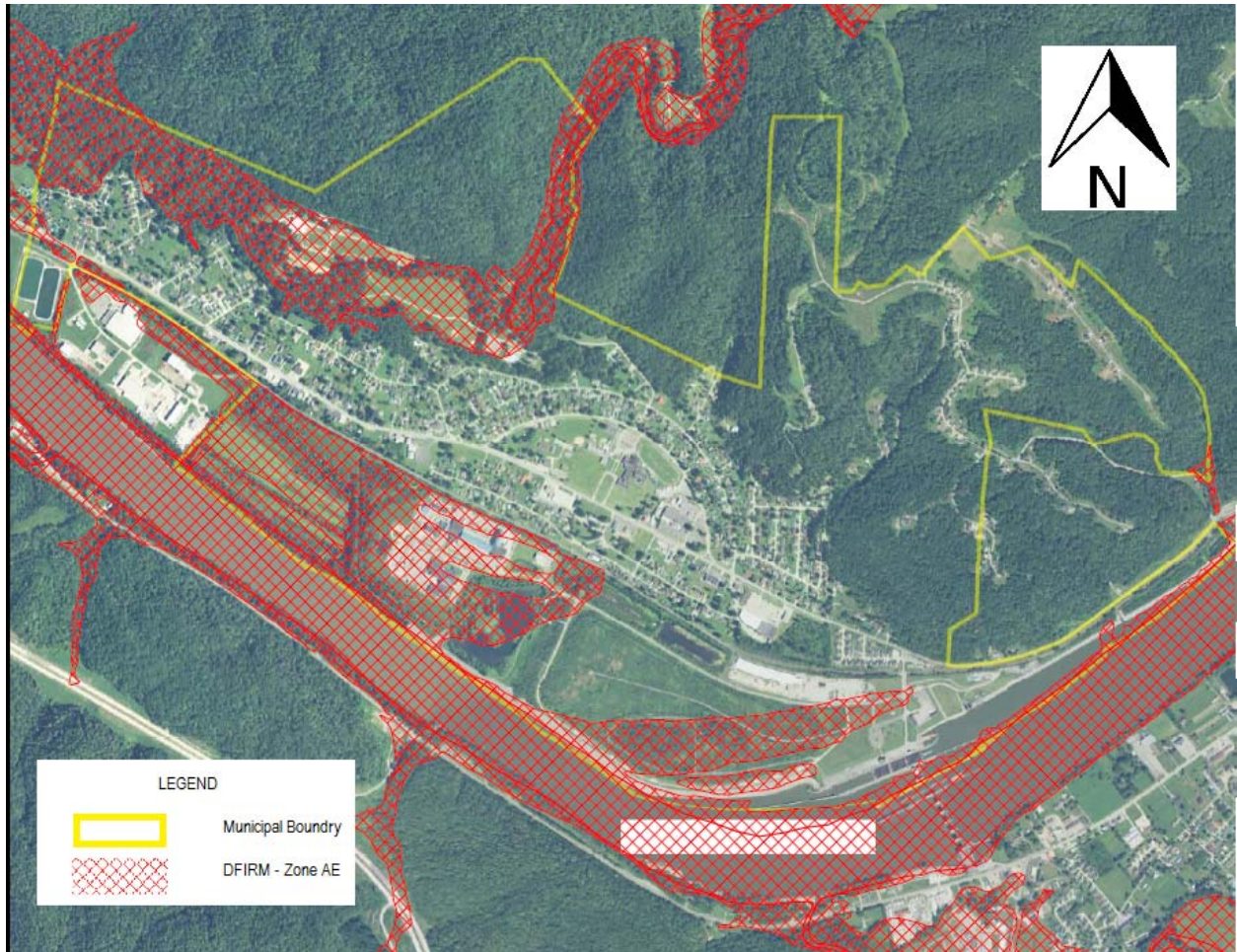


**BUFFALO**



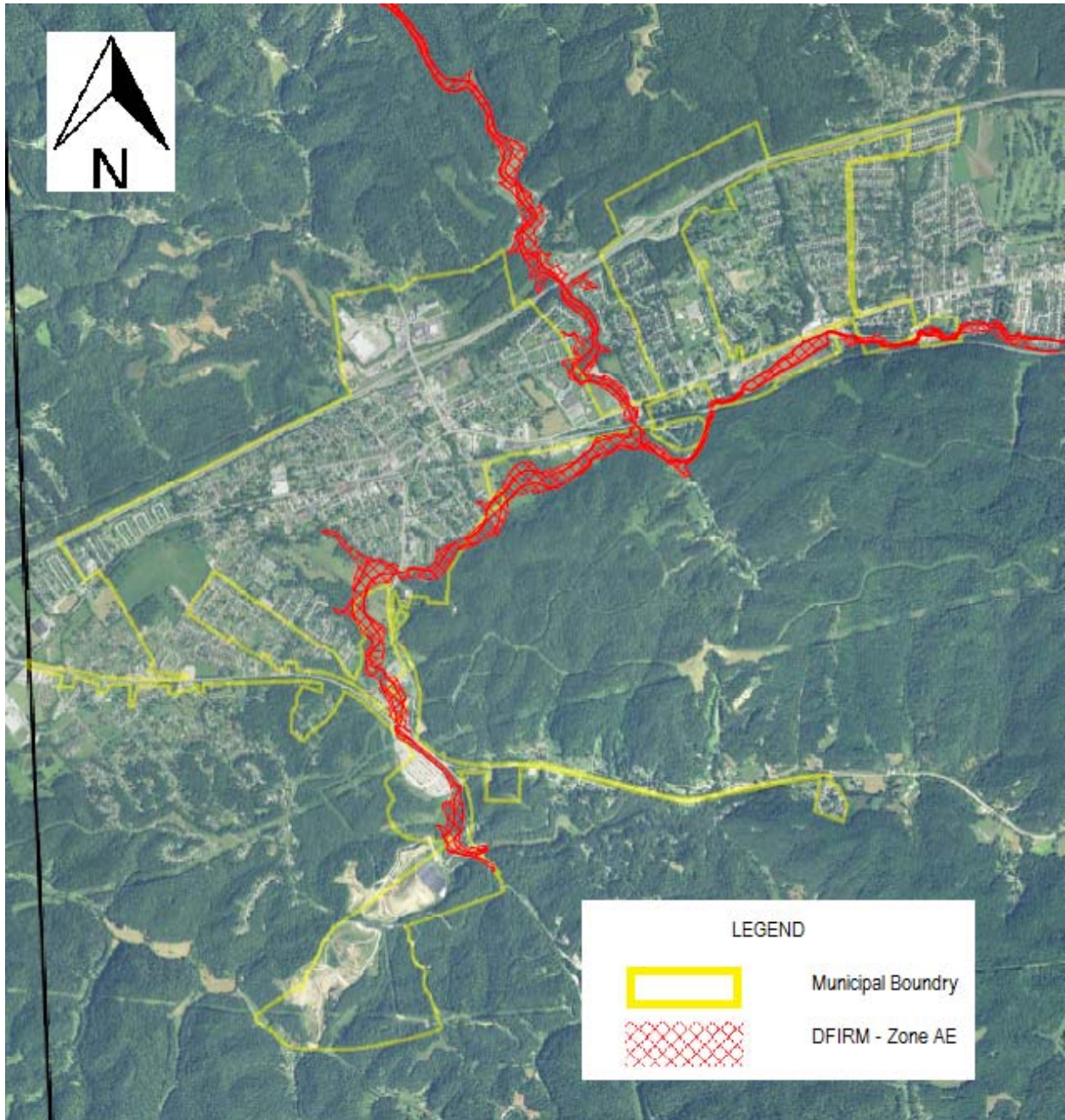


ELEANOR



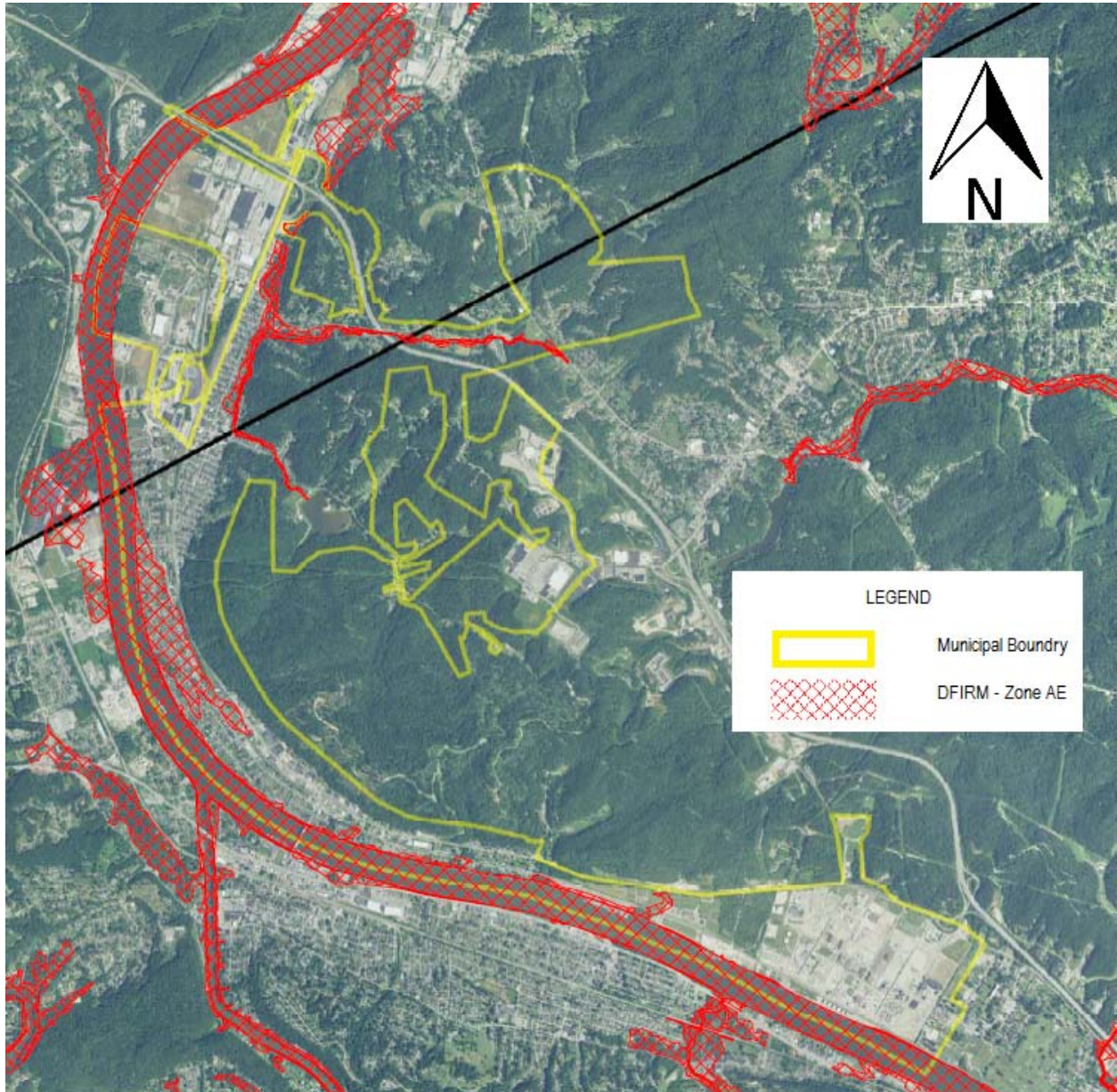


HURRICANE

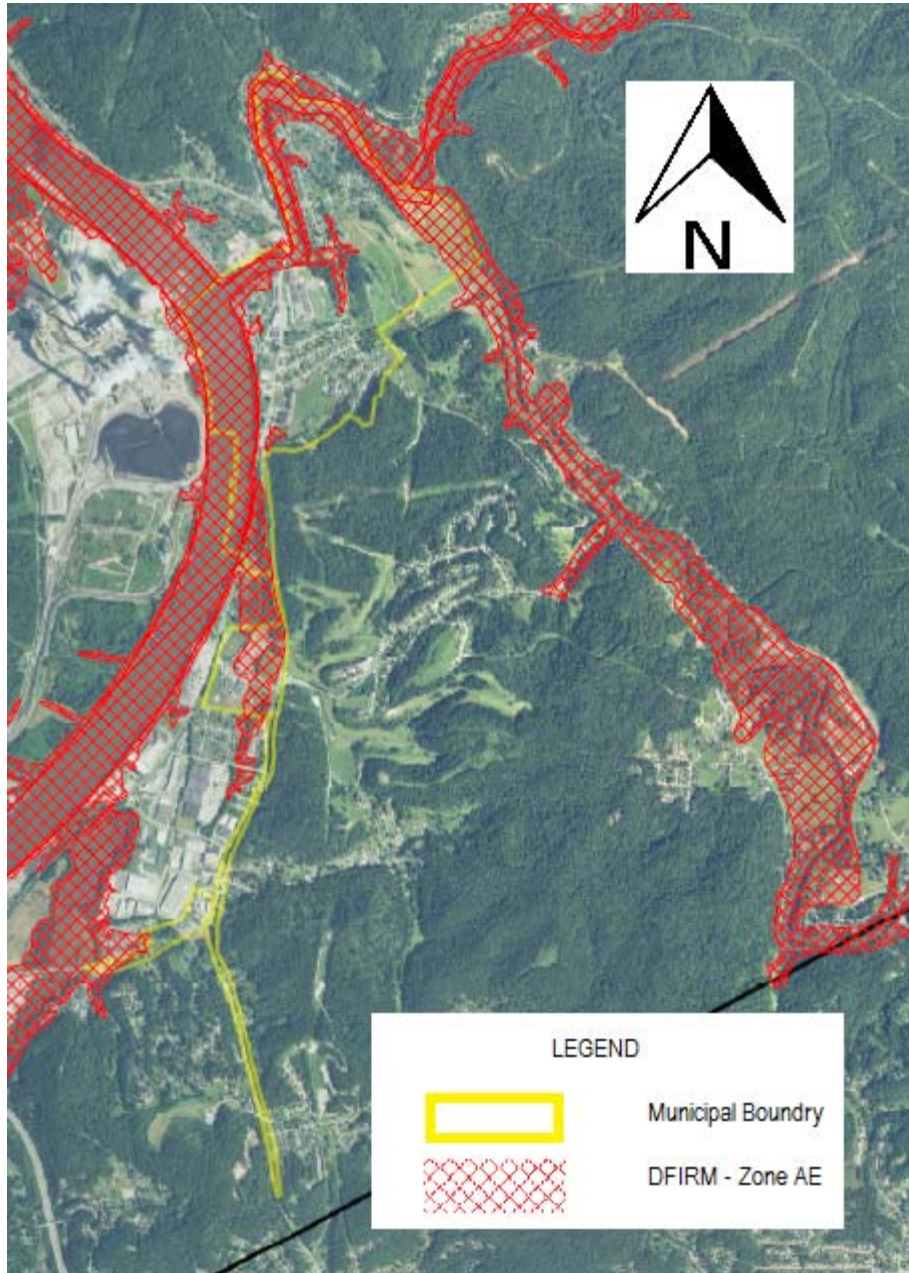




NITRO

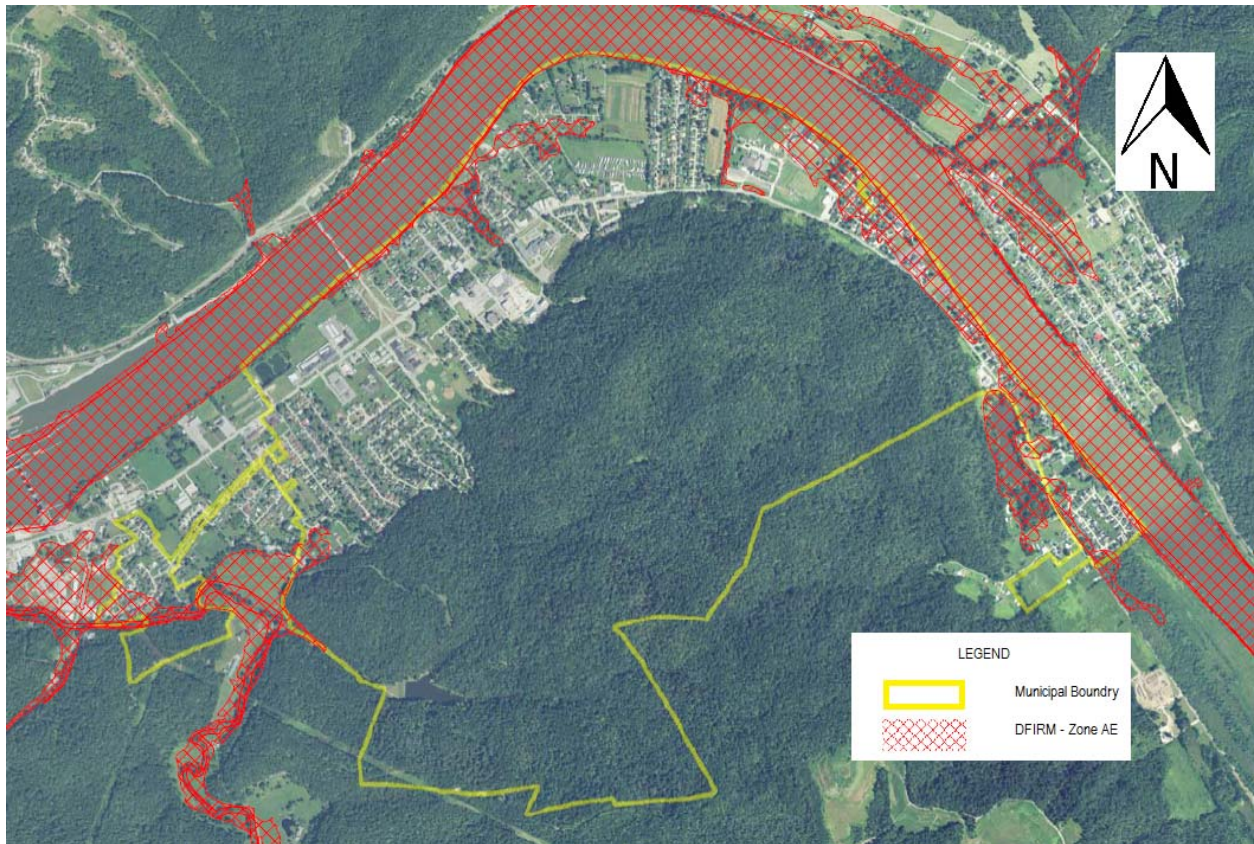


POCA





**WINFIELD**



## HAZARDOUS MATERIALS

<i>Hazardous Materials Snapshot</i>	
"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.)	
Period of Occurrence	Can occur at any time
Number of Events (2010-2015)	360
Probability of Event In Any Given Year	60 per year
Warning time	None
Potential Impacts	Potential loss of life, economic loss, and environmental damage.
Cause Injury or Death	Potential for injury and multiple deaths
Potential Facility Shutdown	Days to weeks
Extent	Region wide, with increased risk in Kanawha and Putnam counties
Loss Estimate	\$78,696/year

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 Citizen 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 response plans in place.

The Pipeline and Hazardous Materials Safety Administration (PHMSA), a division of the U.S. Department of Transportation, tracks hazardous materials incidents that occur during transport. Between 2007 and 2015, the PHMSA recorded 159,295 total hazardous materials incidents during transportation. Of those, 88% (137,674) 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 West Virginia there were 1,890 incidents between 2010 and 2015 (the most recent complete year available). These resulted in 62 fatalities, 157 hospitalizations, and 177 injuries. Nearly half of these incidents (46.5%) involved a mobile vehicle, while 34% were at a fixed site such as a building.

The US Department of Transportation (DOT) also maintains records of hazardous materials incidents that occur during transport at the state level. According to the DOT there were 59 incidents in West Virginia in 2015, resulting in four injuries and over \$24 Million in damage. The majority of these incidents involved highway transportation vehicles (2016).

**LOCATION**

According to data from the RTK Net, every county in the region has had an incident reported to the National Response Center. This hazard is a region wide hazard, with Kanawha County having the highest risk and Clay County having the lowest.

The maps below show the various gas and liquid pipelines that run through the region, broken down by county. The maps are from the National Pipeline Mapping System (NPMS), a service of the Pipeline and Hazardous Materials Safety Administration (PHMSA). While PHMSA maintains state level data on pipeline amounts and incidents, it does not include county level data outside of the mapping system.

**EXTENT**

Table 2.24 Impact of Hazardous Material Event	
Public Health	Death, injury, illness, PTSD, compromised food
Social	Displacement of population, disruption of normal activities, evacuation, hysteria
Economic	Loss or damage to homes, businesses and crops, disruption of business and income, cost of clean-up
Environmental	Air quality, water quality, change in natural habitat
Infrastructure	Loss or damage to structures and transportation infrastructure (roads, bridges, rail)

Every county within the region has experienced some type of hazardous materials event between 2010 and 2015. There have been 360 events in total, with the majority of these events occurring in Kanawha County. In total these incidents have caused over \$21 Million in property damage, though this number is skewed significantly from one incident in Boone County that accounts for all but \$470,000 of the property damage. There have been 20 reported fatalities and 10 reported injuries as a result of these incidents. There were 506



people evacuated due to these incidents, though again, one incident is responsible for the vast majority. An approximate 100 gallon diesel fuel leak in the parking lot of Cedar Grove Elementary and Middle Schools in Kanawha County resulted in the evacuation of 500 students and staff.

Mobile vehicles account for the most incidents in the region, being involved in 176 of the recorded events (49%). Incidents at fixed facilities were the second most common, accounting for 108 incidents (30%). Storage tanks, pipelines, and drilling sites made up a combined 14% of all incidents.

Mobile vehicle incidents can be further divided by mode of transportation. Railroad incidents were the most common in the region, accounting for nearly half of all mobile vehicle incidents. As was discussed in the planning area description, the region has a significant railroad network and is served by two major cargo carriers: CSX Transportation and Norfolk Southern. Wheeled vehicles (trucks, cars, etc.) were the second most common, making up a little more than a quarter of the total. Incidents involving water borne transportation made up just over 10% of mobile incidents, however these only occurred in two of the four counties (Kanawha and Putnam).

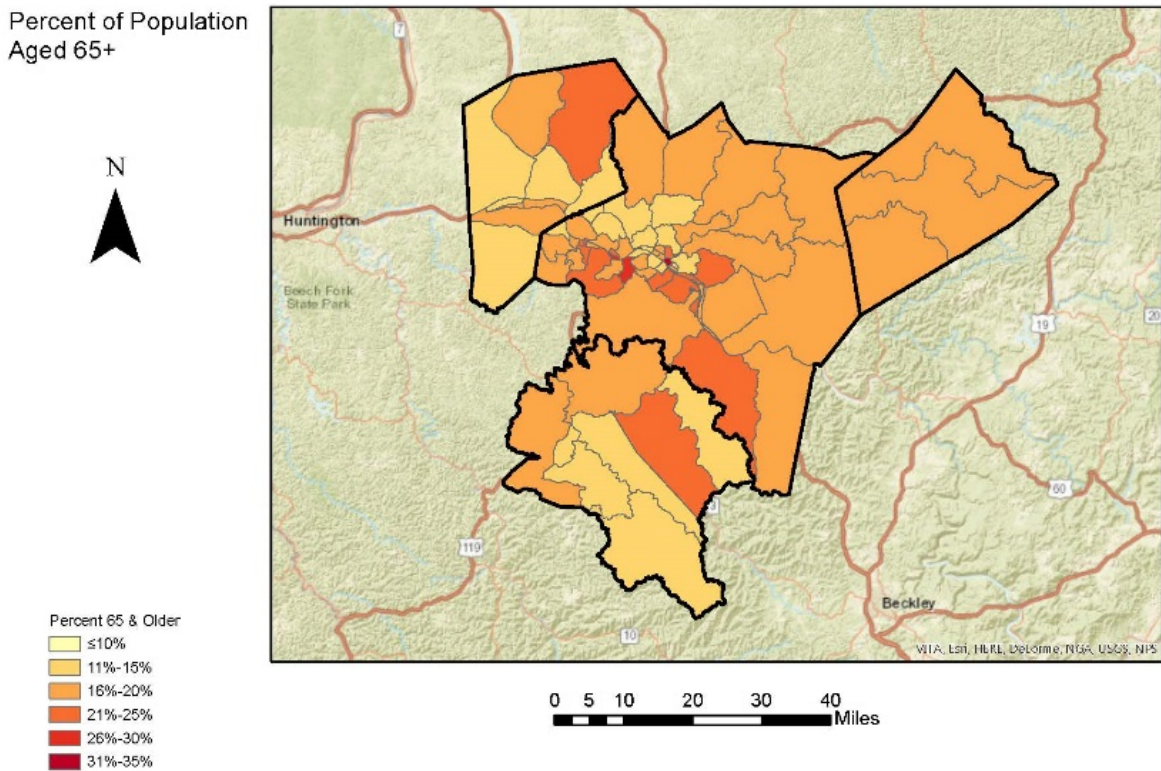
The Union Carbide chemical leak in Bhopal, India, on December 3, 1984, presented a new understanding of industrial risk. A gas release from the Union Carbide facility in Bhopal led to over 4,000 fatalities and tens of thousands injured (Aldred, 2004). Union Carbide closed the pesticide plant in Inventory, WV, at is produced the same chemical as the Bhopal plant. The WV plant did not re-open until April 1985 (Diamond, 1985). In August of 1985, the Union Carbide Plant in Inventory, WV, had a chemical release causing 135 residents seeking treatment for eye, throat, and lung irritation. A Union Carbide physician reported that chemical was a minor irritant and that there were no long-term effects (Franklin, 1985).

In the U.S., the Bhopal disaster led to congressional hearing that ultimately the passing of legislation to prevent similar occurrence in our own communities. The Emergency Planning and Community Right to Know Act (EPCRA) aimed to increase knowledge on chemicals at individual facilities, their uses, and releases into the environment. All facilities that are covered by EPCRA now report hazardous materials inventories annually to the Local Emergency Planning Committee (LEPC), State Emergency Response Commission (SERC), and local fire departments; they must allow local fire departments to conduct on-site inspection of hazardous materials facilities; and they must provide annual report of toxic chemicals released to the EPA and the state (EPA.gov, 2017).

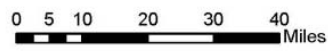
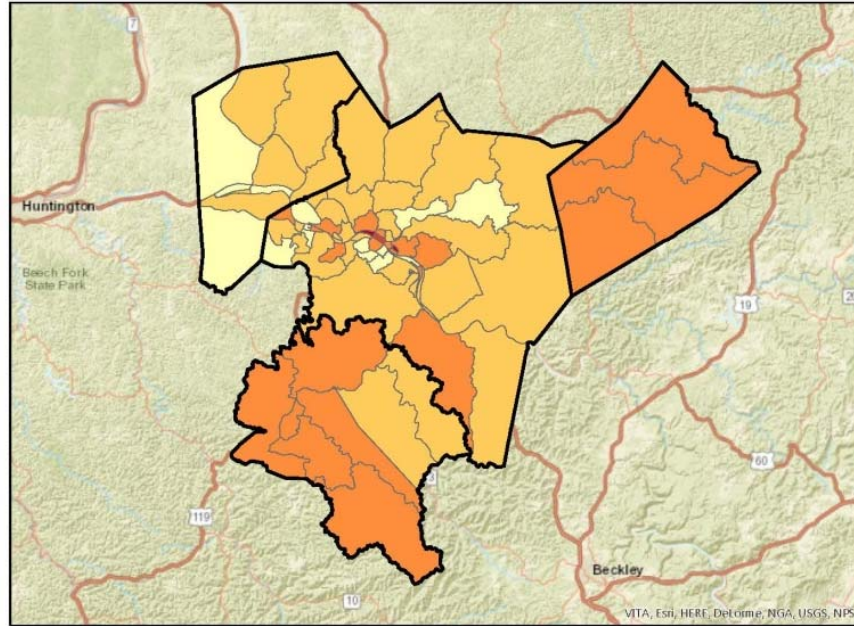
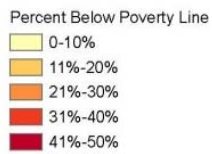




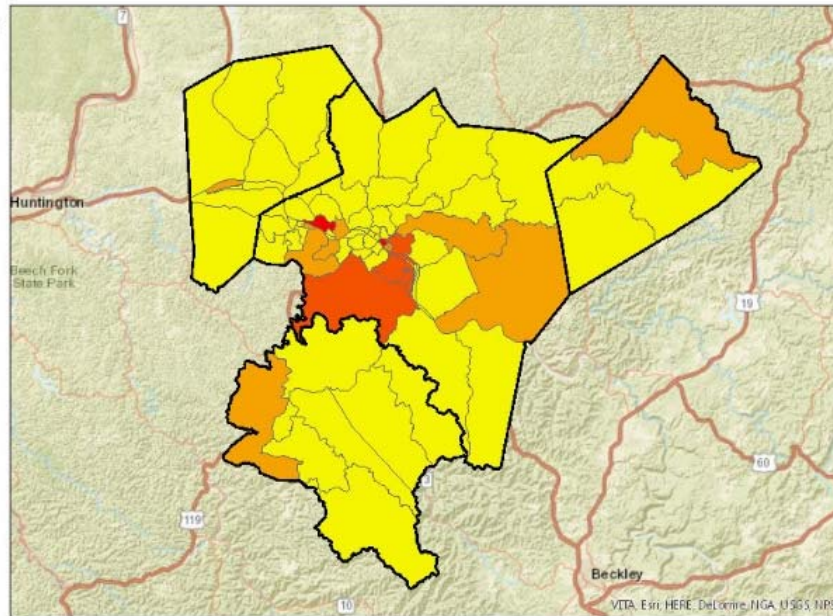
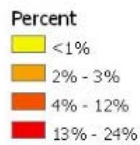
Children, pregnant women, the elderly, hospital patients, and those with low socioeconomic status should be considered to have a greater inherent risk of suffering adverse health effects from a hazmat incident. These groups may have lower exposure thresholds, reduced mobility hindering evacuation, and/or the inability to protect themselves (WHO, 2009). These vulnerable populations are spread out throughout the region which is a serious concern since hazardous material incidents can occur anywhere during transport. The higher percentage areas of the socially vulnerable are concentrated along the main highways as shown on the map.



Percent of Population Below Poverty Line



Percent of Population Living in Institutional Group Quarters



## HISTORICAL OCCURRENCES

### Boone County

On December 6, 2014, a caller reported to the National Response Center that a train had derailed in the area of Julian, WV in Boone County. The caller related that the incident involved a CSX coal train with five rail cars. No injuries were reported, and property damage was reported to be over \$21 Million (RTK Net, 2016).

### Kanawha County

A major incident in December of 2012 near Sissonville, WV was caused by a gas pipeline that had corroded and could no longer handle the pressurized gas (Charleston Gazette, 2014). The pipeline, which was 20 inches in diameter, failed explosively in the early afternoon on December 11<sup>th</sup>, sparking a fire that severely damaged Interstate 77 and destroyed three homes. The force of the explosion sent a 20 foot section of pipe flying approximately 40 feet (Charleston Gazette, 2014).



### Kanawha County

A tank located adjacent to the Elk River just north of Charleston, WV<sup>i</sup> leaked a hazardous chemical used for cleaning coal of impurities into the river on January 9, 2014. The leak occurred approximately 1.5 miles upriver from a water intake pipe at the West Virginia American Water Company. The resulting contamination of the water supply left up to 300,000 residents in nine counties (including all of Region 3) in southeastern West Virginia without potable water (The Washington Post, 2015.)

## LOSS ESTIMATES

For a general, per-incident loss estimate, a static figure can be utilized. Battelle (2001) noted the average non-explosion loading/unloading hazmat incident results in losses of \$5,000. This figure is corroborated by a five-year average using data from the Pipeline and Hazardous Materials Safety Administration (PHMSA). According to PHMSA data, the average incident between 2010 and 2015 resulted in approximately \$5,700 in losses. The region will experience, on average, 60 hazardous materials incidents a year, based on historical data



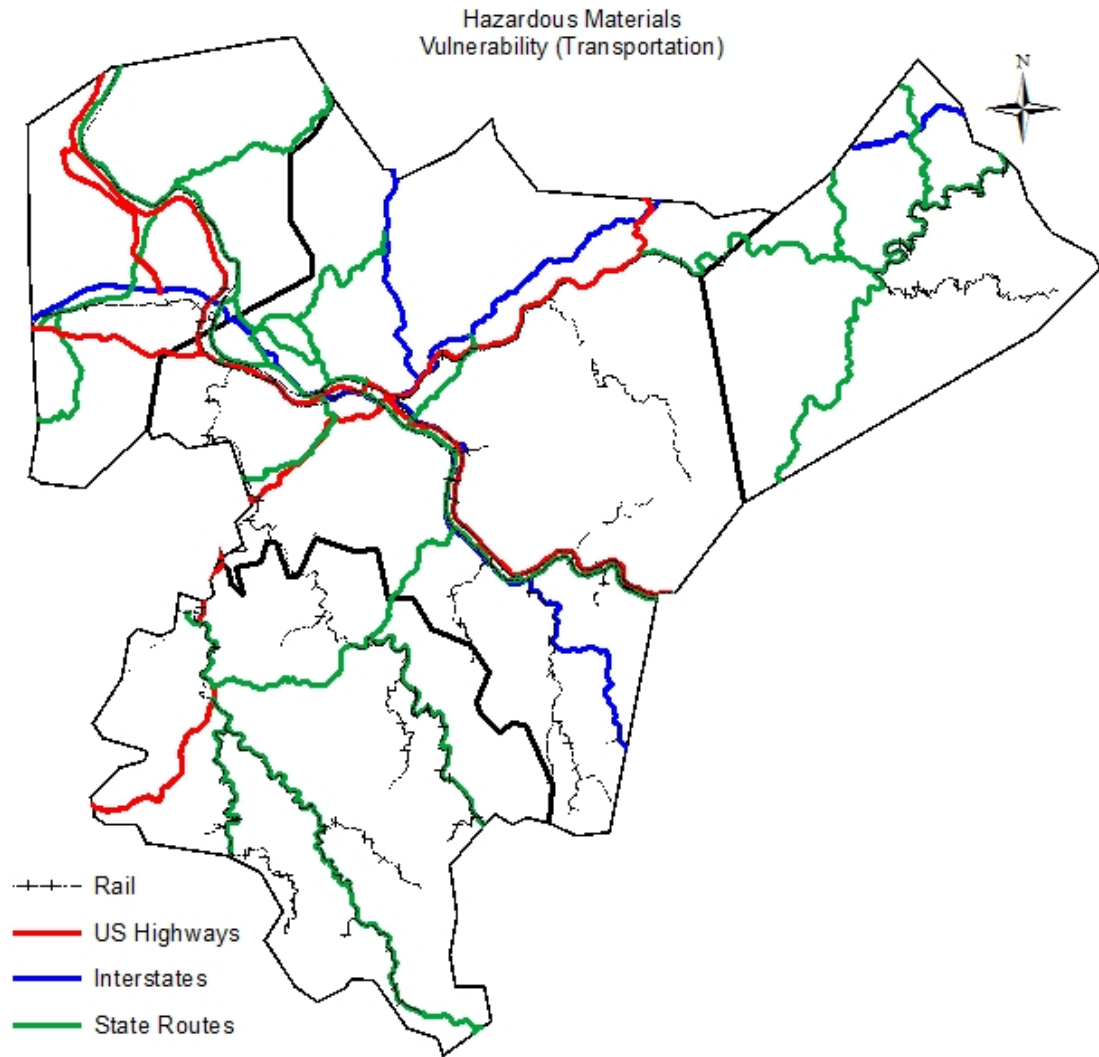
from the RTK Net. Using the estimated loss from Battelle, the region will experience \$360,000 in economic loss in an average year.

Property damage estimates can be calculated using the historical data provided by the RTK Net. Over the last six years, the region has experienced \$470,864.00 in property damage due to hazardous materials incidents (the outlier of \$21 Million for a single incident has been removed as it would significantly skew the estimate). When divided by the number of incidents, an estimate of \$1,311.60 in property damage per incident is reached. A yearly estimate can be found by multiplying this by the average number of incidents in a year (60), resulting in a loss estimate of \$78,696/year.

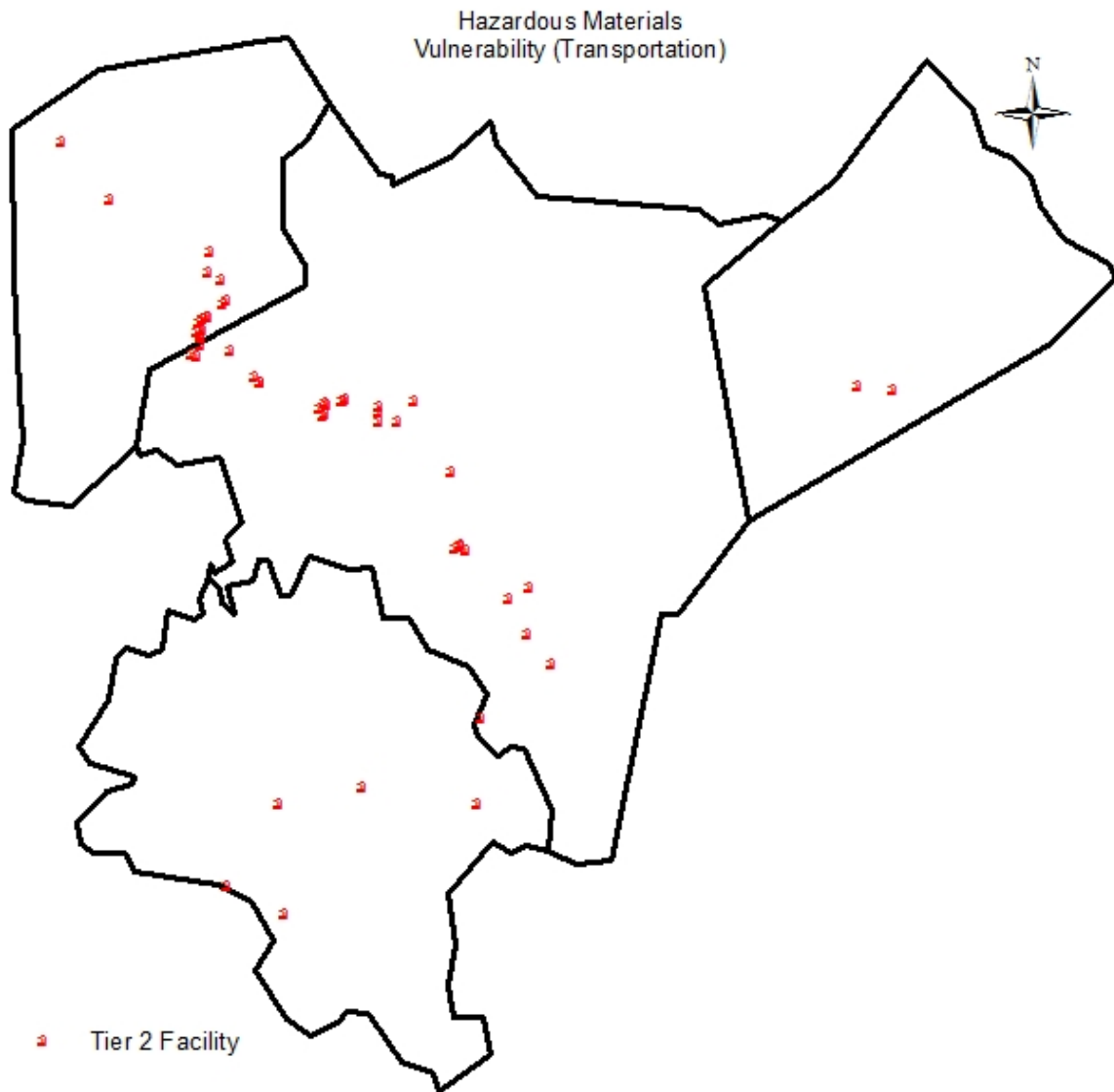




RISK MAPS







<sup>i</sup> Not located within Region 3, but this incident has led to significant regulatory changes in source water protection and changes in regulations regarding above ground tanks.

Research Sources:

- National Right to Know Network
- US Department of Transportation
- Pipeline and Hazardous Materials Safety Administration



## MASS MOVEMENTS

<i>Mass Movements Snapshot</i>	
"Mass movements include several different hazards caused by the horizontal or lateral movement of large quantities of physical matter" (Haddow, Bullock, & Coppola, 2014, pg.46.)	
Period of Occurrence	At any time. Increased chance following long periods of heavy rain, snowmelt or near construction activity
Number of Events (2009-2015)	15 Often listed as a secondary/cascading hazard during flooding events
Probability of Event In Any Given Year	2.14 per year
Warning time	Ranging from no warning to months
Potential Impacts	Damage to infrastructure, decreased land values, agribusiness losses, cost of detours on impacted roads, and cost of litigation
Cause Injury or Death	Injury, possibly fatalities
Potential Facility Shutdown	Days to weeks or months
Extent (Landslides)	Region wide
Loss Estimate (Landslides)	Vulnerability will continue to increase as development spreads in the region.

Mass movements cause damage and loss of life through several processes. Mass movements include pushing, crushing or burying objects in their path and the damming of rivers and waterways (Haddow, Bullock, & Coppola, 2014, pg.46.) There are numerous categories of mass movements: 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. Landslides 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.

## LOCATION

The geography of the region creates large areas that are vulnerable to the various types of mass movements, as is true for most of the state. According to the 2013 Statewide Hazard Mitigation Plan (HMP), more than 30% of all federally declared disasters include landslide as part of the declaration. Often these are flooding events, where the large amount of water has loosened/undermined vulnerable areas.

Of particular concern for the region are mine subsidence events, a type of land subsidence caused by human activity. According to the West Virginia Geological & Economic Survey, mine subsidence occurs when the land over an underground mine settles after the collapse of the mine roof. The region has a strong history in coal mining, with numerous closed and abandoned mines being located across the four counties.

## EXTENT

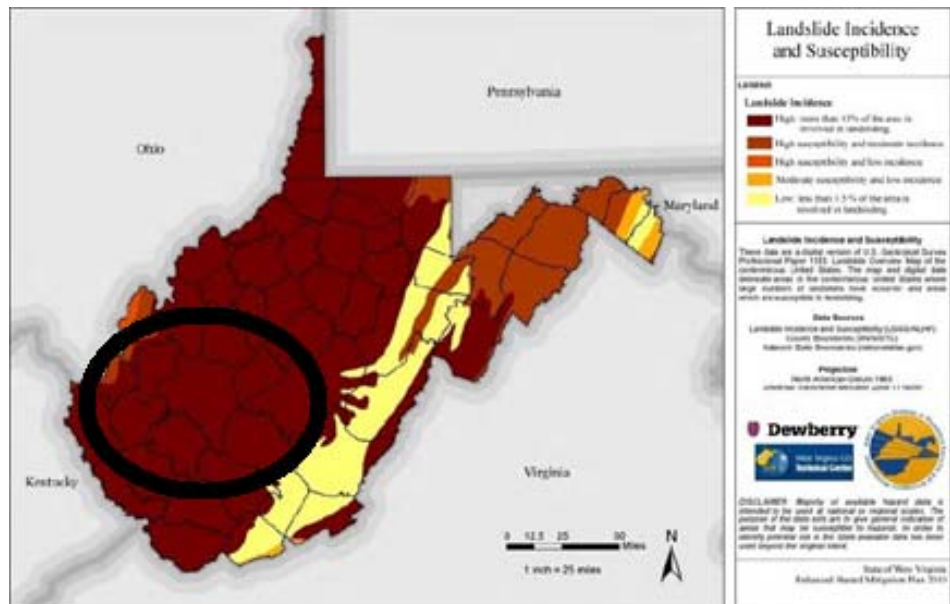
Impact of Mass Movements	
Public Health	Death, injury
Social	Displacement of population, disruption of normal activities, evacuation, hysteria
Economic	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up
Environmental	Erosion, change in topography, change in natural habitat
Infrastructure	Power outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)

The NCDL database is limited in its ability to capture these types of events, with just two events listed in the database. As was discussed above, many of these events occur as



cascading effects of other hazards, such as heavy rainfall and flooding. Others are hyper localized events, such as small sinkholes.

According to the 2013 State HMP, annual costs exceed \$10 million dollars and does not include unreported damage to homes, land, and property. The 2013



State HMP shows that all four counties in the region have a high risk of landslide incidents, as shown in the image from that document. Of the four counties in the region, Kanawha County is listed in the state plan as having the highest risk (Medium-High). Clay County has a “medium-low” risk, while both Boone and Putnam counties are listed as having “medium” risk.

In the U.S. landslides cause approximately \$3.5 billion in damage and kill 25 to 50 people per year. Rock falls, rockslides and debris flows cause the majority of injuries and fatalities in the U.S. The term “landslide” describes a variety of processes in the downward and outward mass movement of slope forming materials including rock, soil, fill, or a combination the three (USGS, 2004).

There are many types of mass movements included in the general term landslide. However, the restrictive use of the term refers to only to mass movements where there is a distinct zone of weakness that separates the slide material from the stable underlying material. The two major types of slides are rotational and transitional. Varne’s classification of slope movements uses the type of movement paired with the type of material involved as shown in the table below.

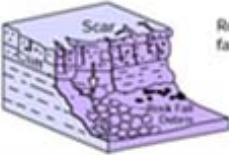
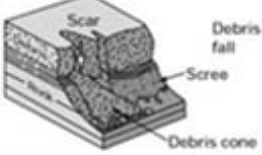
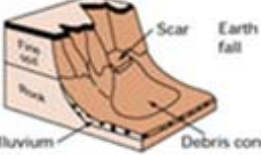
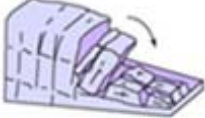
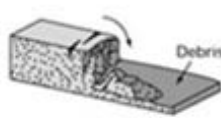
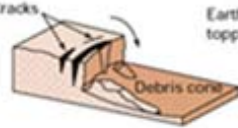

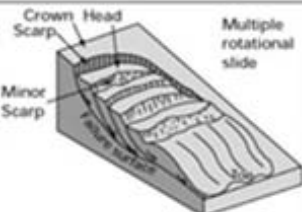
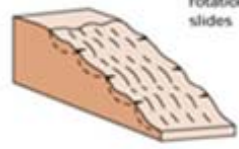
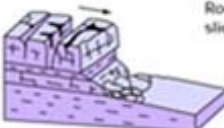


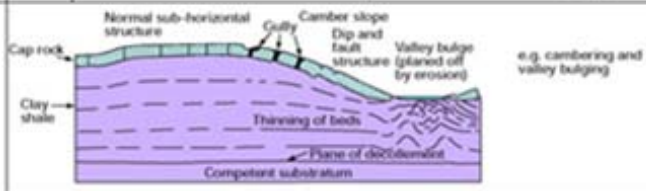

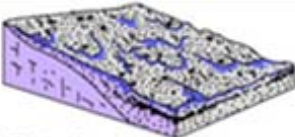



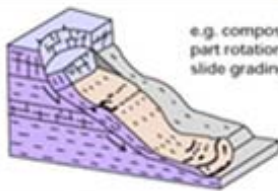
Landslides and flooding are closely associated. Both are related to precipitation, runoff, and the saturation of ground by water. Additionally, debris flows and mudflows often occur in small, steep stream channels and often are mistaken for floods. These events often occur in the same area, at the same time. Landslides cause flooding by forming landslide dams that block stream channels allowing water to back up. This causes backwater flooding





until the dam fails which leads to downstream flooding. Solid debris from landslide add volume and density to normal streamflow and cause channel blockages and diversions creating localized flooding and erosion. Landslides also cause overtopping of reservoirs and reduced capacity to store water (Geology.com, 2017). Additionally, landslides can cause structural damage including disturbing foundations and chimneys as well as damage to utility lines, poles, roadways and bridges (USDHS, 2017).



Material		Table 2.26		
Movement type		ROCK	DEBRIS	EARTH
FALLS		 Rock fall	 Debris fall Scree Debris cone	 Earth fall Fine soil Colluvium Debris cone
		 Rock topple	 Debris topple Debris cone	 Earth topple Cracks Debris cone
SLIDES	Rotational	 Single rotational slide (slump) Failure surface	 Multiple rotational slide Crown Scarp Head Minor Scarp	 Successive rotational slides
	Translational (Planar)	 Rock slide	 Debris slide	 Earth slide
SPREADS				 Earth spread
FLOWS	 Solifluction flows (Periglacial debris flows)	 Debris flow		 Earth flow (mud flow)
COMPLEX	 e.g. Slump-earthflow with rockfall debris		 e.g. composite, non-circular part rotational/part translational slide grading to earthflow at toe	

## HISTORICAL OCCURRENCES

### Kanawha County

According to the 2013 West Virginia Statewide HMP, a mass movement incident occurred near East Bank in 2009. An abandoned mine in Coalburg Mountain filled with water



due to a four day rain event that resulted in up to 2 inches of rainfall in the area. The side of the mine blew out, causing water, rocks, and mud to cascade down the mountainside. Debris from this slide were deposited across roads and railroad tracks near the west side of the community. It took maintenance crews a week to clear State Route 61 of the debris (2013).

### **Kanawha County**

On the morning of February 19, 2014, a rockslide (listed as a “debris flow” in the NCDC) occurred in western Kanawha County. According to the NCDC, a large portion of a hillside had been cut away years before to make room for a building, creating a vertical cliff approximately 20 to 25 feet high. Freezing and thawing events over the year caused the cliff face to become unstable until a large section gave way. Several large six by six foot chunks of rock slid down the steep embankment, causing damage to the building and the vehicles stored inside. The NCDC data shows \$20,000 in damage from the event (2016).

### **Kanawha County**

The most widely covered mass movement event to occur in the region recently occurred on March 12th, 2015, at Charleston’s Yeager Airport. A large section of a 240 foot high man made hillside that supported a safety system on the runways at the airport failed, causing a landslide that covered a local



church and destroyed two homes in the area while also blocking a creek, causing flooding. Dozens of residents were evacuated due to the slide, which also destroyed trees, power lines, and poles in the area (ABC News, 2015). The slide continued to spread into the early morning hours of March 13<sup>th</sup>. The image shows the extent of the event. The runway seen in the image was not damaged. The NCDC data lists the property damage for this event as \$1 Million.



Due to the limited mass movement databases available it is difficult to determine the actual number of events that occurred in Region 3. The table below has a list of events that were found through various news organizations. It is important to note that the slides on U.S. Route 60 have been addressed in the *Metro Mobility 2040*, Kanawha-Putnam Metropolitan Plan (2013).

Table 2.27

MASS MOVEMENT EVENTS (2009-2016)			
Date	Location	Event Type	Source
1/16/2013	Edens Fork Rd., Charleston	Rockslide	WOWK
7/25/2013	U.S. Route 60, Cedar Grove	Rockslide	Charleston Gazetter
10/14/2013	Interstate 79, exit 1	Rockslide	Charleston Gazette
2/5/2014	Interstate 79, mile marker 1	Rockslide	WOWK
2/19/2014	MacCorkle Ave. St. Albans	Landslide	Charleston Gazette
4/24/2015	Private residence, Charleston	Landslide	WOWK
4/18/2015	U.S. Route 60, Kanawha County	Rockslide	WSAZ
7/14/2015	Emmons Rd., Boone County	Mudslide	WBOY
7/14/2015	WV 16 (Bradley Field Area) Clay County	Rockslide	WBOY
3/8/2016	U.S. Route 60, Cedar Grove	Rockslide	WBOY
6/23/2016	Interstate 79 near Clendenin	Mudslide	Charleston Gazette
7/4/2016	Willis Creek Rd., Kanawha County	Landslide	WOWK

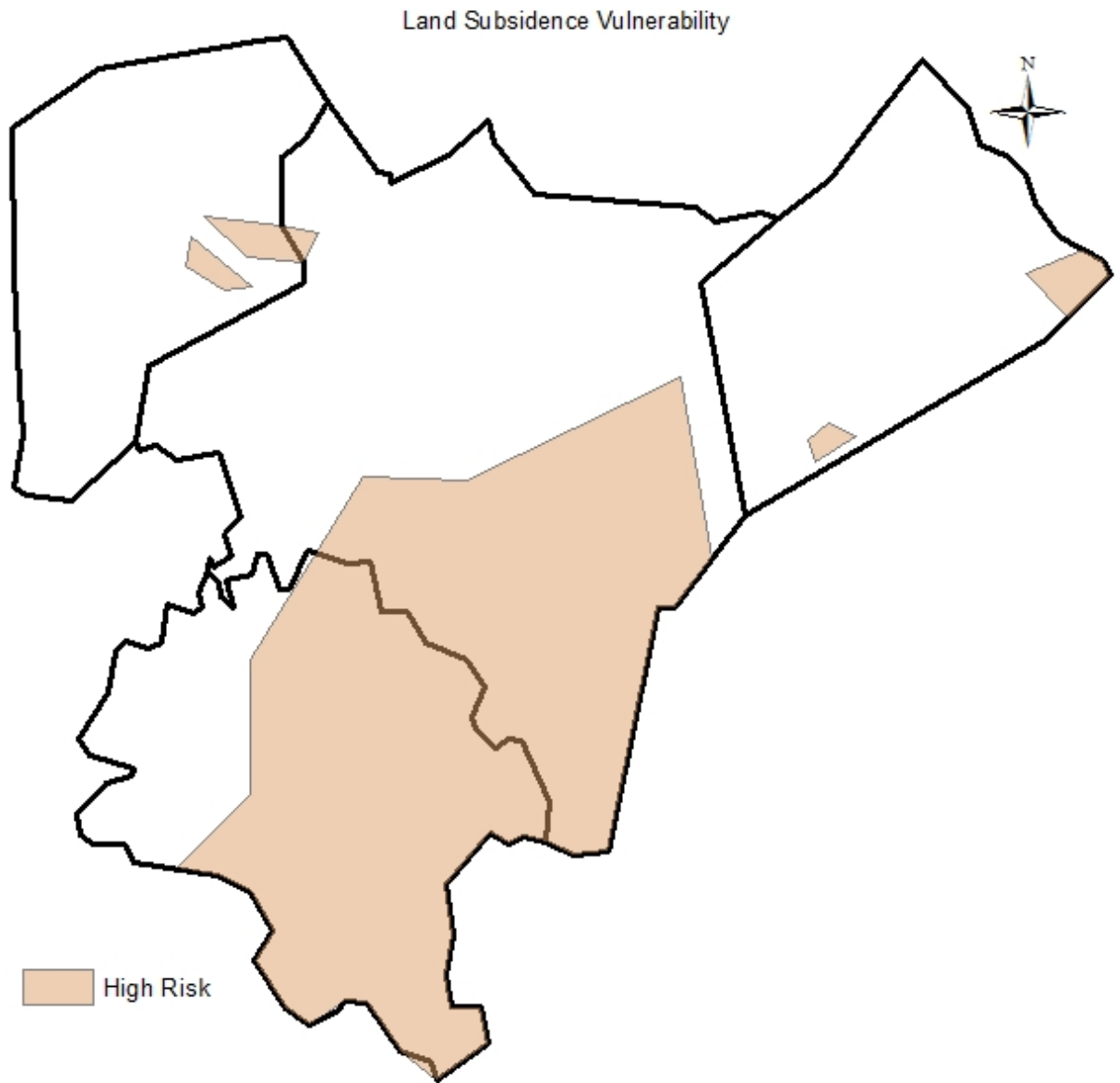
Significantly, mudslides during the June 2016 flood event contributed to the overall damage totals that resulted in a federal disaster declaration.

## LOSS ESTIMATES

The limited historical data, either due to incomplete records or non-reported events, make a vulnerability assessment for this type of hazard difficult. The most at risk structures are those built along hillsides and cliffs, especially those that are manmade. While these areas of the region have historically been the least dense in terms of structures and populations, this has begun to change with recent growth. The available land in the river front municipalities is becoming less available (and has its own associated risks related to the river), leading development to spread into the mountains and hill tops surrounding those areas. This development trend increases the number of structures in the region that are vulnerable to mass movement events.



RISK MAP



\*Based on WVGES underground coal mine maps.

Research Sources:

- National Climatic Data Center
- USGS
- 2013 West Virginia State Wide Hazard Mitigation Plan
- ABC News





**SEVERE STORMS**

<i>Severe Storms Snapshot</i>	
Various types of severe storms can occur throughout the year, typically defined by seasonal meteorological activity. Severe storms “affects considerable portions of North America and cause significant death and destruction each year” (DeVecchio & Keller, 2015). This severe storms hazard profile includes instances of hail, heavy snow, high wind, lighting, strong wind, thunderstorm wind, winter storms and winter weather as defined by NOAA.	
Period of Occurrence	The various types of severe storms can occur year-round.
Number of Events	Hail (1958-2015): 273 Lightning (2001-2015): 12 Wind (1957-2015): 583 Winter Weather (1996-2015): 144
Probability of Event In Any Given Year	Hail: 4.7 events per year Lightning: 0.75 events per year Wind: 9.9 events per year Winter Weather: 7.2 events per year
Warning time	Can range from seconds to days.
Potential Impacts	Property and crop damage.
Cause Injury or Death	Severe storms can potentially cause death and injury.
Potential Facility Shutdown	Ranges from minimal to significant impacts.
Extent	Region wide. Some areas of Region 3 are historically more susceptible to certain types of events than others.
Loss Estimates	Hail: \$268,605.26 per year (Crop & Property Damage) Lightning: \$48,964.29 per year Wind: \$320,663.79 per year Winter Weather: \$359,657.89

In the previous iteration of the Region 3 Hazard Mitigation Plan, all severe storm events, excluding tornadoes, were grouped into a single hazard. The steering committee elected to retain this grouping for the 2016 update. The committee felt that the effects of these events, and the potential mitigation efforts that can be undertaken in reference to them, are similar enough to be considered together. The majority of these events involve storm systems consisting of precipitation and high winds. Tornadoes were not included in this profile due to their unique formation and potential for large scale damage.

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.

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.

A wind event is typically not associated with other hazards, such as thunderstorms. Wind events will have little or no rain associated with them and may last considerably longer than other events like thunderstorm wind and tornados. Wind events can result in a number of impacts, including blowing tree limbs and trees onto structures, roadways, and power lines. The National Climatic Data Center (NCDC) records two types of stand-alone wind events: high wind events and strong wind events. (National Weather Service Instruction 10-1605.)

The National Climatic Data Center (NCDC) compiles data on a number of different types of winter weather events. Included in the research for this hazard profile are blizzards, ice storms, heavy snow, winter storms and winter weather. Winter storms make it extremely difficult and hazardous to travel, and can lead to widespread utility outages. The NCDC defines these events as follows:

- **Blizzard:** A winter storm which produces the following conditions for 3 hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than 1/4 mile, on a widespread or localized basis.
- **Ice Storm:** Ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is 1/4 or 1/2 inch or more), on a widespread or localized basis.



- **Heavy Snow:** Snow accumulation meeting or exceeding locally/regionally defined 12 and/or 24 hour warning criteria, on a widespread or localized basis. This could mean such values as 4, 6, or 8 inches or more in 12 hours or less; or 6, 8, or 10 inches in 24 hours or less.
- **Winter Storms:** A winter weather event which 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 locally/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:** 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. A Winter Weather event could result from one or more winter precipitation types (snow, or blowing/drifting snow, or freezing rain/drizzle), on a widespread or localized basis (National Weather Service Instruction 10-1605.)

## LOCATION

Severe storms events are generally region wide events as weather systems move in lines through the state. Localized events can include straight line wind/wind downbursts, but these have been known to occur throughout the region.

## EXTENT

Impact of Severe Storms	
Public Health	Death, injury, exacerbation of chronic illnesses
Social	Disruption of normal activities, evacuation
Economic	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up
Environmental	Air quality, water quality, change in natural habitat, erosion
Infrastructure	Power and water outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)

Hailstorms events occur fairly often in Region 3. On average, there will be 4.8 hailstorm events per a year, based on historical data. Some of these storms can produce hail of enough magnitude (size) to cause structural and property damage while most will not. The National Climatic Data Center (NCDC) records show that 273 events have occurred since 1958, causing a total of over \$15 Million in property damage and over \$10,000 in crop damage. None of the events are recorded as causing deaths or injuries.



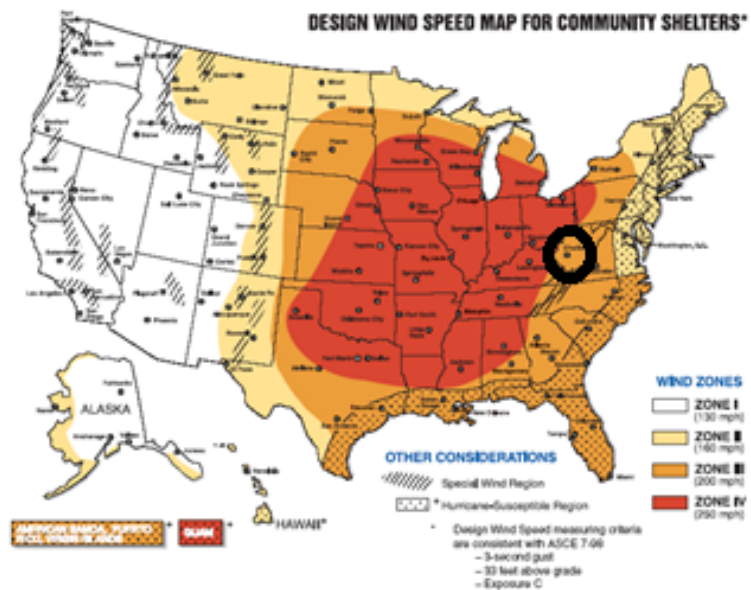
One of the more well-known aspects of hail storms is that a significant amount of the damage is incurred by vehicles. A 2012 report from The Highway Loss Data Institute (HLDI), a division of the Insurance Institute for Highway Safety (IIHS), found that the number of vehicular hail damage claims nationally has increased significantly between 2008 and 2011. There were nearly 245,000 claims filed in 2011, compared to nearly 175,000 claims in 2008. The average severity of each claim in 2011 was \$3,256. According to the research from the HLDI in West Virginia in 2011 there were 1,992 claims for vehicle hail damage, averaging \$2,135 for a total of \$4,252,258 in damage.

Hail also has the ability, dependent on its magnitude, to cause significant structural property damage. Verisk Insurance Solutions used data collected from around the country, totaling nearly 9 million residential and commercial property hail claims between 2000 and 2013. The analysis shows a significant increase in hail damage claims in residential and commercial properties as well as an increase in average annual claim severity.

The wind gusts associated with strong thunderstorms pose a threat to life and/or property. These storms may also involve frequent cloud-to-ground lightning and heavy downpours which can lead to localized flooding. Thunderstorm wind is historically the most prevalent severe storm occurrence in the region, occurring an average of nine times a year.

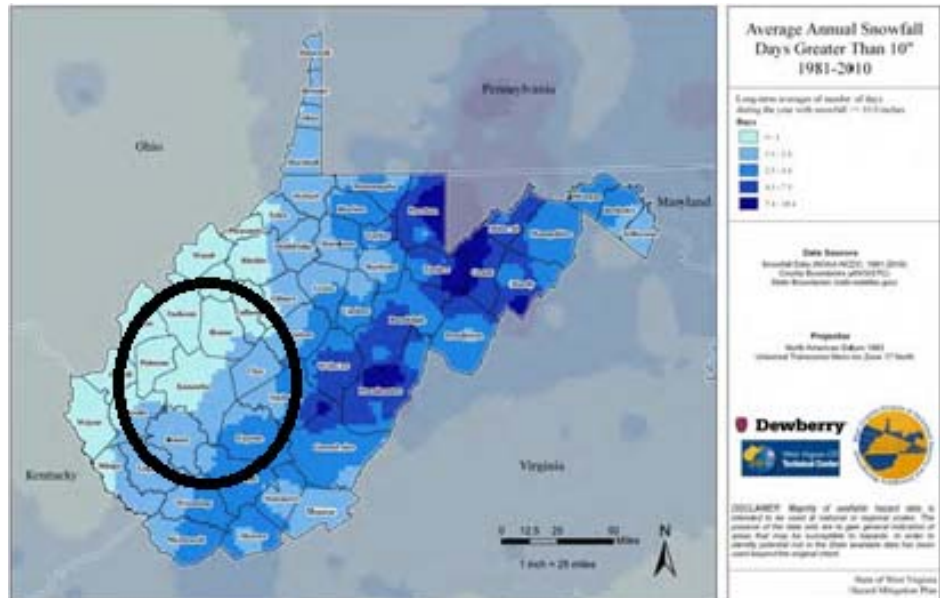
A wind storm is a severe storm condition indicated by high winds and with little or no rain. Localized geographical conditions can exacerbate the damages from high winds and cause increases in wind intensity. The “Design Wind Speed Map for Community Shelters” is one way of graphically analyzing wind risks. As can be seen, Region 3 is in a “Zone III” with respect to design wind speeds, which means that shelters constructed for protective purposes (from wind hazards) should be designed to withstand up to 200 mph winds.

Structures that are most vulnerable will be lightweight structures such as outbuildings, mobile homes and new light weight construction. Severe wind events can cause a variety of secondary, or cascading, hazard



events. For instance, wind may blow limbs from trees down knocking out electric power or blocking roadways. Wind often results in damages to roofs and other home finishings (such as siding, etc.).

Winter weather is an annual, common occurrence in West Virginia, and Region 3 is no different. According to the 2013 West Virginia



Statewide HMP, the majority of the four counties in the region saw an average of 12.6 to 27.5 inches of snowfall annually between 1981 and 2010. The far eastern reaches of the region, including portions of Boone, Clay, and Kanawha counties, averaged more (27.6 - 46.5 inches). Small winter weather 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. Large scale events, that produce large amounts of snow, have a more significant impact. There have been a number of these events in recent years, and according to the Statewide HMP, large portions of the region will see between 1 and 2.5 days of more than 10 inches of accumulation annually.

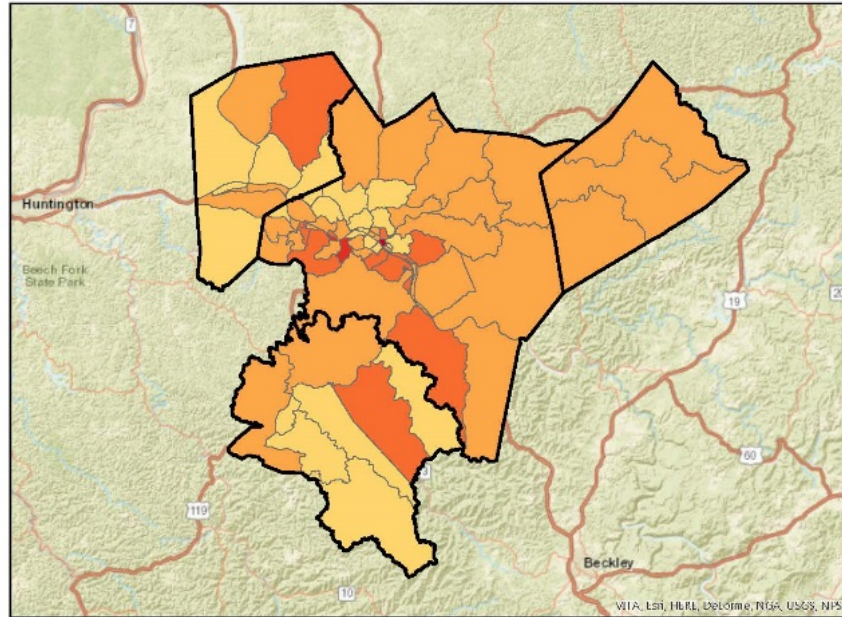
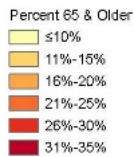
Severe storms can exacerbate medical conditions such as asthma, chronic obstructive pulmonary disease, cardiovascular disease, and angina pectoris. Injuries from ice and hail, shoveling snow, and frostbite from the cold are also a concern. Severe storms can also have an effect on mental health by causing anxiety and panic attacks. Those without proper shelter, including the homeless population, are the most vulnerable to the effects of an event.

Infants and the elderly are the most susceptible to severe storms. Conditions that may be inconvenient or uncomfortable to the general population become life-threatening to them (NOAA, 2017). The homeless have a much greater risk of developing exposure-related conditions (Nationalhomeless.org, 2010). The inability to provide proper shelter, dry clothing and heat, accompanied by malnutrition, decreased body fat, untreated infections and illness, and fatigue make the homeless population more vulnerable (O'Connell, 2004).





Percent of Population  
Aged 65+



## HISTORICAL OCCURRENCES

### Kanawha and Putnam Counties

According to a report from the National Weather Service, a supercell thunderstorm crossed southern West Virginia along the Interstate 64 corridor in the afternoon of August 30, 2006. The storm brought torrential rains, large hail, and damaging winds across the central/western areas of Region 3. Numerous trees and power lines were knocked down in Putnam and Kanawha counties, while hail the size of tennis balls was reported in northern Kanawha County. Winds from the storm were measured around 50 miles per hour in Charleston, but likely gusted up to 70 miles per hour. The NCDC records indicate that the hail from the storm caused \$6 million in property damage in Kanawha County (NWS, 2006 & NCDC, 2016).



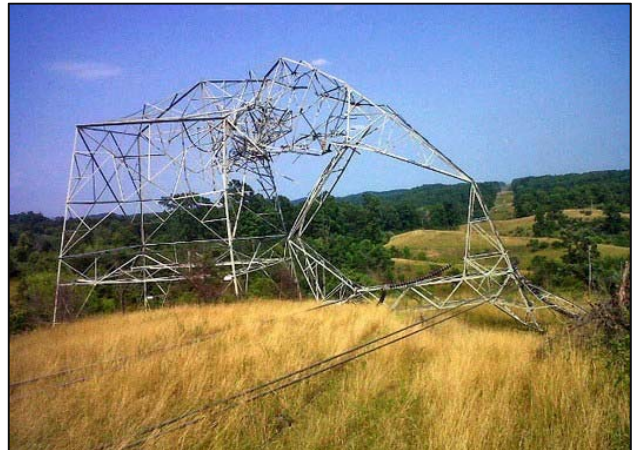
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### Boone, Clay, Kanawha, & Putnam Counties

This event, known regionally and across West Virginia as simply “The Derecho” occurred on June 29, 2012 and impacted areas across the eastern portion of the United States. A strong line of storms moved across a large section of the Midwestern United States, across the Appalachians, and into the Mid-Atlantic States on the afternoon and evening of the 29<sup>th</sup>. The storm destroyed power lines



and poles across the state, leaving over 640,000 residents in the state without power according to the National Weather Service. MetroNews reported that around 70 high voltage power lines were downed by the storm. The picture shows an example of a damaged high voltage power pole, illustrating the power of this storm line. The NCDC data shows that the region sustained over \$11 million in property damages from this event. Examples of damage in the region include a damaged hanger and small airplane at the Yeager Airport in Charleston, two destroyed homes, three severely damaged homes, and a damaged roof at the career and technical center in Putnam County, and a destroyed home and numerous damaged homes in Clay and Boone counties (NCDC, 2016).

### Boone, Clay, Kanawha, & Putnam Counties

One of the most significant winter weather events to impact the region occurred in late October, 2012, when Tropical Storm Sandy (by then being referred to as “Superstorm Sandy”) collided with an arctic front. Blizzard warnings were in place in at least 14 counties prior to the arrival of the storm system (CBSNEWS, 2012). The heavy snow in Region 3 started late on the 29<sup>th</sup>, and continued into the 30<sup>th</sup>. The impact of the early season storm varied significantly, with areas of Charleston receiving 1-2 inches and higher elevations in the region receiving up to 10 inches of wet, heavy snow. Counties located further east received the heaviest snowfall and damage, though Region 3 received \$4 million in property damage, according to the NCDC data (NCDC, 2016).



Table 2.29

**SEVERE STORM EVENTS WITH AT LEAST \$25,000 DAMAGE, 1996-2015 (NCDC, 2017)**

Date	Location	Event Type	Injuries	Fatalities	Damages
6/2/1998	Kanawha	Hail	0	0	\$6,000,000
6/2/1998	Kanawha	Hail	0	0	\$2,000,000
6/2/1998	Kanawha	Hail	0	0	\$1,000,000
2/16/2003	Kanawha	Winter Storm	0	0	\$1,800,000
8/30/2006	Kanawha	Hail	0	0	\$6,000,000
6/16/2008	Kanawha	Hail	0	0	\$50,000
1/27/2009	Kanawha	Winter Storm	0	0	\$25,000
1/27/2009	Putnam	Winter Storm	0	0	\$25,000
12/9/2009	Kanawha	High Wind	0	0	\$125,000
12/18/2009	Boone	Heavy Snow	0	0	\$200,000
12/18/2009	Clay	Heavy Snow	0	0	\$100,000
12/18/2009	Kanawha	Heavy Snow	0	0	\$200,000
12/18/2009	Putnam	Heavy Snow	0	0	\$30,000
1/1/2012	Kanawha	Strong Wind	0	0	\$50,000
7/5/2012	Kanawha	Lightning	0	0	\$100,000
10/29/2012	Boone	Heavy Snow	0	0	\$750,000
10/29/2012	Clay	Heavy Snow	0	0	\$750,000
10/29/2012	Kanawha	Heavy Snow	0	0	\$1,750,000
10/29/2012	Putnam	Heavy Snow	0	0	\$750,000
1/2/2014	Boone	Winter Weather	0	0	\$50,000
3/12/2014	Kanawha	Strong Wind	0	0	\$150,000
7/14/2014	Putnam	Lightning	0	0	\$500,000
8/27/2014	Putnam	Lightning	0	0	\$50,000
11/1/2014	Kanawha	Strong Wind	0	0	\$30,000
2/21/2015	Kanawha	Winter Storm	0	0	\$75,000
1/8/2016	Kanawha	Winter Weather	0	0	\$100,000
1/22/2016	Kanawha	Heavy Snow	0	0	\$200,000
3/1/2016	Kanawha	Strong Wind	0	0	\$75,000
3/1/2016	Putnam	Strong Wind	0	0	\$25,000
3/3/2016	Boone	Winter Weather	0	0	\$25,000
4/2/2016	Kanawha	High Wind	0	0	\$50,000
6/21/2016	Putnam	Hail	0	0	\$100,000
6/21/2016	Putnam	Hail	0	0	\$75,000
6/21/2016	Putnam	Hail	0	0	\$50,000
6/21/2016	Putnam	Hail	0	0	\$25,000



Table 2.30

Date	Location	Event Type	Injuries	Fatalities	Damages
12/9/2009	Putnam	Strong Wind	0	1	\$1,000
7/27/2005	Kanawha	Lightning	1	0	0
7/3/2006	Kanawha	Lightning	0	1	0
7/22/2011	Kanawha	Lightning	0	1	0
5/23/2013	Kanawha	Lightning	0	1	0
5/23/2013	Kanawha	Lightning	0	1	0

## LOSS ESTIMATES

Loss estimates for future occurrences of these hazards can be found using the historical data in the NCDC. Events were broken into four major categories (hail, lightning, wind, and winter weather) and total property damage was calculated for each category. This total was divided by the number of events to determine an estimate of damage per an event. The number of events was divided by the number of years in the study, resulting in an estimated number of events per year. A yearly property damage estimate was found by multiplying the per event figure by the number of estimated events in a year. The result is shown in the table below.

TABLE 2.31

TYPE	EVENTS/YEAR	PROPERTY DAMAGE/YEAR	CROP DAMAGE/YEAR
Hail	4.7	\$268,421.05	\$184.21
Lightning	.75	\$48,964.29	\$0.00
Wind	9.9	\$320,663.79	\$0.00
Winter Weather	7.2	\$359,657.89	\$0.00

Determining the number of structures that are vulnerable is also a matter of using the historical data, and data from the HAZUS-MH software. A HAZUS loss estimation workbook also provides data on residential, non-residential, and critical facilities in the region. Of the 138,007 buildings in the region, 77% are residential, 18% are non-residential, and 5% are critical facilities. It can then be estimated how much damage each category of building can be expected to receive by multiplying the total property damage for that hazard by the percent of each building type. The amount of damage per a category is then divided by the average value to determine the estimated number of structures that will be damaged in a given year. The table below illustrates this calculation; the column on the right is the estimated number of structures of that type that will be impacted in a given year.



Table 2.32					
Hail					
Structure Type	Percent	Avg. Value	Hail Annual Total	Hail Annual \$	Hail Annual #
Residential	77%	\$187,183.46	\$268,421.05	\$207,757.89	1.1
Non-Residential	18%	\$187,613.14	\$268,421.05	\$47,242.11	0.3
Critical Facilities	5%	\$184,017.24	\$268,421.05	\$13,689.47	0.1
Lightning					
Structure Type	Percent	Avg. Value	Lightning Annual Total	Lightning Annual \$	Lightning Annual #
Residential	77%	\$187,183.46	\$48,964.29	\$37,898.36	0.2
Non-Residential	18%	\$187,613.14	\$48,964.29	\$8,617.71	0.05
Critical Facilities	5%	\$184,017.24	\$48,964.29	\$2,497.18	0.01
Wind					
Structure Type	Percent	Avg. Value	Wind Annual Total	Wind Annual \$	Wind Annual #
Residential	77%	\$187,183.46	\$320,663.79	\$248,193.78	1.3
Non-Residential	18%	\$187,613.14	\$320,663.79	\$56,436.83	0.3
Critical Facilities	5%	\$184,017.24	\$320,663.79	\$16,353.85	0.1
Winter Weather					
Structure Type	Percent	Avg. Value	Winter Weather Annual Total	Winter Weather Annual \$	Winter Weather Annual #
Residential	77%	\$187,183.46	\$359,657.89	\$278,375.21	1.5
Non-Residential	18%	\$187,613.14	\$359,657.89	\$63,299.79	0.3
Critical Facilities	5%	\$184,017.24	\$359,657.89	\$18,342.55	0.1

RISK MAP: The entire region is equally susceptible to severe storm events.

Research Sources:

- NOAA National Climatic Data Center
- HAZUS – MH
- Highway Loss Data Institute
- Ohio Emergency Management Agency (i.e., HAZUS Loss Estimation Workbook)

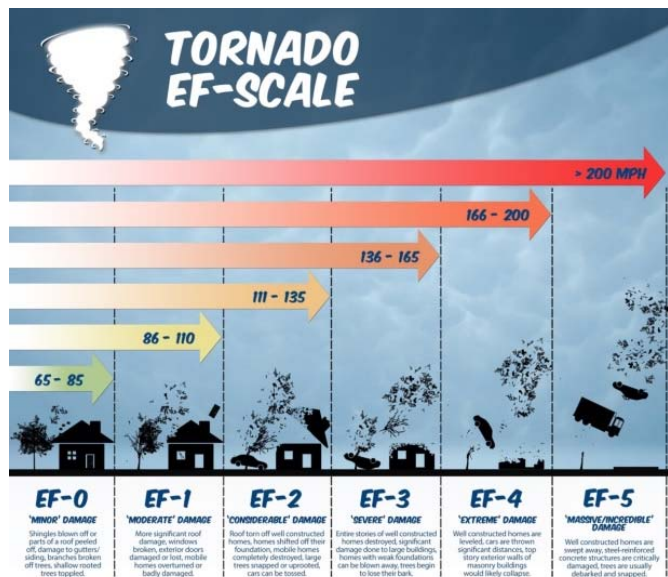




**TORNADOES**

<i>Tornado Snapshot</i>	
"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, pg.42.)	
Period of Occurrence	At any time. Primarily between March and August
Number of Events (1969-2015)	12
Probability of Event In Any Given Year	0.25 per year
Warning time	Seconds to minutes <sup>1</sup>
Potential Impacts	Loss of life and severe property damage. Infrastructure damage
Cause Injury or Death	Potential to cause injury and death
Potential Facility Shutdown	Hours to days or more.
Loss Estimate	\$29,666.67 every four years

Tornados are typically associated with the strongest thunderstorms and are capable of causing tremendous damage. Tornados 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 is considered to cause massive destruction. The following graphic developed by the Insurance Institute for Business & Home Safety and StateFarm shows the wind scales and the damaged expected in each category.



Tornados 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.

## LOCATION

Tornadoes can occur in any area, depending on the storm that they are spawned from. Generally, however, tornados tend to be more common in flat areas, such as those located along the Kanawha River in Region 3. Tornadoes are highly localized events, with damage being limited to the path of the tornado.

## EXTENT

Impact of Tornadoes	
Public Health	Death, injury, PTSD, exacerbation of chronic illnesses
Social	Displacement of population, disruption of normal activities, evacuation, hysteria
Economic	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up
Environmental	Air quality, water quality, change in natural habitat
Infrastructure	Power outages, loss or damage to structures and transportation infrastructure (roads, bridges, rail)

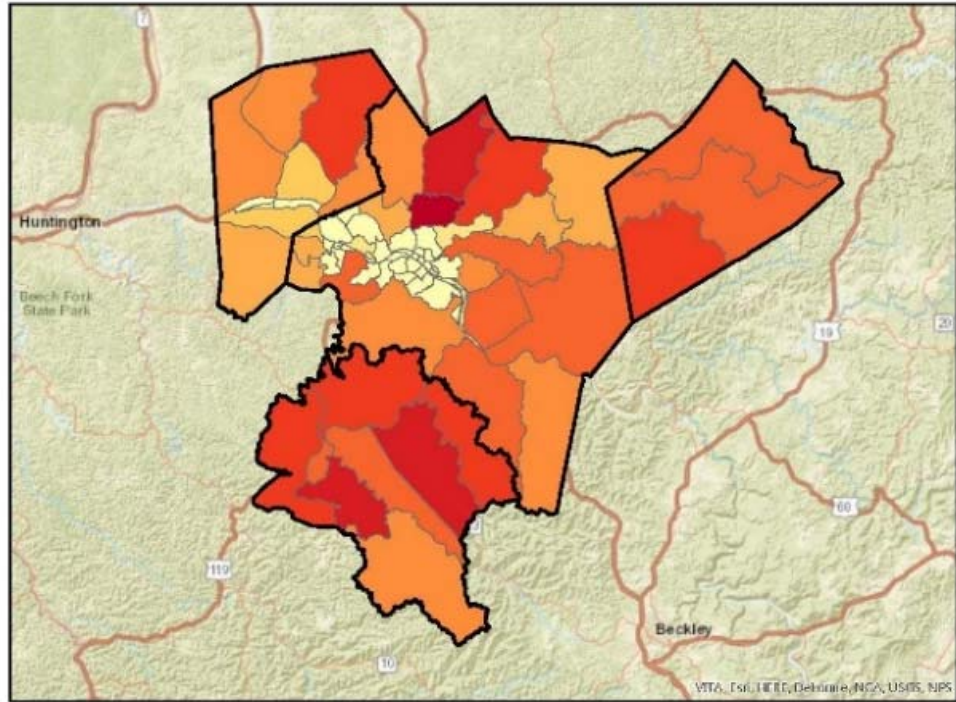
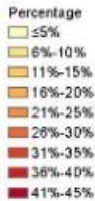
According to NCDRC records, and records from The Tornado Project, there have been twelve tornadoes in Region 3 since 1969. Seven of these occurred in Kanawha County, and the remaining five occurred in Putnam County. There are no recorded instances of tornadoes in either Boone or Clay counties according to the NCDRC data. Two injuries are reported to have been caused by tornadoes, one each in Kanawha and Putnam counties. In total, tornadoes have caused \$356,000 in property damage in the region.

Tornadoes can exacerbate respiratory or cardiac conditions, damage buildings and infrastructure, and damage vegetation. Mental health is also a concern during and after a tornado event. Those suffering from anxiety or post-traumatic stress disorder may be effected. Children and the elderly and the homeless population are vulnerable as they may not be able to provide the proper shelter during a tornado.

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). The map below shows there are areas with large populations living in mobile homes throughout the region.



Percent of Housing Units That Are Mobile Homes



## HISTORICAL OCCURRENCES

### Charleston, Kanawha County

According to NCDC records, a “rotating supercell” formed in southeast Ohio and moved up the Kanawha River Valley, impacting Putnam and Kanawha counties. The storm caused significant damage from wind and hail, while also spawning multiple tornadoes. One of these, an F1, touched down in the Kanawha City area of Charleston, moving up Chappell Hollow. The tornado missed the nearby homes, but still caused damage to multiple buildings through fallen trees. Property damage was reported as \$100,000 in the NCDC data (2016).

### Hurricane, Putnam County

A brief tornado touched down in the evening of October 13, 1999, in Hurricane, on the western border of the county. The F1 tornado damaged a house and its detached garage, though the occupants were able to escape without injury. The incident caused \$80,000 in property damage (NCDC, 2016).



### Blue Creek, Kanawha County

On the evening of March 19, 2008, a low pressure system moved through West Virginia. A line of thunderstorms developed along this front, creating a bow echo as the line moved through Charleston. In addition to damaging straight line winds, a tornado was reported in the Blue Creek area of Kanawha County, northeast of Charleston. The event damaged several structures, rolled a camper into a telephone pole, and lifted a pontoon boat onto a fence. Total property damage of \$40,000 was reported (NCDC, 2016).

Table 2.34

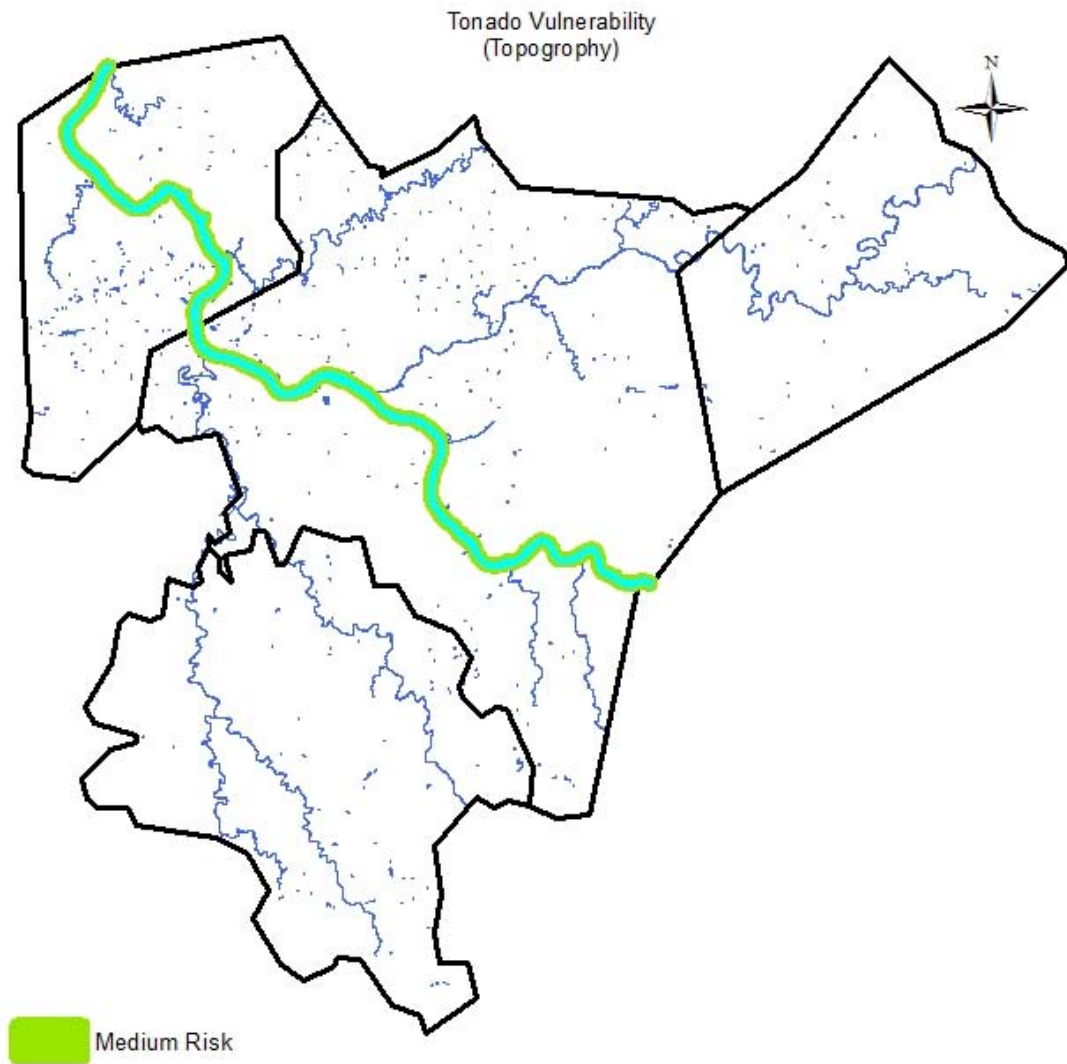
TORNADO EVENTS 1969-2015 (NCDC, 2017)						
Date	County	Scale	Length	Width	Injuries	Damage
4/18/1969	Kanawha	F1	.3 miles	33 yards	1	\$25,000
8/9/1969	Putnam	F1	-	33 yards	0	\$2,500
12/8/1978	Putnam	F0	-	33 yards	1	\$25,000
6/23/1980	Kanawha	F1	.2 miles	17 yards	0	\$25,000
7/9/1980	Kanawha	F1	1.5 miles	30 yards	0	\$25,000
9/14/1990	Kanawha	F0	.2 miles	60 yards	0	\$2,500
6/2/1998	Putnam	F1	.3 miles	40 yards	0	\$20,000
6/2/1998	Kanawha	F1	1.5 miles	80 yards	0	\$100,000
6/2/1998	Kanawha	F0	.5 miles	60 yards	0	\$10,000
10/13/1999	Putnam	F1	.3 miles	200 yards	0	\$80,000
8/9/2000	Putnam	F0	.3 miles	50 yards	0	\$1,000
3/19/2008	Kanawha	EF0	.2 miles	50 yards	0	\$40,000

### LOSS ESTIMATES

Loss estimates for tornado events can be calculated using the historical data available from the NCDC. There have been twelve events recorded in the region between 1969 and 2015. By dividing the number of events by the study period (47 years), an estimate of events per a year is found: 0.25. It is estimated that one tornado event will occur in the region every 4 years. Dividing the total property damage reported in the NCDC by the number of events, a per event property damage estimate is found: \$29,666.67. It is therefore estimated that every four years the region will see this amount of property damage caused by a tornado event.



RISK MAP



\*Based on land topography and historical occurrences

i The National Weather Service can warn of thunderstorms with the potential to spawn a tornado hours in advance, but warning time of the actual formation of a tornado is much shorter.

Research Sources:

- NOAA National Climatic Data Center
- The Tornado Project





**WILDFIRE**

<i>Wildfire Snapshot</i>	
"Uncontrolled combustion or burning of plants in a natural setting, such as a forest, grassland, brush land, or tundra." (Haddow, Bullock, & Coppola, 2014, pg.42.)	
Period of Occurrence	More common during the warm months of the year, but can occur year round, depending on weather
Number of Events (1999-2015)	4
Probability of Event In Any Given Year	0.24 per year
Warning time	Moderate. Fire spread can generally be predicted by weather patterns
Potential Impacts	Damage or destruction of structures in the wildland urban interface. Health impacts from smoke.
Cause Injury or Death	Can cause injury or death to those caught in its path.
Potential Facility Shutdown	Minimal
Loss Estimate	\$12,500 per event

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). Smoke from large fires can travel significant distances, impacting air quality in areas not directly impacted. Reduced air quality can intensify chronic respiratory conditions, especially in the young and elderly.



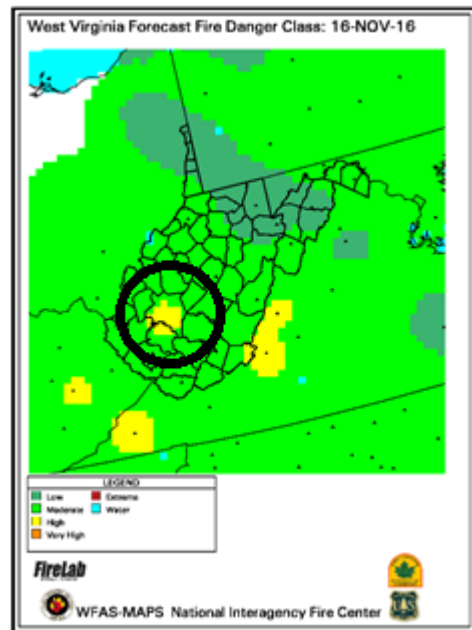
While the annual number of wildfire nationally has been falling since the 1960s, according to the National Interagency Fire Center, the annual average acreage burned has risen. Fewer fires on average are occurring, but these fires are larger and more destructive on average.

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 county. 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.



**LOCATION**

West Virginia is a heavily forested state, and every county within Region 3 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.



## EXTENT

Table 2.35 Impact of Wildfire	
Public Health	Death, injury, illness (respiratory), PTSD, exacerbation of chronic illnesses
Social	Displacement of population, disruption of normal activities, evacuation
Economic	Loss or damage to homes and businesses, disruption of business and income, cost of clean-up
Environmental	Air quality, water quality, change in natural habitat
Infrastructure	Power and water outages, loss or damage to structures

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.) An example of a fire conditions map for West Virginia, from November 2016, is shown. A large area of Kanawha County, and a small northern portion of Boone County, are shown as having a high wildfire hazard, indicating that fires start easily from most causes and are likely to become serious if not suppressed quickly (WV Division of Forestry, 2001).

According to the WV Division of Forestry, the majority of wildfires are caused by human activity. In the spring of 2015, 43% of all reported fires were the result of escaped fire debris, followed by equipment use at 29% and arson at 13%. The NCDRC maintains records on wildfire occurrences. Between 1999 and 2015, four separate wildfire events were reported in Region 3. Two of these events crossed county borders. Only one event, occurring in Kanawha County, is listed as having caused property damage. Putnam County is the only county not listed in the NCDRC data.

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). 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).

## HISTORICAL OCCURRENCES

### **Boone, Clay, & Kanawha Counties**

A week after the last significant rains on November 2<sup>nd</sup>, 1999, a second round of “Indian Summer” weather boosted afternoon temperatures into the upper 60s to the upper 70s on the 9th. Brush fires increased across southern West Virginia. Most of the fires were set by arsonists. The West Virginia Division of Forestry estimated about 38,000 acres burned in this region of the state during the 15 day episode (NCDC, 2016).

### **Boone & Kanawha Counties**

The prolong stretches of Indian summer caused the autumn fire season to peak in November 2001. The WV Division of Forestry estimated over 450 individual fires during the month, burning roughly 37,600 acres. Total acreage affected during the whole autumn fire season was around 75,000 acres from over 800 fires. The state used 400 National Guard troops in 4 one week rotations (NCDC, 2016).

### **Kanawha County**

In the afternoon of March 11<sup>th</sup>, 2014, a 67 year old man near Clendenin was burning some debris near his home. The wind caused the fire to flare up. When firefighters arrived, a barn had caught fire and a small brush fire was burning over a hillside. The firefighters found the man collapsed on the ground. His clothes were not burnt. The preliminary finding was the man died of cardiac arrest, apparently while trying to control the brush fire (NCDC, 2016).

## LOSS ESTIMATES

Loss estimates for wildfire events can be calculated using the historical data available from the NCDC. There have been four events recorded in the region between 1999 and 2015. By dividing the number of events by the study period (17 years), an estimate of events per a year is found: 0.24. It is estimated that one wildfire event will occur in the region approximately every 4 years. Dividing the total property damage reported in the NCDC by the number of events, a per event property damage estimate is found: \$12,500. It is therefore estimated that every four years the region will see this amount of property damage caused by a wildfire event.



RISK MAP



\*Based on historical occurrences and wildland-urban interface

Research Sources:

- NOAA National Climatic Data Center
- West Virginia Division of Forestry
- National Interagency Fire Center





## SYSTEMS DISRUPTION AND COMPLICATING VARIABLES

A number of situations could occur that would result in a disruption to a number of critical systems throughout Region 3. As eluded to in the severe storms profile above, some hazards are complicated by a series of loosely-related variables. Such variables are often considered *cascading hazards*. An example is the severe storms, flooding, landslides, and mudslides event that effected Clay and Kanawha Counties in June 2016. Torrential rain and high winds destroyed critical infrastructure including roads and bridges and knocked out power to thousands of people in Clay and Kanawha Counties. A Kanawha Charleston Health Department release reported that flooding caused sewage and pet, livestock, and wildlife waste to flush into and contaminate natural waters used for recreation. The 2014 Elk River chemical spill provides another example of a cascading situation. When crude 4-methylcyclohexanemethanol leaked into the Elk River, the West Virginia American Water Company treatment plant in Charleston was impacted. Local emergency services established drinking water distribution points throughout the area until tests indicated drinking water was again safe. However, the public's lingering concern about contamination in the water required those distribution points to remain operational for longer than anticipated. In addition to weather-related power outages, structural damage, and public health concerns, cascading hazards in Region 3 could include (but not be limited to) the following.

- Flooding of downstream areas in the event of a dam failure
- Drinking water supply shortages following severe and prolonged drought conditions
- Power outages, ruptured gas lines, etc. following earthquakes
- Road closures resulting from land subsidence



## 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. *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, transportation infrastructure, and major employers. Assets can also be irreplaceable items within the community, such as historical structures or even vulnerable populations (including the elderly or youths).

### 2.3.1 Methodology

Inventorying assets first involves determining what in the community can be affected by a hazard event. The hazard profiles contained in Section 2.2 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 core planning 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.



### **2.3.2 Asset Inventory**

The following tables list assets on a community-by-community basis. Each asset table denotes the name, address, and type of asset for each facility listed as well as a determination of vulnerability for each asset. Vulnerability is listed as either low (L), moderate/medium (M), or high (H). Vulnerability was assessed by mapping the assets and overlaying the hazard areas created during the hazard profiling process.



Table 2.36

### Region 3 Asset List - Boone County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Arch Coal Inc	44 Pine Grove Rd	Wharton	WV	25208			X			M	L	L	L	H	L	H	M	L	M
Ashford Rumble Elementary School	1649 Ashford Nellis Rd	Ashford	WV	25009		X				L	L	L	L	L	L	H	M	L	M
Bias Branch Community Center	18044 Spruce river Rd	Jeffrey	WV	25114					X	L	L	L	L		M	H	M	L	M
Boone Career & Technical Center	3505 Daniel Boone Pkwy	Foster	WV	25081		X				L	L	L	L	I	M	M	M	L	M
Boone County 911 Center	12367 Smoot Ave	Danville	WV	25053	X					L	L	L	L	H	L	M	M	L	M
Boone County Ambulance	1 EMS Circle	Racine	WV	25165	X					L	L	L	L		L	H	M	L	M
Boone County Health Department	213 Kenmoore Dr	Danville	WV	25053	X					L	L	L	L	L	L	M	M	L	M
Boone County Sheriff Department	206 Court St	Madison	WV	25130	X					L	L	L	L	L	L	M	M	L	M
Boone County Sheriff Department - Racine Office	John Slack Memorial Park	Racine	WV	25165	X					L	L	L	L	L	L	H	M	L	M
Boone Nursing and Rehab Center	462 Kenmoore Dr	Danville	WV	25053		X				L	L	L	L	L	L	M	M	L	M
Briar Creek Coal	1313 Bull Creek Rd	Ashford	WV				X			L	L	L	L	L	L	H	M	L	M
Brookview Elementary School	1 Learning Way	Foster	WV	25081		X				L	L	L	L	H	L	M	M	L	M
Christian Faith Academy	18972 Pond Fork Rd	Van	WV	25206		X				L	L	L	L	L	L	H	M	L	M

Table 2.36

### Region 3 Asset List - Boone County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Foster Community Center	435 Foster Rd	Foster	WV	25081					X	L	L	L	L	H	L	H	M	L	M
Health & Human Services Department	156 Resource Ln	Foster	WV	25081	X					L	L	L	L	H	L	M	M	L	M
J.M. Protan Community Center	22654 Coal River Rd	Orgas	WV	25148					X	L	L	L	L	H	M	H	M	L	M
Jeffrey Spencer Elementary School	3277 Hewett Creek Rd	Hewett	WV	25108		X				L	L	L	L		L	H	M	L	M
Jupiter Coal Co Inc	98 Bob White	Van	WV	25206			X			L	L	L	L		L	H	M	L	M
Jupiter Coal Co Inc	822 Brandy Green Br	Gordon	WV				X			L	L	L	L		L	H	M	L	M
Medic Station 20	610 Kenmoore Dr	Danville	WV	25053	X					L	L	L	L	L	L		M	L	M
Medic Station 60	453 Chap Rd	Van	WV	25206	X					L	L	L	L		L	H	M	L	M
Nellis Elementary School	1 School Way	Nellis	WV	25142		X				L	L	L	L	L	L	H	M	L	M
Peabody Coal Co	54912 Pond Fork Rd	Wharton	WV				X			L	L	L	L	H	L	H	M	L	M
Pine Ridge Coal	308 School House Rd	Seth	WV	25181			X			L	L	L	L	L	L	H	M	L	M
Prestera Center for Mental Health	376 Kenmore Dr	Danville	WV	25053	X					L	L	L	L	L	L	M	M	L	M
Progress Coal Co	1478 Robinson Creek Rd	Uneeda	WV	25205			X			L	L	L	L	L	H	H	M	L	M
Racine Community Center	446 John Slack Circle	Racine	WV	25165					X	L	L	L	L	L	L	H	M	L	M
Raleigh Boone Medical Center	37456 Coal River Rd	Whitesville	WV	25209	X					L	L	L	L	L	M	H	M	L	M
Ramage Elementary School	15908 Spruce River Rd	Jeffrey	WV	25114		X				L	L	L	L	L	M	H	M	L	M



Table 2.36

### Region 3 Asset List - Boone County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Salamy Building	38117 Coal River Rd	Whitesville	WV	25209					X	L	L	L	L	L	M	H	M	L	M
Sherman Elementary School	7487 Coal River Rd	Comfort	WV	25049		X				L	L	L	L	L	M	H	M	L	M
Sherman high School	2008 Coal River Rd	Seth	WV	25181		X				L	L	L	L	L	M	H	M	L	M
Sherman Junior High School	9846 Coal River Rd	Seth	WV	25181		X				L	L	L	L	L	M	H	M	L	M
Southern WV Community and Tech College	3505 Daniel Boone Pkwy	Foster	WV	25081		X				L	L	L	L	L	M	L	M	L	M
Spruce River Volunteer Fire Department	663 Hewett Rd	Jeffrey	WV	25114	X					L	L	L	L	L	L	L	M	L	M
Van Community Center	443 Chap Rd	Van	WV	25206					X	L	L	L	L	L	L	L	M	L	M
Van Elementary School	338 Van High School Rd	Van	WV	25206		X				L	L	L	L	H	L	L	M	L	M
Van Jr/Sr High School	913 Van High School Rd	Van	WV	25206		X				L	L	L	L	H	L	L	M	L	M
Van Volunteer Fire Department	45 Sidney St	Van	WV	25206	X					L	L	L	L	H	L	L	M	L	M
Water Ways Water Park	628 Waterway Rd	Julian	WV	25529			X			L	L	L	L	H	M	L	M	L	M
Wharton Barrett Community Center	178 Bennett Dr	Wharton	WV	25208					X	L	L	L	L	L	L	L	M	L	M
Wharton Barrett Volunteer Fire Department	35279 Pond Fork Rd	Wharton	WV	25208	X					L	L	L	L	H	L	L	M	L	M

Table 2.36

### Region 3 Asset List - Boone County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Wharton Medical Center	WV 85	Wharton	WV	25208	X					L	L	L	L	H	M	L	M	L	M
Whitesville Elementary School	37949 Coal River Rd	Whitesville	WV	25209		X				L	L	L	L	L	M	L	M	L	M
Whitesville Volunteer Fire Department	1103 Raleigh St	Whitesville	WV	25209	X					L	L	L	L	L	L	L	M	L	M
WV State Police, Troop 5, Madison	347 Kenmoore Dr	Danville	WV	25053	X					L	L	L	L	L	L	L	M	L	M

Table 2.37

### Region 3 Asset List - Danville

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Boone Memorial Home Care	260 Mall Rd	Danville	WV	25053		X				L	L	L	L	L	L	L	M	L	M
BB&T Bank	1447 Smoot Ave	Danville	WV	25053			X			L	L	L	L	H	M	L	M	L	M
Byrnside Hardware	107 4th St	Danville	WV	25053			X			L	L	L	L		L	L	M	L	M
CSX	311 3rd Ave	Danville	WV	25053	X					L	L	L	L	H	L	L	M	L	M
Danville Fire Department	220 Park Ave	Danville	WV	25053	X					L	L	L	L	H	L	L	M	L	M
Danville Police Department	731 Hopkins Ave	Danville	WV	25053	X					L	L	L	L	H	L	L	M	L	M
Danville Town Hall	500 Hopkins Ave	Danville	WV	25053	X					L	L	L	L	L	L	L	M	L	M
Exxon	Smoot Ave & 3rd St	Danville	WV	25053					X	L	L	L	L	H	M	L	M	L	M
Go Mart	117 Smoot Ave	Danville	WV	25053					X	L	L	L	L	H	M	L	M	L	M
Kroger	Rt 85 & Delta Rd	Danville	WV	25053			X			L	L	L	L	L	M	L	M	L	M
Madison Danville Community Center	Lick Creek Rd	Danville	WV	25053					X	L	L	L	L	L	L	L	M	L	M

Table 2.38

### Region 3 Asset List - Madison

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
BMH Clinic	701 Madison Ave	Madison	WV	25130	X					L	L	L	L	L	M	L	M	L	M
Boone County Adult Learning Center	333 1st St W	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Boone County Ambulance Authority	261 Washington Ave	Madison	WV	25130	X					L	L	L	L	L	L	L	M	L	M
Boone County Annex	206 Court St	Madison	WV	25130	X					L	L	L	L	L	L	L	M	L	M
Boone County Board of Education	69 Avenue B	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Boone County Coal Museum	347 Main St	Madison	WV	25130					X	L	L	L	L	L	L	L	M	L	M
Boone County Courthouse	200 State St	Madison	WV	25130	X					L	L	L	L	L	M	L	M	L	M
Boone County Day Report	327 State St	Madison	WV	25130	X					L	L	L	L	L	M	L	M	L	M
Boone County Economic Development	1 Avenue C	Madison	WV	25130	X					L	L	L	L	L	L	L	M	L	M
Boone County Heritage and Arts	345 Main St	Madison	WV	25130					X	L	L	L	L	L	L	L	M	L	M
Boone County Maintenance Garage	36 Avenue B	Madison	WV	25130	X					L	L	L	L	L	L	L	M	L	M
Boone County School	404 Riverside Dr	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Boone Memorial Hospital	701 Madison Ave	Madison	WV	25130	X					L	L	L	L	L	M	L	M	L	M
Faith Bible Church	514 Riverside Dr	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M

Table 2.38

### Region 3 Asset List - Madison

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Freedom Baptist Fellowship Church	269 Jackson Ave	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Gospel Center Tabernacle	224 Riverside Dr	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Harvest Jubilee Revival	331 State St	Madison	WV	25130		X				L	L	L	L	L	M	L	M	L	M
Kroger	3256 Smoot Ave	Madison	WV	25130			X			L	L	L	L	L	M	L	M	L	M
Madiso United Methodist Church	367 State St	Madison	WV	25130		X				L	L	L	L	L	M	L	M	L	M
Madison Animal Hospital	178 State St	Madison	WV	25130					X	L	L	L	L	L	M	L	M	L	M
Madison Baptist Church	426 2nd St	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Madison Christian Center	790 Old River Rd	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Madison Church of Christ	108 Ruckers St	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Madison City Hall	255 Washington Ave	Madison	WV	25130	X					L	L	L	L	L	L	L	M	L	M
Madison Civic Center	261 Washington Ave	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Madison Elementary School	150 Josephine Ave	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Madison Medical PLLC	471 Main St	Madison	WV	25130		X				L	L	L	L	H	L	L	M	L	M
Madison Middle School	404 Riverside Dr	Madison	WV	25130		X				L	L	L	L	H	L	L	M	L	M



Table 2.38

### Region 3 Asset List - Madison

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Madison Volunteer Fire Department	1 Firehouse Square	Madison	WV	25130	X					L	L	L	L	H	L	L	M	L	M
Main Street Baptist Church	335 Main St	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Maranthan Bible Missionary Baptist Church	504 King Ave	Madison	WV	25130		X				L	L	L	L	H	L	L	M	L	M
McDonalds	WV 85	Madison	WV	25130			X			L	L	L	L	L	M	L	M	L	M
New Harvest Church of Nazarene	309 State St	Madison	WV	25130		X				L	L	L	L	L	M	L	M	L	M
Rescare Inc	330 Jackson Ave	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Revolution Mines	6909 Jacks Branch Rd	Madison	WV	25130			X			L	L	L	L	L	L	L	M	L	M
Rural Health Clinic BMH	173 State St	Madison	WV	25130	X					L	L	L	L	L	M	L	M	L	M
Scott High School	1 Skyhawk Pl	Madison	WV	25130		X				L	L	L	L	H	L	L	M	L	M
St. Mary Catholic Church	55 Madison Ave	Madison	WV	25130		X				L	L	L	L	L	M	L	M	L	M
U.S. Post Office	650 Spruce River Rd	Madison	WV	25130					X	L	L	L	L	L	M	L	M	L	M
Veterans Memorial Building	269 Washington Ave	Madison	WV	25130					X	L	L	L	L	L	L	L	M	L	M
West Madison Baptist Church	401 4th St	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Woman Care DBA Family Care	5515 Main ST	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M
Zion Baptist Church	382 3rd St	Madison	WV	25130		X				L	L	L	L	L	L	L	M	L	M

Table 2.39

### Region 3 Asset List - Sylvester

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Sylvester Community Center	32 Coal River Rd	Sylvester	WV	25193					X	L	L	L	L	L	M	L	M	L	M
Sylvester Town Hall	32 Coal River Rd	Sylvester	WV	25193	X					L	L	L	L	L	M	L	M	L	M
U.S. Post Office	32832 Coal River Rd	Sylvester	WV	25193					X	L	L	L	L	L	M	L	M	L	M

Table 2.40

### Region 3 Asset List - Whitesville

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
CSX Transportation	1 Lewis St	Whitesville	WV	25209	X					L	L	L	L	L	L	L	M	L	M
Marfolk Coal Co	Marfolk Rd & Rt 3	Whitesville	WV	25209		X				L	L	L	L	L	M	L	M	L	M
Whitesville Town Hall	39140 Coal River Rd	Whitesville	WV	25209	X					L	L	L	L	H	M	L	M	L	M
Daniel Chevrolet	39553 Coal River Rd	Whitesville	WV	25209			X			L	L	L	L	H	M	L	M	L	M

Table 2.41

### Region 3 Asset List - Clay County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Big Otter Clinic	797 Clinic Dr	Ivydale	WV	25113	X					L	L	L	L	L	L	L	M	L	M
Big Otter Elementary School	59 Ossia Rd	Duck	WV	25063		X				L	L	L	L	L	M	L	M	L	M
Bog Otter Fire Department	5462 Big Otter Hwy	Ivydale	WV	25113	X					L	L	L	L	L	M	L	M	L	M
Clay Christian Academy	1594 Triplett Ridge Rd	Clay	WV	25043		X				L	L	L	L	L	L	L	M	L	M
Clay County Ambulance	255-259 Main St	Clay	WV	25043	X					L	L	L	L	L	M	L	M	L	M
Clay County Courthouse	245 Main St	Clay	WV	25043	X					L	L	L	L	L	M	L	M	L	M
Clay Health Care Center	1053 Clinic Dr	Ivydale	WV	25113	X					L	L	L	L	L	L	L	M	L	M
Clay Primary Care Clinic	122 Center St	Clay	WV	25043	X					L	L	L	L	L	L	L	M	L	M
Clay Public Service District	247 Main St	Clay	WV	25043	X					L	L	L	L	L	M	L	M	L	M
Cranberry Pipeline Corp	WV 16	Clay	WV	25043			X			L	L	L	L	L	M	L	M	L	M
H.E. White Elementary School	501 Bomont Rd	Bomont	WV	25030		X				L	L	L	L	L	L	L	M	L	M
Lizemore Elementary School	100 Lizemore Lion Rd	Lizemore	WV	25125		X				L	L	L	L	L	L	L	M	L	M
Clay Roane Public Service District	1100 Elkhurst Rd	Prociuous	WV	25164	X					L	L	L	L	H	L	L	M	L	M

Table 2.42

### Region 3 Asset List - Clay

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Clay County Development Corp	PO Box 455	Clay	WV	25043		X				L	L	L	L	L	L	L	M	L	L
Clay City Hall	956 Main St	Clay	WV	25043	X					L	L	L	L	L	M	L	M	L	L
Clay County Elementary School	168 Church St	Clay	WV	25043		X				L	L	L	L	L	L	L	M	L	L
Clay County High School	1 Panther Dr	Clay	WV	25043		X				L	L	L	L	L	L	L	M	L	L
Clay County Middle School	419 Church St	Clay	WV	25043		X				L	L	L	L	L	L	L	M	L	L
Clay Fire Department	171 Church St	Clay	WV	25043	X					L	L	L	L	L	L	L	M	L	L
U.S. Post Office	54 Main St	Clay	WV	25043					X	L	L	L	L	L	M	L	M	L	L



Table 2.43

### Region 3 Asset List - Kanawha County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
130th Airlift Wing Fire Department	1679 Coonskin Dr	Charleston	WV	25311	X					L	L	L	L	L	L	L	M	L	M
Alum Creek Elementary School	Rt 7 Box 279A	South Charleston	WV	25309		X				L	L	L	L	L	L	L	M	L	M
Amherst Madison	2 Port Amherst Dr	Charleston	WV			X				L	L	L	L	L	M	L	M	L	M
Andrew Heights Elementary School	7776 Coal River Rd	Tornado	WV	25202		X				L	L	L	L	H	L	L	M	L	M
Bayer Crop Science	WV 25	Institute	WV	25112			X			L	L	L	L	L	H	L	M	L	M
Belle's Residential Board and Care	2619 Roosevelt Ave	St. Albans	WV	25177		X				L	L	L	L	L	M	L	M	L	M
Bible Baptist Christian School	7020 Sissonville Dr	Charleston	WV	25320		X				L	L	L	L	L	M	L	M	L	M
Bonham Elementary School	Rt 1 Box 425A	Charleston	WV	25312		X				L	L	L	L	L	L	L	M	L	M
Bridge Elementary School	5120 Elk River Rd N	Elkview	WV	25071		X				L	L	L	L	H	M	L	M	L	M
Cabin Creek Volunteer Fire Department	10217 Cabin Creek Rd	Eskdale	WV	25075	X					L	L	L	L	H	M	L	M	L	M
Carver Career Center	4799 Midland Rd	Charleston	WV	25306		X				L	L	L	L	H	M	L	M	L	M
Catenary Coal Co	5914 Cabin Creek Rd	Daws	WV	25306			X			L	L	L	L	L	L	L	M	L	M
Cedar Ridge Health and Rehab	302 Cedar Ridge Rd	Sissonville	WV	25320		X				L	L	L	L	L	L	L	M	L	M
Chamberlain Elementary School	4901 Venable Ave SE	Charleston	WV	25304		X				L	L	L	L	L	L	L	M	L	M

Table 2.43

### Region 3 Asset List - Kanawha County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Christian Family Academy	5345 Big Tyler Rd	Charleston	WV	25313		X				L	L	L	L	L	M	L	M	L	M
Coal River Energy LLC	123 Long Shoals Bch	Alum Creek	WV	25003			X			L	L	L	L	L	L	L	M	L	M
Communication Test Design Inc	418 Goff Mountain Rd	Charleston	WV	25313			X			M	L	L	L	L	M	L	M	L	M
Cross Lanes Christian School	5330 Floradale Dr	Cross Lanes	WV	25313			X			L	L	L	L	L	L	L	M	L	M
Cross Lanes Elementary School	5525 Big Tyler Rd	Charleston	WV	25313		X				L	L	L	L	L	M	L	M	L	M
Davis Creek / Ruthdale Volunteer Fire Department	RR 8 Box 401	South Charleston	WV	25309	X					L	L	L	L	L	L	L	M	L	M
Dunbar Intermediate School	1330 Myers Ave	Dunbar	WV	25064		X				L	L	L	L	L	L	L	M	L	M
Dupont Middle School	301 W 34th St	Belle	WV	25015		X				L	L	L	L	L	L	L	M	L	M
Elk Center Community Education	3320 Pennsylvania Ave	Chas	WV	25302		X				L	L	L	L	L	M	L	M	L	M
Elk Elementary School	3320 Pennsylvania Ave	Chas	WV	25302		X				L	L	L	L	L	M	L	M	L	M
Elk Valley Christian School	58 Mount Pleasant Dr	Elkview	WV	25071		X				L	L	L	L	L	L	L	M	L	M
Elkview Middle School	301 W 34th St	Belle	WV	25015		X				L	L	L	L	L	L	L	M	L	M
Finn Elementary School	2006 McClure Pkwy	Charleston	WV	25312		X				L	L	L	L	L	M	L	M	L	M

Table 2.43

### Region 3 Asset List - Kanawha County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Frame Volunteer Fire Department	115 Poca Fork Rd	Elkview	WV	25071	X					L	L	L	L	L	L	L	M	L	M
Institute Volunteer Fire Department	301 Dubois St	Institute	WV	25112	X					L	L	L	L	L	M	L	M	L	M
Jacobs Engineering Group	5000 Oak River Rd S	Elkview	WV	25071			X			L	L	L	L	L	L	L	M	L	M
Kanawha County Courthouse	409 Virginia St E	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Lakewood Volunteer Fire Department	2627 Shadyside Rd	St. Albans	WV	25177	X					L	L	L	L	L	L	L	M	L	M
Loudendale Volunteer Fire Department	51 Selbe Ln	Loudendale	WV	25314	X					L	L	L	L	L	L	L	M	L	M
Malden Elementary School	4001 Salines Dr	Charleston	WV	25306		X				L	L	L	L	L	L	L	M	L	M
Malden Volunteer Fire Department	3924 Malden Dr	Charleston	WV	25306	X					L	L	L	L	L	L	L	M	L	M
Mary Ingles Elementary School	Campbells Creek Dr	Tad	WV	25201		X				L	L	L	L	L	L	L	M	L	M
NGK	1 NGK Dr	Sissonville	WV	25320			X			L	L	L	L	L	L	L	M	L	M
Piedmont Elementary School	203 Bradford St	Charleston	WV	25301		X				L	L	L	L	L	L	L	M	L	M
Pinch Elementary School	300 S Pinch Rd	Elkview	WV	25071		X				L	L	L	L	L	L	L	M	L	M
Pinch Volunteer Fire Department St. 1	231 N Pinch Rd	Elkview	WV	25071	X					L	L	L	L	L	L	L	M	L	M

Table 2.43

### Region 3 Asset List - Kanawha County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Pinch Volunteer Fire Department St. 2	19 Pennsylvania Ave	Charleston	WV	25302	X					L	L	L	L	L	M	L	M	L	M
Point Harmony Elementary School	5312 Big Tyler Rd	Cross Lanes	WV	25313		X				L	L	L	L	L	M	L	M	L	M
Rand Volunteer Fire Department	5308 Church Dr	Charleston	WV	25306	X					L	L	L	L	L	L	L	M	L	M
Riverside High School	1 Warrior Way	Belle	WV	25015		X				L	L	L	L	L	L	L	M	L	M
Sharon Dawes Elementary School	149 Cabin Creek Rd	Miami	WV	25314		X				L	L	L	L	H	L	L	M	L	M
Sissonville Elementary School	8324 Sissonville Dr	Sissonville	WV	25320		X				L	L	L	L	L	L	L	M	L	M
Sissonville high School	6100 Sissonville Dr	Charleston	WV	25312		X				L	L	L	L	L	L	L	M	L	M
Sissonville Middle School	100 Middle School Ln	Charleston	WV	25312		X				L	L	L	L	L	L	L	M	L	M
Sissonville Volunteer Fire Department Goff Station	8405 Sissonville Dr	Sissonville	WV	25312	X					L	L	L	L	L	L	L	M	L	M
Sissonville Volunteer Fire Department Hutton Station	10 Middle School Ln	Charleston	WV	25312	X					L	L	L	L	L	L	L	M	L	M
Sissonville Volunteer Fire Department Johnson Station	383 Call Rd	Charleston	WV	25312	X					L	L	L	L	L	L	L	M	L	M

Table 2.43

### Region 3 Asset List - Kanawha County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Sissonville Volunteer Fire Department Loftis Station	626 Edens Fork Rd	Charleston	WV	25312	X					L	L	L	L	L	L	L	M	L	M
Smiths Foodfair	10 Elk Plaza	Elkview	WV	25071			X			L	L	L	L	L	M	L	M	L	M
Speed Mining Inc	903 Dawes Hollow Rd	Dawes	WV	25054			X			L	L	L	L	L	L	L	M	L	M
Terraquip Equipment Rental	600 New Goff Mountain Rd	Cross Lanes	WV	25313			X			L	L	L	L	L	M	L	M	L	M
Tyler Mountain Volunteer Fire Department	5380 Big Tyler Rd	Cross Lanes	WV	25313	X					L	L	L	L	L	M	L	M	L	M
Universal School	1 Valley Dr	Charleston	WV	25303		X				L	L	L	L	L	L	L	M	L	M
Vineyards Care Home	2603 Knox Ave	St. Albans	WV	25177		X				L	L	L	L	L	L	L	M	L	M
West Side Volunteer Fire Department	256 W Main St	St	WV	25177	X					L	L	L	L	L	L	L	M	L	M



Table 2.44

### Region 3 Asset List - Belle

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Midland Trail Elementary School	200 Ferry St	Diamond	WV	25015		X				L	L	L	L	L	L	L	M	L	M
Belle Elementary School	401 E 6th St	Belle	WV	25015		X				L	L	L	L	H	L	L	M	L	M
Belle Police Department	1100 E Dupont Ave	Belle	WV	25015	X					L	L	L	L	L	M	L	M	L	M
Belle Town Hall	1100 E Dupont Ave	Belle	WV	25015	X					L	L	L	L	L	M	L	M	L	M
Walker Machinery	1400 E Dupont Ave	Belle	WV	25015			X			L	L	L	L	H	M	L	M	L	M
U.S. Post Office	814 E Dupont Ave	Belle	WV	25015					X	L	L	L	L	L	M	L	M	L	M
Perry's Animal Hospital	112 E Dupont Ave	Belle	WV	25015					X	L	L	L	L	H	M	L	M	L	M
Huntington Bank	300 E Dupont Ave	Belle	WV	25015			X			L	L	L	L	H	M	L	M	L	M

Table 2.45

### Region 3 Asset List - Cedar Grove

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Cedar Grove Elementary School	200 John St	Cedar Grove	WV	25039		X				L	L	L	L	H	M	L	M	L	L
Cedar Grove Middle School	200 John St	Cedar Grove	WV	25039		X				L	L	L	L	H	M	L	M	L	L
Cedar Grove Police Department	302 Alexander St	Cedar Grove	WV	25039	X					L	L	L	L	L	L	L	M	L	L
Cedar Grove Town Hall	302 Alexander St	Cedar Grove	WV	25039	X					L	L	L	L	L	L	L	M	L	L
Cedar Grove Fire Department	311 William St	Cedar Grove	WV	25039	X					L	L	L	L	L	L	L	M	L	L
Mammoth Coal	Kelly's Creek Rd	Cedar Grove	WV	25039			X			L	L	L	L	L	M	L	M	L	L
U.S. Post Office	401 S George St	Cedar Grove	WV	25039					X	L	L	L	L	L	L	L	M	L	L

Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Airgas	905 Morris St	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
Alcoholism and Drug Detox Help	3501 MacCorkle Ave SE	Charleston	WV	25304		X				L	L	L	L	L	M	L	M	L	M
All-Aid Services	612 Virginia St E	Charleston	WV	25301		X				L	L	L	L	L	L	L	M	L	M
Amtrak Station	350 MacCorkle Ave Se	Charleston	WV	25314	X					L	L	L	L	L	M	L	M	L	M
Appalachian Power Co	304 29th St W	Charleston	WV	25387	X					L	L	L	L	L	M	L	M	L	M
Appalachian Tire Products	27 Clendenin St	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
Appalachian Tire Products	2907 4th St	Charleston	WV	25387			X			L	L	L	L	L	L	L	M	L	M
Appalachian Tire Products	1 Westmoreland Rd	Charleston	WV	25302			X			L	L	L	L	L	L	L	M	L	M
Arc of the Three Rivers	1021 Quarrier St	Charleston	WV	25301					X	L	L	L	L	L	L	L	M	L	M
Armstrong World Industries	5107 Country Squire Ln	Charleston	WV	25313			X			L	L	L	L	L	L	L	M	L	M
Arthur B Hodges Center	500 Morris St	Charleston	WV	25301		X				L	L	L	L	L	L	L	M	L	M
Barnes-Wellford House	66 Abney Circle	Charleston	WV	25314				X		L	L	L	L	L	L	L	M	L	M
BB&T	300 Summers St	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
BB&T	501 Tennessee Ave	Charleston	WV	25302			X			L	L	L	L	L	L	L	M	L	M
Bert Wolfe Ford	1900 Patrick St Plaza	Charleston	WV	25387			X			L	L	L	L	L	M	L	M	L	M

Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Bert Wolfe Warehouse Distributor	1900 Patrick St Plaza	Charleston	WV	25387			X			L	L	L	L	L	M	L	M	L	M
Bible Center School	1111 Oakhurst Dr	Charleston	WV	25314		X				L	L	L	L	L	M	L	M	L	M
Bird Haven	733 Myrtle Rd	Charleston	WV	25314				X		L	L	L	L	L	L	L	M	L	M
Bougemont Complex	Bougemont Dr	Charleston	WV	25314				X		L	L	L	L	L	L	L	M	L	M
Breezemont	915 Breezemont Dr	Charleston	WV	25302				X		L	L	L	L	L	L	L	M	L	M
Briarwood	1240 Staunton Rd	Charleston	WV	25314				X		L	L	L	L	L	L	L	M	L	M
Bridges	Various Locations	Charleston	WV		X					L	L	L	L	L	M	L	M	L	M
Bureau of Alcohol, Tobacco and Firearms	300 Summers St	Charleston	WV	25301	X					L	L	L	L	L	M	L	M	L	M
Cabela's	200 Cross Terrace Blvd	Charleston	WV	25309			X			L	L	L	L	L	L	L	M	L	M
CAMC Federal Credit Union	3400 MacCorkle Ave SE	Charleston	WV	25304			X			L	L	L	L	L	M	L	M	L	M
CAMC General Hospital	501 Morris St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
CAMC Memorial Hospital	3200 MacCorkle Ave SE	Charleston	WV	25304	X					L	L	L	L	L	M	L	M	L	M
Capital City Nursing Home	1501 Virginia St E	Charleston	WV	25311		X				L	L	L	L	L	L	L	M	L	M
Capital Area Svc Co Inc	200 Kanawha Blvd	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
Capital High School	1500 Greenbrier St	Charleston	WV	25311		X				L	L	L	L	L	M	L	M	L	M
Catenary Coal Co	42 Rensford Star Rte	Charleston	WV	25306			X			L	L	L	L	L	L	L	M	L	M

Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Chandler Elementary School	1900 School St	Charleston	WV	25387		X				L	L	L	L	L	L	L	M	L	M
Charleston Baptist Temple	209 Morris st	Charleston	WV	25301					X	L	L	L	L	L	L	L	M	L	M
Charleston Catholic High School	1033 Virginia St E	Charleston	WV	25301		X				L	L	L	L	L	L	L	M	L	M
Charleston City Collector's Office	915 Quarrier St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Charleston City Employee Health	601 Morris St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Charleston City Hall	501 Virginia St E	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Charleston City Judge's Chambers	111 Court St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Charleston Civic Center	200 Civic Center Dr	Charleston	WV	25301					X	L	L	L	L	L	L	L	M	L	M
Charleston Police Department	501 Virginia St E	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Charleston Economic and Community	105 McFarland St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Charleston Engineering	105 McFarland St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Charleston Engineering Operations	208 26th St W	Charleston	WV	25387	X					L	L	L	L	L	M	L	M	L	M
Charleston Engineering Traffic	1100 Pennsylvania Ave	Charleston	WV	25302	X					L	L	L	L	L	M	L	M	L	M



Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Charleston Fire Department, Sta 1	300 Morris St	Charleston	WV	25301	X					L	L	L	L	L	M	L	M	L	M
Charleston Fire Department, Sta 2	808 Virginia St	Charleston	WV	25302	X					L	L	L	L	L	M	L	M	L	M
Charleston Fire Department, Sta 3	822 Oakwood Rd	Charleston	WV	25314	X					L	L	L	L	L	M	L	M	L	M
Charleston Fire Department, Sta 4	1810 Oakridge Dr	Charleston	WV	25311	X					L	L	L	L	L	L	L	M	L	M
Charleston Fire Department, Sta 5	918 Bridge St	Charleston	WV	25314	X					L	L	L	L	L	L	L	M	L	M
Charleston Fire Department, Sta 6	5008 MacCorkle Ave	Charleston	WV	25304	X					L	L	L	L	L	M	L	M	L	M
Charleston Fire Department, Sta 7	1280 Cora St	Charleston	WV	25302	X					L	L	L	L	L	L	L	M	L	M
Charleston Fire Department, Sta 8	208 Copenhaver Dr	Charleston	WV	25387	X					L	L	L	L	L	L	L	M	L	M
Charleston Fire Department, Repair Shop	808 Virginia St	Charleston	WV	25302	X					L	L	L	L	L	M	L	M	L	M
Charleston Fire Department Training Office	808 Virginia St	Charleston	WV	25302	X					L	L	L	L	L	M	L	M	L	M
Charleston Job corp	1000 Curtis Price Way	Charleston	WV	25311					X	L	L	L	L	L	L	L	M	L	M
Charleston Joint Apprentice	3601 James Ave	Charleston	WV	25387			X			L	L	L	L	L	M	L	M	L	M
Charleston Parking 1	600 Washington St E	Charleston	WV	25301	X					L	L	L	L	L	M	L	M	L	M

Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Chase Bank	1625 Washington St E	Charleston	WV	25311			X			L	L	L	L	L	M	L	M	L	M
Chase Bank	707 Virginia St E	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
Chesapeake Energy	900 Pennsylvania Ave	Charleston	WV	25302	X					L	L	L	L	L	M	L	M	L	M
Chesapeake Energy	414 Summers St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
City Holding Co	25 Gatewater Rd	Charleston	WV	25313			X			M	L	L	L	L	L	L	M	L	M
City National Bank	10 Hale St	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
City National Bank	1004 Bridge Rd	Charleston	WV	25314			X			L	L	L	L	L	L	L	M	L	M
Clay Center Arts and Sciences	1 Clay Square	Charleston	WV	25301					X	L	L	L	L	L	M	L	M	L	M
Conquerors Christian School	2400 6th Ave	Charleston	WV	25387	X					L	L	L	L	L	L	L	M	L	M
Cracker Barrel	5720 MacCorkle Ave SE	Charleston	WV	25304			X			L	L	L	L	L	M	L	M	L	M
Craik-Patton House	2809 Kanawah Blvd E	Charleston	WV	25311				X		L	L	L	L	L	M	L	M	L	M
Daily Gazette Newspaper	1001 Virginia St E	Charleston	WV	25301					X	L	L	L	L	L	L	L	M	L	M
Department of Environmental Protection	601 57th St SE	Charleston	WV	25304	X					L	L	L	L	L	L	L	M	L	M
Disability Determination Section	500 Quarrier St	Charleston	WV	25301		X				L	L	L	L	L	L	L	M	L	M
Edgewood Country Club	1600 Edgewood Dr	Charleston	WV	25302			X			L	L	L	L	L	L	L	M	L	M
Elizabeth Memorial School	108 Oakwood Rd	Charleston	WV	25314		X				L	L	L	L	L	L	L	M	L	M
Embassy Suites	300 Court St	Charleston	WV	25301			X			L	L	L	L	L	M	L	M	L	M

Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Equitable Production Co	1710 Pennsylvania Ave	Charleston	WV	25302			X			L	L	L	L	H	M	L	M	L	M
Eye & Ear Clinic	1306 Kanawha Blvd E	Charleston	WV	25301		X				L	L	L	L	L	L	L	M	L	M
Fairhaven Christian School	988 Fairhaven Dr	Charleston	WV	25306		X				L	L	L	L	L	L	L	M	L	M
Garnett Career Center	422 Dickinson St	Charleston	WV	25301		X				L	L	L	L	L	L	L	M	L	M
Genesis Health Care	800 Association Dr	Charleston	WV	25311		X				L	L	L	L	L	L	L	M	L	M
George Washington High School	1522 Tennis Club Rd	Charleston	WV	25314		X				L	L	L	L	L	L	L	M	L	M
Grandview elementary School	959 Woodward Dr	Charleston	WV	25312		X				L	L	L	L	L	L	L	M	L	M
Health Smart Benefit Solutions	602 Virginia St E	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
Highland Hospital Children's Unit	300 56th St SE	Charleston	WV	25304	X					L	L	L	L	L	L	L	M	L	M
Holiday Inn	107 Alex Ln	Charleston	WV	25304			X			L	L	L	L	L	L	L	M	L	M
Holiday Inn	100 Civic Center Dr	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
Holz Elementary School	1505 Hampton Rd	Charleston	WV	25134		X				L	L	L	L	L	L	L	M	L	M
Horace Mann Middle School	4300 MacCorkle Ave SE	Charleston	WV	25304		X				L	L	L	L	L	M	L	M	L	M
Jackson Kelly PLLC	500 Lee St E	Charleston	WV	25301			X			L	L	L	L	L	M	L	M	L	M
JC Penny (Charleston Town Center)	401 Lee St E	Charleston	WV	25301			X			L	L	L	L	L	M	L	M	L	M

Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
John Adams Middle School	2002 Presidential Dr	Charleston	WV	25314		X				L	L	L	L	L	L	L	M	L	M
K Mart	1701 4th Ave W	Charleston	WV	25387			X			L	L	L	L	L	M	L	M	L	M
K Mart	6531 MacCorkle Ave	Charleston	WV	25304			X			L	L	L	L	L	M	L	M	L	M
Kanawha City Elementary School	3601 Staunton Ave	Charleston	WV	25304		X				L	L	L	L	L	L	L	M	L	M
Kanawha County Ambulance Authority	601 Brooks St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Kanawha County Board of Education	200 Elizabeth St	Charleston	WV	25311	X					L	L	L	L	L	L	L	M	L	M
Kanawha County Hospice Care	1606 Kanawha Blvd W	Charleston	WV	25387		X				L	L	L	L	L	M	L	M	L	M
Kanawha County Sheriff Department	301 Virginia St E	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Kanawha Manufacturing	1520 Dixie St	Charleston	WV	25311			X			L	L	L	L	L	L	L	M	L	M
Kanawah Valley Regional Transportation Authority (KRT)	1550 4th Ave	Charleston	WV	25387	X					L	L	L	L	L	M	L	M	L	M
Kenna Elementary School	198 Eureka Rd	Charleston	WV	25314		X				L	L	L	L	L	L	L	M	L	M
Kokosing Construction	5725 Kanawah Turnpike	Charleston	WV	25309			X			L	L	L	L	L	L	L	M	L	M
Kroger	5715 MacCorkle Ave SE	Charleston	WV	25304			X			L	L	L	L	L	M	L	M	L	M
Kroger	110 Fledderjohn Rd	Charleston	WV	25314			X			L	L	L	L	L	M	L	M	L	M

Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Lowes Home Improvement	5750 MacCorkle Ave Se	Charleston	WV	25304			X			L	L	L	L	L	M	L	M	L	M
Macy's (Charleston Town Center)	201 Lee St E	Charleston	WV	25301			X			L	L	L	L	L	M	L	M	L	M
McMillion Research	1012 Kanawah Blvd E	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
Metro 911 of Kanawah County	200 Peyton Way	Charleston	WV	25309	X					L	L	L	L	L	L	L	M	L	M
Mountaineer Montessori School	308 20th St SE	Charleston	WV	25304		X				L	L	L	L	L	L	L	M	L	M
Office of the Governor	1900 Kanawah Blvd E	Charleston	WV	25305	X					L	L	L	L	L	M	L	M	L	M
Overbrook Elementary School	218 Oakwood Rd	Charleston	WV	25314		X				L	L	L	L	L	L	L	M	L	M
Patton Building Services	723 Watts St	Charleston	WV	25302			X			L	L	L	L	L	M	L	M	L	M
Robinson & McElgee	700 Virginia St SE	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
Ruffner Elementary School	809 Litz Dr	Charleston	WV	25311		X				L	L	L	L	L	L	L	M	L	M
Sacred Heart Elementary School	1035 Quarrier St	Charleston	WV	25301		X				L	L	L	L	L	L	L	M	L	M
Security America	3412 Chesterfield Ave	Charleston	WV	25304			X			L	L	L	L	H	M	L	M	L	M
Select Specialty Hospital	333 Laidlay St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Seventh Day Adventist	622 Kanawha Blvd W	Charleston	WV	25302					X	L	L	L	L	L	L	L	M	L	M
Shoals Elementary School	100 Dutch Rd	Charleston	WV	25302		X				L	L	L	L	L	M	L	M	L	M



Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
St Agnes School	4801 Stadium Ave SE	Charleston	WV	25305		X				L	L	L	L	L	L	L	M	L	M
St Francis Hospital	333 Laidlay St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
Stonewall Jackson Middle School	812 Park Ave	Charleston	WV	25302		X				L	L	L	L	L	L	L	M	L	M
Tender Heart Home Care	4438 Chestnut St	Charleston	WV	25309		X				L	L	L	L	L	L	L	M	L	M
Tudors Biscuit World	217 Lee St W	Charleston	WV	25302			X			L	L	L	L	L	M	L	M	L	M
Tudors Biscuit World	1506 Washington St E	Charleston	WV	25305			X			L	L	L	L	L	M	L	M	L	M
U.S. Department of Labor	500 Quarrier St	Charleston	WV	25301	X					L	L	L	L	L	L	L	M	L	M
United Bankshares Inc	500 Virginia St E	Charleston	WV	25301			X			L	L	L	L	L	L	L	M	L	M
United Dairy Inc	508 Roane St	Charleston	WV	25302			X			L	L	L	L	L	L	L	M	L	M
University of Charleston	2300 MacCorkle Ave SE	Charleston	WV	25304		X				L	L	L	L	L	M	L	M	L	M
USI Insurance Services	1 Hillcrest Dr	Charleston	WV	25311			X			L	L	L	L	L	L	L	M	L	M
West Virginia American Water	1600 Pennsylvania Ave	Charleston	WV	25302			X			L	L	L	L	L	M	L	M	L	M
West Virginia Department of Education	1900 Kanawha Blvd E	Charleston	WV	25305	X					L	L	L	L	L	M	L	M	L	M
West Virginia Department of Natural Resources	1900 Kanawha Blvd E	Charleston	WV	25305	X					L	L	L	L	L	M	L	M	L	M

Table 2.46

### Region 3 Asset List - Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
West Virginia Higher Education Policy Commission	1018 Kanawha Blvd E	Charleston	WV	25301		X				L	L	L	L	L	L	L	M	L	M
West Virginia State University	3110 MacCorkle Ave SE	Charleston	WV	25304		X				L	L	L	L	L	M	L	M	L	M
YMCA	100 YMCA Dr	Charleston	WV	25301					X	L	L	L	L	L	L	L	M	L	M

Table 2.47

### Region 3 Asset List - Chesapeake

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Chesapeake Elementary School	13620 MacCorkle Ave	Chesapeake	WV	25315		X				L	L	L	L	L	M	L	M	L	M
Chesapeake Town Hall	12404 MacCorkle Ave	Cheseapeake	WV	25315	X					L	L	L	L	H	M	L	M	L	M
Upper Kanawha Valley Christian School	12721 MacCorkle Ave	Cheseapeake	WV	25315		X				L	L	L	L	H	M	L	M	L	M

Table 2.48

### Region 3 Asset List - Clendenin

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Clendenin Branch Library	1 Cardinal St	Clendenin	WV	25045					X	L	L	L	L	H	L	L	M	L	M
Clendenin Elementary School	533 Maywood Ave E	Clendenin	WV	25045		X				L	L	L	L	H	L	L	M	L	M
Clendenin Fire Department	109 Maywood Ave E	Clendenin	WV	25045	X					L	L	L	L	H	L	L	M	L	M
Herbert Hoover High School	5856 Elk River Rd N	Clendenin	WV	25045		X				L	L	L	L	H	L	L	M	L	M
U.S. Post Office	Cardinal St	Clendenin	WV	25045					X	L	L	L	L	H	L	L	M	H	M

Table 2.49

### Region 3 Asset List - Dunbar

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Americare Dunbar Nursing Home and Rehab	501 Caldwell Ln	Dunbar	WV	25064		X				L	L	L	L	L	L	L	M	L	M
Ben Franklin Career Center	500 28th St	Dunbar	WV	25064		X				M	L	L	L	L	L	L	M	L	M
Dunbar Branch Library	301 12th St	Dunbar	WV	25064					X	L	L	L	L	L	L	L	M	L	M
Dunbar City Hall	210 12th St	Dunbar	WV	25064	X					L	L	L	L	L	L	L	M	L	M
Dunbar Fire Department	907 Dunbar Ave	Dunbar	WV	25064	X					L	L	L	L	H	M	L	M	L	M
Dunbar Police Department	1227 Leone Ln	Dunbar	WV	25064	X					L	L	L	L	L	L	L	M	L	M
Regional Education Service Agencies 3	501 22nd St	Dunbar	WV	25064		X				L	L	L	L	L	L	L	M	L	M
West Virginia State Agency for Surplus Property	2700 Charles Ave	Dunbar	WV	25064	X					M	L	L	L	H	M	L	M	L	M



Table 2.50

### Region 3 Asset List - Marmet

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Genesis Health Center	1 Sutphin Dr	Marmet	WV	25315		X				L	L	L	L	L	M	L	M	L	M
Living Faith Christian Church	9203 Ohio Ave	Marmet	WV	25315		X				L	L	L	L	L	M	L	M	L	M
Marmet Elementary School	408 94th St	Marmet	WV	25315		X				L	L	L	L	L	L	L	M	L	M
Marmet Fire Department	9403 MaCorkle Ave	Marmet	WV	25315	X					L	L	L	L	L	M	L	M	L	M
Marmet Police Department	9403 MaCorkle Ave	Marmet	WV	25315	X					L	L	L	L	L	M	L	M	L	M
Marmet Town Hall	9403 MaCorkle Ave	Marmet	WV	25315	X					L	L	L	L	L	M	L	M	L	M
U.S. Post Office	9303 MacCorkle Ave	Marmet	WV	25315					X	L	L	L	L	L	M	L	M	L	M

Table 2.51

### Region 3 Asset List - Nitro

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Freedom Christian Academy	302 21st St #207	Nitro	WV	25143		X				L	L	L	L	L	L	L	M	L	M
Lowes home Improvement	1000 Nitro Market PI	Cross Lanes	WV	25313			X			L	L	L	L	L	L	L	M	L	M
Mardi Gras Casino and Resort	1 Greyhound Dr	Cross Lanes	WV	25313			X			L	L	L	L	L	L	L	M	L	M
Nitro City Hall	2009 20th St	Nitro	WV	25143	X					L	L	L	L	L	L	L	M	L	M
Nitro Elementary School	1921 19th St	Nitro	WV	25143		X				L	L	L	L	L	L	L	M	L	M
Nitro Police Department	2002 2nd Ave	Nitro	WV	25143	X					L	L	L	L	L	L	L	M	L	M
Nitro Public Library	1700 Park Ave	Nitro	WV	25143					X	L	L	L	L	L	L	L	M	L	M
Twin City Christian Academy	100 1st Ave	Nitro	WV	25143		X				L	L	L	L	L	L	L	M	L	M
U.S. Post Office	311 21st St	Nitro	WV	25143					X	L	L	L	L	L	L	L	M	L	M
Wal-Mart Super Center	100 Nitro Market PI	Cross Lanes	WV	25313			X			L	L	L	L	L	L	L	M	L	M

Table 2.52

### Region 3 Asset List - South Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Bible Center Christian School	100 Bible Center Dr	South Charleston	WV	25309		X				L	L	L	L	L	L	L	M	L	M
Bridge Valley Community and Technical College	2001 Union Carbide Dr	South Charleston	WV	25309		X				M	L	L	L	L	L	L	M	L	M
Bridgeview Elementary School	5100 Ohio St	South Charleston	WV	25309		X				L	L	L		L	L	L	M	L	M
Dow Chemical	437 MacCorkle Ave SW	South Charleston	WV	25309			X			L	L	L	L	L	H	L	M	L	M
Dutch Miller Kia of South Charleston	339 MacCorkle Ave SW	South Charleston	WV	25309			X			L	L	L	L	H	M	L	M	L	M
Gestamp	3100 MacCorkle Ave SW	South Charleston	WV	25309			X			L	L	L	L	H	M	L	M	L	M
Herbert J Thomas Memorial Hospital	4605 MacCorkle Ave SW	South Charleston	WV	25309	X					L	L	L	L	L	M	L	M	L	M
Joe Holland Chevrolet	210 MacCorkle Ave SW	South Charleston	WV	25309			X			L	L	L	L	H	M	L	M	L	M
Lester Raines Honda	5102 MacCorkle Ave SW	South Charleston	WV	25303			X			L	L	L	L	L	M	L	M	L	M
Marshall University South Charleston Campus	100 Angus E Peyton Dr	South Charleston	WV	25303		X				L	L	L	L	L	L	L	M	L	M
Montrose Elementary School	631 Montrose Dr	South Charleston	WV	25309		X				L	L	L	L	L	L	L	M	L	M
Office and Commercial Cleaning	117 1st Ave	South Charleston	WV	25309			X			L	L	L	L	L	L	L	M	L	M
Quaker Steak and Lube	2931 Mountaineer Blvd	South Charleston	WV	25309			X			L	L	L	L	L	L	L	M	L	M

Table 2.52

### Region 3 Asset List - South Charleston

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Richmond Elementary School	4620 Spring Hill Ave	South Charleston	WV	25309		X				L	L	L	L	L	L	L	M	L	M
Ruthlawn Elementary School	Rt 8 Box 428	South Charleston	WV	25309		X				L	L	L	L	L	L	L	M	L	M
South Charleston Fire Department St 4	10 Camp Way	South Charleston	WV	25309	X					L	L	L	L	L	L	L	M	L	M
South Charleston Fire Department St. 1	315 4th Ave	South Charleston	WV	25309	X					L	L	L	L	L	L	L	M	L	M
South Charleston Fire Department St. 3	1112 Weberwood Dr	South Charleston	WV	25309	X					L	L	L	L	L	L	L	M	L	M
South Charleston High School	1 Eagle Way	South Charleston	WV	25309		X				L	L	L	L	L	L	L	M	L	M
South Charleston Library	312 4th Ave	South Charleston	WV	25309					X	L	L	L	L	L	L	L	M	L	M
South Charleston Police Department	235 4th Ave	South Charleston	WV	25309	X					L	L	L	L	L	L	L	M	L	M
South Charleston Public Works	1103 Jefferson Rd	South Charleston	WV	25309	X					L	L	L	L	L	M	L	M	L	M
South Charleston Fire Department St. 2	4911 McClung St	South Charleston	WV	25309	X					L	L	L	L	L	M	L	M	L	M
U.S. Post Office	2470 Mountaineer Blvd	South Charleston	WV	25309					X	L	L	L	L	L	L	L	M	L	M
Valley Health Village	1000 Lincoln Dr	South Charleston	WV	25309		X				L	L	L	L	L	L	L	M	L	M
Weberwood Elementary School	732 Gordon Dr	South Charleston	WV	25309		X				L	L	L	L	L	L	L	M	L	M

Table 2.53

### Region 3 Asset List - St. Albans

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
A Caring Heart and Home	2615 Knox Ave	St. Albans	WV	25177		X				L	L	L	L	L	M	L	M	L	M
Alban Elementary School	2030 Harrison Ave	St. Albans	WV	25177		X				L	L	L	L	L	L	L	M	L	M
Anne Bailey Elementary School	405 Winfield Rd	St. Albans	WV	25177		X				L	L	L	L	L	L	L	M	L	M
Central Elementary School	900 Helene St	St. Albans	WV	25177		X				L	L	L	L	L	L	L	M	L	M
George C. Weimer Elementary School	3040 Kanawah Terrace	St. Albans	WV	25177		X				L	L	L	L	L	L	L	M	L	M
Hayes Middle School	830 Strawberry Rd	St. Albans	WV	25177		X				L	L	L	L	L	L	L	M	L	M
Lakewood Elementary School	2089 Lakewood Dr	St. Albans	WV	25177		X				L	L	L	L	L	L	L	M	L	M
McKinley Middle School	3000 Kanawha Terrace	St. Albans	WV	25177		X				L	L	L	L	L	L	L	M	L	M
Riverside Nursing Home	6500 MacCorkle Ave SW	St. Albans	WV	25177		X				L	L	L	L	L	M	L	M	L	M
St. Albans City Hall	1499 MacCorkle Ave	St. Albans	WV	25177	X					L	L	L	L	L	M	L	M	L	M
St. Albans Department of Public Works	5th Ave & 8th St	St. Albans	WV	25177	X					L	L	L	L	L	L	L	M	L	M
St. Albans Fire Department, Central Station	6th Ave	St. Albans	WV	25177	X					L	L	L	L	L	L	L	M	L	M



Table 2.53

### Region 3 Asset List - St. Albans

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
St. Albans Fire Department, Highlawn Station	Walnut St	St. Albans	WV	25177	X					L	L	L	L	L	L	L	M	L	M
St. Albans Police Department	6th Ave	St. Albans	WV	25177	X					L	L	L	L	L	L	L	M	L	M

Table 2.54

### Region 3 Asset List - Putnam County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Calvary Baptist Academy	3655 Teays Valley Rd	Hurricane	WV	25526		X				L	L	L	L	L	M	L	M	L	L
Coca-Cola Bottling Co	1850 Winfield Rd	St. Albans	WV				X			L	L	L	L	L	M	L	M	L	L
Confidence Elementary School	8786 McLane Pike	Liberty	WV	25124		X				L	L	L	L	L	L	L	M	L	L
Conner St Elementary School	445 Conner St	Hurricane	WV	25526		X				L	L	L	L	L	L	L	M	L	L
Eastbrook Elementary School	2092 Bills Creek Rd	Winfield	WV	25213		X				L	L	L	L	L	L	L	M	L	L
George Washington Middle School	402 Roosevelt Blvd	Eleanor	WV	25070		X				L	L	L	L	L	M	L	M	L	L
Hometown Elementary School	107 School Ln	Hometown	WV			X				L	L	L	L	L	L	L	M	L	L
Lakeside Elementary School	2550 US 60	Hurricane	WV			X				L	L	L	L	H	M	L	M	L	L
Lighthouse Baptist Academy	2440 US 60	Hurricane	WV			X				L	L	L	L	L	M	L	M	L	L
Pepsi Bottling Group	100 Indepent Way	Nitro	WV				X			L	L	L	L	L	L	L	M	L	L
Putnam Career Technical Center	300 Roosevelt Blvd	Eleanor	WV			X				L	L	L	L	L	M	L	M	L	L
Putnam County Courthouse	12093 Winfield Rd	Winfield	WV		X					L	L	L	L	L	M	L	M	L	L
Putnam County Development Authority	5664 State Rt 34	Winfield	WV		X					M	L	L	L	L	M	L	M	L	L

Table 2.54

### Region 3 Asset List - Putnam County

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Putnam General Hospital	1400 Hospital Dr	Hurricane	WV		X					L	L	L	L	L	L	L	M	L	L
Rock Branch Elementary School	4616 1st Ave	Nitro	WV			X				L	L	L	L	L	M	L	M	L	L
Scott Teays Elementary School	6153 Teays Valley Rd	Scott Depot	WV			X				L	L	L	L	L	M	L	M	L	L
Sun Bridge Care and Rehab	300 Seville Dr	Hurricane	WV			X				L	L	L	L	L	L	L	M	L	L
Teays Valley Center	590 N Poplar Fork Rd	Hurricane	WV			X				L	L	L	L	L	L	L	M	L	L
Teays Valley Christian School	4373 Teays Valley Rd	Scott Depot	WV			X				L	L	L	L	L	M	L	M	L	L
Trinity Coal Corp	4978 Teays Valley Rd	Scott Depot	WV				X			L	L	L	L	L	M	L	M	L	L
Truth and Liberty Bible College	328 2nd St	Hurricane	WV			X				L	L	L	L	L	L	L	M	L	L
West Teays Elementary School	3676 Teays Valley Rd	Hurricane	WV			X				L	L	L	L	L	M	L	M	L	L

Table 2.55

### Region 3 Asset List - Bancroft

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Bancroft Town Hall	14-B Main St	Bancroft	WV	25011	X					M	L	L	L	H	M	L	M	L	L
Bancroft Volunteer Fire Department	449 Washington St	Bancroft	WV	25011	X					L	L	L	L	L	L	L	M	L	L
U.S. Post Office	14 Main St	Bancroft	WV	25011					X	M	L	L	L	H	M	L	M	L	L

Table 2.56

### Region 3 Asset List - Buffalo

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Buffalo Elementary School	19366 Buffalo Rd	Buffalo	WV	25033		X				L	L	L	L	H	M	L	M	L	L
Buffalo High School	3680 Buffalo Rd	Buffalo	WV	25033		X				L	L	L	L	H	M	L	M	L	L
Buffalo Town Hall	PO Box 307	Buffalo	WV	25033	X					L	L	L	L	H	M	L	M	L	L
Buffalo Volunteer Fire Department	3522 Buffalo Rd	Buffalo	WV	25033	X					L	L	L	L	H	M	L	M	L	L
Toyota Mfg	1 Sugar Maple Ln	Buffalo	WV	25033			X			L	L	L	L	H	H	L	M	L	L
U.S. Post Office	2062 Buffalo Rd	Buffalo	WV	25033					X	L	L	L	L	H	M	L	M	L	L



Table 2.57

### Region 3 Asset List - Eleanor

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Diamond Electric Mfg	207 Eleanor Industrial Park Dr	Eleanor	WV	25070			X			L	L	L	L	H	M	L	M	L	L
Eleanor Branch Library	401 Roosevelt Blvd	Eleanor	WV	25070					X	L	L	L	L	L	M	L	M	L	L
Eleanor Fire Department	600 Roosevelt Blvd	Eleanor	WV	25070	X					L	L	L	L	L	M	L	M	L	L
Eleanor Police Department	201 Ash Circle	Eleanor	WV	25070	X					L	L	L	L	L	L	L	M	L	L
Eleanor Town Hall	401 Roosevelt Blvd	Eleanor	WV	25070	X					L	L	L	L	L	M	L	M	L	L
U.S. Post Office	103 Roosevelt Blvd	Eleanor	WV	25070					X	L	L	L	L	L	M	L	M	L	L

Table 2.58

### Region 3 Asset List - Hurricane

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
CAMC Teays Valley Hospital	1400 Hospital Dr	Hurricane	WV	25526	X					L	L	L	L	L	L	M	L	L	L
Capital Medical Inc	3857 Teays Valley Rd	Hurricane	WV	25526	X					L	L	L	L	L	M	L	M	L	L
Genesis Healthcare	66 Teays Center Dr	Hurricane	WV	25526		X				L	L	L	L	L	M	L	M	L	L
Hurricane City Hall	2801 Virginia Ave	Hurricane	WV	25526	X					L	L	L	L	L	L	L	M	L	L
Hurricane Fire Department	2716 Main St	Hurricane	WV	25526	X					L	L	L	L	L	M	L	M	L	L
Hurricane High School	3350 Teays Valley Rd	Hurricane	WV	25526		X				L	L	L	L	L	M	L	M	L	L
Hurricane Middle School	629 Midland Trail	Hurricane	WV	25526		X				L	L	L	L	L	M	L	M	L	L
Hurricane Town Elementary School	300 Harbour Lane	Hurricane	WV	25526		X				L	L	L	L	L	L	L	M	L	L
Putnam Care and Rehab	300 Seville Circle	Hurricane	WV	25526		X				L	L	L	L	L	L	L	M	L	L
Putnam County Parks	1 Valley Park Rd	Hurricane	WV	25526	X					L	L	L	L	L	L	L	M	L	L
Sleepy Hollow Golf Course	3780 Sleepy Hollow Dr	Hurricane	WV	25526			X			L	L	L	L	L	L	L	M	L	L
US Foods	2575 Virginia Ave	Hurricane	WV	25526			X			L	L	L	L	L	L	L	M	L	L

Table 2.59

### Region 3 Asset List - Poca

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Kanawha Scales & Systems Inc	222 Jaconson Dr	Poca	WV	25159			X			L	L	L	L	L	L	L	M	L	L
Poca Elementary School	2884 Charleston Rd	Poca	WV	25159		X				L	L	L	L	L	M	L	M	L	L
Poca High School	1 Dot ay	Poca	WV	25159		X				L	L	L	L		L	L	M	L	L
Poca Middle School	2884 Charleston Rd	Poca	WV	25159		X				L	L	L	L	L	L	L	M	L	L
Rite Aid Customer Support	360 Jaconson Dr	Poca	WV	25159			X			L	L	L	L	L	L	L	M	L	L
Tri State Roofing & Sheet Metal	321 Harris Dr	Poca	WV	25159			X			L	L	L	L	L	L	L	M	L	L
Tyler Mountain Water & Coffee	159 Harris Dr	Poca	WV	25159			X			L	L	L	L	L	L	L	M	L	L

Table 2.60

### Region 3 Asset List - Winfield

Name/Description	Street Address	City	State	Zip Code	Critical	Vulnerable	Economic	Historical	Special Consideration	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding	Hazardous Materials	Mass Movement	Severe Storms	Tornados	Wild Fires
Putnam County Commission	3389 Winfield Rd	Winfield	WV	25213	X					L	L	L	L	L	M	L	M	L	L
Putnam County Judicial Building	12093 Winfield Rd	Winfield	WV	25213	X					L	L	L	L	L	M	L	M	L	L
Putnam County Sheriffs Department	236 Courthouse Dr	Winfield	WV	25213	X					L	L	L	L	L	M	L	M	L	L
U.S. Post Office	3278 Winfield Rd	Winfield	WV	25213	X					L	L	L	L	L	M	L	M	L	L
Winfield Elementary School	75 Wall St	Winfield	WV	25213		X				L	L	L	L	L	L	L	M	L	L
Winfield High School	11268 Winfield Rd	Winfield	WV	25213		X				L	L	L	L	L	M	L	M	L	L
Winfield Middle School	11883 Winfield Rd	Winfield	WV	25213		X				L	L	L	L	L	M	L	M	L	L
Winfield Town Hall	1 Main St	Winfield	WV	25213	X					L	L	L	L	H	M	L	M	L	L
WV State Police Troop 1, Winfield Detachment	3389 Winfield Rd	Winfield	WV	25213	X					L	L	L	L	L	M	L	M	L	L

## 2.4 ANALYZE 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.

Understanding the risk that the region faces from future hazard occurrences is a multifaceted exercise. The profiles in Section 2.2 provide a background of this risk and provide loss estimates based on historical data, but are generally based in the past. Identifying and analyzing development trends allows for the consideration of future vulnerability. This information comes from a variety of sources, including economic trends, municipal comprehensive plans, and interviews with local officials. In this instance, the Regional Intergovernmental Council has developed a regional development plan, which is updated yearly, allowing for an analysis of region wide development. The RIC has established priorities for development projects in the region. Water and sewer projects are the highest priority, followed by economic development, transportation, community development, and finally housing.

The fiscal year 2016 update to the Comprehensive Economic Development Strategy describes the economic atmosphere of the region over the last year. The region is described as having “a mixture of high tech manufacturing and value-laden business as well as rich, mining based working lands” (RIC, 2016). The region has, however, felt the negative impacts of a declining coal industry. Despite this, the region has continued to see overall growth, largely in part to the transportation infrastructure that exists in the region. Emphasis continued to be placed on attracting new innovative business to areas around the region, such as the WV Regional Technology Park in South Charleston. In addition to the regional efforts that the RIC makes, the individual counties, and in some instances the municipalities, have economic development goals and priorities. The following sections will outline these for each.

### Boone County

The Boone County Community and Economic Development Corporation (BCCEDC) is responsible for promoting development within Boone County, with a stated vision of diversifying the economy with new businesses and offering new opportunities for growth to existing companies (2013). While the county does not have a comprehensive plan that details areas of future development, the BCCEDC does list a number of available



development sites on its website. These sites are all located adjacent, or nearly adjacent, to US 119, the major transportation route through the county (also known as Corridor G). The BCCEDC site lists two recently developed sites in the county, now home to Alpha Natural Resources and the Running Right Leadership Academy, seen in the image.



Another goal of the BCCEDC is to increase the amount of tourists that visit the county. Along with the various events and festivals that occur throughout the year, Boone County is home to part of the Hatfield-McCoy Trail complex, which is made up of over 700 miles of trails in southern West Virginia. In 2017, the complex will include an additional 80 miles of trails in the Madison area, including a trail head. According to Steve Byus, the Emergency Management Coordinator for the City of Madison, this trail head is the location of planned recreation area including RV and tent camping. This addition will likely increase tourism in the area significantly.

### Clay County

The Central Appalachian Empowerment Zone (CAEZ) is a private nonprofit organization that serves all of Clay County and portions of the surrounding counties. The CAEZ has operated since 1994 and states its mission is improving economic conditions and



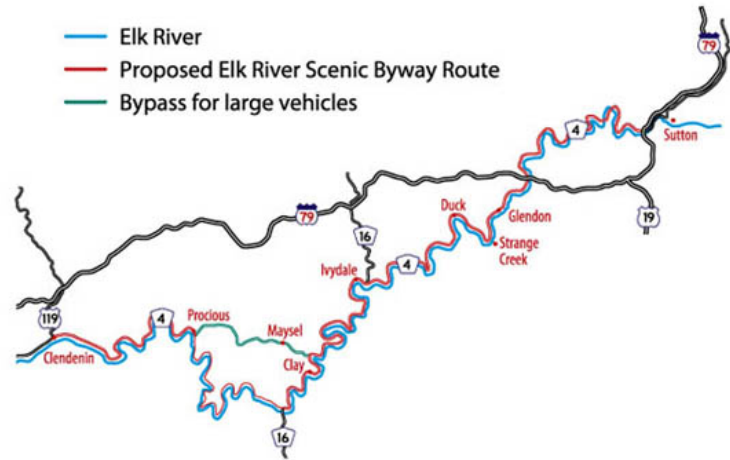
quality of life in the participating jurisdictions. The strategic plan developed at its inception focused on infrastructure enhancement, economic development, housing development, education quality & access, and healthcare & emergency service expansion (2014). Recent projects have included development of an industrial park, and development of a tent and RV

campground along the conjunction of the Elk and Buffalo Rivers in Clay County.





To increase tourist traffic through the region, the CAEZ has supported the designation of the Elk River Scenic Byway. “Letting people know this drive, once the primary north-south corridor, provides spectacular views and a pleasant driving experience will increase the number of travelers along the Elk River and increase business as a result” (CAEZ, 2014). The route, shown in the image, would travel 75 miles through much of Clay County, including the Town of Clay.



While the county does not have a comprehensive plan in place, future development of industry will likely occur in the northern area of the county based on the geography and transportation network available. It is in this area that Interstate 79 crosses through the county. This interstate is the only major highway in Clay County, as the rest of the transportation network consists of two lane state highways and county roads.

Flooding and severe storms are an ever present risk to Clay County. The flood event of June 2016 was highly damaging causing an estimated \$17 million in damage according to the National Climatic Data Center. Clay High School, H.E. White Elementary School, and the school bus garage were all significantly damaged during the flood and need cleanup and reconstruction. The county may consider using water resistant eco-friendly building materials during the reconstruction. Concrete and cement manufacturers have found new, environmentally friendly ways to make cement, which is found on the FEMA Flood Damage Resistant Materials List. Studies, such as the one performed by the Niels Bohr institute, have shown that environmentally friendly cement can withstand higher pressure and are stronger.

### Kanawha County

Kanawha County has adopted a comprehensive development plan (*Twenty-Twenty Vision*) that details past trends and potential future development within the county. Commercial development has mostly been located within the corporate boundaries of the cities located along the river, with Central Business Districts (CBDs) being designated in Charleston, Clendenin, Dunbar, Nitro, St. Albans, and South Charleston (Kanawha County,



2014). Commercial development is common in the county, existing along most major roads. Larger scale versions have opened along Corridor G (US 119) south of Charleston. Industrial development has followed much the same trend, concentrating along the Kanawha River, where large volume highways, rails and potentially river are easily accessible. Residential development in the county has begun to expand beyond the river front municipalities, as available land along the river becomes scarce. Low density residential areas have spread to the hillsides and mountain areas.

According to the RIC, there are more than 6,000 businesses in Kanawha County, though the county population (and the population of Charleston) has been steadily declining over recent years. Recent development in the area has included an expansion of the Charleston Civic Center, with the hope to continue to draw conferences and other large events to the city, and a large healthcare facility offering post-acute care in South Charleston.



Additionally, Ranger Scientific has announced plans to build an ammunition plant on a mountaintop site in Quincy, south east of Charleston, which will overlook the Riverside High School campus.

Flooding is an ever present risk to Kanawha County. The flood event of June 2016, caused an estimated \$62 million in damages according to the National Climatic Data Center. The county may consider the use of natural drainage systems placed in medians and right-of-ways to help capture runoff and slow the flow storm water. King County Washington has already began to use natural drainage systems as a eco-friendly way to mitigate flooding.

### Putnam County

Putnam County has adopted a comprehensive plan that highlights past trends and the opportunities and challenges faced by the county moving forward. Putnam County is the fastest growing county in Region 3, mostly due to the flat, developable land in the Teays Valley and Kanawha River Valley regions. Rural development is largely comprised of single family dwellings clustered around state and U.S. highways. Many of the rural areas in the county do not have all the utilities necessary for commercial development.

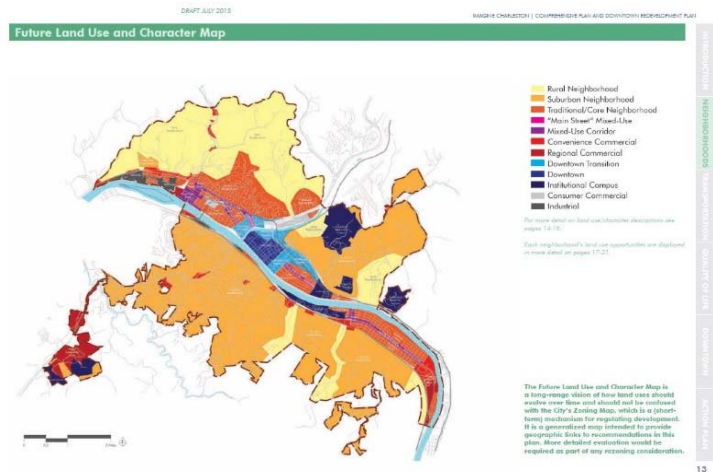


Putnam County continues to see economic growth due to population increase. Putnam County's success is based on development potential, desirable amenities, and a stable regulatory structure. Employment is consistently higher than the national and state averages. The Putnam County Office of Planning and Infrastructure reports that development growth and new construction has been consistently strong for decades.

Putnam County's plan has established goals for land use, transportation, housing, economic development and public service. These goals are in line with the county's growing economy and population. Increasing access to basic utilities in rural areas, developing affordable housing, and promoting maintenance and improvement of the transportation system. Putnam County currently has planned maintenance and improvements on U.S. Route 35 and Interstate 64. Putnam County's healthcare services are expanding with the opening of a 51,000 square-foot medical facility operated by Marshall University. The county also offers industrial, retail and service establishments at multiple industrial parks.

### Charleston

The City of Charleston has adopted a comprehensive plan separate from that developed for the county, with an emphasis on current and future land use and development. While previous plans have focused on classifying land use, density, and land use arrangement, the current update includes character considerations. The identified key strategies include increasing the population in proximity to downtown, developing mixed use centers that conform to recent neighborhood planning efforts, strengthening neighborhood commercial areas, and minimizing land use conflicts (such as buffering industrial zones from nearby homes (Imagine Charleston, 2013)). The image illustrates the long range vision for land use in Charleston.<sup>i</sup> A major aspect of this comprehensive plan update for the redevelopment of existing areas within the city in an effort to revitalize the existing commercial areas and maintain the existing culture of the various neighborhoods.



### Nitro

*Nitro – A Plan for Moving the City Forward* notes that the city has historically relied heavily on industrial activity as a main economic driver. The industry in the area, primarily oriented towards manufacturing, has decreased in recent years. The plan recommends several courses of action for the city, including the focusing of development efforts.

The economic planning section of the plan focuses on partnering with regional employers and using available assets that offer business retention and expansion programs. The city also has the opportunity to develop available industrial sites. Nitro also has cultural sites, an antique district and multiple interstate exits that can be used to market the city as a tourist location.

### St. Albans

The City of St. Albans has adopted a comprehensive plan. The plan's land use analysis focuses on commercial development while maintaining residential areas. Recommendations include discouraging commercial development while maintaining and renewing residential areas and soliciting proposals for new construction that will blend with the historic district. St. Albans' plan also focuses on ensuring housing that will encourage economic diversity to allow low and high income families to live in the community.

St. Albans also identified strategies to maintain and develop infrastructure including identifying and repairing trouble areas of the storm drain and sewer systems. The city is currently using a MS4 management plan and natural drainage systems (i.e. streetscape projects) to mitigate flooding.

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<sup>i</sup> Not to be confused with a zoning map.



### 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.
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The core planning committee determined several goals to mitigate the hazard risks identified in the risk assessment. These mitigation actions were developed based on projects thought to be most feasible and beneficial to hazard reduction.

Local mitigation priorities have changed since the previous hazard mitigation update cycle. The committee chose to continue using a severe storm hazard that encompasses all weather events except for tornadoes. The committee recognized that there are few, if any, structural mitigation actions that can be taken for severe storm events. The focus of mitigation for these events has been shifted to public education/awareness and notification.

Goals are only listed in this section as a quick reference guide for users of the plan. These goals generally guide the development of 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. Region 3's goals are listed in the chart below.



Table 3.1

HAZARD	GOALS
Dam Failure	Protect Boone, Clay, Kanawha and Putnam counties from a catastrophic release or failure of a dam or coal waste slurry impoundment.
Drought	Reduce the negative effects of drought in Boone, Clay, Kanawha and Putnam counties.
Earthquake	Reduce the negative effects of an earthquake in Boone, Clay, Kanawha and Putnam counties.
Extreme Temperatures	Lessen the impacts of extreme temperature events.
Flooding	Minimize the impact of flooding and flash flooding on the people and property in Boone, Clay, Kanawha, and Putnam counties.
Hazardous Materials	Protect the general public in Boone, Clay, Kanawha and Putnam counties from hazardous material incidents.
Mass Movements	Decrease losses due to land subsidence and landslides.
Severe Storms	Lessen the effects of severe storm events.
Tornado	Lessen the effects of tornadoes.
Wildfire	Reduce the effects and occurrences of wildfire.
Miscellaneous	<ul style="list-style-type: none"> <li>• Increase public awareness, understanding, support and demand for hazard mitigation activities and future strategies or projects.</li> <li>• Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards.</li> <li>• Reduce the current and future risks from hazards in Boone, Clay, Kanawha and Putnam counties.</li> <li>• Reduce the potential impact of natural and man-made disasters on Boone, Clay, Kanawha and Putnam counties' historic structures and landmarks.</li> <li>• Develop better hazard data for Boone, Clay, Kanawha and Putnam counties.</li> </ul>





## 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. 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)
- Local Funds
- Pre-Disaster Mitigation Grant (PDM)
- State Funds



The steering committee emphasized a benefit-cost comparison in the prioritization process. Committee members evaluated mitigation actions by their pros and cons, which were represented as costs and benefits. Project prioritization occurred during the third steering committee meeting utilizing a project prioritization matrix. A blank copy of the matrix can be found in Appendix 1. Steering committee members rated each project for their jurisdiction on six criteria using a one (1) to five (5) scale, where five is best. The highest score that a proposed project could attain was 30 and the lowest was six. Those completing municipal project lists with the PDC's consultant ranked municipal projects in roughly the same fashion (though lists were substantially smaller). Prioritization criteria included the following.

- Ease of Implementation
- Cost Effectiveness
- Social Impacts
- Political Impacts
- Economic Impacts
- Overall Positive Impact



BOONE COUNTY PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Boone 1	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Boone County Floodplain Coordinator	WVDHSEM	Local Plans & Regulations	N/A Program maintenance included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> On-going.									
Boone 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Boone County Floodplain Coordinator	Boone County Commission	Local Plans & Regulations	N/A Program maintenance included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> On-going.									
Boone 3	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Boone County Commission	BCOES	Structural & Infrastructure Improvements	Up to \$75,700 per structure acquired	HMGP
<b>Status:</b> On-going.									
Boone 4	Misc.	4	Work with the Board of Education to place pagers in each school that can be activated from the Emergency Operations Center to provide early warning to all schools.	1 year	Boone County Commission	Boone County Board of Education	Education & Awareness Programs	Up to \$100 per pager	Local funding
<b>Status:</b> On-going.									
Boone 5	Severe Storms	16	Local government, industry and the private sector will work to make available a low cost emergency alert radio that can be placed in all homes and businesses that can be activated from the Emergency Operations Center during emergencies.	2 years	BCOES	Boone County Commission, National Weather Service	Emergency Services	Up to \$500 per radio	Local funding, SHSP, Federal DOJ Grants, PDM



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
<b>Status:</b> On-going.									
Boone 6	Misc.	19	Seek funding through state and federal resources to replace the county emergency operations center to a more secure location	2 years	BCOES	Boone County Commission	Structural & Infrastructure Improvements	Up to \$2,500,000	Local funding, SHSP, Federal DOJ Grants
<b>Status:</b> On-going.									
Boone 7	Misc.	17	Seek funding through state and federal resources to erect additional communications towers to improve radio coverage, and add to the back-up capabilities of the emergency operations center.	2 years	BCOES	Boone County Commission	Emergency Services	Unknown	Local funding, SHSP, EMPG
<b>Status:</b> On-going.									
Boone 8	Misc.	18	Seek funding through state and federal resources to purchase equipment and locate communications towers to improve interoperability to other counties and state agencies.	3 years	BCOES	Boone County Commission	Emergency Services	Unknown	Local funding, EMPG
<b>Status:</b> On-going.									
Boone 9	Misc.	4	Communicate to industry and private property owners the need to open private roads that lead to higher ground in an emergency to shorten evacuation routes.	Ongoing	BCOES	Local Fire Departments	Education & Awareness Programs	N/A Partnerships require little to no additional funding	Private funding
<b>Status:</b> On-going.									
Boone 10	Misc.	4	Place signs marking such routes	5 years	BCOES	WVDOH	Education & Awareness Programs	Up to \$500 per sign	Local funding
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Boone 11	Misc.	4	Map routes and make maps available to public	5 years	BCOES	Local Fire Departments	Education & Awareness Programs	Up to \$1,500 for printing	Local funding
<b>Status:</b> On-going.									
Boone 12	Misc.	4	Hold evacuation drills to familiarize the public with proper procedures	Ongoing	BCOES	Local Fire Departments	Emergency Services	N/A General preparedness included in existing budgets	Local funding
<b>Status:</b> On-going.									
Boone 13	Flooding	4	Support the efforts of volunteer groups, state agencies, and other interested parties to clear stream banks, drainage ditches, and other areas of debris.	Ongoing	Boone County Commission	Industry, General Public	Education & Awareness Programs	N/A Partnerships require little to no additional funding	Local Government, Industry, and the Public
<b>Status:</b> On-going.									
Boone 14	Flooding	22	Perform channel modifications to increase flow capacities of rivers and streams in Boone County	5 years	Boone County Commission	WV Soil Conservation, Army Corps of Engineers	Natural System Protection	Unknown	WV Soil Conservation, Army Corps of Engineers
<b>Status:</b> On-going.									
Boone 15	Flooding	21	Support legislation to fund studies on various issues involving coal waste slurry impoundments	Ongoing	Boone County Commission	Industry, General Public	Local Plans & Regulations	N/A Partnerships require little to no additional funding	West Virginia Legislature
<b>Status:</b> On-going.									
Boone 16	Wildfire	19	Develop a proactive policy on issuing countywide burning bans during dry weather.	2 years	Boone County Commission	N/A	Local Plans & Regulations	N/A Policy creation should require little to no additional funding	Local funding
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Boone 17	Wildfire	4	Work with the Forestry Department to educate the public of the burning laws through Public Service Announcements in the Coal Valley News and WZAC radio.	2 years	BCOES	WV Division of Forestry	Education & Awareness Programs	N/A Partnerships require little to no additional funding	Local funding, WV Division of Forestry
<b>Status:</b> On-going.									
Boone 18	Wildfire	4	Increase public awareness of the arson problem in Boone County through public education programs in schools, churches and civic groups.	Ongoing	BCOES	WV Division of Forestry, WV State Fire Marshal	Education & Awareness Programs	Up to \$2,500 per outreach campaign	Local funding, PDM
<b>Status:</b> On-going.									
Boone 19	Wildfire	4	Support the WV Division of Forestry and the WV State Fire Marshall by increasing the award offered for arsonists	Ongoing	Boone County Commission	WVDOF, WVSFM	Education & Awareness Programs	N/A Partnerships require little to no additional funding	Local funding, WVDOF, WVSFM
<b>Status:</b> On-going.									
Boone 20	Flooding	4	Develop an informational package to give to applicants for development permits.	1 year	Boone County Permit Office	BCOES	Education & Awareness Programs	Up to \$2,500 per outreach campaign	Local funding, PDM
<b>Status:</b> On-going.									
Boone 21	Mass Movements	4	Advise the public to contact their insurance agency to confirm that they are covered for land subsidence events	1 year	Boone County Permit Office	BCOES	Education & Awareness Programs	Up to \$2,500 per outreach campaign	Local funding, PDM
<b>Status:</b> On-going.									
Boone 22	Mass Movements	4	Suggest to the public that they add the proper coverage to their insurance policies	1 year	Boone County Permit Office	BCOES	Education & Awareness Programs	Up to \$2,500 per outreach campaign	Local funding, PDM
<b>Status:</b> On-going.									





TOWN OF DANVILLE PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Danville 1	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Danville Floodplain Coordinator	Boone County Floodplain Coordinator	Local Plans & Regulations	N/A Program maintenance already included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Danville 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Danville Floodplain Coordinator	Danville Town Council	Local Plans & Regulations	N/A Program maintenance already included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Danville 3	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Danville Floodplain Coordinator	Boone County Floodplain Coordinator	Structural & Infrastructure Improvements	Up to \$75,700 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Danville 4	Misc.	4	Support county efforts to warn the public of impending emergency situations.	Ongoing	BCOES	Danville Town Council	Education & Awareness Programs	N/A Supporting existing efforts should require little to no additional funding	Local funding, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



CITY OF MADISON PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Madison 1	Flooding	1	Develop a storm water management plan for existing drainage system and future development.	5 years	Madison City Council	N/A	Structural & Infrastructure Improvements	Unknown	CDBG, Local funding, WVIJDC, USACE (Silver Jackets)
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 2	Flooding	20	Expand current drainage system.	5 years	Madison City Council	N/A	Structural & Infrastructure Improvements	Unknown	CDBG, Local funding, WVIJDC
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 3	Flooding	8	Repair or replace current storm water drainage system.	5 years	Madison City Council	N/A	Structural & Infrastructure Improvements	Unknown	CDBG, Local funding, WVIJDC
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 4	Flooding	20	Place check valves in drains that empty into river to prevent back flow from flooding low lying areas.	5 years	Madison City Council	N/A	Structural & Infrastructure Improvements	Unknown	HMPG, CDBG, Local funding, WVIJDC
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 5	Flooding	1	Continue to participate in the National Flood Insurance Program (NFIP).	Ongoing	Madison Floodplain Coordinator	Boone County Floodplain Coordinator	Local Plans & Regulations	N/A Program maintenance included in current budget	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 6	Flooding	1	Continue to enforce current flood plain regulations.	Ongoing	Madison Floodplain Coordinator	Madison City Council	Local Plans & Regulations	N/A Program maintenance included in current budget	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Madison 7	Flooding	1	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Madison Floodplain Coordinator	Boone County Floodplain Coordinator	Structural & Infrastructure Improvements	Up to \$75,700 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 8	Misc.	1	Purchase and install backup generator at Civic Center to be used as shelter.	5 years	Madison City Council	BCOES	Structural & Infrastructure Improvements	Up to \$50,000	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 9	Misc.	8	Partner with local faith based organizations to assist with transporting residents during evacuations.	1 year	Madison City Council	Local Faith Based Organizations	Education & Awareness Programs	N/A Partnerships require little to no funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 10	Misc.	8	Partner with Madison Baptist Church to provide shelter for first responders.	1 year	Madison City Council	Madison Baptist Church	Emergency Services	N/A Partnerships require little to no funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 11	Misc.	1	Purchase and install backup generator at Madison Baptist church to be used as shelter for first responders.	2 years	Madison City Council	Madison Baptist Church	Emergency Services	Up to \$50,000	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 12	Misc.	1	Repair or replace backup generator at City Hall.	5 years	Madison City Council	BCOES	Structural & Infrastructure Improvements	Up to \$50,000	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 13	Misc.	8	Enhance emergency warning by adding an Outdoor Siren System.	2 years	Madison City Council	BCOES	Education & Awareness Programs	Up to \$2,500 per siren	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Madison 14	Misc.	8	Set up a low watt FM station to broadcast emergency alerts.	3 years	Madison City Council	BCOES	Emergency Services	Up to \$1,500 for start-up	SHSP, Local funding, EMPG
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 15	Flooding	8	Support efforts of volunteer groups, state agencies and other interested parties to clear stream banks, drainage ditches and other areas of debris.	Ongoing	Madison City Council	BCOES	Education & Awareness Programs	N/A Partnerships require little to no funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 16	Flooding	22	Perform channel modifications to increase flow capacities of rivers and streams.	5 years	Madison City Council	N/A	Natural System Protection	Unknown	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 17	Misc.	25	Establish an Emergency Operations Center.	5 years	Madison City Council	BCOES	Emergency Services	N/A Identifying a space and staff would require little funding	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 18	Flooding	8	Support legislation to fund studies that research and develop a means to render coal slurry and study different types of impoundment designs that result in less slurry being stored.	5 years	Madison City Council	Local Legislative Representatives	Local Plans & Regulations	N/A Partnerships require little to no funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 19	Misc.	27	Update and add new technology to existing systems to shorten notification and evacuation times.	5 years	Madison City Council	BCOES	Emergency Services	Unknown	SHSP, Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Madison 20	Misc.	8	Partner with industry and private property owners to open private roads during evacuations.	5 years	Madison City Council	BCOES	Education & Awareness Programs	N/A Partnerships require little to no funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 21	Misc.	28	Place signs marking evacuation routes in the city.	5 years	Madison City Council	BCOES	Structural & Infrastructure Improvements	Up to \$500 per sign	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 22	Misc.	25	Map evacuation routes and make maps available to the public.	5 years	Madison City Council	BCOES	Education & Awareness Programs	Up to \$1,500 for printing	Local funding, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 23	Tornado	8	Partner with local media to provide public service announcements.	Ongoing	Madison City Council	Local Media Outlets	Education & Awareness Programs	N/A Partnerships require little to no funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 24	Wildfire	22	Develop a proactive policy on issuing city wide burning bans during dry weather.	1 year	Madison City Council	N/A	Local Plans & Regulations	N/A Policy creation requires no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 25	Wildfire	8	Partner with Forestry Department and local media to educate public on burning laws.	Ongoing	Madison City Council	WVDOF	Education & Awareness Programs	N/A Partnerships require little to no funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 26	Wildfire	8	Partner with schools, churches and civic groups to increase awareness on arson problem in City of Madison.	Ongoing	Madison City Council	Boone County Schools, Local Faith Based Organizations, Civic Groups	Education & Awareness Programs	N/A Partnerships require little to no funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Madison 27	Land Subsidence	22	Develop an information brochure to give to applicants of building permits.	1 year	Madison City Council	BCOES	Education & Awareness Programs	N/A Creating the brochure should be a low-cost effort	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Madison 28	Land Subsidence	8	Partner with insurance companies to educate public on proper coverage for land subsidence.	1 year	Madison City Council	Insurance Companies	Education & Awareness Programs	N/A Partnerships require little to no funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									





TOWN OF SYLVESTER PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Sylvester 1	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Sylvester Floodplain Coordinator	Boone County Floodplain Coordinator	Local Plans & Regulations	N/A Program maintenance already included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Sylvester 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Sylvester Floodplain Coordinator	Sylvester Town Council	Local Plans & Regulations	N/A Program maintenance already included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Sylvester 3	Misc.	4	Support county efforts to warn the public of impending emergency situations.	Ongoing	BCOES	Sylvester Town Council	Education & Awareness Programs	N/A Supporting existing efforts should require little to no additional funding	Local funding, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Sylvester 4	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Sylvester Floodplain Coordinator	Boone County Floodplain Coordinator	Structural & Infrastructure Improvements	Up to \$75,700 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



TOWN OF WHITESVILLE PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Whitesville 1	Flooding	1	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Whitesville Floodplain Coordinator	Boone County Floodplain Coordinator	Local Plans & Regulations	N/A Program maintenance already included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Whitesville 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Whitesville Floodplain Coordinator	Whitesville Town Council	Local Plans & Regulations	N/A Program maintenance already included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Whitesville 3	Misc.	4	Support county efforts to warn the public of impending emergency situations.	Ongoing	BCOES	Whitesville Town Council	Education & Awareness Programs	N/A Supporting existing efforts should require little to no additional funding	Local funding, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Whitesville 4	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Whitesville Floodplain Coordinator	Boone County Floodplain Coordinator	Structural & Infrastructure Improvements	Up to \$75,700 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



CLAY COUNTY PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Clay 1	Misc.	10	Purchase and distribute the booklet "Getting Ready: A Family Emergency Guide" prepared by the State of West Virginia	Ongoing	Clay County Office of Emergency Services	Clay County LEPC	Education & Awareness Programs	N/A Booklets are available from state agencies	WVDHSEM
<b>Status:</b> On-going.									
Clay 2	Misc.	10	Publish timely articles in local newspapers about winter storms, tornados, floods, etc. to inform the public of what to do.	Ongoing	Clay County Office of Emergency Services	Clay County LEPC	Education & Awareness Programs	N/A Many media outlets will allow local govt. to run press releases at no charge	Local funding
<b>Status:</b> On-going.									
Clay 3	Flooding	7	Create a GIS data layer of flood maps on county mapping database to identify floodplain areas of Clay County	Done	Clay County Office of Emergency Services	Region 3 PDC, WVU GIS Tech Center	Structural & Infrastructure Improvements	N/A Base layers are included with this project	Local funding
<b>Status:</b> On-going.									
Clay 4	Flooding	2	Institute a countywide permitting process that will require residents and/or developers to file a permit with the county before beginning any new construction as a means of regulating floodplain development	2 Years	Clay County Floodplain Coordinator	Clay County Commission	Local Plans & Regulations	N/A Policy creation should require little to no additional funding	Local funding
<b>Status:</b> On-going.									
Clay 5	Flooding	2	Ensure general adherence to the guidelines contained in the IBC.	2 years	Clay County Commission	WVSFM	Local Plans & Regulations	N/A Policy creation should require little to no additional funding	Local funding
<b>Status:</b> On-going. Project revised to show consistency with International Building Codes.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Clay 6	Flooding	8	Educate citizens to clear trash, vegetation, and tree stumps from nearby creeks that impede water flow	3 years	Clay County Office of Emergency Services	WVDOH, WVOES, WVDEP, WV Division of Natural Resources, NRCS	Education & Awareness Programs	Up to \$2,500 per outreach campaign	HMGP, WVDEP, WV Division of Natural Resources, NRCS Grants
<b>Status:</b> On-going.									
Clay 7	Flooding	2	Review existing regulations to ensure adequacy in reducing the amount of future development in identified hazard areas.		Clay County Floodplain Coordinator	Clay County Commission	Local Plans & Regulations	N/A Policy creation should require little to no additional funding	Local funding
<b>Status:</b> On-going.									
Clay 8	Flooding	2	Review all comprehensive plans to ensure that designated growth areas are not in hazard areas.		Clay County Commission	Central Appalachian Empowerment Zone	Local Plans & Regulations	N/A Policy creation should require little to no additional funding	Local funding
<b>Status:</b> On-going.									
Clay 9	Flooding	2	Review all capital improvement plans to ensure that infrastructure improvements are not directed toward hazardous areas.	Ongoing	Clay County Floodplain Coordinator	Clay County Office of Emergency Services	Local Plans & Regulations	N/A Policy creation should require little to no additional funding	Local funding
<b>Status:</b> On-going.									
Clay 10	Flooding	8	Provide additional training to county and municipal development officials on NFIP requirements	2 years	Clay County Floodplain Coordinator	Clay County Commission, Clay County Office of Emergency Services	Education & Awareness Programs	N/A Program maintenance included in existing budgets	Local funding
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Clay 11	Misc.	12	Coordinate with all county emergency services personnel to participate in exercises of simulated biological terrorist attacks to practice response efforts.	1 year	Clay County Office of Emergency Services	Local Emergency Services Providers	Emergency Services	Up to \$10,000 per full-scale exercise	SHSP, PDM, EMPG, HMEP, Local funding
<b>Status:</b> On-going.									
Clay 12	Flooding	1	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Clay County Floodplain Coordinator	Clay County Commission	Structural & Infrastructure Improvements	Up to \$78,000 per structure acquired	HMGP
<b>Status:</b> New.									



TOWN OF CLAY PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Town of Clay 1	Flooding	1	Elevate vital equipment for wastewater treatment to ensure continuous operation	2 years	Clay Buildings & Grounds	CCOES	Structural & Infrastructure Improvements	\$20,000	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Town of Clay 2	Flooding	3	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Clay Floodplain Coordinator	Clay County Floodplain Manager, CCOES	Local Plans & Regulations	N/A No additional costs are expected	Local funding, FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Town of Clay 3	Flooding	2	Work with the county to update all floodplain ordinances adopted prior to 1987	Ongoing	Clay Floodplain Manager	Clay County Floodplain Manager	Local Plans & Regulations	N/A No additional costs are expected	Local funding, FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Town of Clay 4	Misc.	5	Support the county in releasing timely articles in local newspapers about winter storms, tornados, floods, etc. to inform the public of what to do.	Ongoing	Clay County Office of Emergency Services	Clay Town Council	Education & Awareness Programs	N/A Local media may allow periodic press releases at no charge	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Town of Clay 5	Flooding	4	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Clay Floodplain Coordinator	Clay County Floodplain Manager	Structural & Infrastructure Improvements	Up to \$78,000 per structure acquired	HMPG
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									





KANAWHA COUNTY PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Kanawha 1	Misc.	9	Create displays for use at public events	Ongoing	KCOEM	N/A	Education & Awareness Programs	N/A Once displays are created, little extra costs would be incurred	Local funding, FEMA, USEPA, NFPA
<b>Status:</b> On-going.									
Kanawha 2	Misc.	9	Utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Charleston FD	Education & Awareness Programs	N/A Media often let local govt. issue press releases at no cost	Local funding, Local media outlets, FEMA
<b>Status:</b> On-going.									
Kanawha 3	Misc.	9	Create a public speaking series on hazard related topics such as what to do in the event of an emergency	Ongoing	KCOEM	N/A	Education & Awareness Programs	N/A Creation of the series and materials to require little funding	Local funding, PDM
<b>Status:</b> On-going.									
Kanawha 4	Misc.	9	Update Kanawha County website to provide hazard related information that is easily accessible	Ongoing	KCOEM	Kanawha County IT	Education & Awareness Programs	N/A Program maintenance included in existing budgets	Local funding
<b>Status:</b> On-going.									
Kanawha 5	Misc.	9	Continue to work with non-governmental organizations (youth service, professional, etc.) to promote mitigation education and awareness	Ongoing	KCOEM	N/A	Education & Awareness Programs	N/A Coordination should require little to no additional funding	Local funding
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Kanawha 6	Misc.	9	Distribute information on hazard related topics to local libraries, hospitals, city halls, insurance agencies, banks, and churches	Ongoing	KCOEM	KPEPC	Education & Awareness Programs	Up to \$1,500 per outreach campaign	Local funding, PDM
<b>Status:</b> On-going.									
Kanawha 7	Misc.	9	Work with utility companies to insert emergency information on monthly bills	Ongoing	KCOEM	Utility Companies	Education & Awareness Programs	N/A Coordination should require little to no additional funding	Local funding
<b>Status:</b> On-going.									
Kanawha 8	Flooding	9	Continue to hold courses on the National Flood Insurance Program for realtors, banks and insurers	Ongoing	Kanawha County Floodplain Office	Kanawha County Planning	Education & Awareness Programs	N/A Once materials are created, little additional funding is incurred	N/A
<b>Status:</b> On-going.									
Kanawha 9	Misc.	2	Ensure that all shelters have adequate emergency power resources	Ongoing	KCOEM	N/A	Structural & Infrastructure Improvements	Up to \$50,000 per generator	HMGP
<b>Status:</b> On-going.									
Kanawha 10	Misc.	9	Increase the number of trained citizen emergency responders	Ongoing	KCOEM	Local Fire Departments and EMS Agencies	Emergency Services	N/A Volunteer recruitment is difficult, but should not necessitate funds	Local funding
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Kanawha 11	Misc.	31	Conduct annual disaster exercises with local law enforcement, emergency personnel, city and county officials, and other disaster response agencies	Ongoing	KCOEM	KPEPC, Health Department	Emergency Services	Up to \$10,000	Local funding, EMPG, SHSP, HMEP
<b>Status:</b> On-going.									
Kanawha 12	Misc.	9	Provide information about local, regional, state and federal training opportunities to fire departments, EMS, ambulance services, and other emergency responders	Ongoing	KCOEM	KPEPC	Education & Awareness Programs	Up to \$1,500 per outreach campaign	Local funding, PDM
<b>Status:</b> On-going.									
Kanawha 13	Severe Storms	9	Conduct National Weather Service Storm Spotter Classes	Ongoing	KCOEM	NWS, KPEPC	Education & Awareness Programs	Up to \$1,000 for class logistics	Local funding, NWS, EMPG
<b>Status:</b> On-going.									
Kanawha 14	Severe Storms, Tornado	9	Promote awareness training for wind hazards to include training in standards and building codes	Ongoing	Kanawha County Planning	Municipalities that have adopted the building code	Education & Awareness Programs	Up to \$1,500 per outreach campaign	Local funding, PDM
<b>Status:</b> On-going.									
Kanawha 15	Severe Storms	6	Continue to be a National Weather Service Storm Ready Community	Ongoing	KCOEM	NWS	Local Plans & Regulations	N/A Program maintenance included in existing budgets	Local funding
<b>Status:</b> On-going.									
Kanawha 16	Flooding	6	Work with municipalities to update all floodplain ordinances adopted prior to 1987	5 years	Kanawha County Floodplain Office	Municipal Floodplain Coordinators	Local Plans & Regulations	N/A Program maintenance included in existing budgets	Local funding
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Kanawha 17	Flooding	9	Provide additional training to county and municipal personnel responsible for the enforcement of the floodplain regulations	Ongoing	Kanawha County Floodplain Office	N/A	Education & Awareness Programs	N/A Program maintenance included in existing budgets	Local funding
<b>Status:</b> On-going.									
Kanawha 18	Flooding	6	Explore participation in the Community Rating System (CRS)	Ongoing	Kanawha County Floodplain Office	Kanawha County Planning	Local Plans & Regulations	N/A Program maintenance included in existing budgets	Local funding
<b>Status:</b> On-going.									
Kanawha 19	Flooding	29	Separate combined storm and sewer drain lines	Ongoing	Utility Operators	N/A	Structural & Infrastructure Improvements	Unknown	Local funding, CDBG
<b>Status:</b> On-going.									
Kanawha 20	Flooding	2	Routinely remove trash and debris from stream beds, culverts, storm grates and storm drains	Ongoing	Kanawha County Planning	WVDEP and Other State Agencies	Natural System Protection	Varies	Local funding, WVDEP
<b>Status:</b> On-going.									
Kanawha 21	Flooding	32	Maintain information on the number and location of all repetitive loss properties throughout Kanawha County and the municipalities	Ongoing	Kanawha County Floodplain Office	Region 3 PDC, KCOEM	Local Plans & Regulations	N/A The list is already compiled at the state level	WVDHSEM, FEMA
<b>Status:</b> On-going.									
Kanawha 22	Flooding	32	Maintain a database of information on all repetitive loss properties including maps	Ongoing	Kanawha County Floodplain Office	Region 3 PDC	Local Plans & Regulations	N/A The list is already compiled at the state level	WVDHSEM, FEMA
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Kanawha 23	Flooding	1	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Kanawha County Floodplain Office	KCOEM, WVDHSEM, FEMA	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> On-going.									
Kanawha 24	Flooding	32	Continue to update asset inventory data to include interface with assets-by-asset loss estimates.	Ongoing	KCOEM	Region 3 PDC	Local Plans & Regulations	N/A	Region 3 PDC
<b>Status:</b> On-going.									
Kanawha 25	Misc.	32	Develop mitigation strategies to protect any at risk historic properties	Ongoing	KCOEM	Region 3 PDC	Structural & Infrastructure Improvements	N/A Project creation should require little to no additional funding	Local funding, WVDHSEM, FEMA, Region 3 PDC
<b>Status:</b> On-going.									
Kanawha 26	Flooding	9	Work with WV Department of Transportation to identify areas of frequent roadway flooding and develop mitigation strategies	Ongoing	KCOEM	Region 3 PDC, WVDOT, KPEPC	Education & Awareness Programs	N/A Project creation should require little to no additional funding	WVDHSEM, FEMA, WVDOT
<b>Status:</b> On-going.									
Kanawha 27	Misc.	28	Upgrade and improve communications in the rural areas of the county by creating back-up communication lines	Ongoing	KCOEM	N/A	Emergency Services	Unknown	N/A
<b>Status:</b> On-going.									
Kanawha 28	Drought	9	Develop and information brochure to distribute to residents focusing on the benefits of conserving water	Ongoing	KCOEM	Utility Operators	Education & Awareness Programs	Up to \$1,500 per outreach campaign	Local funding, PDM
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Kanawha 29	Drought	29	Continue construction of public water systems to eliminate wells	Ongoing	Utility Operators	Kanawha County Commission, Region 3 PDC	Structural & Infrastructure Improvements	Unknown	Local funding, CDBG, WVJJC
<b>Status:</b> On-going.									
Kanawha 30	Wildfire	9	Initiate fire department training programs to enhance response capabilities to wildfires	Ongoing	WV Division of Forestry	KCOEM	Emergency Services		
<b>Status:</b> On-going.									
Kanawha 31	Drought	9	Continue to educate the general public on risks during drought conditions	Ongoing	KCOEM	N/A	Education & Awareness Programs	Up to \$1,500 per outreach campaign	Local funding, PDM
<b>Status:</b> On-going.									
Kanawha 32	Mass Movements	36	Apply for additional Abandoned Mine Lands funding	Ongoing	Kanawha County Commission	Region 3 PDC	Local Plans & Regulations	Unknown	AML, WVDEP
<b>Status:</b> On-going.									
Kanawha 33	Misc.	9	Participate in public awareness campaigns on the local television stations	Ongoing	KCOEM	N/A	Education & Awareness Programs	N/A Outreach via established media should require little to no additional funding	Local media outlets
<b>Status:</b> On-going.									
Kanawha 34	Misc.	36	Assess high traffic intersections for potential problems	Ongoing	WV Department of Transportation	KCOEM	Local Plans & Regulations	Up to \$5,000 for document	Local funding, WVDOT
<b>Status:</b> On-going.									
Kanawha 35	Misc.	9	Publicize evacuation plans in public places such as libraries, schools, hospitals, courthouse, city halls, banks and churches	Ongoing	KCOEM	KPEPC	Education & Awareness Programs	Up to \$1,500 for printing	Local funding, PDM
<b>Status:</b> On-going.									





Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Kanawha 36	Misc.	2	Purchase and install generators for key infrastructure and government buildings	Ongoing	KCOEM	N/A	Structural & Infrastructure Improvements	Up to \$50,000 per generator	HMGP
<b>Status:</b> On-going.									
Kanawha 37	Misc.	38	Remove abandoned, derelict or burned structures	Ongoing	Kanawha County Planning	Municipalities	Local Plans & Regulations	Up to \$10,000 per structure	Local funding
<b>Status:</b> On-going.									
Kanawha 38	Flooding	2	Generators for lift stations and municipal owned water treatment facilities.	Ongoing.	KCOEM	Utility Operators	Structural & Infrastructure Improvements	Up to \$50,000 per generator	HMGP
<b>Status:</b> On-going.									



TOWN OF BELLE PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Belle 1	Flooding	4	Biennially dredge waterways to keep water below street level.	2 years	Belle Public Works Department	N/A	Natural System Protection	Unknown	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Belle 2	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Belle Floodplain Coordinator	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Belle 3	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Belle Floodplain Coordinator	Belle Town Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Belle4	Severe Storms	6	Participate in county provided training for wind hazards to include training standards and building codes	Ongoing	Belle Town Council	KCOEM	Education & Awareness Programs	N/A Participation should require little to no additional funding	Local funding, KCOEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Belle 5	Flooding	6	Participate in county provided training on the enforcement of floodplain regulations	Ongoing.	Belle Floodplain Coordinator	Kanawha County Floodplain Office	Education & Awareness Programs	N/A Participation should require little to no additional funding	Local funding, Kanawha County Floodplain Office
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Belle 6	Misc.	5	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Belle Town Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Belle 7	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Belle Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP

**Status:** New. The previous version of the regional plan did not include municipal-specific projects.



TOWN OF CEDAR GROVE PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Cedar Grove 1	Flooding	1	Require a permit to build in a floodplain and certificate of elevation before utilities can be turned on in new structures.	Ongoing	Building Department	Cedar Grove Town Council	Local Plans & Regulations	N/A Program maintenance is included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Cedar Grove 2	Flooding	3	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Cedar Grove Floodplain Coordinator	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Cedar Grove 3	Flooding	4	Participate in county provided training on the enforcement of floodplain regulations	Ongoing.	Building Department	Kanawha County Floodplain Office	Education & Awareness Programs	N/A Participation should require little to no additional funding	Local funding, Kanawha County Floodplain Office
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Cedar Grove 4	Flooding	2	Continue to enforce current floodplain regulations.	Ongoing	Building Department	Cedar Grove Town Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Cedar Grove 5	Misc.	6	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Cedar Grove Town Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Cedar Grove 6	Flooding	5	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Cedar Grove Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP

**Status:** New. The previous version of the regional plan did not include municipal-specific projects.



CITY OF CHARLESTON PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 1	Misc.	7	Create displays for use at public events (e.g. health fair, public awareness day, etc.).	On-going	Charleston Department of Homeland Security and Emergency Management (CDHSEM)	KCOEM, KPEPC	Education & Awareness Programs	\$500 - \$1,000	Local funds, EMPG
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 2	Misc.	7	Create materials that are targeted towards the tourist population	On-going	Charleston Conference & Visitors Bureau (CVB)	CDHSEM	Education & Awareness Programs	\$500 - \$1,000	Local funds, EMPG
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 3	Misc.	7	Utilize the media for the distribution and publication of hazard information.	On-going	CDHSEM	Local media	Education & Awareness Programs	No local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 4	Misc.	25	Create a public speaking series on hazard-related topics, such as what to do in the event of an emergency and who to contact.	On-going	CDHSEM	KPEPC, KCOEM	Education & Awareness Programs	\$5,000 - \$15,000	Local funds
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 5	Misc.	24	Ensure that the American Red Cross Citizen's Disaster Course is held on a frequent basis.	On-going	CDHSEM	American Red Cross (ARC)	Education & Awareness Programs	No local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									





Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 6	Misc.	6	Continue to work with the Kanawha County School Board to promote hazard mitigation education and awareness and to discuss better ways to integrate mitigation into the curriculum, as well as using the school board as a means to distribute information to homes via students.	On-going	CDHSEM	Kanawha County Schools	Education & Awareness Programs	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 7	Misc.	7	Continue to work with non-governmental organizations (youth, service, professional, etc.) to promote mitigation education and awareness.	On-going	CDHSEM	Local civic organizations	Education & Awareness Programs	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 8	Misc.	7	Distribute information on hazard related topics to local libraries, hospitals, city halls, insurance agencies, banks, and churches.	On-going	CDHSEM	KPEPC, KCOEM	Education & Awareness Programs	\$1,000 - \$2,500	Local funds, EMPG
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 9	Misc.	17	Work with the tax office to insert emergency information into monthly bills.	On-going	CDHSEM	N/A	Education & Awareness Programs	\$1,000 - \$2,500	Local funds, EMPG
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 10	Flooding	7	Distribute information to all property owners in repetitive loss areas within the city of Charleston regarding potential flood hazards as required for participation in the Community Rating System.	On-going	Charleston Planning	CDHSEM	Education & Awareness Programs	Up to \$80,000	PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 11	Misc.	29	Establish all-hazard resource centers. The centers should act as a repository for information on local hazard identification, preparedness, and mitigation strategies for use by citizens, realtors, and lenders.	On-going	CDHSEM	KCOEM, KPEPC	Education & Awareness Programs	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 12	Flooding	15	Continue to hold local courses on the National Flood Insurance Program (NFIP) for land-use organizations (e.g., realtors, bankers, construction companies, surveyors, and insurers).	On-going	Charleston Planning	CDHSEM	Education & Awareness Programs	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 13	Misc.	20	Conduct annual disaster exercises with local law enforcement, emergency personnel, city and county officials, and other disaster response agencies.	On-going	CDHSEM	KPEPC	Emergency Services	Up to \$5,000	Local funds, HMEP, EMPG, SERC
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 14	Severe Storms	19	Become certified by the National Weather Service (NWS) as Storm Ready thereby offer Storm Spotter classes.	On-going	CDHSEM	National Weather Service – Charleston, WVDHSEM	Local Plans & Regulations	Contingent upon availability of NWS resources	Local Funds
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 15	Misc.	18	Implement a Geographic Information System with an emphasis on hazard analysis	On-going	Charleston Planning	N/A	Local Plans & Regulations	\$2,500 - \$5,000	Local Funds
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects. The GIS manager and Floodplain Manager attended a HAZUS-MH training in 2014									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 16	Misc.	26	Review existing regulations to ensure adequacy in reducing the amount of future development in identified hazard areas	On-going	Charleston Planning	CDHSEM	Local Plans & Regulations	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 17	Flooding	3	Continue participation in the Community Rating System (CRS).	On-going	Charleston Planning,	WVDHSEM	Local Plans & Regulations	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects. Charleston has been a CRS community since 2011.									
Charleston 18	Flooding	23	Separate combined storm and sewer drain lines	On-going	Charleston Public Works	N/A	Structural & Infrastructure Improvements	Up to \$5,000,000	CDBG
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 19	Flooding	1	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	On-going (depends on funds availability)	Charleston Planning	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$1,000,000	FMA, HMGP, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 20	Flooding	2	Identify property owners of RL and non-RL properties that may be willing to participate in future property acquisition and demolition projects.	On-going	Charleston Planning	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 21	Misc.	22	Continue to update asset inventory data, to include interface with assets and compilation of asset-by-asset loss estimates.	On-going	Charleston Planning	CDHSEM	Local Plans & Regulations	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 22	Misc.	21	Upgrade and improve communications in the rural areas of the county by creating back-up communication lines	On-going	CDHSEM	KCOEM, KPEPC	Emergency Services	Little to no local cost	N/A



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 23	Drought	7	Develop an information brochure to distribute to residents focusing on the benefits of conserving water.	On-going	CDHSEM	KCOEM, KPEPC	Education & Awareness Programs	\$500 - \$1,000	Local funds, EMPG, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 24	Wildfire	26	Strengthen enforcement of burning bans with the U.S. Forestry Service.	On-going	Charleston City Council	USDA Forest Service	Local Plans & Regulations	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 25	Drought	7	Continue to educate the general public on risks during drought conditions.	On-going	CDHSEM	KCOEM, KPEPC	Education & Awareness Programs	\$500 - \$1,000	Local funds, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 26	Misc.	26	Continue to enforce International Building Codes and continue to update them as required	On-going	Charleston City Council	N/A	Local Plans & Regulations	Little to no local cost	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Charleston 27	Flooding	15	Continue to send out annual notification concerning floodplain management services to all lenders, insurance agents, and real estate agents within the city limits of Charleston	On-going	Charleston Planning	CDHSEM	Education & Awareness Programs	Little to no additional cost	Local funds
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects. This project was started prior to the 2016 HMP update but was not included in previous plans.									
Charleston 28	Flooding	4	Add floodplain information to the Charleston Planning website	On-going	Charleston Planning	Charleston IT	Education & Awareness Programs	Little to no additional cost	Local funds
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects. This project was started prior to the 2016 HMP update but was not included in previous plans.									
Charleston 29	Flooding	5	Update and maintain outreach materials relating to flooding at the Kanawha County Library	On-going	Charleston Planning	Local Libraries	Education & Awareness Programs	Little to no additional cost	Local funds



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Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects. This project was started prior to the 2016 HMP update but was not included in previous plans.									



TOWN OF CHESAPEAKE PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Chesapeake 1	Flooding	1	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Chesapeake Floodplain Coordinator	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Chesapeake Floodplain Coordinator	Chesapeake Town Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 3	Flooding	5	Perform a study of the town's sewer system	One year	Chesapeake Sanitary Board	Chesapeake Town Council	Structural & Infrastructure Improvements	Up to \$25,000	Local funding, CDBG, USACE (Silver Jackets)
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 4	Flooding	10	Develop a plan to eliminate issues in the town's sewer system	One year	Chesapeake Sanitary Board	Chesapeake Town Council	Structural & Infrastructure Improvements	Up to \$25,000	Local funding, USACE (Silver Jackets)
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 5	Flooding	12	Replace the town's current sewer system including pump/lift stations and pipelines	Two years	Chesapeake Sanitary Board	Chesapeake Town Council	Structural & Infrastructure Improvements	\$12 Million	Grants, Local funding, Other resources
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 6	Flooding	1	Enforce current ordinances and codes to prevent residents/businesses from pumping flood water into sewer system	Ongoing	Chesapeake Sanitary Board	Chesapeake Town Council	Local Plans & Regulations	N/A Program maintenance included in existing budgets	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 7	Flooding	5	Perform a study of the town's storm water system	One year	Chesapeake Town Council	N/A	Structural & Infrastructure Improvements	Up to \$25,000	Local funding, CDBG, USACE (Silver Jackets)
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 8	Flooding	10	Develop a Storm Water Improvement Plan	One year	Chesapeake Town Council	N/A	Structural & Infrastructure Improvements	Up to \$25,000	Local funding, CDBG, USACE (Silver Jackets)





Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 9	Flooding	12	Perform repairs and improvements to the storm water system	One year	Chesapeake Town Council	N/A	Structural & Infrastructure Improvements	Unknown	Local funding, CDBG
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 10	Flooding	1	Update and enforce new storm water ordinances	One year	Chesapeake Town Council	N/A	Local Plans & Regulations	N/A Creation of policy should require little to no additional funding	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 11	Flooding	5	Create a Storm Water Management Board	One year	Chesapeake Town Council	N/A	Local Plans & Regulations	N/A Creation of a board should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 12	Flooding	5	Hold quarterly cleanup events to involve the community	Ongoing	Chesapeake Town Council	Kanawha County Planning	Natural System Protection	N/A Support existing efforts should require little to no funding	Kanawha County Planning
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 13	Flooding	15	Create educational series for schools on best practices to maintain local water sources	Ongoing	Chesapeake Town Council	Kanawha County Schools, KCOEM	Education & Awareness Programs	N/A	Kanawha County Schools, KCOEM, Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 14	Flooding	15	Develop plans for rain gardens in the community	One year	Chesapeake Town Council	USEPA	Natural System Protection	Unknown	Local funding, USEPA, USACE (Silver Jackets)
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Chesapeake 15	Flooding	5	Continue work on MS4 permitting	Ongoing	Chesapeake Town Council	WVDEP	Local Plans & Regulations	N/A Program maintenance included in existing budgets	Local funding, WVDEP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 16	Misc.	17	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Chesapeake Town Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Chesapeake 17	Flooding	14	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Chesapeake Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



TOWN OF CLENDENIN PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Clendenin 1	Flooding	1	Continue to buy back repetitive loss properties	Ongoing	Clendenin Building Department	Kanawha County Floodplain Office	Property Protection	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Clendenin 2	Flooding	2	As funding is available, consider other traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Clendenin Building Department	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Clendenin 3	Flooding	4	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Clendenin Building Department	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Clendenin 4	Flooding	3	Continue to enforce current floodplain regulations	Ongoing	Clendenin Building Department	Clendenin Town Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Clendenin 5	Misc.	5	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Clendenin Town Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



CITY OF DUNBAR PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Dunbar 1	Flooding	3	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Dunbar Building Department	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Dunbar 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Dunbar Building Department	Dunbar City Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Dunbar 3	Flooding	1	Continue to Participate in the WV MS4 Permit Program	Ongoing	Dunbar Building Department	Dunbar City Council, WVDEP	Local Plans & Regulations	N/A Creation of policy should require little to no additional funding	Local funding, WVDEP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Dunbar 4	Misc.	5	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Dunbar City Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Dunbar 5	Flooding	4	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Dunbar Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



TOWN OF EAST BANK PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
East Bank 1	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	East Bank Floodplain Coordinator	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
East Bank 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	East Bank Floodplain Coordinator	East Bank Town Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
East Bank 3	Flooding	3	Replace municipal water pipelines	5 years	East Bank Public Works Department	Region 3 PDC	Structural & Infrastructure Improvements	\$5M+	Local funding, CDBG, WVIJDC
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
East Bank 4	Misc.	5	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	East Bank Town Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
East Bank 5	Flooding	4	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	East Bank Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



TOWN OF GLASGOW PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Glasgow 1	Flooding	3	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Glasgow Floodplain Coordinator	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Glasgow 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Glasgow Floodplain Coordinator	Glasgow Town Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Glasgow 3	Flooding	2	Replacing and improving current storm drains to reduce flooding	2017	Glasgow Public Works Department	Glasgow Town Council	Structural & Infrastructure Improvements	Unknown	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Glasgow 4	Misc.	5	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Glasgow Town Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Glasgow 5	Flooding	4	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Glasgow Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									





TOWN OF HANDLEY PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Handley 1	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Handley Floodplain Coordinator	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Handley 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Handley Floodplain Coordinator	Handley Town Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Handley 3	Misc.	4	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Handley Town Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Handley 4	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Handley Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



CITY OF MARMET PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Marmet 1	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Marmet Floodplain Coordinator	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Marmet 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Marmet Floodplain Coordinator	Marmet City Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Marmet 3	Misc.	4	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Marmet City Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Marmet 4	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Marmet Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



TOWN OF PRATT PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Pratt 1	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Kanawha County Floodplain Office	N/A	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Pratt 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Kanawha County Floodplain Office	Pratt Town Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Pratt 3	Misc.	4	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	Pratt Town Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Pratt 4	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Kanawha County Floodplain Office	N/A	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



CITY OF SOUTH CHARLESTON PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
South Charleston 1	Flooding	3	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	South Charleston Floodplain Coordinator	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
South Charleston 2	Flooding	2	Continue to enforce current floodplain regulations	Ongoing	South Charleston Floodplain Coordinator	South Charleston City Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
South Charleston 3	Flooding	1	Buy out six residences in low lying area	2017	South Charleston Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
South Charleston 4	Misc.	5	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	South Charleston City Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
South Charleston 5	Flooding	4	Continue to consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	South Charleston Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



CITY OF ST. ALBANS PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
St. Albans 1	Flooding	4	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	St. Albans Floodplain Coordinator	Kanawha County Floodplain Office	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
St. Albans 2	Flooding	3	Continue to enforce current floodplain regulations	Ongoing	St. Albans Floodplain Coordinator	St. Albans City Council	Local Plans & Regulations	N/A Program maintenance included in budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
St. Albans 3	Flooding	2	Continue to update municipal website to provide information on storm water management	Ongoing	St. Albans IT Personnel	N/A	Education & Awareness Programs	N/A Program maintenance is included in existing budgets	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
St. Albans 4	Flooding	1	Continue to participate in WV MS4 permitting process	Ongoing	St. Albans City Council	WVDEP	Local Plans & Regulations	N/A	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
St. Albans 5	Misc.	6	Support county efforts to utilize the media for the distribution and publication of hazard information	Ongoing	KCOEM	St. Albans City Council	Education & Awareness Programs	N/A Support should require little to no additional funding	N/A
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
St. Albans 6	Flooding	5	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	St. Albans Floodplain Coordinator	Kanawha County Floodplain Office	Structural & Infrastructure Improvements	Up to \$103,100 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



PUTNAM COUNTY PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Putnam 1	Flooding	16	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Putnam County Planning & Infrastructure	WVDHSEM	Local Plans & Regulations	N/A Program maintenance included in existing budgets	Local funding, WVDHSEM, FEMA
<b>Status:</b> On-going. The county joined the CRS program.									
Putnam 2	Flooding	27	Continue to enforce current floodplain regulations	Ongoing	Putnam County Planning & Infrastructure	Putnam County Commission	Local Plans & Regulations	N/A	Local funding, WVDHSEM, FEMA
<b>Status:</b> On-going. This is performed on every permit.									
Putnam 3	Flooding	34	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Putnam County Planning & Infrastructure	Putnam County Commission, WVDHSEM	Structural & Infrastructure Improvements	Up to \$148,600 per structure acquired	HMGP
<b>Status:</b> On-going. An HMGP request was submitted in October 2016 to buy out seven structures.									
Putnam 4	Misc.	23	Work with the board of education to place pagers in each school that can be activated from the emergency operations center to provide early warning to all schools	Ongoing	Putnam County Office of Emergency Services	Putnam County Schools	Structural & Infrastructure Improvements	Up to \$100 per pager	Local funding
<b>Status:</b> On-going. PCOES is searching for funding opportunities.									
Putnam 5	Misc.	32	Local government, industry and the private sector will work to make available a low cost emergency alert radio that can be placed in all homes and businesses that can be activated from the emergency operations center during emergencies.	Ongoing	Putnam County Office of Emergency Services	Local Industry	Emergency Services	Up to \$500 per radio	Local funding, PDM



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
<b>Status: On-going.</b>									
Putnam 6	Misc.	35	Seek funding through state and federal resources to erect additional communications towers to improve radio coverage and add to the back-up capabilities of the emergency operations center	Ongoing	Putnam County Office of Emergency Services	WVDHSEM, Various Putnam County Agencies	Structural & Infrastructure Improvements	Unknown	Local funding, EMPG, SHSP
<b>Status: On-going.</b>									
Putnam 7	Misc.	35	Seek funding through state and federal resources to purchase equipment and locate communications towers to improve interoperability to other counties and state agencies	Ongoing	Putnam County Office of Emergency Services	WVDHSEM	Structural & Infrastructure Improvements	Unknown	Local funding, EMPG, SHSP
<b>Status: On-going.</b>									
Putnam 8	Misc.	32	Communicate to industry and private property owners the need to open private roads that lead to higher ground in an emergency to shorten evacuation routes	Ongoing	Putnam County Office of Emergency Services	WVDHSEM	Education & Awareness Programs	N/A Coordination should require little to no additional funding	Local funding
<b>Status: On-going.</b>									
Putnam 9	Misc.	23	Place signs marking such routes	Ongoing	Putnam County Office of Emergency Services	WVDOH	Education & Awareness Programs	Up to \$500 per sign	Local funding
<b>Status: On-going.</b>									
Putnam 10	Misc.	23	Map routes and make maps available to the public	Ongoing	Putnam County Office of Emergency Services	KPEPC	Education & Awareness Programs	Up to \$1,500 for printing	Local funding, PDM
<b>Status: On-going.</b>									





Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Putnam 11	Misc.	19	Hold evacuation drills to familiarize the public with proper procedures	Ongoing	Putnam County Office of Emergency Services	KPEPC	Emergency Services	Up to \$10,000 per exercise	Local funding, EMPG, SHSP, HMEP
<b>Status:</b> On-going. The county holds a few of these drills each year.									
Putnam 12	Flooding	30	Support the efforts of volunteer groups, state agencies and other interested parties to clear stream banks, drainage ditches and other areas of debris.	Ongoing	Putnam County Office of Emergency Services	Local Volunteer Groups	Education & Awareness Programs	N/A Support should require little to no additional funding	Local funding, WVDEP
<b>Status:</b> On-going.									
Putnam 13	Flooding	30	Perform channel modifications to increase flow capacities of rivers and streams. When funds are available	Ongoing	WVSCS	Putnam County Office of Emergency Services	Natural System Protection	Unknown	WV Soil Conservation, WVDEP
<b>Status:</b> On-going.									
Putnam 14	Misc.	16	Deliver public service announcements through local media, such as Hurricane Breeze, Putnam Post, Charleston Newspapers and WSAZ, WCHS, WVAH, and WOWK and local radio stations.	Ongoing	Putnam County Office of Emergency Services	Local Media	Education & Awareness Programs	N/A Local media often allows local govt. to release messages at no cost	Local funding, Local media
<b>Status:</b> On-going.									
Putnam 15	Wildfire	2	Develop a proactive policy on issuing county wide burn bans during dry weather	Ongoing	Putnam County Commission	Putnam County Office of Emergency Services, WV Division of Forestry, USDA	Local Plans & Regulations	Up to \$1,500 per targeted outreach effort	Local funding, PDM
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Putnam 16	Wildfire	2	Work with the Forestry Department to educate the public of the burning laws through Public Service Announcements in the Hurricane Breeze, Putnam Post, Charleston Newspapers and WSAZ, WCHS, WVAH, and WOWK and local radio stations	Ongoing	Putnam County Office of Emergency Services	WV Division of Forestry	Education & Awareness Programs	N/A Coordination should require little to no additional funding	Local funding, Local media, WVDOF
<b>Status:</b> On-going.									
Putnam 17	Wildfire	2	Increase public awareness of the arson problem in Putnam County through public education programs in schools, churches, and civic groups	Ongoing	Putnam County Office of Emergency Services	WV Division of Forestry, Local Civic Groups	Education & Awareness Programs	Up to \$1,500 per targeted outreach effort	Local funding, PDM, WVDOF
<b>Status:</b> On-going.									
Putnam 18	Wildfire	28	Support the Forestry Department and State Fire Marshall's Office by increasing the reward offered for arsonists.	Ongoing	Putnam County Office of Emergency Services	WV Division of Forestry, WVFSM	Education & Awareness Programs	N/A Support should require little to no additional funding	Local funding
<b>Status:</b> On-going									
Putnam 19	Mass Movements	16	Advise the public to contact their insurance agent to confirm that they are covered for land subsidence	Ongoing	Putnam County Planning & Infrastructure	Putnam County Office of Emergency Services	Education & Awareness Programs	Up to \$1,500 per targeted outreach effort	Local funding, PDM, Local insurance agents
<b>Status:</b> On-going. Advice is broadcast when there are issues (or potential issues) from mass movements.									
Putnam 20	Mass Movements	6	Suggest to the public that they add the proper coverage to their insurance policies	Ongoing	Putnam County Planning & Infrastructure	Putnam County Office of Emergency Services	Education & Awareness Programs	Up to \$1,500 per targeted outreach effort	Local funding, PDM, Local insurance agents
<b>Status:</b> On-going.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Putnam 21	Misc.	6	Continue to work with non-governmental agencies to promote mitigation education and awareness	Ongoing	Putnam County Office of Emergency Services	KPEPC	Education & Awareness Programs	N/A Coordination should require little to no additional funding	WVDHSEM, FEMA, Region 3 PDC
<b>Status:</b> New.									
Putnam 22	Misc.	1	Work on a survey to evaluate existing shelters to determine adequacy for current and future populations	5 years	Putnam County Office of Emergency Services	Red Cross, KPEPC	Education & Awareness Programs	N/A Coordination should require little to no additional funding	Local funding
<b>Status:</b> New.									
Putnam 23	Misc.	5	Continue to work on adequate emergency shelter and evacuation plans for animals (domestic pets and livestock)	Ongoing	Putnam County Office of Emergency Services	KPEPC	Local Plans & Regulations	Up to \$5,000	Local funding, HMEP, EMPG, SHSP, KPEPC
<b>Status:</b> New.									
Putnam 24	Misc.	6	Conduct annual disaster exercises with local law enforcement, emergency personnel, city and county officials, and other disaster response agencies	Ongoing	Putnam County Office of Emergency Services	KPEPC	Emergency Services	Up to \$10,000	Local funding, SHSP, EMPG, HMEP
<b>Status:</b> New.									
Putnam 25	Severe Storms, Tornadoes	6	Become certified by the National Weather Service as Storm Ready	5 years	Putnam County Office of Emergency Services	National Weather Service	Local Plans & Regulations	N/A Participation in the program is no cost	National Weather Service
<b>Status:</b> New.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Putnam 26	Flooding	6	Work with the West Virginia Department of Transportation to identify areas of frequent roadway flooding and develop mitigation strategies.	Ongoing	Putnam County Office of Emergency Services	WVDOT	Education & Awareness Programs	N/A Coordination should require little to no additional funding	WVDOT
<b>Status:</b> New.									
Putnam 27	Hazardous Materials, Misc.	23	Study and evaluate transportation systems for problems that could lead to hazardous materials spills and other incidents.	Ongoing	Putnam County Office of Emergency Services	WVDOT, CSXT, NSRR, KPEPC	Local Plans & Regulations	Up to \$5,000 for document	Local funding, HMEP, CSXT, NSRR, KPEPC
<b>Status:</b> New.									
Putnam 28	Misc.	6	Evaluate railroad crossings for appropriate warning systems.	Ongoing	Putnam County Office of Emergency Services	CSXT, NSRR, WVDOT	Structural & Infrastructure Improvements	N/A Coordination should require little to no additional funding	CSXT, NSRR
<b>Status:</b> New.									
Putnam 29	Misc.	6	Publicize evacuation plans in public places, such as libraries, schools, hospitals, the courthouse, city halls, banks, and churches.	Ongoing	Putnam County Office of Emergency Services	KPEPC	Education & Awareness Programs	Up to \$1,500 per targeted outreach effort	Local funding, PDM
<b>Status:</b> New.									
Putnam 30	Misc.	6	Encourage those dependent on oxygen concentrators or other medical devices to install backup generators.	Ongoing	Putnam County Office of Emergency Services	KPEPC	Education & Awareness Programs	Up to \$1,500 per targeted outreach effort	Local funding, PDM
<b>Status:</b> New.									
Putnam 31	Extreme Temperatures, Severe Storms	19	Inform the public on warming shelter locations	Ongoing	PCOEM	Local Fire, Local Law Enforcement	Education & Awareness Programs	Up to \$1,500 per targeted outreach effort	Local funding, PDM
<b>Status:</b> New.									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Putnam 32	Misc.	6	Educate citizens on the importance of smoke detectors and encourage their use.	Ongoing	Putnam County Office of Emergency Services	Local Fire, Local Law Enforcement	Education & Awareness Programs	Up to \$1,500 per targeted outreach effort	Local funding, PDM
<b>Status:</b> New.									
Putnam 33	Misc.	6	Use social media such as Twitter, Facebook, or mass texting systems to notify the public about hazardous events	Ongoing	Putnam County Office of Emergency Services	N/A	Education & Awareness Programs	N/A Social media options are available at no cost	N/A
<b>Status:</b> New.									
Putnam 34	Misc.	28	Provide training to engineers and surveyors on the new elevation certificate	Ongoing	Putnam County Office of Emergency Services	Putnam County Planning & Infrastructure	Education & Awareness Programs	Unknown	Local funding, WVDHSEM
<b>Status:</b> New.									
Putnam 35	Misc.	19	Provide training to the insurance agents and banking institutions within the county	Ongoing	Putnam County Office of Emergency Services	Putnam County Planning & Infrastructure	Education & Awareness Programs	Unknown	Local funding, WVDHSEM
<b>Status:</b> New.									
Putnam 36	Flooding	19	Provide outreach to the citizens of Putnam County on flood insurance and mitigation options.	Ongoing	Putnam County Office of Emergency Services	Putnam County Planning & Infrastructure	Education & Awareness Programs	Up to \$1,500 per targeted outreach effort	Local funding, PDM
<b>Status:</b> New.									



TOWN OF BANCROFT PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Bancroft 1	Flooding	1	Purchase and install a backup generator for the sewer system.	Ongoing	Bancroft Planning	Putnam County Planning & Infrastructure	Structural & Infrastructure Improvements	Up to \$25,000	USDHS, FEMA, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Bancroft 2	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Putnam County Planning & Infrastructure	Bancroft Town Council	Local Plans & Regulations	N/A Factored into current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Bancroft 3	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Putnam County Planning & Infrastructure	Bancroft Town Council	Structural & Infrastructure Improvements	Up to \$148,600 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Bancroft 4	Extreme Temperatures, Severe Storms	4	Support county efforts to inform the public on warming shelter locations	Ongoing	PCOEM	Local Fire & Law Enforcement	Education & Awareness Programs	N/A Supporting existing efforts should require little to no additional funding	Local funding, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



TOWN OF BUFFALO PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Buffalo 1	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Putnam County Planning & Infrastructure	Buffalo Town Council	Local Plans & Regulations	N/A Factored into current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Buffalo 2	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Putnam County Planning & Infrastructure	Buffalo Town Council	Local Plans & Regulations	N/A Factored into current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Buffalo 3	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Putnam County Planning & Infrastructure	Buffalo Town Council	Structural & Infrastructure Improvements	Up to \$148,600 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Buffalo 4	Extreme Temperatures, Severe Storms	4	Support county efforts to inform the public on warming shelter locations	Ongoing	PCOEM	Local Fire & Law Enforcement	Education & Awareness Programs	N/A Supporting existing efforts should require little to no additional funding	Local funding, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									





TOWN OF ELEANOR PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Eleanor 1	Flooding	1	Permit process for residents to purchase proper size storm water drains to be installed by the town to reduce residential flooding	Ongoing	Eleanor Storm Drain Board	Eleanor Public works Department	Local Plans & Regulations	N/A Program maintenance is in current budget	Storm Drain Board Tax
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Eleanor 2	Flooding	2	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Eleanor Floodplain Coordinator	Putnam County Planning & Infrastructure	Local Plans & Regulations	N/A Program maintenance is in current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Eleanor 3	Flooding	3	Continue to enforce current floodplain regulations	Ongoing	Eleanor Floodplain Coordinator	Eleanor Town Council	Local Plans & Regulations	N/A Program maintenance is in current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Eleanor 4	Flooding	4	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Eleanor Floodplain Coordinator	Putnam County Planning & Infrastructure	Structural & Infrastructure Improvements	Up to \$148,600 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Eleanor 5	Extreme Temperatures, Severe Storms	5	Support county efforts to inform the public on warming shelter locations	Ongoing	PCOEM	Local Fire & Law Enforcement	Education & Awareness Programs	N/A Supporting existing efforts should require little to no additional funding	Local funding, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



CITY OF HURRICANE PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Hurricane 1	Misc.	2	Purchase and install a backup generator at the senior center to be used as an emergency shelter	As funds become available	Hurricane Emergency Management	PCOEM	Structural & Infrastructure Improvements	Up to \$25,000	USDHS, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Hurricane 2	Misc.	3	Purchase portable message boards to be used to alert the community and along evacuation routes	As funds become available	Hurricane Emergency Management	PCOEM	Emergency Services	Up to \$5,000	USDHS, Local Funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Hurricane 3	Flooding	4	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Hurricane Floodplain Coordinator	Putnam County Planning & Infrastructure	Local Plans & Regulations	N/A Program maintenance is in current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Hurricane 4	Flooding	1	Continue to enforce current floodplain regulations	Ongoing	Hurricane Floodplain Coordinator	Hurricane City Council	Local Plans & Regulations	N/A Program maintenance is in current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Hurricane 5	Flooding	5	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Hurricane Floodplain Coordinator	Putnam County Planning & Infrastructure	Structural & Infrastructure Improvements	Up to \$148,600 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



CITY OF NITRO PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Nitro 1	Flooding	1	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Nitro Floodplain Coordinator	Putnam County Planning & Infrastructure	Local Plans & Regulations	N/A Program maintenance is in current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Nitro 2	Flooding	2	Continue to enforce current floodplain regulations	Ongoing	Nitro Floodplain Coordinator	Putnam County Planning & Infrastructure	Local Plans & Regulations	N/A Program maintenance is in current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Nitro 3	Flooding	3	Relocate or acquire and remove structures from the floodplains and SFHA. Also consider elevation and mitigation reconstruction, as appropriate.	Ongoing	Nitro Floodplain Coordinator	Putnam County Planning & Infrastructure	Structural & Infrastructure Improvements	Up to \$148,600 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Nitro 4	Extreme Temperatures, Severe Storms	4	Support county efforts to inform the public on warming shelter locations	Ongoing	PCOEM	Local Fire & Law Enforcement	Education & Awareness Programs	N/A Supporting existing efforts should require little to no additional funding	Local funding, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



TOWN OF POCA PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Poca 1	Flooding	1	Continue to participate in the National Flood Insurance Program (NFIP)	Ongoing	Putnam County Planning & Infrastructure	Poca Town Council	Local Plans & Regulations	N/A Program maintenance is in current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Poca 2	Flooding	2	Continue to enforce current floodplain regulations	Ongoing	Putnam County Planning & Infrastructure	Poca Town Council	Local Plans & Regulations	N/A Program maintenance is in current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Poca 3	Flooding	3	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Putnam County Planning & Infrastructure	N/A	Structural & Infrastructure Improvements	Up to \$148,600 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Poca 4	Extreme Temperatures, Severe Storms	4	Support county efforts to inform the public on warming shelter locations	Ongoing	PCOEM	Local Fire & Law Enforcement	Education & Awareness Programs	N/A Supporting existing efforts should require little to no additional funding	Local funding, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



TOWN OF WINFIELD PROJECTS

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Winfield 1	Misc.	1	Continue to use push-app to notify community of impending hazards	Ongoing	Winfield Emergency Management	PCOEM	Emergency Services	N/A	Local funding
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Winfield 2	Misc.	2	Purchase and install a backup generator at town hall to keep essential offices open	As funds become available	Winfield Emergency Management	PCOEM	Structural & Infrastructure Improvements	Up to \$25,000	USDHS, PDM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Winfield 3	Flooding	3	Permit process for new structures to ensure compliance with floodplain regulations.	Ongoing	Winfield Building Department	Winfield Town Council	Local Plans & Regulations	N/A Program maintenance is in current budget	FEMA, WVDHSEM
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									
Winfield 4	Flooding	4	As funding is available, consider traditional flood mitigation projects such as acquisition and demolition, elevation, relocation, and mitigation reconstruction.	Ongoing	Winfield Floodplain Coordinator	Putnam County Planning & Infrastructure	Structural & Infrastructure Improvements	Up to \$148,600 per structure acquired	HMGP
<b>Status:</b> New. The previous version of the regional plan did not include municipal-specific projects.									



## 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.

### 4.0.1 Monitoring, Evaluating, and Updating the Plan

The Regional Intergovernmental Council (RIC/Region 3) and the steering committee overseeing this plan update established a method for the systematic and periodic review of this document. As the custodial agency, RIC assumes responsibility or scheduling steering committee meetings and also serves as the point of contact for the steering committee and WVDHSEM during the 5-year period. The RIC also maintains the master copy of the plan, which is where all additions, corrections and changes are made. Upon any review, the master copy will be brought up to date to reflect the most current information about the steering committee, the planning process, the most current hazard data, vulnerability analysis, mitigation strategy and plan maintenance processes.

The formal updating process will consist of a series of meetings (either face-to-face or virtual) to review mitigation projects, the risk assessment, and to compare the two. Region 3 will convene the steering committee annually (for a total of three meetings between formal updating processes).



The RIC 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 RIC will ensure completion of the CEDS and mitigation annual reviews simultaneously.



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.

#### **4.0.2 Planning Addendums**

Addendums to this plan may become necessary during its life cycle as programs and priorities change. Addendums that are requested and approved at the local level may be passed through the Region 3 Planning and Development Council to the West Virginia Division of Homeland Security and Emergency Management (WVDHSEM) and to FEMA Region 3. Addendums that are approved by WVDHSEM and FEMA will be included in the plan and will not need to be adopted by resolution by the various municipalities of Region 3.

#### **4.0.3 Implementation through Existing Programs**

The members of the regional council are leaders within the communities and agencies/jurisdictions 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. Table 4.1 below summarizes several plans maintained in the region and identifies mitigation themes in those documents (i.e., ways mitigation can be integrated into those documents) as well as identifies specific mitigation goals and projects (from





Section 3.0) that are consistent with those themes. The RIC and its member governments will integrate mitigation into other planning efforts through three primary means. The RIC intends to integrate mitigation into its CEDS document to explore the connections between hazard mitigation planning and economic development. Further, the RIC maintains a series of community profiles on each of its member governments. RIC planners will add hazard risk and vulnerability to these profiles to ensure that information is available for consideration as its member governments compile community and economic development project lists.

Many member governments in Region 3 are small and do not have dedicated planning staffs. In those cases, the RIC serves as the planning staff, actually composing comprehensive plans for those jurisdictions. In those instances where the RIC serves as the principle author of the plan, mitigation projects will be prioritized. The RIC also frequently supports the larger member governments with jurisdiction-specific planning departments (e.g., Charleston, Kanawha County, Nitro, Putnam County, and St. Albans). The RIC recommends consideration of mitigation in those local planning efforts.

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, Homeland Security Grant Program, Emergency Management Performance Grant, Community Development Block Grant, 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.

Significantly, a number of existing plans already include mitigation considerations. For instance, at the time of the current update, the *City of Charleston Comprehensive Plan* (2013) lists a transportation and infrastructure goal as continuing efforts to reduce the severity of flooding impacts. The plan recognizes participation in the Community Rating System (CRS) as an opportunity to exceed the minimum requirements of the National Flood Insurance Program (NFIP) requirements. The *2015 Region 3 Development Plan* lists projects for the counties and municipalities that will mitigate flooding issues through sewer extensions and upgrades, construction and repair of storm sewer systems, and creation of plans and studies to better understand the effects of the hazards on the communities.



Table 4.1

Existing Program	Responsible Agency(ies)	Applicable Plan (i.e., Document)	Mitigation Action Comparison	
Emergency Operations Planning	Local Emergency Management Agencies (County/City Level) Kanawha-Putnam Emergency Planning Committee Local Emergency Planning Committees (Boone/Clay Counties)	Emergency operations plans Hazard/vulnerability analyses Commodity flow studies	Ensure consistency between updated hazard analyses and the risk assessment portion of the plan Consider mitigation projects as part of the overall cycle of emergency management	
			PLAN ELEMENTS/POLICIES Establish and maintain effective response program	ASSOCIATED MITIGATION GOAL Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards
			Support continuity of critical infrastructure and key resources	Reduce the current and future risks from hazards in Boone, Clay, Kanawha and Putnam counties
Transportation Planning	Regional Intergovernmental Council	RIC 2040 long-range transportation plan (regional level) Bicycle & Pedestrian Plan for Kanawha and Putnam Counties Cross Lanes Corridor Study Public Transit-Human Services Plan	Identify specific risk areas for certain hazards	
			Develop better hazard data for Boone, Clay, Kanawha and Putnam counties	
Transportation Planning	Regional Intergovernmental Council	RIC 2040 long-range transportation plan (regional level) Bicycle & Pedestrian Plan for Kanawha and Putnam Counties Cross Lanes Corridor Study Public Transit-Human Services Plan	Ensure hazards are acknowledged in long-range transportation planning Consider response elements to the hazards identified in the mitigation plan, as appropriate, with respect to transportation (e.g., evacuation) Ensure planned transportation projects do not add to vulnerabilities (e.g., ensure projects utilize proper drainage, are properly elevated, etc.) Consider the incorporation of green infrastructure/low-impact development as transportation projects are undertaken (e.g., permeable pavements, green streets and alleys, etc.)	
			PLAN ELEMENTS/POLICIES Provide for emergency access to all parts of the region and safe evacuation routes	ASSOCIATED MITIGATION GOAL Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards



Table 4.1

Existing Program	Responsible Agency(ies)	Applicable Plan (i.e., Document)	Mitigation Action Comparison	
Floodplain Management	Jurisdictional Floodplain Coordinators Local Emergency Management Agencies (County/City Level)	Floodplain ordinances (county and municipal level)	<p>Continue to enforce floodplain development ordinances</p> <p>Consider participation in the Community Rating System, as appropriate for the jurisdiction</p> <p>Continue public outreach to ensure awareness of flood risk and mitigation options</p>	
			<p><b>PLAN ELEMENTS/POLICIES</b></p> <p>Support resiliency by ensuring new development stays clear of known hazard areas or is built in such a way as to withstand the effects of known hazards</p>	<p><b>ASSOCIATED MITIGATION GOAL</b></p> <p>Minimize the impact of flooding and flash flooding on the people and property in Boone, Clay, Kanawha and Putnam counties</p>
			<p>Protect green spaces in special flood hazard areas</p>	<p>Reduce the current and future risks from hazards in Boone, Clay, Kanawha and Putnam counties</p>



Table 4.1											
Existing Program	Responsible Agency(ies)	Applicable Plan (i.e., Document)	Mitigation Action Comparison								
Infrastructure (i.e., Water, Sewer) Development	Regional Intergovernmental Council Municipal Utilities Public Service Districts WV American Water Company	Regional development plan Comprehensive economic development strategy (CEDS) Regional broadband plan Jurisdictional capital improvement plans Jurisdictional source water protection plans	Ensure protection of environmental features as infrastructure projects are undertaken Support resiliency by extending or improving public utility service to residents Support improved emergency communications								
			<table border="1"> <tr> <th>PLAN ELEMENTS/POLICIES</th> <th>ASSOCIATED MITIGATION GOAL</th> </tr> <tr> <td>Extend access to public utility services throughout the region</td> <td>Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards</td> </tr> <tr> <td>Improve communications and access to high-speed internet</td> <td>Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards</td> </tr> <tr> <td>Support infrastructure development as a means of attracting economic development</td> <td>Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards</td> </tr> </table>	PLAN ELEMENTS/POLICIES	ASSOCIATED MITIGATION GOAL	Extend access to public utility services throughout the region	Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards	Improve communications and access to high-speed internet	Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards	Support infrastructure development as a means of attracting economic development	Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards
			PLAN ELEMENTS/POLICIES	ASSOCIATED MITIGATION GOAL							
Extend access to public utility services throughout the region	Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards										
Improve communications and access to high-speed internet	Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards										
Support infrastructure development as a means of attracting economic development	Improve upon the protection of the citizens of Boone, Clay, Kanawha and Putnam counties from all natural and man-made hazards										



Table 4.1

Existing Program	Responsible Agency(ies)	Applicable Plan (i.e., Document)	Mitigation Action Comparison	
Commercial/Economic Development	Regional Intergovernmental Council Boone County Community & Economic Development Corporation Central Appalachian Empowerment Zone Kanawha County Planning City of Charleston Planning Putnam County Office of Planning & Infrastructure	Regional development plan Comprehensive economic development strategy (CEDS) Twenty-twenty Vision (Kanawha County Comprehensive Plan) Putnam County Community Plan – Bridging to the Future Imagine Charleston Comprehensive Plan Nitro – A Plan for Moving the City Forward St. Albans Comprehensive Plan	Ensure adherence to floodplain and other development ordinances Consider the implementation of storm water management projects Consider incorporating green infrastructure/low-impact development into site-specific projects (e.g., use of porous pavement, tree planting initiatives, planter boxes, bio swales, etc.)	
			<p>PLAN ELEMENTS/POLICIES</p> <p>Encourage responsible land use</p>	<p>ASSOCIATED MITIGATION GOAL</p> <p>Minimize the impact of flooding and flash flooding on the people and property in Boone, Clay, Kanawha and Putnam Counties</p> <p>Decrease losses due to land subsidence and landslides</p>
			<p>Identify areas suitable for residential development (or redevelopment)</p>	<p>Reduce the current and future risks from hazards in Boone, Clay, Kanawha and Putnam Counties</p> <p>Reduce the potential impact of natural and man-made disasters on Boone, Clay, Kanawha and Putnam counties' historic structures and landmarks</p>
			<p>Identify areas suitable for commercial development (or redevelopment)</p>	<p>Reduce the current and future risks from hazards in Boone, Clay, Kanawha and Putnam Counties</p> <p>Reduce the potential impact of natural and man-made disasters on Boone, Clay, Kanawha and Putnam counties' historic structures and landmarks</p>
			<p>Identify areas suitable for industrial development (or redevelopment)</p>	<p>Reduce the current and future risks from hazards in Boone, Clay, Kanawha and Putnam Counties</p> <p>Reduce the potential impact of natural and man-made disasters on Boone, Clay, Kanawha and Putnam counties' historic structures and landmarks</p>



Table 4.1

Existing Program	Responsible Agency(ies)	Applicable Plan (i.e., Document)	Mitigation Action Comparison	
Stormwater Management	Jurisdictional Utilities and Public Works	Jurisdictional MS4 permitting processes (where applicable)	Identification of site-specific flooding concerns and other water quality issues Provides a means for consideration of low-impact development options for flood mitigation	
			PLAN ELEMENTS/POLICIES Encourage onsite management of runoff	ASSOCIATED MITIGATION GOAL Minimize the impact of flooding and flash flooding on the people and property of Boone, Clay, Kanawha and Putnam counties Lessen the effects of severe storm events Reduce the current and future risks from hazards in Boone, Clay, Kanawha and Putnam counties



#### **4.0.4 Continued Public Involvement**

Region 3 and the participating jurisdictions understand that the general public must be involved in the initial planning process, as well as the updates to the completed plan. As such, the steering committee/Region 3 will invite the public to participate as the plan is updated through attendance at future meetings, and distribution of questionnaires/surveys, etc. Further, 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.

Region 3, at a minimum, will maintain file copies of the hazard mitigation plan for review and inspection during routine business hours. Region 3 intends to log all comments received regarding the mitigation plan. Members of the public are invited to contact the Region 3 office 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.





## **APPENDIX 1: STAKEHOLDER AND PUBLIC INVOLVEMENT**

This appendix contains evidence that the public and participating jurisdictions were involved in the development of the hazard mitigation plan. It contains copies of sign-in sheets from meetings as well as copies of newspaper and/or other advertisements providing notice of those meetings.



# Region 3 Multi-Jurisdictional Hazard Mitigation Plan

2017 Update

Public Meetings – Kanawha & Putnam Counties

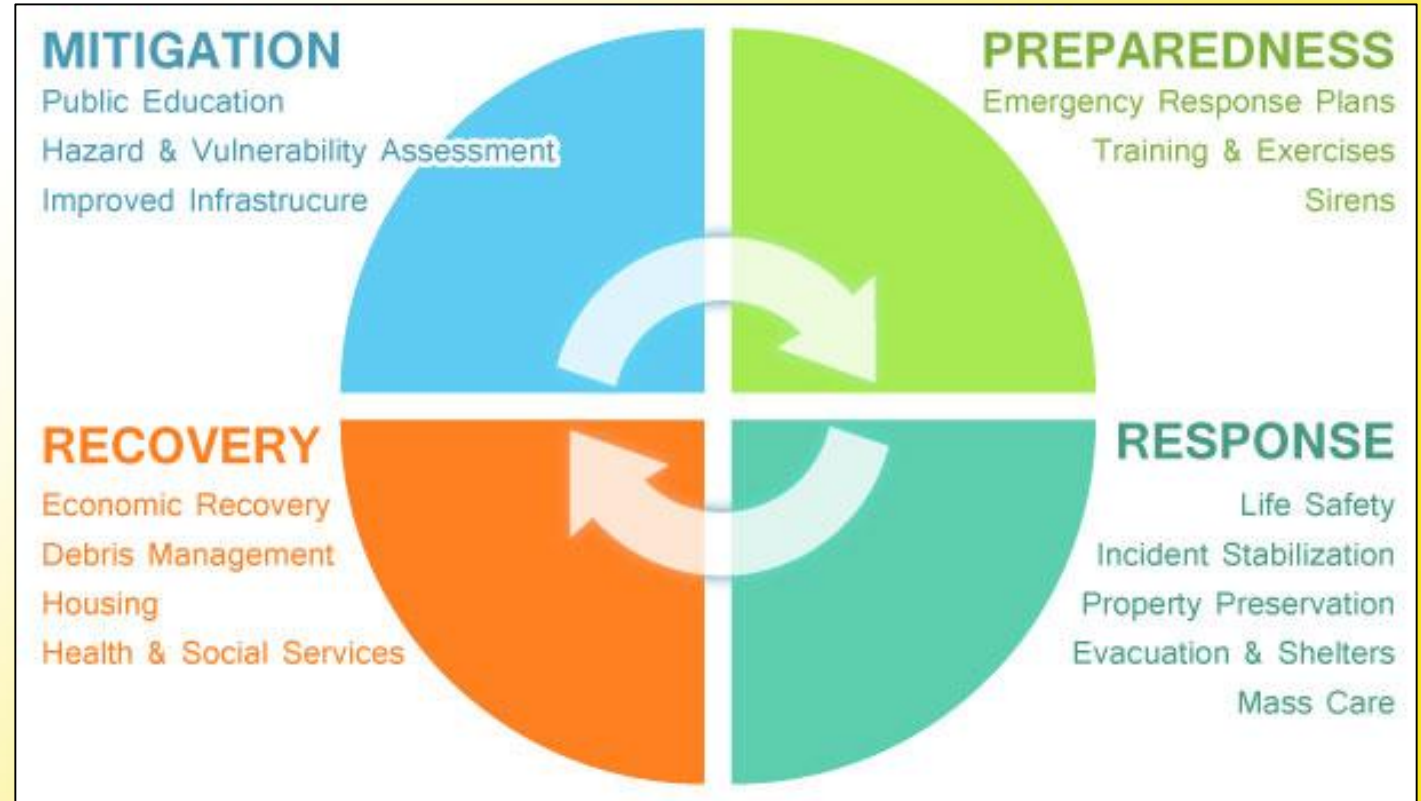
January 24, 2017

# Agenda

- 'Hazard Mitigation' Overview
- Risk vs. Vulnerability
- The Flood Risk
- Region 3 Multi-Jurisdictional Hazard Mitigation Plan Overview
- Discussion

# 'Hazard Mitigation' Overview

- Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters.



# Risk vs. Vulnerability

RISK	VULNERABILITY
Exposure to danger, harm, or loss	The <u>quality or state</u> of being exposed to the possibility of danger, harm, or loss

*With hazard mitigation, we assess risk.*

*We also identify projects that can lessen vulnerability.*

# The Flood Risk

- A flood is a general and temporary condition where two or more acres of normally dry land or two or more properties are inundated by water or mudflow.
- Causes of Flooding
  - Dams and levees
  - New development
  - Flood after fire
  - Heavy rains
  - Winter flooding
- Flash Flooding vs. Flooding



- HOME
- FLOOD RISKS
- UNDERSTANDING FLOOD MAPS
- RESIDENTIAL COVERAGE
- COMMERCIAL COVERAGE
- POLICYHOLDER RESOURCES
- PARTNER RESOURCES
- INSURANCE AGENT RESOURCES
- ABOUT THE NFIP

# Don't Get Caught Unprepared

September is National Preparedness Month. Learn how to keep your family safe and how to protect what matters with flood insurance.

[LEARN ABOUT EMERGENCY PREPAREDNESS](#)

- [Hurricane Season](#)
- [National Preparedness Month](#)
- [Get the FEMA App](#)
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## LATEST NEWS

Learn what you can do to keep your family and property safe before, during, and after a flood.

Typically, there's a 30-day waiting period from date of purchase before your policy goes into effect.

## WHAT'S MY FLOOD RISK

Visit FEMA's [Flood Map Service Center](#) to locate your flood map to help determine your flood risk.



## FIND FLOOD INSURANCE AGENTS IN YOUR AREA

Before you can protect your home, you'll need to find an agent who lives near it.

[FIND AN AGENT](#)

## FLOOD RISKS

- [What Causes Flooding](#)
- Coastal Flooding
- [Understanding Your Risk](#)
- Undergoing a Map Change
- Real Flood Stories
- The Levee Simulator



# Region 3 Multi-Jurisdictional Hazard Mitigation Plan



- Purpose of the Hazard Mitigation Plan
  - Assess risks and vulnerabilities
  - Increase awareness around threats, hazards, and vulnerabilities
  - Build partnerships for risk reduction
  - Identify broad, long-term strategies for risk reduction
  - Align risk reduction with other community objectives
  - Identify implementation approaches
- **Jurisdictions:** Boone, Clay, Kanawha & Putnam Counties (including municipalities)
- **Scope:** All hazard

# Discussion

# Region 3 Multi-Jurisdictional Hazard Mitigation Plan

2017 Update

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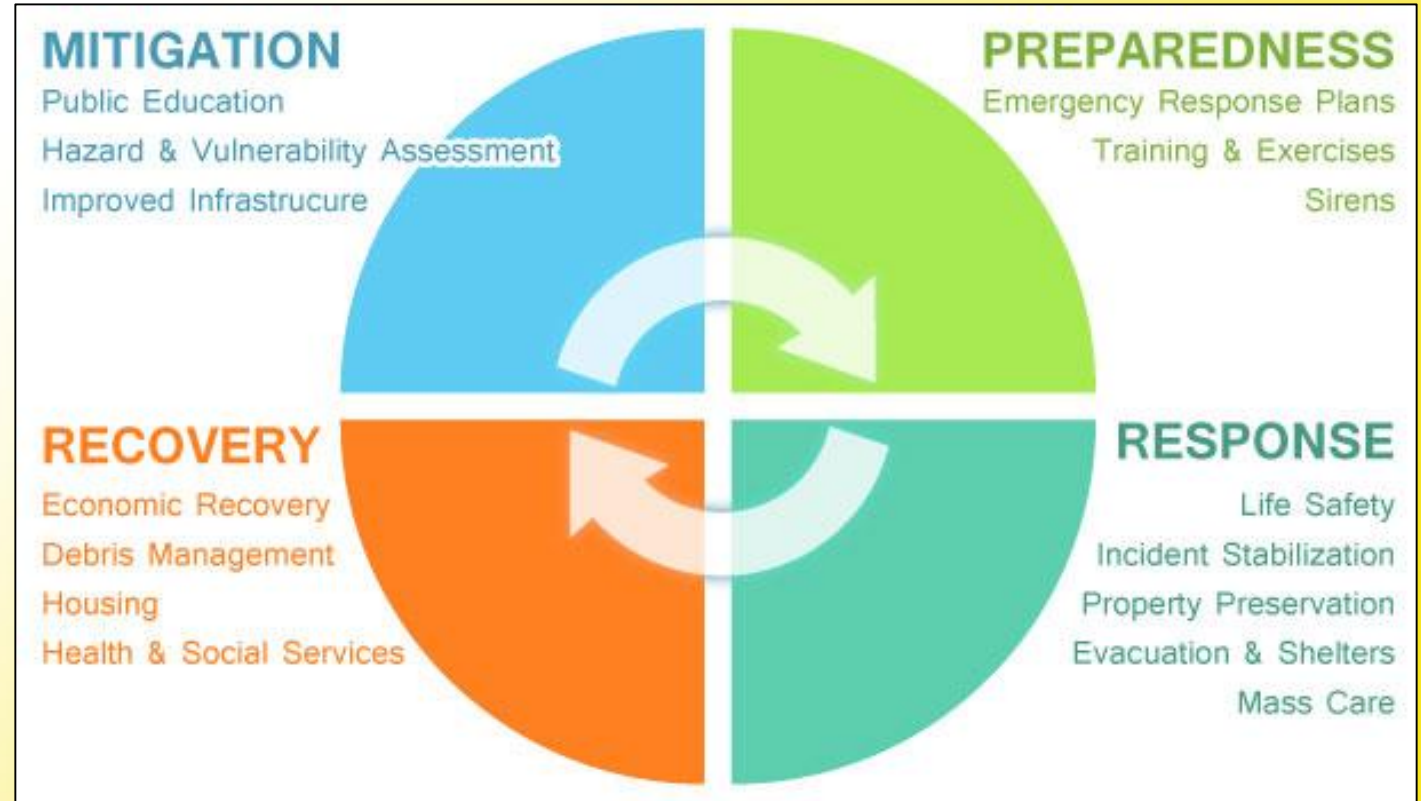
January 25, 2017

# Agenda

- 'Hazard Mitigation' Overview
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- The Flood Risk
- Region 3 Multi-Jurisdictional Hazard Mitigation Plan Overview
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# 'Hazard Mitigation' Overview

- Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters.



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# Region 3 Multi-Jurisdictional Hazard Mitigation Plan



- Purpose of the Hazard Mitigation Plan
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  - Increase awareness around threats, hazards, and vulnerabilities
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  - Identify broad, long-term strategies for risk reduction
  - Align risk reduction with other community objectives
  - Identify implementation approaches
- **Jurisdictions:** Boone, Clay, Kanawha & Putnam Counties (including municipalities)
- **Scope:** All hazard

# Discussion

**Andrew Dunlap, Executive Director – Putnam County Development Authority, Inc.**

- For what is your agency responsible? (i.e. services provided)
  - Executive Director of Putnam County Development Authority, Inc. with a fairly narrow focus of recruiting manufacturing and industrial businesses to the area. Also helps run a business retention program. Most are large manufacturing/industrial partners. (i.e. Toyota)
- How long have you been with your current agency?
  - 3 years with current agency
  - 7 years with similar agency in Kanawha County
- How long have you been in the Kanawha-Putnam Area?
  - A long while
- What do you feel is the biggest transportation issue facing the region?
  - Completion of route 35 from 2 to 4 lanes. Approximately 14 miles of roadway. Project is finally funded and underway (for now)
  - I-64 Bridge at Kanawha/Putnam line. Massive bottlenecks as interstate is 3 lanes each direction and bridge is only 2.
  - Lots of commuters going to Kanawha (Charleston) and Huntington. Efficient travel along I-64 is critical to continue attracting people to Putnam.
- What would you do first in the region to improve the transportation network?
- What are the strengths and weaknesses of the existing transportation system?
  - Rail and river access are extremely marketable to large industrial and manufacturing partners.
  - Really likes the Pritchard Intermodal facility
- What are your top priorities for system improvements?
- Where do you anticipate the most growth within the county over the next 25 years?
  - Continued automotive industry growth, several Japanese companies have expressed continual growth
  - Geographically along Route 35 – more housing development, business parks, and potential farmland marketed for industry
  - Along I-64 primarily residential growth
- What are the biggest challenges you face as development increases?
  - The topography – land development costs are expensive.
  - His agency tries to do earthwork and utility work ahead of time, but timelines with businesses doesn't always line up.
  - It helps to provide a shovel ready site.
- Are there areas that are more suitable for development, or more suitable for a higher quality of development?

- Route 35 – lots of potential farmland being sold for development
  - Kanawha/Putnam Line – old chemical plant recently remediated. Not sure of future plans, but sees as a strong location for potential development with great road, river, and rail access.
- Do you feel that freight centric or multimodal improvements will most benefit economic development in the region?
  - Freight centric – most companies he works with put multimodal/livability as a much lower priority. Companies are most interested in a work force and site with good access.
- How can the transportation system aid economic development in this region?
  - Mentioned industrial access grant program ~ \$400k
  - Does things like upgrades infrastructure, widens turn radii, etc.
  - Specifically mentioned Eleanor Industrial Park



**Hon. Andrew Skidmore, Commissioner – Putnam County Commission**

- For what is your agency responsible? (i.e. services provided)
  - Overseeing county budget; works as a liaison with promoting and managing development in the county
- How long have you been with your current agency?
  - Has been a commissioner for 4 years
- How long have you been in the Kanawha-Putnam Area?
  - Entire life
- What do you feel is the biggest transportation issue facing the region?
  - Deteriorating road conditions
  - Teays Valley Road from Teays Valley to Hurricane – congestion and school traffic
  - I-64 near Nitro, change from 6 to 4 lane cross section
- What would you do first in the region to improve the transportation network?
  - Make Teays Valley Road a 4-lane facility
- What are the strengths and weaknesses of the existing transportation system?
  - Could not think of any strengths
- What is your vision for the growth and development of the region over the next 25 years?
  - Very industrial/Manufacturing. Increased interest in the Fraisers Bottom Industrial Park with announced plans to complete US 35.
  - Lots of land North of the river near Buffalo
- Do you see the growth and development of the region helping or hindering the transportation network?
  - Does not see a help or hindrance. Indifferent because the areas he anticipates growth have very low traffic volumes and little existing issues.
- Are there locations within the transportation system that have significant safety concerns?
  - I-64 changing from 6 to 4 lane cross-section
  - 35 at the Buffalo Bridge. Tractor trailers frequently gain too much speed and crash. Hopeful that it will be addressed with the 35 project.
  - Pilot truck stop.
    - Trucks stopping alongside road, not enough overnight truck parking.
- Does Hurricane PUTNAM have any plans for water or sewer expansion?
  - The county is approximately 95% covered with water facilities
  - No sewer expansions that he is aware of

**Ben Newhouse, City Manager – City of Hurricane**

- For what is your agency responsible? (i.e. services provided)
  - Overseeing personal grant writing, projects, beautification, streets, water & sewer
- How long have you been with your current agency?
  - 11 years with Hurricane
  - DOE for 24 years (with RIC?)
- What do you feel is the biggest transportation issue facing the region?
  - Poor connectivity between communities
  - New Cow Creek Interchange
  - Very few interchanges, travel several miles between each one.
  - Incident management is poor; mentioned the poor use of DMS for crashes and detour information; more advanced notification of crashes.
- What would you do first in the region to improve the transportation network?
  - Short term goals – bypasses
  - Long term goals – more interchanges
    - Stressed that more interchanges would open up the option for new business ventures and investments
- What are the strengths and **weaknesses** of the existing transportation system?
  - Cow Creek pedestrian Facilities would be nice because of high residential development
  - Route 60 near Speedway – Crash problem
  - Not a fan of TWLTL
  - Need a bypass near Walgreen’s
  - Been pushing DOH to get more directional signs
  - Would like DOH to turn Route 19 over to the city
- Are there locations within the transportation system that have significant safety concerns?
  - Disconnection in the pedestrian facilities and lack of sidewalks, crosswalks, causes serious pedestrian safety concerns.
    - Specific locations – Saturn Way, Main Street, Lynn Street, Near the Walmart, along 34 and 19 near major developments
- Where do you anticipate the most growth within the county over the next 25 years?
  - Hurricane, Teays Valley, and Scott Depot all have plenty of land, great access, and a variety of housing options.
  - Teays Valley growth is less controlled because they are not incorporated
- What are the biggest challenges you face as development increases?
  - Property values are increasing and the cost of land is making building more difficult.



- Does Hurricane have any plans for water or sewer expansion?
  - Have reached the limit of expansion.
  - Fully self-sustaining sewer and water

## General Questions

- For what is your agency responsible? (i.e. services provided)
  - Coordination and overseeing of all things related to the county
- How long have you been with your current agency?
  - 4 years as mayor, 4 years as a councilman
- What do you feel is the biggest transportation issue facing the region?
  - In Nitro the reducing of 6 lanes to 4 lanes at exit 45
  - Getting traffic out of Nitro Marketplace area. Substantial backups.
- What would you do first in the region to improve the transportation network?
  - Better access to the Nitro Marketplace
  - More development anticipated and will require better accessibility
- What are the strengths and weaknesses of the existing transportation system?
  - The new Nitro bridge is more efficient – turn lane modifications major help
- What is your vision for the growth and development of the region over the next 25 years?
  - Near current Market Place, new Rural King store & Sheetz coming soon
  - Bringing high speed fiber near Market Place – should help drive development
  - Potential new trampoline park
- Are there locations within the transportation system that have significant safety concerns?
  - Feels that the state has addressed the most significant safety concerns; however, parking along route 25 occasionally poses a problem.
  - Pilot truck stop bottleneck
- Where do you anticipate expanding water and sewer services in the future?
  - \$8 million sewer service expansion down Blake’s Creek to Neuse Park just below the Market Place
- What type of growth do you anticipate in your service area?
  - Some land exchanged for residential development along Blake’s Creek Road
    - Blake’s Creek Road will need to be widened and upgraded to accommodate new traffic
  - Nitro St Albans remediated site
    - Concern about tractor trailers crossing tracks
    - Hopes if fiber is installed, potential annexing of the location
- ADDITIONAL COMMENTS/Discussion
  - Scott to get a marked up map showing residential development near Blakes Creek
  - Scott to share 622 Corridor Study with Mayor Casebolt
  - Road from Marketplace to Nitro/St. Albans bridge – state should consider Origin-Destination study; however Scott is not sure there is enough volume to justify the expense

- Most people turn left to go to 64 WB or continue straight through to Cross Lanes.
- Tractor trailers having trouble getting into Poca

**Frank Chapman, Director – Putnam County Office of Emergency Management**

- For what is your agency responsible? (i.e. services provided)
  - Mitigation, response, and recovery for all types of accidents. Coordinating resources such as ambulances, clean-up crews, law enforcement, and DOH.
- How long have you been with your current agency?
  - Has been in current position since 2004; began work for the county in 1983.
- How long have you been in the Kanawha-Putnam Area?
  - Entire life
- What do you feel is the biggest transportation issue facing the region?
  - There are no roads suitable for traffic diversion. Interstates, especially I-64, have no good detour options. Also, detour options are not suitable for semi traffic.
- What would you do first in the region to improve the transportation network?
  - Make I-64 6 lanes from Nitro to Teays Valley.
  - Manage morning traffic in Winfield. Two lane roads with no turn lanes and very heavy school traffic.
- What are the strengths and weaknesses of the existing transportation system?
  - Teays Valley traffic flow has greatly improved over the last few years. Attributes it greatly to US 35 alleviating evening backups. Hurricane has also seen great improvements in traffic flow. Mentions how beneficial it has been to add turn lanes where possible.
- What are your top priorities for system improvements?
  - Continue 6 lanes of traffic on I-64 between Nitro and Teays Valleys
- Are there locations within the transportation system that have significant safety concerns?
  - Semi-trucks cannot handle the secondary routes because of their windy nature. This becomes a major problem when managing major incidents and having to divert traffic. Noted that his team is contemplating telling semis to park on the interstate while incident management cleans up wrecks and etc. due to increased congestion by semis trying to navigate the secondary routes.
- Are there any specific security or evacuation strategies? If so, what facilities are relied upon?
  - Joint EPC between Kanawha-Putnam
  - [www.kepc.com](http://www.kepc.com)
  - Many shelters throughout the counties, managed by the Red Cross. Several along the interstates.
- What could we be doing better to respond to non-recurring congestion?
  - Shared that there is a standard operating procedure between emergency management, DOH, and Sheriff's office. Shared with us that DOH operates a courtesy patrol responsible for broken down vehicles, flat tires, and etc.

- Working to create a strategy for which resources to pull. Especially officers responding to traffic control. Mentioned a database with officer residences so that closest officers can be utilized or those with easiest access to the location.
- **What suggestions do you have to improve incident management practices?**
  - Gave no specific suggestions. Mentioned how much the “move over” law has helped with incident management.
- **What are specific safety or security mitigation measures that can be reasonably considered for implementation in the transportation plan?**
  - Mentioned the “Winfield Exit.” Major security concerns revolving around the two major truck stops located there.

**Mayor Frank Mullens – City of South Charleston**

- What do you feel is the biggest transportation issue facing the region?
  - Jefferson Road, but realizes that is about to be resolved
  - RHL Boulevard Connector still needs to be built or an alternative solution planned
  - A roundabout was suggested at the intersection of Trace Fork Blvd and RHL Blvd
- What are the strengths and weaknesses of the existing transportation system?
  - Weaknesses
    - Secondary access; need for alternate/secondary routes for travel when I-64, MacCorkle Ave, Kanawha Turnpike, and US 119 are too congested.
- What is your vision for the growth and development of the region over the next 25 years?
  - South Charleston plans to build a new sewer plant near the Lincoln County boundary and expand sewer service from Southridge to the Lincoln County border following US 119
    - Unsure of how far from 119 they want to extend, but there are existing residential areas, new residential developments, and the potential for more
  - South Charleston plans to purchase parcels along 7<sup>th</sup> avenue and develop a building with first floor commercial and second/third floor residential
    - Like the building on 2<sup>nd</sup> Ave (The Olive Tree)
- What are your top priorities for system improvements?
  - Traffic congestion areas in Spring Hill
  - Traffic congestion along MacCorkle Avenue between Montrose and 7<sup>th</sup> Avenue
    - Area could also use sidewalk improvements

**Gary Sigman, Director of Transportation– Putnam County Schools**

- For what is your agency responsible? (i.e. services provided)
  - Managing bus fleet, transportation of students to and from school, bus aides (help load and unload special needs children)
- How long have you been with your current agency?
  - In current position, almost a year; with school system for many more
- How long have you been in the Kanawha-Putnam Area?
  - 32 years
- What do you feel is the biggest transportation issue facing the region?
  - From a school bus transportation perspective, there are routing issues. Many routes overlap with others; feels it could be more efficient
- What would you do first in the region to improve the transportation network?
  - Mentioned that 3 bridges are out and it is causing them to have to run multiple buses, where as if the bridges were in use the buses could run loop routes instead of out and back routes
- Is walking and biking to county schools allowed?
  - They won't tell kids no to walking or biking; however, he doesn't feel it is safe to do so without sidewalks in most areas and in most cases having to cross several lanes of traffic
- If so, has there been consideration of safe routes to school programs?
  - No, the infrastructure and development patterns are not conducive to such a program in Putnam County
- Are there certain county schools that face greater transportation issues than others? Where are these areas?
  - The schools all face very similar challenges. There is one way in and one way out and it causes severe backups.
  - His office tries to alleviate this by getting parents/students with cars out first and then buses. There are also some alternating dismissal times. Buses that must serve both ES and HS service ES first, then HS
  - The order buses line up to pick up students is based on where they are going
    - Buses in the front are going farthest out, buses in back are in closer proximity to school
- Are there locations where student drop-off/pick-up (either through bus routes or associated with school campuses) occurs in unsafe locations? (i.e. on a major roadway)
  - Feels that all pick-up/drop-offs are safe. All occur fully on school premises out of traffic.
- Are there locations where student drop-off/pick-up causes significant vehicle queuing on major streets?
  - YES! 60, 817, 34, and 62 all experience significant traffic backups because of student drop off and pick ups



**Grant Gunnoe, Director –Homeland Security and Emergency Services (City of Charleston)**

- For what is your agency responsible? (i.e. services provided)
  - Agency is responsible for emergency preparedness and emergency management assistance to response agencies
- How long have you been with your current agency?
  - 10 years as emergency manager for city of Charleston, 28 years with Charleston Fire Dept as Chief
- How long have you been in the Kanawha-Putnam Area?
  - Entire life
- What do you feel is the biggest transportation issue facing the region?
  - Lack of repairs and improvements to highways and bridges
- What would you do first in the region to improve the transportation network?
  - Repair current roads
  - Finish widening I-64 all the way to Huntington (6 lanes)
- What are the strengths and weaknesses of the existing transportation system?
  - Strengths
    - Very good service provided by KRT
    - Good interstate access coming through Charleston
    - Yeager Airport
  - Weaknesses
    - Condition of highways
    - Traffic congestion created by I-64 not having enough lanes
- What are your top priorities for system improvements?
  - Upgrades to I-64
  - More cameras and message boards on highways for monitoring traffic and getting emergency information to motorists
- In what areas are the transportation facilities falling short in providing for necessary emergency services?
  - Capability of monitoring highways by electronic means. Many upgrades have been made in this area and with the improvements it has showed us how valuable they are and how more methods and locations are needed.
- Are there any specific security or evacuation strategies? If so, what facilities are relied upon?
  - There is a detailed evacuation plan, our 911 center and Emergency Operation Center work with local law enforcement, KRT, Red Cross along with other agencies to activate the plan

- Are there specific corridors in which emergency response could be improved?
  - As mentioned earlier I-64 congestion is the worst because of the bottleneck created by reducing from 3 lanes to 2 in the Nitro/St. Albans area
- What could we be doing better to respond to non-recurring congestion?
  - Getting highways cleared faster after accidents
- What suggestions do you have to improve incident management practices?
  - All involved agencies training together in incident management classes and then having table top drills
- What are specific safety or security mitigation measures that can be reasonably considered for implementation in the transportation plan?
  - Improvements to the camera system, message boards, and social media

**James H. Edwards, Executive Director– City of Charleston Urban Renewal Authority**

- For what is your agency responsible? (i.e. services provided)
  - Traditionally responsible for reinvesting in blighted areas. Now focused on reinvesting in buildings and properties for redevelopment.
- How long have you been with your current agency?
  - 5 years
- How long have you been in the Kanawha-Putnam Area?
  - 5 years. Previously worked for the CRA in Fort Lauderdale/Hollywood Florida. Moved to the area for the position.
- What do you feel is the biggest transportation issue facing the region?
  - The downtown area is lacking balance. Downtown streets have been over-engineered to accommodate speed and capacity and are not suitable for people.
  - Not enough bridges, causing all bridges to be major bottlenecks.
- What would you do first in the region to improve the transportation network?
  - Convert major E-W corridors through downtown to two-way operation.
    - Make downtown more user (people and vehicle) friendly and less complicated.
    - Potentially decrease the amount of circulation and be better for businesses.
- What are the strengths and weaknesses of the existing transportation system?
  - Strength
    - There are very little capacity problems
  - Weakness
    - Limited E-W movement
    - Interstate coming through downtown complicates things
- What is your vision for the growth and development of the region over the next 25 years?
  - Not very optimistic about seeing growth in the region. Doesn't see adequate economic generators. Feels that the character of the urban area would need to change to support a more balanced environment of vehicles, pedestrians, transit, and parking.
  - Strongly in favor of using the asphalt that is already down and retro-fitting streets.
  - Model cities mentioned:
    - Greenville, SC
    - Chattanooga, TN
- What can the transportation system provide that would best support urban renewal?
  - Parking system is not very well-managed.
    - Visitor spots are at the top of the garage
    - 50 cents an hour for parking through the center of downtown
    - Mentioned that the parking system is resistant to change
  - Stressed balance of the system again. Several roads with 4 wide lanes.

- Lane reductions in width and number
  - Include on-street parking
- What transportation elements does your urban renewal vision include? (i.e. Complete streets, multimodal)
  - In a perfect world – widened sidewalks. However understands drainage problems.
  - Strong advocate of making use of existing infrastructure
  - Reduce lane widths to include on street parking and bicycle facilities
  - Change the overall character of downtown streets.
- Are there any areas that you feel would most benefit from development infill?
  - Many vacant class-A highrise and historic buildings in the downtown area.
  - Excess surface parking that could be utilized for development
  - Areas west of the Elk River and South of Washington.
  - Washington Street corridor could handle redevelopment
- Mentioned that Capitol Street street-scaping project was done well and aided in changing the character of downtown, but it is not being done anywhere else.
- Washington Street street-scaping was 80% federal allocation 20% CURA local match

**Janet Vineyard, President – West Virginia Trucking Association**

- What would you do first in the region to improve the transportation network?
  - Completion of US 35
  - Expansion of I-64 from Nitro WB and from Nitro EB
  - Provide additional parking areas along major routes
- What are the strengths and weaknesses of the existing transportation system?
  - Strengths
    - Interstate system that services major cities in surrounding states
  - Weaknesses
    - Lack of foresight when designing and building the highway system
    - Failing to complete projects in full
- What are your top priorities for system improvements?
  - System improvements could be made by utilizing the resources in our state such as the river and the expansion of existing highways.
- What locations and issues are your constituents sharing as the most troublesome? (i.e. bottlenecks, safety concerns)
  - I-64 WB from Nitro to Putnam County and vice Versa
  - Congestion on Corridor G at South Ridge
- What improvements to the freight network would you most like to see?
  - A new inter-modal terminal in Kanawha County in the Institute or North Charleston areas
- In what areas does the freight industry experience the most problems: interstates, minor roads, or site accesses?
  - Interstates (mostly in St. Albans and Huntington areas)

### Jennifer Sayre, County Manager – Kanawha County Commission

- For what is your agency responsible? (i.e. services provided)
  - As county manager, Jennifer manages about 70 employees and a \$52 million budget. She is technically appointed, and has worked for the commission for 16 years and as county manager for 6 years.
- How long have you been in the Kanawha-Putnam Area?
  - Jennifer has been in the Kanawha County area her entire life.
- What do you feel is the biggest transportation issue facing the region?
  - Not enough secondary routes that are feasible for routing after emergencies. She referenced the accident at the end of summer, as well as another that happened this weekend.
- What are the strengths and weaknesses of the existing transportation system?
  - Strengths
    - Feels that KRT does a great job with public transit. Feels it is well planned and executed and serves the areas that most need it.
  - Weaknesses
    - There aren't enough (or really any) recreational facilities. Sidewalks, greenways, bikeways. She would like to see more of them, and she hears this from many other people as well.
- What is your vision for the growth and development of the region over the next 25 years?
  - Lots of talk about retail development in the South Ridge area. Mentioned that the Charleston Area Alliance handles most of the development information.
- What are your top priorities for system improvements?
  - Paving and maintenance of the existing roads. Many are in very poor repair and need a lot of help.

**Marty Chapman, Putnam County Chamber of Commerce**

- What do you feel is the biggest transportation issue facing the region?
  - School zone congestion in Teays Valley, Winfield, and Poca
  - PM peak period congestion in Winfield on WV 817 from WV 34 intersection through the corporate limits
- What are your top priorities for system improvements?
  - Completing US 35 in Putnam and Mason counties
  - Widening I-64 between Scott Depot and Nitro
  - Frontage road along I-64 from WV 34 at the Teays Valley/I-64 interchange to the Teays Valley Business and Industrial Park
- Are there areas that are more suitable for development, or more suitable for a higher quality of development?
  - Fraziers Bottom area along US 35
- Additional Comments
  - No interest in public transit; great opposition from the community



**Matthew Ballard, CEO/President – Charleston Area Alliance**

- For what is your agency responsible? (i.e. services provided)
  - The Charleston Area Alliance is a merged organization (Chamber of Commerce, Economic Development, and Downtown Urban Redevelopment)
  - Serves all of Kanawha County with an emphasis on Downtown Charleston
  - A little less than a \$2 million budget and 8 full time staff members
  - Support for existing industry and recruitment of new industry, including international. Also lobby for pro-job type policies
- What do you feel is the biggest transportation issue facing the region?
  - Important aspects of transportation necessary to attract industry partners
    - Sees a strong desire for more options as smaller communities dissolve and will be forced to commute more than they already are.
    - Better bus service
    - Rail service
    - Better maintained roadways (was eager to share thoughts that alternate revenue should be explored; mentioned an increased gas tax or user fees.
  - As there is a growing trend of urban revitalization...
    - Mentioned plenty of high and low end urban housing options, but no mid-range vacancies
    - Affordability of living in urban areas in a hurdle
    - Bike lanes/facilities will be essential. Feels the roads are already wide enough to be retrofitted in most places.
- What would you do first in the region to improve the transportation network?
  - bridge deterioration
  - Finishing US 35
  - Improving services at Yeager airport for both private flights and freight (mentioned that federal subsidies at smaller airports are really hurting Yeager)
- What are the strengths and weaknesses of the existing transportation system?
  - Strengths:
    - The convergence of 3 major interstates is a huge attractant for industry partners
  - Weaknesses:
    - See transportation issues above

- What is your vision for the growth and development of the region over the next 25 years?
  - Upper Kanawha Valley (i.e. Montgomery, Cedar Grove) are not doing well. Anticipates that these communities will dissolve altogether or must merge to stay afloat. Largely attributes this to the community's dependence on coal industry and ancillary businesses (i.e. power plants, machine shops) as well as the aging population.
  - Shared that the old WV Institute of Technology is being relocated to Beckley and that the property/buildings provided potential for unknown future development
  - Does not think that Clendenin will make a recovery from the recent flooding due to "downtown" being in the 100-yr flood plain.
    - Would like to see a pilot relocation project for the Clendenin community
  - Elk View – potential residential growth. Likely attraction for families and young people looking to leave Clendenin.
  - New intermodal facility in Wayne County will potentially increase attractiveness of Kanawha/Charleston for industry
- What motivations are there for an industry to locate in Kanawha County?
  - Tax burden was decreased when the business franchise tax was eliminated.
    - However, has never had taxes (positive or negative) be the forefront of any conversation
    - Has not seen any industries specifically wanting/willing to reinvest/be taxed for transportation/infrastructure improvements; however, has followed a legal coalition of highway builders who actively lobby for transportation policy
    - Although there are evident transportation issues, he mentioned never having seen this be a major deterrent for any industry partners.
- Major issues effecting area attractiveness for industry location?
  - Work Force availability is a weak link
    - many individuals who were part of extractive industries out of jobs but have no higher education and are not well-suited for positions
    - Significant concern with drug abuse
  - Cost to develop land in Kanawha County greater than that in Putnam. Very few shovel ready sites, and brownfield developments often add a new level of complexity to development
- Where are some areas of deficiency that improvements to the transportation system could better serve CAA businesses?
  - Route 10 Exchange improvements
  - Feels that volumes on I-64 are reaching a threshold to consider expansion (especially during peak hours)

- Where do you anticipate the most growth within the county over the next 25 years?
  - Chemical industries are of great importance in the Kanawha Valley.
    - Specifically mentioned natural gas/shale/petro-chemical developments
    - Already have committed industries and sees continued growth
  - Automotive manufacturing continues to be very important
    - Parts manufacturers (OEM & after-market).
  - Energy
    - Some coal to remain, but very minimal
  - Employment on the aviation side
    - S.S. asked about increased freight activity; this information was not readily available
  - Specifically mentioned the US 119 Corridor
    - Some growth primarily residential near Charleston/South Charleston; maybe light residential
- Where must the region head to be successful from an economic development stance?
  - Retaining the chemical and automotive industries, but also it is essential for the area to create an economic resiliency.
    - Investments/grants for innovation is beginning to make a slow appearance especially in the materials engineering sphere
    - **New industrial park in South Charleston? (had a hard time following where he was referring to)**
    - New technical community college
- Other Comments:
  - Hobet Mining redevelopment is a long shot. (I could not find an exact location for this on the map)
  - Brownfield site in Nitro should be set for redevelopment within the next year if not a little over a year.
  - Doesn't see that congestion is a significant concern when it comes to attracting businesses

PUTNAM PSD  
RESPONSES PROVIDED BY  
MIKE MCNULTY, GENERAL MANAGER

- Q. For what is your agency responsible? (i.e. services provided)
- A. Water and Sewer Utility Service
- Q. How long have you been with your current agency?
- A. Twelve (12) Years
- Q. How long have you been in the Kanawha-Putnam Area?
- A. Sixteen (16) Years
- Q. What do you feel is the biggest transportation issue facing the region?
- A. Rt. 34 traffic congestion.
- Q. What would you do first in the region to improve the transportation network?
- A. (1) Public outreach to encourage parents to have children ride school buses. (2) Have the WV department of Transportation conduct a study on traffic lights being programed to move flow of traffic from I64 through Teays Valley more efficiently. (3) Study feasibility of adding additional on / off ramps along I64.
- Q. What are the strengths and weaknesses of the existing transportation system?
- A. Rt. 33 is narrow and should be widened. Additional on/off ramp needed to help traffic flow between Hurricane and Teays Valley.
- Q. What are your top priorities for system improvements?
- A. Additional water storage in the Cow Creek area. Rehabilitation of manholes in wastewater collection system.
- Q. Where do you anticipate expanding water and sewer services in the future?
- A. At this time, the District does not have plans for a new water or sewer extension.
- Q. What type of growth do you anticipate in your service area?
- A. Unknown due to current economic down turn in West Virginia's energy sector.

**Chat Log** C:\Users\jharvey.JHC\Documents\ChatLog Region 3 HMP\_Stakeholders Mtg\_\_2 2016\_10\_13 14\_26.rtf

**Timothy Keaton (to Everyone):** 1:50 PM: Flood, Earthquake, Tornado/Hurricane, High winds, help me!

**Jeffery Harvey (to Everyone):** 1:51 PM: How about lump tornado, hurricane, high winds as "severe weather"?

**Timothy Keaton (to Everyone):** 1:54 PM: OK

**Steve Byus (to Everyone):** 2:06 PM: Works for me

City of Eleanor, Putnam County

On 1/25/2017 at approximately 2pm

Met with Mayor Fred Alstead to discuss projects.

Mayor Alstead advised that approximately 10 years ago that the city borrowed \$200,000, to hire an engineering firm to measure every storm drain in the city and determine the current size and the size that would be needed to reduce or eliminate their vulnerability of flooding. Once the survey was completed the city purchased all new storm drains and installed them where needed.

Mayor Alstead also advised that he created a Storm Drain board to oversee the project. As part of the creation of the board the city added a minimal tax to help repay the loan and fund storm drain projects. Once the city completed work on the storm drains, they began a permitting process for residents to install storm drains on their property to relive flooding around their residences. When a resident gets a permit they are told what size drain pipe and connector they will ne to purchase. Once purchased, they can contact the city and have city employees install the drains for them.

Please fill out the Risk Assessment Matrix below using the definitions on the back.

Write in where you think each hazard discussed falls on the matrix based on the definitions.

**RISK ASSESSMENT MATRIX**

<b>HAZARD SEVERITY</b>	<b>PROBABILITY</b>				
	<b>Frequent</b>	<b>Probable</b>	<b>Occasional</b>	<b>Remote</b>	<b>Improbable</b>
<b>Catastrophic</b>					
<b>Critical</b>					
<b>Marginal</b>					
<b>Negligible</b>					



**Hazard Probability Classifications**

Description	Specific Hazard Event	Frequency
Frequent	Likely to occur frequently	Continuously experienced
Probable	Will occur several times in the life of an item	Experienced several times
Occasional	Likely to occur sometime in the life of an item	Experienced
Remote	Unlikely but possible to occur in the life of an item	Unlikely that it has been experienced.
Improbable	So unlikely it can be assumed occurrence may not be experienced.	Not experienced.

**Hazard Severity Classifications**

Description	Mishap 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.

Name/Description	Address	FEMA Designation
Clay Center-Arts & Sciences-WV	1 Clay Square	Special Consideration
City National Bank	10 Hale Street	Economic Asset
City National Bank	1004 Bridge Road	Economic Asset
Holiday Inn	107 Alex Lane	Economic Asset
Holiday Inn	100 Civic Center Drive	Economic Asset
Charleston Engineering - Traffic	1100 Pennsylvania Avenue	Critical Facility
Eye & Ear Clinic	1306 Kanawha Blvd. E.	Economic Asset
Maple Terrace Court and Walton Apartments	1313 Lee Street E.	Historical Consideration
Bert Wolfe Ford	1900 Patrick St. Plaza	Economic Asset
Appalachian Tire Products Inc	27 Clendenin Street	Economic Asset
Appalachian Tire Products Inc	2907 Fourth Avenue	Economic Asset
Appalachian Tire Products Inc	1 Westmoreland Road	Economic Asset
Craik-Patton House	2809 Kanawha Blvd. E.	Historical Consideration
Jackson Kelly PLLC	500 Lee Street E.	Economic Asset
Charleston City Hall	501 Virginia Street E.	Critical Facility
Charleston Parking 1	600 Washington Street E.	Special Consideration
Chesapeake Energy	900 Pennsylvania Avenue	Economic Asset
Chesapeake Energy	414 Summers Street	Economic Asset
Airgas	905 Morris Street	Economic Asset
Airgas	1 Oregon Street	Economic Asset
Alcoholism & Drug Detox Help	3501 Maccorkle Ave SE Pmb 139	Economic Asset
All-Aid Svc	612 Virginia St E # 100	Economic Asset
Amtrak Station	350 MacCorkle Avenue, SE	Critical Facility
Appalachian Power Co	304 29th St W	Critical Facility
Arc Of Three Rivers	1021 Quarrier St # 200	Vulnerable Populations
Armstrong World Industries	5107 Country Squire Ln	Economic Asset
Arthur B. Hodges Center	500 Morris Street	Critical Facility
Barnes-Wellford House	66 Abney Circle	Historical Consideration
BB&T	300 Summers St # 100	Economic Asset
Bert Wolfe Warehouse Distr	1900 Patrick Street Plz	Economic Asset
Bird Haven	733 Myrtle Road	Historical Consideration
Bougemont Complex	Bougemont Drive	Historical Consideration
Breezemont	915 Breezemont Drive	Historical Consideration

Briarwood	1240 Staunton Road	Historical Consideration
Bridges	Charleston, WV	Critical Facility
Bureau of Alcohol, Tobacco, Firearms & Explosives	300 Summers Street	Special Consideration
Cabela's	200 Cross Terrace Blvd	Economic Asset
CAMC General Hospital	501 Morris St	Critical Facility
CAMC Memorial Hospital	3200 MacCorkle Avenue SE	Critical Facility
Capital Area Svc Co Inc	200 Kanawha Blvd E	Economic Asset
Capital Senior High School	1500 Greenbrier St	Vulnerable Populations
Catenary Coal Co	42 Rensford Star Rte	Economic Asset
Charleston Baptist Temple	209 Morris St.	Historical Consideration
Charleston Catholic High	1033 Virginia Street E.	Vulnerable Populations
Charleston City Collector's Office	915 Quarrier Street	Critical Facility
Charleston City Employee Health	601 Morris Street	Critical Facility
Charleston City Judge Chambers	111 Court Street	Critical Facility
Charleston Civic Center	200 Civic Center Drive	Special Consideration
Charleston Department Store	1661 Washington St W	Economic Asset
Charleston Economic & Community	105 McFarland Street	Special Consideration
Charleston Engineering	105 McFarland Street	Critical Facility
Charleston Engineering - Operations	208 26th St. W	Critical Facility
Charleston Fire Department - Station 1	300 Morris Street	Critical Facility
Charleston Fire Department - Station 2	808 Virginia Street, W	Critical Facility
Charleston Fire Department - Station 3	822 Oakwood Road	Critical Facility
Charleston Fire Department - Station 4	1810 Oakridge Drive	Critical Facility
Charleston Fire Department - Station 5	918 Bridge Road	Critical Facility
Charleston Fire Department - Station 6	5008 MacCorkle Avenue	Critical Facility
Charleston Fire Department - Station 7	128 Cora Street	Critical Facility
Charleston Fire Department - Station 8	208 Copenhaver Drive	Critical Facility
Charleston Fire Department Repair Shop	808 Virginia Street, W	Critical Facility
Charleston Fire Department Training Office	808 Virginia Street, W	Critical Facility
Charleston Housing 1	1039 Lawndale Lane	Special Consideration
Charleston Housing 2	50 Ida Mae Way	Special Consideration
Charleston Housing Authority 1	1546 Kanawha Blvd. E	Special Consideration
Charleston Housing Authority 2	1809 Washington St. W	Special Consideration
Charleston Job Corps Ctr	1000 Curtis Price Way	Economic Asset

Charleston Joint Apprentice	3601 James Ave	Economic Asset
Charleston Municipal Auditorium	224 Virginia Street E.	Special Consideration
Charleston Parking 2	917 Quarrier Street	Special Consideration
Charleston PO	1002 Lee Street, E	Special Consideration
Charleston Police Department	501 Virginia St. E	Critical Facility
Charleston Public Safety Council	2005 Quarrier Street	Special Consideration
Charleston Resident Agency	10 Hale Street	Special Consideration
Charleston Sanitary Board	208 26th St, W	Critical Facility
Charleston Street Department	1100 Pennsylvania Avenue	Critical Facility
Charleston Surgical Hospital	1306 Kanawha Blvd E	Critical Facility
Chase Bank	707 Virginia St E	Economic Asset
Chesapeake and Ohio Depot	305 MacCorkle Ave.	Historical Consideration
Chilton, W.E. II, House	1266 Louden Heights Rd	Historical Consideration
City Holding Co	PO Box 7520	Economic Asset
Cox-Morton House	640 Holley Road	Historical Consideration
Cox-Parks House	710 Myrtle Road	Historical Consideration
Crawford-Gardner House	743 Myrtle Road	Historical Consideration
Daily Gazette	1001 Virginia St E	Special Consideration
Dalgain	1223 Staunton Road	Historical Consideration
Danner-Fletcher House	626 Holley Road	Historical Consideration
Dieticians Board	723 Kanawha Blvd. E	Special Consideration
Disability Determination Svc	500 Quarrier St # 500	Economic Asset
Division of Protective Services	1900 Kanawha Blvd, E	Special Consideration
Edgewood Country Club	1600 Edgewood Dr	Economic Asset
Elk Valley Branch Library	4636 Pennsylvania Avenue	Special Consideration
Embassy Suites-Charleston	300 Court St	Economic Asset
Environmental Protection WV	601 57th St SE	Special Consideration
Equitable Production Co	1710 Pennsylvania Ave	Economic Asset
First Baptist Food Pantry	422 Shrewsbury Street	Vulnerable Populations
Fiserv	120 Hills Plz	Economic Asset
Genesis Health Care LLC	1000 Association Dr	Vulnerable Populations
Gilliland, William S., Log Cabin and Cemetery	Louden Hgts and Bridge Rd	Historical Consideration
Gilmore, Elizabeth Harden, House	514 Broad St	Historical Consideration
Governor's Office	1900 Kanawha Blvd E # 1	Special Consideration

Health Smart Benefit Solutions	602 Virginia Street E.	Economic Asset
Health Smart Casualty Claim	426 Leon Sullivan Way	Economic Asset
Heartland of Charleston	3819 Chesterfield Avenue	Critical Facility
Highland Adolescent Unit	300 56th St SE	Vulnerable Populations
Holly Grove Mansion	1710 E. Kanawha Blvd.	Historical Consideration
International Trade Administration	405 Capitol Street	Special Consideration
IRS Criminal Investigation Division	150 Court Street	Special Consideration
JC Penney	401 Lee St E	Economic Asset
Kanawha City Community Center	3511 Venable Avenue	Special Consideration
Kanawha County Courthouse	409 Virginia St, E	Critical Facility
Kanawha County Emergency Ambulance Ops.	601 Brooks Street	Critical Facility
Kanawha County Metro Comms	200 Peyton Way	Critical Facility
Kanawha County Planning	407 Virginia Street, E	Critical Facility
Kanawha County Prosecuting Attorney	301 Virginia St, E	Critical Facility
Kanawha County Public Library	123 Capitol Street	Special Consideration
Kanawha County Sheriff's Dept	409 Virginia St E # 280	Critical Facility
Kanawha County Voter Registration	415 Quarrier Street	Critical Facility
Kanawha Manufacturing Co	1520 Dixie Street	Economic Asset
Kanawha-Charleston Health Dept.	108 Lee Street	Critical Facility
Kearse Theater	161,165,167 Summers St	Historical Consideration
Kmart	1701 4th Ave	Economic Asset
Kmart	6531 Maccorkle Ave SE	Economic Asset
Kokosing Construction Co Inc	403 Pennsylvania Ave	Economic Asset
Kroger	5717 Maccorkle Ave SE	Economic Asset
Kroger	1100 Fledderjohn Rd	Economic Asset
Krt	1550 4th Ave	Critical Facility
Laidley-Summers-Quarrier House	800 Orchard Street	Historical Consideration
Law Library	1900 Kanawha Blvd., E	Special Consideration
Lee, Mattie V., Home	810 Donnally St.	Historical Consideration
Littlepage Stone Mansion	1809 W. Washington St.	Historical Consideration
Loewenstein and Sons Hardware Building	223-225 Capitol St	Historical Consideration
Lowe's Home Improvement	5750 Maccorkle Ave SE	Economic Asset
MacFarland House	1310 Kanawha Blvd.	Historical Consideration
Macy's	201 Lee St E	Economic Asset

Marriott-Charleston Town Ctr	200 Lee St E	Economic Asset
McAndrews-Gallaher House	601 Briarwood Rd.	Historical Consideration
Mcmillion Research LLC	1012 Kanawha Blvd E # 301	Economic Asset
Mohler, William E., House	819 Pennsylvania Ave	Historical Consideration
MRC Global Inc	835 Hillcrest Drive	Economic Asset
North Charleston Community Center	2009 7th Avenue	Special Consideration
Nurse's Office	101 Dee Drive	Special Consideration
Oak Ridge Center	1000 Association Drive	Critical Facility
Patton Building Svc Inc	723 Watts St	Economic Asset
Plaza Theatre	123 Summers Street	Historical Consideration
Quaker Steak & Lube	2931 Mountaineer Blvd	Economic Asset
Region III Workforce Investment Board	405 Capitol Street	Economic Asset
Representative Shelley Moore Capito's Office	4815 MacCorkle Avenue, SE	Special Consideration
Roads	Charleston, WV	Critical Facility
Robinson & Mcelee Law Offices	700 Virginia Street E.	Economic Asset
Sears	200 Quarrier St # 200	Economic Asset
Securities America Inc	5407 MacCorkle Avenue SE	Economic Asset
Security America Inc	3412 Chesterfield Ave	Economic Asset
Select Specialty Hospital	333 Laidley St	Critical Facility
Senator Jay Rockefeller's Office	405 Capitol Street	Special Consideration
Senator Joe Manchin's Office	900 Pennsylvania Avenue	Special Consideration
Sheet Metal Workers Intl Assn	5038 Washington St W	Economic Asset
Simpson Memorial Methodist Episopal Church	607 Shrewsbury St.	Historical Consideration
Smith- Glitinan House	1223 Virginia Street, E	Historical Consideration
Social Security Administration	500 Quarrier Street	Special Consideration
St Francis Hospital	333 Laidley St	Critical Facility
St. John's Episcopal Church	11105 Quarrier St.	Historical Consideration
Starks, Samuel, House	413 Shrewsbury St.	Historical Consideration
State Board Of Education	1900 Kanawha Blvd E # 351	Vulnerable Populations
Station C PO	2328 7th Ave	Special Consideration
Steptoe & Johnson PLLC	707 Virginia Street E.	Economic Asset
Sterrett Brothers' Dry Goods Store	112 Capitol Street	Historical Consideration
Stoneleigh	909 Ridgeway Road	Historical Consideration
Stonewall PO	303 Ohio Ave.	Special Consideration

Sunrise	746 Myrtle Road	Historical Consideration
Thomas-McJunkin-Love House	920 Newton Road	Historical Consideration
Town Center PO	1057 Charleston Town Ctr	Special Consideration
Transportation-District Engr	1334 Smith St	Economic Asset
Tudor's Biscuit World	1506 Washington Street E.	Economic Asset
Tudor's Biscuit World	217 Lee Street W.	Economic Asset
Tudor's Biscuit World	410 50th Street SE	Economic Asset
United Bankshares Inc	500 Virginia St E # 300	Economic Asset
United Carbon Building	1018 Kanawha Blvd, E	Historical Consideration
United Dairy Inc	508 Roane St	Economic Asset
University Of Charleston	2300 Maccorkle Ave SE	Special Consideration
US Circuit Court of Appeals	300 Virginia Street, E	Critical Facility
US Department of the Interior	1027 Virginia Street, E	Special Consideration
US Drug Enforcement Agency	2 Monongalia St.	Special Consideration
US Federal Highway Administration	700 Washington Street, E	Special Consideration
US Federal Railroad Administration	10 Hale Street	Special Consideration
US General Services Administration	300 Virginia Street, E	Special Consideration
US Geological Water Resources	11 Dunbar Street	Special Consideration
US Housing & Urban Development	405 Capitol Street	Special Consideration
US Internal Revenue Service	1206 Quarrier Street	Special Consideration
US Labor Dept	1000 Kennawa Dr	Special Consideration
US Labor Dept - Wage and Hour	500 Quarrier Street	Special Consideration
US Marshall Service, District IV	300 Virginia Street, E	Special Consideration
US Postal Inspection Service	1002 Lee Street	Special Consideration
US Secret Service	300 Summers Street	Special Consideration
US Small Business Administration	405 Capitol Street	Special Consideration
US Veterans Affairs	104 Alex Lane	Special Consideration
USI Insurance Svc LLC	1 Hillcrest Dr E	Economic Asset
Vandalia Neighborhood Center	613 Clifton Road	Special Consideration
Verizon Wireless	3000 Charleston Town Ctr	Economic Asset
Volunteer WV	710 Central Avenue	Critical Facility
West VA Higher Educ Plcy Commn	1018 Kanawha Blvd E # 700	Special Consideration
West Virginia American Water	1600 Pennsylvania Avenue	Critical Facility
West Virginia American Water	100 Dryden Street	Critical Facility



West Virginia Bureau for Public Health	350 Capitol Street	Critical Facility
West Virginia Dept. of Education	1900 Kanawha Boulevard, E	Special Consideration
West Virginia Dept. of Transportation	1340 Smith Street	Special Consideration
West Virginia Library Commission	1900 Kanawha Blvd, E	Special Consideration
West Virginia Parkways Econ. Dev. & Tourism	3310 Piedmont Road	Special Consideration
West Virginia State Fire Marshal Office	1207 Quarrier Street	Special Consideration
West Virginia University	3110 Maccorkle Ave SE	Special Consideration
Wood, Col. Henry Hewitt, House	6560 Roosevelt Ave., SE	Historical Consideration
Woodrums' Building	602 E. Virginia St.	Historical Consideration
WVDNR Law Enforcement Dist. V, HQ	1900 Kanawha Blvd, E	Special Consideration
Young-Noyes House	2122 Kanawha Ave.	Historical Consideration
YWCA	1114 Quarrier St	Special Consideration
Arthur B. Hodges Center	300 Baker Lane	Vulnerable Populations
Bible Center School	1111 Oakhurst Drive	Vulnerable Populations
Capital City Nursing Home	1301 Virginia Street E.	Vulnerable Populations
Capital High	1500 Greenbrier Street	Vulnerable Populations
Chamberlain Elementary	4901 Venable Avenue	Vulnerable Populations
Edgewood Elementary School	550 Hawks Ridge	Vulnerable Populations
Elizabeth Memorial Pre-school	108 Oakwood Road	Vulnerable Populations
Garnet Career Center	422 Dickinson Street	Vulnerable Populations
Garnet High	422 Dickinson Street	Historical Consideration
George Washington High	1522 Tennis Club Road	Vulnerable Populations
Grandview Elementary	959 Woodward Drive	Vulnerable Populations
Holz Elementary	1505 Hampton Road	Vulnerable Populations
Horace Mann Middle	4300 MacCorkle Avenue	Vulnerable Populations
J.E. Robins Elementary	915 Beech Avenue	Vulnerable Populations
John Adams Middle	2002 Presidential Drive	Vulnerable Populations
Kanawha City Elementary	3601 Staunton Avenue	Vulnerable Populations
Kanawha County Ambulance Authority	601 Brooks Street	Critical Facility
Kanawha County Board of Education	200 Elizabeth Street	Critical Facility
Kanawha County Courthouse	409 Virginia Street E.	Critical Facility
Kanawha County Hospice Care	1001 Curtis Price Way	Vulnerable Populations
Kiddie Academy Child Care	1200 Fledderjohn Road	Vulnerable Populations
Mary C. Snow Westside Elementary	100 Florida Street	Vulnerable Populations

Mountaineer Montessori	308 20th Street SE	Vulnerable Populations
Overbrook Elementary	218 Oakwood Road	Vulnerable Populations
Piedmont	203 Bradford Street	Vulnerable Populations
Ruffner Elementary	809 Litz Drive	Vulnerable Populations
Sacred Heart Elementary	1035 Quarrier Street	Vulnerable Populations
St. Agnes	4801 Staunton Avenue SE	Vulnerable Populations
St. Francis Hospital	333 Laidley Street	Critical Facility
Stonewall Jackson Middle	812 Park Avenue	Vulnerable Populations
Weberwood Elementary	732 Gordon Drive	Vulnerable Populations

<b>Name</b>	<b>Address</b>
Dow Chemical	437 MacCorkle Ave SW, SC WV 25303
Bridgeview Elementary	5100 Ohio St
Bible Center Christian School	100 Bible Center Dr South Charleston
Gestamp	3100 Maccorkle Ave Southwest Building 307
Herbert J. Thomas Hospital	4605 MacCorkle Ave SW, South Charleston
Kanawha Valley Community annd Technical	2001 Union Carbide Drive
Montrose Elementary	
Richmond Elementary	
Ruthlawn Elementary	
Valley Health Center	
Webberwood Elementary	
Joe Holland	
Office & commercial cleaning	
Quaker Steak and lube	
South Charleston Garbage Department	
South Charleston High School	
Valley Center	
Arthur B Hodges Center	300 BAKER LANE, CHARLESTON WV, 25302
Bible Center School	1111 Oakhurst DR Charleston WV
Capital City Nursing Home	1301 Va ST E Charleston WV 25301
Capital High School	1500 Greenbrier St Charleston WV25311
Chamberlain Elementary School	4901 Venable Ave, Charleston, WV 25304
Chandler Elementary School	1900 School St Charleston WV 25313
Conquerors Christian School	2400 6th AveCharleston, WV 25387
Elizabeth Memorial Preschool	108 Oakwood Rd, Charleston, WV 25314
Fairhaven Christian School	988 Fairhaven Dr; Charleston
Garnet Career Center	422 Dickinson St Charleston 25301
George Washington High School	1522 Tennis Club Rd, Charleston, WV 25314
<b>Glenwood Elementary School</b>	810 Grant St Charleston, WV 25302
Grandview Elementary	959 Woodward Drive Chas, WV 25387
Holtz Elementary	1505 Hampton Rd, Charleston, WV 25314
Horace Mann	4300 MacCorkle Ave SE, Charleston, WV 2
JE Robins Elementary	915 Beech Ave, Charleston, WV 25302
John Adams Middle School	2002 Presidential Dr, Charleston, WV 2531
Kanawwha City Elementary	3601 Staunton Av Se Chas Wv
Kanawha County Ambulance Authority	601 Brooks St, Charleston, WV 25301
Kanawha countyBoard Of Education	200 Elizabeth Street Charleston, WV 25311.
Kanawha County Hospice Care	1606 Kanawha Blvd W, Chas, WV 25387
Kanawha County Sheriff	301 Virginia St E, Charleston, WV 25301
Kenna Elementary School	198 Eureka Rd, Charleston, WV 25314
Marriott	
Mountaineer Montessori	
Overbrooke Elementary	
Ruffner Elementary	
Sacred Heart Elementary	

Name	Address
Seventh Day Adventist	
Sholes Elementary School	
Saint Agnes School	
St. Francis Hospital	
Stonewall Jackson Middle	
Tender Heart Home Care	
Tyler Middle School	
Watts Elementary	
Airgas	
All-Aid Services	
Appalachain Power	
Appalachain Tire Products	
Arc of three Rivers	
BB&T	
Bert Wolf Ford	
Bert Wolf Ford	
Cabela"s	
CAMC Rehab	
Capital Area SVC Co Inc	
CAMC	
CAMC Medical Morris ST	
Charleston Catholic High School	
City of Charleston	
City of Charleston	
City of cCharleston Fire Department X(8)	
Charleston Fire Department Repair Shop	
Charleston Fire Department Training	
Charleston Housing	
Charleston Job Corps	
Charleston Joint Apprentice	
Charleston Surgical Hospital	
Chase Bank	
Chesapeake Energy	
City Holding	
City National Bank	
Clay Center	
Cracker Barrel	
Daily Gazette Newspaper	
Disability Determination Service	
Edgewood Country Club	
Embassy Sweets	
Enviromental Protection Service	
Equitable Production co	
Eye and Ear Clinic	
Fiserv	
Genesis	

Name	Address
Governors Office	
Health Smart	
Health Smart Casualty Claim	
Highland Adolescent unit	
Hioliday Inn	
Jackson Kelly PLLC	
JC Penny	
METRO 911	
Kanawha County Sheriff's Department	
Kanawha Manufacturing	
Kmart	1701 4th
Kmart	6531 MacCorkle Ave
Kokosing	
Kroger	5715 MacCorkle Ave
Kroger	1100 Fledderjohn
KRT	
Lowe's	5750 MacCorkle
Maces	
Marriot	
Mcmillion research	
Natural Resources	
Patton Building Service	
Robinson and Mcelee	
Sears	
Securities America	3412 Chesterfield
Security America	
Select Speciality Hospital	
Steptoe and Johnson	
State Board of Education	
Transportation District Engr	
Tudors Biscuit World	
United Bankshares	
United Dairy	
University Of Charleston	
US Deoartment of Labor	
USI Insurance SVC	
Verizon Wireless	
WVA Higher Education Plcy	
West Virginia American Water	
West Virginia University	
YWCA	
A Caring Heart and Home	2615 Knox Ave
Alban Elementary School	2030 Harrison Ave
Anne Bailey Elementary	405 Winfield Rd, St Albans, WV 25177
Central Elementary	900 Helene St St Albans
George C. Weimer Elementary School	3040 Kanawha Terrace, St Albans, WV 25177

<b>Name</b>	<b>Address</b>
Hayes Middle School	830 Strawberry Rd, St Albans, WV 25177
Lakewood Elementary	
Mckinley Middle Schoo	
Riverside Nursing Home	
Americare Dunbar Nursing and Rehab	501 Caldwell Ln, Dunbar, WV 25064
Ben Franklin Career Center	500 28th St Dunbar 25064
Freedome Christian Academy	302 21st St #207, Nitro, WV 25143
Kingsway Christian	
Twin City Chriatain Academy	
Lowes	
Marti Gras Casino & Resort	
Walmart	
<b>Midland Trail Elementary School</b>	
Belle Elementary	
Belle Police Department	
Belle Town Hall	
Walker Machinery	
Cedar Grove Elementary	
Cedar Grove Middle School	
Cedar Grove Police Depatrment	
Cedar Grove Town Hall	
Cedar Grove Fire Department	
Mammoth Coal	
Upper Kana Valley Christian School	
Living Faith Christian Academy	
Genesis	
Herbert Hoover High School	5856 Elk River Rd S, Clendenin, WV 25045
130th AW Fire Department	1679 Coonskin Dr, Charleston, WV 25311
Alum Creek Elementary	4540 Brounland RD
Amhurst Madison	2 Port Amherst Dr, Charleston, WV 25306
Andrew Jackson Middle School	5445 Big Tyler RD
Andrews Heights Elementary School	7776 Coal River Rd, Tornado, WV 25202
Bonham Elementary School	Charleston, WV 25301
Bridge Elementary School	5120 Elk River Road
Cabin Creek Fire Department	10217 Cabin Creek Rd, Eskdale, WV 25075
Carver Career Center	4799 Midland Dr Malden
Catenary Coal Company	5914 Cabin Creek Rd Daws
Cedar Ridge Health Care Center	302 Cedar Ridge Rd Sissonville
Coal River Energy LLC	123 Long Shoals Bch, Alum Creek, WV 25003Cou
Cross Lanes Christian School	5330 Floradale Dr, Cross Lanes, WV 25313
Cross Lanes Elementary	5525 Big Tyler Rd, Charleston, WV 25313
Davis Creek Ruthdale VFD	RR 8 Box 401 South Charleston WV 25309
Dupont Middle School	301 W 34th St Belle Wv 25015
Elk Center Community Education	3320 Pennsylvania Ave, Chas, WV 25302
Elk Elementary	3320 Pennsylvania Ave, Chas, WV 25302

<b>Name</b>	<b>Address</b>
Elk Valley Christian School	58 Mount Pleasant Dr, Elkview, WV 25071
Elkview Middle School	5090 Elk River Rd, Elkview, WV 25071
Flinn Elementary	2006 McClure Pkwy, Charleston, WV 25312
Frame Volunteer Fire Dept	115 Poca Fork Rd; Elkview, WV 25071
Institute Volunteer VFD	301 Dubois St, Institute, WV 25112
Jacobs	5000 Elk River Rd, Elkview, WV 25071
Jefferson Volunteer Fire Department	6313 MacCorkle Ave, St Albans, WV 25177
Lakewood Volunteer Fire Department	2627 Shadyside Rd, St Albans, WV 25177
Malden Elementary School	4001 Salines Dr, Charleston, WV 25306
Malden Volunteer Fire Department	
Mary Ingles Elementary	

**Pinch**

NGK	
Pinch Volunteer Fire Dept Sta 1	
Pinch Volunteer Fire Dept Sta 2	
Point Harmony Elementary	
Rand Volunteer Fire Department	
Riverside High School	
Sharon Dawes Elementary	
Sissonville Elementary	
Sissonville Middle	
Sissonville High	
Sissonville Volunteer Fire Department X(3)	
Smithers Police Department	
Smiths Foodfair	
Speed Mining	
Terraquip	
Tornado Volunteer Fire Department	
Tylet Mountain Volunteer Fire Department	
Booker T Washington High	
West Side Volunteer Fire Department	
Walmart	
Catenary Coal Company	
Chemores Plant	
Medford Trucking	
National Guard	
Sheet Metal Workers Intl	
Wendy's	
WVA Air National Guard	



City	Occupancy
South Charleston	Chemical Plant
South Charleston	Elementary School
South Charleston	Private School
South Charleston	Stamping Plant
South Charleston	Hospital
South Charleston	Community College
South Charleston	Elementary School
South Charleston	Elementary School
South Charleston	Elementary School
South Charleston	Health Care
South Charleston	Elementary School
South Charleston	Car Dealership
South Charleston	Cleaning service
South Charleston	Restaurant
South Charleston	Garage
South Charleston	High School
South Charleston	Health Care
Charleston	Assisted Living
Charleston	Private School
Charleston	Independent Living
Charleston	High School
Charleston	Elementary School
Charleston	Elementary School
Charleston	Private School
Charleston	Preschool
Charleston	Private School
Charleston	Technology School
Charleston	High School
Charleston	Elementary School
Charleston	Elementary School
Charleston	Elementary School
Charleston	Middle School
Charleston	Elementary School
Charleston	Middle School
Charleston	Elementary School
Charleston	Ambulance
Charleston	Board of Education
Charleston	Hospice
Charleston	Sheriff
Charleston	Elementary School
Charleston	Hotel
Charleston	Private School
Charleston	Elementary School
Charleston	Elementary School
Charleston	Elementary School

<b>City</b>	<b>Occupancy</b>
Charleston	Church
Charleston	Elementary School
Charleston	Private School
Charleston	Hospital
Charleston	Middle School
Charleston	Nursing Home
Charleston	Middle School
Charleston	Elementary School
Charleston	Gas Company
Charleston	Home Care
Charleston	Power CO
Charleston	Tires
Charleston	Disabilities
Charleston	High Rise
Charleston	Car dealership
Charleston	Warehouse
Charleston	Sports
Charleston	Medical
Charleston	Medical Service plans
Charleston	Hospital
Charleston	Hospital
Charleston	High School
Charleston	Charleston City Hall
Charleston	Police Department
Charleston	Fire Department
Charleston	Garage
Charleston	Training Center
Charleston	Housing
Charleston	Residential Education
Charleston	Apprenticeship training
Charleston	Hospital
Charleston	Highrise
Charleston	
Charleston	Bank
Charleston	Bank
Charleston	Arts and sciences
Charleston	Country resturant
Charleston	Special Consideration
Charleston	Social Security
Charleston	Golf Club
Charleston	Hotel
Charleston	Government
Charleston	Oil and gas
Charleston	Clinic
Charleston	Financial
Charleston	Nursing Home

City	Occupancy
Charleston	Government
Charleston	Health care benefits
Charleston	Claims
Charleston	Hospital
Charleston	Hotel
Charleston	Lawyer office
Charleston	Mercantile
Charleston	911 center
Charleston	Police
Charleston	Manufacturing
Charleston	Mercantile
Charleston	Mercantile
Charleston	Construction
Charleston	Super Market
Charleston	Super Market
Charleston	Transit
Charleston	Hardware
Charleston	Mercantile
Charleston	Hotel
Charleston	Business
Charleston	Government
Charleston	Business
Charleston	Lawyer office
Charleston	Department store
Charleston	Security
Charleston	Security
Charleston	Hospital
Charleston	Lawyer office
Charleston	Government
Charleston	Government
Charleston	Restaurant
Charleston	Highrise
Charleston	Commercial
Charleston	University
Charleston	Government
Charleston	Insurance
Charleston	Cell phone
Charleston	Government
Charleston	Water Company
Charleston	Clinic
Charleston	Rec Center
St Albans	Personel Care home
St Albans	Elementary School
ST Albans	Elementary School
St Albans	Elementary School
St Albans	Elementary School

City	Occupancy
St Albans	Middle School
St Albans	Elementary School
St Albans	Middle School
St Albans	Nursing Home
Dunbar	Nursing and Rehab
Dunbar	Vocational School
Nitro	Private School
	School
Nitro	Church
Nitro	Home Improvement
Nitro	Resort
Nitro	Super Center
Bell	Elementary School
Bell	Elementary School
Bell	Police Department
Bell	Town Hall
Bell	Equipment
Cedar Grove	Elementary School
Cedar Grove	Middle School
Cedar Grove	Police Department
Cedar Grove	Town Hall
Cedar Grove	Fire Department
Cedar Grove	Coal Company
Chesapeake	Private School
Marmet	Private School
Marmet	Nursing Home
Clendenin	High School
County	Fire Department
County	Elementary School
County	Marine Repair
County	Middle School
County	Elementary School
County	Elementary School
County	Elementary School
County	Fire Department
County	Vocational School
County	Coal Company
County	Health Care Ctr
County	Coal Company
County	Private School
County	Elementary School
County	Fire Department
County	Middle School
County	Community Center
County	Elementary School

<b>City</b>	<b>Occupancy</b>
County	Private School
County	Middle School
County	Elementary School
County	Fire Department
County	Fire Department
County	Business
County	Fire Department
County	Fire Department
County	Elementary School
County	Fire Department
County	Elementary School
County	Elementary School
County	
County	Fire Department
County	Fire Department
County	Elementary School
County	Fire Department
County	High School
County	Elementary School
County	Elementary School
County	Middle School
County	High School
County	Fire Department
	Police Department
County	Grocery store
County	Coal Mine
County	Equipmental Rental
County	Fire Department
County	Fire Department
County	Community Center
County	Fire Department
County	Store
County	Coal Company
County	Chemical Plant
County	Trucking
County	Army
County	Union Hall
County	Restaurant
County	Guard

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 1	Misc.		Create displays for use at public events (e.g. health fair, public awareness day, etc.).	On-going	Charleston Department of Homeland Security and Emergency Management (CDHSEM)		Public Education & Awareness	\$500 - \$1,000	Local funds, EMPG
<b>Status:</b>									
Charleston 2	Misc.		Create materials that are targeted towards the tourist population	On-going	Charleston Conference & Visitors Bureau (CVB), CDHSEM		Public Education & Awareness	\$500 - \$1,000	Local funds, EMPG
<b>Status:</b>									
Charleston 3	Misc.		Utilize the media for the distribution and publication of hazard information.	On-going	CDHSEM	Local media	Public Education & Awareness	No local cost	N/A
<b>Status:</b>									
Charleston 4	Misc.		Create a public speaking series on hazard-related topics, such as what to do in the event of an emergency and who to contact.	On-going	CDHSEM, Kanawha-Putnam Emergency Planning Committee (KPEPC)		Public Education & Awareness	\$5,000 - \$15,000	Local funds
<b>Status:</b>									
Charleston 5	Misc.		Ensure that the American Red Cross Citizen's Disaster Course is held on a frequent basis.	On-going	CDHSEM, American Red Cross (ARC)		Emergency Services	No local cost	N/A
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 6	Misc.		Continue to work with the Kanawha County School Board to promote hazard mitigation education and awareness and to discuss better ways to integrate mitigation into the curriculum, as well as using the school board as a means to distribute information to homes via students.	On-going	CDHSEM		Public Education & Awareness	Little to no local cost	N/A
<b>Status:</b>									
Charleston 7	Misc.		Continue to work with non-governmental organizations (youth, service, professional, etc.) to promote mitigation education and awareness.	On-going	CDHSEM		Public Education & Awareness	Little to no local cost	N/A
<b>Status:</b>									
Charleston 8	Misc.		Distribute information on hazard related topics to local libraries, hospitals, city halls, insurance agencies, banks, and churches.	On-going	CDHSEM		Public Education & Awareness	\$1,000 - \$2,500	Local funds, EMPG
<b>Status:</b>									
Charleston 9	Misc.		Work with the tax office to insert emergency information into monthly bills.	On-going	CDHSEM		Public Education & Awareness	\$1,000 - \$2,500	Local funds, EMPG
<b>Status:</b>									
Charleston 10	Flood		: Distribute information to all property owners in <b>repetitive loss areas within the city of charleston</b> Kanawha County regarding potential flood hazards as required for participation in the Community Rating System.	<b>On-going Annual</b>	<b>Charleston Planning</b>		Public Education & Awareness	Up to \$80,000	PDM
<b>Status:</b>									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 11	Misc.		Establish all-hazard resource centers. The centers should act as a repository for information on local hazard identification, preparedness, and mitigation strategies for use by citizens, realtors, and lenders.	On-going	CDHSEM		Public Education & Awareness	Little to no local cost	N/A
<b>Status:</b>									
Charleston 12	Flood		Continue to hold local courses on the National Flood Insurance Program (NFIP) for land-use organizations (e.g., realtors, bankers, construction companies, surveyors, and insurers).	On-going <b>I believe the State tries to coordinate these courses</b>	CDHSEM, Charleston Planning		Property Protection	Little to no local cost	N/A
<b>Status:</b>									
Charleston 13	Misc.		Conduct annual disaster exercises with local law enforcement, emergency personnel, city and county officials, and other disaster response agencies.	On-going	CDHSEM	KPEPC	Emergency Services	Up to \$5,000	Local funds, HMEP, EMPG, SERC
<b>Status:</b>									
Charleston 14	Severe Weather		Become certified by the National Weather Service (NWS) as Storm Ready thereby offer Storm Spotter classes.	On-going	CDHSEM	National Weather Service – Charleston, WVDHSEM	Emergency Services	Contingent upon availability of NWS resources.	Local Funds
<b>Status:</b>									
Charleston 15	Severe Weather		Promote awareness training for wind hazards to include training in standards and building codes.	<b>Not being done. Building Codes are enforced by the Building Dept.</b>	CDHSEM, Charleston Planning <b>*Not sure we should be a coordinating agency</b>		Public Education & Awareness	Little to no local cost	N/A
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 16	Misc.		Implement a Geographic Information System with an emphasis on hazard analysis	<b>On-going</b> <b>*GIS Manager and Floodplain Manager attended a HAZUS MH for Flood training in 2014</b>	<b>Charleston Planning</b>		Emergency Services	\$2,500 - \$5,000	Local Funds
<b>Status:</b>									
Charleston 17	Misc.		Review existing regulations to ensure adequacy in reducing the amount of future development in identified hazard areas	<b>On-going</b>	<b>CDHSEM, Charleston Planning</b>		Prevention	Little to no local cost	N/A
<b>Status:</b>									
Charleston 18	Flood		Provide additional training to county and municipal personnel responsible for the enforcement of the floodplain regulations.	<b>On-going</b> <b>*The Floodplain Manager and the other CFM in the office are the only employees in the city receiving training</b>	<b>Charleston Planning</b> <b>*Not sure we should be the Coordinating Agency</b>		Property Protection	Up to \$1,000 per course	Local funding, HMGP, PDM
<b>Status:</b>									
Charleston 19	Flood		Participate in the Community Rating System (CRS).	<b>On-going Since 2011</b>	<b>Charleston Planning, WVDHSEM</b>		Property Protection	Little to no local cost	N/A
<b>Status:</b>									
Charleston 20	Flood		Separate combined storm and sewer drain lines	On-going	Charleston Public Works		Structural Projects	Up to \$5,000,000	CDBG
<b>Status:</b>									
Charleston 21	Flood		Create a storm water management plan	<b>Completed 2011</b>	Charleston Public Works, Charleston Public Works		Prevention	Little to no local cost	N/A
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 22	Flood		Use flood mitigation grants to fund property buyouts in the lowest lying areas of Charleston (both RL and non-RL properties).	<b>On-going</b> (depends on funds availability)	CDHSEM, <b>Charleston Planning</b>		Prevention	Up to \$1,000,000	FMA, HMGP, PDM
<b>Status:</b>									
Charleston 23	Flood		Identify property owners of RL and non-RL properties that may be willing to participate in future property acquisition projects.	<b>On-going</b>	CDHSEM, <b>Charleston Planning</b>		Prevention	Little to no local cost	N/A
<b>Status:</b>									
Charleston 24	Misc.		Continue to update asset inventory data, to include interface with assets and compilation of asset-by-asset loss estimates.	<b>On-going</b>	<b>Charleston Planning</b>		Property Protection	Little to no local cost	N/A
<b>Status:</b>									
Charleston 25	Misc.		Develop mitigation strategies to protect any at-risk historic properties.	<b>On-going</b> <b>I'm not sure this is being done</b>	<b>Charleston Planning</b>		Property Protection	Little to no local cost	N/A
<b>Status:</b>									
Charleston 26	Misc.		Upgrade and improve communications in the rural areas of the county by creating back-up communication lines	On-going	CDHSEM		Emergency Services	Little to no local cost	N/A
<b>Status:</b>									
Charleston 27	Drought		Develop an information brochure to distribute to residents focusing on the benefits of conserving water.	On-going	CDHSEM		Public Education & Awareness	\$500 - \$1,000	Local funds, EMPG, PDM
<b>Status:</b>									
Charleston 28	Wildfire		Strengthen enforcement of burning bans with the U.S. Forestry Service.	On-going	Municipal Councils		Prevention	Little to no local cost	N/A
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
Charleston 29	Drought		Continue to educate the general public on risks during drought conditions.	On-going	CDHSEM		Public Education & Awareness	\$500 - \$1,000	Local funds, PDM
<b>Status:</b>									
Charleston 30	Misc.		Continue to enforce International Building Codes and continue to update them as required	On-going	Municipal Councils		Prevention	Little to no local cost	N/A
<b>Status:</b>									

**Here are some projects we (the Planning Department) are doing or planning on doing in the near future. If you think we can benefit from adding a few projects, you may want to consider adding these:**

- **We currently send out an annual notification concerning our floodplain management services. This letter is sent to all the Lenders, Insurance Agents, and Real Estate Agents within the city limits of Charleston.**
- **We are in the planning process of adding floodplain information to our website.**
- **We are planning on updating and maintaining outreach materials relating to flooding at the Kanawha County Library.**

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
1.1.1			Create displays for use at public events	Completed This is an on going effort	OEM				
<b>Status:</b>									
1.1.2			Create materials that are targeted towards the tourist population	Ongoing not being done	OEM				
<b>Status:</b>									
1.1.3			Utilize the media for the distribution and publication of hazard information	Ongoing	OEM	Charleston FD			
<b>Status:</b>									
1.1.4			Create a public speaking series on hazard related topics, such as what to do in the event of an emergency and who to contact	2011 This is done by OEM	Primary agency is OEM				
<b>Status:</b>									
1.1.5			Ensure that the American Red Cross's Citizen's Disaster Course is held on a frequent basis	Ongoing Not being done	Red Cross				
<b>Status:</b>									
1.1.6			Update the Kanawha County website to provide hazard related information that is easily accessible	Ongoing					
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
1.1.7			Continue to work with the Kanawha County School Board to promote hazard mitigation education and awareness and to discuss better ways to integrate mitigation into the curriculum, as well as using the school board as a means to distribute information to home via students.	Ongoing 1.1.8 Not aware of any inclusion into the curriculum					
<b>Status:</b>									
1.1.8			Continue to work with non-governmental organizations (youth, service, professional, etc.) to promote mitigation education and awareness.	Ongoing	OEM				
<b>Status:</b>									
1.1.9			Distribute information on hazard related topics to local libraries, hospitals, city halls, insurance agencies, banks, and churches.	Ongoing	OEM Kanawha Putnam EPC				
<b>Status:</b>									
1.1.10			Work with the utility companies to insert emergency information in monthly bills	Ongoing	OEM				
<b>Status:</b>									
1.2.1			Distribute letters to all property owners in Kanawha County regarding potential flood hazards as required for participation in the Community Rating System.	2011	completed				
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
1.2.2			Establish all-hazard resource centers to be located in the Kanawha County Courthouse and the municipalities in the county. The centers should act as a repository for information on local hazard identification, preparedness, and mitigation strategies for use by citizens, realtors, and lenders.	2013	<u>KPEPC and OEM</u>				
<b>Status:</b>									
1.2.3	Flooding		Continue to hold local courses on the National Flood Insurance Program for realtors, banks, and insurers.	Ongoing	<u>Flood Plain Managers and County Planning Departments</u>				
<b>Status:</b>									
1.3.1			Ensure that all shelters have adequate emergency power resources	<u>On-going effort</u>	<u>Emergency Management</u>				
<b>Status:</b>									
1.3.2			Develop adequate emergency shelter and evacuation plans for animals (domestic pets, livestock, and wildlife)	2011 <u>Is within plan for domestic and service animals. Livestock plan rest with WV Agriculture</u>	<u>WV Dept of Agriculture</u>				
<b>Status:</b>									
1.4.1			<u>Teach Community Emergency Response Team (CERT) classes in Kanawha County</u>	<u>Ongoing Not being done</u>					
<b>Status:</b>									
1.4.2			Increase the number of trained citizen emergency responders	Ongoing	<u>OEM and local fire departments and EMS Agencies</u>				



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
<b>Status:</b>									
1.4.3			Conduct annual disaster exercises with local law enforcement, emergency personnel, city and county officials, and other disaster response agencies.	Ongoing	KPEPC, Health Dept and OEM				
<b>Status:</b>									
1.4.4			Provide information about local, regional, state, and federal training opportunities to fire departments, EMS, ambulance services, and other emergency responders.	Ongoing					
<b>Status:</b>									
1.4.5			Conduct National Weather Service Storm Spotter classes.	2013 On-going with two this year	NWS and OEM and KPEPC				
<b>Status:</b>									
1.4.6	Severe Weather		Promote awareness training for wind hazards to include training in standards and building codes	Ongoing No county wide building codes	Cities that have adopted the building codes				
<b>Status:</b>									
1.5.1			Implement a Geographic Information System with an emphasis on hazard analysis	2013					
<b>Status:</b>									
1.5.2			Join the National Weather Service's Storm Ready Community	2013 2016	Kanawha OEM completed in 2016 with on-going training				
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
2.1.1			Review existing regulations to ensure adequacy in reducing the amount of future development in identified hazard areas.	Completed for flood plain issues					
<b>Status:</b>									
2.1.2			Review all comprehensive plans, cities and county, to ensure that designated growth areas are not in high hazard areas.	Completed (2011)					
<b>Status:</b>									
2.1.3			Review all capital improvement plans to ensure that infrastructure improvements are not directed towards hazardous areas.	2011 Not being done except for flood plain issues					
<b>Status:</b>									
2.2.1	Flooding		Work with the municipalities to update all floodplain ordinances adopted prior to 1987	5 years					
<b>Status:</b>									
2.3.1	Flooding		Provide additional training to county and municipal personnel responsible for the enforcement of the floodplain regulations.	Ongoing					
<b>Status:</b>									
2.4.1	Flooding		Participate in the Community Rating System (CRS)	2013					
<b>Status:</b>									
2.5.1			Separate combined storm and sewer drain lines	2013 on-going project					
<b>Status:</b>									
2.5.2			Create a storm water management plan	2013					

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
<b>Status:</b>									
2.5.3	Flooding		Routinely remove trash and debris from stream beds, culverts, storm grates, and storm drains	Ongoing	Counties with assistance from state agencies				
<b>Status:</b>									
2.5.4	Flooding		Perform property buyouts in the lowest lying areas of Kanawha County.	on going project	County and municipalities as funding becomes available				HMGP
<b>Status:</b>									
2.5.5			Support CAMC's PDM grant application	1 year City of Charleston	Should be completed				
<b>Status:</b>									
2.5.6	Flooding		Construct a new municipal building in Clendenin that is not located in a hazard area	2013 Not done, flood of June 2016 severely damaged city hall					
<b>Status:</b>									
3.1.1	Flooding		Maintain information on the number and location of all repetitive loss properties throughout Kanawha County and the municipalities.	On-going	Flood plain management and OEM				
<b>Status:</b>									
3.1.2	Flooding		Maintain a database of information on all repetitive loss properties, including maps.	Ongoing	Flood plain managemet				
<b>Status:</b>									
3.1.3			Identify property owners of repetitive loss and non-repetitive loss properties that may be willing to participate in future property acquisition projects.	Ongoing	OEM and flood plain management and county planning and within municipalities				
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
3.1.4			Continue to update asset inventory data, to include interface with assets and compilation of asset-by-asset loss estimates.	Ongoing					
<b>Status:</b>									
4.1.1			Establish a formal process for the county and the park service to coordinate disaster-related efforts, which should include defining boundaries and establishing responsibilities.	Ongoing No federal park service in this county					
<b>Status:</b>									
4.1.2			Establish a formal process for the county and the park service to coordinate disaster-related efforts, which should include defining boundaries and establishing responsibilities.	Ongoing No federal park service in this county					
<b>Status:</b>									
4.2.1			Conduct a survey of all historic sites that are located in hazard-prone areas	2013					
<b>Status:</b>									
4.2.2			Develop mitigation strategies to protect any at risk historic properties	Ongoing					
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
5.1.1	Flooding		Work with the West Virginia Department of Transportation to identify areas of frequent road way flooding and develop mitigation strategies	Ongoing					
<b>Status:</b>									
5.2.1			Upgrade and improve communications in the rural areas of the county by creating back-up communication lines	Ongoing					
<b>Status:</b>									
6.1.1	Drought		Develop an information brochure to distribute to residents focusing on the benefits of conserving water	Ongoing					
<b>Status:</b>									
6.1.2	Drought		Continue construction of public water systems to eliminate wells	On-going					
<b>Status:</b>									
6.2.1	Wildfire		Strengthen enforcement of burning bans with the U.S. Forestry Service	2013 Not applicable with US Forest Service					
<b>Status:</b>									
6.2.2	Wildfire		Initiate fire department training programs to enhance response capabilities to wildfires	Ongoing	WV Division of Forestry with assistance from OEM				
<b>Status:</b>									
6.2.3	Drought		Continue to educate the general public on risks during drought conditions.	Ongoing	OEM				
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
7.1.1			Institute county wide building codes that will regulate the intensity of use and materials used in construction	2013 Building codes not adopted					
<b>Status:</b>									
7.1.2			Apply for additional Abandoned Mine Lands funding to take care of existing problems	2013 on going					
<b>Status:</b>									
7.1.3			Shore up the north side of the Kanawha River from Patrick Street to the 35 <sup>th</sup> Street Bridge	2013 City of Charleston	completed				
<b>Status:</b>									
8.1.1			Continue to enforce International Building Codes and continue to update them as required	2013 No county building code Only the major municipalities enforce the building or fire codes					
<b>Status:</b>									
9.1.1			Participate in public awareness campaigns on the local television stations.	Ongoing	OEM				
<b>Status:</b>									
10.1.1			Assess high traffic intersections for potential problems.	Ongoing	WV DOT the major municipalities				
<b>Status:</b>									
10.1.2			Evaluate railroad crossings for appropriate warning systems	5 years Not sure if anyone did this					
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
10.1.3			Evaluate the locks on the Kanawha River to ensure necessary warning systems are in place.	Ongoing Not aware of any warning system tied to the locks. They are not for flood control					
<b>Status:</b>									
10.2.1			Publicize evacuation plans in public places, such as libraries, schools, hospitals, the courthouse, city halls, banks, and churches	Ongoing	KPEPC and OEM				
<b>Status:</b>									
10.2.2			Increase public awareness by upgrading the emergency information available in the phone directory	2011 Most use social media and not phone directory					
<b>Status:</b>									
	Severe storms		Generators or cam-locks for key infrastructure and government owned buildings	On-going					
<b>Status:</b>									
	Fire		Remove abandoned, derelict or burned structures	On-going	Planning Dept and municipalities				
<b>Status:</b>									
	Water treatment and sewage		Generators for lift stations and municipal owned water treatment facilities	On-going	OEM				
<b>Status:</b>									
	Water treatment		Upstream warning systems to detect possible pollutants for government owned water treatment plants	On-going	Government water plant operators				

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
	Flooding		Hazard Mitigation Reconstruction	5 years	OEM	FEMA WVDHSEM			



# REGION 3 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

*Putnam County Public Meeting*

January 25, 2017 ~ 5:00 to 7:00 p.m. ~ Putnam County Courthouse  
Sign In Sheet

Name	Community Represented	Contact Info. (Phone or Email)
1. <i>Tim Keaton</i>	<i>Putnam</i>	<i>Keaton@Putnamwv.org</i>
2. <i>Melissa Sargent</i>	<i>Putnam</i>	<i>msargent@putnamwv.org</i>
3. <i>Frankie Chapman</i>	<i>Putnam</i>	<i>Sch Chapman@Putnamwv.org</i>
4. <i>Henry McDonald</i>	<i>SH Consulting</i>	<i>HmcDonald@shcprepaed.com</i>
5.		
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15.		

MITIGATION PLAN REVIEW

UPSTAIRS

COURTROOM 4

5 TO 7 PM





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UNITY

- Current plan expires on 2/21/2017
- Amendments to the current plan are in the works for reconstruction projects.
- Need 5 community members as part of the committee to get points for Charleston for Community Rating System.
- Census transportation package (?)
- Marathon stakeholder meetings (like EOP workshops for HMP)
- Use survey as a tool for plan review from the public.

## KPEPC TALKING POINTS

- We are working with the Region 3 Planning & Development Council (at the Regional Intergovernmental Council) to update the hazard mitigation plan covering both Kanawha and Putnam Counties (and all of the municipalities therein).
  - This is a plan that has been in place **since 2012 at the regional level** and, before that, each county maintained a hazard mitigation plan.
  - They are done in accordance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by the Disaster Mitigation Act of 2000.
  - Jurisdictions are **required to have a mitigation plan in order to be eligible for hazard mitigation funding** (e.g., Hazard Mitigation Grant Program, Pre-Disaster Mitigation grant program, Flood Mitigation Assistance).
- The purpose of our attendance today is simply to **solicit any comments about the hazards** we are including in the plan.
- We are working with the regional council, but want to stress that the appropriate sections of this plan will be your plan and we want to give you as **much opportunity as possible to participate** or to tell us how these hazards affect your jurisdiction.
  - Those hazards are: **READ FROM LIST**
  - Offer to open the floor and let anyone make any comments they would like about the hazards
    - What you'll likely get are questions like, "would XYZ count?", in which case you can make a judgment call. (I typically take any type of feedback people will give me and then I make a decision on its inclusion later – that goes over much better than saying no, unless they are way off base.)
- Also, if you represent the following jurisdictions (**FROM YOUR LIST**) in an official capacity, feel free to get with me after this meeting. I have a couple of questions regarding mitigation projects for your jurisdiction.
  - You may pull some content from our discussion in office about risk vs. vulnerability for this – let them know that you'll be asking if they have any ideas about how to lessen their jurisdiction's vulnerability to any of the identified hazards.
  - This will also be similar to the contacts you made via phone/email to the jurisdictions – you're after the same info.

Also, feel free to give them your contact information and offer to let anyone contact you at any time – you know how that goes.

# Gazette-Mail

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## NOTICE OF PUBLIC HEARING

The City of Charleston and Kanawha County, as part of the B-C-K-P Regional Intergovernmental Council Hazard Mitigation Planning Committee, will hold a public meeting on Tuesday, January 24, 2017 at the Kanawha County Courthouse, 409 Virginia Street East, Charleston, WV 25301 at 5:00 p.m.

The purpose of the meeting is to review updates to the Multi-Jurisdictional Mitigation Plan. Members of the public will be given the opportunity to comment on the natural and man-made hazards most affecting them. As part of this plan update, Kanawha County and the City of Charleston intend to discuss flood-specific risks and potential flood mitigation projects. Those with a concern about flooding in the local area are encouraged to attend.

The B-C-K-P Regional Intergovernmental Council Multi-Jurisdictional Hazard Mitigation Plan was last updated on February 21, 2011 per federal requirements in 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.

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**Notice of Public Meeting**

The Putnam County Office of Planning & Infrastructure, as part of the Boone, Clay, Kanawha and Putnam (BCKP) County's Hazard Mitigation Planning Committee, will hold a public meeting on January 25, 2017 at 5:00 pm at the Putnam County Courthouse, Room 202, 12093 Winfield Road, Winfield.

The purpose of the meeting is to review updates to the county's hazard mitigation plan. Members of the public will be given the opportunity to comment on the natural and man-made hazards most affecting them. As part of this plan update, the Office of Planning and Infrastructure intends to discuss flood-specific risks and potential flood mitigation projects. Those with a concern about flooding in the county are encouraged to attend.

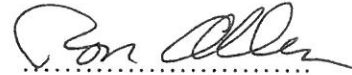
The BCKP Multi-Jurisdictional Hazard Mitigation Plan was last updated in 2012 per federal requirement in Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000. Should you have any questions, please contact Tim Keaton at 304-586-0237.

1-12-17

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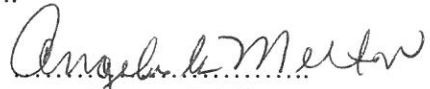
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This day personally appeared before me, a Notary Public of said County of Putnam, ..... Ron Allen..... of The Hurricane Breeze, and after being duly sworn deposes and says that the attached legal publication was duly published in The Hurricane Breeze for One (1) consecutive issues, in its issues dated .... January 12, 2017.

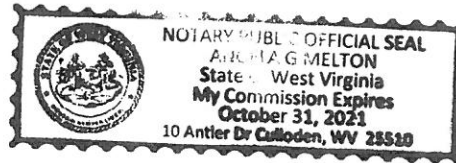


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of ..... January....., 2017..



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## Region 3 Hazard Mitigation Plan Update

The Region 3 Planning and Development Council (PDC), also known as the Regional Intergovernmental Council (RIC), is working with the four counties within the region to update the regional hazard mitigation plan. To update this plan, participation at both the county and municipal level is needed. We understand that this can be a complicated process, and the following information is provided to try to answer some of the more common questions that come up during the process.

### What is Mitigation?

According to the Federal Emergency Management Agency (FEMA), which oversees the hazard mitigation process at the local, regional, state, and national level, “mitigation is the effort to reduce loss of life and property by lessening the impact of disasters” (FEMA.gov, 2016). Generally, we think of mitigation as any strategy or action that can be taken now (or in the near future) to reduce the impact of a future disaster. These strategies and actions are developed into projects during the hazard mitigation process, where coordinating agencies are identified, potential costs are estimated, and potential funding sources are identified.

### Mitigation Projects

For a municipality to be included in the hazard mitigation plan, and thus be eligible for hazard mitigation funding, it must have at least one mitigation project listed in the plan. These projects generally fall into one of four categories shown in the table below, from the FEMA Local Mitigation Planning Handbook. It is important to note that these projects are aimed at directly reducing the risk a community faces from a given hazard. For example planning for a response to a disaster, while an important aspect in preparedness, is not generally considered a mitigation project.

In the most recent update of the Region 3 Hazard Mitigation Plan, the municipalities did not have separate project lists. Therefore, for this update, there is a clean slate to start with. We recommend that the project lists be kept small and manageable (1-2 projects for smaller municipalities, a few more for larger). The key here is that just because it is not on the project list, does not mean that you cannot do a given project. Priorities change and different funding sources become available.



Any other projects that are undertaken can be added to future HMP updates as they happen.

Category	Description	Examples
Local Plans and Regulations	These actions include government authorities, policies or codes that influence the way land and buildings are developed and built	Comprehensive Plans, Land Use Ordinances, NFIP Community Rating System, Open Space Preservation, etc.
Structure and Infrastructure Projects	These actions involve modifying existing structures and infrastructure to protect them from a hazard, or remove them from a hazard area. This can also include constructing structures to reduce the impacts of hazards	Acquisitions, elevations, or relocations of structures in flood zones, utility undergrounding, flood walls and retaining walls, culverts, safe rooms, etc.
Natural Systems Protection	These are actions that minimize damage and losses, while also preserving or restoring the functions of natural systems	Sediment and erosion control, stream restoration, forest management, wetland restoration and preservation, etc.
Education and Awareness Programs	These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them.	Radio or television spots, websites with maps and information, presentations to school groups or other organizations, participating in national programs such as StormReady, etc.

The Hazard Mitigation Steering Committee has included the following hazards in the hazard mitigation plan update:

- Dam Failure
- Drought
- Earthquake
- Flooding
- Hazardous Materials
- Mass Movements (Land subsidence, landslides, sinkholes, etc.)
- Severe Storms
- Tornado
- Wildfire

When developing a potential mitigation project keep these hazards in mind. Which hazards impact your community most often? Which hazard causes the most damage? Your mitigation projects should address those hazards that incur the most damage and occur the most often.



# Hazard Mitigation Goals and Strategies

For

City of Madison

## Flooding and Flash Flooding

**Goal:** To lessen the effects of flooding and flash flooding on the City of Madison and its citizens

**Objectives:** Provide improved storm water management

### **Strategies:**

1. Develop a storm water management plan for the existing drainage system and for future development
  - **Responsibility:** City of Madison
  - **Possible Funding:** City of Madison, FEMA
  - **Timeline:** Unknown
  - **Location:** City Wide
2. Expand current drainage system
  - **Responsibility:** City of Madison
  - **Possible Funding:** City of Madison, FEMA
  - **Timeline:** Unknown
  - **Location:** City Wide
3. Repair or replace current storm water drainage system as funding becomes available
  - **Responsibility:** City of Madison
  - **Possible Funding:** City of Madison, FEMA
  - **Timeline:** Unknown
  - **Location:** City Wide

4. Place check valves in drains that dump into the river to prevent back water from flooding low lying areas.
  - **Responsibility: City of Madison**
  - **Possible Funding: City of Madison, FEMA**
  - **Timeline: Unknown**
  - **Location: City Wide**

**Objective:** Reduce the number of structures in the floodway

**Strategies:**

1. Continue to participate in the National Flood Insurance Program
  - **Responsibility City of Madison**
  - **Possible Funding: City of Madison, FEMA**
  - **Timeline: Immediately**
  - **City Wide**
2. Continue to enforce current flood plain regulations
  - **Responsibility: City of Madison**
  - **Possible Funding: City of Madison, FEMA**
  - **Timeline: Immediately**
  - **Location: City Wide**
3. Relocate or acquire and remove floodway structures
  - **Responsibility: City of Madison**
  - **Possible Funding: City of Madison, FEMA**
  - **Timeline: As funding becomes available**
  - **Location: Lincoln Ave., Old River Road, Riverside Dr.**

**Objective:** Provide a safe, sanitary, and secure place for residents during times of flooding and other emergencies

**Strategies:**

1. Obtain an emergency backup generator for Civic Center to shelter residents during times of flooding
  - **Responsibility:** City of Madison, FEMA, WVDMAPS
  - **Possible Funding:** FEMA, Private, DMAPS, HUD, USDA
  - **Timeline:** As funding becomes available
  - **Location:** Citywide
2. Partner with local faith based organizations for the use of their vans to transport persons to and from the Emergency Shelter
  - **Responsibility:** City of Madison
  - **Possible Funding:** FEMA
  - **Timeline:** 1 Year
  - **Location:** City Wide
3. Partner with the Madison Baptist Church to use their classrooms to convert to dormitories for First Responders and use of their kitchen for food preparation
  - **Responsibility:** City of Madison
  - **Possible Funding:** FEMA
  - **Timeline:** 1 Year
  - **Location:** Madison Baptist Church
4. Obtain an emergency backup generator for the Madison Baptist Church to house first responders during emergencies
  - **Responsibility:** City of Madison
  - **Possible Funding:** FEMA, Private, DMAPS, HUD, USDA
  - **Timeline:** As funding becomes available
  - **Location:** Madison Baptist Church
5. Obtain and store emergency cots and blankets

- **Responsibility:** City of Madison, Red Cross, FEMA, Boone County Emergency Management.
  - **Possible Funding:** Red Cross
  - **Time Line:** 2 Years
  - **Location:** Madison Civic Center
6. Seek Grants and other funding sources to repair or replace the emergency backup generator currently in City Hall
- **Responsibility:** City of Madison
  - **Possible Funding:** FEMA, Private, DMAPS
  - **Time Line:** Unknown
  - **Location:** City Hall

**Objective:** Enhance public warning system

**Strategies:** Enhance emergency warning by adding Outdoor Siren System

- **Responsibility:** City of Madison
  - **Possible Funding:** City of Madison, FEMA
  - **Time Line:** 2 years
  - **Location:** City Wide
1. Setup a small low watt FM station to broadcast emergency alerts to radios in homes that can be activated from the County or City Emergency Operations Center during emergencies
- **Responsibility:** City of Madison, Boone County OES, National Weather Service
  - **Possible Funding:** FEMA, HUD, Private
  - **Timeline:** 3 years
  - **Location:** City Wide

**Objective:** Decrease the number of choke points along the Little Coal River

**Strategies:** Support the efforts of volunteer groups, state agencies, and other interested parties to clear stream banks, drainage ditches and other areas of debris

- **Responsibility:** City of Madison, Boone County Commission, WV Soil Conservation and Army Corp of Engineers
- **Possible Funding:** ACOE, WV Soil Conservation, FEMA
- **Timeline:** When funding becomes available
- **Location:** Pond Fork River, Little Coal River along Lincoln Avenue and Riverside Drive

1. Perform channel modifications to increase flow capacities of rivers and streams. Build instream structure (boulders and large logs) in the river channel to redirect the rivers flow and thereby flush excess sediment.

- **Responsibility:** City of Madison, Boone County Commission, WV Soil Conservation, WVDEP, and Little Coal River Group
- **Possible Funding:** FEMA, WV Soil Conservation, WVDEP
- **Timeline:** When funding becomes available
- **Location:** Pond Fork River, Little Coal River along Lincoln Avenue and Riverside Drive

**Objective:** Establish an Emergency Operation Center for the City of Madison

**Strategies:** To have a command center during an emergency to direct operation of City resources. Such as: Snow removal, minor flooding, debris removal, and other events.

- **Responsibility:** City of Madison
- **Possible Funding:** FEMA, HUD, USDA, USDHS
- **Timeline:** As funding becomes available
- **Location:** Civic Center

## **DAM FAILURE**

**Goal:** Protect the City of Madison and its residences from a catastrophic release or failure of a Coal Slurry Impoundment

**Objectives:** Develop information that will lead to the safest possible handling of Coal Waste Slurry

**Strategies:** Support legislation to fund studies that research and develop:

1. A means to render coal waste slurry environmentally safe.
2. Engineering studies that will examine different types of impoundment design that will result in smaller amounts of slurry being stored.
3. Reports on the effectiveness of current laws regarding coal slurry impoundments
4. Assessments of the current levels of security of coal slurry impoundments as it relates to terrorism.
  - **Responsibility:** Local Government, Industry, and the public.
  - **Possible Funding:** WV Legislature
  - **Time Line:** Unknown
  - **Location:** Unknown

**Objective:** Enhance public warning system

**Strategies:** Update and add new technology to the existing systems in place, to shorten evacuation and notification time

- **Responsibility:** City of Madison, Boone County OES, National Weather Service
- **Possible Funding:** FEMA, National Weather Service
- **Time Frame:** As funds become available
- **Location:** City Wide

**Objective:** Decrease Evacuation Time

**Strategies:**

1. Communicate to industry and private property owners the need to open private roads that lead to higher ground in an emergency to shorten evacuation routes.
  - **Responsibility:** City of Madison, Boone County OES, National Weather Service
  - **Possible Funding:** Boone County Commission, Public
  - **Time Frame:** 5 years
  - **Location:** City Wide
2. Place signs marking evacuation routes



- **Responsibility:** City of Madison OEM, Boone County E-911
- **Possible Funding:** City of Madison, Boone County Commission, WVDOH
- **Time Frame:** Unknown
- **Location:** Tom Price Branch, Workman's Knob Road

### 3. Map Routes and make maps available to the public

- **Responsibility:** Boone County E911
- **Funding:** City of Madison, Boone County Commission
- **Time Frame:** Unknown
- **Location:** City Wide

### 4. Hold evacuation drills to familiarize the public with proper procedures.

- **Responsibility:** City of Madison OEM, Madison Police Department, Boone County OES, Madison Fire Department, Madison Street Department
- **Funding:** City of Madison
- **Time Frame:** Unknown
- **Location:** City Wide

## Tornado/High Winds

**Goal:** To lessen the effects of Tornados and high winds on the City of Madison

**Objective:** Educate the public about the occurrence and durations of such storms.

**Strategy:** Deliver public service announcements through local media, such as the Coal Valley News, WZAC, and Social Media

- **Responsibility:** City of Madison
- **Possible Funding:** City of Madison
- **Time Line:** Immediately
- **Location:** City Wide

## Wildfire

**Goal:** Reduce the effects and occurrences of wildfires in the City of Madison

**Objectives:** Reduce the number of wildfires started by careless burning

**Strategies:** Develop a proactive policy on issuing city wide burning bans during dry weather

- **Responsibility:** City of Madison, Madison Fire Department, WV Division of Forestry
- **Timeline:** Immediately
- **Location:** City Wide

1. Work with Forestry Department to educate the public of the burning laws through Public Service Announcements is Social Media, The Coal Valley News and WZAC radio.

- **Responsibility:** City of Madison, Madison Fire Department, and WV Division Forestry
- **Possible Funding:** City of Madison
- **Timeline:** Immediately
- **Location:** City Wide

**Objective:** Reduce the number of wildfires started by arson.

**Strategies:** Increase public awareness of the arson problem in the City of Madison through public education programs in schools, churches and civic groups.

- **Responsibility:** City of Madison, Madison Fire Department and WV State Fire Marshall
- **Possible Funding:** WV State Fire Commissioner
- **Time Line:** Immediately
- **Location:** City Wide
- **Land Subsidence**

**Goal:** To decrease losses in the City of Madison due to land subsidence

**Objectives:** To inform the public of the possibility of land subsidence in the Madison Area

**Strategies:**

1. Develop an informational packet to give to applicants for building permits
  - **Responsibilities:** City Building Inspector
  - **Funding:** City of Madison
  - **Time Line:** 1 year
  - **Location:** City Wide
  
2. Advise the public to contact their insurance agent to confirm that they are covered for land subsidence.
  - **Responsibility:** City Building Inspector
  - **Funding:** City of Madison
  - **Time Line:** 1 year
  - **Location:** City Wide

**Landslides**

**Goal:** To decrease losses in the City of Madison due to landslides

**Objectives:** Inform the Public of the possibility of landslides in the Madison Area

**Strategies:**

1. Develop an informational package to give to applicants for building permits
  - **Responsibilities:** City Building Inspector
  - **Funding:** City of Madison
  - **Time Line:** 1 year

- **Location:** City Wide
2. Advise the public to contact their insurance agent to confirm that are covered for landslides.
    - **Responsibilities:** City Building Inspector
    - **Fund:** City of Madison
    - **Time Line:** 1 year
    - **Location:** City Wide
  3. Suggest to the public that they add the proper coverage to their insurance policies.
    - **Responsibility:** City Building Inspector
    - **Funding:** City of Madison
    - **Time Line:** 1 year
    - **Location:** City Wide

Nov. 17, 2014 Hazard Mitigation Plan  
Steering Committee Meeting # 3

<u>Name</u>	<u>Organization</u>
Kara Greathouse	RIC
Taylor Jones	JHC
JEFFERY W. HARVEY	JHC
Mark Snuffer	City of Charleston
Tim Keaton	Putnam Co.
C.W. Sigman	Kanawha County
Steve BYUS	MADISON
Greg Lay	Bowling

Region 3 Municipal Phone Log

Date	Municipality	Notes
12/21/2016	Madison	Spoke with Steve Byus. Briefly discussed outdoor warning system and Storm water & flood control study as possible projects. Will call back after January 1.
	Danville	Attempted to contact Josh Barker. Call went directly to fax machine.
	Danville	Called city hall, advised that Josh's phone goes directly to his fax when he is out of the office.
	Sylvester	Message left for Jim Jerrell
	Whitesville	Message left for Denny Ferrell
	Clay	Spoke with Jason Hubbard. Jason stated he had recently become mayor and was not let any information about this project by his predecessor. Sent follow up email to Jason information from previous meetings for review. Jason advised he would call back after January 1.
	Eleanor	Left message at town hall for Mayor Alstead
	Hurricane	Spoke with Ben Newhouse. Discussed several projects and possible funding sources. Follow up email sent with information from previous meeting for review. Received projects via email later this date.
	Winfield	Message left for Charles Roberts at the building department
	Bancroft	Spoke with Tim Keaton. Discussed project and possible funding source.
	Buffalo	Spoke with Tim Keaton. Mr. Keaton advised that Buffalo has no projects.
	Poca	Spoke with Tim Keaton. Mr. Keaton advised that Poca has no projects.
12/29/2016	Danville	Email sent to Josh Barker. Received reply that he will call in the beginning of next week.
1/3/2017	Danville	Josh Barker called. Discussed that all repetitive loss structures in the flood zone have already been removed. Mr. Barker advised he is leaving his position soon and will not be replaced immediately
1/9/2017	Clay	follow up email sent ot Jason hubbard
	Eleanor	Message left at town hall
	Winfield	Message left at town hall
	Whitesville	message left at town hall
	Sylvester	Message left at town hall
1/11/2017	Eleanor	email sent to wfhalstead@frontier.com
	Sylvester	Email sent to town of sylvester@citynet.net
	Winfield	email sent to cityhall@cityof winfield.net
	Whitesville	email sent to whitesvillerecorder@gmail.com
1/19/2017	Eleanor	Message left at town hall
	Winfield	Message left at town hall
	Whitesville	message left at town hall
	Sylvester	Message left at town hall
1/25/2017	Winfield	Went to Winfield city hall. Spoke with building department personell who advised Mr. Roberts only works part-time. They will contact him and have him call and provided an email address for him.

	Eleanor	Went to Eleanor town hall. Spoke with Mayor Alstead who provided information on an ongoing project.
1/26/2017	Winfield Clay	emailed Mr. roberts on his personal email emailed Mayor Hubbard. Received a response that he is still working on ideas for projects
1/27/2017	Sylvester Whitesville	Message left at town hall Message left with Chris Prater at town hall. Received call from Mr. Ferrell and Mr. Prater. They advised they did not have any ongoing projects or ideas for new projects. They requested information on hazards in the plan. Follow up email sent with hazards.
1/30/2017	Belle Cedar Grove Chesapeake Clendenin	Spoke with Glen Chestnut about an ongoing mitigation project Message left for James Hudnall Message left for Janet Armentrout Spoke with John Shelton regarding using HMGP for buy outs
2/1/2017	Nitro	email sent to rking@nitrofd.com
2/2/2017	Clay Danville Sylvester Nitro Whitesville	Spoke with Mayor Hubbard about FEMA funding Clay received to "flood proof" the WWTP equipment. Left message at town hall Message left at town hall. Email sent to town of sylvester@citynet.net email sent to dcasebolt@cityofnitro.org; rking@cityofnitro.org. Message left at city hall Message left at town hall for chris Prate or Denny Ferrell
2/3/2017	Nitro Whitesville	received call from John at city hall. he will reach out for Ron King and have him contact me Spoke with Chris Prate, advised Denny Ferrell will be in for a meeting today and that they would call me after the meeting
2/6/2017	Whitesville Chesapeake Handley Nitro Chesapeake	Spoke with Chris Prate, advised that Denny Ferrell did not show up for the meeting but he would call him and have him contact me today Spoke with Town Recorder Don Hatfield, he requested information and would speak with the mayor and get back to me. Follow up email sent with information requested Spoke with female at town hall who advised that the mayor needs to handle this and that he is out of town until next month. John called back with information on ongoing projects. Received an email from Don Hatfield with information on mitigation projects

## Prioritization Matrix Instructions

- 1 List projects across the top row of the matrix.  
On a scale of 1 to 5 (5 being the best), score each project according to the criteria in the left-
- 2 hand column. Score each project according to your opinion of its merit. No comparison is made during the initial scoring.
- 3 Tally the score for each project by adding the numbers in the column under the project. Place the answer in the same column of the "Total" row.
- 4 The highest score is the highest-priority project. (NOTE: Multiple projects may have the same ranking.)
- 5 Definition of Scoring Criteria:

Ease of Implementation:	Do local policies and capabilities currently allow for the implementation of the project? Are programs available to assist in funding the implementation of the project?
Cost Effectiveness:	Is sufficient funding available to implement the project at a cost manageable by the local government? If not, is funding available? Will the costs of implementing the project be significantly less than the cumulative future costs potentially incurred by an un-corrected situation?
Social Impacts:	Will the public perceive the project as positively lessening hazard-related losses? Will implementing the project adversely affect any segment of the population?
Political Impacts:	Will implementing the project create negative political issues?
Economic Impacts:	Is the cost/benefit ratio of implementing the project acceptable? Will implementing the project adversely affect the local economy?
Overall Positive Impact:	Do local leaders generally agree that implementing the project will be beneficial to the community?





Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
	Misc.		Continue to work with non-governmental agencies to promote mitigation education and awareness						
<b>Status: New</b>									
	Misc.		Work on a survey to evaluate existing shelters to determine adequacy for current and future populations						
<b>Status: New</b>									
	Misc.		Continue to work on adequate emergency shelter and evacuation plans for animals (domestic pets and livestock)						
<b>Status: New</b>									
	Misc.		Conduct annual disaster exercises with local law enforcement, emergency personnel, city and county officials, and other disaster response agencies						
<b>Status: New</b>									
	Severe Weather, Tornadoes		Become certified by the National Weather Service as Storm Ready						
<b>Status: New</b>									
	Flooding		Work with the West Virginia Department of Transportation to identify areas of frequent roadway flooding and develop mitigation strategies.						
<b>Status: New</b>									
	Hazardous Materials, Misc		Study and evaluate transportation systems for problems that could lead to hazardous materials spills and other incidents.						
<b>Status: New</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
	Misc.		Evaluate railroad crossings for appropriate warning systems.						
<b>Status: New</b>									
	Misc.		Publicize evacuation plans in public places, such as libraries, schools, hospitals, the courthouse, city halls, banks, and churches.						
<b>Status: New</b>									
	Misc.		Encourage those dependent on oxygen concentrators or other medical devices to install backup generators.						
<b>Status: New</b>									
	Extreme Temperatures, Severe Weather		Inform the public on warming shelter locations						
<b>Status: New</b>									
	Misc.		Educate citizens on the importance of smoke detectors and encourage their use.						
<b>Status: New</b>									
	Misc.		Use social media such as Twitter, Facebook, or mass texting systems to notify the public about hazardous events						
<b>Status: New</b>									
	Misc.		Provide training to engineers and surveyors on the new elevation certificate						
<b>Status: New</b>									
	Misc		Provide training to the insurance agents and banking institutions within the county						
<b>Status: New</b>									



Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
1.1.1	Flooding		Continue to participate in the National Flood Insurance Program (NFIP)	<b>On-Going</b> Joined CRS Program		Planning & Infrastructure			
<b>Status:</b>									
1.1.2	Flooding		Continue to enforce current floodplain regulations	<b>On-Going</b> We do this on every permit		Planning & Infrastructure			
<b>Status:</b>									
1.1.3	Flooding		Relocate or acquire and remove structures from the floodplains and SFHA	<b>Submitted HMGP to buy out 7 structures10/2016</b>		Planning & Infrastructure			
<b>Status:</b>									
1.2.1			Work with the Board of Education to place pagers in each school that can be activated from the Emergency Operations Center to provide early warning to all schools	<b>ON GOING</b> In search for funding		PCOES			
<b>Status:</b>									
1.2.2			Local Government, industry and the private sector will work to make available a low cost emergency alert radio that can be placed in all homes and businesses that can be activated from the Emergency Operations Center during emergencies.	<b>ON GOING</b> If not completed within the next year or so, this will be deleted		PCOES			
<b>Status:</b>									
1.2.3			Seek funding through state and federal resources to relocate the County Emergency Operations Center to a more secure location.	<b>COMPLETED</b> 05-2013					
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
1.2.4			Seek funding through state and federal resources to erect additional communications towers to improve radio coverage and add to the back-up capabilities of the Emergency Operations Center	<b>ON-GOING</b> Hoping for grant funding	PCOEM	WVDHSEM PUTNAM COUNTY AGENCI			
<b>Status:</b>									
1.2.5			Seek funding through state and federal resources to purchase equipment and locate communications towers to improve interoperability to other counties and state agencies	<b>ON-GOING</b> Looking for grant funding		PCOES			
<b>Status:</b>									
1.3.1			Communicate to industry and private property owners the need to open private roads that lead to higher ground in an emergency to shorten evacuation routes	<b>ON-GOING</b> On a one on one basis		PCOES			
<b>Status:</b>									
1.3.2			Place signs marking such routes	<b>ON-GOING</b> Requires funding		PCOES			
<b>Status:</b>									
1.3.3			Map routes and make maps available to the public	<b>ON-GOING</b> work in progress		PCOES			
<b>Status:</b>									
1.3.4			Hold evacuation drills to familiarize the public with proper procedures	<b>ON-GOING</b> We have a couple of these per year, low attendance		PCOES			
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
1.4.1	Flooding		Support the efforts of volunteer groups, state agencies and other interested parties to clear stream banks, drainage ditches and other areas of debris.	No reports of any problems		PCOES			
<b>Status:</b>									
1.4.2	Flooding		Perform channel modifications to increase flow capacities of rivers and streams. When funds are available	No funding available		PCOES			
<b>Status:</b>									
2.1.1	Flooding		To devise a storm water management plan that identifies areas that are affected by flooding and to assess homeowners a fee to construct additional storm sewers, catch basins and impoundment areas to alleviate flooding and storm water runoff	Most likely not going to happen					
<b>Status:</b>									
2.1.3			Hold informational meeting to explain the fee assessment to the affected public	Most likely not going to happen					
<b>Status:</b>									
3.1.1			Deliver Public Service Announcements through local media, such as Hurricane Breeze, Putnam Post, Charleston Newspapers and WSAZ, WCHS, WVAH, and WOWK and local radio stations.	We've made no public service announcements					
<b>Status:</b>									

Project #	Hazard	Project Priority	Strategy	Timeframe	Primary Coord.	Support Agencies	Mit. Type	Est. Cost	Resources
4.1.1	Wildfire		Develop a proactive policy on issuing county wide burn bans during dry weather	<b>ON-GOING</b> Enforced by state agency		WV Division of Forestry			
<b>Status:</b>									
4.1.2	Wildfire		Work with the Forestry Department to educate the public of the burning laws through Public Service Announcements in the Hurricane Breeze, Putnam Post, Charleston Newspapers and WSAZ, WCHS, WVAH, and WOWK and local radio stations	<b>ON-GOING</b> This is done during fire season from the State agency		WV Division of Forestry			
<b>Status:</b>									
4.2.1	Wildfire		Increase public awareness of the arson problem in Putnam County through public education programs in schools, churches, and civic groups	<b>ON-GOING</b> No issues with arson problems in our county so far!		PCOES			
<b>Status:</b>									
4.2.2	Wildfire		Support the Forestry Department and State Fire Marshall's Office by increasing the reward offered for arsonists.	<b>ON-GOING</b> this is only a support function		PCOES			
<b>Status:</b>									
5.1.1			Develop an informational package to give to applicants for development permits.	<b>Completed</b>					
<b>Status:</b>									
5.1.2	Mass Movements		Advise the public to contact their insurance agent to confirm that they are covered for land subsidence	Mentioned when there are issues with land subsidence or the potential of		Planning & Infrastructure			
<b>Status:</b>									





## Project Prioritization Matrix

PROJECT → CRITERIA ↓	<i>Ease of Implementation</i>	<i>Cost Effectiveness</i>	<i>Social Impacts</i>	<i>Political Impacts</i>	<i>Economic Impacts</i>	<i>Overall Impact</i>
Project #1: Continue to participate in the National Flood Plan Insurance Program (NFIP).	5	5	5	1	4	5
Project #2: Continue to enforce current floodplain regulations.	3	3	4	4	4	4
Project #3: Relocate or acquire and remove structures from the floodplains and SFHA.	1	3	3	3	3	4
Project #4: Work with the Board of Education to place pagers in each school that can be activated from the Emergency Operations Center to provide early warning to all schools.	5	5	5	1	2	5
Project #5: Local Government, Industry and the private sector will work to make available a low cost emergency alert radio that can be placed in homes and businesses that can be activated from the Emergency Operations Center during emergencies.	3	3	3	4	3	3
Project #6: seek funding through state and federal resources to erect additional communications towers to improve radio coverage and add to the back-up capabilities of the Emergency Operations Center.	2	2	3	3	3	3

Project #7: seek funding through state and federal resources to purchase equipment and locate communications towers to improve interoperability to other counties and state agencies.	2	2	3	3	3	3
Project #8: Communicate to industry and private property owners the need to open private roads that lead to higher ground in an emergency to shorten evacuation routes.	3	3	4	3	3	3
Project #9: Place signs marking such routes.	4	4	4	2	4	5
Project #10: Map routes and make maps available to the public.	4	4	4	2	4	5
Project #11: Hold evacuation drills to familiarize the public with proper procedures.	5	4	5	1	4	5
Project #12: Support the efforts of the volunteer groups, state agencies and other interested parties to clear stream banks, drainage ditches and other areas of debris.	3	3	4	3	3	4
Project #13: Perform channel modifications to increase flow capacities of rivers and streams. When Funds are available.	3	3	4	3	3	4
Project #14: Deliver Public Service Announcements through local media, such as Hurricane Breeze, Putnam Post, Charleston Newspapers and WSAZ, WCHS, WVAH and WOWK and local radio stations.	5	5	5	1	4	5
Project #15: develop a proactive policy on issuing county wide burn bans during dry weather.	5	5	5	3	5	5
Project #16: Work with the Forestry Department to educate the public of the burning laws through Public Service Announcements in the Hurricane Breeze, Putnam Post, Charleston Newspapers and WSAZ, WCHS, WVAH and WOWK	5	5	5	3	5	5
Project #17: Increase public awareness of the arson problem in Putnam County through public education programs in schools, churches and civic groups.	5	5	5	3	5	5
Project #18: Support the Forestry Department and State Fire Marshall's Office by increasing the reward offered for arsonists.	4	4	4	3	3	3

Project #19: Advise the public to contact their insurance agent and that they are covered for land subsidence.	5	4	4	3	4	5
Project #20: Suggest to the public that they add the proper coverage to their insurance policies.	5	5	5	1	5	5
Project #21: Continue to work with non-governmental agencies to promote mitigation education and awareness.	5	5	5	1	5	5
Project #22: Work on a survey to evaluate existing shelters to determine adequacy for current and future populations.	5	5	5	5	5	5
Project #23: Continue to work on adequate emergency shelter and evacuation plans for animals (domestic pets and livestock).	5	5	5	4	4	4
Project #24: Conduct annual disaster exercises with local law enforcement, emergency personnel, city and county officials and other disaster response agencies.	5	5	5	1	5	5
Project #25: Become certified by the National Weather Service as Storm Ready.	5	5	5	1	5	5
Project #26: Work with the West Virginia Department of Transportation to identify areas of frequent roadway flooding and develop mitigation strategies.	5	5	5	1	5	5
project #27: Study and evaluate transportation systems for problems that could lead to hazardous spills and other incidents.	5	4	4	1	4	5
Project #28: Evaluate railroad crossings for appropriate warning systems.	5	5	5	1	5	5
Project #29: Publicize evacuation plans in public places, such as libraries, schools, hospitals, the courthouse, city halls, banks, and churches.	5	5	5	1	5	5
Project #30: Encourage those dependent on oxygen concentrators or other medical devices to install backup generators.	5	5	5	1	5	5
Project #31: Inform the public on warming shelter locations.	5	4	4	1	5	5
Project #32: Educate citizens on the importance of smoke detectors and encourage their use.	5	5	5	1	5	5

Project #33: Use social media such as Twitter, Facebook, or mass texting systems to notify the public about hazardous events.	5	5	5	1	5	5
Project #34: Provide training to engineers and surveyors on the new elevation certificate.	4	4	4	1	4	4
Project #35: Provide training to the insurance agents and banking institutions within county.	5	5	5	1	4	4
Project #36: Provide outreach to the citizens of Putnam County on flood insurance and mitigation options.	5	4	5	1	4	5
<b>TOTAL</b>	154	153	161	74	150	164

## Taylor Jones

---

**From:** Timothy Keaton <tkeaton@putnamwv.org>  
**Sent:** Friday, December 02, 2016 1:03 PM  
**To:** Taylor Jones  
**Subject:** RE: Project statuses

Sure!

---

**From:** Taylor Jones [mailto:tjones@jhcreparedness.com]  
**Sent:** Friday, December 02, 2016 10:27 AM  
**To:** Timothy Keaton  
**Subject:** RE: Project statuses

Got the update, thanks Tim. Quick follow up: for the ones that you say are not likely to happen, do you want them deleted from the plan?

Thanks,  
Taylor

Taylor Jones  
Emergency Preparedness Planner  
[tjones@jhcreparedness.com](mailto:tjones@jhcreparedness.com)

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**From:** Timothy Keaton [mailto:tkeaton@putnamwv.org]  
**Sent:** Friday, December 02, 2016 8:14 AM  
**To:** Taylor Jones <[tjones@jhcreparedness.com](mailto:tjones@jhcreparedness.com)>  
**Subject:** RE: Project statuses

There's no box for status so we included as a timeframe. Hope this works.

---

**From:** Taylor Jones [mailto:tjones@jhcreparedness.com]  
**Sent:** Thursday, December 01, 2016 8:40 AM  
**To:** Timothy Keaton  
**Subject:** Project statuses

Good Morning Tim,

Was looking through the project list you returned to us at the last meeting and had some quick follow up questions. Some of the projects have "on-going" listed in the timeframe box. Is that the status, or is that a time frame?

Also, for those that did not have anything written, can you give a status update? Looking for completed, deleted, deferred, or on-going with a brief narrative.

Let me know if you have any questions, I should be in the office all day.

Thanks,  
Taylor

**Taylor Jones**  
Emergency Preparedness Planner  
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# REGION 3 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

*Kanawha County / City of Charleston Public Meeting*

January 24, 2017 ~ 5:00 to 7:00 p.m. ~ Kanawha County Courthouse  
Sign In Sheet

	Name	Community Represented	Contact Info. (Phone or Email)
1.	Joe Melton	St. Albans	joemelton@kanawha.us
2.	C:W Sigman	So. Charleston	
3.	Kara Greathouse		Kgreathouse@wvregion3.org
4.		KCC	Chuckgrishaber@kanawha.us
5.	JEFF HARVEY	JH CONSULTING, LLC	jharvey@jhpreparedness.com
6.	Debbie Robinson		
7.	Tom Sullivan	Handley VFD	
8.	Mark Snuffer	City of Charleston	mark.snufforc.cityofcharleston.org
9.	Henry McDonald	JH Consulting	hmcDonald@jhpreparedness.com
10.	Cott Sanders	Montgomery	cott@wvregion3.org
11.			
12.			
13.			
14.			
15.			





## Jeffery Harvey

---

**From:** Kara Greathouse <[kgreathouse@wvregion3.org](mailto:kgreathouse@wvregion3.org)>  
**Sent:** Wednesday, January 04, 2017 9:39 AM  
**To:** Jeffery Harvey  
**Subject:** FW: Region 3 Hazard Mitigation Plan

*Kara*

---

**From:** Jason Roberts [<mailto:jasonroberts@regiononepdc.org>]  
**Sent:** Wednesday, January 04, 2017 9:37 AM  
**To:** Kara Greathouse <[kgreathouse@wvregion3.org](mailto:kgreathouse@wvregion3.org)>; [regionone@regiononepdc.org](mailto:regionone@regiononepdc.org); [cchiles@kyovaipc.org](mailto:cchiles@kyovaipc.org); [jtuggle@reg4wv.org](mailto:jtuggle@reg4wv.org); [carol.jackson@movrc.org](mailto:carol.jackson@movrc.org)  
**Cc:** Colt Sandoro <[colt@wvregion3.org](mailto:colt@wvregion3.org)>  
**Subject:** RE: Region 3 Hazard Mitigation Plan

Thanks for the info Kara. The only thing I can think of would be flooding events caused by waterways crossing the regional borders. I believe everything else will be region-wide and whatever you encounter (snowstorm, sleet, etc.) will affect us as well.

---

**From:** Kara Greathouse [<mailto:kgreathouse@wvregion3.org>]  
**Sent:** Wednesday, January 04, 2017 9:18 AM  
**To:** [jasonroberts@regiononepdc.org](mailto:jasonroberts@regiononepdc.org); [regionone@regiononepdc.org](mailto:regionone@regiononepdc.org); [cchiles@kyovaipc.org](mailto:cchiles@kyovaipc.org); [jtuggle@reg4wv.org](mailto:jtuggle@reg4wv.org); [carol.jackson@movrc.org](mailto:carol.jackson@movrc.org)  
**Cc:** Colt Sandoro  
**Subject:** Region 3 Hazard Mitigation Plan

The Region 3 Planning & Development Council is currently in the process of updating its hazard mitigation plan, which applies to Boone, Clay, Kanawha, and Putnam Counties. Our planning committee has been discussing hazard risks that could either originate in a neighboring jurisdiction and impact our region or originate in our region and impact neighboring jurisdictions. We have also been discussing the unique impacts that natural hazards and hazardous material incidents could have on specific assets in our communities. To that end, based on your knowledge of the local area, your facility, and/or any studies you have done, are you aware of any such hazards or impacts? If so, please reply with a brief description.

Also, we have generated an online survey to gather data from the general public for use in our planning process. Please see <https://www.surveymonkey.com/r/9G6X279> for more information. We would encourage you, as well as anyone else in your office or community, to log on and complete the survey.

As our project nears completion, we will provide access to our draft plan and encourage you to review it and provide comments. Thank you for this consideration. Should you have any questions or comments, feel free to contact me.

Kara Greathouse

Transportation Project Manager  
Regional Intergovernmental Council  
315 D Street  
South Charleston, WV 25303

304-744-4258

## Jeffery Harvey

---

**From:** Kara Greathouse <[kgreathouse@wvregion3.org](mailto:kgreathouse@wvregion3.org)>  
**Sent:** Wednesday, January 04, 2017 1:59 PM  
**To:** Jeffery Harvey  
**Subject:** FW: Region 3 Hazard Mitigation Plan

*Kara*

---

**From:** Meganne Robinson [mailto:[meganne.robinson@movrc.org](mailto:meganne.robinson@movrc.org)]  
**Sent:** Wednesday, January 04, 2017 1:58 PM  
**To:** Kara Greathouse <[kgreathouse@wvregion3.org](mailto:kgreathouse@wvregion3.org)>  
**Cc:** Carol Jackson <[carol.jackson@movrc.org](mailto:carol.jackson@movrc.org)>  
**Subject:** RE: Region 3 Hazard Mitigation Plan

Kara,

My only other thought in addition to Carol's would be that potential source water contamination issues in Kanawha County can impact citizens in some very southern areas of Jackson and Roane Counties. Water services was disrupted for some Jackson and Roane citizens by the January, 2014 chemical spill and both counties were included in the Federal Emergency Declaration.

All Best,

**Meganne Robinson, MPA**  
Project Coordinator  
Mid-Ohio Valley Regional Council  
(304) 422-4993, Ext. 105

---

**From:** Carol Jackson  
**Sent:** Wednesday, January 04, 2017 9:55 AM  
**To:** Kara Greathouse <[kgreathouse@wvregion3.org](mailto:kgreathouse@wvregion3.org)>  
**Cc:** Meganne Robinson <[meganne.robinson@movrc.org](mailto:meganne.robinson@movrc.org)>  
**Subject:** RE: Region 3 Hazard Mitigation Plan

Kara,

Other than flooding from Roane County spilling over into Clay Elk River watershed nothing comes to mind. Meganne worked on our hazard plan and if she knows of anything I am sure she will respond.

*Carol Jackson, CPA, MBA, PCED*

*Executive Director*

*Mid Ohio Valley Regional Council*

*304-422-4993*

*Equal opportunity employer/program. Auxiliary aids and services available upon request to individuals with disabilities*

---

**From:** Kara Greathouse [<mailto:kgreathouse@wvregion3.org>]

**Sent:** Wednesday, January 04, 2017 9:18 AM

**To:** [jasonroberts@regiononepdc.org](mailto:jasonroberts@regiononepdc.org); [regionone@regiononepdc.org](mailto:regionone@regiononepdc.org); [cchiles@kyovaipc.org](mailto:cchiles@kyovaipc.org); [jtuggle@reg4wv.org](mailto:jtuggle@reg4wv.org); Carol Jackson <[carol.jackson@movrc.org](mailto:carol.jackson@movrc.org)>

**Cc:** Colt Sandoro <[colt@wvregion3.org](mailto:colt@wvregion3.org)>

**Subject:** Region 3 Hazard Mitigation Plan

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As our project nears completion, we will provide access to our draft plan and encourage you to review it and provide comments. Thank you for this consideration. Should you have any questions or comments, feel free to contact me.

**Kara Greathouse**

Transportation Project Manager

Regional Intergovernmental Council

315 D Street

South Charleston, WV 25303

304-744-4258

## Jeffery Harvey

---

**From:** Kara Greathouse <kgreathouse@wvregion3.org>  
**Sent:** Wednesday, January 04, 2017 11:25 AM  
**To:** Jeffery Harvey  
**Subject:** FW: Region 3 Hazard Mitigation Plan

*Kara*

---

**From:** Carol Jackson [mailto:carol.jackson@movrc.org]  
**Sent:** Wednesday, January 04, 2017 9:55 AM  
**To:** Kara Greathouse <kgreathouse@wvregion3.org>  
**Cc:** Meganne Robinson <meganne.robinson@movrc.org>  
**Subject:** RE: Region 3 Hazard Mitigation Plan

Kara,

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*Executive Director*

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**Sent:** Wednesday, January 04, 2017 9:18 AM  
**To:** [jasonroberts@regiononepdc.org](mailto:jasonroberts@regiononepdc.org); [regionone@regiononepdc.org](mailto:regionone@regiononepdc.org); [cchiles@kyovaipc.org](mailto:cchiles@kyovaipc.org); [jtuggle@reg4wv.org](mailto:jtuggle@reg4wv.org); Carol Jackson <carol.jackson@movrc.org>  
**Cc:** Colt Sandoro <colt@wvregion3.org>  
**Subject:** Region 3 Hazard Mitigation Plan

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**Kara Greathouse**

Transportation Project Manager  
Regional Intergovernmental Council  
315 D Street  
South Charleston, WV 25303  
304-744-4258

Wednesday, September 7<sup>th</sup>, 2016

1:30 p.m. – RIC Office

- Wildfires are not a major concern, more a nuisance event.
- Keep weather grouped, renamed “Severe Weather”
  - Want extreme temperatures placed in severe weather.
    - Notion that extreme heat is a public health event.
- Hazardous materials in an annex?
  - Not sure what that means.
- Do not want terrorism included.
- Drought
  - Low water flows will impact the dilution of chemicals released from the industrial areas of the valley into the river.
- Dam Failure
  - Slurry impoundments are a major concern for dam failures.
    - Not well built, vulnerable to seismic activity.
    - Unknown how much they actually contain
    - Within mining operations shutting down, inspections are suspect
    - “Blow outs” are a concern, then an impoundment leaks into an abandoned mine.
      - Major environmental damage
    - Town of Glasgow has an abandoned mine about a nursing home, might want something done about it.
- Flooding
  - Increase in flash floods over river flooding.
  - Area analysis for Charleston?
- Mass Movements
  - Erosion
  - I79 event during floods
  - Slips along the river in Clendenin
  - Poor water management
- Tornado
  - Noted that there has been an increase in the number of tornado warnings in recent years.
- Next meeting: early October
  - Need asset lists and project lists ready to distribute.
  -



# Region 3 PDC All Hazards Mitigation Plan and Risk Assessment Update



**Regional Intergovernmental Council**

**September 7<sup>th</sup>, 2016**

**1:30 p.m.**

**315 D Street**

**South Charleston, WV**

# Agenda

1. Welcome & Introductions
2. Overview of the Hazard Mitigation Process
  - CRS Additions
  - Steering Committee Roles & Responsibilities
  - Steering Committee Meeting Schedule
3. Hazard Review
  - Hazards in the Existing Plan
  - Hazards to Add?
  - Committee Member Homework!
4. Mitigation Reconstruction Amendment to Existing Plan
5. Preparation for Next Steering Committee Meeting
  - Discussion of Date
  - Introduction: Asset Inventorying
6. Q&A

# Welcome and Introductions

# What is a Hazard Mitigation Plan?

- Formal document that identifies risk to all hazards (e.g., Flooding, High Winds, Winter Storms, Land Subsidence, Wildfires, Earthquakes, etc.). It will also incorporate mitigation strategies and risk reduction strategies. It is a LIVING document!
- Plan must be reviewed/updated/re-adopted and submitted to FEMA every 5 years. The plan expires 2/21/17.

# History

- 2012: First Regional Multi-Jurisdictional Hazard Mitigation Plan completed by the Regional Intergovernmental Council
- Prior plans were completed at the county level.

## Our Process – Committee

- Committee Review – Will need to meet regularly to work through the document in order to complete the timeline.
- Additional contact with committee members will be made through email, and teleconference as needed.
- Committee members will be asked to complete tasks specific to their jurisdiction.
- JHC planning staff will be primarily responsible for research and document drafting.

# Our Process – Public Input

- Public input is required per FEMA, and can be obtained in multiple ways.
  - Hazard Mitigation meetings in each jurisdiction for the public to comment on the process.
  - Copies of the plan placed at county offices/libraries for public review and comment.
  - Online surveys regarding the current plan, public thoughts on hazard mitigation, and comments on the updated plan draft.
    - Social media presence is very important for these surveys to be successful.

# Estimated Project Schedule

- 9/7/16 – Kick-off Meeting
- September – November – On-going meetings and communication with steering committee. Surveys disseminated and public meetings scheduled. Draft materials sent to committee members for review.
- November – Full draft presented for approval to the committee and full council.
- December – Submittal to WVDHSEM for approval
- After State approval, Plan is sent to FEMA Region III for approval. The plan expires 2/21/17.



# Multi-Jurisdictional Requirements

The Hazard Risk Assessment and Multi-Jurisdictional Mitigation Plan will cover all the jurisdictions of the four counties that make up the Region 3 Planning and Development Council (PDC), also known as the Regional Intergovernmental Council (RIC).

# Hazards In Current Plan

- Dam Failure
- Drought
- Earthquake
- Flooding
- Landslides/Land Subsidence
- Severe Storms
  - Includes thunderstorms, lightning, hail, and winter storms
- Tornados
- Wildfire

# Additional Hazards

- Extreme Temperatures (Hot & Cold)
- Hazardous Materials
- Terrorism
- Others?

# Profiling Hazards

By virtue of their location in the Region 3 PDC, the municipalities in the four counties can be said to be susceptible to the same hazards as the county. The municipalities, however, may be more or less susceptible.

# Hazard Review: Dam Failure

- Dam data from U.S. Army Corps of Engineers (2000), and WV DEP.
  - 60 Dams located in the region.
  - 46 are High Hazard, 14 are Significant Hazard
- Stanford University – National Performance of Dams Program Incidents
  - 3 incidents since 1996, no reported damage.
- Bluestone Dam poses significant hazard to the region.
- Summersville and Sutton dams
- Other incidents or concerns?

# Hazard Review: Drought

- Noted NOAA NCDC Events
  - Drought = 50 since 1997
    - An event is noted for each county (I.E. one drought period will show up four times in the data), however droughts will generally effect the entire region.
  - Comparing 2007 (drought year) to 2006 and 2008 (non-drought years) shows a significant drop in production of Hay in 2007.

# Hazard Review: Earthquake

- West Virginia Geological and Economic Survey
  - Three events since 1991
    - June 28<sup>th</sup>, 1991: 3.0 magnitude event in Kanawha County
    - October 2<sup>nd</sup>, 1998: 2.5 magnitude event in Kanawha County
    - March 16<sup>th</sup>, 2012: 2.8 magnitude event in Boone County
  - HAZUS-MH Analysis
    - 5.0 earthquake located in southeastern Kanawha County (at location of June 1991 event)
    - 5,053 structures impacted.
    - Over \$800 million in losses

# Hazard Review: Flooding

- Noted NOAA NCDC Events (1996-2015)
  - Flash flood = 112
    - Property damage = \$37,837,000
    - No reported crop damage
    - 6 fatalities
  - Flood = 54
    - Property damage = \$17,115,000
    - No reported crop damage
    - 2 fatalities
  - June Flooding
    - Unable to include into the loss estimates due to the final economic costs not being known. A section of the flood profile will be dedicated to discussing the event.



# Hazard Review: Land Subsidence/Mass Movement

- All of West Virginia is at significant risk due to topography and human impacts (mining, expanding communities).
- Two events noted in the NCDC records
  - February 19<sup>th</sup>, 2014: Debris flow in the area of Marlaing Addition caused a reported \$20,000 in property damage.
  - March 12<sup>th</sup> 2015: Debris flow at the Yeager Airport caused a reported \$1 million in damage.
- Other events? Areas of concern?

# Hazard Review: Severe Storms

- Current version of the plan combines severe thunderstorms, lightning, winter storms, wind storms, and hail storms into this severe storm profile.
  - Keep format? Separate out?
- Over 1,000 events combined

# Hazard Review: Tornado

- Noted NOAA NCDC Events, with additional information from “The Tornado Project” (1969 – 2015)
  - Twelve Events, all either F1 or F0
    - Only have occurred in Kanawha & Putnam Counties
  - Total property damage: \$365,000
  - Total injuries: 2

# Probability vs. Severity

## Hazard Probability Classifications

Description	Specific Hazard Event	Frequency
Frequent	Likely to occur frequently	Continuously experienced
Probable	Will occur several times in the life of an item	Experienced several times
Occasional	Likely to occur sometime in the life of an item	Experienced
Remote	Unlikely but possible to occur in the life of an item	Unlikely that it has been experienced.
Improbable	So unlikely it can be assumed occurrence may not be experienced.	Not experienced.

# Probability vs. Severity

## Hazard Severity Classifications

Description	Mishap 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.

# Probability vs. Severity

## Risk Assessment Matrix

HAZARD SEVERITY	PROBABILITY				
	Frequent	Probable	Occasional	Remote	Improbable
Catastrophic	Red	Red	Red	Yellow	White
Critical	Red	Red	Yellow	White	White
Marginal	Yellow	Yellow	White	White	White
Negligible	White	White	White	White	White



Risk reduction required

Risk reduction suggested

Risk reduction not required

# Committee Member Homework

- Any additional or local data on the hazards discussed, or additional hazards agreed upon.
- Please forward this information to the RIC or directly to the planners at JHC.
- Would like to have local insight to add to the profiles.

# Mitigation Reconstruction Amendment to Existing Plan



# Preparing for Next Steering Committee Meeting

- Date and time

# Preparing for Next Steering Committee Meeting – Asset Inventory

- Need to update the Asset Inventory included in the plan. Assets fall into one of the five categories below
  - *Critical Facilities*: Governmental facilities, water/wastewater facilities, emergency services facilities, medical facilities (hospitals/clinics), military facilities, and the 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.
- You will be receiving a list of the assets that were included for your county in the existing plan. Need you to make revisions, deletions, and additions.

Questions/Discussion?

# Adjournment

- Thanks for your input!
- Look for survey links and asset inventories to be sent out soon.

**REGION 3 PLANNING & DEVELOPMENT COUNCIL  
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN  
STEERING COMMITTEE #1 MEETING**

**AGENDA**

Date: September 7, 2016  
Time: 1:30 p.m.  
Estimated Duration: 90-120 minutes  
Location: Region 3 PDC Offices, South Charleston, WV

1. Welcome & Introductions
2. Brief Overview of Process
  - Mitigation Planning Process
  - CRS Additions
  - Steering Committee Roles & Responsibilities
  - Steering Committee Meeting Schedule
3. Hazard Review
  - Hazards in the Existing Plan
  - Hazards to Add?
  - Committee Member Homework!
4. Mitigation Reconstruction Amendment to Existing Plan
5. Preparation for Next Steering Committee Meeting
  - Discussion as to Date
  - Introduction – Asset Inventorying
6. Questions & Answers
7. Adjournment

**REGION 3 PLANNING & DEVELOPMENT COUNCIL  
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN  
STEERING COMMITTEE #2 MEETING**

**AGENDA**

Date: October 13, 2016  
Time: 1:30 p.m.  
Estimated Duration: 60-90 minutes  
Location: GoToMeeting Web Conference Suite

1. Welcome
2. Review of Progress to Date
3. Goals, Objectives, and Strategies Discussion
  - Regional Goals
  - Individual County Project List Review
  - Committee Member Homework!
    - Introduce status designations
    - Discussion as to Municipal Inclusions
4. Asset Inventory
5. Preparation for Next Steering Committee Meeting
  - November 17, 2016 – 1:30 p.m.
  - Finalize Project List
  - Project Prioritization
6. Questions & Answers
7. Adjournment

**REGION 3 PLANNING & DEVELOPMENT COUNCIL  
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN  
STEERING COMMITTEE #3 MEETING**

**AGENDA**

Date: November 17, 2016  
Time: 1:30 p.m.  
Estimated Duration: 60-90 minutes  
Location: Regional Intergovernmental Council Offices, S. Charleston

1. Welcome
2. Review of Progress to Date
3. Asset Inventory
  - Discussion of any updates
  - Review of asset tables as they stand
  - Discuss finalizing asset tables
4. Discussion of Municipal Project Lists
5. Review County-Level Project Lists
  - Discussion of any changes
  - Prioritization matrices
6. Discuss Need for Additional Steering Committee Meeting
7. Questions & Answers
8. Adjournment

### Regional Goals

POSSIBLE – Structures, life safety, etc.

POSSIBLE – Ranking by Top 5 Hazards

POSSIBLE – Reduce the adverse impacts of flooding in flood prone areas.

POSSIBLE – Familiarize general public, industrial and other partners with the plan and mitigation concepts.

### Possible Objective or Project

Data on interstate re: traffic accidents, minimizing accidents, maximize traffic flow, etc. – Possibly tie to several of the hazards, tie to evac planning, general life safety, etc.







**Greg Lay**

1 hr • 



The Boone County Emergency management Agency is currently updating our part of a Multi-Jurisdictional Hazard Mitigation Plan. The plan includes Boone, Clay, Kanawha and Putnam Counties and the municipalities in each. We are looking for community input. Please follow the link below and participate in the survey. It only takes a few minutes and it wi... [Continue Reading](#)

### **Region 3 Hazard Mitigation Survey**

Web survey powered by SurveyMonkey.com....

[surveymonkey.com](https://www.surveymonkey.com)



You and 1 other

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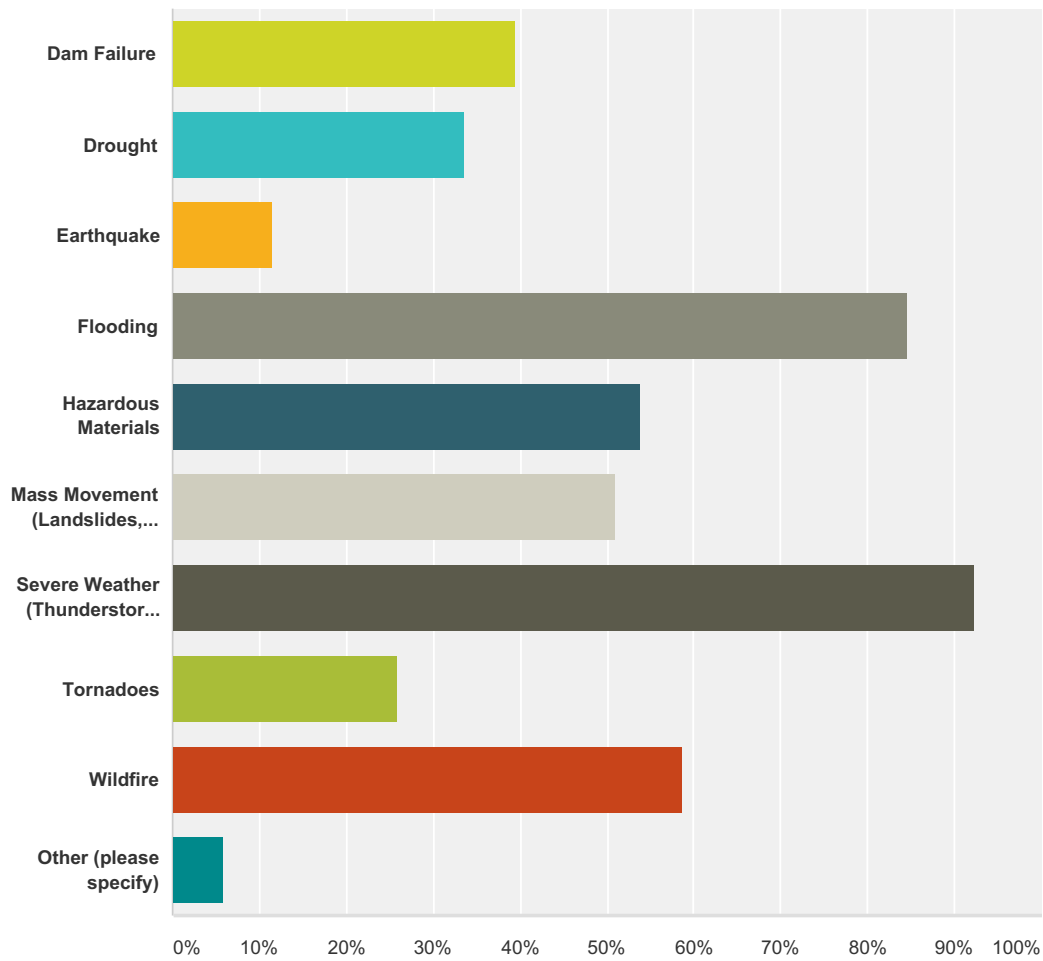
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## **APPENDIX 2: RAW SURVEY DATA**



### Q1 What hazards do you believe exist in your community? (check all that apply)

Answered: 104 Skipped: 0



Answer Choices	Responses
Dam Failure	39.42% 41
Drought	33.65% 35
Earthquake	11.54% 12
Flooding	84.62% 88
Hazardous Materials	53.85% 56
Mass Movement (Landslides, sinkholes, etc.)	50.96% 53
Severe Weather (Thunderstorms, Hail, Lightning, Wind, Snow Storms, and Extreme Temperatures)	92.31% 96
Tornadoes	25.96% 27
Wildfire	58.65% 61
Other (please specify)	5.77% 6

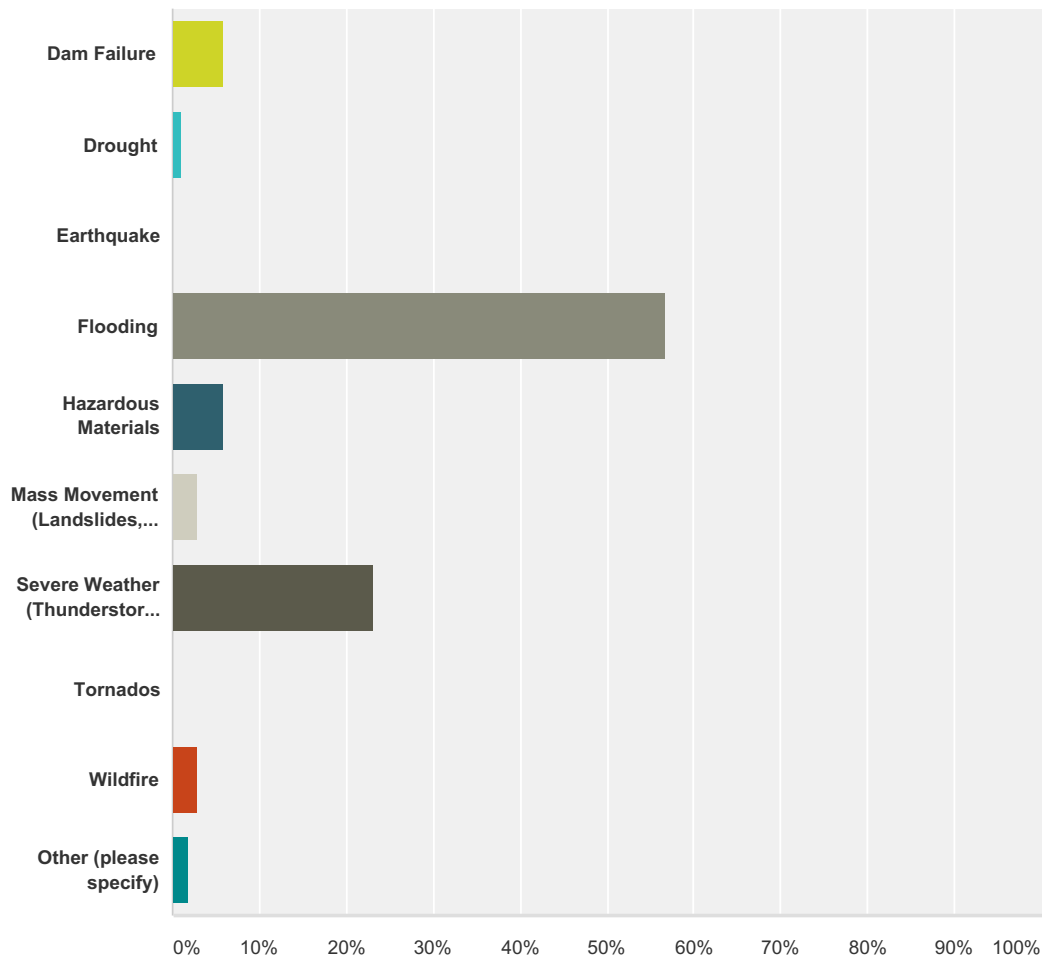
## Region 3 Hazard Mitigation Survey

Total Respondents: 104

#	Other (please specify)	Date
1	Living close to a sizable chemical plant I believe a threat exists for a terror attack.	10/15/2016 10:18 AM
2	Impoundment failure	10/13/2016 11:40 PM
3	Nuclear/biological/chemical hazards	10/13/2016 9:51 PM
4	Water contamination	10/13/2016 6:29 PM
5	Falling rocks from hillsides above highways	10/11/2016 10:57 AM
6	Fire training that's obtainable fir the average working person	10/7/2016 3:29 PM

**Q2 Please choose the hazard you consider to pose the largest risk to your community.**

Answered: 104 Skipped: 0



Answer Choices	Responses
Dam Failure	5.77% 6
Drought	0.96% 1
Earthquake	0.00% 0
Flooding	56.73% 59
Hazardous Materials	5.77% 6
Mass Movement (Landslides, sinkholes, etc.)	2.88% 3
Severe Weather (Thunderstorms, Hail, Lightning, Wind, Snow Storms, and Extreme Temperatures)	23.08% 24
Tornados	0.00% 0
Wildfire	2.88% 3
Other (please specify)	1.92% 2

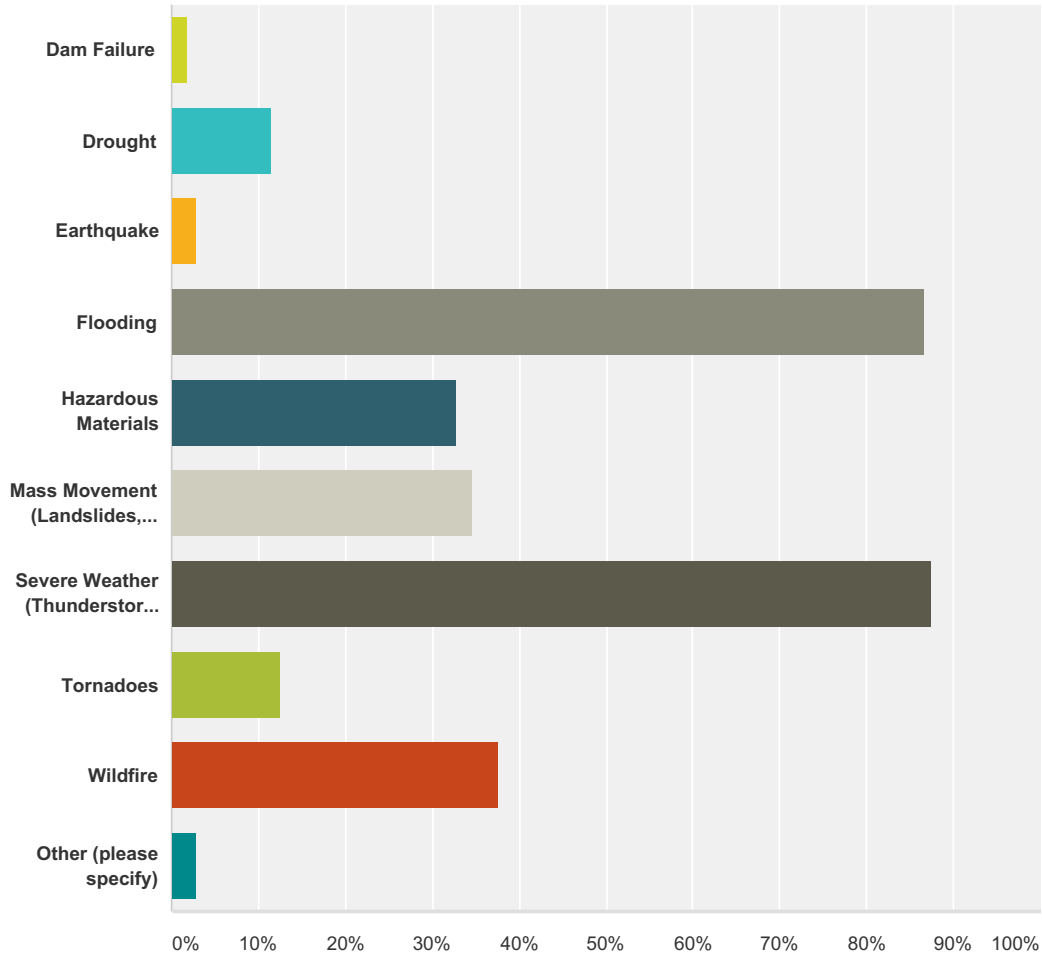
## Region 3 Hazard Mitigation Survey

<b>Total</b>	<b>104</b>
--------------	------------

<b>#</b>	<b>Other (please specify)</b>	<b>Date</b>
1	Terrorist attackto chemical plant in close proximity.	10/15/2016 10:18 AM
2	Nuclear/biological/chemical/infrastructure failure	10/13/2016 9:51 PM

**Q3 In the past 10 years, which hazards do you recall having occurred in your community? (Check all that apply)**

Answered: 104 Skipped: 0



Answer Choices	Responses
Dam Failure	1.92% 2
Drought	11.54% 12
Earthquake	2.88% 3
Flooding	86.54% 90
Hazardous Materials	32.69% 34
Mass Movement (Landslides, sinkholes, etc.)	34.62% 36
Severe Weather (Thunderstorms, Hail, Lightning, Wind, Snow Storms, and Extreme Temperatures)	87.50% 91
Tornadoes	12.50% 13
Wildfire	37.50% 39
Other (please specify)	2.88% 3



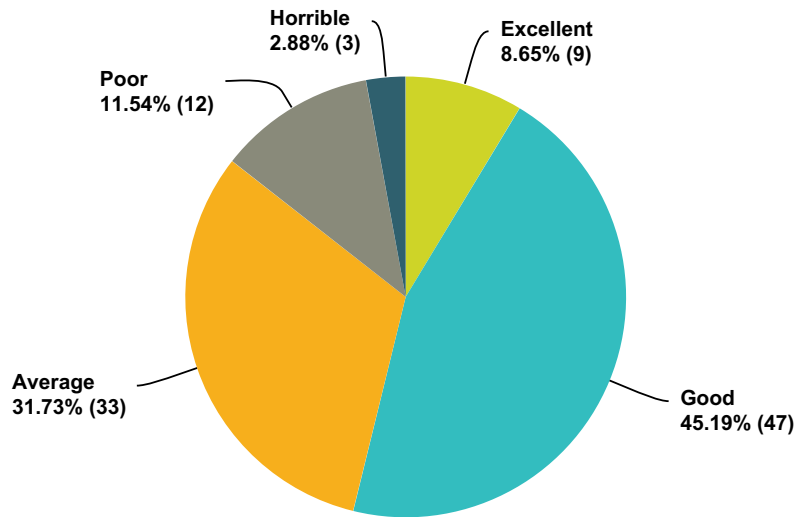
## Region 3 Hazard Mitigation Survey

Total Respondents: 104

#	Other (please specify)	Date
1	water problem Elk River throughout area	10/13/2016 11:02 PM
2	Water contamination	10/13/2016 6:29 PM
3	Water pollution	10/11/2016 9:03 AM

**Q4 Think back to a recent hazard occurrence (any of the hazards listed before.) How would you rate your community's ability to handle the hazard event?**

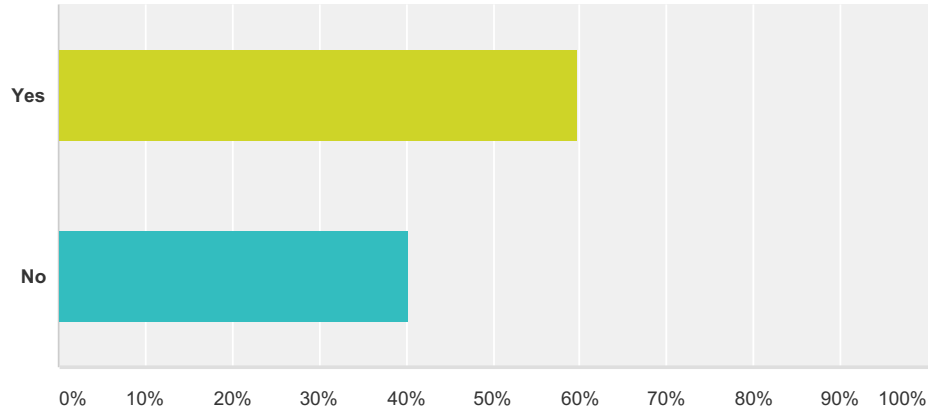
Answered: 104 Skipped: 0



Answer Choices	Responses	
Excellent	8.65%	9
Good	45.19%	47
Average	31.73%	33
Poor	11.54%	12
Horrible	2.88%	3
<b>Total</b>		<b>104</b>

**Q5 During this event did you receive information or warnings from your local public officials / emergency management officials?**

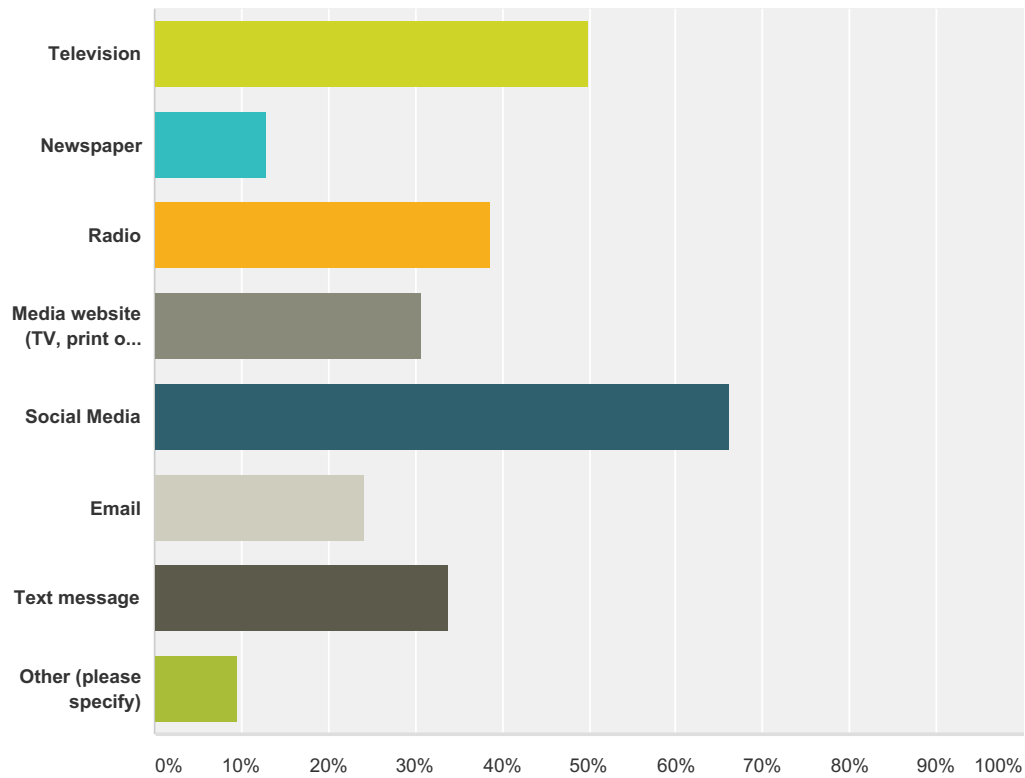
Answered: 104 Skipped: 0



Answer Choices	Responses	
Yes	59.62%	62
No	40.38%	42
<b>Total</b>		<b>104</b>

### Q6 How did you receive this information?

Answered: 62 Skipped: 42



Answer Choices	Responses	
Television	50.00%	31
Newspaper	12.90%	8
Radio	38.71%	24
Media website (TV, print or radio)	30.65%	19
Social Media	66.13%	41
Email	24.19%	15
Text message	33.87%	21
Other (please specify)	9.68%	6
<b>Total Respondents: 62</b>		

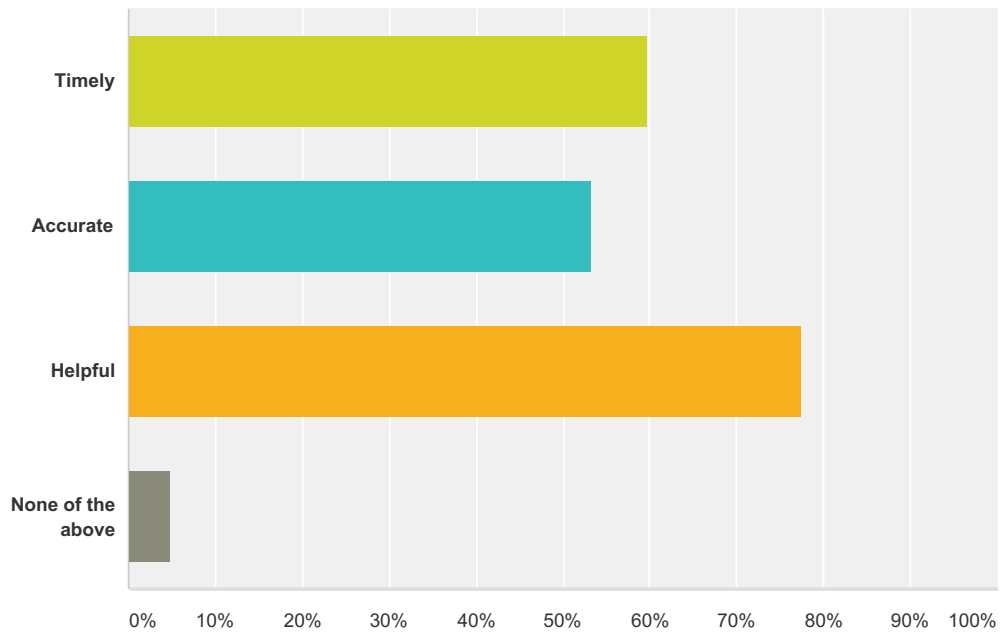
#	Other (please specify)	Date
1	Scanner	10/17/2016 11:29 AM
2	Some phone calls	10/14/2016 1:27 PM
3	Weather app	10/14/2016 7:28 AM
4	Phone	10/13/2016 10:49 PM
5	Facebook	10/13/2016 9:51 PM

# Region 3 Hazard Mitigation Survey

6	Counties k. Ready ap	10/7/2016 3:30 PM
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**Q7 Was this information timely, accurate and helpful? (choose as many as apply)**

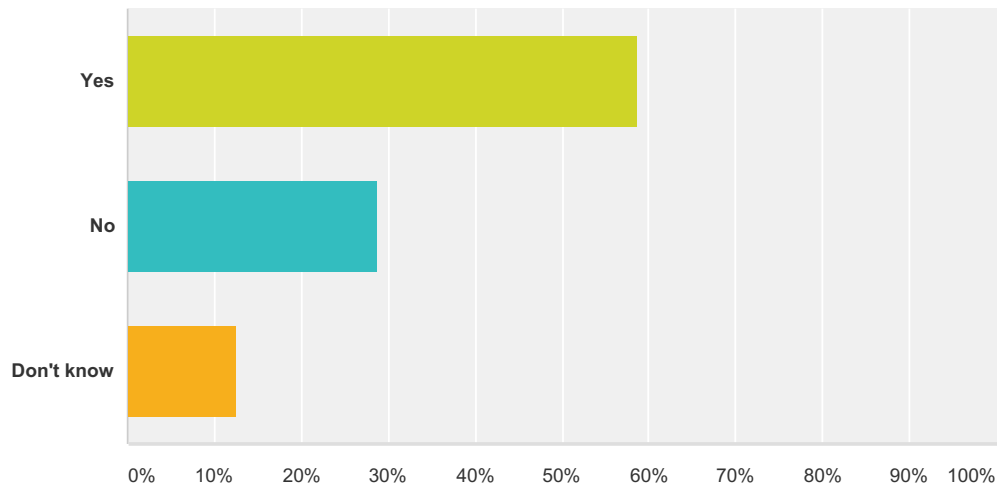
Answered: 62 Skipped: 42



Answer Choices	Responses
Timely	59.68% 37
Accurate	53.23% 33
Helpful	77.42% 48
None of the above	4.84% 3
<b>Total Respondents: 62</b>	

### Q8 Do you know if you live in the flood plain?

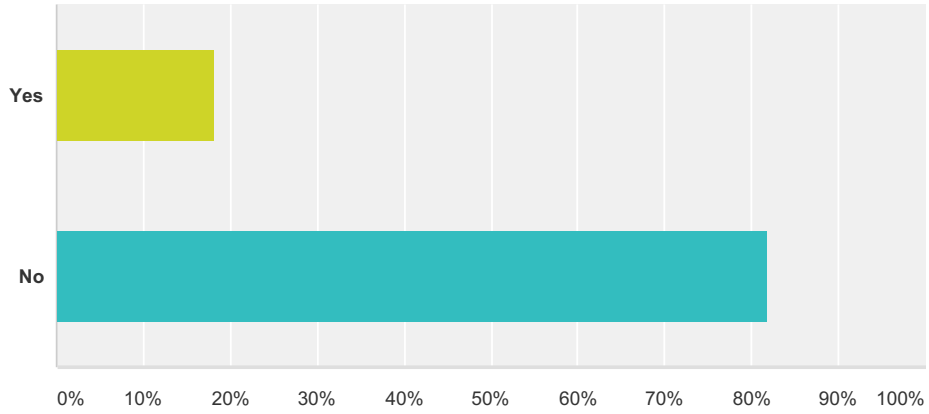
Answered: 104 Skipped: 0



Answer Choices	Responses
Yes	58.65% 61
No	28.85% 30
Don't know	12.50% 13
<b>Total</b>	<b>104</b>

**Q9 Please visit the WV Flood Tool (Found Here) and locate your residence. Is it located in the flood plain? (The red shaded area)**

Answered: 11 Skipped: 93

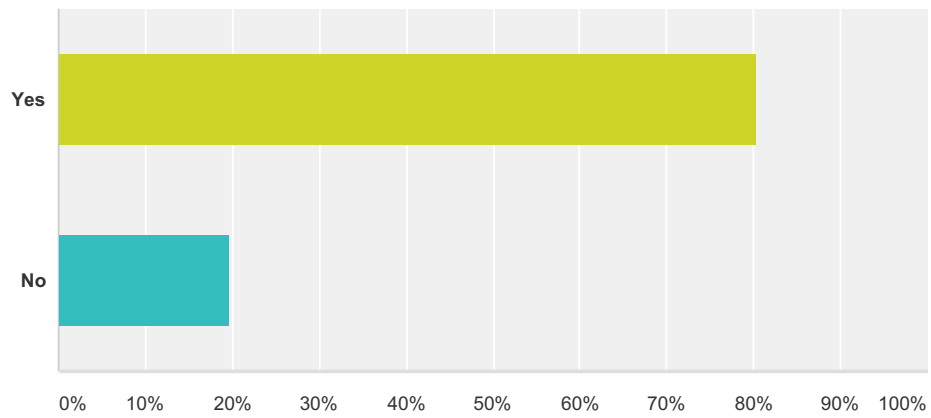


Answer Choices	Responses
Yes	18.18% 2
No	81.82% 9
<b>Total</b>	<b>11</b>



### Q10 Do you have homeowners/renters insurance?

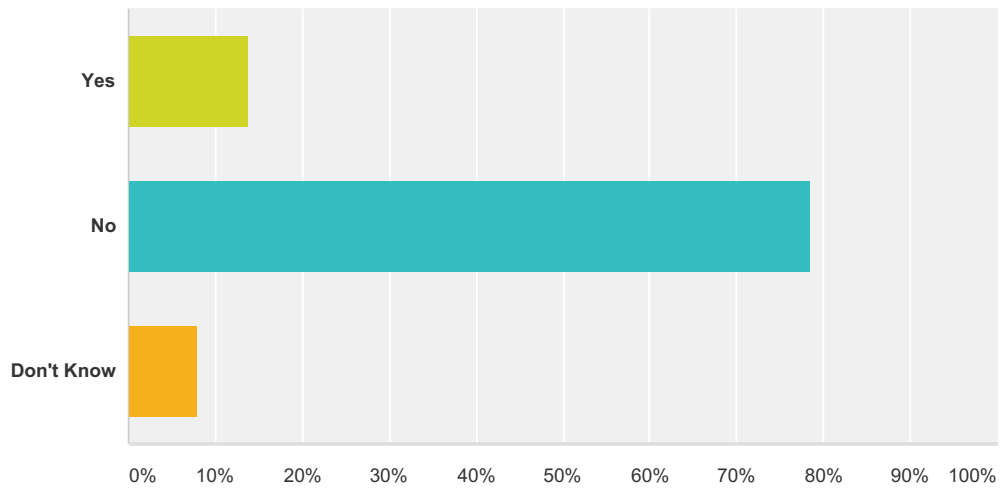
Answered: 102 Skipped: 2



Answer Choices	Responses
Yes	80.39% 82
No	19.61% 20
<b>Total</b>	<b>102</b>

### Q11 Does your homeowner/renters insurance include flood insurance?

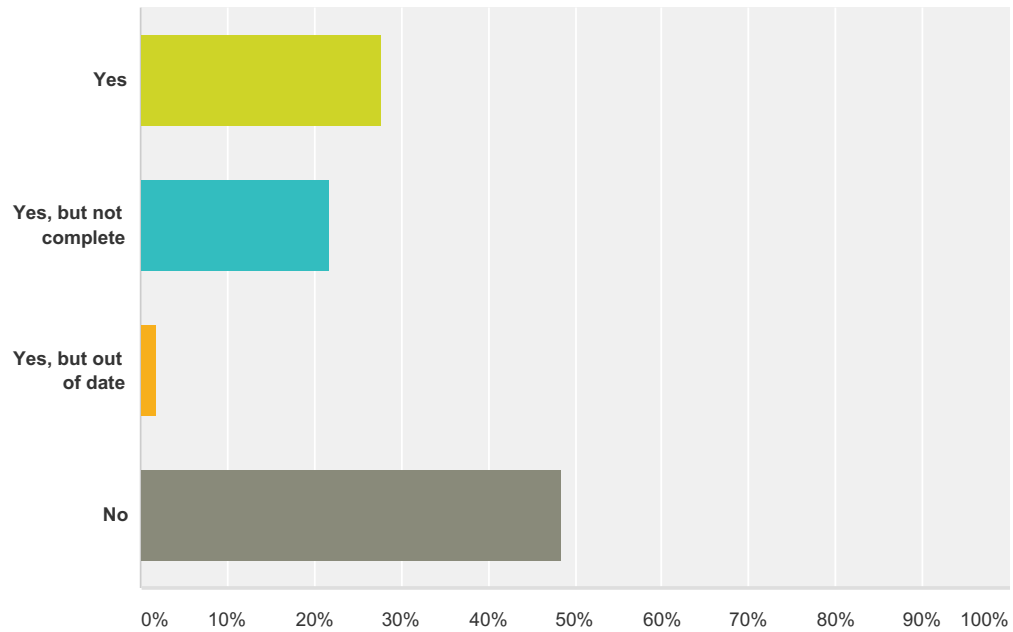
Answered: 102 Skipped: 2



Answer Choices	Responses
Yes	13.73% 14
No	78.43% 80
Don't Know	7.84% 8
<b>Total</b>	<b>102</b>

**Q12 Do you / does your household have a 72-hour kit? (<http://www.ready.gov/build-a-kit> )**

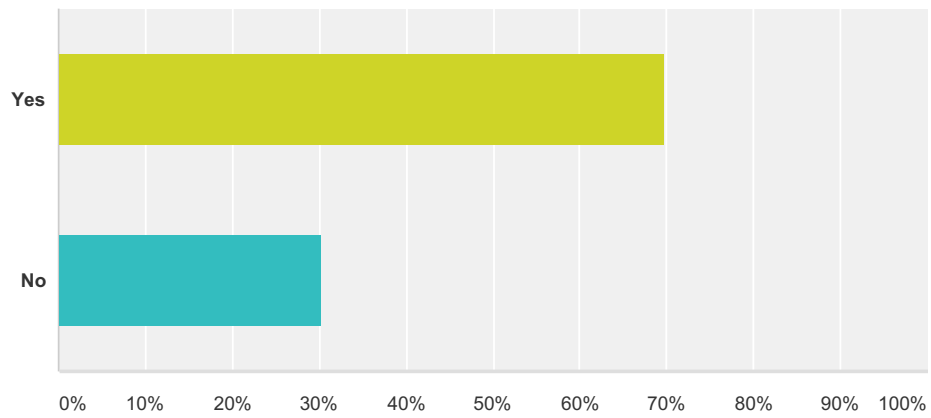
Answered: 101 Skipped: 3



Answer Choices	Responses	
Yes	27.72%	28
Yes, but not complete	21.78%	22
Yes, but out of date	1.98%	2
No	48.51%	49
<b>Total</b>		<b>101</b>

### Q13 Are you willing to spend your money on mitigation activities for your home?

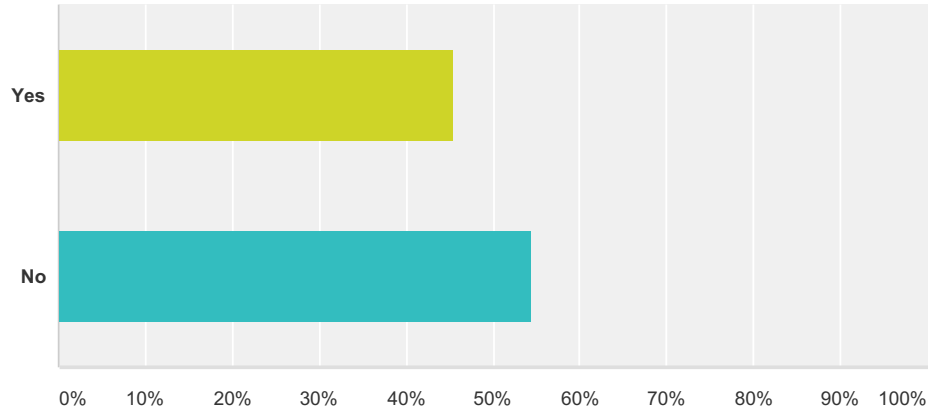
Answered: 99 Skipped: 5



Answer Choices	Responses
Yes	69.70% 69
No	30.30% 30
<b>Total</b>	<b>99</b>

**Q14 Have you performed any improvements to your home to reduce your risk from a hazard?**

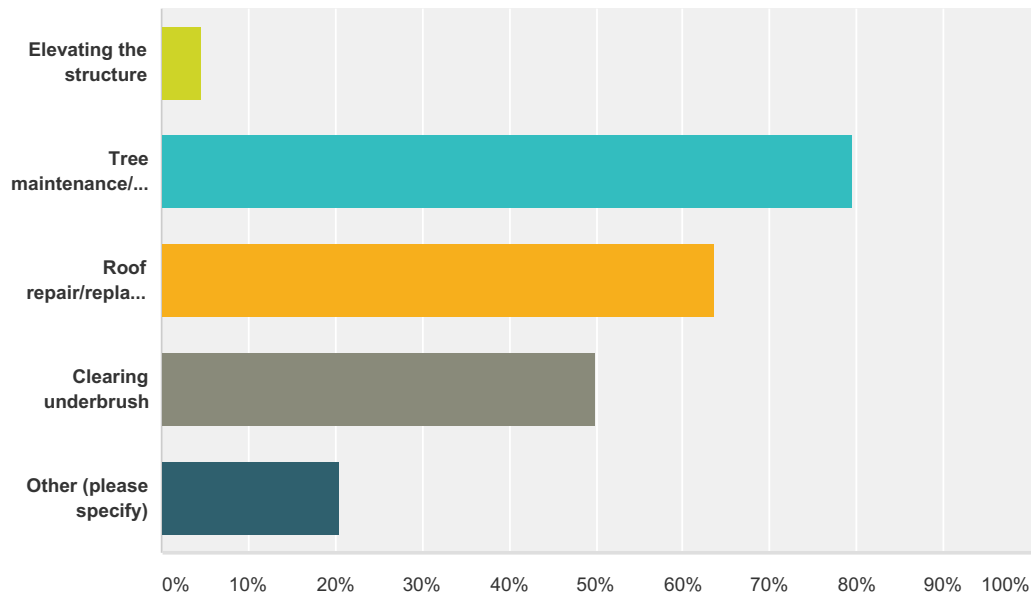
Answered: 99 Skipped: 5



Answer Choices	Responses	
Yes	45.45%	45
No	54.55%	54
<b>Total</b>		<b>99</b>

### Q15 Please indicate what improvements you have made:

Answered: 44 Skipped: 60

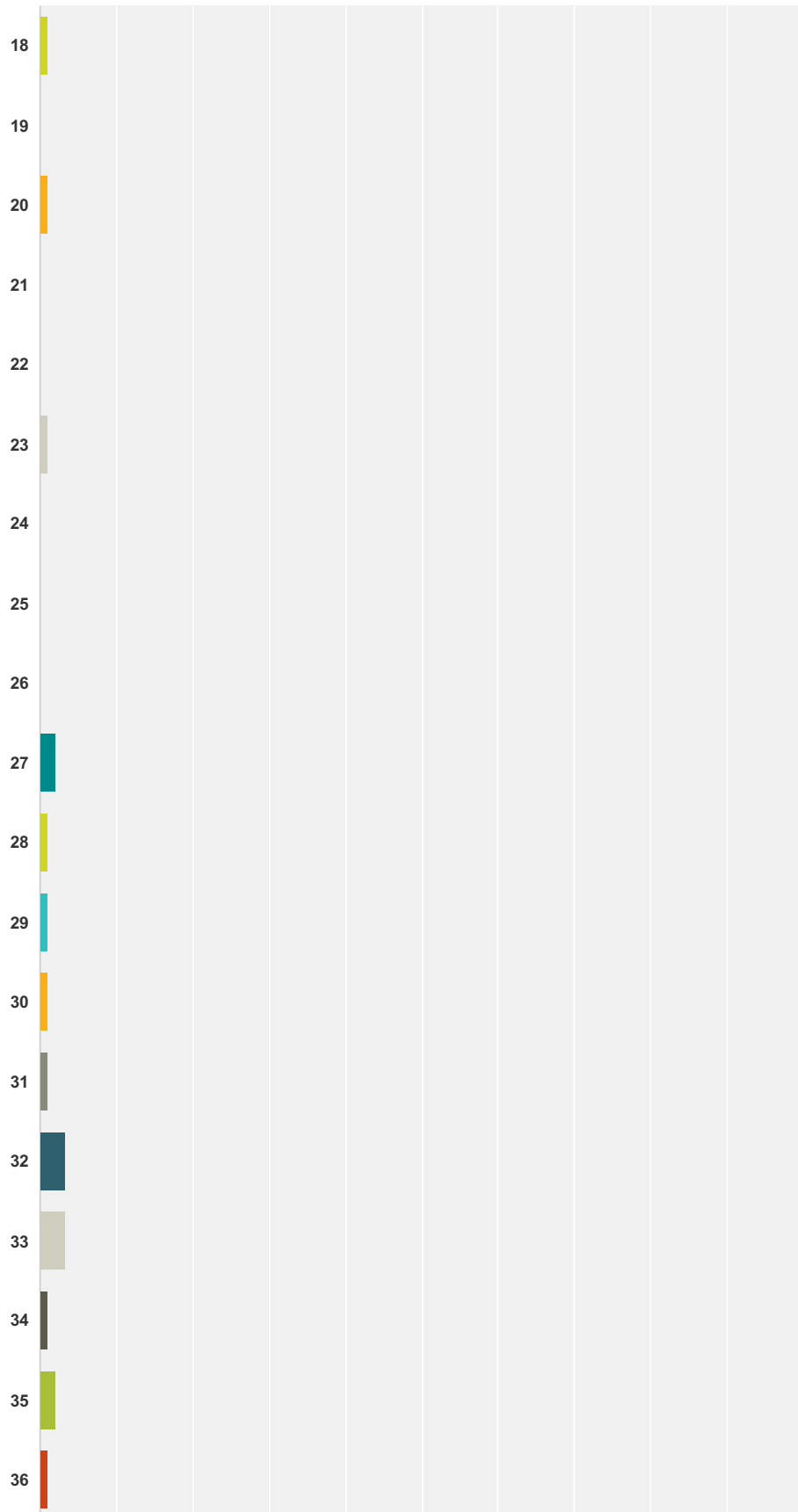


Answer Choices	Responses
Elevating the structure	4.55% 2
Tree maintenance/removal	79.55% 35
Roof repair/replacement	63.64% 28
Clearing underbrush	50.00% 22
Other (please specify)	20.45% 9
<b>Total Respondents: 44</b>	

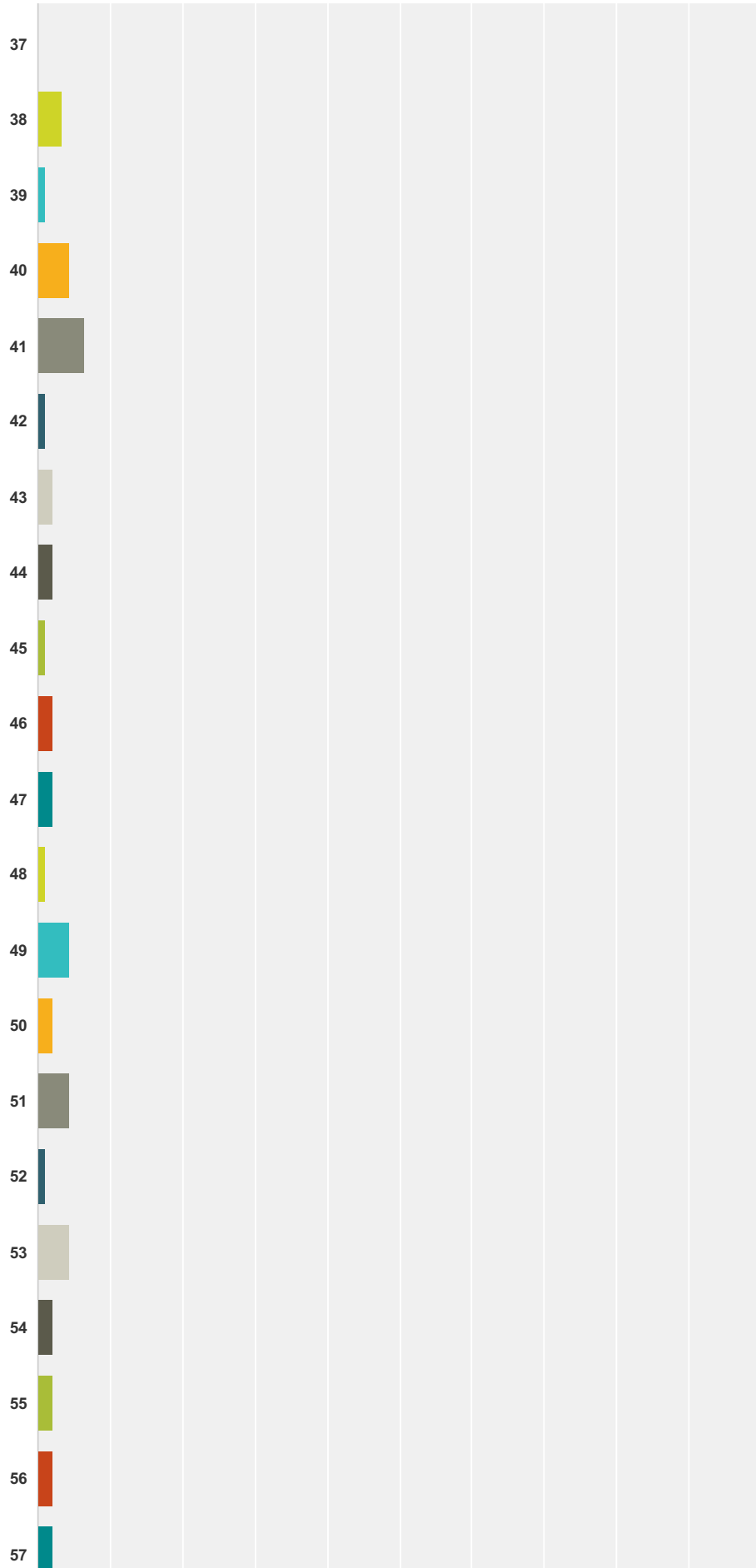
#	Other (please specify)	Date
1	Cleaning ditches	10/14/2016 10:36 AM
2	All new electrical	10/13/2016 11:40 PM
3	Alternate power/communications/HVAC	10/13/2016 9:52 PM
4	Cleared creek and built a wall	10/13/2016 7:49 PM
5	Generator purchase	10/10/2016 9:38 PM
6	added emergency generator	10/10/2016 8:32 AM
7	New drainage/grading	10/8/2016 11:34 AM
8	foundation work	10/7/2016 2:35 PM
9	Ditching	10/7/2016 1:11 PM

### Q16 Please choose your age

Answered: 92 Skipped: 12

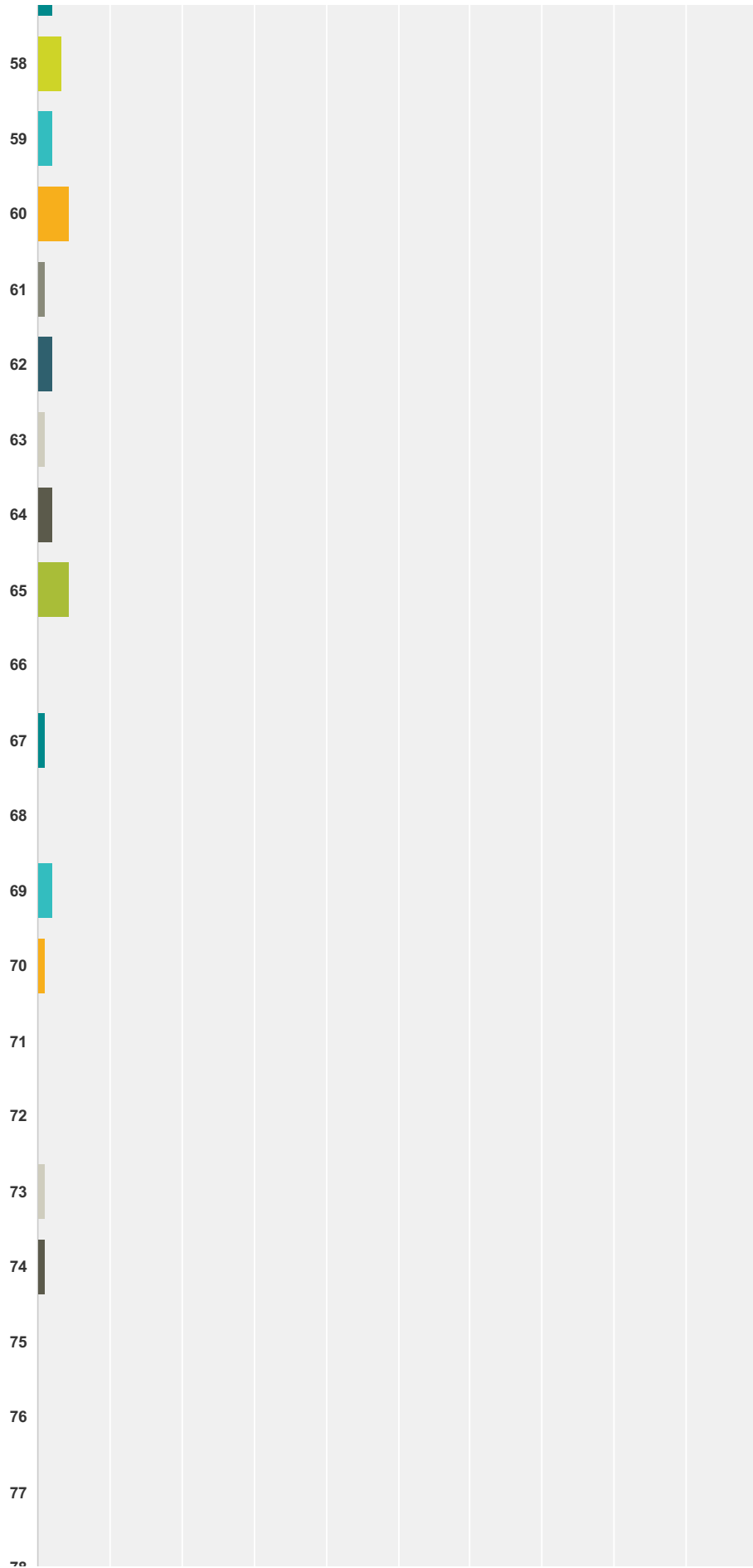


# Region 3 Hazard Mitigation Survey





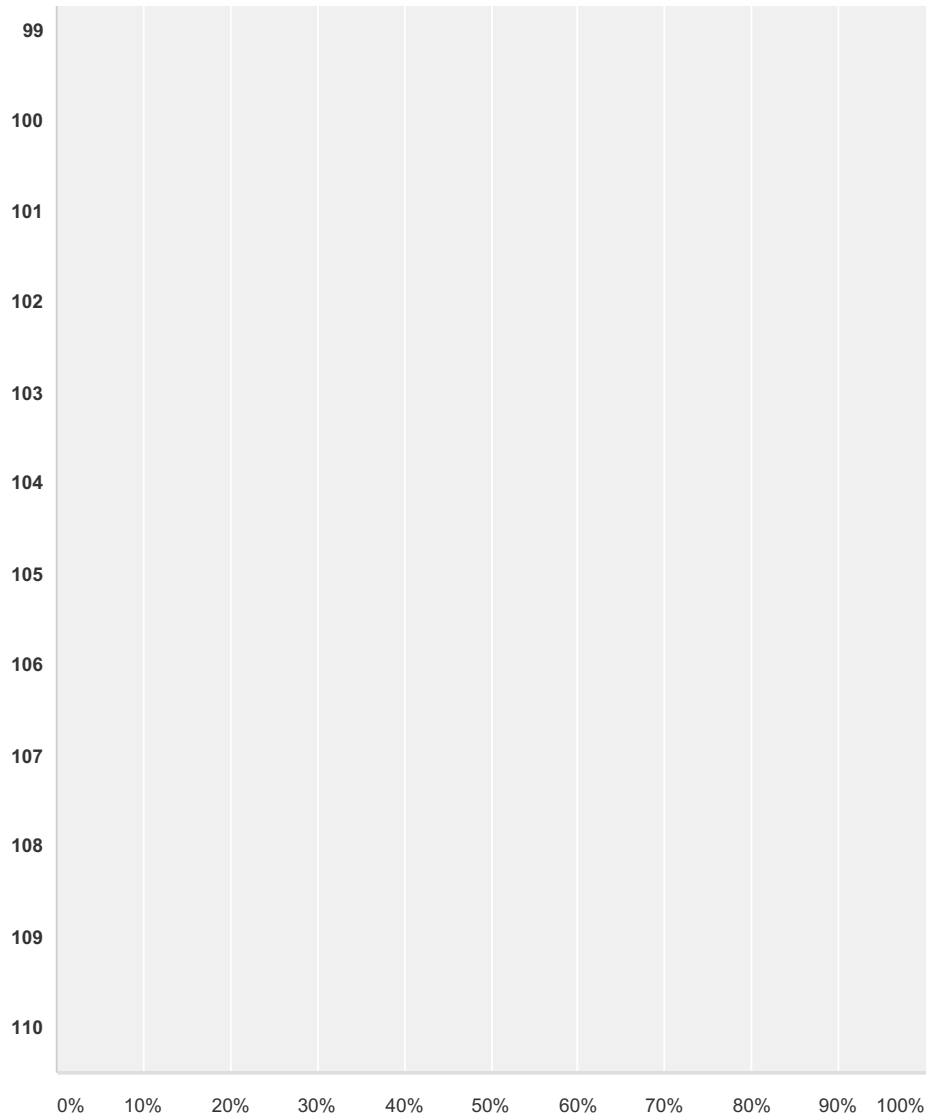
# Region 3 Hazard Mitigation Survey



# Region 3 Hazard Mitigation Survey

80									
79									
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97									
98									

### Region 3 Hazard Mitigation Survey



Answer Choices	Responses	Count
18	1.09%	1
19	0.00%	0
20	1.09%	1
21	0.00%	0
22	0.00%	0
23	1.09%	1
24	0.00%	0
25	0.00%	0
26	0.00%	0
27	2.17%	2
28	1.09%	1
29	1.09%	1

## Region 3 Hazard Mitigation Survey

30	1.09%	1
31	1.09%	1
32	3.26%	3
33	3.26%	3
34	1.09%	1
35	2.17%	2
36	1.09%	1
37	0.00%	0
38	3.26%	3
39	1.09%	1
40	4.35%	4
41	6.52%	6
42	1.09%	1
43	2.17%	2
44	2.17%	2
45	1.09%	1
46	2.17%	2
47	2.17%	2
48	1.09%	1
49	4.35%	4
50	2.17%	2
51	4.35%	4
52	1.09%	1
53	4.35%	4
54	2.17%	2
55	2.17%	2
56	2.17%	2
57	2.17%	2
58	3.26%	3
59	2.17%	2
60	4.35%	4
61	1.09%	1
62	2.17%	2
63	1.09%	1

### Region 3 Hazard Mitigation Survey

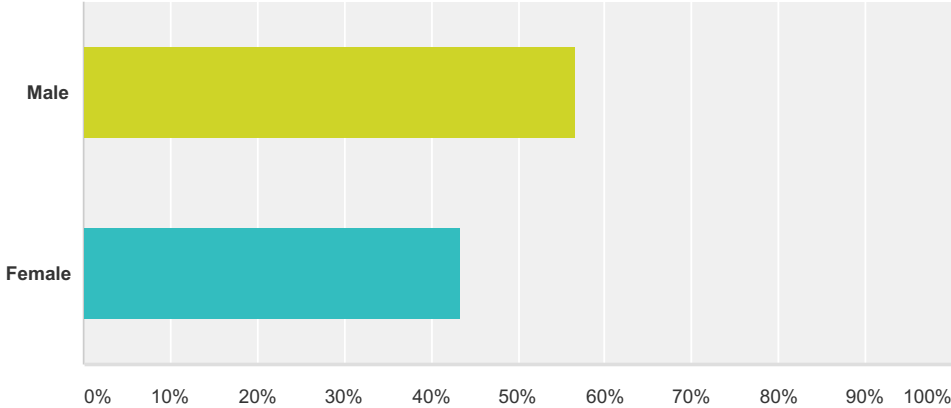
64	2.17%	2
65	4.35%	4
66	0.00%	0
67	1.09%	1
68	0.00%	0
69	2.17%	2
70	1.09%	1
71	0.00%	0
72	0.00%	0
73	1.09%	1
74	1.09%	1
75	0.00%	0
76	0.00%	0
77	0.00%	0
78	0.00%	0
79	0.00%	0
80	0.00%	0
81	0.00%	0
82	0.00%	0
83	0.00%	0
84	0.00%	0
85	0.00%	0
86	0.00%	0
87	0.00%	0
88	0.00%	0
89	0.00%	0
90	0.00%	0
91	0.00%	0
92	0.00%	0
93	0.00%	0
94	0.00%	0
95	0.00%	0
96	0.00%	0
97	0.00%	0
98	0.00%	0

### Region 3 Hazard Mitigation Survey

99	0.00%	0
100	0.00%	0
101	0.00%	0
102	0.00%	0
103	0.00%	0
104	0.00%	0
105	0.00%	0
106	0.00%	0
107	0.00%	0
108	0.00%	0
109	0.00%	0
110	0.00%	0
<b>Total</b>		<b>92</b>

### Q17 Gender

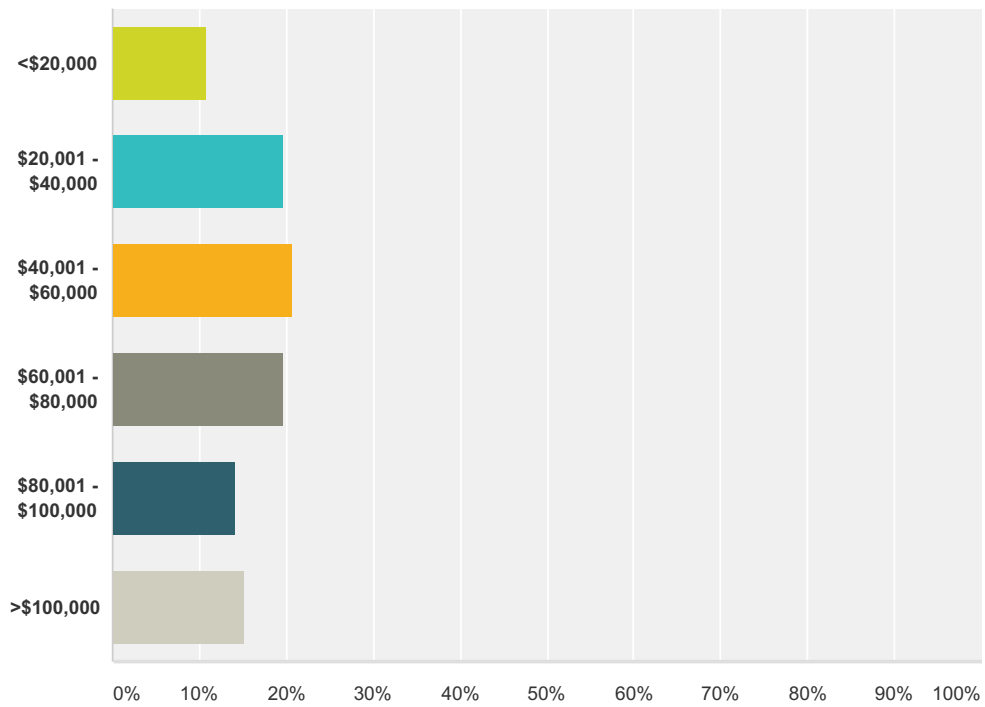
Answered: 92 Skipped: 12



Answer Choices	Responses
Male	56.52% 52
Female	43.48% 40
<b>Total</b>	<b>92</b>

### Q18 Please indicate your household income:

Answered: 92 Skipped: 12

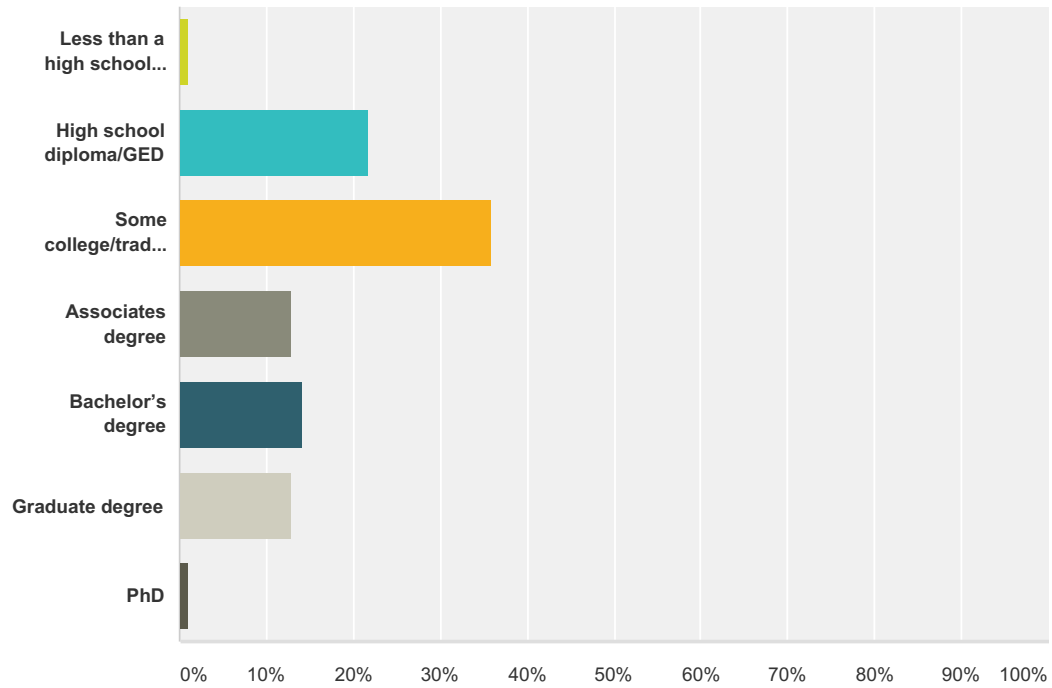


Answer Choices	Responses	
<\$20,000	10.87%	10
\$20,001 - \$40,000	19.57%	18
\$40,001 - \$60,000	20.65%	19
\$60,001 - \$80,000	19.57%	18
\$80,001 - \$100,000	14.13%	13
>\$100,000	15.22%	14
<b>Total</b>		<b>92</b>



### Q19 Please indicate your level of education

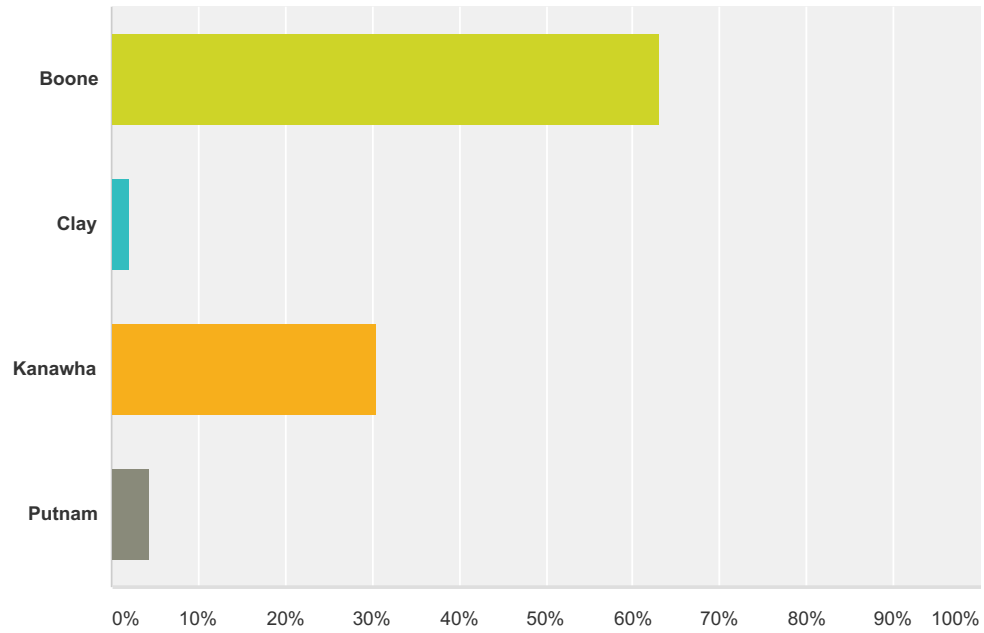
Answered: 92 Skipped: 12



Answer Choices	Responses
Less than a high school diploma	1.09% 1
High school diploma/GED	21.74% 20
Some college/trade school	35.87% 33
Associates degree	13.04% 12
Bachelor's degree	14.13% 13
Graduate degree	13.04% 12
PhD	1.09% 1
<b>Total</b>	<b>92</b>

### Q20 Which county do you reside in?

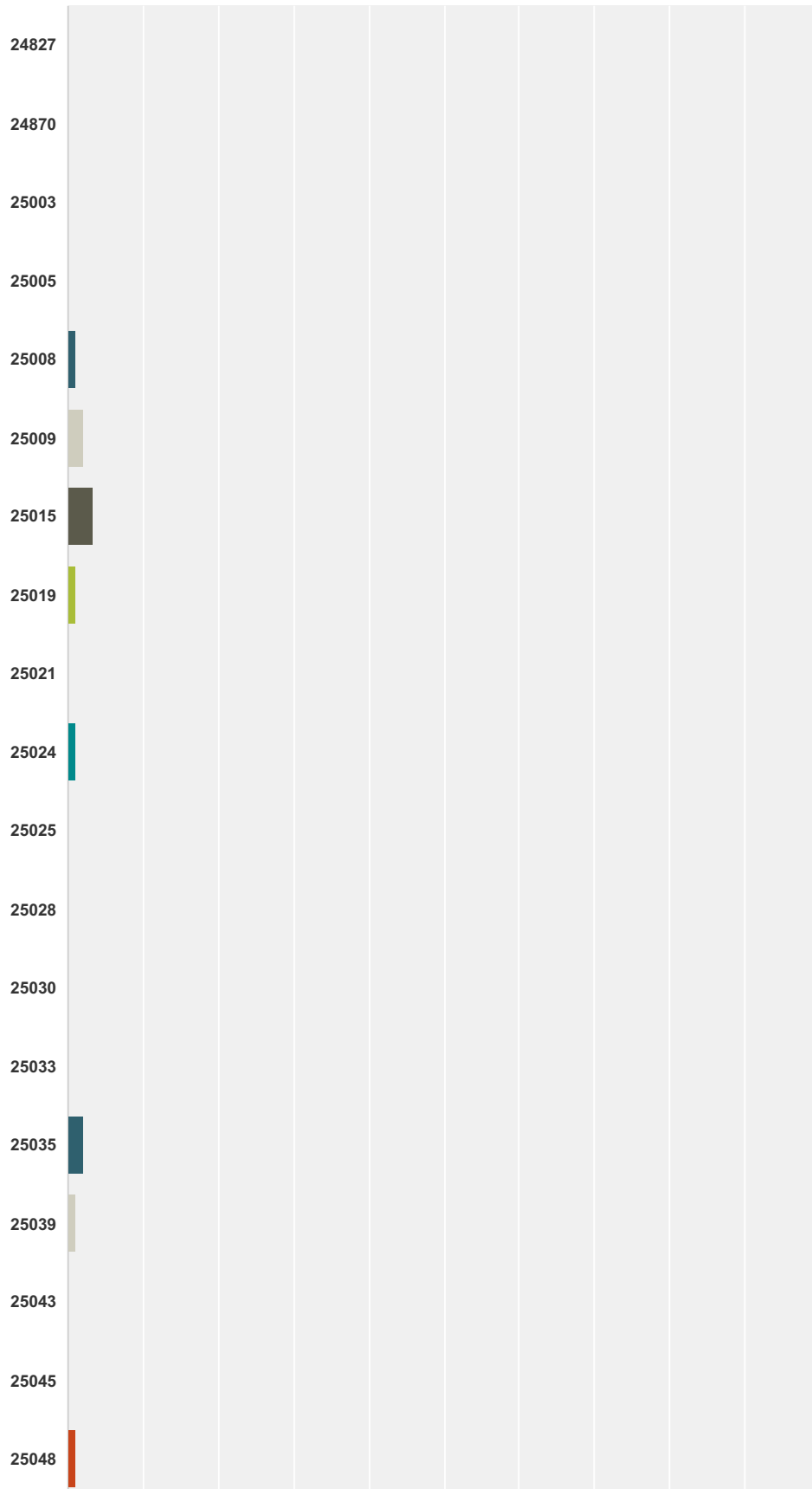
Answered: 92 Skipped: 12



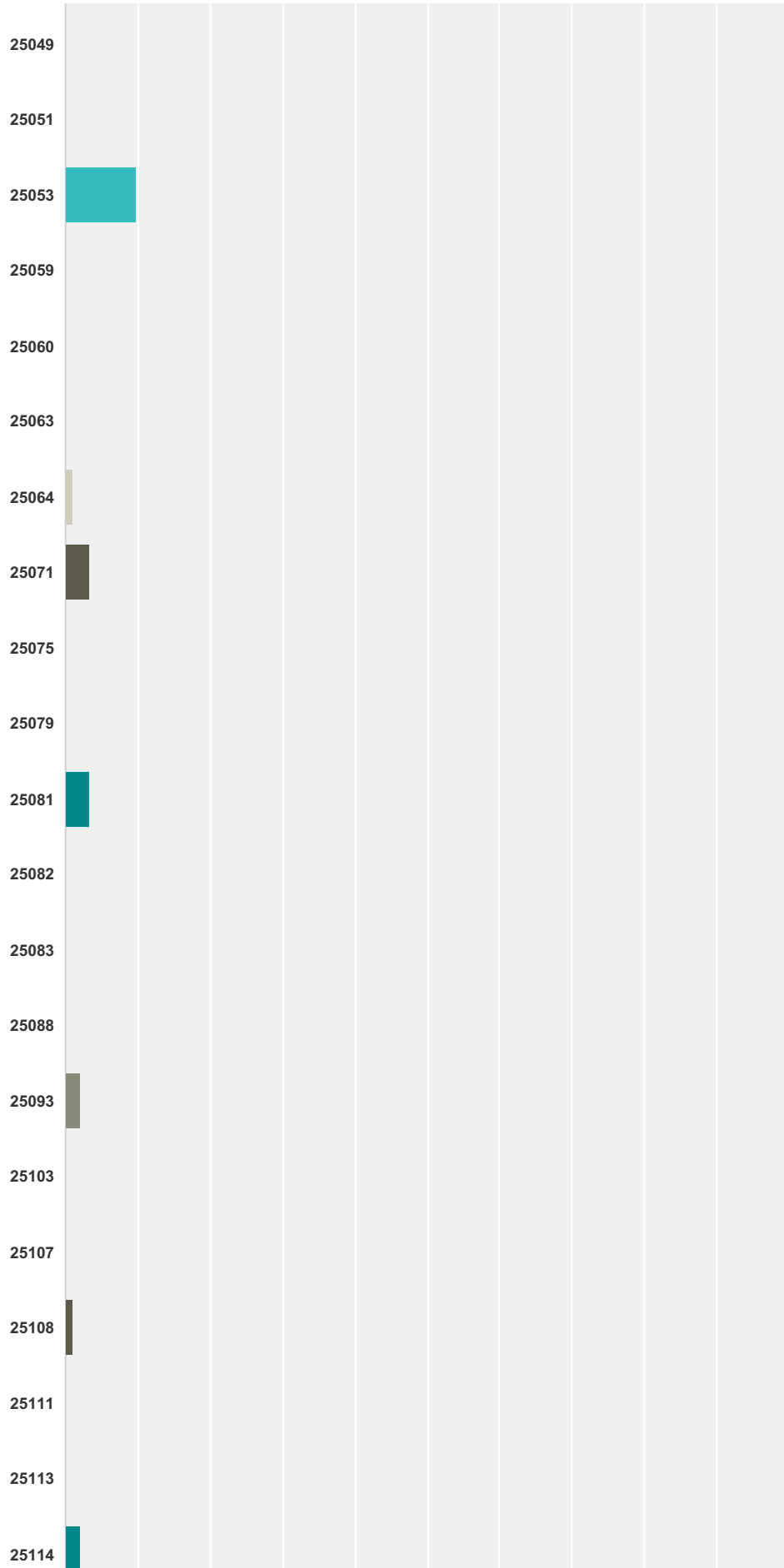
Answer Choices	Responses
Boone	63.04% 58
Clay	2.17% 2
Kanawha	30.43% 28
Putnam	4.35% 4
<b>Total</b>	<b>92</b>

### Q21 What zipcode do you reside in?

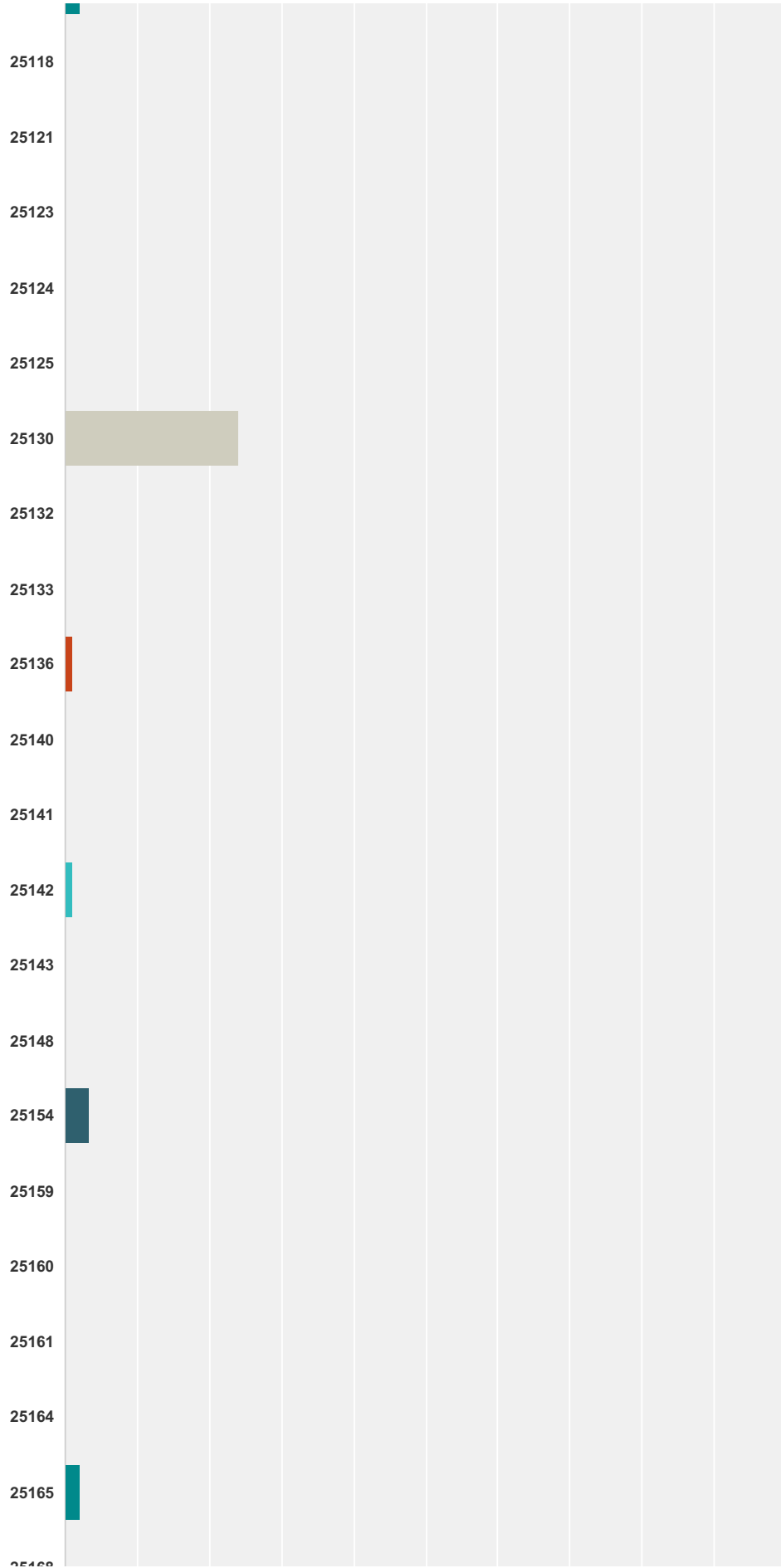
Answered: 92 Skipped: 12



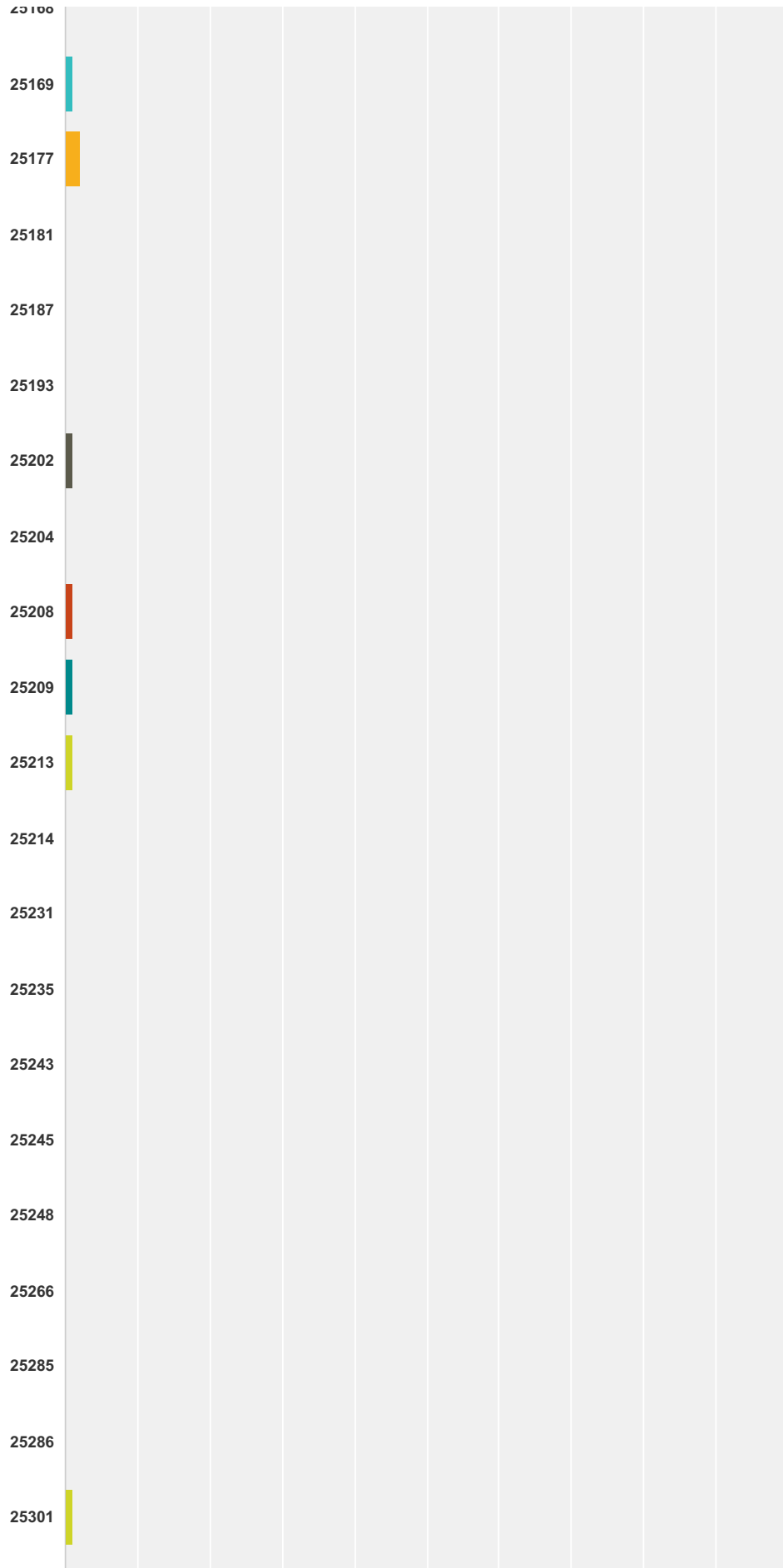
# Region 3 Hazard Mitigation Survey



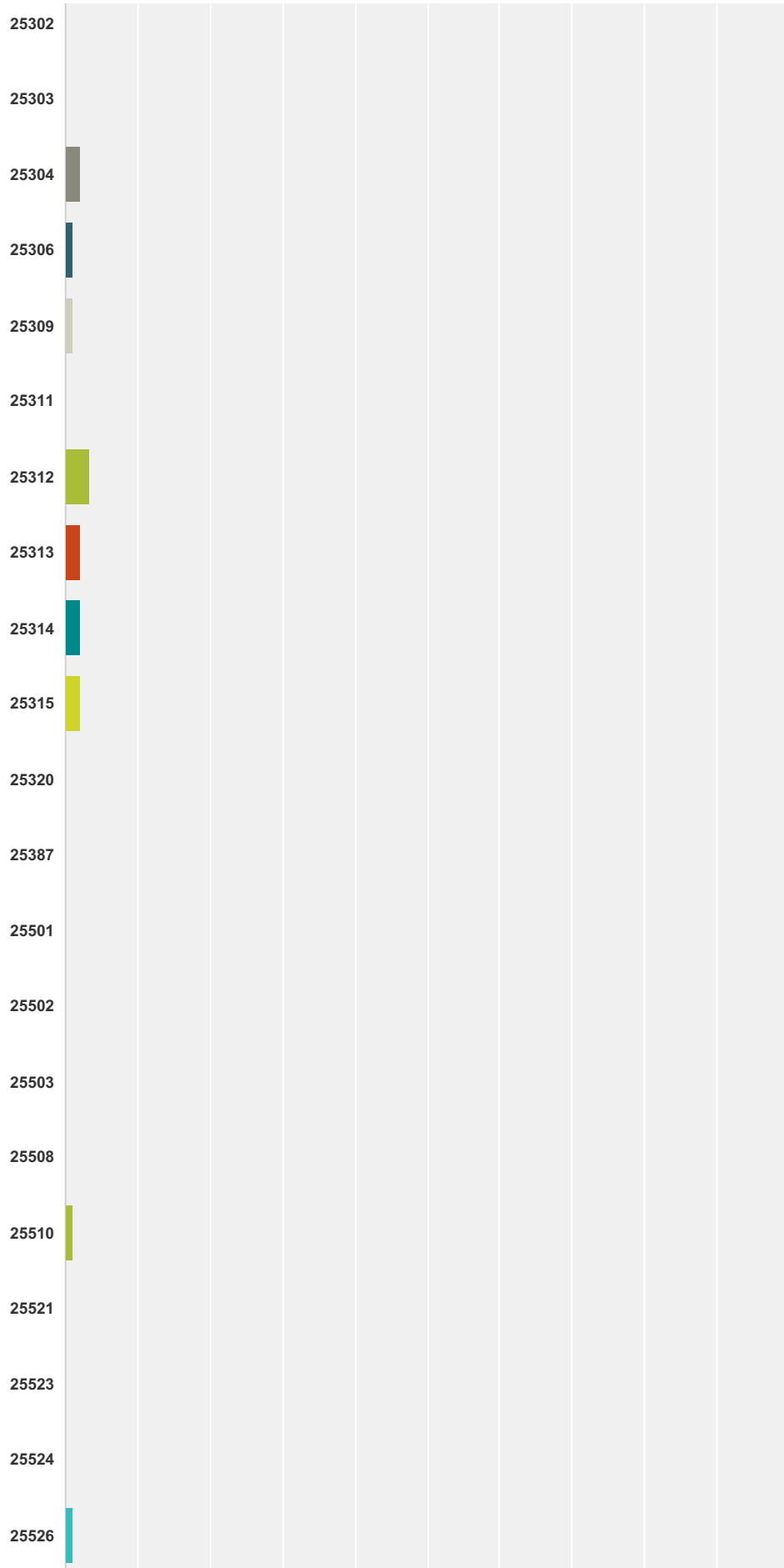
# Region 3 Hazard Mitigation Survey



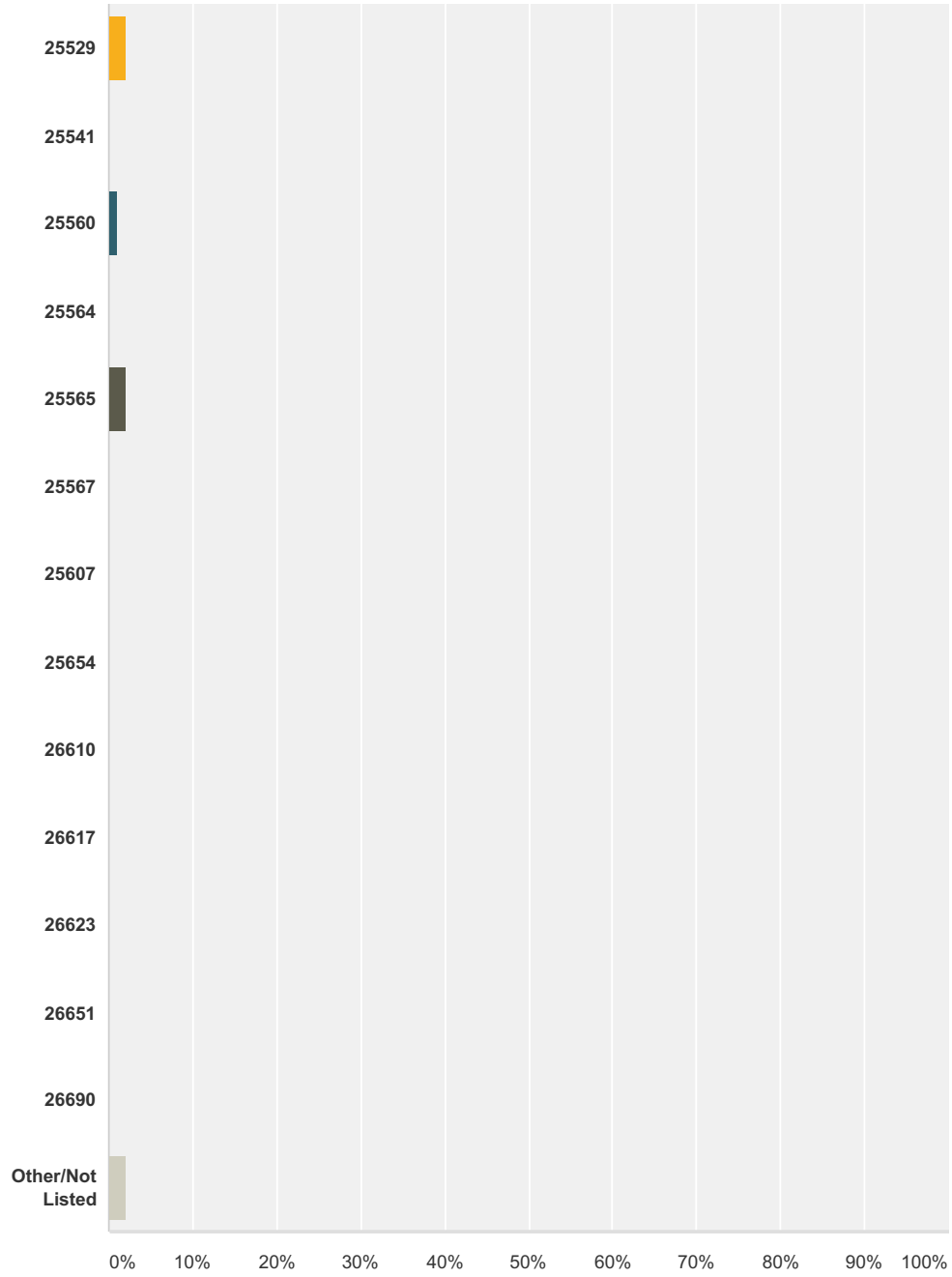
# Region 3 Hazard Mitigation Survey



# Region 3 Hazard Mitigation Survey



### Region 3 Hazard Mitigation Survey



Answer Choices	Responses
24827	0.00% 0
24870	0.00% 0
25003	0.00% 0
25005	0.00% 0
25008	1.09% 1
25009	2.17% 2
25015	3.26% 3
25019	1.09% 1



### Region 3 Hazard Mitigation Survey

25021	0.00%	0
25024	1.09%	1
25025	0.00%	0
25028	0.00%	0
25030	0.00%	0
25033	0.00%	0
25035	2.17%	2
25039	1.09%	1
25043	0.00%	0
25045	0.00%	0
25048	1.09%	1
25049	0.00%	0
25051	0.00%	0
25053	9.78%	9
25059	0.00%	0
25060	0.00%	0
25063	0.00%	0
25064	1.09%	1
25071	3.26%	3
25075	0.00%	0
25079	0.00%	0
25081	3.26%	3
25082	0.00%	0
25083	0.00%	0
25088	0.00%	0
25093	2.17%	2
25103	0.00%	0
25107	0.00%	0
25108	1.09%	1
25111	0.00%	0
25113	0.00%	0
25114	2.17%	2
25118	0.00%	0
25121	0.00%	0
25123	0.00%	0

### Region 3 Hazard Mitigation Survey

25124	0.00%	0
25125	0.00%	0
25130	23.91%	22
25132	0.00%	0
25133	0.00%	0
25136	1.09%	1
25140	0.00%	0
25141	0.00%	0
25142	1.09%	1
25143	0.00%	0
25148	0.00%	0
25154	3.26%	3
25159	0.00%	0
25160	0.00%	0
25161	0.00%	0
25164	0.00%	0
25165	2.17%	2
25168	0.00%	0
25169	1.09%	1
25177	2.17%	2
25181	0.00%	0
25187	0.00%	0
25193	0.00%	0
25202	1.09%	1
25204	0.00%	0
25208	1.09%	1
25209	1.09%	1
25213	1.09%	1
25214	0.00%	0
25231	0.00%	0
25235	0.00%	0
25243	0.00%	0
25245	0.00%	0
25248	0.00%	0

### Region 3 Hazard Mitigation Survey

25266	0.00%	0
25285	0.00%	0
25286	0.00%	0
25301	1.09%	1
25302	0.00%	0
25303	0.00%	0
25304	2.17%	2
25306	1.09%	1
25309	1.09%	1
25311	0.00%	0
25312	3.26%	3
25313	2.17%	2
25314	2.17%	2
25315	2.17%	2
25320	0.00%	0
25387	0.00%	0
25501	0.00%	0
25502	0.00%	0
25503	0.00%	0
25508	0.00%	0
25510	1.09%	1
25521	0.00%	0
25523	0.00%	0
25524	0.00%	0
25526	1.09%	1
25529	2.17%	2
25541	0.00%	0
25560	1.09%	1
25564	0.00%	0
25565	2.17%	2
25567	0.00%	0
25607	0.00%	0
25654	0.00%	0
26610	0.00%	0

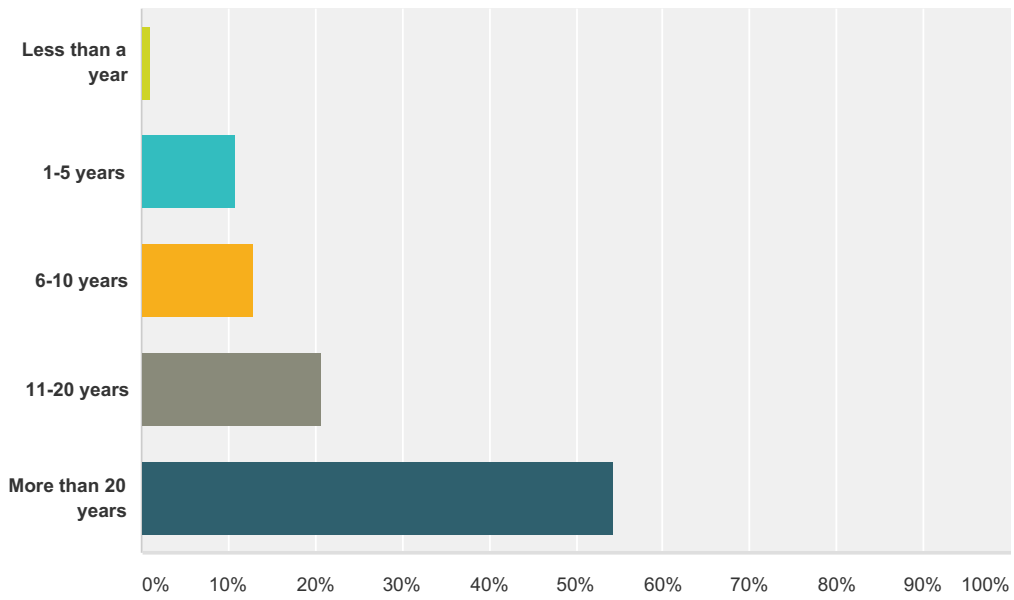
### Region 3 Hazard Mitigation Survey

26617	0.00%	0
26623	0.00%	0
26651	0.00%	0
26690	0.00%	0
Other/Not Listed	2.17%	2
<b>Total</b>		<b>92</b>

#	Other/Not Listed	Date
1	25205	10/13/2016 9:46 PM
2	25162	10/11/2016 8:48 AM

### Q22 How long have you resided in your community?

Answered: 92 Skipped: 12



Answer Choices	Responses
Less than a year	1.09% 1
1-5 years	10.87% 10
6-10 years	13.04% 12
11-20 years	20.65% 19
More than 20 years	54.35% 50
<b>Total</b>	<b>92</b>

## Region 3 Hazard Mitigation Survey

**Q23 If you would like to receive more information and give your opinion about future mitigation projects, please enter an email you can be reached at.**

Answered: 20 Skipped: 84

#	Responses	Date
1	amartin@wvregion3.org	10/18/2016 10:42 AM
2	mcbayer59@yahoo.com	10/15/2016 10:39 AM
3	Sarah.k.moore@wv.gov	10/14/2016 7:54 PM
4	Browneyzsonu@yahoo.com	10/14/2016 1:29 PM
5	dvfdlt106@gmail.com	10/14/2016 1:57 AM
6	bigboylong2001@yahoo.com	10/13/2016 11:42 PM
7	jdsmith109@gmail.com	10/13/2016 11:02 PM
8	bmumwa633@frontier.com	10/13/2016 10:25 PM
9	Tstbow@aol.com	10/13/2016 10:24 PM
10	ronald.egnor@gmail.com	10/13/2016 9:59 PM
11	glendyneelkins@yahoo.com	10/13/2016 9:54 PM
12	dallaswv9@frontier.com	10/13/2016 8:35 PM
13	Rmccormick@lawv.net	10/13/2016 7:19 PM
14	pt_castle64@yahoo.com	10/13/2016 7:09 PM
15	wordseeker38@yahoo.com	10/13/2016 6:34 PM
16	cityk9cop@gmail.com	10/7/2016 11:42 PM
17	sbyus@madisonwv.org	10/7/2016 3:57 PM
18	Davistornado@aol.com	10/7/2016 3:26 PM
19	patrick.fuge@camc.org	10/7/2016 2:46 PM
20	timkeaton@hotmail.com	10/7/2016 1:16 PM

## Region 3 Hazard Mitigation Survey

### Q24 Please share any other comments you have

Answered: 8 Skipped: 96

#	Responses	Date
1	The chemical spill in Jan,2014 that affected the water supply here in Kanawha County for the most was handled very poorly. A lot of work and attention focus on details should go into place. It proves to me that Kanawha County, WV as well as surrounding areas aren't prepared for much in the way of a disaster.	10/15/2016 10:39 AM
2	Put mitigation plans on Facebook, most don't look at email anymore. Too much spam	10/14/2016 7:30 AM
3	I am the current Fire Chief of Danville VFD and would be happy to help any time that I can. I can be reached by email or at the fire department phone 304-369-0232.	10/14/2016 1:57 AM
4	There was a wild fire last year and lost power for a couple of days and I did not get a notification about it.	10/13/2016 9:55 PM
5	the haz. materials i refer to was the water crisis	10/13/2016 9:13 PM
6	Thank you for your good work.	10/13/2016 7:51 PM
7	i thank that the state should dueredge the creeks and smaller river to help with flooding and move some of the roads out of the flood plain	10/8/2016 9:06 AM
8	Creeks in neighborhood need to be "dredged ". If kanawha county commissioners could/would bypass EPA regulations (not worry so much about minnows etc) and clean out creeks or allow homeowners to do so it would alleviate some of the problems	10/7/2016 1:15 PM

## APPENDIX 3: SOCIAL VULNERABILITY INFORMATION

The Social Vulnerability Index (SVI) tool was developed by the Centers for Disease Control and Prevention's (CDC) Agency for Toxic Substances and Disease Registry (ATSDR) to identify and map the subsets of the community that will most likely need more support before, during and after a disaster event. This tool is available for any user from the SVI website (<http://svi.cdc.gov/>) and runs on ESRI's ArcMap program.

The SVI uses variables that fall into four themes: socioeconomic, household composition, minority status/language, and housing/transportation. The variables are identified and described in the following tables. The variables are grouped by theme, which are color coded. Green variables are in the socioeconomic theme, household composition variables are orange, minority status/language variables are purple and housing/transportation variables are blue.

VARIABLE	DESCRIPTION
STATE_ABBR	State Abbreviation
STATE_NAME	State Name
FIPS	FIPS Code
LOCATION	Text description of tract, county, state
TOTPOP	Total population, 2010 SF1
E_TOTPOP	Population estimate, 2006-2010 ACS
M_TOTPOP	Population estimate MOE, 2006-2010 ACS
HU	Housing units, 2010 SF1
E_HU	Housing units estimate, 2006-2010 ACS
M_HU	Housing units estimate MOE, 2006-2010 ACS
HH	Number of households, 2010 SF1
E_POV	Persons below poverty estimate, 2006-2010 ACS
M_POV	Persons below poverty estimate MOE, 2006-2010 ACS
E_UNEMP	Civilian (age 16+) unemployed estimate, 2006-2010 ACS
M_UNEMP	Civilian (age 16+) unemployed estimate MOE, 2006-2010 ACS
E_PCI	Per capita income estimate, 2006-2010 ACS
M_PCI	Per capita income estimate MOE, 2006-2010 ACS
E_NOHSDIP	Persons (age 25+) with no high school diploma estimate, 2006- 2010 ACS
M_NOHSDIP	Persons (age 25+) with no high school diploma estimate MOE, 2006-2010 ACS
AGE65	Persons aged 65 and older, 2010 SF1
AGE17	Persons aged 17 and younger, 2010 SF1
SNGPRNT	Single parent household with children under 18, 2010 SF1
MINORITY	Minority (all persons except white, non-Hispanic), 2010 SF1
E_LIMENG	Persons (age 5+) who speak English "less than well" estimate, 2006-2010





	ACS
M_LIMENG	Persons (age 5+) who speak English "less than well" estimate MOE, 2006-2010 ACS
E_MUNIT	Housing in structures with 10 or more units estimate, 2006- 2010 ACS
M_MUNIT	Housing in structures with 10 or more units estimate MOE, 2006-2010 ACS
E_MOBILE	Mobile homes estimate, 2006-2010 ACS
M_MOBILE	Mobile homes estimate MOE, 2006-2010 ACS
E_CROWD	At household level, more people than rooms estimate, 2006- 2010 ACS
M_CROWD	At household level, more people than rooms estimate MOE, 2006-2010 ACS
E_NOVEH	Households with no vehicle available estimate, 2006-2010 ACS
M_NOVEH	Households with no vehicle available estimate MOE, 2006- 2010 ACS
GROUPQ	Persons in institutionalized group quarters, 2010 SF1
E_P_POV	Proportion of persons below poverty estimate
M_P_POV	Proportion of persons below poverty estimate MOE
E_P_UNEMP	Proportion of civilian (age 16+) unemployed estimate
M_P_UNEMP	Proportion of civilian (age 16+) unemployed estimate MOE
E_P_PCI	Per capita income estimate, 2006-2010 ACS
M_P_PCI	Per capita income estimate MOE, 2006-2010 ACS
E_P_NOHSDIP	Proportion of persons with no high school diploma (age 25+) estimate
M_P_NOHSDIP	Proportion of persons with no high school diploma (25+) estimate MOE
P_AGE65	Proportion of persons aged 65 and older
P_AGE17	Proportion of persons aged 17 and younger
P_SNGPRNT	Proportion of single parent households with children under 18
P_MINORITY	Proportion minority (all persons except white, non-Hispanic)
E_P_LIMENG	Proportion of persons (age 5+) who speak English "less than well" estimate
M_P_LIMENG	Proportion of persons (age 5+) who speak English "less than well" estimate MOE
E_P_MUNIT	Proportion of housing in structures with 10 or more units estimate
M_P_MUNIT	Proportion of housing in structures with 10 or more units estimate MOE
E_P_MOBILE	Proportion of mobile homes estimate
M_P_MOBILE	Proportion of mobile homes estimate MOE
E_P_CROWD	Proportion of households with more people than rooms estimate
M_P_CROWD	Proportion of households with more people than rooms estimate MOE
E_P_NOVEH	Proportion of households with no vehicle available estimate
M_P_NOVEH	Proportion of households with no vehicle available estimate MOE
P_GROUPQ	Proportion of persons in institutionalized group quarters
E_PL_POV	Percentile of the proportion of persons below poverty estimate, no consideration of MOE
E_PL_UNEMP	Percentile of the proportion of civilian (age 16+) unemployed estimate, no consideration of MOE
E_PL_PCI	Percentile of per capita income estimate, no consideration of MOE



E_PL_NOHSDIP	Percentile of the proportion of persons with no high school diploma (age 25+) estimate, no consideration of MOE
S_PL_THEME1	Sum of E_PLxxx series for Socioeconomic theme
R_PL_THEME1	Percentile ranking for Socioeconomic theme
PL_AGE65	Percentile of the proportion of persons aged 65 and older
PL_AGE17	Percentile of the proportion of persons aged 17 and younger
PL_SNGPRNT	Percentile of the proportion of single parent households with children under 18
S_PL_THEME2	Sum of PLxxx series for Household Composition theme
R_PL_THEME2	Percentile ranking for Household Composition theme
PL_MINORITY	Percentile of the proportion minority (all persons except white, non-Hispanic)
E_PL_LIMENG	Percentile of the proportion of persons (age 5+) who speak English "less than well" estimate, no consideration of MOE
S_PL_THEME3	Sum of PLxxx series for Minority Status/Language theme
R_PL_THEME3	Percentile ranking for Minority Status/Language theme
E_PL_MUNIT	Percentile of the proportion of housing in structures with 10 or more units estimate
E_PL_MOBILE	Percentile of the proportion of mobile homes estimate
E_PL_CROWD	Percentile of the proportion of households with more people than rooms estimate
E_PL_NOVEH	Percentile of the proportion of households with no vehicle available estimate
PL_GROUPQ	Percentile of the proportion persons in institutionalized group quarters
S_PL_THEME4	Sum of PLxxx series for Housing/Transportation theme
R_PL_THEME4	Percentile ranking for Housing/Transportation theme
S_PL_THEMES	Sum of PLxxx series themes
R_PL_THEMES	Overall percentile ranking
F_PL_POV	Flag - for poverty, the proportion is in the 90th percentile (1= yes, 0 = no)
F_PL_UNEMP	Flag - for civilian unemployed, the proportion is in the 90th percentile (1 = yes, 0 = no)
F_PL_PCI	Flag - for per capita income, the proportion is in the 90th percentile (1 = yes, 0 = no)
F_PL_NOHSDIP	Flag - for no high school diploma, the proportion is in the 90th percentile (1 = yes, 0 = no)
F_PL_THEME1	Sum of flags for Socioeconomic Status theme
F_PL_AGE65	Flag - the proportion of persons aged 65 and older is in the 90th percentile (1 = yes, 0 = no)
F_PL_AGE17	Flag - the proportion of persons aged 17 and younger is in the 90th percentile (1 = yes, 0 = no)
F_PL_SNGPRNT	Flag - the proportion of single parent households is in the 90th percentile (1 = yes, 0 = no)
F_PL_THEME2	Sum of flags for Household Composition theme
F_PL_MINORITY	Flag - the proportion of minority is in the 90th percentile (1= yes, 0 = no)



F_PL_LIMENG	Flag - for limited English, the proportion is in the 90th percentile (1 = yes, 0 = no)
F_PL_THEME3	Sum of flags for Minority Status/Language theme
F_PL_MUNIT	Flag - for multi-unit housing, the proportion is in the 90th percentile (1 = yes, 0 = no)
F_PL_MOBILE	Flag - for mobile homes, the proportion is in the 90th percentile (1 = yes, 0 = no)
F_PL_CROWD	Flag - for crowded housing, the proportion is in the 90th percentile (1 = yes, 0 = no)
F_PL_NOVEH	Flag - for no vehicle access, the proportion is in the 90th percentile (1 = yes, 0 = no)
F_PL_GROUPQ	Flag - the proportion of persons in institutionalized group quarters is in the 90th percentile (1 = yes, 0 = no)
F_PL_THEME4	Sum of flags for Housing/Transportation theme
F_PL_TOTAL	Sum of flags for the four themes



## APPENDIX 4: CITATIONS

- Aldred, Carolyn. (2004). Bhopal Disaster Changed Handling of Industrial Risks. Retrieved from <http://www.businessinsurance.com/article/20041205/ISSUE01/100015848/bhopal-disaster-changed-handling-of-industrial-risks>
- American Society of Civil Engineers. (2013). 2013 Report Card for America's Infrastructure: Dam Section. Retrieved from <http://www.infrastructurereportcard.org/a/#p/dams/conditions-and-capacity>
- Army Public Health Center. (n.d.) Cold Weather Casualties and Injuries. Retrieved from <https://phc.amedd.army.mil/topics/discond/cip/Pages/ColdCasualtiesInjuries.aspx>
- Associated of State Dam Safety Officials. (2012). *Living With Dams: Know Your Risks*. Retrieved from <http://www.damsafety.org/resources/downloads/?p=92fc7963-aa9e-4f6f-9f02-2b19cdda4422>
- Bureau of Labor Statistics. (2015). *County Data* [data file]. Retrieved from <http://www.bls.gov>
- Centers for Disease Control. (n.d.). Climate Change and Extreme Heat Events. Retrieved from <https://www.cdc.gov/climateandhealth/pubs/ClimateChangeandExtremeHeatEvents.pdf>
- Clements, B.W. (2009). *Disasters and Public Health*. MA: Butterworth-Heinemann.
- Dewberry (2013). *2013 West Virginia Statewide Standard Hazard Mitigation Plan Update*. Retrieved from <http://www.dhsem.wv.gov/MitigationRecovery/Documents/2013%20WV%20Statewide%20Hazard%20Mitigation%20Plan%20Update.pdf>
- Diamond, Stuart. (1985). Union Carbide Plans to Reopen Factory in U.S. Retrieved from <http://www.nytimes.com/1985/02/13/world/union-carbide-plans-to-reopen-factory-in-us.html>
- Emergency Planning and Citizen Right to Know Act of 1984, 44 U.S.C. § 11001 et seq. (2011). Retrieved from <https://www.gpo.gov/fdsys/pkg/USCODE-2011-title42/html/USCODE-2011-title42-chap116.htm>
- Environmental Protection Agency. (2015). *Drought*. Retrieved from <https://www.epa.gov/natural-disasters/drought>
- Federal Emergency Management Agency (FEMA). (2014). Are you ready? An in-depth guide to civilian preparedness (IS-22). Retrieved from



- <http://www.fema.gov/media-library/assets/documents/7877>
- Franklin, Ben A. (1985). Toxic Cloud Leaks At Carbide Plant in West Virginia. Retrieved from <http://www.nytimes.com/1985/08/12/us/toxic-cloud-leaks-at-carbide-plant-in-west-virginia.html>
- Geoscience News and Information. (2017). Landslide Hazard Information. Retrieved from <http://geology.com/usgs/landslides/>
- Haddow, G.D., Bullock, J.A., & Coppola, D.P. (2014). Introduction to emergency management (5th ed.). Waltham, MA: Butterworth-Heinemann.
- Health Resources & Services Administration. *Various sections*. Accessed at <http://www.hrsa.gov/index.html>
- Highway Loss Data Institute. (2012). *Hail-related claims under comprehensive coverage*. Retrieved from [http://www.iihs.org/media/a1aeb8a-9c5e-4d1a-8310-d19fbc1bc70f/1119311205/HLDI%20Research/Bulletins/hldi\\_bulletin\\_29.3.pdf](http://www.iihs.org/media/a1aeb8a-9c5e-4d1a-8310-d19fbc1bc70f/1119311205/HLDI%20Research/Bulletins/hldi_bulletin_29.3.pdf)
- Insurance Institute for Business & Home Safety. (2017). Vulnerable Populations. Retrieved from <https://disastersafety.org/ibhs-public-policy/vulnerable-populations/>
- Jespersion, Kathy (2001). Drought: Making it Through a Dry Spell. Retrieved from [http://www.nesc.wvu.edu/ndwc/articles/OT/SU01/OTSu01\\_drought.html](http://www.nesc.wvu.edu/ndwc/articles/OT/SU01/OTSu01_drought.html)
- Keller, E. A., & DeVecchio, D.E. (2015). Natural Hazards. Earth's Processes as Hazards, Disasters, and Catastrophes (4<sup>th</sup> ed.). Santa Barbara, CA: Pearson.
- National Coalition for the Homeless. (2010). Winter Homeless Services. Retrieved from [http://www.nationalhomeless.org/publications/winter\\_weather/report.html](http://www.nationalhomeless.org/publications/winter_weather/report.html)
- National Floodplain Insurance Program. Community status book report. Retrieved from <http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book>
- NOAA National Climatic Data Center (NCDC). Thunderstorm wind history. Retrieved from <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGINIA>
- NOAA National Climatic Data Center Storm Events Database. *Drought Events* [Data Set]. Retrieved from <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGINIA>
- NOAA National Climatic Data Center Storm Events Database. *Extreme Temperature Events* [Data Set]. Retrieved from



<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGI>  
[NIA](#)

NOAA National Climatic Data Center Storm Events Database. *Flooding Events* [Data Set]. Retrieved from

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGI>  
[NIA](#)

NOAA National Climatic Data Center Storm Events Database. *Hail Events* [Data Set]. Retrieved from

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGI>  
[NIA](#)

NOAA National Climatic Data Center Storm Events Database. *Land Subsidence Events* [Data Set]. Retrieved from

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGI>  
[NIA](#)

NOAA National Climatic Data Center Storm Events Database. *Lightning Events* [Data Set]. Retrieved from

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGI>  
[NIA](#)

NOAA National Climatic Data Center Storm Events Database. *Tornado Events* [Data Set]. Retrieved from

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGI>  
[NIA](#)

NOAA National Climatic Data Center Storm Events Database. *Wildfire Events* [Data Set]. Retrieved from

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGI>  
[NIA](#)

NOAA National Climatic Data Center Storm Events Database. *Wind Events* [Data Set]. Retrieved from

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGI>  
[NIA](#)

NOAA National Climatic Data Center Storm Events Database. *Winter Weather Events* [Data Set]. Retrieved from

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=54%2CWEST+VIRGI>  
[NIA](#)



- NOAA National Severe Storms Laboratory. (2017). Severe Weather 101. Retrieved from <http://www.nssl.noaa.gov/education/svrwx101/wind/>
- Noji, E.K. (1999). The Public Health Consequences of Disasters. *Prehospital and Disaster Medicine*, 21-31. Retrieved from <https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine/article/the-public-health-consequences-of-disasters/02F6B8FEEAC2A36F13C0EC4A84710D73>
- Ohl, C.A. & Tapsell, S. (2000). Flooding and Human Health, the Dangers Posed Are Not Always Obvious. *British Medical Journal*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1118941/pdf/1167.pdf>
- Palmer Drought Index. (n.d.). Retrieved January 7, 2016 from Wikipedia: [https://en.wikipedia.org/wiki/Palmer\\_drought\\_index](https://en.wikipedia.org/wiki/Palmer_drought_index)
- Public Service Commission of West Virginia. *Various utility data*. Retrieved from <http://www.psc.state.wv.us/utilities/default.htm>
- United States Census Bureau. (2015.) *American Fact Finder* [data file]. Retrieved from [http://factfinder.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml)
- United States Census Bureau. (2015.) *County Business Patterns* [data file]. Retrieved from <http://www.census.gov/econ/cbp/>
- United States Department of Homeland Security / Federal Emergency Management Agency (2013). *Local mitigation Planning Handbook*. Retrieved from <https://www.fema.gov/media-library/assets/documents/31598>
- United States Environmental Protection Agency (2016). *Climate Change Impacts*. Retrieved from <https://www.epa.gov/climate-impacts/climate-impacts-water-resources>
- United States Geological Society. (2016). *Earthquake Hazards Program*. Retrieved from <http://earthquake.usgs.gov/earthquakes/>
- West Virginia Coalition to End Homelessness. (2015). *West Virginia Point in Time Count Statewide Report January 2015*. Retrieved from [http://wvceh.org/uploads/default/default2015\\_Statewide\\_PIT\\_Count\\_Report-FINALhq.pdf](http://wvceh.org/uploads/default/default2015_Statewide_PIT_Count_Report-FINALhq.pdf)
- West Virginia Department of Environmental Protection. (2009). *West Virginia Definition of a Dam –Exemptions*. Retrieved from <http://www.dep.wv.gov/WWE/ee/ds/Documents/Definition%20of%20a%20Dam-v4.pdf>



West Virginia Geological & Economic Survey. (2016). *Earthquake Epicenters of West Virginia: 1824 through 2016*. [Data file.] Retrieved from <http://www.wvgs.wvnet.edu/www/earthquakes/seismic.html#Map>

West Virginia Geological & Economic Survey. (2016). Underground and Surface Coal Mines [http://www.wvgs.wvnet.edu/GIS/CBMP/all\\_mining.html](http://www.wvgs.wvnet.edu/GIS/CBMP/all_mining.html)





## APPENDIX 5: INACTIVE PROJECTS

This appendix contains a list of those projects committee members noted as 'Completed,' 'Deleted,' or 'Deferred.'

### **Boone County**

Boone County listed all existing projects as on-going.

### **Clay County**

Clay County listed all existing projects as on-going.

### **Kanawha County**

PROJECT 1.1.2: Create materials that are targeted towards the tourist population.

STATUS: Deleted (The committee considered the project unfeasible.)

PROJECT 1.1.5: Ensure that the American Red Cross's Citizen's Disaster Course is held on a frequent basis.

STATUS: Deleted (The course is not regularly offered. Further, scheduling is the responsibility of the Red Cross.)

PROJECT 1.1.7: Continue to work with the Kanawha County School Board to promote hazard mitigation education and awareness and to discuss better ways to integrate mitigation into the curriculum, as well as using the school board as a means to distribute information to home via students.

STATUS: Deleted (Mitigation has not been included into a curriculum. Further, the school system has been involved in other preparedness initiatives with KCOEM.)

PROJECT 1.4.2: Teach Community Emergency Response Team (CERT) classes in Kanawha County.

STATUS: Deleted (There has been little citizen interest in the project.)

PROJECT 2.5.5: Support CAMC's PDM grant application.

STATUS: Completed



PROJECT 4.1.1: Establish a formal process for the county and the park service to coordinate disaster-related efforts, which should include defining boundaries and establishing responsibilities.

STATUS: Deleted (There is no federal park service in Kanawha County.)

PROJECT 6.2.1: Strengthen enforcement of burning bans with the US Forest Service.

STATUS: Deleted (The project is not applicable to the Forest Service.)

PROJECT 7.1.1: Institute countywide building codes that will regulate the intensity of use and materials used in construction.

STATUS: Deleted (Building codes have not been adopted.)

PROJECT 10.1.3: Evaluate the locks on the Kanawha River to ensure necessary warning systems are in place.

STATUS: Completed (KCOEM coordinates, as necessary, with the USACE regarding lock and dam preparedness.)

### **City of Charleston<sup>1</sup>**

PROJECT 1.4.6: Promote awareness training for wind hazards to include training in standards and building codes.

STATUS: Completed (Building codes currently enforced by the city's building department.)

PROJECT 2.5.2: Create a storm water management plan.

STATUS: Completed (The city completed a plan in 2011.)

### **Putnam County**

PROJECT 1.2.3: Seek funding through state and federal resources to relocate the county emergency operations center to a more secure location.

STATUS: Completed (Putnam County Emergency Services relocated to 100 Emergency Lane in Winfield in 2013.)

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<sup>1</sup> Charleston, like other municipalities in the region, did not have specific municipal projects in the previous version of the regional plan. However, the city frequently participated in mitigation planning with Kanawha County which is why Charleston is listed here.



PROJECT 2.1.1: To devise a storm water management plan that identifies areas that are affected by flooding and to assess homeowners a fee to construct additional storm sewers, catch basins, and impoundment areas to alleviate flooding and storm water runoff.

STATUS: Deleted (This project is considered unfeasible.)

PROJECT 2.1.3: Hold information meeting to explain the fee assessment to the affected public.

STATUS: Deleted (This project related to the storm water management plan project and was also deemed unfeasible.)

PROJECT 5.1.1: Develop an informational package to give to applicants for development permits.

STATUS: Completed

