



# Montour County 2021 Hazard Mitigation Plan



Prepared for:

Montour County  
EMA  
24 Wesner Lane  
Danville, PA 17821

Prepared by:

MCM Consulting Group,  
Inc.  
2595 Clyde Avenue, Suite  
#1  
State College, PA 16801



**Montour County, Pennsylvania**  
**2021 Hazard Mitigation Plan**

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**Certification of Annual Review Meetings**

YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED? *	SIGNATURE
2021			
2022			
2023			
2024			
2025			

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

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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## **Record of Changes**

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

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

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## **Executive Summary**

Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. Hazard mitigation focuses attention and resources on county and municipal policies and actions that will produce successive benefits over time. State and local governments engage in hazard mitigation planning to identify risks and vulnerabilities associated with natural as well as human-caused hazards and develop long-term strategies for protecting people and property from future hazard events. Mitigation plans are key to breaking the cycle of disaster damage, reconstruction, and repeated damage. This plan represents the work of citizens, elected and appointed government officials, business leaders, and volunteer and nonprofit groups to protect community assets, preserve the economic viability of the community, and save lives.

In 2020, Montour County Emergency Management Agency contracted the services of a consulting agency to revise and update the Montour County Hazard Mitigation Plan. The plan was successfully updated in accordance with the requirements set forth by the Pennsylvania Emergency Management Agency (PEMA) and the Federal Emergency Management Agency (FEMA). The updated Montour County Hazard Mitigation Plan was adopted by the Montour County Commissioners in 2021.

The Montour County Commissioners secured a grant to complete the 2021 update to the Montour County Hazard Mitigation Plan. MCM Consulting Group, Inc. was hired to assist the county with the update of the plan. The planning kick-off meeting was conducted September 16, 2020.

The planning process for the 2021 Montour County Hazard Mitigation Plan Update consisted of the following:

- Identification and prioritization of the hazards that may affect the county and its municipalities.
- Assessment of the county's and municipalities' vulnerability to these hazards.
- Identification of the mitigation actions and projects that can reduce that vulnerability.
- Development of a strategy for implementing the actions and projects, including identifying the agency(ies) responsible for that implementation.

Throughout the planning process, the general public was given the opportunity to comment on the existing HMP and provide suggestions for the updated version. Due to COVID-19, public meetings were conducted via an online survey to provide residents an opportunity to provide input on the HMP. Several meetings were held virtually, and participants were invited to submit surveys and other documents via an online survey.

The following hazards were identified by the local planning team as presenting the highest risk to the county and its municipalities:

- Dam/Levee Failure
- Drought
- Flooding
- Hurricane and Tropical Storm
- Invasive Species
- Landslide
- Pandemic and Infectious Disease
- Radon Exposure
- Subsidence and Sinkhole
- Tornado and Windstorms
- Wildfire
- Winter Storms

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- Civil Disturbance
- Disorientation
- Emergency Services
- Environmental Hazards
- Nuclear
- Terrorism
- Transportation Accidents
- Utility Interruption

A total of twenty hazards are identified in the 2021 Montour County Hazard Mitigation Plan. A total of seventeen identified hazards were listed in the previous 2015 plan update. New hazards identified in this plan include civil disturbance, disorientation, and emergency services.

To mitigate against the effects of these hazards, the local planning team identified the following goals for hazard mitigation over the next five years:

- Increase public awareness and education on both the potential impacts of all hazards (natural and human caused) and activities to reduce those impacts.
- Strengthen county and local capabilities to reduce the potential impacts of flooding and other natural or human caused hazards on existing and future public/private assets, including structures, critical facilities, and infrastructure.
- Conduct an annual hazard mitigation maintenance and report program.
- Increase intergovernmental cooperation and build public-private partnerships to implement activities that will reduce the impacts of all hazards (natural and human caused).

Mitigation actions are specific projects and activities that help achieve goals. A total of thirty-six actions were developed for this plan update as they pertain to hazards identified by the local planning team. The 2015 Montour County Hazard Mitigation Plan consisted of thirty-three total actions. The individual objectives and actions that will be implemented are shown in section 6.4. Each municipality was provided the opportunity to submit new project opportunity forms for this update. A total of six project opportunity forms were submitted during the 2015 HMP update. Municipalities were asked to indicate the current status of these projects submitted in 2015, of which two indicated completed projects. A total of seven project opportunities were submitted for this plan update.

The 2021 Montour County Hazard Mitigation Plan is the cornerstone to reducing Montour County's vulnerability to disasters. It is the commitment to reducing risks from hazards and serves as a guide for decision makers as they commit resources to reducing the effects of hazards. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage.

The 2021 Montour County Hazard Mitigation Plan is a living document that reflects ongoing hazard mitigation activities and requires monitoring, evaluating, and updating to ensure the mitigation actions are implemented. To facilitate the hazard mitigation planning process and adhere to regulatory requirements, the plan will be reviewed annually, and any major revisions will be incorporated into the five-year update.

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## **1. Introduction**

### **1.1. Background**

The Montour County Board of Commissioners, in response to the Disaster Mitigation Act of 2000 (DMA 2000), organized a countywide hazard mitigation planning effort to prepare, adopt and implement a multi-jurisdictional Hazard Mitigation Plan (HMP) for Montour County and all of its eleven municipalities. The Montour County Emergency Management Agency and Planning Department was charged by the County Board of Commissioners to prepare the 2021 plan. The 2015 HMP has been utilized and maintained during the five-year life cycle.

The Montour County Commissioners were successful in securing hazard mitigation grant funding to update the county hazard mitigation plan. The pre-disaster mitigation grant funding was administered by the Pennsylvania Emergency Management Agency and provided to Montour County as a sub-grantee. The Montour County Commissioners assigned the Montour County Emergency Management Agency with the primary responsibility to update the hazard mitigation plan. MCM Consulting Group, Inc. was selected to complete the update of the HMP. A local hazard mitigation planning team was developed comprised of government leaders and citizens from Montour County. This updated HMP will provide another solid foundation for the Montour County Hazard Mitigation Program.

Hazard mitigation describes sustained actions taken to prevent or minimize long-term risks to life and property from hazards and to 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.

Hazard mitigation planning has the potential to produce long-term and recurring benefits. A core assumption of mitigation is that current dollars invested in mitigation practices will significantly reduce the demand for future dollars by lessening the amount needed for recovery, repair and reconstruction. These mitigation practices will also enable local residents, businesses, and industries to reestablish themselves in the wake of a disaster, getting the economy back on track sooner and with less interruption.

### **1.2. Purpose**

The purpose of this all-hazard mitigation plan (HMP) is:

- Protect life, safety, and property by reducing the potential for future damages and economic losses that result from hazards.
- Qualify for additional grant funding, in both the pre-disaster and the post-disaster environment.
- Speed recovery and redevelopment following future disaster events.
- Demonstrate a firm local commitment to hazard mitigation principles.
- Comply with both state and federal legislative requirements for local hazard mitigation plans.

### **1.3. Scope**

This Montour County Multi-Jurisdictional Hazard Mitigation Plan serves as a framework for saving lives, protecting assets and preserving the economic viability of the eleven municipalities in Montour County. The HMP outlines actions designed to address and reduce the impact of a full range of natural hazards facing Montour County, including drought, earthquakes, flooding, tornadoes, hurricanes/tropical storms, and severe winter weather. Human caused hazards such as transportation accidents, hazardous materials spills and fires are also addressed.

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A multi-jurisdictional planning approach was utilized for the Montour County HMP update, thereby eliminating the need for each municipality to develop its own approach to hazard mitigation and its own planning document. Further, this type of planning effort results in a common understanding of the hazard vulnerabilities throughout the county, a comprehensive list of mitigation projects, common mitigation goals and objectives and an evaluation of a broad capabilities assessment examining policies and regulations throughout the county and its municipalities.

### **1.4. Authority and Reference**

Authority for this plan 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
- Disaster Mitigation Act of 2000, Public Law 106-390, as amended
- National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq.
- Authority for this plan 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
- Pennsylvania Storm Water Management Act of October 4, 1978. P.L. 864, No. 167

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
- FEMA Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards. January 2013
- FEMA Rehabilitation of High Hazard Potential Dams: Grant Program Guidance, June 2020

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
- PEMA: All-Hazard Mitigation Planning Standard Operating Guide, 2020.

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The following document produced by the National Fire Protection Association (NFPA) provided additional guidance for updating this plan:

- NFPA 1600: Standard on Disaster/Emergency Management and Business Continuity Programs. 2011

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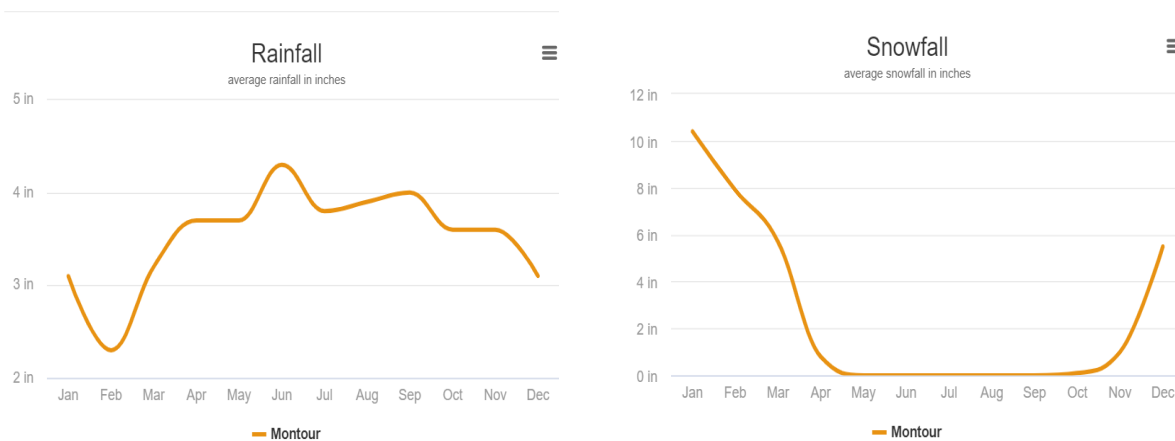
## 2. Community Profile

### 2.1. Geography and Environment

Montour County is geographically the smallest county in the Commonwealth of Pennsylvania, encompassing approximately 132 square miles. Of the 132 square miles, approximately 130 square miles is land while 2.1 square miles is water. Approximately 45% of the county is considered to be wooded. Situated in the heart of Pennsylvania’s rural farmlands, state game lands, state forests, nature preserves, and the Susquehanna River and its tributaries in north-central Pennsylvania, Montour County houses almost 20,000 acres of state game land, used for hunting, boating, hiking, bird watching, and nature study. Montour County consists of a scenic landscape characterized by steep slopes, deep river valleys, and abundant forestland. It is bordered to the north by Lycoming County, to the east by Columbia County, and to the south and west by Northumberland County.

Montour County receives approximately forty-two inches of rain, on average, per year as shown in *Figure 1 – Rain and Snow Fall for Montour County*. The US average is thirty-eight inches of rain per year. Montour received an average of thirty-one inches of snow per year as shown in *Figure 1 – Rain and Snow Fall for Montour County*. The US average is twenty-eight inches of snow per year. On average, there are 177 sunny days per year in Montour County. The US average is 177 sunny days per year. The summer high in Montour County is around the month of July at 83°F while the winter low is around the month of January with a low of 18°F as shown in *Figure 2 - Low and High Temperatures for Montour County*. The months of June, August, and September are the most pleasant months in Montour County, while January and February are the least pleasant months in the county. Montour County and the rest of Pennsylvania is classified Humid Continental, as shown in *Figure 3 -The Koppen-Geiger Climate Areas Map*. While all of Pennsylvania’s counties share many weather similarities, there are a few unique characteristics to certain regions.

Figure 1 - Rain and Snow Fall for Montour County



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Figure 2 - Low and High Temperatures for Montour County

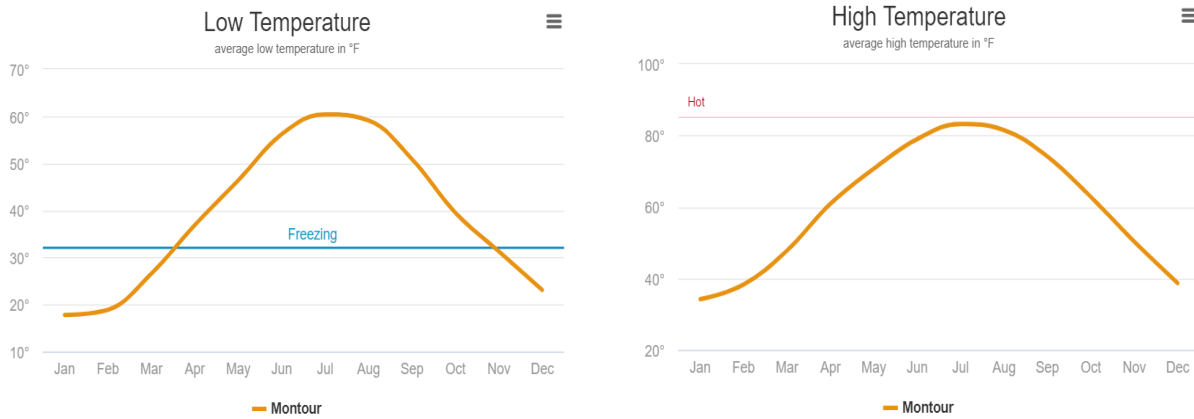
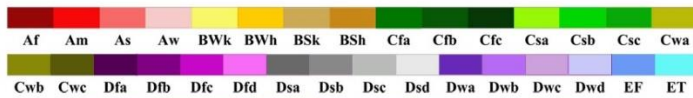


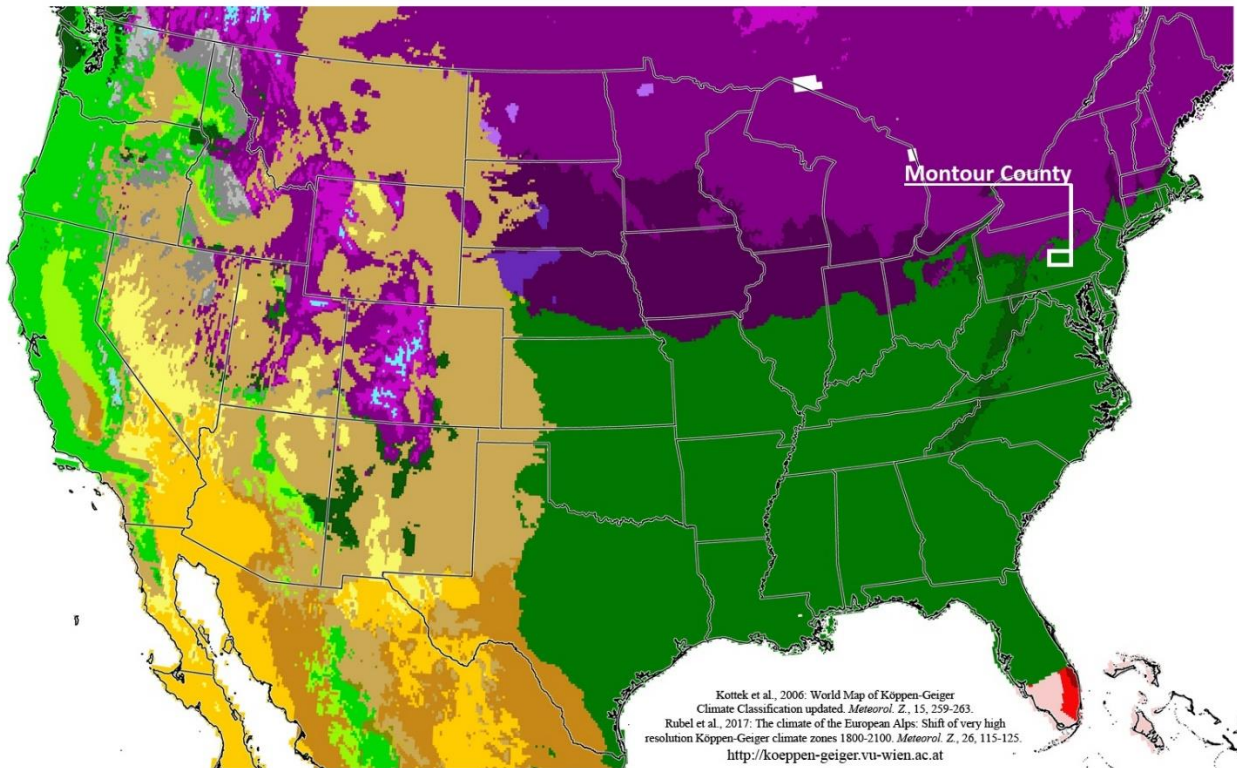
Figure 3- Köppen-Geiger Climate Areas map

## US Map of Köppen-Geiger Climate Classification

updated with CRU TS 2.1 temperature and VASCLIM v1.1 precipitation data 1951 to 2000



Main climates	Precipitation	Temperature
A: equatorial	W: desert	h: hot arid
B: arid	S: steppe	k: cold arid
C: warm temperate	f: fully humid	a: hot summer
D: snow	s: summer dry	b: warm summer
E: polar	w: winter dry	c: cool summer
	m: monsoonal	d: extremely continental
		F: polar
		T: polar



Kottke et al., 2006: World Map of Köppen-Geiger Climate Classification updated. *Meteorol. Z.* 15, 259-263.  
 Rubel et al., 2017: The climate of the European Alps: Shift of very high resolution Köppen-Geiger climate zones 1800-2100. *Meteorol. Z.* 26, 115-125.  
<http://koeppen-geiger.vu-wien.ac.at>



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## **2.2. Community Facts**

Montour County was established on May 3, 1850 from part of Columbia County. The county was named after Madame Montour who was prominent in the Indian affairs. Danville was established in 1792 and incorporated into the borough on February 27, 1849 and serves as the county seat. Danville is named for Daniel Montgomery, who was the son of the early settler General William Montgomery. Danville’s Big Mill made iron and steel from 1838 to 1938 which allowed for the first T-rails with the railroads to be made in Danville of Montour County. Economic development attracted many of the settlers who came to Montour County. Manufacturing continues to provide a strong economic base to the area today. The Susquehanna River forms part of the county’s southern border, playing another key role in early settlement of the area. Along with Danville Borough, there is another borough in Montour County with the name of Washingtonville. Washingtonville was laid out in 1775 and was incorporated into the borough on April 28, 1870. There are currently nine townships in Montour County along with the two boroughs. Anthony township was incorporated in 1849, Cooper and Mayberry township were incorporated in 1850, Derry and Mahoning township were incorporated in 1786, Liberty and Limestone township were incorporated in 1816, Valley township was incorporated in 1839, and West Hemlock township was incorporated in 1853. These eleven municipalities are what make up Montour County.

The following boroughs and townships are in Montour County:

### **Boroughs (2):**

Danville (county seat) and Washingtonville

### **Townships (9):**

Anthony, Cooper, Derry, Liberty, Limestone, Mahoning, Mayberry, Valley, and West Hemlock

Today, Montour County has a workforce of 9,100 labor forced employees and 8,800 employed people. Since September 2020, the unemployment rate is only around 5.0% with about 500 people unemployed. Montour County’s unemployment rate is lower compared to the state of Pennsylvania’s unemployment rate which is an average of 6.45%. There is a vast variety of types of industries residents of Montour County can go into for employment such as healthcare, government, education services, agriculture, construction, etc. However, out of the many industry fields, the top ten employers and their industries are listed in *Table 1 – Montour County Top Employers*. Although *Table 1* illustrates the top ten employers in Montour County, there are other industry fields to go into in Montour that are not included in the top ten industries. In Montour County since 2019, about 168 people work in the agriculture, forestry, and hunting industry. There are about 137 people that work in the construction industry, and about 290 people that work in the professional/technical services industry. Out of the overall ownership of 15,835 industries in Montour County, 14,359 industries are privately owned, 36 industries are federally owned, 689 industries are state owned, and 751 industries are locally owned.

*Table 1 – Montour County Top Employers*

<b>Montour County Top Employers</b>	
<b>Company</b>	<b>Industry</b>
Geisinger Medical Center	Healthcare
Geisinger Clinic	Healthcare
Geisinger System Services	Healthcare
Geisinger Health Plan	Healthcare
State Government	Government
<b>Company</b>	<b>Industry</b>

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<b>Company</b>	<b>Industry</b>
Great Dane LLC	Engineering
Danville Area School District	Education Services
Maria Joseph Manor	Healthcare
Geisinger HealthSouth Rehab Hospital	Healthcare
Grandview Nursing & Rehabilitation	Nursing Home Services
Geisinger Medical Center	Healthcare
Geisinger Clinic	Healthcare

*Source: Center for Workforce Information & Analysis*

### **2.3. Population and Demographics**

Montour County is considered to be an eighth-class county due to having an overall population size less than 20,000 inhabitants. Based on the 2010 Census, the population in Montour County was 18,267 persons. According to 2019 estimation data, the population in Montour County was 18,230, which is a loss of 0.1%. However, Montour County is the sixty-second most populated county out of the sixty-seven counties located within the state of Pennsylvania. Montour County is composed of two boroughs and nine townships for a total of eleven municipalities. The population per municipality are identified in *Table 2 – Montour County Municipal Population* (based on the 2010 Census figures). The higher populated municipalities of Montour County include Danville Borough (4,897), Mahoning Township (4,263), Valley Township (2,093), and Liberty Township (1,476). This creates a population density of 140 persons per square mile, which is substantially lower than the Pennsylvania statewide average of 274 persons per square mile (based on the county profile from the Center for Rural Pennsylvania). However, a low population density also helps prevent hazards from affecting as many people as possible. For example, diseases may not spread as quickly because there is less contact among people. Similarly, fires are less likely to spread to other structures because of the large distances between them. The magnitude of an event is typically smaller in a less populated area because each event affects fewer people and properties.

*Table 2 - Montour County Municipal Population*

<b>Montour County Municipal Population</b>	
<b>Municipality</b>	<b>Population from Year 2010</b>
Anthony Township	1,388
Cooper Township	966
Danville Borough	4,897
Derry Township	1,215
Liberty Township	1,476
Limestone Township	1,004
Mahoning Township	4,263
Mayberry Township	244
Valley Township	2,093
Washingtonville Borough	273
West Hemlock Township	489
<b>Total Population</b>	<b>18,267</b>

*Source: U.S. Census Bureau, 2010*

Population and demographic information provide baseline data about residents. Changes in demographics or populations may be used to identify higher-risk populations. Maintaining up-to-date data on demographics will allow the county to better assess magnitudes of hazards and develop more specific

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

mitigation plans. *Table 3 – Montour County Demographic Information* is shown below. The 2019 estimation for demographic information estimates that the age distribution for Montour County is 1,039 people under age five, 3,755 people under age eighteen, 8,714 people between ages 19 – 64, and 3,919 people above age sixty-five. About 22% of Montour County’s population is aged sixty-five years or older. These residents may have access and functional needs. For example, many may be unable to drive; therefore, special evacuation plans may need to be created for them. They may also have hearing or vision impairments that could make receiving emergency instructions difficult. Both older and younger populations have higher risks for contracting certain diseases. The county’s combined populations who are under five years of age and over sixty-five years of age represent approximately 27% of its total population.

*Table 3 - Montour County Demographic Information*

<b>Montour County Demographic Information</b>	
<b>Demographics</b>	<b>2019 Estimates</b>
Male	8,842 (48.5%)
Female	9,389 (51.5%)
Under 5 years	1,039(5.7%)
Under 18 years	3,755 (20.6%)
Between 19 and 64 years	8,714 (47.8%)
65 years and over	3,919 (21.5%)
Median Age	43 years
<b>Total Population</b>	<b>18,230</b>
<i>Source: U.S. Census Bureau, 2019</i>	

Montour County’s race information provides data about the resident’s ethnicity. High ethnicity in a county could lead to higher vulnerability related to issues due to lack of knowledge on the English language. The county’s race data is shown in *Table 4 – Montour County Population by Race*. As shown in table below, approximately 6% of Montour County’s population is not proficient in English. Hazard mitigation strategies will need to address language barriers to ensure that all residents can receive emergency instructions. Non-English-speaking residents of Montour County are at higher risk than English-speaking residents due to possible miscommunication that could be present during an emergency.

*Table 4 - Montour County Population by Race*

<b>Montour County Population by Race</b>	
<b>Race</b>	<b>2019 Estimates</b>
White	16,990 (93.2%)
Black/African American	328 (1.8%)
American Indian/Alaska Native	36 (0.2%)
Asian	620 (3.4%)
Hispanic/Latino	529 (2.9%)

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Race	2019 Estimates
Two or More Races	237 (1.3%)
Language other than English spoken at home	1,148 (6.3%)
<b>Total Population</b>	<b>18,230</b>

*Source: U.S. Census Bureau, 2019*

Montour County has around 8,000 residential properties. These properties may be vulnerable to various natural hazards, particularly flooding and windstorms. Damage to residential properties is not only expensive to repair or rebuild, but also devastating to the displaced family. Within the 8,000 residential properties of housing units, there are 7,482 households with about 2.34 persons per household. The more individuals living within the same households creates a higher vulnerability in an event of a disaster such as structure fire, flooding, tornadoes, etc. Additionally, a high number of values could potentially be lost if damage were to occur to many residential areas with a dollar value of \$181,500.00. Montour County has a median household income of \$57,183.00 with a median per capita income of \$34,095.00 from the estimate 2019 values. The income values can be seen in *Table 5 – Montour County Income and Poverty*.

*Table 5 - Montour County Housing*

<b>Montour County Housing</b>	
Housing Characteristics	2019 Estimates
Total housing units	8,273
Owner-occupied housing units	5,692 (68.8%)
Median value of houses (dollars)	\$181,500.00

*Source: U.S. Census Bureau, 2019*

*Table 6 - Montour County Income and Poverty*

<b>Montour County Income and Poverty</b>	
Economic Characteristics	2019 Estimates
Median household income	\$57,183.00
Per capita income	\$34,095.00
Persons in Poverty	1,841 (10.1%)

*Source: U.S. Census Bureau, 2019*

There are eight major transportation routes within the county, including one railroad method: Interstate 80; State Routes 44, 45, 54, 254, and 642; US Route 11; and North Shore Railroad. The law enforcement of Montour County is found in Danville Borough and Mahoning Township with the police departments. The Montour County Sheriff's Office is also located in Danville. There is a total of four hospitals in Montour County. There is one hospital per 4,575 people and per thirty-two square miles. Montour County contains Danville State Hospital, Geisinger HealthSouth Rehabilitation Hospital, Geisinger Medical Center, and Select Specialty Hospital. Montour County is ranked first of the sixty-seven counties of Pennsylvania in

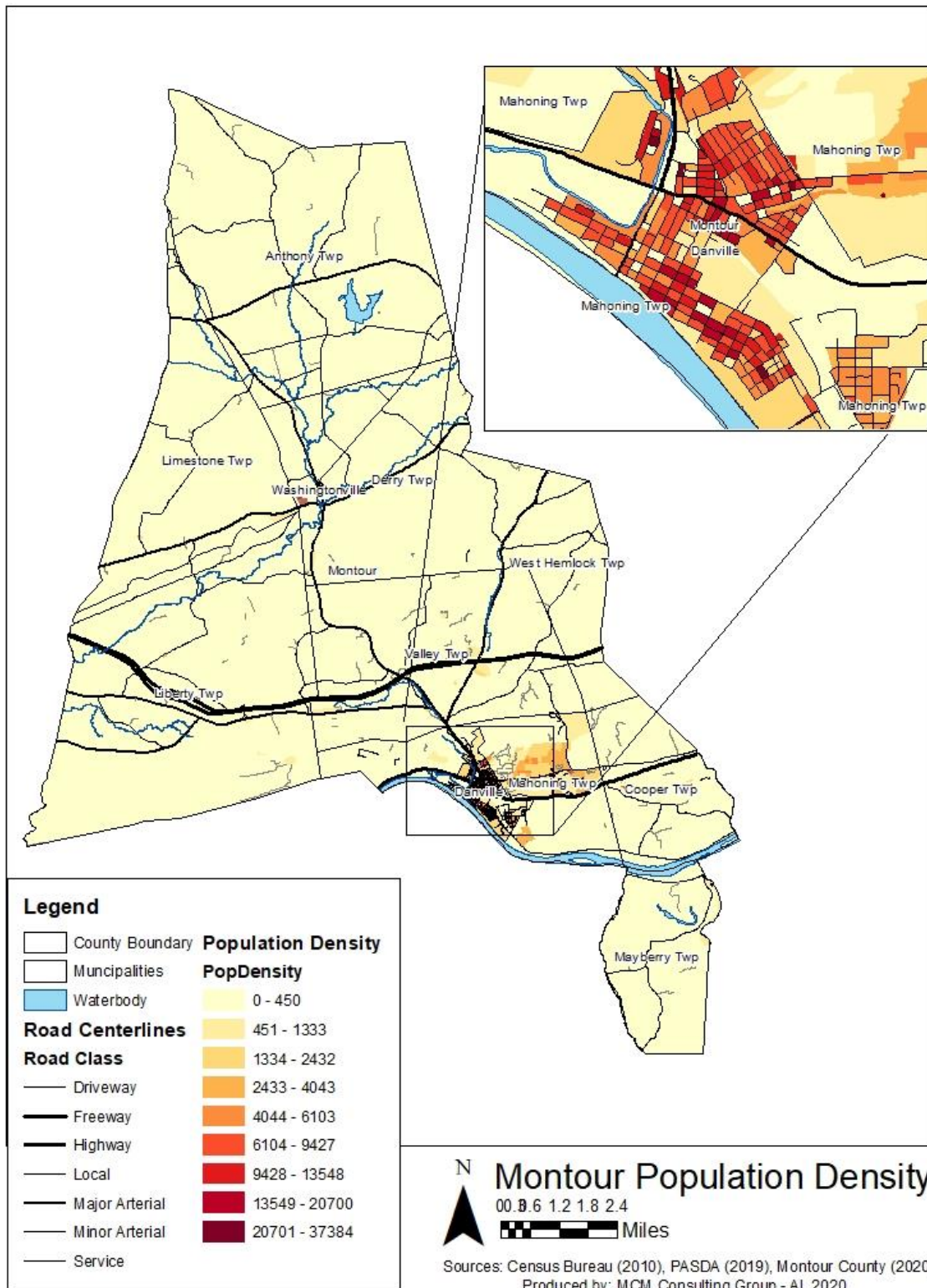
## ***Montour County, Pennsylvania 2021 Hazard Mitigation Plan***

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Hospitals per capita and fifth of the sixty-seven counties in hospitals per square mile.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 4 - Population Density Map



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## **2021 Hazard Mitigation Plan**

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### **2.4. Land Use and Development**

Montour County is located in the Ridge and Valley Province of the Appalachian Mountains. In the county, 65% of the soil is well-drained. Topographically, the county is divided into upland hills/valleys and is dissected by streams and a river. On the northern part of the county are the Muncy Hills and Montour Ridge is located on the southern portion of the county which is adjacent to the Susquehanna River. Hills and valleys can be found located in the central portion of the county as well.

Prime farmland is one of the several kinds of important farmlands defined by the U.S. Department of Agriculture. Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, fiber, and oilseed crops. It contains the growing season, soil quality, and water supply need to produce a sustained high yield of crops when managed using acceptable farming methods. Now, prime farmland may be in crops, pastures, woodlands, or other lands, but not typically in urban, build-up land, or water areas. About 18,000 acres (or 21%) of Montour County meets the soil requirements for prime farmland. Areas are scattered throughout the county but are mainly in associations two and three of a soil map. Most of the prime farmland in Montour County is used for crops. Farming is a major land use in Montour County. There has been a total of 43,000 acres used for crops and pasture in the county. Of this total, 5,000 acres were used for permanent pasture. It is reported there are 9,300 acres of corn, 5,950 acres of small grains, 10,000 acres of alfalfa and other hay, 140 acres of orchards/vineyard, and the rest is other cropland and pasture. The average acreage per farm is estimated to be around 109 acres. The share of sales by type for each farm is an average of 42% for crops and 58% for livestock, poultry, and products. *Table 7 – Market Value of Agricultural Products Sold in Montour County* indicates the types of crops and products sold with their associated sales. With the number of farms and sales associated with the farms within Montour County, the total market value of products sold in the county is \$60,225,000.00. This has been a 12% increase on market value since 2012 in Montour County.

Montour County has about 37,300 acres of woodland, nearly all of which are privately owned. Oak-hickory make up 38% of the woodland in the county. This cover type mainly consists of white oak, red oak, and hickories, although black oak, and chestnut oak are dominant in some areas. Elm-ash-red maple makes up 10% of the woodland. This cover type is mainly white ash, American elm, and red maple. Maple-beech-birch makes up 6% and chestnut oak makes up 1% of the woodland. Eastern white pine makes up 17% of the woodland. Lastly, sawtimber makes up approximately 34% percent of the acreage in commercial woodland. The areas of woodland, adjoining farmland, streams, and the Susquehanna River provide a major source of recreational activities in the county such as hunting, fishing, boating, and hiking.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Table 7 - Market Value of Agricultural Products Sold in Montour County

<b>Market Value of Agricultural Products Sold in Montour County</b>		
<b>Type of Crop</b>	<b>Sales</b>	<b>Rank in State</b>
Grains	\$6,894,000.00	39
Tobacco	\$796,000.00	5
Fruits/Berries	\$388,000.00	42
Cultivated Christmas Trees	\$260,000.00	26
Hay	\$1,169,000.00	62
<b>Total</b>	<b>\$25,536,000.00</b>	<b>31</b>
<b>Type of Product</b>	<b>Sales</b>	<b>Rank in State</b>
Poultry/Eggs	\$27,512,000.00	16
Cattle/Calves	\$2,102,000.00	48
Milk from Cows	\$4,627,000.00	48
Hogs/Pigs	\$246,000.00	36
Horses/Mules/Donkeys	\$141,000.00	36
<b>Total</b>	<b>\$34,689,000.00</b>	<b>27</b>
<b>Overall Total</b>	<b>\$60,225,000.00</b>	<b>34</b>

## **2.5. Data Sources**

The county relied heavily on existing data sources developed by other Montour County departments, including:

- Montour County Hazard Vulnerability Analysis.
- Montour County Comprehensive Plan.
- Montour County Assessment Department data.
- Montour County Subdivision and Land Development Ordinance.
- Montour County Open Space Management Plan.
- Montour County Greenways Plan
- Montour County Digital Tax Assessment Data.
- Montour County Commodity Flow Study.

The following are additional data sources used during the update process:

- U.S. Census Bureau.
- National Climatic Data Center (NCDC).
- National Oceanic and Atmospheric Administration (NOAA).
- Pennsylvania Department of Conservation and Natural Resources.
- Pennsylvania Groundwater Information System.
- Pennsylvania Emergency Incident Reporting System.
- Pennsylvania Emergency Management Agency.
- Pennsylvania Department of Labor and Industry

The countywide digital flood insurance rate maps (DFIRM), were used for all flood risk analysis and estimation of loss. The Montour DFIRMs were approved and effective on May 16, 2008. The DFIRM database provides flood frequency and elevation information used in the flood hazard risk assessment. Other Montour County GIS datasets including road centerlines, parcels and structures were utilized in conjunction with the DFIRM. In addition to the county's existing spatial datasets, the Montour County Planning Commission developed a database and maps of the county's critical facilities, special needs populations,



# **Montour County, Pennsylvania**

## **2021 Hazard Mitigation Plan**

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transportation systems and hazardous materials facilities. Potential losses were then analyzed by using existing county tax assessment data and DFIRM data.

### **Geographic Information Systems (GIS) Data**

GIS data was utilized in risk assessment, estimation of loss and the development of map products for the hazard mitigation plan update. A core foundation of data was available from the Montour County Emergency Management Agency and Montour County Planning Commission. Some data was downloaded from the Pennsylvania Spatial Data Access (PASDA) and utilized. The following is a list of existing GIS data that was utilized in the plan update process and a list of new GIS data that was developed to complete the 2021 mitigation plan update.

Existing Montour County GIS Data Used:

- Structures
- Road Centerlines
- Tax Parcels
- Municipality Boundaries
- Digital Flood Insurance Rate Maps
- Watershed and Sub-Sheds
- Lakes and Streams

New GIS Data Developed and Used:

- Critical Facilities
- Functional Needs Facilities
- Bedrock Geology
- Land Slope Features
- Land Use Features
- Mobile Homes
- Utility Locations
- Shared Relief Digital Elevation Model
- Tornado Paths
- Recreational Opportunities
- Zip Codes
- Wildlife Urban Interface Values

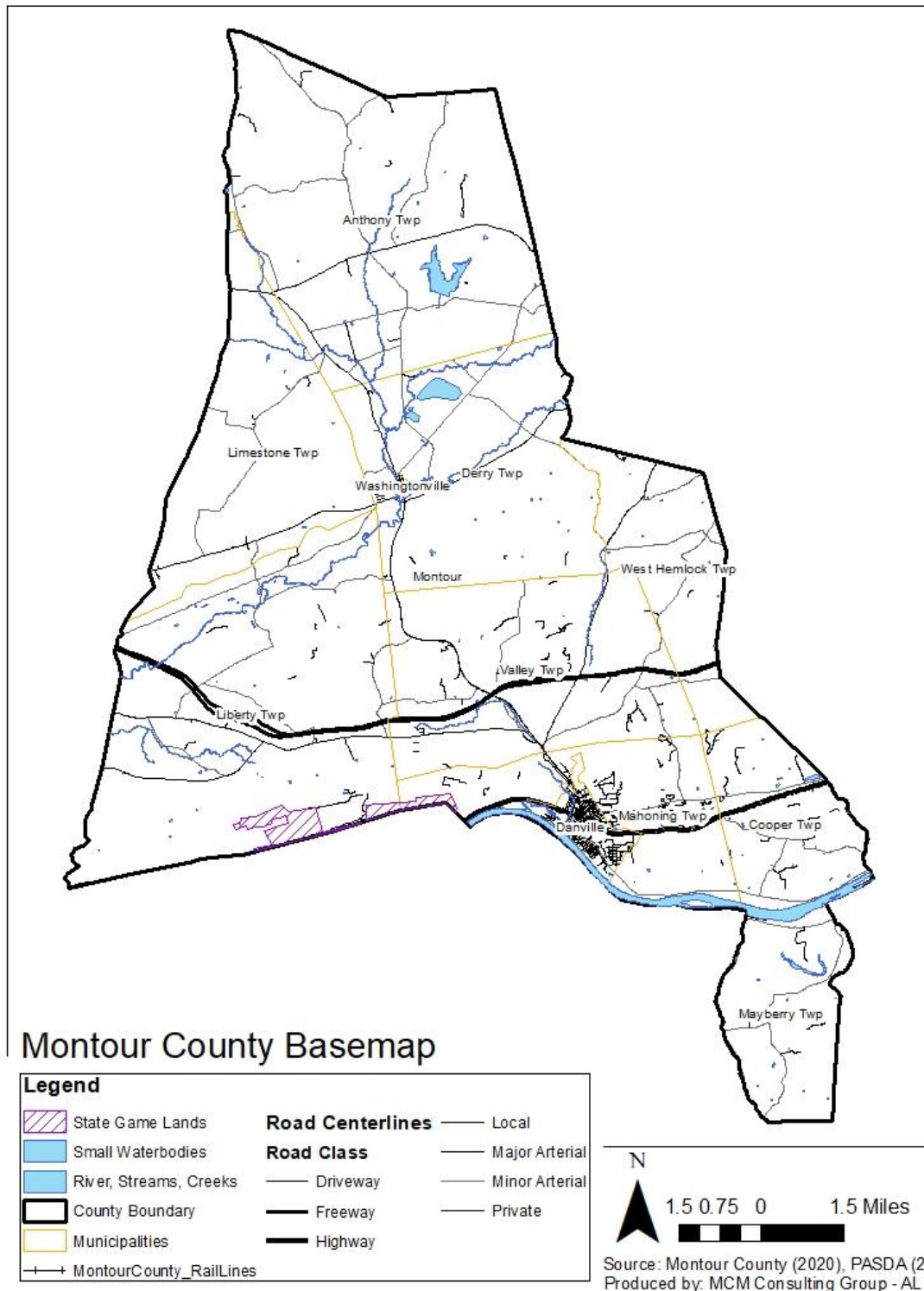
The Montour County parcel dataset includes a value for the land in each parcel, as well as a combined value for all buildings on each parcel. Some parcels that contain multiple buildings with one or more buildings in the flood plain and one or more buildings out of the flood plain. The individual value by specific building within any given parcel was indeterminate from the data provided by Montour County. Therefore, the combined value of all buildings in that parcel has been used – not simply the value of only the structures in the floodplain.

HAZUS calculations and statistics were based on a total of twelve reaches. There were zero failed reaches. The loss estimations were completed as part of the HAZUS scenario processing and represent FEMA depths grids and general building information from FEMA's general building stock.

The following maps provide a base map of Montour County and other specific features of the county.

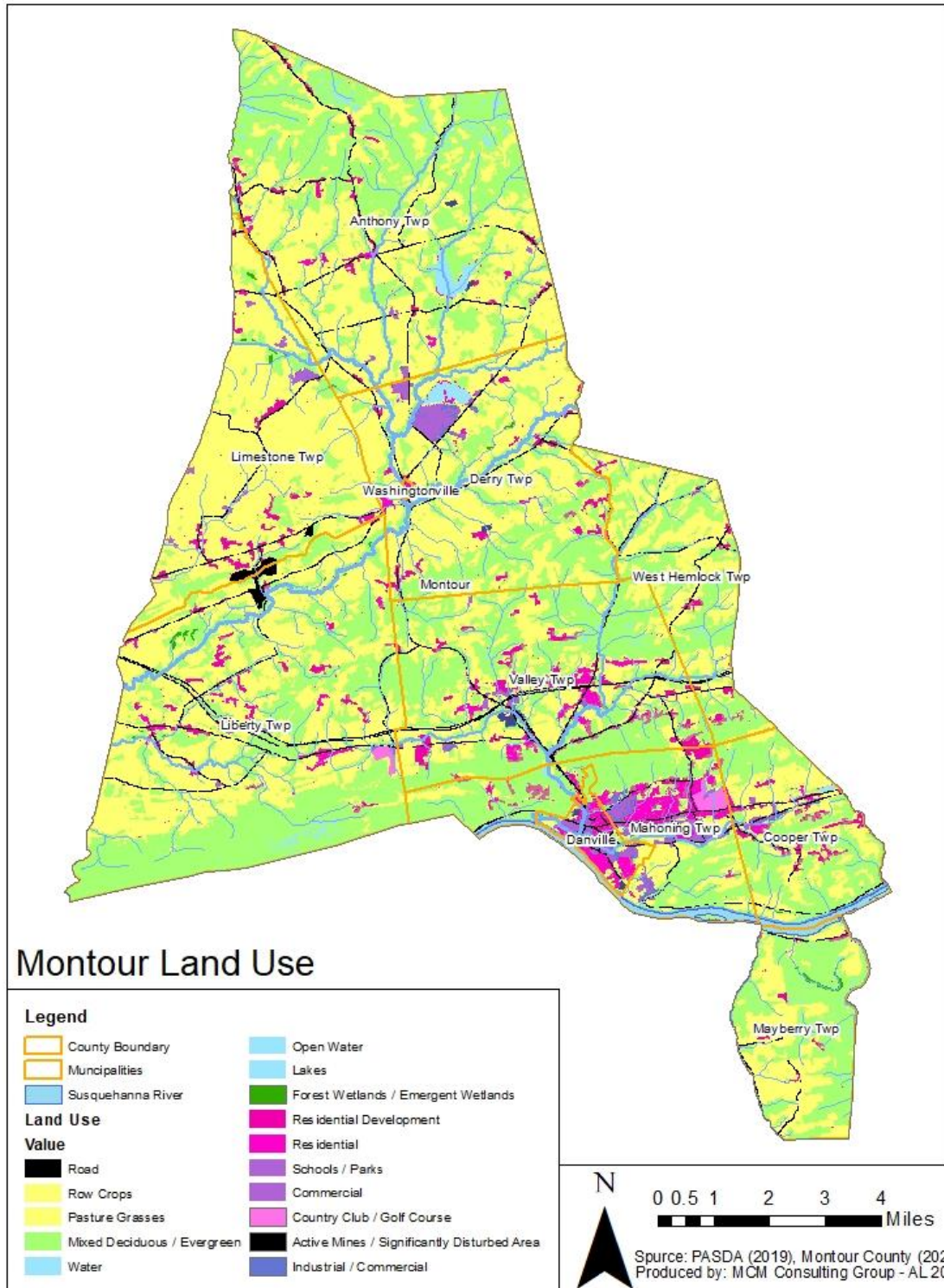
# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 5 - Base Map of Montour County



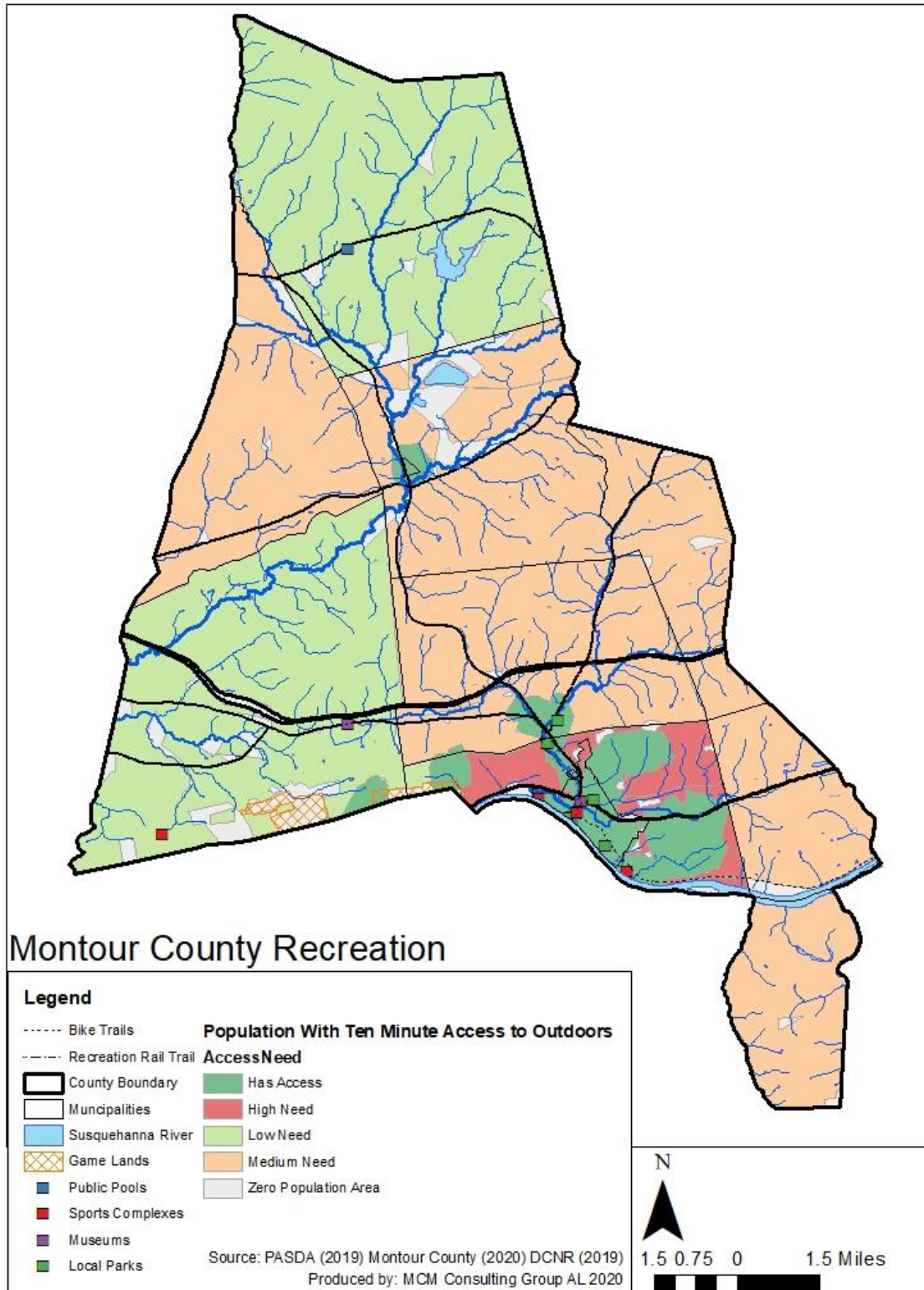
# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 6 - Montour Land Use Map



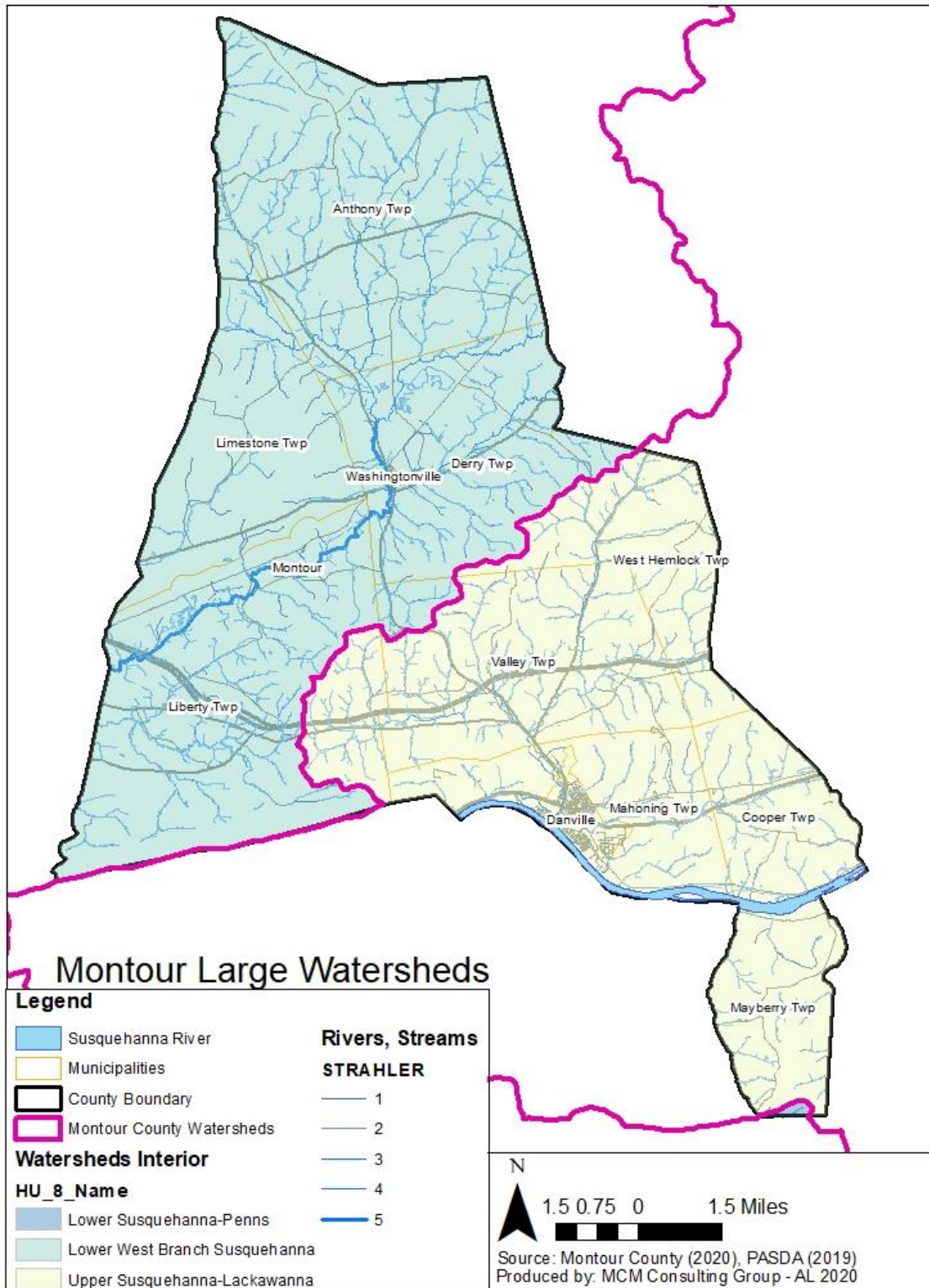
# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 7 - Recreational Opportunities Map



# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 8 - Montour County Watershed Map



# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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## **3. Planning Process**

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

The Montour County Hazard Mitigation Plan update began August 13, 2020. The Montour County Commissioners were able to secure a hazard mitigation grant to start the process. The Montour County Emergency Management Agency was identified as the lead agency for the Montour County Hazard Mitigation Plan update. The planning process involved a variety of key decision makers and stakeholders within Montour County. Montour County immediately determined that the utilization of a contracted consulting agency would be necessary to assist with the plan update process. MCM Consulting Group, Inc. was selected as the contracted consulting agency to complete the update of the hazard mitigation plan. The core hazard mitigation team, which was referred to as the steering committee, included officials from the Montour County Emergency Management Agency, Montour County Planning Commission, and MCM Consulting Group, Inc. (MCM).

The process was developed around the requirements laid out in the Federal Emergency Management Agency (FEMA) Local Hazard Mitigation Crosswalk, referenced throughout this plan, as well as numerous other guidance documents including, but not limited to, Pennsylvania's All-Hazard Mitigation Standard Operating Guide, FEMA's State and Local Mitigation Planning How-to Guide series of documents (FEMA 386-series) and the National Fire Protection Association (NFPA) 1600 Standard on Disaster/Emergency Management and Business Continuity Programs.

MCM Consulting Group, Inc. assisted Montour County Planning Commission, and Montour County Assessment Department, as well as Montour County Emergency Management Agency in coordinating and leading public involvement meetings, local planning team meetings, analysis, and the writing of the updated HMP. The Montour County Local Planning Team (LPT) worked closely with MCM in the writing and review of the HMP. MCM conducted project meetings and local planning team meetings throughout the update process. Due to COVID-19, most meetings were held virtually. Meeting agendas, meeting minutes and sign in sheets were developed and maintained for each meeting conducted by MCM. These documents are detailed in Appendix C of this plan.

Public meetings with local elected officials were held, as well as work sessions and in-progress review meetings with the Montour County Local Planning Team and staff. Due to COVID-19, a majority of the meetings were held virtually. At each of the public meetings, respecting the importance of local knowledge, municipal officials were strongly encouraged to submit hazard mitigation project opportunity forms, complete their respective portions of the capability's assessment and review, and eventually adopt the county hazard mitigation plan. Montour County will continue to work with all local municipalities to collect local hazard mitigation project opportunities.

The HMP planning process consisted of:

- Applying for and receiving a hazard mitigation planning grant (HMPG) to fund the planning project.
- Announcing the initiative via press releases and postings on the county website.
- Involving elected and appointed county and municipal officials in a series of meetings, training sessions and workshops.
- Identifying capabilities and reviewed the information with the municipalities.
- Identifying hazards.
- Assessment of risk and analyzing vulnerabilities.
- Identifying mitigation strategies, goals, and objectives.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

- Developing an implementation plan.
- Announcing completion via press releases and postings on the county website.
- Plan adoption at a public meeting of the Montour County Board of Commissioners.
- Plan submission to FEMA and PEMA.

The 2021 Montour County HMP was completed February 3, 2021. The 2021 plan follows an outline developed by PEMA which provides a standardized format for all local HMPs in the Commonwealth of Pennsylvania. The 2021 HMP format is consistent with the PEMA recommended format. The 2021 Montour County HMP has additional hazard profiles that were added to the HMP and these additional profiles increased the subsections in section 4.3 of the HMP.

### **3.2. The Planning Team**

The 2021 Montour County Hazard Mitigation Plan update was led by the Montour County Steering Committee. The Montour County Steering Committee provided guidance and leadership for the overall project. The steering committee assisted MCM Consulting Group, Inc. with dissemination of information and administrative tasks. *Table 8 – Steering Committee* outlines the individuals that comprised this team.

*Table 8 - Steering Committee*

<b>Montour County Hazard Mitigation Plan Update Steering Committee</b>		
<b>Name</b>	<b>Organization</b>	<b>Position</b>
Ed Burkland	Montour Emergency Management Agency	EMA Director
Trevor Finn	Montour County Commissioners' Office	Commissioner
Greg Molter	Montour County	Planning Director/EOC
Michelle Sharrow	Montour County	Assessment
Brad Bason	Montour County	IT/EOC
Bob Stoudt	Montour Recreation	EOC
Jackie Hart	Danville Borough	Appointed Official
Al Shulski	American Red Cross	Red Cross/EOC
Michael Rearick	MCM Consulting Group, Inc.	Senior Consultant
Corbin Snyder	MCM Consulting Group, Inc.	Consultant

In order to represent the county, the Montour County Steering Committee developed a diversified list of potential local planning team (LPT) members. Members that participated in the 2015 hazard mitigation plan were highly encouraged to join the 2021 team. The steering committee then provided invitations to the prospective members and provided a description of duties to serve on the LPT. The following agencies, departments and organizations were invited to participate in the LPT: Montour County Commissioners, Danville School District, PennDOT, American Red Cross, Sheetz, GMC, Cole's Hardware, Columbia County EMA, Northumberland County EMA, and Lycoming County EMA, and all eleven municipalities. The invitations for membership of the LPT were disseminated by the Montour County Emergency Management Agency utilizing letters, email, and telephone calls. The LPT worked throughout the process to plan and hold meetings, collect information, and conduct public outreach.

The stakeholders listed in *Table 9 – Local Planning Team* served on the 2021 Montour County Hazard Mitigation Local Planning Team, actively participated in the planning process by attending meetings, completing assessments, surveys, and worksheets and/or submitting comments.

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Table 9 - Local Planning Team

<b>Montour County Hazard Mitigation Plan Update Local Planning Team</b>		
<b>Name</b>	<b>Organization</b>	<b>Position</b>
Ed Burkland	Montour Emergency Management Agency	EMA Director
Trevor Finn	Montour County Commissioners' Office	Commissioner
Greg Molter	Montour County Planning Commission	Planning Director/EOC
Michelle Sharrow	Montour County	Assessment
Brad Bason	Montour County	IT/EOC
Bob Stouidt	Montour Recreation	EOC
Al Shulski	American Red Cross	Red Cross/EOC
Taylor Cole	Cole's Hardware	Appointed Official
Jeremy Reese	GMC	Appointed Official
Matt Cutshall	Sheetz	Appointed Official
Jackie Hart	Danville Borough	Appointed Official
Sean Levan	Montour County	Conservation District
Ken Berkich	Danville School District	Appointed Official
Jennifer Long	Columbia County EMA	Appointed Official
Steve Jeffery	Northumberland County EMA	Appointed Official
Steve Long	PennDOT	Appointed Official
Scott Bitting	Montour County	LEPC/Community member

### **3.3. Meetings and Documentation**

Meetings with local elected officials and the local planning team were held as needed. Meetings were mostly held via conference call and virtual meeting rooms due to COVID-19. At each of the meetings, municipal officials were strongly encouraged to submit hazard mitigation project opportunity forms, complete their respective portions of the capability assessment, review and eventually adopt the multi-jurisdictional HMP. *Table 10 – HMP Process Timeline* lists the meetings held during the HMP planning process, which organizations and municipalities attended and the topic that was discussed at each meeting. All meeting agendas, sign-in sheets, presentation slides, any other documentation is located in Appendix C. It should be noted that as a result of the COVID-19 pandemic, most meetings were held virtually. As a result, the number of sign-in sheets decreased when compared to the 2015 HMP update. Participants are identified on the Local Planning Team meeting minutes found in Appendix C.

The draft plan was made available for public review on February 3, 2021. The draft was advertised on Montour County's social media page and was made available digitally on the Montour County website at: <http://montourema.org/hazard-mitigation-plan/>

The public comment period remained open until March 3, 2021. All public comments were submitted via an online survey or in writing to Ed Burkland at the Montour County Emergency Management Agency. All public comments have been included in this plan in Appendix C.

Table 10 - HMP Process Timeline



## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

<b>Montour County HMP Process - Timeline</b>		
<b>Date</b>	<b>Meeting</b>	<b>Description</b>
09/16/2020	Montour County Hazard Mitigation Plan (HMP) Kick-Off meeting	Identified challenges and opportunities as they relate to fulfilling the DMA 2000 requirements. Identified existing studies and information sources relevant to the hazard mitigation plan. Identified stakeholders, including the need to involve local officials. Presentation on hazard identification, capability assessment and NFIP worksheets.
09/16/2020	Local Planning Team initial meeting	Defined hazard mitigation planning and identified roles and responsibilities. Discussed the 2015 hazard mitigation plan and defined a timeline to complete the update.
09/16/2020	Municipality Kick-off meeting	Presentation on hazard identification, capability assessment and NFIP worksheets. WebEx was made available.
10/07/2020	Local Planning Team meeting	Complete the hazard identification worksheet and the capabilities assessment survey
10/14/2020	Local Planning Team Meeting – Selection of Hazards	Montour County LPT met via WebEx to discuss hazards profiled in the previous plan and identify any new hazards to be included in the plan update.
11/10/2020	Local Planning Team Meeting – Risk Factor Assessment and Mitigation Strategy	Montour County LPT met via WebEx to determine a risk factor score for each of the selected hazards in the 2021 update. A municipal comparison document was then sent to all municipalities in Montour County for their input.
11/11/2020	Meetings with Municipal Officials	Virtual meetings. Educated county and local elected officials on the hazard mitigation planning process. Presented the findings of the hazard vulnerability analysis and risk assessment. Sought input for mitigation projects throughout the county. Distributed hazard mitigation project opportunity forms. Distributed review worksheets from the 2015 HMP.
11/12/2020	Meetings with Municipal Officials	Virtual meetings. Educated county and local elected officials on the hazard mitigation planning process. Presented the findings of the hazard vulnerability analysis and risk assessment. Sought input for mitigation projects throughout the county. Distributed hazard mitigation project opportunity forms. Distributed review worksheets from the 2015 HMP.
11/16/2020	Risk Factor Assessment Public Comment	Due to COVID-19, the risk factor assessment results of the Montour County Hazard Mitigation Plan were posted via social media and on the county website. Members of the public were encouraged to read and submit any comments on this via email or online survey.
11/24/2020	Local Planning Team Meeting – Mitigation Strategy	Montour County LPT met via WebEx to continue mitigation strategy development by finalizing the goals and objectives to be included in this plan update. The LPT also reviewed all mitigation actions from the 2015 plan and discussed new actions for the plan update. Also discussed the capability assessment and hazard ID worksheets, and the risk assessment and NFIP.
01/06/2021	Local Planning Team Meeting – Mitigation Strategy	Montour County LPT met via WebEx to discuss 2021 goals, objectives, and actions for mitigation strategy development.
01/20/2021	Local Planning Team Meeting – Mitigation Strategy	Montour County LPT met via WebEx to finalize mitigation actions for the mitigation strategy development. New project opportunities were also discussed.
02/03/2021	Montour County Hazard Mitigation Plan – Draft Plan Public Review	The draft HMP was made available for all members of the public to review. All were invited to submit any comments via an online survey or provide comments to the Montour Emergency Management Agency

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## **2021 Hazard Mitigation Plan**

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### **3.4. Public and Stakeholder Participation**

Montour County engaged numerous stakeholders and encouraged public participation during the HMP update process. Advertisements for public meetings were completed utilizing the local newspaper and the Montour County website. Copies of those advertisements are located in Appendix C. Municipalities and other county entities were invited to participate in various meetings and encouraged to review and update various worksheets and surveys. Copies of all meeting agendas, meeting minutes and sign-in sheets are located in Appendix C. Worksheets and surveys completed by the municipalities and other stakeholders are located in appendices of this plan update as well. Municipalities were also encouraged to review hazard mitigation related items with other constituents located in the municipality like businesses, academia, private and nonprofit interests.

The tools listed below were distributed with meeting invitations, provided directly to municipalities to complete and return to the Montour County Emergency Management Agency or at meetings to solicit information, data and comments from both local municipalities and other key stakeholders. Responses to these worksheets and surveys are available for review at the Emergency Management Agency.

1. **Risk Assessment Hazard Identification and Risk Evaluation Worksheet:** Capitalizes on local knowledge to evaluate the change in the frequency of occurrence, magnitude of impact and/or geographic extent of existing hazards and allows communities to evaluate hazards not previously profiled using the Pennsylvania Standard List of Hazards.
2. **Capability Assessment Survey:** Collects information on local planning, regulatory, administrative, technical, fiscal, and political capabilities that can be included in the countywide mitigation strategy.
3. **Municipal Project Opportunity Forms and Mitigation Actions:** Copies of the 2015 mitigation opportunity forms that were included in the current HMP were provided to the municipalities for review and amendment. These opportunities are located in Appendix G. The previous mitigation actions were provided and reviewed at update meetings. New 2021 municipal project opportunity forms are included as well, located in Appendix G.
4. **National Flood Insurance Program Survey:** Collects data from county residents and measures their level of participation in the National Flood Insurance Program (NFIP) provided by FEMA.

Members of the public were encouraged to contact Montour County Emergency Management Agency or MCM Consulting Group, Inc. with any comments or questions regarding this update. Any public comment that was received during public meetings or during the draft review of the plan were documented and included in the plan. Copies of newspaper public meeting notices, website posted public notices and other correspondence are included in Appendix C of this plan.

Montour County invited all contiguous counties to review the 2021 draft hazard mitigation plan. A letter was sent to the emergency management coordinator in Columbia, Northumberland, and Lycoming counties in Pennsylvania, on February 3, 2021. Copies of these letters are included in Appendix C.

### **3.5. Multi-Jurisdictional Planning**

Montour County used an open, public process to prepare this HMP. Meetings and letters to municipal officials were conducted to inform and educate them about hazard mitigation planning and its local requirements. Municipal officials provided information related to existing codes and ordinances, the risks and impacts of known hazards on local infrastructure and critical facilities and recommendations for related mitigation opportunities. The pinnacle to the municipal involvement process was the adoption of the final

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

plan. *Table 11 – Municipality Participation in Worksheets, Surveys, and Forms* reflects the municipality participation by completing worksheets, surveys, and forms.

*Table 11 - Municipality Participation in Worksheets, Surveys, and Forms*

<b>Municipality Participation in Worksheets, Surveys and Forms</b>			
<b>Municipality</b>	<b>Capability Assessment Survey</b>	<b>Risk Assessment Hazard Identification and Risk Evaluation Worksheet</b>	<b>Hazard Mitigation Opportunity Form Review and Updates</b>
Anthony Township	X	X	
Cooper Township	X	X	
Danville Borough	X	X	X
Derry Township	X	X	
Liberty Township	X	X	
Limestone Township	X	X	X
Mahoning Township	X	X	X
Mayberry Township	X	X	X
Valley Township	X	X	
Washingtonville Borough	X	X	
West Hemlock Township	X	X	

In March of 2020, Pennsylvania and the rest of the world experienced a pandemic event entitled COVID-19. Unfortunately, because of the pandemic, public meetings were unable to be held as normal during the hazard mitigation planning process. In lieu of a public meeting for the risk factor assessment results of the plan update were posted to Montour County’s website as well as their social media platforms. Members of the public were encouraged to submit any comments via SurveyMonkey, an online survey platform, or to contact MCM Consulting Group, Inc. with any questions or comments.

All eleven municipalities within Montour County adopted the 2015 Montour County Hazard Mitigation Plan as the municipal hazard mitigation plan. The goal of the Montour County Local Planning Team is to 100% participation by municipalities in adopting the 2021 Montour County Hazard Mitigation Plan.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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## **4. Risk Assessment**

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

A key component to reducing future losses is to first have a clear understanding of what the current risks are and what steps may be taken to lessen their threat. The development of the risk assessment is the critical first step in the entire mitigation process, as it is an organized and coordinated way of assessing potential hazards and risks. The risk assessment identifies the effects of both natural and human-caused hazards and describes each hazard in terms of its frequency, severity, and county impact. Numerous hazards were identified as part of the process.

A risk assessment evaluates threats associated with a specific hazard and is defined by probability and frequency of occurrence, magnitude, severity, exposure, and consequences. The Montour County risk assessment provides in-depth knowledge of the hazards and vulnerabilities that affect Montour County and its municipalities. This document uses an all-hazards approach when evaluating the hazards that affect the county and the associated risks and impacts each hazard presents.

This risk assessment provides the basic information necessary to develop effective hazard mitigation/prevention strategies. Moreover, this document provides the foundation for the Montour County Emergency Operations Plan (EOP), local EOPs and other public and private emergency management plans.

The Montour County risk assessment is not a static document, but rather, is a biennial review requiring periodic updates. Potential future hazards include changing technology, new facilities and infrastructure, dynamic development patterns and demographic and socioeconomic changes into or out of hazard areas. By contrast, old hazards, such as brownfields and landfills, may pose new threats as county conditions evolve.

Using the best information available and geographic information systems (GIS) technologies, the county can objectively analyze its hazards and vulnerabilities. Assessing past events is limited by the number of occurrences, scope and changing circumstances. For example, ever-changing development patterns in Pennsylvania have a dynamic impact on traffic patterns, population density and distribution, storm water runoff and other related factors. Therefore, limiting the risk assessment to past events is myopic and inadequate.

The Montour County Local Planning Team reviewed and assessed the change in risk for all natural and manmade hazards identified in the 2015 hazard mitigation plan. The mitigation planning team then identified hazards that were outlined within the Pennsylvania Hazard Mitigation Plan but not included in the 2015 Montour County Hazard Mitigation Plan that could impact Montour County. The team utilized the Hazard Identification and Risk Evaluation worksheet that was provided by the Pennsylvania Emergency Management Agency.

The Montour County Steering Committee met with municipalities and provided guidance on how to complete the municipal hazard identification and risk evaluation worksheet. All eleven municipalities in Montour County returned a completed worksheet. This information was combined with the county information to develop an overall list of hazards that would need to be profiled.

Once the natural and human-caused hazards were identified and profiled, the local planning team then completed a vulnerability assessment for each hazard. An inventory of vulnerable assets was completed utilizing GIS data and local planning team knowledge. The team used the most recent Montour County assessment data to estimate loss to particular hazards. Risk factor was then assessed to each profiled hazard utilizing the hazard prioritization matrix. This assessment allows the county and its municipalities to focus

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on and prioritize local mitigation efforts on areas that are most likely to be damaged or require early response to a hazard event.

### **4.2. Hazard Identification**

#### **4.2.1. Presidential and Gubernatorial Disaster Declarations**

Table 12 – *Presidential & Gubernatorial Disaster Declarations* presents a list of all Presidential and Governor’s Disaster Declarations that have affected Montour County from 1955 through 2020, according to the Pennsylvania Emergency Management Agency.

Table 12 - *Presidential & Gubernatorial Disaster Declarations*

<b>Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations</b>		
<b>Date</b>	<b>Hazard Event</b>	<b>Action</b>
September, 1955	Drought	Gubernatorial Declaration
January, 1966	Heavy snow	Gubernatorial Declaration
February, 1972	Heavy snow	Gubernatorial Declaration
June, 1972	Flood (Agnes)	Presidential Disaster Declaration
February, 1974	Truckers strike	Gubernatorial Declaration
September, 1975	Severe storms, heavy rains, flooding	Presidential Disaster Declaration
January, 1978	Heavy snow	Gubernatorial Declaration
February, 1978	Blizzard	Gubernatorial Declaration
March, 1993	Blizzard	Presidential Emergency Declaration
January, 1994	Severe winter storms	Presidential Disaster Declaration
September, 1995	Drought	Gubernatorial Declaration
January, 1996	Severe winter storms	Presidential Disaster Declaration
January, 1996	Flooding	Presidential Disaster Declaration
July, 1999	Drought	Gubernatorial Declaration
September, 1999	Hurricane Floyd	Presidential Disaster Declaration
December, 1999	Drought	Gubernatorial Declaration
September, 2003	Hurricane Isabel/Henri	Presidential Disaster Declaration
September, 2004	Tropical Depression Ivan	Presidential Disaster Declaration
September, 2005	Hurricane Katrina	Gubernatorial Proclamation of Emergency
September, 2006	Tropical depression Ernesto	Gubernatorial Proclamation of Emergency
February, 2007	severe winter storm	Gubernatorial Proclamation of Emergency
February, 2007	Waive the regulations regarding hours of service limitations for drivers of commercial vehicles	Gubernatorial Proclamation of Emergency
April, 2007	Severe storm	Gubernatorial Declaration
April, 2007	Severe winter storm	Gubernatorial Proclamation of Emergency
February, 2010	severe winter storm	Gubernatorial Proclamation of Emergency
January, 2011	Severe winter storm	Gubernatorial Proclamation of Emergency
September, 2011	Severe storms and flooding (Lee/Irene)	Gubernatorial Proclamation of Emergency
April, 2012	Spring winter storms	Gubernatorial Proclamation of Emergency
October, 2012	Hurricane Sandy	Presidential Emergency Declaration
June, 2013	High winds, thunderstorms, heavy rain, tornado, flooding	Gubernatorial Proclamation of Emergency
January, 2014	Extended prolonged cold	Gubernatorial Proclamation of Emergency
January, 2014	Driver hours waived due to prolonged and continued severe winter weather	Gubernatorial Proclamation of Emergency
February, 2014	Severe winter weather	Gubernatorial Proclamation of Emergency

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<b>Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations</b>		
<b>Date</b>	<b>Hazard Event</b>	<b>Action</b>
February, 2014	Severe winter storm	Presidential Proclamation of Emergency
March, 2017	Severe winter storm	County and Municipal Declarations
July, 2017	Flash flooding	County and Municipal Declarations
January, 2018	Opioid crisis	Gubernatorial Proclamation of Emergency
March, 2020	COVID-19	Presidential Disaster Declaration
<i>Source: Pennsylvania Emergency Management Agency and Federal Emergency Management Agency</i>		

## **4.2.2. Summary of Hazards**

The Montour County Local Planning Team (LPT) was provided the Pennsylvania Standard List of Hazards to be considered for evaluation in the 2021 HMP Update. Following a review of the hazards considered in the 2015 HMP and the standard list of hazards, the local planning team decided that the 2021 plan should identify, profile, and analyze twenty hazards. These twenty hazards include all of the hazards profiled in the 2015 plan. The list below contains the twenty hazards that have the potential to impact Montour County as identified through previous risk assessments, the Montour County Hazards Vulnerability Analysis and input from those that participated in the 2021 HMP update. Hazard profiles are included in Section 4.3 for each of these hazards.

### *Identified Natural Hazards*

#### **Drought**

Drought is defined as a deficiency of precipitation experienced over an extended period of time, usually a season or more. Droughts increase the risk of other hazards, like wildfires, flash floods, and landslides or debris flows. This hazard is of particular concern in Pennsylvania due to the prevalence of farms and other water-dependent industries, water dependent recreation uses, and residents who depend on wells for drinking water.

#### **Flooding**

Flooding is the temporary condition of partial or complete inundation of normally dry land, and it is the most frequent and costly of all-natural hazards in Pennsylvania. 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. 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.

#### **Hurricanes, Tropical Storms**

Hurricanes, tropical storms, and nor'easters are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counterclockwise (in the Northern Hemisphere) and whose diameter averages 10-30 miles across. Potential threats from hurricanes include powerful winds, heavy rainfall, storm surges, coastal and inland flooding, rip currents, tornadoes, and landslides. The Atlantic hurricane season runs from June 1 to November 30.

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### **Invasive Species**

An invasive species is a species that is not indigenous to the ecosystem under consideration and whose introduction causes or is likely to cause economic, environmental, or human harm. These species can be any type of organism: plant, fish, invertebrate, mammal, bird, disease, or pathogen.

### **Landslide**

In a landslide, masses of rock, earth or debris move down a slope. Landslides can be caused by a variety of factors, including earthquakes, storms, fire, and human modification of land. Areas that are prone to landslide hazards include previous landslide areas, areas on or at the base of slopes, areas in or at the base of drainage hollows, developed hillsides with leach field septic systems, and areas recently burned by forest or brush fires.

### **Pandemic and Infectious Diseases**

A pandemic is a global outbreak of disease that occurs when a new virus emerges in the human population, spreading easily in a sustained manner, and causing serious illness. An epidemic describes a smaller scale infectious outbreak, within a region or population, that emerges at a disproportional rate. Infectious disease outbreaks may be widely dispersed geographically, impact large numbers of the population, and could arrive in waves lasting several months at a time.

### **Radon Exposure**

Radon is a radioactive gas produced by the breakdown of uranium in soil and rock that can lead to lung cancer in people exposed over a long period of time. Most exposure comes from breathing in radon gas that enters homes and buildings through foundation cracks and other openings. According to the DEP, approximately 40% of Pennsylvania homes have elevated radon levels.

### **Subsidence and Sinkhole**

Land subsidence is a gradual settling or sudden sinking of the ground surface due to the movement of subsurface materials. A sinkhole is a subsidence feature resulting from the sinking of surficial material into a pre-existing subsurface void. Subsidence and sinkholes are geologic hazards that can impact roadways and buildings and disrupt utility services. Subsidence and sinkholes are most common in areas underlain by limestone and can be exacerbated by human activities such as water, natural gas, and oil extraction.

### **Tornadoes, Windstorm**

A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. About 1,250 tornadoes hit the U.S. each year, with about sixteen hitting Pennsylvania. Damaging winds exceeding 50-60 miles per hour can occur during tornadoes, severe thunderstorms, winter storms, or coastal storms. These winds can have severe impacts on buildings, pulling off the roof covering, roof deck, or wall siding and pushing or pulling off the windows.

### **Wildfire**

A wildfire is an unplanned fire that burnt in a natural area. Wildfires can cause injuries or death and can ruin homes in their path. Wildfires can be caused by humans or lightning, and can happen anytime, though the risk increases in period of little rain. In Pennsylvania, 98% of wildfires are caused by people.

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### **Winter Storm**

A winter storm is a storm in which the main types of precipitation are snow, sleet, or freezing rain. 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. Most deaths from winter storms are not directly related to the storm itself, but result from traffic accidents on icy roads, medical emergencies while shoveling snow, or hypothermia from prolonged exposure to cold.

#### *Identified Human Caused Hazards*

### **Dam/Levee Failures**

Dam failure is the uncontrolled release of water (and any associated wastes) from a dam. This hazard often results from a combination of natural and human causes, and can follow other hazards such as hurricanes, earthquakes, and landslides. The consequences of dam failures can include property and environmental damage and loss of life. A levee is a human-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water to provide protection from temporary flooding (FEMA, 2016). A levee failure or breach occurs when a levee fails to prevent flooding on the landside of the levee. The consequences of a sudden levee failure can be catastrophic, with the resulting flooding causing loss of life, emergency evacuations, and significant property damage.

### **Civil Disturbance**

A civil disturbance is defined by FEMA as a civil unrest activity (such as a demonstration, riot, or strike) that disrupts a community and requires intervention to maintain public safety.

### **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, Pennsylvania, 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).

### **Disorientation**

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



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## **Emergency Services**

Emergency medical services (EMS) and fire department services play a crucial role in the emergency response system, and the functionality of these emergency services directly impacts many of the other hazards profiles in this report. Both EMS and fire services face challenges from lack of funding and lower rates of volunteerism.

## **Environmental Hazards**

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

- Hazardous material releases: at fixed facilities or as such materials are in transit and including toxic chemicals, infectious substances, biohazardous waste and any materials that are explosive, corrosive, flammable, or radioactive (PL 1990-165, § 207(e)).
- Air or Water Pollution; the release of harmful chemical and waste materials into water bodies or the atmosphere, for example (National Institute of Health Sciences, July 2009; Environmental Protection Agency, Natural Disaster PSAs, 2009).
- Superfund Facilities: hazards originating from abandoned hazardous waste sites listed on the National Priorities List (Environmental Protection Agency, National Priorities List, 2009).
- Manure Spills: involving the release of stored or transported agricultural waste, for example (Environmental Protection Agency, Environmental Impacts of..., 1998).
- Product Defect or Contamination; highly flammable or otherwise unsafe consumer products and dangerous foods (Consumer Product Safety Commission, 2003).

## **Nuclear Incidents**

Nuclear explosions can cause significant damage and casualties from blast, heat, and radiation. The primary concern following a nuclear accident or nuclear attack 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.

## **Terrorism/Cyber Terrorism**

Terrorism is use of force or violence against persons or property with the intent to intimidate or coerce. Acts of terrorism include threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber-attacks (computer-based); and the use of chemical, biological, nuclear, and radiological weapons. Cyber-attacks have become an increasingly pressing concern. Cyber terrorism refers to acts of terrorism committed using computers, networks, and the Internet. The most widely cited definition comes from Denning's Testimony before the Special Oversight Panel on Terrorism: "Cyberterrorism...is generally understood to mean unlawful attacks and threats of attack against computers, networks, and the information stored therein when done to intimidate or coerce a government or its people in furtherance of political or social objectives. Further, to qualify as cyberterrorism, an attack should result in violence against persons or property, or at least cause enough harm to generate fear".

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### **Transportation Accidents**

Transportation accidents are technological hazards involving the nation's system of land, sea, and air transportation infrastructure. A flaw or breakdown in any component of this system can and often does result in a major disaster involving loss of life, injuries, property and environmental damage, and economic consequences.

### **Utility Interruption**

Utility interruption hazards are hazards that impair the functioning of important utilities in the energy, telecommunications and public works and information network sectors. Utility interruption hazards include the following:

- Geomagnetic Storms; including temporary disturbances of the Earth's magnetic field resulting in disruptions of communication, navigation, and satellite systems (National Research Council et al., 1986).
- Fuel or Resource Shortage; resulting from supply chain breaks or secondary to other hazard events, for example (McGrady County, PA, 2005).
- Electromagnetic Pulse; originating from an explosion or fluctuating magnetic field and causing damaging current surges in electrical and electronic systems (Institute for Telecommunications Sciences, 1996).
- Information Technology Failure; due to software bugs, viruses, or improper use (Rainer Jr., et al, 1991).
- Ancillary Support Equipment; electrical generating, transmission, system-control, and distribution-system equipment for the energy industry (Hirst & Kirby, 1996).
- Public Works Failure; damage to or failure of highways, flood control systems, deep-water ports and harbors, public buildings, bridges, dams, for example (United States Senate Committee on Environment and Public Works, 2009).
- Telecommunications System Failure; Damage to data transfer, communications, and processing equipment, for example (FEMA, 1997)
- Transmission Facility or Linear Utility Accident; liquefied natural gas leakages, explosions, facility problems, for example (United States Department of Energy, 2005)
- Major Energy, Power, Utility Failure; interruptions of generation and distribution, power outages, for example (United States Department of Energy, 2000).

### **4.2.3. Climate Change**

#### **Impacts of Climate Change on Identified Hazards**

Humans have become the dominant species on Earth and our society and influence is globalized. Human activity such as the large-scale consumption of fossil fuels and de-forestation has caused atmospheric carbon dioxide concentrations to significantly increase and a notable diversity of species to go extinct. The result is rapid climate change unparalleled in Earth's history and an extinction event approaching the level of a mass extinction (Barnosky et al., 2011; Wake & Vredenburg, 2008). The corresponding rise of average atmospheric temperatures is intensifying many natural hazards, and further threatening biodiversity. The effects of climate change on these hazards is expected to intensify over time as temperatures continue to rise, so it is prudent to be aware of how climate change is impacting natural hazards.

The most obvious change is in regard to extreme temperature. As average atmospheric temperatures rise, extreme high temperatures become more threatening, with record high temperatures outnumbering record low temperatures 2:1 in recent years. As climate change intensifies, it is expected that the risk of extreme

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heat will be amplified whereas the risk of extreme cold will be attenuated. Some studies show increased insect activities during a similar rapid warming event in Earth's history. Other studies make projections that with the warming temperatures and lower annual precipitation that are expected with climate change, there will be an expansion of the suitable climate for mosquitos, potentially increasing the risk of disease.

Climate change is likely to increase the risk of droughts (Section 4.3.1). Higher average temperatures mean that more precipitation will fall as rain rather than snow, snow will melt earlier in the spring, and evaporation and transpiration will increase. Along with the prospect of decreased annual precipitation, the risk of hydrological and agricultural drought is expected to increase (Sheffield & Wood, 2008). Correspondingly this will impact wildfires (Section 4.3.9). Drought is accompanied by drier soils and forests, resulting in an elongated wildfire season and more intense and long-burning wildfires (Pechony & Shindell, 2010). However, the Southwest United States is at a greater risk of this increased drought and wildfire activity than Monroe County in the Eastern United States.

While it may seem counterintuitive considering the increased risk of drought, there is also an increased risk of flooding associated with climate change (Section 4.3.4). As previously mentioned, warmer temperatures mean more precipitation will fall as rain rather than snow. Combined with the fact that warmer air holds more moisture, the result is heavier and more intense rainfalls, increasing the risk of flooding and dam and levee failures. Similarly, winter storms are expected to become more intense, if possibly less frequent (Section 4.3.10). Climate change is also expected to result in more intense hurricanes and tropical storms (Section 4.3.5). With the rise of atmospheric temperatures, ocean surface temperatures are rising, resulting in warmer and moister conditions where tropical storms develop (Stott et al., 2010). A warmer ocean stores more energy and is capable of fueling stronger storms. It is projected that the Atlantic hurricane season is elongating, and there will be more category 4 and 5 hurricanes than before (Trenberth, 2010).

Climate change is contributing to the introduction of new invasive species (Section 4.3.6). As maximum and minimum seasonal temperatures change, non-native species are able to establish themselves in previously inhospitable climates where they have a competitive advantage. This may shift the dominance of ecosystems in the favor of non-native species, contributing to species loss and the risk of extinction.

This type of sudden global change is novel to humanity. Despite the myriad of well thought out research, there is still much uncertainty surrounding the future of the Earth. All signs point to the intensification of the hazards mentioned above, especially if human society and individuals do not make swift and significant changes to reduce emissions and species losses.

### **4.3. Hazard Profiles**

#### **4.3.1. Drought**

##### **4.3.1.1 Location and Extent**

While Pennsylvania is generally more water-rich than many U.S. states, the Commonwealth may be subject to drought conditions. A drought is broadly defined as a time period of prolonged dryness that contributes to the depletion of ground and surface water. Droughts are regional climatic events, so when such an event occurs in Montour County, impacts are not restricted to the county and are often more widespread. The spatial extent of the impacted area can range from localized areas in Pennsylvania to the entire Mid-Atlantic region.

There are three types of drought:

**Meteorological Drought** – A deficiency of moisture in the atmosphere compared to average conditions. Meteorological drought is defined by the duration of the deficit and degree of dryness and is often associated

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with below average rainfall. Depending on the severity of the drought, it may or may not have a significant impact on agriculture and the water supply.

**Agricultural Drought** – A drought inhibiting the growth of crops, due to a moisture deficiency in the soil. Agricultural drought is linked to meteorological and hydrologic drought.

**Hydrologic Drought** – A prolonged period without rainfall that has an adverse effect on streams, lakes, and groundwater levels, potentially impacting agriculture.

Leaving areas with little moisture, droughts are often one of the leading contributing factors to wildfires.

Droughts have several effects:

- Depletion of consumable water supply
- Depletion of agricultural water supply
- Depletion of forest water and water used to fight forest fires
- Depletion of water for navigational and recreational purposes
- Depletion of water for natural irrigation (besides crops and forests)
- Poor water quality

Droughts can have adverse effects on farms and other water-dependent industries. This can result in a local economic loss. Areas with extensive agriculture uses are particularly vulnerable to drought; roughly 38,635 acres of Montour County, or 46% of the 83,200 total land acreage, are held in farms (United States Department of Agriculture [USDA], 2017 Census). This agricultural land is spread throughout Montour County, although it is significantly smaller (11%) than reported in the 2015 hazard mitigation plan.

Public safety is an issue in terms of consumable water not being available, as well as water for fire protection and emergency services.

### **4.3.1.2 Range of Magnitude**

Nearly 50% of the annual precipitation of forty-nine inches is during the spring/summer. Fall is usually the driest. Average snowfall for the county is twenty-one inches. Rural farming areas of Montour County are most at risk when a drought occurs. A drought can be a significant financial burden as approximately 42% of the county farmland use is devoted to crop cultivation and another 48% to livestock and poultry. (U.S. Census of Agriculture, 2017). Wildfires are often the most severe secondary effect associated with drought. Wildfires can devastate wooded and agriculture areas, threatening natural resources, structures near high wildfire loads, and farm production facilities. Prolonged drought conditions can have a lasting impact on the economy and can cause major ecological changes, such as increases in scrub growth, flash flooding and soil erosion.

*Table 13 – Drought Preparation Phases* shows the FEMA-defined levels of drought severity along with suggested actions, requests, and goals. Drought can cause municipalities to enforce water rationing and distribution.

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Table 13 - Drought Preparation Phases

<b>Drought Preparation Phases (PA DEP, 2017)</b>				
<b>Phase</b>	<b>General Activity</b>	<b>Actions</b>	<b>Request</b>	<b>Goal</b>
<b>Drought Watch</b>	Early stages of planning and alert for drought possibility	Increased water monitoring, awareness and preparation for response among government agencies, public water suppliers, water users and the public	Voluntary water conservation	Reduce water use by 5%
<b>Drought Warning</b>	Coordinate a response to imminent drought conditions and potential water shortages	Reduce shortages - relieve stressed sources, develop new sources if needed	Continue voluntary water conservation, impose mandatory water use restrictions if needed	Reduce water use by 10-15%
<b>Drought Emergency</b>	Management of operations to regulate all available resources and respond to emergency	Support essential and high priority water uses and avoid unnecessary uses	Possible restrictions on all nonessential water uses	Reduce water use by 15%

Local Water Rationing: Although not a drought phase, local municipalities may, with the approval of the Pennsylvania 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.

Long-term water shortages during severe drought conditions can have a significant impact on agribusiness, public utilities, and other industries reliant on water for production services. Montour County also has a growing agritourism business that would be threatened by long-term drought.

The Commonwealth uses five parameters to assess drought conditions:

- Stream flows (compared to benchmark records);
- Precipitation (measured as the departure from normal, thirty-year average precipitation);
- Reservoir storage levels in a variety of locations such as three New York City reservoirs in the upper Delaware River Basin;
- Groundwater elevations in a number of counties (comparing to past month, past year and historic record); and
- Soil moisture via the Palmer Drought Index (See *Table 14 – Palmer Drought Severity Index*) - a soil moisture algorithm calibrated for relatively homogeneous regions which measures dryness based on recent precipitation and temperature.

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Table 14 - Palmer Drought Severity Index

Palmer Drought Severity Index	
Severity Category	PDSI
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
Severity Category	PDSI
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

### 4.3.1.3 Past Occurrence

The Department of Environmental Protection (PA DEP) maintains the most comprehensive data on drought occurrences across the commonwealth. Descriptions of drought status categories (i.e., watch, warning, and emergency) are included in the “Range of Magnitude” section above. The declared drought status from 1989 to 2021 is shown in *Table 15 – Past Drought Events in Montour County*.

Based on the county’s disaster history and other drought occurrence data, the worst drought event in Montour County occurred in the summer of 1999. Extended dry weather spurred Governor Ridge to declare a drought emergency in fifty-five counties, including Montour. During this event, precipitation deficits for that summer averaged five to seven inches; the Susquehanna River hit record low flows, streams were empty, and wells dried up. Crop damages indicated losses of over \$500 million statewide, and crop losses totaled 70% - 100%. There were also additional losses from the decline of milk production due to the drought (National Climatic Data Center [NCDC], 2011). Additionally, during this event, the state asked municipal and private water suppliers to cut local water use.

Table 15 - Past Drought Events in Montour County

Past Drought Events in Montour County			
Dates	Drought Status	Dates	Drought Status
3/3/1989 – 5/15/1989	Watch	6/10/1999 – 7/20/1999	Warning
6/28/1991 – 7/24/1991	Warning	7/20/1999 – 9/30/1999	Emergency
7/24/1991 – 4/20/1992	Emergency	9/30/1999 – 5/5/2000	Watch
4/20/1992 – 9/11/1992	Warning	8/8/2001 – 12/5/2001	Watch
9/11/1992 – 1/15/1993	Watch	12/5/2001 – 6/14/2002	Warning
9/1/1995 – 11/8/1995	Warning	8/9/2002 – 9/5/2002	Watch

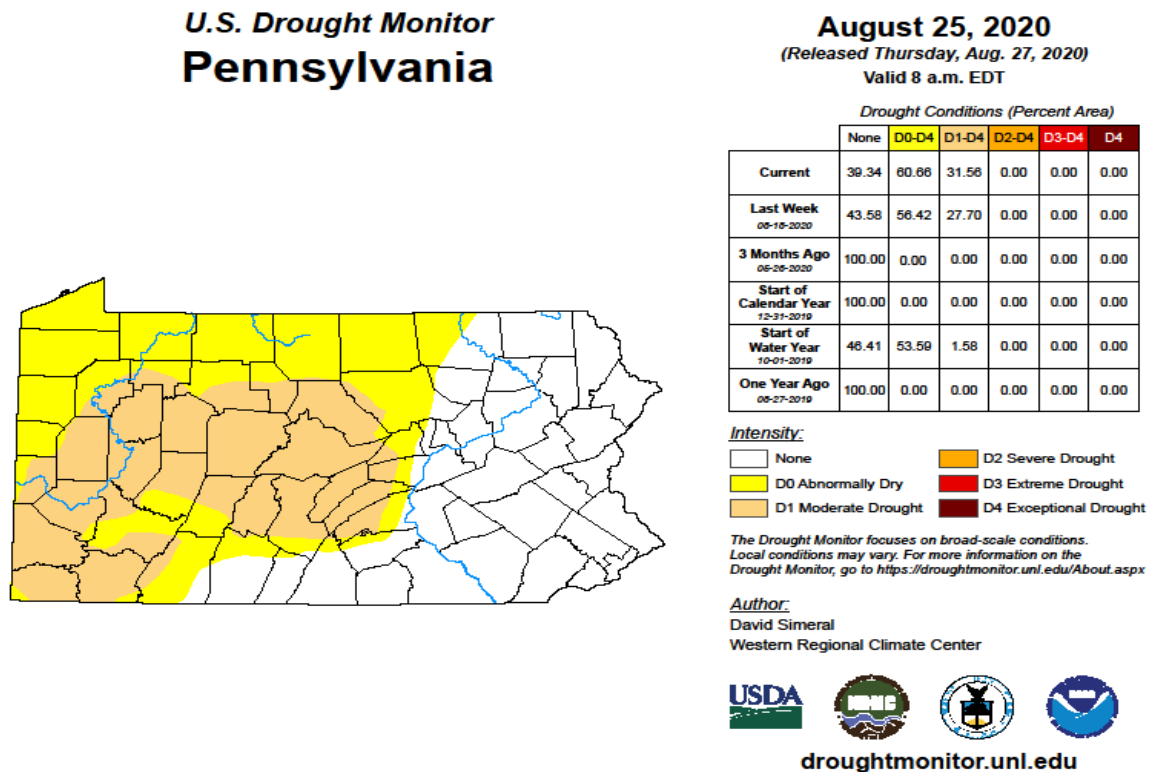
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Dates	Drought Status	Dates	Drought Status
11/8/1995 – 12/18/1995	Watch	9/5/2002 – 11/7/2002	Warning
7/17/1997 – 11/13/1997	Watch	4/11/2006 – 6/30/2006	Watch
12/3/1998 – 12/14/1998	Watch	8/6/2007 – 9/5/2007	Watch
12/14/1998 – 3/15/1999	Warning	10/5/2007 – 2/15/2008	Watch
3/15/1999 – 6/10/1999	Watch	9/16/2010 – 11/10/2010	Watch
		9/30/2020 – 1/7/2021	Watch

*Source: SHELDUS, 2020*

SHELDUS also notes crop indemnity payments in 2016 for \$165,000.00. The National Centers for Environmental Information (NCEI) report that year’s precipitation was below normal but did not reach drought status. Pennsylvania had its warmest July on record in 2020, and twenty-nine counties, including Montour, entered Drought Watch status on September 30, 2020. The drought monitor map below (*Figure 9 – Drought Conditions*) shows the drought conditions moving west to east in the commonwealth, in alignment with the lack of rainfall from storm systems through the summer. At the writing of this plan, however, drought watches had been lifted in all but three counties – Centre, Clearfield, and Clinton.

Figure 9 - Drought Conditions

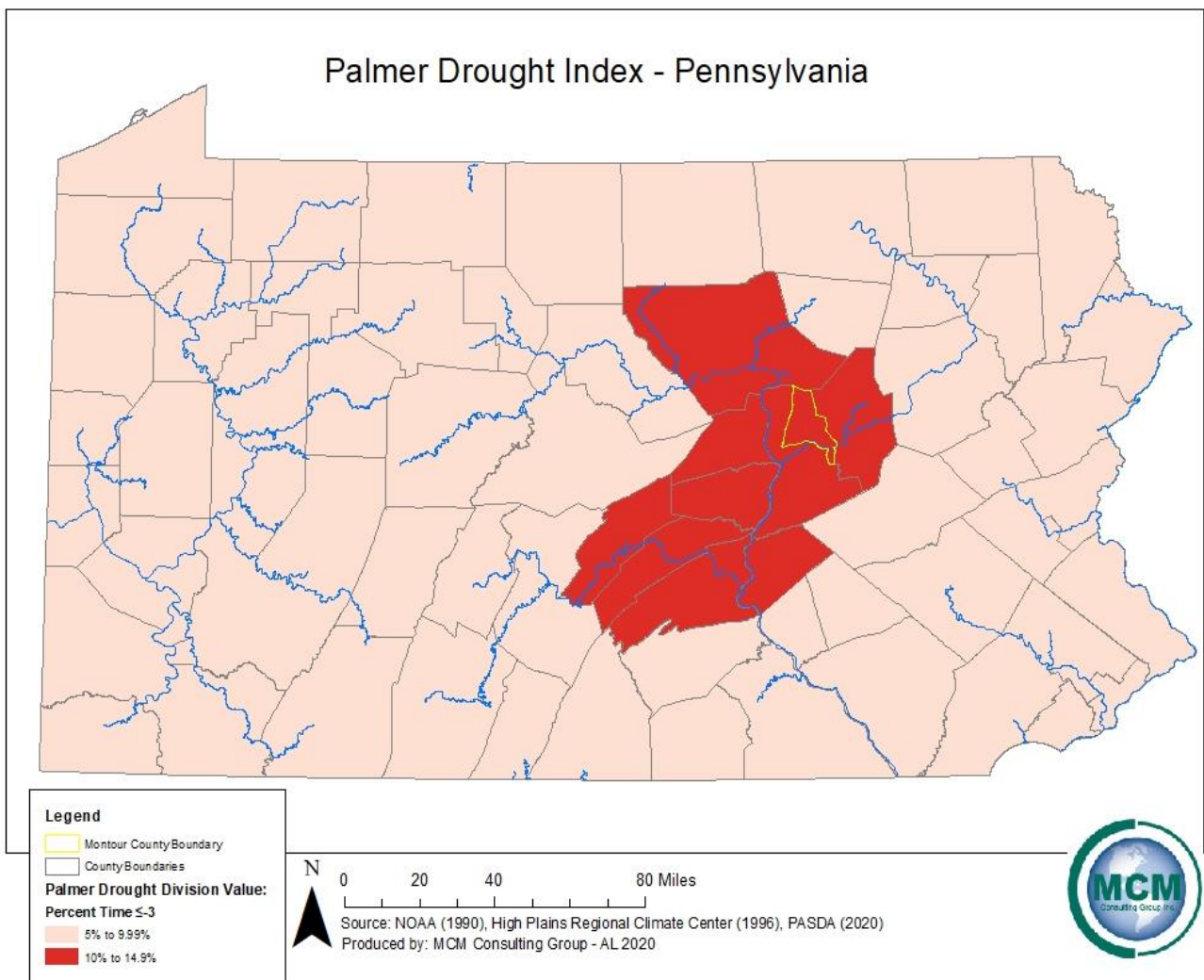


# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

## 4.3.1.4 Future Occurrence

It is difficult to forecast the exact severity and frequency of future drought events and the future of climate change will lead to increased uncertainty and extremity of climate events, suggesting that it is best to be prepared for potentially adverse conditions. As depicted in *Figure 10 – Palmer Drought Severity Index for Pennsylvania*, Montour County has experienced severe drought between 10% – 14.9% of the time between in a 100-year period. This report can be used to make a rough estimate of the future probability of drought in Montour County, although it does not account for changes introduced by climate change. Drought conditions are expected to become more severe with climate change, as evaporation and transpiration will increase with higher temperatures (Sheffield & Wood, 2008; EPA, 2016).

Figure 10 - Palmer Drought Severity Index for Pennsylvania



The potential for a drought to occur in Montour County is, nevertheless, high. Given the frequency of drought watches issued for Montour County and its municipalities, the county can reasonably expect to be under a drought watch at least once per year. While some form of drought condition frequently exists in Montour County, the impact depends on the duration of the event, severity of conditions, and area affected.





## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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Montour County and there are multiple recreational sites across the county dependent on consistent water sources and replenishment. From a societal perspective, public safety is an issue in terms of consumable water not being available, as well as water for fire protection and emergency services.

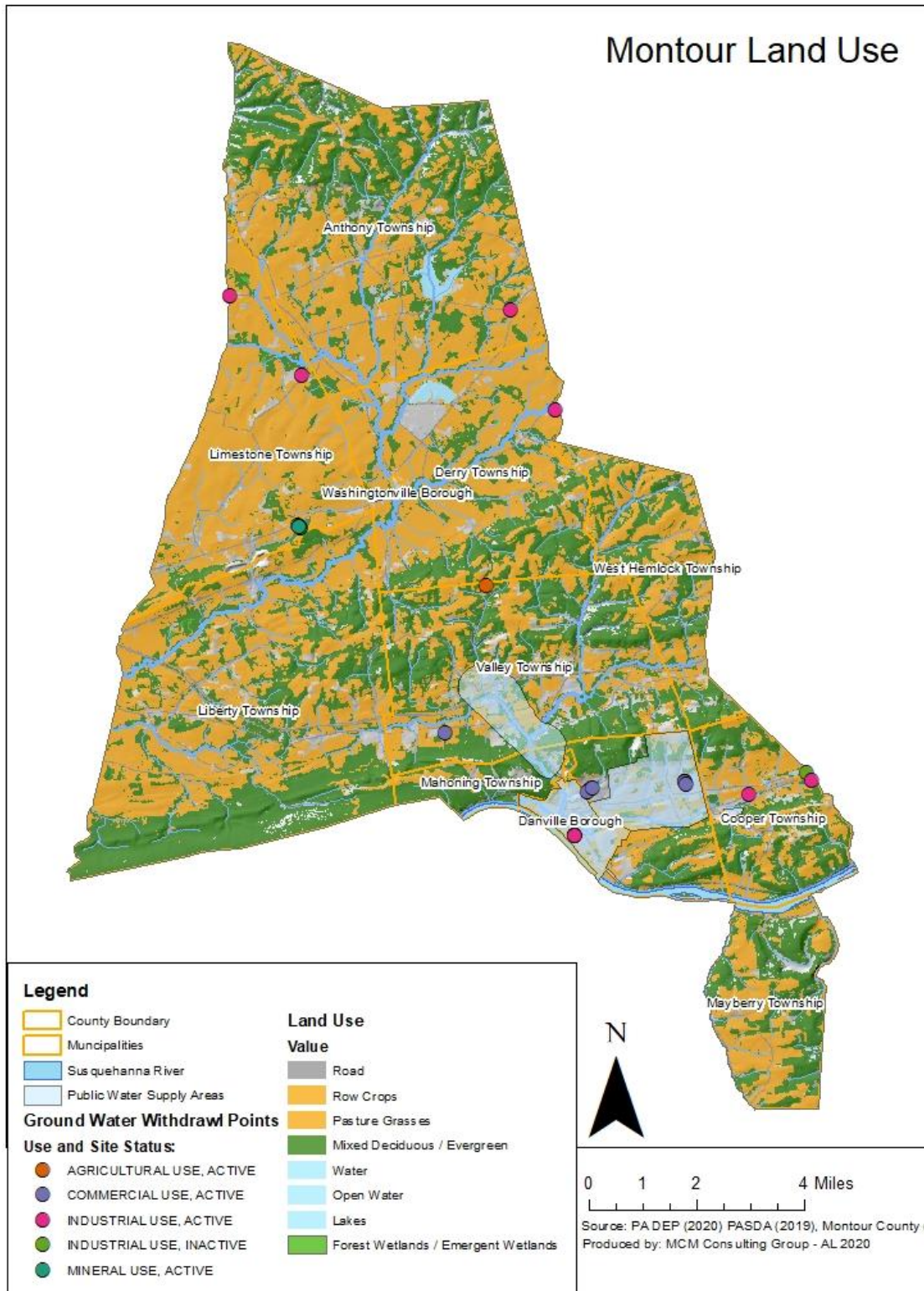
The most significant losses resulting from drought events are typically found in the agriculture sector. The 1999 Gubernatorial Proclamation was issued in large part due to significant crop damage. Preliminary estimates by the Pennsylvania Department of Agriculture indicated possible crop losses across the Commonwealth in excess of \$500 million. This estimate did not include a twenty percent decrease in dairy milk production which also resulted in million-dollar losses (NCDC, 2009).

While these were statewide impacts, they illustrate the potential for droughts to severely impair the local economy in more agricultural communities. The 2017 Census of Agriculture reports there were 356 farms in Montour County, at an average size of 109 acres. Montour County ranks thirty-fourth of sixty-seven counties in the commonwealth for agricultural production, totaling just over \$60,000 annually (USDA, 2017). Agricultural production from crops, including nursery and greenhouse crops, accounts for \$25,536,000 in commerce annually. Production from livestock, poultry, and their products accounts for \$34,689,000 annually.

A map of properties with tillable agricultural land use, forestry, and other land in the county vulnerable to drought is shown below at *Figure 12, Land Use and Cover Vulnerable to Drought*.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

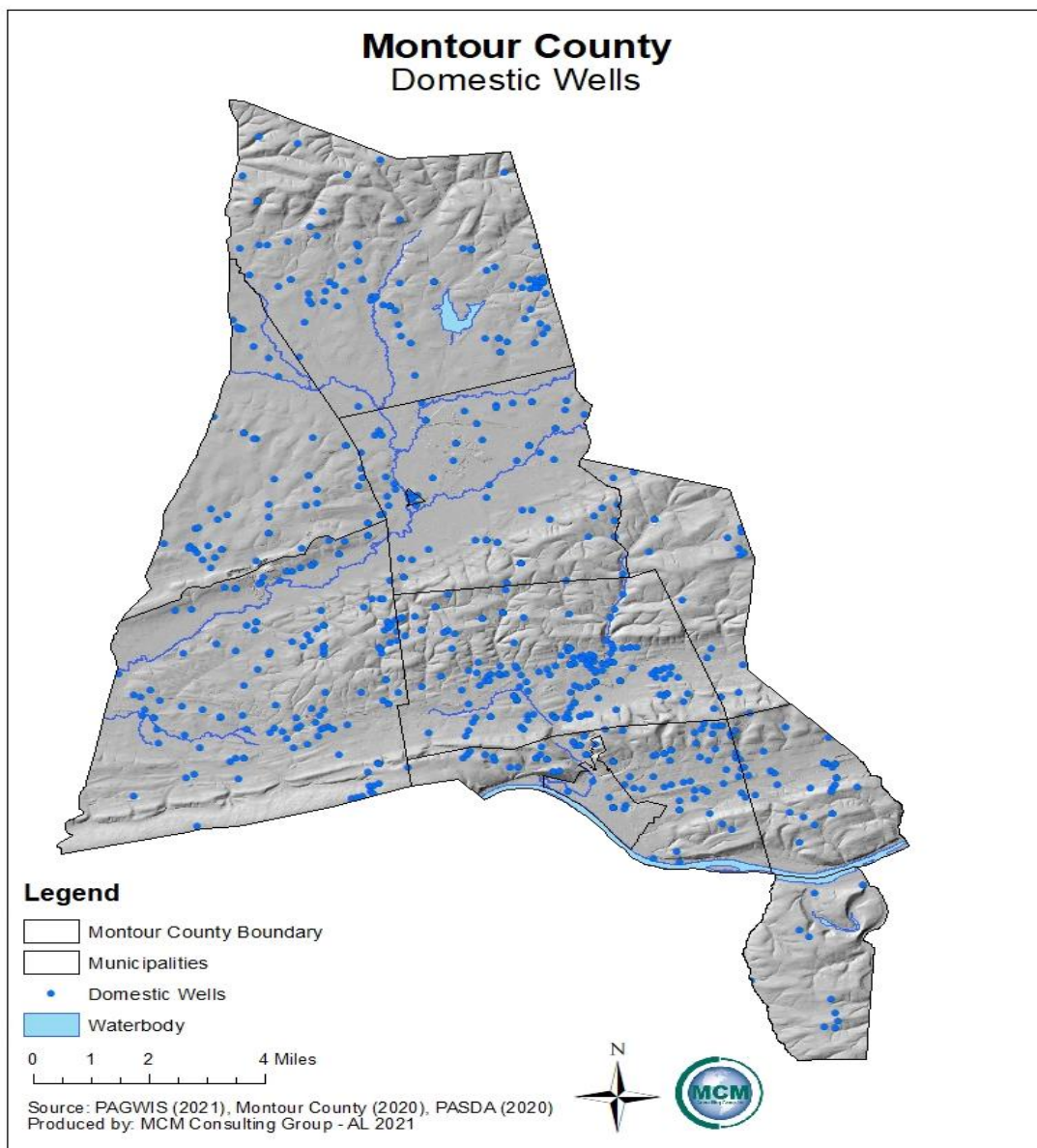
Figure 12 - Land Use and Cover Vulnerable to Drought



# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Public or municipal water supplies are also vulnerable to the effects of drought because supply sources include rivers, reservoirs, and groundwater. Public water service areas cover only some of the land area in the county, as depicted in *Figure 13 – Montour County Domestic Wells*. The majority of the county relies on domestic wells for their fresh drinking water. Residents or water authorities that use private domestic wells are more vulnerable to droughts because their drinking water can literally dry up. There is a total of 864 domestic wells in the county. It is important to note that the well data was obtained from the Pennsylvania Groundwater Information System (PaGWIS). PaGWIS relies on *voluntary submissions* of well record data by well drillers; as a result, it is not a complete database of all domestic wells in the county. This is the most complete dataset of domestic wells available.

Figure 13 - Montour County Domestic Wells



# Montour County, Pennsylvania

## 2021 Hazard Mitigation Plan

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Through 2017, the USGS has conducted many Baseline Water Quality Studies throughout Pennsylvania, but one for Montour County is not yet completed. The studies comprise a useful reference to get a general sense of the water quality and challenges associated with domestic water wells in the Commonwealth.

The EPA provides a guide published in October 2017 for water utilities to aid in drought response and recovery. The guide outlines what goes into a good drought response plan, how to manage water supply and demand during a drought, best practices for communication and partnerships with other local utilities and provides case studies to discuss examples of drought management practices (EPA, 2017). The guide may be found here: [https://www.epa.gov/sites/production/files/2017-10/documents/drought\\_guide\\_final\\_508compliant\\_october2017.pdf](https://www.epa.gov/sites/production/files/2017-10/documents/drought_guide_final_508compliant_october2017.pdf).

### 4.3.2. Flooding

#### 4.3.2.1 Location and Extent

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 incidents are generally the result of excessive precipitation. General flooding is typically experienced when precipitation occurs over a given river basin for an extended period.

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 incident 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.

Winter flooding can include ice jams, which occur when warm temperatures and heavy rain cause snow to melt rapidly. Snowmelt 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.

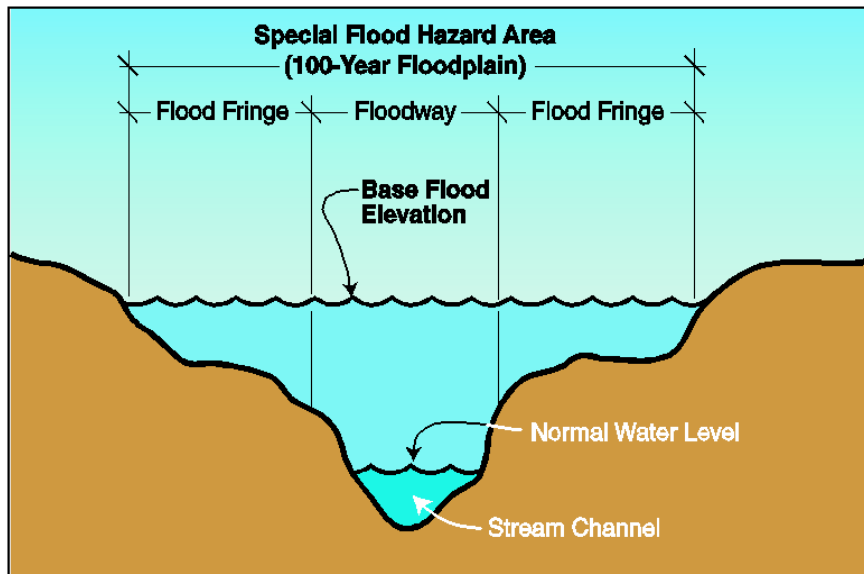
Many communities in Montour County are located along stream and creek valleys. Montour County has five major natural waterways within its borders; the Susquehanna River; Lake Chillisquaque; and the Chillisquaque, Mahoning, and Roaring creeks. The waterways provide watershed for most of the county's one hundred and forty-one square miles. Excess water from snowmelt or rainfall accumulates and overflows onto stream banks and adjacent floodplains.

Floodplains are lowlands adjacent to rivers, streams, and creeks that are subject to recurring floods. The size of the floodplain is described by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in the "Future Occurrence" section below. 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 NFIP, for which Flood Insurance Rate Maps (FIRMs) are published, identifies the 1% annual chance flood. This 1% annual chance flood incident is used to delineate the Special Flood Hazard Area (SFHA) and identify Base Flood Elevations. *Figure 14 - Special Flood Hazard Area, 1% Annual Chance Floodplain, Floodway, and Flood* illustrates these terms. The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania, and Montour County's local governments.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 14 - Special Flood Hazard Area, 1% Annual Chance Floodplain, Floodway, and Flood



The effective, countywide DFIRMs were released for Montour County and all communities on May 16, 2008. All communities within the county are now shown on a single set of Countywide FIRMs. Prior to the publication of this digital data, flood hazard information from FEMA was available through paper FIRMs and Q3 Flood Data. The final FIRMs and DFIRM data for Montour County can be obtained from the FEMA Map Service Center (<http://www.msc.fema.gov>). These maps can be used to identify the expected spatial extent and elevation of flooding from a 1% and 0.2% annual chance incident.

### 4.3.2.2 Range of Magnitude

Floods are considered hazards when people and property are affected. Most injuries and deaths from flooding happen when people are swept away by flood currents, and most property damage results from inundation by sediment-filled water. A large amount of rainfall over a short time span can result in flash flood conditions. Small amounts of rain can result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces, such as large parking lots, paved roadways, or other impervious and developed areas. Flooding can occur in individual municipalities within Montour County or it can have a countywide effect, involving multiple sites and streams. In this portion of the Susquehanna River Basin, flooding occurs most frequently in spring and early summer.

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover, and rate of snowmelt. Water runoff is greater in areas with steep slopes and little to no vegetative ground cover. In addition, urbanization typically results in the replacement of vegetative ground cover with asphalt and concrete, increasing the volume of surface runoff and stormwater, particularly in areas with poorly planned stormwater drainage systems.

In the winter and early spring, major flooding has occurred as a result of heavy rainfall on dense snowpack throughout contributing watersheds. Summer floods have occurred from intense rainfall on previously saturated soils. Summer thunderstorms deposit large quantities of rainfall over a short period of time, which can result in flash flood incidents when the velocity of floodwaters has the potential to amplify the impacts of a flood incident. Winter floods also have resulted from runoff of intense rainfall on frozen ground, and, on rare occasions, local flooding has been exacerbated by ice jams in rivers.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Montour County has two stream gages that serve essentially as an early warning system for flooding. The first stream gage in Montour County is located in the Susquehanna River in Danville on right bank approximately 500 feet upstream from the Mill Street bridge on State Highway 54 and approximately 0.8 miles upstream from Mahoning Creek. The second stream gage is located on the Chillisquaque Creek in Washingtonville on the left bank approximately 60 feet upstream from the bridge on State Highway 54, and approximately 0.7 miles north of U.S. Post Office in Washingtonville.

### 4.3.2.3 Past Occurrence

#### River and Stream Flooding:

Montour County has a long history of flooding incidents. Nine of the fourteen Presidential Disaster and Emergency Declarations affecting Montour County have been in response to hazard incidents related to flooding. *Table 16 - Flood and Flash Flood Incidents Impacting Montour County* below lists flood incident information from 1996 to 2018 obtained from the NCEI database.

*Table 16 - Flood and Flash Flood Incidents Impacting Montour County*

<b>Flooding and Flash Flood Incidents Impacting Montour County</b>		
<b>Location</b>	<b>Date</b>	<b>Type</b>
<b>Danville</b>	7/25/2018	Flash Flood
<b>Mansdale</b>	7/24/2017	Flash Flood
<b>Mansdale</b>	6/27/2013	Flash Flood
<b>Strawberry Ridge</b>	9/7/2011	Flood
<b>Danville</b>	11/16/2006	Flash Flood
<b>Danville</b>	7/1/2006	Flood
<b>Danville</b>	6/28/2006	Flood
<b>Countywide</b>	6/28/2006	Flood
<b>Countywide</b>	6/27/2006	Flash Flood
<b>Countywide</b>	4/3/2005	Flood
<b>Countywide</b>	4/2/2005	Flood
<b>Countywide</b>	3/29/2005	Flood
<b>Countywide</b>	1/15/2005	Flood
<b>Countywide</b>	9/18/2004	Flood
<b>Countywide</b>	9/17/2004	Flood
<b>Danville</b>	9/24/2001	Flash Flood
<b>Countywide</b>	12/17/2000	Flash Flood
<b>Countywide</b>	9/16/1999	Flash Flood
<b>Countywide</b>	1/8/1998	Flash Flood
<b>Countywide</b>	12/13/1996	Flash Flood
<b>Countywide</b>	12/1/1996	Flash Flood
<b>Countywide</b>	1/19/1996	Flash Flood
<b>Countywide</b>	1/19/1996	Flood

*Source: National Climatic Data Center, 2021*

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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The National Flood Insurance Program identifies properties that frequently experience flooding. *Repetitive loss properties* are structures insured under the NFIP which have had at least two paid flood losses of more than \$1,000 over any ten-year period since 1978. The hazard mitigation assistance (HMA) definition of a repetitive loss property is a structure covered by a contract for flood insurance made available under the NFIP that has incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded twenty five percent of the market value of the structure at the time of each such flood event; and at the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

A property is considered a *severe repetitive loss property* either when there are at least four losses each exceeding \$5,000 or when there are two or more losses where the building payments exceed the property value. There are eighteen repetitive loss properties in Montour County. This is an increase from 2015 when there were no repetitive loss properties listed.

The worst flood incident in Montour County occurred during Hurricane Agnes in June 1972. This early season hurricane came up from the Gulf of Mexico and brought heavy rain that exceeded the carrying capacity of streams and rivers from southern New York to Virginia from June 22 to June 25. In Montour County, flooding from Hurricane Agnes claimed the lives of eleven people and caused significant property loss and damage. The flooding resulted in evacuations, economic losses, and casualties in many communities and major cities, including Harrisburg, Wilkes-Barre, and York. Statewide in Pennsylvania, the flooding from Hurricane Agnes caused \$2.8 billion in economic losses and forty-eight deaths.

More recently, Montour County was impacted by Tropical Storm Lee, fortunately not to the extent of Hurricane Agnes. However, the county as a whole was not drastically affected, the only exception being Danville Borough. Danville Borough had a significant amount of flooding due to the proximity of waterways. Danville Middle School was extensively damaged from floodwaters. The Danville School District received greater than \$7 million dollars in state and federal aid to repair the flood-damaged school.

### **Flash Flooding:**

The incidence of flash flooding in Montour County is variable, as a large portion of the county is rural, with a few municipalities that contain impermeable layers. All of the municipalities in Montour County can have flash floods dependent on regional weather patterns, soil moisture conditions, and the presence of impermeable layers.

### **Ice Jam Flooding:**

Past occurrences of ice jam flooding are also infrequent due to a small number of bridges and infrastructure near rivers and floodplains. Municipalities that can be increasingly affected by ice jams include Danville Borough, Cooper Township, Liberty Township, Mayberry Township, and Mahoning Township.

In addition to the funding received by the Danville School District, FEMA also allocated funds for several other municipalities affected by Tropical Storm Lee. *Table 17 - Individual and Household Funding* illustrates the amount of funding provided.

*Table 17 - Individual and Household Funding*

<b>Individual and Household Funding</b>		
<b>Municipality</b>	<b>Individual</b>	<b>Household</b>
<b>Bloomsburg</b>	\$1,130.00	\$1,130.00
<b>Catawissa</b>	\$36,356.00	\$34,001.00



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<b>Municipality</b>	<b>Individual</b>	<b>Household</b>
<b>Danville</b>	\$392,417.00	\$373,960.13
<b>Milton</b>	\$9,149.00	\$9,149.00
<b>Montoursville</b>	\$6,830.21	\$6,830.21
<b>Turbotville</b>	\$32,432.57	\$32,432.57
<b>Washingtonville</b>	\$14,291.23	\$13,801.24
<b>TOTAL</b>	<b>\$492,596.88</b>	<b>\$471,304.75</b>

A number of loans were also provided through the Small Business Administration (SBA). This funding was allocated for projects for eleven homes and businesses throughout the county. Nine households received a total of \$437,400.00 dollars and two businesses received a total of \$31,300.00 dollars.

Table 18 - Summary of Number and Type of Repetitive Loss Properties by Municipalities

<b>Summary of Number and Type of Repetitive Loss Properties by Municipality</b>							
<b>Municipality</b>	<b>Type</b>					<b>Sum of Repetitive Loss Properties</b>	<b>Sum of Losses</b>
	<b>Non-Residential</b>	<b>2-4 Family</b>	<b>Single Family</b>	<b>Condo</b>	<b>Other Residential</b>		
<b>Anthony Township</b>	0	0	1	0	0	1	2
<b>Cooper Township</b>	0	0	0	0	0	0	0
<b>Danville Borough</b>	3	0	4	1	0	8	20
<b>Derry Township</b>	0	0	1	0	0	1	3
<b>Liberty Township</b>	0	0	0	0	0	0	0
<b>Limestone Township</b>	0	0	0	0	0	0	0
<b>Mahoning Township</b>	0	0	0	0	0	1	0
<b>Mayberry Township</b>	0	0	2	0	0	2	4
<b>Valley Township</b>	0	0	0	0	0	0	0
<b>Washingtonville Borough</b>	1	0	0	0	0	0	2
<b>West Hemlock Township</b>	0	0	0	0	0	0	0
<b>Total Repetitive Loss Properties:</b>	<b>4</b>	<b>0</b>	<b>8</b>	<b>1</b>	<b>0</b>	<b>13</b>	<b>30</b>

Source: FEMA, 2020

Floods are the most common and costly natural catastrophe in the United States. In terms of economic disruption, property damage, and loss of life, floods cause a tremendous economic impact. 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 flood losses is to purchase flood insurance through the NFIP.

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" and service the NFIP's Standard Flood Insurance Policy (SFIP) under their own names. The NFIP provides flood insurance to individuals in

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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 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.

*Table 19 - Montour County NFIP Participation* lists the Montour County municipalities participating in the NFIP along with the date of the initial FIRM and the current effective map date.

*Table 19 - Montour County NFIP Participation*

<b>Montour County NFIP Participation</b>				
<b>Community</b>	<b>Participation Status</b>	<b>Community Identification</b>	<b>Initial FIRM Identified</b>	<b>Current Effective Map Date</b>
<b>Anthony Township</b>	P	421232	4/1/1997	5/16/2008
<b>Cooper Township</b>	P	421920	9/30/1987	5/16/2008
<b>Danville Borough</b>	P	420714	5/2/1977	5/16/2008
<b>Derry Township</b>	P	421135	8/1/1978	5/16/2008
<b>Liberty Township</b>	P	421921	12/1/1986	5/16/2008
<b>Limestone Township</b>	P	421922	6/1/1987	5/16/2008
<b>Mahoning Township</b>	P	421234	4/15/1977	5/16/2008
<b>Mayberry Township</b>	P	421923	9/30/1987	5/16/2008
<b>Valley Township</b>	P	421924	8/19/1991	5/16/2008
<b>Washingtonville Borough</b>	P	420715	8/10/1979	5/16/2008
<b>West Hemlock Township</b>	P	421925	8/1/1987	5/16/2008

### **4.3.2.4 Future Occurrence**

In Montour County, flooding intermittently and historically has occurred during any season of the year. Therefore, the future occurrence of floods in Montour County can be considered highly likely. Floods are described in terms of their extent and the related probability of occurrence. The NFIP uses historical records to determine the probability of occurrence for different extents of flooding.

The NFIP recognizes the 1% annual chance flood, also known as the base flood, as the standard for identifying properties subject to federal flood insurance purchase requirements. A 1% annual chance flood is a flood that has a 1% annual chance of occurring over a given year. The DFIRMs are used to identify areas subject to the 1% and 0.2% annual chance flooding. Areas subject to 2% and 10% annual chance incidents are not shown on maps; however, water surface elevations associated with these incidents are included in the flood source profiles contained in the Flood Insurance Study Report. *Table 20 – Recurrence Intervals and Associated Probabilities of Occurrence* shows the recurrence intervals and associated probabilities of occurrence for the range of flood recurrence intervals and associated probabilities of occurrence.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Table 20 - Recurrence Intervals and Associated Probabilities of Occurrence

<b>Recurrence Intervals and Associated Probabilities of Occurrence</b>	
<b>Recurrence Interval</b>	<b>Chance of Occurrence in any given year (%)</b>
10 years	10
50 years	2
100 years	1
500 years	0.2

### 4.3.2.5 Vulnerability Assessment

#### River and Stream Flooding:

Montour County is vulnerable to flooding that causes loss of lives, property damage, and road closures. Floodwater damages that occur to agricultural, urban, and other properties, such as roads, bridges, and utilities are projected to increase when there is development in flood-prone lands. For purposes of assessing vulnerability, the county focused on community assets that are located in the 1% annual chance floodplain. While greater and smaller floods are possible, information about the extent and depths for this floodplain is available for all municipalities countywide, thus providing a consistent basis for analysis. Flood vulnerability maps for each applicable local municipality, showing the 1% annual chance flood hazard area and addressable structures, and critical facilities and transportation routes within it, are included in Appendix D.

Table 21 – County Structures Within Special Flood Hazard Area provides a summary of the number of site structures and critical infrastructure and functional needs facilities within the special flood hazard area. These buildings and structures are particularly vulnerable to flooding and inundation from the local waterways.

Table 21 - County Structures Within Special Flood Hazard Area

<b>County Structures Within Special Flood Hazard Area</b>			
<b>Municipality</b>	<b>Site Structures Within Flood Area</b>	<b>Critical Infrastructure Within Flood Area</b>	<b>Functional Needs Within Flood Area</b>
<b>Anthony Township</b>	18	1	0
<b>Cooper Township</b>	3	0	0
<b>Danville Borough</b>	1232	14	10
<b>Derry Township</b>	45	1	0
<b>Liberty Township</b>	22	1	0
<b>Limestone Township</b>	2	1	0
<b>Mahoning Township</b>	21	2	2
<b>Mayberry Township</b>	20	0	0
<b>Valley Township</b>	34	1	1
<b>Washingtonville Borough</b>	24	1	1

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Municipality	Site Structures Within Flood Area	Critical Infrastructure Within Flood Area	Functional Needs Within Flood Area
<b>West Hemlock Township</b>	11	0	0
<b>Totals:</b>	<b>1432</b>	<b>22</b>	<b>14</b>
<i>Source: FEMA, HAZUS (2020)</i>			

The following information discusses flood vulnerability and losses in Montour County, including the 1% annual-chance flood incident results from HAZUS, FEMA’s loss estimation software, the number of parcels vulnerable to flood hazards, and the assessed value of vulnerable parcels. The HAZUS analysis performed for the HMP was a level 1 analysis. While the HAZUS software is prescribed by FEMA for use in hazard mitigation plans, there are significant issues with the out-of-the-box software. Given the lack of data supplied with the software, it is extremely limited in providing accurate loss estimations. There is a limited amount of data that can be used to conduct a higher level HAZUS analysis for Montour County.

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with the inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood. The HAZUS report can be found in Appendix F.

### **Flash Flooding:**

Flash flooding can occur anywhere within Montour County when the conditions allow. Locations that are more populated and have more impervious ground cover have a higher vulnerability to flash flooding. During the risk assessment process, numerous resources were utilized to determine flash flooding locations. The National Climatic Data Center was also queried to determine flash flood vulnerable areas. This data query is included in *Table 16 - Flood and Flash Flood Incidents Impacting Montour County*, located above.

Locations that are identified as vulnerable to flash flooding in Montour County are as follows:

- Danville Borough
- Washingtonville Borough

Although the above locations were identified as vulnerable areas within the county, they are not the only locations that are vulnerable to flash flooding. The Montour County Hazard Mitigation Team will continue to work with individual municipalities to identify vulnerable flash flooding locations and identify vulnerable functional needs population and critical infrastructure.

### **Ice Jam Flooding:**

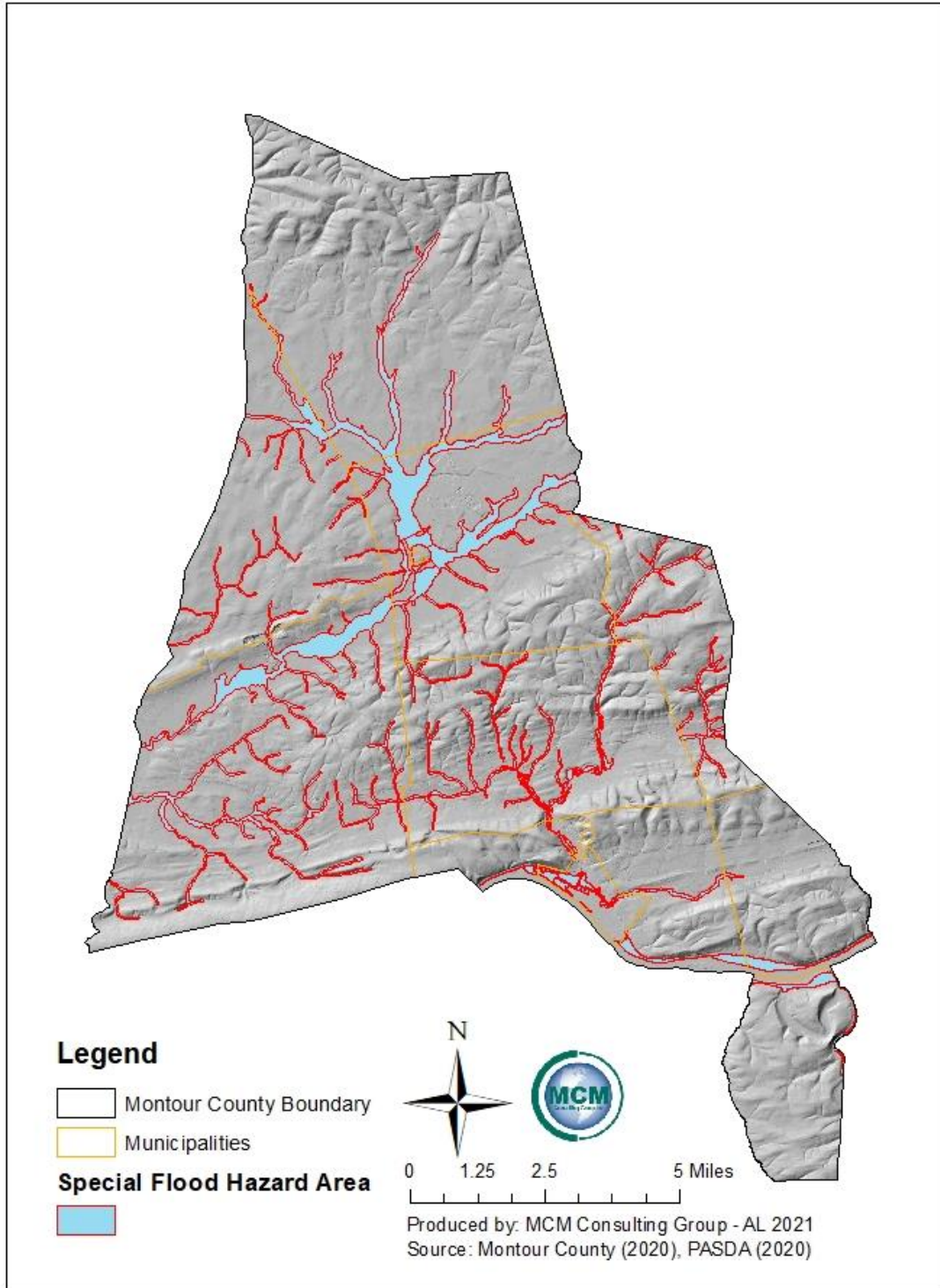
Ice Jam flooding has affected multiple areas and specific locations within Montour County. These areas include portions of the Susquehanna River in Cooper Township, Mayberry Township, and Liberty Township. The ice jam flooding also causes erosion to riverbanks in the county.

The Montour County Hazard Mitigation Team will continue to work with municipalities to identify vulnerable ice jam flooding locations and identify vulnerable functional needs population and critical infrastructure.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 15 - Montour County Special Flood Hazard Area

## Montour County Special Flood Hazard Area



# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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## **4.3.3. Hurricane, Tropical Storm**

### **4.3.3.1 Location and Extent**

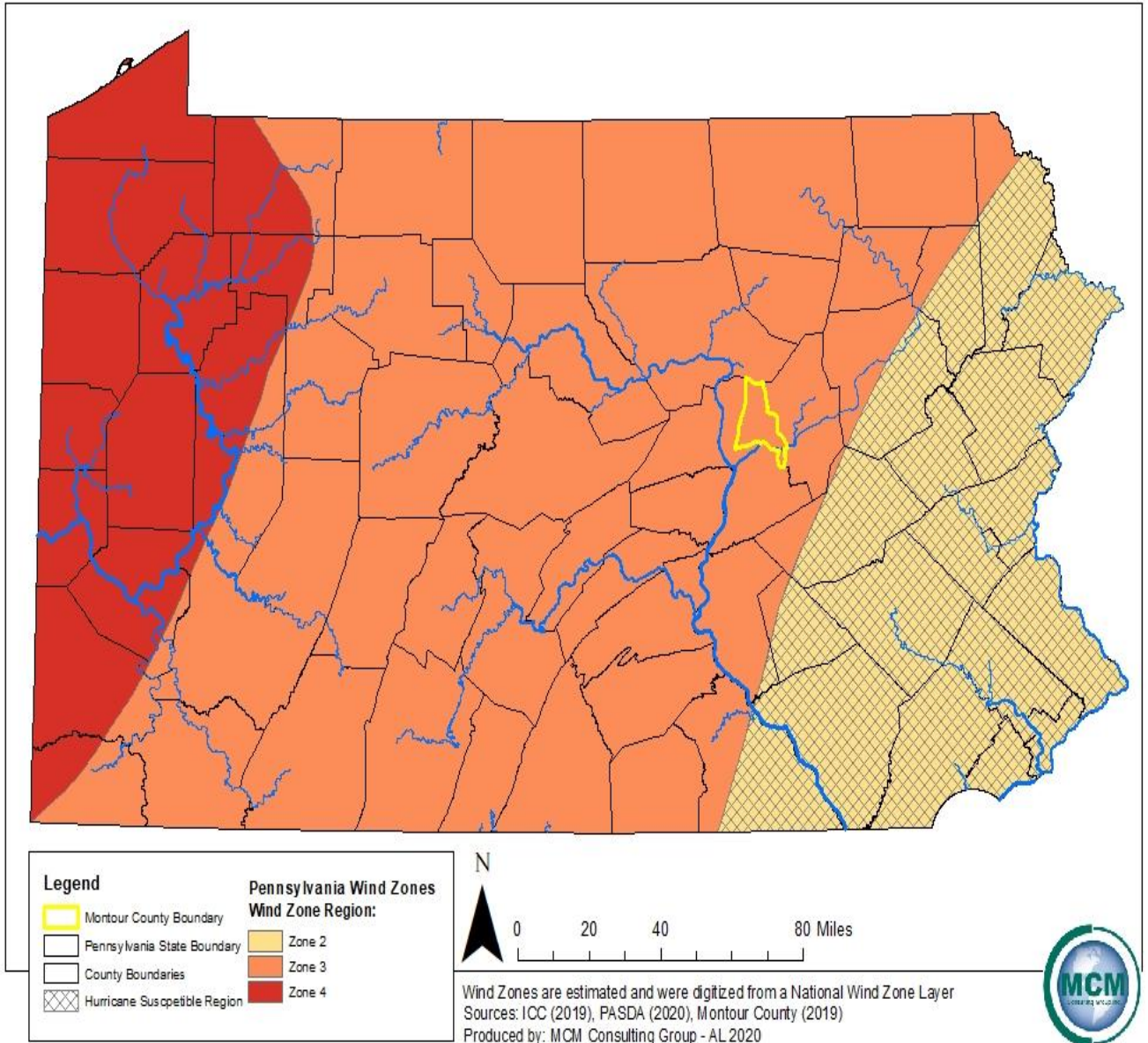
Montour County does not have any open-ocean coastline areas. However, the impacts from coastal storms such as tropical storms and hurricanes can expand inland. Tropical depressions are cyclones with maximum sustained winds of less than thirty-nine miles per hour (mph). The system becomes a tropical storm when the maximum sustained winds reach between thirty-nine to seventy-four miles per hour. When wind speeds exceed seventy-four mph, the system is considered a hurricane. Tropical storms impacting Montour County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Caribbean Sea, or Gulf of Mexico. Another type of tropical storms are nor'easters, which are large cyclones that rotate clockwise and are typically associated with the Atlantic Ocean and the East Coast of the United States between North Carolina and Massachusetts. The name nor'easter comes from the direction that the strongest winds typically blow from the cyclone.

While Montour County is located over two hundred miles inland of the East Coast of the United States, tropical storms can track inland and cause heavy rainfall and strong winds. Montour County is located just inland of the East Coast region, designated by FEMA, as being Hurricane-Susceptible (see *Figure 16 – Pennsylvania Wind Zones*). Montour County falls within the wind zone III as shown in *Figure 16 – Pennsylvania Wind Zones*. All communities within Montour County are equally subject to the impacts of hurricanes and tropical storms that track near the county. Areas in Montour County which are subject to flooding, wind, and winter storm damage are particularly vulnerable.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 16 - Pennsylvania Wind Zones

## Pennsylvania Wind Zones



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## 4.3.3.2 Range of Magnitude

Table 22 - Saffir-Simpson Scale

<b>Saffir-Simpson Hurricane Scale</b>		
<b>Category</b>	<b>Wind Speed</b>	
	<b>mph</b>	<b>knots</b>
5	≥156	≥135
4	131-155	114-134
3	111-130	96-113
2	96-110	84-95
1	74-95	65-83
<b>Non-Hurricane Classifications</b>		
Tropical Storm	39-73	34-64
Tropical Depression	0-38	0-33

The impact tropical storm or hurricane events have on an area is typically measured in terms of wind speed. Flood damage results from intense precipitation and wind, typically from coastal storms, which impact Montour County. Expected damage from hurricane force winds is measured using the Saffir-Simpson Scale (*Table 22 – Saffir-Simpson Scale*). The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential. Categories three, four, and five are classified as “major” hurricanes, but category one and two storms can contain potential significant storm surge. A category one storms result in very dangerous winds with some damage, while a category two storms result in extremely dangerous winds with extensive damage. However, category three storms result in devastating damage and category four/five storms result in catastrophic damage. While major hurricanes comprise only 20% of all tropical cyclones making landfall, they account for over 70% of the damage in the United States. While hurricanes can cause high winds and associated impacts, it is also important to recognize the potential for flooding events during hurricanes, tropical storms, and nor’easters. These storms can produce high volumes of rainfall that cause flash flooding initially and then follow with stream and river flooding. The risk assessment and associated impact for flooding events is included Section 4.3.2.5.

## 4.3.3.3 Past Occurrence

*Table 23 – History of Coastal Storms Impacting* lists all coastal storms that have impacted Montour County from 1952 to October 2020. *Figure 18 – Historic Tropical Storms/Hurricanes in Pennsylvania* identifies some past hurricanes that had an inland path through Pennsylvania. Although impacts of tropical storms are commonly felt in the Commonwealth, it is rare that a hurricane would track through Montour County. Hurricane Agnes was a severe coastal storm event in June 1972 that impacted Montour County. After making first landfall as a hurricane near Florida, Agnes weakened and exited back into the Atlantic off the North Carolina coast. The storm skirted along the coast and made a second landfall near New York City as a tropical storm and merged with an extra-tropical low-pressure system over northern Pennsylvania. This brought extremely heavy rains to Pennsylvania that caused major flooding throughout. Pennsylvania incurred \$2.8 billion in damages and forty-eight deaths statewide. However, particularly in Montour County, Hurricane Agnes claimed the lives of eleven people and caused many millions of dollars in property loss. The event triggered a Presidential Disaster Declaration for the region. Rainfall of seven to ten inches was noted across the Commonwealth, with some areas reporting as much of eighteen inches locally. Many roadways in Montour County were damaged.

Tropical Storm Lee was another event that caused great impact and damage to Montour County, fortunately, not to the extent of Hurricane Agnes. The municipality with extreme damage within Montour County was



## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

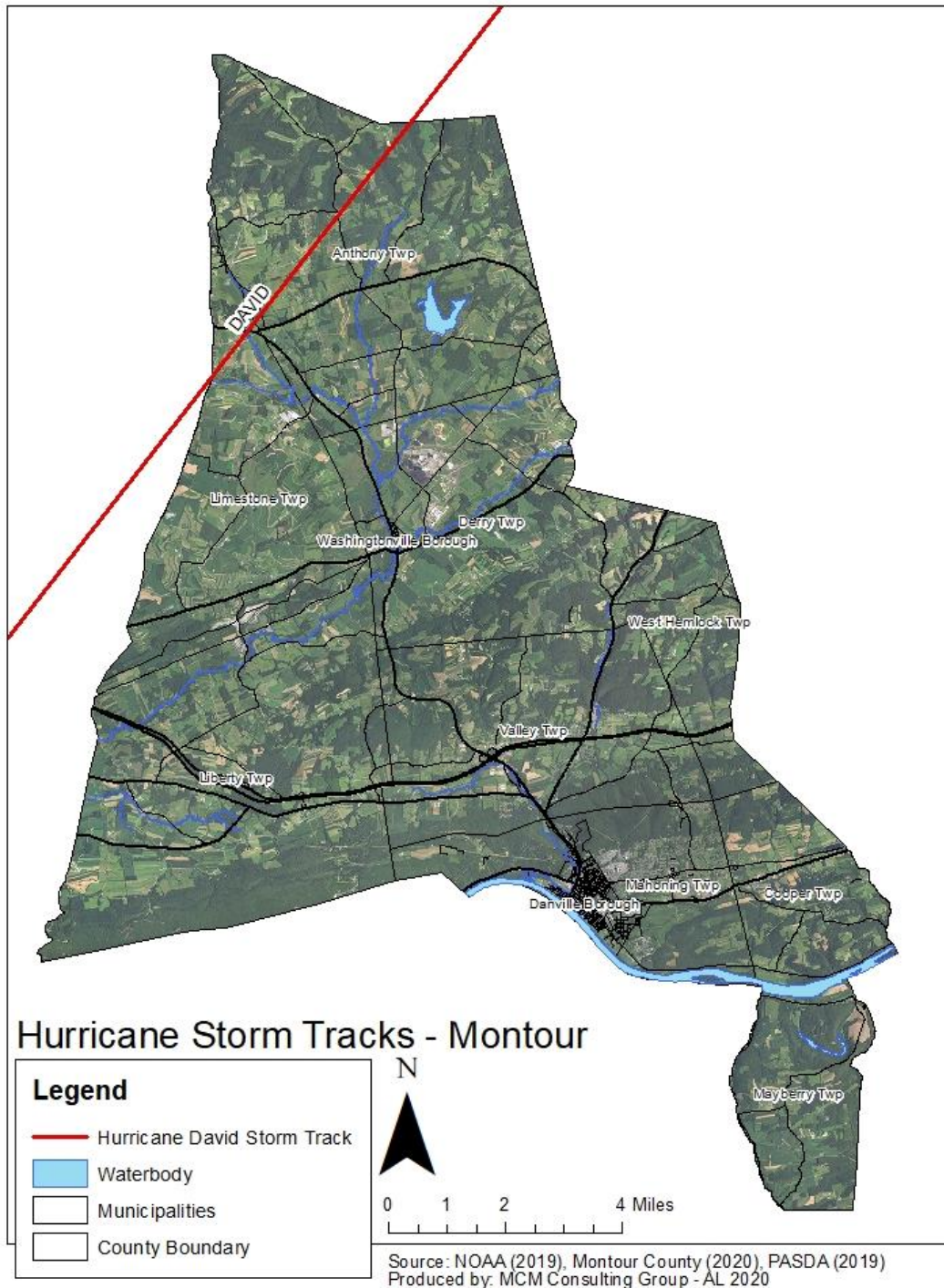
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Danville Borough. Danville Borough had a significant amount of flooding due to the proximity of the waterways. The middle school located in Danville Borough was severely damaged from the flood of the waterways. The Danville School District received \$7 million in state and federal aid to help repair the flood-damaged school. The funding for Danville School District was also allocated from FEMA to other municipalities that were affected by Tropical Storm Lee. The additional funding went to another municipality within Montour which was Washingtonville and to other municipalities around Montour county such as of Bloomsburg, Catawissa, Milton, Montoursville, and Turbotville to help with damage and destruction from Tropical Storm Lee.

Tropical Storm David was one of the events to physically pass-through Montour County. David took place in 1979 and resulted in a significant amount of damage across the United States and the commonwealth. Tropical Storm David brought \$320 million worth of damage to the United States with five direct and ten indirect deaths. The tropical storm also formed various tornadoes in the in Virginia, Delaware, and Maryland areas. David brought great high winds and extreme rains that resulted in great damage in powerlines around the New York and Pennsylvania area which included Montour County. *Figure 17 – Tropical Storm David's Inland Path through Montour County* illustrates David's inland path through the northern part of Montour County.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 17 - Tropical Storm David's Inland Path through Montour County



# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

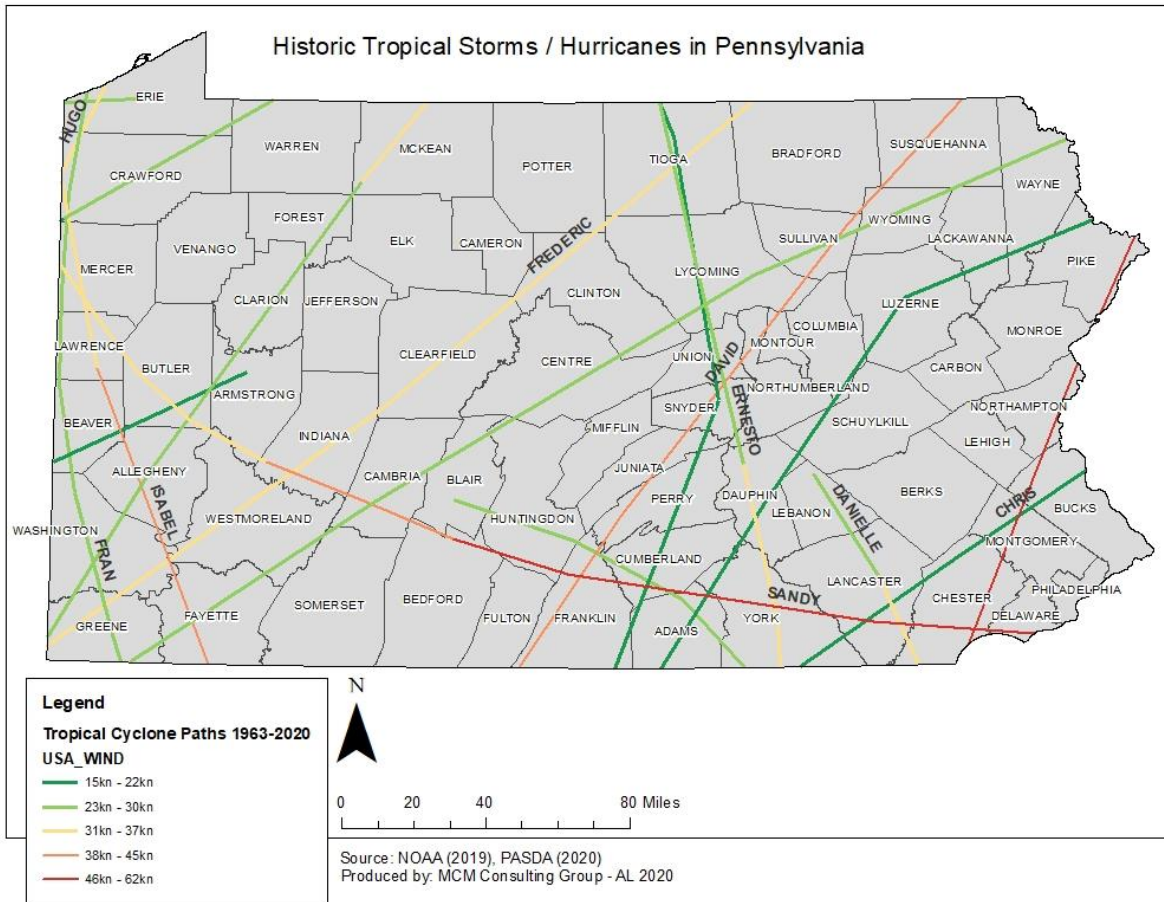
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*Table 23 - History of Coastal Storms Impacting Montour County*

<b>History of Coastal Storms Impacting Montour County (HomeFacts, 2018; USGS, 2020)</b>	
<b>Year</b>	<b>Name</b>
1952	Able
1954	Hazel
1955	Diane
1955	Connie
1959	Gracie
1972	Agnes
1979	David
1992	Danielle
1994	Beryl
1999	Dennis
1999	Floyd
2004	Ivan
2005	Katrina
2006	Ernesto
2011	Lee
2011	Irene
2012	Sandy
2016	Matthew
2017	Harvey
2017	Irma
2017	Nate
2018	Florence
2020	Isaias
2020	Laura
2020	Delta

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 18 - Historic Tropical Storms/Hurricanes in Pennsylvania



### 4.3.3.4 Future Occurrence

Although hurricanes and tropical storms can cause flood events consistent with 100- and 500-year flood levels, the probability of occurrence of hurricanes and tropical storms is measured relative to wind speed. *Table 24 – Annual Probability of Wind Speeds* shows the annual probability of winds that reach the strength of tropical storms and hurricanes in Montour County and the surrounding areas based on a sample period of forty-six years. According to FEMA, there is a high probability each year that Montour County will experience winds from coastal storms that could cause minimal to moderate damages (*Table 24 – Annual Probability of Wind Speeds*). The probability of winds exceeding 118 mph is less than 0.1% annually.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Table 24 - Annual Probability of Wind Speeds

<b>Annual Probability of Wind Speeds (FEMA, 2000)</b>		
<b>Wind Speed (mph)</b>	<b>Saffir-Simpson Scale</b>	<b>Annual Probability of Occurrence (%)</b>
45-77	Tropical Storms// Category 1 Hurricane	91.59
78-118	Category 1 to 2 Hurricanes	8.32
119-138	Category 3 to 4 Hurricanes	.0766
139-163	Category 4 to 5 Hurricanes	.0086
164-194	Category 5 Hurricanes	.00054
195+	Category 5 Hurricanes	.00001

Climate change is causing atmospheric temperatures to rise, which corresponds to a rise in ocean surface temperatures, resulting in warmer and moister conditions where tropical storms develop. However, the relationship between climate change and hurricanes can be complex due to the many other factors that are associated with hurricane development which include wind shear and air pollution. Warmer oceans store more energy and are capable of fueling stronger storms and it is projected that Atlantic hurricanes will become more intense and produce more precipitation as ocean surface temperatures rise. The storms associated with the tropical storms/hurricanes can also linger around for a longer period of time in a given place due to the climate change which enhances destructive impacts in the future. Other possible connections of hurricanes in near future related to climate change are the length of hurricane season and seeing more hurricanes earlier or later than usual hurricane season. There are expected to be more category four and five hurricanes in the Atlantic and the hurricane season may be elongated which all impact the future of Montour County.

### **4.3.3.5 Vulnerability Assessment**

The impacts of climate change are no longer hypothetical concepts set in the future, but rather tangible and hazardous realities. Due to the impact on climate change and more devastating hurricanes/tropical storms, the vulnerability for Montour County is higher. Two kinds of vulnerable economic losses were determined: 1) direct building losses, and 2) business interruption losses. Direct building losses consist of direct damage to any structure. Business interruption losses consist of relocation of employee wage loss, expenses, income loss, etc. With Montour County, the county is very vulnerable when it comes to the loss of buildings and other related items. The total direct building loss amount for Montour County totals up to \$13,169.00 in total damage due to wind hazards from hurricanes (PA HMP, 2018). The total business interruption for Montour county totals up to \$805 million in total loss due to wind hazards from hurricanes (PA HMP, 2018). Tropical storms tracking nearby Montour County can not only cause high winds but can also cause heavy rains to occur. Flooding associated from hurricanes/tropical storms can occur in areas throughout Montour county which can cause great loss and damage to buildings and structures as well. A vulnerability assessment for hurricanes and tropical storms focuses on the impacts of flooding and severe wind. The assessment for flood-related vulnerability is addressed in Section 4.3.2.5 and discussion of wind related vulnerability is addressed in Section 4.3.9.5.

### **4.3.4. Invasive Species**

#### **4.3.4.1 Location and Extent**

An invasive species is a species that is not indigenous to a given ecosystem and that, when introduced to a non-native environment, tends to thrive. The spread of an invasive species often alters ecosystems, which

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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can cause environmental and economic harm and pose a threat to human health. The phenomenon of invasive species is due to human activity. Human society is globalized, and people have the capability to traverse the globe at rates unparalleled in human history. Either intentionally or unintentionally, other species may accompany people when they travel, introducing the stowaway species to a novel ecosystem. In a foreign ecosystem, a transported species may thrive, potentially restructuring the ecosystem and threatening its health. Common pathways for invasive species introduction to Pennsylvania include (Pennsylvania Invasive Species Management Plan, 2017):

- Contamination of internationally traded products;
- Hull fouling;
- Ship ballast water release;
- Discarded live fish bait;
- Intentional release;
- Escape from cultivation;
- Movement of soil, compost, wood, vehicles or other materials and equipment;
- Unregulated sale of organisms;
- Smuggling activities; and
- Hobby trading or specimen trading.

Invasive species threats are typically divided into two main subsets:

**Aquatic Invasive Species (AIS)** are nonnative, invertebrates, fishes, aquatic plants, and microbes that threaten the diversity or abundance of native species, the ecological stability of the infested waters, human health and safety, or commercial, agriculture, or recreational activities dependent on such waters.

**Terrestrial Invasive Species (TIS)** are nonnative plants, vertebrates, arthropods, or pathogens that complete their lifecycle on land whose introduction does or is likely to cause economic or environmental harm or harm to human health.

The location and extent of invasive threats is dependent on the preferred habitat of the species, as well as the species' ease of movement and establishment. *Table 25 - Prevalent Invasive Species* lists invasive species that have been found in or near Montour County.

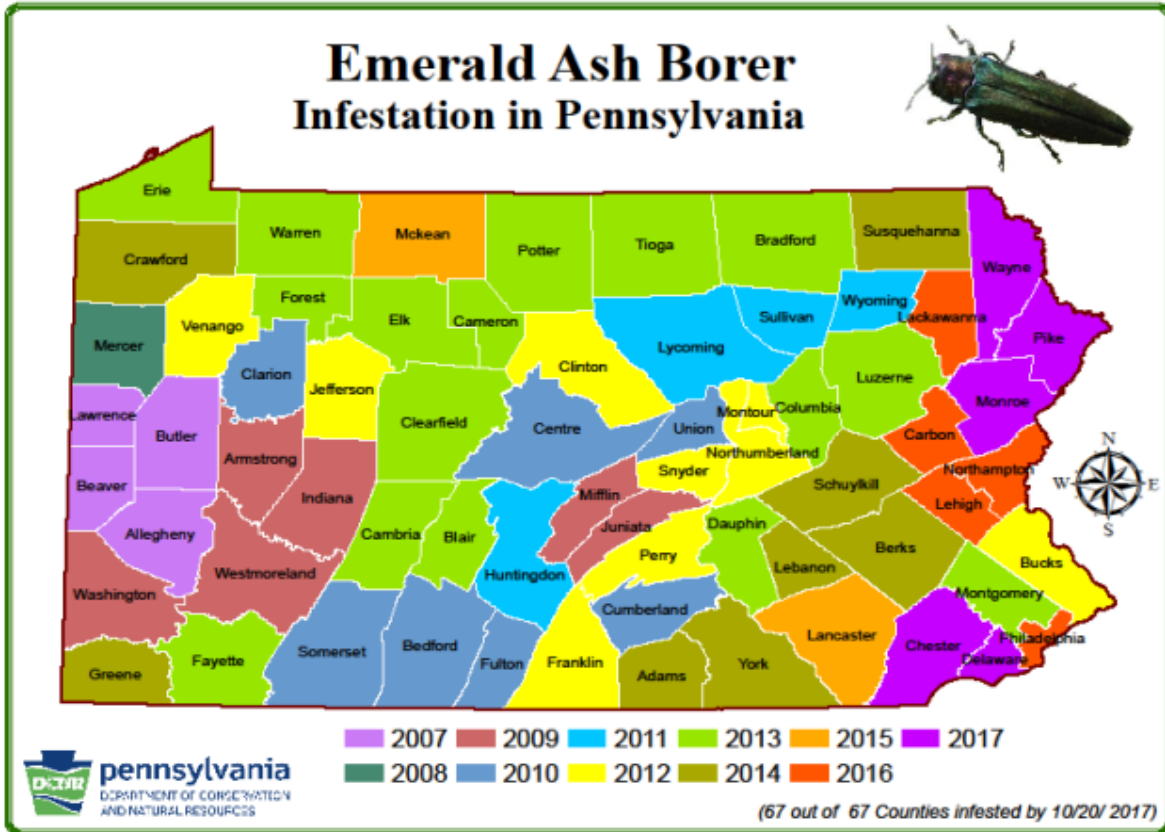
#### **4.3.4.2 Range of Magnitude**

Some invasive species are not considered agricultural pests, and do not harm humans or cause significant ecological problems. Other invasive species can have many negative impacts and cause significant changes in the composition of ecosystems. For example, the Emerald Ash Borer has a 99% mortality rate for any ash tree it infects. Didymo, an aggressive form of algae not yet found in Montour County, can clog waterways and smother native aquatic plants and animals.

The aggressive nature of many invasive species can cause significant reductions in biodiversity by crowding out native species. This can affect the health of individual host organisms as well as the overall well-being of the affected ecosystem. An example of a worst-case scenario for invasive species is the success of the Emerald Ash Borer in Montour County and the surrounding region. The Emerald Ash Borer has already become established in Montour County (see *Figure 19 – Emerald Ash Borer Infestation in Pennsylvania*) and the surrounding region, and there is a high mortality rate for trees associated with this pest.

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Figure 19 - Emerald Ash Borer Infestation in Pennsylvania

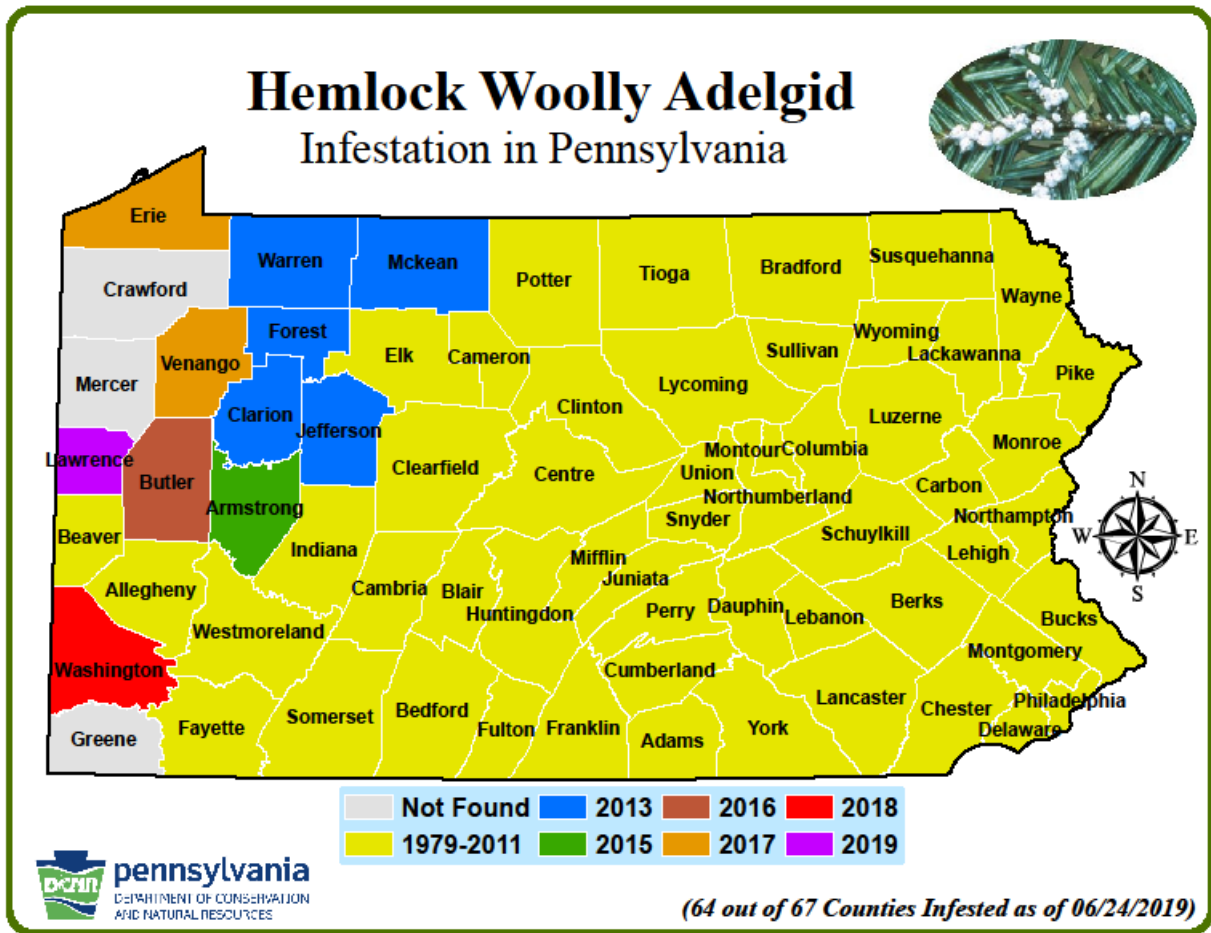


Another example is *Adelges tsugae*, the hemlock woolly adelgid (HWA). Hemlock woolly adelgid is a fluid-feeding insect that feeds on hemlock trees throughout eastern North America, including Pennsylvania. The egg sacs of these insects look like the tips of cotton swabs clinging to the undersides of hemlock branches.

Hemlock woolly adelgid was introduced from Asia into the Pacific Northwest in 1924. It was probably introduced into the northeastern United States in the 1950s and it was first discovered in Pennsylvania in 1967. This insect has been damaging hemlock ever since and it is spreading. To date, sixty-four counties in Pennsylvania, including Montour County, have been infested with this insect. See *Figure 20 - Hemlock Woolly Adelgid Infestation in Pennsylvania*.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 20 - Hemlock Woolly Adelgid Infestation in Pennsylvania



Eastern hemlock (Pennsylvania's state tree) and Carolina hemlocks (found further south in the Smoky Mountain sections of the Appalachians) are more susceptible to hemlock woolly adelgid damage than Asian and western hemlock trees due to feeding tolerance and predators that protect the latter species. Hemlock woolly adelgid sucks fluid from the base of hemlock needles. It may also inject toxins into the tree as it feeds, accelerating needle drop and branch dieback. Although some trees die within four years, trees often persist in a weakened state for many years. Hemlocks that have been affected by hemlock woolly adelgid often have a grayish-green appearance (hemlocks naturally have a shiny, dark green color).

In recent years, hardwood forests in the county have been increasingly negatively impacted due to these invasive species and there have been many tree fatalities. Degradation of forest health cascades into other problems. Among other benefits, forests prevent soil degradation and erosion, protect watersheds, and sequester carbon from the atmosphere. Forests have a key role in hydrologic systems, so losing a forest amplifies the effects of erosion and flooding. Forest degradation also has adverse economic effects, impacting such activities as logging, tourism, foraging and other production activities dependent on lumber.

The magnitude of an invasive species threat is generally amplified when the ecosystem or host species is already stressed, such as in times of drought. The already weakened state of the native ecosystem causes it to succumb to an infestation more easily. A worst-case example could be the Hemlock Woolly Adelgid



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causing reduced biodiversity, increased wildfire potential and thermal harm to small stream cold water fisheries and habitats.

### 4.3.4.3 Past Occurrence

Invasive species have been entering Pennsylvania since the arrival of European settlers.

Since there are swatches of public land in Montour County, including Montour Preserve, Hopewell Park and Hess Recreation Area, and a large acreage of farmland, there are risks for invasive species. There are many invasive plants that are widespread in Montour County that are common problems throughout the Commonwealth; some of the most problematic include:

- Japanese Knotweed
- Garlic Mustard
- Japanese Stiltgrass
- Multiflora Rose
- Japanese Barberry

In the past these species have been cut back to slow their spread and treated with foliar herbicide when they re-sprout. However, when species are so widespread and established, they may not be actively treated unless they are in a project area that is receiving attention otherwise.

There are several invasive pests that have moved through Montour County and the surrounding region which have resulted in the deaths of many trees. PennDOT summarizes these invasive species:

*Pennsylvania has been inhabited by an invasive beetle known as the Emerald Ash Borer. This green-colored insect has infested many ash trees, which has resulted in a pandemic level of dead ash trees. In addition, the Gypsy Moth Caterpillar defoliated Western Pennsylvania at least twice within the last twenty years. This insect infested the oak tree species and many of those trees have died as well. The Woolly Adelgid and needle blight fungi are also currently affecting the white pine and hemlock trees, resulting in their premature deaths. (PennDOT, 2017)*

These occurrences represent lost battles to invasive species. Once a species is established in an area and it causes a change in the ecology, it can be quite difficult if somewhat futile to turn back the clock on the prevalence of the species; however, Montour County can work towards limiting the spread and mitigating the negative impacts of such widespread invasive species. In the case of the Emerald Ash Borer, Hemlock Woolly Adelgid and other tree killing invasive species, PennDOT has identified one way that the threat needs to be mitigated in the wake of the surge of dead trees:

*[The Emerald Ash Borer, Gypsy Moth and Woolly Adelgid] have left ... tens of thousands of dead trees either within the State Department of Transportation's (PennDOT) right-of-way, on other public property or on private property, but within close proximity to falling on our highways. Although random in nature, several fatalities have been associated with trees falling on motorists or motorists running into downed trees across the highway...*

*PennDOT has been incorporating select tree removal into roadway construction projects using both federal and state funding. Since July 1, 2016, PennDOT Department Force Crews have also increased their efforts in select manual tree removal. This work is often done during the winter when crews are not engaged in snow removal operations. Dead tree removal is quickly becoming a major focus of PennDOT, however a sustained funding source to remove all of these potential hazards is simply not available. The PA Department*

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*of Agriculture has established strict firewood and lumber quarantine areas in some of these districts so additional costs may be incurred.*

Table 25 - *Prevalent Invasive Species* lists problematic non-native species that are established in Montour County. While all species listed here are not native to Montour County, those species highlighted in red are considered to pose a larger ecological threat than some of the others (see Vulnerability Assessment of this plan for additional discussion). For some species such as the European Bark Beetle and the Sirex Wood Wasp, Montour County is on the edge of the species range, meaning control efforts taken in the county can help limit the propagation of the threat even beyond the county.

Table 25 - *Prevalent Invasive Species*

<b>Prevalent Invasive Species (EDDMaps, 2019; PA DCNR, 2019; USDA FS, 2019; iMapInvasives, 2019)</b>		
<i>Scientific Name</i>	<b>Common Name</b>	<b>Type</b>
<i>Corbicula fluminea</i>	Asiatic Clam	Aquatic Animal
<i>Cyprinus carpio</i>	Common Carp	Aquatic Animal
<i>Craspedacusta sowerbyi</i>	Freshwater Jellyfish	Aquatic Animal
<i>Etheostoma blennioides</i>	Greenside Darter	Aquatic Animal
<i>Misgurnus anguillicaudatus</i>	Oriental Weatherfish	Aquatic Animal
<i>Orconectes rusticus</i>	Rusty Crayfish	Aquatic Animal
<i>Dreissena polymorpha</i>	Zebra Mussel	Aquatic Animal
<i>Potamogeton crispus</i>	Curly-Leaf Pondweed	Aquatic Plant
<i>Myriophyllum spicatum</i>	Eurasian Watermilfoil	Aquatic Plant
<i>Hydrilla verticillata</i>	Hydrilla	Aquatic Plant
<i>Persicaria hydropiper</i>	Marshpepper Knotweed, Smartweed	Aquatic Plant
<i>Mentha aquatica</i>	Water Mint	Aquatic Plant
<i>Nasturtium officinale</i>	Watercress	Aquatic Plant
<i>Nymphoides peltata</i>	Yellow Floatingheart	Aquatic Plant
<i>Neonectria (N.) &amp; Cryptococcus fagisuga</i>	Beech Bark Disease Complex	Disease
<i>Sirococcus clavignenti-juglandacearum</i>	Butternut Canker	Disease
<i>Diaporthales: Cryphonectriaceae</i>	Chestnut Blight	Disease
<i>Discula destructiva</i>	Dogwood Anthracnose	Disease
<i>Hemiptera: Diaspididae</i>	Elongate Hemlock Scale	Disease
<i>Neonectria faginata</i>	Neonectria Canker	Disease
<i>Cronartium ribicola</i>	White Pine Blister Rust	Disease
<i>Coleoptera: Buprestidae</i>	Emerald Ash Borer	Insect
<i>Hymenoptera: Diprionidae</i>	European Pine Sawfly	Insect
<i>Lepidoptera: Tortricidae</i>	European Pine Shoot Moth	Insect
<i>Lepidoptera: Lymantriidae</i>	Gypsy Moth	Insect
<i>Adelges tsugae</i>	Hemlock Woolly Adelgid	Insect
<i>Plagioderma versicolora</i>	Imported Willow Leaf Beetle	Insect

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<b>Prevalent Invasive Species</b> (EDDMaps, 2019; PA DCNR, 2019; USDA FS, 2019; iMapInvasives, 2019)		
<i>Scientific Name</i>	<b>Common Name</b>	<b>Type</b>
<i>Coleoptera: Scarabaeidae</i>	Japanese Beetle	Insect
<i>Sirex noctilio</i>	Sirex Wood Wasp	Insect
<i>Lonicera maackii</i>	Amur Honeysuckle	Plant
<i>Elaeagnus umbellata</i>	Autumn Olive	Plant
<i>Ranunculus bulbosus</i>	Bulbous Buttercup	Plant
<i>Cirsium vulgare</i>	Bull Thistle	Plant
<i>Lonicera spp.</i>	Bush Honeysuckles (Exotic)	Plant
<i>Cirsium arvense</i>	Canada Thistle	Plant
<i>Tussilago farfara</i>	Colt's Foot	Plant
<i>Securigera varia</i>	Common Crown-Vetch	Plant
<i>Phragmites australis ssp. australis</i>	European Common Reed	Plant
<i>Alliaria petiolata</i>	Garlic Mustard	Plant
<i>Berberis thunbergii</i>	Japanese Barberry	Plant
<i>Reynoutria japonica</i>	Japanese Knotweed	Plant
<i>Microstegium vimineum</i>	Japanese Stiltgrass	Plant
<i>Sorghum halepense</i>	Johnson Grass	Plant
<i>Lonicera morrowii</i>	Morrow'S Honeysuckle	Plant
<i>Rosa multiflora</i>	Multiflora Rose	Plant
<i>Conium maculatum</i>	Poison Hemlock	Plant
<i>Lythrum salicaria</i>	Purple Loosestrife	Plant
<i>Phalaris arundinacea</i>	Reed Canarygrass	Plant
<i>Acorus calamus</i>	Sweetflag, Calamus	Plant
<i>Ailanthus altissima</i>	Tree-Of-Heaven	Plant
<i>Myosotis scorpioides</i>	True Forget-Me-Not	Plant
<i>Rubus phoenicolasius</i>	Wineberry	Plant
<i>Iris pseudacorus</i>	Yellow Iris	Plant

#### 4.3.4.4 Future Occurrence

According to the Pennsylvania Invasive Species Council (PISC), the probability of future occurrence for invasive species threats is growing due to the increasing volume of transported goods, increasing efficiency and speed of transportation, and expanding international trade agreements. Expanded global trade has created opportunities for many organisms to be transported to and establish themselves in new counties and regions. Climate change is contributing to the introduction of new invasive species. As maximum and minimum seasonal temperatures change, pests are able to establish themselves in previously inhospitable climates. This also gives introduced species an earlier start and increases the magnitude of their growth, possibly shifting the dominance of ecosystems in the favor of non-native species.

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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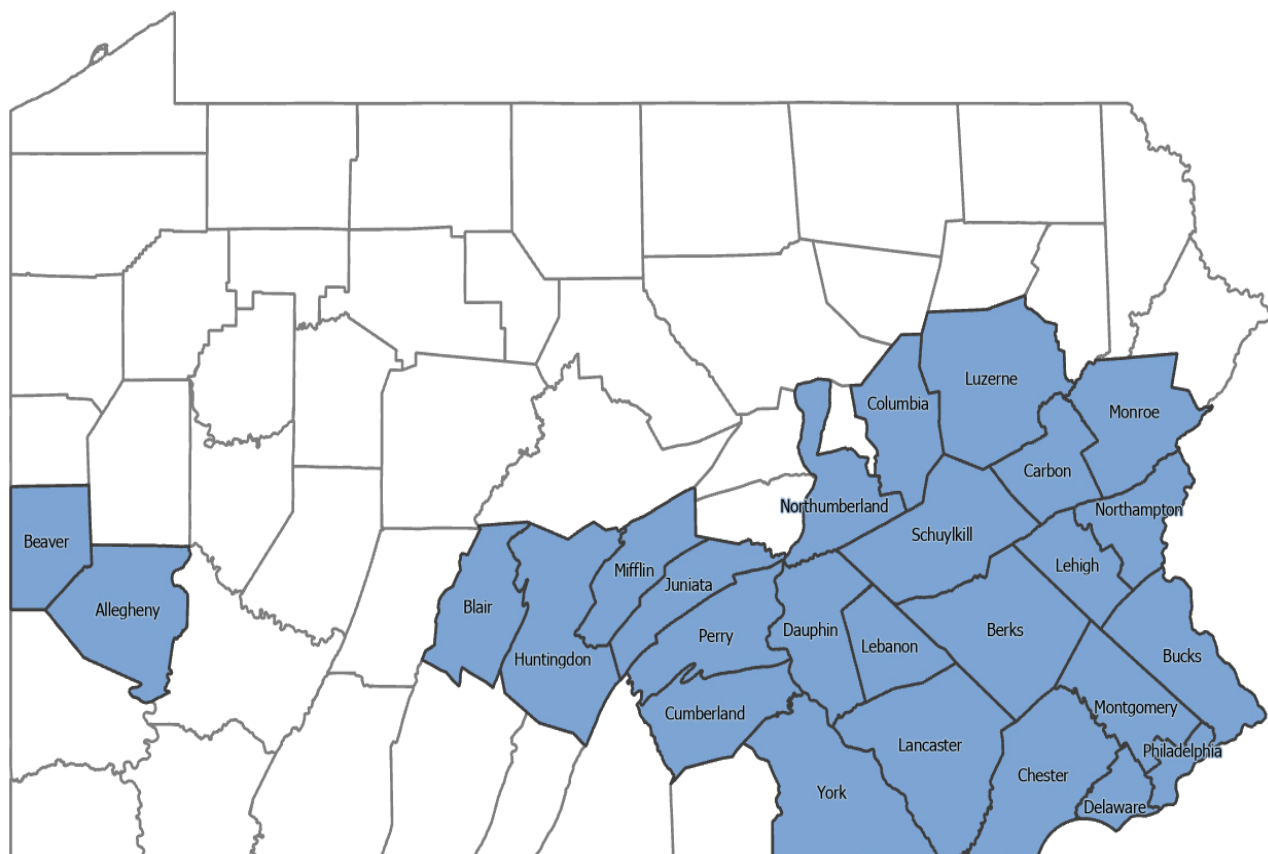
In order to combat the increase in future occurrences, the PISC (a collaboration of state agencies, public organizations, and federal agencies) released the Invasive Species Management Plan in April 2010 and updated the plan in 2017. The plan outlines the Commonwealth's goals for managing the spread of nonnative invasive species and creates a framework for responding to threats through research, action, and public outreach and communication. More information can be found here: [https://www.agriculture.pa.gov/Plants\\_Land\\_Water/PlantIndustry/GISC/Pages/default.aspx](https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/GISC/Pages/default.aspx).

There are several invasive species that are found near Montour County but have not yet been detected inside the county (see *Table 26 - Vulnerable Species*). Especially in cases like this, control efforts, heightened awareness, and public outreach and education can help prevent an invasive species from becoming established. Once a species is established, it is much more difficult to eradicate it from an ecosystem meaning prevention is very important. Bush Honeysuckle species, the Spotted Lanternfly, Mile-A-Minute Vine and the Asian Long-Horned Beetle are all widespread and highly problematic in nearby counties but have not been reported in Montour. The forests of Montour County would greatly benefit if these species can be kept out of the area. For a more inclusive list of invasive plants found in Pennsylvania and a list of invasive plants on the Pennsylvania watch list, see the referenced PA DCNR webpage: <https://www.dcnr.pa.gov/Conservation/WildPlants/InvasivePlants/Pages/default.aspx>

The Spotted Lanternfly is a harmful invasive pest with a healthy appetite for native plants and can negatively impact the quality of life and enjoyment of the outdoors. If not contained, the Spotted Lanternfly could potentially drain Pennsylvania's economy of at least \$324 million. The Spotted Lanternfly is currently found in twenty-six counties in Pennsylvania, all of which are under a state-imposed quarantine. The Spotted Lanternfly is undoubtedly traveling west and north as the State Department of Agriculture announced on March 3, 2020 that an additional twelve counties in Pennsylvania were added to the quarantine area. At the writing of this plan, Montour County is not among them. See *Figure 21 – Pennsylvania Spotted Lanternfly Quarantine 2020*. However, when Columbia and Northumberland counties were added to the list in 2020, the insect was found in the southern end of the counties; in the summer of 2020, colonies had been found in the central sections of the counties (Penn State Extension, 2021).

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Figure 21 - Pennsylvania Spotted Lanternfly Quarantine 2020



**Pennsylvania Spotted Lanternfly Quarantine**  
■ Quarantine



Table 26 - Vulnerable Species

<b>Vulnerable Species</b> <i>(EDDMaps, 2019; PA DCNR, 2019; USDA FS, 2019; iMapInvasives, 2019)</i>		
<i>Scientific Name</i>	<b>Common Name</b>	<b>Type</b>
<i>Nelumbo lutea</i>	American Water Lotus	Aquatic Plant
<i>Veronica anagallis-aquatica</i>	Water Speedwell	Aquatic Plant
<i>Ophiostoma novo-ulmi</i>	Dutch Elm Disease	Disease
<i>Ceratocystis fagacearum</i>	Oak Wilt	Disease
<i>Anoplophora glabripennis</i>	Asian Long-Horned Beetle	Insect
<i>Cryptopistomus castaneus</i>	Asiatic Oak Weevil	Insect
<i>Adelges piceae</i>	Balsam Woolly Adelgid	Insect
<i>Scolytus schevyrewi</i>	Banded Elm Bark Beetle	Insect
<i>Phyllaphis fagi</i>	Beech Woolly Adelgid	Insect
<i>Fenusa pusilla</i>	Birch Leafminer	Insect

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<b>Vulnerable Species</b> (EDDMaps, 2019; PA DCNR, 2019; USDA FS, 2019; iMapInvasives, 2019)		
<b>Scientific Name</b>	<b>Common Name</b>	<b>Type</b>
<i>Otiorhynchus sulcatus</i>	Black Vine Weevil	Insect
<i>Dryocosmus kuriphilus</i>	Chestnut Gall Wasp	Insect
<i>Hylastes opacus</i>	European Bark Beetle (H. Opacus)	Insect
<i>Contarinia baeri</i>	European Pine Needle Midge	Insect
<i>Epinotia nanana</i>	European Spruce Needleminer	Insect
<i>Gilpinia hercyniae</i>	European Spruce Sawfly	Insect
<i>Coleophora laricella</i>	Larch Casebearer	Insect
<i>Pristiphora erichsonii</i>	Larch Sawfly	Insect
<i>Homadaula anisocentra</i>	Mimosa Webworm	Insect
<i>Pristiphora geniculata</i>	Mountain-Ash Sawfly	Insect
<i>Asterolecanium minus</i>	Oak Pit Scale A. Minus	Insect
<i>Lepidosaphes ulmi</i>	Oystershell Scale	Insect
<i>Caliroa cerasi</i>	Pear Sawfly	Insect
<i>Taeniothrips inconsequens</i>	Pear Thrips	Insect
<i>Acantholyda erythrocephala</i>	Pine False Webworm	Insect
<i>Trichiocampus viminalis</i>	Poplar Sawfly	Insect
<i>Matsucoccus resinosa</i>	Red Pine Scale	Insect
<i>Hylurgus ligniperda</i>	Redhaired Pine Bark Beetle	Insect
<i>Diaspidiotus perniciosus</i>	San Jose Scale	Insect
<i>Scolytus multistriatus</i>	Smaller European Elm Bark Beetle	Insect
<i>Lycroma delicatula</i>	Spotted Lanternfly (Lycorma)	Insect
<i>Otiorhynchus ovatus</i>	Strawberry Root Weevil	Insect
<i>Lonicera spp. (species unknown)</i>	Bush Honeysuckle (Species Unknown)	Plant
<i>Heracleum mantegazzianum</i>	Giant Hogweed	Plant
<i>Lonicera japonica</i>	Japanese Honeysuckle	Plant
<i>Persicaria perfoliata</i>	Mile-A-Minute Vine	Plant
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Plant
<i>Cardamine impatiens</i>	Touch-Me-Not Bittercress	Plant

#### **4.3.4.5 Vulnerability Assessment**

Montour County’s vulnerability to invasion depends on the species in question. Human activity and mobility are ever increasing, and combined with the prospects of climate change, invasive species are becoming increasingly threatening. Invasive species can have adverse economic effects by impacting agriculture and logging activities. Natural forest ecosystems provide clean water, recreational opportunities, habitat for native wildlife, and places to enjoy the tranquility and transcendence of nature. The balance of forest ecosystems and forest health are vulnerable to invasive species threats. While there is significant acreage of

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state park and game lands in Montour County where forest managers can impact invasive species, private lands can provide refuge for invasive species if landowners are unaware of or apathetic towards the threat.

An interesting facet of the invasive species problem in Pennsylvania is that deer do not eat many invasive plants, giving invasive species a competitive advantage over the native species that deer prefer. As such, the management of deer populations in Montour County has a significant impact on the vulnerability of an ecosystem to invasive species, where overpopulation of deer favors invasive species.

The Governor's Invasive Species Council of Pennsylvania (PISC), the lead organization for invasive species threats, has identified over 100 species threats that are or could potentially become significant in Pennsylvania. Of these threats, county and municipal leaders believe that the most significant are invasive forest pests like the Emerald Ash Borer, Eurasian Wood Wasp, Exotic Bark Beetle, Asian Long Horned Beetle, Sudden Oak Death, Hemlock Woolly Adelgid, the Gypsy Moth and vascular plants, especially Purple Loosestrife, Japanese Knotweed, Garlic Mustard and Multi-flora Rose.

There are five primary components to managing invasive plants:

**Prioritize:** Public use areas such as state parks and other healthy forest ecosystems should be prioritized over developed and private areas. Locations with lower densities of invasive plants are often easier to control and should be given quick attention. Locations where humans are disturbing the landscape opens up niche space, and often times the aggressive invasive species move in faster than native species. Such locations include areas around road work, ditch/culvert work, logging activities, stream improvement/stabilization and bridge work. Some species pose a higher risk than others - invasive species are easiest to control before they become widespread and established in an area, and for that reason, species that are less widespread should be prioritized for management.

Species highlighted in red in *Table 25 – Prevalent Invasive Species* and *Table 26 – Vulnerable Species* have been species that have been considered priority species throughout Pennsylvania. Priority species of note for Montour County include the Emerald Ash Borer, Zebra Mussels, Japanese Knotweed and the Hemlock Woolly Adelgid.

Furthermore, it is best to take action before a species can become established in the county, so management should be aware of invasive species found nearby Montour County but not yet present in the county (priority species in *Table 26 - Vulnerable Species*). Public outreach and education are important for these species in order to improve identification and prevention of invasion. The Asian Long-horned Beetle first attacks red maple trees, followed by many other hardwoods by boring half inch holes through the trees, weakening them structurally and causing limbs to break off, ultimately killing trees. Montour County has many red and sugar maple trees, so if the Asian Long-horned Beetle ever became established in the county, it could spread quickly and have a devastating impact – especially on the *Montour Preserve* and annual maple sugaring program.

**Locate:** Detailed locations should be recorded for invasive plants so sites can be easily relocated, treated, and monitored.

**Delineate:** The scale and extent of the infestation should be recorded and mapped so that the progress of the infestation can be monitored.

**Control:** Methods of control depend on the specific infestation, but the most common approaches are mechanical (cutting and hand-pulling) and chemical (herbicide treatments).

**Monitor:** Identified sites should be monitored and revisited as often as several times in a growing season (depending on the location/species). Monitoring can allow for early detection of spreading infestations. Most importantly, it prevents a relapse towards full-blown infestation.

# Montour County, Pennsylvania

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Due to the instances and extent of the current infestations, it is reasonable to project that the county's vulnerability will increase.

### 4.3.5. Landslides

#### 4.3.5.1 Location and Extent

Pennsylvania has a wide variety of landside occurrences, on both geologic and human time scales. The Greater Pittsburgh urban area has the best documented and most publicized landslide problems, but other parts of the Commonwealth are also prone to slides. Information on costs to remediate landslide effects is incomplete, but damages to utilities, buildings, and roadways probably averages in the \$10 million per year (U.S. Geological Service, 2013). Landslides are described as downward and outward movement of slope-forming soil, rock, and vegetation reactive to the force of gravity. Rockfalls, rockslides, rock topples, block slides, debris flows, mudflows and mudslides are all forms of landslides. Natural causes of landslides include heavy rain, rapid snow melt, erosion, earthquakes, and changes in groundwater levels. Landslides occur most frequently in areas with moderate to steep slopes and high precipitation. Most often slope failures happen during or after periods of sustained above average precipitation or snowmelt events. Human activity can increase the likelihood of landslides by reducing vegetation cover, altering the natural slope gradient, or increasing the soil water content. One location where this type of human activity is common are areas that were excavated along highways and other roadways. These landslides are due to geologic properties of the area that make it easily prone to erosion. Montour County is not especially prone to landslides. Montour County's vulnerability to a landslide is generally low, but there are areas with a moderate to high possibility of occurrence.

#### 4.3.5.2 Range of Magnitude

Landslides can cause damage to utilities as well as transportation routes, resulting in road closure, or travel delays. Fortunately, deaths and injuries due to landslides are rare in Pennsylvania and Montour County. Most reported deaths due to landslides have occurred when rockfalls or other slides along highways have involved vehicles. Storm-induced debris flows can also sometimes cause death and injury. As residential and recreational development increase 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 property rather than people.

The Pennsylvania Department of Transportation and large municipalities incur substantial costs due to landslide damage and to extra construction costs for new roads in known landslide-prone areas. An average of \$10 million per year is spent on landslide repair contracts across the Commonwealth and a similar amount is spent on mitigation costs for grading projects. The USGS identifies lower portion of Montour County in a zone of high susceptibility with moderate incidence while the middle region of the county is in the low incidence zone (*see Figure 22 – Montour County Landslide Vulnerability Map*). Areas that are susceptible to landslides are geologically prone to giving way after significant precipitation events.

#### 4.3.5.3 Past Occurrence

No comprehensive list of landslide incidents is available currently, as there is no formal reporting system in place in the county or the Commonwealth. Based on anecdotal information from the county and municipal officials, minor landslides occur each year, typically during periods of heavy rains.

#### 4.3.5.4 Future Occurrence

Based on historical events, future landslide events resulting in loss of life and property damage are unlikely in Montour County. However, with mixed susceptibility to landslides, the probability of landslides occurring in the county is possible. The majority of Montour County is not at high risk for landslides, however



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mismanaged development in steeply sloped areas would increase the frequency of occurrence of landslides. Road cuts are the most common development that puts an area at a heightened probability of a slide. The Pennsylvania Department of Environmental Protection has an Erosion and Sediment (E&S) program that sets requirements for development projects of a certain scale that are intended to mitigate erosion, which are similar practices to prevent causing landslides. A landslide is a low occurrence as defined by the risk factor methodology.

### **4.3.5.5 Vulnerability Assessment**

Landslides are often precipitated by other natural hazards such as earthquakes or floods, and a serious landslide can cause \$1 million in damages. Continued enforcement of floodplain management and proper road and building construction helps to mitigate the threat of landslides. Floodplain management is important where mining has occurred within proximity to watercourses and associated flat-lying areas. Surface water may permeate into areas that still have open fractures and the build-up of surface water in fractures could lead to unexpected flood events. A comprehensive database of land highly prone to erosion and landslides is difficult to develop. Construction projects in Montour County should be wary of erosion and the potential for landslides. There are several general factors that can be indicators of a landslide vulnerable area:

- On or close to steep hills.
- Areas of steep road cuts or excavations.
- Steep areas where surface run-off is channeled.
- Fan shaped areas of sediment and rock accumulations.
- Evidence of past sliding such as tilted utility lines, tilted trees, cracks in the ground and irregularly surfaced ground.

Montour County is not especially prone to landslides. Montour County's vulnerability to a landslide is generally low, but there are areas with a moderate to high possibility of occurrence. In Montour County, the vulnerability is correlated with people and buildings present within the county. The vulnerable population for Montour County is 14,464 while the vulnerable buildings is 6,153 (PA State HMP, 2018). The overall vulnerable exposed building value in Montour County results in \$1,583,680.00 with an overall 85% building value (PA State HMP, 2018).

The vulnerability of each county depends on various site-specific characteristics which include local topography and soil type. For example, counties with facilities on loose soil or steep slopes are more prone to experiencing landslides. Therefore, transportation routes throughout Montour County located at the base or crest of steep landmasses should be considered vulnerable to this hazard. *Figure 22 – Montour County Landslide Vulnerability Map* identifies slopes with greater than 25% grade which may assist in identifying areas within the county that are potentially susceptible to landslides. Municipalities throughout Montour County have great amounts of addressable structures located within the 25% to 40% slope region and few structures located within the 40% or greater slope region. Fortunately, there is only one critical infrastructure present within the 20 to 40% slope region, as shown in *Table 27 - Vulnerable Critical Infrastructures Within Number of Addressable Structures*.

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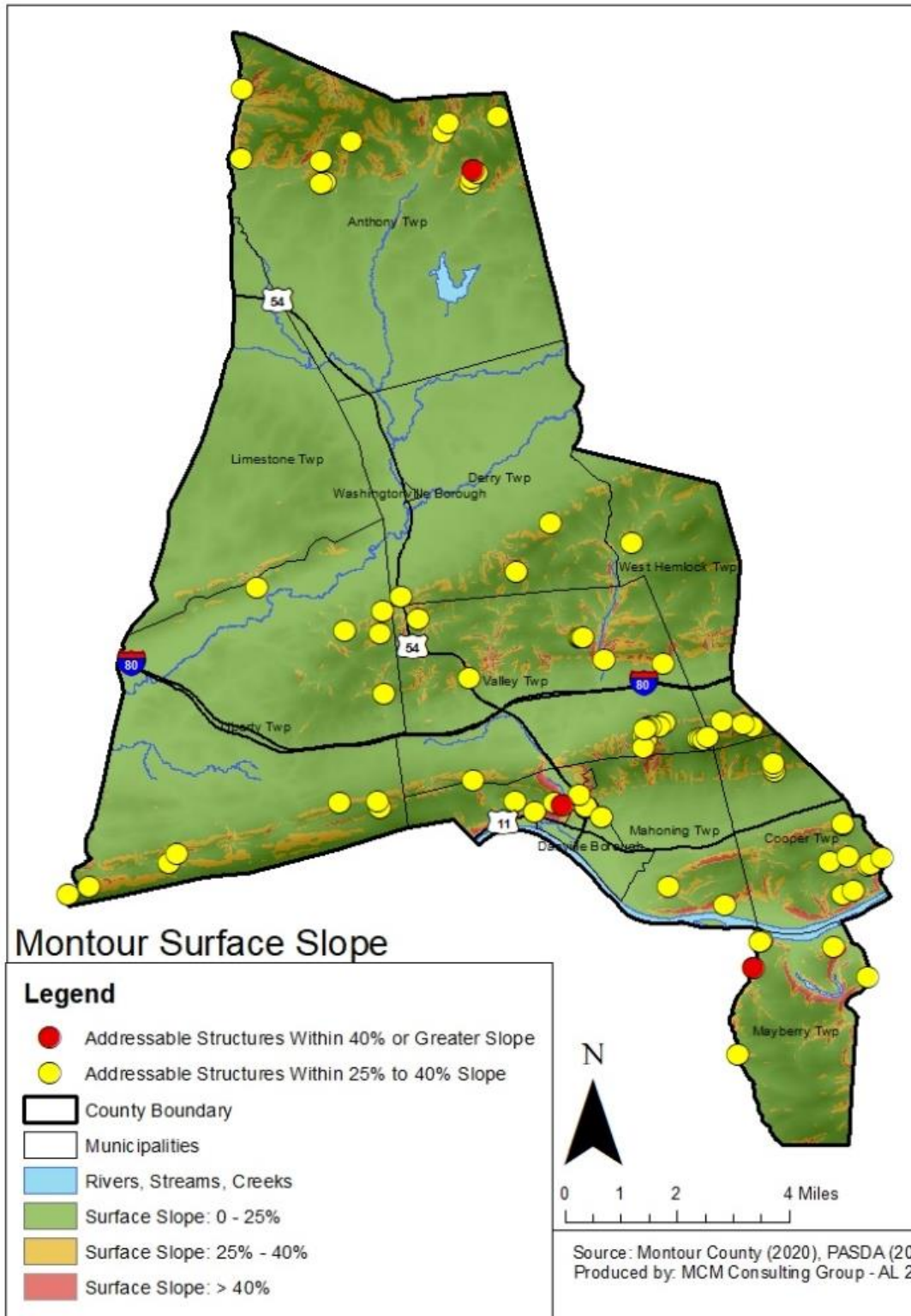
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Table 27 - Vulnerable Critical Infrastructures Within Number of Addressable Structures

<b>Montour County Addressable Structures and Critical Facilities at 25%+ Slope Regions</b>				
<b>Municipality</b>	<b>Number of Addressable Structures Within 25% to 40% Slope Region</b>	<b>Number of Addressable Structures Within 40% or Greater Slope Region</b>	<b>Number of Critical Infrastructures Within 25% to 40% Slope Region</b>	<b>Number of Critical Infrastructures Within 40% or Greater Slope Region</b>
Anthony Township	12	1	-	-
Cooper Township	13	-	-	-
Danville Borough	2	-	-	-
Derry Township	3	-	-	-
Liberty Township	11	-	1	-
Limestone Township	-	-	-	-
Mahoning Township	12	1	-	-
Mayberry Township	6	1	-	-
Valley Township	22	-	-	-
West Hemlock Township	4	-	-	-
<b>Totals</b>	<b>85</b>	<b>3</b>	<b>1</b>	<b>0</b>

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Figure 22 - Montour County Landslide Vulnerability Map



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## 4.3.6. Pandemic and Infectious Disease

### 4.3.6.1 Location and Extent

#### **Pandemic & Epidemic**

A pandemic is a disease that attacks or affects the population of an extensive area. This is sometimes an entire country or continent. In the years 2019-2021, a pandemic encompassed the entire planet. An epidemic is an outbreak or disease affecting or tending to affect a disproportionately large number of individuals within a population, community, or region at the same time. It is characterized by very widespread growth or extent that spreads quickly and affects many individuals at the same time.

A pandemic is a type of epidemic (one with greater range and coverage), an outbreak of a disease that occurs over a wide geographic area and affects an exceptionally high proportion of the population. While a pandemic may be characterized as a type of epidemic, an epidemic is *not* a type of pandemic. Pandemics *travel* more effectively than epidemics.

Each year, different strains of influenza are labeled as potential pandemic threats. Pandemics happen when novel (new) viruses emerge and can infect people easily and spread efficiently and are sustained from person to person. The spread of a disease depends on the mode of transmission of the disease, how contagious it is, and the amount of contact between infected and non-infected persons. In the event of a pandemic occurring in the eastern United States, the entirety of Montour County would likely be affected. Strains of influenza, or the flu, are highly contagious, have caused epidemics and pandemics, and they commonly attack the respiratory tract in humans. Influenza pandemic planning began in response to the H5N1 (avian) flu outbreak in Asia, Africa, Europe, the Pacific, and the Near East in the late 1990s and early 2000s. Avian flu did not reach pandemic proportions in the United States, but the country began planning for flu outbreaks. The Pennsylvania Department of Health (PADOH) Influenza Pandemic Response Plan states that “an influenza pandemic is inevitable and will probably give little warning” (PADOH, 2005).

The 2009 H1N1 flu virus resulted in seventy-eight deaths in Pennsylvania by the time the pandemic ended. Studies after the 2009 H1N1 influenza pandemic showed that the strain disproportionately impacted people younger than twenty-four years old (CIDRAP, 2010). Schools have potential to become outbreak centers due to their large young adult populations, high levels of close social contact, and permeable boundaries. During a pandemic or disease outbreak, the population affected may exceed the seasonal norm of one-third of the student population. Because universities and schools can be sites of transmission, they may cause a virus to spread among the surrounding community as well.

On March 11, 2020, the World Health Organization (WHO) characterized the outbreak of a coronavirus disease as a pandemic. The virus was named “SARS-CoV-2” and the disease it causes is named “coronavirus disease 2019” (COVID-19). Coronaviruses are common in people and many different species of animals to include camels, cattle, cats, and bats. The disease is believed to have started in Wuhan Province, China in late 2019 and spread around the globe. At the epicenter in China, the virus was linked to a large seafood and live animal market; however, community spread of the virus rapidly ensued.

#### **Infectious Disease**

Infectious diseases range from influenza, pneumonia, tuberculosis, rabies, Middle East Respiratory Syndrome (MERS), Lyme Disease, Zika, Ebola, and HIV/AIDS.

West Nile virus is contracted through a mosquito bite and is aided by warm temperatures and wet climates conducive to mosquito breeding, with most cases occurring between April and October. West Nile virus is a vector-borne disease. This means an animal, usually an insect or a tick, transmits parasitic microorganisms to people and animals, and therefore, the diseases they cause. The disease causes headaches, high fever,

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neck stiffness, disorientation, tremors, convulsions, muscle weakness, paralysis, and death in its most serious form.

Lyme Disease, spread by the bite of infected blacklegged ticks, is a bacterial disease with symptoms including fever, headaches, and characteristic skin rash (erythema migrans). Untreated, Lyme Disease can spread to joints, the heart, and the nervous system (CDC, 2016). To prevent the disease, it is recommended to use insect repellent, remove ticks promptly, apply pesticides, and reduce tick habitat.

The Zika virus is another infectious disease that is spread by mosquito bites and it is related to West Nile virus. Zika virus can also be spread through sexual intercourse, blood transfusion, or passed from mother to child in the womb. The virus was first identified in 1947, but largely came to the attention of the United States in 2015 when there was an outbreak of Zika in Brazil. The direct illness caused by Zika can include fever, red eyes, joint pain, headache, and a rash, or sometimes have no symptoms at all. Zika is troubling for pregnant mothers as the virus can result in microcephaly or cause other problems for brain development. For adults, the virus can be linked to increased incidence of Guillain-Barré syndrome.

Although brought under control in 2004, Severe Acute Respiratory Syndrome (SARS) has shown the potential of becoming a pandemic. Neither the WHO nor the Centers for Disease Control and Prevention (CDC) has classified SARS.

### **4.3.6.2 Range of Magnitude**

#### **Pandemic & Epidemic**

Public health emergencies typically occur on a regional basis. Sources include infected animals, contaminated food, and improperly prepared food. As evidenced during the 2019/2020 COVID-19 pandemic, the whole county, Commonwealth, country and world are vulnerable to a public health emergency. The likely source of a severe infection may be a farm, animal market or restaurant; see Location and Extent.

Advancements in medical technologies have greatly reduced the number of deaths caused by influenza over time. In the early 1900s, flu pandemics could cause tens of millions of deaths, while the 2009 swine flu caused fewer than 20,000 deaths world-wide, and many people infected with swine flu in 2009 recovered without needing medical treatment. However, the modern flu viruses are still quite dangerous. About seventy percent of those who were hospitalized with the 2009 H1N1 flu virus in the United States belonged to a high-risk group (CDC, 2009). High risk populations for influenza include children, the elderly, pregnant women, and patients with reduced immune system capability.

While there are limited secondary hazards related to public health emergencies, an outbreak could cause a variety of general secondary effects. Civil disorder is the most likely hazard to result from a public health emergency. Further potential secondary effects could include a shortage of medical supplies and personnel; hoarding of household paper and cleaning supplies; school, business, and government closings; government restrictions on travel; low attendance at places of employment, as well as slowed productivity.

The WHO has six phases of pandemic alert for incorporation of new recommendations and approaches for preparedness and response plans. These phases are listed below in *Table 28 – Pandemic Influenza Phases*.

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Table 28 - Pandemic Influenza Phases

<b>Pandemic Influenza Phases</b>	
<b>Phase</b>	<b>Characteristics</b>
Phase 1	No viruses circulating among animals have been reported to cause infections in humans.
Phase 2	An animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans and is therefore considered a potential pandemic threat.
Phase 3	An animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks.
Phase 4	Characterized by verified human-to-human transmission of an animal or human-animal influenza reassortant virus able to cause “community-level outbreaks”.
Phase 5	Characterized by human-to-human spread of the virus into at least two countries in one WHO region.
Phase 6	The pandemic phase is characterized by community level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5. Designation of this phase will indicate that a global pandemic is under way.
Source: WHO <a href="http://www.who.int/en/">http://www.who.int/en/</a>	

At the writing of this plan, the United States was in an Opioid epidemic. The opioid epidemic specifically refers to the growing number of deaths and hospitalizations from opioids, including prescriptions, illicit drugs, and analogues. In recent years, death rates from these drugs have ramped up to over 40,000 a year, or 115 a day, across the country. Drug overdose in 2020 was the leading cause of accidental death in the United States, largely due to the opioid epidemic. The opioid epidemic first gained notoriety around 2010, but the factors behind it had begun several years earlier.

Obesity is a serious health problem in the United States: nearly 35% of Americans have obesity. Obesity is not just a problem of “girth control”; it is now considered a chronic disease by the American Medical Association, the American Association of Clinical Endocrinologists, the American College of Endocrinology, the Endocrine Society, the Obesity Society, the American Society of Bariatric Physicians, and the National Institutes of Health (NIH). *Figure 23 - Prevalence of Self-Reported Obesity Among U.S. Adults by State and Territory* shows overall obesity rates among the states. Additional obesity information by race/ethnicity, age, and education may be found here: <https://www.cdc.gov/obesity/data/prevalence-maps.html#overall>.

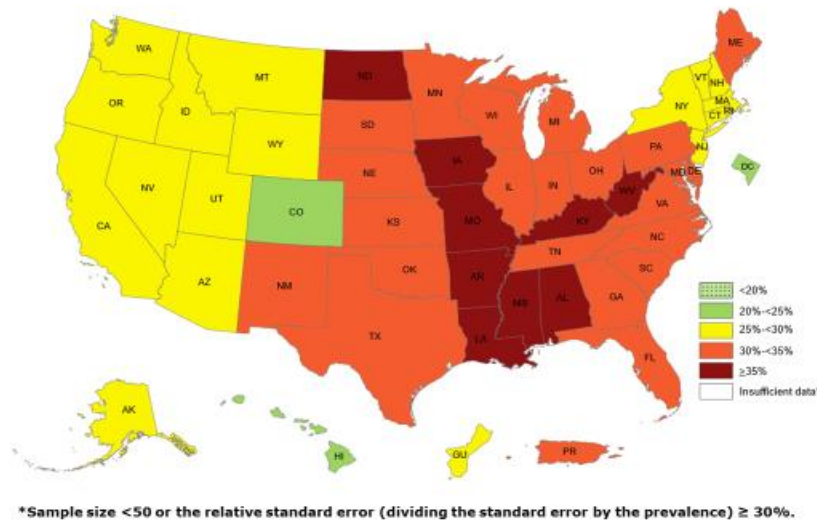
The global nature of the obesity epidemic was formally recognized by a World Health Organization consultation in 1997.

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Figure 23 - Prevalence of Self-Reported Obesity

## Prevalence<sup>1</sup> of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2018

<sup>1</sup> Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.



## Infectious Disease

### Smallpox

This was an infectious disease unique to humans, caused by either of two virus variants, Variola major and Variola minor. The last naturally occurring case of smallpox (Variola minor) was diagnosed in October 1977 in Somalia. The last reported case in the United States was in 1949. Variola major is the more severe and has an overall mortality rate of 30% - 35%. Variola minor only has a mortality rate of one percent. Long-term complications of Variola major include characteristic scars. Less common complications are blindness, and limb deformities due to arthritis and osteomyelitis.

### West Nile Virus

This is found in temperate and tropical regions of the world and is a mosquito-borne zoonotic arbovirus. It was first identified in the West Nile sub-region in the East African nation of Uganda in 1937. It was considered a minor risk to humans until an outbreak in Algeria in 1994. At that time there were cases of West Nile virus that caused encephalitis. The virus has spread globally. In 2019, West Nile virus infected 326 people and killed fifteen people in the United States, a significant decrease from previous years. Pennsylvania infections were seven with zero deaths (CDC, 2019.) Most West Nile infections in humans are sub-clinical, causing no symptoms. Approximately twenty percent of infections cause symptoms and less than one percent of cases result in severe neurological disease or death. Symptoms typically appear between two and fifteen days after infection and there is currently no vaccine for West Nile virus. Person to person transmission of West Nile is less prevalent than person to person transmission of influenza.

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### **Lyme Disease**

Since 2011, Pennsylvania has led the country in the number of Lyme disease cases, according to the CDC. Each year since 2005, the number of confirmed cases of Lyme disease in Pennsylvania has grown, with 10,208 confirmed cases in 2018. This number was well below the number of cases reported in 2016 and 2017, perhaps as a result of a reduced number of acorns available to feed field mice, one of the lead carriers of the disease; and/or perhaps as a result of public awareness due to the actions of a Pennsylvania Task Force formed to focus on prevention, education, awareness, and surveillance of the tick-borne illness. In 2015, the state Department of Conservation and Natural Resources placed signs in the 120 state parks and twenty state forest districts warning visitors and staff about the presence of ticks. (PA DOH June 2019). While most cases of Lyme disease can be treated over a few weeks with antibiotics, undetected Lyme disease can seriously damage a body's musculoskeletal and nervous systems, sometimes resulting in death.

### **Zika Virus**

Zika virus has spread to Pennsylvania primarily by persons from Pennsylvania traveling to locations where the virus is a transmission risk. These places include certain countries in South America, Central America, the Caribbean, the Pacific Islands, Africa and Southeast Asia. No locations within the United States are considered to have significant risk of Zika virus transmission (PA DOH, 2019). If a Pennsylvania resident does contract Zika virus, preventing the spread of the disease is important. If an infected individual is bitten by a mosquito within three weeks of infection, the mosquito can transmit the virus to anyone else it bites. Infected individuals should strictly avoid any possibility of mosquito bites to prevent the spread of Zika virus. Additionally, Zika can be transmitted through sexual intercourse, so infected individuals should use condoms or abstain from sex while they have the virus.

#### **4.3.6.3 Past Occurrence**

### **Pandemic & Epidemic**

#### **Influenza**

##### H1N1

Montour County was impacted with the H1N1 virus during 2009. The Pennsylvania Department of Health set up clinics throughout the county to administer vaccines.

##### Spanish Flu

Prior to the COVID-19 world-wide pandemic, the 1918 influenza (Spanish Flu) pandemic was classified as the "Mother of all Pandemics". An estimated one third of the world's population was infected and had clinically apparent illnesses during the 1918 - 1919 influenza pandemic. Pennsylvania was one of the hardest hit states in the country because influenza tended to strike cities very hard. The impact of the 1918 - 1919 influenza is not limited to that time frame. All Influenza-A pandemics since that time have been caused by 1918 virus descendants (including "drifted" H1N1 viruses and reassorted H2N2 and H3N2 viruses). Only Influenza Type A viruses are known to have caused pandemics. *Table 29 – Notable Influenza A events in the United States* lists past Influenza A events.



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Table 29 - Notable Influenza A events in the United States

Notable Influenza A events in the United States	
Year(s)	Common Name
1889	Russian Flu
1918 - 1919	Spanish Flu
1957	Asian influenza
1968	Hong Kong influenza
1976	Swine Flu
2009	Novel H1N1 “swine flu”
2020	COVID-19
<i>Sources: WHO and CDC</i>	

## Legionella

The CDC estimates about 25,000 annual cases of pneumonia due to Legionella bacteria (*Legionella pneumophila*) in the United States. Only 5,000 cases are reported, however, because of the disease’s nonspecific signs and symptoms. About 10% of people infected with Legionella bacteria will die from the infection. Legionella is also known as Legionnaires’ disease.

Legionnaires’ disease outbreaks and clusters have been linked to a number of sources, including: water systems, such as those used in hospitals, nursing homes, and hotels; large plumbing systems; hot-water tanks and heaters; cooling towers of air conditioning systems; showers and faucets; mist machines and hand-held sprayers; swimming pools; hot tubs and whirlpools; equipment used in physical therapy; decorative fountains.

In June of 2020, the Pennsylvania Health Alert Network warned of an anticipated increase in Legionellosis cases due to the summer season and building re-openings as the Commonwealth relaxed its risk mitigation strategies for COVID-19. See below.

## COVID-19

This is an on-going pandemic at the time of the writing of this plan, so websites are used to provide the most up-to-date statistics. The first cases in Pennsylvania were reported on March 6, 2020 in Delaware and Wayne counties. The first confirmed case of COVID-19 in Montour County was on March 21, 2020. At the writing of this plan, the country had recorded over 400,000 deaths from the virus, 20,000 of them in Pennsylvania and forty-five of those in Montour County – twenty of those were in long-term care facilities. Over the winter of 2020-2021, all of Pennsylvania was experiencing a dangerous number of daily cases. See more information here: <https://www.health.pa.gov/topics/disease/coronavirus/Pages/Cases.aspx>.

The good news was the release of two vaccines reported to be 95% percent effective; vaccinations began across the commonwealth in January 2021 in phases: <https://www.health.pa.gov/topics/disease/coronavirus/Vaccine/Pages/Vaccine.aspx#data>

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## **Infectious Disease**

### 2019/2020 Influenza Season

The Pennsylvania Department of Health monitors influenza activity throughout the year but ramps up surveillance activities in the fall and winter. The official influenza surveillance season starts with the 40th week of the year (typically around the beginning of October) and ends on the 20th week of the following year (in May). For the 2020-2021 season, the influenza surveillance season began on Sept. 27, 2020, and will run through May 22, 2021. Updated influenza activity data will be posted on this web page (<https://www.health.pa.gov/topics/disease/Flu/Pages/2020-21-Flu.aspx>) every Tuesday throughout the influenza surveillance season.

### Week 2 (Ending 1/16/2021) Report Summary

- Flu activity is low across the Commonwealth.
- Influenza A and B are identified by laboratory testing.
- A total of 2,195 laboratory-confirmed influenza cases have been reported season to date. Confirmed reports were received from all sixty-seven Counties.
- Percent of outpatient visits associated with Influenza-Like Illness (ILI) has been low and is still below the state epidemic threshold.
- A total of twenty-five influenza associated hospitalizations and spell out deaths have been reported in Pennsylvania during the current flu season.

At week thirteen 2020, the state Department of Health stopped updating its 2019-2020 influenza data page when influenza activity was known to have decreased significantly and was below epidemic limits. At that juncture, Montour County had reported 386 cases of influenza A and 233 cases of influenza B for a total of 619 cases of the flu. The department also reported that during the same time frame, a total of 102 Pennsylvanians died from influenza. Of this number, those aged sixty-five and older had the highest mortality rate.

### West Nile Virus

West Nile virus reached the United States in 1999 and a year later was detected in Pennsylvania when mosquito pools, dead birds, and/or horses in nineteen counties tested positive for the virus. A comprehensive network has been developed in Pennsylvania that includes trapping mosquitoes, collecting dead birds, and monitoring horses, people and, in past years, sentinel chickens. *Table 30 – West Nile Virus Control Program in Montour County Since 2015* outlines the West Nile Virus within Montour County since 2015.

*Table 30 - West Nile Virus Control Program in Montour County Since 2015*

<b>West Nile Virus Control Program in Montour County Since 2015</b>				
<b>Year</b>	<b>Total Positives</b>	<b>Human Positives</b>	<b>Mosquito Positives</b>	<b>Bird Positives</b>
2020	0	0	0	0
2019	8	0	0	0
2018	0	0	0	0
2017	0	0	0	0
2016	2	0	2	0
2015	4	0	4	0

*Source: <http://www.depgis.state.pa.us/WNV/index.html>*

### Lyme Disease

The PA DOH lists the following information regarding cases in Montour County, *Table 31 - 2018 Lyme Disease Data for Montour County*. The case count shows an alarming and consistent rise in cases over the past several years, although it should be noted that information represented for each county “may vary with

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respect to the resources they have to devote to investigation of Lyme cases”. It should also be noted that these figures represent a rough estimate of the Lyme disease burden in Montour County.

*Table 31 - 2018 Lyme Disease Data for Montour County*

2018 Lyme Disease Data for Montour County			
Year	Number of cases	Year	Number of cases
1980	0	2000	0
1981	0	2001	<4
1982	0	2002	<4
1983	0	2003	0
1984	0	2004	<4
1985	0	2005	<4
1986	0	2006	<4
1987	0	2007	<4
1988	<4	2008	0
1989	4	2009	<4
1990	<4	2010	6
1991	<4	2011	8
1992	<4	2012	7
1993	<4	2013	6
1994	0	2014	13
1995	0	2015	28
1996	0	2016	48
1997	<4	2017	53
1998	0	2018	53
1999	0	2019	Not available

*Source: <https://www.health.pa.gov/topics/disease/Pages/Lyme-Disease.aspx>*

#### **4.3.6.4 Future Occurrence**

##### **Pandemic & Epidemic**

The probability of a widespread pandemic public health emergency is every ten years or less with varying degrees of severity. Minor outbreaks of less serious communicable disease, such as influenza, occur much more frequently. Montour County is vulnerable to these diseases and infections since people commute to the larger urban areas outside the county for employment and from the larger urban areas to the county for recreation and sport related activities.

There is useful prediction data in a report released by Carnegie Mellon University during the COVID-19 pandemic in May 2020. The report, inclusive of employment travel patterns that may aid in prevention protocols or early stay-at-home/work-from-home orders, may be found here:

<https://www.governor.pa.gov/wp-content/uploads/2020/05/20200529-CMU-Risk-Based-Decision-Support-Tool-05-28-2020.pdf>

##### **West Nile Virus**

The best defense against West Nile virus is to remove mosquito breeding locations – stagnant water sources. Another defense is to prevent insect bites by wearing shoes, socks, long pants and a long-sleeved shirt when outdoors for long periods of time, or when mosquitoes are most active. Also, mosquito repellent can be considered whenever people are outside.

##### **Influenza**

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It is estimated that five to twenty percent (600,000 to 2,400,000) of Pennsylvanians get the flu each year, and 120 to 2,000 die from complications of influenza (PA DOH 2020). The CDC recommends that everyone six months and older get a flu vaccine every season. People who are at a high risk of serious flu illness should take flu antiviral drugs as soon as they get sick.

### **Lyme Disease**

Lyme disease is best combated using insect repellent, removing ticks promptly, applying pesticides, and reducing tick habitat. Once a person realizes they have been bitten by a tick, they should seek medical attention, as undetected Lyme Disease can seriously damage a body's musculoskeletal and nervous systems or result in death.

#### **4.3.6.5 Vulnerability Assessment**

It is extremely difficult to predict a pandemic or an epidemic. The National Institute on Drug Abuse estimates the epidemic of opioid use and overdose costs the country annually \$78.5 billion in healthcare costs, addiction treatment, lost productivity, and criminal justice involvement. The Harvard School of Public Health estimates the obesity epidemic costs the country annually \$190 billion in obesity-related healthcare costs alone.

The severity of the next pandemic cannot be predicted, but modeling studies suggest the impact of a pandemic on the United States could be substantial. In the absence of any control measures (vaccination or drugs), it is estimated that a "medium-level" pandemic could cause 89,000-207,000 deaths, 314,000-734,000 hospitalizations, eighteen to forty-two million outpatient visits, and another twenty to forty-seven million sick people in the United States. Between fifteen to thirty-five percent of the U.S. population could be affected by an influenza pandemic, and the economic impact could range between \$71.3 - \$166.5 billion. These data for the 2020 pandemic have fluctuated widely but, at the time of the writing of this plan, were on pace for greater than a "medium level" pandemic. The COVID 19 virus, however, has severely affected populations over the age of 65 – especially those in nursing homes – disproportionately; it has also severely affected different races disproportionately, e.g., non-Hispanic American Indian and Black people. The CDC reports that long-standing systemic health and social inequities have put some members of racial and ethnic minority groups at increased risk of getting COVID-19 or experiencing severe illness, regardless of age.

As of July 2, 2020, according to the Johns Hopkins Coronavirus Resource Center, there were nearly eleven million confirmed cases of COVID-19 resulting in nearly 518,000 deaths world-wide. The World Health Organization also reports that as of March 12, 2020 there were 188 countries, areas or territories with cases. The most up-to-date United States information, including data by county, may be found here:

<https://coronavirus.jhu.edu/us-map>

Influenza pandemics are different from many of the threats for which public health and health-care systems were currently planning. A pandemic will last much longer than most public health emergencies and may include "waves" of influenza activity separated by months (in 20th Century pandemics, a second wave of influenza activity occurred three to twelve months after the first wave). The numbers of healthcare workers and first responders available to work will likely reduce as they will be at high risk of illness from exposure in the community and healthcare settings. Some may have to miss work to care for ill family members. Resources in many locations could be limited depending on the severity and spread of an influenza pandemic. These limited resources could also be affected by unrelated shortages.

Because of these differences and the expected size of an influenza pandemic, it is important to plan preparedness activities that will permit a prompt and effective public health response. The U.S. Department of

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Health and Human Services (DHHS) supports pandemic influenza activities in the areas of surveillance (detection), vaccine development and production, strategic stockpiling of antiviral medications, research, and risk communications. In May 2005, the U.S. Secretary of DHHS created a multi-agency National Influenza Pandemic Preparedness and Response Task Group. This unified initiative involves CDC and many other agencies (international, national, state, local, and private) in planning for a potential pandemic. Its responsibility includes revision of a U.S. National Pandemic Influenza Response and Preparedness Plan.

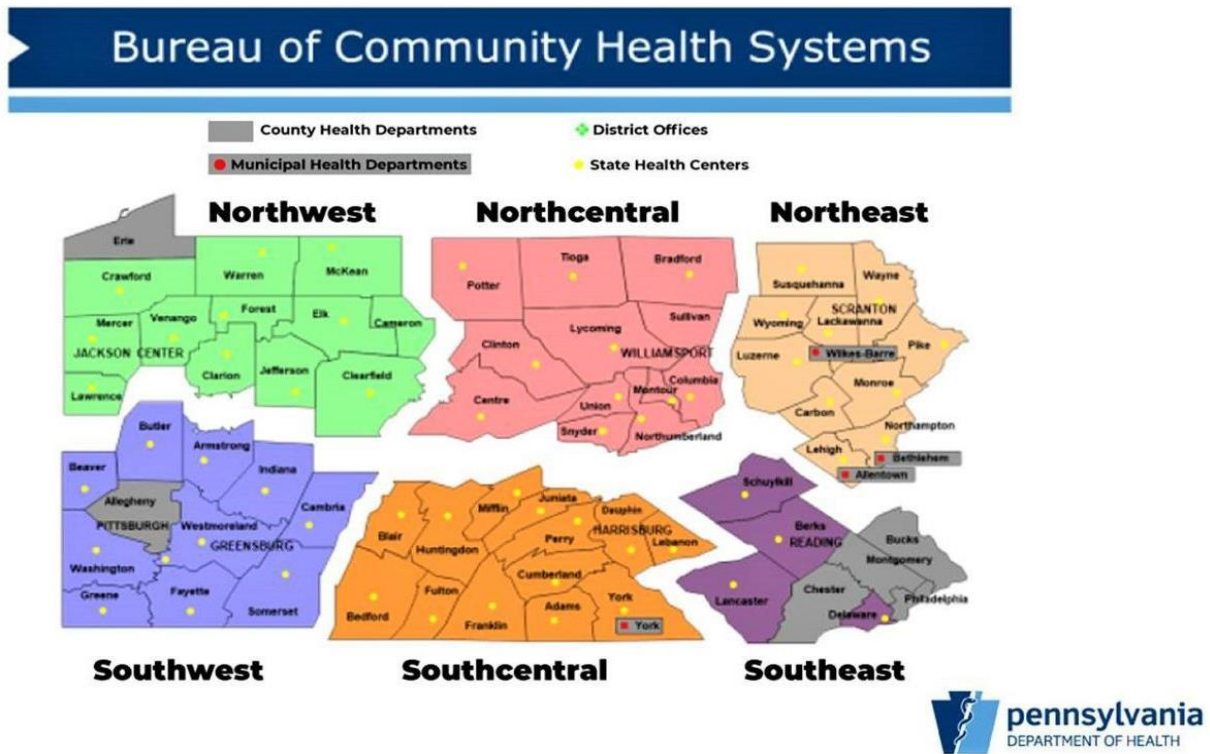
Elderly individuals, children and immune deficient individuals are most vulnerable to influenza. Nursing facilities, personal care facilities, daycares, schools, and hospitals are considered more vulnerable since there are normally groups of these functional-needs population present at the facilities. Spread of disease is at an increased risk due to the vulnerability and density of these populations. Correctional institutions would also be at an increased risk due to the lack of social distancing required to help stop the spread of a pandemic. During the early and middle stages of the COVID-19 pandemic, nursing homes and personal care homes in Pennsylvania suffered staggering numbers of cases and deaths and several county jails and state correctional institutions reported wide community spread.

It is important to plan preparedness activities that will permit a prompt and effective public health response. During a public health emergency, the PA DOH may open emergency medicine centers called Points of Dispensing (PODs) to ensure that medicine, supplies, vaccines, and information reach Pennsylvania residents during a public health emergency. An open POD is where the general public goes to receive free emergency medicine and supplies from public health officials, while a closed POD provides free emergency medicine and supplies to a specific community, like a university, including faculty, staff, and students. Dispensing of medications/vaccines is a core function of the Strategic National Stockpile's Mass Dispensing of Medical Countermeasures Plan.

PODs are coordinated with county emergency managers by the PA DOH with through the six regional healthcare districts (see *Figure 24 – Pennsylvania Department of Health Districts*). Montour County is in the north central district. At the time of the writing of this plan, POD planning for mass vaccinations against COVID-19 was occurring and hundreds of locations were offering the vaccinations. This is just one source of reference: <https://www.health.pa.gov/topics/disease/coronavirus/Pages/Vaccine.aspx#map>.

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Figure 24 - Pennsylvania Department of Health Districts



Health-care workers and those working in direct-care situations (such as correctional institutions or those who cannot social distance due to their jobs) are more likely to be exposed to a pandemic disease. Those that work outdoors for extended periods of time in warm months may be more vulnerable to West Nile, Lyme Disease or the Zika virus.

### 4.3.7. Radon Exposure

#### 4.3.7.1 Location and Extent

Airborne radon gas is radioactive and is a step in the radioactive decay of uranium to radium. Radon is a noble gas, cannot be seen and has no odor. Like other noble gasses, radon gas is very stable, so it does not easily combine with other chemicals. Two isotopes of radon are commonly found: 222Rn and 220Rn. The 220Rn isotope has a very short half-life, so it often only exists for fifty-five seconds, not long enough to pose a hazard to humans. The 222Rn isotope has a half-life of 3.8 days which is long enough to pose a threat to humans. Still, due to the relatively short half-life of 222Rn, it only exists in relative proximity to its radioactive parent, usually within tens of feet away. Radon is a carcinogen and when inhaled, it causes humans to develop lung cancer.

Radioactivity, caused by airborne radon, has been recognized for many years as an important component in the natural background radioactivity exposure of humans, but it was not until the 1980s that the wide geographic distribution of elevated values in houses and the possibility of extremely high radon values in houses were recognized. Radon was discovered as a significant source of natural radiation for humans in 1984 in the Reading Prong geologic province in Eastern Pennsylvania, when routine monitoring of employees leaving the not yet active Limerick nuclear power plant showed readings that a construction worker working on the plant frequently exceeded expected radiation levels despite the fact that the plant was not

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active. The Environmental Protection Agency (EPA) guidelines state that mitigation actions should be taken if levels exceed 4pCi/L in a home, and most uranium miners have a maximum exposure of 67 pCi/L. Subsequent testing of the Limerick power plant worker's home showed high radon levels of 2,500 pCi/L (pico Curies per Liter), triggering the Reading Prong to become the focus of the first large-scale radon scare.

Radon gas is considered ubiquitous and can be found in indoor and outdoor environments, however there is no known safe level of exposure to radon. For most people in Pennsylvania, the greatest risk of radon exposure is from within their home in rooms that are below, directly in contact with, or immediately above the ground. Sources of radon include radon in the air from soil and rock beneath homes, radon dissolved in water from private wells and exsolved during water use (rare in Pennsylvania), and radon emanating from uranium-rich building materials such as concrete blocks or gypsum wallboard (also rare in Pennsylvania). Key factors in radon concentration in homes are the rates of air flow into and out of the house, the location of air inflow, and the radon content of air in the surrounding soil. Because of the flow dynamics of air inside of most houses, even a small rate of soil radon gas inflow can lead to elevated radon concentrations.

There are several factors that contribute to higher radon levels in soil gas:

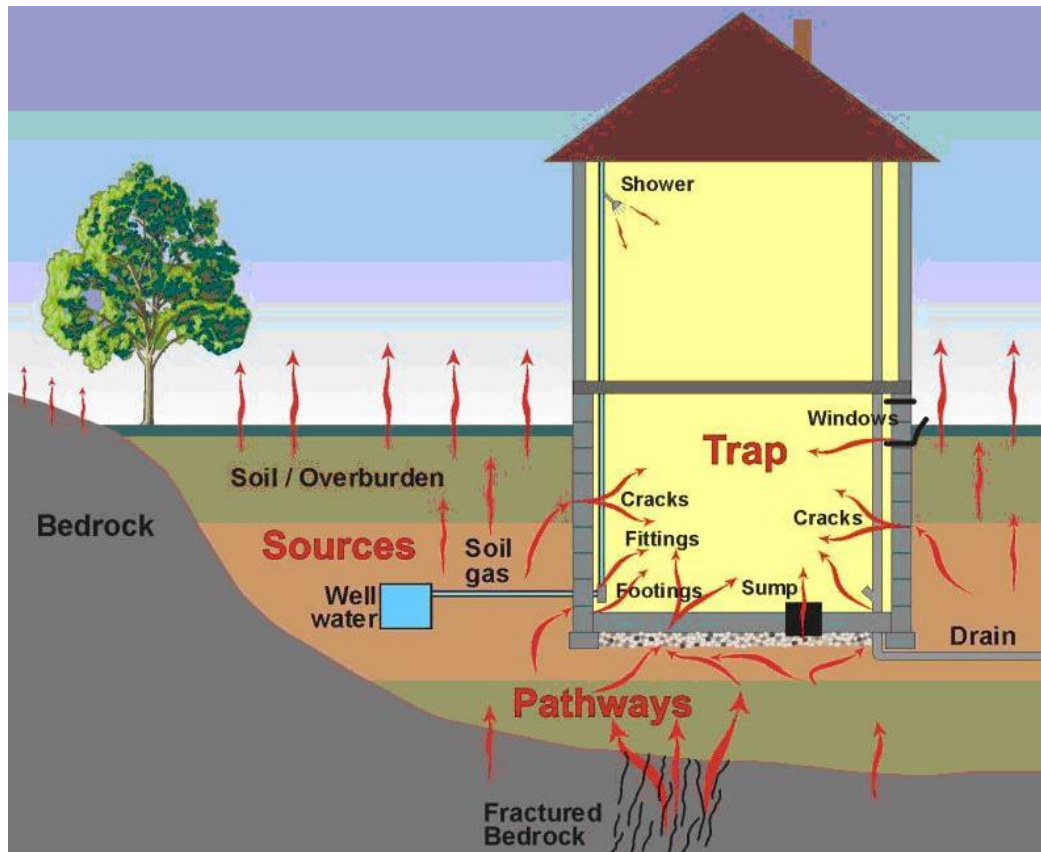
- Proximity to elevated uranium rich deposits (>50ppm). Areas within a few hundred feet of such deposits are most at risk. Such deposits are rare in Pennsylvania.
- Some more common rocks have higher than average uranium content (5 to 50 ppm), and proximity to such rocks also increases the risk of radon exposure. These rock types include black shales as well as granitic and felsic alkali igneous rocks. This is the most common source of high radon levels in Pennsylvania. The Reading Prong elevated radon levels come from Precambrian granitic gneisses.
- Other soil and bedrock properties that facilitate radon mobility. The amount of pore space in the soil and its permeability – more porous soils will allow radon to travel more easily. Limestone-dolomite soils can also be predisposed to collect radon from radium resultant from weathering of iron oxide or clay surfaces. In some cases (like State College in Centre County, PA) even with underlying bedrock having normal uranium concentrations (.5 to 5 ppm), the vast majority of locations built on limestone-dolomite soils exceed radon concentrations of 4pCi/L, and many exceeded 20 pCi/L.

The following three sources of radon in houses are now recognized (see *Figure 25 - Sketch of Radon Entry Points into A House* below):

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

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Figure 25 - Sketch of Radon Entry Points into A House



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

The radon concentration of soil gas depends upon a number of soil properties, the importance of which is still being evaluated. In general, 10% to 50% of newly formed radon atoms escape the host mineral of their parent radium and gain access to the air-filled pore space. The radon content of soil gas clearly tends to be higher in soils containing higher levels of radium and uranium, especially if the radium occupies a site on or near the surface of a grain from which the radon can easily escape. The amount of pore space in the soil and its permeability for airflow, including cracks and channels, are important factors determining radon concentration in soil gas and its rate of flow into a house. Soil depth and moisture content, mineral host and form for radium, and other soil properties may also be important. For houses built on bedrock, fractured zones may supply air having radon concentrations similar to those in deep soil.



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The second factor listed above is most likely the cause of high radon levels in Montour County. The majority of Montour County has high radon level test results. The areas and test results are shown in more detail in 4.3.7.3.

### **4.3.7.2 Range and Magnitude**

According to the EPA, about 21,000 lung cancer deaths each year in the U.S. are related to radon. It is the second leading cause of lung cancer after smoking and the number one cause of lung cancer among non-smokers. Radon causes lung cancer by continuing to radioactively decay after being inhaled, and turning into a daughter product (218Po, 214Pb, 214Bi) which may become attached to lung tissue and induce lung cancer due to their continued radioactive decay.

The EPA reports that the national average radon concentration of indoor air of homes is about 1.3 pCi/L, and they recommend that homes be fixed if the radon level is 4pCi/L or more. There is however no safe level of radon exposure, so the EPA also recommends considering fixing a home if the radon level is between 2 pCi/L and 4 pCi/L.

Table 32 - Radon Risk for Smokers and Nonsmokers shows the relationship between various radon levels, probability of lung cancer, comparable risks from other hazards, and action thresholds. As seen in the Table 32 - Radon Risk for Smokers and Nonsmokers below, a smoker exposed to radon has a much higher risk of lung cancer.

Table 32 - Radon Risk for Smokers and Non-Smokers

<b>Radon Risk for Smokers and Non-Smokers</b>			
<b>RADON LEVEL (pCi/L)</b>	<b>IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME...*</b>	<b>RISK OF CANCER FROM RADON EXPOSURE COMPARES TO...***</b>	<b>ACTION THRESHOLD</b>
<b>SMOKERS</b>			
20	About 260 people could get lung cancer	250 times the risk of drowning	Fix Structure
10	About 150 people could get lung cancer	200 times the risk of dying in a home fire	
8	About 120 people could get lung cancer	30 times the risk of dying in a fall	
4	About 62 people could get lung cancer	5 times the risk of dying in a car crash	
2	About 32 people could get lung cancer	6 times the risk of dying from poison	Consider fixing structure between 2 and 4 pCi/L
1.3	About 20 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2pCi/L is difficult
0.4	About 3 people could get lung cancer	(Average outdoor radon level)	
<b>NON-SMOKERS</b>			
20	About 36 people could get lung cancer	35 times the risk of drowning	Fix Structure

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<b>Radon Risk for Smokers and Non-Smokers</b>			
<b>RADON LEVEL (pCi/L)</b>	<b>IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME...*</b>	<b>RISK OF CANCER FROM RADON EXPOSURE COMPARES TO...***</b>	<b>ACTION THRESHOLD</b>
10	About 18 people could get lung cancer	20 times the risk of dying in a home fire	
8	About 15 people could get lung cancer	4 times the risk of dying in a fall	
4	About 7 people could get lung cancer	The risk of dying in a car crash	
2	About 4 people could get lung cancer	The risk of dying from poison	Consider fixing structure between 2 and 4 pCi/L
1.3	About 2 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2pCi/L is difficult
0.4	-	(Average outdoor radon level)	
<i>Note: Risk may be lower for former smokers * Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003). ** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports.</i>			

### **4.3.7.3 Past Occurrence**

In 1984, the Pennsylvania Radon Bureau responded to the newly detected high radon levels with a massive radon monitoring, educational, and remediation effort. In the start of November 1986, over 18,000 homes had been screened for radon and approximately 59% were found to have radon daughter levels in excess of the 0.020 Working Level (WL) guideline. Radon daughter levels ranged up to 13 WL or 2600 pCi/L or radon gas.

The Pennsylvania Department of Environmental Protection (PA DEP) provides information for homeowners about how to test for radon in their homes, and when they receive a test result over 4 pCi/L, the PA DEP Bureau of Radiation Protection works to help homeowners repair the home and mitigate the hazard. The DEP has estimated that the national average indoor radon concentration is 1.3 pCi/L and the level for action is 4.0 pCi/L; however, they have estimated that the average indoor concentration in Pennsylvania basements is about 7.1 pCi/L and 3.6 pCi/L on the first floor. The PA DEP records all the tests they receive and categorize them in a searchable database by zip code. There are currently 2,174 zip codes in Pennsylvania, but the zip code radon test data only covers for 986 zip codes. The missing zip codes that report in the data base as “N/A” for Insufficient Data either had fewer than thirty test results or no test results at all. *Table 33 – Radon Level Test Results in Montour County* shows there are a total of eight zip codes in Montour County where tests were reported for the PA DEP to report their findings, one of which had insufficient data. The highest average radon level was reported from the 17820 zip code, which is located in the lower end of the county, with an average reading of 21.4 pCi/L within location of the basement. Most reporting zip codes in Montour County have average basement Radon levels significantly above the suggested EPA action level of 4 pCi/L. The average basement reading for reporting zip codes in the county is 11.7 pCi/L, and the average first floor reading is 5.0 pCi/L.

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Table 33 - Radon Level Test Results in Montour County

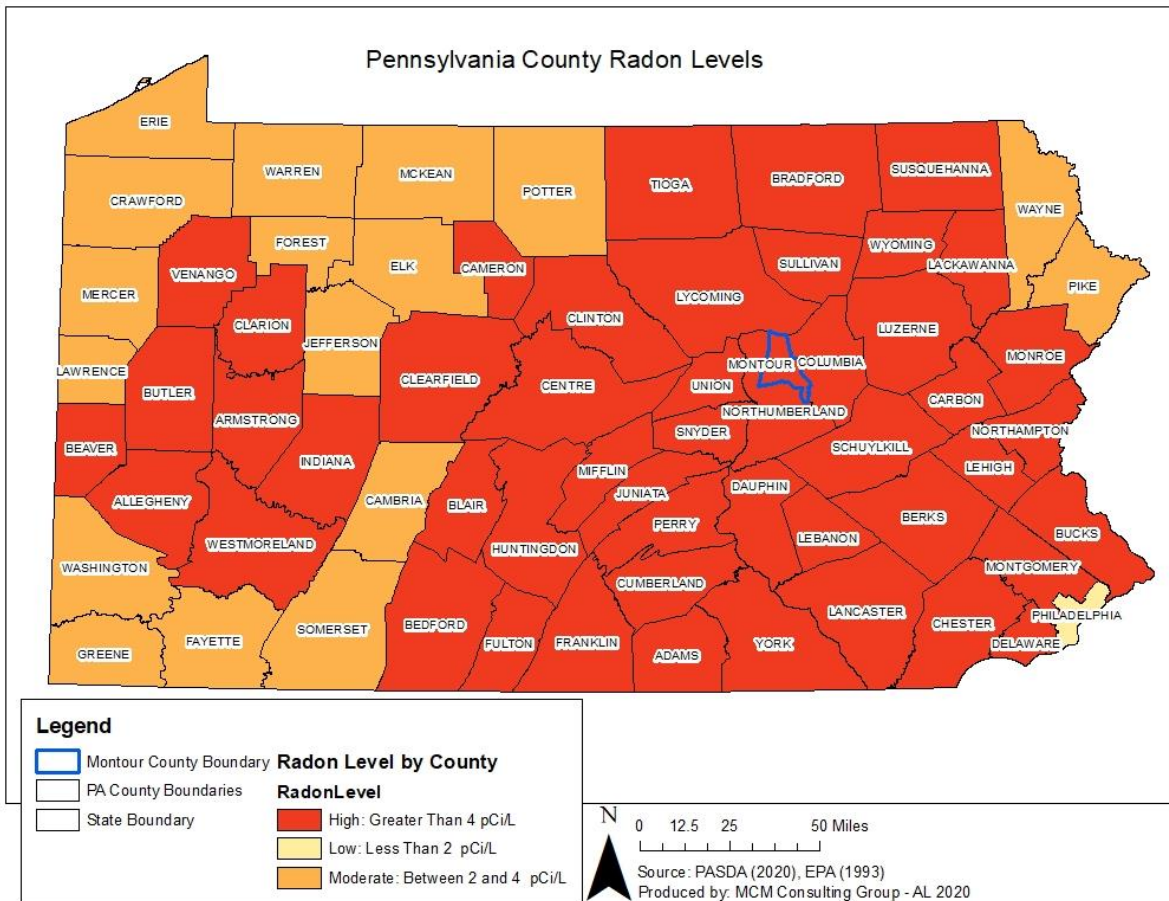
Radon Level Test Results (PA DEP, 2020)				
Zip Code	Location	Number of Tests	Max Result pCi/L	Average Result pCi/L
17821	Basement	2812	620.0	10.3
	First Floor	456	323.0	6.8
17884	Basement	N/A	N/A	N/A
	First Floor	N/A	N/A	N/A
17772	Basement	124	53.2	7.2
17815	Basement	2973	627.5	13.1
	First Floor	480	501.0	6.6
17756	Basement	784	321.0	13.1
	First Floor	187	188.3	3.6
17777	Basement	529	219.3	8.0
	First Floor	76	37.5	3.0
17820	Basement	434	269.3	21.4
	First Floor	95	79.1	6.8
17847	Basement	1105	324.4	8.5
	First Floor	165	55.6	3.3

#### 4.3.7.4 Future Occurrence

Radon exposure is inevitable given the geologic and geomorphic conditions in Montour County. The EPA and USGS have mapped radon potential in the US to help target resources and assist local governments in determining if radon-resistant features are applicable for new construction. The designations are broken down in three zones and are assigned by county, as shown in *Figure 26 - Montour County Radon Hazard Zone*. Each zone reflects the average short-term measurement of radon that can be expected in a building without radon controls. Montour County is located within Zone 1 with counties of high potential for radon which indicate great likelihood of occurrence in the future.

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Figure 26 - Montour County Radon Hazard Zone



- Zone 1 has the highest potential and readings can be expected to exceed the 4 pCi/L recommended limit.
- Zone 2 has a moderate potential for radon with levels expected to be between 2 and 4 pCi/L and
- Zone 3 has a low potential with levels expected to be less than 2 pCi/L.

Due to the great likelihood of future occurrence, the level of radon daughters should be monitored. Radon daughters are the concentration of decay products of radon in the uranium chain. Fortunately, the presence of radon daughters can be monitored through the means as radon gas. *Table 34 - Suggested Actions and Time Frame for Exposure to Radon Daughters* provides suggested actions and time frames for varying levels of exposure to radon daughters.

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Table 34 - Suggested Actions and Timeframe for Exposure to Radon Daughters

<b>Suggested Actions and Timeframes for Exposure to Radon Daughters</b>		
<b>EXPOSURE LEVEL*</b>	<b>SUGGESTED ACTION**</b>	<b>TIME FRAME FOR PLAN</b>
More than 5.0 WL***	Residents should either promptly relocate or undertake temporary remedial action to lower levels as far below 5.0 WL as possible. Smoking in high areas discouraged.	Within 2-3 days
1.0 to 5.0 WL	Residents should undertake temporary remedial action to lower levels as far below 1.0 WL as possible. Smoking in high areas discouraged.	Within 1 week
0.5 to 1.0 WL	Residents should undertake temporary remedial action to lower levels as far below 0.5 WL as possible.	Within 2 weeks
0.1 to 0.5 WL	Residents should undertake temporary remedial action to lower levels as far below 0.1 WL as possible. Higher exposure levels require action to be taken in a shorter period of time.	3 weeks to 3 months
0.02 to 0.1 WL	Residents should undertake temporary and/or permanent remedial action to lower levels below 0.02 WL. Higher exposure levels require action to be taken in a shorter period of time.	4 to 15 months
<p>*Assumes continuous 24-hour exposure in living area.</p> <p>**Home testing should be conducted at the end of the indicated time frame to determine if remedial action has reduced the exposure levels of the radon daughters below the indicated value. If remedial action has not been successful, residents should be aware of the risks associated with continuous exposure at the indicated levels.</p> <p>***Work levels of exposure to radon daughters.</p>		

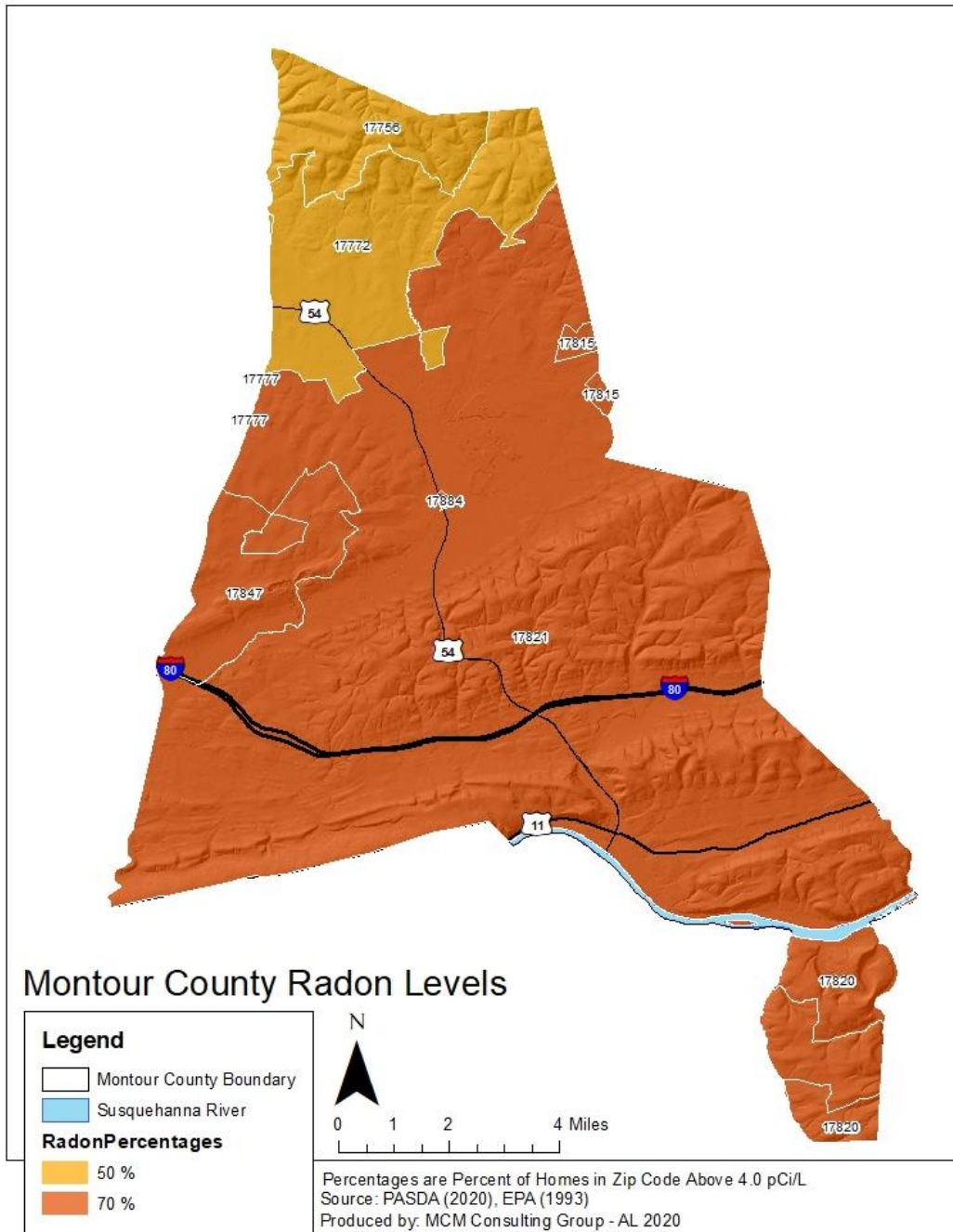
### **4.3.7.5 Vulnerability Assessment**

Proper testing for radon levels should be completed across Montour County, especially in the areas of higher incidence levels and for those individuals and households that face the contributing risks. This testing will determine the level of vulnerability that residents face in their homes, as well as in their businesses and schools.

Montour County is in the EPA Radon Hazard Zone 1, meaning there is a high risk of radon exposure. Smokers can be up to ten times more vulnerable to lung cancer from high levels of radon depending on the level of radon they are exposed to (see *Table 32 - Radon Risk for Smokers and Nonsmokers*). Additionally, older homes that have crawl spaces or unfinished basements are more vulnerable to having high radon levels. Average basement radon levels for homes who reported their results to the PA DEP are often found to be above the EPA action level of 4 pCi/L. *Figure 27 - Radon Vulnerability for Montour County* shows the best available data from the EPA about the percentage of homes with radon levels at or above the EPA action level. The EPA estimates that an average radon mitigation system costs approximately \$1,200.00. The PA DEP Bureau of Radiation Protection provide short- and long-term tests to determine radon levels, as well as information on how to mitigate high levels of radon in a building. The 2018 PA HMP estimates that there are 7,708 vulnerable buildings in Montour County that are in areas with high radon test results, and the cost to mitigate the most impacted of those buildings (an estimated 20% of them or 1,542 buildings) would be \$1,849,920.00.

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Figure 27 - Radon Vulnerability for Montour County



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### 4.3.8. Subsidence and Sinkhole

#### 4.3.8.1 Location and Extent

Subsidence potential in Montour County is primarily associated with the dissolution of carbonate bedrock such as limestone and dolomite by water. Water passing through naturally occurring fractures and bedding planes dissolves the bedrock, leaving voids below the surface. Incidentally, overburden on top of the voids collapse, leaving surface depressions, resulting in karst topography. Karst is a type of topography or landscape characterized by surface depressions, sinkholes, rock pinnacles/uneven bedrock surface, underground drainage, and caves, which are formed in carbonate rock such as limestone or dolomite. Characteristic structures associated with karst topography include sinkholes, linear depressions, and caves. Often, a subsurface solution of limestone will not result in the immediate formation of karst features. Collapse sometimes occurs only after a large amount of activity, or when a heavy burden is placed on the overlying material. Abrupt or long-term changes in the ground surface may also occur following subsurface fluid extraction (e.g., natural gas, water, oil, etc.). *Figure 28 – Sinkhole and Subsidence Vulnerability Map of Montour County* shows that a great portion of Montour County lies in an area of Pennsylvania where limestone is present near the ground surface, thus making it more susceptible to natural sinkhole development. However, there has never been a documented occurrence of subsidence or sinkhole within Montour County. Given the lack of historical data and any damages associated with subsidence/sinkholes developing effective mitigation strategies is difficult. This will be revisited in future plans if there are actual subsidence/sinkhole occurrences.

The PA DCNR created a series of interactive maps showing the density of identified karst features for most of the band of carbonate rock running through Montour County. Within this band, the density of karst features ranges from 0 to approximately 600 per square mile. There is wide variation in the size of these features. Fewer karst features have been mapped in the existing urban areas of the county. However, this is likely a result of development activities that disguise, cover, or fill existing karst features rather than an absence of the features themselves. The interactive maps can be viewed at: [www.dcnr.state.pa.us/topo-geo/index.aspx](http://www.dcnr.state.pa.us/topo-geo/index.aspx).

Human activity can also increase the risk of subsidence events. Areas with coal or other mineral deposits which have been mined using deep mining techniques may become susceptible to subsidence. Poor engineering practices used at the time of withdrawal or progressive degradation in geological stability can increase the risk of subsidence. Montour County is not susceptible to sinkholes from mining due to lack of activity within the county.

#### 4.3.8.2 Range of Magnitude

Based on the geologic formations underlying portions of Montour County, subsidence and sinkhole incidents may occur gradually or abruptly. Incidents could result in minor elevation changes or deep, gaping holes in the ground surface. Subsidence and sinkhole incidents can cause severe damage, although gradual incidents can be addressed before significant damage occurs. If long-term subsidence or sinkhole formation is not recognized and mitigation measures are not implemented, fractures or complete collapse of building foundations and roadways may result. General recommendations have been published for site investigations prior to construction of buildings due to the potential for karst subsidence. These recommendations vary depending on the rock type immediately underlying soil cover and include thorough geotechnical investigations to identify un-collapsed karst features and potential excavation to solid rock prior to construction.

Groundwater in limestone and other similar carbonate rock formations can be easily polluted because water moves readily from the Earth's surface down through solution cavities and fractures, thus undergoing very little filtration. Contaminants such as sewage, fertilizers, herbicides, pesticides, or industrial products are of concern.

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The worst-case scenario for sinkholes in Montour County would be a series of large sinkholes opening in Mahoning Township. A majority of the municipality has near-surface limestone, making it vulnerable to sinkholes. Also, the municipality has a high number of addressable structures within the limestone region of the county which could result in great damage. This series of sinkholes could close roads, cause power outages, prevent the delivery of emergency services, cause injuries or death to the township's residents, and could cause property damage. The following is a list and description of the potential environmental impacts from subsidence and/or sink holes:

- Water quality could be diminished.
- The supply of water could be depleted.
- Power lines could be damaged increasing the risk for urban and/or wildfires.
- Fuel supply lines could be damaged, causing the release of hazardous materials into the environment.

### **4.3.8.3 Past Occurrence**

To date, there has been no documented occurrence of subsidence or sinkholes within Montour. While there is karst topography within the county, it is possible that an event has occurred but has gone unnoticed due to the sparse population and large open spaces within the county. It is difficult to develop meaningful mitigation strategies for a hazard that has no documented occurrences and subsequent damages. Mitigation strategies will be developed in future HMP updates should the need arise.

### **4.3.8.4 Future Occurrence**

Based on geological conditions, the annual occurrence of subsidence and sinkhole incidents in the future for the areas of Montour County underlain by carbonate rock, such as limestone, is possible. The exact area within the county is difficult to predict due to the site-specific conditions that contribute to sinkhole development. Signs that signal potential development include but are not limited to:

- Slumping/falling fence posts, trees, or foundations
- Sudden formation of small ponds
- Wilting vegetation
- Discolored well water
- Structural cracks in walls/floors

### **4.3.8.5 Vulnerability Assessment**

The areas along the southern karst band as well as the karst formation in the western portion of the county are most vulnerable to the effects of natural subsidence incidents. Currently, there are no active sinkholes in Montour County but vulnerability within the county is continuously present. Within Montour County, there are a great number of vulnerabilities present which include population, buildings, etc. The vulnerable population in Montour County is around 9,522 while the vulnerable buildings present are 4,013. With the vulnerable buildings present, \$797,648.00 is the expected dollar value of the exposed buildings with a building value of about 43%. Although Montour is not considered to be one of the largest vulnerable populated or building exposed counties, there is still great risk and vulnerability present within Montour County. While the possibility of a sinkhole cannot be ruled out, given the lack of sinkhole activity, the likelihood of the development of a sinkhole is reasonably low.



## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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Communities within Montour County can decrease the vulnerability of subsidence or sinkholes by implementing solutions such as insurance programs, subsidence-resistant designs, land use controls, etc. Since 1987, sinkhole insurance has been available within Pennsylvania which can eliminate potential financial burdens that might be associated with the vulnerable area(s). Careful planning is the least costly and most effective method for reducing vulnerability to the potential subsidence hazards.

A portion of Montour County lies in an area of Pennsylvania where limestone is present near ground surface, thus making it vulnerable to natural sinkhole development. The more limestone present in the municipality, the higher the vulnerability. Out of the ten municipalities in the county, 60% have limestone present. Based on geology, the following municipalities are vulnerable to sinkholes:

- Cooper Township
- Danville Borough
- Liberty Township
- Limestone Township
- Mahoning Township
- Valley Township

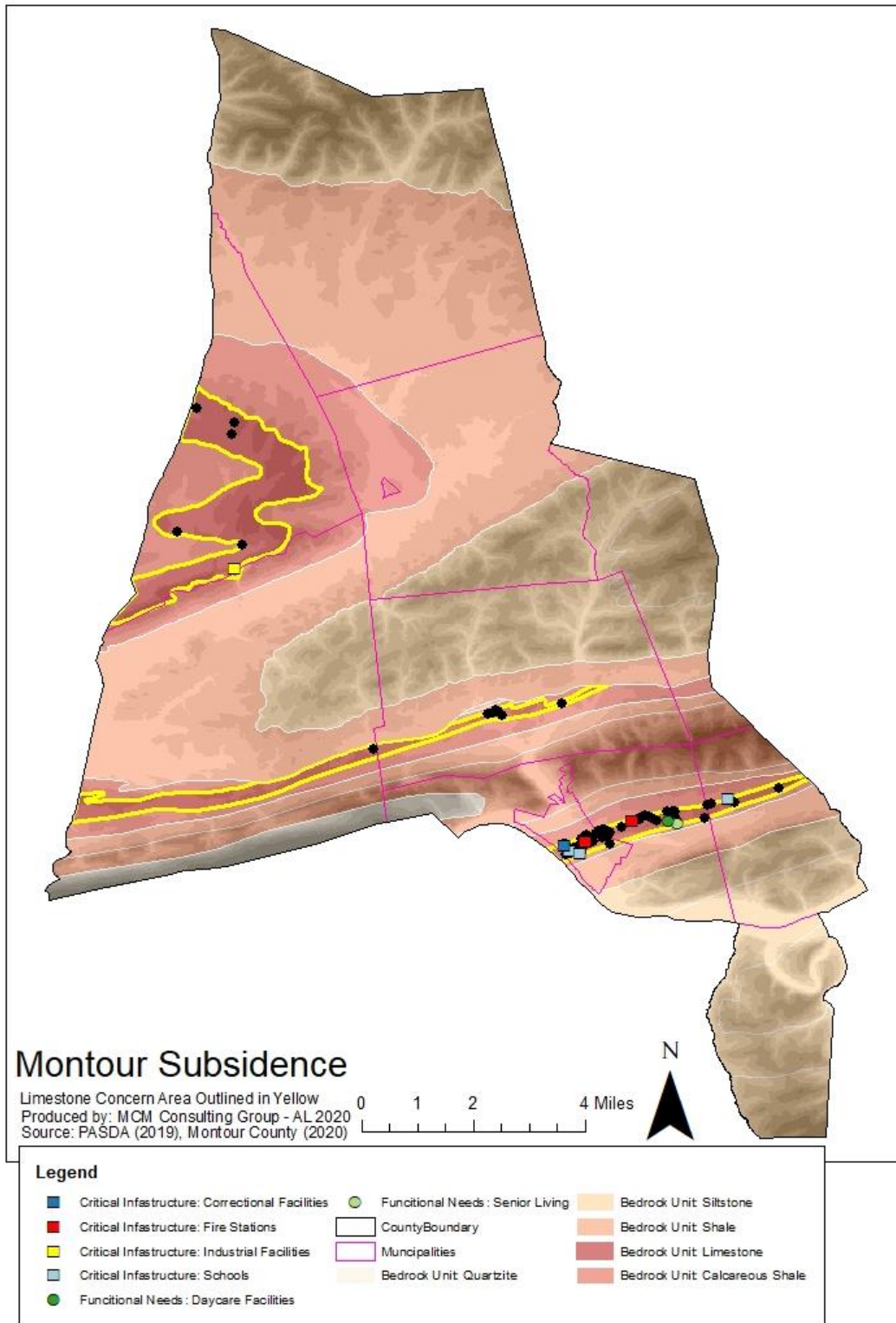
The municipalities that have great vulnerability to sinkholes, the vulnerability is due to the amount of limestone present. Within the municipalities, there are many addressable structures and critical facilities located on or near the limestone. As shown in *Table 35 – Montour County Addressable Structures and Critical Facilities in Limestone Regions*, Mahoning Township has the highest number of addressable structures. However, Danville Borough has the highest numbers of critical facilities. Both addressable structures and critical facilities cause great vulnerability within Montour County. As depicted, *Figure 28 – Sinkhole and Subsidence Vulnerability Map of Montour County* illustrates the areas of limestone within the county and each municipality. Along with limestone present, *Figure 28 – Sinkhole and Subsidence Vulnerability Map of Montour County* also demonstrates the number of addressable structures and critical infrastructures within each municipality along with the associated location.

*Table 35 - Montour County Addressable Structures and Critical Facilities in Limestone Regions*

<b>Montour County Addressable Structures and Critical Facilities in Limestone Regions</b>		
<b>Municipality</b>	<b>Number of Ad- dressable Struc- tures in Lime- stone Region</b>	<b>Number of Critical Facilities in Lime- stone Region</b>
Anthony Township	-	-
Cooper Township	41	6
Danville Borough	443	48
Derry Township	-	-
Liberty Township	15	1
Limestone Township	164	6
Mahoning Township	692	26
Mayberry Township	-	-
Valley Township	57	6
Washingtonville Borough	-	-
West Hemlock Township	-	-
<b>Totals</b>	<b>1,412</b>	<b>93</b>

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 28 - Sinkhole and Subsidence Vulnerability Map of Montour County



# Montour County, Pennsylvania

## 2021 Hazard Mitigation Plan

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### 4.3.9. Tornadoes and Windstorms

#### 4.3.9.1 Location and Extent

Tornadoes and windstorms can occur throughout Montour County, though incidents are usually localized. Severe thunderstorms may result in conditions favorable for the formation of numerous or long-lived tornadoes. Tornadoes can occur at any time during the day or night, but are most frequent during late afternoon into early evening, the warmest hours of the day, and most likely to occur during the spring and early summer months of March through June. Tornado movement is characterized in two ways: direction/speed of spinning winds and forward movement of the tornado, also known as the storm track. The width of tornadoes can vary greatly, from one hundred feet wide to over a mile, and the forward motion of tornadoes can range from speeds between zero and fifty miles per hour. The NCEI continues by reporting that, “the maximum winds in tornadoes are often confined to extremely small areas and vary tremendously over short distances,” which explains why one house may be completely demolished by a tornado and a neighboring house could be untouched. Some tornadoes never touch the ground and are short lived, while others may touch the ground several times.

Straight-line winds and windstorms are experienced on more of a region wide scale. Windstorms may be caused by thunderstorms, hurricanes, and tornadoes, but the most frequent cause of windstorms in western Pennsylvania is thunderstorms. While such winds usually accompany thunderstorms, straight-line winds are caused by the movement of air from areas of higher pressure to areas of lower pressure. Windstorms are generally defined with sustained wind speeds of 40 mph or greater, lasting for at least one hour, or winds of 50 mph or greater lasting for any duration. A microburst is a very-localized column of sinking air, capable of producing damaging opposing and straight-line winds at the surface. A wind shear is usually found when a violent weather front is moving through; wind speeds have been recorded up to one-hundred miles per hour. Wind shear is defined as a difference in wind speed and direction over a relatively short distance in the atmosphere.

#### 4.3.9.2 Range of Magnitude

Each year, tornadoes account for \$1.1 billion in damages and cause over eighty deaths nationally. 2011 was the second worst year on record for deadly tornadoes, the worst being 1936. The number of tornado reports has increased by 14% since 1950. While the extent of tornado damage is usually localized, the vortex of extreme wind associated with a tornado can result in some of the most destructive forces on Earth. Rotational wind speeds can range from 100 mph to more than 250 mph. In addition, the speed of forward motion can range from zero to fifty mph. Therefore, some estimates place the maximum velocity (combination of ground speed, wind speed, and upper winds) of tornadoes at about 300 mph. The damage caused by a tornado is a result of the high-wind velocity and windblown debris, also accompanied by lightning or large hail. The most violent tornadoes have rotating winds of 250 mph or more and are capable of causing extreme destruction and turning normally harmless objects into deadly projectile.

Damages and deaths can be especially significant when tornadoes move through populated, developed areas. The destruction caused by tornadoes ranges from minor to severe depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damages to structures of light weight construction such as mobile homes. 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, also known as the “F-Scale” that was published in 1971. It classifies U.S. tornadoes into six intensity categories based upon the estimated maximum winds occurring within the wind vortex (*Table 37 - Enhanced Fujita Scale*). Since its implementation by the National Weather Service in 2007, the EF-Scale has become the definitive metric for estimating wind speeds within tornadoes based upon damage to buildings and structures.

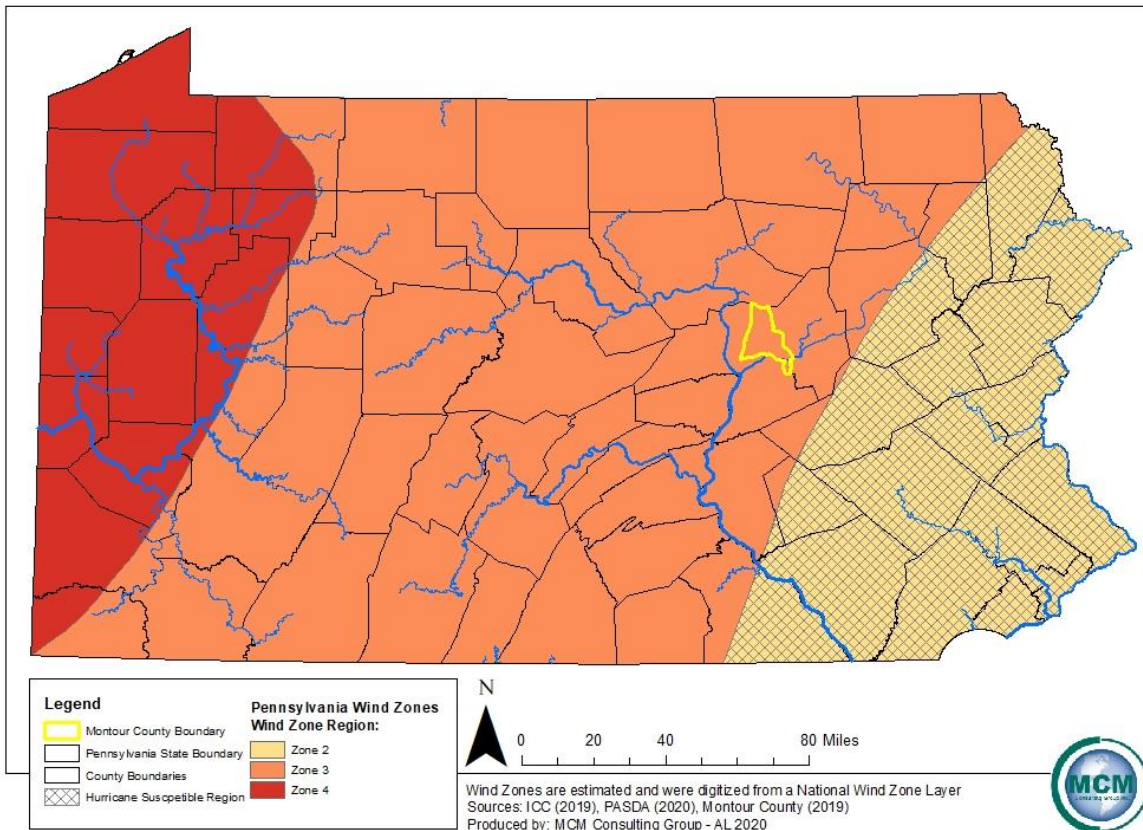
# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Previously recorded tornadoes are reported with the older F-Scale values, but *Table 37 - Enhanced Fujita Scale* shows F-Scale categories with corresponding EF-Scale wind speeds.

*Figure 29 - Pennsylvania Wind Zones* identifies wind speed zones across the state. It identifies wind speeds that could occur across the state to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities. A majority of Pennsylvania falls within Zone III, meaning that design wind speeds for shelters and critical facilities should be able to withstand a three-second gust of up to 200 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm incident. The Western portion of the state falls within the Zone IV which indicates shelters can withstand up to 250 mph winds, while the Eastern side falls within the Zone II where shelters can withstand up to only 160 mph. *Table 36 - Wind Zones and Counties Affected in Pennsylvania* identifies which county is located in specific wind zones throughout Pennsylvania. As shown on *Figure 29* and *Table 36*, Montour County is identified to be in Wind Zone III.

*Figure 29 - Pennsylvania Wind Zones*

Pennsylvania Wind Zones



## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Table 36 - Wind Zones and Counties Affected in Pennsylvania

<b>Wind Zones and Counties Affected in Pennsylvania</b>	
<b>Wind Zones</b>	<b>Counties Affected</b>
Zone I (130 mph)	N/A
Zone II (160 mph)	Berks, Bucks, Carbon, Chester, Delaware, Lackawanna, Lancaster, Lebanon, Lehigh, Luzerne, Monroe, Montgomery, Northampton, Philadelphia, Pike, Schuylkill, Wayne, York
Zone III (200 mph)	Adams, Armstrong, Bedford, Blair, Bradford, Cambria, Cameron, Centre, Clearfield, Clinton, Columbia, Cumberland, Dauphin, Elk, Fayette, Franklin, Fulton, Greene, Huntingdon, Indiana, Juniata, Jefferson, Lycoming, McKean, Mifflin, <b>Montour</b> , Northumberland, Perry, Potter, Snyder, Somerset, Sullivan, Susquehanna, Tioga, Union, Westmoreland, Wyoming
Zone IV (250 mph)	Allegheny, Beaver, Butler, Clarion, Crawford, Erie, Forest, Lawrence, Mercer, Venango, Warren, Washington

No recorded fatalities have occurred in Montour County due to tornadoes, as most of these storms have been relatively low in magnitude. However, twenty-six tornado-related injuries, most being minor in nature, have been reported over the years. The vast majority of tornadoes in Montour County are F-0 through F-1 levels. Since tornado incidents are typically localized, environmental impacts are rarely widespread. However, where these incidents occur, severe damage to plant species is likely. This includes loss of trees and an increased threat of wildfire in areas where dead trees are not removed.

Montour County falls within Zone III, meaning shelters and critical facilities should be designed to withstand a three-second gust of up to 200 mph, regardless of whether the gust is the result of a tornado, coastal storm, or windstorm event. While it is difficult to pinpoint the exact locations at the greatest risk of a tornado, the southeast, southwest, and northwest sectors of the Commonwealth are more prone to tornadoes.

Tornadoes can have varying secondary effects. The most common is power failure. The severe wind can dismantle power sources and cause significant structural damage. Hazardous material spills can occur if a tornado comes near a holding tank, or the spill stems from a traffic accident caused by high winds. Windstorms of all types have caused the following problems within Montour County:

- Power failures lasting four hours or longer.
- Loss of communications networks lasting four hours or more.
- Residents requiring evacuation or provision of supplies or temporary shelter.
- Severe crop loss or damage.
- Trees down or snapped off high above the ground/tree debris-fire fuel.
- Toppled high profile vehicles, including those containing hazardous materials.

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Table 37 - Enhanced Fujita Scale

Enhanced Fujita Scale			
EF-Scale Number	Wind Speed (MPH)	F-Scale Number	Description of Potential Damage
<b>EF0</b>	65–85	F0-F1	<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.
<b>EF1</b>	86-110	F1	<b>Moderate damage:</b> Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
<b>EF2</b>	111–135	F1-F2	<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.
<b>EF3</b>	136–165	F2-F3	<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.
<b>EF4</b>	166–200	F3	<b>Devastating damage:</b> Well-constructed houses and whole frame houses completely leveled; cars thrown and small projectiles generated.
<b>EF5</b>	>200	F3-F6	<b>Extreme damage:</b> Strong frame houses leveled off foundations and swept away; automobile-sized projectiles fly through the air in excess of 100 m (300 ft.); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation.

### 4.3.9.3 Past Occurrence

Montour County has experienced numerous tornadoes since 1979 and wind incidents since 1963 (see *Table 38 - Tornado History*). There have been seventy-four high-wind incidents recorded in Montour County since 1963. Most often these are the result of intense thunderstorms, which often fell trees and damage power lines, causing power outages in some areas. Historically, the county has experienced both severe windstorms and tornadoes. Montour County averages about seven damaging windstorms each year. There have been four tornado incidents recorded in Montour County since 1979. The most recent tornado impacts in Montour County occurred on April 1, 1998 when an F0 was reported within the county. The most damaging tornado to affect Montour County was an F1 on May 23, 1983 which was reported to have caused \$250,000.00 in damages. From a relatively low magnitude tornado, the damages were great. The most recent wind incident in Montour County occurred in May 2020 when a 43-magnitude wind was reported. The most damaging wind incident to affect Montour County was on June 20, 2001 which was reported to have caused \$500,000.00 in damages. See *Tables 38 – Tornado History, Table 39 - High Wind History, and Figure 30 - Past Tornado Occurrences in Montour County* below.

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Table 38 - Tornado History

<b>Montour County Tornado History (NOAA NCEI, 2020)</b>					
<b>Location</b>	<b>Date</b>	<b>Magnitude (F/EF Scale)</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damage</b>
Montour County	10/3/1979	F1	0	0	\$25,000.00
Montour County	5/23/1983	F1	0	0	\$250,000.00
Montour County	7/17/1992	F0	0	0	\$0
Montour County	4/1/1998	F0	0	0	\$0
<b>Totals</b>	<b>4 events</b>		<b>0</b>	<b>0</b>	<b>\$275,000.00</b>

Table 39 - High Wind History

<b>Montour County High Wind History (NOAA NCEI, 2020)</b>				
<b>Location</b>	<b>Date</b>	<b>Mag. (knots)</b>	<b>Injuries</b>	<b>Property Damage</b>
Montour County	5/9/1963	0	0	\$0
Montour County	8/6/1968	0	0	\$0
Montour County	3/26/1970	0	0	\$0
Montour County	6/18/1970	0	0	\$0
Montour County	7/15/1970	0	0	\$0
Montour County	6/10/1974	0	0	\$0
Montour County	8/26/1975	0	0	\$0
Montour County	8/11/1980	0	0	\$0
Montour County	6/24/1989	0	5	\$0
Montour County	6/27/1989	0	0	\$0
Montour County	11/20/1989	0	0	\$0
Montour County	6/12/1994	0	0	\$50,000.00
Montour County	7/6/1994	0	0	\$0
Danville	11/11/1995	0	0	\$0
Danville	4/23/1996	N/A	0	\$0
Danville	5/19/1997	51	0	\$0
Danville	7/18/1997	51	0	\$0
Mooresburg	8/16/1997	52	0	\$0
Danville	8/16/1997	51	0	\$0
Danville	5/29/1998	51	0	\$0
Danville	5/31/1998	51	0	\$0
Mooresburg	6/2/1998	51	0	\$0
Danville	6/16/1998	52	0	\$0
Danville	6/30/1998	51	0	\$0
Washingtonville	9/2/1998	51	0	\$0
Danville	9/7/1998	51	0	\$0

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<b>Montour County High Wind History (NOAA NCEI, 2020)</b>				
<b>Location</b>	<b>Date</b>	<b>Mag. (knots)</b>	<b>Injuries</b>	<b>Property Damage</b>
Danville	9/27/1998	51	0	\$0
Danville	5/24/1999	N/A	0	\$5,000.00
Danville	6/7/1999	N/A	0	\$1,000.00
Danville	7/9/1999	N/A	0	\$10,000.00
Danville	8/14/1999	N/A	0	\$10,000.00
Danville	9/30/1999	N/A	0	\$5,000.00
Danville	6/2/2000	N/A	0	\$3,000.00
Danville	6/11/2000	N/A	0	\$5,000.00
Danville	6/21/2000	N/A	0	\$2,000.00
Washingtonville	6/20/2001	N/A	0	\$1,000.00
Washingtonville	6/20/2001	N/A	0	\$500,000.00
Exchange	8/19/2001	50	0	\$0
Danville	3/9/2002	50	0	\$0
Danville	4/28/2002	50	0	\$0
Danville	7/21/2003	50	0	\$0
Danville	5/26/2004	50	0	\$0
Danville	5/27/2004	50	0	\$0
Danville	6/17/2004	50	0	\$0
Danville	6/17/2004	50	0	\$0
Danville	7/27/2005	50	0	\$0
Danville	11/6/2005	50	0	\$0
Danville	4/24/2006	50	0	\$0
Danville	12/1/2006	50	0	\$0
Mansdale	6/8/2007	50	0	\$0
Mansdale	6/27/2007	50	0	\$0
New Columbia	6/27/2007	50	0	\$0
Danville	6/27/2007	50	0	\$0
Paxinos	8/25/2007	52	0	\$40,000.00
Mansdale	9/30/2010	50	0	\$5,000.00
Washingtonville	4/26/2011	50	0	\$5,000.00
Danville	5/27/2012	50	0	\$5,000.00
Danville	6/22/2012	50	0	\$5,000.00
Danville	4/19/2013	50	0	\$5,000.00
Danville	7/3/2014	50	0	\$1,000.00
Danville	7/13/2014	50	0	\$1,000.00
Exchange	2/24/2016	50	0	\$0
Mooresburg	7/24/2017	52	0	\$8,000.00



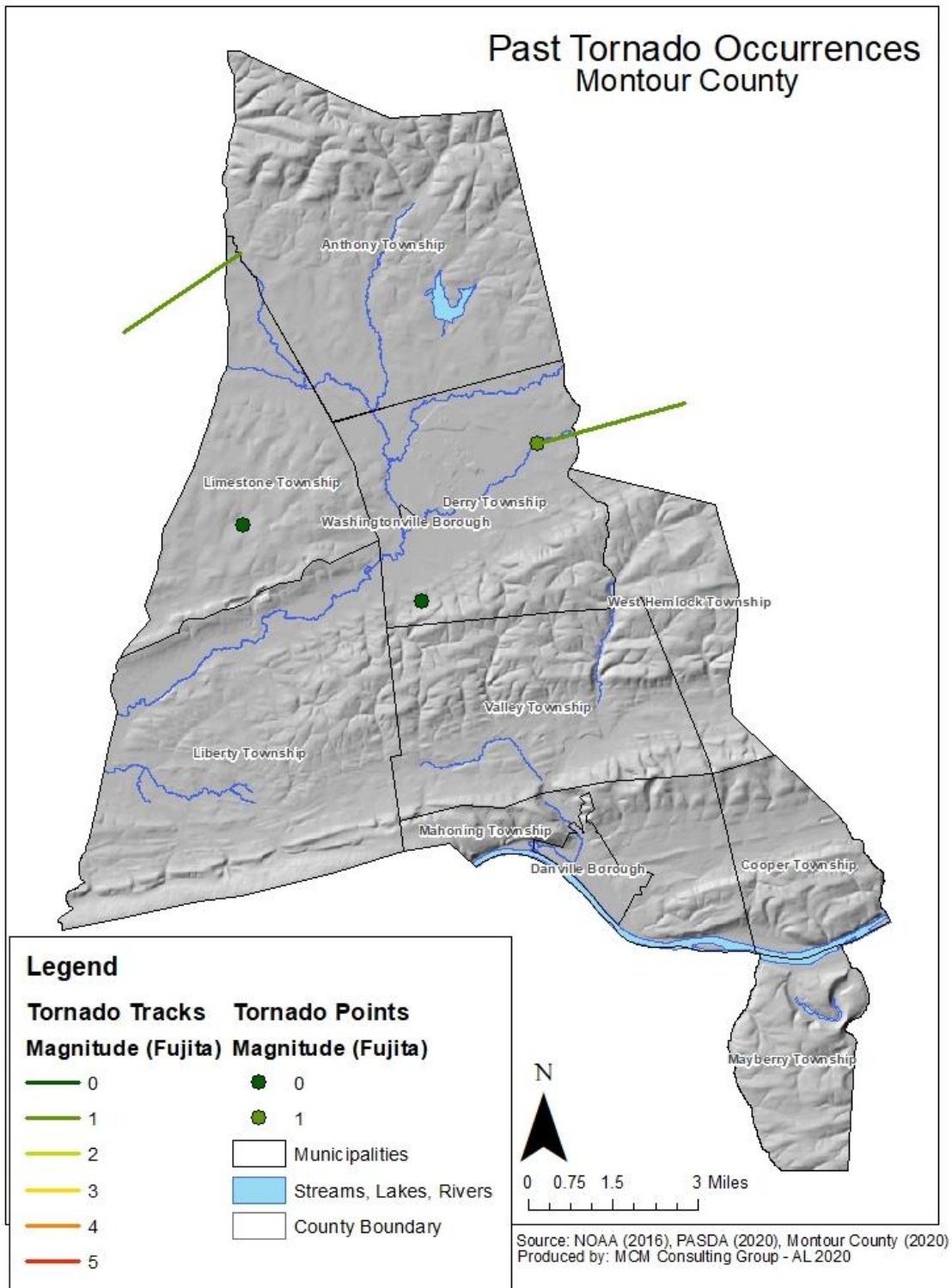
## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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<b>Montour County High Wind History (NOAA NCEI, 2020)</b>				
<b>Location</b>	<b>Date</b>	<b>Mag. (knots)</b>	<b>Injuries</b>	<b>Property Damage</b>
Danville	7/24/2017	52	0	\$4,000.00
Danville	8/4/2017	52	0	\$0
Danville	8/19/2017	52	0	\$1,000.00
Ridgeville	8/19/2017	52	0	\$1,000.00
Danville	5/15/2018	70	0	\$10,000.00
Danville	5/15/2018	70	0	\$10,000.00
Danville	5/15/2018	78	0	\$0
Danville	6/18/2018	52	0	\$2,000.00
Limestoneville	4/14/2019	91	0	\$300,000.00
Washingtonville	8/2/2019	52	0	\$1,000.00
Schuyler	5/29/2020	43	0	\$1,000.00
<b>Totals</b>	<b>74 events</b>		<b>5</b>	<b>\$997,000.00</b>

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 30 - Past Tornado Occurrences



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### **4.3.9.4 Future Occurrence**

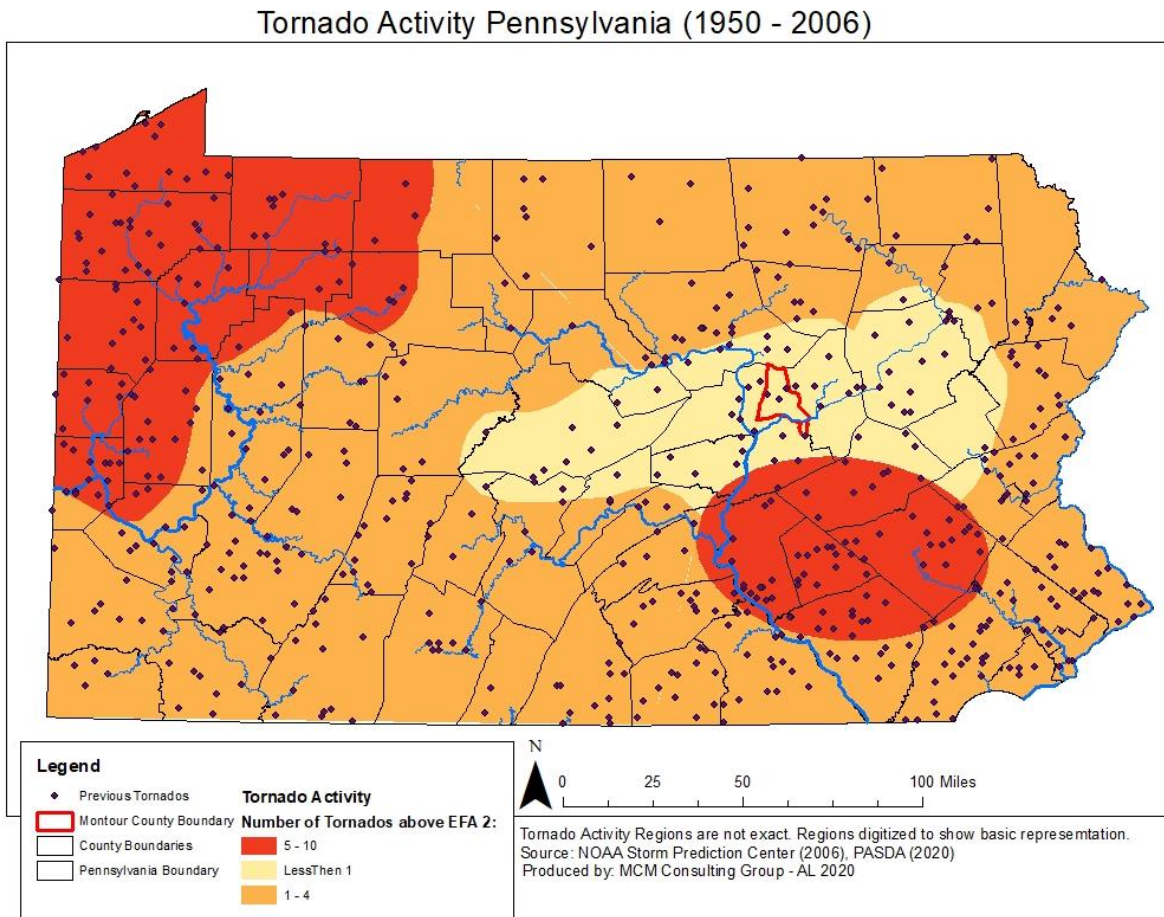
According to the National Weather Service, the Commonwealth of Pennsylvania has an annual average of ten tornadoes with two related deaths. While the chance of being hit by a devastating tornado in Montour County is slim, the damage that results when the tornado arrives can be catastrophic. An EF-5 tornado with a 0.019% 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. The number of windstorms and tornadoes occurring in the county is expected to remain constant. As the county’s population continues to grow and as residential and commercial construction continues, the number of people and properties will be greatly affected by tornadoes and windstorms as they increase accordingly.

Based on historic patterns, tornadoes are unlikely to remain on the ground for long distances, especially in areas of the county with hilly terrain. However, the high historical number of windstorms with winds at or over 50 knots indicates that the annual chance of a windstorm in the county is higher. According to FEMA, there is high probability (~92%) each year that Montour County will experience winds of 45 mph - 77 mph; however, there is under a 10% chance of winds of 78 mph - 118 mph and the risk declines even more dramatically as higher wind speeds are calculated. The number of days when tornadoes occur in the United States has decreased; however, there has been an increase in tornado activity on those days. The tornado season has also been lengthening, with the season starting earlier than it has historically. Pennsylvania had, for example, a record number of tornados in April and May 2019 compared to any other April or May on record.

Based on historical incidents between 1950 and 2006, there are three zones in Pennsylvania that experience <1, 1 to 4, and 5 to 10, F3, F4, and F5 tornadoes per 3,700 square miles. Communities in Montour County, as shown in the *Figure 31 - Tornado Activity in Montour County* below, are expected to have less than one tornado annually.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 31 - Tornado Activity in Montour County



### 4.3.9.5 Vulnerability Assessment

Tornadoes can occur at any time of the year, though they are more likely during peak months, which are during the summer for the northern part of the United States. Tornadoes are most likely to occur between 3 p.m. and 9 p.m. but have been known to occur at all hours of the day or night. While the frequency of windstorms and minor tornadoes is expected to remain relatively constant, vulnerability increases in more densely developed areas. Factors that impact the amount of damage caused by a tornado are the strength of the tornado, the time of day and the area of impact. Usually, such distinct funnel clouds are localized phenomena impacting a small area; however, the high winds of tornadoes make them one of the most destructive natural hazards. There can be many secondary impacts of tornadoes and windstorms, including transportation accidents, hazardous material spills, flooding, and power outages. A proper warning system is vital for the public to be informed of what to do and where to go.

Dangers that accompany thunderstorms which can produce tornadoes:

- Flash floods – with 146 deaths annually nationwide.
- Lightning – 75 - 100 deaths annually nationwide.
- Damaging straight-line winds – reaching 140 mph wind speed.

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- Large hail – can reach the size of a grapefruit and causes several \$100 million in damages annually to property and crops.

Since high-wind incidents may affect the entire county, it is important to identify specific critical facilities and assets that are most vulnerable to the hazard. Critical facilities are highly vulnerable to high windstorms. While many severe storms can cause exterior damage to structures, tornadoes can also completely destroy structures, along with their surrounding infrastructure, abruptly halting operations. Tornadoes are often accompanied by severe storms which can be threatening to critical facilities within the county. Many critical facilities are particularly vulnerable to power outages which can leave facilities functionless, potentially crippling infrastructure supporting the population of the county. With a storm’s ability to destroy structures, citizens and their possessions are often left at the will of the storm. The elderly and disabled, and non-English speaking residents are at risk when faced with tornadoes. Without assistance to evacuate or difficulty understanding public information, they may be unable to prepare themselves or their homes and other possessions to safely weather the storm. Due to their lightweight and often unanchored design, commercial trailers and mobile homes are also extremely vulnerable to high winds/tornadoes and will generally sustain the most damage. These structures represent a small percentage of the occupied structures within the county. Locations of mobile home parks in Montour County can be found in *Table 40 – Vulnerable Mobile Homes in Montour County*.

*Table 40 - Vulnerable Mobile Homes in Montour County*

<b>Vulnerable Mobile Homes in Montour County</b>		
<b>Municipality</b>	<b>Number of Mobile Homes</b>	<b>Location</b>
Danville Borough	47	Fisher Ct.
Derry Township	117	Blue Springs Ter.
Cooper Township	48	Pepper Hills Dr.
Cooper Township	6	Canary Dr.
Cooper Township	53	Adams Dr.
Cooper Township	5	Office Dr.

The local economy is also vulnerable due to possibility of being crippled by tornadoes and windstorms and their secondary effects when buildings and supporting infrastructure are destroyed in the storm. Power outages can create work stoppages while transportation accidents and road closures can limit the transportation of goods and services. Additionally, flooding cannot be discounted as it can destroy the physical structures, merchandise, and equipment essential for business operation. In the case of hazardous material spills caused by windstorms, the local environment can also be negatively impacted, requiring extensive clean-up, and mitigation efforts.

## **4.3.10. Wildfire**

### **4.3.10.1 Location and Extent**

The most prevalent causes of devastating wildfires are droughts, lightning strikes, arson, human carelessness, and in rare circumstances, spontaneous combustion. Most fires in Pennsylvania are caused by anthropogenic fires such as debris burns that spread and get out of control. A fire, started in somebody’s backyard, could travel through dead grasses and weeds into bordering woodlands starting a wildfire. Major urban fires can cause significant property damage, loss of life, and residential or business displacement. While wildfires are a natural and essential part of many native Pennsylvania ecosystems (e.g., pitch pine – scrub oak woodlands), wildfires can also cause devastating damage if they are undetected and allowed to propagate unfettered. Wildfires most often occur in less developed areas such as open fields, grass, dense brush or

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

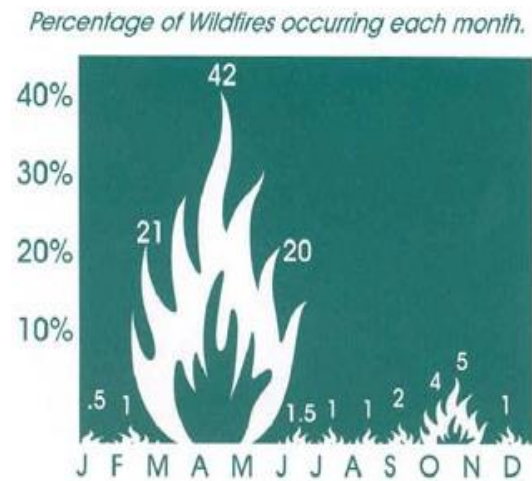
forests where they can spread rapidly by feeding off of vegetative fuels. Wildfires are most prevalent under prolonged dry and hot spells, or generally drought conditions. The greatest potential for wildfires (83% of all Pennsylvania wildfires) occur in the spring months of March, April, and May, and the autumn months of October and November. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris and increasing wildfire vulnerability. In the fall, the surplus of dried leaves is fuel for fires. *Figure 32 – Seasonal Wildfire Percentage* shows the wildfire percentage occurrence during each month occurring in Pennsylvania.

Because half of Montour County is covered by farmland, the potential geographic extent of wildfire in Montour is quite high. Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands. The greatest potential for wildfires is in the spring months of March, April, and May, and the autumn months of October and November. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. In the fall, dried leaves are also fuel for fires. Ninety-eight percent of wildfires in Pennsylvania are caused by people, most frequently by debris burns (DCNR, 2019).

For recreational enjoyment, the county boasts several local parks and three natural areas (Montour Preserve, Hopewell Park and Hess Recreation Area) that include a series of trail systems – all at risk for wildfire.

### 4.3.10.2 Range and Magnitude

Figure 32 - Seasonal Wildfire Percentage



Forested areas, croplands and properties that are at the interface between wild lands and human development are most at risk for being impacted by and causing wildfires. If an urban fire or wildfire is not contained, secondary impacts such as power outages may result. Other negative impacts of wildfires include killing people, livestock, fish and wildlife and destroying valuable property, timber, forage, recreational and scenic values. Wildfires can also cause severe erosion, silting of stream beds and reservoirs, and flooding due to a loss of ground cover.

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 country and affect vast areas of land and residential areas, most of the

fires in Montour County are contained before they cause any damage or extensive property loss. However, the county recognizes that wildfires of some magnitude will continue to occur in Montour County, and will have more devastating effects if development in or around the natural areas increases.

The United States Forest Service utilizes the Forest Fire Assessment System to classify the dangers of wildfire. *Table 41 – Wildland Fire Assessment System* identifies each threat classification and provides a description of the level.

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Table 41 - Wildland Fire Assessment System

<b>Wildland Fire Assessment System (U.S. Forest Service)</b>	
<b>Rank</b>	<b>Description</b>
<b>Low (L)</b>	Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering and burn in irregular fingers. There is little danger of spotting.
<b>Moderate (M)</b>	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur but is not persistent. Fires are not likely to become serious and control is relatively easy.
<b>High (H)</b>	All fine dead fuels ignite readily, and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are attacked successfully while small.
<b>Very High (VH)</b>	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.
<b>Extreme (E)</b>	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

### **4.3.10.3 Past Occurrence**

The State Department of Natural Resources (DCNR) has an extensive history of reported wildfires in its state forestry system and districts. Historically, Montour County experiences only a small number of these types of fires annually with all fires being relatively small. However, due to the many acres of farmland and open space in the county, under the right conditions the potential exists for a significant wildfire. Montour County lies entirely within the Weiser Forest District (District 18) of PA DCNR’s Bureau of Forestry. This district encompasses Northumberland, Montour, Columbia, Luzerne, and Sullivan counties. In 2019, there were seventy-three total fires in District 18 that were responsible for destroying 51.3 acres.

District 18 reports the following seventeen-year wildfire summary, which indicates wide fluctuations between years, and no observed downward or upward trend:

- In 2019, there were seventy-three wildfires burning 51.3 acres.
- In 2017, there were seventy-five wildfires burning 334.6 acres.
- In 2017, there were 143 wildfires burning 135.2 acres.
- In 2015, there were **128 wildfires burning 2,070.7 acres, nearly half of all acreage by wildfire in the commonwealth.**

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- In 2014, there were 122 wildfires burning 216.3 acres.
- In 2013, there were 134 wildfires burning 111.2 acres.
- In 2012, there were 150 wildfires burning 502.6 acres.
- In 2011, there were forty-one wildfires burning 41.2 acres.
- In 2010, there were ninety-four wildfires burning 128.7 acres.
- In 2009, there were 112 wildfires burning 312 acres.
- In 2008, there were 143 wildfires burning 498.2 acres.
- In 2007, there were 104 wildfires burning 20.9 acres.
- In 2006, there were 157 wildfires burning 1,555.5 acres.
- In 2005, there were 135 wildfires burning 447.3 acres.
- In 2004, there was forty-five wildfires burning 43.9 acres.
- In 2003, there were sixty-nine wildfires burning 190.7 acres.

Far and away, the primary cause of the wildfires is consistently listed as “debris burning”. See more detail at the following link:

[http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr\\_20033433.pdf](http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20033433.pdf)

In recent years, the number of prescribed burns in Pennsylvania has been increasing. This corresponds to an embrace of the need for fire in many natural ecosystems and management strategies for reducing vulnerability to wildfire; it also improves hunting opportunities. In July 2020 there were dozens of prescribed burns in State Game Lands at the time of the writing of this plan, but only one on Game Lands in Montour County was listed (PA Prescribed Fire Council, 2020).

#### **4.3.10.4 Future Occurrence**

Annual occurrences of urban and wildfires in Montour County are expected. Urban fires are most often a result of human errors, outdated wiring or occasionally malintent (arson). The occurrence of large scale and intensity wildfires is somewhat unpredictable and highly dependent on environmental conditions and human response. Weather conditions play a major role in the occurrence of wildfires, so in the event of drought conditions, wildfire caution should be heightened. Any fire without the quick response or attention of firefighters, forestry personnel, or visitors to the forest, has the potential to become a wildfire. The Montour County Emergency Management Agency coordinates county-wide burn bans when the conditions are ideal for wildfires. Public information and press releases are issued to help decrease the risk of a major fire and may reduce the possibility of future occurrences. The Montour County Emergency Management Agency disseminates all red flag warnings.

Climate change is expected to bring an elongated wildfire season and more intense and long-burning fires (Pechony & Shindell, 2010). Unfortunately, in some regions of the United States, this is not a hypothetical, but a devastating reality – Northern California has experienced unprecedentedly devastating wildfires in 2017, 2018, 2019 and 2020, and the fires are thought to be burning faster and hotter due to worsening drought conditions caused by climate change (Cvijanovic et al., 2017). Wildfire conditions in Pennsylvania are not nearly as severe as in Northern California currently, but the intensification is a signal that the changes brought by climate change are not to be ignored. In Pennsylvania, higher air temperatures and earlier warming in the spring are expected to continue, resulting in more wildfire prone conditions in the summer and fall (Shortle et al., 2015).

#### **4.3.10.5 Vulnerability Assessment**

The size and impact of a wildfire depends on its location, climate conditions and the response of firefighters. If the right conditions exist, these factors may often mitigate the effects of wildfires; however, during a



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drought, wildfires can be devastating. The highest risk for wildfires in Pennsylvania occurs during the spring (March–May) and fall (October–November) months and 99% of all wildfires in Pennsylvania are caused by people (DCNR). Firefighters and other first responders can encounter life-threatening situations due to forest fires. Traffic accidents during a response and the impacts of fighting the fire once on scene are examples of first responder vulnerabilities.

The Wildland Urban Interface (WUI) was nationally mapped by a United States Department of Agriculture Forest Service effort in 2015 that used data from 1990-2010 to develop a robust dataset that relates housing density and vegetative density. The dataset provides a way to help identify locations where larger numbers of humans are living in or near natural areas that could be at risk in the event of a wildfire. The WUI defines two types of communities – interface and intermix: intermix WUI refers to areas where housing and wildland vegetation intermingle, and interface WUI refers to areas where housing is in the vicinity of a large area of dense wildland vegetation (Martinuzzi et al., 2015). The WUI was the fastest-growing land use type in the United States between 1990 and 2010. Factors behind the growth include population shifts, expansions of cities into wildlands, and new vegetation growth. The primary cause has been migration of people, not vegetation growth.

Pennsylvania is among the states with the largest area of WUI and the most housing units in a WUI designated area. Pennsylvanians desire the proximity of natural beauty in their daily lives, and the growth in WUI housing noted above shows it. *Figure 34 – Wildland Urban Interface* shows the total Montour County addressable structures and critical facilities that are located in, near, adjacent to or among state game lands, state parks, state forests and local parks and other locations designated by the Wildland Urban Interface. Wildfire hazard is defined based on conditions that affect wildfire ignition and/or behavior such as fuel, topography, and local weather. Cells in the chart that have a zero numerical entry had zero vulnerable addressable structures or critical facilities according to this analysis at that time. The many addressable structures in the Wildland Urban Interface and Intermix zone are broken up by assessed parcel use codes – the “other” land use is comprised of Industrial, Agriculture, Service, Transportation, Communication, Utility, Natural Resources, and other Land uses.

Several citations, including one from the U.S. Department of Agriculture Forest Service, indicate a better data driven WUI model will be available soon; if available, that data will be included in the 2022 Montour County Hazard Mitigation Plan Annual Update. As a complement to that upcoming data, *Figure 32 – Fire Departments and Forested Areas* shows the locations of fire departments in relative proximity (or lack thereof) to natural areas which represent vast swatches of forests and farmland within the county.

There are five fire departments that service Montour County, a list of which can be seen in Table 4.3.15.5 of the *Emergency Services* profile. Each fire department conducts its own schedule of in-house training sessions for its members.

However, the likelihood that fire services will fail is a real threat to county communities’ safety. Many communities have already experienced the unfortunate fact that services have failed. It is recommended that each municipality assess their own vulnerabilities by maintaining and building a relationship with their local providers to make the determination and begin to plan accordingly if a local service were to shut down its operation. The statistics, response times and call times associated with all units dispatched are easily obtainable from the local 9-1-1 center.

These departments must be supported to create and or discover new ways to not only recruit but to retain volunteers. If left unattended, the issues will continue and the lack of response will grow, leaving the community more vulnerable to loss of life and loss of property to the threat of wildfire.

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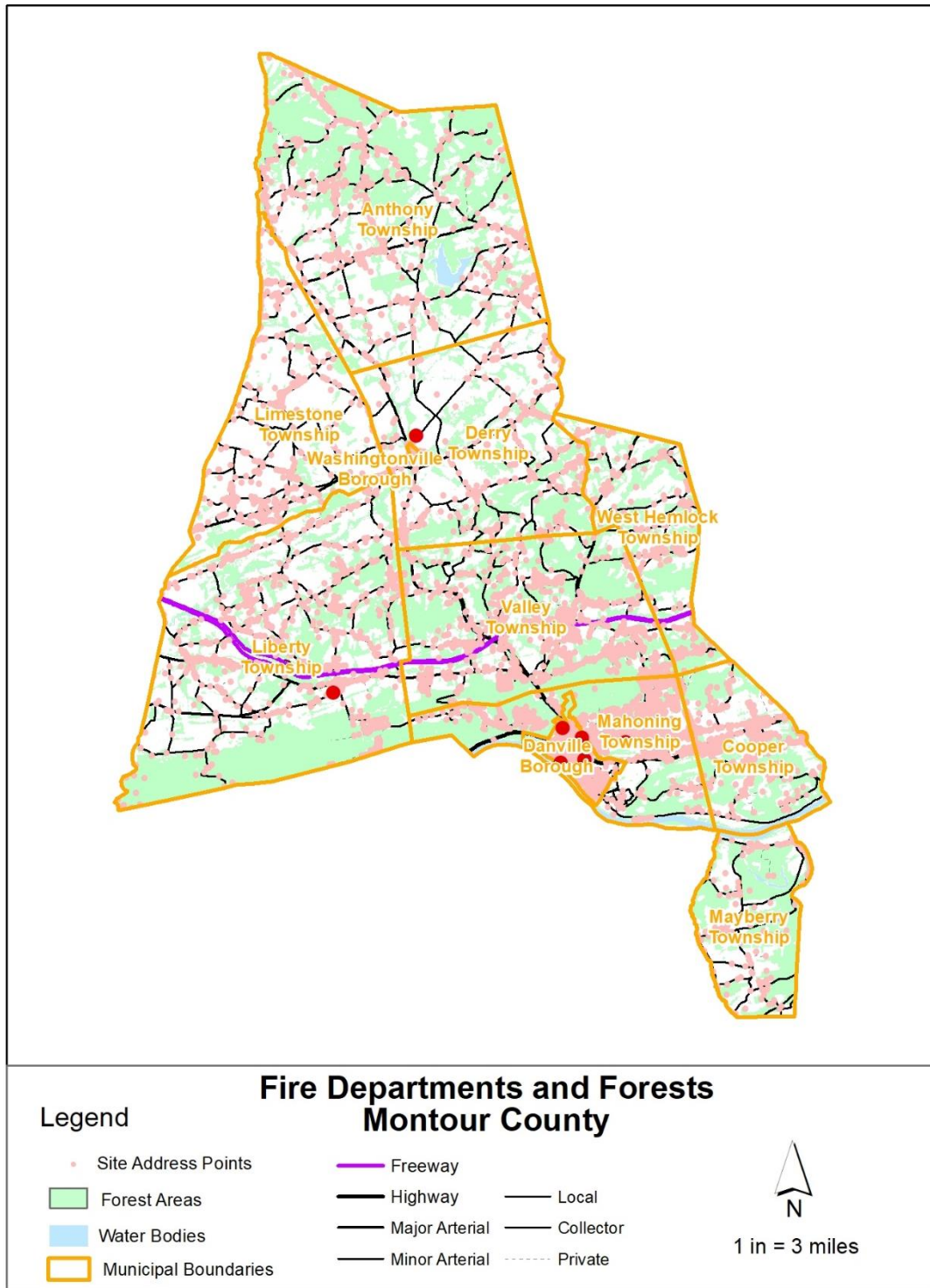
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At the time of this writing, it is possible the continuing or resurgent COVID-19 pandemic will impact the availability of firefighters, too.

It is recommended that the entire community be educated on the perpetual needs associated with providing these services. In addition, continued efforts to inform the state legislature could prove to be paramount in assuring these services remain in operation into the future. At the time of the writing of this plan, a flurry of bills had been introduced in both the House of Representatives and the Senate as a result of a two-year study initiated by Senate Resolution 6 (SR 6). The final report can be found here: <http://pehsc.org/wp-content/uploads/2014/05/SR-6-REPORT-FINAL.pdf>

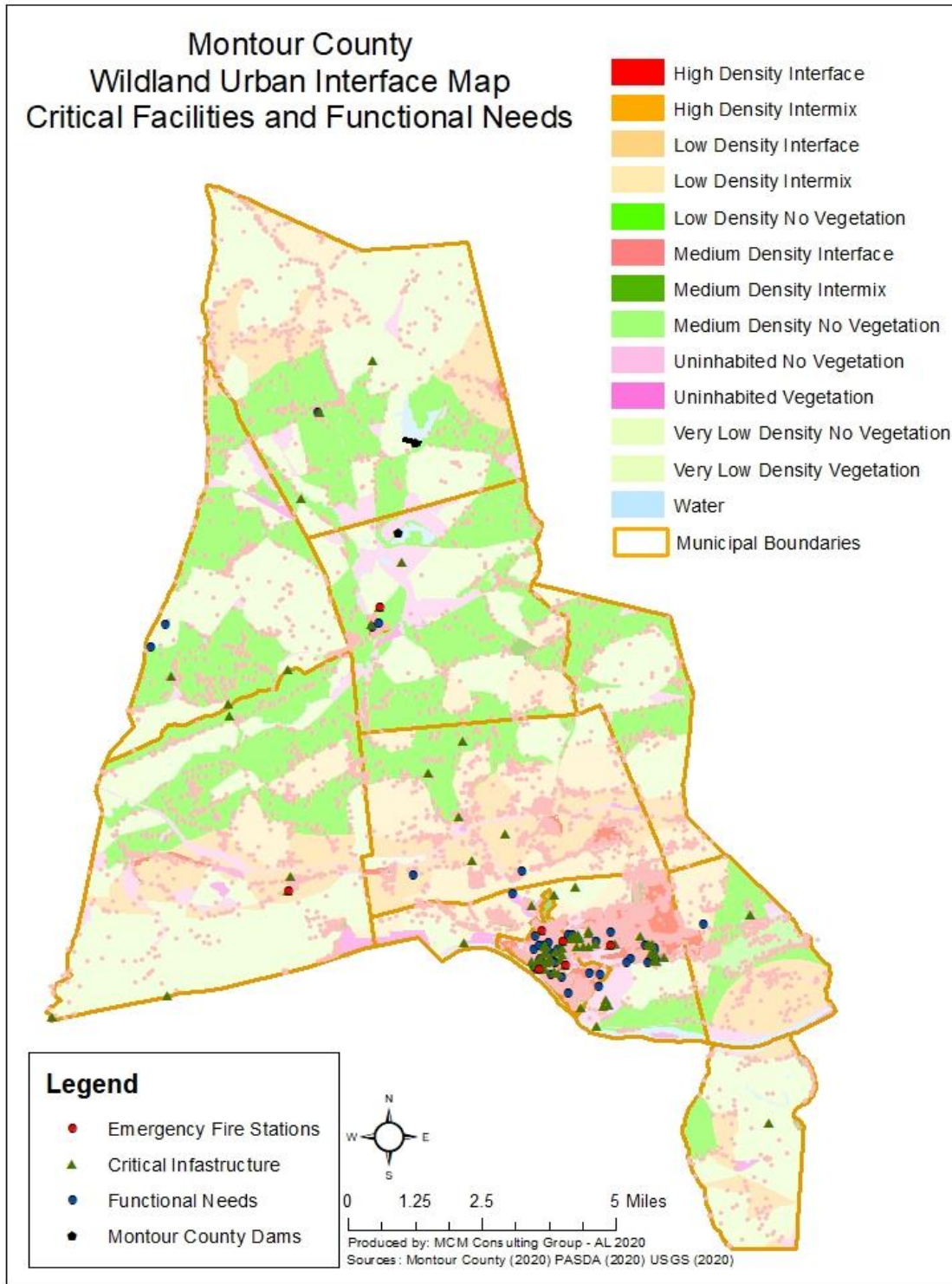
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Figure 33 - Fire Departments and Forested Areas



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Figure 34 - Wildland Urban Interface Locations



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### 4.3.11. Winter Storms

#### 4.3.11.1 Location and Extent

There is an average of thirty-five winter weather events that impact Pennsylvania each year. Such winter storms are regional events, so each county in Pennsylvania shares these hazards; however, the northern tier, western counties and mountainous regions generally experience storms more frequently and with a greater severity due to lake effects and geographic influence. Within Montour County there are variations in the average amount of snowfall that is received throughout the county because of differences in terrain; higher elevations experience greater snowfalls than lower-lying areas.

On occasion Montour County can be affected by a Nor'easter, depending on its track. A Nor'easter is a storm characterized by a central low-pressure area that deepens dramatically as it moves northward along the U.S. East Coast. The name came from the strong northeast winds that precede and accompany the storm as it passes over New England. Nor'easters are notorious for producing heavy snow in the Central and Northeastern Mountains (including the Alleghenies), but typically make lighter snow (or even no snow) for counties in the west. Nor'easters will ordinarily produce a heavy, wet snow. There is usually a fairly consistent demarcation between rain, mixed precipitation, and snow which moves along with the storm and generally parallel to the track of the surface low. The demarcation typically pivots with the storm as the track changes direction. The mixed precipitation and rainfall are generated when warmer marine air is pulled into the storm. The heaviest snow in a Nor'easter falls to the north and west of the track of the surface low (NWS).

#### 4.3.11.2 Range of Magnitude

Winter storms consist of cold temperatures, heavy snow or ice and sometimes strong winds. Descriptions of types of winter storms can be found in *Table 42 - Winter Weather Events*. Montour County generally experiences one or more significant winter storms each year. The storms come in the form of snow, freezing rain, and sub-zero temperatures lasting for several days. Winter storms have caused power failures, loss of communications networks, road closings, disruption of EMS and fire response capabilities and losses of water supplies throughout the county.

Power outages, sometimes caused by large amounts of snow or ice weighing on and breaking power lines, can result in a loss of heat for residential customers, potentially posing a threat to human life.

Long cold spells can cause rivers and lakes to freeze over. A subsequent thaw and rise in the water level break the ice into large chunks and can result in ice jams when the ice begins to flow. The ice jams can act as dams and result in flooding. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice build-up and/or high winds which can break limbs or even bring down large trees. While gradual melting of snow and ice provides excellent groundwater recharge, high temperatures following a heavy snowfall can cause rapid surface water runoff and severe flooding. *Figure 35 - Pennsylvania Annual Snowfall 1981-2010* shows mean annual snowfall in Montour County to be between thirty-one and forty inches, with a norm of thirty-five inches. *Table 44 - Recent Annual Snowfall by Snow Station* summarizes annual snowfall accumulation for recent years not covered in *Figure 35- Pennsylvania Annual Snowfall 1981-2020* as recorded in the weather station at Danville. *Table 43 – Monthly Snowfall Average* shows the average amount of snowfall per month in Montour County.

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Table 42 - Winter Weather Events

Winter Weather Events	
Weather Event	Classification
<b><u>Heavy Snowstorm</u></b>	Accumulations of four inches or more in a six-hour period, or six inches or more in a twelve-hour period.
<b><u>Sleet Storm</u></b>	Significant accumulations of solid pellets which form from the freezing of raindrops or partially melted snowflakes causing slippery surfaces posing hazards to pedestrians and motorists.
<b><u>Ice Storm</u></b>	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.
<b><u>Blizzard</u></b>	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.
<b><u>Severe Blizzard</u></b>	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.

Table 43 - Monthly Snowfall Average

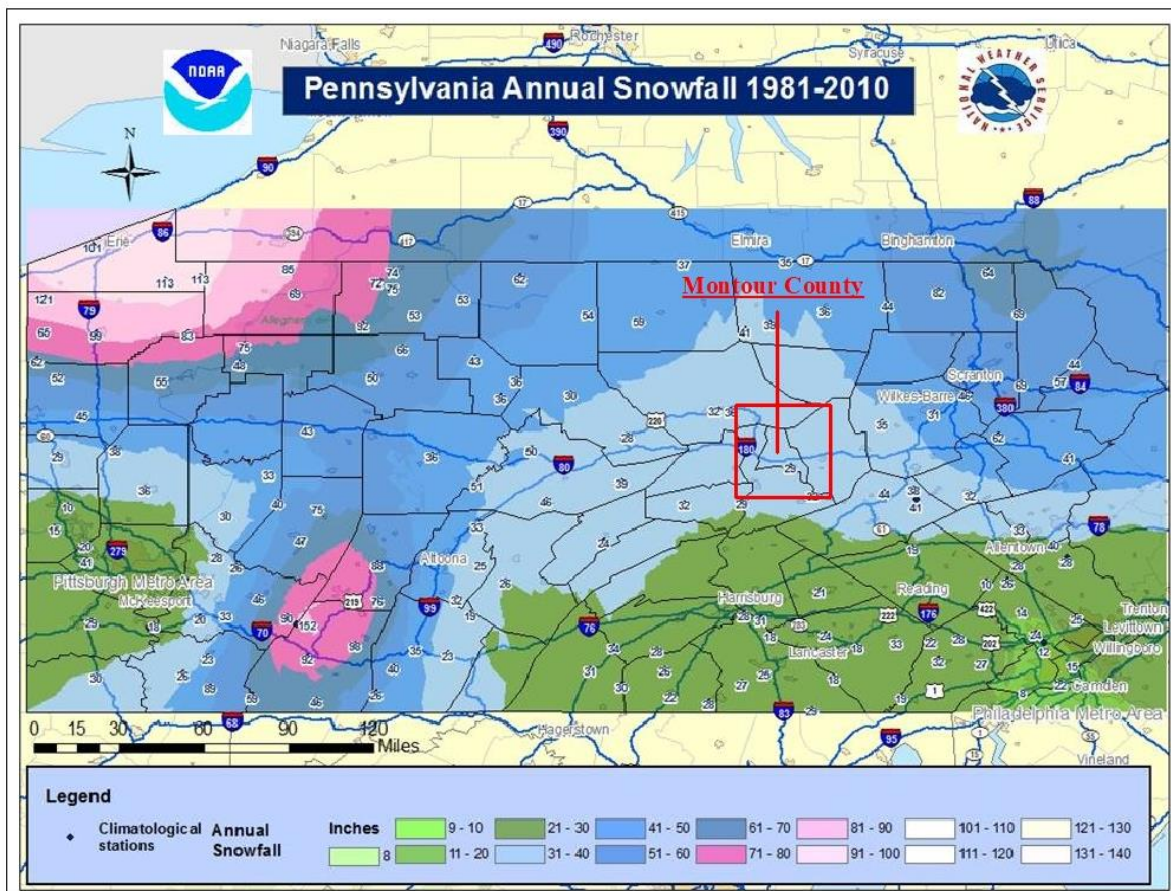
Monthly Snowfall Average (NOAA, 2020)	
Month	Danville
July	0.0"
August	0.0"
September	0.0"
October	0.1"
November	0.6"
December	5.0"
January	10.4"
February	7.0"
March	5.1"
April	0.7"
May	0.0"
June	0.0"
<b>Annual</b>	<b>28.9"</b>

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Table 44 - Recent Annual Snowfall by Snow Station

Recent Annual Snowfall by Accumulation/Snow Station (NOAA, 2020)	
Winter Season	Danville
2010-2011	35.4"
2011-2012	Minimal
2012-2013	Minimal
2013-2014	Minimal
2014-2015	Minimal
2015-2016	Minimal
2016-2017	Minimal
2017-2018	Minimal
2018-2019	Minimal
2019-2020	Minimal
2020-2021	Not available

Figure 35 - Pennsylvania Annual Snowfall 1981-2010



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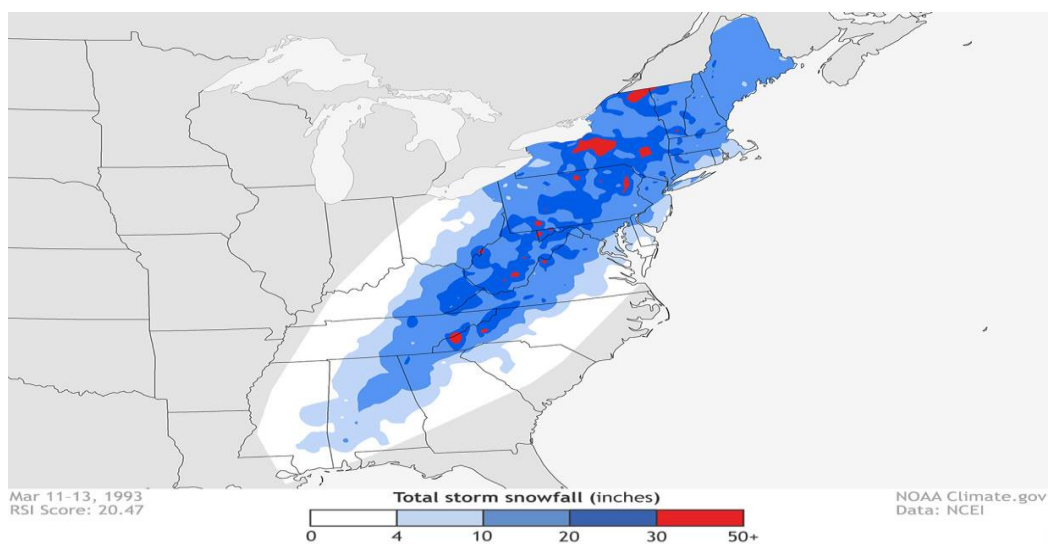
## 4.3.11.3 Past Occurrence

Winter storms occur on the average of three times a year in Montour County. In January 1996, a series of severe winter storms with 27- and 24-inch accumulated snow depths across the Commonwealth was followed by 50- to 60-degree temperatures resulting in rapid melting and flooding.

Another severe winter event in the county's history was in the winter of 1993 – 1994 when 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. One of these devastating winter storms occurred in early January 1994 with record snowfall depths in many areas 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 which closed major arterial roads and downed many trees and power lines. Utility crews from a five-state area were called to assist in power restoration repairs. Officials from PPL Corporation stated that this was the worst winter storm in the history of the company – related damage-repair costs exceeded \$5,000,000. Serious and sporadic power supply outages continued through mid-January in many locations due to record cold temperatures. 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 (with temperatures as low as -31°F) resulted in numerous water-main breaks and interruptions of service to thousands of municipal and city water customers throughout the Commonwealth. The extreme cold in conjunction with accumulations of frozen precipitation resulted in acute shortages of road salt. Trucks were dispatched to haul salt from New York to expedite deliveries to Pennsylvania Department of Transportation storage sites.

The year prior, the country's so-called "Storm of the Century" clobbered the east coast. See *Figure 36 - Storm of the Century Total Storm Snowfall*.

*Figure 36 - Storm of the Century Total Storm Snowfall*





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On March 12–14, 1993, a massive storm system bore down on nearly half of the U.S. population. Causing approximately \$5.5 billion in damages (\$9.9 billion in 2020 dollars), America’s “Storm of the Century,” as it would become known, swept from the Deep South all the way up the East Coast. With a central pressure usually found in Category 3 hurricanes, the storm spawned tornadoes and left coastal flooding, crippling snow, and bone-chilling cold in its wake. Of the more than 250 [weather and climate events with damages exceeding \\$1 billion](#) since 1980, this storm remains the country’s most costly winter storm to date.

Montour County is vulnerable to an array of winter weather. This weather has the ability to close businesses, close schools and block and damage roadways throughout the county. The history of major winter storms in Montour County since 1986 is outlined in *Table 45 – Winter Weather Occurrences*.

*Table 45 - Winter Weather Occurrences*

<b>Winter Weather Occurrences</b>	
<b>DATE</b>	<b>EVENT</b>
1/26/1986	Heavy Snow
02/07/1986	Heavy Snow
1/1/1987	Heavy Snow
1/19/1987	Heavy Snow
11/11/1987	Heavy Snow
1/25/1988	Heavy Snow
1/20/1990	Snow and Ice Storm
1/29/1990	Heavy Snow
12/27/1990	Heavy Snow
1/11/1991	Snow/Freezing Rain
12/10/1992	Heavy Snow
01/01/1994	Extreme Cold/Snow
01/04/1994	Heavy Snow
01/07/1994	Ice Storm
01/14/1994	Heavy Snow/Extreme Cold
01/17/1994	Heavy Snow
01/27/1994	Ice
04/19/1994	Extreme Cold
12/19/2000	Heavy Snow
01/20/2001	Heavy Snow
03/4/2001	Heavy Snow
01/06/2002	Heavy Snow
12/05/2002	Heavy Snow
12/10/2002	Ice Storm
12/25/2002	Heavy Snow
01/05/2005	Winter Storm
01/02/2003	Heavy Snow

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DATE	EVENT
02/16/2003	Heavy Snow
01/27/2004	Heavy Snow
02/03/2004	Heavy Snow
02/06/2004	Ice Storm
03/16/2004	Heavy Snow
03/19/2004	Heavy Snow
12/09/2005	Heavy Snow
12/16/2005	Winter Storm
02/13/2007	Winter Storm
03/16/2007	Heavy Snow
02/01/2008	Winter Storm
02/12/2008	Ice Storm
12/19/2008	Winter Storm
01/06/2009	Ice Storm
01/27/2009	Winter Storm
02/09/2010	Winter Storm
02/25/2010	Winter Storm
02/01/2011	Winter Storm
03/06/2011	Heavy Snow
10/29/2011	Heavy Snow
12/14/2013	Winter Storm
02/04/2014	Winter Storm
02/13/2014	Heavy Snow
11/25/2014	Heavy Snow
01/22/2016	Winter Storm
02/08/2017	Winter Storm
03/13/2017	Winter Storm
11/15/2018	Winter Storm
02/20/2019	Winter Storm
12/17/2019	Heavy Snow

#### **4.3.11.4 Future Occurrence**

There is a high probability of winter weather and winter storms occurring in Montour County, with expected annual events across most of the commonwealth. An analysis of the past occurrences indicates that this trend will continue annually in the future.

Meanwhile, climate change is expected to bring changes to the future of winter storms impacting Pennsylvania. Climate scientists believe that extreme winter storms are expected to occur more frequently – there have been about twice as many extreme snow events in the United States in the latter half of the 20<sup>th</sup> century as occurred in the first half (NOAA, 2018). This uptick is caused in part by higher-than-normal ocean

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surface temperatures that result in an increased source of moisture for storms that develop over the Atlantic Ocean. Conditions for severe winter storms are particularly heightened in the eastern United States due to changes in atmospheric circulation patterns caused by higher temperatures and melting Arctic sea ice (Francis & Vavrus, 2012). Winters in 2000 and 2001 were mild in Pennsylvania and led to spring-like thunderstorms during the winter months rather than snowstorms. Such thunderstorms can be followed by cold fronts and winter storms resulting in temperature drops of 50°F in a few short hours. With warmer average temperatures, more precipitation is expected to fall as rain rather than snow, and data from NOAA show that Montour County has experienced a significant decrease in the amount of snowfall relative to the amount of rainfall, with a change of -10% to -20% from 1949 to 2016 (NOAA, 2016; PA HMP, 2018). Even though average temperatures are expected to be higher overall and there are expected to be fewer extreme cold days, those that do occur are expected to reach record-setting low temperatures more frequently (Vose et al., 2017).

Winter storms are a regular, annual occurrence in Montour County and should be considered highly likely. Approximately thirty-five winter storm events occur across Pennsylvania annually and about two-four are estimated to impact Montour County each year (NOAA, 2020).

### **4.3.11.5 Vulnerability Assessment**

Based on the information available, all communities in Montour County are essentially equally vulnerable to the direct impacts of winter storms. Residents of the more rural areas of the county may be more susceptible to the vulnerability of delayed emergency medical assistance.

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

Icy and snow-covered roads often result in increases in traffic incidents. Residents of the mountainous and more rural areas of the county may be more susceptible during severe storms, especially when emergency medical assistance is required due to the location's potential for isolation. The economic impacts from snow removal, road and infrastructure repair and other secondary effects impart a great strain on the budgets and material resources of local municipalities.

Even for communities that are prepared to respond to winter storms, severe events involving snow accumulations that exceed six or more inches in a twelve-hour period can cause a large number of traffic accidents, strand motorists due to snow drifts, interrupt power supply and communications, and cause the failure of inadequately designed and/or maintained roof systems. Similar to the vulnerability assessment discussion for tornados and severe wind, vulnerability to the effects of winter storms on buildings is dependent on the age of the building, construction material used and condition of the structure. Unfortunately, no comprehensive database of these variables could be identified for Montour County.

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### 4.3.12. Civil Disturbance

#### 4.3.12.1 Location and Extent

Civil disturbance is described as acts of violence and disorder detrimental to the public law and order. It includes acts such as riots, acts of violence, insurrections, and unlawful obstructions or assemblages. Civil disturbance events have not been frequent occurrences throughout the history of the Commonwealth, however when they occur, they can cause significant property damage, injury and even loss of life. The scale and scope of civil disturbance events varies widely. Government facilities, local landmarks, prisons, and universities are common sites where crowds and mobs may gather. Riots and violence happen when crowds gather, and people feed on one another's excitement, anger, or other strong emotions. Once strong emotions are ignited, it does not take long to spread through a crowd.

#### 4.3.12.2 Range of Magnitude

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

- **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 may be more impulsive and emotional and require only minimal stimulation to arouse violence. Examples of this type of crowd could include demonstrator and strikers, though not all demonstrators and strikers are aggressive.

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

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

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- **Escape Mob:** An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs are generally difficult to control and can be characterized by unreasonable terror.
- **Acquisitive Mob:** An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property.
- **Expressive Mob:** An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent-up emotions in highly charged situations.

In the event of significant civil disorder, local government operations and the delivery of services in the community may experience short-term disruptions. The greatest secondary effect is the impact on the economic and financial conditions of the affected community, particularly in relation to the property, facilities, and infrastructure damaged because of the disturbance. More serious acts of vandalism may result in limited power failure or hazardous material spills, leading to a possible public health emergency. Altered traffic patterns may increase the probability of a transportation accident.

Some common causes of civil disorder or unrest are:

- Reaction to court decisions
- Political motivations
- Terrorism and foreign agitators
- Natural disasters
- Financial collapse

### 4.3.12.3 Past Occurrences

There have not been any major civil disturbances in Montour County.

### 4.3.12.4 Future Occurrence

While unlikely, civil disturbances may occur in Montour County, and it is difficult to accurately predict the probability of future occurrences over the long-term.

### 4.3.12.5 Vulnerability Assessment

All municipalities in Montour County could be vulnerable to civil disturbance, however the anticipated impact from such events is minimal. These events may be sparked for varying reasons and the seriousness of the event may well be exacerbated by how authorities handle the crowd.

## 4.3.13. Dam and Levee Failure

### 4.3.13.1 Location and Extent

#### Dams

Dam failures most often occur during or after a massive rainfall, flooding, or spring thaws, sometimes with little to no warning. Depending on the size of the water body where the dam is constructed, water contributions may come from distant upstream locations. Water contributions may also come from dam failures in adjoining counties, along the same riverine or water features.

The National Inventory of Dams (NID) is a registry that captures information about structures that are greater than or equal to 25 feet in height or that impound 50-acre-feet or more of water (an acre-foot is

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equal to 325,851 gallons of water); it includes structures above 6 feet in height, where failure would potentially cause damage downstream. The dams are classified in terms of hazard potential as “High,” “Significant,” or “Low,” with high-hazard dams requiring emergency action plans (EAPs). As listed in the below table, there are two dams in Montour County registered with the U.S. Army Corps of Engineers in the NID. According to the NID, the Lake Chillisquaque Dam has an emergency action plan (EAP). *Table 46 – Montour County Dam Inventory* displays the information for the dams located within Montour County.

*Table 46 - Montour County Dam Inventory*

<b>Montour County Dam Inventory</b>						
<b>Dam Name</b>	<b>River</b>	<b>Owner Name</b>	<b>Year Completed</b>	<b>Drainage Area</b>	<b>Hazard</b>	<b>EAP Completed</b>
Lake Chillisquaque	Chillisquaque Creek	PPL Montour LLC	1971	5.6	H	Yes
Montour Ash Basin No 1	Watershed Chillisquaque	PPL Montour LLC	1971	0.2	L	NR
<i>SOURCE: NATIONAL INVENTORY OF DAMS</i>						

The Pennsylvania Department of Environmental Protection (PA DEP) defines a high-hazard dam as “any dam so located as to endanger populated areas downstream by its failure” [Def. added May 16, 1985, P.L.32, No. 15]. High-hazard dams receive two inspections each year – once by a professional engineer on behalf of the owner and once by a PA DEP inspector (PA DEP, 2008).

### **Levees**

Levee failures have the potential to place large numbers of people and properties at risk. Unlike dams, levees are built parallel to a river or another body of water to protect the population and structures behind it from risks of damage during flooding events (FEMA, 2008). Levees do not serve a purpose beyond flood protection, unlike dams, which can serve to store water or generate energy in addition to protect areas from flooding. The National Levee Database (NLD), like its counterpart of the NID, is maintained by the U.S. Army Corps of Engineers and tracks levees across the United States. Montour County is home to three levees, which are detailed in *Table 47 - Montour County Levee Inventory* below. *Figure 37 – Montour County Dams and Levees* offers a map view of the levees in the county.

All levee systems within Montour County are within Danville Borough. Danville Borough has a high level of flood protection from threats posed by Susquehanna River, Mahoning Creek, and Sechler Run. The levee protection system has been constructed in stages beginning in 1958 and improved several times since that time. The system includes five reaches: Lower Susquehanna River, Upper Susquehanna River, Hospital Run Right Bank, Mahoning Creek Left Bank, and, the most recently constructed, Mahoning Right Bank. All portions except for Mahoning Creek Right Bank are part of the U.S. Army Corps of Engineers (USACE) inspection program. *Table 47 – Montour County Levee Inventory* shows the levees that are part of the levee protection system for Montour County.

In September of 2011, the community experienced extremely high creek and river levels due to heavy rains from Tropical Storm Lee. Although there was not a levee breach of Mahoning Creek Right Bank sandbag closure, the closure was not sufficient to manage the volume of water produced by the heavy rains. All certified levee projects held despite the large volume of water. Nonetheless, subsequent to this event, FEMA requested inclusion of the event’s data in an updated levee certification report. The final Addendum the levee certification report was completed on June 6, 2014 and submitted to FEMA on August 8, 2014.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Table 47 - Montour County Levee Inventory

<b>Montour County Levee Inventory</b>					
<b>Name</b>	<b>System Type</b>	<b>Levee Miles</b>	<b>Leveed Area Square Miles</b>	<b>Sponsors</b>	<b>FEMA Accreditation Rating</b>
Danville - Lower Susquehanna/Mahoning Creek	Levee System	2.676749084	0.435719706	Borough of Danville	PAL
Danville - Mahoning Creek - Right Bank	Levee System	0.583054837	0.072341863	Borough of Danville	PAL
Danville - Upper Susquehanna/Hospital Run - Left Bank	Levee System	0.551137851	0.046294581	Borough of Danville	PAL

### **4.3.13.2 Range of Magnitude**

Dam failures can pose a serious threat to communities located downstream from major dams. The impact of a dam failure is dependent on the volume of water impounded by the dam and the amount of population or assets located downstream. Catastrophic failures are characterized by the sudden, rapid, and uncontrolled release of impounded water from a dammed impoundment or water body. *Figure 37 – Montour County Dams and Levees* shows the locations of dams within Montour County.

Dam failures may or may not leave enough time for evacuation of people and property, depending on their abruptness. Seepages in earth dams usually develop gradually, and, if the embankment damage is detected early, downhill residents have at least a few hours or days to evacuate. Failures of concrete or masonry dams tend to occur suddenly, sending a wall of water and debris down the valley quickly. Dam failures due to the overtopping of a dam normally give sufficient lead time for evacuation.

### **Levees**

Levee failures can be caused by a number of factors, and they can also cause catastrophic effects. Damage to the area beyond a levee, if it fails, could be more significant than if the levee was not present (FEMA, 2008). Levees are designed to provide a specific level of protection, so flooding events could overtop the levees if these events exceeded the levee specifications. Additionally, levees can also fail if they are allowed to decay or deteriorate. Regular maintenance of levees is critical. *Figures 37, 38, and 39* show levees, levee protection areas, and critical infrastructure/functional needs facilities in Montour County.

A levee failure or breach causes flooding in landward areas adjacent to the structure. The failure of a levee or other flood protection structure could be devastating, depending on the level of flooding for which the structure is designed and the amount of landward development present. Large volumes of water may be moving at high velocities, potentially causing severe damage to buildings, infrastructure, trees, and other large objects. Levee failures are generally worse when they occur abruptly with little warning and result in deep, fast-moving water through highly developed areas.

### **4.3.13.3 Past Occurrence**

#### **Dams**

The National Performance of Dams (NPD) Program lists no occurrences of dam failure or major incidents occurring at either of the two dams in Montour County.

# **Montour County, Pennsylvania**

## **2021 Hazard Mitigation Plan**

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### **Levees**

The National Levee Database (NLD) lists no occurrences of levee failure or major incidents occurring at either of the three levees in Montour County.

#### **4.3.13.4 Future Occurrence**

Although dam and levee failures can occur at any time, given the right circumstances, the future occurrence of dam or levee failures in the Montour County can be considered unlikely.

The presence of structural integrity and inspection programs significantly reduces the potential for major dam failure events to occur. The PA DEP inventories and regulates all dams that meet or exceed the following criteria (PA DEP, 2008):

- Impound water from a drainage area of greater than 100 acres.
- Have a maximum water depth greater than 15 feet.
- Have a maximum storage capacity of 50 acre-feet or greater.

The construction, operation, maintenance, modification, and abandonment of dams is reviewed and monitored by the PA DEP Division of Dam Safety. Dams are evaluated based on categories such as slope stability, undermining seepage, and spillway adequacy. Levees should also be inspected on a routine or periodic basis to ensure continued maintenance.

Additionally, most levees are designed to meet a specified level of flooding. While FEMA focuses on mapping levees that will reduce the risk of a 1% annual chance flood, other levees may be designed to protect against smaller or larger floods.

#### **4.3.13.5 Vulnerability Assessment**

Property and populations located downstream from any dam or levee are vulnerable to dam and levee failures. The Pennsylvania Code (§105.91 Classification of dams and reservoirs) classifies both dams by size and the amount of loss of life and economic loss expected in a failure event. *Table 48 - Dam Classification* displays the dam classification. Although the size of a dam may result in varying impacts, the hazard potential classification of category one dams is a more important reference indicator, since that will indicate the level of potential substantial loss of life and excessive economic loss.



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Table 48 - Dam Classification

Dam Classification		
Class	Impoundment Storage (Acre-Feet)	Dam Height (Feet)
<b>A</b>	Equal to or greater than 50,000	Equal to or greater than 100
<b>B</b>	Less than 50,000 but greater than 1,000	Less than 100 but greater than 40
<b>C</b>	Equal to or less than 1,000	Equal to or less than 40
Dam Damage Classification		
Category	Loss of Life	Economic Loss
<b>1</b>	Substantial	Excessive
<b>2</b>	Few	Appreciable
<b>3</b>	None Expected	Minimal

### **Chillisquaque Dam:**

The Chillisquaque Dam was built on the middle branch of Chillisquaque Creek by Pennsylvania Power & Light Co. in 1972. This 165-acre reservoir serves as a backup cooling water supply for the Montour Power Plant. A failure of this dam could cause significant downstream damage to several municipalities, including Washingtonville.

The Chillisquaque Dam is a 54-foot high, 2,000-foot-long earthen embankment dam, maintaining a normal pool of 2,194 acre-feet of water with a maximum pool capacity of 4,400 acre-feet. The dam is located along the Middle Branch of the Chillisquaque Creek, approximately 1.7 miles north of the Montour Electric Station near Washingtonville, PA. There are fifty-five addressable structures located within a 1-mile radius of the Chillisquaque Dam.

The Chillisquaque Dam is inspected by PP&L at a minimum of once every three years. The inspection is on-site visual inspection of the dam, the dam's spillways, control systems, and the toe area below. Any questionable conditions are immediately reported to PP&L Generation Technical Services and to the Division of Dam Safety of the PA DEP. The most recent inspection of the Chillisquaque Dam was on September 8, 2017.

### **Ash Basin Dam:**

The Ash Basin Dam is located in an unnamed tributary of the Chillisquaque Creek, two miles northeast of Washington, PA. The dam is a 40-foot high, 11,000-foot-long earthen embankment dam that maintains a normal pool of 4.458 acre-feet of ash and water, with a maximum pool capacity of 5.315 feet. The ash basin is partially closed with soil covering approximately 120 acres of the 150 acres of storage. There are nineteen addressable structures located within a 1-mile radius of the Ash Basin Dam.

The Ash Basin Dam is inspected by PP&L at a minimum of once every three years. The inspection is an on-site visual inspection of the dam, the dam's spillways, control systems, and the toe area below. Any and all questionable conditions are immediately reported to PP&L Generation Technical Services to the Division of Dam Safety of the PA DEP. The most recent inspection of the Ash Basin Dam was on November 22, 2017.

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Because flooding is the most common secondary effect of dam failure and the primary effect of levee failure, if a failure is severe, a large amount of water will enter riverbeds and overflow the stream banks for miles. A dam failure at Lake Chillisquaque Dam could cause a reduction in output from the Montour power plant, due to the lack of available water for cooling. This reduction in output could result in a brownout or partial utility failure.

Dam and levee failures may also cause significant environmental effects, as the resulting flood from a dam failure is likely to disperse debris and hazardous materials downstream that can damage local ecosystems. Debris carried downstream can block roads, cause traffic accidents, disrupt traffic patterns, and delay the delivery of essential services along major traffic corridors. Debris flow can also cause landslides along steep slopes and embankments. The economic and financial impact from damage and recovery can range from minimal to severe, depending on the magnitude of damage and scale of failure.

### **Levees:**

There are a large number of critical infrastructure and functional needs facilities within the levee protection area for the levees around Danville Borough in Montour County. *Table 49* shows number of addressable structures, critical infrastructure facilities, and functional needs facilities in the levee protection area. The features included in the tables will be particularly vulnerable to levee failure because they are protected by the system. Should the levee protection system fail, the outlined facilities would be vulnerable to flooding from Mahoning Creek and the Susquehanna River.

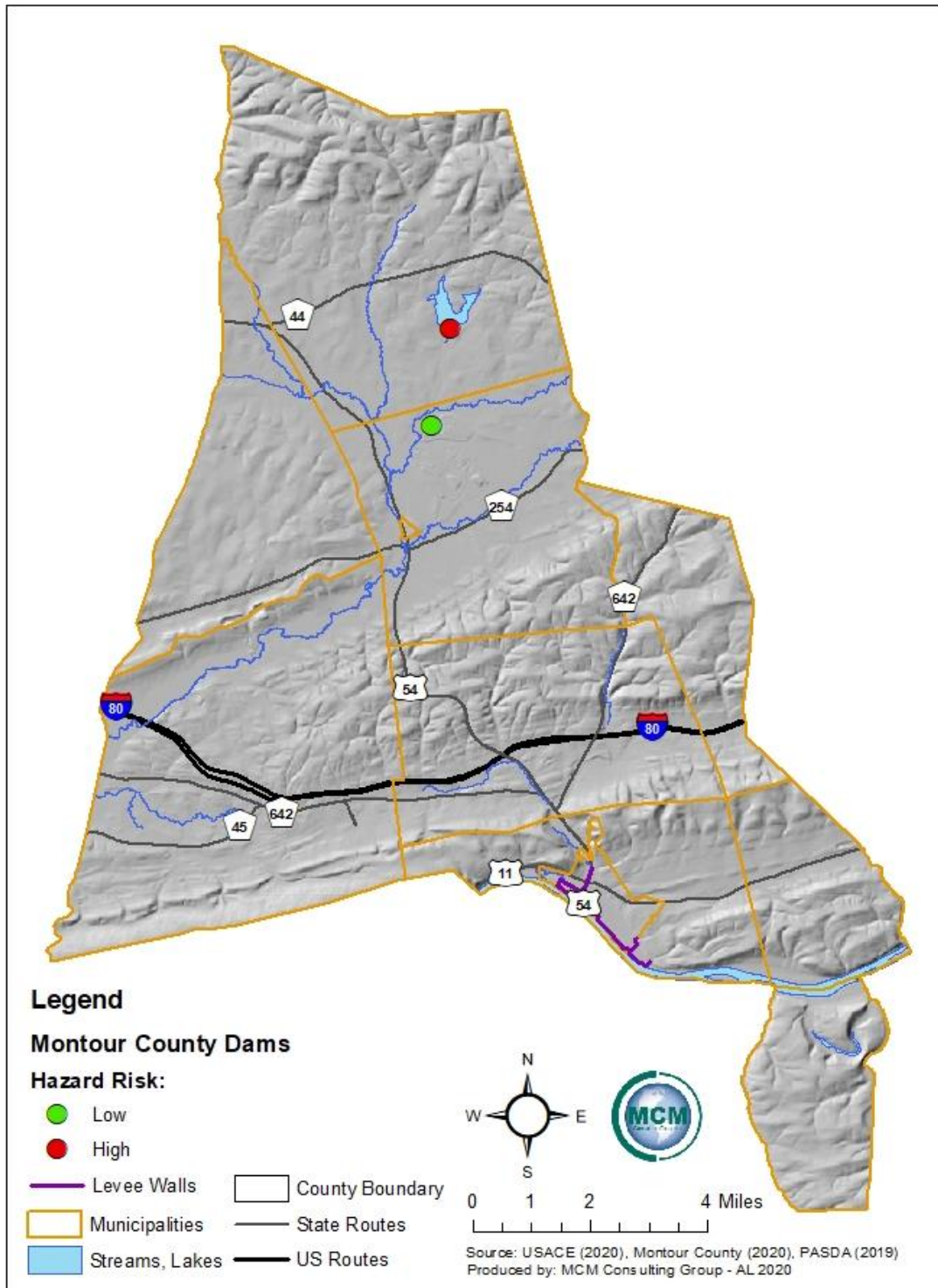
*Table 49 - Number of Vulnerable Structures within Leveed Areas*

<b>Number of Vulnerable Structures within Leveed Areas</b>	
<b>Leveed Area Name</b>	<b>Addressable Structures in Levee Area</b>
Danville – Mahoning Creek – Right Bank	80
Danville – Lower Susquehanna/Mahoning Creek	1056
Danville – Upper Susquehanna/Hospital Run – LB	1
<b>Total</b>	1137
<b>Leveed Area Name</b>	<b>Critical Infrastructure in Levee Area</b>
Danville – Mahoning Creek – Right Bank	0
Danville – Lower Susquehanna/Mahoning Creek	13
Danville – Upper Susquehanna/Hospital Run – LB	0
<b>Total</b>	13
<b>Leveed Area Name</b>	<b>Functional Needs in Levee Area</b>
Danville – Mahoning Creek – Right Bank	2
Danville – Lower Susquehanna/Mahoning Creek	6
Danville – Upper Susquehanna/Hospital Run – LB	0
<b>Total</b>	8

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

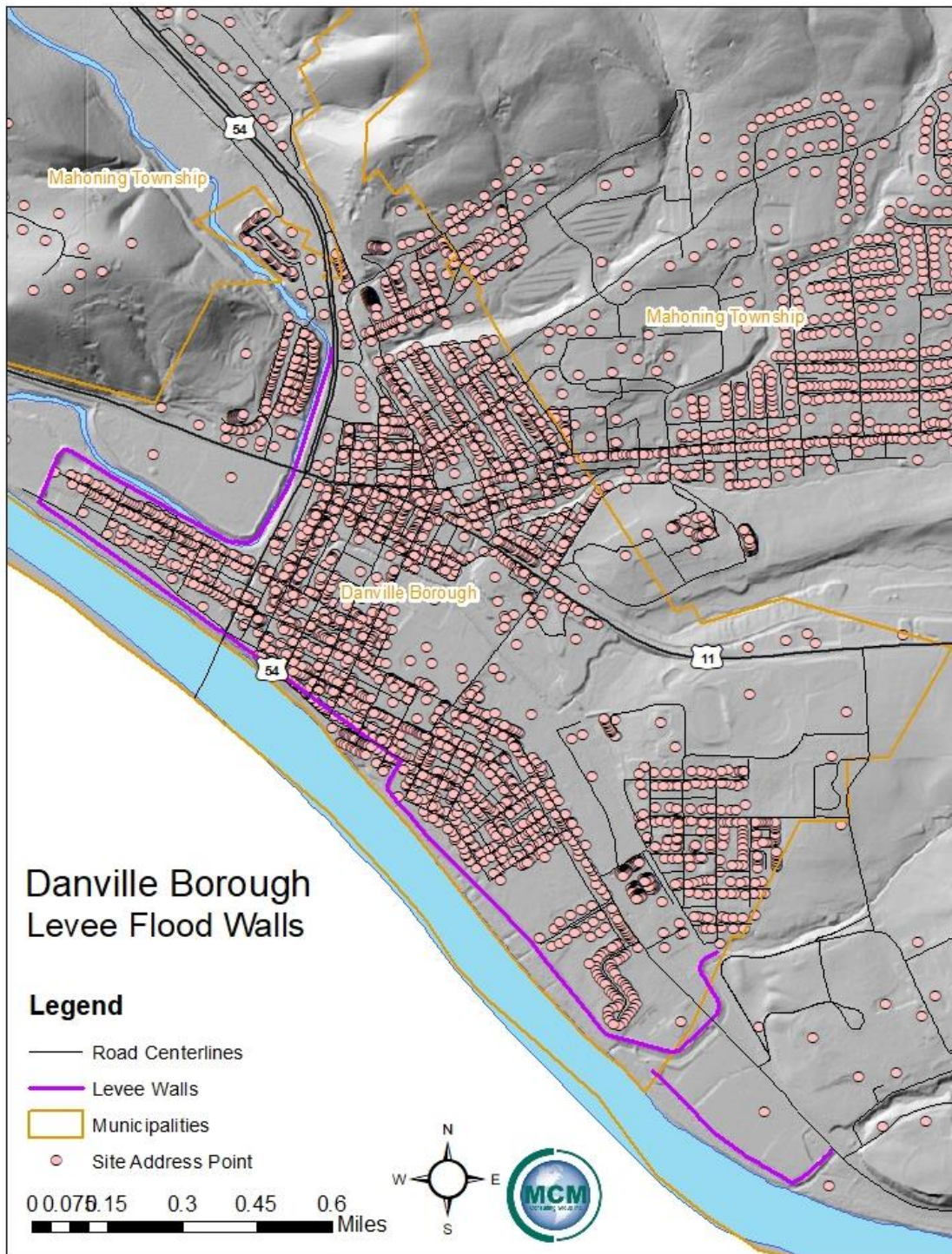
Figure 37 - Montour County Dams and Levees

## Montour County Dams and Levees



# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

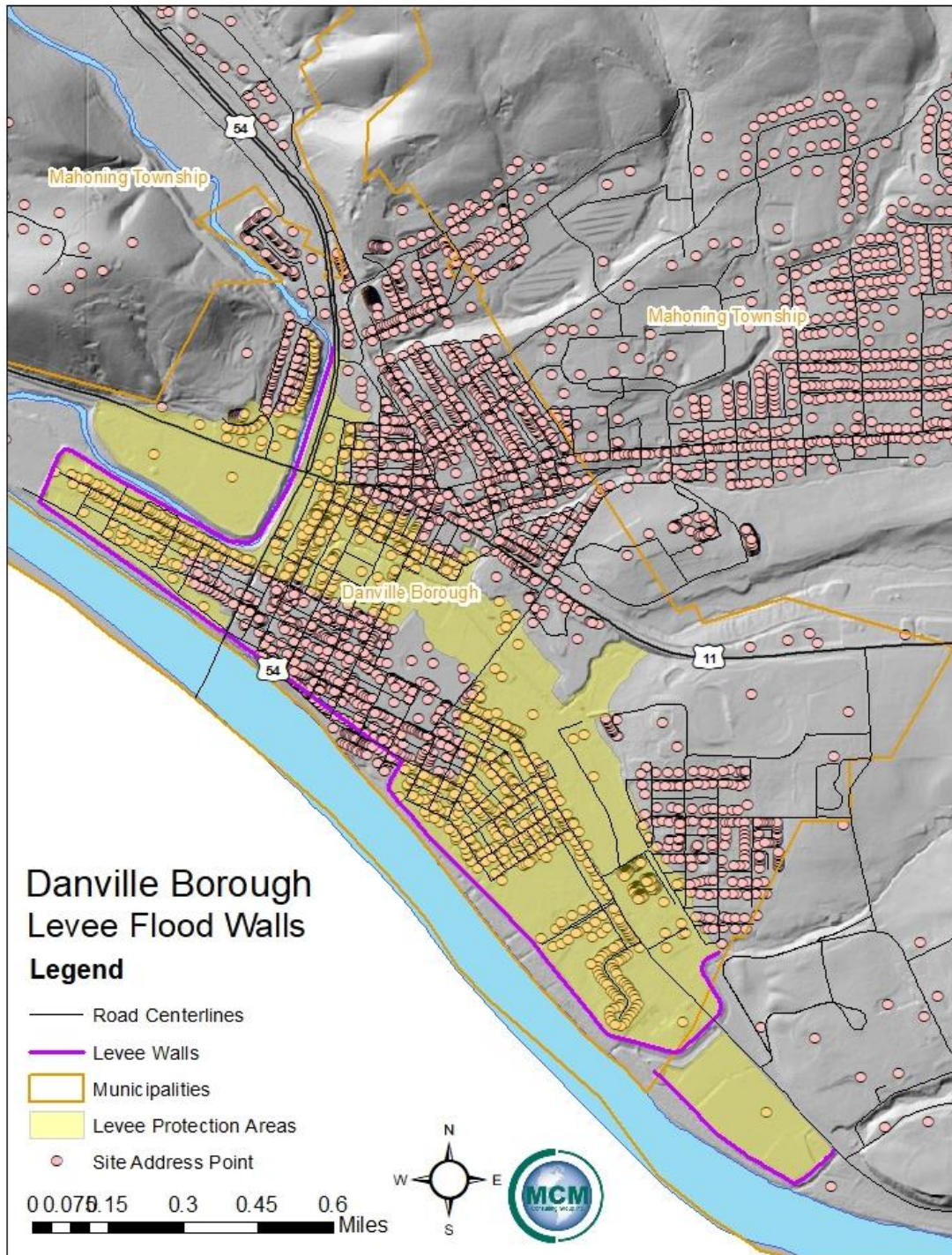
Figure 38 - Danville Borough Levee Flood Wall Map - Without Leveled Areas



Source: USACE (2020), PASDA (2019), Montour County (2020)  
Produced by: MCM Consulting Group - AL 2020

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

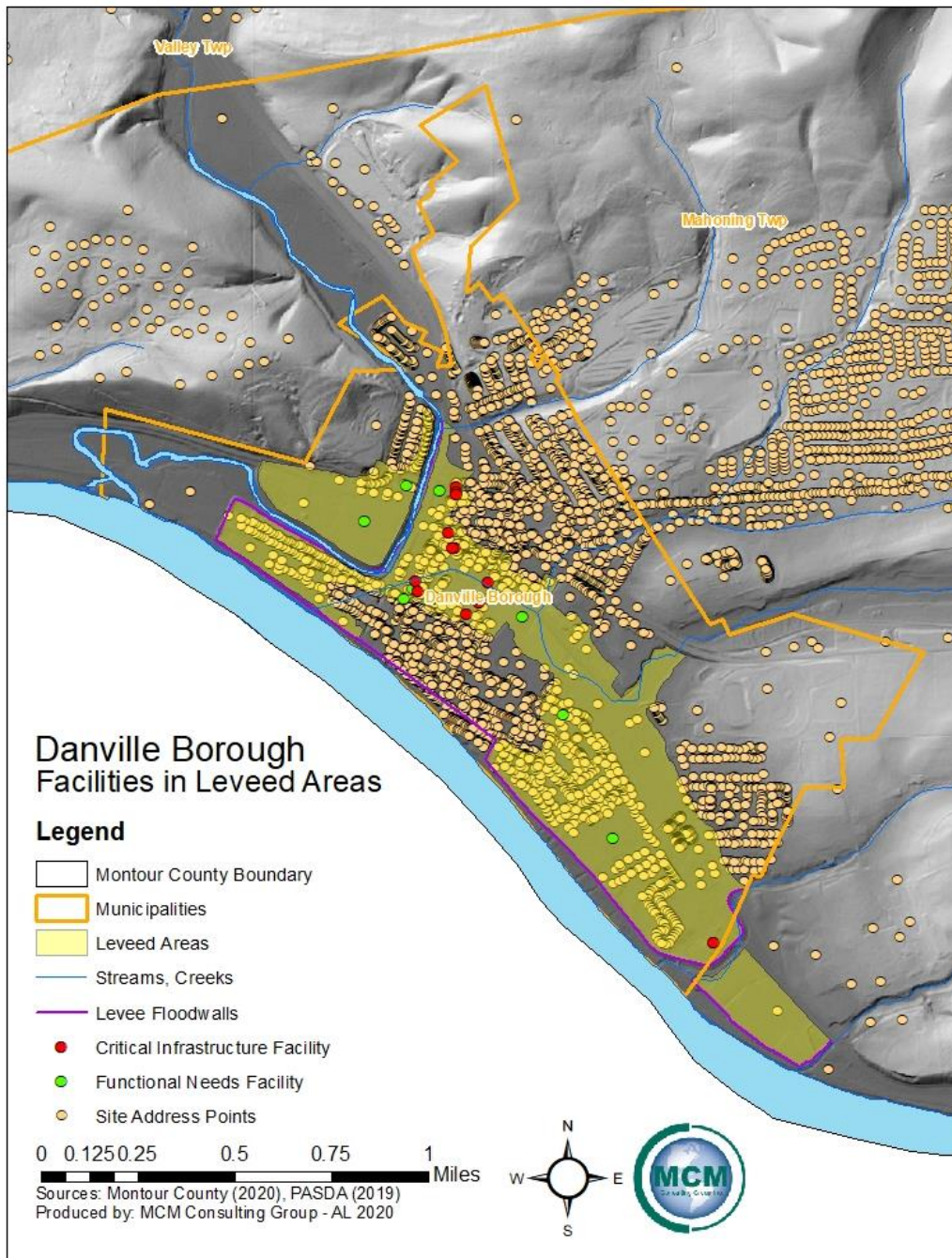
Figure 39 - Danville Borough Levee Flood Wall Map - With Leveed Areas



Source: USACE (2020), PASDA (2019), Montour County (2020)  
Produced by: MCM Consulting Group - AL 2020

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Figure 40 - Danville Borough with Leveled Area and Critical Infrastructure/Functional Needs



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### **4.3.14. Disorientation**

#### **4.3.14.1 Location and Extent**

Disorientation is considered to be a person that has an altered mental state that may not know their location, time, or date. Many symptoms that are commonly associated with disorientation are confusion, delirium, delusions, agitation, or hallucinations. Disorientation is very common in rural regions of Pennsylvania, such as Montour County, due to great amounts of forestry and wilderness present. Large numbers of people are attracted to Pennsylvania's rural areas for recreational purposes such as hiking, camping, hunting, and fishing. As a result, people can become lost or trapped in remote and rugged wilderness areas. Montour County attracts environmental tourists due to the natural beauty of the county and the expanses of forested area, both state land and otherwise. Montour County is known for large, regional public recreation destinations such as the Appalachian Mountains throughout the county, Muncy Hills in the northern part of the county, Montour Ridge in the southern part of the county, Susquehanna River, and state game lands. In the event of disorientation, search and rescue may be required for people who suffer from medical problems, such as dementia or delirium, or injuries and those who become accidentally disoriented, such as becoming lost in the wilderness. Search and rescue efforts are often focused in and around state forest and state park lands as they contain numerous miles of hiking and biking trails.

#### **4.3.14.2 Range of Magnitude**

Montour County has a total of 132 square miles which 130 of it being land and 2.1 being water. The major water ways that go through the county are the Susquehanna River, Chillisquaque Creek, and Mahoning Creek. Approximately 45% of Montour County is wooded. A wide variety of factors can contribute to the outcome of a search and rescue mission, but the most common dangers associated with disorientation are lack of food, water, and shelter. Montour County generally has a great abundance of water due to the multiple waterways throughout the county, and during the warmer summer months, shelter is less of a necessity than during winter months when extreme cold temperatures can pose a threat. Age, physical fitness, and familiarity with the area can also have a bearing on the outcome. Initial search and rescue efforts are often made with teams of dogs, people on horseback, volunteers from fire departments, and for longer term incidents, drones may be employed.

#### **4.3.14.3 Past Occurrence**

Wilderness search and rescue has required considerable resources, sometimes resulting in the expenditure of hundreds of man-hours. Montour County does not have exact numbers and dates of past disorientation occurrences. However, on average, there are about two disorientation incidents per year in Montour County. The incidents are either lost/disoriented, escapee, or suicide related. The last disorientation event for Montour County was documented to be on November 13, 2019. With the pandemic in year 2020, there have not been any disorientation occurrences.

#### **4.3.14.4 Future Occurrence**

During the warm summer months, as activities such as hiking, biking, and camping increase, so does the likelihood of individuals becoming disoriented. November also has many search and rescue events due to lost hunters during hunting season. Disorientations are most likely to occur in state parks and state forests where outdoor recreation is most abundant, and the forest is most dense. Medical emergencies occur regularly in the county, especially with the elderly that could result in disorientation.

#### **4.3.14.5 Vulnerability Assessment**

Individuals are most likely to become disorientated in areas of vast, open wilderness. Children and the elderly are more vulnerable to the exposure of elements. The elderly tend to be more vulnerable to

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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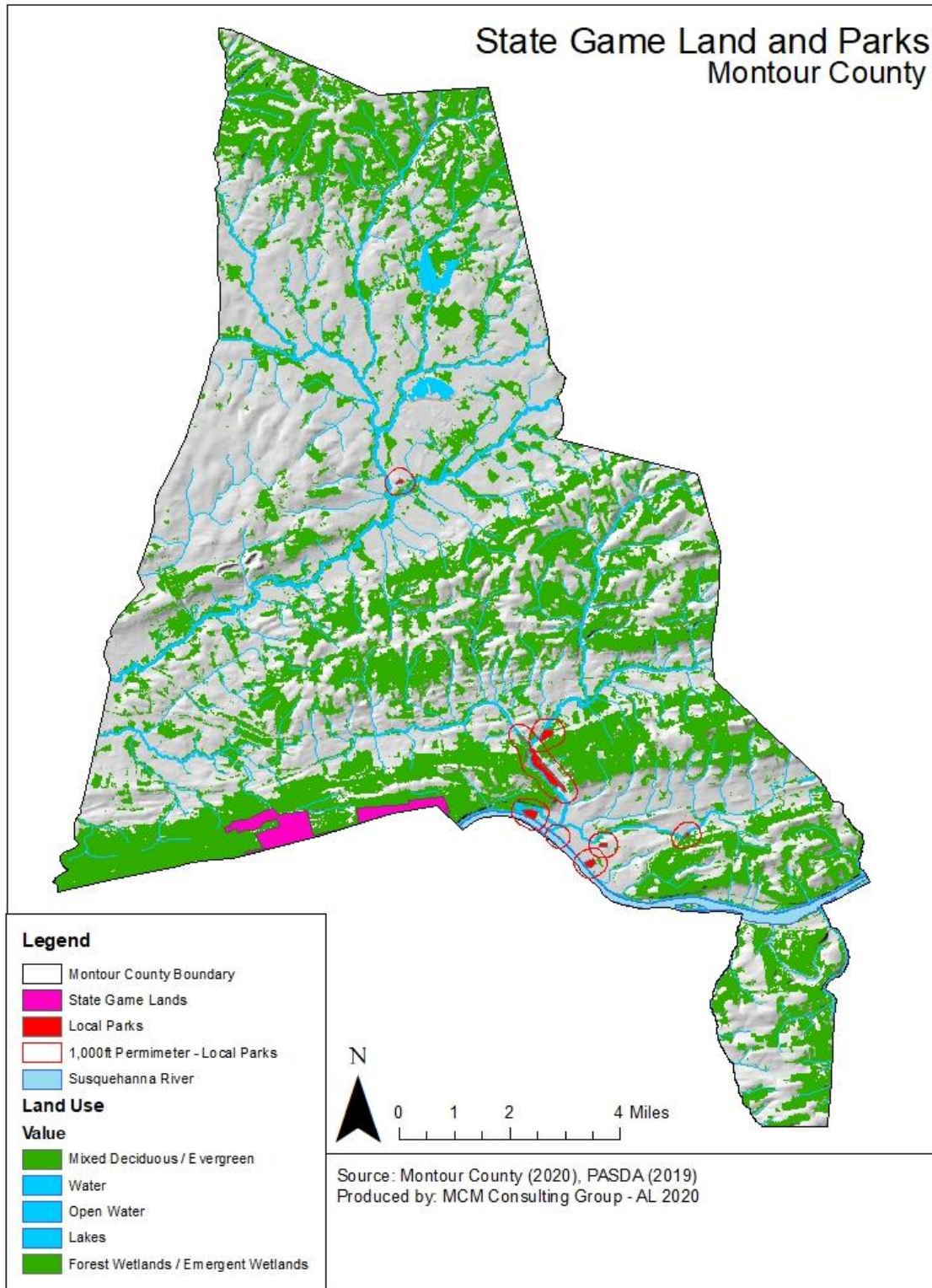
disorientation due to medically related issues. Many times, an individual with dementia or Alzheimer's Disease will become disoriented in wilderness or residential areas.

The most dangerous period to become lost outdoors is during the winter months when heat and shelter are vital. Montour County regularly experiences winter storms and temperatures below freezing, so persons participating in outdoor recreational activities in the winter are at a higher risk in the event of disorientation. A majority of the county is forested and relatively rural, and *Figure 41 – Disorientation Vulnerability for Montour County* identifies areas within the county where disorientation is most likely to occur, such as state parks, state forests, and state game lands. Due to hunting seasons and the number of hunters taking to the woods, November is often a high-volume time for search and rescue events, especially in state game lands and the surrounding areas. Also, vulnerability in Montour County is associated with the numerous waterways that run through the county, which are illustrated in *Figure 41 – Disorientation Vulnerability for Montour County*



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Figure 41 - Disorientation Vulnerability for Montour County



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### **4.3.15. Emergency Services**

#### **4.3.15.1 Location and Extent**

Montour County subdivisions, townships, boroughs and cities, have assignment of services for their municipalities. Fire, emergency medical services (EMS), emergency management (EMA), and law enforcement service agencies are defined per municipality. In addition to the local services, the county hosts numerous special teams. These county-wide special response teams are for those specialty services like hazardous materials incidents, K9 search, incident command management and auxiliary communications services. Regional and state-wide services are also available.

The county's vast areas increase the travel time for responders to an incident. Most areas are served by volunteers instead of career personnel which can add response time due to the volunteer availability. Agencies do struggle with the availability of personnel depending on the time of day and skills/resources needed. The number of responders in general has decreased due to funding and retention of personnel issues.

#### **4.3.15.2 Range of Magnitude**

Finances, changing political climates, leadership, or a significant high-profile event can all trigger a system to be declared as "success" or a "failure". In some cases, a combination of these factors can create a perfect storm. Unfortunately, many "failed" systems are measured by recent events, no matter how successful they may have been in the past. Although financial problems are often blamed on poor leadership, they have many root causes. Labor rates, benefits, poor productivity, operational design, insurance reimbursements and market regulation all have a significant direct impact on the financial viability of an organization.

Two fundamental yet misunderstood topics are the financial and economic variables that drive emergency service systems. These systems typically generate revenue through tax subsidies, memberships, direct sales, diversification into other lines of business, grants or fundraising. They spend most of these revenues on direct and indirect labor and benefits, with the remaining dollars going to infrastructure, fuel, medical supplies, insurances, fleet maintenance, dispatch and other essential items with hopefully some left over for recapitalization or fund balance development.

#### **4.3.15.3 Past Occurrence**

Most agencies are private organizations that lack local funding and exist based on tax dollars, fund raisings and donations received from their community. The time demand for fund raising adds to the demands of the struggling availability of volunteers. Past practices are not sustaining the needed funds or manpower.

Without financial support from the communities, services may not be able to remain in operation to serve the same communities they have served for decades. Recruitment and personnel retention are a key to success.

#### **4.3.15.4 Future Occurrence**

Volunteerism has been a significant component of the fire service. Most, if not all, members of our community fire departments are volunteers. Commonly a problem is recruitment and retention of volunteers to staff, both fire and emergency medical services. There has been a decline in volunteerism due to the required training requirements for firefighters and emergency medical technicians (EMTs) in the region.

Today, it is difficult for small communities to have a paid service therefore requiring the use of volunteers. The trend has devastating effects. With fewer volunteers to perform the tasks associated with fires and rescue operations it is imperative to facilitate fundraising. If there are fewer volunteers to raise funds, then the operational needs are impacted as well. Without fundraising and community support these fire departments will experience broader challenges.

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The individual volunteers also face many challenges. Most volunteers must address their own needs by providing for their family and, in many cases, are part of a two-income family. In some cases, they may have to have multiple jobs to sustain their needs. Becoming certified as a volunteer firefighter requires hundreds of hours. With the limitation of time, most members of our society find it personally challenging to find the time to dedicate to a volunteer position. Volunteers are becoming less reliable. Many current volunteers are aging and unable to perform at the same levels they once were.

Fire departments perform many tasks, not just fighting fires. It would perhaps be more appropriate to call these departments “All Hazards Departments” as they respond to various hazards such as vehicle accidents, commercial accidents, flooded basements, wires down, trees down, trench rescues, hazardous material spills, traffic control and sometimes even standbys to support other agencies or events to name only a few.

### **4.3.15.5 Vulnerability Assessment**

The likelihood that EMS agencies and fire services will fail is a real threat to our communities’ safety. Many communities have already experienced the unfortunate failure of services. It is recommended that each municipality assess their own vulnerabilities by maintaining and building a relationship with their local providers to make the determination and begin to plan accordingly if a local service was to shut down its operation. The statistics, response times and all times associated with all units dispatched are easily obtainable from the local 911 centers.

These departments must be supported to create and or discover new ways to not only recruit but to also retain volunteers. If left unattended the issues will continue and the lack of response will grow, leaving the community more vulnerable to loss of life and loss of property.

It is recommended that the entire community be educated on the perpetual needs associated with providing these services. In addition, continued support and efforts to inform legislatures could all prove to be paramount in assuring these services remain in operation into the future. At the time of the writing of this plan, a flurry of bills had been introduced in both the House of Representatives and the Senate as a result of a two-year study initiated by Senate Resolution 6 (SR 6). The final report can be found here: <http://pehsc.org/wp-content/uploads/2014/05/SR-6-REPORT-FINAL.pdf>

*Table 50 - Emergency Responders*

<b>Emergency Responders (Montour County)</b>		
<b>Municipality</b>	<b>Station Name</b>	<b>Address</b>
Danville Borough	Continental Fire Company	331 Meadow Lane, Danville, PA 17821
Danville Borough	Friendship Fire Company	219 Ferry Street, Danville, PA 17821
Danville Borough	Goodwill Hose Company	407 Center Street, Danville, PA 17821
Danville Borough	Washington Fire Company	532 Railroad Street, Danville, PA 17821
Mahoning Township	East End Fire Company	954 Bloom Road, Danville, PA 17821
Liberty Township	Liberty Township Volunteer Fire Company	127 Mooresburg Road, Danville, PA 17821
Washingtonville Borough	Washington Volunteer Fire Company	121 Strawberry Ridge Road, Danville, PA 17821

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### 4.3.16. Environmental Hazards

#### 4.3.16.1 Location and Extent

Hazardous materials (hazmat) incidents are generally not caused by deliberate maliciousness and are most often associated with transportation accidents or accidents at fixed facilities. However, hazardous materials can be released as a criminal or terrorist act. Any release can result in injury and death and may contaminate the air, water, and/or soils. Hazardous materials fall into nine hazard classes, including the following:

- Explosive and blasting agents
- Compressed gases
- Flammable and combustible materials (liquid and solids)
- Oxidizing materials
- Poisons
- Radioactive materials
- Corrosive liquids
- Miscellaneous hazardous materials

Environmental hazards in Montour County focus mainly on hazardous material releases at fixed facilities or due to transportation accidents.

#### **Fixed facility**

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 aware of the presence and release of chemicals at individual facilities. The EPCRA was designed to ensure that state and local communities are prepared to respond to potential chemical accidents through Local Emergency Planning Committees (LEPCs). LEPCs are charged with developing emergency response plans for SARA Title III facilities that cover the location and extent of hazardous materials; establish evacuation plans, response procedures, and methods to reduce the magnitude of a materials release; and establish methods and schedules for training and exercises.

There are fifteen facilities classified as using or storing extremely hazardous substances as defined by the EPA (PEMA, 2018). However, because SARA Title III facilities are covered under their own unique planning process and are continually evaluated through the LEPC, this HMP will focus on the EPA-identified hazardous materials sites known collectively as Toxic Release Inventory (TRI) sites. This dataset, publicly available at [http://www.epa.gov/enviro/geo\\_data.html](http://www.epa.gov/enviro/geo_data.html) concerns several materials facilities, including the following:

- Superfund National Priorities List (NPL) sites
- RCRAInfo (EPA and state treatment, storage, disposal) facilities
- TRI System Sites
- Integrated Compliance Information System (ICIS) and Permit Compliance System (PCS)
- National Pollutant Discharge Elimination System (NPDES) Majors
- RCRAInfo – Large Quantity Generators (LQGs)
- Air Facility System (AFS) – Major discharges of air pollutants
- RCRAInfo – Corrective Actions

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- Risk Management Plan
- Section Seven Tracking System Sites (Pesticides)
- ACRES – Brownfields Properties

Using this dataset will help to provide a more complete picture of the risk of hazardous materials releases in Montour County. Montour County has seven EPA-identified hazardous materials sites throughout the county. Several of these facilities are close to population centers that could be affected should a major accident or spill occur. *Table 51 - EPA Tri Facilities Per Jurisdiction in Montour County* provides the number of TRI facilities in each jurisdiction. For a complete listing of TRI sites, please see Appendix E.

*Table 51 - EPA Tri Facilities Per Jurisdiction in Montour County*

<b>EPA Tri Facilities Per Jurisdiction in Montour County</b>	
<b>Municipality</b>	<b>Number of TRI Facilities</b>
Anthony Township	0
Cooper Township	0
Danville Borough	7
Derry Township	0
Liberty Township	0
Limestone Township	0
Mahoning Township	0
Mayberry Township	0
Valley Township	0
Washingtonville	0
West Hemlock Township	0
<b>Total</b>	<b>7</b>

An additional concern relative to the county is the existence of Methamphetamine (meth) labs in the area, which produce another type of material hazardous to human health. According to the Meth Project, which is considered one of the nation’s most effective prevention programs against this drug, Meth is the greatest drug threat in the nation. Meth is a very addictive drug. When it is abused, it can lead to strong, negative medical, social, and psychological consequences, to include the following:

- Memory loss
- Aggression
- Psychotic behavior

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- Heart damage
- Malnutrition
- Severe dental problems

Meth labs themselves are also dangerous places, as they are often filled with household cleaners, camping fuel, stripped batteries, and other hazardous materials, in addition to the drug itself. More information on meth, drug activity hot spots, the consequences of taking it, and prevention programs can be located at the Meth Project's website <http://www.methproject.org/>.

### **Transportation**

The major highways most frequently used by facilities in Montour County to transport hazardous materials are Interstate 80 and U.S. Route 11, along with S.R. 54, 45, 254, and 642.

#### **4.3.16.2 Range of Magnitude**

Hazardous material releases can contaminate air, water, and soils, possibly resulting in death and/or injuries. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur because of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary incidents. 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 materials 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 materials release. Exacerbating conditions, or characteristics that can enhance or magnify the effects of a hazardous materials release, include the following:

- Weather conditions, which affect how the hazard occurs and develops.
- Micro-meteorological effects of buildings and terrain, which alters the dispersion of hazardous materials.
- Noncompliance with applicable codes (e.g., building or fire codes) and maintenance failures (e.g., fire protection and containment features), which can substantially increase the damage to the facility itself and to surrounding buildings.

Whether or not a hazardous materials site is contained in the SFHA is also a concern, as there could be larger-scale water contamination during a flood incident, should the flood compromise the production or storage of hazardous chemicals. Such a situation could swiftly move toxic chemicals throughout a water supply and across great distances.

The severity of a given incident is dependent on not only 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.

The existence of meth labs in Montour County can result in increased hard drug usage among citizens and can ultimately result in death, serious injury, or mental trauma. Meth can cause psychosis, leading to

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delusions, hallucinations, aggression, and paranoia. Meth induced psychosis can result in increased violence toward other people, as well as toward the drug user. While most incidents of Meth lead to only a small overall impact on the population, the overall fear and social anxiety that the prevalence of the drug in the community can cause to members of the community can become relatively large.

### **4.3.16.3 Past Occurrence**

With some exceptions, many hazardous materials incidents over the past few years involved petroleum product spills along the highways or leaks from a fixed source. Most of these were the result of collisions or leaks and had limited impact on people and the environment. The number of hazardous materials being produced, stored, and transported continues to increase each year in Pennsylvania.

Concerning Methamphetamine, a sudden surge in this drug's usage appeared in 2010 throughout central Pennsylvania. Police have continued to discover meth labs in Danville and other parts of Montour County, along with labs in Berwick, lower Luzerne County, and parts of Columbia County. The existence of these labs led to an increase in drug addiction, burned buildings, endangered children, and arrests of both addicts and meth lab developers/distributors. Ultimately, over 100 meth suspects were investigated and potentially charged for their criminal behavior. In May of 2019, a meth lab was blamed for a fire that gutted a home on Chambers Street, Danville, according to WNEP Web Staff.

PEMA provides an annual report for the Pennsylvania Hazardous Material Emergency Planning and Response Act 1990-165. This report provides a summary of hazardous materials incidents by county. Montour County had the following:

- Calendar year – 2016. There were nine reports:
  - One for hazardous materials/petroleum
  - Two for infrastructure
  - Three for law enforcement
  - Three for other unspecified
- Calendar year – 2017. There were thirteen reports:
  - One for adverse severe weather
  - Two for fire
  - Two for hazardous materials
  - One for law enforcement
  - Five transportation emergencies
  - Two utility emergencies
- Calendar year – 2018. There were no incidents reported.

For calendar year 2018, Pennsylvania had 12,025 facilities submit reports on 42,067 chemicals. During the same reporting timeframe, Montour County had fifteen facilities report on seventy-three chemicals.

### **4.3.16.4 Future Occurrence**

While incidents involving hazardous materials releases and Meth labs have occurred in Montour County in the past, they are generally difficult to predict. Any occurrence is largely dependent upon the accidental or intentional actions of a person or group. Population growth, especially in areas close to transportation routes, can expose more people to these hazards if a release incident occurs. The transport, storage, and handling of hazardous materials are increasing nationwide and with this is the potential for an increase in accidents.

The continuing trend of accidents involving hazardous materials in Montour County is expected to remain constant. The probability of future occurrence is likely, according to the risk factor methodology probability

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criteria. The continuing trend of Meth labs in the county is expected to decrease over time, and while the probability of future occurrence is also likely, it will likely not be large in scale.

While future occurrences cannot be eliminated, emergency responders can prepare for hazardous materials releases (to include Meth labs) by maintaining an annual training schedule for courses from HazMat Awareness to specialty courses.

### **4.3.16.5 Vulnerability Assessment**

Jurisdictions that are home to one or more of the TRI facilities should be considered vulnerable to hazardous materials releases from fixed facilities.

Hazmat incidents involving hydrocarbons continue to be ranked as one of the most frequent hazardous materials incidents. Most of these incidents usually involve transportation mediums. This can be attributed to several factors, such as the county being home to multiple TRI sites, the transportation of hazardous materials to and from these sites and continued industrial growth in the county. Another major contributing factor is the high number of major roadways that run through Montour County, including US 11, PA 44, PA 45, PA 54, PA 254, and PA 642, as well as Interstate 80.

Montour County also has large sections of rural and forested areas. Consequently, it is quite common to see herbicides, insecticides, and fertilizers that are classified as extremely hazardous substances. When not properly controlled, these substances can pose health and/or environmental problems. In addition, the county contains underground pipelines, pump stations, and terminals that transport and distribute several different petroleum products (e.g., butane, ethane, fuel oil, jet fuel, kerosene, propane, and low-sulfur diesel). There are also underground pipelines throughout the county that transport natural gas to various locations. These pipelines and related facilities pose a certain level of risk, depending on the type of materials and their proximity to highly populated sections of the county.

Most counties in Pennsylvania, in the past few years have been affected with environmental hazards from hydraulic fracking the Marcellus Shale oil field. However, there has not been any hydraulic fracking in Montour County.

### **4.3.17. Nuclear Incidents**

#### **4.3.17.1 Location and Extent**

Nuclear incidents generally refer to incidents involving the release of significant levels of radioactivity or exposure of workers or the public to radiation. The primary concern following a nuclear incident or accident is the extent of radiation, inhalation, and ingestion of radioactive isotopes that can cause acute health effects (e.g., death, burns, severe impairments), chronic health effects (e.g., cancer), and psychological effects.

Although the county has no nuclear facilities within its borders, it is located relatively near several major nuclear facilities. The closest nuclear facility is the Susquehanna Steam Electric Station in Salem, Pennsylvania, which lies about thirty-three miles away from the county. The Susquehanna Steam Electric Station is the only station close enough to the county that it falls within the fifty-mile radius for potential contamination. According to the Natural Resources Defense Council (NRDC), this station has two operating nuclear reactors.

The Limerick Generating Station, located in Pottstown, Pennsylvania, and the Peach Bottom Atomic Power Station, located in Peach Bottom Township, York County, Pennsylvania, are both about 128 miles from Montour county. In addition, the Three Mile Island Nuclear Generating Station is about ninety miles from Montour county in Londonderry Township, Dauphin County; its license expired in 2019 and, at the writing



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of this plan, was conducting appropriate decommissioning and dismantlement requirements and was for sale.

The Nuclear Regulatory Commission encourages the use of Probabilistic Risk Assessments (PRAs) 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 that include a Plume Exposure Pathway Emergency Planning Zone (EPZ) with a radius of about ten miles from each nuclear power facility and an Ingestion Exposure Pathway EPZ with a radius of about fifty miles from each facility. See *Table 52 – Emergency Planning Zones*. The exact size and configuration of the EPZ may vary in relation to local emergency response capabilities, topography, road networks, and political boundaries.

*Table 52 - Emergency Planning Zones*

<b>Emergency Planning Zones</b>	
<b>EPZ</b>	<b>Description</b>
<b>Plume Exposure Pathway</b>	Has a radius of about 10 miles from each reactor site. Predetermined protective action plans are in place and include sheltering, evacuation, and the use of potassium iodide where appropriate.
<b>Ingestion Exposure Pathway</b>	Has a radius of about 50 miles from each reactor site. Predetermined protective action plans are in place and are designed to avoid or reduce dose from potential ingestion of radioactive materials. These actions include a ban of contaminated food and water.

Source: U.S. Nuclear Regulatory Commission <http://www.nrc.gov/about-nrc/emerg-preparedness/about-emerg-preparedness/planning-zones.html>

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Figure 42 - Location of Nuclear Facilities Relative to Montour County

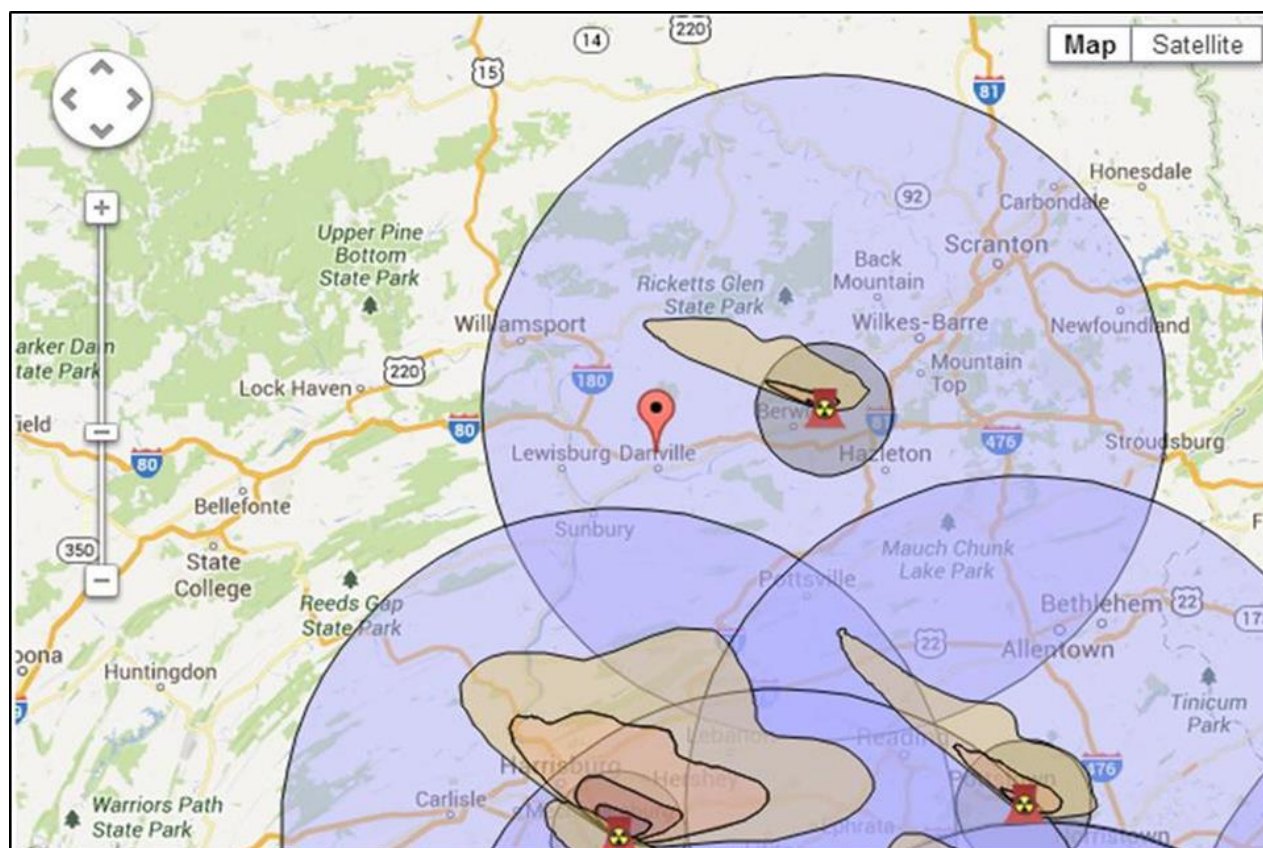


Figure 42 - Location of Nuclear Facilities Relative to Montour County shows the location of the commonwealth nuclear facilities that could potentially impact the county.

### 4.3.17.2 Range of Magnitude

The magnitude of a nuclear incident differs for those within the Plume Exposure Pathway EPZ and those within the Ingestion Exposure Pathway EPZ. The Plume Exposure Pathway refers to whole-body external exposure to gamma radiation from a radioactive plume and from deposited materials and inhalation exposure from the passing radioactive plume. The duration of primary exposures could range in length from hours to days. The Ingestion Exposure Pathway refers to exposure primarily from ingestion of water or foods such as milk and fresh vegetables that have been contaminated with radiation.

Nuclear accidents themselves are classified into three categories:

- Criticality accidents: Involves loss of control of nuclear assemblies or power reactors.
- Loss-of-coolant accidents: Occurs 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 makeup system.
- Loss-of-containment accidents: Involves the release of radioactivity from materials such as tritium, fission products, plutonium, and natural, depleted, or enriched uranium. Points of release have been

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containment vessels at fixed facilities or damaged packages during transportation accidents. Nuclear facilities must notify the appropriate authorities in the incident of an accident.

The Nuclear Regulatory Commission uses four classification levels for nuclear incidents (Nuclear Regulatory Commission, 2008):

- **Unusual Event**: Under this category, incidents are in process or have occurred, which indicates potential degradation in the level of safety of the plant. No release of radioactive material requiring off-site response or monitoring is expected unless further degradation occurs.
- **Alert**: If an alert is declared, incidents 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 EPA's Protective Action Guides (PAGs).
- **Site Area Emergency**: A site area emergency involves incidents 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's 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's PAGs for more than the immediate site area.

The nuclear industry has adopted predetermined, site-specific Emergency Action Levels (EALs). The EALs provide the framework and guidance to observe, address, and classify the severity of site-specific incidents and conditions that are communicated to off-site emergency response organizations (Nuclear Regulatory Commission, 2008). There are additional EALs that specifically deal with issues of security, such as threats of airborne attack, hostile action within the facility, or facility attack. These EALs ensure that appropriate notifications for the security threat are made in a timely manner. Each facility is also equipped with a public alerting system, which includes several sirens to alert the public located in the EPZ. This alerting system is activated by the counties of each specific EPZ. Emergency notifications and instructions are communicated to the public via the Emergency Alert System as activated by the Commonwealth Resource Coordination Center (formerly Pennsylvania Emergency Operations Center). State officials also have the capability to send emergency messages as text messages to mobile devices.

### **4.3.17.3 Past Occurrence**

Nuclear incidents rarely occur, but the incident at Three Mile Island is the worst fixed nuclear facility accident in U.S. history. The resulting contamination and state of the reactor core led to the development of a 14-year cleanup and scientific effort. Additionally, the *President's Commission on the Accident at Three Mile Island* examined the costs of the accident, concluding that "the accident at Three Mile Island on March 28, 1979, generated considerable economic disturbance. Some of the impacts were short term, occurring during the first days of the accident. Many of the impacts were experienced by the local community; others will be felt at the regional and national levels." The report concluded: "It appears clear that the major costs of the TMI Unit 2 accident are associated with the emergency management replacement power and the plant refurbishment or replacement. The minimum cost estimate of nearly one billion dollars supports the argument that considerable additional resources can be cost effective if spent to guard against future accidents."

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Despite the severity of the damage, no injuries due to radiation exposure occurred. However, numerous studies were conducted to determine the measurable health effects related to radiation and/or stress. More than a dozen epidemiological and stress-related studies conducted to date have found no discernible direct health effects on the population in the vicinity of the plant. However, one study conducted by the Pennsylvania Department of Health's Three Mile Island Health Research Program did find evidence of psychological stress, "lasting in some cases for five to six years." According to the program chief, "the people suffering from stress perceived their health as being poorer than it actually was when the health department checked the medical records."

The accident at Three Mile Island had a profound effect on the residents, emergency management community, government officials, and nuclear industry, not only in Pennsylvania, but nationwide. There were minimal requirements for off-site emergency planning for nuclear power stations prior to the accident. Afterward, comprehensive, coordinated, and exercised plans were developed for the state, counties, school districts, special facilities (hospitals, nursing homes, day care centers, and detention facilities) and municipalities to ensure the safety of the populations. Costs associated with an incident at one of the commonwealth's nuclear facilities, be it real or perceived, are significant. The mitigation efforts put in place immediately following the 1979 accident continue until today. The commonwealth's nuclear/radiological plan, which is a successor of the original "Annex E," is a result of the commonwealth's efforts to address the many components of mitigation planning. The comprehensive planning involved with the five nuclear facilities is an ongoing effort. Plans are reviewed and amended on an annual basis.

Another incident occurred at Three Mile Island on February 7, 1993, when an individual drove his car through a chain-link fence and then slammed into a roll-up garage door leading into the facility's turbine building. Plant officials, fearing the worst, immediately declared a Site Area Emergency. Fortunately, the person who crashed the gate was found and apprehended. Other than property damage caused by the forcible entry through physical structures, there was no lasting damage to the facility.

#### **4.3.17.4 Future Occurrence**

Pennsylvania is the site of the only nuclear power plant with an incident rated as a General Emergency in the nation. Since the Three Mile Island incident, nuclear power has become significantly safer and is one of the most heavily regulated industries in the nation. Despite the knowledge gained since then, there is still the potential for a similar accident to occur again at any of the nuclear generating facilities near the county. The Nuclear Energy Agency of the Organization for Economic Co-Operation and Development notes that studies estimate the chance of a breach of protective barriers in a modern nuclear facility at less than one in 100,000 per year (Nuclear Energy Agency, 2005). Nuclear incident occurrences may also happen because of intentional actions, but these terrorist acts are rare. Nuclear incidents are rare in or near Montour County and should be considered unlikely.

#### **4.3.17.5 Vulnerability Assessment**

Susquehanna Steam Electric Station is the only nuclear facility that is located close enough to the county for the county to fall within the fifty-mile potential contamination zone. Based on 2010 census data, there are 1,880,000 people living in this station's fifty-mile Ingestion Planning Zone (IPZ) and 80,000 people living in the ten-mile EPZ. Of this number, 442 public schools and thirty-three hospitals are also in the fifty-mile EPZ. These individuals and facilities are considered vulnerable to direct radiation exposure if a significant nuclear incident were to occur. Evacuation and emergency planning for nuclear incidents is usually conducted at multiple levels, including the municipality level, countywide, statewide, and privately (i.e., the facility's own EOP).

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In addition to the areas of Montour County facing direct contamination risk, the entire county would also be affected on some level by incidents from any of the other nearby nuclear facilities, such as those at Peach Bottom, Three Mile Island, and Limerick. Evacuation of residents from these areas could lead to increased population or through-traffic in the county. Additionally, county residents could be negatively impacted through the psychological effects of a nuclear incident as the effects and likelihood of radiation contamination are not always well understood by the public. Another particular concern is the possibility of food, soil, and water contamination.

Water contamination is always a concern in nuclear incidents. Public water supplies, coupled with the county's domestic drinking water wells, are all vulnerable to the effects of a nuclear incident. While unlikely that all agricultural products would be lost in the event of a nuclear incident, the county could expect some portion of the agricultural products to be lost. The time of year also impacts the vulnerability and losses estimated for a nuclear incident; an incident that occurs during the prime growing and harvesting season will have a larger impact on the county. For example, the incident at Three Mile Island occurred in the off-season; as a result, the United States Department of Agriculture estimated that agricultural losses for the entire Commonwealth were not more than one million dollars.

Significant emergency planning occurs at the state level to reduce the overall vulnerability of the county's communities to nuclear incidents. The Safety Evaluation Report for Susquehanna Steam Electric Station, most recently published in 2009, reviews many of the mechanical and engineering safety features as part of the license renewal process for the station. There are seventy-six alert sirens for public notification in the ten-mile EPZ. These preparations, in addition to the utility company's own public information campaigns, help to reduce vulnerability, and better prepare county citizens for a nuclear incident.

### **4.3.18. Terrorism and Cyber Terrorism**

#### **4.3.18.1 Location and Extent**

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. Often, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences. However, it is important to consider that the prevalence of Homegrown Violent Extremists (HVEs) has increased in recent years, with individuals able to become radicalized on the internet. In a speech on August 29, 2018 addressed to the 11<sup>th</sup> annual Utah National Security and Anti-Terrorism Conference, FBI Director Christopher Wray describes HVEs as "the primary terrorist threat to the homeland here today, without question."

Critical facilities are either in the public or private sector that provide essential products and/or services to the general public. Critical facilities are often necessary to preserve the welfare and quality of life in the county, or fulfill important public safety, emergency response, and/or disaster recovery functions. Critical facilities identified in the county are: shelters; gas, electric and communication utilities; hospitals and other health care facilities; water and wastewater treatment plants, hazardous waste sites; and schools.

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In addition to critical facilities, the county contains at risk populations that should be factored into a vulnerability assessment. These populations include not only the residents and workforce in the county, but also the tourists that visit the area on a daily basis, those that are traveling through the county on any of the major highways and marginalized groups such as LGBTQ persons and racial minorities. Potential targets for attack include:

- Commercial facilities
- Abortion or family planning clinics/organizations associated with controversial issues.
- Education facilities
- Events attracting large amounts of people.
- Places of worship
- Industrial facilities, especially those utilizing large quantities of hazardous materials.
- Transportation infrastructure
- Historical sites; and
- Government facilities

### **4.3.18.2 Range of Magnitude**

Terrorism may include use of Weapons of Mass Destruction (WMD) (including biological, chemical, explosive, nuclear, and radiological weapons) arson; incendiary, explosive, armed attacks; industrial sabotage; intentional hazardous materials releases; and cyber-terrorism. Within these general categories, there are many variations. There is a wide variety of agents and ways for them to be disseminated, particularly in the case of biological and chemical weapons. Terrorist methods can take many forms, including:

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

Active assailant incidents and threats can disrupt the learning atmosphere in schools, interfere with worship services, cause traffic to be re-routed, and uses taxpayer assets from deploying police, EMS and/or fire units. Montour County has one school district (per Public Schools K12).

The areas along major transportation routes can be susceptible to forms of public transit terrorist attacks. More populated areas of the county, including the county seat of Danville, can be susceptible to chemical, biological, radiological, nuclear, or explosive (CBRNE) events due to the concentration and density of residential communities and government activity and buildings. Secondary effects from CBRNE incidents can be damaging as well. Mass evacuations could result in congestion of roadways and possibly result in

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breakdown of civil order, further exacerbating the situation. Government operations may be disrupted due to the need to displace or operate under reduced capacity. Radiation fallout, hazardous chemical introduction into the groundwater, or biologic/germ agents can cause long-term environmental damage.

Cyber terrorism is becoming increasingly prevalent. Cyber terrorism can be defined as activities intended to damage or disrupt vital computer systems. These acts can range from taking control of a host website to using networked resources to directly cause destruction and harm. Protection of databases and infrastructure are the main goals for a safe cyber environment. Cyber terrorists can be difficult to identify because the internet provides a meeting place for individuals from various parts of the world. Individuals or groups planning a cyber-attack are not organized in a traditional manner, as they are able to effectively communicate over long distances without delay. The largest threat to institutions from cyber terrorism comes from any processes that are networked and controlled via computer.

Ransomware continues to be the leading threat, with Maze ransomware accounting for nearly half of all known cases in 2020. Yet the [Acronis Cyberthreats Report](#) points to a growing trend of cybercriminals trying to maximize their financial gain. Not content to collect ransoms to decrypt infected data, they steal proprietary – and sometimes embarrassing – data before encrypting it. They then threaten to publicly release the stolen files if the victims do not pay up.

### **4.3.18.3 Past Occurrence**

Danville-based Geisinger Health Plan discovered the protected health information (PHI) of some of its members was exposed as a result of a suspected phishing attack on one of its business associates, Magellan NIA. Magellan NIA discovered the breach on July 5, 2019 when suspicious activity was detected in the email account of one of its employees. The account was immediately secured to prevent further unauthorized access and misuse and an investigation was launched to determine the extent of the breach. The investigation revealed the account was breached on May 28, and there had been several connections to the account up until July 5. Those connections were made from a location outside the United States. Geisinger Health Plan believes the sole purpose of the attack was to gain access to email accounts for the purpose of spamming, rather than to steal sensitive plan member data. However, it was not possible to rule out unauthorized data access and theft of plan member data, so the incident was classed as a data breach.

There have been no physical terrorist attacks in the county, to date.

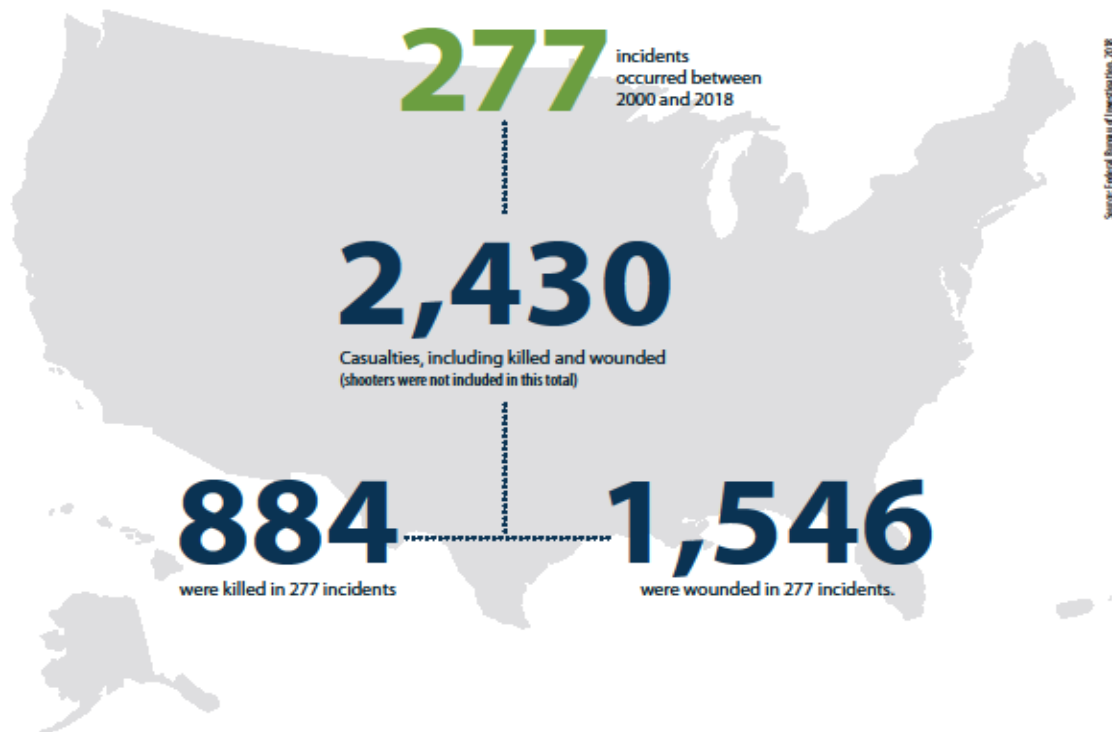
An active assailant (shooter), as defined by the U.S. Department of Homeland Security, is an individual actively engaged in killing or attempting to kill people in a confined area; in most cases, active shooters use firearms and there is not necessarily a pattern or method to their selection of victims. Throughout the year in 2020, there was a total of 28 mass shooting incidents in the United States according to the FBI. Often these shooters are homegrown violent extremists (HVE). Two significant events have occurred in Pennsylvania in recent history: one happened on October 27, 2018, when eleven people were killed by a gunman in the Pittsburgh neighborhood of Squirrel Hill; the gunman (an HVE) attacked the congregation at the *Tree of Life* Synagogue in a shooting that targeted the Jewish population and was fueled by the gunman's anti-Semitic, anti-immigrant, and anti-refugee sentiments; and, in January 2019, a gunman killed two people and permanently injured one inside P.J. Harrigan's bar in State College and later killed a homeowner and himself.

A few other significant active shooter events include those that occurred at Virginia Tech (April 2007), Sandy Hook elementary School (December 2012), San Bernardino, California (December 2015), an Aurora, Colorado movie theater (July 2012) and a church in Charleston, South Carolina (June 2015). A 2014 study by the FBI concluded that there has been a significant recent increase in frequency of active shooter incidents, and the vast majority (154 of 160 shooters between 2000 and 2013) were male (FBI, 2014). Of

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these 160 incidents, 45.6% took place in commercial environments, 24.3% took place in an educational environment, and the remaining 30.1% took place at other locations such as open spaces, military and other government properties, residential locations, houses of worship, and health care facilities (FBI, 2019). The annual report on the study may be found here: <https://www.justice.gov/usao-mdpa/page/file/1272096/download>. See *Figure 43 - Active Shooter Incidents 2000-2018* from that same report.

Figure 43 - Active Shooter Incidents 2000-2018 (FBI, 2019)



Significant international terrorism incidents in the USA include: the World Trade Center bombing in 1993, the bombing of the Murrow Building in Oklahoma City in 1995, and the September 11, 2001 attacks on the World Trade Center and The Pentagon. One of the aircrafts hijacked in the September 11, 2001 attack crash landed in Somerset County, Pennsylvania before it reached its intended target. While fatalities and destruction at the intended target were avoided, all passengers on the flight perished.

While the largest scale terrorist incidents have often had international stimuli, many other incidents are caused by home grown actors who may have become radicalized through hate groups either in real life or via the internet, and who may struggle with mental health issues or idleness constraints caused by the on-going pandemic. Hate groups such as the *Ku Klux Klan (KKK)*, *Aryan Nation* and, more recently, the *Alt-Right*, *Antifa*, *Proud Boys*, plus conspiracy theorist believers/promoters such as *QAnon*, have been a part of domestic terrorism in different forms. Supporters of former President Donald Trump from one or more of these groups stormed the United States Capitol on January 6, 2021 to disrupt certification of the 2020 presidential election, resulting in five deaths and evacuation of the Congress.



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### 4.3.18.4 Future Occurrence

The likelihood of Montour County being a primary target for a major international terrorist attack is small. More likely terrorist activity in Montour County includes bomb threats or other incidents at schools. Montour County has one school district consisting of three public schools. Despite the lack of recent events, bomb threats at schools are typically experienced at least once a year across the county.

### 4.3.18.5 Vulnerability Assessment

Montour County should stay prepared to terrorism type incidents. With the existence of industrial commerce, interstate highways and freight railroad activity create soft targets that could be used to interfere with the focus of day-to-day life that the county enjoys. It is important to note that the use and exposure to biological agents can remain unknown for several days until the infected person(s), livestock, or crops begin to experience symptoms or show damages. Often such agents are contagious, and the infected persons must be quarantined, livestock culled, and/or crops destroyed.

And, although previous events have not resulted in what are considered significant terrorist attacks, the severity of a future incident cannot be predicted with a total level of certainty. One of the major concerns with agroterrorism is that acts can be carried out with minimal planning, effort, or expense (CBRNE Terrorism Newsletter, 2013).

The [Acronis Cyberthreats Report 2020](#) contains an in-depth review of the current threat landscape and projections for the coming year. Based on the protection and security challenges that were amplified by the shift to remote work during the COVID-19 pandemic, Acronis warns 2021 will bring aggressive cybercrime activity as criminals pivot their attacks from data encryption to data exfiltration. Takeaways of the report are the following:

- **Attacks against remote workers will increase.** While 31% of global companies reported daily cyberattacks in 2020, the frequency of attacks targeting their remote workers is projected to increase in 2021, since the defenses for systems outside of the corporate network are more easily compromised, giving bad actors access to that organization's data.
- **Ransomware will look for new victims, become more automated.** Rather than continuing to cast a wide net, ransomware attackers will focus on targets that provide a bigger return on their efforts. Breaking into one network to steal data from several companies is more profitable than attacking individual organizations. So, while small businesses will still be targeted, cloud environments and organizations like managed service providers will become more valued targets because their systems can provide access to the data of multiple clients.
- **Legacy solutions will struggle to keep up.** Blocking the new malware has rendered traditional antimalware solutions obsolete, as they cannot keep pace with the increased sophistication and frequency of new threats. The average lifespan of a malware sample in 2020 was just 3.4 days. As attackers continue to utilize automation, the number of malware samples will continue to climb. Organizations will need to find new approaches to protection that are agile and designed to stay ahead of new threats. Simple standalone security and backup solutions will no longer be enough.

And, according to a study carried out on the data sourced from FBI, Pennsylvania ranks second worst when it comes to handling cyber-attacks (outranked only by Hawaii). The study made by Information Network Associates - an international security consulting company - says an increase of 25 percent was witnessed in cyber-attacks between 2016 and 2017 and, hence, Pennsylvania has some prevention work to do.

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The probability of terrorist activity is more difficult to quantify than some other hazards. Instead of considering likelihood of occurrence, 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. Planning should work towards identifying potentially at-risk critical facilities and systems in the community, prioritizing those assets and locations, and identifying their vulnerabilities relative to known potential threats.

All communities in Montour County are vulnerable on some level, directly or indirectly, to a terrorist attack. However, communities with schools and government infrastructure like the county seat should be considered more likely to attract terrorist activity.

### **4.3.19. Transportation Accidents**

Transportation accidents are defined as an accident involving air, rail, and roadway travel resulting in death or serious injury or extensive property loss or damage. Accidents related to hazardous materials are considered under the hazardous materials section of this document.

#### **4.3.19.1 Location and Extent**

Montour County is serviced by two major highways: Interstate 80 (I-80), which runs east to west along the southern portion of the county, and U.S. Route 11 running east to west through Danville in the southern tip of Montour County. Major connector routes within the county include S.R. 54, S.R. 45, S.R. 254, and S.R. 642. Pennsylvania Department of Transportation (PennDOT) states that the county contains 172 miles of roadway, 137 bridges, two interstate roadside rests, and one picnic area.

There are no public airports listed in Montour County by the PennDOT Bureau of Aviation. However, this does not exclude the county from aviation accidents. Montour County has several general aviation airports within a short distance. The Danville Airport, the Northumberland County Airport, the Sunbury Airport, and the Sunbury Seaplane Base, are in Northumberland County. The Penn Valley Airport is in Selinsgrove, Snyder County. The Bloomsburg Municipal Airport is in Columbia County. Additionally, Geisinger Health Systems has two heliports located in the Borough of Danville.

Montour County is served by three major railroads: Canadian Pacific Railway, which runs through Mayberry Township along the North Branch Susquehanna River; North Shore Railroad Company which runs through Danville Borough, Anthony, Cooper, Derry, and Mahoning townships; and Norfolk Southern Railway, which has a line that runs through the northern part of Limestone Township.

Montour County Transit provides public transportation throughout Montour County. Common locations visited by Montour County Transit are Geisinger Health Systems and other doctors' offices, dentists' offices, pharmacies, grocery stores, and banks. Montour County Transit also provides transportation for the following services: medical assistance, human services, welfare-to-work programs, and MH/MR programs. Rabbit Transit also provides transportation to the county.

There are three pipeline companies that provide services or transport product through Montour County. Sunoco Pipeline, LLC, owns and operates a pipeline that runs through a small portion of Montour County, bisecting the southwestern edge of Liberty Township. This pipeline transports the following materials: butane, ethane, fuel oil, gasoline, jet fuel, kerosene, propane, and low-sulfur diesel. UGI Energy Services owns and operates a pipeline that runs through the northern part of the county. This pipeline transports natural gas and propane. UGI Utilities, Inc. owns and operates a pipeline that transports natural gas and hydrogen sulfide in and through Montour County. More information on the hazardous materials transported is outlined in the environmental hazards section of this document.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

### **4.3.19.2 Range of Magnitude**

Significant transportation accidents can result in death or serious injury or extensive property loss or damage. Road, pipeline, and railway accidents have the potential to result in hazardous materials release.

### **4.3.19.3 Past Occurrence**

The most common transportation accidents in the county are highway incidents involving motor vehicles. Montour holds one of the lowest rates in the Commonwealth for reported traffic crashes and made up only 0.2% of the total crashes in Pennsylvania in 2011. The county ties with Sullivan County for the fewest traffic-related deaths in Pennsylvania, as it has 0.1% of the state total traffic-related deaths. Crash facts and statistics were obtained from PennDOT and the National Highway Traffic Safety Administration’s Fatality Analysis Reporting System (FARS). *Table 53 - Montour County Crash Data* provides information on vehicle crashes and related fatalities between 2007 and 2019. Percentages are the comparison of that number to the statewide totals. *Table 54 - Crash-Related Fatalities* lists fatalities per year from 2007 to 2019 and is reported by The National Highway Traffic Safety Administration. Although the population has increased in the county over the last two decades, crash fatality rates have remained about the same.

*Table 53 - Montour County Crash Data*

<b>Montour County Crash Data</b>					
<b>Year</b>	<b>Total Crashes</b>	<b>Traffic Deaths</b>	<b>Pedestrian Deaths</b>	<b>Train/Vehicle Crashes</b>	<b>Deaths by Train/Vehicle</b>
2007	202 (0.2%)	2 (0.1%)	1	0	0
2008	206 (0.2%)	5 (0.3%)	1	0	0
2009	202 (0.2%)	0 (0.0%)	0	0	0
2010	202 (0.2%)	1 (0.1%)	0	1	0
2011	227 (0.2%)	1 (0.1%)	0	1	0
2012	224 (0.2%)	0 (0.0%)	0	0	0
2013	211 (0.2%)	1 (0.1%)	0	0	0
2014	221 (0.2%)	2 (0.2%)	0	0	0
2015	251 (0.2%)	5 (0.5%)	0	1	1
2016	217 (0.2%)	3 (0.3%)	0	0	0
2017	218 (0.2%)	5 (0.5%)	0	0	0
2018	218 (0.2%)	2 (0.2%)	0	0	0
2019	195 (0.2%)	2 (0.2%)	0	0	0

*Source: Pennsylvania Crash Facts & Statistics Report, PennDOT (2007-2019)*

*Table 54 - Crash-Related Fatalities*

<b>Crash-Related Fatalities</b>		
<b>Year</b>	<b>PA Crash related fatalities</b>	<b>US Crash related fatalities</b>
2009	1,256	33,883
2010	1,324	32,999
2011	1,286	32,367
2012	1,310	33,782
2013	1,210	32,893
2014	1,195	32,744

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

<b>Crash-Related Fatalities</b>		
<b>Year</b>	<b>PA Crash related fatalities</b>	<b>US Crash related fatalities</b>
2015	1,200	35,484
2016	1,188	37,806
2017	1,137	37,473
2018	1,190	36,560
<i>Source: NHTSA</i>		

Data obtained from the National Transit Safety Board (NTSB) shows two aviation-related incidents in the county between 2009 and 2020. These incidents are listed in *Table 55 - Aviation-Related Incidents*.

*Table 55 - Aviation-Related Incidents*

<b>Aviation-Related Incidents</b>		
<b>Event date</b>	<b>Location</b>	<b>Probable cause and severity</b>
5/11/2009	Danville, PA	Cause: The student pilot's failure to maintain control during a landing. Event Severity: Nonfatal
2/14/2013	Danville, PA	Cause: Not listed. Location involved the Geisinger Medical Center. Event Severity: Nonfatal

#### **4.3.19.4 Future Occurrence**

The number of transportation-related accidents is expected to rise with increased vehicular usage. Transportation incidents may increase slightly over the next five years without proper mitigation strategies in place. Therefore, based on this and past occurrences, the probability of transportation accidents is characterized as highly likely.

According to the United States Department of Transportation the average rate of aviation accidents nationwide is 5.88 accidents per 100,000 flight hours (2018). Therefore, the likelihood of an aviation incident in Montour County is considered low.

#### **4.3.19.5 Vulnerability Assessment**

A transportation-related accident can occur on any stretch of road or railway in Montour County. However, severe accidents are more likely along major highways such as the Interstate or State Routes, which experience heavier traffic volumes, including heavy freight vehicles. Although the overall impact of transportation accidents in the county is likely to be low when compared to the rest of the Commonwealth, barring a hazardous material release or other unplanned circumstances, the impact upon the county itself is much greater, due to its small size.

*Figure 44 – Transportation Vulnerability Map* identifies the vulnerable roadways and railways in Montour County. This map also reflects a ¼ mile vulnerable zone for each roadway and railway. Critical facilities

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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were identified within this ¼ mile zone. These critical facilities are more vulnerable to a transportation related accident than critical facilities that are not within that vulnerability zone. *Table 56 – Critical Facilities within ¼ Mile of Major Transportation Routes* identifies the various critical facilities.

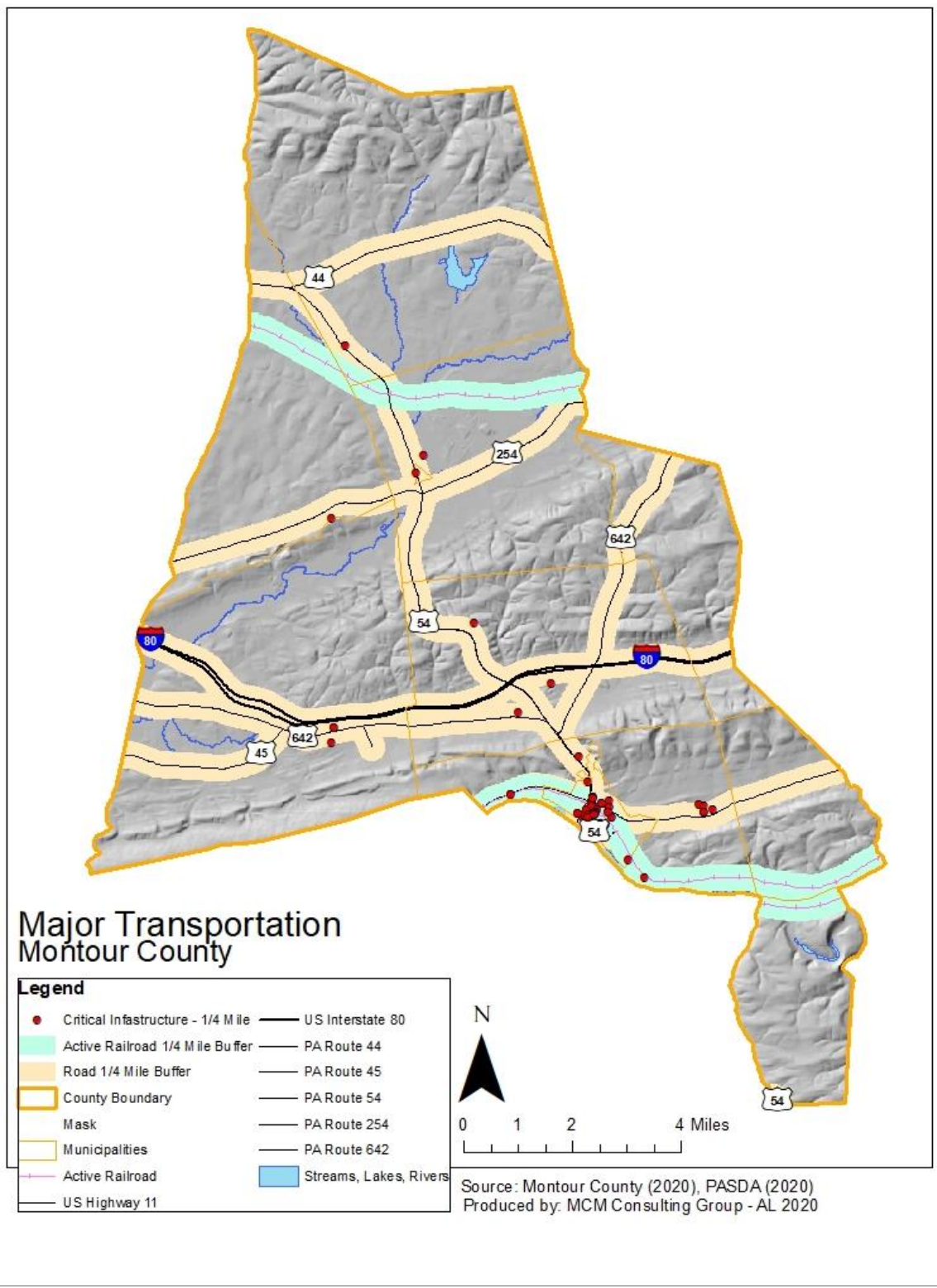
*Table 56 - Critical Facilities within ¼ Mile of Major Transportation Routes*

<b>Critical Facilities within ¼ Mile of Major Transportation Routes</b>			
<b>Critical Facility</b>	<b>Quantity</b>	<b>Critical Facility</b>	<b>Quantity</b>
9-1-1 Tower	5	National Guard	1
Emergency Services Facilities	8	Prison	2
Health and Medical	45	State Government	4
Municipal/County Government	17		

*Figure 45 – Percentage of Truck Traffic on Major Roads* identifies percentage data for all the major routes in Montour County as outlined by PASDA (2020).

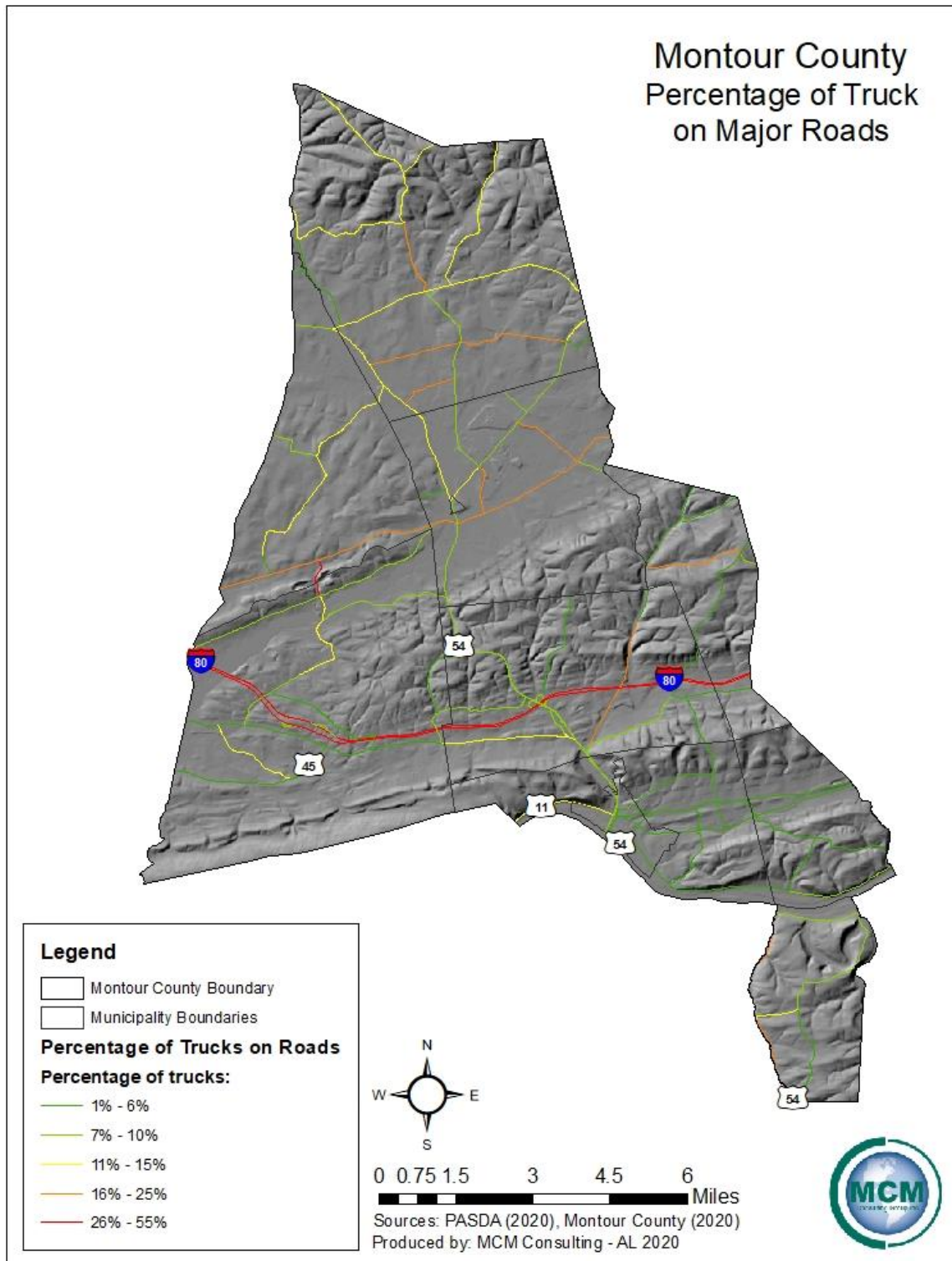
# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Figure 44 – Transportation Vulnerability Map



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Figure 45 - Percentage of Truck Traffic on Major Roads



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## **4.3.20. Utility Interruptions**

### **4.3.20.1 Location and Extent**

Power outages can happen anywhere that power is supplied. The causes for outages are usually downed power wires or utility poles because of inclement weather or vehicle accidents. Additionally, outages can be caused by blown transformers or tripped circuit breakers. Most often, there is no cause reported and power is restored within the hour.

Different utilities companies service different regions of Pennsylvania and the US. The breakdown of utilities' providers for the county is as follows:

- Electric services are provided by PPL Electric Utilities Corporation
- Water/Sewer services:
  - Much of the county is serviced by private wells and private septic.
  - The Borough of Danville and Mahoning Township provide public water and sewer.
  - Valley Township and Washingtonville Borough provide public sewer.
  - Cooper Township has limited public sewer.
- Natural gas services are provided by UGI Energy Services and UGI Utilities, Inc. Communications access is available through Alltel, Sprint, Verizon, MCI WorldCom Network Services, Inc., and Service Electric Cable TV.

Utility interruptions are caused primarily by electrical failures, which are commonly a secondary effect of hazards, such as severe weather and flooding. High winds, along with heavy snow, ice, and rain, can affect an electrical system's ability to function. Worker strikes at power generation facilities have also been known to cause minor power failures. Other causes of power outages include falling tree limbs, vehicular accidents, and small animals that destroy wiring. When major power outages occur, they are typically on a regional scale.

### **4.3.20.2 Range of Magnitude**

Utility interruptions do not typically lead to large-scale problems by themselves. Neither do direct human casualties that typically result from outages. However, because many utility interruptions occur during storms or other severe weather events, they can have severe secondary consequences. Typical secondary effects from a power outage could be a delay in emergency response services from poor communication or a lack of potable water for drinking/health services.

Montour County's worst-case scenario would be an extended countywide power outage during an extreme temperature event. Numerous facilities are dependent on power to serve the needs of the community, specifically individuals with access and functional needs. These facilities include schools, long-term care facilities, and hospitals.

### **4.3.20.3 Past Occurrence**

Utility outages have been caused by winter storms, wind, vehicle accidents, and other factors. The Pennsylvania Public Utility Commission (PUC) tracks the reliability of Electric Distribution Companies (EDC) and outages during the year. According to the PUC's 2011 Electric Service Reliability report, eight of the eleven EDCs achieved compliance with the twelve-month Customer Average Interruption Duration Index (CAIDI) performance, which concerns the time duration of power outages, while nine achieved compliance



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with the twelve-month System Average Interruption Frequency Index (SAIFI), which focuses on the frequency of outages.

More than 3.8 million electric outages from extreme weather events were reported in Pennsylvania during 2011, ranking at the highest number of customer electric outages in the past nine years. Many Pennsylvania residents experienced outages greater than seventy-two hours. The events leading to so many outages included the following:

- Heavy snow and some ice in February
- Strong thunderstorms in late May
- Hurricane Irene in late August
- Tropical Storm Lee in early September
- Early-season heavy, wet snow in late October

*Table 57 - 2011 Power Outages by EDC* below compares the customers affected by power outages in Pennsylvania during 2011 as broken down by EDC. This information was shared with the PUC by the EDCs and compiled into the Summary Report of Outage Information Reported by the EDCs, which investigates and analyzes the outage reports in other categories.

*Table 57 - 2011 Power Outages by EDC*

<b>2011 Power Outages by EDC</b>			
<b>EDC</b>	<b>Customers affected (total outages)</b>	<b>Customers affected (Outages greater than seventy-two hours)</b>	<b>Percentage of customers affected for greater than seventy-two hours to total outages</b>
Met Ed	159,360	50,476	31.7
PECO	129,407	4,036	3.1
Penelec	25,999	2,023	7.8
Penn Power	221	0	0
Pike County Electric	1,552	861	55.5
PPL	275,758	43,197	15.7
UGI Electric	16,036	9,921	61.9
Wellsboro	249	1	0.4
West Penn Power	1,637	108	6.6
Totals	610,219	11,623	18.1%

*Source: PUC, 2011*

*Table 58 –2018 Winter Storms Riley and Quinn Power Outages by EDC* compares the customers affected by power outage in Pennsylvania during these storms and compares them to statistics from Nika 2014 and Sandy 2012. Some of the EDCs were not impacted by Winter Storm Quinn. PPL customers experienced power outages for a duration of eight days with Winter Storms Quinn and Riley, whereas during Sandy in 2012 the duration was nine days, and just over three days for Nika in 2014.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Table 58 - 2018 Winter Storms Riley and Quinn Power Outages by EDC

<b>2018 Winter Storms Riley and Quinn Power Outages by EDC</b>			
<b>EDC</b>	<b>Customers affected by storms Riley and Quinn 2018 (Percentage of total customers)</b>	<b>Customers affected Nika 2014 (Percentage of total customers)</b>	<b>Customers affected Sandy 2012 (Percentage of total customers)</b>
Met-Ed	272,928 (49.22%)	144,000 (26.00%)	298,300 (54.00%)
PECO	794,969 (46.76%)	723,681 (42.00%)	845,703 (54.20%)
Penelec	90,856 (15.61%)	N/A	96,847 (16.40%)
PCLP	2,101 (47.44%)	N/A	4,487 (100.00%)
PPL	261,341 (18.67%)	92,283 (7.00%)	523,936 (37.50%)
Total	1,422,195	959,964	1,769,273

*Source: Winter Storm Riley and Quinn Report 2019*

#### **4.3.20.4 Future Occurrence**

Power outages can be expected at any time of year, on a nearly monthly basis. Iced power lines; falling tree limbs due to ice, wind, or lightning strikes; and vehicle accidents damage power lines, or their support poles are reasons for power outages. Montour County should consider the probability of future utility interruptions as likely.

#### **4.3.20.5 Vulnerability Assessment**

Resources such as electricity, communications, gas, and water supply are critical to ensure the health, safety, and general welfare of the citizenry. Power outages can cause even greater detriment to at-risk and vulnerable populations, such as the elderly or those with functional and access needs. All critical infrastructures are vulnerable to the effects of a power outage. The probability of a large-scale, extended utility failure is low; however, small-scale failures lasting short periods of time occur annually.

### **4.4. Hazard Vulnerability Summary**

#### **4.4.1. Methodology**

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

RF values were obtained by assigning varying degrees of risk to five categories for each of the hazards profiled in the HMP update. Those categories include *probability, impact, spatial extent, warning time and duration*. Each degree of risk was assigned a value ranging from one to four. The weighting factor agreed upon by the planning team is shown in *Table 59 – Risk Factor Approach Summary*. To calculate the RF value for a given hazard, the assigned risk value for each category was multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the following example equation:

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

*Table 59 – Risk Factor Approach Summary* summarizes each of the five categories used for calculating a RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Table 59 - Risk Factor Approach Summary

Summary of Risk Factor Approach Used to Rank Hazard Risk.					
RISK ASSESSMENT CATEGORY	DEGREE OF RISK			WEIGHT VALUE	
	LEVEL	CRITERIA	INDEX		
<b>PROBABILITY</b> <i>What is the likelihood of a hazard event occurring in a given year?</i>	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>	NEGLIGIBLE	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	(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)	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	(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)	1	10%
	LESS THAN 24 HRS	SELF-DEFINED		2	
	LESS THAN 1 WEEK	SELF-DEFINED		3	
	MORE THAN 1 WEEK	SELF-DEFINED		4	

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## 4.4.2. Ranking Results

Using the methodology described in Section 4.4.1, *Table 60 – Risk Factor Assessment* lists the risk factor calculated for each of twenty potential hazards identified in the 2021 HMP. Hazards identified as *high* risk have risk factors greater than 2.5. Risk factors ranging from 2.0 to 2.4 were deemed *moderate* risk hazards. Hazards with risk factors 1.9 and less are considered *low* risk.

*Table 60 - Risk Factor Assessment*

Montour County Hazard Ranking Based on RF Methodology.							
HAZARD RISK	HAZARD NATURAL(N) OR HUMAN-CAUSED(H)	RISK ASSESSMENT CATEGORY					RISK FACTOR (RF)
		PROBABILITY	ECONOMIC IM-PACT	SPATIAL EXTENT	WARNING TIME	DURATION	
<b>HIGH</b>	Emergency Services (H)	4	3	4	1	4	<b>3.4</b>
	Dam/Levee Failures (H)	1	4	4	4	4	<b>3.1</b>
	Pandemic and Infectious Disease (N)	3	3	4	1	4	<b>3.1</b>
	Terrorism/Cyber Terrorism (H)	3	3	3	4	3	<b>3.1</b>
	Winter Storms (N)	4	2	4	1	3	<b>3</b>
	Flooding (N)	3	2	3	4	4	<b>2.9</b>
	Transportation Accidents (H)	4	3	1	4	2	<b>2.9</b>
	Drought (N)	3	3	4	1	4	<b>2.8</b>
	Invasive Species (N)	4	1	4	1	4	<b>2.8</b>
	Utility Interruptions (H)	3	2	2	4	2	<b>2.5</b>
<b>MODERATE</b>	Tornado/Windstorm (N)	3	2	2	2	3	<b>2.4</b>
	Environmental Hazards (H)	2	2	2	4	4	<b>2.4</b>
	Nuclear Incidents (H)	1	2	4	3	3	<b>2.3</b>
	Hurricane/Tropical Storm (N)	2	1	4	1	4	<b>2.2</b>
	Disorientation/Missing Person(s) (H)	3	1	1	4	3	<b>2.1</b>
<b>LOW</b>	Civil Disturbance (H)	1	2	2	4	2	<b>1.9</b>
	Radon Exposure (N)	2	1	1	1	4	<b>1.6</b>
	Landslide (N)	1	1	1	4	2	<b>1.4</b>
	Subsidence and Sinkhole (N)	1	1	1	4	2	<b>1.4</b>
	Wildfire (N)	1	1	1	4	1	<b>1.3</b>

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

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

A risk assessment result for the entire county does not mean that each municipality is at the same amount of risk to each hazard. *Table 61 – Countywide Risk Factor* shows the different municipalities in Montour County and whether their risk is greater than (>), less than (<), or equal to (=) the risk factor assigned to the county as a whole. This table was developed by the consultant based on the findings in the hazard profiles located in sections 4.3.1 through 4.3.20.

*Table 61 - Countywide Risk Factor by Hazard*

<b>Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk</b>										
<b>IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR</b>										
JURISDICTION	Emergency Services (H)	Dam/Levee Failures (H)	Pandemic and Infectious Disease (N)	Terrorism/Cyber Terrorism (H)	Winter Storms (N)	Flooding (N)	Transportation Accidents (H)	Drought (N)	Invasive Species (N)	Utility Interruptions (H)
	3.4	3.1	3.1	3.1	3	2.9	2.9	2.8	2.8	2.5
Anthony Township	=	=	=	=	=	=	=	=	=	=
Cooper Township	=	<	=	=	=	=	>	=	=	>
Danville Borough	=	=	=	=	=	=	=	=	=	=
Derry Township	=	<	=	=	<	=	>	<	=	>
Liberty Township	=	=	=	=	=	=	=	=	=	=
Limestone Township	=	=	=	=	=	=	=	=	=	=
Mahoning Township	=	=	=	>	=	=	<	>	=	=
Mayberry Township	=	=	=	<	=	=	=	=	=	=
Valley Township	=	=	=	=	=	=	=	=	=	=
Washingtonville Borough	=	=	=	<	=	>	<	=	=	>
West Hemlock Township	=	=	=	=	=	=	=	=	=	=

# Montour County, Pennsylvania 2021 Hazard Mitigation Plan

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk										
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR										
JURISDICTION	Tornado/Windstorm (N)	Environmental Hazards (H)	Nuclear Incidents (M)	Hurricane/Tropical Storm (N)	Disorientation (H)	Civil Disturbance (H)	Radon Exposure (N)	Landslide (N)	Subsidence and Sinkhole (N)	Wildfire (N)
	2.4	2.4	2.3	2.2	2.1	1.9	1.6	1.4	1.4	1.3
Anthony Township	=	=	=	=	=	=	=	=	=	=
Cooper Township	=	>	<	=	=	=	=	=	=	=
Danville Borough	=	=	=	=	=	=	=	=	=	=
Derry Township	<	=	=	=	=	=	=	>	=	>
Liberty Township	=	=	=	=	=	=	=	=	=	=
Limestone Township	=	=	=	=	=	=	=	=	=	=
Mahoning Township	=	=	<	>	>	=	=	>	=	=
Mayberry Township	=	>	>	=	<	=	=	=	=	=
Valley Township	=	=	=	=	=	=	=	=	=	=
Washingtonville Borough	=	=	=	=	<	=	=	=	=	=
West Hemlock Township	=	=	=	=	=	=	=	=	=	=

### 4.4.3. Potential Loss Estimates

Based on various kinds of available data, potential loss estimates were established for flooding. Estimates provided in this section are based on HAZUS-MH, version MR4, geospatial analysis, and previous events. Estimates are considered *potential* in that they generally represent losses that could occur in a countywide hazard scenario. In events that are localized, losses may be lower, while regional events could yield higher losses.

Potential loss estimates have four basic components, including:

**Replacement Value:** Current cost of returning an asset to its pre-damaged condition, using present-day cost of labor and materials.

**Content Loss:** Value of building's contents, typically measured as a percentage of the building replacement value.

**Functional Loss:** The value of a building's use or function that would be lost if it were damaged or closed.

**Displacement Cost:** The dollar amount required for relocation of the function (business or service) to another structure following a hazard event.

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### **Flooding Loss Estimation:**

Flooding is a high-risk natural hazard in Montour County. The estimation of potential loss in this assessment focuses on the monetary damage that could result from flooding. The potential property loss was determined for each municipality and for the entire county. The quantity of commercial and residential structures in each Montour County municipality is outlined in section 4.3.4 of the flooding hazard profile.

MCM Consulting Group, Inc. conducted a countywide flood study using the Hazards U.S. Multi-Hazard (HAZUS-MH) software that is provided by the Federal Emergency Management Agency. This software is a standardized loss estimation software deriving economic loss, building damage, content damage and other economic impacts that can be used in local flood mitigation planning activities.

Using HAZUS-MH, total building-related losses from a 1%-annual-chance flood in Montour County are estimated to equal \$40.82 million with \$17.75 million of that coming from residential homes. Total economic loss, including replacement value, content loss, functional loss, and displacement cost, from a countywide 1%-annual-chance flood are estimated to equal \$89.25 million.

#### **4.4.4. Future Development and Vulnerability**

The 2019 estimated population for Montour County is 18,230 which is thirty-seven less than the 2010 census. There was an overall decrease of 0.2% in population based on the estimate. Six municipalities have seen population increases while five had decreases in the period between 2010 and the 2019 estimate as identified in *Table 62 – Population Change in Montour County from 2010-2019*.

*Table 62 - 2010-2019 Population Change*

<b>Population Change in Montour County from 2010-2019</b>				
<b>Municipality</b>	<b>2010 Census</b>	<b>2015 Estimates</b>	<b>2019 Estimates</b>	<b>Percent of Change 2010-2019 Estimate</b>
Anthony Township	1,501	1,513	1,503	+0.1%
Cooper Township	932	938	950	+1.9%
Danville Borough	4,699	4,639	4,648	-1.1%
Derry Township	1,130	1,128	1,119	-1.0%
Liberty Township	1,584	1,596	1,589	+0.3
Limestone Township	1,066	1,107	1,102	+3.4%
Mahoning Township	4,171	4,191	4,142	-0.7%
Mayberry Township	250	250	275	-0.8%
Valley Township	2,158	2,156	2,149	-0.4%
Washingtonville Borough	273	275	275	+0.7%
West Hemlock Township	503	506	505	+0.4%
<b>TOTAL</b>	<b>18,267</b>	<b>18,299</b>	<b>18,230</b>	<b>-0.2%</b>



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## **5. Capability Assessment**

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

The capability assessment is an evaluation of Montour County's governmental structure, political framework, legal jurisdiction, fiscal status, policies and programs, regulations and ordinances and resource availability. Each category is evaluated for its strengths and weaknesses in responding to, preparing for, and mitigating the effects of the profiled hazards. A capability assessment is an integral part of the hazard mitigation planning process. Here, the county and municipalities identify, review, and analyze what they are currently doing to reduce losses and identify the framework necessary to implement new mitigation actions. This information will help the county and municipalities evaluate alternative mitigation actions and address shortfalls in the mitigation plan.

A capabilities assessment survey was provided to the municipalities during the planning process at meetings held with Montour County officials. These meetings were designed to seek input from key county and municipal stakeholders on legal, fiscal, technical, and administrative capabilities of all jurisdictions. As such, the capabilities assessment helps guide the implementation of mitigation projects and will help evaluate the effectiveness of existing mitigation measures, policies, plans, practices, and programs.

Throughout the planning process, the mitigation local planning team considered the county's eleven municipalities. Pennsylvania municipalities have their own governing bodies, pass and enforce their own ordinances and regulations, purchase equipment and manage their own resources, including critical infrastructure. These capability assessments, therefore, consider the various characteristics and capabilities of municipalities under study.

The evaluation of the following categories – political framework, legal jurisdiction, fiscal status, policies and programs, and regulations and ordinances – allows the mitigation planning team to determine the viability of certain mitigation actions. The capability assessment analyzes what Montour County and its municipalities have the capacity to do and provides an understanding of what must be changed to mitigate loss.

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

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

All eleven municipalities in Montour County completed and submitted a capability assessment survey. The results of the survey were collected, aggregated, and analyzed.

#### **5.2.1. Planning and Regulatory Capability**

Municipalities have the authority to govern more restrictively than state and county minimum requirements as long as they are compliant with all criteria established in the Pennsylvania Municipalities Planning Code (MPC) and their respective municipal codes. Municipalities can develop their own policies and programs and implement their own rules and regulations to protect and serve their local residents. Local policies and

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programs are typically identified in a comprehensive plan, implemented through a local ordinance, and enforced by the governmental body or its appointee.

Municipalities regulate land use via the adoption and enforcement of zoning, subdivision, and land development, building codes, building permits, floodplain management and/or stormwater management ordinances. When effectively prepared and administered, these regulations can lead to an opportunity for hazard mitigation. For example, the National Flood Insurance Program (NFIP) established minimum floodplain management criteria. Adoption of the Pennsylvania Floodplain Management Act (Act 166 of 1978) established higher standards. A municipality must adopt and enforce these minimum criteria to be eligible for participation in the NFIP. Municipalities have the option of adopting a single-purpose ordinance or incorporating these provisions into their zoning, subdivision and land development, or building codes; thereby mitigating the potential impacts of local flooding. This capability assessment details the existing Montour County and municipal legal capabilities to mitigate the profiled hazards. It identifies the county's and the municipalities' existing planning documents and their hazard mitigation potential. Hazard mitigation recommendations are, in part, based on the information contained in the assessment.

### **Building Codes**

Building codes are important in mitigation because they are developed for a region of the country in respect to the hazards existing in that area. Consequently, structures that are built according to applicable codes are inherently resistant to many hazards, such as strong winds, floods, and earthquakes; and can help mitigate regional hazards, such as wildfires. The Pennsylvania Uniform Construction Code (UCC) regulates the codes and standards of building projects in the Commonwealth. The UCC has been enforced since April 2004 across Pennsylvania. Over 90% of Pennsylvania's 2,562 municipalities have elected to administer and enforce the UCC locally, using their own employees or via certified third-party agencies (private code enforcement agencies) that they have retained.

If a municipality has “opted in”, all UCC enforcement is local, except where municipal (or third party) code officials lack the certification necessary to approve plans and inspect commercial construction for compliance with UCC accessibility requirements. For the municipalities who have elected to follow the UCC, the codes for which a construction permit is sought on, or after October 1, 2018, are the 2015 International Codes issued by the International Code Council (ICC), and the provisions amended by the UCC Review & Advisory Council (RAC). Only these codes as first published, and their errata are applicable in Pennsylvania. If a municipality has “opted out”, the PA Department of Labor and Industry is responsible for all commercial code enforcement in that municipality; and all residential construction is inspected by independent third-party agencies selected by the owner. The department also has sole jurisdiction for all state-owned buildings no matter where they are located.

All municipalities in Montour County have opted-in on building code enforcement.

### **Zoning Ordinance**

Article VI of the Municipalities Planning Code (MPC) authorizes municipalities to prepare and enact zoning to regulate land use. Its regulations can apply to the permitted use of land; the height and bulk of structures; the percentage of a lot that may be occupied by buildings and other impervious surfaces; yard setbacks; the density of development; the height and size of signs; the parking regulations. A zoning ordinance has two parts, including the zoning map that delineates zoning districts and the text that sets forth the regulations that apply to each district. Seven of the eleven municipalities in Montour County have their own zoning regulations.

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### **Subdivision Ordinance**

Subdivision and land development ordinances include regulations to control the layout of streets, the planning of lots and the provision of utilities and other site improvements. The objectives of a subdivision and land development ordinance are to: coordinate street patterns; assure adequate utilities and other improvements are provided in a manner that will not pollute streams, wells and/or soils; reduce traffic congestion; and provide sound design standards as a guide to developers, the elected officials, planning commissions and other municipal officials. Article V of the Municipality Planning Code authorizes municipalities to prepare and enact a subdivision and land development ordinance. Subdivision and land development ordinances provide for the division and improvement of land. All municipalities in Montour County utilize some form of land use and land development regulation. The Montour County Subdivision and Land Development Ordinance provides regulatory guidance for four of the eleven municipalities.

### **Stormwater Management Plan/Stormwater Ordinance**

The proper management of storm water runoff can improve conditions and decrease the chance of flooding. Pennsylvania's Storm Water Management Act (Act 167) confers on counties the responsibility for development of watershed plans. The act specifies that counties must complete their watershed storm water plans within two years following the promulgation of these guidelines by the DEP, which may grant an extension of time to any county for the preparation and adoption of plans. Counties must prepare the watershed plans in consultation with municipalities and residents. This is to be accomplished through the establishment of a watershed plan advisory committee. The counties must also establish a mechanism to periodically review and revise watershed plans, so they are current. Plan revisions must be done every five years or sooner, if necessary.

Municipalities have an obligation to implement the criteria and standards developed in each watershed storm water management plan by amending or adopting laws and regulation for land use and development. The implementation of storm water management criteria and standards at the local level are necessary since municipalities are responsible for local land use decisions and planning. The degree of detail in the ordinances depends on the extent of existing and projected development. The watershed storm water management plan is designed to aid the municipality in setting standards for the land uses it has proposed. Municipalities within rapidly developing watersheds will benefit from the watershed storm water management plan and will use the information for sound land use considerations. A major goal of the watershed plan and the attendant municipal regulations is to prevent future drainage problems and avoid the aggravation of existing problems. All municipalities in Montour County have adopted the county's stormwater management plan.

### **Comprehensive Plan**

A comprehensive plan is a policy document that states objectives and guides the future growth and physical development of a municipality. The comprehensive plan is a blueprint for housing, transportation, community facilities, utilities, and land use. It examines how the past led to the present and charts the community's future path. The Pennsylvania Municipalities Planning Code (MPC Act 247 of 1968, as reauthorized and amended) requires counties to prepare and maintain a county comprehensive plan. In addition, the MPC requires counties to update the comprehensive plan every ten years.

With regard to hazard mitigation planning, Section 301.a(2) of the Municipality Planning Code requires comprehensive plans to include a plan for land use, which, among other provisions, suggests that the plan gives consideration to floodplains and other areas of special hazards and other similar uses. The MPC also

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requires comprehensive plans to include a plan for community facilities and services and recommends considering storm drainage and floodplain management.

Montour County updated their comprehensive plan in 2009.

Article III of the MPC enables municipalities to prepare a comprehensive plan; however, development of a comprehensive plan is voluntary. Three municipalities in Montour County have adopted their own comprehensive plan.

### **Capital Improvements Plan**

The capital improvements plan is a multi-year policy guide that identifies needed capital projects and is used to coordinate the financing and timing of public improvements. Capital improvements relate to streets, storm water systems, water distribution, sewage treatment and other major public facilities. A capital improvements plan should be prepared by the respective county's planning department and should include a capital budget. This budget identifies the highest priority projects recommended for funding in the next annual budget. The capital improvements plan is dynamic and can be tailored to specific circumstances. Montour County does not have any capital improvement plans in place.

### **Participation in the National Flood Insurance Program (NFIP)**

Floodplain management is the operation of programs or activities that may consist of both corrective and preventive measures for reducing flood damage, including but not limited to such things as emergency preparedness plans, flood control works and flood plain management regulations. The Pennsylvania Floodplain Management Act (Act 166) requires every municipality identified by the Federal Emergency Management Agency (FEMA) to participate in the National Flood Insurance Program (NFIP) and permits all municipalities to adopt floodplain management regulations. It is in the interest of all property owners in the floodplain to keep development and land usage within the scope of the floodplain regulations for their community. This helps keep insurance rates low and makes sure that the risk of flood damage is not increased by property development.

The Pennsylvania DCED provides communities, based on their CFR, Title 44, Section 60.3 level of regulations, with a suggested ordinance document to assist municipalities in meeting the minimum requirements of the NFIP along with the Pennsylvania Flood Plain Management Act (Act 166). These suggested or model ordinances contain provisions that are more restrictive than state and federal requirements. Suggested provisions include, but are not limited to:

1. Prohibiting manufactured homes in the floodway.
2. Prohibiting manufactured homes within the area measured 50 feet landward from the top-of bank of any watercourse within a special flood hazard area.
3. Special requirements for recreational vehicles within the special flood hazard area.
4. Special requirement for accessory structures.
5. Prohibiting new construction and development within the area measured 50 feet landward from the top-of bank of any watercourse within a special flood hazard area.
6. Providing the county conservation district an opportunity to review and comment on all applications and plans for any proposed construction or development in any identified floodplain area.

Act 166 mandates municipal participation in and compliance with the NFIP. It also establishes higher regulatory standards for new or substantially improved structures which are used for the production or storage of dangerous materials (as defined by Act 166) by prohibiting them in the floodway. Additionally, Act 166

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establishes the requirement that a special permit be obtained prior to any construction or expansion of any manufactured home park, hospital, nursing home, jail and prison if said structure is located within a special flood hazard area.

The NFIP's Community Rating System (CRS) provides discounts on flood insurance premiums in those communities that establish floodplain management programs that go beyond NFIP minimum requirements. Under the CRS, communities receive credit for more restrictive regulations; acquisition, relocation, or flood-proofing of flood-prone buildings; preservation of open space; and other measures that reduce flood damages or protect the natural resources and functions of floodplains.

The CRS was implemented in 1990 to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards. Section 541 of the 1994 Act amends Section 1315 of the 1968 Act to codify the Community Rating System in the NFIP. The section also expands the CRS goals to specifically include incentives to reduce the risk of flood-related erosion and to encourage measures that protect natural and beneficial floodplain functions. These goals have been incorporated into the CRS and communities now receive credit toward premium reductions for activities that contribute to them.

Under the Community Rating System, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet a minimum of three of the following CRS goals:

1. Reduce flood losses.
2. Protect public health and safety.
3. Reduce damage to property.
4. Prevent increases in flood damage from new construction.
5. Reduce the risk of erosion damage.
6. Protect natural and beneficial floodplain functions.
7. Facilitate accurate insurance rating.
8. Promote the awareness of flood insurance.

There are ten Community Rating System classes. Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. CRS premium discounts on flood insurance range from 5% for Class 9 communities up to 45% for Class 1 communities. The CRS recognizes eighteen credible activities, organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction and Flood Preparedness.

FEMA Region III makes available to communities, an ordinance review checklist which lists required provisions for floodplain management ordinances. This checklist helps communities develop an effective floodplain management ordinance that meets federal requirements for participation in the NFIP. The Pennsylvania Department of Community and Economic Development (DCED) provides communities, based on their 44 CFR 60.3 level of regulations, with a suggested ordinance document to assist municipalities in meeting the minimum requirements of the NFIP and the Pennsylvania Flood Plain Management Act (Act 166). Act 166 mandates municipal participation in and compliance with the NFIP. It also establishes higher regulatory standards for hazardous materials and high-risk land uses. As new Digital Flood Insurance Rate Maps (DFIRMs) are published, the Pennsylvania State NFIP Coordinator 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.

All eleven municipalities that reside in Montour County have floodplain regulations in place that meet requirements set forth by the NFIP. Currently, two municipalities have completed or started to complete the CRS program. Additional research will be conducted on the CRS program and mitigation actions will be developed in support of the CRS.

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In an effort to spread awareness as well as capture participation levels, all municipalities were instructed to complete an NFIP survey provided by the Federal Emergency Management Agency. In total, eight municipalities submitted an NFIP survey. These surveys can be found in Appendix C of this plan.

### **5.2.2. Administrative and Technical Capability**

There are two boroughs and nine townships within Montour County. Each of these municipalities conducts its daily operations and provides various community services according to local needs and limitations. Some of these municipalities have formed cooperative agreements and work jointly with their neighboring municipalities to provide services such as police protection, fire and emergency response, infrastructure maintenance and water supply management. Others choose to operate on their own. Municipalities vary in staff size, resource availability, fiscal status, service provision, constituent population, overall size and vulnerability to the profiled hazards.

#### **County Planning Commission**

In Pennsylvania, planning responsibilities traditionally have been delegated to each county and local municipality through the Municipalities Planning Code (MPC). A planning agency acts as an advisor to the governing body on matters of community growth and development. A governing body may appoint individuals to serve as legal or engineering advisors to the planning agency. In addition to the duties and responsibilities authorized by Article II of the MPC, a governing body may, by ordinance, delegate approval authority to a planning agency for subdivision and land development applications. A governing body has considerable flexibility, not only as to which powers and duties are assigned to a planning agency, but also as to what form an agency will possess. A governing body can create a planning commission, a planning department, or both. The Montour County Planning Commission assists all municipalities in the county as needed. The county employs a county planner on an annual basis.

#### **Municipal Engineer**

A municipal engineer performs duties as directed in the areas of construction, reconstruction, maintenance and repair of streets, roads, pavements, sanitary sewers, bridges, culverts, and other engineering work. The municipal engineer prepares plans, specifications and estimates of the work undertaken by the township. All municipalities employ a municipal engineer on an as-needed basis.

#### **Personnel Skilled in GIS or FEMA HAZUS Software**

A geographic information system (GIS) is an integrated, computer-based system designed to capture, store, edit, analyze, and display geographic information. Some examples of uses for GIS technology in local government are land records management, land use planning, infrastructure management and natural resources planning. A GIS automates existing operations such as map production and maintenance, saving a great deal of time and money. The GIS also includes information about map features such as the capacity of a municipal water supply or the acres of public land. GIS data is managed, maintained and developed by the Montour County Planning Commission. There are no members of the Montour County GIS Department that have completed Basic HAZUS-MH.

#### **Emergency Management Coordinator**

Emergency management is a comprehensive, integrated program of mitigation, preparedness, response, and recovery for emergencies/disasters of any kind. No public or private entity is immune to disasters and no single segment of society can meet the complex needs of a major emergency or disaster on its own.

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A municipal emergency management coordinator is responsible for emergency management – preparedness, response, recovery, and mitigation within his/her respective authority having jurisdiction (AHJ). The responsibilities of the emergency management coordinator are outlined in PA Title 35 §7503:

- Prepare and maintain a current disaster emergency management plan.
- Establish, equip, and staff an emergency operations center.
- Provide individuals and organizations training programs.
- Organize and coordinate all locally available manpower, materials, supplies, equipment, and services necessary for disaster emergency readiness, response, and recovery.
- Adopt and implement precautionary measures to mitigate the anticipated effects of a disaster.
- Cooperate and coordinate with any public and private agency or entity.
- Provide prompt information regarding local disaster emergencies to appropriate Commonwealth and local officials or agencies and the general public.
- Participate in all tests, drills and exercises, including remedial drills and exercises, scheduled by the agency or by the federal government.

Title 35 requires Montour County and its municipalities to have an emergency management coordinator.

The Montour County Emergency Management Agency 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.

The Emergency Management Services Code (PA Title 35) requires that all municipalities in the Commonwealth have a local emergency operations plan (EOP) which is updated every two years. All eleven municipalities have adopted the county EOP. The notification and resource section of the plan was developed individually by each municipality.

### 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 interest among local officials when compared with competing priorities. Therefore, the local political climate must be considered when designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing the adoption or implementation of specific actions.

The capability assessment survey was used to capture information on each jurisdiction’s political capability. Survey respondents were asked to identify examples of political capability, such as guiding development away from hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (i.e. building codes, floodplain management ordinances, etc.). These examples were used to guide respondents in scoring their community on a scale of “unwilling” (0) to “very willing” (5) to adopt policies and programs that reduce hazard vulnerabilities. Of the municipalities that responded, none of the municipalities completed this section with a numerical response. *Table 63 – Montour County Community Political Capability* summarizes the results of political capability.

*Table 63 - Montour County Community Political Capability*

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<b>Montour County Community Political Capability</b>						
<b>Municipality Name</b>	<b>Capability Ranking</b>					
	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Anthony Township				X		
Cooper Township		X				
Danville Borough				X		
Derry Township				X		
Liberty Township				X		
Limestone Township	Not completed by municipality					
Mahoning Township						X
Mayberry Township				X		
Valley Township					X	
Washingtonville Borough				X		
West Hemlock Township				X		

### **Self-Assessment**

In addition to the inventory and analysis of specific local capabilities, the capability assessment survey required each local jurisdiction to conduct its own self-assessment of its capability to effectively implement hazard mitigation activities. As part of this process, county and municipal officials were encouraged to consider the barriers to implementing proposed mitigation strategies in addition to the mechanisms that could enhance or further such strategies. In response to the survey questionnaire, local officials classified each of the capabilities as either “L = limited” “M = moderate” or “H = high.” *Table 64 – Capability Self-Assessment Matrix* summarizes the results of the self-assessment survey. All eleven municipalities returned this section of the assessment completed.

*Table 64 - Capability Self-Assessment Matrix*

<b>Montour County Capability Self-Assessment Matrix</b>				
<b>Municipality Name</b>	<b>Capability Category</b>			
	<b>Planning and Regulatory Capability</b>	<b>Administrative and Technical Capability</b>	<b>Fiscal Capability</b>	<b>Community Political Capability</b>
Anthony Township	L	L	L	L
Cooper Township	M	M	L	L
Danville Borough	H	H	L	H
Derry Township	L	M	L	M
Liberty Township	L	L	L	L
Limestone Township	L	L	L	L
Mahoning Township	H	M	H	H
Mayberry Township	M	L	L	M
Valley Township	M	M	L	M
Washingtonville Borough	L	L	L	L



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<b>Montour County Capability Self-Assessment Matrix</b>				
<b>Municipality Name</b>	<b>Capability Category</b>			
	<b>Planning and Regulatory Capability</b>	<b>Administrative and Technical Capability</b>	<b>Fiscal Capability</b>	<b>Community Political Capability</b>
West Hemlock Township	L	L	L	L

### **Existing Limitations**

Funding has been identified as the largest limitation for a municipality to complete mitigation activities. The acquisition of grants is the best way to augment this process for the municipalities. The county and municipalities representatives will need to rely on regional, state, and federal partnerships for future financial assistance. Development of intra-county regional partnerships and intra-municipality regional partnerships will bolster this process.

### **5.2.3. Financial Capability**

Fiscal capability is significant to the implementation of hazard mitigation activities. Every jurisdiction must operate within the constraints of limited financial resources. The following information pertains to various financial assistance programs relevant to hazard mitigation.

#### **State and Federal Grants**

During the 1960s and 1970s, state and federal grants-in-aid were available to finance a large number of municipal programs, including streets, water and sewer facilities, airports, parks, and playgrounds. During the early 1980s, there was a significant change in federal policy, based on rising deficits and a political philosophy that encouraged states and local governments to raise their own revenues for capital programs. The result has been a growing interest in “creative financing”.

#### **Capital Improvement Financing**

Because most capital investments involve the outlay of substantial funds, local governments can seldom pay for these facilities through annual appropriations in the annual operating budget. Therefore, numerous techniques have evolved to enable local government to pay for capital improvements over a time period exceeding one year. Public finance literature and state laws governing local government finance classify techniques that are used to finance capital improvements. The techniques include: revenue bonds; lease-purchase, authorities and special district; current revenue (pay-as-you-go); reserve funds; and tax increment financing. Most municipalities have very limited local tax funds for capital projects. Grants and other funding is always a priority.

#### **Indebtedness through General Obligation Bonds**

Some projects may be financed with general obligation bonds. With this method, the jurisdiction’s taxing power is pledged to pay interest and principal to retire debt. General obligation bonds can be sold to finance permanent types of improvements, such as schools, municipal buildings, parks, and recreation facilities. Voter approval may be required.

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### **Municipal Authorities**

Municipal authorities are most often used when major capital investments are required. In addition to sewage treatment, municipal authorities have been formed for water supply, airports, bus transit systems, swimming pools and other purposes. Joint authorities have the power to receive grants, borrow money and operate revenue generating programs. Municipal authorities are authorized to sell bonds, acquire property, sign contracts and take similar actions. Authorities are governed by authority board members, who are appointed by the elected officials of the member municipalities.

### **Sewer Authorities**

Sewer authorities include multi-purpose authorities with sewer projects. They sell bonds to finance acquisition of existing systems or for construction, extension, or system improvement. Sewer authority operating revenues originate from user fees. The fee frequently is based on the amount of water consumed and payment is enforced by the ability to terminate service or by the imposition of liens against real estate. In areas with no public water supply, flat rate charges are calculated on average use per dwelling unit.

### **Water Authorities**

Water authorities are multi-purpose authorities with water projects, many of which operate both water and sewer systems. The financing of water systems for lease back to the municipality is among the principal activities of the local government facilities' financing authorities. An operating water authority issues bonds to purchase existing facilities or to construct, extend, or improve a system. The primary source of revenue is user fees based on metered usage. The cost of construction or extending water supply lines can be funded by special assessments against abutting property owners. Tapping fees also help fund water system capital costs. Water utilities are also directly operated by municipal governments and by privately owned public utilities regulated by the Pennsylvania Public Utility Commission. The Pennsylvania Department of Environmental Protection has a program to assist with consolidating small water systems to make system upgrades more cost effective.

### **Circuit Riding Program (Engineer)**

The Circuit Riding Program is an example of intergovernmental cooperation. This program offers municipalities the ability to join together to accomplish a common goal. The circuit rider is a municipal engineer who serves several small municipalities simultaneously. These are municipalities that may be too small to hire a professional engineer for their own operations yet need the skills and expertise the engineer offers. Municipalities can jointly obtain what no one municipality could obtain on its own.

#### **5.2.4. Education and Outreach**

Montour County conducts an education and outreach program. The Montour County Emergency Management Agency conducts public outreach at public events to update the citizens and visitors of the county on natural and human-caused hazards. The county conservation district also conducts outreach on various activities and projects in the county. Many of these projects are related to or directly impact hazard mitigation projects.

Educational activities that directly impact hazard mitigation in Montour County predominantly revolve around the first responders. Providing fire, medical and search and rescue training and education enhances the response and recovery capabilities of response agencies in the county. Additional training is always a goal within Montour County.

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Education and outreach on the NFIP are necessary. With new regulations in flood-plain management, updated digital flood insurance rate maps and new rates for insurance policies, education, and outreach on the NFIP would assist the program. The Montour County Local Planning Team will identify actions necessary to complete this.

### **5.2.5. Plan Integration**

The Montour County Comprehensive Plan, April 2009, was utilized for various sections of the 2021 Montour County HMP update. The Montour County Comprehensive Plan provided useful information on historical context, population and housing, land use, economic development, transportation, facilities, and utilities. The future land use map, land use section, and the goals, objective and recommendations were utilized when developing section 2.4 of the community profile which provided valuable information on land use trends in Montour County. The comprehensive plan was used in section 2.3 places, populations and demographics and provided information on general economics.

Identified goals and actions in the comprehensive plan ranged from high, medium, and long or on-going. Each guiding principle from this plan provided numerous actions and projects that were integrated into the 2021 HMP mitigation strategy. The overall goal of the Montour County Comprehensive Plan is “to attain a balance among residential, economic, and agricultural development reflecting the natural capacity and infrastructure of Montour County by guiding growth and development to appropriate areas while preserving agriculture, open space, and critical resources in areas appropriate for these uses”. The following are some of the goals and actions from the 2009 comprehensive plan, followed by the 2021 HMP mitigation actions that were developed or supported by the goals and actions from the 2009 comprehensive plan:

- An identified goal in the county comprehensive plan mentions the need for encouraging new development and expansion in level areas outside and/or above floodplains. The 2021 HMP local planning team developed mitigation action 1.2.1 which identifies a continued outreach program to municipalities to ensure compliance with NFIP.
- An identified goal in the county comprehensive plan mentions the need to preserve and conserve critical natural and environmental features that defines the county, specifically educating the public about preservation of the 100-year floodplains. The 2021 HMP local planning team developed mitigation action 1.2.3 which identifies developing informational workshops on risk and mitigation for property owners in areas prone to flooding.
- An identified goal in the county comprehensive plan mentions the need to preserve and conserve critical natural and environmental features that defines the county. The 2021 HMP local planning team developed mitigation action 2.1.1 which identifies creating a county-wide map of streams prone to backup and flooding.
- An identified goal in the county comprehensive plan mentions the need to provide an adequate level of public utility services appropriate for the rural-urban profile of the county. The 2021 HMP local planning team developed mitigation action 2.3.2 which identifies a continued evaluation of the demand for expanded infrastructure in Montour County.
- An identified goal in the county comprehensive plan mentions the need to provide an adequate level of community services (specifically emergency services providers) appropriate for the rural-urban profile of the county. The 2021 HMP local planning team developed mitigation action 1.1.5 which identifies dissemination of informational pamphlets and include information on the county website for residents that explains the risk of hazards, outlines precautionary measures that can be

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taken to help reduce impacts of disaster to themselves and their property, and emphasizes the value of hazard mitigation.

Although specific portions of the comprehensive plan outlined projects, actions or specific planning items that would support hazard mitigation, the information will be more comprehensive with the integration of new hazard mitigation principles and data from the 2021 Montour County HMP update. During discussion with county planning personnel as part of this hazard mitigation plan update, discussions about the importance of hazard mitigation integration during the next comprehensive plan update was expressed. Specifically, the risk assessment section and mitigation strategy section hold vital information that requires integration into the next plan update. Identification of hazard areas, vulnerable structures and developments and future risk is critical in the determination of and management of economic growth and development to areas in the county. Numerous mitigation opportunity forms have been received during the planning period and would provide beneficial information for the next comprehensive plan update as well. The local planning team determined that an action to integrate 2021 hazard mitigation principles and data into the next updated county comprehensive plan was needed in the 2021 Montour County Hazard Mitigation Plan. Action 3.1.1 identifies this.

The Montour County Comprehensive Plan was utilized for various sections of the 2020 Montour County HMP Update. Vision and Principles as well as the snapshot sections provided useful information on historical context, population and housing, land use, economic development, transportation, facilities, and utilities. The overview section within Vision and Principles was utilized in the development of the community profile section. Additionally, the future land use plan was utilized when developing section 2.4 of the community profile which provided valuable information on land use trends in Montour County. The Core Communities section within Vision and Principles was used in section 2.3 places, populations and demographics and provided information on general economics. The Connecting Communities and Healthy Communities section within Vision and Principles was used in section 2.2 community facts which provided information on healthcare facilities and school districts.

The Rehabilitation of High Hazard Potential Dams guidance document, June 2020, provided by FEMA was utilized in the development of goals, objectives and actions found in the mitigation strategy section.

### **Montour County Emergency Operations Plan**

The Pennsylvania Emergency Management Services Code, 35 PA C.S. Sections 7701-7707, as amended, requires each county and municipality to prepare, maintain and keep current an Emergency Operations Plan (EOP). Montour County Department of Emergency Services is responsible for preparing and maintaining the county's EOP, which applies to both the county and municipal emergency management operations and procedures.

The EOP is reviewed at least annually. Whenever portions of the plan are implemented in an emergency event or training exercise, a review is performed, and changes are made where necessary. These changes are then distributed to the county's municipalities.

The complete risk assessment section, mitigation actions and mitigation project opportunities identified in the Montour County Hazard Mitigation Plan will assist with decreasing hazard specific risk and vulnerability. Understanding the risks and vulnerability in the county and municipalities will allow for emergency management and other response agencies to better direct planning, response, and recovery aspects.

Montour County Emergency Management Agency will consider the Montour County Hazard Mitigation Plan during its annual review of the county EOP. Recommended changes to the HMP will then be coordinated with the hazard mitigation local planning team.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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## **Plan Interrelationships**

Ensuring consistency between these planning mechanisms is critical. In fact, Section 301 (4.1) of the Pennsylvania Municipalities Planning Code requires that comprehensive plans include a discussion of the interrelationships among their various plan components, “which may include an estimate of the environmental, energy conservation, fiscal, economic development and social consequences on the environment.”

To that end, Montour County and its municipalities must ensure that the components of the hazard mitigation plan are integrated into existing community planning mechanisms and are generally consistent with goals, policies, and recommended actions. Montour County and the hazard mitigation planning team will utilize the existing maintenance schedule of each plan to incorporate the goals, policies and recommended actions as each plan is updated.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

## **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 four goals and fifteen objectives identified in the 2015 hazard mitigation plan. The 2021 Montour County Hazard Mitigation Plan Update has four goals and thirteen objectives. Objectives have been added and arranged in order to associate them with the most appropriate goal. These changes are noted in *Table 65 – 2015 Mitigation Goals and Objectives Review*. These reviews are based on the five-year hazard mitigation plan review worksheet, which includes a survey on existing goals and objectives completed by the local planning team. Municipal officials then provided feedback on the changes to the goals and objectives via a mitigation strategy update meeting. Copies of these meetings and all documentation associated with the meetings are located in Appendix C.

Actions provide more detailed descriptions of specific work tasks to help the county and its municipalities achieve prescribed goals and objectives. There were thirty-four actions identified in the 2015 mitigation strategy. A review of the 2015 mitigation actions was completed by the local planning team. The results of this review are identified in *Table 65 – 2015 Mitigation Actions Review*. Actions were evaluated by the local planning team with the intent of carrying over any actions that were not started or continuous for the next five years.

*Table 65 - 2015 Mitigation Goals and Objectives*

<b>2015 Mitigation Goals and Objectives Review</b>		
<b>GOAL Objective</b>	<b>Description</b>	<b>Review Comments</b>
<b>GOAL 1</b>	<b>Increase public awareness and education on both the potential impacts of natural hazards and activities to reduce those impacts.</b>	Add in “all hazards (natural and human caused)”.
Objective 1.1	Promote public education about hazards in the county.	The LPT decided this objective should remain the same.
Objective 1.2	Provide training on hazard mitigation techniques and processes.	Change to: “Provide training to municipal officials and businesses partners on hazard mitigation techniques and recovery processes.”
<b>GOAL 2</b>	<b>Strengthen county and local capabilities to reduce the potential impacts of flooding and other natural or human-caused hazards on existing and future public/private assets, including structures, critical facilities, and infrastructure.</b>	The LPT decided this goal should remain the same.
Objective 2.1	Develop regulations limiting development in hazard-prone areas.	Change this to: “Encourage development of regulations...”
Objective 2.2	Direct new growth away from hazard-prone areas.	Redundant. Remove.

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<b>GOAL Objective</b>	<b>Description</b>	<b>Review Comments</b>
Objective 2.3	Lessen impacts on natural resources and open space areas from natural and human-caused hazards.	The LPT decided this objective should remain the same.
Objective 2.4	Encourage property owners in the 1% -annual-chance floodplain to purchase flood insurance.	“Educate property owners about FEMA’s NFIP program.”
Objective 2.5	Assess and analyze the strengths and weaknesses of critical facilities in regard to the impacts of natural and human-caused hazards.	Roll forward. Change “weaknesses” to “vulnerabilities”.
<b>GOAL 3</b>	<b>Continue to build the county’s spatial information resources to strengthen public and private hazard mitigation planning and decision support capabilities.</b>	<p>Goal 3 is no longer applicable. Create a new goal of:</p> <p>“Conduct a hazard mitigation maintenance and report program.”</p> <p>Objective: Improve tracking of mitigation actions and project opportunities.</p> <p>Continue to regularly meet quarterly with local EMC’s to review county goals/objectives.</p>
Objective 3.1	Develop data management tools to ensure adequate data management.	Remove. The LPT determined this objective as no longer applicable.
Objective 3.2	Ensure adequacy of equipment and technology.	Remove. The LPT determined this objective as no longer applicable.
Objective 3.3	Continue to foster development of information and resources for subsequent HMPs.	Remove. The LPT determined this objective as no longer applicable.
Objective 3.4	Maintain databases and information tracking systems on streams and culverts to track relevant trends and to reduce backup and flooding.	Remove. The LPT determined this objective as no longer applicable.
<b>GOAL 4</b>	<b>Increase intergovernmental cooperation and build public-private partnerships to implement activities that will reduce the impacts of natural, human-caused, and technological hazards.</b>	Change to “all hazards” as found in goal 1.
Objective 4.1	Encourage participation in the HMP update process.	The LPT decided this objective should remain the same.
Objective 4.2	Improve coordination and communication between departments and private industry.	The LPT decided this objective should remain the same.

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GOAL Objective	Description	Review Comments
<b>GOAL 5</b>	<b>Enhance planning and emergency response efforts among state, county, and local emergency management personnel to protect public health and safety.</b>	Duplicate. Remove.
Objective 5.1	Ensure adequate training and resources for those involved in emergency response, services, relief, or hazard mitigation.	The LPT decided this objective should remain the same.
Objective 5.2	Ensure that residents receive relief and are evacuated as quickly as possible in the event of a disaster.	The LPT decided this objective should remain the same.

Table 66 - 2015 Mitigation Actions Review

<b>2015 Montour County Mitigation Actions Review Worksheet</b>						
<i>Existing Mitigation Actions (2015 HMP)</i>	<i>Status</i>					<i>Review Comments</i>
	<b>No Progress/ Unknown</b>	<b>In Progress/ Not Yet Complete</b>	<b>Continuous</b>	<b>Completed</b>	<b>Discontinued</b>	
<b>Action 1.1.1</b> – Increase advertisement of public meetings.			<b>X</b>			Change to: “Continue to advertise public meetings as needed.”
<b>Action 1.1.2</b> – Develop and post on the county website hazard mitigation and other information and resources and links outside agency resources.		<b>X</b>				Change to: “Continue to utilize the county website and post the HMP and other plans as well as useful links as a resource to the public.”
<b>Action 1.1.3</b> – Provide information on the county website on evacuation and shelter in place procedures for residences and continuity of operations plans and procedures for businesses.	<b>X</b>					The LPT decided this action should remain the same.
<b>Action 1.1.4</b> – Development and distribute to the public information on potential hazards in Montour County.			<b>X</b>			Change to: “Develop and distribute to the public...”



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<i>Existing Mitigation Actions (2015 HMP)</i>	<i>Status</i>					<i>Review Comments</i>
	No Progress/ Unknown	In Progress/Not Yet Complete	Continuous	Completed	Discontinued	
<b>Action 1.1.5</b> – Evaluate and refine the county's repetitive loss structures list by ranking properties based on the number of losses and the value of the claims paid and target the priority properties for buyout opportunities.					<b>X</b>	The LPT decided this was no longer relevant to Montour County.
<b>Action 1.1.6</b> - Disseminate informational pamphlets and include information on the county website for residents that explains the risk of hazards, outlines precautionary measures that can be taken to help reduce impacts of disaster to themselves and their property, and emphasizes the value of hazard mitigation.			<b>X</b>			The LPT decided this action should remain the same.
<b>Action 1.2.1</b> - Work with municipalities to regularly inspect culverts.					<b>X</b>	The LPT decided this was no longer relevant to Montour County.
<b>Action 1.2.2</b> - Work with municipalities to create and maintain a County-wide database of streams prone to backup and flooding.		<b>X</b>				Change to: “Create a county-wide map of streams prone to backup and flooding.”
<b>Action 1.3.1</b> - Conduct a thorough critical facilities vulnerability assessment and impact analysis using HMP's GIS-based critical infrastructure history.			<b>X</b>			Change to: Conduct a thorough critical facilities vulnerability assessment and impact analysis using critical infrastructure historical event data.
<b>Action 1.3.2</b> - Conduct analysis on the future demand for expanded infrastructure.			<b>X</b>			“Continue to evaluate the demand for expanded infrastructure in Montour County.”

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<i>Existing Mitigation Actions (2015 HMP)</i>	<i>Status</i>					<i>Review Comments</i>
	No Progress/ Unknown	In Progress/ Not Yet Complete	Continuous	Completed	Discontinued	
<b>Action 2.1.1</b> - Encourage the development of safety buffers between industrial facilities and the population.			X			The LPT decided this action should remain the same.
<b>Action 2.1.2</b> - Encourage the requirement of special use permits for hazard-prone areas.			X			Change to: “Encourage municipalities to require the use of special use permits for hazard-prone areas.”
<b>Action 2.1.3</b> - Adopt a countywide post-disaster recovery and reconstruction ordinance using the model ordinance included in the APA/FEMA PAS Report No. 483/484.					X	The LPT decided this was no longer relevant to Montour County.
<b>Action 2.1.4</b> - Ensure county and municipal subdivision and land development ordinances are consistent with Chapter 102 Erosion & Sedimentation Control Requirements.			X			The LPT decided this action should remain the same.
<b>Action 2.1.5</b> - Adopt/continue to enforce zoning ordinances that prevent construction in hazard prone areas.			X			Encourage municipalities to continue adoption and enforcement of zoning ordinances that prevent construction in hazard prone areas.

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<i>Existing Mitigation Actions (2015 HMP)</i>	<i>Status</i>					<i>Review Comments</i>
	<b>No Progress/ Unknown</b>	<b>In Progress/Not Yet Complete</b>	<b>Continuous</b>	<b>Completed</b>	<b>Discontinued</b>	
<b>Action 2.2.1</b> - Encourage the review of planned infrastructure to ensure that it will be developed outside of hazard-prone areas.					<b>X</b>	This is a repeat of the previous action.
<b>Action 2.2.2</b> - Coordinate with the municipal zoning boards to stop growth in the floodplain.			<b>X</b>			“Coordinate with the municipal zoning boards to prevent development in the floodplain.”
<b>Action 2.4.1</b> - Conduct outreach to municipalities to ensure compliance with NFIP.			<b>X</b>			Change to: “Continue to...”
<b>Action 2.4.2</b> - Develop informational workshops on risk and mitigation for property owners in areas prone to flooding.			<b>X</b>			The LPT decided this action should remain the same.
<b>Action 3.1.1</b> - Encourage the involvement of private industry with plan revisions.			<b>X</b>			The LPT decided this action should remain the same.
<b>Action 3.1.2</b> - Integrate the 5-year maintenance cycle of the hazard mitigation plan with both the 10-year and biennial review and maintenance cycles of the county comprehensive plan and county regional emergency operations plan, respectively.			<b>X</b>			The LPT decided this action should remain the same.

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<i>Existing Mitigation Actions (2015 HMP)</i>	<i>Status</i>					<i>Review Comments</i>
	<b>No Progress/ Unknown</b>	<b>In Progress/ Not Yet Complete</b>	<b>Continuous</b>	<b>Completed</b>	<b>Discontinued</b>	
<b>Action 3.2.1</b> - Implement a countywide electronic damage assessment management tool to increase the efficiency of county and municipal damage survey and reporting.			<b>X</b>			The LPT decided this action should remain the same.
<b>Action 3.2.2</b> - Create a GIS dataset of the locations of the SARA facilities in Montour County to analyze their vulnerability to potential hazards.			<b>X</b>			Get rid of “GIS” in this sentence.
<b>Action 3.2.3</b> - Review and approve the Montour County DFIRM information and incorporate the data into the County GIS.			<b>X</b>			The LPT decided this action should remain the same.
<b>Action 3.3.1</b> - Conduct an audit of information systems and technology.					<b>X</b>	This was completed at the EOC level.
<b>Action 3.4.1</b> - Maintain a web-based inventory of the county's at-risk populations to strengthen emergency response and evacuations.			<b>X</b>			“Enhance overall situational awareness for at-risk populations in Montour County.”
<b>Action 3.5.1</b> - Maintain a list of repetitive loss structures from the Governor's Center for Local Government Service's NFIP Coordinator and incorporate the data into the county hazard mitigation planning project.					<b>X</b>	Repeat of 1.1.5

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<i>Existing Mitigation Actions (2015 HMP)</i>	<i>Status</i>					<i>Review Comments</i>
	<b>No Progress/ Unknown</b>	<b>In Progress/ Not Yet Complete</b>	<b>Continuous</b>	<b>Completed</b>	<b>Discontinued</b>	
<b>Action 3.5.2</b> - Continue to work with municipalities to identify and incorporate hazard mitigation project opportunity forms to include in the 5-year update of the HMP.			<b>X</b>			The LPT decided this action should remain the same.
<b>Action 3.5.3</b> - Collect and analyze data on the specific impacts identified in the Montour County Hazard Mitigation Plan.			<b>X</b>			Change to: "Conduct post-incident review to identify HMP effectiveness."
<b>Action 4.1.1</b> - Conduct training sessions on hazard mitigation during county commissioners' meetings or COG meetings.			<b>X</b>			The LPT decided this action should remain the same.
<b>Action 4.2.1</b> - Promote outreach opportunities with municipalities in Montour County.			<b>X</b>			The LPT decided this action should remain the same.
<b>Action 5.1.1</b> - Locate and secure funding streams for emergency response and support services.			<b>X</b>			The LPT decided this action should remain the same.
<b>Action 5.1.2</b> - Update the Montour County Emergency Operations Plan to be consistent with the National Response Framework.				<b>X</b>		Completed in 2021. Change this to a maintenance item.
<b>Action 5.1.3</b> - Continue to encourage multi-jurisdictional exercises and drills.			<b>X</b>			Change to: Continue to encourage participation in multi-jurisdictional exercises and drills.

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

Based on results of the goals and objectives evaluation exercise and input from the local planning team, a list of four goals and thirteen corresponding objectives was developed. *Table 67 – 2021 Goals and Objectives* details the mitigation goals and objectives established for the 2021 Montour County Hazard Mitigation Plan.

*Table 67 - 2021 Goals and Objectives*

2021 Montour County Mitigation Goals and Objectives	
Goal Objective	Description
<b>Goal 1</b>	<b>Increase public awareness and education on both the potential impacts of all hazards (natural and human caused) and activities to reduce those impacts.</b>
Objective 1.1	Promote public education about hazards in Montour County.
Objective 1.2	Provide training to municipal officials, business partners and the public on hazard mitigation techniques and recovery processes.
Objective 1.3	Develop and maintain a notification process to disseminate crucial information when an emergency occurs.
<b>Goal 2</b>	<b>Strengthen county and local capabilities to reduce the potential impacts of flooding and other natural or human-caused hazards on existing and future public/private assets, including structures, critical facilities, and infrastructure.</b>
Objective 2.1	Encourage the development of regulations limiting development in hazard-prone areas.
Objective 2.2	Lessen impacts on natural resources and open space areas from natural and human-caused hazards.
Objective 2.3	Assess and analyze the strengths and vulnerabilities of critical infrastructure regarding impacts of natural and human-caused hazards.
Objective 2.4	Develop local structural projects to reduce the impacts of natural and human-caused hazards on public and private property.
Objective 2.5	Acquire, elevate, demolish or demolish/reconstruct flood prone properties to remove or mitigate risks to homeowners and property.
Objective 2.6	Reduce long-term vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public
<b>Goal 3</b>	<b>Conduct a hazard mitigation maintenance and report program.</b>
Objective 3.1	Integrate and maintain hazard mitigation information into other county and local plans
Objective 3.2	Continue to regularly meet with the local planning team to review and update the hazard mitigation plan.
<b>Goal 4</b>	<b>Increase intergovernmental cooperation and build public-private partnerships to implement activities that will reduce the impacts of all hazards (natural and human caused).</b>
Objective 4.1	Encourage participation in the HMP update process.

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Goal Objective	Description
Objective 4.2	Improve coordination and communication between all Montour County departments and private industry.

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

This section includes an overview of alternative mitigation actions based on the goals and objectives identified in Section 6.2. There are four general mitigation strategy techniques to reducing hazard risks:

- Planning and regulations
- Structure and infrastructure
- Natural systems protection
- Education and awareness

**Planning and Regulations:** These actions include government authorities, policies or codes that influence the way land and buildings are developed and built. The following are some examples:

- Comprehensive plans
- Land use ordinances
- Subdivision regulations
- Development review
- Building codes and enforcement
- National Flood Insurance Program and Community Rating System
- Capital improvement programs
- Open space preservation
- Stormwater management regulations and master plans

The planning and regulations technique will protect and reduce the impact of specific hazards on new and existing buildings by improving building code standards and regulating new and renovation construction. The improved building codes will decrease the impact of risk hazards. Subdivision and land development enhancements will also augment this process. Ensuring that municipalities participate in the National Flood Insurance Program and encourage participation in the Community Rating System will decrease the impact as well.

**Structure and infrastructure implementation:** These actions involve modifying existing structures and infrastructure or constructing new structures to reduce hazard vulnerability. The following are examples:

- Acquisitions and elevations of structures in flood prone areas
- Utility undergrounding
- Structural retrofits
- Floodwalls and retaining walls
- Detention and retention structures
- Culverts
- Safe rooms

Structure and infrastructure implementation is a technique that removes or diverts the hazard from structures or protects the structure from a specific hazard. The new or renovated structures are therefore protected or have a reduced impact of hazards.

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**Natural Resource Protection:** These are actions that minimize damage and losses and also preserve or restore the functions of natural systems. They include the following:

- Erosion and sediment control
- Stream corridor restoration
- Forest management
- Conservation easements
- Wetland restoration and preservation

Natural resource protection techniques allow for the natural resource to be used to protect or lessen the impact on new or renovated structures through the management of these resources. Utilization and implementation of the examples above will protect new and existing buildings and infrastructure.

**Education and Awareness:** These are actions to inform and educate citizens, elected officials and property owners about hazards and potential ways to mitigate them and may also include participation in national programs. Examples of these techniques include the following:

- Radio and television spots
- Websites with maps and information
- Real estate disclosure
- Provide information and training
- NFIP outreach
- StormReady
- Firewise Communities

The education and awareness technique will protect and reduce the impact of specific hazards on new and existing buildings through education of citizens and property owners on the impacts that specific hazards could have on new or renovated structures. This information will allow the owner to make appropriate changes or enhancements that will lessen or eliminate the impact of hazards.

*Table 68 – Mitigation Strategy Technique Matrix* provides a matrix identifying the mitigation techniques used for all low, moderate, and high-risk hazards in the county. The specific actions associated with these techniques are included in *Table 69 – 2021 Mitigation Action Plan*.



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Table 68 - Mitigation Strategy Technique Matrix

<b>Montour County Mitigation Strategy Technique Matrix</b>				
<b>HAZARD</b>	<b>MITIGATION TECHNIQUE</b>			
	<b>Local Plans and Regulations</b>	<b>Structural and Infrastructure</b>	<b>Natural Systems Protection</b>	<b>Education and Awareness</b>
Drought	X		X	X
Landslides	X	X		X
Flooding	X	X	X	X
Invasive Species	X		X	X
Pandemic and Infectious Disease	X		X	X
Disorientation	X	X		X
Radon Exposure	X	X		X
Tornado/Windstorm	X	X		X
Wildfires	X	X	X	X
Winter Storms	X	X		X
Hurricane/Tropical Storm	X	X		X
Subsidence and Sinkholes	X	X		X
Dam/Levee Failure	X		X	X
Emergency Services	X			X
Environmental Hazards	X	X		X
Civil Disturbance	X	X		X
Nuclear Incidents	X	X		X
Terrorism/Cyber Terrorism	X			X
Transportation Accidents	X	X		X
Utility Interruptions	X	X		X

## **6.4. Mitigation Action Plan**

The Montour County Hazard Mitigation Local Planning Team (LPT) immediately began work on the mitigation strategy section of the 2021 hazard mitigation plan (HMP) update after the risk assessment section was completed. The LPT started this section by reviewing the 2015 HMP mitigation strategy section. A review of the previous goals, objectives, actions and project opportunities documented in the 2015 HMP was conducted. The next step the LPT completed was the brainstorming of possible new actions based on new identified risks. The LPT compiled all this information for presentations to the municipalities.

MCM Consulting Group, Inc. completed municipality meetings at various time periods via conference calls due to COVID-19. During all these meetings, an overview of mitigation strategy was presented, and the municipalities were informed that they needed to have at least one hazard-related mitigation action for their municipality. All municipalities were invited to attend these meetings. Municipalities that were not able to join conference calls were contacted individually.

The municipalities were notified of draft mitigation actions and encouraged to provide new mitigation actions that could be incorporated into the plan. Municipalities were provided copies of their previously submitted mitigation opportunity forms and asked to determine if the projects were still valid. Municipalities were solicited for new project opportunities as well. All agendas, sign in sheets and other support information from these meetings is included in Appendix C. Mitigation measures for the 2021 Montour County HMP are listed in the mitigation action plan. *Table 69 – 2021 Mitigation Action Plan* is the 2021 Montour County Mitigation Action Plan. This plan outlines mitigation actions and projects that comprise a strategy for Montour County. The action plan includes actions, a benefit and cost prioritization, a schedule for implementation, any funding sources to complete the action, a responsible agency or department and an

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estimated cost. All benefit and cost analysis were completed using the Pennsylvania Emergency Management Agency recommended analysis tool. The completed analysis is located in Appendix H. *Table 69 – 2021 Mitigation Action Plan* is a matrix that identifies the county and/or municipalities responsible for mitigation actions in the new mitigation action plan.

*Table 69 - 2021 Mitigation Action Plan*

<b>Montour County 2021 Mitigation Action Plan</b>									
Action Number	Mitigation Actions		Hazard Vulnerability	Prioritization			Implementation		
	Category	Description/ Action Items		High	Medium	Low	Schedule	Funding	Local Champion
1.1.1	Planning and Regulations	Continue to advertise public meetings as needed.	All-Hazards			X	2021 - 2025	Local	Montour County Government
1.1.2	Planning and Regulations	Continue to utilize the county website and post the HMP and other plans as well as useful links as a resource to the public.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
1.1.3	Structure and Infrastructure	Provide information on the county website on evacuation and shelter in place procedures for residences and continuity of operations plans and procedures for businesses.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
1.1.4	Planning and Regulations	Develop and distribute to the public information on potential hazards in Montour County.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
1.1.5	Planning and Regulations	Disseminate informational pamphlets and include information on the county website for residents that explains the risk of hazards, outlines precautionary measures that can be taken to help reduce impacts of disaster to themselves and their property, and emphasizes the value of hazard mitigation.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
1.2.1	Planning and Regulations	Continue to conduct outreach to municipalities to ensure compliance with NFIP.	Flooding		X		2021 - 2025	Local	Montour County EMA
1.2.2	Planning and Regulations	Educate property owners in the 1% annual-chance floodplain about FEMA's NFIP program.	Flooding		X		2021 - 2025	FMA	Montour County EMA
1.2.3	Planning and Regulations	Develop informational workshops on risk and mitigation for property owners in areas prone to flooding.	Flooding		X		2021 - 2025	FMA	Montour County EMA
1.2.4	Planning and Regulations	Locate and secure funding streams for emergency response and support services.	All-Hazards	X			2021 - 2025	Local	Montour County EMA
1.3.1	Structure and Infrastructure	Enhance overall situational awareness for at-risk populations in Montour County	All-Hazards		X		2021 - 2025	Local	Montour County EMA
2.1.1	Planning and Regulations	Create a countywide map of streams prone to backup and flooding.	All-Hazards		X		2021 - 2025	Local	Montour County GIS

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<b>Montour County 2021 Mitigation Action Plan</b>									
<b>Action Number</b>	<b>Mitigation Actions</b>		<b>Hazard Vulnerability</b>	<b>Prioritization</b>			<b>Implementation</b>		
	<b>Category</b>	<b>Description/ Action Items</b>		<b>High</b>	<b>Medium</b>	<b>Low</b>	<b>Schedule</b>	<b>Funding</b>	<b>Local Champion</b>
<b>2.1.2</b>	Planning and Regulations	Ensure county and municipal subdivision and land development ordinances are consistent with Chapter 102 Erosion & Sedimentation Control Requirements.	All-Hazards			<b>X</b>	2021 - 2025	Local	Montour County Planning Commission
<b>2.1.3</b>	Planning and Regulations	Continue to evaluate the demand for expanded infrastructure in Montour County.	All-Hazards			<b>X</b>	2021 - 2025	Local	Montour County Planning Commission
<b>2.1.4</b>	Planning and Regulations	Encourage the development of safety buffers between industrial facilities and the population.	All-Hazards			<b>X</b>	2021 - 2025	Local	Montour County Planning Commission
<b>2.1.5</b>	Planning and Regulations	Encourage municipalities to require the use of special use permits for hazard-prone areas.	All-Hazards			<b>X</b>	2021 - 2025	Local	Montour County Planning Commission
<b>2.1.6</b>	Planning and Regulations	Encourage municipalities to continue adoption and enforcement of zoning ordinances that prevent construction in hazard prone areas.	All-Hazards		<b>X</b>		2021 - 2025	Local	Montour County Planning Commission
<b>2.2.1</b>	Planning and Regulations	Coordinate with the municipal zoning boards to prevent development in the floodplain.	Flooding		<b>X</b>		2021 - 2025	Local	Montour County Planning Commission
<b>2.3.1</b>	Planning and Regulations	Conduct a thorough critical facilities vulnerability assessment and impact analysis using critical infrastructure historical event data.	All-Hazards		<b>X</b>		2021 - 2025	Local	Montour County EMA
<b>2.3.2</b>	Planning and Regulations	Create a dataset of the locations of the SARA facilities in Montour County to analyze their vulnerability to potential hazards.	Environmental Hazards		<b>X</b>		2021 - 2025	Local	Montour County EMA
<b>2.4.1</b>	Structure and Infrastructure	Continue to work with municipalities to identify and incorporate hazard mitigation project opportunity forms to include in the 5-year update of the HMP.	All-Hazards	<b>X</b>			2021 - 2025	Local	Montour County EMA
<b>2.5.1</b>	Planning and Regulations	Develop informational workshops on risk and mitigation for property owners in areas prone to flooding.	Flooding	<b>X</b>			2021 - 2025	Local	Montour County EMA
<b>2.5.2</b>	Planning and Regulations	Implement a countywide electronic damage assessment management tool to increase the efficiency of county and municipal damage survey and reporting.	All-Hazards		<b>X</b>		2021 - 2025	Local	Montour County EMA

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

<b>Montour County 2021 Mitigation Action Plan</b>									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Local Champion
2.5.3	Planning and Regulations	Review and approve the Montour County DFIRM information and incorporate the data into the County GIS.	All-Hazards			X	2021 - 2025	Local	Montour County GIS
2.6.1	Planning and Regulations	Research and add additional Hazard Mitigation actions to reduce vulnerabilities from high hazard potential dams (HHPD)	Dam/Levee Failure		X		2021 - 2025	HHPD	Montour County EMA
2.6.2	Planning and Regulations	Identify current and potential sources of funding to implement mitigation actions and activities that reduce risk to the public.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
2.6.3	Structure and Infrastructure	Analyze and enhance local mitigation policies, programs, and capabilities that address high hazard potential dams.	Dam/Levee Failure		X		2021 - 2025	HHPD	Montour County EMA
2.6.4	Planning and Regulations	Develop and integrate digital inundation data to enhance downstream vulnerability assessments for high hazard dams.	Dam/Levee Failure		X		2021 - 2025	HHPD	Montour County EMA
3.1.1	Planning and Regulations	Integrate the 5-year maintenance cycle of the hazard mitigation plan with both the 10-year and biennial review and maintenance cycles of the county comprehensive plan and county regional emergency operations plan, respectively.	All-Hazards	X			2021 - 2025	Local	Montour County EMA/Montour County Planning Commission
3.1.2	Planning and Regulations	Maintain the Montour County Emergency Operations Plan.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
3.2.1	Structure and Infrastructure	Conduct post-incident review to identify HMP effectiveness.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
4.1.1	Planning and Regulations	Encourage the involvement of private industry with plan revisions.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
4.1.2	Planning and Regulations	Conduct training sessions on hazard mitigation during county commissioners' meetings or COG meetings.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
4.1.3	Planning and Regulations	Continue to encourage participation in multi-jurisdictional exercises and drills.	All-Hazards	X			2021 - 2025	Local	Montour County EMA
4.2.1	Planning and Regulations	Promote outreach opportunities with municipalities in Montour County.	All-Hazards		X		2021 - 2025	Local	Montour County EMA/Montour County Planning Commission

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

Montour County 2021 Mitigation Action Plan									
Action Number	Mitigation Actions		Hazard Vulnerability	Prioritization			Implementation		
	Category	Description/ Action Items		High	Medium	Low	Schedule	Funding	Local Champion
4.2.2	Planning and Regulations	Encourage the involvement of private industry with HMP revisions.	All-Hazards		X		2021 - 2025	Local	Montour County EMA
4.2.3	Education and Outreach	Identify crucial businesses in Montour County and identify the needs of those businesses before and after an emergency.	All-Hazards		X		2021 - 2025	Local	Montour County EMA

### **Funding acronym definitions:**

- FMA: Flood Mitigation Assistance Grant Program, administered by the Federal Emergency Management Agency
- HMGP: Hazard Mitigation Grant Program, administered by the Federal Emergency Management Agency
- PDM: Pre-Disaster Mitigation Grant, administered by the Federal Emergency Management Agency
- EMPG: Emergency Management Performance Grant, administered by the Federal Emergency Management Agency
- HSGP: Homeland Security Grant Program, administered by the Federal Emergency Management Agency
- HMEP: Hazardous Material Emergency Planning Grant, administered by the Pennsylvania Emergency Management Agency
- HMRP: Hazardous Material Response Fund, administered by the Pennsylvania Emergency Management Agency
- HMERP: Hazard Mitigation Emergency Response Program by the Pennsylvania Emergency Management Agency
- HHPD: High-hazard potential dam by the Federal Emergency Management Agency

Table 70 - Municipal Hazard Mitigation Actions Checklist

Municipal Hazard Mitigation Actions Checklist										
Municipality	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.2.1	1.2.2	1.2.3	1.2.4	1.3.1
Anthony Township	X	X	X	X	X	X	X	X	X	X
Cooper Township	X	X	X	X	X	X	X	X	X	X
Danville Borough	X	X	X	X	X	X	X	X	X	X
Derry Township	X	X	X	X	X	X	X	X	X	X
Liberty Township	X	X	X	X	X	X	X	X	X	X

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

<b>Municipal Hazard Mitigation Actions Checklist</b>										
<b>Municipality</b>	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.2.1	1.2.2	1.2.3	1.2.4	1.3.1
Limestone Township	X	X	X	X	X	X	X	X	X	X
Mahoning Township	X	X	X	X	X	X	X	X	X	X
Mayberry Township	X	X	X	X	X	X	X	X	X	X
Valley Township	X	X	X	X	X	X	X	X	X	X
Washingtonville Borough	X	X	X	X	X	X	X	X	X	X
West Hemlock Township	X	X	X	X	X	X	X	X	X	X
Montour County	X	X	X	X	X	X	X	X	X	X

<b>Municipal Hazard Mitigation Actions Checklist</b>										
<b>Municipality</b>	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6	2.2.1	2.3.1	2.3.2	2.4.1
Anthony Township	X	X	X	X	X	X	X			X
Cooper Township	X	X	X	X	X	X	X			X
Danville Borough	X	X	X	X	X	X	X			X
Derry Township	X	X	X	X	X	X	X			X
Liberty Township	X	X	X	X	X	X	X			X
Limestone Township	X	X	X	X	X	X	X			X
Mahoning Township	X	X	X	X	X	X	X			X
Mayberry Township	X	X	X	X	X	X	X			X
Valley Township	X	X	X	X	X	X	X			X
Washingtonville Borough	X	X	X	X	X	X	X			X
West Hemlock Township	X	X	X	X	X	X	X			X
Montour County	X	X	X	X	X	X	X	X	X	X

<b>Municipal Hazard Mitigation Actions Checklist</b>										
<b>Municipality</b>	2.5.1	2.5.2	2.5.3	2.6.1	2.6.2	2.6.3	2.6.4	3.1.1	3.1.2	3.2.1
Anthony Township	X	X	X	X	X	X	X	X	X	X
Cooper Township	X	X	X	X	X	X	X	X	X	X
Danville Borough	X	X	X	X	X	X	X	X	X	X
Derry Township	X	X	X	X	X	X	X	X	X	X
Liberty Township	X	X	X	X	X	X	X	X	X	X
Limestone Township	X	X	X	X	X	X	X	X	X	X
Mahoning Township	X	X	X	X	X	X	X	X	X	X
Mayberry Township	X	X	X	X	X	X	X	X	X	X
Valley Township	X	X	X	X	X	X	X	X	X	X

## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

<b>Municipal Hazard Mitigation Actions Checklist</b>										
<b>Municipality</b>	<b>2.5.1</b>	<b>2.5.2</b>	<b>2.5.3</b>	<b>2.6.1</b>	<b>2.6.2</b>	<b>2.6.3</b>	<b>2.6.4</b>	<b>3.1.1</b>	<b>3.1.2</b>	<b>3.2.1</b>
Washingtonville Borough	X	X	X	X	X	X	X	X	X	X
West Hemlock Township	X	X	X	X	X	X	X	X	X	X
Montour County	X	X	X	X	X	X	X	X	X	X

<b>Municipal Hazard Mitigation Actions Checklist</b>										
<b>Municipality</b>	<b>4.1.1</b>	<b>4.1.2</b>	<b>4.1.3</b>	<b>4.2.1</b>	<b>4.2.2</b>	<b>4.2.3</b>				
Anthony Township	X	X	X	X	X	X				
Cooper Township	X	X	X	X	X	X				
Danville Borough	X	X	X	X	X	X				
Derry Township	X	X	X	X	X	X				
Liberty Township	X	X	X	X	X	X				
Limestone Township	X	X	X	X	X	X				
Mahoning Township	X	X	X	X	X	X				
Mayberry Township	X	X	X	X	X	X				
Valley Township	X	X	X	X	X	X				
Washingtonville Borough	X	X	X	X	X	X				
West Hemlock Township	X	X	X	X	X	X				
Montour County	X	X	X	X	X	X				

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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## **7. Plan Maintenance**

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

Monitoring, evaluating, and updating this plan, is critical to maintaining its value and success in Montour 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 Montour County HMP Local Planning Team decided to alter the current maintenance procedures. The 2021 HMP update establishes a review of the plan within thirty days of a disaster event in addition to continuing with an annual plan evaluation. This HMP update also defines the municipalities' role in updating and evaluating the plan. Finally, the 2021 HMP update encourages continued public involvement and how this plan may be integrated into other planning mechanisms in the county.

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

Hazard mitigation planning in Montour County is a responsibility of all levels of government (i.e., county and local), as well as the citizens of the county. The Montour County Local Planning Team will be responsible for maintaining this multi-jurisdictional HMP. The local planning team will meet annually and following each emergency declaration to review the plan. Every municipality that has adopted this plan will also be afforded the opportunity to provide updated information or information specific to hazards encountered during an emergency or disaster. Each review process will ensure that the hazard vulnerability data and risk analysis reflect current conditions of the county, that the capabilities assessment accurately reflects local circumstances and that the hazard mitigation strategies are updated based on the county's damage assessment reports and local mitigation project priorities. The HMP must be updated on a five-year cycle. An updated HMP must be completed and approved by the end of the five-year period. The monitoring, evaluating, and updating of the plan every five years will rely heavily on the outcomes of the annual HMP planning team meetings.

The Montour County Local Planning Team will complete a hazard mitigation progress report to evaluate the status and accuracy of the multi-jurisdictional HMP and record the local planning team's review process. The annual plan review will be distributed to appropriate representatives at both PEMA and FEMA. The following items will be completed during the annual review and reporting process:

- Review the risk assessment section and identify occurrences of hazards within the last year. Identify date, time, damage, fatalities and other specific information of the events. Also identify any new hazards that have occurred or increased risk within the county.
- Complete a review and update of capability assessment section. Identify any capability weaknesses.
- Complete a review of the mitigation strategy section. Review the goals and objectives identified in the 2021 HMP and determine if any updates are needed. Provide all mitigation actions and opportunities to the county and municipalities that are applicable. Have all entities complete an action review matrix and document all results in the report. Also, add any new actions that are identified. Complete a review of each mitigation opportunity and identify the status of each opportunity on the opportunity review spreadsheet. All information will be included in the annual review report.

The Montour County Emergency Management Agency will maintain a copy of these records and place them in Appendix I of this plan. Montour County will continue to work with all municipalities regarding



## **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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hazard mitigation projects, especially those municipalities that did not submit projects for inclusion in this plan.

### **7.3. Continued Public Involvement**

The Montour County Emergency Management Agency will ensure that the 2021 Montour County Hazard Mitigation Plan is posted and maintained on the Montour County website and will continue to encourage public review and comment on the plan. The Montour County website that the plan will be located at is as follows: <http://montourema.org/hazard-mitigation-plan/>

The public will have access to the 2021 HMP through their local municipal office, the Montour County Planning Commission, or the Montour County Emergency Management Agency. Information on upcoming events related to the HMP or solicitation for comments will be announced via newsletters, newspapers, mailings, and the county website.

The citizens of Montour County are encouraged to submit their comments to elected officials and/or members of the Montour County HMP Local Planning Team. To promote public participation, the Montour County Local Planning Team will post a public comment form as well as the Hazard Mitigation Project Opportunity Form on the county's website. These forms will offer the public various opportunities to supply their comments and observations. All comments received will be maintained and considered by the Montour County Hazard Mitigation Planning Team.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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## **8. Plan Adoption**

### **8.1. Resolutions**

In accordance with federal and state requirements, the governing bodies of each participating jurisdiction must review and adopt by resolution, the 2021 Montour County Hazard Mitigation Plan. Copies of the adopting resolutions are included in this plan in Appendix J. FEMA Region III in Philadelphia is the final approval authority for the Hazard Mitigation Plan. PEMA also reviews the plan before submission to FEMA.

# **Montour County, Pennsylvania 2021 Hazard Mitigation Plan**

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## **9. Appendices**

<b>APPENDIX A:</b>	<b>References</b>
<b>APPENDIX B:</b>	<b>FEMA Local Mitigation Review Tool</b>
<b>APPENDIX C:</b>	<b>Meetings and Support Documents</b>
<b>APPENDIX D:</b>	<b>Municipal Flood Maps</b>
<b>APPENDIX E:</b>	<b>Critical and Special Needs Facilities</b>
<b>APPENDIX F:</b>	<b>2020 HAZUS Reports</b>
<b>APPENDIX G:</b>	<b>2021 Mitigation Project Opportunities</b>
<b>APPENDIX H:</b>	<b>2021 Mitigation Action Evaluation &amp; Prioritization</b>
<b>APPENDIX I:</b>	<b>Annual Review Documentation</b>
<b>APPENDIX J:</b>	<b>Montour County &amp; Municipal Adoption Resolutions</b>