Table of Contents

Fayette County Hazard Mitigation Plan

Certification of Quarterly Review Meetings

The Fayette County Hazard Local Planning Committee has reviewed this Hazard Mitigation Plan. See Section 8 of the Fayette County 2011 Hazard Mitigation Plan for further details regarding this form. The director of the Planning Committee (Fayette County Emergency Services Director) hereby certifies the review.

YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED?*	SIGNATURE
2012			
Q2			
Q3			
Q4			
2013			
Q2			
Q3			
Q4			
2014			
Q2			
Q3			
Q4			
2015			
Q2			
Q3			
Q4			
2016			
Q2			
Q3			
Q4			
2017			
Q2			
Q3			
Q4			

**Confirm yes here annually and describe on record of changes page.*

Fayette County Hazard Mitigation Plan

Record of Changes

DATE	DESCRIPTION OF CHANGE MADE, MITIGATION ACTION COMPLETED, OR PUBLIC OUTREACH PERFORMED	CHANGE MADE BY (PRINT NAME)	CHANGE MADE BY (SIGNATURE)

REMINDER: ***Please attach all associated meeting agendas, sign-in sheets, handouts, and minutes.***

1 Introduction

1.1 Background

Across the United States, natural and human-caused disasters have led to increasing levels of deaths, injuries, property damage, and interruption of business and government services. The time, money, and efforts to recover from these disasters exhaust resources, diverting attention from important public programs and private agendas. The emergency management community, citizens, elected officials and other stakeholders in Fayette County, Pennsylvania recognize the impact of disasters on their community and support proactive efforts needed to reduce the impact of natural and human-caused hazards.

Hazard mitigation describes sustained actions taken to prevent or minimize long-term risks to life and property from hazards and create successive benefits over time. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to breaking the disaster cycle of damage, reconstruction, and repeated damage. With careful selection, successful mitigation actions are cost-effective means of reducing risk of loss over the long-term.

Accordingly, the Fayette County Hazard Mitigation Planning Committee, composed of government leaders from Fayette County and in cooperation with the elected officials of the County and its municipalities, has prepared this Hazard Mitigation Plan Update (HMPU). The Plan is the result of work by citizens of the County to develop a pre-disaster multi-hazard mitigation plan that will not only guide the County towards greater disaster resistance, but will also respect the character and needs of the community.

1.2 Purpose

This Hazard Mitigation Plan was developed to for the purpose of:

- Providing a blueprint for reducing property damage and saving lives from the effects of future natural and human-made disasters in Fayette County;
- Qualifying the County for pre-disaster and post-disaster grant funding;
- Complying with state and federal legislative requirements related to local hazard mitigation planning;
- Demonstrating a firm local commitment to hazard mitigation principles; and
- Improving community resiliency following a disaster event.

1.3 Scope

The Fayette County 2011 Hazard Mitigation Plan has been prepared to meet requirements set forth by the Federal Emergency Management Agency (FEMA) and the Pennsylvania Emergency Management Agency (PEMA) in order for the County to be eligible for funding and technical assistance from state and federal hazard mitigation programs. It will be updated and maintained to continually address both natural and human-made hazards determined to be of significant risk to the County and/or its local municipalities. Updates will take place following significant disasters or at a minimum, every five years.

1.4 Authority and Reference

Authority for this guide originates from the following federal sources:

- Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., Section 322, as amended;
- Code of Federal Regulations (CFR), Title 44, Parts 201 and 206; and
- Disaster Mitigation Act of 2000, Public Law 106-390, as amended.

Authority for this guide originates from the following Commonwealth of Pennsylvania sources:

- Pennsylvania Emergency Management Services Code. Title 35, Pa C.S. Section 101.
- Pennsylvania Municipalities Planning Code of 1968, Act 247 as reenacted and amended by Act 170 of 1988.

The following Federal Emergency Management Agency (FEMA) guides and reference documents were used to prepare this document:

- FEMA 386-1: *Getting Started*. September 2002.
- FEMA 386-2: *Understanding Your Risks: Identifying Hazards and Estimating Losses*. August 2001.
- FEMA 386-3: *Developing the Mitigation Plan*. April 2003.
- FEMA 386-4: *Bringing the Plan to Life*. August 2003.
- FEMA 386-5: *Using Benefit-Cost Review in Mitigation Planning*. May 2007.
- FEMA 386-6: *Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning*. May 2005.
- FEMA 386-7: *Integrating Manmade Hazards into Mitigation Planning*. September 2003.
- FEMA 386-8: *Multijurisdictional Mitigation Planning*. August 2006.
- FEMA 386-9: *Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects*. August 2008.
- FEMA *Local Multi-Hazard Mitigation Planning Guidance*. July 1, 2008.
- FEMA *National Fire Incident Reporting System 5.0: Complete Reference Guide*. January, 2008.

The following Pennsylvania Emergency Management Agency (PEMA) guides and reference documents were used prepare this document:

- PEMA: *Hazard Mitigation Planning Made Easy!*
- PEMA Mitigation Ideas: *Potential Mitigation Measures by Hazard Type; A Mitigation Planning Tool for Communities*. March 6, 2009.

The following additional guidance document produced by the National Fire Protection Association (NFPA) was used to update this plan:

- NFPA 1600: *Standard on Disaster/Emergency Management and Business Continuity Programs*. 2007.

2 Community Profile

2.1 Geography and Environment

Fayette County is located in the southwestern part of Pennsylvania, encompassing a land area of 794 square miles. The County is bordered by Greene, Washington, Westmoreland, and Somerset Counties. The Monongahela River marks the entire western boundary of Fayette County, while the Youghiogheny River crosses the eastern portion of the County. Running along the southern boundary of the County, the "Mason-Dixon Line" separates Fayette from the States of West Virginia and Maryland. Topographically, the County can be divided roughly into two parts, with the eastern half, as the western edge of the Allegheny Mountains, being very mountainous. The western half of the County, characterized by less dramatic elevation, is situated on the Pittsburgh Low Plateau Section of the Appalachian Plateau. Elevations range from nearly 3,000 feet on Laurel Hill (Springfield Township) in the eastern part of the County to 740 feet along the Monongahela River, where Fayette meets with Washington and Westmoreland Counties. About 1% (8 sq. miles) of Fayette County is comprised of rivers, streams, and lakes. The County contains a number of ponds, reservoirs, and lakes, including Greenlick Dam Lake, Mill Run Reservoir, Deer Lake, and Lake Courage. Major floodplains exist adjacent to the Monongahela, Youghiogheny, and Cheat Rivers, as well as Redstone Creek.

All of Fayette County is in the Monongahela River Watershed, which is a part of the larger Ohio River watershed. The Cheat and Youghiogheny Rivers are the two principal tributaries of the Monongahela River. The Cheat River drains the southwestern part of the County as far east as Chestnut Ridge many small tributaries. In addition, the Cheat River drains the south end of the Ohiopyle Valley. The Youghiogheny River, flowing northward from Maryland, drains the eastern and northern parts of the County by means of Indian Creek and Jacobs Creek. The western edge of the County is drained by Georges Creek, Dunlap Creek, Redstone Creek, and several small streams, all of which flow directly into the Monongahela River (Fayette County Comprehensive Plan, 2000). Figure 2.1–1 demonstrates the location of the watersheds across Fayette County.

Two national parks are located in Fayette County: Fort Necessity and the Albert Gallatin House/Friendship Hill. The County is also home to two state park complexes—the 18,500 acre Ohiopyle State Park and a portion of the 13,625 acre Laurel Ridge State Park—and the Forbes State Forest. Dunlap Creek, German-Masontown, and Jacobs Creek Parks and five river trails are maintained by the County. Additionally, Fayette County is home to Pennsylvania State Game Lands 51, 138, 238, 265 and 296.

This page is intentionally blank.

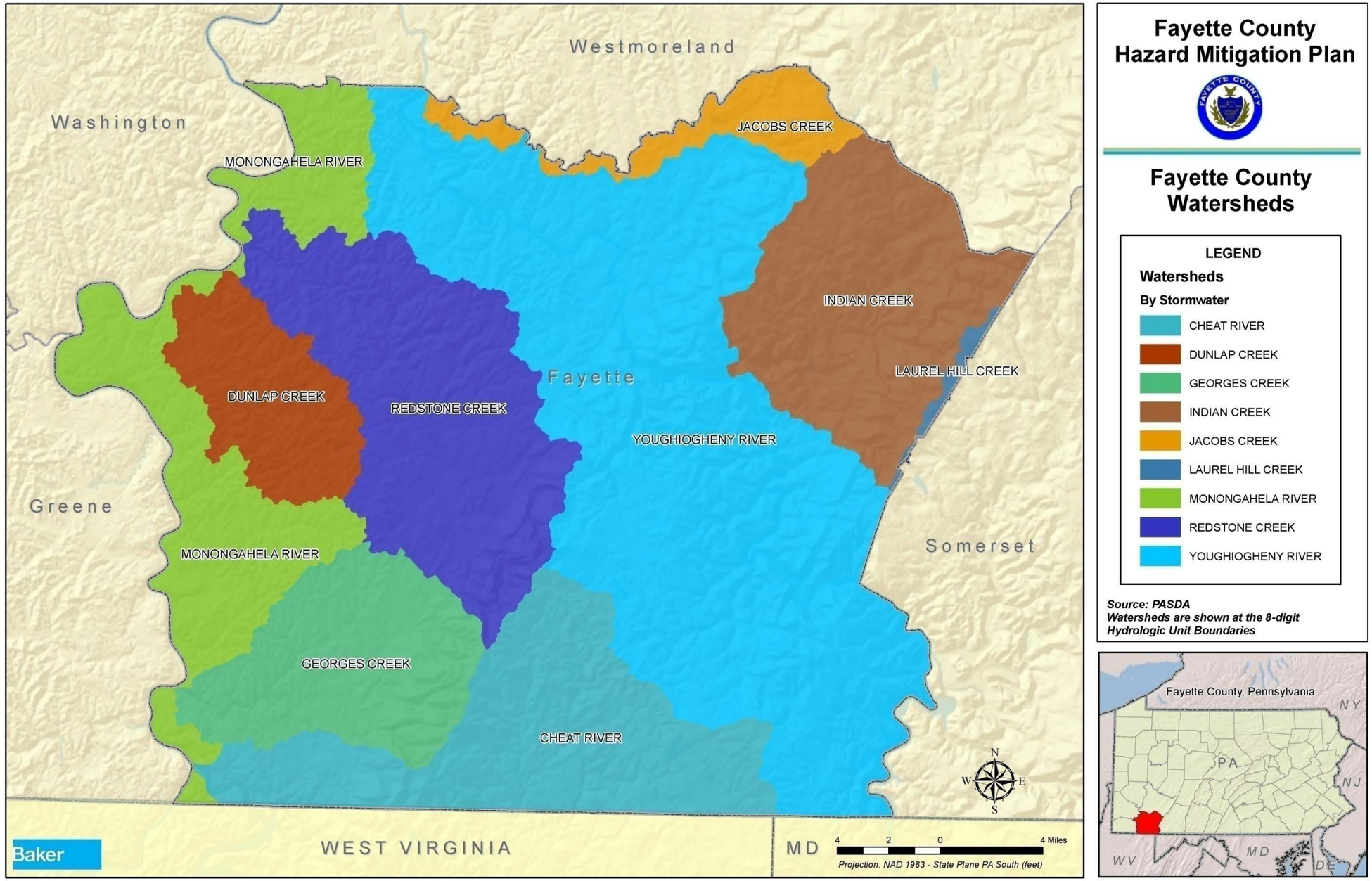


Figure 2.1-1. Fayette County Watersheds

2.2 Community Facts

Fayette County was formed from the southern portion of Westmoreland County in 1783. The County was named for the Marquis de la Fayette, a French military officer who assisted General George Washington during the Revolutionary War. Much like its name, Fayette County holds a great deal of significance in the history of America. Much of the French and Indian War was fought in the area on which the County is currently located, and, as a result, the County is home to multiple historic sites, including Fort Necessity. In addition, two of architect Frank Lloyd Wright's most notable works—Fallingwater and Kentuck Knob—are located in the County (Fayette County website).

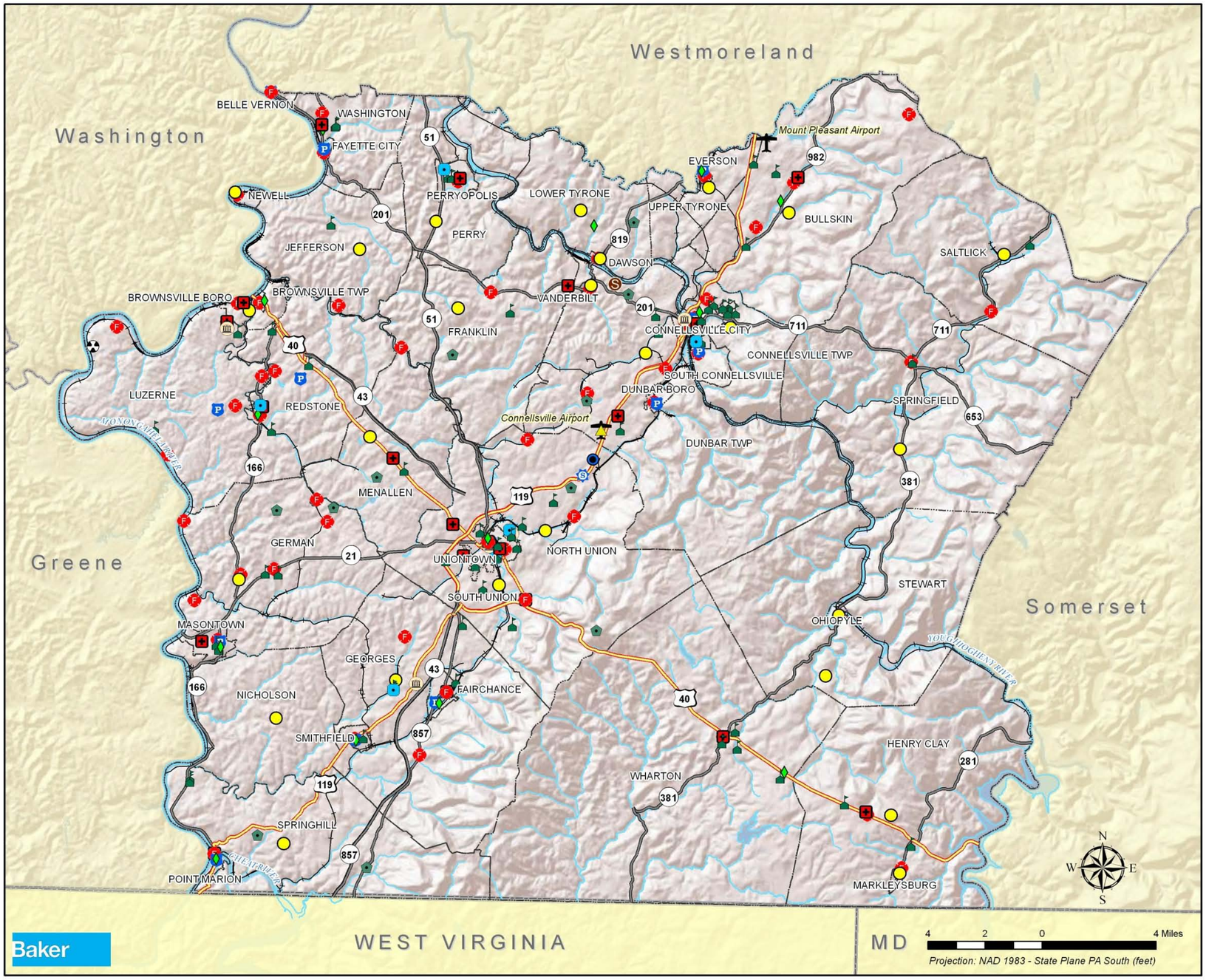
From the mid-1800s well into the twentieth century, Fayette County was a vital coal mining center, fueling the American industrial revolution by supplying major industrial centers with the coke necessary for steel production. By the 1960s, however, the County's coal resources had been largely depleted, forcing the region to restructure its economy (Fayette County website). According to 2009 Census data, 23.3% of the County's workforce is employed in educational/healthcare services; 13.2% are employed in the retail trade; 12.1% work in manufacturing (U.S. Census ACS, 2009).

Fayette County maintains a diverse landscape with both rural and urban settings. This is reflected by high-density residential and commercial areas, such as the City of Uniontown, coupled with large tracts of open space, parks, and agricultural lands. The following Critical Facilities Map (Figure 2.2–1) presents the general locations of important community assets, including fire stations, road systems, schools, airports, rail lines, and police stations.

The County is served by multiple modes of transportation. Major roads include US Routes 40 (National Road) and 119, and PA State Routes 21, 43, 51, 88, 166, 201, 281, 381, 653, 711, 819, 857, 906, and 982. In addition to the Greater Pittsburgh International Airport (Allegheny County), Fayette County is served by two public airports: Mount Pleasant-Scottdale Airport (Bullskin Township) and the Joseph A. Hardy Connellsville Airport (Dunbar Township). Rail transportation is a significant part of the Fayette County landscape, located primarily along the streams and rivers in the County (i.e. the Youghiogheny and Monongahela Rivers). Two main railway companies operate in the County: Amtrak and CSX Transportation. The Monongahela River is a major part of southwestern Pennyslvania's transportation infrastructure, facilitating the movement of large quantities of goods shipped via barge. Locks and dams running along Fayette County's stretch of the Monongahela River include the Maxwell Lock and Dam, Grays Lock and Dam, and the Point Marion Lock and Dam.

Fayette County is home to multiple institutions of higher learning, including the Westmoreland County Community College (WCCC) Fayette County campus in Uniontown and the Penn State Fayette campus in North Union Township. There are 8 public school districts and 15 private schools. The Fayette County Library System consists of 10 public libraries.

This page is intentionally blank.



Fayette County Hazard Mitigation Plan

Critical Facilities

LEGEND

- 9-1-1 CENTER EMA OFFICE
- SCHOOL ADMINISTRATION
- AIRPORT
- EMS
- CAMPUS
- COMPRESSOR STATION
- FIRE STATION
- HAZ MAT RESPONSE TEAM
- MUNICIPAL BUILDING
- MUNICIPAL BUILDING/POLICE
- PRISON
- PSP UNIONTOWN BARRICKS
- SCHOOL
- SENIOR CENTER
- STADIUM
- THEATER / MUSIC HALL
- WASTE WATER TREATMENT
- US HIGHWAYS
- STATE HIGHWAYS

Source: ESRI; Fayette County EMA/911, 2011.

Figure 2.2-1. Critical Facilities in Fayette County

2.3 Population and Demographics

According to the 2010 Census, the population of Fayette County is 136,591. While increasing from 145,351 residents in 1990 to 148,643 in 2000, over the past decade, the County's population has declined dramatically. This decline represents an overall 6% population decrease in twenty years. Table 2.3-1 demonstrates the specific population changes for each municipality from 2000 to 2010..

Table 2.3-1. Municipal Population Change

MUNICIPALITY	2000 POPULATION	2010 POPULATION	PERCENT CHANGE (%)
Belle Vernon Borough	1,211	1,093	-9.7
Brownsville Borough	2,804	2,331	-16.9
Brownsville Township	769	683	-11.2
Bullskin Township	7,782	6,966	-10.5
Connellsville City	9,146	7,637	-16.5
Connellsville Township	2483	2,391	-3.7
Dawson Borough	451	367	-18.6
Dunbar Borough	1,219	1,042	-14.5
Dunbar Township	7,562	7,126	-5.8
Everson Borough	842	793	-5.8
Fairchance Borough	2,174	1,975	-9.2
Fayette City Borough	714	596	-16.5
Franklin Township	2,628	2,528	-3.8
Georges Township	6,752	6,612	-2.1
German Township	5,595	5,097	-8.9
Henry Clay Township	1,984	2,066	4.1
Jefferson Township	2,259	2,015	-10.8
Lower Tyrone Township	1,171	1,123	-4.1
Luzerne Township	4,683	5,965	27.4
Markleysburg Borough	282	284	0.7
Masontown Borough	3,611	3,450	-4.5
Menallen Township	4,644	4,205	-9.5
Newell Borough	551	541	-1.8
Nicholson Township	1,989	1,805	-9.3
North Union Township	14,140	12,728	-10
Ohiopyle Borough	77	59	-23.4
Perry Township	2,786	2,552	-8.4
Perryopolis Borough	1,764	1,784	1.1
Point Marion Borough	1,333	1,159	-13.1
Redstone Township	6,397	5,566	-13
Saltlick Township	3,715	3,461	-6.8

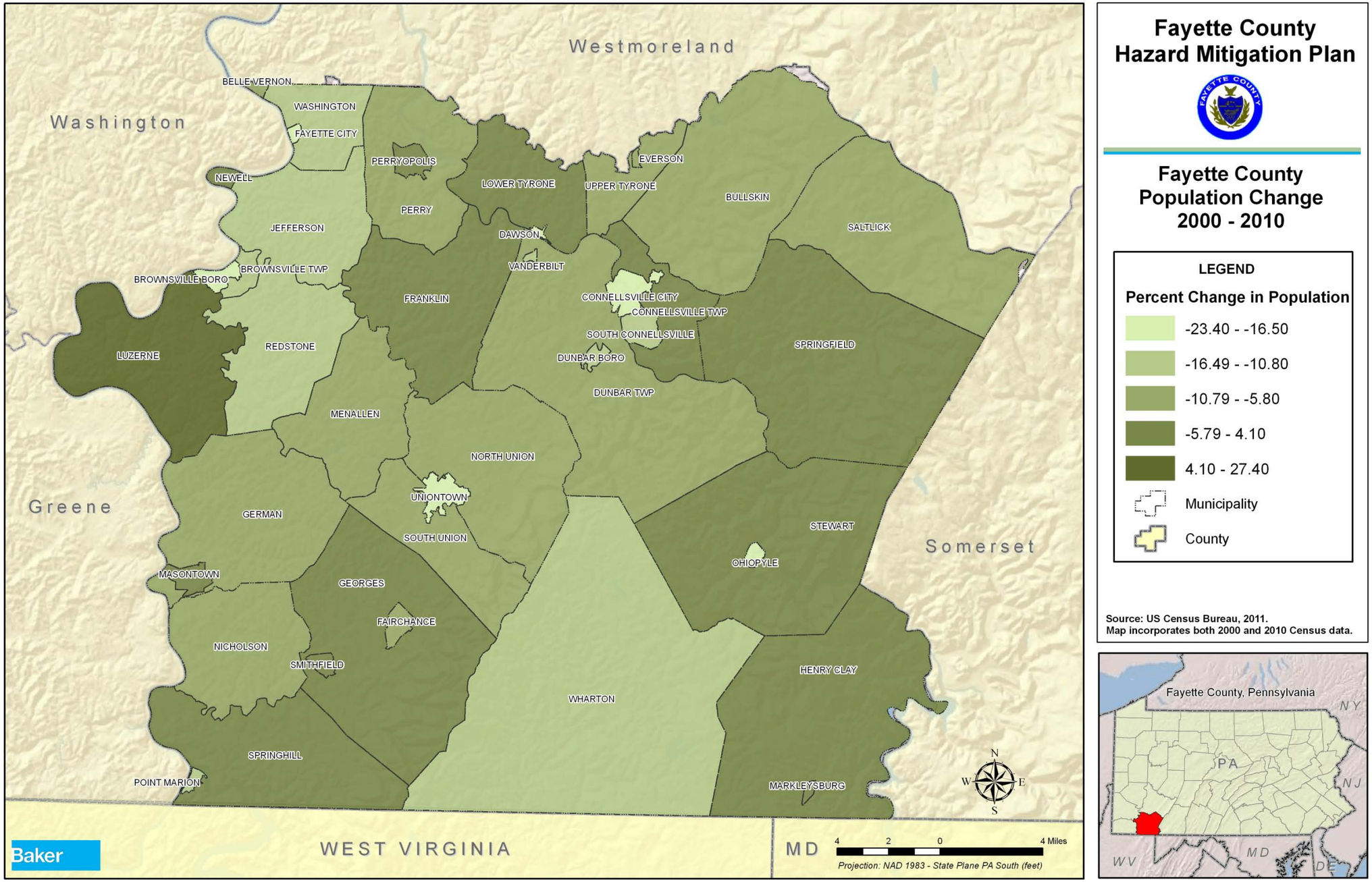
MUNICIPALITY	2000 POPULATION	2010 POPULATION	PERCENT CHANGE (%)
Smithfield Borough	854	875	2.5
South Connellsville Borough	2,281	1,970	-13.6
South Union Township	11,337	10,681	-5.8
Springfield Township	3,111	3,043	-2.2
Springhill Township	2,974	2,907	-2.3
Stewart Township	743	731	-1.6
Uniontown City	12,422	10,372	-16.5
Upper Tyrone Township	2,244	2,059	-8.2
Vanderbilt Borough	553	476	-13.9
Washington Township	4,461	3,902	-12.5
Wharton Township	4,145	3,575	-13.8
TOTAL	**148,643**	**136,591**	**-8.1%**

Source: U.S. Census Bureau

About 94% of the County is white, while 4% of the population is black. Approximately 17% of the County is 65 years old or older; in comparison, 15% of the state is 65 or older. The median income of households in Fayette County for 2008 is $34,050. Approximately 20.8 percent of Fayette County individuals live in poverty. The median age of the County population is 42 years. There are an estimated 67,408 housing units, 88% of which are occupied and 12% are vacant. The median value of an owner occupied home in the County is $63,900 (U.S. Census Bureau QuickFacts, 2011).

2.4 Land Use and Development

Since 2000, the population of Fayette County has declined over 8%. Since 1970, while the population has seen some population growth during certain decades (from 1970 to 1980 and 1990 to 2000), the general trend has been negative. Between 2000 and 2010, population losses were largest in the older, urban areas of the County, such as Connellsville, Uniontown, and Brownsville Borough, and in townships primarily in the western portion of the County, such as Redstone, Washington, Jefferson, and Brownsville Townships. On the other hand, during the same time period, other communities, mainly in the eastern and central parts of the County, have witnessed much smaller declines and, in some places, growth. While not in the east, Luzerne Township saw the largest increase in population of any municipality in Fayette County with over 27% growth. Figure 2.4-1 displays population changes across Fayette County for the years 2000 to 2010.



Fayette County Hazard Mitigation Plan

Fayette County Population Change 2000 - 2010

LEGEND

Percent Change in Population

- -23.40 - -16.50
- -16.49 - -10.80
- -10.79 - -5.80
- -5.79 - 4.10
- 4.10 - 27.40
- Municipality
- County

Source: US Census Bureau, 2011.
Map incorporates both 2000 and 2010 Census data.

Figure 2.4-1. Fayette County Population Change (2000-2010)

The County is composed of 42 political subdivisions, breaking into:

- the Cities of Connellsville City and Uniontown;
- 16 boroughs; and
- 24 townships.

Fayette County's boroughs and cities are almost entirely built-out. Consequently, most new development has taken place in the townships surrounding Uniontown. Development within the boroughs and cities can be expected to take the form of infill and reuse projects. Residential land-uses are generally single-family, detached units (Housing Market Analysis, 2005). There are approximately 141,000 acres of farmland, covering 27.9% of the County (Census of Agriculture, 2007). Forest areas in the County are largely confined in the east, beyond and including Chestnut Ridge. The area east of the ridge is approximately 80% woodland and the area west of the ridge is approximately 10% woodland. Forest areas that are currently protected from development (covering 10% of the County's land area) include all of the state game lands found in Connellsville, Springfield, Dunbar, Stewart, Wharton, North Union, Henry Clay, Georges, German, Lower Tyrone, and Perry Townships; plus all State and County parks (Comprehensive Plan, 2000). Figure 2.4-2 shows the existing land use pattern in Fayette County.

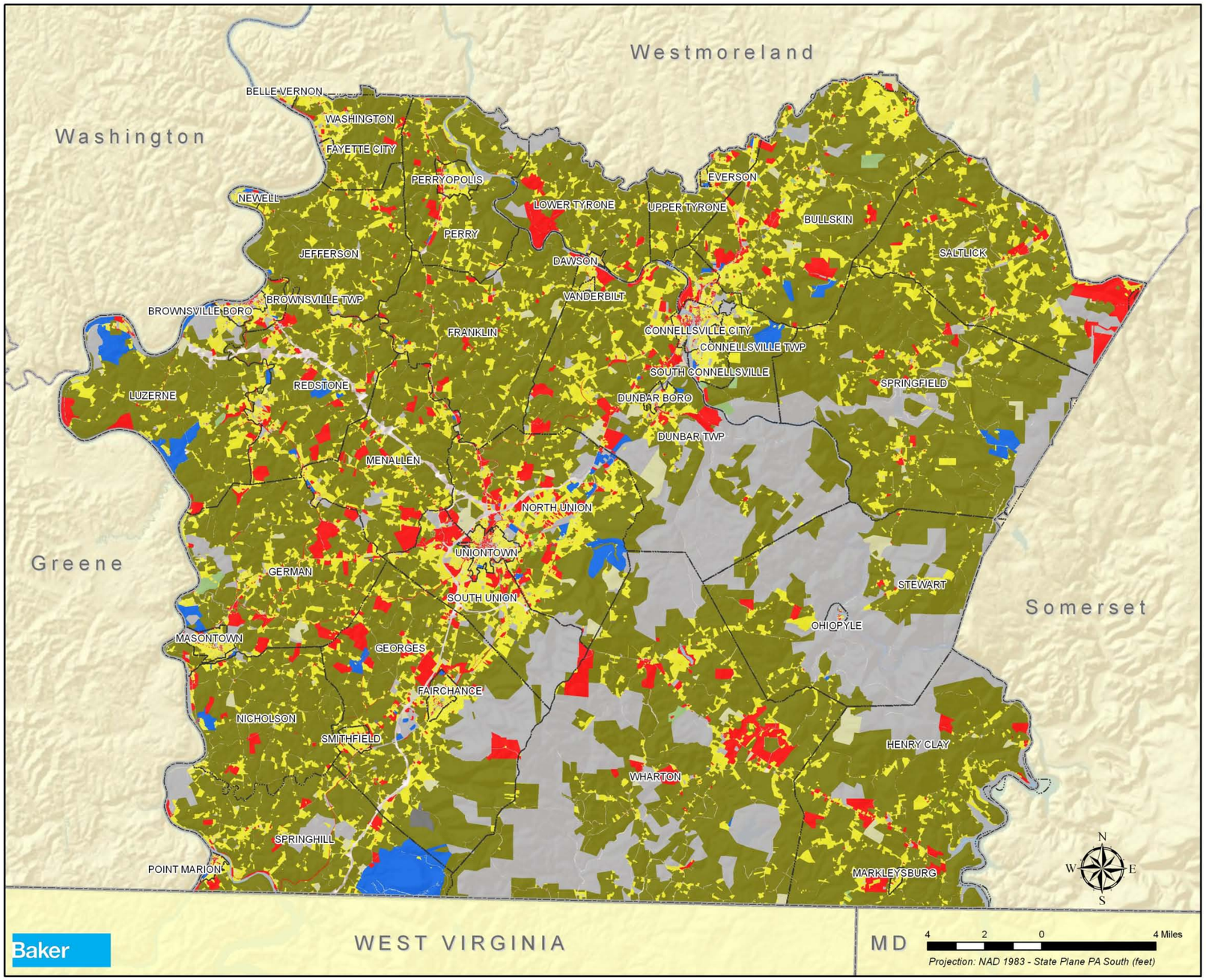
Fayette County's *2000 Comprehensive Plan* contained the following future land use objectives:

- Preserve agricultural areas for agricultural use;
- Direct growth towards established urban areas;
- Establish urban growth boundaries; and
- Limit growth in rural and conservation areas.

Fayette County's *2005 Land Use & Growth Management Report* outlined a number of similar land use goals. The report recommended the following:

- Revitalization of Uniontown and Connellsville to ensure self-sustaining downtown districts;
- Remediation of a number of abandoned mine problem areas; and
- Maintenance of the Agricultural Land Preservation Program.

This page is intentionally blank.



Fayette County Hazard Mitigation Plan

Fayette County Land Use

LEGEND

Parcels

Land Use Classification

- Agricultural
- Commercial
- Exempt
- Forest
- Industrial
- Residential
- Other
- Utilities
- Vacant
- Municipality
- County

Land Use data from the parcel database.

Source: Fayette County EMA/911, 2011

Figure 2.4-2. Existing Land Use Pattern in Fayette County

2.5 Data Sources

In order to assess the vulnerability of different jurisdictions to the hazards, data on past occurrences of damaging hazard events was gathered. For a number of historic natural hazard events, the National Climatic Data Center (NCDC) database was utilized. NCDC is a division of the US Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Information on hazard events is compiled by NCDC from data gathered by the National Weather Service (NWS), another division of NOAA. NCDC then presents it on their website in various formats. The data used for this plan came the US Storm Events database, which "documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce" (NOAA, 2006).

When applicable, the Pennsylvania Emergency Incident Reporting System (PEIRS) incident data from the last 8 years (1/1/2002 - 6/1/2009) was used in the 2011 plan update. Although PEIRS data proved valuable primarily in the human-made hazards section where few records of past occurrences exist; the data is limited in that the reporting system is not mandatory. Because it is a voluntary reporting system, the number and frequency of events may be under-reported. PEIRS information was used in the following hazard profile sections:

- Environmental Hazards – hazardous materials releases;
- Building/Structure Collapse;
- Urban Fires and Explosions;
- Transportation Accidents; and
- Civil Disorder/Terrorism.

Additional information used to complete the risk assessment for this plan was taken from various government agency and non-government agency sources. Those sources are cited where appropriate throughout the plan with full references listed in Appendix A. It should be noted that numerous GIS datasets were obtained from the Pennsylvania Spatial Data Access (PASDA) website (http://www.pasda.psu.edu/). PASDA is the official public access geospatial information clearinghouse for the Commonwealth of Pennsylvania. PASDA was developed by the Pennsylvania State University as a service to the citizens, governments, and businesses of the Commonwealth. PASDA is a cooperative project of the Governor's Office of Administration, Office for Information Technology, Geospatial Technologies Office and the Penn State Institutes of Energy and the Environment of the Pennsylvania State University.

The flood hazard area data used in this plan is the Preliminary countywide Digital Flood Insurance Rate Map (DFIRM). This data provides flood frequency and elevation information used in the flood hazard risk assessment. The Fayette County GIS department's dataset of land use and building information was used as an inventory of structures throughout the County. Other GIS datasets including *streams, lakes, roads,* and *municipal boundaries* were provided by the Fayette County GIS Department.

The population in Special Flooding Hazard Areas (SFHAs) was determined by determining the block groups in which the centroid of that group fell within the SFHA and taking the sum of the

population in those groups. This is an estimate – a census block could fall partly in a SFHA without its centroid falling in the area, or population in a census block counted could fall outside of the area. By using this process it is the intent that the over and under estimations in individual block groups will average out to an approximate estimation for the entire area.

Every attempt was made to provide consistency in reported data and in data sources. However, at the time of this plan update, the US Census Bureau is in the middle of tabulating the results of the 2010 Decennial Census; at this time, population counts are available at only the municipal, county, and state level. No population counts exist for Census Tracts or Blocks in Pennsylvania at this point. As a result, while population change data is reported in this HMP by municipality from 2000-2010, the calculated population at risk to flooding in Section 4.3.4.5 is derived from the 2000 Census Block geography. It was important to use the 2000 Block data to interpolate the population living in the SFHAs because larger geographies would grossly overestimate risk. As new data from the 2010 Census becomes available between 2011 and 2013, it will be incorporated into the HMP.

HAZUS-MH is a powerful risk assessment methodology for analyzing potential losses from floods, hurricane winds and earthquakes. In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest GIS technology to produce estimates of hazard-related damage before, or after, a disaster occurs. This software was used to estimate losses for floods in Fayette County.

Estimating potential losses that may occur as a result of hazard events requires a full range of information and accurate data. There are a number of site-specific characteristics that reduce a given structure's vulnerability and consequential losses. Examples include first-floor elevation, the number of stories, construction type, foundation type and the age and condition of the structure. The property tax assessment database includes the building and land assessment value for each parcel but does not include information on key variables that impact vulnerability, such as the age and value of individual structures, specific information on building height, construction type and first floor elevations.

Throughout the risk and vulnerability assessment included in Section 4, descriptions of limited data indicate some areas in which the County and municipalities can improve their ability to identify vulnerable structures and improve loss estimates. As the County and municipal governments work to increase their overall technical capacity and implement comprehensive planning goals, they will also attempt to improve the ability to identify areas of increased vulnerability.

This HMP evaluates the vulnerability of the County's critical facilities. For the purposes of this plan, critical facilities are those entities that are essential to the health and welfare of the community. The list of critical facilities was largely extracted from the list of State Critical Facilities identified during the creation of the Commonwealth of Pennsylvania 2010 All-Hazard Mitigation Plan, which included locations of 911 and emergency services facilities, airports, colleges and universities, fire departments, and police departments. This list was supplemented

with locations of hospitals and nursing homes from the Pennsylvania Department of Health, the locations of schools from ESRI Geographical Information Services, the locations of sewage treatment facilities from the Pennsylvania Department of Environmental Protection, and the locations of hazardous material facilities from the United States Environmental Protection Agency. Table 2.5-1 summarizes the critical facilities in Fayette County by type and by municipality. For a complete listing of critical facilities, please see Appendix E.

Table 2.5-2.5-1. Critical Facilities by Municipality

MUNICIPALITY	911 & EMERGENCY SERVICES	FIRE DEPARTMENT	POLICE DEPARTMENT	SENIOR CENTER	SCHOOL	AIRPORT	CORRECTIONAL FACILITY	SEWAGE TREATMENT PLANT	CULTURAL	ADMINISTRATION	COMPRESSOR STATION	HAZMAT RESPONSE TEAM	FAIRGROUNDS	DISTRICT WAREHOUSE	METER STATION	COURT HOUSE	TOTAL
Belle Vernon		1	1														**2**
Brownsville Borough	1	2	1	1													**5**
Brownsville Twp										1							**1**
Bullskin	1	3		1	2	1				1							**9**
Connellsville City	1	2	1	1	6				1								**12**
Connellsville Twp		1			2					2							**5**
Dawson		1															**2**
Dunbar Borough		1	1														**2**
Dunbar Twp	2	2			3	1		1		1	2	1	1				**14**
Everson		1	1	1													**3**
Fairchance	1	1	1	1													**4**
Fayette City		1	1														**2**
Franklin		2			1					1	1						**5**
Georges		2			4				1	2							**9**
German		5			2					1	2						**10**
German/Menallen											1						**1**
Henry Clay	1	1			2					1							**4**
Jefferson		1			1					1							**3**
Lower Tyrone				1						1	1						**3**

MUNICIPALITY	911 & EMERGENCY SERVICES	FIRE DEPARTMENT	POLICE DEPARTMENT	SENIOR CENTER	SCHOOL	AIRPORT	CORRECTIONAL FACILITY	SEWAGE TREATMENT PLANT	CULTURAL	ADMINISTRATION	COMPRESSOR STATION	HAZMAT RESPONSE TEAM	FAIRGROUNDS	DISTRICT WAREHOUSE	METER STATION	COURT HOUSE	TOTAL
Luzerne	1	5	1		2		1			1							**11**
Markleysburg		1								1							**2**
Masontown	1	1	1	1	2												**6**
Menallen	1	1			1					1	1			1			**6**
Newell		1								1							**2**
Nicholson										1							**1**
North Union		2			3				1	2	2						**10**
North Union Twp					1												**1**
Ohiopyle		1								1							**2**
Perry										1							**1**
Perryopolis	1	1	1	1	3				1								**8**
Point Marion	1	1	1	1													**4**
Redstone	1	2	1	1	3				1								**9**
Saltlick		1			1					1							**3**
Smithfield		1	1	1	1												**4**
South Connellsville		1	1														**2**
South Union	3	2			3					1							**9**
Springfield		2			1					1							**4**
Springhill					2					1	2				1		**6**
Stewart										1							**1**
Uniontown	3	2	2	1	5		1		2	1						1	**18**

MUNICIPALITY	911 & EMERGENCY SERVICES	FIRE DEPARTMENT	POLICE DEPARTMENT	SENIOR CENTER	SCHOOL	AIRPORT	CORRECTIONAL FACILITY	SEWAGE TREATMENT PLANT	CULTURAL	ADMINISTRATION	COMPRESSOR STATION	HAZMAT RESPONSE TEAM	FAIRGROUNDS	DISTRICT WAREHOUSE	METER STATION	COURT HOUSE	TOTAL
Upper Tyrone					1					1							**2**
Vanderbilt		1								1							**2**
Washington	1	1	1	1	2												**6**
Wharton	1	1	1	1	4												**8**
TOTAL	**21**	**55**	**18**	**14**	**58**	**2**	**2**	**1**	**7**	**30**	**12**	**1**	**1**	**1**	**1**	**1**	**225**

3 Planning Process

3.1 Update Process and Participation Summary

The Hazard Mitigation Planning Team was first formed in 2003 to construct a plan in order to identify hazards that affect the County, assess potential damages from those hazard events, select actions to address the County's vulnerability to such hazards, and develop an implementation-strategy action plan in order to mitigate potential losses. The 2004 HMP was adopted by the County on July 22, 2004.

The County's current plan is a product of the 2011 Hazard Mitigation Plan Update. An update to the 2004 HMP was initiated in January 2011. With funding support from the Pennsylvania Emergency Management Agency and the Federal Emergency Management Agency, Michael Baker Jr., Inc., a full-service engineering firm that provides hazard mitigation planning guidance and technical support, assisted the County through the update process. The 2011 HMP follows an outline developed by the Pennsylvania Emergency Management Agency in 2009 which provides a standardized format for all local hazard mitigation plans in the Commonwealth of Pennsylvania. As a result, the format of the 2011 Fayette County HMP contrasts significantly with the 2004 Fayette County HMP. A summary of the update process used for each section of this plan included in Sections 4.1, 5.1, 6.1, and 7.1. **__ out of 42** municipalities participated in the plan update. The 2011 Hazard Mitigation Plan Update was completed in May 2011.

3.2 The Planning Team

During development of the 2004 HMP the following individuals served as members of the Hazard Mitigation Planning Team:

• Roy Shipley, Jr.	Director, Emergency Management Agency
• L. Guy Napolillo	Deputy Director, Emergency Management Agency
• Vince Sherwood	Deputy 911 Coordinator, Emergency Management Agency
• Scott Dolan	Planner/Trainer, Emergency Management Agency
• James E. Bittner, Jr.	Planner/Training Officer, Emergency Management Agency
• Vincent Vicites	Commissioner, Fayette County
• Joseph Hardy	Commissioner, Fayette County
• Angela Zimmerlink	Commissioner, Fayette County
• Warren Hughes	County Manager, Fayette County
• James Hercik	Chief Assessor, County Assessment Office
• Tammy Shell	Director, County Planning and Zoning Office
• Ray Polaski	County Redevelopment Authority
• Ralph Wombacker	Connellsville City Redevelopment Authority
• Bill Long	Uniontown City Redevelopment Authority
• Anna Sarver	USDA Agricultural Service Center
• Paul Whipkey	Department of Conservation and Natural Resources, Department of Forestry

- Lee Jordan — Forest Fire Inspector, Department of Conservation and Natural Resources, Department of Forestry
- Myron Nypaver — Fire Chief, Code Enforcement Official, City of Uniontown
- Robert C. Junk, Jr. — Strategic Planning Manager, Fay-Penn Economic Development Council

The Planning Committee for the 2011 Hazard Mitigation Plan Update included:

- Roy Shipley, Jr. — Director, Emergency Management Agency
- James E. Bittner, Jr. — Planner/Training Officer, Emergency Management Agency
- Sara Rosiek — Director, Planning Commission
- Dave Schaarsmith — Planner, Michael Baker Jr., Inc.

The Planning Committee spearheaded this update effort, with assistance from the Planning Team. The Committee developed a well-diversified list of potential stakeholders which included municipal officials, state, Fayette County government representatives, adjacent county representatives, and other non-profit organizations. These individuals were invited to participate in the HMP update process:

- All Fayette County Municipalities;
- Fayette County Conservation District (BCCD);
- Greater Redstone Clearwater Initiative;
- Youghiogheny River Council;
- Georges Creek Clearwater Coop Initiative;
- Mountain Watershed Association; and
- Adjacent Counties:
  - Somerset County;
  - Greene County;
  - Westmoreland County;
  - Washington County;
  - Monongalia County, West Virginia; and
  - Preston County, West Virginia.

The Planning Team is composed of all stakeholders who regularly attended meetings, provided input, and helped to develop mitigation strategies. The Planning Team will remain involved throughout the planning term. The ongoing roles of both the Planning Committee and Team are further discussed in Section 7 Plan Maintenance.

Table 3.2-1. Participants in the Fayette County 2011 HMP Update

Municipality/Organization	Participants
Fayette County	James Bittner, Roy Shipley
Belle Vernon Borough	
Brownsville Borough	Lester Ward, Edward Nicholson

Municipality/Organization	Participants
Brownsville Township	Homer Yeander
Bullskin Township	
Connellsville City	
Connellsville Township	Robert Leiberger Sr, Robert Carson
Dawson Borough	
Dunbar Borough	Jerry Brame
Dunbar Township	Bill Mathews, Ross Rock
Everson Borough	Chuck Leighty
Fairchance Borough	
Fayette City Borough	
Franklin Township	Michael Wystepek, Melvin Lerch Jr
Georges Township	Mark Migyanko
German Township	Arthur Austin, Floyd Gladman III
Henry Clay Township	Margaret Rishel
Jefferson Township	Larry Stuckslager, Jeffrey Redman
Lower Tyrone Township	James Rearick Jr
Luzerne Township	Robert Miller
Markleysburg Borough	
Masontown Borough	Donald Beck
Menallen Township	
Newell Borough	
Nicholson Township	Douglas Sholtuitsy, Bob Reinhard, Charles McClain
North Union Township	Tom Kumor
Ohiopyle Borough	
Perry Township	AJ Boni
Perryopolis Borough	Steve Kontayes
Point Marion Borough	
Redstone Township	George Matis
Saltlick Township	Greg Grimm
Smithfield Borough	Chuck Cieszynski Jr
South Connellsville Borough	Guy Napololo
South Union Township	
Springfield Township	Ross Miner
Springhill Township	
Stewart Township	Tony Aviar
Uniontown, City	Gregory Crossley, Melissa Fox
Upper Tyrone Township	Sam Killinger

Municipality/Organization	Participants
Vanderbilt Borough	
Washington Township	Jeff Keffer, Ray Moody
Wharton Township	Jim Means

The Fayette County Hazard Mitigation Planning Team developed the All-Hazard Mitigation Plan with the assistance and guidance from representatives of the Federal Emergency Management Agency (FEMA) and the Pennsylvania Emergency Management Agency (PEMA).

3.3 Meetings and Documentation

The following meetings were held during the plan update process. Invitations, agendas, sign-in sheets, and minutes for these meetings are included in Appendix C:

January 13, 2011: Internal Hazard Mitigation Planning Committee teleconference to discuss project scope, schedule, goals, agenda and handouts for upcoming kick-off meeting with local municipalities.

February 17, 2011: Community Kick-Off Meeting held at the Fayette County Emergency Services Center to introduce the project to local municipalities, inform community representatives of the HMP update process and schedule, and make a formal request for response to the *Capability Assessment Surveys* and *Risk Assessment Surveys*. This meeting was used to review the 2005 goals and discuss opportunities to improve the Plan.

March 14, 2011: Internal Mitigation Review Workshop. The Planning Team (via teleconference) reviewed the 2005 goals, objectives, and actions. At this meeting, the Planning team made revisions, additions, and deletions to the existing goals, objectives, and actions.

March 28, 2011: Risk Assessment and Mitigation Solution Workshop held at the Fayette County Public Services Building to review the update process and actions completed to date. The results of the Risk Assessment and Risk Prioritization were presented. With this knowledge discussed, the group reviewed what constitutes mitigation actions as well as typical mitigation actions per hazard found in Fayette County. Communities were provided with an opportunity to comment on results of the risk assessment and prioritization. A formal request was made for responses to the *Mitigation Action Forms*. Stakeholders were reminded to provide responses to the *Capability Assessment Surveys* and *Risk Assessment Surveys*.

May 31, 2011: Public Meeting held at the Fayette County Public Services Building. The Mitigation Action Plan was reviewed and discussed in detail. The meeting was noticed in the Fayette County Times newspaper and the project website. *Add details about attendance and comments received.* The public was provided an opportunity to comment during this meeting. After this meeting, the Draft Plan was posted on the Fayette County website, project website, and paper copies were available at the Fayette County Public Services Building with a request for public review and comment.

Adoption Placeholder Language: Following review by the Pennsylvania Emergency Management Agency and the Federal Emergency Management Agency, the Fayette Planning Committee incorporated all agency and public comments received. At this meeting, the Board of County Commissioners adopted the Final 2011 Hazard Mitigation Plan by resolution.

3.4 Public & Stakeholder Participation

Each municipality was given multiple opportunities to participate in the HMP update process through invitation to meetings, review of risk assessment results and mitigation actions, and an opportunity to comment on a final draft of the HMP. The four tools listed below were distributed with meeting invitations and at meetings to solicit data, information, and comments from all 42 local municipalities in Fayette County. Responses to these worksheets and surveys are included in Appendix C:

1) ***Capability Assessment Survey***: Collects information on local planning, regulatory, administrative, technical, fiscal, political, and resiliency capabilities that can be included in the countywide mitigation strategy.

2) ***Risk Evaluation Worksheet***: Capitalizes on local knowledge to obtain information on identified hazards, historical records or studies that may have been performed on hazards, available inventory assets, updated loss estimates, and new data sources.

3) ***Mitigation Action Form***: Allows communities to propose mitigation actions for the HMP and include information about each action such as a lead agency or department, implementation schedule, priority, estimated cost, and potential funding sources.

4) ***5-Year Hazard Mitigation Plan Review Worksheet***: Evaluates previous mitigation goals, objectives, actions, and projects for deciding whether to continue, modify, or remove them from the updated plan. This worksheet also aims to record progress made on actions contained in the 2004 HMP.

Community participation and comment was encouraged throughout the planning process. In addition to the community meetings being advertised on the project website (www.Fayettehmp.com), a newspaper notice was published in the Fayette County Herald Standard on May 20, 2011 to notify the citizens of Fayette County of the public meeting held on May 31, 2011. A copy of this notice is shown in Figure 3.4-1. Additionally, notification of the HMPU sent to representatives from neighboring counties is included in Appendix C.

In addition to the public meeting held on May 31, 2011, the draft plan was made available to the public on the project website (www.fayettehmp.com). This website was established to facilitate the update process and will be removed upon adoption of the updated HMP. Public comments were received via phone and email through June 2011.

In order to obtain information from municipalities and other stakeholders, forms and surveys were distributed and collected throughout the planning process. Some forms were completed

during planning meetings while others were sent via mail and email and completed and returned in between scheduled meetings. All municipalities were required to have a representative attend at least one meeting and provide pertinent information for the HMP. Table 3.4-1 lists each municipality along with their specific participation and contributions to the planning process. Sign-in sheets for each meeting with individual names are available in Appendix C along with all completed forms and surveys.

The Fayette County Emergency Management Agency is in the process of updating the Fayette County All-Hazard Mitigation Plan.

The final public meeting for the plan update is scheduled for Tuesday, May 31, 2011 at 2PM at the Fayette County Public Services Building, 1st Floor Commissioner's Conference Room, 24 E Main Street, Uniontown, PA 15401.

The plan is a blueprint for reducing property damage and saving lives from the effects of future natural and human-made disasters in Fayette County.

Fayette County Emergency Management Agency Director Roy Shipley, Jr. encourages the participation of community leaders and Local Emergency Management Coordinators in updating the plan.

Interested persons may download and review an electronic copy of the draft Plan at: www.fayettehmp.com beginning Wednesday, June 1, 2011. For questions regarding the Plan, please contact David Schaarsmith via telephone at 412-269-7915 or email at dschaarsmith@mbakercorp.com. All comments on the draft Hazard Mitigation Plan should be submitted in writing no to David Schaarsmith later than June 30, 2011.

Figure 3.4-1. Public Meeting Notice

Table 3.4-1: Summary of participation from local municipalities during the 2011 Hazard Mitigation Planning Process.

MUNICIPALITY	MEETINGS			WORKSHEETS/SURVEYS/FORMS		
	KICK-OFF MEETING February 17, 2011	RISK & MITIGATION WORKSHOP March 28, 2011	PUBLIC MEETING May 31, 2011	CAPABILITY ASSESSMENT SURVEY	RISK ASSESSMENT SURVEY	MITIGATION ACTION FORM
Belle Vernon Borough			✓			
Brownsville Borough	✓	✓				
Brownsville Township	✓	✓		✓	✓	✓
Bullskin Township						
Connellsville City						
Connellsville Township	✓					
Dawson Borough						
Dunbar Borough	✓				✓	
Dunbar Township		✓				
Everson Borough		✓				
Fairchance Borough			✓			
Fayette City Borough						
Franklin Township		✓			✓	
Georges Township		✓		✓	✓	
German Township		✓			✓	
Henry Clay Township		✓				
Jefferson Township	✓	✓		✓	✓	
Lower Tyrone Township	✓					
Luzerne Township						
Markleysburg Borough						
Masontown Borough	✓			✓	✓	
Menallen Township						
Newell Borough						
Nicholson Township	✓	✓		✓	✓	
North Union Township	✓			✓	✓	

Table 3.4-1: Summary of participation from local municipalities during the 2011 Hazard Mitigation Planning Process.

MUNICIPALITY	MEETINGS			WORKSHEETS/SURVEYS/FORMS		
	KICK-OFF MEETING February 17, 2011	RISK & MITIGATION WORKSHOP March 28, 2011	PUBLIC MEETING May 31, 2011	CAPABILITY ASSESSMENT SURVEY	RISK ASSESSMENT SURVEY	MITIGATION ACTION FORM
Ohiopyle Borough						
Perry Township	✓	✓		✓	✓	
Perryopolis Borough		✓				✓
Point Marion Borough						
Redstone Township	✓	✓		✓	✓	
Saltlick Township	✓	✓		✓	✓	✓
Smithfield Borough		✓				
South Connellsville Borough		✓				
South Union Township				✓	✓	✓
Springfield Township		✓				
Springhill Township						
Stewart Township	✓			✓	✓	✓
Uniontown, City	✓	✓		✓	✓	✓
Upper Tyrone Township	✓	✓				
Vanderbilt Borough						
Washington Township		✓		✓	✓	✓
Wharton Township	✓	✓		✓	✓	

3.5 Multi-Jurisdictional Planning

This hazard mitigation plan was developed using a multi-jurisdictional approach. Though, County-level departments had resources such as technical expertise and data which local jurisdictions may lack; involvement from local municipalities is critical to the collection of local knowledge related to hazard events. Local municipalities also have the legal authority to enforce compliance with land use planning and development issues. The County undertook an intensive effort to involve all municipalities in the planning process. Table 3.5-1 lists the participating municipality and the date each adopted the 2011 HMP which includes mitigation action items specific to each jurisdiction. The 2004 HMP included 14 of 42 municipalities, and the 2011 Update successfully includes XX out of 42 municipalities.

Table 3.5-1. Participating Jurisdictions in the 2004 and 2011 Fayette County Hazard Mitigation Plan

Municipality	2004 HMP	2011 HMP
Belle Vernon Borough	2/12/2007	
Brownsville Borough	11/12/2007	
Brownsville Township	12/6/2004	
Bullskin Township	10/27/2004	
Connellsville City		
Connellsville Township	7/13/2006	
Dawson Borough	3/12/2007	
Dunbar Borough	9/8/2006	
Dunbar Township	1/5/2006	
Everson Borough	6/18/2007	
Fairchance Borough	7/11/2007	
Fayette City Borough		
Franklin Township	3/1/2007	
Georges Township	8/19/2004	
German Township	12/14/2004	
Henry Clay Township	2/6/2006	
Jefferson Township	9/21/2004	
Lower Tyrone Township	12/14/2004	
Luzerne Township	11/9/2004	
Markleysburg Borough	1/3/2006	
Masontown Borough	11/23/2004	
Menallen Township		
Newell Borough	11/8/2004	
Nicholson Township	3/2/2006	
North Union Township	11/9/2004	
Ohiopyle Borough		
Perry Township		

Municipality	2004 HMP	2011 HMP
Perryopolis Borough	11/23/2004	
Point Marion Borough		
Redstone Township	11/10/2004	
Saltlick Township	9/14/2004	
Smithfield Borough	11/16/2004	
South Connellsville Borough	12/10/2007	
South Union Township		
Springfield Township	11/2/2004	
Springhill Township	11/2/2004	
Stewart Township	2/19/2007	
Uniontown City	11/1/2004	
Upper Tyrone Township	11/14/2006	
Vanderbilt Borough	10/17/2006	
Washington Township	2/21/2007	
Wharton Township	7/3/2006	

A participation matrix is provided in Table 3.4-1 which documents community presence at the meetings described in Section 3.3 and other involvement from each jurisdiction throughout the planning process. Each municipality was emailed or mailed invitations to all meetings and if email addresses were available, received email reminders prior to each meeting. Surveys and forms were mailed or emailed to jurisdictions along with letters requesting that local information be provided. All 42 municipalities in the County participated in the plan thus achieving 100% participation.

3.6 Existing Planning Mechanisms

There are numerous existing regulatory and planning mechanisms in place at the state, County, and municipal level of government which support hazard mitigation planning efforts. These tools include the Commonwealth of Pennsylvania Standard All-Hazard Mitigation Plan, local floodplain management ordinances, the Fayette County Comprehensive Plan, Local Emergency Operation Plans, and local zoning ordinances. These mechanisms were discussed at community meetings and are described in Section 5.2. In addition to the discussion at the community meetings, the Fayette Planning Committee reviewed all available technical information provided within these planning mechanisms. These planning mechanisms enhance the County's mitigation strategy and are therefore incorporated into several of the mitigation actions identified in Section 6.4.

Information on identified development constraints and potential future growth areas was incorporated from the Fayette County Comprehensive Plan so that vulnerability pertaining to future development could be established. Floodplain management ordinance information was used to aid in the establishment of local capabilities in addition to participation in the NFIP.

4 Risk Assessment

4.1 Update Process Summary

For the purposes of this HMP, risk is defined as the potential for damage, injury, or death as a result of natural or human-made hazard events. A risk assessment provides a factual basis for activities proposed by the County in their mitigation strategy. The hazard profile structure used in this Plan differs from what was used in the 2004 Fayette County HMP; however all information from the previous plan has been included or updated in the 2011 HMPU, unless otherwise indicated. These changes were made in an effort to:

- Clearly and effectively communicate how and to what extent Fayette County is exposed to each hazard;
- Identify municipalities most at risk; and
- Provide guidance for the development of mitigation actions.

During the Kick-Off Meeting, stakeholders were asked to review the hazards identified in the 2004 Plan and identify the current risk to the County from those hazards. As part of this exercise, the stakeholders identified many new hazards that were not profiled in the 2004 Plan. The following hazards have been added to the 2011 HMP:

- Hurricane, Tropical Storm, Nor'easter;
- Lightning Strike;
- Radon Exposure;
- Pandemic;
- Transportation Accidents;
- Marcellus Shale Natural Gas Development;
- Utility Interruption;
- Urban Fire or Explosion;
- Building or Structure Collapse;
- Dam Failure;
- Drowning; and
- Disorientation.

Fayette County has prioritized the hazards that affect their county and has developed mitigation opportunities/strategies to deal with these hazards.

Each hazard identified is profiled in Section 4.3 in order to:

- Estimate the location and extent of area potentially impacted;
- Describe the range of magnitude or severity of impacts that could potentially occur;
- Identify and summarize the impacts of previous occurrences;
- Estimate the probability of future occurrences; and
- Identify the vulnerable structures and populations.

4.1.1 Data Sources and Limitations

The quality of a hazard profile is strongly dependent on the information available for use. As noted previously PEIR incident data from the last 8 years (1/1/2002 -6/1/2009) was used in the 2011 plan update. Although PEIRS data proved valuable primarily in the human-made hazards section where few records of past occurrences exist; the data is limited in that the reporting system is not mandatory. Because it is a voluntary reporting system, the number and frequency of events may be under-reported. PEIRS information was used in the following hazard profile sections:

- Environmental Hazards – hazardous materials releases
- Transportation accidents
- Civil Disorder/Terrorism

Estimating the probability of future occurrence is often the most challenging. The likelihood of a hazard event occurring is usually expressed in terms of annual probability. Certain hazards (e.g. floods) have undergone more detailed study than others; therefore annual probability is readily available. However probability information may be lacking for other hazards. In those cases, historical occurrences and input from members of the Planning Team are used to characterize the frequency of a given hazard as:

- *Unlikely*: Less than 1% annual probability;
- *Possible*: Between 1 and 49% annual probability;
- *Likely*: Between 50 and 90% annual probability; and
- *Highly Likely*: Between 90% and 100% annual probability.

Each hazard profile estimates the future probability of the hazard using the above language consistently. Those probabilities are then used to quantitatively assess the risk posed by each hazard, as discussed in Section 4.3.

4.2 Hazard Identification

Gathering data on past natural disasters that affected Fayette County will provide a more thorough understanding of what hazards Fayette County is susceptible to. An analysis of the past occurrences of each hazard is the first step toward predicting the future susceptibility to that hazard. By noting the hazards of the past, the municipalities in Fayette County will be able to better understand and prepare for future natural disasters.

4.2.1 Presidential Disaster Declarations

A presidential disaster declaration is issued when a disaster has been determined to exceed the capabilities of state and local governments to respond. A list of past presidential disaster declarations occurring from 1960 to 2010 in Fayette County is provided in Table 4.2-1. Any additional declarations beyond 2010 can be found on the FEMA website.

Table 4.2-1. Presidential Disaster Declarations in Fayette County

Year	Date	Disaster Types	Disaster Number	Public Assistance	Individual Assistance
1971	9/18	Flooding	312	Yes	Yes
1985	11/9	Flooding	754	Yes	Yes
1994	3/10	Winter Storm	1015	Yes	None
1996	1/13	Blizzard	1085	Yes	None
1996	1/21	Flooding	1093	Yes	Yes
2010	4/16	Snow	1898	Yes	None

Source: FEMA, 2011

4.2.2 Summary of Hazards

A comprehensive list of hazards ensures that no hazard has been omitted, and all potential hazards have been given consideration. The comprehensive list of hazards provided in the *Hazard Mitigation Standard Operating Guide* was reviewed in the context of Fayette County's unique risks. To narrow this comprehensive list down to the Fayette County-specific hazards, the Fayette County Planning Committee reviewed existing reports, the previous hazard mitigation plan, conducted interviews with experts and community leaders, and reviewed previous incidences. Table 4.2-2 and Table 4.2-3 illustrate the reviewed and reduced list of natural and human-made hazards for Fayette County.

Table 4.2-2. Summary of Natural Hazards

	Hazard	Description
Natural Hazards	**Drought**	Drought is a natural climatic condition which occurs in virtually all climates, the consequence of a natural reduction in the amount of precipitation experienced over a long period of time, usually a season or more in length. High temperatures, prolonged winds, and low relative humidity can exacerbate the severity of drought. This hazard is of particular concern in Pennsylvania due to the presence of farms as well as water-dependent industries and recreation areas across the Commonwealth. A prolonged drought could severely impact these sectors of the local economy, as well as residents who depend on wells for drinking water and other personal uses. (National Drought Mitigation Center, 2006).
	Earthquake	An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area. Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking which is dependent upon amplitude and duration of the earthquake. (FEMA, 1997).
	Extreme Temperatures	Extreme cold temperatures drop well below what is considered normal for an area during the winter months and often are accompanied by winter storm events. Combined with increases in wind speed, such temperatures in Pennsylvania can be life threatening to those exposed for extended periods of time. Extreme heat can be described a temperatures that hover 10 degree Fahrenheit or more above average high temperatures for a region during the summer months. Extreme heat is responsible for more deaths in Pennsylvania than all other natural disasters combined (Lawrence County, PA HMP, 2004).
	Flood, Flash Flood, Ice Jam	Flooding is the temporary condition of partial or complete inundation on normally dry land and it is the most frequent and costly of all hazards in Pennsylvania. Flooding events are generally the result of excessive precipitation. General flooding is typically experienced when precipitation occurs over a given river basin for an extended period of time. Flash flooding is usually a result of heavy localized precipitation falling in a short time period over a given location, often along mountain streams and in urban areas where much of the ground is covered by impervious surfaces. The severity of a flood event is dependent upon a combination of stream and river basin topography and physiography, hydrology, precipitation and weather patterns, present soil moisture conditions, the degree of vegetative clearing as well as the presence of impervious surfaces in and around flood-prone areas. (NOAA, 2009). Winter flooding can include ice jams which occur when warm temperatures and

Hazard		Description
		heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. All forms of flooding can damage infrastructure (USACE, 2007).
	Hailstorms	In addition to flooding and severe winds, hailstorms are another potentially damaging product of severe thunderstorms. Hailstorms occur when ice crystals form within a low pressure front due to the rapid rise of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation in the form of balls or irregularly shaped masses of ice greater than 0.75 inches in diameter (FEMA, 1997). The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Damage to crops and vehicles are typically the most significant impacts of hailstorms. Areas in western Pennsylvania experience 2-3 hailstorms annually (FEMA, 1997).
	Hurricane	Hurricanes and tropical storms are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise (in the Northern Hemisphere) and whose diameter averages 10-30 miles across. While most of Pennsylvania is not directly affected by the devastating impacts cyclonic systems can have on coastal regions, many areas in the state are subject to the primary damaging forces associated with these storms including high-level sustained winds, heavy precipitation and tornadoes. Areas in southeastern Pennsylvania could be susceptible to storm surge and tidal flooding. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico during the official Atlantic hurricane season which extends from June through November (FEMA, 1997).
	Landslide	A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation reacting to the force of gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, and changes in groundwater levels. Mudflows, mudslides, rockfalls, rockslides, and rock topples are all forms of a landslide. Areas that are generally prone to landslide hazards include previous landslide areas, the bases of steep slopes, the bases of drainage channels, developed hillsides, and areas recently burned by forest and brush fires (Delano & Wilshusen, 2001).

Hazard		Description
	Lightning Strike	Lightning is a discharge of electrical energy resulting from a build-up of positive and negative charges within a thunderstorm. The flash or "bolt" of light usually occurs within clouds or between clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. On average, 89 people are killed each year by lightning strikes in the united States. Within Pennsylvania, the annual average number of thunder and lightning events a given area can expect ranges between 40-70 (FEMA, 1997).
	Pandemic	A pandemic occurs when infection from of a new strain of a certain disease, to which most humans have no immunity, substantially exceeds the number of expected cases over a given period of time. Such a disease may or may not be transferable between humans and animals. (Martin & Martin-Granel, 2006).
	Radon Exposure	Radon is a cancer-causing natural radioactive gas that you can't see, smell, or taste. It is a large component of the natural radiation that humans are exposed to and can pose a serious threat to public health when it accumulates in poorly ventilated residential and occupation settings. According to the USEPA, radon is estimated to cause about 21,000 lung cancer deaths per year, second only to smoking (EPA 402-R-03-003: EPA Assessment, 2003). An estimated 40% of the homes in Pennsylvania are believed to have elevated radon levels (PAEPA, 2009).
	Subsidence, Sinkhole	Subsidence is a natural geologic process that commonly occurs in areas with underlying limestone bedrock and other rock types that are soluble in water. Water passing through naturally occurring fractures dissolves these materials leaving underground voids. Eventually, overburden on the top of the voids causes a collapse which can damage structures with low strain tolerances. This collapse can take place slowly over time or quickly in a single event, but in either case. Karst topography describes a landscape that contains characteristic structures such as sinkholes, linear depressions, and caves. In addition to natural processes, human activity such as water, natural gas, and oil extraction can cause subsidence and sinkhole formations (FEMA, 1997).
	Tornado, Wind Storm	A wind storm can occur during severe thunderstorms, winter storms, coastal storms, or tornadoes. Straight-line winds such as a downburst have the potential to cause wind gusts that exceed 100 miles per hour. Based on 40 years of tornado history and over 100 years of hurricane history, FEMA identifies western and central Pennsylvania as being more susceptible to higher winds than eastern Pennsylvania. (FEMA, 1997). A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes or tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of high wind velocities and wind-blown debris. According to the National Weather Service, tornado wind speeds can

Hazard		Description
		range between 30 to more than 300 miles per hour. They are more likely to occur during the spring and early summer months of March through June and are most likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small, short-lived tornadoes can inflict tremendous damage. Destruction ranges from minor to catastrophic depending on the intensity, size, and duration of the storm. Structures made of light materials such as mobile homes are most susceptible to damage. Waterspouts are weak tornadoes that form over warm water and are relatively uncommon in Pennsylvania. Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries (NOAA, 2002). Based on NOAA Storm Prediction Center Statistics, the number of recorded F3, F4, & F5 tornadoes between 1950-1998 ranges from <1 to 15 per 3,700 square mile area across Pennsylvania (FEMA, 2009). A water spout is a tornado over a body of water (American Meteorological Society, 2009).
	Wildfire	A wildfire is a raging, uncontrolled fire that spreads rapidly through vegetative fuels, exposing and possibly consuming structures. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that can be seen for miles. Wildfires can occur at any time of the year, but mostly occur during long, dry hot spells. Any small fire in a wooded area, if not quickly detected and suppressed, can get out of control. Most wildfires are caused by human carelessness, negligence and ignorance. However, some are precipitated by lightning strikes and in rare instances, spontaneous combustion. Wildfires in Pennsylvania can occur in fields, grass, brush and forests. 98% of wildfires in Pennsylvania are a direct result of people, often caused by debris burns (Department of Conservation and Natural Resources, 2009).
	Winter Storm	Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. A winter storm can range from a moderate snowfall or ice event over a period of a few hours to blizzard conditions with wind-driven snow that lasts for several days. Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can severely impair visibility and disrupt transportation. The Commonwealth of Pennsylvania has a long history of severe winter weather. (NOAA, 2009).

Table 4.2-3. Summary of Human-Made Hazards

	Hazard	How Identified
Human-Made Hazards	**Building or Structure Collapse**	Collapse of a building or structure refers to the loss of the load-carrying capacity of a component of the structure or the entire structure itself. The loss of a structure's load-carrying capacity occurs when the loads applied to the structure exceed the structure's load-carrying capacity. This can be a result of improper design, lack of maintenance, events from a structure's load history that have gradually reduced its load-carrying capacity, or a sudden and sever hazard event such as severe weather, terrorism, or earthquake (Ratay, 2000).
	Civil Disturbance	Civil disturbance hazards encompass a set of hazards emanating from a wide range of possible events that cause civil disorder, confusion, strife, and economic hardship. Civil disturbance hazards include the following: • **Famine**; involving a widespread scarcity of food leading to malnutrition and increased mortality (Robson, 1981). • **Economic Collapse, Recession**; very slow or negative growth (Economist, 2009). • **Misinformation, Public Unrest, Mass Hysteria, Riot**; group acts of violence against property or individuals (18 U.S.C. § 232, 2008). • **Strike, Labor Dispute**; controversies related to the terms and conditions of employment (29 U.S.C. § 113, 2008).
	Dam Failure	A dam is a barrier across flowing water that obstructs, directs, or slows down water flow. Dams provide benefits such as flood protection, power generation, drinking water, irrigation, and recreation. Failure of these structures results in an uncontrolled release of impounded water. Failures are relatively rare, but immense damage and loss of life is possible in downstream communities when such events occur. Aging infrastructure, hydrologic, hydraulic and geologic characteristics, population growth, and design and maintenance practices should be considered when assessing dam failure hazards. The failure of the South Fork Dam, located in Johnstown, PA, was the deadliest dam failure ever experienced in the United States. It took place in 1889 and resulted in the Johnstown Flood which claimed 2,209 lives (FEMA, 1997). Today there are approximately 3,200 dams and reservoirs throughout Pennsylvania (Pennsylvania Department of Environmental Protection, 2009).

Hazard		How Identified
	Disorientation	Large numbers of people are attracted to Pennsylvania's rural areas for recreational purposes such as hiking, camping, hunting, and fishing. As a result, people can become lost or trapped in remote and rugged wilderness areas. Search and rescue may be required for people who suffer from medical problems or injuries and those who become accidentally or intentionally disoriented. Search and rescue efforts are focused in and around state forest and state park lands (DCNR, 2009).
	Drowning	Drowning is death from suffocation, typically associated with swimming, fishing, boating, bridge accidents, or suicide. It can be a significant hazard in communities with numerous residential pools or water bodies (e.g. ponds, lakes, rivers) and extensive outdoor recreational activity. Drowning rates are particularly high for children ages 1-14. The Centers for Disease Control and Prevention estimates that drowning is the second leading cause of injury death (after motor vehicle crashes) among children ages 1-14 (CDC, 2008).
	Environmental Hazards • Hazardous Materials • Marcellus Shale Natural Gas Extraction	Environmental hazards are hazards that pose threats to the natural environment, the built environment, and public safety through the diffusion of harmful substances, materials, or products. Environmental hazards include the following: • **Hazardous material releases**; at fixed facilities or as such materials are in transit and including toxic chemicals, infectious substances, biohazardous waste, and any materials that are explosive, corrosive, flammable, or radioactive (PL 1990-165, § 207(e)). • **Air or Water Pollution**; the release of harmful chemical and waste materials into water bodies or the atmosphere, for example (National Institute of Health Sciences, July 2009; Environmental Protection Agency, Natural Disaster PSAs, 2009). • **Superfund Facilities**; hazards originating from abandoned hazardous waste sites listed on the National Priorities List (Environmental Protection Agency, National Priorities List, 2009). • **Manure Spills**; involving the release of stored or transported agricultural waste, for example (Environmental Protection Agency, Environmental Impacts of…, 1998). • **Product Defect or Contamination**; highly flammable or otherwise unsafe consumer products and dangerous foods (Consumer Product Safety Commission, 2003).
	Terrorism	Terrorism is use of force or violence against persons or property with the intent to intimidate or coerce. Acts of terrorism include threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber attacks (computer-based); and the use of chemical, biological, nuclear and radiological weapons. (FEMA, 2009).

Hazard		How Identified
	Transportation Accidents	Transportation accidents can result from any form of air, rail, water, or road travel. It is unlikely that small accidents would significantly impact the larger community. However, certain accidents could have secondary regional impacts such as a hazardous materials release or disruption in critical supply/access routes, especially if vital transportation corridors or junctions are present. (Research and Innovative Technology Administration, 2009). Traffic congestion in certain circumstances can also be hazardous. Traffic congestion occurs when traffic approaches or exceeds the available capacity of the road network. This hazard should be evaluated during emergency planning since it is a key factor in timely disaster or hazard response, especially in areas with high population density. (Federal Highway Administration, 2009).
	Urban Fire and Explosion	An urban fire involves a structure or property within an urban or developed area. For hazard mitigation purposes, major urban fires involving large buildings and/or multiple properties are of primary concern. The effects of a major urban fire include minor to significant property damage, loss of life, and residential or business displacement. Explosions are extremely rapid releases of energy that usually generate high temperatures and often lead to fires. The risk of severe explosions can be reduced through careful management of flammable and explosive hazardous materials. (FEMA, 1997).
	Utility Interruption	Utility interruption hazards are hazards that impair the functioning of important utilities in the energy, telecommunications, public works, and information network sectors. Utility interruption hazards include the following: • **Geomagnetic Storms**; including temporary disturbances of the Earth's magnetic field resulting in disruptions of communication, navigation, and satellite systems (National Research Council et al., 1986). • **Fuel or Resource Shortage**; resulting from supply chain breaks or secondary to other hazard events, for example (Mercer County, PA, 2005). • **Electromagnetic Pulse**; originating from an explosion or fluctuating magnetic field and causing damaging current surges in electrical and electronic systems (Institute for Telecommunications Sciences, 1996). • **Information Technology Failure**; due to software bugs, viruses, or improper use (Rainer Jr., et al, 1991). • **Ancillary Support Equipment**; electrical generating, transmission, system-control, and distribution-system equipment for the energy industry (Hirst & Kirby, 1996). • **Public Works Failure**; damage to or failure of highways, flood control systems, deepwater ports and harbors, public buildings, bridges, dams, for example (United States Senate Committee on Environment and Public Works, 2009). • **Telecommunications System Failure**; Damage to data transfer, communications, and processing equipment, for example (FEMA, 1997) • **Transmission Facility or Linear Utility Accident**; liquefied

Hazard		How Identified
		natural gas leakages, explosions, facility problems, for example (United States Department of Energy, 2005) • **Major Energy, Power, Utility Failure**; interruptions of generation and distribution, power outages, for example (United States Department of Energy, 2000).

4.3 Hazard Profiles and Vulnerability Analysis

Hazard profiling investigates the impact, historical occurrence, and probability of future occurrence for hazards that can affect Fayette County, as determined through hazard identification. Hazard profiling exposes the unique characteristics of individual hazards and begins the process of determining which areas within Fayette County are vulnerable to a specific hazard event. Throughout this section, it may be helpful to refer back to Figure 2.2-1 (Critical Facilities in Fayette County), to review the vulnerabilities of each municipality. Additionally, Appendix E contains a list of critical facilities by municipality.

NATURAL HAZARDS

4.3.1 Flood, Flash Flood, Ice Jam

4.3.1.1 Location and Extent

Located within the Ohio River Basin, all of Fayette County is in the Monongahela River Watershed, which is, in turn, comprised of the Monongahela and Youghiogheny Rivers and their respective tributaries. For inland areas, excess water from snowmelt or rainfall accumulates and overflows onto stream banks and adjacent floodplains. Floodplains are lowlands adjacent to rivers, streams and creeks that are subject to recurring floods. The size of the floodplain is described by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in Section 4.3.1.4. However, in assessing the potential spatial extent of flooding it is important to know that a floodplain associated with a flood that has a 10 percent chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2% annual chance of occurring. The National Flood Insurance Program (NFIP), for which Flood Insurance Rate Maps (FIRM) are published, identifies the 1% annual chance flood. This 1% annual chance flood event is used to delineate the *Special Flood Hazard Area* (SFHA) and identify *Base Flood Elevations*. Figure 4.3.1-1 illustrates these terms. The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania, and Fayette County local governments.

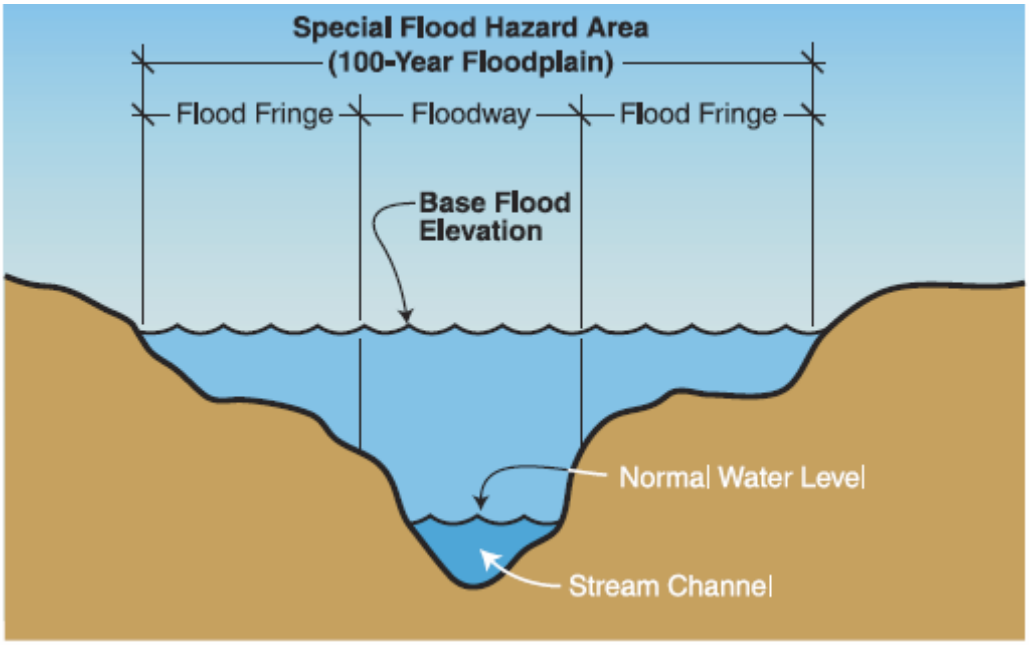
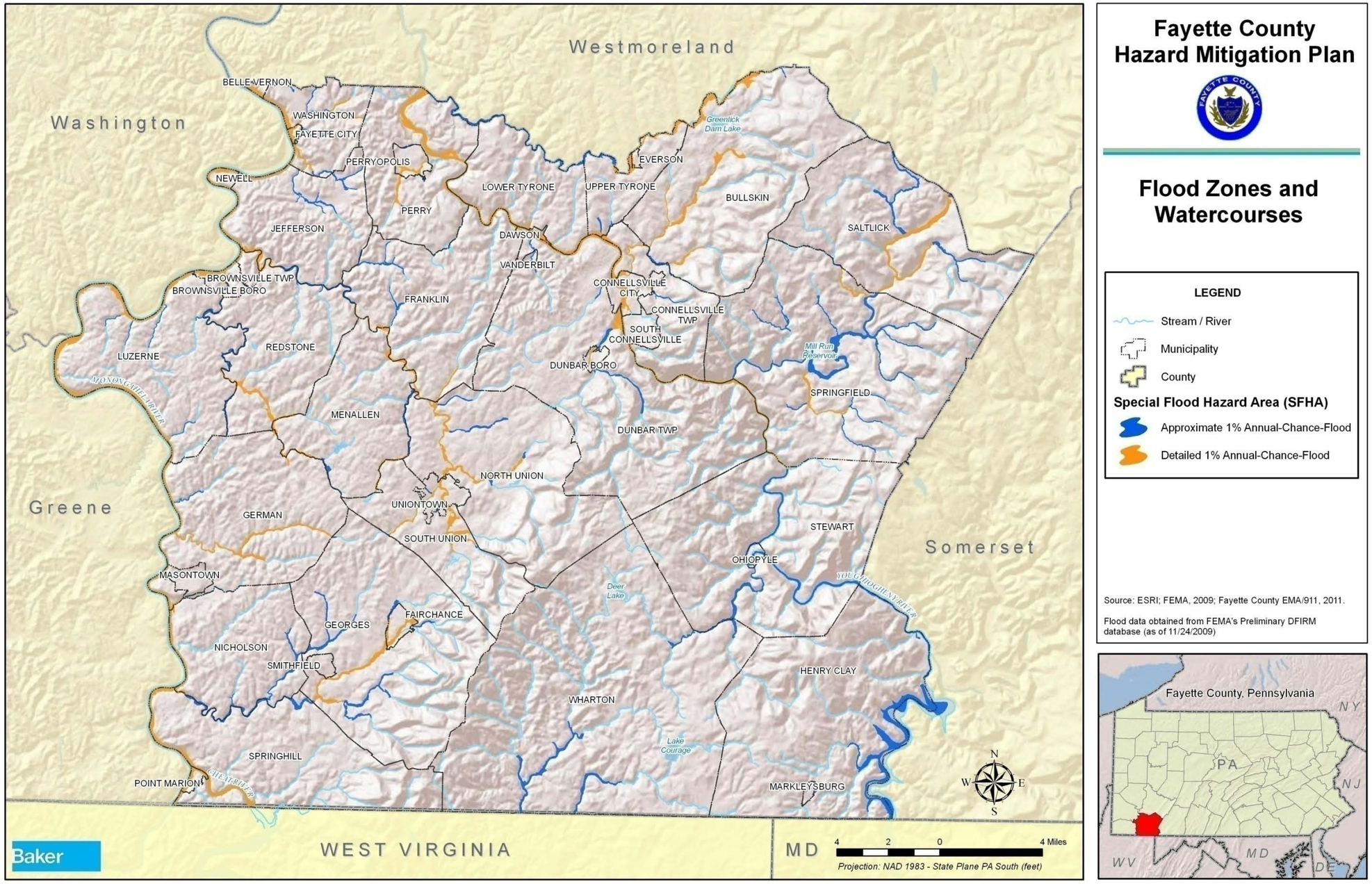


Figure 4.3.1-1. Special Flood Hazard Area, 1% annual chance diagram

42 of Fayette County's 42 municipalities are flood prone. Appendix D contains flood risk maps, based upon the draft Digital Flood Insurance Rate Maps (DFIRM), for each of the 42 municipalities in Fayette County.

Watercourses prone to flooding include: Monongahela River, Youghiogheny River, and Redstone, Indian, Jacobs, Champion, and Deadman's Run Creeks. Flooding can occur throughout the year. Figure 4.3.1-2 illustrates the flood prone areas for the County.



Fayette County Hazard Mitigation Plan

Flood Zones and Watercourses

LEGEND

- Stream / River
- Municipality
- County

Special Flood Hazard Area (SFHA)

- Approximate 1% Annual-Chance-Flood
- Detailed 1% Annual-Chance-Flood

Source: ESRI; FEMA, 2009; Fayette County EMA/911, 2011.

Flood data obtained from FEMA's Preliminary DFIRM database (as of 11/24/2009)

Figure 4.3.1-2. Flood Zones and Waterways in Fayette County

4.3.1.2 Range of Magnitude

Floods are the most prevalent type of natural disaster occurring in the Commonwealth of Pennsylvania and Fayette County. Pennsylvania is one of the most flood-prone states in the nation. From rural areas to suburban communities, floods (especially flash floods) are a constant concern. Floods, seasonal or flash, have been the cause of millions of dollars in annual property damages, loss of lives, and disruption of economic activities. The Commonwealth of Pennsylvania leads the nation on flood related losses. Over 94% of Pennsylvania's municipalities have been designated as flood-prone.

Floodplain management, flood control structures, and flood relief funds are strategies that have reduced the Commonwealth's annual flood damages significantly, but these structures cannot completely protect all existing and future flood plain development.

The impacts due to flooding, in terms of injuries, damages, and death, can vary in degrees from minor to catastrophic:

- **Minor** – Very few injuries, if any. Only minor property damage & minimal disruption on quality of life. Temporary shutdown of critical facilities.
- **Limited** – Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.
- **Critical** – Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.
- **Catastrophic** – High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.

The worst case scenario would be a catastrophic flood resulting in loss of life and massive property damage across the County. Fayette County is susceptible to the entire range of flooding hazards, from minor to catastrophic.

4.3.1.3 Past Occurrence

Flooding is an annual event expected by residents in various locations throughout Fayette County. This has caused much inconvenience and hardship. Property damage has often been quite heavy. Table 4.3-1 is a summary of Fayette County flooding occurrences. Floods in 1972, 1985, 1996, and 2000 resulted in the largest property damages. In 1985 and 1996, flooding was so severe that Presidential Disaster Declarations were issued. Since 1994, there has only been one flood-related death in Fayette County (in 2004).

Table 4.3-1. History of Flooding in Fayette County

Date	Location	Estimated Cost
6/21/1972	N/A	$7,462,687
11/5/1985	N/A	$5,000,000
3/10/1994	Redstone Creek near Brownsville	$50,000

Date	Location	Estimated Cost
8/2/1994	Labelle	$50,000
8/4/1995	Uniontown	$20,000
1/19/1996	Along Youghiogheny and the Monongahela Rivers	$2,540,000
6/8/1996	Uniontown	$6,000
3/2/1997	Connellsville	$10,000
5/25/1997	Indian Creek	$5,000
9/19/1998	Uniontown	$50,000
7/28/1999	Uniontown	$5,000
2/14/2000	Hopwood	$10,000
2/18/2000	Monongahela River	$20,000
2/19/2000	Along Youghiogheny and the Monongahela Rivers	$1,250,000
6/27/2000	Deadman's Run Creek	$5,000
7/10/2000	Brownsville	$5,000
8/6/2000	Mill Run, Perryopolis, Connellsville, South Connellsville, Dunbar, Dawson and the Bullskin Township areas	$500,000
8/6/2000	Youghiogheny River in South Connellsville	$100,000
8/6/2000	Indian Creek, Jacobs Creek	$5,000
6/20/2001	Uniontown	$50,000
8/4/2001	Champion Creek in Saltlick Township	$250,000
3/26/2002	Widespread small stream flooding	$85,000
5/9/2002	Brownsville and Perryopolis boroughs, as well as Luzerne, Jefferson, Franklin, Perry and Saltlick townships	$200,000
6/13/2002	Indian Head	$20,000
7/23/2002	Uniontown	$10,000
7/8/2003	Perryopolis	$10,000
8/8/2003	Fairchance	$10,000
8/9/2003	Fairchance	$5,000
8/27/2003	Hopwood	$5,000
11/19/2003	Connellsville	$530,000
2/6/2004	Ice jams cause flooding in southern Fayette County	$85,000
4/13/2004	Along Youghiogheny and the Monongahela Rivers	$25,000
5/18/2004	Hopwood	$5,000
7/18/2004	Connellsville	$3,000
9/8/2004	Redstone and Uniontown	$15,000

Date	Location	Estimated Cost
1/6/2005	Fayette City to Belle Vernon	$20,000
1/12/2005	Youghiogheny River	$30,000
3/28/2005	Youghiogheny River near Connellsville	$8,000
3/28/2005	Youghiogheny River near Connellsville	$10,000
6/11/2005	Uniontown	$9,000
7/5/2007	Youghiogheny River near Connellsville	$50,000
8/9/2007	Uniontown	$25,000
8/9/2007	Brownsville	$50,000
8/9/2007	Connellsville	$30,000
8/9/2007	Newell	$10,000
12/14/2007	Fayette City	$5,000
6/16/2008	Uniontown	$100,000
12/19/2008	Widespread small stream flooding	$5,000
5/4/2009	Tunnel flooding	$10,000
6/17/2009	Dunbar Township	$250,000
	Total Cost Estimate	**$19,013,687**

Source: National Oceanic and Atmospheric Administration, 2011; SHELDUS, 2011.

In addition to the aforementioned past flood events, the NFIP identifies properties that frequently experience flooding. *Repetitive loss properties* are structures insured under the NFIP which have had at least two paid flood losses of more than $1,000 over any ten year period since 1978. A property is considered a *severe repetitive loss property* either when there are at least four losses each exceeding $5,000 or when there are two or more losses where the building payments exceed the property value. As of January 2010, there were 48 repetitive loss properties in Fayette County, one of which was insured and twenty-seven (27) of which were identified as *single family* (PA All-HMP, 2010). Table 4.3-2 shows the number of repetitive loss properties by municipality. There are no severe repetitive loss properties in Fayette County.

Table 4.3-2. NFIP Repetitive Loss Properties in Fayette County

Municipality	2-4 FAMILY	ASSMD CONDO	NON-RESIDENTIAL	OTHER	SINGLE FAMILY	TOTAL
BELLE VERNON BOROUGH	3	0	2	1	7	**13**
BROWNSVILLE BOROUGH	0	0	2	0	1	**3**
BROWNSVILLE TOWNSHIP	0	0	0	0	0	**0**
BULLSKIN TOWNSHIP	0	0	0	0	0	**0**

Municipality	2-4 FAMILY	ASSMD CONDO	NON-RESIDENTIAL	OTHER	SINGLE FAMILY	TOTAL
CONNELLSVILLE CITY	0	0	0	0	2	**2**
CONNELLSVILLE TOWNSHIP	0	0	1	0	0	**1**
DAWSON BOROUGH	0	0	0	0	0	**0**
DUNBAR BOROUGH	0	0	1	0	0	**1**
DUNBAR TOWNSHIP	0	0	0	0	0	**0**
EVERSON BOROUGH	0	0	0	0	0	**0**
FAIRCHANCE BOROUGH	0	0	0	0	0	**0**
FAYETTE CITY BOROUGH	0	0	2	0	4	**6**
FRANKLIN TOWNSHIP	0	0	0	0	0	**0**
GEORGES TOWNSHIP	0	0	0	0	0	**0**
GERMAN TOWNSHIP	0	0	0	0	0	**0**
HENRY CLAY TOWNSHIP	0	0	0	0	0	**0**
JEFFERSON TOWNSHIP	0	0	0	0	1	**1**
LOWER TYRONE TOWNSHIP	0	0	0	0	0	**0**
LUZERNE TOWNSHIP	0	0	0	0	3	**3**
MARKLEYSBURG BOROUGH	0	0	0	0	0	**0**
MASONTOWN BOROUGH	0	0	0	0	0	**0**
MENALLEN TOWNSHIP	0	0	0	0	0	**0**
NEWELL BOROUGH	0	0	0	0	0	**0**
NICHOLSON TOWNSHIP	0	0	0	0	0	**0**
NORTH UNION TOWNSHIP	0	0	0	0	0	**0**
OHIOPYLE BOROUGH	0	0	0	0	0	**0**
PERRY TOWNSHIP	0	1	1	0	0	**2**
PERRYOPOLIS BOROUGH	0	0	1	0	2	**3**
POINT MARION BOROUGH	0	0	0	0	2	**2**
REDSTONE TOWNSHIP	0	0	1	0	1	**2**
SALTLICK TOWNSHIP	0	0	0	0	1	**1**
SMITHFIELD BOROUGH	0	0	0	0	0	**0**
SOUTH CONNELLSVILLE BOROUGH	0	0	0	0	0	**0**
SOUTH UNION TOWNSHIP	0	0	1	0	2	**3**
SPRINGFIELD	0	0	0	0	0	**0**

Municipality	2-4 FAMILY	ASSMD CONDO	NON-RESIDENTIAL	OTHER	SINGLE FAMILY	TOTAL
TOWNSHIP						
SPRINGHILL TOWNSHIP	0	0	0	0	0	**0**
STEWART TOWNSHIP	0	0	0	0	0	**0**
UNIONTOWN CITY	0	0	4	0	1	**5**
UPPER TYRONE TOWNSHIP	0	0	0	0	0	**0**
VANDERBILT BOROUGH	0	0	0	0	0	**0**
WASHINGTON TOWNSHIP	0	0	0	0	0	**0**
WHARTON TOWNSHIP	0	0	0	0	0	**0**
TOTALS	**3**	**1**	**16**	**1**	**27**	**48**

Floods are the most common and costly natural catastrophe. In terms of economic disruption, property damage, and loss of life, floods are “nature’s number-one disaster.” For that reason, flood insurance is almost never available under industry-standard homeowner’s and renter’s policies. The best way for citizens to protect their property against loss to flood is to purchase flood insurance through the National Flood Insurance Program (NFIP).

Congress established the NFIP in 1968 to help control the growing cost of federal disaster relief. The NFIP is administered by the Federal Emergency Management Agency (FEMA), part of the U.S. Department of Homeland Security. The NFIP offers federally backed flood insurance in communities that adopt and enforce effective floodplain management ordinances to reduce future flood losses.

Since 1983, the chief means of providing flood insurance coverage has been a cooperative venture of FEMA and the private insurance industry known as the Write Your Own (WYO) Program. This partnership allows qualified property and casualty insurance companies to “write” (that is, issue) and service the NFIP’s Standard Flood Insurance Policy (SFIP) under their own names.

Today, nearly 90 WYO insurance companies issue and service the SFIP under their own names. More than 4.4 million federal flood insurance policies are in force. These policies represent $650 billion in flood insurance coverage for homeowners, renters, and business owners throughout the United States and its territories.

The NFIP provides flood insurance to individuals in communities that are members of the program. Membership in the program is contingent on the community adopting and enforcing floodplain management and development regulations.

The NFIP is based on the voluntary participation of communities of all sizes. In the context of this program, a “community” is a political entity – whether an incorporated city, town, township,

borough, or village, or an unincorporated area of a county or parish – that has legal authority to adopt and enforce floodplain management ordinances for the area under its jurisdiction.

National Flood Insurance is available only in communities that apply for participation in the NFIP and agree to implement prescribed flood mitigation measures. Newly participating communities are admitted to the NFIP's Emergency Program. Most of these communities quickly earn "promotion" to the Regular Program.

The Emergency Program is the initial phase of a community's participation in the NFIP. In return for the local government's agreeing to adopt basic floodplain management standards, the NFIP allows local property owners to buy modest amounts of flood insurance coverage.

In return for agreeing to adopt more comprehensive floodplain management measures, an Emergency Program community can be "promoted" to the Regular Program. Local policyholders immediately become eligible to buy greater amounts of flood insurance coverage. All participating municipalities in Fayette County are in the Regular Program.

The minimum floodplain management requirements include:

- Review and permit all development in the Special Flood Hazard Area (SFHA);
- Elevate new and substantially improved residential structures above the BFE;
- Elevate or dry floodproof new and substantially improved non-residential structures;
- Limit development in floodways;
- Locate or construct all public utilities and facilities to minimize or eliminate flood damage; and
- Anchor foundation or structure to resist floatation, collapse, or lateral movement.

In addition, Regular Program communities are eligible to participate in the NFIP's Community Rating System (CRS). Under the CRS, policyholders can receive premium discounts of 5 to 45 percent as their cities and towns adopt more comprehensive flood mitigation measures. To date, no municipalities in Fayette County participate in the CRS.

Table 4.3-3 lists the Fayette County municipalities participating in the NFIP. Note that 40 of 42 municipalities participate in the program. The two exceptions are Smithville and South Connellsville Boroughs.

Table 4.3-3. National Flood Insurance Program Communities

COMMUNITY	PARTICIPATION STATUS	CID	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
BELLE VERNON BOROUGH	PARTICIPATING	420457	07/16/81	11/16/95
BROWNSVILLE BOROUGH	PARTICIPATING	420458	09/16/81	11/16/95
BROWNSVILLE TOWNSHIP	PARTICIPATING	421621	02/17/82	11/16/95

COMMUNITY	PARTICIPATION STATUS	CID	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
BULLSKIN TOWNSHIP	PARTICIPATING	421622	04/16/91	12/06/02
CONNELLSVILLE CITY	PARTICIPATING	420459	03/01/78	03/01/78
CONNELLSVILLE TOWNSHIP	PARTICIPATING	421623	07/16/91	07/16/91
DAWSON BOROUGH	PARTICIPATING	420460	03/04/88	03/04/88
DUNBAR BOROUGH	PARTICIPATING	420461	03/18/91	03/18/91
DUNBAR TOWNSHIP	PARTICIPATING	421624	07/04/88	07/04/88
EVERSON BOROUGH	PARTICIPATING	420462	08/01/79	12/06/02
FAIRCHANCE BOROUGH	PARTICIPATING	420463	04/16/91	04/16/91
FAYETTE CITY BOROUGH	PARTICIPATING	420464	02/03/82	12/19/95
FRANKLIN TOWNSHIP	PARTICIPATING	421625	03/18/91	03/18/91
GEORGES TOWNSHIP	PARTICIPATING	421626	04/16/91	04/16/91
GERMAN TOWNSHIP	PARTICIPATING	421627	04/16/91	04/03/96
HENRY CLAY TOWNSHIP	PARTICIPATING	421628	01/01/87	01/01/87(L)
JEFFERSON TOWNSHIP	PARTICIPATING	421629	06/01/79	09/30/95
LOWER TYRONE TOWNSHIP	PARTICIPATING	421630	03/04/88	03/04/88
LUZERNE TOWNSHIP	PARTICIPATING	421631	03/01/82	09/20/95
MARKLEYSBURG BOROUGH	PARTICIPATING	422606	06/19/85	06/19/85
MASONTOWN BOROUGH	PARTICIPATING	422572	09/04/91	02/02/95
MENALLEN TOWNSHIP	PARTICIPATING	421632	04/16/91	04/16/91
NEWELL BOROUGH	PARTICIPATING	420465	04/15/81	11/16/95
NICHOLSON TOWNSHIP	PARTICIPATING	422420	09/04/91	09/06/95
NORTH UNION TOWNSHIP	PARTICIPATING	421633	04/16/91	04/16/91
OHIOPYLE BOROUGH	PARTICIPATING	421615	12/01/86	12/01/86(L)
PERRY TOWNSHIP	PARTICIPATING	421634	04/15/82	04/15/82
PERRYOPOLIS BOROUGH	PARTICIPATING	421616	02/03/82	02/03/82
POINT MARION BOROUGH	PARTICIPATING	421617	07/04/88	06/16/95
REDSTONE TOWNSHIP	PARTICIPATING	421635	01/06/82	01/06/82
SALTLICK TOWNSHIP	PARTICIPATING	421636	03/18/91	03/18/91
SMITHFIELD BOROUGH	NOT PARTICIPATING	421618		
SOUTH CONNELLSVILLE BOROUGH	NOT PARTICIPATING	421619		
SOUTH UNION TOWNSHIP	PARTICIPATING	421637	04/16/91	04/16/91
SPRINGFIELD TOWNSHIP	PARTICIPATING	421638	04/16/91	04/16/91
SPRINGHILL TOWNSHIP	PARTICIPATING	421639	03/18/91	04/17/95
STEWART TOWNSHIP	PARTICIPATING	421640	01/01/87	01/01/87(L)
UNIONTOWN CITY	PARTICIPATING	420466	05/01/78	05/01/78
UPPER TYRONE TOWNSHIP	PARTICIPATING	420467	03/15/79	12/06/02

COMMUNITY	PARTICIPATION STATUS	CID	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
VANDERBILT BOROUGH	PARTICIPATING	421620	01/01/87	01/01/87(L)
WASHINGTON TOWNSHIP	PARTICIPATING	421641	01/20/82	09/06/95
WHARTON TOWNSHIP	PARTICIPATING	421642	01/01/86	01/01/87(L)

Table Notes:
CID *– Community Identification Number.*

FIRM *– Flood Insurance Rate Map.*

(L) *– Minimally Flood Prone, with Flood Hazard Boundary Map converted to Flood Insurance Rate Map by letter, no change in flooding shown on map, no elevation on map.*

4.3.1.4 Future Occurrence

In Fayette County, flooding occurs commonly and can occur during any season of the year. Therefore, the future occurrence of floods in Fayette County can be characterized as *highly likely*. Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence. The NFIP uses historical records to determine the probability of occurrence for different extents of flooding. The probability of occurrence is expressed in percentages as the chance of a flood of a specific extent occurring in any given year.

A specific flood that is used for a number of purposes is called the “base flood”, which has a one percent chance of occurring in any particular year. The base flood is often referred to as the “100-year flood” since its probability of occurrence suggests it should reoccur once every 100 years, although this is not the case in practice. As noted previously, this plan will instead refer to the 1% annual chance flood. A 1% annual chance flood is a flood which has a 1 percent chance of occurring over a given year. The NFIP recognizes the base flood as the standard for identifying properties subject to federal flood insurance purchase requirements. Table 4.3-4Table 4.3-4 shows a range of flood recurrence intervals and associated probabilities of occurrence.

Table 4.3-4. Flood Probability

Flood Recurrence Intervals	Chance of Occurrence in Any Given Year, %
10 Year	10
50 Year	2
100 Year	1
500 Year	0.2

4.3.1.5 Vulnerability Assessment

Fayette County is vulnerable to flooding that causes loss of lives, property damage, and road closures. The flood hazard vulnerability assessment for the County focuses on community assets that are located in the 1% annual chance floodplain. While greater and smaller floods are possible, information about the extent and depths for this floodplain is available for all municipalities countywide, thus providing a consistent basis for analysis. Flood vulnerability maps for each municipality, showing the 1% annual chance flood hazard area and addressable structures, critical facilities, and transportation routes within the hazard area, are shown in Appendix D. These maps were created using FEMA's Preliminary DFIRM database. The DFIRMs should be finalized in the summer of 2011.

Most of the municipalities in Fayette County have flood prone areas. The waterways prone to flooding include the Monongahela and Youghiogheny Rivers, as well as Redstone, Indian, Jacobs, Champion, and Deadmans Run Creeks. As shown in Table 4.3-5, 15 out of Fayette County's 225 critical facilities are located within a NFIP Special Flood Hazard Area (SFHA; 1% annual chance flood zone).

Table 4.3-5. Critical Facilities within Special Flood Hazard Area

MUNICIPALITY	NUMBER OF FACILITIES
Belle Vernon Borough	1
Brownsville Borough	2
Brownsville Township	1
Bullskin Township	2
Connellsville, City	3
Dunbar Borough	2
Fayette City	1
Point Marion Borough	2
Uniontown, City	1
TOTAL	**15**

Currently, there are 2,240 total addressable structures located within a SFHA in Fayette County. Approximately 3.2% of Fayette County's population and 3.4% of its addressable structures are located within the SFHA. Table 4.3-6 details the number of parcels, addressable structures, and property value within SFHAs by municipality.

Table 4.3-6. Summary of Properties in SFHA (1% annual chance flood zone) by Municipality

Municipality	# of Parcels in SFHA	# of Addressable Structures in SFHA	Total Value of Property in SFHA
Belle Vernon Borough	482	443	$ 26,637,580
Brownsville Borough	1,565	1,136	$ 53,412,700

Municipality	# of Parcels in SFHA	# of Addressable Structures in SFHA	Total Value of Property in SFHA
Brownsville Township	536	380	$ 14,610,240
Bullskin Township	4,763	3,337	$ 272,264,370
Connellsville City	3,472	3,129	$ 216,279,810
Connellsville Township	1,290	1,067	$ 74,225,030
Dawson Borough	256	210	$ 9,366,330
Dunbar Borough	255	507	$ 22,204,270
Dunbar Township	4,121	3,728	$ 270,695,330
Everson Borough	390	354	$ 19,087,460
Fairchance Borough	970	821	$ 45,419,720
Fayette City Borough	373	369	$ 15,335,160
Franklin Township	1,541	1,301	$ 79,106,030
Georges Township	3,480	3,202	$ 228,545,660
German Township	3,245	2,803	$ 145,084,790
Henry Clay Township	1,846	1,526	$ 92,334,660
Jefferson Township	1,174	1,005	$ 70,096,620
Lower Tyrone Township	651	568	$ 45,759,890
Luzerne Township	2,836	2,315	$ 747,527,020
Markleysburg Borough	137	132	$ 5,491,740
Masontown Borough	1,755	1,500	$ 90,699,270
Menallen Township	2,328	2,075	$ 146,470,140
Newell Borough	367	281	$ 15,152,760
Nicholson Township	1,180	977	$ 53,221,080
North Union Township	6,223	5,724	$ 480,621,230
Ohiopyle Borough	81	76	$ 7,179,460
Perry Township	1,581	1,410	$ 89,141,940
Perryopolis Borough	921	863	$ 84,463,270
Point Marion Borough	670	565	$ 29,666,200
Redstone Township	3,618	2,981	$ 162,589,490
Saltlick Township	2,322	1,986	$ 140,751,880
Smithfield Borough	442	396	$ 23,596,820
South Connellsville Borough	1,127	890	$ 46,878,110
South Union Township	5,200	4,685	$ 594,239,710
Springfield Township	1,832	1,609	$ 97,424,750
Springhill Township	1,744	1,500	$ 90,383,620
Stewart Township	616	460	$ 32,960,310
Uniontown City	4,735	4,500	$ 341,519,590
Upper Tyrone Township	1,025	877	$ 60,119,590
Vanderbilt Borough	276	245	$ 8,014,000

Municipality	# of Parcels in SFHA	# of Addressable Structures in SFHA	Total Value of Property in SFHA
Washington Township	2,150	1,854	$ 138,494,170
Wharton Township	2,503	2,047	$ 446,815,740
TOTAL	**76,079**	**65,384**	**$5,633,887,540**

Additional information on flood vulnerability and losses in Fayette County, including the 1% annual chance flood event results from HAZUS, is provided in Section 4.4.3, Potential Loss Estimates.

4.3.2 Winter Storms

4.3.2.1 Location and Extent

Fayette County is subject to winter storms including heavy snowfall, ice, high winds, and extremely cold temperatures. By reviewing records from the National Weather Service, information from the PEMA, FEMA, and the Fayette County Emergency Management Agency, a profile, history, and probability of severe winter weather within Fayette County was compiled. Every municipality in Fayette County is subject to severe winter storms.

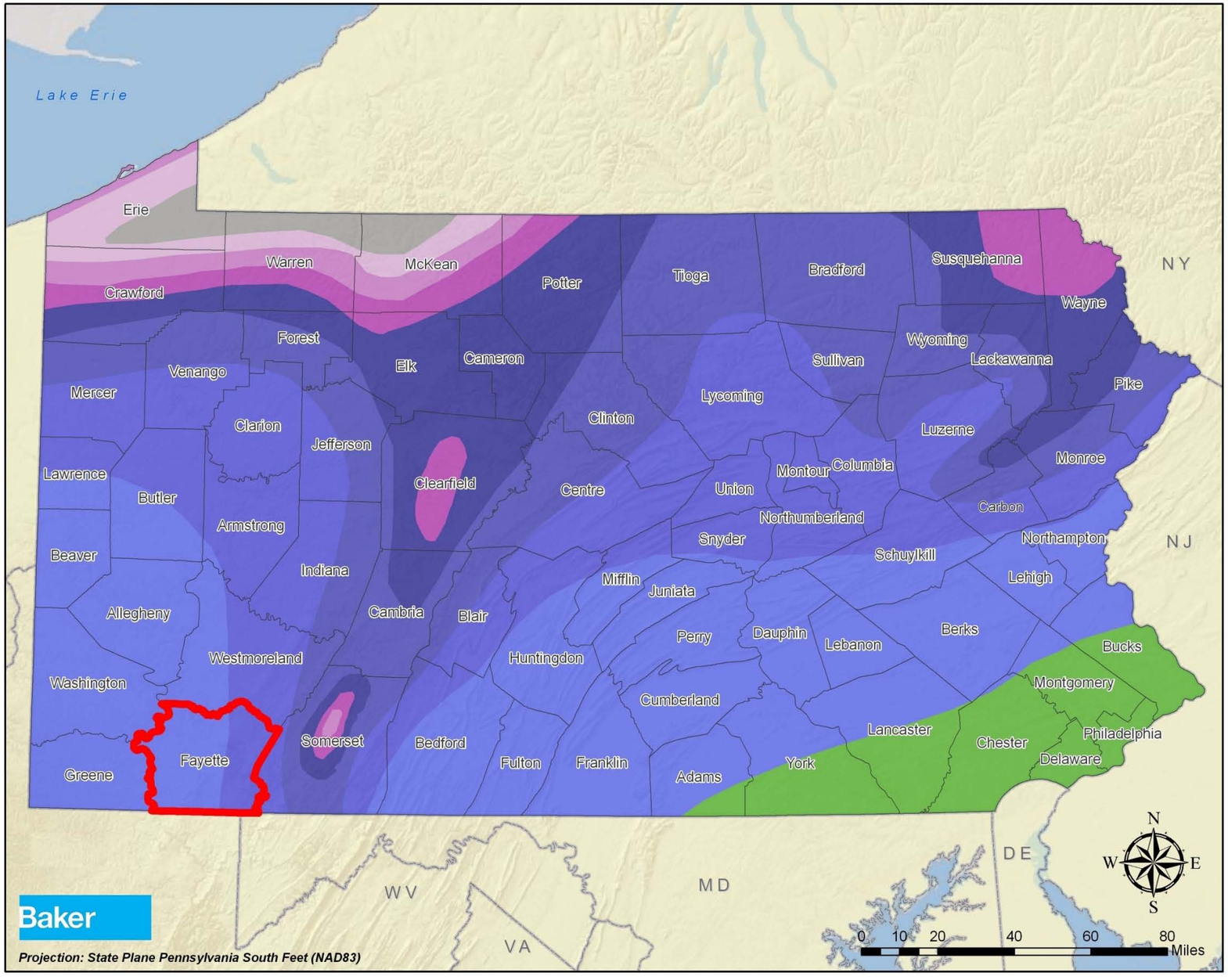
4.3.2.2 Range of Magnitude

Winter storms consist of cold temperatures, heavy snow or ice and sometimes strong winds. They begin as low-pressure systems that move through Pennsylvania either following the jet stream or developing as extra-tropical cyclonic weather systems over the Atlantic Ocean called nor'easters. Due to their regular occurrence, these storms are considered hazards only when they result in damage to specific structures or cause disruption to traffic, communications, electric power, or other utilities. A winter storm can adversely affect roadways, utilities, business activities and can cause loss of life, frostbite, or freezing. Winter storms may contain one or more of the following hazardous weather events:

- **Heavy Snowstorm**: Accumulations of four inches or more in a six-hour period, or six inches or more in a twelve-hour period.
- **Sleet Storm**: Significant accumulations of solid pellets can form from the freezing of raindrops or partially melted snowflakes causing slippery surfaces posing hazards to pedestrians and motorists.
- **Ice Storm**: Significant accumulations of rain or drizzle freezing on objects (trees, power lines, roadways, etc.) as it strikes them, causing slippery surfaces and damage from the sheer weight of ice accumulation.
- **Blizzard**: Wind velocity of 35 miles per hour or more, temperatures below freezing, considerable blowing snow with visibility frequently below one-quarter mile prevailing over an extended period of time.
- **Severe Blizzard**: Wind velocity of 45 miles per hour, temperatures of 10 degrees Fahrenheit or lower, a high density of blowing snow with visibility frequently measured in feet prevailing over an extended period time.

Any of the above events can result in the closing of major or secondary roads, particularly in rural locations, stranded motorists, transportation accidents, loss of utility services, and depletion of oil heating supplies. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice build-up and/or high winds which can break limbs or even bring down large trees. Gradual melting of snow and ice provides excellent groundwater recharge. However, high temperatures following a heavy snowfall can cause rapid surface water runoff and severe flooding.

Fayette County and its 42 municipalities are susceptible to the entire range of severe weather, from heavy snow storm to severe blizzard. The worst case scenario would be a series of multiple, severe blizzards causing major disruptions to utilities and transportation, and limiting the effectiveness of emergency response activities. Figure 4.3.2-1 shows mean annual snowfall in Fayette County ranges from 30 – 40 inches in the western half of the County to 40 – 50 inches in the east.



Fayette County Hazard Mitigation Plan

Average Annual Snowfall (1971-2000)

LEGEND

Average Annual Snowfall in inches

- 30 or Less
- 30-40
- 40-50
- 50-60
- 60-70
- 70-80
- 80-90
- 90-100
- 100+
- Counties
- States

Source: NOAA-NWSFO
Long-term average annual snowfall over the 29-year period from 1971-2000

Figure 4.3.2-1. Average Annual Snowfall in Pennsylvania

4.3.2.3 Past Occurrence

Winter storms occur on the average of five times a year in Fayette County. Fayette County experienced major winter storms in 1953 and 1958 in addition to the storms listed in Table 4.3-7. In all of these events, Pennsylvania was hit by a series of protracted winter storms. The severity and nature of these storms, combined with accompanying record-breaking frigid temperatures, posed a major threat to the lives, safety and well-being of Commonwealth residents and caused major disruptions to the activities of schools, businesses, hospitals, and nursing homes. The worst winter storm in recent history took place on February 5, 2010, bringing over two feet of snowfall to parts of the County and significantly impacting the operation of the County. The following table describes the estimated property damage resulting from past severe winter events in Fayette County.

Table 4.3-7. History of Severe Winter Storms in Fayette County

Date	Cost
12/29/1962	$517,624
11/30/1974	$942,026
3/14/1975	$100,000
1/26/1978	$8,552,696
12/10/1992	$114,135
3/13/1993	$39,098
2/8/1994	$31,401
1/2/1999	$21,667
10/25/2005	$27,659
TOTAL:	**$10,346,306**

Source: Hazards & Vulnerability Research Institute, SHELDUS, 2011.

4.3.2.4 Future Occurrence

Winter storms occur regularly and annually in Fayette County; their occurrence should be considered *highly likely*. The County is located in an area with the chance of equaling or exceeding total snow depths of 30 to 50 inches. An analysis of the past occurrences indicates that this trend will continue annually in the future.

4.3.2.5 Vulnerability Assessment

Based on the information available, all communities in Fayette County are essentially equally vulnerable to the direct impacts of winter storms. The mountainous terrain and high elevation of the eastern portion of the County increases the vulnerability to winter storms. The most obvious threat of winter weather is snow. Extreme snow is the most potentially disruptive to the public, for it can bring down power lines, trees, lead to roof collapses, and cause extremely hazardous driving conditions. Ice, cold temperatures, and high winds are also common and can be very dangerous. Severe winter storms could potentially produce an accumulation of snow and ice on trees and utility lines resulting in loss of electricity and blocked transportation routes.

Frequently, especially in rural areas, loss of electric power means loss of heat for residential customers, which poses an immediate threat to human life.

Because of the frequency of winter storms, strategies have been developed to respond to these events. Snow removal and utility repair equipment is available to respond to typical events. The use of auxiliary heat and electricity supplies such as wood burning stoves, kerosene heaters and gasoline power generators reduces the vulnerability of humans to extreme cold temperatures commonly associated with winter storms. People residing in structures lacking adequate equipment to protect against cold temperatures or significant snow and ice are more vulnerable to winter storm events. Even for communities that are prepared to respond to winter storms, severe events involving snow accumulations that exceed six or more inches in a twelve hour period can cause a large number of traffic accidents, strand motorists due to snow drifts, interrupt power supply and communications, and cause the failure of inadequately designed and/or maintained roof systems.

4.3.3 Tornadoes and Windstorms

4.3.3.1 Location and Extent

Severe wind can occur during severe thunderstorms, winter storms, coastal storms, or tornadoes. Straight-line winds such as a downburst have the potential to cause wind gusts that exceed 100 miles per hour. Based on 40 years of tornado history and over 100 years of hurricane history, FEMA identifies western and central Pennsylvania as being more susceptible to higher winds than eastern Pennsylvania (PA All-HMP, 2010). Tornadoes and windstorms pose a potential threat to Fayette County and the Commonwealth of Pennsylvania. Windstorms are usually associated with hurricanes, tropical storms, and tornadoes, but may also include thunderstorms and less violent storm systems. The destruction from these storms can be tremendous, destroying buildings, uprooting trees and injuring people. Severe thunderstorms most frequently occur in the summer in southwestern Pennsylvania. These usually occur in the late afternoon or during the evening or night hours. Tornadoes are considered a County-wide hazard because their path is unpredictable and can affect everyone in the county. Tornadoes and thunderstorms are most likely to occur during the spring months of May and June. Tornadoes during these months have also been the strongest, resulting in the greatest amount of harm or damage

4.3.3.2 Range of Magnitude

The Enhanced Fujita Scale, also known as the “EF-Scale,” measures tornado strength and associated damages. The EF-Scale is an update to the earlier Fujita scale that was published in 1971. It classifies United States tornadoes into six intensity categories, as shown in Table 4.3-8, based upon the estimated maximum winds occurring within the wind vortex. The EF-Scale has become the definitive metric for estimating wind speeds within tornadoes based upon the damage done to buildings and structures since it was implemented through the National Weather Service in 2007. The following table provides a summary of the EF-Scale along with the probability of actually being in the path of a tornado in any given year.

Table 4.3-8. Tornado Enhanced Fujita Scale, Associated Damage, and Probability of Occurrence

Tornado EF Number	Wind Speed – 3 Second Gusts (mph)	Expected Damage	Annual Probability of Occurrence (%)
EF0	65 - 85	Light damage: Some damage to chimneys; branches break from trees and shallow-rooted trees pushed over; damage to sign boards.	0.00031
EF1	86 - 110	Moderate damage: Peel surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off road.	0.00295
EF2	111 - 135	Considerable damage: Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.	0.00326
EF3	136 - 165	Severe damage: Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.	0.00109
EF4	166 - 200	Devastating damage: Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	0.0146
EF5	Over 200	Extreme damage: Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100 yards; trees debarked; incredible phenomena will occur.	0.00035

Source: National Oceanic and Atmospheric Administration, Storm Prediction Center, 2009.

As per American Society of Civil Engineers (ASCE) Wind Zone design guidelines, the shelters and critical facilities should be designed to withstand a 3-second gust of up to 200 mph in Fayette County (PA Wind Zone III, according to ASCE). Therefore, these structures should be able to withstand speeds experienced in an EF4 tornado. The worst case scenario for Fayette County would be the occurrence of an EF5 tornado, with wind speeds exceeding 200 miles per hour.

4.3.3.3 Past Occurrence

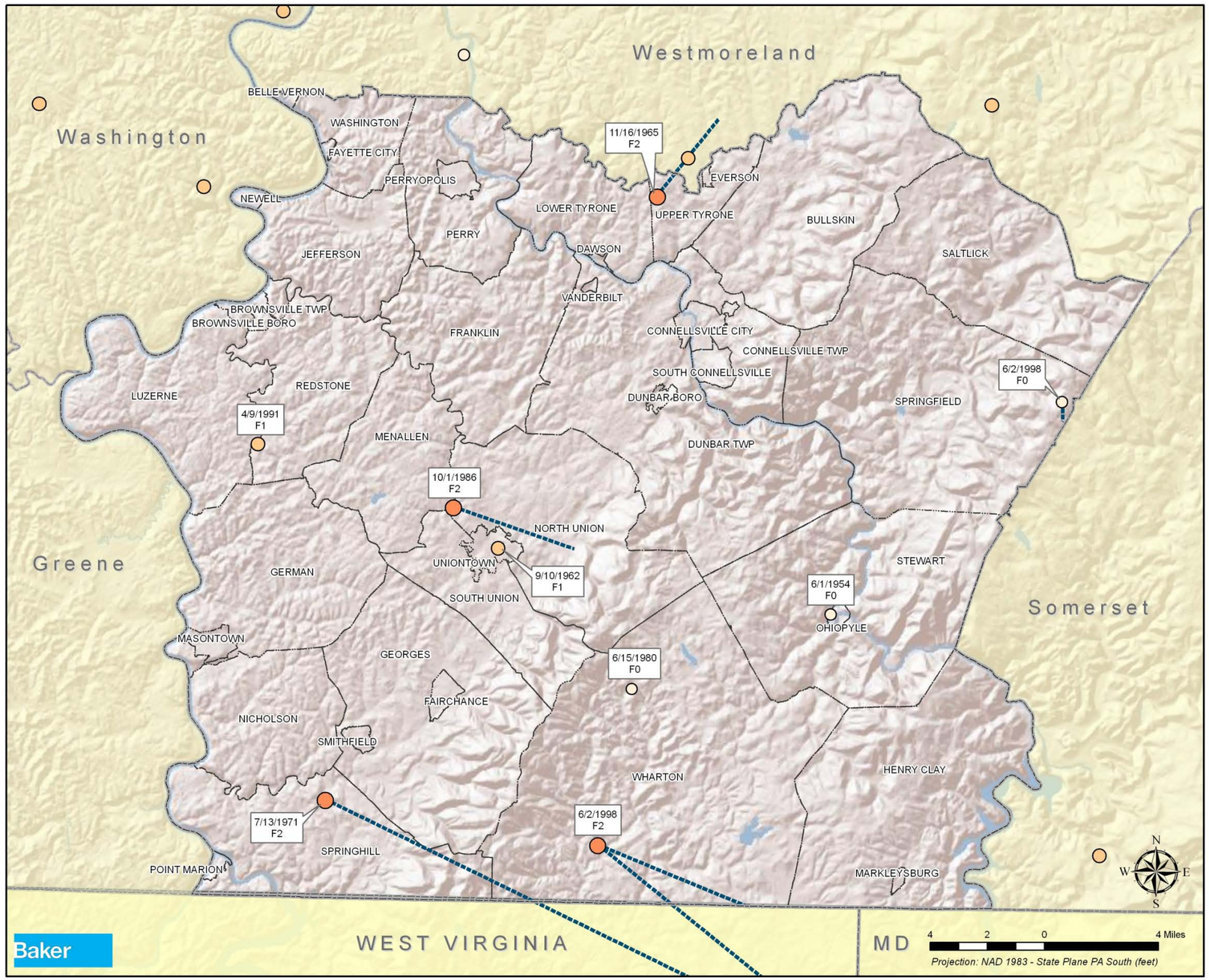
Based on NOAA Storm Prediction Center Statistics, the number of recorded EF3, EF4, & EF5 tornadoes between 1950-1998 ranges from 1 to 15 per 3,700 square miles of area across Pennsylvania (FEMA, 2009). No F3, F4, or F5 tornadoes occurred in Fayette County during this time period. However, Fayette County experienced eleven tornadoes of lesser magnitude between 1950 and 2008 (two occurring on the same day in June 1998). Tornadoes have resulted in 9 injuries, 0 deaths, and over $6.5 million in property damages (NOAA, 2011). Table 4.3-9 summarizes these past occurrences.

Table 4.3-9. Fayette County Tornado History

Location of Origin	Date	Magnitude	Death	Injury	Property Damage
Ohiopyle Borough	6/1/1954	F0	0	0	$3,000
Uniontown, City	9/10/1962	F1	0	0	$250,000
Upper Tyrone Township	11/16/1965	F2	0	3	$250,000
Springhill Township	7/13/1971	F2	0	4	$275,000
Wharton Township	6/15/1980	F0	0	0	$0
North Union Township	10/1/1986	F2	0	2	$2,500,000
Redstone Township	4/9/1991	F1	0	0	$250,000
Springfield Township	6/2/1998	F0	0	0	$10,000
Wharton Township	6/2/1998	F2	0	0	$3,000,000
Henry Clay Township	7/30/2008	F0	0	0	$5,000
		TOTAL	**0**	**9**	**$6,543,000**

Source: National Oceanic and Atmospheric Administration, 2011.

The approximate location of the each of the past tornadoes is shown in Figure 4.3.3-1.



Fayette County Hazard Mitigation Plan

Fayette County Tornado History (1950 - 2004)

LEGEND

Tornados

Fujita Scale

- F0
- F1
- F2
- F3
- F4
- Historical Tornado Track
- Municipality
- County

SCALE	WIND ESTIMATE (MPH)
F0	< 73
F1	73-112
F2	113-157
F3	158-206
F4	207-260
F5	261-318

Source: National Weather Service, National Atlas Map illustrates locations where tornados have touched down within the years of 1950-2004

Figure 4.3.3-1. Location of Past Tornadoes

4.3.3.4 Future Occurrence

According to the National Weather Service, the Commonwealth of Pennsylvania has an annual average of ten tornadoes with two related deaths. The incidence of smaller tornadoes is increasing. The highest probability of a tornado occurring exists between the months of May, June, and July, although a moderate amount of tornadoes have occurred in the months of March, April, August, and September. Based on the previous occurrences of tornadoes in Fayette County, the probability of a tornado striking the County in any given year is approximately 19% (11 previous tornadoes/57 years of data), which could also be described as *possible*.

4.3.3.5 Vulnerability Assessment

The potential for tornadoes always exists. There has been an increase in the incidence of smaller tornadoes. However, The National Weather Service cannot accurately predict these smaller funnels, so there is difficulty in alerting the populace in a timely manner.

While the frequency of windstorms and minor tornadoes is expected to remain relatively constant, vulnerability increases in more densely developed areas. Since high wind events may affect the entire County, it is important to identify specific critical facilities and assets that are most vulnerable to the hazard. Due to their light-weight and often unanchored design, residential and commercial modular facilities are extremely vulnerable to high winds.

4.3.4 Drought

4.3.4.1 Location and Extent

Droughts are regional climatic events, so when these events occur in Fayette County the impacts are felt across the entire County and often the entire Western Pennsylvania region. All 42 municipalities in Fayette County can be subject to droughts. The County is largely rural, with 141,000 acres utilized for agriculture, meaning droughts can have a significant impact on crop yields and, consequently, the overall economic health of the County. In addition, many residents within the County have well water and require high amounts of rainfall to provide adequate water supplies (Fayette County HMP, 2004).

4.3.4.2 Range of Magnitude

The Commonwealth uses five parameters to assess drought conditions:

- Stream flows (compared to benchmark records);
- Precipitation (measured as the departure from normal, 30 year average precipitation);
- Reservoir storage levels in a variety of locations (especially three New York City reservoirs in Upper Delaware River Basin);
- Groundwater elevations in a number of counties (comparing to past month, past year and historic record); and
- The Palmer Drought Severity Index (PDSI), a measure of soil moisture based on recent precipitation and temperature.

Table 4.3-10. Palmer Drought Severity Index Classification

SEVERITY CATEGORY	PSDI VALUE
Extremely wet	4.0 or more
Very wet	3.0 to 3.99
Moderately wet	2.0 to 2.99
Slightly wet	1.0 to 1.99
Incipient wet spell	0.5 to 0.99
Near normal	0.49 to -0.49
Incipient dry spell	-0.5 to -0.99
Mild drought	-1.0 to -1.99
Moderate drought	-2.0 to -2.99
Severe drought	-3.0 to -3.99
Extreme drought	-4.0 or less

Phases of drought preparedness in Pennsylvania are:

Drought Watch: A period to alert government agencies, public water suppliers, water users and the public regarding the potential for future drought-related problems. The focus is on increased monitoring, awareness and preparation for response if conditions worsen. A request for voluntary water conservation is made. The objective of voluntary water conservation measures during a drought watch is to reduce water uses by 5 percent in the affected areas. Because of varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.

Drought Warning: This phase involves a coordinated response to imminent drought conditions and potential water supply shortages through concerted voluntary conservation measures to avoid or reduce shortages, relieve stressed sources, develop new sources, and if possible forestall the need to impose mandatory water use restrictions. The objective of voluntary water conservation measures during a drought warning is to reduce overall water uses by 10-15 percent in the affected areas. Because of varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.

Drought Emergency: This stage is a phase of concerted management operations to marshal all available resources to respond to actual emergency conditions, to avoid depletion of water sources, to assure at least minimum water supplies to protect public health and safety, to support essential and high priority water uses and to avoid unnecessary economic dislocations. It is possible during this phase to impose mandatory restrictions on nonessential water uses that is provided for in 4 PA Code Chapter 119, if deemed necessary and if ordered by the Governor of Pennsylvania. The objective of water use restrictions (mandatory or voluntary) and other conservation measures during this phase is to reduce consumptive water use in the affected area by

15 percent, and to reduce total use to the extent necessary to preserve public water system supplies, to avoid or mitigate local or area shortages, and to assure equitable sharing of limited supplies.

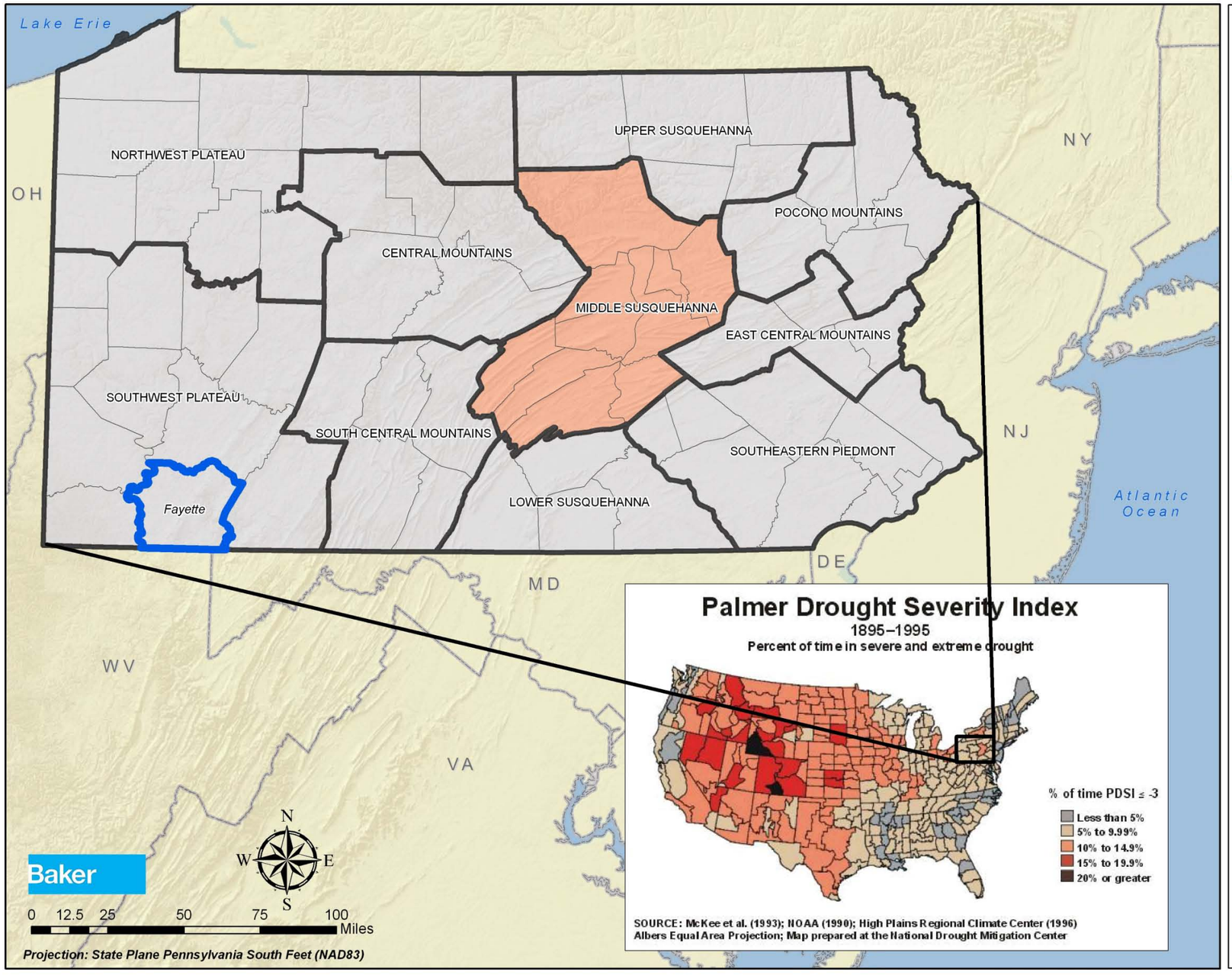
Local Water Rationing: Although not a drought phase, local municipalities may, with the approval of the PA Emergency Management Council, implement local water rationing to share a rapidly dwindling or severely depleted water supply in designated water supply service areas. These individual water rationing plans, authorized through provisions of 4 PA Code Chapter 120, will require specific limits on individual water consumption to achieve significant reductions in use. Under both mandatory restrictions imposed by the Commonwealth and local water rationing, procedures are provided for granting of variances to consider individual hardships and economic dislocations [Source: PEMA, 409 Plan].

The worst case scenario for Fayette County would be a protracted drought that impacted all commercial crop production as well as livestock losses due to deficient water supplies.

4.3.4.3 Past Occurrence

Based on data from the Pennsylvania Department of Environmental Protection (PA DEP) since 1980, Fayette County has experienced two periods of severe and extended drought emergency—July 1991 through April 1992 and July 1999 through September 1999. The 1999 drought, in particular, caused over $700 million in crop damage statewide according to NOAA. While emergency drought periods have been rare, declared drought watches and warnings in the County have occurred much more frequently, in 1988, 1992, 1998, 1999, and 2010 (PA DEP, 2011). Most recently, in September 2010, a drought warning was declared for 24 Pennsylvania counties, including Fayette. This warning period ended in November 2010. Figure 4.3.4-1 illustrates the percent of time Fayette County experienced a severe drought (for a hundred year period from 1895-1995) in comparison to the entire state. As is reinforced by this map, Fayette County has had few occurrences of severe drought, having spent less than 10% of the hundred year period experiencing a severe drought.

This page is intentionally blank.



Fayette County Hazard Mitigation Plan

Pennsylvania Palmer Drought Severity Index (1895-1995)

LEGEND

PDSI Boundaries

Percent of time in severe and extreme drought

- 5% to 9.9%
- 10% to 14.9%
- Fayette County
- Counties
- States

Source:
PDSI Division boundaries obtained from National Integrated Drought Information System (NIDIS) - www.drought.gov, 2010

U.S. PDSI image obtained from: http://drought.unl.edu, 1996

Figure 4.3.4-1. Drought Severity across Pennsylvania

4.3.4.4 Future Occurrence

Fayette County has experienced droughts in the past and the potential exists for the County to experience droughts in the future. Increases in water usages and leakage may result in a deficiency in coming years. Water deficiencies and the threat of drought are expected to increase statewide, mainly because of the demand for water by residential, industrial and agricultural use. These situations can be closely monitored and predicted by the use of five parameters: stream-flows, precipitation, reservoir storage levels, groundwater elevations, and a measure of soil moisture. With a 6% (2 incidents/31 years) chance of a drought occurring in any given year, the future occurrence of drought is *possible,* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1). The probability criteria (*unlikely, possible, likely, highly likely*) will be used consistently throughout the risk assessments found in Section 4.3.

4.3.4.5 Vulnerability Assessment

The most significant losses resulting from drought events are typically found in the agriculture sector. For instance, the 1999 Gubernatorial Proclamation of a drought emergency was issued in part due to significant crop damage across Pennsylvania. Preliminary estimates by the Department of Agriculture indicated possible crop losses across the Commonwealth in excess of $500 million. This estimate did not include a 20% decrease in dairy milk production which also resulted in million dollar losses (PA All-HMP, 2010).

Over a quarter of Fayette County's land area is currently under agricultural production; the total value of the County's agricultural products is $25,974,000 (USDA, 2007). As such, a severe drought event could severely impair the local economy, negatively impacting the livelihood of residents within agricultural communities. Although Fayette County has witnessed few drought emergencies, the effects of a drought watch or warning can be just as harmful. Brush and wildfire are two other hazards that could occur during a severe drought.

The depletion of public and private water supplies is also a significant threat. Fayette County residents that use private domestic wells are especially vulnerable to droughts because their drinking water supply can be threatened.

4.3.5 Wildfires

4.3.5.1 Location and Extent

A wildfire is a raging, uncontrolled fire that spreads rapidly through vegetative fuels, exposing and possibly consuming structures. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that can be seen for miles. Wildfires can occur at any time of the year, but mostly occur during long, dry hot spells in the spring months of March, April, and May, and the autumn months of October and November. Around 83% of all Pennsylvania wildfires occur in these two time periods. Any small fire in a wooded area, if not quickly detected and suppressed, can get out of control, potentially damaging property and croplands. Most wildfires are caused by human carelessness, negligence and ignorance. However, some are precipitated by lightning strikes and in rare instances, spontaneous combustion (PA All-HMP, 2010). Because designated park/recreation areas make up around 10% of the County's total acreage and much of the over 141,000 acres of farmland in the County are classified as "woodland," the potential geographic extent of wildfires is quite large (Fayette County Comprehensive Parks Plan, 2007).

4.3.5.2 Range of Magnitude

Wildfire events can range from small fires that can be managed by local firefighters to large fires impacting many acres of land. Large events may require evacuation from one or more communities and necessitate regional or national firefighting support. The impact of a severe wildfire can be devastating, potentially killing people, livestock, and wildlife, and destroying property, valuable timber, forage land, cropland, and recreational area (worst case scenario). In addition to the risk wildfires pose to the general public and property owners, the safety of firefighters is also a concern. Nonetheless, controlled wildfires can have positive environmental impacts because they burn dead trees, leaves, and grasses to allow more open spaces for new vegetation to grow and receive sunlight. Moreover, they stimulate the growth of new shoots on trees and shrubs and its heat can open pine cones and other seed pods.

4.3.5.3 Past Occurrence

Between 2002 and 2008, there were 107 wildfire events reported in Fayette County. These wildfires burned approximately 350 acres of land (PA All-HMP, 2010). Table 4.3-11 provides a more detailed account of each of these events. More recently, in 2010, the Pennsylvania Department of Conservation and Natural Resources (DCNR) reported there were 30 wildfires affecting 75.1 acres in District 4—the DCNR district encompassing most of southwestern Pennsylvania, including Fayette County (Pennsylvania Wildfire Summary, 2010).

Of all the jurisdictions, between 2002 and 2008, German and Henry Clay Townships have experienced the most wildfires with 20 and 14 respectively. However, Connellsville has experienced the largest number of acres burned as a result of wildfires. 2005 saw the most reported wildfire events at 24, and the largest number of acres burned at 120.

Table 4.3-11. Fayette County Wildfires

Year	Municipality	Area (acres)
2002	BULLSKIN TWP	1.00
2005	BULLSKIN TWP	0.10
2005	BULLSKIN TWP	0.25
2005	BULLSKIN TWP	0.50
2008	BULLSKIN TWP	8.10
2008	BULLSKIN TWP	1.00
2003	CONNELLSVILLE	5.00
2005	CONNELLSVILLE	60.00
2005	CONNELLSVILLE	6.00
2005	CONNELLSVILLE	1.00
2006	CONNELLSVILLE	0.10
2003	CONNELLSVILLE TWP	1.00
2008	CONNELLSVILLE TWP	1.50
2006	DUNBAR TWP	5.00
2006	DUNBAR TWP	8.00
2006	DUNBAR TWP	20.00
2007	DUNBAR TWP	2.00
2008	DUNBAR TWP	4.00
2002	GEORGES TWP	2.00
2004	GERMAN TWP	5.00
2006	GERMAN TWP	4.00
2006	GERMAN TWP	2.00
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	8.00
2006	GERMAN TWP	0.25
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2006	GERMAN TWP	0.10
2007	GERMAN TWP	0.50

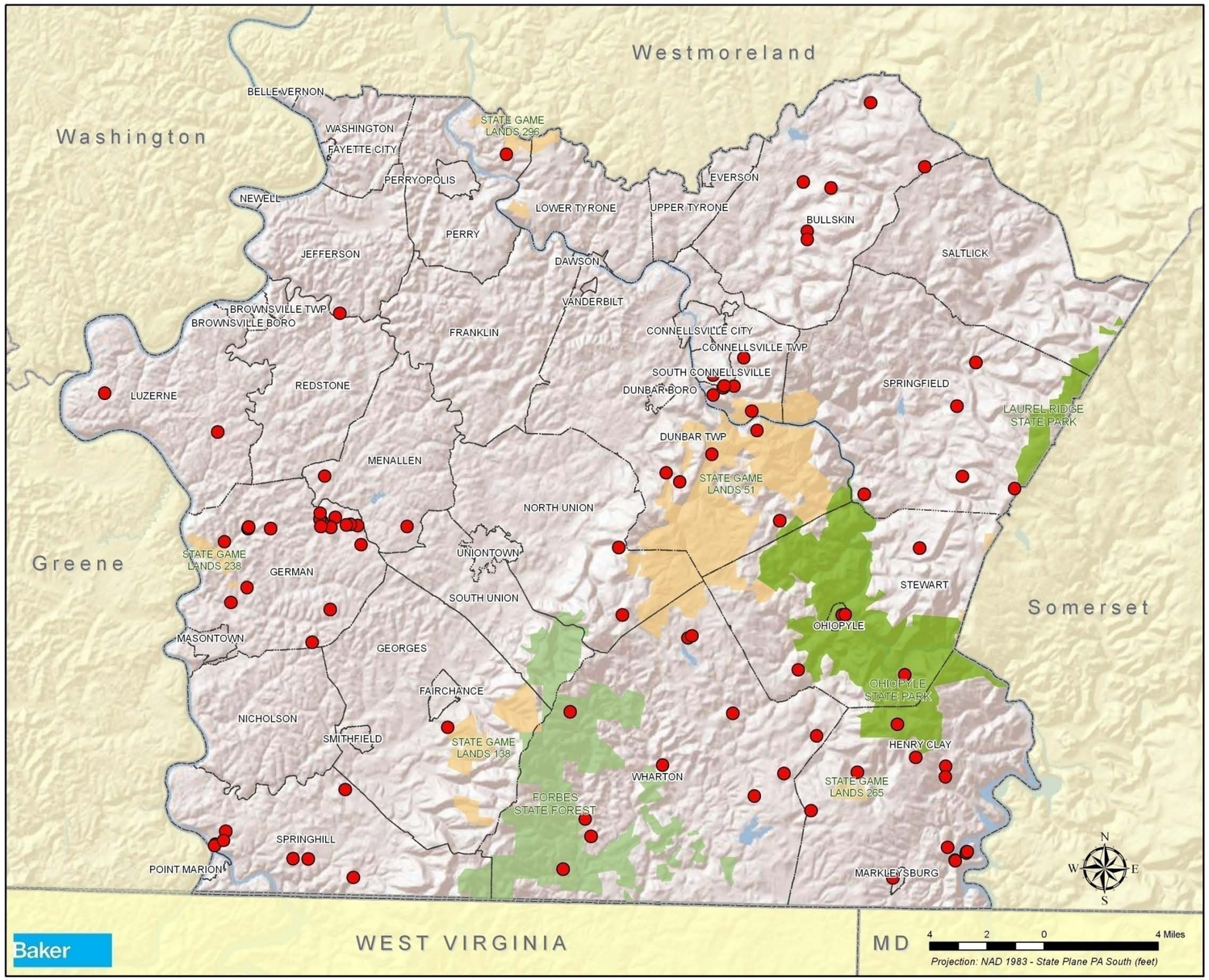
Year	Municipality	Area (acres)
2008	GERMAN TWP	0.50
2008	GERMAN TWP	3.00
2002	HENRY CLAY TWP	0.10
2003	HENRY CLAY TWP	5.00
2003	HENRY CLAY TWP	1.30
2003	HENRY CLAY TWP	0.10
2003	HENRY CLAY TWP	0.10
2003	HENRY CLAY TWP	0.10
2003	HENRY CLAY TWP	0.10
2005	HENRY CLAY TWP	1.00
2005	HENRY CLAY TWP	1.00
2005	HENRY CLAY TWP	1.00
2006	HENRY CLAY TWP	3.00
2006	HENRY CLAY TWP	0.50
2007	HENRY CLAY TWP	1.00
2008	HENRY CLAY TWP	0.10
2005	JEFFERSON TWP	10.00
2002	LUZERNE TWP	0.10
2002	LUZERNE TWP	2.50
2005	LUZERNE TWP	15.00
2008	MENALLEN TWP	0.10
2003	NORTH UNION TWP	20.00
2008	PERRY TWP	2.00
2003	SOUTH CONNELLSVILLE BORO	1.00
2003	SPRINGFIELD TWP	1.00
2003	SPRINGFIELD TWP	4.00
2005	SPRINGFIELD TWP	2.80
2005	SPRINGFIELD TWP	0.50
2006	SPRINGFIELD TWP	12.00
2004	SPRINGHILL TWP	12.00
2004	SPRINGHILL TWP	1.00
2005	SPRINGHILL TWP	10.00
2005	SPRINGHILL TWP	1.00
2005	SPRINGHILL TWP	1.00
2005	SPRINGHILL TWP	1.00
2008	SPRINGHILL TWP	8.50
2008	SPRINGHILL TWP	1.50
2008	SPRINGHILL TWP	0.10

Year	Municipality	Area (acres)
2008	SPRINGHILL TWP	0.10
2008	SPRINGHILL TWP	0.10
2008	SPRINGHILL TWP	0.10
2008	SPRINGHILL TWP	0.10
2003	STEWART TWP	24.00
2005	STEWART TWP	0.25
2005	STEWART TWP	1.00
2007	STEWART TWP	2.80
2008	STEWART TWP	4.60
2002	WHARTON TWP	6.00
2003	WHARTON TWP	2.00
2003	WHARTON TWP	1.50
2004	WHARTON TWP	2.00
2004	WHARTON TWP	0.50
2005	WHARTON TWP	0.25
2005	WHARTON TWP	3.00
2005	WHARTON TWP	1.50
2005	WHARTON TWP	1.00
2005	WHARTON TWP	1.50

Source: PA DCNR, Bureau of Forestry, 2010

The locations of Fayette County wildfire events occurring between 2002 and 2008 are also displayed in Figure 4.3.5-1. The map shows that previous occurrences of wildfires, while taking place throughout the entire County, have been largely concentrated in German, Henry Clay, Wharton, Springhill, and Connellsville Townships.

This page is intentionally blank.



Fayette County Hazard Mitigation Plan

Wildfire Origins (2002-2008)

LEGEND

- Wildfire Origin
- State Park
- State Forest
- State Game Land
- Municipality
- County

Map displays all wildfire origin locations having known coordinates for the years 2002 - 2008.

Source: PA DCNR, Bureau of Forestry, 2010

Figure 4.3.5-1. Fayette County Wildfire Origins

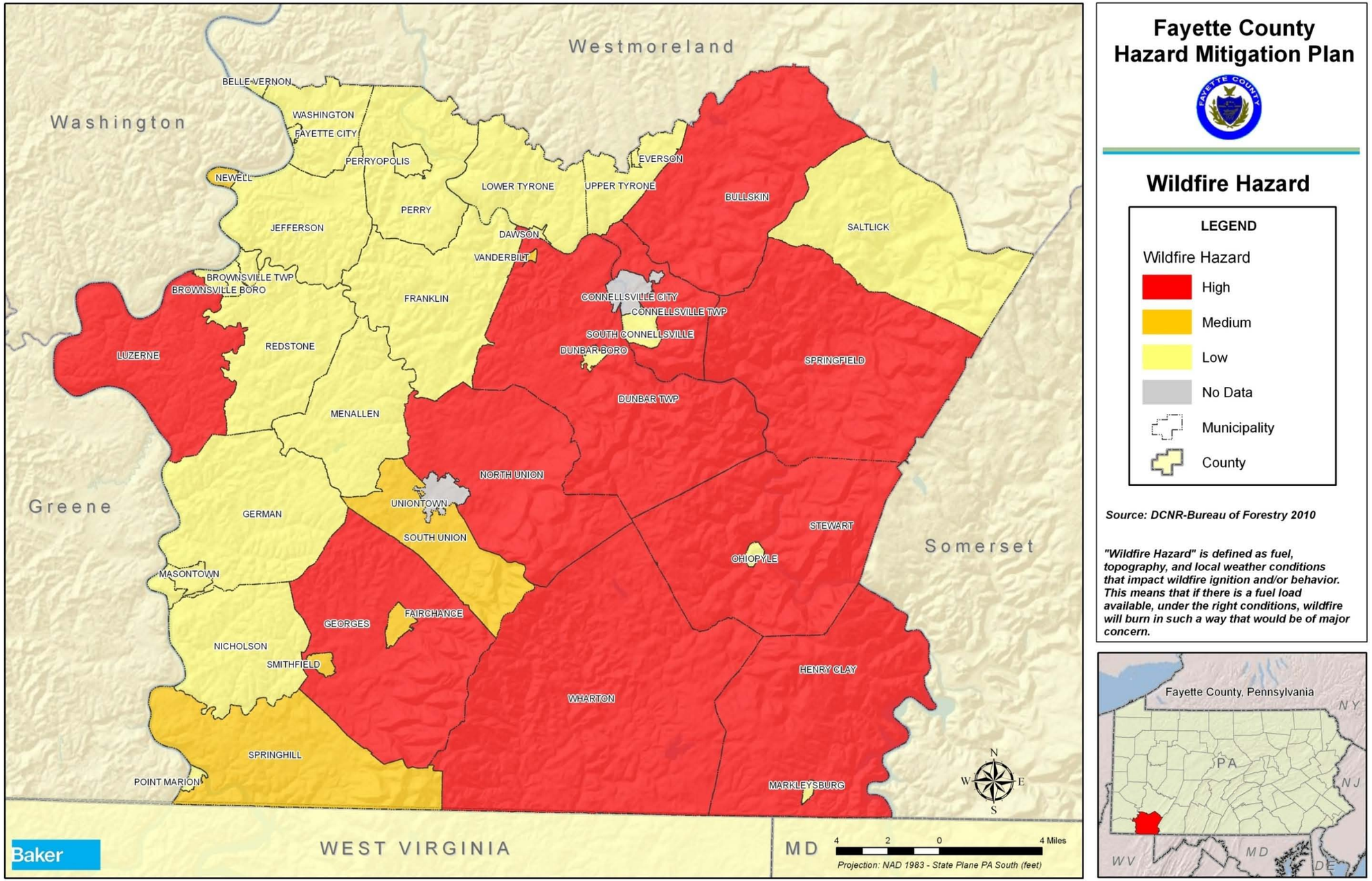
4.3.5.4 Future Occurrence

Wildfire events will occur in Fayette County every year. Therefore, annual occurrence should be considered *highly likely*. The likelihood, however, of one of those fires attaining significant size and intensity is unpredictable and highly dependent on environmental conditions and firefighting response. Based on the DCNR data collected between 2002 and 2008, Fayette County can expect around 18 wildfires in any given year (Pennsylvania Wildfire Summary, 2010).

4.3.5.5 Vulnerability Assessment

The Pennsylvania Bureau of Forestry has conducted an independent wildfire hazard risk assessment for the various municipalities across Fayette County. Results of that assessment are shown in Figure 4.3.5-2. Wildfire hazard is defined based on conditions that affect wildfire ignition and/or behavior such as fuel, topography and local weather. Based on this assessment, about a quarter of the municipalities within Fayette County (covering roughly half of the County's land area) have a high wildfire hazard potential. These high hazard areas are generally located in the eastern, more densely forested, portion of the County. Approximately 24,111 buildings in the County are located in these wildfire high-hazard areas, with a combined total building and content value of $5,561,327,000 (PA All-HMP, 2010).

This page is intentionally blank.



Fayette County Hazard Mitigation Plan

Wildfire Hazard

LEGEND

Wildfire Hazard
- High
- Medium
- Low
- No Data
- Municipality
- County

Source: DCNR-Bureau of Forestry 2010

"Wildfire Hazard" is defined as fuel, topography, and local weather conditions that impact wildfire ignition and/or behavior. This means that if there is a fuel load available, under the right conditions, wildfire will burn in such a way that would be of major concern.

Figure 4.3.5-2. Fayette County Wildfire Hazards

4.3.6 Landslides

4.3.6.1 Location and Extent

Rockfalls, rockslides, block glide, debris slide, earth flow, mud flow, and other slope failures usually occur in areas of Fayette County with moderate to steep slopes and high precipitation. Many slope failures are associated with precipitation events – periods of sustained above-average precipitation, specific rainstorms, or snowmelt events. Areas experiencing erosion, decline in vegetation cover, and earthquakes are also susceptible to landslides. Human activities that contribute to slope failure include altering the natural slope gradient, increasing soil water content, and removing vegetation cover.

The USGS identifies Fayette County as falling into two distinct zones of landslide susceptibility and incidence. Figure 4.3.6-1 shows areas of low, moderate, and high landslide susceptibility throughout Pennsylvania as determined by the U.S. Geological Survey. The majority of Fayette County has a high susceptibility to landslides and a moderate incidence. The western portion of the County has a higher landslide incidence, with more than 15% of the area in this region involved in landsliding.

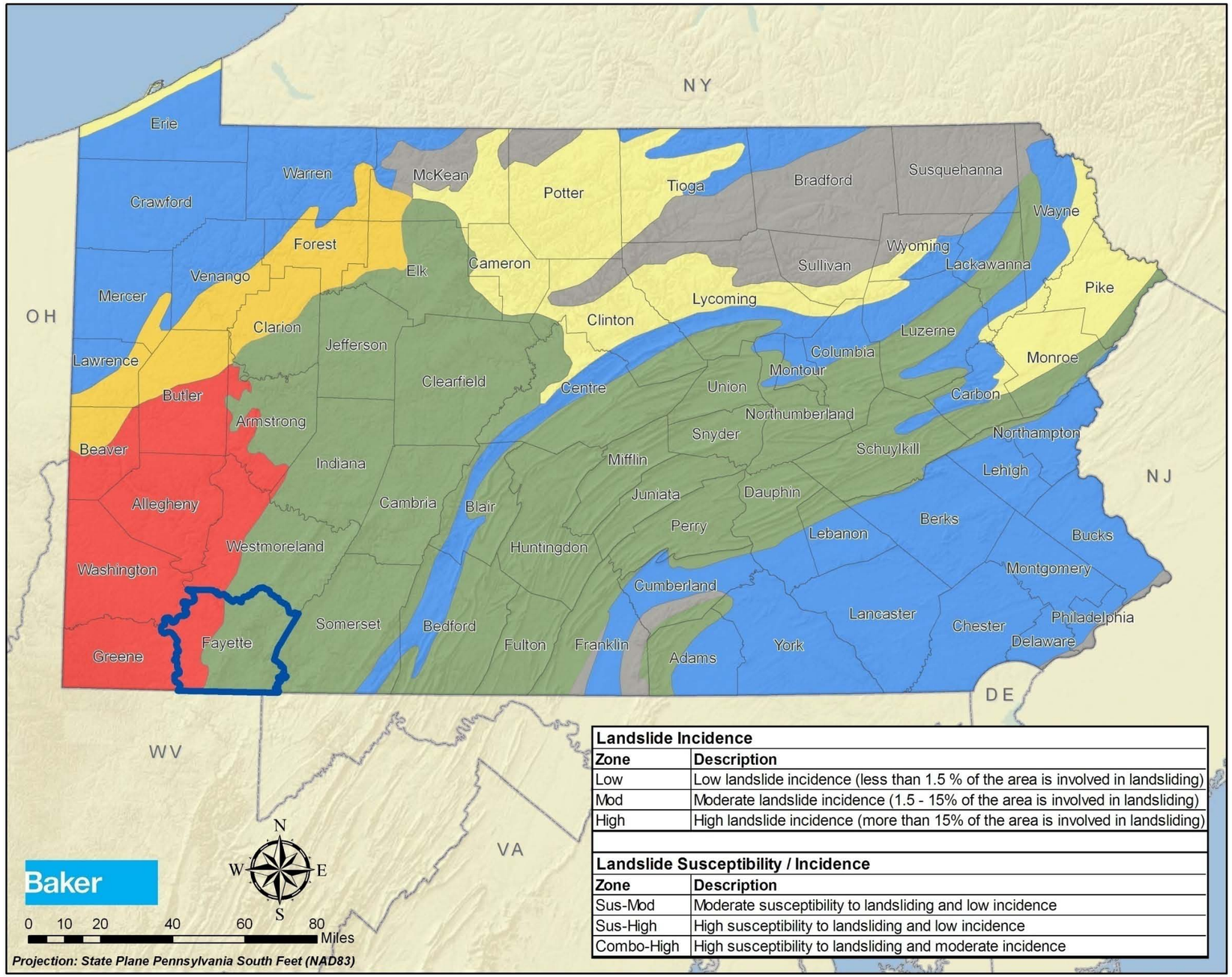
4.3.6.2 Range of Magnitude

Landslides cause damage to transportation routes, utilities, and buildings and create travel delays and other side effects. Fortunately, deaths and injuries due to landslides are rare in Pennsylvania. Almost all of the known deaths due to landslides have occurred when rockfalls or other slides along highways have involved vehicles. Storm induced debris flows are the only other type of landslide likely to cause death and injuries. As residential and recreational development increases on and near steep mountain slopes, the hazard from these rapid events will also increase. Most Pennsylvania landslides are moderate to slow moving and damage things rather than people.

The Pennsylvania Department of Transportation (PennDOT) and large municipalities incur substantial costs due to landslide damage and to extra construction costs for new roads in known landslide-prone areas. A 1991 estimate showed an average of $10 million per year is spent on landslide repair contracts across the Commonwealth and a similar amount is spent on mitigation costs for grading projects (PA All-HMP, 2010).

Fayette County's irregular topography makes landslides a possible threat. Areas with steep slopes, largely associated with the banks of the various major watercourses in the County, are especially vulnerable to landslides. While the potential for damage to lives or property from this type of natural hazard is relatively low within the County, the worst case scenario would involve deaths, injuries, and transportation network disruptions.

This page is intentionally blank.



Landslide Incidence	
Zone	**Description**
Low	Low landslide incidence (less than 1.5 % of the area is involved in landsliding)
Mod	Moderate landslide incidence (1.5 - 15% of the area is involved in landsliding)
High	High landslide incidence (more than 15% of the area is involved in landsliding)

Landslide Susceptibility / Incidence	
Zone	**Description**
Sus-Mod	Moderate susceptibility to landsliding and low incidence
Sus-High	High susceptibility to landsliding and low incidence
Combo-High	High susceptibility to landsliding and moderate incidence

Fayette County Hazard Mitigation Plan

Fayette County Landslide Susceptibility and Incidence

LEGEND

Landslide Incidence

- Low
- Mod
- High

Landslide Susceptibility/Incidence

- Sus-Mod
- Sus-High
- Combo-High
- Counties
- States

Source:
USGS (via National Atlas), 2001

Figure 4.3.6-1. Fayette County Landslide Susceptibility

4.3.6.3 Past Occurrence

Fayette County has experienced only minor landslides in the past. There have been no recent reported injuries or deaths due to this type of hazard. The areas of greatest vulnerability to landslides are usually associated with highway or road cuts. However, housing units located at the base of steep hillsides or mine refuse piles also are vulnerable to landslides.

4.3.6.4 Future Occurrence

It is unlikely that Fayette County will see an increase in this type of hazard threat. Of the 23 municipalities that responded to the HVA survey, only 17% believed this hazard to be a significant threat. Therefore the future probability of landslides is considered *possible*.

4.3.6.5 Vulnerability Assessment

Landslides often occur with other natural hazards such as earthquakes and floods. A serious landslide can cause loss of life and millions of dollars in damage. Although there has not been a landslide incident involving serious injury in Fayette County, the potential exists for such an event to create significant damage to structures and disrupt transportation routes and major utility services. 79% (131 of 164) critical facilities and 60% of addressable structures in Fayette County are located in an area of high landslide susceptibility. 67% (110 of 164) critical facilities and 39% of addressable structures in the County are located in an area of high landslide incidence. Table 4.3-12 displays the number of addressable structures and critical facilities that are located in the landslide hazard zones, by jurisdiction. It is important to note that the vulnerability of each individual parcel and critical facility will depend on a number of factors including slope, topography, and underlying geology and soil.

Table 4.3-12. Fayette County Addressable Structures and Critical Facilities in Landslide Hazard Areas

Municipality	# of Addressable Structures in High Landslide Incidence Area	# of Critical Facilities in High Landslide Incidence Areas	# of Addressable Structures in High Landslide Susceptibility Area	# of Critical Facilities in High Landslide Susceptibility Area
Belle Vernon Borough	443	4	-	-
Brownsville Borough	1,136	7	-	-
Brownsville Township	381	1	-	-
Bullskin Township	-	-	3,337	9
Connellsville City	-	-	3,129	14
Connellsville Township	-	-	1,067	5
Dawson Borough	-	-	210	2
Dunbar Borough	-	-	507	2
Dunbar Township	25	-	3,703	2
Everson Borough	-	-	354	3
Fairchance Borough	58	-	763	5
Fayette City Borough	369	3	-	-

Municipality	# of Addressable Structures in High Landslide Incidence Area	# of Critical Facilities in High Landslide Incidence Areas	# of Addressable Structures in High Landslide Susceptibility Area	# of Critical Facilities in High Landslide Susceptibility Area
Franklin Township	1,217	5	84	-
Georges Township	1,549	6	1,653	6
German Township	2,804	12	-	-
Henry Clay Township	-	-	1,523	5
Jefferson Township	1,005	3	-	-
Lower Tyrone Township	96	-	472	3
Luzerne Township	2,315	11	-	-
Markleysburg Borough	-	-	132	2
Masontown Borough	1,500	7	-	-
Menallen Township	2,052	7	23	-
Newell Borough	281	3	-	-
Nicholson Township	977	1	-	-
North Union Township	64	-	5,660	13
Ohiopyle Borough	-	-	76	2
Perry Township	1,410	1	-	-
Perryopolis Borough	863	8	-	-
Point Marion Borough	565	5	-	-
Redstone Township	2,981	9	-	-
Saltlick Township	-	-	1,986	3
Smithfield Borough	396	4	-	-
South Connellsville Borough	-	-	890	3
South Union Township	218	-	4,467	12
Springfield Township	-	-	1,609	5
Springhill Township	1,447	7	3	-
Stewart Township	-	-	460	1
Uniontown City	-	-	4,502	21
Upper Tyrone Township	-	-	877	2
Vanderbilt Borough	-	-	245	2
Washington Township	1,854	6	-	-
Wharton Township	-	-	2,035	9
TOTAL	**26,006**	**110**	**39,767**	**131**

Source: Michael Baker Jr., Inc. and Fayette County Emergency Service Center, 2011

4.3.7 Subsidence, Sinkholes

4.3.7.1 Location and Extent

In western Pennsylvania, mine subsidence most often develops where the soil and rock above a mine is less than sixty feet thick (PA All-HMP, 2010). Fayette County contains areas of both limestone bedrock and mining—two characteristics that make the County vulnerable to subsidence hazards—in a dominant portion of Fayette County west of Chestnut Ridge (PA All-HMP, 2010). Figure 4.3.7-1 displays limestone bedrock areas in Fayette County. This area has been extensively undermined and, therefore, needs careful consideration prior to any development (Fayette County Comprehensive Plan, 2000).

4.3.7.1 Range and Magnitude

Based on the geologic formations and mines underlying parts of Fayette County, subsidence and sinkhole events may occur gradually or abruptly. Events could result in minor elevation changes or deep, gaping holes in the ground surface. Subsidence and sinkhole events can cause severe damage in urban environments, although gradual events can be addressed before significant damage occurs. If long-term subsidence or sinkhole formation is not recognized and mitigation measures are not implemented, fractures or complete collapse of building foundations and roadways may result. For Fayette County, a worst case scenario for a subsidence hazard would involve structural damage to buildings, closure of transportation routes, power outages, and injuries or death.

4.3.7.1 Past Occurrence

Fayette County has never experienced a subsidence event involving serious injury, death, or substantial property damage. Most recently, in late 2010, Connellsville Township witnessed a mine subsidence incident resulting from the collapse of a mine only seventeen feet below the street surface. The event caused road closures, endangered two sanitary lines, and required intensive mitigation actions (PA DEP, 2011). PEIRS data recorded 3 previous mine subsidence events – 2 events in 2005 and 1 event in 2008

4.3.7.2 Future Occurrence

The geologic formations and underground mines present in the County make future occurrences are unavoidable. The annual occurrence of subsidence and sinkhole events is considered *possible*.

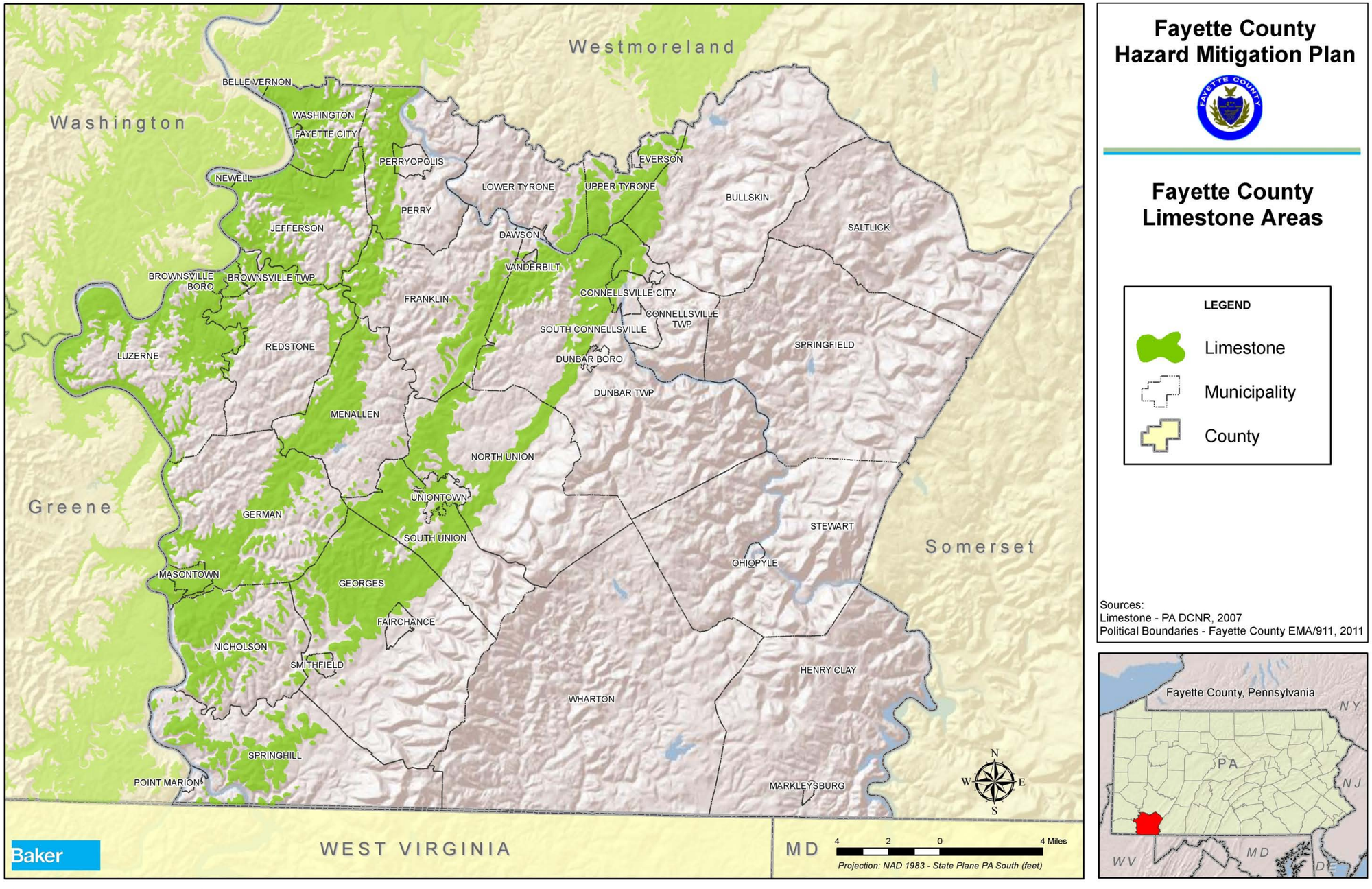
4.3.7.3 Vulnerability Assessment

Land subsidence above underground mines is a significant problem in Fayette County. There is no depth for a mine at which the surface can be considered entirely safe. More insidious is the fact that land subsidence might not occur until more than 100 years after mining has ceased (Fayette County Comprehensive Plan, 2000). According to the *2010 Pennsylvania Standard All-Hazard Mitigation Plan*, there are 38,475 buildings (a total of $9,995,475,063 in buildings and contents) within Fayette County that are threatened by subsidence or sinkholes. Table 4.3-13 lists the 36 municipalities in the County that have a record of mining activity.

Table 4.3-13. Fayette County Municipalities with Recorded Mines

Municipalities			
Belle Vernon Borough	Fairchance Borough	Menallen Township	South Union Township
Brownsville Borough	Fayette City Borough	Newell Borough	Springfield Township
Brownsville Township	Franklin Township	Nicholson Township	Springhill Township
Bullskin Township	Georges Township	North Union Township	Stewart Township
Connellsville City	German Township	Perry Township	Uniontown City
Connellsville Township	Jefferson Township	Perryopolis Borough	Upper Tyrone Township
Dunbar Borough	Lower Tyrone Township	Redstone Township	Vanderbilt Borough
Dunbar Township	Luzerne Township	Saltlick Township	Washington Township
Everson Borough	Masontown Borough	Smithfield Borough	Wharton Township

Source: PA DEP, 2011.



Fayette County Hazard Mitigation Plan

Fayette County Limestone Areas

LEGEND

- Limestone
- Municipality
- County

Sources:
Limestone - PA DCNR, 2007
Political Boundaries - Fayette County EMA/911, 2011

Figure 4.3.7-1. Fayette County Limestone Areas

4.3.8 Extreme Temperatures

4.3.8.1 Location and Extent

Extreme cold temperatures drop well below what is considered normal for an area during the winter months and often are accompanied by winter storm events. Combined with increases in wind speed, such temperatures in Pennsylvania can be life threatening to those exposed for extended periods of time. Extreme heat can be described a temperatures that hover 10 degree Fahrenheit or more above average high temperatures for a region during the summer months. Extreme heat is responsible for more deaths in Pennsylvania than all other natural disasters combined. As shown in the following figures, average minimum and maximum temperatures vary across the County. Minimum average temperatures vary across Fayette County, ranging anywhere from 16-17°F in the eastern half of the County to 22-23°F in the extreme southwest. Summer average high temperatures are equally diverse, going from 76-77°F in the east to 86-87°F along some portions of the Monongahela River, near West Virginia.

4.3.8.1 Range and Magnitude

Extreme temperatures can result in elevated utility costs to consumers and also can cause human risks. Extremely high temperatures cause heat stress in humans, leading to heat cramps, heat syncope, heat exhaustion, heatstroke, and death. In general, *Heat Advisories* are issued when the heat index will be equal to or greater than 100°F, but less than 105°F. *Excessive Heat Warning*s are issued when heat indices will attain or exceed 105°F, and *Excessive Heat Watches*, are issued when there is a possibility that excessive heat warning criteria may be experienced within twelve to forty-eight hours (PA All-HMP, 2010).

Cold temperatures can be extremely dangerous to humans. Without heat and shelter, cold temperatures can cause hypothermia, frost bite, and death. Wind chill temperatures are often used in place of raw temperature values due to the affect of wind can have in drawing heat from the body under cold temperatures. Similar to high temperatures, the effect of cold temperatures will vary by individual. In Pennsylvania, *Wind Chill Warnings* are issued when wind chills drop to -25°F or lower. Wind Chill Advisories are issued in the southeast and western sections of Pennsylvania when wind chill values drop to -10°F to -24°F (PA All-HMP, 2010).

In Fayette County, a potential worst-case extreme temperature scenario would involve the County experiencing 90°F or higher temperatures (or 0°F or lower) for an extended number of days. The heat/cold would overwhelm the power grid, causing widespread blackouts and damaging property. This kind of event could create a public health hazard for the elderly and children and would result in injury or death.

4.3.8.2 Past Occurrence

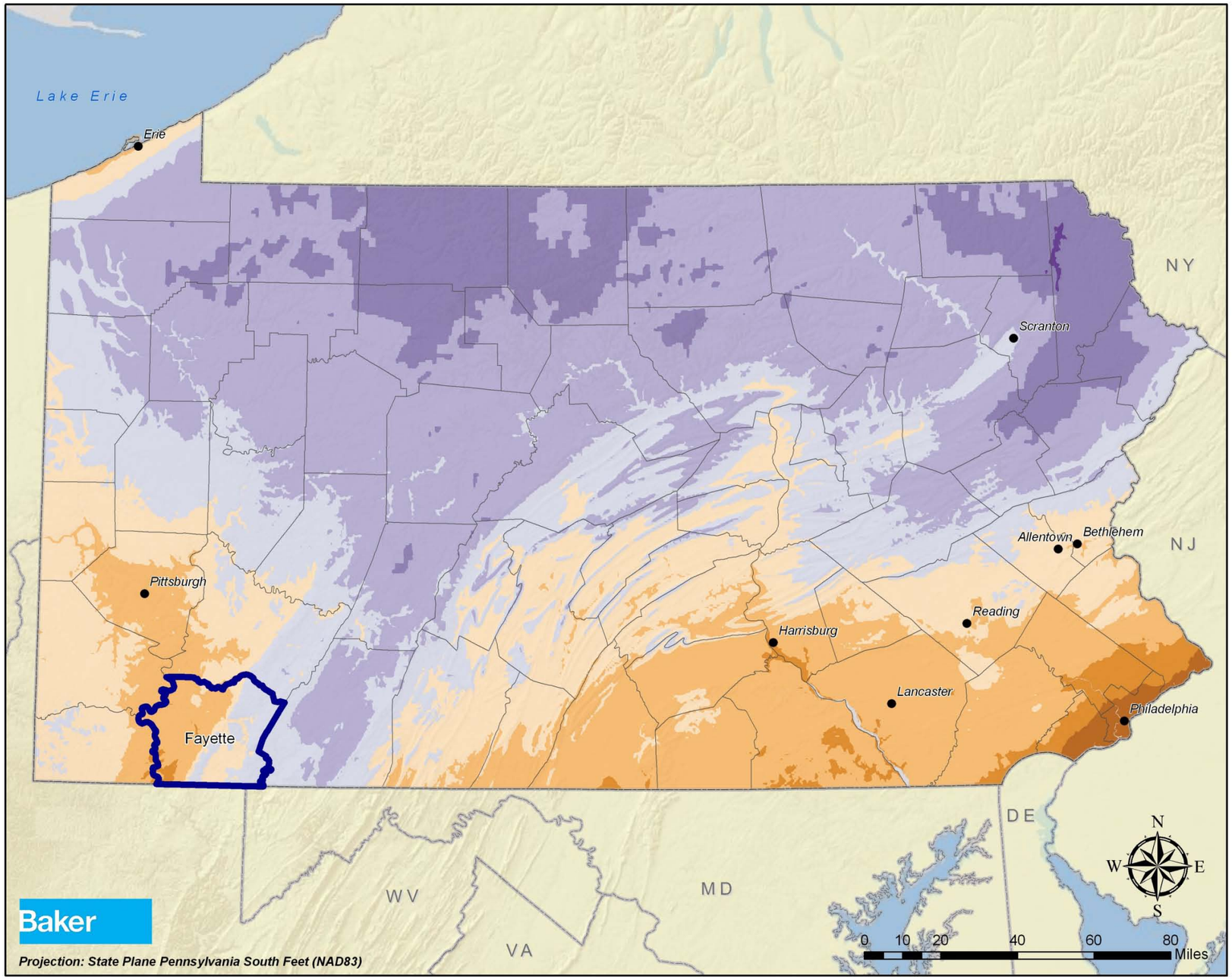
According to NOAA records, since 1990, Fayette County has experienced three notable periods of extreme cold—January 1994, February 1995, and December 2009. The worst of these incidences was January 1994, when temperatures dipped to -17°F. Luckily, no deaths were associated with these three incidences in Fayette County (NOAA, 2011).

4.3.8.3 Future Occurrence

Extreme temperatures are expected during and around the summer and winter months. They have occurred in Fayette County in the past and will continue to occur in the future. While the probability varies according to elevation, on average Fayette County can anticipate temperatures to dip below -10°F about once every five years and temperatures to rise above 100°F about once every ten years (PA All-HMP, 2010). For this reason, the probability of the County experiencing an extreme temperature event in any given year is considered *possible*.

4.3.8.4 Vulnerability Assessment

The potential for extreme heat and cold always exists in and around the summer and winter months. Meteorologists and weather forecasters can normally predict the temperature with excellent accuracy. Adhering to extreme temperature warnings can significantly reduce the risk of temperature related deaths.



Fayette County Hazard Mitigation Plan

Average Minimum Temperature (1971 - 2000)

LEGEND

- Major Cities

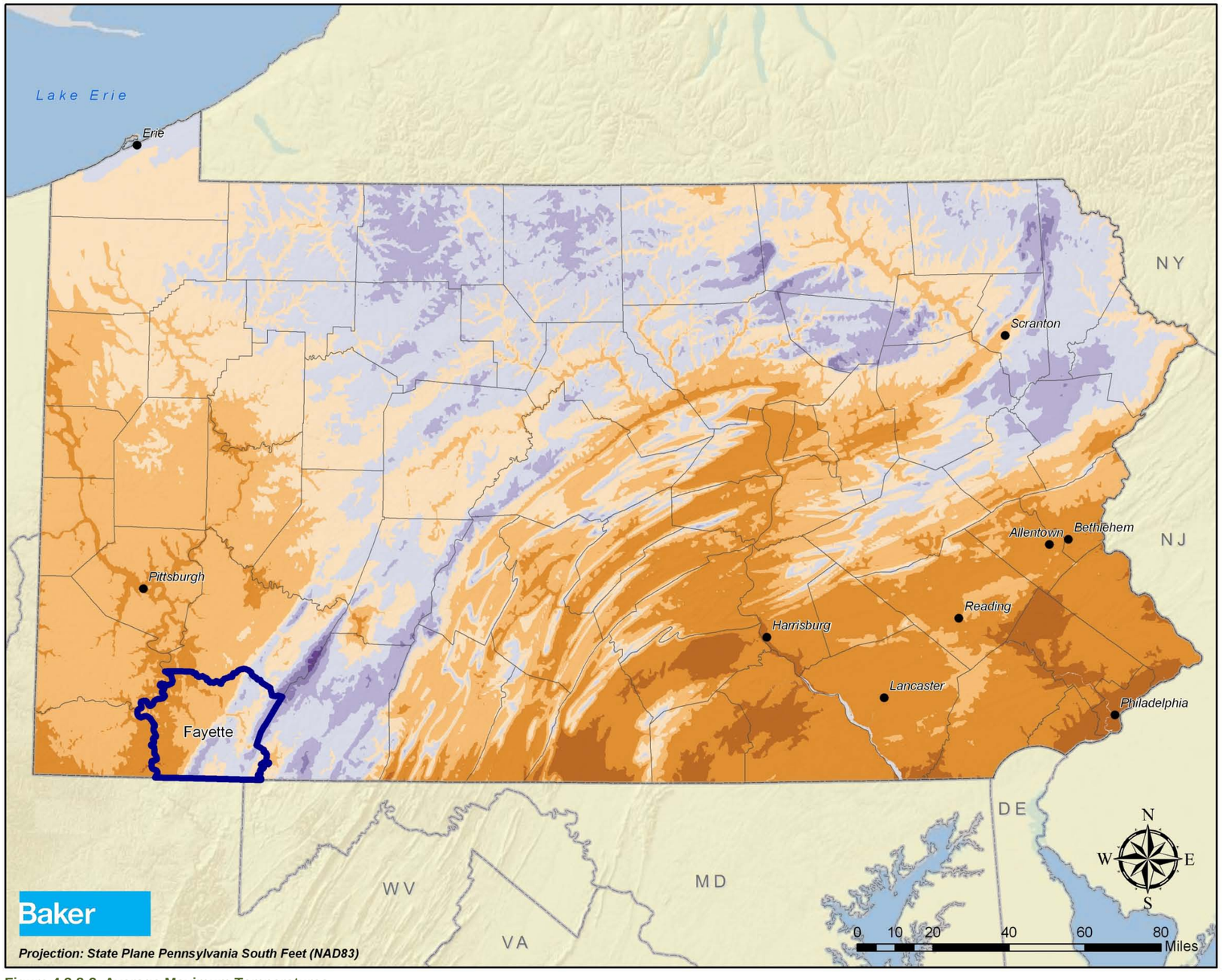
Minimum Temperature (°F)

- 9 - 10
- 11 - 13
- 14 - 15
- 16 - 17
- 18 - 19
- 20 - 21
- 22 - 23
- 24 - 27
- Counties
- States

Map displays average minimum temperature according to a model using point precipitation and elevation data for the 30-year period of 1971-2000.

Source: USDA/NRCS - National Cartography & Geospatial Center, 2006

Figure 4.3.8-1. Average Minimum Temperatures



Fayette County Hazard Mitigation Plan

Average Maximum Temperature (1971 - 2000)

LEGEND

- Major Cities

Maximum Temperature (°F)

- 73
- 74 - 75
- 76 - 77
- 78 - 79
- 80 - 81
- 82 - 83
- 84 - 85
- 86 - 87
- Counties
- States

Map displays average maximum temperature according to a model using point precipitation and elevation data for the 30-year period of 1971-2000.

Source: USDA/NRCS - National Cartography & Geospatial Center, 2006

Figure 4.3.8-2. Average Maximum Temperatures

4.3.9 Hailstorms

4.3.9.1 Location and Extent

Hailstorm events can occur in all areas of Pennsylvania. Hail precipitation is often produced at the front of a severe thunderstorm system.

4.3.9.2 Range and Magnitude

Hailstorms can cause significant damage to crops and property. Damage is dependent on the size, duration, and intensity of hail precipitation. Those who do not seek shelter could face serious injury. Automobiles and aircraft are particularly susceptible to damage. Since hail precipitation usually occurs during thunderstorm events, the impacts of other hazards associated with thunderstorms (e.g. strong winds, intense precipitation) often occur simultaneously.

A potential worst-case scenario of a hailstorm would be if a storm carrying hail of over 2 inches were to occur over a prolonged period, causing severe damage particularly in Fayette County's agricultural areas. Because hail can cause significant crop damage, a storm of this magnitude would potentially destroy agricultural yields and result in significant lost revenue, as well as anticipated property damage or injuries.

4.3.9.3 Past Occurrence

Between 1970 and 2009, there were 56 recorded hail events in Fayette County (NOAA, 2011). The worst hailstorms Fayette County has witnessed took place in July 1983, July 1985, and April 1999. In all three instances hail accumulation was at or in excess of 2 inches (NOAA, 2010). While County-specific data is not available, statewide hailstorms caused $4,592,000 in property damage and $3,487,000 in crop damage between 1950 and 2009 (PA All-HMP, 2010).

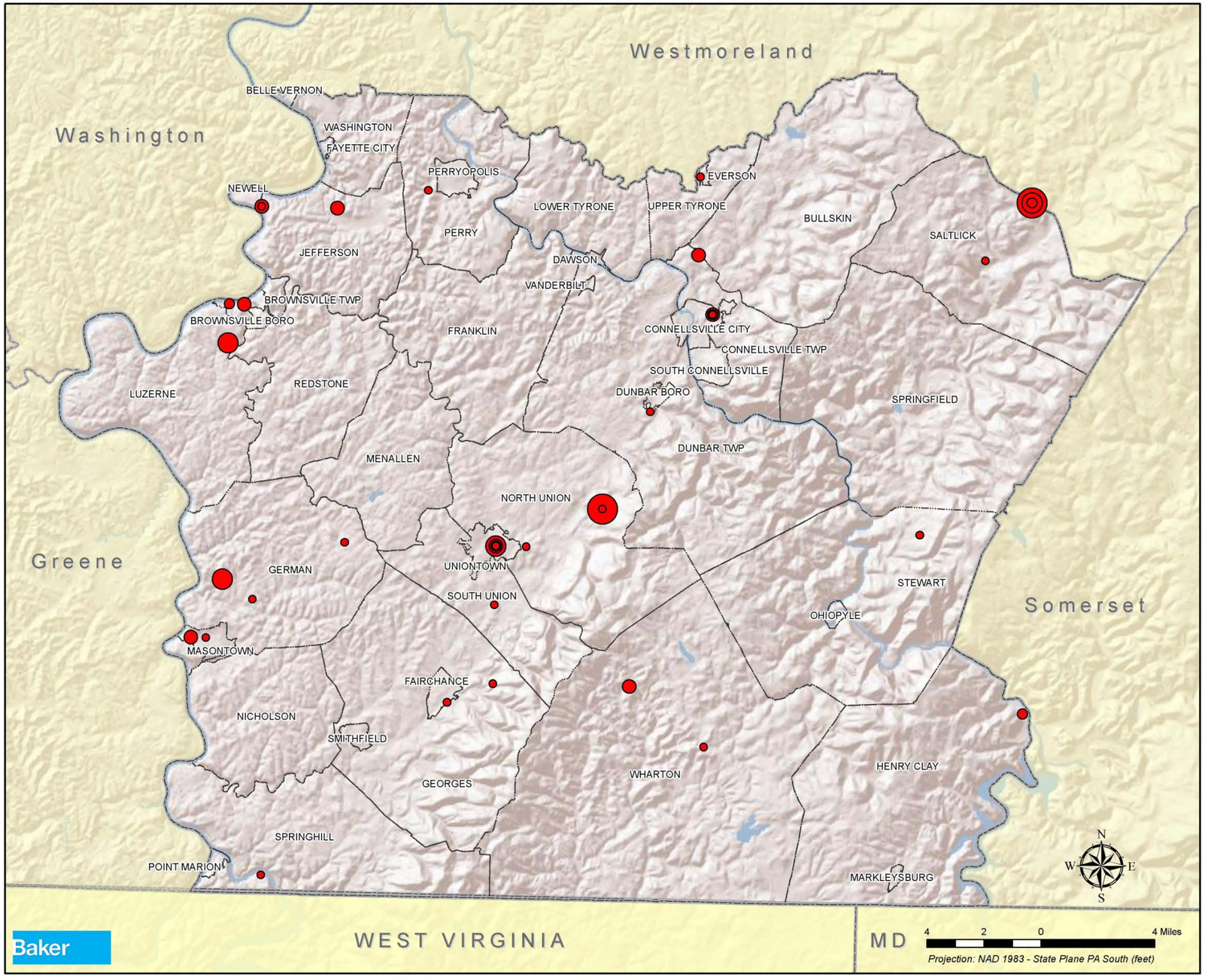
Table 4.3-14. Fayette County Hailstorms, 1970-2009

Date	Report Location	Magnitude
7/10/1973	Not reported	0.75 in.
7/20/1983	Not reported	3.00 in.
4/14/1984	Not reported	0.75 in.
7/8/1985	Not reported	2.00 in.
6/29/1987	Not reported	1.00 in.
6/30/1990	Not reported	1.75 in.
7/6/1991	Not reported	0.75 in.
5/12/1993	Uniontown	1.00 in.
2/27/1996	Connellsville	0.75 in.
8/15/1996	Uniontown	0.75 in.
5/31/1998	Brownsville and Republic	1.75 in.
6/2/1998	Champion	2.00 in.

Date	Report Location	Magnitude
6/19/1998	Champion	0.88 in.
6/30/1998	Perryopolis, Hopwood, Farmington	0.75 in.
4/23/1999	Point Marion	2.00 in.
6/2/2000	Farmington	0.75 in.
4/9/2001	Uniontown	1.00 in.
4/28/2002	Uniontown	1.00 in.
8/27/2003	Fairchance	0.75 in.
7/18/2004	Connellsville	0.75 in.
8/10/2004	Uniontown	0.75 in.
6/6/2005	Brownsville, Perryopolis, Connellsville, Dunbar	1.25 in.
6/29/2006	Uniontown	0.88 in.
7/2/2006	Masontown	1.00 in.
10/4/2006	Brownsville	1.00 in.
6/13/2007	Fairchance	0.75 in.
6/27/2007	Connellsville	0.88 in.
7/29/2007	Smithfield	0.75 in.
8/8/2007	Everson	0.75 in.
8/9/2007	Masontown	0.75 in.
6/16/2008	Brownsville, Uniontown, Leith Edenborn	1.00 in.
7/30/2008	Leckrone	0.75 in.
6/17/2009	Moyer	1.00 in.
7/21/2009	Fairmount	0.75 in.

Source: NOAA, 2011.

Figure 4.3.9-1 displays the location of hailstorm events across Fayette County. The hailstorm events have been fairly evenly distributed across the County.



Fayette County Hazard Mitigation Plan

Fayette County Hailstorm Event History (1950-2009)

LEGEND

Hail Location

Hail Size (inches)

- 0.1 - 0.75
- 0.76 - 0.99
- 1 - 1.49
- 1.5 - 1.99
- 2.0 and greater
- Municipality
- County

Sources: NOAA-NWS, 2010; Fayette County EMA/911, 2011

Figure 4.3.9-1. Fayette County Hailstorm Events

4.3.9.4 Future Occurrence

Hailstorm events will occur annually in Fayette County, primarily between April and August. Based on past events, over a fifty year period, the County can expect anywhere from forty to sixty hail events in the western two-thirds of the County and twenty to forty in the eastern third (PA All-HMP, 2010). Therefore, it is *highly likely* that hailstorms will occur in Fayette County in any given year.

4.3.9.5 Vulnerability Assessment

The potential for hailstorms will always exist. However, meteorologists and weather forecasters can normally predict hail events with accuracy. Adhering to hail warnings can significantly reduce the risk of hail-related injuries and even certain property/crop damages. The nearly 141,000 acres of agricultural land in Fayette County, with a total agricultural production value of $25,974,000, is especially vulnerable to hailstorm damage (PA All-HMP, 2010).

4.3.10 Hurricane, Tropical Storm, Nor'easter

4.3.10.1 Location and Extent

Tropical storms impacting Fayette County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. Cyclones with maximum sustained winds of less than 39 miles per hour (mph) are called tropical depressions. A tropical storm is a cyclone with maximum sustained winds between 39-74 mph. These storms sometimes develop into hurricanes with wind speeds in excess of 74 mph (PA All-HMP, 2010).

While Fayette County is located too far inland to be directly affected by the devastating impacts of a hurricane or tropical storm system, these weather systems can track inland and still cause heavy rainfall and flooding. Such storms are regional events, impacting very large areas hundreds to thousands of miles across over the life the storm. Areas in Fayette County which are subject to flooding, wind, and winter storm damage are particularly vulnerable.

Figure 4.3.10-1 shows wind speed zones developed by the American Society of Civil Engineers based on information including 40 years of tornado history and over 100 years of hurricane history. It identifies wind speeds that could occur across the United States to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities.

Fayette County falls within Zone III, meaning design wind speeds for shelters and critical facilities should be able to withstand a 3-second gust of up to 200 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. Fayette County does not fall within the identified Hurricane Susceptibility Region.

4.3.10.1 Range and Magnitude

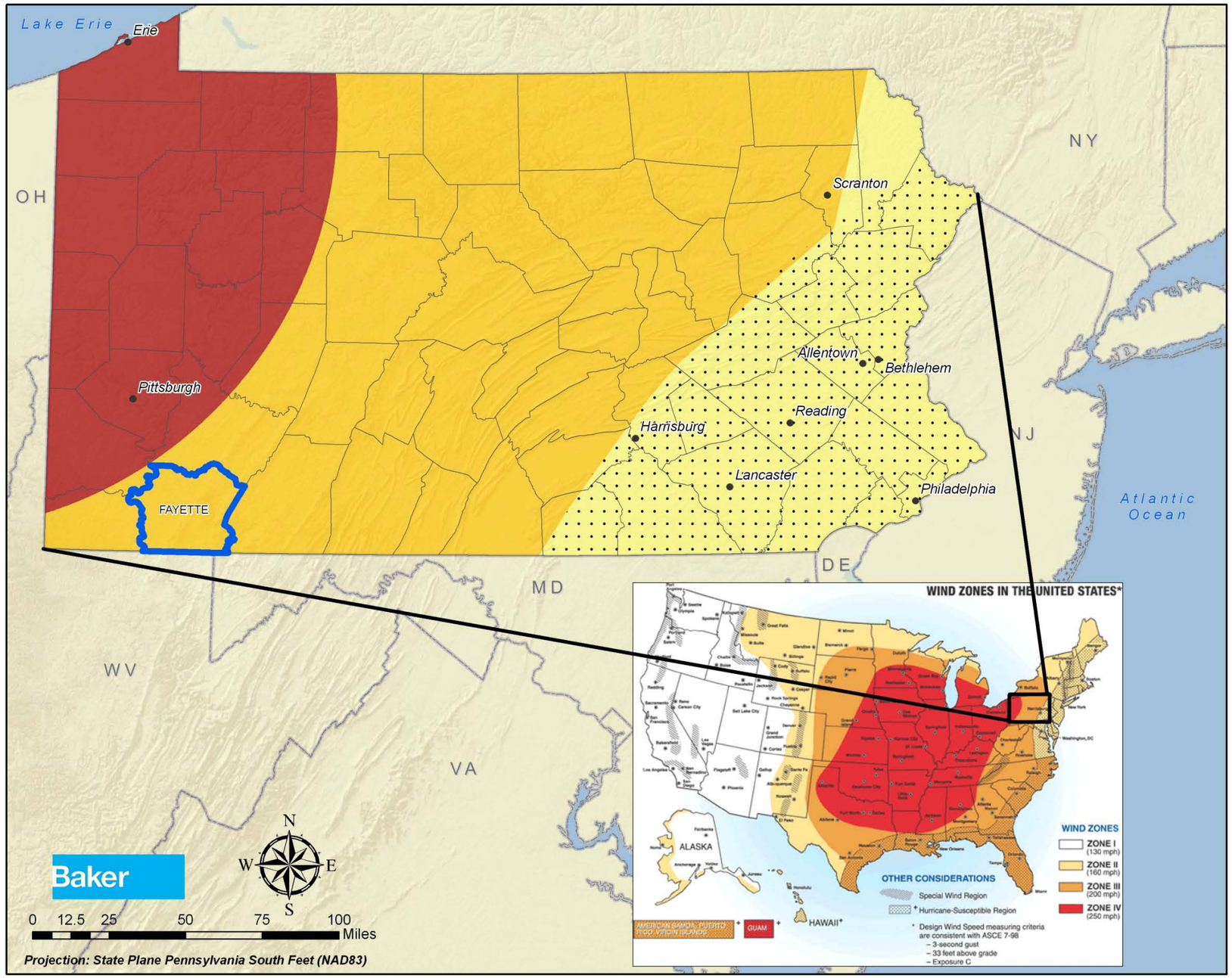
The impacts associated with hurricanes and tropical storms are primarily wind damage and flooding. It is not uncommon for tornadoes to develop during these events. Historical tropical storm events have brought intense rainfall, sometimes leading to damaging floods, northeast winds, which, combined with waterlogged soils, caused trees and utility poles to fall. It is

important to recognize the potential for flooding events during hurricanes and tropical storms; the risk assessment and associated impact for flooding events is included in Section 4.3.1. The worst case hurricane, tropical storm, or Nor'easter event for Fayette County would involve a weakened tropical storm system merging with an extratropical low pressure system over Pennsylvania. This occurrence would bring extremely heavy rains to Pennsylvania, causing flooding and millions of dollars of damage in Fayette County.

While not a threat to Fayette County, the impact tropical storm or hurricane events have on an area is typically measured in terms of wind speed. Expected damage from hurricane force winds is measured using the Saffir-Simpson Scale. The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential (**characteristic of tropical storms and hurricanes, but not a threat to Fayette County**), which are combined to estimate potential damage. Table 4.3-15 lists Saffir-Simpson Scale categories with associate wind speeds and expected damages. Categories 3, 4, and 5 are classified as "major" hurricanes. While major hurricanes comprise only 20 percent of all tropical cyclones making landfall, they account for over 70 percent of the damage in the United States. The likelihood of these damages occurring in Fayette County is assessed in Section 4.3.10.4, *Future Occurrence*.

Table 4.3-15. Damage Associated with Hurricane Events

Storm Category	Wind Speed (mph)	Description of Damages
1	74-95	MINIMAL: Damage is limited primarily to shrubbery and trees, unanchored mobile homes, and signs. No significant structural damage.
2	96-110	MODERATE: Some trees are toppled, some roof coverings are damaged, and major damage occurs to mobile homes. Some roofing material, door, and window damage.
3	111-130	EXTENSIVE: Some structural damage to small residences and utility buildings, with a minor amount of curtain wall failures. Mobile homes are destroyed. Large trees are toppled. Terrain may be flooded well inland.
4	131-155	EXTREME: Extensive damage to roofs, windows, and doors; roof systems on small buildings completely fail. More extensive curtain wall failures. Terrain may be flooded well inland.
5	>155	CATASTROPHIC: Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Massive evacuation of residential areas may be required.



Fayette County Hazard Mitigation Plan

Wind Zones in Pennsylvania

LEGEND

- Major Cities
- Hurricane Susc. Region

Wind Zones

- ZONE II (160 mph)
- ZONE III (200 mph)
- ZONE IV (250 mph)
- Fayette County
- Counties
- States

Source:
FEMA, 2009. Retrieved at: http://www.fema.gov/plan/prevent/saferoom/tsfs02_wind_zones.shtm

Wind speed zones developed by the American Society of Civil Engineers based on information including 40 years of tornado history and over 100 years of hurricane history.

Figure 4.3.10-1. Wind Zones in Pennsylvania

4.3.10.2 Past Occurrence

Fayette County has experienced only one major tropical storm in the past sixty years. Tropical Storm Agnes, which struck Pennsylvania in June 1972, resulted in a Presidential Disaster Declaration that included Fayette County. Merging with an extratropical low pressure system over northern Pennsylvania, Agnes brought extremely heavy rains to Pennsylvania. The major impact of this storm was its lingering economic damage; Pennsylvania incurred $2.1 billion in damage and 48 deaths statewide. Fires and floods destroyed 68,000 homes and 3,000 businesses, leaving 220,000 Pennsylvanians homeless (PA All-HMP, 2010). In Fayette County, Agnes resulted in $7,462,687 in flooding-related property damages (SHELDUS, 2011). More recently, the remnants of Tropical Storm Allison (June 2001) and Tropical Depression Frances (September 2004) caused flooding-related property damage in Fayette County totaling $50,000 and $15,000 respectively (NOAA, 2011).

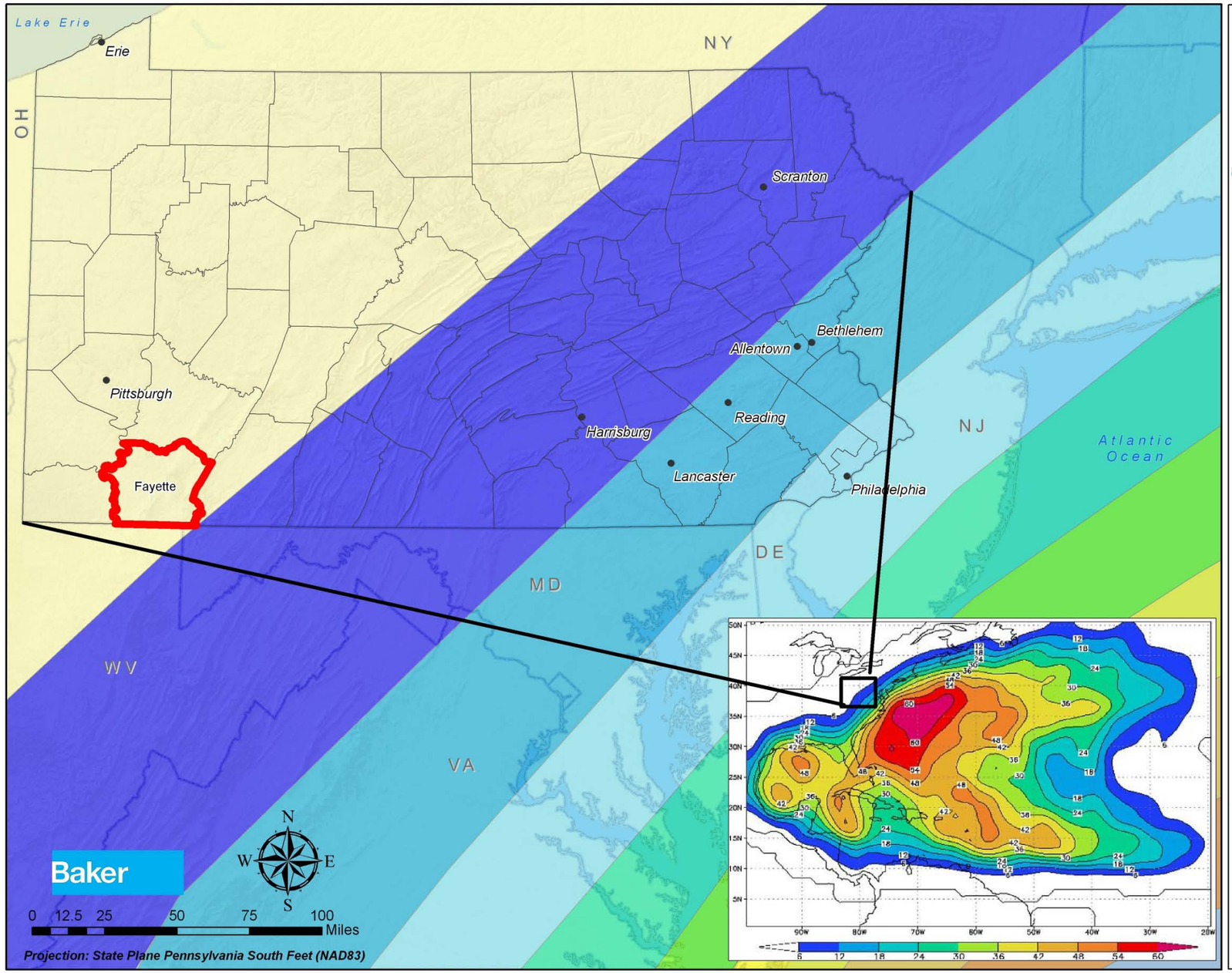
4.3.10.3 Future Occurrence

Although hurricanes and tropical storms can cause flood events consistent with 1 percent and 2 percent level frequency, their probability of occurrence is measured relative to wind speed. The National Oceanic and Atmospheric Administration Hurricane Research Division published the map included as Figure 4.3.10-2 showing the chance that a tropical storm or hurricane will affect a given area during the entire Atlantic hurricane season spanning from June to November. Note that this figure does not provide information on the probability of various storm intensities. Based on historical data between 1944 and 1999, this map shows that Fayette County has less than a 6% annual chance of experiencing a tropical storm or hurricane event. Based on this data, a hurricane/tropical storm event occurring in Fayette County in any given year is *possible*.

4.3.10.1 Vulnerability Assessment

The potential for a tropical storm to impact Fayette County, while slight, does exist. However, meteorologists and weather forecasters can normally predict storm events with great accuracy. Adhering to storm warnings can significantly reduce the risk of injury and even certain property/crop damages. According to the 2010 Pennsylvania All-Hazard Mitigation Plan and HAZUS economic loss estimates for a 100-year hurricane event, Fayette County could expect to sustain between $1,000 and $171,000 in building and economic disruption losses due to wind-related damages. Total possible building-related losses for the County could be as high as $602,684 (PA All-HMP, 2010). A vulnerability assessment for hurricanes and tropical storms must also focus on the impacts of flooding. An assessment for flood-related vulnerability is addressed in Section 4.3.2.5.

This page is intentionally blank.



Fayette County Hazard Mitigation Plan

Seasonal Probability of Hurricanes or Tropical Storms in Pennsylvania

LEGEND

Seasonal Probability of Storm Event

Percentage %

- Less than 6% risk
- 6
- 12
- 18
- 24
- 30
- 36
- 42
- 48
- Major Cities
- Counties
- States

Source:
NOAA Hurricane Research Division, 2009

This map depicts what the chance is that a tropical storm or hurricane will affect a given area sometime during hurricane season. Probability was calculated using 1944 to 1999 data when a storm was within 100 miles (165 km).

Figure 4.3.10-2. Fayette County Hurricane or Tropical Storm Annual Probability

4.3.11 Radon Exposure

4.3.11.1 Location and Extent

Radioactivity caused by airborne radon has been recognized for many years as an important component in the natural background radioactivity exposure of humans, but it was not until the 1980s that the wide geographic distribution of elevated values in houses and the possibility of extremely high radon values in houses were recognized. Radon is a noble gas that originates by the natural radioactive decay of uranium and thorium. Like other noble gases (e.g., helium, neon, and argon), radon forms essentially no chemical compounds and tends to exist as a gas or as a dissolved atomic constituent in groundwater. Three sources of radon in houses are now recognized:

- Radon in soil air that flows into the house;
- Radon dissolved in water from private wells and exsolved during water usage; this is rarely a problem in Pennsylvania; and
- Radon emanating from uranium-rich building materials (e.g. concrete blocks or gypsum wallboard); this is not known to be a problem in Pennsylvania.

Figure 4.3.11-1 illustrates radon entry points into a home.

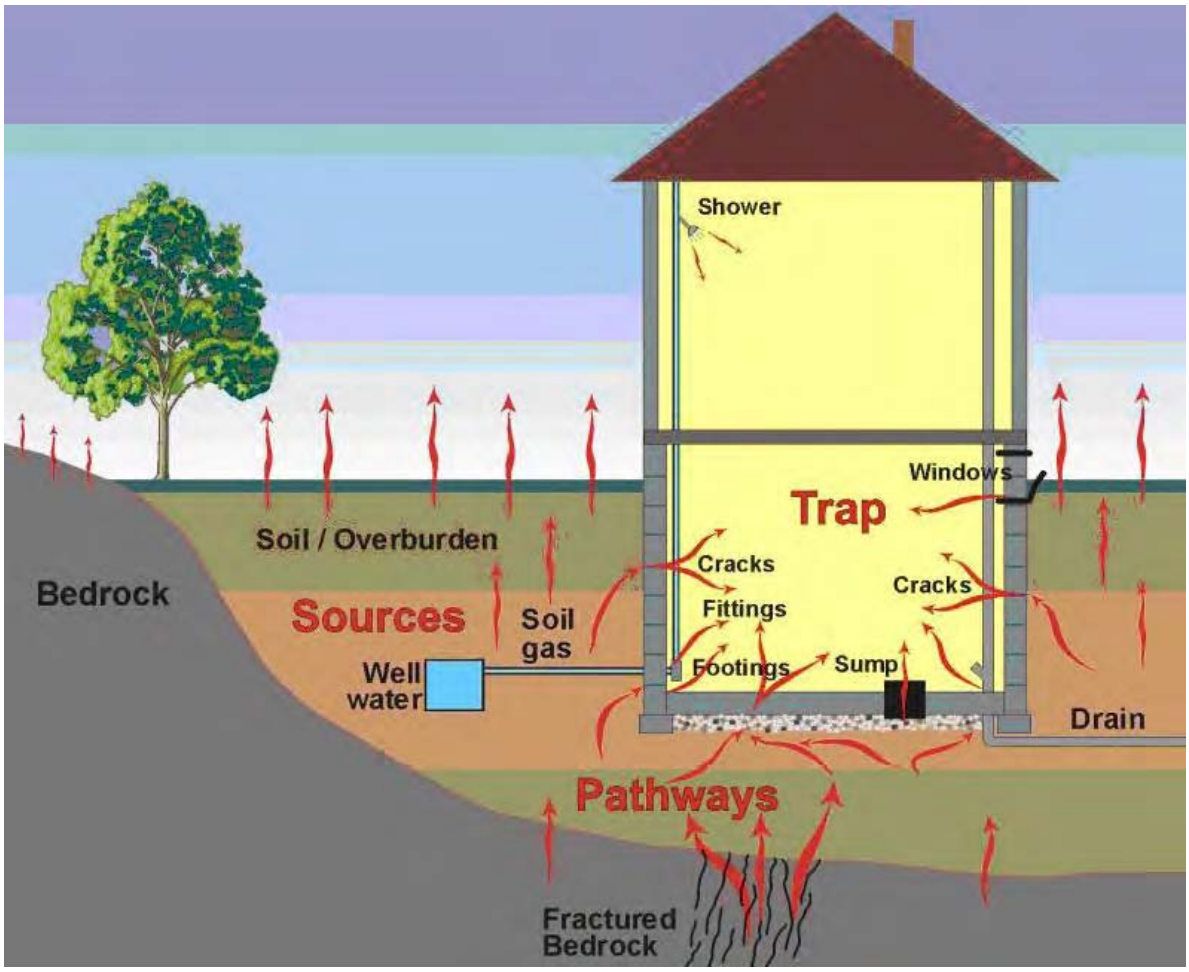


Figure 4.3.11-1. Radon Entry Points

Each county in Pennsylvania is classified as having a *low*, *moderate*, or *high* radon hazard potential (see Figure 4.3.11-2). A majority of counties across the Commonwealth, particularly counties in eastern Pennsylvania, have a *high* hazard potential. However, as is shown in Figure 4.3.11-2, Fayette County has a *moderate* hazard potential, with average indoor radon levels between 2 to 4 pCiL.

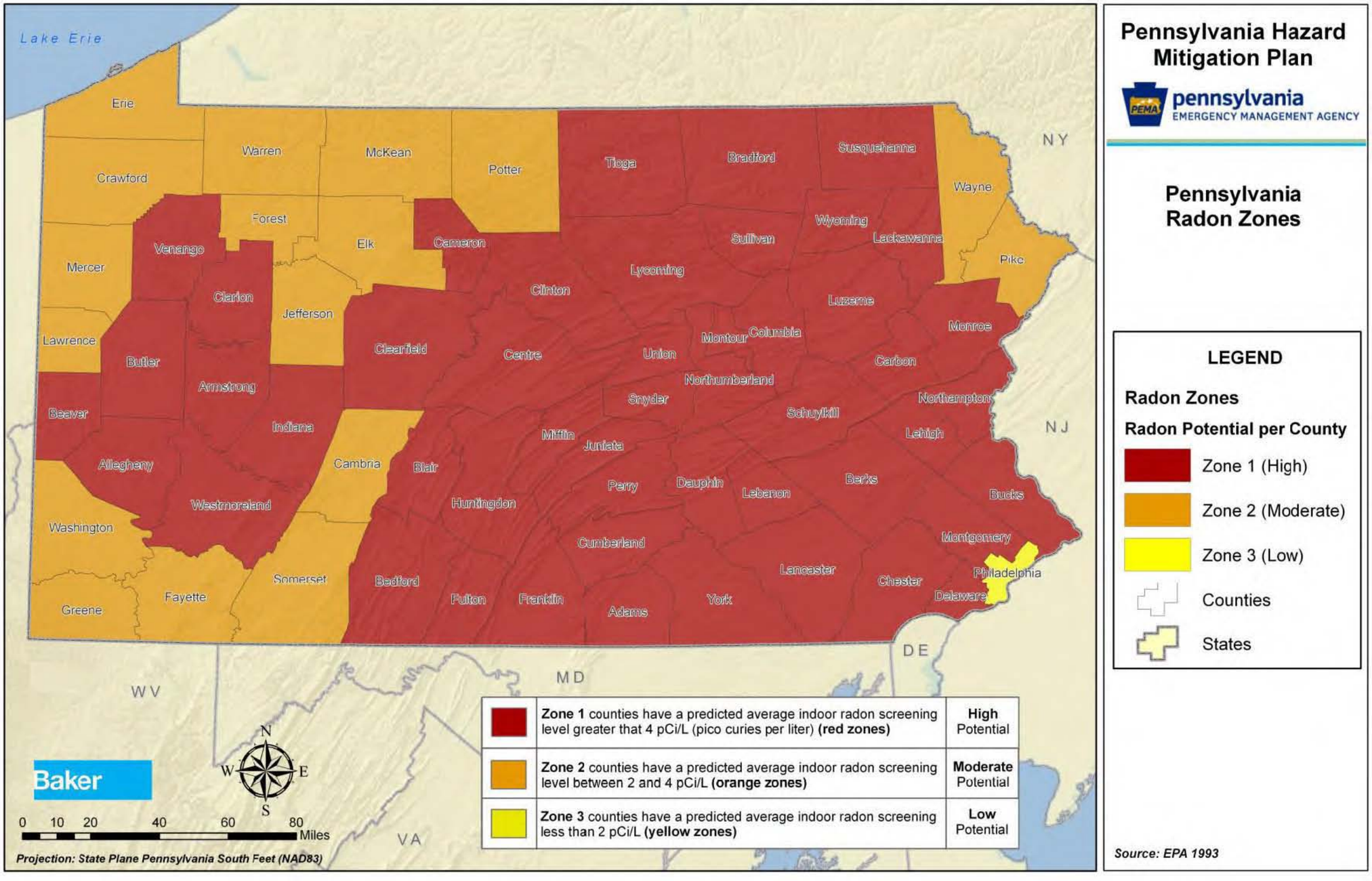


Figure 4.3.11-2. Fayette County Radon Level

High radon levels were initially thought to be exacerbated in houses that are tightly sealed, but it is now recognized that rates of air flow into and out of houses, plus the location of air inflow and the radon content of air in the surrounding soil, are key factors in radon concentrations. Outflows of air from a house, caused by a furnace, fan, thermal "chimney" effect, or wind effects, require that air be drawn into the house to compensate. If the upper part of the house is tight enough to impede influx of outdoor air (radon concentration generally <0.1 pCi/L), then an appreciable fraction of the air may be drawn in from the soil or fractured bedrock through the foundation and slab beneath the house, or through cracks and openings for pipes, sumps, and similar features. Soil gas typically contains from a few hundred to a few thousand pCi/L of radon; therefore, even a small rate of soil gas inflow can lead to elevated radon concentrations in a house.

4.3.11.2 Range and Magnitude

Exposure to radon is the second leading cause of lung cancer after smoking. It is the number one cause of lung cancer among non-smokers. Radon is responsible for about 21,000 lung cancer deaths every year; approximately 2,900 of which occur among people who have never smoked. Lung cancer is the only known effect on human health from exposure to radon in air and thus far, there is no evidence that children are at greater risk of lung cancer than are adults (USEPA, 2010). The main hazard is actually from the radon daughter products (218Po, 214Pb, 214Bi), which may become attached to lung tissue and induce lung cancer by their radioactive decay (PA All-HMP, 2010).

According to the EPA, the average radon concentration in the indoor air of America's homes is about 1.3 pCi/L. The EPA recommends homes be remediated if the radon level is 4 pCi/L or more. However, because there is no known safe level of exposure to radon, the EPA also recommends that Americans consider remediating their home for radon levels between 2 pCi/L and 4 pCi/L (PA All-HMP, 2010). Table 4.3-16 shows the relationship between various radon levels, probability of lung cancer, and action thresholds.

Table 4.3-16. Radon Risk for Non-Smokers

Radon Level (pCi/L)	If 1,000 People Exposed to this Level Over a Lifetime	Action Threshold
20	36 would get lung cancer	Fix Structure
10	18 would get lung cancer	Fix Structure
8	15 would get lung cancer	Fix Structure
4	7 would get lung cancer	Fix Structure
2	4 would get lung cancer	Consider fixing between 2 and 4 pCi/L
1.3	2 would get lung cancer	Reducing radon levels below 2 pCi/L is difficult
0.4	0 would get lung cancer	Avg. outdoor level

Source: USEPA, 2010.

The worst-case scenario for radon exposure in Fayette County would be that a large area of tightly sealed homes provided residents high levels of exposure over a prolonged period of time without the resident being aware. This worst-case scenario exposure then could lead to a large number of people with cancer attributed to the radon exposure (PA All-HMP, 2010).

4.3.11.3 Past Occurrence

According to PEMA, current data on abundance and distribution of radon in Pennsylvania houses is considered incomplete and potentially biased, but some general patterns do exist. Values exceeding the EPA guideline of 4 pCi/L occur in all regions of the Commonwealth, including all 42 municipalities in Fayette County.

4.3.11.4 Future Occurrence

Radon exposure is inevitable given present soil, geologic, and geomorphic factors across Pennsylvania. Development in areas where previous radon levels have been significantly high will continue to be more susceptible to exposure. However, new incidents of concentrated exposure may occur with future development or deterioration of older structures. Exposure can be limited with proper testing for both past and future development and appropriate mitigation measures. Therefore, annual occurrence of radon exposure in Fayette County should be considered *possible*.

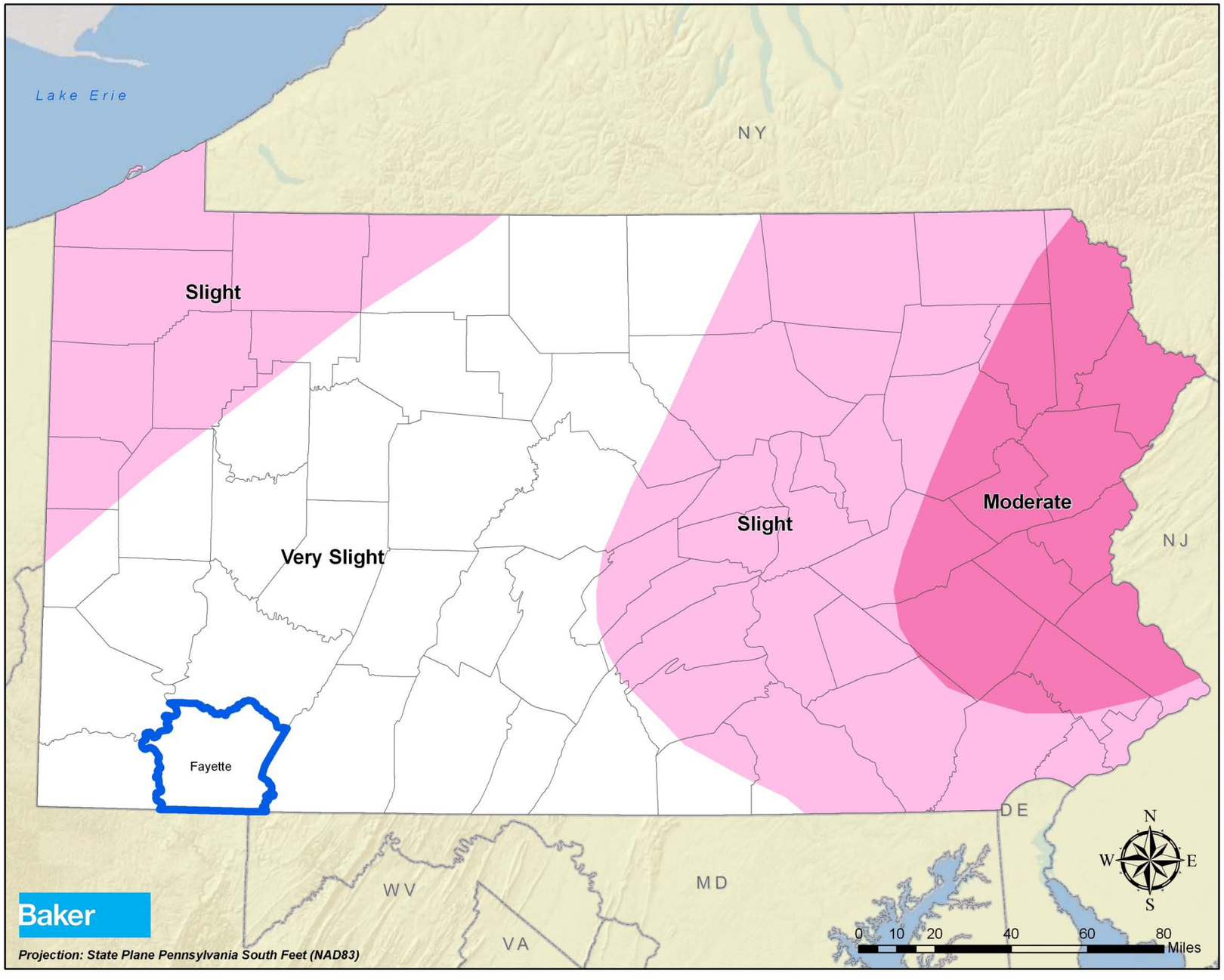
4.3.11.5 Vulnerability Assessment

The potential for radon exposure always exists. However, utilizing residential construction and mitigation techniques that aid the flow of radon out of the house and prevent its buildup can significantly reduce the risk of radon exposure-related deaths. Currently, the EPA determines that an average radon mitigation system costs $1,200 (PA All-HMP, 2010).

4.3.12 Earthquakes

4.3.12.1 Location and Extent

Southwestern Pennsylvania's vulnerability to earthquakes decreases from west to east. Fayette County is located in an area ranked at *very slight* risk of earthquake. Further details are shown in Figure 4.3.12-1 and described in the following section.



Fayette County Hazard Mitigation Plan

Pennsylvania Relative Earthquake Hazard Zones

LEGEND

Earthquake Hazard Zones

- Moderate
- Slight
- Very Slight
- Counties
- States

Source: Millersville University Department of Earth Sciences, 2009

Figure 4.3.12-1. Earthquake Hazard Zones

4.3.12.2 Range of Magnitude

The impact an earthquake event has on an area is typically measured in terms of earthquake intensity. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. A detailed description of the Modified Mercalli Intensity Scale is shown in Table 4.3-17. The earthquakes that occur in Pennsylvania originate deep with the Earth's crust, and not on an active fault. Therefore, little or no damage is expected.

Table 4.3-17. Modified Mercalli Intensity Scale with Associated Impacts

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

One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. Peak ground acceleration (PGA) measures the strength of ground movements in this manner. PGA represents the rate in change of motion of the earth's surface during an earthquake as a percent of the established rate of acceleration due to gravity. Fayette County is estimated to have a *slight* earthquake hazard.

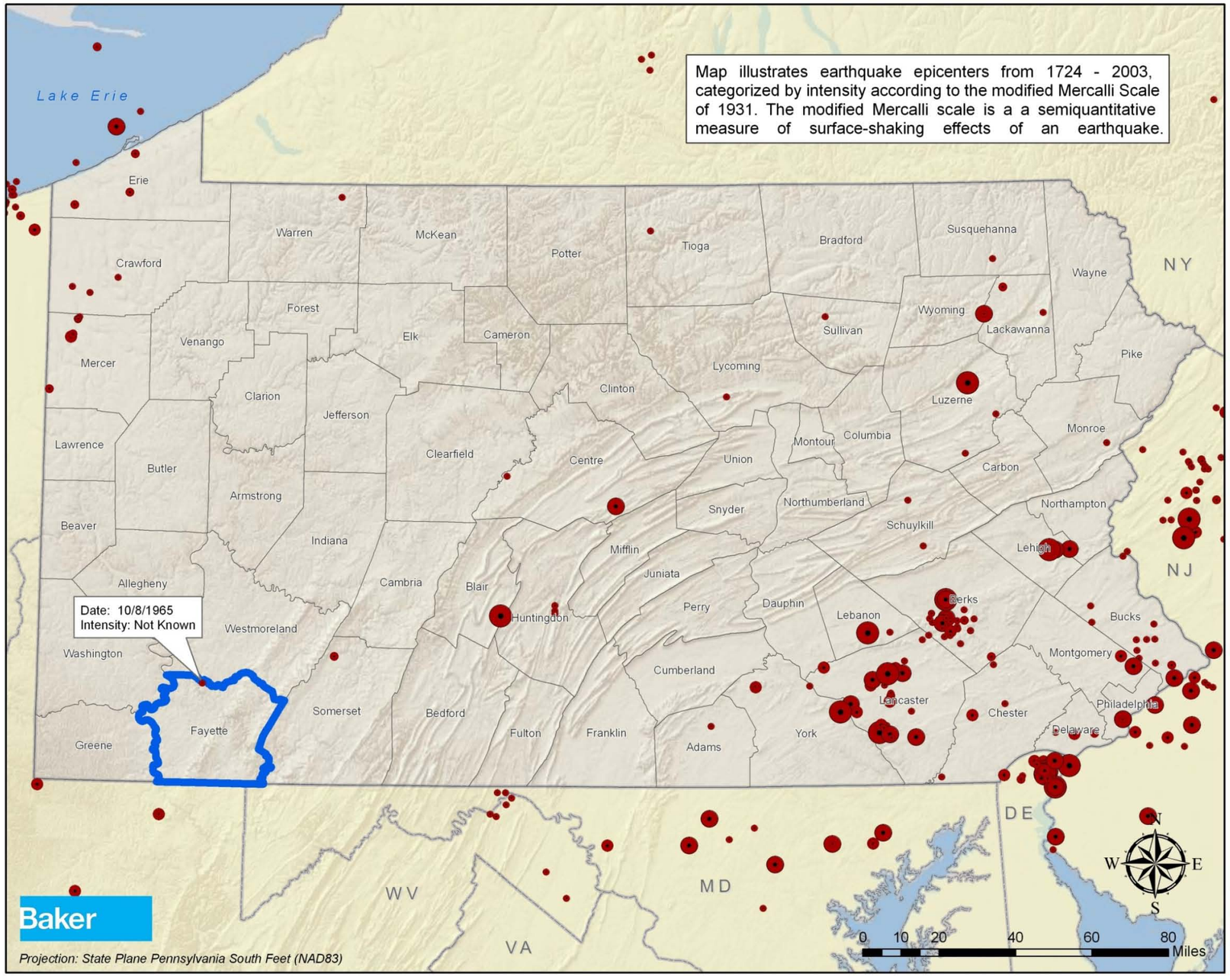
Environmental impacts of earthquakes can be numerous, widespread, and devastating, particularly if indirect impacts are considered. The worst case scenario, although highly unlikely, for Fayette County would be the occurrence of a Mercalli Scale XII earthquake with the following consequences.

- Induced tsunamis and flooding or landslides, subsidence and avalanches;
- Poor water quality;

- Damage to vegetation; and
- Breakage in sewage or toxic material containments.

4.3.12.3 Past Occurrence

Since 1724, Fayette County has been the epicenter of one measured earthquake, taking place near the Fayette/Westmoreland County border on October 8, 1965 (DCNR, 2004). The intensity of the earthquake is not known. The following map (Figure 4.3.12-2) shows recorded earthquake events in Pennsylvania between 1724 and 2003. Earthquake events are shown in other areas of Pennsylvania, with a particular concentration of events occurring in the southeastern part of the State, around Lancaster. No injury or severe damage from earthquake events has been reported in Fayette County.



Fayette County Hazard Mitigation Plan

Pennsylvania Earthquake History (1724 - 2003)

LEGEND

Earthquakes

Modified Mercalli Scale

- Not Known
- I - III
- IV
- V
- VI
- Fayette County
- Counties
- States

Source: Pennsylvania DCNR, 2004

Figure 4.3.12-2. Earthquake Epicenters in Pennsylvania

4.3.12.4 Future Occurrence

Fayette County is located in a zone where minor earthquake damage is expected. Based on the past history of earthquake events in Fayette County, the future probability (1 earthquake/279 years) is about 0.4% and is considered *unlikely*.

4.3.12.5 Vulnerability Assessment

The effects of an earthquake (if the hazard exists) could potentially be anything from detected only on seismographs to ground water wells collapsing to total destruction, trees falling, ground rises and falls in waves. Continued enforcement of the unified construction code should mitigate this vulnerability.

4.3.13 Pandemic

4.3.13.1 Location and Extent

Pandemic events cover a wide geographic area and can affect large populations. The exact size and extent of an infected population is dependent upon how easily the illness is spread, mode of transmission, and the amount of contact between infected and uninfected individuals. Fayette County is primarily concerned with the possibility of a pandemic flu outbreak. The H1N1 virus, colloquially known as the *Swine Flu*, has been of particular concern over the past few years. This virus was first detected in people in the United States in April 2009. On June 11, 2009, the World Health Organization signaled that a pandemic of 2009 H1N1 flu was underway (CDC, 2009).

4.3.13.2 Range of Magnitude

Advancements in medical technologies have greatly reduced the number of deaths caused by influenza. Consequently, the impact various influenza outbreaks have had globally has declined over the course of the past century. High risk populations considered more vulnerable to various pandemic diseases are described in Section 4.3.13.5. Pandemic viruses/diseases have the potential to cause many deaths. Approximately 12,470 Americans died from H1N1 in a roughly one-year period, spanning from April 2009 to April 2010 (CDC, 2010). A worst case scenario for Fayette County would be a widespread outbreak resulting in disruption of services and daily life, and deaths.

4.3.13.3 Past Occurrence

There have been several pandemic influenza outbreaks which have occurred over the past 100 years. A list of worldwide pandemic events is shown in Table 4.3-18. As of August 2010, H1N1 was in a post-pandemic period. The Pennsylvania Department of Health confirmed 50 cases of H1N1 with 3 deaths in Fayette County through February 2010 (PADH, 2010).

Table 4.3-18. Previous Pandemic Outbreak

Date	Pandemic/Subtype	Worldwide Deaths (Approx.)
1918-1920	Spanish Flu/H1N1	50 Million
1957-1958	Asian Flu/H2N2	1.5-2 Million

Date	Pandemic/Subtype	Worldwide Deaths (Approx.)
1968-1969	Hong Kong Flu/H3N2	1 Million
2009-2010	Swine Flu/H1N1	> 18,000

Source: CDC, 2010.

4.3.13.4 Future Occurrence

Based on historical data, Fayette County is expected to experience pandemic influenza outbreaks every 11 to 41 years. The precise timing of pandemic influenza outbreaks is unpredictable. Therefore the future occurrence is considered *possible*.

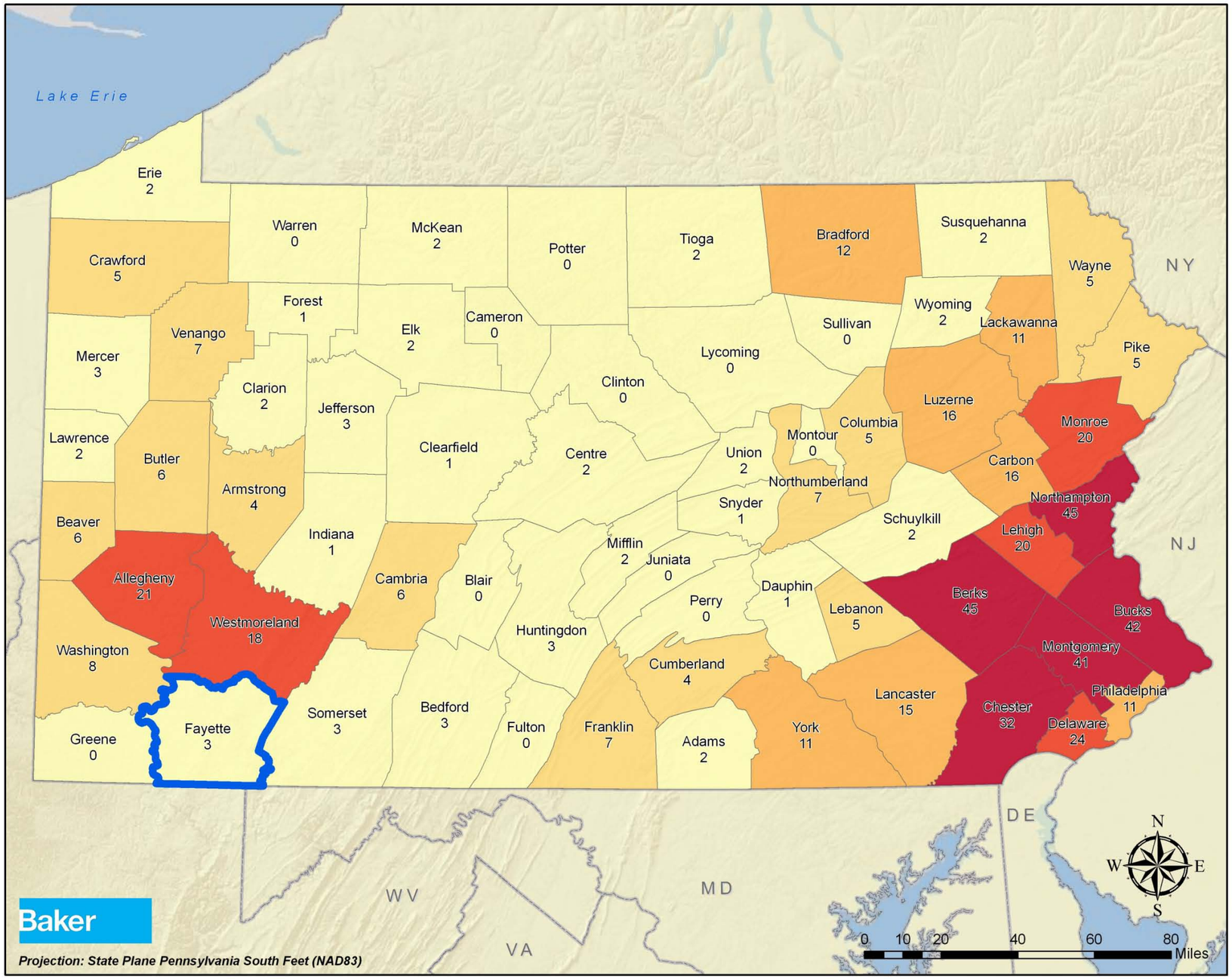
4.3.13.5 Vulnerability Assessment

Depending on the characteristics of the disease/virus, certain population groups can be at higher risk of infection. With seasonal influenza, about 60% of hospitalizations and 90% of flu-related deaths occur among people 65 and older. However, in the recent H1N1 pandemic, 90% of hospitalizations and 87% of H1N1-related deaths occurred in people younger than 65. As is the case with seasonal flu, people with underlying health conditions faced a much higher probability of contracting H1N1. Schools, convalescent centers, and other institutions are highly conducive to faster transmission of pandemic diseases (CDC, 2010).

4.3.14 Lightning Strikes

4.3.14.1 Location and Extent

Lightning events can occur across Fayette County. Different areas experience varying event frequencies, but in all cases lightning strikes occur primarily during the summer months. While the impact of flash events is highly localized, strong storms can result in numerous widespread events over a broad area. In addition, the impacts of an event can be serious or widespread if lightning strikes a particularly significant location such as a power station or large public venue. Figure 4.3.14-1 depicts the history of lightning events across Pennsylvania for the years 1950 to 2009; Fayette County has experienced a very low number of lightning events in comparison to many of the surrounding areas, including Allegheny and Westmoreland Counties. Fayette County's relatively low population density is partly to thank for the low number of events.



Fayette County Hazard Mitigation Plan

Pennsylvania Lightning Event History (1950-2009)

LEGEND

Lightning History

Number of Events

- 0 - 3
- 4 - 8
- 9 - 16
- 17 - 24
- 25 - 45
- Fayette County
- Counties
- States

Lightning events are classified as events resulting in fatality, injury and/or property and crop damage. This map does not illustrate the number of lightning strikes per county.

Source: NCDC, 2010
Data current as of April, 2010.

Figure 4.3.14-1 Previous Lightning Events in Fayette County

4.3.14.2 Range of Magnitude

Each year, lightning is responsible for the deaths of a hundred or so people, injuries to several hundred more, and millions of dollars in property damage, in the United States. Many case histories show heart damage. Inflated lungs and brain damage have also been observed from lightning fatalities. Loss of consciousness, amnesia, paralysis and burns are reported by many who have survived. Deaths and injuries to livestock and other animals, thousands of forest and brush fires, as well as millions of dollars in damage to buildings, communications systems, power lines, and electrical systems are also the result of lightning (PA All-HMP, 2010). In Fayette County, the worst case lightning event would be a strike in a large crowd or gathering of people as might be found at a large sporting event or outdoor concert. This could result in mass deaths or injuries.

4.3.14.3 Past Occurrence

Records from the National Climatic Data Center show that there were 529 lightning *events* in the 67 counties across Pennsylvania between 1950 and 2009. A lightning "event" is defined as a lightning strike which results in fatality, injury, and/or property or crop damage. During this time period, Fayette County recorded three (3) lightning events, totaling $27,000 in property damage and no fatalities (NOAA, 2011). A more detailed profile of these events is shown in Table 4.3.14-1.

Table 4.3-19. Previous Lightning Events in Fayette County

Date	Location	Property Damage
7/15/1995	Uniontown	$5,000
8/17/1997	Grindstone	$20,000
5/31/1998	Vanderbilt	$2,000
	TOTAL	**$27,000**

Source: NOAA, 2011

4.3.14.4 Future of Occurrence

While lightning occurs annually in Fayette County, severe damaging and/or life threatening lightning strikes occur much less frequently. Based on past recorded events, the probability of Fayette County experiencing a severe lightning event in any given year is *possible*.

4.3.14.5 Vulnerability Assessment

The potential for lightning strike events will always exist during the summer months in Fayette County. However, meteorologists and weather forecasters can normally predict severe storm events with great accuracy. Adhering to storm warnings and taking proper shelter during lightning events can significantly reduce the risk of lightning-related injuries and deaths.

B. HUMAN-MADE HAZARDS

4.3.15 Dam Failure

There are thirty-five (35) major dams in Fayette County. Due to safety and security concerns, the details on Fayette County's risk from dam failure are provided in Appendix G. Information regarding high hazard dams can be obtained from the Fayette County Emergency Services Center.

4.3.16 Environmental Hazards

Environmental hazards are hazards that pose threats to the natural environment, the built environment, and public safety through the diffusion of harmful substances, materials, or products. Environmental hazards that have the potential of affecting Fayette County include the following:

A. **Hazardous Material Releases**; at fixed facilities or in transit include toxic chemicals, infectious substances, biohazardous waste, and any materials that are explosive, corrosive, flammable, or radioactive (PL 1990-165, § 207(e)).

   Across the Commonwealth many municipalities are experiencing a tremendous increase in the number of chemical, oil, radioactive materials and other hazardous substances spills. These spills are the direct result from highway, rail, and waterway accidents, storage leakage, pipeline breaks, and numerous unspecified situations. Facilities that use, manufacture, or store hazardous materials in Pennsylvania must comply with Title III of the federal Superfund Amendments and Reauthorization Act (SARA), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. The community right-to-know reporting requirements keep communities abreast of the presence and release of chemicals at individual facilities.

B. **Marcellus Shale Production and Distribution**; extraction of natural gas (from the Marcellus Shale formation) requiring horizontal drilling and a process known as 'hydraulic fracturing' that uses water, mixed with sand and potentially hazardous chemicals, pumped into the shale formation under high pressure to fracture the shale around the well, allowing the natural gas to flow freely. Once the hydraulic fracturing process is completed, the used water, often referred to as "frac fluid," must be treated to remove chemicals and minerals (PA DEP Marcellus Shale, 2011).

   Marcellus Shale drilling may increase the Commonwealth's potential for experiencing an environmental issue. Drilling and pipelines have a very real potential for affecting water quality and quantity, during both the hydraulic fracturing and wastewater treatment phases of the drilling process (Penn State University, 2011). All oil and gas exploration and drilling in the state is regulated under all or part of the state oil and gas laws, the

Clean Streams Law, the Dam Safety and Encroachments Act, the Solid Waste Management Act, the Water Resources Planning Act, and the Worker and Community Right to Know Act. PA DEP is responsible for reviewing and issuing drilling permits, inspecting drilling operations and responding to complaints about water quality problems. DEP inspectors conduct routine and unannounced inspections of drilling sites and wells statewide (PA DEP, 2011).

4.3.16.1 Location and Extent

A. Hazardous Materials

A hazardous material release can occur wherever hazardous materials are manufactured, used, stored, or transported. Such releases usually occur at fixed site facilities or along transportation routes. Hazardous material releases can create direct injuries and death and contaminate air, water, and soils. They can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary hazards. Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. An accidental hazardous material release can occur wherever hazardous materials are manufactured, used, stored, or transported. Such releases can affect the nearby population and contaminate critical or sensitive environmental areas.

There are increasingly large numbers of chemicals, oils, radioactive materials and other hazardous substances spilled as the result of highway, rail and waterway accidents, storage tank leakage, pipeline break, and/or other accidents. On occasion, these events become a major disaster and force people to evacuate and/or lose their homes and businesses.

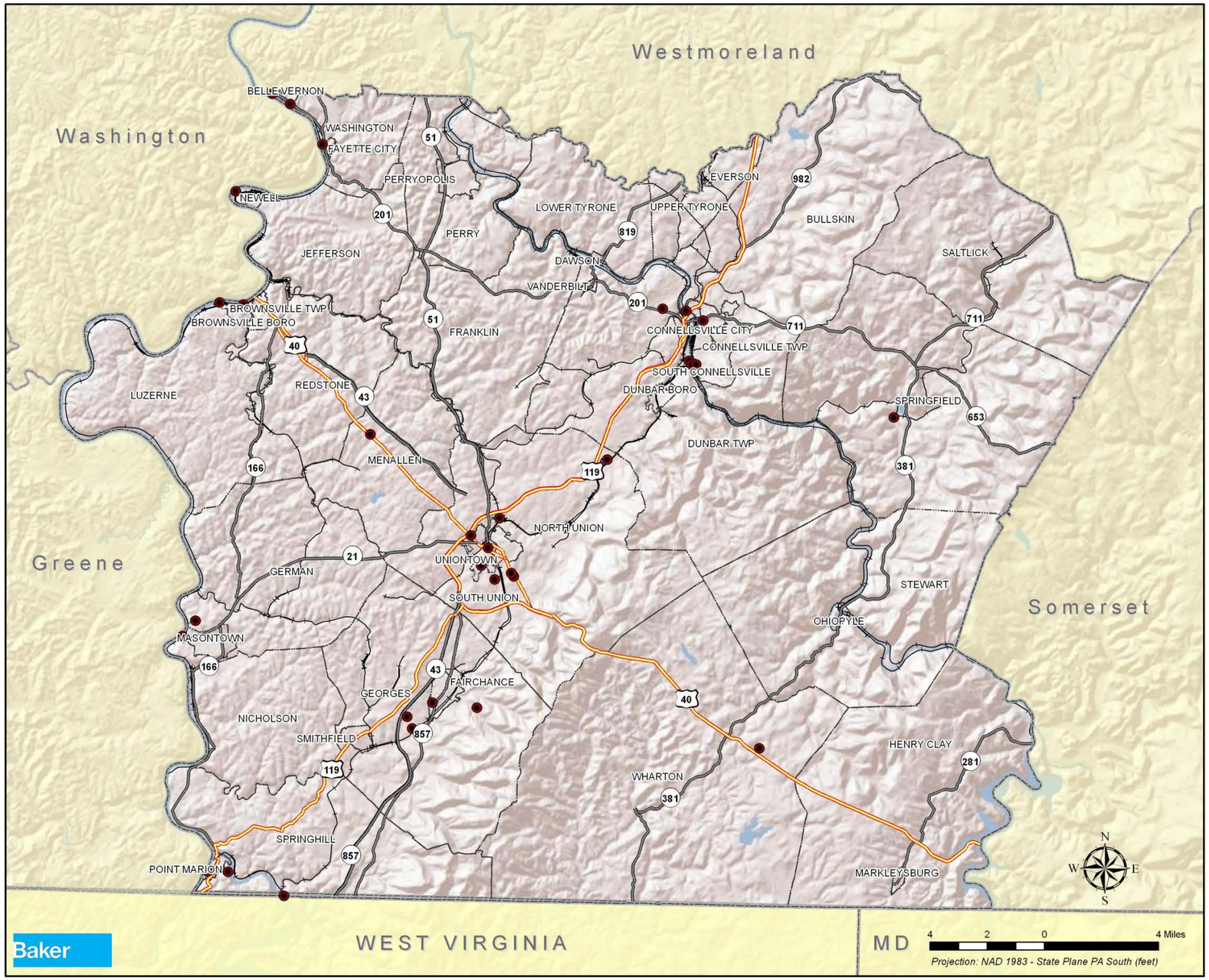
Fayette County is home to thirty-two (32) sites which generate/store hazardous materials. The following table lists all 32 SARA Title III facilities in Fayette County, taking into consideration their location with respect to the special flood hazard area (SFHA). Table 4.3-20 gives the name of each facility, and its location with respect to an SFHA. The map that follows this table, Figure 4.3.16-1, provides the geographic location of SARA facilities throughout the County. As is shown in the map, most of the SARA Title II facilities in the County are clustered around either Uniontown or Connellsville.

Table 4.3-20. Hazardous Materials Facilities

Facility	Municipality	SFHA
MUNICIPAL AUTHORITY OF BELLE VERNON	BELLE VERNON	Yes
BELLE VERNON SEWAGE PLANT	BELLE VERNON	Yes
PA AMERICAN WATER (BROWNSVILLE)	BROWNSVILLE BORO	No
VERIZON - BROWNSVILLE	BROWNSVILLE BORO	No
VERIZON - CONNELLSVILLE	CONNELLSVILLE CITY	No
CONNELLSVILLE MUNICIPAL AUTHORITY	CONNELLSVILLE CITY	Yes
NORTH FAYETTE MUNICIPAL AUTHORITY	DUNBAR TWP	No

Facility	Municipality	SFHA
MUNICIPAL AUTHORITY OF WESTMORELAND CO	DUNBAR TWP	Yes
OGLEVEE LIMITED	DUNBAR TWP	No
VERIZON - FAIRCHANCE	FAIRCHANCE	No
WASHINGTON TWP MUNICIPAL AUTHORITY	FAYETTE CITY	Yes
JOHNSON MATTEY INC	GEORGES	No
FAIRCHANCE WATER TREATMENT PLANT	GEORGES	No
MYPODIAMOND	GEORGES	No
DUKE ENERGY FAYETTE LLC	GERMAN	No
MASONTOWN WATER TREATMENT PLANT	MASONTOWN	Yes
PA AMERICAN WATER (MENALLEN)	MENALLEN	No
NEWELL MUNICIPAL AUTHORITY	NEWELL	No
GREATER UNIONTOWN JOINT SEWAGE PLANT	NORTH UNION	No
UNIVERSAL WELL SERVICES	NORTH UNION	No
POINT MARION SEWAGE	POINT MARION	Yes
CROWN CORK AND SEAL	SOUTH CONNELLSVILLE	No
UNIONTOWN COUNTRY CLUB	SOUTH UNION	No
LEVEL THREE COMMUNICATIONS	SOUTH UNION	No
VALLEY NATIONAL GAS	SOUTH UNION	No
INDIAN CREEK VALLEY WATER AUTHORITY	SPRINGFIELD	Yes
ALBERT GALLATIN MUNICIPAL AUTHORITY	SPRINGHILL	No
POINT MARION WATER	SPRINGHILL	No
UNITED DAIRY (FIKES)	UNIONTOWN	No
VERIZON - UNIONTOWN	UNIONTOWN	No
UNIONTOWN JEWISH COMMUNITY CENTER	UNIONTOWN	No
NEMACOLN WOODLANDS	WHARTON	No

Source: Fayette County Emergency Services, 2010 and Michael Baker, Jr., Inc.



Fayette County Hazard Mitigation Plan

Fayette County SARA Title III Facility Locations

LEGEND

- SARA Planning Facility
- US Highways
- State Highways
- Railroad
- Municipality
- County

Source: Fayette County EMA/911, 2011

Table 4.3.16-1. Hazardous Materials Facilities

B. Marcellus Shale

Since 2005, natural gas exploration activities in the Marcellus Shale Formation have increased significantly in the Commonwealth of Pennsylvania. According to maps produced by the PA DEP, in 2008, 195 Marcellus Shale wells were drilled in Pennsylvania; two years later, in 2010, 1,386 Marcellus Shale wells had been drilled. As of March, 2011, most of this drilling has taken place in the northern-central and southwestern portions of the State, with Bradford, Tioga, Lycoming, Butler, Greene, Susquehanna, and Washington Counties possessing the highest number of Marcellus Shale drilling permits in the State. Washington County, bordering Fayette County to the northwest, had the third largest number of Marcellus Shale wells being drilled, with 58 wells (PA DEP, 2011).

Between January 1 and April 14, 2011, Fayette County issued 26 Marcellus Shale drilling permits. Nine were issued in January; eleven in February; three in March; and, three in April. Nineteen of these permits are held by Atlas America LLC. Chief Oil & Gas LLC is the next largest permit holder with five (PA DEP, 2011). Table 4.3-21 provides the locations and quantities of Marcellus Shale permits in Fayette County.

Table 4.3-21. Marcellus Shale Drilling Permits Issued in Fayette County (January – April, 2011)

Municipality	Number of Permits
Bullskin	3
Dunbar	2
German	2
Jefferson	3
Menallen	3
North Union	4
Redstone	4
Wharton	5

Source: PA DEP, 2011.

4.3.16.2 Range of Magnitude

A. Hazardous Materials

Hazardous material releases can contaminate air, water, and soils and create death and injuries. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events. Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas.

With a hazardous material release, whether accidental or intentional, there are several potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or

shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Characteristics that can enhance or magnify the effects of a hazardous material release include:

- **Weather conditions:** affects how the hazard occurs and develops;
- **Micro-meteorological effects of buildings and terrain:** alters dispersion of hazardous materials, especially if facility is in SFHA; and
- **Non-compliance with applicable codes (e.g. building or fire codes) and maintenance failures (e.g. fire protection and containment features):** can substantially increase the damage to the facility itself and to surrounding buildings.

The severity of the incident is dependent not only on the circumstances described above, but also with the type of material released and the distance and related response time for emergency response teams. The areas within closest proximity to the releases are generally at greatest risk, yet depending on the agent, a release can travel great distances or remain present in the environment for a long period of time (e.g. centuries to millennia for radioactive materials), resulting in extensive impacts on people and the environment.

B. Marcellus Shale

During both the hydraulic fracturing and wastewater treatment phases of the process, Marcellus Shale drilling holds the potential for affecting water quality and quantity. Negligence and/or mishaps in well drilling can result in the pollution of private water supplies, groundwater and stormwater runoff by hazardous materials. Improper treatment of the wastewater from the hydraulic fracturing process (i.e., wastewater not treated, recycled, or collected in DEP-authorized wastewater treatment facilities) could contaminate regional water supplies, resulting in thousands of people being exposed to hazardous materials (PA DEP, 2010).

Drilling mishaps, such as “blowouts,” can also cause drill explosions and fires which can, consequently, emit high quantities of natural gas and potentially injure/kill workers. In densely populated area, such a natural gas leak also has the potential of being ignited by numerous external sources, causing an explosion (Pittsburgh Post-Gazette, 2010).

4.3.16.3 Past Occurrence

A. Hazardous Materials

Since the passage of SARA, Title III facilities which produce, use, or store hazardous chemicals must notify the public through the county emergency dispatch center and PEMA if an accidental release of a hazardous substance meets or exceeds a designated reportable quantity, and affects or has the potential to affect persons and/or the environment outside the plant. SARA, Title III and Pennsylvania Act 165 also require a written follow-up report to PEMA and the County. These written follow-up reports include any known or anticipated health risks associated with the release, and actions to be taken to mitigate potential future incidents. In addition, Section 204(a)(10) of Act 165

requires PEMA to staff and operate a 24-hour State Emergency Operations Center (SEOC) to provide effective emergency response coordination.

From 2003 to 2009, there were 128 hazardous materials incidents in Fayette County reported through PEIRS. Those incidents are detailed in Table 4.3-22.

Table 4.3-22. Past Occurrences of Hazardous Material Incidents (2004-2009)

Date	Type	Location
1/23/2002	HYDRAULIC OIL SPILL	German Twp
2/28/2002	GASOLINE SPILL	Connellsville
3/02/2002	NATURAL GAS RELEASE	Dunbar Twp
3/16/2002	NATURAL GAS RELEASE	Luzerne Twp
3/09/2002	CHEMICAL RELEASE	Newell
3/20/2002	KEROSENE SPILL	South Union Twp
4/21/2002	HEATING OIL SPILL	Dunbar Twp
4/05/2002	NATURAL GAS RELEASE	North Union Twp
5/06/2002	TIRE FIRE	Perry Twp
5/17/2002	DIESEL FUEL SPILL	Uniontown
6/07/2002	GASOLINE SPILL	Brownsville Twp
6/26/2002	DIESEL FUEL SPILL	Connellsville Twp
6/26/2002	CHEMICAL RELEASE	Menallen Twp
8/14/2002	DIESEL FUEL SPILL	Connellsville
9/26/2002	DIESEL FUEL SPILL	Everson
9/14/2002	CHEMICAL SPILL	Masontown
1/09/2002	HEATING OIL SPILL	Stewart Twp
2/01/2003	WELL FIRES	Luzerne Twp
5/08/2003	OIL SHEEN	Newell
6/2003	DIESEL FUEL SPILL	Belle Vernon
6/25/2003	CHEMICAL SPILL	Connellsville
7/25/2003	OIL SHEEN	Belle Vernon
7/20/2003	FLAMMABLE LIQUID & SOLIDS	Uniontown
8/12/2003	HEATING OIL SPILL	North Union Twp
9/24/2003	OIL SHEEN	Brownsville
9/09/2003	NATURAL GAS RELEASE	Connellsville
9/18/2003	GASOLINE SPILL	Dunbar Twp
10/23/2003	EXPLOSIONS	North Union Twp
12/21/2003	NATURAL GAS RELEASE	Luzerne Twp
12/16/2003	NATURAL GAS RELEASE	Menallen Twp
1/14/2004	OIL SHEEN	Fayette City
1/18/2004	NATURAL GAS RELEASE	South Union Twp
2/02/2004	WELL FIRES	German Twp
3/07/2004	DIESEL FUEL SPILL	German Twp
7/13/2004	NATURAL GAS RELEASE	Newell
7/12/2004	OIL SPILL	Wharton Twp
8/04/2004	OIL SHEEN	Markleysburg

Date	Type	Location
9/10/2004	DIESEL FUEL SPILL	Bullskin
11/30/2004	NATURAL GAS RELEASE	Dunbar
11/10/2004	ODOR INVESTIGATION	South Union Twp
12/31/2004	NATURAL GAS RELEASE	Newell
1/16/2005	CHEMICAL RELEASE	Connellsville Twp
1/04/2005	TIRE FIRE	Springfield Twp
2/22/2005	NATURAL GAS RELEASE	Uniontown
3/13/2005	NATURAL GAS RELEASE	Franklin Twp
4/18/2005	NATURAL GAS RELEASE	German Twp
4/11/2005	NATURAL GAS RELEASE	North Union Twp
5/10/2005	MISC. OILS	Brownsville Twp
5/11/2005	CHEMICAL SPILL	German Twp
5/24/2005	HEATING OIL SPILL	German Twp
5/20/2005	NATURAL GAS RELEASE	North Union Twp
5/09/2005	EXPLOSIONS	Wharton Twp
6/21/2005	TIRE FIRE	Dunbar Twp
6/17/2005	NATURAL GAS RELEASE	German Twp
6/17/2005	CHEMICAL SPILL	Uniontown
7/26/2005	DIESEL FUEL SPILL	Connellsville Twp
7/16/2005	MILITARY ORDNANCE	Fairchance
7/15/2005	CHEMICAL RELEASE	Georges Twp
8/31/2005	HEATING OIL SPILL	Menallen
8/09/2005	BIO-HAZARDOUS WASTE	North Union Twp
9/14/2005	NATURAL GAS RELEASE	German Twp
10/06/2005	JUNKYARD FIRE	Georges Twp
10/17/2005	HYDRAULIC OIL SPILL	Uniontown
11/16/2005	DIESEL FUEL SPILL	Perry Twp
11/29/2005	WELL FIRES	Redstone Twp
12/23/2005	DIESEL FUEL SPILL	Bullskin
12/25/2005	NATURAL GAS RELEASE	Washington Twp
1/07/2006	NATURAL GAS RELEASE	Dunbar Twp
2/14/2006	WELL FIRES	Jefferson Twp
2/20/2006	HYDRAULIC OIL SPILL	Masontown
2/15/2006	HYDRAULIC OIL SPILL	Newell
3/27/2006	HYDRAULIC OIL SPILL	Belle Vernon
3/30/2006	DIESEL FUEL SPILL	Belle Vernon
3/11/2006	BIO-HAZARDOUS WASTE	Redstone Twp
4/08/2006	BOMB FOUND	Henry Clay
4/11/2006	CHEMICAL RELEASE	Luzerne Twp
4/21/2006	INDUSTRIAL ACCIDENT	Luzerne Twp
4/01/2006	DYNAMITE FOUND	Wharton Twp
5/16/2006	ODOR INVESTIGATION	Dunbar Twp
5/25/2006	INDUSTRIAL ACCIDENT	Springhill Twp
9/01/2006	NATURAL GAS RELEASE	Redstone Twp

Date	Type	Location
9/14/2006	HEATING OIL SPILL	Redstone Twp
10/24/2006	NATURAL GAS RELEASE	Vanderbilt
11/08/2006	OIL SPILL	Masontown
12/15/2006	OIL SPILL	Masontown
12/11/2006	BIO-HAZARDOUS WASTE	Redstone Twp
1/02/2007	DIESEL FUEL SPILL	Newell
3/11/2007	NATURAL GAS RELEASE	Georges Twp
3/29/2007	NATURAL GAS RELEASE	North Union Twp
4/15/2007	HEATING OIL SPILL	Luzerne Twp
6/14/2007	TIRE FIRE	Connellsville Twp
6/04/2007	HYDRAULIC OIL SPILL	Masontown
8/26/2007	HEATING OIL SPILL	Bullskin
8/18/2007	NATURAL GAS RELEASE	Connellsville Twp
8/07/2007	NATURAL GAS RELEASE	German Twp
8/10/2007	HYDRAULIC OIL SPILL	Masontown
8/08/2007	MILITARY ORDNANCE	North Union Twp
8/22/2007	COMMERCIAL EXPLOSIVES	Wharton Twp
9/24/2007	DYNAMITE FOUND	German Twp
10/05/2007	HYDRAULIC OIL SPILL	Masontown
10/31/2007	MILITARY ORDNANCE	Springhill Twp
11/26/2007	HEATING OIL SPILL	Dunbar Twp
11/20/2007	HEATING OIL SPILL	Lower Tyrone
12/16/2007	HEATING OIL SPILL	Georges Twp
1/07/2008	NATURAL GAS RELEASE	Washington Twp
3/27/2008	NATURAL GAS RELEASE	Belle Vernon
3/27/2008	NATURAL GAS RELEASE	Nicholson Twp
5/13/2008	OIL SPILL	German Twp
5/22/2008	NATURAL GAS RELEASE	South Union Twp
6/14/2008	HEATING OIL SPILL	German Twp
6/26/2008	HEATING OIL SPILL	Luzerne Twp
6/19/2008	MILITARY ORDNANCE	Washington Twp
7/11/2008	DIESEL FUEL SPILL	Dunbar Twp
8/21/2008	MILITARY ORDNANCE	Connellsville
9/11/2008	NATURAL GAS RELEASE	Brownsville Twp
9/30/2008	NATURAL GAS RELEASE	Jefferson Twp
9/03/2008	NATURAL GAS RELEASE	Luzerne Twp
10/20/2008	INDUSTRIAL ACCIDENT	Luzerne Twp
11/13/2008	HEATING OIL SPILL	Masontown
11/07/2008	CHEMICAL RELEASE	North Union Twp
1/15/2009	NATURAL GAS RELEASE	Georges Twp
1/07/2009	TOXIC/INFECTIOUS SUBS.	Uniontown
2/06/2009	EXPLOSIONS	Springhill Twp
3/16/2009	DIESEL FUEL SPILL	Belle Vernon
3/18/2009	HYDRAULIC OIL SPILL	Newell
4/18/2009	NATURAL GAS RELEASE	Dunbar Twp

Date	Type	Location
4/16/2009	NATURAL GAS RELEASE	Luzerne Twp
5/09/2009	MILITARY ORDNANCE	German Twp

Source: Fayette County.

According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), in 2010, there were 695 highway related hazardous material incidents totaling $2,161,339 in damages and 22 railway related incidents totaling $15,650 in damages (PHMSA, 2010) across the Commonwealth. The *Pennsylvania's Hazardous Material Emergency Planning and Response Act 1990-165 - 2008 Annual Report* states there were 9 "hazardous materials" incidents reported in Fayette County in 2008 (PEMA, 2008).

B. Marcellus Shale

Fayette County has no prior history of environmental hazards or deaths caused by the production and/or distribution of Marcellus Shale. Nonetheless, Marcellus Shale drilling has caused some environmentally hazardous situations in Pennsylvania. For instance, a well "blowout" occurring in Clearfield County in 2010 released natural gas and hazardous drilling chemicals into the air for over 16 hours, contaminating a nearby spring and injuring seven people (Pittsburgh Post-Gazette, 2010).

Despite the accidents that have occurred, the byproducts of Marcellus Shale drilling have contaminated few water supplies. Data from various regulatory agencies responsible for enforcement of gas well drilling regulations indicate that more than 95% of complaints received by homeowners suspecting problems from nearby gas well drilling are, instead, due to pre-existing problems or other nearby land use activities. A study by Penn State University in 2007 found that about three percent of private water wells in areas undergoing extensive drilling exceeded drinking water standards for total dissolved solids, barium or chloride (three of the most likely water pollutants from gas well drilling) (PSU 2007). Additionally, while claims have been made that treated water originating from wastewater treatment plans accepting Marcellus Shale wastewater contained hazardous levels of radioactivity, a PA DEP test conducted in 2010 found radioactivity levels below federal drinking water standards (DEP, 2011). Both the PA DEP and US Environmental Protection Agency (USEPA) are conducting ongoing tests of water quality in and around Marcellus Shale operations. The results of this research should be continually monitored.

4.3.16.4 Future Occurrence

A. Hazardous Materials

While numerous hazardous material release incidents have occurred in Fayette County in the past, they are generally considered difficult to predict. An occurrence is largely dependent upon the accidental or intentional actions of a person or group. However, the past occurrences of hazardous materials accidents indicate that they are likely to continue into the future. Intentional acts are addressed under Section 4.3.20. The likelihood of a hazardous material incident occurring in Fayette County is compounded

by the fact that dangerous loads of hazardous materials are being transported in and out of the County along with hazardous waste. Clearly, the combination of high traffic volume, severe winter weather, and a large number of hazardous material haulers creates high potential for disaster. Also, freight rail lines, which cover the County, are used to transport hazardous material. The future occurrence of hazardous materials releases is considered *highly likely*.

B. Marcellus Shale

While Marcellus Shale drilling/transportation incidents have occurred in Pennsylvania in the past, they are generally considered difficult to predict. An occurrence is largely dependent upon the accidental actions of a person or group. However, the past occurrences of accidents indicate that it is *possible* that such an event can occur in any given year.

4.3.16.5 Vulnerability Assessment

A. Hazardous Materials

Transportation carriers and industries must have response plans in place to address accidents, otherwise the local emergency response team will step in to secure and restore the area. Quick response minimizes the volume and concentration of hazardous materials that disperse through air, water, and soil. A significant portion of the County population resides within ¼ to ½ mile of major highways and railways. Populations should be considered vulnerable to hazardous material releases in every municipality. In the event of an accidental or intentional release, the size and type of chemical released would be critical determinants of the effects on nearby residents and the environment. Table 4.3-23 lists the number of addressable structures and critical facilities located within 1 ½ miles of a hazardous materials site for each municipality.

Table 4.3-23. Structures Vulnerable to Hazardous Materials

Municipality	Critical Facilities in 1.5 mile buffer of EPA Hazardous Material Site
Belle Vernon Borough	2
Brownsville Borough	5
Brownsville Township	1
Bullskin Township	-
Connellsville City	12
Connellsville Township	5
Dawson Borough	-
Dunbar Borough	-
Dunbar Township	8
Everson Borough	-
Fairchance Borough	3

Municipality	Critical Facilities in 1.5 mile buffer of EPA Hazardous Material Site
Fayette City Borough	2
Franklin Township	-
Georges Township	7
German Township	1
Henry Clay Township	-
Jefferson Township	-
Lower Tyrone Township	-
Luzerne Township	4
Markleysburg Borough	-
Masontown Borough	6
Menallen Township	2
Newell Borough	2
Nicholson Township	-
North Union Township	4
Ohiopyle Borough	-
Perry Township	-
Perryopolis Borough	-
Point Marion Borough	4
Redstone Township	1
Saltlick Township	-
Smithfield Borough	-
South Connellsville Borough	2
South Union Township	8
Springfield Township	2
Springhill Township	-
Stewart Township	-
Uniontown, City	18
Upper Tyrone Township	-
Vanderbilt Borough	-
Washington Township	6
Wharton Township	8
TOTAL	**113**

B. Marcellus Shale

DEP inspects well sites from construction to reclamation to ensure that the site has proper erosion controls in place, and that any waste generated in drilling and completing the well was properly handled and disposed of. Also, well operators are required to submit a variety of reports regarding well drilling, completion, production, waste disposal, and well plugging. Populations should be considered vulnerable to hazardous material releases in every municipality. However, dense populations in close proximity to drilling sites, where possible gas leaks could easily ignite and cause explosions, are considered more vulnerable than populations in rural, sparsely populated areas (Pittsburgh Post-Gazette, 2010).

4.3.17 Urban Fire and Explosions

4.3.17.1 Location and Extent

A. Urban Fires

Significant urban fires are limited to densely populated areas of the County that contain large and/or multiple buildings. Such fires may start in single structure, but spread to nearby buildings or throughout a large building if adequate fire control measures are not in place.

B. Explosions and Industrial Accidents

Significant explosions are most common in densely populated areas and at industrial facilities utilizing combustible hazardous materials (refer to **Error! Reference source not found.** 4.3-20 for a list of hazardous materials facilities in Fayette County). Explosions can also occur due to automobile, boat, and rail accidents. All such explosions can turn into fires, spreading to nearby structures.

4.3.17.2 Range of Magnitude

A. Urban Fires

The effects of a major urban fire include minor to significant property damage, loss of life, environmental damage, and residential or business displacement (FEMA, 1997). Severe urban fires result in extensive damage to residential, commercial, and/or pubic property. Lives may be lost and people are often displaced for several months to years depending on the magnitude of the event. The worst year on record in Fayette County for fire hazards was 2000, when 11 people lost their lives due to fires.

B. Explosions and Industrial Accidents

The effects of a major (industrial) explosion include minor to serious property damage, loss of life, environmental damage, and residential or industry displacement (FEMA, 1997). Severe explosions result in extensive damage to residential, commercial, and/or pubic property. Lives may be lost and people are often displaced. Additionally, there may be hazardous materials mitigation issues.

4.3.17.3 Past Occurrence

A. Urban Fires

There have been a number of fires in the county during the past decade. Most of these incidents have resulted in one or more the following: extensive use of resources, loss of jobs, or impact to the community. The table below details the number of urban and structural fires that have occurred in Fayette County since 2002.

Table 4.3-24. Fayette County Fire Information

Year	Structural Fires
2002	6
2003	7
2004	5
2005	6
2006	5
2007	9
2008	7
2009	2
Total	**47**

Source: Pennsylvania Emergency Incident Response System.

B. Explosions and Industrial Accidents

There have been a few explosions in Fayette County during the past decade. These incidents were primarily industrial in nature and resulted in one or more the following: extensive use of resources, loss of jobs, or impact to the community.

The *Pennsylvania's Hazardous Material Emergency Planning and Response Act 1990-165 - 2008 Annual Report* states there were 3 "explosive" incidents reported in Fayette County in 2008 (PEMA, 2008). PEIRS data indicates that Fayette County has experienced 3 additional explosions – in 2003, 2005, and 2009 – for a total of 6 explosions.

4.3.17.4 Future Occurrence

A. Urban Fires

Minor fire hazards occur often primarily due to human error. Urban fires occur as a result of human error, outdated wiring, and sabotage. These events have occurred in Fayette County in the past and will continue to occur in the future. However, the risk should begin to decrease as older, non-code compliant buildings are phased out. Therefore, the probability is considered *possible*.

B. Explosions and Industrial Accidents

While a number of explosion incidents have occurred in Fayette County in the past, they are generally considered difficult to predict. An occurrence is largely dependent upon the accidental actions of a person or group and/or oversights in industrial processes. However, the past occurrences of explosions indicate that they will continue into the future. The concentration of industrial activity located in aging facilities increases potential for accident. Therefore, the probability for industrial accidents is considered *likely*.

4.3.17.5 Vulnerability Assessment

A. Urban Fires

The potential for fire damage is not limited to any one area of the County. However, human error can play an important role in creating the potential for a major urban or forest fire. The vulnerability of the citizens and property of Fayette County to fire and related incidents depends on many factors. A positive factor is the advanced fire services provided within the county. On the negative side, there are many homes and business that have not been updated to current fire safety codes. Each year that these structures go without safety updates, the more at risk they become for a fire incident. In Pennsylvania, the most vulnerable population groups are the elderly, age 65 and over, and the low-income earners. The elderly had the highest number of deaths resulting from fire and all population groups. The elderly in the County represent a large portion of the population spectrum.

Although newer buildings are constructed with higher safety standards and with more fire resistant material, there are still a large number of older, highly vulnerable buildings throughout the County. Until these buildings are upgraded or replaced, the risk will remain.

B. Explosions and Industrial Accidents

The potential for explosions is not limited to any one area of the County. However, human error can play an important role in creating the potential for a major explosion. The vulnerability of the citizens and property of Fayette County to explosions and industrial accidents depends on many factors. A positive factor is the advanced emergency services provided within the County. On the negative side, there are many industries within the County that have not updated their buildings and operations to current fire and safety standards. Additionally, despite regulations and standards enforced by the Occupational Safety and Health Administration, preventable malfunctions in industrial activities persist.

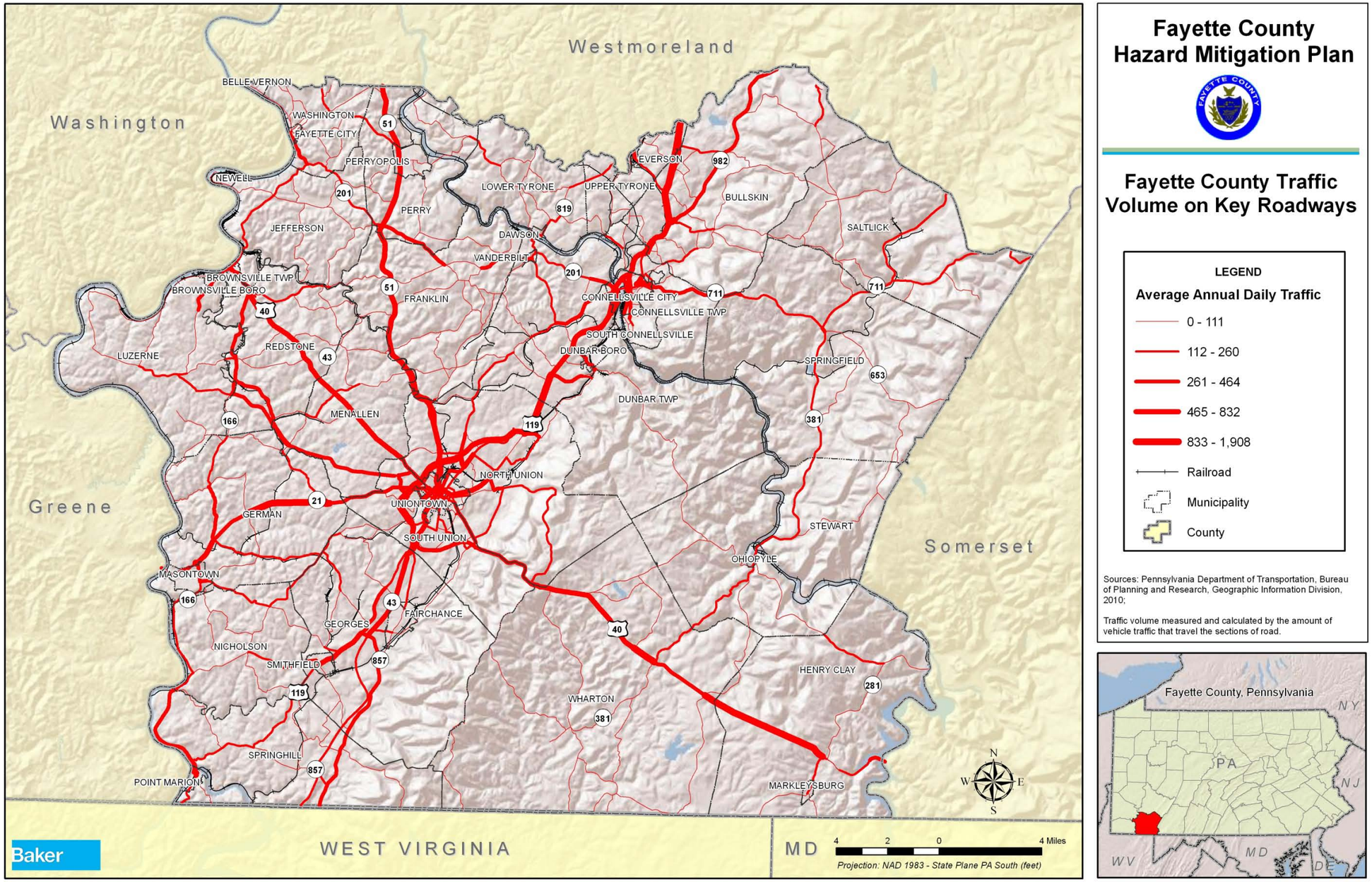
4.3.18 Transportation Accidents

For this analysis, a transportation accident is defined as an incident involving highway, air, rail, or marine travel resulting in death or serious injury to five or more people per accident or extensive property loss or damage. Accidents related to hazardous materials are considered under the hazardous materials section of the analysis. Highway transportation is by far the greatest method of transportation in Fayette County.

4.3.18.1 Location and Extent

The number of motor vehicle accidents is directly related to traffic volume and speed, as well as weather factors. As shown in 4.3.181, the roadways with the highest traffic volume include: Routes 40, 43, 51 and 119.

The Fayette County Airport is located in Connellsville. Other public airports are located in Mount Pleasant and Seven Springs. Pittsburgh International Airport is located 60 miles northwest of Fayette County.



Fayette County Hazard Mitigation Plan

Fayette County Traffic Volume on Key Roadways

LEGEND

Average Annual Daily Traffic

- 0 - 111
- 112 - 260
- 261 - 464
- 465 - 832
- 833 - 1,908
- Railroad
- Municipality
- County

Sources: Pennsylvania Department of Transportation, Bureau of Planning and Research, Geographic Information Division, 2010;

Traffic volume measured and calculated by the amount of vehicle traffic that travel the sections of road.

Figure 4.3.18-1. Fayette County Average Daily Traffic

4.3.18.2 Range of Magnitude

Significant transportation accidents can result in death or serious injury or extensive property loss or damage. Road and railway accidents in particular have the potential to result in hazardous materials release (see Section 4.3.16).

4.3.18.3 Past Occurrence

During a 5-year period ending in 2009, Fayette County averaged 1,240 traffic accidents and 27 traffic fatalities annually. In the years since 2007, the number of fatalities attributed to transportation accidents has decreased. Accident-related fatalities peaked at 38 in both 2007. Total yearly accident numbers have remained stable over the past five years.

Table 4.3-25. Traffic Accidents in Fayette County (1999 – 2010)

Year	Number of Accidents	Accidents Reported with Injuries	Accidents Reported, no Injuries	Fatalities
2002	1,495	NA	NA	28
2003	1,519	NA	NA	24
2004	1,425	NA	NA	21
2005	1,293	717	549	28
2006	1,174	662	493	19
2007	1,250	NA	NA	38
2008	1,302	NA	NA	27
2009	1,183	625	528	23
Total	**10,641**	**2,004**	**1,570**	**208**

Sources: PennDOT 2009 & 2005

There were 3 railroad accidents in 2004, and 1 in 2005. Fayette County experienced 1 marine accident in 2007.

4.3.18.4 Future Occurrence

Considering the transportation network within the County and the estimated 6-10% growth in vehicular traffic, it can be expected that the number of accidents and fatalities will increase. The same can be said for the other forms of transportation accidents. Transportation accidents will occur annually, therefore the probability is considered *highly likely*.

4.3.18.5 Vulnerability Assessment

With the combined efforts of the County's fire & police departments, hazardous materials team, and EMTs, transportation emergencies are now largely manageable problems. Additionally, PennDOT has facilities that are strategically located throughout the county in an effort to provide quick response to emergencies and enhance operational efficiency. PennDOT uses a proactive approach to provide a safe, smooth, swift intermodal transportation system by performing life

cycle analysis, applying asset management principles, pavement predictability modeling, scenario analysis, and performing preventive maintenance activities.

4.3.19 Utility Interruptions

Energy emergencies may be caused by nationwide shortages or more localized imbalances of energy supply due to weather, strikes, or oil embargos. Such emergencies have been experienced in the U.S., including the problems caused by rapid price increases that have left homes and industries without needed fuels.

4.3.19.1 Location and Extent

Utility interruptions in Fayette County focus primarily on power failures which are often a secondary impact of another hazard event. For example, severe thunderstorms or winter storms could bring down power lines and cause widespread disruptions in electricity service. Strong heat waves may result in rolling blackouts where power may not be available for an extended period of time. Local outages may be caused by traffic accidents or wind damage.

4.3.19.2 Range of Magnitude

Most severe power failures or outages are regional events. A loss of electricity can have numerous impacts including, but not limited to food spoilage, loss of heat or air conditioning, basement flooding (i.e. sump pump failure), lack of indoor lighting, loss of water supply (i.e. well pump failure), and lack of phone or internet service. These issues are often more of a nuisance than a hazard, but can cause damage or harm depending on the population affected and the severity of the outage.

At a minimum, power outages can cause short term disruption in the orderly functioning of business, government and private citizen functioning and activities. Examples of functions include traffic signals, elevators, and retail sales. A worst case scenario for utility interruption in Fayette County would be downed trees and wires from the heavy ice formation causing power outages throughout the entire County for prolonged periods of time.

4.3.19.3 Past Occurrence

The nationwide oil embargo of 1973 - 1974, the severe winter of 1976 - 1978, and the national gasoline shortage of 1979 emphasized the vulnerability of all residents in Fayette County to energy emergencies. Minor power outages occur annually. Fayette County has not endured any localized energy emergencies. No complete/comprehensive list of utility interruptions exists for the County.

4.3.19.4 Future Occurrence

Minor power failure (i.e. short outage events) may occur several times a year for any given area in the County, while major (i.e. widespread, long outage) events take place once every few years. Power failures are often occurrences during severe weather and therefore, should be

expected during those events. Therefore the future occurrence of utility interruptions in Fayette County should be considered *highly likely*.

4.3.19.5 Vulnerability Assessment

Emergency medical facilities, retirement homes, and senior centers are particularly vulnerable to power outages. While back-up power generators are often used at these facilities, loss of electricity may result in hot or cold temperatures for which elderly populations are particularly vulnerable. Pennsylvania Power and Lighting recently implemented a new dispatch communications system called Mobile Operations Management (MOM). This system links every Pennsylvania Power and Lighting crew to a central emergency response coordination center. This technology has reduced average outage times in Pennsylvania from an average of 108 minutes between 2004 and 2008 to 71 minutes in 2009.

4.3.20 Terrorism

4.3.20.1 Location and Extent

Terrorism is a threat everywhere, but there are a number of important considerations when evaluating terrorism hazards, such as the existence of facilities, landmarks, or other buildings of international, national, or regional importance. The Federal Bureau of Investigation (FBI) further characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. However, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences.
In general, the following is list of potential targets that a terrorist may select:

- Government facilities including Military installations
- County Government Facilities
- Fayette County Prison -- Uniontown
- State/Federal Government Facilities
- Pennsylvania State Police – North Union Township
- United States Postal Facilities
- Communications Centers (9-1-1)
- Commercial facilities, particularly multinational or international firms
- Industrial facilities, particularly those storing large quantities of hazardous materials or those involved in military development
- Abortion or Family Planning Clinics or any organization associated with a socially controversial issue
- Utility facilities including power generation plants, dams and water treatment plants
- Law enforcement facilities
- Facilities housing important political or religious figures
- Historical sites
- Transportation infrastructure
- High profile events attracting large amounts of people of VIPs
- Educational facilities, especially colleges and universities

- Major waterways in Fayette County
- Dams

Although terrorists will usually select targets based on the impact that the event will make, the reality is that targets of terrorist can include anything, can target anyone, and can occur anywhere.

The scale and scope of civil disorders varies widely. However, government facilities, local landmarks, prisons, and universities are common sites where crowds and mobs may gather. The above lists of potential targets are valid for potential civil disorder sites as well.

4.3.20.2 Range of Magnitude

Terrorism refers to the use of WMD, including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous materials releases; and "cyber-terrorism". Within these general categories, however, there are many variations. Particularly in the area of biological and chemical weapons, there are a wide variety of agents and ways for them to be disseminated.

Terrorist methods can take many forms, including:

- Agri-terrorism;
- Arson/incendiary attack;
- Armed attack;
- Biological agent;
- Chemical agent;
- Cyber-terrorism;
- Conventional bomb or bomb threat;
- Hazardous material release (intentional);
- Nuclear bomb; and
- Radiological agent.

Civil disorder can take the form of small gatherings or large groups blocking or impeding access to a building, or disrupting normal activities by generating noise and intimidating people. They can range from a peaceful sit-in to a full scale riot, in which a mob burns or otherwise destroys property and terrorizes individuals. Even in its more passive forms, a group that blocks roadways, sidewalks, or buildings interferes with public order. Generally there are two types of large gatherings typically associated with disorders: a crowd and a mob. A crowd may be defined as a casual, temporary collection of people without a strong, cohesive relationship. Crowds can be classified into four categories (Juniata County, PA MJHMP, 2008):

- Casual Crowd: A casual crowd is merely a group of people who happen to be in the same place at the same time. Violent conduct does not occur.
- Cohesive Crowd: A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common

activity, such as worshipping, dancing, or watching a sporting event. Although they may have intense internal discipline, they require substantial provocation to arouse to action.

- Expressive Crowd: An expressive crowd is one held together by a common commitment or purpose. Although they may not be formally organized, they are assembled as an expression of common sentiment or frustration. Members wish to be seen as a formidable influence. One of the best examples of this type is a group assembled to protest.
- Aggressive Crowd: An aggressive crowd is comprised of individuals who have assembled and are visibly angry or violent. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities. They tend to be impulsive and highly emotional, and require only minimal stimulation to arouse them to violence.

4.3.20.3 Past Occurrence

Like just about every other county in the nation, Fayette County has had its share of domestic terrorism incidents. Whether it was a prison uprising, a hostage situation, a protest, civil unrest or bomb threats, the county has been able to respond and resolve the situation with minimal impact on the public as a whole. Prior to 09/11/2001, the threat of international terrorism was unheard of in the county.

On September 11, 2001, the way the citizens of Fayette County view terrorism changed forever. Fayette County nearly became a direct target of an international terrorist attack when highjacked Flight 93 flew over the county and crashed in neighboring Somerset County. For nearly two weeks, members of the Fayette County EMA / Hazmat Team worked on scene with federal, state, and local agencies coordinating resources during the response and investigation process.

A second wave of terror began a few weeks later when letters, tainted with anthrax, began showing up in Florida, New York and Washington DC. Security in the county was heightened and reports of suspicious substances began to pop up all over the county. During the next three months, the Fayette County Hazardous Materials Response Team responded to 14 calls for suspicious substances. There were no confirmed cases of anthrax in the County.

Table 4.3-26 indicates the number of previous potential terrorist incidents from 2002 through 2009.

Table 4.3-26. Potential Terrorist Incident 2002 - 2009

Date	Incident
02/20/2002	BOMB THREAT
03/23/2002	BOMB THREAT
03/27/2002	BOMB THREAT
04/07/2002	BOMB THREAT

Date	Incident
07/31/2002	BOMB THREAT
07/31/2002	BOMB THREAT
10/31/2002	BOMB THREAT
01/05/2003	BOMB THREAT
01/09/2003	BOMB THREAT
01/16/2003	BOMB THREAT
02/04/2003	BOMB THREAT
02/27/2003	TERRORISTIC THREAT
03/04/2003	SUSPICIOUS ACTIVITY
03/10/2003	BOMB THREAT
03/12/2003	BOMB THREAT
03/19/2003	BOMB THREAT
03/22/2003	BOMB THREAT
03/23/2003	BOMB THREAT
03/24/2003	BOMB THREAT
03/28/2003	BOMB THREAT
04/16/2003	BOMB THREAT
10/08/2003	BOMB THREAT
01/28/2004	BOMB THREAT
03/26/2004	SUSPICIOUS SUBSTANCE
05/05/2004	SCHOOL BOMB THREAT
05/10/2004	TERRORISTIC THREAT
06/22/2004	TERRORISTIC THREAT
11/29/2004	BOMB THREAT
12/22/2004	SUSPICIOUS DEVICE
01/31/2005	SCHOOL BOMB THREAT
03/01/2005	SUSPICIOUS ACTIVITY
03/09/2005	SCHOOL BOMB THREAT
03/15/2005	BOMB THREAT
03/16/2005	SCHOOL BOMB THREAT
03/17/2005	SCHOOL BOMB THREAT
03/18/2005	BOMB THREAT
04/15/2005	SUSPICIOUS SUBSTANCE

Date	Incident
04/19/2005	BOMB THREAT
05/19/2005	SCHOOL BOMB THREAT
05/26/2005	BOMB THREAT
07/19/2005	BOMB THREAT
11/03/2005	SUSPICIOUS DEVICE
04/08/2006	BOMB FOUND
04/26/2006	SCHOOL BOMB THREAT
05/27/2006	SUSPICIOUS DEVICE
07/27/2006	SUSPICIOUS DEVICE
08/14/2006	SUSPICIOUS SUBSTANCE
03/25/2007	SUSPICIOUS DEVICE
04/03/2007	SCHOOL BOMB THREAT
04/19/2007	SCHOOL BOMB THREAT
05/26/2007	SUSPICIOUS PACKAGE
08/29/2007	SUSPICIOUS ACTIVITY
02/23/2008	BOMB THREAT
10/15/2008	SUSPICIOUS DEVICE
03/06/2009	SUSPICIOUS DEVICE

Source: Pennsylvania Emergency Incident Reporting System, 2009.

4.3.20.4 Future Occurrence

The probability of terrorism occurring cannot be quantified with as great a level of accuracy as that of many natural hazards. Furthermore, these incidents generally occur at a specific location, such as a government building, rather than encompassing an area such as a floodplain. Thus, planning should be asset-specific, identifying potentially at-risk critical facilities and systems in the community.

Although the probability of Fayette County being the target of a direct Domestic Terrorist attack is greater than being the direct target of an International Terrorist Attack, it should be equally prepared for both. It is hard to determine at this point what the actual probability of a terrorist attack occurring within the county is. However, it is safe to assume that it is much greater than it was before September 11th, 2001.

Minor civil disturbances may occur in Fayette County, but it is not possible to accurately predict the probability of future occurrence for civil disorder events over the long-term. However, it may be possible to recognize the potential for an event to occur in the near-term. For example, an upcoming significant sporting event at one of the colleges of high schools in the County may result in gathering of large crowds. Local law enforcement should anticipate these types of

events and be prepared to handle a crowd so that peaceful gatherings are prevented from turning into unruly public disturbances. Overall, it is *unlikely* that Fayette County will be the target of a major terrorism attack or civil disturbance.

4.3.20.5 Vulnerability Assessment

Since the probability of terrorism occurring cannot be quantified in the same way as that of many natural hazards, it is not possible to assess vulnerability in terms of likelihood of occurrence. Instead, vulnerability is assessed in terms of specific assets. By identifying potentially at-risk terrorist targets in a community, planning efforts can be put in place to reduce the risk of attack. All communities in Fayette County are vulnerable on some level, directly or indirectly, to a terrorist attack. However, communities where the previously mentioned potential targets are located should be considered more vulnerable. Site-specific assessments should be based on the relative importance of a particular site to the surrounding community or population, and threats that are known to exist. For these assets, it is critical that the proprietors and local law enforcement ask the following questions regarding vulnerability:

- Inherent vulnerability:
  - Visibility – How aware is the public of the existence of the facility?
  - Utility – How valuable might the place be in meeting the objectives of a potential terrorist?
  - Accessibility – How accessible is the place to the public?
  - Asset mobility – is the asset's location fixed or mobile?
  - Presence of hazardous materials – Are flammable, explosive, biological, chemical, and/or radiological materials present on site? If so, are they well secured?
  - Potential for collateral damage – What are the potential consequences for the surrounding area if the asset is attacked or damaged?
  - Occupancy – What is the potential for mass casualties based on the maximum number of individuals on site at a given time?
- Tactical vulnerability:

  Site Perimeter
  - Site planning and Landscape Design – Is the facility designed with security in mind (both site-specific and with regard to adjacent land uses)?
  - Parking Security – Are vehicle access and parking managed in a way that separates vehicles and structures?

  Building Envelope
  - Structural Engineering – Is the building's envelope designed to be blast-resistant? Does it provide collective protection against chemical, biological, and radiological contaminants?

  Facility Interior
  - Architectural and Interior Space Planning – Does security screening cover all public and private areas?
  - Mechanical Engineering – Are utilities and HVAC systems protected and/or backed up with redundant systems?

- Electrical Engineering – Are emergency power and telecommunications available? Are alarm systems operational? Is lightning sufficient?
- Fire Protection Engineering – Are the building's water supply and fire suppression systems adequate, code-compliant, and protected? Are on-site personnel trained appropriately? Are local first responders aware of the nature of the operations at the facility?
- Electronic and Organized Security – Are systems and personnel in place to monitor and protect the facility?

In general, Fayette County is not particularly vulnerable to civil disorder events. Most civil disorder events, should they occur, would have minimal impact. Sites previously identified in this section are locations where such events are more likely to occur and therefore should be considered more vulnerable. Adequate law enforcement at these locations minimizes the chances of a small assembly of people turning into a significant disturbance.

4.3.21 Civil Disturbance

4.3.21.1 Location and Extent

Civil disturbance is a broad term that is typically used by law enforcement to describe one or more forms of disturbance caused by a group of people. Civil disturbance is typically a symptom of, and a form of protest against, major socio-political problems. Typically the severity of the action coincides with the level of public outrage. In addition to a form of protest against major socio-political problems, civil disturbances can also arise out of union protest, institutional population uprising, or from large celebrations that become disorderly. The scale and scope of civil disturbance events varies widely. However, government facilities, landmarks, prisons, and universities are common sites where crowds and mobs may gather.

4.3.21.2 Range of Magnitude

Civil disturbances can take the form of small gatherings or large groups blocking or impeding access to a building, or disrupting normal activities by generating noise and intimidating people. They can range from a peaceful sit-in to a full scale riot, in which a mob burns or otherwise destroys property and terrorizes individuals. Even in its more passive forms, a group that blocks roadways, sidewalks, or buildings interferes with public order. Often that which was intended to be a peaceful demonstration to the public and the government can escalate into general chaos. There are two types of large gatherings typically associated with civil disturbances: a crowd and a mob. A crowd may be defined as a casual, temporary collection of people without a strong, cohesive relationship. Crowds can be classified into four categories (Blumer, 1946):

1. **Casual Crowd:** A casual crowd is merely a group of people who happen to be in the same place at the same time. Violent conduct does not occur.

2. **Cohesive Crowd:** A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common

activity, such as worshipping, dancing, or watching a sporting event. Although they may have intense internal discipline, they require substantial provocation to arouse to action.

3. **Expressive Crowd:** An expressive crowd is one held together by a common commitment or purpose. Although they may not be formally organized, they are assembled as an expression of common sentiment or frustration. Members wish to be seen as a formidable influence. One of the best examples of this type is a group assembled to protest.

4. **Aggressive Crowd:** An aggressive crowd is comprised of individuals who have assembled and are visibly angry or violent. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities. They tend to be impulsive and highly emotional, and require only minimal stimulation to arouse them to violence.

A mob can be defined as a large disorderly crowd or throng. Mobs are usually emotional, loud, tumultuous, violent and lawless. Similar to crowds, mobs have different levels of commitment and can be classified into four categories (Alvarez and Bachman, 2007):

1. **Aggressive Mob:** An aggressive mob is one that attacks, riots and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are the inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.

2. **Escape Mob:** An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs are generally difficult to control can be characterized by unreasonable terror.

3. **Acquisitive Mob:** An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property.

4. **Expressive Mob:** An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent up emotions in highly charged situations.

The worst-case scenario for a civil disturbance event would be riots akin to the 1967 Newark Riots, an event fueled by police brutality, political exclusion of blacks, urban renewal, inadequate housing, unemployment, and poverty. In this event, the arrest and subsequent treatment of a cab driver sparked violence and looting in downtown Newark, NJ. The National Guard was called in, but their presence only served to intensify the violence. The riots lasted six days, after which 23 people were dead, 725 were injured, and nearly 1,500 were arrested.

The impacts of civil disturbance events are contingent upon numerous factors including issues, politics, and method of response. Generally, the impact of civil disturbance events is nominal and short-lived unless acts of sabotage are performed. There may be minor injuries to first responders or participants from physical confrontations, and vandalism may cause minimal damage to property, facilities, and infrastructure. Adequate law enforcement at planned civil disturbance events and around likely target locations like the offices of state agencies minimizes the chances of a small assembly of individuals turning into a significant disturbance.

4.3.21.3 Past Occurrence

According to PIERS data for Fayette County, the only past occurrence of a civil disturbance was a prison disturbance on December 21, 2007 at the State Correctional Institution in Luzerne Township. Four injuries were reported during the disturbance.

4.3.21.4 Future of Occurrence

Civil disturbance is always a possibility as long as there is discrimination or other perceived social or economic injustices. However, it may be possible to recognize the potential for an event to occur in the near-term. For example, an upcoming significant sporting event at one of the colleges or universities in the Commonwealth may result in gathering of large crowds. Local law enforcement should anticipate these types of events and be prepared to handle a crowd so that peaceful gatherings are prevented from turning into unruly public disturbances.

4.3.21.5 Vulnerability Assessment

The vulnerability of individual jurisdictions is difficult to determine because civil disturbance hazards are tied to the current political and economic climate. A jurisdiction that is very vulnerable one month may be less vulnerable the next. However, in general, Fayette County may have lower than average vulnerability in Pennsylvania due to lower concentrations of local, state, and federal facilities. The probability of major civil disturbance in Fayette County is *possible*.

4.3.22 Building or Structure Collapse

4.3.22.1 Location and Extent

Building or structure collapse refers to the loss of the load-carrying capacity of a component of the structure or the entire structure itself. This can be a result of improper design, lack of maintenance, events from a structure's load history that have gradually reduced its load-carrying capacity, or a sudden and sever hazard event such as severe weather, terrorism, or earthquake. Bridges are structures which serve to connect both large and small roadways and communities throughout the County. Whether they span another roadway or a body of water, bridges are a crucial part of every transportation system. However, many of Pennsylvania's bridge structures are aging and in great need of repair. Inspection and maintenance are necessary to observe and mitigate the extent of the disrepair, especially on older structures.

4.3.22.2 Range of Magnitude

The level of disrepair depends on how much of the building or structure is damaged and how critical that portion of the structure is to the integrity of the structure.

Structures, such as bridges, are ranked by sufficiency rating and condition in order to classify the level of deterioration. Sufficiency ratings determine the overall capability of a bridge, help to determine funding for repair, and range from 0 to 100, worst to best. Condition ratings are determined for each of the following bridge components: bridge superstructure, bridge deck, and the bridge substructure or foundation. These ratings range from 0 to 9, worst to best. For a bridge to be structurally deficient, it must have one or more component with a condition rating equal to or less than four

.

4.3.22.3 Past Occurrence

Fayette County has had five incidences of building or structure collapse since 2005. On March 15, 2005 an eight foot basement wall collapsed on building being dismantled in Brownsville Township, one person was treated at local hospitals for injuries sustained in the collapse. On November 15, 2006 a New Salem firefighter was injured when a structure collapsed at a residential fire in Menallen Township. On January 5, 2008, one person was reported trapped in the collapse of bleachers during cheerleading practice at the Uniontown Senior High School in the city of Uniontown. On January 8, 2008 a partial commercial building collapsed in Vanderbilt Borough; no injuries were reported. The last incidence of a building collapse occurred on March 28, 2011 in Connellsville.

4.3.22.4 Future of Occurrence

It is impossible to predict when and where a building collapse may occur. Building collapse will depend on the condition of the building and any events in its history that may impact the integrity of the building. The Interstate 35W Bridge that collapsed into the Mississippi River sparked all state transportation departments to take a closer look at the state of their bridges. Pennsylvania ranks last nationwide with the worst conditions for state-owned bridges (Glenside News Globe Times Chronicle, 2011). Consequently, the entire state will see an increased focus on prevention of structure collapse. The probability of building or structure collapse occurring in the future is *likely*.

4.3.22.5 Vulnerability Assessment

The vulnerability of individual jurisdictions is difficult to determine because building or structure collapse is tied to the state or repair of each individual building or structure, as well as the occurrence of any significant events impacting the building or structure.

4.3.23 Drowning

4.3.23.1 Location and Extent

Drowning can be a significant hazard in communities with numerous water bodies (e.g. ponds, lakes, rivers, etc.) and extensive outdoor recreational activity. Drowning rates are particularly high for children ages 1-14. Fayette County is a tourist destination and water-related

recreational opportunities such as fishing, boating, and swimming are popular among visitors. One of the most popular tourist destinations in the County is the Ohiopyle State Park which is also a popular location for whitewater activities.

4.3.23.2 Range of Magnitude

By definition, drowning results in death. Drowning rates are particularly high for children ages 1-14 and according to the Center for Disease Control (CDC). In a typical year, counties in Pennsylvania can range from having 0 to 100 drowning incidents. Drowning accidents can be categorized as unintentional, suicide, homicide, or undetermined depending on the circumstances (Pennsylvania Department of Health, 2005).

4.3.23.3 Past Occurrence

Between 2000 and 2004 there were 12 deaths due to drowning in Fayette County. This ranks 14th among Pennsylvania counties.

4.3.23.4 Future of Occurrence

It is impossible to predict when and where drowning may occur. During the warm summer months, as activities such as swimming, boating and fishing increase so does the likelihood of drowning. Based on past occurrence, Fayette County can expect to experience two drownings every year. Therefore the probability is *highly likely*.

4.3.23.5 Vulnerability Assessment

As tourism continues to be a major draw in the County and number of visitors grows, drowning is likely to continue without effective mitigation actions in place.

4.3.24 Disorientation

4.3.24.1 Location and Extent

Large numbers of people are attracted to Pennsylvania's rural and park areas for recreational purposes and as a result, people can become lost or trapped in remote and rugged wilderness areas. Search and rescue may be required for people who suffer from medical problems or injuries and those who become accidentally or intentionally disoriented. Search and rescue efforts are often focused in and around state forest and state park lands (DCNR 2009).

Fayette County is largely rural and heavily wooded with steep ridges and numerous rivers and streams. Popular outdoor recreational activities include biking, rock-climbing, hiking hunting, fishing, boating.

4.3.24.2 Range of Magnitude

A wide variety of factors can contribute to the outcome of a search and rescue mission, but the most common dangers associated with disorientation are a lack of food, water, shelter and/or medical care. Fayette County generally has a constant abundance of water and during the warmer summer months shelter is less of a necessity than during winter months when extreme

temperatures can pose a more serious threat. Age, physical fitness, and familiarity with the area can also have a bearing on the outcome. The worst case scenario associated with disorientation involves serious injury or death.

4.3.24.3 Past Occurrence

Each year several people become lost in Fayette County's wilderness areas. Associated Search and Rescue (SAR) operations use resources such as man-hours and equipment. Annual reports by PEMA state that there have been 16 SAR operations in the County between January 2006 and June 2008.

4.3.24.4 Future of Occurrence

It is impossible to predict when and where disorientation may occur. During times when activities such as hunting, hiking, biking and camping increase, so does the likelihood of individuals becoming disoriented. Fayette County continues to gain popularity as a tourist and recreational destination and therefore the probability of future occurrence is expected to increase proportionately. Based on available past occurrence data the probability of the County experiencing a disorientation incident is *likely*.

4.3.24.5 Vulnerability Assessment

Individuals are most likely to become disorientated in areas of vast, open wilderness. Children and the elderly are more vulnerable to the exposure of elements. Bikers, hunters, hikers and All-terrain vehicle (ATV) riders are one of the most common victims of disorientation (PA All-HMP, 2010). Many outdoor, recreational activities commonly associated with disorientation take place during the warmer months of spring and summer and pose a somewhat lesser risk because of the average temperature range during these seasons. The most dangerous period to become lost outdoors is during the winter months when heat and shelter are vital. Fayette County often experiences winter storms and temperatures below freezing.

While prevention is the best solution to disorientation, lessening the impacts of this hazard by identifying and quickly locating individuals that have become lost or injured is equally important. There are several resources available on a state and local level for responding to SAR events. The DCNR is the primary coordinator for SAR operations efforts on state lands within Pennsylvania. The agency is responsible for over two million acres of forest land and currently has 140 people trained as search managers and search responders (PA All-HMP, 2010).

The Pennsylvania Search and Rescue Council (PSARC) is made up of representatives from DCNR, PEMA, law enforcement, emergency managers and responders, and others. PSARC sets training and operational standards to SAR teams throughout the Commonwealth in addition to mission response coordination, and providing SAR prevention and response education to local officials and the public (PA All-HMP, 2010).

4.4 Hazard Vulnerability Summary

A vulnerability assessment applies the information collected through hazard profiling to Fayette County's assets to summarize the impacts from hazards on the community and its vulnerable structures. These impacts are represented by measures such as population at risk, percent damages, and dollar loss estimation. The purpose of this analysis is to identify weaknesses or vulnerabilities prior to an event so that mitigation action plans may prevent or reduce the predicted impact of disasters. The primary objective of the vulnerability assessment is to prioritize hazards of concern to provide a framework for the mitigation strategy and policy development.

4.4.1 Methodology

Ranking hazards helps communities set goals and priorities for mitigation based on their vulnerabilities. A Risk Factor (RF) is a tool used to measure the degree of risk for identified hazards in a particular planning area. The RF can also be used to assist local community officials in ranking and prioritizing those hazards that pose the most significant threat to their area based on a variety of factors deemed important by the planning team and other stakeholders involved in the hazard mitigation planning process. The RF system relies mainly on historical data, local knowledge, general consensus opinions from the planning team and information collected through development of the hazard profiles included in Section 4.3. The RF approach produces numerical values that allow identified hazards to be ranked against one another; the higher the RF value, the greater the hazard risk.

RF values were obtained by assigning varying degrees of risk to five categories for each of the eleven hazards profiled in the 2010 HMP. Those categories include: *probability*, *impact*, *spatial extent*, *warning time* and *duration*. Each degree of risk was assigned a value ranging from 1 to 4. The weighting factor is shown in Table 4.4-1. To calculate the RF value for a given hazard, the assigned risk value for each category was multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the example equation:

RF Value = [(Probability x .30) + (Impact x .30) +
(Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

Table 4.4-1 summarizes each of the five categories used for calculating a RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

Table 4.4-1. Risk Assessment Criteria

RISK ASSESSMENT CATEGORY	DEGREE OF RISK			WEIGHT VALUE
	LEVEL	CRITERIA	INDEX	
PROBABILITY *What is the likelihood of a hazard event occurring in a given year?*	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY	1	30%
	POSSIBLE	BETWEEN 1 & 49.9% ANNUAL PROBABILITY	2	
	LIKELY	BETWEEN 50 & 90% ANNUAL PROBABILITY	3	
	HIGHLY LIKELY	GREATER THAN 90% ANNUAL PROBABILTY	4	
IMPACT *In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?*	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	1	30%
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.	2	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.	3	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR 30 DAYS OR MORE.	4	
SPATIAL EXTENT *How large of an area could be impacted by a hazard event? Are impacts localized or regional?*	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED	1	20%
	SMALL	BETWEEN 1 & 10.9 OF AREA AFFECTED	2	
	MODERATE	BETWEEN 11 & 25% OF AREA AFFECTED	3	
	LARGE	GREATER THAN 25% OF AREA AFFECTED	4	
WARNING TIME *Is there usually some lead time associated with the hazard event? Have warning measures been implemented?*	**MORE THAN 24 HRS**	SELF-DEFINED	1	10%
	12 TO 24 HRS	SELF-DEFINED	2	
	6 TO 12 HRS	SELF-DEFINED	3	
	LESS THAN 6 HRS	SELF-DEFINED	4	
DURATION *How long does the hazard event usually last?*	**LESS THAN 6 HRS**	SELF-DEFINED	1	10%
	LESS THAN 24 HRS	SELF-DEFINED	2	
	LESS THAN 1 WEEK	SELF-DEFINED	3	
	MORE THAN 1 WEEK	SELF-DEFINED	4	

(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)

(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)

4.4.2 Ranking Results

Using the methodology described in Section 4.4-1, Table 4.4-2 lists the Risk Factor calculated for each of the eleven potential hazards identified in the 2010 HMP. Hazards identified as *high* risk have risk factors greater than 2.6. Risk Factors ranging from 2 to 2.6 were deemed *moderate* risk hazards. Hazards with Risk Factors less than 2 are considered *low* risk.

Table 4.4-2. Risk Factor Analysis Results

HAZARD RISK	HAZARD	RISK ASSESSMENT CATEGORY					RISK FACTOR
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
HIGH	Wildfire	4	3	2	3	2	3.0
	Floods	4	3	2	2	3	3.0
	Winter Storm	4	2	4	1	3	3.0
	Environmental Hazards	4	2	2	4	3	2.9
	Landslides	2	2	4	4	1	2.5
	Subsidence	2	2	4	4	1	2.5
	Utility Interruption	4	1	2	4	2	2.5
	Transportation Accidents	4	2	1	4	1	2.5
	Drowning	4	2	1	4	1	2.5
MODERATE	Extreme Temperatures	2	2	4	1	3	2.4
	Hailstorms	4	1	3	2	1	2.4
	Tornado	2	3	2	4	1	2.4
	Urban Fire and Explosion	3	2	1	4	2	2.3
	Hurricane	2	2	4	1	2	2.3
	Pandemic	2	2	3	1	4	2.3
	Building or Structure Collapse	3	2	1	4	1	2.2
	Drought	2	1	3	1	4	2.0
	Radon Exposure	2	1	3	1	4	2.0
	Dam Failure	1	3	2	3	1	2.0
LOW	Earthquakes	1	1	4	4	1	1.9
	Disorientation	3	1	1	4	1	1.9
	Lightning Strike	2	1	2	4	1	1.8
	Terrorism	1	2	1	4	2	1.7
	Civil Disturbance	1	1	1	2	3	1.3

Based on these results, there are nine (9) *high* risk hazards, ten (10) *moderate* risk hazards and five (5) *low* risk hazards in Fayette County. Mitigation actions were developed for all high, moderate, and low risk hazards (see Section 6.4). The threat posed to life and property for moderate and high risk hazards is considered significant enough to warrant the need for establishing hazard-specific mitigation actions. Mitigation actions related to future public outreach and emergency service activities are identified to address low risk hazard events (i.e. landslides and earthquakes).

Based on the Risk Factor Analysis, the natural hazard with the highest risk potential was tied between wildfire, floods, and winter storms, which had values of 3.0; the lowest risk potential

natural hazard was lightning strikes, which had a value of 1.8. The human-made hazard with the highest risk potential was found to be environmental hazards (including hazardous materials and Marcellus Shale production), with a value of 2.9; the lowest risk potential human-made hazard was found to be civil disturbance, with a value of 1.3.

4.4.3 Potential Loss Estimates

Based on various kinds of available data, potential loss estimates were established for flood and flash flood events. Loss estimates are based on HAZUS-MH, version MR4, geospatial analysis, cumulative assessed values for parcels located in hazard-specific risk areas, and previous events. Estimates are considered *potential* in that they generally represent losses that could occur in a countywide hazard scenario. In events that are localized, losses may be lower, while regional events could yield higher losses.

Potential loss estimates have four basic components, including:

- Replacement Value: Current cost of returning an asset to its pre-damaged condition, using present-day cost of labor and materials.
- Content Loss: Value of building's contents, typically measured as a percentage of the building replacement value.
- Functional Loss: The value of a building's use or function that would be lost if it were damaged or closed.
- Displacement Cost: The dollar amount required for relocation of the function (business or service) to another structure following a hazard event.

Many of the potential flood loss estimates provided in this 2011 HMP are based on building values provided in the county tax assessment database. These values are representative of replacement value alone; content loss, functional loss, and displacement cost are not included.

Flood

The flood hazard vulnerability assessment for the County focuses on community assets that are located in the 1%-annual-chance floodplain. While greater and smaller floods are possible, information about the extent and depths for this floodplain is available for all municipalities countywide, thus providing a consistent basis for analysis.

The National Flood Insurance Program identifies repetitive loss properties as structures insured under the NFIP which have had at least two paid flood losses of more than $1,000 over any 10-year period since 1978. Table 4.4-3 contains the number of repetitive loss properties by municipality.

Based on this valuation, the approximately 59,706 buildings in Fayette County are cumulatively worth about $8,806 million.

Table 4.4-3. Repetitive Flood Loss Properties

Community	Number of Losses
Belle Vernon Borough	13
Brownsville Borough	3
Connellsville City	2
Connellsville Township	1
Dunbar Borough	1
Fayette City	6
Jefferson Township	1
Luzerne Township	3
Perry Township	2
Perryopolis Borough	3
Point Marion Borough	2
Redstone Township	2
Saltlick Township	1
South Union Township	3
Uniontown City	5

Source: Federal Emergency Management Agency, 2009.

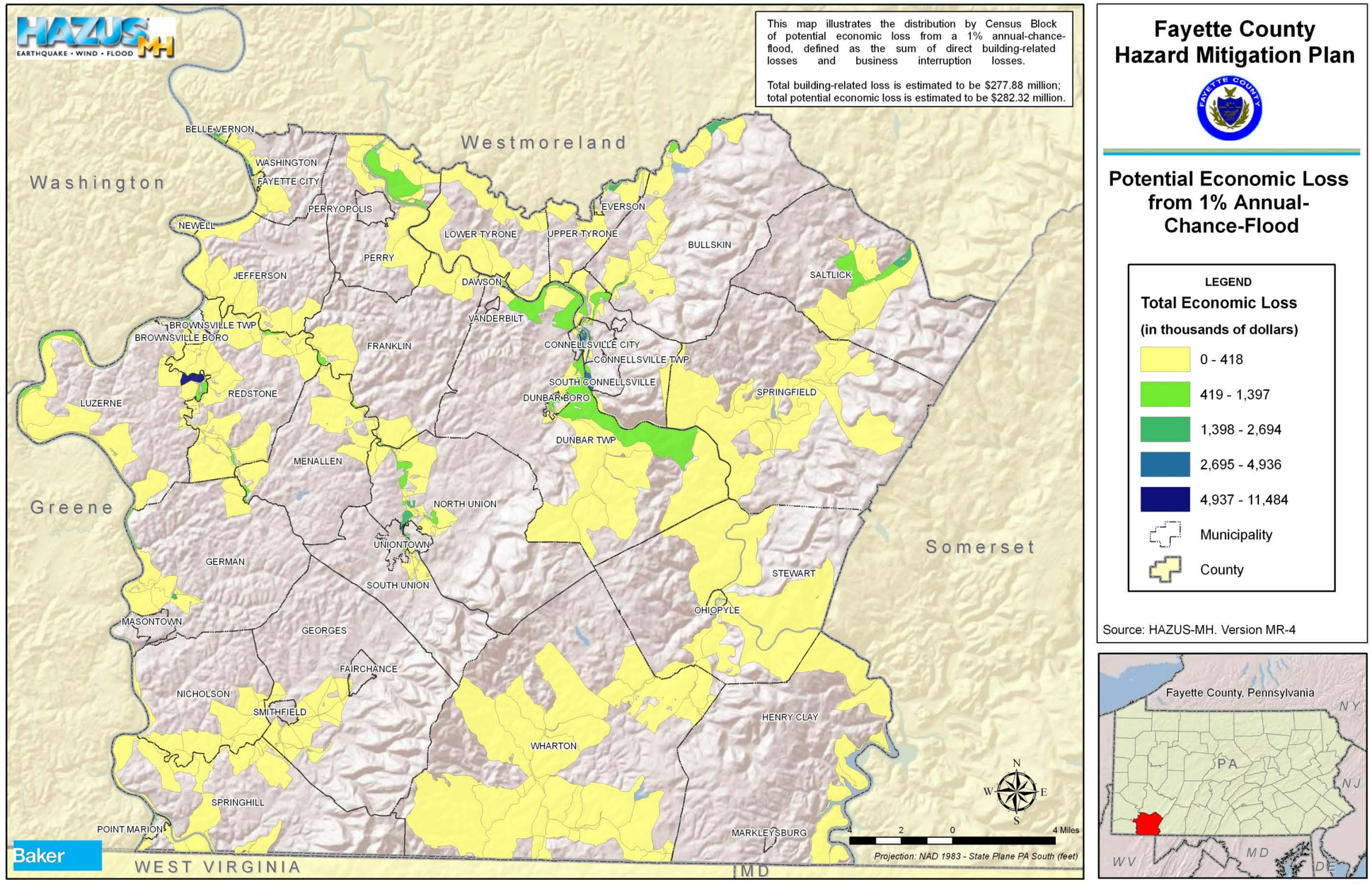
In addition to the analysis presented above, HAZUS was used to calculate general loss values. The full HAZUS report is provided in Appendix F. A map (Figure 4.4.3-1) displaying the HAZUS data found on flood loss is shown on the following page.

In 2007, PEMA conducted a Statewide Flood Study using Hazards U.S. Multi-Hazard (HAZUS-MH), a standardized loss estimation software package available from FEMA. The flood study provided estimates of total economic loss, building damage, content damage, and other economic impacts that can be used in local flood response and mitigation planning activities. While this information is extremely valuable, potential loss estimates due to flooding were recalculated using HAZUS-MH during development of the 2010 HMP for two reasons:

1. Since 2007, an updated version of HAZUS-MH has been released (i.e. version MR-3 replaced version MR-2). Several improvements to data and methodology were made to version MR-3, including: new Dun & Bradstreet 2006 commercial data, updated building valuations, revised building counts based on census housing units for *RES1* (i.e. single-family dwellings) and *RES2* (i.e. manufactured housing) structures, and an optimized building analysis methodology.
2. The economic loss GIS data available from PEMA includes Total Damage (in thousands of dollars), Building Damage, Content Damage, and a host of other economic loss estimates for each affected census block. However, the data is limited to *Residential* occupancy type, omitting *Commercial*, *Industrial*, *Agriculture*, *Religious/Non-Profit*, *Government* and *Education* occupancy types. While losses from these occupancy types

were included in the Community Summary Report's total economic loss, they were not captured in the GIS data needed for mapping.

Using HAZUS-MH Version MR-3, total building-related losses from a 1%-annual-chance flood in Fayette County are estimated to equal $529.63 million. Residential occupancies make up 33.75% of the total estimated building-related losses. Figure 4.4.3-1 shows a distribution of building-related losses by census block across Fayette County. Total economic loss, including replacement value, content loss, functional loss and displacement cost, from a County-wide 1%-annual-chance flood are estimated to equal $533.23 million.



Fayette County Hazard Mitigation Plan

Potential Economic Loss from 1% Annual-Chance-Flood

LEGEND

Total Economic Loss

(in thousands of dollars)

- 0 - 418
- 419 - 1,397
- 1,398 - 2,694
- 2,695 - 4,936
- 4,937 - 11,484
- Municipality
- County

Source: HAZUS-MH. Version MR-4

Figure 4.4.3-1. Potential Loss Estimate Based on HAZUS Report

4.4.4 Future Development and Vulnerability

Risk and vulnerability to natural and human-made hazard events are not static. Risk will increase or decrease as counties, and municipalities see changes in land use and development as well as changes in population. Fayette County is expected to experience a variety of factors that will, in some areas, increase vulnerability to hazards while in other areas, vulnerability may stay static or even be reduced.

Population change is perhaps the most significant indicator of changes in vulnerability in the future. As discussed in Section 2.3, Fayette County's population has risen to 145,351 in 1990, to 148,645 in 2000, and fallen to 142,605 in 2009. This decline represents a 1.8% decrease in nineteen years. Population losses have been largest in the older, urban areas of the County. On the other hand, over the past nineteen years, some outlying communities have witnessed growth rates of 1% or more, including Luzerne Township, Henry Clay Township, and Perryopolis Borough (US Census, 2010). Table 4.4-4 shows the four municipalities with the highest percent growth and the six municipalities with the largest percent decline for the period 2000-2010.

Table 4.4-4. Largest Municipal Population Changes (2000-2010)

Municipality	% Population Change (2000-2010)
Luzerne Township	+ 27.4%
Henry Clay Township	+ 4.1%
Smithfield Borough	+ 2.5%
Perryopolis Borough	+ 1.1%
Connellsville City	-16.5%
Uniontown City	-16.5%
Brownsville Borough	-16.9%
Dawson Borough	-18.6%
Ohiopyle Borough	-23.4%

Source: Fayette County Comprehensive Plan 2010

US Census estimates released in early 2011 show that the County's total population may have decreased between 2009 and 2010, from 142,605 to 136,591. This population decline might possibly be signaling future gradual, sustained population decline (US Census, 2010). Municipalities that continue to experience population losses, despite some borough/township gains, can expect to see hazard risk levels remain relatively constant in the future.

While increases land development may increase risk and vulnerability, Fayette County developed a 2007 Comprehensive Parks, Recreation, Open Space, Greenways and Trail Plan that recognizes the value of natural areas and green infrastructure that may serve to maintain or reduce hazard risk and vulnerability in the County. The County has recognized the development pressures it is experiencing and is working to preserve land through the maintenance of a variety of protected and recreational space.

This page is intentionally blank.

5 Capability Assessment

5.1 Update Process Summary

Fayette County has a number of resources it can access to implement hazard mitigation initiatives including emergency response measures, local planning and regulatory tools, administrative assistance and technical expertise, fiscal capabilities, and participation in local, regional, state, and federal programs. The presence of these resources enables community resiliency through actions taken before, during, and after a hazard event.

The 2004 HMP identified the presence of local plans, ordinances, codes, and community resources in each municipality. It also specified local, state, and federal resources available for mitigation efforts. Through responses to the *Capability Assessment Survey* distributed to all municipalities and input from the Fayette LPT, this 2010 HMP provides an updated inventory of the most critical local planning tools available within each municipality and a summary of the fiscal and technical capabilities available through programs and organizations outside of the County. It also identifies emergency management capabilities and the processes used for implementation of the National Flood Insurance Program.

While the capability assessment serves as a good instrument for identifying local capabilities for, it also provides a means for recognizing gaps and weaknesses that can be resolved through future mitigation actions. The results of this assessment lend critical information for developing an effective mitigation strategy.

5.2 Capability Assessment Findings

All participating municipalities completed and submitted a capability assessment survey. The results of the survey were collected, aggregated and analyzed. The individual assessments and the detailed results of the capability assessments are provided in Appendix C.

5.2.1 Emergency Management

The Fayette County Department of Emergency Services coordinates countywide emergency management efforts. Each municipality has a designated local emergency management coordinator who possesses a unique knowledge of the impact hazard events have on their community. A significant amount of information used to develop this plan was obtained from the emergency management coordinators.

Emergency Operations Plan (EOP)

An Emergency Operations Plan is an all-hazard plan developed for use by county government departments and agencies to ensure a coordinated and effective response to natural, technological, or man-made disasters that may occur in Fayette County. The plan is organized to correspond to the four phases of emergency management; mitigation, preparedness, response, and recovery.

Each municipality is required to adopt the County-wide EOP. The Notification and Resource Section of the plan was developed individually by each municipality. A copy of each EOP is on file with the Department of Emergency Services. Fayette County updates the EOP every 5 years. The next update will occur in 2010.

5.2.2 Participation in the National Flood Insurance Program

40 of 42 municipalities in Fayette County are participants in the NFIP (see Table 5.2-1). The program is managed by local municipalities participating in the program through ordinance adoption and floodplain regulation. Similarly, permitting processes needed for building construction and development in the floodplain are implemented at the municipal level through various ordinances (e.g. zoning, subdivision/land development and floodplain ordinances).

FEMA Region III makes available to communities, an ordinance review checklist which lists required provisions for floodplain management ordinances. This checklist helps communities develop an effective floodplain management ordinance that meets federal requirements for participation in the NFIP.

The Pennsylvania Department of Community and Economic Development (DCED) provides communities, based on their CFR, Title 44, Section 60.3 level of regulations, with a suggested ordinance document to assist municipalities in meeting the minimum requirements of the NFIP along with the Pennsylvania Flood Plain Management Act (Act 166). These suggested or model ordinances contain provisions that are more restrictive than state and federal requirements.

Act 166 mandates municipal participation in and compliance with the NFIP. It also establishes higher regulatory standards for hazardous materials and high risk land uses. As new Digital Flood Insurance Rate Maps (DFIRMs) are published, the Pennsylvania State NFIP Coordinator housed at DCED, works with communities to ensure the timely and successful adoption of an updated floodplain management ordinance by reviewing and providing feedback on existing and draft ordinances. In addition, DCED provides guidance and technical support through Community Assistance Contacts (CAC) and Community Assistance Visits (CAV).

Fayette County municipalities will soon have full access to 2010 Digital Flood Insurance Rate Maps (DFIRMS). The digital maps greatly enhanced mitigation capabilities as they relate to identifying flood hazards and are a significant improvement to the previously effective paper Flood Insurance Rate Maps. Residents and municipal officials are provided with mapping assistance from the Fayette County Planning Commission upon request.

The following table lists the Fayette County municipalities participating in the NFIP. There are no communities in Fayette County participating in the NFIP Community Rating System.

Table 5.2-1. National Flood Insurance Program Communities

Municipality	CID	Initial FIRM Identified	Current Effective Map Date
BELLE VERNON BOROUGH	420457	07/16/81	11/16/95
BROWNSVILLE BOROUGH	420458	09/16/81	11/16/95
BROWNSVILLE TOWNSHIP	421621	02/17/82	11/16/95
BULLSKIN TOWNSHIP	421622	04/16/91	12/06/02
CONNELLSVILLE CITY	420459	03/01/78	03/01/78
CONNELLSVILLE TOWNSHIP	421623	07/16/91	07/16/91
DAWSON BOROUGH	420460	03/04/88	03/04/88
DUNBAR BOROUGH	420461	03/18/91	03/18/91
DUNBAR TOWNSHIP	421624	07/04/88	07/04/88
EVERSON BOROUGH	420462	08/01/79	12/06/02
FAIRCHANCE BOROUGH	420463	04/16/91	04/16/91
FAYETTE CITY BOROUGH	420464	02/03/82	12/19/95
FRANKLIN TOWNSHIP	421625	03/18/91	03/18/91
GEORGES TOWNSHIP	421626	04/16/91	04/16/91
GERMAN TOWNSHIP	421627	04/16/91	04/03/96
HENRY CLAY TOWNSHIP	421628	01/01/87	01/01/87(L)
JEFFERSON TOWNSHIP	421629	06/01/79	09/30/95
LOWER TYRONE TOWNSHIP	421630	03/04/88	03/04/88
LUZERNE TOWNSHIP	421631	03/01/82	09/20/95
MARKLEYSBURG BOROUGH	422606	06/19/85	06/19/85
MASONTOWN BOROUGH	422572	09/04/91	02/02/95
MENALLEN TOWNSHIP	421632	04/16/91	04/16/91
NEWELL BOROUGH	420465	04/15/81	11/16/95
NICHOLSON TOWNSHIP	422420	09/04/91	09/06/95
NORTH UNION TOWNSHIP	421633	04/16/91	04/16/91
OHIOPYLE BOROUGH	421615	12/01/86	12/01/86(L)
PERRY TOWNSHIP	421634	04/15/82	04/15/82
PERRYOPOLIS BOROUGH	421616	02/03/82	02/03/82
POINT MARION BOROUGH	421617	07/04/88	06/16/95
REDSTONE TOWNSHIP	421635	01/06/82	01/06/82
SALTLICK TOWNSHIP	421636	03/18/91	03/18/91
SMITHFIELD BOROUGH	421618		
SOUTH CONNELLSVILLE BOROUGH	421619		
SOUTH UNION TOWNSHIP	421637	04/16/91	04/16/91
SPRINGFIELD TOWNSHIP	421638	04/16/91	04/16/91
SPRINGHILL TOWNSHIP	421639	03/18/91	04/17/95

Municipality	CID	Initial FIRM Identified	Current Effective Map Date
STEWART TOWNSHIP	421640	01/01/87	01/01/87(L)
UNIONTOWN CITY	420466	05/01/78	05/01/78
UPPER TYRONE TOWNSHIP	420467	03/15/79	12/06/02
VANDERBILT BOROUGH	421620	01/01/87	01/01/87(L)
WASHINGTON TOWNSHIP	421641	01/20/82	09/06/95
WHARTON TOWNSHIP	421642	01/01/86	01/01/87(L)

Table Notes:
(NSFHA) *- The community has no special flood hazard areas and a flood map for the community has not been published. Although it may not be subject to the 100-year flood, floods of a greater magnitude could occur there. In addition, certain structures may be damaged by local drainage problems. The community is ALL ZONE C for flood insurance rating purposes.*

(L) *- Minimally Flood Prone, with Flood Hazard Boundary Map converted to Flood Insurance Rate Map by letter, no change in flooding shown on map, no elevation on map.*

(M) *- Minimally Flood Prone, no elevation on map.*

 # - This community has a map with a 10-digit ID number. Each map with such a number will be published as one or more Z-fold panels (like road maps). Each map having more than one panel also has an index showing which panels apply to the various sections of a community. Since the 10-digit system permits the revision of individual panels rather than the entire map, the index also shows the correct suffix of the most current panel for a particular location in the community.

5.2.3 Planning and Regulatory Capability

Some of the most important planning and regulatory capabilities that can be utilized for hazard mitigation include comprehensive plans, building codes, floodplain ordinances, subdivision and land development ordinances, and zoning ordinances. These tools provide mechanisms for the implementation of adopted mitigation strategies. The following table summarizes the planning capability of the County. The floodplain regulations and participation in the NFIP was frequently reported incorrectly by municipalities. The NFIP number reflects the actual enrollment in the program, not the participation noted by municipalities. The floodplain regulations implementation percentage reflects both the self-reported participation and independent research performed by the Fayette Planning Team to cross-check municipal responses. Appendix C contains the detailed responses received from the municipalities.

Table 5.2-2. Planning and Regulatory Capability

COMMUNITY	COMPRE-HENSIVE PLAN	BUILDING CODE	FLOODPLAIN ORDINANCE - NFIP PARTICIPANT	SUBDIVISION & LAND DEVELOPMENT ORDINANCE	ZONING ORDINANCE
BELLE VERNON BOROUGH		Yes	Yes		
BROWNSVILLE BOROUGH		Yes	Yes		
BROWNSVILLE TOWNSHIP	Yes	Yes	Yes	Yes	Yes
BULLSKIN TOWNSHIP		Yes	Yes		
CONNELLSVILLE CITY		Yes	Yes		
CONNELLSVILLE TOWNSHIP		Yes	Yes		
DAWSON BOROUGH		Yes	Yes		
DUNBAR BOROUGH		Yes	Yes		
DUNBAR TOWNSHIP		Yes	Yes		
EVERSON BOROUGH		Yes	Yes		
FAIRCHANCE BOROUGH		Yes	Yes		
FAYETTE CITY BOROUGH		Yes	Yes		
FRANKLIN TOWNSHIP		Yes	Yes		
GEORGES TOWNSHIP		Yes	Yes		
GERMAN TOWNSHIP		Yes	Yes		
HENRY CLAY TOWNSHIP		Yes	Yes		
JEFFERSON TOWNSHIP	Yes	Yes	Yes	Yes	Yes
LOWER TYRONE TOWNSHIP		Yes	Yes		
LUZERNE TOWNSHIP		Yes	Yes		
MARKLEYSBURG BOROUGH		Yes	Yes		
MASONTOWN BOROUGH		Yes	Yes		
MENALLEN TOWNSHIP		Yes	Yes		
NEWELL BOROUGH		Yes	Yes		

COMMUNITY	COMPRE-HENSIVE PLAN	BUILDING CODE	FLOODPLAIN ORDINANCE - NFIP PARTICIPANT	SUBDIVISION & LAND DEVELOPMENT ORDINANCE	ZONING ORDINANCE
NICHOLSON TOWNSHIP	Yes	Yes	Yes	Yes	Yes
NORTH UNION TOWNSHIP	Yes	Yes	Yes		
OHIOPYLE BOROUGH		Yes	Yes		
PERRY TOWNSHIP	Yes	Yes	Yes	Yes	Yes
PERRYOPOLIS BOROUGH		Yes	Yes		
POINT MARION BOROUGH		Yes	Yes		
REDSTONE TOWNSHIP	Yes	Yes	Yes	Yes	Yes
SALTLICK TOWNSHIP	Yes	Yes	Yes	Yes	Yes
SMITHFIELD BOROUGH		Yes			
SOUTH CONNELLSVILLE BOROUGH		Yes			
SOUTH UNION TOWNSHIP		Yes	Yes		
SPRINGFIELD TOWNSHIP		Yes	Yes		
SPRINGHILL TOWNSHIP		Yes	Yes		
STEWART TOWNSHIP		Yes	Yes	Yes	Yes
UNIONTOWN CITY	Yes	Yes	Yes		Yes
UPPER TYRONE TOWNSHIP		Yes	Yes		
VANDERBILT BOROUGH		Yes	Yes		
WASHINGTON TOWNSHIP		Yes	Yes	Yes	Yes
WHARTON TOWNSHIP	Yes	Yes	Yes	Yes	Yes

Comprehensive Plans promote sound land use and regional cooperation among local governments to address planning issues. These plans serve as the official policy guide for influencing the location, type, and extent of future development by establishing the basis for decision-making and review processes on zoning matters, subdivision and land development, land uses, public facilities and housing needs over time. County governments are required by law to adopt a comprehensive plan, while local municipalities may do so at their option. Future comprehensive plan updates and improvements will consider 2011 HMP findings.

Building codes regulate construction standards for new construction and substantially renovated buildings. Standards can be adopted that require resistant or resilient building design practices to address hazard impacts common to a given community. In 2003, the Commonwealth of Pennsylvania implemented Act 45 of 1999, the Uniform Construction Code (UCC), a comprehensive building code that establishes minimum regulations for most new construction, including additions and renovations to existing structures. All 42 municipalities in Fayette County are required to adhere to the UCC. On December 10, 2009 the Commonwealth adopted regulations of the 2009 International Code Council's codes. The effective date of the regulations is December 31, 2009. Since all municipalities in Fayette County are required to abide by the UCC, they are required to enforce the 2009 building code regulations for all building permits submitted after December 31, 2009. If a design or construction contract for proposed work was signed between December 31, 2006 and December 30, 2009 then the 2006 International Codes must be abided.

Subdivision and land development ordinances are intended to regulate the development of housing, commercial, industrial or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Within these ordinances, guidelines on how land will be divided, the placement and size of roads and the location of infrastructure can reduce exposure of development to hazard events. 32 of 42 jurisdictions within Fayette County have adopted and enforce a subdivision and land development ordinance.

Zoning ordinances allow for local communities to regulate the use of land in order to protect the interested and safety of the general public. Zoning ordinances can be designed to address unique conditions or concerns within a given community. They may be used to create buffers between structures and high-risk areas, limit the type or density of development and/or require land development to consider specific hazard vulnerabilities. 35 of 42 jurisdictions within Fayette County have adopted and enforce a zoning ordinance.

5.2.4 Administrative and Technical Capability

Administrative capability is described by an adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise in order to effectively execute mitigation activities. Common examples of skill sets and technical personnel needed for hazard mitigation include: planners with knowledge of land development/management practices, engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g. building inspectors), planners or engineers with an understanding of natural and/or human caused hazards, emergency managers, floodplain managers, land surveyors, scientists familiar with hazards in the community, staff with the education or expertise to assess community vulnerability to hazards, personnel skilled in geographic information systems, resource development staff or grant writers, fiscal staff to handle complex grant application processes. Table 5–3 summarizes the administrative and technical capability across the County.

Based on assessment results, municipalities in Fayette County have adequate to limited administrative and technical staff needed to conduct hazard mitigation-activities. However, there seems to be a common lack of personnel for land surveying and scientific work related to community hazards. This result is not necessarily surprising since these tasks would typically be contracted to outside providers. Few communities have personnel skilled in geographic information systems. The County GIS Department often provides these services. All municipalities in the County have an identified emergency management coordinator. Some of these coordinators are responsible for more than one jurisdiction.

Table 5.2-3. Administrative Capability

Administrative Capability	Implementation
Planners	50%
Engineers	58%
Scientists	25%
GIS (or HAZUS) staff	8%
Grant writers	33%

5.2.5 Fiscal Capability

The decision and capacity to implement mitigation-related activities is often strongly dependent on the presence of local financial resources. While some mitigation actions are less costly than others, it is important that money is available locally to implement policies and projects. Financial resources are particularly important if communities are trying to take advantage of state or federal mitigation grant funding opportunities that require local-match contributions. Based on survey results, most municipalities within the County perceive fiscal capability to be limited.

State programs which may provide financial support for mitigation activities include, but are not limited to:

- Community Conservation Partnerships Program;
- Community Revitalization Program;
- Floodplain Land Use Assistance Program;
- Growing Greener Program;
- Keystone Grant Program;
- Local Government Capital Projects Loan Program;
- Land Use Planning and Technical Assistance Program;
- Pennsylvania Heritage Areas Program;
- Pennsylvania Recreational Trails Program;
- Shared Municipal Services; and
- Technical Assistance Program.

Federal programs which may provide financial support for mitigation activities include, but are not limited to:

- Community Development Block Grants (CDBG);
- Disaster Housing Program;
- Emergency Conservation Program;
- Emergency Management Performance Grants (EMPG);
- Emergency Watershed Protection Program;
- Hazard Mitigation Grant Program (HMGP);
- Flood Mitigation Assistance Program;
- Non-insured Crop Disaster Assistance Program;
- Pre-Disaster Mitigation Program;
- Repetitive Flood Claims Program (RFC);
- Section 108 Loan Guarantee Programs;
- Severe Repetitive Loss Grant Program (SRL); and
- Weatherization Assistance Program.

5.2.6 Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to mitigate hazard events. The adoption of hazard mitigation measures may be seen as an impediment to growth and economic development. In many cases, mitigation may not generate the level of interest among local officials when compared with competing priorities. Therefore the local political climate must be considered with designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing the adoption or implementation of specific actions. As this is a notably sensitive subject for local government employees, few municipalities directly responded. The Capability Assessments distributed to municipalities used a numerical range of 1 to 5 to demonstrate political willingness to implement mitigation actions, with 1 being not willing and 5 being very willing. The average level of willingness was 3.25, indicating that most municipalities felt that their political leadership was somewhat willing to implement hazard mitigation actions.

5.2.7 Self-Assessment

In addition to the inventory and analysis of specific local capabilities, the Capability Assessment requested each municipality to conduct a self-assessment of its capability to implement hazard mitigation activities. The survey classified the capabilities as either ‘limited’, ‘moderate’, or ‘high’. Response to this section of the Assessment was low; presumably due to many of the same political sensitivities discussed above. The percentages were calculated based on the number that responded to this section, rather than the 42 municipalities. The following table demonstrates the overall feeling of capabilities in Fayette County.

Table 5.2-4. Self-Assessment of Capabilities

Overall Capability	Limited	Moderate	High
Planning and Regulatory Capability	60%	40%	0%
Administrative Capability	50%	50%	0%
Fiscal Capability	60%	40%	0%
Community Political Capability	50%	50%	0%
Community Resiliency	40%	50%	10%

5.2.8 Existing Limitations

The capability assessment revealed several weaknesses in the capability of the municipalities in Fayette County. The most glaring weakness was the lack of understanding of the National Flood Insurance Program. Self-assessments demonstrated that many municipalities were not aware of their participation in the program or even the basic requirements of the program. The mitigation action plan specifically addresses this deficiency in understanding the NFIP.

Other limitations include an overall lack of municipality-specific zoning ordinances and comprehensive plans. The capability assessments received the municipalities often had incorrect information regarding the existence of comprehensive plans. The information provided in this plan and demonstrated in Appendix C shows the capability discovered after a cross-check performed by the Fayette LPT. Many zoning ordinances are outdated and encourage sprawl and the separation of uses. This inefficient use of land can lead to lowered response time in the case of an emergency.

Numerous roads and intersections exist in the County where flooding issues repeatedly occur. Some of these roads and intersections are state routes. The County and local municipalities face challenges in mitigating flood events on state routes since these roads are owned and maintained by the Commonwealth of Pennsylvania. Local municipalities do not have the authority to independently carry out a mitigation project. In these situations, the Pennsylvania Department of Transportation must decide to undertake the project. Since the Department of Transportation is often most concerned with larger, critical transportation routes, smaller state roads and intersections which significantly affect a local community may not get the attention they need for the Commonwealth to take on a mitigation project. Finally, limited funding is a critical barrier to the implementation of hazard mitigation activities. The County will need to rely on regional, state, and federal partnerships for financial assistance.

6 Mitigation Strategy

6.1 Update Process Summary

Mitigation goals are general guidelines that explain what the County wants to achieve. Goals are usually expressed as broad policy statements representing desired long-term results. Mitigation objectives describe strategies or implementation steps to attain the identified goals. Objectives are more specific statements than goals; the described steps are usually measurable and can have a defined completion date. There were three goals and nine objectives identified in the 2004 Fayette County Hazard Mitigation Plan. The goals address the hazards facing Fayette County by organizing around the categories of mitigation. A list of these goals and objectives as well as a review summary based on comments received from stakeholders who participated in the Hazard Mitigation Plan update process is included in Table 6.1-1. These reviews are based on responses received from communities to the *5-Year Hazard Mitigation Plan Review Worksheet* and comments received from county officials. Appendix C includes a summary of responses to the *5-Year Hazard Mitigation Plan Review Worksheet*.

Actions provide more detailed descriptions of specific work tasks to help the County and its municipalities achieve prescribed goals and objectives. There were nine actions identified in the 2003 Fayette County Hazard Mitigation Plan. A list of these actions as well as a review and summary of their progress based on comments received from stakeholders involved in the Hazard Mitigation Plan update process is included in Table 6.1-2. The 2003 Plan did not identify other parameters of the mitigation action (priority, estimated cost, funding sources, or time frames) and as such, these data are not included in Table 6.1-2.

Based on stakeholder participation from the Planning Team and the Fayette Planning Committee, the mitigation strategy was modified and updated. Objectives were clarified to better document roles and responsibilities. Completed actions were deleted. New actions have been added to address particular hazards facing Fayette County and the consensus achieved in how to address those actions. The updated mitigation strategy is presented in Section 6.4.

Table 6.1-1. Five Year Mitigation Plan Review of Goals and Objectives in 2003 Plan

Goal	Objective	Continue	Change	Delete	Reason
Better community preparedness for residents when dealing with hazards.	1.1 Community members will have an understanding of the concept of hazard mitigation and be able to identify ways that they can mitigate hazards in the home as well as prepare for hazards outside the home.	✓			
Reduce overall damage in the county caused by repetitive flooding.	2.1 Using proven techniques, jointly work with municipalities to identify areas that are subject to constant repetitive flooding and work to combat this problem.	✓			
Reduce the negative impact and effects that winter storms have on the County.	3.1 Assist municipalities and emergency responders with providing essential services to the communities.	✓			

Table 6.1-2. Five Year Mitigation Plan Review for Actions in 2004 Plan

Community: 1.1.1 ***Action No:***	***Action:*** ***Provide workshops for community members and elected officials in each of the Fayette Forward communities using funds provided through Fayette Enterprise Community grant.***
Category	Public Education and Awareness
Hazard(s) Addressed	
Priority (High, Medium, Low)	
Estimated Cost	
Potential Funding Sources:	
Lead Agency/Department	Fayette County Emergency Management Agency
Implementation Schedule	

Progress Report

Review Date	***Status***	***Notes***
3/14/2011	Completed	This action was funded by a one-time grant which is no longer available. The activity was completed under this grant.

Community: 1.1.2 ***Action No:***	***Action:*** ***Integrate hazard mitigation into the Community Emergency Response Preparedness program being presented in the County.***
Category	Public Education and Awareness
Hazard(s) Addressed	
Priority (High, Medium, Low)	
Estimated Cost	
Potential Funding Sources:	
Lead Agency/Department	Fayette County Emergency Management Agency
Implementation Schedule	

Progress Report

Review Date	***Status***	***Notes***
3/14/2011	Ongoing	This is a continuous activity. Fayette County uses their version of the CERT program to focus on preparedness.

Community: 1.1.3 ***Action No:***	***Action:*** ***Make information available to community members via the EMA website, utilizing links as well to other sites offering mitigation information.***
Category	Public Education and Awareness
Hazard(s) Addressed	
Priority (High, Medium, Low)	
Estimated Cost	
Potential Funding Sources:	
Lead Agency/Department	Fayette County Emergency Management Agency
Implementation Schedule	

Progress Report

Review Date	***Status***	***Notes***
3/14/2011	Ongoing	EMA is in the process of redesigning the webpage.

Community: 2.1.1 ***Action No:***	***Action:*** ***Repair areas that are damaged due to poor drainage and run off conditions. Utilize riprap and rebuild these areas with better technology.***
Category	Structural Projects
Hazard(s) Addressed	
Priority (High, Medium, Low)	
Estimated Cost	
Potential Funding Sources:	
Lead Agency/Department	Fayette County and Municipalities
Implementation Schedule	

Progress Report

Review Date	***Status***	***Notes***
3/14/2011	Ongoing	

Community: 2.1.2 ***Action No:***	***Action:*** ***Clean debris from the banks and beds of creeks that constantly flood and evaluate the possibility of installing flood control measures on these areas.***
Category	Natural Resource Protection
Hazard(s) Addressed	
Priority (High, Medium, Low)	
Estimated Cost	
Potential Funding Sources:	
Lead Agency/Department	Fayette County and Municipalities
Implementation Schedule	

Progress Report		
Review Date	***Status***	***Notes***
3/14/2011	Ongoing	

Community: 2.1.3 ***Action No:***	***Action:*** ***Potentially replace existing infrastructure that is continuously a problem in certain areas. This may include the storm sewer systems, bridges, roadways and culvert systems.***
Category	Structural Projects
Hazard(s) Addressed	
Priority (High, Medium, Low)	
Estimated Cost	
Potential Funding Sources:	
Lead Agency/Department	Fayette County and Municipalities
Implementation Schedule	

Progress Report		
Review Date	***Status***	***Notes***
3/14/2011	Ongoing	Some communities have started to separate sewer and storm systems where continuous problems exist.

Community: 3.1.1 Action No:	Action: Make snow routes available in certain municipalities where limited resources are available for snow removal.
Category	Preventive Measures
Hazard(s) Addressed	
Priority (High, Medium, Low)	
Estimated Cost	
Potential Funding Sources:	
Lead Agency/Department	Fayette County and Municipalities
Implementation Schedule	

Progress Report		
Review Date	Status	Notes
3/14/2011	Ongoing	

Community: 3.1.2 Action No:	Action: Ensure that the municipalities have contingency plans in place for the instances where the resources become overtaxed and additional help is needed.
Category	Preventive Measures
Hazard(s) Addressed	
Priority (High, Medium, Low)	
Estimated Cost	
Potential Funding Sources:	
Lead Agency/Department	Fayette County and Municipalities
Implementation Schedule	

Progress Report		
Review Date	Status	Notes
3/14/2011	Ongoing	2010 snow storms provided the impetus to begin addressing this action.

Community: 3.1.3 ***Action No:***	***Action:*** ***Ensure that emergency responders in the County are able to respond in the event of a snow emergency, especially where life safety is a major concern. Rural areas of the County can pose a major threat to patient access during this time.***
Category	Preventative Measures
Hazard(s) Addressed	
Priority (High, Medium, Low)	
Estimated Cost	
Potential Funding Sources:	
Lead Agency/Department	Fayette County and Municipalities
Implementation Schedule	

Progress Report

Review Date	***Status***	***Notes***
3/14/2011	Ongoing	

6.2 Mitigation Goals and Objectives

Hazard mitigation goals and objectives for the 2011 Plan were developed after the Fayette Planning Committee reviewed the results of the updated Risk Assessment and Capability Analysis. The following tables identify the goals and objectives established for the 2011 HMP.

Table 6.2-1. Goal 1 and Objectives

GOAL	OBJECTIVES
GOAL 1 **Better community preparedness for residents when dealing with hazards.**	1.1 Community members will have an understanding of the concept of hazard mitigation and be able to identify ways that they can mitigate hazards in the home as well as prepare for hazards outside the home.
	1.2 Review the existing Fayette County EOP and update where necessary based on the recommendations of the Fayette County Hazard Mitigation Plan.

Table 6.2-2. Goal 2 and Objectives

GOAL	OBJECTIVES
GOAL 2 **Reduce overall damage in the county caused by repetitive flooding.**	2.1 Using proven techniques, jointly work with municipalities to identify areas that are subject to constant repetitive flooding and work to combat this problem.
	2.2 Collect updated information of the number and location of all repetitive loss properties throughout the municipalities.

Table 6.2-3. Goal 3 and Objectives

GOAL	OBJECTIVES
GOAL 3 **Reduce the negative impact and effects of natural and man-made hazards on the County**	3.1 Assist municipalities and emergency responders with providing essential services to the communities.

Table 6.2-4. Goal 4 and Objectives

GOAL	OBJECTIVE
GOAL 4 **Evaluate existing shelters to determine adequacy for current and future populations.**	4.1 Ensure that all shelters have adequate emergency power resources.
	4.2 Establish a protocol for the sharing of annual shelter survey information between the local Red Cross chapter and Fayette County Emergency Services EMA
	4.3 Ensure sufficient sheltering space exists to meet the needs of the County's Municipalities.

Table 6.2-5. Goal 5 and Objectives

GOAL	OBJECTIVES
GOAL 5 **Attempt to reduce the current and future risk of flood damage in Fayette County**	5.1 Reduce flood damage by directing new development away from high hazard areas by reviewing existing regulations to ensure adequacy in reducing the amount of future development in identified hazard areas
	5.2 Municipalities to review all comprehensive plans to ensure that designated growth areas are not in hazard areas
	5.3 Adoption and enforcement of statewide Uniform Construction Code (UCC)
	5.4 Review any capital improvement plans to ensure that infrastructure improvements are not directed towards hazardous areas without adhering to all applicable state, federal, and local regulations.
	5,5 Evaluate and update existing floodplain ordinances to meet or exceed the NFIP standards
	5.6 Improve the enforcement of existing floodplain regulations

Table 6.2-6. Goal 6 and Objectives

GOAL	OBJECTIVES
GOAL 6 **Reduce or redirect the impact of natural disasters (especially floods) away from at-risk population areas**	6.1 Research possible mitigation projects to reduce flooding, reduce/eliminate sewage leakage and inflow/infiltration problems. Some projects may include reservoirs, levees, floodwalls, diversions, channel modification and storm sewers

Table 6.2-7. Goal 7 and Objectives

GOAL	OBJECTIVES
GOAL 7 **Protect existing natural resources and open space, including parks and wetlands, within the floodplain and watershed to improve their flood control function**	7.1 Protect Fayette County's natural resources through the implementation of cost-effective and technically feasible mitigation projects
	7.2 Protect Fayette County's natural resources through the implementation of recreation planning and storm water management planning

6.3 Identification and Analysis of Mitigation Techniques

In order to ensure that a broad range of mitigation actions were considered, the Planning Committee and Planning Team analyzed a comprehensive range of specific mitigation actions for each hazard. This was done by developing a matrix of mitigation planning techniques (described below) versus the priority hazards in the County. This helped to ensure that there was sufficient breadth and creativity in the mitigation actions considered.

There are six categories of mitigation actions which Fayette County considered in developing its mitigation action plan. Those categories include:

- **Prevention:** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning, zoning, building codes, subdivision regulations, hazard specific regulations (such as floodplain regulations), capital improvement programs, and open-space preservation and stormwater regulations.
- **Property Protection:** Actions that involve modifying or removing existing buildings or infrastructure to protect them from a hazard. Examples include the acquisition, elevation and relocation of structures, structural retrofits, flood-proofing, storm shutters, and shatter-resistant glass. Most of these property protection techniques are considered to involve "sticks and bricks;" however, this category also includes insurance.
- **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate them. Such actions include hazard mapping, outreach projects, library materials

dissemination, real estate disclosures, the creation of hazard information centers, and school age / adult education programs.

- **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, forest and vegetation management, wetlands restoration or preservation, slope stabilization, and historic property and archeological site preservation.
- **Structural Project Implementation:** Mitigation projects intended to lessen the impact of a hazard by using structures to modify the environment. Structures include stormwater controls (culverts); dams, dikes, and levees; and safe rooms.
- **Emergency Services:** Actions that typically are not considered mitigation techniques but reduce the impacts of a hazard event on people and property. These actions are often taken prior to, during, or in response to an emergency or disaster. Examples include warning systems, evacuation planning and management, emergency response training and exercises, and emergency flood protection procedures.

The following table provides a matrix identifying the mitigation techniques used for the high risk hazards identified in the County. The specific actions associated with these techniques are discussed in Section 6.4. Mitigation projects associated with some of these techniques (e.g. structural project implementation for flood hazards) are also included in Section 6.4.

Table 6.3-1. Mitigation Strategy Matrix

Mitigation Category	High Risk Hazards								
	Floods	Winter Storms	Wildfire	Landslides	Subsidence	Environmental hazards	Tornado	Transportation Accidents	Utility Interruption
Prevention	✓	✓	✓	✓	✓	✓	✓	✓	✓
Property Protection	✓								
Natural Resource Protection	✓								
Structural Projects	✓	✓	✓						

Mitigation Category	High Risk Hazards								
	Floods	Winter Storms	Wildfire	Landslides	Subsidence	Environmental hazards	Tornado	Transportation Accidents	Utility Interruption
Emergency Services	✓	✓	✓	✓	✓	✓	✓	✓	✓
Public Education & Awareness	✓	✓	✓	✓	✓	✓	✓	✓	✓

These data were then used to help guide the development of the Mitigation Action Plan.

6.4 Mitigation Action Plan

Following the risk assessment stage of the update process, a mitigation workshop was held on March 28, 2011 to develop a framework for the County Mitigation Action Plan (see meeting minutes in Appendix C). The following tables list actions which were developed at this workshop, during the LPT meetings, and at other times during the update process based identified needs and community comments received. The actions are organized according to goals. At least one mitigation action was established for each moderate and high risk hazard in Fayette County. More than one action is identified for several hazards. Appendix H specifically details the communities responsible for each action item. The following actions address continued compliance and improved participation with the National Flood Insurance Program:

- 2.1.1
- 2.1.2
- 2.1.4
- 2.2.1
- 5.6.1
- 5.6.2
- 5.6.3

Actions 2.2.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 2.2.1, 3.1.2, 3.1.4, 3.1.5, 3.1.6, 3.1.8, 3.1.9, 5.2.1, 5.3.1, 5.4.1, and 7.1.2 focus on reducing the effects of hazards on new and existing buildings and infrastructure.

Table 6.4-1. Mitigation Actions for Goal 1

MITIGATION CATEGORY	ACTION	HAZARD ADDRESSED
Public Education and Awareness	1.1.1 Provide workshops for community members and elected officials in each of the Fayette Forward communities using funds provided through Fayette Enterprise Community grant.	All
Public Education and Awareness	1.1.2 Integrate hazard mitigation into the Community Emergency Response Preparedness program being presented in the County.	All
Public Education and Awareness	1.1.3 Make information available to community members via the EMA website, utilizing links as well to other sites offering mitigation information.	All
Emergency Service Measures	1.2.1 Review and update all annexes of the Fayette County Emergency Operations Plan. Include participation from all municipalities in update process.	All
Emergency Service Measures	1.2.2 After EOP is updated, meet with municipal leaders to be sure that they formally adopt the updated EOP.	All

Table 6.4-2. Mitigation Actions for Goal 2

MITIGATION CATEGORY	ACTION	HAZARD ADDRESSED
Structural Projects	2.1.1 Repair areas that are damaged due to poor drainage and run off conditions. Utilize riprap and rebuild these areas with better technology.	Flooding NFIP
Natural Resource Protection	2.1.2 Clean debris from the banks and beds of creeks that constantly flood and evaluate the possibility of installing flood control measures on these areas.	Flooding NFIP
Property Protection	2.1.3 Maximize use of FEMA HMA grant and other programs to support all-hazard mitigation as well as acquisition/demolition, elevation, and relocation of flood-prone residences along with flood-proofing of non-residential structures.	Flooding
Structural Projects	2.1.4 Potentially replace existing infrastructure that is continuously a problem in certain areas. This may include the storm sewer systems, bridges, roadways and culvert systems.	Flooding NFIP

MITIGATION CATEGORY	ACTION	HAZARD ADDRESSED
Structural Projects	2.1.5 Repair retaining wall on Redstone Creek on Cinder Road in South Union Township	Flooding
Prevention	2.2.1 To work with FEMA and PEMA to get updated repetitive loss information on properties in the County and in the municipalities in order to plan future mitigation activities.	Flooding NFIP

Table 6.4-3. Mitigation Actions for Goal 3

MITIGATION CATEGORY	ACTION	HAZARD ADDRESSED
Prevention	3.1.1 Make snow routes available in certain municipalities where limited resources are available for snow removal.	Winter Storm
Prevention	3.1.2 Create a list of 'critical facilities' as guided by PEMA that could be affected by each identified hazard.	All
Prevention	3.1.3 Ensure that the municipalities have contingency plans in place for the instances where the resources become overtaxed and additional help is needed.	All
Structural Projects	3.1.4 Conduct an engineering study to assess the incidence of landslide undermining existing roadways.	Winter Storm Flooding Landslide
Structural Projects	3.1.5 Conduct an engineering study for cross benches and key ways cut into hill sides to prevent landslides onto roadways.	Winter Storm Flooding Landslide
Prevention	3.1.6 Trim vegetation over utility lines to reduce utility interruptions resulting from storms	Utility Interruption Winter Storms Tornadoes
Prevention	3.1.7 Establish a County wide team of Law Enforcement Officers trained and equipped to respond to civil disturbances and terrorism.	Civil Disturbance Terrorism
Property Protection	3.1.8 Implement a building hardening program for critical facilities and infrastructure to protect against terrorism.	Terrorism
Property Protection	3.1.9 Upgrade fire protection systems to meet NFPA standards. Projects may include purchase of mobile booster pumps to increase pressure for fire protection.	Urban Fire and Explosion

MITIGATION CATEGORY	ACTION	HAZARD ADDRESSED
Emergency Services	3.1.10 Identify and monitor transportation routes of hazardous materials. Train municipal police and fire departments on placard identification.	Environmental Hazards
Prevention	3.1.11 Fully utilize resources available to help identify impacts and consequences of Marcellus Shale natural gas extraction operations.	Environmental Hazards
Prevention	3.1.12 Ensure that emergency responders in the County are able to respond in the event of an emergency, especially where life safety is a major concern. Rural areas of the County can pose a major threat to patient access during this time.	All

Table 6.4-4. Mitigation Actions for Goal 4

MITGATION CATEGORY	ACTION	HAZARD ADDRESSED
Emergency Services	4.1.1 To work with the American Red Cross towards upgrading all shelter resources. Also any new shelters that the Red Cross may establish in the future. This will include shelters in all areas of Fayette County.	All
Emergency Services	4.2.1 Hold an annual work session with Fayette County Red Cross and Fayette County EMA to share information about local shelters. Information to include the site of each shelter, how many people it can house and feed, if it has back-up power available on site, completed site survey forms and types of resources that they have or that they need. This will benefit all areas of Fayette County in the event of the need to open shelters.	All
Emergency Services	4.2.2 Establish a committee representative of all areas of the County that will include vets, pet store owners, the Humane Society, animal shelters, the Extension Service and other interested parties to work on animal-specific evacuation and sheltering needs.	All
Public Education and Awareness	4.2.3 Fayette County Emergency Management Coordinator to develop and deliver information to all county residents, through community groups and/or publications, information on how to shelter in place and when it is appropriate to do so.	All
Emergency Services	4.3.1 Set up an Emergency Shelter	All

Table 6.4-5. Mitigation Actions for Goal 5

MITIGATION CATEGORY	ACTION	HAZARD ADDRESSED
Prevention	5.1.1 Encourage municipal offices to review regulations pertaining to their jurisdiction to make sure that adequate zoning regulations are in place to reduce future development in high hazard areas in their jurisdiction. Planning department to review Subdivision and Land Development Ordinance.	Dam Failure Flooding Earthquake Subsidence Landslide Wildfire
Prevention	5.1.2 Review all Emergency Action Plans for dams.	Dam Failure
Prevention	5.2.1 Planning department and applicable municipal offices to review their comprehensive plans to ensure that designated growth areas are not in high hazard areas identified in this plan.	Dam Failure Flooding Earthquake Subsidence Landslide Wildfire
Prevention	5.3.1 Municipal offices to review statewide Uniform Construction Code to ensure enforcement thereof.	Flooding Tornado Earthquake Urban Fire
Prevention	5.4.1 Encourage applicable municipal offices to review their capital improvement plans to ensure that programmed infrastructure improvements are not in high hazard areas.	Dam Failure Flooding Earthquake Subsidence Landslide Wildfire
Prevention	5.5.1 Applicable municipalities to review and update their floodplain ordinances to be sure that they are in full compliance with the NFIP.	Flooding NFIP
Prevention	5.6.1 For Fayette County EMA to arrange with PEMA/FEMA/DCED to hold training sessions with the County and the municipalities on the NFIP requirements.	Flooding NFIP
Prevention	5.6.2 Fayette County EMA to arrange with PEMA/FEMA/DCED to hold training for Insurance Companies on the NFIP.	Flooding NFIP
Prevention	5.6.3 Fayette County EMA to arrange with PEMA/FEMA/DCED to conduct training on the Community Rating System (CRS) with municipalities.	Flooding NFIP

Table 6.4-6. Mitigation Actions for Goal 6

MITGATION CATEGORY	ACTION	HAZARD ADDRESSED
Prevention	6.1.1 Continue to review Hazard Mitigation Questionnaires and post-disaster reviews submitted by the municipalities.	All
Prevention	6.1.2 Continue to produce and submit Hazard Mitigation Project Opportunity Forms for high-risk structures/areas (especially post-disaster).	All

Table 6.4-7. Mitigation Actions for Goal 7

MITGATION CATEGORY	ACTION	HAZARD ADDRESSED
Natural Resource Protection	7.1.1 Work with DEP, conservation agencies, park and recreation organizations, wildlife groups and other appropriate agencies to collect information of the number and location of natural resource areas throughout the County.	Flooding
Prevention	7.1.2 Continue to use and improve GIS capability to identify and prioritize hazards and critical infrastructure for mitigation.	Natural Resource Protection
Property Protection	7.1.3 When funds become available for mitigation projects, the county plans to hold meetings to identify high-risk properties in the county and to determine potential participation in future acquisition and relocation projects.	Flooding
Natural Resource Protection	7.1.4 Create a 2 acre wetland along Walnut Hill Road in the area where Lick Run floods.	Flooding
Natural Resource Protection	7.2.1 Planning Department to continue the development of the County-wide Stormwater Management Plan within the next 5 years.	Flooding
Natural Resource Protection	7.2.2 County to work with DEP, conservation agencies, and others, to research avenues for restoring degraded natural resources and open space to improve their flood control functions.	Flooding

The preceding tables list the mitigation actions, many of which will require substantial time commitments from staff at the County and local municipalities. Those that participated in the development of the 2011 HMP believe that each of these actions is attainable and can pragmatically be implemented over the next five-year cycle. While all of these activities will be pursued over the next five years, the reality of limited time and resources requires the

evaluation and prioritization of mitigation actions. Evaluation allows the individuals and organizations involved to focus their energies and ensure progress on mitigation activities.

Mitigation actions were evaluated using the seven criteria which frame the *PASTEEL* method. These feasibility criteria include:

- **Political:** Does the action have public and political support?
- **Administrative:** Is there adequate staffing and funding available to implement the action in a timely manner?
- **Social:** Will the action be acceptable by the community or will it cause any one segment of the population to be treated unfairly?
- **Technical:** How effective will the action be in avoiding or reducing future losses?
- **Economic:** What are the costs and benefits of the action and does it contribute to community economic goals?
- **Environmental:** Will the action provide environmental benefits and will it comply with local, state and federal environmental regulations?
- **Legal:** Does the community have the authority to implement the proposed measure?

The *PASTEEL* method use political, administrative, social, technical, economic, environmental and legal considerations as a basis means of evaluating which of the identified actions should be considered most critical. Economic considerations are particularly important in weighing the costs versus benefits of implementing one action prior to another.

FEMA mitigation planning requirements indicate that any prioritization system used shall include a special emphasis on the extent to which benefits are maximized according to a cost-benefit review of the proposed projects. To do this in an efficient manner that is consistent with FEMA's guidance on using cost-benefit review in mitigation planning, the *PASTEEL* method was adapted to include a higher weighting for two elements of the *economic* feasibility factor – Benefits of Action and Costs of Action. This method incorporates concepts similar to those described in Method C of FEMA 386-5: Using Benefit Cost Review in Mitigation Planning (FEMA, 2007).

Table 6.4-8. PASTEEL

		P Political			A Administrative			S Social		T Technical			E Economic				E Environmental					L Legal				
Action No.	Action	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance/Operations	Community Acceptance	Effect on Segments of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (Prioritized - 3x)	Cost of Action (Prioritized - 3x)	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenges	Total Plus	Total Minus
1.1.1	Provide workshops for community members and elected officials in each of the Fayette Forward communities using funds provided through Fayette Enterprise Community grant.	+	-	N	+	+	+	+	+	+	+	+	+	+	-	+	N	N	N	+	+	N	+	+	20	2
1.1.2	Integrate hazard mitigation into the Community Emergency Response Preparedness program being presented in the County.	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	N	N	N	+	+	N	+	+	22	1
1.1.3	Make information available to community members via the EMA website, utilizing links as well to other sites offering mitigation information.	+	-	+	+	+	+	+	+	+	+	+	+	+	-	+	N	N	N	N	+	N	+	+	20	2
1.2.1	Review and update all annexes of the Fayette County Emergency Operations Plan. Include participation from all municipalities in update process.	+	-	+	+	+	+	+	+	+	+	+	+	-	-	+	N	N	N	N	+	N	+	+	17	5
1.2.2	After EOP is updated, meet with municipal leaders to be sure that they formally adopt the updated EOP.	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+	N	N	N	N	+	N	+	+	18	4
2.1.1	Repair areas that are damaged due to poor drainage and run off conditions. Utilize riprap and rebuild these areas with better technology.	+	-	+	+	-	-	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	20	7
2.1.2	Clean debris from the banks and beds of creeks that constantly flood and evaluate the possibility of installing flood control measures on these	+	-	+	+	-	-	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	20	7

		P Political			A Administrative			S Social		T Technical			E Economic				E Environmental					L Legal				
Action No.	Action	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance/Operations	Community Acceptance	Effect on Segments of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (Prioritized - 3x)	Cost of Action (Prioritized - 3x)	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenges	Total Plus	Total Minus
	areas.																									
2.1.3	Maximize use of FEMA HMA grant and other programs to support all-hazard mitigation as well as acquisition/demolition, elevation, and relocation of flood-prone residences along with flood-proofing of non-residential structures.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	23	0
2.1.4	Potentially replace existing infrastructure that is continuously a problem in certain areas. This may include the storm sewer systems, bridges, roadways and culvert systems.	+	-	+	+	-	-	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	20	7
2.1.5	Repair retaining wall on Redstone Creek on Cinder Road in South Union Township	+	+	+	+	-	-	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	21	6
2.2.1	To work with FEMA and PEMA to get updated repetitive loss information on properties in the County and in the municipalities in order to plan future mitigation activities.	+	-	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	22	5
3.1.1	Make snow routes available in certain municipalities where limited resources are available for snow removal.	+	-	+	+	-	-	+	+	+	+	+	+	-	+	+	+	+	+	+	+	N	+	+	20	6
3.1.2	Create a list of 'critical facilities' as guided by PEMA that could be affected by each identified hazard.	N	-	+	+	-	-	+	+	+	+	+	+	-	-	-	+	+	+	+	+	+	+	+	18	8

		P Political			A Administrative			S Social		T Technical			E Economic				E Environmental					L Legal				
Action No.	Action	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance/Operations	Community Acceptance	Effect on Segments of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (Prioritized - 3x)	Cost of Action (Prioritized - 3x)	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenges	Total Plus	Total Minus
3.1.3	Ensure that the municipalities have contingency plans in place for the instances where the resources become overtaxed and additional help is needed.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	23	0
3.1.4	Conduct an engineering study to assess the incidence of landslide undermining existing roadways.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	20	7
3.1.5	Conduct an engineering study for cross benches and key ways cut into hill sides to prevent landslides onto roadways.	+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	20	7
3.1.6	Trim vegetation over utility lines to reduce utility interruptions resulting from storms	+	+	-	-	-	-	-	+	+	+	+	+	+	-	+	-	+	+	-	+	+	+	+	19	8
3.1.7	Establish a County wide team of Law Enforcement Officers trained and equiped to respond to civil disturbances and terrorism.	+	-	+	-	-	-	+	+	+	+	+	+	-	-	-	N	N	N	N	+	+	+	+	14	9
3.1.8	Implement a building hardening program for critical facilities and infrastructure to protect against terrorism.	+	-	+	-	-	-	+	-	+	+	+	+	-	-	-	N	N	N	N	+	+	+	+	13	10
3.1.9	Upgrade fire protection systems to meet NFPA standards. Projects may include purchase of mobile booster pumps to increase pressure for fire protection.	+	-	+	-	-	-	+	-	+	+	+	+	-	-	-	N	N	N	N	+	+	+	+	13	10
3.1.10	Identify and monitor transportation routes of hazardous materials. Train municipal police and fire departments on placard	+	-	+	+	-	-	+	+	+	+	+	+	-	-	-	+	+	+	+	+	+	+	+	19	8

		P Political			A Administrative			S Social		T Technical			E Economic				E Environmental					L Legal				
Action No.	Action	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance/Operations	Community Acceptance	Effect on Segments of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (Prioritized - 3x)	Cost of Action (Prioritized - 3x)	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenges	Total Plus	Total Minus
	identification.																									
3.1.11	Fully utilize resources available to help identify impacts and consequences of Marcellus Shale natural gas extraction operations.	N	-	+	-	-	-	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	18	8
3.1.12	Ensure that emergency responders in the County are able to respond in the event of an emergency, especially where life safety is a major concern. Rural areas of the County can pose a major threat to patient access during this time.	+	+	+	+	-	+	+	+	+	+	+	+	-	-	+	N	N	N	N	+	+	+	+	18	5
4.1.1	To work with the American Red Cross towards upgrading all shelter resources. Also any new shelters that the Red Cross may establish in the future. This will include shelters in all areas of Fayette County.	+	-	+	+	-	+	+	+	+	+	+	+	-	-	+	N	N	N	N	+	+	+	+	17	6

		P Political			A Administrative			S Social		T Technical			E Economic				E Environmental					L Legal				
Action No.	Action	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance/Operations	Community Acceptance	Effect on Segments of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (Prioritized - 3x)	Cost of Action (Prioritized - 3x)	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenges	**Total Plus**	**Total Minus**
4.2.1	Hold an annual work session with Fayette County Red Cross and Fayette County EMA to share information about local shelters. Information to include the site of each shelter, how many people it can house and feed, if it has back-up power available on site, completed site survey forms and types of resources that they have or that they need. This will benefit all areas of Fayette County in the event of the need to open shelters.	+	-	+	+	-	+	+	+	+	+	+	+	-	-	+	N	N	N	N	+	+	+	+	17	6
4.2.2	Establish a committee representative of all areas of the County that will include vets, pet store owners, the Humane Society, animal shelters, the Extension Service and other interested parties to work on animal-specific evacuation and sheltering needs.	+	-	+	+	-	+	+	+	+	+	+	+	-	-	+	N	N	N	N	+	+	+	+	17	6
4.2.3	Fayette County Emergency Management Coordinator to develop and deliver information to all county residents, through community groups and/or publications, information on how to shelter in place and when it is appropriate to do so.	+	-	+	+	+	+	+	+	+	+	+	+	-	-	+	N	N	N	N	+	+	+	+	18	5
4.3.1	Set up an Emergency Shelter	+	-	+	+	-	+	+	+	+	+	+	+	-	-	+	N	N	N	N	+	+	+	+	17	6

		P Political			A Administrative			S Social		T Technical			E Economic				E Environmental					L Legal				
Action No.	Action	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance/Operations	Community Acceptance	Effect on Segments of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (Prioritized - 3x)	Cost of Action (Prioritized - 3x)	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenges	Total Plus	Total Minus
5.1.1	Encourage municipal offices to review regulations pertaining to their jurisdiction to make sure that adequate zoning regulations are in place to reduce future development in high hazard areas in their jurisdiction. Planning department to review Subdivision and Land Development Ordinance.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	26	1
5.1.2	Review all Emergency Action Plans for dams.	+	-	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	25	2
5.2.1	Planning department and applicable municipal offices to review their comprehensive plans to ensure that designated growth areas are not in high hazard areas identified in this plan.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	26	1
5.3.1	Municipal offices to review statewide Uniform Construction Code to ensure enforcement thereof.	N	-	N	+	-	-	-	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	17	8
5.4.1	Encourage applicable municipal offices to review their capital improvement plans to ensure that programmed infrastructure improvements are not in high hazard areas.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	26	1
5.5.1	Applicable municipalities to review and update their floodplain ordinances to be sure that they are in full compliance with the NFIP.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	26	1

		P Political			A Administrative			S Social		T Technical			E Economic				E Environmental					L Legal				
Action No.	Action	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance/Operations	Community Acceptance	Effect on Segments of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (Prioritized - 3x)	Cost of Action (Prioritized - 3x)	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenges	Total Plus	Total Minus
5.6.1	For Fayette County EMA to arrange with PEMA/FEMA/DCED to hold training sessions with the County and the municipalities on the NFIP requirements.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	22	1
5.6.2	Fayette County EMA to arrange with PEMA/FEMA/DCED to hold training for Insurance Companies on the NFIP.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	22	1
5.6.3	Fayette County EMA to arrange with PEMA/FEMA/DCED to conduct training on the Community Rating System (CRS) with municipalities.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	22	1
6.1.1	Continue to review Hazard Mitigation Questionnaires and post-disaster reviews submitted by the municipalities.	+	-	+	+	-	-	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	20	3
6.1.2	Continue to produce and submit Hazard Mitigation Project Opportunity Forms for high-risk structures/areas (especially post-disaster).	+	-	+	+	-	-	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	20	3
7.1.1	Work with DEP, conservation agencies, park and recreation organizations, wildlife groups and other appropriate agencies to collect information of the number and location of natural resource areas throughout the County.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	26	1

		P Political			A Administrative			S Social		T Technical			E Economic				E Environmental					L Legal				
Action No.	Action	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance/Operations	Community Acceptance	Effect on Segments of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Benefit of Action (Prioritized - 3x)	Cost of Action (Prioritized - 3x)	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenges	Total Plus	Total Minus
7.1.2	Continue to use and improve GIS capability to identify and prioritize hazards and critical infrastructure for mitigation.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	26	1
7.1.3	When funds become available for mitigation projects, the county plans to hold meetings to identify high-risk properties in the county and to determine potential participation in future acquisition and relocation projects.	+	-	-	+	-	+	-	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	19	8
7.1.4	Create a 2 acre wetland along Walnut Hill Road in the area where Lick Run floods.	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	23	4
7.2.1	Planning Department to continue the development of the County-wide Stormwater Management Plan within the next 5 years.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	26	1
7.2.2	County to work with DEP, conservation agencies, and others, to research avenues for restoring degraded natural resources and open space to improve their flood control functions.	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	26	1

7 Plan Maintenance

7.1 Update Process Summary

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Fayette County's hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities including a description of how the public will be involved on a continued basis. The 2005 HMP did not include a specific plan maintenance process; therefore the provisions established in this section are new.

7.2 Monitoring, Evaluating and Updating the Plan

The Fayette Planning Committee established for the 2011 HMP is designated to lead plan maintenance processes of monitoring, evaluation and updating with support and representation from all participating municipalities. The Planning Committee (as organized by the Fayette County Director of Emergency Services) will coordinate maintenance efforts, but the input needed for effective periodic evaluations will come from community representatives, local emergency management coordinators and planners, the general public, and other important stakeholders (Planning Team). The Committee will oversee the progress made on the implementation of action items identified in the 2011 HMP and modify actions, as needed, to reflect changing conditions. The Committee will meet quarterly to discuss specific coordination efforts that may be needed with other stakeholders and the wider Team. In addition, it will also serve in an advisory capacity to the Fayette County Board of Commissioners and the Planning Commission. At least annually, at a regularly scheduled Municipal Elected Officials and Local Responders Meeting, the Planning Committee will update the Planning Team on any ongoing mitigation activities, success stories, and planned mitigation activities. At this meeting, the Planning Committee will solicit continued input from the Planning Team regarding hazard mitigation planning.

Each municipality will designate a community representative to monitor mitigation activities and hazard events within their respective communities. The local emergency management coordinator would be suitable for this role. This individual will be asked to work with the Committee to provide updates on applicable mitigation actions and feedback on changing hazard vulnerabilities within their community.

Periodic evaluations of the 2011 HMP will take place as deemed necessary by the Committee during its annual meeting. Evaluations of the 2011 HMP will not only include an investigation of whether mitigation actions were completed, but also an assessment of how effective those actions were in mitigating losses. A review of the qualitative and quantitative benefits (or avoided losses) of mitigation activities will support this assessment. Results of the evaluation will then be compared to the goals and objectives established in the plan and decisions will be made regarding whether actions should be discontinued, or modified in any way in light of new

developments in the community. Progress will be documented by the Committee for use in the next Hazard Mitigation Plan Update and submitted to the Board of Commissioners.

The 2011 HMP will be updated every five years, as required by the Disaster Mitigation Act of 2000, or following a disaster event. Future plan updates will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. During the five-year review process, the following questions will be considered as criteria for assessing the effectiveness of the Fayette County Hazard Mitigation Plan:

- Has the nature or magnitude of hazards affecting the County changed?
- Are there new hazards that have the potential to impact the County?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the Plan?
- Should additional local resources be committed to address identified hazards?

Issues that arise during monitoring and evaluation which require changes to the risk assessment, mitigation strategy, and other components of the plan will be incorporated during future updates.

7.3 Incorporation into Other Planning Mechanisms

As identified in Section 5, the jurisdictions participating in this Plan feel they have limited to moderate capability to implement many of the mitigation actions necessary to achieve a hazard-resilient community. During this update process, municipalities agreed that minimal action was taken in incorporating the 2005 HMP findings into other planning mechanisms. To address this deficiency several actions aim at reviewing existing zoning ordinances, floodplain ordinances, land-use ordinances, and building codes to incorporate findings of the 2011 HMP and evaluate whether local planning tools adequately address risk assessment results. Based on the results of these evaluations, communities are expected to revise existing local planning and regulatory tools to address local vulnerability to the high and moderate risk hazards identified in this plan. During the quarterly review process, the Planning Committee will encourage further incorporation and monitor results of this process. Results of the 2011 HMP update process will also be incorporated into future updates to the County and municipal Comprehensive Plans and Emergency Operations Plans.

7.4 Continued Public Involvement

As was done during the development of the 2011 HMP, the Planning Committee will involve the public during the evaluation and update of the HMP through various workshops and meetings. The public will have access to the current HMP through their local municipal office, the Fayette County Planning Commission Office, or the Fayette County Department of Emergency Services. Information on upcoming events related to the HMP or solicitation for comments will be announced via newsletters, newspapers, mailings, and the County website. The public is

encouraged to submit comments on the HMP at any time. The Planning Committee will incorporate all relevant comments during the next update of the hazard mitigation plan.

This page is intentionally blank.

8 Plan Adoption

The Plan was submitted to the Pennsylvania State Hazard Mitigation Officer on July XX, 2011. It was forwarded to FEMA for final review and approval-pending-adoption on July XX, 2011. FEMA granted approval-pending-adoption on *<Month Day, Year>*. Full approval from FEMA was received on *<Month Day, Year>*.

This section of the plan includes copies of the local adoption resolutions passed by Beaver County and its municipal governments. Adoption resolution templates are provided to assist the County and municipal governments with recommended language for future adoption of the HMP.

Table 8.1-1. Participating Municipalities and Adoption Dates

Municipality	2005 HMP	2011 HMP
BELLE VERNON BOROUGH		Pending
BROWNSVILLE BOROUGH		Pending
BROWNSVILLE TOWNSHIP	December 6, 2004	Pending
BULLSKIN TOWNSHIP	October 27, 2004	Pending
CONNELLSVILLE CITY		Pending
CONNELLSVILLE TOWNSHIP		Pending
DAWSON BOROUGH		Pending
DUNBAR BOROUGH		Pending
DUNBAR TOWNSHIP		Pending
EVERSON BOROUGH		Pending
FAIRCHANCE BOROUGH		Pending
FAYETTE CITY BOROUGH		Pending
FRANKLIN TOWNSHIP		Pending
GEORGES TOWNSHIP	August 19, 2004	Pending
GERMAN TOWNSHIP	December 14, 2004	Pending
HENRY CLAY TOWNSHIP		Pending
JEFFERSON TOWNSHIP	September 21, 2004	Pending
LOWER TYRONE TOWNSHIP	December 14, 2004	Pending
LUZERNE TOWNSHIP		Pending
MARKLEYSBURG BOROUGH		Pending
MASONTOWN BOROUGH	November 23, 2004	Pending
MENALLEN TOWNSHIP		Pending
NEWELL BOROUGH	November 8, 2004	Pending
NICHOLSON TOWNSHIP		Pending
NORTH UNION TOWNSHIP	November 9, 2004	Pending
OHIOPYLE BOROUGH		Pending
PERRY TOWNSHIP		Pending

Municipality	2005 HMP	2011 HMP
PERRYOPOLIS BOROUGH	November 23, 2004	Pending
POINT MARION BOROUGH		Pending
REDSTONE TOWNSHIP	November 11, 2004	Pending
SALTLICK TOWNSHIP	September 14, 2004	Pending
SMITHFIELD BOROUGH		Pending
SOUTH CONNELLSVILLE BOROUGH		Pending
SOUTH UNION TOWNSHIP		Pending
SPRINGFIELD TOWNSHIP	November 2, 2004	Pending
SPRINGHILL TOWNSHIP		Pending
STEWART TOWNSHIP		Pending
UNIONTOWN CITY	November 1, 2004	Pending
UPPER TYRONE TOWNSHIP		Pending
VANDERBILT BOROUGH		Pending
WASHINGTON TOWNSHIP		Pending
WHARTON TOWNSHIP		Pending

Fayette County 2010 Hazard Mitigation Plan

County Adoption Resolution

Resolution No. _____

Fayette County, Pennsylvania

WHEREAS, the municipalities of Fayette County, Pennsylvania are most vulnerable to natural and human-made hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, Fayette County acknowledges the requirements of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Fayette County 2010 Hazard Mitigation Plan has been developed by the Fayette County Planning Commission Office and the Fayette County Emergency Services Department in cooperation with other county departments, local municipal officials, and the citizens of Fayette County, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Fayette County 2010 Hazard Mitigation Plan, and

WHEREAS, the Fayette County 2010 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards that face the County and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for the County of Fayette that:

- The Fayette County 2010 Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the County, and
- The respective officials and agencies identified in the implementation strategy of the Fayette County 2010 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2010

ATTEST:

_____

FAYETTE COUNTY COMMISSIONERS

By _____

By _____

By _____

Fayette County 2010 Hazard Mitigation Plan

Municipal Adoption Resolution

Resolution No. _____
<*Borough/Township of Municipality Name*>, Fayette County, Pennsylvania

WHEREAS, the <*Borough/Township of Municipality Name*>, Fayette County, Pennsylvania is most vulnerable to natural and human-made hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the <*Borough/Township of Municipality Name*> acknowledges the requirements of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Fayette County 2010 Hazard Mitigation Plan has been developed by the Fayette County Planning Commission Office and the Fayette County Emergency Services Department in cooperation with other county departments, and officials and citizens of <*Borough/Township of Municipality Name*>, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Fayette County 2010 Hazard Mitigation Plan, and

WHEREAS, the Fayette County 2010 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards that face the County and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for the <*Borough/Township of Municipality Name*>:

- The Fayette County 2010 Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the <*Borough/Township*>, and
- The respective officials and agencies identified in the implementation strategy of the Fayette County 2010 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2010

ATTEST:

_____

<BOROUGH/TOWNSHIP OF MUNICIPALITY NAME>

By _____

By _____

By _____

9 Appendices

This page intentionally left blank.

Appendix A Bibliography

This page intentionally left blank.

Centers for Disease Control and Prevention (CDC). November, 2009. *2009 H1N1 Flu, Situation Update*. Retrieved at: http://www.cdc.gov/h1n1flu/.

Centers for Disease Control and Prevention (CDC). November, 2009. *2009 H1N1 Flu ("Swine Flu") and You*. Retrieved at: http://www.cdc.gov/h1n1flu/qa.htm.

Deppen, R. Wildfire Prevention Specialist at the Pennsylvania Department of Conservation and Natural Resources – Bureau of Forestry. September 23, 2009. *Personal Communication.*

Evans, Barry M., Joy R. Drohan, & Scott B. Dane. 2000. *Multi-hazard identification and risk assessment*. Pennsylvania State University; Pennsylvania Emergency Management Agency.

Federal Emergency Management Agency (FEMA). July, 2000. Benefit-Cost Analysis of Hazard Mitigation Projects: Tornado and Hurricane Shelter Model.

Federal Emergency Management Agency (FEMA). August, 2001. FEMA 386-2: Understanding Your Risks – Identifying Hazards and Estimating Losses.

Federal Emergency Management Agency (FEMA). September 2008. *Glossary: Frequently Used Terms for Levee Systems*.

Federal Emergency Management Agency (FEMA). June 4, 2009. Retrieved at: http://www.fema.gov/plan/prevent/saferoom/tsfs02_torn_activity.shtm.

Federal Emergency Management Agency (FEMA). 2009. Retrieved at: http://www.fema.gov/graphics/library/wmap.gif.

Federal Emergency Management Agency Community Information System (FEMA CIS). October 14, 2009. *Community Rating System Overview Report*.

Federal Emergency Management Agency (FEMA). 2009. *Community Rating System*. Retrieved at: http://www.fema.gov/business/nfip/crs.shtm.

Global Security. May, 2009. *Flu Pandemics in History*. Retrieved at: http://www.globalsecurity.org/security/ops/hsc-scen-3_pandemic-history.htm.

Hazards & Vulnerability Research Institute. 2010. The Spatial Hazard Events and Losses Database for the United States, Version 8.0 [Online Database]. Columbia, SC: University of South Carolina. Available from http://www.sheldus.org "

Juniata County, PA Multi-Jurisdictional Hazard Mitigation Plan (Juniata, PA MJHMP). July, 2008. *Appendix C – Hazard Profiles: Civil Disorder*.

Kochanov, W. E. 1999. *Sinkholes in Pennsylvania*. Harrisburg, PA: Pennsylvania Geological Survey, 4th ser., Educational Series 11.

McKee, T.B.; N.J. Doesken; and J. Kleist. 1993. The relationship of drought frequency and duration to time scales. Preprints, 8th Conference on Applied Climatology, pp. 179–184. January 17–22, Anaheim, California.

Millersville University, Department of Earth Sciences. 2009. Retrieved at: http://www.millersville.edu/esci/geology/.

National Center for Atmospheric Research (NCAR), Environmental and Societal Impacts Group, and the American Meteorological Society, 2001: *Extreme Weather Sourcebook 2001: Economic and Other Societal Impacts Related to Hurricanes, Floods, Tornadoes, Lightning, and Other U.S. Weather Phenomena*. National Center for Atmospheric Research, Boulder, CO.

National Climatic Data Center. 2009. Retrieved at: http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms.

National Climatic Data Center. 2007. United State Snow Climatology. Retrieved at: http://www.ncdc.noaa.gov/ussc/index.jsp.

National Drought Mitigation Center, University of Nebraska - Lincoln. 2009. Retrieved at: http://drought.unl.edu/.

National Hurricane Center (NHC). 2009. *The Saffir-Simpson Hurricane Wind Scale (Experimental)*. Retrieved at: http://www.nhc.noaa.gov/aboutsshs.shtml.

National Oceanic and Atmospheric Association – Hurricane Research Division (NOAA – HRD). 2009. Retrieved at: http://www.aoml.noaa.gov/hrd/tcfaq/G11.html.

Pennsylvania Department of Conservation and Natural Resources (DCNR). 2003. *Map 68: Density of Mapped Karst Features in South-Central and Southeastern Pennsylvania.* Retrieved at: http://www.dcnr.state.pa.us/topogeo/map68/index.aspx.

Pennsylvania Department of Conservation and Natural Resources (DCNR). 2009. *Landslides in Pennsylvania*. Retrieved at: http://www.dcnr.state.pa.us/topogeo/hazards/landslides.aspx.

Pennsylvania Department of Conservation and Natural Resources (DCNR). 2009. *Sinkholes in Pennsylvania*. Retrieved at: http://www.dcnr.state.pa.us/topogeo/hazards/sinkholes.aspx.

Pennsylvania Department of Conservation and Natural Resources (DCNR). October 9, 2009. *Counties with Burn Bans*. Retrieved at: http://www.dcnr.state.pa.us/forestry/ffp/burnbans.aspx.

Pennsylvania Department of Environmental Protection (PADEP). May, 2008. *3140-FS-DEP4174: Pennsylvania's Dam Safety Program Fact Sheet*.

Pennsylvania Department of Health. October 8, 2009. *Novel 2009 Influenza A/H1N1 Confirmed and Probable Case Counts in Pennsylvania*. Retrieved at: http://www.health.state.pa.us/H1N1Map/.

Pennsylvania Emergency Management Agency (PEMA). 2007. *Pennsylvania's Hazardous Material Emergency Planning and Response Act 1990-165 - 2007 Annual Report*.

Pennsylvania Emergency Management Agency (PEMA). 2008. *Pennsylvania's Hazardous Material Emergency Planning and Response Act 1990-165 - 2008 Annual Report*.

Pennsylvania Department of Environmental Protection (PADEP). *Watershed Management Drought Information Center*. 2009. Retrieved at: http://www.depweb.state.pa.us/watershedmgmt/cwp/view.asp?a=1435&q=527747.

Spatial Hazard Events and Losses Database for the United States (SHELDUS). 2009. Retrieved at: http://webra.cas.sc.edu/hvri/products/sheldus.aspx.

United States Census Bureau (U.S. Census). 2009. *Fayette County, Pennsylvania Quick Facts*. Retrieved at: http://quickfacts.census.gov/qfd/states/42/42019.html

United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA). 2009. Retrieved at: http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents.

United States Geological Survey, Earthquake Hazards Program. 2009. Retrieved at: http://earthquake.usgs.gov/regional/states/?region=Pennsylvania.

United States Environmental Protection Agency (USEPA). 2009. *Toxic Release Inventory*. Retrieved at: http://www.epa.gov/TRI/.

Appendix B FEMA Crosswalk

The FEMA Crosswalk is an administrative tool required for the FEMA review. The crosswalk will be completed prior to submission to FEMA and will be included in the Final Plan.

This page intentionally left blank.

Appendix C Meeting Minutes and Participation Documentation

This appendix has not been uploaded because it contains sensitive or personal information about planning process participants. If you have questions on the participation documentation, please call Dave Schaarsmith, Planning Consultant, at 412.269.7915.

CONTENTS

This page intentionally left blank.

Appendix D Municipal Flood Risk Maps

This page intentionally left blank.

Appendix E Critical Facilities

This appendix has not been uploaded because it contains sensitive information about critical facilities. If you have questions on the critical facilities, please call David Schaarsmith, Planning Consultant, at 412.269.7915.

This page intentionally left blank.

Appendix F Hazus Flood Report

This page intentionally left blank.

Appendix G Dam Risk Evaluation

This appendix has not been uploaded because it contains sensitive information. If you have questions on dams in Fayette County, please call David Schaarsmith, Planning Consultant, at 412.269.7915.

Appendix H Mitigation Actions

This page intentionally left blank.

Appendix I PASTEEL

This page intentionally left blank.