

# Mercer County 2011 Hazard Mitigation Plan

---

**Prepared for:**

Mercer County Department of Public Safety  
205 S. Erie Street  
Mercer, PA 16137

**Prepared by:**

Michael Baker Jr., Inc.  
1818 Market Street, Suite 3110  
Philadelphia, Pennsylvania 19130

Approved on: **JANUARY 2012**



# Mercer County Hazard Mitigation Plan

## Certification of Annual Review Meetings

The Mercer County Hazard Mitigation Steering Committee has reviewed this Hazard Mitigation Plan. See Section 8 of the Mercer County 2011 Hazard Mitigation Plan for further details regarding this form. The director of the Hazard Mitigation Steering Committee hereby certifies the review.

YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED*	SIGNATURE
2011			
2012			
2013			
2014			
2015			

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

# Mercer 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)
3/5/2010	Stoneboro Borough and Wheatland Borough requested participation in the Hazard Mitigation Plan Update and completed their Capability Assessments, Risk Assessments, 5-Year Plan Review, and Mitigation Action Strategies.	Michael Lincheck, Mercer County POC, Michael Baker Jr., Inc.	
3/30/2010	Findley Township requested participation in the Hazard Mitigation Plan Update and completed their Capability Assessments, Risk Assessments, 5-Year Plan Review, and Mitigation Action Strategies.	Michael Lincheck, Mercer County POC, Michael Baker Jr., Inc.	
11/11/2010	South Pymatuning and New Vernon Township chose to participate in the County's Mitigation Plan Update by completing their Capability Assessments, Risk Assessments, and Mitigation Action Strategies worksheet and engaged in a Hazard Mitigation discussion with County POC	Heather Sloniger, Mercer County POC, Michael Baker Jr., Inc.	
11/16/2010	Jackson Center Borough and Pymatuning Township chose to participate in the County's Mitigation Plan Update by completing their Capability Assessments, Risk Assessments, and Mitigation Action Strategies worksheet and engaged in a Hazard Mitigation discussion with County POC	Heather Sloniger, Mercer County POC, Michael Baker Jr., Inc.	
12/2/2010	Lackawannock Township chose to participate in the County's Mitigation Plan Update by completing their Capability Assessments, Risk Assessments, and Mitigation Action Strategies worksheet and engaged in a Hazard Mitigation discussion with County POC	Heather Sloniger, Mercer County POC, Michael Baker Jr., Inc.	
12/8/2010	Deer Creek and Mill Creek Township chose to participate in the County's Mitigation Plan Update by completing their Capability Assessments, Risk Assessments, and Mitigation Action Strategies worksheet and engaged in a Hazard Mitigation discussion with County POC	Heather Sloniger, Mercer County POC, Michael Baker Jr., Inc.	
3/15/2011	Updated Section 4.3.3.4 Future Occurrences to remove table and refer to Figure 4-5. Edited Objective 4.1 and Action 4.1.2 to specifically state acquisition, elevation and relocation of properties in the floodplain. Edit base plan and Appendix E to reflect change.	Sarah Bowen, Project Manager, Michael Baker Jr., Inc.	

## Mercer County Hazard Mitigation Plan 2011

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.*





**Table of Contents**

**1. Introduction ..... 1**

    1.1. *Background*.....5

    1.2. *Purpose*.....5

    1.3. *Scope* .....6

    1.4. *Authority and Reference* .....6

**2. Community Profile ..... 9**

    2.1. *Geography and Environment*.....9

    2.2. *Community Facts*..... 13

    2.3. *Population and Demographics* .....20

    2.4. *Land Use and Development*.....20

    2.5. *Data Sources* .....21

**3. Planning Process ..... 25**

    3.1. *Update Process and Participation Summary* .....25

    3.2. *The Planning Team* .....29

    3.3. *Meetings and Documentation*.....30

    3.4. *Public & Stakeholder Participation* .....32

    3.5. *Multi-Jurisdictional Planning*.....32

    3.6. *Existing Planning Mechanisms* .....35

**4. Risk Assessment ..... 38**

    4.1. *Update Process Summary* ..... 38

        4.1.1. *Data Sources and Limitations* ..... 38

    4.2. *Hazard Identification*.....39

        4.2.1. *Table of Presidential Disaster Declarations* ..... 39

        4.2.2. *Summary of Hazards* ..... 39

    4.3. *Hazard Profile*.....41

        Hazards by Municipality..... 41

        A. *NATURAL HAZARDS*..... 41

            4.3.1. *Flooding* ..... 41

                4.3.1.1. *Location and Extent* ..... 42

                4.3.1.2. *Range of Magnitude*..... 47

                4.3.1.3. *Past Occurrence* ..... 47

4.3.1.4 National Flood Insurance Program ..... 50

4.3.1.5 Future Occurrence ..... 54

4.3.1.6 Vulnerability Assessment ..... 56

**4.3.2. Winter Storms ..... 58**

4.3.2.1 Location and Extent ..... 58

4.3.2.2 Range of Magnitude ..... 58

4.3.2.3 Past Occurrence ..... 60

4.3.2.4 Future Occurrence ..... 63

4.3.2.5 Vulnerability Assessment ..... 63

**4.3.3. Tornadoes, Hurricanes, and Windstorms ..... 64**

4.3.3.1 Location and Extent ..... 64

4.3.3.2 Range of Magnitude ..... 68

4.3.3.3 Past Occurrence ..... 68

4.3.3.4 Future Occurrence ..... 70

4.3.3.5 Vulnerability Assessment ..... 71

**4.3.4. Droughts and Water Supply Deficiencies ..... 71**

4.3.4.1 Location and Extent ..... 71

4.3.4.2 Range of Magnitude ..... 75

4.3.4.3 Past Occurrence ..... 77

4.3.4.4 Future Occurrence ..... 77

4.3.4.5 Vulnerability Assessment ..... 77

**4.3.5. Subsidence/Landslides ..... 78**

4.3.5.1 Location and Extent ..... 78

4.3.5.2 Range of Magnitude ..... 78

4.3.5.3 Past Occurrence ..... 84

4.3.5.4 Future Occurrence ..... 84

4.3.5.5 Vulnerability Assessment ..... 84

**4.3.6. Earthquakes ..... 85**

4.3.6.1 Location and Extent ..... 85

4.3.6.2 Range of Magnitude ..... 86

4.3.6.4 Future Occurrence ..... 89

4.3.6.5 Vulnerability Assessment ..... 89

**4.3.7. Pandemic ..... 93**

4.3.7.1 Location and Extent ..... 93

4.3.7.2 Range of Magnitude ..... 93

4.3.7.3 Past Occurrence ..... 93

4.3.7.4 Future Occurrence ..... 94

4.3.7.5 Vulnerability Assessment ..... 94

**B. HUMAN-MADE HAZARDS ..... 95**

**4.3.8. Dam Failure ..... 95**

**4.3.9. Hazardous Materials ..... 95**

4.3.9.1 Location and Extent ..... 95

4.3.9.2 Range of Magnitude ..... 97

4.3.9.3 Past Occurrence ..... 98

4.3.9.4	<i>Future Occurrence</i> .....	101
4.3.9.5	<i>Vulnerability Assessment</i> .....	101
<b>4.3.10.</b>	<b>Fire Hazard (Urban and Wild)</b> .....	<b>101</b>
4.3.10.1	<i>Location and Extent</i> .....	102
4.3.10.2	<i>Range of Magnitude</i> .....	102
4.3.10.3	<i>Past Occurrence</i> .....	102
4.3.10.4	<i>Future Occurrence</i> .....	103
<b>4.3.11.</b>	<b>Transportation Accidents</b> .....	<b>109</b>
4.3.11.1	<i>Location and Extent</i> .....	109
4.3.11.2	<i>Range of Magnitude</i> .....	109
4.3.11.3	<i>Past Occurrence</i> .....	109
4.3.11.4	<i>Future Occurrence</i> .....	110
4.3.11.5	<i>Vulnerability Assessment</i> .....	110
<b>4.3.12.</b>	<b>Energy Emergencies</b> .....	<b>111</b>
4.3.12.1	<i>Location and Extent</i> .....	111
4.3.12.2	<i>Range of Magnitude</i> .....	111
4.3.12.3	<i>Past Occurrence</i> .....	112
4.3.12.4	<i>Future Occurrence</i> .....	112
4.3.12.5	<i>Vulnerability Assessment</i> .....	112
<b>4.3.13.</b>	<b>Fixed Nuclear Facility</b> .....	<b>114</b>
4.3.13.1	<i>Location and Extent</i> .....	114
4.3.13.2	<i>Range of Magnitude</i> .....	114
4.3.13.3	<i>Past Occurrence</i> .....	115
4.3.13.4	<i>Future Occurrence</i> .....	115
4.3.13.5	<i>Vulnerability Assessment</i> .....	115
<b>4.3.14.</b>	<b>Terrorism, Criminal Activity, or Civil Disturbance</b> .....	<b>118</b>
4.3.14.1	<i>Location and Extent</i> .....	118
4.3.14.2	<i>Range of Magnitude</i> .....	119
4.3.14.3	<i>Past Occurrence</i> .....	120
4.3.14.4	<i>Future Occurrence</i> .....	121
4.3.14.5	<i>Vulnerability Assessment</i> .....	121
<b>4.4.</b>	<b>Hazard Vulnerability Summary</b> .....	<b>122</b>
4.4.1.	<b>Methodology</b> .....	<b>124</b>
4.4.2.	<b>Ranking Results</b> .....	<b>125</b>
4.4.3.	<b>Potential Loss Estimates</b> .....	<b>128</b>
4.4.4.	<b>Future Development and Vulnerability</b> .....	<b>133</b>
<b>5.</b>	<b>Capability Assessment</b> .....	<b>136</b>
5.1.	<b>Update Process Summary</b> .....	<b>136</b>
5.2.	<b>Capability Assessment Findings</b> .....	<b>136</b>
5.2.1.	<b>Emergency Management</b> .....	<b>136</b>
5.2.2.	<b>Participation in the National Flood Insurance Program</b> .....	<b>137</b>
5.2.3.	<b>Planning and Regulatory Capability</b> .....	<b>140</b>

- 5.2.4. Administrative and Technical Capability..... 142
- 5.2.5. Fiscal Capability ..... 143
- 5.2.6. Political Capability..... 144
- 5.2.7. Self-Assessment..... 144
- 5.2.8. Existing Limitations..... 146
- 6. Mitigation Strategy ..... 148**
  - 6.1. Update Process Summary ..... 148
  - 6.2. Mitigation Goals and Objectives ..... 157
  - 6.3. Identification and Analysis of Mitigation Techniques ..... 160
  - 6.4. Mitigation Action Plan ..... 162
- 7. Plan Maintenance ..... 169**
  - 7.1. Update Process Summary ..... 169
  - 7.2. Monitoring, Evaluating and Updating the Plan ..... 169
  - 7.3. Incorporation into Other Planning Mechanisms ..... 170
  - 7.4. Continued Public Involvement ..... 170
- 8. Plan Adoption and Resolutions ..... 171**
- 9. Appendices ..... 178**
  - Appendix A Bibliography
  - Appendix B FEMA Crosswalk
  - Appendix C HAZUS Flood Report
  - Appendix D Municipal Flood Maps
  - Appendix E Mitigation Action Plan
  - Appendix F Meeting Minutes and Participation Documentation
  - Appendix G PA STEEL Evaluation
  - Appendix H Dam Risk Analysis
  - Appendix I Hazard Vulnerability Matrix



# 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 Mercer 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 Mercer County Hazard Mitigation Local Planning Team, composed of government leaders from Mercer 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.

The Mercer County All Hazard Mitigation Plan is an umbrella plan that encompasses the input of the local municipalities. Mitigation begins at the local level, in communities, boroughs, and cities where impacts of damaging events are first felt. Local mitigation planning will focus community attention on development issues prior to a disaster, ensuring participation in a more proactive sense. Through participation in the hazard mitigation planning process, local entities will possess the capability to identify, take advantage of, and implement mitigation strategies. Active hazard mitigation in a community also contributes to public safety and welfare, economic development, and environmental protection.

## 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 Mercer 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 Mercer County 2010 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 to 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.

This page intentionally left blank.

## 2. Community Profile

### 2.1. Geography and Environment

According to the U.S. Census Bureau, the County has a total area of 683 square miles, of which 672 square miles of it is land and 11 square miles of it (1.58%) is water. The County is located in Northwestern Pennsylvania, bordered by Ohio to the west. Mercer County falls within the Appalachian Plateaus Physiographic Province, specifically the Northwestern Glaciated Plateau section. The dominant topographic form within this section is characterized by broad, rounded upland and deep steep-sided, linear valleys that are partly filled with glacial deposits. The underlying rock is shale, siltstone, and sandstone. Areas of steep slope (grades over 25%) are found along the river and stream corridors, including the Big Bend area of the Shenango River, along the Neshannock Creek in Lackawannock Township, along Sandy Creek and at the south end of Lake Wilhelm. The Mercer County Comprehensive plan cites these areas of steep slope as areas of concern because if they are disturbed, they can produce heavy soil erosion and sediment loading in adjacent streams.

The geology of Mercer County consists of 6 rock formations. They are the Allegheny Formation (Group), the Berea Sandstone through Venenago Formation (undivided), Corry Sandstone through Riceville Formation (undivided), Cuyahoga Group, Pottsville Formation (Group), and Shenango Formation. Almost half of Mercer County is underlain by the Pottsville Formation. The Shenango Formation is the second most prevalent followed by the Cuyahoga Group. These two formations are closely related and are generally found in the northwestern part of the County. They cover an additional 35% of the County.

The Mercer County Comprehensive plan lists 11 waterways as shown in Table 2-1. Other smaller waterways include: Powdermill Run, Pymatuning Creek, Mill Creek, Foulk Run, East Branch Wolf Creek, Dugan Run, Saul Run, Schofield Run, and Minis Hollow Run. Lakes, reservoirs, and swamps in Mercer County include: Shenango River Lake, Lake Wilhelm, Watts Lake, Little Shenango Dam Reservoir, Saul Run Dam Reservoir, Pine Run Dam Sediment Pond, Pa-474 Reservoir, Barmore Lake, and Lake Latonka.

**Table 2-1. Waterways in Mercer County**

Waterway	Tributary of ...	Location
<b>Crooked Creek</b>	Little Shenango River	Sugar Grove Township
<b>Little Shenango River</b>	Shenango River	Lake, New Vernon, Perry, Salem, Sugar Grove, and Hempfield Townships, and Greenville Borough
<b>Big Run</b>	Shenango River	Green and West Salem Townships
<b>Otter Creek</b>	Neshannock Creek	Otter Creek, Delaware, Fairview, Coolspring, and Findley Townships and Mercer Borough
<b>Cool Spring Creek</b>	Neshannock Creek	Jackson, Coolspring, Findley, and Fairview Townships and Mercer Borough



## Mercer County Hazard Mitigation Plan 2011

Waterway	Tributary of ....	Location
<b>French Creek</b>	Allegheny River	French Creek Township
<b>Little Neshannock Creek</b>	Neshannock Creek	Jefferson Township and border between Lackawannock and East Lackawannock Township
<b>Little Neshannock Creek (West Branch)</b>	Neshannock Creek	Hermitage, Lackawannock, and Wilmington Townships
<b>Neshannock Creek</b>	Shenango River	Mercer Borough, border of East Lackawannock and Findley Townships and Springfield Township
<b>Wolf Creek</b>	Slippery Rock Creek	Worth, Wolf Creek, Pine, and Liberty Townships, and Grove City Borough
<b>Sandy Creek</b>	Allegheny River	Sandy Creek, Deer Creek, New Vernon, Mill Creek, and Sandy Lake Townships and Sandy Lake Borough

As demonstrated in the following figure, Mercer County straddles seven watersheds:

- French;
- Shenango;
- Little Shenango;
- Sandy;
- Neshannock;
- Little Neshannock; and
- Wolf.

There is one Pennsylvania State Park in Mercer County. Maurice K. Goddard State Park, named for Maurice K. Goddard, former Secretary of the Pennsylvania Department of Environmental Resources, is located on the western side of exit 130, off Interstate 79 on Pennsylvania Route 358, near Stoneboro. Other parks in Mercer County include: Shenango Public Use Area, Mahaney Public Use Area, State Game Lands Number 294, Johnston Tavern Historical Site, State Game Lands Number 270, State Game Lands Number 284, and State Game Lands Number 130.

This page intentionally left blank.

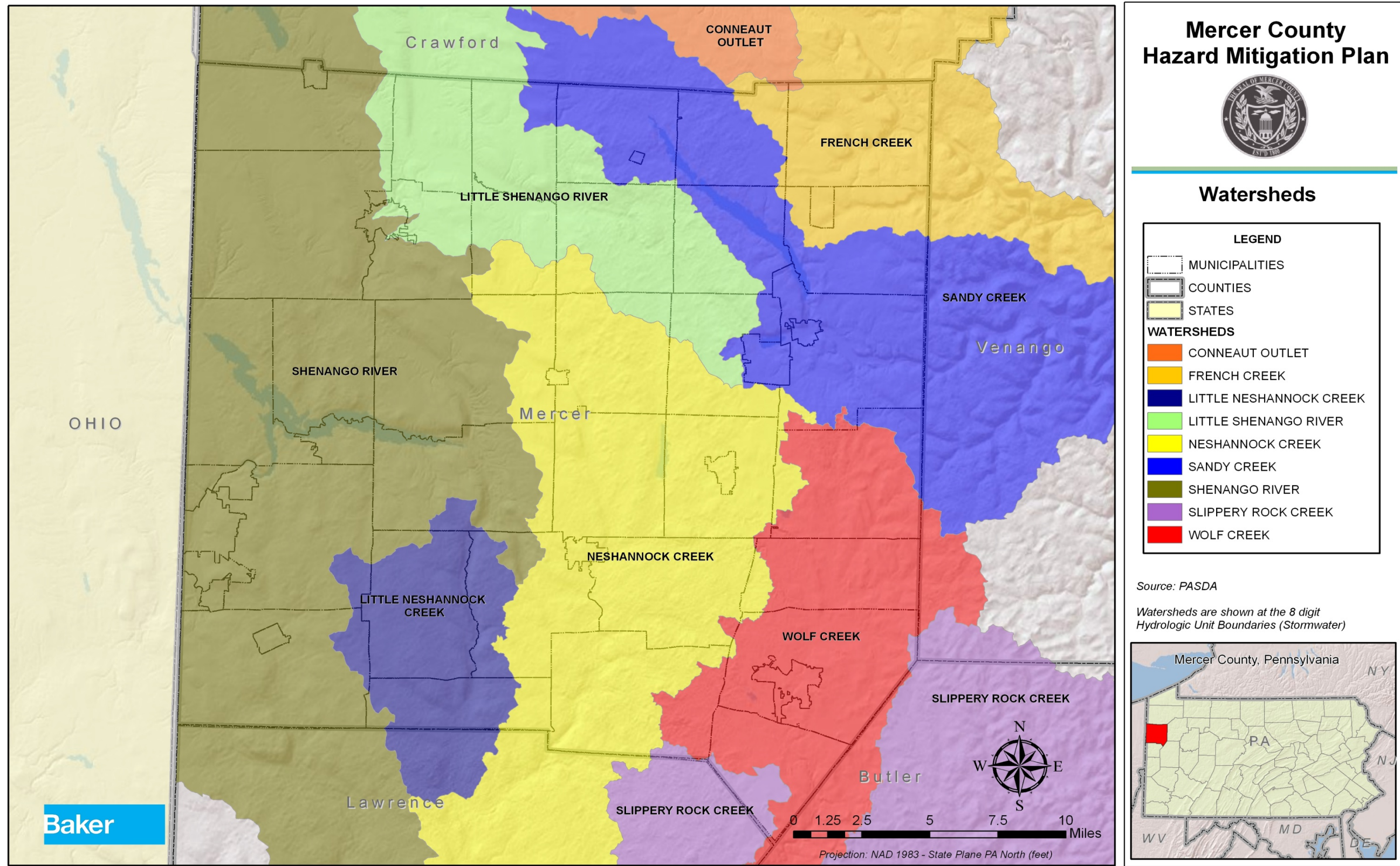


Figure 2-1. Mercer County Watersheds



### 2.2. Community Facts

The County was settled in the late 1700s and early 1800s by European immigrants from Ireland and Scotland and named for Hugh Mercer, a general in the American Revolution, in 1800. The main communities are Hermitage, Sharon, Farrell, Grove City, Greenville, and Sharpsville. The Borough of Mercer is the county seat. The economy is based on heavy industry, bituminous coal mining, and agriculture (dairy, hay, and oats). The following Critical Facilities Map (Figure 2-2) presents the general locations of important community assets, including fire stations, road systems, schools, airports, rail lines, and police stations.

As part of the update process Mercer County had their critical facilities mapped. The term "critical facility," varies from county to county. It depends on what a particular county identifies as their critical facilities. Mercer County in this plan update identified airports, police departments, fire departments, medical care facilities(not limited to hospitals), and schools as being a critical facility. When reviewing the HAZUS report, which is included as Appendix C in the plan update, it is important to note that "critical" and "essential" do not share the same meaning. Essential Facilities in HAZUS are schools, fire stations, and police stations, and emergency operation centers if a particular county has one. As a result Mercer County identified critical facilities count will not match the count of the HAZUS essential facilities.

The County is served by a number of major transportation routes, containing 53.9 miles of interstate highways, 757.23 miles of state and federal highways, and 1,307.87 miles of secondary and municipal roads. They include:

- US Routes 18, 58, and 62
- Junction of I-79 & I-80
  - Interstate 80 – Exits 1, 2, & 3A
  - Interstate 79 – Exits 31, 33, & 34

As of October, 3, 2007, Mercer County owns and maintains 255 bridges throughout the county. Of these, two are owned jointly with Trumbull County, Ohio, three are owned jointly with Crawford County, Pennsylvania, and one is owned jointly with Coolspring Township. The physical cost to replace all county owned bridges using base year 2002 costs amounts to \$100,021,000. This figure represents the base construction cost and does not include design, inspection, right-of-way, and utility costs which are typically required to replace a structure.

Mercer County has 28 bridges, or roughly 11% that are considered "Structurally Deficient" and 17 bridges (6%) that are "Functionally Obsolete". In Pennsylvania, 9% of the bridges on the State system and 17% of the bridges on the local system are considered structurally deficient and 15% of state bridges and 12% of local bridges are functionally obsolete according to figures released for the year 2004 by the LTAP program at Penn State. Our bridges are in overall better condition when compared to both the state and local averages. Mercer County has removed three bridges from the Structurally deficient/Functionally obsolete category in 2006. However, since then, four new bridges have been added to the structurally deficient list due to coding revisions for non-composite adjacent box beam bridges.

## *Mercer County Hazard Mitigation Plan 2011*

A bridge is Structurally Deficient if it is in relatively poor condition, or has insufficient load-carrying capacity. The insufficient load capacity could be due to the original design of an older bridge that used lighter design loads, or due to deterioration. A bridge is considered Functionally Obsolete if it is narrow, has inadequate under-clearances, has insufficient load-carrying capacity, is poorly aligned with the roadway, and can no longer adequately service today's traffic.

Federal law requires that all bridges on public roads be inspected at least once every two years in accordance with the National Bridge Inspection Standards (NBIS). Due to the large number of bridges in Mercer County, we inspect half one year and the other half the following year. Our inspection report data is sent to PennDOT for entry into their computer system and reporting to the federal government. Approximately 250 items are inventoried, reviewed and catalogued at each inspection for each bridge.

All bridges in Pennsylvania are inspected using the same criteria, and numeric ratings are assigned to various parts of the structure. All inspectors, if they are not registered engineers, are required to attend inspection training to assure all inspection conditions are properly coded and recorded. These numeric codes are used to develop what is known as the structure's federal sufficiency rating which indicates the overall condition of the structure and how critical it is in relation to other structures throughout the country.

The Pennsylvania Department of Transportation uses the numeric ratings to also determine a "Deficiency" rating. The deficiency rating system assigns higher priorities to bridges on the Interstate and Arterial roads than to those on collector or local roads. Based on the deficiency ratings computed, bridges are ranked County wide, District wide, and State wide.

Mercer County's worst bridges have federal and/or state funds allocated for either design or design and construction on the State Transportation Improvement Program. The federal or state participation is at least 80% of the cost with the remaining cost to be borne by the County. Therefore, our worst bridges are on a schedule to be addressed.

The state of Mercer County's bridges has been gradually improving due to an aggressive maintenance and replacement program. In 1983, the average sufficiency rating for all Mercer County owned bridges was 74.39 on a scale of zero to 100, with 100 representing a new structure. In 1998 this had increased to 85.92, and today (as of October 3, 2007) it stands at 86.94. It stood at 87.42 in 2003. Although bridges have been removed from the Structurally deficient/Functionally obsolete category, the continued deterioration of the remaining bridges is expected to reduce the average rating over the next few years. The County does not expect this number to go much higher. Approximately 49% of Mercer County bridges are between 40 and 135 years old, and the sufficiency ratings decrease more rapidly as a structure ages.

In addition to the Greater Pittsburgh International Airport, Mercer County is served by three public airports: Greenville Airport, Grove City Airport, and Venango Regional Airport. Rail transportation is still a vital means of transportation in the County, Conrail Bessemer and Lake Erie both have lines traversing Mercer County.

Mercer County is the home of several institutions of higher learning, including Grove City, Thiel, and Westminster colleges, as well as the Pennsylvania State University, Shenango Campus.



Also located within the County are a number of business, technical and trade schools. There are 14 public school districts and two parochial schools.

This page intentionally left blank.





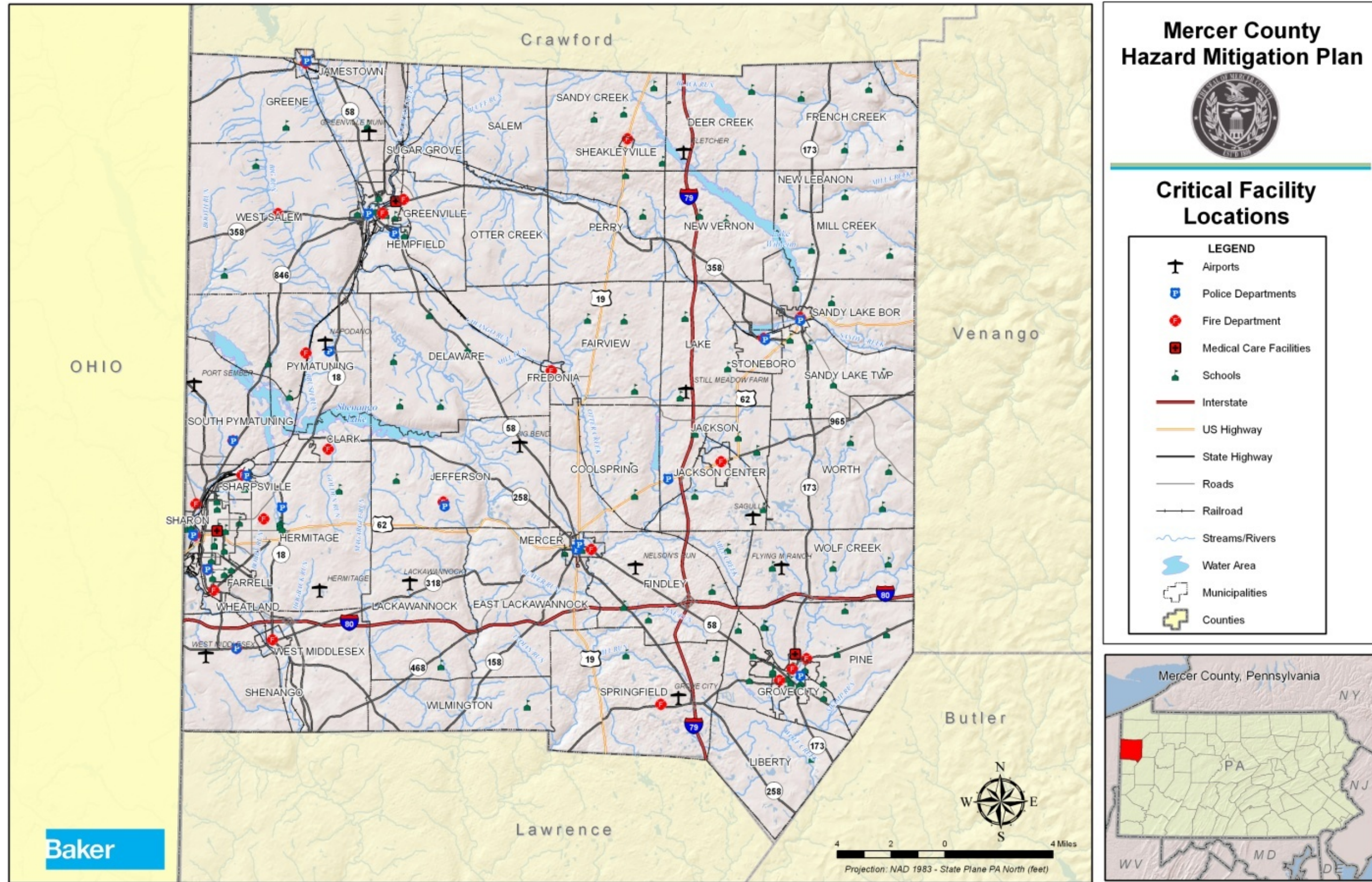


Figure 2-2. Mercer County Critical Facilities







## 2.3. Population and Demographics

Mercer County's population has steadily declined from 121,018 in 1990, to 120,169 in 2000, and 116,652 in 2008. Since 2000, the County has lost 3% of its population. The following table demonstrates the specific demographic characteristics of Mercer County.

Table 2-2. Mercer County Demographic Summary

Demographic Category	Mercer County	Pennsylvania
Population, 2008 estimate	116,652	12,448,279
Population, percent change, April 1, 2000 to July 1, 2008	-3.0%	1.4%
Population estimates base (April 1) 2000	120,292	12,281,052
Persons under 5 years old, percent, 2008	5.2%	5.9%
Persons under 18 years old, percent, 2008	21.1%	22.2%
Persons 65 years old and over, percent, 2008	17.8%	15.3%
Female persons, percent, 2008	51.0%	51.3%
Racial Breakdown	Mercer County	Pennsylvania
White persons, percent, 2008 (a)	92.8%	85.4%
Black persons, percent, 2008 (a)	5.5%	10.8%
American Indian and Alaska Native persons, percent, 2008 (a)	0.1%	0.2%
Asian persons, percent, 2008 (a)	0.5%	2.4%
Native Hawaiian and Other Pacific Islander, percent, 2008 (a)	N/A	N/A
Persons reporting two or more races, percent, 2008	1.1%	1.1%
Persons of Hispanic or Latino origin, percent, 2008 (b)	0.9%	4.8%
White persons not Hispanic, percent, 2008	92.0%	81.4%

Source: United States Census Bureau, 2009.

## 2.4. Land Use and Development

In Mercer County, there are 3 types of incorporated municipalities: cities, boroughs, townships, and, in at most two cases, towns. The County is composed of 48 municipalities, which break down to:

- 3 cities;
- 14 boroughs; and
- 31 townships.

There are 14 school districts in Mercer County. The Mercer County Comprehensive Plan identified the following sites, listed in order of market priority, that have been selected as target locations to serve as the catalyst for economic growth and development. Detailed site investigations were not conducted as part of this study.

- Exit 15 – I-80
- Exit 113 – I-79/PA 208
- Exit 4 – I-80/PA60/PA318

These growth areas will have a significant impact on land use, economic development, and potential hazard creation in Mercer County. These growth areas were selected in part to reverse a trend of greater land development with little corresponding economic or population growth. In the 20 years between 1973 and 1993, more and more land was consumed by relatively the same amount of people, housing, commerce, and industry. People and development have simply chosen to relocate themselves, typically from the older, urban areas to the newer suburban and rural areas. If Mercer County were to undergo growth, land consumption and sprawl development would be a major concern. The following maps from Mercer County's Comprehensive Plan have been included to show the County's existing and future land use/cover. The Comprehensive Plan cites that these maps were created using data from the Mercer County Regional Planning Commission, PENN DOT, and Penn State University. These maps were created by Gannet Flemming and Delta Development Group Inc., consultants hired by the County.

### **2.5. Data Sources**

Sources used to provide this information include the following:

- United States Census Bureau: American Community Survey and QuickFacts
- Mercer County Comprehensive Plan; and
- Mercer County Watersheds Act 167 Stormwater Management Plan



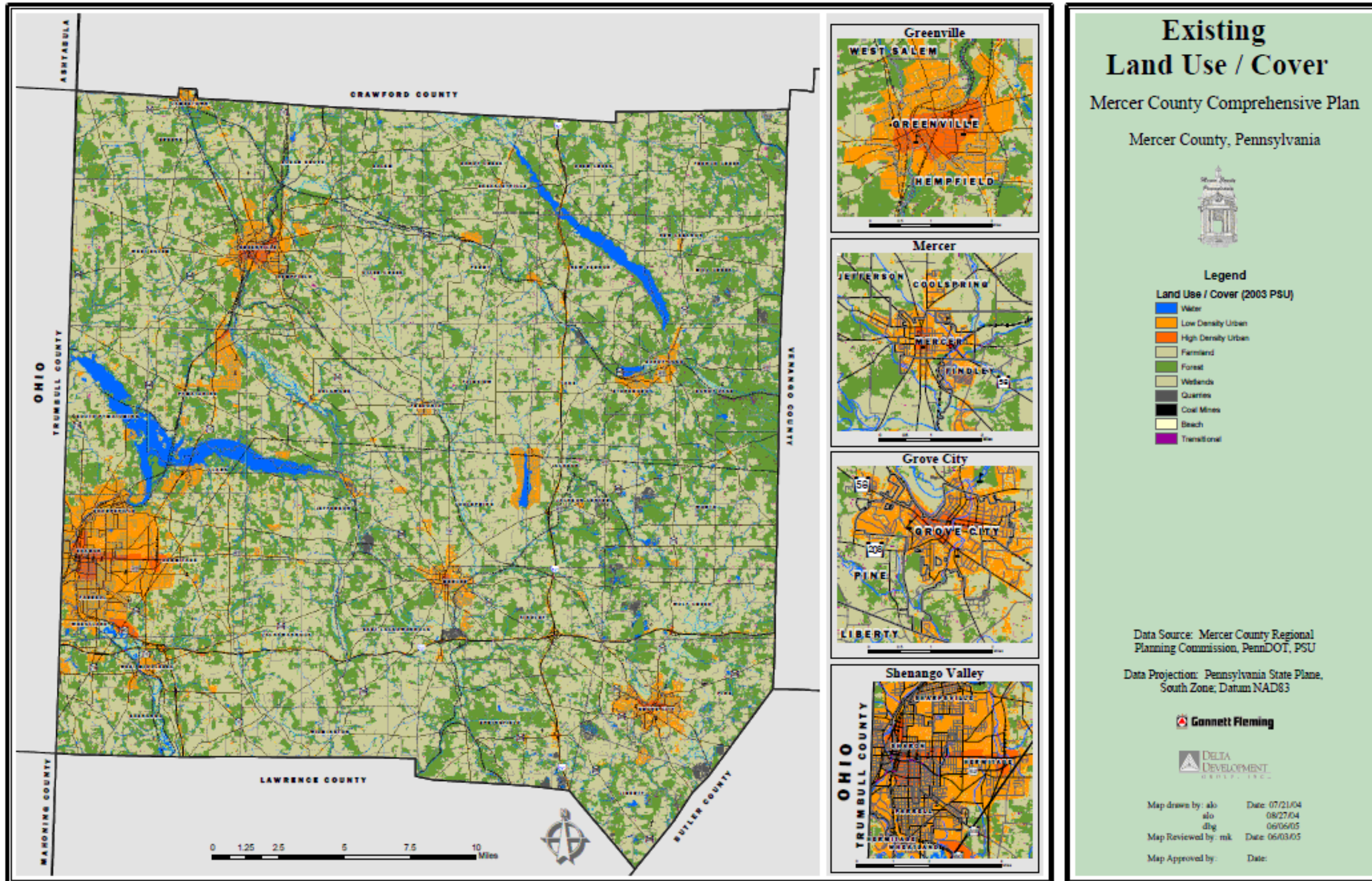


Figure 2-3. Mercer County Existing Land Use/Cover





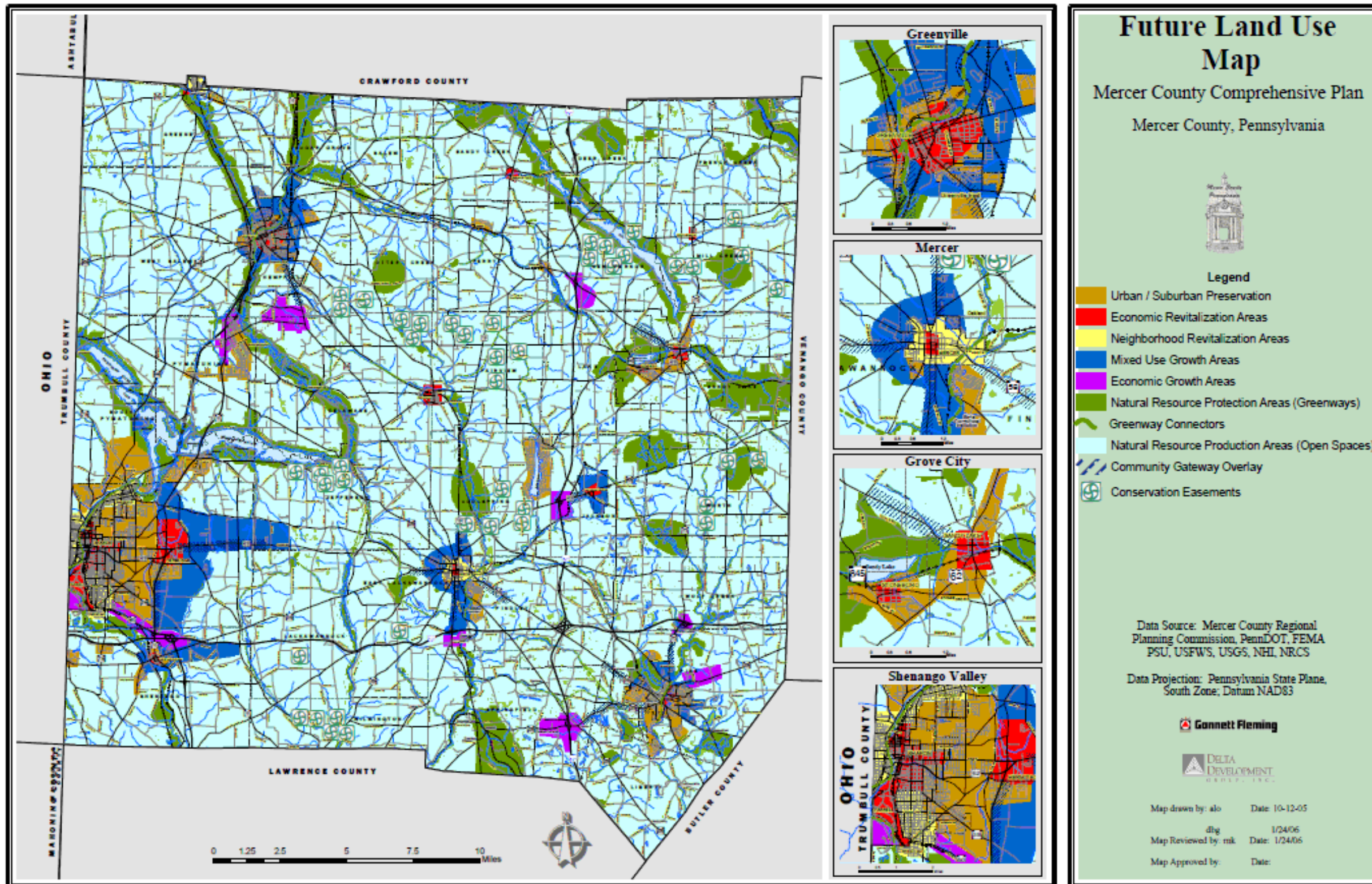


Figure 2-4. Mercer County Future Land Use/Cover

## **3. Planning Process**

### ***3.1. Update Process and Participation Summary***

The planning process used in Mercer County was based on Section 322 of the Disaster Mitigation Act of 2000 and supporting guidance developed by FEMA and PEMA. The planning process included the following steps:

- Establish a Core Planning Team
- Review and Update the Hazard Vulnerability Assessment
- Develop Capabilities Assessment
- Complete Mitigation Plan
- FEMA/PEMA Review
- Advertise Opportunity for Public Comment
- Adopt and Implement Mitigation Plan
- Present to Municipalities for Adoption

This process was initiated by the Northwest Regional Planning and Development Commission and supported by Mercer County Hazard Mitigation Team, PEMA and FEMA representatives.

John R. Nicklin, was appointed Hazard Mitigation Officer in December of 2000, and the Hazard Mitigation Local Planning Team (LPT) was formed in December of 2002 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 County's current HMP was adopted by the County in 2004.

An update to the 2004 HMP was initiated in August of 2009. 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 Mercer County HMP contrasts significantly with the 2004 Mercer County HMP. A summary of the update process used for each section of this plan are included in Sections 4.1, 5.1, 6.1, and 7.1. A total of 47 out of 48 municipalities participated in the plan update. For participation municipalities were provided the opportunity to attend two public meetings. If they could not attend some chose to call and listen to the presentation. They were also given the opportunity to complete assessment forms.

Some municipalities were not able to originally participate in the initial update process. This was mainly due to scheduling conflicts and the fact that in the more rural communities most staff members are volunteers and are not full-time paid positions. Through continued outreach by Mercer County and the County Point of Contact, the importance of participation and the related benefits were more fully communicated to these municipalities and their participation in the

## ***Mercer County Hazard Mitigation Plan 2011***

---

process was secured. As a result of this additional outreach, the municipalities participated in a hazard mitigation phone call and completed a risk assessment, capability assessment, selected a mitigation action to benefit a hazard concern for their municipality and a mitigation action related to the National Flood Insurance Program.

A participation matrix has been included below. The 2011 Hazard Mitigation Plan Update was completed in March, 2011 and later revised in May of 2011 and December of 2011.



## Mercer County Hazard Mitigation Plan 2011

**Table 3-1. Plan Update: Participation Matrix**

MERCER COUNTY								
PEMA HAZARD MITIGATION PLAN UPDATE								
	Kick-off Meeting		Capability Assessment	Risk Assessment	Mitigation Strategy Meeting		Mitigation Action	NFIP Action
	9-Nov-09				7-Dec-09			
Stakeholder	Mailed Invitation	Respond / Attend	Completed	Completed	Mailed Invitation	Respond / Attend	Completed	Completed
Mercer County	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clark Borough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coolspring Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Deer Creek Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Delaware Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
East Lackawannock Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Fairview Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Farrell (City)	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Findley Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Fredonia Borough	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
French Creek Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Greene Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Greenville Borough	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grove City Borough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hempfield Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hermitage (City)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jackson Center Borough	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Jackson Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Jamestown Borough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jefferson Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Lackawannock Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

## Mercer County Hazard Mitigation Plan 2011

MERCER COUNTY								
PEMA HAZARD MITIGATION PLAN UPDATE								
	Kick-off Meeting		Capability Assessment	Risk Assessment	Mitigation Strategy Meeting		Mitigation Action	NFIP Action
	9-Nov-09				7-Dec-09			
Stakeholder	Mailed Invitation	Respond / Attend	Completed	Completed	Mailed Invitation	Respond / Attend	Completed	Completed
Lake Township	<input type="checkbox"/>				<input type="checkbox"/>			
Liberty Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mercer Borough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mill Creek Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
New Lebanon Borough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
New Vernon Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Otter Creek Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perry Township	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Pine Township	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Pymatuning Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Salem Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Sandy Creek Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Sandy Lake Borough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sandy Lake Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sharon (City)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sharpsville Borough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sheakleyville Borough	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shenango Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
South Pymatuning Township	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Springfield Township	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Stoneboro Borough	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Sugar Grove Township	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
West Middlesex Borough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
West Salem Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

## Mercer County Hazard Mitigation Plan 2011

MERCER COUNTY								
PEMA HAZARD MITIGATION PLAN UPDATE								
	Kick-off Meeting		Capability Assessment	Risk Assessment	Mitigation Strategy Meeting		Mitigation Action	NFIP Action
	9-Nov-09				7-Dec-09			
Stakeholder	Mailed Invitation	Respond / Attend	Completed	Completed	Mailed Invitation	Respond / Attend	Completed	Completed
Wheatland Borough	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Wilmington Township	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Wolf Creek Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worth Township	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Adjacent Counties</b>								
Lawrence County	<input type="checkbox"/>				<input type="checkbox"/>			
Butler County	<input type="checkbox"/>				<input type="checkbox"/>			
Venango County	<input type="checkbox"/>				<input type="checkbox"/>			
Crawford County	<input type="checkbox"/>				<input type="checkbox"/>			

### 3.2. The Planning Team

During development of the 2004 HMP, the following individuals served as members of the LPT:

- John R. Nicklin, Deputy Director, Mercer County EMA
- Jim Mondok, Director, Mercer County Soil Conservation District
- Michael Deforest, Director, Mercer County Revenue Department
- Mark Miller, Director, Mercer County Bridge Department

The LPT for the 2011 Hazard Mitigation Plan Update included:

- Frank Jannetti, Director, Mercer County Department of Public Safety
- John R. Nicklin, Deputy Director, Mercer County Department of Public Safety

Mr. Frank Jannetti along with Mr. John Nicklin will be responsible for making sure that maintenance procedures are carried out, meetings are held annually to discuss progress on mitigation projects, and that in the event of a disaster the HMP will be reviewed and modified as necessary.

During the planning process, additional contacts were made with the following agencies (a complete mailing list can be found in Appendix F) to determine how their programs affect or could support the county's hazard mitigation efforts:

Pennsylvania Department of Transportation;

## ***Mercer County Hazard Mitigation Plan 2011***

---

Pennsylvania Department of Environmental Protection;  
National Oceanic & Atmospheric Administration (NOAA), National Weather Service (NWS);  
Department of Conservation and Natural Resources, Bureau of Forestry;  
Mercer County Airport;  
Mercer County Planning Commission; and  
Adjacent Counties:

- Crawford County;
- Mahoning County;
- Trumbull County;
- Lawrence County;
- Butler County; and
- Venango County.

### ***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 F:

**November 9, 2009:** Community kick-off meeting held at the Mercer County Department of Public Safety office 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 *5-year Hazard Mitigation Plan Review Worksheets*. This meeting was used to review the 2004 goals and objectives, and discuss opportunities to improve the Plan. The meeting was open to the public.

**December 7, 2009:** Mitigation strategy workshop meeting held at the Mercer County Public Meeting Room to review the update process and actions completed to date. The results of the Capability Assessments and Risk Assessment were presented. With this knowledge discussed, the County-wide Planning Team brainstormed new mitigation actions to be included in the updated HMP. Communities were provided with an opportunity to comment on results of the risk assessment. The meeting was open to the public.

**XX, XX, 20XX:** Public Meeting to be held

**XX, XX, 20XX:** Following review by the Pennsylvania Emergency Management Agency and the Federal Emergency Management Agency, the Mercer LPT incorporated all agency and public comments received. At this meeting, the Board of Commissioners adopted the Final 2011 Hazard Mitigation Plan by resolution.

**Public Notices about Hazard Mitigation**

**November 12, 2010:** Mercer County made the plan available to the public for comment and review on their website. All comments can be e-mailed to Frank Jannetti, Director, Mercer County Department of Public Safety or John R. Nicklin, Deputy Director, Mercer County Department of Public Safety. The plan will remain on the County website. Once the plan has been approved and adopted, the current version of the plan online will be updated.



The screenshot shows the Mercer County Pennsylvania website interface. At the top is the county logo with the text "Mercer County PENNSYLVANIA". Below the logo is a search bar with the text "Search for:" and an "OK" button. To the right of the search bar are two social media icons: "Governor's Office" and "County Information". A horizontal line separates the header from the main content. The main content features the title "Hazard Mitigation Plan" in a large, bold, black serif font. Below the title is a red Adobe Reader icon followed by the text "Download Adobe Reader here". A dashed horizontal line is positioned below this section. The next section is titled "Mercer County through the Emergency Management Agency is Seeking Your Feedback on Our Hazard Mitigation Plan Update" in a blue sans-serif font. Below this title is a paragraph of text: "Mercer County Emergency Management is currently seeking your feedback on our Hazard Mitigation Plan Update for the County. The updated plan will be submitted and approved by the end of year, and now is your chance to contact us with any questions, comments, or concerns that you might have with the current plan. The County's initial plan was developed in 2004." This is followed by the text "Please address any questions, comments, or concerns to:" and the email addresses "fjannetti@mcc.co.mercer.pa.us or jnicklin@mcc.co.mercer.pa.us". Below that is the text "To review the Hazard Mitigation Plan, please click here:" followed by a blue link "Click Here To View Hazard Mitigation Plan". The final section is titled "This comment form provides an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impact of future hazard events in Mercer County." followed by a blue link "Click Here To View Comment Form".

**November 16 and 19 2010:** Newspaper notices were published to inform the public that the plan was now available on the County's website. The notice below was published in both the Sharon Herald and the Greenville Record Argus. Both newspaper notices can be found in Appendix F.

**Invitation to Actively Participate in the Draft  
Hazard Mitigation Plan Update for Mercer County**

Mercer County is soliciting comments on the recently updated Mercer County Hazard Mitigation Plan. The plan includes an assessment of the impacts of man-made and natural hazards such as hazardous material releases, dam failure, floods, tornadoes, and winter storms and a strategy with long-term solutions and alternatives for minimizing potential impacts to people and property. The plan will allow the County and participating jurisdictions to be eligible for mitigation grant funds from the Federal Emergency Management Agency (FEMA).

Mercer County Emergency Management wants your feedback on the Hazard Mitigation Plan Update for the County. The updated plan will be submitted and approved by the end of year, and now is your chance to contact us with any questions, comments, or concerns that you might have with the current plan. The County's initial plan was developed in 2004.

**Please address any questions, comments, or concerns to:**  
[fjannetti@mcc.co.mercer.pa.us](mailto:fjannetti@mcc.co.mercer.pa.us) or [jnicklin@mcc.co.mercer.pa.us](mailto:jnicklin@mcc.co.mercer.pa.us)

**To review the Hazard Mitigation Plan, please go to the following website:**  
<http://www.mcc.co.mercer.pa.us/Hazard.Mitigation/default.htm>

### 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 two tools listed below were distributed with meeting invitations and at meetings to solicit data, information, and comments from the local municipalities in Mercer County. Please refer back to Table 3-1 to view which municipality completed these two surveys. Responses to these surveys are included in Appendix F:

- 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 Assessment Survey:** Identifies hazards, assesses risk by hazard, and analyzes vulnerability by hazard.

Public comment was encouraged throughout the planning process. Additionally, notification of the HMPU sent to representatives from neighboring counties is included in Appendix F.

### 3.5. Multi-Jurisdictional Planning

This hazard mitigation plan was developed using a multi-jurisdictional approach. With funding support from PEMA, County-level departments had resources such as technical expertise and

data which local jurisdictions lacked. However, the County could not develop the plan on its own. To undertake such a regional planning effort, involvement from local municipalities was 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 3-2 lists the participating municipality and the date each adopted the 2004 plan and the 2011 HMP, which includes mitigation action items specific to each jurisdiction. The 2004 HMP included all 48 municipalities, and the 2011 Update successfully includes 47 out of 48 municipalities. During the update process warning letters were sent to those jurisdictions not participating. Additional phone calls were also made to try and get the jurisdictions to fill out the risk and capability assessment and to attend meetings.

**Table 3-2. Municipal Adoption Dates**

<b>Jurisdiction</b>	<b>Participated in 2004 Plan</b>	<b>2011 Adoption Date</b>
<b>Mercer County</b>	Yes	Pending
<b>Clark Borough</b>	Yes	Pending
<b>Coolspring Township</b>	Yes	Pending
<b>Deer Creek Township</b>	Yes	Pending
<b>Delaware Township</b>	Yes	Pending
<b>East Lackawannock Township</b>	Yes	Pending
<b>Fairview Township</b>	Yes	Pending
<b>Farrell, City</b>	Yes	Pending
<b>Findley Township</b>	Yes	Pending
<b>Fredonia Borough</b>	Yes	Pending
<b>French Creek Township</b>	Yes	Pending
<b>Greene Township</b>	Yes	Pending
<b>Greenville Borough</b>	Yes	Pending
<b>Grove City Borough</b>	Yes	Pending
<b>Hempfield Township</b>	Yes	Pending
<b>Hermitage, City</b>	Yes	Pending
<b>Jackson Center Borough</b>	Yes	Pending
<b>Jackson Township</b>	Yes	Pending
<b>Jamestown Borough</b>	Yes	Pending
<b>Jefferson Township</b>	Yes	Pending
<b>Lackawannock Township</b>	Yes	Pending

## Mercer County Hazard Mitigation Plan 2011

Jurisdiction	Participated in 2004 Plan	2011 Adoption Date
Lake Township	Yes	Non-Participating
Liberty Township	Yes	Pending
Mercer Borough	Yes	Pending
Mill Creek Township	Yes	Pending
New Lebanon Borough	Yes	Pending
New Vernon Township	Yes	Pending
Otter Creek Township	Yes	Pending
Perry Township	Yes	Pending
Pine Township	Yes	Pending
Pymatuning Township	Yes	Pending
Salem Township	Yes	Pending
Sandy Creek Township	Yes	Pending
Sandy Lake Borough	Yes	Pending
Sandy Lake Township	Yes	Pending
Sharon, City	Yes	Pending
Sharpsville Borough	Yes	Pending
Sheakleyville Borough	Yes	Pending
Shenango Township	Yes	Pending
South Pymatuning Township	Yes	Pending
Springfield Township	Yes	Pending
Stoneboro Borough	Yes	Pending
Sugar Grove Township	Yes	Pending
West Middlesex Township	Yes	Pending
West Salem Township	Yes	Pending
Wheatland Borough	Yes	Pending
Wilmington Township	Yes	Pending
Wolf Creek Township	Yes	Pending
Worth Township	Yes	Pending

All participation documents can be found in Appendix F which documents community presence at the meetings described in Section 3.3 and other involvement from each jurisdiction throughout the planning process. All community resolutions are found in Section 8 of this document.



### ***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 Mercer 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. These planning mechanisms discussed in Section 5.2 enhance the County's mitigation strategy and are therefore incorporated into several of the mitigation actions identified in Section 6.4.

This page intentionally left blank.



## **4. Risk Assessment**

### **4.1. Update Process Summary**

#### **4.1.1. Data Sources and Limitations**

Part 201.6(c)(2)(i) of the CFR requires a risk assessment that includes a description of the type of all hazards that can affect the jurisdiction. A risk assessment provides a factual basis for activities proposed by the County in their mitigation strategy. Hazards that may affect Mercer County are identified and defined in terms of location and geographic extent, magnitude of impact, previous events, and likelihood of future occurrence. This hazard profile structure differs from what was used in the 2004 Mercer County HMP; however all information from the previous plan has been included or updated in the 2011 HMPU, unless otherwise indicated.

The process of hazard identification is to recognize each of the hazards that can occur in Mercer County. The hazard identification process was based on historical data that was gathered from a variety of sources (County archives, historical societies, Internet sites, Pennsylvania Emergency Management Agency (PEMA) publications, and the National Weather Service). Mercer County has prepared as part of their Emergency Operations Plan, a Hazard Vulnerability Analysis (HVA). The HVA and other documents were utilized to show what hazards are or are not a threat to Mercer County and its municipalities. Mercer County has prioritized the hazards that affect their county and has developed mitigation opportunities/strategies to deal with these hazards.

Following hazard identification and profiling, a vulnerability assessment identifies the impact of natural or human-caused hazard events on people, buildings, infrastructure, and the community. The assessment allows Mercer County and its 48 municipalities to focus mitigation efforts on areas most likely to be damaged or most likely to require early response to a hazard event. Depending upon the data available, a vulnerability analysis involves identifying structures, critical facilities, or people that may be impacted by hazard events or describing what those events can do to physical, social, and economic assets. Assessment results consist of an inventory of vulnerable structures or populations.

The local planning team reviewed the risk assessment. Please refer back to Table 3-1 to view which municipality completed the risk assessment survey. The complete surveys from the participating municipalities are included in Appendix F. The local planning team determined that updates were needed and includes the following major elements:

- Incorporation of current hazard data (new data generated over past five years).
- Pandemic outbreak has been added to the risk assessment.
- HAZUS analysis for the flood assessment.
- Future development from the Mercer County Comprehensive Plan has been incorporated into the document.
- Addition of a Risk Factor method of ranking and prioritizing hazards.

Throughout the risk and vulnerability assessment, 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 should attempt to also improve their ability to identify areas of increased vulnerability.

## **4.2. Hazard Identification**

Gathering data on past natural disasters that affected Mercer County will provide a more thorough understanding of what hazards Mercer 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 Mercer County will be able to better understand and prepare for future natural disasters.

### **4.2.1. Table of 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 through 2009 in Mercer County is provided in Table .

**Table 4-1. Presidential Disaster Declarations in Mercer County**

<i>Year</i>	<i>Date</i>	<i>Disaster Types</i>	<i>Disaster Number</i>	<i>Public Assistance</i>	<i>Individual Assistance</i>
<b>1972</b>	06/23	Tropical Storm Agnes	340	Yes	Data Not Available
<b>1981</b>	06/15	Severe Storms, Flooding	641	Yes	Data Not Available
<b>1985</b>	06/03	Severe Storms, High Winds, Tornadoes	737	Yes	Data Not Available
<b>1996</b>	7/26	Flooding	1330	Yes	Data Not Available
<b>2003</b>	08/23	Severe Storms, Tornadoes, and Flooding	1485	Yes	Yes

### **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. A comprehensive list of hazards provided in the Draft Standard Operating Guide was reviewed in the context of Mercer County’s unique risks. To narrow this comprehensive list down to the Mercer County-specific hazards, the Mercer LPT reviewed existing reports, the previous hazard mitigation plan, and reviewed previous incidences. Table and Table illustrate the reviewed and reduced list of natural and human-made hazards for Mercer County.

## Mercer County Hazard Mitigation Plan 2011

Table 4-2. Summary of Natural Hazards

		Hazard	How Identified
Natural Hazards	Priority	Floods	<ul style="list-style-type: none"> <li>• National Weather Service</li> <li>• Review of FIRMs and Q3 Flood Data</li> <li>• Review of Past Occurrences</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Winter Storms	<ul style="list-style-type: none"> <li>• National Weather Service</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Tornadoes, Hurricanes and Windstorms	<ul style="list-style-type: none"> <li>• National Weather Service</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Droughts and Water Supply Deficiencies	<ul style="list-style-type: none"> <li>• National Weather Service</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Subsidence / Landslides	<ul style="list-style-type: none"> <li>• Review of Past Occurrences</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Earthquakes	<ul style="list-style-type: none"> <li>• Review of Past Occurrences</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Pandemic	<ul style="list-style-type: none"> <li>• PEMA</li> </ul>

Table 4-3. Summary of Human-Made Hazards

		Hazard	How Identified
Human-Made Hazards	Priority	Dam Failures	<ul style="list-style-type: none"> <li>• Review of Past Occurrences</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Hazardous Materials	<ul style="list-style-type: none"> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> <li>• Pennsylvania DEP</li> <li>• US EPA</li> </ul>
		Fire Hazards	<ul style="list-style-type: none"> <li>• Review of Past Occurrences</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Transportation Accidents	<ul style="list-style-type: none"> <li>• National Weather Service</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Energy Emergencies	<ul style="list-style-type: none"> <li>• Review of Past Occurrences</li> <li>• Hazard Vulnerability Analysis</li> <li>• PEMA</li> </ul>
		Fixed Nuclear Facility	<ul style="list-style-type: none"> <li>• Review of Past Occurrences</li> <li>• Hazard Vulnerability Analysis</li> <li>• PDEP Bureau of Radiation Protection</li> <li>• US Nuclear Regulatory Commission</li> </ul>
		Terrorism, Nuclear Attack, Civil Disorders	<ul style="list-style-type: none"> <li>• Review of Past Occurrences</li> <li>• Hazard Vulnerability Analysis</li> <li>• PDEP Bureau of Radiation Protection</li> </ul>



### 4.3. Hazard Profile

Hazard profiling investigates the impact, historical occurrence, and probability of future occurrence for hazards that can affect Mercer County, as determined through hazard identification. Hazard profiling exposes the unique characteristics of individual hazards and begins the process of determining which areas within Mercer County are vulnerable to a specific hazard event.

#### Hazards by Municipality

Tables 4-2 and 4-3 list the hazards that have been identified for Mercer County. All (48 of 48) municipalities in Mercer County have risk to the following hazards, however not all have the same vulnerability. For example, subsidence has a low probability for most of the County but a high probability in the Southeast Sections of the County. A Hazard Vulnerability Matrix has been created and can be found in Appendix I of the plan. To identify which critical facilities that could be affected in the event of each hazard please read each hazard profile and refer back to the critical facility map found at page 14. This map will also help identify which critical facilities are located in a particular municipality. For flooding, critical facilities have been listed within the section. Also, enclosed in each hazard section is a description of the worst case scenario. This scenario provides an upper boundary for the level of preparedness that may be necessary. Not all hazards had a readily available worst case scenario. For example, the Beaver Valley Nuclear Power Station has not had an accident, so Three Mile Island Nuclear Facility located in Middletown, Pennsylvania was used.

## A. NATURAL HAZARDS

### 4.3.1. Flooding

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 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).

Flood sources within Mercer County include rivers and streams. 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. 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% 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 which is used to delineate the *Special Flood Hazard Area (SFHA)* and identify *Base Flood Elevations*. The Special Flood Hazard Area serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania and Mercer County local governments.

#### *4.3.1.1. Location and Extent*

Most of Mercer County's municipalities are flood-prone. The only municipalities without identified flood hazard areas are Fredonia and Sharpville Boroughs. Those municipalities are not subject to 1- percent or 0.2- percent annual chance floods; however, they may be susceptible to a larger flood event. Most of the municipalities in Mercer County have flood prone areas. The streams prone to flooding include: Shenango River, Crooked Creek, French Creek. The main flood season is usually December through April. Figure 4-1 illustrates the flood prone areas for the County.

Flood control structures have been built on the Shenango River, protecting the Shenango Valley communities, in the Sandy Creek watersheds protecting the boroughs of Sandy Lake and Stoneboro and on the Saul-Mathay and Little Shenango River Watersheds protecting the Borough of Greenville.

This page intentionally left blank.





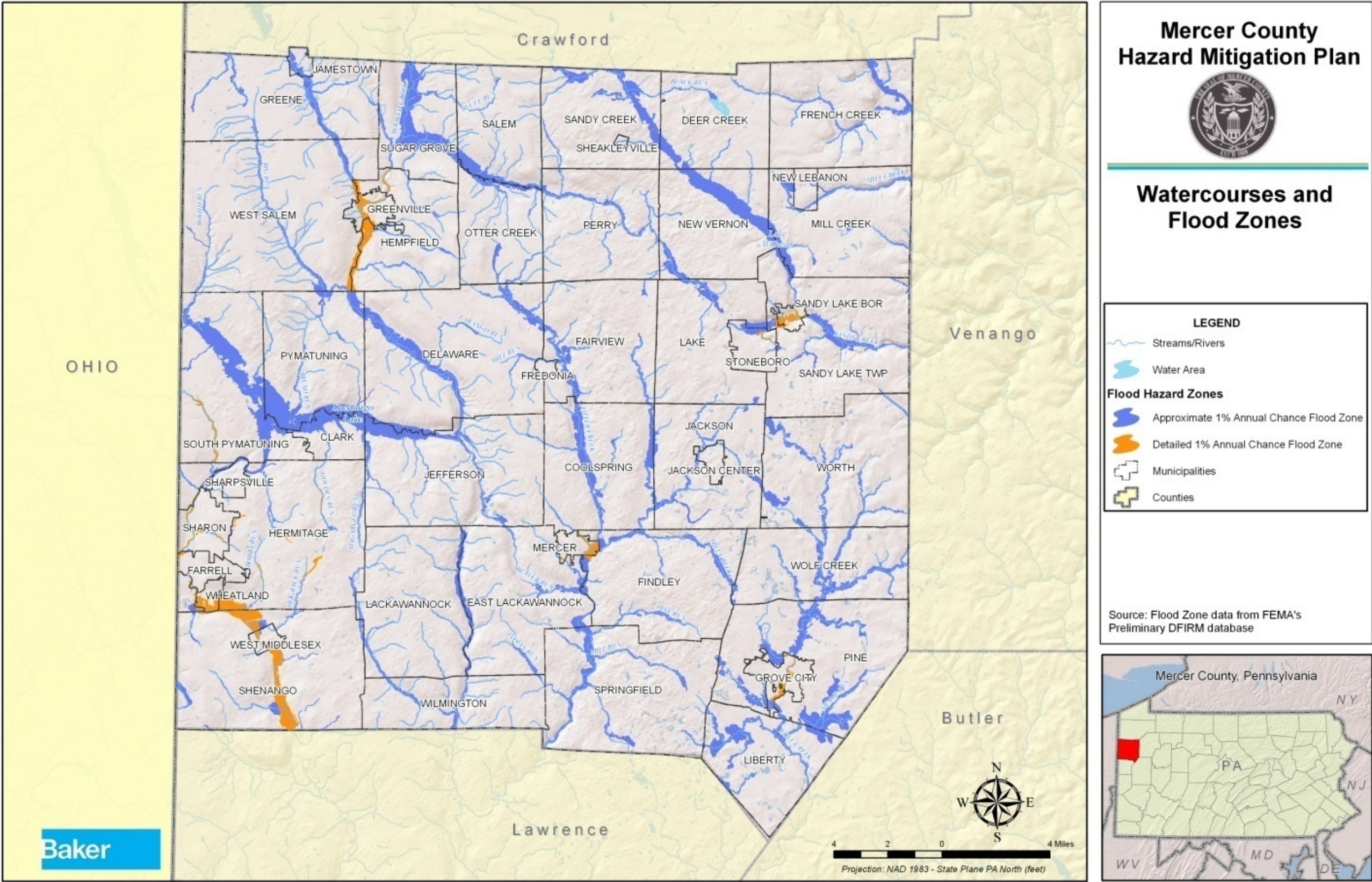


Figure 4-1. Flood Zones and Waterways in Mercer County





#### *4.3.1.2 Range of Magnitude*

Floods are the most prevalent type of natural disaster occurring in the Commonwealth of Pennsylvania. 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 and 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 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.
- **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.

Mercer County is susceptible to the entire range of flooding hazards, from minor to catastrophic. The worse event that Mercer County has endured was on March 23, 1913 the Shenango River crested at 18.6 feet resulting in 1 death. The height of flood waters made buildings collapse; damage to buildings, streets, railroads, industries, bridges and lost wages was set at 2 million dollars.

#### *4.3.1.3 Past Occurrence*

Flooding is an annual event expected by residents in various locations throughout Mercer County. This has caused much inconvenience and hardship. Property damage has been heavy at times.

On March 23, 1913 the Shenango River crested at 18.6 feet resulting in 1 death. The height of flood waters made buildings collapse; damage to buildings, streets, railroads, industries, bridges and lost wages was set at 2 million dollars. This was the largest recorded flood on the Shenango River.

## Mercer County Hazard Mitigation Plan 2011

In addition to the 1913 flood, the Shenango River flooded on a grand scale in:

- 1936 at 13.38 feet
- 1937 at 13.58 feet
- 1942 at 13.46 feet
- 1946 at 14.26 feet
- 1950 at 13.64 feet
- 1952 at 15.45 feet
- 1954 at 16.00 feet

On October 18, 1954 the Shenango River again flooded, cresting at 16 feet. The flood resulted in \$1.5 million in damages to business, industry, homes, farms, streets and highways.

The most recent severe flooding occurred in July and August of 2003 in the County when several storms poured over seven inches of rain in six hours. This resulted in a presidential declaration with Mercer County receiving approximately \$370,000 for Individual Assistance. 36 of 48 municipalities applied for Public Assistance for approximately \$935,340. Hurricane Agnes, in 1972, was less intense in Mercer County than in the eastern portion of Pennsylvania. The flood control dams in Shenango River, Little Shenango River, Sandy Creek and Saul-Mathay Watersheds were instrumental in minimizing the effects of the storm. Table is a summary of Mercer County occurrences of flooding since 1954.

**Table 4-4. History of Flooding in Mercer County 1954 – 2009**

Location or County	Date	Type	Estimated Damage
Countywide	04/02/1970	Flood	N/A
Countywide	06/21/1972	Flood	N/A
Countywide	06/28/1983	Flood	N/A
Susquehanna	3/29/1993	Flood	\$0
Mercer	8/27/1993	Flood	\$0
Countywide	4/12/1994	Flood/Flash Flood	\$5,000
Countywide	8/13/1994	Flash Flood	\$500,000
Grove City	6/10/1995	Flood/Flash Flood	\$10,000
Grove City	7/15/1995	Flood/Flash Flood	\$0
Countywide	7/15/1995	Flood/Flash Flood	\$0
Sharon	7/25/1995	Flood/Flash Flood	\$0
Sharon	8/15/1995	Flood/Flash Flood	\$0
Mercer	1/19/1996	Flash Flood	\$5,000
Mercer	5/11/1996	Flash Flood	\$0
Stoneboro	6/22/1996	Flash Flood	\$5,000

## Mercer County Hazard Mitigation Plan 2011

Location or County	Date	Type	Estimated Damage
Milledgeville	7/19/1996	Flash Flood	\$100,000
Mercer	8/8/1996	Flash Flood	\$0
Sandy Lake	9/28/1996	Flash Flood	\$3,000
Greenville	6/12/1997	Flash Flood	\$0
Greenville	6/25/1997	Flash Flood	\$0
Sharon	6/30/1997	Flash Flood	\$8,000
Sharon	8/16/1997	Flash Flood	\$0
Countywide	4/16/1998	Flash Flood	\$5,000
Greenville	1/24/1999	Flood	\$0
South Portion	7/28/1999	Flash Flood	\$20,000
Countywide	4/8/2000	Flood	\$5,000
Countywide	8/2/2000	Flood	\$25,000
New Lebanon	4/15/2002	Flood	\$5,000
Stoneboro	5/13/2002	Flood	\$0
Sharon	8/16/2002	Flood	\$250,000
Mercer	7/4/2003	Flash Flood	\$10,000
Sharon	7/6/2003	Flash Flood	\$10,000
Greenville	7/6/2003	Flash Flood	\$0
Grove City	7/6/2003	Flash Flood	\$15,000
Greenville	7/21/2003	Flash Flood	\$5,000
Sharon	7/21/2003	Flash Flood	\$0
Sharon	7/21/2003	Flash Flood	\$5,000
Sharpsville	7/21/2003	Flash Flood	\$0
West Middlesex	7/22/2003	Flash Flood	\$0
Sharon	7/22/2003	Flash Flood	\$0
West Middlesex	7/23/2003	Flash Flood	\$0
Sharon	7/24/2003	Flash Flood	\$0
Shenango	7/27/2003	Flash Flood	\$0
Farrell	8/4/2003	Flash Flood	\$0
Greenville	8/5/2003	Flash Flood	\$0
Stoneboro	8/8/2003	Flash Flood	\$0
Mercer	8/9/2003	Flash Flood	\$10,000
Sharon	8/29/2003	Flash Flood	\$0
Greenville	5/22/2004	Flash Flood	\$2,000
PAZ007	5/23/2004	Flood	\$1,000
PAZ007	7/18/2004	Flood	\$0
PAZ007	8/28/2004	Flood	\$0
PAZ007	9/8/2004	Flood	\$200,000

## Mercer County Hazard Mitigation Plan 2011

Location or County	Date	Type	Estimated Damage
PAZ007	9/17/2004	Flood	\$66,000
Sharon	6/10/2005	Flash Flood	\$0
Sharon	6/28/2005	Flash Flood	\$0
Greenville	7/16/2005	Flash Flood	\$30,000
Jamestown	7/27/2006	Flash Flood	\$0
Greenville	7/31/2006	Flash Flood	\$0
Sandy Lake	8/29/2006	Flash Flood	\$0
New Lebanon	8/29/2006	Flash Flood	\$0
Mercer	3/15/2007	Flood	\$0
Greenville	3/27/2007	Flash Flood	\$0
Mercer	3/27/2007	Flash Flood	\$0
Salem	2/11/2009	Flood	\$25,000.00
<b>TOTAL:</b>			<b>\$ 1,325,000</b>

Source: National Oceanic and Atmospheric Administration, 2009. & Hazards & Vulnerability Research Institute Department of Geography University of South Carolina, 2008.

### 4.3.1.4 National Flood Insurance Program

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 Mercer 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 Base Flood Elevation (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 Mercer County participate in the CRS.

The following table lists the Mercer County municipalities participating in the NFIP. Only two municipalities (Deer Creek Township and Sheakleyville Borough) do not participate in the Program.

## Mercer County Hazard Mitigation Plan 2011

Table 4-5. National Flood Insurance Program Communities

Community Name	CID	Initial FIRM Identified	Current Effective Map Date
Clark Borough	422475#	07/30/82	07/30/82(M)
Coolspring Township	421863#	09/17/82	09/17/82(M)
Delaware Township	422283#	07/30/82	07/30/82(M)
East Lackawannock Township	421864#	07/23/82	07/23/82(M)
Fairview Township	421865	01/01/86	01/01/87(L)
Farrell, City	420673#	04/17/78	04/17/78
Findley Township	421866#	02/04/83	02/04/83(M)
Fredonia Borough	422477		(NSFHA)
French Creek Township	421867#	06/01/86	06/01/86(L)
Greene Township	422478	06/30/76	06/30/76(M)
Greenville Borough	420674#	07/16/81	07/16/81
Grove City Borough	420675#	09/30/77	09/30/77
Hempfield Township	421868#	02/15/91	02/15/91
Hermitage, City	421862#	07/09/76	09/30/81
Jackson Center Borough	422479#	06/18/82	06/18/82(M)
Jackson Township	422480#	12/19/1980	12/19/80(M)
Jamestown Borough	422481#	09/10/82	09/10/82(M)
Jefferson Township	421869	06/01/86	06/01/86(L)
Lackawannock Township	422482	06/30/76	06/30/76(M)
Lake Township	422483#	06/18/82	06/18/82(M)
Liberty Township	421870	06/01/86	06/01/86(L)
Mercer Borough	420676#	03/15/77	03/15/77
Mill Creek Township	421871#	12/17/1982	12/17/82(M)
New Lebanon Borough	422484#	09/10/82	09/10/82(M)
New Vernon Township	422485#	10/15/1982	10/15/82(M)
Otter Creek Township	422486	12/1/1986	12/01/86(L)
Perry Township	422487#	12/17/1982	12/17/82(M)
Pine Township	422284#	02/25/83	02/25/83(M)
Pymatuning Township	422285	06/01/89	06/01/89(L)
Salem Township	421872	05/01/86	05/01/86(L)
Sandy Creek Township	421873	05/01/86	10/01/86(L)
Sandy Lake Borough	420677#	03/18/91	03/18/91
Sandy Lake Township	421874#	09/03/82	09/03/82(M)



Community Name	CID	Initial FIRM Identified	Current Effective Map Date
Sharon, City	420678#	10/17/1978	10/17/1978
Sharpsville Borough	420682		(NSFHA)
Shenango Township	421875#	09/04/91	09/04/91
South Pymatuning Township	421876#	03/18/91	03/18/91
Springfield Township	421877#	07/16/82	07/16/82(M)
Stoneboro Borough	420679#	03/18/91	03/18/91
Sugar Grove Township	422489#	09/17/82	09/17/82(M)
West Middlesex Borough	420680#	09/04/91	09/04/91
West Salem Township	422490#	01/21/83	01/21/83(M)
Wheatland Borough	420681#	02/15/78	02/15/78
Wilmington Township	421878#	02/04/83	02/04/83(M)
Wolf Creek Township	422491#	06/25/82	06/25/82(M)
Worth Township	422492#	02/04/83	02/04/83(M)

**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.

**LOCAL FLOODPLAIN REGULATIONS**

The National Flood Insurance Program (NFIP) requirements establish minimum standards for local floodplain management ordinances. In return for local adoption of local floodplain regulations, flood insurance is made available to property owners of participating communities. In addition to national requirements and regulations, the Commonwealth of Pennsylvania has statewide requirements.

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) is the primary agency responsible for providing technical and financial assistance to Pennsylvania communities participating in the NFIP. The Pennsylvania Flood Plain Management Act of 1978 (Act 166) and the Pennsylvania Municipalities Planning Code authorize municipalities to establish, administer and enforce local policies, regulations and /or ordinances that best serve their community and meets both the NFIP requirements and Act 166. Act 166 requires any municipality with flood-prone areas to comply with the NFIP and to establish:

- a special permit process for guiding the development of hospitals, nursing homes, jails/prisons, and mobile home parks in a flood plain;
- more stringent development standards for flood plain storage of substances that have been determined to be dangerous to human life ;
- and construction standards that require the lowest floor of a new or substantially-improved structure is located and certified to be 1.5 feet above the Base Flood Elevation (BFE).

As new Digital Flood Insurance Rate Maps (DFIRMs) are published, the Pennsylvania State NFIP Coordinator 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).

DCED has developed a model or suggested Floodplain Management Ordinance provisions to help PA communities or municipalities comply with these Federal and state requirements. These requirements provide an additional level or margin of safety above the NFIP and state requirements. They can be accessed via <http://www.newpa.com/get-local-gov-support/publications/index.aspx> or call 1-866-Go NEWPA or 1-866-466-3972.

Please note that these provisions do not contain everything necessary or desirable for good floodplain management. For any municipality that may be interested, considerably more could be done concerning the regulation of development in floodprone areas.

#### *4.3.1.5 Future Occurrence*

In Pennsylvania, flooding occurs commonly and can occur during any season of the year. Every two to three years, serious flooding occurs along one or more of Pennsylvania's major rivers or streams, and it is not unusual for this to occur several years in succession. 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.

Smaller floods occur more often than larger (deeper and more widespread) floods. Thus, a "10-year" flood has a greater likelihood of occurring than a "100-year" flood.

The extent of flooding associated with a one percent probability of occurrence – the base flood – is used as a regulatory boundary by a number of federal, state and local agencies. Also referred to as the “special flood hazard area” (see Figure 4-2), this boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities, since many communities like Mercer County have maps available that show the extent of the base flood and the likely depths that will be experienced.

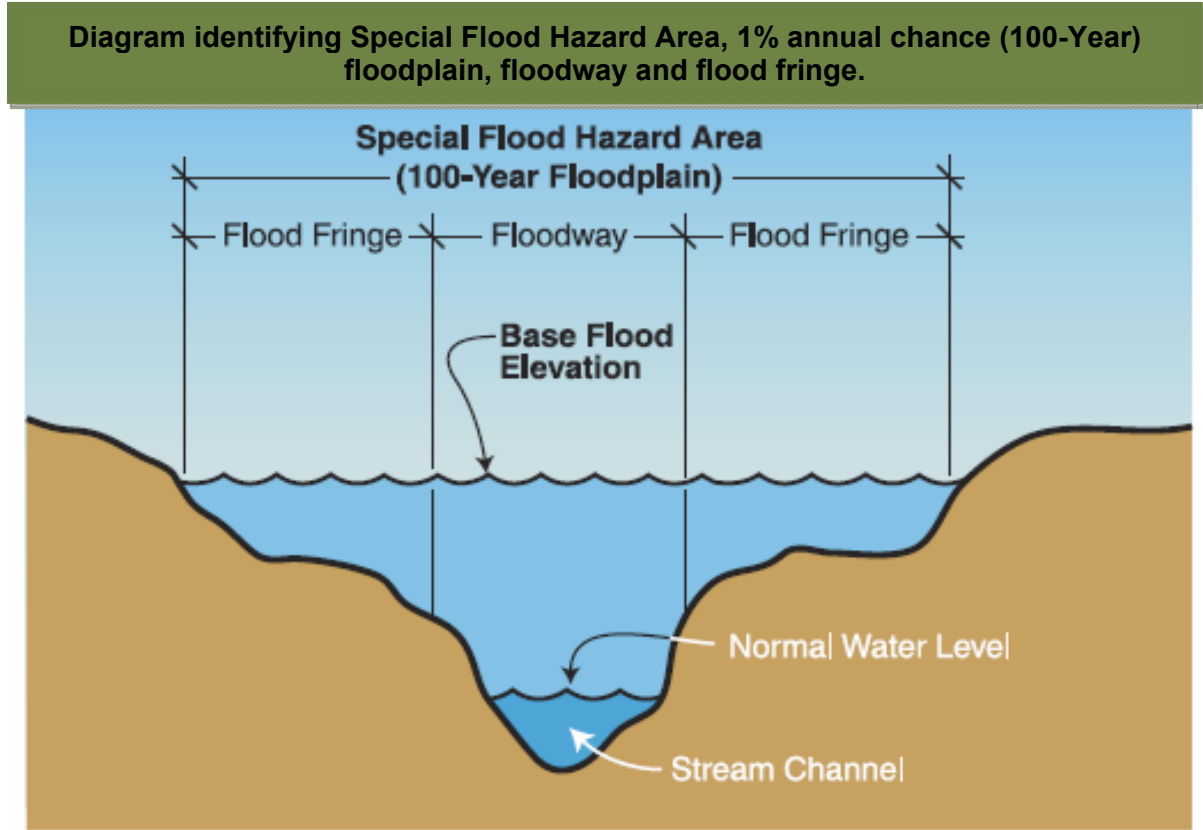


Figure 4-2. Floodplain Terminology

Table 4-5. 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

### 4.3.1.6 Vulnerability Assessment

The flood hazard vulnerability assessment for the County focuses on community assets that are located in 1%-annual-chance floodplain area. 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 is likely to occur in areas located within the floodplain. Please refer to Appendix D, which displays the mapped vulnerability for each jurisdiction within Mercer County.

Based on the 2004 Hazard Vulnerability Assessment (HVA), 60 percent of the population is located within floodplain boundaries. That number has decreased slightly in the years since the HVA as the general population of Mercer County has declined. There are facilities within the floodplain or flood prone areas which house people with special needs. The handicapped, senior citizens, blind and the hearing impaired are more vulnerable to these disasters. Disaster can and does occur with little or no warning, thus making advance evacuation an improbability. Mercer County, being 55 percent rural, has a large agriculture area located within these same boundaries. Too much water or heavy flooding can and does cause severe damage to the farm areas.

There are a total of 16 critical facilities found within the 1% annual chance area. As mentioned previously, what Mercer County considers a “critical facility,” is different from what HAZAUS defines as an “essential facility.” These facilities include fire stations, police station, SARA Title III Facilities, and a school. Table summarizes this information.

Table 4-6. Critical Facilities in 1% annual chance area

Facility	Municipality
Sandy Lake Volunteer Fire Department (at 3295 N Main St., Sandy Lake, PA 16145)	SANDY LAKE, BOROUGH
Sandy Lake Borough Police Dept (at 3271 S Main St., Sandy Lake, PA 16145)	SANDY LAKE, BOROUGH
United Community Hospital (at 631 North Broad Street Ext, Grove City, PA)	PINE, TOWNSHIP OF
LAKE LATONKA	COOLSPRING, TOWNSHIP
STONEBORO (PA-474)	STONEBORO, BOROUGH
PINE RUN (PA-491)	FAIRVIEW, TOWNSHIP O
Bartman Elementary School	HERMITAGE, CITY OF
Currier School	SANDY LAKE, TOWNSHIP

## Mercer County Hazard Mitigation Plan 2011

CHAUTAUQUA FIBERGLASS & PLASTIC at 80 CANAL ST., SHARPSVILLE, PA	SHARPSVILLE
HERMITAGE MUNICIPAL AUTHORITY STP at ROUTE 60 W, HERMITAGE, PA	HERMITAGE
MERCER FORGE at E. MARKET ST. EXT., MERCER, PA	MERCER
RYAN MILK CO at 53 CANAL ST., GREENVILLE, PA	GREENVILLE
SPANG POWER ELECTRONICS at 5241 LAKE ST, SANDY LAKE, PA	SANDY LAKE BOR
THOMAS & BETTS REZNOR MFG at 150 MCKINLEY AVE., MERCER, PA	MERCER
TRINITY IND PLT 102S RR CARS MFG at 100 YORK ST., GREENVILLE, PA	GREENVILLE
WHEATLAND TUBE COUNCIL AVENUE PLT at 1 COUNCIL AVENUE, WHEATLAND, PA	WHEATLAND

Source: Mercer County GIS Data, 2009.

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. As of September 14, 2009, there were 6 repetitive loss buildings in Mercer County. Unfortunately, the data did not include detailed information regarding the type of buildings that are repetitive losses. Table contains the number of repetitive loss buildings in each municipality. While updating the Hazard Mitigation plan concrete definitions for type were unable to be obtained. For now, we assume that “non-residential” is anything other than residential including, but not limited to commercial. Also please assume that “ASMD Condo” refers to a situation where an individual owns the structure, or portion of the structure, but not any of the land.

**Table 4-7. Repetitive Flood Loss Properties**

Summary of the number and type of Repetitive Loss properties by municipality (FEMA, 2010).				
MUNICIPALITY	TYPE			SUM OF REPETITIVE LOSS PROPERTIES
	ASMD CONDO	NON-RESIDENTIAL	SINGLE FAMILY	
FRENCH CREEK, TOWNSHIP OF			1	1
HERMITAGE, MUNICIPALITY OF		1		1
MILL CREEK, TOWNSHIP OF			1	1
SHARON, CITY OF	1	1		2
STONEBORO, BOROUGH OF			1	1
<b>TOTAL</b>	1	2	3	6

An SRL property is defined as a **residential property** that is covered under an NFIP flood insurance policy and:

- That has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both scenarios above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.

**Table 4-8. Severe Repetitive Flood Loss Properties**

Summary of the number and type of Severe Repetitive Loss properties by municipality; this property is identified as “Single Family” (FEMA, 2010).	
MUNICIPALITY	NUMBER OF SEVERE REPETITIVE LOSS PROPERTIES
STONEBORO, BOROUGH OF	1
<b>TOTAL</b>	<b>1</b>

**4.3.2. Winter Storms**

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).

Severe winter weather most frequently occurs during the winter months (November-March) and can be caused by lake-effect conditions, warm air masses associated with the Gulf Stream or other areas. The impact of a winter storms in Mercer County are not as devastating as some other hazards can be. Winter storms are a frequent event in Mercer County and are mitigated through the plowing, salting, and spraying efforts of PennDOT and local municipalities. During the rare occurrence of a major event, 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.

*4.3.2.1 Location and Extent*

Mercer County is subject to severe winter weather including heavy snowfall, ice, high winds, and extremely cold temperatures. By reviewing records from the National Weather Service, information from the Pennsylvania Emergency Agency (PEMA), the Federal Emergency Management Agency (FEMA), and The Hazards & Vulnerability Research Institute Department of Geography University of South Carolina and the Mercer County Department of Emergency Services, a profile, history, and probability of severe winter weather within Mercer County was compiled.

Average snowfalls range from 40 inches in southwestern parts of the county to more than 50 inches in the northern and eastern parts. The total varies widely from year to year. Less than ten inches have been recorded in some years while more than 90 inches have been recorded in others. Expected total snowfall ranges from 30 - 60 inches. One-day totals seldom exceed six inches. However, 16 inches have been recorded, and 28 inches in a four-day period have also been known to occur. Every municipality in Mercer County is subject to severe winter storms.

*4.3.2.2 Range of Magnitude*

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.

Mercer County and its 48 municipalities are susceptible to the entire range of severe weather, from heavy snow storm to severe blizzard.

One of the most major historical severe winter events was in the winter of 1993 - 1994. In that event, the state 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.

Mercer County was not as severely affected as other parts of the Commonwealth. However, what the other part of the Commonwealth experienced can serve as a worst case scenario that Mercer County has yet to experience.

**Worst case scenario example that hit other parts of the Commonwealth in the winter of 1993-1994:** The first of these devastating winter storms occurred in early January with record snowfall depths in excess of 33 inches in the southwest and south-central portions of the Commonwealth, strong winds and sleet/freezing rains. Numerous storm-related power outages were reported and as many as 600,000 residents were without electricity, in some cases for several days at a time. A ravaging ice storm followed, affecting the southeastern portion of the Commonwealth, which closed major arterial roads and downed trees and power lines. Utility crews from a five-state area were called to assist in power restoration repairs. Officials from PP&L stated that this was the worst winter storm in the history of the company; related damage-repair costs exceeded \$5,000,000.

Serious power supply shortages continued through mid-January because of record cold temperatures at many places, causing sporadic power generation outages across the



Commonwealth. The entire Pennsylvania-New Jersey-Maryland grid and its partners in the District of Columbia, New York and Virginia experienced 15-30 minute rolling blackouts, threatening the lives of people and the safety of the facilities in which they resided. Power and fuel shortages affecting Pennsylvania and the East Coast power grid system required the Governor to recommend power conservation measures be taken by all commercial, residential and industrial power consumers.

The record cold conditions resulted in numerous water-main breaks and interruptions of service to thousands of municipal and city water customers throughout the Commonwealth. Additionally, the extreme cold in conjunction with accumulations of frozen precipitation resulted in acute shortages of road salt. As a result, trucks were dispatched to haul salt from New York to expedite deliveries to Pennsylvania Department of Transportation storage sites.

### 4.3.2.3 *Past Occurrence*

Winter storms occur on the average of five times a year in Mercer County. Mercer County experienced major winter storms in 1950, 1977, 1978, 1982, 1983, 1993, 1994, 1996 and 1998. The severe winter of 1977, with its extreme temperatures, heavy snow and strong winds coupled with fuel shortages, caused extreme hardship in Mercer County. Motorists were stranded on I-80 and some secondary roads; household fuel oil suppliers and food stocks ran out and re-supply was impaired by drifting snow. Heavy snow and drifting closed many roads, some for more than three days. Municipal and state road crews could not keep up with drifting snow and required supplemental equipment and manpower from the private sector.

In most recent years, the mild winters in 2000 and 2001 led to spring-like thunderstorms, during the winter months. These thunderstorms and accompanying wind related damage and power outages have been followed into the county by cold fronts and winter storms. Thus temperature drops of 50 degrees Fahrenheit in a few short hours have been observed.

One of the most major historical severe winter events was in the winter of 1993 - 1994. In that event, the state 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 following table describes the full history of severe winter events in Mercer County. It should be noted that the data obtained from The Hazards & Vulnerability Research Institute Department of Geography University of South Carolina, aggregates their data for death, injuries, and estimated damage. For example if 40 injuries were to occur and 55 counties were affected, they would take the average, which would be 0.8 and apply that as the number of Injuries. As result, where numbers were indicated, a N/A has been provided.

**Table 4-9. History of Severe Winter Storms in Mercer County**

## Mercer County Hazard Mitigation Plan 2011

Date	Type	Deaths	Injuries	Estimated Damage
2/18/1960	Heavy Snow	N/A	N/A	N/A
3/03/1960	Heavy Snow	N/A	N/A	N/A
12/1/1960	Heavy Snow	0	0	N/A
12/11/1960	Heavy Snow	N/A	N/A	N/A
2/3/1961	Heavy Snow	N/A	N/A	N/A
03/06/1962	Heavy Snow	0	0	N/A
12/06/1962	Heavy Snow	0	0	N/A
12/10/1962	Heavy Snow	0	0	N/A
12/29/1962	Heavy Snow	0	0	N/A
1/12/1964	Heavy Snow	0	0	N/A
3/10/194	Ice Storm	0	0	N/A
1/23/1965	Ice Storm	0	0	N/A
1/30/1966	Heavy Snow/Blizzard	N/A	N/A	N/A
11/12/1968	Heavy Snow	0	N/A	N/A
12/05/1968	Heavy Snow	N/A	0	N/A
12/25/1969	Heavy Snow	0	0	N/A
1/26/1971	Heavy Snow	N/A	0	N/A
1/27/1971	Heavy Snow	0	0	N/A
2/13/1971	Ice Storm	0	0	N/A
2/17/1971	Ice Storm	0	0	N/A
4/6/1971	Heavy Snow	0	0	N/A
11/25/1971	Heavy Snow	0	0	N/A
2/18/1972	Heavy Snow	0	0	N/A
11/30/1974	Heavy Snow	0	N/A	N/A
1/28/1977	Heavy Snow/Blizzard	N/A	0	N/A
1/20/1978	Heavy Snow	0	0	N/A
1/26/1978	Heavy Snow	0	0	N/A
1/7/1979	Ice Storm	N/A	N/A	N/A
12/10/1992	Heavy Snow	0	0	N/A
2/12/1993	Heavy Snow	0	0	N/A
2/16/1993	Heavy Snow	0	0	\$0
3/13/1993	Heavy Snow	0	0	\$50,000,000

## Mercer County Hazard Mitigation Plan 2011

Date	Type	Deaths	Injuries	Estimated Damage
10/31/1993	Heavy Snow	0	0	\$5,000
1/4/1994	Heavy Snow	0	185	\$5,000,000
1/17/1994	Heavy Snow	0	0	\$500,000
3/2/1994	Heavy Snow/Blizzard/Avalanche	0	1	\$5,000,000
11/23/1994	Heavy Snow	0	0	\$0
1/4/1995	Heavy Snow	0	0	\$0
1/7/1995	Ice	0	0	\$0
2/15/1995	Ice	0	0	\$0
12/19/1995	Heavy Snow	0	0	\$0
1/2/1996	Heavy Snow	0	0	\$0
1/6/1996	Heavy Snow	0	0	\$0
11/13/1997	Ice Storm	0	0	\$41,000
2/4/1998	Ice Storm	0	0	\$0
1/2/1999	Winter Storm	2	1	\$250,000
1/8/1999	Winter Storm	0	0	\$0
1/13/1999	Winter Storm	0	0	\$0
3/6/1999	Heavy Snow	0	0	\$0
2/17/2000	Winter Storm	0	0	\$0
11/22/2000	Heavy Snow	0	0	\$0
12/13/2000	Winter Storm	0	0	\$0
3/25/2002	Winter Storm	0	0	\$0
12/25/2002	Heavy Snow	0	0	\$0
1/11/2003	Heavy Snow	0	0	\$0
12/5/2003	Heavy Snow	0	0	\$0
1/14/2004	Heavy Snow	0	0	\$0
2/3/2004	Ice Storm	0	0	\$10,000
2/5/2004	Ice Storm	0	0	\$0
3/16/2004	Heavy Snow	0	0	\$0
12/19/2004	Heavy Snow	0	100	\$650,000
1/5/2005	Ice Storm	0	0	\$120,000
1/11/2005	Ice Storm	0	0	\$25,000
1/22/2005	Heavy Snow	0	0	\$0

## Mercer County Hazard Mitigation Plan 2011

Date	Type	Deaths	Injuries	Estimated Damage
3/1/2005	Heavy Snow	0	0	\$0
4/3/2005	Heavy Snow	0	0	\$10,000
12/15/2005	Ice Storm	0	0	\$0
2/13/2007	Heavy Snow	0	0	\$0
2/13/2007	Ice Storm	0	0	\$0
12/13/2007	Ice Storm	0	0	\$0
1/1/2008	Heavy Snow	0	0	\$0
2/1/2008	Winter Storm	0	0	\$10,000
2/12/2008	Winter Storm	0	0	\$0
3/7/2008	Winter Storm	0	0	\$0
10/28/2008	Winter Weather	0	0	\$0
11/20/2008	Heavy Snow	0	0	\$0
1/6/2009	Winter Storm	0	0	\$0
1/9/2009	Heavy Snow	0	0	\$0
1/17/2009	Heavy Snow	0	0	\$0
1/27/2009	Ice Storm	0	0	\$0
1/27/2009	Winter Storm	0	0	\$0
<b>TOTALS</b>		<b>2</b>	<b>287</b>	<b>\$61,621,000</b>

*Source: National Oceanic and Atmospheric Administration, 2009. & Hazards & Vulnerability Research Institute Department of Geography University of South Carolina, 2008.*

#### 4.3.2.4 Future Occurrence

Winter storms occur on the average of 5 times a year in Pennsylvania. Mercer County has regularly been subjected to severe winter storms. The severity and frequency of major winter storms is expected to remain fairly constant. However, due to increased dependence on various mode of transportation and use of public utilities for light, heat and power, the disruption by these storms is more significant today than in the past. Furthermore, the County population has become diffused into the rural area where necessary services become much more difficult for municipal authorities to provide during winter storm events.

#### 4.3.2.5 Vulnerability Assessment

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.

Similar to the vulnerability assessment discussion for tornadoes, vulnerability to the effects of winter storms on buildings is dependent on the age of the building type, construction material used, and condition of the structure. Mercer County lacks a comprehensive database of this information; therefore a full analysis is not possible. This information and data on construction type and building codes enforced at time of construction would allow a more thorough assessment of the vulnerability of structures to winter storm impacts such as severe wind and heavy snow loading. Based on the information available, all 48 of 48 communities in Mercer County are essentially equally vulnerable to the direct impacts of winter storms.

### **4.3.3. Tornadoes, Hurricanes, and Windstorms**

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 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). Summer thunderstorms involve lightning, strong winds and heavy rains that can result in wildfires or localized wind damage and flash flooding.

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 (FEMA, 1997).

#### **4.3.3.1 *Location and Extent***

Tornadoes and windstorms pose a potential threat to Mercer 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.



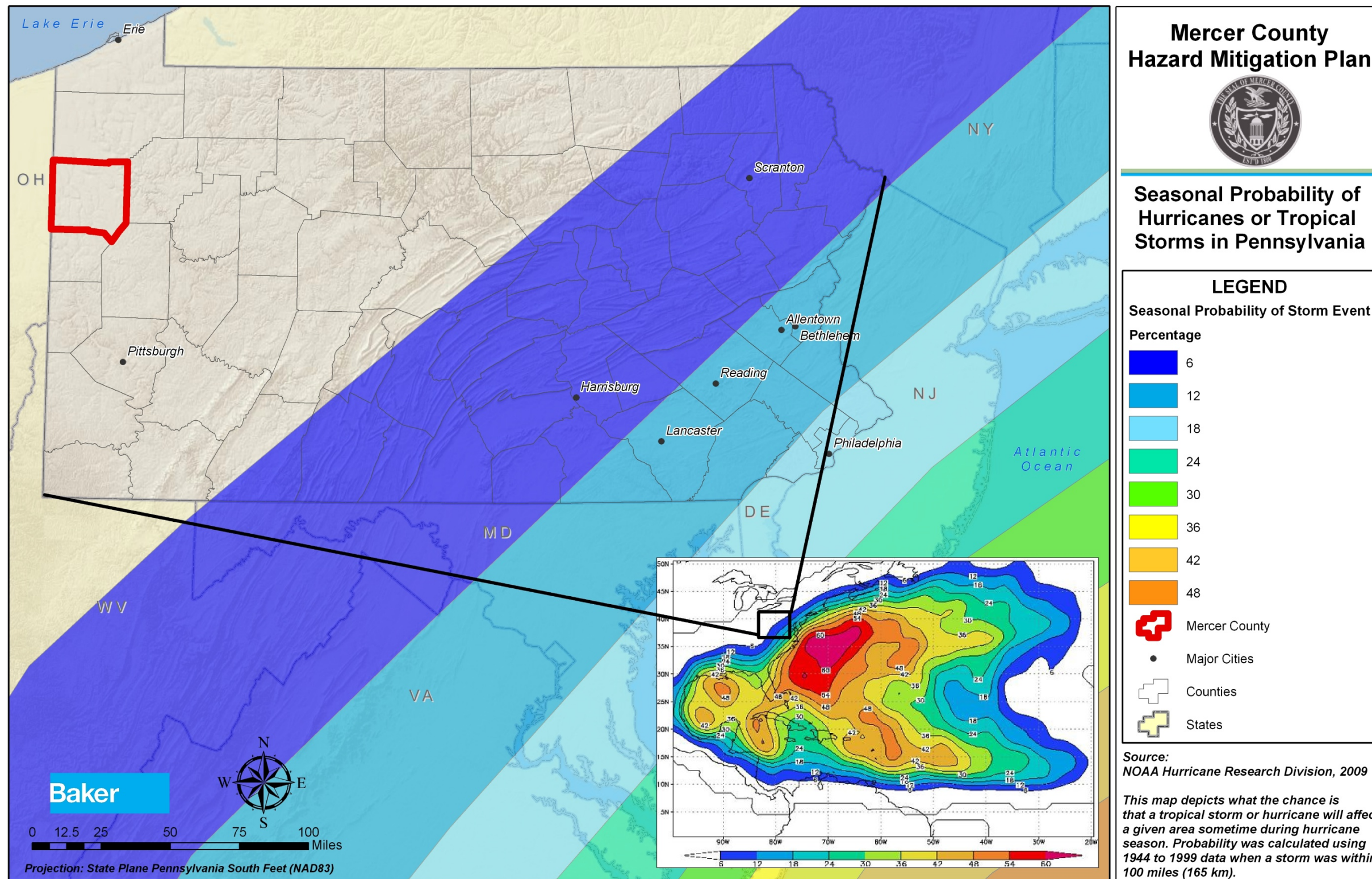


Figure 4-3. Mercer County: Seasonal Probabilities of Hurricanes and Tropical Storms



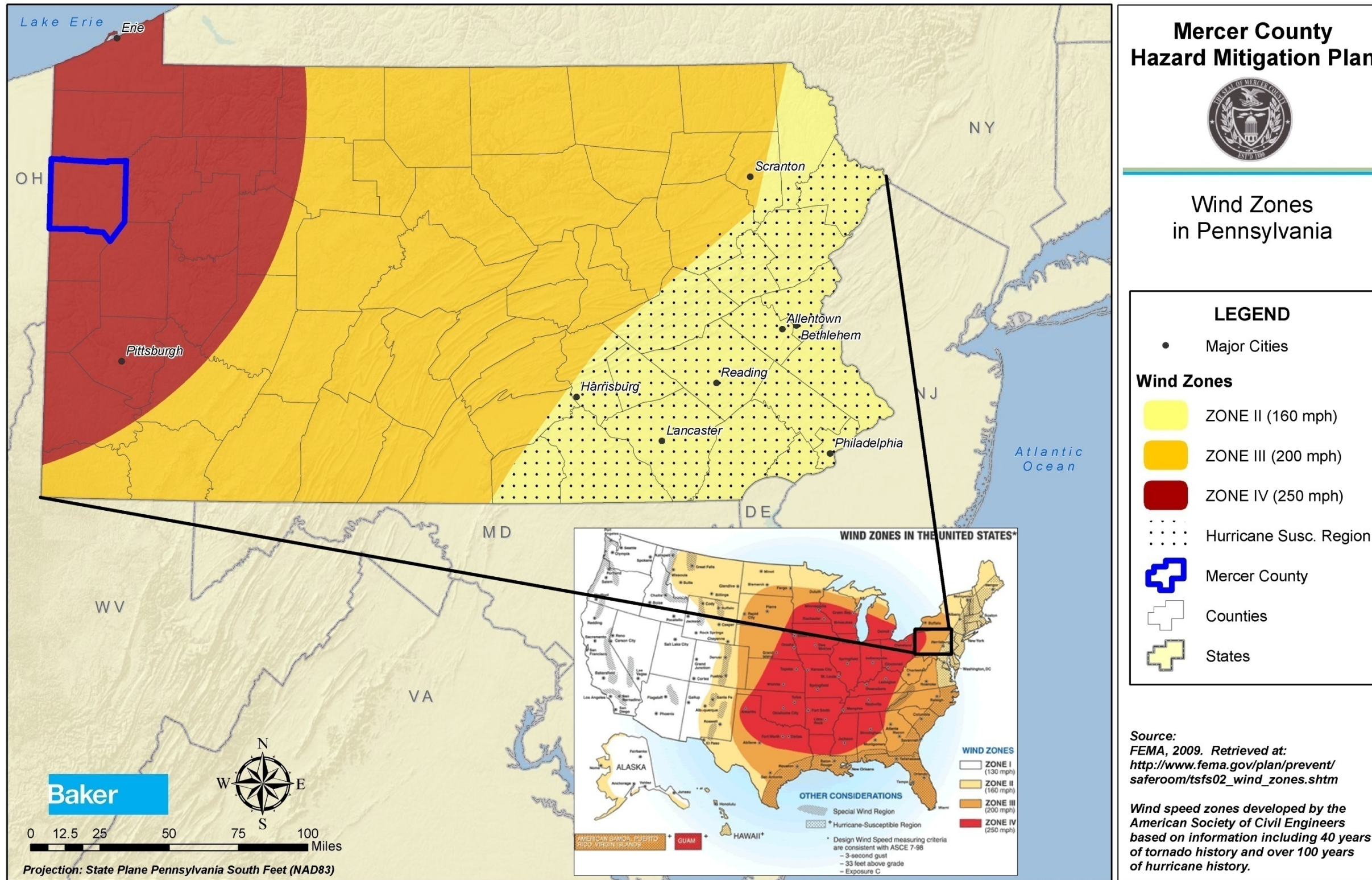


Figure 4-4. Mercer County: Wind Zone

**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 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. Table 4–10 provides a summary of the EF-Scale. The worst event(s) regarding tornadoes occurred on May 31, 1985 multiple tornadoes swept through Mercer County and the surrounding counties. These tornadoes resulted in 65 dead, 700 injured, 1,000 homes destroyed, and hundreds of millions of dollars in property damage. In Mercer County, the tornadoes struck the Borough of Wheatland, the City of Hermitage, and Lackawannock Township.

**Table 4-10. Tornado Enhanced Fujita Scale and Associated Damage**

EF-SCALE NUMBER	WIND SPEED (mph)	TYPE OF DAMAGE POSSIBLE
EF0	65–85	<b>Minor damage:</b> Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.
EF1	86-110	<b>Moderate damage:</b> Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111–135	<b>Considerable damage:</b> Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136–165	<b>Severe damage:</b> Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166–200	<b>Devastating damage:</b> Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	<b>Extreme damage:</b> Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (300 ft); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation.

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

**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 less than 1 to 15 per 3,700 square mile area across Pennsylvania (FEMA, 2009). Mercer County experienced 18 tornadoes between the period of



1950 and 2008. On May 31, 1985 multiple tornadoes swept through Mercer County and the surrounding counties. These tornadoes resulted in 65 dead, 700 injured, 1,000 homes destroyed, and hundreds of millions of dollars in property damage. In Mercer County, the tornadoes struck the Borough of Wheatland, the City of Hermitage, and Lackawannock Township. There were three tornadoes, an F0, F1, and F2, that affected Clark Borough, South Pymatuning Township, and Delaware Township that occurred in November of 2002. Table 4-11 summarizes these past occurrences.

**Table 4-11. Mercer County Tornado History**

Location or County	Date	Magnitude	Deaths	Injuries	Estimated Damage
MERCER	6/1/1954	F2	0	3	\$3,000
MERCER	9/30/1954	F2	0	0	\$25,000
MERCER	6/15/1964	F2	0	4	\$250,000
MERCER	5/2/1972	F3	0	0	\$25,000
MERCER	8/8/1977	F	0	1	\$0
MERCER	9/24/1977	F	0	0	\$250,000
MERCER	5/13/1978	F	0	0	\$0
MERCER	8/2/1980	F1	0	1	\$25,000
MERCER	5/31/1985	F4	0	5	\$25,000,000
MERCER	5/31/1985	F5	0	0	\$250,000
MERCER	5/31/1985	F5	8	60	\$250,000
MERCER	10/3/1986	F2	0	0	\$2,500,000
MERCER	9/21/1992	F0	0	0	\$25,000
Sharon	4/28/2002	F0	0	0	\$150,000
Mercer	4/28/2002	F1	0	0	\$750,000
Sharpville	11/10/2002	F2	1	19	\$1,000,000
New Lebanon	7/21/2003	F0	0	0	\$15,000
Mercer	5/1/2007	F0	0	0	\$20,000
<b>TOTALS:</b>			<b>9</b>	<b>93</b>	<b>\$30,538,000</b>

*Source: National Oceanic and Atmospheric Administration, 2009.*

Mercer County has experienced numerous severe wind damage storms. Power lines have been knocked down from high winds and fallen trees and limbs, resulting with power loss for hours in many areas. The strongest windstorms were in 1984, 1989, 1995, 1998, and the winter of 2000, which caused extended power outages, which lasted for 4 days in some areas. Most frequent result is downed trees and power lines. There were 215 occurrences of thunderstorms recorded by NOAA for a total damage estimate of \$5,728,000. These thunderstorm events uprooted trees, damaged roofs and siding and left hundreds of people without power. Some of the most powerful storms occurred in May 1995, October 1996, May 1997, August 1997, and December 2000.

## 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. While the chance of being hit by a tornado is small, the damage that results when the tornado arrives is devastating. An F4 tornado, with a 0.019 percent annual probability of occurring, can carry wind velocities of 200 mph, resulting in a force of more than 100 pounds per square foot of surface area. This is a wind load that exceeds the design limits of most buildings.

Based on tornado activity information for Pennsylvania between 1950 and 1998, Mercer County lies within an area that has experienced 6 to 15 F3, F4, or F5 tornadoes per 3,700 square miles (see Figure 4.3.8-3). This equals a 12 percent to 31 percent chance that the planning area will be affected by a Category F3, F4, or F5 tornado each year.

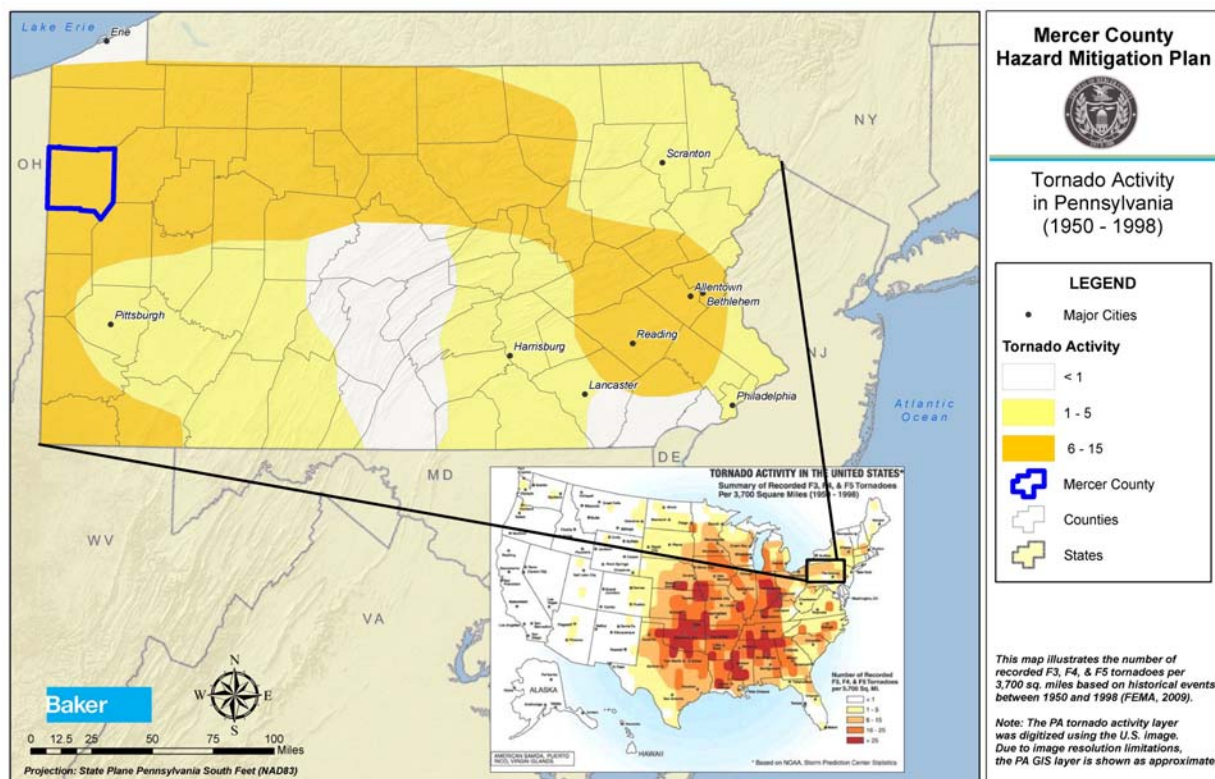


Figure 4-5. Tornado Activity in Mercer County

### 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 chance is small, the damage that results when the tornado arrives is devastating. A tornado with an “F4” designation can carry a wind velocity of 200 mph resulting in a force of more than 100 pounds per square foot of surface area, a “wind load” that exceeds the design limits of most buildings.

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. **Droughts and Water Supply Deficiencies**

The World Meteorological Organization categorizes and defines six types of drought; meteorological, climatologically, atmospheric, agricultural, hydrologic, and water management. It is the latter two types that are of greatest concern to emergency management. A hydrologic drought is defined in terms of reduction of stream flows, reduction in lake or reservoir storage, and lowering of groundwater levels. A water management drought is characterized as water deficiencies, which exists because of water management practices or facilities to bridge normal or abnormal dry periods and equalize water supply throughout the year. Pennsylvania has faced, and will continue to face in the future, both types.

A hydrologic drought results when there is a shift in normal weather patterns over an area causing the amount of precipitation to fall significantly below the long-term average. A water management drought, as the description above indicated, results not necessarily from a reduction in supply but rather a disparity in supply versus demands. This is generally caused by poor water management practices and/or community planning. The main type of drought that affects Mercer County is a hydrological drought.

#### 4.3.4.1 *Location and Extent*

The entirety of Mercer County can be subject to droughts, but no particular areas are prone to water shortages.





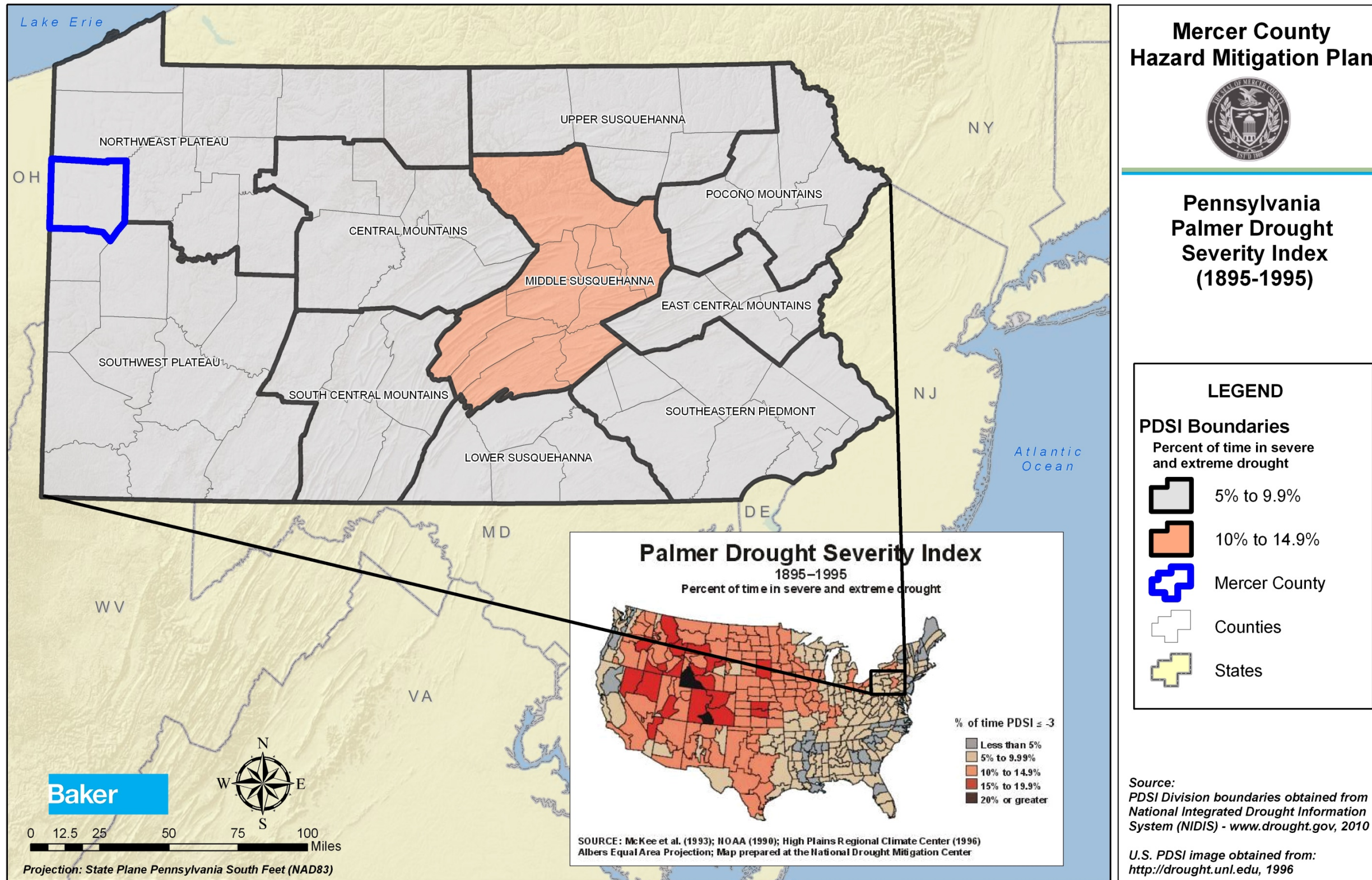


Figure 4-6. Mercer County: Drought Severity



**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;
- Groundwater elevations in a number of counties (comparing to past month, past year and historic record); and
- The Palmer Drought Index, a measure of soil moisture computed by the National Weather Service.

Soil moisture information is provided by the National Oceanic and Atmospheric Administration in the form of the Palmer Drought Severity Index (PDSI). The PDSI is a soil moisture algorithm calibrated for relatively homogeneous regions which measures dryness based on recent precipitation and temperature. Based on a number of meteorological and hydrological factors, it is compiled weekly by the Climate Prediction Center of the National Weather Service. See Table below for categories and their associated PSDI values.

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

**Table 4-12. PSDI Values and Associated Categories**

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 are 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].

Mercer County has a drought website:

<http://www.mcc.co.mercer.pa.us/DPS/Drought%20Info.htm>

This website provides information on current conditions for the county as well as providing information on drinking water wells, drought emergency frequently asked questions, drought emergency restrictions, and nonessential water use restrictions.

The most severe drought incident to affect Mercer County is discussed in the Vulnerability Assessment.

### 4.3.4.3 *Past Occurrence*

Mercer County has experienced drought/water supply deficiencies in the past. A total of 15 drought events have occurred in the last five years. The latest water deficiency to occur was in August of 1991. Two major drought events were recorded in 1999 and are discussed in more detail within the Vulnerability Assessment below.

### 4.3.4.4 *Future Occurrence*

Mercer 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. In addition, there are some areas of the County that may have water supply problems as predicted by the State Water Plan.

### 4.3.4.5 *Vulnerability Assessment*

The most significant losses resulting from drought events are typically found in the agriculture sector. The 1999 Gubernatorial Proclamation was issued in part due to significant crop damage. 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 (NCDC, 2009). The other event occurred in the summer of 1983. It caused over \$157 million in damages to the state corn crop and over \$39 million to forage crop.

Much of Mercer County is currently in agricultural production and classified as Agricultural Security Areas. A severe drought event could severely impair the local economy with prolonged drought negatively impacting the livelihood of residents within agricultural communities.



### 4.3.5. Subsidence/Landslides

Subsidence may be natural or related to mining activities. Areas under-laid by coal or other minerals which use deep mining techniques may become susceptible to subsidence. Poor engineering practices at the time of withdrawal or progressive degradation in geological stability contributes to subsidence. Natural subsidence results from what are considered normal geological processes particular to certain landform. In Pennsylvania, water movement through carbonate terrain, i.e., limestone and dolomite, may result in topographic features such as swales, sinkhole and forms of subsidence.

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.

#### 4.3.5.1 *Location and Extent*

Mercer County certainly is no different than the majority of Pennsylvania, as at one time in history, it was a large coal mining area. Today, we think of coal mining in the eastern part of the county and not so much to the remaining section. Strip mining is the method of coal removal versus the tunnel method of the past.

Although landslides may occur anywhere in Pennsylvania, only 15 to 18 percent of the Commonwealth's land area is naturally prone to landslides. 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). The following Landslide Susceptibility Map (Figure 4) depicts a general assessment of landslide risk across the Commonwealth. Despite the general indication of a high risk shown in the following map, there have been no recorded incidents of landslides. Landslides incidences in Mercer County should remain low.

#### 4.3.5.2 *Range of Magnitude*

Areas of the state that have underlying mines are subject to subsidence and constitute a potential threat to people living in those areas. Isolated incidents throughout the "coal regions," within in the Commonwealth over the years have been houses, garages, and trees swallowed up by subsidence holes. Lengths of local streets and highways, and countless building foundations have been damaged. Most recent occurrences within Mercer County, noted in 2002 are two occurrences of subsidence along the Barkeyville Road in Pine Twp. causing repeated damage to sections of public roadways.

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.

This page intentionally left blank.





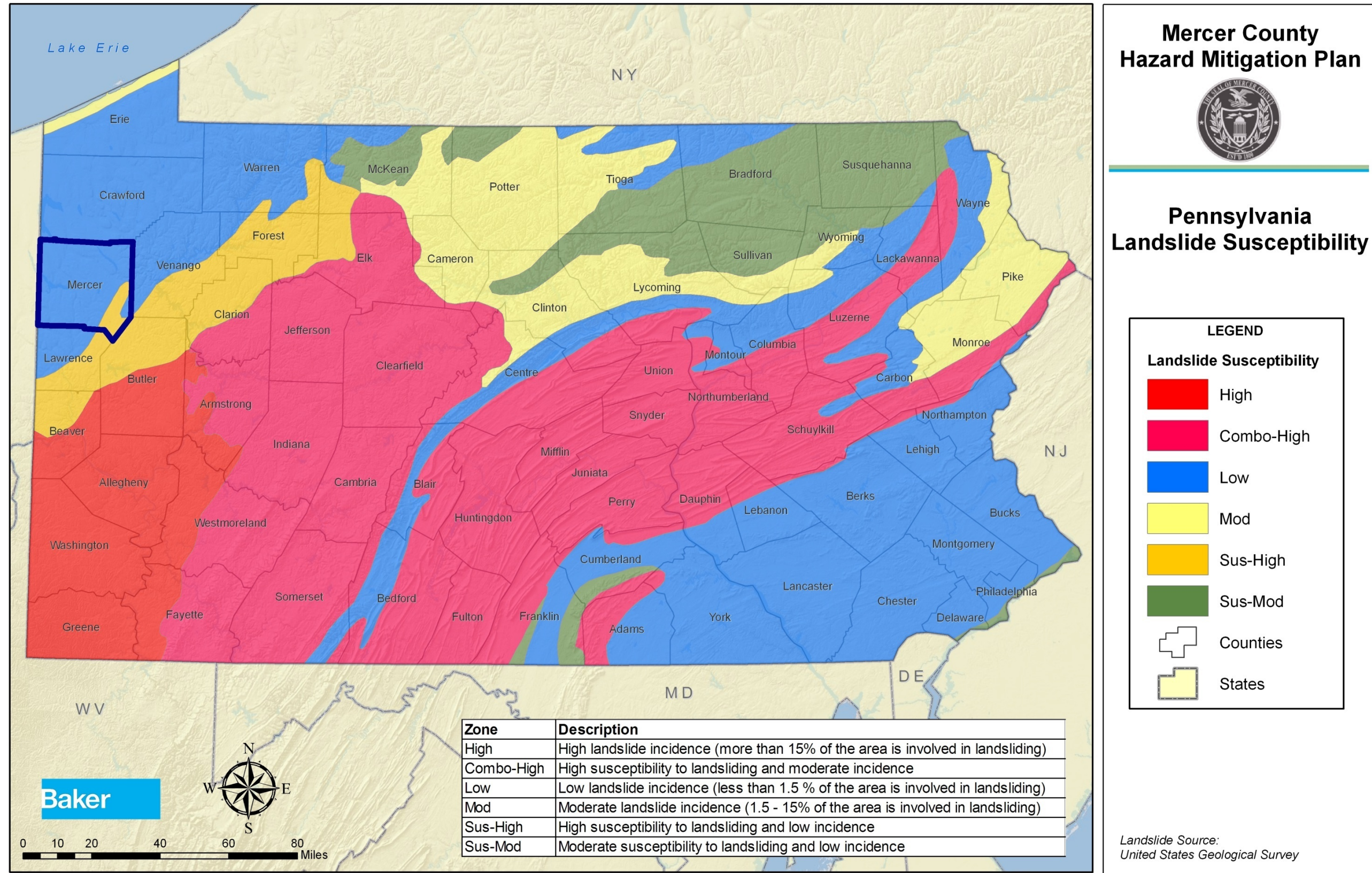


Figure 4-7. Statewide Landslide Susceptibility





Landslides are not a serious risk in the majority of Mercer County but are more likely to occur in the hill and valley areas of Mercer County. Limited areas of steep slopes associated with the banks of major watercourses in the County could collapse under heavy rainfall to produce a localized landslide. The potential of damage to lives or property from this type of natural hazard is low.

### *4.3.5.3 Past Occurrence*

Within the past five to ten years, sinkholes have been appearing notably within the Shenango Valley area and as recently as 2003, in the Findley Township area. These have been contributed to old coal mining methods that left a network of tunnels over which schools, homes, businesses and streets have been built. Due to the passage of time, expansion and development of cities and boroughs, these mines were thought to be non-existent and what records that were, have been lost or forgotten.

There have been no documented reports of any major landslides in Mercer County. A worst case scenario although rare, but possible is of a landslide that took place in 1951 in Allegheny County. According to the Pittsburgh Geological Society, it was a large landslide about 500 feet wide and several hundred feet wide as a result a seemingly 8 foot cut was made in soils at the base of the slope. This resulted in the total destruction of six houses and damage to several others, as well as dislocation of a highway, a street car line, and overhead and underground utilities. This example of a landslide occurring in another county was used to show the severity of landslide.

As stated previously there were in 2002, two occurrences of subsidence along the Barkeyville Road in Pine Twp. causing repeated damage to sections of public roadways. There have been no documented reports found to describe the amount of damage and the cost of repairs. A mitigation action will be created with Subsidence/Landslides to collect data on occurrence, damage, and cost associated with repairs.

### *4.3.5.4 Future Occurrence*

As time passes, more sinkholes due to subsidence can be expected to appear throughout Mercer County, and they are likely to be more frequent and more severe. This is due to: first, the age of the timber support for those mine shafts and secondly, the weight and pressure placed upon them due to building structures and traffic movement.

There is very little chance of a major landslide occurring in Mercer County. However, mismanaged intense development in steeply sloped areas could increase their frequency of occurrence.

### *4.3.5.5 Vulnerability Assessment*

Landslides often occur with other natural hazards such as earthquakes and floods. A serious landslide can cause millions of dollars in damage. However, few areas of the County are at risk

from a major landslide. Continued enforcement of floodplain management and proper road and building construction should mitigate this vulnerability. Floodplain management practices are important for areas where mining has occurred within close proximity to watercourses and associated flat-lying areas. Surface water may permeate into areas that still have open fractures. The build-up of surface water in fractures could lead to unexpected flood events. Also, surface water that enters into the fractures could mix with potential chemicals within rock strata and be flushed out and return to the groundwater system. A mitigation action will be created to identify previous and present mining operations and their proximity to floodplains so that these areas can be identified and monitored.

Areas of the county that have underlying mines are subject to subsidence and constitute a potential threat to people living in those areas. It is hard to relate the number of people and properties vulnerable to a hazardous mining or other subsidence incident because of poor records where the mine shafts were located, the depth of the shafts and the size of the these shafts.

Mine Subsidence Insurance is available through the Pennsylvania Department of Environmental Protection (Pa DEP). Areas of Mercer County, which are known to have been mined, can contact the Pa DEP to have a site specific request conducted at 1-800-922-1678.

### **4.3.6. Earthquakes**

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 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).

#### **4.3.6.1 Location and Extent**

Southwestern Pennsylvania's vulnerability to earthquakes decreases from west to east. The majority of Mercer County is located in an area ranked as 'very slight' risk of earthquake, with the northwestern portion of the County ranked as 'slight' risk of earthquake. Further details are shown in Figure 4 -8 and described in the following section.

## Earthquake Hazard Zones

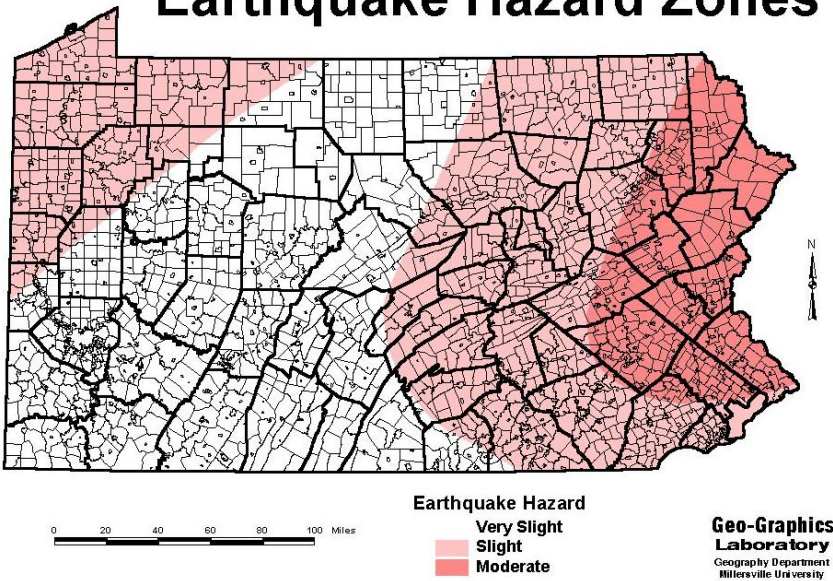


Figure 4-8. Millersville University Earthquake Hazard Zones Seismic Risk Study

### 4.3.6.2 Range of Magnitude

The worst earthquake to occur in Mercer County was the “Pymatuning Earthquake”, which will be discussed in the Past Occurrence section.

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 . 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 4-13. 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

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
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.

Mercer County is estimated to have a moderate earthquake hazard, which means that it can be felt quite noticeable by persons indoors, especially on upper floors of buildings, and standing vehicles may rock slightly.

Environmental impacts of earthquakes can be numerous, widespread, and devastating, particularly if indirect impacts are considered. Some examples are shown below, but are unlikely to occur in Mercer County:

- Induced tsunamis and flooding or landslides and avalanches;
- Poor water quality;
- Damage to vegetation; and
- Breakage in sewage or toxic material containments.

**4.3.6.3 Past Occurrence**

In October 1934, an earthquake struck Rochester County, New York; a slight tremor was felt though Warren County to Mercer County. No injuries or damages resulted. In January 1984, earthquakes tremors were felt. The tremors registered 4.0 on the Richter scale. It was felt from Erie to as far as Scranton. It had caused a 4 foot long by 1/8" wide crack in the side of the Sharon City Hall Building. Another quake occurred on September 25, 1998, near the southern end of Pymatuning Reservoir, hence being named the “Pymatuning Earthquake”. The major effects were experienced in the West Salem Township, Greene Township, Jamestown and Greenville area. It was a magnitude of 5.2 on the Richter scale, the largest ever recorded in Pennsylvania. Structural damage was minimal, with reports of things falling off shelves, some chimneys cracked. However, the hydrologic changes in the area were more serious. Approximately 120 domestic wells went dry, while other, previously dry wells, started flowing again. About 80 of the 120 wells were on a ridge between Jamestown and Greenville, where the water declined as much as 100 feet. Those areas that experienced an increase in water levels

was up to 62 feet in the valley wells. One possible explanation of the observed hydrologic effects is that the earthquake increased the vertical hydraulic conductivity of shales beneath the ridge, which allowed the groundwater to drain from the hilltops. The USGS sites that computer simulations of groundwater flow beneath the ridge between Jamestown and Greenville indicate that increasing the vertical hydraulic conductivity of shale confining beds about 10 to 60 times from their pre-quake values could cause the general pattern that was experienced. Some residents reported dirty or sulfur-smelling water as well.

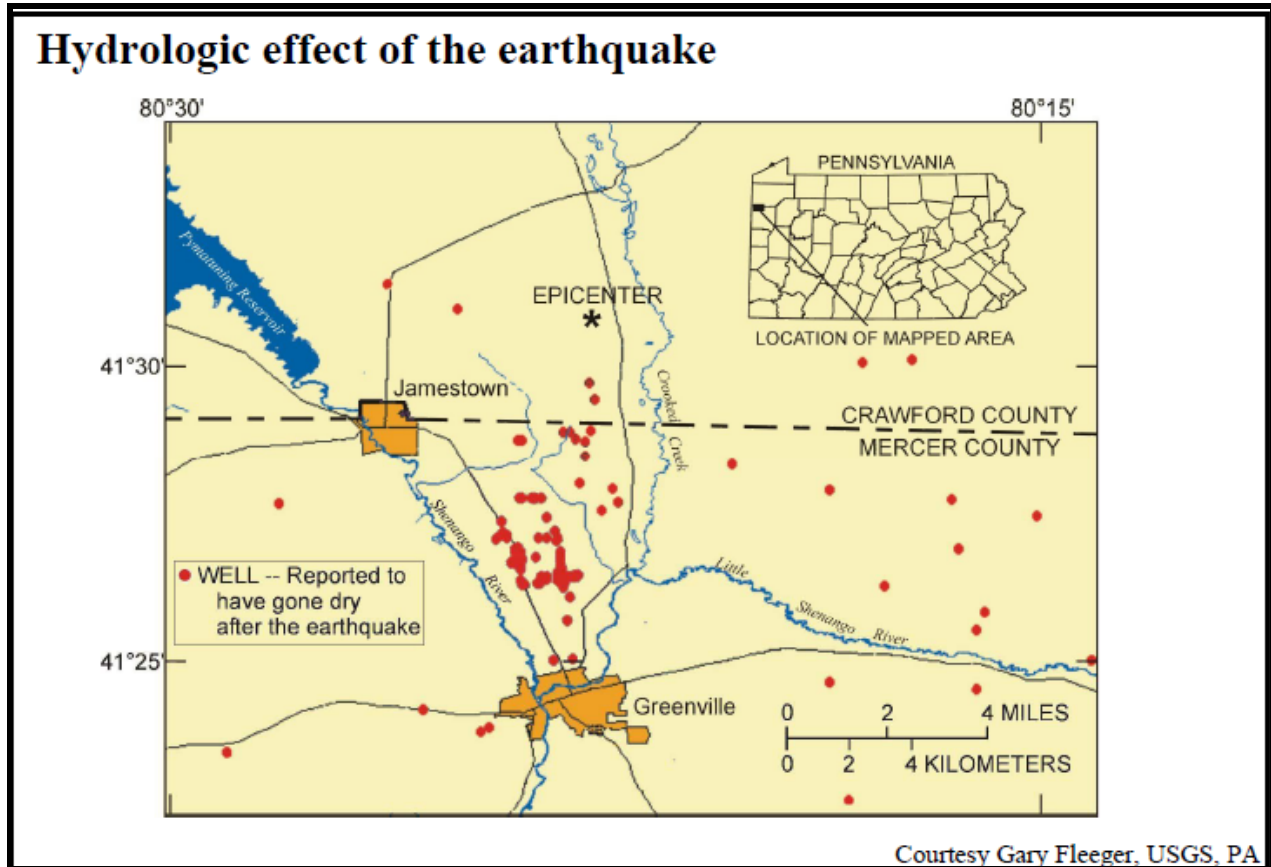


Figure 4-9. Location of Wells that Were Reported Dry from the Pymatuning Earthquake

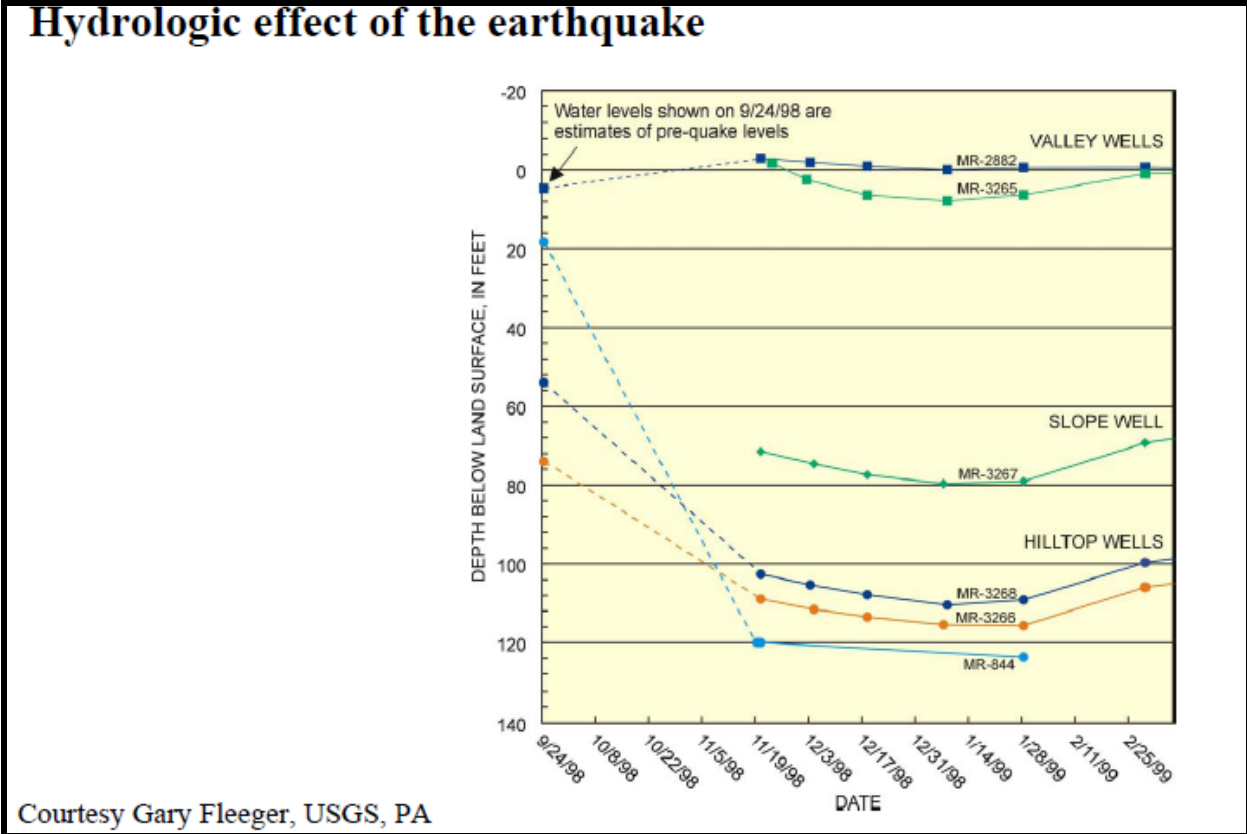


Figure 4-10. Well Water Levels from the Pymatuning Earthquake

4.3.6.4 Future Occurrence

Mercer County is located in a zone where minor earthquake damage is expected. There is a very low probability of a major earthquake occurring in Mercer County.

4.3.6.5 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.







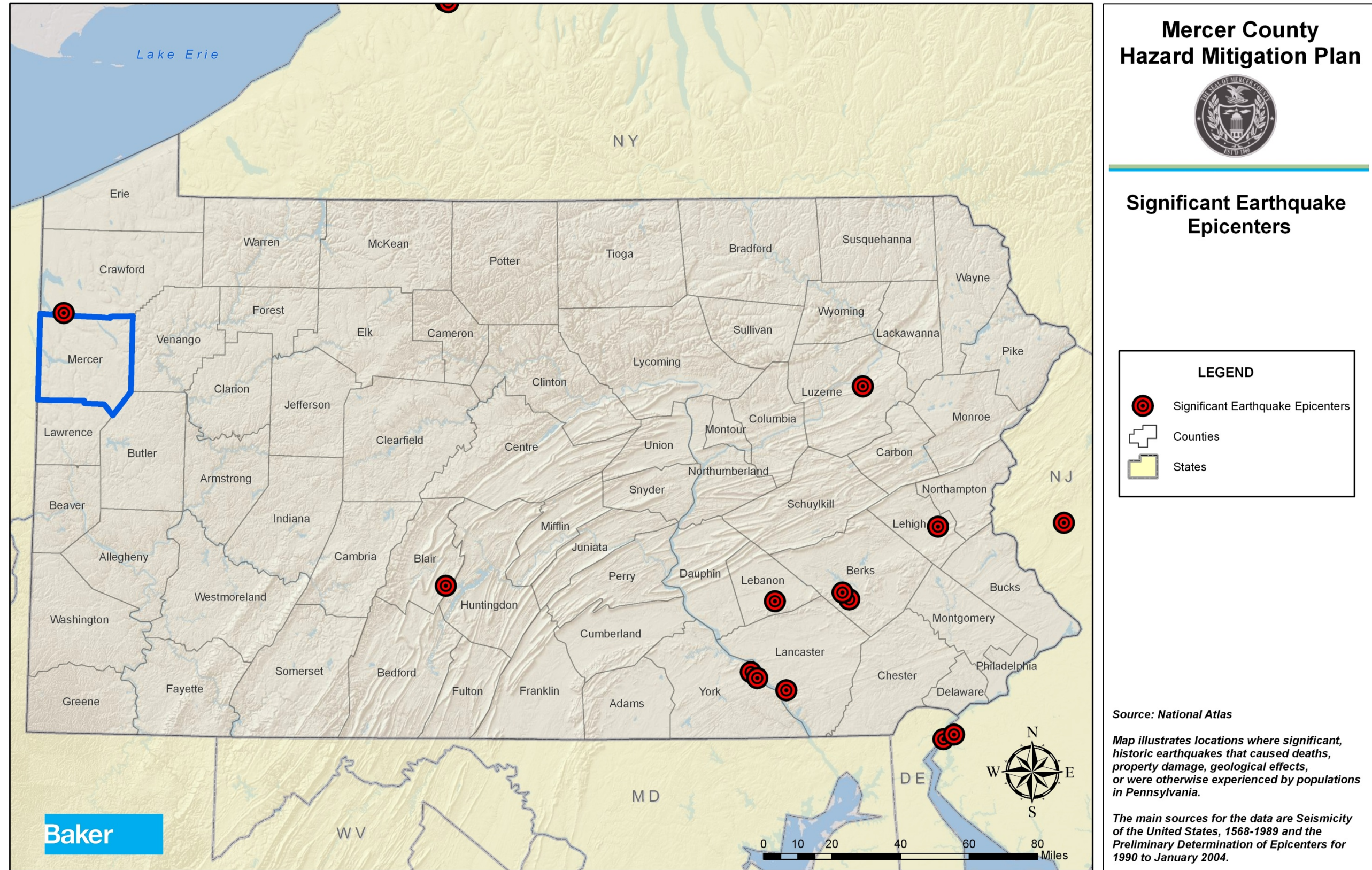


Figure 4-11. Significant Earthquake Epicenters





**4.3.7. Pandemic**

A pandemic is an epidemic that becomes very widespread and affects a whole region, a continent, or the world. An epidemic occurs when new cases of a certain disease substantially exceed the number of expected cases over a given period of time. Such a disease may or may not be transferable between humans and animals. Epidemics can occur subsequent to or be exacerbated by other hazard events such as water/food contamination or flooding. (Martin & Martin-Granel, 2006).

**4.3.7.1 Location and Extent**

Pandemic events cover a wide geographical area and affect a large population. 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. Mercer County is primarily concerned with the possibility of a pandemic flu outbreak. The H1N1 virus, colloquially known as *swine flu*, is of particular concern. 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).

**4.3.7.2 Range of Magnitude**

Advancements in medical technologies have greatly reduced the number of deaths caused by influenza over time. The impact various pandemic influenza outbreaks have had globally over the last century has declined (see Table 4-14). The severity of illness from the 2009 H1N1 influenza flu virus has varied greatly, with the gravest cases occurring mainly among those considered at high risk. High risk populations considered more vulnerable are described in Section 4.3.10.5. Most people infected with swine flu in 2009 have recovered without needing medical treatment. However, the virus has resulted in many deaths, including fourteen in Pennsylvania as of December 2009. According to the CDC, about 70% of those who have been hospitalized with the 2009 H1N1 flu virus in the United States have belonged to a high risk group (CDC, 2009). In Mercer County, the PA Department of Health has 63 confirmed cases of H1N1 in the County.

**4.3.7.3 Past Occurrence**

There have been several pandemic influenza outbreaks which have occurred over the past 100 years. A list of events worldwide is shown in Table below.

Table 4-14 Previous Pandemic Outbreaks

DATE	PANDEMIC NAME/SUBTYPE	WORLDWIDE DEATHS (APPROXIMATE)
1918-1920	Spanish Flu/H1N1	50 million
1957-1958	Asian Flu/H2N2	1.5-2 million
1968-1969	Hong Kong Flu/H3N2	1 million
2009-November	Swine Flu/H1N1	6000 ( as of November 2009)

In Mercer County, the PA Department of Health has 63 confirmed cases of H1N1 in the County. And 1 death has occurred in Mercer County as well. This data is from the PA Department of Health website that was last updated February 26, 2010.

#### *4.3.7.4 Future Occurrence*

Based on historical events, Mercer County is expected to experience pandemic influenza outbreaks approximately every 11 to 41 years. The precise timing of pandemic influenza outbreaks is unpredictable (U.S. HHS, 2009).

#### *4.3.7.5 Vulnerability Assessment*

Certain population groups are at higher risk of pandemic disease. This population group includes people 65 years and older, children younger than 5 years old, pregnant women, and people of any age with certain chronic medical conditions. Such conditions include but are not limited to diabetes, heart disease, asthma, and kidney disease (CDC, 2009). Schools, convalescent centers, and other institutions serving those younger than 5 years old and older than 65 years old are locations conducive to faster transmission of the 2009 H1N1 virus since populations identified as being at high risk are concentrated at these facilities.



## **B. HUMAN-MADE HAZARDS**

### **4.3.8. 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).

Due to safety concerns, the details on Mercer County's risk from dam failure are provided in Appendix H.

### **4.3.9. Hazardous Materials**

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. Hazardous material releases are unauthorized or unintended releases of toxic chemicals, infectious substances, biohazardous waste, and any materials that are explosive, corrosive, flammable, or radioactive (PL 1990-165, § 207(e)) at fixed facilities or such materials are in transit. 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. Mercer County also has hundreds of miles of pipelines that transport natural gas.

#### **4.3.9.1 Location and Extent**

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

## Mercer County Hazard Mitigation Plan 2011

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.

Tennessee Gas Company has approximately 250 miles of pipelines transporting natural gas into and through Mercer County. Tennessee Gas Company is the prime supplier of natural gas to all gas companies in Mercer County in addition to Lawrence and Venango County. This pipeline consists of:

- 41.45 miles of 21 inch pipe
- 12.49 miles of 36 inch pipe
- 14.45 miles of 24 inch pipe
- 14.45 miles of 30 inch pipe

Atlas Energy Producers is a major gas well operator in Mercer County. In 2004, they had 57 sites throughout the County. Columbia Gas Transmission Corporation has approximately seven miles of gas line that runs from North Liberty in Mercer County to Slippery Rock in Butler County. This stretch of lines is located in a rural area and not located near any critical/vulnerable facilities.

As of April 2004, a total of 38 SARA Facilities were found within Mercer.

**Table 4-15. SARA Facilities**

Facility Name	Location
Alcoa Ivex Packaging	Grove City
Barber's Chemical	Sharpsville
CCL Container	Hermitage
Consumers PA Water Co	Sharon
Dean Foods, Inc	S. Pymatuning Twp
Farrell Sewage Treatment Plant	Farrell
Fredonia Sewage Treatment Plant	Fredonia
Greenville Sewage Plant	Greenville
Greenville Swimming Pool	Greenville
Greenville Water Plant	Greenville
Grove City Sewage Plant	Grove City
Grove City Water Plant	Grove City
Hermitage Sewage Plant	Hermitage
Interstate Chemical Co	Hermitage

Facility Name	Location
Jamestown Sewage Plant	Jamestown
Jamestown Water Plant	Jamestown
MCI World Com	-
Mercer Boro Sewage Plant	Mercer
Pymatuning Independent Telephone Co.	Transfer
Reynolds Water Plant	Transfer
Reynolds Sewage Plant	Transfer
Salem Tube	Reynolds
Sandy Lake Water Co	Sandy Lake
Sears & Roebuck Auto Center	Hermitage
Sharon Sewage Plant	Sharon
Sharon Tube Co.	Sharon
Sharon Tube Co.	Wheatland
Sharpsville Water Co.,	Sharpsville
Shenango Twp Sewage Plant	Shenango Twp
Verizon	Grove City
Verizon	Mercer
Verizon	Sharon
Verizon	Sharpsville
Verizon	Greenville
Verizon	West Middlesex
Wheatland Tube Co.	Wheatland
Wheatland Tube (Sawhill Tube)	Wheatland
Wheatland Tube (Sawhill Tube)	Sharon

*Source: Mercer County Hazard Mitigation Plan, 2004*

#### **4.3.9.2      *Range of Magnitude***

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; 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.

#### 4.3.9.3 *Past Occurrence*

In 1983, Mercer County experienced its first gas line break. Fortunately, no injuries or property damage resulted from this break. No critical/vulnerable facilities are located near this pipeline. Since 1997 the county has responded to a limited amount of pipeline breaks. A worst case scenario example that has not occurred in Mercer County, but could would be the March 5, 2008 pipeline leak in Plum Borough, Allegheny County. The undetected leak later led to explosion and fire. The explosion destroyed a residence, killing a man and seriously injuring a 4-year-old girl. Two other houses were destroyed as well and 11 houses were damaged. Property damage and losses were \$1,000,000 according to the report completed by the National Transportation Safety Board in Washington D.C.

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. Since 2004, there have been 22 hazardous materials incidents reported through the Pennsylvania Emergency Incident Reporting System (PEIRS). Those incidents are detailed in the table below. There were no deaths reported as a result of these incidents. Also, it should be noted that PEIRS data does not state specifically where the event occurred and what method of occurrence it took place in. For example the data will not specify whether the pesticide spill took

place at a farm or a manufacturing plant for pesticides, or if it took place as part of a traffic accident. The data dates back to 2004. This was the data that was available upon request a mitigation action will be created to work on obtaining data for pre-2004 and post-2010.

**Table 4-16. Past Occurrences of Hazardous Material Releases**

<b>Date</b>	<b>Type</b>
1/05/2004	Pesticide Spill
2/04/2004	Flammable Liquid & Solids
3/10/2004	Chemical Spill
6/08/2004	Natural Gas Release
6/18/2004	Chemical Spill
9/07/2004	Chemical Spill
9/07/2005	Natural Gas Release
2/18/2005	Explosions
3/04/2005	Natural Gas Release
6/08/2005	Chemical Spill
6/14/2005	Pipeline Break
6/17/2005	Chemical Spill
7/06/2005	Chemical Release
4/10/2006	Odor Investigation
1/04/2008	Chemical Spill
1/14/2008	Natural Gas Release
4/29/2008	Chemical Spill
7/16/2008	Natural Gas Release
10/02/2008	Natural Gas Release
10/12/2008	Sewage Spill
4/25/2009	Natural Gas Release
5/04/2009	Natural Gas Release

*Source: Pennsylvania Emergency Incident Response System, 2009.*

**Table 4-17 Petroleum Spills**

<b>Date</b>	<b>Type</b>
1/05/2004	Oil Sheen
4/20/2004	Oil Sheen
5/22/2004	Misc. Oils
5/24/2004	Oil Spill
6/15/2004	Misc. Oils
6/17/2004	Asphalt Spill
9/18/2004	Oil Sheen



## **Mercer County Hazard Mitigation Plan 2011**

<b>Date</b>	<b>Type</b>
<b>12/16/2004</b>	Diesel Fuel Spill
<b>8/25/2005</b>	Heating Oil Spill
<b>9/06/2005</b>	Oil Spill
<b>1/19/2006</b>	Diesel Fuel Spill
<b>7/10/2006</b>	Misc. Oils
<b>7/17/2006</b>	Diesel Fuel Spill
<b>10/04/2005</b>	Oil Sheen
<b>10/28/2006</b>	Diesel Fuel Spill
<b>5/25/2007</b>	Diesel Fuel Spill
<b>5/29/2007</b>	Diesel Fuel Spill
<b>8/16/2007</b>	Oil Sheen
<b>10/18/2007</b>	Oil Spill
<b>2/06/2008</b>	Gasoline Spill
<b>2/06/2008</b>	Gasoline Spill
<b>5/17/2008</b>	Oil Spill
<b>7/12/2008</b>	Oil Sheen
<b>8/04/2008</b>	Misc. Oils
<b>10/13/2008</b>	Misc. Oils
<b>10/27/2008</b>	Diesel Fuel Spill
<b>2/05/2009</b>	Diesel Fuel Spill
<b>3/31/2009</b>	Diesel Fuel Spill
<b>6/20/2009</b>	Diesel Fuel Spill

### 4.3.9.4 *Future Occurrence*

While many hazardous material release incidents have occurred in Mercer 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. Intentional acts are addressed under Section 4.3.14.

### 4.3.9.5 *Vulnerability Assessment*

Transportation carriers 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.

The Mercer County LEPC recognizes the threat of the transportation routes within Mercer County. The LEPC via grant funds sponsors various hazardous material training classes. These classes are offered annually to all public safety, first responder, and EMS entities, free of charge.

### **4.3.10. Fire Hazard (Urban and Wild)**

Fires can be caused by any number of sources – weather, human-made, or natural – and can cause extensive loss of life and property. Fires can be triggered or exacerbated by other disaster events such as floods, storms, drought, transportation accidents and hazardous materials incidents. Thus, fire as a secondary event may result in a very complex situation.

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 (PA DCNR, 1999).

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.

**4.3.10.1 Location and Extent**

Much of the County is rural in character which creates vulnerabilities to brush and forest fires. However, the population density is low in these rural areas of Mercer County. Significant urban fires are limited to more densely populated areas 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. During the past 10-15 years, the City of Hermitage, Mercer Borough, City of Sharon, and City of Farrell have experienced the worst urban fires in Mercer County.

**4.3.10.2 Range of Magnitude**

The effects of a major fire, both urban and wild, 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 public property. Lives may be lost and people are often displaced for several months to years depending on the magnitude of the event.

In April of 1992, McCandless Ford Dealership in the Borough of Mercer was burned to the ground. An Amerigas Co. propane truck was being repaired and one of the valves was accidentally broken off. Propane leaked and although an attempt was made to shut off all ignition sources, the propane had ignited and burned for more than 5 hours. Evacuation was conducted of surrounding residents, schools, and businesses. There were no injuries.

**4.3.10.3 Past Occurrence**

There have been a number of fires in the county during the past few years. 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 Mercer County since 1999. A mitigation action will be created to identify gaps in both urban and wildland fire data and identify sources from which this information could be obtained.

**Table 4-18. Mercer County Fire Information**

Year	Urban-Structural Fires	Wildland Fires
2004	6	0
2005	10	1
2006	4	0
2007	21	0
2008	29	0
2009	9	0

Year	Urban- Structural Fires	Wildland Fires
<b>Total</b>	<b>79</b>	<b>1</b>

*Source: Pennsylvania Emergency Incident Response System, 2009 and Mercer County Emergency Services, 2009.*

**4.3.10.4**      *Future Occurrence*

Minor fire hazards occur often primarily due to human error. The possibility of wildfire also exists due to the amount of brush and wooded areas that could fuel such a fire. Urban fires occur as a result of human error, outdated wiring, and sabotage. These events have occurred in Mercer 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.

**4.3.10.5**      *Vulnerability Assessment*

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 Mercer 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 group was 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. It must be assumed then that their residences and the many county nursing homes possess safety features.

The state fire marshals should focus on strict enforcement of required record keeping by local fire departments. This will aid future analyses and reduce risk. Due to increased training and response by local fire departments, as well as increased public awareness, we hope to see a decrease in the total number of fires each year.

Overall, the County is at a moderate risk for wildland fires. The table below details the areas that are most at risk from wildland fires as assessed by the Pennsylvania Bureau of Forestry. Almost all of the wildland fires in the County occur in remote areas or areas away from residential structures. Unlike the wildland fires that occur in other parts of the County and affect vast areas of land and residential areas, most of the fires in the County are contained before they cause any damage or extensive property loss.

The fire departments of Mercer County have a continuous education program for the public regarding fire awareness and fire safety. A great deal of these fires and possible deaths can be avoided in the future with stronger building codes and fire codes. The greatest first line of defense is good housekeeping. To supplement this good housekeeping, each resident, school, hospital, high-rise and industrial area should be equipped with a fire alarm systems and smoke

## Mercer County Hazard Mitigation Plan 2011

detectors. Due to the great saturation of information on smoke detectors, the vulnerability and maximum threat of loss of human lives and property has decreased.

Table 4-19. Mercer County Wildland Fire Risk By Municipality

Municipality	Risk	Hazard	Value	Affected Acres
CLARK	Medium	Low	Low	14,293
COOLSPRING	Low	Low	Low	15,536
DEER CREEK	Low	Low	Low	11,127
DELAWARE	Medium	Medium	Medium	1,139
EAST LACKAWANNOCK	High	High	Medium	15,524
FAIRVIEW	Medium	Low	Low	13,853
FINDLEY	High	Medium	Medium	342
FREDONIA	Low	Low	Low	15,706
FRENCH CREEK	Medium	Medium	Medium	16,799
GREENE	Medium	Medium	Medium	1,825
GREENVILLE	Low	Low	Low	350
GROVE CITY	Low	Low	Low	16,081
HEMPFIELD	High	Medium	Medium	15,041
JACKSON	Medium	Medium	Medium	15,247
JACKSON CENTER	Medium	Low	Medium	15,890
JAMESTOWN	Low	Low	Low	14,879
JEFFERSON	Medium	Medium	Medium	847
LACKAWANNOCK	Medium	Medium	Medium	115
LAKE	High	Medium	Medium	14,506
LIBERTY	High	Medium	Medium	14,700
MERCER	Low	Low	Low	662
MILL CREEK	Medium	Medium	Medium	854
NEW LEBANON	Medium	Low	low	465
NEW VERNON	Medium	Medium	Medium	15,453
PERRY	High	Medium	Medium	65
PINE	High	Low	Medium	15,030
PINE	High	Low	Medium	14,531
PINE	High	Low	Medium	253
PINE	High	Low	Medium	528
PINE	High	Low	Medium	13,660
PINE	High	Low	Medium	14,932
PINE	High	Low	Medium	221
PINE	High	Low	Medium	14,791
PINE	High	Low	Medium	16,314
PYMATUNING	High	Medium	Medium	287
SALEM	Medium	Medium	Medium	8,174
SANDY CREEK	Medium	Medium	Medium	14,972
SANDY LAKE	Low	Low	Low	15,388
SANDY LAKE				14,994



## Mercer County Hazard Mitigation Plan 2011

Municipality	Risk	Hazard	Value	Affected Acres
<b>SHARPSVILLE</b>	Low	Low	Low	15,040
<b>SHEAKLEYVILLE</b>	Low	Low	Low	15,417
<b>SHENANGO</b>	Medium	Low	Low	242
<b>SOUTH PYMATUMING</b>	High	Medium	Medium	581
<b>SPRINGFIELD</b>	Medium	Medium	Medium	2,358
<b>STONEBORO</b>	Medium	Medium	Low	557
<b>SUGAR GROVE</b>	Medium	Low	Low	546
<b>WEST MIDDLESEX</b>	Medium	Low	Low	16,604
<b>WHEATLAND</b>	Medium	Low	Low	1,039
<b>WILMINGTON</b>	Low	Low	Low	14,298
<b>WOLF CREEK</b>	High	Medium	Medium	239
<b>WORTH</b>	High	Medium	Medium	13,248

*Table Notes:*

*Risk – refers to the level of risk resulting from human activity that can cause the ignition of a wildfire.*

*Hazard – assesses the risk from fuel, topography, and local weather patterns.*

*Value – assesses the value of real estate, aesthetics, timber, habitat, water resources, etc.*

The number of fire incidents and fatalities should remain at the same level for the foreseeable future. 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 moderate.

It should be noted that Mercer County has 25 fire departments, (1) full-time paid fire department, (2) combination, 2 paid chiefs and 20 all volunteer. Some of the fire departments are firefighter only: some are fire/rescue departments; one operates an ambulance service. Because of their versatility, they are considered the backbone of the community.

Each fire department conducts its own schedule of “in house” training sessions for its members. To assist each department a Fire School Training is held periodically with two comprehensive trainings being conducted annually. These programs are the Annual Mercer County Fire Training conducted by the Mercer County Fire Training Institute and the Rescue Expo, which is sponsored jointly by the Mercer County Fire Training Institute and the Emergency Service of Mercer County.

This page intentionally left blank.

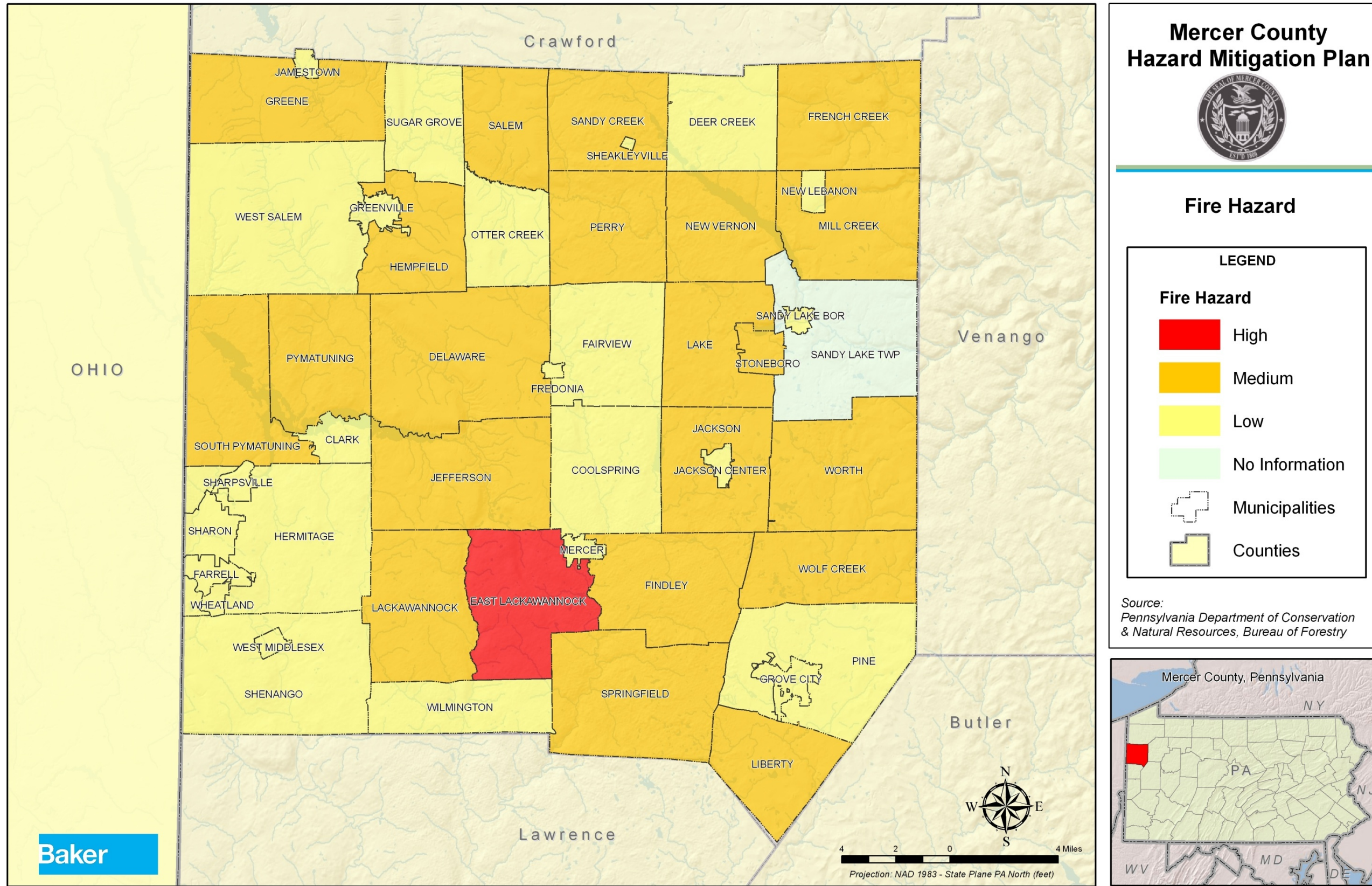


Figure 4-12. Fire Risk





#### **4.3.11. 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 is a condition that occurs when traffic demand approaches or exceeds the available capacity of the road network. This hazard should be carefully 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).

For this analysis, a transportation accident is defined as an incident involving highway, air, or rail 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 Mercer County. Mercer County is highly vulnerable to traffic accidents.

##### *4.3.11.1 Location and Extent*

Mercer County has 539 miles of interstate; 839.2 miles of state and federal highways; 1,125.9 miles of secondary and municipal highways/roadways, a total of 2,504 miles of highway. There are three (3) tunnels located on this highway system. One is located on Route 62, approximately four (4) miles north of Mercer, the other is located on Route 18 near Osgood, and the third is in Jamestown.

Another form of transportation is railroads, of which the County has approximately 140 miles. These railroad systems are serviced regularly by Bessemer & Lake Erie (B&LE) and ConRail.

There are two (2) airports located in Mercer County. These small regional airports are located in Grove City and Groveville. Smaller private grass strips do exist. Minor aircraft accidents have resulted in a few deaths throughout the County. However, there have not been any major accidents like Flight 427 in Allegheny County or Flight 93 in Somerset County. Aviation accidents are the third form of transportation accident relevant in Mercer County.

##### *4.3.11.2 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 4.3.10).

##### *4.3.11.3 Past Occurrence*

A moderate amount of recreational aviation frequents the two airports. As a result, there have been accidents. In 1982 and 1983, there were two separate small aircraft accidents in



Shenango Township which resulted in two persons being injured in both incidents. In 1998, a small plane crashed while approaching Greenville Airport, killing the pilot. There have been three (3) serious aircraft accidents since 1995, resulting in four deaths. In December 1995, a pilot crashed into the frozen Shenango Reservoir; this incident was believed to be a suicide. In 1999, over the 4th of July holiday, a small aircraft crashed in the Shenango Reservoir, resulting in 2 deaths. In the fall of 1999, one man was killed during a solo training flight near the Greenville Airport.

In November 1992, two small private planes collided in mid-air in Osgood, northeast of the Greenville Airport. This accident resulted in four deaths with wreckage being scattered in a one mile square area.

The City of Sharon has had four derailments involving hazardous materials; however leakage resulted in one of the four incidents. Sandy Lake has had two rail derailments; however these were coal car hoppers and posed no immediate threat to the community.

The Pennsylvania Department of Transportation 2008 release of their Pennsylvania Crash Facts and Statistics Report was obtained. Please see the tables below for the number of crashes and deaths from 2004 to 2008.

**Table 4-20. Mercer County Crash Statistics**

<b>Mercer County Crash Statistics from 2004-2008</b>				
<b>2004 Crashes</b>	<b>2005 Crashes</b>	<b>2006 Crashes</b>	<b>2007 Crashes</b>	<b>2008 Crashes</b>
<b>1,526</b>	1,451	1,393	1,391	1,298

**Table 4-21. Mercer County Traffic Deaths**

<b>Mercer County Traffic Deaths from 2004-2008</b>				
<b>2004 Deaths</b>	2005 Deaths	2006 Deaths	2007 Deaths	2008 Deaths
<b>26</b>	27	26	22	25

**4.3.11.4 Future Occurrence**

The numbers of accidents are decreasing and overall the deaths are about the same for the past four years the future probability and risks are likely to be about the same.

**4.3.11.5 Vulnerability Assessment**

With I-80 and I-79 intersecting within Mercer County and hazardous materials being transported on these interstates, Mercer County is highly vulnerable to transportation accidents. This has

increased more so since the transportation of radioactive waste from Three Mile Island and spent fuel rods from the State of New York go through Mercer County.

The two airports, although a hazard, pose minimum threat due to small population located in the path of their runways; each is located in a rural area. The frequency of small aircraft accidents will likely increase, as increased recreational use of aircraft grows. The Grove City Airport is now host to recreational Skydiving, thus skydivers and aircraft share the same air space. Skydiving aircraft also accumulate more air hours and carry increased passenger load.

Mercer County is also within the approach and departure lanes of both the Youngstown, Ohio and Pittsburgh airports. It is not beyond the realm of possibility a major aircraft inbound or departing one of these destinations could encounter difficulties causing a major crash in Mercer County

### 4.3.12. Energy Emergencies

Energy emergency hazards are hazards that impair the functioning of important utilities in the energy, telecommunications, public works, and information network sectors. Energy interruption hazards can be caused by the following: geomagnetic storms, fuel or resource shortage, electromagnetic pulse, information technology failure, public works failure, telecommunications system failure, transmission facility accident, and major utility failure.

#### 4.3.12.1 *Location and Extent*

Power failure is 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 throughout Mercer County. 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.

#### 4.3.12.2 *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. In September of 2008, there were over 180,000 power outages in the Pittsburgh area due Hurricane Ike wind gusts that ranged from 60 mph to more than 70 mph. In Mercer County, Penn Power reported that 27,000 residents were without power in Mercer County on September 15, 2008 and over 19,000 residents were still without power the following day. Tony Zucco, Penn Power's Mercer County manager stated that it was the worse power outage that he has seen in 32 years. Overall, depending on where residents were located power was out for 2-4 days. In spite of the downed lines, shattered trees, and property damage, there were no storm-related injuries reported by the Mercer County hospitals.

### *4.3.12.3 Past Occurrence*

The nationwide oil embargo of 1973 - 1974, the severe winter of 1976 - 1977, and the national gasoline shortage of 1979 emphasized the vulnerability of all residents in Mercer County to energy emergencies. Minor power outages occur annually. A significant outage occurred in September 15, 2008 and is described in the above Range of Magnitude Section. Another power outage occurred in May of 2009. Over 2,000 residents were without power. West Salem Township in Mercer County received numerous calls about power outages and trees being down. According to Mercer County EMA most calls came from the City of Hermitage. There were no reports of injuries or severe property damage. Although one isolated power outage caused a basement to flood and another fallen tree collapsed a roof of a shed. A mitigation action will be created to establish a better system for tracking energy emergencies and the costs associated with these events.

### *4.3.12.4 Future Occurrence*

It is not anticipated that the County will face any localized energy emergencies and will remain susceptible to national emergencies. Minor power failure events (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 likely occurrences during severe weather and therefore, should be expected during those events.

### *4.3.12.5 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.

Conservation and improved technology for more efficient uses of fuel have reduced the rate of increase of demand for energy for many purposes. The capability of substitution of fuel, should a shortage of one fuel develop, has also increased in Mercer County. The vulnerability to shortages seems to have decreased as a result of these changes and adjustments. Even so, Mercer County experiences minor shortages resulting in malfunction and overheating the electrical equipment. During cold weather conditions, the increased demand for natural gas requires some users to switch to oil or other sources of energy.

There are two natural gas pump stations in Mercer County; the Tennessee Gas Pipeline and Columbia Gas. Of the two, Tennessee Gas provides the majority of the required natural gas in Mercer County. If a major disaster were to strike the Tennessee Gas Pump Station or its main switching area, it would create a large impact on the County's business, industries and citizens,

especially during cold weather. If a severe weather or disaster were to strike Mercer County, isolated areas could be without electricity, but not the entire County at one time. Severe weather, hot or cold, could create shortages or disruption of fuel or electricity within Mercer County. For example, severe cold weather may cause low gas pressure or hot weather may result in an overload on electrical power.

### 4.3.13. Fixed Nuclear Facility

Nuclear accidents generally refer to events involving the release of significant levels of radioactivity or exposure of workers or the general public to radiation (FEMA, 1997). Nuclear accidents/incidents can be placed into three categories:

- Critical accidents which involve loss of control of nuclear assemblies or power reactors;
- Loss-of-coolant accidents which result whenever a reactor coolant system experiences a break or opening large enough so that the coolant inventory in the system cannot be maintained by the normally operating make-up system; and
- Loss-of-containment accidents which involve the release of radioactivity.

The primary concern following such an incident or accident is the extent of radiation, inhalation, and ingestion of radioactive isotopes which can cause acute health effects (e.g. death, burns, severe impairment), chronic health effects (e.g. cancer), and psychological effects (FEMA, 1997).

#### 4.3.13.1 Location and Extent

The Nuclear Regulatory Commission encourages the use of Probabilistic Risk Assessments (PRA) to estimate quantitatively the potential risk to public health and safety considering the design, operations, and maintenance practices at nuclear power plants. PRAs typically focus on accidents that can severely damage the core and that may challenge containment. FEMA, PEMA and county governments have formulated Radiological Emergency Response Plans to prepare for radiological emergencies at the five nuclear power generating facilities in the Commonwealth of Pennsylvania. These plans include a *Plume Exposure Pathway Emergency Planning Zone (EPZ)* with a radius of 10 miles from each nuclear power facility, and an *Ingestion Exposure Pathway (IEP)* with a radius of 50 miles from each facility. The majority of Mercer County is located within the ingestion exposure pathway (IEP) of the Beaver Valley Power Station. Approximately 25% of land area and approximately 60% of the county's population falls within the ingestion exposure pathway.

The IEP is the 50-mile radius around a nuclear facility, as illustrated in Figure 13. Should an accident occur at this facility, the area within the IEP could receive some radioactive contamination. The amounts are of little concern in terms of external exposure. A bigger threat is internal exposure, through the contamination of the food chain, particularly milk from local dairy cattle. Should an accident occur, state and federal agencies would sample and monitor milk, livestock feed, storage crops, and water supplies within the IEP. The Mercer County Department of Public Safety may be asked to assist in gathering samples, and if requested by the state agencies, also participate in implementing control of foods, foodstuffs and water.

#### 4.3.13.2 Range of Magnitude

In the event of a nuclear facility disaster, radioactive fallout would be the main danger for Mercer County. Invisible gamma rays from this fallout can cause radiation sickness as a result of physical and chemical changes in the cells of the body. If a person would receive a large dose



of radiation, that person would die in a very short time. Non-lethal doses in varying degrees would cause radiation sickness among the survivors.

Nuclear facilities must notify the appropriate authorities in the event of an accident. The Nuclear Regulatory Commission uses four classification levels for nuclear incidents (NRC, 2008):

- **Unusual Event:** Under this category, events are in process or have occurred which indicate *potential degradation in the level of safety of the plant*. No release of radioactive material requiring offsite response or monitoring is expected unless further degradation occurs.
- **Alert:** If an alert is declared, events are in process or have occurred which involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the Environmental Protection Agency Protective Action Guides.
- **Site Area Emergency:** A site area emergency involves events in process or which have occurred that result in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.
- **General Emergency:** A general emergency involves actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area.

#### 4.3.13.3 *Past Occurrence*

There has been one nuclear incident above the *Alert* classification in the United States. In March 1979, a *Site Area Emergency* event occurred at Three Mile Island - Unit 2. This event is the most serious commercial nuclear accident in United States history. The resulting contamination and state of the reactor core led to the development of a ten-year cleanup and scientific effort. Despite the severity of the damage, no injuries due to radiation exposure occurred. There were however, significant health effects reported due to the psychological stress on the individuals living in the area. There have been no major incidents at the Beaver Valley Power Station.

#### 4.3.13.4 *Future Occurrence*

Mercer County has minimum potential to be affected by a fixed nuclear facility's incident, but the possibility exists due to the proximity of the Power Station.

#### 4.3.13.5 *Vulnerability Assessment*

Mercer County has potential to be affected by a fixed nuclear facility disaster at the Beaver Valley Power Station. Much of Mercer County's population is located within fifty (50) miles of the facility. Mercer County is a support county in the event of a nuclear emergency at the Beaver Valley Power Station. The Beaver Valley Power Station, Beaver County, and the Mercer County Department of Public Safety have emergency response plans in place for a fixed nuclear incident.



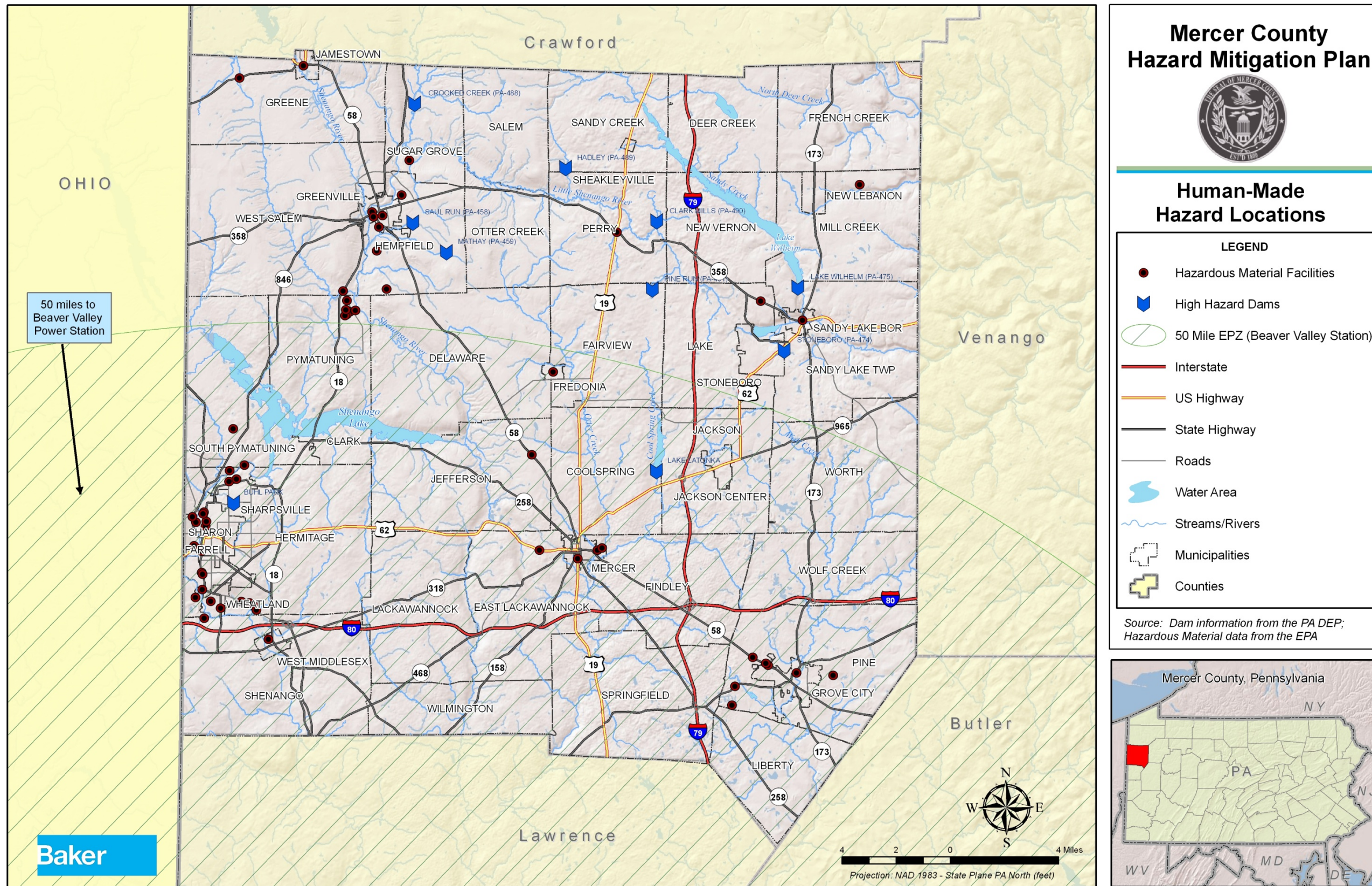


Figure 4-13. Human Made Hazards





### 4.3.14. Terrorism, Criminal Activity, or Civil Disturbance

Terrorism, war, and criminal activity hazards are intentional acts of violence, damage to property, and other criminal activities as well as war. Following several serious international and domestic terrorist incidents during the 1990's and early 2000's, citizens across the United States paid increased attention to the potential for deliberate, harmful actions of individuals or groups. The term "terrorism" refers to intentional, criminal, malicious acts. The functional definition of terrorism can be interpreted in many ways. Officially, terrorism is defined in the Code of Federal Regulations as "...the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives" (28 CFR §0.85).

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.

#### 4.3.14.1 *Location and Extent*

In general, the following is list of potential targets that a terrorist may select. Mercer County does have a few potential targets within the County such as Interstate 80, historic courthouse, and EMA 9-1-1 facility.

- Government facilities including Military installations
- County Government Facilities
- State/Federal Government 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

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.

### 4.3.14.2 *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 disorders 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 for a specific purpose. 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. Examples of this type of crowd include demonstrators and strikers.

**4.3.14.3 Past Occurrence**

Like just about every other county in the nation, Mercer County has had its share of domestic terrorism incidents. Mercer County has had one significant civil disorder in the last 40 years. This occurred in Farrell in 1967. This disorder was primarily restricted to the lower southern part of Farrell and resulted in fires, looting and civil disorder. Due to the cooperativeness of the local officials and civil leaders, this disorder was confined and short-lived. Based on phone calls with the Southwestern Regional Police Chief and Fire Chief, the 1967 incident arose due to a racial altercation. The area most affected was along Idaho Street where store front windows were destroyed. All stores were repaired and fully functional. Also, in 1999 the Ku Klux Klan (KKK) hosted a rally on the Mercer County Courthouse Steps. State Police were on scene. Information was not readily available on whether any injuries took place.

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 September 11<sup>th</sup>, 2001, the threat of international terrorism was unheard of in the county. The table below indicates the number of previous occurrences of terrorism, criminal activity, and potential civil disorder through 2004. Since 2004, Mercer County has tracked other potential terrorist incidents. Those incidents are shown in Table 4-22.

**Table 4-22. Terrorist, Criminal, and Civil Disorder 2004 – 2009 Summary**

<b>Year</b>	<b>Incidents</b>	<b>Number Of Incidents</b>
<b>2004</b>	School Bomb Threat	22
	Bomb Threat	2
	Suspicious Activity	4
<b>2005</b>	School Bomb Threat	27
	Bomb Threat	5
	Suspicious Substance	1
<b>2006</b>	School Bomb Threat	3
	Bomb Threat	1
<b>2007</b>	School Bomb Threat	3
	Bomb Found	2
	Suspicious Activity	2
	Bomb Threat	1
	Suspicious Substance	1
<b>2008</b>	School Bomb Threat	3
	Bomb Threat	2
<b>2009</b>	School Bomb Threat	1

Source: Pennsylvania Emergency Incident Reporting System, 2009.

#### 4.3.14.4 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 Mercer 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 11<sup>th</sup>, 2001.

Minor civil disturbances may occur in Mercer 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 or universities 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.

#### 4.3.14.5 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 Mercer 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, Mercer 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.

#### 4.4. Hazard Vulnerability Summary

A vulnerability assessment applies the information collected through hazard profiling to Mercer 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**

A strong analysis includes both quantitative and qualitative methodologies. For instance, geographic information systems (GIS)-based analysis and local knowledge are both important inputs to identifying vulnerabilities. As part of this hazard vulnerability analysis, the Mercer County LPT conducted the following steps:

- ✓ Inventory and summarize vulnerable assets
- ✓ Characterize repetitive flood loss properties
- ✓ Estimate loss
- ✓ Develop risk factor for each profiled hazard
- ✓ Describe asset vulnerability to future development

As part of the data analysis process, the Mercer LPT considered areas of new development, the quality of existing and new building stock, critical facilities, transportation systems, lifeline utility systems, communications systems and networks, high potential loss facilities, hazardous materials facilities, economic generators, and historic, cultural, and natural resource areas.

In addition, FEMA requires the identification of properties suffering from repetitive flood damage and losses. This process described the property type (residential, commercial, and institutional), estimates the numbers of repetitive loss properties, and estimates the potential dollar losses. The next step of the analysis included the generation of potential loss estimates in dollars for properties located within the range of an identified hazard. To focus the mitigation goals, hazards were ranked and prioritized based on the criteria established by the Mercer LPT. The last step of the analysis described how land uses and development trends are expected to impact Mercer County's vulnerability to the identified hazards.



#### **4.4.2. Ranking Results**

Hazards were ranked in order to provide structure and prioritize the mitigation goals and actions discussed in this plan. Ranking was both quantitative and qualitative. First, the quantitative analysis considered all the GIS and HAZUS data available. A HAZUS report on flooding was run and analyzed. The results are presented in Appendix C. Then, a qualitative approach, the Risk Factor (RF) approach, was used to provide additional insights on the specific risks associated with each hazard. This process can also be a valuable cross-check or validation of the quantitative analysis performed.

The RF approach combines historical data, local knowledge, and consensus opinions to produce numerical values that allow identified hazards to be ranked against one another. During the planning process, the Mercer LPT considered the results of the Hazard Profile against their local knowledge to generate a set of ranking criteria. These criteria were used to evaluate hazards and identify the highest risk hazard.

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 are obtained by assigning varying degrees of risk to five categories for each hazard: probability, impact, spatial extent, warning time, and duration. Each degree of risk is assigned a value ranging from 1 to 4 and a weighing factor for each category was agreed upon by the LPT. Based upon any unique concerns for the planning area, the LPT may also adjust the RF weighting scheme.

To calculate the RF value for a given hazard, the assigned risk value for each category is multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the example equation:

$$\text{RF Value} = [(Probability \times .30) + (Impact \times .30) + (Spatial \text{ Extent} \times .20) + (Warning \text{ Time} \times .10) + (Duration \times .10)]$$

# Mercer County Hazard Mitigation Plan 2011

Table 4-23. Risk Assessment Criteria

Risk Assessment Category	Level	Degree of Risk Criteria	Index	Weight Value
<b>PROBABILITY</b> What is the likelihood of a hazard event occurring in a given year?	UNLIKELY	LESS THAN 1% ANNUAL PROBABILITY	1	30%
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY	2	
	LIKELY	BETWEEN 10 & 100% ANNUAL PROBABILITY	3	
	HIGHLY LIKELY	100% ANNUAL PROBABILITY	4	
<b>IMPACT</b> <i>In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?</i>	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	
<b>SPATIAL EXTENT</b> <i>How large of an area could be impacted by a hazard event? Are impacts localized or regional?</i>	NEGLECTIBLE	LESS THAN 1% OF AREA AFFECTED	1	20%
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED	2	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED	3	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED	4	
<b>WARNING TIME</b> <i>Is there usually some lead time associated with the hazard event? Have warning measures been implemented?</i>	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	
<b>DURATION</b> <i>How long does the hazard event usually last?</i>	LESS THAN 6 HRS	SELF DEFINED	1	10%
	LESS THAN 24 HRS	SELF DEFINED	2	
	LESS THAN 1 WEEK	SELF DEFINED	3	

	<b>MORE THAN 1 WEEK</b>	SELF DEFINED	<b>4</b>
--	-----------------------------	--------------	----------

According to the default weighting scheme applied, the highest possible RF value is 4.0. **Error! Reference source not found.** illustrates the categories used to calculate the variables for the RF Value. The results of the RF Analysis are illustrated in **Error! Reference source not found.**

**Table 4-24. Risk Factor Analysis Results**

	Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	RF Factor
<b>Natural Hazards</b>	Flooding	3	2	4	2	3	<b>2.8</b>
	Winter Storms	4	2	4	1	3	<b>3</b>
	Tornadoes, Hurricanes, & Windstorms	1	3	3	4	1	<b>2.3</b>
	Drought	2	1	4	1	4	<b>2.2</b>
	Subsidence / Landslides	2	1	1	1	1	<b>1.3</b>
	Earthquakes	1	1	2	4	1	<b>1.5</b>
	Pandemic	2	1	4	1	4	<b>2.2</b>
<b>Human-Made Hazards</b>	Dam Failure	1	3	3	4	3	<b>2.5</b>
	Hazardous Materials	3	3	3	3	2	<b>2.9</b>
	Fire Hazards	3	1	1	4	1	<b>1.9</b>
	Transportation Accidents	2	1	2	4	1	<b>1.8</b>
	Energy Emergencies	1	3	4	4	1	<b>2.5</b>
	Fixed Nuclear Facility	1	3	4	4	2	<b>2.6</b>
	Terrorism or Civil Disturbance	2	2	1	3	2	<b>1.9</b>

Based on the Risk Factor Analysis, the Natural Hazard with the highest risk potential is Severe Winter Weather, which has a value of 3.0. This is primarily due to the probability and spatial extent of the damage within the affected areas. Flooding was calculated as second in risk potential, with a value of 2.8.

The Human-Made Hazard with the highest risk potential was found to be Hazardous Materials, with a value of 2.9. This is primarily due to fact that hazardous materials events can occur at any time and location based on the type of event. The events could 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. The second highest-ranked risk was tied between dam failure and nuclear incident. This is partially due to the high level of devastation that would be associated with a major accident at a nuclear facility or a total dam failure.

The top four risks identified in the 2004 HMP were flooding, severe winter weather, thunderstorms/tornadoes, and hazardous materials. This RF analysis generally reflects the findings of the original 2004 HMP and the Mercer LPT. The RF analysis demonstrated that dam failures and nuclear incidents may represent a higher risk than thunderstorms and tornadoes.

### 4.4.3. Potential Loss Estimates

The County does not currently have the capability to categorize the structures in the floodplain as residential/non-residential. This information was requested from FEMA but was not received prior to the current plan expiration. Potential loss estimates were not calculated for the following hazards: severe winter weather, drought, urban fires, hazardous material releases, thunderstorms and tornadoes, dam failure, landslide, mine subsidence, nuclear incidents, and terrorism. For such hazards as terrorism, hazardous material releases, drought, and nuclear incidents, there are too many variables to consider in generating a cost of such a hazard event occurrence. For the remaining hazards, necessary structure data such as the number of stories, building code it was built under, presence of basement, and construction type that is necessary to determine damage and replacement values (the cost to rebuild) was not available from the Mercer County tax assessment database at the time this Plan was developed. Market value is not available from the tax assessment; only the assessed value is provided making a thorough loss estimate difficult.

#### *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.

HAZUS was used to calculate general loss values. The full HAZUS report is provided in Appendix C. A map (Figure 4-1) 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 2011 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 Mercer County are estimated to equal \$428,430,000. Residential occupancies make up 20.34% of the total estimated building-related losses. Figure 4-14 shows a distribution of building-related losses by census block across Mercer 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 \$432,690,000.



This page intentionally left blank.



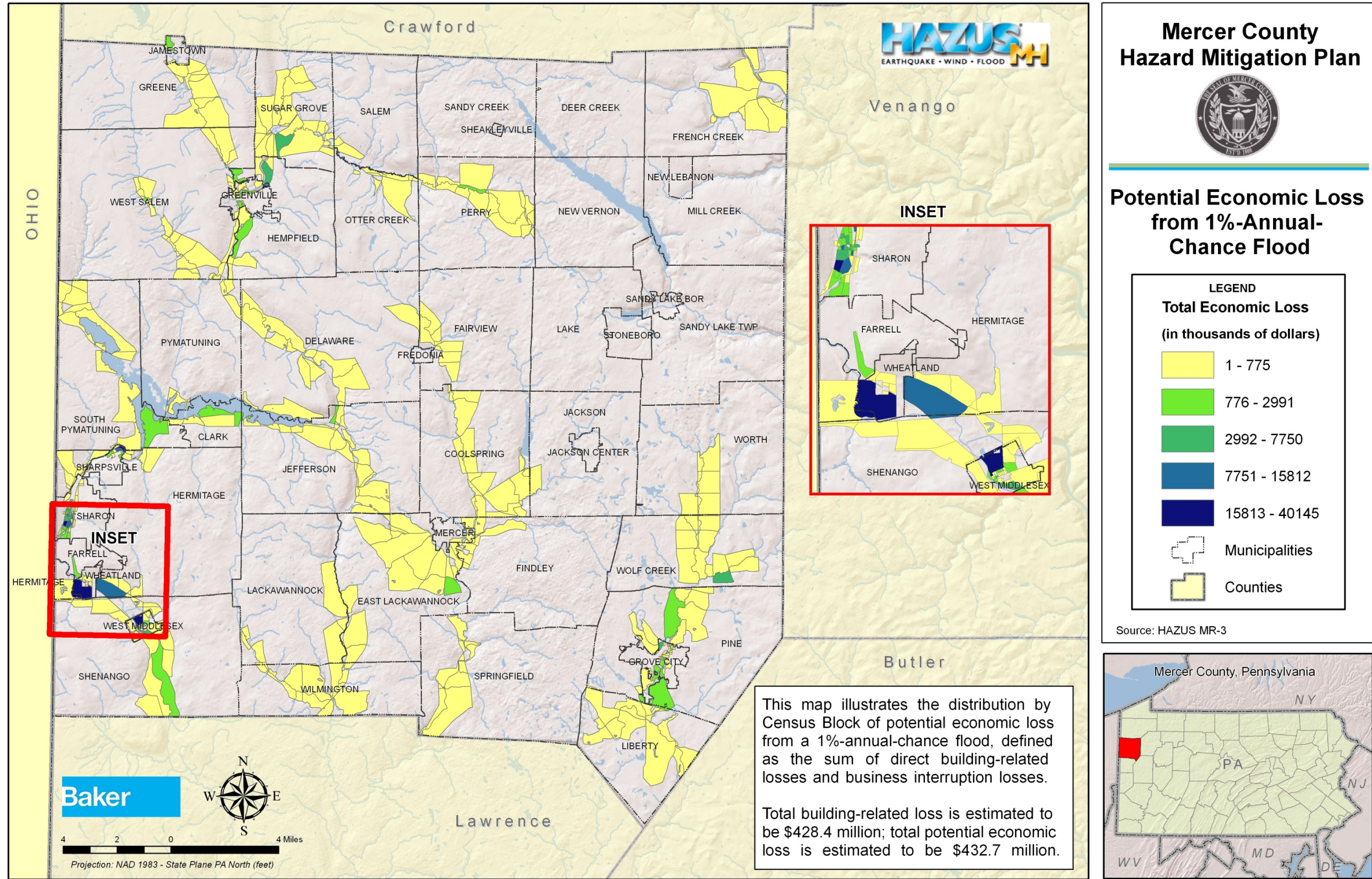


Figure 4-14. Potential Loss Estimate Based on HAZUS Report





### 4.4.4. Future Development and Vulnerability

Today, Mercer County contains 681 square miles inhabited by a half urban and half rural population. The 2000 Census of population count was 120,293, down 0.6 percent from the 1990 population of 121,003. The 2000 Census establishes a population that has stabilized since the dramatic population loss of the 1980s.

State projected growth for Mercer County from 1990-2000 did not occur. County population projections available from the Pennsylvania State Data Center were prepared prior to the Census 2000. The projections indicated that moderate growth at a rate of 1.1 percent would occur from 1990 to 2000, and would continue at similar rates until the projection horizon of 2020. The 2000 Census demonstrated that such growth did not occur.

Population projections were prepared by Pennsylvania for its 67 counties between 1990 and 2000. These population projections were considered as part of the 2004 Plan. Those projections indicated that Mercer County could expect an additional 859 residents (a 0.7 percent increase) in population by 2010, and another 1,457 residents (a 1.2 percent increase) from 2010 to 2020. Unfortunately, the latest population estimates from the census indicate that Mercer County's population did not grow as projected. The County has lost population since 2000.

To address slowing population growth and sprawling land use patterns, the Mercer County Comprehensive Plan identified several 'growth strategies' in Mercer County to promote economic growth and development. The following is a list of desired outcomes from the land use planning and regulations from the Comprehensive Plan

- Provide technical guidance to municipal officials and local planning organizations.
- Guide new development in such a way as to retain a community's existing character.
- Continue Smart Growth Policy development and implementation.
- Ensure consistency between land use designations and the availability of public sewer and water capacity.
- Advance the application and capability of providing countywide GIS data, and expand coordination with public and private sector entities.
- Facilitate and incentivize multi-municipal planning efforts, joint and/or compatible zoning ordinances, and cooperative implementation agreements throughout the county, as well as with surrounding counties and states.
- Enhance and maintain the county's Future Land Use Map to ensure consistency with the county's Growth and Development Policy statement as stated in the previous chapter.
- Encourage stewardship of agricultural and forest land for recreation, timber production, wildlife habitat, and water quality protection. The natural resources action plan provides greater details regarding these recommended strategies.

These growth strategies will have a significant impact on land use, economic development, and potential hazard creation in Mercer County.

## *Mercer County Hazard Mitigation Plan 2011*

---

The Mercer County Comprehensive Plan also identified growth area factors that are relatively consistent with national site selection factors and Mercer County prospect requirements. These factors included: proximity to a major transportation corridor, sufficiently sized land; proximity to the 'path of progress'; location in close proximity to I-80; availability of a qualified workforce; and proximity to service amenities. The following sites, listed in order of market priority, have been selected as target locations to serve as the catalyst for implementing economic development. Detailed site investigations were not conducted as part of this study.

- 1) Exit 15 – I-80
- 2) Exit 113 – I-79/PA 208
- 3) Exit 4 – I-80/PA60/PA318





## **5. Capability Assessment**

### **5.1. Update Process Summary**

Mercer 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 Mercer LPT, this 2011 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.

The planning committee reviewed the previous capability assessment and determined that it needed updated. Updates include the following major elements:

- Incorporation of a detailed analysis of the NFIP participating communities.
- Updated and detailed look at the Planning, Regulatory, Administrative, Fiscal, and Political Capacities of the communities.

### **5.2. Capability Assessment Findings**

The results of the capability assessment surveys completed by the municipalities were collected, aggregated and analyzed. The individual assessments and the detailed results of the capability assessments are provided in Appendix F.

#### **5.2.1. Emergency Management**

The Mercer County Department of Public Safety 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 Mercer County. The plan is organized to correspond to the four phases of emergency management; mitigation, preparedness, response, and recovery. The Hazard Mitigation Plan (HMP) is a compliment to this plan. The HMP identifies critical facilities and areas that are greatly affected by specific hazards. The EOP when using the HMP can better plan out preparedness, response, and recovery techniques to further reduce damage from hazards.

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 Public Safety. Mercer County updates the EOP every 2 years. The next update will occur in 2012.

### **5.2.2. Participation in the National Flood Insurance Program**

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.

**Mercer County Hazard Mitigation Plan 2011**

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 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 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.

The following table lists the Mercer County municipalities participating in the NFIP. Only two municipalities (Deer Creek Township and Sheakleyville Borough) do not participate in the Program. There are no communities in Mercer County participating in the NFIP Community Rating System.

**Table 5-1. National Flood Insurance Program Communities**

<b>Community Name</b>	<b>CID</b>	<b>Initial FIRM Identified</b>	<b>Current Effective Map Date</b>
<b>Clark Borough</b>	422475#	07/30/82	07/30/82(M)

## Mercer County Hazard Mitigation Plan 2011

Community Name	CID	Initial FIRM Identified	Current Effective Map Date
Coolspring Township	421863#	09/17/82	09/17/82(M)
Delaware Township	422283#	07/30/82	07/30/82(M)
East Lackawannock Township	421864#	07/23/82	07/23/82(M)
Fairview Township	421865	01/01/86	01/01/87(L)
Farrell, City	420673#	04/17/78	04/17/78
Findley Township	421866#	02/04/83	02/04/83(M)
Fredonia Borough	422477		(NSFHA)
French Creek Township	421867#	06/01/86	06/01/86(L)
Greene Township	422478	06/30/76	06/30/76(M)
Greenville Borough	420674#	07/16/81	07/16/81
Grove City Borough	420675#	09/30/77	09/30/77
Hempfield Township	421868#	02/15/91	02/15/91
Hermitage, City	421862#	07/09/76	09/30/81
Jackson Center Borough	422479#	06/18/82	06/18/82(M)
Jackson Township	422480#	12/19/1980	12/19/80(M)
Jamestown Borough	422481#	09/10/82	09/10/82(M)
Jefferson Township	421869	06/01/86	06/01/86(L)
Lackawannock Township	422482	06/30/76	06/30/76(M)
Lake Township	422483#	06/18/82	06/18/82(M)
Liberty Township	421870	06/01/86	06/01/86(L)
Mercer Borough	420676#	03/15/77	03/15/77
Mill Creek Township	421871#	12/17/1982	12/17/82(M)
New Lebanon Borough	422484#	09/10/82	09/10/82(M)
New Vernon Township	422485#	10/15/1982	10/15/82(M)
Otter Creek Township	422486	12/1/1986	12/01/86(L)
Perry Township	422487#	12/17/1982	12/17/82(M)
Pine Township	422284#	02/25/83	02/25/83(M)
Pymatuning Township	422285	06/01/89	06/01/89(L)
Salem Township	421872	05/01/86	05/01/86(L)
Sandy Creek Township	421873	05/01/86	10/01/86(L)
Sandy Lake Borough	420677#	03/18/91	03/18/91
Sandy Lake Township	421874#	09/03/82	09/03/82(M)
Sharon, City	420678#	10/17/1978	10/17/1978
Sharpsville Borough	420682		(NSFHA)
Shenango Township	421875#	09/04/91	09/04/91
South Pymatuning Township	421876#	03/18/91	03/18/91
Springfield Township	421877#	07/16/82	07/16/82(M)



## Mercer County Hazard Mitigation Plan 2011

Community Name	CID	Initial FIRM Identified	Current Effective Map Date
Stoneboro Borough	420679#	03/18/91	03/18/91
Sugar Grove Township	422489#	09/17/82	09/17/82(M)
West Middlesex Borough	420680#	09/04/91	09/04/91
West Salem Township	422490#	01/21/83	01/21/83(M)
Wheatland Borough	420681#	02/15/78	02/15/78
Wilmington Township	421878#	02/04/83	02/04/83(M)
Wolf Creek Township	422491#	06/25/82	06/25/82(M)
Worth Township	422492#	02/04/83	02/04/83(M)

**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. Table 5–2 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 Mercer LPT to cross-check municipal responses.

**Table 5-2. Planning and Regulatory Capability**

Planning & Regulatory Capability	Implementation
<b>Comprehensive Plan</b>	73%
<b>Zoning Regulations</b>	78%
<b>Subdivision Regulations</b>	89%
<b>Floodplain Regulations (self-reported and researched)</b>	65%
<b>National Flood Insurance Program</b>	96%

*Building Codes*

The adoption of various construction, property maintenance, and fire prevention codes are critical for quality construction and safety reasons. Therefore, the building code is increasingly recognized as an indispensable tool to promote the public health, safety and welfare through the establishment of minimum building/construction standards.

The building code is the basic regulation for new construction in a community. It also regulates the expansion, alteration and repair of existing structures. It includes requirements for the various special facilities and equipment, which may be placed in buildings, such as air conditioning, electrical, plumbing, heating, and other facilities, and elevators. Even though the building code appears to be complex, its adoption, implementation and enforcement enhance solid community development.

When properly adopted, administered and enforced, the building code can increase the quality of housing and can also promote the improvement and rehabilitation of older sections of a community.

The Uniform Construction Code (UCC) Administration and Enforcement Regulation has been approved by the Attorney General and was published in the January 10, 2004 Pennsylvania Bulletin. Publication of the administrative and enforcement regulation means that the municipal election period for enforcement, also known as the opt in/opt out period is set. During this period, all of Pennsylvania’s municipalities must decide how they will enforce the UCC — opt in for total enforcement or opt out of enforcement, in which case the Department of Labor and Industry would handle all commercial construction, while a certified third-party would handle residential construction in that municipality.

The grandfathering period has been set allowing all current code administrators to continue performing code-related work such as plan review and building inspections for a period of three years for residential projects and five years for commercial projects before they must meet the training and certification requirements of the UCC.

### *Zoning Ordinance & Subdivision Ordinance*

Mercer County has zoning and subdivision regulations. Of the two, zoning most directly affects land use patterns, while subdivision regulations speak more to the way in which raw land is physically prepared for development. How these ordinances function and how well they perform are vital to any overall land use recommendations, which are contained in the Mercer County Comprehensive Plan. 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. Out of the municipalities who completed Capability Assessment Surveys, 29 have an identified that they have a zoning ordinance. Mercer County does not have an adopted countywide zoning ordinance.

The Subdivision and Land Development Ordinance operates on a smaller scale than a Zoning Ordinance, but can be effective in achieving well planned new residential and commercial developments so as to insure the provision of adequate community facilities, public utilities, and streets plus an acceptable level of subdivision layout and design. Out of the municipalities who completed Capability Assessment Surveys, 33 identified that they have a subdivision ordinance or have adopted Mercer County's. Those municipalities not having an adopted ordinance fall under the Mercer County Subdivision and Land Development Ordinance.

### *Comprehensive Plan*

Mercer County currently has a Comprehensive Plan, which is simply a formally documented policy guide for the physical development of the county. It is an expression of how a county sees itself in the future, and a blueprint of how the county will achieve the future. Mercer County's Comprehensive Plan includes a variety of topics such as land use planning (subdivision and zoning ordinances), housing statistics, sanitary sewer project priorities, community facilities, recreation, libraries, museums schools, health and safety (fire protection, hospitals), physical environment description, energy conservation, transportation, and much more that can be used to help Mercer County prosper and grow. To date, 27 municipalities either have Comprehensive Plan or adopted the County's. Future comprehensive plan updates and improvements will consider 2011 HMP findings.

#### **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 Mercer 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 5-3. Administrative Capability**

Administrative Capability	Implementation
<b>Planners</b>	45%
<b>Engineers</b>	64%
<b>Scientists</b>	10%
<b>GIS (or HAZUS) staff</b>	17%
<b>Grant writers</b>	25%

**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.

**Table 5-4. Fiscal Capability**

<b>Fiscal Capability</b>	<b>Implementation</b>
<b>Capital improvements plan</b>	23%
<b>CDBG funds</b>	64%
<b>Special purpose taxes</b>	20%
<b>Development impact fees</b>	14%
<b>Partnering agreements</b>	67%

**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 3.32, 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 48 municipalities. The following table demonstrates the overall feeling of capabilities in Mercer County.



Table 5-5. Self-Assessment of Capabilities

<b>Overall Capability</b>	<b>Limited</b>	<b>Moderate</b>	<b>High</b>
<b>Planning and Regulatory Capability</b>	28%	53%	20%
<b>Administrative Capability</b>	43%	38%	20%
<b>Fiscal Capability</b>	75%	20%	5%
<b>Community Political Capability</b>	33%	55%	13%
<b>Community Resiliency</b>	33%	46%	21%

### **5.2.8. Existing Limitations**

The capability assessment revealed several weaknesses in the capability of the municipalities in Mercer 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 information provided in this plan and demonstrated in Appendix F shows the capability discovered after a cross-check performed by the Mercer 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.

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 six goals and sixteen objectives identified in the 2004 Mercer County Hazard Mitigation Plan. The goals address the hazards facing Mercer 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. 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 F 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 thirty-one actions identified in the 2004 Mercer 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 6–2. The 2004 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 6–2.

Based on stakeholder participation from the Mercer LPT, the following items have been updated for the 2011:

- Objectives were clarified to better document roles and responsibilities.
- Completed actions were deleted.
- New actions have been added to address particular hazards facing Mercer County and the consensus achieved in how to address those actions. The updated mitigation strategy is presented in Section 6.4.

\*\*For a complete table of which jurisdiction signed up for what action(s) for the 2011 update HMP please refer to Appendix E, entitled Mitigation Action Plan.

\*\*Additional Mitigation Actions that were created after gaps in data were identified, can also be found in Appendix E. The jurisdictions did not sign up for these actions. The County will serve as the designate lead and it is understood that the jurisdictions will cooperate and provide any data and/or assistance on obtaining data so that these gaps can be completed before the next HMP update.

Table 6-1. Five Year Mitigation Plan Review of Goals and Objectives in 2004 Plan

Goal	Objective	Continue	Change	Delete	Reason/Comment
<i>Attempt to reduce the current and future risk of flood damage in Mercer County</i>		X			
	1.1 Mercer County will attempt to reduce the current and future risk of 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	X			Continue both goal and objective.
	1.2 Review all comprehensive plans to ensure that designated growth areas are not in hazard areas	X			Mercer County Planning Dept. works with about 30 municipalities in the county.
	1.3 Adoption and enforcement of statewide Uniform Construction Code (UCC)			X	Current system is too expensive. Code inspection should be free. All municipalities are required to have a state-certified inspector by state law, so this is not needed in the County Plan.
	1.4 Review all capital improvement plans to ensure that infrastructure improvements are not directed towards hazardous areas	X			Good for public infrastructure.
	1.5 Evaluate and update existing floodplain ordinances to meet or exceed the NFIP standards	X			People in the county occasionally suffer property damage from floods after the municipality has permitted them to build there.



## Mercer County Hazard Mitigation Plan 2011

Goal	Objective	Continue	Change	Delete	Reason/Comment
	1.6 Improve the enforcement of existing floodplain regulations	X			
	1.7 Evaluate existing shelters to determine adequacy for current and future populations			X	All municipalities in the county are assigned Red Cross shelters.
<i>Reduce the potential impact of natural and man-made disasters on public and private property</i>		X			Flooding was originally placed in Goal 1 because of the high risk associated with the failure of the Shenango Dam.
	2.1 Encourage participation in the National Flood Insurance Program (NFIP)	X			Makes sense to enforce at the Municipal level.
	2.2 Protect Mercer County's most vulnerable populations, buildings and critical facilities through the implementation of cost-effective and technically feasible projects		X		Should be rewritten in simpler form, easier to understand. Identify "vulnerable populations" (e.g. seniors, children, hospitals, etc.), and equipment needed to help these populations.
<i>Improve upon the protection of the citizens of Mercer County from all natural and man-made hazards</i>		X			
	3.1 Ensure adequate training and resources for emergency organizations and personnel	X			Fire Departments don't always check firefighters' training to ensure it is up to date.
	3.2 Improve emergency preparedness in Mercer County and its municipalities	X			

Goal	Objective	Continue	Change	Delete	Reason/Comment
	3.3 Improve coordination and communication among disaster response organizations, local, and county governments	X			Communities participate in VOAD Volunteer Organizations Some municipalities have warning systems, some do not
<b>Reduce or redirect the impact of natural disasters (especially floods) away from at-risk population areas</b>		X			
	4.1 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	X			Should be more localized because not too many areas in Mercer County are at high risk for flooding. Retention ponds should be required at county level. Run-off Plan is currently being developed and ordinances are being adopted, hopefully during July, 2011.
<b>Protect existing natural resources and open space, including parks and wetlands, within the floodplain and watershed to improve their flood control function</b>		X			
	5.1 Protect Mercer County's natural resources through the implementation of cost-effective and technically feasible mitigation projects	X			Good to protect open space, water bodies, and wetlands

## Mercer County Hazard Mitigation Plan 2011

Goal	Objective	Continue	Change	Delete	Reason/Comment
<b><i>Protect public health, safety, and welfare by increasing the public awareness of existing hazards and by fostering both individual and public responsibility in mitigating risks due to those hazards</i></b>		<b>X</b>			
	6.1 Develop and distribute public awareness materials about natural hazard risks, preparedness, and mitigation	<b>X</b>			Documents are published related to emergency situations such as HazMat spills.
	6.2 Target owners of properties within identified hazard areas for additional outreach regarding mitigation and disaster preparedness	<b>X</b>			

## Mercer County Hazard Mitigation Plan 2011

**Table 6-2. Five Year Mitigation Plan Review for Actions in 2004 Plan**

Action	Review Comments
	*Term Ongoing refers to an action that has not been fully completed with no definite date determined
<b>Goal 1 / Objective 1.1 Actions</b>	
1.1.1 Mercer County Planning Office and 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.	Ongoing*
<b>Goal 1 / Objective 1.2 Actions</b>	
1.2.1 Mercer County Planning Office and applicable Municipal Offices to review their comprehensive plans to ensure that designated growth areas are not in high hazard areas.	Ongoing*
<b>Goal 1 / Objective 1.3 Actions</b>	
1.3.1 County Planning Office and Municipal Offices to review the statewide Uniform Construction Code to ensure the enforcement thereof.	Deleted
<b>Goal 1 / Objective 1.4 Actions</b>	
1.4.1 County and applicable Municipal Offices to review their capital improvement plans to ensure programmed infrastructure improvements are not in high hazard areas.	Ongoing*
<b>Goal 1 / Objective 1.5 Actions</b>	
1.5.1 County and applicable Municipalities to review and update their floodplain ordinances to be sure that they are in full compliance with the NFIP.	Ongoing*
<b>Goal 1 / Objective 1.6 Actions</b>	
1.6.1 Mercer County will arrange with PEMA to hold training sessions with the County and the municipalities on the National Flood Insurance Program requirements.	Training sessions to be held in Spring 2011
<b>Goal 1 / Objective 1.7 Actions</b>	
1.7.1 Ensure that all shelters within Mercer County have adequate emergency power resources and are not in high hazard areas. Work with the American Red Cross towards upgrading all shelter resources.	Deleted
1.7.2 Establish a protocol for the sharing of annual shelter survey information between the local ARC Chapter and the Mercer County Dept. of Public Safety by holding an annual work session 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 are unmet.	Deleted

## Mercer County Hazard Mitigation Plan 2011

Action	Review Comments
	*Term Ongoing refers to an action that has not been fully completed with no definite date determined
This will benefit all areas of Mercer County in the event of the need to open shelters.	
<b>Goal 2 / Objective 2.1 Actions</b>	
2.1.1 Local and state to conduct outreach efforts to educate municipalities and citizens about the NFIP and its requirements. Could be accomplished at Local Quarterly Training and/or Twp. Supervisors School.	Ongoing*
2.1.2 County to obtain updated information on the number of NFIP policyholders in Mercer County and its municipalities from PEMA and FEMA.	Ongoing*
<b>Goal 2 / Objective 2.2 Actions</b>	
2.2.1 Work with PEMA and FEMA to collect updated information of the number and location of all repetitive loss properties throughout the county and the municipalities in order to plan future mitigation activities such as raising electrical services and initiating property buy-outs.	Ongoing*
2.2.2 County and Northwest Commission to develop a database using a GIS System, when the technology becomes available, of information on all repetitive loss properties including maps to be used in future mitigation activities.	Ongoing*
<b>Goal 2 / Objective 2.3 Actions</b>	
2.3.1 Geographic Information Systems (GIS) are designed to help manage spatial information. More than simple computerized maps, a GIS assigns data to specific locations. The data are then searchable, and spatial relationships can easily be analyzed. Mercer County needs to develop a GIS with the Mercer County DPS having direct access to the data. The logical responsible entities to complete this project would be the County Commissioners and County Planning Commission.	To be implemented in Spring 2011
<b>Goal 3 / Objective 3.1 Actions</b>	
3.1.1 DPS to conduct annual tabletop disaster exercises with local law enforcement, emergency managers, county and local officials, and other disaster response agencies. Types of exercises to include: Flood Exercise, Weapons of Mass Destruction Exercise, Hazardous Materials Spill Exercise, Weather Exercise and Biological Terrorism Exercise.	To be conducted in Summer 2011
3.1.2 Provide information about local, regional, state, and federal training opportunities to fire departments, EMS, ambulance services, and	To be provided in Summer 2011



## Mercer County Hazard Mitigation Plan 2011

Action	Review Comments
	<b>*Term Ongoing refers to an action that has not been fully completed with no definite date determined</b>
other emergency responders. Develop a list of training opportunities that are available and distribute the list to all local emergency responders. This will benefit all areas of Mercer County.	
3.1.3 Continue to conduct National Weather Service SKYWARN classes by partnering with the National Weather Service to provide training to people throughout Mercer County on Skywarn, all weather preparedness.	<b>To be conducted in Summer 2011</b>
<b>Goal 3 / Objective 3.2 Actions</b>	
3.2.1 Review the existing Mercer County Emergency Operations Plan (EOP) and update where necessary, based on the recommendations of the Mercer County Hazard Mitigation Plan. Include participation from all municipalities in the update process by ensuring that their EOP's are reviewed and updated annually.	To be reviewed in Fall 2011
<b>Goal 3 / Objective 3.3 Actions</b>	
3.3.1 Develop a plan to update the Communications Center equipment to allow faster more timely warning notifications to mitigate the results of a natural, manmade or technological emergency.	To be developed 2010
3.3.2 Research the possibility of installing Alert Warning Sirens to reach all populated areas throughout the County.	To be researched 2010
3.3.3 Distribution of NOAA Weather Radios to Mercer County municipalities, schools, hospitals, nursing homes, day care centers, libraries, malls, SARA Facilities to initiate earlier warnings to minimize the impact of an emergency on the community.	Ongoing*
<b>Goal 4 / Objective 4.1 Actions</b>	
4.1.1 Review the questionnaires returned by the municipalities and consider ways to best mitigate the effects of the hazards which the municipalities are most vulnerable to.	Ongoing*
4.1.2 Categorize and submit Hazard Mitigation Project Opportunity Forms for the municipalities that returned them upon request.	Revised Action that is Ongoing*
<b>Goal 5 / Objective 5.1 Actions</b>	
5.1.1 When GIS technology is available to Mercer County we would develop a database of natural resources areas including maps to be used in future mitigation activities.	To be developed in 2010
5.1.2 When funds become available for hard mitigation projects, the county plans to hold	Ongoing*

## Mercer County Hazard Mitigation Plan 2011

Action	Review Comments *Term Ongoing refers to an action that has not been fully completed with no definite date determined
meetings to identify high-risk properties in the county and to review the mitigation opportunities submitted by the municipalities.	
<b>Goal 6 / Objective 6.1 Actions</b>	
6.1.1 Use the media for the distribution and publication of hazard information by sending news releases to local newspapers, radio and TV stations about pre-disaster information. Design to reach all areas of Mercer County.	Ongoing*
6.1.2 Work with the American Red Cross to ensure that citizen's disaster classes are held on a frequent basis and that there is not a duplication of services. The American Red Cross holds a variety of courses to educate the public and responders to mitigate the effects of an emergency situation. Some courses offered: CPR, first aid, mass care, shelter ops., etc.	Ongoing*
6.1.3 Continue to provide public speaking series on hazard related topics which include, how to develop and family disaster plan and disaster supply kit, sheltering in place, development of a business continuity plan, and sheltering in place, how to use 9-1-1. These topics of instruction are offered to the civic groups such as Rotary, Kiwanis, Chamber of Commerce, local churches, scout groups.	Ongoing*
6.1.4 Update the county website to provide hazard related information that is easily accessible. The County website has information about disaster preparedness and related activities. The plan is to expand and update the website as needed and as appropriate in a timely manner to benefit all County residents.	Ongoing*
6.1.5 Develop a County Resource Directory, including all municipal equipment that can be updated and accessed via the County website. A central resources directory will expedite mitigation and recovery efforts.	Ongoing*
<b>Goal 6 / Objective 6.2 Actions</b>	
6.2.1 Continue working with representatives from NFIP to hold local course on the National Flood Insurance Program (NFIP) for realtors, bankers, and insurers to be attended from all areas of Mercer County.	Ongoing*

After reviewing the mitigation action items from the 2004 Plan, the Mercer LPT evaluated the actions using the PA STEEL approach. The PA STEEL approach allows for a careful review of the feasibility of mitigation actions by using seven criteria. The criteria are described below:

- P Political
- A Administrative
- S Social
- T Technical
- E Economic
- E Environmental
- L Legal

Appendix G offers a detailed summary of the criteria used to rank the actions and the results of this evaluation. 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 PA STEEL 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).

### **6.2. Mitigation Goals and Objectives**

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

## Mercer County Hazard Mitigation Plan 2011

Table 6-3 Goal 1 and Objectives

Goal	Objective
<p><b>1.0</b> Attempt to reduce the current and future risk of flood damage in Mercer County</p>	<p>1.1 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</p>
	<p>1.2 Municipalities to review all comprehensive plans to ensure that designated growth areas are not in hazard areas</p>
	<p>1.3 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.</p>
	<p>1.4 Evaluate and update existing floodplain ordinances to meet or exceed the NFIP standards</p>
	<p>1.5 Improve the enforcement of existing floodplain regulations</p>

Table 6-4. Goal 2 and Objectives

Goal	Objective
<p><b>2.0</b> Reduce the potential impact of natural and man-made disasters on public and private property</p>	<p>2.1 Encourage participation in the National Flood Insurance Program</p>
	<p>2.2 Protect Mercer County's most vulnerable populations (e.g. schools, senior citizens, hospital patients, etc.), buildings, and critical facilities with the purchase of appropriate equipment (e.g. generators, busses, etc.)</p>
	<p>2.3 To enhance the existing information resources available to Mercer County Department of Public Safety</p>

**Table 6-5. Goal 3 and Objectives**

Goal	Objective
<p><b>3.0</b> Improve upon the protection of the citizens of Mercer County from all natural and man-made hazards</p>	<p>3.1 Ensure adequate training and resources for emergency organizations and personnel for certification</p>
	<p>3.2 Improve emergency preparedness in Mercer County and its municipalities</p>
	<p>3.3 Evaluate cost-effective ways of augmenting existing broadcast and communication systems to monitor warning information continuously and to disseminate appropriate warnings</p>

**Table 6-6. Goal 4 and Objectives**

Goal	Objective
<p><b>4.0</b> Reduce or redirect the impact of natural disasters (especially floods) away from at-risk population areas</p>	<p>4.1 Research and implement mitigation projects to reduce flooding, reduce/eliminate sewage leakage and inflow/infiltration problems. Projects for review and implementation include reservoirs, levees, floodwalls, diversions, channel modification and storm sewers, as well as, acquisition, elevation and relocation of properties in the floodplain.</p>

**Table 6-7. Goal 5 and Objectives**

Goal	Objective
<p><b>5.0</b> Protect existing natural resources and open space, including parks and wetlands, within the floodplain and watershed to improve their flood control function</p>	<p>5.1 Protect Mercer County’s natural resources through the implementation of cost-effective and technically feasible mitigation projects</p>
	<p>5.2 Protect Mercer County’s natural resources through the implementation of recreation planning and storm water management planning</p>

Table 6-8. Goal 6 and Objectives

Goal	Objective
<p><b>6.0</b> Protect public health, safety, and welfare by increasing the public awareness of existing hazards and by fostering both individual and public responsibility in mitigating risks due to those hazards</p>	<p>6.1 Develop and distribute public awareness materials about natural hazard risks, preparedness, and mitigation</p>
	<p>6.2 Target owners of properties within identified hazard areas for additional outreach regarding mitigation and disaster preparedness</p>

**6.3. Identification and Analysis of Mitigation Techniques**

In order to ensure that a broad range of mitigation actions were considered, the Mercer LPT 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 Mercer 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.

Table 6–9 provides a matrix identifying the mitigation techniques used for the moderate and 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 included in Section 6.4.

**Table 6-9. Mitigation Strategy Matrix**

Mitigation Category	High and Moderate Risk Hazards			
	Floods	Severe Winter Weather	Dam Failure	Hazardous Materials
Prevention	✓	✓	✓	✓
Property Protection	✓	✓	✓	
Natural Resource Protection	✓			
Structural Projects			✓	
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 December 7, 2009 to develop a framework for the County Mitigation Action Plan (see meeting minutes in Appendix F). 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 Mercer County. More than one action is identified for several hazards. Appendix E specifically details the communities responsible for each action item. The following actions address continued compliance and improved participation with the National Flood Insurance Program:

- 1.4.1;
- 1.5.1;
- 2.1.1;
- 2.1.2;
- 2.2.1;
- 2.2.2;
- 2.3.1; and
- 6.2.1.

**Table 6-10. Mitigation Actions for Goal 1**

<b>Mitigation Category</b>	<b>Action</b>	<b>Hazard Addressed</b>
Prevention	1.1.1 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 Flood Earthquake Subsidence Landslide Wildfire
Structural Projects	1.2.1 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 Flood Earthquake Subsidence Landslide Wildfire
Prevention	1.2.2 Planning department and applicable municipal offices enact an ordinance to require present and future mobile homes to install tie down anchors.	Tornadoes, High Winds

## Mercer County Hazard Mitigation Plan 2011

Mitigation Category	Action	Hazard Addressed
Prevention	1.3.1 Encourage applicable municipal offices to review their capital improvement plans to ensure that programmed infrastructure improvements are not in high-hazard areas.	Dam Failure Flood Earthquake Subsidence Landslide Wildfire
Prevention	1.4.1 Applicable municipalities to review and update their floodplain ordinances to be sure that they are in full compliance with the NFIP.	Flood NFIP
Prevention	1.5.1 For Mercer County DPS to arrange with PEMA/FEMA/DCED to hold training sessions with the County and the municipalities on the NFIP requirements.	Flood NFIP
Prevention	1.6.1 Review and update all existing ordinances and other regulatory planning mechanisms with respect to findings included in the 2011 HMP. <b>(New for 2011 HMP Update)</b>	All
Prevention	1.7.1 Adopt an Act 167 Stormwater Management Plan <b>(New for 2011 HMP Update)</b>	Flood
Prevention	1.8.1 Identify a floodplain manager within the Municipality so that the public could obtain and/or view them by contacting the Secretary <b>(New for 2011 HMP Update)</b>	Flood NFIP

**Table 6-11. Mitigation Actions for Goal 2**

Mitigation Category	Action	Hazard Addressed
Prevention	2.1.1 County DPS and PEMA to conduct outreach efforts to educate municipalities about the NFIP and its requirements	Flood NFIP
Prevention	2.1.2 County to obtain updated information on the number of NFIP policyholders in Mercer County and its municipalities from PEMA and FEMA	Flood NFIP
Prevention	2.2.1 DPS to work with municipalities to collect updated information of the number and location of all repetitive loss properties throughout the county and the municipalities in order to plan future mitigation activities	Flood NFIP
Public Education and Awareness	2.2.2 County to work with the Northwest Planning Commission to develop a database in existing hazard GIS system of information on all repetitive loss properties including maps to be used in future mitigation activities	Flood NFIP

## Mercer County Hazard Mitigation Plan 2011

Property Protection & Public Education	2.3.1 Geographic Information Systems (GIS) are designed to help manage spatial information. More than simple computerized maps, a GIS assigns data to specific locations. The data are then searchable, and spatial relationships can easily be analyzed. Mercer County needs to develop a GIS with the Mercer County DPS having direct access to the data. The logical responsible entities to complete this project would be the County Commissioners and County Planning Commission.	Flood NFIP
Emergency Services	2.3.2 Assist with coordination between county residents and utility companies on critical outage events. <b>(New for 2011 HMP Update)</b>	All
Public Education and Awareness	2.4.1 Provide property owners with information how they can obtain and purchase flood insurance from the NFIP. <b>(New for 2011 HMP Update)</b>	Flood NFIP

Table 6-12. Mitigation Actions for Goal 3

Mitigation Category	Action	Hazard Addressed
Emergency Services	3.1.1 DPS to conduct annual tabletop disaster exercises with local law enforcement, emergency managers, county and local officials, and other disaster response agencies. Types of exercises to include: Flood Exercise, Weapons of Mass Destruction Exercise, Hazardous Materials Spill Exercise, Weather Exercise and Biological Terrorism Exercise.	All
Emergency Services	3.1.2 DPS to work with the Mercer Fire Association, Mercer Hospital EMS and the Sheriff's Department to increase the number of trained citizen emergency responders by meeting with groups of potential volunteers. All areas of Mercer County will benefit.	All
Emergency Services	3.1.3 DPS to provide information about local, regional, state, and federal training opportunities to fire departments, EMS, ambulance services, and other emergency responders. Develop a list of training opportunities that are available and distribute the list to all local emergency responders. Will benefit all areas of Mercer County.	All
Emergency Services	3.1.4 Continue to conduct National Weather Service Storm Spotter classes by partnering with the National Weather Service to provide training to people throughout Mercer County on SKYWARN, all weather preparedness.	Flood Thunderstorms Tornadoes

## Mercer County Hazard Mitigation Plan 2011

Emergency Services	3.2.1 Review the existing Mercer County Emergency Operations Plan (EOP) and update when necessary based on the recommendations of the Mercer County Hazard Mitigation Plan. Include participation from all municipalities in the update process by ensuring that their EOPs are reviewed and updated annually.	All
Emergency Services	3.2.2 Mercer County has obtained a bus to be used as an emergency command vehicle. We would like to complete it to be used to respond to emergencies within the county.	All
Emergency Services	3.2.3 A temporary water supply should be established for persons with no water in the event of a dam failure.	Dam
Emergency Services	3.3.1 Develop a plan to update the Communications Center equipment to allow faster more timely warning notifications to mitigate the results of a natural, manmade or technological emergency.	All
Emergency Services	3.3.2 Research the possibility of installing a Notification System to reach all populated areas throughout the County.	All
Emergency Services	3.3.3 Distribution of NOAA Weather Radios to Mercer County municipalities, schools, hospitals, nursing homes, day care centers, libraries, malls, SARA Facilities to initiate earlier warnings to minimize the impact of an emergency on the community.	All

**Table 6-13. Mitigation Actions for Goal 4**

Mitigation Category	Action	Hazard Addressed
Structural Projects	4.1.1 Continue to review Hazard Mitigation Questionnaires and post-disaster reviews submitted by the municipalities.	All
Structural Projects	4.1.2 Submit Hazard Mitigation Project Opportunity Forms for acquisition, elevation and relocation of properties in the floodplain and other flood mitigation projects.	Flood and Hurricane
Prevention/Emergency Response	4.2.1 Coordinate with the Pennsylvania Department of Transportation on winter storm response and snow removal <b>(New for 2011 HMP Update)</b>	Winter Storm

## Mercer County Hazard Mitigation Plan 2011

Table 6-14. Mitigation Actions for Goal 5

Mitigation Category	Action	Hazard Addressed
Natural Resource Protection	5.1.1 County to develop a database in existing GIS system of all natural resource areas including maps to be used in future mitigation activities.	Natural Resource Protection
Natural Resource Protection	5.1.2 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.	Flood
Natural Resource Protection	5.2.1 Planning Department to continue the development of the County-wide Storm water Management Plan within the next 5 years. <b>(New for 2011 HMP Update)</b>	Flood Water Pollution
Natural Resource Protection	5.2.2 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. <b>(New for 2011 HMP Update)</b>	Flood

Table 6-15. Mitigation Actions for Goal 6

Mitigation Category	Action	Hazard Addressed
Public Education and Awareness	6.1.1 Use the media for the distribution and publication of hazard information by sending news releases to local newspapers, radio and TV stations about pre-disaster information. Design to reach all areas of Mercer County.	All
Public Education and Awareness	6.1.2 Work with the American Red Cross to ensure that citizen's disaster classes are held on a frequent basis and that there is not a duplication of services. The American Red Cross holds a variety of courses to educate the public and responders to mitigate the effects of an emergency situation. Some courses offered: CPR, first aid, mass care, shelter ops., etc.	All



## Mercer County Hazard Mitigation Plan 2011

Public Education and Awareness	6.1.3 Continue to provide public speaking series on hazard related topics which include, how to develop and family disaster plan and disaster supply kit, sheltering in place, development of a business continuity plan, and sheltering in place, how to use 9-1-1. These topics of instruction are offered to the civic groups such as Rotary, Kiwanis, Chamber of Commerce, local churches, and scout groups.	All
Public Education and Awareness	6.1.4 Update the county website to provide hazard related information that is easily accessible. The County website has information about disaster preparedness and related activities. The plan is to expand and update the website as needed and as appropriate in a timely manner to benefit all County residents.	All
Public Education and Awareness	6.1.5 Develop a County Resource Directory, including all municipal equipment that can be updated and accessed via the County website. A central resources directory will expedite mitigation and recovery efforts.	All
Public Education and Awareness	6.2.1 Continue working with representatives from NFIP to hold local course on the National Flood Insurance Program (NFIP) for realtors, bankers, and insurers to be attended from all areas of Mercer County.	Flood NFIP
Public Education and Awareness	6.2.2 Educate residents on keeping drainage ditches clear through yearly mailings as well as water and sewer bills as reminders. <b>(New for 2011 HMP Update)</b>	Flood
Public Education and Awareness	6.2.3 Educate the public on how to make use of a yard sump to minimize drainage into sewer systems. <b>(New for 2011 HMP Update)</b>	Flood
Public Education and Awareness	6.2.4 Educate the public on the damages associated with high winds in combination with loose debris, and standing objects near buildings, such as trees. <b>(New for 2011 HMP Update)</b>	Tornadoes, High Winds
Emergency Services	6.2.5 Set up a site and identify a place where vaccinations and medical supplies could be distributed <b>(New for 2011 HMP Update)</b>	All

\*\*For a complete table of which jurisdiction signed up for what action(s) for the 2011 update HMP please refer to Appendix E, entitled Mitigation Action Plan.

\*\*Additional Mitigation Actions that were created after gaps in data were identified, can also be found in Appendix E. The jurisdictions did not sign up for these actions. The County will serve as the designate lead and it is understood that the jurisdictions will cooperate and provide any data and/or assistance on obtaining data so that these gaps can be completed before the next HMP update.

This page intentionally left blank.

## **7. Plan Maintenance**

### **7.1. Update Process Summary**

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Mercer 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 local planning team reviewed the plan maintenance from the 2004 Plan and determined that updates were needed and include the following major elements:

- Including an annual review of the hazard mitigation plan.
- Emphasize the need for more public involvement in the updating process.

### **7.2. Monitoring, Evaluating and Updating the Plan**

The Mercer LPT 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. Mr. Frank Jannetti along with Mr. John Nicklin will be responsible for making sure that maintenance procedures are carried out, meetings are held annually to discuss progress on mitigation projects, and that in the event of a disaster the HMP will be reviewed and modified as necessary.

The LPT 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. The LPT 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 Mercer LPT will meet annually to discuss specific coordination efforts that may be needed with other stakeholders. In addition, it will also serve in an advisory capacity to the Mercer County Board of Commissioners and the Department of Public Safety.

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 LPT 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 LPT 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

## ***Mercer County Hazard Mitigation Plan 2011***

---

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 LPT 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 Mercer 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. Based upon this review and the review of the 2004 HMP, municipalities agreed that minimal action was taken in incorporating the 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 annual review process, the Mercer LPT 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 LPT 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 Mercer County Planning Commission Office, or the Mercer County Department of Public Safety. 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 LPT will incorporate all relevant comments during the next update of the hazard mitigation plan.

## 8. Plan Adoption and Resolutions

This section of the plan includes copies of the local adoption resolutions passed by Mercer County and its municipal governments including the municipalities listed below.

**Table 8-1. Participating Jurisdictions and Adoption Dates**

<b>Jurisdiction</b>	<b>2011 Adoption Date</b>
<b>Mercer County</b>	Pending
<b>Clark Borough</b>	Pending
<b>Coolspring Township</b>	Pending
<b>Deer Creek Township</b>	Pending
<b>Delaware Township</b>	Pending
<b>East Lackawannock Township</b>	Pending
<b>Fairview Township</b>	Pending
<b>Farrell, City</b>	Pending
<b>Findley Township</b>	Pending
<b>Fredonia Borough</b>	Pending
<b>French Creek Township</b>	Pending
<b>Greene Township</b>	Pending
<b>Greenville Borough</b>	Pending
<b>Grove City Borough</b>	Pending
<b>Hempfield Township</b>	Pending
<b>Hermitage, City</b>	Pending
<b>Jackson Center Borough</b>	Pending
<b>Jackson Township</b>	Pending
<b>Jamestown Borough</b>	Pending
<b>Jefferson Township</b>	Pending
<b>Lackawannock Township</b>	Pending
<b>Lake Township</b>	Non Participating
<b>Liberty Township</b>	Pending
<b>Mercer Borough</b>	Pending

## ***Mercer County Hazard Mitigation Plan 2011***

<b>Jurisdiction</b>	<b>2011 Adoption Date</b>
Mill Creek Township	Pending
New Lebanon Borough	Pending
New Vernon Township	Pending
Otter Creek Township	Pending
Perry Township	Pending
Pine Township	Pending
Pymatuning Township	Pending
Salem Township	Pending
Sandy Creek Township	Pending
Sandy Lake Borough	Pending
Sandy Lake Township	Pending
Sharon, City	Pending
Sharpsville Borough	Pending
Sheakleyville Borough	Pending
Shenango Township	Pending
South Pymatuning Township	Pending
Springfield Township	Pending
Stoneboro Borough	Pending
Sugar Grove Township	Pending
West Middlesex Township	Pending
West Salem Township	Pending
Wheatland Borough	Pending
Wilmington Township	Pending
Wolf Creek Township	Pending
Worth Township	Pending



Table 8-2 Jurisdiction Not Qualified Under the 2011 Hazard Mitigation Plan

Jurisdiction
Lake Township

The Plan was submitted to the Pennsylvania State Hazard Mitigation Officer on February 7, 2010. It was forwarded to the Federal Emergency Management Agency for final review and approval on XXX X, 2010. FEMA granted approval-pending-adoption on XXXXX. Full approval from FEMA was received on XXXXX. A copy of the adoption resolutions executed by Mercer County and the participating municipalities are included in this section.



**Mercer County 2011 Hazard Mitigation Plan  
County Adoption Resolution**

Resolution No. \_\_\_\_\_  
Mercer County, Pennsylvania

**WHEREAS**, the municipalities of Mercer 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**, Mercer 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 Mercer County 2011 Hazard Mitigation Plan has been developed by the Mercer County Department of Public Safety in cooperation with other county departments, local municipal officials, and the citizens of Mercer County, and

**WHEREAS**, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Mercer County 2011 Hazard Mitigation Plan, and

**WHEREAS**, the Mercer County 2011 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 Mercer that:

- The Mercer County 2011 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 Mercer County 2011 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

**ADOPTED**, this \_\_\_\_\_ day of \_\_\_\_\_, 2012

**ATTEST:**

\_\_\_\_\_

**MERCER COUNTY COMMISSIONERS**

By \_\_\_\_\_

By \_\_\_\_\_

By \_\_\_\_\_

**Mercer County 2011 Hazard Mitigation Plan  
Municipal Adoption Resolution**

Resolution No. \_\_\_\_\_

<Borough/Township of Municipality Name>, Mercer County, Pennsylvania

**WHEREAS**, the <Borough/Township of Municipality Name>, Mercer 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 Mercer County 2011 Hazard Mitigation Plan has been developed by the Mercer County Department of Public Safety 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 Mercer County 2011 Hazard Mitigation Plan, and  
**WHEREAS**, the Mercer County 2011 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 Mercer County 2011 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 Mercer County 2011 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

**ADOPTED**, this \_\_\_\_\_ day of \_\_\_\_\_, 2012

**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](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](http://www.globalsecurity.org/security/ops/hsc-scen-3_pandemic-history.htm).
- 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, 4<sup>th</sup> 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.

## Mercer County Hazard Mitigation Plan 2011

- 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. *Mercer 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/>.

## ***Mercer County Hazard Mitigation Plan 2011***

---

United States Nuclear Regulatory Commission (NRC). December 19, 2008. Retrieved at:  
<http://www.nrc.gov/about-nrc/emerg-preparedness/emerg-classification.html>.



This page intentionally left blank.

***Appendix B FEMA Crosswalk***

*Appendix C*

This page intentionally left blank.

*Appendix C      HAZUS Flood Report*

This page intentionally left blank.

***Appendix D      Municipal Flood Risk Maps***



*Appendix E*

This page intentionally left blank.

*Appendix E Mitigation Strategy Action Plan*

This page intentionally left blank.

***Appendix F Meeting Minutes and Participation  
Documentation***

This page intentionally left blank.

***Appendix G      PA STEEL Evaluation***



Appendix H

This page intentionally left blank.

*Appendix H      Dam Risk Evaluation*

This page intentionally left blank.

**4.3.8 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).

*4.3.8.1 Location and Extent*

Presently there are eleven dams located in Mercer County. Of these, seven (7) are County flood control dams, one private, one state and one federal-owned. One dam is located in Crawford County, which is the Pymatuning Dam. Failure of this dam would primarily effect the population of Mercer County and, therefore, is on the list with Mercer County.

A joint "Down Dam Evacuation Plan" has been established between Crawford County EM Coordinator and the Dam Supervisor with the office of the Mercer County EM. Mercer County has completed a "Down Dam Evacuation Plan" for all dams with the exception of the Shenango Dam, which is a Federal Dam and the Sugar Creek Dam, recently completed and a study is needed to be conducted by an Engineer prior to any plan being drawn.

*4.3.8.2 Range of Magnitude*

Dam safety laws are embodied in the Dam Safety and Encroachments Act ("DSE Act")-enacted July 1, 1979 and last amended in 1985. Rules pertaining to dam safety are found in Title 25- Rules and Regulations; Part I-Department of Environmental Resources; Subpart C-Protection of Natural Resources; Article II-Water Resources; Chapter 105-Dam Safety and Waterway Management ("the Rules")-adopted Sept. 16, 1980 ([www.damsafety.org](http://www.damsafety.org)). Rules have been supplemented by subsequent policy statements, which are incorporated into Chapter 105..

Dam height is the measurement expressed in feet as measured from the downstream toe of the dam at its lowest point to the elevation of the top of the dam (Rule 105.1). Dam classifications, found in the Rule 105.91, are based on size and hazard potential:

**Dam Hazard Classification System**

<b>Class</b>	<b>Impoundment Storage (ac-ft)</b>	<b>Dam Height (ft)</b>
<b>A</b>	50,000 or more	100 or more
<b>B</b>	< 50,000 but > 1000	< 100 but > 40

<b>C</b>	1000 or less	40 or less
----------	--------------	------------

**Dam Hazard Endangered Population Categories**

Category	Loss of Life	Economic Loss
<b>1</b>	Substantial	Excessive
<b>2</b>	Few	Appreciable
<b>3</b>	None Expected	Minimal

**4.3.8.3 Past Occurrence**

All County dams are inspected annually by an engineer. The Lake Latonka Dam received a "red cover" which was considered an unsafe dam with several deficiencies (e.g., slope instability, excessive seepage, inadequate spillway, etc.).

Upon correcting these deficiencies and re-inspection, Lake Latonka has been removed from the "unsafe" category to the "safe" category. Lake Latonka Dam was the only dam to have a failure in Mercer County. This was in 1966. In October 1966, a youth had noticed a potential dam failure at the Lake Latonka Dam. Water and dirt were being forced out around the sides of the center block. Lake Latonka Board and all concerned were notified. The Dam waters were lowered and repairs made.

The Dam Safety Act of 1978 provides for the regulations of dams and reservoirs in the Commonwealth. The Mercer County Emergency Management Agency maintains a copy of the warning and evacuation plans, generated in accordance with the Act, for each applicable dam in the county and for those outside the county, which could affect the county.

**4.3.8.4 Future Occurrence**

Provided that adequate engineering and maintenance measures are in place, high hazard dam failures are unlikely in Mercer County. The presence of structural integrity and inspection programs significantly reduces the potential for major dam failure events to occur. Mercer County has minimal potential to be affected by dam failure, but the possibility exists. Each of the high hazard dams has Dam Failure, Dam Warning, and Evacuation Plans in place in the event of an emergency.

**4.3.8.5 Vulnerability Assessment**

If any dams were to fail, the following is a list of these dams with the total population vulnerable to the effects:

- Hadley (PA 489): 50 residents, 20 homes, 5 businesses;
- Fairview Dam (PA-491): approximately 6 residents, 2 homes, 1 school with 20 students;
- Clarks Mills Dam (PA-490): 50 residents, 20 homes, 5 businesses;
- Stoneboro Dam (PA-474): 100 residents, 40 homes, 10 businesses;
- Saul Dam (PA-458): 125 residents, 50 homes, 10 businesses;
- Mathay Dam (PA-459): 125 residents, 50 homes, 10 businesses;

## *Mercer County Hazard Mitigation Plan 2011*

---

- Lake Latonka Dam (D43-49): 200 residents, 48 homes, 15 businesses;
- Lake Wilhelm Dam: 1,100 people;
- Crooked Creek Dam: 200 residents, 50 homes, 25 businesses and Greenville City Hall; Pine Run 50;
- Shenango Dam: 5,000+ residents; and
- Pymatuning Dam (DER #20-007): 22 miles through Jamestown and Greenville Boroughs, affecting various homes, schools, businesses and state and local roads and bridges.